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February 13, 2024

***Via Registered Mail – Return Receipt Requested***

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**RE: 90-Day Notice of Intent to Sue Sampson County Disposal, LLC; Waste Industries, USA, LLC; Waste Industries, LLC; Black Creek Renewable Energy, LLC; and GFL Environmental, Inc. for Violations of the Resource Conservation and Recovery Act**

Mr. Smith, Mr. Wuester, and Mr. Pfleger:

This letter is to notify Sampson County Disposal, LLC and its parent companies Waste Industries, USA, LLC; Waste Industries, LLC; and GFL Environmental, Inc. (collectively, "GFL"), as well as the Environmental Protection Agency Administrator and Region IV

Administrator, the North Carolina Department of Environmental Quality Secretary and Division of Waste Management Director, and the Attorney General of the United States of America, that Environmental Justice Community Action Network intends to file suit against GFL for violations of the Resource Conservation and Recovery Act, specifically GFL's handling, storage, treatment, or disposal of solid waste at the Sampson County Landfill ("the Landfill") in Sampson County, North Carolina, which may present an imminent and substantial endangerment to health or the environment. Unless the harms described below are fully redressed, Environmental Justice Community Action Network will file a lawsuit against GFL under the citizen suit provision of the Resource Conservation and Recovery Act ("RCRA"), 42 U.S.C. § 6972(a)(1)(B), after the 90-day notice period has expired. Environmental Justice Community Action Network may seek injunctive relief, fees and costs of litigation, and such other relief as the court deems appropriate to address and correct the harms described below.

## I. Summary of Violations & Civil Enforcement Demand

GFL is violating 42 U.S.C. § 6972(a)(1)(B) of RCRA because it is a person who has contributed or is contributing to the past and present handling, storage, treatment or disposal of solid waste that is polluting air, surface water, groundwater, and private drinking water wells with toxic per- and polyfluoroalkyl substances ("PFAS") in a manner that may present an imminent and substantial endangerment to human health and the environment.

GFL must take immediate steps to cease this endangerment, including, but not limited to:

- Ceasing the handling, storage, treatment, and/or disposal of PFAS-contaminated solid waste at the Landfill in a manner which poses an imminent and substantial endangerment to health or the environment.
- Fully investigating, ceasing, and remediating PFAS contamination of surface waters, including Bearskin Swamp, from the Landfill caused by GFL's past and present solid waste handling, treatment, storage, and disposal operations, including but not limited to GFL's leachate management and landfill gas management systems.
- Fully investigating, ceasing, and remediating PFAS-contaminated groundwater beyond the Landfill's compliance boundary caused or contributed to by GFL's past and present solid waste handling, treatment, storage, and disposal operations, including but not limited to leachate management and landfill gas management.
- Fully investigating, ceasing, and remediating any and all PFAS contamination of residential drinking water wells in Sampson County, North Carolina, caused by GFL's past and present solid waste handling, treatment, storage, and disposal operations at the Landfill, including but not limited to GFL's leachate management and landfill gas management systems.
- Fully investigating and remediating any and all contamination caused by PFAS emissions from the Landfill's leachate evaporator and landfill-gas-to-energy facility and ensuring that any and all of GFL's leachate management practices and landfill-gas-to-energy projects do not release PFAS to the environment.

## II. Persons Responsible for the Endangerment

The Landfill is owned and operated by GFL Environmental, Inc. ("GFL Environmental"), which wholly owns Sampson County Disposal, LLC ("Sampson County Disposal").[1] GFL Environmental acquired Sampson County Disposal's parent company, Waste Industries (including Waste Industries, USA, LLC, and Waste Industries, LLC), thereby gaining ownership of the Landfill, in 2018.[2] GFL Environmental also owns Black Creek Renewables, LLC ("Black Creek Renewables"), which operated a landfill gas facility on site between 2011 and 2021. Because GFL Environmental is the parent company for Sampson County Disposal, Waste Industries, and Black Creek Renewables, LLC, this notice letter collectively refers to these entities as "GFL." Under RCRA, GFL Environmental, and its subsidiaries, are the "person(s)" responsible for the endangerment described in this letter.

The Registered Agent on file for Sampson County Disposal and Waste Industries with the North Carolina Secretary of State is CT Corporation System. The Registered Agent on file for GFL Environmental with the Securities and Exchange Commission is Corporations Creations Network, Inc.

## III. Persons Giving Notice

Pursuant to 40 C.F.R. § 254.3(a), the person giving notice of intent to sue is:

Environmental Justice Community Action Network
P.O. Box 616
Clinton, NC 28329
(910) 299-9118

Environmental Justice Community Action Network ("EJCAN") is a North Carolina nonprofit organization working to ensure that Sampson County communities have clean and safe air, water, and soil. EJCAN has approximately 200 members, many of whom live, work, or recreate near the Landfill. EJCAN and these members are imminently and substantially endangered by GFL's actions.

## IV. Identification of Legal Counsel

Pursuant to 40 C.F.R. § 254.3(c), the following legal counsel, who will be representing EJCAN, are identified:

Maia Hutt
Irena Como
Zoe Gabrielson

[1] GFL Env't, Inc., *Sampson County Community Info*, https://perma.cc/8BQP-N6U7 (last visited Dec. 15, 2023).
[2] *Id.*

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## V. Background

### A. The Sampson County Landfill

The Sampson County Landfill is located in Roseboro, North Carolina, in the rural, predominantly Black community of Snow Hill.[3] The Landfill began operating in Snow Hill in 1973 and has since undergone changes in ownership and expanded significantly, despite widespread opposition from the community. Waste Industries purchased and expanded the Landfill in the early 2000s; GFL Environmental in turn purchased Waste Industries in 2018[4] and has also embarked on an aggressive expansion plan.[5] The Snow Hill community's concerns about the Landfill's impact on air, water, and soil quality as well as their health, quality of life, livelihoods, and property values—first expressed nearly fifty years ago—persist to this day.[6]

What began as a 15-acre landfill currently spans approximately 1,000 acres and is the largest in North Carolina.[7] A regional Landfill, it accepts up to 1,825,000 tons of waste annually from dozens of counties across the state.[8] The Landfill consists of multiple active landfills on the same site: a lined Subtitle D Municipal Solid Waste landfill ("MSW"), in operation since 2000, and an unlined Construction & Demolition landfill ("C&D"), in operation since 1996.[9] GFL also

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[3] Joey Horan, *'We All Feel Targeted': Rural N.C. Community Pushes Back Against Landfill, Hog Farms*, Southerly (Feb. 3, 2021), https://perma.cc/7W3H-FMLM.
[4] Robert Johnston, *Leachate Evaporation at a Large Landfill in the Southeast: Challenges and Solutions*, CB&I (2016), https://perma.cc/579L-UB2Y; Eddie Fitzgerald, *Trucking the Trash*, The Wilson Times (Aug. 2, 2007), https://perma.cc/F8Q4-AKST; Laurel Mountain, *Individual Landfill Acquisitions or Developments*, https://perma.cc/T4EJ-58C3 (last visited Feb. 7, 2024); *GFL Environmental, Waste Industries Announce Merger,* Waste 360 (Oct. 10, 2018), https://perma.cc/Z978-QXQG; *Subsidiaries of GFL Environmental Holdings Inc.*, SEC, https://perma.cc/XMR8-QLND (last visited Feb. 7, 2024).
[5] *See, e.g.*, Letter from John R. Rearrington, P.E., Smith Gardner Inc. to Sherri Stanely, N.C. Dep't of Env't Qual. Div. of Waste Mgmt., (June 8, 2022) (requesting determination of applicability of proposed 315-acre expansion), https://perma.cc/DX46-88EP.
[6] Cameron Oglesby, *Waste, Race and Place Collide at North Carolina's Largest Landfill*, The Assembly (Jan. 19, 2024), https://perma.cc/G9HV-NUTL.
[7] Chris Berendt, *Sampson County Landfill Issues Addressed*, The Sampson Indep. (Feb. 19, 2016), https://perma.cc/4KUE-W4U4; *see also* Div. of Waste Mgmt. *Solid Waste Management Facility Permit No. 8202-MSWLF-2000* (Nov. 15, 2022), https://perma.cc/843V-7X2V.
[8] Div. of Waste Mgmt., *Solid Waste Management Facility Permit No. 8202-MSWLF-2000* (Nov. 15, 2022), https://perma.cc/843V-7X2V.
[9] *First Semi-Annual 2022 Sampling Event: Sampson County Disposal, LLC Active MSW and C&D Landfills, Permit No. 82-02 Sampson County, North Carolina* 1, Golder Assocs. N.C., Inc. (July 19, 2022), https://perma.cc/F66G-A9LS.

operates two landfills which no longer accept waste—a closed, lined MSW landfill and one closed, unlined C&D landfill in the same location as shown below.[10]

**Figure 1: Sampson County Landfill Map**


[10] Aleah Walsh & Courtney G. Woods, *Presence of Perfluoroalkyl Substances in Landfill Adjacent Surface Waters in North Carolina*, 20 Int'l J. Env't Rsch. & Pub. Health (Aug. 2023), https://perma.cc/LA3X-YYRP.

**Figure 2: Aerial Photograph of Sampson County Landfill (Copyright Cornell Watson)**

The Landfill accepts a variety of waste types, including commercial and municipal refuse, ashes, sludges, animal manure, residue from incineration, food processing wastes, dredging wastes, tires, asbestos,[11] and creosote/treated timbers.[12] Furthermore, the Landfill accepts industrial waste, such as PFAS-contaminated sludge from the Chemours chemical manufacturing facility in Fayetteville,[13] waste from federal military facilities like Camp Lejeune,[14] sludge from the polyester and recycled plastics manufacturing facility Alpek Polyester (formerly, DAK Americas),[15] remediation waste from the Navassa Superfund Site,[16] and tri-fuel ash—made up of combusted wood, tires, and coal—from power plants.[17]

[11] Sampson Cnty., *Solid Waste & Recycling,* https://perma.cc/W7SU-ZVMW (last visited Feb. 7, 2024).
[12] Sampson Cnty. Disposal, *Disposal Gate Rate (Per Ton)* (2023), https://perma.cc/4GZZ-BWHH.
[13] Steve DeVane, *Sludge from Chemours Plant Dumped in Sampson County Landfill*, The Fayetteville Observer (Oct. 20, 2018), https://perma.cc/225N-MFXV.
[14] URS Grp., Inc., *Solid Waste Management Plan Update* 5-20 (July 2012), https://perma.cc/6T2F-3LX9.
[15] DAK Ams., *Permit Renewal and Modification NPDES Permit No.: NC0003719*, 14 (May 3, 2022), https://perma.cc/3YXM-THN2.
[16] Lisa Sorg, *EPA Asks for Feedback on Shipping Waste to Sampson County, Then Admits It's Been Doing Just That – Since 2017*, NC Newsline (Mar. 20, 2023), https://perma.cc/8BAW-BU3T.
[17] Berendt, *supra* note 7.

Since GFL acquired the Landfill in 2018, the accepted waste volume has surged: the Landfill is projected to accumulate 41,600,000 tons of waste by 2043.[18] This staggering expansion is by design; the Landfill's manager has stated that GFL intentionally imports as much waste as possible to "maximize [its] asset."[19] Thousands of tons of waste arrive from across the state in hundreds of 20–22-ton trucks on a daily basis.

