

Alcona County

Bluegill/Sunfish

Cedar Lake

Alcona/Iosco County

Hg Analysis:

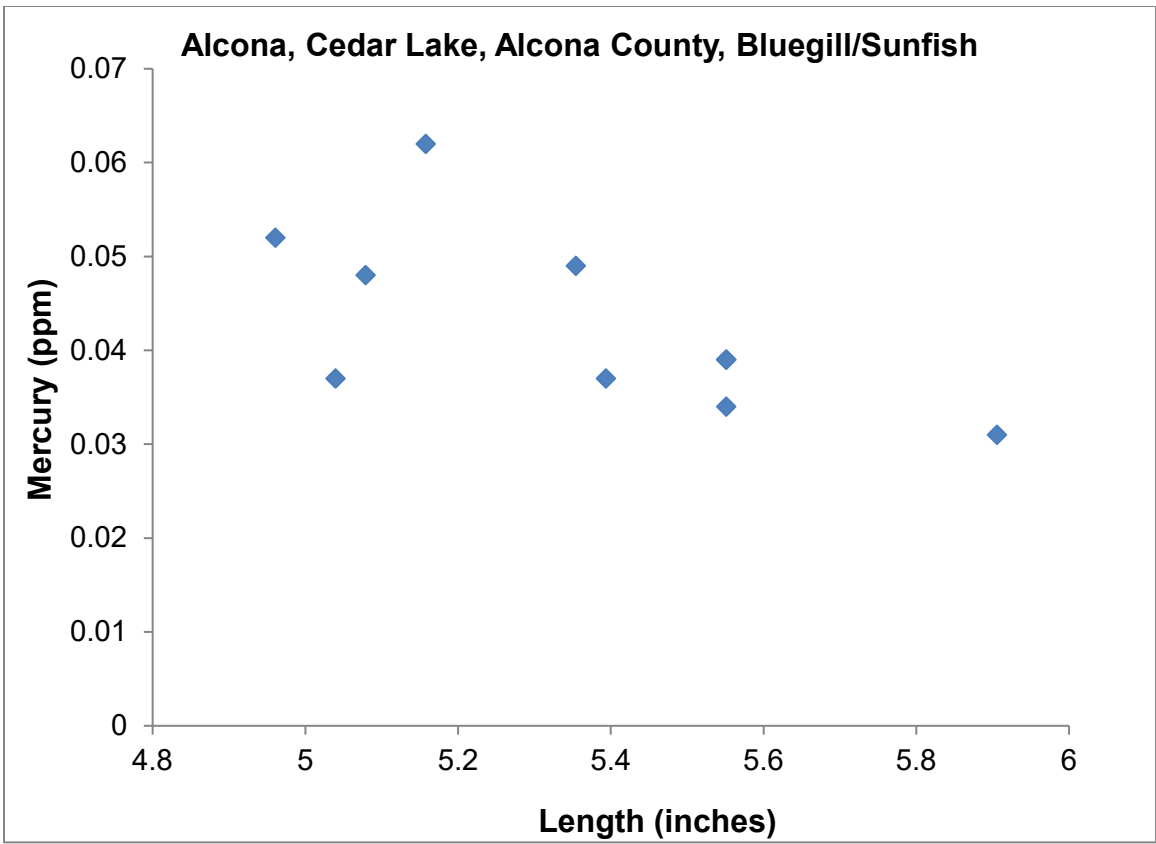
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2019	2019	10	5.0	NA	5.0	5.9
Datasets available: 2019						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.043	0.031	0.062	0.050	16
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.438	0.485				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2019	2019	10	5.0	NA	5.0	5.9
Datasets available: 2019						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
PFOS	10	--	< 0.25 ppb	< 0.25 ppb	--	16
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	NA	NA				
Final meal category based on UCL:						16

Existing MDHHS Advisory: Bluegill and sunfish from Cedar Lake in Alcona County are covered by the statewide advisory due to mercury: No one should eat more than 8 meals per month of bluegill or sunfish of any size.

Recommendation: No one should eat more than 16 meals per month of bluegill or sunfish from Cedar Lake of any size due to mercury.



Northern Pike

Cedar Lake

Alcona/Iosco County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Size Range of All Samples	
Earliest	Most Recent				Min	Max
1990	1990	3	18.9	24	18.9	28.9
Datasets available: 1990						
Chemical	Sample Size	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	3	0.36	0.13	0.69	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.179	0.362				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Size Range of All Samples	
Earliest	Most Recent				Min	Max
--	--	--	--	--	--	--
Datasets available: --						
Chemical	Sample Size	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						--

Existing Advisory: Cedar Lake northern pike are covered under the statewide mercury consumption advisory.

Recommendation: A dataset of less than five data points for a given chemical, species and waterbody is considered insufficient for evaluation using the standard evaluation method. The statewide advice due to mercury applies to Cedar Lake northern pike: No one should eat more than 1 meal per month of northern pike larger than 30 inches or more than 2 meals per month of northern pike smaller than 30 inches in length.

Yellow Perch

Cedar Lake

Alcona/Iosco County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2019	2019	5	5.1	NA	5.1	7.2
Datasets available: 2019						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	5	0.112	0.061	0.150	0.166*	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.764	0.649				

*95% UCL exceeded maximum concentration due to small sample size (N=5) and concentration variability.

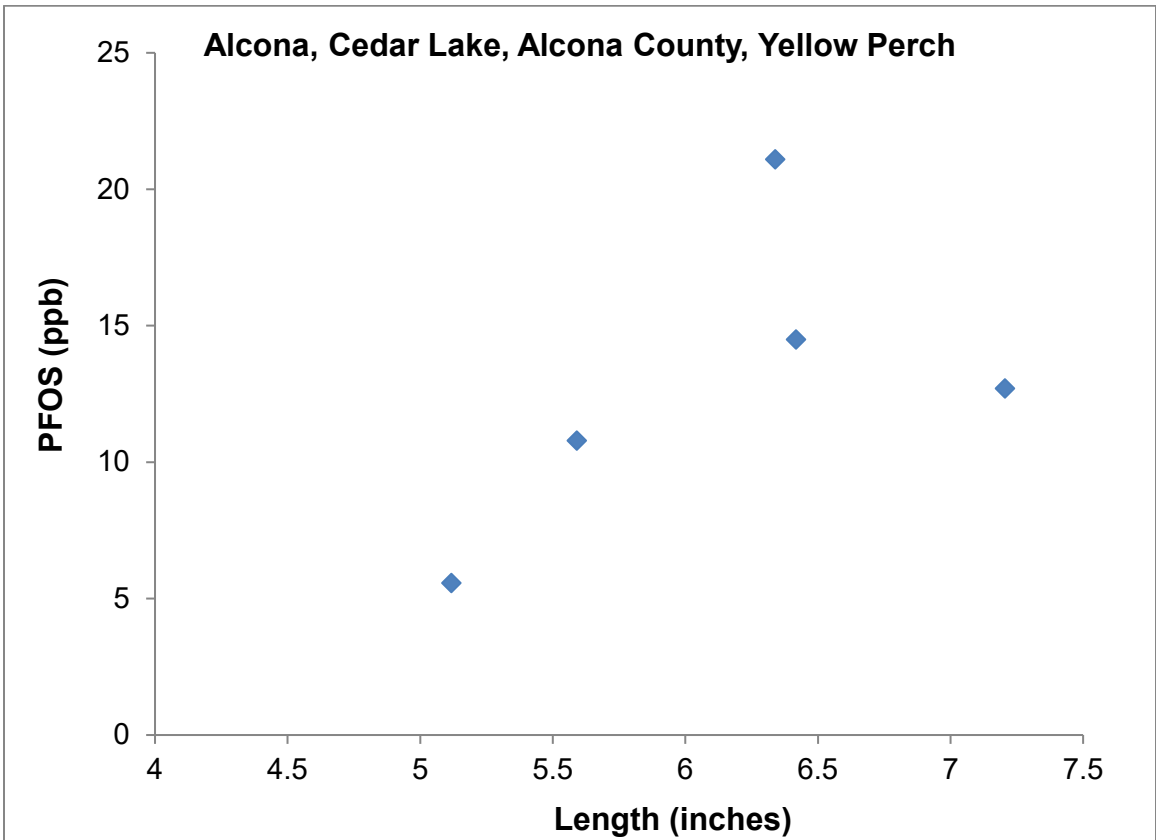
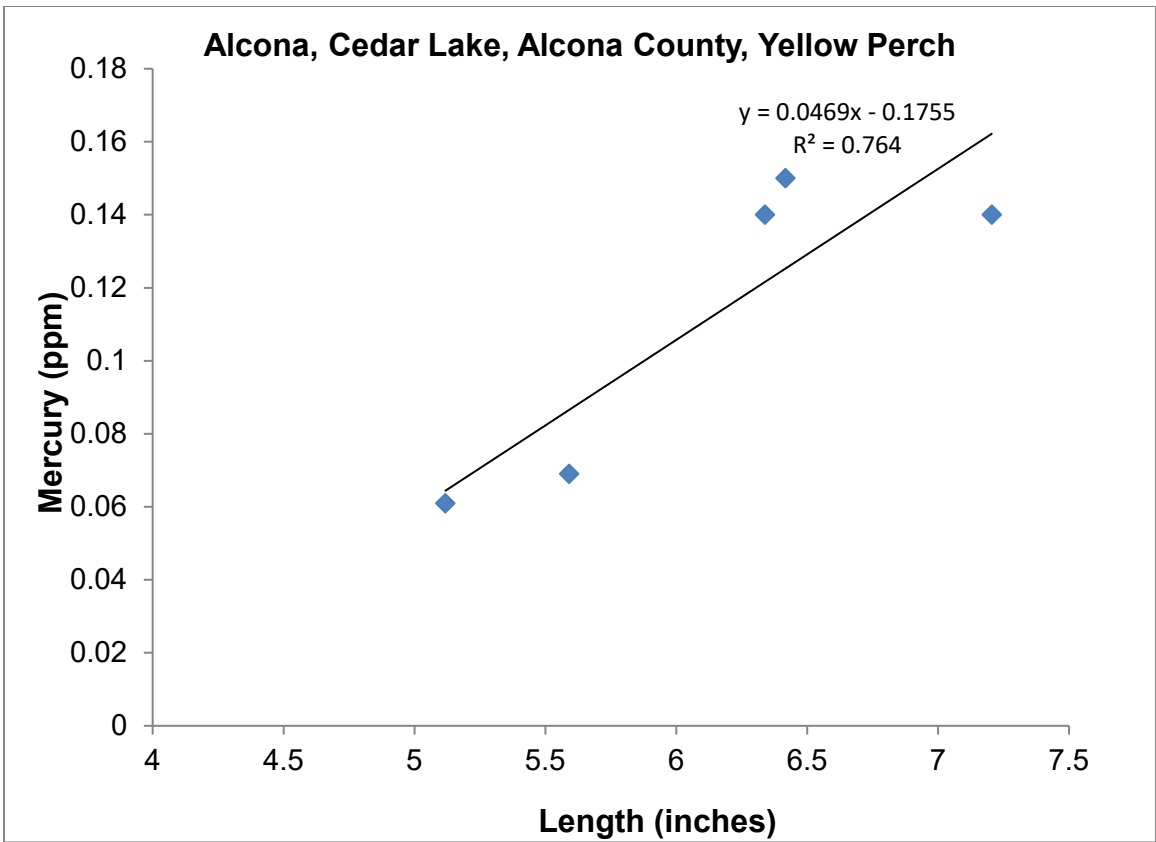
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2019	2019	5	5.1	NA	5.1	7.2
Datasets available: 2019						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
PFOS	5	12.9 ppb	5.6 ppb	21.1 ppb	20.0 ppb	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	0.332	0.458	Final meal category based on UCL:		4	

Existing MDHHS Advisory: Yellow perch from Cedar Lake in Alcona County are currently covered under the statewide mercury advice. No one should eat more than 4 meals per month of yellow perch of any size due to mercury.

Recommendation: No one should eat more than 4 meals per month of yellow perch smaller than 10 inches due to mercury and PFOS and no more than 2 meals per month of yellow perch larger than 10 inches due to mercury. Length break was applied at the upper end of the regression as the sample size range was limited.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
6	0.106	8
7	0.153	4
8	0.200	4
9	0.247	4
10	0.294	2
11	0.340	2
<i>Shaded area denotes extrapolated estimates</i>		



Walleye

Crooked Lake

Alcona County

Hg Analysis:

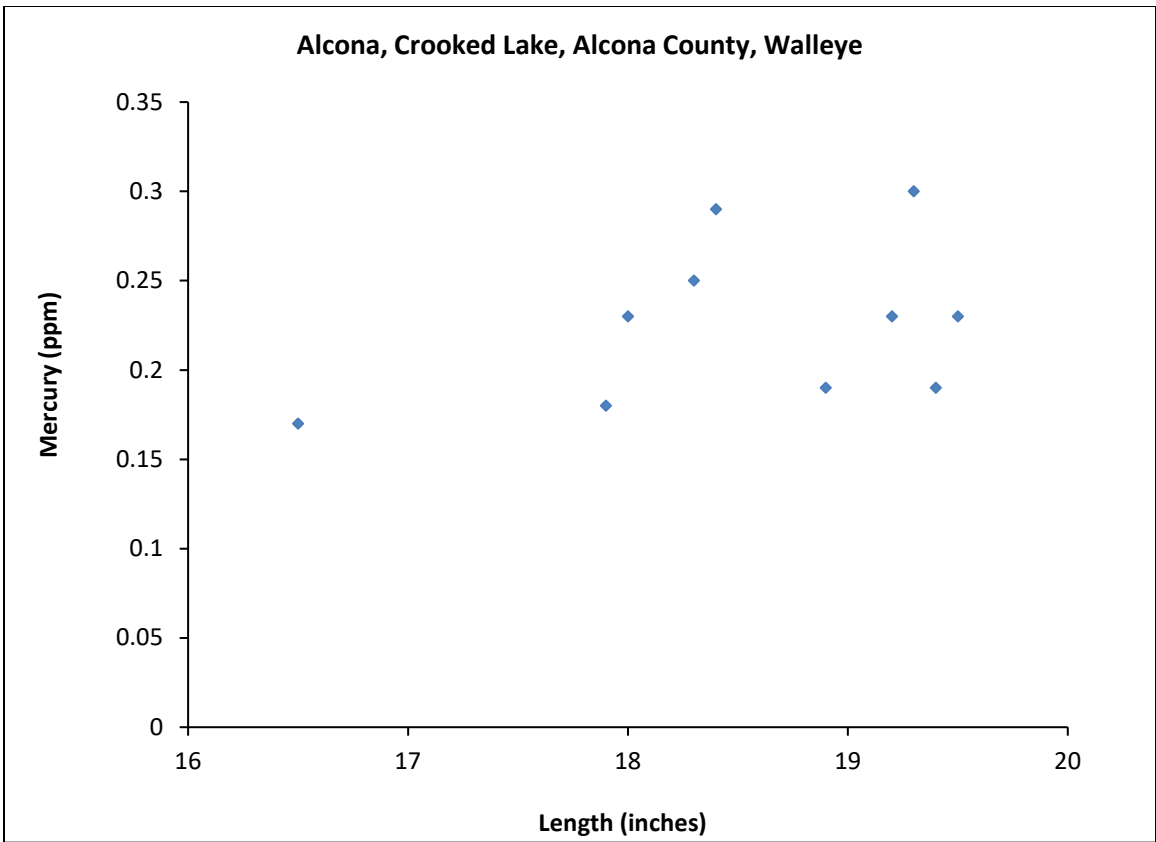
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2009	2009	10	16.5	15	16.5	19.5
Datasets available: 2009						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.23	0.17	0.29	0.26	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.152	0.179				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available: --						
Chemical	Sample Size	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						4

Existing Advisory: Crooked Lake walleye are covered under the statewide mercury consumption advisory.

Recommendation: No one should eat more than 4 meals per month of Crooked Lake walleye smaller than 20 inches or more than 2 meals per month of those fish larger than 20 inches due to mercury. Statewide length break added as the size range was limited.



Northern Pike

Hubbard Lake

Alcona County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1989	1989	8	18.3	24	26	28
Datasets available: 1989						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	8	0.23	0.12	0.54	0.35	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.724	0.792				

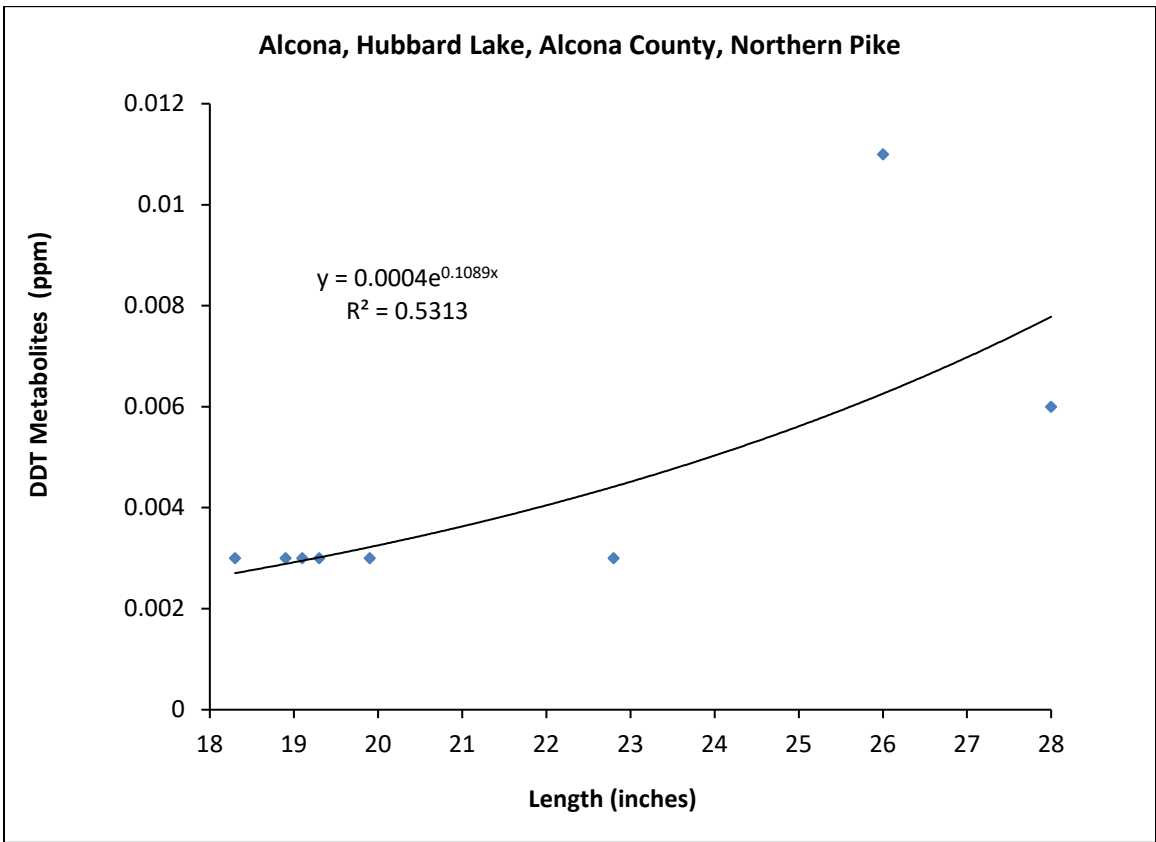
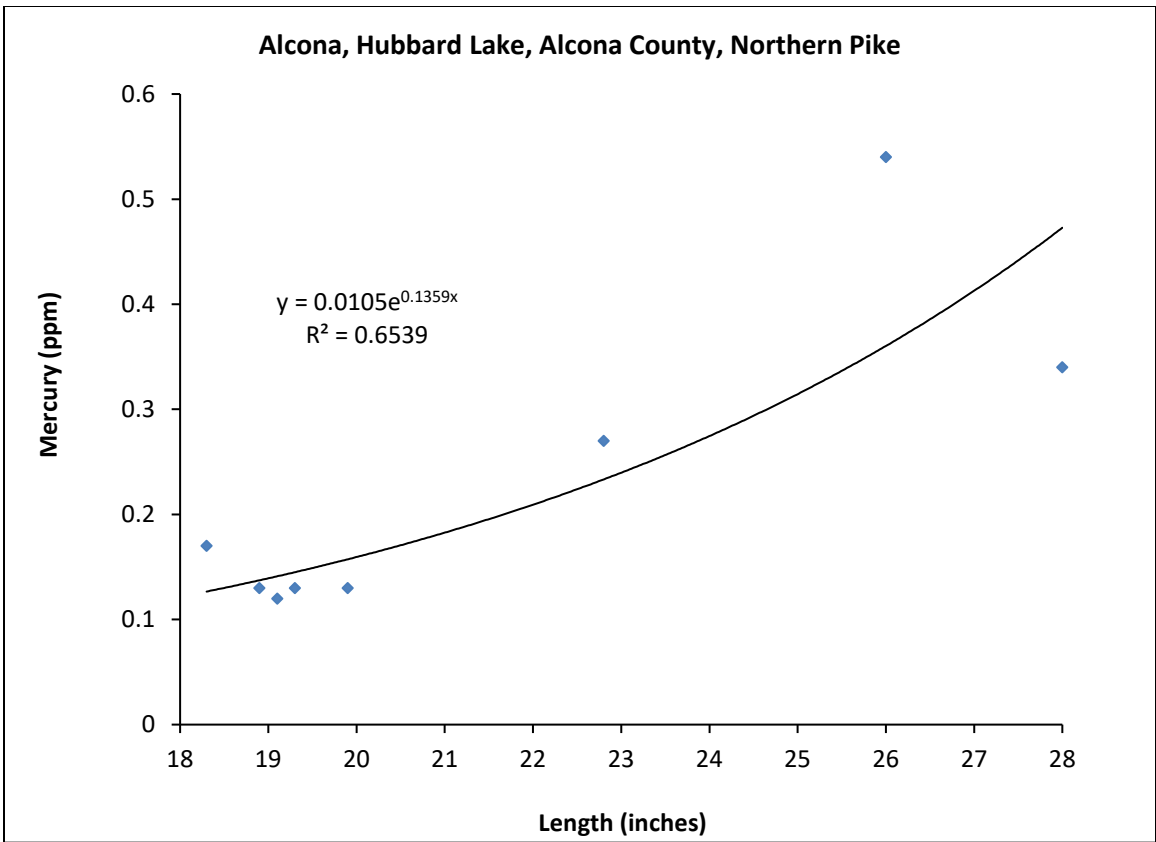
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1989	1989	8	18.3	24	26	28
Datasets available: 1989						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	8	ND	--	--	--	--
DDT	8	0.004	0.003	0.01	0.01	16
Chlordane	8	ND	--	--	--	--
Toxaphene	8	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	0.556	0.670				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						2

Existing Advisory: Hubbard Lake northern pike are covered under the statewide mercury consumption advisory.

Recommendation: No one should eat more than 1 meal per month of Hubbard Lake northern pike larger than 28 inches or more than 2 meals per month of northern pike smaller than 28 inches in length.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
18	0.121	8
20	0.159	4
22	0.209	4
24	0.274	2
26	0.360	2
28	0.472	2
29	0.540	1
30	0.619	1
31	0.709	1
<i>Shaded area denotes extrapolated estimates</i>		



Walleye

Hubbard Lake

Alcona County

Hg Analysis:

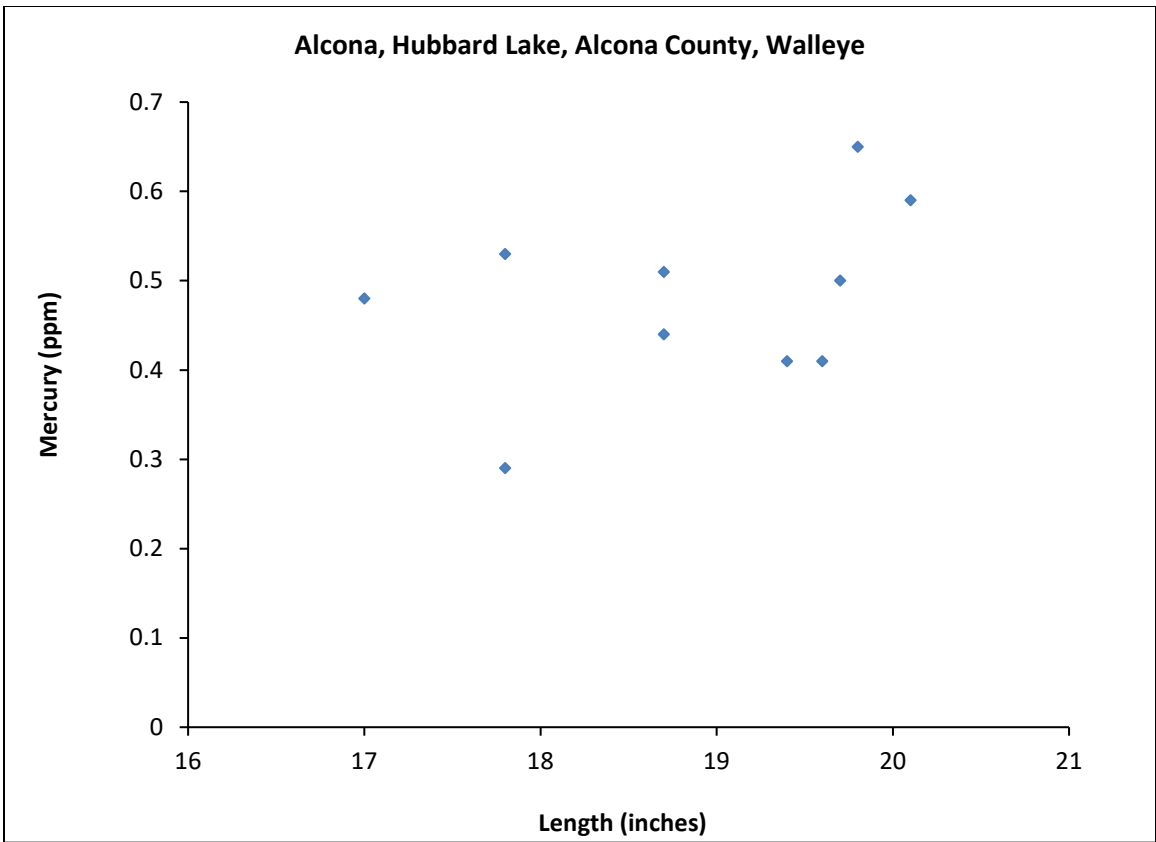
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1989	2006	20	16.5	15	16.5	21.5
Datasets available: 2006						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	20	0.54	0.29	0.90	0.61	1
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.155	0.146				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available: --						
Chemical	Sample Size	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						1

Existing Advisory: Hubbard Lake walleye are covered under the statewide mercury consumption advisory.

Recommendation: No one should eat more than 1 meal per month of Hubbard Lake walleye smaller than 20 inches or more than 6 meals per year of those fish larger than 20 inches due to mercury. Statewide length break added as the size range was limited.



Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2010	2010	10	14.2	14	14.2	19.2
Datasets available: 2010						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.55	0.41	0.82	0.64	1
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.699	0.648				

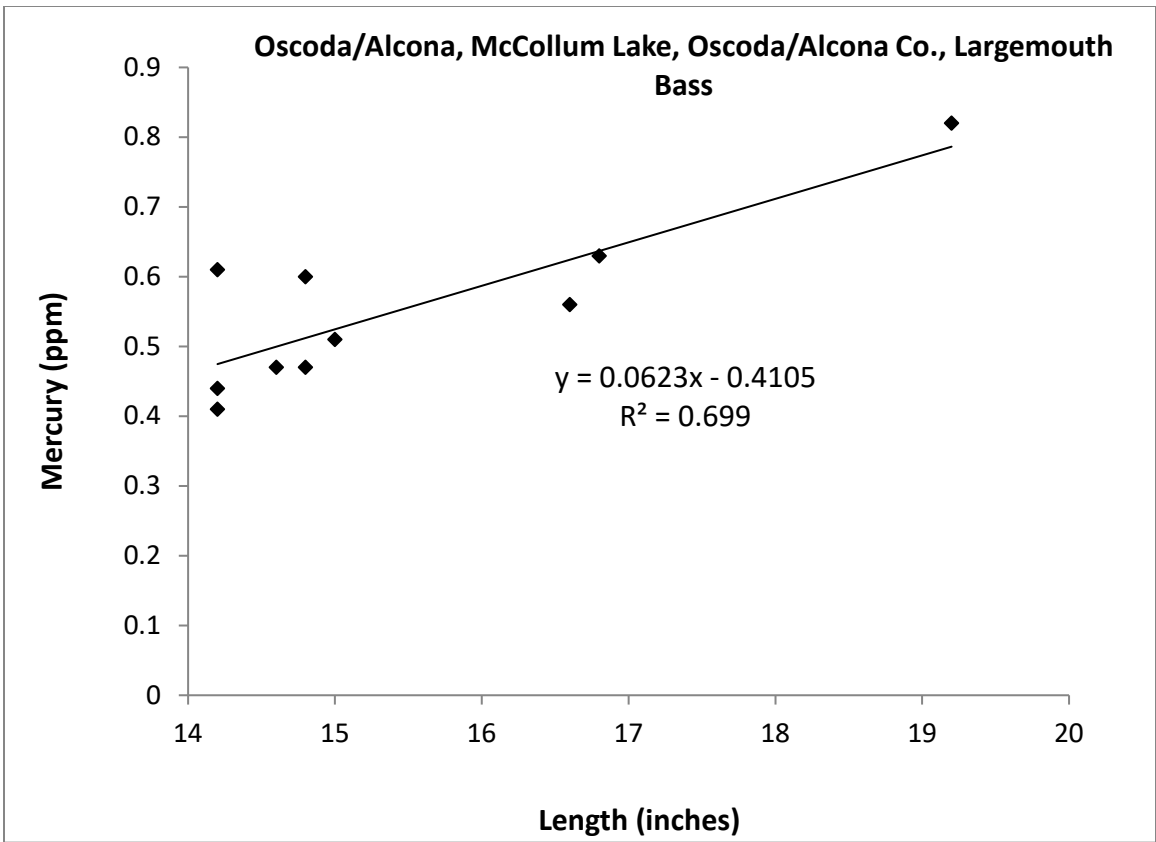
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available: --						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	--	--	--	--	--	--
DDT	--	--	--	--	--	--
Chlordane	--	--	--	--	--	--
Toxaphene	--	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						1

Existing Advisory: McCollum Lake largemouth bass are covered by the statewide mercury advisory.

Recommendation: No one should eat more than 1 meal per month of McCollum Lake largemouth or smallmouth bass smaller than 20 inches or more than 6 meals per year of those fish larger than 20 inches due to mercury. Length break was applied at the upper end of the regression as the sample range was limited.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
12	0.34	2
14	0.46	2
16	0.59	1
18	0.71	1
20	0.84	1
22	0.96	1
24	1.08	1
<i>Shaded area denotes extrapolated estimates</i>		



Alpena County

Northern Pike

Beaver Lake

Alpena County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1987	1987	5	12.2	24	25.2	25.2
Datasets available: 1987						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	5	0.32	0.19	0.5	0.49	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.725*	0.621	* Regression slope determined by 1 data point and therefore is not used.			

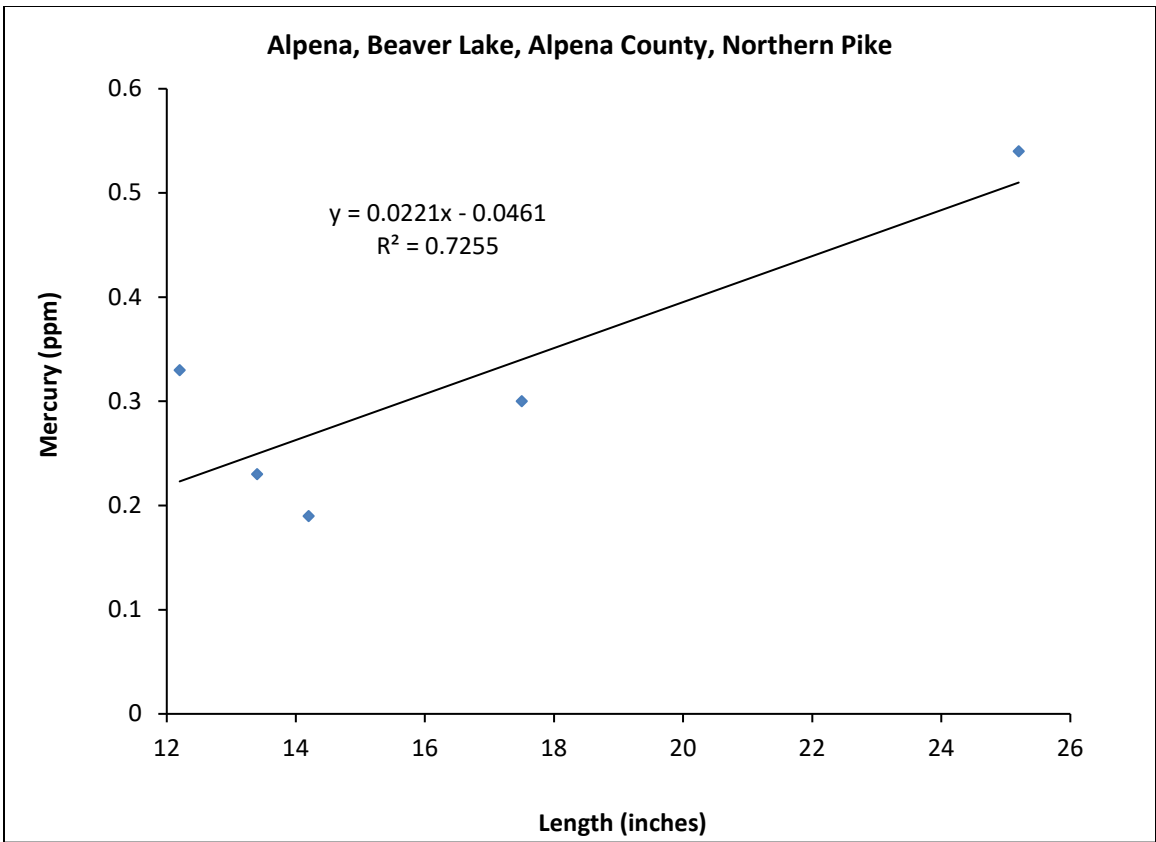
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	--	--	--	--	--
Datasets available: --						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						2

Existing Advisory: Beaver Lake northern pike are covered under the statewide mercury consumption advisory.

Recommendation: Dataset is insufficient due to sublegal lengths. The statewide guidelines apply: No one should eat more than 1 meal per month of northern pike larger than 30 inches or more than 2 meals per month of northern pike smaller than 30 inches in length.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
12	0.219	4
13	0.241	4
14	0.263	4
15	0.285	2
20	0.396	2
24	0.484	2
26	0.529	2
28	0.573	1
30	0.617	1
<i>Shaded area denotes extrapolated estimates</i>		



Smallmouth Bass

Beaver Lake

Alpena County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1987	1987	9	7.9	14	15.4	20.5
Datasets available: 1987						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	5	0.79	0.43	1.06	0.49	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.934	0.980				

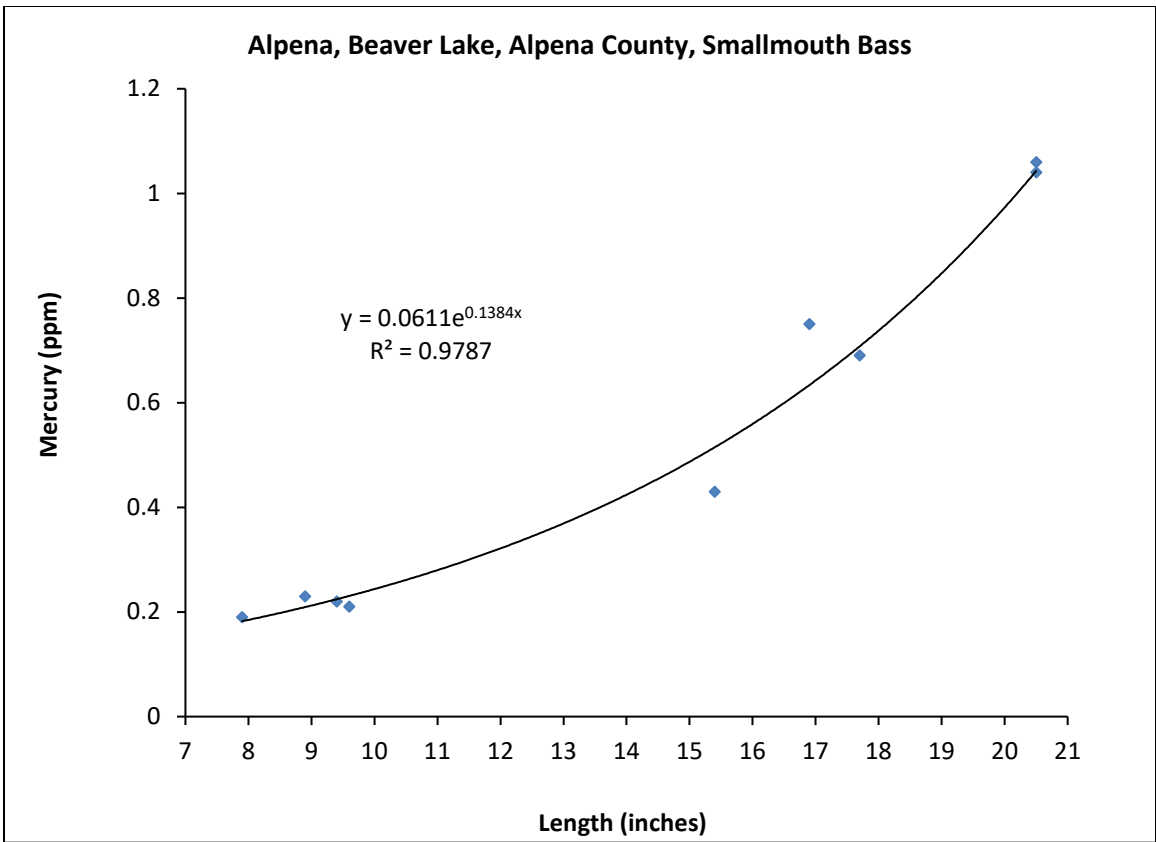
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	--	--	--	--	--
Datasets available: --						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						2

Existing Advisory: Beaver Lake smallmouth bass are covered under the statewide mercury consumption advisory.

Recommendation: No one should eat more than 1 meal per month of Beaver Lake largemouth or smallmouth bass smaller than 20 inches or more than 6 meals per year of those fish larger than 20 inches due to mercury.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
14	0.42	2
15	0.49	2
16	0.56	1
17	0.64	1
18	0.74	1
19	0.85	1
20	0.97	1
21	1.12	0.5
22	1.28	0.5
<i>Shaded area denotes extrapolated estimates</i>		



Brown Bullhead

Long Lake

Alpena & Presque Isle Counties

Hg Analysis:

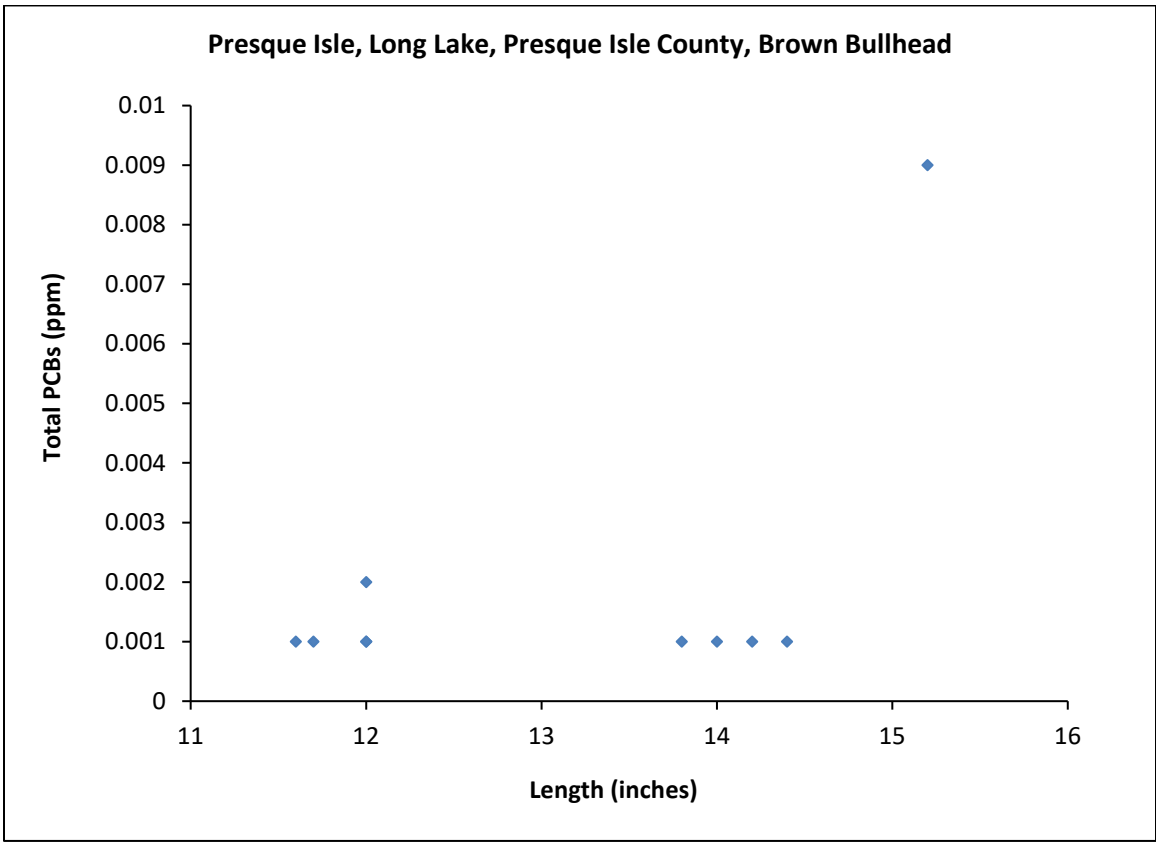
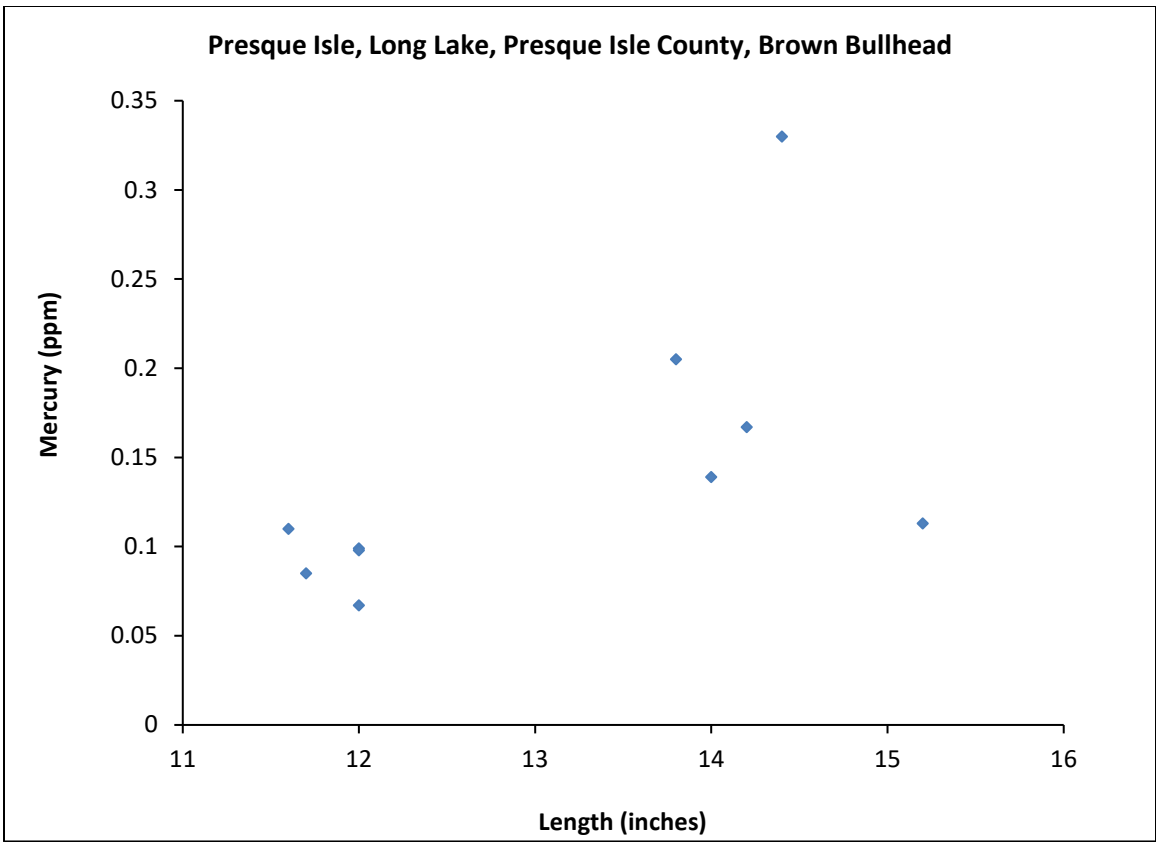
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2006	2006	10	11.6	na	11.6	15.2
Datasets available: 2006						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.14	0.07	0.33	0.20	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.348	0.438				

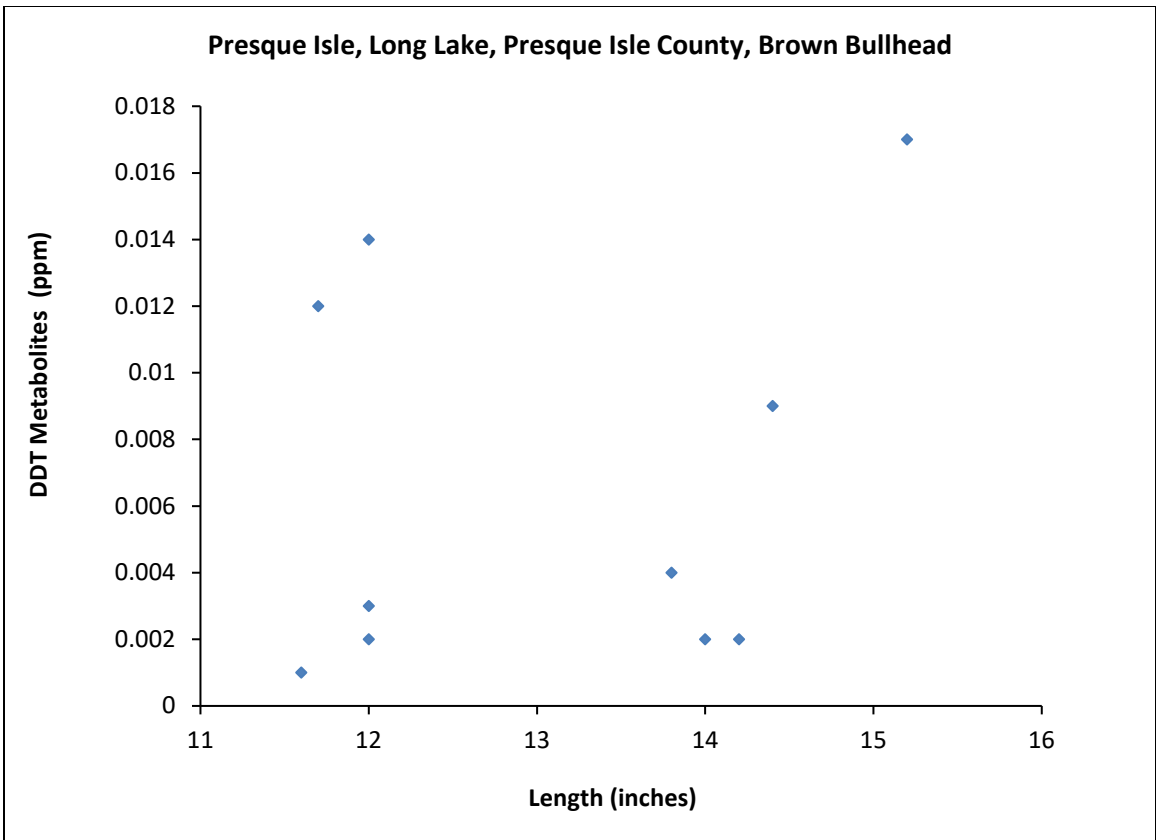
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2006	2006	10	11.6	na	11.6	15.2
Datasets available: 2006						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.002	0.001	0.009	0.004	16
DDT	10	0.007	0.001	0.017	0.010	16
Chlordane	10	ND	--	--	--	--
Toxaphene	10	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.266	0.205				
DDT	0.048	0.060				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						4

Existing Advisory: There are no current consumption advisories for Long Lake brown bullhead.

Recommendation: No one should eat more than 4 meals per month of Long Lake bullhead due to mercury.





Smallmouth Bass

Long Lake

Alpena & Presque Isle Counties

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2004	2006	23	10	14	13.7	20
Datasets available: 2004, 2006						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	20	0.26	0.10	0.66	0.34	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.540	0.666				

Organics Analysis:

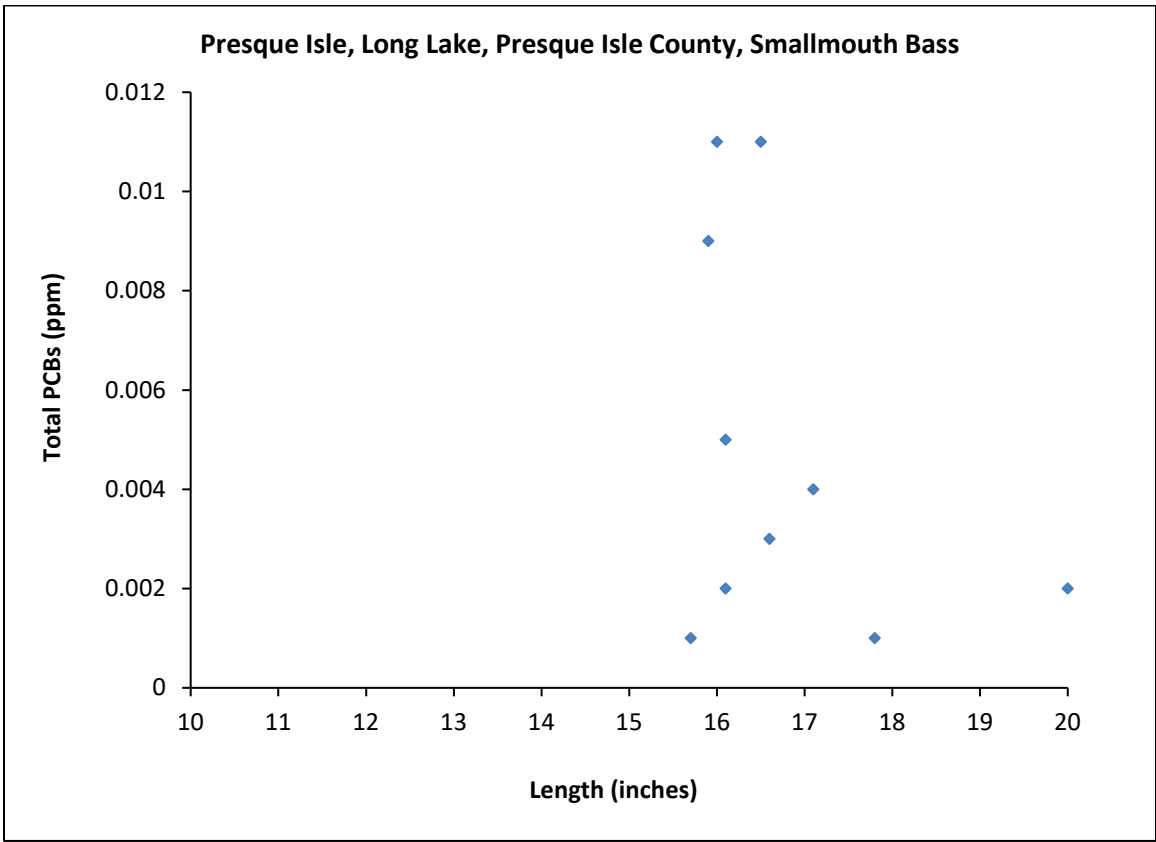
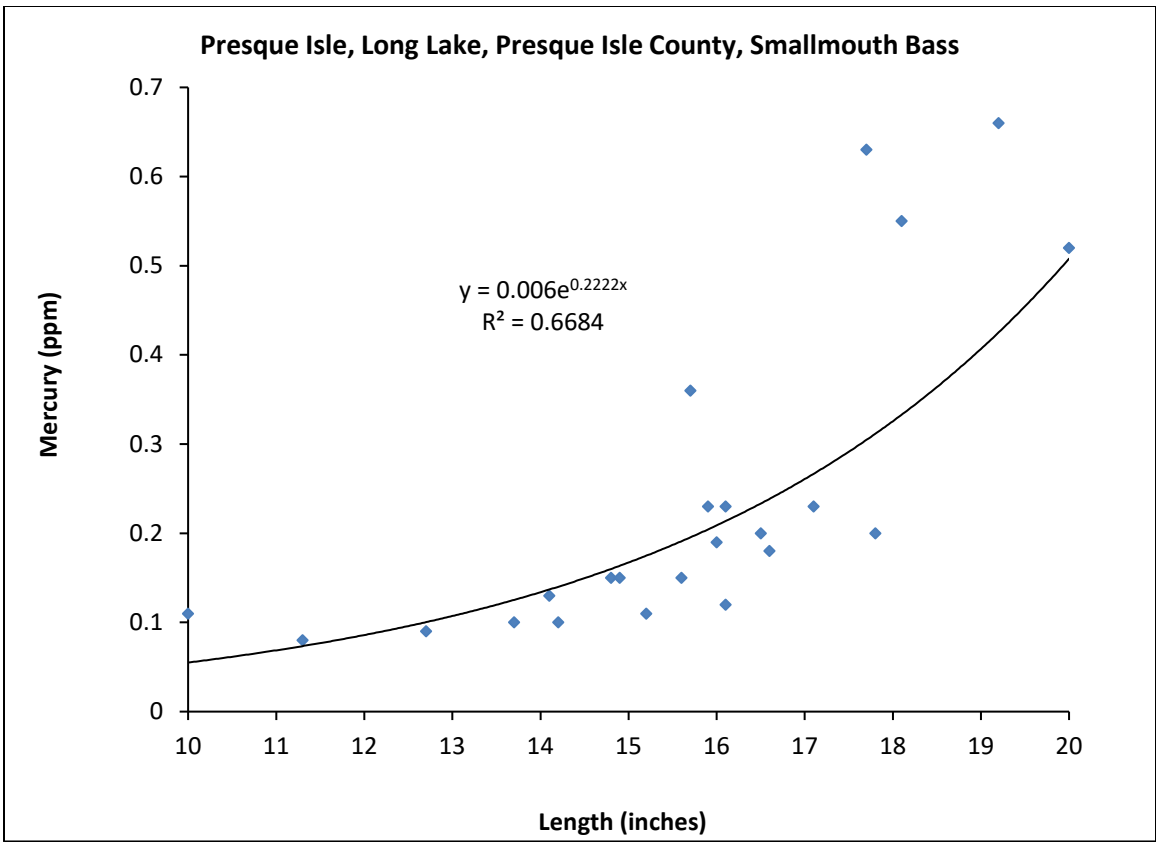
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2004	2004	10	15.7	14	15.7	20
Datasets available: 2004						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.005	0.001	0.01	0.01	16
DDT	10	0.007	0.002	0.02	0.01	16
Chlordane	10	ND	--	--	--	--
Toxaphene	10	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.137	0.113				
DDT	0.055	0.023				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						2

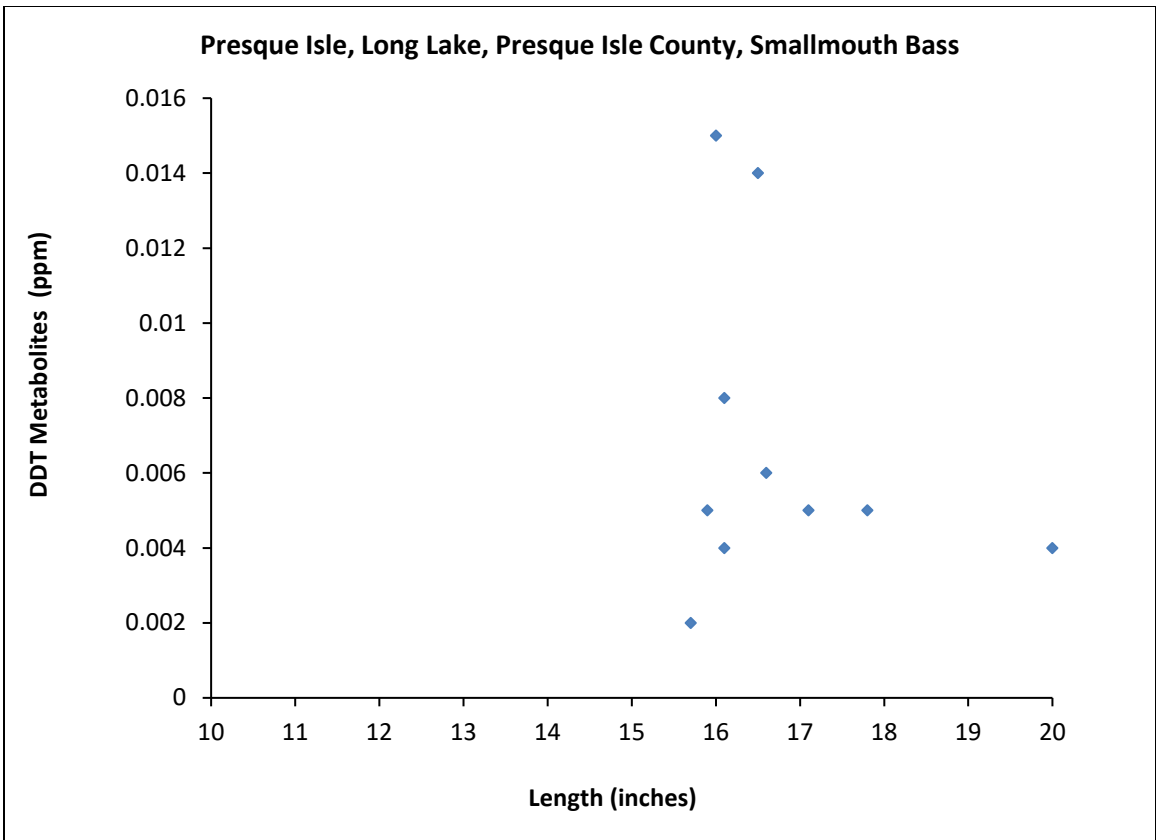
Existing Advisory: Women and children should not eat more than one meal per month of Long Lake smallmouth bass larger than 18 inches due to mercury.

Recommendation: No one should eat more than 4 meals per month of Long Lake largemouth or smallmouth bass smaller than 18 inches or more than 2 meals per month of those fish larger than 18 inches due to mercury.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
14	0.135	4
15	0.168	4
16	0.210	4
17	0.262	4
18	0.327	2
19	0.409	2
20	0.511	2
21	0.638	1
22	0.796	1

Shaded area denotes extrapolated estimates





White Sucker

Long Lake

Alpena & Presque Isle Counties

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2004	2004	10	11.6	na	11.6	20.5
Datasets available: 2004						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.08	0.03	0.12	0.10	8
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.672	0.772				

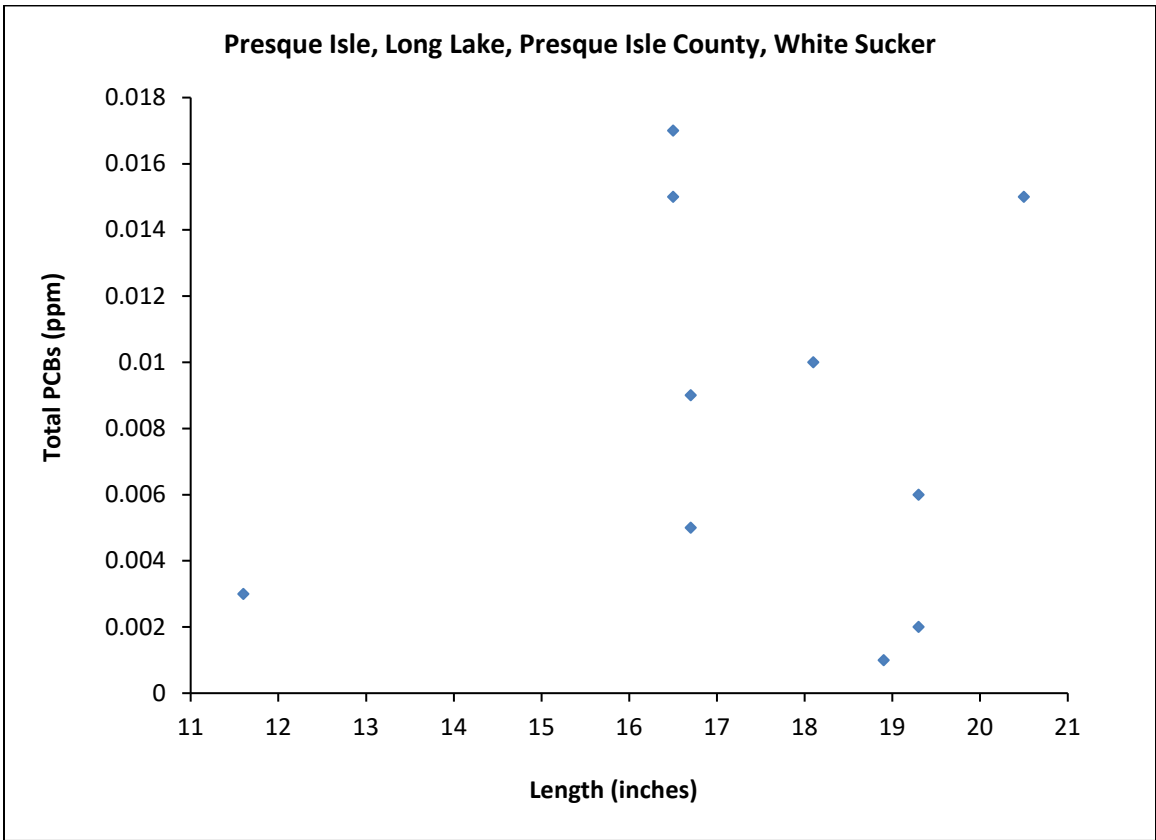
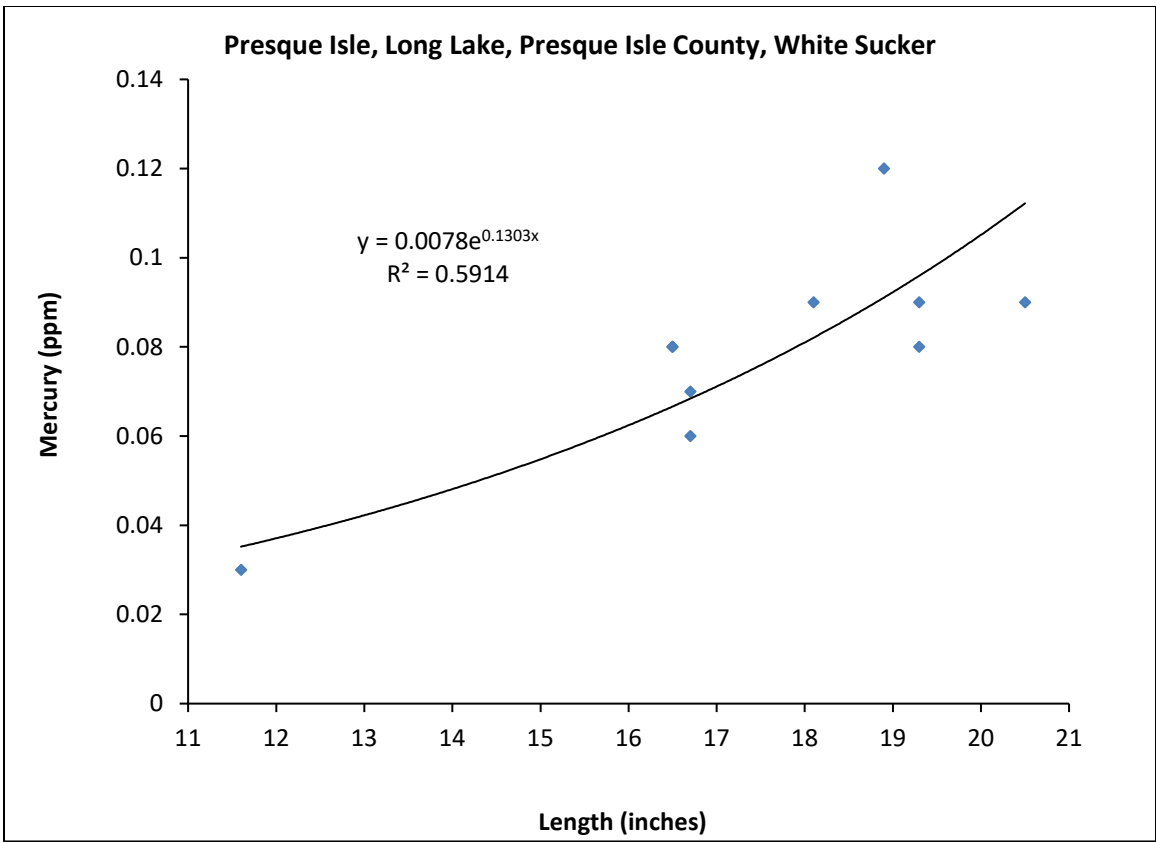
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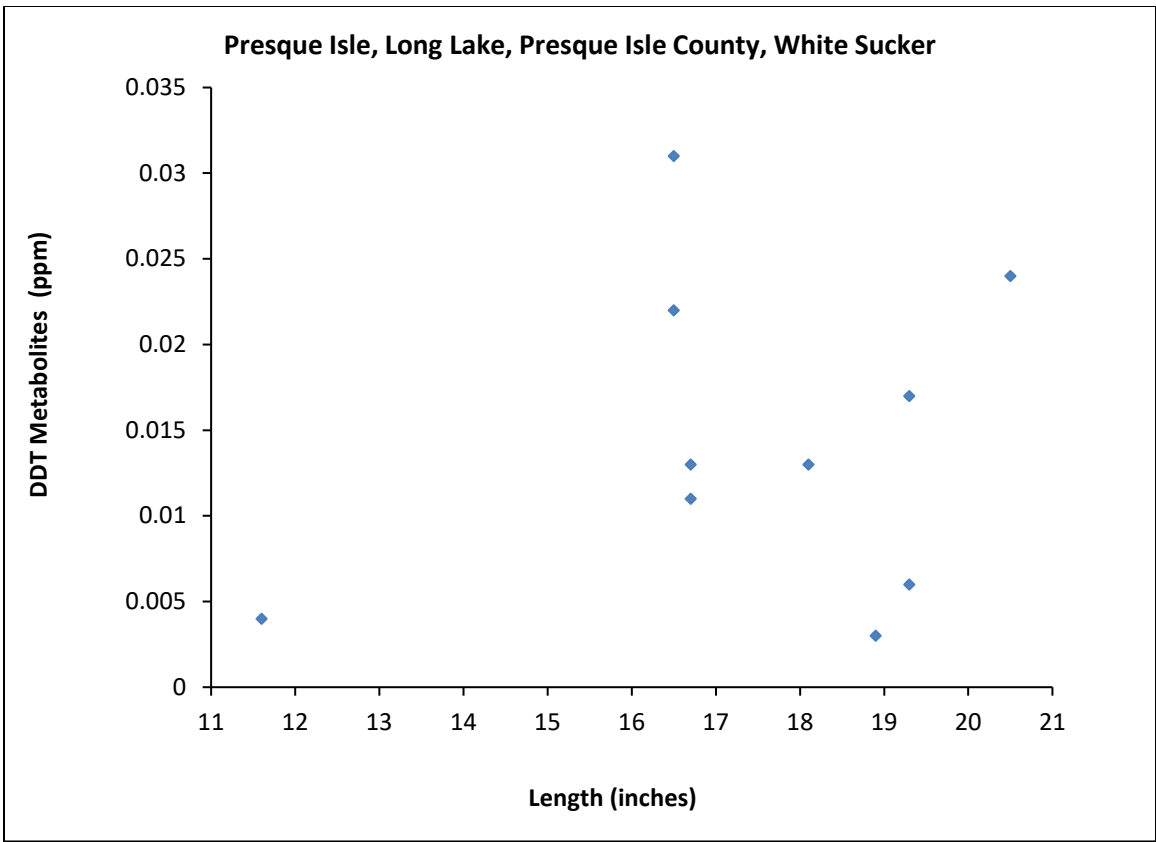
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2004	2004	10	11.6	na	11.6	20.5
Datasets available: 2004						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.008	0.001	0.02	0.01	16
DDT	10	0.014	0.003	0.02	0.02	16
Chlordane	10	ND	--	--	--	--
Toxaphene	10	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.010	0.001				
DDT	0.043	0.065				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						8

Existing Advisory: There are no current consumption advisories for Long Lake white sucker.

Recommendation: It is safe to eat at least 16 meals per month of Long Lake sucker smaller than 16 inches. No one should eat more than 8 meals per month of Long Lake sucker larger than 16 inches due to mercury.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
12	0.037	16
13	0.042	16
14	0.048	16
15	0.055	16
16	0.063	16
17	0.071	12
18	0.081	12
19	0.093	8
20	0.106	8
<i>Shaded area denotes extrapolated estimates</i>		





Arenac County

Redhorse Sucker

Rifle River

Arenac County

Hg Analysis:

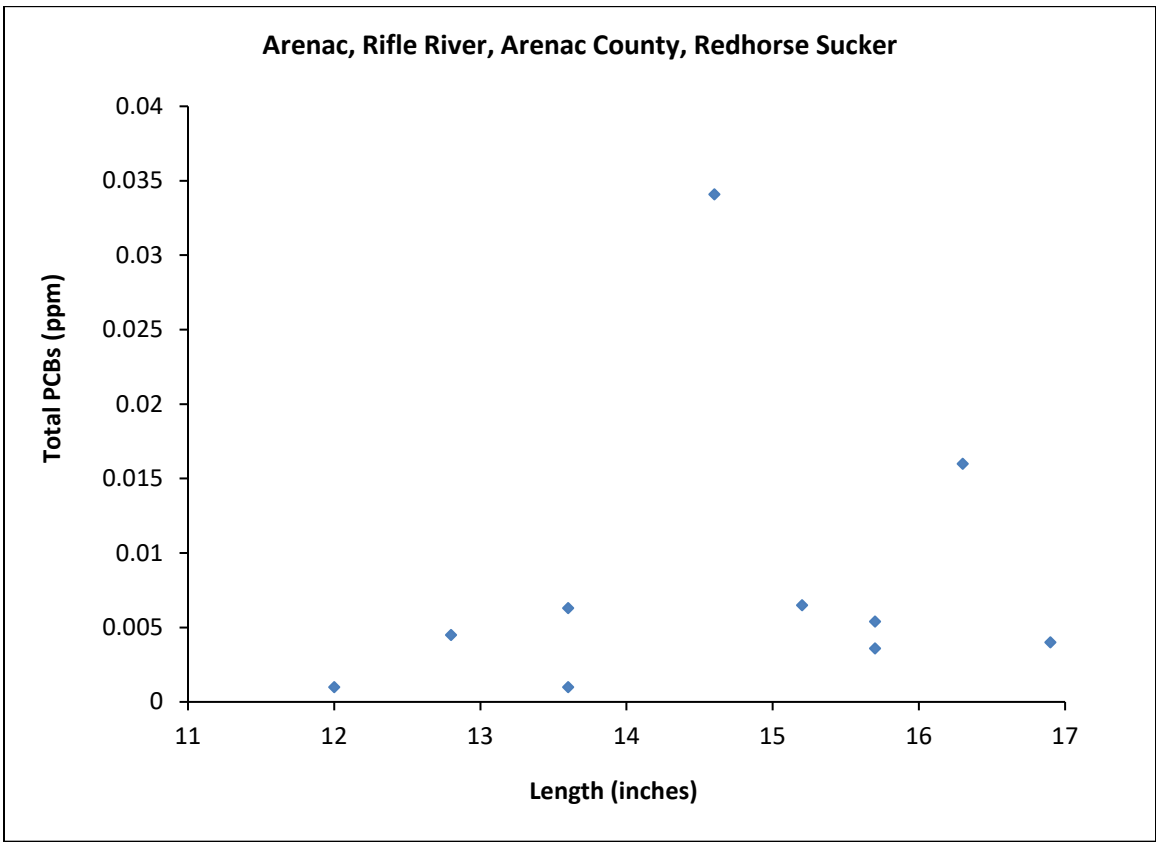
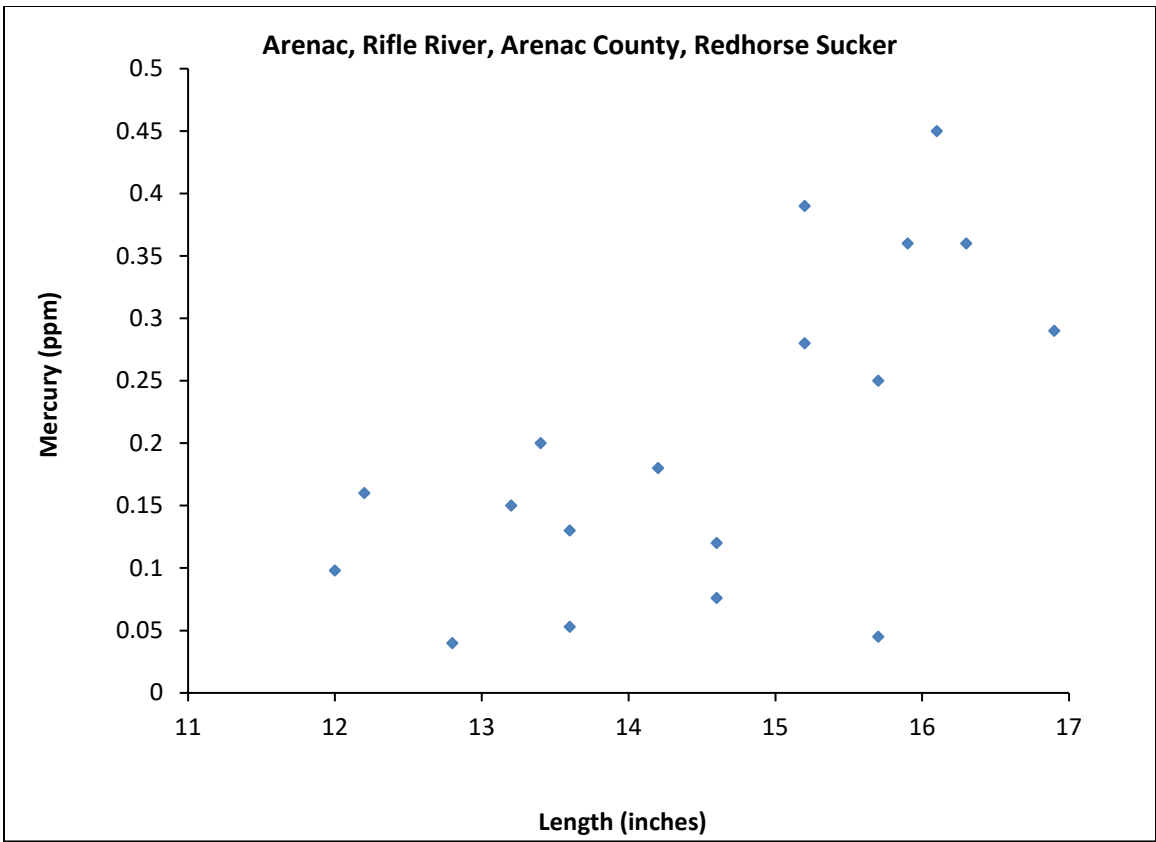
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1988	2009	18	12	na	12	16.9
Datasets available: 1988, 2009						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	18	0.20	0.04	0.45	0.27	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.415	0.290				

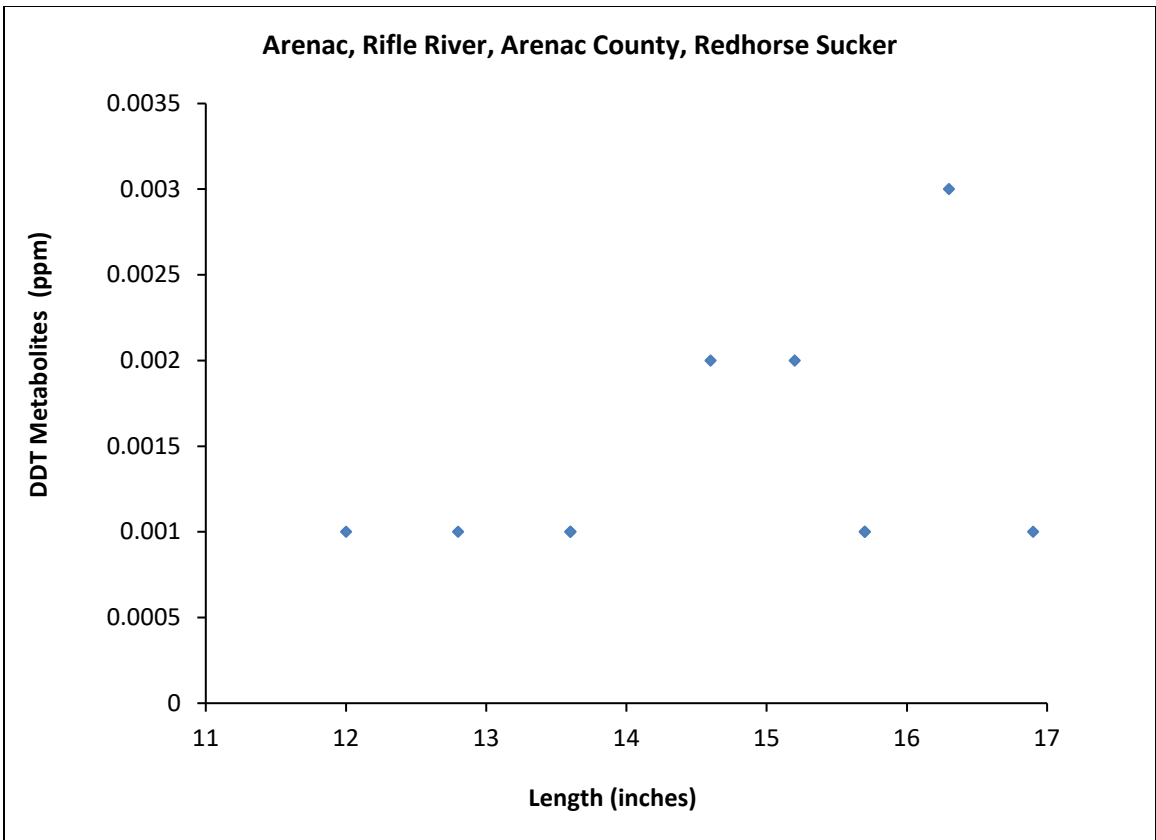
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2009	2009	10	12	na	12	16.9
Datasets available: 1988, 2009						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.008	0.001	0.03	0.02	12
DDT	10	0.001	0.001	0.003	0.002	16
Chlordane	10	ND	--	--	--	--
Toxaphene	10	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.040	0.209				
DDT	0.146	0.134				
Chlordane	0.000	--				
Toxaphene	--	--				
Final meal category based on UCL:						4

Existing Advisory: Women and children should eat no more than one meal per week of Rifle River redhorse sucker due to PCBs.

Recommendation: No one should eat more than 4 meals per month of Rifle River sucker due to mercury. PCBs would cause an advisory.





Rock Bass

Rifle River

Arenac County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1988	2009	20	4.6	na	4.6	10
Datasets available: 1988, 2009						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	20	0.27	0.037	0.55	0.34	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.687	0.719				

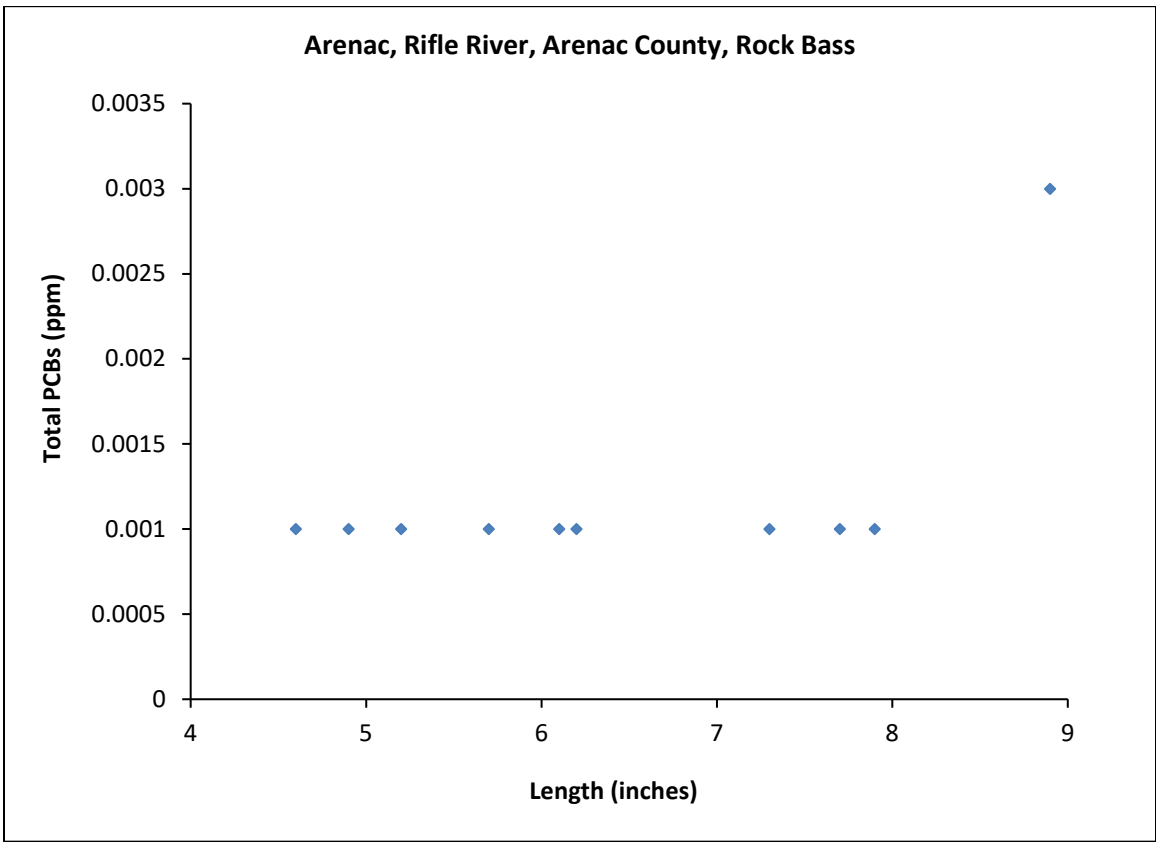
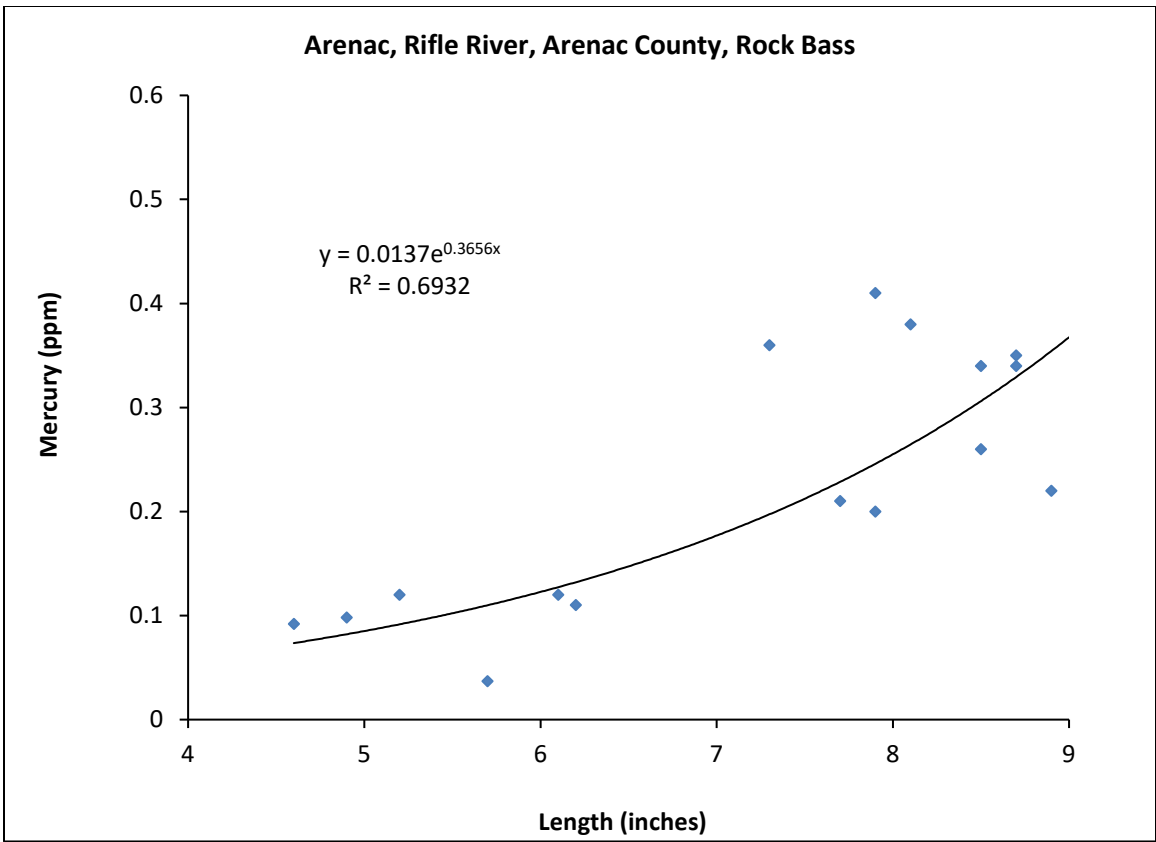
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2009	2009	10	4.6	na	4.6	8.9
Datasets available: 1988, 2009						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.001	0.001	0.003	0.002	16
DDT	10	ND	--	--	--	--
Chlordane	10	ND	--	--	--	--
Toxaphene	10	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.360	0.360				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						2

Existing Advisory: There are no current consumption advisories for Rifle River rock bass.

Recommendation: No one should eat more than 8 meals per month of Rifle River rock bass smaller than 6 inches, more than 4 meals per month of those fish between 6 and 9 inches or more than 2 meals per month of fish larger than 9 inches due to mercury.

Length (Inches)	Regression Equation Estimate (ppm)	Meal Category
4	0.059	16
5	0.085	12
6	0.123	8
7	0.177	4
8	0.255	4
9	0.368	2
10	0.530	1
11	0.764	1
12	1.102	0.5
<i>Shaded area denotes extrapolated estimates</i>		



Au Sable River

Alcona, Crawford, Iosco, Oscoda, Otsego, and
Roscommon Counties

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1989	1989	2	7.9	7.9	9.8	
Datasets available: 1989						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	2	0.11	0.08	0.13	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	--	--				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1989	1989	2	7.9	8*	7.9	9.8
Datasets available: 1989						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	2	ND	--	--	--	--
DDT	2	ND	--	--	--	--
Chlordane	2	ND	--	--	--	--
Toxaphene	2	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						--

* - size limit varies by river reach; 8 inches is the smallest minimum size

Existing Advisory: There are no consumption advisories for Au Sable River brook trout.

Recommendation: A dataset of less than five data points for a given chemical, species and waterbody is considered insufficient for evaluation using the standard evaluation method.

