

# PFAS in the East Metro

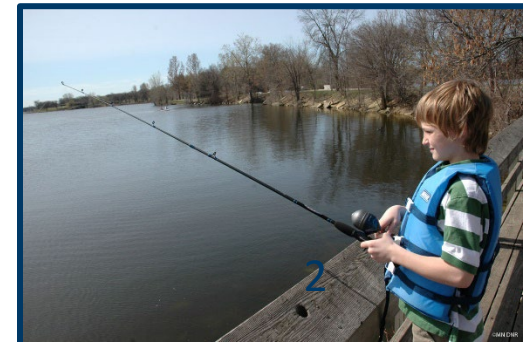
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July 19, 2023

# Ecological Harm from PFAS



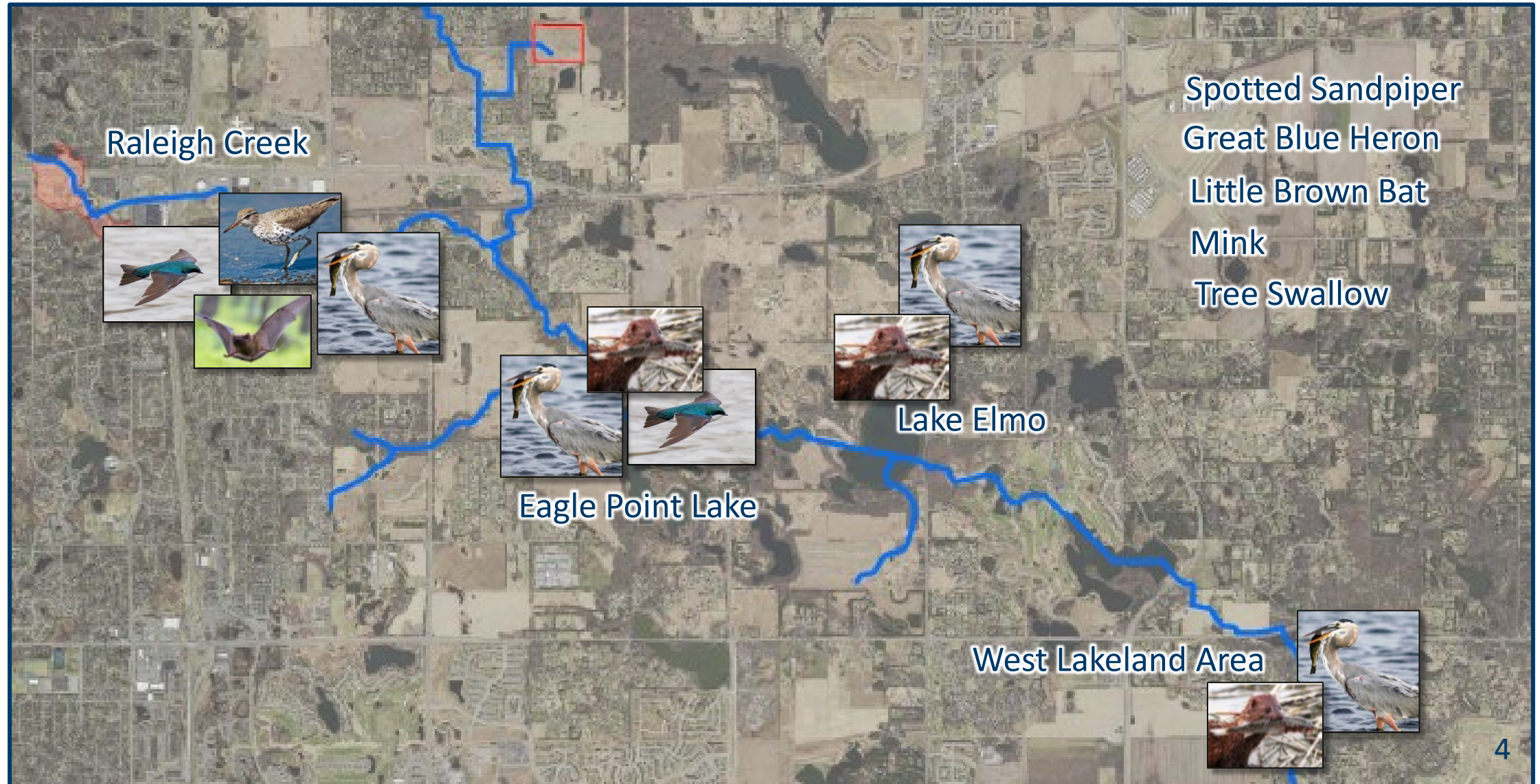
- PFAS releases to environment cause injuries to fish and wildlife
  - Acute toxicity of organisms (e.g., plants, invertebrates, amphibians, fish)
  - Other harm, including developmental, reproductive, immunological, morphological, and neurological effects
- PFAS in fish is a concern for human health reflected by fish consumption advisories
- PFAS releases have resulted in injuries to vulnerable wildlife species and lost recreational opportunities
- **Priority 2 is intended to replace, protect, enhance these natural resources and services that have been lost**



# Wildlife Studies Findings

- Previous studies show impacts to wildlife:
  - Reduced hatching success, PFAS in blood
- Recent studies identify potentially vulnerable species reliant on aquatic habitats:
  - Fish (particularly the least darter and pugnose shiner minnows)
  - Wildlife that consumes fish (blue herons, Forsters tern, mink)
  - Wildlife that consume aquatic insects (Little Brown bat, tree swallows, spotted sandpiper)
- Areas with high PFAS concentrations are a threat to fish and wildlife populations and particularly reproductive success

