

# NHDES Residuals Management Section PFAS Investigation Update



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**Supervisor - Residuals Management Section**

**2022 GSOWA 33<sup>rd</sup> Annual Spring Septic System Conference & Expo: Breakout Session I**



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

# Residuals Management Section

## NHDES

- ▶ Water Division
  - ▶ Wastewater Engineering Bureau
    - ▶ Residuals Management Section

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# Applicable State Rules for Residuals Management Options



- ▶ Land Application - Env-Wq 800/Env-Wq 1600/RSA 485-A
- ▶ Solid Waste - Env-Sw 100 through 2100, RSA 149-M
- ▶ Incineration - Env-A 600, 40 CFR Part 60, Subpart O
- ▶ Federal Regulations - 40 CFR Part 503



# What Residuals do we regulate in NH?

## Sludge REGULATION

- ▶ DRINKING WATER TREATMENT
- ▶ SHORT PAPER FIBER
- ▶ WASTEWATER TREATMENT
  - ▶ SLUDGE
  - ▶ BIOSOLIDS

## Septage REGULATION

- ▶ SEPTIC TANK
- ▶ GREASE INTERCEPTOR / GREASE (BROWN vs YELLOW)
- ▶ PORTABLE TOILETS
- ▶ MARINE SANITATION DEVICE

# Sludge & Septage Management:

- Hauling
- Residuals Quality
- Sites/Land Application
- Facilities
- Recordkeeping
- Reporting to NHDES







## Sludge

vs.

## Biosolids

- ▶ NOT treated
- ▶ NOT AS MUCH Testing
- ▶ Disposed at a landfill or burned in an incinerator
- ▶ NO CERTIFICATION
- ▶ Can be transformed into Biosolids

- ▶ Treated
- ▶ Tested for 170+Analytes
- ▶ Beneficial Use
- ▶ NHDES CERTIFIED
- ▶ UNH BMP
- ▶ NEIWPC SAP



# Sludge Quality Certification

- Basic information
- Industrial pretreatment information
- Quantity
- Pathogen & vector attraction reduction options
  - Class A & Class B biosolids
    - **P**rocess to **S**ignificantly **R**educe **P**athogens: Class B
    - **P**rocess to **F**urther **R**educe **P**athogens: Class A
  - Short Paper Fiber
  - Drinking Water Residuals
- Historical & current quality data

## Biosolids





# Sludge Quality Certification

- Annual Testing (frequency of testing based on volume generated)
- Recordkeeping
- Annual Report to NHDES by last business day in **January**, each year
- Renew certificate every 5 years





# Sludge Quality Certification

**Beneficial Use is the utilization of the nutrients and organic matter from the biosolids for the agronomic need as long as it does not pose a significant threat to human health or environment. Beneficial use applies to agricultural, forest, and land reclamation management practices**

- Bulk biosolids must obtain an SQC to be distributed in NH
- Annual soil test determine crops nutrient demand supplied from biosolids (UNH BMP)
- Class B land application must obtain a site permit through RMS
- Concentration limits and screening standards set for VOC, SVOC, PCB's, Dioxin, & Metals – **168 analytes**



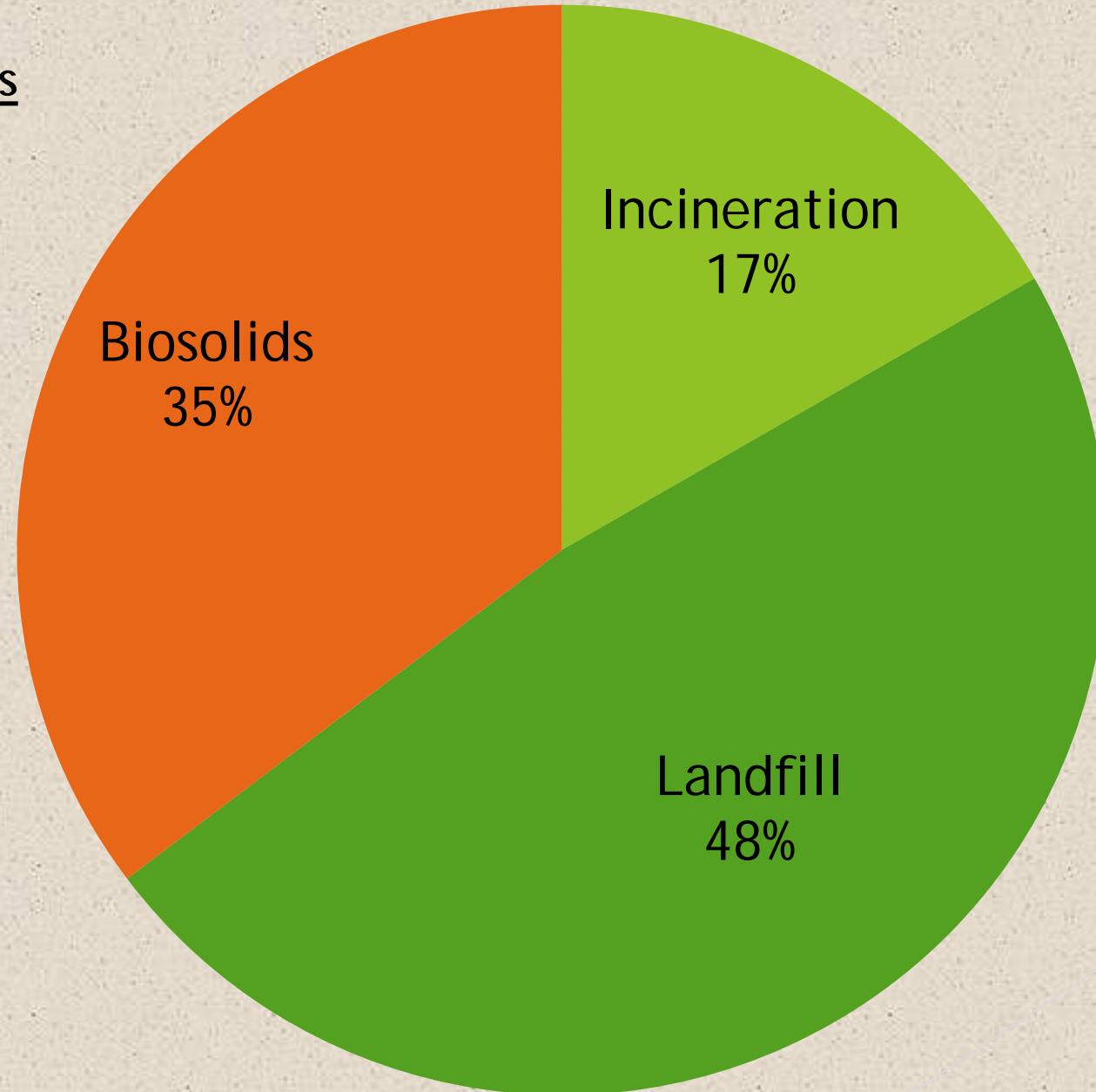


# 2018 NH Sludge, Septage, and Leachate

- NH Biosolids Recycled to Land Application : **39,902 wet tons**
- NH Sludge that was disposed at a landfill : **50,176 wet tons**
- NH Sludge that was incinerated : **17,450 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 : **99,331,519 gallons** of leachate
  - 79,036,610 gallons** managed at WWTFs within state
  - 19,115,003 gallons** managed at WWTFs out of state

