

# **PFAS NACAA Monitoring Steering Committee**

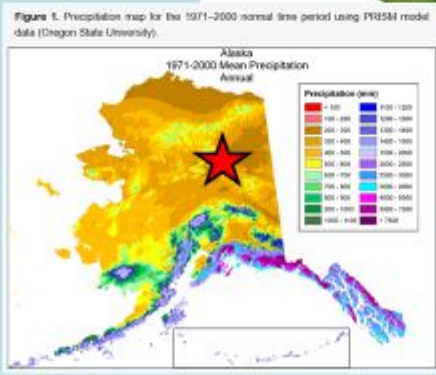
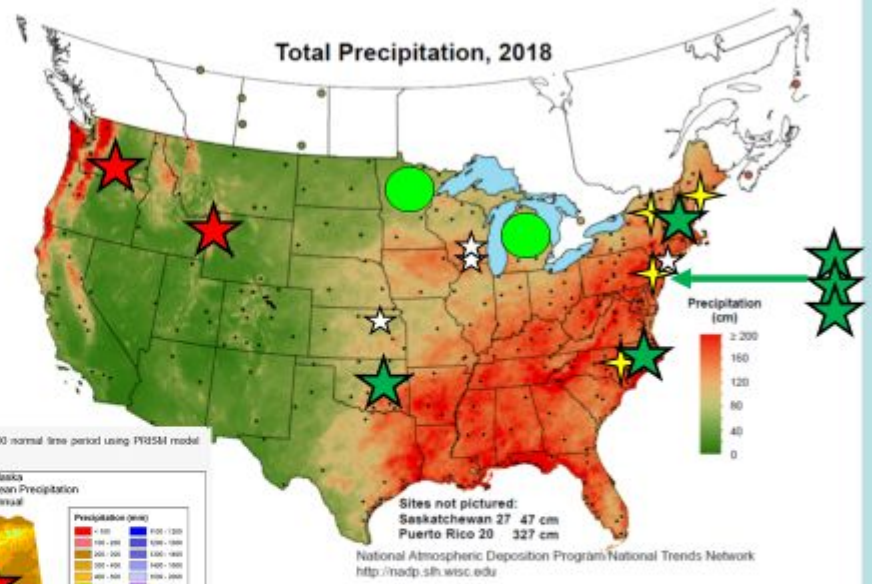
January 31, 2024

Dirk Felton, Melissa Puchalski and Katie Praedel

# EPA ORD PFAS Efforts

## Operating Sites & Potential New Sites

- PFAS site: 1<sup>st</sup> Phase 
- PFAS site: 2<sup>nd</sup> Phase 
- PFAS site: 3<sup>rd</sup> Phase 
- PFAS site: 4<sup>th</sup> Phase 
- Interested: 



# Wisconsin PFAS in Air Monitoring

# Wisconsin 2020: PFAS in Precipitation

- Samples collected to investigate PFAS's transport via atmospheric pathways and what rates precipitation deposits PFAS to surface waters and soil.
- Certain precipitation samples showed similar signatures to PFAS in AFFF.
- PFAS concentrations measured in Wisconsin are much lower than other states.
- Results from the study are published in the scientific journal, *Atmospheric Environment*

