PFAS in New York State Fish, 2010 – 2018

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Bureau of Ecosystem Health
Division of Fish and Wildlife

NEW YORK
STATE OF
OPPORTUNITY
Department of
Environmental
Conservation

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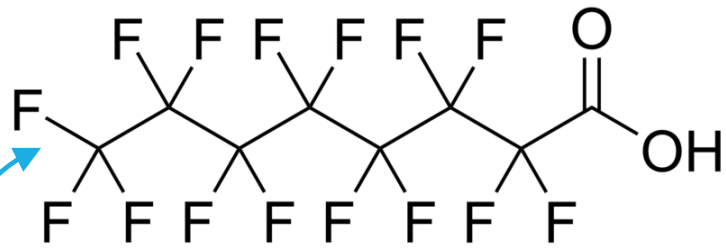
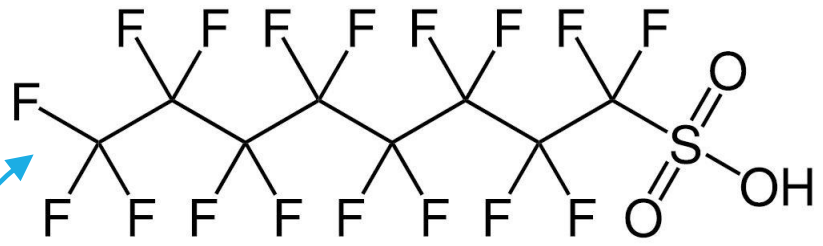
Conservation

Acids



PFBA	4
PFPeA	5
PFHxA	6
PFHpA	7
PFOA	8
PFNA	9
PFDA	10
PFUnA	11
PFDoA	12

Sulfonates



PFBS	4
PFHxS	6
PFOS	8

ONLY WHAT WE TEST FOR!

1000s of possible compounds!

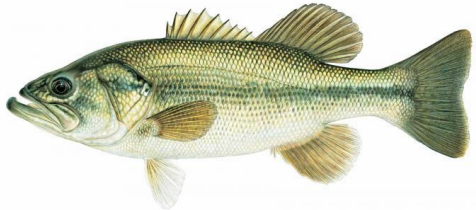
Sulfonamide

PFOSA	8

Not our (grand)parents' pollutants…

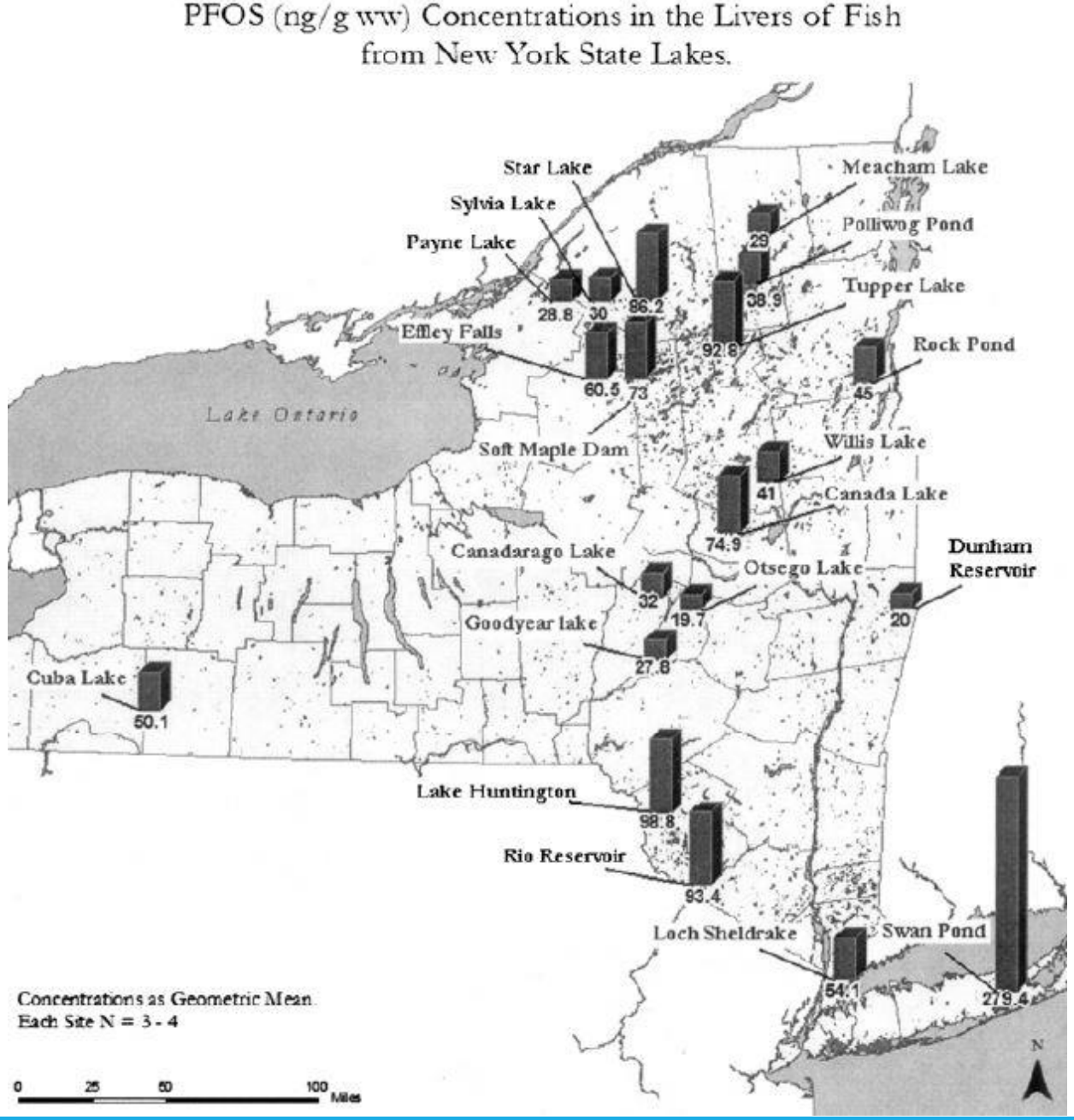
PCBs,
Pesticides, PCDD/Fs → lipids →

Mercury → muscle →



PFAS → serum, viscera, liver → ?

