

Issues and Needs for PFAA Exposure and Health Research: A State Perspective

**PFAA Days II
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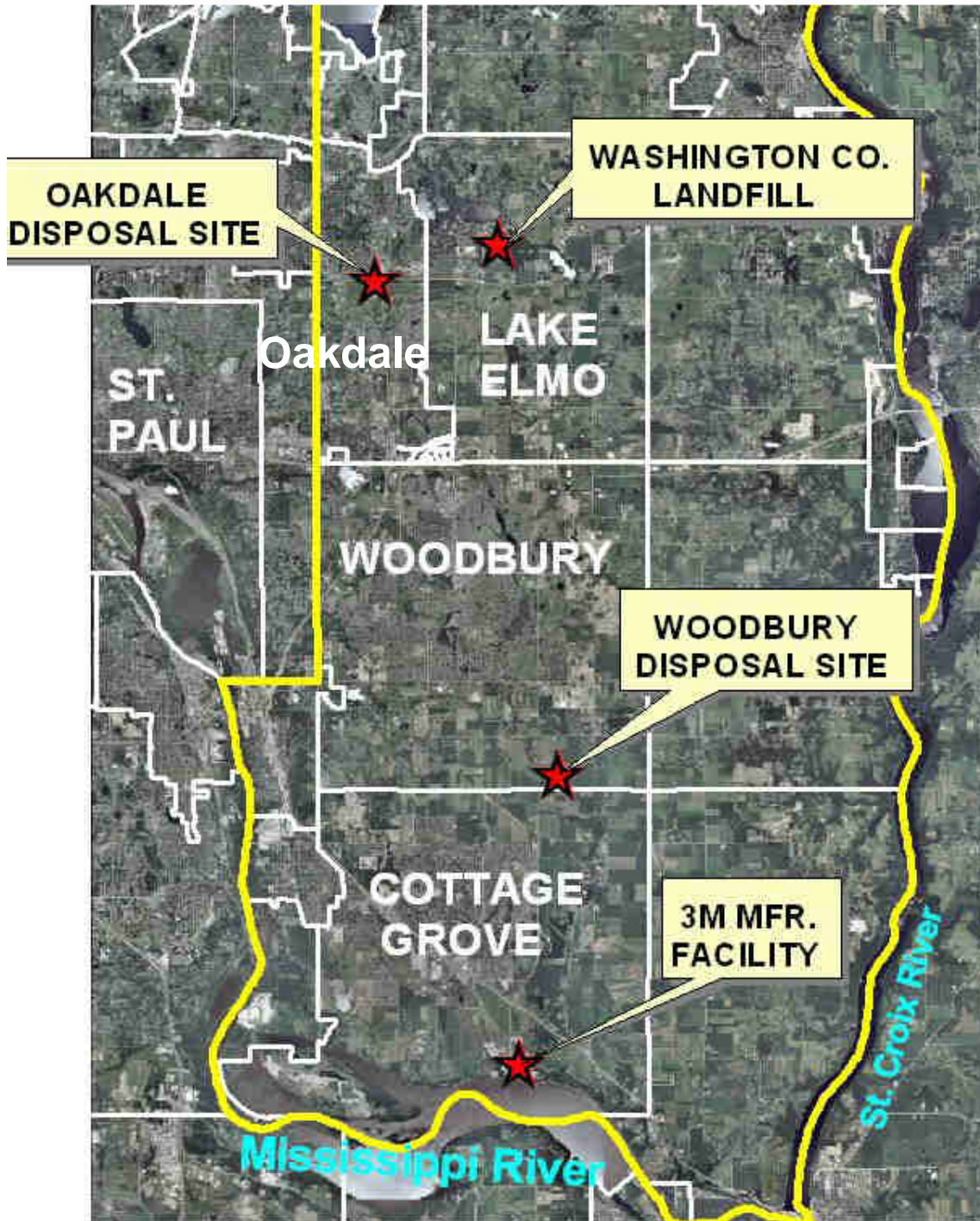


Outline

- Environmental Occurrence in Minn.
 - Disposal Sites Investigations
 - “Ambient” Monitoring Studies
 - On-going activities
- Health-based Guidance
- Interactions with EPA
- Data Needs
- Future Opportunities

Background - Why Are PFCs An Issue in MN?

- We are the home of 3M, originally known as Minnesota Mining and Manufacturing
- 3M operates a large chemical plant on the banks of the Mississippi River in Cottage Grove, Minnesota
- PFCs were manufactured at the plant for decades
- PFC production wastes and wastewater treatment sludge was disposed of both on and off site; primary PFC waste disposal sites are located in Washington Co., Minnesota