# NH Sludge Disposal Practices:

2018: 104,500 Wet Tons





# Municipal Responsibility

## RSA 485-A:5-b

Each municipality shall either provide, or assure access to, a DES-approved septage facility or a DES-approved alternative option for its residents.



**“provide, or assure access to”**

**shall mean a written agreement, indicating that the recipient facility agrees to accept septage generated in that municipality**

## 2019 Septage Generation by town

- ▶ Londonderry  
5,855,012 gal
- ▶ Bedford  
3,435,354 gal
- ▶ Salem  
2,970,950 gal
- ▶ Amherst  
2,720,380 gal
- ▶ Windham  
2,135,485 gal
- ▶ North Hampton  
2,039,764 gal
- ▶ Derry  
2,037,164 gal
- ▶ Litchfield  
1,979,975 gal
- ▶ Plaistow  
1,778,245 gal



# FLUOROTECHNOLOGY MAKES IMPORTANT PRODUCTS FOR VITAL INDUSTRIES POSSIBLE

FluoroCouncil member companies voluntarily committed to a global phase-out of long-chain fluorochemistries by the end of 2015, resulting in the transition to alternatives, such as short-chain fluorochemistries that offer the same high-performance benefits, but with improved environmental and health profiles.



FluoroTechnology is the use of fluorine chemistry to create any fluorinated product. When fluorine and carbon atoms join together, they create a powerful chemical bond. The use and manipulation of this bond gives FluoroTechnology its distinct properties of strength, durability, heat-resistance and stability. These properties are critical to the reliable and safe function of myriad products that industry and consumer rely on every day.

# Select PFAS Standards and Guidance Values in the U.S.

Specific PFAS	NHDES MCLs	NJDEP MCLs	VT DEP MCL	MI DHHS MCL	MA DEP MCL	NY DOH MCLs	MN DOH Guid.	CA Response Level	CA Notif. Level	CA Notif. Recom.	USEPA LHA	CT DPH Advisory
PFOA	12	13	20* combined	8	20* combined	10	35	10	5.1	0.1	70* combined	70* combined
PFOS	15	14	*	16	*	10	15	40	6.5	0.4	*	*
PFHxS	18		*	51	*		47					*
PFNA	11	13	*	6	*							*
PFHpA			*		*							*
PFDA					*							
GenX				370								
PFBS				420			2000					
PFBA							7000					
PFHxA				400,000								

