NBC PFAS Sampling – Developing a Protocol

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NEWEA PFAS Seminar May 3, 2023

The Narragansett Bay Commission

- Own and operate two largest WWTFs in Rhode Island, USA
- Serving Providence and surrounding towns
- Located at the headwaters of Narragansett Bay
- Current RIPDES permits in effect since 2017 – new permits due anytime

PFAS monitoring

- Monitoring requirements are expected with next permit draft
- **September 2020** – began pro-actively exploring PFAS
- Guidance on PFAS Sampling = ~~SCARY~~ *intimidating given existing sampling routines*
- Start simple, use blanks and other QC samples to evaluate potential for contamination

CBS News

https://www.limno.com/sampling-for-pfas-requires-caution/

Initial Protocol Development

- **Blanks**
  - Reagent blank – grab sample directly from DI source
  - Field blank (influent back-up autosampler) – DI water pumped through the sampler into a clean influent composite carboy, mix with stir bar, pour off via spigot into sample bottle
  - Field blank (modified portable autosampler) – similar to above but using the "Modified" sampler.

All data shown today analyzed by contract lab using methods EPA 537m or 537.1m.

DISCLAIMER

"The NBC does not provide any certification concerning the precision or accuracy of such results and provides no assurance that such results are representative of the NBC's influent, discharge, biosolids, or industrial user discharge."

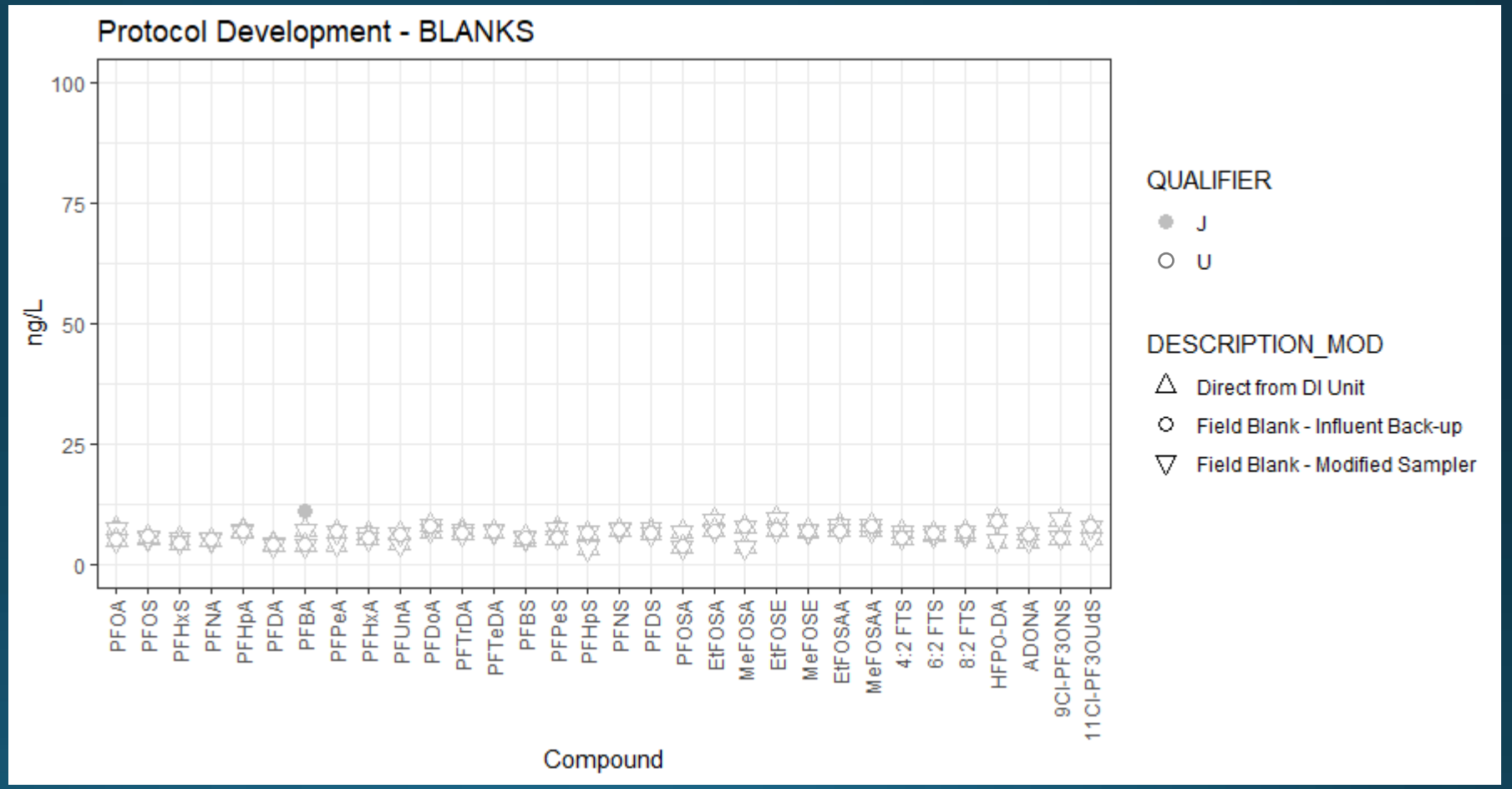
	First Event	
ng/L (ppt)	**Direct from DI Unit**	***Qualifier***
PFBA	7.0	U
PFPeA	4.1	U
PFHxA	6.4	U
PFHpA	7.1	U
PFOA	7.4	U
PFNA	4.9	U
PFDA	4.1	U
PFUnA	4.3	U
PFDoA	6.8	U
PFTRDA	6.9	U
PFTEDA	6.7	U
PFBS	5.1	U
PFPeS	7.4	U
PFHxS	5.2	U
PFHpS	3.3	U
PFOS	5.2	U
PFNS	7.0	U
PFDS	7.2	U
PFOSA	6.6	U
EtFOSA	9.0	U
MeFOSA	3.5	U
EtFOSE	9.4	U
MeFOSE	6.6	U
EtFOSAA	8.1	U
MeFOSAA	7.0	U
4:2 FSA	6.6	U
6:2 FSA	5.9	U
8:2 FSA	5.9	U
HFPO-DA	4.7	U
4,8-D-3H-PFNA	4.8	U
F-53B Major	9.3	U
F-53B Minor	5.3	U