Common Carp, copyright Duane Raver
Largemouth Bass, copyright Joseph Tomelleri

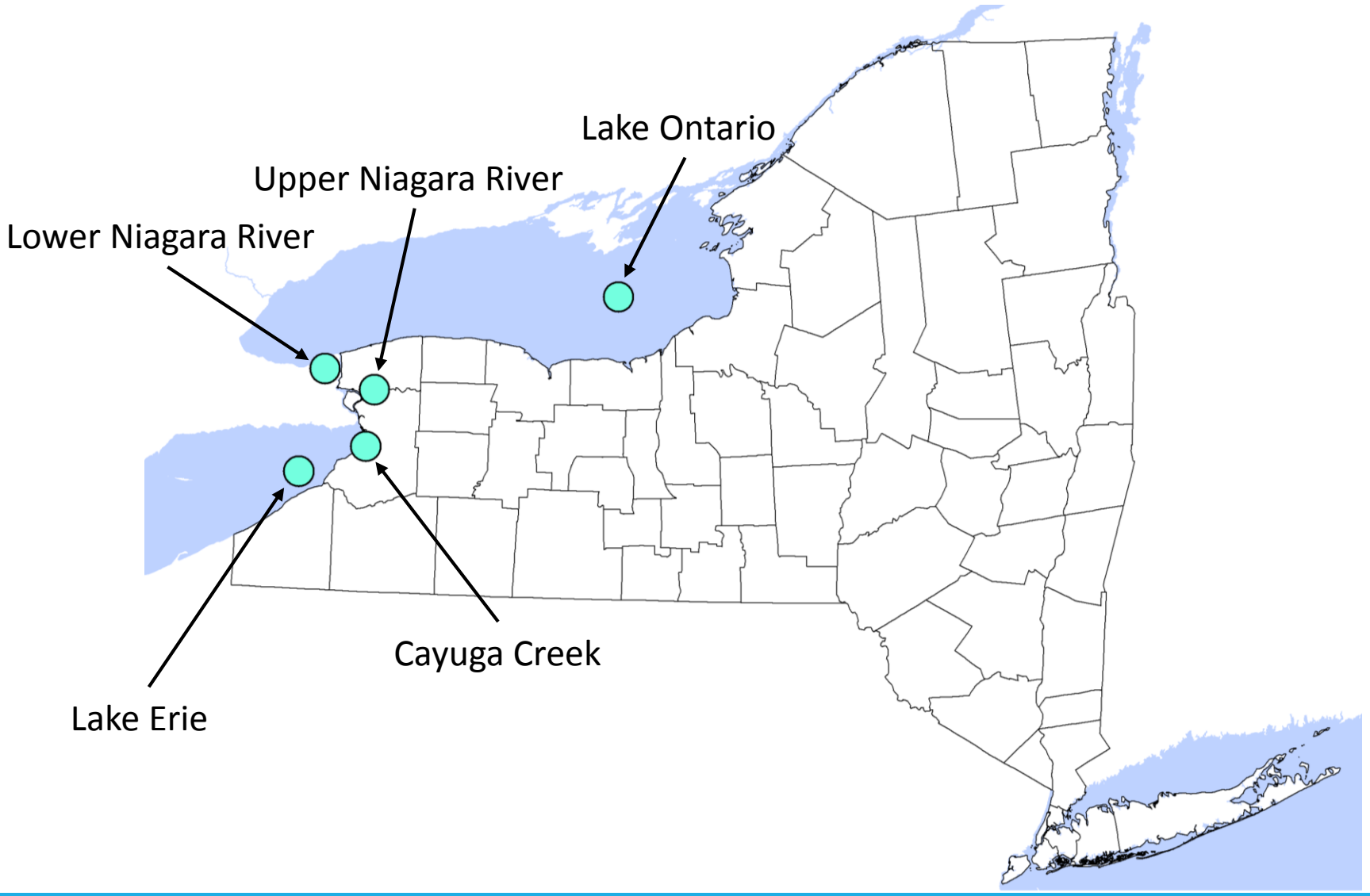


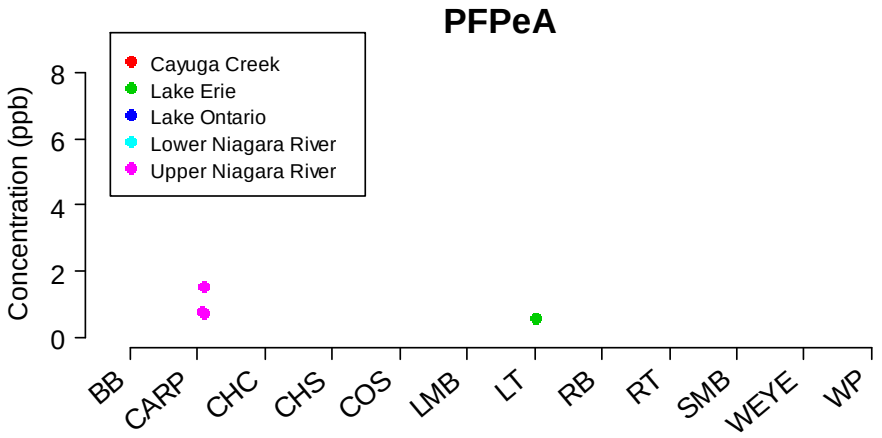
Sinclair et al. 2006. Archives of Environmental Contamination and Toxicology 50:398–410.

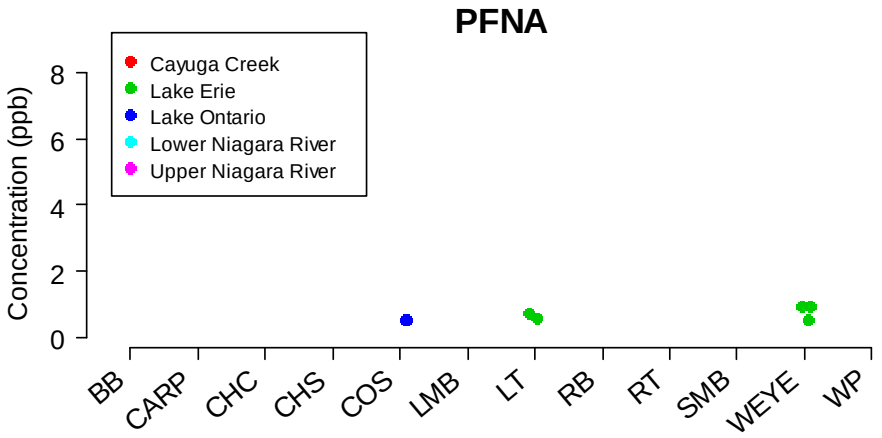
Goals

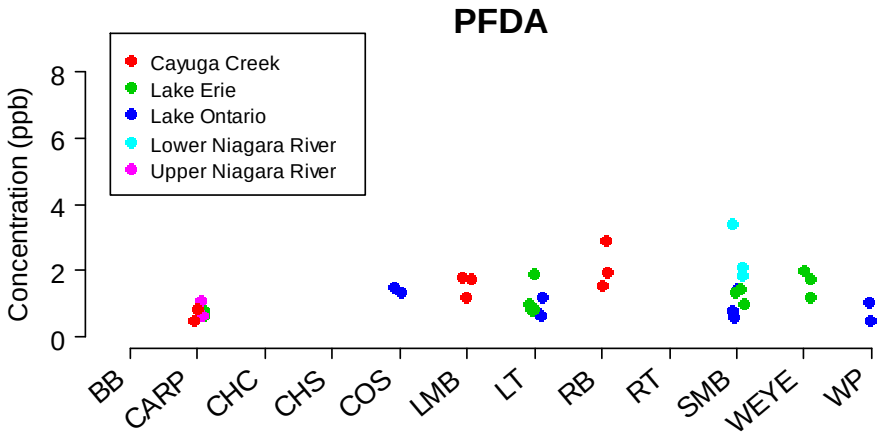
- Understand prevalence across the state.
- Develop an informed position on the risks of human fish consumption where PFAS contamination might be found.
- Provide information to the public about PFAS in fish.
- Evaluate food chain risks from the consumption of contaminated fish by fish-eating wildlife.
- Better understand the relationship between PFAS concentrations in water/sediments and in fish.

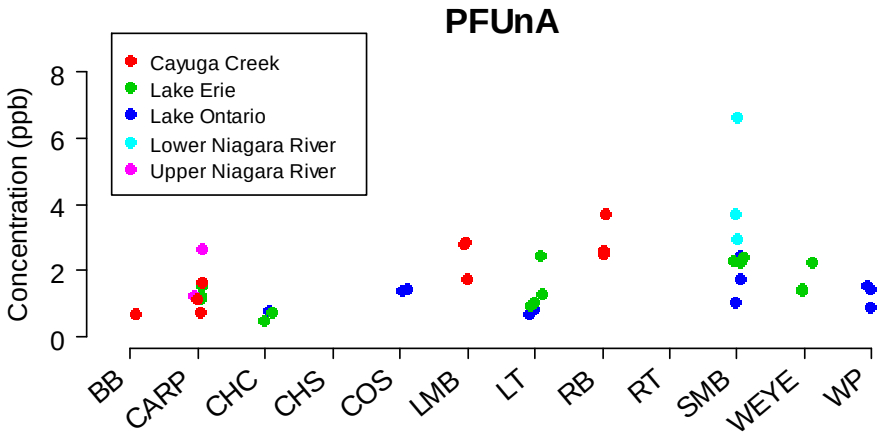
2010 Fish Sampling – NY Great Lakes

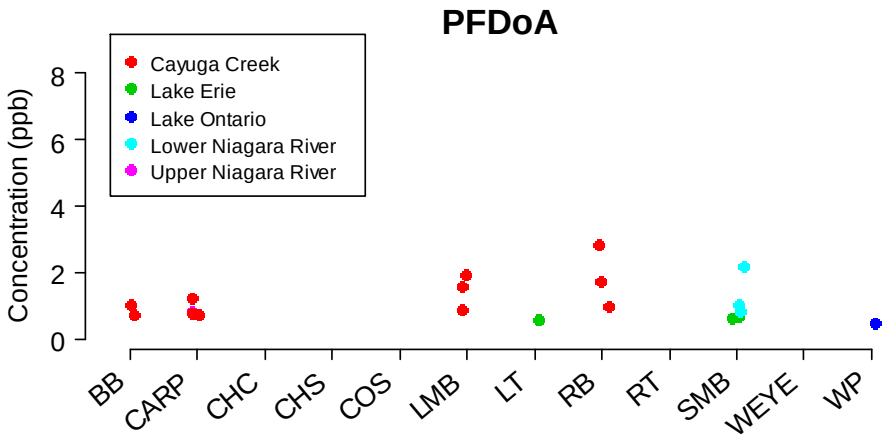


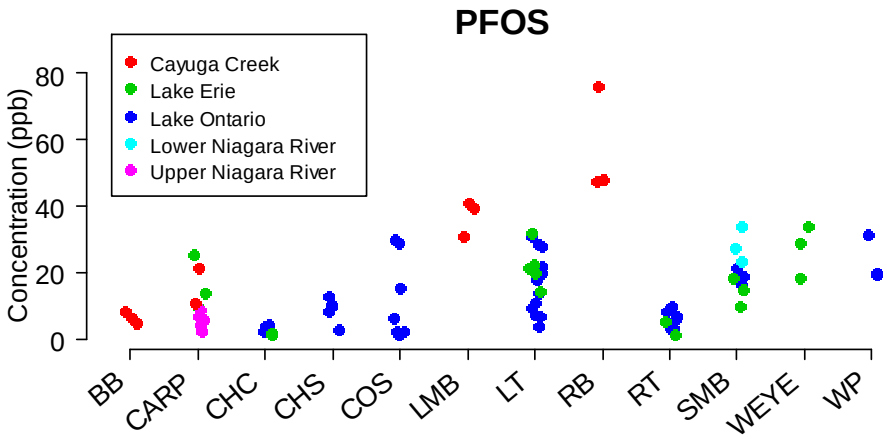

PFPeA
Concentration (ppb)
0
2
4
6
8
Cayuga Creek
Lake Erie
Lake Ontario
Lower Niagara River
Upper Niagara River
BB
CARP
CHC
CHS
COS
LMB
LT
RB
RT
SMB
WEYE
WP


