Division of Water Resources Identification of Select Emerging PFAS Compounds in Public Water Supply Reservoirs of the Cape Fear, Watauga, and New River Basins (2023)

NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER RESOURCES
WATER SCIENCES SECTION

THIS REPORT HAS BEEN APPROVED FOR RELEASE

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Introduction

In response to the rising interest in the public health effects associated with per- and polyfluoroalkyl substances (PFAS) and 1,4-Dioxane in drinking water sources, the Intensive Survey Branch (ISB) conducted a special study alongside our Ambient Lakes Monitoring Program to characterize the presence and concentrations of these emerging compounds (EC) in public drinking water supply reservoirs of the Cape Fear, Watauga, and New River basins. Beginning in May of 2023, ISB staff collected surface water samples for 47 different per- and polyfluoroalkyl substances (Appendix 2) and 1,4-Dioxane at ambient lakes monitoring stations nearest to the surface water intake of 18 public water supply reservoirs in the Cape Fear, Watauga, and New River basins (Appendix 1). Analytical results indicated the presence of at least one PFAS analyte above the laboratory practical quantitation limit (PQL) in each waterbody during the 2023 sampling season. It is important to note that all analytical data presented in this document reflect levels of target analytes detected in untreated surface waters, as opposed to finished drinking water.

Appendix 1. *Station ID, description, and coordinates of 2023 ALM sampled sites.*

WATERBODY NAME	STATION ID	LATITUDE	LONGITUDE
LAKE MACKINTOSH	CPF038NSUR	36.03892	-79.50370
REIDSVILLE LAKE	CPF002A1SUR	36.28892	-79.68022
HIGH POINT LAKE	CPF089E4SUR	35.99615	-79.94499
HIGH POINT RESERVOIR	CPF089D5SUR	36.01236	-79.98828
LAKE BRANDT	CPF007BSUR	36.17123	-79.83965
LAKE TOWNSEND	CPFLT8SUR	36.18969	-79.73329
LAKE BURLINGTON	CPFSCR4SUR	36.12893	-79.40698
GRAHAM-MEBANE RESERVOIR	CPFGMR4SUR	36.09976	-79.32872
CANE CREEK RESERVOIR	CPFCCR6SUR	35.94955	-79.24155
UNIVERSITY LAKE	CPFUL6SUR	35.89647	-79.09322
BUCKHORN DAM LAKE	CPFBDL1SUR	35.54187	-78.99547
RANDLEMAN RESERVOIR	CPFRD4SUR	35.86300	-79.82800
SANDY CREEK RESERVOIR	CPFSC1SUR	35.74443	-79.67630
TURNER RESERVOIR	CPFTR01SUR	35.76300	-79.45625
GLENVILLE LAKE	CPF138BSUR	35.06932	-78.89730
ASU LAKE	NEW006ESUR	36.23912	-81.67036
BLOWING ROCK LAKE	NEWBTP1SUR	36.142932	-81.672783
BUCKEYE LAKE	WATBL1SUR	36.219191	-81.907021

Methods

Selected sites were sampled in conjunction with regularly scheduled sampling events as part of ALMP monitoring. Samples were collected in accordance with ISB's Standard Operating Procedures Manual: Physical and Chemical Monitoring v2.1, Dec. 2013 and Ambient Lakes Quality Assurance Project Plan v2.0, March 2014, as well as ISB's Draft Standard Operating Procedures Manual: Per- and Polyfluorinated Alkyl Substances (PFAS) - Field Collection Method. Physical parameters were collected at surface (0.15 m) using an In-Situ multiparameter hydrosonde. Chemical samples were collected as

surface grab samples. All PFAS and 1,4- dioxane samples were analyzed by the DWR central laboratory in Raleigh, NC. Appropriate QA/QC samples were collected during each sampling event including trip blanks, field blanks, duplicates, matrix spikes and matrix spike duplicates. Guidance on acceptable supplies, equipment, and personal care products is provided within the ISB Draft Standard Operating Procedures Manual: Per- and Polyfluorinated Alkyl Substances (PFAS) - Field Collection Method. Full PFAS sampling results are shown below in Table 2.

Results

PFAS analysis was conducted by DWR at the Central Laboratory in Raleigh, NC. Of the 47 PFAS compounds (Appendix 2) selected for this study, the following 21 compounds were found above the PQL on at least one occasion: HFPO-DA (GenX), PFOS, PFPeA, PFPeS, 6:2 FTS, N-EtFOSAA, PFHxA, PFOA, PFHxS, PFBA, PFBS, PFHpA, PFHpS, PFNA, PFTeDA, PFTrDA, PFDoS, PMPA, PFO2HxA, PFMOAA, and PFESA BP2. These results demonstrate the widespread distribution of detectable PFAS in public lakes and reservoirs. Values of detected compounds and the associated detection dates for sites with compounds above the PQL are listed in Table 2 below.