# Project 1007 Example: Vulnerable Species



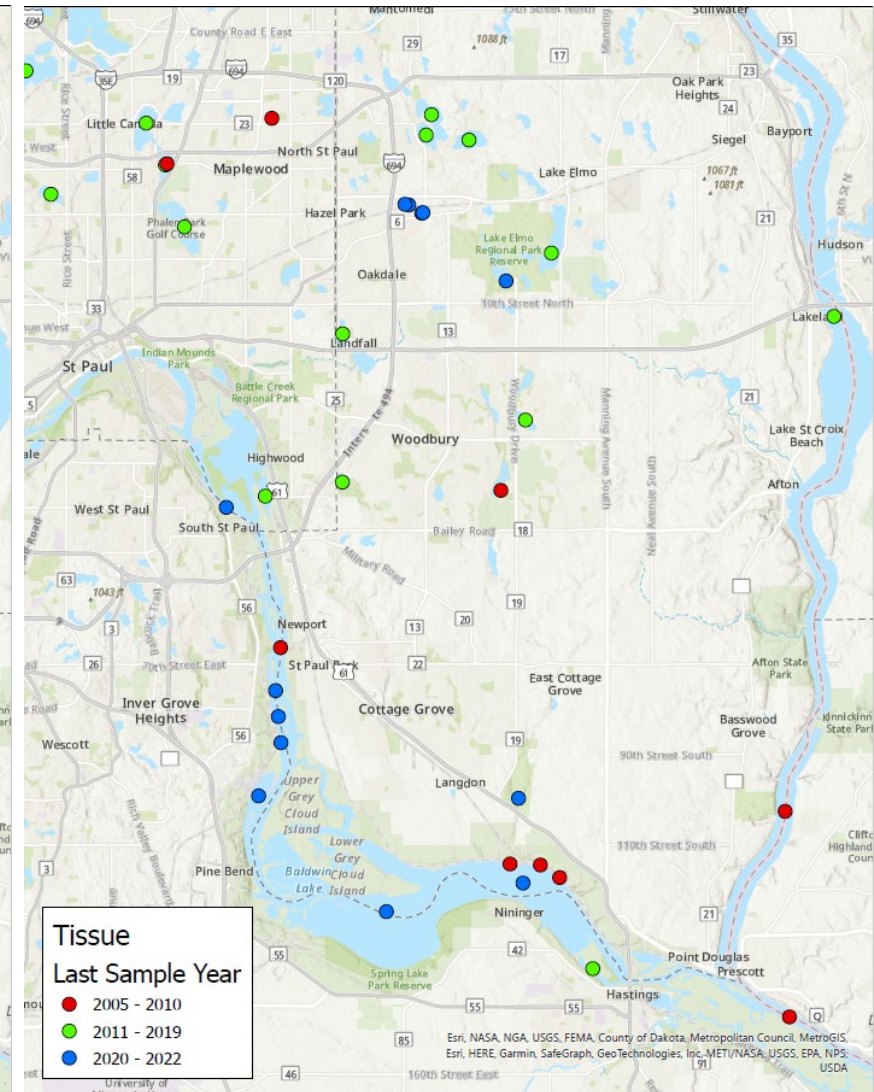