PFNA
Concentration (ppb)
0
2
4
6
8
Cayuga Creek
Lake Erie
Lake Ontario
Lower Niagara River
Upper Niagara River
BB
CARP
CHC
CHS
COS
LMB
LT
RB
RT
SMB
WEYE
WP

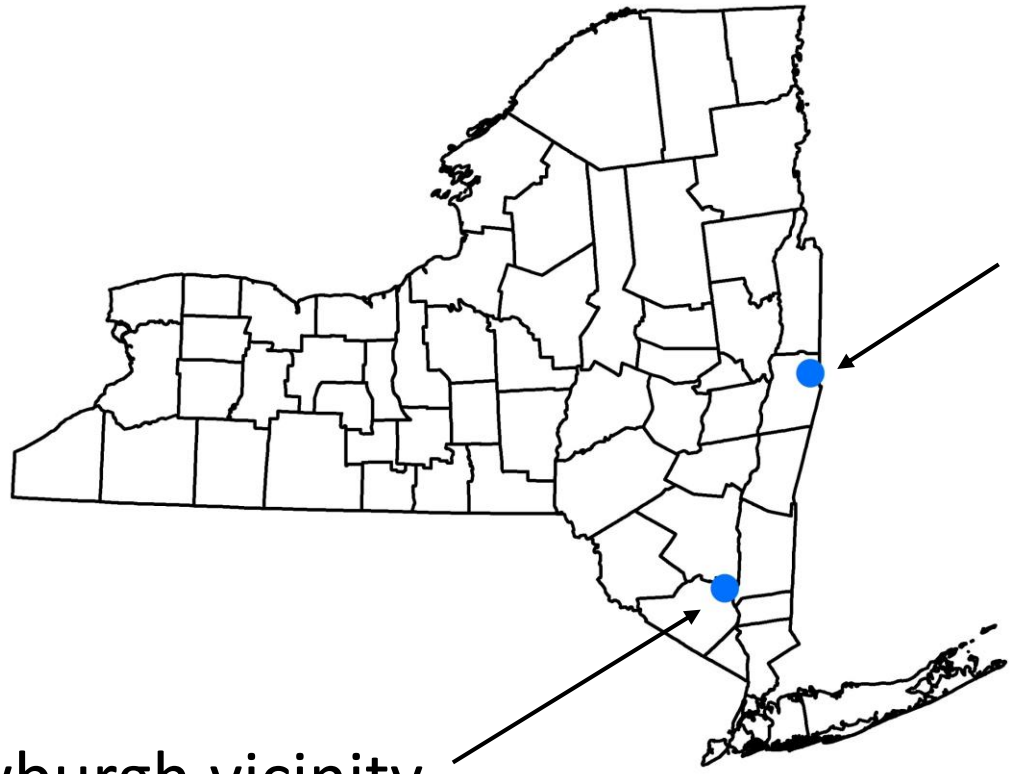

PFDA
Concentration (ppb)
0
2
4
6
8
Cayuga Creek
Lake Erie
Lake Ontario
Lower Niagara River
Upper Niagara River
BB
CARP
CHC
CHS
COS
LMB
LT
RB
RT
SMB
WEYE
WP


PFUnA
Concentration (ppb)
0
2
4
6
8
Cayuga Creek
Lake Erie
Lake Ontario
Lower Niagara River
Upper Niagara River
BB
CARP
CHC
CHS
COS
LMB
LT
RB
RT
SMB
WEYE
WP


PFDoA
Concentration (ppb)
0
2
4
6
8
Cayuga Creek
Lake Erie
Lake Ontario
Lower Niagara River
Upper Niagara River
BB
CARP
CHC
CHS
COS
LMB
LT
RB
RT
SMB
WEYE
WP


PFOS
Concentration (ppb)
0
20
40
60
80
Cayuga Creek
Lake Erie
Lake Ontario
Lower Niagara River
Upper Niagara River
BB
CARP
CHC
CHS
COS
LMB
LT
RB
RT
SMB
WEYE
WP

2016-2017 Fish Sampling



Hoosick Falls and Petersburgh
PFOA

Newburgh vicinity
PFOS

Targeted Sampling

Sportfish: two to five species per location, 10 individuals per species.
(n=345)

Forage fish: one species per location, 10 samples per species.
(n=140)

Targeted Sampling

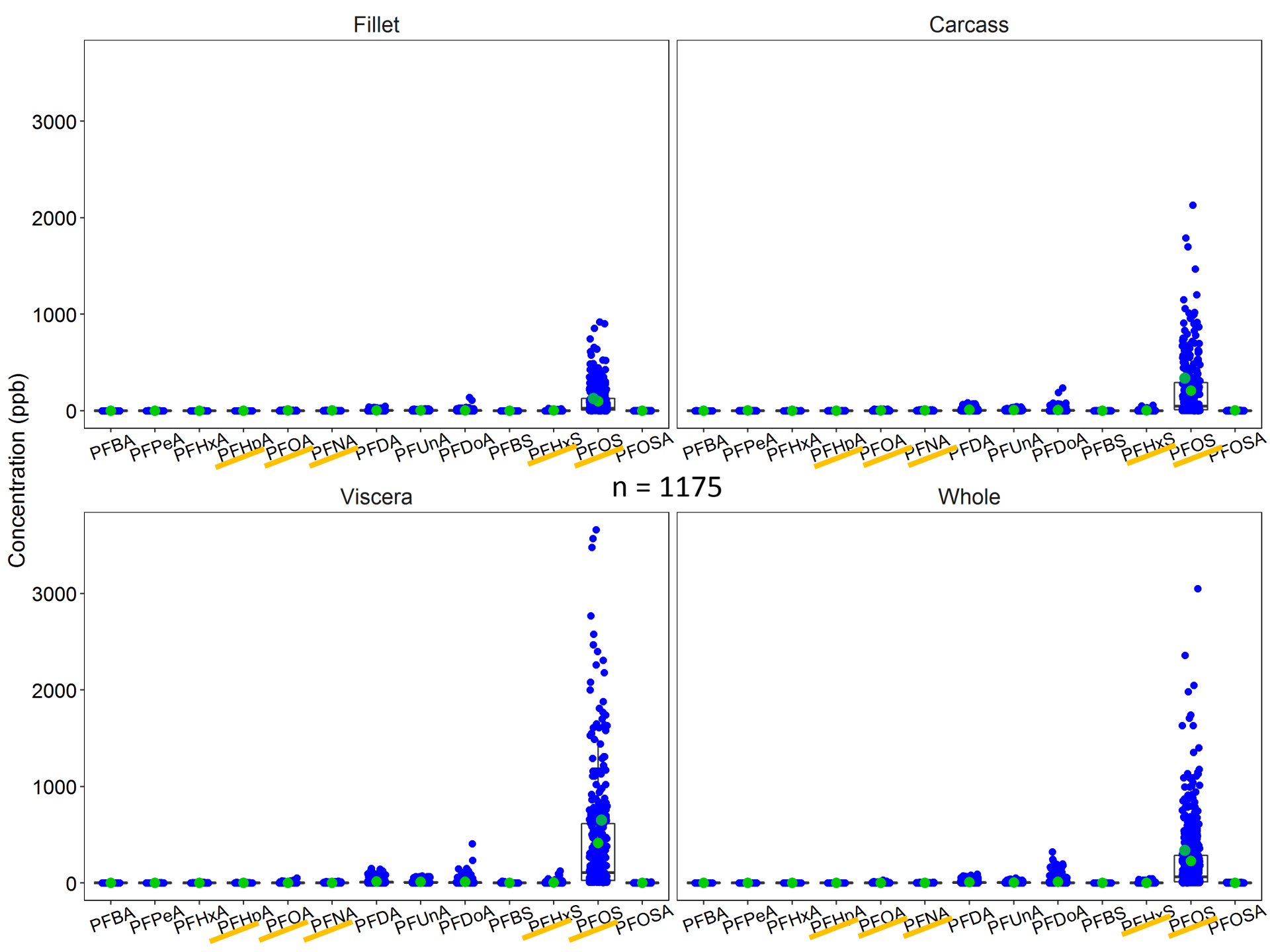
Sportfish: two to five species per location, 10 individuals per species. (n=345)

