



Freshwater PFAS

Tom Danielson, Ph.D.

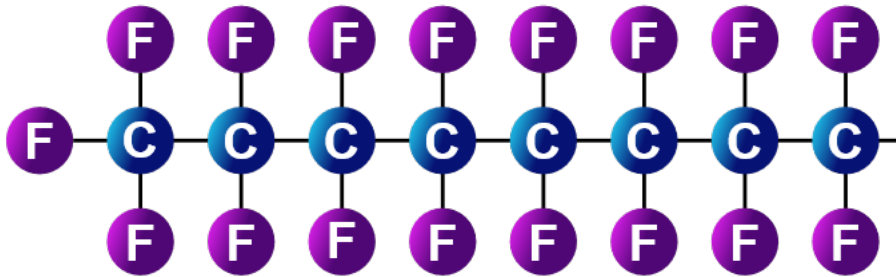
Casco Bay Monitoring Network
May 14, 2024

MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION

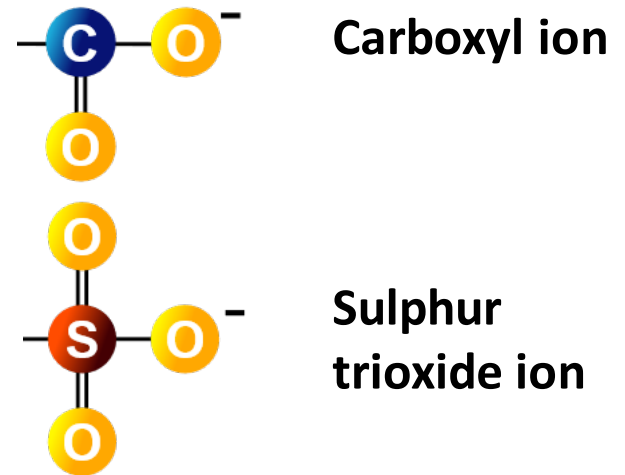
Protecting Maine's Air, Land and Water

Per- and Polyfluoroalkyl Substances (PFAS)

Fluorinated Carbon Chain (“Tail”)



Functional Group (“Head”)



Carboxyl ion

Sulphur trioxide ion

C Carbon

F Fluorine

O Oxygen

S Sulfur

N Nitrogen

H Hydrogen

Tom Danielson, Maine DEP

Monitoring Freshwater Toxics

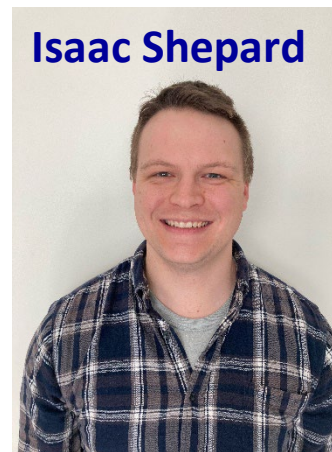


Aquatic Toxicology Unit

- Tom Danielson (Biologist III)
- Isaac Shepard (Biologist I)
- Joe Glowa (Env. Technician)
- 1/3 of Josh Noll (Env. Technician)



Joe Glowa



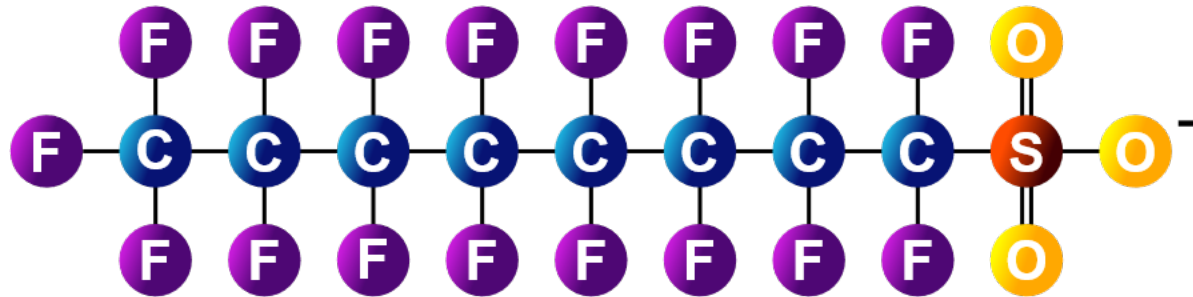
Isaac Shepard



Josh Noll



Perfluorooctane sulfonate (PFOS)

