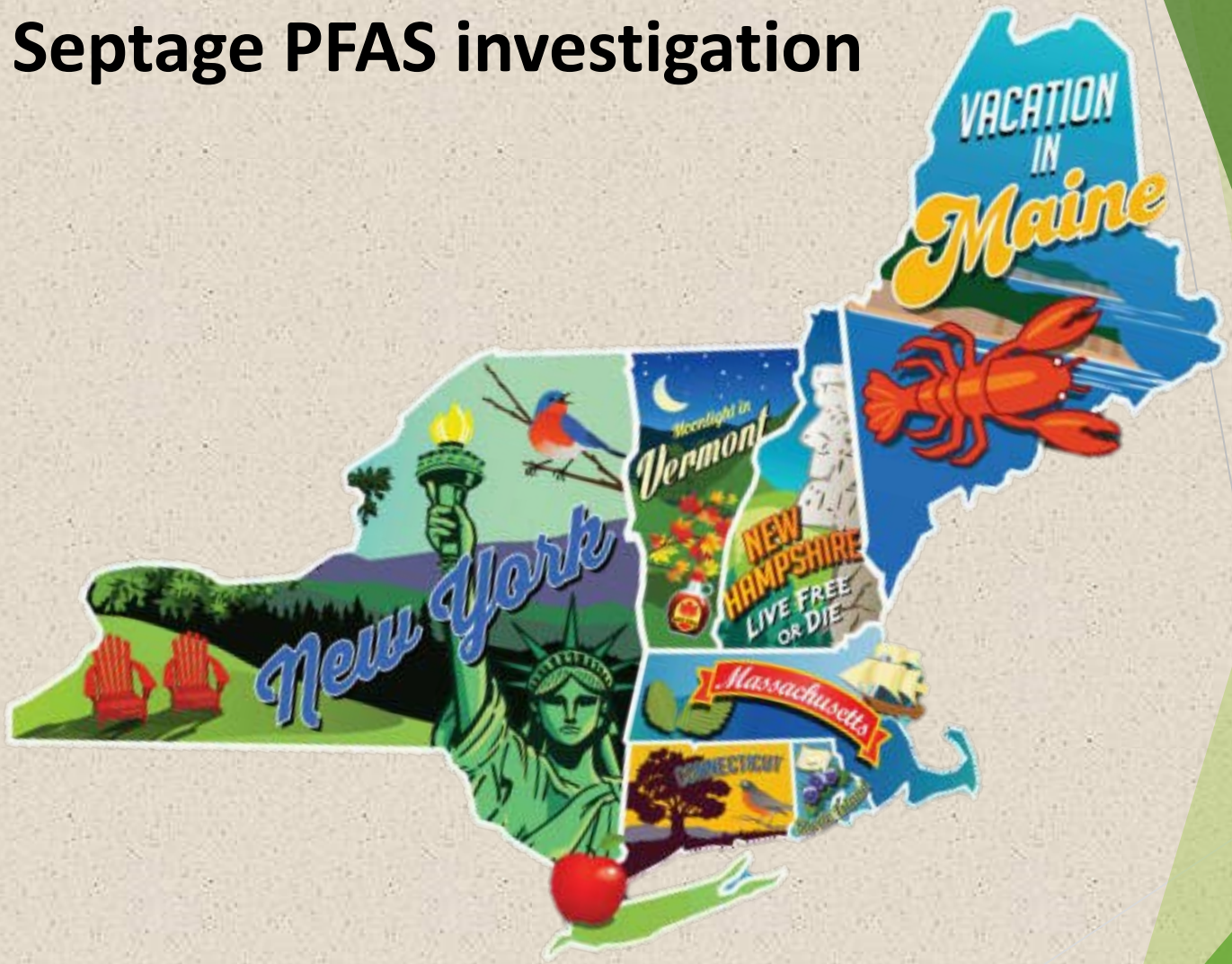
NEWMOA : Science in PFAS

NHDES Sludge and Septage PFAS investigation

2017 - present



Anthony F. Drouin

Administrator- Residuals Management Section

Water Division – Wastewater Engineering Bureau (NHDES)

April 5th, 2022

- Who is in RMS today?
- NH Residuals Waste Cycle – Sludge, Leachate, Septage
- PFAS Collection System Sampling
- PFAS Biosolids Sampling
- Other Notable PFAS Residuals Sampling
- USGS PFAS Sludge and Soil Leaching Study
- Northeast Biosolids Improvement Program

Residuals Management Section

NHDES

- Water Division
  - Wastewater Engineering Bureau
    - Residuals Management Section