LOCATION OF 3M SITES IN WASHINGTON CO. MINNESOTA



Environmental Occurrence - Drinking Water Investigations

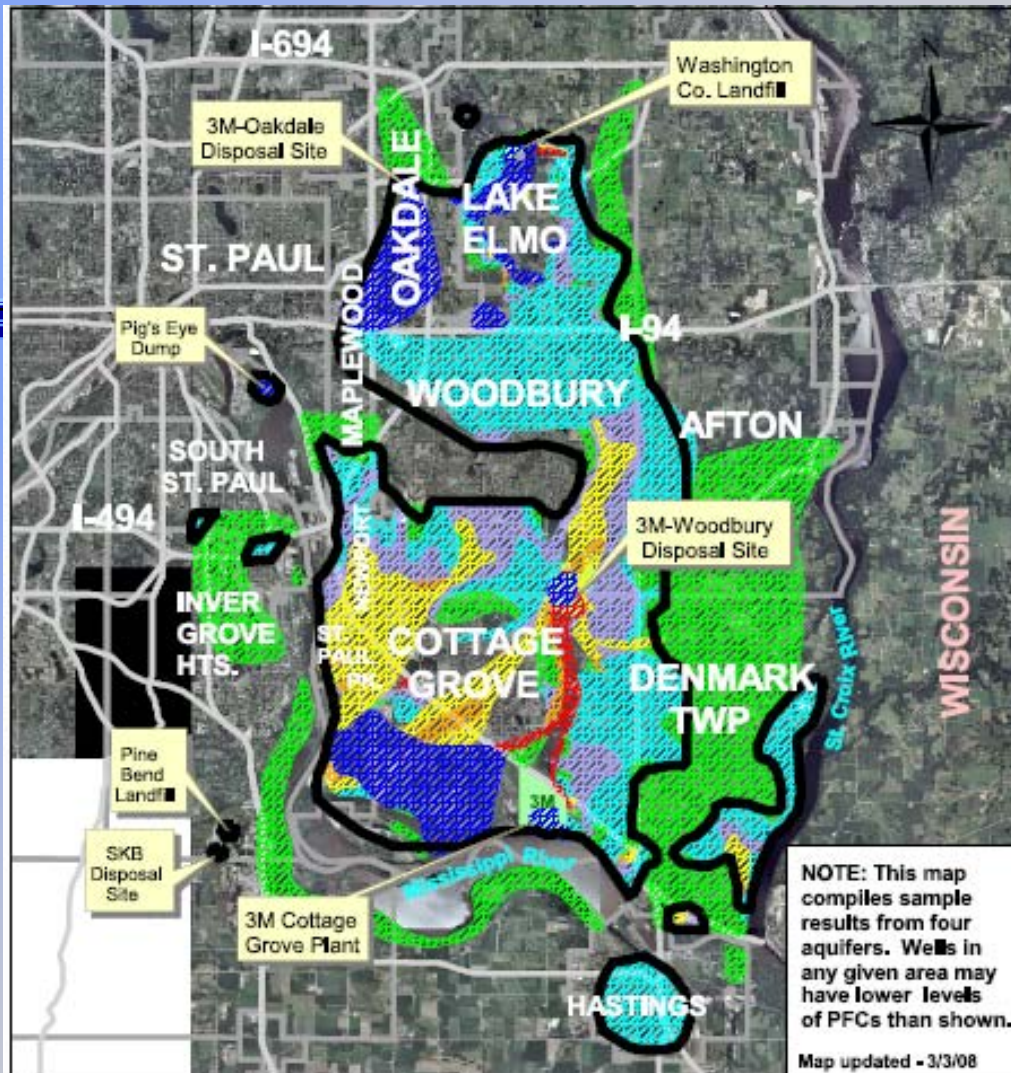
- 2006 MDH expanded list of PFC analytes beyond PFOA and PFOS to include:
 - PFBA (perfluorobutanoic acid)
 - PFPeA (perfluoropentanoic acid)
 - PFHxA (perfluorohexanoic acid)
 - PFBS (perfluorobutane sulfonate)
 - PFHxS (perflurohexane sulfonate)

Environmental Occurrence - Site Investigations

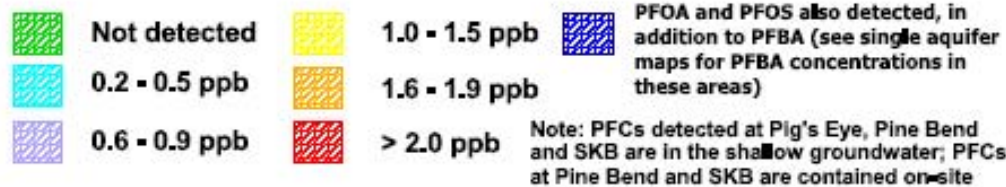
Media	Maximum Detected Concentration (ppb)					
	PFBA	PFPeA	PFHxA	PFOA	PFDA	PFDoA
Ground water	1,170	36.6	50.2	23,700		
Drinking water	11.8	0.9	0.42	3.2		
Surface Water	1.08	9.75	1.27	20.4		
Fish	19.6		4.21	20.1	17.2	14.6
Soil	1,600	165	999	18,050		

Environmental Occurrence - Site Investigations (cont)

Media	Maximum Detected Concentration (ppb)			
	PFBS	PFHxS	PFOS	PFOSA
Groundwater	26.1	40.0	8,343	
Drinking water	0.33	0.21	3.4	
Surface Water	9.69	4.58	11	
Fish	5.03	5.23	5150	33.1
Soil	224	5585	108,000	



