



# PFAS Distribution and Transport in Surface Water, Sediment, and Fish Tissue at a DOD Site

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*Protecting Maine's Air, Land and Water*

# What is PFAS?

- Per- and PolyFluoroAlkyl Substances
- Also known as PFC
- PFOA, PFOS
- Manmade, ubiquitous
- Organic compounds, H is replaced with F, has a functional group
- C-F bond, strongest covalent bond
- More than 200 different chemicals



# What is PFAS?

- Hydrophobic and lipophobic
- Resists stains, heat, water, oil
- Very mobile, very persistent
- Bioaccumulates

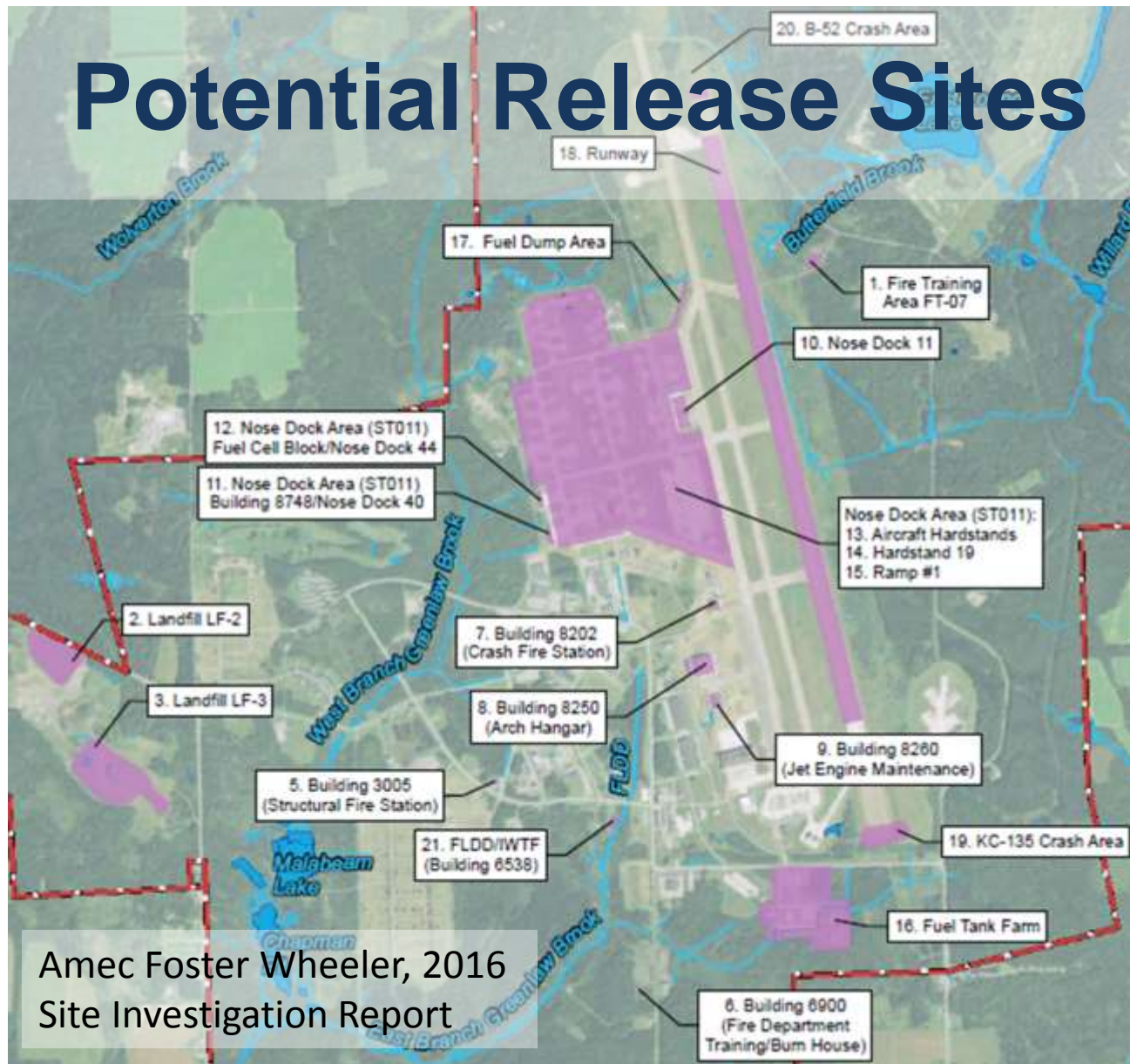


# Why are they at DOD sites?

- AFFF, aqueous film-forming foams
- Used at crash sites, spills, fire training



# Potential Release Sites



Amec Foster Wheeler, 2016  
Site Investigation Report

# Site Investigation

- 2015
  - 23 Surface water samples
  - 22 Sediment samples
  - 15 Fish tissue samples
- 2016
  - 12 Surface water samples
  - 13 Sediment samples
  - 2 Fish tissue samples