1,4-Dioxane was only detected above the PQL (1.0 µg/L) on five occasions at two lakes throughout the sampling period. Those values are displayed below in Table 1.

Table 1. *Values of 1,4-Dioxane and detection date for values above PQL.*

Station	Date	1,4-Dioxane Result (µg/L)
CPFBDL1SUR **BUCKHORN DAM LAKE**	06/06/2023	1.8
	08/01/2023	1.3
CPFRD4SUR **RANDLEMAN RESERVOIR**	05/02/2023	1.1
	06/06/2023	1.6
	07/18/2023	1.1

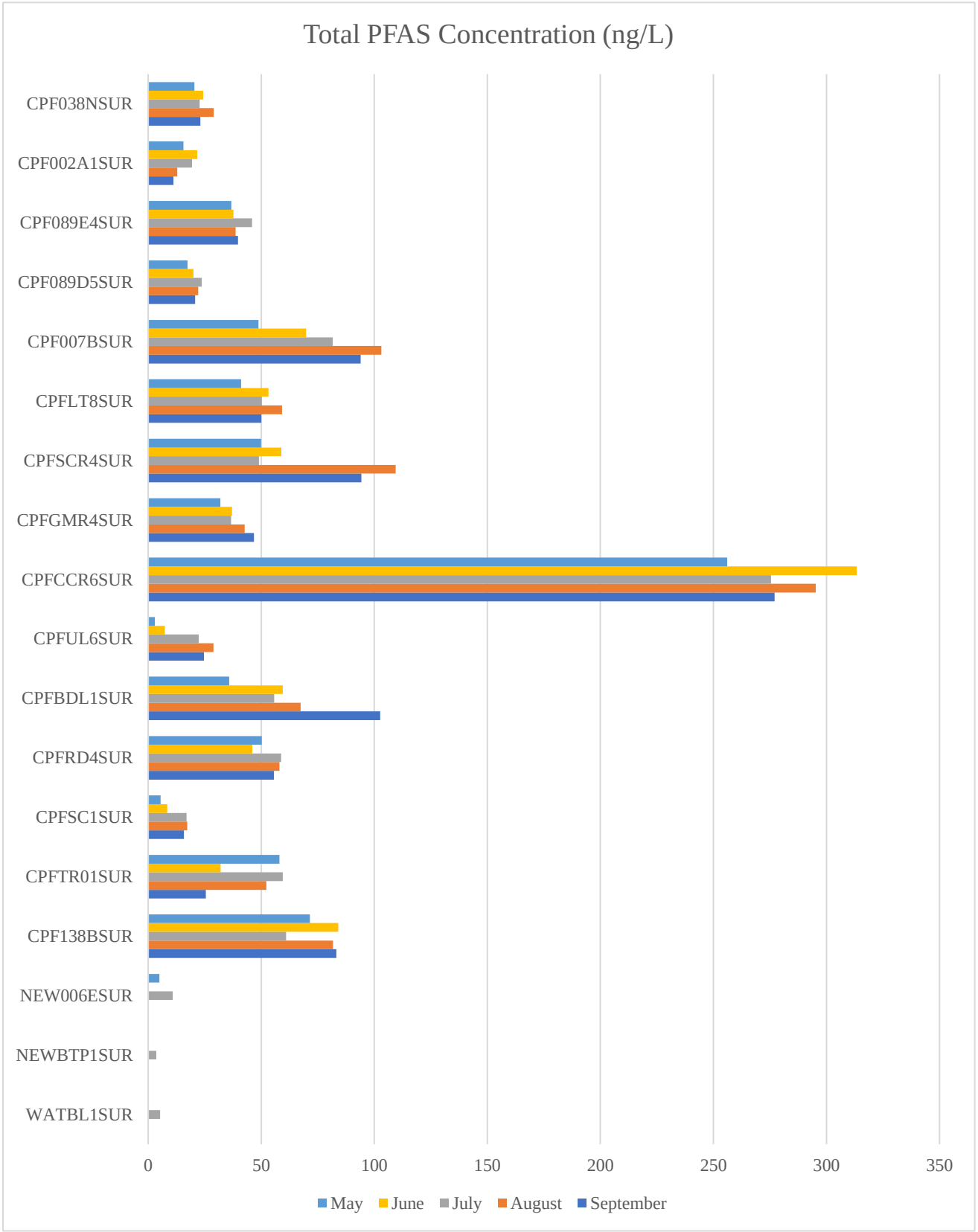
Summary

Evaluation of chemical results from this study suggest that while there are detectable levels of target analytes at all public water supply reservoirs tested in the Cape Fear, New, and Watauga River Basins additional long-term monitoring would need to be conducted to evaluate persistence of these compounds and their associated effects on drinking water.

