

Former Wurtsmith AFB PFAS Contamination – MDHHS Updates

DECEMBER 6, 2017

Foam on Van Etten Lake



What does exposure to PFAS-containing foam mean? – Initial evaluation

- ▶ Samples analyzed for PFAS content
 - ▶ First samples showed up to 2,237ppt PFOA+PFOS in foam (PFOS was predominant PFAS in foam)
 - ▶ Calculated for child playing in foam at beach and swallowing it
 - expected dose was one-half the Reference Dose for Health Advisory level for PFOA+PFOS

Foam – Follow-up evaluation

- ▶ Additional samples of foam
 - ▶ Surface water previously diluted the foam sample
 - ▶ Maximum PFOS concentration = 165,000 ppt
- ▶ Default exposure assumptions → more likely scenario
 - ▶ Daily exposure → summer-only exposure
- ▶ Swallowing foam might cause internal PFAS increase
 - ▶ Predicting PFAS amount in blood is difficult
 - ▶ Cannot predict if increase would cause harm

Foam – Recommendations

- ▶ Skin contact is not a health concern.
- ▶ Avoid getting foam in your mouth and swallowing it. Easiest way to do this is to avoid playing with foam.
- ▶ Natural (non-PFAS) foams often occur in water bodies, usually where water is choppy or agitated.

Evaluating drinking water – decision process

- ▶ Key = do we understand the PFAS source:
 - ▶ Do we know where the PFAS came from?
 - ▶ Do we know the concentrations in the groundwater?
 - ▶ Do we know how and where groundwater moves?
 - ▶ Are there enough data to build a concept (picture) of the site?

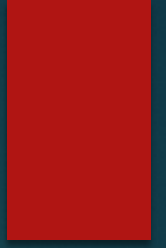
Source understood – downgradient

- ▶ West shore of Van Etten Lake is downgradient from WAFB
 - ▶ Historic groundwater data from base shows where it's going
 - ▶ Sampling also showed that PFAS were on the east side of the lake
 - ▶ PFAS detections (any amount) → alternate water recommended

Source understood – outlying areas

- ▶ Colbath area and school are not downgradient from WAFB
 - ▶ Groundwater from base not moving toward those areas (no high concentrations moving toward them)
 - ▶ PFAS in groundwater there likely from localized fire fighting
 - ▶ Groundwater monitoring wells will tell us ongoing status
 - ▶ PFAS detections → compare PFOA+PFOS to EPA 70 ppt

Extra Slides- Audience Questions



Groundwater Flow Direction

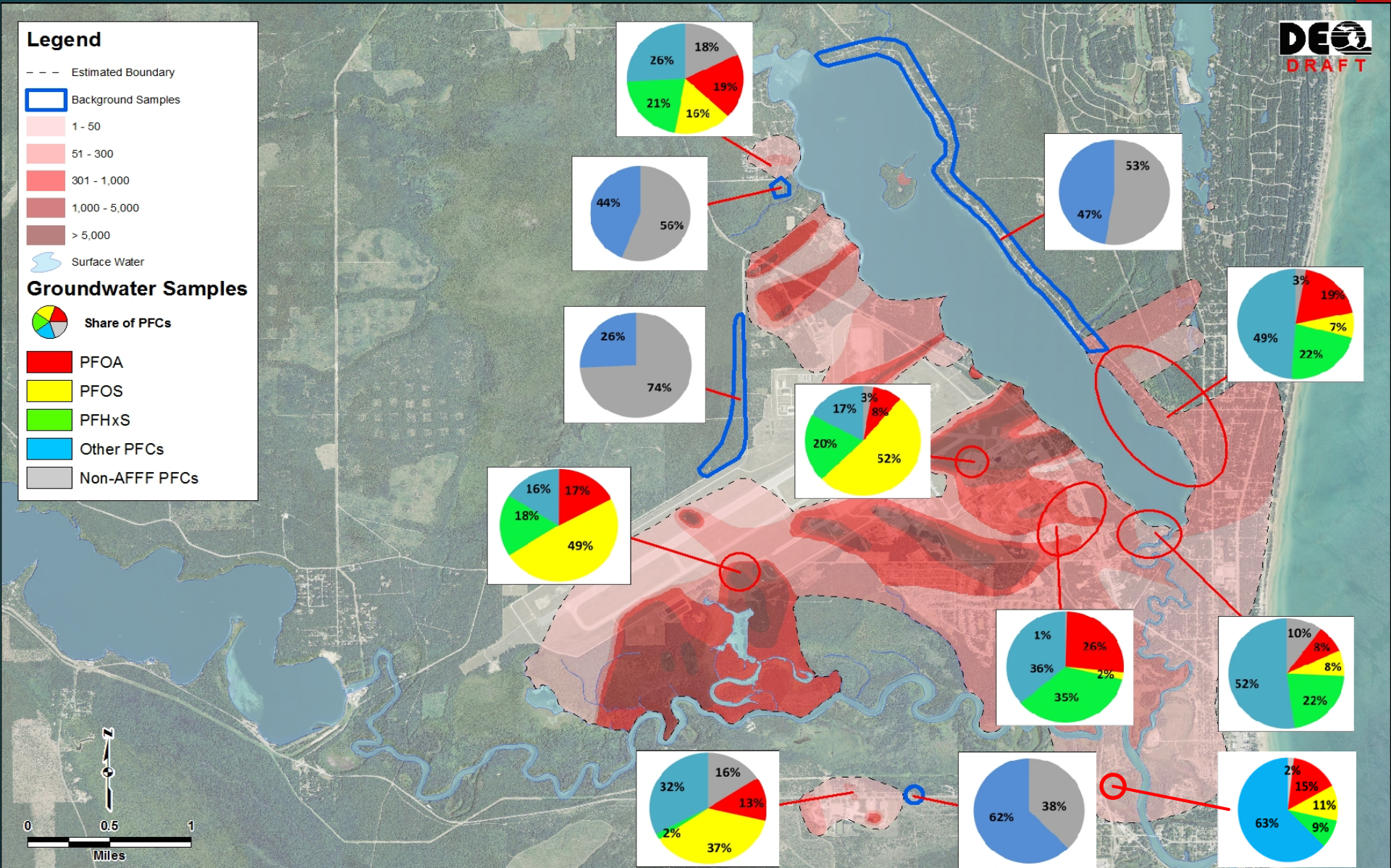
Hydrogeological Conceptual Site Model DRAFT