	First Event			
ng/L (ppt)	**Direct from DI Unit**	***Qualifier***	**Field Blank: Influent Back-up**	***Qualifier***
PFBA	7.0	U	11.0	J
PFPeA	4.1	U	6.0	J
PFHxA	6.4	U	6.4	U
PFHpA	7.1	U	7.1	U
PFOA	7.4	U	7.4	U
PFNA	4.9	U	4.9	U
PFDA	4.1	U	4.1	U
PFUnA	4.3	U	4.3	U
PFDoA	6.8	U	6.8	U
PFTRDA	6.9	U	6.9	U
PFTEDA	6.7	U	6.7	U
PFBS	5.1	U	5.1	U
PFPeS	7.4	U	7.4	U
PFHxS	5.2	U	5.2	U
PFHpS	3.3	U	3.3	U
PFOS	5.2	U	5.2	U
PFNS	7.0	U	7.0	U
PFDS	7.2	U	7.2	U
PFOSA	6.6	U	6.6	U
EtFOSA	9.0	U	9.0	U
MeFOSA	3.5	U	3.5	U
EtFOSE	9.4	U	9.4	U
MeFOSE	6.6	U	6.6	U
EtFOSAA	8.1	U	8.1	U
MeFOSAA	7.0	U	7.0	U
4:2 FSA	6.6	U	6.6	U
6:2 FSA	5.9	U	5.9	U
8:2 FSA	5.9	U	5.9	U
HFPO-DA	4.7	U	4.7	U
4,8-D-3H-PFNA	4.8	U	4.8	U
F-53B Major	9.3	U	9.3	U
F-53B Minor	5.3	U	5.3	U

	First Event					
ng/L (ppt)	Direct from DI Unit	*Qualifier*	Field Blank: Influent Back-up	*Qualifier*	Field Blank: Modified Sampler	*Qualifier*
PFBA	7.0	U	11.0	J	7.0	U
PFPeA	4.1	U	6.0	J	4.1	U
PFHxA	6.4	U	6.4	U	6.4	U
PFHpA	7.1	U	7.1	U	7.1	U
PFOA	7.4	U	7.4	U	7.4	U
PFNA	4.9	U	4.9	U	4.9	U
PFDA	4.1	U	4.1	U	4.1	U
PFUnA	4.3	U	4.3	U	4.3	U
PFDoA	6.8	U	6.8	U	6.8	U
PFTRDA	6.9	U	6.9	U	6.9	U
PFTEDA	6.7	U	6.7	U	6.7	U
PFBS	5.1	U	5.1	U	5.1	U
PFPeS	7.4	U	7.4	U	7.4	U
PFHxS	5.2	U	5.2	U	5.2	U
PFHpS	3.3	U	3.3	U	3.3	U
PFOS	5.2	U	5.2	U	5.2	U
PFNS	7.0	U	7.0	U	7.0	U
PFDS	7.2	U	7.2	U	7.2	U
PFOSA	6.6	U	6.6	U	6.6	U
EtFOSA	9.0	U	9.0	U	9.0	U
MeFOSA	3.5	U	3.5	U	3.5	U
EtFOSE	9.4	U	9.4	U	9.4	U
MeFOSE	6.6	U	6.6	U	6.6	U
EtFOSAA	8.1	U	8.1	U	8.1	U
MeFOSAA	7.0	U	7.0	U	7.0	U
4:2 FSA	6.6	U	6.6	U	6.6	U
6:2 FSA	5.9	U	5.9	U	5.9	U
8:2 FSA	5.9	U	5.9	U	5.9	U
HFPO-DA	4.7	U	4.7	U	4.7	U
4,8-D-3H-PFNA	4.8	U	4.8	U	4.8	U
F-53B Major	9.3	U	9.3	U	9.3	U
F-53B Minor	5.3	U	5.3	U	5.3	U

	Second Event					
ng/L (ppt)	Direct from DI Unit	*Qualifier*	Field Blank: Influent Back-up	*Qualifier*	Field Blank: Modified Sampler	*Qualifier*
PFBA	3.9	U	3.9	U	3.9	U
PFPeA	6.7	U	6.7	U	6.7	U
PFHxA	5.3	U	5.3	U	5.3	U
PFHpA	6.7	U	6.7	U	6.7	U
PFOA	5.0	U	5.0	U	5.0	U
PFNA	5.1	U	5.1	U	5.1	U
PFDA	3.9	U	3.9	U	3.9	U
PFUnA	6.2	U	6.2	U	6.2	U
PFDoA	8.0	U	8.0	U	8.0	U
PFTRDA	6.4	U	6.4	U	6.4	U
PFTEDA	6.8	U	6.8	U	6.8	U
PFBS	5.6	U	5.6	U	5.6	U
PFPeS	5.5	U	5.5	U	5.5	U
PFHxS	4.4	U	4.4	U	4.4	U
PFHpS	6.5	U	6.5	U	6.5	U
PFOS	5.7	U	5.7	U	5.7	U
PFNS	7.2	U	7.2	U	7.2	U
PFDS	6.4	U	6.4	U	6.4	U
PFOSA	3.6	U	3.6	U	3.6	U
EtFOSA	7.0	U	7.0	U	7.0	U
MeFOSA	7.8	U	7.8	U	7.8	U
EtFOSE	7.1	U	7.1	U	7.1	U
MeFOSE	7.0	U	7.0	U	7.0	U
EtFOSAA	7.0	U	7.0	U	7.0	U
MeFOSAA	8.0	U	8.0	U	8.0	U
4:2 FSA	5.4	U	5.4	U	5.4	U
6:2 FSA	6.5	U	6.5	U	6.5	U
8:2 FSA	6.7	U	6.7	U	6.7	U
HFPO-DA	9.0	U	9.0	U	9.0	U
4,8-D-3H-PFNA	6.3	U	6.3	U	6.3	U
F-53B Major	5.4	U	5.4	U	5.4	U
F-53B Minor	7.7	U	7.7	U	7.7	U