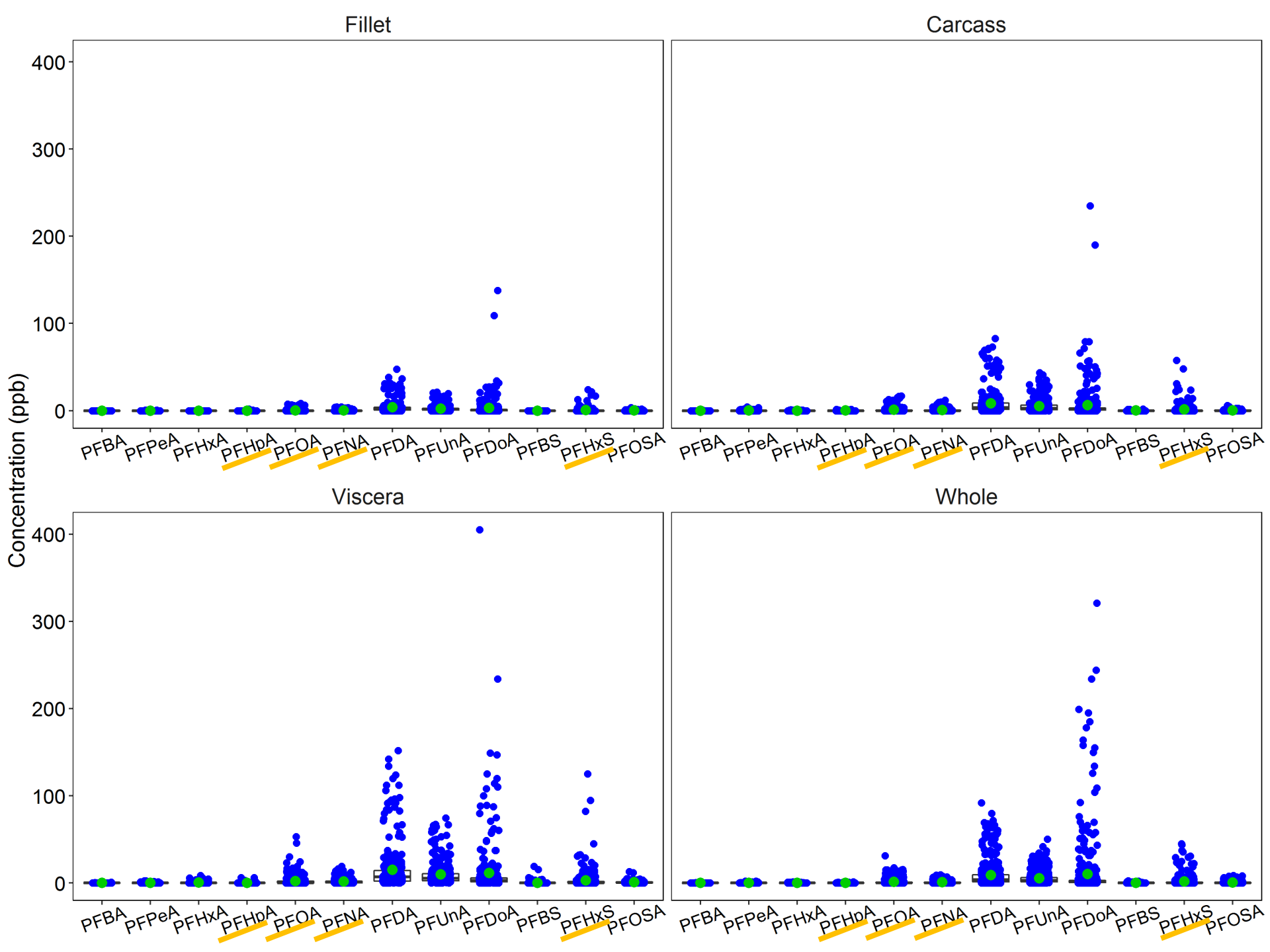
Standard fillet

Viscera

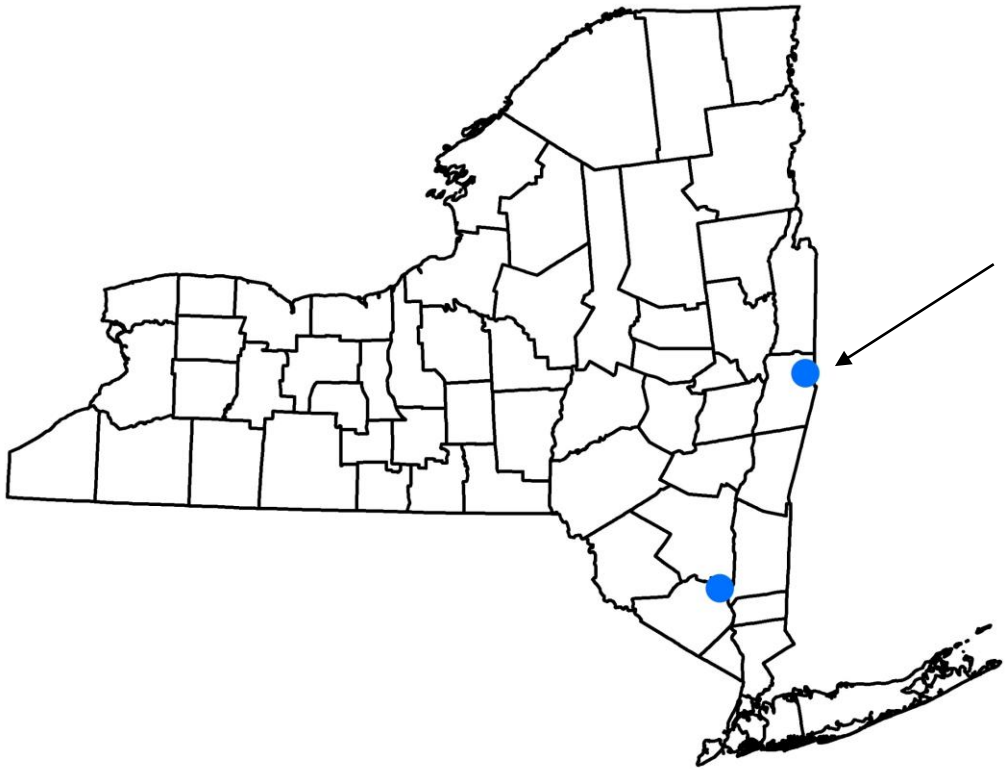
Remainder of fish

} Synthesized Whole


Fillet
Carcass
Viscera
Whole
n = 1175
Concentration (ppb)
0
1000
2000
3000
PFBA
PFPeA
PFHxA
PFHpA
PFOA
PFNA
PFDA
PFUnA
PFDoA
PFBS
PFHxS
PFOS
PFOSA

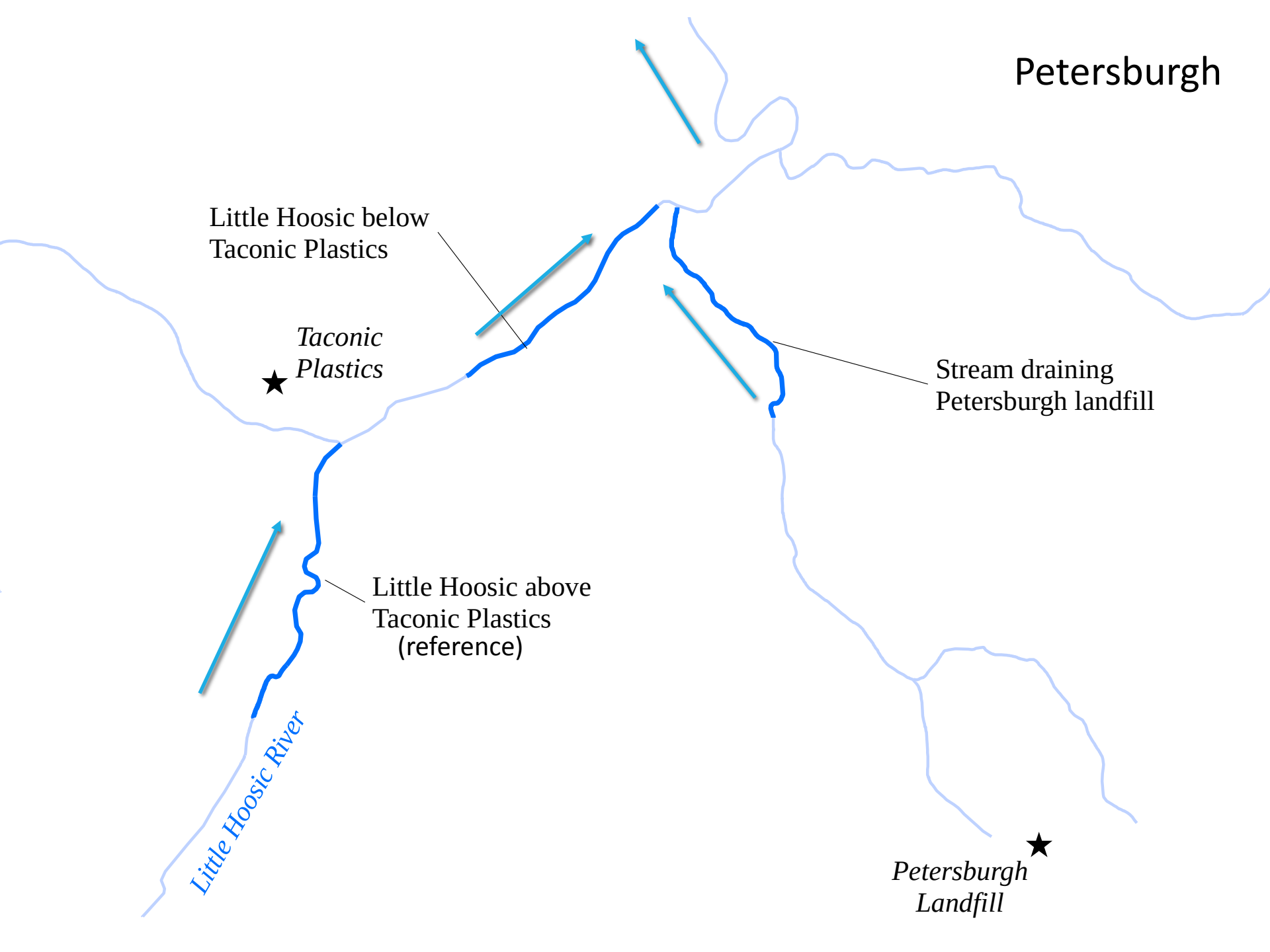

Fillet
Carcass
Viscera
Whole
Concentration (ppb)
0
100
200
300
400
PFBA
PFPeA
PFHxA
PFHpA
PFOA
PFNA
PFDA
PFUnA
PFDoA
PFBS
PFHxS
PFOSA