Legend

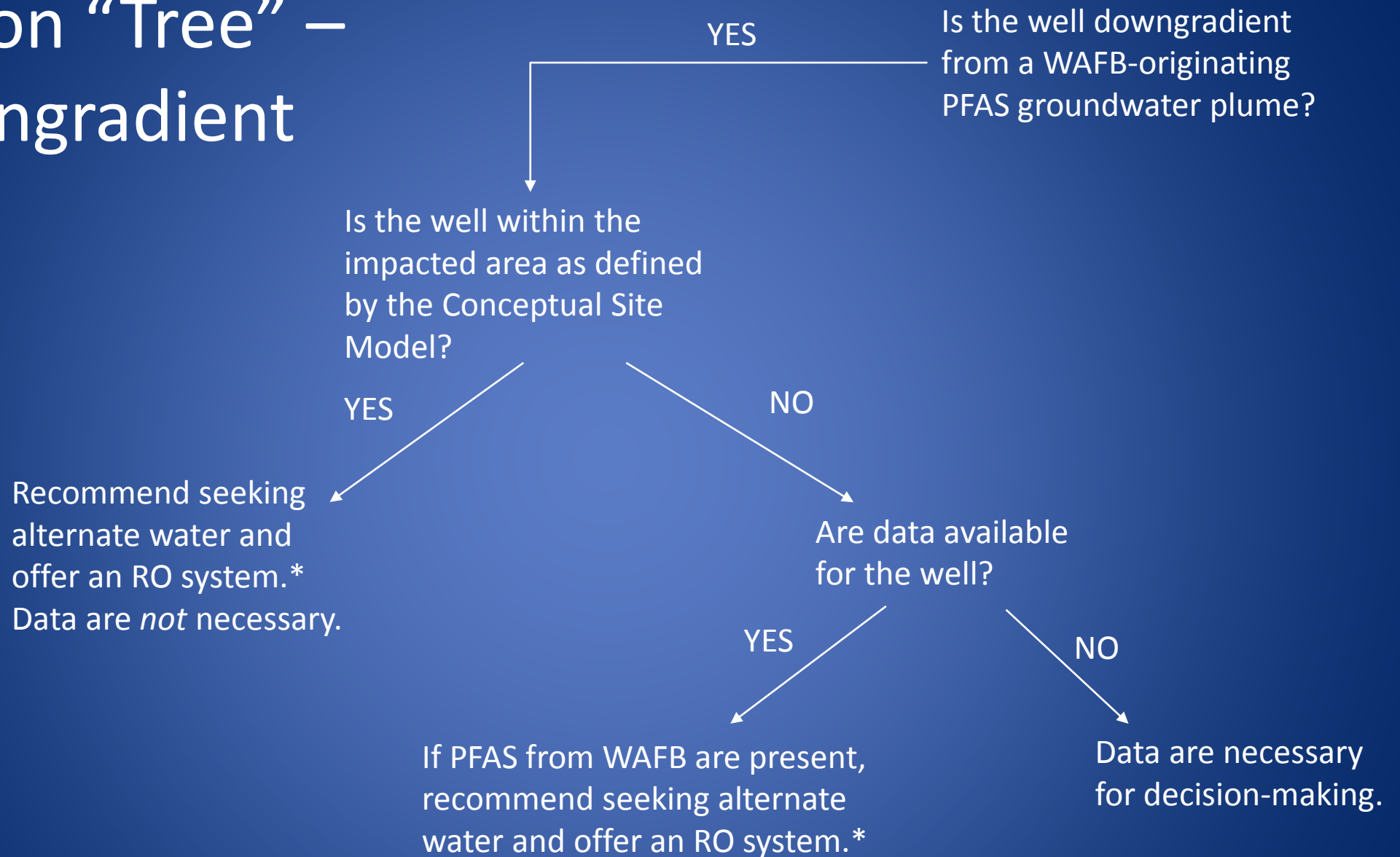
- Road
- Groundwater Elevation Data Point
- Approximate Groundwater Flow
- Groundwater Elevation Contour
- - - Inferred Groundwater Elevation Contour