All units are in part-per-trillion











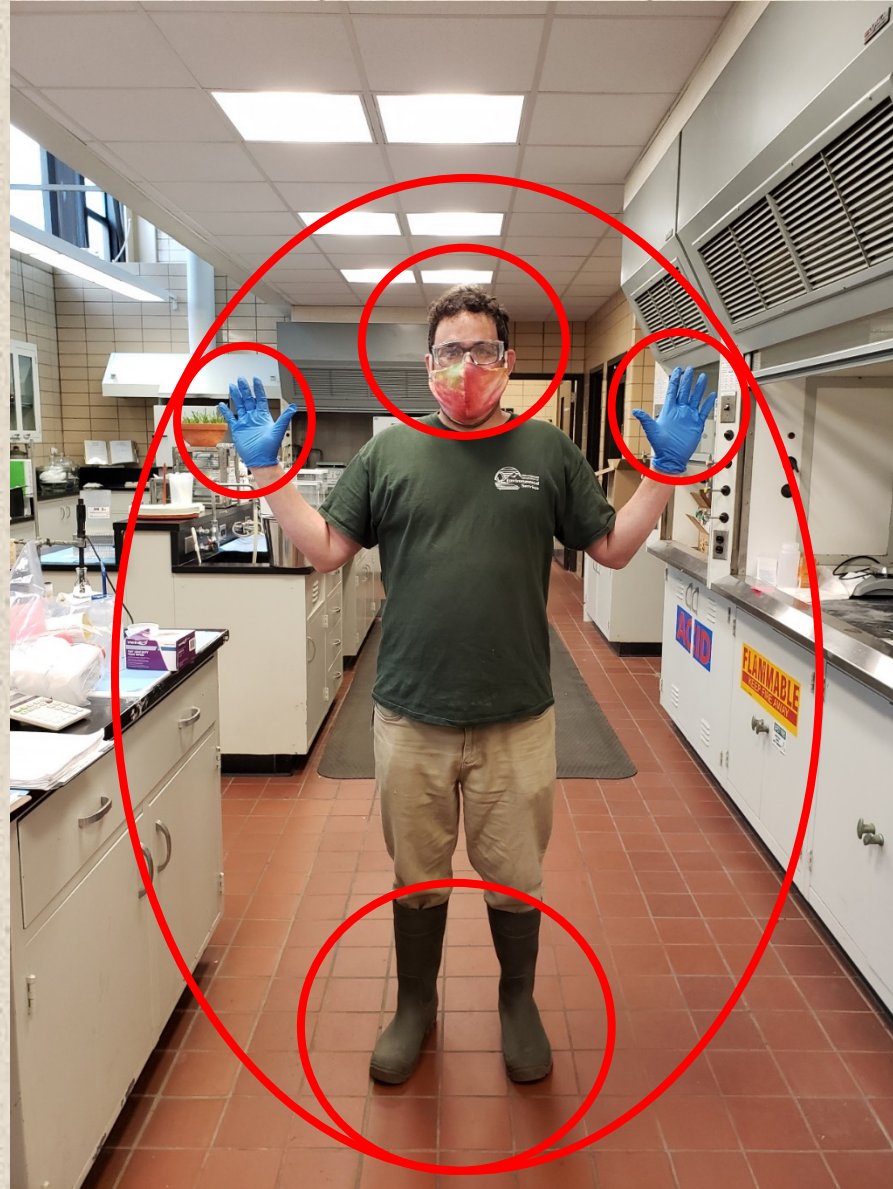




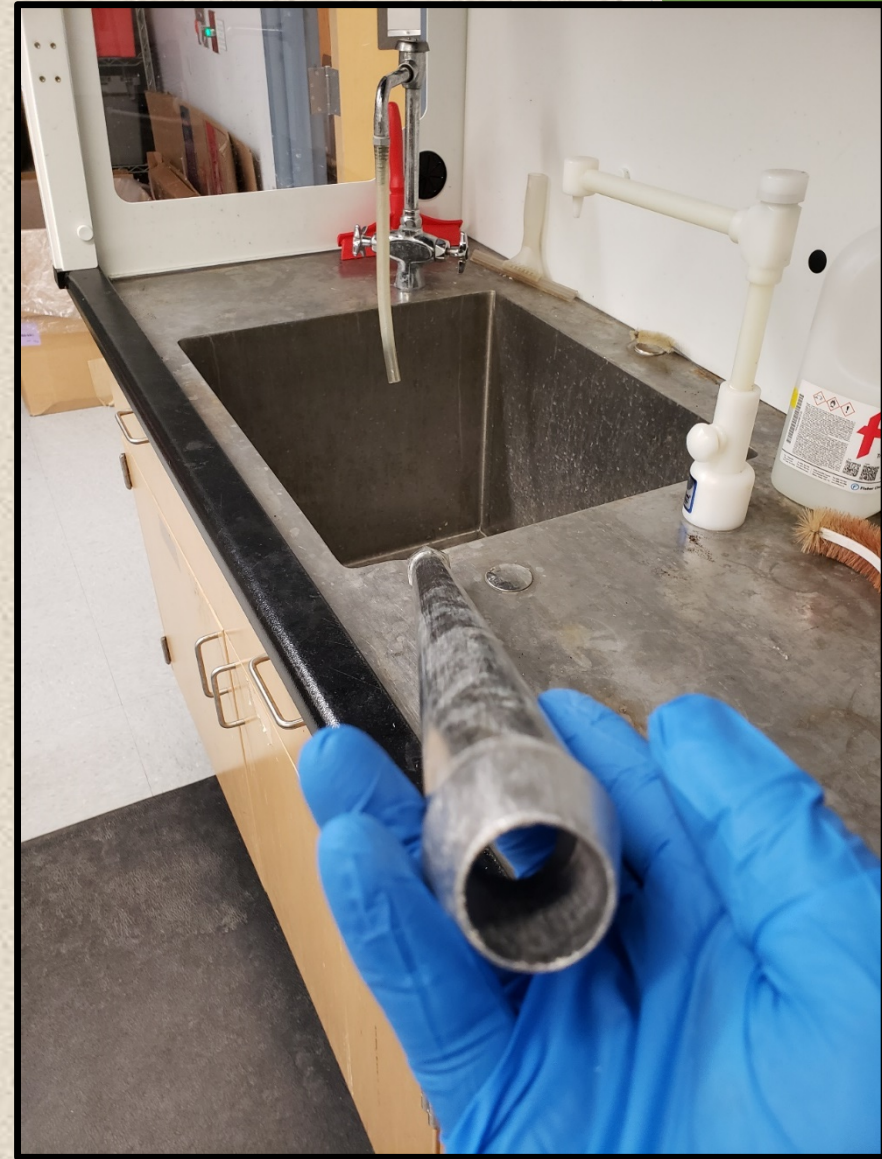




# PPE and proper clothing for sludge PFAS sampling









# Sample equipment cleaning & sampling

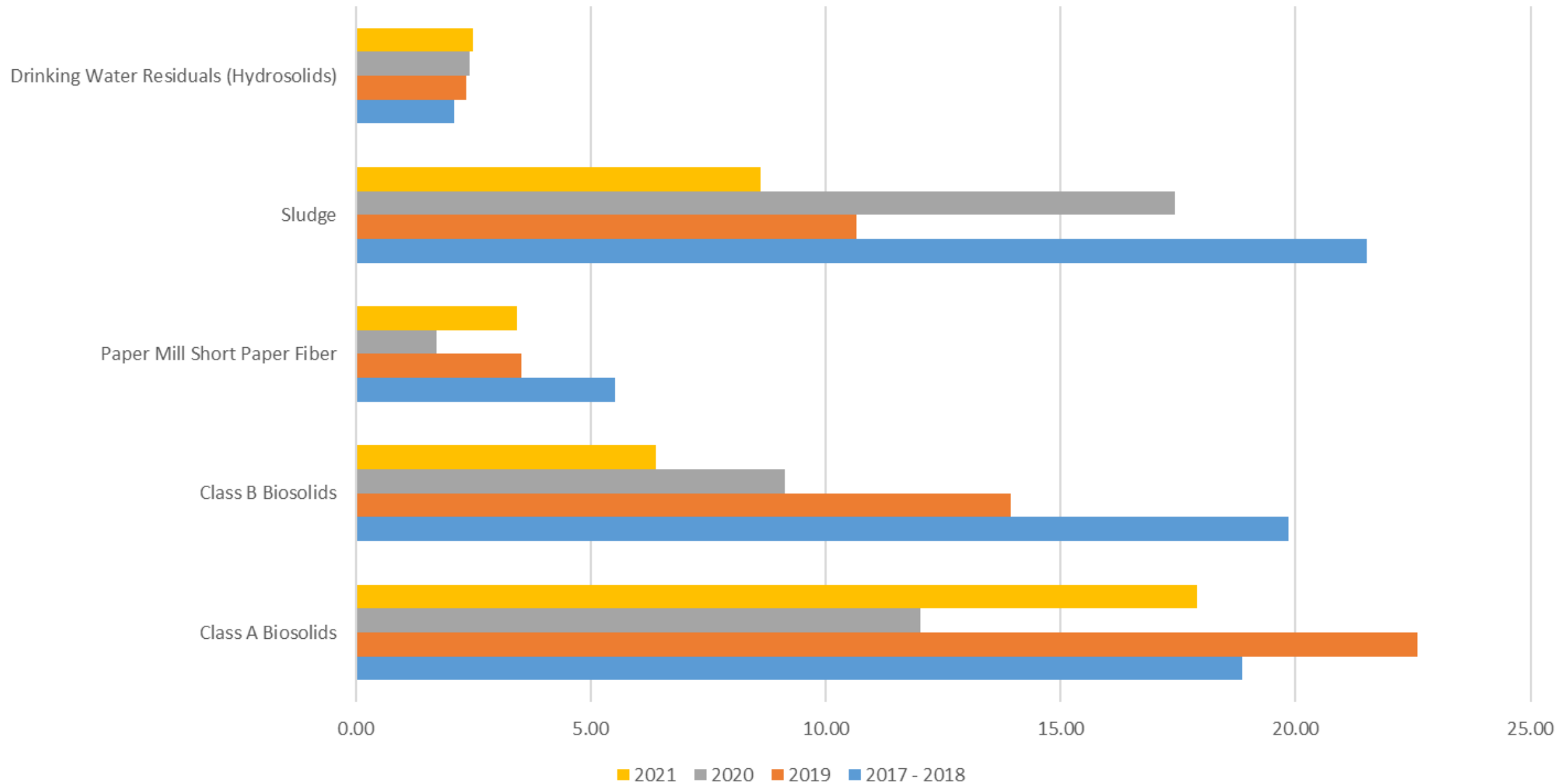
- Rinse equipment with warm tap water to remove most solids.
- Using a brush and PFAS free lab detergent to scrub the equipment to remove all residues
- After scrubbing, rinse the equipment three times with tap water (make sure all detergent is removed).
- The tap water rinse should be followed by rinsing three times with PFAS free deionized water.
- To store, buckets, beakers and other containers can be inverted in a clean, dry location.
- Just prior to sampling, rinse the sample equipment three times in PFAS free deionized water. Take equipment blank rinsate samples to check if your cleaning process is preventing cross contamination.