PFBA in Southeast Metro - Jan. 2008

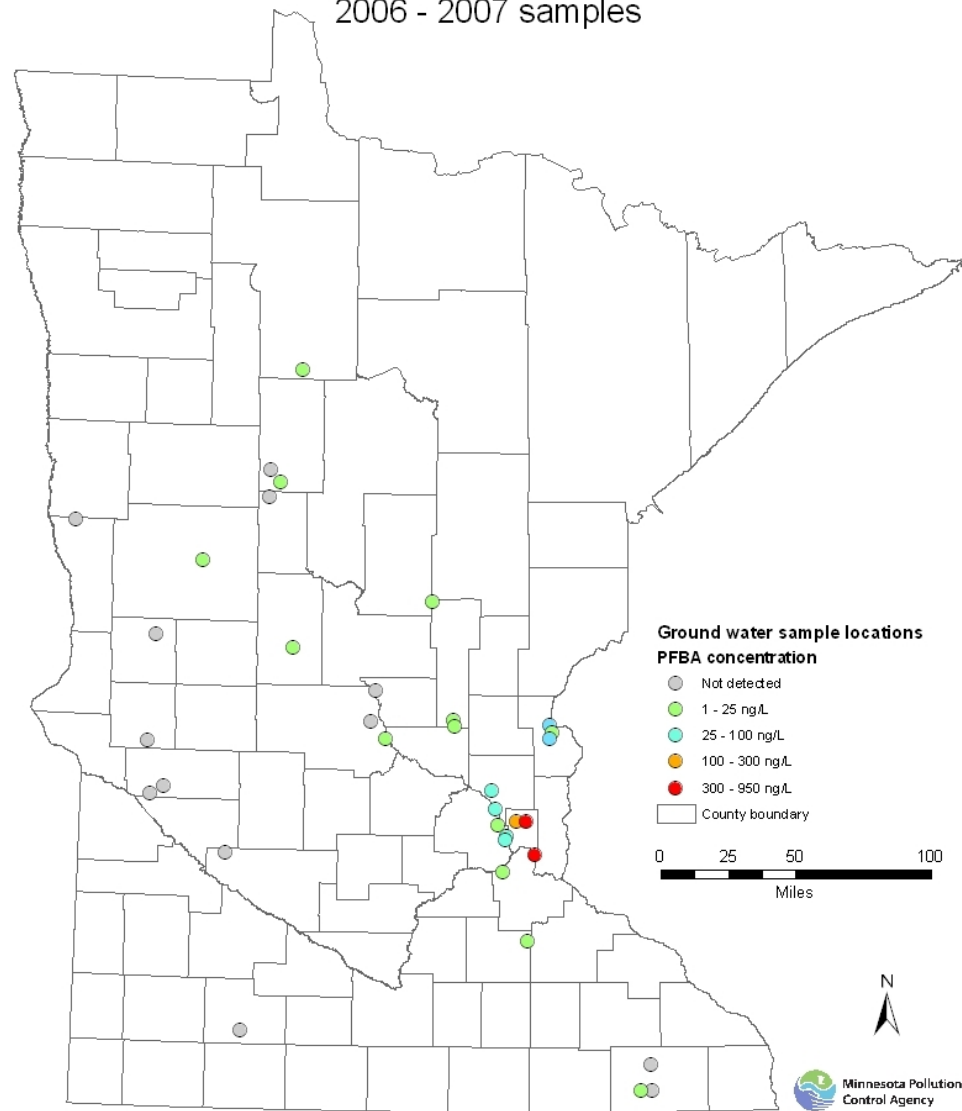


Environmental Occurrence - “Ambient” Investigations

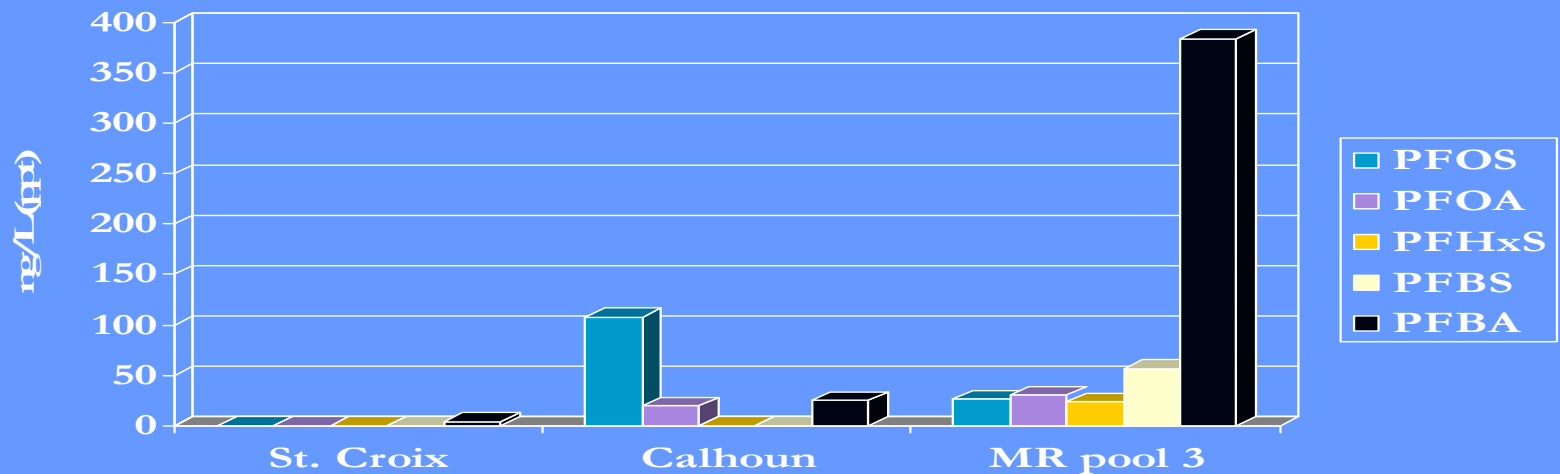
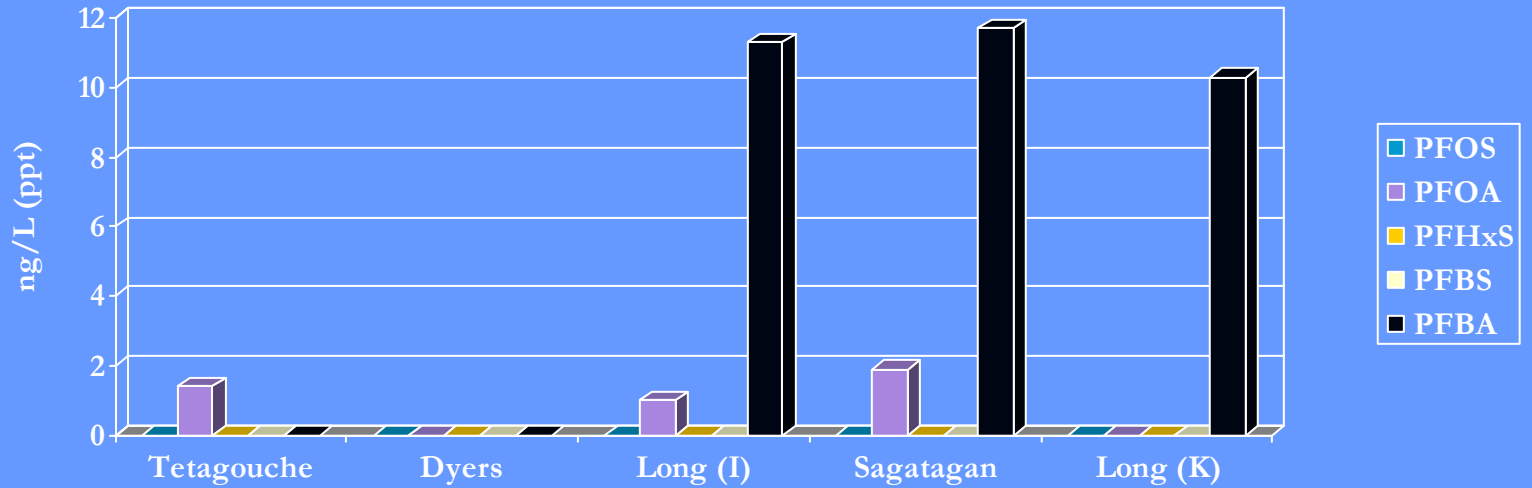
- Perfluoroalkyl sulfonates and sulfonamide:
 - PFBS
 - PFHxS
 - PFOS
 - **PFOSA**
- Perfluoroalkyl carboxylic acids:
 - PFBA
 - PFPeA
 - PFHxA
 - **PFHpA**
 - PFOA
 - **PFNA**
 - **PFDA**
 - **PFUnA**
 - **PFDnA**