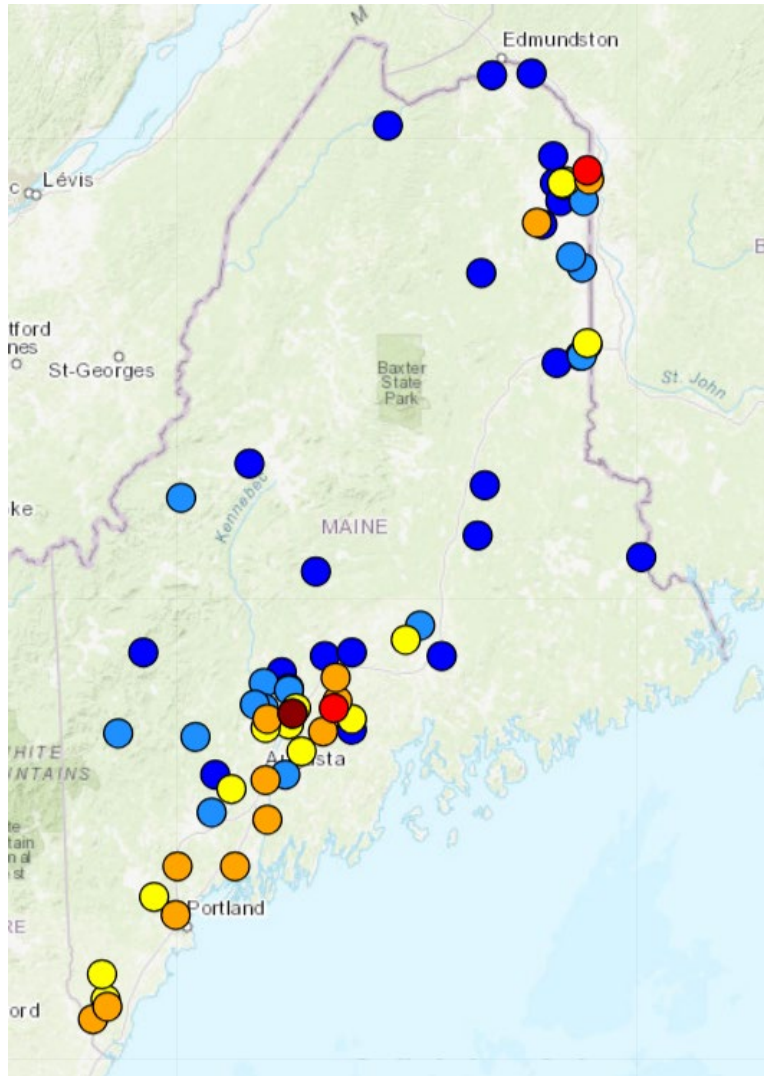


Tom Danielson, Maine DEP

- Maine has a fish tissue action level (FTAL) for PFOS of **3.5 ppb (*ng/g wet weight*)**
- Applies to freshwater and anadromous fish



PFOS in Surface Waters (2021-2023)