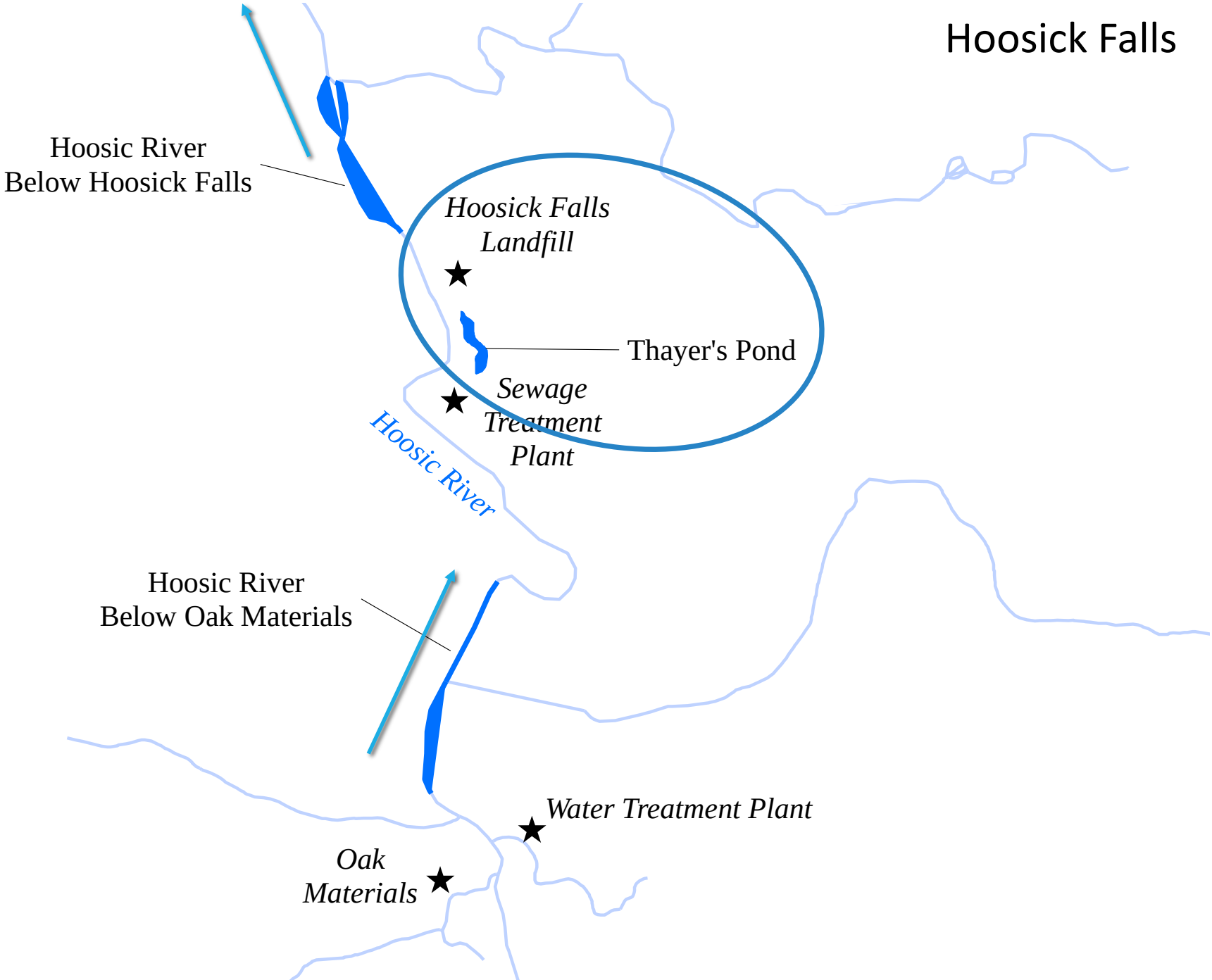
2016-2017 Fish Sampling

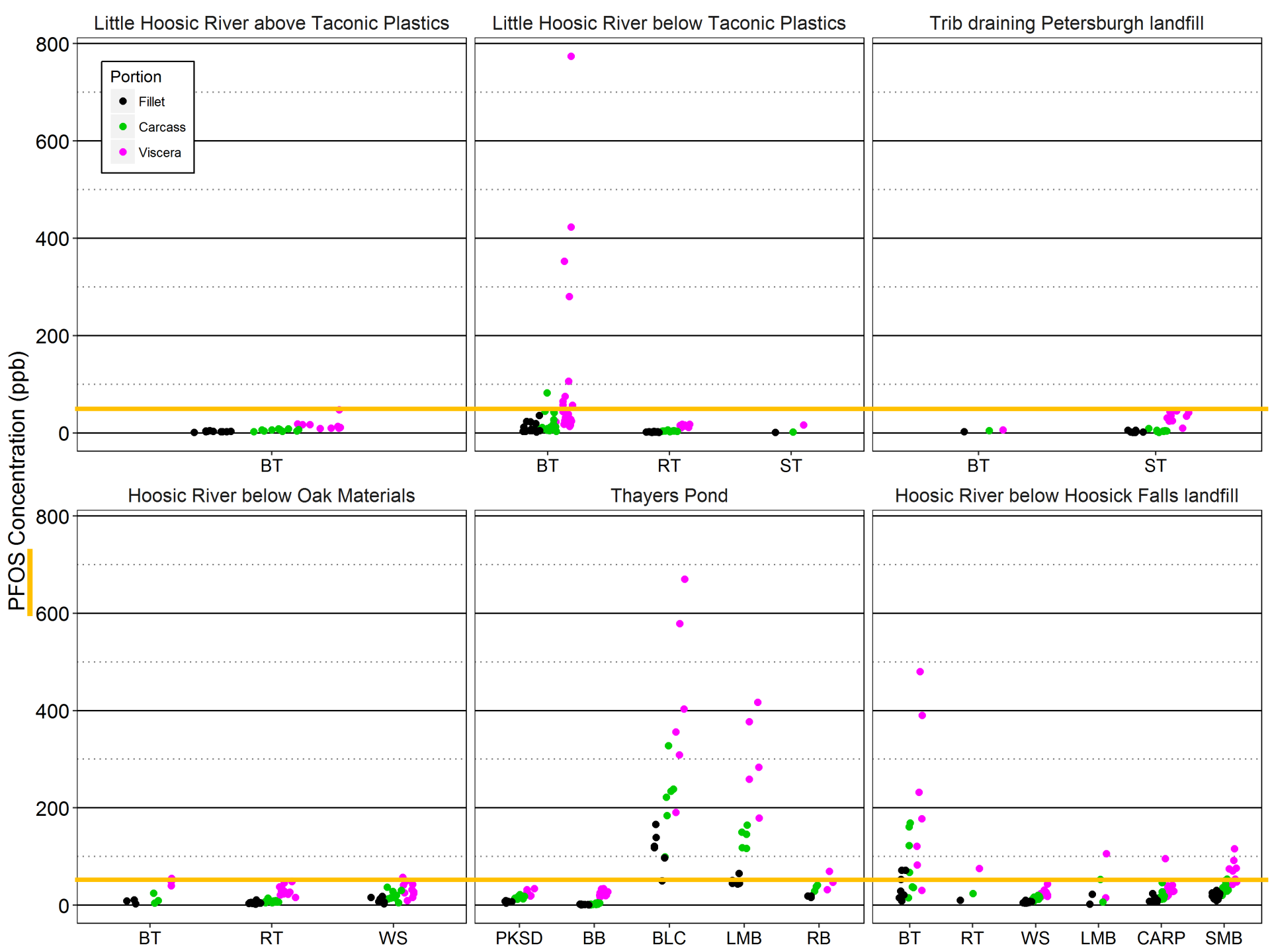


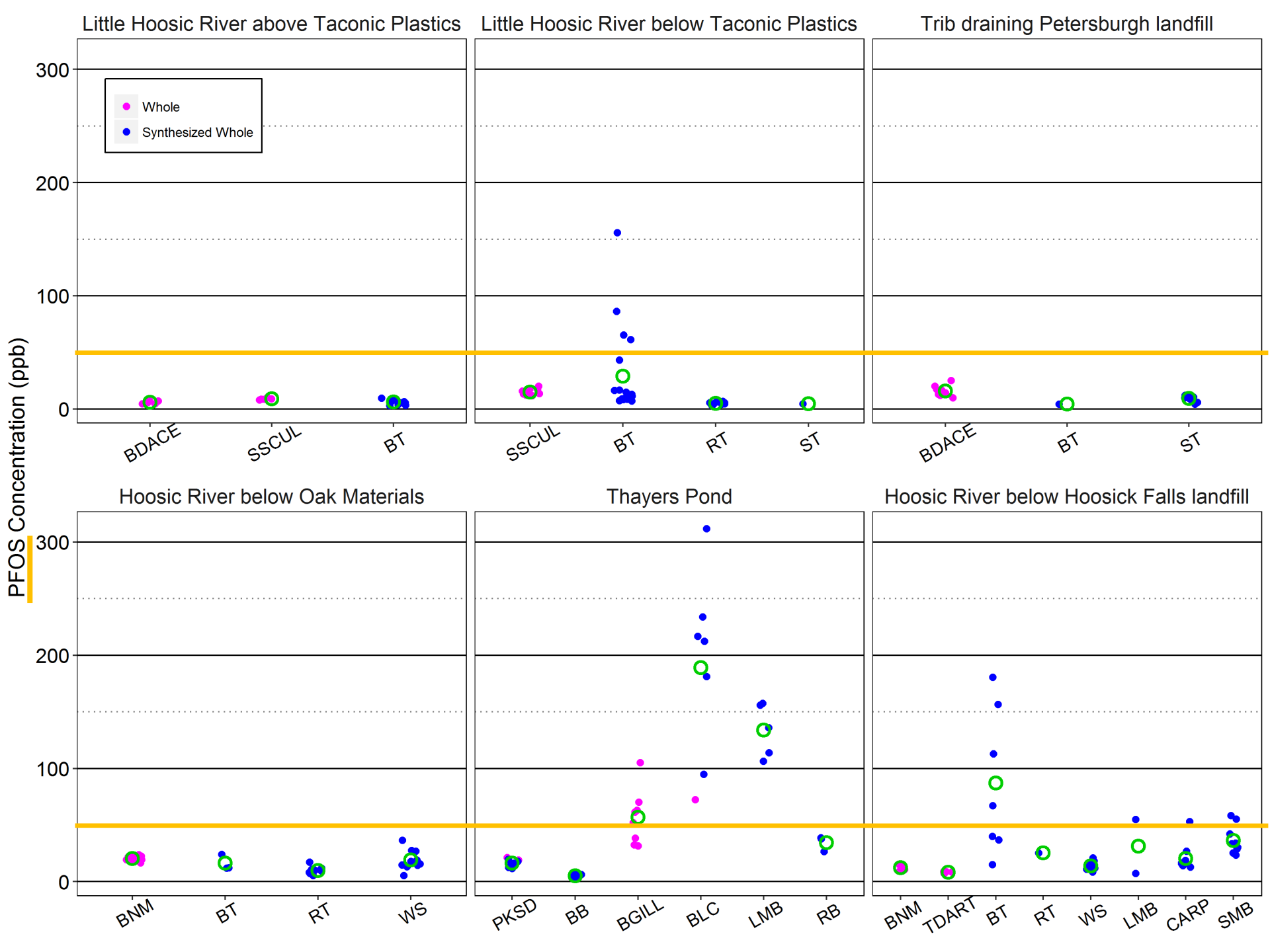
Hoosick Falls and Petersburgh

PFOA

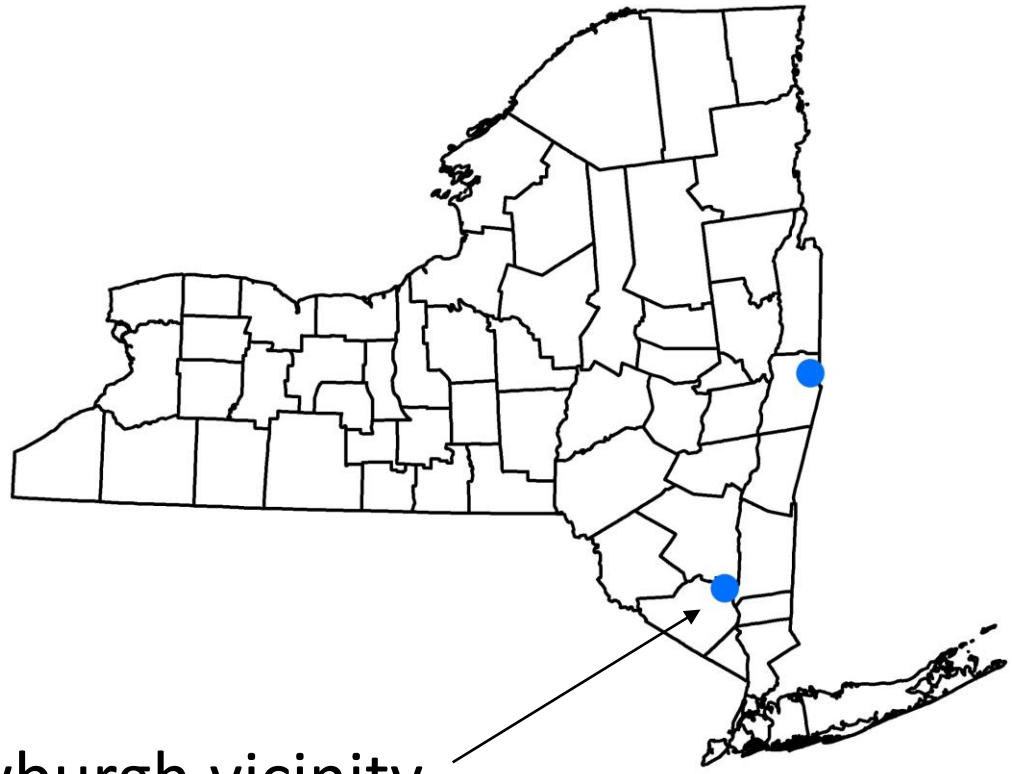

Petersburgh
Little Hoosic below
Taconic Plastics
Taconic
Plastics
Stream draining
Petersburgh landfill
Little Hoosic above
Taconic Plastics
(reference)
Little Hoosic River
Petersburgh
Landfill


Hoosick Falls
Hoosic River
Below Hoosick Falls
Hoosick Falls
Landfill
