PFAS

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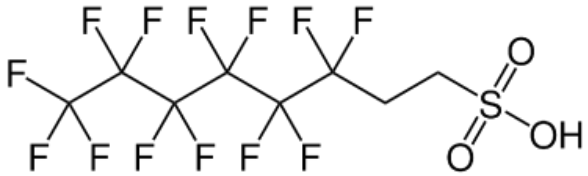
PHMDC

Public Health
MADISON & DANE COUNTY
Healthy people. Healthy places.

What is PFAS?



- Per- and polyfluoroalkyl substances
- Produced commercially since 1940 (peak production from 1970-2002)
- Commercially useful
  - Fire resistance
  - Oil, stain, water and grease repellent
- Over 3000 different PFAS compounds

Manufacturing Uses

- Non-stick coatings
- Waterproof fabrics
- Food packaging
- Specialty firefighting foams
- Coated paper

Environmental Concerns

- Some PFAS compounds are highly resistant to degradation in groundwater
  - Called “forever chemicals”
  - Found at many training sites for use in aviation-related firefighting (airports, military bases, etc.)
- Bioaccumulation in the food chain
  - Fish
  - Wildlife

Exposure Routes

- Primary routes of exposure include:
  - Eating food packaged in PFAS-containing material
  - Eating fish caught in waterways with PFAS
  - Drinking contaminated water
  - Incidental ingestion of dust or soil with PFAS
  - Consumer products
- PFAS found in detectable levels in blood of virtually all people in North America

PFAS Health Concerns

- High levels of PFAS may contribute to:
  - Thyroid issues
  - Increased cholesterol levels
  - Reduced efficacy of vaccines
  - Decreased fertility in women
- Based largely on animal studies with a small subset of the 3000+ PFAS compounds

Important Messages

- PFAS chemicals are widely used.
- They stay in the body for a long time.
- A variety of health risks are associated with high-level exposure.
- Well 15 is off. PFAS has been found in other wells.
- Department of Health Services has recommended standards for PFOA and PFOS.
- Follow new fish advisory for Lake Monona to reduce potential exposure to PFAS.

PFAS Monitoring

Madison Water Utility PFAS Testing, 2012-2018

	2012		2015		2017		2018	
	Tested	Results	Tested	Results	Tested	Results	Tested	Results
Well 06	X	ND	2X	ND				
Well 07			2X	ND				
Well 08			2X	ND				
Well 09			2X	ND				
Well 11	X	ND	2X	ND				
Well 12			2X	ND				
Well 13			2X	ND				
Well 14	X	ND	2X	ND				
Well 15			2X	ND				
Well 16	X	ND	2X	ND				
Well 17			2X	ND				
Well 18			2X	ND				
Well 19			2X	ND				
Well 20			2X	ND				
Well 23			2X	ND				
Well 24			2X	ND				
Well 25			2X	ND				
Well 26			2X	ND				
Well 27			2X	ND				
Well 28			2X	ND				
Well 29			2X	ND				
Well 30			2X	ND				
PFAS Tested	6		6					
Test Method	EPA 537	RL: 10-90 ppt	EPA 537	RL: 10-90 ppt				

ND = not detected at reporting limit (RL)

