Oscoda Area and Former Wurtsmith Air Force Base PFAS Update Meeting

October 20, 2020

The webinar will begin at 6:00 pm

MPART

Agenda	
6:05 pm	Zoom Instructions
6:10 pm	EGLE Update
6:40 pm	MDHHS Update
6:50 pm	DNR Update
6:55 pm	Purdue University Update
7:05 pm	Question and Answer Session
8:00	Meeting Conclusion

Webinar Housekeeping

All lines are muted during the webinar.

We are recording this webinar

How to ask a question in Zoom

Submit your questions using the "**Q/A**" box in at the bottom of your screen.

Click the "hand" icon at the bottom of your screen.

Type *9 to raise your hand.

*9

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ENVIRONMENT, GREAT LAKES, AND ENERGY

PFAS concentrations in Lake Huron near the Au Sable River

Brandon Armstrong, Ph.D.
Aquatic Biology Specialist
Water Resources Division

Introduction

- The Au Sable River empties into Lake Huron in Au Sable township, roughly 6 miles downstream of groundwater and surface water inputs from Clark's Marsh.
- Water currents in Lake Huron generally rotate in a counter-clockwise direction

- The Huron Shore Regional Utility Authority (HSRUA) operates a water treatment facility with a Lake Huron intake approximately 11 miles south of the Au Sable River mouth

Study Objective

- Determine the extent of measurable PFAS contamination in nearshore Lake Huron south of the Au Sable River mouth.

Sampling Locations

- Two sites on the Au Sable River
- Six Lake Huron transects
  - Four transects near Oscoda
    - Two north and two south of the Au Sable River mouth
  - Two transects near Tawas City
    - One north and one south of the HSRUA drinking water intake.
- Each transect begins approximately 300 m from the shore and extends approximately 1.2 km perpendicular to shore.
- Three sampling locations along each transect
- At each location, samples collected at 1-meter below the surface, mid-depth, and 1-meter off lake bottom


CEDAR
HURON RD
N STATE ST
W RIVER RD
Oscoda
S STATE ST
Mill St.
Old Au Sable River
610
600
US-23
23
HURON RD
ON2a
ON2b
ON2c
ON1c
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OS1c
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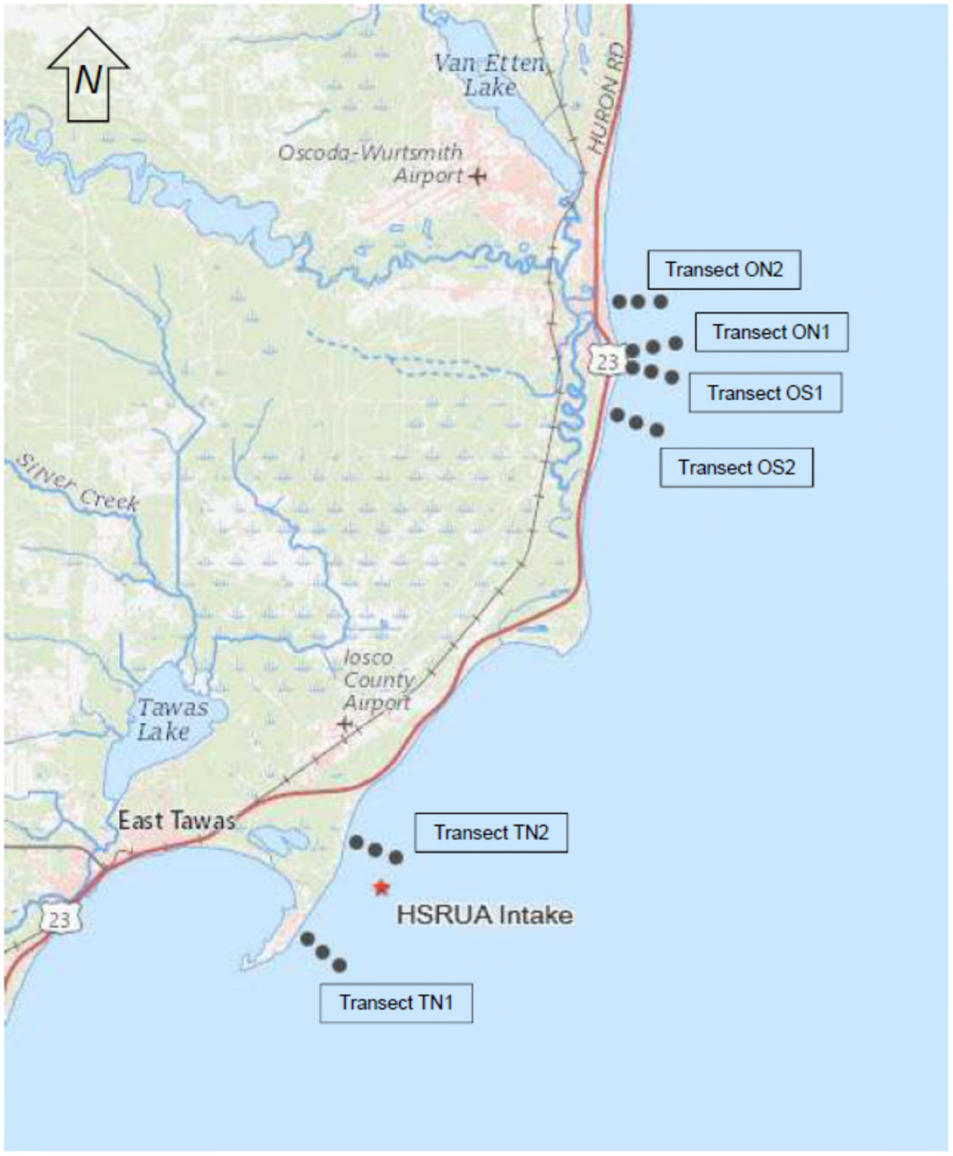
OS2b
OS2c
N
Old Au Sable River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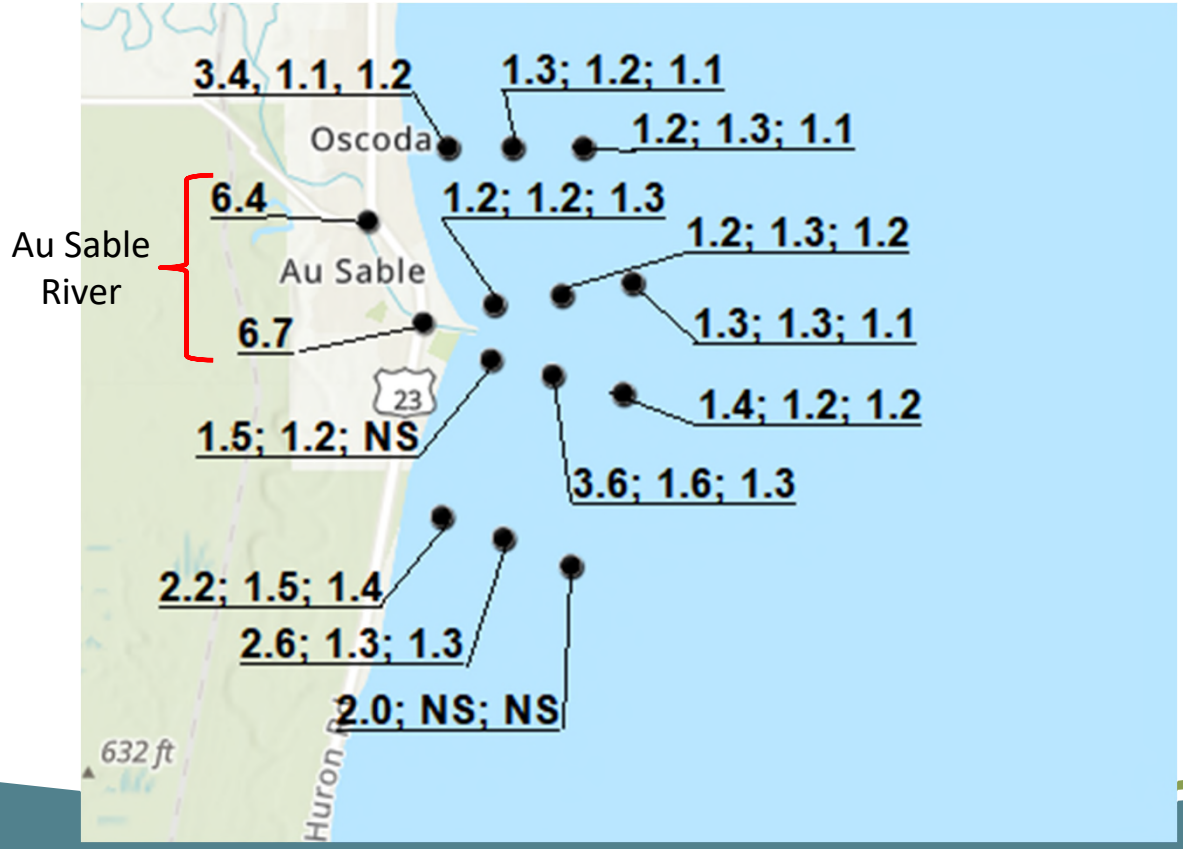
Van Etten Lake
HURON RD
Oscoda-Wurtsmith Airport
Transect ON2
Transect ON1
23
Transect OS1
Transect OS2
Silver Creek
Iosco County Airport
Tawas Lake
East Tawas
Transect TN2
HSRUA Intake
23
Transect TN1

Seasonal differences

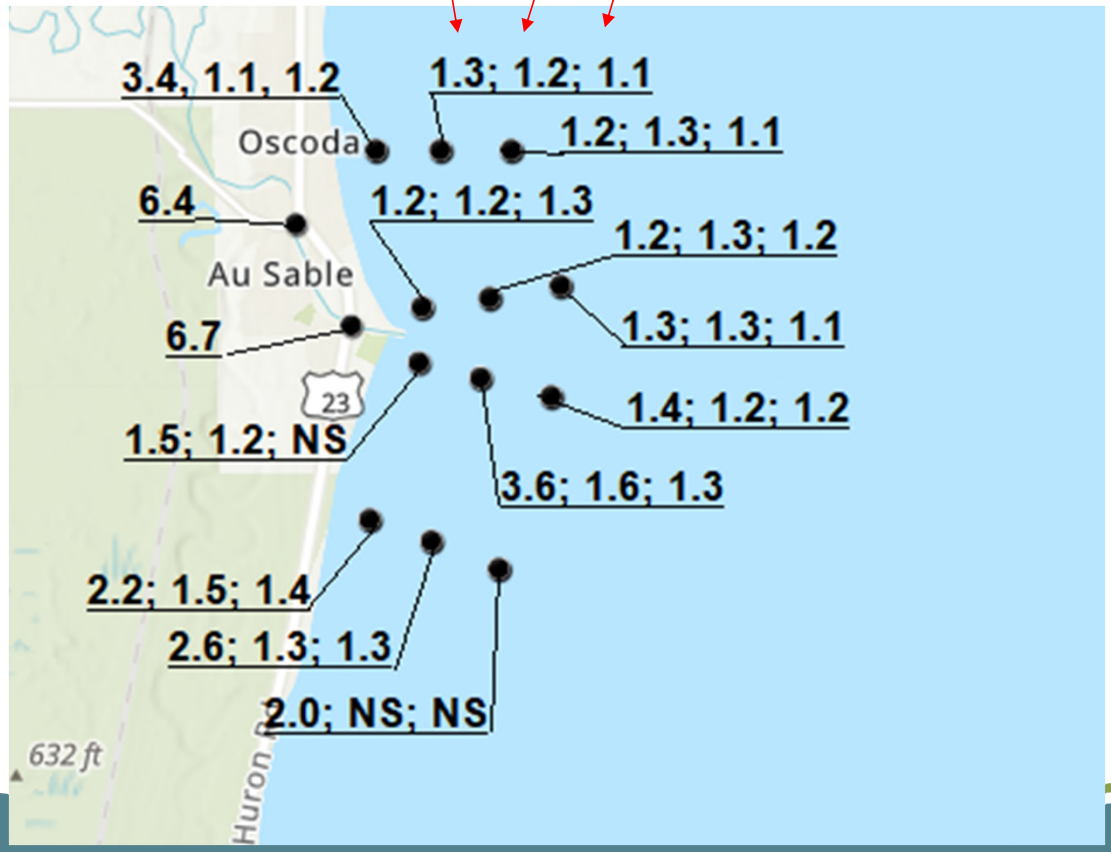
- Account for variability in concentrations due to weather related conditions by conducting four sampling events: June 2019; September 2019; November 2019; April 2021*.
  - Spring runoff sampling scheduled for April 2020; postponed due to COVID-19: Rescheduled for April 2021

July 2019 Results
PFOS Concentrations (ppt)



July 2019 Results
PFOS Concentrations (ppt)