Average PFOS Concentration

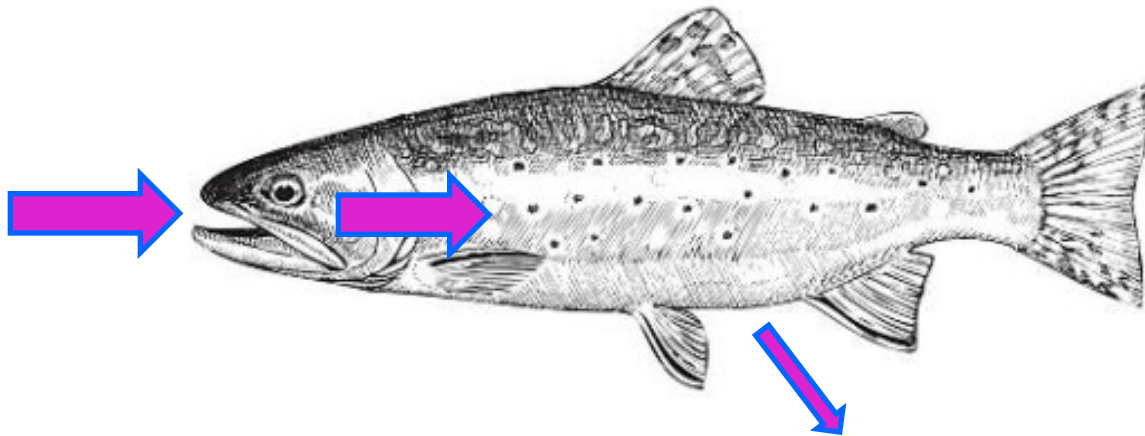
ng/L, ppt

- < 0.5
- 0.5 - 1
- 1 - 2
- 2 - 10
- 10 - 100
- > 100



Uptake of PFOS By Fish

Uptake from eating food or sediment
Uptake from water passing over gills

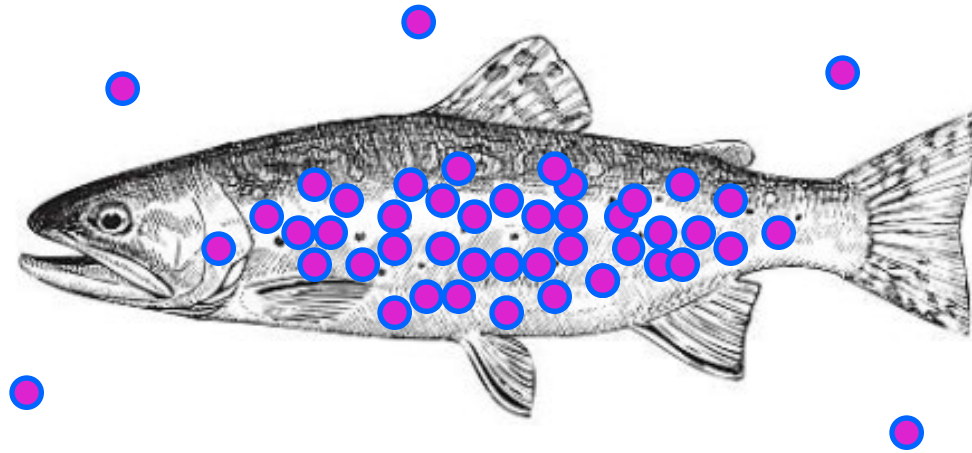


Loss from excretions



PFOS Bioaccumulation

Hundreds or thousands times more in the fish
(for some kinds of PFAS)



