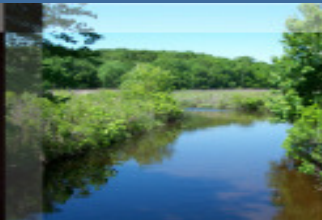




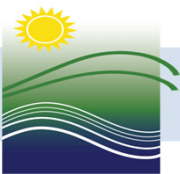
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Connecticut Department of
**ENERGY &
ENVIRONMENTAL
PROTECTION**

Introduction to PFAS and Firefighting Foam Release to the Farmington River

CEHA Annual Meeting
Portland, CT
November 1, 2019



Connecticut Department of Energy and Environmental Protection

Overview

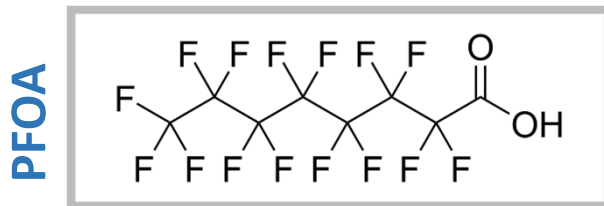
- Overview of PFAS chemicals
- Timeline of events related to Signature Flight AFFF release
- DEEP and DPH response
- On-going environmental assessment
- Lessons learned



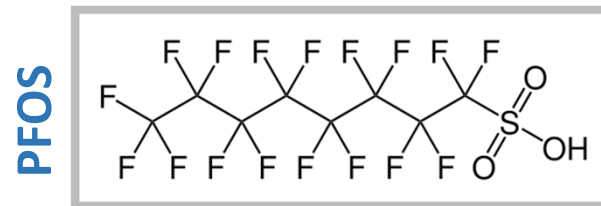
What Are PFAS?

PFAS = Per- and Polyfluoroalkyl Substances

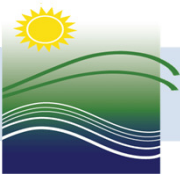
- Over 4,700 “forever chemicals”
- Developed in the 1940s
- Ubiquitous in consumer products and industry
- PFOA and PFOS most well-known



Perfluorooctanoic acid



Perfluorooctane sulfonic acid



PFAS Characteristics

GOOD

- Resist oil, grease, water, heat
- Stable

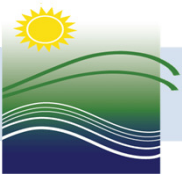
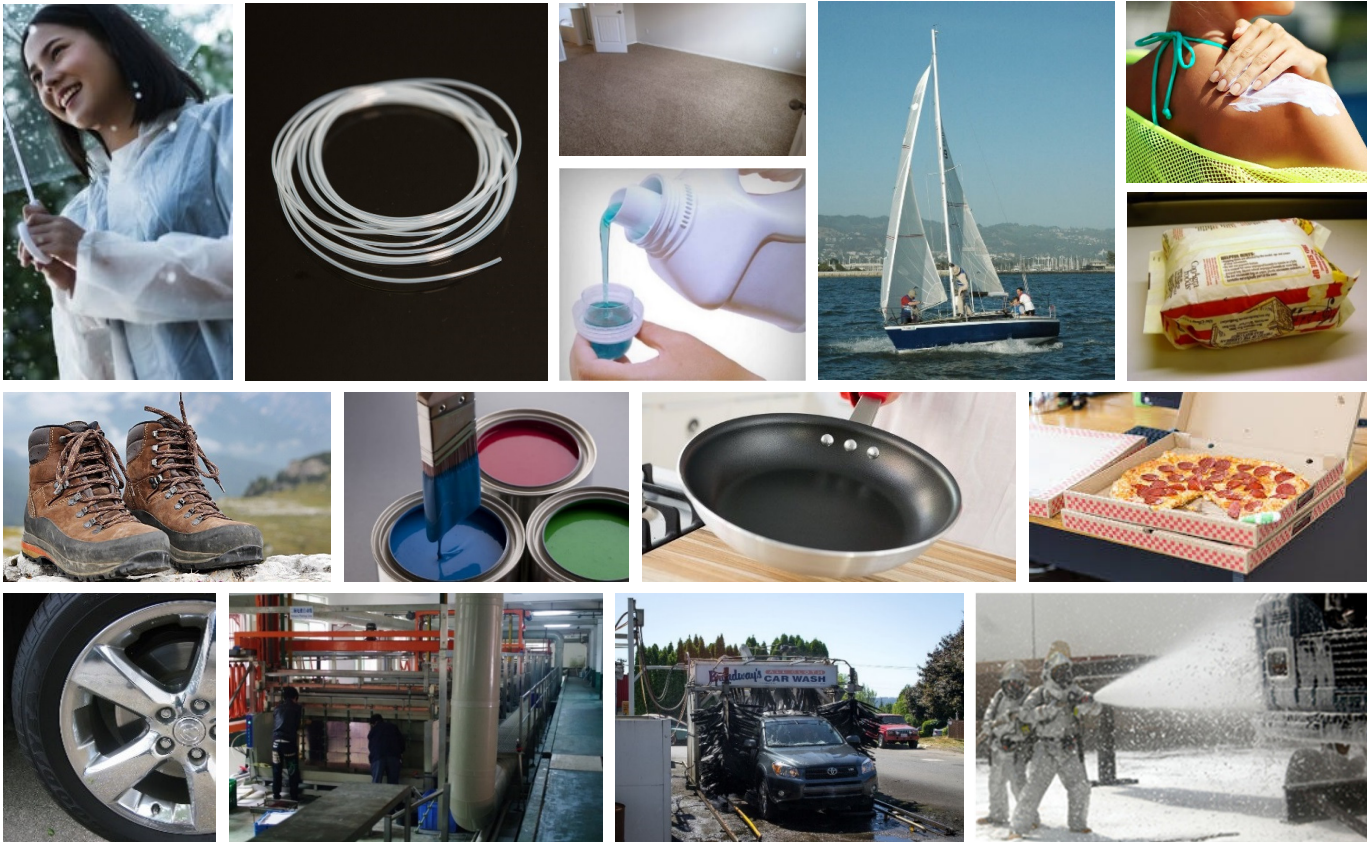
BUT....