Anthony Drouin **Supervisor** *Sludge Quality Certification Permitting*	Judith Sears-Houston **Permitting & Enforcement Engineer** *Site and Facility Permitting*	Wade Pelham **Sludge & Septage Coordinator** *Training and Outreach*	Jim Talvy **Inspector** *Sludge & Septage Hauler Permitting*

2018 NH Sludge, Septage, and Leachate

- **NH Biosolids Recycled to Land Application : ~40,000 wet tons**
- **NH Sludge that was disposed at a landfill : ~50,000 wet tons**
- **NH Sludge that was incinerated : ~17,500 wet tons**

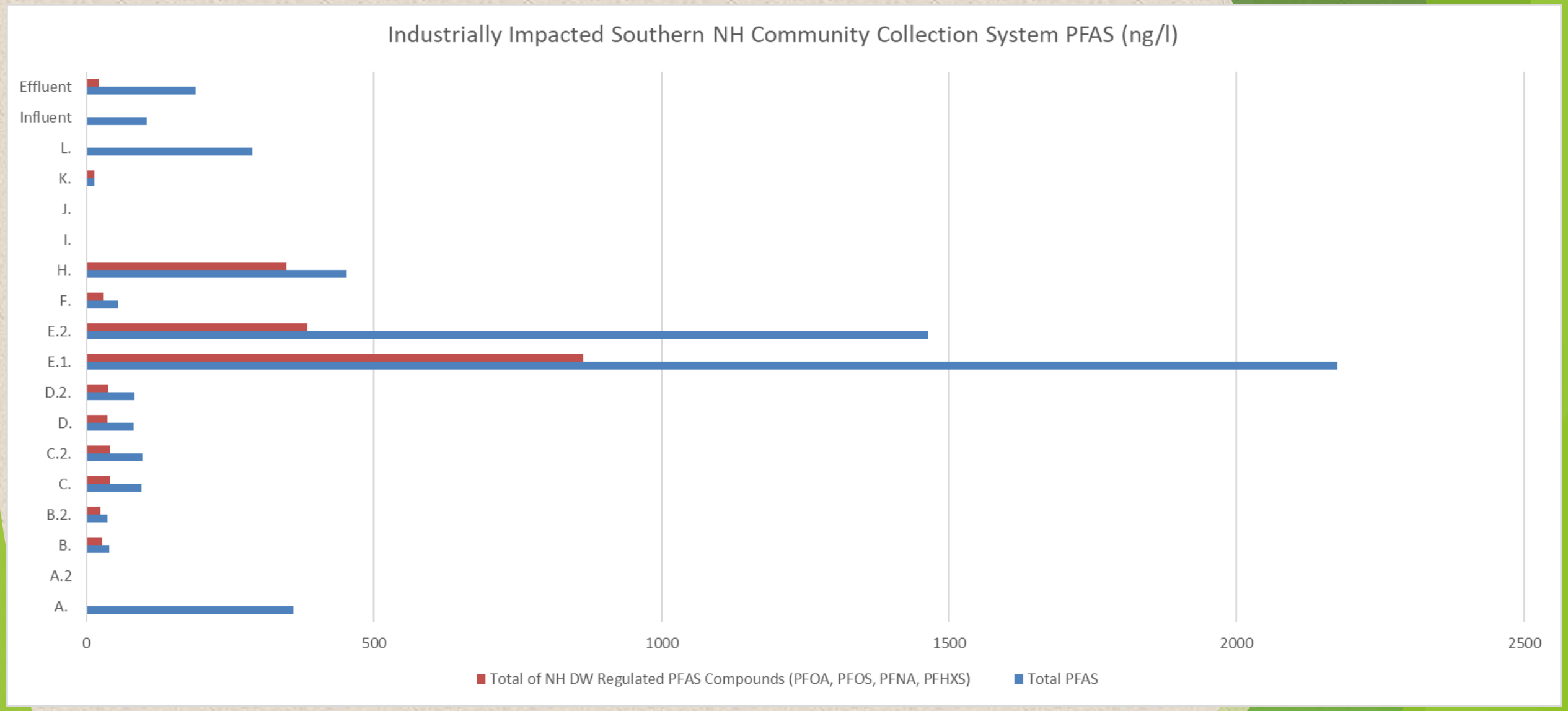
*Sludge managed to lagoon not accounted for
**NH WWTF, no paper mill sludge accounted for