Fish Consumption Advisories

Responsible Agency

Maine Center for Disease Control & Prevention

An Office of the Maine Department of Health and Human Services

Breana Bennett and Andy Smith

Agencies that Provide Input



Francis Brautigam, Jerrod Parker, Tegwin Taylor



Tom Danielson, Wendy Garland

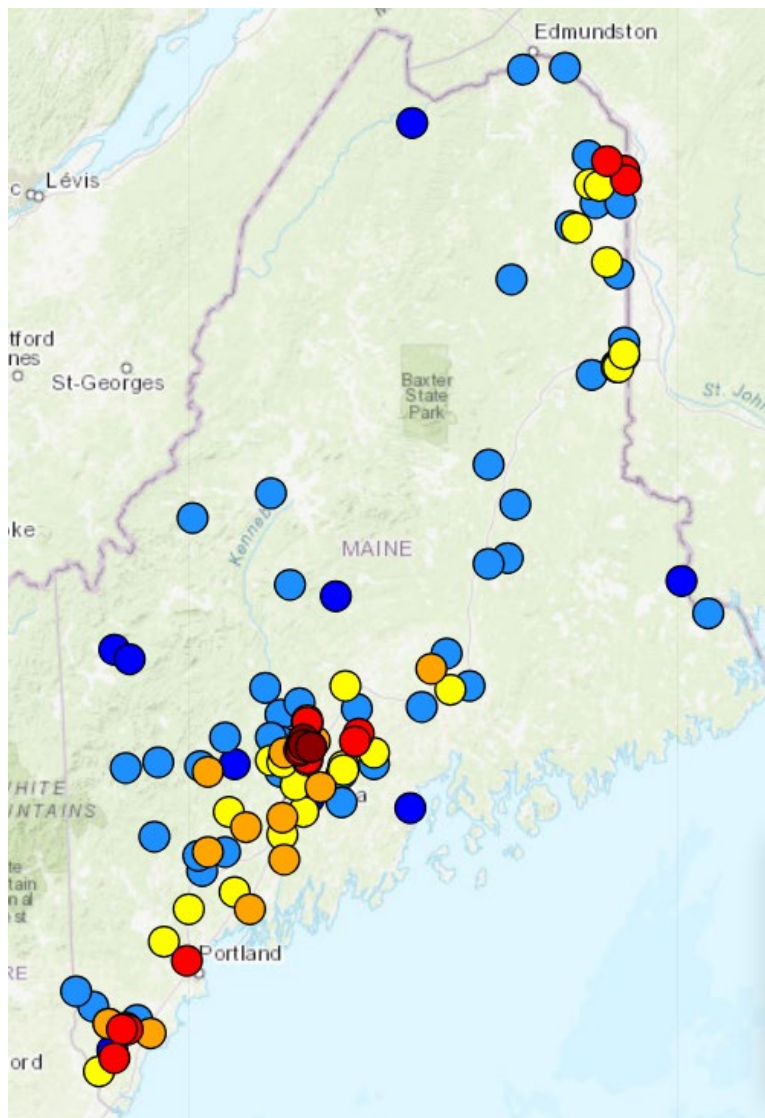


Color	PFOS ng/g, ppb	Brook Trout and Landlocked Salmon	All Other Fish
●	< 1	Follow mercury advisory	Follow mercury advisory
●	1 – 3.5	Follow mercury advisory	Follow mercury advisory
●	3.5 – 7.5	2 meals per month*	Follow mercury advisory
●	7.5 – 15	1 meal per month*	1 meal per month*
●	15 – 30	6 meals per year*	6 meals per year*
●	30 – 60	3 meals per year*	3 meals per year*
●	> 60	Do Not Eat*	Do Not Eat*

*** Maine CDC might consider waterbody-specific fish consumption advisory for PFAS**



PFOS in Maine Fish (2014-23)



Average PFOS Concentration (ng/g, ppb)