Brown Trout

**Au Sable River – South Branch
Robinson Creek**

Roscommon County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1989	1989	10	7.9	10	9.8	16.3
Datasets available: 1989						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	6	0.18	0.08	0.37	0.30	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.607	0.552				

Organics Analysis:

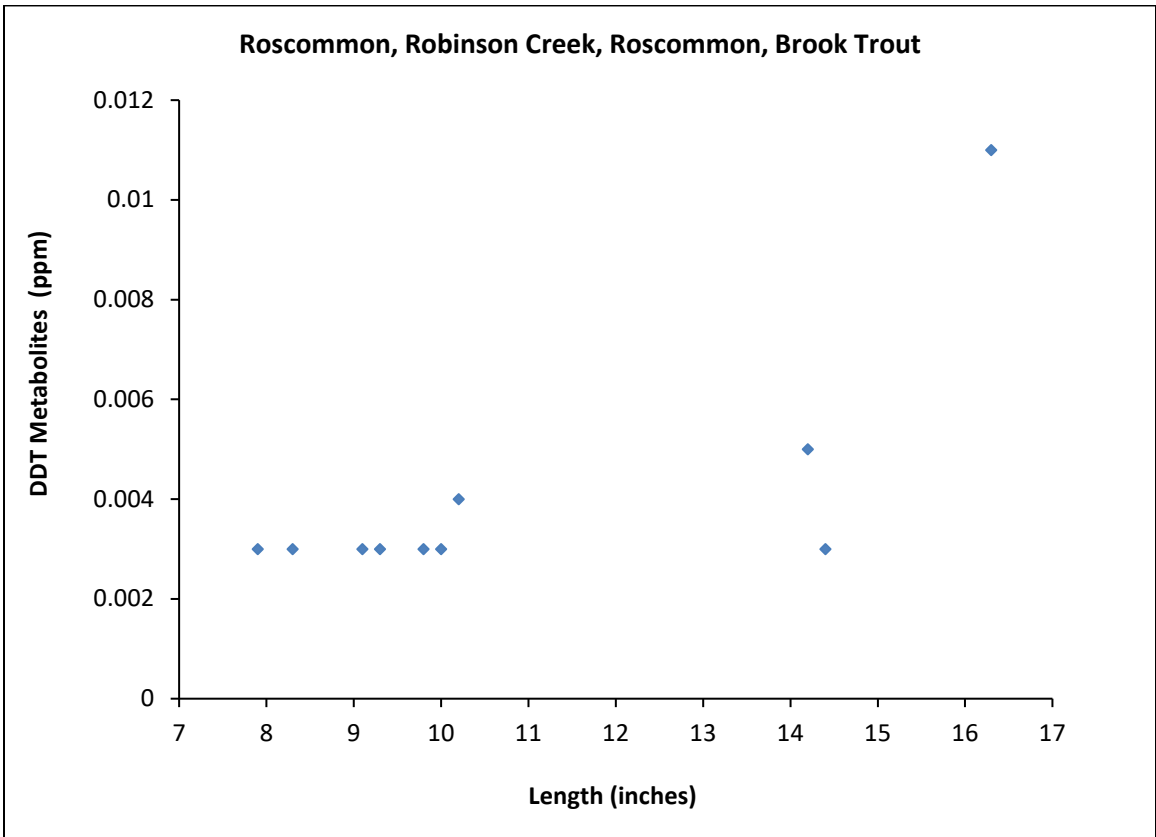
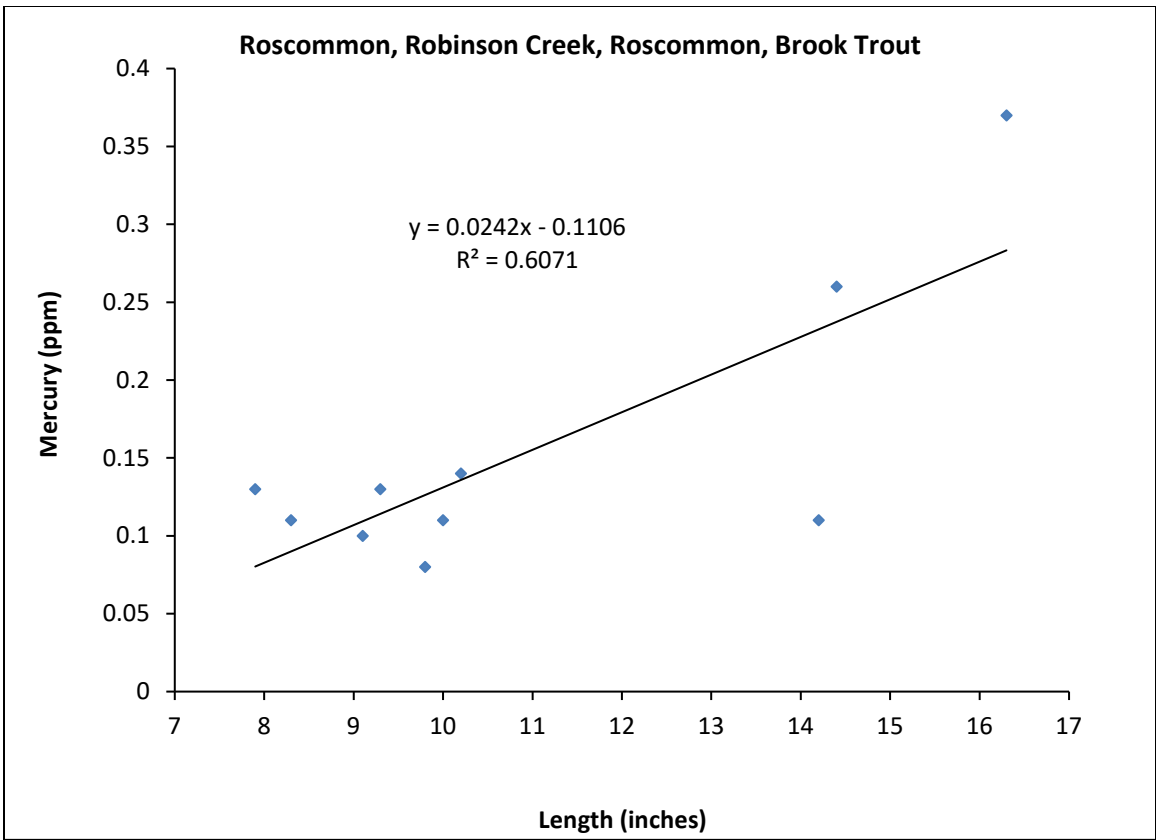
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1989	1989	10	7.9	10	9.8	16.3
Datasets available: 1989						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	6	ND	--	--	--	--
DDT	6	0.005	0.003	0.01	0.01	16
Chlordane	6	ND	--	--	--	--
Toxaphene	6	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	0.543	0.580				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						2

Existing Advisory: There are no consumption advisories for Robinson Creek brown trout.

Recommendation: No one should eat more than 4 meals per month of Robinson Creek brown trout smaller than 16 inches or more than 2 meals per month of those fish larger than 16 inches due to mercury.

Note: Sample site is on a S. Branch Au Sable tributary in the city of Roscommon; sampling was conducted to determine if a nearby waste disposal site was impacting the stream. No significant contamination was found.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
10	0.13	4
11	0.16	4
12	0.18	4
13	0.20	4
14	0.23	4
15	0.25	4
16	0.28	2
17	0.30	2
18	0.33	2
<i>Shaded area denotes extrapolated estimates</i>		



Brown Trout

**Au Sable River
Upstream of Mio Dam**

Crawford County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1988	2017	25	7.9	8*	7.9	16.4
Datasets available: 1988, 1996, 2017						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	34	0.18	0.07	0.32	0.20	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.463	0.445				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1988	1996	25	7.9	8*	7.9	16.4
2017	2017	10	11.3	12**	11.5	15.7
Datasets available (chlorinated):		1988, 1996				
Datasets available (PFOS):		2017				
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	25	0.03	0.02	0.07	0.03	8†
DDT	25	0.007				
Chlordane	25	ND	--	--	--	--
Toxaphene	25	ND	--	--	--	--
PFOS	9	0.47 ppb	0.25 ppb (ND)	1.09 ppb	0.73 ppb	16
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.023	0.023				
DDT	0.087	0.174				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	0.312	0.378	Final meal category based on UCL:			4

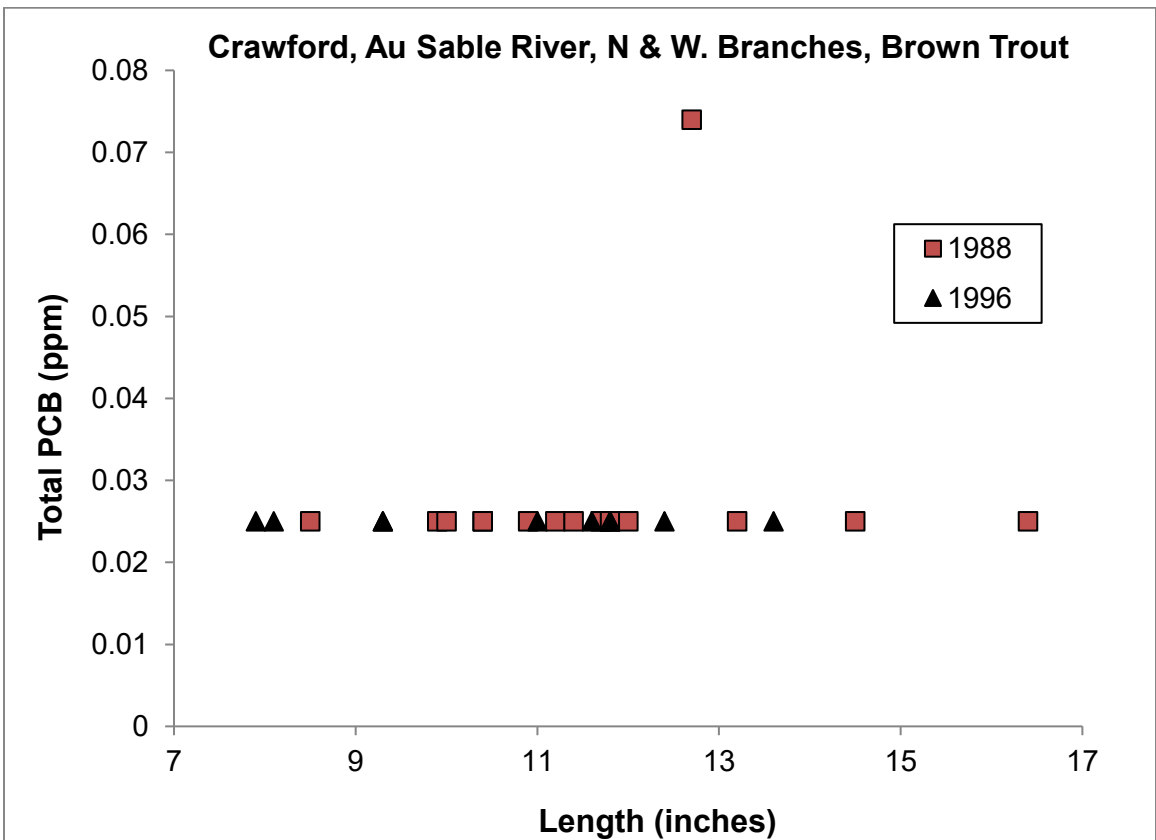
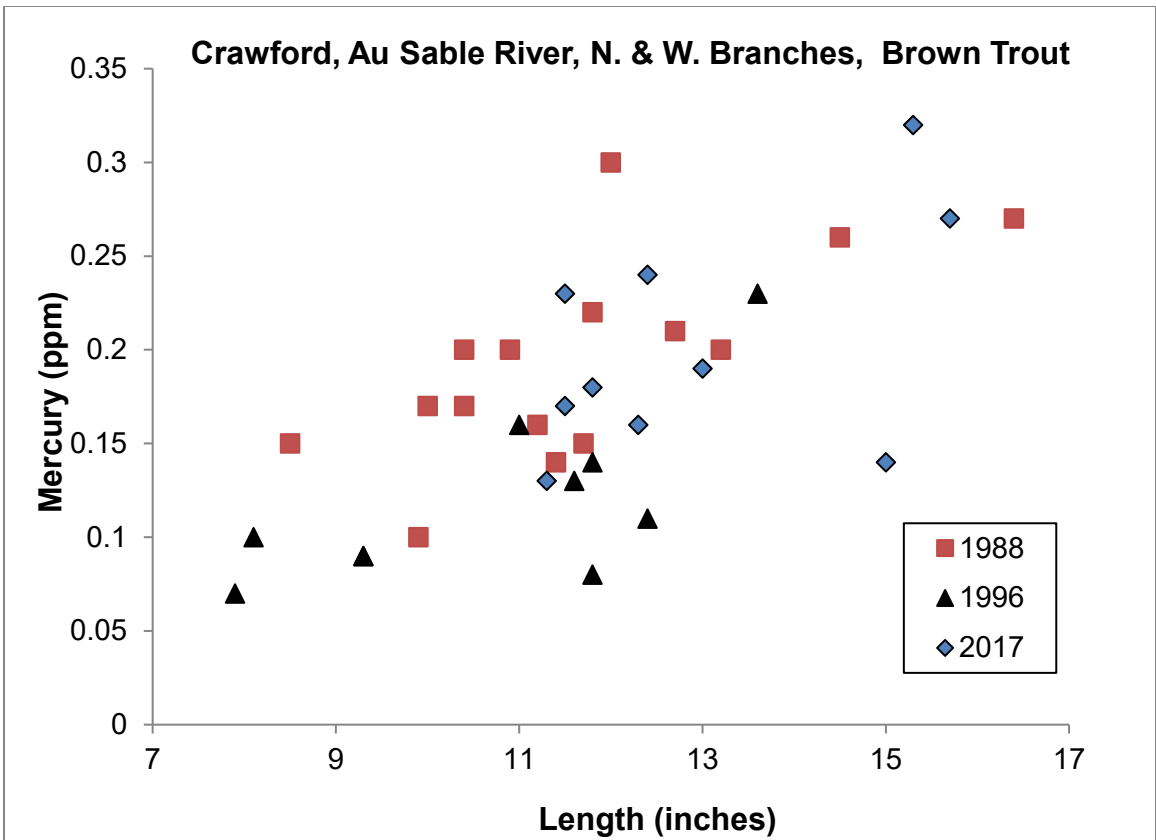
* - size limit varies by river reach; 8 inches is the smallest minimum size

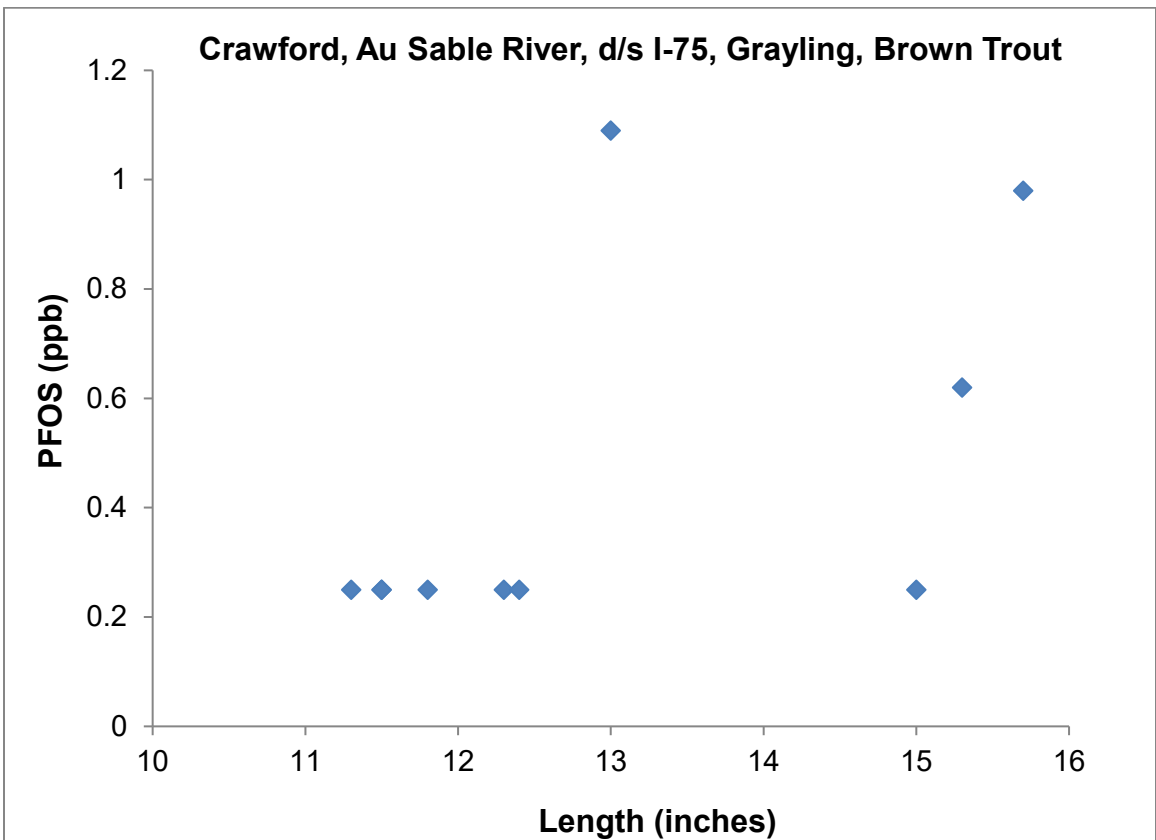
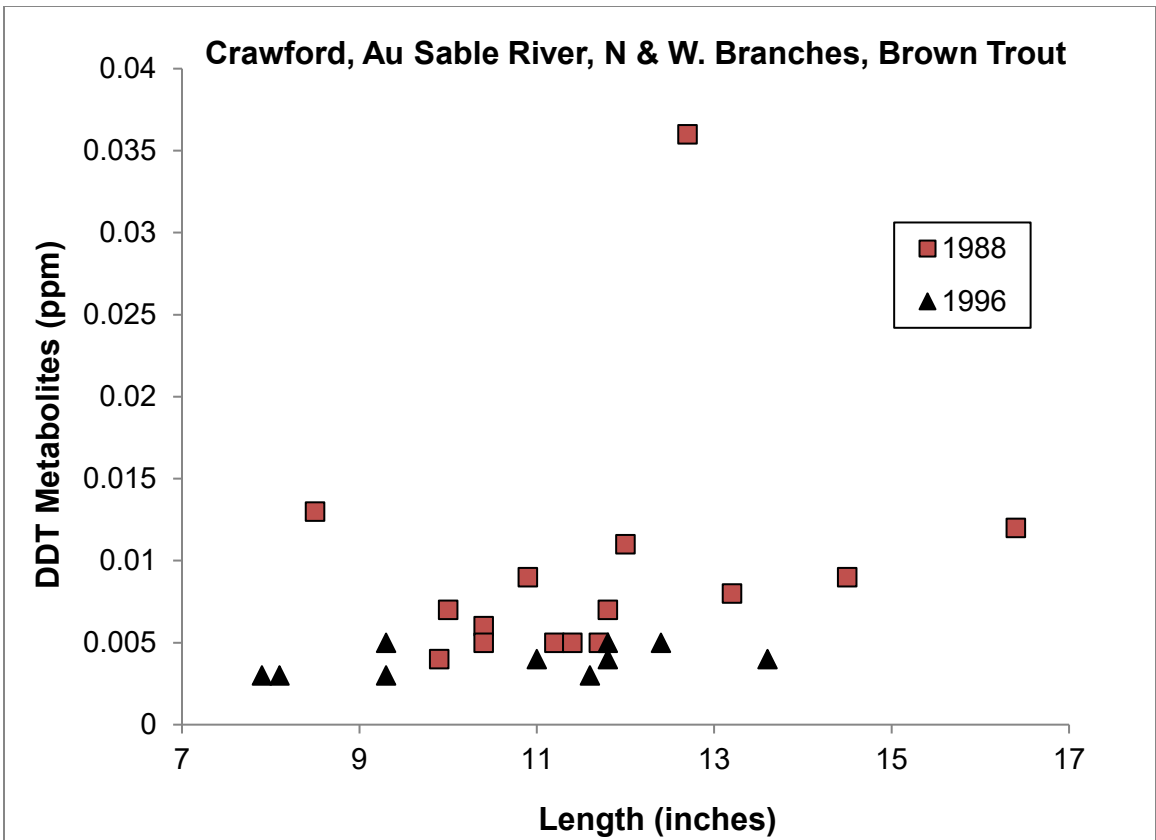
** - size limit for reach sampled in May 2017

† - all but one sample at reporting limit of 0.025 ppm

Existing MDHHS Advisory: No one should eat more than 4 meals of brown trout from the Au Sable River upstream of the Mio dam due to mercury.

Recommendation: No change is recommended.





Northern Pike

**Au Sable River
Upstream of Mio Dam**

**Otsego, Crawford,
& Oscoda Counties**

Hg Analysis:

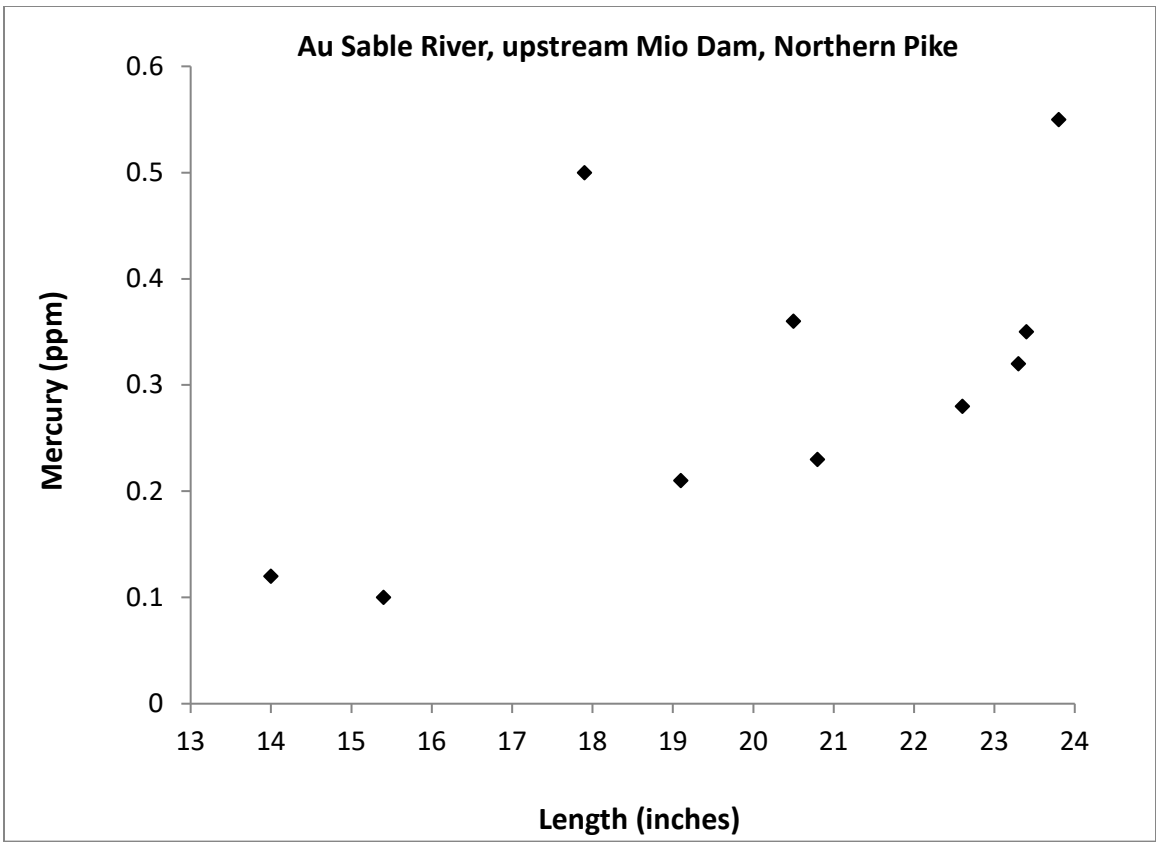
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2009	2009	10	14	24	23.8	23.8
Datasets available: 2009						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.30	0.10	0.55	0.41	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.368	0.534				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available: --						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						2

Existing Advisory: Mio Dam Pond northern pike are covered by the statewide mercury advisory; northern pike from flowing reaches of the Au Sable River are not covered by an advisory.

Recommendation: No one should eat more than 2 meals per month of northern pike from the Au Sable River upstream of the Mio Dam smaller than 30 inches or more than 1 meal per month of those fish larger than 30 inches due to mercury. The statewide length break was applied as the size of the fish was limited.



White Sucker

**Au Sable River
Upstream of Mio Dam**

**Otsego, Crawford,
& Oscoda Counties**

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1998	1998	14	10.4	na	10.4	15.4
Datasets available: 1998						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	3*	0.14	0.11	0.18	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	--	--				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1998	1998	14	10.4	na	10.4	15.4
Datasets available: 1998						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	3*	ND	--	--	--	--
DDT	3*	ND	--	--	--	--
Chlordane	3*	ND	--	--	--	--
Toxaphene	3*	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						--

* - fish were analyzed as composites

Existing Advisory: Au Sable River sucker are not covered by a consumption advisory.

Recommendation: A dataset of less than five data points for a given chemical, species and waterbody is considered insufficient for evaluation using the standard evaluation method. The statewide advice due to mercury applies to sucker from the Au Sable River upstream of Mio Dam: No one should eat more than 8 meals per month of sucker from inland waters.

Carp

**Au Sable River
Between Mio and Foote Dams**

**Oscoda, Alcona,
& Iosco Counties**

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2003	2003	3	20	na	20	28.3
Datasets available: 2003						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	3	0.16	0.07	0.32	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	--	--				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2003	2003	3	20	na	20	28.3
Datasets available: 2003						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	3	0.007	0.001	0.02	--	--
DDT	3	0.006	0.002	0.02	--	--
Chlordane	3	0.001	0.001	0.002	--	--
Toxaphene	3	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						--

Existing Advisory: There are no consumption advisories for carp from the Au Sable River upstream of Foote Dam.

Recommendation: A dataset of less than five data points for a given chemical, species and waterbody is considered insufficient for evaluation using the standard evaluation method. The statewide advice due to mercury applies to carp from the Au Sable River upstream of Foote Dam: No one should eat more than 2 meals per month of carp from any river or inland lake.

Northern Pike

**Au Sable River
Between Mio and Foote Dams**

**Oscoda, Alcona,
& Iosco Counties**

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2003	2008	14	14.6	24	23.6	26.5
Datasets available:						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	6	0.50	0.35	0.67	0.64	1
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.663	0.717				

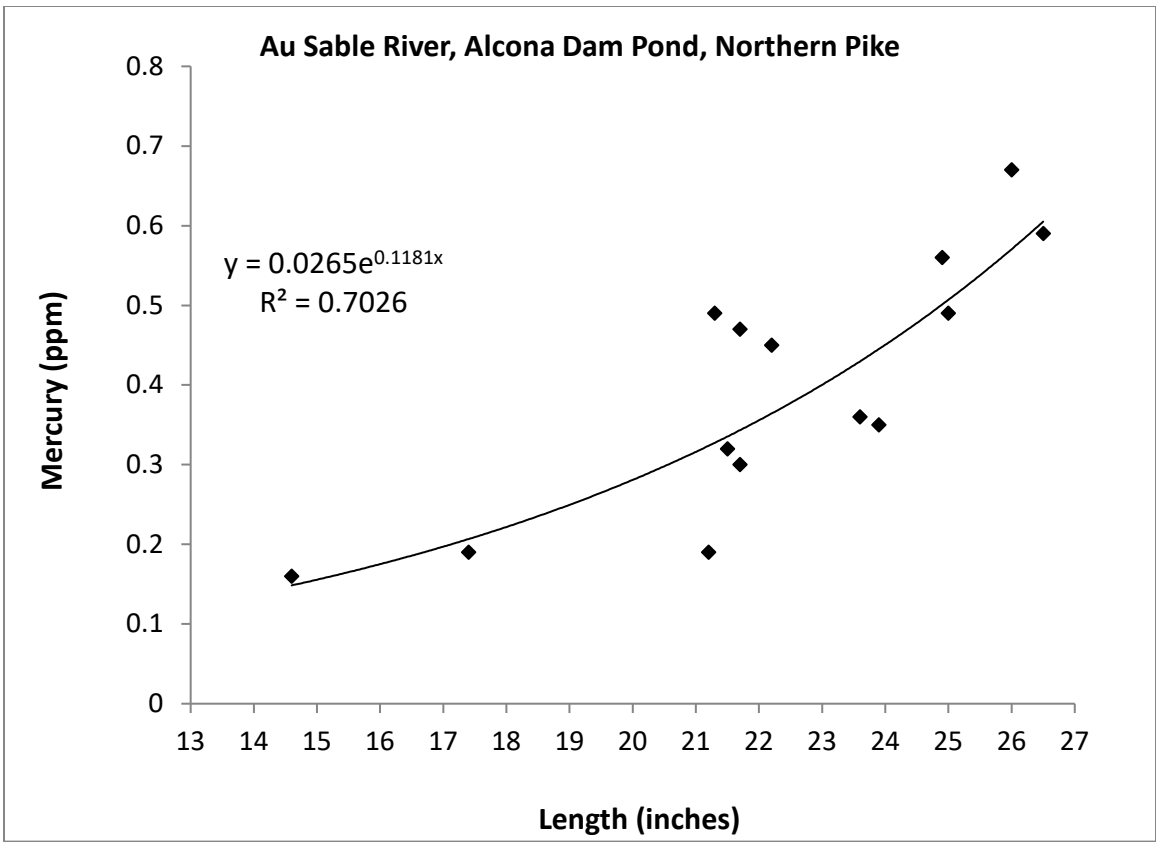
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2003	2003	4	17.4	24	23.6	23.6
Datasets available: 2003						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	4	ND	--	--	--	--
DDT	4	ND	--	--	--	--
Chlordane	4	ND	--	--	--	--
Toxaphene	4	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						1

Existing Advisory: Northern pike from Au Sable River impoundments are covered by the statewide mercury advisory; northern pike from flowing reaches of the Au Sable River are not covered by an advisory.

Recommendation: No one should eat more than 1 meal per month of northern pike from the Au Sable River between the Mio and Foote Dams smaller than 30 inches or more than 6 meals per year of those fish larger than 30 inches due to mercury.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
20	0.28	2
22	0.36	2
24	0.45	2
26	0.57	1
28	0.72	1
30	0.92	1
32	1.16	0.5
34	1.47	0.5
36	1.86	0.5
<i>Shaded area denotes extrapolated estimates</i>		



Walleye**Au Sable River
Between Mio and Foote Dams****Oscoda, Alcona,
& Iosco Counties****Hg Analysis:**

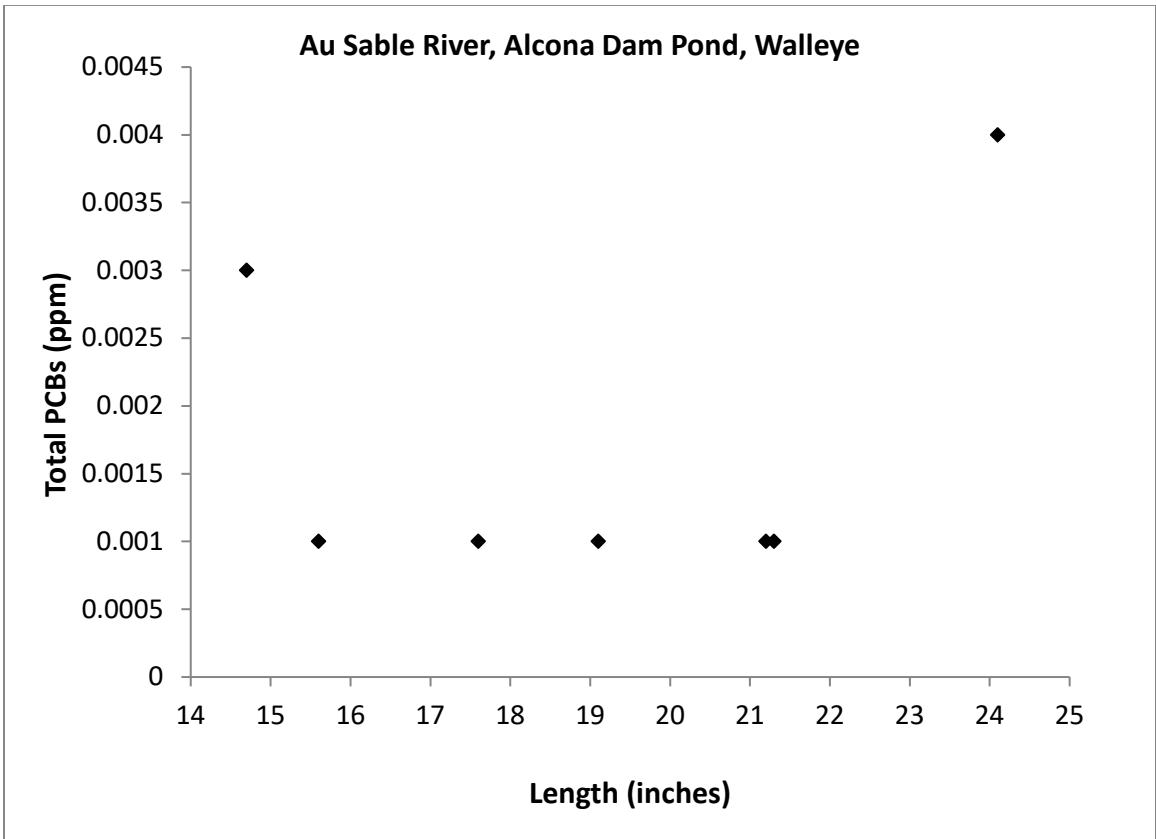
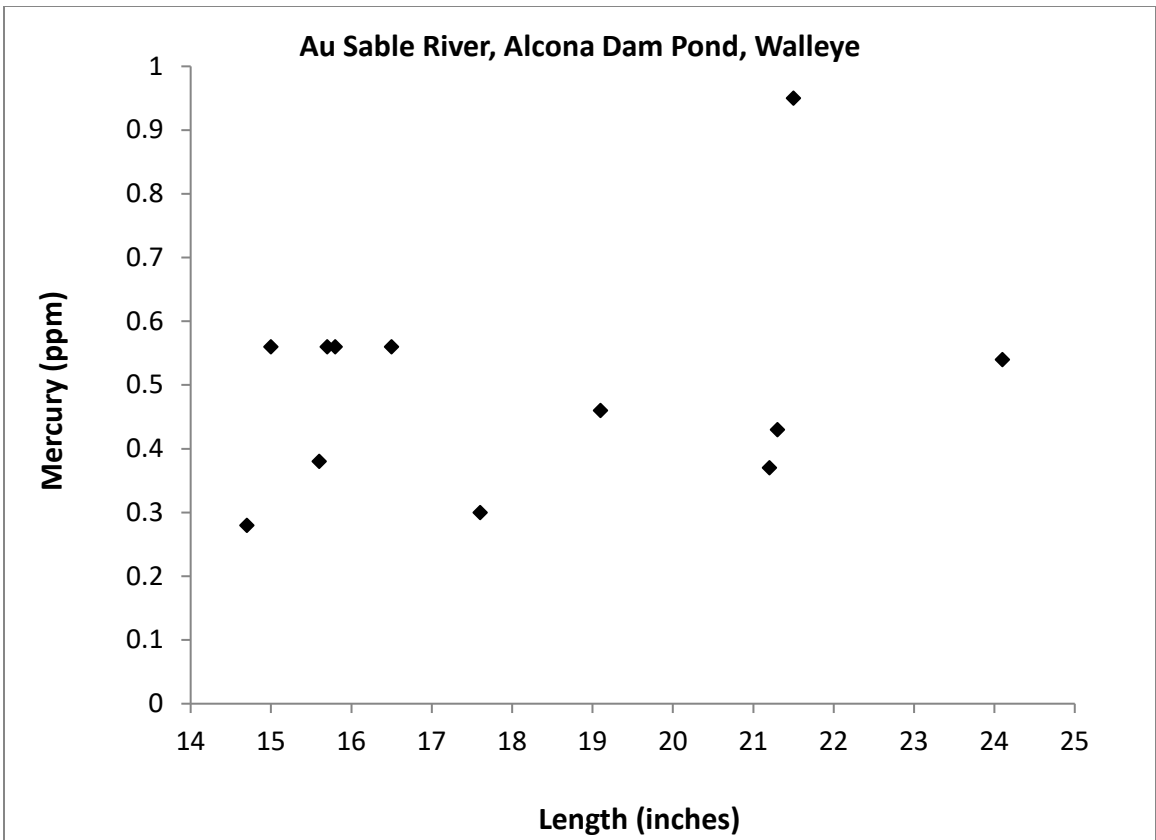
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1998	2003	12	14.7	15	14.7	24.1
Datasets available: 1998, 2003						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	12	0.50	0.28	0.95	0.61	1
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.076	0.070				

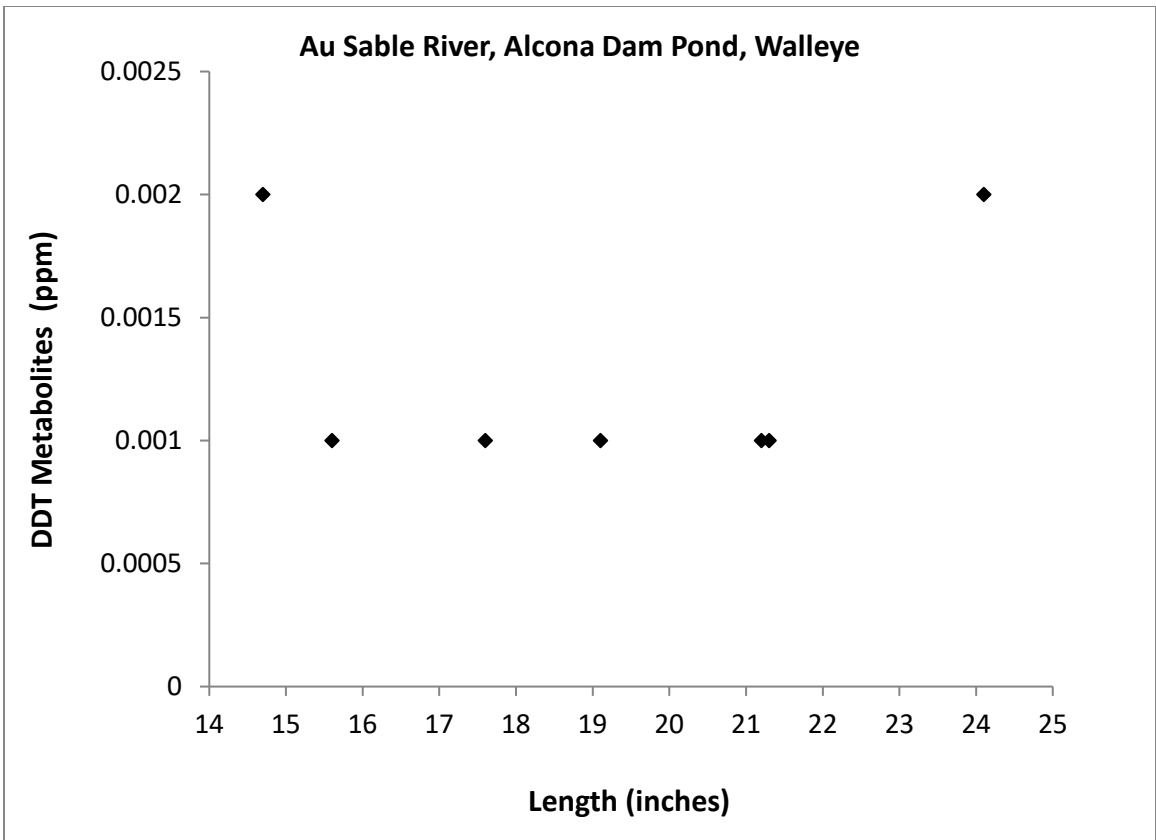
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2003	2003	7	14.7	15	14.7	24.1
Datasets available: 1998, 2003						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	7	0.002	0.001	0.004	0.003	16
DDT	7	0.001	0.001	0.002	0.002	16
Chlordane	7	ND	--	--	--	--
Toxaphene	7	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.061	0.030				
DDT	0.004	0.004				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						1

Existing Advisory: Women and children should not eat more than 1 meal per month of walleye from the Au Sable River between the Alcona and Mio Dams due to mercury.

Recommendation: No one should eat more than 1 meal per month of walleye from the Au Sable River between the Mio and Foote Dams due to mercury.





White Sucker

**Au Sable River
Between Mio and Foote Dams**

**Oscoda, Alcona,
& Iosco Counties**

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1998	1998	10	15	na	15	20.1
Datasets available: 1998						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	2*	0.27	0.22	0.32	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	--	--				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1998	1998	10	15	na	15	20.1
Datasets available: 1998						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	2*	ND	--	--	--	--
DDT	2*	0.003	0.003	0.003	--	--
Chlordane	2*	ND	--	--	--	--
Toxaphene	2*	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						--

* - fish were analyzed as 2 composites

Existing Advisory: There are no consumption advisories for Au Sable River sucker.

Recommendation: A dataset of less than five data points for a given chemical, species and waterbody is considered insufficient for evaluation using the standard evaluation method. The statewide advice applies to sucker from the Au Sable River between the Mio and Foote Dams: No one should eat more than 8 meals per month of sucker from inland waters.

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples			
Earliest	Most Recent							
2012	2019	14	4.1	NA	4.1	8.9		
Datasets available: 2012, 2019								
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category		
Mercury	14	0.107	0.044	0.210	0.136	4		
Chemical	Linear Regression	Exponential Regression						
	R ²	R ²						
Mercury	0.616	0.618						

Organics Analysis:

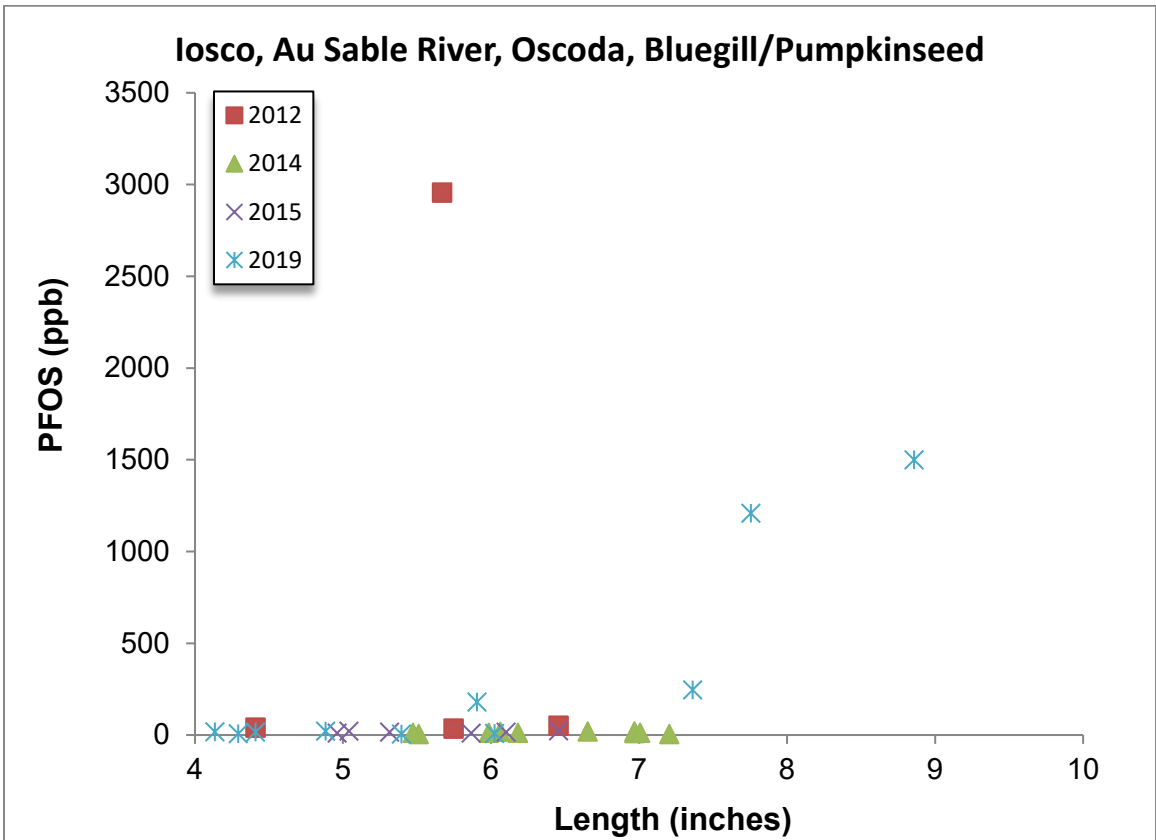
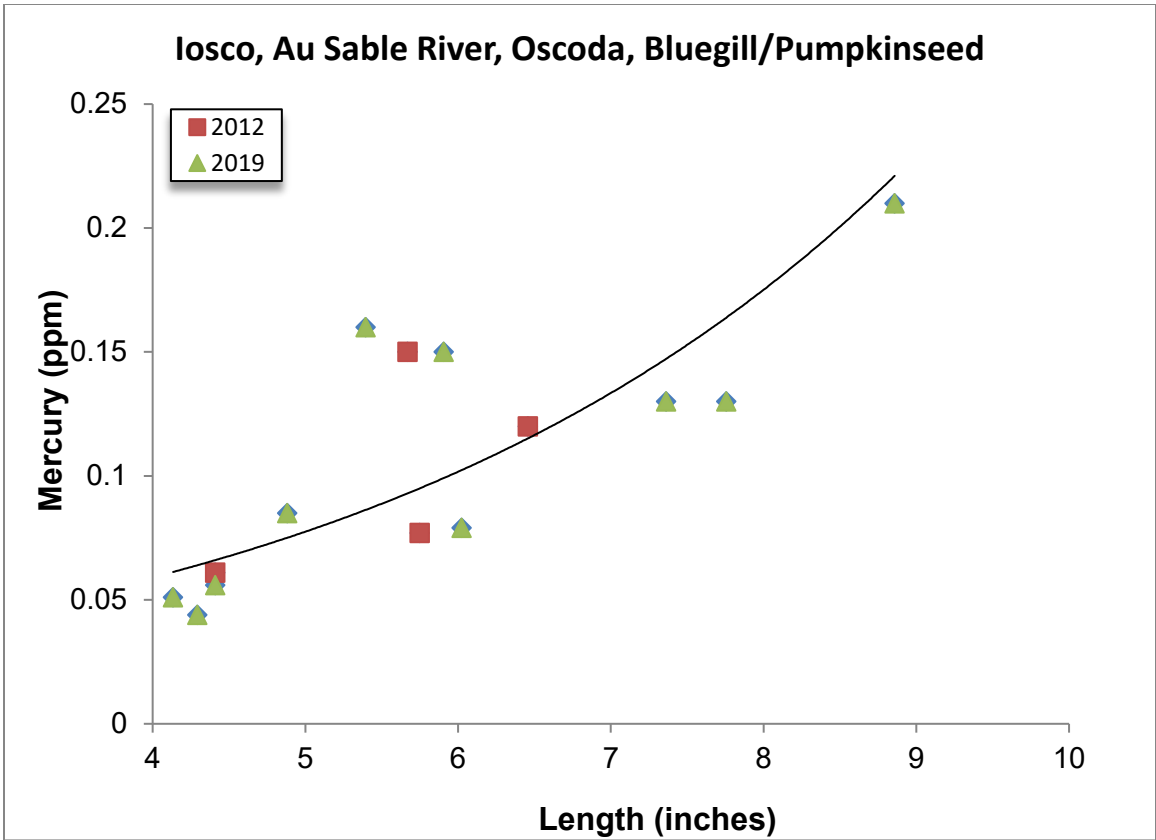
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples			
Earliest	Most Recent							
2012	2019	30	4.1	NA	4.1	8.9		
Datasets available: 2012, 2014, 2015, 2019								
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category		
PCB	0	--	--	--	--	--		
DDT	0	--	--	--	--	--		
Chlordane	0	--	--	--	--	--		
Toxaphene	0	--	--	--	--	--		
PFOS	30	217.9 ppb	6.1 ppb	2956 ppb	449 ppb	0		
Chemical	Linear Regression	Exponential Regression						
	R ²	R ²						
PCB	--	--						
DDT	--	--						
Chlordane	--	--						
Toxaphene	--	--						
PFOS	0.088	0.184						
						Final meal category based on UCL:		0

Existing MDHHS Advisory: There is a Do Not Eat advisory for bluegill and pumpkinseed sunfish from the Au Sable River downstream of the Foote Dam including Van Etten Creek due to PFOS.

Recommendation: No change to the advisory is recommended. Mercury causes an advisory less restrictive than PFOS.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
4	0.059	16
5	0.077	12
6	0.102	8
7	0.133	4
8	0.175	4
9	0.229	4
10	0.301	2

Shaded area denotes extrapolated estimates



Carp

**Au Sable River
Oscoda**

Iosco County

Hg Analysis:

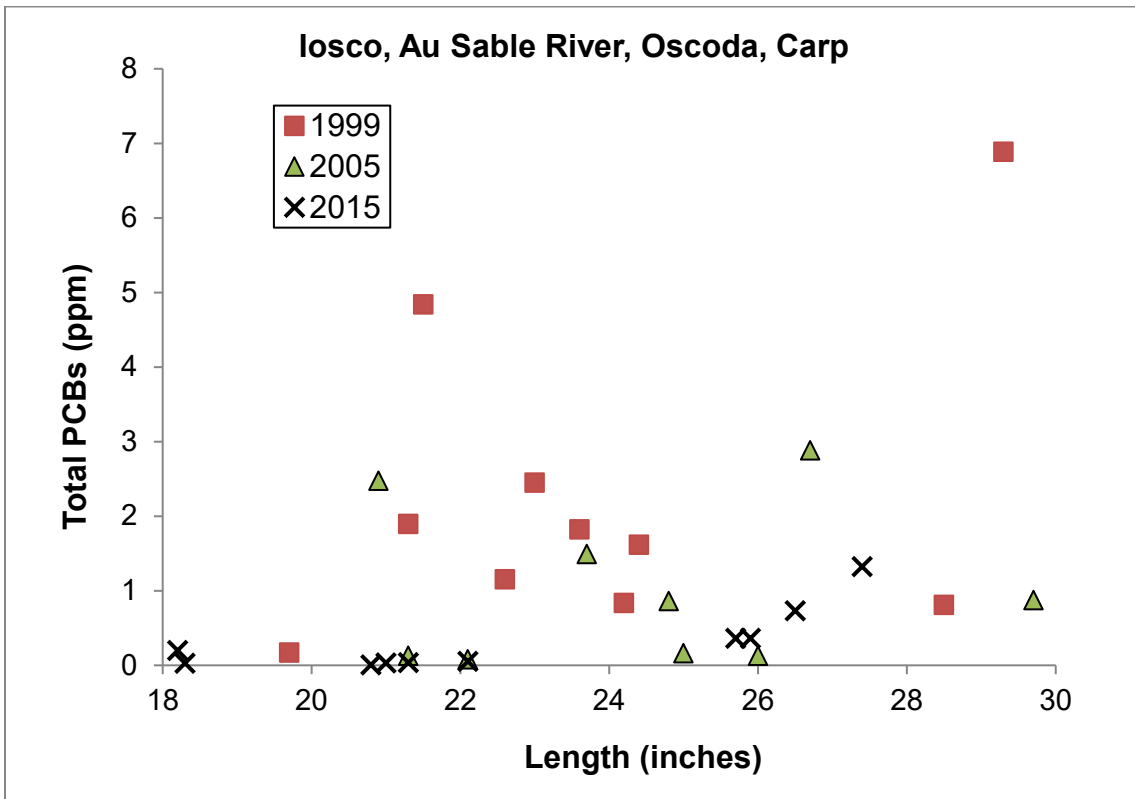
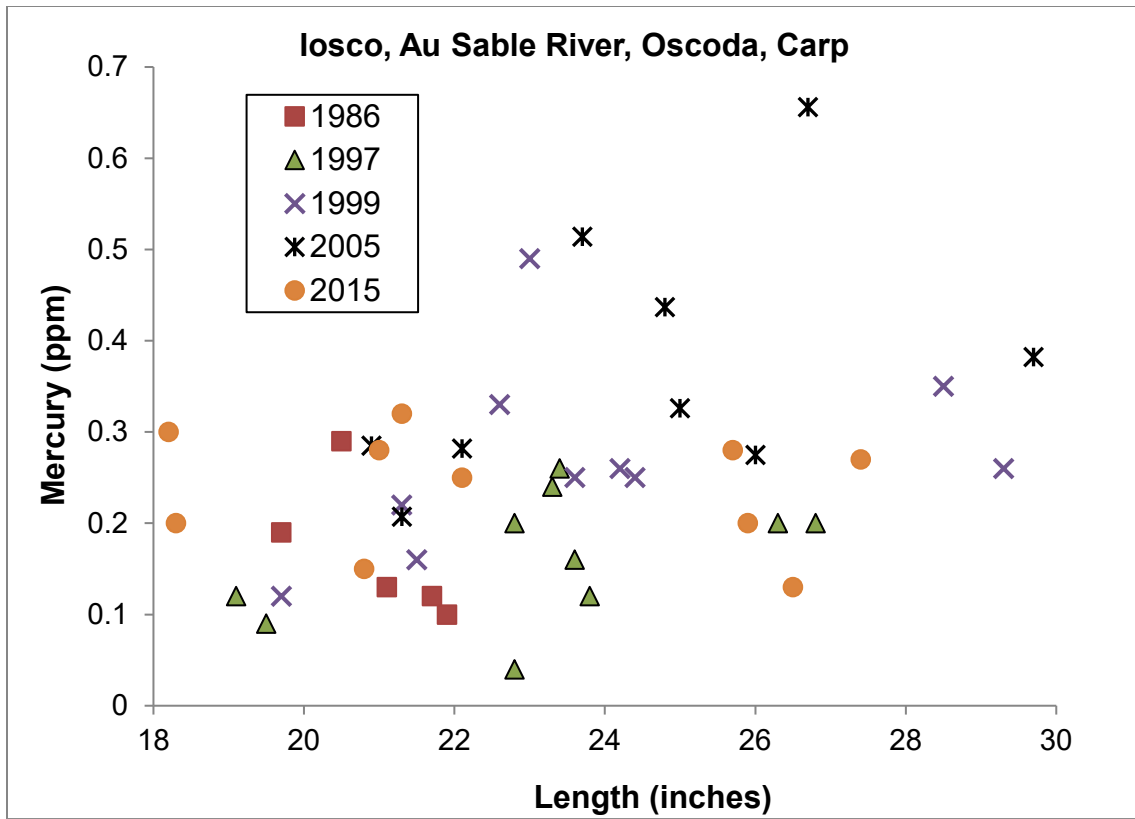
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1986	2015	44	18.2	na	18.2	29.7
Datasets available: 1986, 1997, 1999, 2005, 2015						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	44	0.25	0.04	0.66	0.28	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.126	0.117				

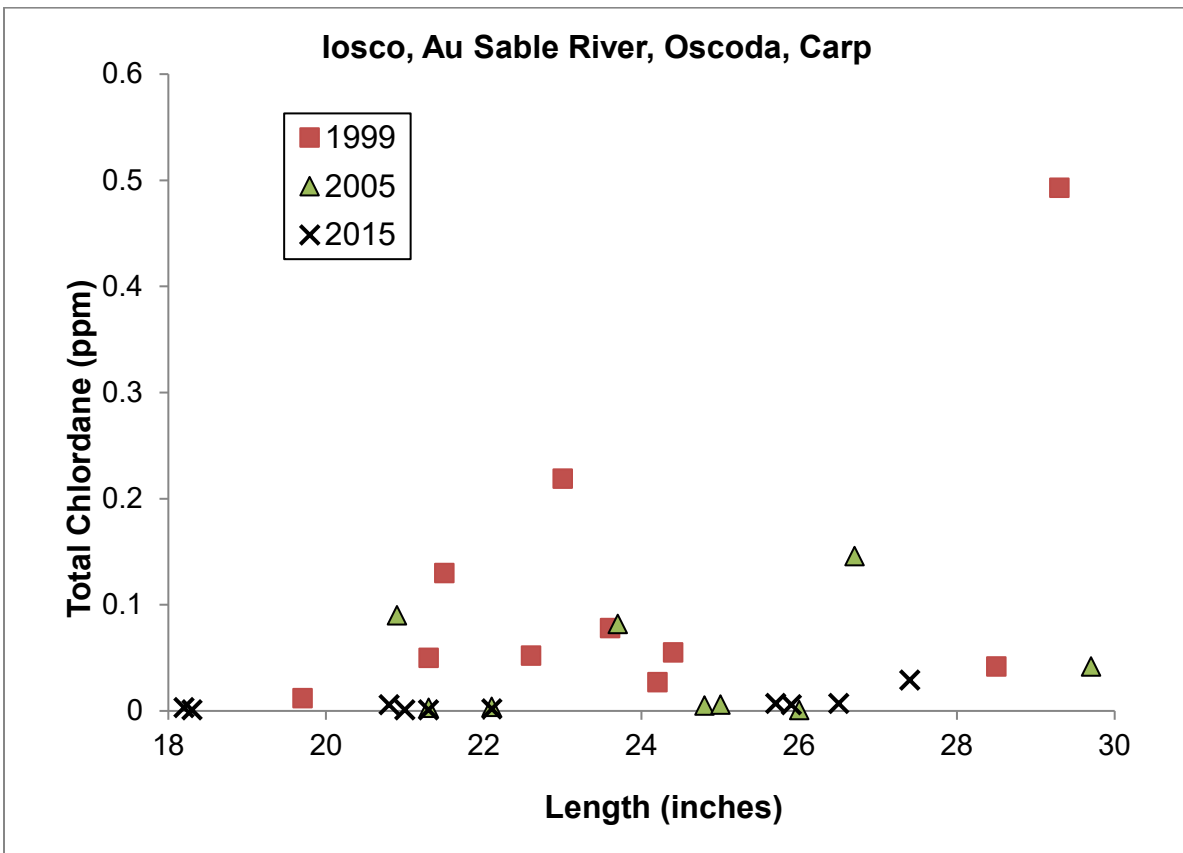
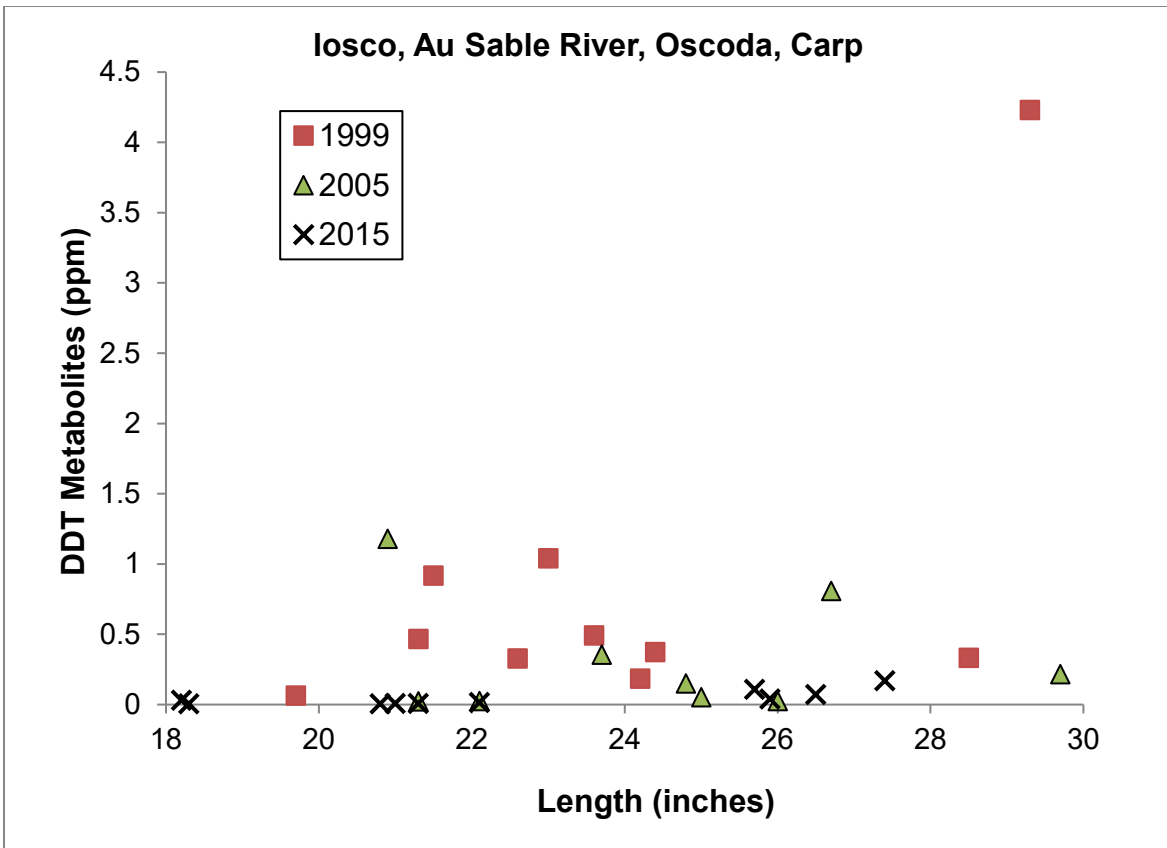
Organics Analysis:

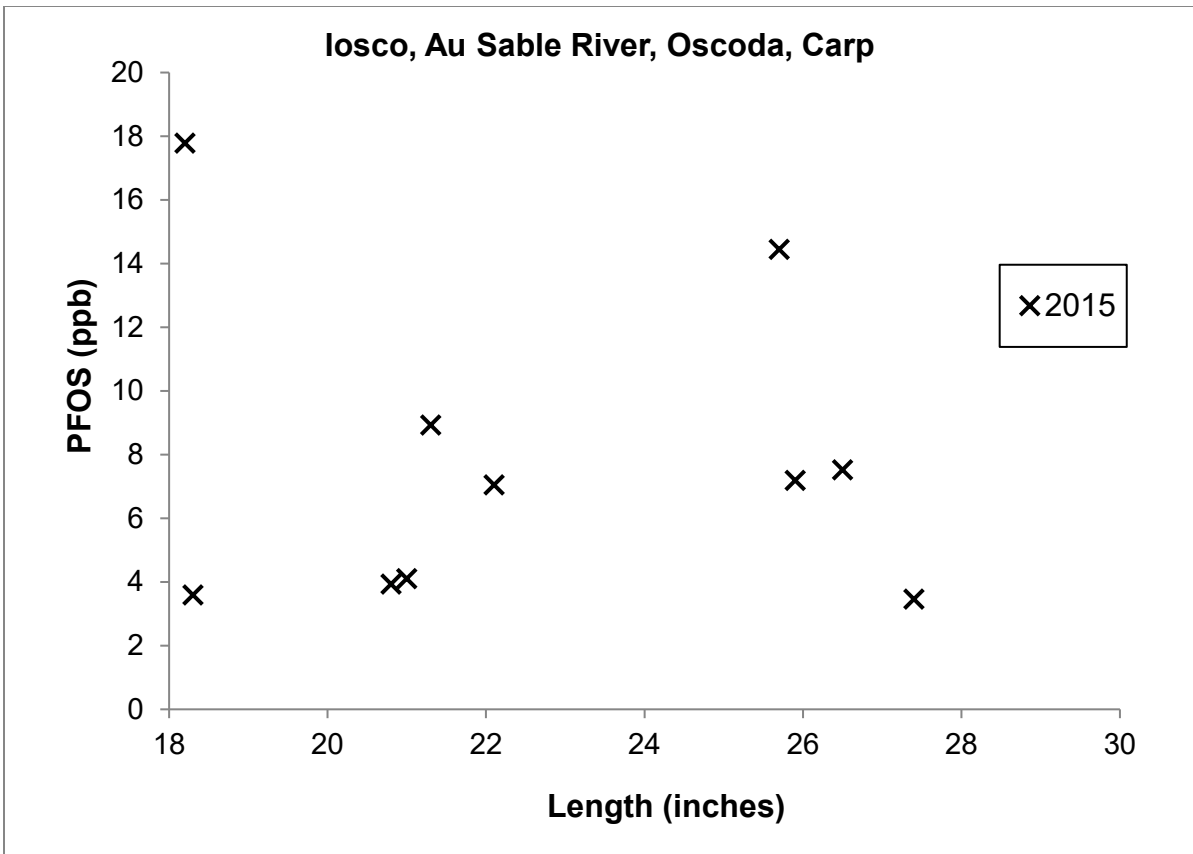
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1999	2015	29	18.2	na	18.2	29.7
Datasets available: 1997, 1999, 2005, 2015						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	29	1.196	0.005	6.89	1.79	Limited
DDT	29	0.404	0.006	4.23	0.71	2
Chlordane	29	0.055	0.001	0.49	0.09	--
Toxaphene	29	ND	--	--	--	--
PFOS	10	7.8 ppb	3.4 ppb	17.8 ppb	11.3 ppb	12
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.097	0.226				
DDT	0.112	0.205				
Chlordane	0.122	0.153				
Toxaphene	--	--				
PFOS	0.014	0.000				
Final meal category based on UCL:						Limited

Existing MDHHS Advisory: No one should eat non-migratory fish (including carp) from the Au Sable River downstream of the Foote Dam until further sampling is conducted due to uncertainty of the concentrations of PFOS in fish.

Recommendation: Sensitive populations should not eat these fish. Healthy adults should not eat more than 1 or 2 meals per year of carp from the Au Sable River between the Foote Dam and the river mouth due to PCBs. Mercury, DDT, and PFOS would cause advisories.







Rock Bass

**Au Sable River
Oscoda**

Iosco County

Hg Analysis:

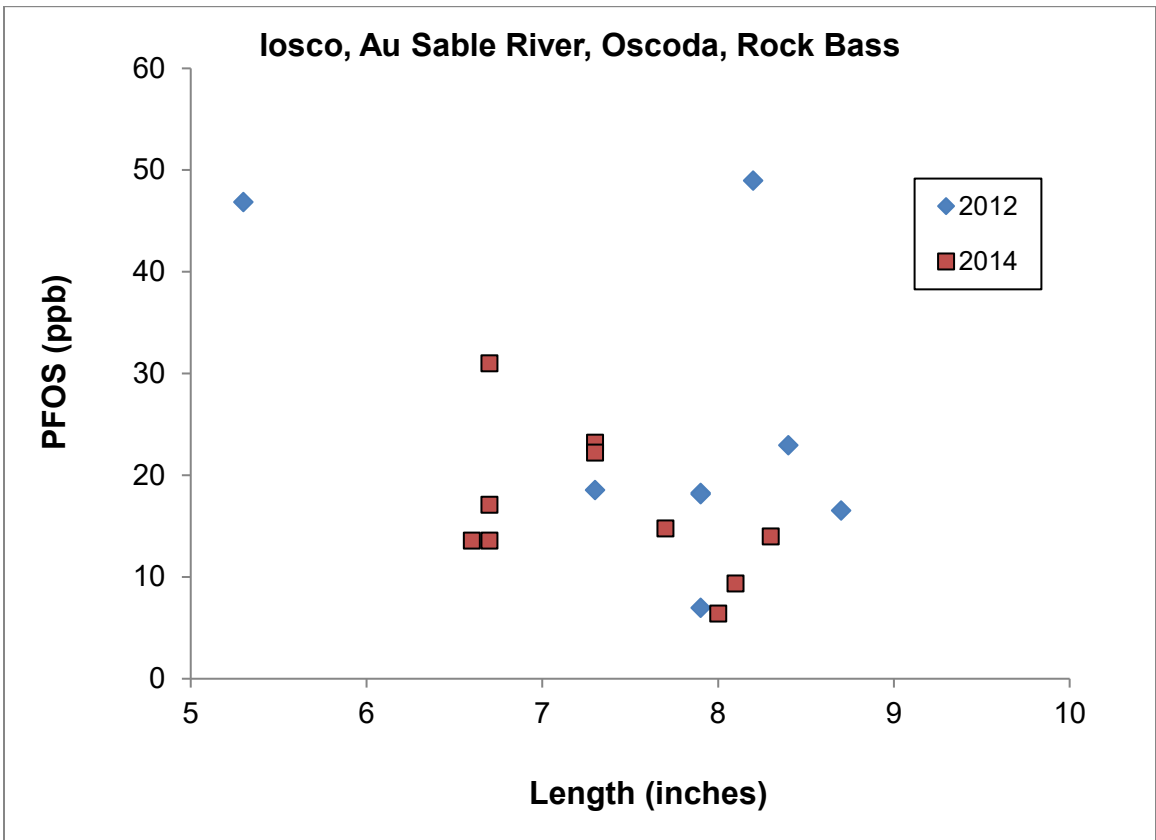
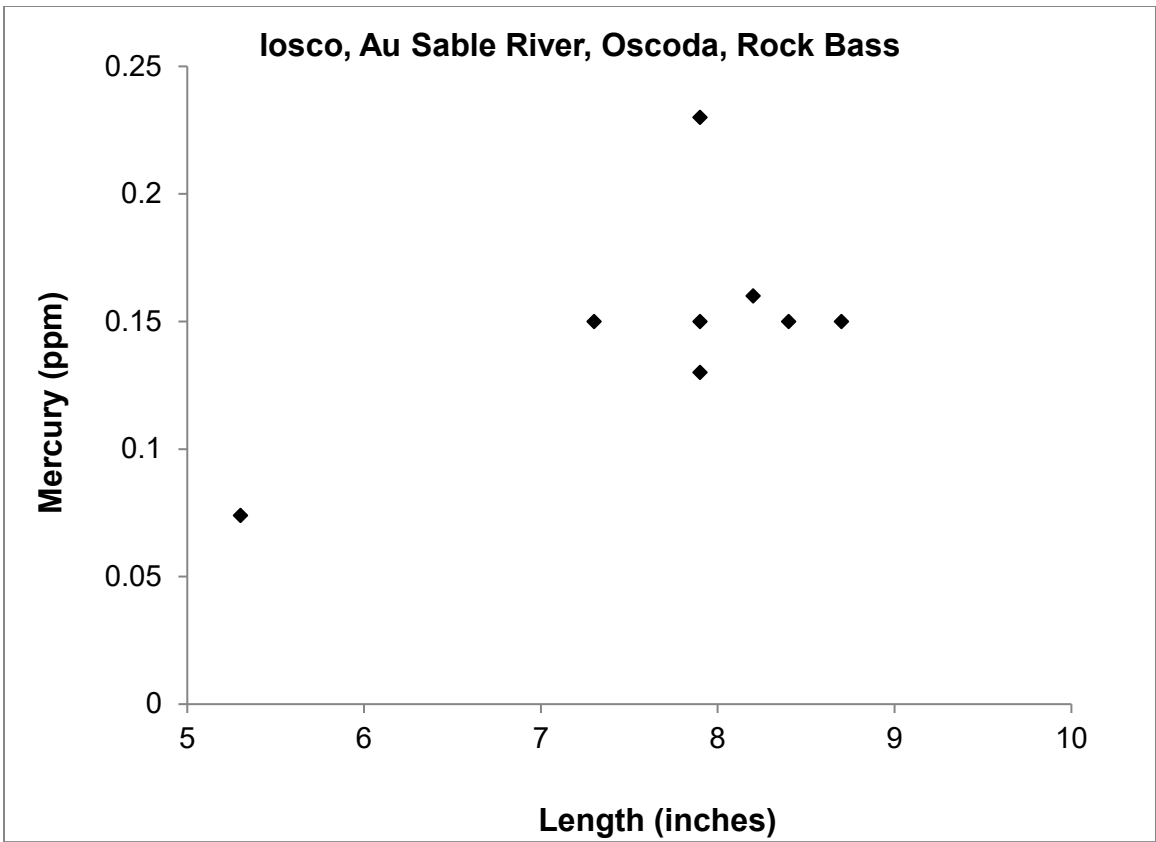
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2012	2012	8	5.3	na	5.3	8.7
Datasets available: 2012						
Chemical	Sample Size (Legal)	Mean Conc. (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	8	0.15	0.07	0.23	0.18	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.403	0.593				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2012	2014	18	5.3	na	5.3	8.7
Datasets available: 2012, 2014						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
PFOS	18	20 ppb	6 ppb	49 ppb	26 ppb	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	0.136	0.130				
Final meal category based on UCL:						4

Existing MDHHS Advisory: No one should eat non-migratory species of fish (including rock bass) from the Au Sable River downstream of Foote Dam due to high concentrations of PFOS.

Recommendation: No change. Due to the PFOS levels in the bluegill and pumpkinseed, additional rock bass should be collected to better understand the population variability.



Smallmouth Bass

**Au Sable River
Downstream Foote Dam**

Iosco County

Hg Analysis:

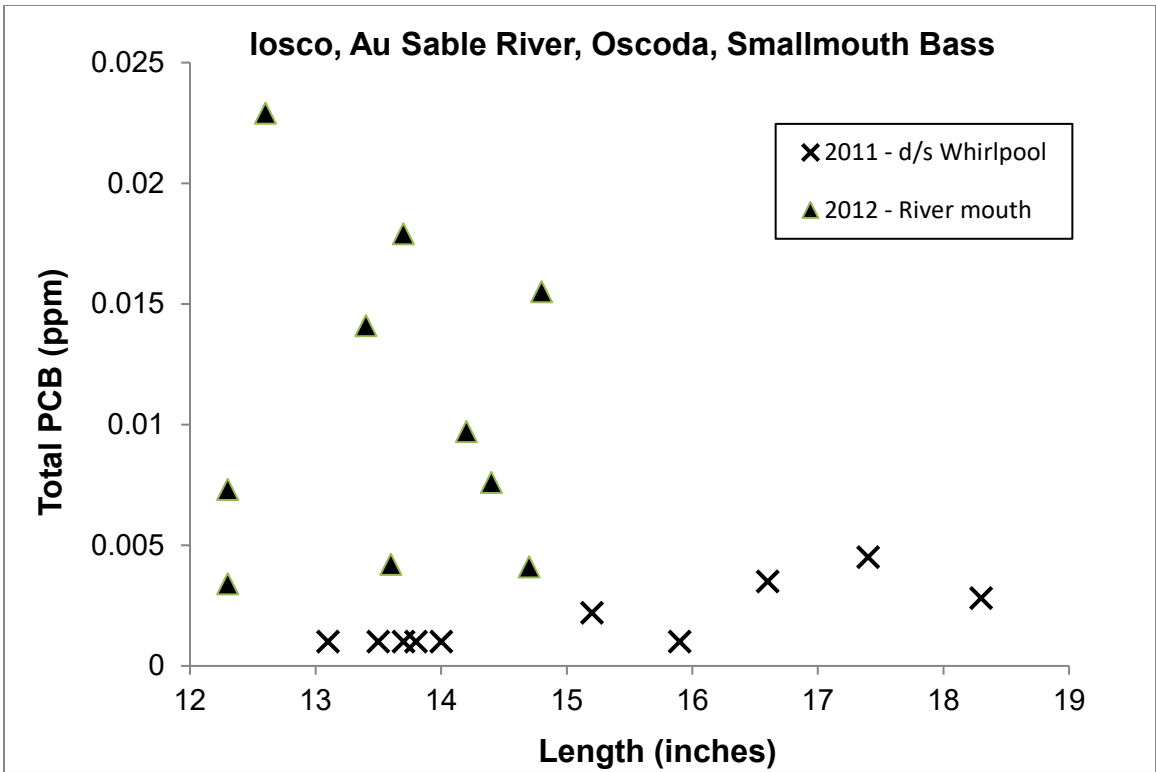
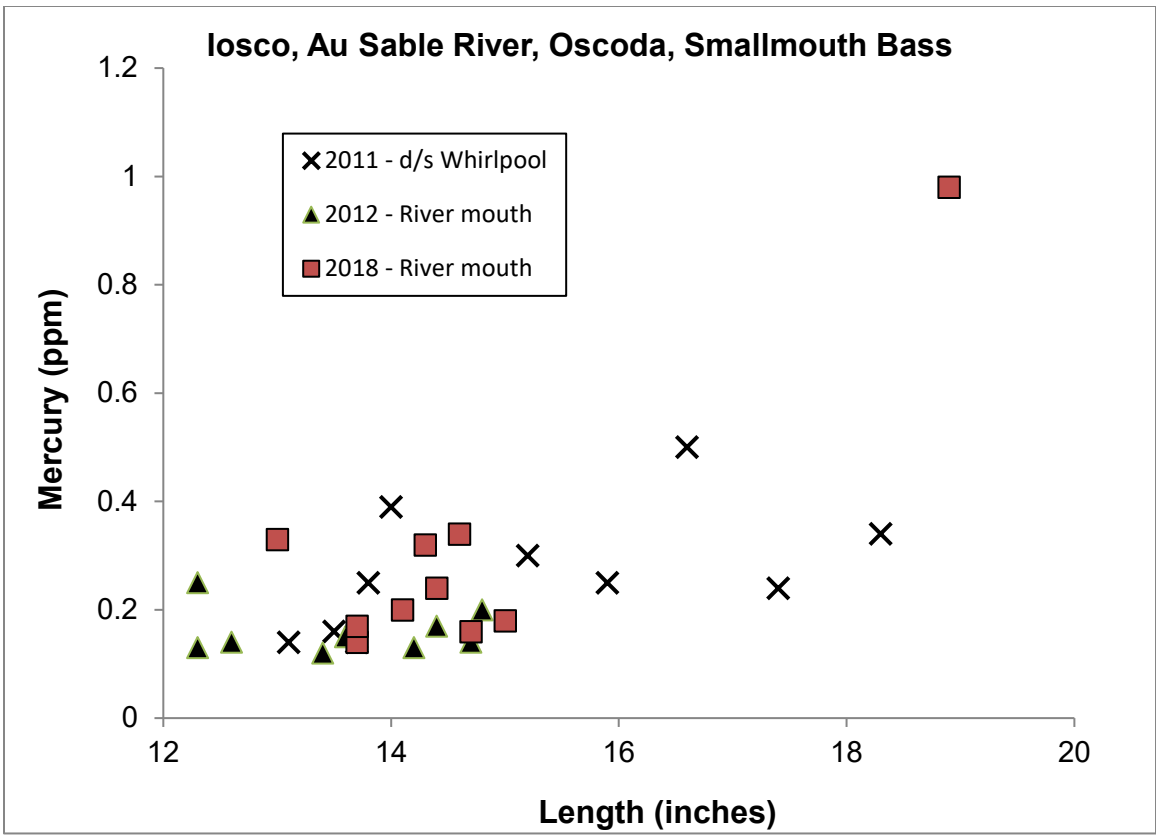
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2011	2018	30	12.3	14	13.5	18.9
Datasets available: 2011, 2012, 2018						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	24	0.26	0.13	0.98	0.34	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.442	0.423				

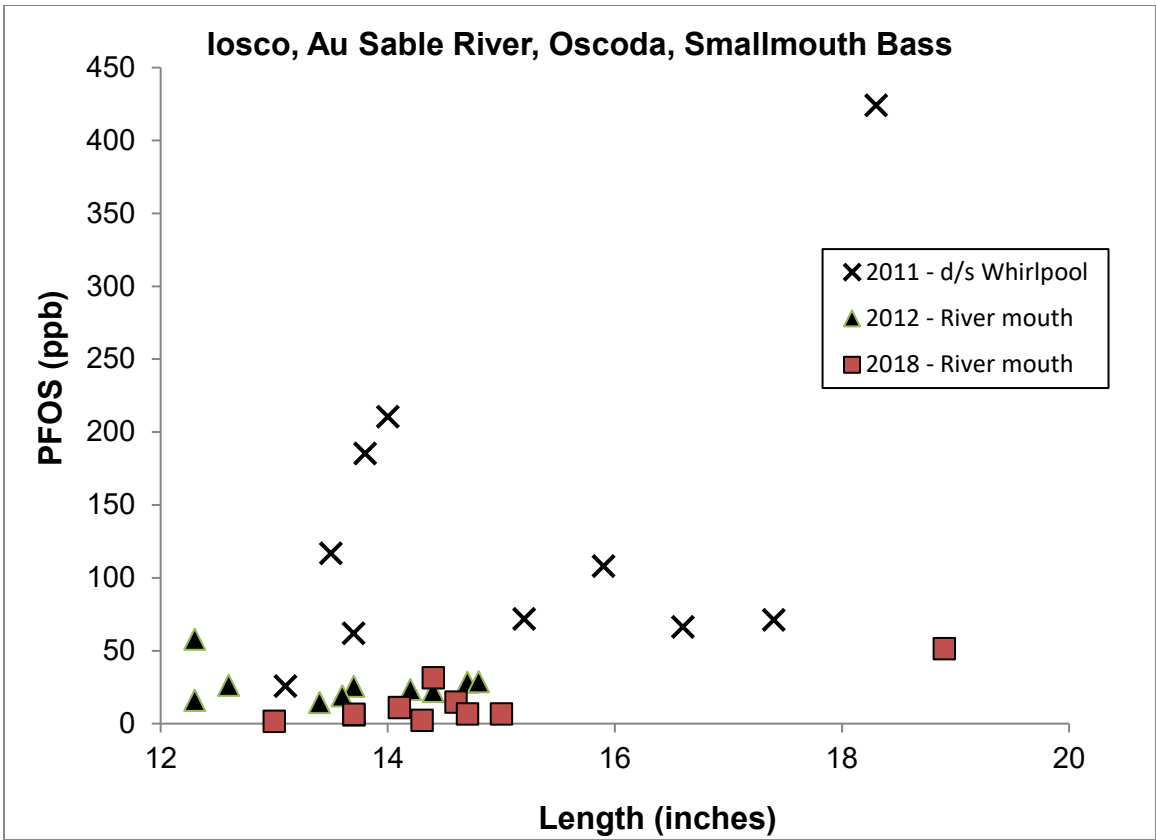
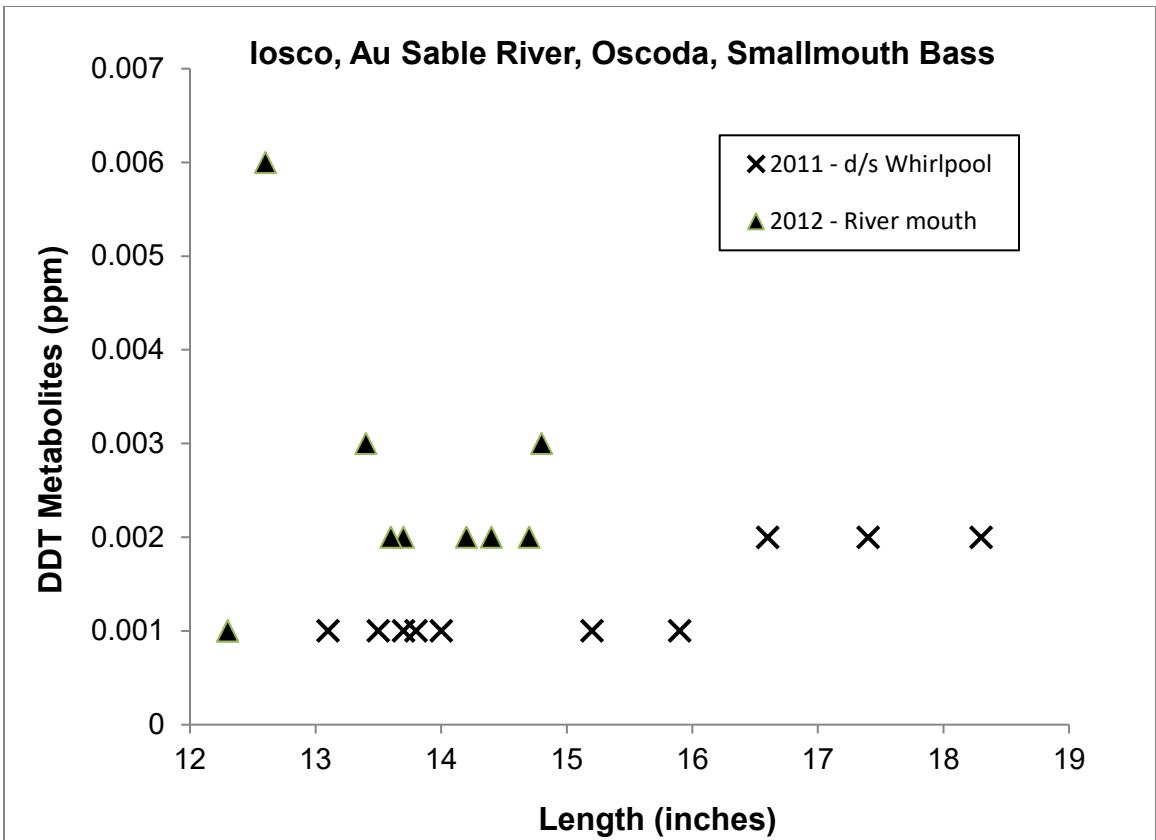
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2011	2018	30	12.3	14	13.5	18.9
Datasets available: PFOS - 2011, 2012, 2018 Chlorinated organics – 2011, 2012						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	15	0.005	< 0.001	0.018	0.008	16
DDT	15	0.002	< 0.001			16
Chlordane	15	ND	< 0.001	--	--	--
Toxaphene	15	ND	< 0.05	--	--	--
PFOS	24	67 ppb	2 ppb	424 ppb	106 ppb	1
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.072	0.019				
DDT	0.003	0.012				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	0.191	0.152				
Final meal category based on UCL:						1

Existing MDHHS Advisory: No one should eat non-migratory species of fish (including smallmouth bass) from the Au Sable River downstream of Foote Dam due to high concentrations of PFOS.

Recommendation: No change is recommended.





White Sucker

**Au Sable River
Downstream of Foote Dam**

Iosco County

Hg Analysis:

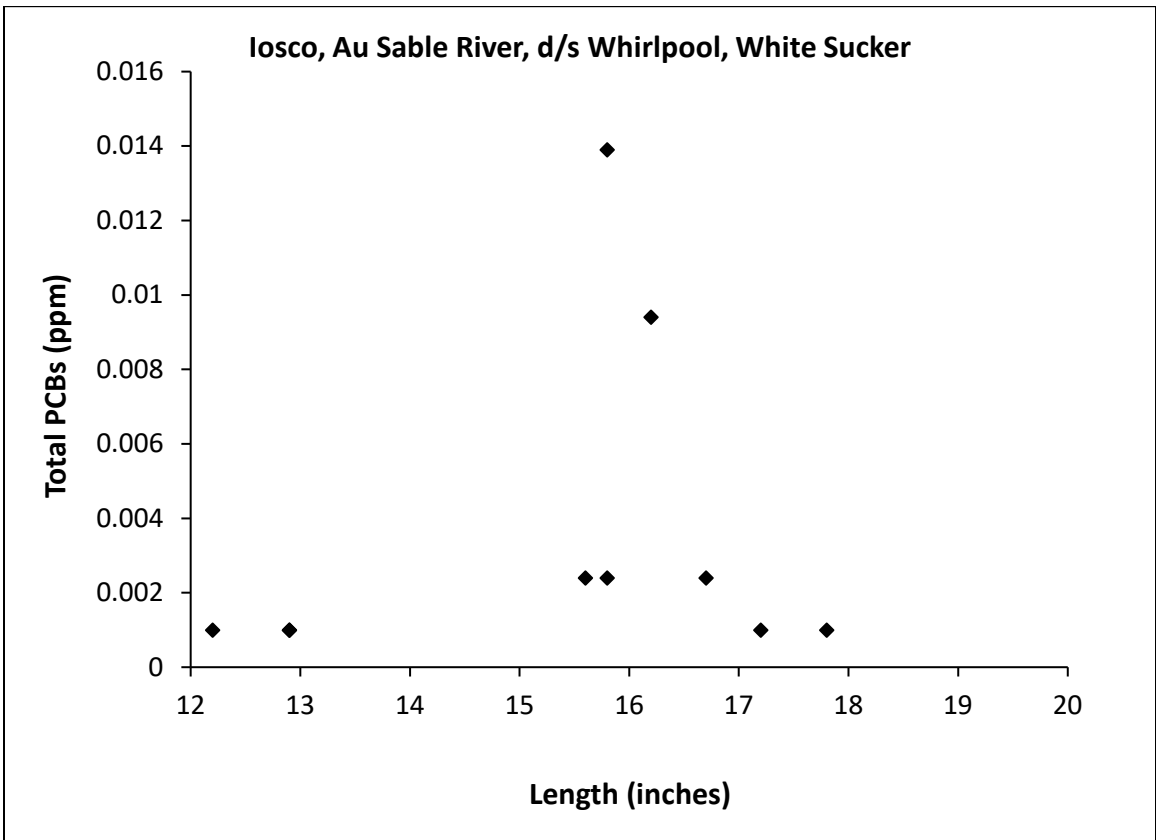
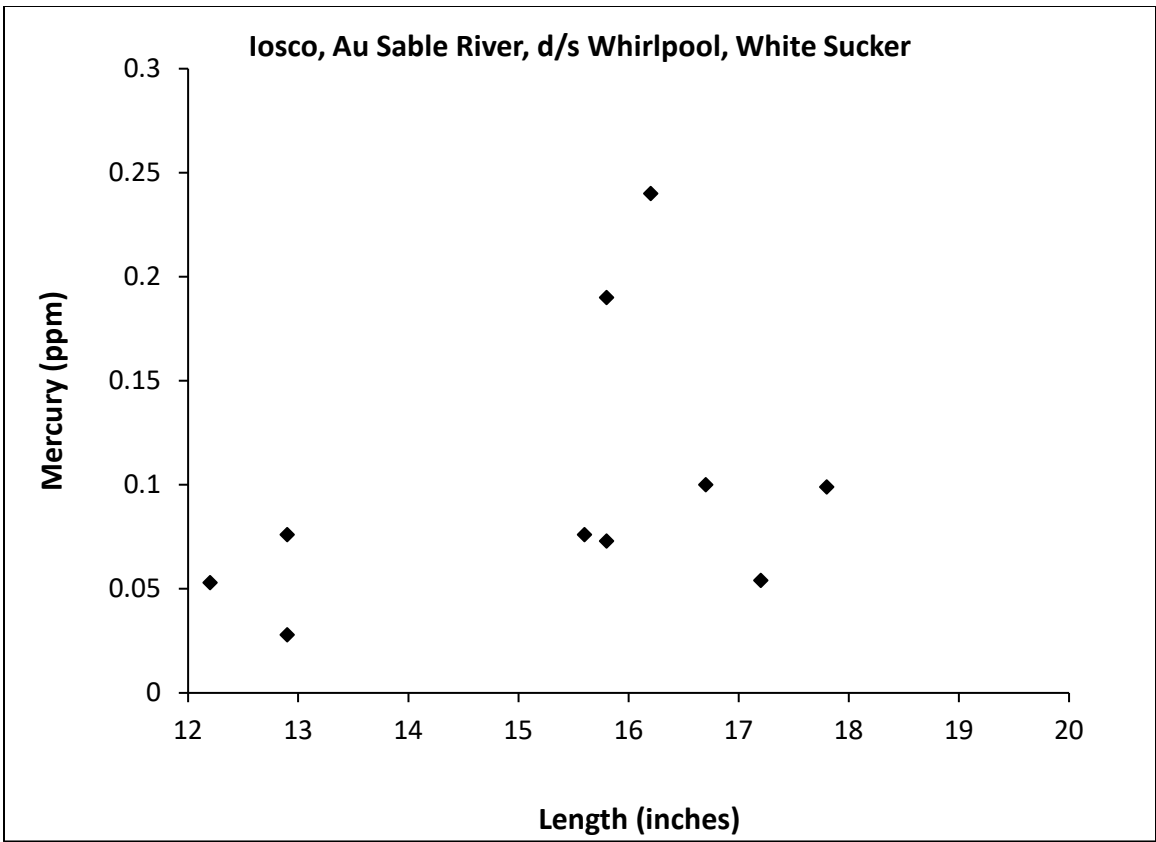
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2011	2011	10	12.2	na	12.2	17.8
Datasets available: 2011						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.10	0.03	0.24	0.15	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.142	0.242				

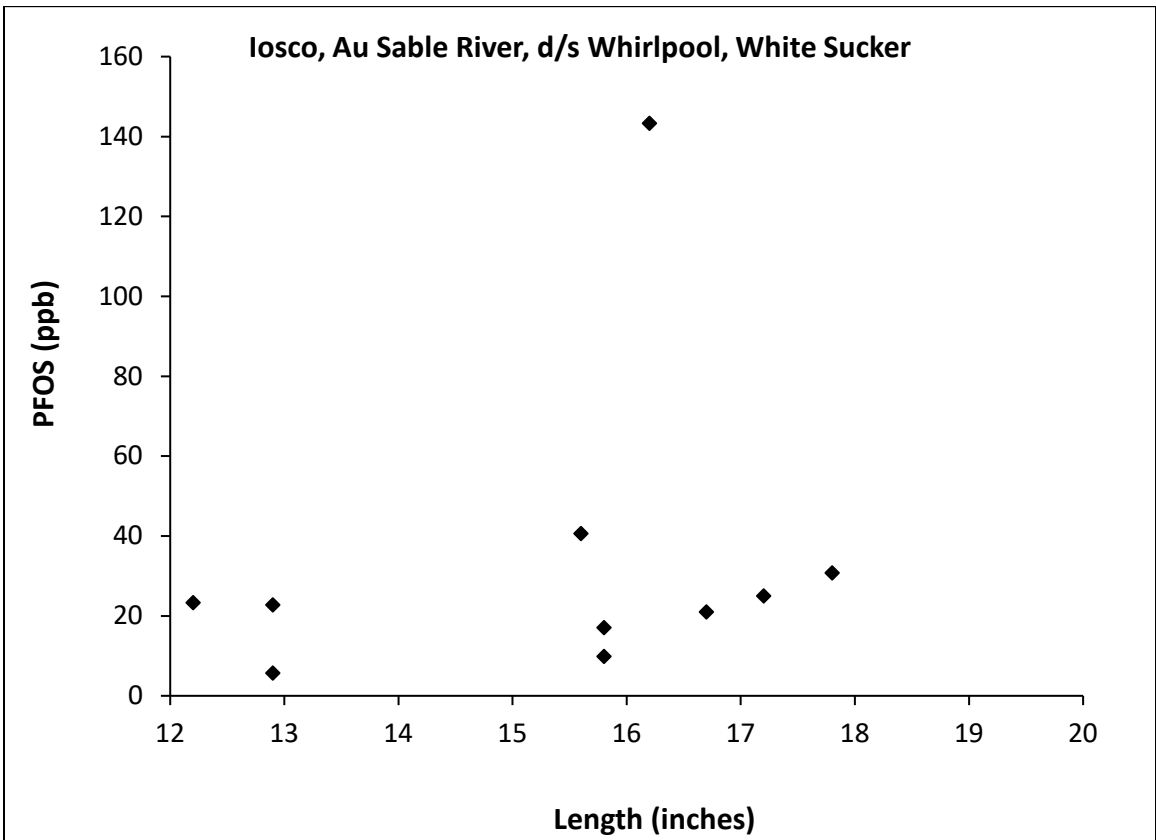
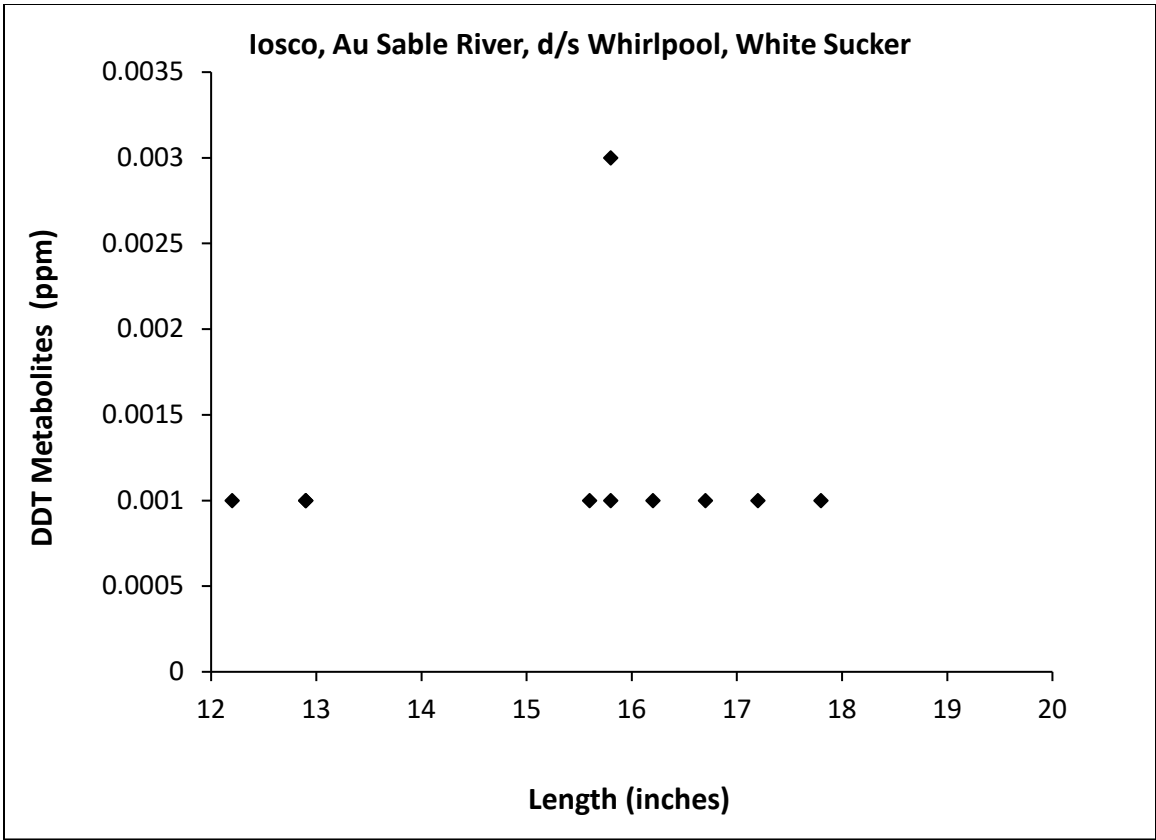
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2011	2011	10	12.2	na	12.2	17.8
Datasets available: 2011						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.004	0.001	0.014	0.007	16
DDT	10	0.004	0.001	0.003	0.002	16
Chlordane	10	ND	--	--	--	--
Toxaphene	10	ND	--	--	--	--
PFOS	10	0.03	0.006	0.143	0.06	12
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.046	0.091				
DDT	0.008	0.008				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	0.055	0.126				
Final meal category based on UCL:						4*

Existing Advisory: No one should eat non-migratory fish from the Au Sable River downstream of the Foote Dam until further sampling is conducted due to potential high concentrations of PFOS.