Environmental Occurrence - Ambient Ground Water

PFBA in Minnesota's Shallow Ambient Ground Water
2006 - 2007 samples

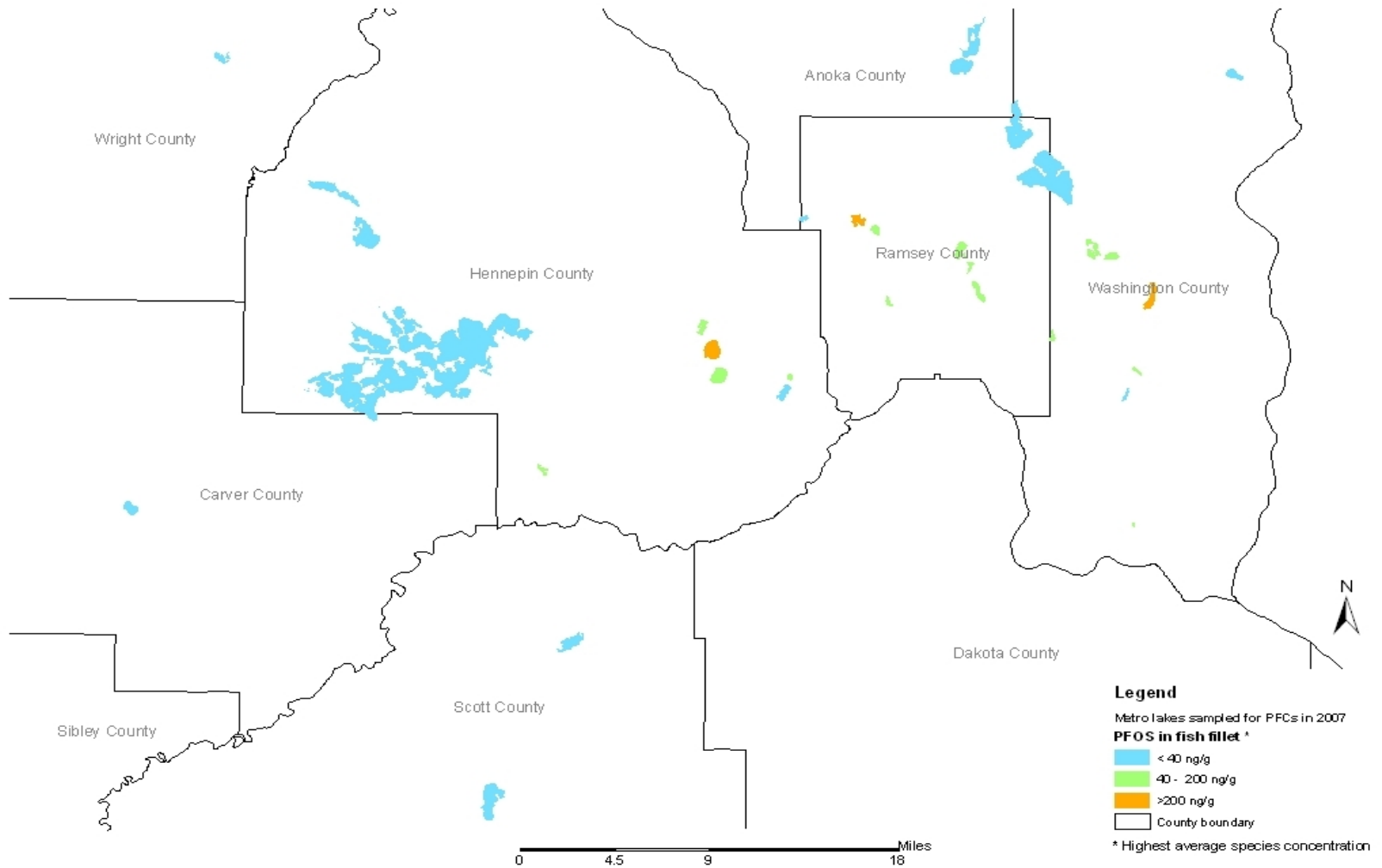


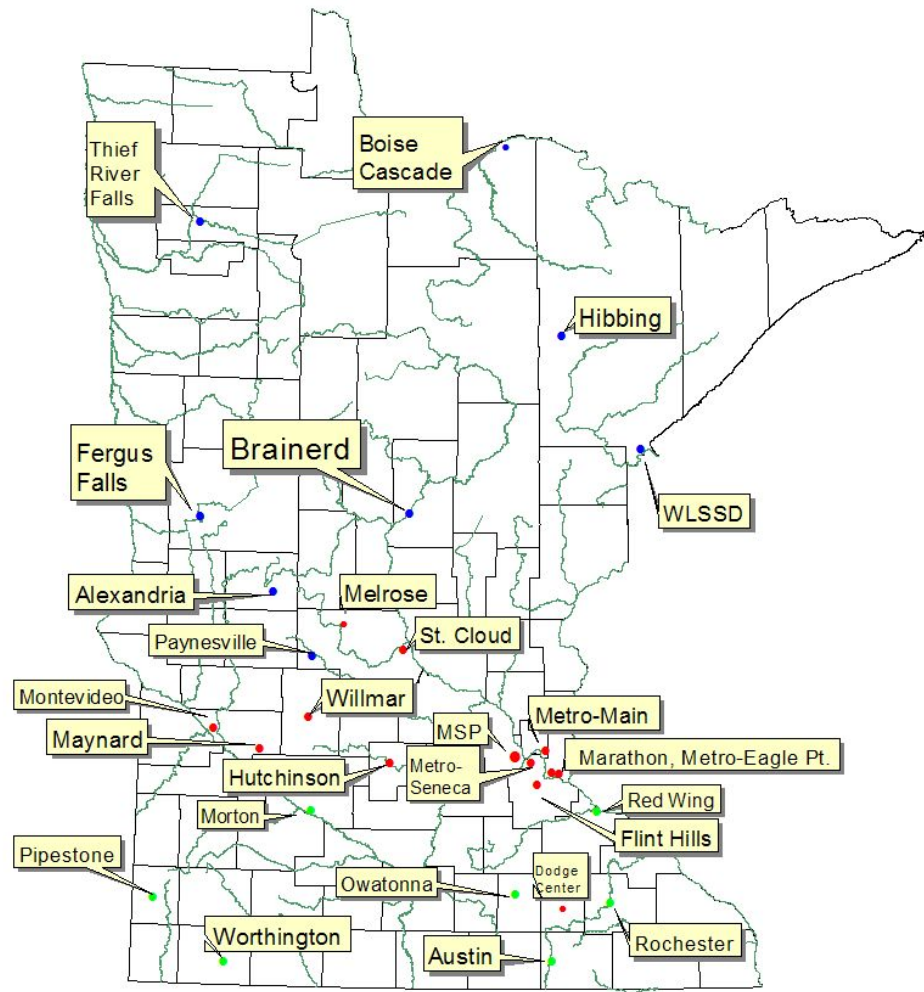
Environmental Occurrence - Ambient Surface Water