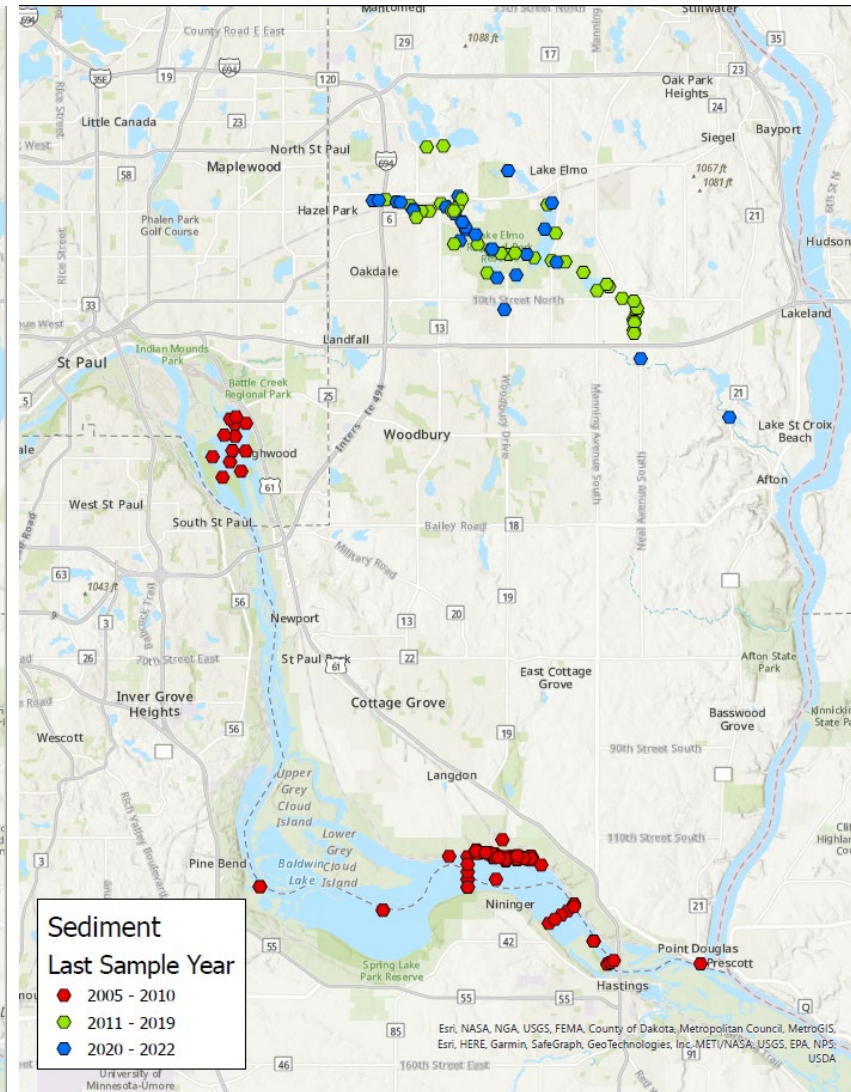
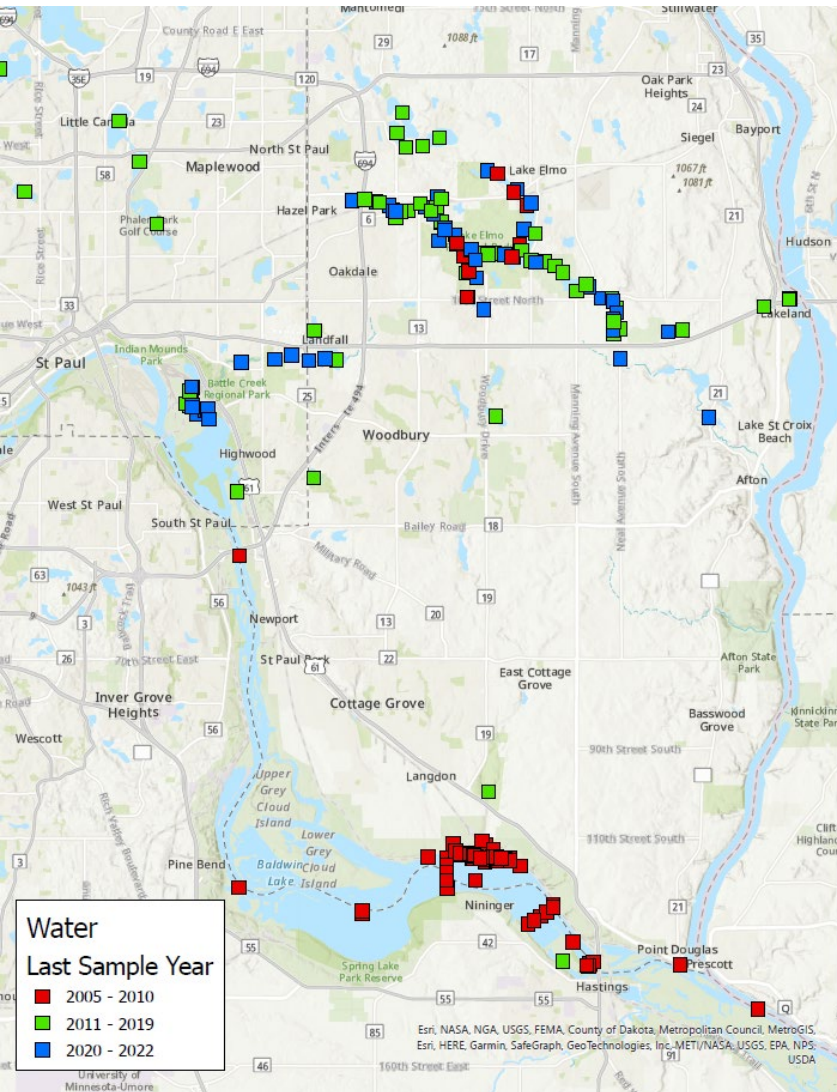
# What Areas Have Been Impacted by PFAS?