Recommendation: *No change. No one should eat non-migratory fish from the Au Sable River downstream of the Foote Dam until further sampling is conducted due to potential high concentrations of PFOS due to uncertainty of the concentrations of PFOS in fish.





Yellow Perch

**Au Sable River
Oscoda**

Iosco County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0	--	--	--	--
Datasets available: --						
Chemical	Sample Size (Legal)	Mean Conc. (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	--	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	--	--				

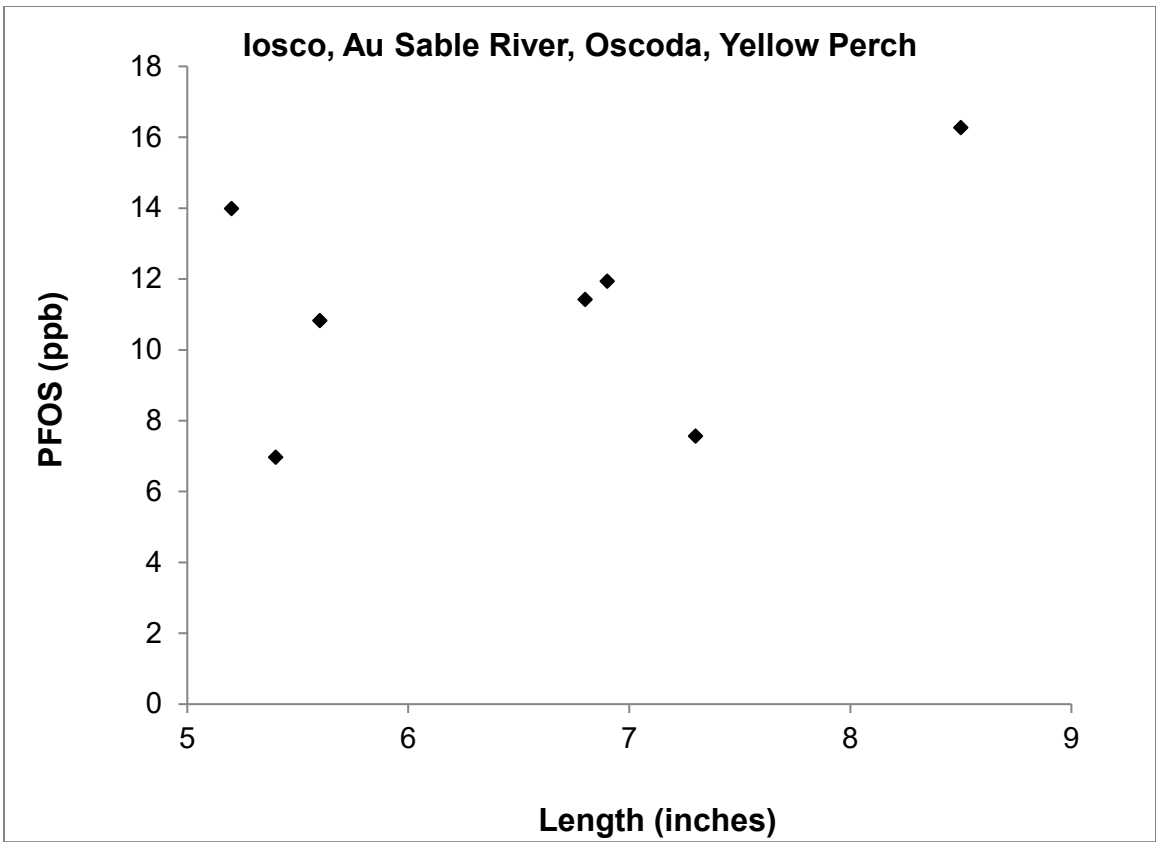
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2014	2014	7	5.2	na	5.2	8.5
Datasets available: 2014						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
PFOS	7	11 ppb	7 ppb	16 ppb	14 ppb	8
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	0.143	0.111				
Final meal category based on UCL:						8

Existing Advisory: No one should eat non-migratory species of fish (including yellow perch) from the Au Sable River downstream of Foote Dam due to high concentrations of PFOS.

Recommendation: Advice should revert to the statewide advisory for yellow perch: No one should eat more than 4 meals per month of yellow perch due to mercury. PFOS would cause an advisory.

Note: No guideline will be listed in the guide as mercury was not measured in these fish. Yellow perch are not listed specifically in the Au Sable River guidelines as they are covered under the "All Other Species" Guidelines. Additional samples should be collected for mercury analysis.



Cheboygan County

Northern Pike

Black River – Kleber Pond

Cheboygan County

Hg Analysis:

Range of Years Used		N (All*)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples*	
Earliest	Most Recent					
2019	2019	10	16.6	24	16.6	24
Datasets available: 2019						
Chemical	Sample Size (All*)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.258	0.230	0.290	0.273	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.117	0.117				

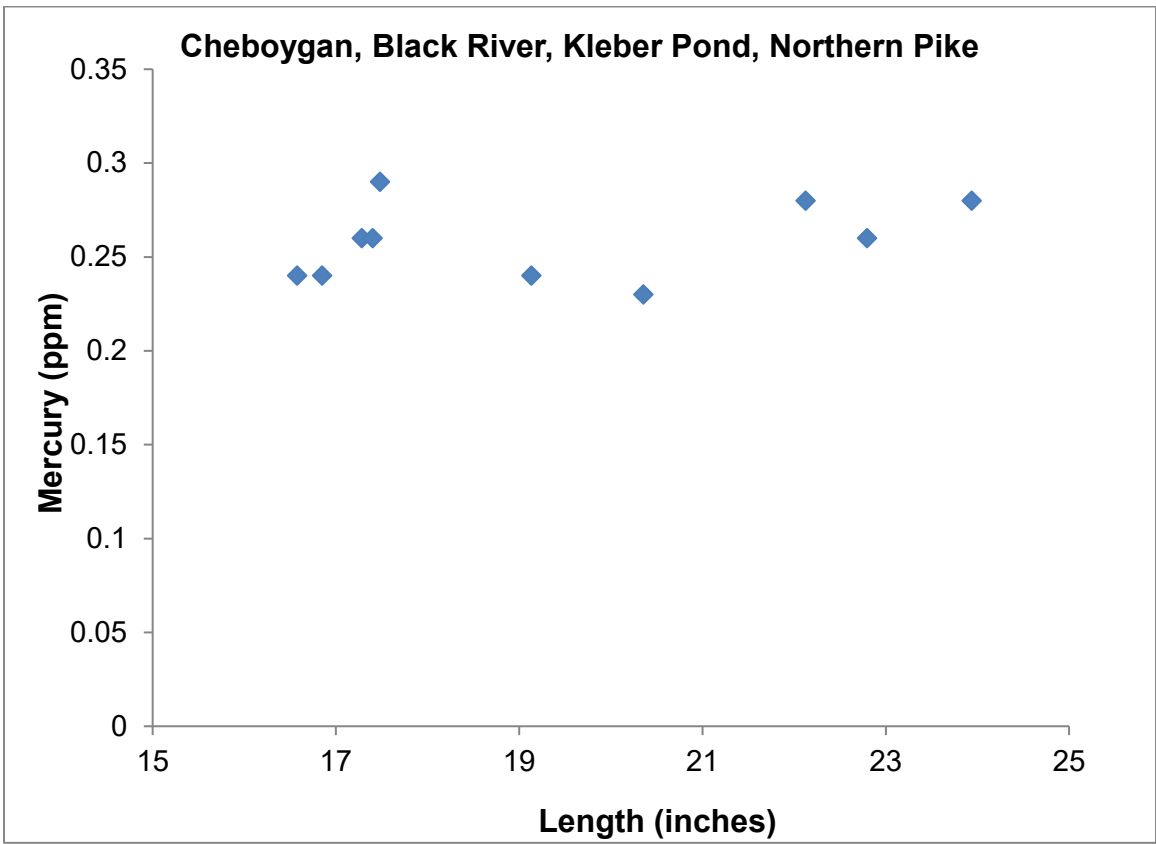
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent					
Datasets available:						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
PFOS	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	--	--				
Final meal category based on UCL:						2

* Only one legal-sized fish was collected in 2019.

Existing MDHHS Advisory: Northern Pike from the Kleber Dam impoundment of the Black River in Cheboygan County are covered by the statewide advisory due to mercury: No one should eat more than 2 meals per month of pike less than 30 inches in length or no more than 1 meal per month of pike larger than 30 inches in length.

Recommendation: The statewide mercury guidance should continue for the Kleber Pond impoundment of the Black River. Only one individual of legal size was collected, and regression analysis was not sufficient to assign length-based advisory. Therefore, an assessment of mercury in this species was not possible. The sub-legal size mercury data correspond to a meal category of 2, indicating that the statewide mercury guidance is health-protective.



Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent					
2019	2019	10	17.2	NA*	17.2	33.3
Datasets available: 2019						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.527	0.380	0.690	0.595	1
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.656	0.658				

* This section of the river has no size limit on northern pike with the exception of no more than 1 over 24 inches may be kept.

Organics Analysis:

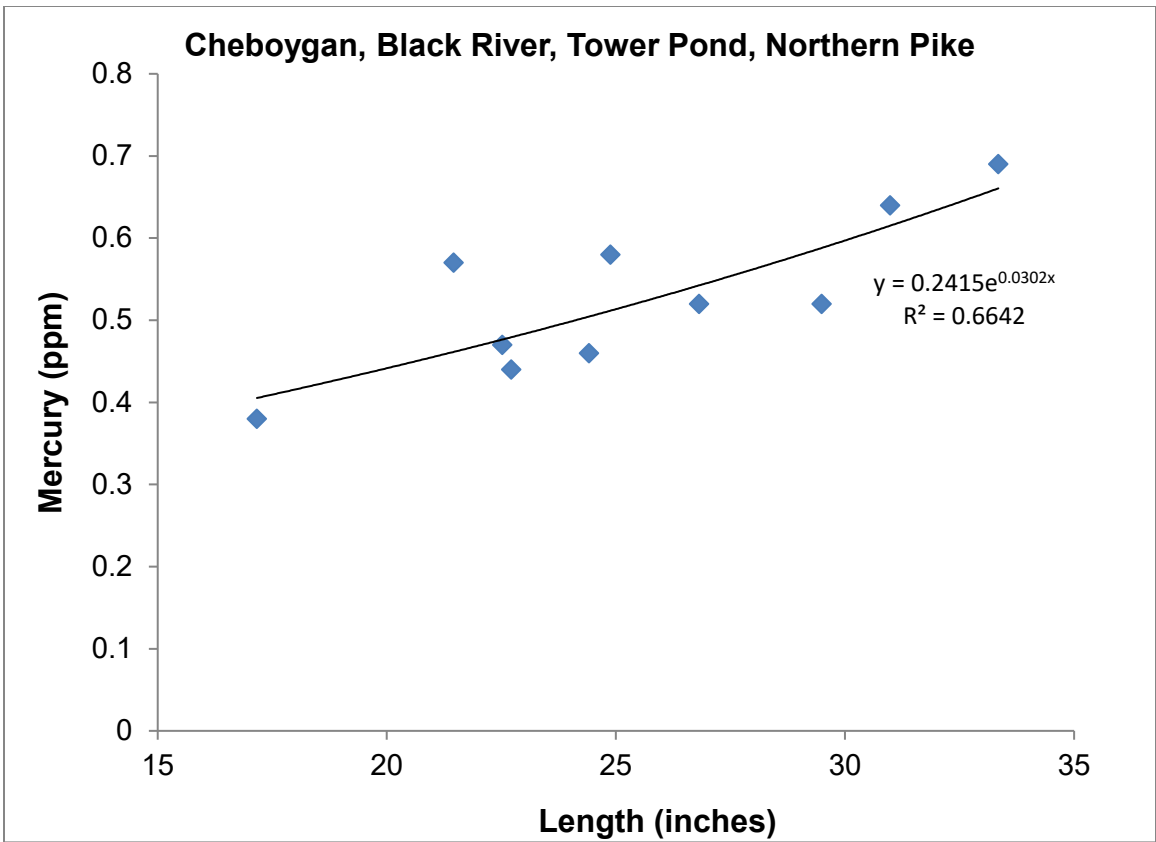
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent					
Datasets available:						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
PFOS	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	--	--				
Final meal category based on UCL:						1

Existing MDHHS Advisory: Northern Pike from the Tower Dam impoundment of the Black River in Cheboygan County are covered by the statewide advisory due to mercury: No one should eat more than 2 meals per month of pike less than 30 inches in length or no more than 1 meal per month of pike larger than 30 inches in length.

Recommendation: No one should eat more than 2 meals per month of northern pike less than 30 inches in length or no more than 1 meal per month of pike larger than 30 inches in length from the Black River upstream of the Tower Dam.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
15	0.380	2
20	0.442	2
25	0.514	2
30	0.598	1
35	0.695	1
40	0.808	1

Shaded area denotes extrapolated estimates



Northern Pike

Burt Lake

Cheboygan County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1990	2015	16	18.5	24	24	31.4
Datasets available: 1990, 2015						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.45	0.34	0.70	0.53	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.192	0.252				

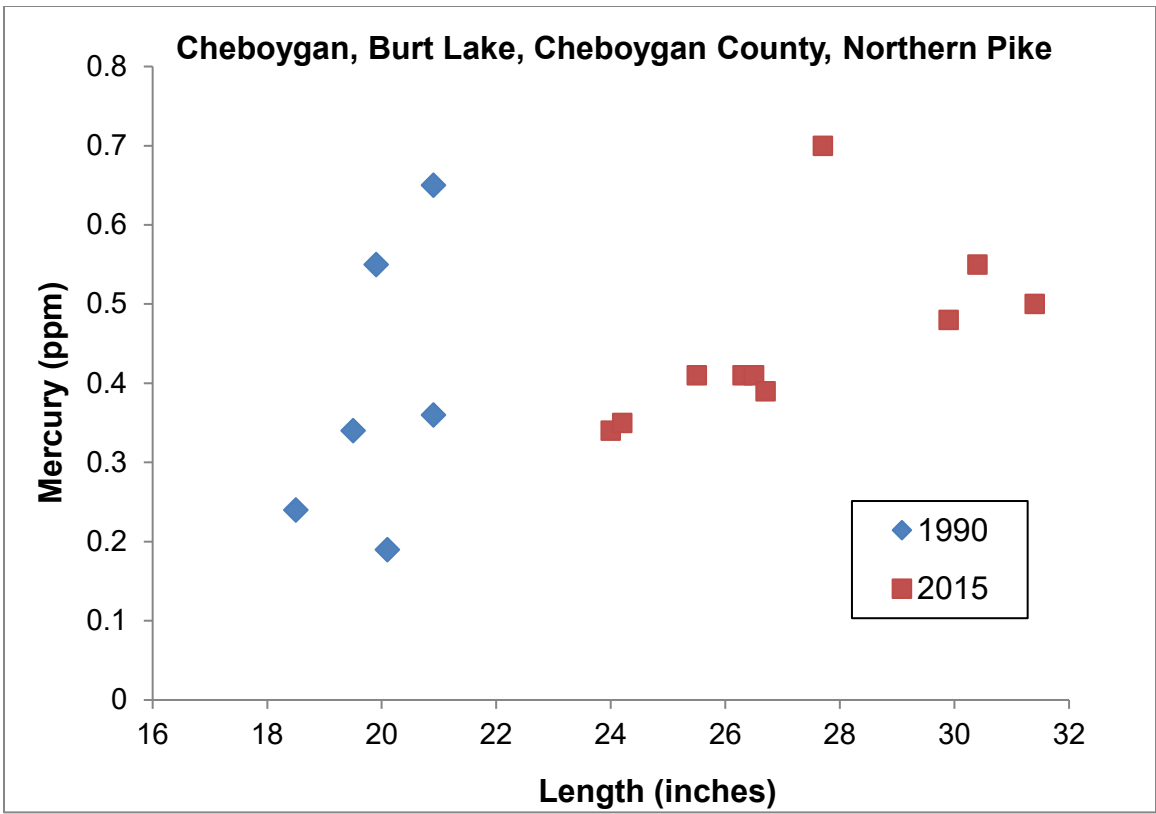
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2015	2015	10	24	24	24	31.4
Datasets available: 1990, 2015						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	ND	--	--	--	16
DDT	10	ND	--	--	--	16
Chlordane	10	ND	--	--	--	--
Toxaphene	10	ND	--	--	--	--
TEQ	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
TEQ	--	--				
Final meal category based on UCL:						2

Existing MDHHS Advisory: No one should eat more than 1 meal per month of northern pike from Burt Lake in Cheboygan County smaller than 30 inches or more than 6 meals per year of northern pike larger than 30 inches. The statewide length break was applied as the size of the fish was limited.

Recommendation: No change. An additional year of data is needed to relax the advice.

Note: Previous advice was conservative since all fish were sub-legal size and variance was relatively high for the length range. Recent (2015) sample size was larger, fish were all of legal size, and concentrations were more consistent. Based on the 2015 data, the recommendation would be the same as the statewide advice for northern pike due to mercury. (No one should eat more than 2 meals per month of Burt Lake northern pike smaller than 30 inches or more than 1 meal per month of those fish larger than 30 inches due to mercury.)



Walleye

Burt Lake

Cheboygan County

Hg Analysis:

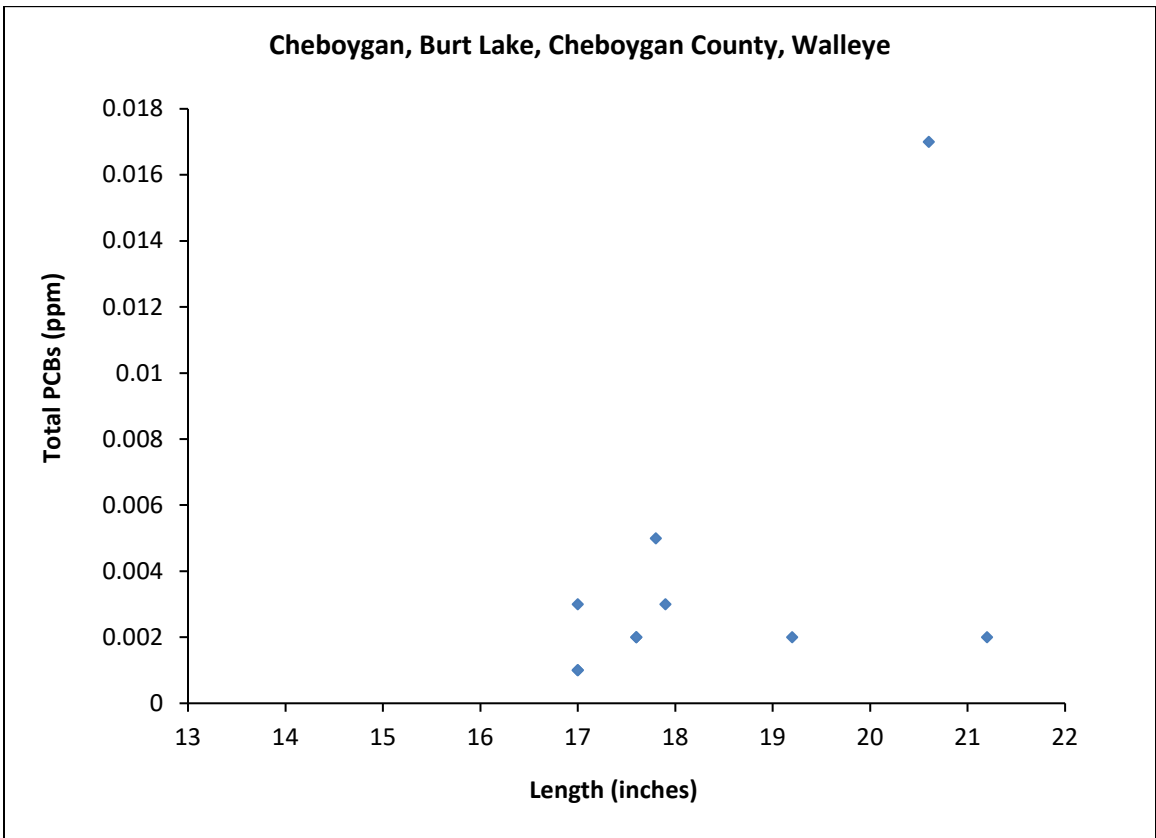
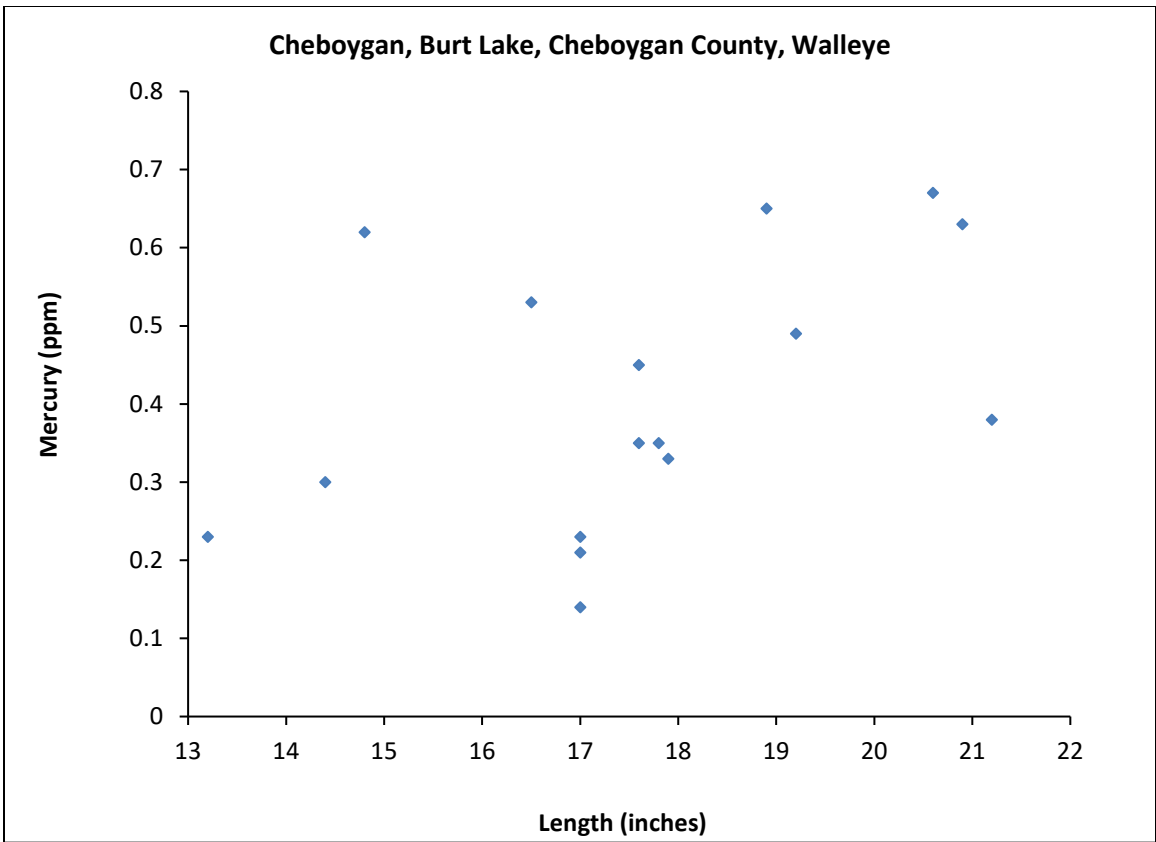
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1990	2001	16	13.2	15	14.8	21.2
Datasets available: 1990, 2001						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	14	0.43	0.14	0.67	0.53	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.200	0.191				

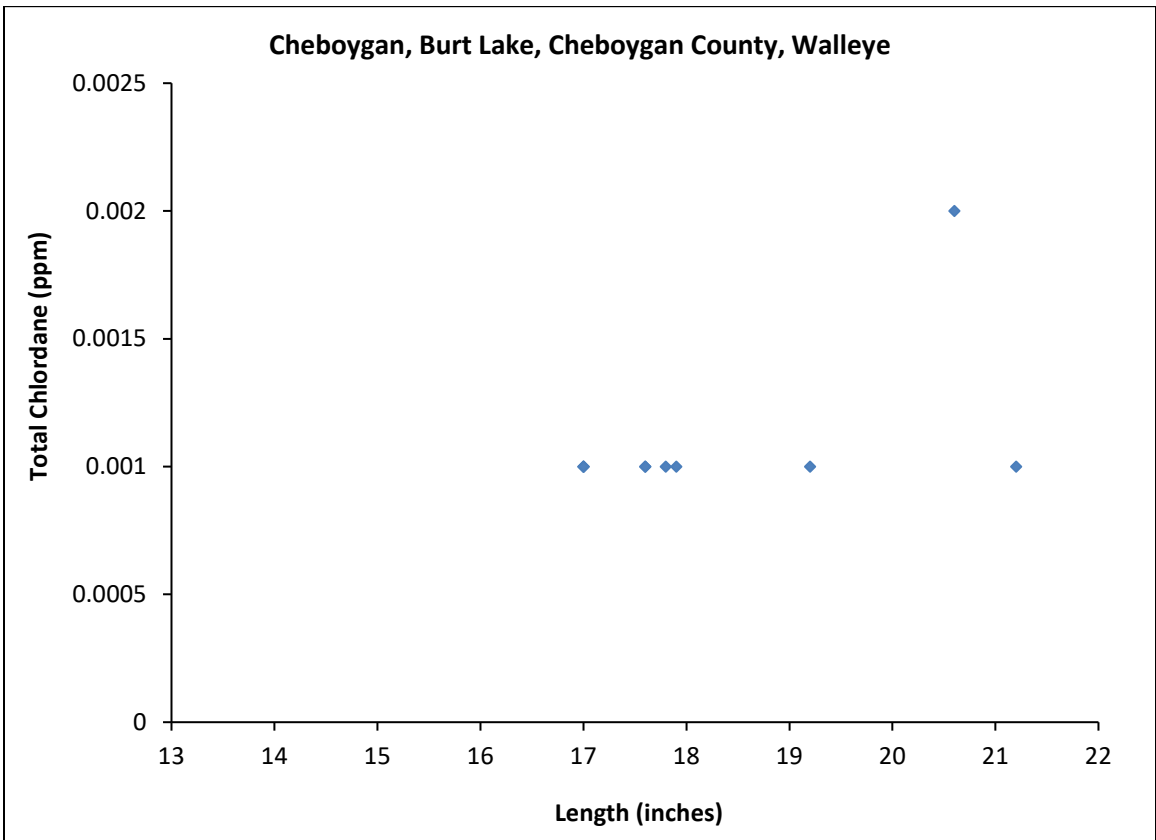
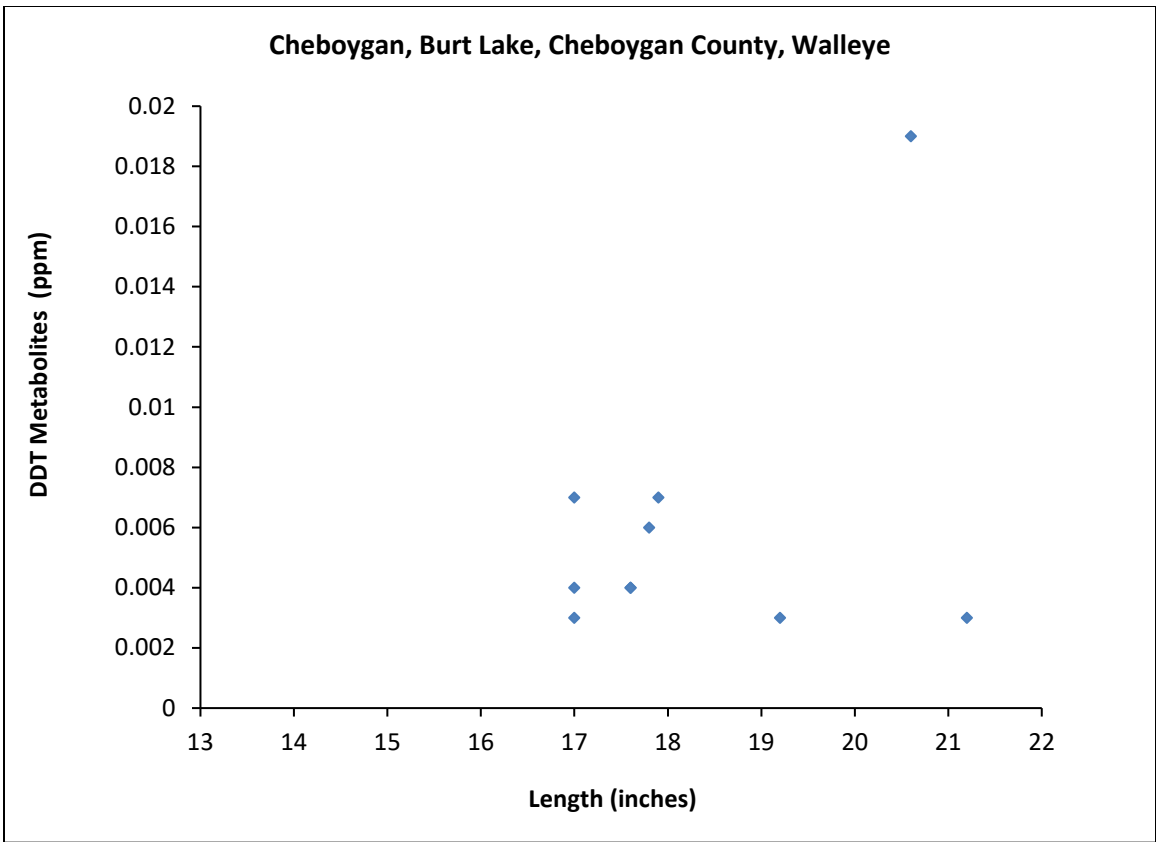
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2001	2001	10	17	15	17	21.2
Datasets available: 1990, 2001						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.004	0.001	0.02	0.01	16
DDT	10	0.006	0.003	0.02	0.01	16
Chlordane	10	0.001	0.001	0.002	0.001	--
Toxaphene	10	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.269	0.246				
DDT	0.155	0.048				
Chlordane	0.283	0.283				
Toxaphene	--	--				
Final meal category based on UCL:						2

Existing Advisory: Women and children should not eat more than one meal per month of Burt Lake walleye larger than 18 inches due to mercury.

Recommendation: No one should eat more than 2 meals per month of Burt Lake walleye smaller than 20 inches or more than 1 meal per month of walleye larger than 20 inches due to mercury. The statewide length break applied as the size of the fish was limited.





White Sucker

Burt Lake

Cheboygan County

Hg Analysis:

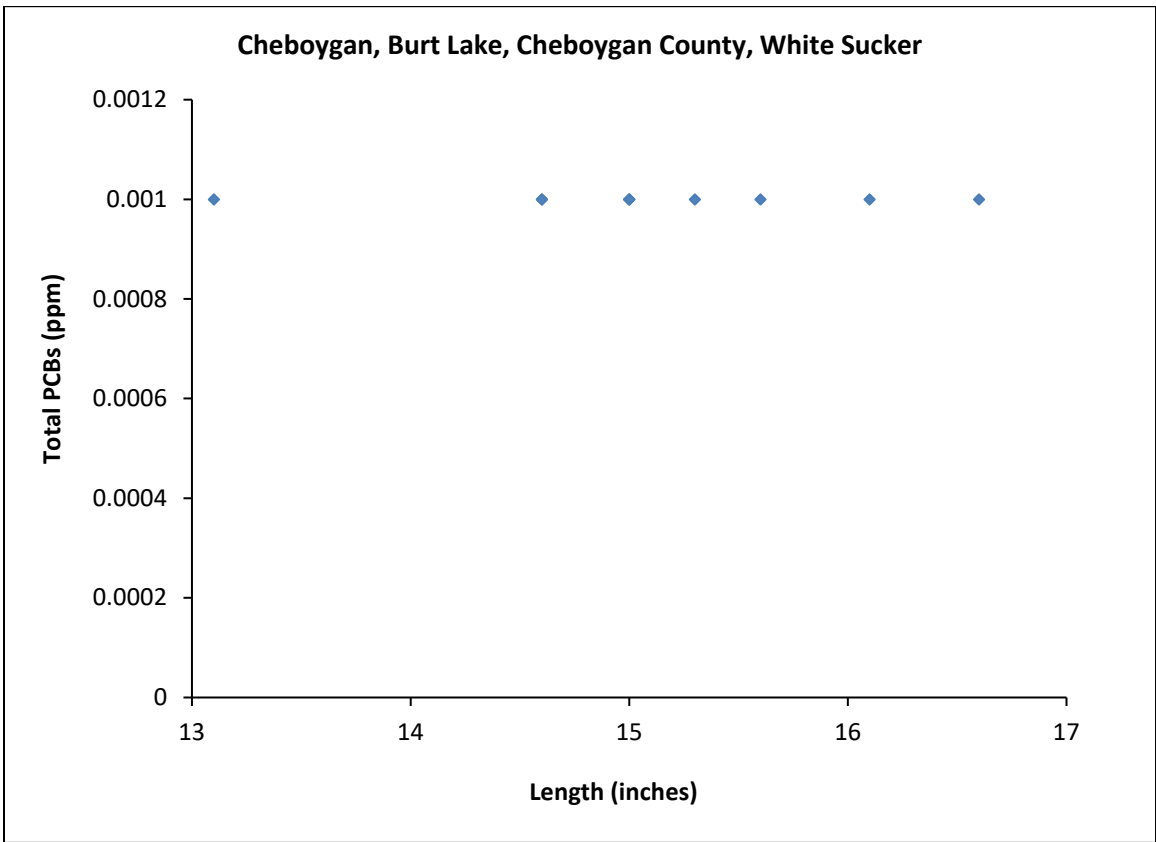
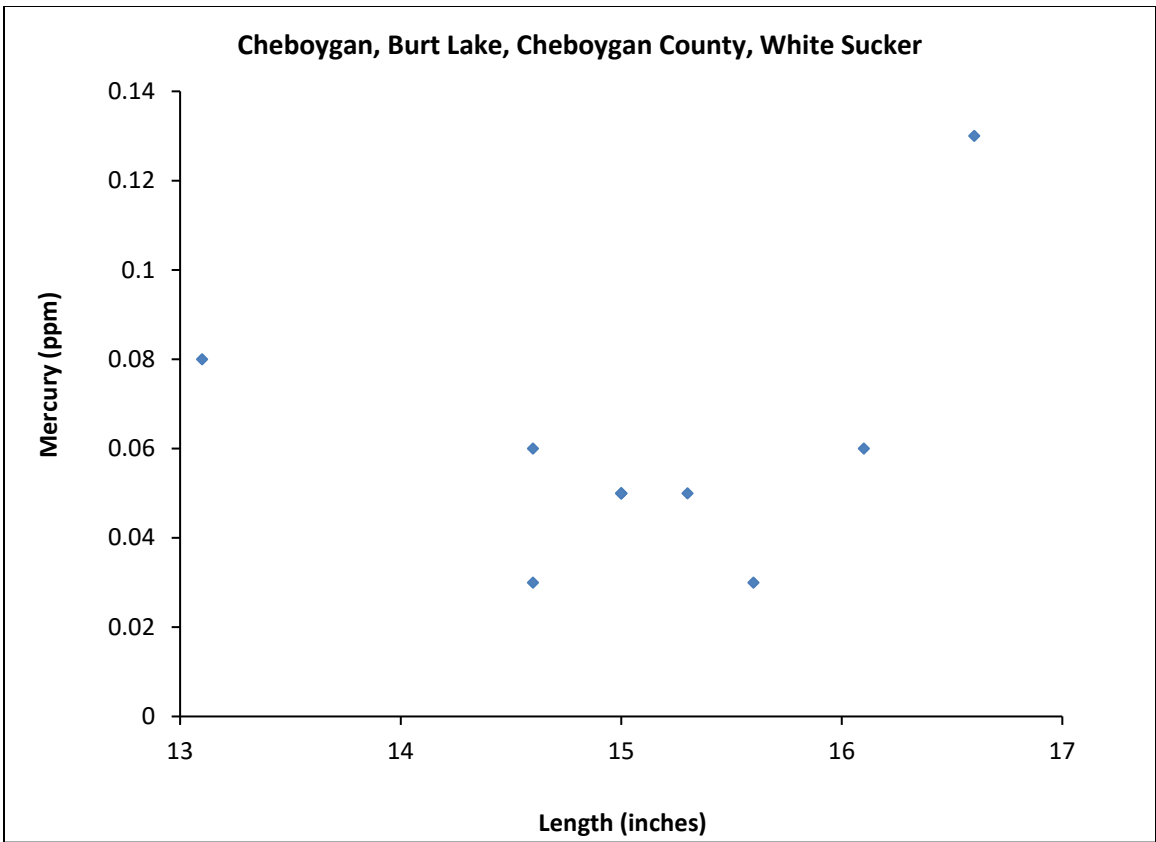
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2001	2001	10	13.1	na	13.1	16.6
Datasets available: 2001						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.06	0.03	0.13	0.080	12
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.072	0.026				

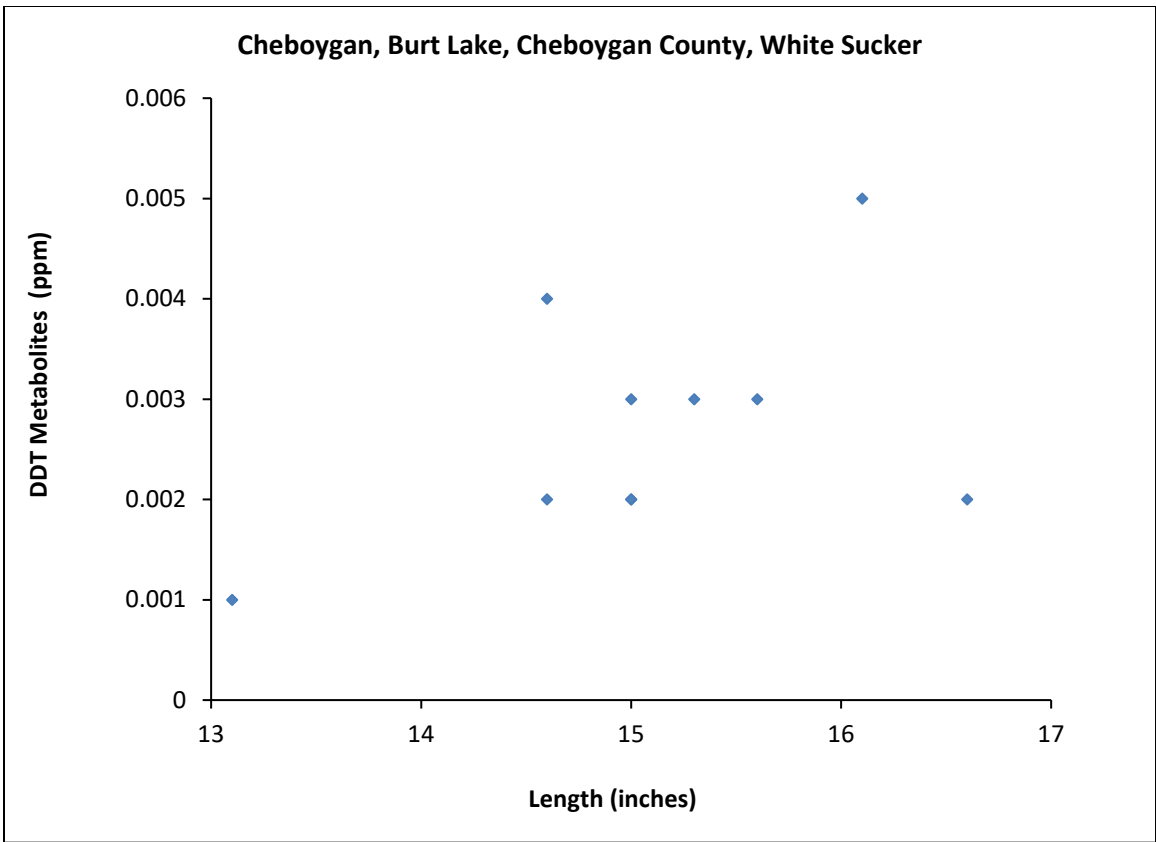
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2001	2001	10	13.1	na	13.1	16.6
Datasets available: 2001						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.001	0.001	0.001	0.001	16
DDT	10	0.003	0.001	0.005	0.004	16
Chlordane	10	ND	--	--	--	--
Toxaphene	10	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.000	--				
DDT	0.223	0.332				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						12

Existing Advisory: There are no current consumption advisories for Burt Lake white sucker.

Recommendation: No one should eat more than 12 meals per month of Burt Lake sucker due to mercury.





Northern Pike

Douglas Lake

Cheboygan County

Hg Analysis:

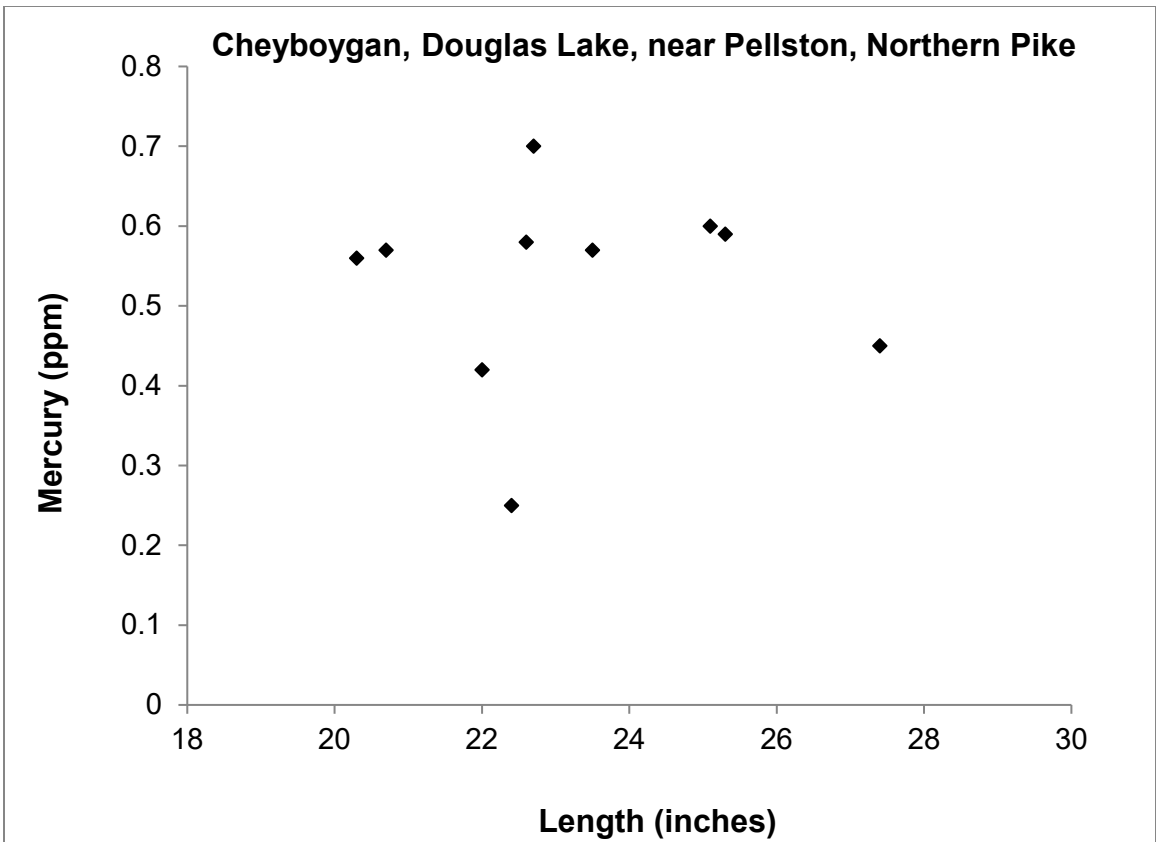
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples			
Earliest	Most Recent				Min	Max		
2014	2014	10	20.3	24	23.5	27.4		
Datasets available:		2014						
Chemical	Sample Size (Legal)	Mean		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
Mercury	4	0.55		0.45	0.60	0.66	1	
Chemical	Linear Regression	Exponential Regression						
	R ²	R ²						
Mercury	0.000	0.001						

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples			
Earliest	Most Recent				Min	Max		
--	--	0	--	--	--	--		
Datasets available:		--						
Chemical	Sample Size (Legal)	Mean		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
PCB	--	--		--	--	--	--	
DDT	--	--		--	--	--	--	
Chlordane	--	--		--	--	--	--	
Toxaphene	--	--		--	--	--	--	
TEQ*	--	--		--	--	--	--	
Chemical	Linear Regression	Exponential Regression						
	R ²	R ²						
PCB	--	--						
DDT	--	--						
Chlordane	--	--						
Toxaphene	--	--						
TEQ*	--	--						
Final meal category based on UCL:							1	

Existing Advisory: Douglas Lake northern pike are covered by the statewide advisory: No one should eat more than 2 meals per month of northern pike smaller than 30 inches or more than 1 meal per month of those fish larger than 30 inches due to mercury.

Recommendation: No one should eat more than 1 meal per month of Douglas Lake northern pike smaller than 30 inches or more than 6 meals per year of those fish larger than 30 inches due to mercury. The statewide length break was applied since the size range of fish was limited.



Northern Pike

Mullett Lake

Cheboygan County

Hg Analysis:

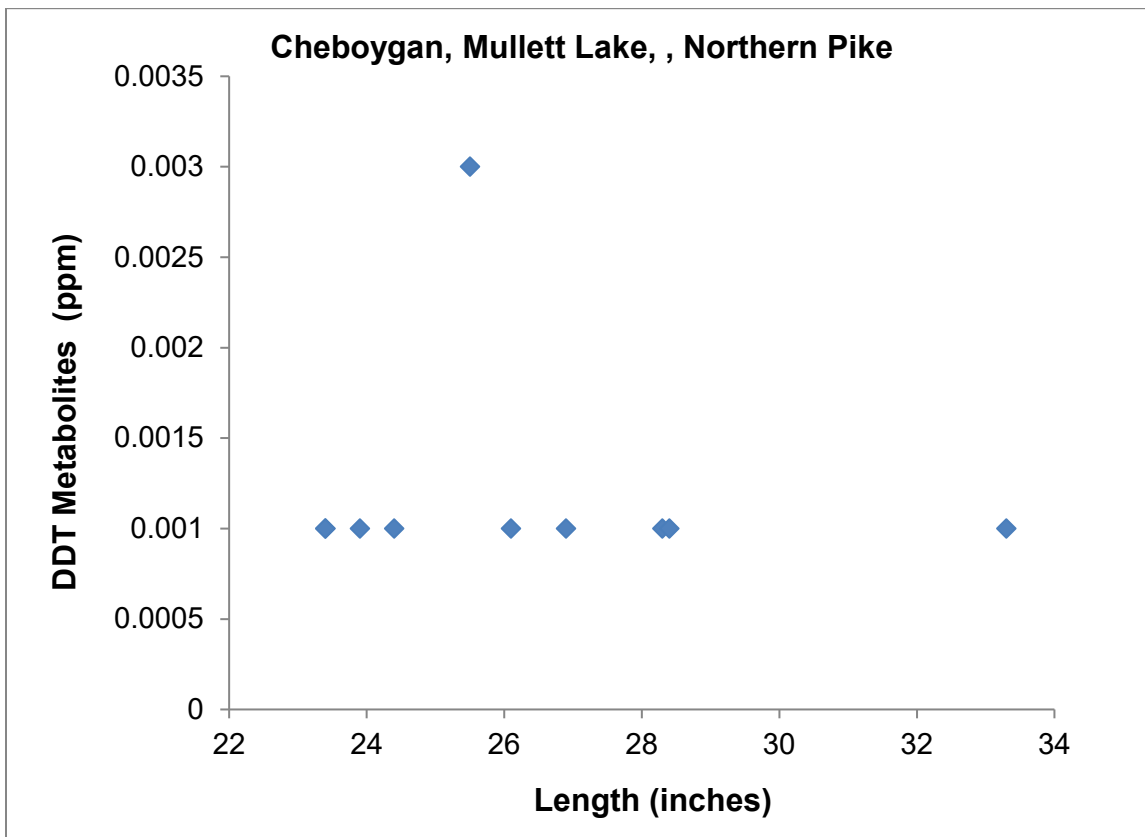
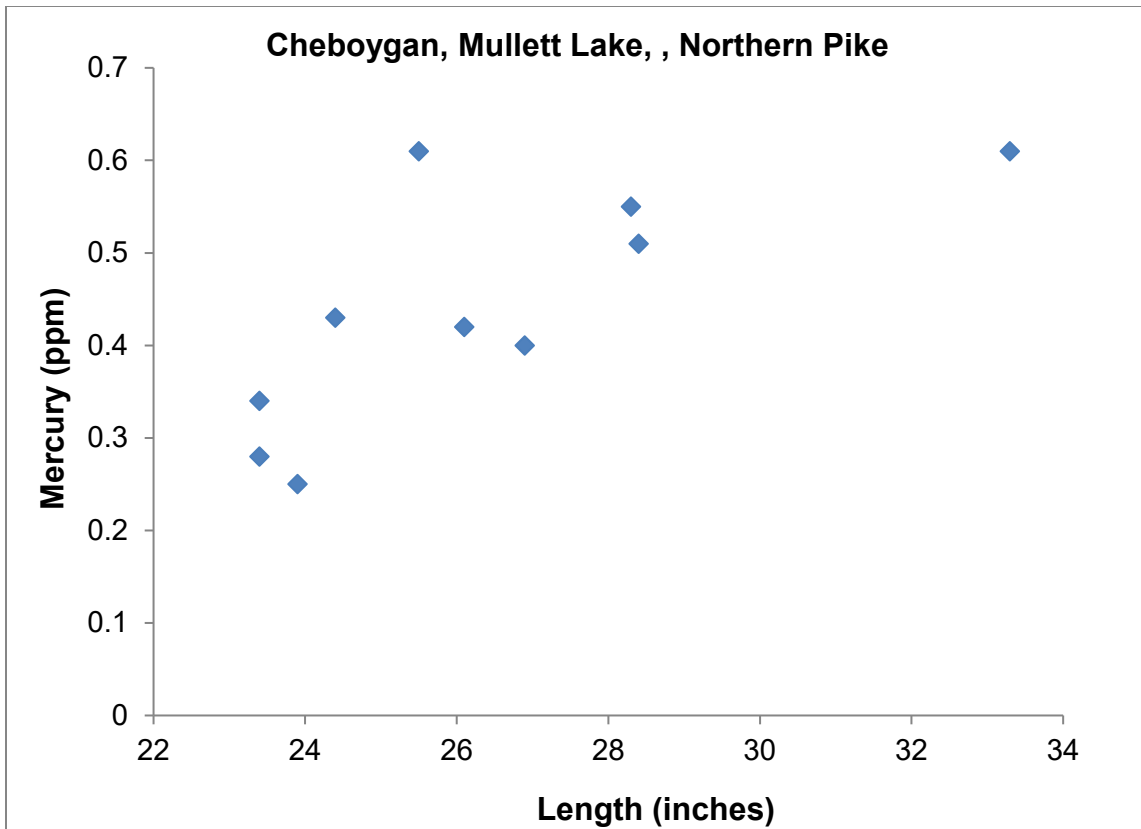
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2017	2017	10	23.4	24	23.9	33.3
Datasets available: 1988 (1 sample; non-detect), 2017						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	8	0.47	0.25	0.61	0.58	1
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.550	0.525				

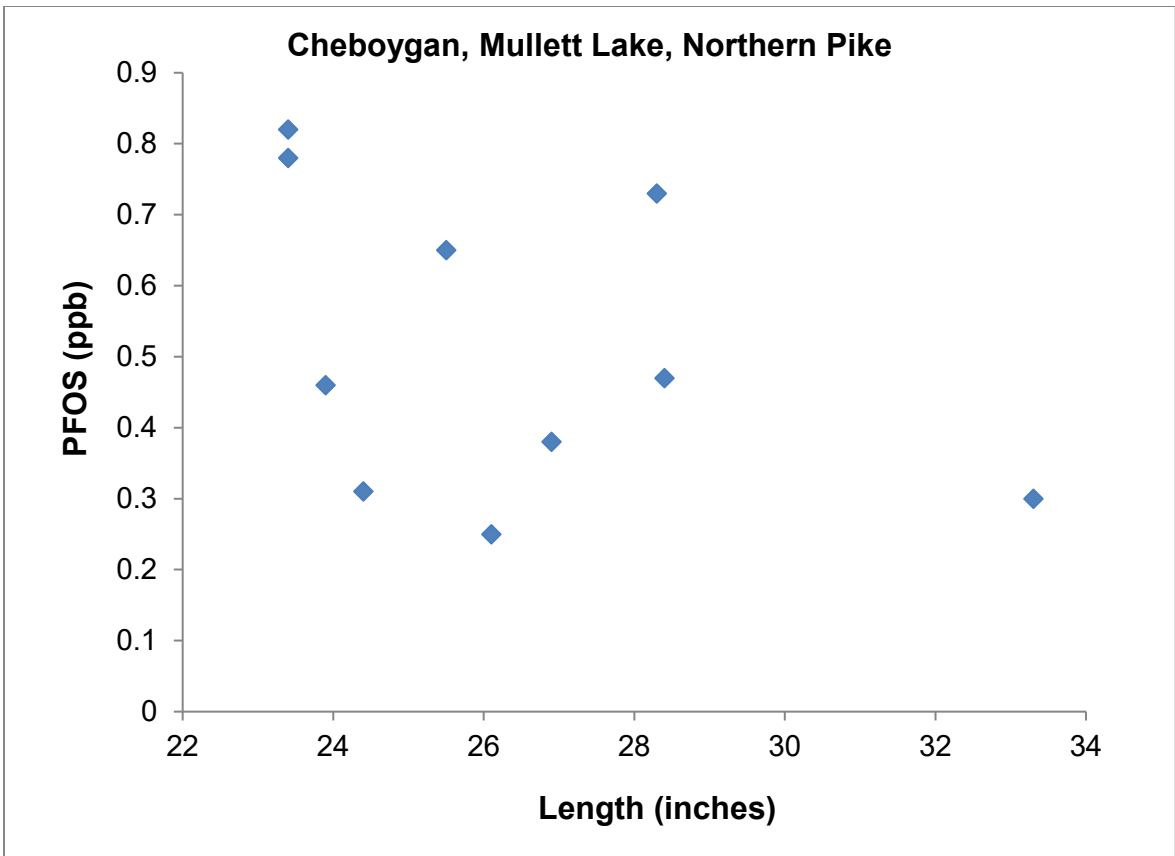
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2017	2017	10	23.4	24	23.9	33.3
Datasets available: 2017						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	8	ND	< 0.001	< 0.001	--	16
DDT	8	0.001	< 0.001	0.003	0.002	16
Chlordane	8	ND	< 0.001	< 0.001	--	--
Toxaphene	8	ND	< 0.05	< 0.05	--	--
PFOS	8	0.4 ppb	< 0.25 ppb	0.7 ppb	0.6 ppb	16
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	0.010	0.010				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	0.171	0.160				
Final meal category based on UCL:						1

Existing MDHHS Advisory: Mullett Lake northern pike are covered by the statewide advisory due to mercury: No one should eat more than 1 meal per month of northern pike larger than 30 inches or more than 2 meals per month of northern pike smaller than 30 inches in length.

Recommendation: No one should eat more than 1 meal per month of Mullett Lake northern pike of any size due to mercury.





Smallmouth Bass

Mullet Lake

Cheboygan County

Hg Analysis:

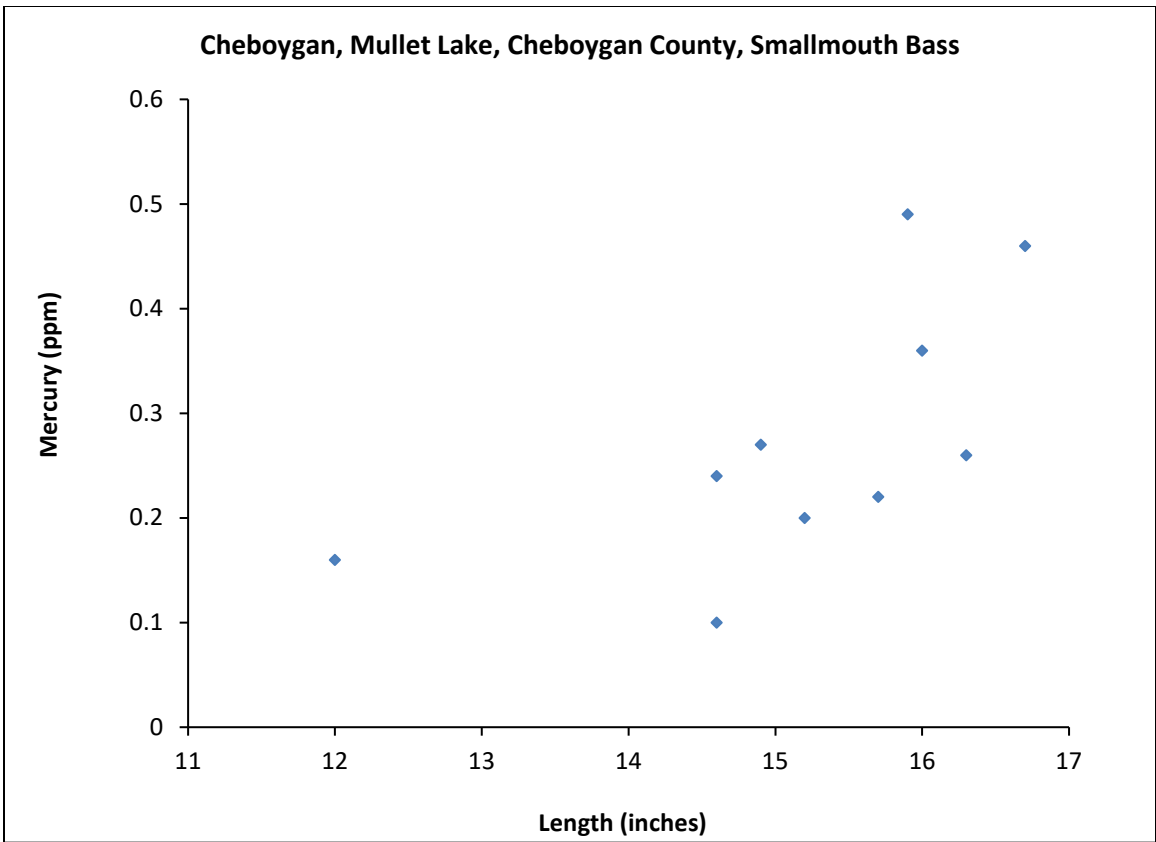
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1988	2009	11	12	14	14.6	17.1
Datasets available: 1988, 2009						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.28	0.10	0.49	0.37	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.261	0.291				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Size Range of All Samples	
Earliest	Most Recent				Min	Max
1988	1988	2	12	14	12	14.6
Datasets available: 1988						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	2	ND	--	--	--	--
DDT	2	0.020	0.017	0.023	--	--
Chlordane	2	0.004	0.003	0.005	--	--
Toxaphene	2	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						2

Existing Advisory: Mullet Lake smallmouth bass are covered under the statewide mercury consumption advisory.

Recommendation: No one should eat more than 2 meals per month of Mullet Lake largemouth or smallmouth bass smaller than 18 inches or more than 1 meal per month of those fish larger than 18 inches due to mercury. The statewide length break applied as the size of the fish was limited.



Walleye

Mullet Lake

Cheboygan County

Hg Analysis:

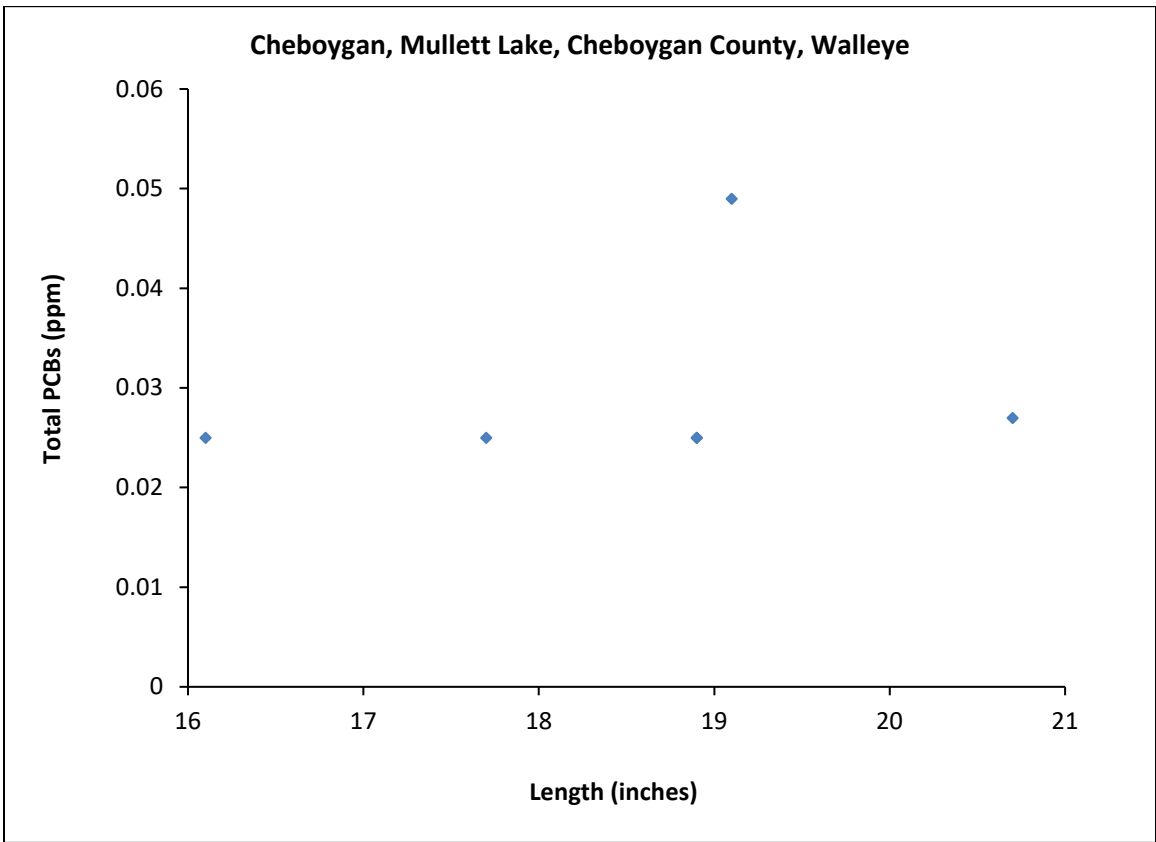
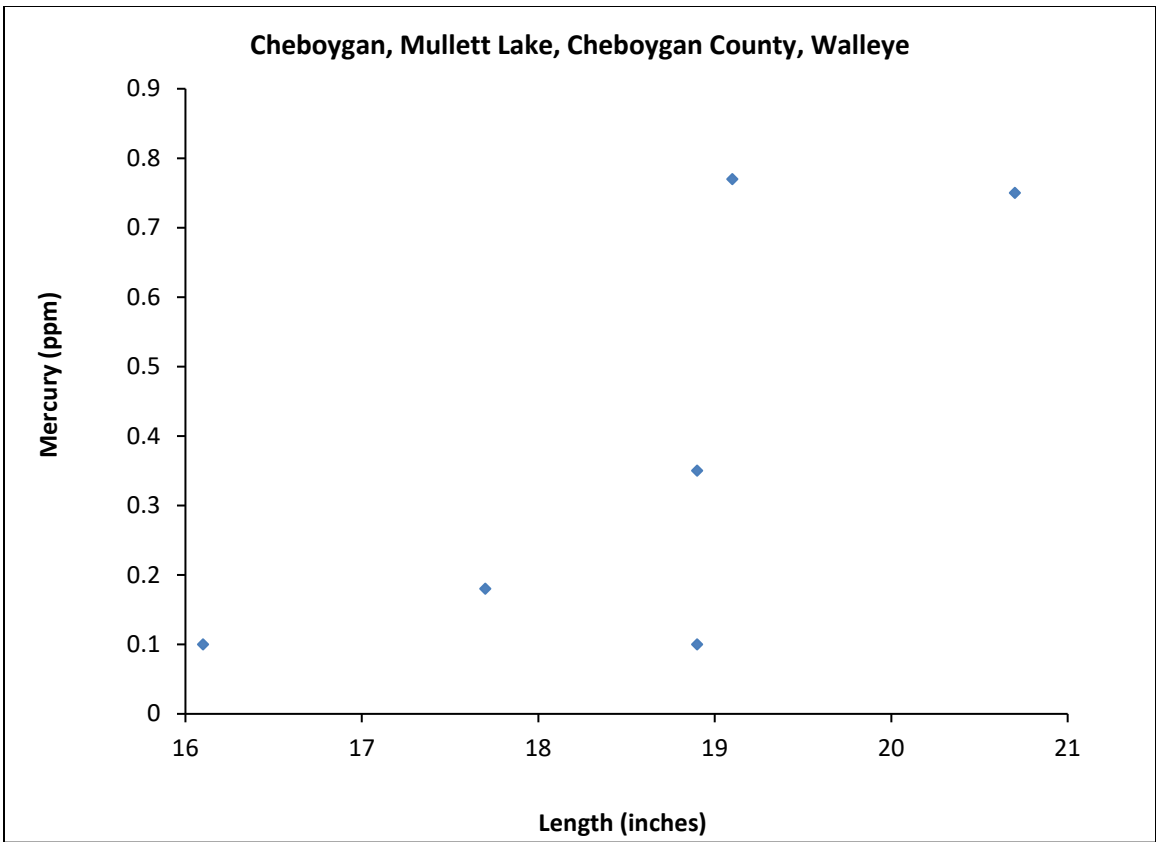
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1988	1988	6	16.1	15	16.1	20.7
Datasets available: 1988						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	6	0.38	0.10	0.77	0.70	1
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.534	0.542				

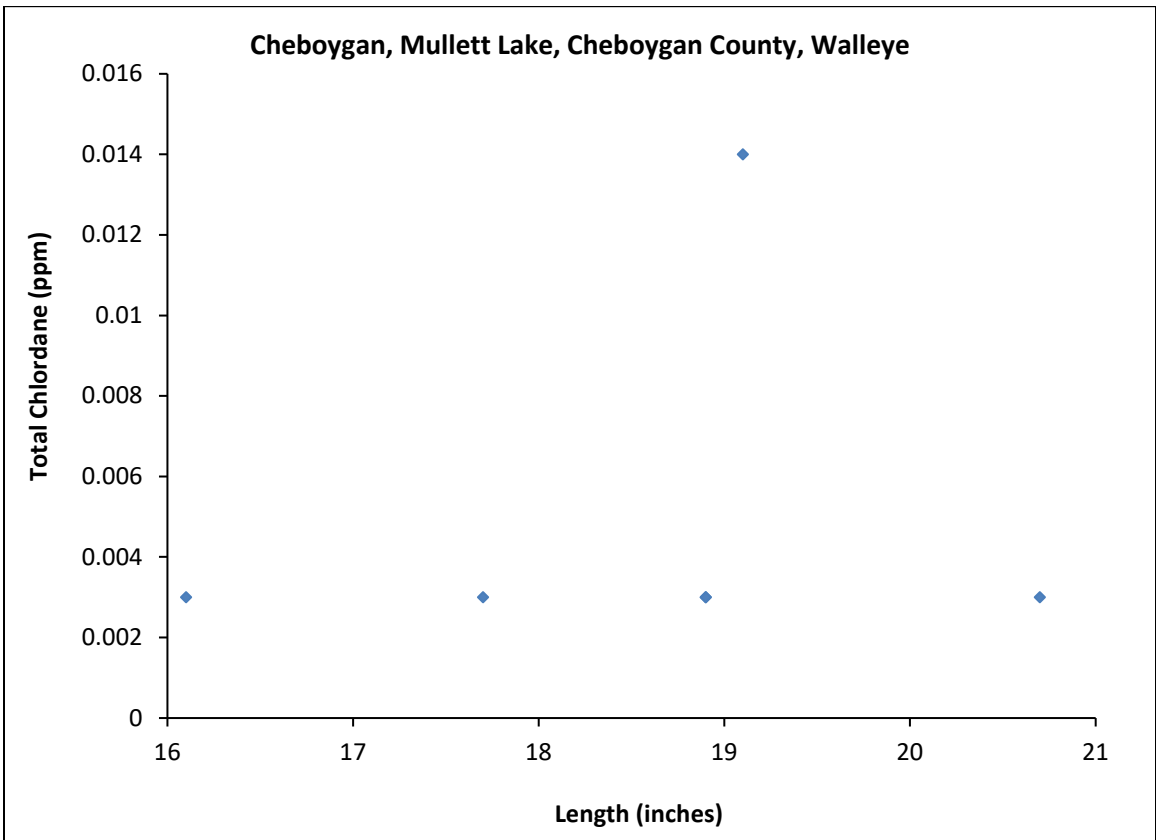
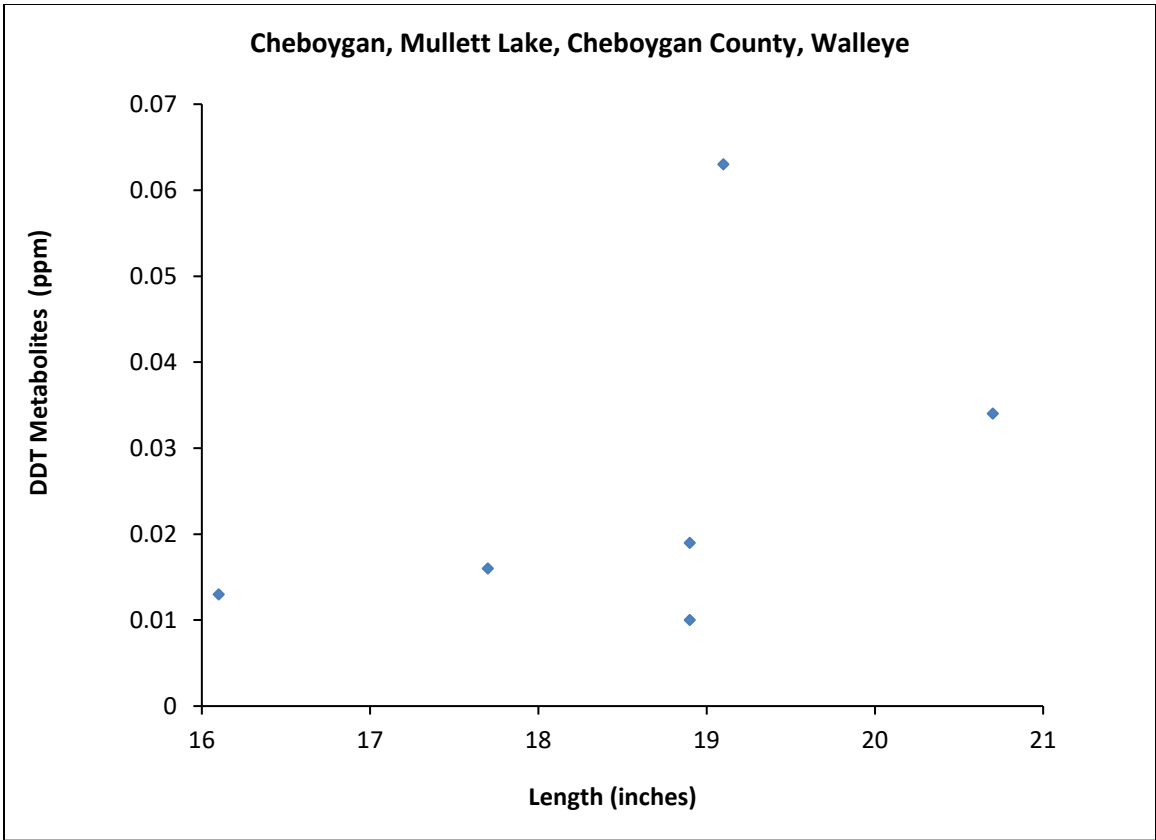
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Size Range of All Samples	
Earliest	Most Recent				Min	Max
1988	1988	6	16.1	15	16.1	20.7
Datasets available: 1988						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	6	0.03	0.02	0.05	0.04	4
DDT	6	0.03	0.01	0.06	0.05	16
Chlordane	6	0.005	0.003	0.01	0.01	16
Toxaphene	6	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.052	0.063				
DDT	0.205	0.276				
Chlordane	0.029	0.029				
Toxaphene	--	--				
Final meal category based on UCL:						1

Existing Advisory: Mullet Lake walleye are covered under the statewide mercury consumption advisory.

Recommendation: No one should eat more than 1 meal per month of Mullet Lake walleye smaller than 20 inches or more than 6 meals per year of those fish larger than 20 inches due to mercury. The statewide length break applied as the size of the fish was limited.





Hg Analysis:

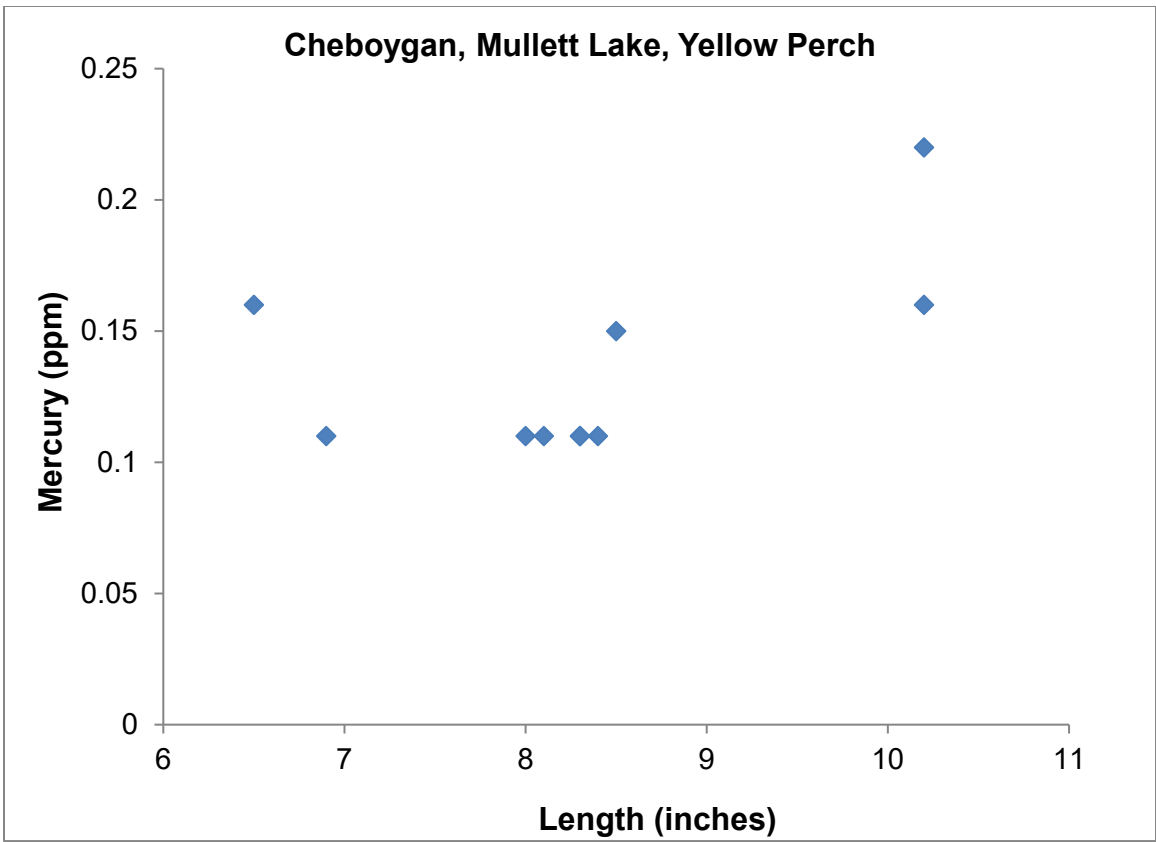
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2017	2017	10	6.5	na	6.5	10.2
Datasets available: 2017						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.14	0.11	0.22	0.16	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.287	0.262				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	--	--	--	--	--
Datasets available: --						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	--	--	--	--	--	--
DDT	--	--	--	--	--	--
Chlordane	--	--	--	--	--	--
Toxaphene	--	--	--	--	--	--
TEQ	--	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
TEQ	--	--				
Final meal category based on UCL:						4

Existing MDHHS Advisory: Mullett Lake yellow perch are covered by the statewide advisory due to mercury: No one should eat more than 4 meals of yellow perch of any size.

Recommendation: No one should eat more than 4 meals of Mullett Lake yellow perch of any size due to mercury.



Largemouth Bass

Twin Lakes

Cheboygan County

Hg Analysis:

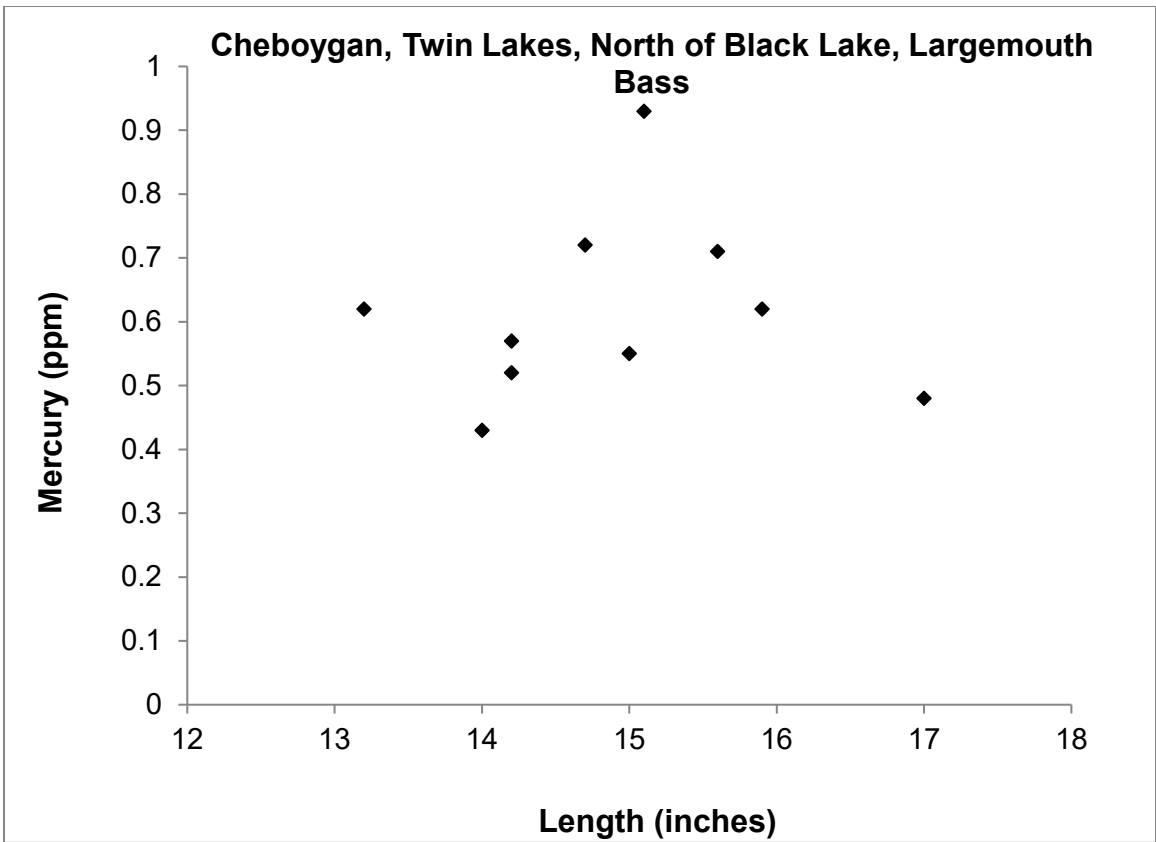
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2013	2013	10	13.2	14	14	17
Datasets available: 2013						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	9	0.61	0.43	0.93	0.73	1
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.003	0.002				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0	--	--	--	--
Datasets available: --						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						1

Existing Advisory: Twin Lakes largemouth and smallmouth bass are covered by the statewide advisory: No one should eat more than 2 meals of per month of largemouth or smallmouth bass smaller than 18 inches or more than 1 meal per month of those fish larger than 18 inches.

Recommendation: No one should eat more than 1 meal per month of Twin Lakes largemouth or smallmouth bass smaller than 18 inches or more than 6 meals per year of those fish larger than 18 inches due to mercury. The statewide length break was applied as the size range of fish was limited.



Crawford County

**Bluegill and
Pumpkinseed**

Lake Margrethe

Crawford County

Hg Analysis:

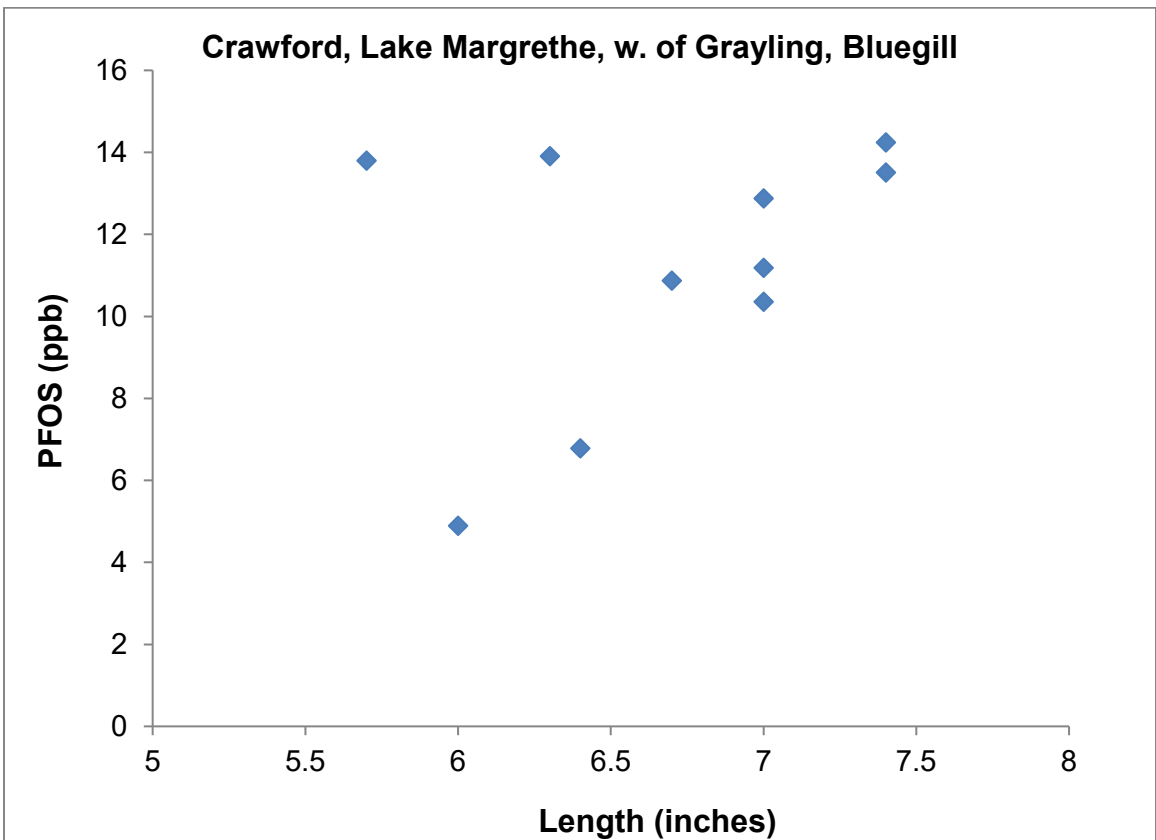
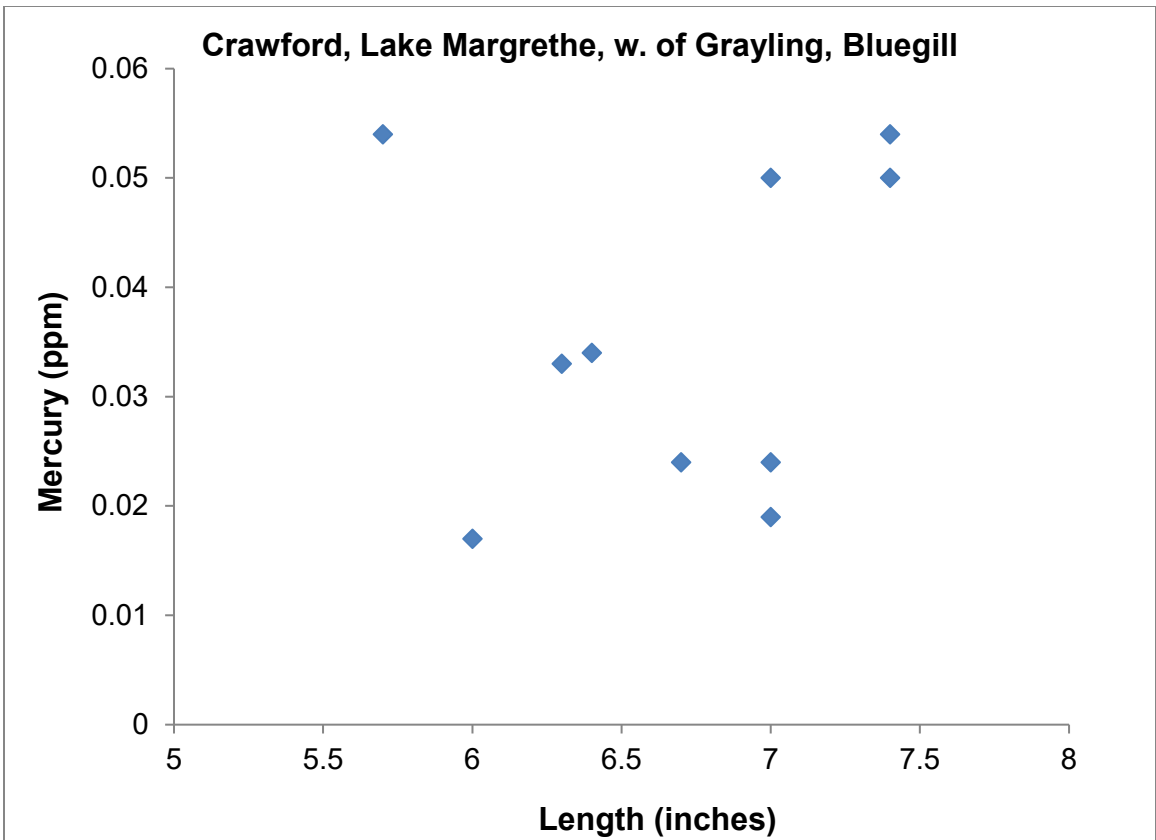
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2017	2017	10	5.7	na	5.7	7.4
Datasets available: 2017						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.04	0.02	0.05	0.05	16
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.038	0.040				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2017	2017	10	5.7	na	5.7	7.4
Datasets available: 2017						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
PFOS	10	11 ppb	5 ppb	14 ppb	14 ppb	8
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	0.134	0.166				
Final meal category based on UCL:						8

Existing MDHHS Advisory: Bluegill and sunfish from Lake Margrethe in Crawford County are covered by the statewide advisory due to mercury: No one should eat more than 8 meals per month of bluegill or sunfish of any size.