- Blanks
  - All results <Reporting Limit
  - MOST results <Detection Limit



Initial Protocol Development

- **Blanks**
  - Reagent blank – grab sample directly from DI source
  - Field blank (influent back-up autosampler) – DI water pumped through the sampler into a clean influent composite carboy, mix with stir bar, pour off via spigot into sample bottle
  - Field blank (modified portable autosampler) – similar to above but using the "Modified" sampler.
- Evaluate **sampling equipment and methods** (collected as concurrently as possible)
  - Grab sample direct from influent (in duplicate)
  - Pumped grab sample into 125 mL sample container using influent back-up autosampler
  - Pumped grab sample into 125 mL sample container using modified portable autosampler

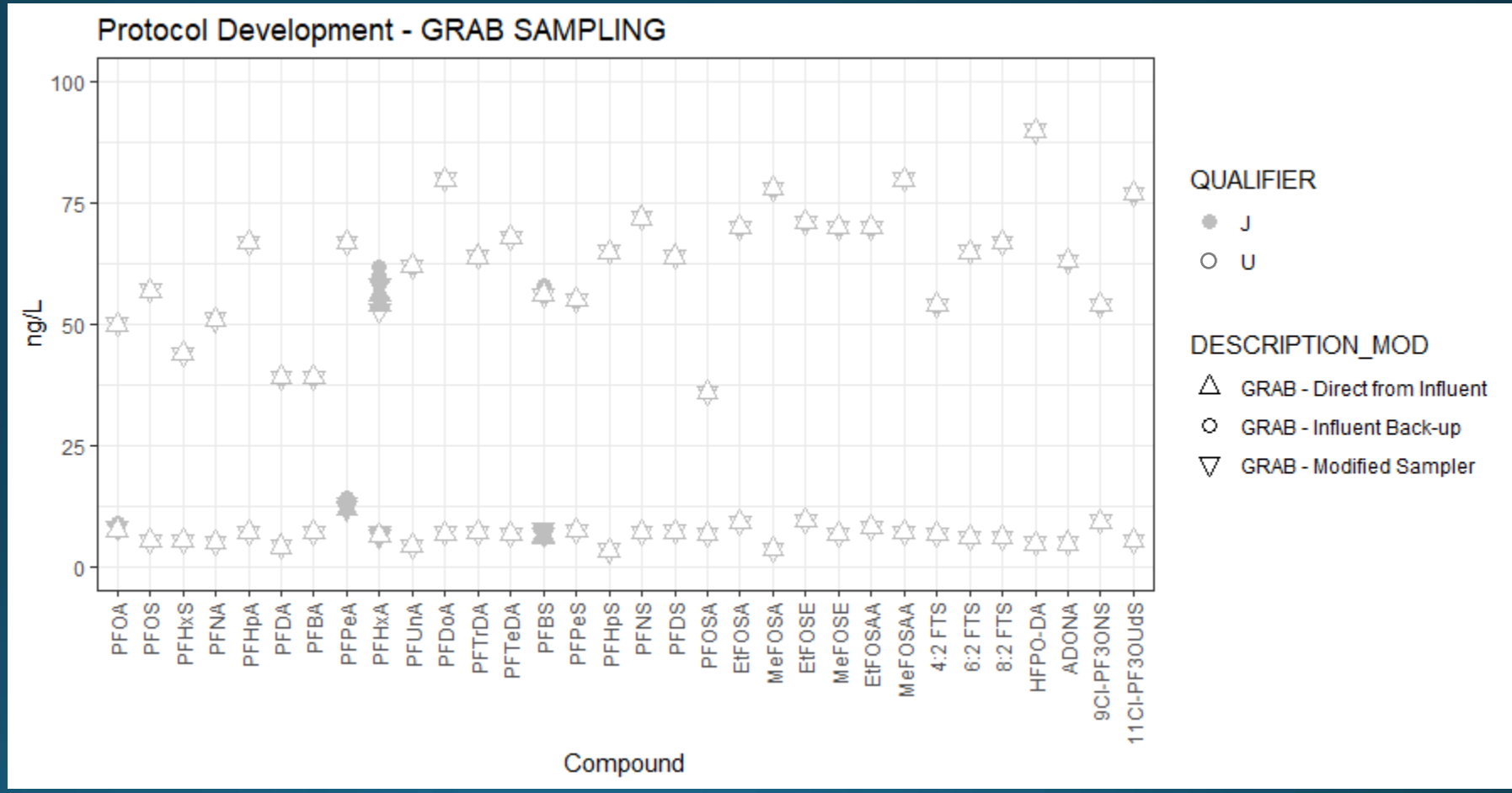
	First Event			
ng/L (ppt)	**Direct grab from Influent**	***Qualifier***	**Direct grab from Influent DUP**	***Qualifier***
PFBA	7.0	U	7.0	U
PFPeA	12.0	J	12.0	J
PFHxA	6.4	U	6.4	U
PFHpA	7.1	U	7.1	U
PFOA	7.4	J	7.4	U
PFNA	4.9	U	4.9	U
PFDA	4.1	U	4.1	U
PFUnA	4.3	U	4.3	U
PFDoA	6.8	U	6.8	U
PFTRDA	6.9	U	6.9	U
PFTEDA	6.7	U	6.7	U
PFBS	6.0	J	6.2	J
PFPeS	7.4	U	7.4	U
PFHxS	5.2	U	5.2	U
PFHpS	3.3	U	3.3	U
PFOS	5.2	U	5.2	U
PFNS	7.0	U	7.0	U
PFDS	7.2	U	7.2	U
PFOSA	6.6	U	6.6	U
EtFOSA	9.0	U	9.0	U
MeFOSA	3.5	U	3.5	U
EtFOSE	9.4	U	9.4	U
MeFOSE	6.6	U	6.6	U
EtFOSAA	8.1	U	8.1	U
MeFOSAA	7.0	U	7.0	U
4:2 FSA	6.6	U	6.6	U
6:2 FSA	5.9	U	5.9	U
8:2 FSA	5.9	U	5.9	U
HFPO-DA	4.7	U	4.7	U
4,8-D-3H-PFNA	4.8	U	4.8	U
F-53B Major	9.3	U	9.3	U
F-53B Minor	5.3	U	5.3	U

