

PFCs in Fish: Minnesota & Wisconsin Data

MDH Fish Consumption Guidelines

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Overview

- PFOS
 - most common PFC detected in fish fillets
 - highest concentrations
- PFOS measured in fish from MN lakes with no known point source
- Not able to predict which lakes will be higher
- Fish PFOS levels not predicted by typical influencing factors – trophic level, length/age, lipid...
- PFOS levels appear to be lower in rural lakes than in urban lakes

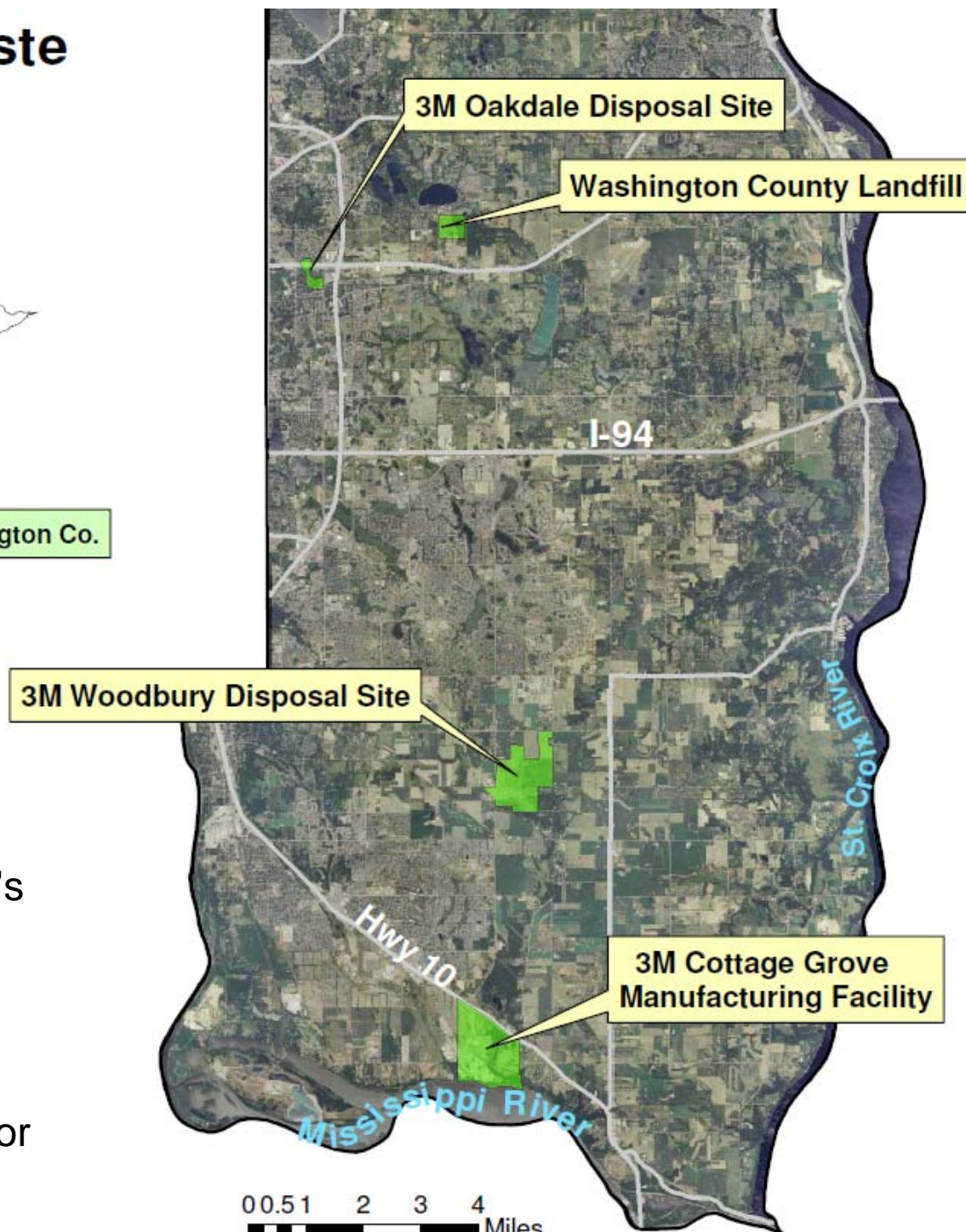
Figure 1 - PFC Waste Site Locations



PFCs made in MN since 1950's

PFOA & PFOS manufacture
ceased in 2002

3M, through agreement with
MPCA, has provided funding for
environmental monitoring



Health-based Guidance for PFBA, PFOA, PFBS, PFHxS and PFOS

FSTRAC

October 21, 2009

Helen Goeden, Ph.D.

Minnesota Department of Health

PFOS RfD_{MDH(2007)}

- RfD = 0.08 $\mu\text{g/kg-d}$
 - 26 week monkey study
 - POD = 35 $\mu\text{g/mL}$ serum level corresponding to the BMDL10 for cholesterol and liver weight effects.
 - HED = 0.00245 mg/kg-d
 - SS, Human $t_{1/2}$ = 1971 days, one compartment model
 - UFs = 30 (3A, 10H)

Meal Advice Categories

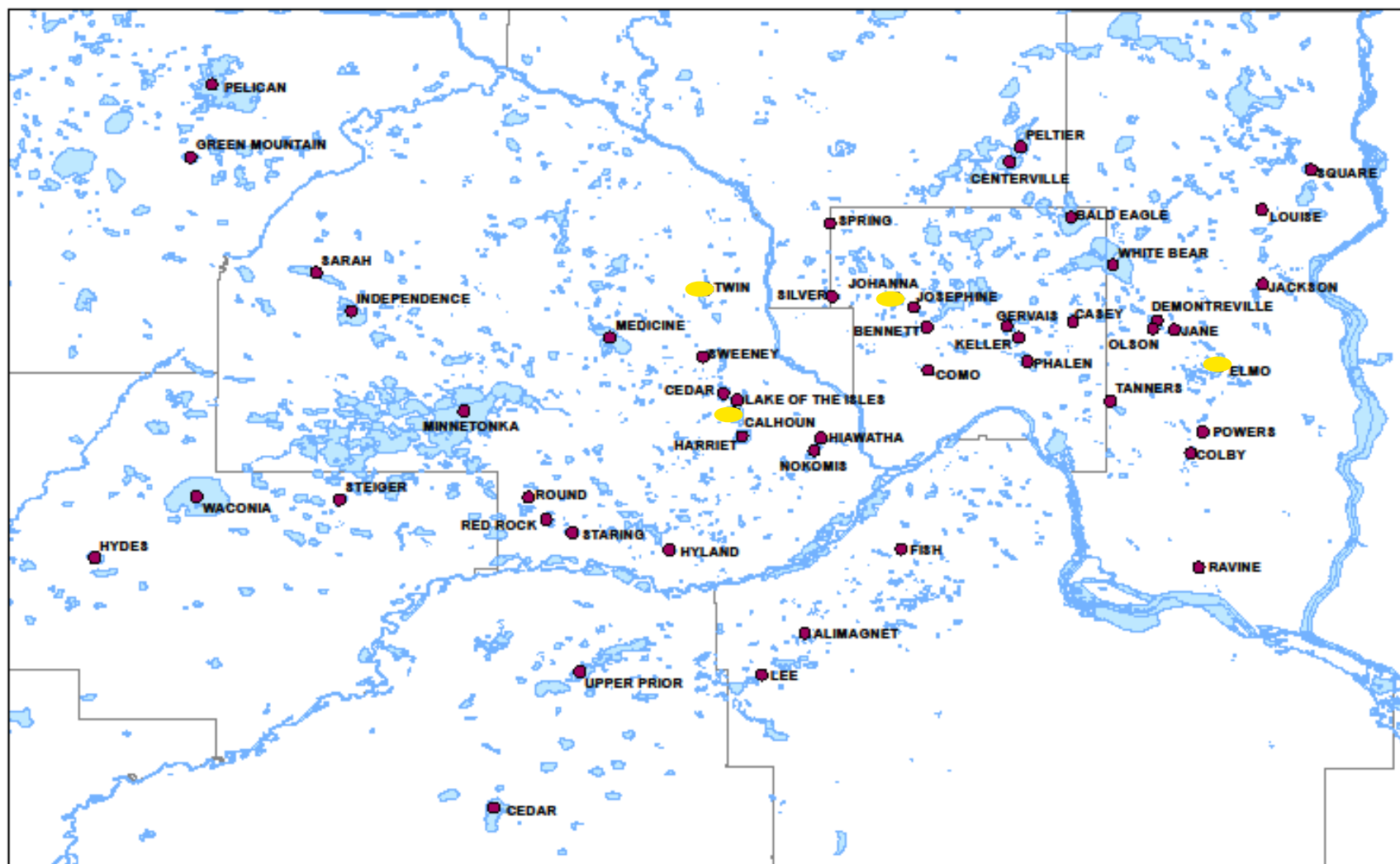
Meal Advice	PFOS Concentration (ng/g)
No restrictions	< 40
1 meal / week	> 40 - 200
1 meal / month	> 200 - 800
Do not eat	> 800