Thayer's Pond
Sewage
Treatment
Plant
Hoosic River
Hoosic River
Below Oak Materials
Water Treatment Plant
Oak
Materials

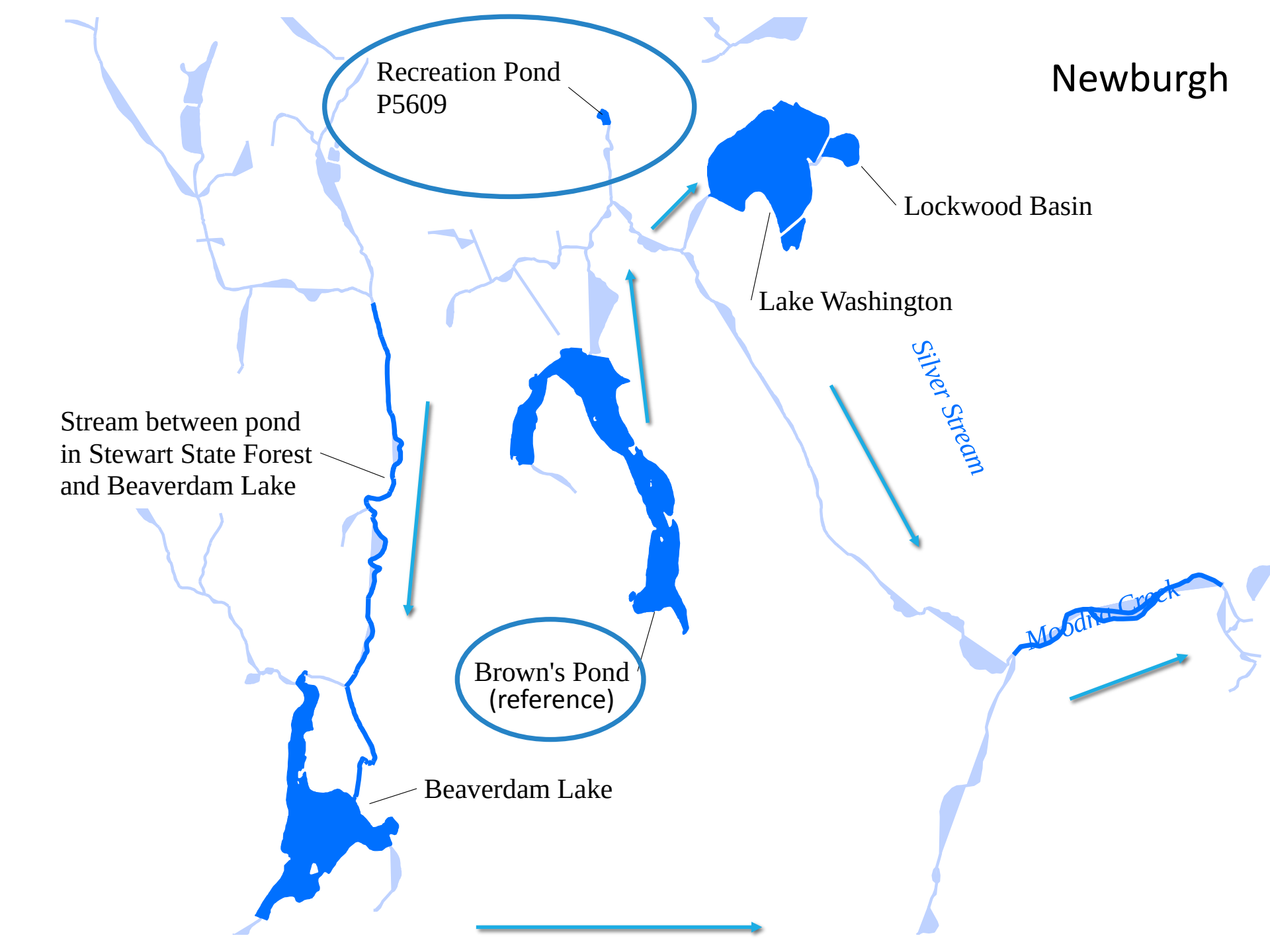

Little Hoosic River above Taconic Plastics
Little Hoosic River below Taconic Plastics
Trib draining Petersburgh landfill
Hoosic River below Oak Materials
Thayers Pond
Hoosic River below Hoosick Falls landfill
PFOS Concentration (ppb)
Portion
Fillet
Carcass
Viscera
0
200
400
600
800
BT
RT
ST
WS
PKSD
BB
BLC
LMB
RB
CARP
SMB