PFAS Fingerprinting - Groundwater



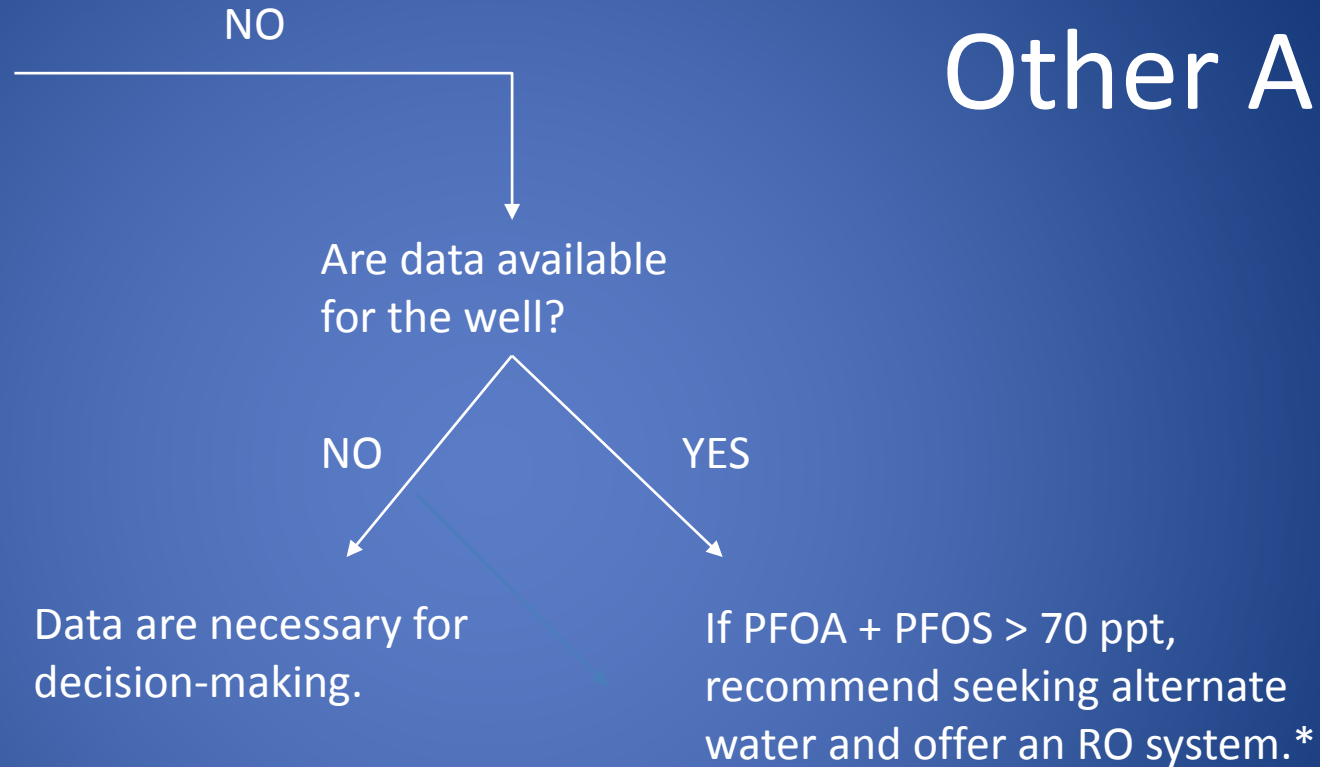
Decision “Tree” – Downgradient



*Well owners may choose to connect to township water, if that is currently available.

Decision “Tree” – Other Areas

Is the well downgradient
from a WAFB-originating
PFAS groundwater plume?



*Well owners may choose to connect to township water, if that is currently available.

EPA's PFOA and PFOS 70 ppt Drinking Water Health Advisory

- Offer a “margin of protection”
- For the most sensitive population (developing fetus and newborns)
- For an entire lifetime of potential exposure
- For all potential health effects (non-cancer and cancer)



EPA
United States
Environmental Protection Agency

FACT SHEET
PFOA & PFOS Drinking Water

FACT SHEET
PFOA & PFOS Drinking Water Health Advisories

Overview
EPA has e...
agency's i...
water syst...
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the health...
to protect...
water syst...
to PFOA a...
chemicals

Background
PFOA and...
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EPA's 2016 Lifetime Health Advisories, continued
To provide Americans, including the most sensitive populations, with a margin of protection from a lifetime of exposure to PFOA and PFOS from drinking water, EPA established the health advisory levels at 70 parts per trillion. When both PFOA and PFOS are found in drinking water, the combined concentrations of PFOA and PFOS should be compared with the 70 parts per trillion health advisory level. This health advisory level offers a margin of protection for all Americans throughout their life from adverse health effects resulting from exposure to PFOA and PFOS in drinking water.

How the Health Advisories were developed