MDH Fish Consumption Advice - PFOS

- Spring 2006 - 1st Advisory Issued
 - Bluegill from Mississippi River Pool 2
- 2007 PFOS Consumption Advice
 - Mississippi River Pools 2 – 6
 - Calhoun (Brownie, Cedar, Isles, Harriet)



Twin Cities Area Lakes Sampled 2006-2008 for PFC's in Fish



Legend

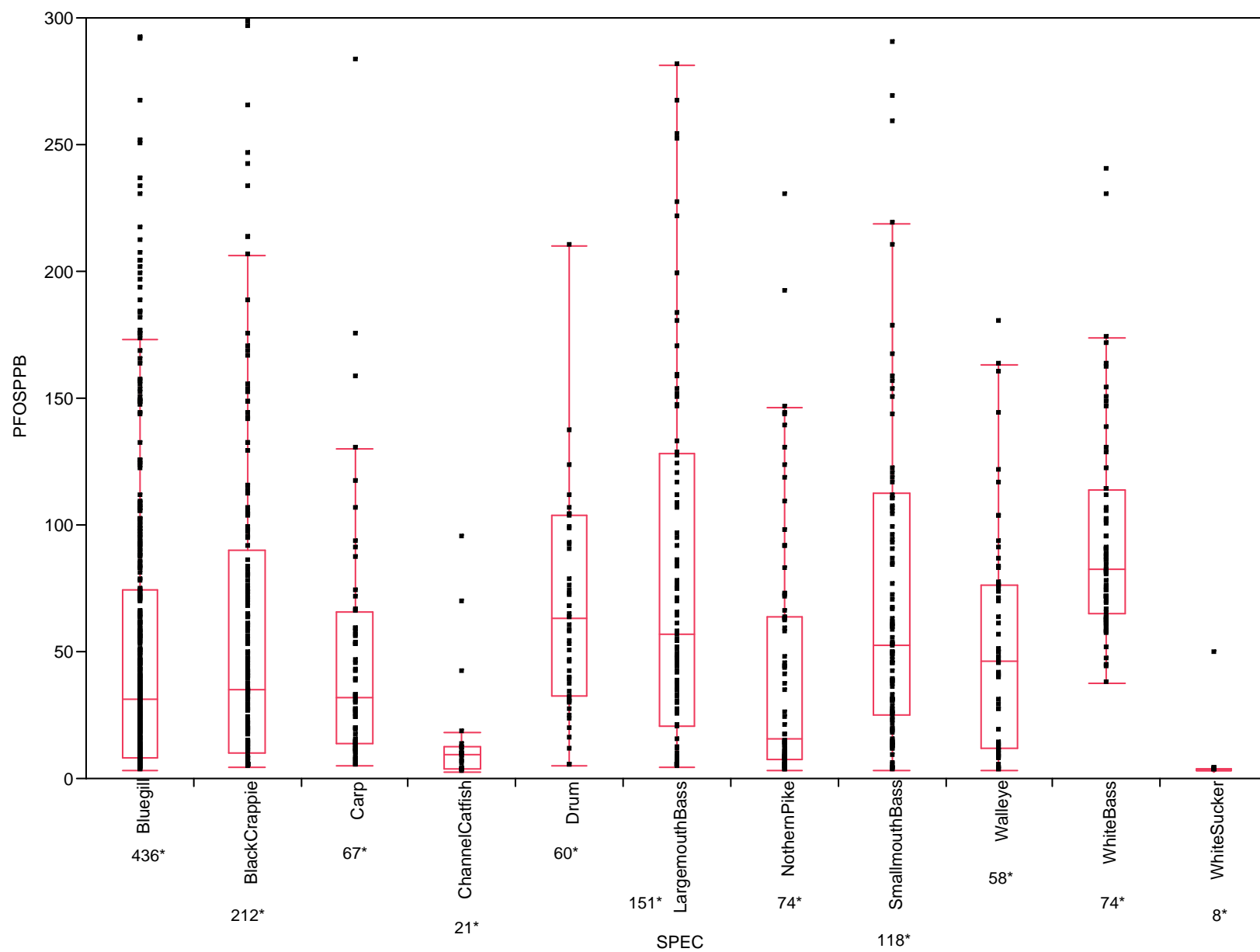
- Sampled Lakes
- Major Lakes
- MN Counties

20 10 0 20 Miles



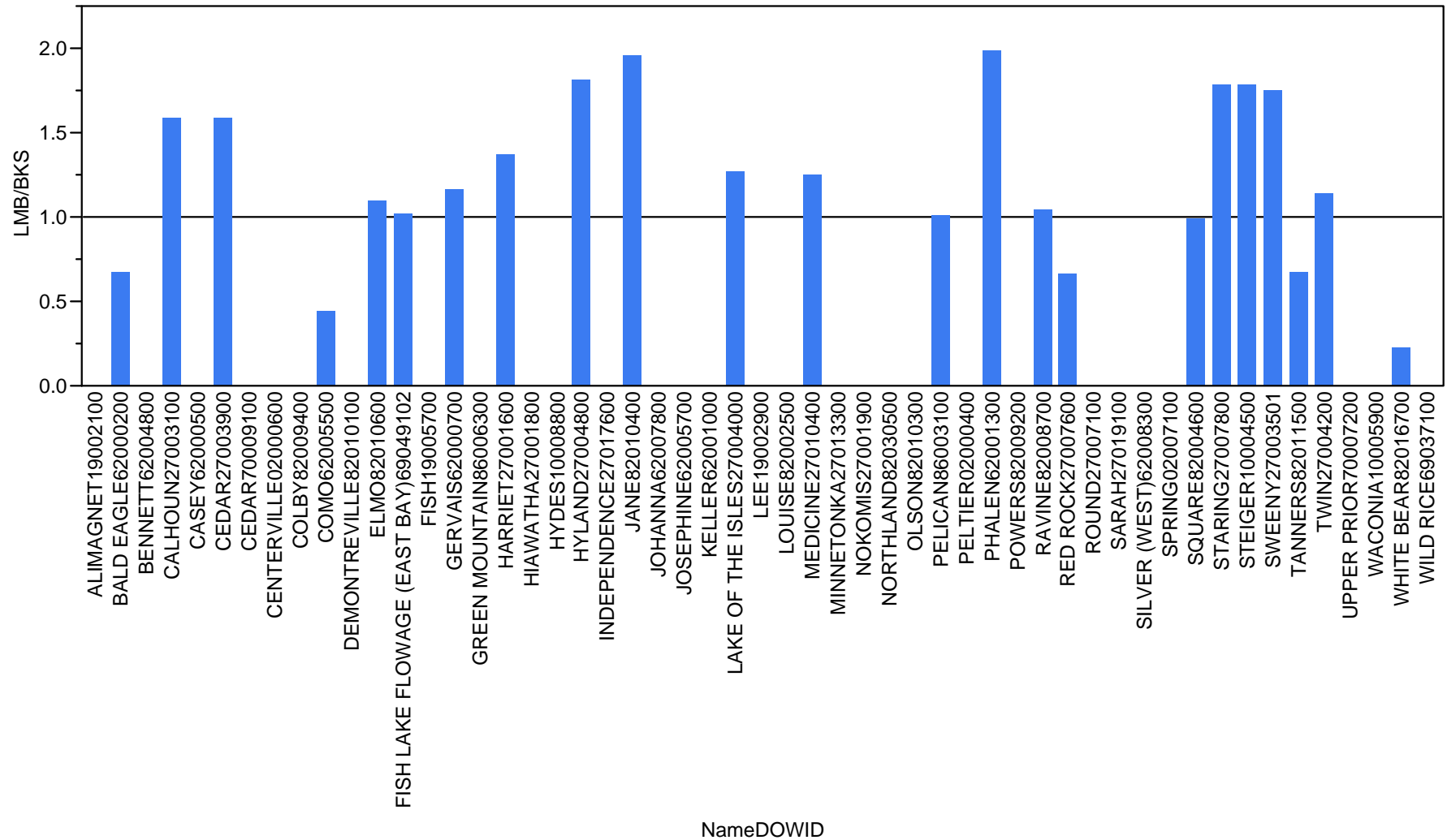
Wisconsin

- WI analyzed fish from Mississippi River
 - Analyzed by AXYS
 - WI and MN combined data
 - Utilized the MN risk assessment to provide consumption guidance
- WI lab has developed capability to analyze PFCs in fish.
 - Analyzing fish for National Park Service, Great Lakes Network