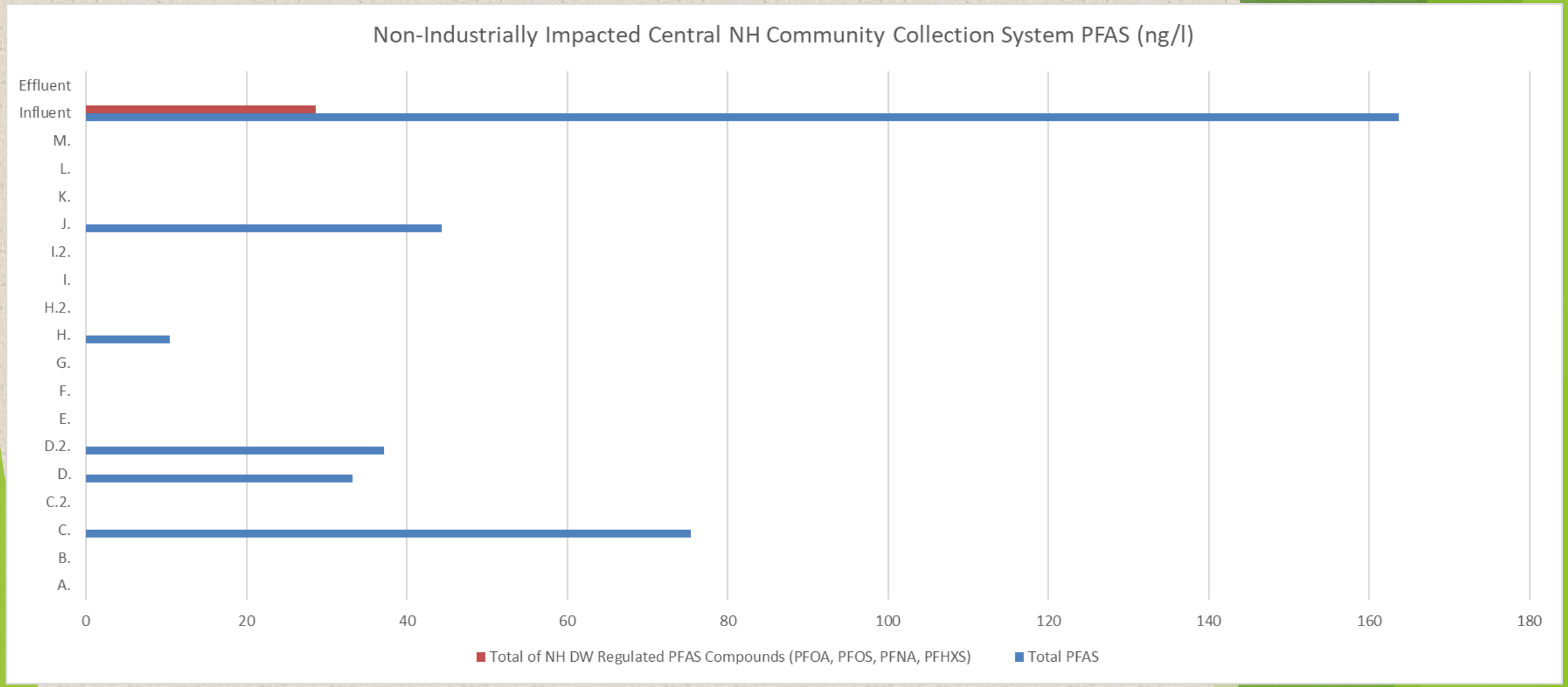
- **Over 100,000,000 gallons of septage was managed in NH**
- **6 Operating lined landfills in NH : ~100,000,000 gallons of leachate**
  - **~80,000,000 gallons managed at WWTFs within state**
  - **~20,000,000 gallons managed at WWTFs out of state**