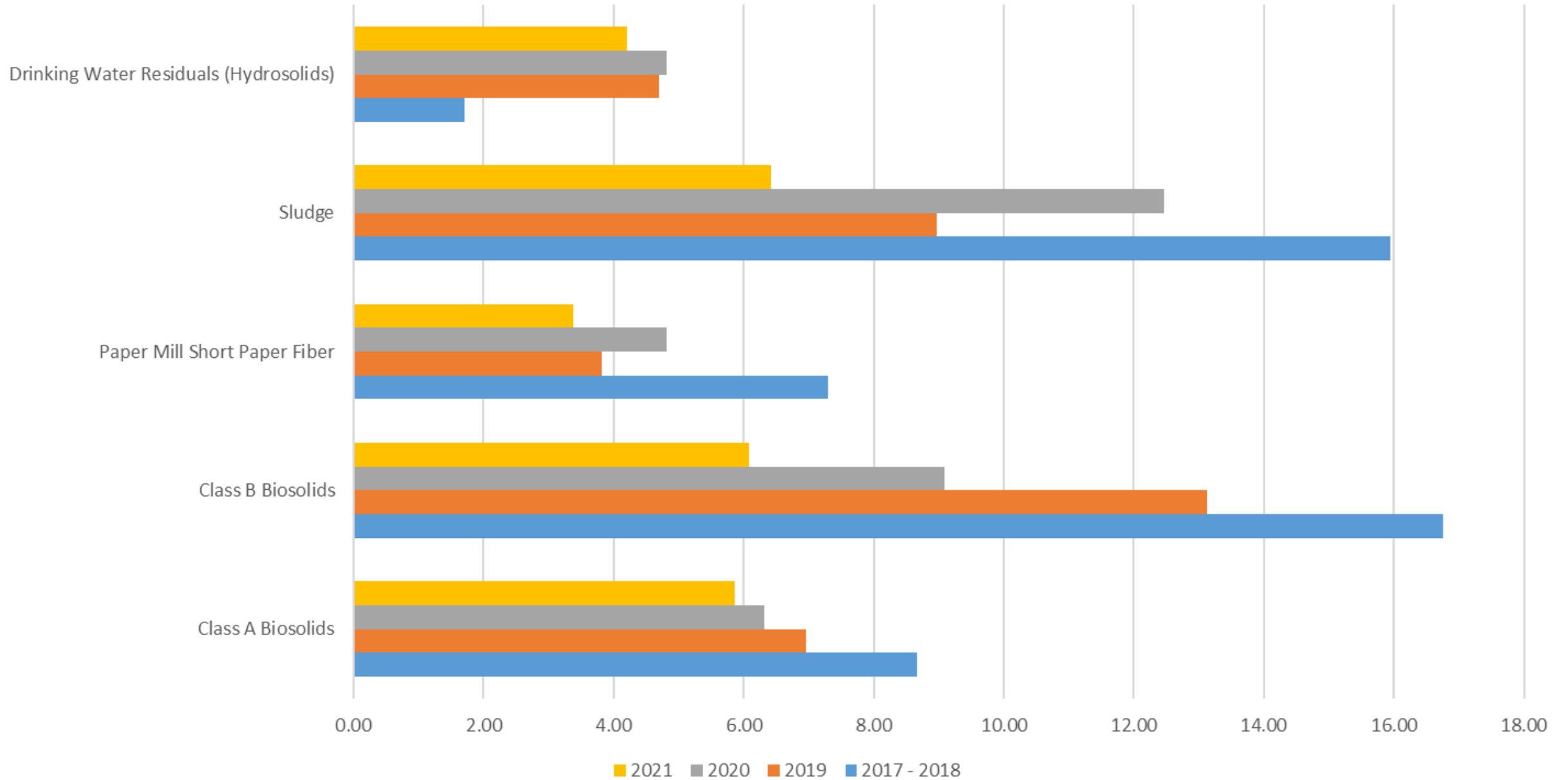
# NH SQC 2017 - 2021 PFAS Residuals Investigation (ng/g) (sum of PFOA, PFOS, PFHxS, & PFNA)