*Number of samples

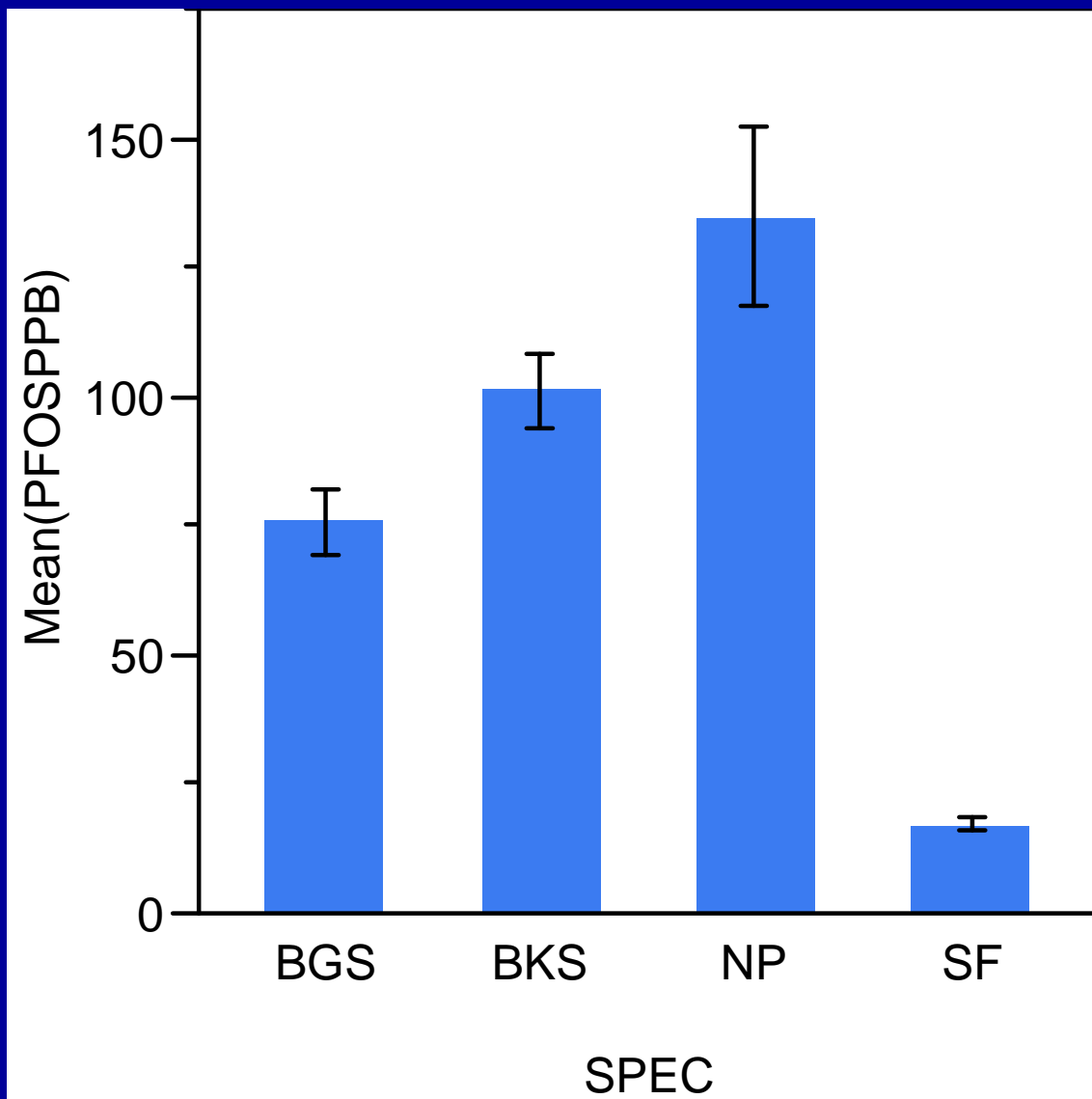
PFOS ratio -- Largemouth Bass/Crappie



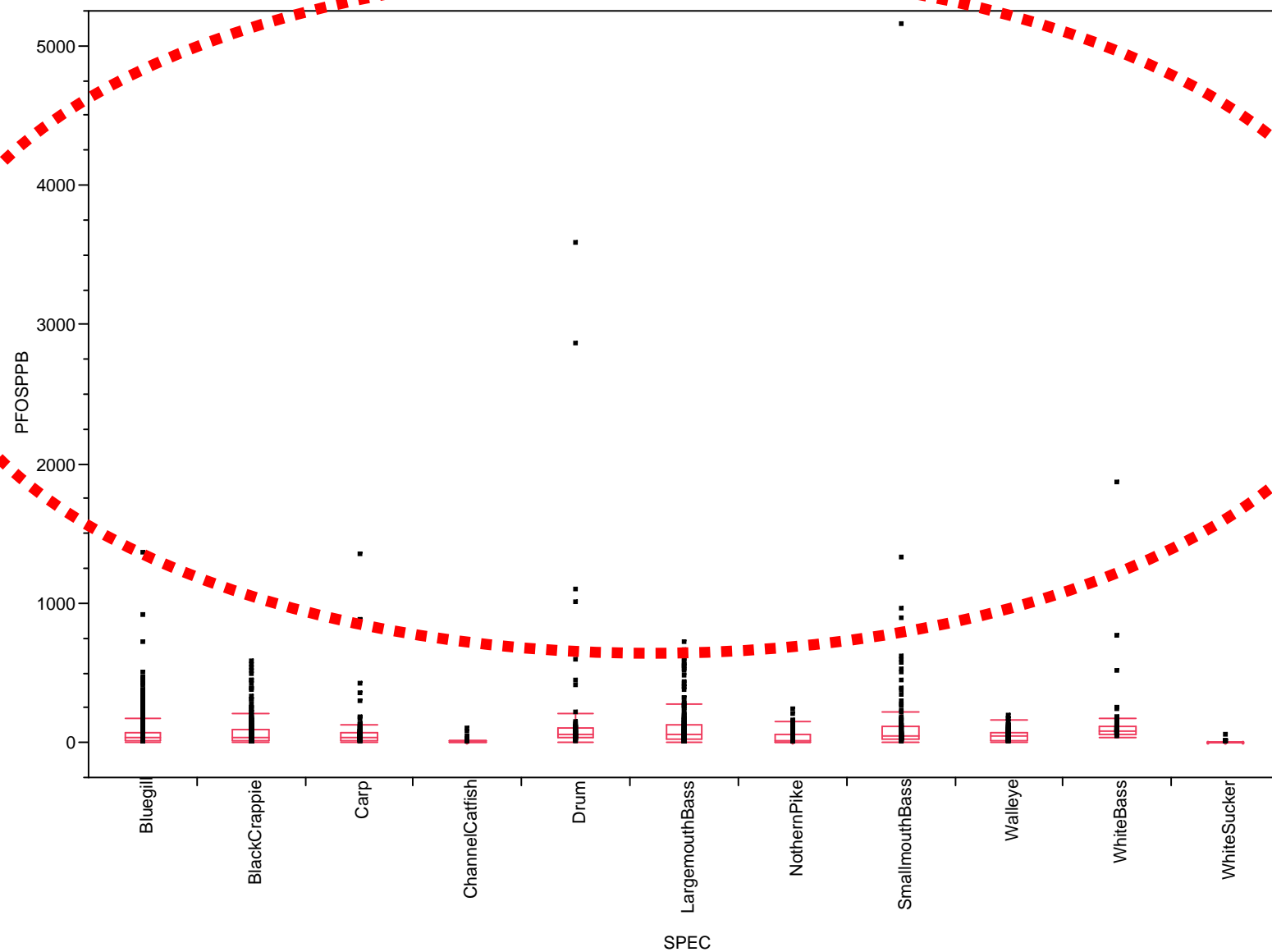
Fish Lake 190057, Dakota Co.