- We analyzed which areas seemed to have natural resources and recreational services that were injured by PFAS
- Data sources include:
  - Project 1007 data (sediment, surface water, tissue, others)
  - Fish consumption advisories (fish tissue, surface water)
  - NRDA expert reports (various)
  - Ongoing MPCA assessments and sampling (fish tissue, surface water)
- This talk will focus on what we currently understand about PFAS contamination in the East Metro area
  - Next talk will address how we might use this information in Priority 2 planning

# What Areas Have Been Impacted by PFAS?

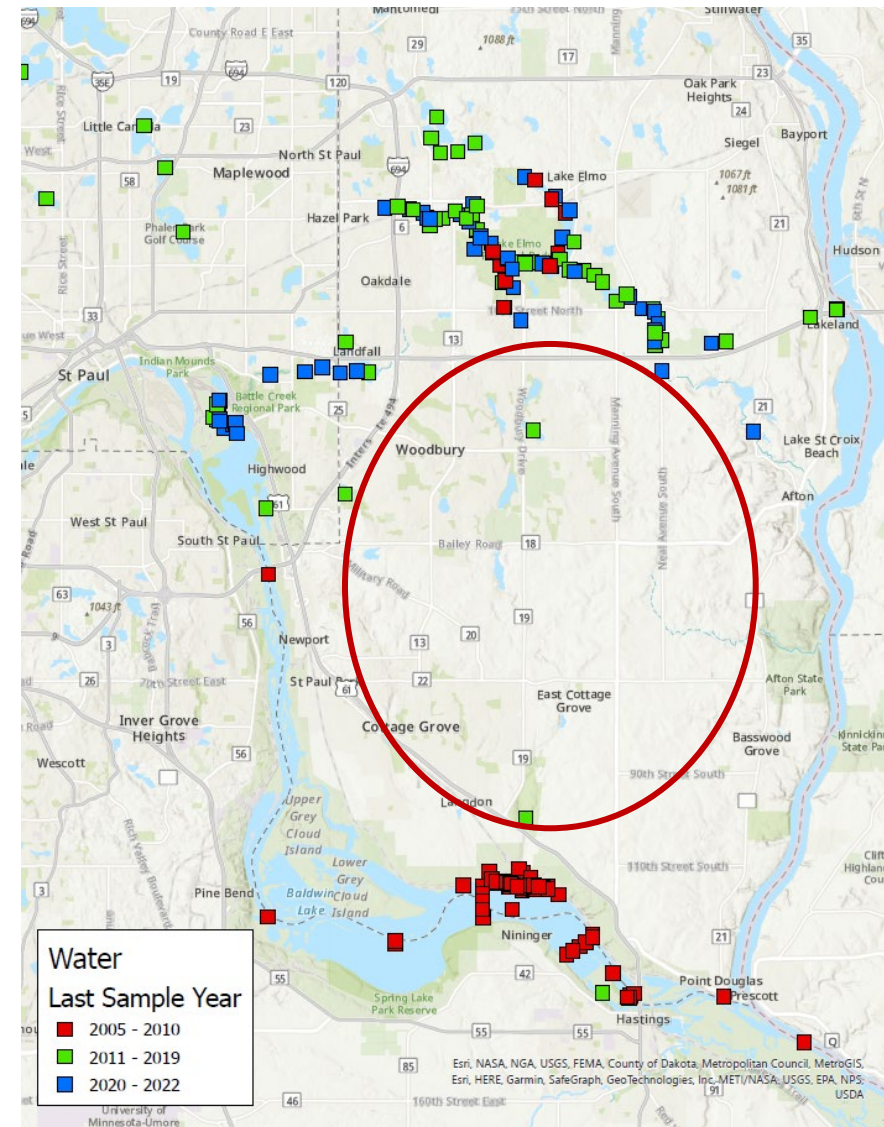
- Next slides will show a series of maps with individual PFAS data points
- We will begin by showing where data are currently available for different media, by sampling year
- Then we will compare the data collected to current thresholds for natural resource injury
  - That is, which samples tell us that an area is potentially harmful to wildlife, or to the people that consume them?

# Available PFAS Data by Year by Medium



# Limits on Available Data

- Many data gaps – many/most water bodies have not yet been sampled
- Areas with known contamination often have the most data





# PFAS Thresholds

PFOS specific threshold values	Fish Tissue	Water Quality	Sediment
<b>Wildlife Risk Thresholds</b>	4.6 ppb <sup>(1,2)</sup> (Exceedance would indicate injury to wildlife consumers of fish)	6.8 ppb <sup>(1)</sup> (Exceedance would indicate direct injury to biota in water)	140 ppb <sup>(3,4)</sup> (Exceedance would indicate direct injury to biota in sediment and water in contact with the sediment)
<b>Human Fish Consumption Risk Thresholds</b>	0.37 ppb <sup>(5)</sup> (Exceedance would indicate unacceptable risk to human consumers of fish)	0.00005 ppb <sup>(5)</sup> (Exceedance would indicate unacceptable risk to human consumers of fish)	

1) [Canadian Environmental Protection Act, 1999 Federal Environmental Quality Guidelines Perfluorooctane Sulfonate \(PFOS\) - Canada.ca](#)

2) 4.6 ng/g = Mammalian wildlife food diet; 8.2 ng/g = avian wildlife diet. The wildlife diet guidelines are intended to protect either mammalian or avian species that consume aquatic biota. It is the concentration of PFOS in the aquatic biota food item, expressed on whole body, wet weight basis that could be eaten by terrestrial or semi-aquatic mammalian or avian wildlife.

3) [Environment and Climate Change Canada - Perfluorooctane Sulfonate \(PFOS\)](#)

4) Soil Quality Guideline to Protect Freshwater Life (FSQG<sub>FL</sub>) – 140 ng/g – course soil; 210 ng/g – fine soil; FEQGs for PFOS do not exist for sediment.