	First Event							
ng/L (ppt)	**Direct grab from Influent**	***Qualifier***	**Direct grab from Influent DUP**	***Qualifier***	**Grab - Influent Back-up Sampler**	***Qualifier***	**Grab - Influent Back-up Sampler DUP**	***Qualifier***
PFBA	7.0	U	7.0	U	7.1	J	7.0	U
PFPeA	12.0	J	12.0	J	14.0	J	14.0	J
PFHxA	6.4	U	6.4	U	7.0	J	7.1	J
PFHpA	7.1	U	7.1	U	7.1	U	7.1	U
PFOA	7.4	J	7.4	U	8.8	J	8.6	J
PFNA	4.9	U	4.9	U	4.9	U	4.9	U
PFDA	4.1	U	4.1	U	4.1	U	4.1	U
PFUnA	4.3	U	4.3	U	4.3	U	4.3	U
PFDoA	6.8	U	6.8	U	6.8	U	6.8	U
PFTRDA	6.9	U	6.9	U	6.9	U	6.9	U
PFTEDA	6.7	U	6.7	U	6.7	U	6.7	U
PFBS	6.0	J	6.2	J	6.5	J	6.7	J
PFPeS	7.4	U	7.4	U	7.4	U	7.4	U
PFHxS	5.2	U	5.2	U	5.2	U	5.2	U
PFHpS	3.3	U	3.3	U	3.3	U	3.3	U
PFOS	5.2	U	5.2	U	5.2	U	5.2	U
PFNS	7.0	U	7.0	U	7.0	U	7.0	U
PFDS	7.2	U	7.2	U	7.2	U	7.2	U
PFOSA	6.6	U	6.6	U	6.6	U	6.6	U
EtFOSA	9.0	U	9.0	U	9.0	U	9.0	U
MeFOSA	3.5	U	3.5	U	3.5	U	3.5	U
EtFOSE	9.4	U	9.4	U	9.4	U	9.4	U
MeFOSE	6.6	U	6.6	U	6.6	U	6.6	U
EtFOSAA	8.1	U	8.1	U	8.1	U	8.1	U
MeFOSAA	7.0	U	7.0	U	7.0	U	7.0	U
4:2 FSA	6.6	U	6.6	U	6.6	U	6.6	U
6:2 FSA	5.9	U	5.9	U	5.9	U	5.9	U
8:2 FSA	5.9	U	5.9	U	5.9	U	5.9	U
HFPO-DA	4.7	U	4.7	U	4.7	U	4.7	U
4,8-D-3H-PFNA	4.8	U	4.8	U	4.8	U	4.8	U
F-53B Major	9.3	U	9.3	U	9.3	U	9.3	U
F-53B Minor	5.3	U	5.3	U	5.3	U	5.3	U