***Pumpkinseed sunfish << Bluegill

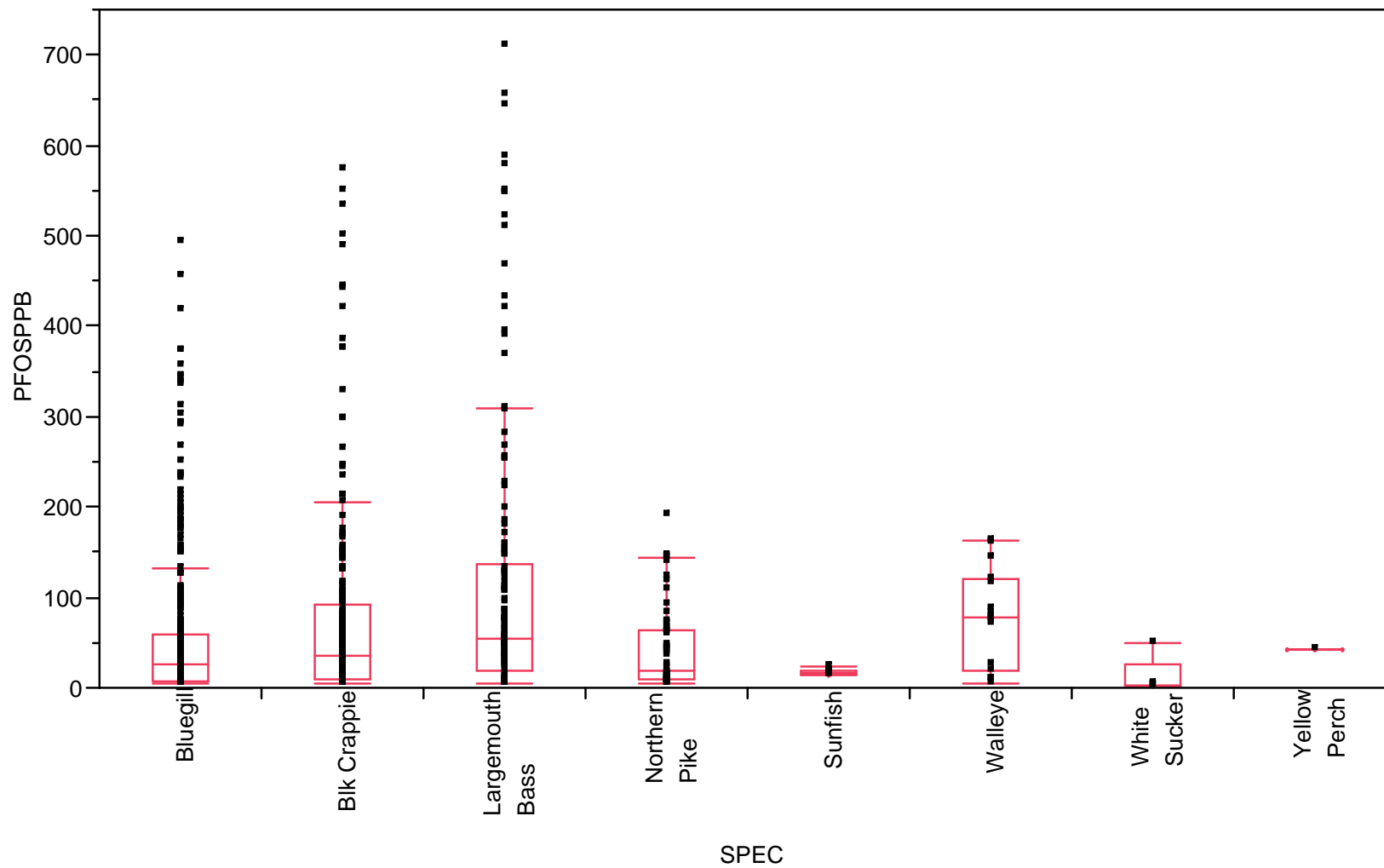
N=2



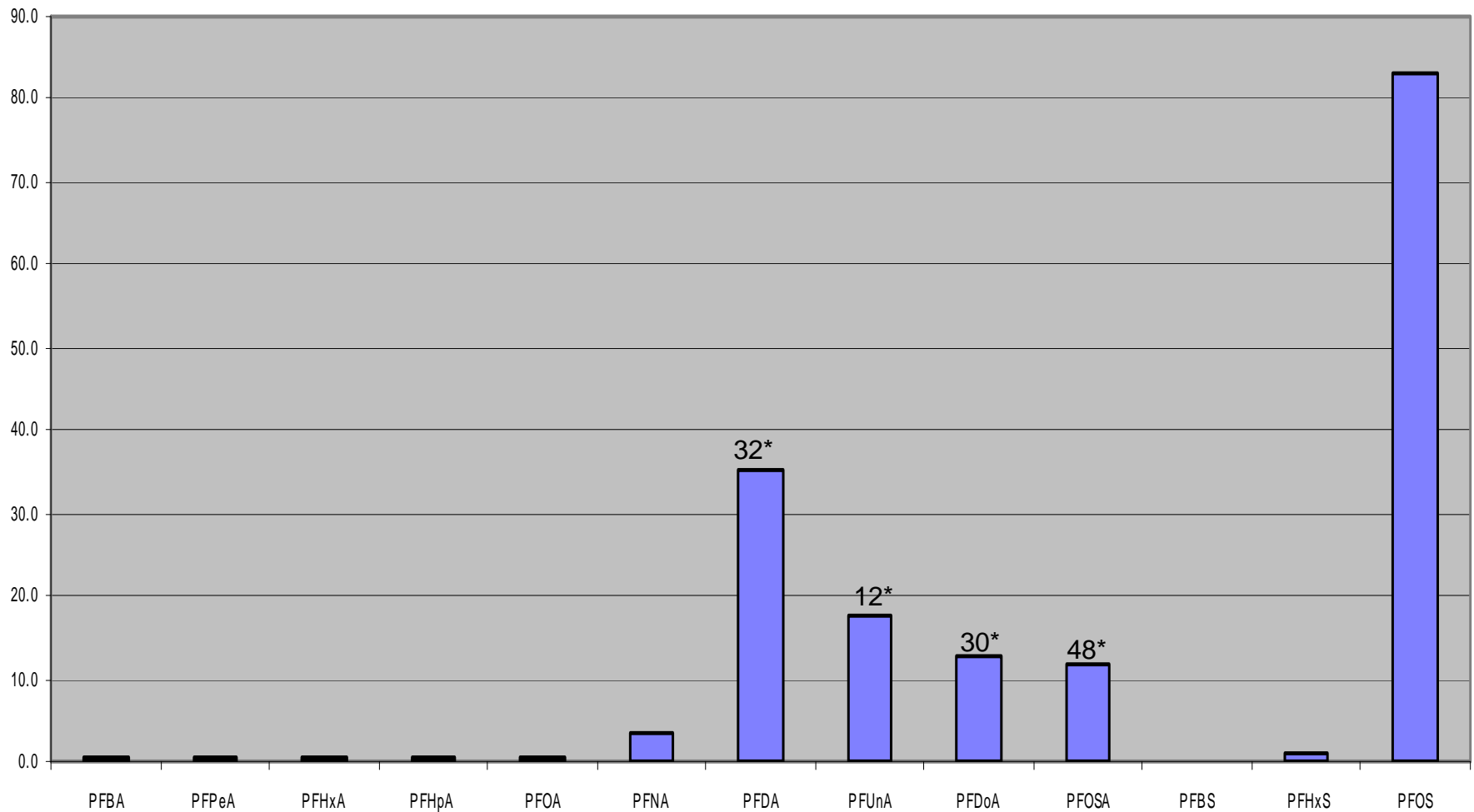
PFOS (ng/g) Fillet Data – Lakes and Rivers



Lakes only



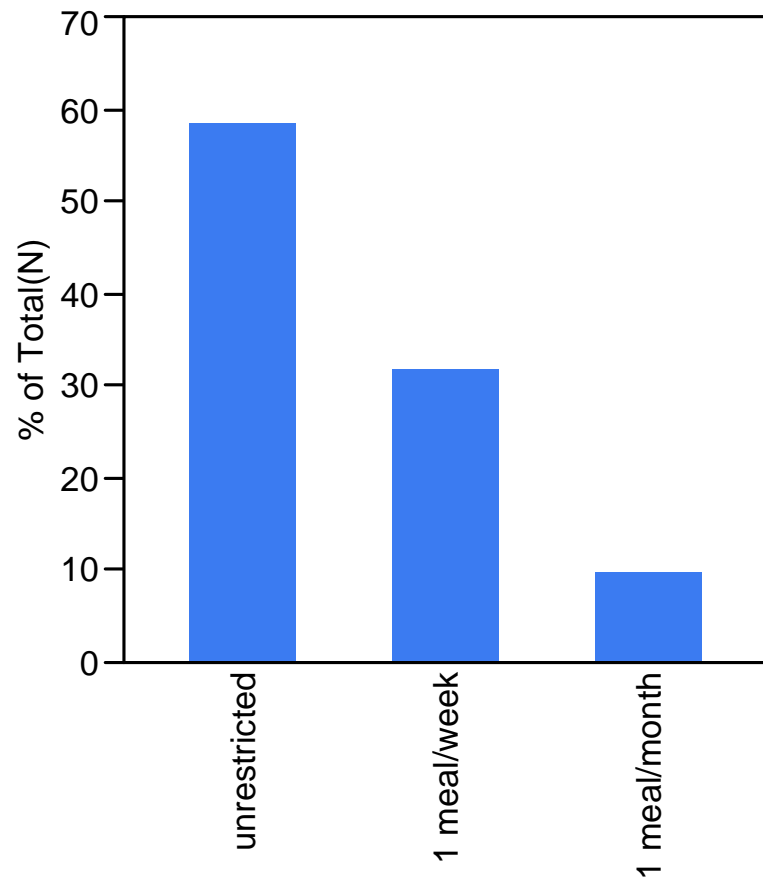
Percent Detect by Analyte



*Maximum concentration (ng/g)