At Each Location: 3 Sample Depths: Surface Mid Bottom



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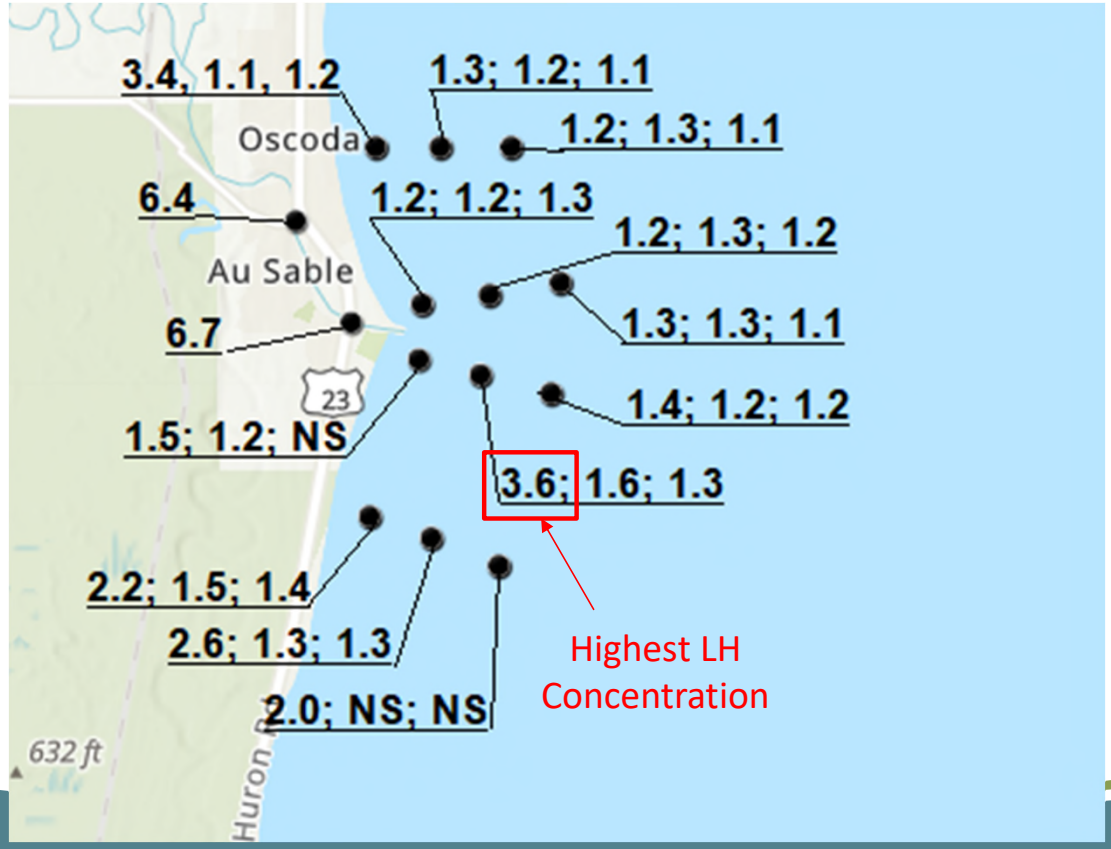

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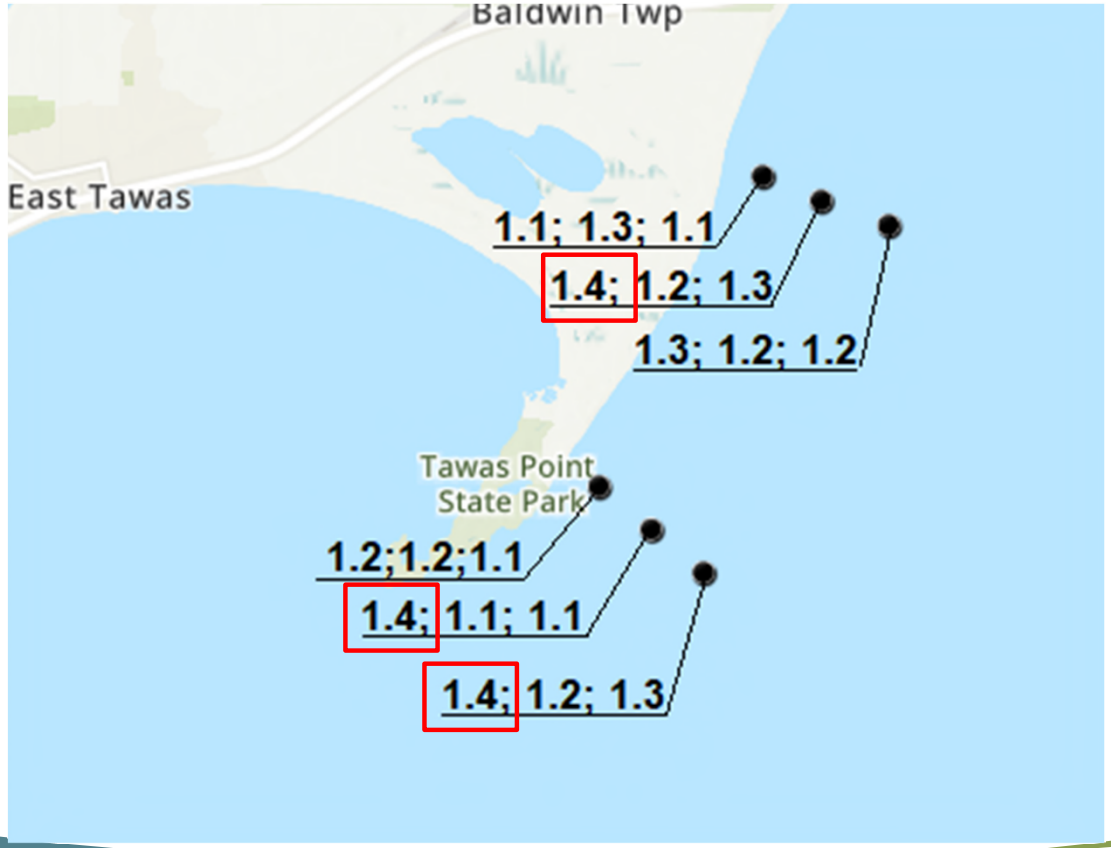
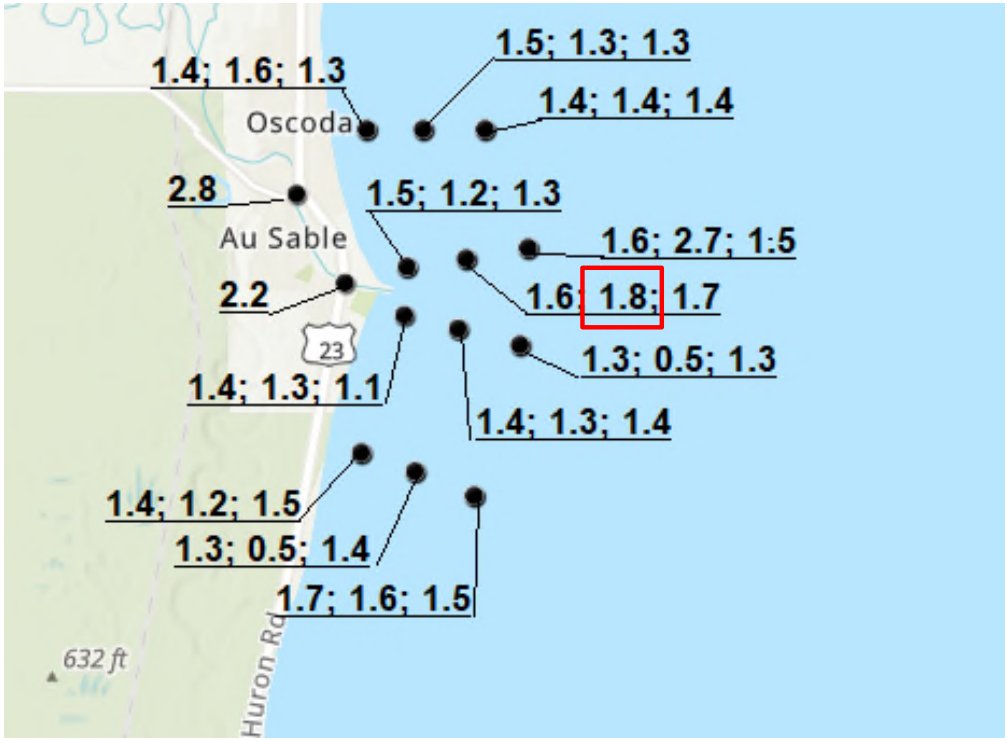
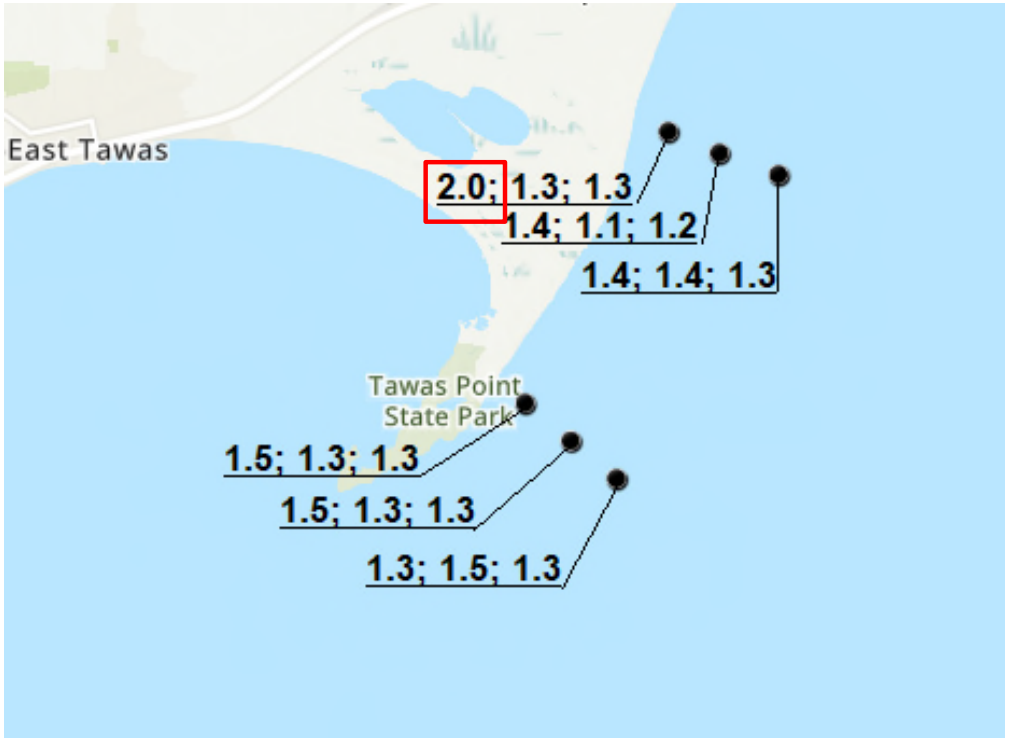


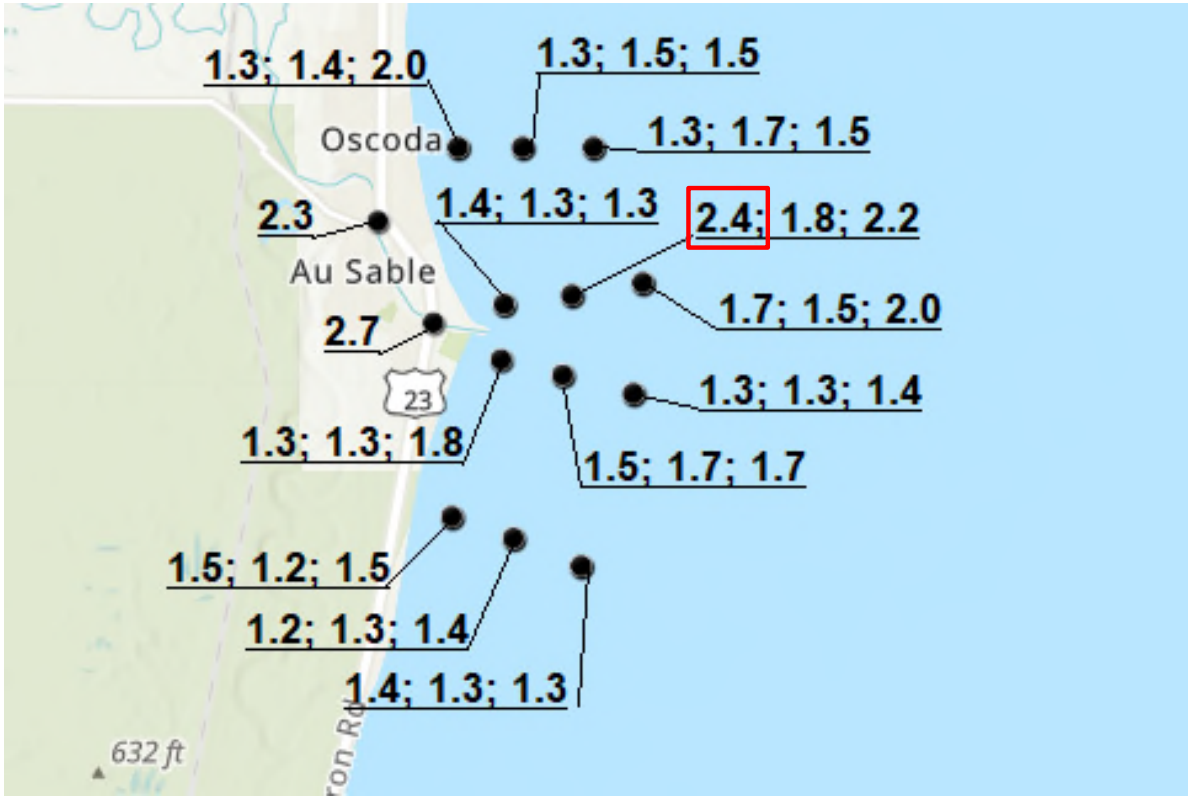
September 2019 Results
PFOS Concentrations (ppt)