5) [Developing water-quality criteria for PFAS | Minnesota Pollution Control Agency \(state.mn.us\)](#) (0.37 ng/g fish tissue and 0.05 ng/L in water)

# Hazard Quotient

- *Hazard Quotient (HQ)* = 
$$\frac{\text{Exposure Concentration}}{\text{Reference Concentration (RfC)}}$$

- Exposure concentration – measured concentration

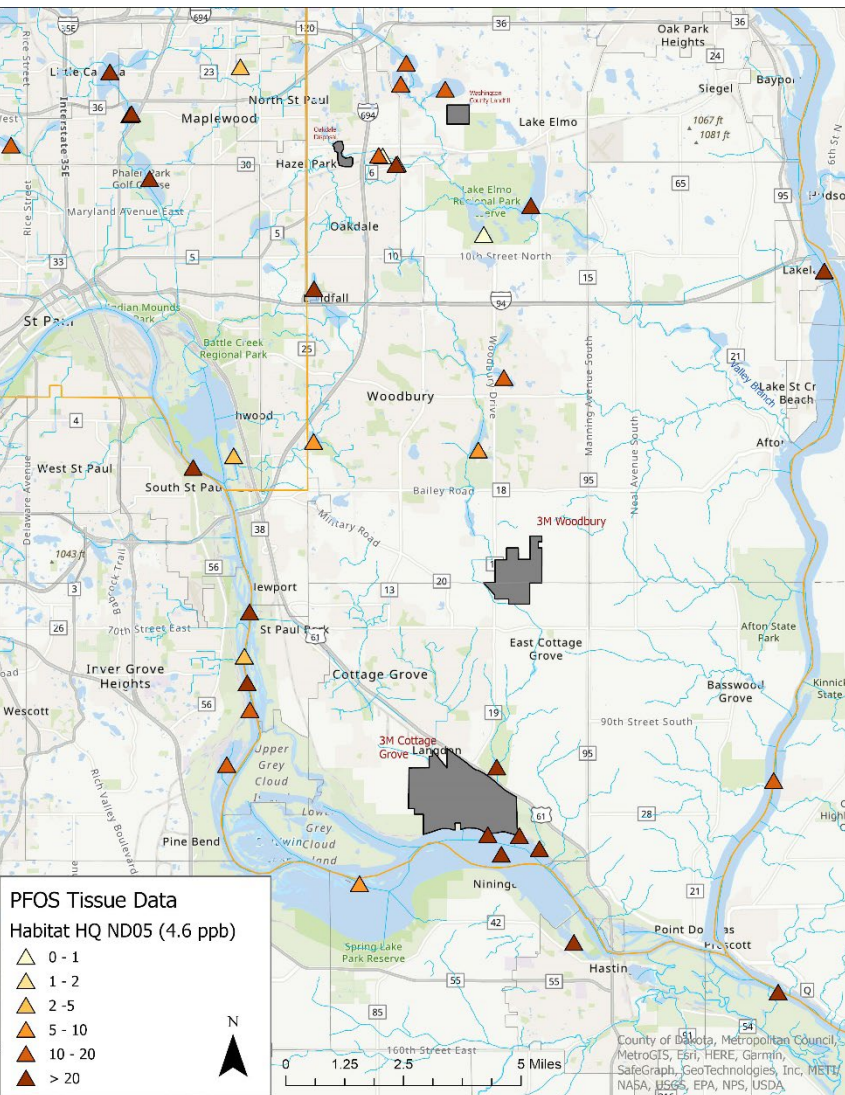
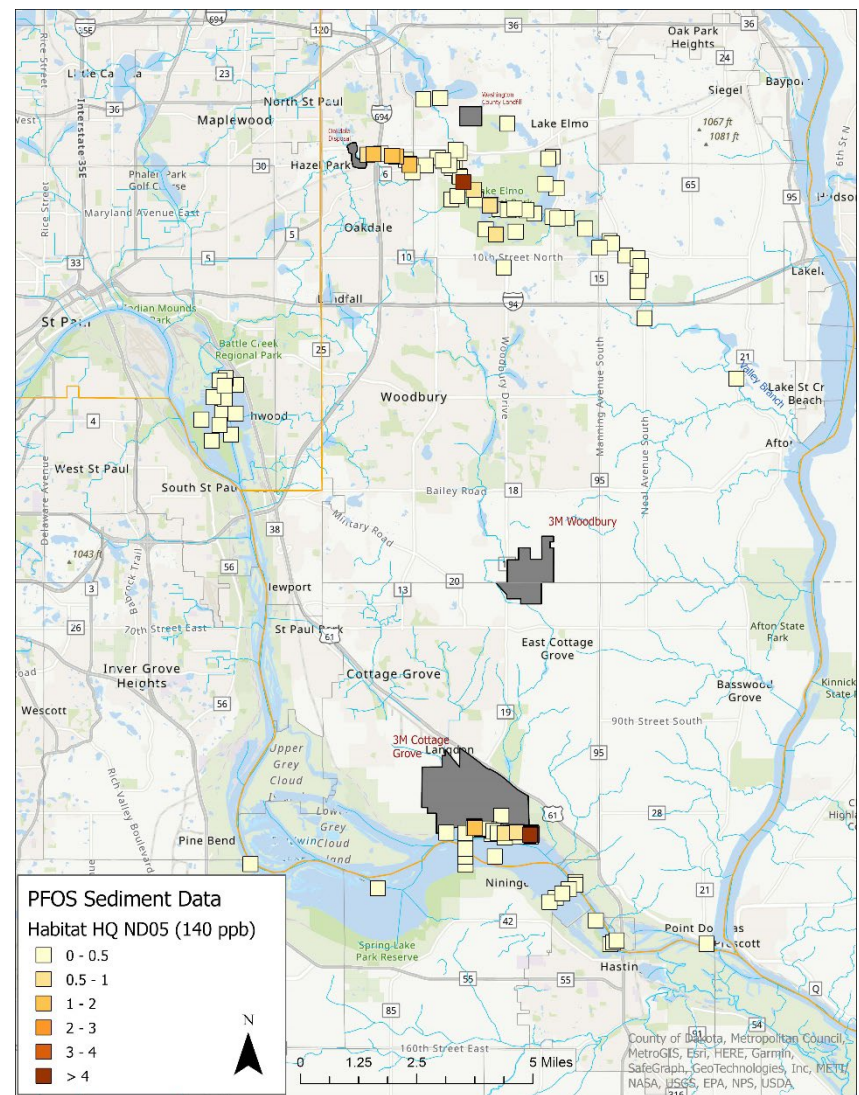
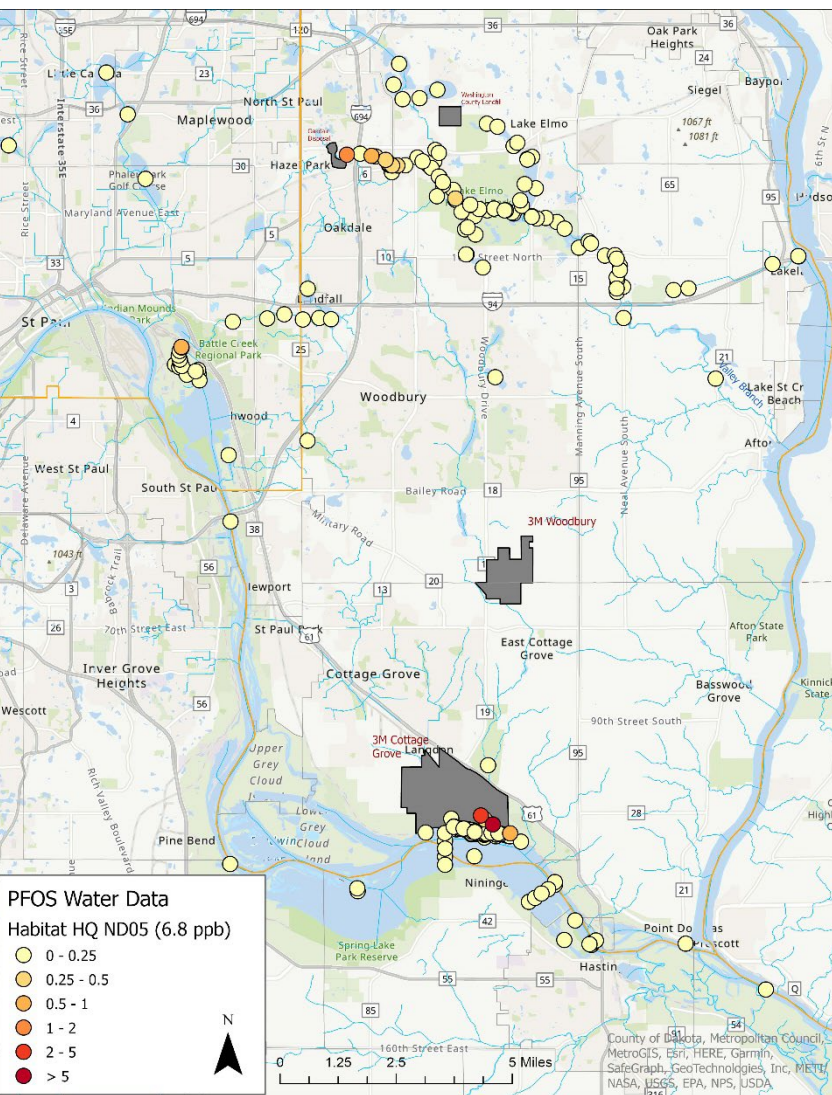
- Reference concentration – threshold value above which will cause impacts