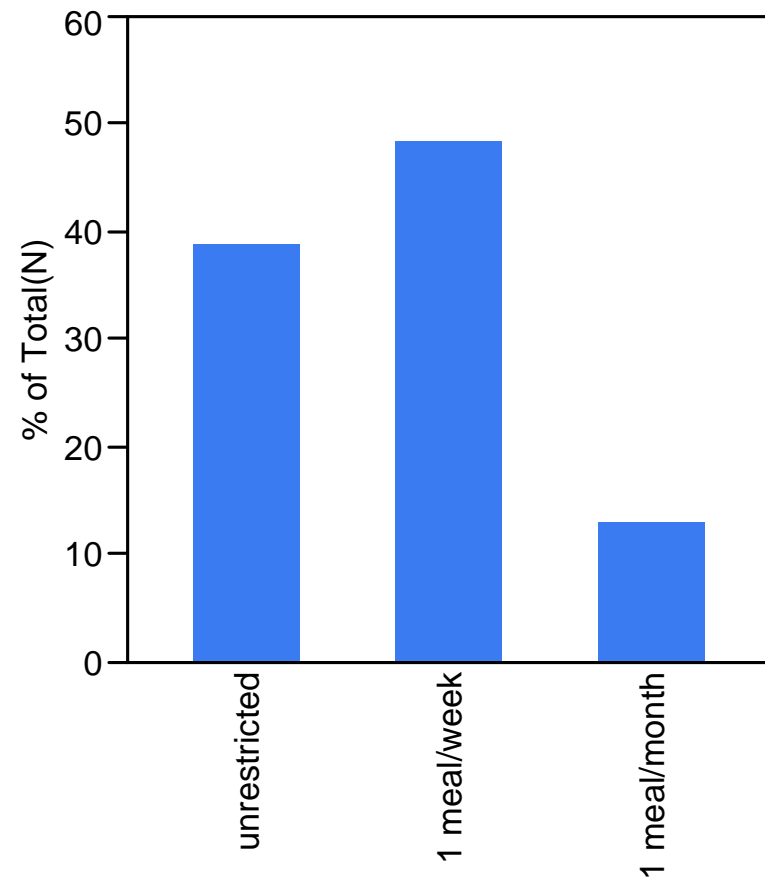
Eating Guidelines - PFOS

Chart species=Bluegill Sunfish



pfosadv

Chart species=Crappie



pfosadv

Chart species=Largemouth Bass

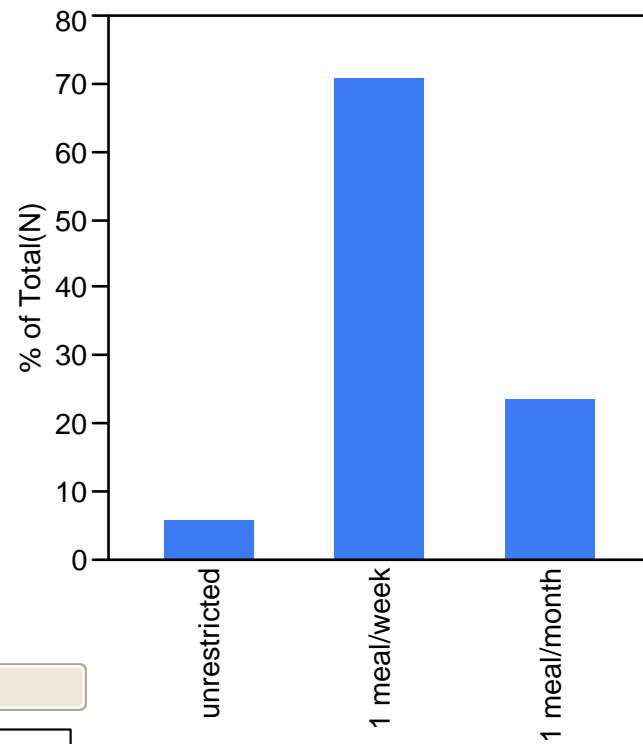


Chart species=Northern Pike

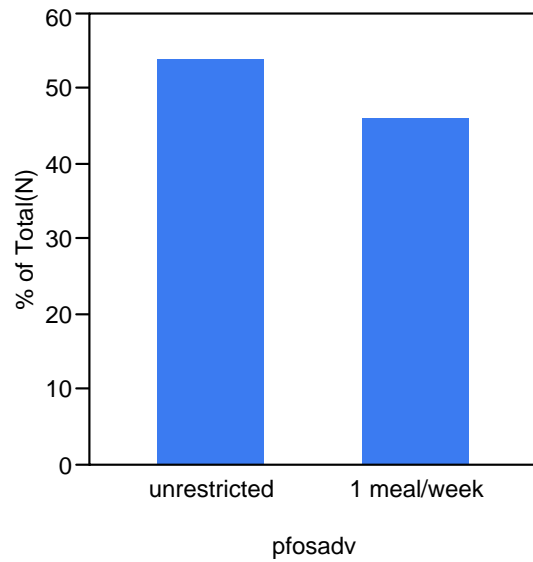
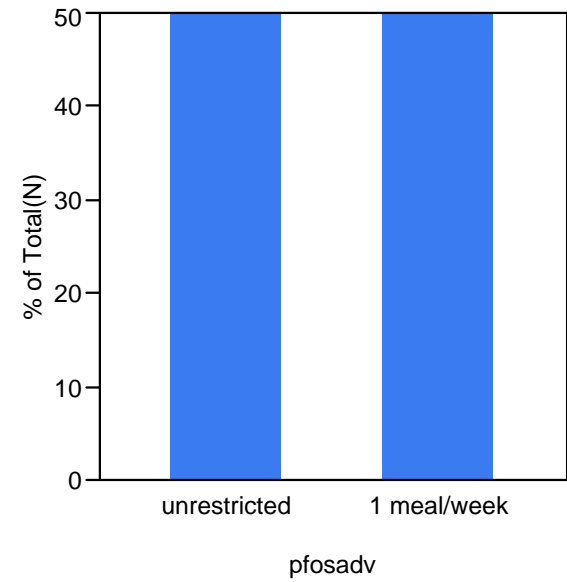