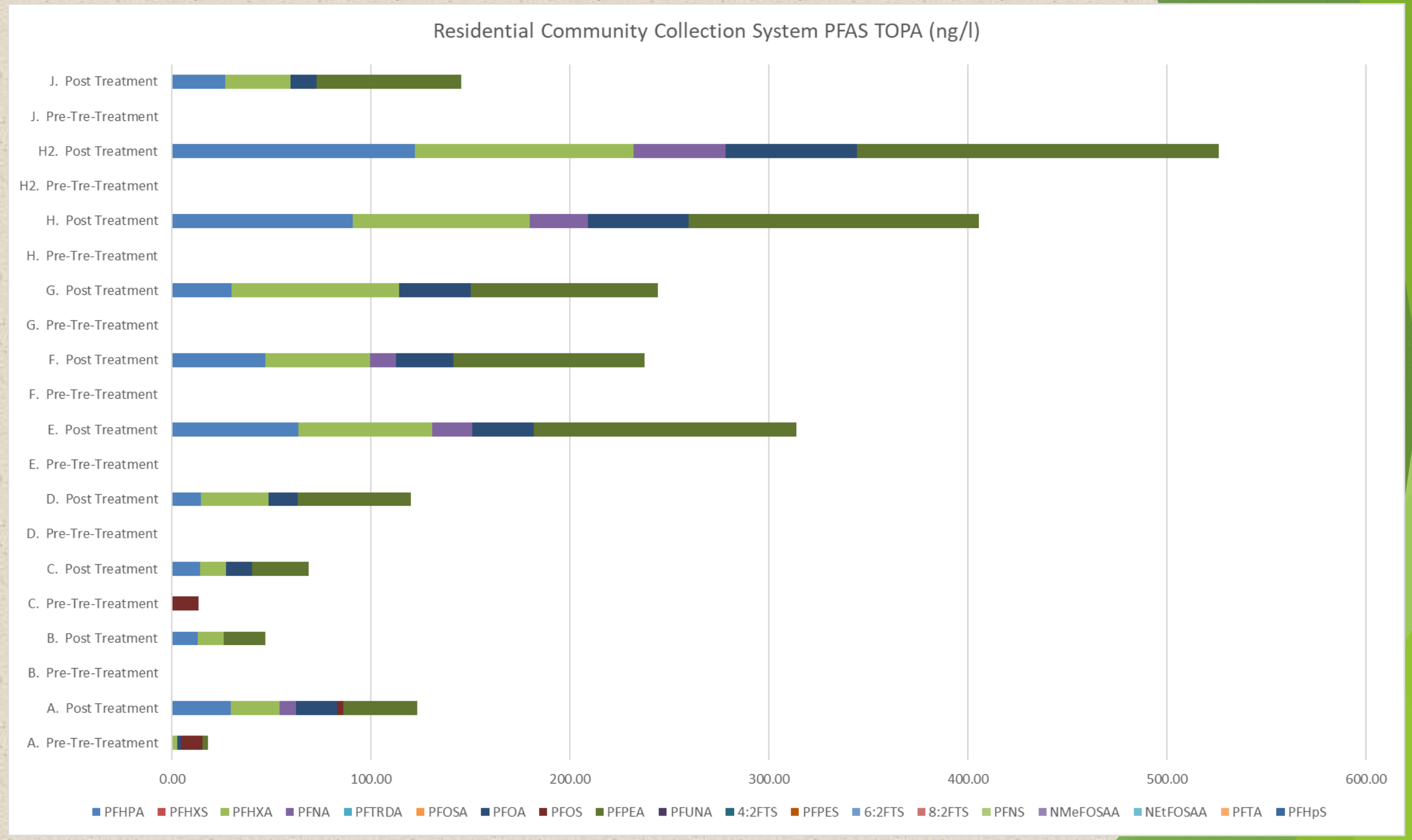
NHDES RMS Collection Systems Sampling Effort