Madison Water Utility PFAS Testing, 2012-2018

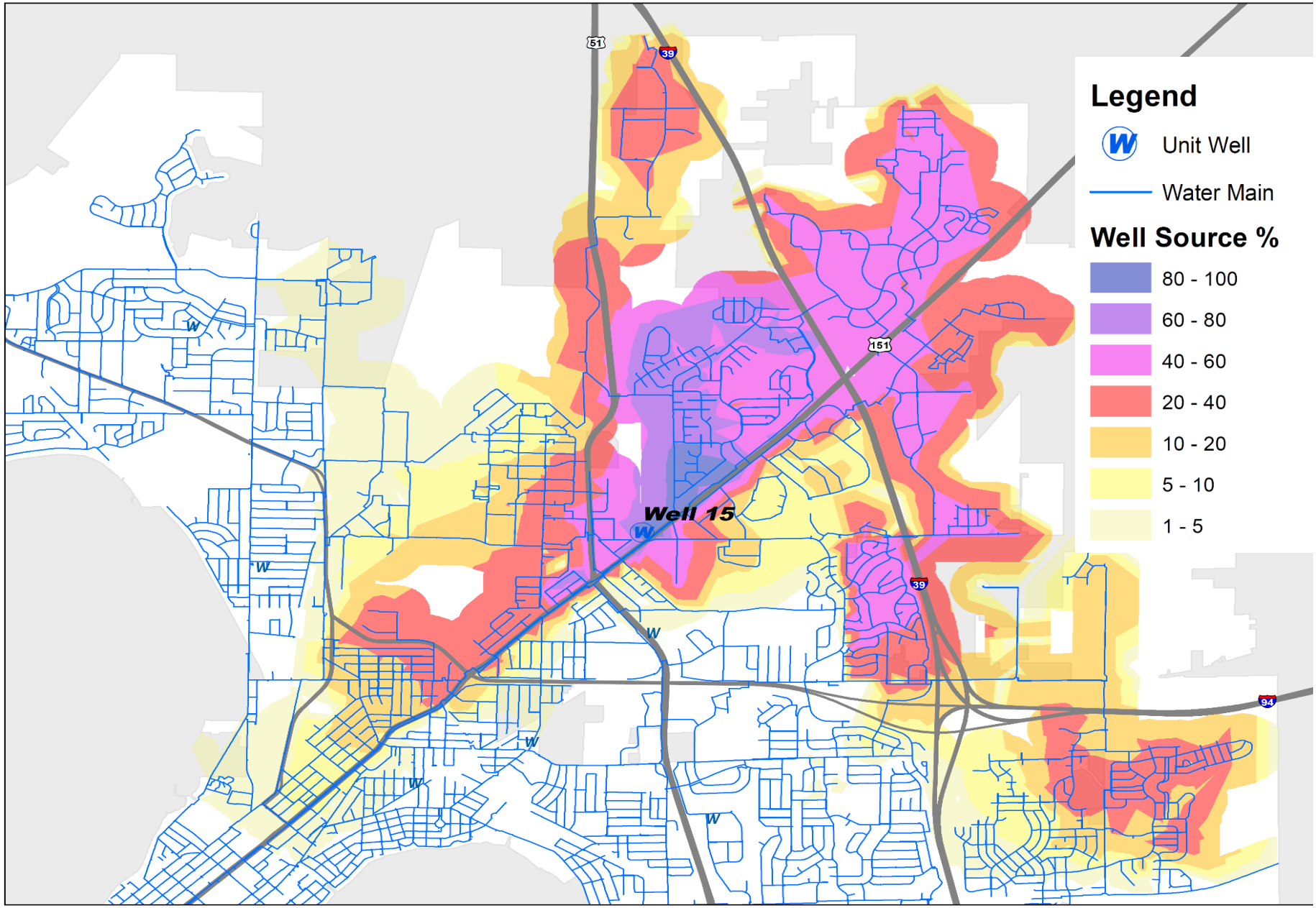
	2012		2015		2017		2018	
	Tested	Results	Tested	Results	Tested	Results	Tested	Results
Well 06	X	ND	2X	ND				
Well 07			2X	ND	X	ND		
Well 08			2X	ND				
Well 09			2X	ND				
Well 11	X	ND	2X	ND				
Well 12			2X	ND				
Well 13			2X	ND				
Well 14	X	ND	2X	ND				
Well 15			2X	ND	2X	31-35 ppt		
Well 16	X	ND	2X	ND	2X	2.4-2.6 ppt		
Well 17			2X	ND				
Well 18			2X	ND	X	ND		
Well 19			2X	ND				
Well 20			2X	ND				
Well 23			2X	ND				
Well 24			2X	ND				
Well 25			2X	ND				
Well 26			2X	ND				
Well 27			2X	ND				
Well 28			2X	ND				
Well 29			2X	ND	X	ND		
Well 30			2X	ND				
PFAS Tested	6		6		6			
Test Method	EPA 537	RL: 10-90 ppt	EPA 537	RL: 10-90 ppt	Mod EPA 537	**RL: 2 ppt**		