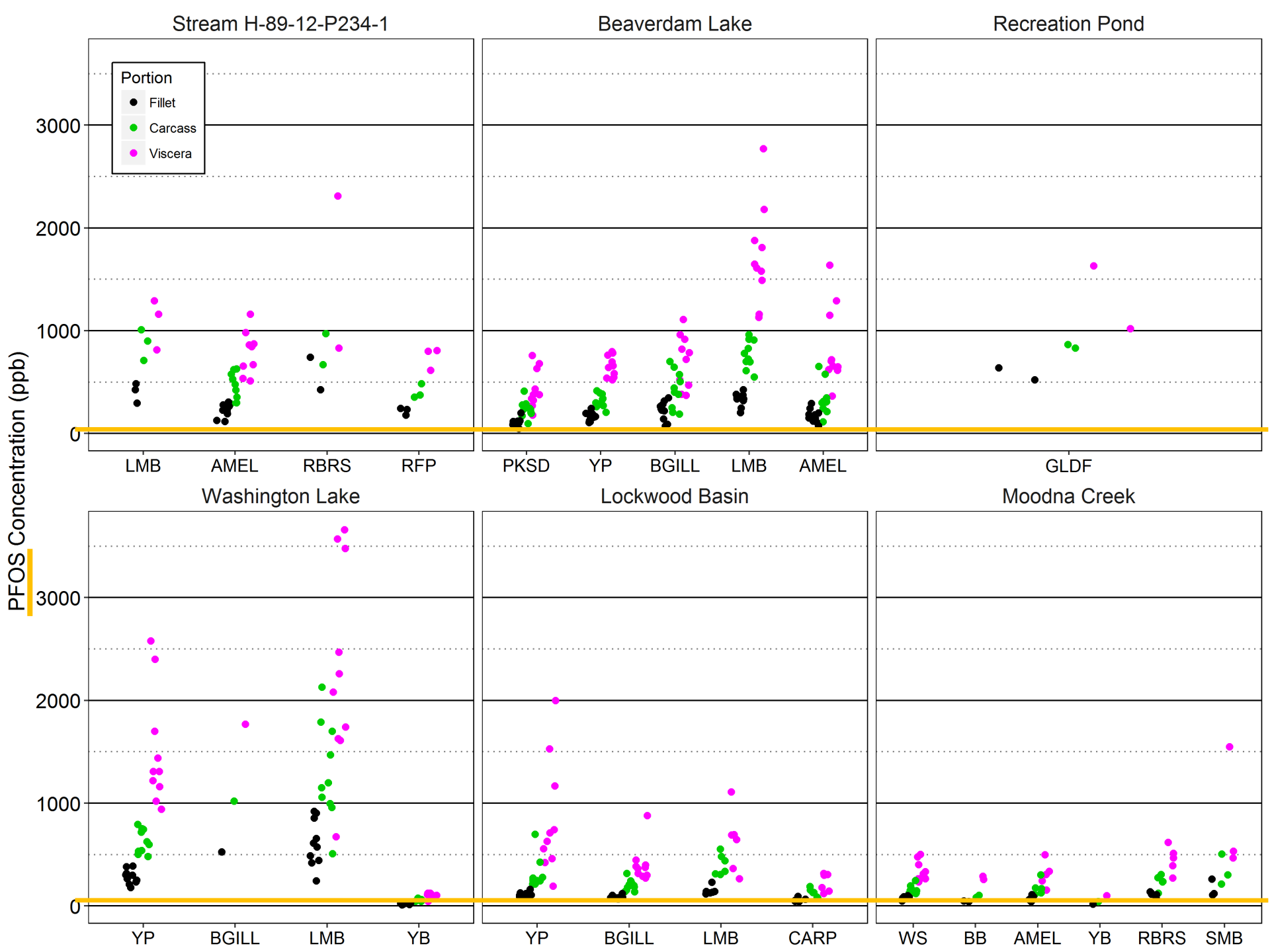

Little Hoosic River above Taconic Plastics
Little Hoosic River below Taconic Plastics
Trib draining Petersburgh landfill
Hoosic River below Oak Materials
Thayers Pond
Hoosic River below Hoosick Falls landfill
PFOS Concentration (ppb)
Whole
Synthesized Whole
0
100
200
300
BDACE
SSCUL
BT
RT
ST
BNM
WS
PKSD
BB
BGILL
BLC
LMB
RB
TDART
CARP
SMB