Glenville Lake (CPF138BSUR) displayed the greatest diversity of target analytes (n=13) on 09/21/2023 while Cane Creek Reservoir (CPFCCR6SUR) had the highest total PFAS concentrations each of the five months of sampling with the highest levels being 313.4 ng/L on 06/15/2023.

The graph in Figure 1 shows total PFAS concentration values for each month of the sampling period.

Figure 1. *Graph showing total PFAS concentrations per site per month.*



Appendix 2. *List of PFAS compounds sampled for.*

ABBREVIATION	NAME	CAS #
HFPO-DA (GENX)	Perfluoro-2-methyl-3-oxahexanoic acid	13252-13-6
PFOS	Perfluorooctanesulfonic acid	1763-23-1
PFUNA	Perfluoroundecanoic acid	2058-94-8
N-MEFOSAA	2-(N- Methylperfluorooctanesulfonamido)acetic acid	2355-31-9
PFPEA	Perfluoropentanoic acid	2706-90-3
PFPES	Perfluoropentanesulfonic acid	2706-91-4
6:2 FTS	6:2 Fluorotelomer sulfonic acid	27619-97-2
N-ETFOSAA	2-(N- Ethylperfluorooctanesulfonamido)acetic acid	2991-50-6
PFHXA	Perfluorohexanoic acid	307-24-4
PFDOA	Perfluorododecanoic acid	307-55-1
PFOA	Perfluorooctanoic acid	335-67-1
PFDA	Perfluorodecanoic acid	335-76-2
PFDS	Perfluorodecanesulfonic acid	335-77-3
PFHXS	Perfluorohexanesulfonic acid	355-46-4
PFBA	Perfluorobutanoic acid	375-22-4
PFBS	Perfluorobutanesulfonic acid	375-73-5
PFHPA	Perfluoroheptanoic acid	375-85-9
PFHPS	Perfluoroheptanesulfonic acid	375-92-8
PFNA	Perfluorononanoic acid	375-95-1
PFTEDA	Perfluorotetradecanoic acid	376-06-7
8:2 FTS	8:2 Fluorotelomer sulfonic acid	39108-34-4
PFNS	Perfluorononanesulfonic acid	68259-12-1
PFTRDA	Perfluorotridecanoic acid	72629-94-8
9CL-PF3ONS	9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	756426-58-1
4:2 FTS	4:2 Fluorotelomer sulfonic acid	757124-72-4
11CL-PF3OUDS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	763051-92-9
PFDOS	Perfluorododecane sulfonic acid	79780-39-5
ADONA	4,8-Dioxa-3H-perfluorononanoicacid	919005-14-4
PFEESA/PES	Perfluoro(2-ethoxyethane)sulphonic acid	113507-82-7
PMPA	Perfluoro-2-methoxypropanoic acid	13140-29-9
PFECA B OR NFHDA	Perfluoro-3,6-dioxaheptanoic acid	151772-58-6
R-PSDA (NAFION BYPRODUCT 4)	Perfluoro-4-(2-sulfoethoxy)pentanoic acid	2416366-18-0
HYDROLYZED PSDA (NAFION BYPRODUCT 5)	2-fluoro-2-[1,1,2,3,3,3-hexafluoro-2-(1,1,2,2-tetrafluoro-2-sulfoethoxy)propoxy]-acetic acid	2416366-19-1
R-PSDCA (NAFION BYPRODUCT 6)	1,1,2,2-tetrafluoro-2-[1,2,2,3,3-pentafluoro-1-(trifluoromethyl)propoxy] ethanesulfonic acid	2416366-21-5
R-EVE	4-(2-carboxy-1,1,2,2-tetrafluoroethoxy)-2,2,3,3,4,5,5,5-octafluoro-pentanoic acid	2416366-22-6