BAD

- Extremely persistent – resist degradation
- Bioaccumulative
- Linked to health risks
- Migrate easily
 - High solubility, low volatility, mobile in soil, leach to groundwater
 - Air emissions a source of soil & groundwater pollution

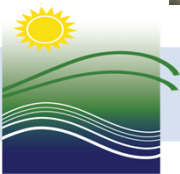


Some PFAS Uses



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Places Where We Might Find PFAS



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Aqueous Film-Forming Foam (AFFF)



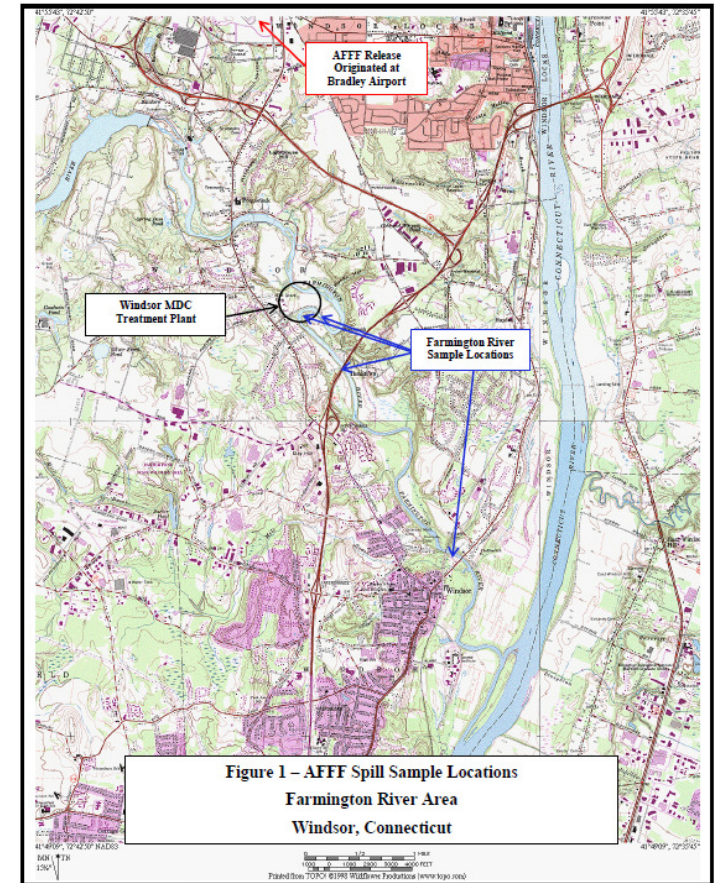
The Problems with PFAS

- Possible health effects
 - Developmental effects to fetuses and infants
 - Kidney and testicular cancer
 - Liver, thyroid, cholesterol, immune system effects
- Present in human blood worldwide
- Have polluted drinking water supplies worldwide
- Discovery in wastewater treatment plants, biosolids, landfills, soil, surface water, fish tissue, animals, cow's milk, and plants
- Replacement chemicals also a problem (GenX)