Chart species=Walleye

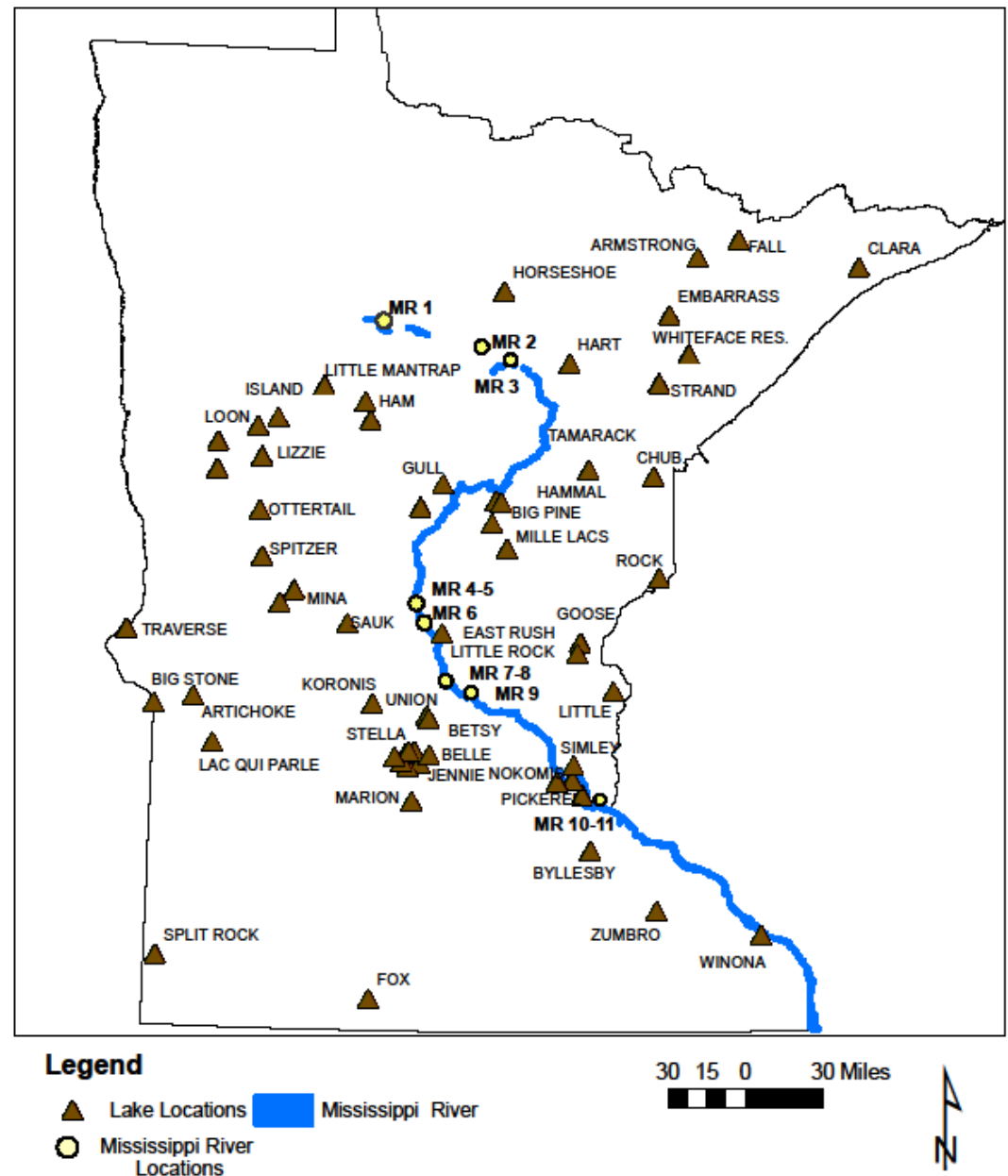


Screening Study – Bluegill and Crappie

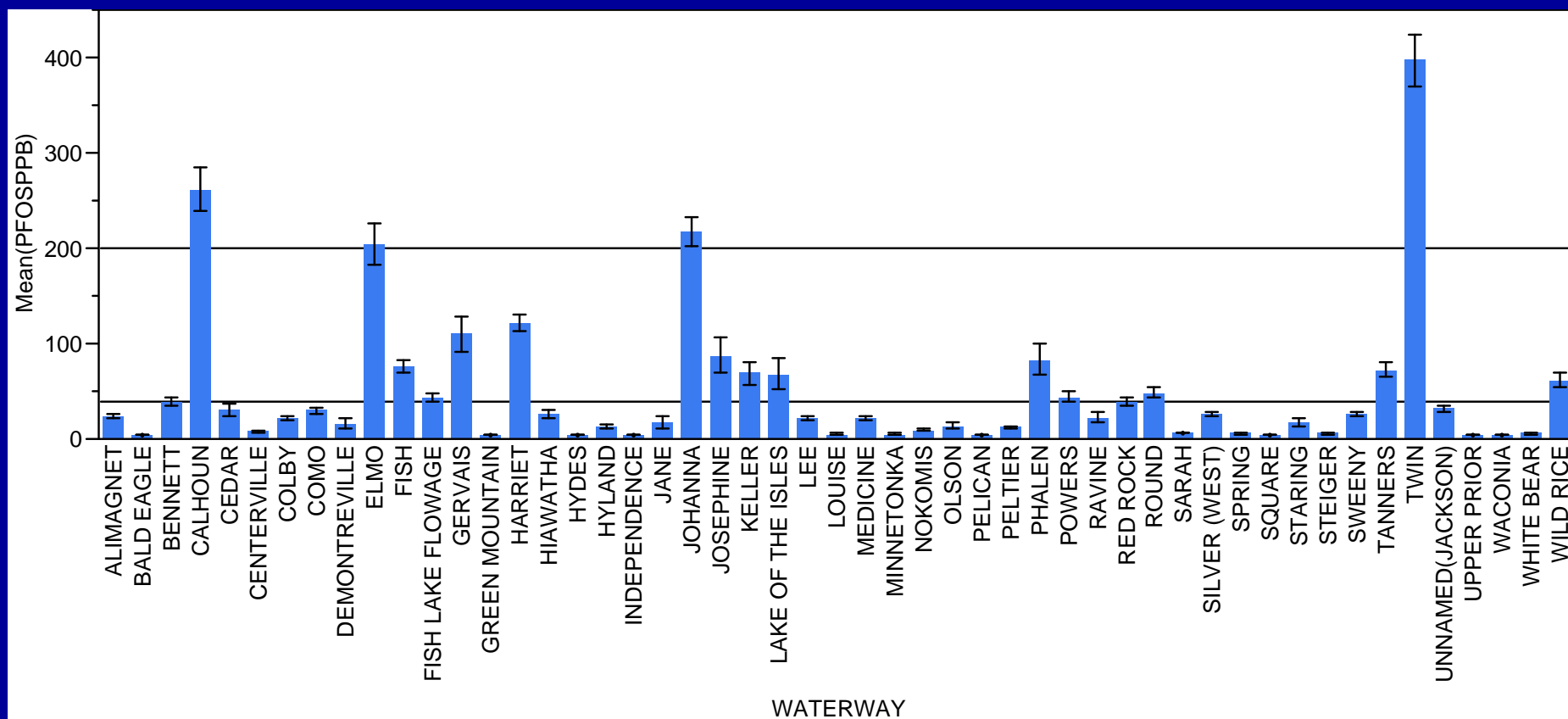
59 lakes and
areas along Mississippi R.

55 non-metro lakes

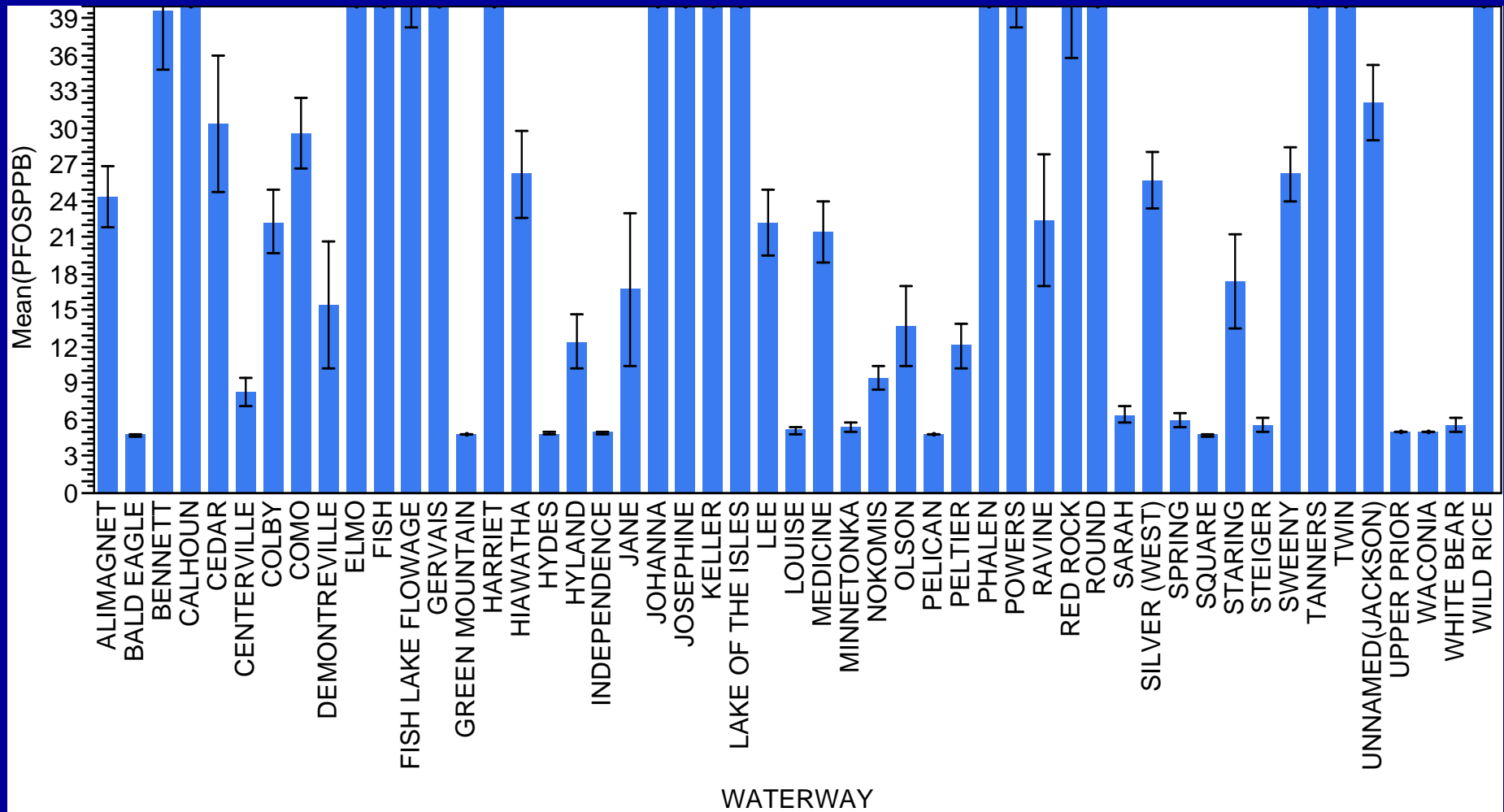
Supplemental Information Table 1.
Sampling Locations for Minnesota Fish