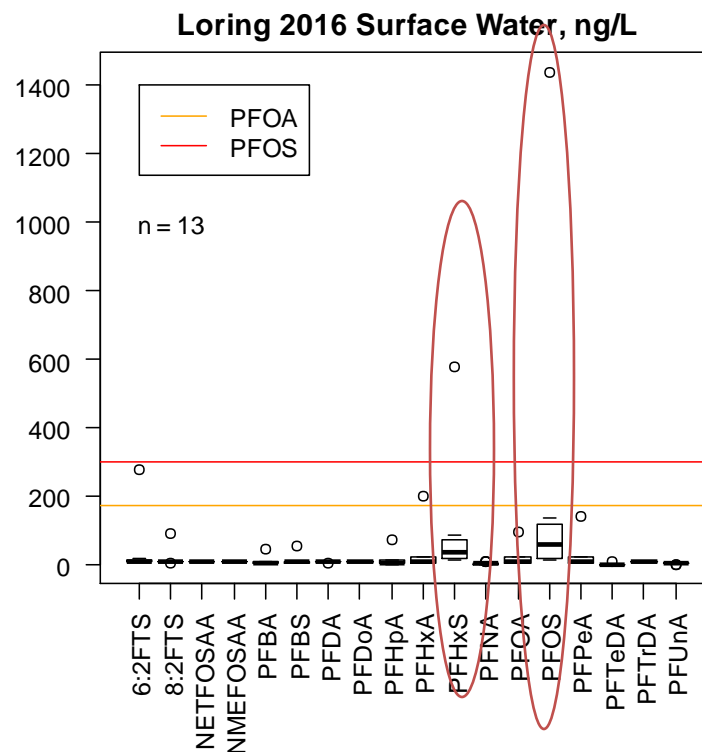
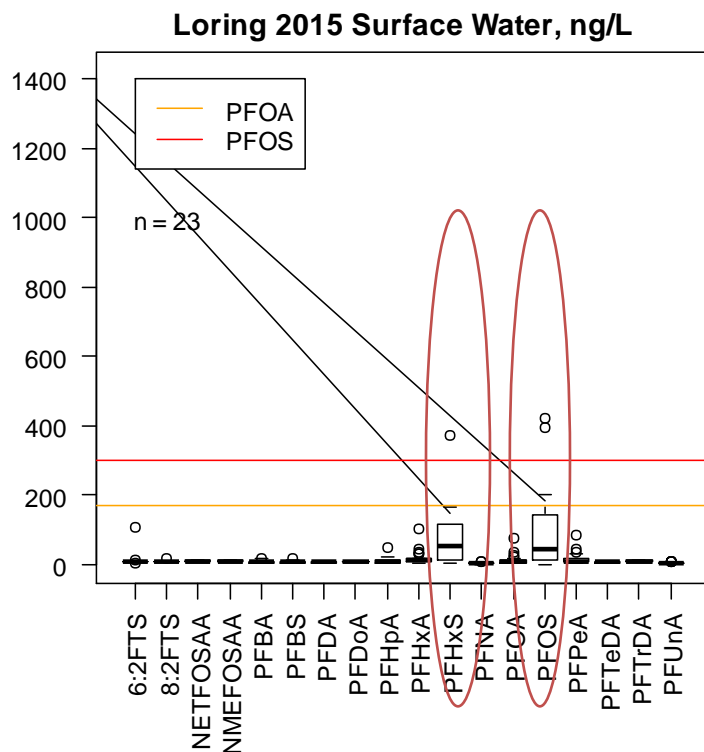