In addition to the management of active and closed cells for placement of solid waste, GFL also operates a leachate management system and landfill gas management system. The leachate management system captures and recirculates leachate—the liquid produced when solid waste mixes with rainwater and other liquids—throughout the Landfill. For many years, GFL's leachate management system—which includes a collection system with dozens of sumps which collect and move leachate caught by the Landfill's liners to secondary containment areas—relied in part on a landfill gas-fired leachate evaporator.[20] The evaporator combusted landfill gas to evaporate a significant portion of the Landfill's liquid leachate. For a decade, this process released contaminants present in the Landfill's leachate into the air.[21] The Sampson County Leachate Management Facility evaporated an average of 34,000 gallons/day of landfill leachate between 2012 and 2022.[22] In 2021, the last full year that the leachate evaporator operated, it processed over six million gallons of leachate and reported emitting various toxic air pollutants present in landfill leachate, including ammonia and arsenic.[23] The Landfill did not disclose emitting PFAS during the leachate evaporation permitting process, but as demonstrated by the scientific literature, landfills that rely on "evaporation likely contribute[] significant quantities of PFAS to the atmosphere and surrounding environment."[24] In 2022, GFL requested a rescission of the Landfill's leachate management facility's air permit because "the evaporator is no longer operational and will be demolished in the near future."[25] Following the subsequent closure of the evaporator, GFL increased the amount of leachate it trucked offsite to the Lumberton and South Harnett County wastewater treatment plants.[26] In May 2021, GFL submitted an application to the state Department of Environmental Quality ("DEQ") for a National Pollutant Discharge

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[18] *Sampson County Disposal, LLC Landfill Gas Management Plan* 33, G.N. Richardson & Assocs. (Dec. 2004), https://perma.cc/GT3M-9ZVE.
[19] Berendt, supra note 7.
[20] Mitch Revels, *Sampson County Leachate Management Facility Inspection Report*, Div. of Air Quality (May 9, 2012), https://perma.cc/S8PA-AMNN; *see* Edward F. Mussler III, *Response to Work Plan for PFAS Sampling and Analysis, Permit 8202-MSWLF-2000* 2, N.C. Dep't of Env't Quality (June 7, 2023), https://perma.cc/GG6B-K2LH.
[21] *See, e.g.*, Jeffrey D. Cole, *Sampson County Leachate Management Facility Inspection Report*, Div. of Air Quality (June 18, 2019), https://perma.cc/G83B-F5VB (indicating 13.25 tons of hazardous air pollutants were emitted by the leachate management facility in 2015).
[22] Mitch Revels, *Sampson County Leachate Management Facility Inspection Report*, Div. of Air Quality (Dec. 6, 2012), https://perma.cc/RWR7-UFU8.
[23] Charles A. Pare, *Sampson County Leachate Management Facility – 2021 Report*, APTIM (Jan. 25, 2022), https://perma.cc/W486-SMJC (describing quantity of leachate); Heather Carter, *Air Permit No. 10212R02 Sampson County Leachate Management Facility*, Div. of Air Quality (June 29, 2018), https://perma.cc/MAE2-KCRG (describing toxic air pollutant emissions limits for leachate evaporator).
[24] Thabet Tolaymat et al., *A Critical Review of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) Landfill Disposal in the United States*, 905 Sci. of the Total Env't 167185 (Sept. 19, 2023), https://perma.cc/9CNQ-9ETP.
[25] David Way, *Operating Permit Recission – Sampson County Leachate Management Facility*, APTIM (July 18, 2022), https://perma.cc/HGG9-XGUR.
[26] Smith + Gardner, *Air Emissions Inventory – Reporting Year 2022, Sampson County Disposal, LLC MSW Landfill*, (June 2023), https://perma.cc/KPC8-7E6G.

Elimination System ("NPDES") permit that would authorize GFL to construct an on-site leachate treatment facility which would discharge into nearby Little Coharie Creek and recirculate a concentrated byproduct containing PFAS back into the landfill.[27] In that application, GFL noted that "it is not clear how environmentally sound continued evaporation is as a treatment method for leachate."[28]

Landfills produce significant air emissions during the decomposition of organic matter, including methane, a potent greenhouse gas that significantly contributes to climate change by trapping heat in the atmosphere. GFL captures a portion of these emissions through a landfill gas management system. The Landfill's first landfill gas management system, which was primarily made up of flares—flames that partially combust the gases—has been operating since at least 2006.[29] From 2011 to 2021, Black Creek Renewables—a GFL subsidiary—operated a landfill-gas-to-energy facility on GFL's property.[30] GFL did not disclose emitting PFAS during the landfill gas permitting process, but research demonstrates that flaring landfill gas emits PFAS into the air.[31] Landfill flares target the destruction of nonmethane organic compounds, not PFAS, so they are operated at too low a temperature to destroy PFAS in landfill leachate and landfill gas.[32] In February 2023, Black Creek Renewables reported that it had ceased operation of the landfill-gas-to-energy facility and requested that its air permit be rescinded.[33] In October 2023, the North Carolina DEQ permitted a new landfill-gas-to-energy facility to be constructed and operated by Sapphire RNG, LLC, on GFL's property.[34]

### B. The Cape Fear Watershed and Bearskin Swamp

Bearskin Swamp, also known as Turlington Millpond, is a Class C stream with Swamp Waters designation.[35] A Class C classification indicates that the stream must be kept safe for fishing, boating, swimming, and "protected for secondary recreation, fishing, wildlife, fish consumption, aquatic life … agriculture, and other uses."[36] Swamp waters are "topographically

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[27] Bryan Wuester, *Sampson County Disposal NPDES Permit Application*, GFL (May 21, 2021), https://perma.cc/QC6T-KPNH.
[28] *Id.* at 50.
[29] Gregg O'Neal, *Sampson County Disposal, LLC Source Testing Report*, Div. of Air Quality (Mar. 12, 2008), https://perma.cc/KM77-4MPS.
[30] Donald R. van der Vaart, *Air Quality Permit No. 10148T00*, N.C. Dep't of Env't & Nat. Res. (Apr. 25, 2011), https://perma.cc/J7AQ-G8PH; Joseph Santangelo, *Air Emission Inventory – Reporting Year 2021, Black Creek Renewable Energy, LLC*, GFL (June 24, 2022), https://perma.cc/SJY7-BUFB.
[31] Tolaymat et al., *supra* note 25.
[32] *Id.*
[33] Heather Carter, *Recission Request – Cessation of Operations, Black Creek Renewable Energy, LLC*, Div. of Air Quality (Feb. 24, 2023), https://perma.cc/48WY-36PY.
[34] *See generally* Div. of Air Quality, *Air Permit No. 10772R00*, N.C. Dep't of Env't Quality (Oct. 4, 2023), https://perma.cc/RS62-9YH5.
[35] Div. of Water Res., *Alphabetic List of NC Waterbodies: Cape Fear River Basin*, N.C. Dep't of Env't Quality (Mar. 3, 2016), https://perma.cc/97A9-5GLD.
[36] Div. of Water Quality, *A Guide to Surface Freshwater Classifications in North Carolina*, N.C. Dep't of Env't & Nat. Res. (2009), https://perma.cc/ZVE9-S975.

located so as to generally have low velocities and other natural characteristics which are different from adjacent streams draining land with steeper topography."[37]

Bearskin Swamp flows through the Eastern side of the Landfill and drains to the Southwest into the Little Coharie Creek, which flows into the Great Coharie Creek. Another Class C stream, Williams Pond, originates at the Landfill and flows Southeast, where it drains into the Little Coharie Creek. All these surface waters are part of the Cape Fear River Basin, North Carolina's largest river basin.

### C. The Snow Hill and Roseboro Communities

The Landfill is located in rural Roseboro, North Carolina, in the unincorporated, predominantly Black community of Snow Hill. Approximately 590 people live within one mile of the Landfill,[38] and some households live as close as 200 feet away from its edge.[39]

Once a thriving community that was a "centerpiece of Black excellence in Sampson County," with its own barber shop, Boy Scout troop and community center, and a middle-class population comprised of teachers, lawyers, and doctors, Snow Hill has been steadily declining since the arrival of the Landfill in 1973, mirroring the environmental justice challenges faced by many rural Black communities.[40] Before the Landfill, communal life in Snow Hill was tied to the land. People who grew up there recall outdoor community-wide barbeques, playing outdoor sports with other children, and foraging for fruits and berries in the woods.[35] Today, Snow Hill and its residents are plagued by persistent malodor, contaminated drinking water wells, near-constant truck traffic, and trash blowing onto their property.[36] Residents say that a "place once buzzing with life now feels empty. . . [;] the impact of pollution and general lack of opportunity have driven people away."[37] Described as a "clammy miasma,"[38] and a "greasy, oily" smell "like decaying flesh,"[39] the odor from the Landfill wakes people up at night, stops adults from gardening and children from playing outside,[40] and ruins social events like cookouts and church gatherings.[41] Flocks of turkey vultures drawn by the Landfill damage people's homes.[42] Housing values have not appreciated in the community. Indeed, when adjusted for inflation, the median house value for owner-occupied units has fallen from $112,000 in 1990 to $110,000 in 2020 in the neighborhood surrounding the Landfill.[43]

Like many rural communities in Eastern North Carolina, households in Roseboro and Snow Hill often rely on private drinking water wells for their everyday water needs. Millions of North Carolinians rely on private wells for drinking water—and this reliance is higher in rural, Black neighborhoods systematically excluded from public water service.[41] Moreover, regular water testing of private wells and filtration systems to ensure their safety is prohibitively

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[37] *Id.*
[38] U.S. Census Bureau, *Census 2020 Redistricting Data (P.L. 94-171),* at Tables P1 & P2, https://perma.cc/C82H-R8W9 (Nov. 29, 2023).
[39] Walsh & Woods, *supra* note 10, at 2.
[40] *See, e.g.*, Melba Newsome, *Rural NC Black Communities Paying the Price of Environmental Racism*, The Charlotte Post (Sept. 30, 2021), https://perma.cc/YQV2-29F9; Cameron Oglesby, *Waste, Race and Place Collide at North Carolina's Largest Landfill*, The Assembly (Jan. 19, 2024), https://perma.cc/G9HV-NUTL.
[41] *See generally* Michele Okoh, *Forgotten Waters*, 11 Geo. L. J. 723 (2023), https://perma.cc/L8BP-YA84.

expensive and thus out of reach for low-wealth households.[42] In North Carolina, the racial composition of a community has been found to be the strongest determinant of access to clean water. As one study explained, "[t]he disparity of water access . . . is not random or accidental, but often a consequence of housing conditions, racialized development decision, and systemic social inequality."[43]

This disparity is compounded by the fact that, across the state, solid waste facilities are disproportionately located in communities of color and low wealth communities, which means the communities relying on private wells that are vulnerable to contamination are the same ones where contamination is likely to occur.[44] In Sampson County, 25 percent of the population identifies as Black, 20.7 percent as Latino, and 2 percent as American Indian, but the proportion of Black, American Indian, and Hispanic or Latino North Carolinians living near the Landfill is much greater, a common pattern near municipal waste sites.[45] 47 percent of people living within one mile of the Landfill identify as Black, 21.3 percent identify as Hispanic or Latino, and 2.7 percent identify as American Indian.[46] 71 percent of people living within a mile of the Landfill identify as people of color, compared to 50 percent in Sampson County, and 39.5 percent in North Carolina.[47]

In Snow Hill, only a few homes have access to public water. Roseboro's public water supply, which the municipality sells to other towns in Sampson County, comes from groundwater.[48] Roseboro's public water supply has not been publicly tested for PFAS since 2019.[49]