	First Event											
ng/L (ppt)	**Direct grab from Influent**	***Qualifier***	**Direct grab from Influent DUP**	***Qualifier***	**Grab - Influent Back-up Sampler**	***Qualifier***	**Grab - Influent Back-up Sampler DUP**	***Qualifier***	**Grab - Modified Sampler**	***Qualifier***	**Grab - Modified Sampler DUP**	***Qualifier***
PFBA	7.0	U	7.0	U	7.1	J	7.0	U	7.0	U	7.0	U
PFPeA	12.0	J	12.0	J	14.0	J	14.0	J	13.0	J	12.0	J
PFHxA	6.4	U	6.4	U	7.0	J	7.1	J	6.8	J	6.4	J
PFHpA	7.1	U	7.1	U	7.1	U	7.1	U	7.1	U	7.1	U
PFOA	7.4	J	7.4	U	8.8	J	8.6	J	8.0	J	8.1	J
PFNA	4.9	U	4.9	U	4.9	U	4.9	U	4.9	U	4.9	U
PFDA	4.1	U	4.1	U	4.1	U	4.1	U	4.1	U	4.1	U
PFUnA	4.3	U	4.3	U	4.3	U	4.3	U	4.3	U	4.3	U
PFDoA	6.8	U	6.8	U	6.8	U	6.8	U	6.8	U	6.8	U
PFTRDA	6.9	U	6.9	U	6.9	U	6.9	U	6.9	U	6.9	U
PFTEDA	6.7	U	6.7	U	6.7	U	6.7	U	6.7	U	6.7	U
PFBS	6.0	J	6.2	J	6.5	J	6.7	J	7.5	J	6.6	J
PFPeS	7.4	U	7.4	U	7.4	U	7.4	U	7.4	U	7.4	U
PFHxS	5.2	U	5.2	U	5.2	U	5.2	U	5.2	U	5.2	U
PFHpS	3.3	U	3.3	U	3.3	U	3.3	U	3.3	U	3.3	U
PFOS	5.2	U	5.2	U	5.2	U	5.2	U	5.2	U	5.2	U
PFNS	7.0	U	7.0	U	7.0	U	7.0	U	7.0	U	7.0	U
PFDS	7.2	U	7.2	U	7.2	U	7.2	U	7.2	U	7.2	U
PFOSA	6.6	U	6.6	U	6.6	U	6.6	U	6.6	U	6.6	U
EtFOSA	9.0	U	9.0	U	9.0	U	9.0	U	9.0	U	9.0	U
MeFOSA	3.5	U	3.5	U	3.5	U	3.5	U	3.5	U	3.5	U
EtFOSE	9.4	U	9.4	U	9.4	U	9.4	U	9.4	U	9.4	U
MeFOSE	6.6	U	6.6	U	6.6	U	6.6	U	6.6	U	6.6	U
EtFOSAA	8.1	U	8.1	U	8.1	U	8.1	U	8.1	U	8.1	U
MeFOSAA	7.0	U	7.0	U	7.0	U	7.0	U	7.0	U	7.0	U
4:2 FSA	6.6	U	6.6	U	6.6	U	6.6	U	6.6	U	6.6	U
6:2 FSA	5.9	U	5.9	U	5.9	U	5.9	U	5.9	U	5.9	U
8:2 FSA	5.9	U	5.9	U	5.9	U	5.9	U	5.9	U	5.9	U
HFPO-DA	4.7	U	4.7	U	4.7	U	4.7	U	4.7	U	4.7	U
4,8-D-3H-PFNA	4.8	U	4.8	U	4.8	U	4.8	U	4.8	U	4.8	U
F-53B Major	9.3	U	9.3	U	9.3	U	9.3	U	9.3	U	9.3	U
F-53B Minor	5.3	U	5.3	U	5.3	U	5.3	U	5.3	U	5.3	U

	Second Event											
ng/L (ppt)	**Direct grab from Influent**	***Qualifier***	**Direct grab from Influent DUP**	***Qualifier***	**Grab - Influent Back-up Sampler**	***Qualifier***	**Grab - Influent Back-up Sampler DUP**	***Qualifier***	**Grab - Modified Sampler**	***Qualifier***	**Grab - Modified Sampler DUP**	***Qualifier***
PFBA	39	U	39	U	39	U	39	U	39	U	39	U
PFPeA	67	U	67	U	67	U	67	U	67	U	67	U
PFHxA	56	J	54	J	62	J	60	J	53	U	58	J
PFHpA	67	U	67	U	67	U	67	U	67	U	67	U
PFOA	50	U	50	U	50	U	50	U	50	U	50	U
PFNA	51	U	51	U	51	U	51	U	51	U	51	U
PFDA	39	U	39	U	39	U	39	U	39	U	39	U
PFUnA	62	U	62	U	62	U	62	U	62	U	62	U
PFDoA	80	U	80	U	80	U	80	U	80	U	80	U
PFTRDA	64	U	64	U	64	U	64	U	64	U	64	U
PFTEDA	68	U	68	U	68	U	68	U	68	U	68	U
PFBS	56	U	56	U	58	J	56	U	56	U	56	U
PFPeS	55	U	55	U	55	U	55	U	55	U	55	U
PFHxS	44	U	44	U	44	U	44	U	44	U	44	U
PFHpS	65	U	65	U	65	U	65	U	65	U	65	U
PFOS	57	U	57	U	57	U	57	U	57	U	57	U
PFNS	72	U	72	U	72	U	72	U	72	U	72	U
PFDS	64	U	64	U	64	U	64	U	64	U	64	U
PFOSA	36	U	36	U	36	U	36	U	36	U	36	U
EtFOSA	70	U	70	U	70	U	70	U	70	U	70	U
MeFOSA	78	U	78	U	78	U	78	U	78	U	78	U
EtFOSE	71	U	71	U	71	U	71	U	71	U	71	U
MeFOSE	70	U	70	U	70	U	70	U	70	U	70	U
EtFOSAA	70	U	70	U	70	U	70	U	70	U	70	U
MeFOSAA	80	U	80	U	80	U	80	U	80	U	80	U
4:2 FSA	54	U	54	U	54	U	54	U	54	U	54	U
6:2 FSA	65	U	65	U	65	U	65	U	65	U	65	U
8:2 FSA	67	U	67	U	67	U	67	U	67	U	67	U
HFPO-DA	90	U	90	U	90	U	90	U	90	U	90	U
4,8-D-3H-PFNA	63	U	63	U	63	U	63	U	63	U	63	U
F-53B Major	54	U	54	U	54	U	54	U	54	U	54	U
F-53B Minor	77	U	77	U	77	U	77	U	77	U	77	U

- Influent Grab Samples
  - MOST results <Detection limit
    - PFOA, PFPeA, PFHxA, PFBS detected (J-qualified)