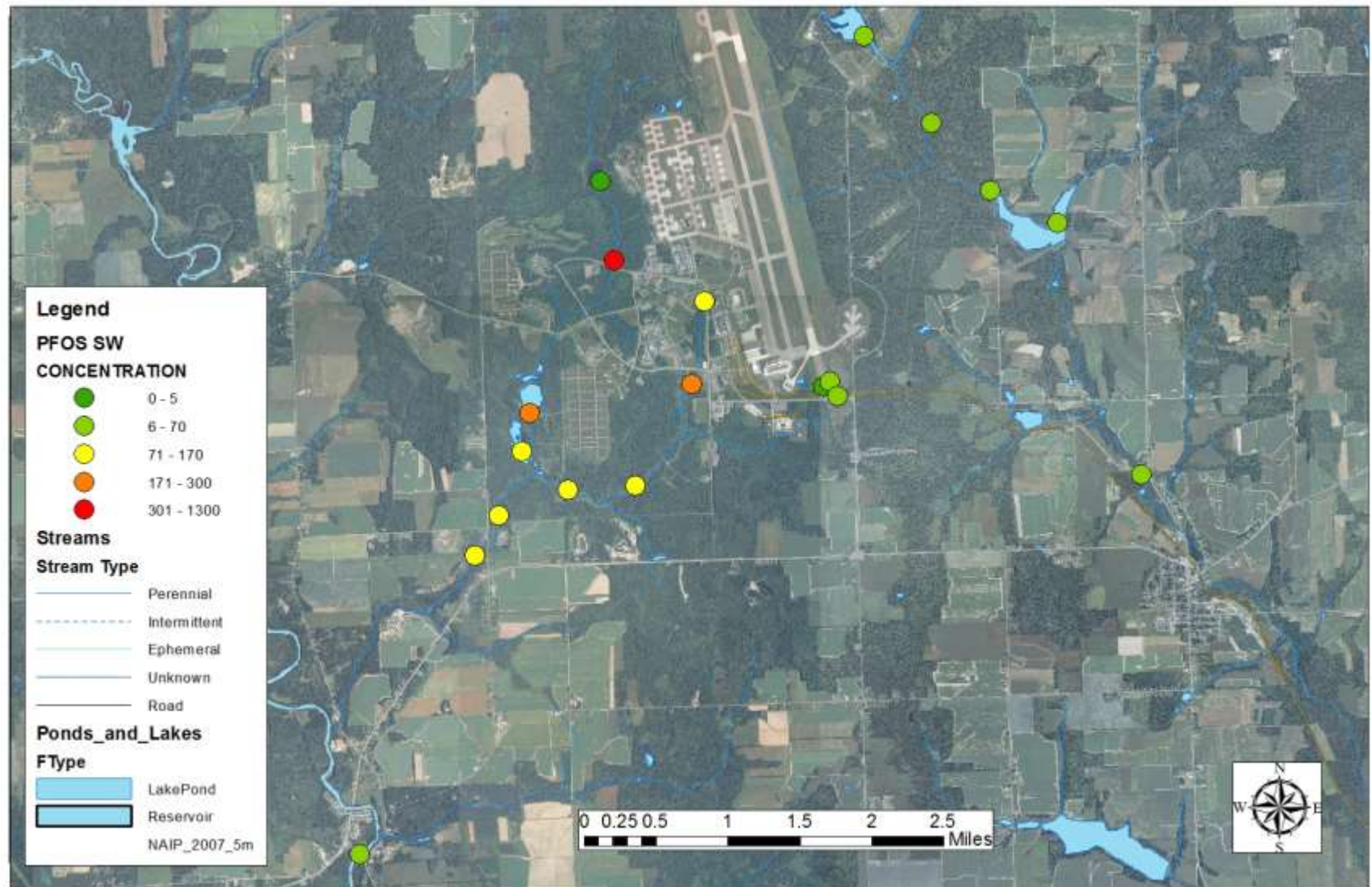
# Surface Water Results

MeCDC Human Health Risk-Based Screening Levels

ng/L	Recreational SL	Construction Worker SL
PFOA	170	740
PFOS	300	1,300



# Surface Water 2015 Results, ng/L





# Surface Water Results

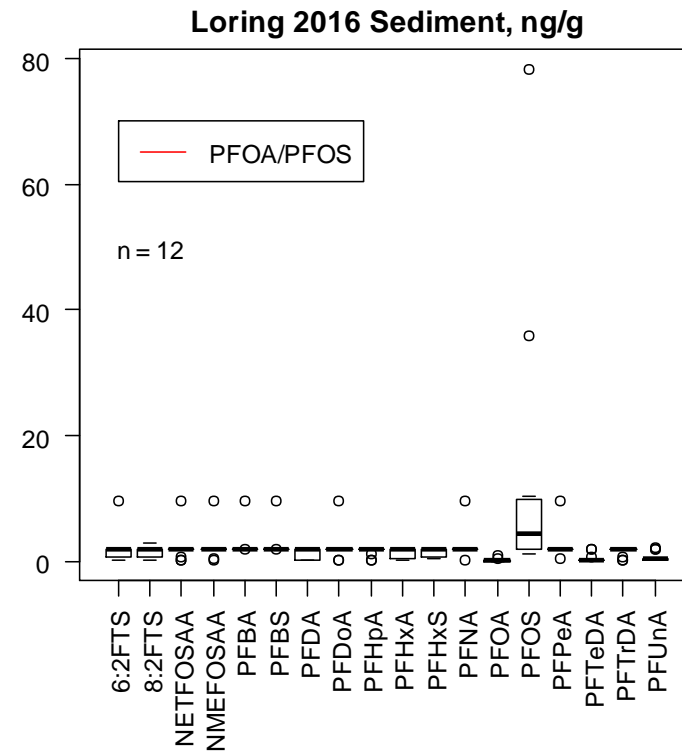
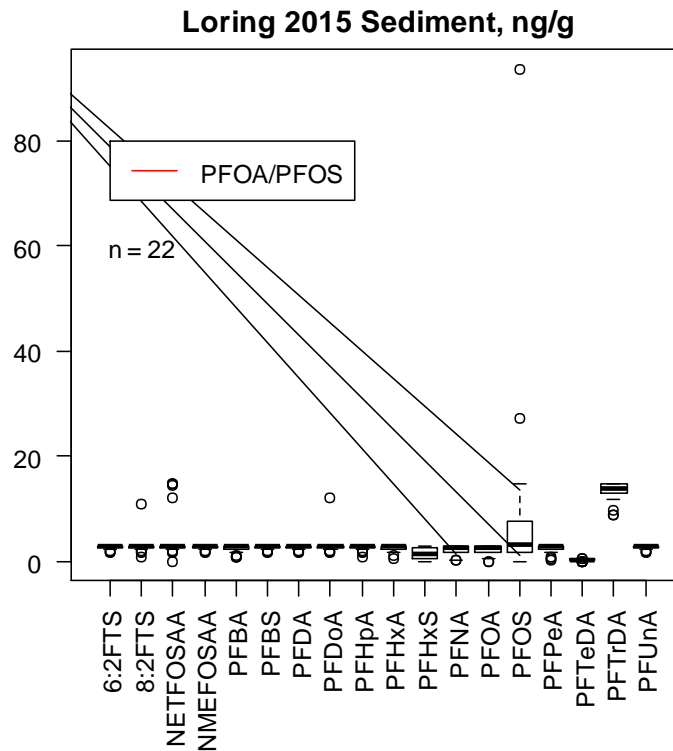
- PFOS and PFHxS most commonly detected, greatest concentrations.
- PFOA, PFHxA also commonly detected.
- 3 PFOS exceedances (Recreational) near base.
- No PFOA, PFBS exceedances.
- Western drainage to Greenlaw Brook more impacted than eastern Butterfield Brook.