### D. PFAS Spread, Persist, and Endanger Human Health and the Environment

PFAS encompass a group of thousands of human-made chemicals that have been developed, manufactured, sold, and used broadly by industry since the 1940s.[50] PFAS do not occur naturally in the environment; they are synthetic chemicals, used in various industrial processes due to their ability to repel water and other substances, stabilize heat and chemicals,

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[42] *See generally* Antonia Sohns, *Differential Exposure to Drinking Water Contaminants in North Carolina: Evidence from Structural Topic Modeling and Water Quality Data*, 336 J. Env't Mgmt. 117600 (June 15, 2023), https://perma.cc/6NXR-QTD7.
[43] *See generally id*.
[44] Jennifer M. Norton et al., *Race, Wealth, and Solid Waste Facilities in North Carolina*, 115 Env't Health Persps. 1344-50 (Sept. 9, 2007) https://perma.cc/2KQ6-EF8A ("In North Carolina solid waste facilities are disproportionately located in communities of color and low wealth [communities].").
[45] *Id.*
[46] U.S. Census Bureau, *Census 2020 Redistricting Data (P.L. 94-171),* at Tables P1 & P2, https://perma.cc/C82H-R8W9 (Nov. 29, 2023)
[47] U.S. Census Bureau, *Decennial Census Redistricting Data (P.L. 94-171) N.C. Summary File*, at Tables P1 & P2 (Nov. 29, 2023), https://perma.cc/R9QT-AULC.
[48] Sampson Cnty., *Water Operations*, https://perma.cc/6WEW-LPUB (last visited Feb. 7, 2024).
[49] North Carolina PFAS Testing Network, *NC PFAS Quantitative Screening Results for Raw Drinking Water* (Aug. 28, 2019), https://perma.cc/5CAL-Z665.
[50] EPA, *Our Current Understanding of the Human Health and Environmental Risks of PFAS* (June 7, 2023), https://perma.cc/9ZXJ-Z5JC.

and reduce friction.[51] But these toxic chemicals are also highly persistent, and although they may transform into other PFAS, they do not break down into benign substances once released into the environment, or upon entering our bodies.[52] The toxic and persistent nature of PFAS, often referred to as "forever chemicals", poses a significant threat to both human and environmental health, even at extremely low concentrations.

1. PFAS Spread Rapidly Through Air and Water

Once PFAS are in the environment, they are highly mobile and spread quickly. Southeastern North Carolina has been the epicenter for a recent PFAS public health emergency caused by PFAS released from Chemours' Fayetteville Works Facility ("Chemours"). PFAS from Chemours has contaminated nearly 9,000 private drinking water wells across nine counties[53] and municipal drinking water intakes nearly 100 miles downstream of the facility in the Cape Fear River[54]—polluting the drinking water for more than 500,000 people and counting.[55] PFAS also travel through the air and deposit through precipitation, contaminating soil, crops, groundwater, and drinking water supplies.[56] A study, published in 2022, found that 13 PFAS compounds have elevated concentrations in ambient fine particulate matter—tiny air particles with a diameter of 2.5 micrometers or smaller—within two kilometers of Chemours.[57] A more recent independent analysis conducted by The Guardian reported that PFAS concentrations remain high in the air downwind of Chemours even after the state required the company to install control technology.[58] Studies have confirmed that landfills are also a significant source of PFAS air emissions.[59] Just as the PFAS from Chemours have tainted

[51] Interstate Tech. Regul. Council, *History and Use of Per- and Polyfluoroalkyl Substances (PFAS) Found in the Environment*, (Aug. 2020), https://perma.cc/94SL-55LD.
[52] Ian T. Cousins et al., *The High Persistence of PFAS is Sufficient for Their Management as a Chemical Class*, 12 Env't Sci. Process Impacts 2307 (2020), https://perma.cc/HGH3-STFG; Carol F. Kwiatkowski et al., *Scientific Basis for Managing PFAS as a Chemical Class*, 7 Env't Sci. Process Impacts 534 (2020), https://perma.cc/WQ4L-YC9X.
[53] *See* Chemours, *Consent Order Progress Report for Third Quarter 2023* (Oct. 23, 2023), https://perma.cc/E6CH-NSNE.
[54] Vaughn Hagerty, *Toxin Taints CFPUA Drinking Water*, Star News Online (June 8, 2017), https://perma.cc/W892-7MZ9.
[55] Steve DeVane, *GenX Not the Only Possible Toxin in Cape Fear River*, Fayetteville Observer (July 15, 2017), https://perma.cc/U979-AZVA; *see also 2022 Annual Report* 9, Cape Fear Pub. Util. Auth. (2022), https://perma.cc/KY3P-59F2 (explaining the utility serves 200,000 people); Brunswick Cnty., N.C., *Frequently Asked Questions: Water Treatment Upgrades and Rates*, https://perma.cc/U6GQ-2KJN (July 2022) (explaining the utility serves over 300,000 people).
[56] *See, e.g.*, Jason E. Galloway et al., *Evidence of Air Dispersion: HFPO—DA and PFOA in Ohio and West Virginia Surface Water and Soil Near a Fluoropolymer Production Facility*, 54 Env't Sci. Tech. 7175–84 (2020) https://perma.cc/37QW-4XQU; Daniel Ross, *Rainwater in Parts of US Contains High Levels of PFAS Chemical, Says Study*, The Guardian (Dec. 17, 2019), https://perma.cc/7GXT-R5QM.
[57] Jiaqi Zhou et al., *Legacy and Emerging Airborne Per- and Polyfluoroalkyl Substances (PFAS) Collected on PM 2.5 Filters in Close Proximity to a Fluoropolymer Manufacturing Facility*, 12 Env't Sci.: Processes & Impacts 2722–83 (Nov. 9, 2022), https://perma.cc/B3VV-QKVB.
[58] Tom Perkins, *A North Carolina PFAS Factory Claims its Emissions Fell by 99.99%. A Guardian Test Reveals Otherwise*, The Guardian (Jan. 28, 2024), https://perma.cc/JQ5V-FMZA.
[59] Lutz Ahrens et al., *Wastewater Treatment Plant and Landfill s as Sources of Polyfluoroalkyl Compounds to the Atmosphere*, 45 Env't Sci. Tech. (Apr. 5, 2011), https://perma.cc/2XER-6AEZ.

drinking water, groundwater, and air across Southeastern North Carolina, PFAS from the Landfill are polluting air and water and endangering human health in Snow Hill and Roseboro.

2. PFAS Endanger Human Health Even at Low Doses

PFAS pose a significant threat to human health and the environment, even at extremely low concentrations measured in parts per *trillion* ("ppt"). In June 2022, the federal Environmental Protection Agency ("EPA") issued updated interim drinking water health advisories for perfluorooctanoic acid ("PFOA") and perfluorooctane sulfonate ("PFOS"), two particularly well-studied PFAS, of 0.004 ppt and 0.02 ppt, respectively.[60] EPA's advisories represent the level at which and above negative health effects are expected to occur over a lifetime of exposure,[61] and make clear that virtually no level of PFOA and PFOS in drinking water is safe. EPA has also released a final health advisory for another type of PFAS—hexafluoropropylene oxide dimer acid and its ammonium salt (known as "GenX chemicals")—which are manufactured by Chemours.[62]

In March 2023, EPA issued draft national drinking water standards for six additional PFAS compounds. These standards are expected to be finalized in Spring 2024.[63] Each of the six PFAS compounds that will be subject to the drinking water standards have been detected at the Landfill at dangerously high levels. The proposed drinking water standards set a public health goal (also known as a maximum contaminant level goal or MCLG) of 0 ppt for both PFOA and PFOS—again recognizing that when health and safety are the only factors considered, "there is no dose below which either chemical is considered safe."[64] EPA proposes to set drinking water standards ("MCLs") for PFOA and PFOS at 4 ppt, and proposes to regulate perfluorononanoic acid ("PFNA"), perfluorobutanesulfonic sulfonic acid ("PFBS"), perfluorohexane sulfonic acid ("PFHxS"), and GenX chemicals as a mixture, employing a hazard index formula.[65]

EPA has established health advisories and maximum contaminant level goals for these PFAS compounds at such low levels due to the significant health risks associated with exposure to even minimal concentrations.[66] PFOA and PFOS, which have both been detected in high concentrations at the Landfill, and are both known to cause developmental effects in fetuses and infants, kidney and testicular cancer, liver malfunction, hypothyroidism, high cholesterol, ulcerative colitis, lower birth weight and size in infants, obesity, decreased immune response to

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[60] *Lifetime Drinking Water Health Advisories for Four Perfluoroalkyl Substances*, 87 Fed. Reg. 36,848, 36,849 (June 21, 2022).
[61] *See id.*
[62] *Id.*
[63] *See* EPA, *Biden-Harris Administration Proposes First-Ever National Standard to Protect Communities From PFAS in Drinking Water* (Mar. 14, 2023), https://perma.cc/Y8LS-TT4T; *PFAS National Primary Drinking Water Regulation Rulemaking*, 88 Fed. Reg. 18,638, 18,641 (Mar. 29, 2023).
[64] 88 Fed. Reg. at 18,639; *see also* EPA, *Fact Sheet: EPA's Proposal to Limit PFAS in Drinking Water* 1-2 (Mar. 2023), https://perma.cc/3S7X-HXY6; EPA, *Proposed PFAS National Primary Drinking Water Regulation* 13 (Mar. 29, 2023), https://perma.cc/RP2N-9P9R.
[65] 88 Fed. Reg. at 18,639–40.
[66] *Id.*; *see also* Nat. Academies of Scis., Eng'ng, & Med., *Guidance on PFAS Exposure, Testing, and Clinical Follow-Up* (2022) https://perma.cc/8LYF-HVZJ.

vaccines, reduced hormone levels, and delayed puberty.[67] Recognizing these effects, international scientists and experts classify PFOA as carcinogenic and PFOS as possibly carcinogenic to humans.[68] Epidemiological studies show that other PFAS similarly endanger human health at low concentrations including PFHxS,[69] PFBS,[70] Perfluorobutanoic Acid ("PFBA"),[71] perfluorohexanoic acid ("PFHxA"),[72] PFNA,[73] perfluorodecanoic acid ("PFDA"),[74] GenX chemicals,[75] perfluoroundecanoic acid ("PFUnA"),[76] perfluorododecanoic acid ("PFDoDA"),[77] perfluoropropanoic acid ("PFPrA")[78] and perfluoropentanoic acid ("PFPeA").[79] PFOA, PFOS, PFHxS, PFBS, PFBA, PFHxA, PFNA, PFDA, GenX chemicals, PFUnA, PFPrA and PFPeA have each been detected at the Landfill.[80]

A "growing body of evidence" demonstrates that short-chain PFAS found at the Landfill, like GenX chemicals and PFPrA, "are associated with similar adverse toxicological effects" as

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[67] Arlene Blum et al., *The Madrid Statement on Poly- and Perfluoroalkyl Substances (PFASs)*, 123 Env't. Health Persps. A107-111 (May 1, 2015), https://perma.cc/PP72-HZZW; *see also* 88 Fed. Reg. at 18,638–39; EPA, *Fact Sheet: EPA's Proposal to Limit PFAS in Drinking Water* 5 (Mar. 2023), https://perma.cc/3S7X-HXY6.

[68] Int'l Agency for Rsch. on Cancer, IARC Monographs *Evaluate the Carcinogenicity of Perfluorooctanoic Acid ("PFOA") and Perfluorooctanesulfonic Acid (PFOS)* (Dec. 1, 2023), https://perma.cc/4QAU-J6HJ.