EPA's health advisories are based on the best available peer-reviewed studies of the effects of PFOA and PFOS on laboratory animals (rats and mice) and were also informed by epidemiological studies of human populations that have been exposed to PFASs. These studies indicate that exposure to PFOA and PFOS over certain levels may result in adverse health effects, including developmental effects to fetuses during pregnancy or to breastfed infants (e.g., low birth weight, accelerated puberty, skeletal variations), cancer (e.g., testicular, kidney), liver effects (e.g., tissue damage), immune effects (e.g., antibody production and immunity), thyroid effects and other effects (e.g., cholesterol changes).

EPA's health advisory levels were calculated to offer a margin of protection against adverse health effects to the most sensitive populations: fetuses during pregnancy and breastfed infants. The health advisory levels are calculated based on the drinking water intake of lactating women, who drink more water than other people and can pass these chemicals along to nursing infants through breastmilk.

Recommended Actions for Drinking Water Systems

Steps to Assess Contamination
If water sampling results confirm that drinking water contains PFOA and PFOS at individual or combined concentrations greater than 70 parts per trillion, water systems should quickly undertake additional sampling to assess the level, scope and localized source of contamination to inform next steps

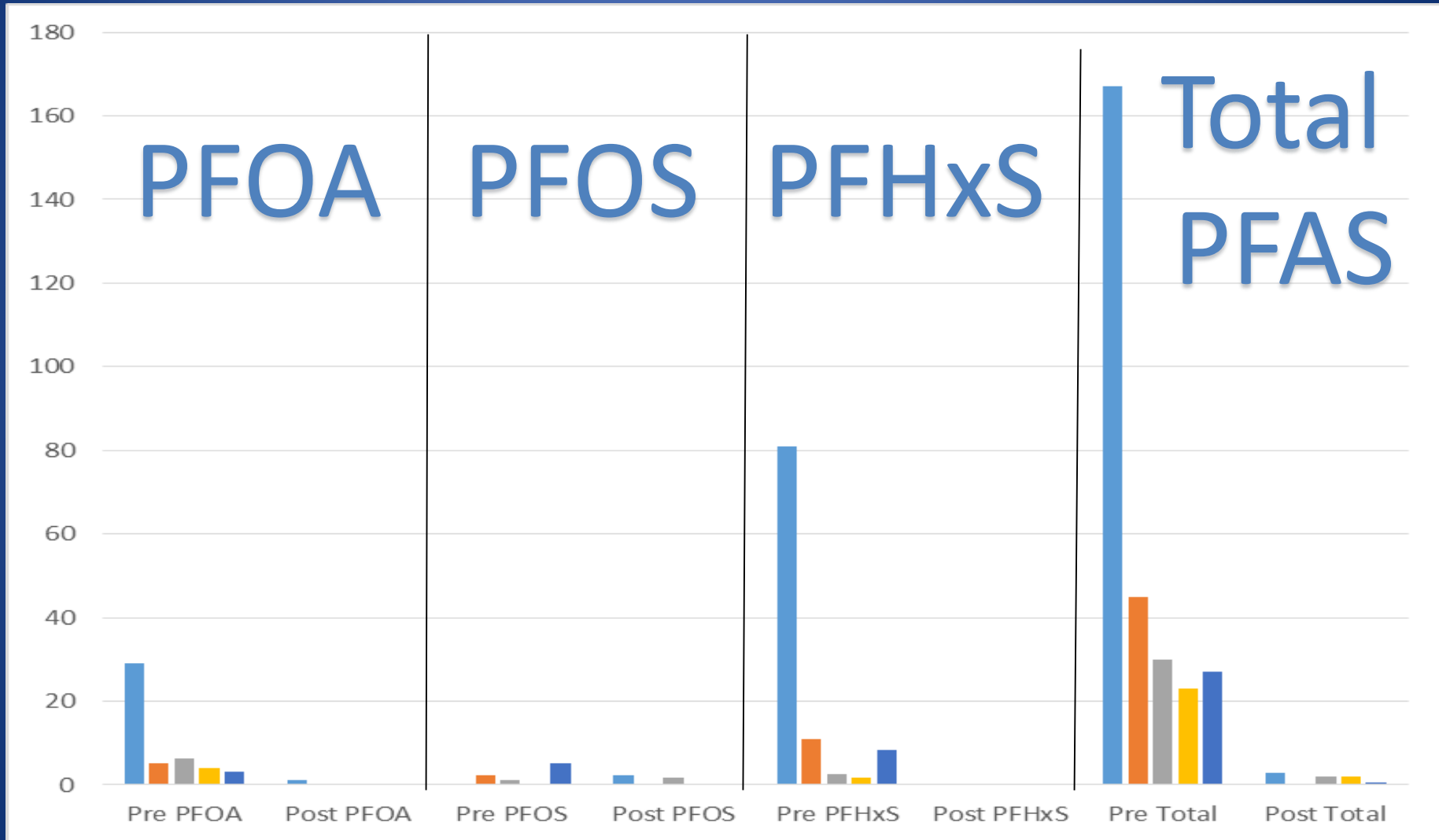
Steps to Inform
If water sampling results confirm that drinking water contains PFOA and PFOS at individual or combined concentrations greater than 70 parts per trillion, water systems should promptly notify their State drinking water safety agency (or with EPA in jurisdictions for which EPA is the primary drinking water safety agency) and consult with the relevant agency on the best approach to conduct additional sampling.