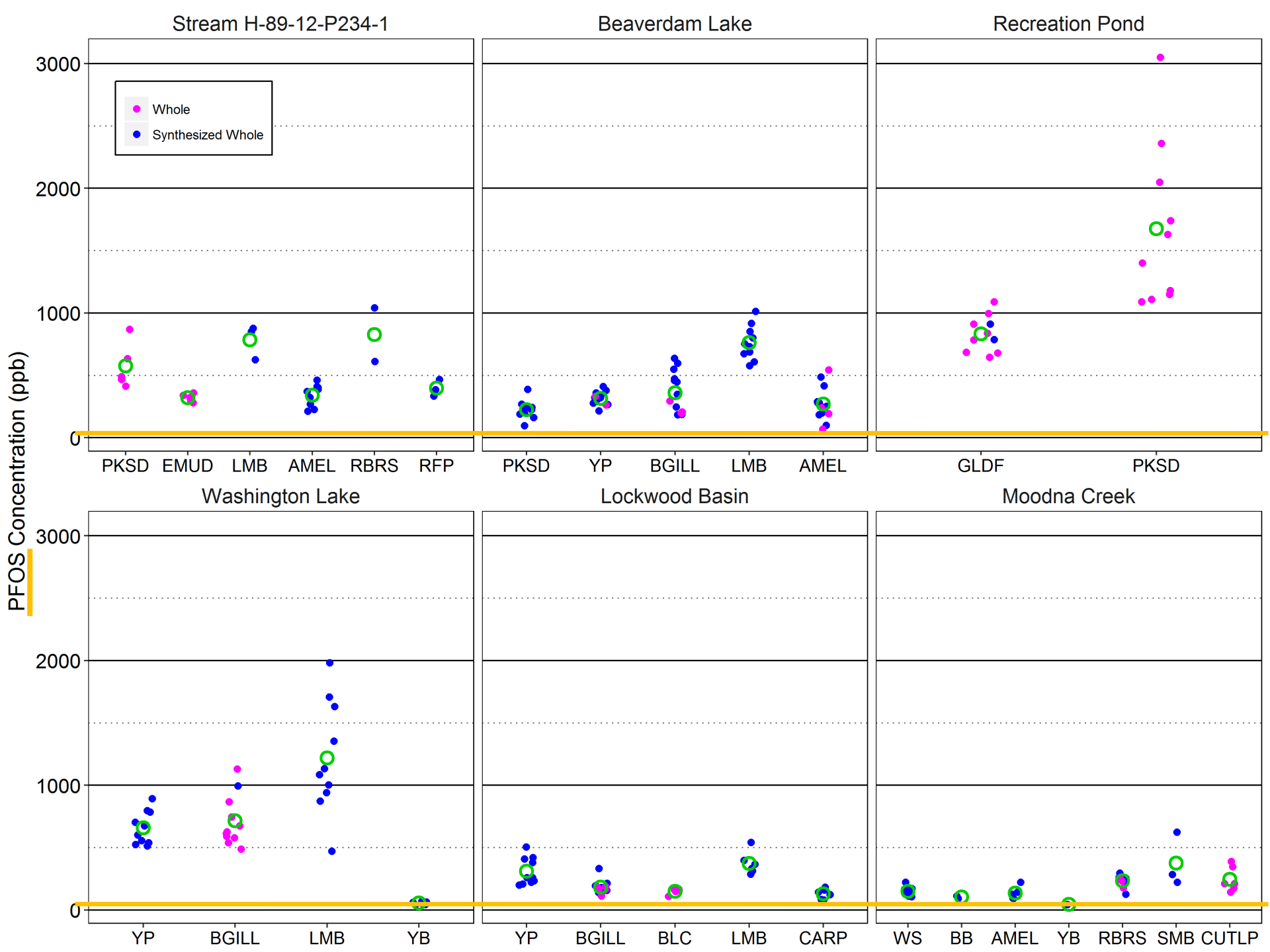
2016-2017 Fish Sampling



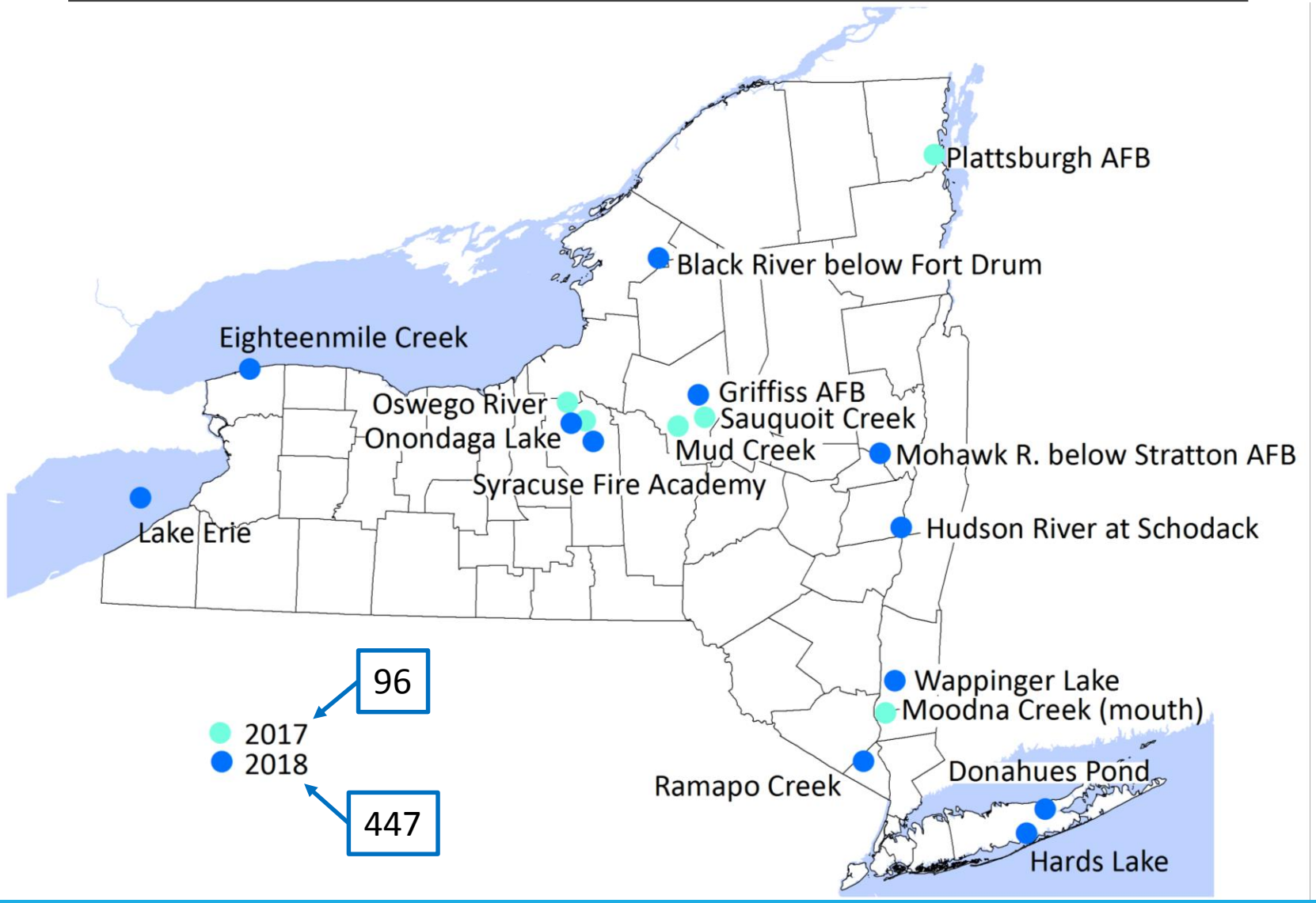
Newburgh vicinity
PFOS


Newburgh
Recreation Pond
P5609
Lockwood Basin
Lake Washington
Silver Stream
Stream between pond
in Stewart State Forest
and Beaverdam Lake
Brown's Pond
(reference)
Beaverdam Lake


Stream H-89-12-P234-1
Beaverdam Lake
Recreation Pond
Washington Lake
Lockwood Basin
Moodna Creek
Portion
Fillet
Carcass
Viscera
PFOS Concentration (ppb)
0
1000
2000
3000
LMB
AMEL
RBRS
RFP
PKSD
YP
BGILL
LMB
AMEL
GLDF
YP
BGILL
LMB
YB
YP
BGILL
LMB
CARP
WS
BB
AMEL
YB
RBRS
SMB


Stream H-89-12-P234-1
Beaverdam Lake
Recreation Pond
Washington Lake
Lockwood Basin
Moodna Creek
Whole
Synthesized Whole
PFOS Concentration (ppb)
3000
2000
1000
0
PKSD EMUD LMB AMEL RBRS RFP
PKSD YP BGILL LMB AMEL
GLDF PKSD
YP BGILL LMB YB
YP BGILL BLC LMB CARP
WS BB AMEL YB RBRS SMB CUTLP

2017-2018 Statewide Fish Sampling

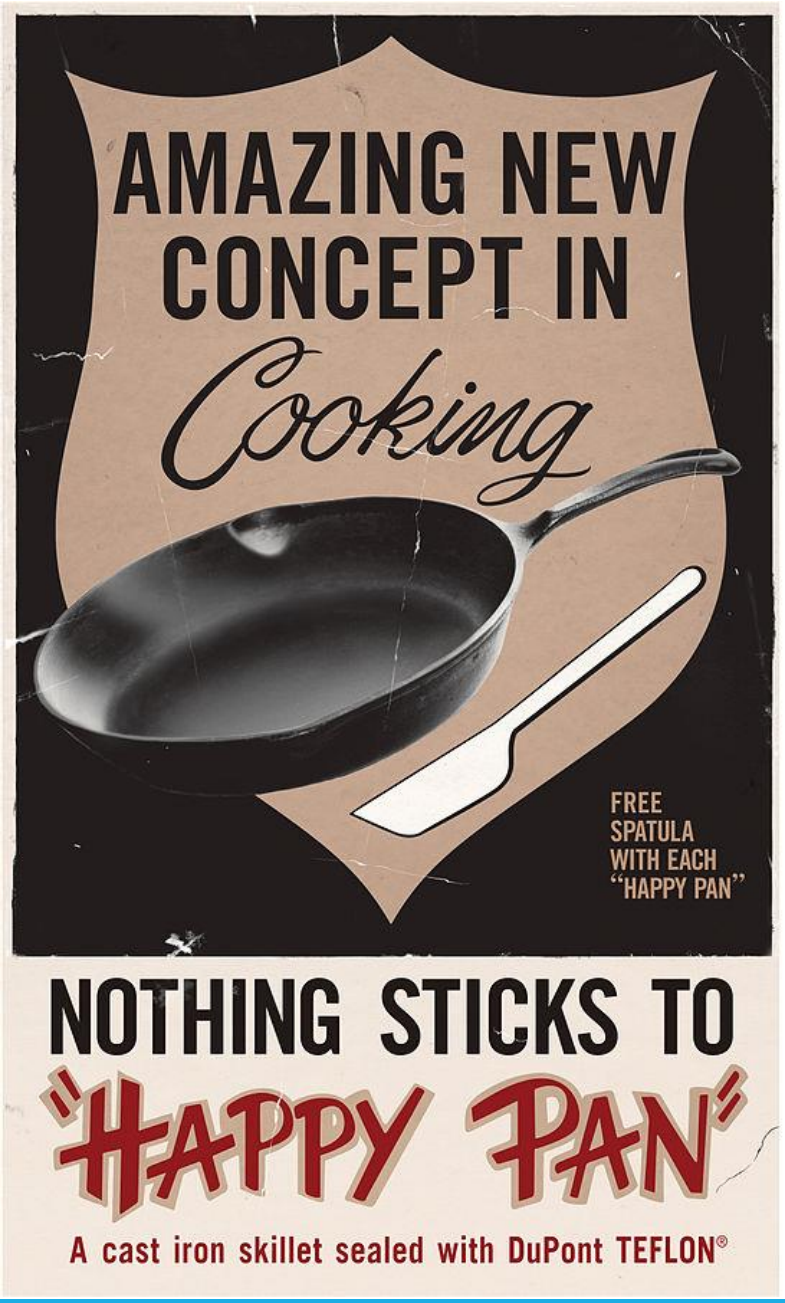


Conclusions:

- PFAS are pervasive in fish and can be at high concentrations – these contaminants are in the food chain!
- Concentrations are highest in the viscera but are also high in the edible portion (fillet).
- Low food chain species and small individuals can have high concentrations.
- Catfish and bullhead have relatively low concentrations, even in polluted sites.
- Concentrations can vary in a relatively short spatial distance.

Conclusions and Questions:

- PFOS is highly bioaccumulative while PFOA is much less so. But the 9-12 chain acids can be an important contributor to total PFAS.
- The compounds of concern for fish are likely to be different than those for water.
- The analysis suite is expanding – what else will we see? Expect surprises!
- We will be looking at the ecological implications.
- Our DEC laboratory is in method validation for the analysis of PFAS in tissues.


AMAZING NEW
CONCEPT IN
Cooking
FREE
SPATULA
WITH EACH
"HAPPY PAN"
NOTHING STICKS TO
"HAPPY PAN"
A cast iron skillet sealed with DuPont TEFLON®