Bluegill

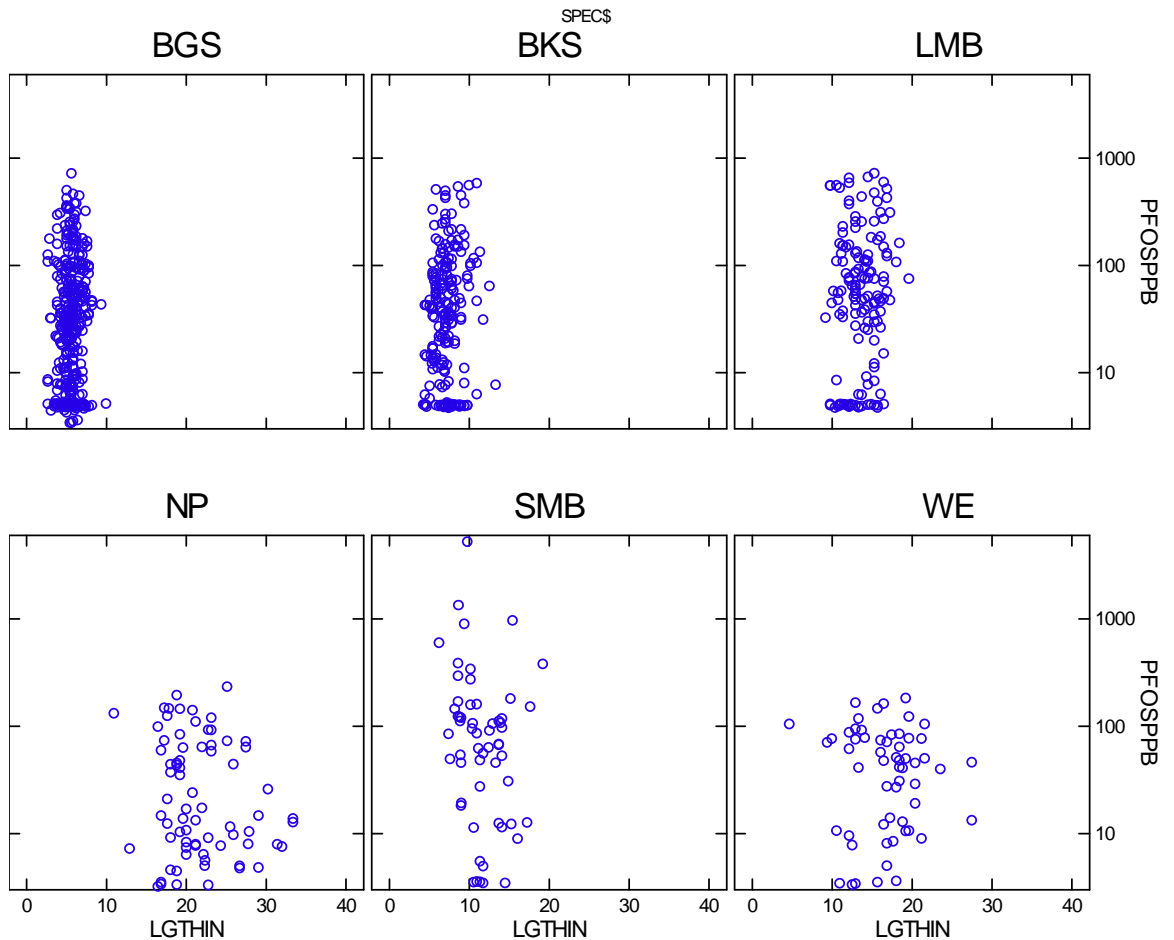


Bluegill (scale 0 – 40 ppb)



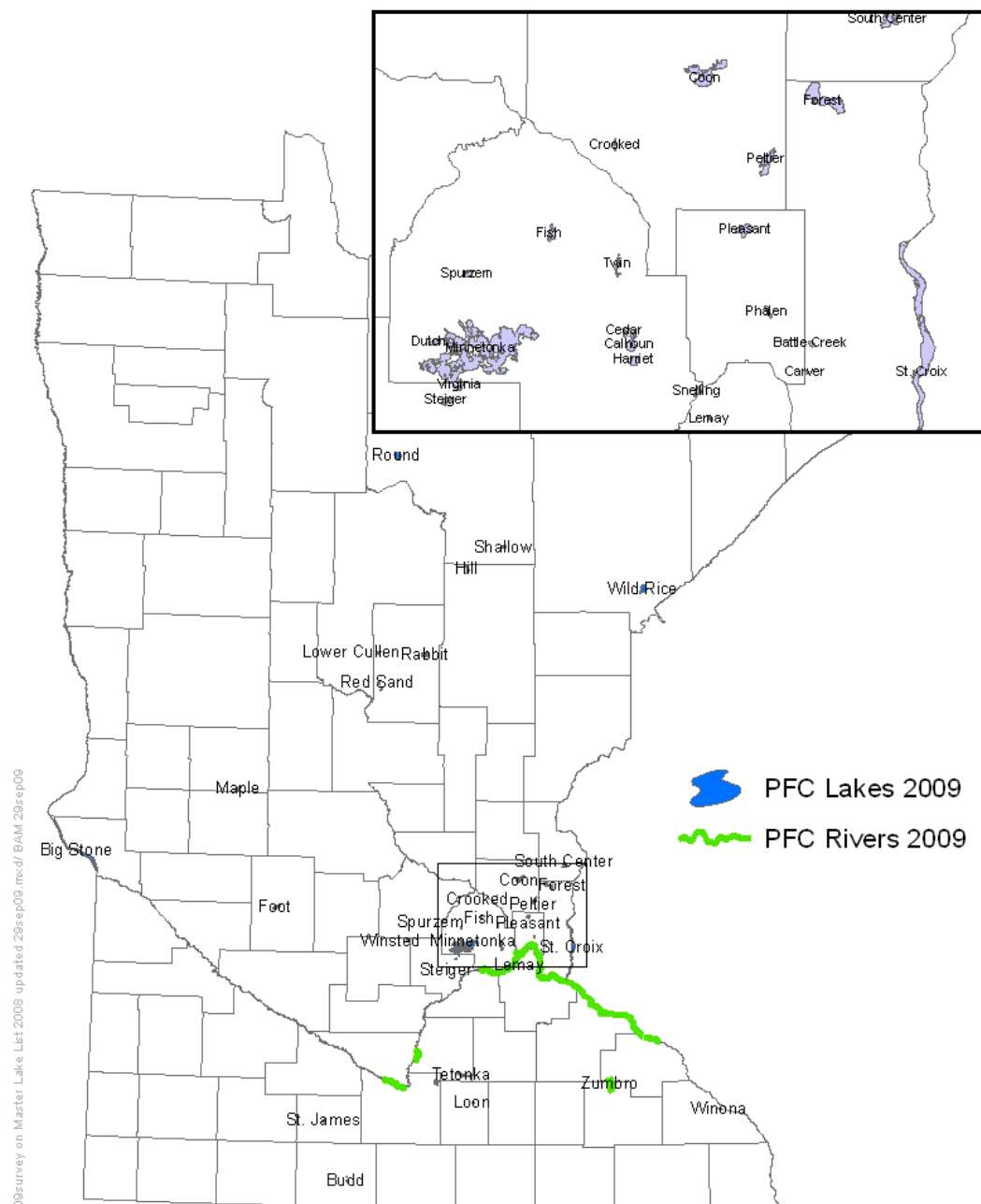
PFOS in Fish

- No relationship to:
 - Length, age, weight
 - Lipid



2009 Sampling Locations

50+ lakes & rivers



H:\009survey on Master Lake List 2008 updated 20sep09.mxd/ BAM 20sep09

Areas of PFC Investigation in MN

- Fire Fighting Training Sites
- Large Fires
- Landfills
- Waste Water Treatment Plants
- Ambient Environment
 - Surface water
 - Wildlife (esp. fish)
- Other studies:
 - Biomonitoring
 - Vegetables



Minnesota Health-Based Numbers

- Drinking Water Criteria (ug/L)
 - PFBA (7), PFOA (0.3), PFOS (0.3), PFBS (7)
- Soil Criteria – PFBA, PFOA, PFOS
 - Residential & Industrial
- Surface Water Criteria - PFOA & PFOS
 - Mississippi River (Pool 3)
 - Lake Calhoun



PFCs

Perfluorochemicals

- [Home](#)

PFCs In Water

- [Oakdale Municipal Wells](#)
- [Lake Elmo Private Wells](#)
- [PFBA in the SE Metro Area](#)

PFCs In Fish

- [Fish Consumption Advisory](#)
- [Health Guidelines](#)

PFCs and Minnesota Sites

- [Washington County Landfill](#)
- [Oakdale Dume](#)
- [3M Woodbury](#)
- [3M Cottage Grove Facility](#)
- [Class 5 Firefighting Foam](#)

Hazardous Sites & Substances

- [Home](#)
- [Sites](#)
- [Topics](#)

More from MDH

- [Health Based Rules and Guidance for Groundwater](#)
- [Special Well Construction Areas](#)
- [Well Management](#)
- [Drinking Water](#)
- [Bottled Water](#)
- [Home Water Treatment](#)
- [Environmental Health Home](#)
- [Topic Index](#)
- [Emerging Issues](#)
- [3M Contacts](#)

Perfluorochemicals in Minnesota

Introduction

Perfluorochemicals (PFCs) are a family of manmade chemicals that have been used for decades to make products that resist heat, oil, stains, grease and water. Common uses include nonstick cookware, stain-resistant carpets and fabrics, as components of fire-fighting foam, and other industrial applications. PFCs have been found in the groundwater in [southern Washington County](#) and [northern Dakota County](#).