\*RfCs are different depending on contaminant, receptor, exposure media, and exposure durations.

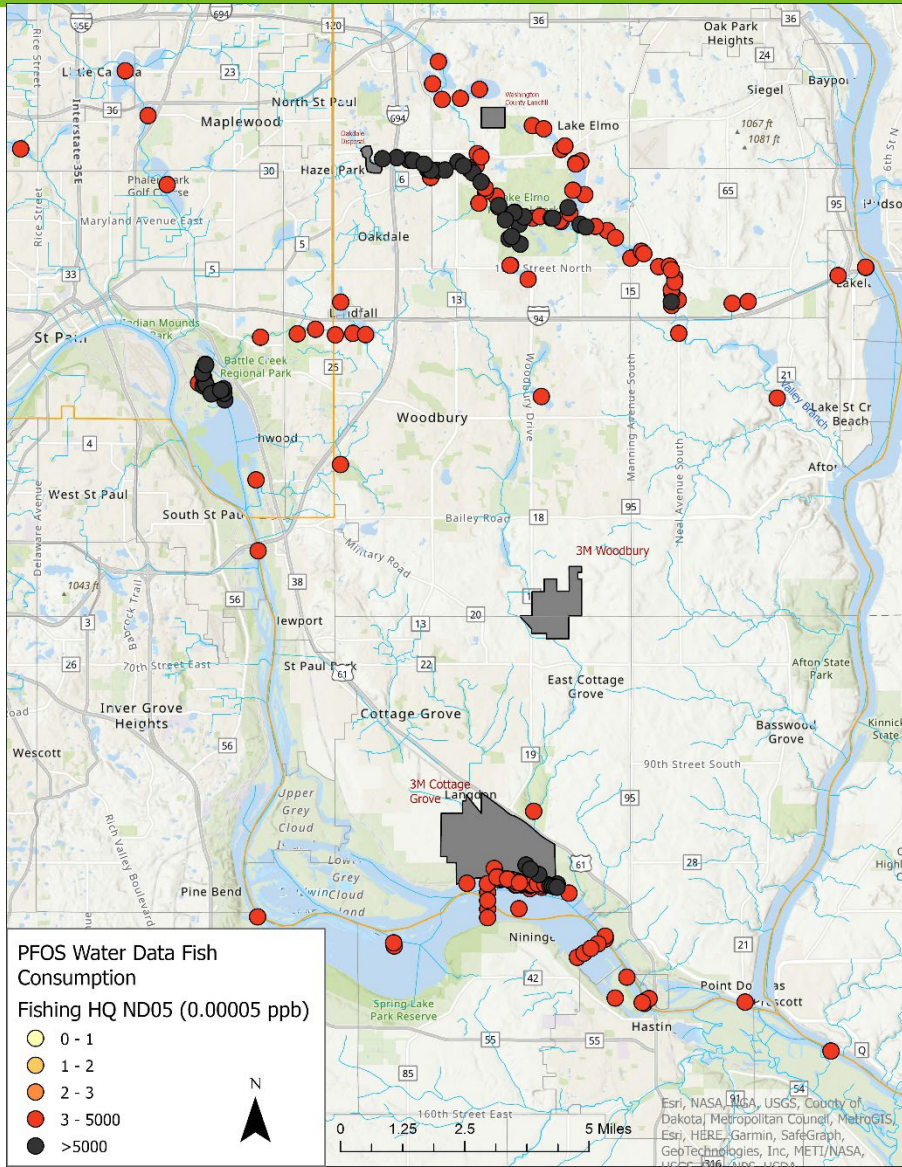
- A hazard quotient less than or equal to 1 indicates that adverse effects are not likely to occur.