Drinking water systems and public health officials should also promptly provide consumers with information about the levels of PFOA and PFOS in their drinking water. This notice should include specific information on the risks to fetuses during pregnancy and breastfed and formula-fed infants from exposure to drinking water with an individual or combined concentration of PFOA and PFOS above EPA's health advisory level of 70 parts per trillion. In addition, the notification should include actions they are taking and identify options that consumers may consider to reduce risk such as seeking an alternative drinking water source, or in the case of parents of formula-fed infants, using formula that does not require adding water.

US Environmental Protection Agency

US Environmental Protection Agency 2 November 2016 EPA 800-F-16-003

Pre- and Post-RO filter tests



Van Etten Lake

Type of Fish	Chemicals of Concern	Size of Fish (length in inches)	MI Servings per Month*
Catfish	PCBs	Any	Limited [▲]
Suckers	Mercury	Under 14"	8
		14 to 20"	4
		Over 20"	2
Walleye	Mercury	Any	1

Meal Category

PFOS

meals per month

µg/g (ppm)^a

16

≤ 0.009

12

>0.009 to 0.013

8

>0.013 to 0.019

4

>0.019 to 0.038

2

>0.038 to 0.075

1

>0.075 to 0.15

6 meals per year

>0.15 to 0.3

Limited

NA

Do Not Eat

>0.3

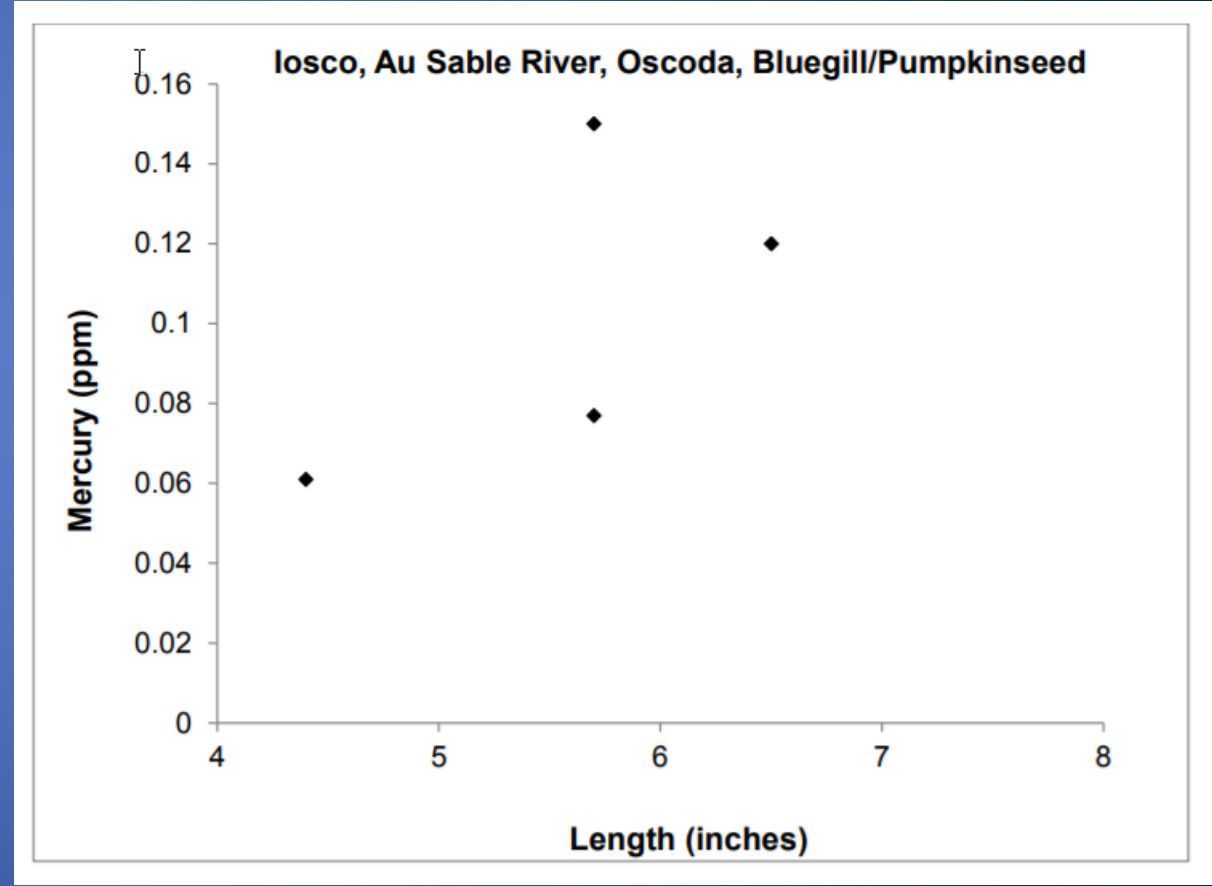
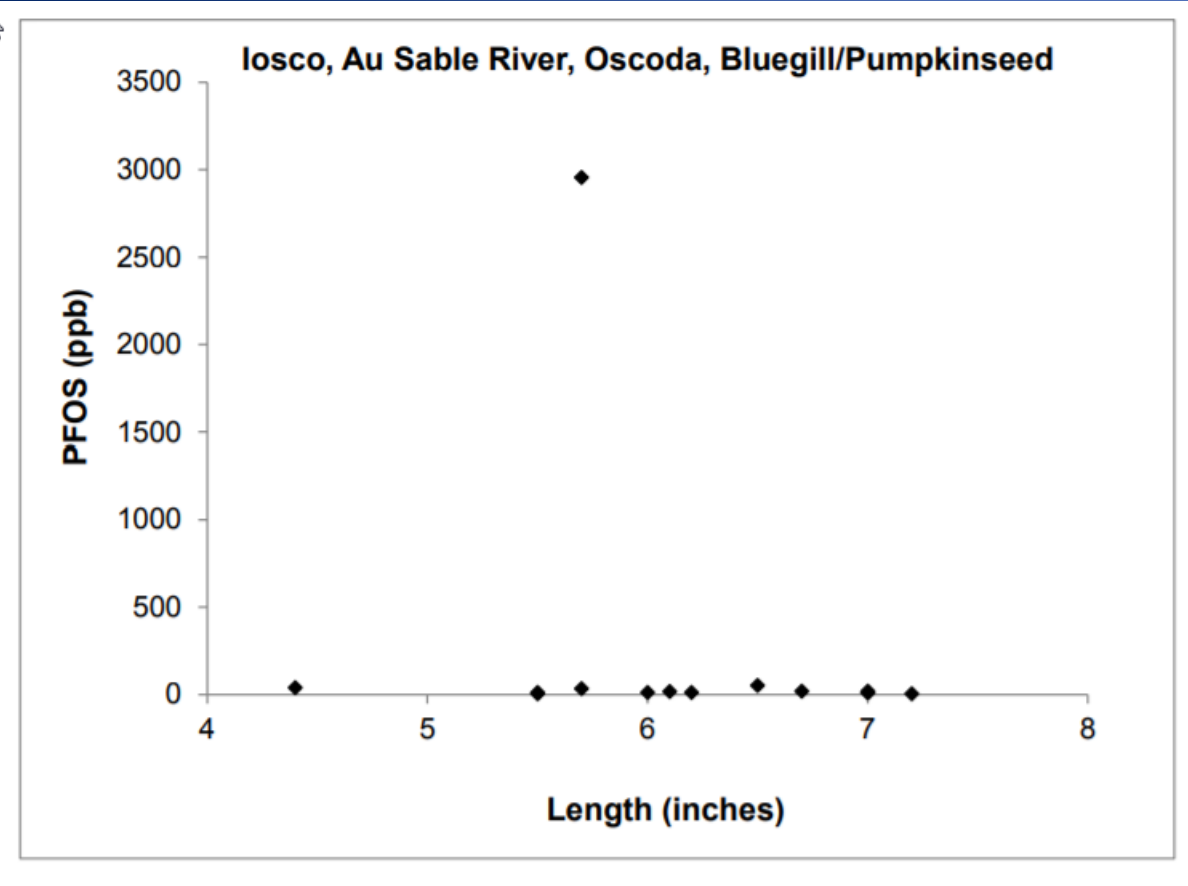
Au Sable River

(downstream of Foote Dam; includes Van Etten Creek)