PFCs are "emerging contaminants." This term describes contaminants about which we have a new awareness or understanding about how they move in the environment or affect public health. PFCs, like other emerging contaminants, are the focus of active research and study which means that new information is released periodically. See the links below for more information about PFCs.

If you would like to receive periodic e-mail updates on topics related to PFCs, please subscribe to the e-mailing list by clicking on the envelope in the column on the right side of this page.

Topics

[Perfluorochemicals and Health: Links to Topics](#)

Topics include:

- general information on PFCs and Health
- health based exposure limits for PFOA, PFOS and PFBA
- toxicological studies
- guidelines for fish consumption
- PFCs biomonitoring pilot program information

[Community Information](#)

Ten communities in the eastern metro are affected by PFC groundwater contamination. This page provides:

- maps
- a summary of well sampling activities
- a public health report on PFC contamination in Lake Elmo and Oakdale that includes conclusions and recommendations to protect public health

[Community Meetings](#)

Health education was provided to the affected communities in February 2007 and March 2008. This page includes the presentations by the various speakers.

[Perfluorochemicals and Water Analysis and Treatment](#)

Information on:

- a water treatment device study report
- carbon filters
- water testing for PFCs that is available for cost to citizens

[Washington County Disposal Sites](#)

This page gives information on four disposal sites that contain wastes with PFCs in Washington County.

[Archived news releases](#)

All news releases concerning PFCs are located here.

[Additional resources on perfluorochemicals](#)

Links to:

- other reports
- the biomonitoring project
- information from PFC-related workshops
- other state and federal agencies


Updates

[Health Consultation: Review of Private Well Data: Former Washington County Sanitary Landfill \(PDR 005K05/14 pages\)](#)

[PFCs in Class 5 firefighting foam](#)

[Class 5 Firefighting Foam: Municipal Well Investigative Sampling Results](#)

[The final public health assessment for the Perfluorochemical Contamination in Lake Elmo and Oakdale, Washington County, MN is now available.](#)

 [Subscribe to Perfluorochemicals and Health in Minnesota](#)



PFC Sites:

[PFC Waste Sites](#)

Related Topics:

[Hot Topics](#)

This website contains 222
documents that require Adobe
Acrobat for viewing.

[MPCA Home](#) > [Hot Topics](#) > [Perfluorochemicals](#) > [MPCA Sampling Activity](#)

Perfluorochemicals

Current Status

- [Investigating PFCs in Minnesota: Current Status as of March 2008](#)

The latest news:

- [2008 MPCA Metro Lakes PFC Fish Data: Final 9 lakes](#) (February 27, 2008)
- [2008 MPCA Metro Lakes PFC Fish Data: 15 lakes](#) (February 13, 2008)
 - [Minnesota Department of Health News Release](#) [MDOH](#)
- [PFCs and Class 6 Firefighting Foam](#) (February 10, 2008)
- [PFCs in Minnesota's Ambient Environment: 2008 Progress Report](#)
- [2007 MPCA Metro Lakes PFC Fish Data – additional 20 lakes](#) (January 29, 2008). Data reporting from second batch. Follow this link to a [summary statement](#) and data tables.
- [2007 MPCA Metro Lakes PFC Fish Data – Final 10 of 30 Lakes](#) (August 17, 2007).
 - Analysis of fish from additional metro area lakes prompts changes in fish consumption advice for specific lakes. [Minnesota Department of Health News Release](#) [MDOH](#)
- [MPCA has finalized site-specific water-quality criteria for PFCA and PFOS](#) (August 2007).
- [Summary of PFC Testing at Landfills](#). The MPCA recently received the results of groundwater and leachate sampling conducted at about 40 landfills across Minnesota. The results show that PFCs are found in groundwater and/or leachate at a number of active landfills, many of which don't have a history of accepting wastes related to the 3M Company's manufacture of PFCs. Questions about the survey can be directed to [Mark Rye](#) at the MPCA, 651-751-2555.
- [Wastewater Survey Finds Elevated PFCs in Steward](#). Finding will delay city's wastewater permit. (posted July 20, 2007).
- [Results from Testing at Wastewater Treatment Plants](#) (posted July 20, 2007).
- [Settlement Agreement and Consent Order with 3M for PFC Cleanup](#). The MPCA Citizens' Board voted 9-0 on Tuesday, May 22nd, to approve the Settlement Agreement and Consent Order with 3M regarding the 3M Chemtule Disposal site, the 3M Celoxide Disposal Site, and the 3M Woodbury Disposal Site.
- Residents of Washington and Dakota Counties concerned about possible contamination of their private wells by PFCs are now able to get their water tested through a partnership between the counties and MPCA. The cost for testing is \$300 in Washington County, \$287 in Dakota County. More information is available on the [Washington County](#) and the [Dakota County](#) Web sites.
- [Proposed Consent Order on PFCs – A Summary of Negotiations](#) (fact sheet posted May 16, 2007)
- The Proposed Consent Order will be presented to the MPCA Citizens' Board on May 22, 2007.
 - [Letter to Citizens' Board, and Board Item on Proposed Consent Order](#)
- Recent Citizens' Board Action:
The Minnesota Pollution Control Agency Citizens' Board voted on April 24, 2007, to postpone the MPCA Commissioner's recommendation to issue Requests for Response Action (RRFA) to the 3M Company for PFC contamination at three disposal sites in Washington County. Instead the Board directed the agency and 3M to negotiate cleanup agreements for the three sites by the Board's next regular monthly meeting, scheduled for May 22nd. The Board affirmed in its motion that if negotiations are not successful by then, the Board may again consider issuing the RRFA's. The Board's motion also directed MPCA staff to ensure that negotiation discussions include the following topics:
 - Cleanup plans should be rigorous and robust
 - Full recognition of MPCA's legal authority
 - Provisions for dealing with affected municipal and private water supplies
 - Provisions for addressing PFRA's in future
 - Any additional studies needed on health effects and payment for the state's costs
 - Any additional cooperation needed from 3M, in terms of sharing information
 - Future RRFA action is not precluded

- [Current Status of PFC Investigation](#)
- [The Latest News](#)
- [MPCA Actions](#)
- [Health Information](#)
- [What are PFCs?](#)
- [PFC Connection to Minnesota](#)
- [Sampling and Pilot Test for Ground-Water Treatment at Washington County Landfill](#)
- [Sampling in Lake Simo and Celoxide](#)
- [Active Landfill Evaluation for PFCs](#)
- [Sediment and Fish Tissue Sampling for PFCs from the Mississippi River and Metro-Area Lakes](#)
- [Water-Quality Criteria for PFCA and PFOS](#)
- [MPCA Investigation and Cleanup of 3M PFC Sites](#)
 - [PFC Cleanup Sites](#)
- [PFCs and Class 6 Firefighting Foam - MPCA/MOH Investigation](#)
- [SRA Activities for PFCA and Other PFC Compounds](#)
- [Future MPCA Activities](#)
- [Fact Sheets and Presentations](#)
- [Links](#)
- [More Information](#)

MPCA Actions

The MPCA is involved in a number of activities related to cleanup and research about perfluorinated chemicals, or PFCs. Some of the most notable of these include:

- Working with the Minnesota Department of Health to sample private and municipal drinking water supplies;
- Evaluating closed and active landfills that may have accepted waste containing perfluorooctane sulfate (PFOS) and perfluorooctanoic acid (PFOA);
- Sampling Mississippi River sediment and discharge from outfalls at the 3M Cottage Grove facility;
- Sampling effluent from a number of wastewater treatment plants statewide, including the Twin Cities metro plants;
- Fish tissue sampling;
- Review and oversight of 3M's investigation and cleanup plans for sites in the Superfund program;
- Coordination of information with the U.S. Environmental Protection Agency (EPA) about PFOA; and
- Developing water-quality criteria for surface water discharge of PFOS and PFOA.

For more information . . .

- Minnesota Department of Health web sites –
 - PFCs -
<http://www.health.state.mn.us/divs/eh/hazardous/topics/pfc/index.html>
 - Fish Consumption Guidelines –
<http://www.health.state.mn.us/divs/eh/fish/index.html>
 - Health-based guidance for water -
<http://www.health.state.mn.us/divs/eh/risk/guidance/gw/index.html>
- Minnesota Pollution Control Agency PFC –
<http://www.pca.state.mn.us/cleanup/pfc/index.html>