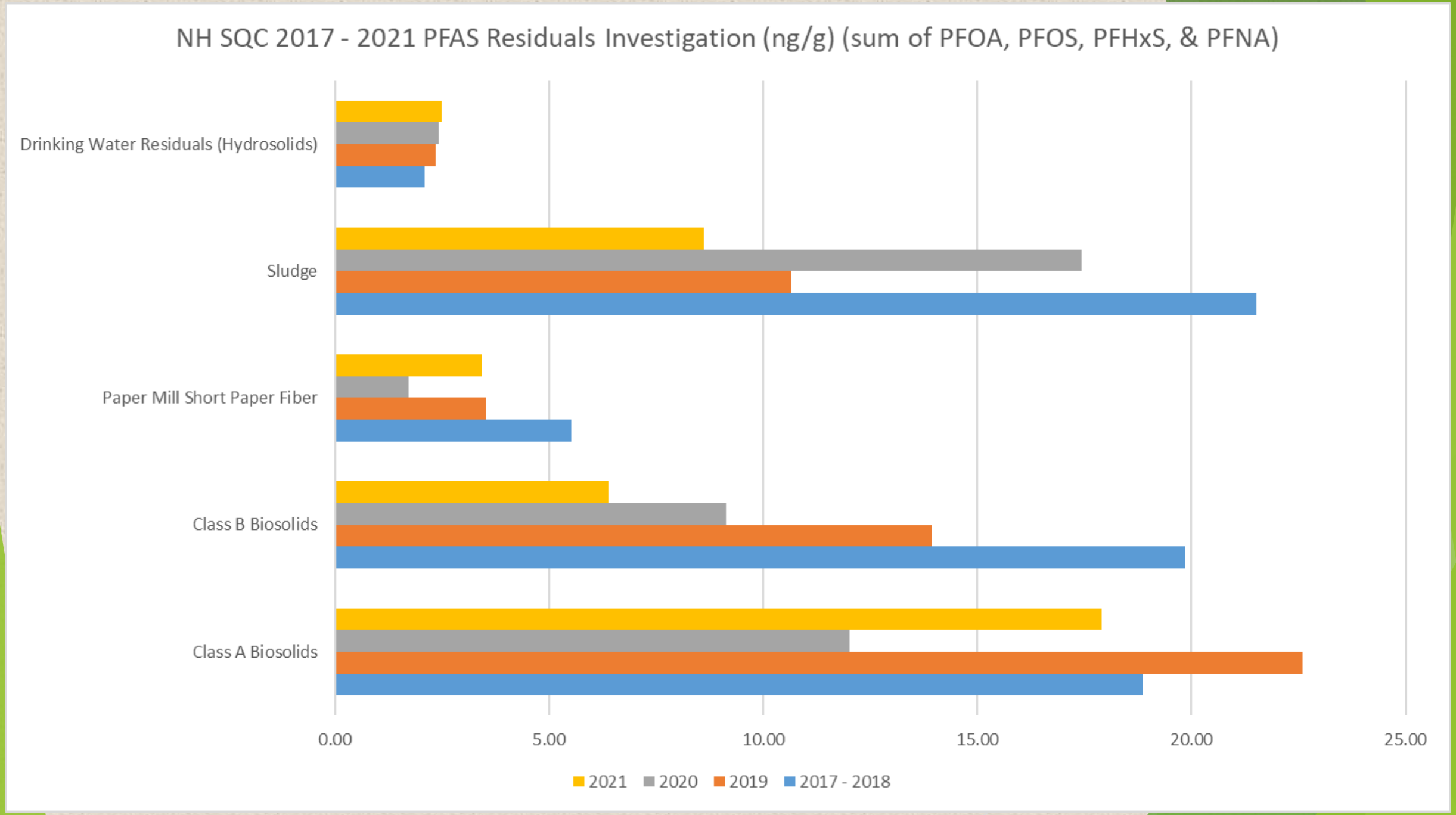

12/01/2021


12/01/2021

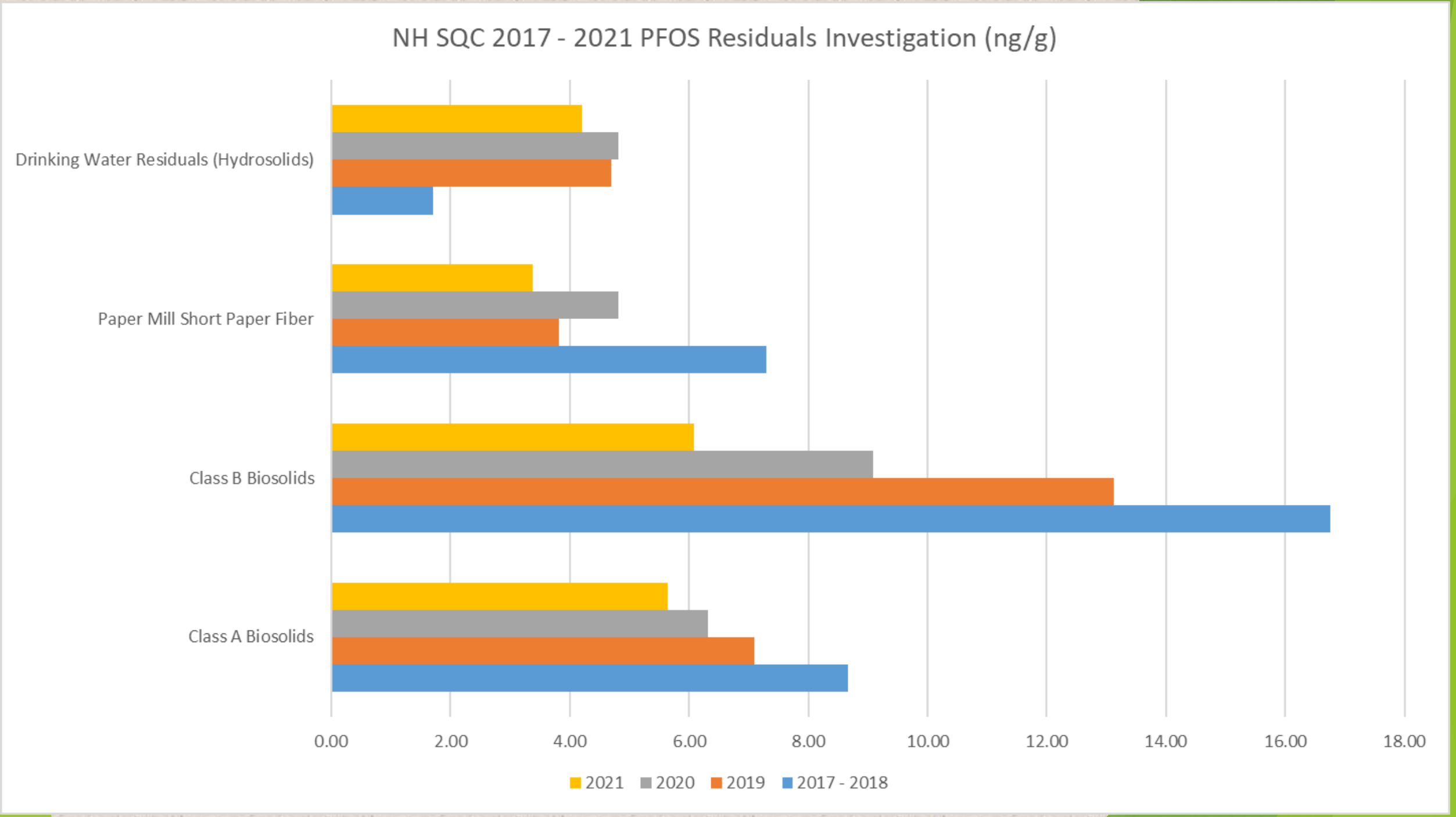

Industrially Impacted Southern NH Community Collection System PFAS (ng/l)
Effluent
Influent
L.
K.
J.
I.
H.
F.
E.2.
E.1.
D.2.
D.
C.2.
C.
B.2.
B.
A.2
A.
0
500
1000
1500
2000
2500
Total of NH DW Regulated PFAS Compounds (PFOA, PFOS, PFNA, PFHXS)
Total PFAS


Non-Industrially Impacted Central NH Community Collection System PFAS (ng/l)
Effluent
Influent
M.
L.
K.
J.
I.2.
I.
H.2.
H.
G.
F.
E.
D.2.
D.
C.2.
C.
B.
A.
0
20
40
60
80
100
120
140
160
180
Total of NH DW Regulated PFAS Compounds (PFOA, PFOS, PFNA, PFHXS)
Total PFAS


Residential Community Collection System PFAS TOPA (ng/l)
J. Post Treatment
J. Pre-Tre-Treatment
H2. Post Treatment
H2. Pre-Tre-Treatment
H. Post Treatment
H. Pre-Tre-Treatment
G. Post Treatment
G. Pre-Tre-Treatment
F. Post Treatment
F. Pre-Tre-Treatment
E. Post Treatment
E. Pre-Tre-Treatment
D. Post Treatment
D. Pre-Tre-Treatment
C. Post Treatment
C. Pre-Tre-Treatment
B. Post Treatment
B. Pre-Tre-Treatment
A. Post Treatment
A. Pre-Tre-Treatment
0.00
100.00
200.00
300.00
400.00
500.00
600.00
PFHPA
PFHXS
PFHXA
PFNA
PFTRDA
PFOSA
PFOA
PFOS
PFPEA
PFUNA
4:2FTS
PFPES
6:2FTS
8:2FTS
PFNS
NMeFOSAA
NEtFOSAA
PFTA
PFHpS



Samples analyzed for PFAS were analyzed using isotope dilution. Some compounds from sample reports' QA/QC report were flagged for being outside of percent recovery acceptable criteria.