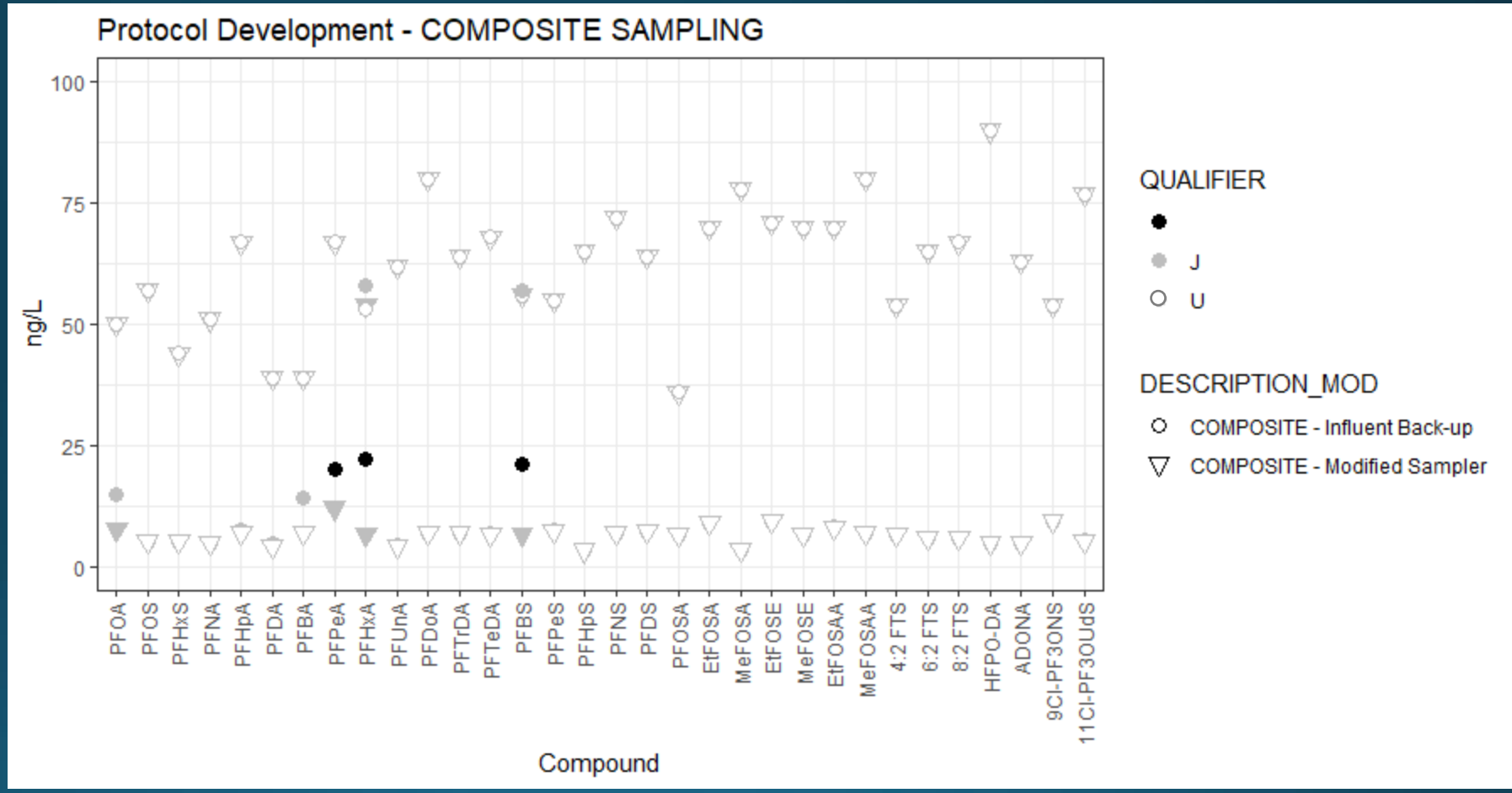
Initial Protocol Development

- **Blanks**
  - Reagent blank – grab sample directly from DI source
  - Field blank (influent back-up autosampler) – DI water pumped through the sampler into a clean influent composite carboy, mix with stir bar, pour off via spigot into sample bottle
  - Field blank (modified portable autosampler) – similar to above but using the "Modified" sampler.
- Evaluate **sampling equipment and methods** (collected as concurrently as possible)
  - Grab sample direct from influent (in duplicate)
  - Pumped grab sample into 125 mL sample container using influent back-up autosampler
  - Pumped grab sample into 125 mL sample container using modified portable autosampler
- Evaluate **composite sampling**
  - Poured-off sample direct from influent back-up composite carboy (non-Teflon)
  - Poured-off sample from 250 mL composite, collected over same time period as above using modified portable autosampler

	First Event			
ng/L (ppt)	24-hr Composite - Influent Back-up Sampler	*Qualifier*	24-hr Composite - Modified Sampler	*Qualifier*
PFBA	14.0	J	7.0	U
PFPeA	20.0		12.0	J
PFHxA	22.0		6.5	J
PFHpA	7.4	J	7.1	U
PFOA	15.0	J	7.8	J
PFNA	4.9	U	4.9	U
PFDA	4.6	J	4.1	U
PFUnA	4.3	U	4.3	U
PFDoA	6.8	U	6.8	U
PFTRDA	6.9	U	6.9	U
PFTEDA	6.7	U	6.7	U
PFBS	21.0		6.7	J
PFPeS	7.4	U	7.4	U
PFHxS	5.2	U	5.2	U
PFHpS	3.3	U	3.3	U
PFOS	5.2	U	5.2	U
PFNS	7.0	U	7.0	U
PFDS	7.2	U	7.2	U
PFOSA	6.6	U	6.6	U
EtFOSA	9.0	U	9.0	U
MeFOSA	3.5	U	3.5	U
EtFOSE	9.4	U	9.4	U
MeFOSE	6.6	U	6.6	U
EtFOSAA	8.1	U	8.1	U
MeFOSAA	7.0	U	7.0	U
4:2 FSA	6.6	U	6.6	U
6:2 FSA	5.9	U	5.9	U
8:2 FSA	5.9	U	5.9	U
HFPO-DA	4.7	U	4.7	U
4,8-D-3H-PFNA	4.8	U	4.8	U
F-53B Major	9.3	U	9.3	U
F-53B Minor	5.3	U	5.3	U