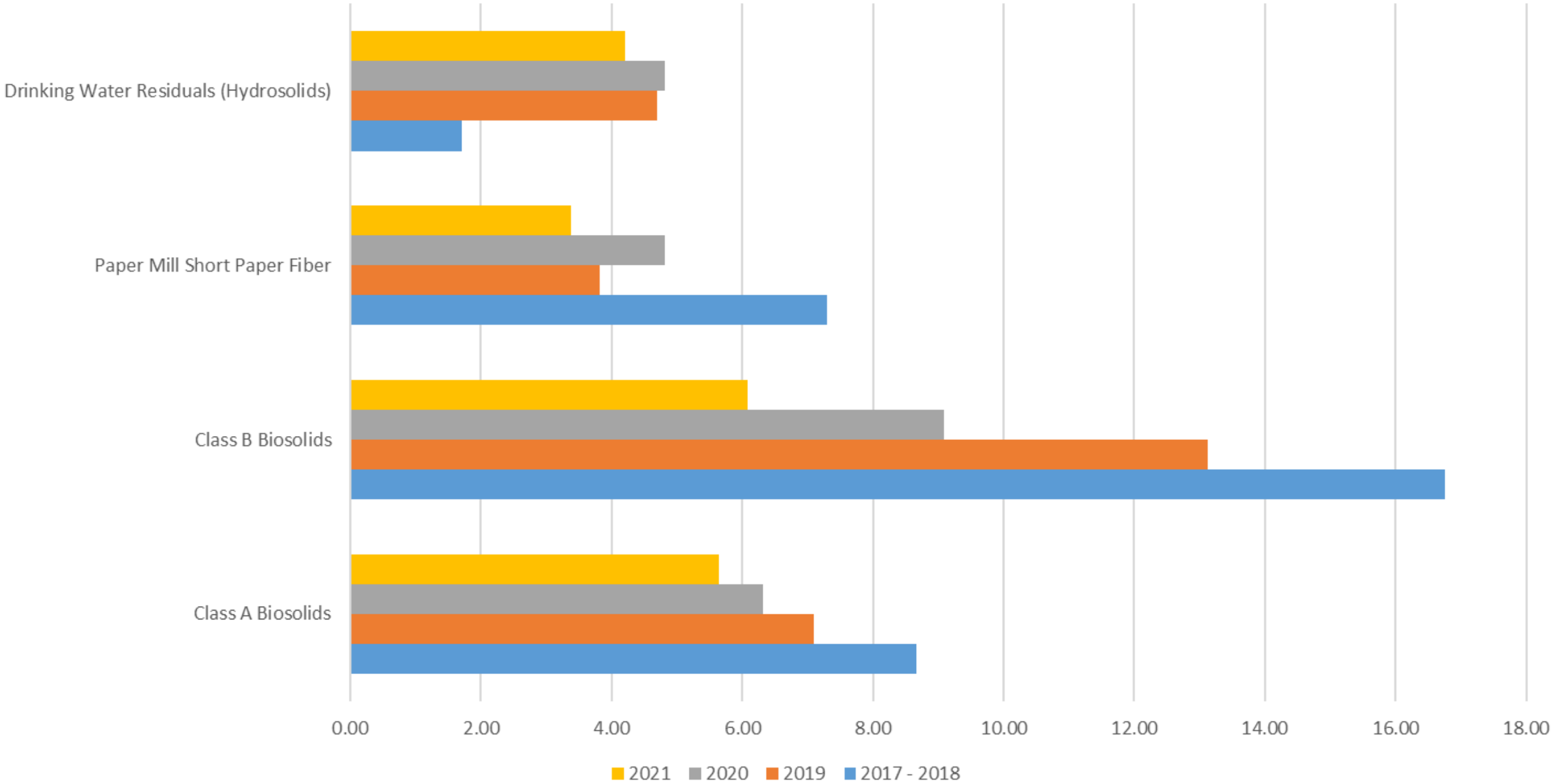
Samples analyzed for PFAS were analyzed using isotope dilution. Some compounds from sample reports' QA/QC report were flagged for being outside of percent recovery acceptable criteria.



# NH SQC 2017 - 2021 PFOS Residuals Investigation (ng/g)



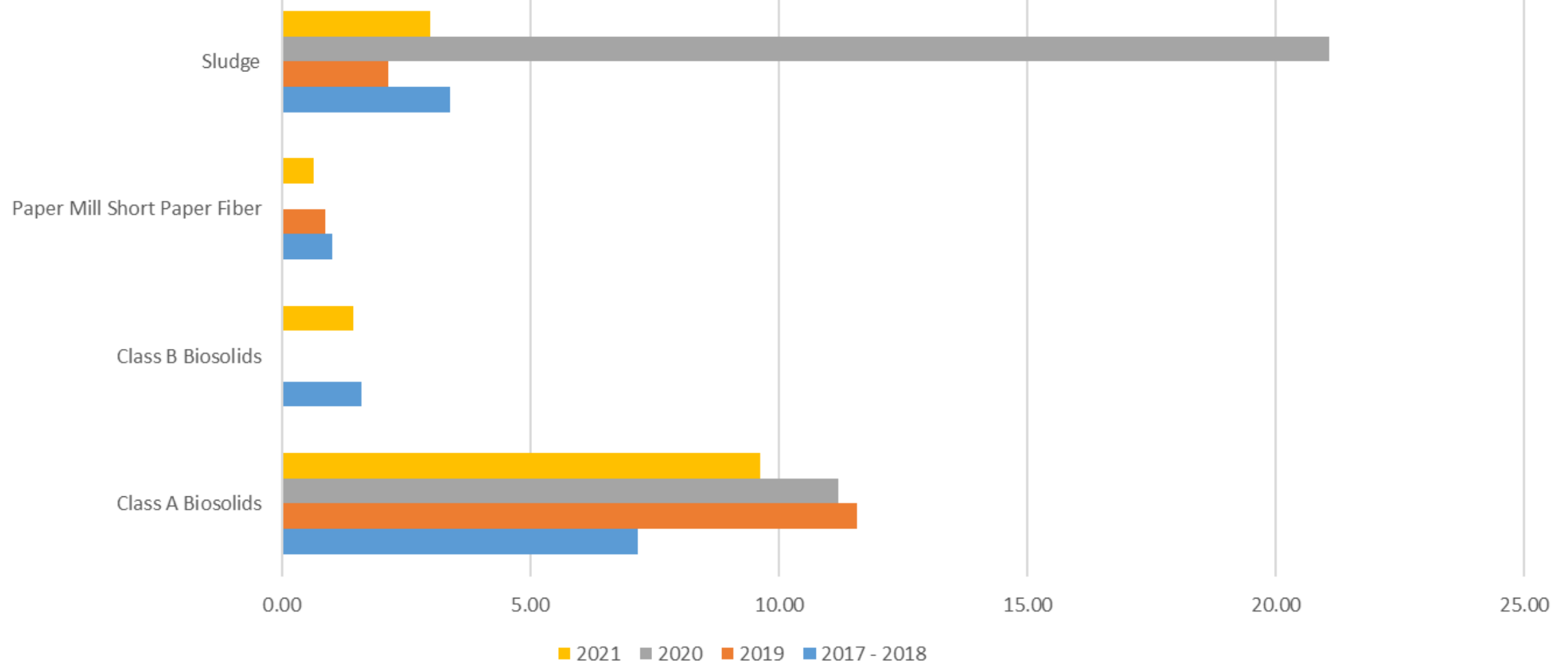
# NH SQC 2017 - 2021 PFOS Residuals Investigation (ng/g)