Signature Flight AFFF Release – June 8, 2019

- Approx. 2 pm, malfunctioning fire suppression system at a private hangar at Bradley Airport caused discharge of AFFF for 6 minutes
 - Total AFFF concentrate: ~1,500 gallons
 - Total foam solution released: ~40,000 gallons
- CT DEEP onsite within 45 minutes, Signature Flight immediately took responsibility
- Emergency Contractor onsite 40 minutes later
- ~15,000 gallons foam captured at hangar



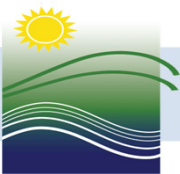
Signature Flight AFFF Release – June 8

- Path of remaining foam solution:
 - Floor Drain → Oil-Water Separator → Sewer System → MDC Wastewater Treatment Plant → Farmington River
- MDC notified of release
- Approx. 7:30 pm, foam observed exiting vented sewer manhole on Rainbow Rd.
- Emergency Contractor called to remove foam from a manhole



Signature Flight Hangar AFFF Discharge Event

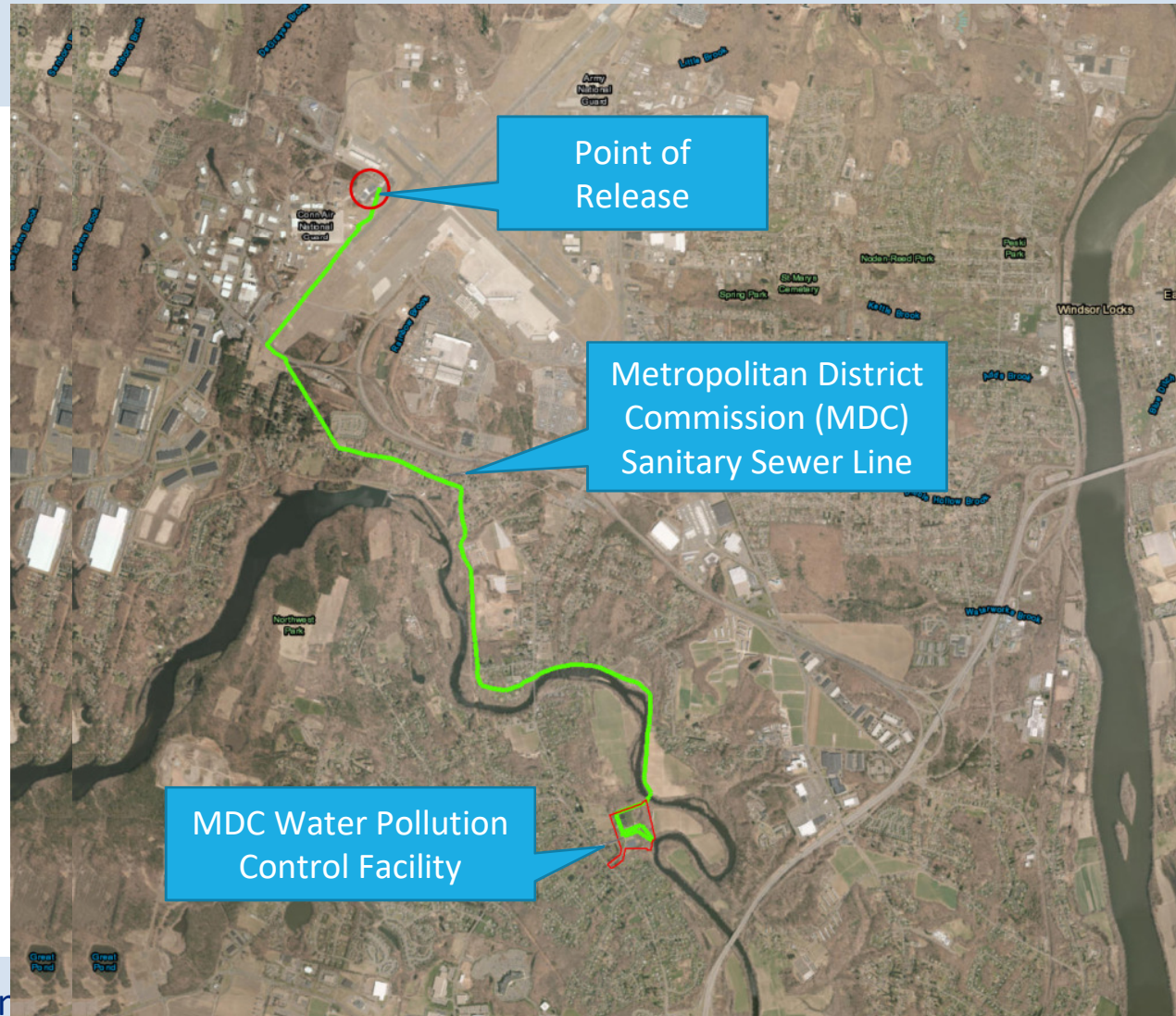
- Foam entered MDC Plant ~ 12 am and the Farmington River in the early morning (5:30-7:30 am) of June 9
- Booms deployed at MDC outfall to contain as much foam as possible
 - ~5,000 gallons of contained foam pumped from the river
- Surface water samples collected
- DPH advises no contact with foam/
do not eat fish