PEPA	Perfluoro-2-ethoxypropanoic acid	267239-61-2
PFESA-BP1 (NAFION BYPRODUCT 1)	Perfluoro-3,6-dioxa-4-methyl-7-octenesulfonic acid	29311-67-9
PFO2HXA	Perfluoro (3,5-dioxahexanoic) acid	39492-88-1
PFO3OA	Perfluoro (3,5,7-trioxaoctanoic) acid	39492-89-2
PFO4DA	Perfluoro (3,5,7,9-tetraoxadecanoic) acid	39492-90-5
PFO5DA	Perfluoro(3,5,7,9,11-pentaoxadodecanoic) acid	39492-91-6
PFMOAA	Perfluoro-2-methoxyacetic acid	674-13-5
EVE ACID	2,2,3,3-tetrafluoro-3-({1,1,1,2,3,3-hexafluoro-3-[(1,2,2-trifluoroethenyl)oxy]propan-2-yl}oxy)propionic acid	69087-46-3
PFESA-BP2 (NAFION BYPRODUCT 2)	7H-Perfluoro-4-Methyl-3,6-Dioxaoctanesulfonic Acid	749836-20-2
HYDRO-EVE ACID	2,2,3,3-Tetrafluoro-3-{[1,1,1,2,3,3-hexafluoro-3-(1,2,2,2-tetrafluoroethoxy)propan-2-yl]oxy}propanoic acid	773804-62-9
NVHOS	Perfluoroethoxysulfonic acid	801209-99-4
PFECA G	4-(Heptafluoroisopropoxy)hexafluorobutanoic acid	801212-59-9

Table 2. *Values of detected PFAS compounds and detection date for sites with values above PQLs.*

Station	Date	Analytes Detected	Analyte	Result (ng/L)	PFAS Sum (ng/L)
CPF038NSUR **LAKE MACKINTOSH**	05/24/2023	5	PFBA PFBS PFHxS PFOA PFOS	2.1 Q2 2.4 Q2 3.0 Q2 4.2 Q2 8.7 Q2	20.4
CPF002A1SUR **REIDSVILLE LAKE**	05/16/2023	4	PFBA PFHxS PFOA PFOS	7.4 Q2 2.1 Q2 2.4 Q2 3.7 Q2	15.6
CPF089E4SUR **HIGH POINT LAKE**	05/10/2023	8	PFBA PFBS PFHpA PFHxA PFHxS PFOA PFOS PFPeA	3.5 2.6 2.0 4.5 6.4 3.4 10 4.4	36.8
CPF089D5SUR **HIGH POINT RESERVOIR**	05/10/2023	7	PFBA PFBS PFHxA PFHxS PFOA PFOS PFPeA	2.1 2.2 2.4 2.0 2.5 3.9 2.3	17.4
CPF007BSUR **LAKE BRANDT**	05/11/2023	8	PFBA PFBS PFHpA PFHxA PFHxS PFOA PFOS PFPeA	3.1 3.0 2.1 4.2 9.8 3.8 19 3.8	48.8
CPFLT8SUR **LAKE TOWNSEND**	05/11/2023	7	PFBA PFBS PFHxA PFHxS PFOA PFOS PFPeA	2.3 2.9 3.8 8.6 3.1 17 3.4	41.1

Station	Date	Analytes Detected	Analyte	Result (ng/L)	PFAS Sum (ng/L)
CPFSCR4SUR **LAKE BURLINGTON**	05/23/2023	8	PFBA PFBS PFHpA PFHxA PFHxS PFOA PFOS PFPeA	2.6 Q2 2.2 Q2 4.6 Q2 4.6 Q2 4.0 Q2 12 Q2 16 Q2 3.9 Q2	49.9
CPFGMR4SUR **GRAHAM-MEBANE RESERVOIR**	05/11/2023	7	PFBA PFBS PFHxA PFHxS PFOA PFOS PFPeA	2.0 10 2.2 2.7 6.1 6.9 2.0	31.9
CPFCCR6SUR **CANE CREEK RESERVOIR**	05/04/202	11	PFBA PFBS PFHpA PFHpS PFHxA PFHxS PFNA PFOA PFOS PFPeA PFPeS	3.7 7.8 18 4.9 14 22 2.9 76 93 7.7 6.1	256.1
CPFUL6SUR **UNIVERSITY LAKE**	05/04/2023	1	PFOS	2.9	2.9
CPFBDL1SUR **BUCKHORN DAM LAKE**	05/02/2023	8	PFBA PFBS PFHpA PFHxA PFHxS PFOA PFOS PFPeA	3.3 J2 7.7 2.1 4.2 2.5 4.8 7.9 3.3	35.8
CPFRD4SUR **RANDLEMAN RESERVOIR**	05/02/2023	8	PFBA PFBS PFHpA PFHxA PFHxS PFOA PFOS PFPeA	4.2 8.8 2.5 7.1 6.3 4.8 10 6.6	50.3

