

PFAS Contamination of the Lower Androscoggin River:

Results of an Initial Sampling* Probe



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* Sampling funded by [WILPF Earth Democracy Project](#)



Maine Environmental Group finds high levels of PFAS in the Androscoggin River

By Pat Elder
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In addition to the PFAS test, Ed Friedman measures specific conductivity for a general measure of water quality. Photo: Pat Elder

Ed Friedman with [Friends of Merrymeeting Bay](#) (FOMB) in Bowdoinham, Maine teamed up with local activists and other FOMB members Barbara West and Martha Spiess to test for PFAS in the Androscoggin River and a nearby stream that empties into it. Pat Elder of www.militarypoisons.org facilitated the testing.

They found alarming levels of the cancer-causing chemicals.

The group met on a crisp morning in late October at the Merrymeeting Dog Park and walked on the picturesque trail along the river to the outfall of the Brunswick

Sewer District on the Androscoggin River. Sewer pipes that empty into rivers aren't normal destinations for hikers, but this group knew exactly where it was heading to collect a water sample.

PFAS test kits used in the current sampling are manufactured by [Cyclopure](#), a materials science company. The test kits are finding widespread use and have been found to be remarkably accurate.

The environmentalists also collected a sample from a stream between Bath Rd. and Allagash Drive, draining ponds on the former Brunswick Naval Air Station (BNAS) about 2,500 feet from where the stream empties into the Androscoggin. The site is about a mile southeast from the Brunswick Sewer District and just west of Cook's Corner.



The red X shows the sewer outfall on the Androscoggin River. The yellow X is the site of the stream with dangerously high levels of the carcinogens.

Here's what they found:

Location	PFOS	PFOA	PFHxS	PFNA	PFHpA	PFDA	Total 6 PFAS
River Outfall	51.1	5.4	3.4	1.1	1.7	3	65.7
Stream	363.1	29.1	110	1.2	14.4	<1	517.8

The group reported 363.1 parts per trillion (ppt) of PFOS (per-and poly fluoroalkyl substances) in a stream draining out of the former Brunswick Naval Air Station into the Androscoggin River. They also found 51.1 ppt of PFOS in the river at the Brunswick Sewer District outfall which still receives and discharges wastewater from the former air station. PFOS is among the most dangerous of PFAS compounds because it bioaccumulates in seafood.