Sewer Line Map

Signature Flight AFFF Release

- Discharge to MDC Poquonock wastewater treatment plant and Farmington River via sanitary sewer lines in East Granby and Windsor



Environmental Media Requiring Assessment

Farmington River

- Surface Water
- Fish
- Sediment

MDC Treatment Plant

- Sludge
- Influent/Effluent

Results
pending

Public & Private Wells

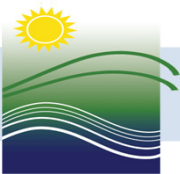
Rainbow Road

Results
pending

- Surface soil
- Catch basin sediment

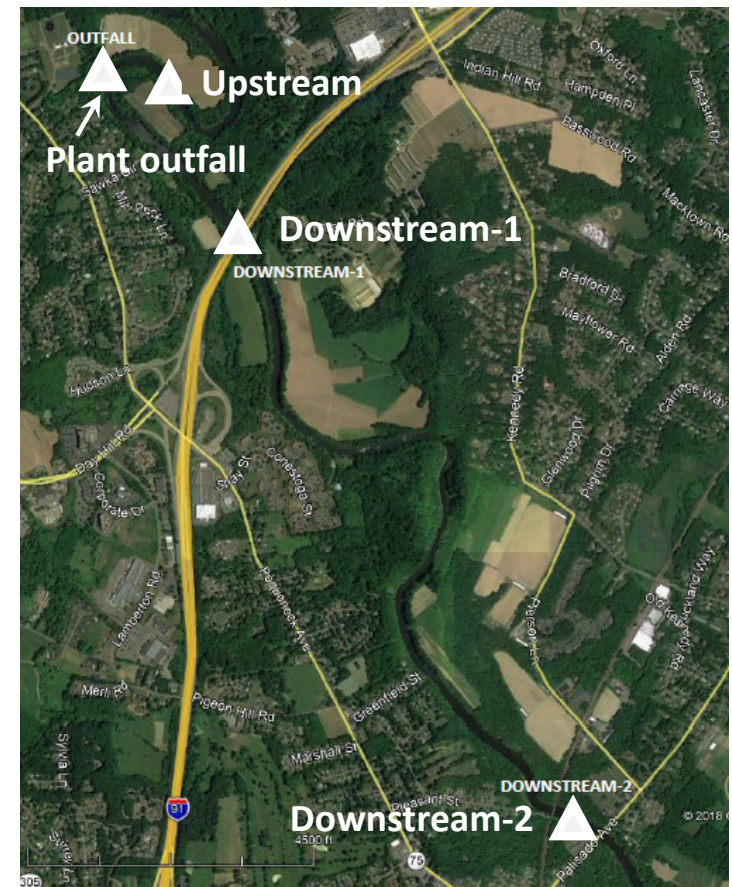
Signature Flight Hangar

- Soil Removal
- Groundwater monitoring



Farmington River Surface Water Sampling

- 4 sampling events
 - June 9, 11 (Outfall only), and 21
 - July 10 (Upstream & Downstream-1 only)
- 4 locations
 - Upstream
 - Treatment plant outfall
 - Downstream-1 at I-91(0.6 mi.)
 - Downstream-2 at boat launch/Palisado Ave. (3 mi.)