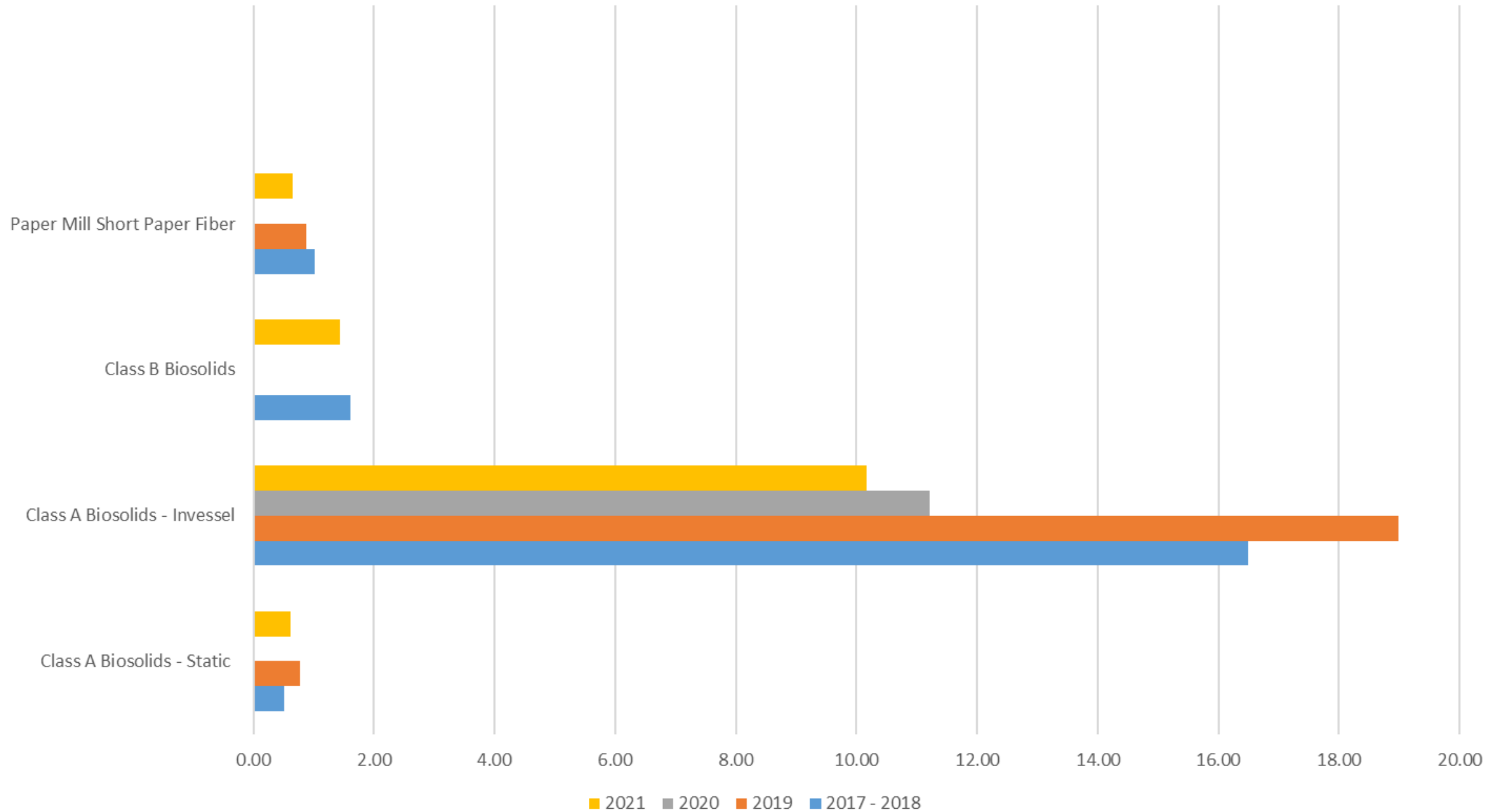


# NH SQC 2017 - 2021 PFOA Residuals Investigation (ng/g)

Drinking Water Residuals (Hydrosolids)



# NH SQC 2017 - 2021 PFOA Residuals Investigation (ng/g)





# 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

# NHDES RMS Collection Systems

## Sampling Effort







11/10/2021





11/10/2021





11/10/2021





12/01/2021















## Industrially PFAS Impacted Community

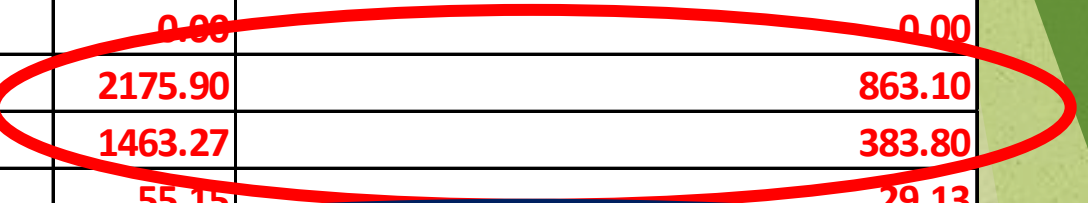
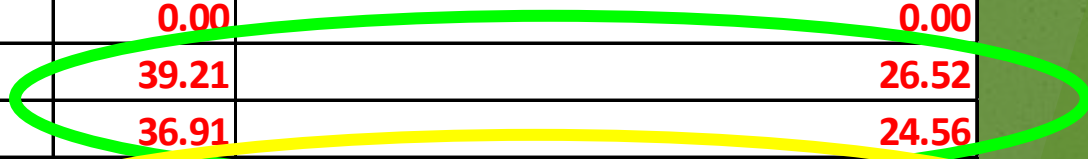
<u>Sample Name</u>	<u>Units</u>	<u>Total PFAS</u>	<u>Total of NH DW Regulated PFAS Compounds (PFOA, PFOS, PFNA, PFHXS)</u>
1	ng/l	360.00	0.00
1-DUP	ng/l	0.00	0.00
2	ng/l	39.21	26.52
2-DUP	ng/l	36.91	24.56
3	ng/l	95.07	40.70
3-DUP	ng/l	97.64	41.30
4	ng/l	82.45	36.22
4-DUP	ng/l	83.40	37.60
Field Blank	ng/l	0.00	0.00
5-initial	ng/l	2175.90	863.10
5-5 min later	ng/l	1463.27	383.80
6	ng/l	55.15	29.13
7	ng/l	5531.43	3840.70
8	ng/l	452.88	347.38
9	ng/l	0.00	0.00
10	ng/l	0.00	0.00
11	ng/l	14.10	14.10
12	ng/l	288.50	0.00
Influent Composite (Composite Sampler)	ng/l	104.40	0.00
Effluent Composite (Composite Sampler)	ng/l	190.29	21.68
Field Blank	ng/l	0.00	0.00