Recommendation: No one should eat more than 8 meals per month of Lake Margrethe bluegill or pumpkinseed due to PFOS.



**Largemouth and
Smallmouth Bass**

Lake Margrethe

Crawford County

Hg Analysis:

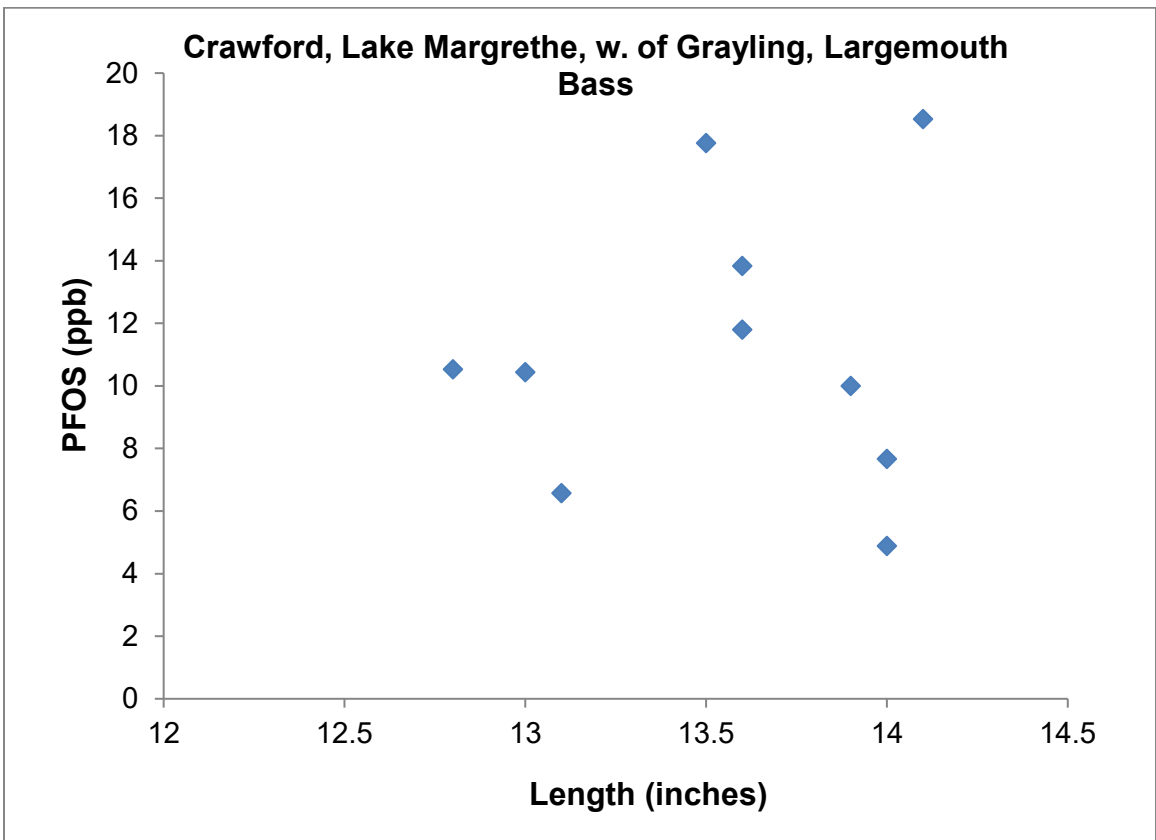
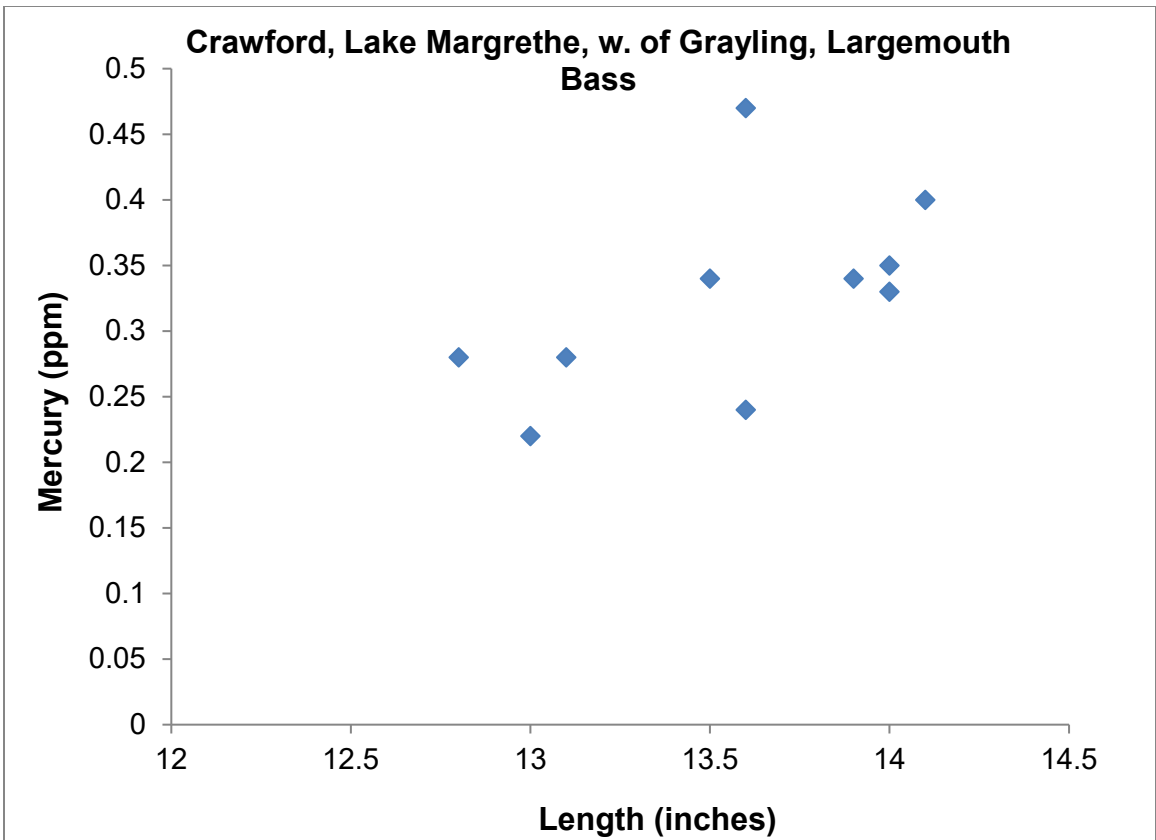
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2017	2017	10	12.8	14	13.5	14.1
Datasets available: 2017						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	7	0.35	0.24	0.47	0.42	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.318	0.358				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2017	2017	10	12.8	14	13.5	14.1
Datasets available: 2017						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
PFOS	7	12 ppb	5 ppb	18 ppb	17 ppb	8
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	0.012	0.000				
Final meal category based on UCL:						2

Existing MDHHS Advisory: Largemouth and smallmouth bass from Lake Margrethe in Crawford County are covered by the statewide advisory due to mercury: No one should eat more than 2 meals per month of largemouth or smallmouth bass smaller than 18 inches or more than 1 meal per month of largemouth or smallmouth bass larger than 18 inches.

Recommendation: No one should eat more than 2 meals per month of largemouth or smallmouth bass from Lake Margrethe smaller than 18 inches or more than 1 meal per month of largemouth or smallmouth bass larger than 18 inches due to mercury. The statewide length break was applied as the size of the fish was limited. PFOS would also cause an advisory.



Walleye

Lake Margrethe

Crawford County

Hg Analysis:

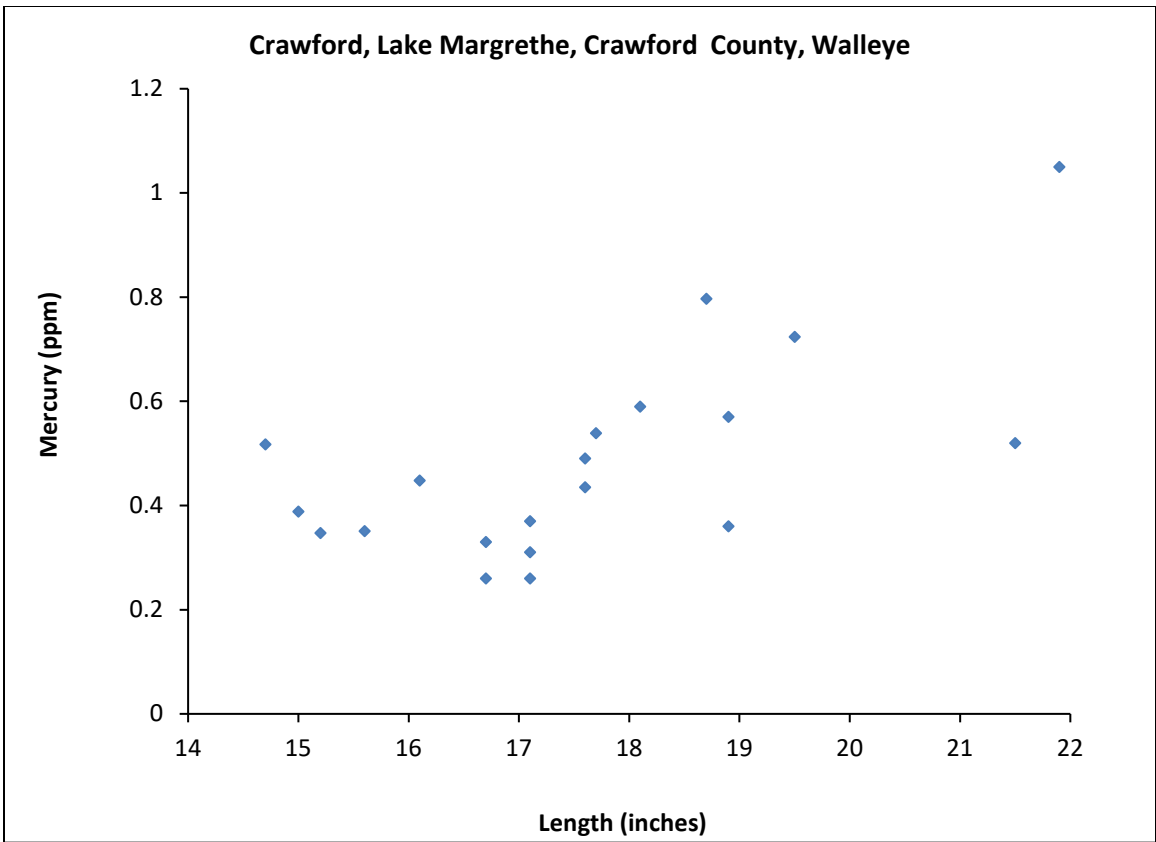
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1995	2007	20	14.7	15	14.7	21.9
Datasets available: 1995, 2007						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	20	0.48	0.26	1.05	0.57	1
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.436	0.380				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available: --						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						1

Existing Advisory: Lake Margrethe walleye are covered under the statewide mercury consumption advisory.

Recommendation: No one should eat more than 1 meal per month of Lake Margrethe walleye smaller than 20 inches or more than 6 meals per year of those fish larger than 20 inches due to mercury. The statewide length break applied as the size of the fish was limited.



Brown Trout

Manistee River

Crawford County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Size Range of All Samples	
Earliest	Most Recent				Min	Max
1998	1998	10	6.7	12	6.7	10.2
Datasets available: 1998						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	2*	0.08	0.07	0.09	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	--	--				

Organics Analysis:

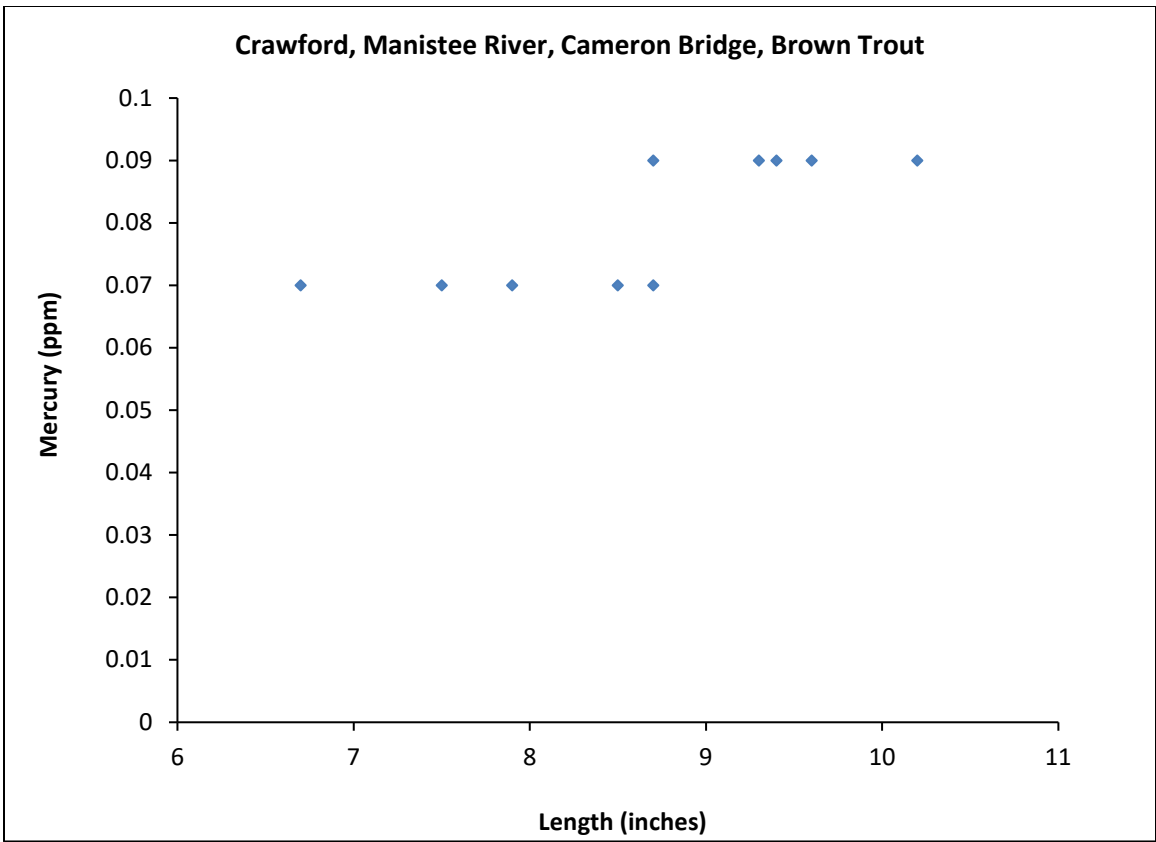
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Size Range of All Samples	
Earliest	Most Recent				Min	Max
1998	1998	10	6.7	12	6.7	10.2
Datasets available: 1998						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	2*	ND	--	--	--	--
DDT	2*	ND	--	--	--	--
Chlordane	2*	ND	--	--	--	--
Toxaphene	2*	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						--

* - 10 fish were analyzed as 2 composite samples

Existing Advisory: There are no current consumption advisories for Manistee River brown trout.

Recommendation: A dataset of less than five data points for a given chemical, species and waterbody is considered insufficient for evaluation using the standard evaluation method.

Note: Fish were collected from the headwaters of the Manistee River near the town of Frederic, and are the only brown trout samples for the river.



White Sucker

Manistee River

Crawford County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1998	1998	10	9.6	na	9.6	15.7
Datasets available: 1998						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	2*	0.12	0.07	0.16	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	--	--				

Organics Analysis:

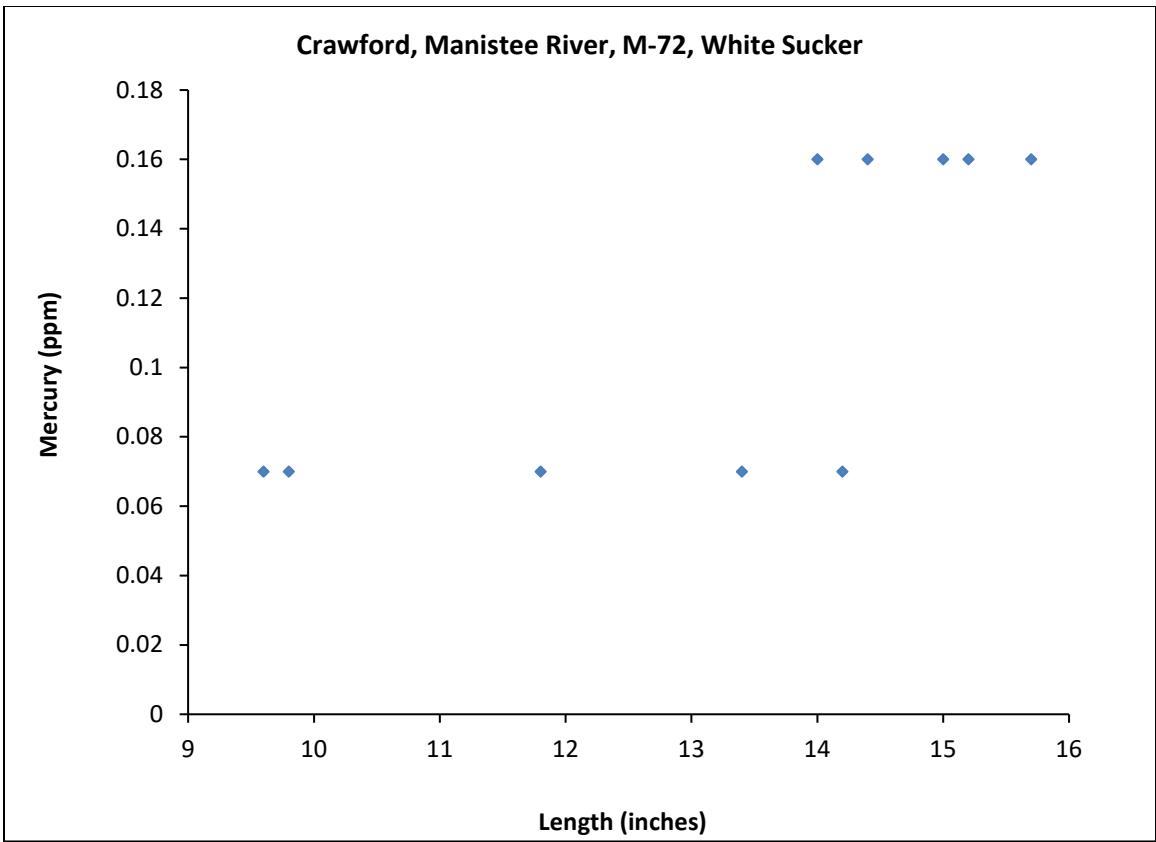
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1998	1998	10	9.6	na	9.6	15.7
Datasets available: 1998						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	2*	ND	--	--	--	--
DDT	2*	ND	--	--	--	--
Chlordane	2*	ND	--	--	--	--
Toxaphene	2*	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						--

* - 10 fish were analyzed as 2 composite samples

Existing Advisory: There are no current consumption advisories for Manistee River white sucker.

Recommendation: A dataset of less than five data points for a given chemical, species and waterbody is considered insufficient for evaluation using the standard evaluation method. The statewide advice applies: No one should eat more than 8 meals per month of sucker from inland waters.

Note: Fish were collected from the headwaters of the Manistee River near the town of Grayling, and are the only sucker samples for the river.



Bluegill/Pumpkinseed

**Portage Creek
u/s Manistee Confluence**

Crawford County

Hg Analysis:

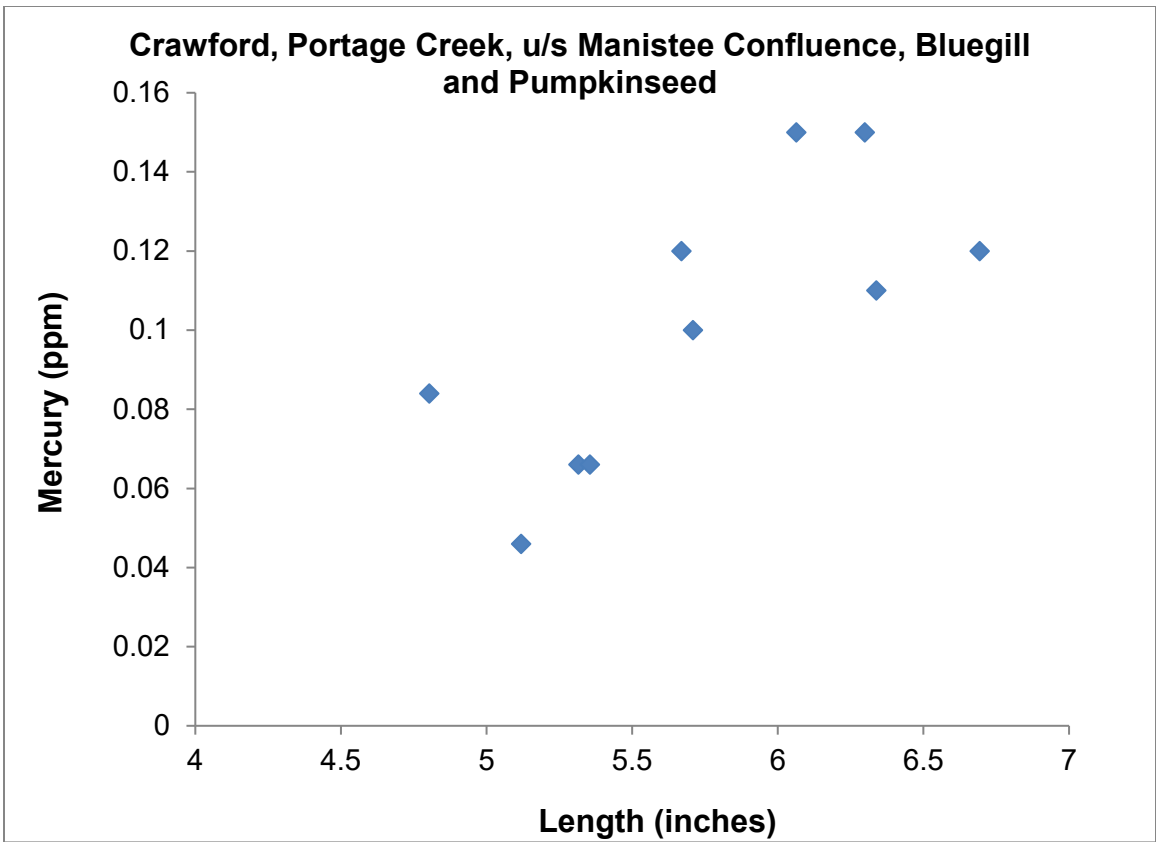
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent					
2019	2019	10	4.8	NA	4.8	6.7
Datasets available: 2019						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.101	0.046	0.150	0.127	8
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.555	0.544				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent					
2019	2019	10	4.8	NA	4.8	6.7
Datasets available: 2019						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	--	--	--	--	--	--
DDT	--	--	--	--	--	--
Chlordane	--	--	--	--	--	--
Toxaphene	--	--	--	--	--	--
PFOS	10	ND	--	--	--	16
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	NA	NA				
Final meal category based on UCL:						8

Existing MDHHS Advisory: Bluegill and sunfish from Portage Creek upstream of the Manistee River confluence in Crawford County are currently covered under the statewide advisory for mercury. No one should eat more than 8 meals per month of bluegill or sunfish of any size due to mercury.

Recommendation: No one should eat more than 8 meals per month of bluegill or sunfish of any size due to mercury.



Rock Bass

**Portage Creek
u/s Manistee Confluence**

Crawford County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent					
2019	2019	10	5.5	NA	5.5	7.7
Datasets available: 2019						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.231	0.150	0.490	0.303	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.702	0.802				

Organics Analysis:

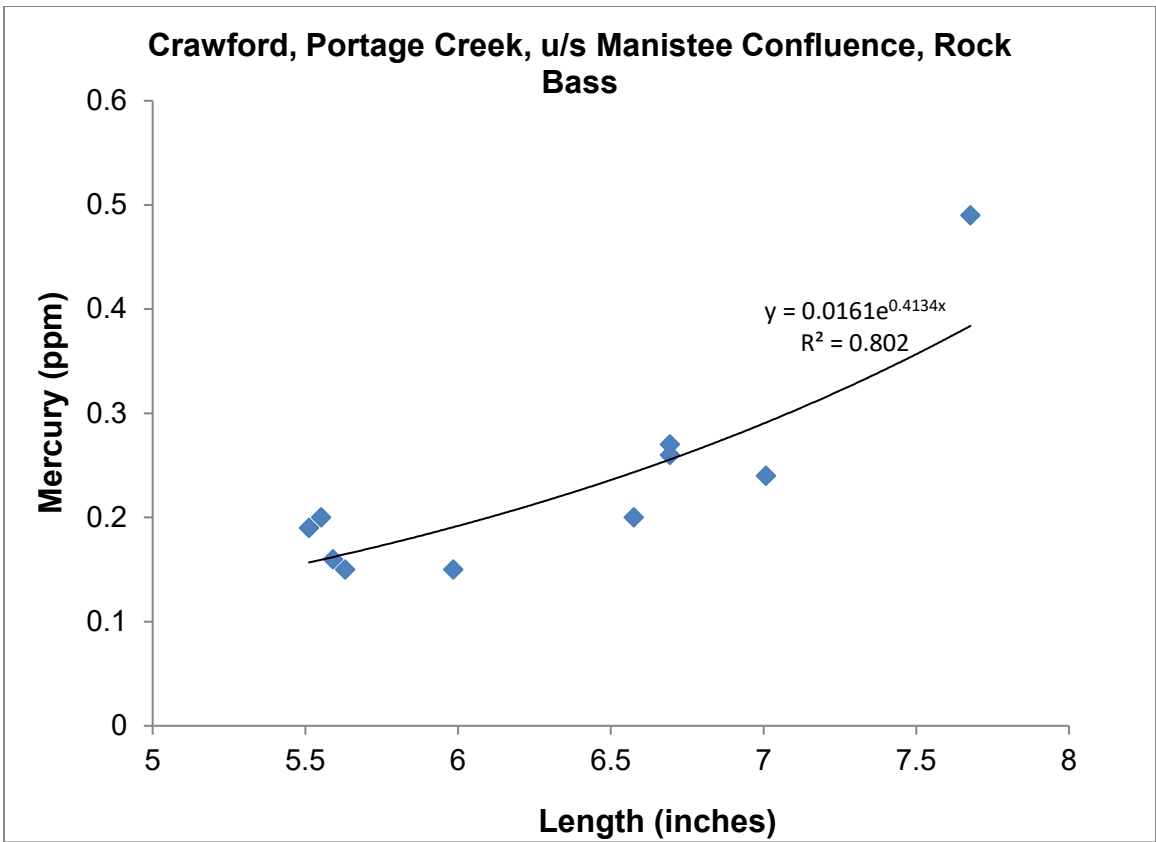
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent					
2019	2019	10	5.5	NA	5.5	7.7
Datasets available: 2019						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	--	--	--	--	--	--
DDT	--	--	--	--	--	--
Chlordane	--	--	--	--	--	--
Toxaphene	--	--	--	--	--	--
PFOS	10	1.7 ppb	< 0.25ppb	14.6* ppb	4.93 ppb	16
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	0.036	0.036				
Final meal category based on UCL:						2

* Only one of the ten individuals had detectable PFOS in the fillet

Existing MDHHS Advisory: Rock bass from Portage Creek upstream of the Manistee River confluence in Crawford County are currently covered under the statewide advisory for mercury. No one should eat more than 4 meals per month of rock bass of any size due to mercury.

Recommendation: No one should eat more than 2 meals per month of rock bass smaller than 8 inches or no more than 1 meal per month of rock bass larger than 8 inches due to mercury.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
6	0.192	4
7	0.290	2
8	0.439	2
9	0.663	1
10	1.002	1
<i>Shaded area denotes extrapolated estimates</i>		



Largemouth Bass

Shupac Lake

Crawford County

Hg Analysis:

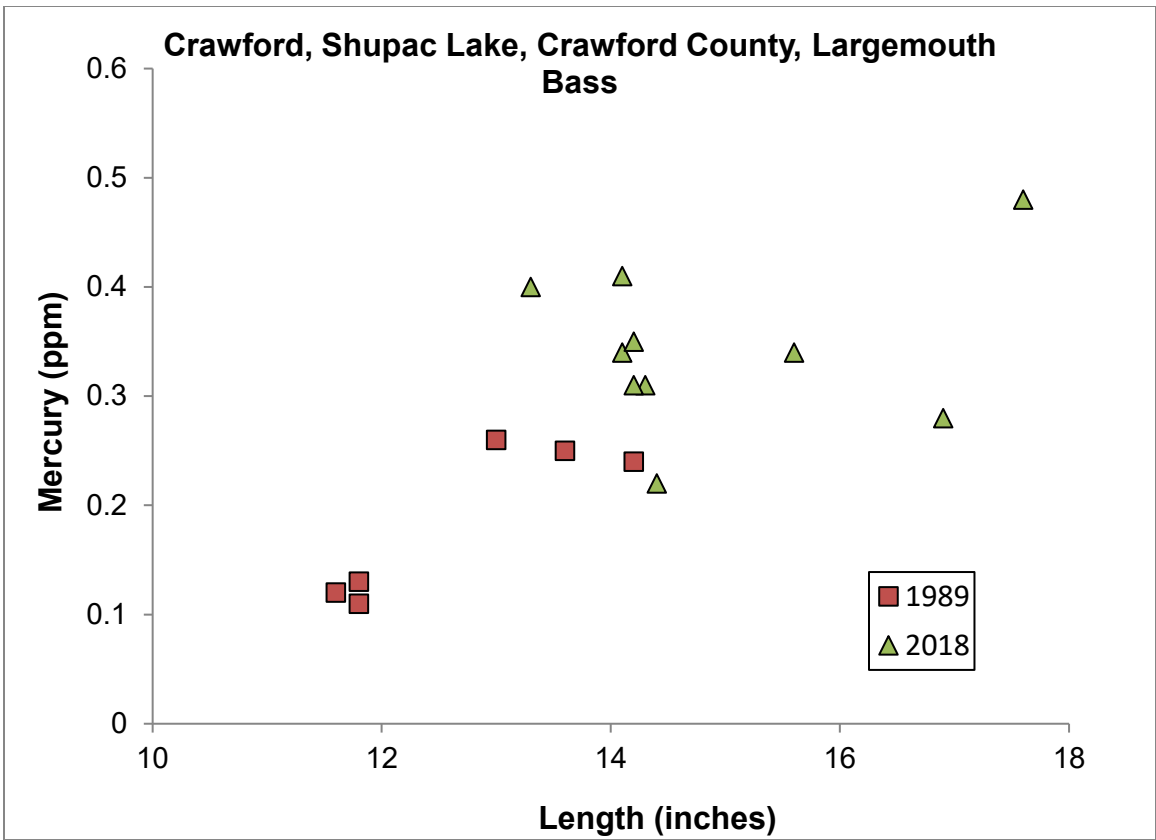
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1989	2018	16	11.6	14	13.6	17.6
Datasets available: 1989, 2018						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	11	0.32	0.22	0.48	0.37	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.499	0.525				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0	--	--	--	--
Datasets available: --						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
PFOS	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	--	--				
Final meal category based on UCL:						2

Existing MDHHS Advisory: Shupac Lake largemouth bass are covered under the statewide advisory due to mercury: No one should eat more than 2 meals per month largemouth or smallmouth bass smaller than 18 inches or more than 1 meal per month of those fish larger than 18 inches.

Recommendation: No one should eat more than 2 meals per month of Shupac Lake largemouth or smallmouth bass smaller than 18 inches or more than 1 meal per month of those fish larger than 18 inches due to mercury. Statewide length break applied as the size of the fish was limited.



Rainbow Trout

Shupac Lake

Crawford County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1989	1989	4	16.5	12	16.5	18.7
Datasets available:		1989				
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	4	0.16	0.13	0.19	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.226	0.264				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available:		--				
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						--

Existing Advisory: There are no current consumption advisories for Lake Shupac rainbow trout.

Recommendation: A dataset of less than five data points for a given chemical, species and waterbody is considered insufficient for evaluation using the standard evaluation method.

Hg Analysis:

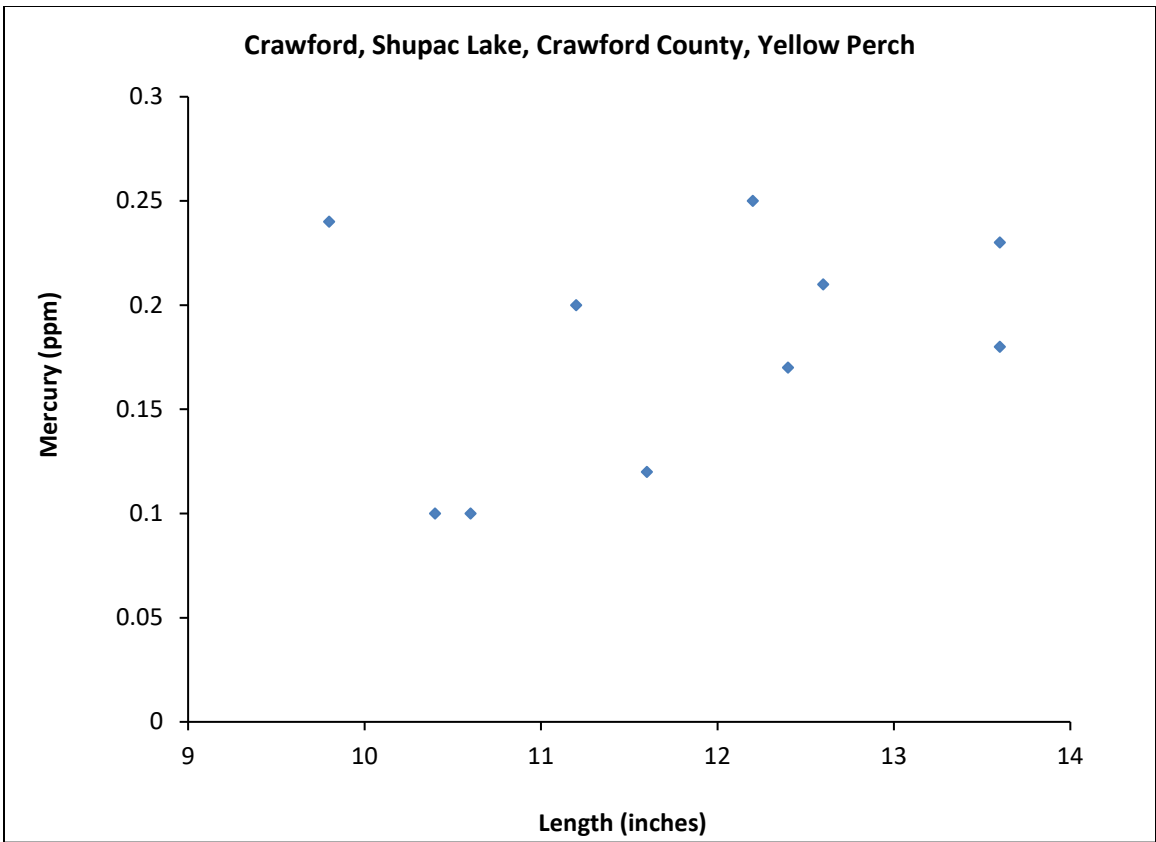
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1989	1989	10	9.8	na	9.8	13.6
Datasets available: 1989						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.18	0.10	0.25	0.22	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.113	0.154				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available: --						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						4

Existing Advisory: Shupac Lake yellow perch are covered under the statewide mercury consumption advisory.

Recommendation: No one should eat more than 4 meals per month of Shupac Lake yellow perch due to mercury.



Gladwin County

See Tittabawassee River recommendations (Southeast 2 – Oakland to Wayne County) for Wixom Lake data.

Largemouth Bass

Pratt Lake

Gladwin County

Hg Analysis:

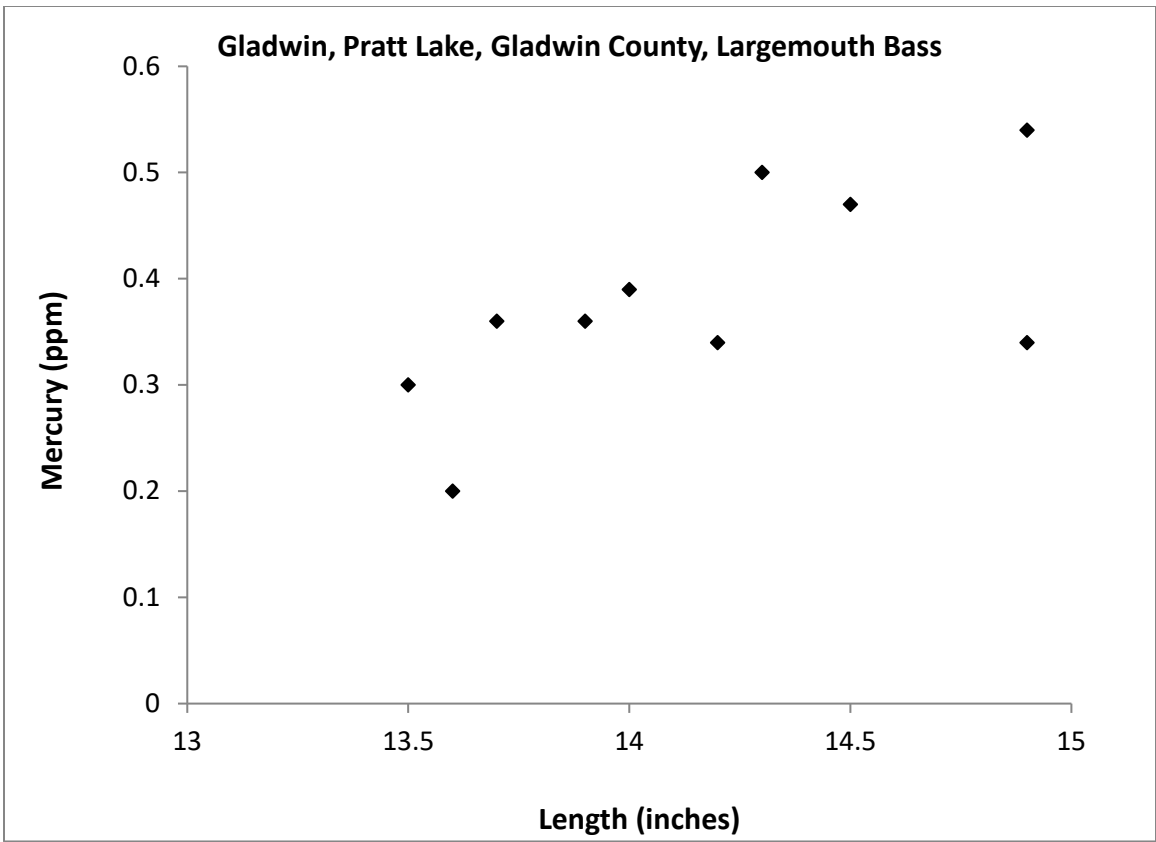
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2003	2003	10	13.5	14	13.5	14.9
Datasets available: 2003						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.38	0.20	0.54	0.45	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.436	0.413				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available: --						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						2

Existing Advisory: Pratt Lake largemouth bass are covered by the statewide mercury advisory.

Recommendation: No one should eat more than 2 meals per month of Pratt Lake largemouth or smallmouth bass smaller than 18 inches or more than 1 meal per month of those fish larger than 18 inches due to mercury. The statewide length break was applied as the size range of fish was limited.



Black Crappie

Ross Lake

Gladwin County

Hg Analysis:

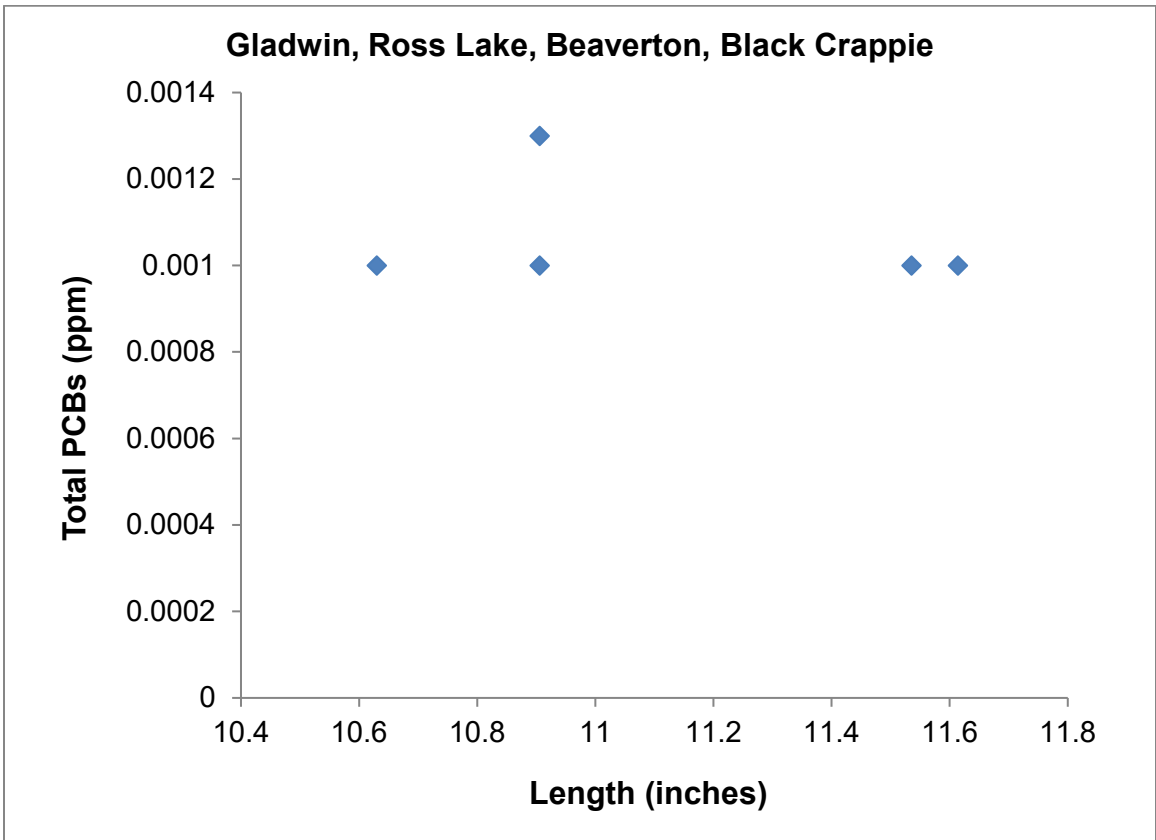
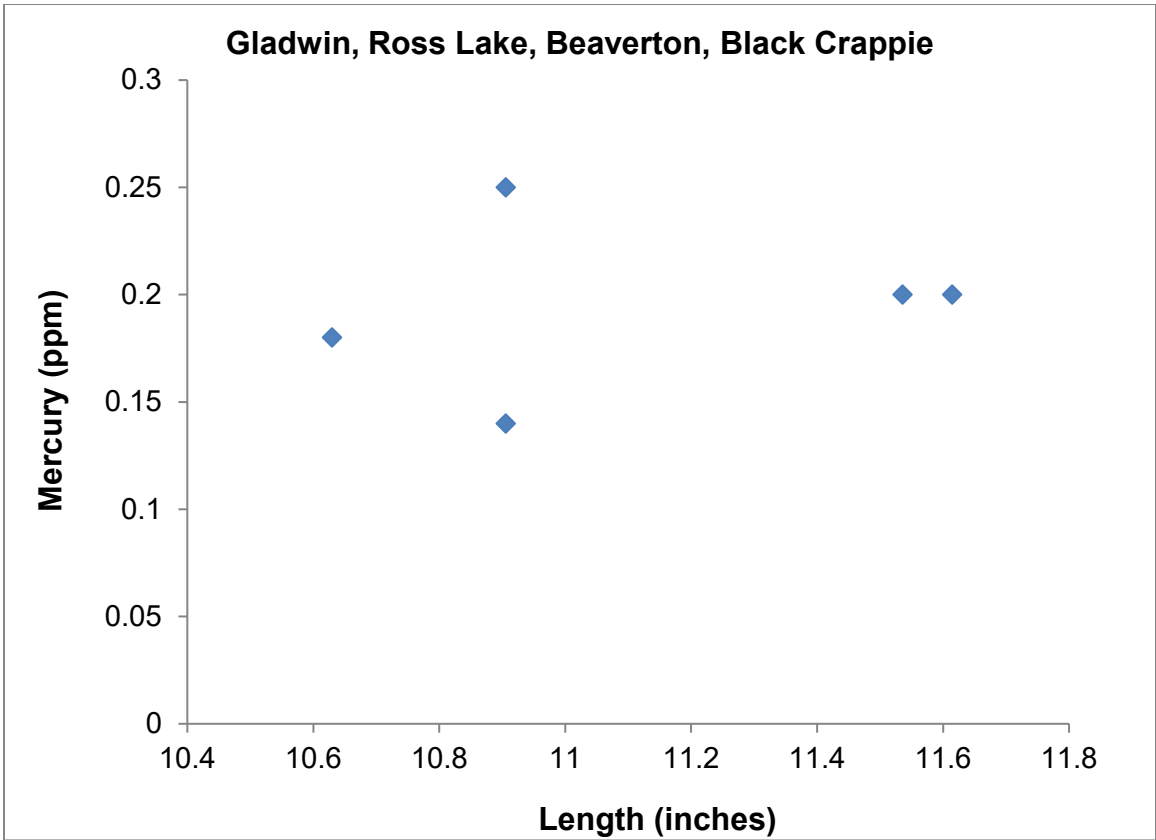
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2018	2018	5	10.6	NA	10.6	11.6
Datasets available: 2018						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	5	0.194	0.140	0.250	0.243	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.030	0.048				

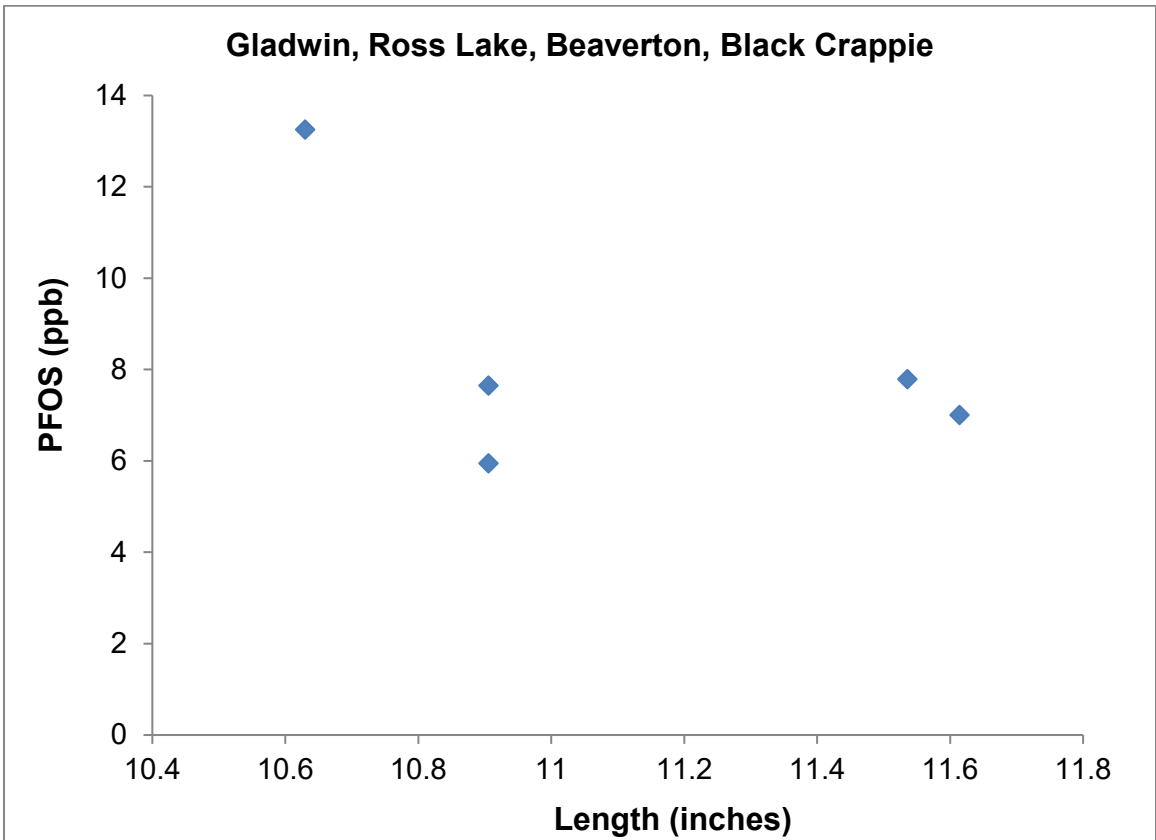
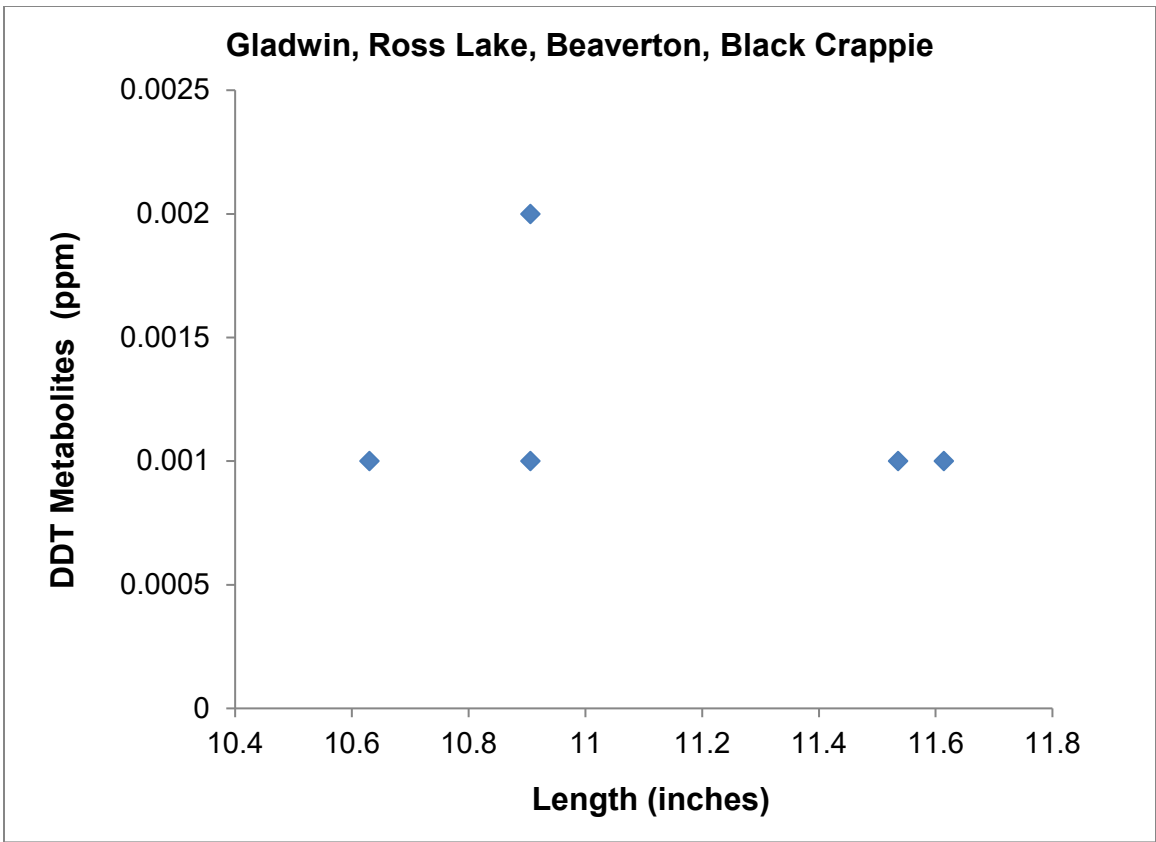
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2018	2018	5	10.6	NA	10.6	11.6
Datasets available: 2018						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	5	0.001	<0.001	0.001	0.001	16
DDT	5	0.001	<0.001	0.002	0.002	16
Chlordane	5	ND	--	--	--	16
Toxaphene	5	ND	--	--	--	--
PFOS	5	8.3 ppb	6.0 ppb	13.3 ppb	11.9 ppb	12
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.075	0.075				
DDT	0.075	0.075				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	0.286	0.231				
Final meal category based on UCL:						4

Existing MDHHS Advisory: Black and white crappie from Ross Lake in Gladwin County are currently covered under the statewide mercury guidance. No one should eat more than 4 meals per month of black or white crappie of any size.

Recommendation: No one should eat more than 4 meals per month of black or white crappie of any size from Ross Lake in Gladwin County due to mercury. PFOS causes less restrictive guidance.





Iosco County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples			
Earliest	Most Recent				Min	Max		
2015	2015	20	5	na	5	8.3		
Datasets available:		2015						
Chemical	Sample Size (Legal)	Mean		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
Mercury	20	0.10		0.05	0.18	0.11	8	
Chemical	Linear Regression	Exponential Regression						
	R ²	R ²						
Mercury	0.388	0.422						

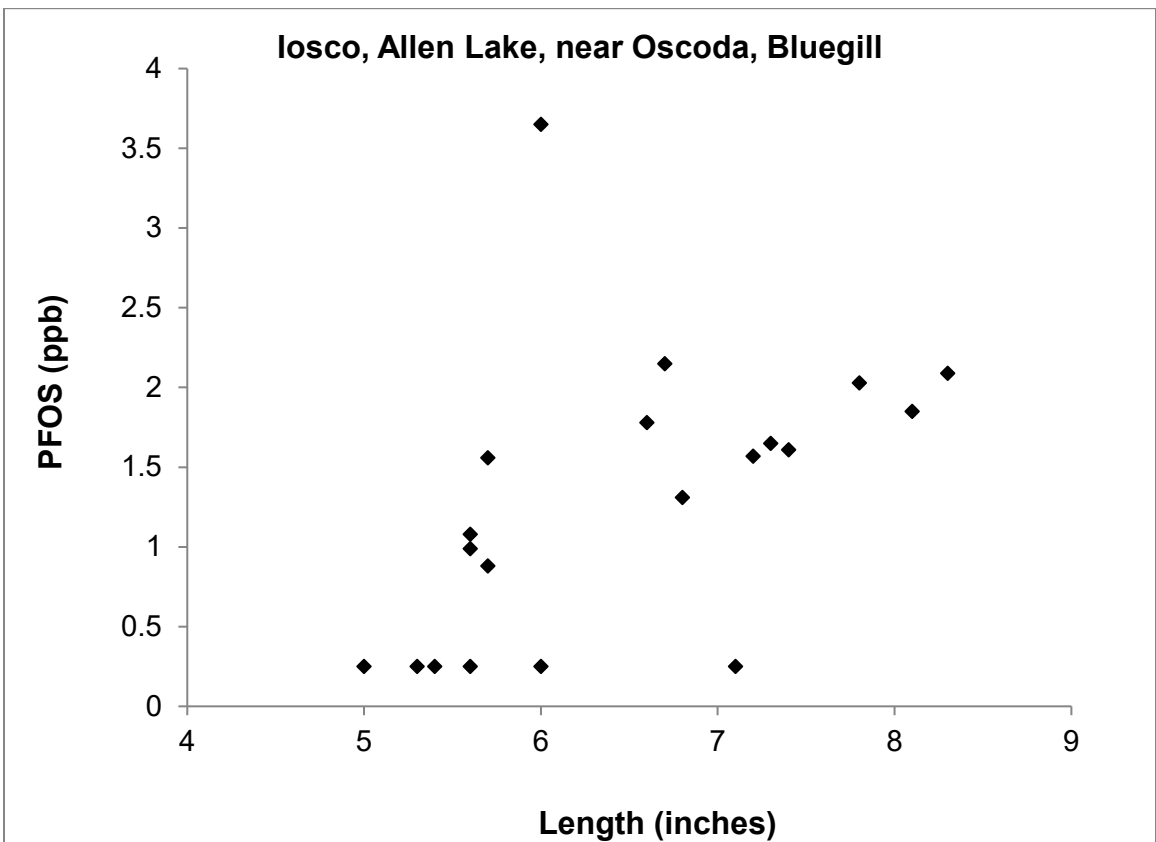
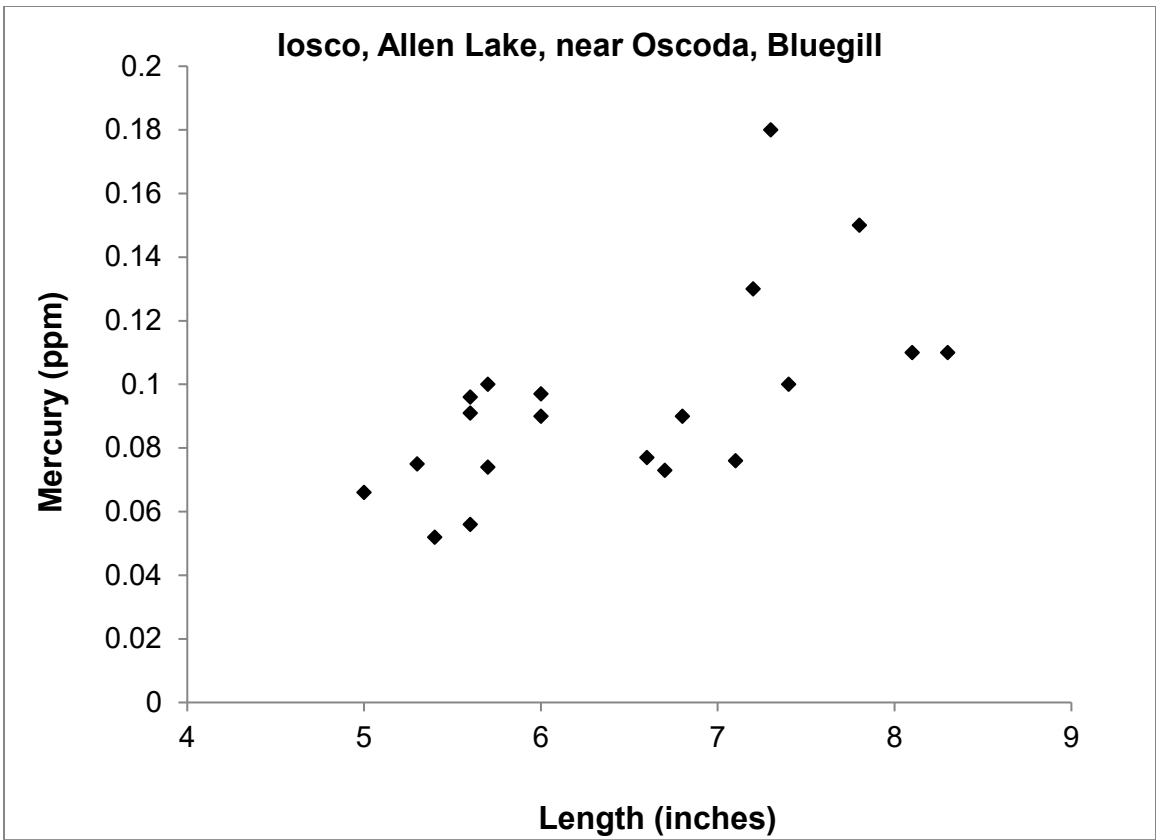
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples			
Earliest	Most Recent				Min	Max		
2015	2015	20	5	na	5	8.3		
Datasets available:		2015						
Chemical	Sample Size (Legal)	Mean		Min. Conc. (ppb)	Max Conc. (ppb)	95%UCL (ppb)	Meal Category	
PCB	0	--		--	--	--	--	
DDT	0	--		--	--	--	--	
Chlordane	0	--		--	--	--	--	
Toxaphene	0	--		--	--	--	--	
PFOS	20	1.3		ND	3.6	1.7	16	
Chemical	Linear Regression	Exponential Regression						
	R ²	R ²						
PCB	--	--						
DDT	--	--						
Chlordane	--	--						
Toxaphene	--	--						
PFOS	0.248	0.322						
Final meal category based on UCL:							8	

Existing Advisory: Allen Lake bluegill and pumpkinseed are by the “do not eat” guidelines for all species from Clark’s Marsh and Allen Lake.

Recommendation: No one should eat more than 8 meals per month of Allen Lake bluegill or sunfish due to mercury.

Note: A waterbody wide advisory (“All Other Species) applies to Allen Lake based on the uncontrolled local source and the concentrations in Clark’s Marsh fish. Additional data is needed to lift the advisory on untested species of fish.



Largemouth Bass

Allen Lake

Iosco County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples			
Earliest	Most Recent				Min	Max		
2015	2015	3	12.4	14	12.4	13.1		
Datasets available:		2015						
Chemical	Sample Size (All)	Mean		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
Mercury	3	0.82		0.38	1.1	--	--	
Chemical	Linear Regression	Exponential Regression						
	R ²	R ²						
Mercury	0.913	0.882						

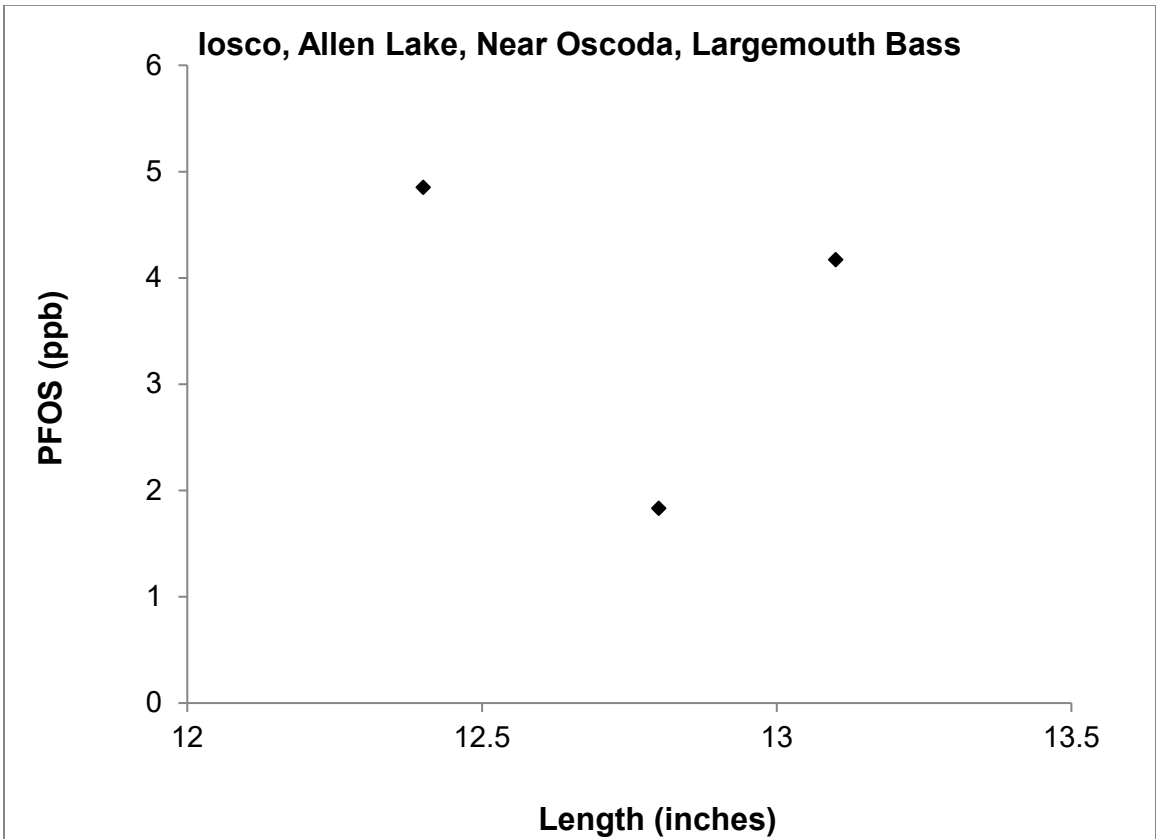
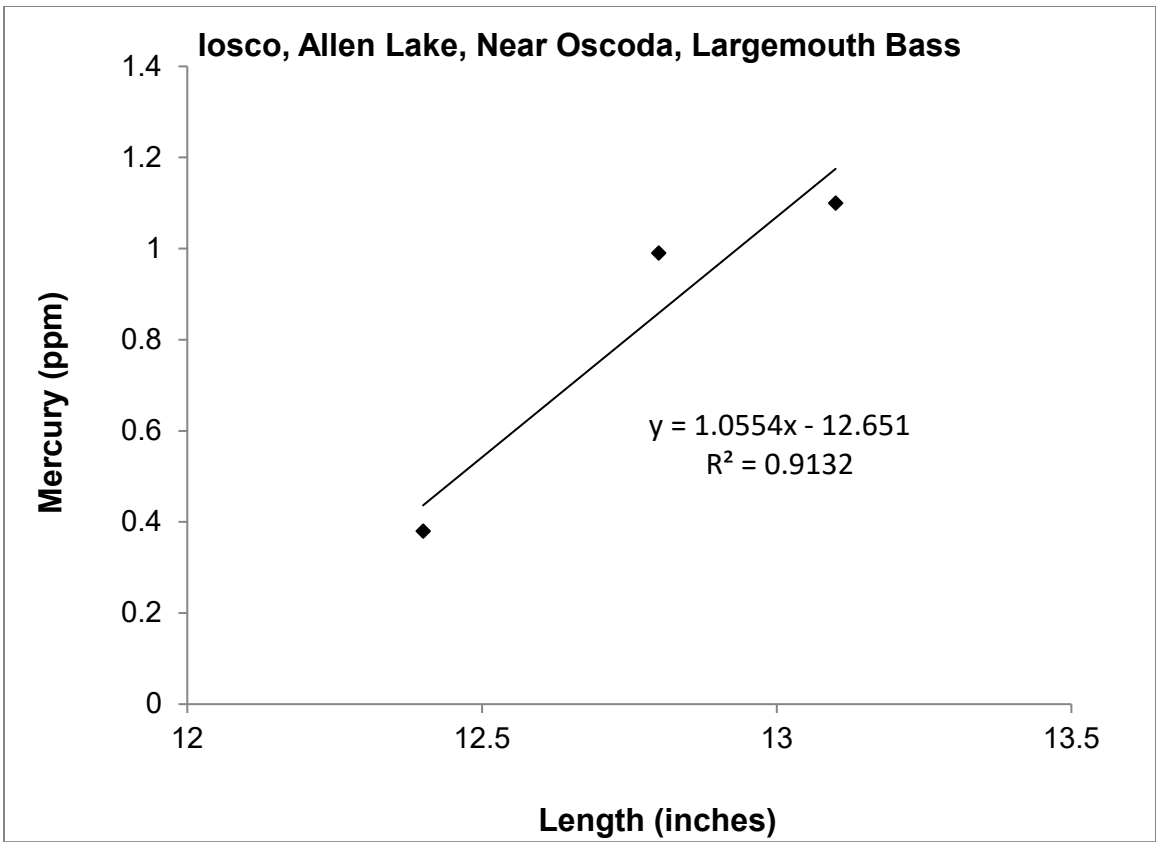
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples			
Earliest	Most Recent				Min	Max		
2015	2015	3	12.4	14	12.4	13.1		
Datasets available:		2015						
Chemical	Sample Size (All)	Mean		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
PCB	3	ND		--	--	--	--	
DDT	3	ND		--	--	--	--	
Chlordane	3	ND		--	--	--	--	
Toxaphene	3	ND		--	--	--	--	
PFOS	3	3.6 ppb		1.8 ppb	4.8 ppb	--	--	
Chemical	Linear Regression	Exponential Regression						
	R ²	R ²						
PCB	--	--						
DDT	--	--						
Chlordane	--	--						
Toxaphene	--	--						
PFOS	0.087	0.051						
Final meal category based on UCL:							--	

Existing Advisory: Allen Lake largemouth bass are covered by the statewide advisory: No one should eat more than 2 meals per month of largemouth or smallmouth bass smaller than 18 inches or more than 1 meal per month of those fish larger than 18 inches due to mercury.

Recommendation: No one should eat more than 6 meals per year of Allen Lake largemouth or smallmouth bass due to mercury.

Note: As sub-legal fish had elevated levels of mercury, Allen Lake largemouth bass may have high mercury concentrations relative to largemouth bass from most inland lakes. This was a determination based on the available data for mercury and with consideration of the bluegill & pumpkinseed PFOS data. A waterbody wide advisory ("All Other Species) applies to Allen Lake based on the uncontrolled local source and the concentrations in Clark's Marsh fish. Additional data is needed to lift the advisory on untested species of fish.



**Bluegill and
Pumpkinseed**

Clarks Marsh

Iosco County

Hg Analysis:

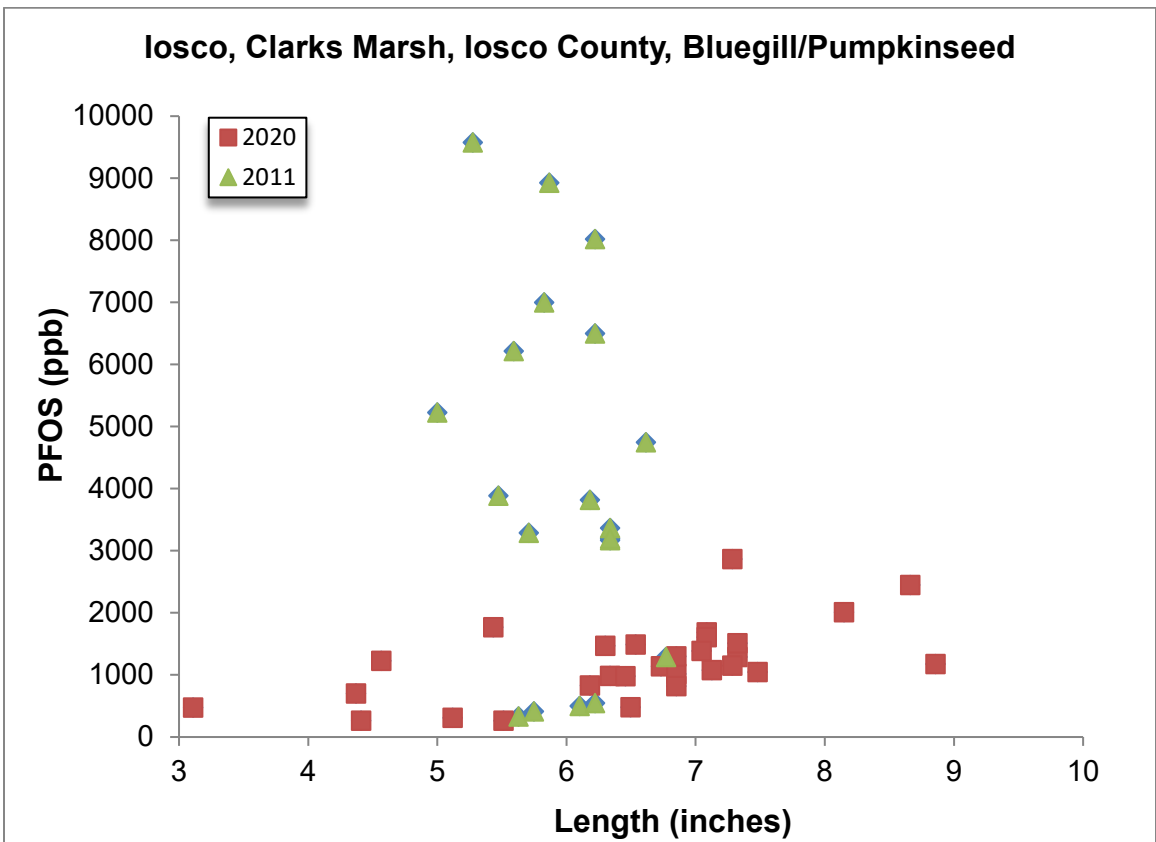
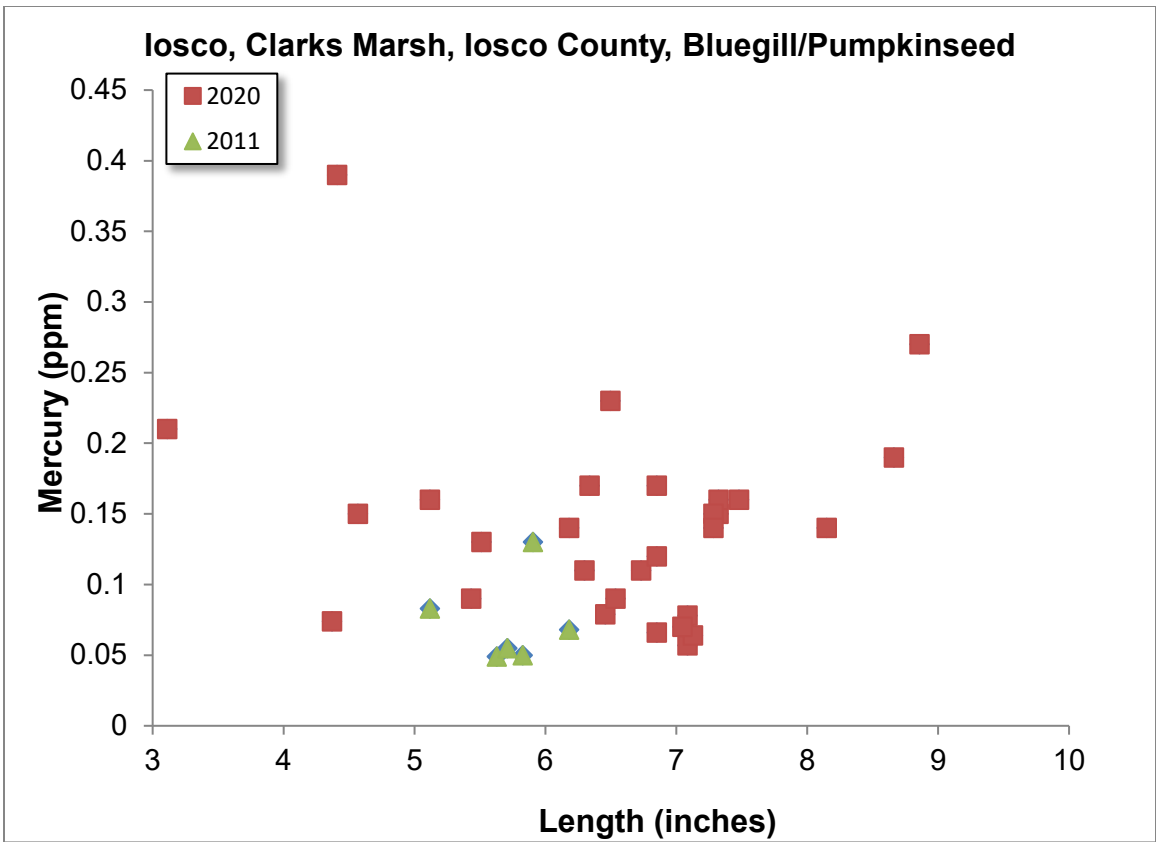
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent						
2011	2020	35	3.1	NA	3.1	8.9	
Datasets available: 2011, 2020							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	35	0.130		0.049	0.390	0.154	4
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.000	0.003					

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent						
2011	2020	54	3.1	NA	3.1	8.9	
Datasets available: 2011, 2020 (Only Hg and PFOS in 2020)							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	ND		--	--	--	16
DDT	10	ND		--	--	--	16
Chlordane	10	ND		--	--	--	--
Toxaphene	10	ND		--	--	--	--
PFOS	48	2393 ppb		263 ppb	9580 ppb	3086 ppb	0
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	NA	NA					
DDT	NA	NA					
Chlordane	NA	NA					
Toxaphene	NA	NA					
PFOS	0.011	0.017					
Final meal category based on UCL:							0

Existing MDHHS Advisory: There is a Do Not Eat fish and wildlife advisory for all species from Clarks Marsh due to PFOS.

Recommendation: No change to the Do Not Eat advisory is recommended.



Hg Analysis:

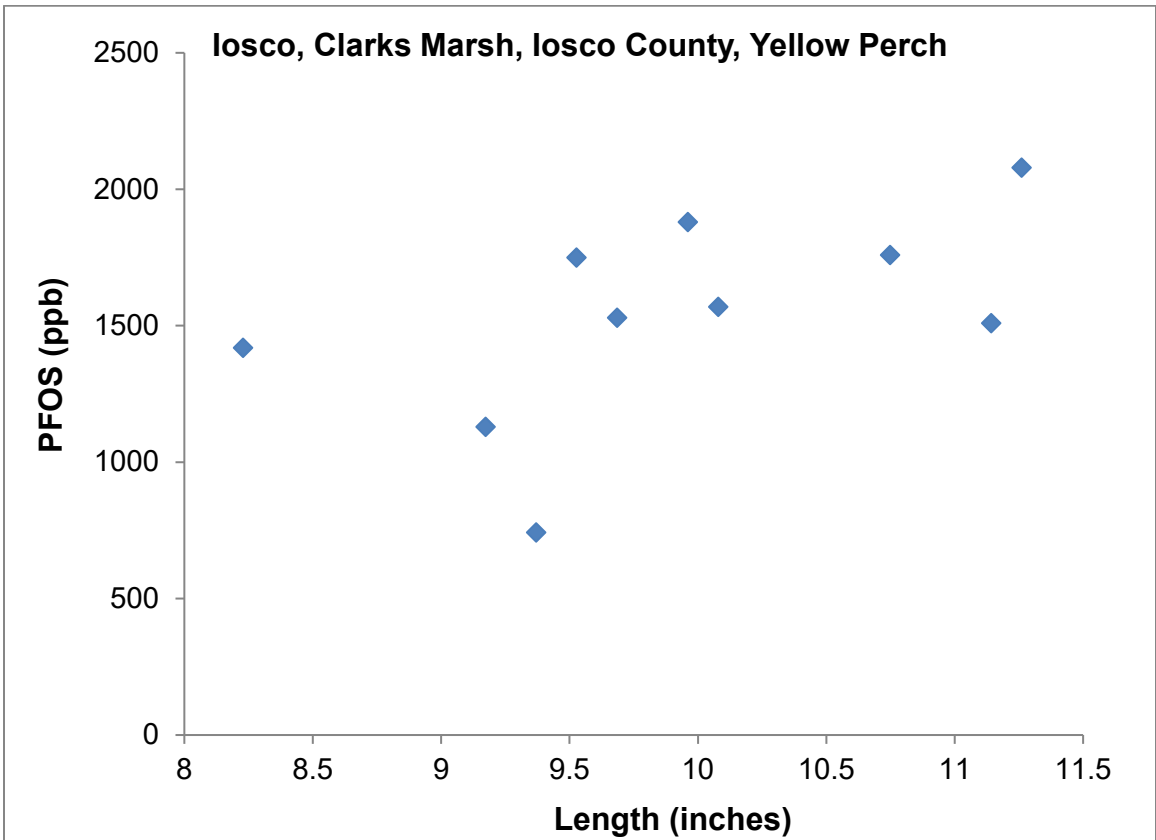
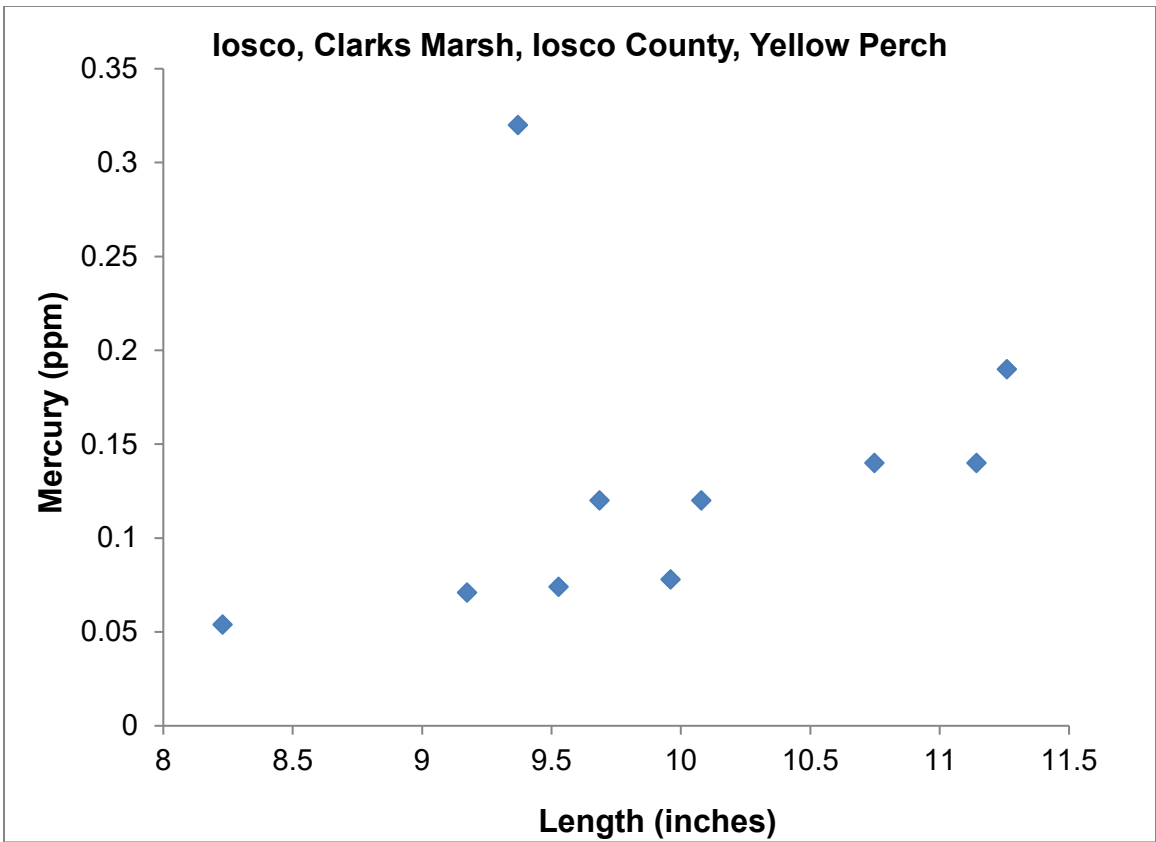
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent						
2020	2020	10	8.2	NA	8.2	11.3	
Datasets available: 2020							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
Mercury	10	0.131	0.054	0.320	0.187	4	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.082	0.265					

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent						
2020	2020	10	8.2	NA	8.2	11.3	
Datasets available: 2020							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
PCB	0	--	--	--	--	--	--
DDT	0	--	--	--	--	--	--
Chlordane	0	--	--	--	--	--	--
Toxaphene	0	--	--	--	--	--	--
PFOS	10	1537 ppb	743 ppb	2080 ppb	1811 ppb	0	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	--	--					
DDT	--	--					
Chlordane	--	--					
Toxaphene	--	--					
PFOS	0.294	0.239					
Final meal category based on UCL:						0	

Existing MDHHS Advisory: There is a Do Not Eat fish and wildlife advisory for all species from Clarks Marsh due to PFOS.

Recommendation: No change to the Do Not Eat advisory is recommended. Mercury should be added as a contaminant that causes a less-restrictive advisory for yellow perch.



Largemouth Bass

Floyd Lake

Iosco County

Hg Analysis:

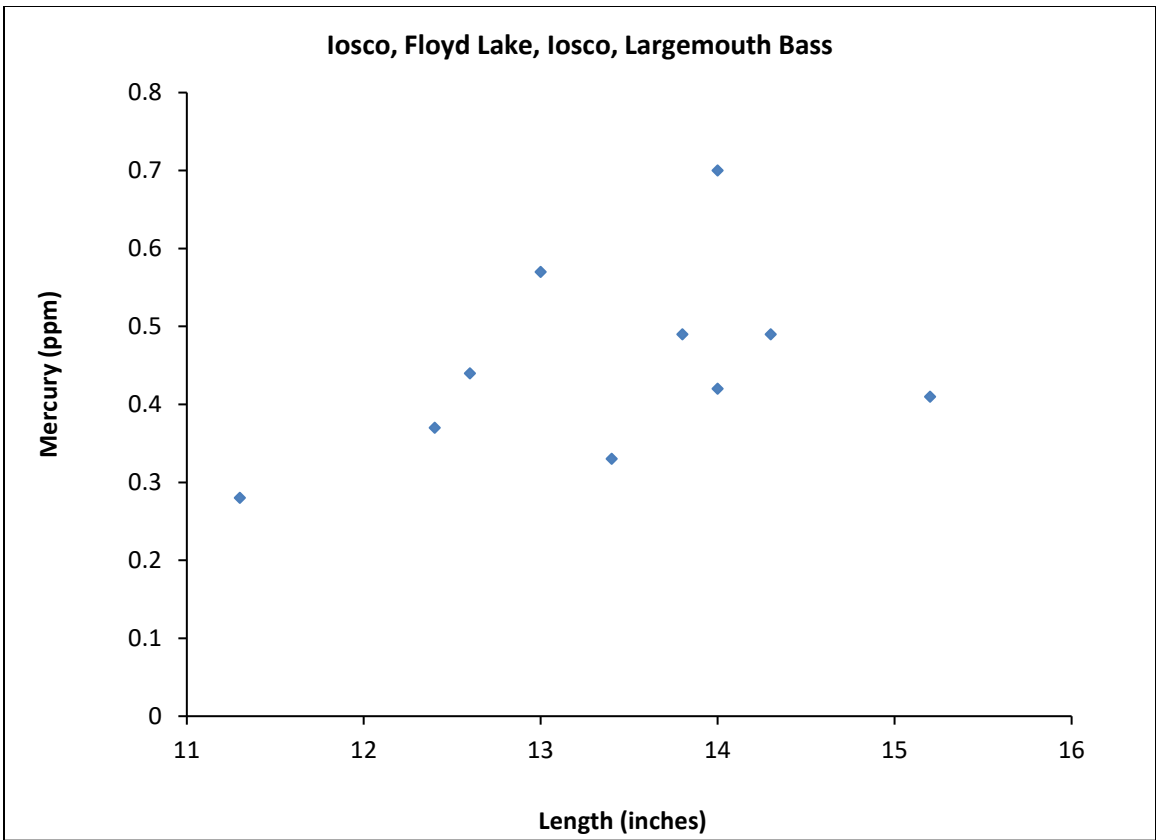
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2008	2008	10	11.3	14	13.8	15.2
Datasets available: 2008						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	5	0.50	0.41	0.70	0.65	1
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.176	0.235				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available: --						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						1

Existing Advisory: Floyd Lake largemouth bass are covered under the statewide mercury consumption advisory.

Recommendation: No one should eat more than 1 meal per month of Floyd Lake largemouth or smallmouth bass smaller than 18 inches or more than 6 meals per year of those fish larger than 18 inches due to mercury. The statewide length break was applied as the size of the fish was limited.