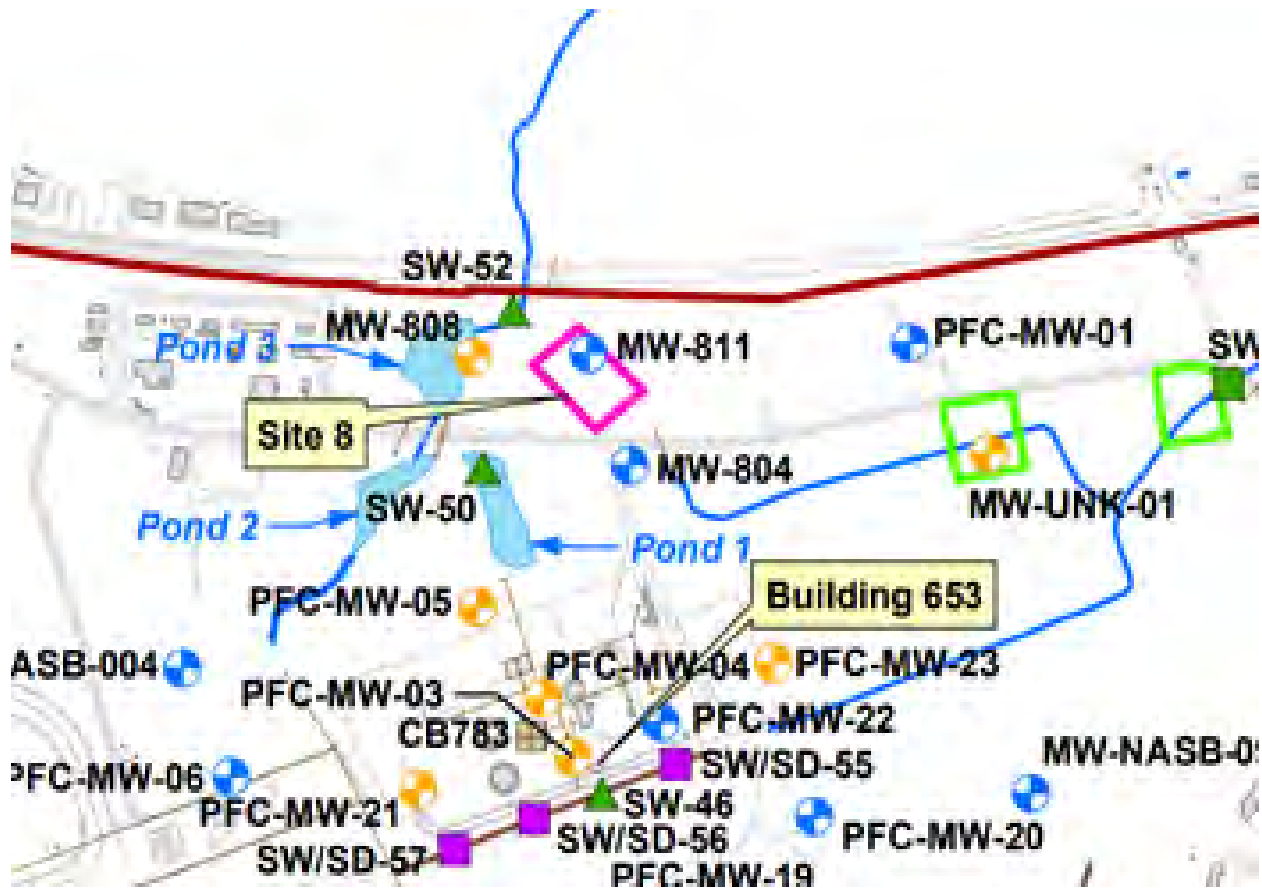
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Maine limits the 6 PFAS compounds in the preceding Table and listed below to 20 ppt (alone or in combination) in drinking water:

- Perfluorooctanoic acid (PFOA)
- Perfluorooctane sulfonic acid (PFOS)
- Perfluorohexane sulfonic acid (PFHxS)
- Perfluorononanoic acid (PFNA)
- Perfluoroheptanoic acid (PFHpA)
- Perfluorodecanoic acid (PFDA).

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Total PFAS concentrations were 183.1 ppt for the river (total of 36 different PFAS compounds detected) and 1,661.2 ppt for the stream (total of 29 different compounds detected). CycloPure tests for 55 PFAS compounds.



The Navy & DEP tested the toxic stream water for only three PFAS compounds at the same spot in 2018. The sample site is shown at the top of this Navy graphic as the green triangle marked “SW-52”. (Note: “Pond 1” is only a tiny creek.)

Analyte (ppt)	Navy - May, 2018	FOMB - Dec, 2021
PFOS	256.0	363.1
PFOA	29.9	29.1
PFBS	17.2	9.5
Total PFAS reported	303.1 (3 compounds)	1,661.2 (29 compounds)

NGO activists reported five times more PFAS than did the Navy but the Navy only reported data for three compounds. Compared to most states, Maine’s done a pretty good job trying to get in front of the PFAS avalanche of poisons. But this report reminds us how far Maine has to go.

6:2 FTS 6:2 Fluorotelomer Sulfonate (6:2 FTS)

The stream draining former Brunswick Naval Air Station contains a shocking concentration of 886.4 ppt 6:2 FTS, a common substitute for PFOS in various industrial applications and in fire-fighting foam. (*See both sets of results below.*) The EPA has not established a reference dose or a reference concentration for 6:2 FTS. They badly need to, given the widespread PFOS replacement use of these compounds. Several studies indicate 6:2 FTS can cause kidney and liver damage in rodents. Scientists have found considerable concentrations of 6:2 FTS in marine invertebrates, indicative of uptake by biological communities.