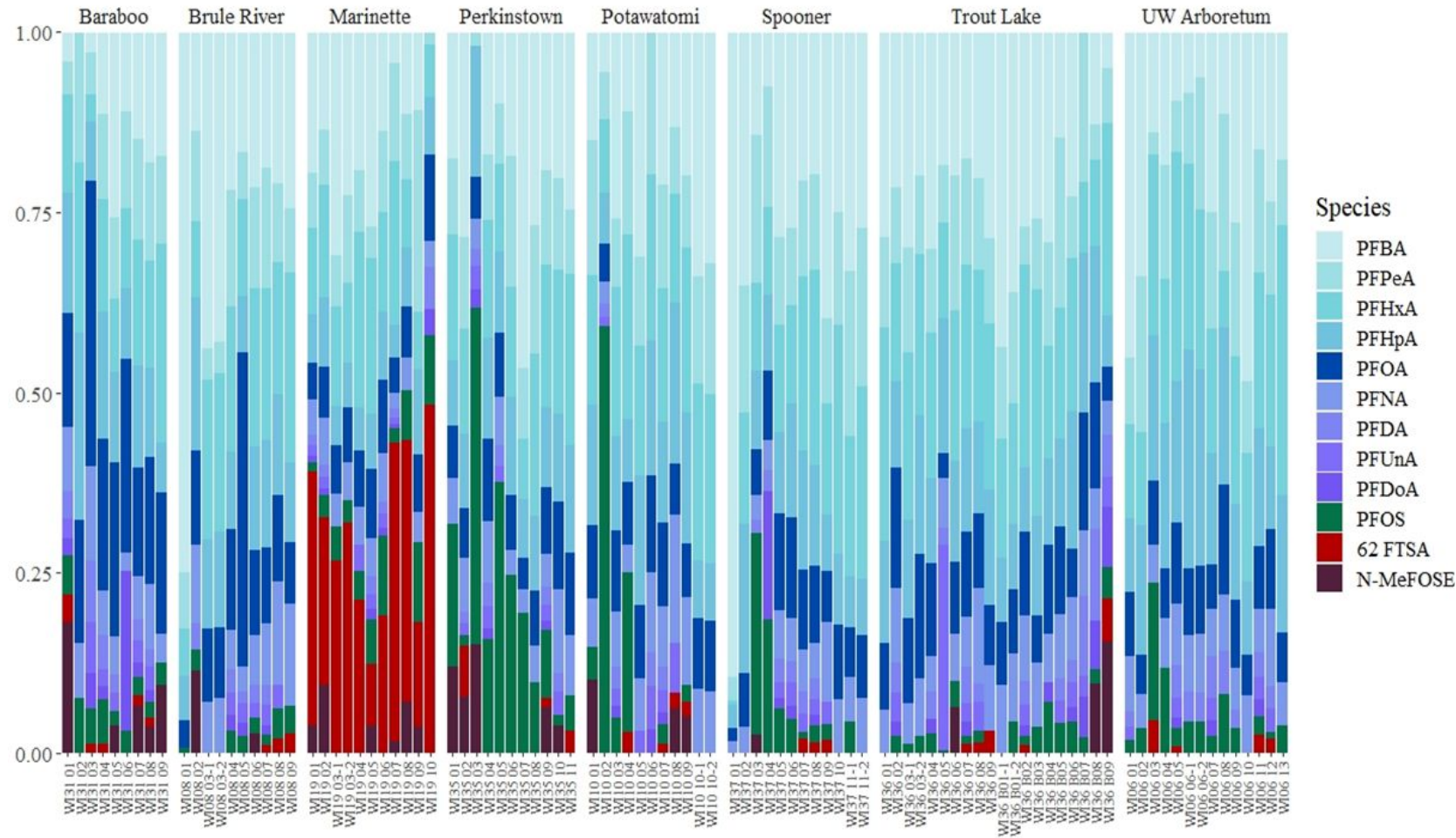


# PFAS Signatures by Site - Regional Trends

Generally similar class signatures at five of the sites:  
(UW, Baraboo, Potawatomi, Trout Lake, Spooner)

Higher PFSA contributions at Perkinstown (middle state)

Marinette site signature is different





# Wisconsin PFAS Method Development Study: 2022-2023

- Wisconsin operates two of **12** sites in support of EPA's Pilot study for understanding the fate and transport of PFAS.
- Results from this project will be used to inform PFAS air monitoring methods as well as stack testing and aerosolized methods with a focus on field and lab processes
- Additional multi-media samples collected (soil, lake water, lake sediment) will be used to inform scientific understanding of fate and transport of PFAS