	Second Event					
ng/L (ppt)	24-hr Composite - Influent Back-up Sampler	*Qualifier*	24-hr Composite - Influent Back-up Sampler DUP	*Qualifier*	24-hr Composite - Modified Sampler	*Qualifier*
PFBA	39	U	39	U	39	U
PFPeA	67	U	67	U	67	U
PFHxA	58	J	53	U	54	J
PFHpA	67	U	67	U	67	U
PFOA	50	U	50	U	50	U
PFNA	51	U	51	U	51	U
PFDA	39	U	39	U	39	U
PFUnA	62	U	62	U	62	U
PFDoA	80	U	80	U	80	U
PFTRDA	64	U	64	U	64	U
PFTEDA	68	U	68	U	68	U
PFBS	56	U	57	J	56	U
PFPeS	55	U	55	U	55	U
PFHxS	44	U	44	U	44	U
PFHpS	65	U	65	U	65	U
PFOS	57	U	57	U	57	U
PFNS	72	U	72	U	72	U
PFDS	64	U	64	U	64	U
PFOSA	36	U	36	U	36	U
EtFOSA	70	U	70	U	70	U
MeFOSA	78	U	78	U	78	U
EtFOSE	71	U	71	U	71	U
MeFOSE	70	U	70	U	70	U
EtFOSAA	70	U	70	U	70	U
MeFOSAA	80	U	80	U	80	U
4:2 FSA	54	U	54	U	54	U
6:2 FSA	65	U	65	U	65	U
8:2 FSA	67	U	67	U	67	U
HFPO-DA	90	U	90	U	90	U
4,8-D-3H-PFNA	63	U	63	U	63	U
F-53B Major	54	U	54	U	54	U
F-53B Minor	77	U	77	U	77	U

- Influent Composite Samples
  - MOST results <Detection limit
    - Actual <u>detections</u> of PFPeA, PFHxA, PFBS



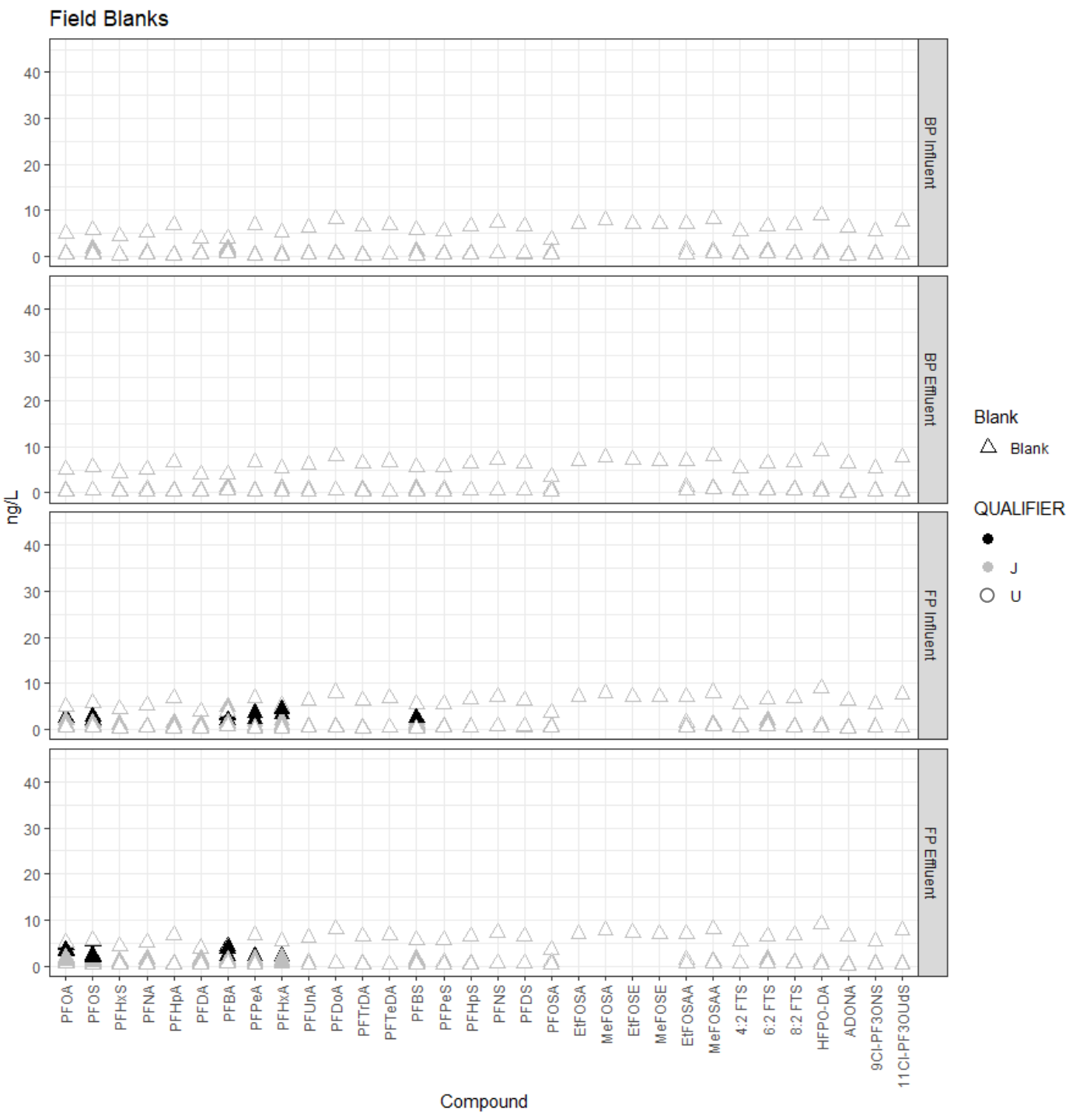
Protocol Development QC Samples

- No evidence of blank contamination in DI water source
- Limited evidence of blank contamination using autosamplers (influent back-up or modified)
- Limited evidence of contamination by autosampler use
- Final selection - **Influent back-up sampler** – pour-off of 24-hour composite sample selected for protocol
  - Potential contamination appeared low
  - Allows minimal disruption to existing sampling routine
  - More representative than a grab sample