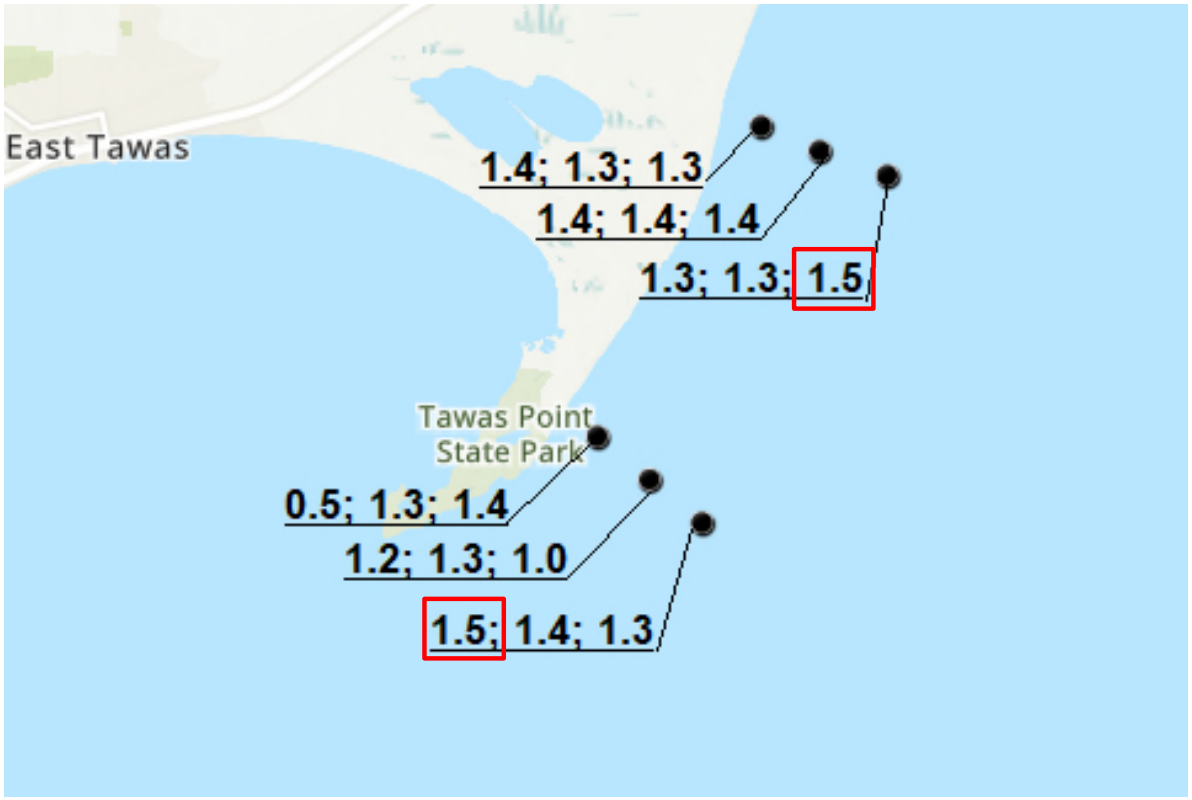
September 2019 Results
PFOS Concentrations (ppt)



November 2019 Results
PFOS Concentrations (ppt)



November 2019 Results
PFOS Concentrations (ppt)



Conclusions

- Overall, Lake Huron surface water PFOS concentrations have been generally low; 1 – 2 ppt.
- Highest PFOS concentration was 3.6 ppt in a sample collected 1 m below surface south of river in July 2019
- Lake Huron PFOA generally < 2 ppt; one sample collected north of the river at mid-depth was 3.9 ppt in Sept 2019.
- Other PFAS generally below reporting limit and/or < 5 ppt.

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Huron Shores Regional Utility Authority: Statewide PFAS Survey Results

Ian Smith, Ph.D.
Emerging Contaminants Unit Manager
Drinking Water and Environmental Health Division

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Huron Shores Regional Utility Authority: Drinking Water PFAS Testing

- Initially tested during Phase I of EGLE statewide PFAS survey
  - Samples collected for raw (intake) water and finished (treated) water
  - Raw and finished water analyzed for 24 PFAS compounds: **No detections**
  - Finished water also analyzed using EPA method 537 (14 compounds): **No detections**
- Monthly testing performed by EGLE at HSRUA between April and September 2019
  - Samples again collected for raw and finished water
  - Raw water analyzed for 24 PFAS compounds: **No detections**
  - Finished water analyzed for 14 PFAS compounds: **No detections**
- HSRUA is participating in compliance monitoring for Michigan's 7 PFAS MCLs
  - Initial sampling period is August 3, 2020 – February 2, 2021
  - Monitoring schedule determined based on initial sample results

Huron Shores Regional Utility Authority: Statewide PFAS Survey Results

Sample Date	Sample Type	Analytical Method	Total Tested PFAS (parts per trillion)
11/15/2018	Raw Water (Intake)	EPA 537 Modified	Non-Detect (ND)
11/15/2018	Finished Water	EPA 537/EPA 537 Modified	ND
4/26/2019	Raw Water (Intake)	EPA 537 Modified	ND
4/26/2019	Finished Water	EPA 537	ND
5/29/2019	Raw Water (Intake)	EPA 537 Modified	ND
5/29/2019	Finished Water	EPA 537	ND
6/25/2019	Raw Water (Intake)	EPA 537 Modified	ND
6/25/2019	Finished Water	EPA 537	ND
8/6/2019	Raw Water (Intake)	EPA 537 Modified	ND
8/6/2019	Finished Water	EPA 537	ND
9/5/2019	Raw Water (Intake)	EPA 537 Modified	ND
9/5/2019	Finished Water	EPA 537	ND
9/24/2019	Raw Water (Intake)	EPA 537 Modified	ND
9/24/2019	Finished Water	EPA 537	ND

Full statewide PFAS survey results available on the MPART website: michigan.gov/pfasresponse

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Former Wurtsmith Air Force Base

Beth Place, Project Manager
Remediation and Redevelopment Division
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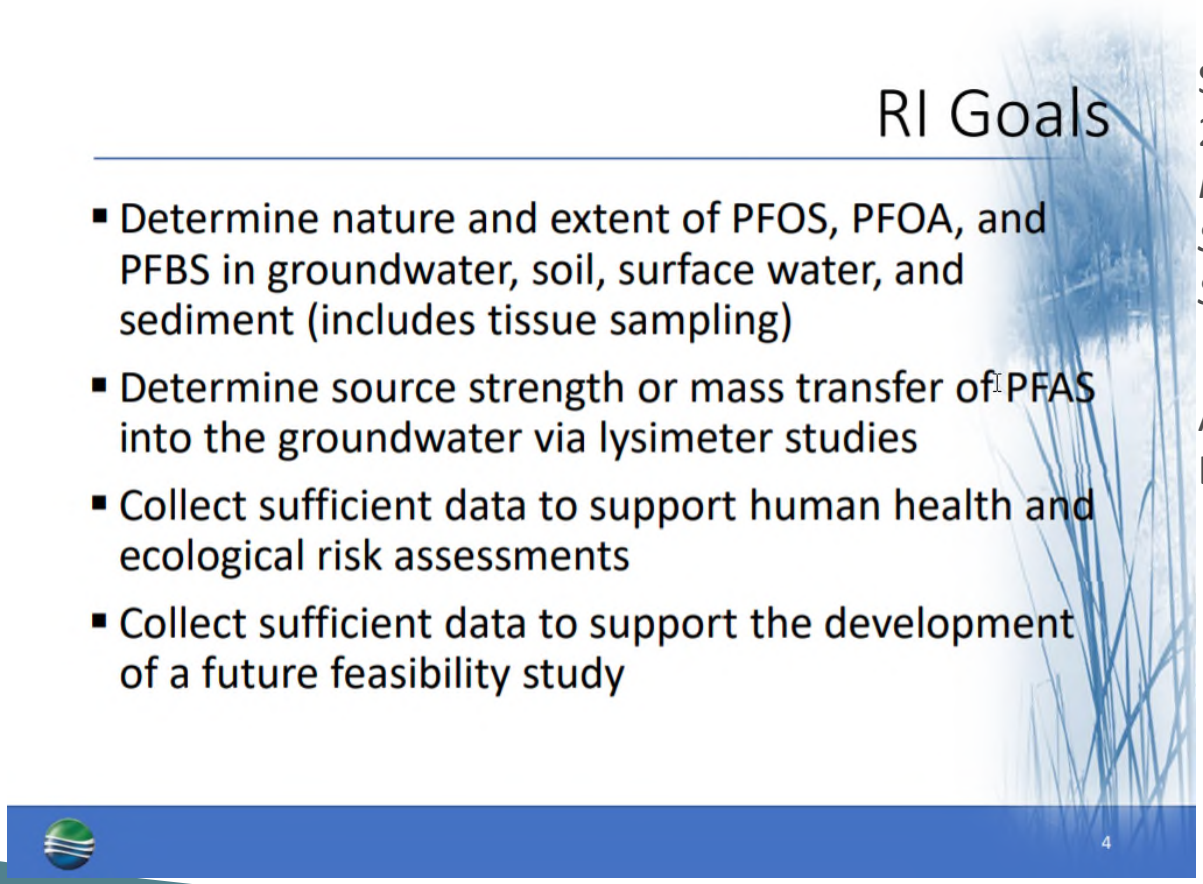
Air Force led Remedial Investigation
Interim Remedial Action BCT Planning

- Remedial Investigation Scoping Meetings
  - Kick off Meeting-August 20, 2020
  - Interim Remedial Action Meeting, October 7, 2020
  - Conceptual Site Model and Initial Data Quality Objective Meeting, October 15, 2020
- Upcoming Meeting (October –November)
  - Follow Up Data Quality Objectives
  - Risk Assessment
  - Potential ARARs
- Final Summaries available on Michigan.gov/Wurtsmith
- Restoration Advisory Board Meeting, October 21, 2020

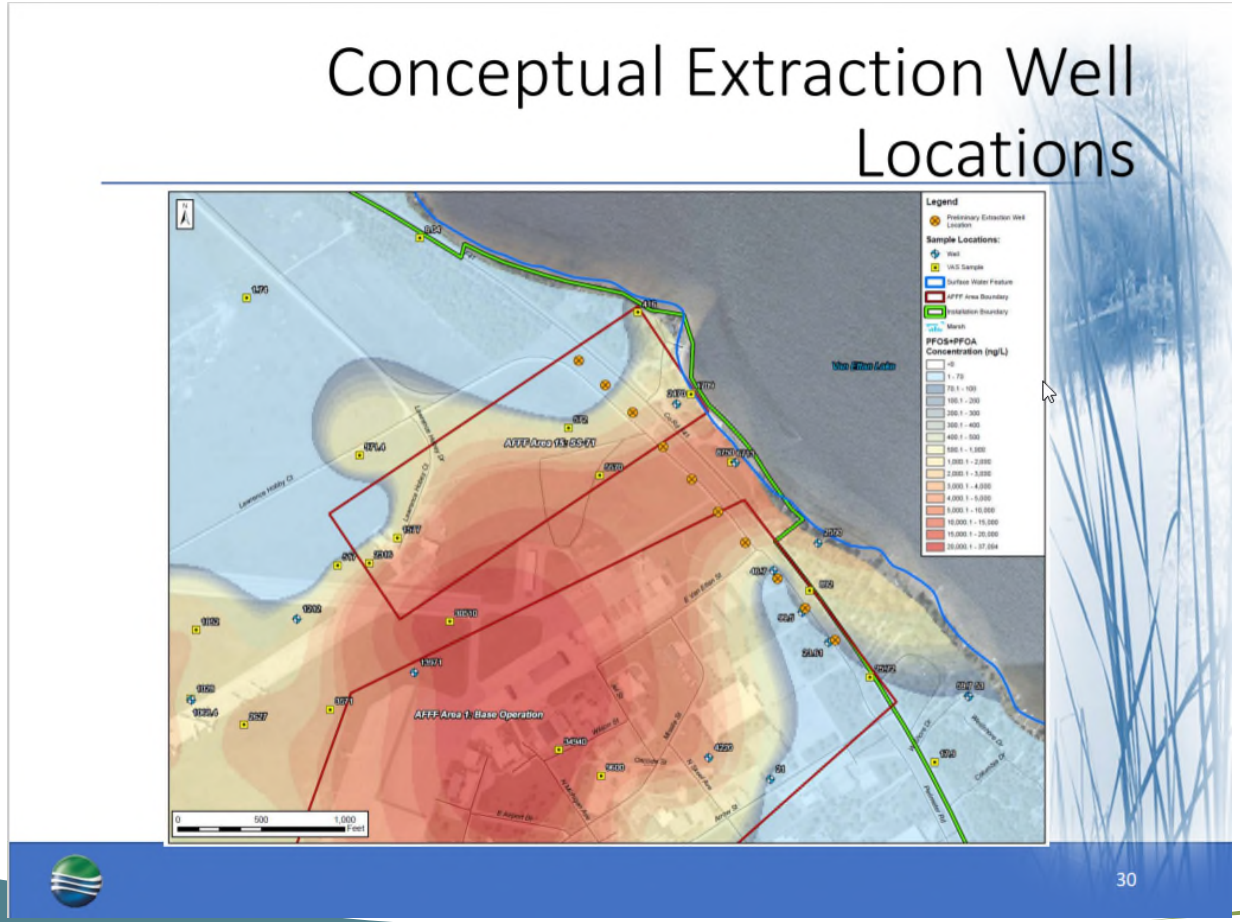
Air Force led Remedial Investigation (RI)



Source: August 20, 2020, *Final RI/IRA BCT Scoping Meeting Summary*

Aerostar SES, LLC for Air Force

Air Force led Interim Remedial Actions (IRA)