[69] EPA*, IRIS Toxicological Review of Perfluorohexanesulfonic Acid (PFHxS, CASRN 335-46-4) and Related Salts* xiv (July 2023), https://perma.cc/JLR8-4MMM (explaining that exposure to PFHxS "is likely to cause thyroid and developmental immune effects in humans"); Min Joo Kim et al., *Association Between Perfluoroalkyl Substances Exposure and Thyroid Function in Adults: A Meta-Analysis*, 13 PLOS One (May 10, 2018), https://perma.cc/F8FY-WG2V (meta-analysis of human data concluding that exposure to PFHxS was associated with decreased levels of total thyroxine (T4), a thyroid hormone); Jessica Trowbridge et al., *Extending Nontargeted Discovery of Environmental Chemical Exposures During Pregnancy and Their Association With Pregnancy Complications-A Cross-Sectional Study*, 131 Env't Health Persps. 077003-1 (Jul. 2023), https://perma.cc/8LYF-HVZJ (explaining that PFHxS can travel through the umbilical cord during pregnancy); Mengment Xu et al., *Using Comprehensive Lipid Profiling to Study Effects of PFHxS During Different Stages of Early Zebrafish Development*, 808 Sci. of Total Env't 151739 (2022), https://perma.cc/2K8P-3B9R (concluding that PFHxS can disrupt the ability to break down lipids and can cause oxidative stress in fetal development).

[70] *See* EPA, *Drinking Water Health Advisory: Perfluorobutane Sulfonic Acid (CASRN 375-73-5) and Related Compound Potassium Perfluorobutane Sulfonate (CASRN 29420-49-3)* 14 (June 2022), https://perma.cc/6J9Q-M2QU (explaining that exposure to PFBS can lead to degraded liver and kidney functions, compromised immune systems, and fetal development issues); EPA, *Human Health Toxicity Values for Perfluorobutane Sulfonic Acid (CASRN 375-73-5) and Related Compound Potassium Perfluorobutane Sulfonate (CASRN 29420-49-3)* 35 (Apr. 2021), https://perma.cc/L68Z-Q39Y (explaining that literature confirms exposure to PFBS impacts to thyroid, reproductive systems, development, kidneys, liver, and lipid and lipoprotein homeostasis); Veronika Ehrlich et al., *Consideration of Pathways for Immunotoxicity of Per- and Polyfluoroalkyl Substances (PFAS)*, Env't Health 22:19, 5 (2023), https://perma.cc/QC27-CR8V (finding that PFBS is associated with decreased bone marrow cells, as well as decreased spleen and thymus function).

[71] EPA, *IRIS Toxicological Review of Perfluorobutanoic Acid (PFBA, CASRN 375-22-4) and Related Salts* xii, (Dec. 2022), https://perma.cc/UP5H-7VQJ (explaining "available evidence indicates that developmental, thyroid, and liver effects in humans are likely caused by PFBA exposure in utero or during adulthood").

[72] *See* EPA, *IRIS Toxicological Review of Perfluorohexanoic Acid [PFHxA, CASRN 307-24-4] and Related Salts* xiv (Apr. 2023), https://perma.cc/W33E-WUZL (concluding exposure to PFHxA "likely causes" liver, fetal development, and immune system complications, as well as decreased red blood cell counts).

[73] Cheryl E. Rockwell et al., *Acute Immunotoxic Effects of Perfluorononanoic Acid (PFNA) in C57BL/6 Mice*, J. of Clinical & Experimental Pharmacology S4-002 7 (2013), https://perma.cc/48DX-X3HC (concluding that PFNA can disrupt blood cell functions and alter immune system responses); Agency for Toxic Substances & Disease Registry, *Toxicological Profile for Perfluoroalkyls* 7-21 (May 2021), https://perma.cc/7MCX-HDMV (noting decreased pup survival in rodents as well as developmental delays, decreases in birth weight, decreased sperm motility, and altered

their longer-chain predecessors, "can be equally environmentally persistent and are even more mobile in the environment and more difficult to remove from drinking water."[81] Furthermore, bioaccumulation of these short-chain PFAS can occur in the living tissues of both humans and animals over time.[82] For instance, exposure to GenX chemicals can lead to cardiovascular toxicity,[83] maternal and fetal liver toxicity,[84] and other fetal gene expression changes that can result in increased heart rate and spinal deformations.[85] Although the impacts of inhaling PFAS are still understudied, at least one study has documented changes to immune cells in lungs

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immune responses); Francesca Coperchini et al., *Thyroid Disrupting Effects of Old and New Generation PFAS*, 11 Frontiers in Endocrinology 612320 (Jan. 2021), https://perma.cc/VSK9-KBHR; Ryan C. Lewis et al., *Serum Biomarkers of Exposure to Perfluoroalkyl Substance in Relation to Serum Testosterone and Measures of Thyroid Function Among Adults and Adolescents from NHANES 2011-2012*, 12 Int'l J. Env't Res. Pub. Health 6098–6114 (2015), https://perma.cc/U8MQ-LG4P (finding exposure to PFAS may disrupt thyroid hormones).

[74] EPA, *IRIS Toxicological Review of Perfluorodecanoic Acid (PFDA) and Related Salts (Public Comment and External Review Draft)* (Apr. 2023), https://perma.cc/2LPK-LLHH.

[75] *See* EPA, *Drinking Water Health Advisory: Hexafluoropropylene Oxide (HFPO) Dimer Acid (CASRN 13252-13-6) and HFPO Dimer Acid Ammonium Salt (CASRN 62037-80-3), Also Known as "GenX Chemicals"* 20 (June 2022), https://perma.cc/P3ZF-G23R (explaining that exposure to GenX increases harms to liver, reproductive, and developmental functions); *see also* Sylvia Gong et al., *Toxicity Assessment of Hexafluoropropylene Oxide-Dimer Acid on Morphology, Heart Physiology, and Gene Expression During Zebrafish (*Danio rerio*) Development*, 30 Env't Sci. & Pollution Rsch. 32,320, 32,327–31 (Dec. 3, 2022), https://perma.cc/58YX-9YCV (concluding that exposure to GenX led to spinal deformations, increased heart rate, and changes in gene expression); Zuying Feng et al., *Physiological and Transcriptomic Effects of Hexafluoropropylene Oxide Dimer Acid in* Caenorhabditis elegans *During Development*, 244 Ecotoxicology and Env't Safety 114,047 (Oct. 2022), https://perma.cc/9B79-DETV (GenX exposure can lead to altered gene expression during fetal development).

[76] *See* Agency for Toxic Substances & Disease Registry, *Toxicological Profile for Perfluoroalkyls* 139, 164, 172 (May 2021), https://perma.cc/7MCX-HDMV; Mika Takahashi et al., *Repeated Dose and Reproductive/Developmental Toxicity of Perfluoroundecanoic Acid in Rats*, 39 J. Toxicological Sci. 97–108 (2014), https://perma.cc/45AA-G8JV.

[77] Agency for Toxic Substances & Disease Registry, *Toxicological Profile for Perfluoroalkyls* 27, 118, 140, 166 (May 2021), https://perma.cc/7MCX-HDMV (PFDoDA is associated with harm to the liver, increased mortality of pregnant females).

[78] EPA, *ORD Human Health Toxicity Value for Perfluoropropanoic Acid (CASRN 422-64-0 | DTXSID8059970)* 16-18 (July 2023), https://perma.cc/AK64-BHYK (PFPrA is associated with liver toxicity).

[79] Ke Gao et al., *Prenatal Exposure to Per- and Polyfluoroalkyl Substances (PFASs) and Association Between the Placental Transfer Efficiencies and Dissociation Constant of Serum Proteins – PFAS Complexes*, 52 Env't Sci & Tech. 6529–38 (2019), https://perma.cc/FN8N-MJTJ; Xin Liu et al., *Structure-Based Investigation on the Association Between Perfluoroalkyl Acids Exposure and Both Gestational Diabetes Mellitus and Glucose Homeostasis in Pregnant Women*, 127 Env't Int'l 85–93 (2019), https://perma.cc/AM4Y-DW2P; Surabhi Shah-Kulkarni et al., *Prenatal Exposure to Perfluorinated Compounds Affects Thyroid Hormone Levels in Newborn Girls*, 94 Env't Int'l 607–613 (2016), https://perma.cc/C4YL-SQW7; Xiaofei Song et al., *Biomonitoring PFAAs in Blood and Semen Samples: Investigation of a Potential Link Between PFAAs Exposure and Semen Mobility in China*, 113 Env't Int'l 50–54 (2018), https://perma.cc/7HUF-5G3C.

[80] *See infra* Section VI.

[81] Carol F. Kwiatkowski et al., *Scientific Basis for Managing PFAS as a Chemical Class*, 7 Env't Sci. Process Impacts 534 (2020), https://perma.cc/WQ4L-YC9X.

[82] *Id.*

[83] Gong et al., *supra* note 75, at 32,328.

[84] Bevin E. Blake et al., *Transcriptional Pathways Linked to Fetal and Maternal Hepatic Dysfunction Caused by Gestational Exposure to Perfluorooctanoic Acid (PFOA) or Hexafluoropropylene Oxide-Dimer Acid (HFPO-DA or GenX) in CD-1 Mice*, 248 Ecotoxicology & Env't Safety 114,314 (Nov. 24, 2022), https://perma.cc/7LG9-4DMK.

[85] Gong et al., supra note 75, at 32,327–31.

following respiratory exposure to GenX chemicals.[86] Exposure to PFHxA "likely causes" liver, developmental, and immune system complications and decreased red blood cell counts in humans exposed.[87] Similarly, exposure to PFPrA (an ultra-short-chain PFAS) which has been documented in particularly high concentrations in groundwater and drinking water wells near the Landfill,[88] has been linked to liver injury.[89] Additionally, PFPeA, also found at high concentrations in and around the Landfill, readily crosses the placenta[90] and has been found at higher levels in pregnant women with gestational diabetes mellitus.[91] Like other PFAS, PFPeA is associated with altered thyroid hormone levels[92] and has been found to be linked to decreased sperm mobility.[93] Nafion Byproduct 2, a PFAS chemical produced by Chemours that is also pervasive at the Landfill, has been linked to toxic intestinal and liver effects, as well as developmental impacts and reduced birth weight.[94]

Exposure to mixtures of multiple PFAS also compounds health risks. Recent studies show that exposure to a mixture of PFAS may disrupt maternal and neonatal thyroid function,[95] and reduce fertility in women.[96]