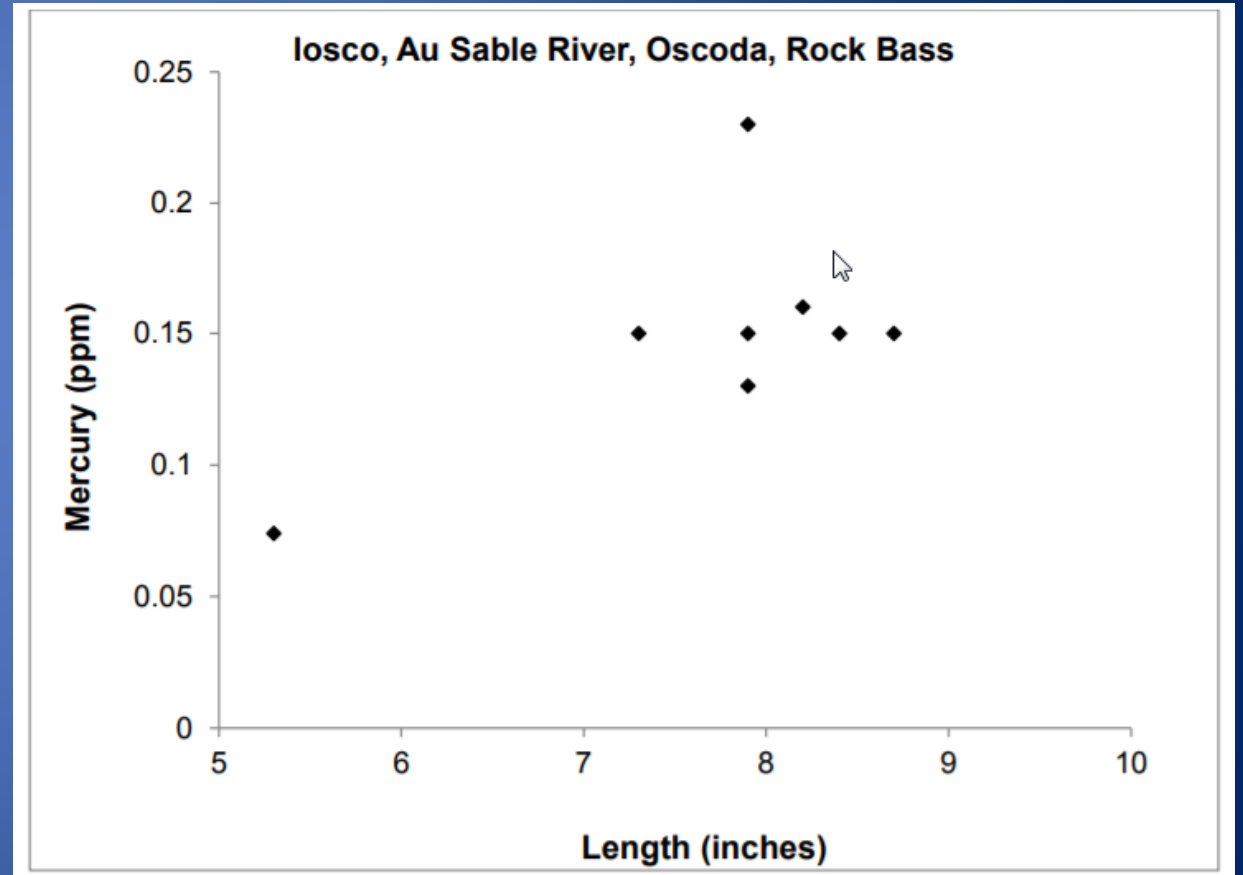
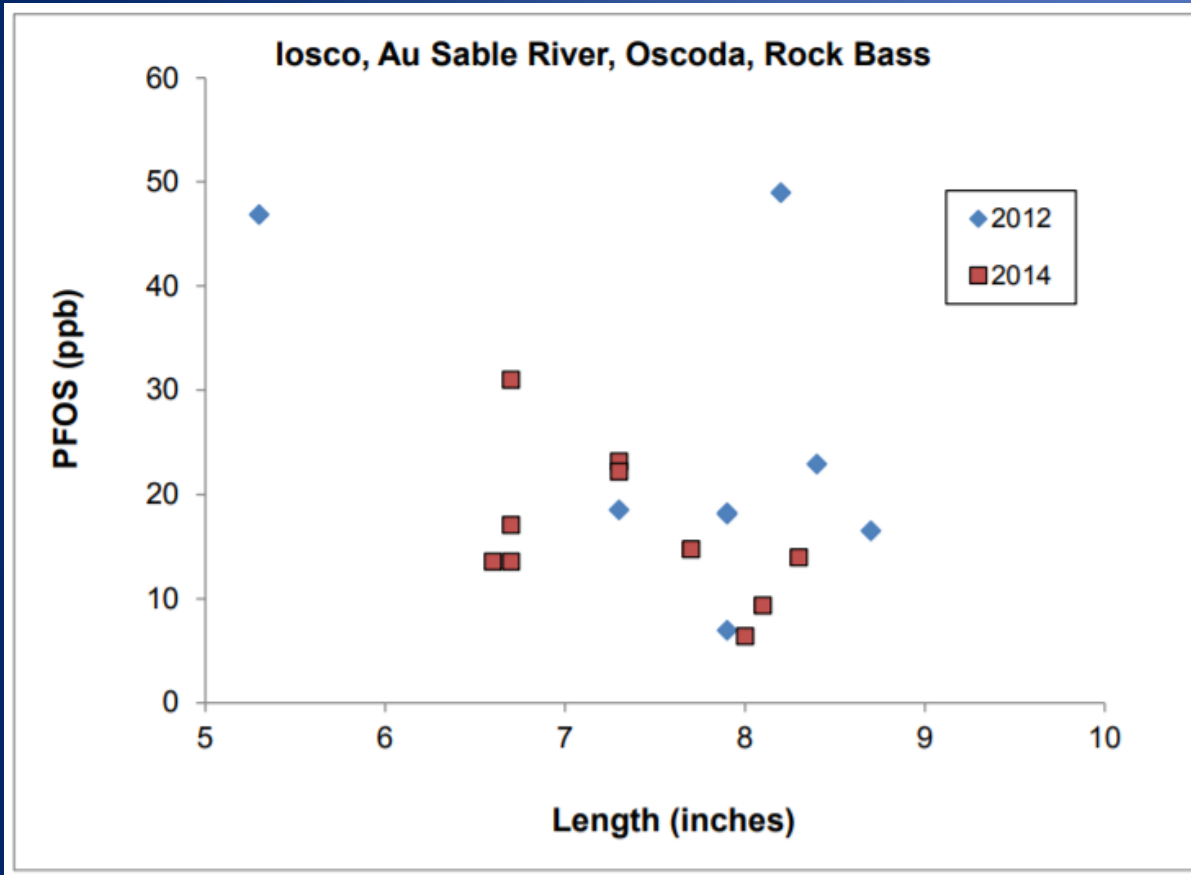
Type of Fish	Chemicals of Concern	Size of Fish (length in inches)	MI Servings per Month*
Brown Trout	PCBs	Any	6 Per Year ^{2x}
Carp	PFOS	Any	Do Not Eat [▲]
Chinook Salmon	PCBs	Any	6 Per Year ^{2x}
Coho Salmon	PCBs	Any	6 Per Year ^{2x}
Largemouth Bass	PFOS	Any	Do Not Eat [▲]
Rainbow Trout	PCBs	Any	6 Per Year ^{2x}
Rock Bass	Mercury & PFOS	Any	Do Not Eat [▲]
Smallmouth Bass	PFOS	Any	Do Not Eat [▲]
Steelhead	PCBs	Any	6 Per Year ^{2x}
Suckers	PFOS	Any	Do Not Eat [▲]
Walleye	Dioxins	Any	6 Per Year ^{2x}
All Other Species	PFOS	Any	Do Not Eat [▲]

PFOS can't be reduced by trimming and cooking. Do not double MI Servings.