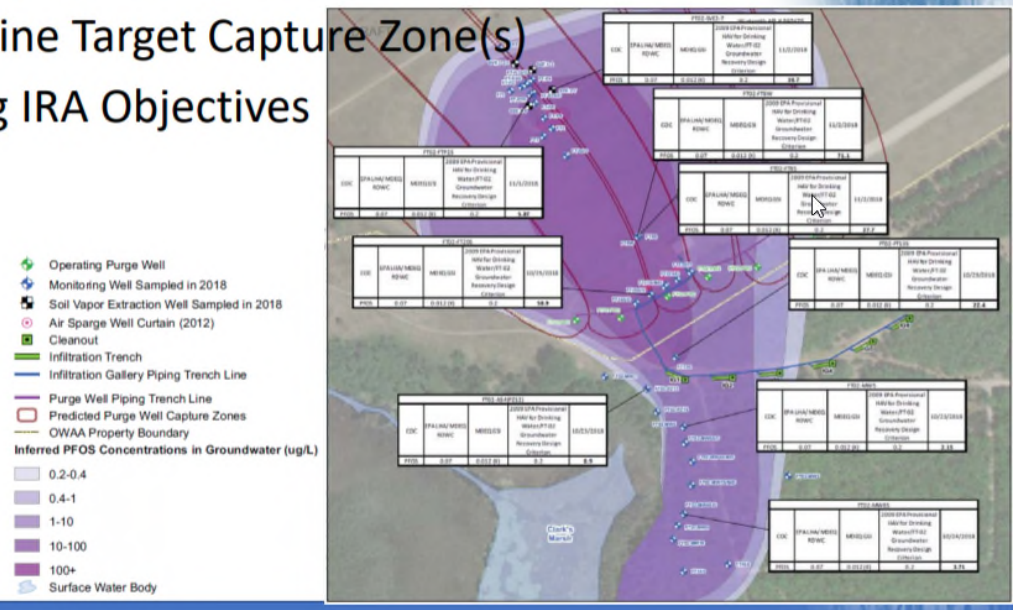
Source: August 20, 2020, *Final RI/IRA BCT Scoping Meeting Summary*

Aerostar SES, LLC for Air Force

Air Force led Interim Remedial Action

IRA Approach Fire Training Area

- Currently reviewing data
- Determine Target Capture Zone(s)
- Refining IRA Objectives



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Source: Augu
20, 2020, *Fi*
RI/IRA BCT
Scoping Mee
Summary

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Oscoda Area Sites

Amanda Armbruster, Geologist
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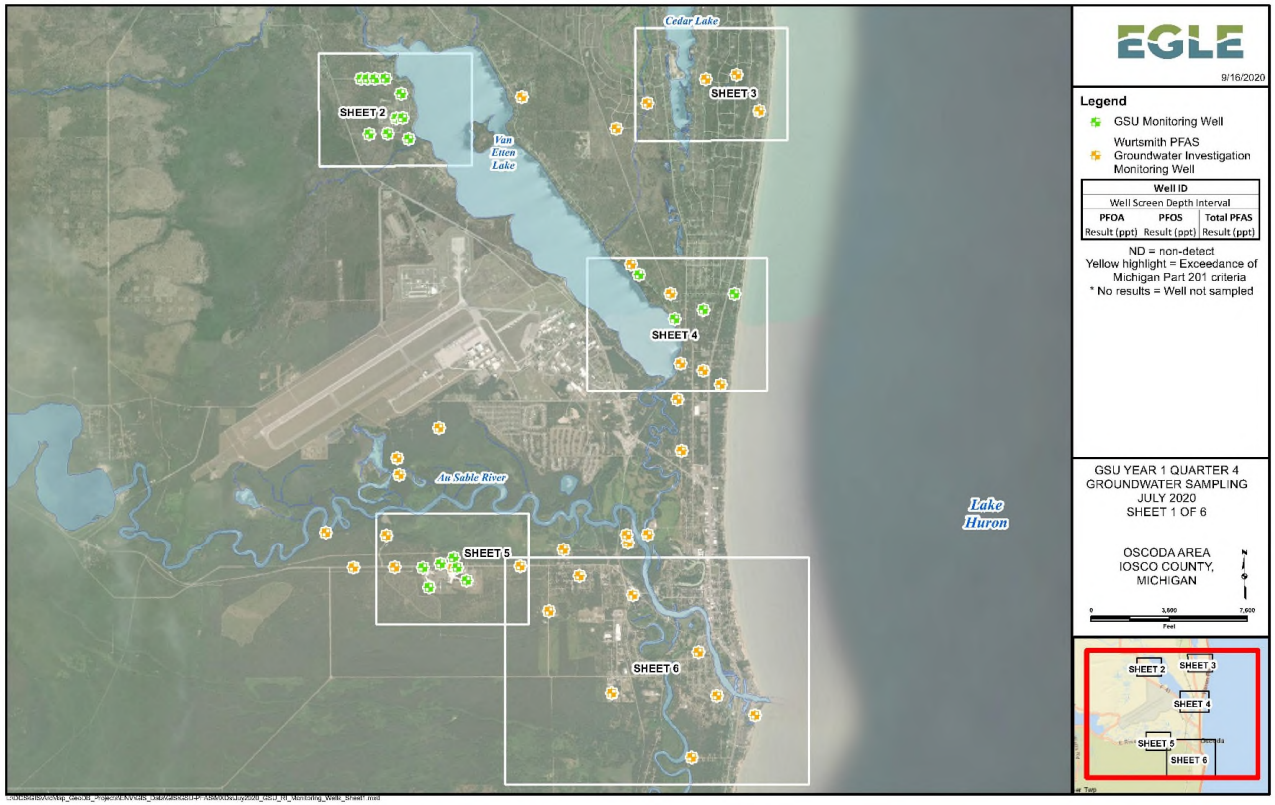
Oscoda Township & Au Sable Township Groundwater Monitoring Well Locations



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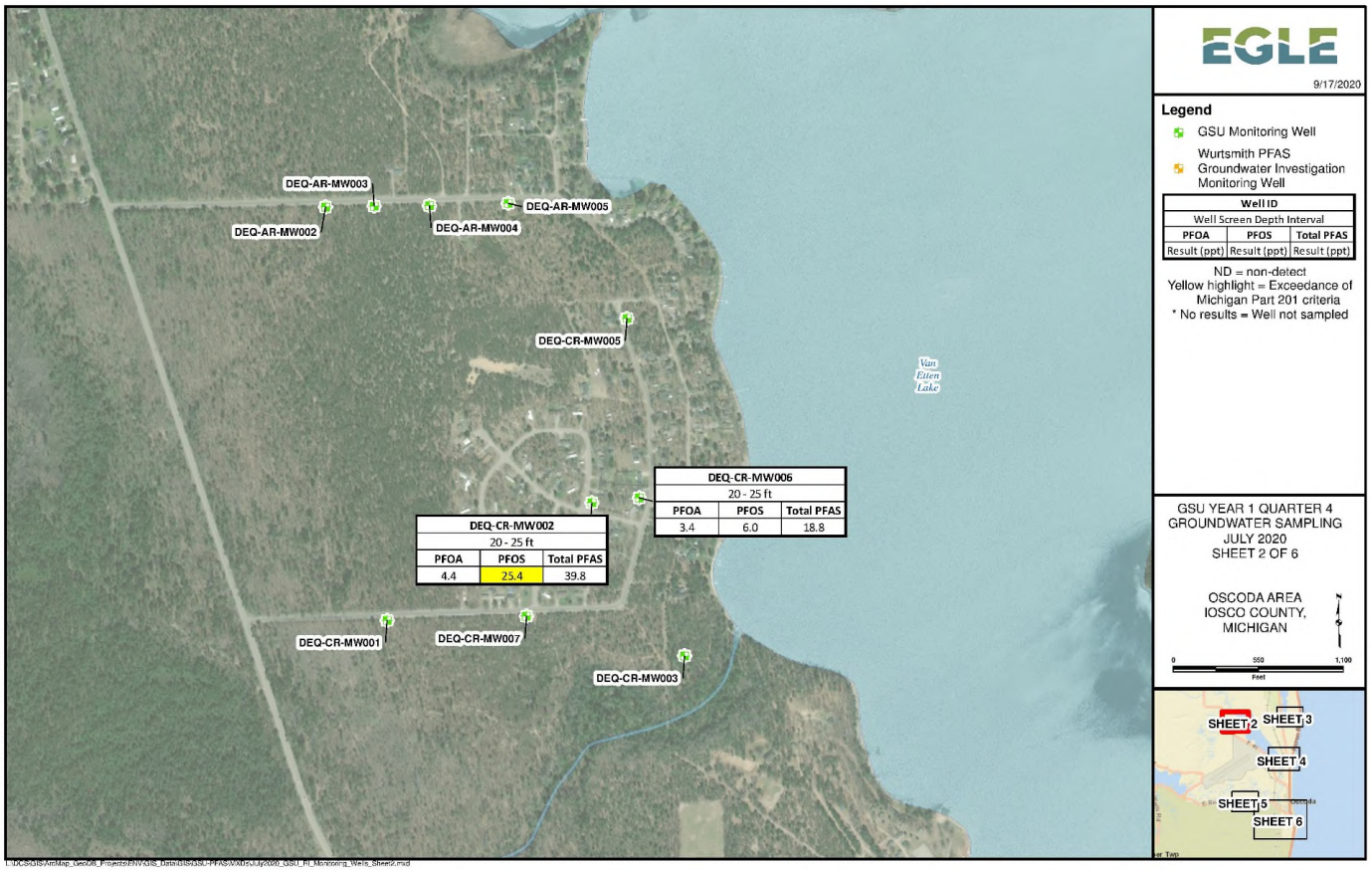
Colbath Road Area



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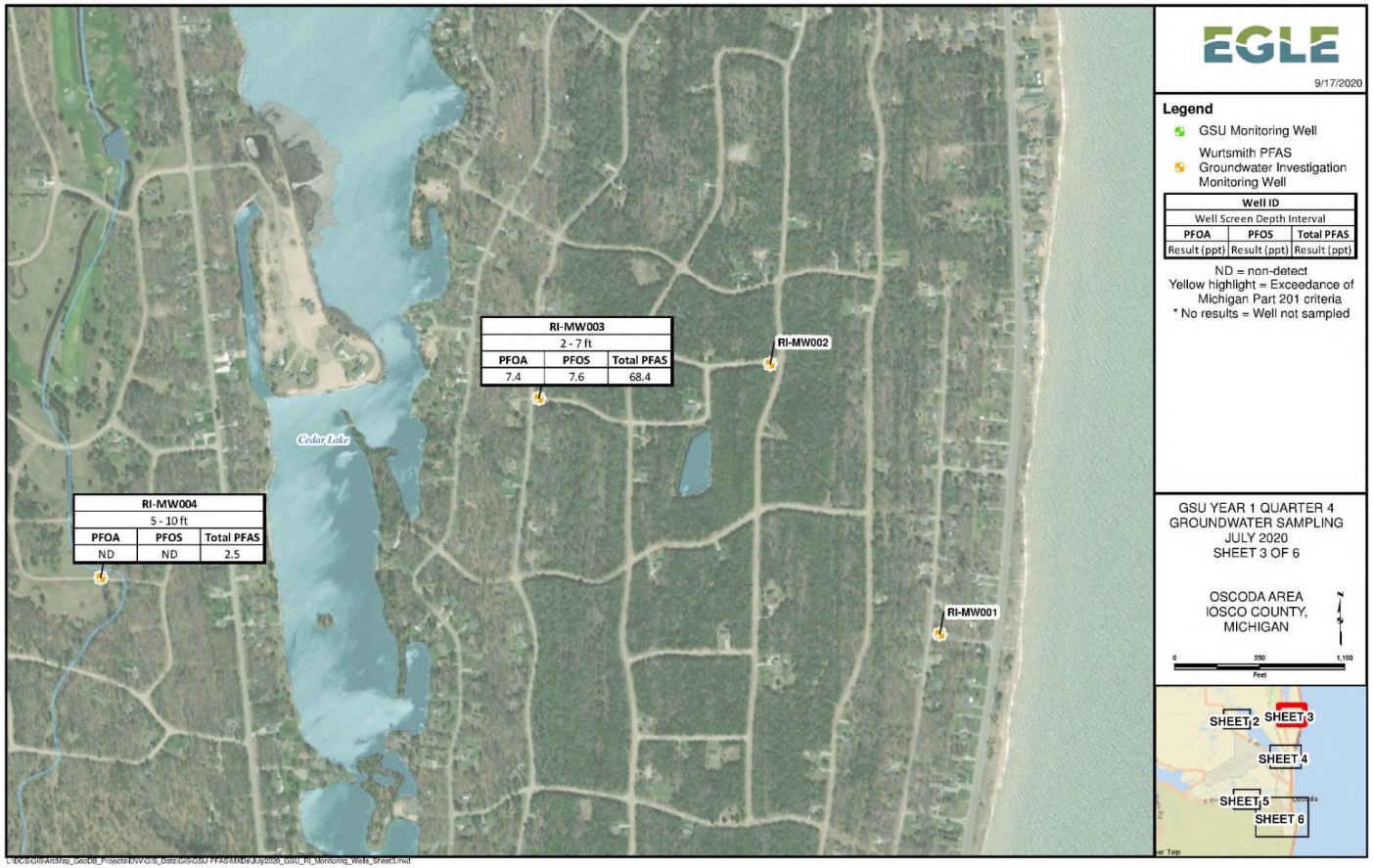
Cedar Lake Area