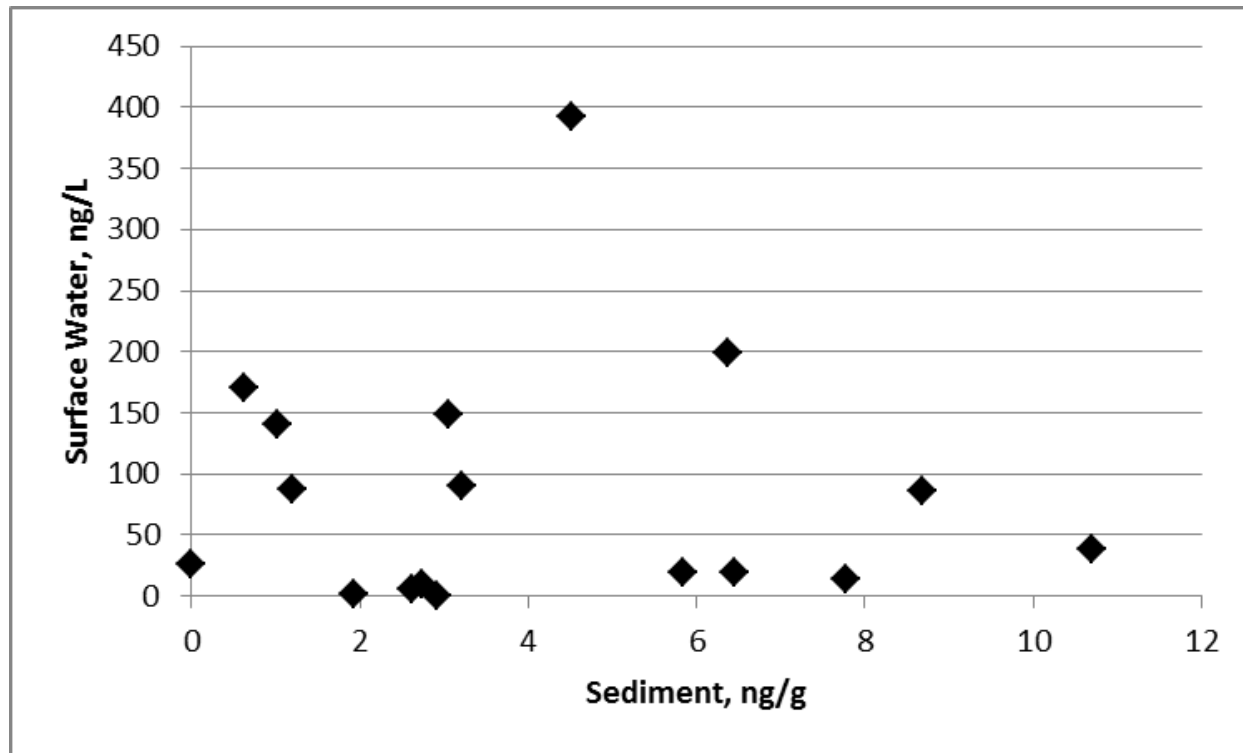
# Sediment Results

MeCDC Human Health Risk-Based Screening Levels

ng/g	Child	Adult	Screening
PFOA	5,000	47,000	5,000
PFOS	5,000	47,000	5,000



# PFOS Surface Water – Sediment Relationship



# Sediment Results

- PFOS most commonly detected.
- PFOA, PFHxS also commonly detected, but very low concentrations
- No exceedances.