ND = not detected at reporting limit (RL)

Madison Water Utility PFAS Testing, 2012-2018

	2012		2015		2017		2018	
	Tested	Results	Tested	Results	Tested	Results	Tested	Results
Well 06	X	ND	2X	ND				
Well 07			2X	ND	X	ND		
Well 08			2X	ND				
Well 09			2X	ND				
Well 11	X	ND	2X	ND				
Well 12			2X	ND				
Well 13			2X	ND				
Well 14	X	ND	2X	ND				
Well 15			2X	ND	2X	31-35 ppt	2X	37-42 ppt
Well 16	X	ND	2X	ND	2X	2.4-2.6 ppt	X	2.4 ppt
Well 17			2X	ND				
Well 18			2X	ND	X	ND		
Well 19			2X	ND				
Well 20			2X	ND				
Well 23			2X	ND				
Well 24			2X	ND				
Well 25			2X	ND				
Well 26			2X	ND				
Well 27			2X	ND				
Well 28			2X	ND				
Well 29			2X	ND	X	ND		
Well 30			2X	ND				
PFAS Tested	6		6		6		12/18	
Test Method	EPA 537	RL: 10-90 ppt	EPA 537	RL: 10-90 ppt	Mod EPA 537	RL: 2 ppt	Mod EPA 537	RL: 2 ppt

ND = not detected at reporting limit (RL)


Legend
Unit Well
Water Main
Well Source %
80 - 100
60 - 80
40 - 60
20 - 40
10 - 20
5 - 10
1 - 5
Well 15
51
39
151
94

Differing Federal & State Guidelines

Units in parts per trillion, ppt	INDIVIDUAL PFAS COMPOUNDS							
	PFOA	PFOS	PFHxS	PFHpA	PFNA	PFBA	PFBS	Gen-X
Well 15 (max)	**6.1**	**5.9**	**21**	**2.4**	**<2**	**3.0**	**3.4**	**<5**
New Jersey	14	13			13			
California	14	13						
Draft ATSDR	21	14	140		21			
Minnesota	35	27	27			7000	2000	
New Hampshire (new)	70 (12)	38 (15)	85 (18)		23 (11)			
North Carolina								140

Units in parts per trillion, ppt	SUMMED TOTAL PFAS (5/2)							
	PFOA	PFOS	PFHxS	PFHpA	PFNA	PFBA	PFBS	Gen-X
Well 15 (max)	**34**					**3.0**	**3.4**	**<5**
Vermont	20							
Alaska	70						2000	
Connecticut	70							
Massachusetts	70						2000	
Wisconsin	20							
Well 15 (max)	**12**							
Maine	70							
Michigan	70							
New Hampshire	70							
Rhode Island	70							

Sources: www.asdwa.org/pfas/ Accessed 1/18/19

pfas-1.itrcweb.org Accessed 3/6/19

Tissue results

Starkweather Creek

ng/g (ppb)

		LMB1	LMB2	LMB3	NOP1	NOP2	NOP3	NOP4	WAE1	WAE2	YEP1	YEP2
PFOS	8	33	140	180	72	21	59	52	55	91	120	120
PFOA	7	ND	ND	ND	ND	ND	4.8	4.1	5.2	1.7*	1.2*	1.5*
PFDA	9	ND	1.4*	3.1	2.8*	ND	5	4.4	4.8	1.5*	1.5*	1.7*
PFDoA	11	2.4*	2.3	2.2*	ND	ND	3*	2.2*	2.9*	1.8*	1.7*	2.1*
PFHxS	6	ND	ND	2.4*	ND	ND	ND	ND	ND	1.3*	ND	3.5
PFUnA	10	1.8*	1.5*	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFHxA	5	ND	ND	ND	ND	ND	1.4*	1.1*	1.1*	ND	ND	ND
PFPeA	4	ND	ND	ND	ND	ND	ND	.65*	ND	ND	ND	ND
PFTeDA	14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total		33	145.4	180	72	21	68.8	60.5	65	91	120	123.5