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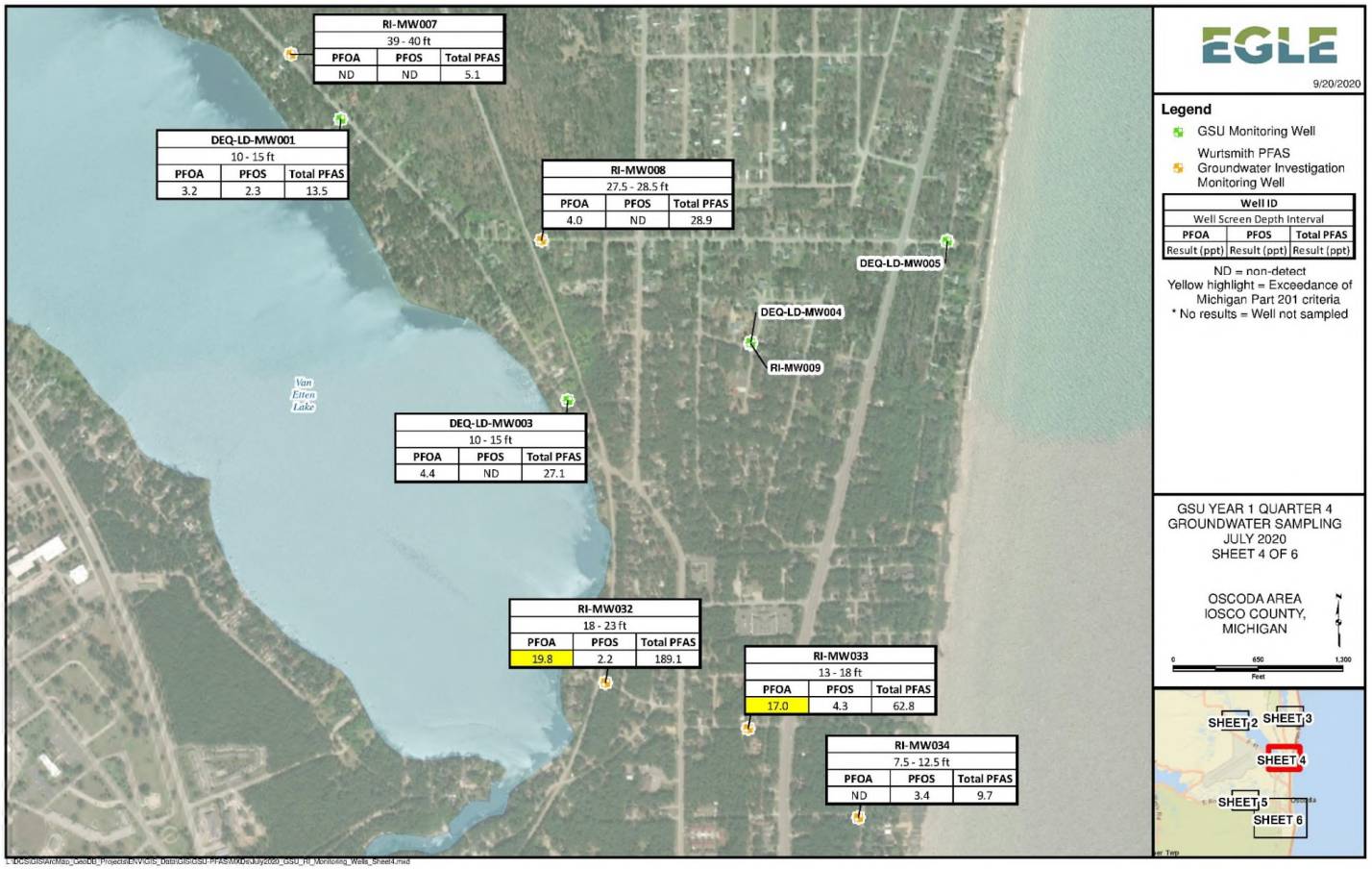
Loud Drive Area



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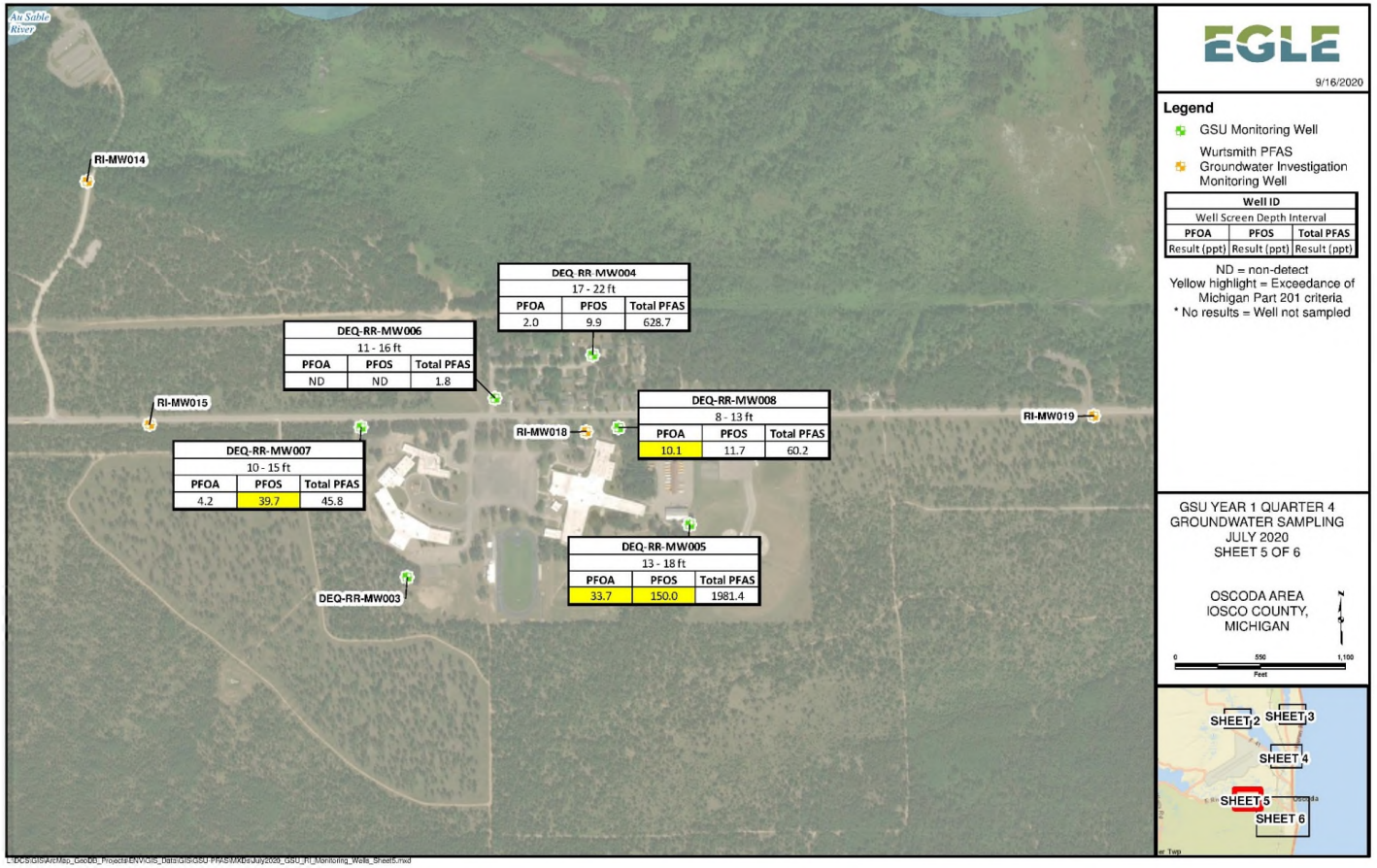
River Road Oscoda Schools Area



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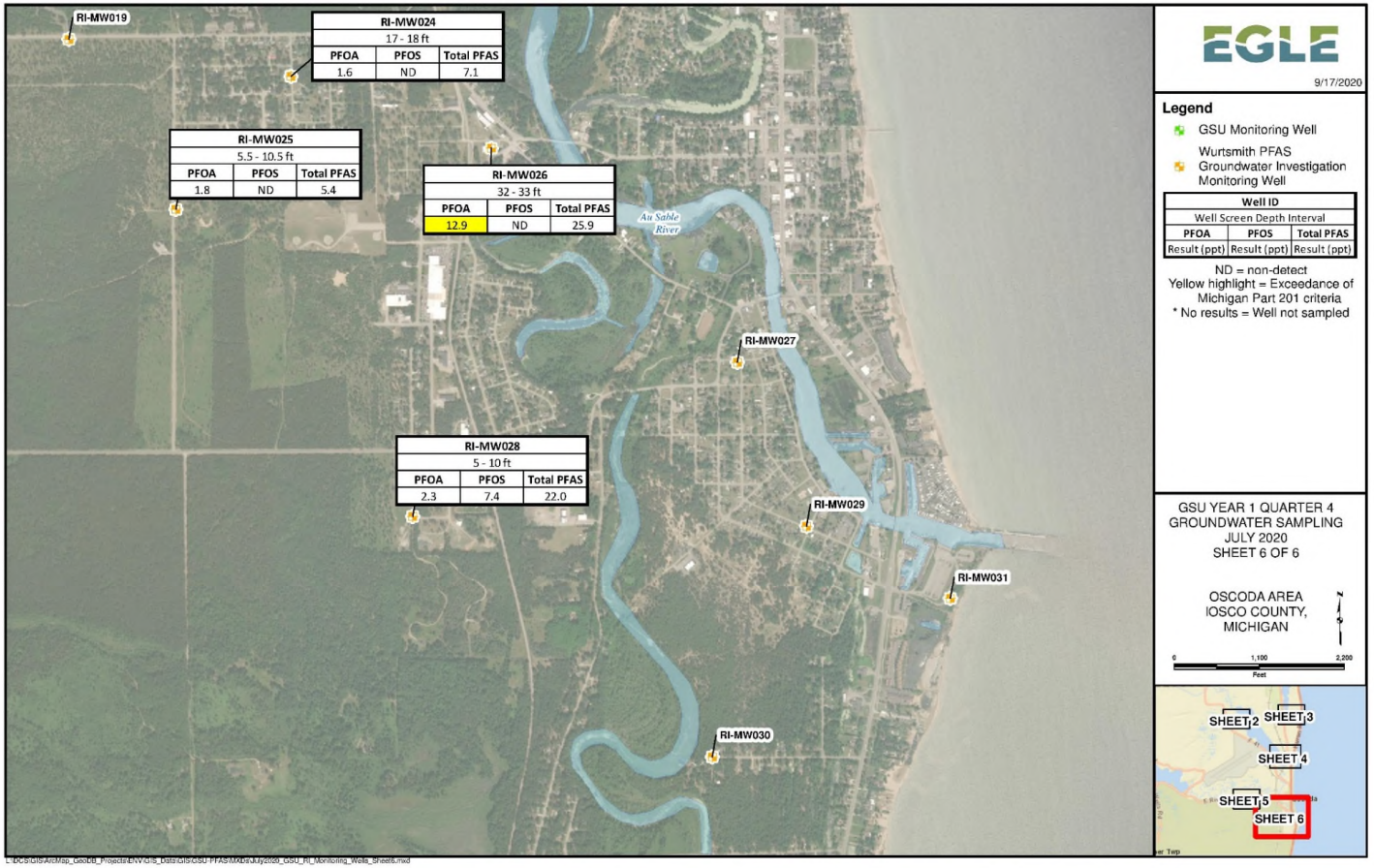
Au Sable Township Area



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Michigan Department of Health and Human Services (MDHHS)

Puneet Vij, Ph.D.
Toxicologist

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The Role of MDHHS

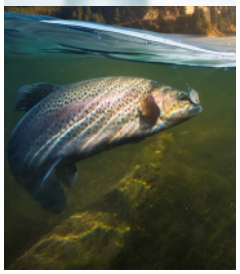
- Understand the health concerns facing your community
- Develop a plan to investigate and address health risks
    - EGLE leads the site investigation
    - MDHHS and the Local Health Department lead the public health planning and response
- Evaluate PFAS exposures to residents in the community
    - Recommend public health actions as needed

Potential Associated Human Health Outcomes
PFOA and/or PFOS

- Lowering a woman's chance of getting pregnant
- Increasing the chance of high blood pressure in pregnant women
- Increasing the chance of thyroid disease*
- Increasing cholesterol levels
- Changing immune response
- Increasing chance of cancer, especially kidney and testicular cancers

* PFOA only

Exposure to PFAS Chemicals



- Drinking contaminated water
- Eating fish/wild game caught from areas contaminated by PFAS
- Incidental swallowing of contaminated soil or dust
- Eating food packaged in materials containing PFAS
- Using some consumer products
- PFAS absorption through skin is typically not a concern

MDHHS PFAS Comparison Values

Specific PFAS	MDHHS Screening Levels	Approved MCLs	MDHHS Comparison Values
PFOA	9 ppt	8 ppt	8 ppt
PFOS	8 ppt	16 ppt	8 ppt
PFNA	9 ppt	6 ppt	6 ppt
PFHxS	84 ppt	51 ppt	51 ppt
PFBS	1,000 ppt	420 ppt	420 ppt
PFHxA		400,000 ppt	400,000 ppt

MDHHS Resampling Effort

Phase 1 Resampling Summary (as of Oct 06, 2020)

- Number of wells sampled: 272
- Number of non-detects (ND): 133
- Number of Detections: 118
- Range PFOA + PFOS: 2.05 – 263.62 ppt
- Range Total PFAS: 2.01 – 2514.02 ppt
- Number exceeding MDHHS Comparison Values: 20

Do-Not-Eat Advisories in Clark's Marsh

- Fish (2012)
- Deer (2018); Updated in 2019
- Resident aquatic and semi-aquatic wildlife (2019)
- No one eat organs from any fish, deer, and other wild game
- Eating fish or wildlife caught from Clark's Marsh is a concern. Catch and release is OK.
- High levels of PFAS, mainly PFOS, measured in fish and deer

MDHHS Exposure Assessment

- Beginning stages of planning
- This would look like MDHHS testing blood for PFAS and administering survey to participants
- We will be reaching out to have additional conversations with community members soon

Michigan Department of Natural Resources

Tammy Newcomb
Senior Water Policy Advisor

MPART

PFAS in aquatic food webs: Clark's Marsh as a case study

Wes Flynn, Linda Lee, Maria Sepulveda, Jason Hoverman

Purdue University

Department of Forestry and Natural Resources

Research Group

- PIs: Jason Hoverman, Linda Lee, and Marisol Sepulveda
- Research Staff: Matt Hamilton, Mahsa Modiri Gharehveran, Chloe de Perre
- Collaborators: MI DNR, MI EGLE
- Funding: Michigan DNR, Purdue's Center for the Environment