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[86] Ho Young Lee et al., *Pulmonary Exposure of Mice to Ammonium Perfluoro (2-methyl-3-oxahexanoate) (GenX) Suppresses the Innate Immune Response to Carbon Black Nanoparticles and Stimulates Lung Cell Proliferation*, 34, Inhalation Toxicology 244–59 (2022), https://perma.cc/UWG3-LKZ3.
[87] EPA, *IRIS Toxicological Review of Perfluorohexanoic Acid [PFHxA, CASRN 307-24-4] and Related Salts* xiv (Apr. 2023), https://perma.cc/W33E-WUZL (concluding exposure to PFHxA "likely causes" liver, fetal development, and immune system complications, as well as decreased red blood cell counts).
[88] *See infra* Section VI.
[89] EPA, *ORD Human Health Toxicity Value for Perfluoropropanoic Acid (CASRN 422-64-0 | DTXSID8059970)* 16-17 (July 2023), https://perma.cc/AK64-BHYK.
[90] Ke Gao et al., *Prenatal Exposure to Per- and Polyfluoroalkyl Substances (PFASs) and Association Between the Placental Transfer Efficiencies and Dissociation Constant of Serum Proteins – PFAS Complexes*, 52 Env't Sci & Tech. 6529–38 (2019), https://perma.cc/FN8N-MJTJ.
[91] Xin Liu et al., *Structure-Based Investigation on the Association Between Perfluoroalkyl Acids Exposure and Both Gestational Diabetes Mellitus and Glucose Homeostasis in Pregnant Women*, 127 Env't Int'l 85–93 (2019), https://perma.cc/AM4Y-DW2P.
[92] Surabhi Shah-Kulkarni et al., *Prenatal Exposure to Perfluorinated Compounds Affects Thyroid Hormone Levels in Newborn Girls*, 94 Env't Int'l 607–613 (2016), https://perma.cc/C4YL-SQW7.
[93] Xiaofei Song et al., *Biomonitoring PFAAs in Blood and Semen Samples: Investigation of a Potential Link Between PFAAs Exposure and Semen Mobility in China*, 113 Env't Int'l 50–54 (2018), https://perma.cc/7HUF-5G3C.
[94] *See, e.g.*, Wanying Gui et al., *Emerging Polyfluorinated Compound Nafion By-Product 2 Disturbs Intestinal Homeostasis in Zebrafish (*Danio Rerio*)*, 249 Ecotoxicology & Env't Safety 114368 (2023), https://perma.cc/UY98-D4MT (showing toxic liver effects in zebrafish, organisms that are commonly used to develop human toxicity research); Justin M. Conley et al., *Developmental Toxicity on Nafion Byproduct 2 (NBP2) in the Sprague-Dawley Rat With Comparisons to Hexafluoropropylene Oxide-Dimer Acid (HFPO-DA or GenX) and Perfluorooctane Sulfonate (PFOS)*, 160 Env't Int'l 107056 (2022), https://perma.cc/Y537-MUZZ (showing liver and fetal development impacts, as well as increased neonatal mortality, in rats).
[95] Emma V. Preston et al., *Prenatal Exposure to Per- and Polyfluoroalkyl Substances and Maternal and Neonatal Thyroid Function in the Project Viva Cohort: A Mixtures Approach*, 139 Env't Int'l 1 (2020), https://perma.cc/DJK3-87SN.
[96] Nathan J. Cohen et al., *Exposure to Perfluoroalkyl Substances and Women's Fertility Outcomes in a Singaporean Population-Based Preconception Cohort*, 873 Sci. Total Env't 162267 (May 15, 2023), https://perma.cc/LTA2-34AL.

PFAS also endanger people who eat fish from PFAS-polluted water bodies because these chemicals readily accumulate in fish tissue once they are released into waterways.[97] Studies have shown that those who eat PFAS-contaminated fish have higher PFAS concentrations in their blood,[98] and that "even low levels of seafood [consumption] have been associated with elevated PFAS levels."[99] Indeed, "[w]idespread PFAS contamination of freshwater fish in surface waters in the U.S. is likely a significant source of exposure to PFOS and potentially other [PFAS] for all persons who consume freshwater fish, but especially for high frequency freshwater fish consumers."[100] Communities of color and low-wealth communities disproportionately suffer from PFAS pollution in their rivers, creeks, and streams[101] and practice subsistence fishing at higher rates, leading to higher PFAS blood levels.[102]

Recognizing these risks, North Carolina has joined 14 other states in issuing fish consumption advisories for PFAS "based on concerns about exposure to [PFOS] found in fish sampled" in the middle and lower Cape Fear River.[103] The advisories specifically caution women of childbearing age, pregnant women, nursing mothers, and children against eating certain fish

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[97] *See, e.g.*, Line S. Haug et al., *Diet and Particularly Seafood are Major Sources of Perfluorinated Compounds in Humans*, 36 Env't Int'l 772, 776 (2010), https://perma.cc/4844-ZJ9E; *see also* EPA, *Framework For Estimating Noncancer Health Risks Associated With Mixtures Of Per- and Polyfluoroalkyl Substances (PFAS)* 12 (Mar. 2023), https://perma.cc/Z8R2-2ZW3; Patricia A. Fair et al., *Perfluoroalkyl Substances (PFASs) in Edible Fish Species from Charleston Harbor and Tributaries*, *South Carolina, United States: Exposure and Risk Assessment*, 171 Env't Rsch. 266 (Apr. 2019), https://perma.cc/TR4K-8D8M; Patricia A. Fair et al., *Associations Between Perfluoroalkyl Compounds and Immune and Clinical Chemistry Parameters in Highly Exposed Bottlenose Dolphins (*Tursiops Truncatus*),* 32 Env't Toxicology & Chem. 736 (2013); Charlotta Rylander et al., *Dietary Predictors and Plasma Concentrations of Perfluorinated Compounds in a Coastal Population from Northern Norway*, J. Env't & Pub. Health (2009), https://perma.cc/4SLW-KTNQ (demonstrating "that PFOS and PFHpS concentrations . . . increased with intake of fatty fish"); Jerzy Falandysz et al., *Is Fish a Major Source of Fluorinated Surfactants and Repellents in Humans Living on the Baltic Coast?*, 40 Env't Sci. Tech. 748, 750–51 (2006), https://perma.cc/L53B-FVTR.

[98] Nadia Barbo et al., *Locally Caught Freshwater Fish Across the United States Are Likely a Significant Source of Exposure to PFOS and Other Perfluorinated Compounds*, 220 Env't Rsch. 115165, 3 (2023), https://perma.cc/MP9E-MW82; Jerzy Falandysz et al., *Is Fish a Major Source of Fluorinated Surfactants and Repellents in Humans Living on the Baltic Coast?*, 40 Env't Sci. Tech. 748, 748 (2006), https://perma.cc/L53B-FVTR.

[99] Patricia A. Fair et al., *Perfluoroalkyl Substances (PFASs) in Edible Fish Species from Charleston Harbor and Tributaries*, *South Carolina, United States: Exposure and Risk Assessment*, 171 Env't Rsch. 266, 271 (Apr. 2019), https://perma.cc/TR4K-8D8M.

[100] Nadia Barbo et al., *Locally Caught Freshwater Fish Across the United States Are Likely A Significant Source of Exposure to PFOS and Other Perfluorinated Compounds*, 220 Env't Rsch. 115165, 9 (2023), https://perma.cc/MP9E-MW82.

[101] *See* Jahred M. Liddie et al., *Sociodemographic Factors Are Associated with the Abundance of PFAS Sources and Detection in U.S. Community Water Systems*, 57 Env't Sci. & Tech. 7902 (2023), https://perma.cc/7YUC-NYMM; Susan Lee, *Dirty Water: Toxic 'Forever' PFAS Chemicals Are Prevalent in the Drinking Water of Environmental Justice Communities* (Aug. 2021), https://perma.cc/6XAV-ADRD; Genna Reed, *PFAS Contamination Is an Equity Issue, and President Trump's EPA Is Failing to Fix It*, Union of Concerned Scientists (Oct. 30, 2019), https://perma.cc/9JVE-QSQ4.

[102] Patricia A. Fair et al., *Perfluoroalkyl Substances (PFASs) in Edible Fish Species from Charleston Harbor and Tributaries*, *South Carolina, United States: Exposure and Risk Assessment*, 171 Env't Rsch. 266, 273-75 (Apr. 2019), https://perma.cc/TR4K-8D8M.

[103] *NCDHHS Recommends Limiting Fish Consumption from the Middle and Lower Cape Fear River Due to Contamination With "Forever Chemicals"*, N.C. Dep't of Health & Hum. Servs. (July 13, 2023), https://perma.cc/8H7R-VFUC.

from that area, while limiting consumption of all other fish to "[n]o more than 1 meal per year."[104] For the rest of the population, the advisories recommend limiting fish consumption to one to seven meals per year, depending on the species.[105]

3. PFAS Endanger the Environment

Finally, PFAS are also harmful to the environment and surrounding ecosystems. PFAS have been shown to harm species like fish,[106] reptiles,[107] amphibians,[108] mollusks,[109] and other aquatic invertebrates,[110] which are present in Bearskin Swamp, the Little Coharie Creek, and

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[104] *Id*.
[105] *See id.*
[106] *See, e.g.*, Haihua Huang et al., *Toxicity, Uptake Kinetics and Behavior Assessment in Zebrafish Embryos Following Exposure to Perfluorooctanesulphonicacid (PFOS)*, 98 Aquatic Toxicology 139–47 (2010), https://perma.cc/2FVN-GA3B (fish embryos exposed to PFOS developed spinal, brain, eye, and tail problems, malformations, and slower swimming); *see also* Carrie E. Jantzen et al., *PFOS, PFNA, and PFOA Sub-Lethal Exposure to Embryonic Zebrafish Have Different Toxicity Profiles in Terms of Morphometrics, Behavior and Gene Expression*, 175 Aquatic Toxicology 160–70 (2016), https://perma.cc/J6Q9-SFDA; An Hagenaars et al., *Structure–Activity Relationship Assessment of Four Perfluorinated Chemicals Using a Prolonged Zebrafish Early Life Stage Test*, 82 Chemosphere 764, 771 (2011), https://perma.cc/Y63D-YMH7; Yongbing Du et al., *Chronic Effects of Water-Borne PFOS Exposure on Growth, Survival and Hepatotoxicity in Zebrafish: A Partial Life-Cycle Test*, 74 Chemosphere 723, 726–29 (2009), https://perma.cc/AJ9J-T7R6; John Charles Rotondo et al., *Environmental Doses of Perfluorooctanoic Acid Change the Expression of Genes in Target Tissues of Common Carp*, 37 Env't Toxicology & Chem. 942, 947 (2018), https://perma.cc/9V8B-NQPY; Yang Liu et al., *The Thyroid-Disrupting Effects of Long-Term Perfluorononanoate Exposure on Zebrafish (*Danio rerio*)*, 20 Ecotoxicology 47, 47 (2011), https://perma.cc/BXL2-RGJ2; Lianguo Chen et al., *Multigenerational Disruption of the Thyroid Endocrine System in Marine Medaka after a Life-Cycle Exposure to Perfluorobutanesulfonate*, 52 Env't Sci. & Tech. 4432, 4432–39 (2018), https://perma.cc/7M8J-XJES; Lianguo Chen et al., *Perfluorobutanesulfonate Exposure Causes Durable and Transgenerational Dysbiosis of Gut Microbiota in Marine Medaka*, 5 Env't Sci. & Tech. Letters 731, 731–38 (2018), https://perma.cc/AN42-S3W5; Lianguo Chen et al., *Accumulation of Perfluorobutane Sulfonate (PFBS) and Impairment of Visual Function in the Eyes of Marine Medaka after a Life-Cycle Exposure*, 201 Aquatic Toxicology 1, 1–10 (2018), https://perma.cc/YT6Y-XBD2.
[107] *See, e.g.*, Theresa Guillette et al., *Blood Concentrations of Per- and Polyfluoroalkyl Substances are Associated with Autoimmune-like Effects in American Alligators from Wilmington, North Carolina*, 4 Frontier Toxicology 1010185 (Oct. 20, 2022), https://perma.cc/UM3G-9RVB.
[108] *See, e.g.*, Gerald T. Ankley et al., *Partial Life-Cycle Toxicity and Bioconcentration Modeling of Perfluorooctanesulfonate in the Northern Leopard Frog (*Rana pipiens*)*, 23 Env't Toxicology & Chem. 2745, 2745 (2004), https://perma.cc/94BH-29CH; Yan Cheng et al., *Thyroid Disruption Effects of Environmental Level Perfluorooctane Sulfonates (PFOS) in* Xenopus laevis, 20 Ecotoxicology 2069, 2069–78 (2011), https://perma.cc/2MK3-8AWZ; Qin-Qin Lou et al., *Effects of Perfluorooctanesulfonate and Perfluorobutanesulfonate on the Growth and Sexual Development of* Xenopus laevis, 22 Ecotoxicology 1133, 1133–44 (2013), https://perma.cc/G5CN-Z42L.
[109] *See, e.g.*, Changhui Liu et al., *Oxidative Toxicity of Perfluorinated Chemicals in Green Mussel and Bioaccumulation Factor Dependent Quantitative Structure-Activity Relationship*, 33 Env't Toxicology & Chem. 2323, 2323–32 (2014), https://perma.cc/5CHC-84RJ; Changhui Liu et al., *Immunotoxicity in Green Mussels Under Perfluoroalkyl Substance (PFAS) Exposure: Reversible Response and Response Model Development*, 37 Env't Toxicology & Chem. 1138, 1138–45 (2018), https://perma.cc/HL9K-FLZY.
[110] *See, e.g.*, Kyunghee Ji et al., *Toxicity of Perfluorooctane Sulfonic Acid and Perfluorooctanoic Acid on Freshwater Macroinvertebrates (*Daphnia magna *and* Moina macrocopa*) and Fish (*Oryzias latipes*)*, 27 Env't Toxicology & Chem. 2159, 2159 (2008), https://perma.cc/96YJ-JBBA; Magali Houde et al, *Endocrine-Disruption Potential of Perfluoroethylcyclohexane Sulfonate (PFECHS) in Chronically Exposed* Daphnia magna, 218 Env't Pollution 950, 950–56 (2016), https://perma.cc/XM6R-K5ZQ; Ruoyu Liang et al., *Effects of Perfluorooctane Sulfonate on*