Environmental Occurrence - Fish Tissue

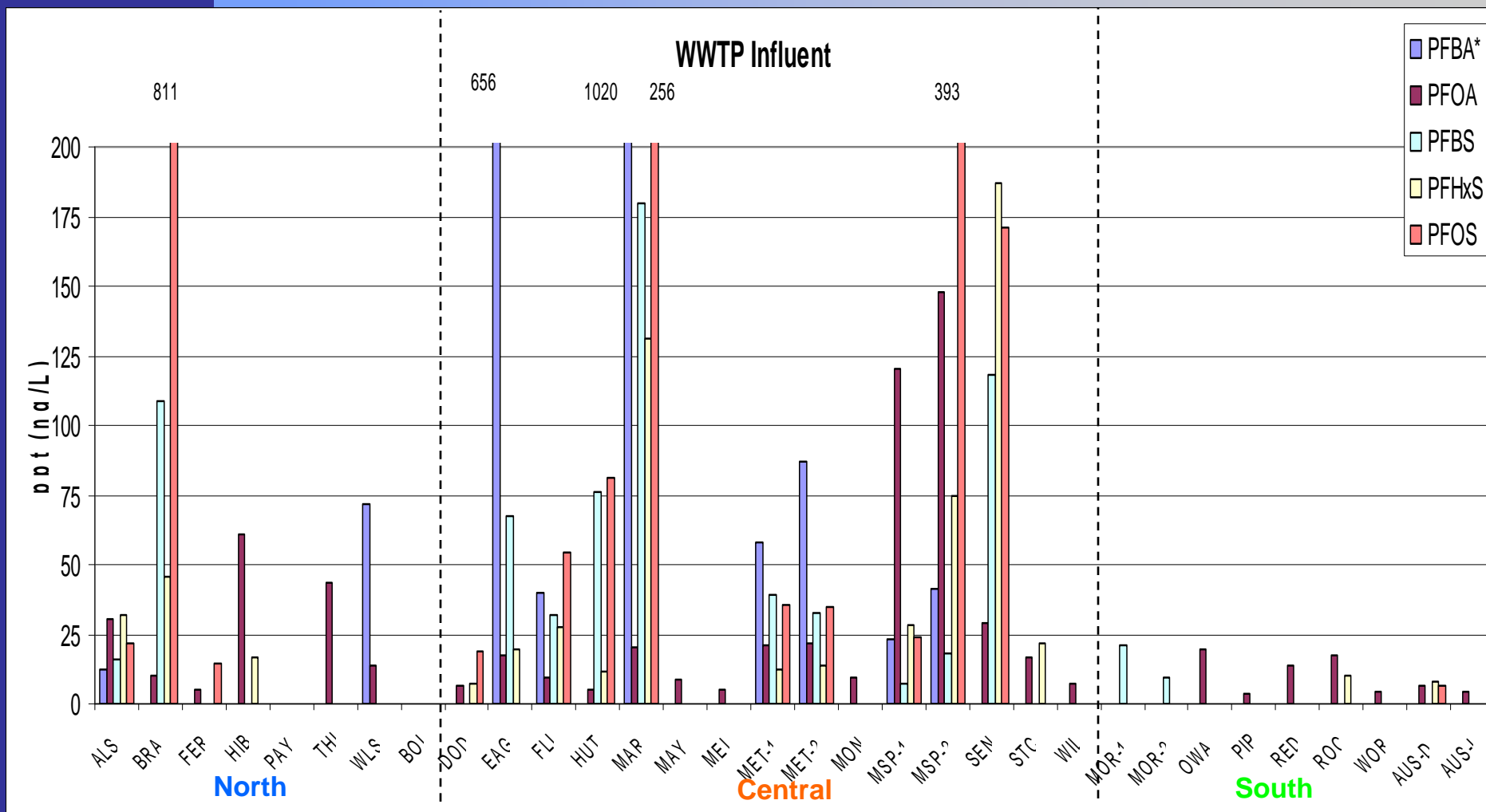
Fish Tissue Sampling Results for the Twin Cities Area, Minnesota
2006 and 2007 Sampling