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DEPARTMENT OF NATURAL RESOURCES

DNR

MICHIGAN

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Center for the Environment

EGLE

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Introduction

- Aquatic ecology, toxicology, environmental chemistry, ecosystem ecology
- Effects of chemical contaminants on wildlife
  - Per-/polyfluoroalkyl substances (PFAS), coal ash, herbicides, fungicides,
- Collaborations with state and federal agencies
- Laboratory and field studies
  - Aquatic, dermal, dietary exposure
  - Effects on community composition, survival, growth, development, disease susceptibility, neurological
  - Bioaccumulation in aquatic life

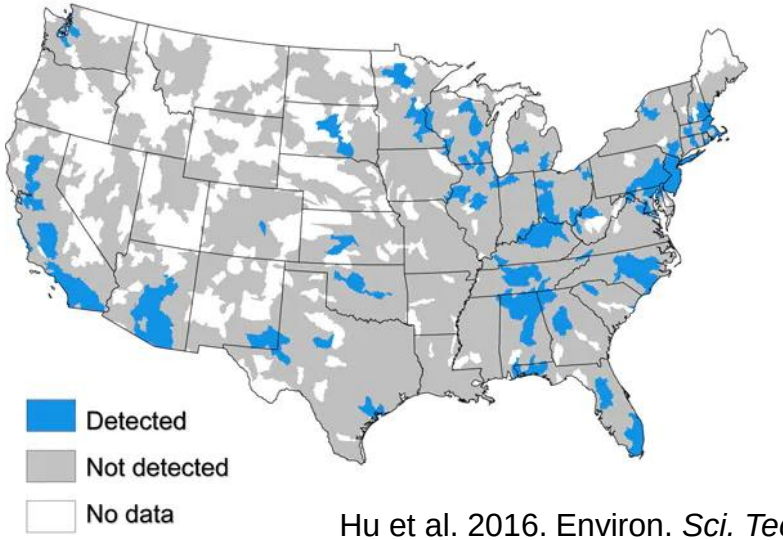
Clark's Marsh Research Overview

- Background
- Objectives
- Rationale
- Approach
- Impact and Deliverables

Background

- Per-/polyfluoroalkyl substances (PFAS)
  - Numerous industrial and consumer applications since 1940s
  - Most prevalent and well known are PFOS and PFOA, but 1000's of others
  - Rapid increase in research over last 15 years due to persistence in the environment, accumulation in humans and wildlife, and potential to affect health
  - Global use of aqueous film forming foams (AFFF) and other applications associated have resulted in widespread detection in environment

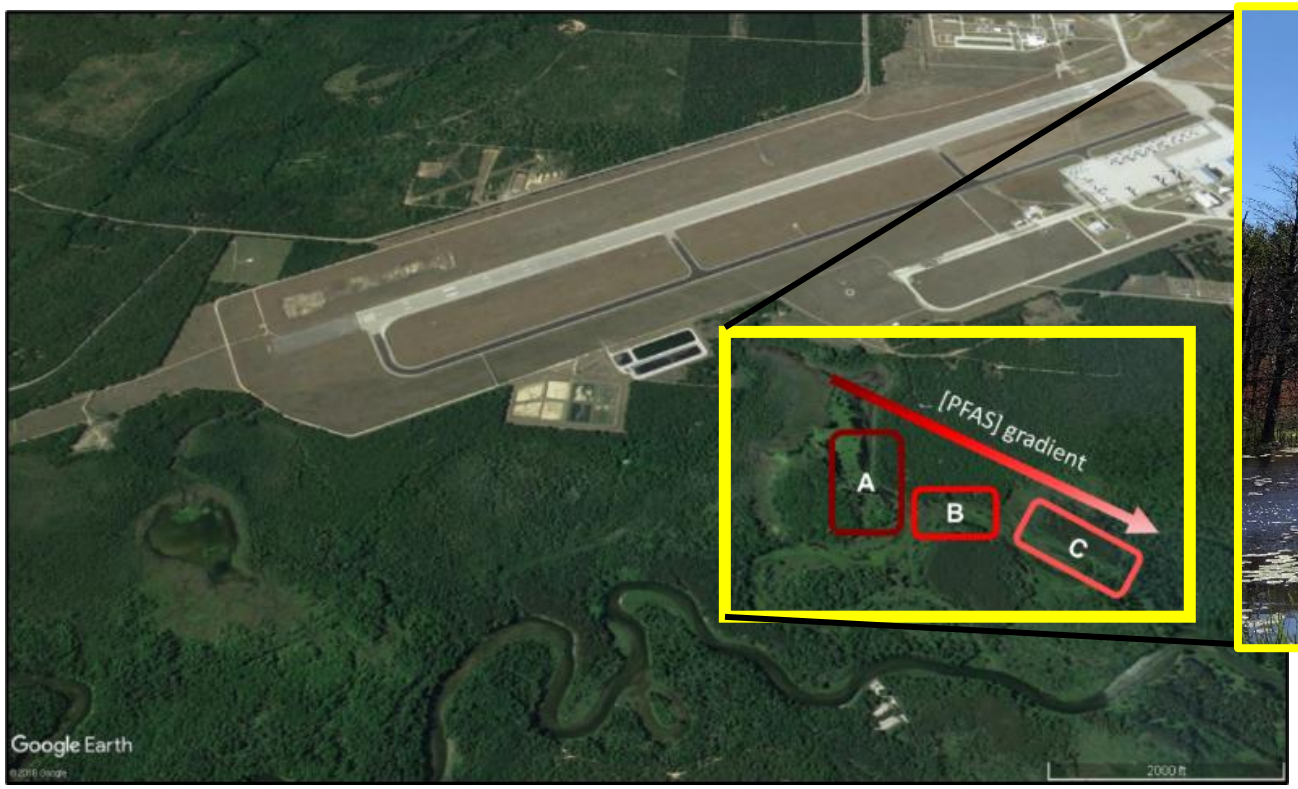
Hydrological units with detectable PFASs



Hu et al. 2016. Environ. *Sci. Technol. Lett.*

Background

- Clark’s Marsh Wildlife Area



Objectives

1. Determine where PFAS are accumulating in ecosystem
2. Assess which PFAS are accumulating
3. Identify major contributors to PFAS accumulation
4. Identify likely sources of PFAS transfer from aquatic to terrestrial systems

Rationale

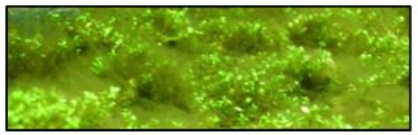
- Why is it important to understand how PFAS behave in an aquatic ecosystm?

PFAS and Aquatic Environments

Tertiary consumers
(e.g. Game fish)

Secondary consumers
(e.g. Crayfish, turtles, small fish)

Primary consumers
(e.g. Zooplankton, snails, amphibian larvae)



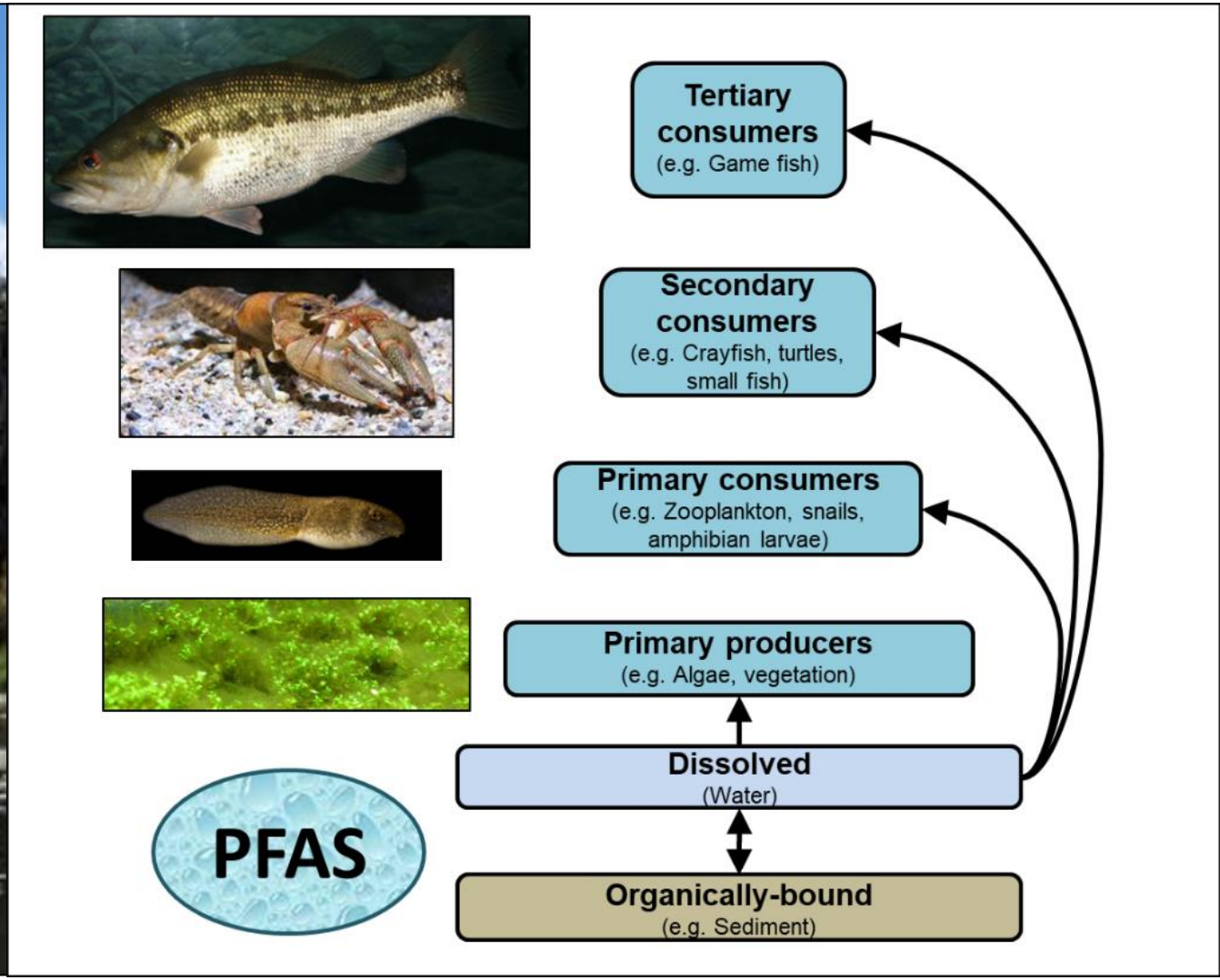
Primary producers
(e.g. Algae, vegetation)

PFAS

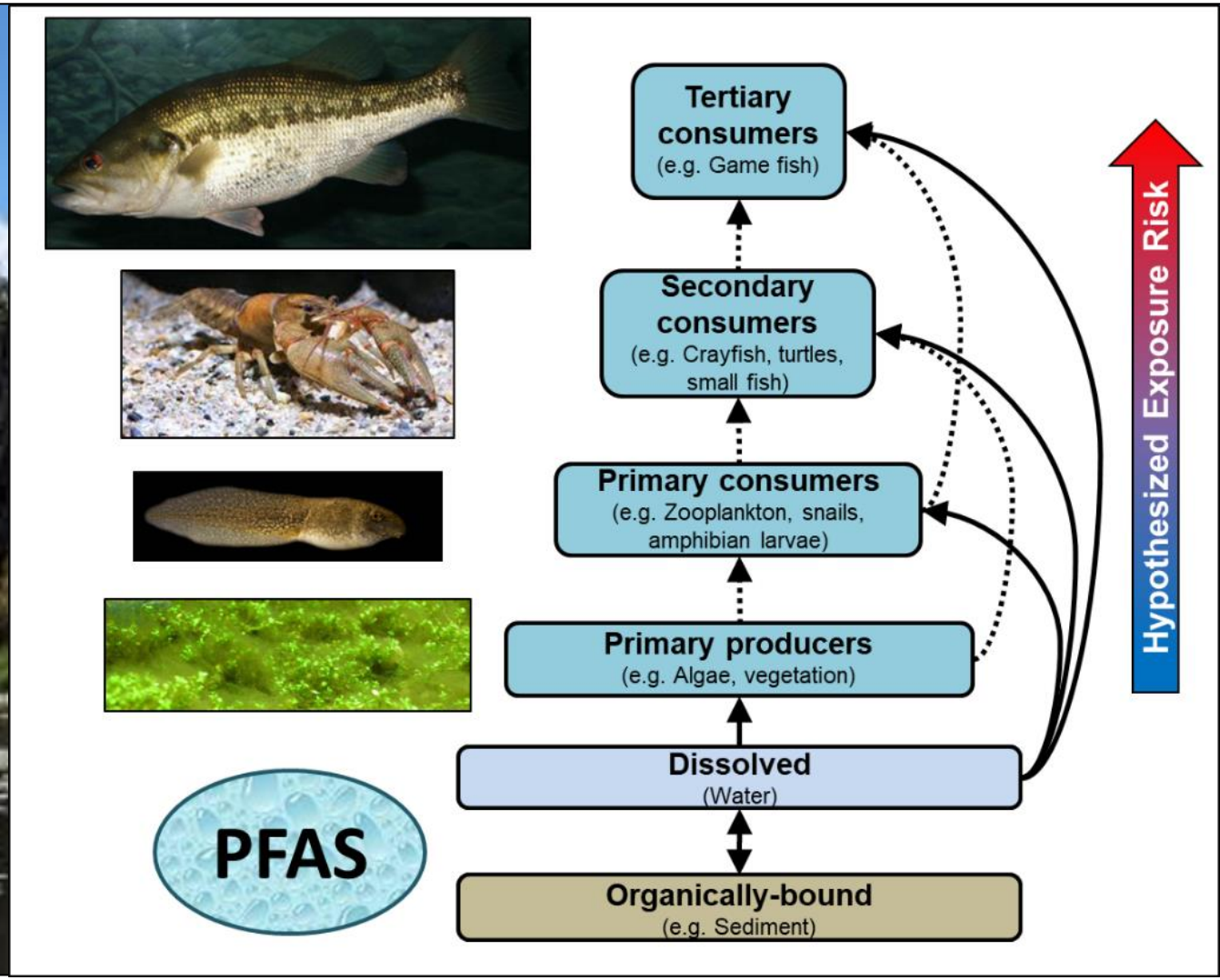
Dissolved
(Water)