their tributaries. The Landfill's grossly inadequate waste management practices have contaminated these water bodies with PFAS, thereby endangering the environment and organisms living there.

### E. The Landfill Has Accepted PFAS-Laden Waste for Years

The Sampson County Landfill has long been a dumping ground for byproducts from PFAS production processes in North Carolina. Chemours' predecessor E. I. DuPont de Nemours & Co. ("DuPont") and Chemours have built their businesses through decades of producing PFAS products. These companies sent their PFAS-laden waste, including dried sludge, a byproduct of their manufacturing processes, to the Landfill for years. As early as 2011, DuPont reported sending an average of 23,000 pounds of this sludge to the Sampson County Landfill *each week*.[111] When DuPont spun off its chemicals business to create "The Chemours Company," Chemours continued sending its sludge to Sampson County. By 2015, the weekly quantity of sludge had increased to an average of 35,000 pounds—totaling an astonishing 1,820,000 pounds a year.[112] DEQ eventually instructed Chemours to stop sending sludge to the Landfill, but the toxic consequences remain. As discussed below, several PFAS compounds manufactured by Chemours, including GenX chemicals, Nafion Byproduct 1, Nafion Byproduct 2, Nafion Byproduct 4, Nafion Byproduct 5, and Nafion Byproduct 6, HydroEVE, PFO4DA, and PFDoDa, have been documented at high concentrations in and around the Landfill.[113]

## VI. The Landfill is Polluting Surface Water, Groundwater, and Private Drinking Water Wells with PFAS

GFL's handling, storage, treatment, and disposal of PFAS-laden sludge and other solid waste has contaminated Bearskin Swamp and residential drinking water wells with toxic PFAS pollution. This contamination has occurred as a result of waste management practices including, but not limited to: GFL's placement of massive quantities of PFAS-contaminated waste in MSW and C&D cells at the active landfill; continued management of PFAS-contaminated waste in the MSW and C&D cells at the closed landfill; operation of an inadequate leachate management system that has allowed PFAS-laden leachate to contaminate groundwater and of a leachate evaporator that has released PFAS into the air; and operation of a landfill gas management system that has emitted PFAS-contaminated landfill gas into the air.

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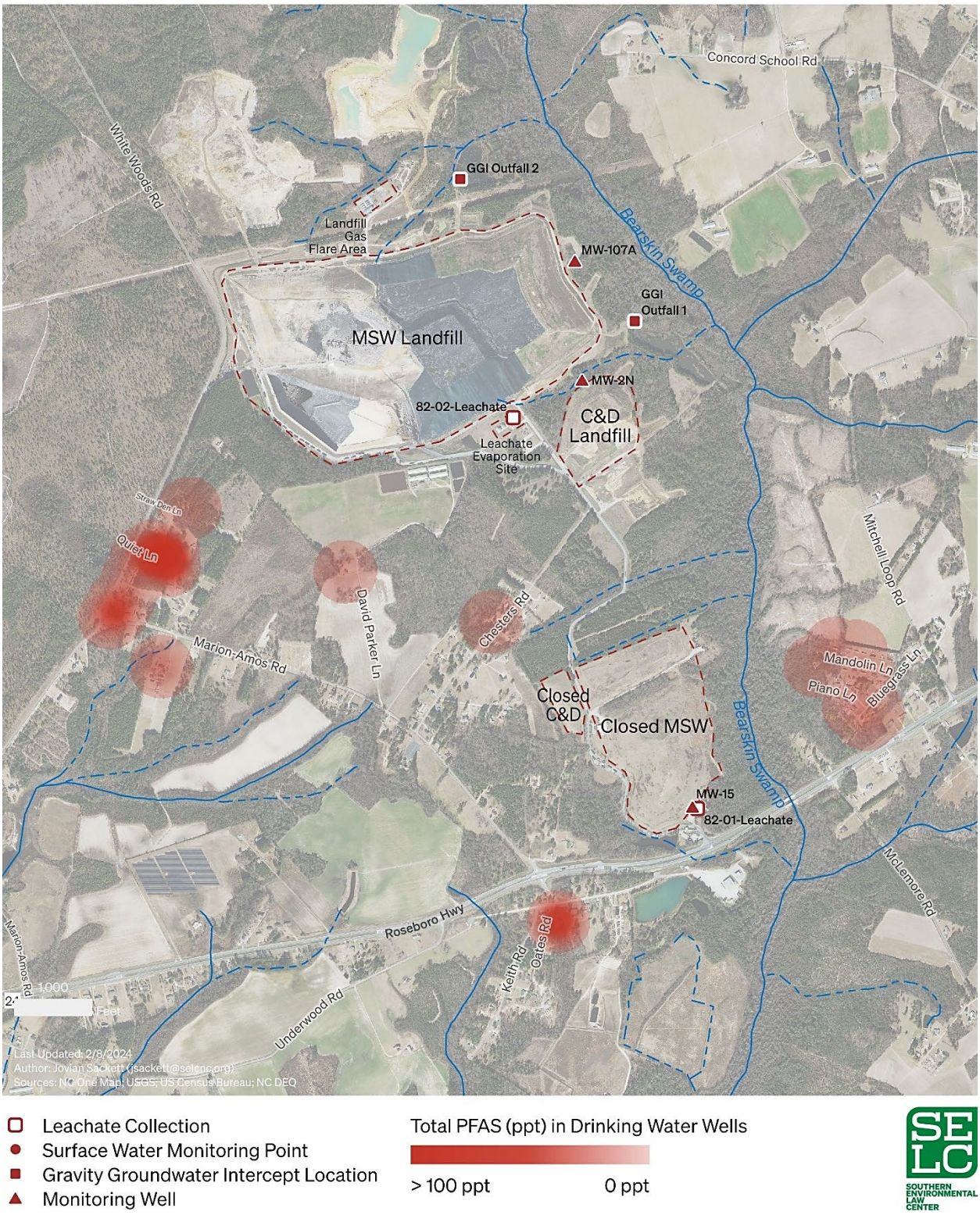
*Immobilization, Heartbeat, Reproductive and Biochemical Performance of* Daphnia magna, 168 Chemosphere 1613, 1613–18 (2017), https://perma.cc/NF8R-U3BC; Michelle MacDonald et al., *Toxicity of Perfluorooctane Sulfonic Acid and Perfluorooctanoic Acid to* Chironomus tentans, 23 Env't Toxicology & Chem. 2116, 2116 (2004), https://perma.cc/HM58-6M2U.

[111] Steve DeVane, *Sludge From Chemours Plant Dumped in Sampson County Landfill*, The Fayetteville Observer (Oct. 20, 2018), https://perma.cc/225N-MFXV; *see also* Charles Wakild, Letter from N.C. Dep't of Env't & Nat. Res. to E.I. DuPont de Nemours & Co. Re: Issuance of NPDES Permit NC0003573 at 52 (Feb. 6, 2012), https://perma.cc/Q3AR-AEFS.

[112] Michael E. Johnson, *NPDES Permit Renewal* 31, Chemours (Apr. 27, 2016), https://perma.cc/N3FN-MLLU.

[113] *See infra* Part VI.

**Figure 3: PFAS Contamination On-Site and Around the Landfill**



### F. The Landfill's Leachate Contains Dangerously High Concentrations of PFAS

Landfills are well-documented sources of PFAS contamination.[114] GFL acknowledged this in its 2021 permit application for an on-site reverse osmosis system, citing "high concentrations" of PFAS in its leachate.[115] On average, municipal solid waste landfills contain approximately 12,600 ppt total PFAS, including PFOA (1,400 ppt), PFOS (260 ppt), PFNA (69 ppt), PFBS (910 ppt), PFHxS (540 ppt), PFHxA (2,800 ppt), and 5:3 FTCA (3,500 ppt).[116] These are extremely high concentrations of toxic substances that—as discussed above—endanger human health at even miniscule doses. But the Sampson County Landfill is an outlier even among landfills, with PFAS concentrations in leachate that dramatically exceed these means.

The North Carolina DEQ began to monitor PFAS in landfills in 2019. That study only considered a limited number of PFAS compounds, but found these PFAS totaled 124,633.07 ppt in the Landfill's leachate.[117] GenX was detected in the Sampson County Landfill's leachate at an astounding 10,800 ppt.[118] Other PFAS were also detected in the Landfill's leachate in the thousands of ppt: PFOA (1,790 ppt), PFBS (7,530 ppt), PFBA (4,770 ppt), PFHpA (5,520 ppt), PFHxA (6,730 ppt), and PFPeA (86,400 ppt).[119]

According to public records, DEQ did not require the Landfill to again test its leachate for PFAS until 2023. This more recent, comprehensive round of sampling documents extremely high PFAS concentrations in leachate from the older, closed portion of the Landfill, and even higher concentrations at the currently operating, open portion of the site.