**Residential**

**Residential**

**Industrial**

**Industrial Storm Water**

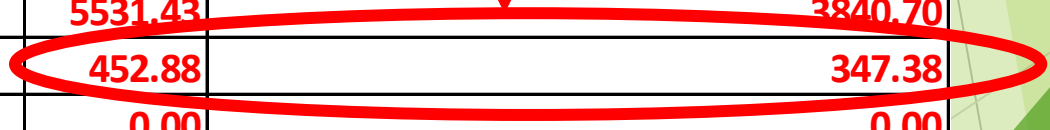




# Industrially PFAS Impacted Community

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3-DUP	ng/l	97.64	41.30
4	ng/l	82.45	26.22
4-DUP	ng/l	83.15	27.60
Field Blank	ng/l	0.00	0.00
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7	ng/l	5531.43	3840.70
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9	ng/l	0.00	0.00
10	ng/l	0.00	0.00
11	ng/l	14.10	14.10
12	ng/l	288.50	0.00
Influent Composite (Composite Sampler)	ng/l	104.40	0.00
Effluent Composite (Composite Sampler)	ng/l	190.29	21.68
Field Blank	ng/l	0.00	0.00

Older Residential Neighborhood



## Industrially PFAS Impacted Community

<u>Sample Name</u>	Units	Total PFAS	Total of NH DW Regulated PFAS Compounds (PFOA, PFOS, PFNA, PFHXS)
1	ng/l	360.00	0.00
1-DUP	ng/l	0.00	0.00
2	ng/l	39.21	26.52
2-DUP	ng/l	36.91	24.56
3	ng/l	95.07	40.70
3-DUP	ng/l	97.64	41.30
4	ng/l	82.45	36.22
4-DUP	ng/l	83.40	37.60
Field Blank	ng/l	0.00	0.00
5-initial	ng/l	2175.90	863.10
5-5 min later	ng/l	1463.27	383.80
6	ng/l	55.15	29.13
7	ng/l	5531.43	3840.70
8	ng/l	452.88	347.38
9	ng/l	0.00	0.00
10	ng/l	0.00	0.00
11	ng/l	14.10	14.10
12	ng/l	288.50	0.00
Influent Composite (Composite Sampler)	ng/l	104.40	0.00
Effluent Composite (Composite Sampler)	ng/l	190.29	21.68
Field Blank	ng/l	0.00	0.00



## Non-Industrially PFAS Impacted Community

<u>Sample Name</u>	Units	Total PFAS	Total of NH DW Regulated PFAS Compounds (PFOA, PFOS, PFNA, PFHXS)
1	ng/l	0	0
2	ng/l	0	0
2-DUP	ng/l	0	0
3	ng/l	0	0
4	ng/l	10.5	0
5	ng/l	0	0
5_DUP	ng/l	0	0
6	ng/l	75.4	0
7	ng/l	0	0
8	ng/l	0	0
9	ng/l	0	0
10	ng/l	33.2	0
10_DUP	ng/l	37.1	0
Influent Composite (Composite Sampler)	ng/l	0	0
Effluent Composite (Composite Sampler)	ng/l	163.69	28.66
Field Blank	ng/l	0	0
11	ng/l	0	0
12	ng/l	44.3	0
13	ng/l	0	0
4-DUP	nh/l	0	0

# USGS Soil / Sludge Leaching Study

- ▶ **Three phase study**
  - ▶ **NH soil background sampling (100 samples)**
  - ▶ **PFAS Batch Experiments on biosolid and NH soils**
  - ▶ **Field Investigation to prove accurate coefficients were developed**
- ▶ **Phase 1 : Complete – Data Release soon. PFOS detected 100%**
- ▶ **Phase 2: In Proceasd**
- ▶ **Phase 3: Fall 2021 – Spring 2022**
- ▶ **Full Completion: October 2022**
- ▶ **Rule revisions: Soil Standard proposed by Nov. 2023 per HB1547 – Newly proposed legislation**



# NEBIP Brochures

## PFAS in Wastewater

When you wash items that contain PFAS compounds some of the chemicals are drawn out of the item, be it clothing, dishware, or furniture, those chemicals ultimately end up in your wastewater and drain into the city sewers or into your own septic tank.

PFAS cannot break down in the environment, this makes them 'forever chemicals.' Once these chemicals enter our water supply or the environment it is very hard to get them out.

Even though wastewater treatment facilities are extremely effective at removing many pollutants, PFAS are not.

PFAS can be discharged into a river.

### How does PFAS effect your local wastewater treatment facility and YOU?

Drafted by:  
The Northeast Biosolids Improvement Program

Cool Picture!

### What is "PFAS" & what does it do?

PFAS stands for "Per- and polyfluoroalkyl substances" and is a group of manmade chemicals that have been widely used since the 1940s.

PFAS is commonly used to make products that are heat, water, or oil resistant and are so useful they are found everywhere within our world!

**BUT... There's a catch!**

PFAS have been known by the EPA to be very harmful to wildlife and humans! They can negatively impact child development, cause reproductive harm, immunological problems, and have been linked to some cancers.

This is why we need to be careful, when buying new products, to make sure they are PFAS free. This can be very difficult since the chemicals are so popular! The reverse of this pamphlet contains a list of products to be on the lookout for that may contain PFAS chemicals and what you can do to help!

### Products that may contain PFAS

Outdoor Apparel  
Coated Paper  
Personal Care Products  
Food Packaging  
Cleaning Agents  
Paints / Coatings / Sealants  
Nonstick Cookware  
Stain resistant clothing, furnishing, & carpets

More Clipart

### What can I do to help?

1. Read labels and research products to find PFAS-free replacements.
2. Check out [www.nbscentral.org](http://www.nbscentral.org) to help you understand PFAS in your world.
3. Talk to your local legislator or state's representative and ask for legislative action to stop the manufacturing of PFAS.

Including--

- What are PFAS chemicals?
- How PFAS effects wastewater and gets into our environment!
- A list of products that may contain PFAS!
- What you can do to limit PFAS usage!

## What are Emerging Contaminants?

The EPA defines emerging contaminants to include: PFAS, Pharmaceuticals, Pesticides, Personal care products, Industrial solvents and chemicals, Explosives, and Gasoline additives.

"Contaminants of emerging concern" are pharmaceuticals and pesticides, and their metabolites, and there is concern about their potential impact on aquatic life and the environment. The EPA is currently conducting research to evaluate the potential risks of these contaminants to aquatic life and the environment.

## Turning Sludge into Biosolids

Wastewater treatment facilities generate sludge from the operations at their plant. On the surface this sludge may seem useless, but the sludge can be recycled into a fertilizer known as biosolids. Biosolids are very useful and can be used to fertilize agricultural lands and public parks and gardens.