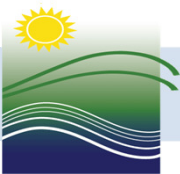


Surface Water Sampling Results

Summary of Total PFAS Concentrations

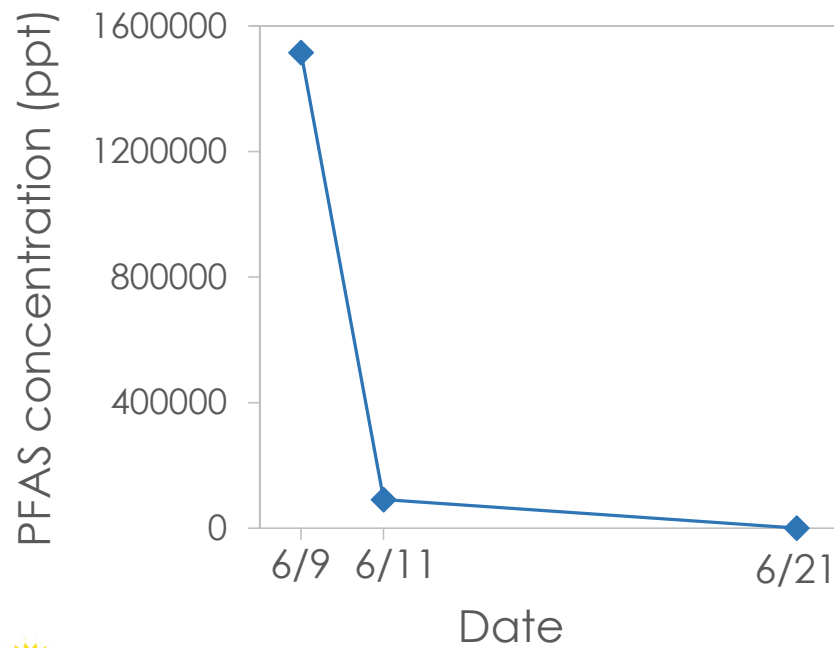
Location	June 9	June 11	June 21
Upstream	38 ppt	--	18 ppt
Outfall	1,515,700 ppt	90,899 ppt	331 ppt
Downstream-1	13,300 ppt	--	50 ppt
Downstream-2	10,253 ppt	--	40 ppt

- Total = sum of 18 individual PFAS
- Primary chemical is PFOS (1,300,000 ppt at outfall on 6/9, 86% of total PFAS)
- Total PFAS at the outfall decreased by more than 4,000 times over 12 days

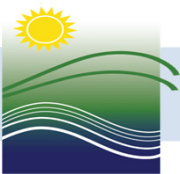
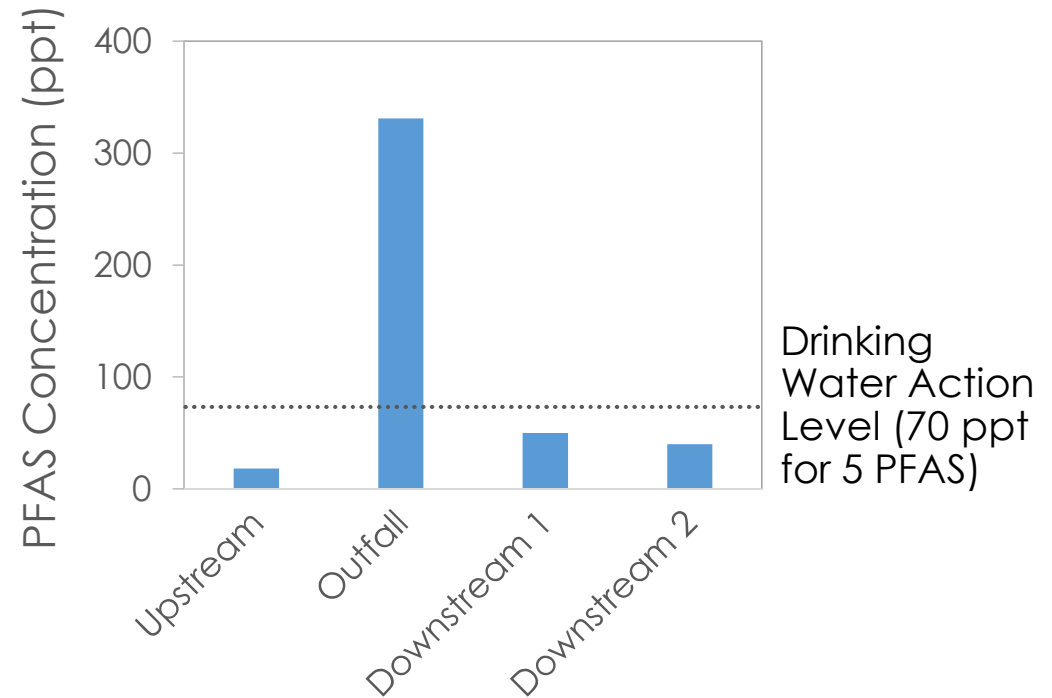