Organically-bound
(e.g. Sediment)

PFAS and Aquatic Environments

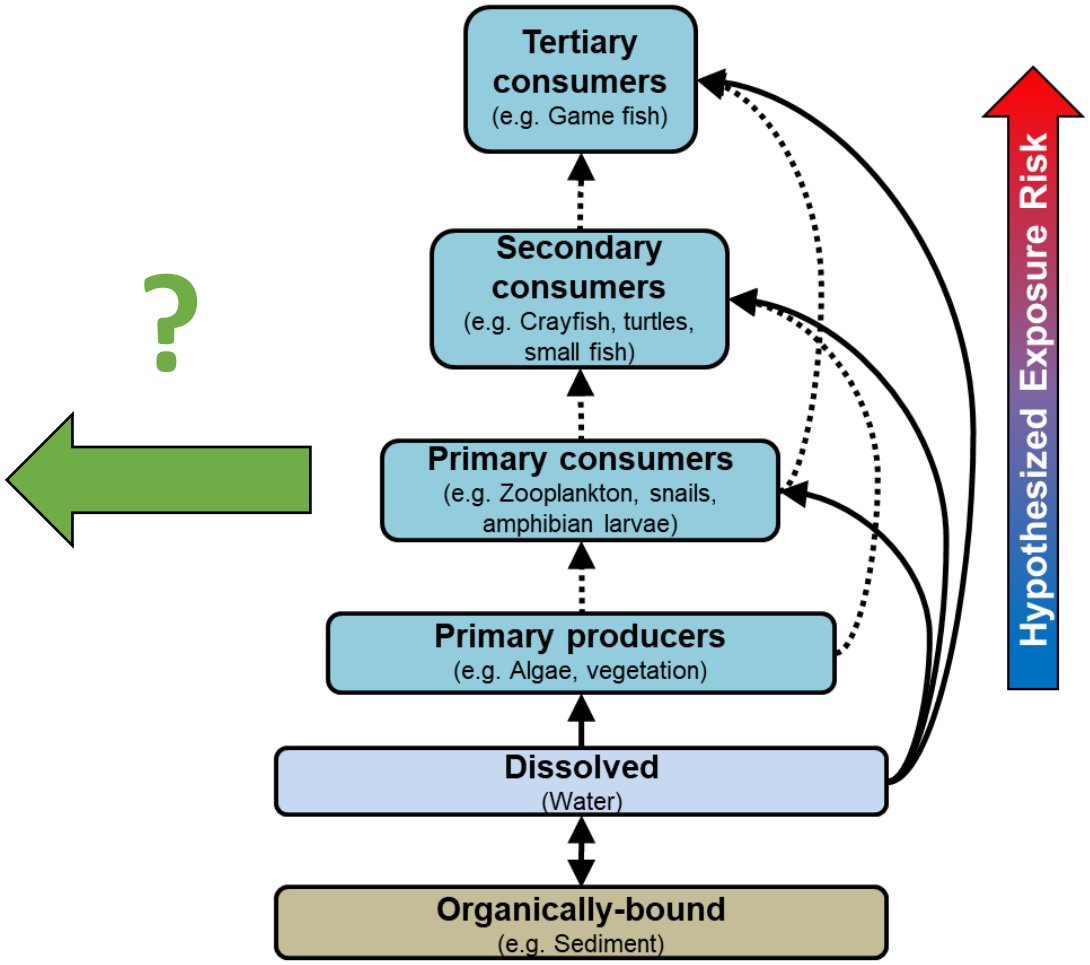


PFAS and Aquatic Environments



Links between Aquatic and Terrestrial Food Webs

?



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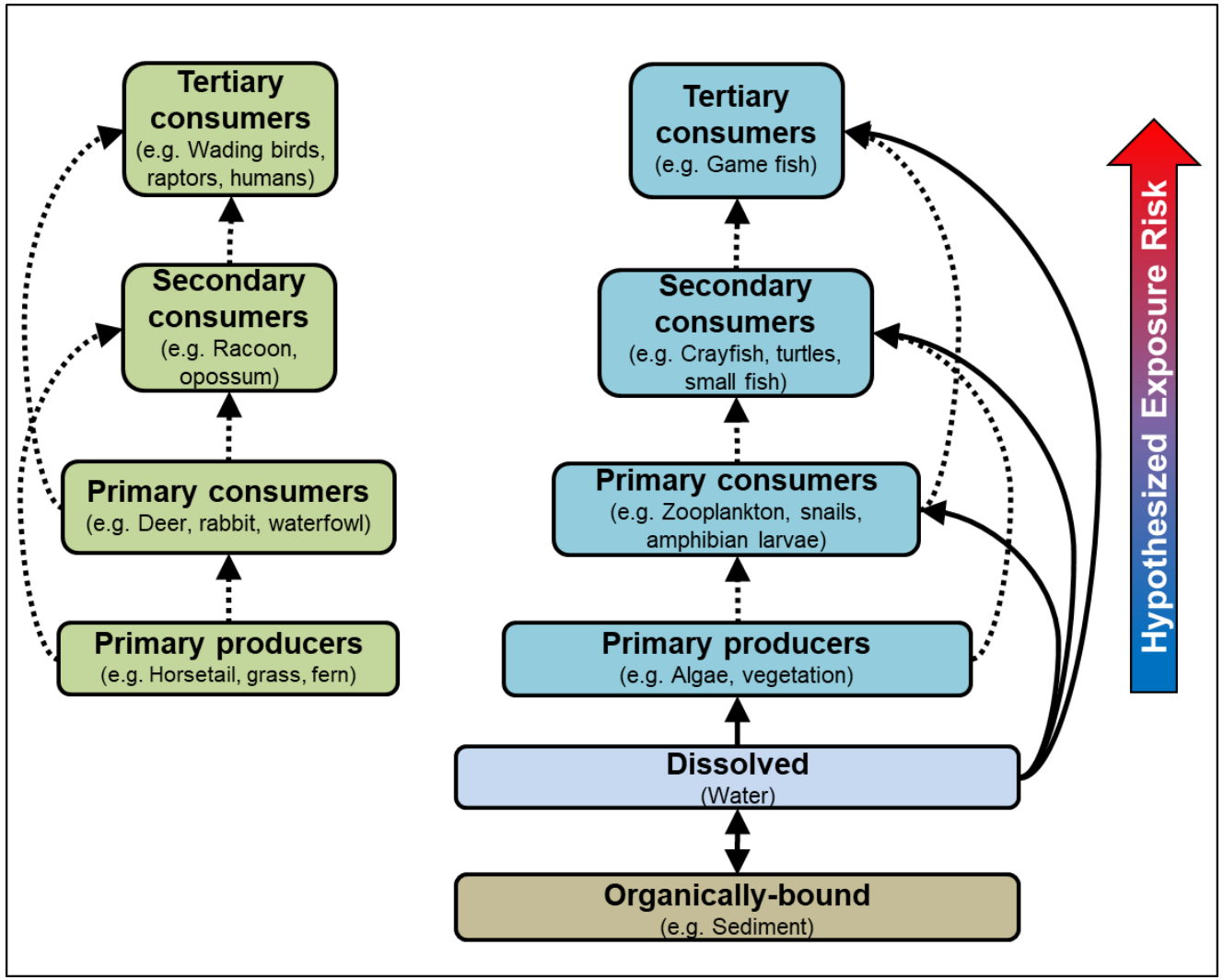

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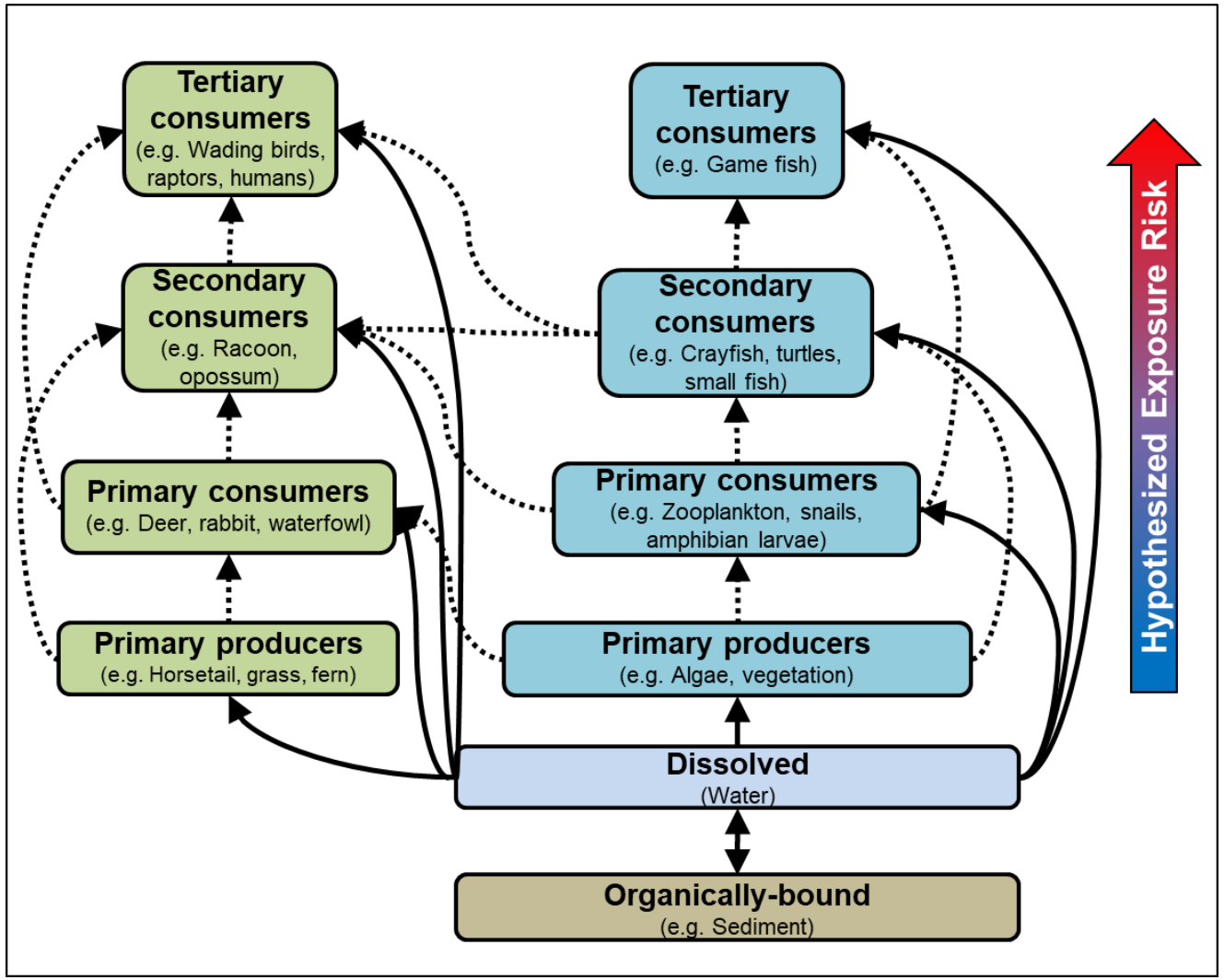
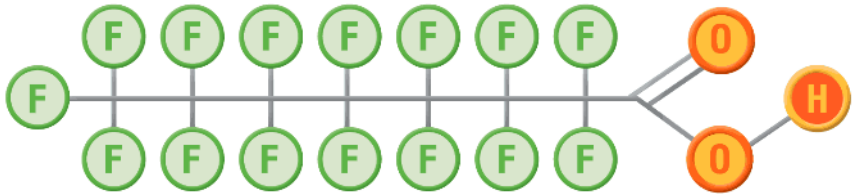
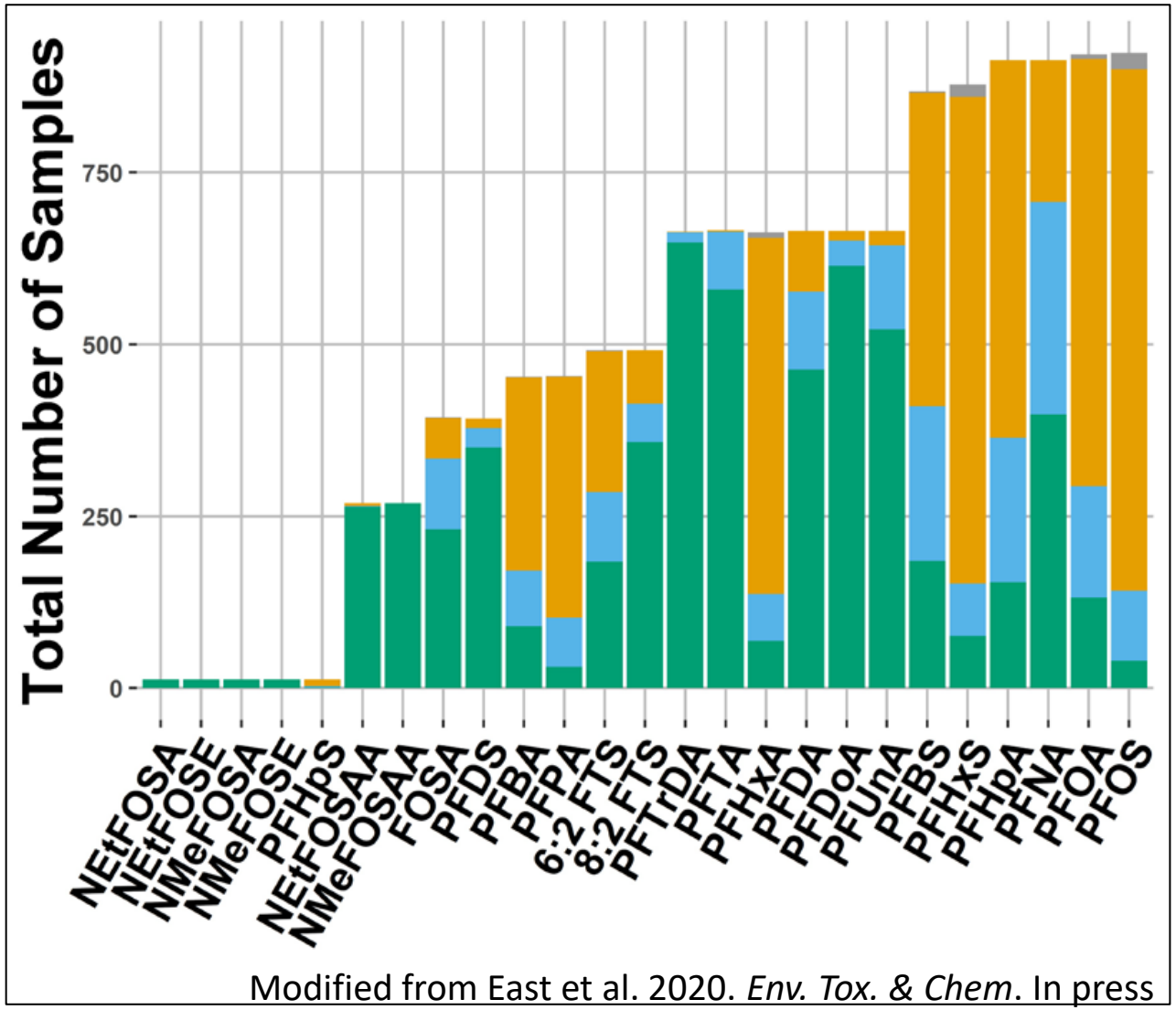