Northern Pike

Jose Lake

Iosco County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
2018	2018	10	21.7	24.0	23.8	31.7	
Datasets available: 2018							
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
Mercury	6	0.568	0.410	0.820	0.734	1	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.413	0.337					

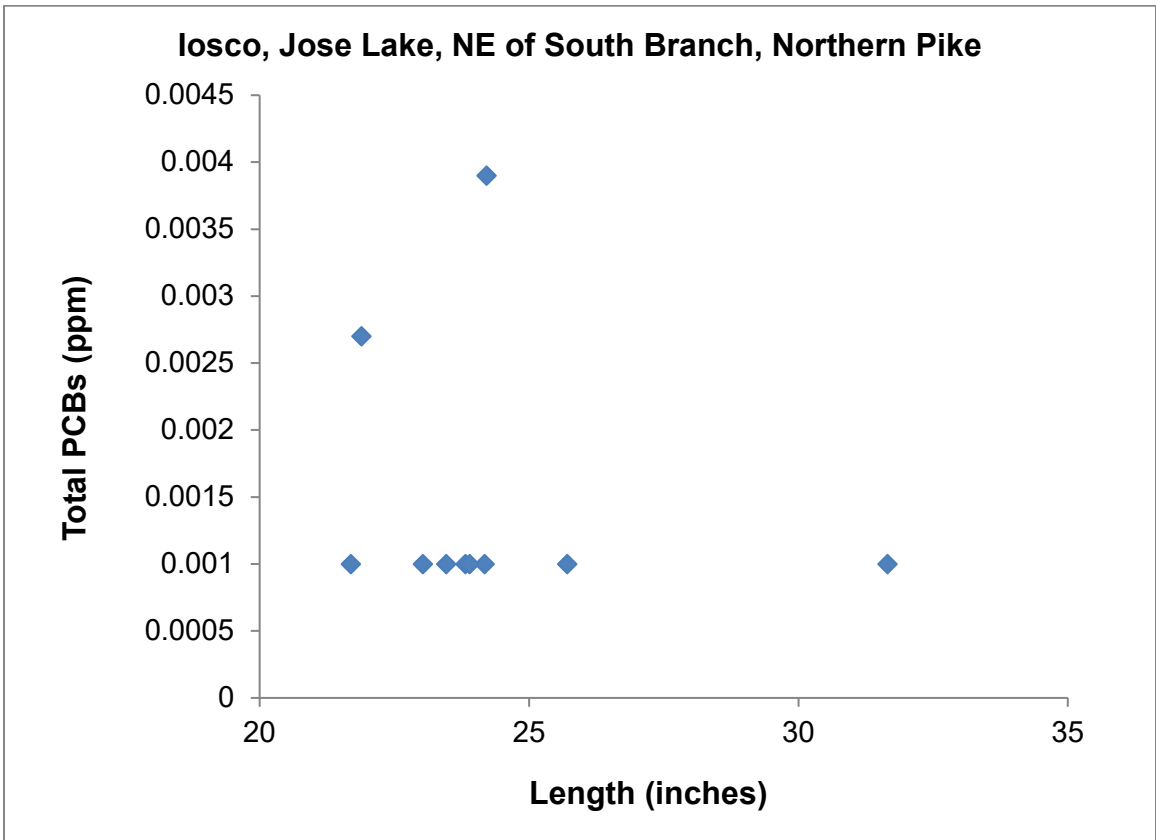
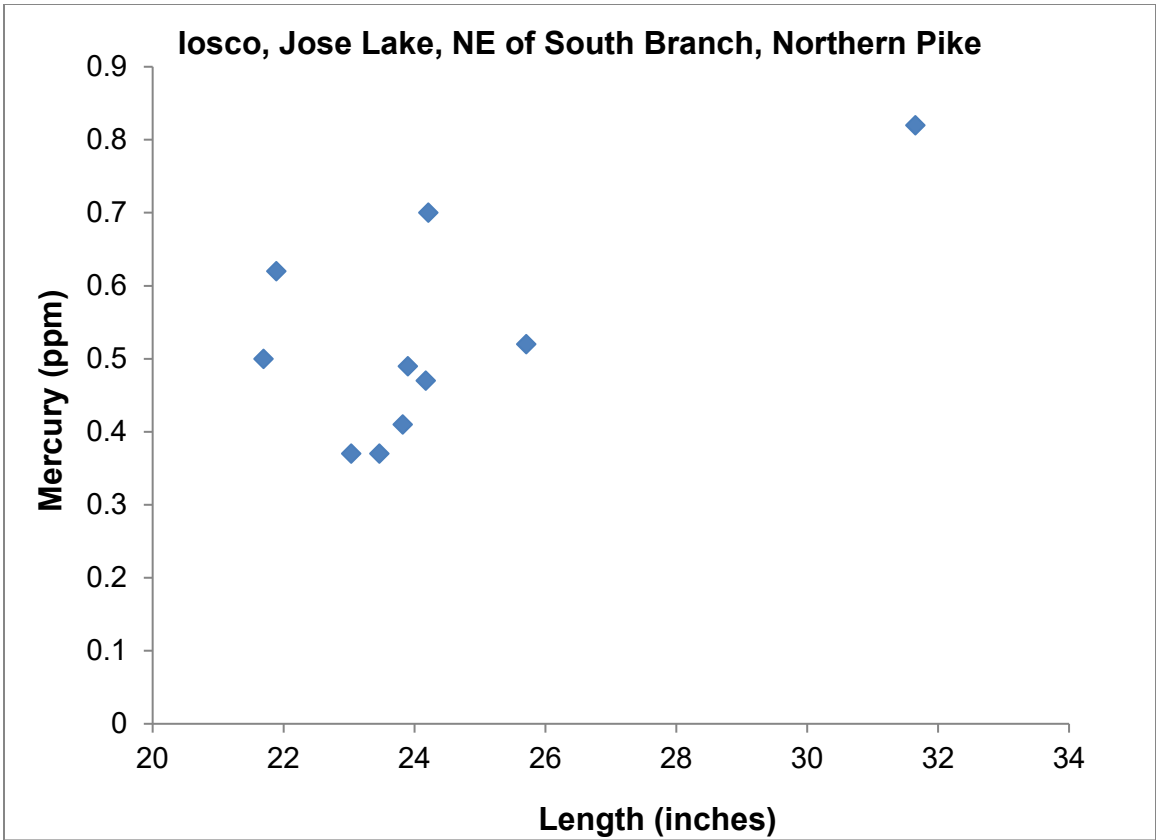
Organics Analysis:

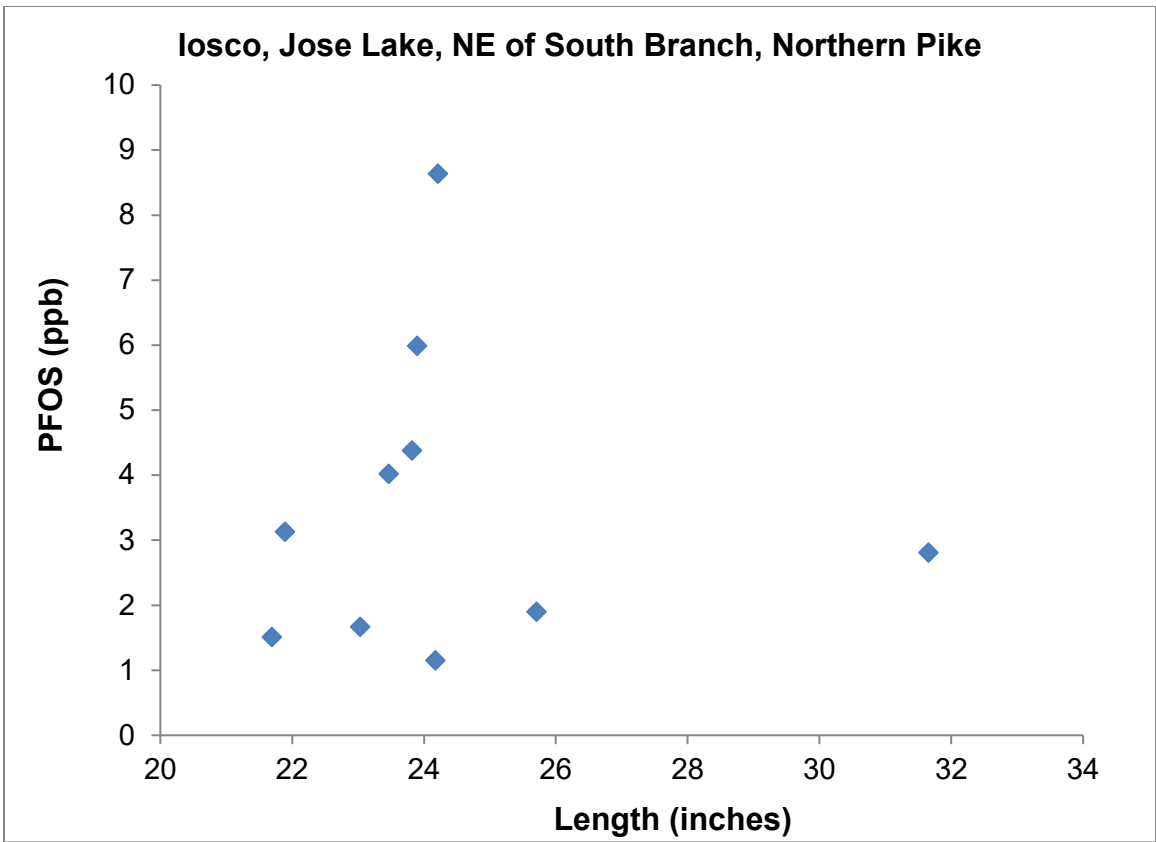
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
2018	2018	10	21.7	24.0	23.8	31.7	
Datasets available: 2018							
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
PCB	6	0.001	<0.001	0.004	0.003	16	
DDT	6	0.001	<0.001	0.001	0.001	16	
Chlordane	6	ND	--	--	--	16	
Toxaphene	6	ND	--	--	--	--	
PFOS	10*	3.5 ppb	1.5 ppb	8.6 ppb	5.2 ppb	16	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.032	0.043					
DDT	0.000	0.000					
Chlordane	--	--					
Toxaphene	--	--					
PFOS	0.000	0.002					
Final meal category based on UCL:						1	

*Sub-legal sized individuals used in the analysis as no correlation between fish size and PFOS concentration has been observed in the statewide data set.

Existing MDHHS Advisory: Northern Pike from Jose Lake in Iosco County are currently covered under the statewide mercury guidance. No one should eat more than 2 meals per month of northern pike smaller than 30 inches or no more than 1 meal per month of northern pike larger than 30 inches.

Recommendation: No one should eat more than 1 meal per month of northern pike smaller than 30 inches from Jose Lake in Iosco County due to mercury or no more than 6 meals per year of these fish larger than 30 inches due to mercury. Statewide length break applied due to limited size of fish used in this analysis.





Largemouth Bass

Long Lake

Iosco County

Hg Analysis:

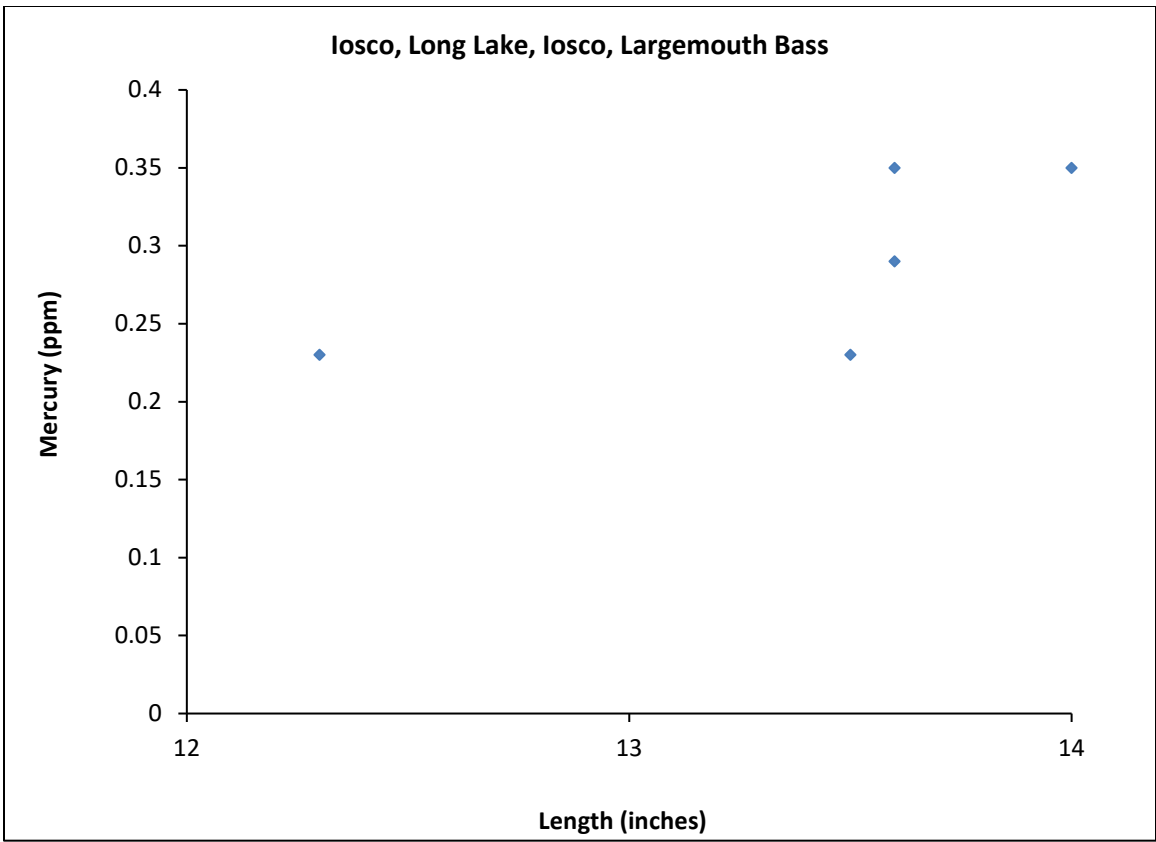
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples			
Earliest	Most Recent				Min	Max		
1990	1990	5	12.3	14	13.5	14		
Datasets available:		1990						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category		
Mercury	4	0.30	0.23	0.35	--	--		
Chemical	Linear Regression	Exponential Regression						
	R ²	R ²						
Mercury	0.488	0.498						

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples			
Earliest	Most Recent				Min	Max		
--	--	0						
Datasets available:		--						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category		
PCB	0	--	--	--	--	--		
DDT	0	--	--	--	--	--		
Chlordane	0	--	--	--	--	--		
Toxaphene	0	--	--	--	--	--		
Chemical	Linear Regression	Exponential Regression						
	R ²	R ²						
PCB	--	--						
DDT	--	--						
Chlordane	--	--						
Toxaphene	--	--						
						Final meal category based on UCL:		--

Existing Advisory: Long Lake largemouth bass are covered under the statewide mercury consumption advisory.

Recommendation: A dataset of less than five data points for a given chemical, species and waterbody is considered insufficient for evaluation using the standard evaluation method. The statewide advice due to mercury applies to Long Lake largemouth and smallmouth bass: No one should eat more than 2 meals per month of largemouth or smallmouth bass smaller than 18 inches or more than 1 meal per month of those fish larger than 18 inches.



Northern Pike

Long Lake

Iosco County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1990	1990	4	20	24	24.2	26
Datasets available: 1990						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	3	0.27	0.19	0.40	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.351	0.460				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available: --						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						--

Existing Advisory: Long Lake northern pike are covered under the statewide mercury consumption advisory.

Recommendation: A dataset of less than five data points for a given chemical, species and waterbody is considered insufficient for evaluation using the standard evaluation method. The statewide advice due to mercury applies to Long Lake northern pike: No one should eat more than 2 meals per month of northern pike smaller than 30 inches or more than 1 meal per month of northern pike larger than 30 inches.

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
2018	2018	6	13.1	14.0	14.3	14.6	
Datasets available: 2018							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
Mercury	4	0.248	0.190	0.310	0.332	2	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.757*	0.784*					

*95% UCL exceeded maximum concentration due to small sample size (N=5) and concentration variability.

Organics Analysis:

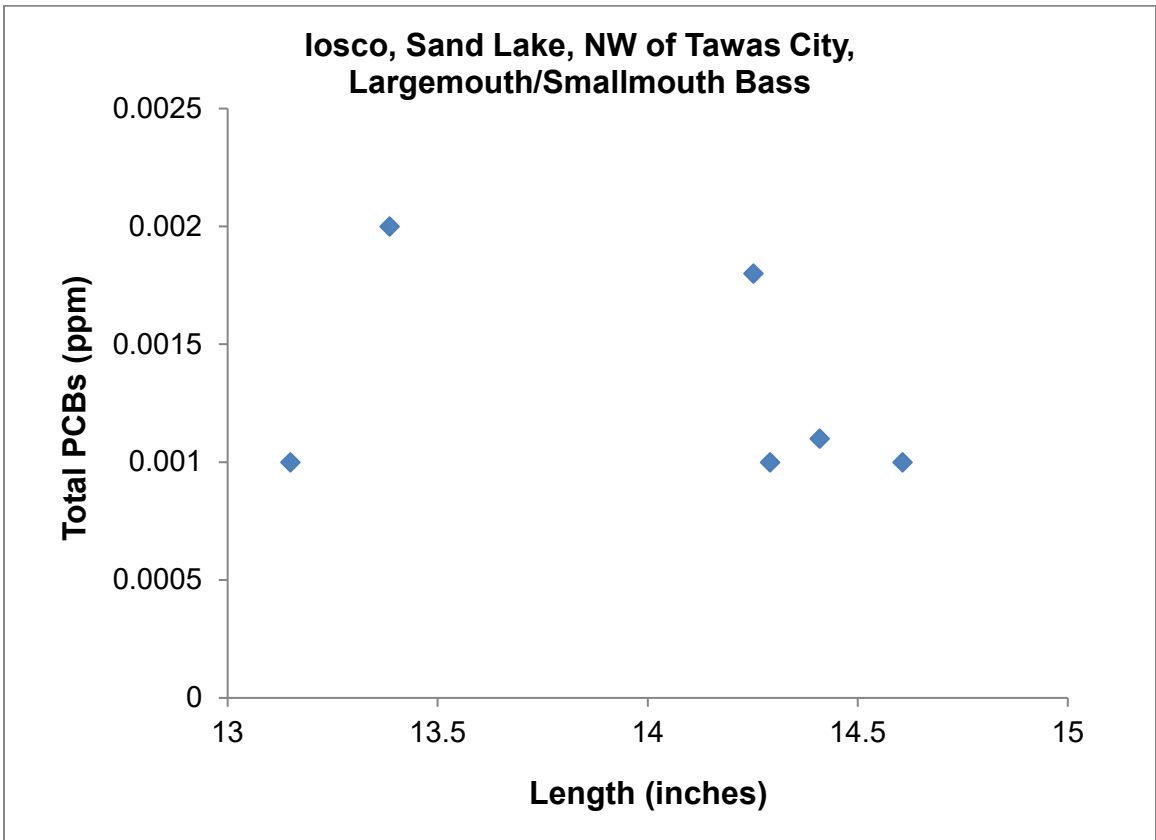
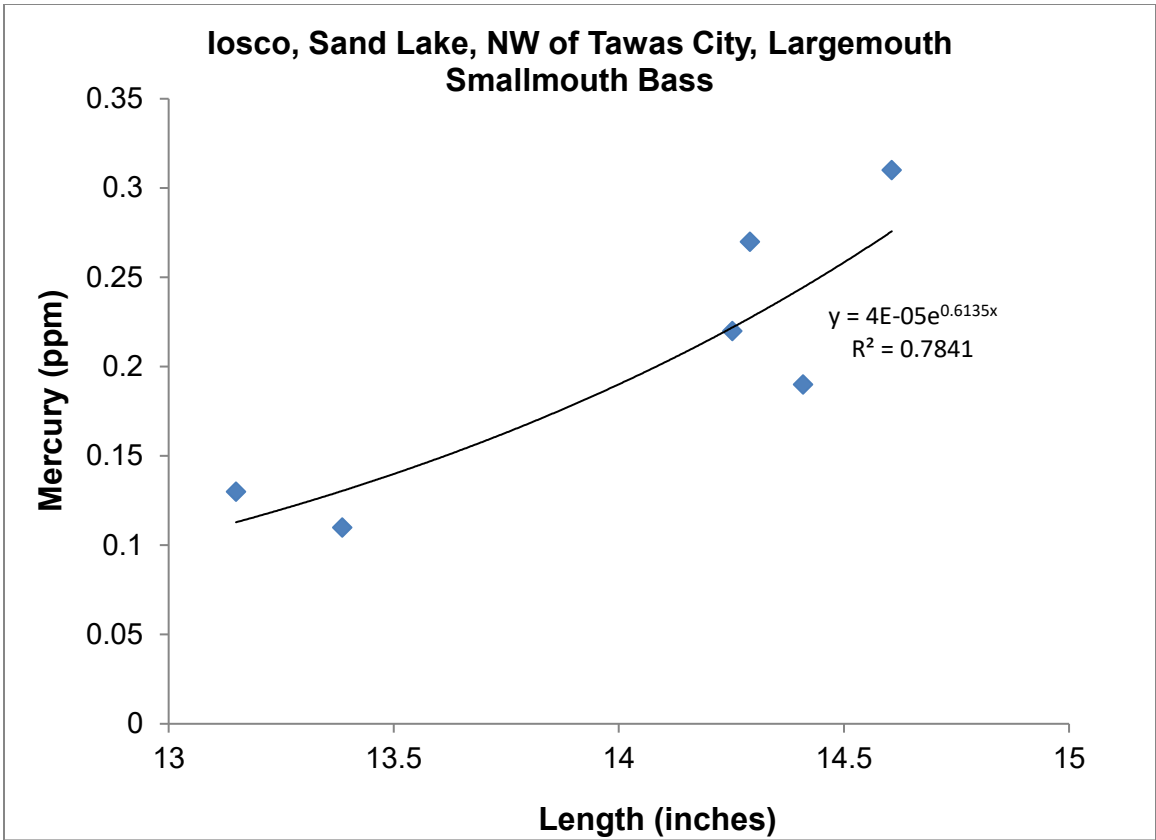
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
2018	2018	6	13.1	14.0	14.3	14.6	
Datasets available: 2018							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
PCB	4	0.001	<0.001	0.002	0.001	16	
DDT	4	ND	--	--	--	16	
Chlordane	4	ND	--	--	--	16	
Toxaphene	4	ND	--	--	--	--	
PFOS	6 [^]	3.5 ppb	1.5 ppb	6.1 ppb	5.3 ppb	16	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.086	0.073					
DDT	--	--					
Chlordane	--	--					
Toxaphene	--	--					
PFOS	0.038	0.038					
Final meal category based on UCL:							2

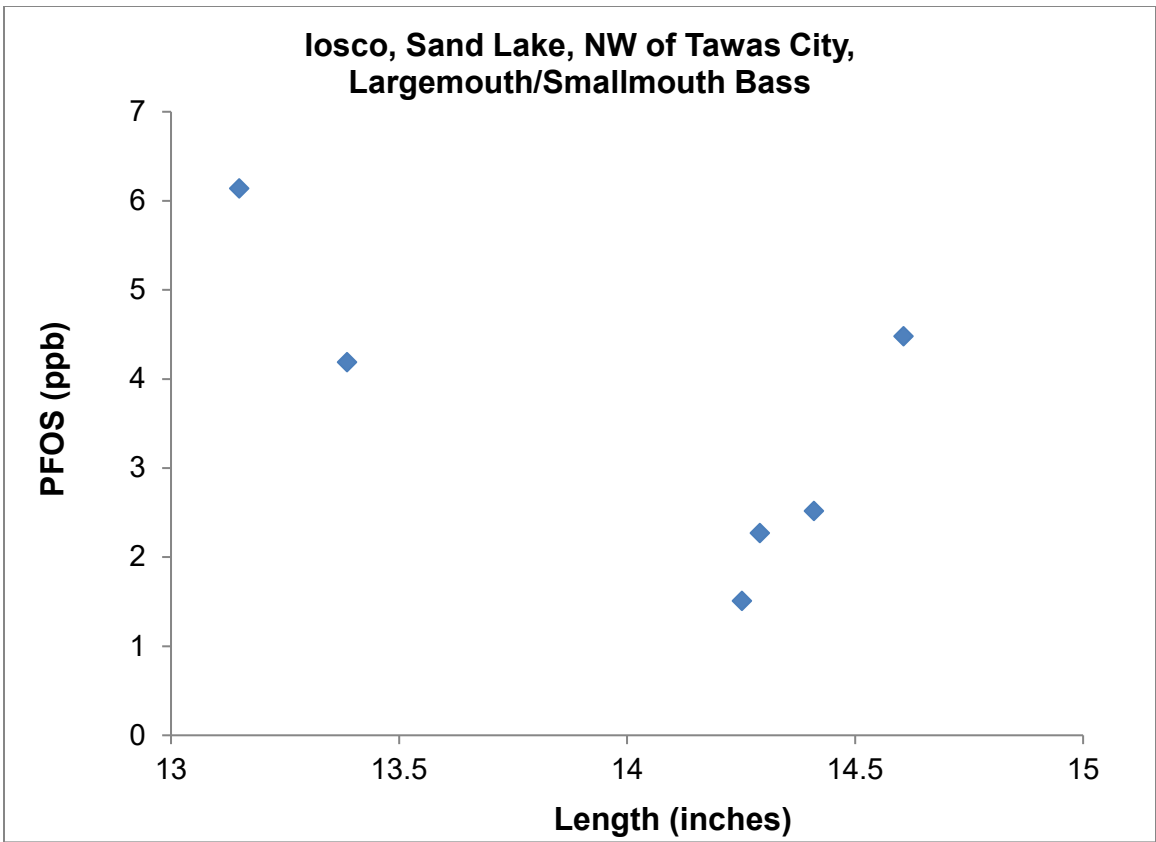
* While there was a significant correlation between fish size and mercury concentration, the sampling size and size range of the fish used in the analysis was limited. Therefore, we recommend using the statewide length break rather than size specific guidance.

[^] Sub-legal sized fish used in the analysis as no correlation between fish size and PFOS has been observed in the statewide dataset.

Existing MDHHS Advisory: Largemouth and smallmouth bass from Sand Lake in Iosco County are currently covered under the statewide mercury guidance. No one should eat more than 2 meals per month of largemouth or smallmouth bass smaller than 18 inches or no more than 1 meal per month of these fish larger than 18 inches.

Recommendation: Minimum of five legal-sized samples was not achieved to complete the analysis. Statewide guidance should continue for this water body until a larger sample size can be collected.





Hg Analysis:

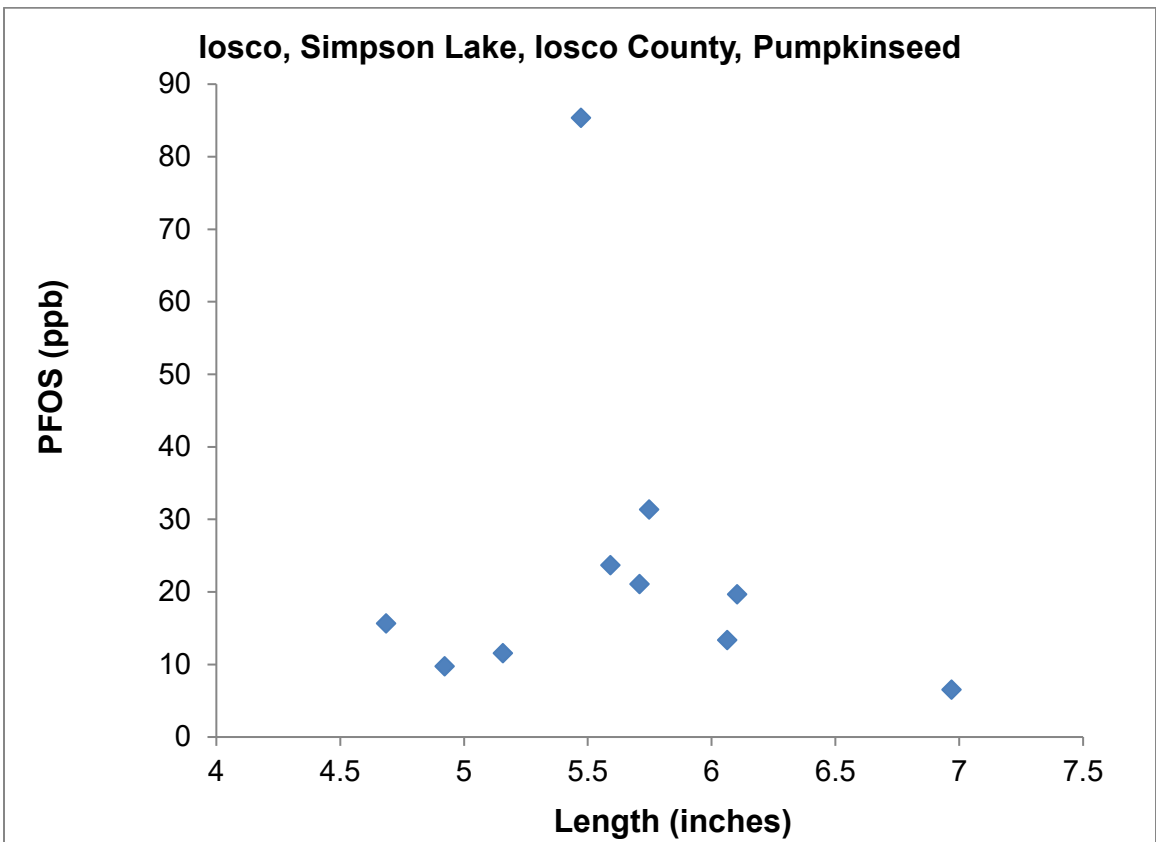
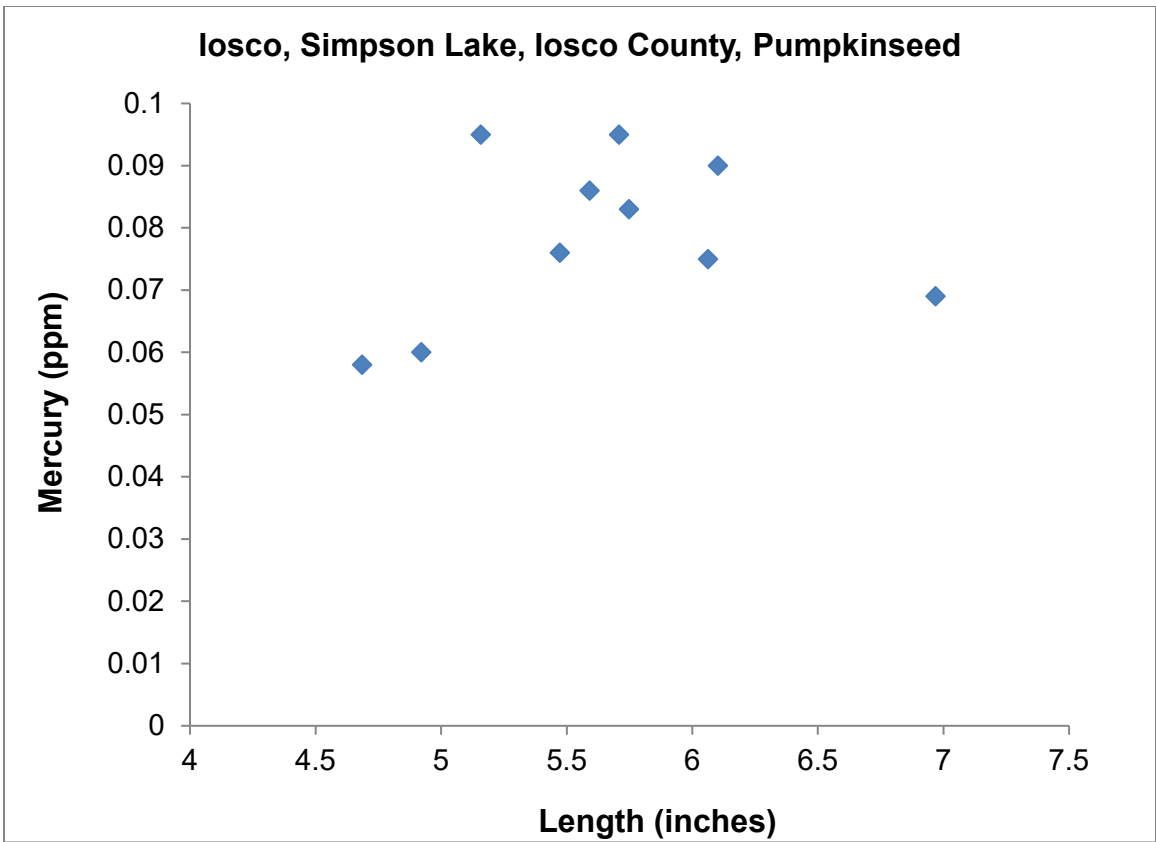
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2021	2021	10	4.7	NA	4.7	7.0
Datasets available: 2021						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.079	0.058	0.095	0.088	12
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.050	0.073				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2021	2021	10	4.7	NA	4.7	7.0
Datasets available: 2021						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
PFOS	10	23.8 ppb	6.6 ppb	85.4 ppb	40.2 ppb	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	0.013	0.041				
Final meal category based on UCL:						2

Existing MDHHS Advisory: Bluegill and sunfish from Simpson Lake in Iosco County are currently covered under the statewide mercury guideline. No one should eat more than 8 meals per month of bluegill or sunfish of any size.

Recommendation: No one should eat more than 2 meals per month of bluegill or sunfish of any size from Simpson Lake in Iosco County due to PFOS. Mercury causes a less restrictive guideline.



Black Crappie

Tawas Lake

Iosco County

Hg Analysis:

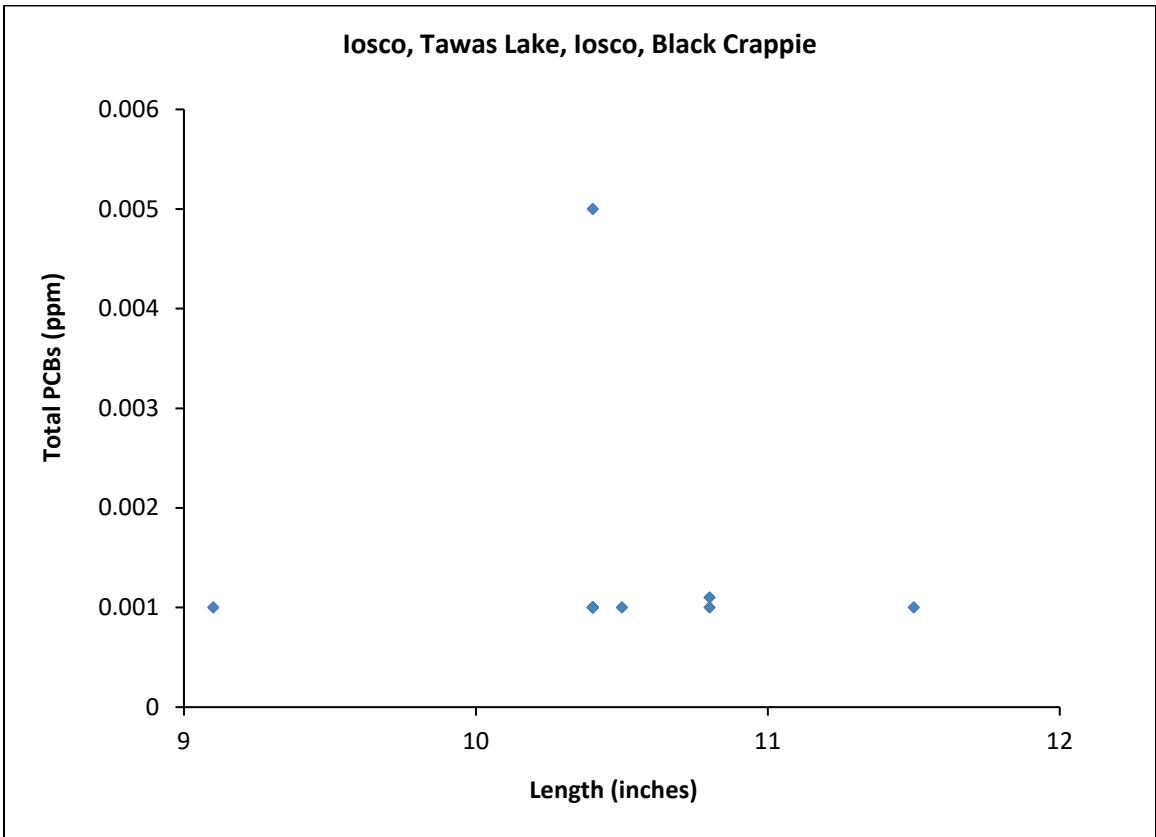
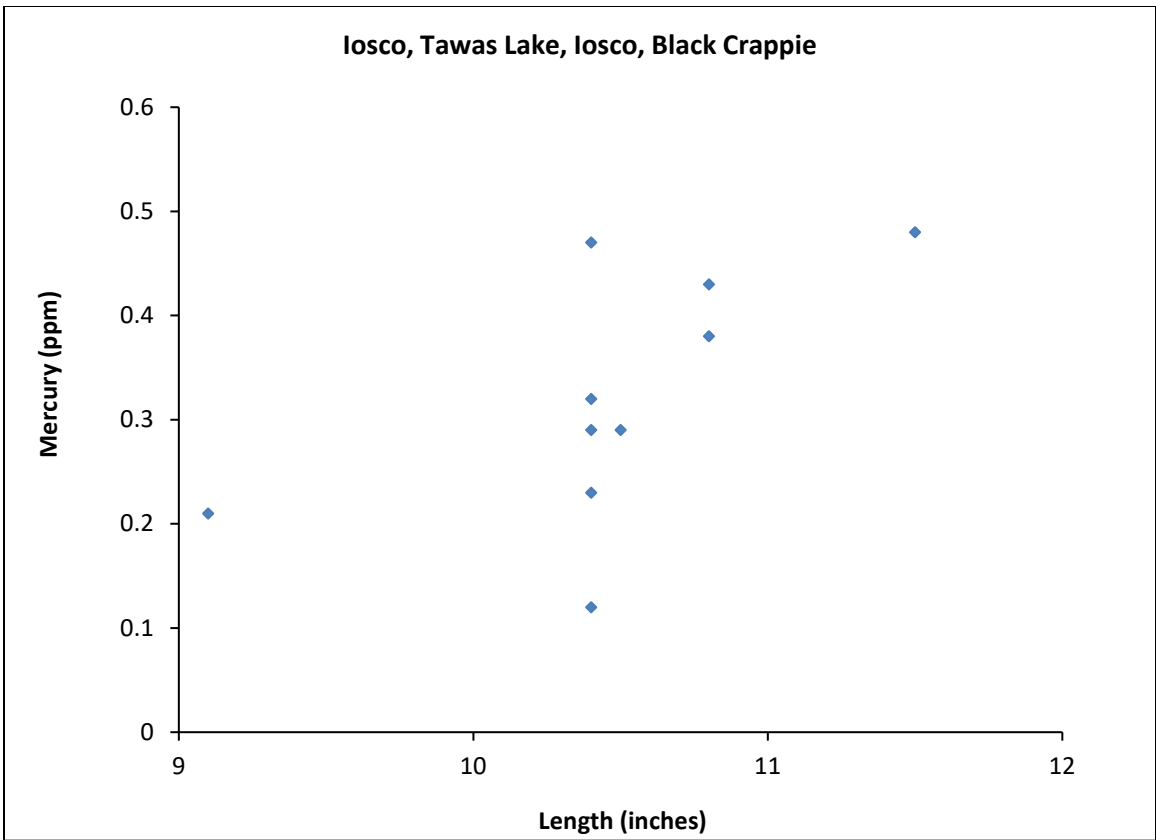
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2006	2006	10	9.1	na	9.1	11.5
Datasets available: 2006						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.32	0.12	0.48	0.41	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.366	0.282				

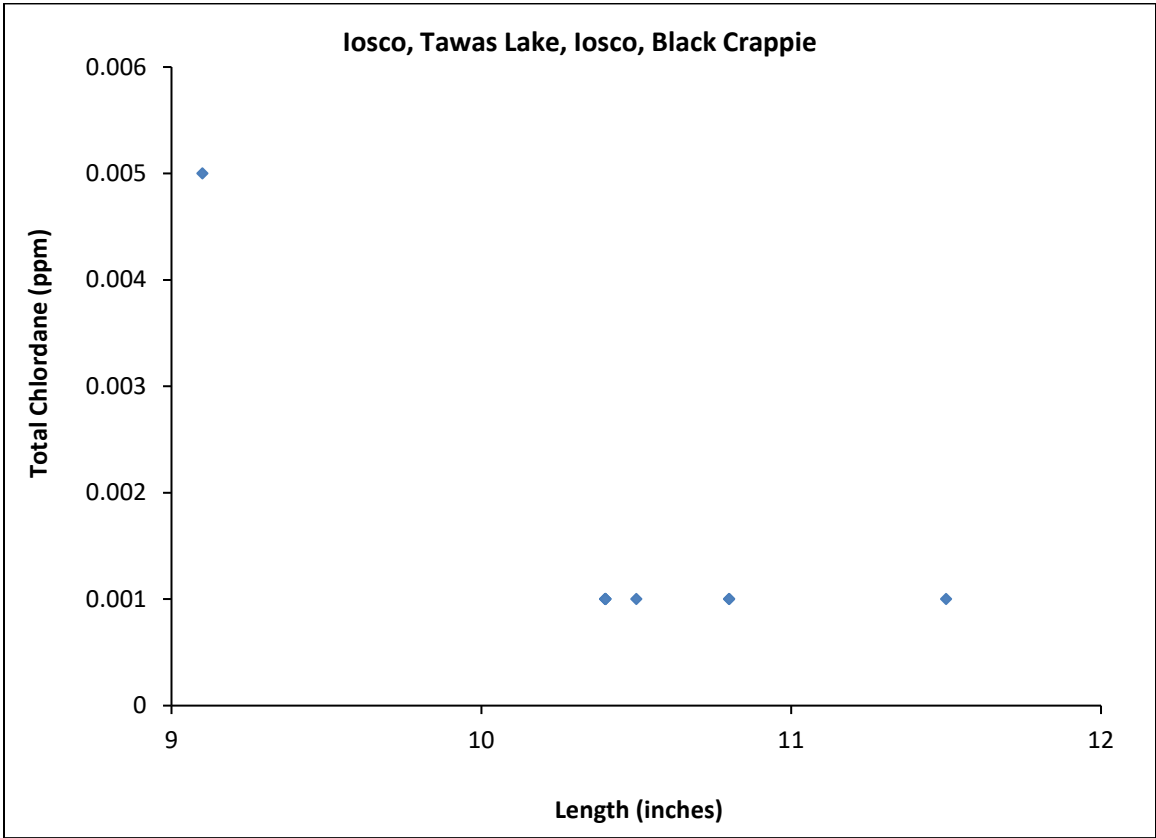
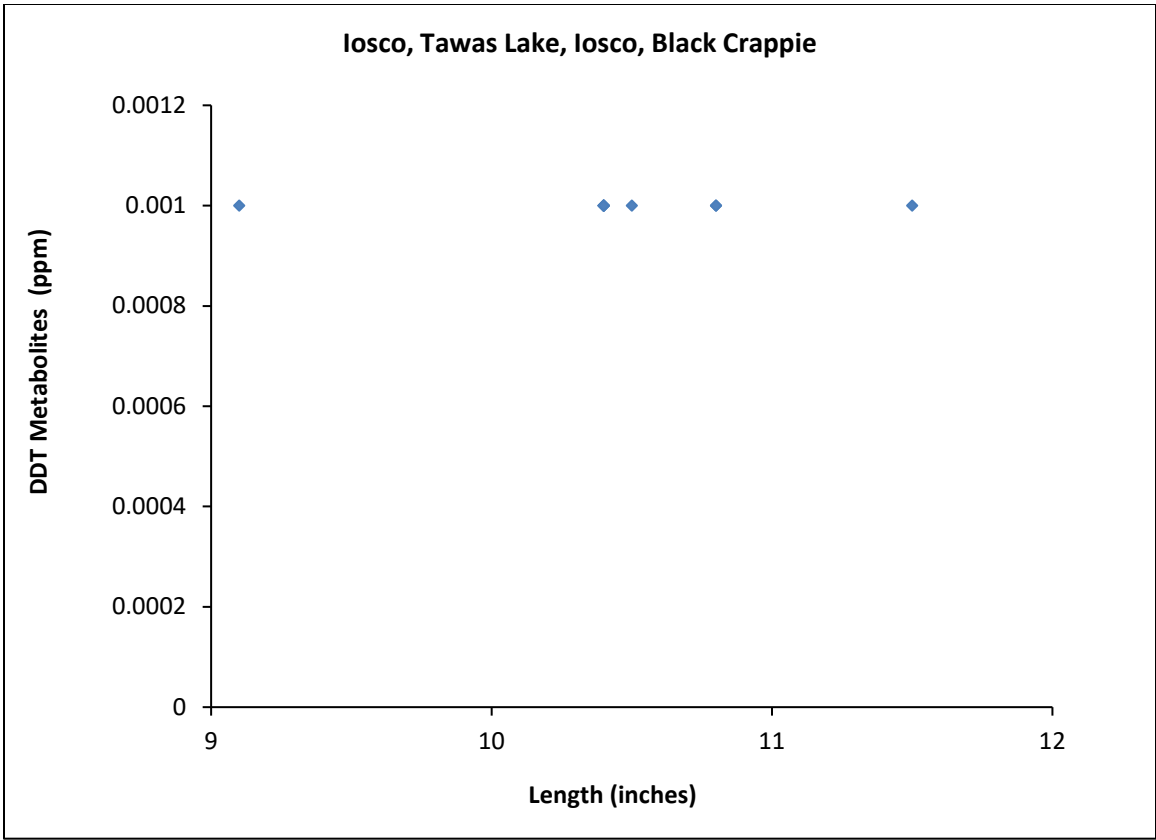
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2006	2006	10	9.1	na	9.1	11.5
Datasets available: 2006						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.001	0.001	0.005	0.002	16
DDT	10	0.001	0.001	0.001	0.002	16
Chlordane	10	0.001	0.001	0.005	0.002	16
Toxaphene	10	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.001	0.001				
DDT	0.000	--				
Chlordane	0.656	0.656				
Toxaphene	--	--				
Final meal category based on UCL:						2

Existing Advisory: Tawas Lake black crappie are covered under the statewide mercury consumption advisory.

Recommendation: No one should eat more than 2 meals per month of Tawas Lake crappie due to mercury.





Northern Pike

Tawas River

Iosco County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1988	1988	10	20.7	24	24.2	25.6
Datasets available: 1988						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	4	0.19	0.14	0.23	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.058	0.067				

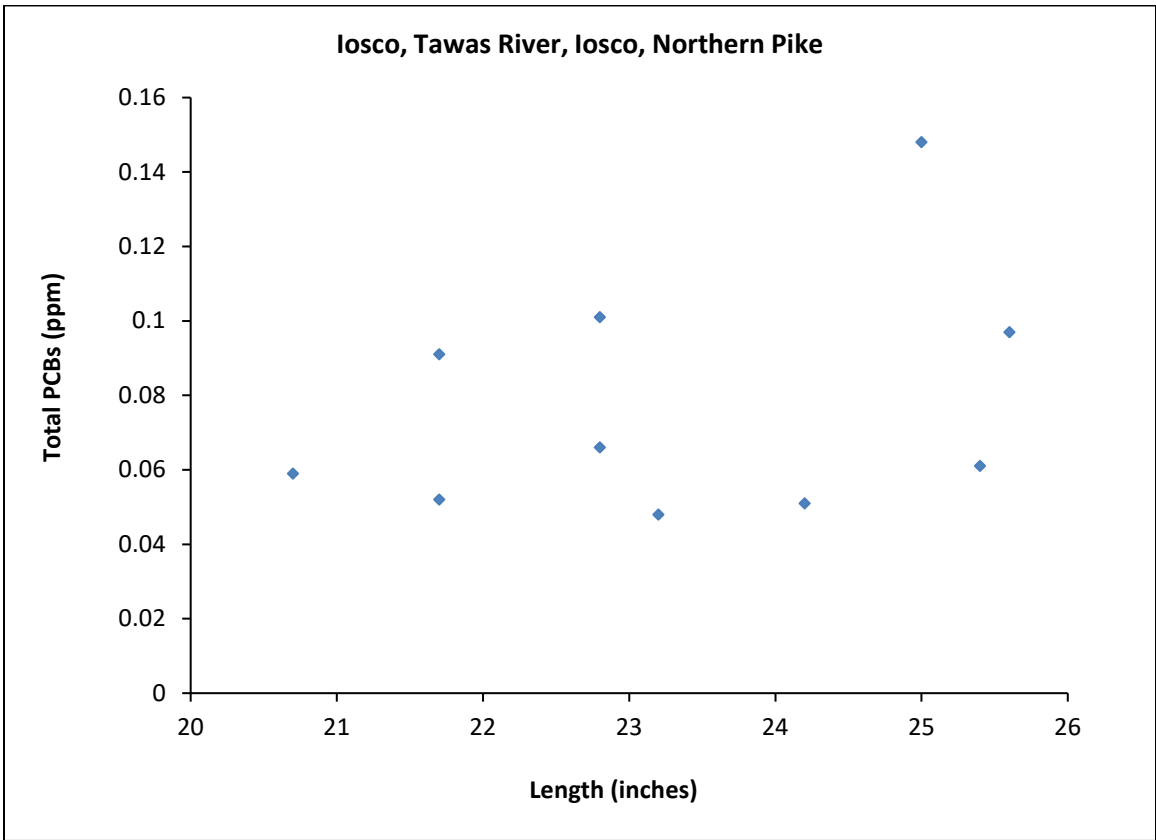
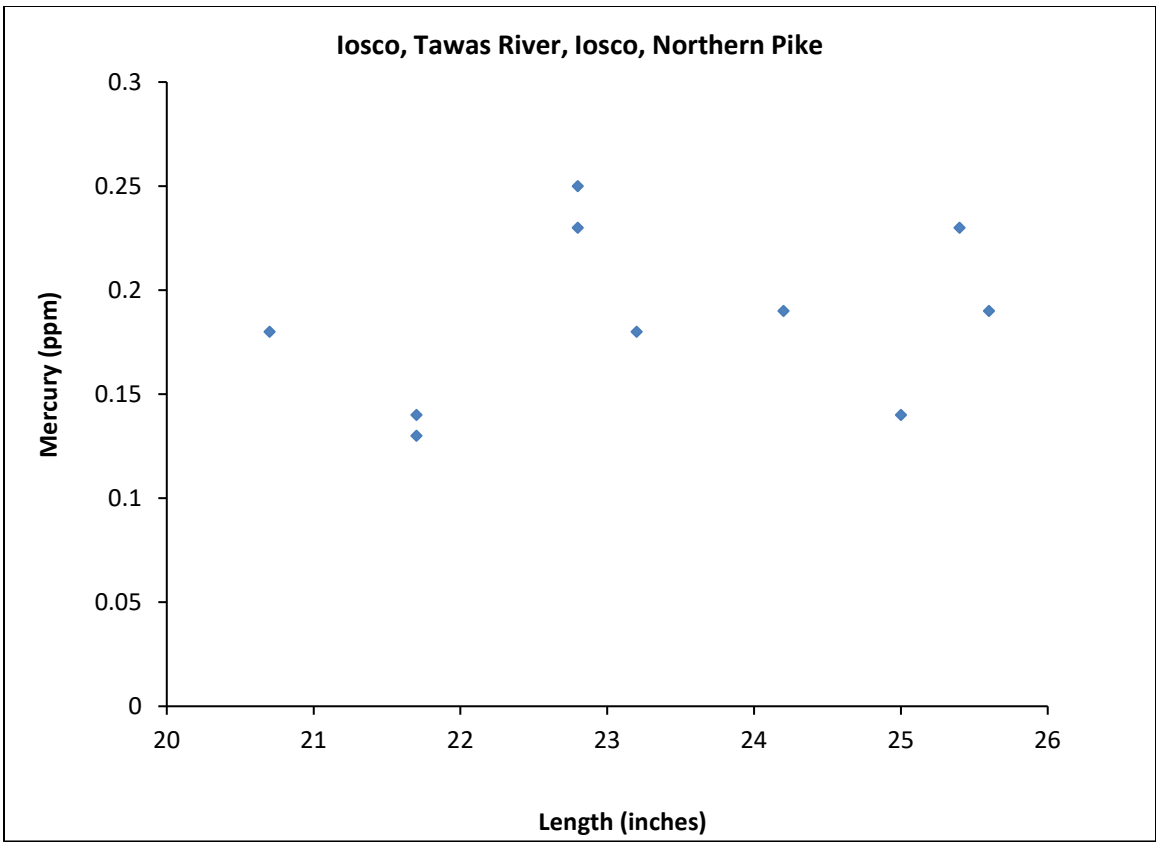
Organics Analysis:

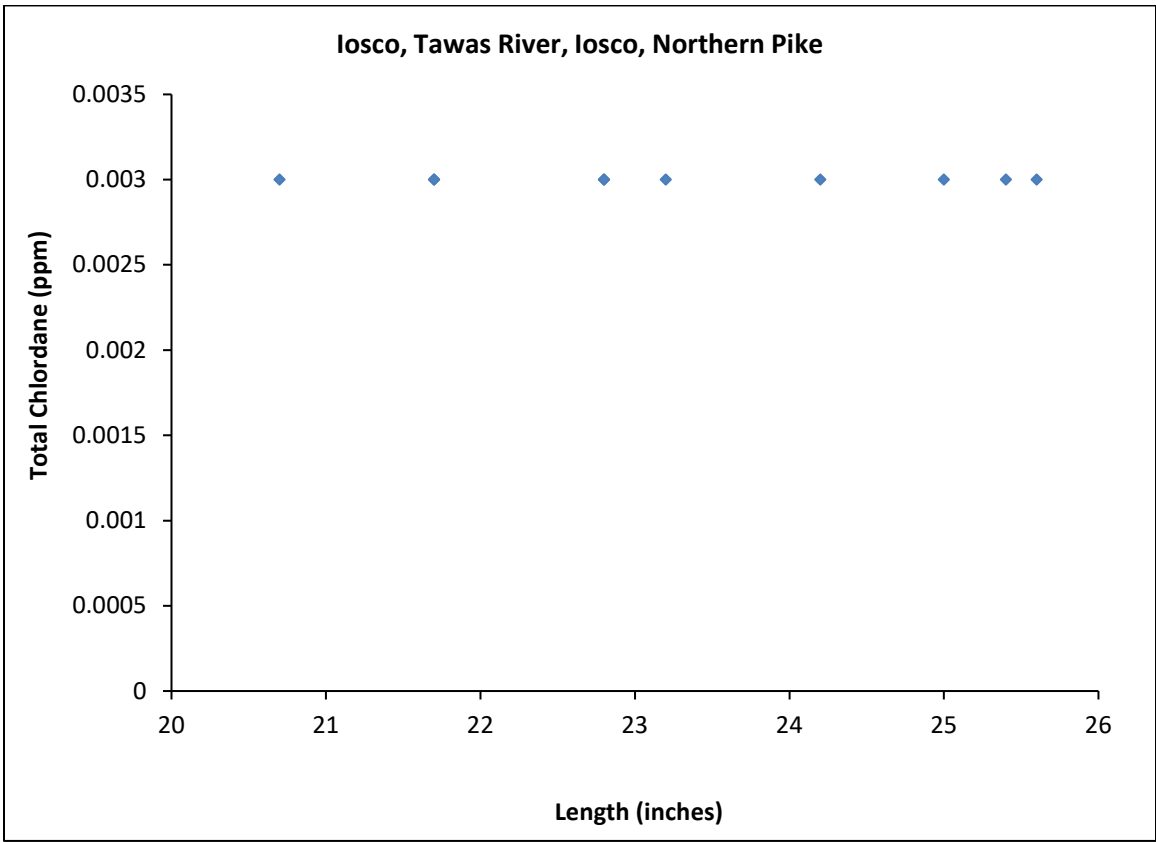
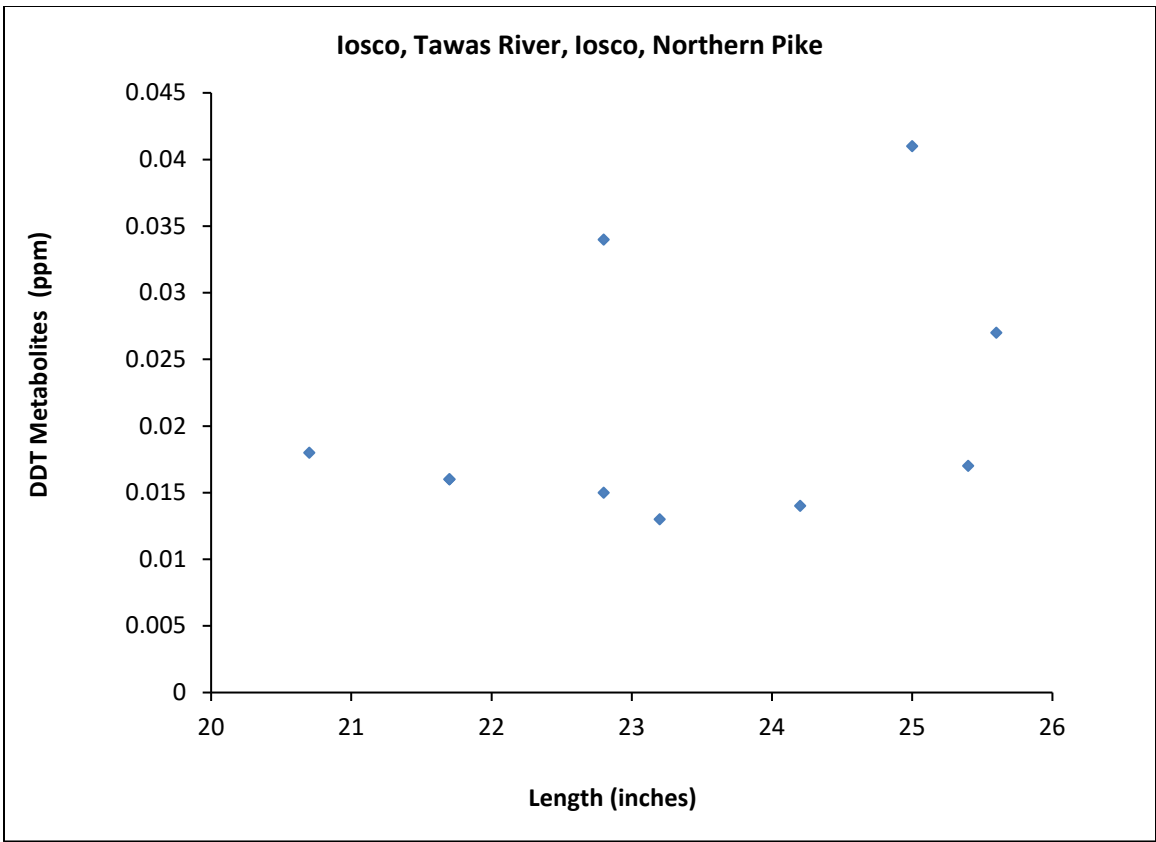
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1988	1988	10	20.7	24	24.2	25.6
Datasets available: 1988						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	4	0.09	0.05	0.19	--	--
DDT	4	0.02	0.01	0.04	--	--
Chlordane	4	0.003	0.003	0.003	--	--
Toxaphene	4	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.124	0.105				
DDT	0.137	0.128				
Chlordane	0.000	0.000				
Toxaphene	--	--				
Final meal category based on UCL:						--

Existing Advisory: Women and children should not eat more than one meal per week of Tawas River northern pike due to PCBs.

Recommendation: The quality of this dataset is limited due to the age of the data, and a dataset of less than five data points for a given chemical, species and waterbody is considered insufficient for evaluation using the standard evaluation method. Statewide guidelines apply: No one should eat more than 2 meals per month of northern pike smaller than 30 inches or more than 1 meal per month of northern pike larger than 30 inches.

Note: 95% UCL for PCBs using all samples regardless of length is 0.10 ppm.





White Sucker

Tawas River

Iosco County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1988	1988	5	16.1	na	16.1	18.9
Datasets available: 1988						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	5	0.22	0.11	0.45	0.39	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.730	0.617				

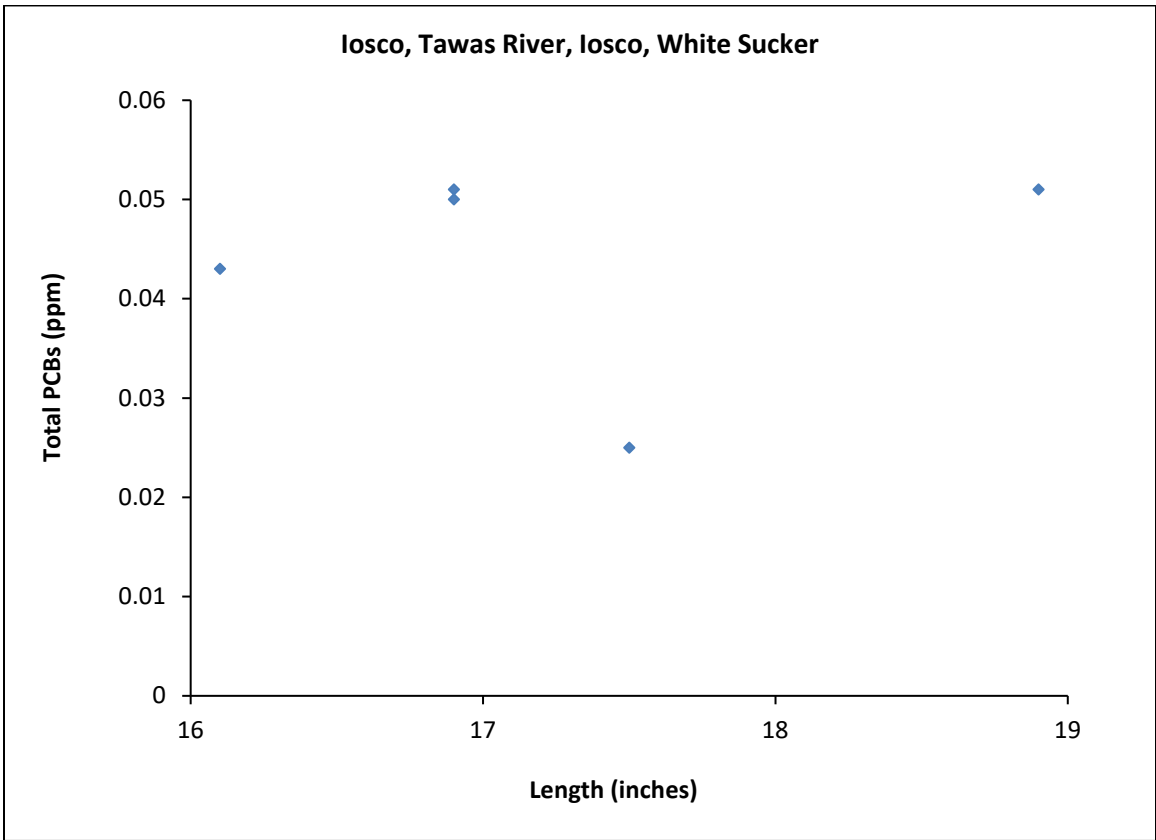
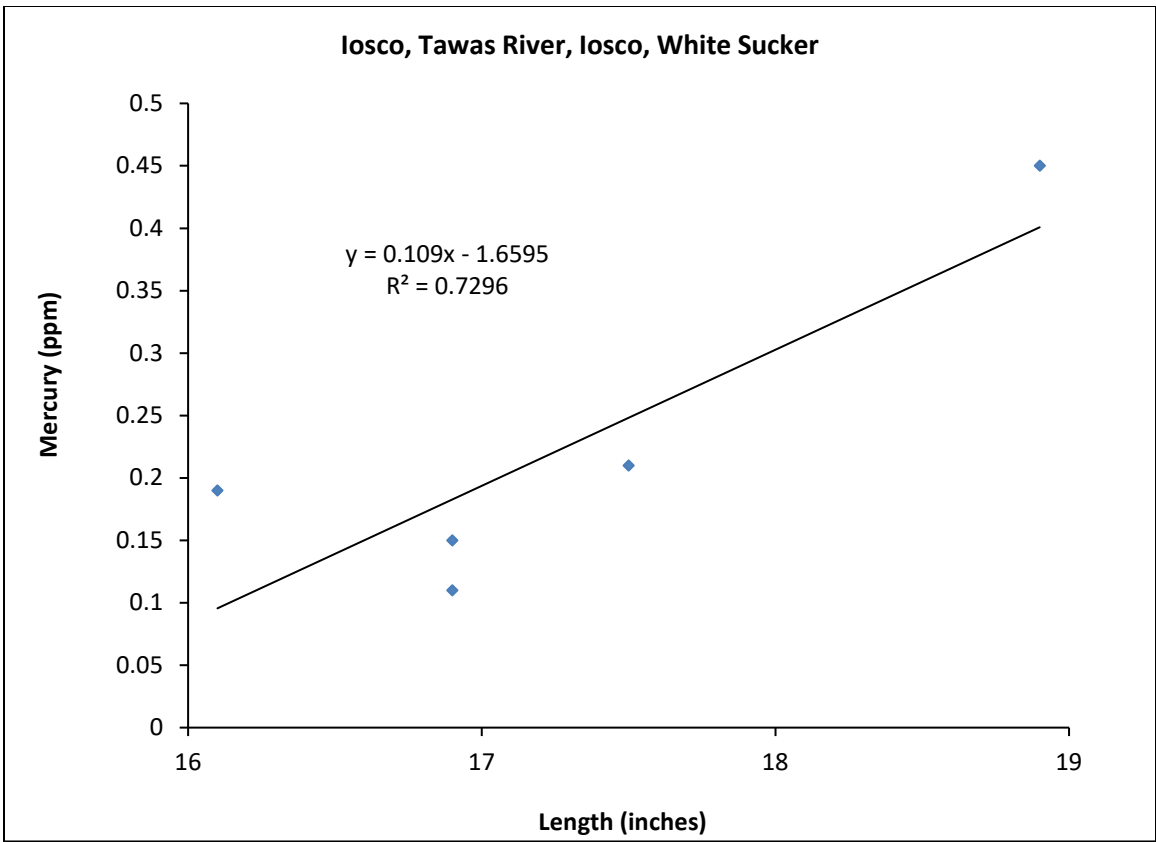
Organics Analysis:

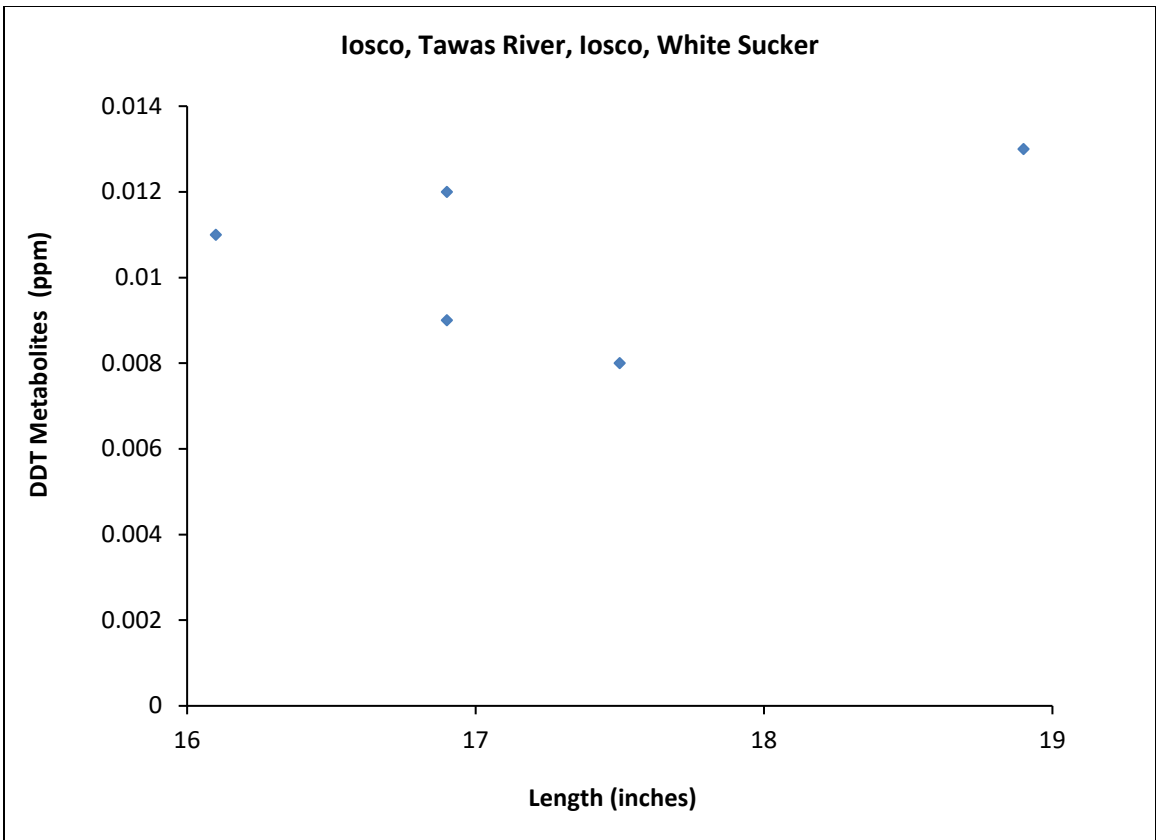
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1988	1988	5	16.1	na	16.1	18.9
Datasets available: 1988						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	5	0.04	0.02	0.05	0.06	2*
DDT	5	0.01	0.008	0.01	0.01	16
Chlordane	5	ND	--	--	--	--
Toxaphene	5	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.005	0.001				
DDT	0.114	0.080				
Chlordane						
Toxaphene						
Final meal category based on UCL:						2

Existing Advisory: There are no current consumption advisories for Tawas River white sucker.

Recommendation: No one should eat more than 2 meals per month of Tawas River sucker due to mercury. *Based on the EGLE Fish Contaminant Monitoring Program, PCB concentrations ≥15 years old are expected to have declined to a concentration that allows a less restrictive meal category. The regression was not used as it was driven by one fish and the size range was limited. PCBs would cause an advisory.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
16	0.085	12
17	0.194	4
18	0.303	2
19	0.412	2
20	0.521	2
21	0.630	1
22	0.739	1
<i>Shaded area denotes extrapolated estimates</i>		





Black Crappie

Van Etten Lake

Iosco County

Hg Analysis:

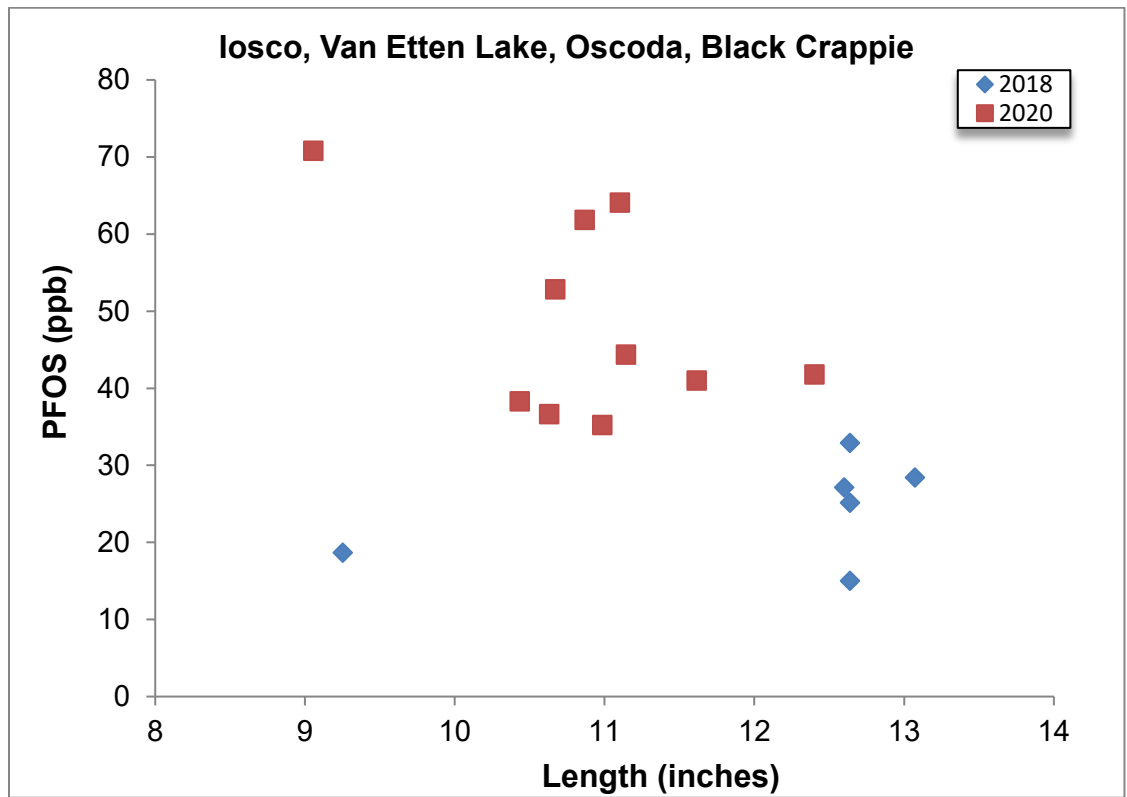
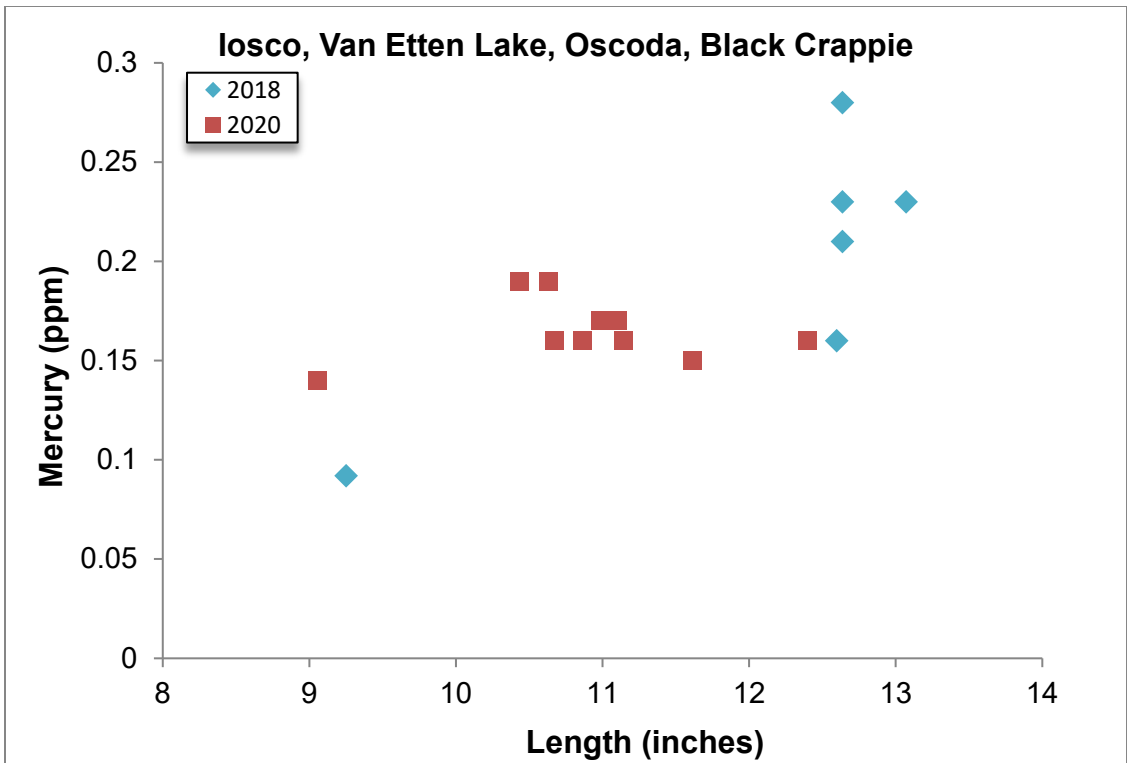
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2018	2020	16	9.1	NA	9.1	13.1
Datasets available: 2018, 2020						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	16	0.178	0.092	0.280	0.201	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.482	0.505				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2018	2020	16	9.1	NA	9.1	13.1
Datasets available: 2018, 2020						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
PFOS	16	39.7 ppb	15.0 ppb	70.8 ppb	48.2 ppb	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	0.225	0.165				
Final meal category based on UCL:						2

Existing MDHHS Advisory: No one should eat more than 4 meals per month of black or white crappie from Van Etten Lake due to PFOS. Mercury causes a less restrictive advisory.

Recommendation: No one should eat more than 2 meals per month of black or white crappie from Van Etten Lake due to PFOS. Mercury causes a less restrictive advisory.



Hg Analysis:

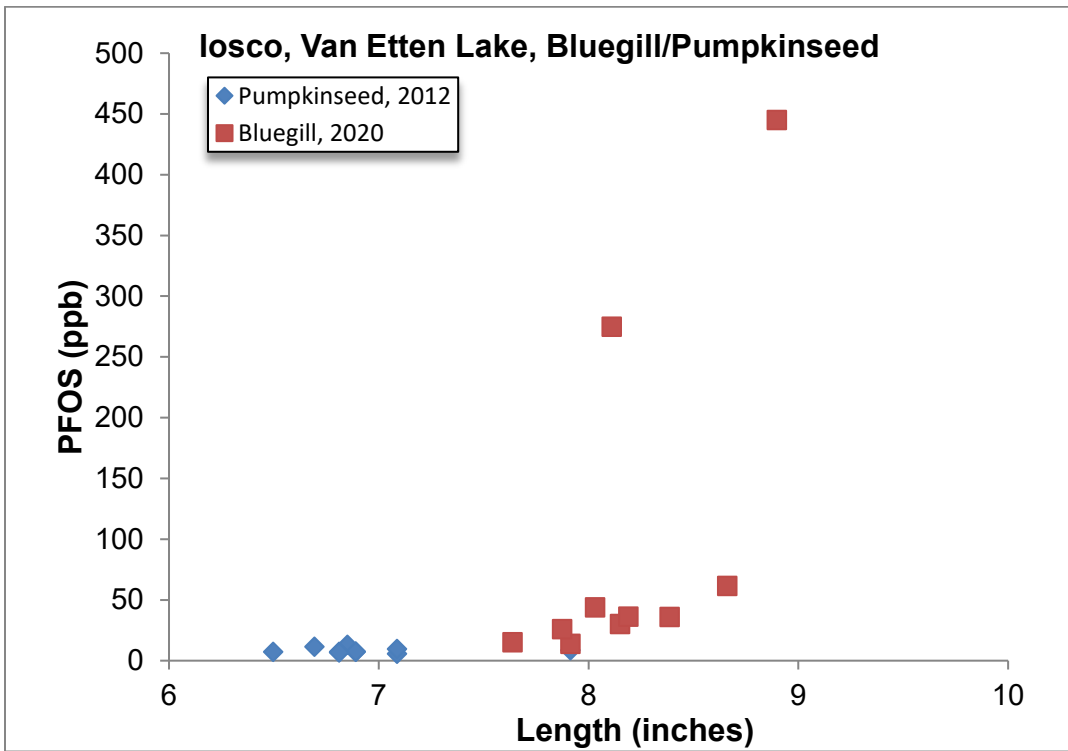
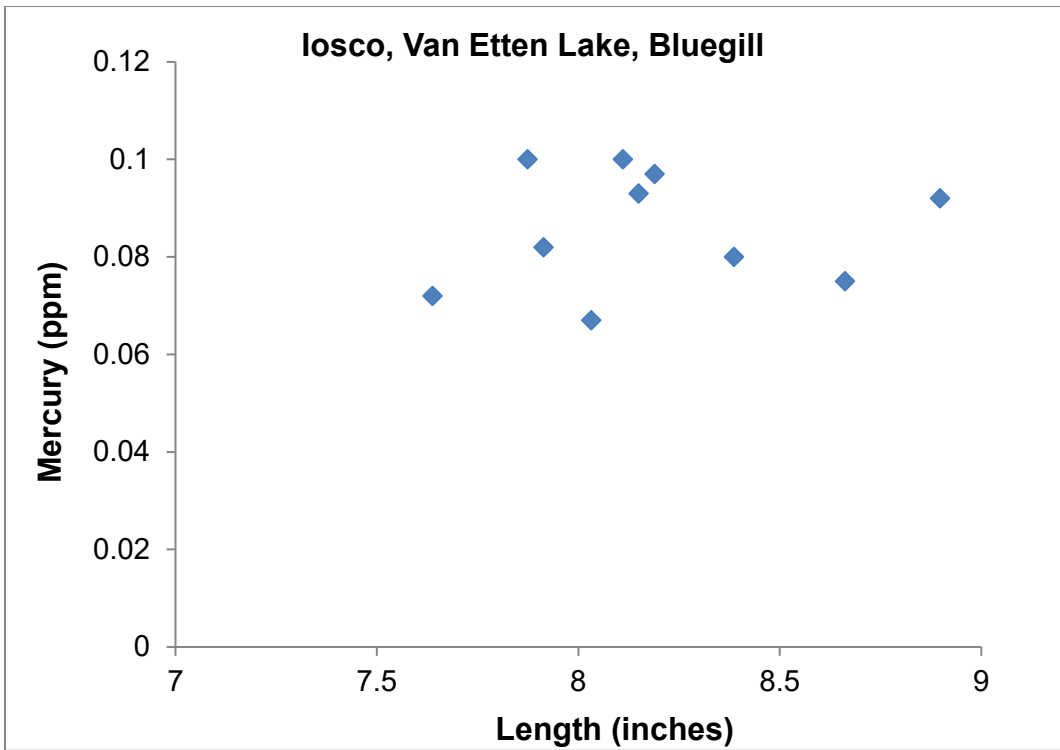
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2020	2020	10	7.6	NA	7.6	8.9
Datasets available: 2020						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.086	0.067	0.100	0.094	8
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.009	0.013				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2012	2020	20	6.5	NA	6.5	8.9
Datasets available: 2012, 2020						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
PFOS	20	53.3 ppb	5.6 ppb	444.9 ppb	104.6 ppb	1
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	0.318	0.537				
Final meal category based on UCL:						1

Existing MDHHS Advisory: Mercury was not assessed in the 2012 fish; therefore, the statewide consumption guidelines recommend that no one eat more than 8 meals per month of sunfish from inland waters due to mercury. PFOS caused a less restrictive advisory in the 2012 fish.

Recommendation: No one should eat more than one meal per month of bluegill or sunfish from Van Etten Lake due to PFOS. Mercury causes less restrictive advice.



Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1990	1990	3	22	na	22	24.8
Datasets available: 1990						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	3	0.16	0.14	0.20	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	--	--				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1990	1990	3	22	na	22	24.8
Datasets available: 1990						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	3	0.284	0.23	0.31	--	--
DDT	3	0.144	0.12	0.16	--	--
Chlordane	3	0.033	0.02	0.05	--	--
Toxaphene	3	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.005	0.001				
DDT	0.114	0.080				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						--

Existing Advisory: Women and children should not eat more than one meal per month of Van Etten Lake carp due to PCBs.

Recommendation: A dataset of less than five data points for a given chemical, species and waterbody is considered insufficient for evaluation using the standard evaluation method. The statewide advice due to PCBs applies to Van Etten Lake carp. No one should eat more than 2 meals per month of carp.

Hg Analysis:

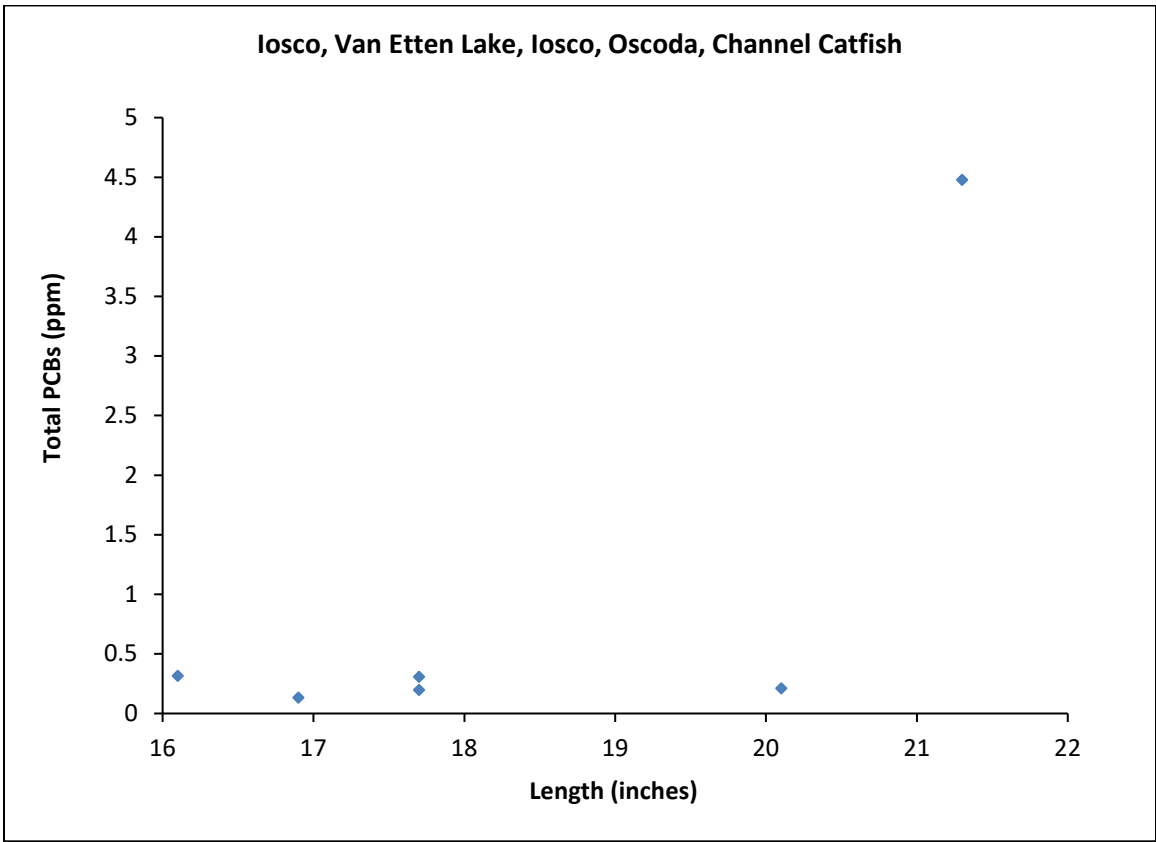
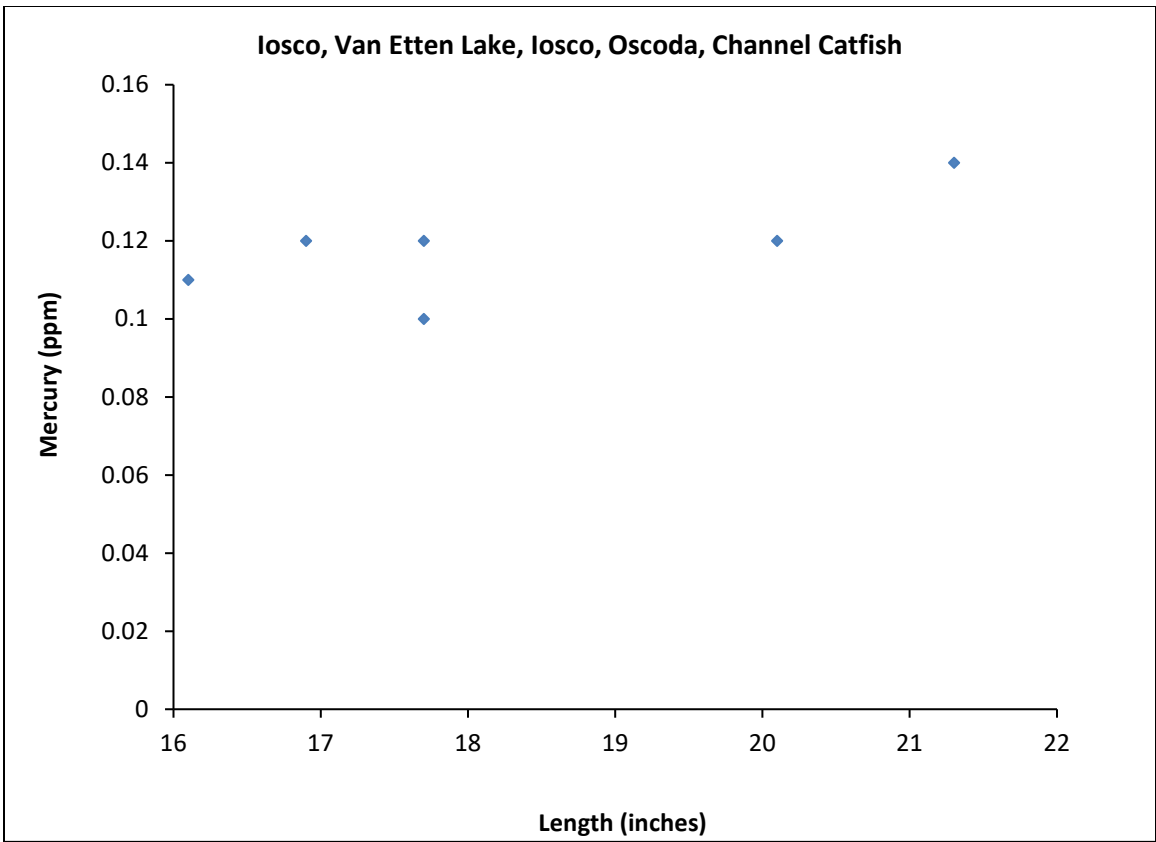
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1990	1990	6	16.1	12	16.1	21.3
Datasets available: 1990						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	6	0.12	0.10	0.14	0.13	8
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.506	0.473				

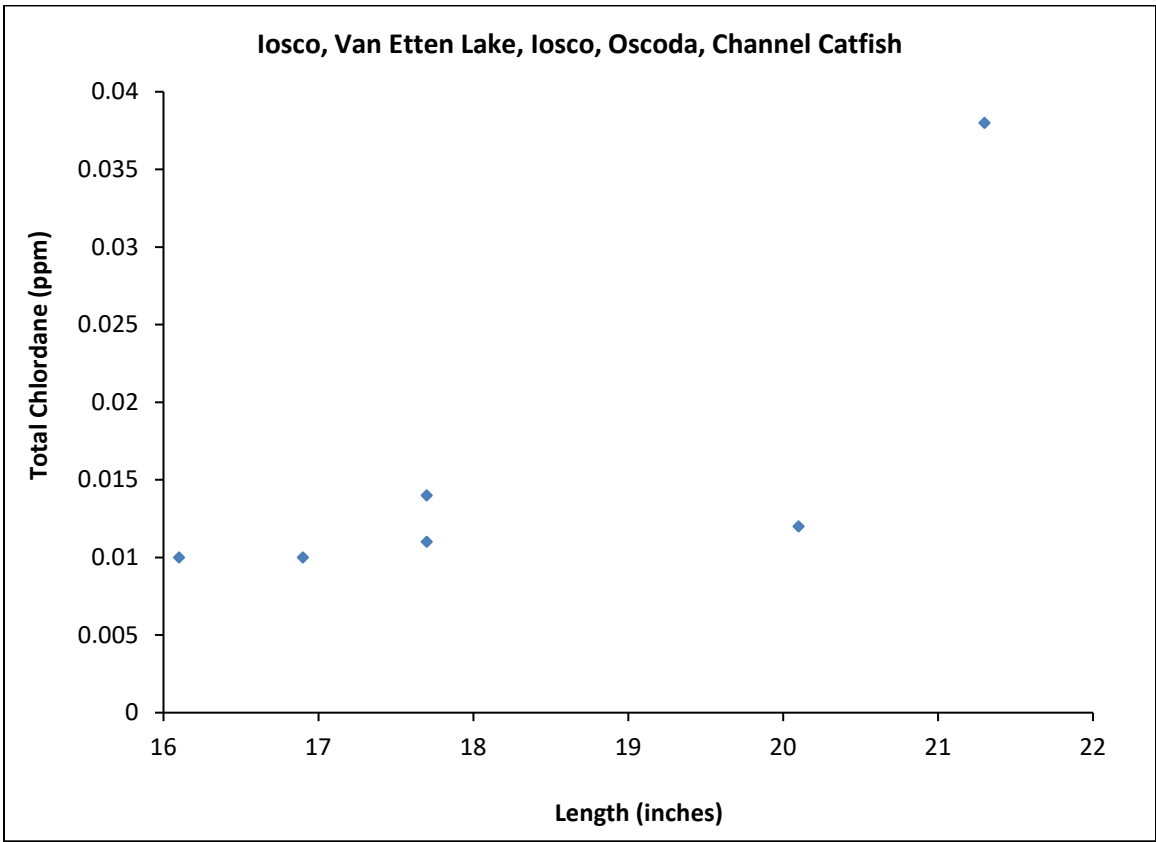
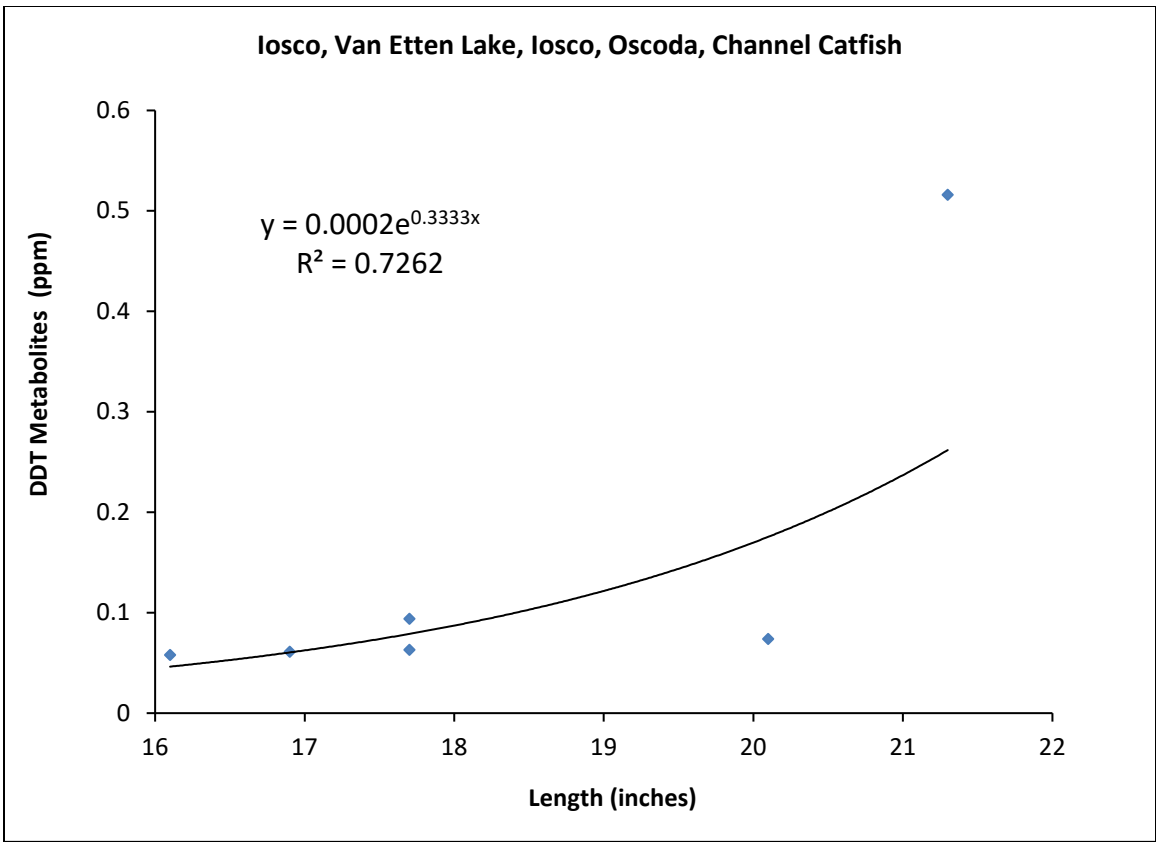
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1990	1990	6	16.1	12	16.1	21.3
Datasets available: 1990						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	6	0.23	0.13	4.48	2.05	Limited
DDT	6	0.07	0.06	0.52	0.09	4
Chlordane	6	0.01	0.01	0.04	0.01	--
Toxaphene	6	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.537	0.481				
DDT	0.573	0.621				
Chlordane	0.603	0.644				
Toxaphene	--	--				
Final meal category based on UCL:						Limited

Existing Advisory: Women and children should not eat more than one meal per month of Van Etten Lake channel catfish less than 14 inches or more than six meals per year of those fish larger than 14 inches due to PCBs.