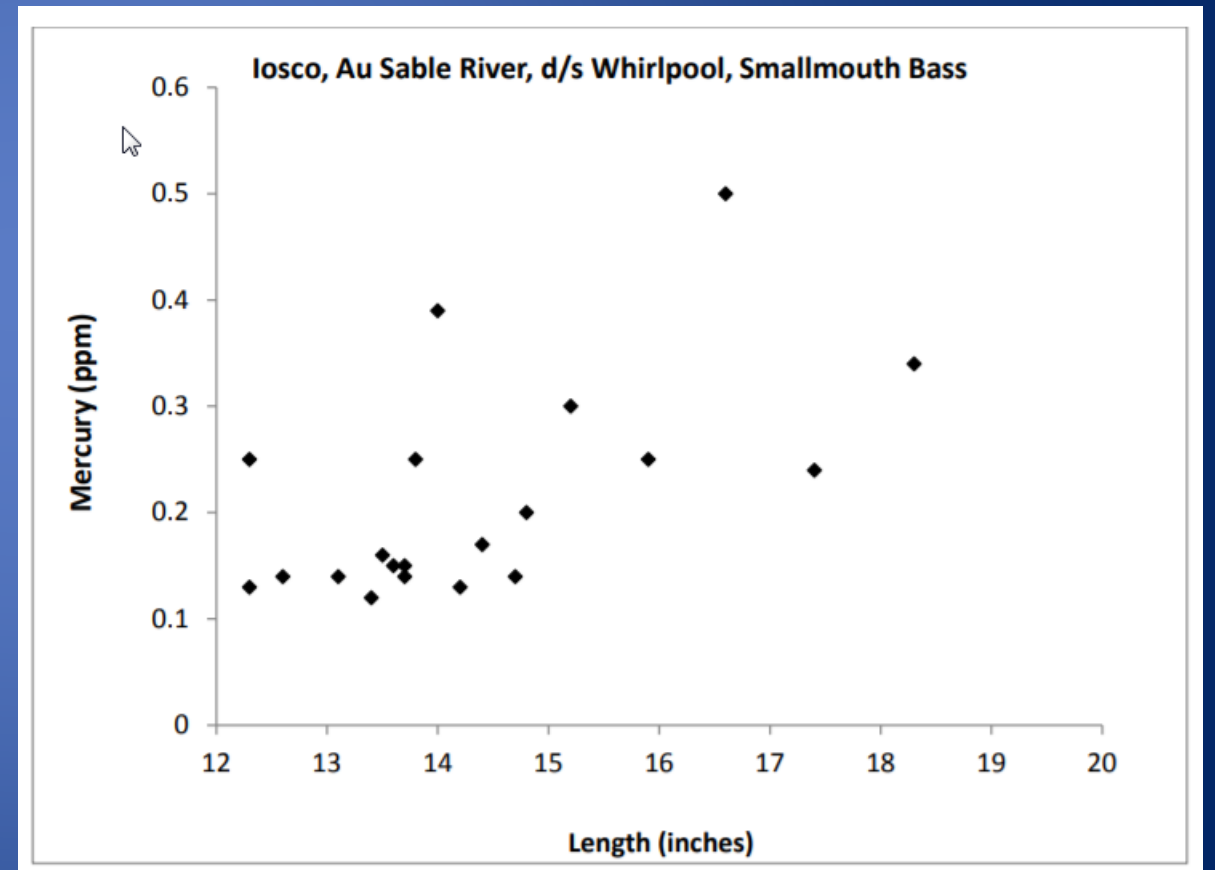
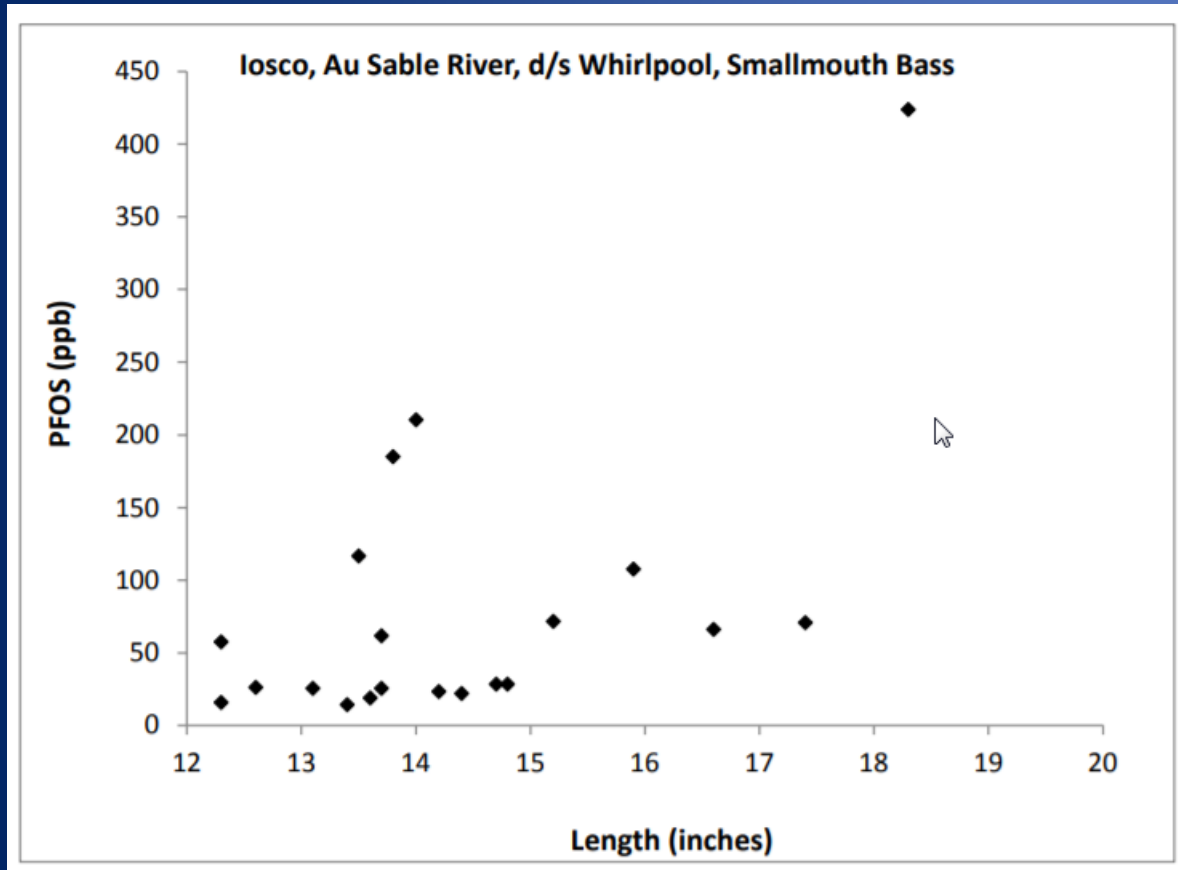
Au Sable River – Downstream of Foote Dam