Station	Date	Analytes Detected	Analyte	Result (ng/L)	PFAS Sum (ng/L)
CPFSC1SUR **SANDY CREEK RESERVOIR**	05/31/2023	2	PFOA PFOS	2.5 Q2 3.0 Q2	5.5
CPFTR01SUR **TURNER RESERVOIR**	05/22/2023	9	PFBA PFBS PFHpA PFHpS PFHxA PFHxS PFOA PFOS PFPeA	2.7 J2, Q2 14 Q2 2.3 Q2 15 Q2 2.9 Q2 2.0 Q2 4.4 Q2 11 Q2 3.7 Q2	58
CPF138BSUR **GLENVILLE LAKE**	05/10/2023	9	PFBA PFBS PFHpA PFHxA PFHxS PFOA PFOS PFPeA PMPA	2.2 5.4 2.1 5.8 18 6.8 25 4.0 2.2 J13	71.5
NEW006ESUR **ASU LAKE**	05/15/2023	1	PFHpS	4.9 Q2	4.9
CPF038NSUR **LAKE MACKINTOSH**	06/15/2023	6	PFBA PFBS PFHxA PFHxS PFOA PFOS	2.2 J2 2.2 2.0 3.5 4.8 9.6	24.3
CPF002A1SUR **REIDSVILLE LAKE**	06/27/2023	8	N-EtFOSAA PFBA PFDoS PFHxS PFOA PFOS PFTeDA PFTrDA	2.4 3.4 2.2 J13 2.4 2.5 4.1 2.4 2.3	21.7
CPF089E4SUR **HIGH POINT LAKE**	6/26/2023	8	PFBA PFBS PFHpA PFHxA PFHxS PFOA PFOS PFPeA	4.1 2.9 2.1 4.5 6.3 3.7 8.9 5.2	37.7

Station	Date	Analytes Detected	Analyte	Result (ng/L)	PFAS Sum (ng/L)
CPF089D5SUR **HIGH POINT RESERVOIR**	06/26/2023	7	PFBA PFBS PFHxA PFHxS PFOA PFOS PFPeA	3.2 2.2 2.8 2.6 2.5 4.0 2.7	20
CPF007BSUR **LAKE BRANDT**	06/08/2023	10	PFBA PFBS PFHpA PFHpS PFHxA PFHxS PFOA PFOS PFPeA PFPeS	3.6 Q2 4.2 Q2 2.3 Q2 7.2 Q2 5.5 Q2 11 Q2 3.9 Q2 25 Q2 4.9 Q2 2.2 Q2	69.8
CPFLT8SUR **LAKE TOWNSEND**	06/08/2023	9	PFBA PFBS PFHpA PFHpS PFHxA PFHxS PFOA PFOS PFPeA	3.2 Q2 3.8 Q2 2.0 Q2 2.1 Q2 4.6 Q2 10 Q2 3.3 Q2 20 Q2 4.2 Q2	53.2
CPFSCR4SUR **LAKE BURLINGTON**	06/14/2023	9	PFBA PFBS PFHpA PFHpS PFHxA PFHxS PFOA PFOS PFPeA	3.0 2.4 4.3 6.5 4.9 4.1 12 18 3.7	58.9
CPFGMR4SUR **GRAHAM-MEBANE RESERVOIR**	06/26/2023	8	PFBA PFBS PFHpS PFHxA PFHxS PFOA PFOS PFPeA	3.0 8.9 5.4 2.4 2.8 5.4 7.0 2.2	37.1

Station	Date	Analytes Detected	Analyte	Result (ng/L)	PFAS Sum (ng/L)
CPFCCR6SUR **CANE CREEK RESERVOIR**	06/15/2023	12	6:2 FTS PFBA PFBS PFHpA PFHpS PFHxA PFHxS PFNA PFOA PFOS PFPeA PFPeS	15 J2 4.8 J2 9.7 20 5.7 16 25 3.3 86 110 10 7.9	313.4
CPFUL6SUR **UNIVERSITY LAKE**	06/15/2023	4	PFHxS PFBS PFBA	2.1 2.0 3.3	7.4
CPFBDL1SUR **BUCKHORN DAM LAKE**	06/06/2023	8	PFBA PFBS PFHpA PFHxA PFHxS PFOA PFOS PFPeA	8.0 J2, Q2 7.3 Q2 3.9 Q2 9.5 Q2 4.1 Q2 7.2 Q2 11 Q2 8.5 Q2	59.5
CPFRD4SUR **RANDLEMAN RESERVOIR**	06/06/2023	8	PFBA PFBS PFHpA PFHxA PFHxS PFOA PFOS PFPeA	4.8 6.5 2.7 6.6 5.3 4.8 8.8 6.5	46
CPFSC1SUR **SANDY CREEK RESERVOIR**	06/15/2023	3	PFHpA PFBA PFBS	2.2 2.7 3.5	8.4
CPFTR01SUR **TURNER RESERVOIR**	06/15/2023	7	PFBA PFBS PFHpA PFHxA PFOA PFOS PFPeA	3.2 3.4 8.9 3.2 4.2 5.9 3.2	32