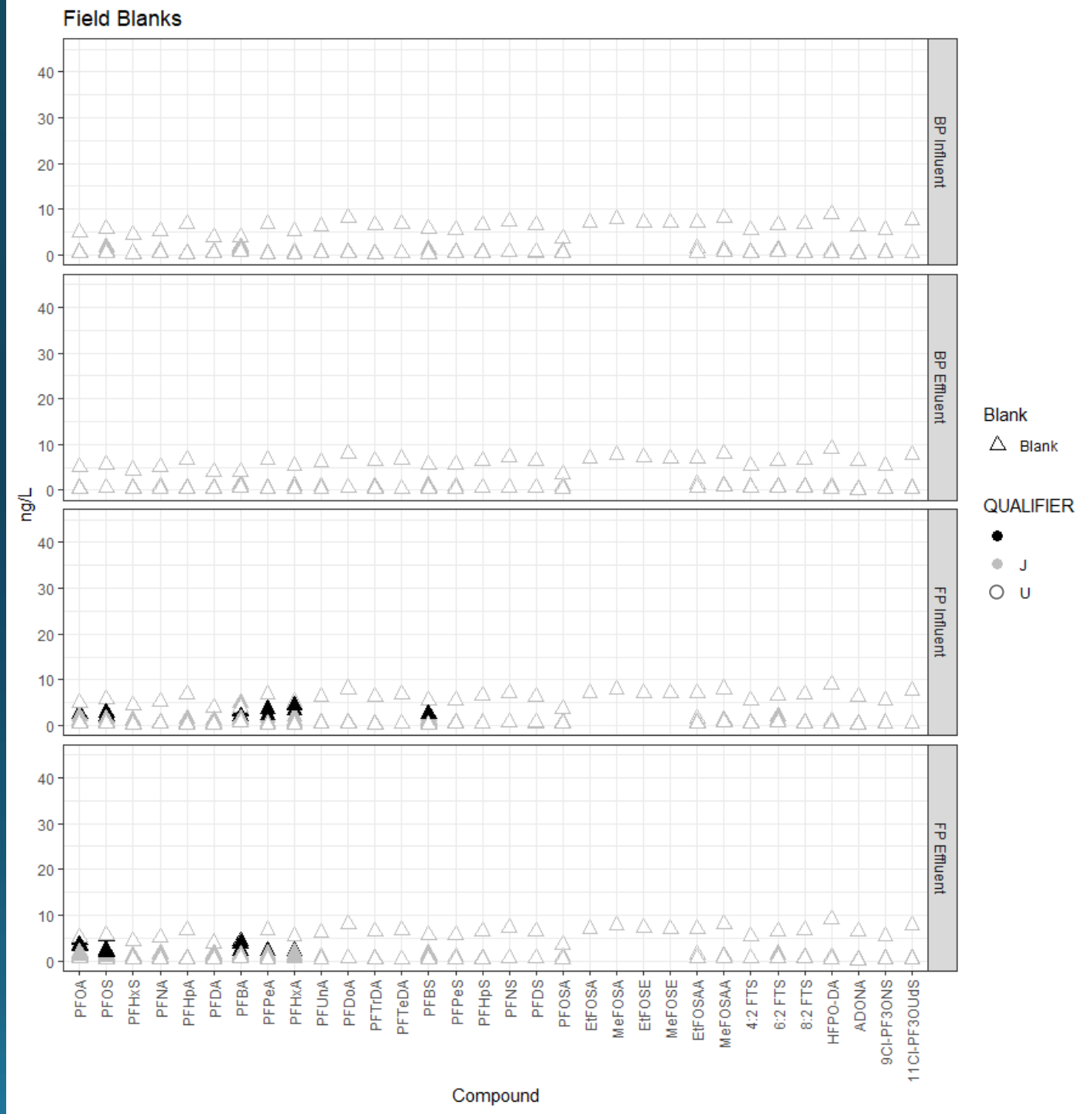
Commence sampling…

- Influent and effluent samples collected ~monthly at Bucklin Point and Field's Point WWTFs
- Field blanks collected with each monthly event
- All data considered exploratory and non-reportable

- Field Blanks collected 2020-present
  - Field's Point detections generally <5 ng/L
  - Bucklin Point < Reporting Limit



- Field Blanks collected 2020-present
  - Field's Point detections generally <5 ng/L
  - Bucklin Point < Reporting Limit
- Detections in blanks are low relative to true sample results



Conclusions

- Minimal evidence of sample contamination using routine sample collection methods

- Potential interference of very small magnitude may be important for compliance
- Need to reevaluate methodology as EPA-approved method implemented

Thank you!

- Eliza Moore - Environmental Scientist III emoore@narrabay.com
- Appreciations to NBC Environmental Monitoring, Technical Analysis and Compliance, and Laboratory staff for their support and sample handling.

The Narragansett Bay Commission's mission is ***to maintain a leadership role in the protection and enhancement of water quality in Narragansett Bay and its tributaries by providing safe and reliable wastewater collection and treatment services to its customers at a reasonable cost.***