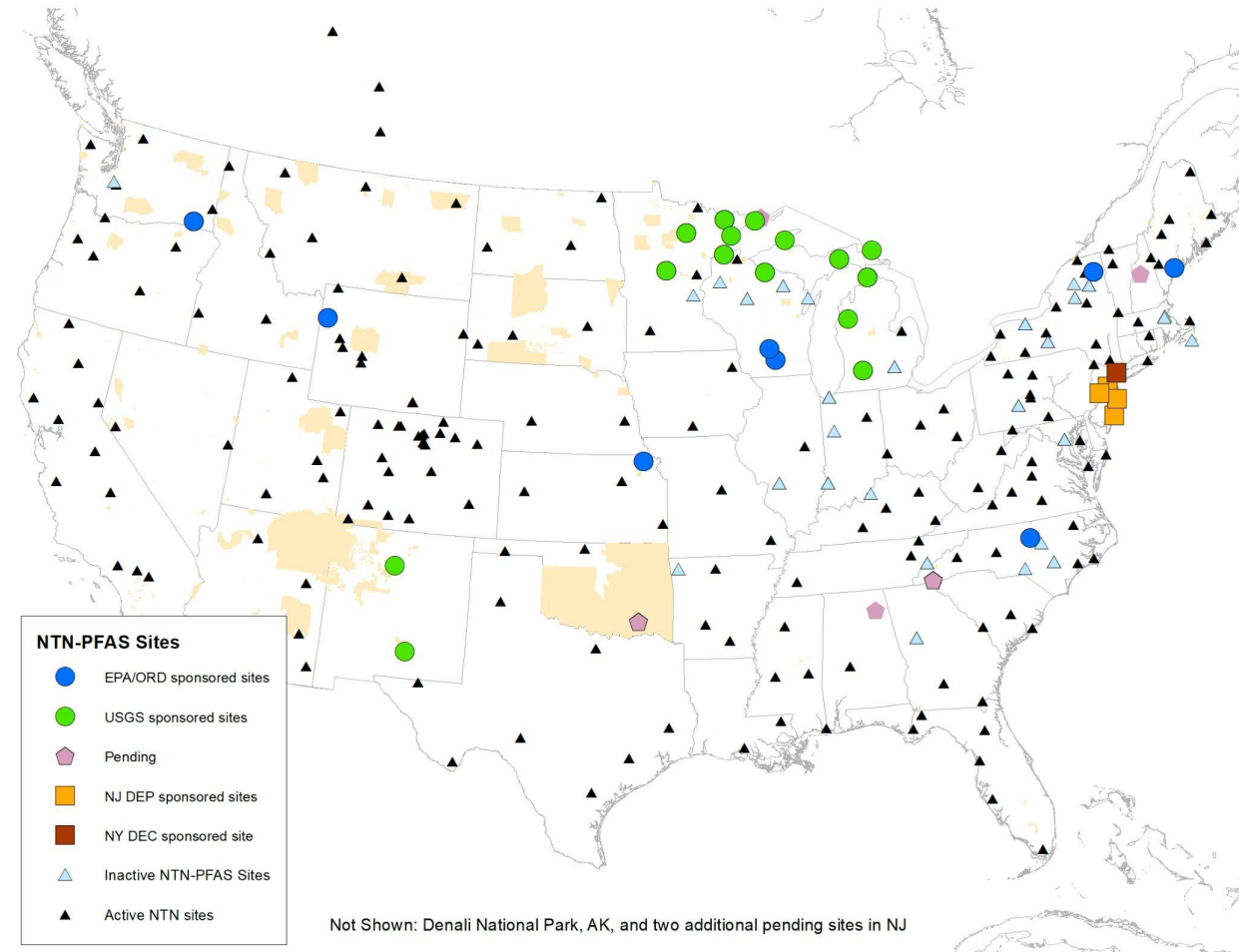


Collaboration with:



# NADP PFAS Initiative Became a Pilot Network in 2024

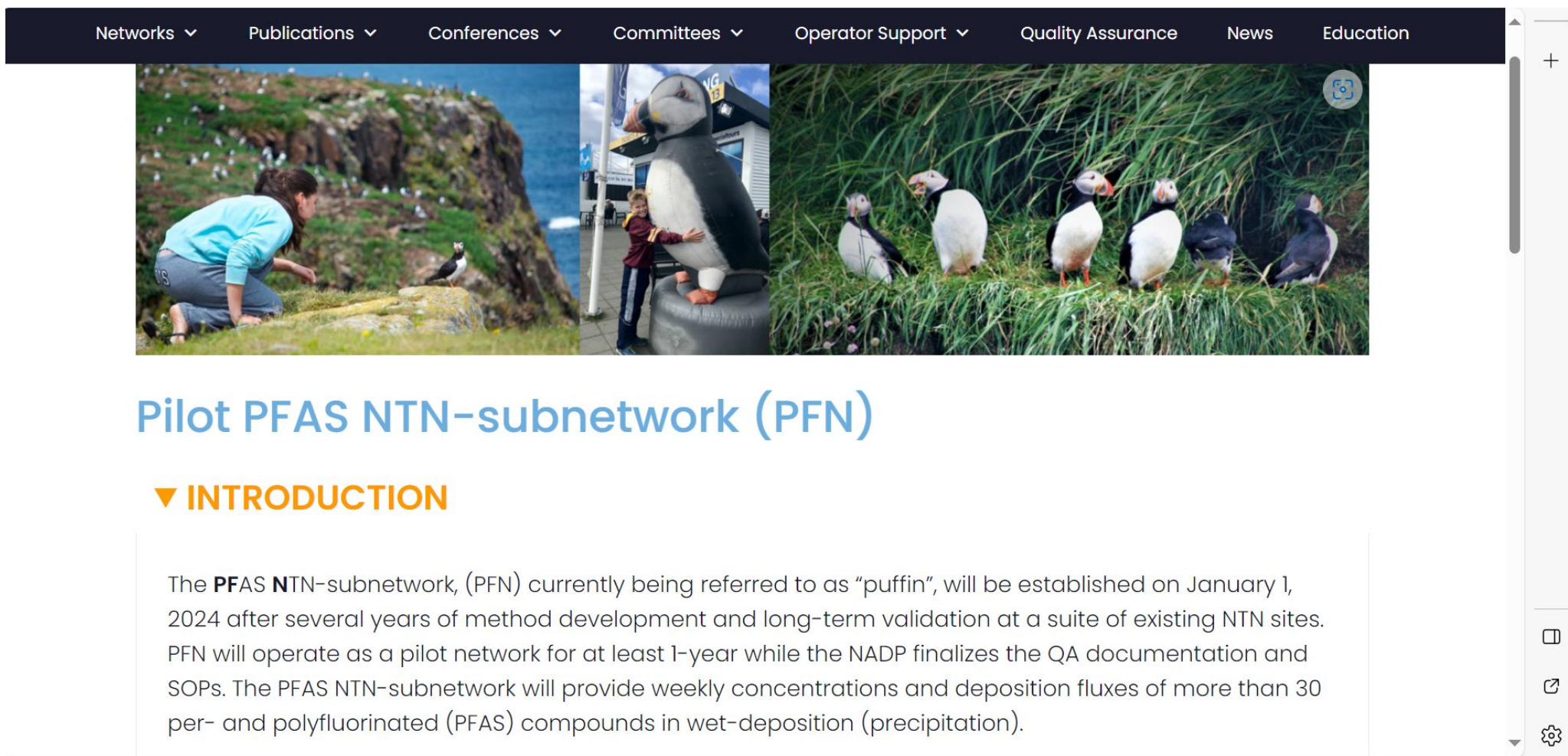
- Wisconsin State Laboratory of Hygiene (WSLH) at the University of Wisconsin-Madison hosts the NADP
  - NADP supports five networks that measure precipitation chemistry, air quality and litterfall with more than 300 monitoring locations across the US, Canada, USVI
- Developed a method for using excess precipitation collected at National Trends Network (NTN) sites to analyze for 36 PFAS
  - Most observable portion of atmospheric dynamics of PFAS is through wet deposition
  - Method development focused on using the existing infrastructure and sampling techniques
  - Robust QA: precision evaluated at Duke Forest (NC30, NC96, NC97), field blanks and spikes processed quarterly
- Network was approved as a pilot network (PFAS NTN Subnetwork or PFN “puffin”) by the NADP
  - Sites are required to join NTN (or use an existing NTN site)
  - Special study sites (map) will become pilot network sites
- Growing interest from federal, state, and tribal agencies
  - Data will help determine the importance of atmospheric inputs to drinking water (private wells and larger reservoirs) and new restrictions on the manufacturing and use of PFAS translate to environmental results






# More information

[nadp.slh.wisc.edu/pfas-sub-network/](https://nadp.slh.wisc.edu/pfas-sub-network/)



Networks ▾ Publications ▾ Conferences ▾ Committees ▾ Operator Support ▾ Quality Assurance News Education



## Pilot PFAS NTN-subnetwork (PFN)

### ▼ INTRODUCTION

The **PFAS NTN**-subnetwork, (PFN) currently being referred to as “puffin”, will be established on January 1, 2024 after several years of method development and long-term validation at a suite of existing NTN sites. PFN will operate as a pilot network for at least 1-year while the NADP finalizes the QA documentation and SOPs. The PFAS NTN-subnetwork will provide weekly concentrations and deposition fluxes of more than 30 per- and polyfluorinated (PFAS) compounds in wet-deposition (precipitation).