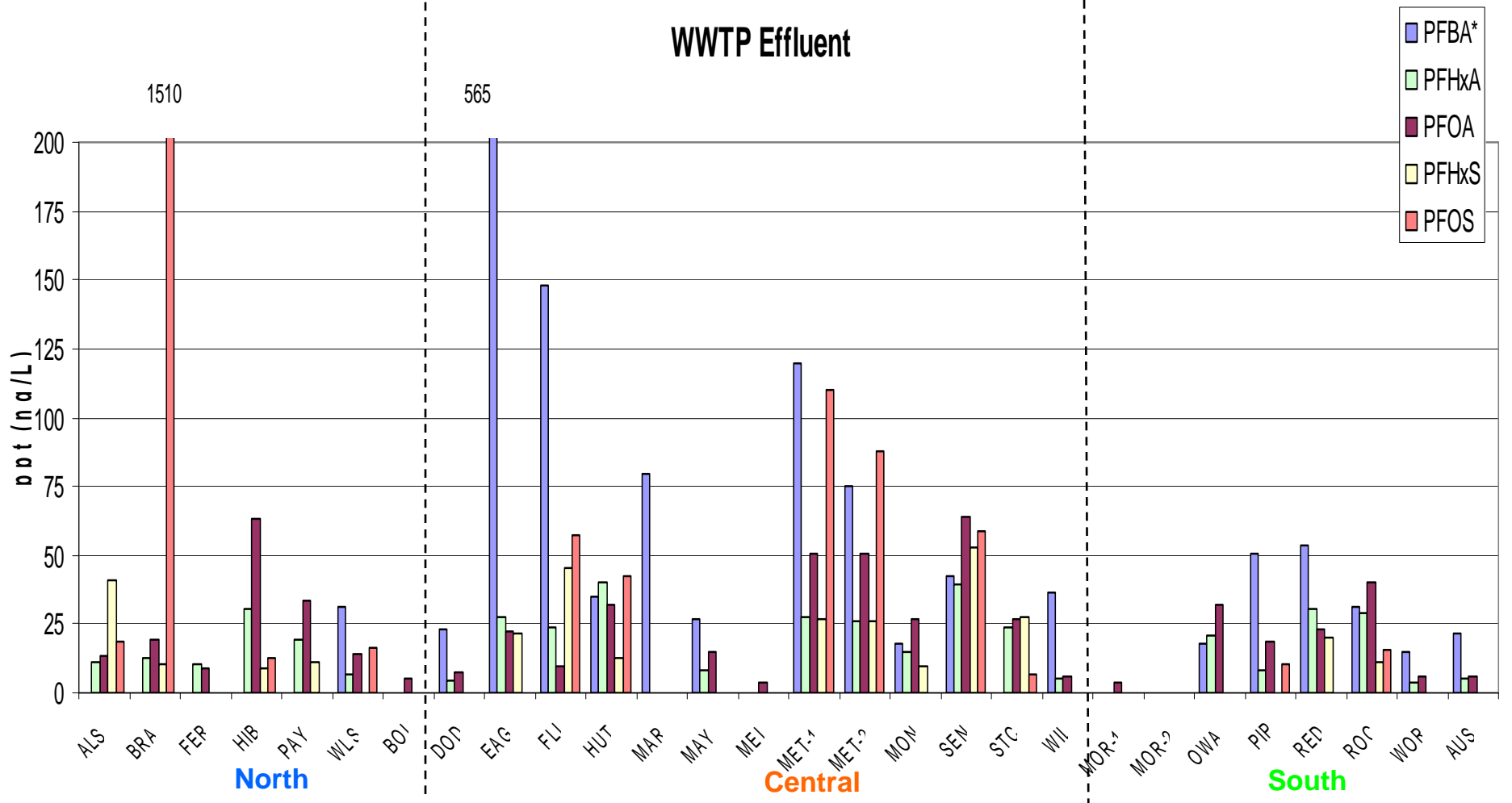
MPCA 2007 WWTP Sample Locations

Environmental Occurrence - Waste Water Treatment Plants

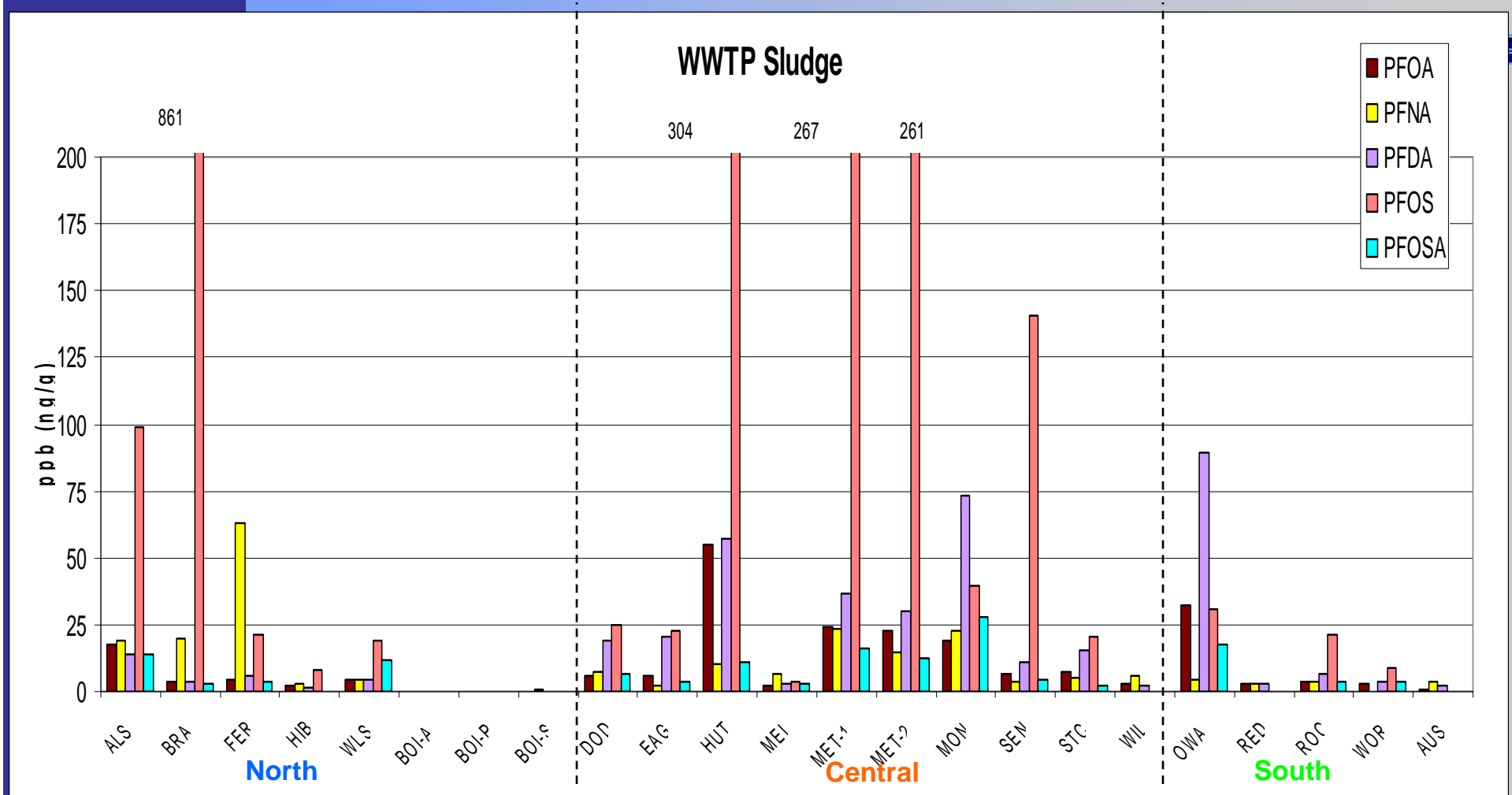


Environmental Occurrence - Waste Water Treatment Plants

WWTP Effluent



Environmental Occurrence - Waste Water Treatment Plants



Environmental Occurrence - Sanitary Landfills

- Leachate/gas condensate (> 1 ppb)
 - PFBA, PFHxA, PFOA, PFHxS
 - N-Me FOSA, N-Et FOSA, N-Me FOSE, N-Et FOSE

- Landfill gas (> 1 ng/m³)
 - PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFOSA

- Groundwater (> 0.1 ppb)
 - PFBA*, PFPeA, PFHxA, PFHpA, PFOA, PFHxS

Some of Minnesota's current activities

- Surface water and fish tissue in urban and rural areas
- Waste water treatment plant PFC assessment
- Air and precipitation monitoring
- Food chain/wildlife/ecological studies
- Targeted source investigations, including “fingerprinting” study
- Working with chrome platers on substitute for PFOS-containing fume suppressant
- Soil microcosm studies with EPA
- Pilot biomonitoring study in Washington County
- Treatability studies for managing discharge from disposal sites and point of use treatment for households
- Laboratory development of analytical methods for additional PFCs, lower detection limits

Minnesota Health-Based Criteria

- Drinking Water Criteria (ug/L)
 - PFBA (7), PFOA (0.3), PFOS (0.3)
- Soil Criteria (mg/kg)
 - Residential – PFBA (77), PFOA (2), PFOS (2)
 - Industrial - PFBA (500), PFOA (13), PFOS (14)
- Surface Water Criteria (ug/L)
 - Mississippi River (Pool 3) - PFOA (0.72), PFOS (0.006)
 - Lake Calhoun - PFOA (0.61), PFOS (0.0122)
- Fish Advisory (ppb)
 - 1 meal/week – PFOS (>40)
 - 1 meal/month – PFOS (>200)