Brunswick NAS was officially closed on September 15, 2011. The Navy used firefighting foams containing various PFAS compounds from the 1970's until closure however stores of firefighting foam persist on the former base, now run by the Midcoast Regional Redevelopment Authority (MRRA).

Maine is not unique. This is occurring across the country. The sources of most PFAS in the environment are not mysteries. The state has a very good idea who is polluting the environment with it. Vigorously clamping down on the sources of Maine contamination has not been a priority.

Maine has the authority and the ability to monitor pollution and set stringent contaminant levels for PFAS in industrial sewage and surface water discharges. It doesn't help that any commitment Maine regulators may have had to protect health from PFAS has been undermined by the talk-a-lot- do-little EPA under former President Trump. Despite recent decisions under President Biden to add select PFAS to their Contaminant Candidate List, we have yet to see concrete and meaningful regulatory actions from EPA. Designating PFAS as hazardous substances under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or "Superfund") should be done now, not in the fullness of time.

The Navy discharged massive quantities of firefighting foams containing various PFAS compounds for about 35 years. Think of the subsurface soil as a kind of giant subterranean sponge with astronomically high concentrations of the compounds. These chemicals perpetually seep into surface waters along hillsides and ravines. It's busy under the ground, kind of like all of the arteries and veins in our bodies. Brunswick, Maine is in trouble. PFAS is not going away.

The history of carcinogenic foam use at BNAS is disturbing. Due to the number of intentional and accidental discharges of aqueous fire-fighting foam (AFFF) to the sanitary sewer system, treatment of the sanitary drain line was implemented by the Navy as a corrective measure before drain water left the former base. The Navy

injected a defoaming chemical into the sanitary sewer system prior to discharge to the Brunswick Sewer District. While the defoamer reduces the amount of foam entering into the Brunswick wastewater treatment plant (WWTP), it does not break down the chemical compounds producing the foam. While drain line treatments occurred prior to base closure, system conditions have remained in need of upgrading since transfer to the MRRA and many floor drains still empty into the Brunswick WWTP.

AFFF can cause issues with wastewater treatment plants if the foam concentrate or solution enters a sanitary sewer. There is rapid mixing and agitation which can give rise to a dangerous generation and expansion of foam. It's a common practice for the Navy to inject defoaming chemicals into the mix before sending AFFF-laden substances to municipal sewer systems. We saw it in the Chesapeake region earlier this year when the Patuxent River NAS in Maryland treated 2,500 gallons of highly concentrated foam with defoaming agents before the local wastewater treatment plant dumped it, untreated, into the middle of the Chesapeake Bay. Navy hangers often experience accidental discharges of foam.

The Brunswick Sewer District may receive sewage from many sources that contain PFAS. It may also be picking up stormwater runoff from AFFF use at the old base.

That PFOS is the dominant sampled species, along with 2:6 FTS, the fire-fighting foam PFOS replacement, puts the former BNAS in the crosshairs as the likely source.

Officials in Minnesota say PFOS concentrations in fish filet may be up to 7,000 times greater than the ambient water levels. They have set Health Based Value (the level of a contaminant that can be present and pose little or no health risk) limits for [PFOS in drinking water at 15 ppt](#). The water in the Androscoggin has concentrations of PFOS at 51.1 ppt, 333% higher. Fish in the river are likely to be highly contaminated.

Maine has reported deer meat from the Waterville region with [40,000 ppt](#) of PFOS likely as a result of spreading municipal and or industrial sludge. Mussels in Brunswick were found with a total of [12,020 ppt](#) of overall PFAS and 7,270 of PFOS. A Brook Trout had concentrations of [1,080,000 ppt](#) of PFOS in a stream near the former Loring Air Force Base, closed in 1994, where fire-fighting foams, like those at Brunswick Naval Air Station, were carelessly used and discarded for years. (Note: this facility is now known as Loring International Airport, is operational and has similar problems to NASB). Chicken eggs in Fairfield contained an average of 37,000 ppt of PFAS, according to the Maine Department of Health and Human Services. Critters near many of Maine's military and

industrial sites are poisoned and so are the birds and their eggs. We can change this with a whole lot of education, stringent regulation, and more courage in Augusta.