# Whiteface Mountain (WFM) PFAS pilot study

A. Deitsch, C.E. Lawrence, P. Casson, S. Lance, M.M. Shafer, J.H. Offenbergl, M.A. Puchalski



- Samples were selected from ASRC's frozen cloud water archive, limited to those with  $\geq 200$  ml sample volume
- 29 cloud water samples in total were chosen, covering four cloud water collection seasons (2018-2021)
- Cloud water sample selection was aimed at obtaining a wide range of back-trajectory profiles representative of those encountered at the WFM summit
  - Determined using HYSPLIT back-trajectory analysis, including all cloud episodes 2014-2021

## Wet deposition sampling

- NADP Site (NY98)
  - WFM Base Station
  - 610m ASL
  - Year-round collection
  - ~1 week time resolution



NY98 site



Whiteface Mountain

## Cloud water sampling

- ASRC WFM Summit Observatory
  - 1483m ASL
  - Warm-season collection (Jun thru Sep)
  - 12-hourly time resolution



Summit Observatory

## Chemical analyses

- PFAS measurements of all samples conducted by WSLH using LC-MS/MS
- 33 small chain PFAS analytes investigated
- Inorganic anions, cations, and organic carbon measurements of cloud water samples conducted by ASRC
- System rinses, field blanks and bottle blanks were collected and tested for comparison to sample data



Cloud water sampling equipment

## This research supported by:

1. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Educational Partnership Program (Agreement No. NA22SEC4810015)
2. NYSERDA (Award No. 124461)
3. NASA FINESST Graduate Fellowship (Award No. 20-EARTH20-0298)