- < 1
- 1 – 3.5*

- 3.5* - 7.5
- 7.5 - 15
- 15 - 60
- > 60

* Maine's fish tissue action level (FTAL) for PFOS is 3.5 ppb



Portland Area Sampling 2023

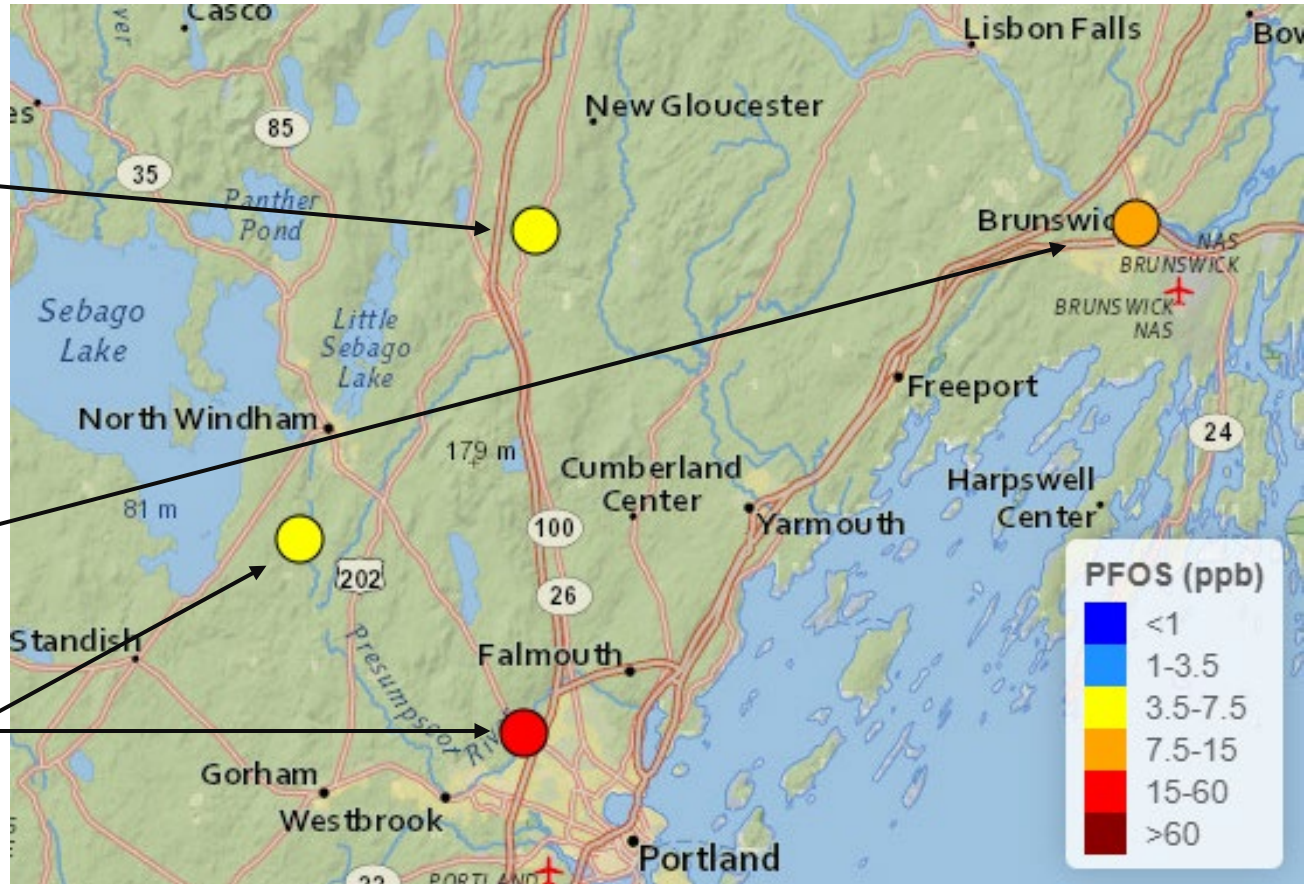


Collyer Brook

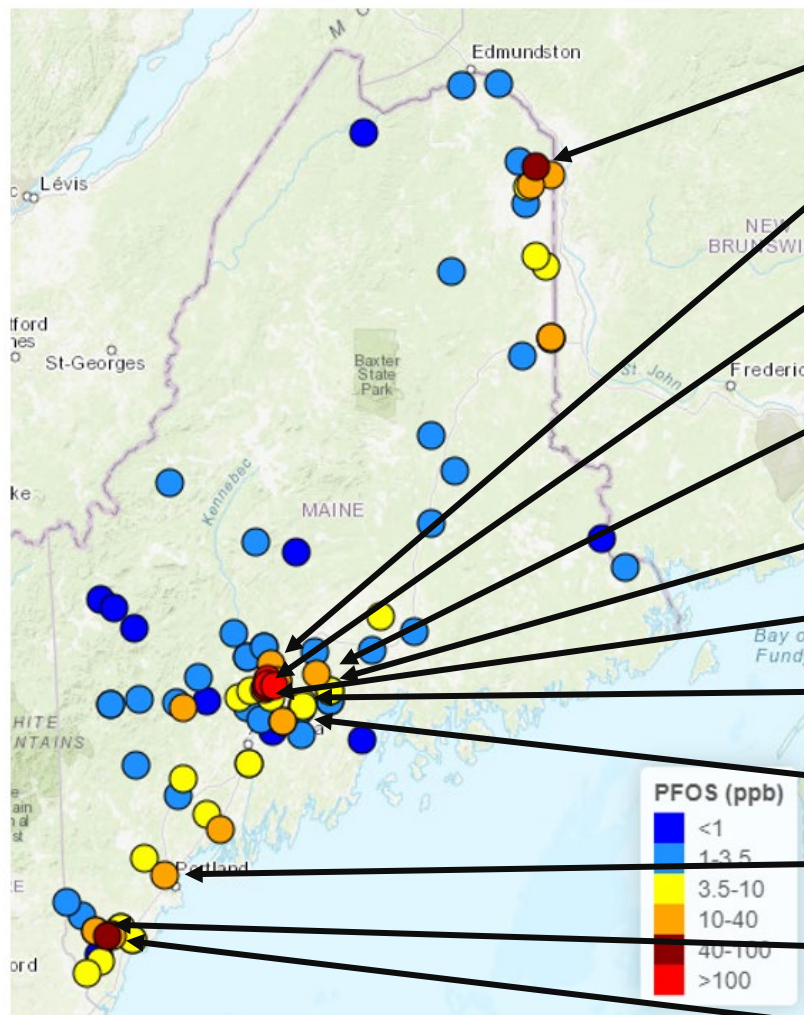


Androscoggin River

Presumpscot River



PFAS Fish Consumption Advisories



Durepo Pond & Limestone Stream

(4 meals/year of brook trout &
Do not eat smallmouth bass)

Kennebec River (9 meals/year of bass)

Fish Brook, Fairfield (Do not eat)

PAL Ponds, Fairfield (Do not eat)

Unity Pond, Unity

(6 meals/year of black crappies &
12 meals/year of other fish)

Halfmoon Stream (2 meals/month of brook trout)

Messalonskee Stream (3 meals/year)

Fifteenmile Stream (2 meals/month of brook trout)

China Lake (1 meal/month)