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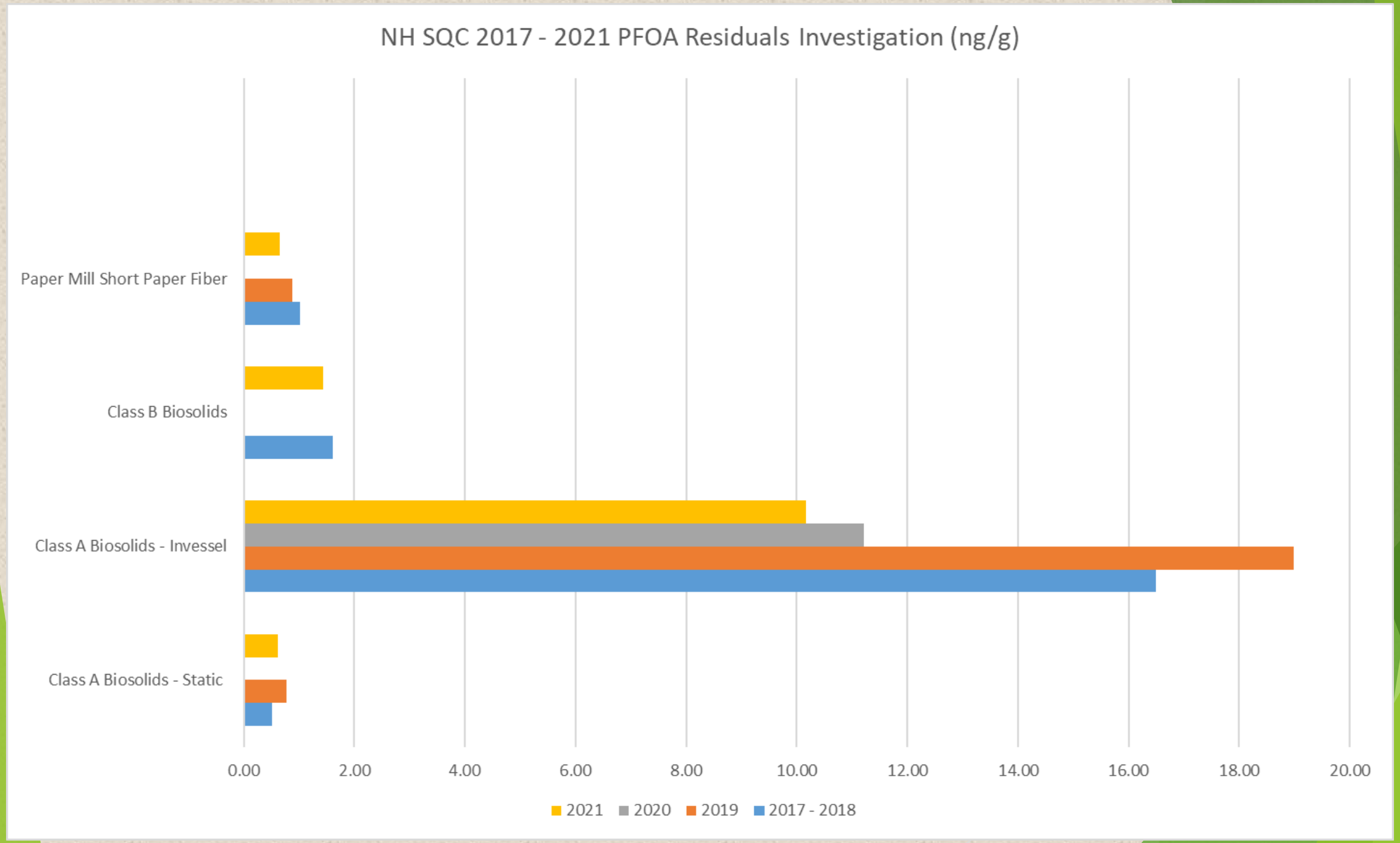

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Other Notable PFAS Sampling Events

- **Rural NH community Septage Lagoon Solids sampled in 2020**
  - Total PFAS (24 compounds) – **222.8 ng /g**
  - Total of NH DW Regulated Compounds (PFOS, PFOA, PFNA, PFHxS) – **86.6 ng /g**

- **Compostable Toilet Compost sampled in 2021**
  - Total PFAS (24 compounds) – **13.3 ng /g**
  - Total of NH DW Regulated Compounds (PFOS, PFOA, PFNA, PFHxS) – **9.6 ng /g**