Recommendation: Sensitive populations should not eat these fish. Healthy adults should limit consumption of Van Etten Lake channel catfish to no more than 1 or 2 meals per year due to PCBs. The quality of this dataset is limited due to the age of the data. Based on the EGLE Fish Contaminant Monitoring Program, PCB concentrations ≥ 15 years old are expected to have declined to a concentration that allows a less restrictive meal category than determined by the standard evaluation method. After allowing for a decline in PCB concentrations of 50%, the 95% UCL would still be in the "Limited" range.





Northern Pike

Van Etten Lake

Iosco County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2018	2018	10	21.7	24	24.2	36.2
Datasets available: 2018						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	8	0.57	0.29	0.92	0.72	1
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.655*	0.508*	* - regression driven by one point			

Organics Analysis:

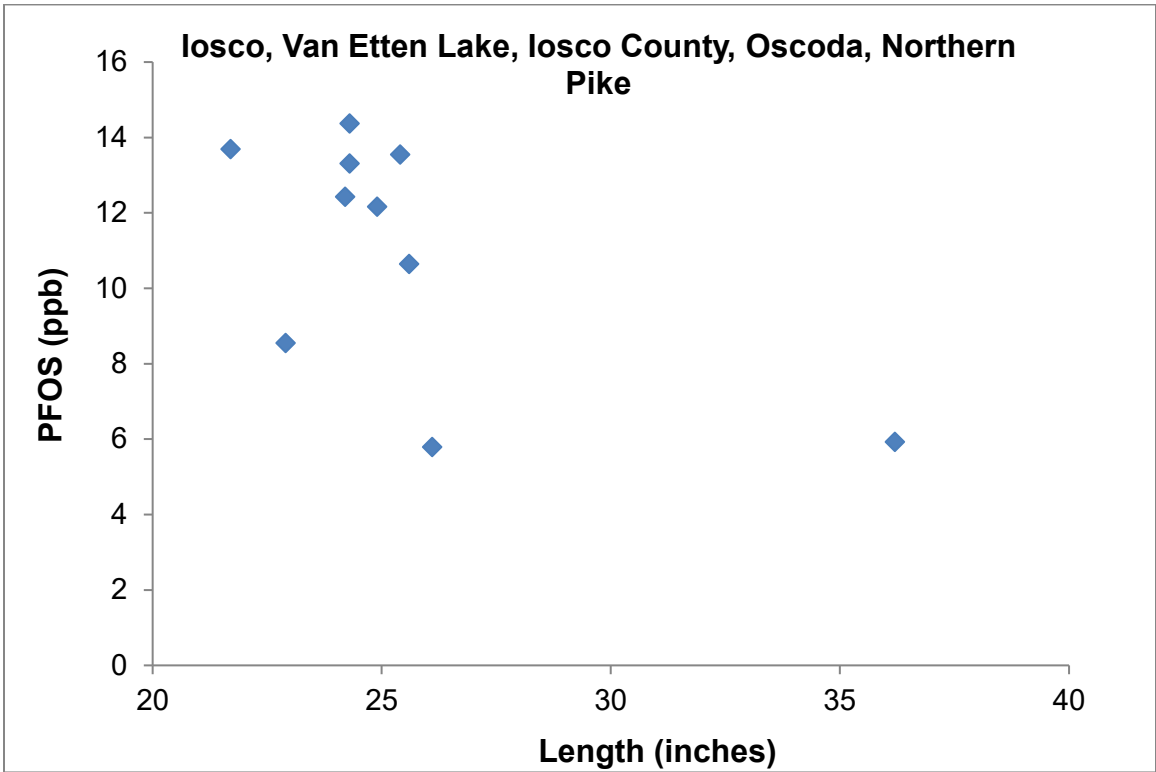
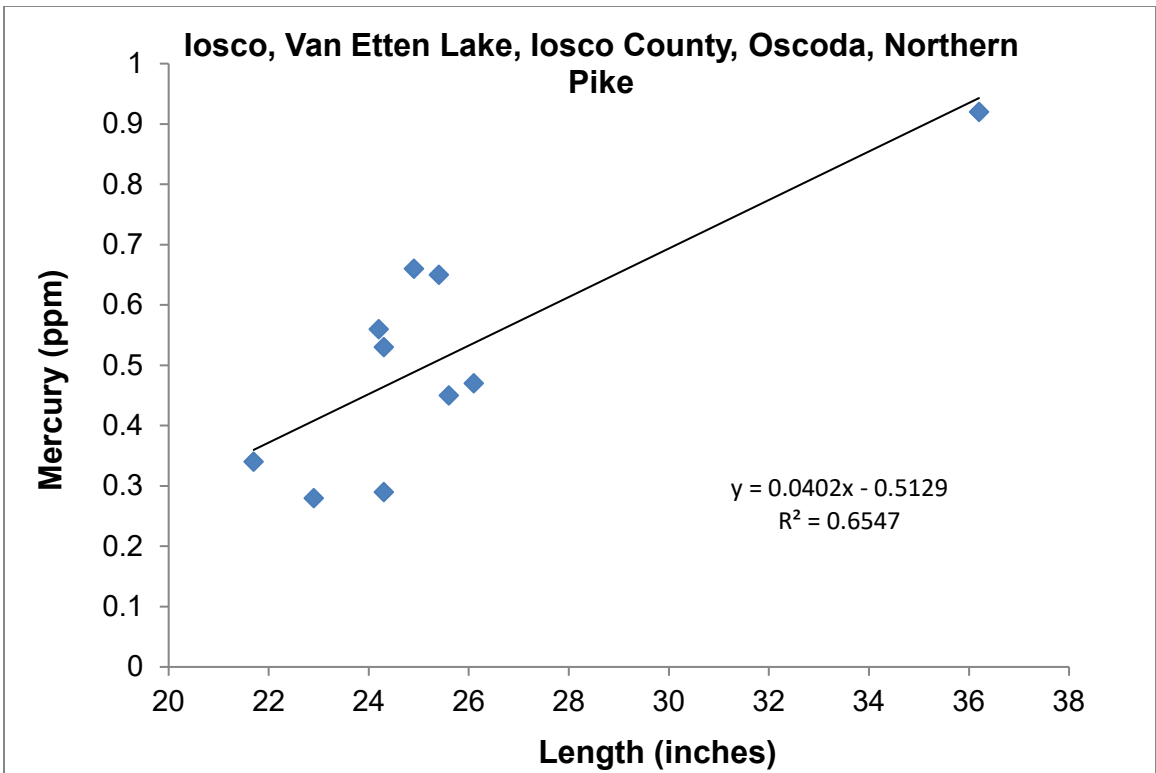
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2018	2018	10	21.7	24	24.2	36.2
Datasets available: 2018						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
PFOS	8	11 ppb	6 ppb	14 ppb	14 ppb	8
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	0.385	0.421	Final meal category based on UCL:			1

Existing MDHHS Advisory: Van Etten Lake northern pike are covered by the statewide advisory. No one should eat more than 2 meals per month of northern pike smaller than 30 inches or more than 1 meal per month of those fish larger than 30 inches due to mercury.

Recommendation: No one should eat more than 1 meal per month of Van Etten Lake northern pike due to mercury. PFOS would cause an advisory.

Note: The 95% UCL for Hg in the seven legal size fish smaller than 27 inches is 0.63 ppm (1 meal/month category).

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
22	0.37	2
24	0.45	2
26	0.53	2
28	0.61	1
30	0.69	1
32	0.77	1
34	0.85	1
36	0.93	1
38	1.01	1
<i>Shaded area denotes extrapolated estimates</i>		



Rock Bass

Van Etten Lake

Iosco County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2018	2018	10	5.1	na	5.1	11.3
Datasets available: 2018						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.18	0.07	0.32	0.24	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.944	0.958				

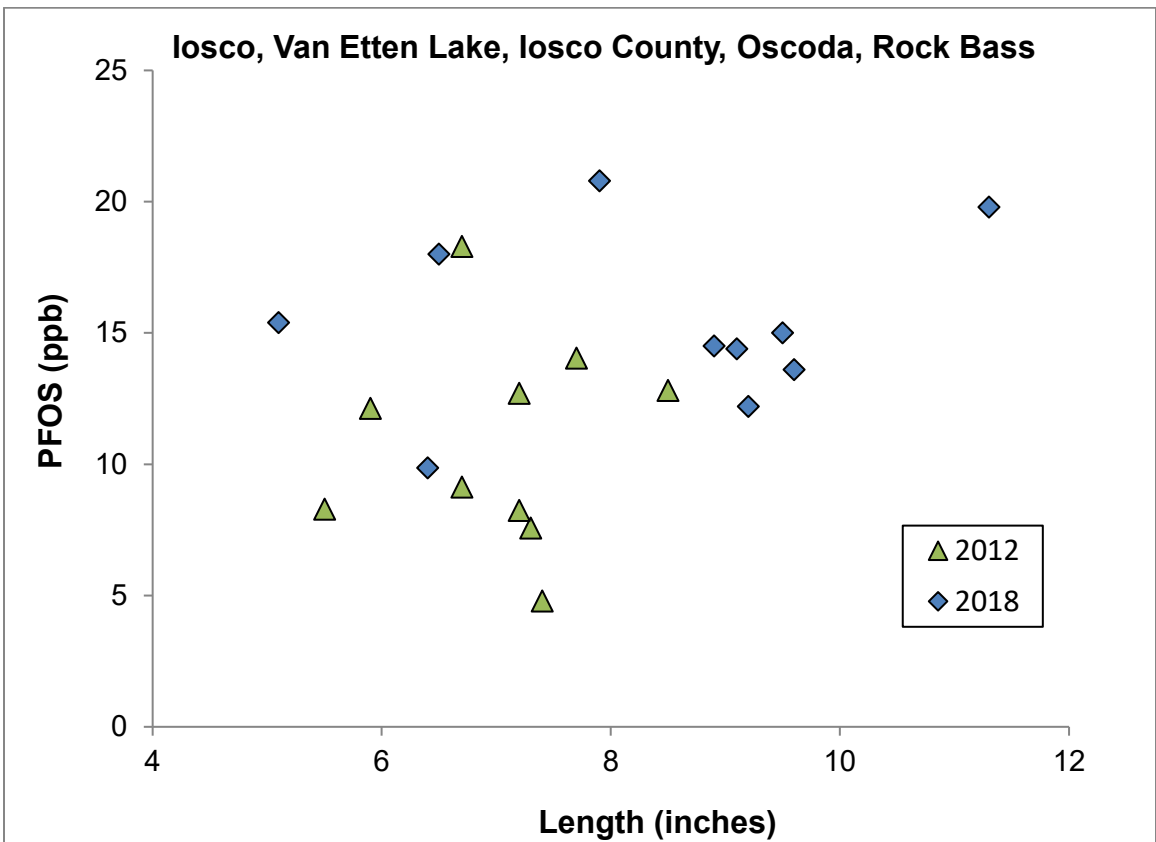
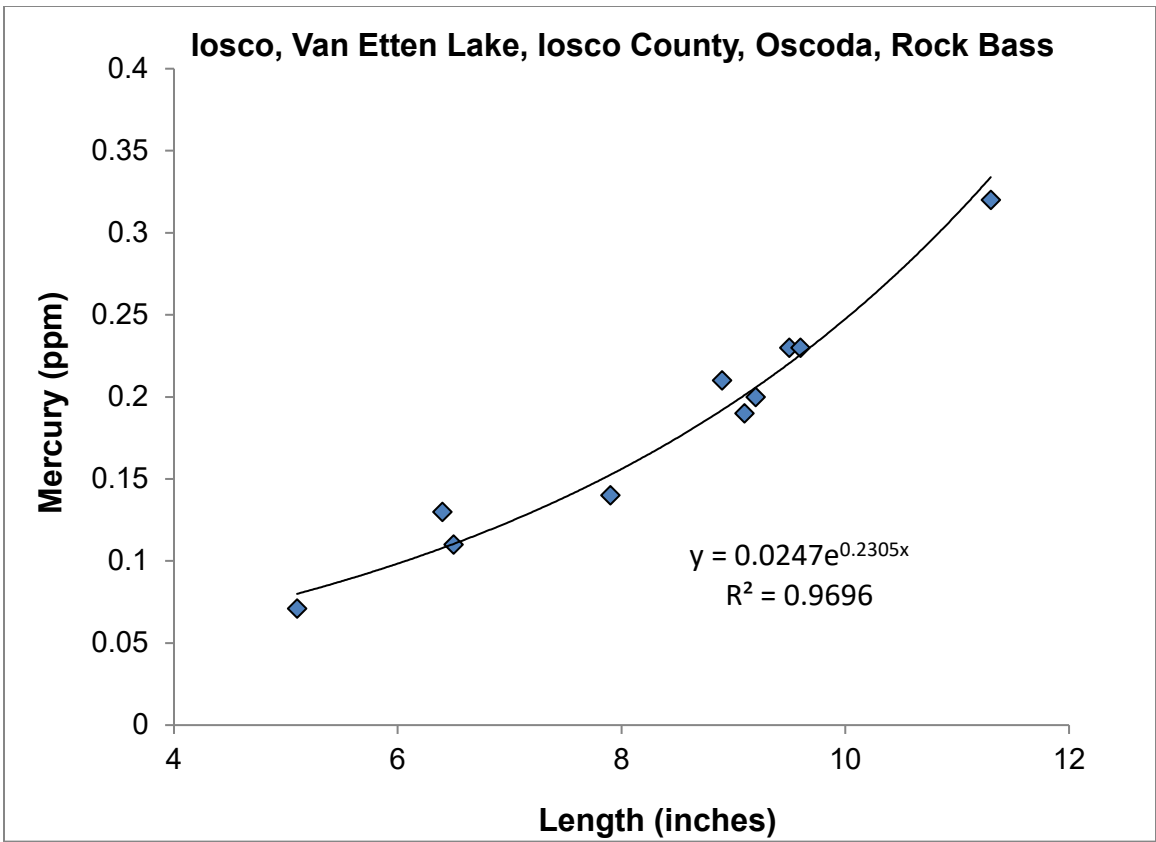
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2012	2018	20	5.1	na	5.1	11.3
Datasets available: 2018						
Chemical	Sample Size (Legal)	Mean (ppb)	Min. Conc. (ppb)	Max Conc. (ppb)	95%UCL (ppb)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
PFOS	20	13.1	5	21	15	8
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	0.113	0.103				
Final meal category based on UCL:						4

Existing MDHHS Advisory: Van Etten Lake rock bass are covered by the statewide advisory due to mercury: no one should eat more than 4 meals per month of rock bass of any size.

Recommendation: No one should eat more than 8 meals per month of Van Etten Lake rock bass less than 8 inches in length due to mercury and PFOS, no more than 4 meals per month of those fish between 8 and 10 inches due to mercury, and no more than 2 meals per month of those fish larger than 10 inches due to mercury

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
4	0.06	16
5	0.08	12
6	0.1	8
7	0.12	8
8	0.16	4
9	0.2	4
10	0.25	4
11	0.31	2
12	0.39	2
<i>Shaded area denotes extrapolated estimates</i>		



Walleye

Van Etten Lake

Iosco County

Hg Analysis:

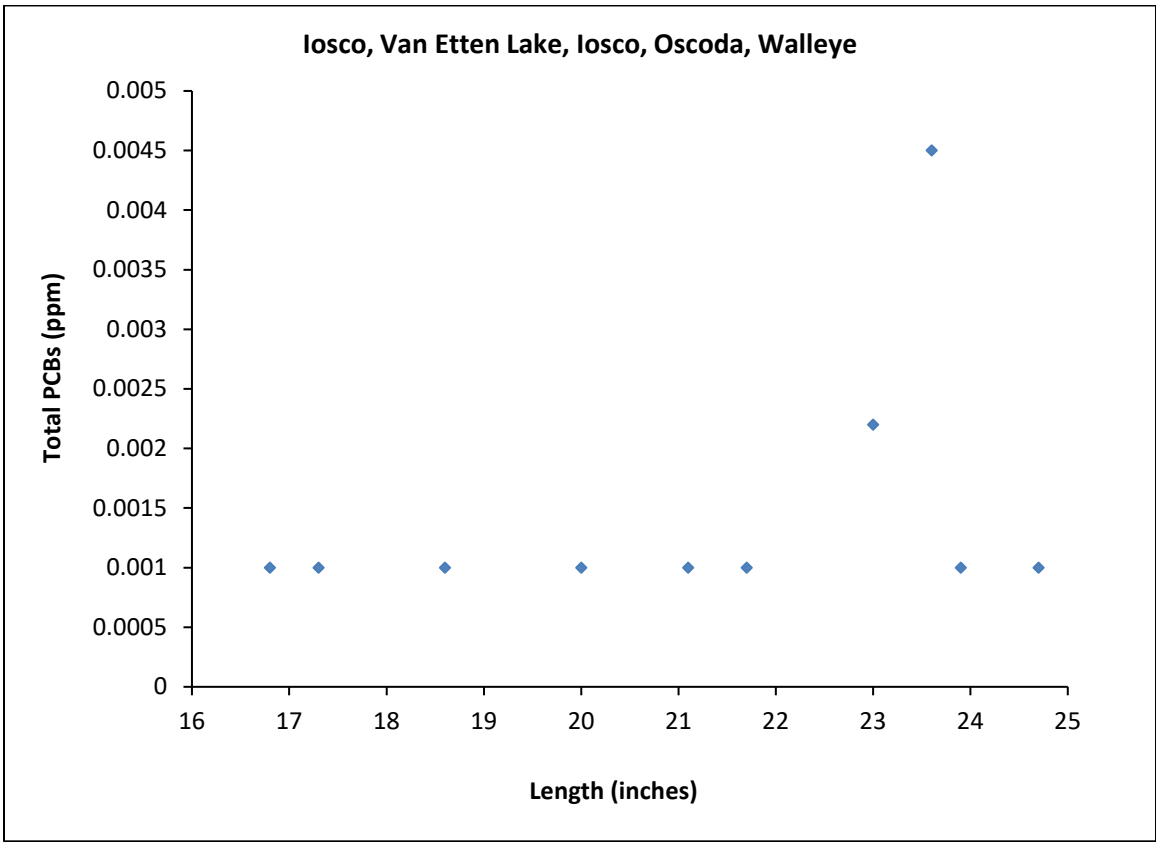
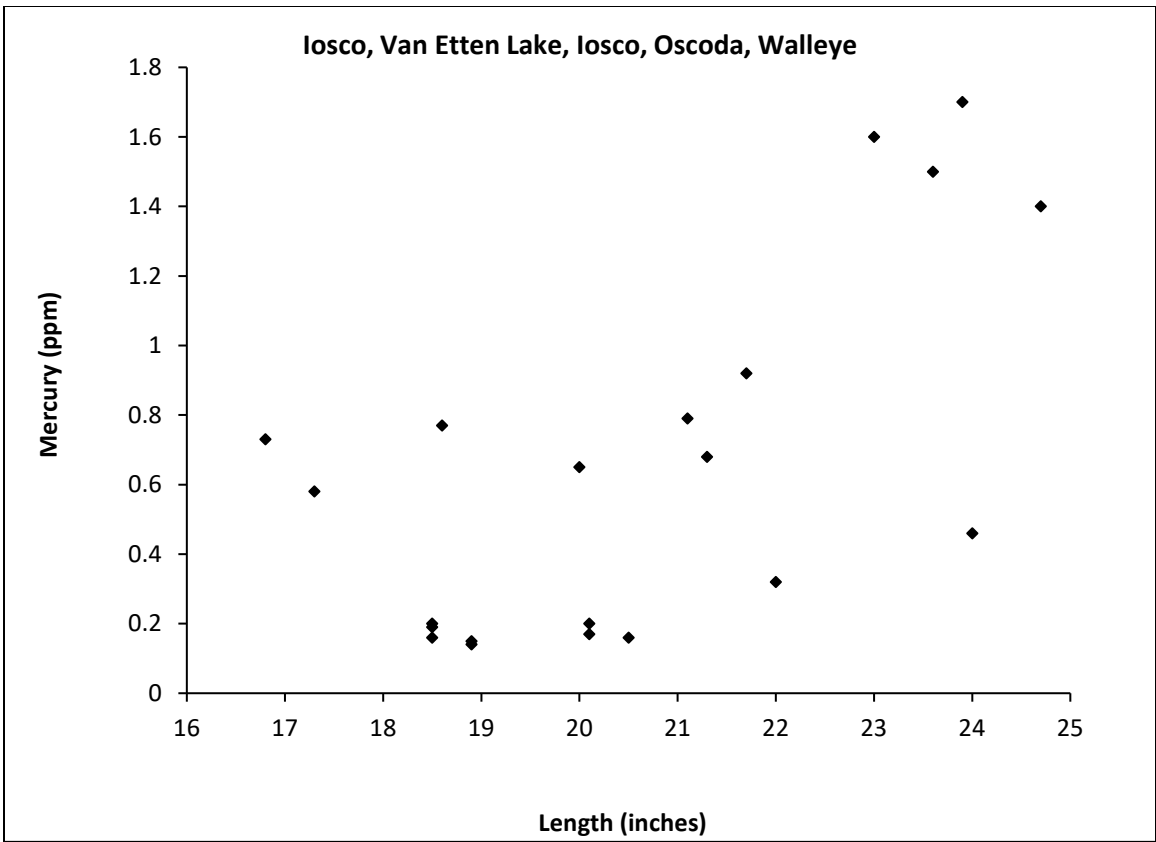
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1990	2010	21	16.8	15	16.8	24.7
Datasets available: 1990, 2010						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	21	0.64	0.14	1.7	0.88	1
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.416	0.321				

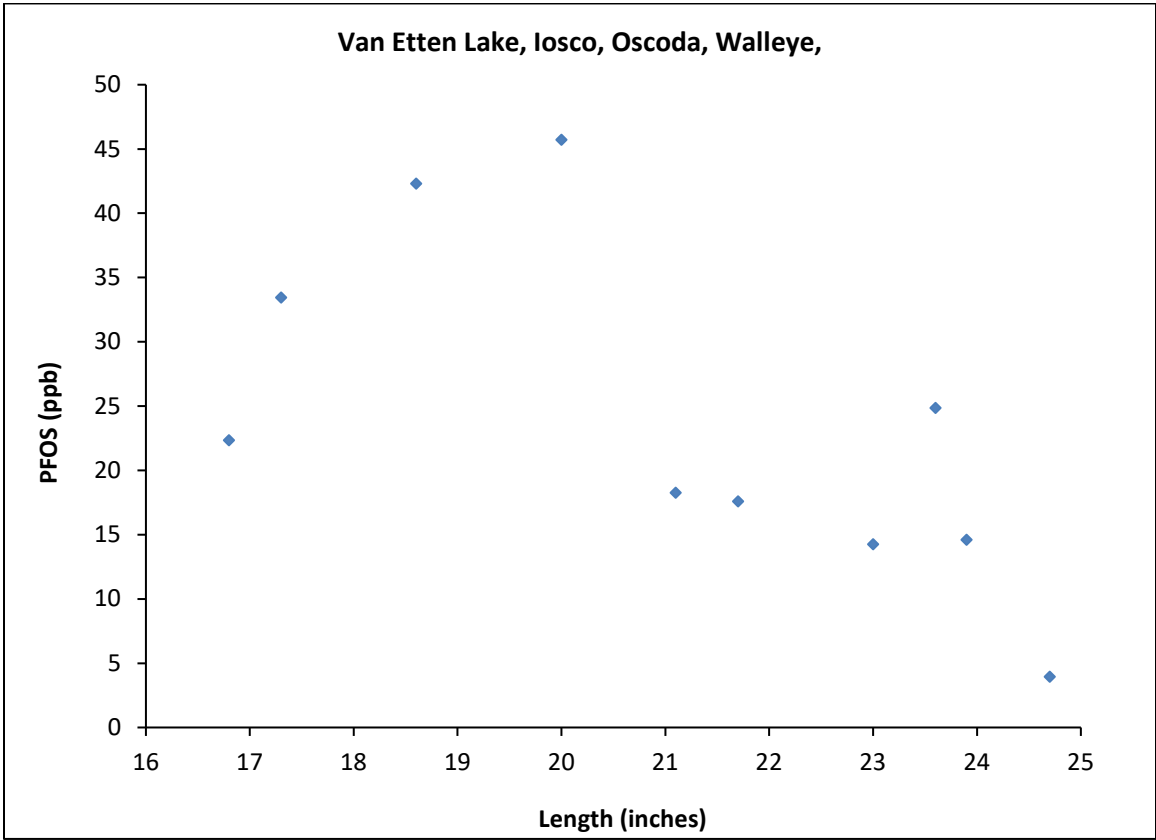
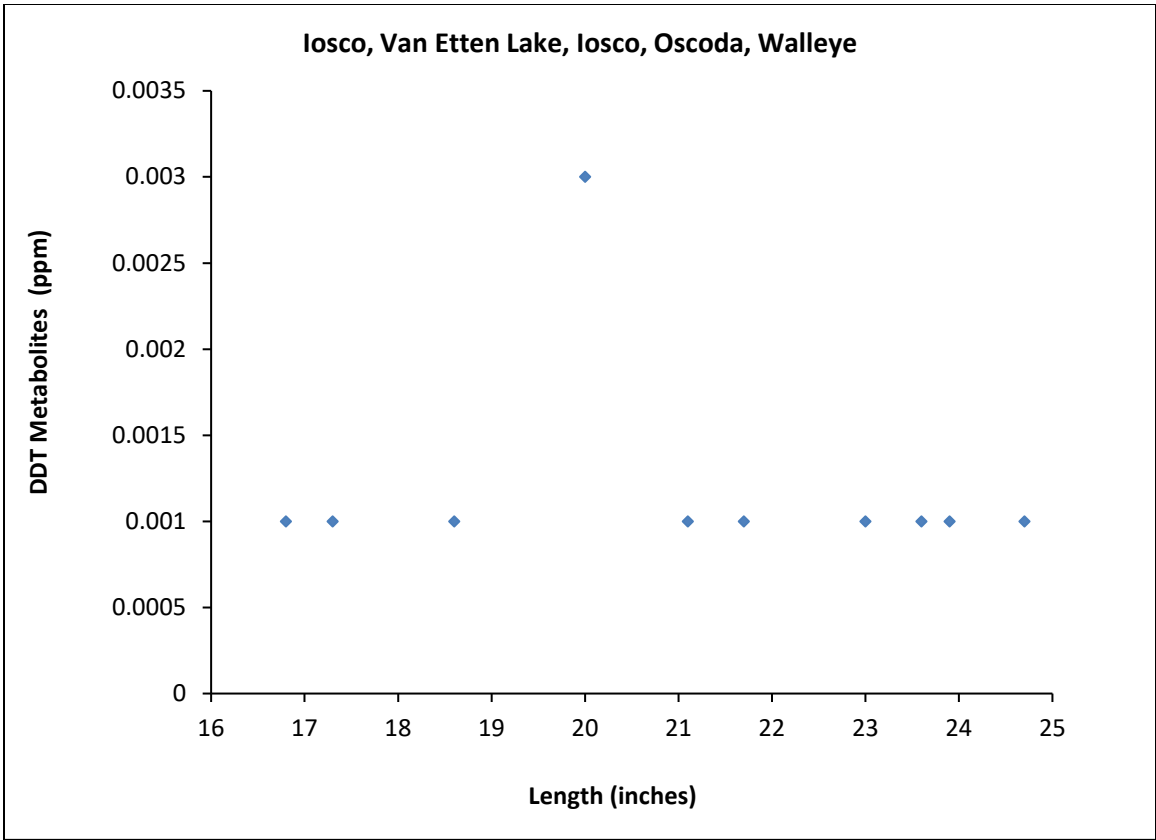
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2010	2010	10	16.8	15	16.8	24.7
Datasets available: 1990, 2010						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.001	0.001	0.005	0.002	16
DDT	10	0.001	0.001	0.003	0.002	16
Chlordane	10	ND	--	--	--	--
Toxaphene	10	ND	--	--	--	--
PFOS	10	23.7 ppb	3.9 ppb	45.7 ppb	33.1 ppb	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.152	0.169				
DDT	0.018	0.018				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	0.425	0.463				
Final meal category based on UCL:						1

Existing Advisory: Women and children should not eat more than one meal per month of Van Etten Lake walleye due to mercury and PCBs.

Recommendation: No one should eat more than 1 meal per month of Van Etten Lake walleye due to mercury.





White Sucker

Van Etten Lake

Iosco County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2010	2019	20	11.5	NA	11.5	19.5
Datasets available: 2010, 2019						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	20	0.16	0.05	0.34	0.20	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.633	0.659				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2010	2019	20	11.5	NA	11.5	19.5
Datasets available: 2010, 2019 (No PCBs/Pesticides)						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	ND	<0.001	<0.001	--	16
DDT	10	ND	<0.001	<0.001	--	16
Chlordane	10	ND	<0.001	<0.001	--	--
Toxaphene	10	ND	<0.05	<0.05	--	--
PFOS	20	8.3 ppb	0.5 ppb	28.2 ppb	11.8 ppb	12
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	-	-				
DDT	-	-				
Chlordane	-	-				
Toxaphene	-	-				
PFOS	0.028	0.156				
Final meal category based on UCL:						4

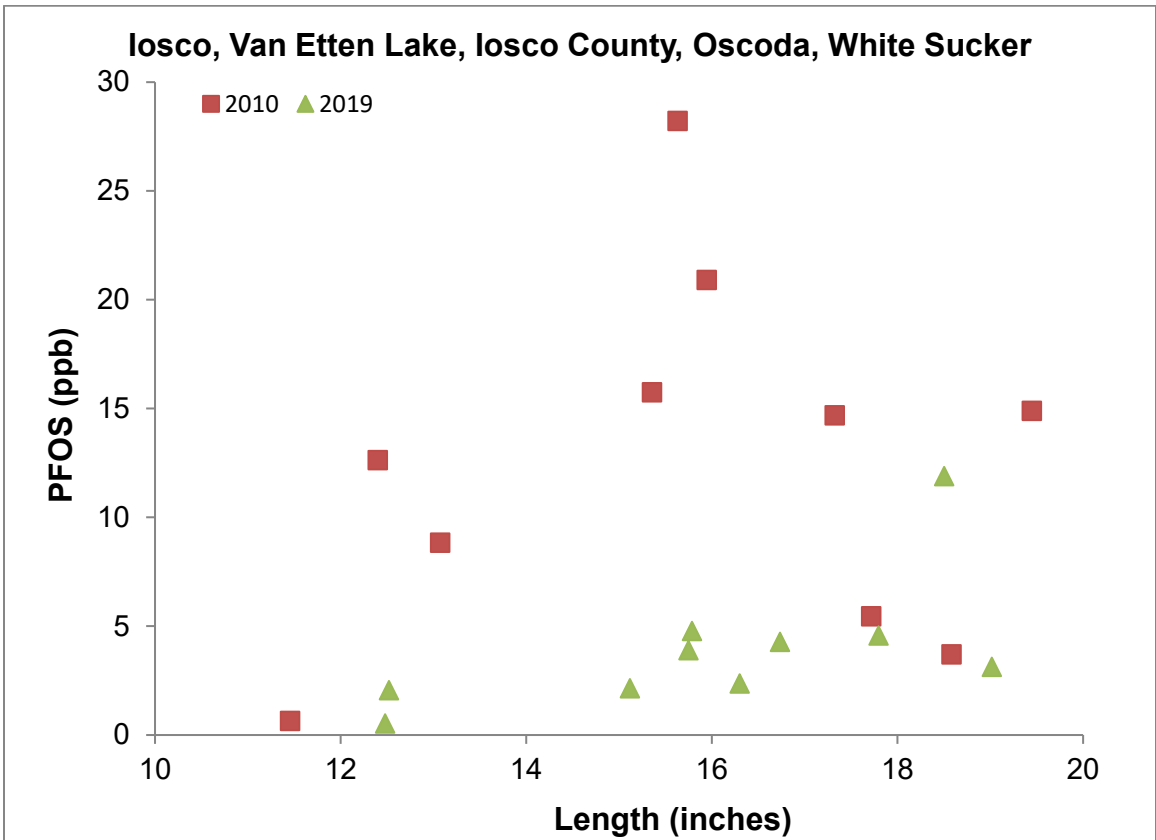
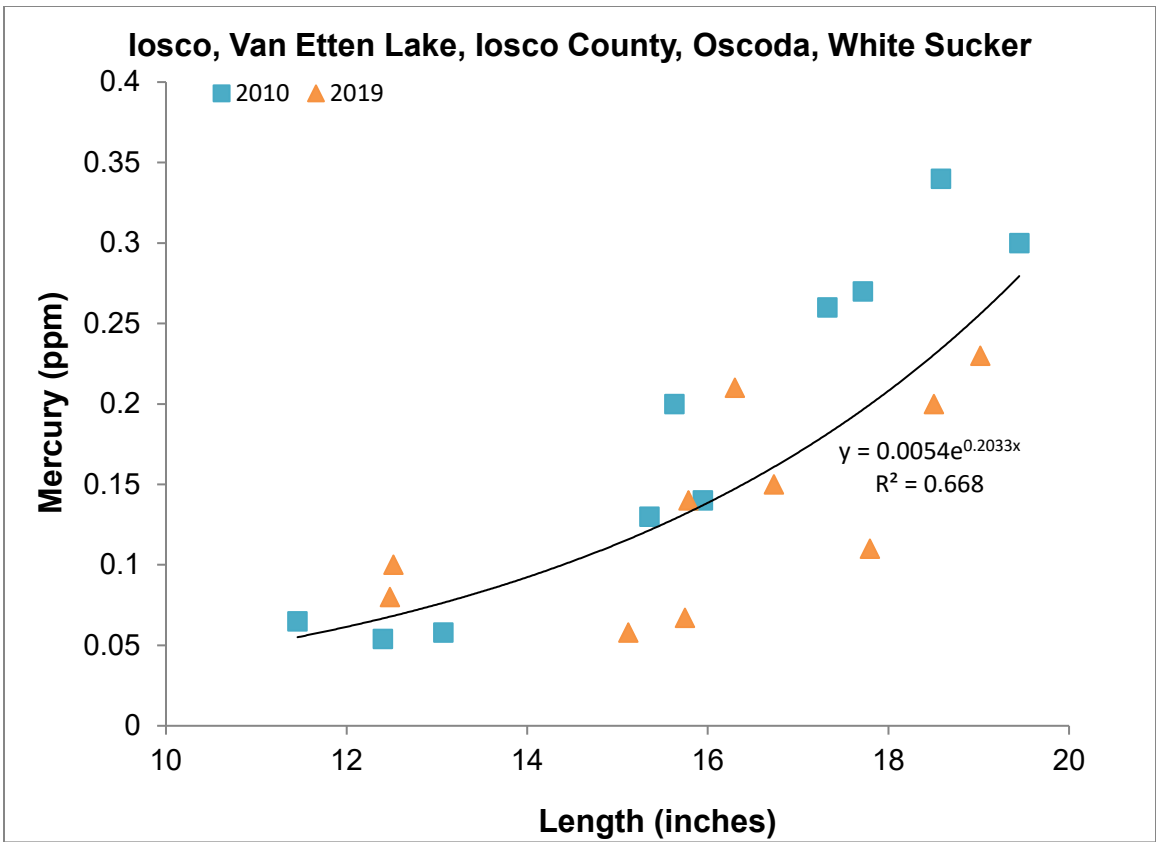
Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
10	0.041	16
12	0.062	16
14	0.093	8
16	0.140	4
18	0.210	4
20	0.315	2
22	0.473	2
24	0.710	1

Shaded area denotes extrapolated estimates

Existing MDHHS Advisory: No one should eat more than 8 meals per month of suckers from Van Etten Lake in Iosco County smaller than 14 inches due to PFOS and mercury, no more than 4 meals per month of those fish between 14 inches and 20 inches due to mercury, or no more than 2 meals per month of those fish larger than 20 inches due to mercury.

Recommendation: No one should eat more than 8 meals per month of suckers from Van Etten Lake in Iosco County smaller than 14 inches due to PFOS and mercury, no more than 4 meals per month of those fish between 14 inches and 18 inches due to mercury, or no more than 2 meals per month of those fish larger than 18 inches due to mercury.

Although PFOS data correspond to a meal category of 12 meals per month, MDHHS requires two datasets showing decreased concentrations in order to relax a restriction. Additionally, there is a known contamination source contributing PFAS to Van Etten Lake.



Yellow Perch

Van Etten Lake

Iosco County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
2018	2020	16	6.3	NA	6.3	12.3	
Datasets available: 2018, 2019, 2020							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	16	0.203		0.110	0.330	0.236	4
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.625	0.649					

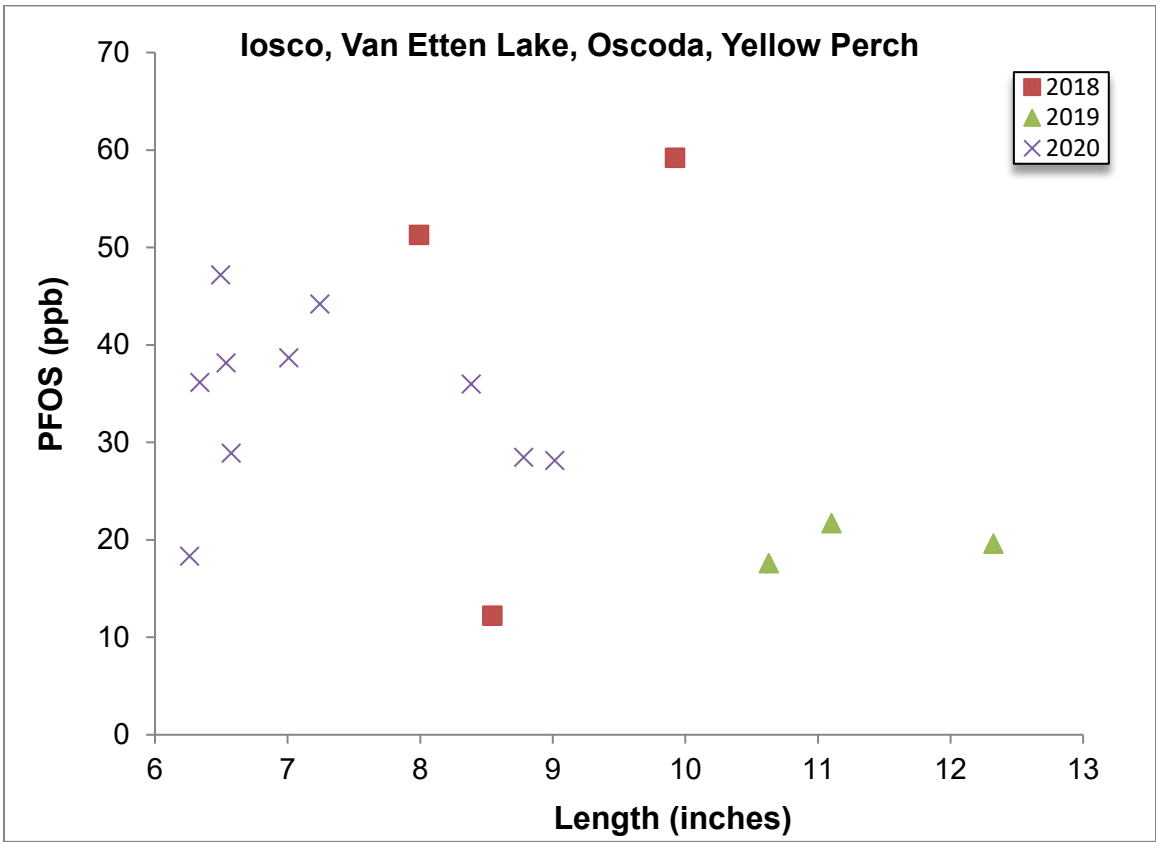
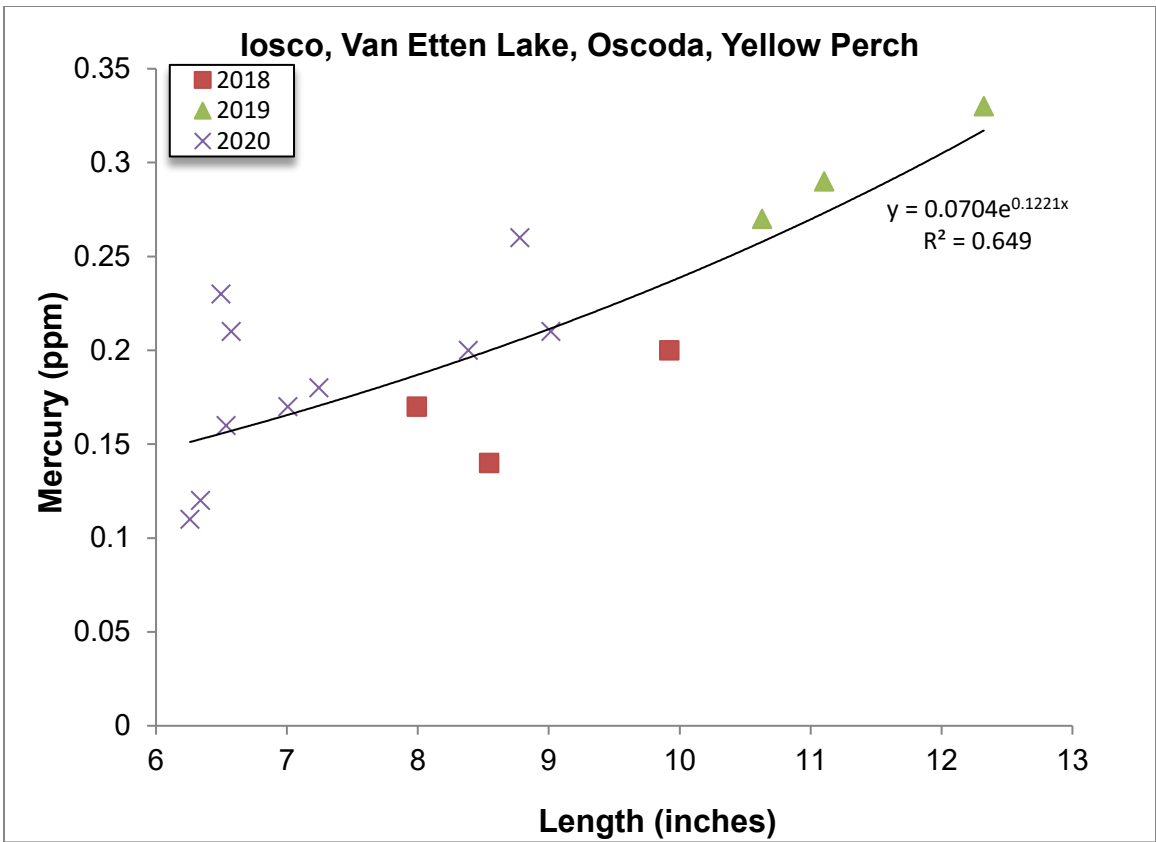
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
2018	2020	16	6.3	NA	6.3	12.3	
Datasets available: 2018, 2019, 2020							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--		--	--	--	--
DDT	0	--		--	--	--	--
Chlordane	0	--		--	--	--	--
Toxaphene	0	--		--	--	--	--
PFOS	16	32.9 ppb		12.2 ppb	59.2 ppb	40.0 ppb	2
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	--	--					
DDT	--	--					
Chlordane	--	--					
Toxaphene	--	--					
PFOS	0.098	0.129					
Final meal category based on UCL:							2

Existing MDHHS Advisory: No one should eat more than 2 meals per month of yellow perch from Van Etten Lake smaller than 10 inches due to PFOS or no more than 2 meals per month of yellow perch larger than 10 inches due to PFOS and mercury.

Recommendation: No change to the advisory is recommended. New mercury regression indicates that the length break cutoff should be at 11 inches. However, we need an additional year of data showing reduced mercury concentrations in these fish to change the advisory.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
7	0.165	4
8	0.187	4
9	0.211	4
10	0.239	4
11	0.270	4
12	0.305	2
13	0.344	2
<i>Shaded area denotes extrapolated estimates</i>		



Montmorency County

Largemouth Bass

Avery Lake

Montmorency County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2009	2009	13	10.8	14	15.7	19.4
Datasets available: 2009						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	6	0.85	0.70	1.10	1.00	1
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.753	0.696				

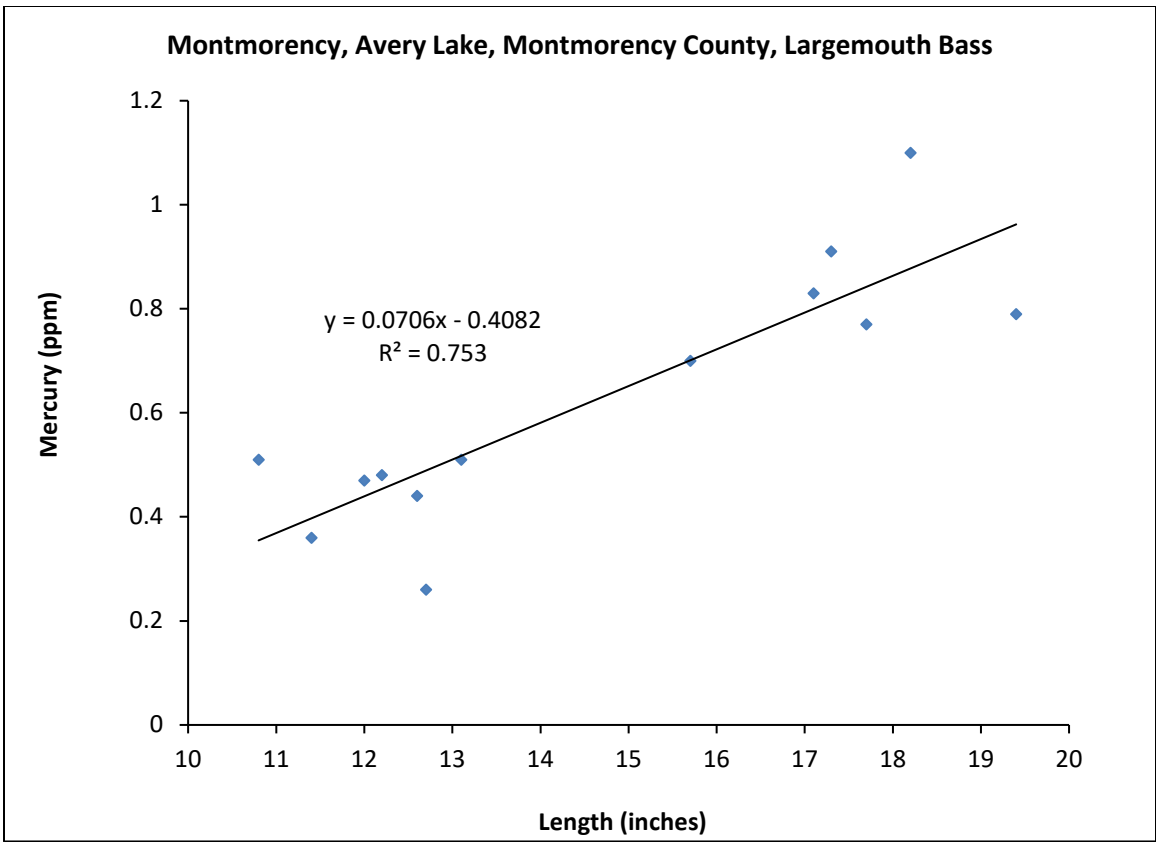
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available: --						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						1

Existing Advisory: Avery Lake largemouth bass are covered under the statewide mercury consumption advisory.

Recommendation: No one should eat more than 1 meal per month of Avery lake largemouth or smallmouth bass less than 20 inches or 6 meals per year of those over 20 inches due to mercury. Size break applied due as no fish was over 20 inches.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
14	0.58	1
15	0.65	1
16	0.72	1
17	0.79	1
18	0.86	1
19	0.93	1
20	1.00	1
21	1.07	1
22	1.14	0.5
<i>Shaded area denotes extrapolated estimates</i>		



Northern Pike

Ess Lake

Montmorency County

Hg Analysis:

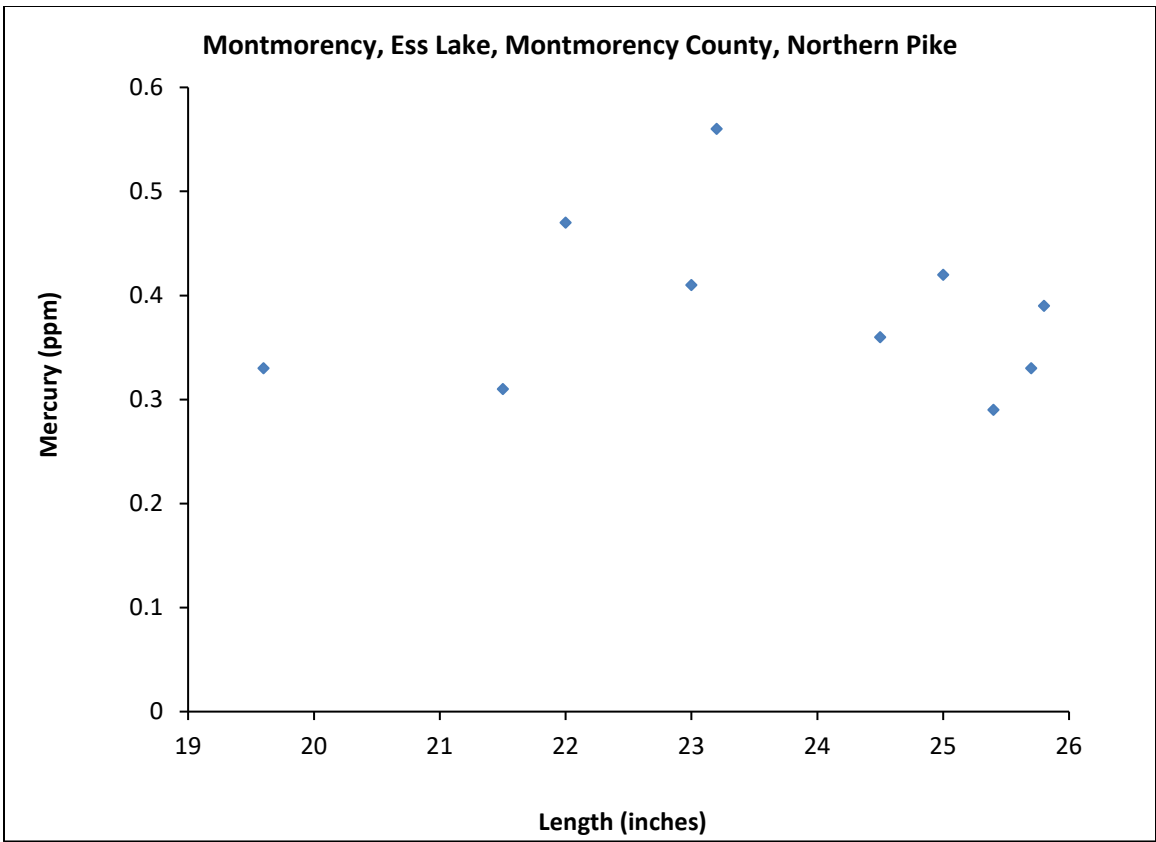
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2003	2003	10	19.6	24	24.5	25.8
Datasets available: 2003						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	5	0.36	0.29	0.42	0.42	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.004	0.002				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available: --						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						2

Existing Advisory: Women and children should not eat more than one meal per week of Ess Lake northern pike smaller than 26 inches or more than one meal per month those fish larger than 26 inches due to mercury.

Recommendation: No one should eat more than 2 meals per month of Ess Lake northern pike smaller than 30 inches or more than 1 meal per month of those fish larger than 30 inches due to mercury. The statewide length break applied as the size of the fish was limited.



Northern Pike

Gaylanta Lake

Montmorency County

Hg Analysis:

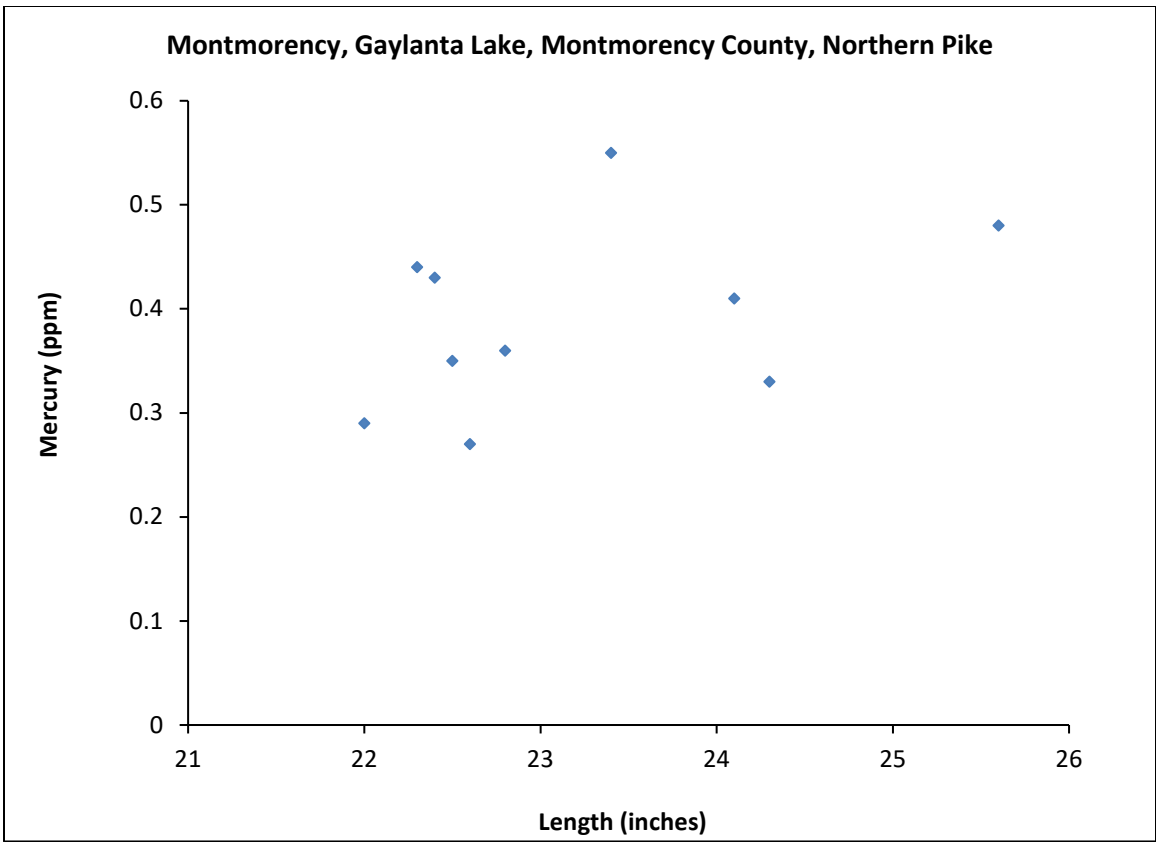
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2003	2003	10	22	24	24.1	25.6
Datasets available: 2003						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.39	0.27	0.48	0.55	1
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.157	0.161				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available: --						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						1

Existing Advisory: Women and children should not eat more than one meal per week of Gaylanta Lake northern pike smaller than 26 inches or more than one meal per month of those fish larger than 26 inches due to mercury.

Recommendation: No one should eat more than 1 meal per month of Gaylanta Lake northern pike smaller than 30 inches or more than 6 meals per year of those fish larger than 30 inches due to mercury. The statewide length break applied as the size of the fish was limited.



Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2011	2011	8	10.3	14	13.7	18.7
Datasets available: 2011						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	6	0.50	0.38	0.88	0.70	1
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.896	0.892				

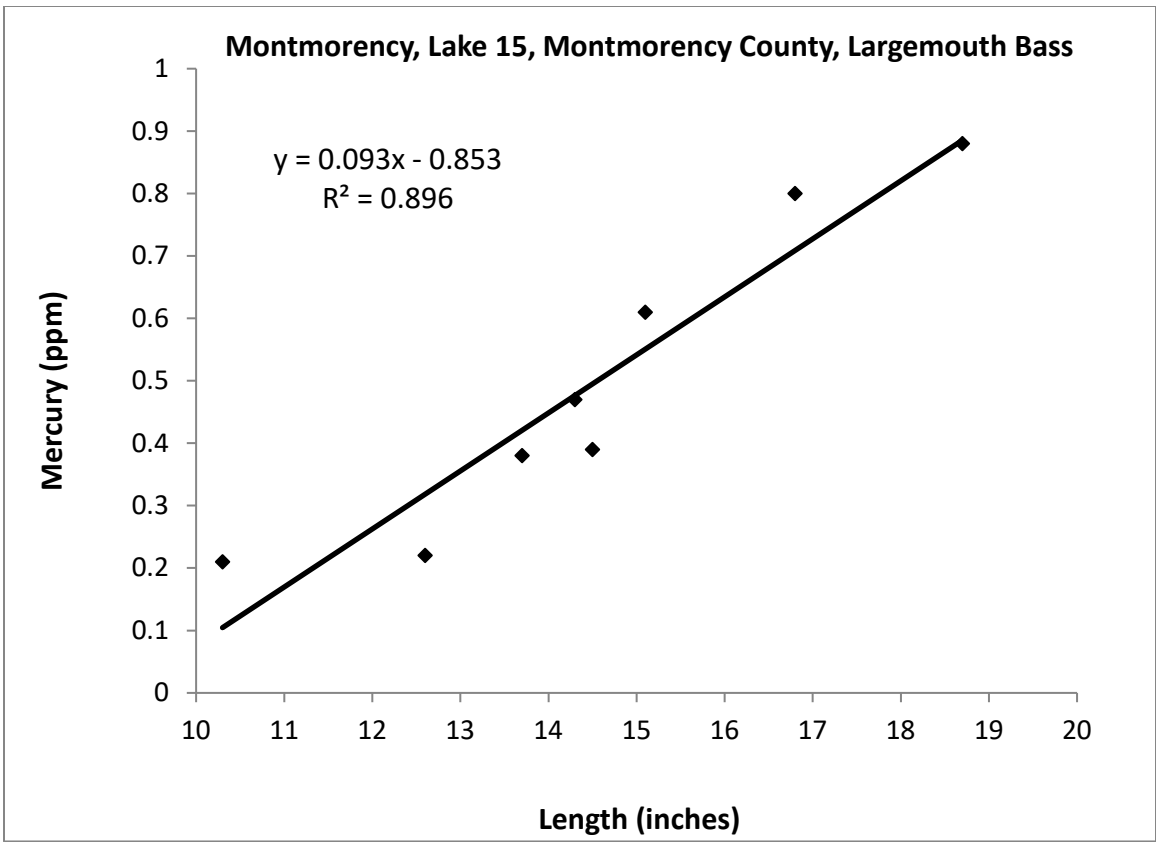
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available: --						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	--	--	--	--	--	--
DDT	--	--	--	--	--	--
Chlordane	--	--	--	--	--	--
Toxaphene	--	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						1

Existing Advisory: Lake 15 largemouth bass are covered by the statewide mercury advisory.

Recommendation: No one should eat more than 1 meal per month of Lake 15 largemouth or smallmouth bass smaller than 18 inches or more than 6 meals per year of those fish larger than 18 inches due to mercury. Length break was applied at the upper end of the regression as the sample range was limited.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
12	0.26	4
14	0.45	2
16	0.64	1
18	0.82	1
20	1.01	1
22	1.19	0.5
24	1.38	0.5
<i>Shaded area denotes extrapolated estimates</i>		



Hg Analysis:

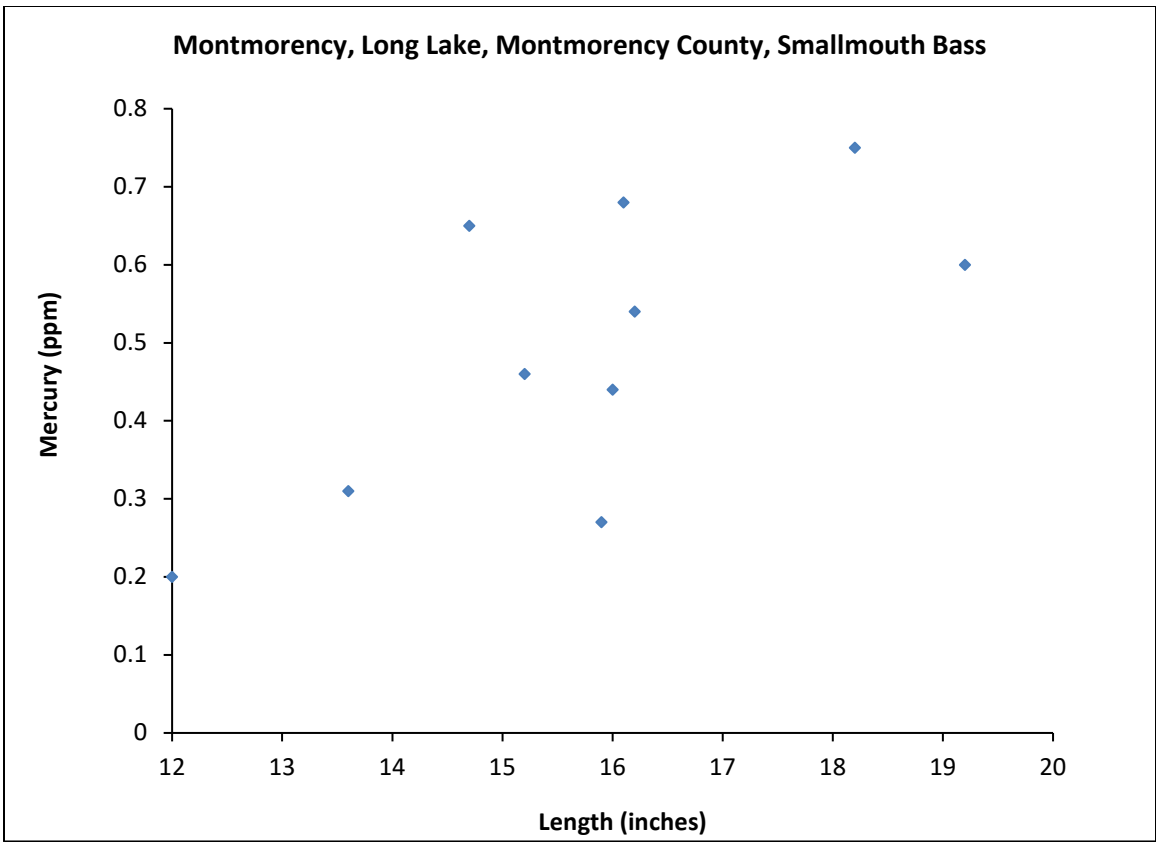
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2006	2006	10	12	14	13.6	19.2
Datasets available: 2006						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	9	0.52	0.27	0.75	0.65	1
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.474	0.510				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available: --						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						1

Existing Advisory: Long Lake smallmouth bass are covered under the statewide mercury consumption advisory.

Recommendation: No one should eat more than 1 meal per month of Long Lake largemouth or smallmouth bass smaller than 18 inches or more than 6 meals per year of those fish larger than 18 inches due to mercury. The statewide length break applied as the size of the fish was limited.



Brown Trout

McCormick Lake

Montmorency County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2004	2004	7	13.2	12	13.2	20.6
Datasets available: 2004						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	7	0.20	0.08	0.49	0.35	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.887	0.874				

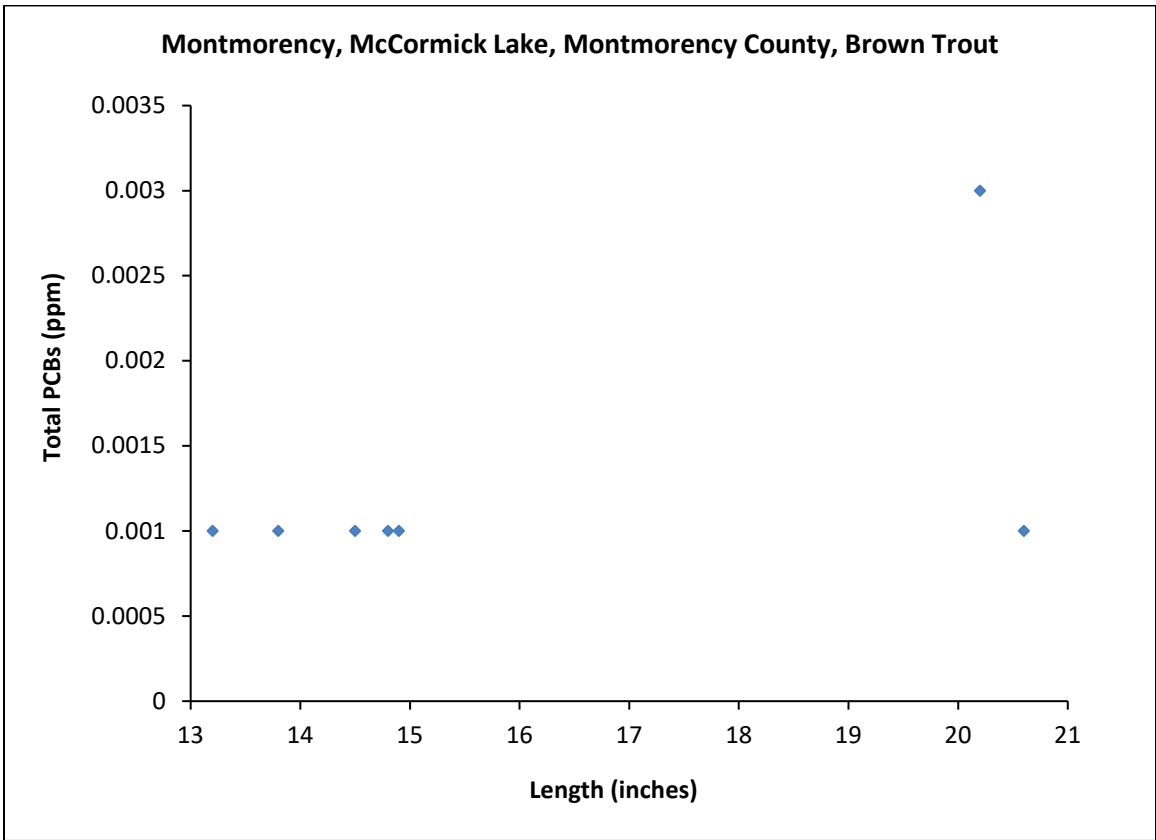
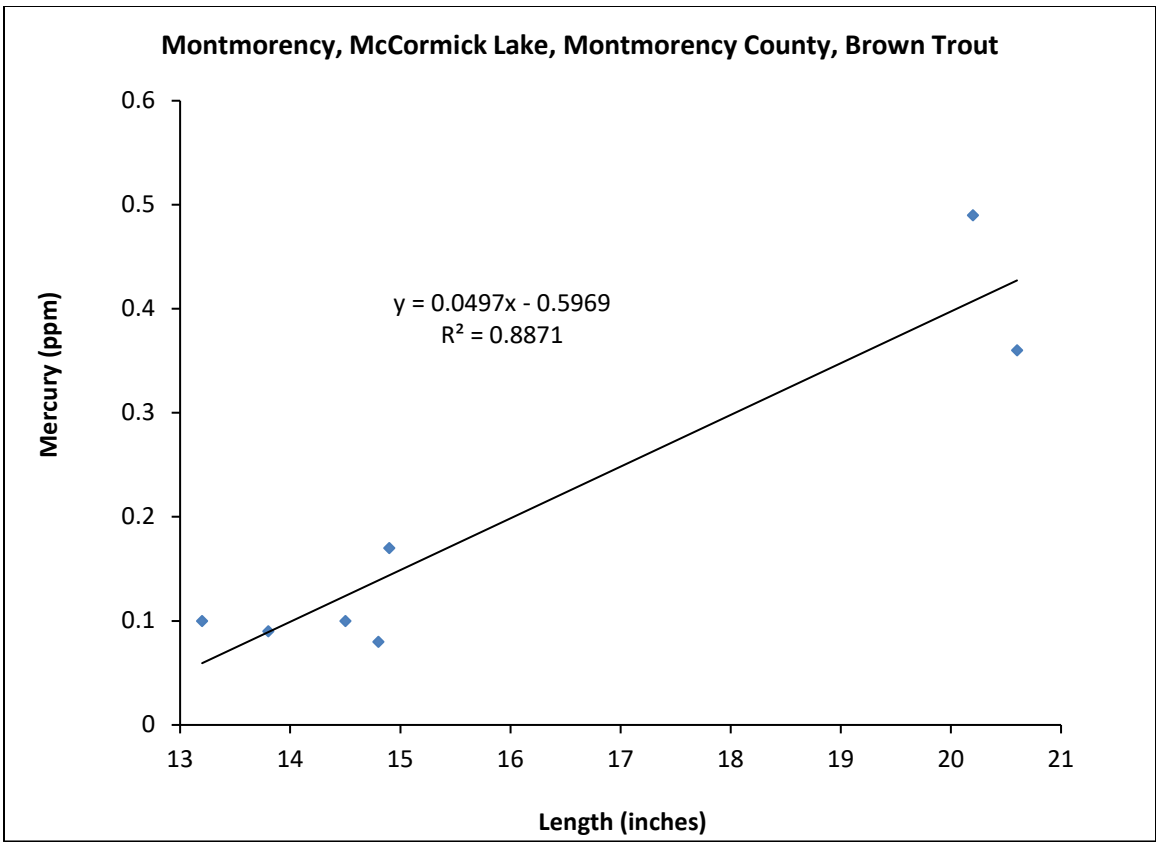
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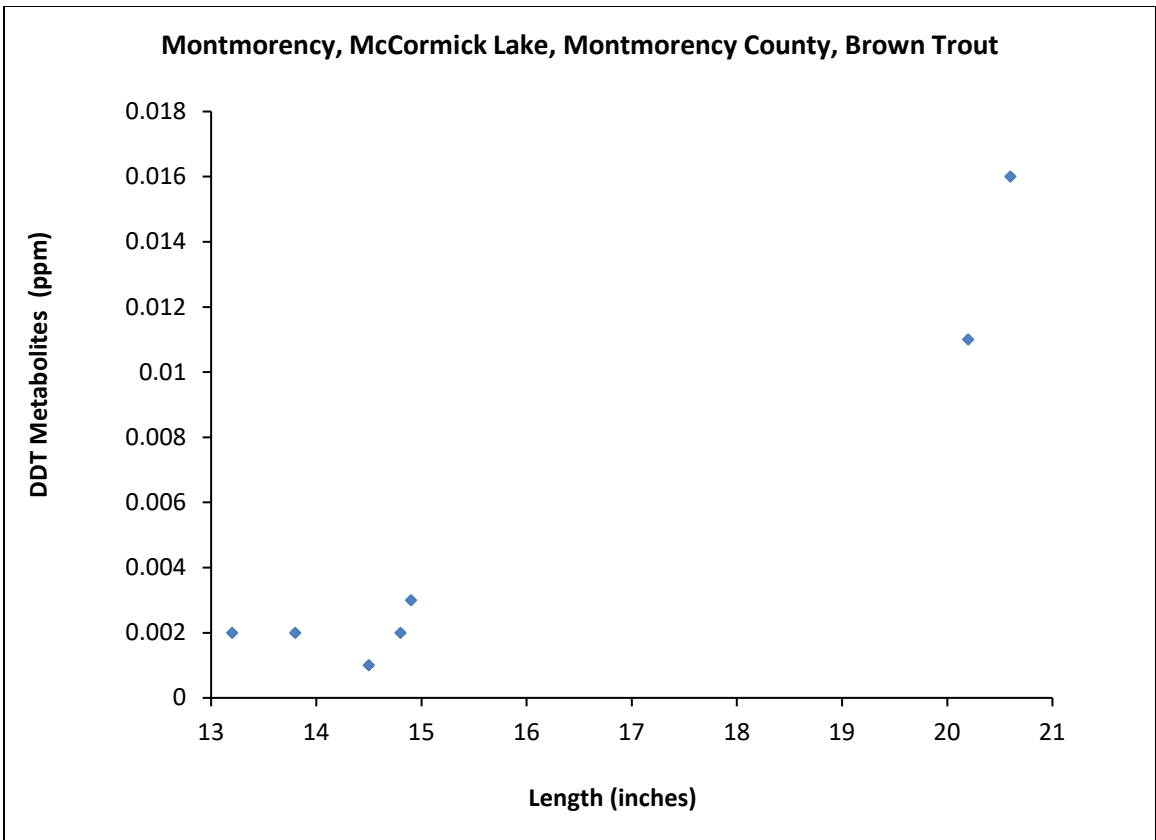
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2004	2004	7	13.2	12	13.2	20.6
Datasets available: 2004						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	7	0.001	0.001	0.003	0.002	16
DDT	7	0.005	0.001	0.016	0.011	16
Chlordane	7	ND	--	--	--	--
Toxaphene	7	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.365	0.365				
DDT	0.918	0.868				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						2

Existing Advisory: There are no current consumption advisories for McCormick Lake brown trout.

Recommendation: No one should eat more than 8 meals per month of McCormick Lake brown trout less than 14 inches, 4 meals per month of McCormick Lake brown trout between 14 and 18 inches or more than 2 meals per month of those fish larger than 18 inches due to mercury.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
12	0	16
13	0.05	16
14	0.10	8
15	0.15	4
16	0.20	4
17	0.25	4
18	0.30	2
19	0.35	2
20	0.40	2
<i>Shaded area denotes extrapolated estimates</i>		





Largemouth Bass

Twin Tomahawk Lake

Montmorency County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2018	2018	10	12.8	14.0	13.8	15.4
Datasets available: 2018						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	9	0.571	0.380	0.640	0.635	1
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.781	0.743				

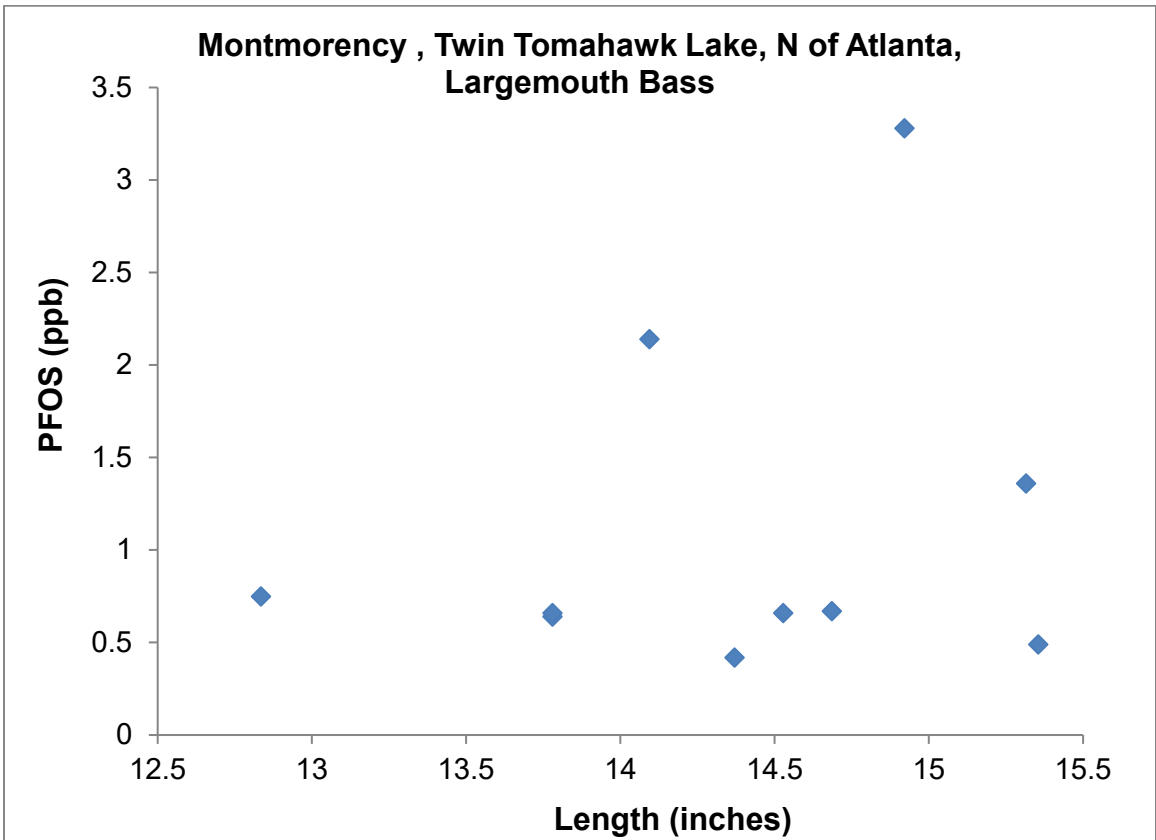
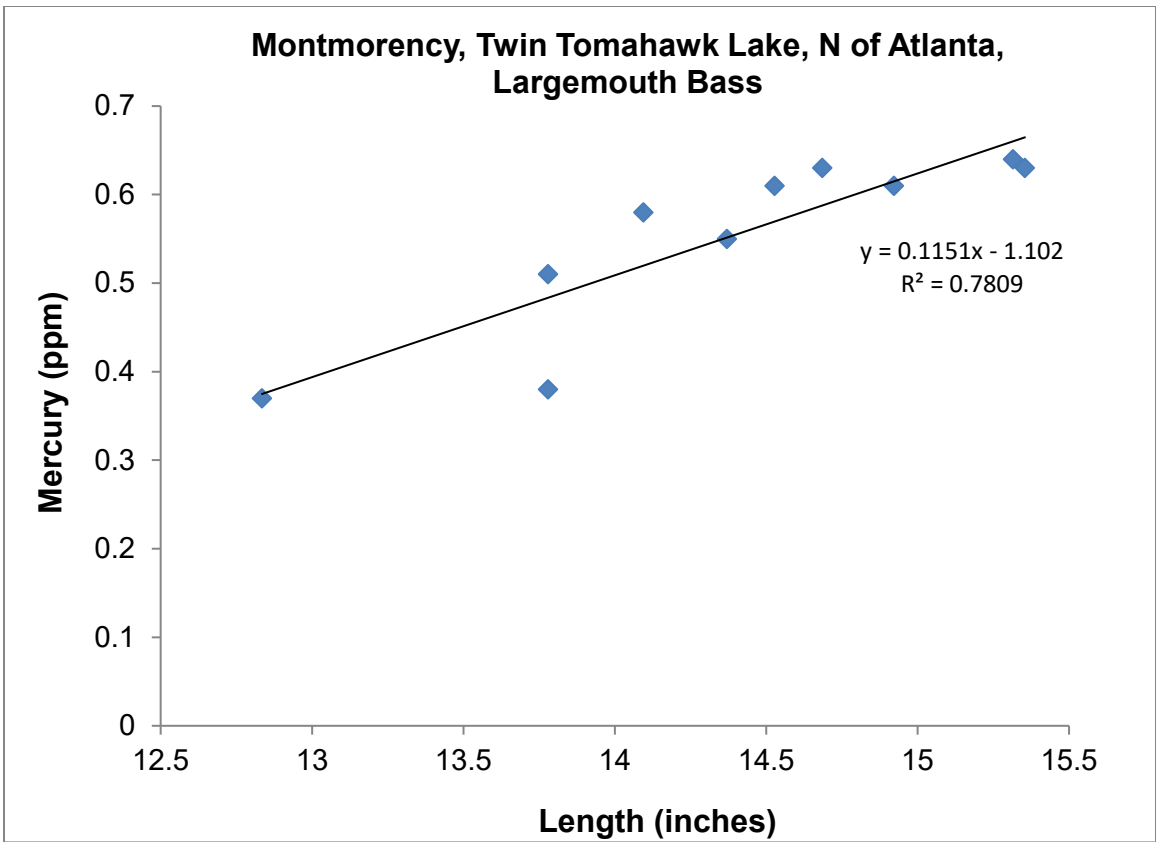
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2018	2018	10	12.8	14.0	13.8	15.4
Datasets available: 2018						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	9	ND	--	--	--	16
DDT	9	0.001	<0.001	0.001	0.001	16
Chlordane	9	ND	--	--	--	16
Toxaphene	9	ND	--	--	--	--
PFOS	9	1.1 ppb	0.4 ppb	3.3 ppb	1.8 ppb	16
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	0.000	0.000				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	0.049	0.029				
Final meal category based on UCL:						1

Existing MDHHS Advisory: Largemouth and smallmouth bass from Twin Tomahawk Lake in Montmorency County are currently covered under the statewide mercury guidance. No one should eat more than 2 meals per month of largemouth or smallmouth bass smaller than 18 inches or no more than 1 meal per month of these fish larger than 18 inches.

Recommendation: No one should eat more than 1 meal per month of largemouth or smallmouth bass smaller than 18 inches from Twin Tomahawk Lake in Montmorency County due to mercury or no more than 6 meals per year of these fish larger than 18 inches due to mercury. Statewide length break applied given the limited size range of fish used in the analysis.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
14	0.509	2
16	0.740	1
18	0.970	1
20	1.200	0.5
22	1.430	0.5
<i>Shaded area denotes extrapolated estimates</i>		



Ogemaw County

Northern Pike

Hardwood Lake

Ogemaw County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Size Range of All Samples	
Earliest	Most Recent				Min	Max
2004	2004	10	17.3	24	17.3	27.8
Datasets available: 2004						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.36	0.21	0.53	0.42	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.558	0.645				

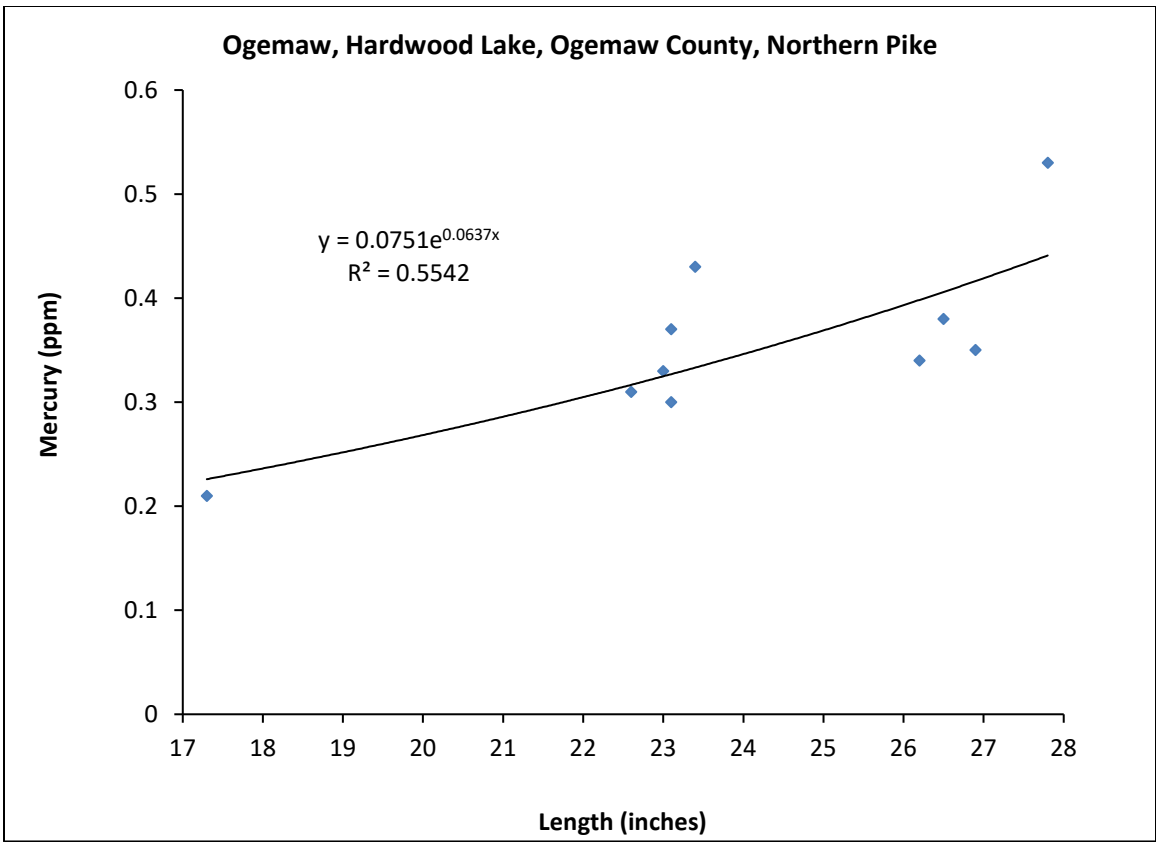
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Size Range of All Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available: --						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						2

Existing Advisory: Hardwood Lake northern pike are covered under the statewide mercury consumption advisory.

Recommendation: No one should eat more than 2 meals per month of Hardwood Lake northern pike smaller than 28 inches or more than 1 meal per month of northern pike larger than 28 inches due to mercury.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
24	0.346	2
25	0.369	2
26	0.393	2
27	0.419	2
28	0.447	1
34	0.655	1
36	0.744	1
38	0.845	1
40	0.960	1
<i>Shaded area denotes extrapolated estimates</i>		



Largemouth Bass

Horseshoe Lake

Ogemaw County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Size Range of All Samples	
Earliest	Most Recent				Min	Max
2009	2009	10	11.9	14	11.9	15.4
Datasets available: 2009						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.32	0.13	0.49	0.39	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.662	0.513				

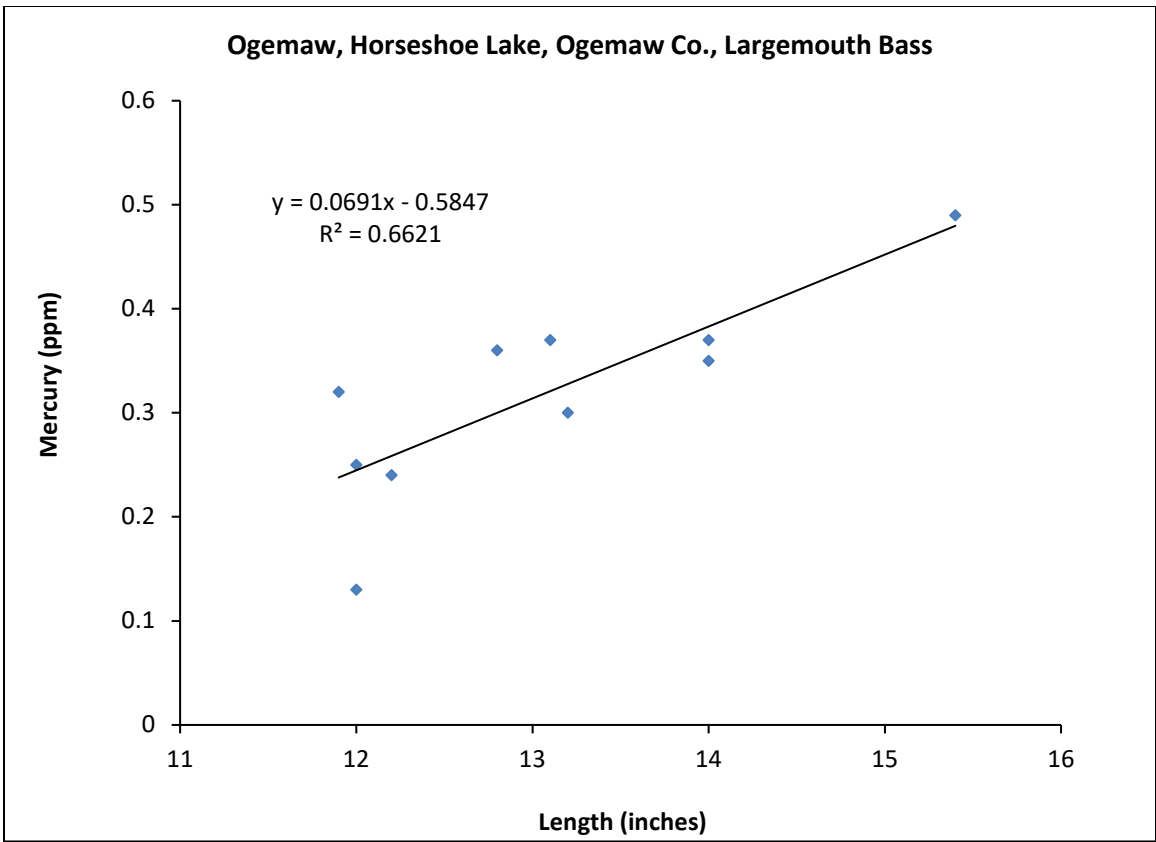
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Size Range of All Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available: --						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						2

Existing Advisory: Horseshoe Lake largemouth bass are covered under the statewide mercury consumption advisory.