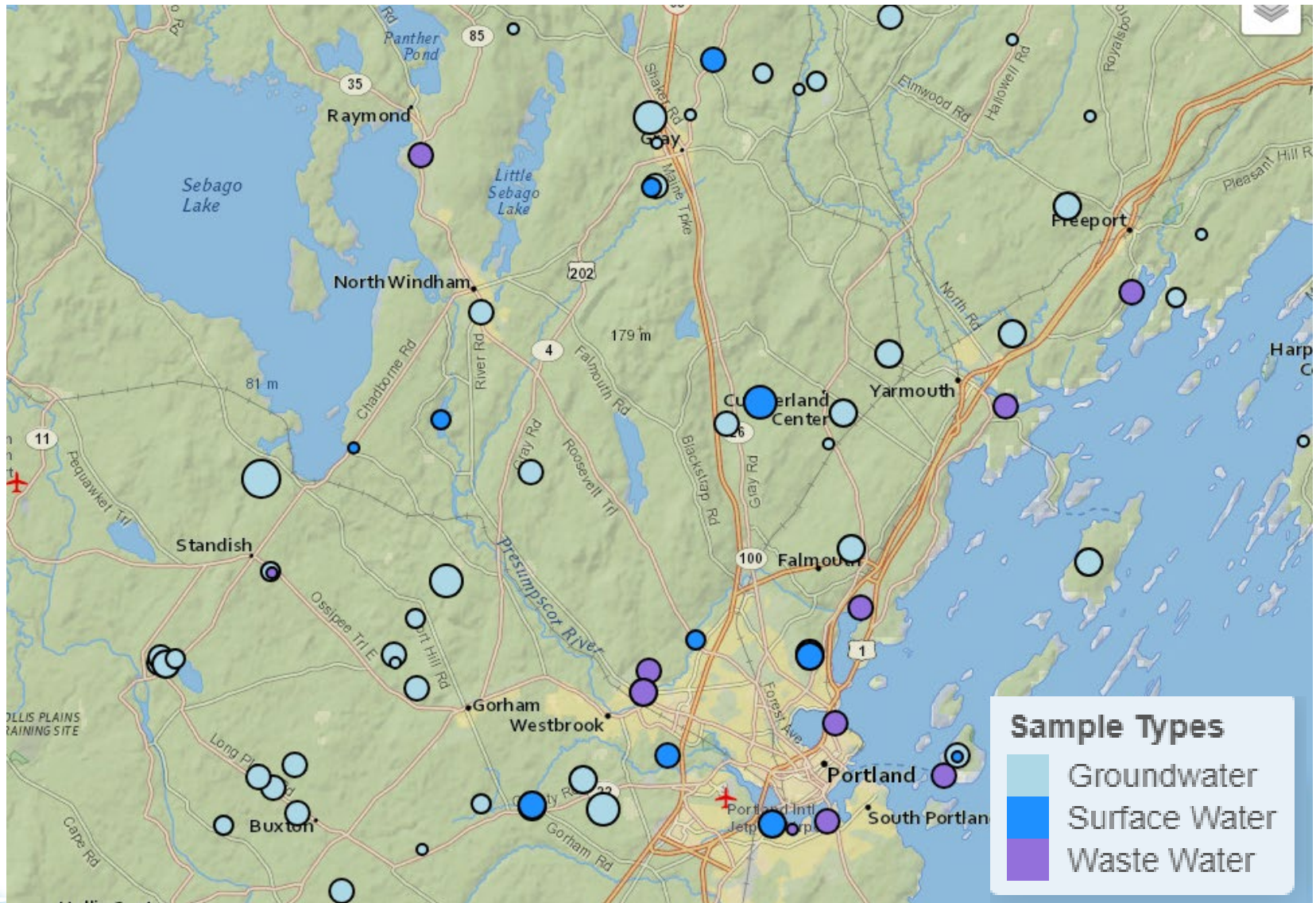
Presumpscot River (4 meals/year)

Number One Pond (1 meal/month of bass)

Mousam River (3 meals/year)



Other PFAS Samples



PFAS Investigation Map

<https://www.maine.gov/dep/spills/topics/pfas/index.html>

Maine DEP PFAS Investigation (Formerly the "Septage and Sludge Map")

This map depicts groundwater (residential well drinking water), soil, fish, surface water, and wastewater samples collected and analyzed for various PFAS. The map is continuously updated as more information and data become available. All data is carefully reviewed and validated. The information presented on this map comes from several sources, including the Maine Environmental and Geographic Analysis Database (EGAD). Please note that the data illustrated on this map represents the most recent data available and does not represent a comprehensive dataset of all available information.

Please be patient while our staff investigate and assemble this data, which is updated bi-weekly. Any errors or omissions should be reported via email to PFAS.DEP@maine.gov.

For information relating to PFAS testing in groundwater and soil, please visit <https://www.maine.gov/dep/spills/topics/pfas/>.

For information relating to PFAS testing of fish and surface water, please visit <https://www.maine.gov/dep/water/monitoring/toxics/swat/>.

For information relating to PFAS testing of wastewater effluent sampling, please visit https://www.maine.gov/dep/gis/datamaps/LD1911/index_study_details.html

Legend

- PFAS Results Near Land Application Sites
 - Above Drinking Water Standard
 - Below Drinking Water Standard
- PFAS Groundwater Results Near Other Site Types
 -
- PFAS Fish Sample Location
 -
- PFAS Surface Water Samples
 -
- Installed Water Treatment System
 -
- Septage Land Application Site
 - Septage Land Application Site
- Sludge Utilization Site
 - Sludge Utilization Site
- LD1911 PFAS Investigation - Wastewater Sample Location
 -
- Soil Sample Area
 -
- Maine Towns
 -





Surface Water Ambient Toxics (SWAT) Monitoring Program Reports

<https://www.maine.gov/dep/water/monitoring/toxics/swat>

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