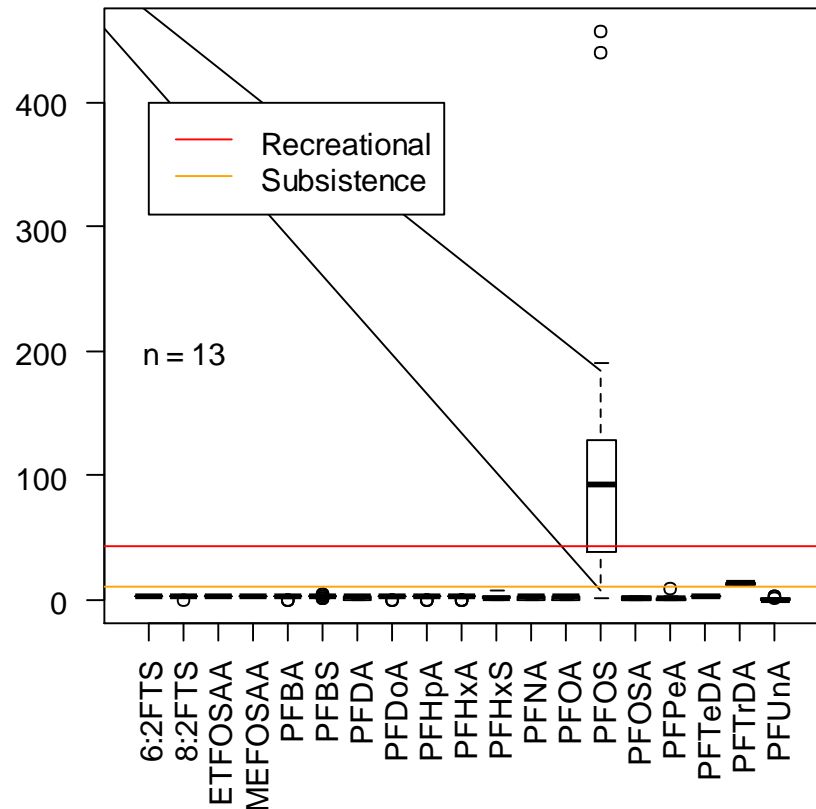


# Fish Tissue 2015 Results

MeCDC Human Health Risk-  
Based Screening Levels

ng/g	Maine Recreational Angler	Subsistence Fisher
Meals/wk	1	4
PFOA	44	11
PFOS	44	11