**Figure 4: DEQ's Leachate Sampling Results**

| Sampling Location and Date | Total PFAS (ppt) |
|---|---|
| 82-01-Leachate (9/12/23) | 727,368.84 |
| 82-01-Leachate (9/12/23) (field duplicate) | 708,275.96 |
| 82-02-Leachate (9/15/23) | 1,422,796.6 |
| 82-02-Leachate (9/15/23) (field duplicate) | 1,022,332.8 |

[114] Interstate Tech. Regul. Council, *2.6 PFAS Releases to the Environment* (Sept. 2023), https://perma.cc/R2BD-7TDV.
[115] GFL, *Permit Application No. NC0089966* 50 (May 28, 2021), https://perma.cc/KZ9E-9HK5.
[116] Tolaymat et al., *supra* note 25, at Table 1.
[117] *Collective Study of PFAS and 1,4-dioxane in Landfill Leachate and Estimated Influence on Wastewater Treatment Plant Facility Influent* at Table 8, Hart & Hickman (Mar. 10, 2020), https://perma.cc/RD9H-XQLS.
[118] *Id.* at 179-80.
[119] *Id.*

The Landfill's leachate contains PFOA and PFOS in concentrations as high as 1,810 ppt and 389 ppt, respectively. The leachate also contains Nafion Byproduct 4 at concentrations as high as 852,000 ppt, as well as PFPeA (551,000 ppt), NVHOS (219,000 ppt), Nafion Byproduct 5 (92,300 ppt), R-EVE (72,100 ppt), GenX (64,300 ppt), FpePA (37,000 ppt), PFHpA (35,200 ppt), PFPrA (21,600 ppt), PFBS (20,400 ppt), and many others. As noted above, concentrations for many types of PFAS detected at the Landfill are significantly higher than what is present in the average landfill across the United States.[120] And many of the PFAS identified at the Landfill have never been measured in landfill leachate before.[121]

For a decade, the Landfill's leachate evaporator evaporated millions of gallons of this PFAS-laden leachate into the atmosphere.[122] Leachate evaporators are known to contribute "significant quantities of PFAS to the atmosphere and surrounding environment."[123] MSW landfills are also known to experience leachate leakage through their liners—researchers report an average leachate leakage rate of 1.9%.[124] C&D landfills that contain PFAS pose an even greater threat to groundwater because C&D landfills are not required to install liners[125]—and at least one of the C&D landfills at the Landfill is unlined. With PFAS concentrations at the Landfill so extraordinarily high, even a relatively small leak poses a significant threat to groundwater. The Landfill also has a history of seeps going back to 2007, as self-documented through monitoring reports.[126] Seeps occur when leachate escapes waste cells contaminating groundwater and forces its way through the side of a landfill, where it can run off into surface waters. And as discussed below, researchers from the University of North Carolina have found evidence that PFAS from the Landfill's leachate are migrating offsite into Bearskin Swamp.[127]

### G. Groundwater at the Landfill has Dangerously High PFAS Concentrations

DEQ's testing of onsite groundwater at the Landfill reveals the PFAS are not confined to leachate. In September 2023, PFAS were detected in every groundwater monitoring well, some at alarmingly high concentrations. MW-107A, a groundwater monitoring well located to the East (downgradient) of the active MSW landfill, near Bearskin Swamp, had a total PFAS concentration of 40,106.33 ppt. MW-15, which is located on the Southeast side of the closed MSW landfill, has a total PFAS concentration of 29,771.03 ppt. And MW-2N, located South and East of the active MSW landfill, has a total PFAS concentration of 18,354.42 ppt. GGI Outfall 1, which also borders Bearskin Swamp, has a total PFAS concentration of approximately 9,500 ppt. A spreadsheet documenting the groundwater monitoring results from sampling conducted by DEQ at the Landfill are attached to this document as Attachment 1.

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[120] Tolaymat et al., *supra* note 25, at Table 1.
[121] *Id.*
[122] *See, e.g.*, *Sampson County Landfill Operations and Sustainability* 6, Waste Indus. (Feb. 16, 2016), https://perma.cc/JPV7-CB65 (31.1 million gallons were evaporated between August 15, 2012 and February 2016).
[123] Tolaymat et al., *supra* note 25, at Table 1.
[124] *Id.*
[125] *Id.*
[126] *See* GFL, *Water Quality Monitoring Report, First Semi-Annual 2022 Sampling Event* 2 (July 19, 2022), https://perma.cc/C3NE-EASU.
[127] *See* Walsh & Woods, *supra* note 10.

These groundwater monitoring results are unusual and disturbing. For comparison, a recent study which evaluated PFAS concentrations in groundwater from a landfill in Florida reported a median total PFAS of 140 ppt and a maximum single measurement of approximately 10,000 ppt (across 77 samples).[128] The groundwater PFAS concentrations at the Landfill dwarf these figures and show extensive and dangerous groundwater contamination.[129]

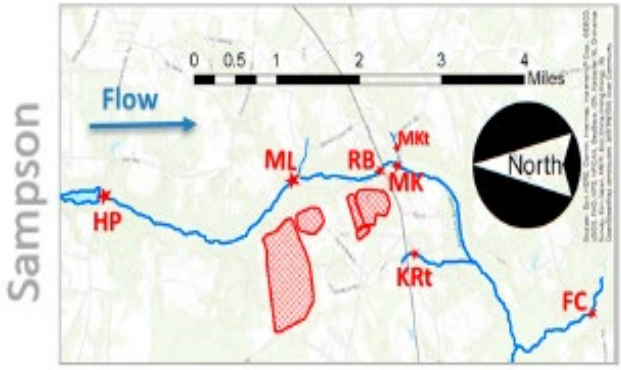
**H. Dangerous Levels of PFAS from the Landfill are Contaminating Surface Waters**

DEQ also tested surface waters upstream, downstream, and adjacent to the Landfill, and found consistently high PFAS concentrations adjacent to and downstream of the Landfill across three sampling dates in 2023. Total PFAS concentrations are highest adjacent to the landfill, exceeding 8,200 ppt.

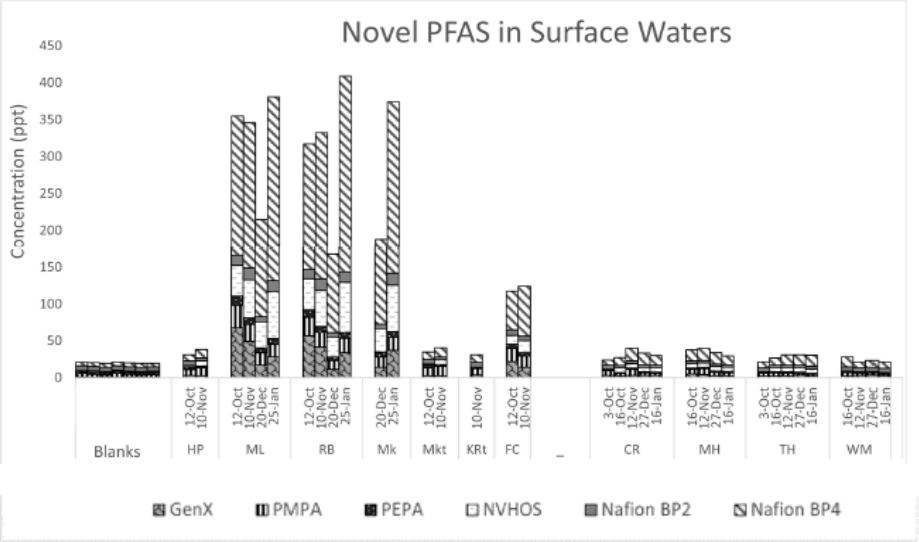
PFAS detected in surface waters near the Landfill included PFOA and PFOS at concentrations as high as 214 ppt and 110 ppt, respectively. Additional PFAS detected adjacent to the Landfill include but are not limited to: PFPrA (2,280 ppt), PFPeA (984 ppt), NVHOS (947 ppt), PFHxA (388 ppt), and GenX chemicals (332 ppt). The Landfill's pollution persists downstream where documented total PFAS levels are as high as 428.5 ppt. The same high concentrations are not observed upstream of the Landfill.

These data corroborate findings from researchers at the University of North Carolina, which found significantly higher concentrations of PFAS and heavy metals adjacent to and downstream of the Landfill relative to upstream of the Landfill. As illustrated in the figures below, researchers sampled Bearskin Swamp upstream, adjacent to, and downstream of the Landfill and found extremely high PFAS concentrations at three sampling locations adjacent to the Landfill, and elevated PFAS concentrations downstream of the Landfill.

**Figures 5 and 6: Surface Water Sampling Results, Walsh & Woods 2023[130]**




[128] Yatao Chen et al., *Evaluation of Per- and Polyfluoroalkyl Substances (PFAS) in Leachate, Gas Condensate, Stormwater and Groundwater at Landfills*, 318 Chemosphere 137903 (Mar. 2023), https://perma.cc/2HJ7-9UUP.
[129] *See* Tolaymat et al., *supra* note 25 (noting overall leachate leakage rate of 1.9% for lined MSW landfills and higher groundwater contamination risks for unlined CD landfills).
[130] Walsh & Woods, *supra* note 10 at 6.




The University of North Carolina researchers found elevated concentrations of certain PFAS, including Chemours' proprietary GenX chemicals.[131] GenX chemicals were found in concentrations nearly 20 times greater at sampling sites adjacent to the Landfill compared to upstream.[132] Based on these findings, the researchers concluded that there is likely migration of landfill leachate off-site,[133] and "contamination (via landfill leachate or runoff) is entering the surrounding environment."[134] This publication confirms that PFAS compounds are not present in significant quantities upstream of the Landfill, but appear at high concentrations downstream of the Landfill.[135]

## I. Dangerous Levels of PFAS from the Landfill are Contaminating Residential Drinking Water Wells

In addition to polluting groundwater and surface water, PFAS from the Landfill is also contaminating residential drinking water wells. DEQ's recent testing shows that PFAS from the Landfill have migrated into private residential wells that households rely on for drinking water, cleaning, bathing, and other purposes. To date, DEQ has tested at least 30 private residential wells within 2,000 feet of the Landfill's property boundary and has detected PFAS in 22 of those wells. Many of the wells have PFOA and PFOS at concentrations higher than EPA's health advisories (the most up-to-date guidance regarding health risk for these compounds).

[131] *See id.* at 11.
[132] *Id.*
[133] *See id.* at 12.
[134] *Id.* at 11.
[135] *Id.*

**Figure 7: Anonymized DEQ Private Drinking Water Well Data**

| | | EPA Interim Health Advisory Levels | |
|---|---|---|---|
| **Street Address** | **Total PFAS (ppt)** | **PFOS** | **PFOA)** |
| Oates Rd. | 126.92 | 22.3 | 5.33 |
| Quiet Ln. A | 117.669 | 4.68 | 17.2 |
| Quiet Ln. B | 97.84 | BDL | 4.7 |
| Quiet Ln. C | 90.622 | 17.8 | 9.57 |
| Marion Amos Rd. A | 46.097 | 5.46 | 3.75 |
| White Woods Rd. A | 45.703 | 5.37 | 3.86 |
| Marion Amos Rd. B | 38.663 | 9.78 | 2.82 |
| White Woods Rd. B | 38.277 | 1.06 | 1.14 |
| White Woods Rd. C | 28.257 | 0.958 | 0.761 |
| Mandolin Ln. A | 21.679 | BDL | 1.64 |
| Mandolin Ln. B | 20.404 | BDL | BDL |
| Straw Den Ln. | 18.332 | 2.34 | 1.11 |
| White Woods Rd. D | 16.926 | 0.87 | BDL |
| Piano Ln. | 16.545 | BDL | BDL |
| David Parker Ln. | 15.042 | 1.92 | 0.719 |
| Bluegrass Ln. | 13.764 | BDL | BDL |
| White Woods Rd. E | 13.189 | 1.11 | 0.839 |
| Chesters Rd. | 11.959 | BDL | BDL |
| Bluegrass Ln. A | 11.888 | BDL | BDL |
| Mandolin Ln. C | 9.822 | BDL | BDL |
| Bluegrass Ln. A | 1.458 | BDL | BDL |
| Mandolin Ln. C | 0.974 | BDL | BDL |

*BDL: below laboratory detection limits
*Red: exceeds health advisory levels (PFOS 0.004 ppt; PFOA 0.02 ppt)

In sum, the unprecedented PFAS concentrations measured in the leachate, along with PFAS concentrations exceeding health-based limits in nearby groundwater, surface water, and drinking water wells, demonstrate that PFAS from solid waste disposed of at the Landfill has not been contained to the landfill cells where the waste was initially placed. GFL's mishandling of waste containing extremely high concentrations of PFAS—including management of MSW and

C&D landfill cells in a manner that has caused widespread groundwater and surface water contamination and operation of landfill leachate evaporation and landfill gas flaring systems that emit PFAS into the air—has caused widespread pollution and is endangering the health of people nearby.