# PFAS Risk Map for Wildlife

## Detected PFOS (water, sediment and fish tissue) compared to Wildlife Risk Thresholds

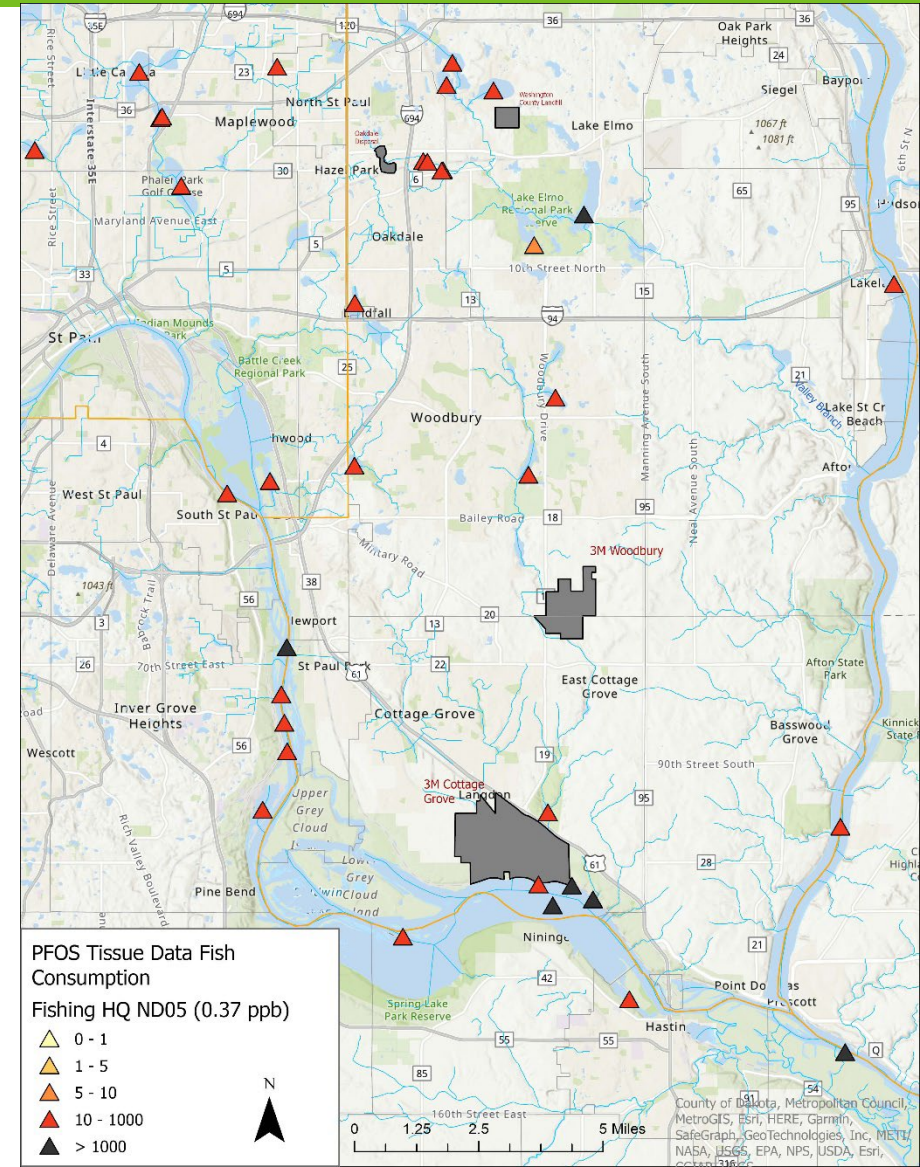


# PFAS Risk Map for Human Fish Consumption

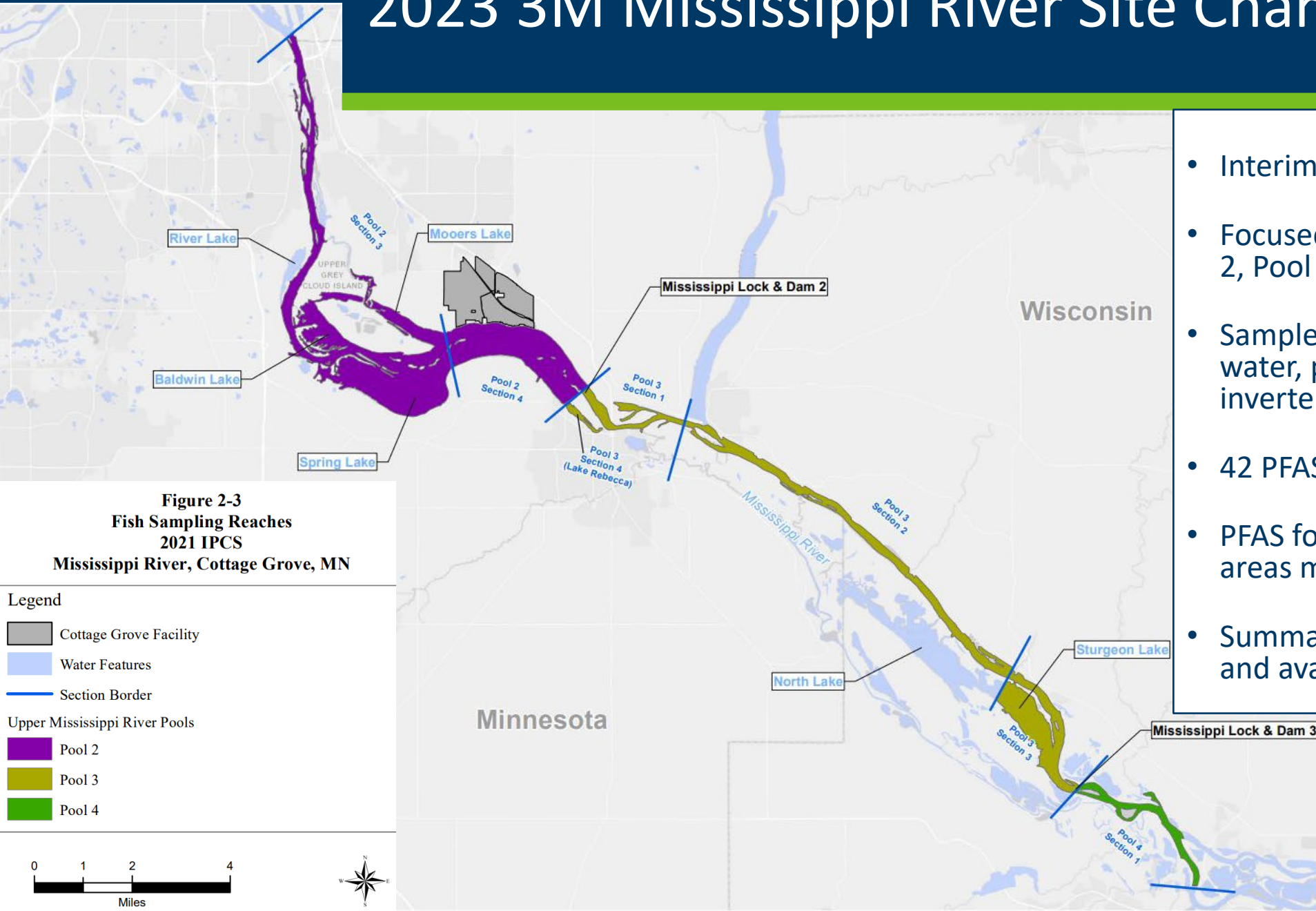


- Detected PFOS results in Water and Fish tissue compared to **Human Fish Consumption Risk Thresholds**

- <<PFOS in Water
- Threshold: 0.00005 ppb
- PFOS in Fish Tissue >>
- Threshold: 0.37 ppb



# 2023 3M Mississippi River Site Characterization



- Interim report submitted in April 2023
- Focused sampling effort in lower Pool 2, Pool 3 and upper Pool 4
- Samples media includes surface water, pore water, fish tissue, benthic invertebrates, sediment
- 42 PFAS compounds
- PFAS found in all areas; depositional areas most concerning (Lake Rebecca)
- Summary will be developed by MPCA and available in late 2023

# Why Does this Matter for Priority 2 Planning?

- Contamination data are typically used to assess injury, but are relevant to Priority 2 project planning as well
- Priority 2 projects should aim to minimize inadvertently increasing the risk of injury to wildlife and habitats that we are aiming to help
- The next talk will address this issue more deeply – why and how we may consider PFAS contamination in Priority 2 planning

# Questions?

- Clarifying questions?