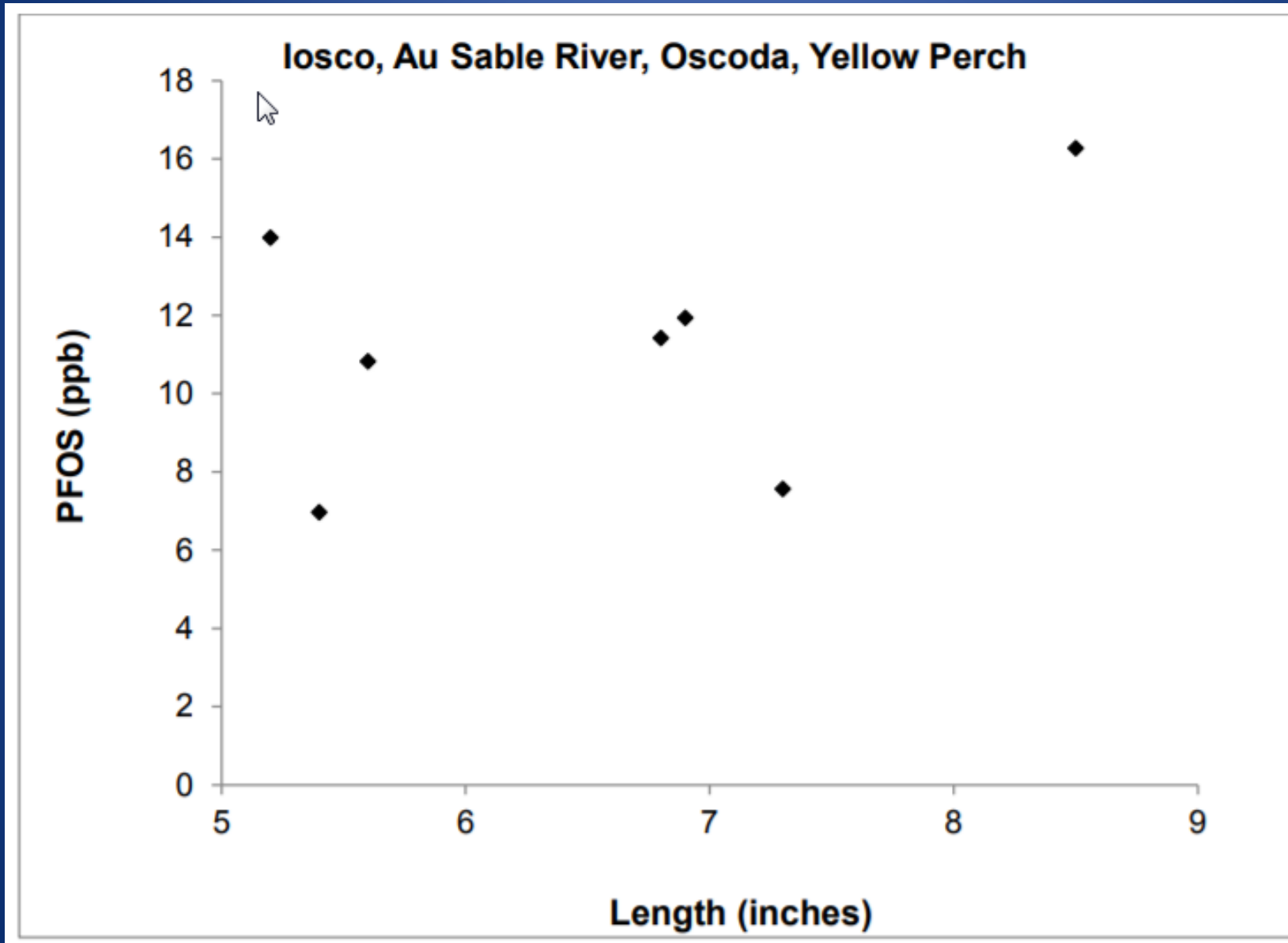
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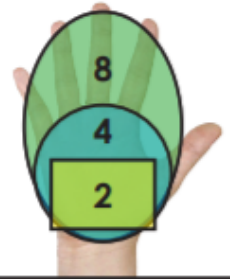


Statewide Safe Fish Guidelines

Type of Fish	Chemical of Concern	Size of Fish (length in inches)	MI Servings per Month*
Black Crappie	Mercury	Any Size	4
Bluegill	Mercury	Any Size	8
Bullhead	Mercury	Any Size	4
Carp	PCBs	Any Size	2
Catfish	PCBs & Mercury	Any Size	4
Largemouth Bass	Mercury	Under 18"	2
		Over 18"	1
Muskellunge	Mercury	Any Size	1
Northern Pike	Mercury	Under 30"	2
		Over 30"	1
Rock Bass	Mercury	Any Size	4
Smallmouth Bass	Mercury	Under 18"	2
		Over 18"	1
Suckers	Mercury	Any Size	8
Sunfish	Mercury	Any Size	8
Walleye	Mercury	Under 20"	2
		Over 20"	1
White Crappie	Mercury	Any Size	4
Yellow Perch	Mercury	Any Size	4

My Michigan, MI Serving Size

- 8 ounces of fish = size of an adult's hand (large oval)
- 4 ounces of fish = size of the palm of an adult's hand (small circle)
- 2 ounces of fish = size of half a palm of an adult's hand (rectangle)



How much is MI Serving?

Weight of Person	MI Serving Size
45 pounds	2 ounces
90 pounds	4 ounces
180 pounds	8 ounces

Weigh Less?

For every 20 pounds less than the weight listed in the table, subtract 1 ounce of fish.

For example, a 70 pound child's *MI Serving* size is 3 ounces of fish.
 $90 \text{ pounds} - 20 \text{ pounds} = 70 \text{ pounds}$
 $4 \text{ ounces} - 1 \text{ ounce} = \text{a } MI \text{ Serving size of } 3 \text{ ounces}$

Weigh More?

For every 20 pounds more than the weight listed in the table, add 1 ounce of fish.

For example, a 110 pound person's *MI Serving* size is 5 ounces of fish.
 $90 \text{ pounds} + 20 \text{ pounds} = 110 \text{ pounds}$
 $4 \text{ ounces} + 1 \text{ ounce} = \text{a } MI \text{ Serving size of } 5 \text{ ounces}$



Are you pregnant?

Fish is good for you and your baby! Use your pre-pregnancy weight to find your *MI Serving* size. It is best to avoid eating fish labeled as "Limited" if you're pregnant or breastfeeding.