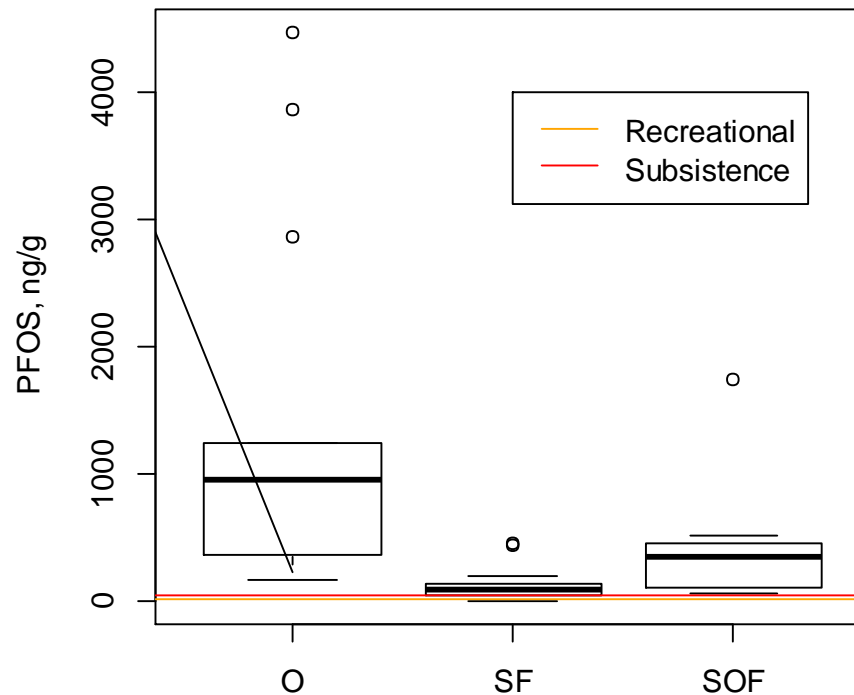
Loring Skinless Fillets, ng/g



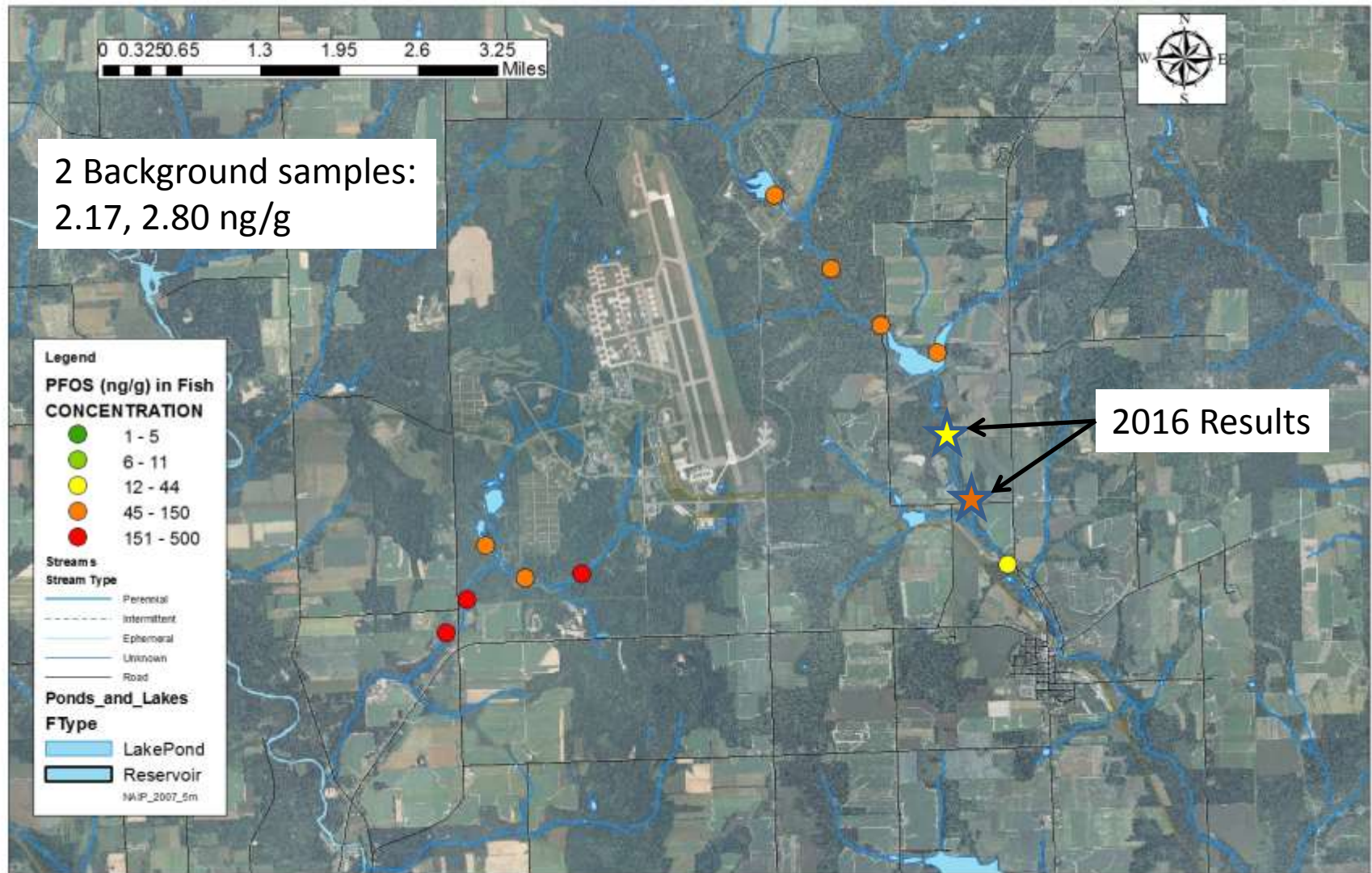


# Fish Tissue 2015 Results

O = Offal  
SF = Skinless Fillets  
SOF = Skin-On Fillets



# Fish Tissue 2015 Results

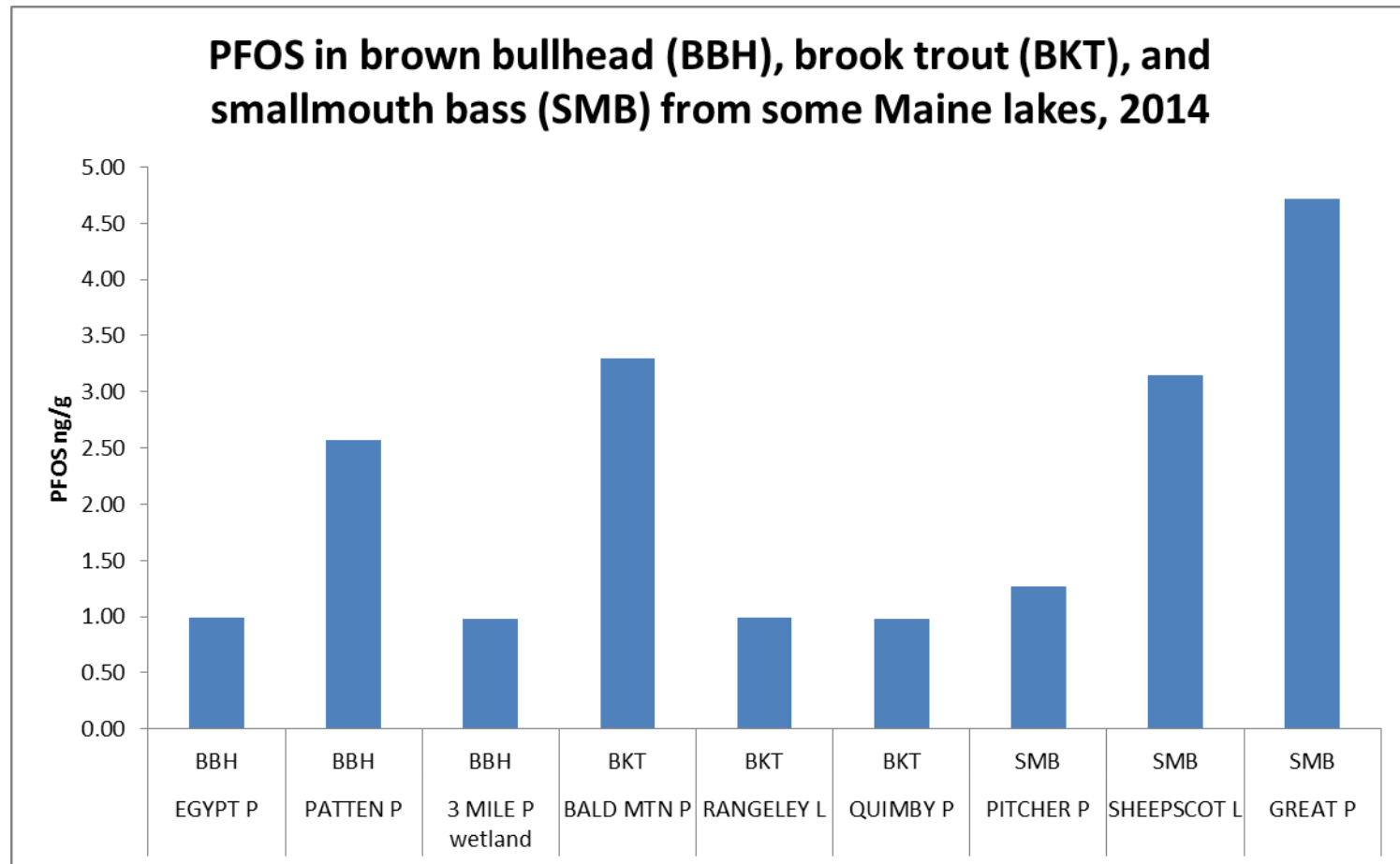