Station	Date	Analytes Detected	Analyte	Result (ng/L)	PFAS Sum (ng/L)
CPF138BSUR **GLENVILLE LAKE**	06/21/2023	11	PFBA PFBS PFHpA PFHxA PFHxS PFOA PFOS PFPeA PFPeS PFO2HxA PMPA	4.8 J2 6.1 2.4 6.3 19 8.0 24 6.4 2.2 2.1 J13, Q2 2.8 J13, Q2	84.1
CPF038NSUR **LAKE MACKINTOSH**	07/19/2023	5	PFBS PFHxA PFHxS PFOA PFOS	2.1 2.1 3.6 5.0 10	22.8
CPF002A1SUR **REIDSVILLE LAKE**	07/24/2023	5	PFBA PFHpS PFHxS PFOA PFOS	7.1 J1, V2 3.4 2.3 2.3 4.3	19.4
CPF089E4SUR **HIGH POINT LAKE**	07/17/2023	8	PFBA PFBS PFHpA PFHxA PFHxS PFOA PFOS PFPeA	4.0 J1 3.8 2.8 5.8 7.6 4.3 11 6.6	45.9
CPF089D5SUR **HIGH POINT RESERVOIR**	07/17/2023	8	PFBA PFBS PFHpS PFHxA PFHxS PFOA PFOS PFPeA	2.7 J1 2.4 2.3 3.1 2.9 2.9 4.4 3.0	23.7
CPF007BSUR **LAKE BRANDT**	07/13/2023	10	6:2 FTS PFBA PFBS PFHpA PFHxA PFHxS PFOA PFOS PFPeA PFPeS	8.0 J1 3.9 4.1 2.6 8.3 13 4.4 27 7.9 2.4	81.6

Station	Date	Analytes Detected	Analyte	Result (ng/L)	PFAS Sum (ng/L)
CPFLT8SUR **LAKE TOWNSEND**	07/13/2023	9	PFBA PFBS PFHpA PFHpS PFHxA PFHxS PFOA PFOS PFPeA	3.4 3.3 2.0 2.0 4.9 9.0 3.4 18 4.3	50.3
CPFSCR4SUR **LAKE BURLINGTON**	07/20/2023	8	PFBA PFBS PFHpA PFHxA PFHxS PFOA PFOS PFPeA	4.0 J1 2.1 4.1 4.7 3.8 11 15 4.3	49
CPFGMR4SUR **GRAHAM-MEBANE RESERVOIR**	07/19/2023	7	PFBS PFHpA PFHxA PFHxS PFOA PFOS PFPeA	11 2.2 3.4 3.2 6.7 7.5 2.7	36.7
CPFCCR6SUR **CANE CREEK RESERVOIR**	07/13/2023	11	PFBA PFBS PFHpA PFHpS PFHxA PFHxS PFNA PFOA PFOS PFPeA PFPeS	4.0 J1 9.3 19 J2 4.4 16 24 3.0 78 100 9.9 7.9	275.5
CPFUL6SUR **UNIVERSITY LAKE**	07/13/2023	4	PFBA PFHpS PFOA PFOS	3.3 J1 13 2.4 3.6	22.3
CPFBDL1SUR **BUCKHORN DAM LAKE**	07/11/2023	8	PFBA PFBS PFHpA PFHxA PFHxS PFOA PFOS PFPeA	5.5 J1 8.1 3.4 7.5 3.6 7.3 12 8.3	55.7

Station	Date	Analytes Detected	Analyte	Result (ng/L)	PFAS Sum (ng/L)
CPFRD4SUR **RANDLEMAN RESERVOIR**	07/18/2023	8	PFBA PFBS PFHpA PFHxA PFHxS PFOA PFOS PFPeA	5.4 J1 7.2 3.3 9.5 6.7 6.0 11 9.7	58.8
CPFSC1SUR **SANDY CREEK RESERVOIR**	07/20/2023	5	PFBA PFBS PFHpA PFOA PFOS	3.6 J1 4.0 2.5 2.8 4.1	17
CPFTR01SUR **TURNER RESERVOIR**	07/20/2023	8	PFBA PFHpA PFHpS PFHxA PFHxS PFOA PFOS PFPeA	3.4 J1 18 17 2.6 2.3 4.2 9.5 2.5	59.5
CPF138BSUR **GLENVILLE LAKE**	07/20/2023	11	PFBA PFBS PFHpA PFHpS PFHxA PFHxS PFO2HxA PFOA PFOS PFPeA PMPA	3.2 J1 4.4 3.0 2.1 4.2 12 2.3 J13 5.4 17 4.6 2.8 J1, J13	61
NEW006ESUR **ASU LAKE**	07/10/2023	2	PFBS PFOS	6.8 4.1	10.9
NEWBTP1SUR **BLOWING ROCK LAKE**	07/10/2023	1	PFBS	3.6	3.6
WATBL1SUR **BUCKEYE LAKE**	07/11/2023	1	PFBS	5.3	5.3