Recommendation: No one should eat more than 2 meals per month of Horseshoe Lake largemouth or smallmouth bass smaller than 18 inches or more than 1 meal per month of those fish larger than 18 inches due to mercury. The statewide length break was applied as the size of the fish was limited.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
14	0.38	2
15	0.45	2
16	0.52	2
17	0.59	1
18	0.66	1
19	0.73	1
20	0.80	1
21	0.87	1
22	0.94	1
<i>Shaded area denotes extrapolated estimates</i>		



Northern Pike

Peach Lake

Ogemaw County

Hg Analysis:

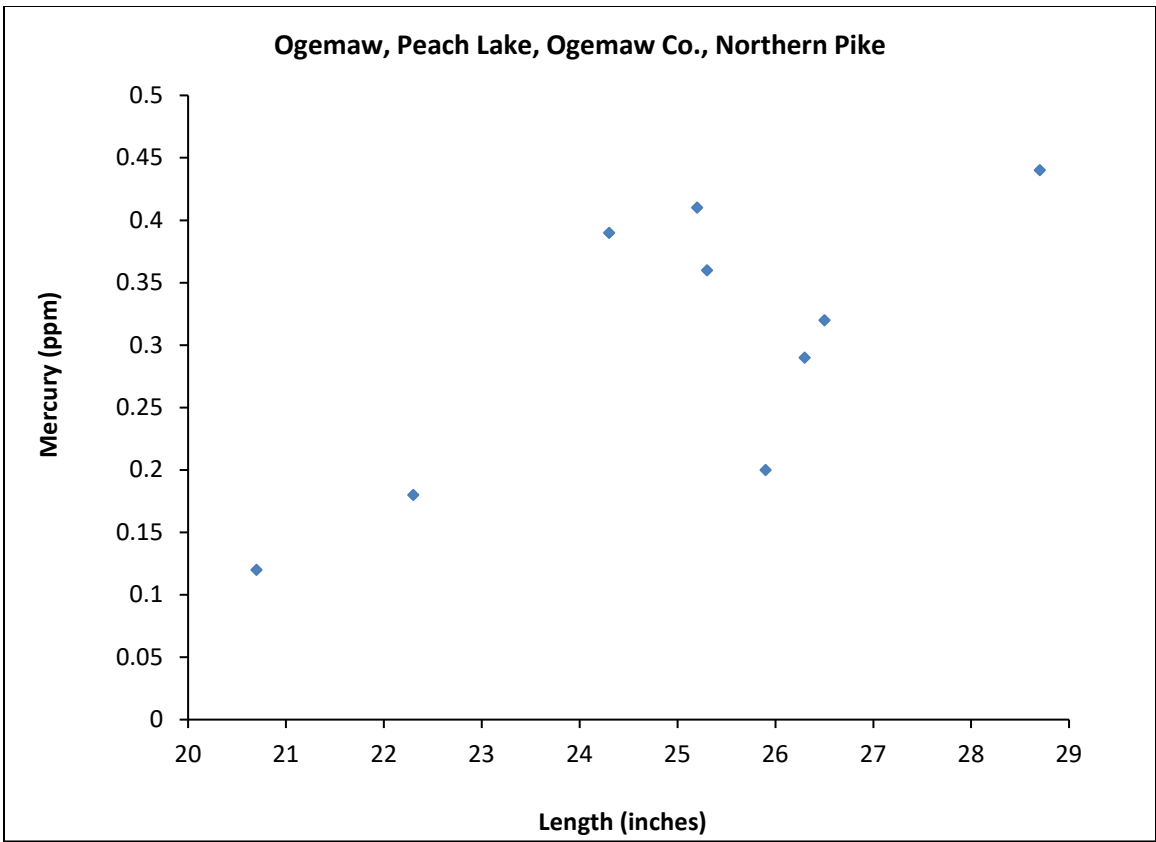
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2004	2004	9	20.7	24	25.3	28.7
Datasets available: 2004						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	7	0.34	0.2	0.44	0.42	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.512	0.578				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available: --						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						2

Existing Advisory: Peach Lake northern pike are covered under the statewide mercury consumption advisory.

Recommendation: No one should eat more than 2 meals per month of Peach Lake northern pike smaller than 30 inches or more than 1 meal per month of northern pike larger than 30 inches due to mercury. The statewide length break was applied as the size of the fish was limited.



Oscoda County

Brook Trout

Perry Creek

Oscoda County

Hg Analysis:

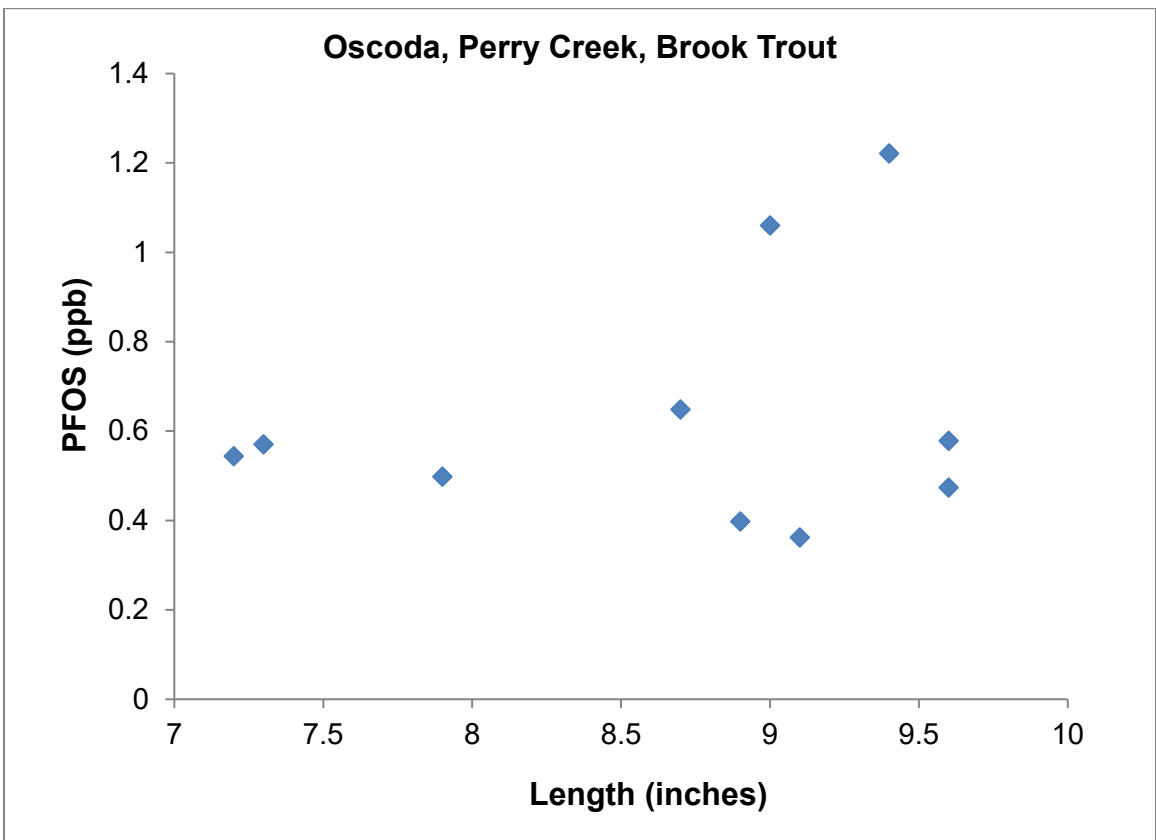
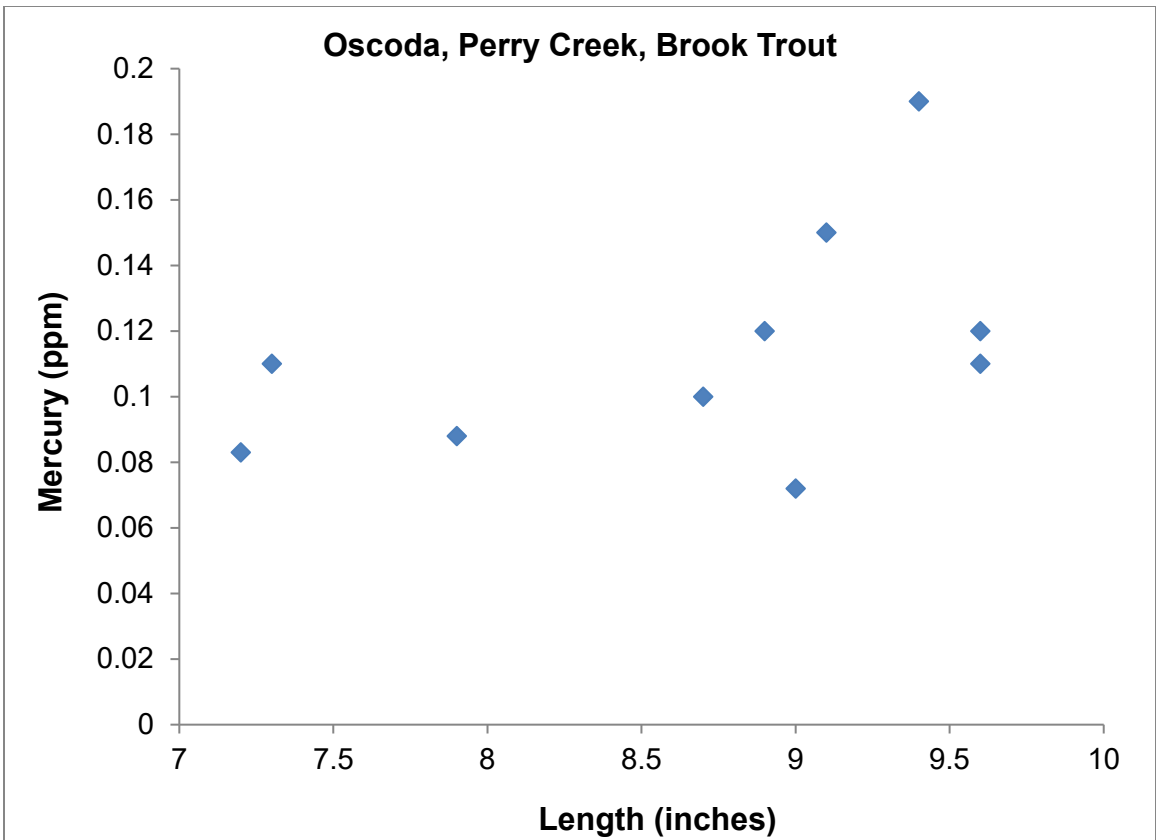
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2017	2017	10	7.2	7	7.2	9.6
Datasets available: 2017						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.11	0.07	0.19	0.14	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.220	0.220				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2017	2017	10	7.2	7	7.2	9.6
Datasets available: 2017						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
TEQ	0	--	--	--	--	--
PFOS	10	0.6 ppb	0.4 ppb	1.2 ppb	0.8 ppb	16
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
TEQ	--	--				
PFOS	0.052	0.025				
Final meal category based on UCL:						4

Existing MDHHS Advisory: Perry Creek brook trout are not covered by a consumption advisory.

Recommendation: No one should eat more than 4 meals per month of brook trout of any size due to mercury.



Otsego County

Smallmouth Bass

Big Lake

Otsego County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2011	2011	10	14.2	14	14.2	19.8
Datasets available: 2011						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.38	0.16	0.61	0.48	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.841	0.744				

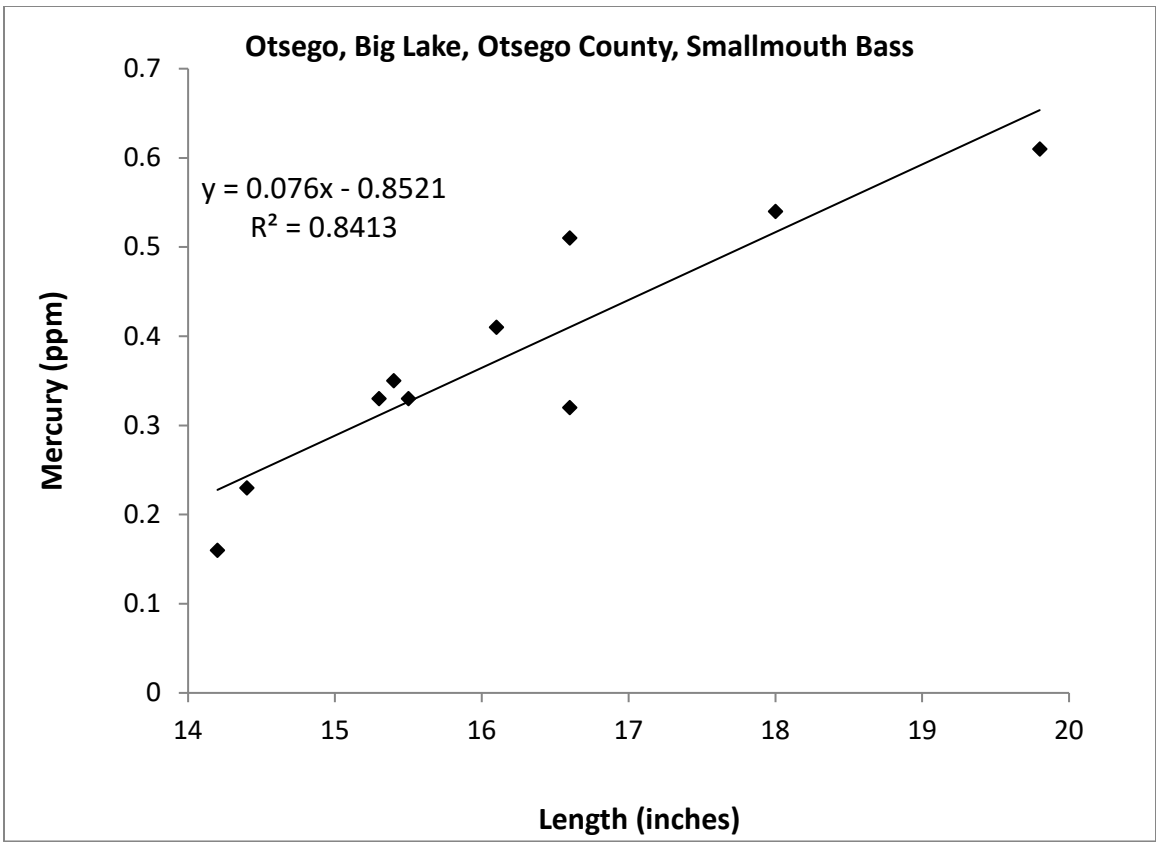
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available: --						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	--	--	--	--	--	--
DDT	--	--	--	--	--	--
Chlordane	--	--	--	--	--	--
Toxaphene	--	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						2

Existing Advisory: Big Lake largemouth bass are covered by the statewide mercury advisory.

Recommendation: No one should eat more than 2 meals per month of Big Lake largemouth or smallmouth bass smaller than 18 inches or more than 1 meal per month of those fish larger than 18 inches due to mercury.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
12	0.06	16
14	0.21	4
16	0.36	2
18	0.52	2
20	0.67	1
22	0.82	1
24	0.97	1
<i>Shaded area denotes extrapolated estimates</i>		



Rock Bass

Guthrie Lake

Otsego County

Hg Analysis:

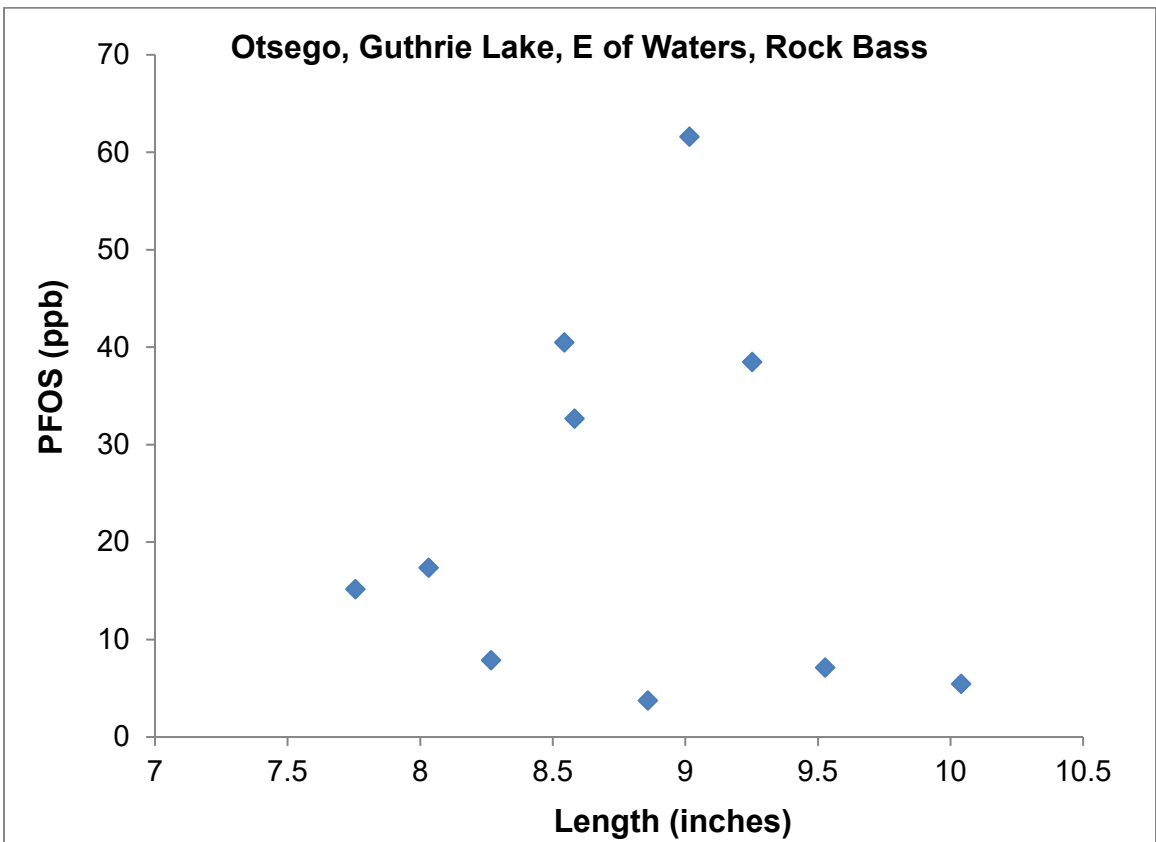
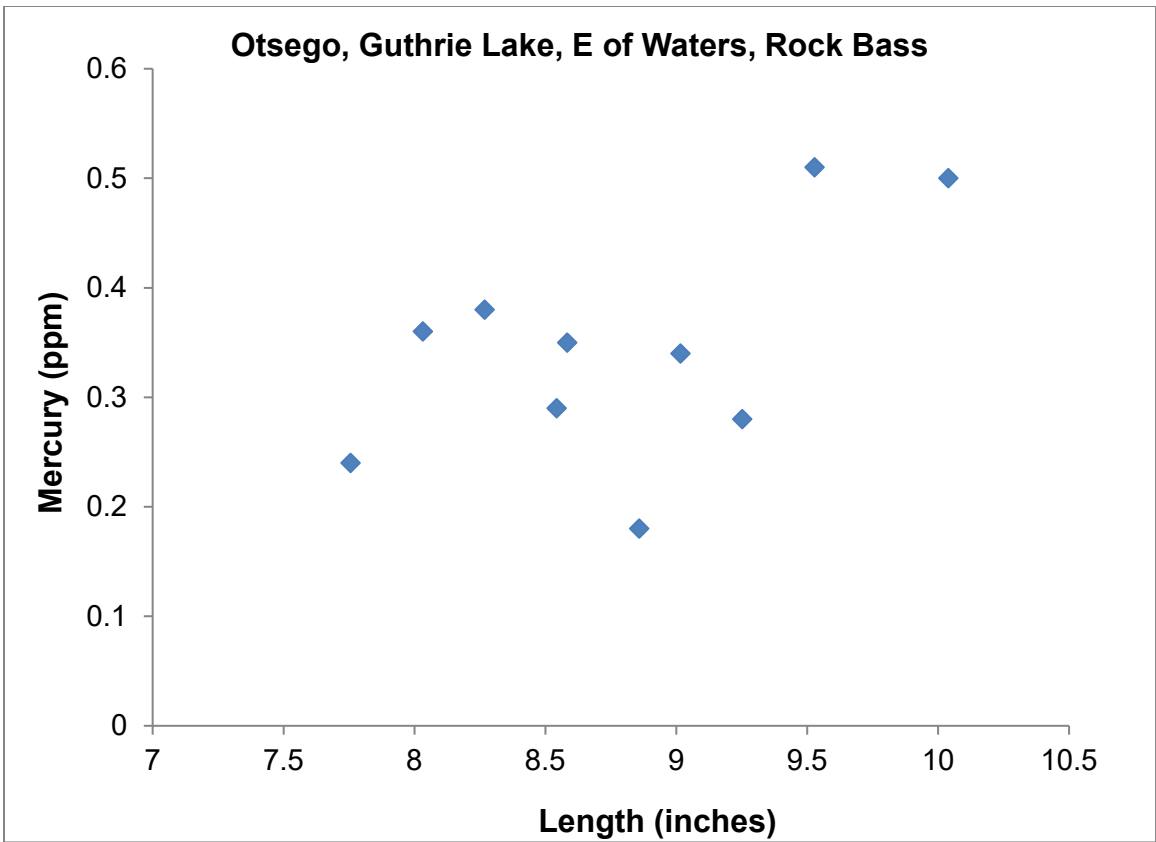
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
2019	2019	10	7.8	NA	7.8	10.0	
Datasets available: 2019							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
Mercury	10	0.343	0.180	0.510	0.418	2	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.308	0.221					

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
2019	2019	10	7.8	NA	7.8	10.0	
Datasets available: 2019							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
PCB	0	--	--	--	--	--	
DDT	0	--	--	--	--	--	
Chlordane	0	--	--	--	--	--	
Toxaphene	0	--	--	--	--	--	
PFOS	10	23.0 ppb	3.8 ppb	61.6 ppb	36.9 ppb	4	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	--	--					
DDT	--	--					
Chlordane	--	--					
Toxaphene	--	--					
PFOS	0.002	0.049					
Final meal category based on UCL:							2

Existing MDHHS Advisory: Rock bass from Guthrie Lake in Otsego County east of Waters are currently covered under the statewide mercury guideline. No one should eat more than 4 meals per month of rock bass of any size.

Recommendation: No one should eat more than 2 meals per month of rock bass of any size from Guthrie Lake east of Waters in Otsego County due to mercury. PFOS causes a less restrictive guideline.



Hg Analysis:

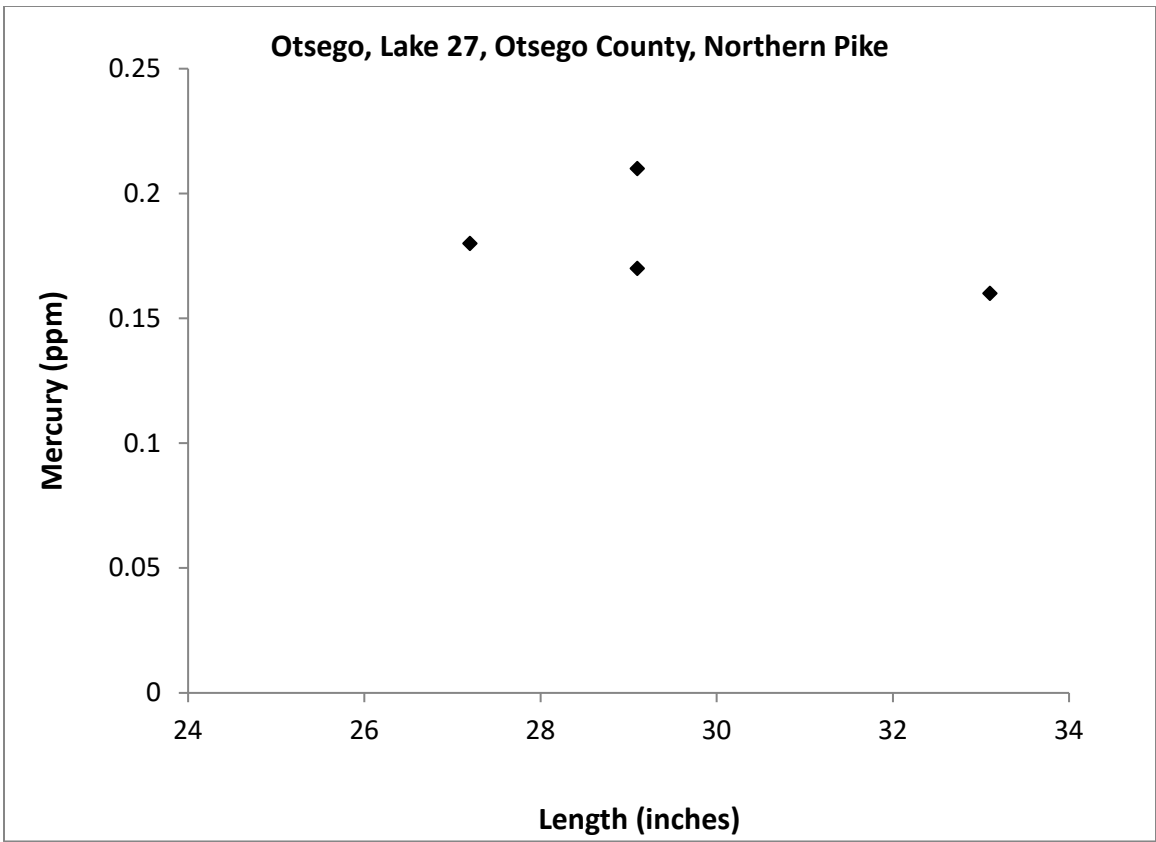
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
1995	1995	4	27.2	24	27.2	33.1	
Datasets available: 1995							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
Mercury	4	0.18	0.17	0.21	0.21	--	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.210	0.234					

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
--	--	0					
Datasets available: --							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
PCB	0	--	--	--	--	--	
DDT	0	--	--	--	--	--	
Chlordane	0	--	--	--	--	--	
Toxaphene	0	--	--	--	--	--	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	--	--					
DDT	--	--					
Chlordane	--	--					
Toxaphene	--	--					
Final meal category based on UCL:							--

Existing Advisory: Lake 27 northern pike are covered under the statewide mercury consumption advisory.

Recommendation: A dataset of less than five data points for a given chemical, species and waterbody is considered insufficient for evaluation using the standard evaluation method. The statewide advice due to mercury applies to Lake 27 northern pike: No one should eat more than 2 meals per month of northern pike smaller than 30 inches or more than 1 meal per month of northern pike larger than 30 inches.



Walleye

Otsego Lake

Otsego County

Hg Analysis:

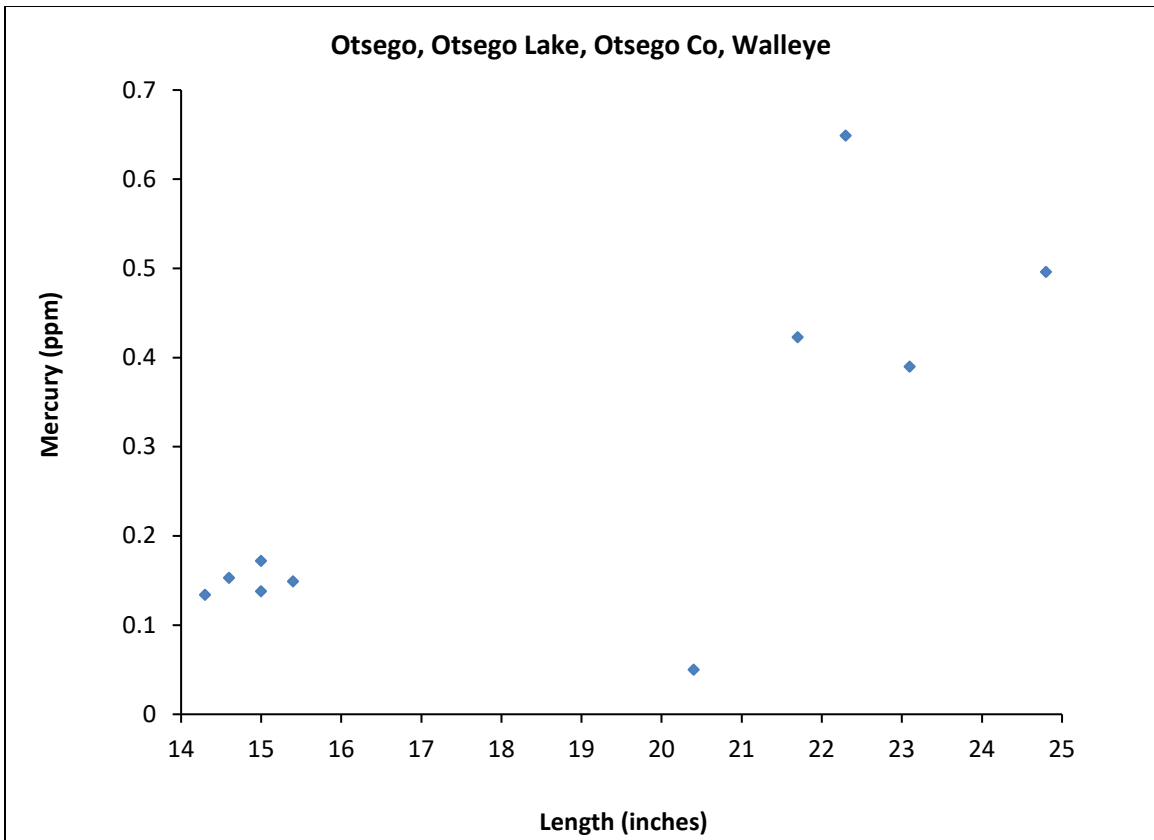
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2007	2007	10	14.3	15	14.6	24.8
Datasets available: 2007						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	9	0.29	0.05	0.65	0.45	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.585	0.389				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available: --						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						2

Existing Advisory: Otsego Lake walleye are covered under the statewide mercury consumption advisory.

Recommendation: No one should eat more than 2 meals per month of Otsego Lake walleye due to mercury.



Presque Isle County

See Alpena County for Long Lake

Rock Bass

Grand Lake

Presque Isle County

Hg Analysis:

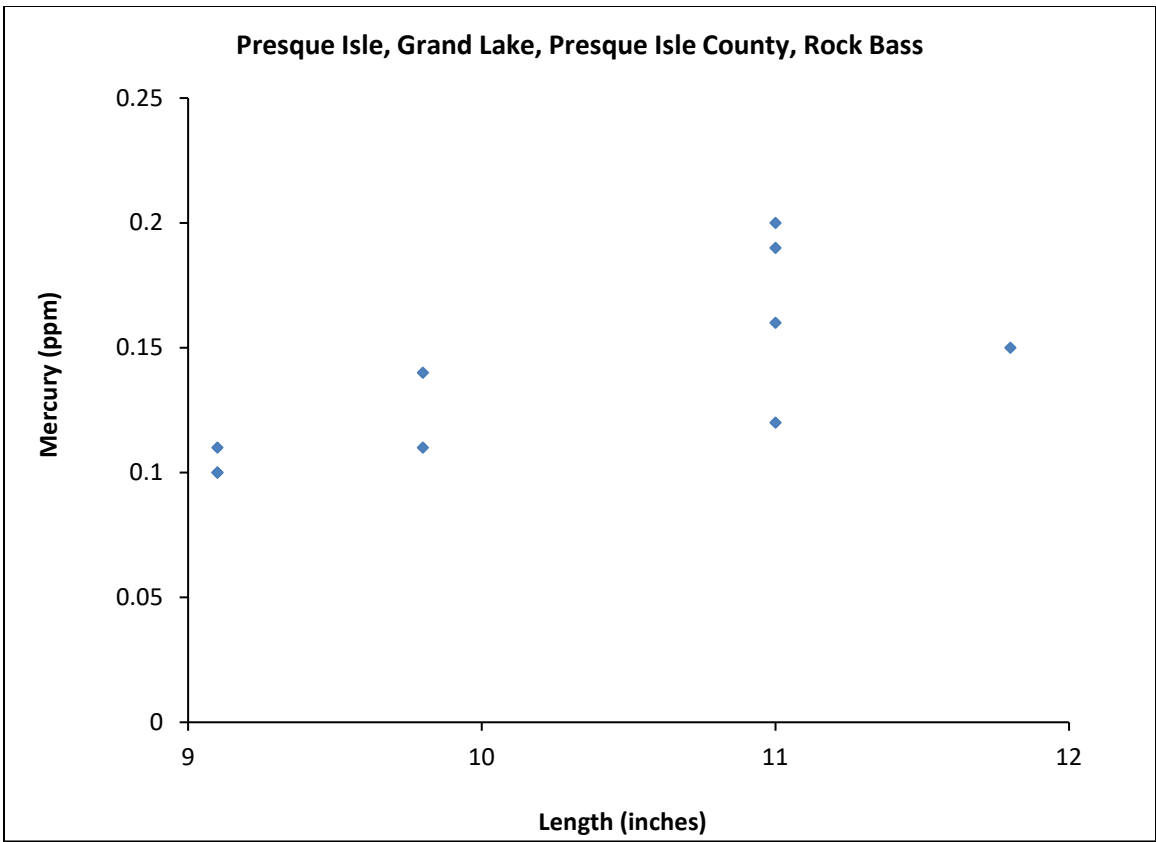
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1995	1995	10	9.1	na	9.1	11.8
Datasets available: 1995						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.14	0.10	0.20	0.16	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.527	0.580				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	--	--	--	--	--
Datasets available: --						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						4

Existing Advisory: Grand Lake rock bass are covered under the statewide mercury consumption advisory.

Recommendation: No one should eat more than 4 meals per month of Grand Lake rock bass due to mercury.



Smallmouth Bass

Grand Lake

Presque Isle County

Hg Analysis:

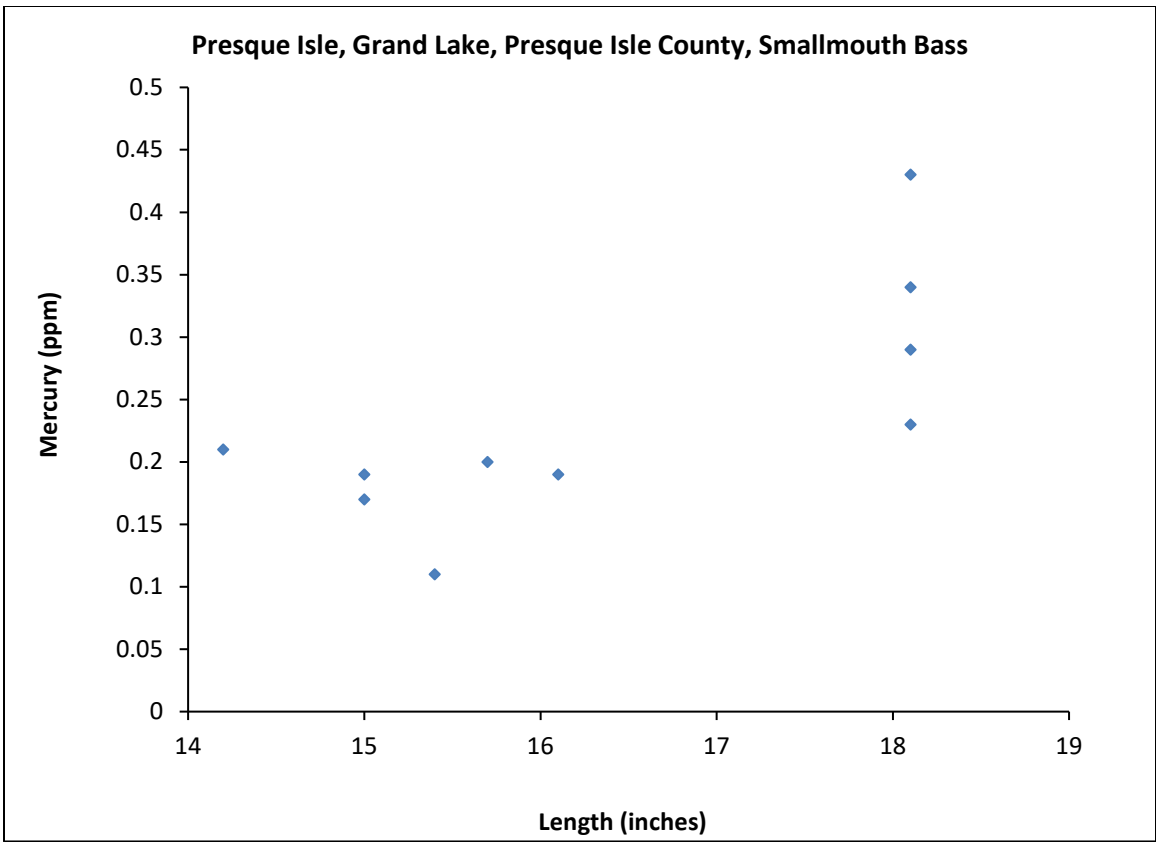
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1995	1995	10	14.2	14	14.2	18.1
Datasets available: 1995						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.24	0.11	0.43	0.30	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.549	0.526				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	--	--	--	--	--
Datasets available: --						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						2

Existing Advisory: Grand Lake smallmouth bass are covered under the statewide mercury consumption advisory.

Recommendation: No one should eat more than 2 meals per month of Grand Lake largemouth or smallmouth bass smaller than 18 inches or more than 1 meal per month of those fish larger than 18 inches. The statewide length break was applied as the size of the fish was limited.



Walleye

Grand Lake

Presque Isle County

Hg Analysis:

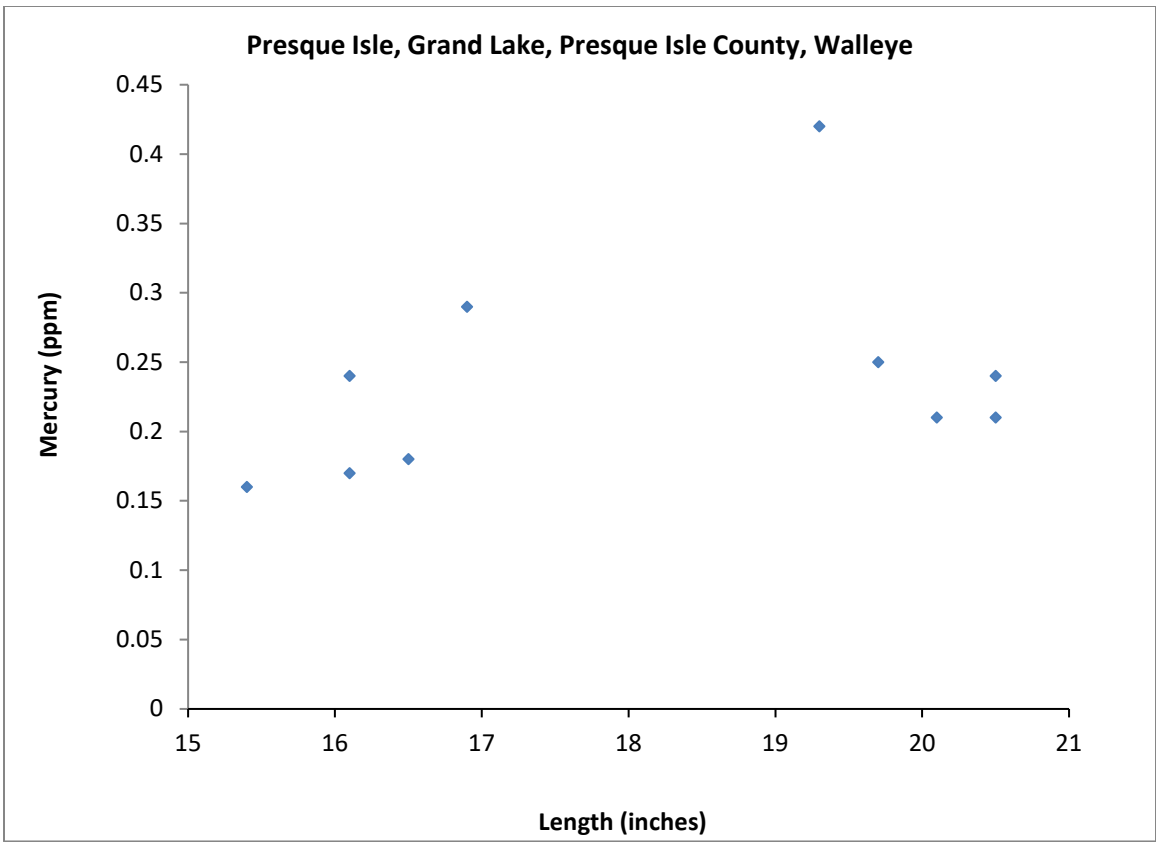
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1995	1995	10	15.4	15	15.4	20.5
Datasets available: 1995						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.24	0.16	0.42	0.29	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.121	0.167				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available: --						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						2

Existing Advisory: Grand Lake walleye are covered under the statewide mercury consumption advisory.

Recommendation: No one should eat more than 2 meals per month of walleye smaller than 20 inches or more than 1 meal per month of walleye larger than 20 inches. The statewide length break was applied as the size of the fish was limited.



Northern Pike

Lake Emma

Presque Isle County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Size Range of All Samples	
Earliest	Most Recent				Min	Max
2003	2003	10	15.6	na*	15.6	19.8
Datasets available: 2003						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.43	0.26	0.65	0.52	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.582	0.599				

Organics Analysis:

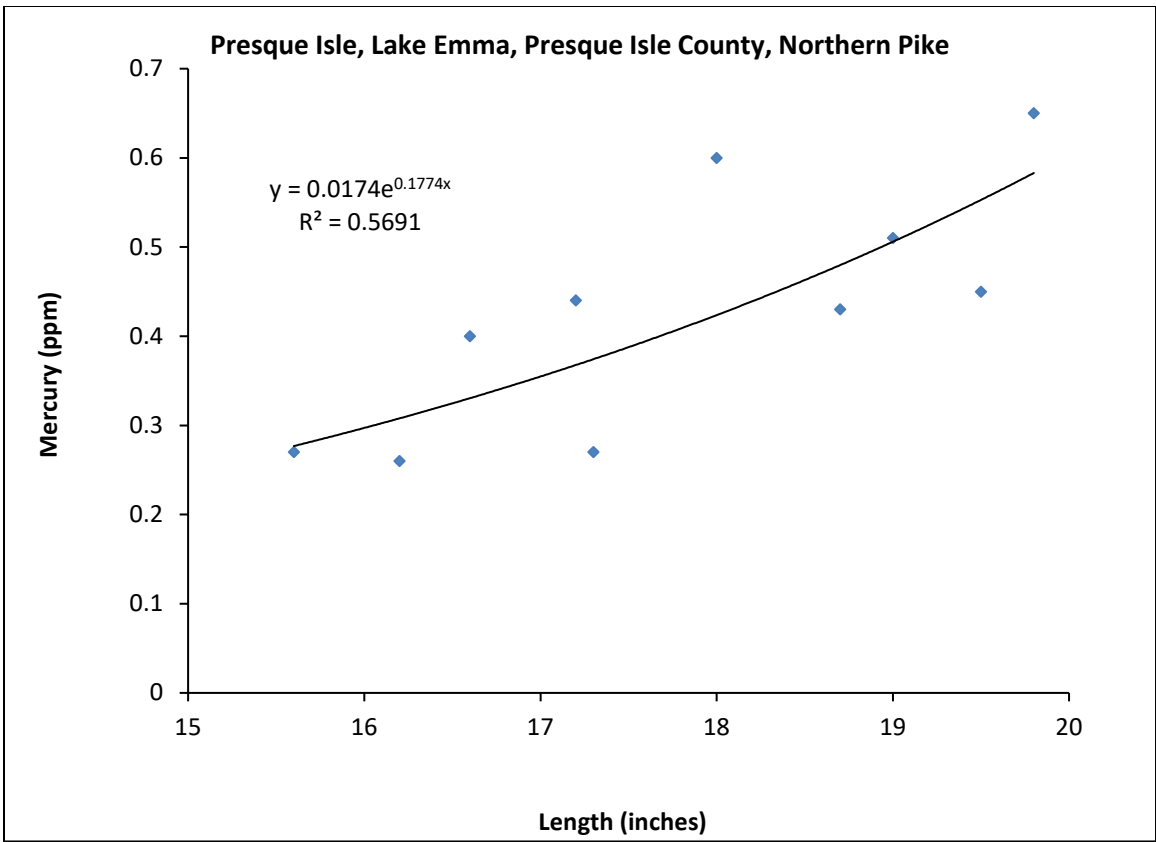
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Size Range of All Samples	
Earliest	Most Recent				Min	Max
--	--	--	--	--	--	--
Datasets available: --						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						2

* - there is no size limit for northern pike from Emma Lake

Existing Advisory: Women and children should not eat more than one meal per week of Lake Emma northern pike less than 22 inches or more than one meal per month of those fish larger than 22 inches due to mercury.

Recommendation: No one should eat more than 2 meals per month of Lake Emma northern pike smaller than 20 inches or more than 1 meal per month of those fish larger than 20 inches due to mercury.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
15	0.25	4
16	0.30	2
17	0.36	2
18	0.42	2
19	0.51	2
20	0.60	1
21	0.72	1
22	0.86	1
23	1.03	1
<i>Shaded area denotes extrapolated estimates</i>		



Hg Analysis:

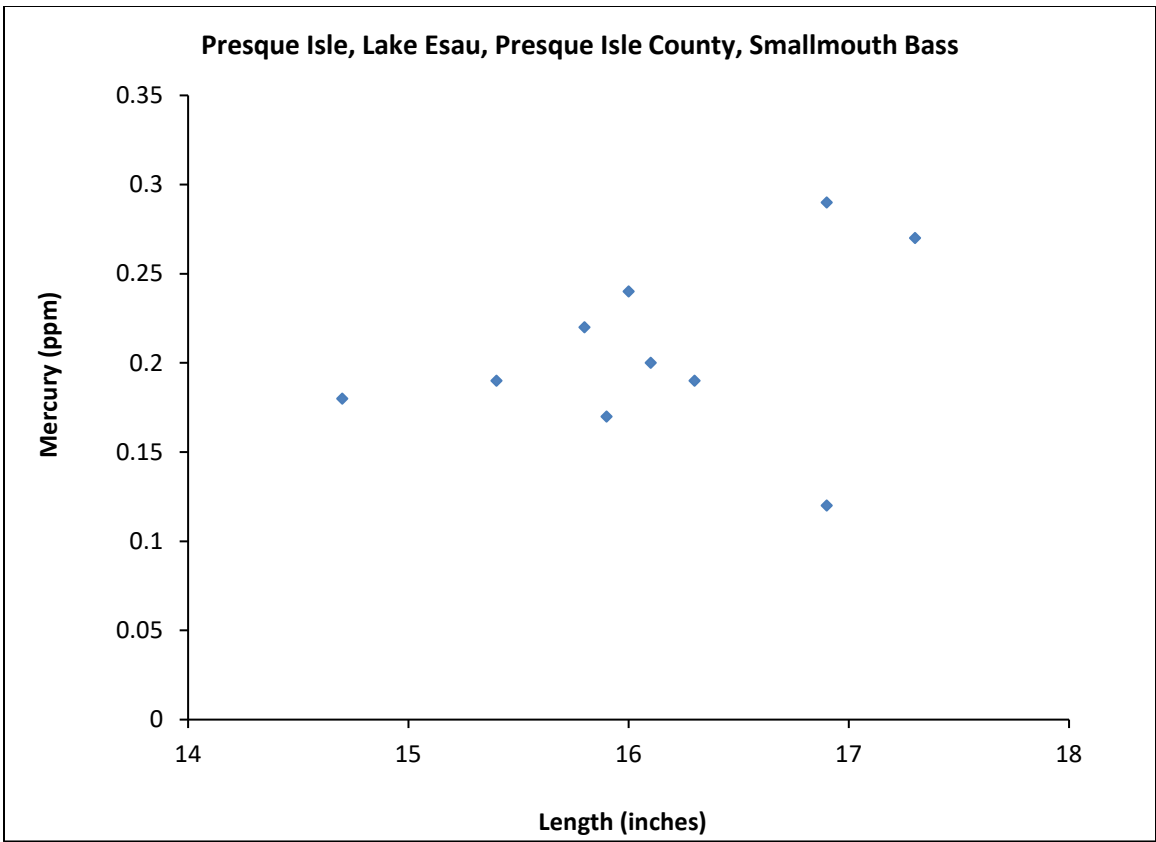
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2003	2003	10	14.7	14	14.7	17.3
Datasets available: 2003						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.21	0.12	0.27	0.24	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.118	0.054				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	--	--	--	--	--
Datasets available: --						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						4

Existing Advisory: Due to elevated levels of mercury; women and children should eat no more than one meal per month and the general population should eat no more than one meal per week of Lake Esau smallmouth bass greater than 18 inches in length.

Recommendation: No one should eat more than 4 meals per month of Lake Esau largemouth or smallmouth bass smaller than 18 inches or more than 2 meals per month of those fish larger than 18 inches due to mercury. The statewide length break was applied as the size of the fish was limited.



**Largemouth Bass
& Smallmouth Bass
Hg Analysis:**

Lake Nettie

Presque Isle County

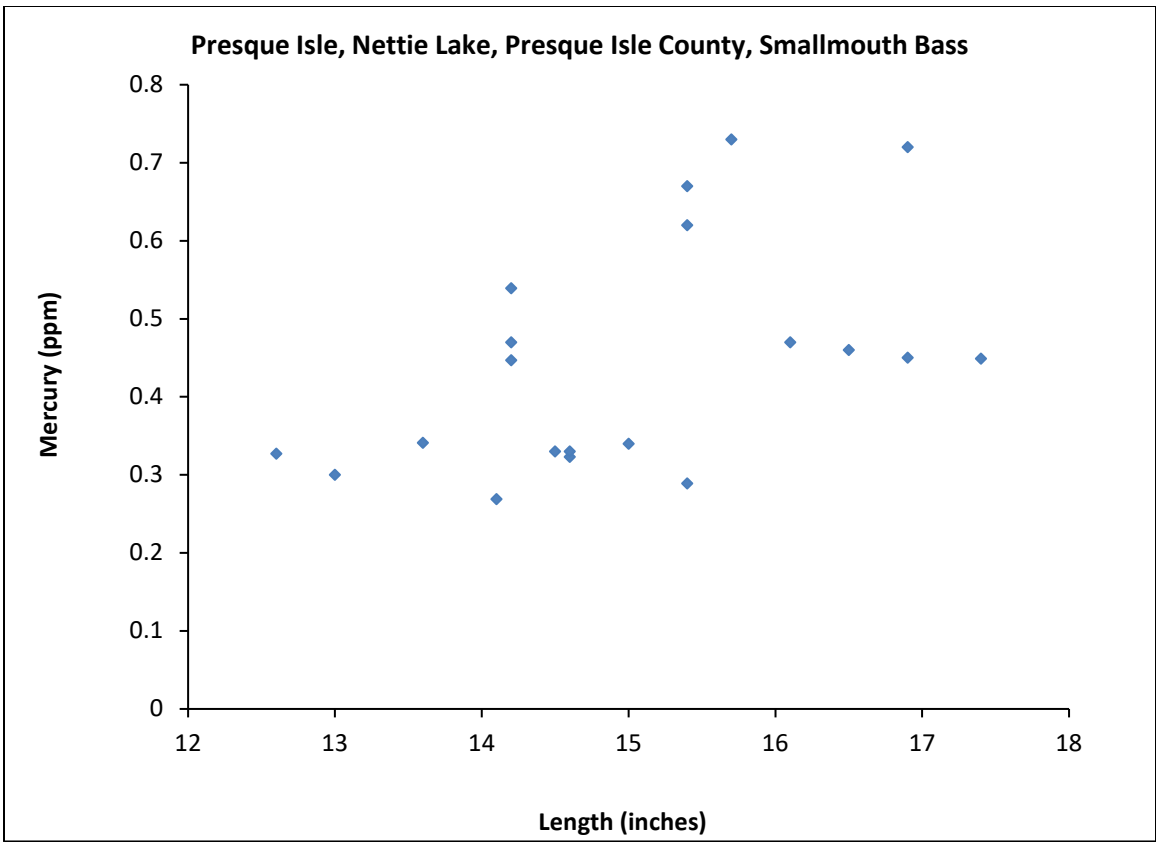
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
1995	2005	20	12.6	14	13.6	17.4	
Datasets available:		2005					
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
Mercury	18	0.46	0.27	0.73	0.53	2	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.255	0.279					

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
--	--	--	--	--	--	--	
Datasets available:		--					
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
PCB	0	--	--	--	--	--	
DDT	0	--	--	--	--	--	
Chlordane	0	--	--	--	--	--	
Toxaphene	0	--	--	--	--	--	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	--	--					
DDT	--	--					
Chlordane	--	--					
Toxaphene	--	--					
Final meal category based on UCL:						2	

Existing Advisory: Nettie Lake bass are covered under the statewide mercury consumption advisory.

Recommendation: No one should eat more than 2 meals per month of Nettie Lake largemouth or smallmouth bass smaller than 18 inches or more than 1 meal per month of those fish larger than 18 inches. The statewide length break was applied as the size of the fish was limited.



Northern Pike

Lake Nettie

Presque Isle County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1995	1995	3	24.4	na*	24.4	25.2
Datasets available: 1995						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	3	0.68	0.62	0.72	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	--	--				

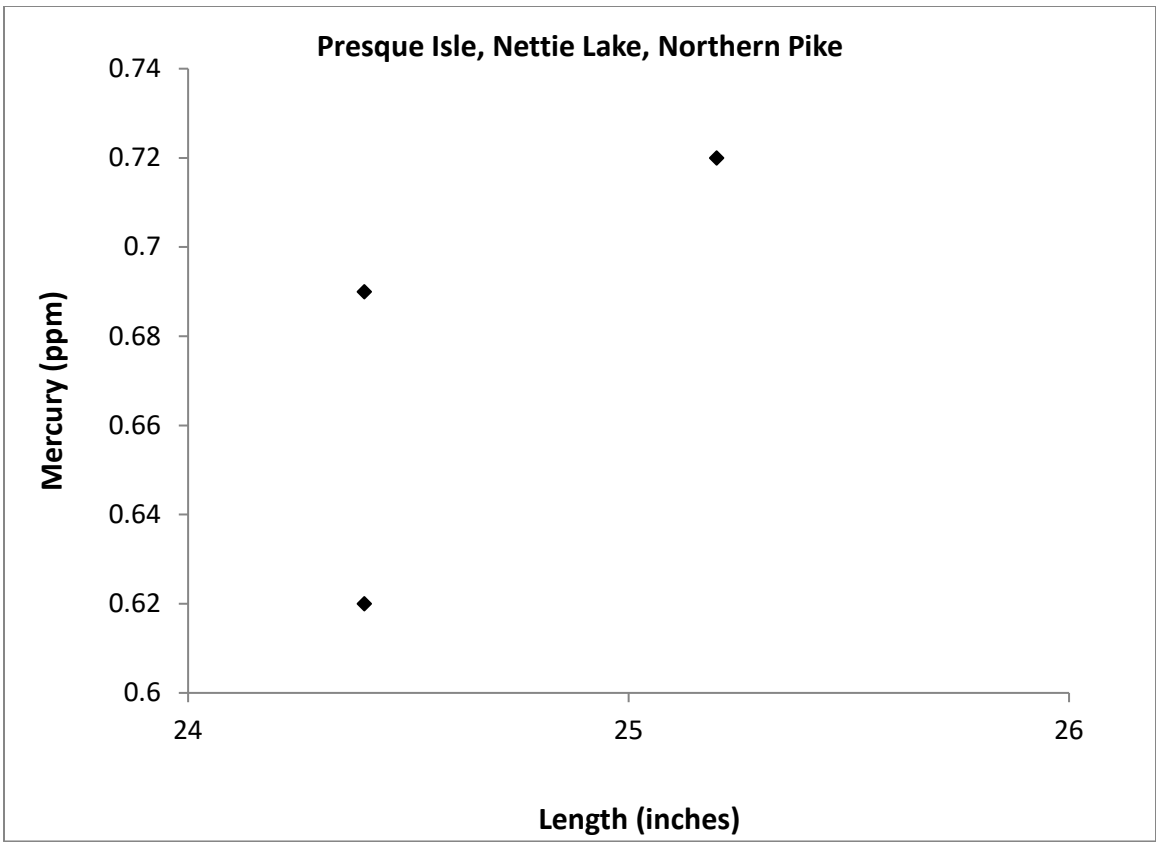
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available: --						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						1

* - there is no size limit on northern pike from Nettie Lake

Existing Advisory: Nettie Lake northern pike are covered under the statewide mercury consumption advisory.

Recommendation: A dataset of less than five data points for a given chemical, species and waterbody is considered insufficient for evaluation using the standard evaluation method. The statewide advice due to mercury applies to Nettie Lake northern pike: No one should eat more than 2 meals per month of northern pike smaller than 30 inches or more than 1 meal per month of northern pike larger than 30 inches.



Largemouth Bass

Lost Lake

Presque Isle County

Hg Analysis:

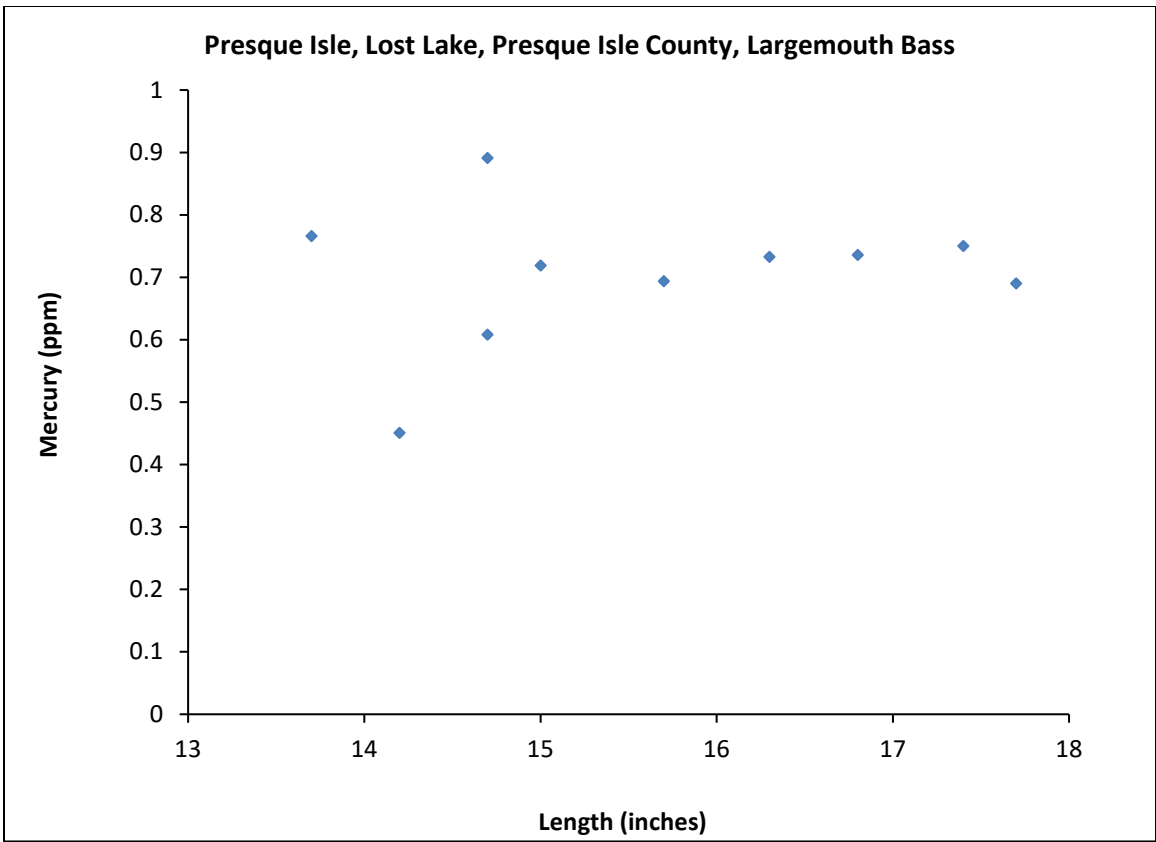
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2007	2007	10	13.7	14	13.7	17.7
Datasets available: 2007						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.70	0.45	0.89	0.79	1
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.033	0.056				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available: --						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						1

Existing Advisory: Lost Lake largemouth bass are covered under the statewide mercury consumption advisory.

Recommendation: No one should eat more than 1 meal per month of Lost Lake largemouth or smallmouth bass smaller than 18 inches or more than 6 meals per year of those fish larger than 18 inches due to mercury. The statewide length break was applied as the size of the fish was limited.



Northern Pike

Ocqueoc Lake

Presque Isle

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
2016	2016	10	16.0	NA*	16.0	25.0	
Datasets available: 2016							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)		
Mercury	10	0.518	0.320	0.740	0.624	1	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.561	0.557					

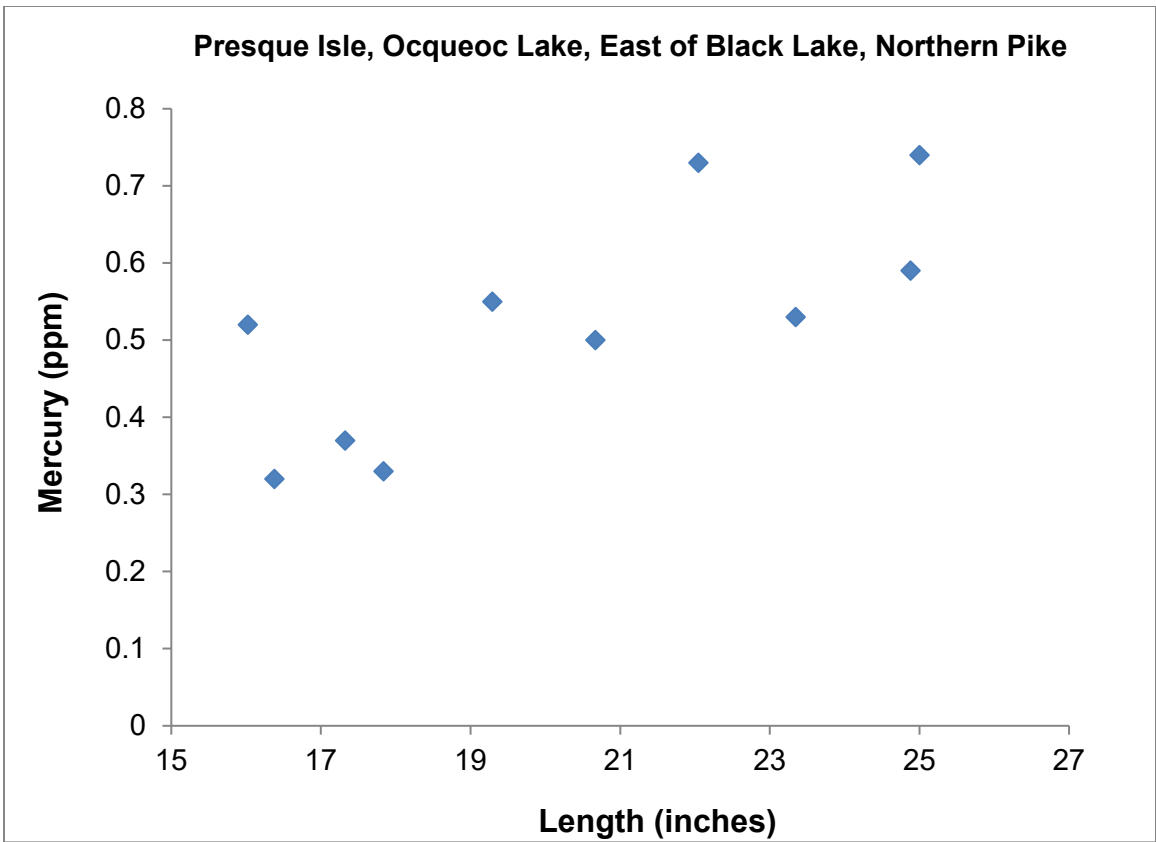
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
--	--	--	--	--	--	--	
Datasets available: --							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)		
PCB	0	--	--	--	--	--	
DDT	0	--	--	--	--	--	
Chlordane	0	--	--	--	--	--	
Toxaphene	0	--	--	--	--	--	
PFOS	0	--	--	--	--	--	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	--	--					
DDT	--	--					
Chlordane	--	--					
Toxaphene	--	--					
PFOS	--	--					
Final meal category based on UCL:							1

*Pike of any size may be taken from Ocqueoc Lake with only 1 greater than 24 inches allowed in the daily possession limit

Existing MDHHS Advisory: Northern Pike from Ocqueoc Lake in Presque Isle County are currently covered under the statewide mercury guideline. No one should eat more than 2 meals per month of pike smaller than 30 inches or no more than 1 meal per month of pike larger than 30 inches.

Recommendation: No one should eat more than 1 meal per month of northern pike smaller than 30 inches from Ocqueoc Lake in Presque Isle County or no more than 6 meals per year of these fish larger than 30 inches due to mercury. Statewide length break applied due to limited size of fish used in the dataset.



Roscommon County

Brown Trout

Higgins Lake

Roscommon County

Hg Analysis:

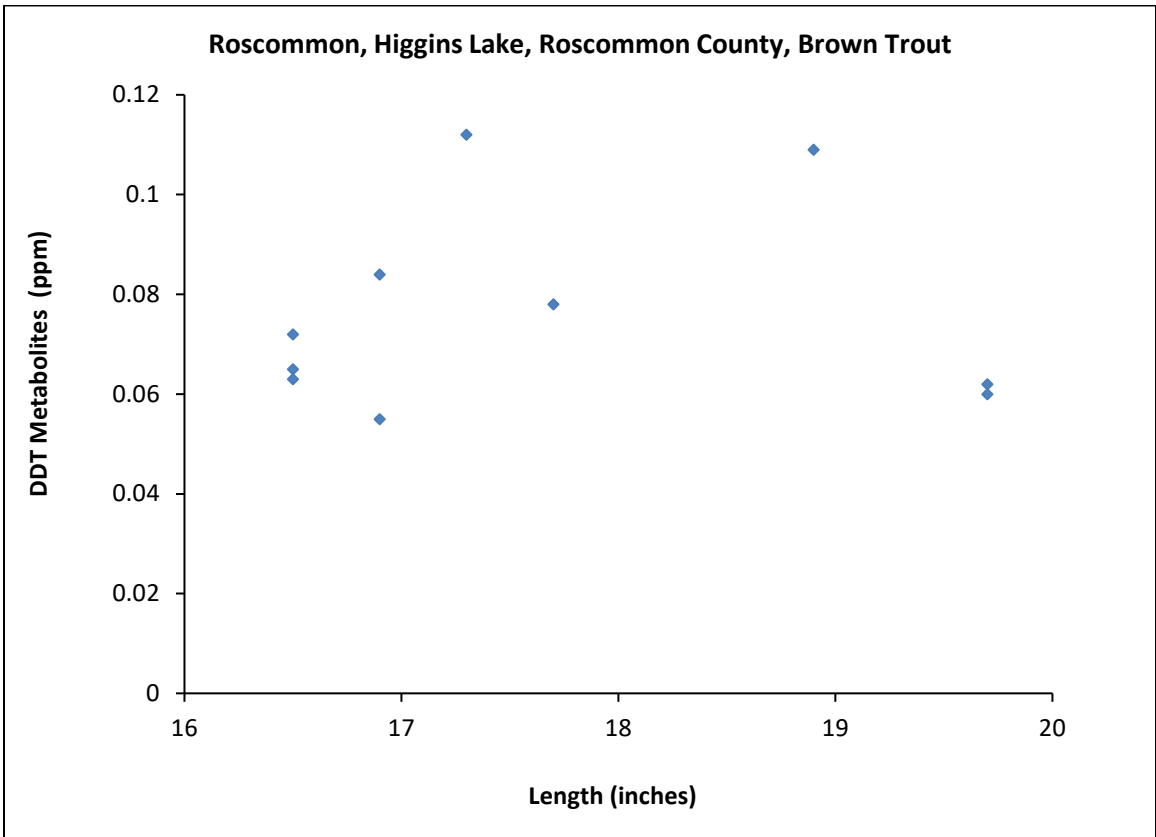
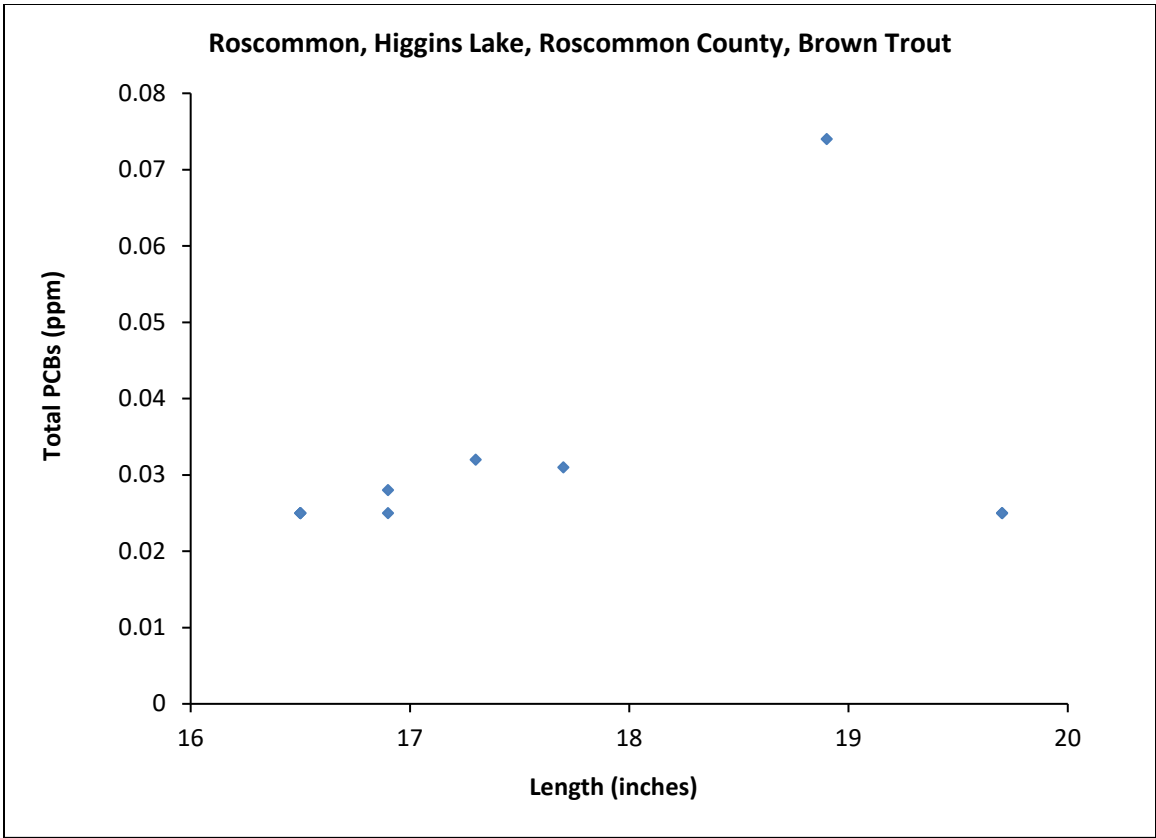
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1988	1988	10	16.5	15	16.5	19.7
Datasets available: 1988						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	ND	--	--	--	16
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	--	--				

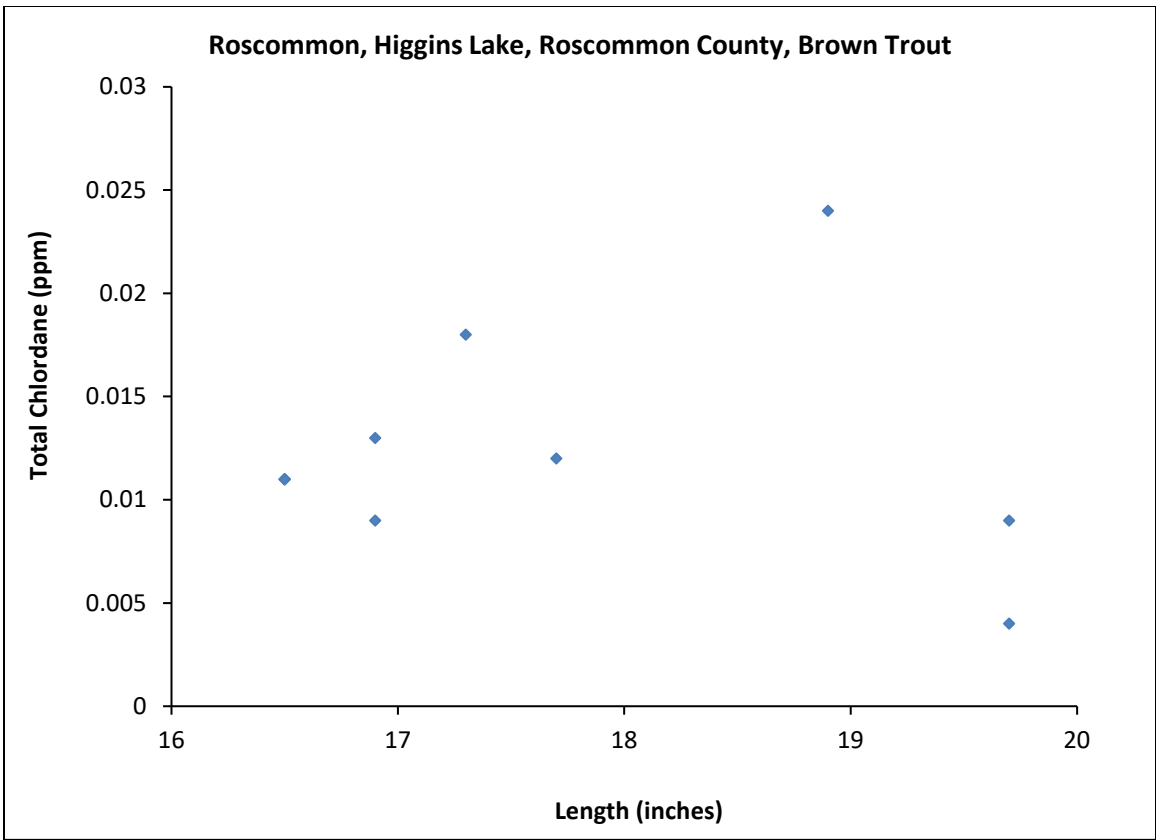
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1988	1988	10	16.5	15	16.5	19.7
Datasets available: 1988						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.03	0.02	0.07	0.04	4*
DDT	10	0.08	0.06	0.11	0.09	16
Chlordane	10	0.01	0.004	0.02	0.02	--
Toxaphene	10	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.100	0.090				
DDT	0.002	0.000				
Chlordane	0.006	0.091				
Toxaphene	--	--				
Final meal category based on UCL:						4*

Existing Advisory: There are no current consumption advisories for Higgins Lake brown trout.

Recommendation: No one should eat more than 8 meals per month of Higgins Lake brown trout due to PCBs. The quality of this dataset is limited due to the age of the data. *Based on the EGLE Fish Contaminant Monitoring Program, PCB concentrations ≥ 15 years old are expected to have declined to a concentration that allows a less restrictive meal category than determined by the standard evaluation method.





Lake Herring

Higgins Lake

Roscommon County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1988	1995	18	11.8	na	11.8	15.7
Datasets available: 1988, 1995						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	18	0.12	0.07	0.21	0.14	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.692	0.735				

Organics Analysis:

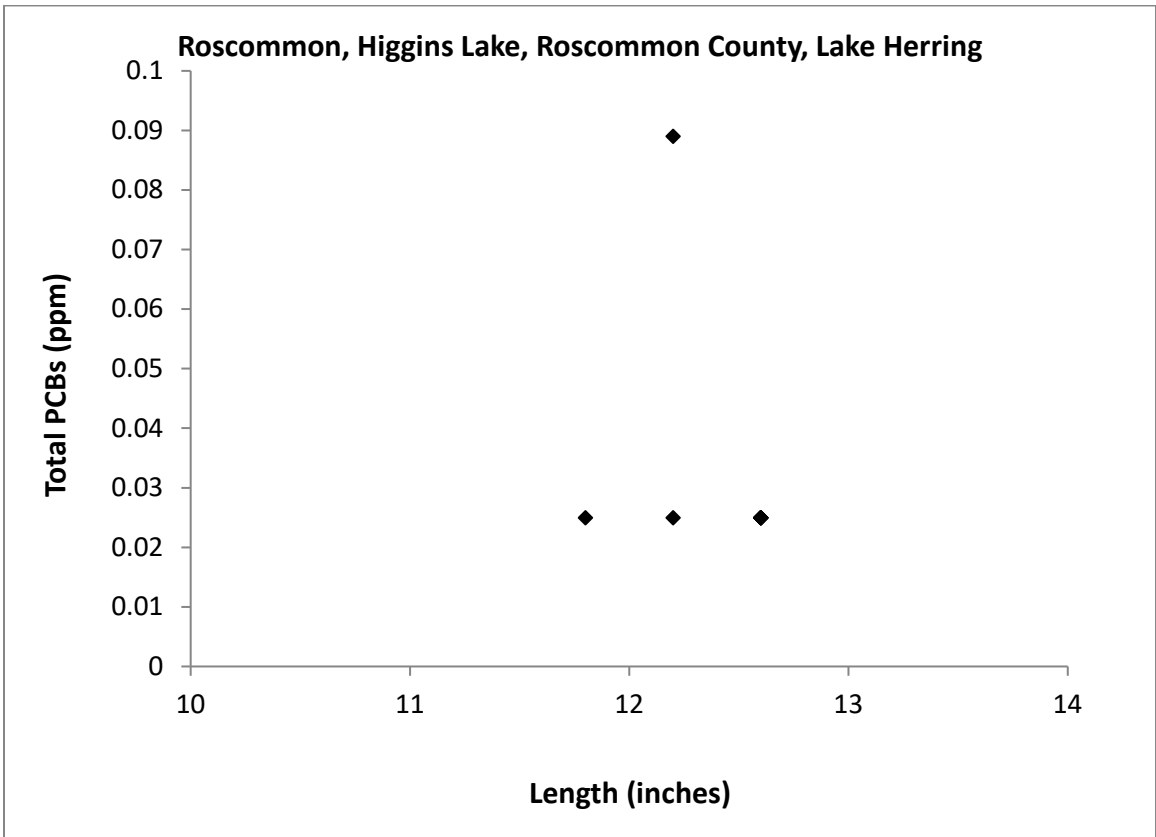
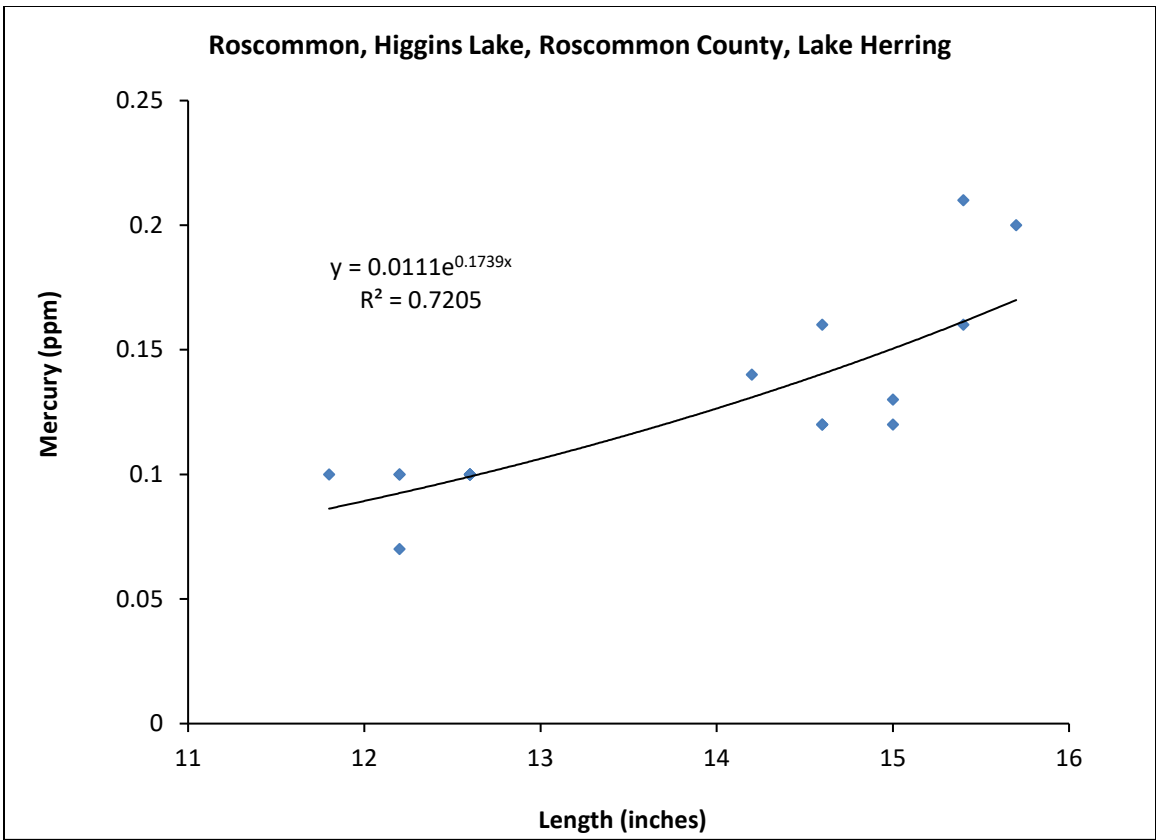
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1988	1988	8	11.8	na	11.8	12.6
Datasets available: 1988						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	8	0.03	0.02	0.09	0.05	4*
DDT	8	0.12	0.08	0.16	0.15	12
Chlordane	8	0.06	0.03	0.08	0.07	--
Toxaphene	8	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.071	0.071				
DDT	0.011	0.014				
Chlordane	0.095	0.083				
Toxaphene	--	--				
Final meal category based on UCL:						4

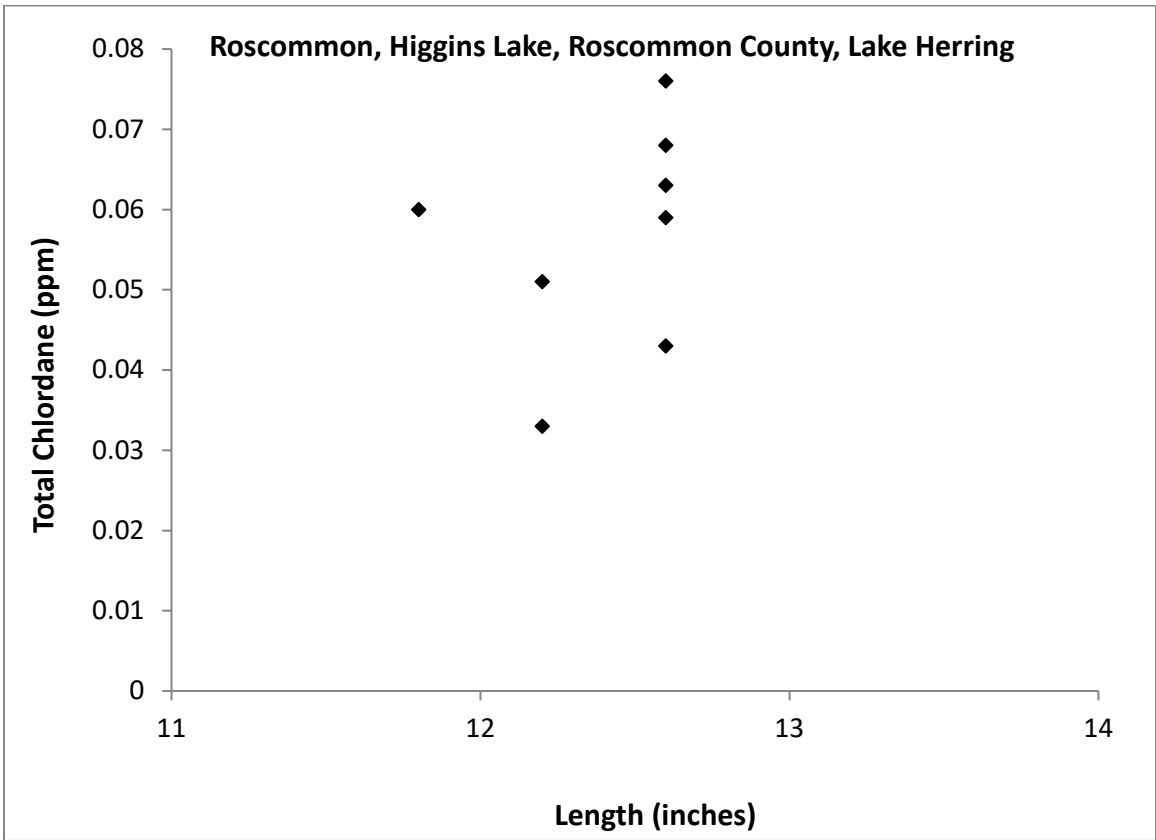
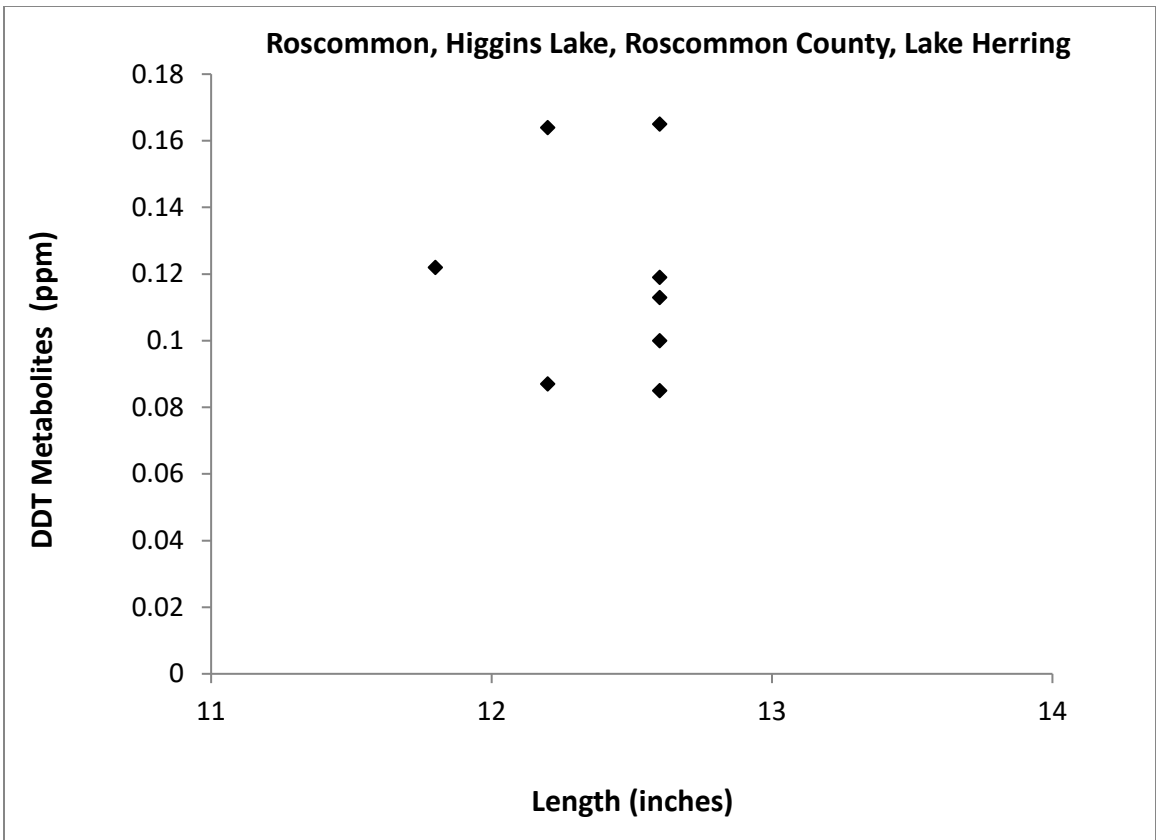
Existing Advisory: There are no consumption advisories for Higgins Lake lake herring.

Recommendation: No one should eat more than 8 meals per month of Higgins Lake lake herring smaller than 14 inches due to PCBs and mercury or more than 4 meals per month of those fish larger than 14 inches due to mercury. The quality of this dataset is limited due to the age of the data. *Based on the EGLE Fish Contaminant Monitoring Program, PCB concentrations ≥15 years old are expected to have declined to a concentration that allows a less restrictive meal category than determined by the standard evaluation method.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
10	0.063	16
11	0.075	12
12	0.089	12
13	0.106	8
14	0.127	8
15	0.151	4
16	0.179	4
17	0.213	4
18	0.254	4
<i>Shaded area denotes extrapolated estimates</i>		

Note: Only one sample had a PCB concentration above the QL of 0.025 ppm.