# Fish Tissue Results

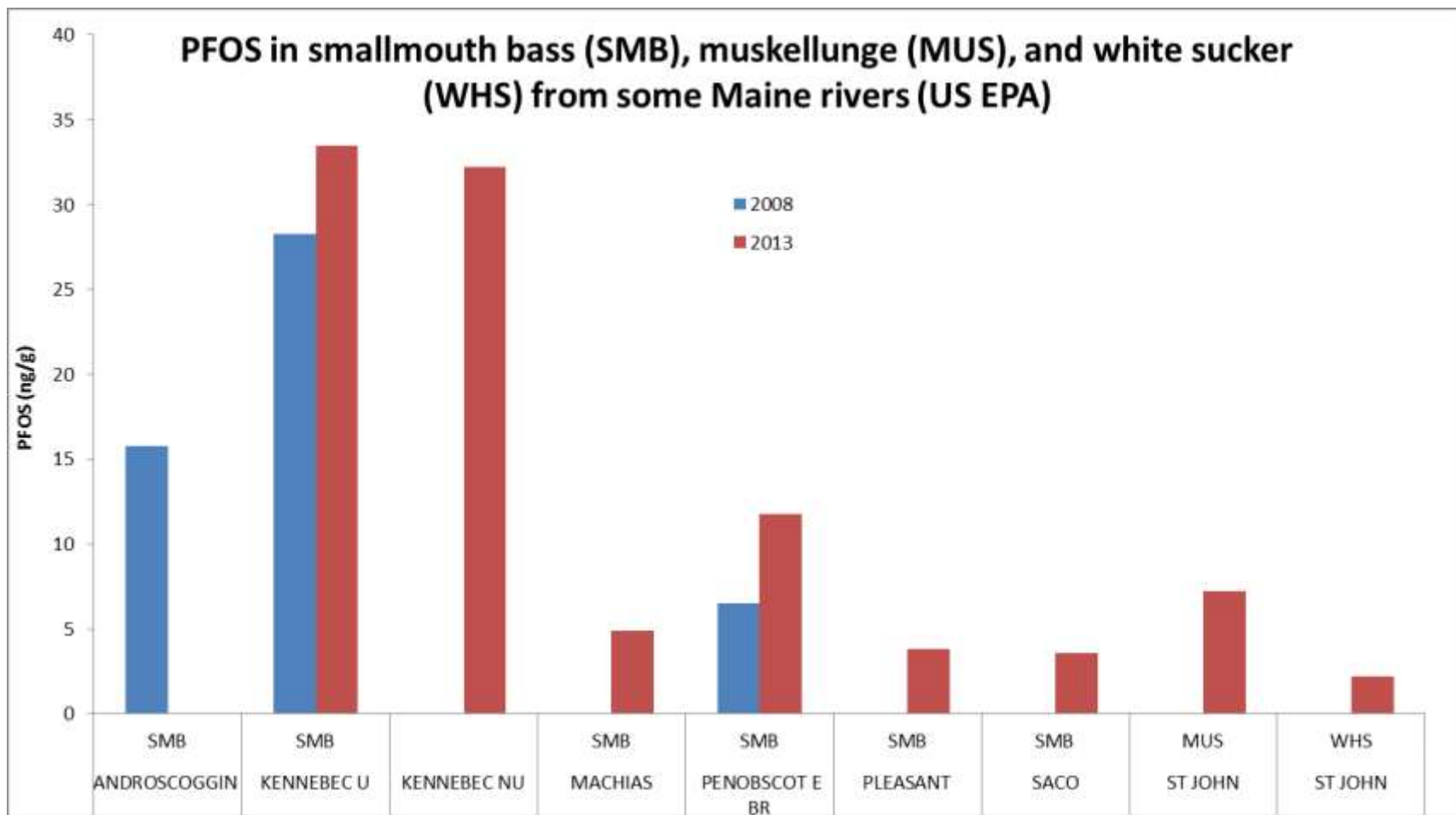
- PFOS was most commonly detected PFAS.
- All the fish samples had exceedances, except for background samples.
- PFOS concentrations greater in western drainage than in eastern.
- PFOS concentrations in offal and skin are greater than in fillets.