Station	Date	Analytes Detected	Analyte	Result (ng/L)	PFAS Sum (ng/L)
CPF038NSUR **LAKE MACKINTOSH**	08/10/2023	7	PFBA PFBS PFESA BP2 PFHxA PFHxS PFOA PFOS	2.4 J1 2.0 3.5 J13 1.9 3.4 4.8 11	29
CPF002A1SUR **REIDSVILLE LAKE**	08/21/2023	4	PFHpS PFHxS PFOA PFOS	4.3 2.4 2.4 3.8	12.9
CPF089E4SUR **HIGH POINT LAKE**	08/22/2023	8	PFBA PFBS PFHpA PFHxA PFHxS PFOA PFOS PFPeA	3.5 3.0 2.1 5.0 6.5 3.6 9.2 5.8	38.7
CPF089D5SUR **HIGH POINT RESERVOIR**	08/22/2023	7	PFBA PFBS PFHxA PFHxS PFOA PFOS PFPeA	2.8 2.3 3.1 2.7 2.6 5.6 3.0	22.1
CPF007BSUR **LAKE BRANDT**	08/17/2023	10	6:2 FTS PFBA PFBS PFHpA PFHxA PFHxS PFOA PFOS PFPeA PFPeS	4.5 3.7 5.4 3.1 9.6 16 5.1 43 9.2 3.5	103.1
CPFLT8SUR **LAKE TOWNSEND**	08/17/2023	10	PFBA PFBS PFHpA PFHpS PFHxA PFHxS PFOA PFOS PFPeA PFPeS	2.8 3.1 2.1 3.1 5.2 9.6 3.3 23 5.1 1.9	59.2

Station	Date	Analytes Detected	Analyte	Result (ng/L)	PFAS Sum (ng/L)
CPFSCR4SUR **LAKE BURLINGTON**	08/23/2023	11	PFBA PFBS PFHpA PFHpS PFHxA PFHxS PFNA PFOA PFOS PFPeA PFPeS	3.5 J1 3.4 8.4 9.4 9.2 7.9 1.9 24 32 7.3 2.5	109.5
CPFGMR4SUR **GRAHAM-MEBANE RESERVOIR**	08/17/2023	8	PFBA PFBS PFHpA PFHxA PFHxS PFOA PFOS PFPeA	3.0 J1 12 2.6 3.2 3.4 6.9 8.3 3.3	42.7
CPFCCR6SUR **CANE CREEK RESERVOIR**	08/03/2023	11	PFBA PFBS PFHpA PFHpS PFHxA PFHxS PFNA PFOA PFOS PFPeA PFPeS	4.7 J1 9.3 20 8.8 16 25 3.3 81 110 9.9 7.3	295.3
CPFUL6SUR **UNIVERSITY LAKE**	08/03/2023	6	PFBA PFHpA PFHpS PFHxS PFOA PFOS	2.9 J1 6.3 12 2.0 2.2 3.5	28.9
CPFBDL1SUR **BUCKHORN DAM LAKE**	08/01/2023	8	PFBA PFBS PFHpA PFHxA PFHxS PFOA PFOS PFPeA	5.9 J1 8.8 10 8.7 4.4 8.1 13 8.5	67.4

Station	Date	Analytes Detected	Analyte	Result (ng/L)	PFAS Sum (ng/L)
CPFRD4SUR **RANDLEMAN RESERVOIR**	08/08/2023	8	PFBA PFBS PFHpA PFHxA PFHxS PFOA PFOS PFPeA	5.5 J1 6.7 3.2 9.7 6.6 5.7 11 9.6	58
CPFSC1SUR **SANDY CREEK RESERVOIR**	08/16/2023	6	PFBA PFHpA PFHxA PFHxS PFOA PFOS	2.9 2.7 1.9 1.8 3.5 4.5	17.3
CPFTR01SUR **TURNER RESERVOIR**	08/16/2023	7	PFBA PFHpA PFHpS PFHxA PFOA PFOS PFPeA	3.0 J1 14 15 2.6 4.1 11 2.5	52.2
CPF138BSUR **GLENVILLE LAKE**	08/15/2023	11	PFBA PFBS PFHpA PFHxA PFHxS PFO2HxA PFOA PFOS PFPeA PFPeS PMPA	3.4 J1 5.8 11 5.3 16 2.9 J13 7.0 21 4.3 2.1 2.9 J13	81.7
CPF038NSUR **LAKE MACKINTOSH**	09/07/2023	6	PFBA PFBS PFHxA PFHxS PFOA PFOS	2.5 J1 2.3 2.0 3.1 4.5 8.7	23.1
CPF002A1SUR **REIDSVILLE LAKE**	09/06/2023	4	PFHpS PFHxS PFOA PFOS	2.2 2.3 2.5 4.2	11.2