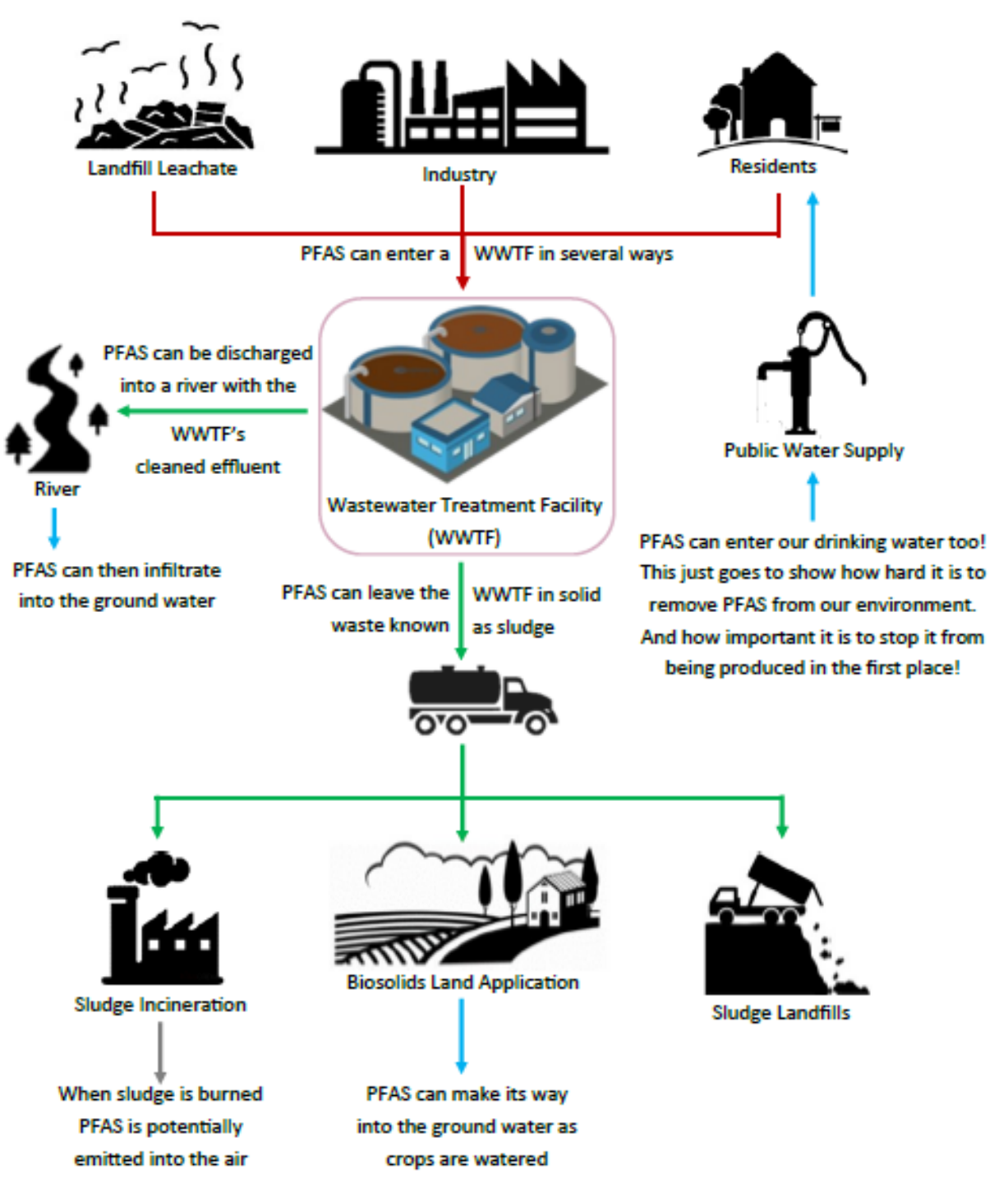
- **Elementary School Septic Tank Septage sampled in 2021**
  - Total PFAS (24 compounds) – **59.6 ng /g (bottom) / 421.4 ng /g (top)**
  - Total of NH DW Regulated Compounds (PFOS, PFOA, PFNA, PFHxS)
    - **0.0 ng /g (bottom) 3.8 ng /g (top)**

- **Aerated Lagoon Sludge Blanket sampled in 2020**
  - Total PFAS (24 compounds) – **388.3 ng /g (lagoon 1) / 533.5 ng /g (lagoon 2)**
  - Total of NH DW Regulated Compounds (PFOS, PFOA, PFNA, PFHxS)
    - **0.0 ng (lagoon 1) /g / 31.6 ng /g (lagoon 2)**
    - Higher concentrations in precursors analyzed than terminal compounds
    - Equipment blanks were ND

USGS Soil / Sludge Leaching Study

- Three phase study
  - NH soil background sampling (100 samples)
  - Batch Experiments on 5 major biosolids and PFAS contaminated NH soils
  - Field Investigation to prove accurate coefficients were developed
- Phase 1 : 100% complete – PFOS detected in all samples taken
- Phase 2: In Process
- Phase 3: Fall 2021
- Full Completion: October 2022 – pushed back from Spring 2022
- Rule revisions: 2023? – Newly proposed legislation

NEBIP Brochures


Landfill Leachate
Industry
Residents
PFAS can enter a WWTF in several ways
PFAS can be discharged into a river with the WWTF's cleaned effluent
River
PFAS can then infiltrate into the ground water
Wastewater Treatment Facility (WWTF)
Public Water Supply
PFAS can enter our drinking water too! This just goes to show how hard it is to remove PFAS from our environment. And how important it is to stop it from being produced in the first place!
PFAS can leave the waste known WWTF in solid as sludge
Sludge Incineration
When sludge is burned PFAS is potentially emitted into the air
Biosolids Land Application
PFAS can make its way into the ground water as crops are watered
Sludge Landfills

Thank you! Any Questions?

Anthony F. Drouin

Residuals Management Section Supervisor

Water Division - Wastewater Engineering Bureau, NHDES

29 Hazen Drive, PO Box 95, Concord, NH 03302

Tel: (603) 271-3571 | Fax: (603) 271-4128

anthony.f.drouin@des.nh.gov