Surface Water Sampling Results

Concentration at Plant Outfall

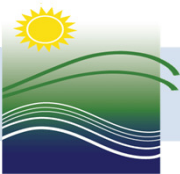
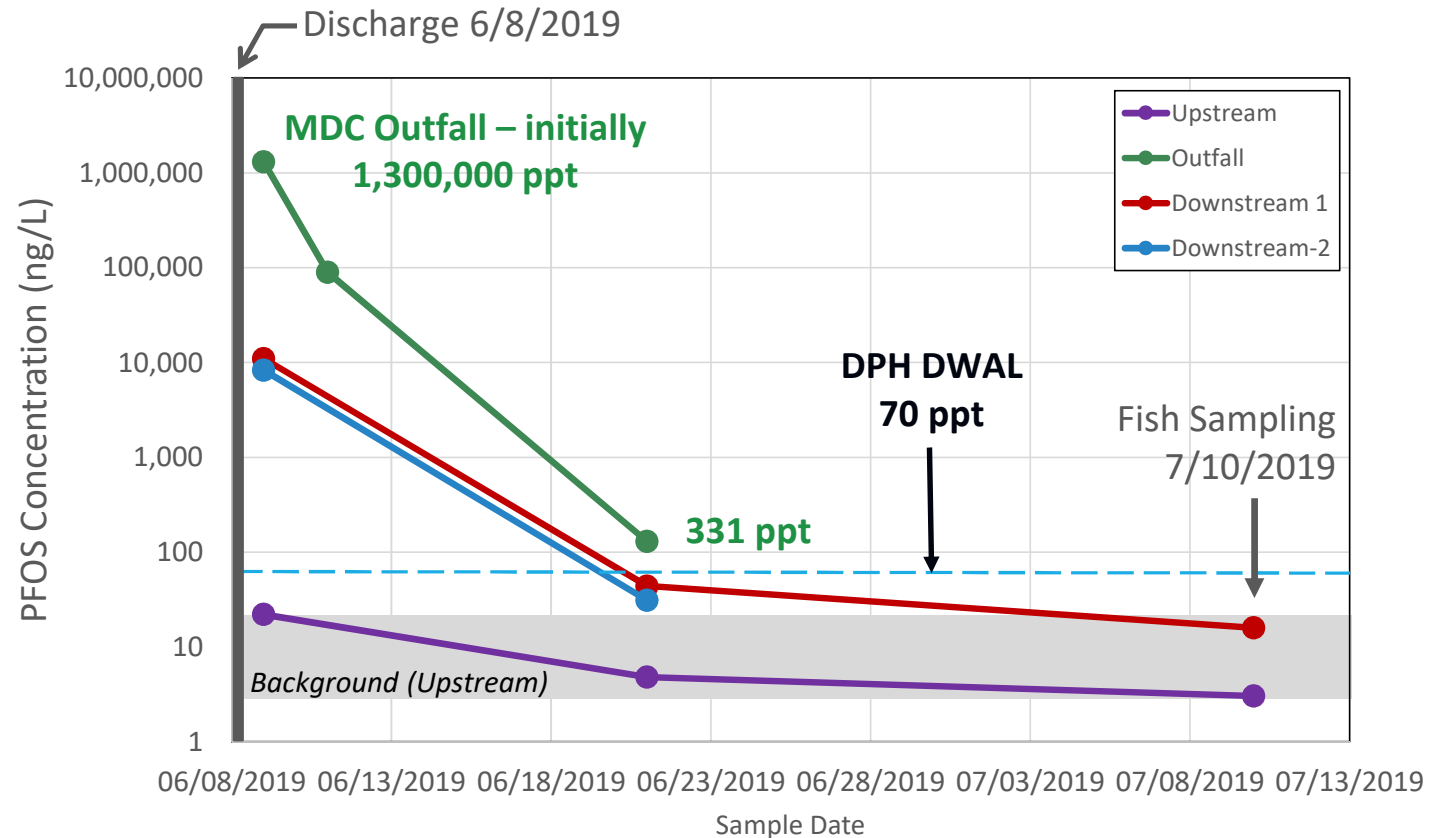


Concentrations (6/21)



PFOS Concentrations in Surface Water

- PFOS concentration at MDC Outfall decreased 4 orders of magnitude by June 21.
- Downstream concentrations were within upstream range by July 10.