Tissue Results

Lake Monona

ng/g (ppb)

		BLG1	BLG2	BLG3	BLG4	BLG5	BLG6	LMB1	LMB2	LMB3	LMB4	LMB5
PFOS	8	48	48	30	46	43	30	77	84	97	92	110
PFOA	7	3.3	1.9*	1.5	4.4	2.2*	1.3*	4.1	5.2	1.7*	1.2*	1.5*
PFDA	9	3.1	1.2*	ND	2.9	2*	ND	ND	2*	1.8*	.99*	2.4*
PFDoA	11	1.4*	1.1*	ND	2.6	1.3*	ND	ND	1.1*	3.1	ND	1.2*
PFHxS	6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFUnA	10	ND	ND	ND	ND	ND	ND	ND	.87*	1.3*	ND	ND
PFHxA	5	.92*	ND	ND	1.7*	ND	ND	ND	ND	ND	ND	ND
PFPeA	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFTeDA	14	ND	ND	ND	ND	ND	ND	ND	ND	1.2*	ND	ND
Total		54.4	48	31.5	55.9	43	30	77	84	100.1	92	110

New Fish Consumption Guidance

- 1 Blue Gill meal per week

- 1 meal of other species per month

(carp, catfish, largemouth, pike, walleye, perch)

- Other species were not tested so they remain the same

County	Dane
Advisory Area	LAKE MONONA (DANE COUNTY)

Advice for eating fish from the area you selected:

County: Dane
Advisory Area: LAKE MONONA (DANE COUNTY)
Includes: LAKE MONONA

Women up to age 50 (child bearing age) and children (under age 15) may safely eat:

1 Meal Per Week	bluegill, bullheads, crappies, inland trout
and	
1 Meal Per Month	carp, catfish, largemouth bass, northern pike, walleye, yellow perch, all other species and sizes
Do Not Eat	muskies

All men (15 and older) and older women (50 and older) may safely eat:

Unrestricted	bullheads, crappies, inland trout
1 Meal Per Week	bluegill, catfish, all other species and sizes
and	
1 Meal Per Month	carp, largemouth bass, muskies, northern pike, walleye, yellow perch

The above advice is due to the following pollutants:MERCURY, PCB, PFOS
Date of Query:January 22 2020

County	Dane
Advisory Area	STARKWEATHER CREEK (DANE COUNTY)

Advice for eating fish from the area you selected:

County: Dane
Advisory Area: STARKWEATHER CREEK (DANE COUNTY)
Includes: STARKWEATHER CREEK

Women up to age 50 (child bearing age) and children (under age 15) may safely eat:

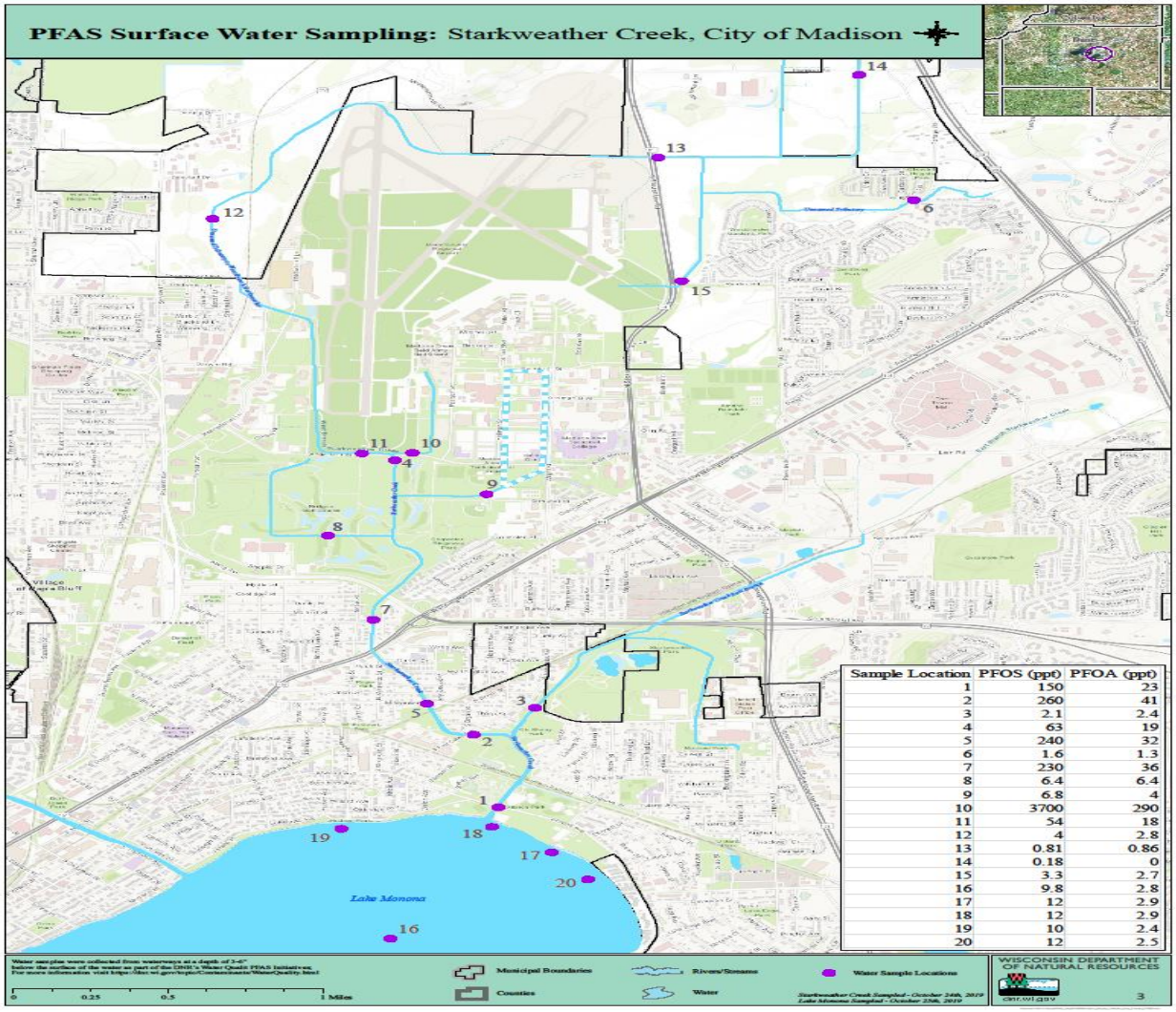
1 Meal Per Week	bluegill, bullheads, crappies, inland trout
and	
1 Meal Per Month	catfish, largemouth bass, northern pike, walleye, yellow perch, all other species and sizes
Do Not Eat	muskies

All men (15 and older) and older women (50 and older) may safely eat:

Unrestricted	bullheads, crappies, inland trout
1 Meal Per Week	bluegill, catfish, all other species and sizes
and	
1 Meal Per Month	largemouth bass, muskies, northern pike, walleye, yellow perch

The above advice is due to the following pollutants:MERCURY, PFOS
Date of Query:January 22 2020

Surface sample locations



Sample Location	PFOS (ppt)	PFOA (ppt)
1	150	23
2	260	41
3	2.1	2.4
4	63	19
5	240	32
6	1.6	1.3
7	230	36
8	6.4	6.4
9	6.8	4
10	3700	290
11	54	18
12	4	2.8
13	0.81	0.86
14	0.18	0
15	3.3	2.7
16	9.8	2.8
17	12	2.9
18	12	2.9
19	10	2.4
20	12	2.5