Station	Date	Analytes Detected	Analyte	Result (ng/L)	PFAS Sum (ng/L)
CPF089E4SUR **HIGH POINT LAKE**	09/12/2023	8	PFBA PFBS PFHpA PFHxA PFHxS PFOA PFOS PFPeA	4.3 3.5 2.5 5.0 6.0 3.7 9.0 5.7	39.7
CPF089D5SUR **HIGH POINT RESERVOIR**	09/12/2023	7	PFBA PFBS PFHxA PFHxS PFOA PFOS PFPeA	2.9 J1 2.6 3.1 2.3 2.6 3.9 3.4	20.8
CPF007BSUR **LAKE BRANDT**	09/14/2023	11	6:2 FTS PFBA PFBS PFHpA PFHpS PFHxA PFHxS PFOA PFOS PFPeA PFPeS	2.1 J1 4.3 J1 5.5 3.0 3.4 8.4 15 4.8 36 8.4 3.1	94
CPFLT8SUR **LAKE TOWNSEND**	09/14/2023	9	PFBA PFBS PFHpA PFHpS PFHxA PFHxS PFOA PFOS PFPeA	3.2 J1 3.1 2.1 2.6 4.9 8.2 3.0 18 4.9	50
CPFSCR4SUR **LAKE BURLINGTON**	09/06/2023	11	PFBA PFBS PFHpA PFHpS PFHxA PFHxS PFNA PFOA PFOS PFPeA PFPeS	3.8 J1 3.6 7.8 3.2 8.6 7.0 2.0 21 28 7.2 2.1	94.3

Station	Date	Analytes Detected	Analyte	Result (ng/L)	PFAS Sum (ng/L)
CPFGMR4SUR **GRAHAM-MEBANE RESERVOIR**	09/11/2023	9	PFBA PFBS PFHpA PFHpS PFHxA PFHxS PFOA PFOS PFPeA	3.7 J1 11 2.6 5.1 3.4 3.1 6.7 7.8 3.4	46.8
CPFCCR6SUR **CANE CREEK RESERVOIR**	09/07/2023	11	PFBA PFBS PFHpA PFHpS PFHxA PFHxS PFNA PFOA PFOS PFPeA PFPeS	4.9 J1 9.8 27 4.3 16 24 3.5 73 96 11 7.6	277.1
CPFUL6SUR **UNIVERSITY LAKE**	09/07/2023	8	PFBA PFBS PFHpA PFHpS PFHxS PFOA PFOS PFPeA	3.6 J1 2.0 5.3 3.2 2.2 2.4 3.9 2.1	24.7
CPFBDL1SUR **BUCKHORN DAM LAKE**	09/05/2023	9	GenX PFBA PFBS PFHpA PFHxA PFHxS PFOA PFOS PFPeA	4.2 8.7 J1 16 6.1 18 5.6 10 16 18	102.6
CPFRD4SUR **RANDLEMAN RESERVOIR**	09/05/2023	8	PFBA PFBS PFHpA PFHxA PFHxS PFOA PFOS PFPeA	5.2 J1 7.5 3.1 9.3 5.9 5.3 9.9 9.4	55.6

Station	Date	Analytes Detected	Analyte	Result (ng/L)	PFAS Sum (ng/L)
CPFSC1SUR **SANDY CREEK RESERVOIR**	09/21/2023	5	PFBA PFHpS PFOA PFOS PFPeA	3.6 J1 3.0 3.1 4.1 2.0	15.8
CPFTR01SUR **TURNER RESERVOIR**	09/21/2023	6	PFBA PFHpS PFHxA PFOA PFOS PFPeA	3.2 J1 6.7 2.3 3.1 7.6 2.6	25.5
CPF138BSUR **GLENVILLE LAKE**	09/21/2022	13	PFBA PFBS PFHpA PFHpS PFHxA PFHxS PFMOAA PFO2HxA PFOA PFOS PFPeA PFPeS PMPA	3.0 J1 6.5 2.3 3.2 5.1 16 5.1 J1, J13 5.0 J13 6.6 21 4.2 2.3 2.9 J1, J13	83.2

Data Qualifier Codes:

J1 – Surrogate recovery limits have been exceeded.

J2 – The reported value failed to meet the established quality control criteria for either precision or accuracy.

J13 – Standards used for this analyte are from an uncertified source. These are the only standards currently available for this analyte.

Q2 – Holding time exceeded following receipt by lab.

V2 – The analyte was detected in both the sample and the field blank.