PFCs in Other States - Water

- Alabama
- Florida
- Georgia
- New Jersey
- New York
- North Carolina
- Ohio/West Virginia
- Tennessee
- Virginia

Interactions with EPA

- 2006 –
 - PFBA developmental study initiated
 - Comment on PFOA Relative Source Contribution
 - Informal discussions regarding PFOA and PFOS toxicity data evaluated in EPA draft reports

- 2007 –
 - Feb – established contacts at SOT CCT workshop
 - May 2007 workshop – representatives from EPA and ATSDR
 - Developing rigorous analytical method – NHEERL (RTP) NRMRL (Cincinnati)
 - Consultation with NHEERL scientists regarding thyroid effects and toxicokinetic concerns
 - PFBA developmental study completed

Data Needs – Dose Response

- Chemicals
 - PFBA
 - PFPeA, PFHxA, PFBS, PFHxS
 - Precursors?
- Toxicokinetics (species, life-stage, dose duration, dose rate, etc.)
- Toxicodynamics
 - Mixtures
 - Relevance of sensitive endpoint to humans (e.g., PPAR α , displacement of T4, etc.)

Data Needs - Exposure

- Potential source(s) and routes
 - Relative contribution
- Environmental fate and transport
- Food Chain
 - Bioaccumulation of PFOS in fish (others?)
 - Accumulation in produce
 - Breast milk

Future Opportunities

- Communication
 - Identified contacts/liaisons
 - Direct Federal communication to interested/affected parties
 - “Access” to scientific forums
- Collaboration/Partnership
 - Inform research needs
 - Pool resources to gather and share information

For more information . . .

- Minnesota Department of Health PFC web site -
<http://www.health.state.mn.us/divs/eh/hazardous/topics/pfcs/index.html>
- Minnesota Pollution Control Agency PFC web site –
<http://www.pca.state.mn.us/cleanup/pfc/index.html>