## Why Conduct Septage Screenings?

In order to comply with incoming PFAS regulations, some wastewater facilities may set up testing programs to screen domestic and non-domestic septage coming into the plant for PFAS or the other emerging contaminants.

The septage hauler to be in receiving facility to check if it is PFAS free.

### What is Domestic Septage?

Domestic septage is the liquid or solid material removed from a septic tank, cesspool, portable toilet, type III marine sanitation device, or a similar system that receives only household, non-commercial, or non-industrial wastes.

Household activities include the normal bathroom and kitchen activities done at home by the residents living in that household such as toilet use, residential dish and clothes washing, and showering.

### What is Non-Domestic Septage?

Non-Domestic Septage is also known as commercial or industrial septage. It includes any waste generated by non-household activities that is discharged as wastewater into a septic tank, cesspool, portable toilet, or type III marine sanitation device.

Some examples of Non-Domestic Septage:

- A hair salon operating out of someone's home
- An auto mechanic's shop attached to the owner's home
- A school that uses industrial grade cleaning chemicals

"The factor that differentiates commercial and industrial septage from domestic septage is not the type of establishment generating waste, rather it is the type of waste being produced" (EPA).

### Document Objective

Dealing with emerging contaminants is a challenge for wastewater disposal facilities, especially if they are producing solids or biosolids for beneficial use. Because of this, some wastewater treatment facilities are beginning to screen for PFAS and other emerging contaminants. These facilities know that this screening is necessary to ensure they provide a quality fertilizer or soil conditioner to their customers, and to maintain public acceptance of their materials.

This document is to help septage haulers and wastewater operators distinguish the difference between domestic and non-domestic septage, and to help familiarize these haulers and operators with the screening programs that may be in place to monitor for emerging contaminants.

### Useful Links

NEBIA Sampling Guide:  
[https://www.nbscentral.org/sites/default/files/2023-09/NEBIA\\_Sampling\\_Guide.pdf](https://www.nbscentral.org/sites/default/files/2023-09/NEBIA_Sampling_Guide.pdf)

MaineWast WWTF Septage Permit Application:  
<https://www.maine.gov/dep/water/wwtf/permits/wwtf-septage-permit-application.pdf>

USEPA Septage Sampling Guide:  
<https://www.epa.gov/watersheds/wwtf-septage-sampling-guide>

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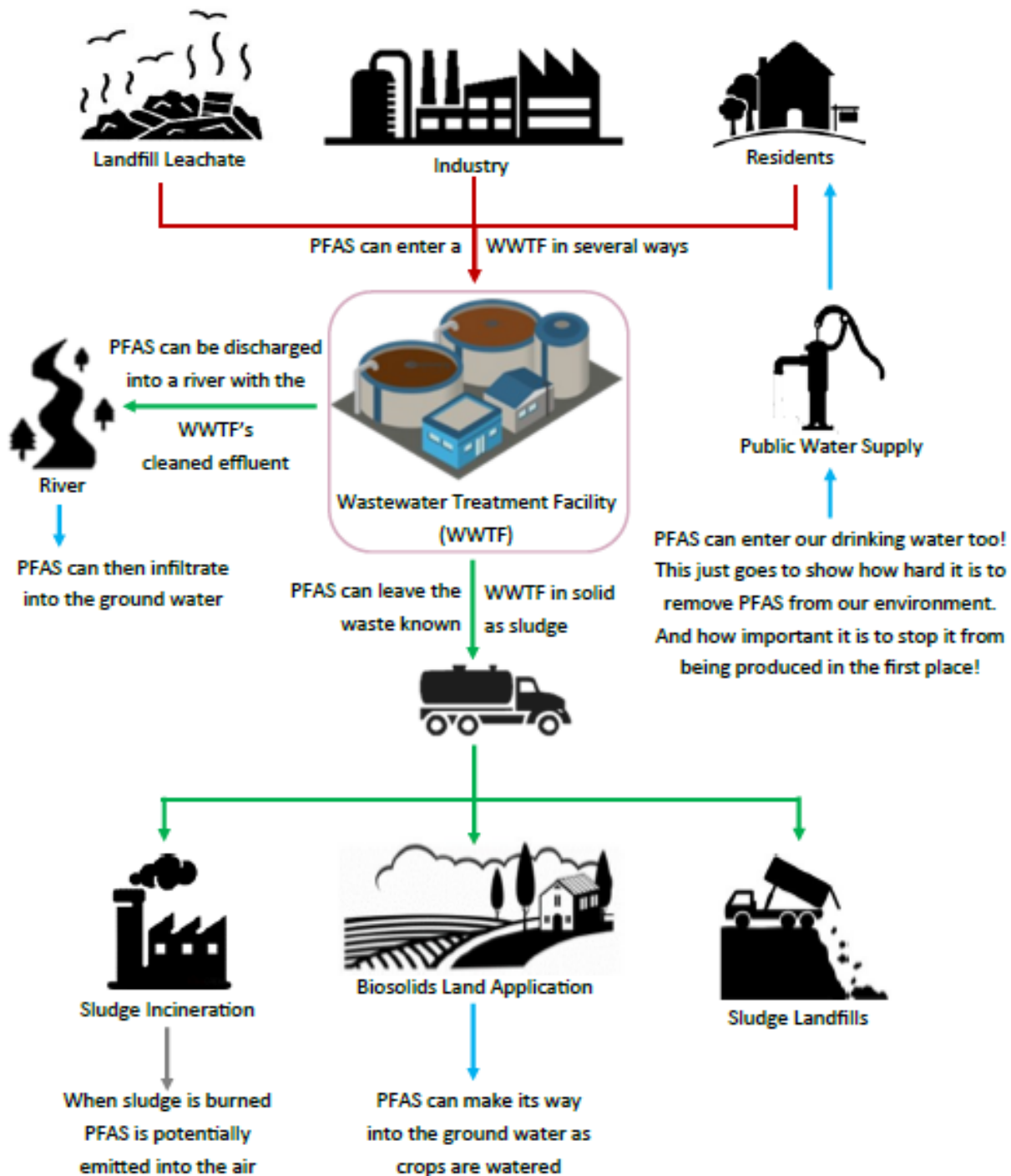
USEPA Septage Sampling Guide:  
<https://www.epa.gov/watersheds/wwtf-septage-sampling-guide>

### Wastewater Operator and Septage Hauler PFAS Guidance

Drafted by:  
The Northeast Biosolids Improvement Program

Including--

- The importance of keeping PFAS out of our biosolids
- A list of Emerging Contaminants and their effects!
- What WWTF operators and septage haulers can do against these contaminants!





# Thank you! Any Questions?

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