July 2019 Fish Sampling Event

- 2 locations
 - Upper Farmington/Control Zone
 - Upstream of Rainbow Dam
 - Lower Farmington/Contamination Zone
 - Downstream of MDC outfall
- 2 fish species at each location
 - Predator (Yellow Perch)
 - Bottom-dweller (White Sucker)



July 2019 Fish Sampling Results

Species	Number of Samples ⁽¹⁾	PFOS Average (ppb)	PFOS Range (ppb)
Upstream/Upper Farmington/Control Zone			
Yellow Perch (predator)	4	24.3	21.3 – 26.6
White Sucker (bottom feeder)	3	6.3	4.98 – 8.2
Downstream/Lower Farmington/Contamination Zone			
Yellow Perch (predator)	3	172	130 – 215
White Sucker (bottom feeder)	4	68.4	58.2 – 95.5

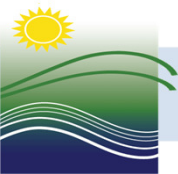
⁽¹⁾ Each sample result represents a composite of 5 fish.

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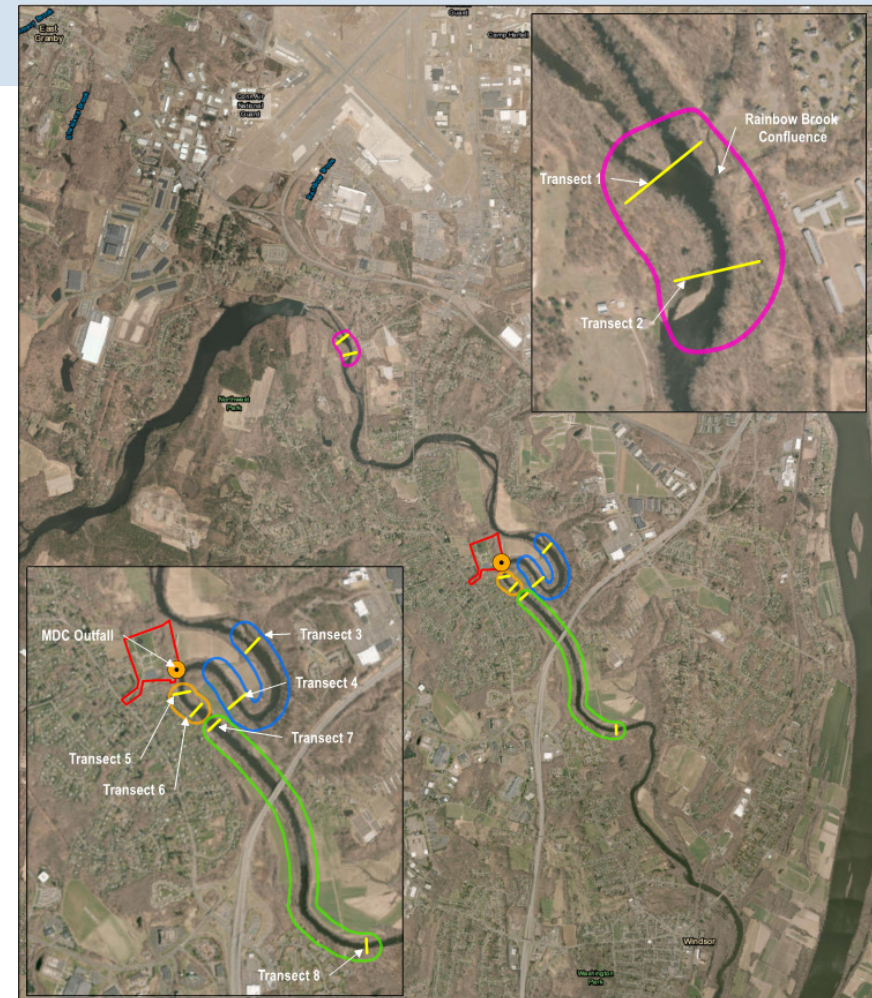
Additional Fish Sampling

- Second fish sampling event
 - Completed on 9/21/19
 - Initial lab results due 11/27/19, validated data 3 weeks later



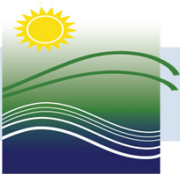
Sediment Evaluation

- Sediment to be sampled upstream of the MDC outfall, and in two downstream areas.
- Will also sample sediment located near the confluence of Rainbow Brook to evaluate B-17 release.
- Sediment and surface water sampling will be re-attempted early November.
- Results will inform whether sampling of biota is needed.