Surface water results

Sample Location	PFOS (ppt)	PFOA (ppt)	Sample Location	PFOS (ppt)	PFOA (ppt)
1	150	23	11	54	18
2	260	41	12	4	2.8
3	2.1	2.4	13	0.81	0.86
4	63	19	14	0.18	0
5	240	32	15	3.3	2.7
6	1.6	1.3	16	9.8	2.8
7	230	36	17	12	2.9
8	6.4	6.4	18	12	2.9
9	6.8	4	19	10	2.4
10	3700	290	20	12	2.5

Foam

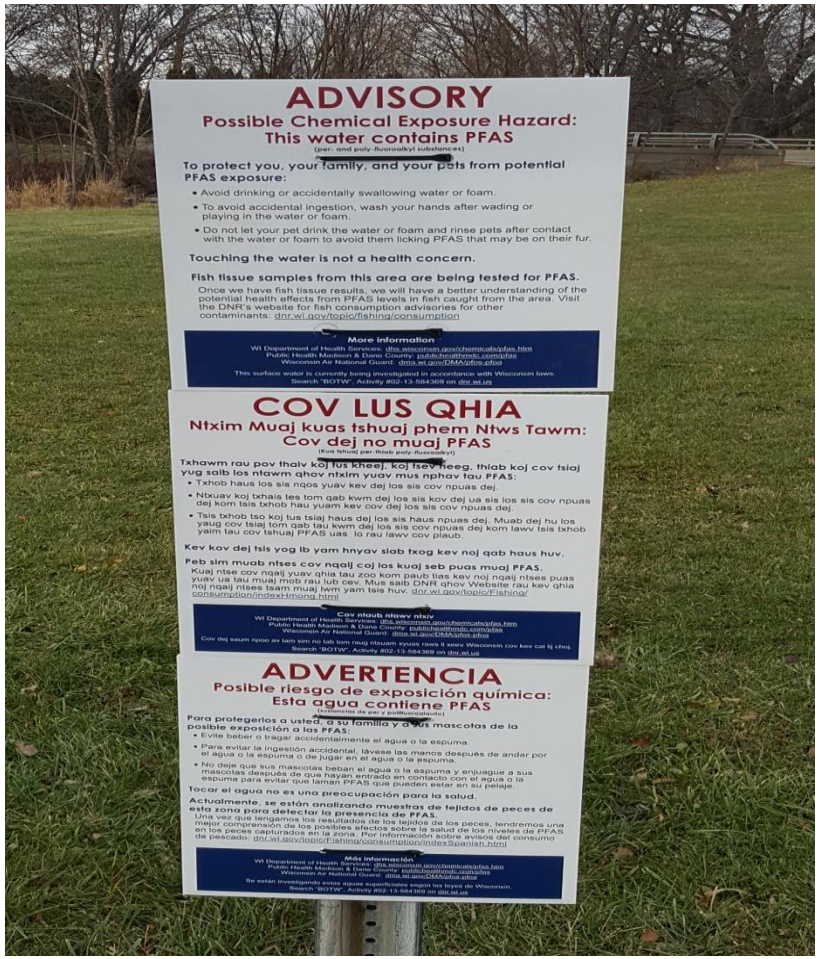
PFAS contaminated foam

- Can have bright white coloring
- Tends to pile up like shaving cream
- Can be sticky
- May blow inland and collect on lake shores and river banks
- Is usually lightweight

Naturally occurring foam

- Is off-white and/or brown
- Often accumulates in bays, eddies or river blockages
- May have an earthy or fishy aroma

Current Signage



Reduce exposure

- Avoid eating contaminated fish
- Dust and vacuum household surfaces regularly
- Limit eating food from treated paper and packaging products

Showering, washing dishes, swimming in water that contains PFAS should not increase exposure

Next Steps

- WDNR
  - Additional fish tissue and surface water sampling
  - Rulemaking process for groundwater standard
- WDHS – Reviewing 26 additional PFAS (Complete Dec 2020)
- Community meetings – Fish consumption
- PHMDC Website – www.publichealthmdc.com/pfas
- Additional studies needed for PFAS overall – over 4,000 substances – only 2 have been studied in depth

Questions?

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www.publichealthmdc.com/pfas