We call for clean-up of PFAS hotspots on the former base and elsewhere, robust testing, regular reporting of effluent from significant industrial users and establishing stringent, enforceable maximum contaminant levels in Maine soil, water, sludge, fish and wildlife.

Test results from BNAS Pond 3 Outlet Stream 12/1/21

testing_location	Brunswick, ME 04011
sample_taken_from	Unfiltered
date_of_testing	12/1/21 10:30 AM
Order ID	3924
GenX	< 5 ng/L
N-EtFOSAA	< 1 ng/L
N-MeFOSAA	< 1 ng/L
PFBA	10
PFBS	9.5
PFDA	< 1 ng/L
PFDoA	< 1 ng/L
PFHpA	14.4
PFHxA	78.1
PFHxS	110
PFNA	1.2
PFOA	29.1
PFOS	363.1
PFPeA	66.3
PFTeA	< 1 ng/L
PFTrDA	< 1 ng/L
PFUnA	< 1 ng/L
Total PFAS (17 Compounds)	681.7
Additional PFAS	
PFPrS	2.6
PFPeS	14
PFHpS	8.8
PFECHS	3.1
FBSA	8.7
FHxSA	9.8
5:3 FTA	12.4
FHEA	9.1
FOUEA	18.1
4:2 FTS	3.6
6:2 FTS	886.4
8:2 FTS	2.9
Total PFAS (All Detected)	1661.2

Test results from Brunswick Sewer District Androscoggin outfall 10/28/21

WTK_ID	WTK_PFAS_669
Sampling Location	Brunswick, ME 04011 (Androscoggin River)
Filtration Status	Unfiltered
Sampling Date	10/28/21 11:00 AM
Order ID	3645
GenX	< 5 ng/L
N-EtFOSAA	8.5
N-MeFOSAA	19.7
PFBA	1.4
PFBS	1
PFDA	3
PFDoA	< 1 ng/L
PFHpA	1.7
PFHxA	6.6
PFHxS	3.4
PFNA	1.1
PFOA	5.4
PFOS	51.1
PFPeA	3.4
PFTeA	< 1 ng/L
PFTrDA	< 1 ng/L
PFUnA	< 1 ng/L
Total PFAS (17 Compounds)	106.3
Additional PFAS	
5:3 FTA	3.2
7:3 FTA	< 1 ng/L
6:2 FTS	18.4
8:2 FTS	3.2
FBSA	< 1 ng/L
FHxSA	< 2
PFOSA	5.9
PFPrS	< 1 ng/L
PFPeS	< 1 ng/L
PFHpS	< 1 ng/L
PFNS	< 1 ng/L
PFDS	< 1 ng/L
PFECHS	< 1 ng/L
FOSAA	1.9
NMeFOSE	2.3
PFOPA	< 5 ng/L
6:2diPAP	39.4
6:6PFPi	1.4
N-AP-FHxSA	1.1
Total PFAS (All Detected)	183.1

FINAL TIER II SAMPLING AND ANALYSIS PLAN ADDENDUM PER AND
POLYFLUOROALKYL SUBSTANCES BASEWIDE INVESTIGATION NAS
BRUNSWICK ME 05/03/2018 RESOLUTION CONSULTANTS

https://www.navfac.navy.mil/niris/MID_ATLANTIC/BRUNSWICK_NAS/N60087_003833.pdf

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PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) INVESTIGATION
SUMMARY REPORT Former Naval Air Station (NAS) Brunswick Brunswick,
Maine FINAL Prepared for: Naval Facilities Engineering Command, Mid-Atlantic
September 2020

https://www.navfac.navy.mil/niris/MID_ATLANTIC/BRUNSWICK_NAS/N60087_004082.pdf

For more information:

Pat Elder, Military Poisons 301-997-3963

Ed Friedman, Friends of Merrymeeting Bay 207-666-3372

Barbara West, ME, Women's International League for Peace and Freedom-US 207-443-2899