# Background Fish Tissue, MEDEP

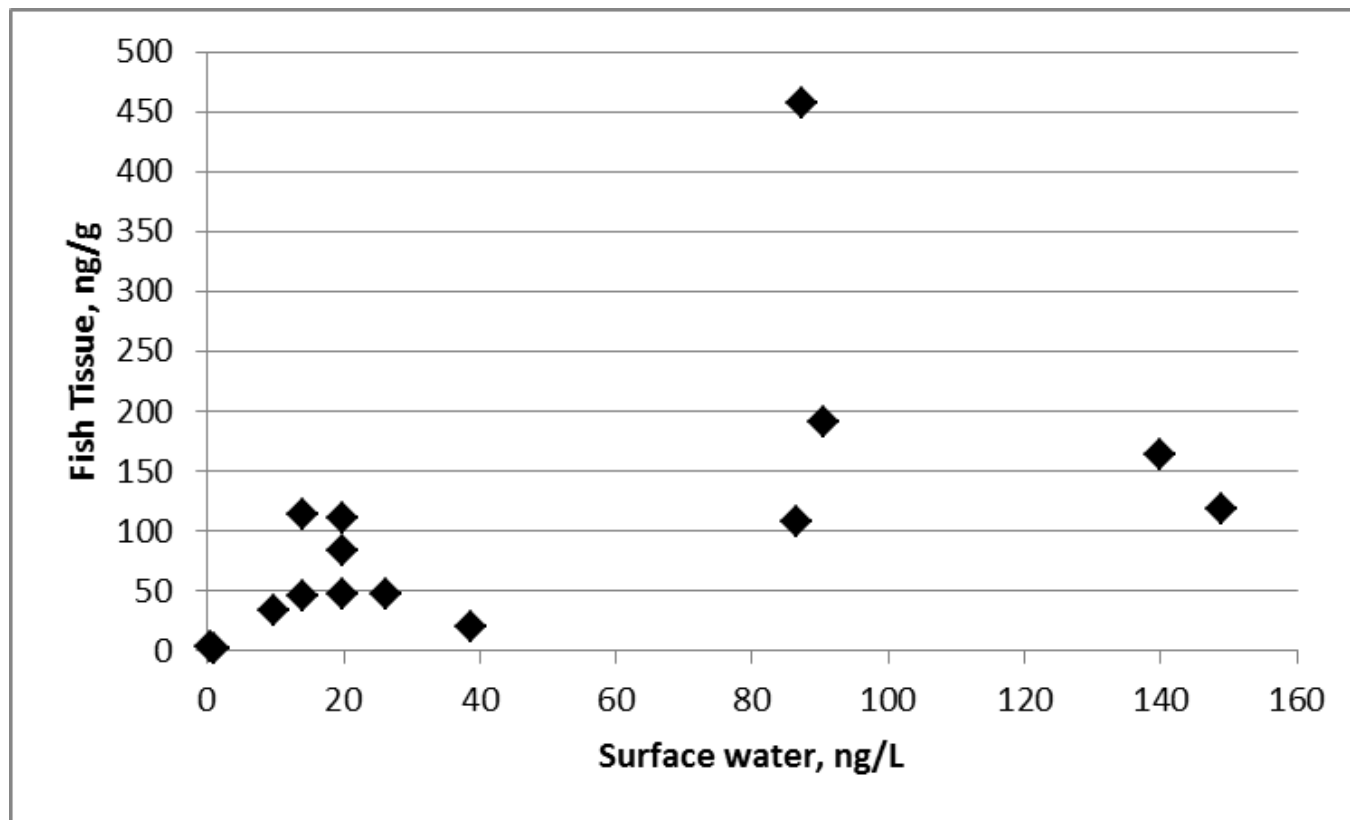


# Background Fish Data, EPA





# Surface Water – Fish Relationship



$R^2 = 0.293$

Possible increase of fish tissue concentrations  
with surface water concentrations



# Conclusions

- PFOS is most commonly detected PFAS in all media.
- Surface water:
  - 3 PFOS exceedances of screening levels.
  - PFHxS concentrations similar to PFOS.
  - Detections of PFOA, PFHxA.
- Sediment: no exceedances, mostly PFOS.
- Fish tissue:
  - PFOS exceedances for all samples except background.
  - PFOS had greatest concentrations.
  - Possible relationship with surface water concentrations.





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