# Comparison between Cloud water & Precipitation

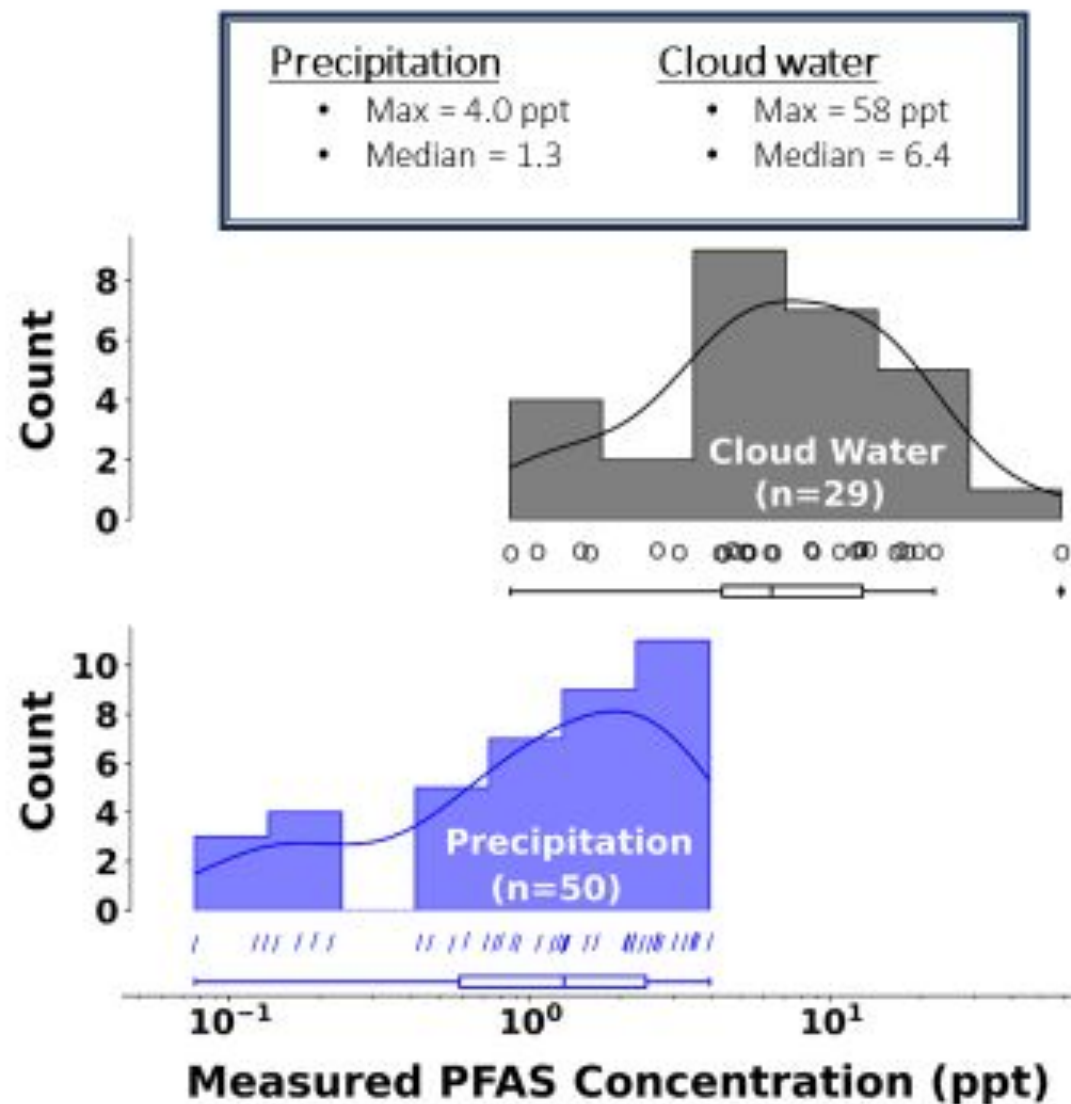
## Total measured PFAS Concentrations (33 analytes)

- Medians nearly a factor of five higher in cloud water than in precipitation
- Upper range of precipitation samples overlap lower range of cloud water samples

### Measured PFAS Classes\*

- |                 |                |                 |
|-----------------|----------------|-----------------|
| • FASA (n = 7)  | • GenX (n = 4) | • PFCA (n = 11) |
| • Sulfonamides  | • Generation X | • Carboxylates  |
| • C8 – C12      | • C8 – C12     | • C4 – C14      |
| • FTSA (n = 3)  | • PFSA (n = 8) |                 |
| • FT Sulfonates | • Sulfonates   |                 |
| • C6 – C10      | • C4 – C12     |                 |