## VII. The Landfill's Ongoing Pollution Creates an Imminent and Substantial Endangerment for Roseboro and Snow Hill Residents

GFL has caused and is causing harmful, environmentally persistent, and toxic PFAS pollution to contaminate surface water and groundwater in a manner that presents an imminent and substantial endangerment to health and the environment, which RCRA prohibits.

RCRA is a comprehensive environmental statute that governs the treatment, storage, and disposal of solid and hazardous waste.[136] One of its citizen suit provisions, 42 U.S.C. § 6972(a)(1)(B), gives citizens a cause of action "against a defendant whose conduct—whether ongoing or purely in the past—'may' now pose an 'imminent and substantial endangerment to health or the environment.'"[137] These "Endangerment Claims" can thus be brought against

> any person, … including any past or present generator, past or present transporter, or past or present owner or operator of a treatment, storage or disposal facility, who has contributed or who is contributing, to the past or present handling, storage, treatment, transportation, or disposal of any solid or hazardous waste which may present an imminent and substantial endangerment to health or the environment.

RCRA's "Endangerment Claims" are "essentially a codification of the common law public nuisance" action but intended to be construed "more liberal[ly] than their common law counterparts."[138] Congress used "expansive language that confers upon the courts the authority to grant affirmative equitable relief to the extent necessary to eliminate any risk posed by toxic wastes."[139]

GFL and its subsidiaries are the past and present owners and operators of the MSW landfills, C&D landfills, landfill leachate management system, and landfill-gas-to-energy systems that make up the Sampson County Landfill. As detailed above, GFL's past and present operation of the active MSW cells, closed MSW cells, open C&D cells, closed C&D cells; landfill leachate collection system, including the leachate evaporator that operated from 2012-2022; and landfill gas collection system including the Black Creek Renewables facility which operated from 2011-2021 has caused PFAS contamination of air, groundwater, surface water, and private drinking water wells and poses a serious, imminent and ongoing threat to the health

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[136] *Meghrig v. KFC Western*, 515 U.S. 1192, 1254 (1996).
[137] *Goldfarb v. Mayor and City Council of Baltimore*, 791 F.3d 500, 505 (4th Cir. 2015).
[138] *United States v. Waste Indus., Inc.*, 734 F.2d 159, 167 (4th Cir. 1984) (quoting Subcommittee on Oversight and Investigations of the Committee on Interstate and Foreign Commerce, Report on Hazardous Waste Disposal, H.R. Comm. Print No. 96–IFC 31, 96th Cong., 1st Sess. 32 (1979)).
[139] *See Parker v. Scrap Metal Processors, Inc.*, 386 F.3d 993, 1015 (11th Cir. 2004) (citing *United States v. Price*, 688 F.2d 204, 213-14 (3d Cir. 1982)) (internal quotation marks omitted).

and well-being of EJCAN members, Snow Hill and Roseboro residents, and the environment of Sampson County.

PFAS endanger human health even at low doses.[140] The PFOS and PFOA levels found by the North Carolina DEQ in residential drinking water wells near the Landfill exceed current health advisories by several orders of magnitude. Other forms of PFAS were found in drinking water wells at even higher concentrations, and these PFAS have also been linked to various serious health conditions even at low levels of exposure. People rely on well water to drink, cook, brush their teeth, shower, and water their food gardens—and these are all routes of dangerous PFAS exposure.[141]

The state's provision of bottled drinking water to a mere fraction of Snow Hill residents whose private wells contain PFAS at concentrations that exceed EPA's proposed MCLs (but not those that exceed its health advisories) does not abate the widespread endangerment posed by GFL's pollution. Many households near the Landfill continue to rely on PFAS-contaminated drinking water wells. And even people who have access to county water or otherwise manage to avoid contaminated drinking water wells may be endangered by GFL's pollution. PFAS concentrations in surface water adjacent to and downstream of the Landfill dramatically exceed EPA's health advisories for PFOS, PFOA, and GenX chemicals. People may be exposed to PFAS when they canoe, kayak, or swim in Bearskin Swamp, the Little Coharie Creek, or their tributaries, or when they consume fish caught from those waterways. People may also be exposed to PFAS by consuming meat from animals hunted or raised near the Landfill—this route of exposure is particularly concerning given the high concentration of industrial hog and poultry operations in Sampson County.[142] Regular inhalation of PFAS in the air or airborne soil or dust may also pose a threat to human health.[143]

In summary, GFL's storage, treatment, handling, and disposal of PFAS-contaminated waste at the Landfill imminently and substantially endangers EJCAN's members and others who live, work, or recreate in Roseboro and Snow Hill.

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[140] *See generally supra* Section V(D).
[141] *See, e.g.*, Wis. Dep't of Health Servs., *PFAS and Backyard Gardening*, (Jan. 2023), https://perma.cc/MY9X-YZXK; Rossella Ghisi et al., *Accumulation of Perfluorinated Alkyl Substances (PFAS) in Agricultural Plants: A Review*, 169 Env't Rsch. 326–41 (Feb. 2019), https://perma.cc/3NJF-FSBD.
[142] *See, e.g.*, Me. Dep't of Inland Fisheries & Wildlife, *PFAS Do Not Eat Advisory*, (Apr. 2023), https://perma.cc/8ZM4-9EFK; Tom Perkins, *Michigan Beef Found to Contain Dangerous Levels of 'Forever Chemicals'*, The Guardian (Feb. 11, 2022), https://perma.cc/N9SL-7ZCL; Antti T. Mikkonen et al., *Spatio-temporal Trends in Livestock Exposure to Per- and Polyfluoroalkyl Substances (PFAS) Inform Risk Assessment and Management Measures*, 225 Env't Rsch. 115518 (May 15, 2023), https://perma.cc/M2JX-L8DE; Clare Death et al., *Per- and Polyfluoroalkyl Substances (PFAS) in Livestock and Game Species: A Review*, 774 Sci. of Total Env't 144795 (June 20, 2021), https://perma.cc/6WRB-DUAE.
[143] Andrew D. Monnot et al., *Can Oral Toxicity Data for PFAS Inform on Toxicity via Inhalation?* 42 Risk. Anal. 1533-38 (Oct. 6, 2022), https://perma.cc/CS3Q-ADX6; Ho Young Lee et al., *Pulmonary Exposure of Mice to Ammonium Perfluoro (2-methyl-3-oxahexanoate) (GenX) Suppresses the Innate Immune Response to Carbon Black Nanoparticles and Stimulates Lung Cell Proliferation*, Inhalation Toxicology 244-59 (2022), https://perma.cc/U233-6J8Z.

## VIII. Conclusion

GFL's practices have contributed to and continue to contribute to the imminent and substantial endangerment of EJCAN's members and others living in Roseboro and Snow Hill. EJCAN is prepared to file suit under 42 U.S.C. § 6972(a)(1)(B) against GFL (with Sampson County Disposal, LLC; Waste Industries USA, LLC; Waste Industries LLC; Black Creek Renewables, LLC; and GFL Environmental, Inc. joined as defendants) once the notice period has expired, unless GFL takes immediate steps to redress this harm.

If litigation is necessary, EJCAN will seek redress for the violations described in this letter, including but not limited to injunctive relief, costs, and attorneys' fees pursuant to 42 U.S.C. § 6972(a)(l)(B). EJCAN will also seek declaratory and injunctive relief pursuant to Section 6972(a) of RCRA to address or remediate past violations and prevent further violations and other such relief as is permitted by law.

EJCAN reserves the right to add additional claims based on the same or a similar pattern of actions. EJCAN also reserves the right to seek additional remedies under state and federal law and does not intend, by giving this notice, to waive any other rights or remedies.

During the relevant notice period, EJCAN is willing to discuss the factual assertions set forth in this letter as well as effective remedies for the violations noted above. **If you wish to pursue negotiations, you should initiate such negotiations within the next twenty (20) days so that they may be completed prior to completion of the notice period.** EJCAN has retained the assistance of the counsel listed below, and all responses to this letter should be directed to the undersigned counsel.

Thank you for your prompt attention to this matter.

Sincerely,

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# ATTACHMENT 1

## NCDEQ Groundwater Sampling
## September 11–November 14, 2023

| DEQ Sampling Location and Date | Total PFAS (ppt) |
|---|---|
| MW-107A (9/14/23) | 40107.33 |
| MW-15 (9/13/23) | 29771.03 |
| MW-2N (9/15/23) | 18354.42 |
| GGI Outfall 1 (9/14/23) | 9590.99 |
| GGI Outfall 1 (9/14/23) (field duplicate) | 9504.31 |
| MW-108 (9/14/23) (field duplicate) | 6308.387 |
| MW-108 (9/14/23) | 5852.075 |
| MW-3N (9/15/23) | 5711.5 |
| MW-108-GP (9/13/23) | 5528.81 |
| MW-17 (9/13/23) | 4617.791 |
| GGI Outfall 2 (9/14/23) | 3884.822 |
| MW-8 (9/12/23) | 3304.291 |
| MW-11 (9/12/23) | 2422.326 |
| MW-19S (9/12/23) | 2023.41 |
| MW-11 (9/12/23) (field duplicate) | 1952.104 |
| MW-9 (9/12/23) (field duplicate | 1834.86 |
| MW-9 (9/12/23) | 1825.092 |
| MW-14 (9/12/23) | 1491.1 |
| MW-1N (9/15/23) | 1454.24 |
| MW-18 (9/12/23) | 1322.457 |
| MW-14-GP(9/11/23) | 1242.65 |
| MW-IN-GP (9/14/23) | 1198.894 |
| MW-12-GP (9/11/23) | 1025.748 |
| MW-106 (9/14/23) | 933.141 |
| MW1 (11/14/23) | 866.22 |
| MW5 (11/14/23) | 838.94 |
| MW1 (11/14/23) (field duplicate) | 821.77 |

| DEQ Sampling Location and Date | Total PFAS (ppt) |
|---|---|
| MW-12 (9/12/23) | 759.129 |
| MW7 (11/14/23) | 627.853 |
| MW-13 (9/13/23) | 548.298 |
| MW-105 (9/14/23) | 508.951 |
| MW-104 (9/14/23) | 506.287 |
| MW-16 (9/13/23) | 291.065 |
| MW-10 (9/12/23) | 153.573 |
| MW4 (11/14/23) | 67.54 |
| MW-4N (9/15/23) | 42.11 |
| MW-4N-GP (9/14/23) | 40.74 |
| MW-103A (9/14/23) | 39.897 |
| MW-5AN (9/15/23) | 28.66 |
| MW-4N (9/15/23) (field duplicate) | 24.6 |
| MW2 (11/14/23) | 13.715 |
| MW-12 (9/12/23)-FRB | 4.765 |
| MW-102B-GP-(9/13/23) | 0.822 |
| MW-102B (9/14/23) | 0.574 |