Rationale

- PFAS in the environment are often present as complex mixtures of chemicals
- C-chain length and functional group affect accumulation potential, but variation among species less understood
- Some PFAS can be metabolized to other PFAS



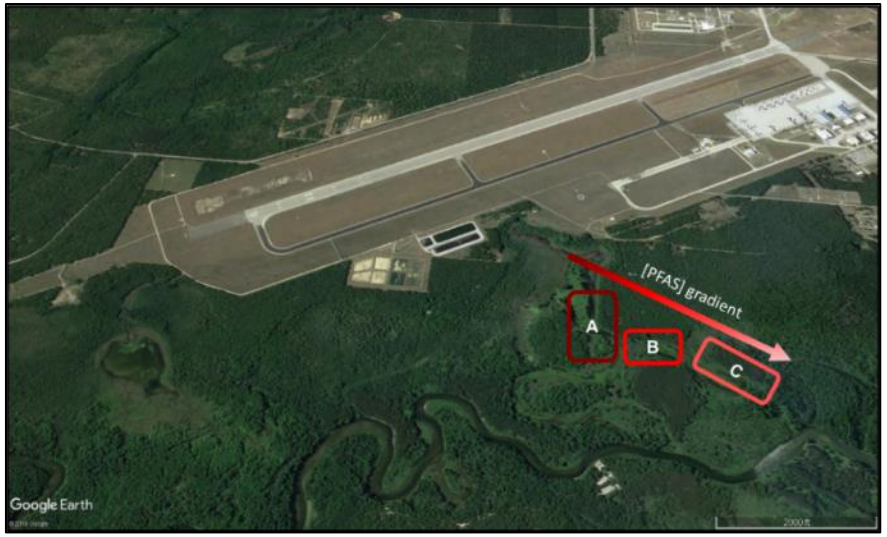
25 PFAS frequently detected in surface water near AFBs



Modified from East et al. 2020. *Env. Tox. & Chem*. In press

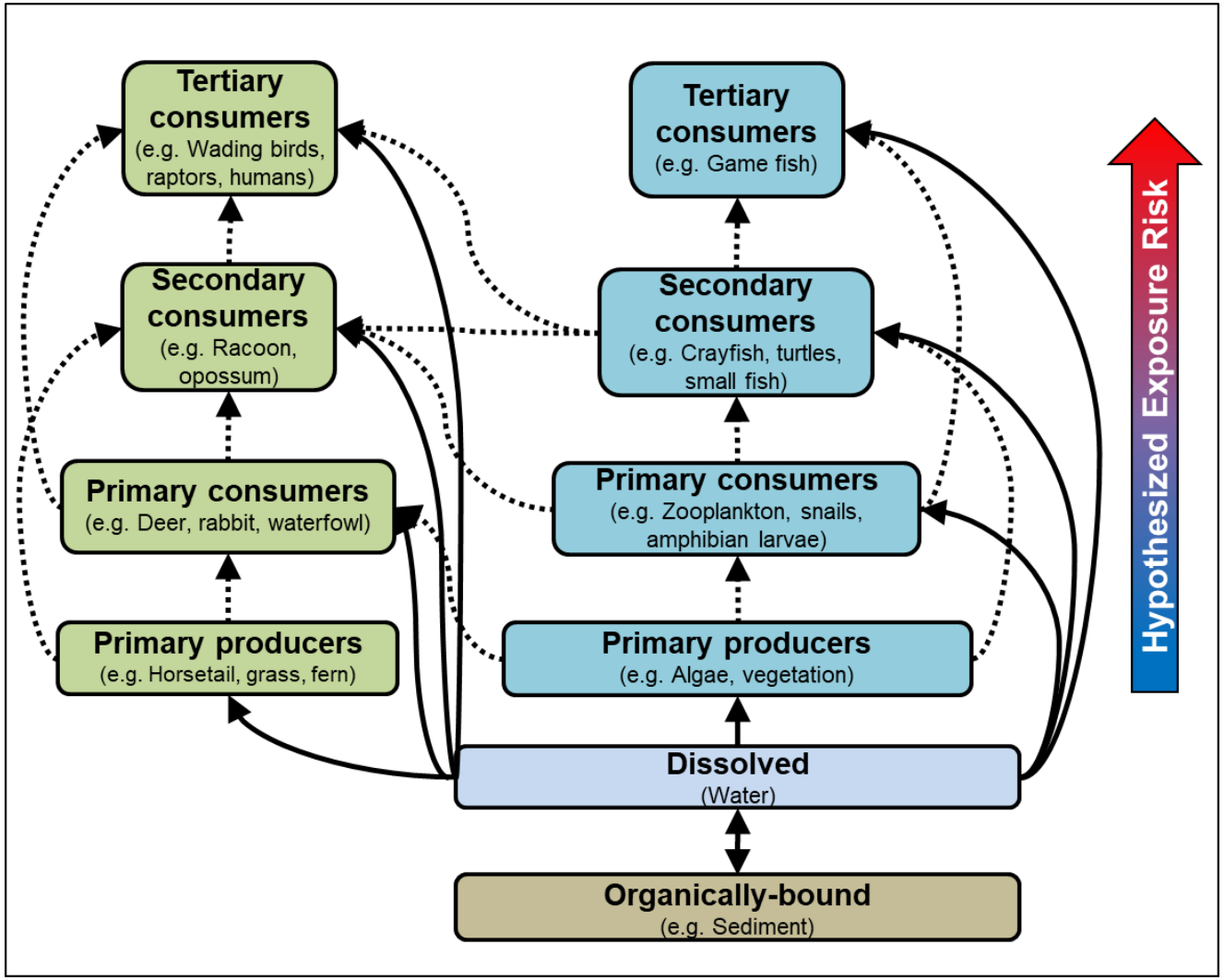
Approach

- Collect water, sediment, and biota
  - Dip-netting, minnow traps, hoop nets
- Process samples to quantify:
  - Stable isotope composition
    - “Who eats who”
  - Accumulation of 24 different PFAS
- Create statistical models and refine conceptual models



Approach

Sample Type	Taxa
Grass sp.	Plant
Oak fern	Plant
Horsetail	Plant
Algae	Plant
Aquatic plant sp.	Plant
Helisoma trivolvis (snail)	Invertebrate
Physella sp (snail)	Invertebrate
Benthic dragonfly sp	Invertebrate
Anax sp. (dragonfly)	Invertebrate
Macrobdella sp. (leech)	Invertebrate
Crayfish sp.	Crustacean
Green frog	Amphibian
Northern leopard frog	Amphibian
Gray tree frog	Amphibian
Brook stickleback	Fish
Central mudminnow	Fish
Iowa darter	Fish
Blackstripe topminnow	Fish



Impact and Deliverables

- Deliverables
  - Determine PFAS accumulation differs among species and along concentration gradient
    - Are there specific chemicals and species of concern?
  - Estimates of major sources of PFAS exposure and accumulation
  - Develop tools to facilitate long-term monitoring efforts
  - Provide stakeholders with recommendations
- Impacts
  - Improve understanding of how PFAS behave in aquatic food webs
  - Identify potential sources of PFAS transfer to terrestrial environments

Question and Answer Session

- Please introduce yourself
- Ask one question at a time so everyone can ask their question/make a comment.

Poll

- How many people are with you at this meeting?

How to ask a question in Zoom

Submit your questions using the "**Q/A**" box in at the bottom of your screen.

Click the "hand" icon at the bottom of your screen.

Type *9 to raise your hand.

*9

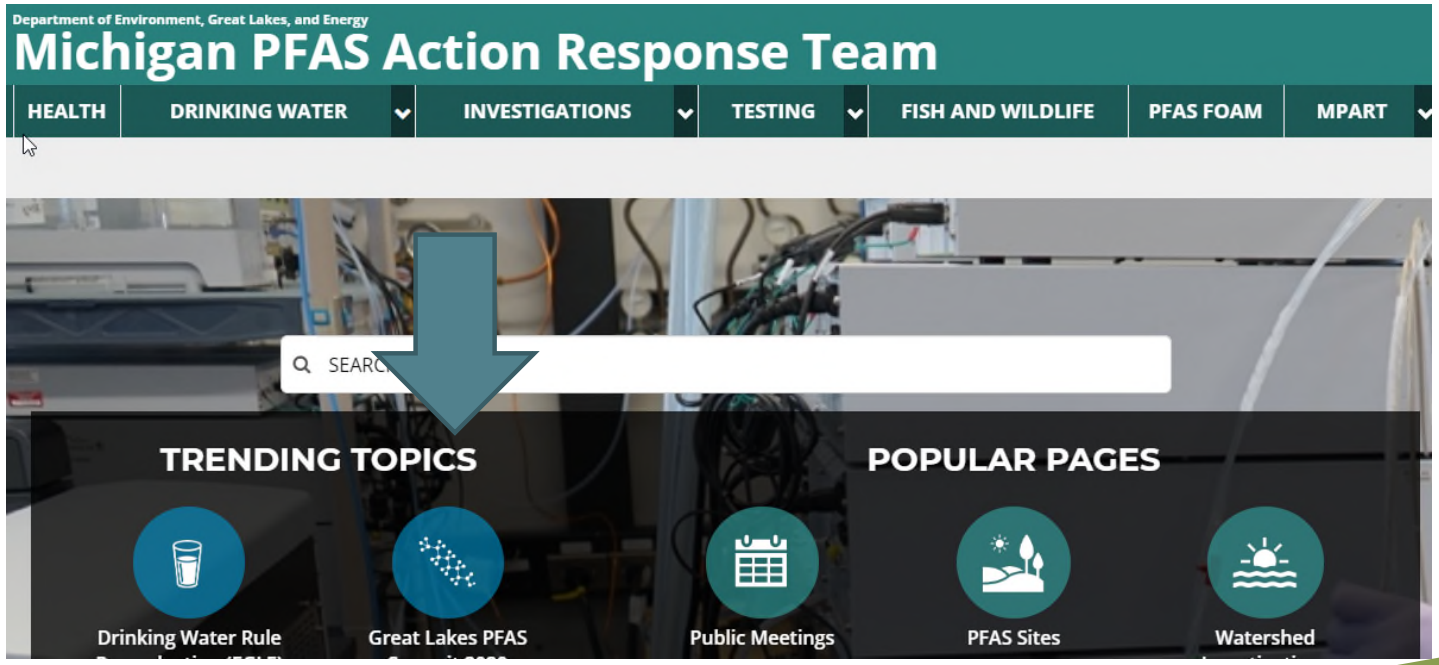
Additional Resources

- Michigan PFAS Action Response Team (MPART) www.michigan.gov/pfasresponse
- More info about ESF guidelines → www.michigan.gov/EatSafeFish
- Agency for Toxic Substances and Disease Registry (ATSDR) https://www.atsdr.cdc.gov/pfas/

Restoration Advisory Board (RAB) Meeting

- Wednesday, October 21 5:00 – 8:00 pm
- Sign up at michigan.gov/pfas -> MPART tab -> Public Meeting Calendar

PFAS Virtual Summit
October 26 - 30



Feedback

- Did you receive the information you needed?
- What would have made this meeting better for you?
- Contact us at mdhhs-pfas@michigan.gov

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Thank you!

We will share the slides and a recording and closed-captioned copy of today's conversation via email and on our website in the next few days.