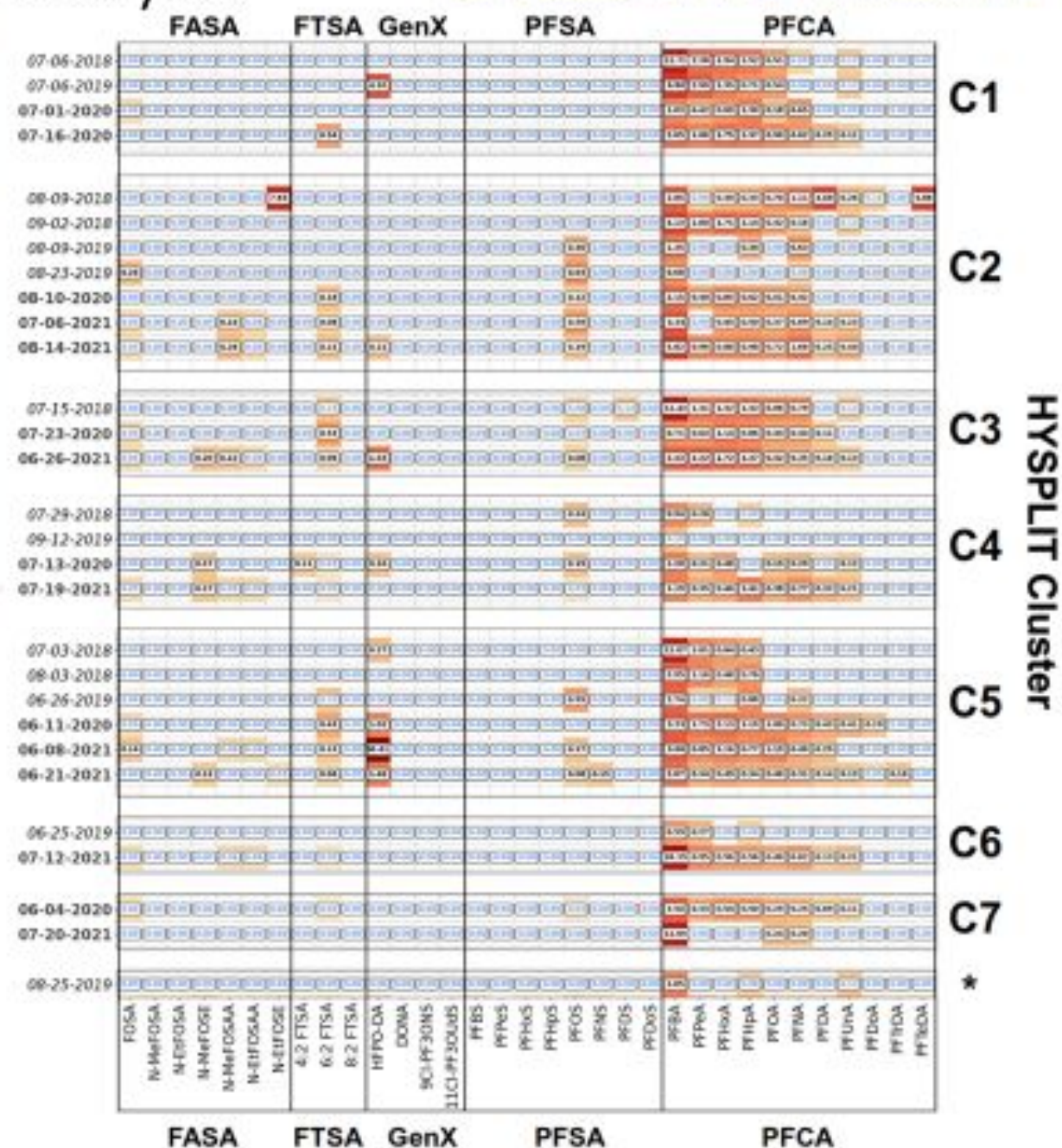
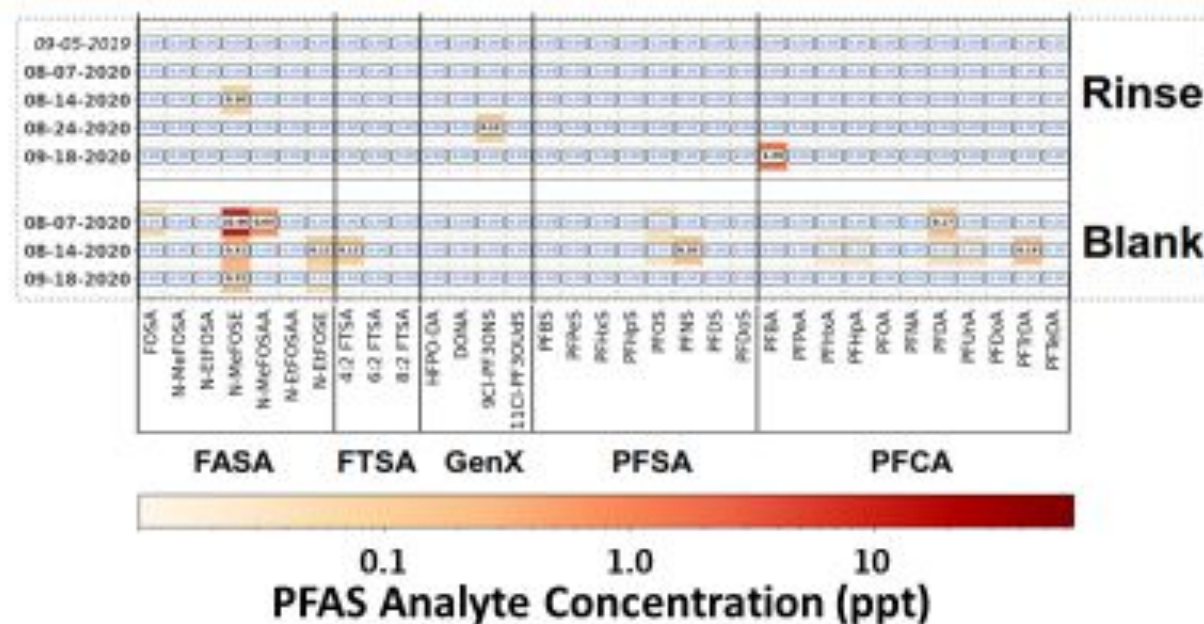
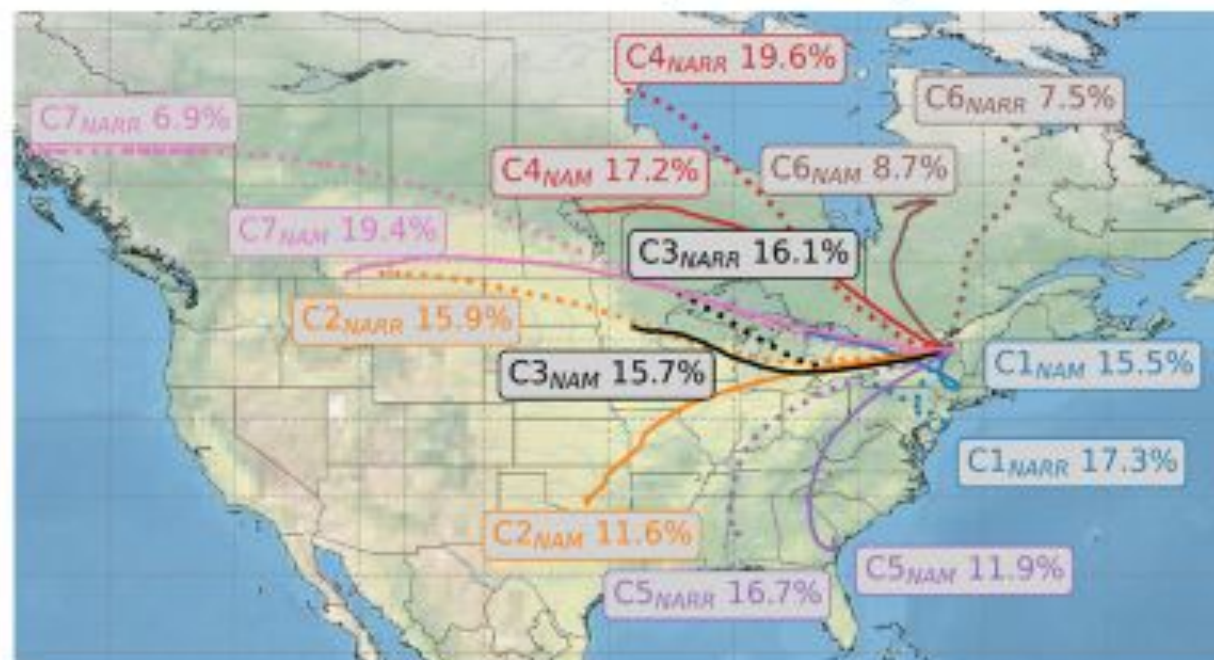
\*These values represent a small subset of the wider list of compounds in these classes.





# HYSPLIT Back-Trajectory Cluster Analysis

NARR (2014 - 2019) NAM (2014 - 2021)  
 Below Detection Limit = MDL/2 ; Not Detected = 0.00





# Resources

- A pilot program for measuring Per- and Polyfluoroalkyl Substances (PFAS) in wet deposition in the eastern United States. - *Offenberg*
- PFAS concentrations and deposition in precipitation: An intensive 5-month study at National Atmospheric Deposition Program – National trends sites (NADP-NTN) across Wisconsin, USA - *Pfotenhauer*
- Whiteface Mountain (WFM) PFAS pilot study. - A. Deitsch, C.E. Lawrence, P. Casson, S. Lance, M.M. Shafer, J.H. Offenberg, M.A. Puchalski
- [NADP Website](#)