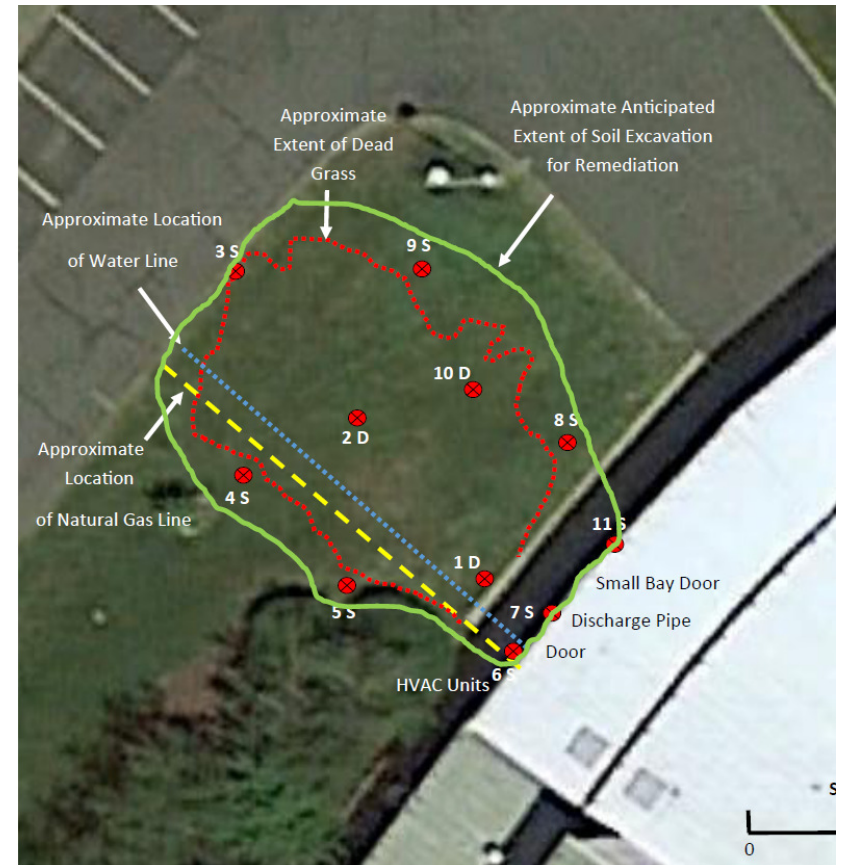
Potable Well Receptor Survey

- No public wells affected by AFFF release
- Private wells
 - Survey of more than 500 parcels within 500 ft. of an 8 mile route along Farmington River and 2 miles along the sanitary sewer route (East Granby/Windsor)
 - Determined that exposure pathway was not complete, pending evaluation of surface soil on Rainbow Road near manhole



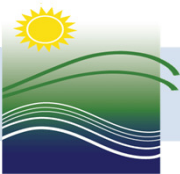
Hangar Soil Remediation

- Work scheduled to begin mid-November
- Excavate impacted soil and dispose via incineration
- Install monitoring wells



Lessons Learned

- Awareness of AFFF discharges being a problem
- Prompt containment measures to reduce extent of release
- More immediate public notification, reverse 911 utilized, frequent status updates posted on DEEP website, calls with Town officials
- Improved communication among state agencies and local officials



PFAS Foam versus Naturally Occurring Foam

PFAS Foam

- Can be bright white
- Tends to pile up like shaving cream
- Usually lightweight
- May blow inland
- Can be sticky



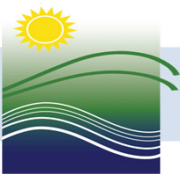
Naturally Occurring Foam

- Is off-white and/or brown
- Often accumulate in bays, eddies, or river blockages
- May have earthy or fishy aroma



10/24/2019

Source: Michigan Department of Environment, Great Lakes, and Energy, PFAS Action Response Team website



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Questions?

Thank you!

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