Lake Trout

Higgins Lake

Roscommon County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1995	2011	27	20.1	15	20.1	37.6
Datasets available: 1988, 1995, 1998, 2011						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	27	0.33	0.14	0.85	0.41	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.588	0.610				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1998	2011	20	20.1	15	20.1	37.6
Datasets available: 1988, 1998, 2011						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	20	0.45	0.016	3.81	0.85	Limited
DDT	20	0.81	0.03	8.47	1.69	1
Chlordane	20	0.14	0.01	0.88	0.24	--
Toxaphene	10	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.192	0.658				
DDT	0.138	0.680				
Chlordane	0.347	0.771				
Toxaphene	--	--				
Final meal category based on UCL:						Limited

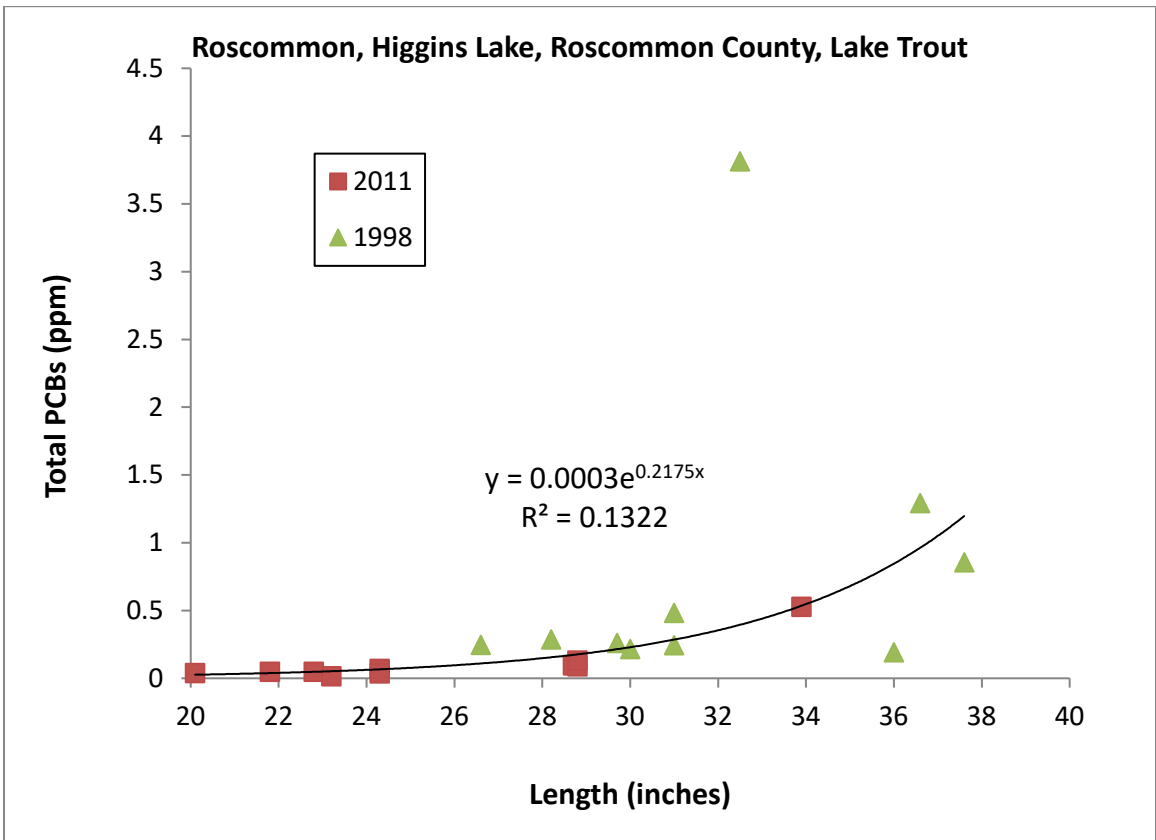
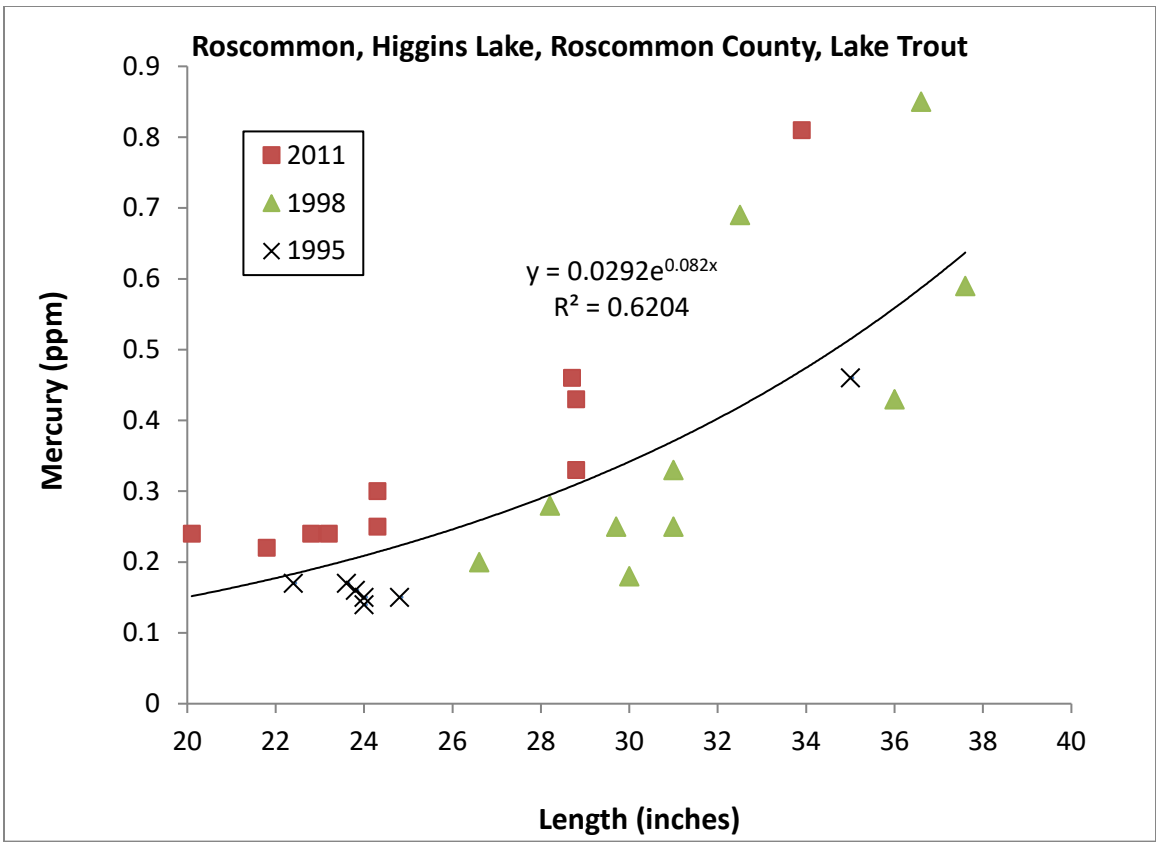
Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category	PCB Regression Equation Estimate (ppm)	Meal Category	DDT Regression Equation Estimate (ppm)	Meal Category
16	0.11	8	0.01	16	0.01	16
18	0.13	8	0.02	12	0.02	16
20	0.15	4	0.02	12	0.03	16
22	0.18	4	0.04	4	0.05	16
24	0.21	4	0.06	2	0.09	16
26	0.25	4	0.09	2	0.13	12
28	0.29	2	0.13	1	0.21	8
30	0.34	2	0.2	1	0.32	4
32	0.4	2	0.32	0.5	0.51	2
34	0.47	2	0.49	Limited	0.79	2
36	0.56	1	0.75	Limited	1.24	1

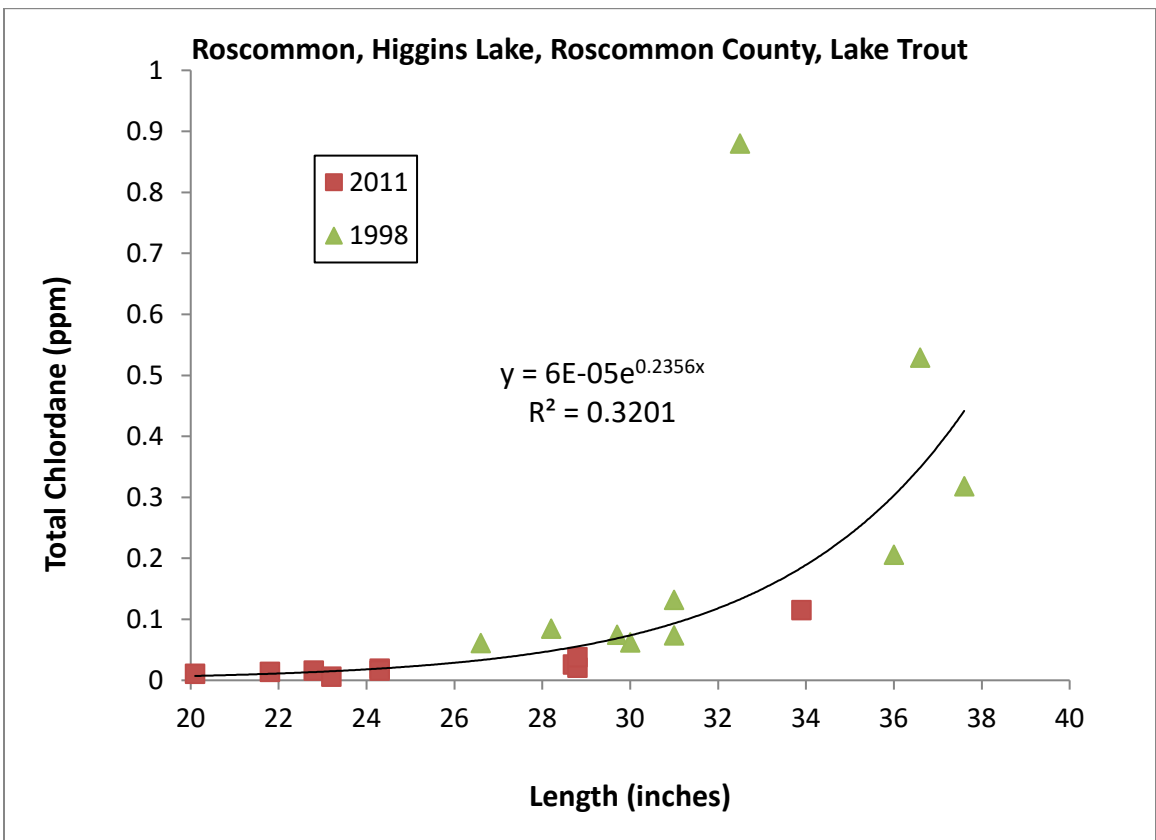
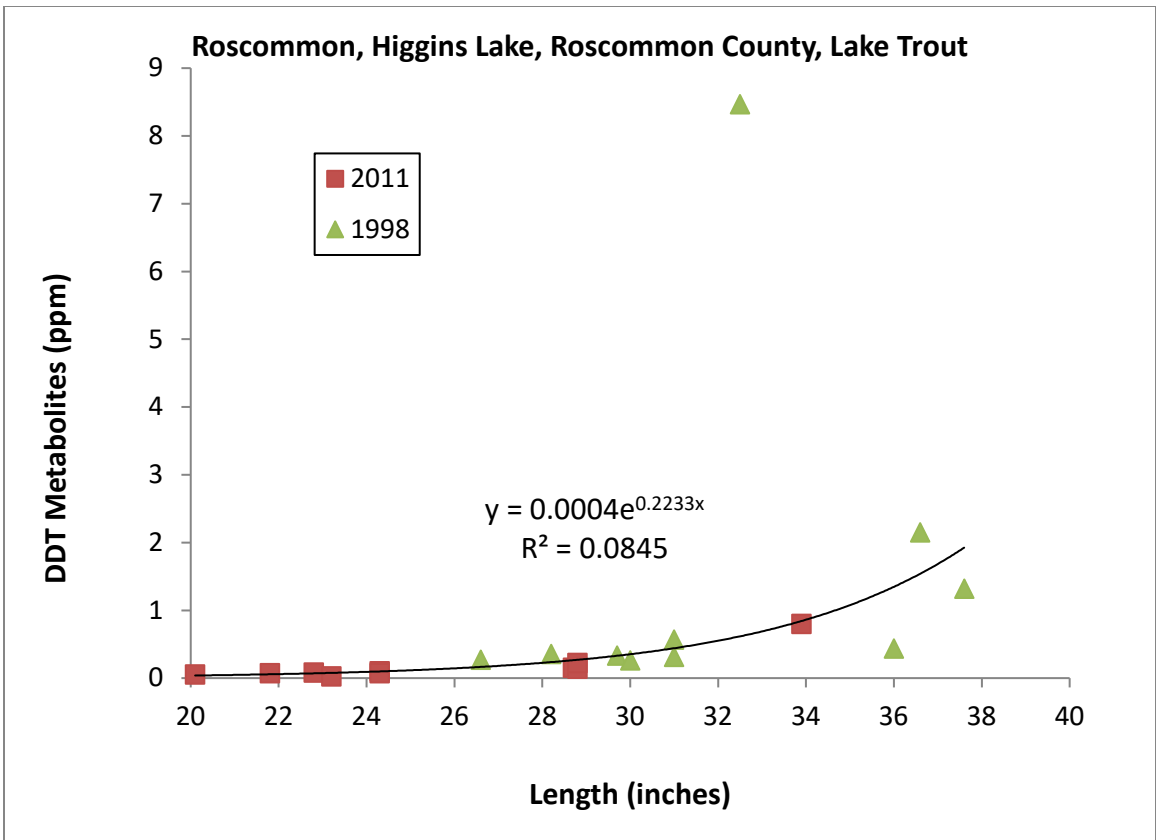
Shaded area denotes extrapolated estimates

Existing Advisory: Sensitive populations should not eat these fish. Healthy adults should not eat more than 1 or 2 meals per year of Higgins Lake lake trout due to PCBs.

Recommendation: No one should eat more than 4 meals per month of Higgins Lake lake trout smaller than 22 inches due to mercury and PCBs, or more than 1 meal per month of those fish between 22 and 30 inches due to PCBs. Sensitive populations should not eat Higgins Lake lake trout larger than 30 inches while healthy adults should not eat more than 1 or 2 meals per year of those fish. DDT would cause an advisory.

Note: The 2011 fish samples included smaller fish which resulted in use of the regression equations for the guidelines.





Rainbow Smelt

Higgins Lake

Roscommon County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2021	2021	59*	3.8	NA	3.8	6.3
Datasets available: 2021						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	3*	0.061	0.057	0.068	0.062	16
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	NA	NA				

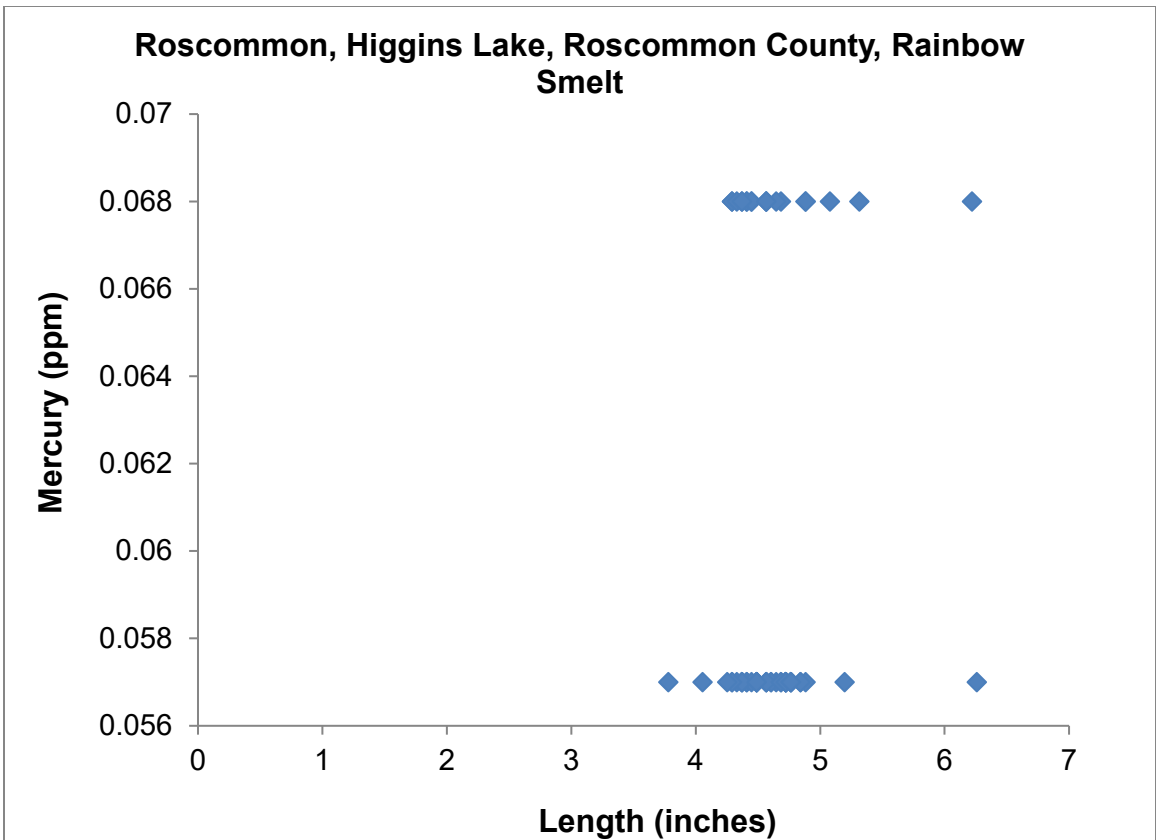
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2021	2021	59*	3.8	NA	3.8	6.3
Datasets available: 2021						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	3*	0.001	<0.001	0.001	0.001	16
DDT	3*	0.004	0.004	0.004	0.004	16
Chlordane	3*	0.001	<0.001	<0.001	<0.001	16
Toxaphene	3*	ND	--	--	--	--
PFOS	3*	34.3 ppb	26.9 ppb	43.4 ppb	36.1 ppb	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	NA	NA				
DDT	NA	NA				
Chlordane	NA	NA				
Toxaphene	NA	NA				
PFOS	NA	NA				
Final meal category based on UCL:						4

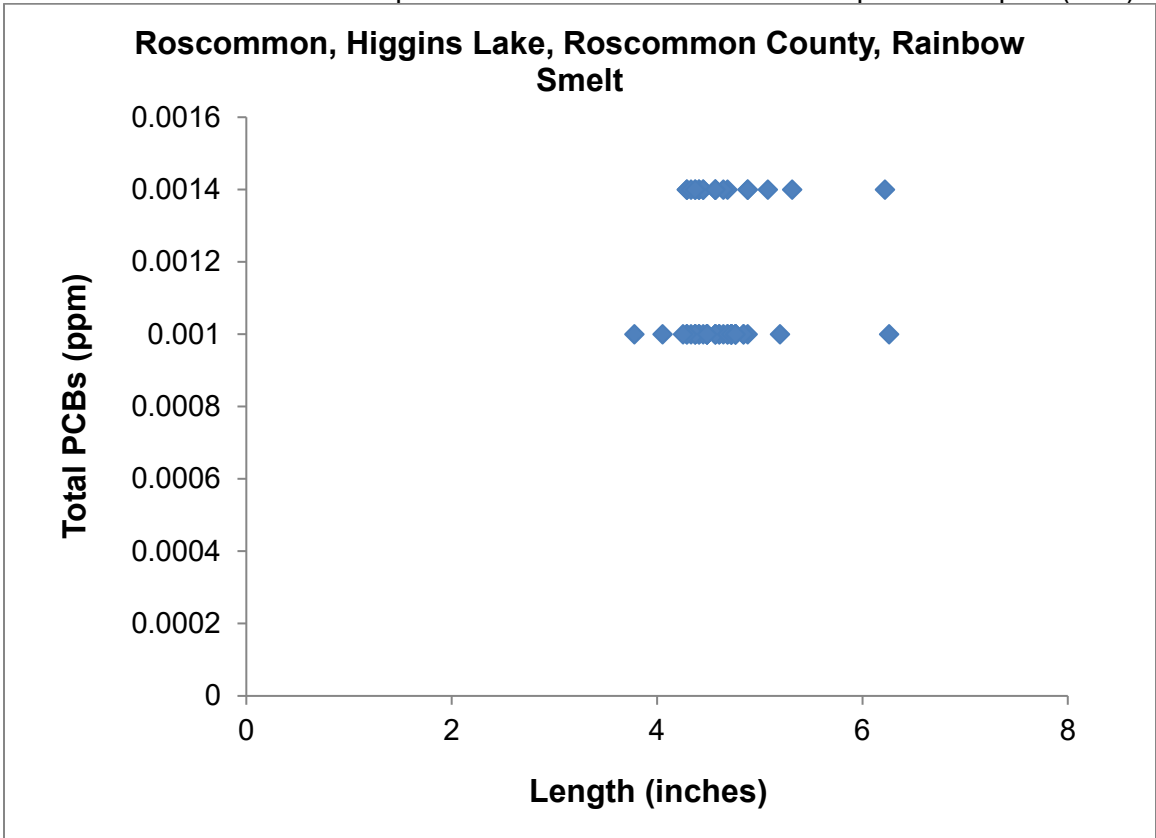
*Due to sample size requirements for the laboratory analysis, composites (N = 3) of twenty individuals (19 for one composite) were analyzed.

Existing MDHHS Advisory: There is currently no guideline for rainbow smelt from Higgins Lake.

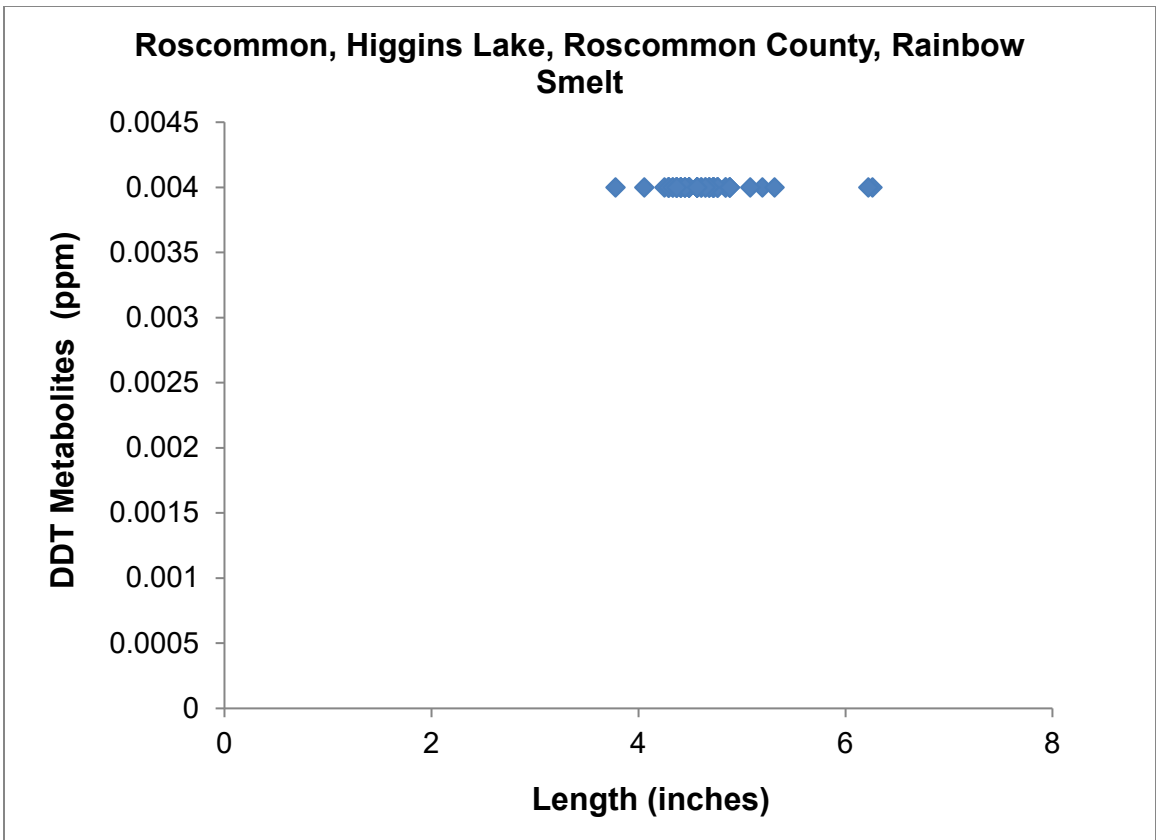
Recommendation: No one should eat more than 4 meals per month of smelt from Higgins Lake in Roscommon County due to PFOS.



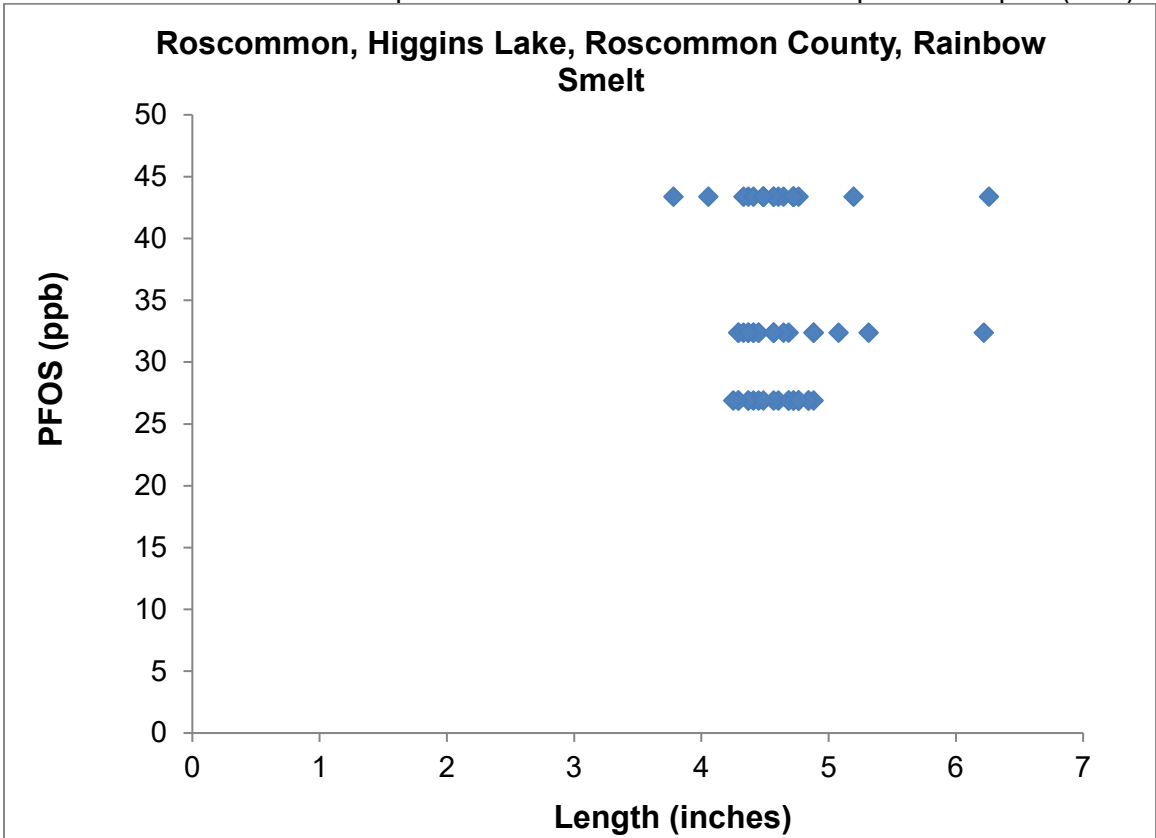
Note: Includes individual data points for each fish used in the composite samples (N=3).



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Carp

Houghton Lake

Roscommon County

Hg Analysis:

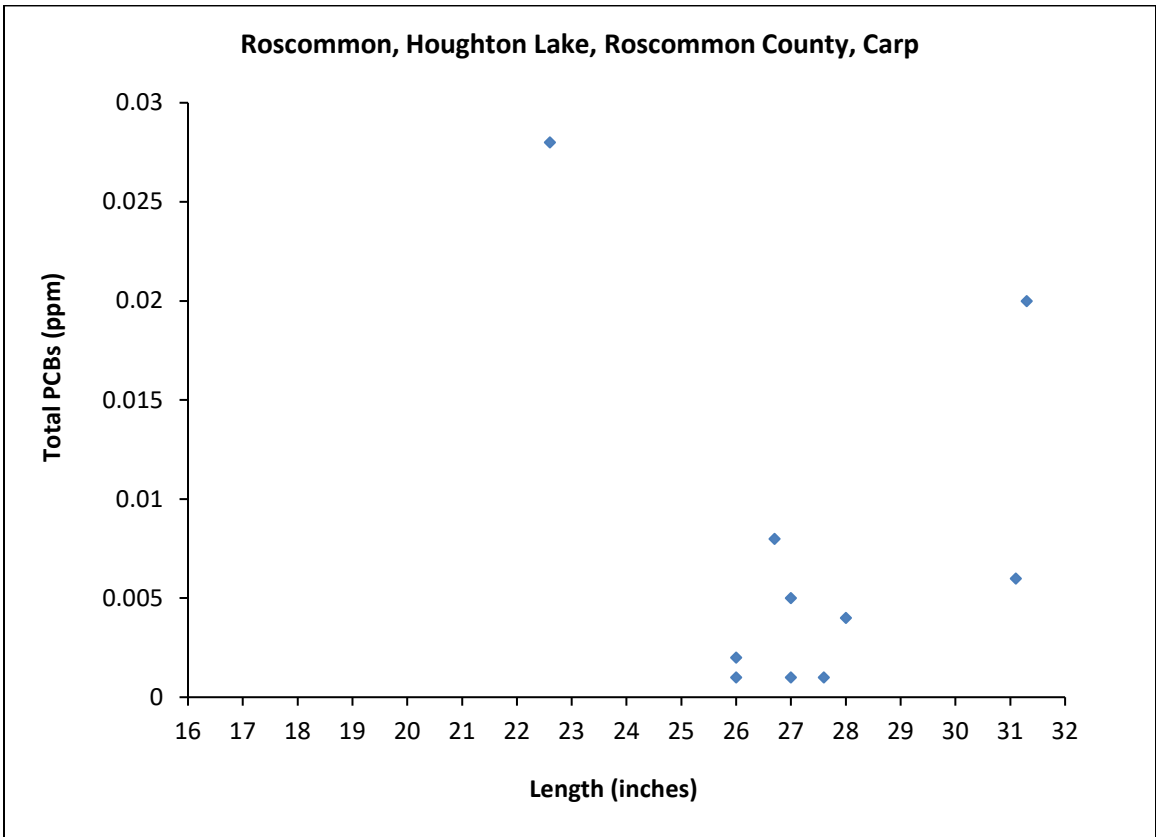
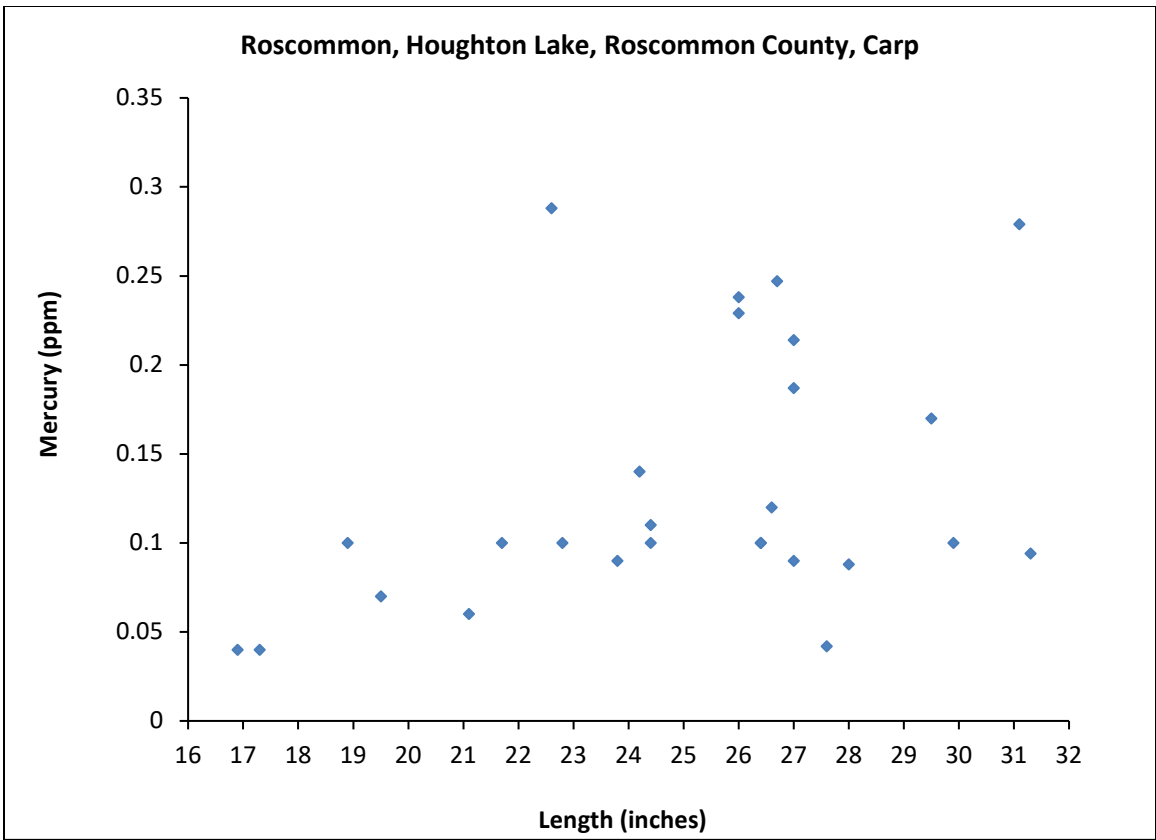
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1987	2008	27	16.9	na	16.9	31.3
Datasets available: 1987, 1998, 2008						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	27	0.13	0.04	0.29	0.16	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.157	0.232				

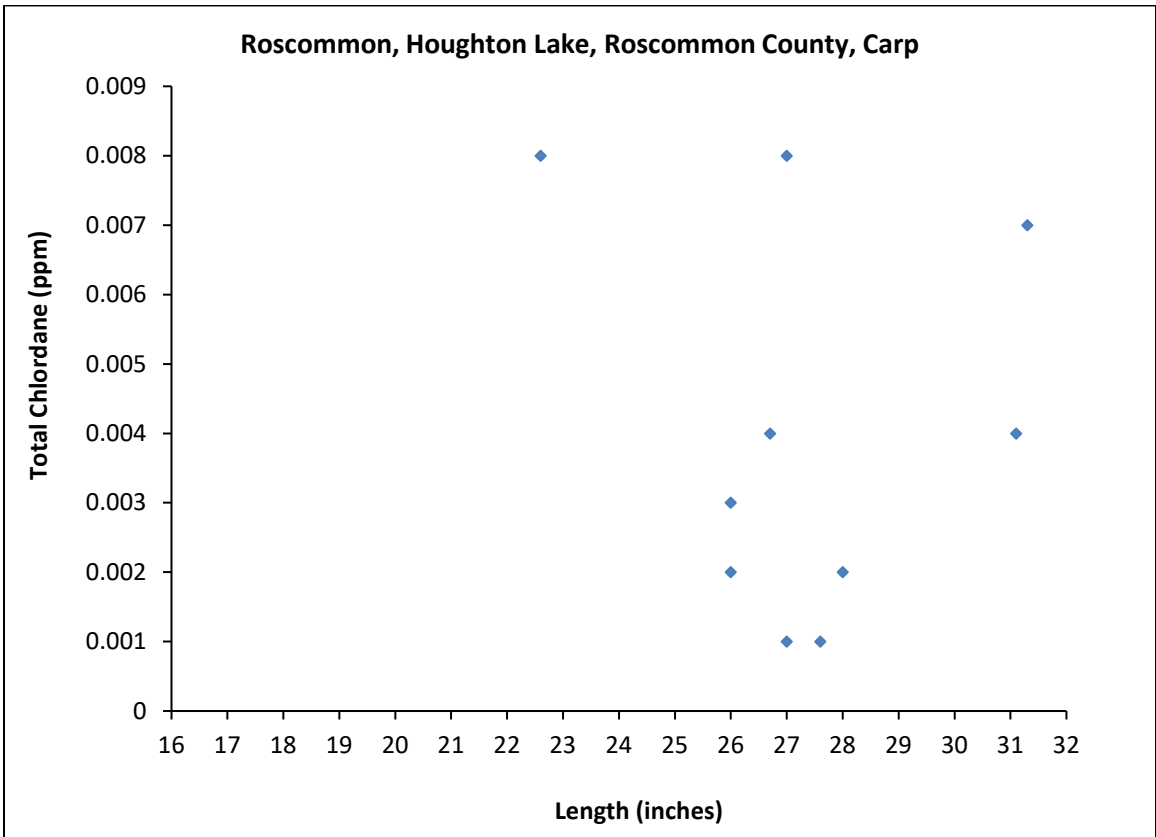
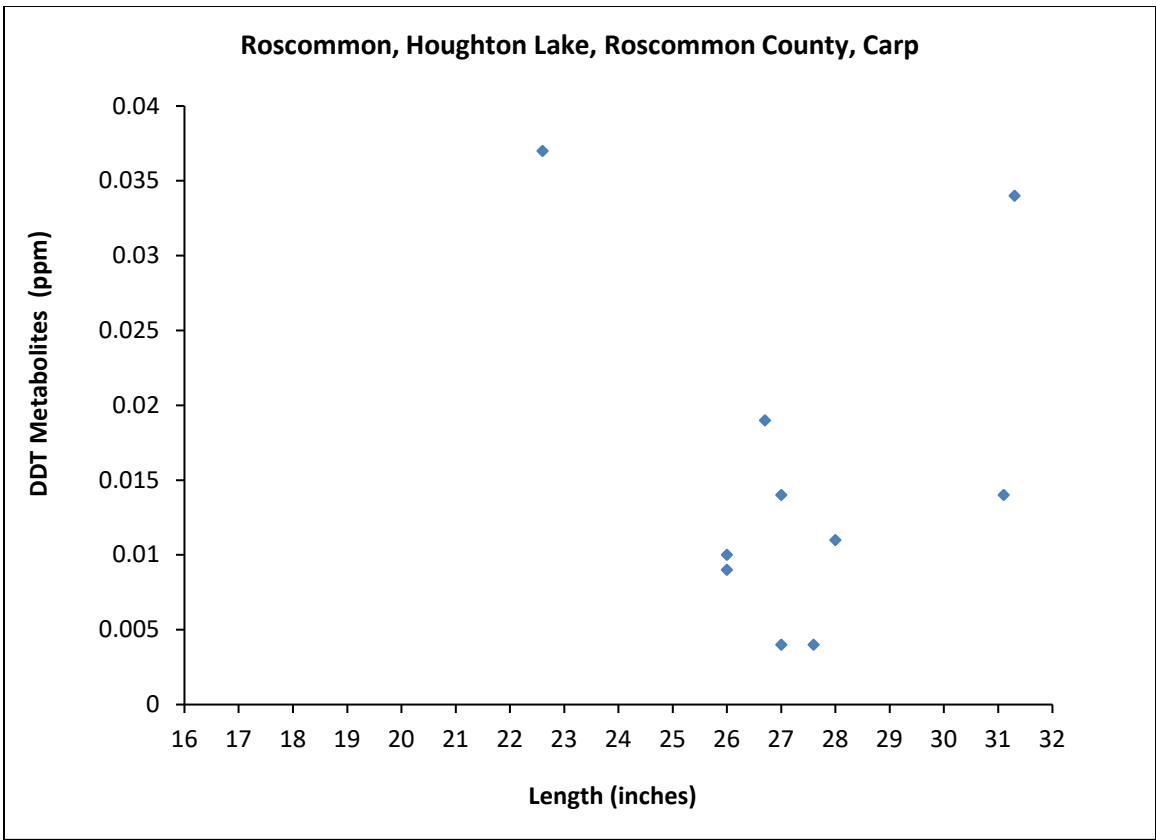
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2008	2008	10	22.6	na	22.6	31.3
Datasets available: 1987, 1998, 2008						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.008	0.001	0.03	0.01	16
DDT	10	0.02	0.004	0.04	0.02	16
Chlordane	10	0.004	0.001	0.008	0.01	--
Toxaphene	10	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.034	0.001				
DDT	0.007	0.000				
Chlordane	0.008	0.000				
Toxaphene	--	--				
Final meal category based on UCL:						4

Existing Advisory: Due to elevated levels of PCBs; women and children should eat no more than one meal per week of Houghton Lake carp greater than 22 inches in length.

Recommendation: No one should eat more than 4 meals per month of Houghton Lake carp due to mercury.





Northern Pike

Houghton Lake

Roscommon County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Size Range of All Samples	
Earliest	Most Recent				Min	Max
1987	1987	2	19.7	24	19.7	22
Datasets available:		1987				
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	2	0.18	0.18	0.19	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	--	--				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Size Range of All Samples	
Earliest	Most Recent				Min	Max
1987	1987	2	19.7	24	19.7	22
Datasets available:		1987				
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	2	ND	--	--	--	--
DDT	2	0.017	0.012	0.022	--	--
Chlordane	2	ND	--	--	--	--
Toxaphene	2	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						--

Existing Advisory: Houghton Lake northern pike are covered under the statewide mercury consumption advisory.

Recommendation: A dataset of less than five data points for a given chemical, species and waterbody is considered insufficient for evaluation using the standard evaluation method. The statewide guidelines apply to Houghton Lake northern pike: No one should eat more than 2 meals per month of northern pike smaller than 30 inches or more than 1 meal per month of northern pike larger than 30 inches.

Walleye

Houghton Lake

Roscommon County

Hg Analysis:

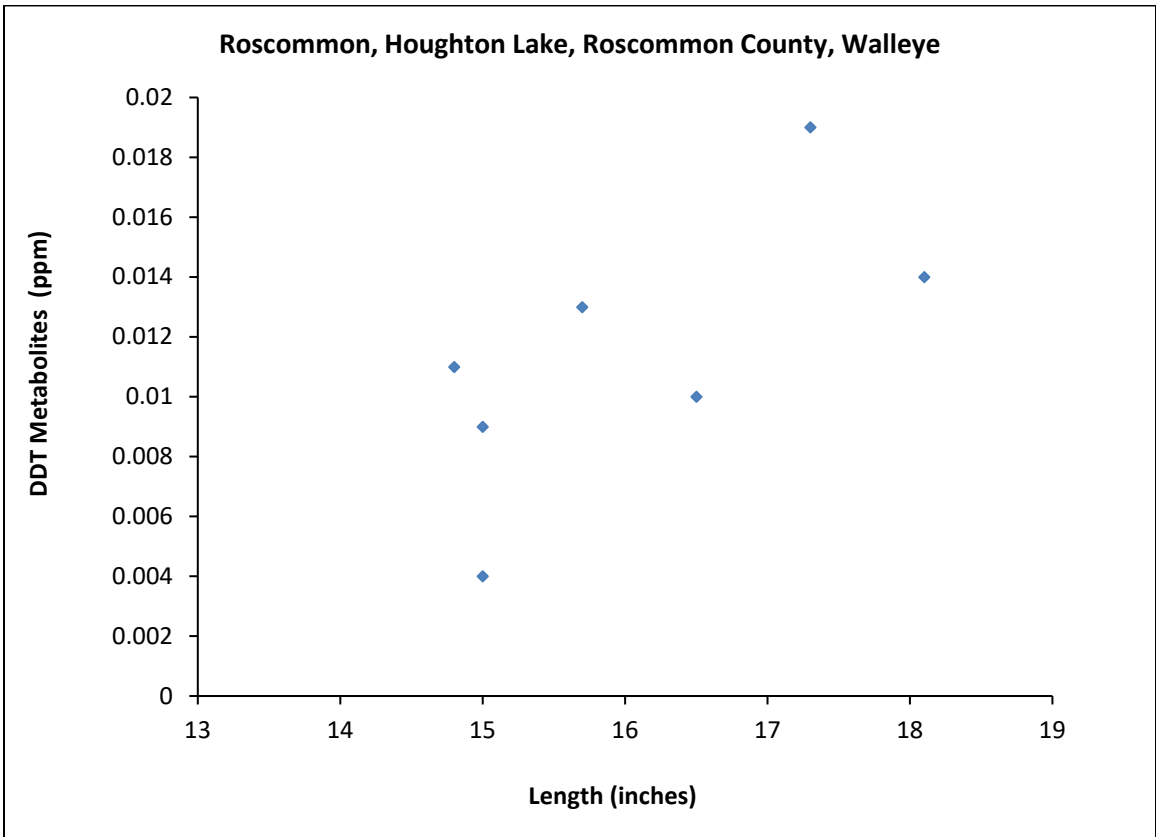
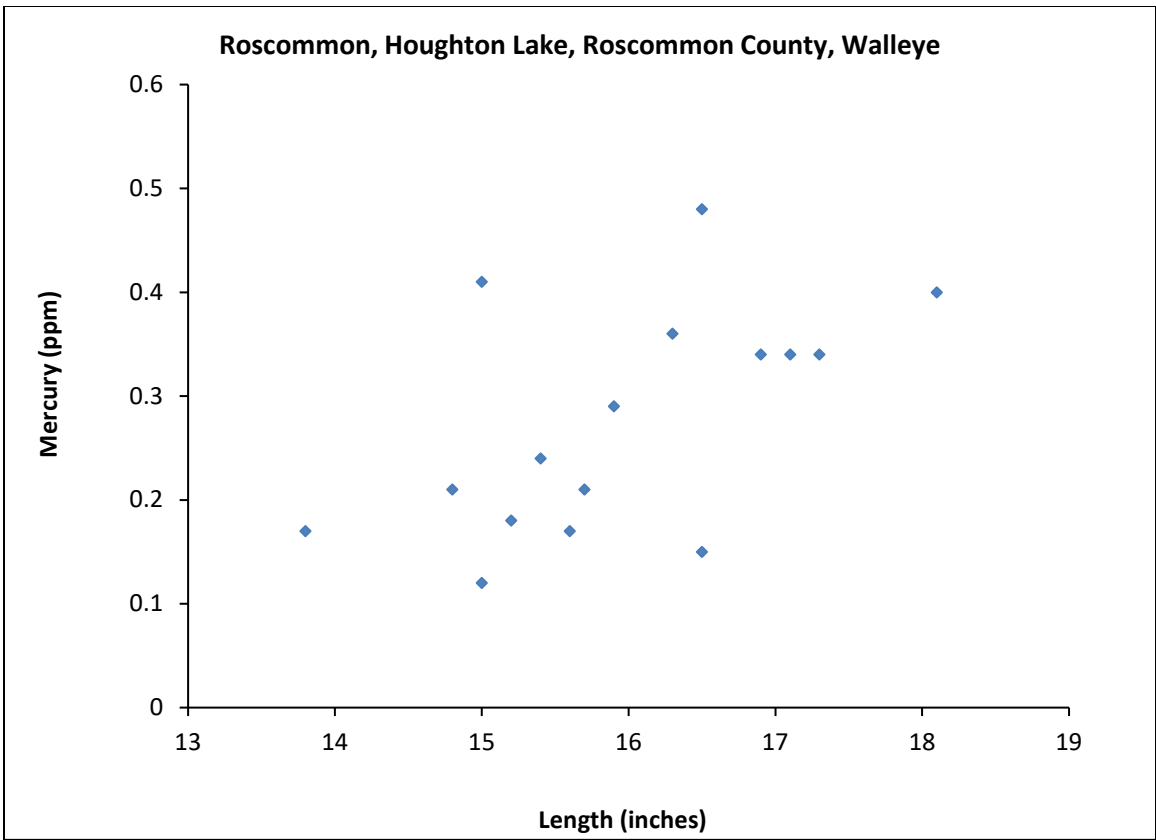
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1987	1993	16	13.8	15	14.8	18.1
Datasets available: 1987, 1993						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	15	0.28	0.12	0.48	0.34	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.330	0.335				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1987	1987	8	14.8	15	14.8	18.1
Datasets available: 1987						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	7	ND	--	--	--	--
DDT	7	0.011	0.004	0.02	0.02	16
Chlordane	7	ND	--	--	--	--
Toxaphene	7	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	0.467	0.390				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						2

Existing Advisory: Houghton Lake walleye are covered under the statewide mercury consumption advisory.

Recommendation: No one should eat more than 2 meals per month of Houghton Lake walleye smaller than 20 inches or more than 1 meal per month of walleye larger than 20 inches due to mercury. The statewide length break was applied as the size of the fish was limited.



Walleye

Lake St. Helen

Roscommon County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2010	2010	10	14.8	15	14.8	23.3
Datasets available: 2010						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.43	0.24	0.98	0.64	1
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.875	0.839				

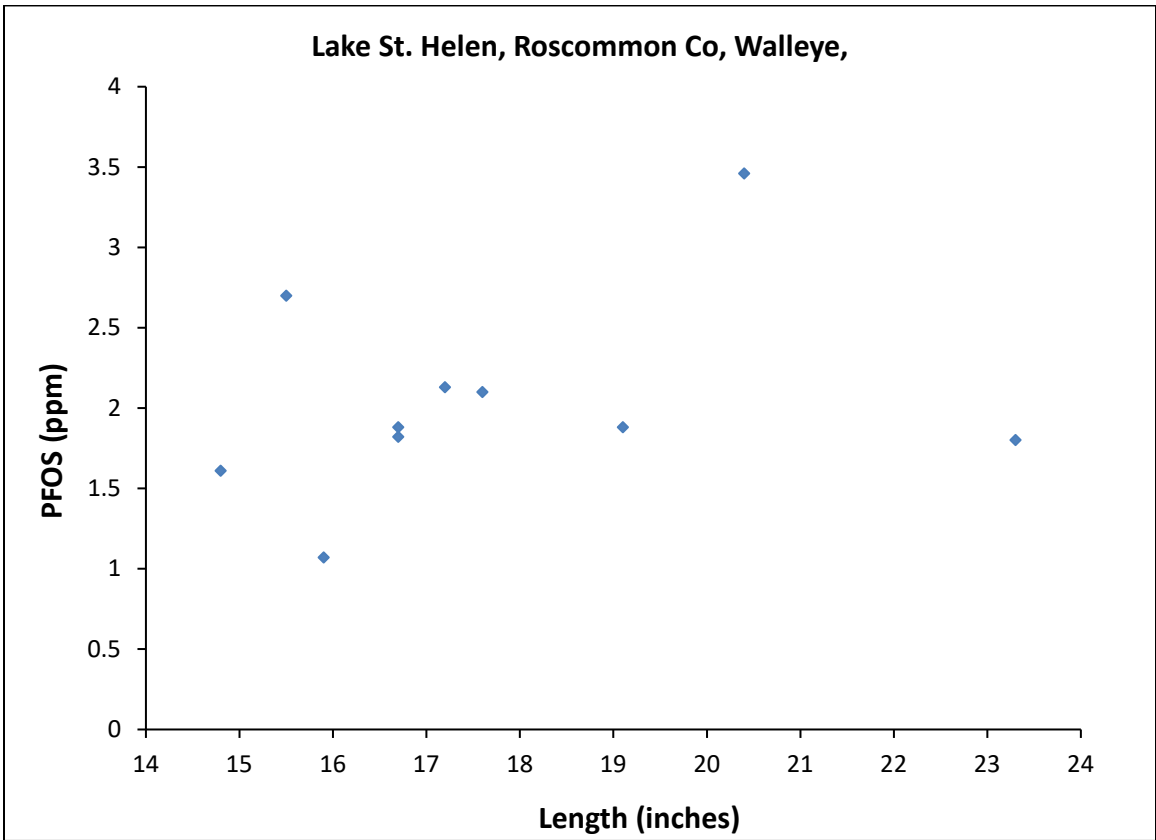
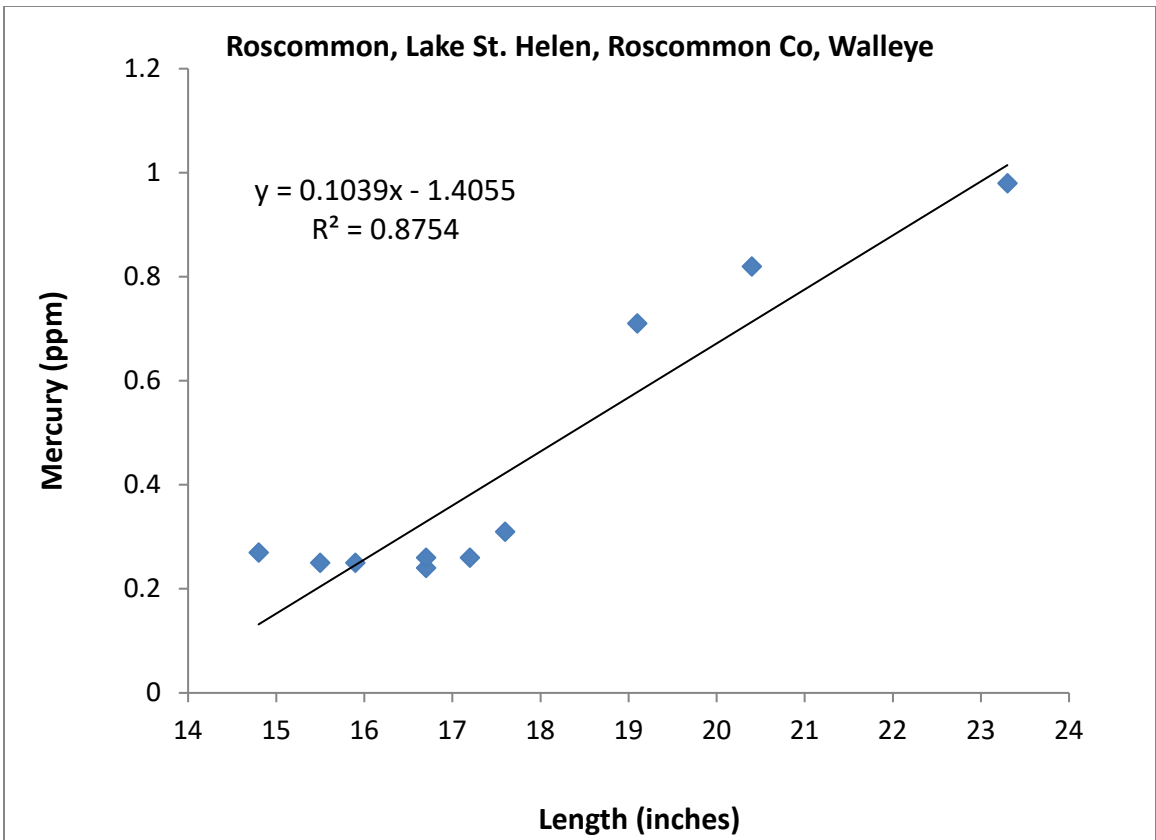
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2010	2010	10	14.8	15	14.8	23.3
Datasets available: 2010						
Chemical	Sample Size (Legal)	Mean (ppb)	Min. Conc. (ppb)	Max Conc. (ppb)	95%UCL (ppb)	Meal Category
PFOS	10	2.04	1.07	3.46	2.51	16
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PFOS	0.077	0.080				
Final meal category based on UCL:						1

Existing Advisory: Lake St. Helen walleye are covered under the statewide mercury consumption advisory.

Recommendation: No one should eat more than 2 meals per month of Lake St. Helen walleye smaller than 18 inches or more than 1 meal per month of walleye larger than 18 inches due to mercury.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
15	0.15	4
16	0.26	4
17	0.36	2
18	0.46	2
19	0.57	1
20	0.67	1
21	0.78	1
22	0.88	1
23	0.98	1
<i>Shaded area denotes extrapolated estimates</i>		



Thunder Bay River Alpena and Montmorency Counties

Northern Pike

**Thunder Bay River
Fletcher Pond**

Alpena County

Hg Analysis:

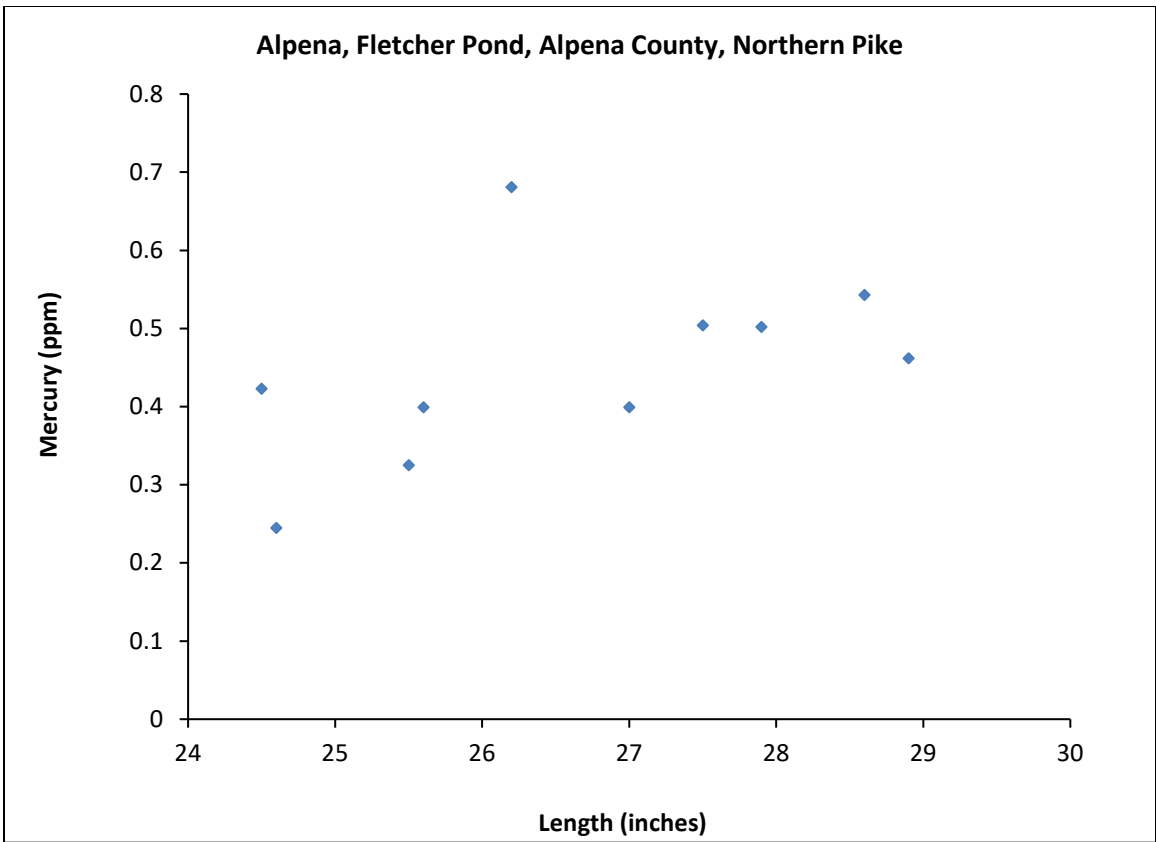
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2005	2005	10	24.5	24	24.5	28.9
Datasets available: 2005						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.45	0.24	0.68	0.53	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.255	0.321				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available: --						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						2

Existing Advisory: Fletcher Pond (Thunder Bay River) northern pike are covered under the statewide mercury consumption advisory.

Recommendation: No one should eat more than 2 meals per month of northern pike from the Thunder Bay River upstream of the Fletcher Dam pike smaller than 30 inches or more than 1 meal per month of those fish larger than 30 inches due to mercury. Statewide length break applied as the size range is limited.



Brown Bullhead

**Thunder Bay River
d-s Fletcher Dam**

**Alpena & Montmorency
Counties**

Hg Analysis:

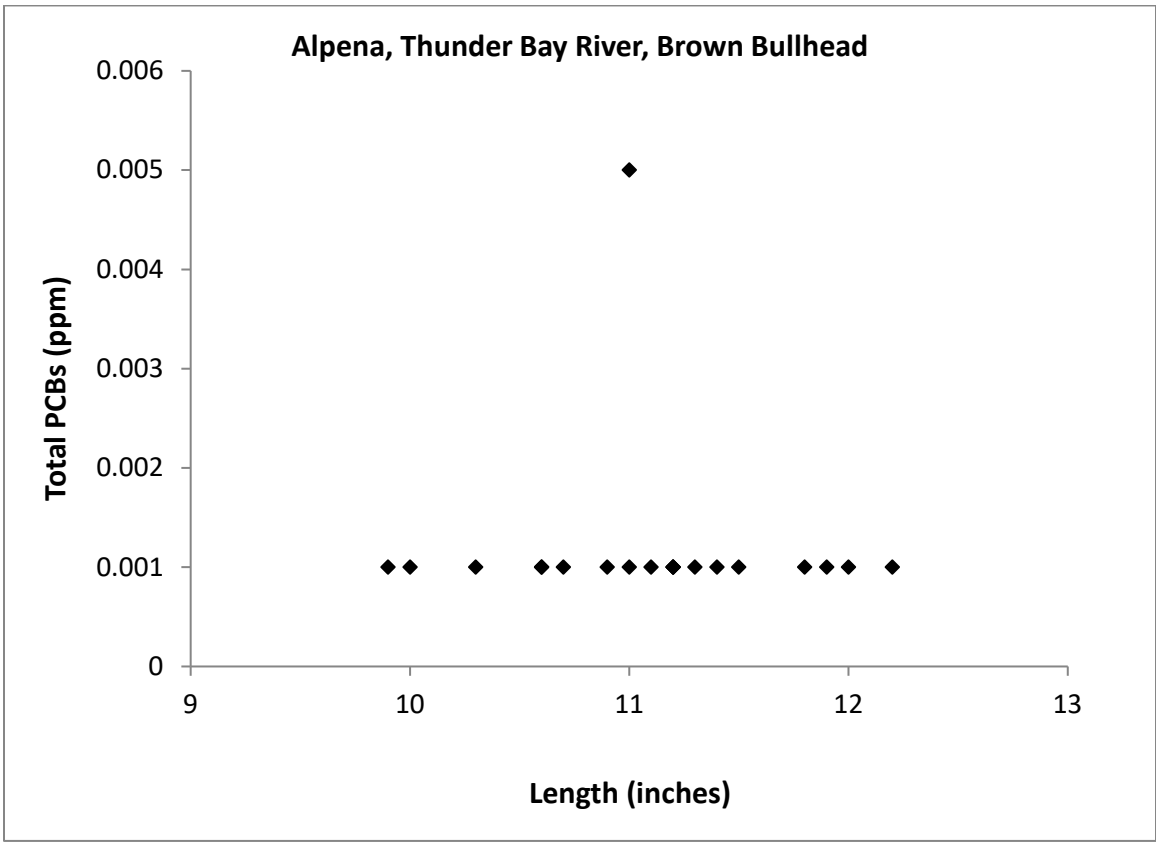
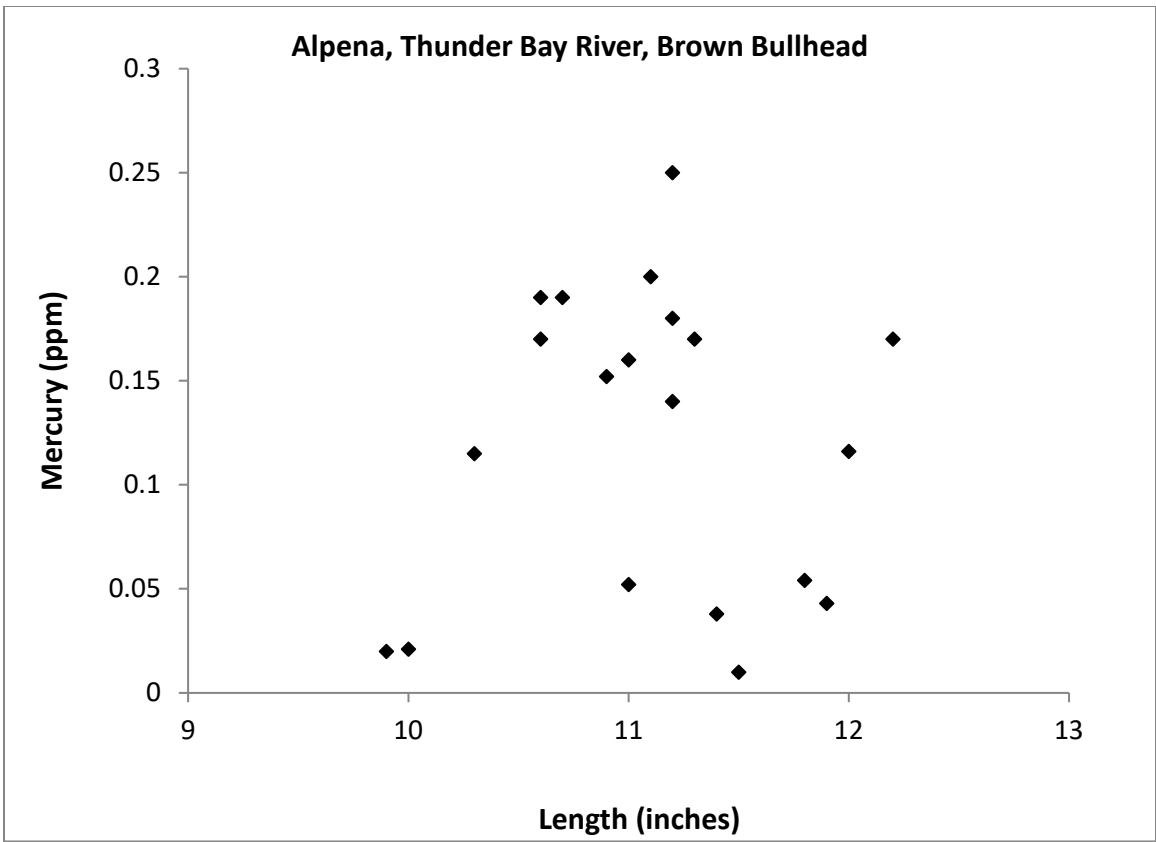
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2002	2006	20	9.9	na	9.9	12.2
Datasets available: 2002, 2006						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	20	0.12	0.01	0.25	0.16	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.003	0.014				

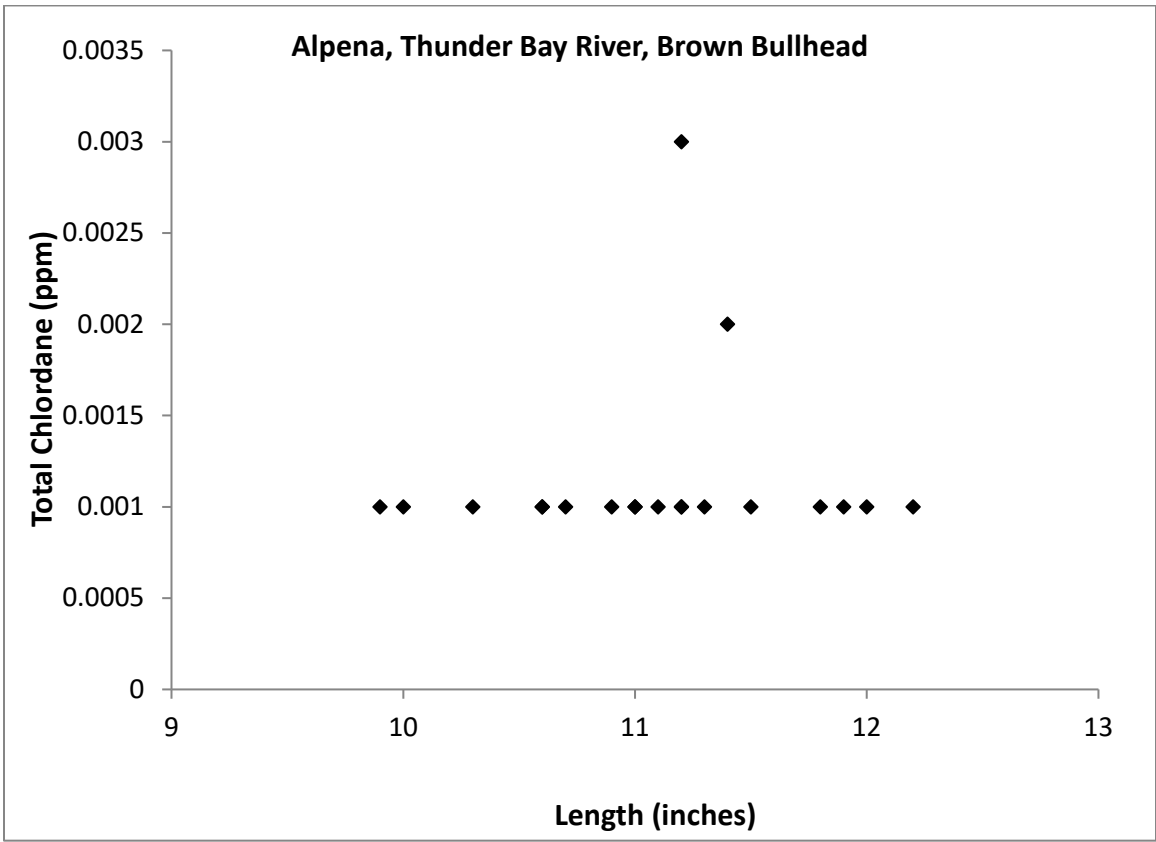
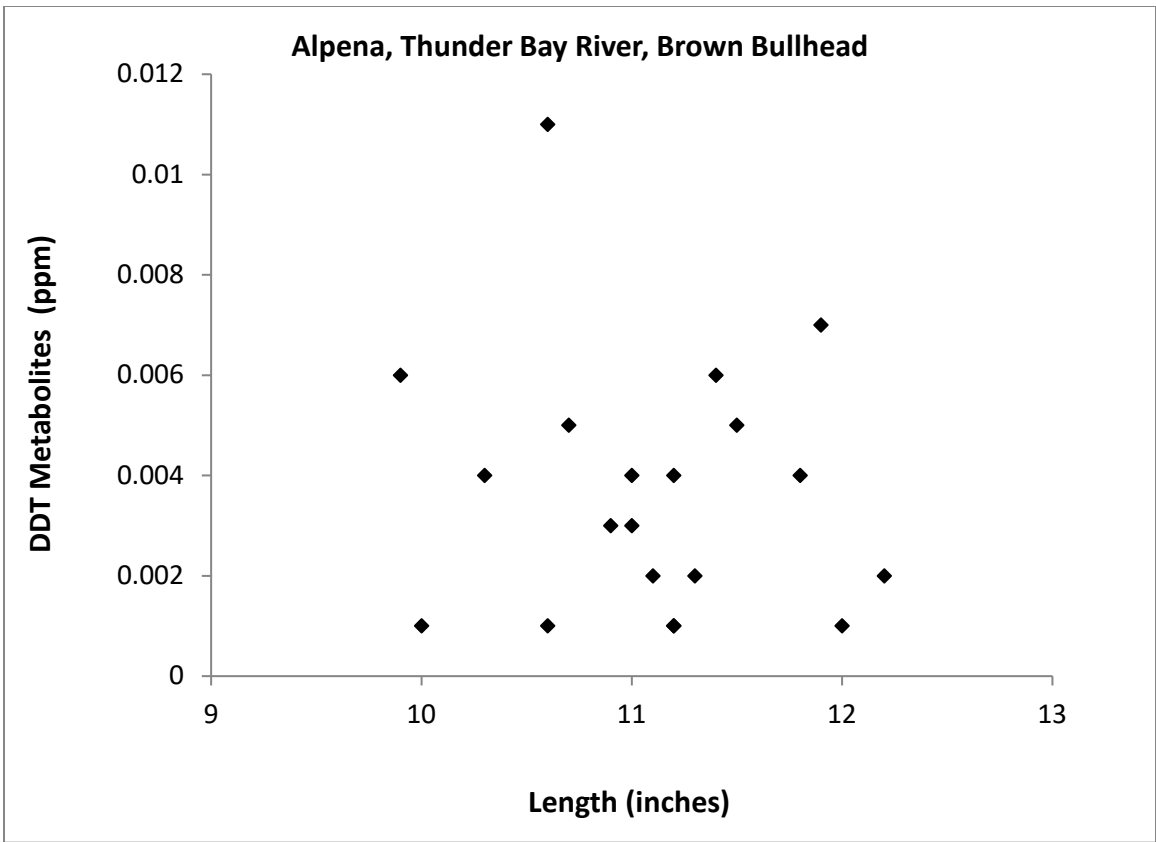
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2002	2006	20	9.9	na	9.9	12.2
Datasets available: 2002, 2006						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	20	0.001	0.001	0.005	0.002	16
DDT	20	0.004	0.001	0.01	0.005	16
Chlordane	20	0.001	0.001	0.003	0.001	--
Toxaphene	20	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.001	0.001				
DDT	0.015	0.005				
Chlordane	0.008	0.010				
Toxaphene	--	--				
Final meal category based on UCL:						4

Existing Advisory: Thunder Bay River bullhead are not covered by an advisory.

Recommendation: No one should eat more than 4 meals per month of bullhead from the Thunder Bay River downstream of the Fletcher Dam due to mercury.





Carp

**Thunder Bay River
Lake Besser**

**Alpena & Montmorency
Counties**

Hg Analysis:

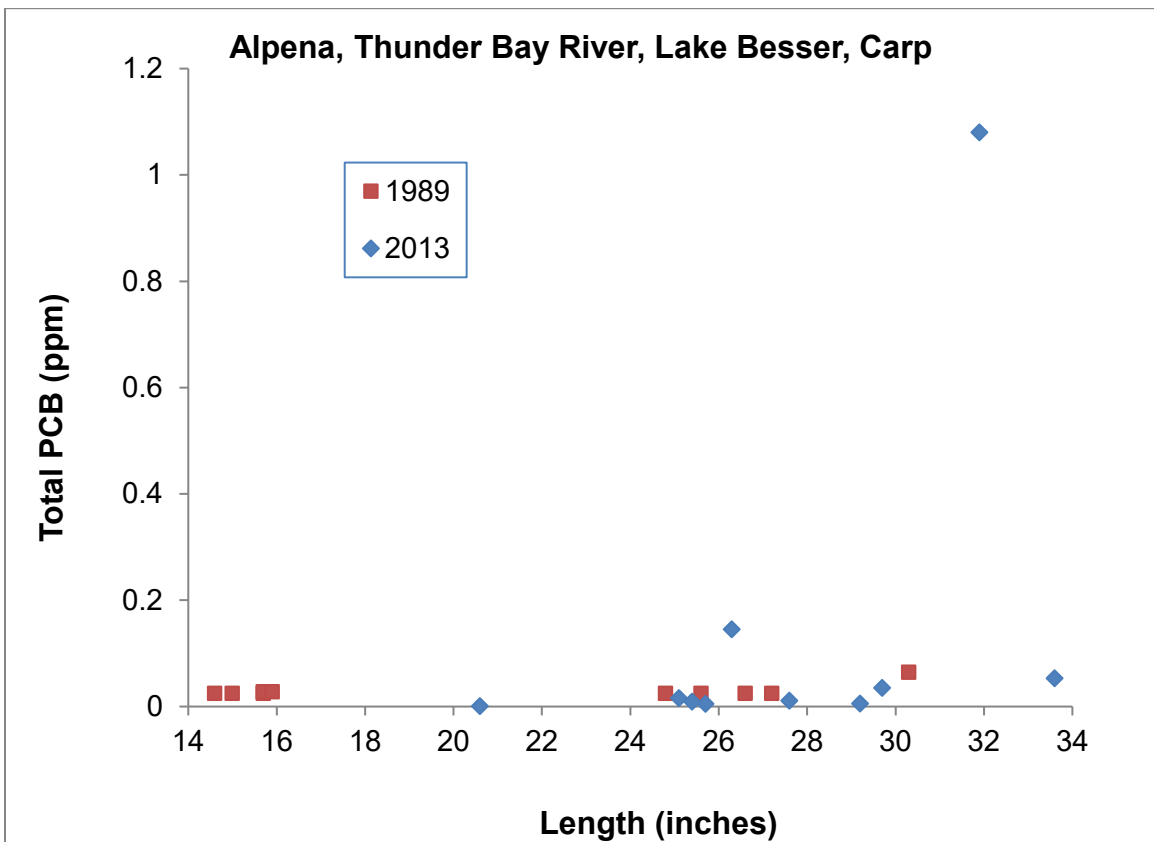
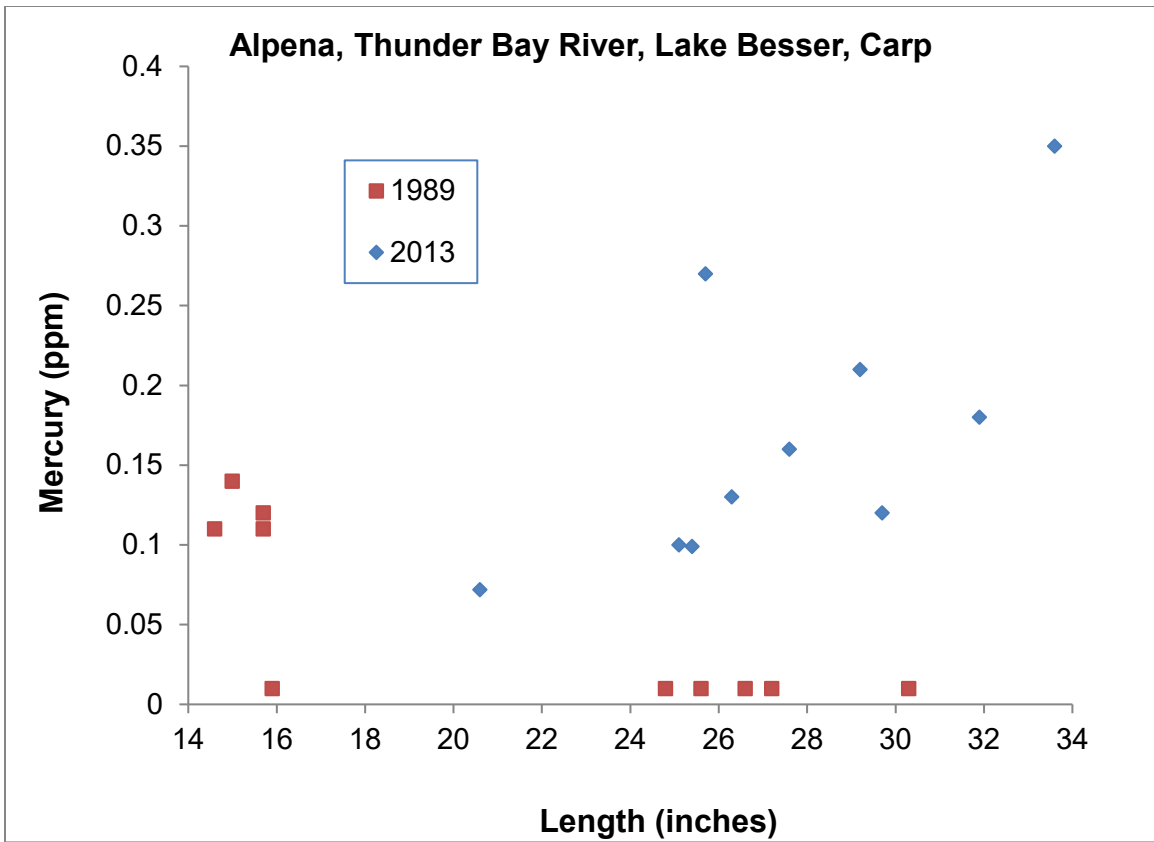
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1989	2013	20	14.6	na	14.6	33.6
Datasets available: 1989, 2013						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	20	0.11	0.01	0.35	0.15	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.083	0.003				

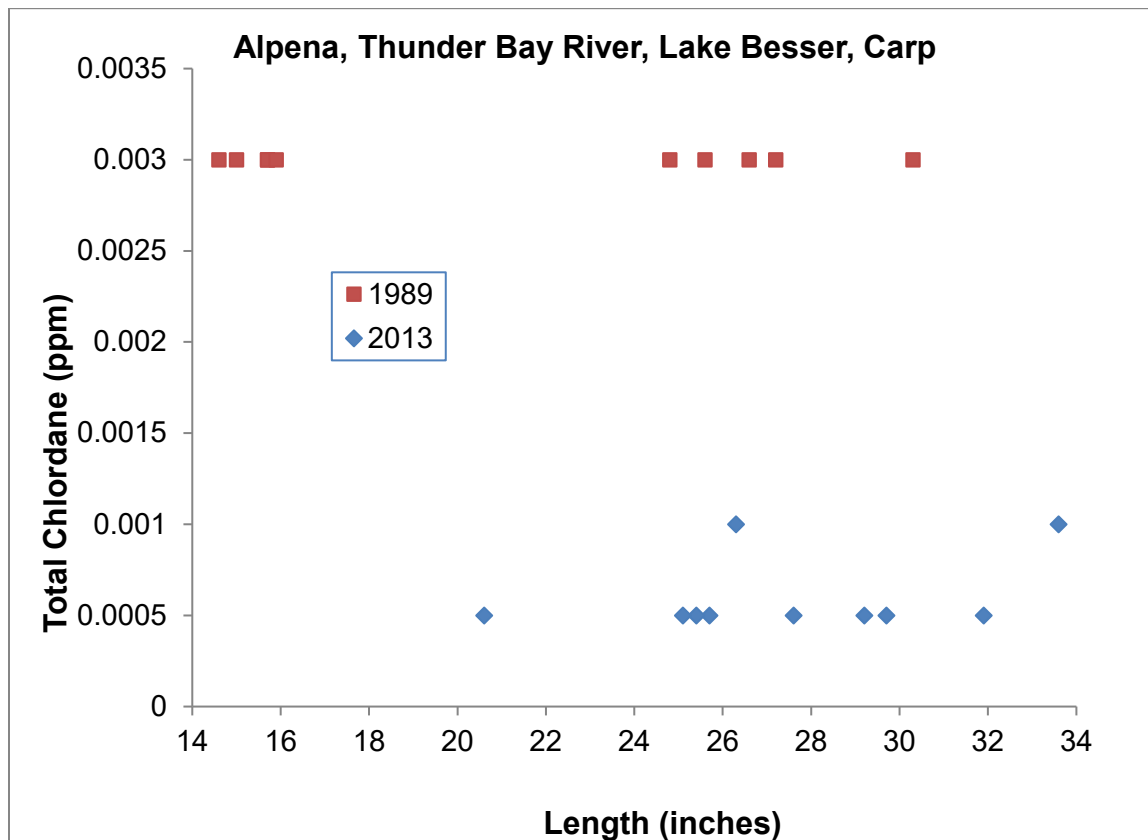
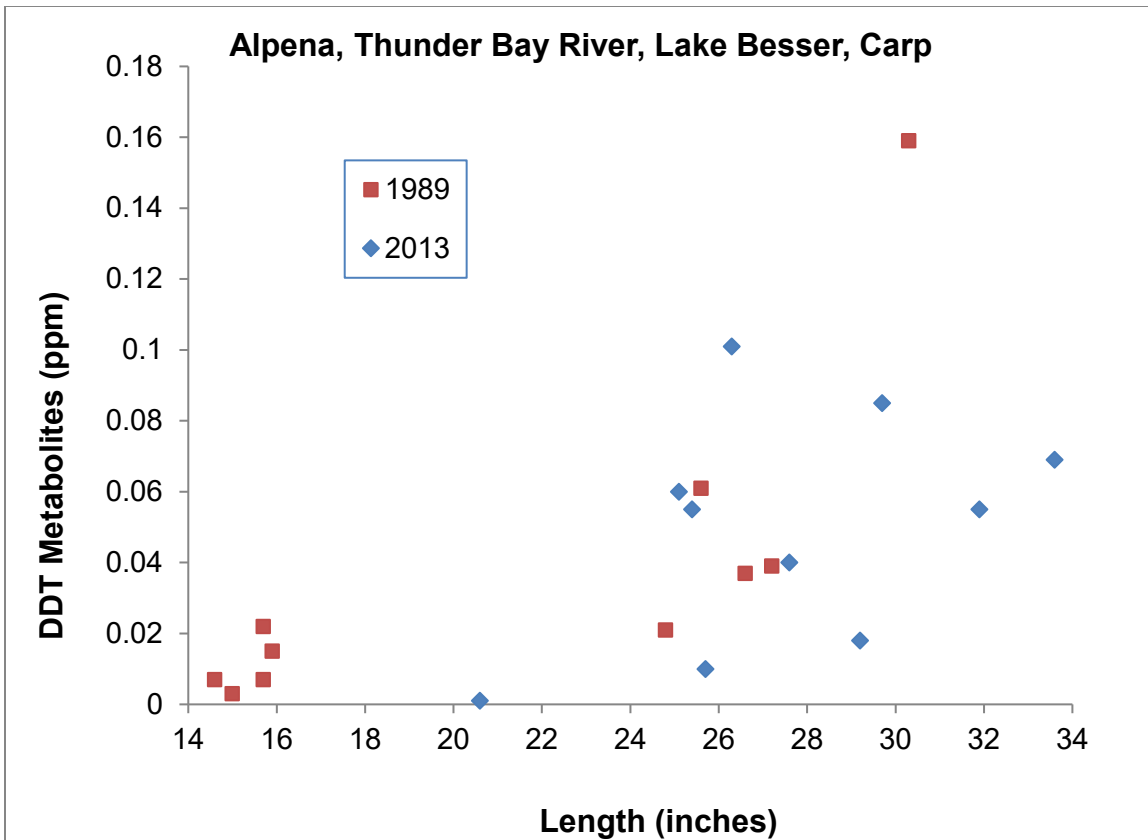
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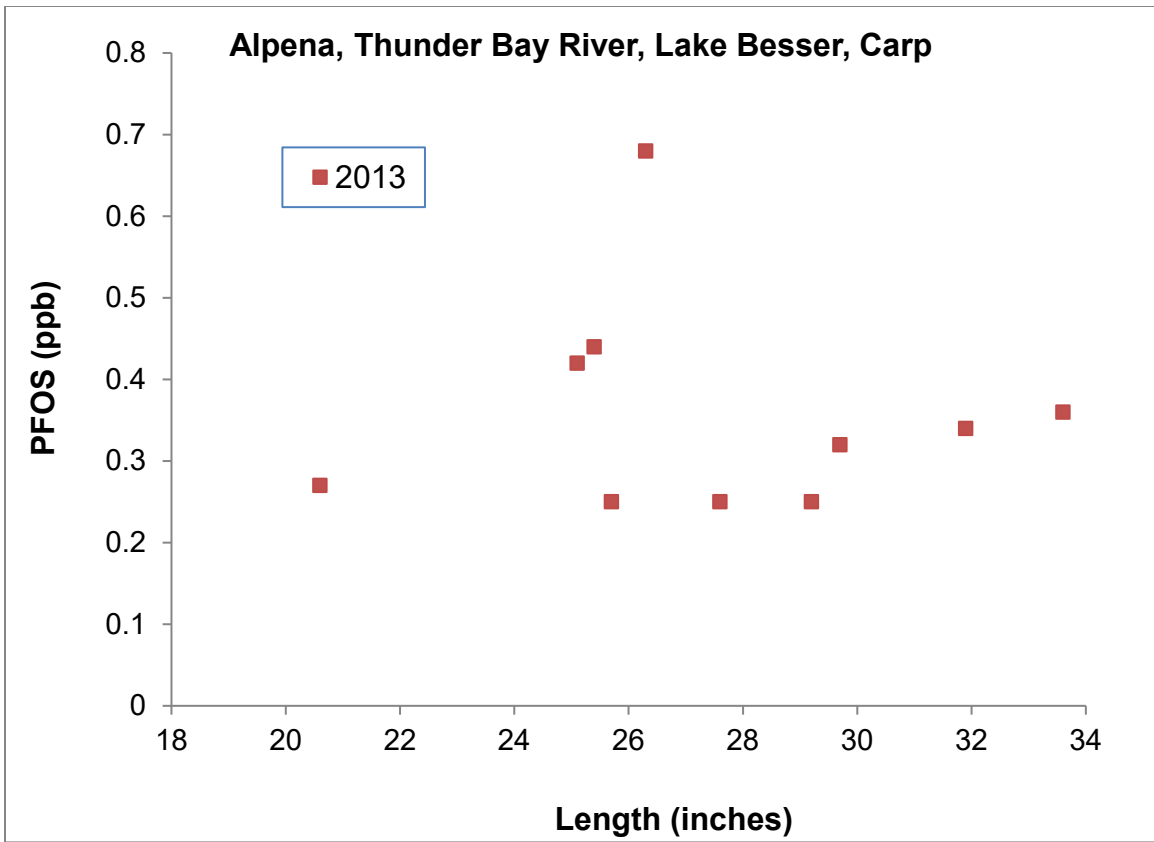
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2013	2013	10	20.6	na	20.6	33.6
Datasets available: 1989, 2013						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.136	0.001	1.0803	0.380	0.5
DDT	10	0.049	0.001	0.101	0.070	16
Chlordane	10	0.001	ND	0.001	0.001	--
Toxaphene	10	ND	--	--	--	--
PFOS	10	0.36 ppb	0.25 ppb	0.68 ppb	0.45 ppb	16
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.447	0.533				
DDT	0.188	0.476				
Chlordane	0.187	0.411				
Toxaphene	0.117	0.117				
PFOS	0.003	0.000				
Final meal category based on UCL:						0.5

Existing Advisory: No one should eat more than 8 meals per month of carp from the Thunder Bay River downstream of Fletcher Dam due to PCBs and mercury.

Recommendation: No one should eat more than 6 meals per year of carp from the Thunder Bay River downstream of Fletcher Dam due to PCBs. Mercury would cause an advisory.







**Largemouth
& Smallmouth Bass**
Hg Analysis:

**Thunder Bay River
d-s Fletcher Dam**

**Alpena & Montmorency
Counties**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1989	2013	61	8.3	14	13.6	19.1
Datasets available: 1989, 2002, 2006, 2009, 2013						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	44	0.42	0.16	0.84	0.47	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.436	0.446				

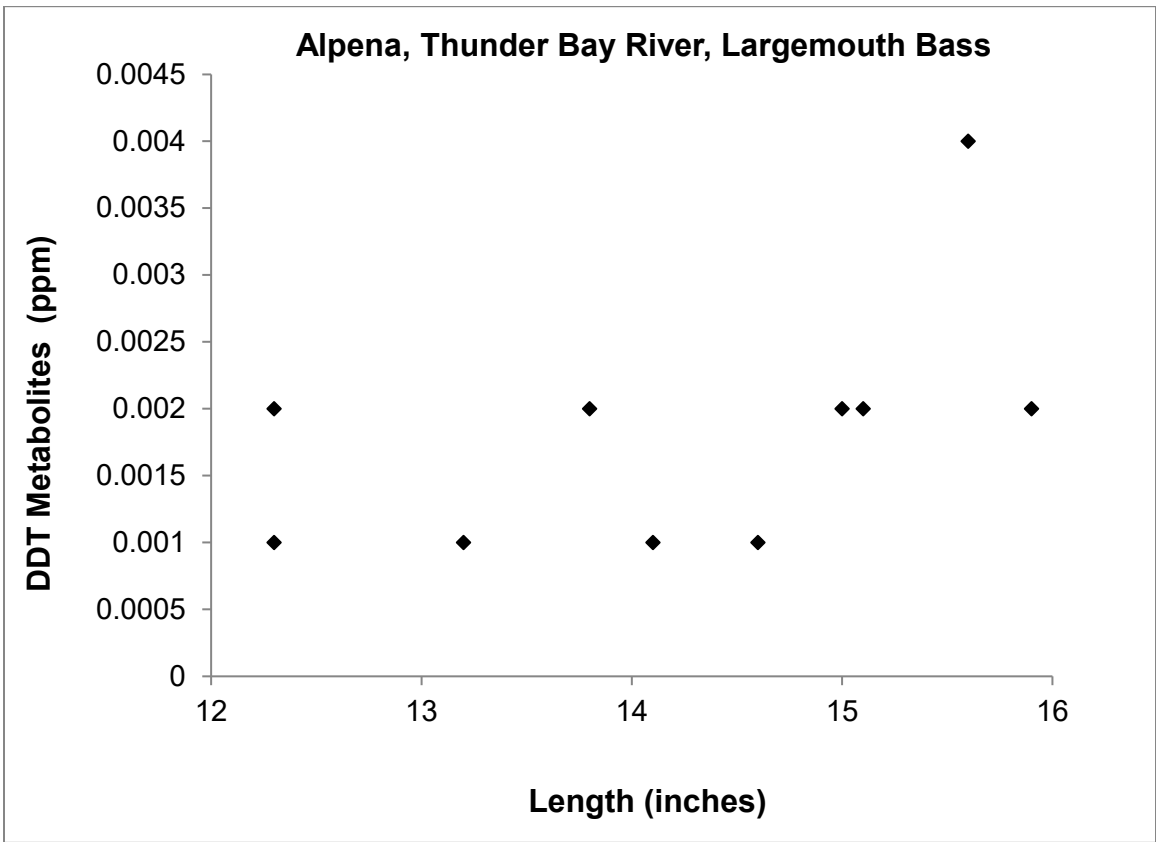
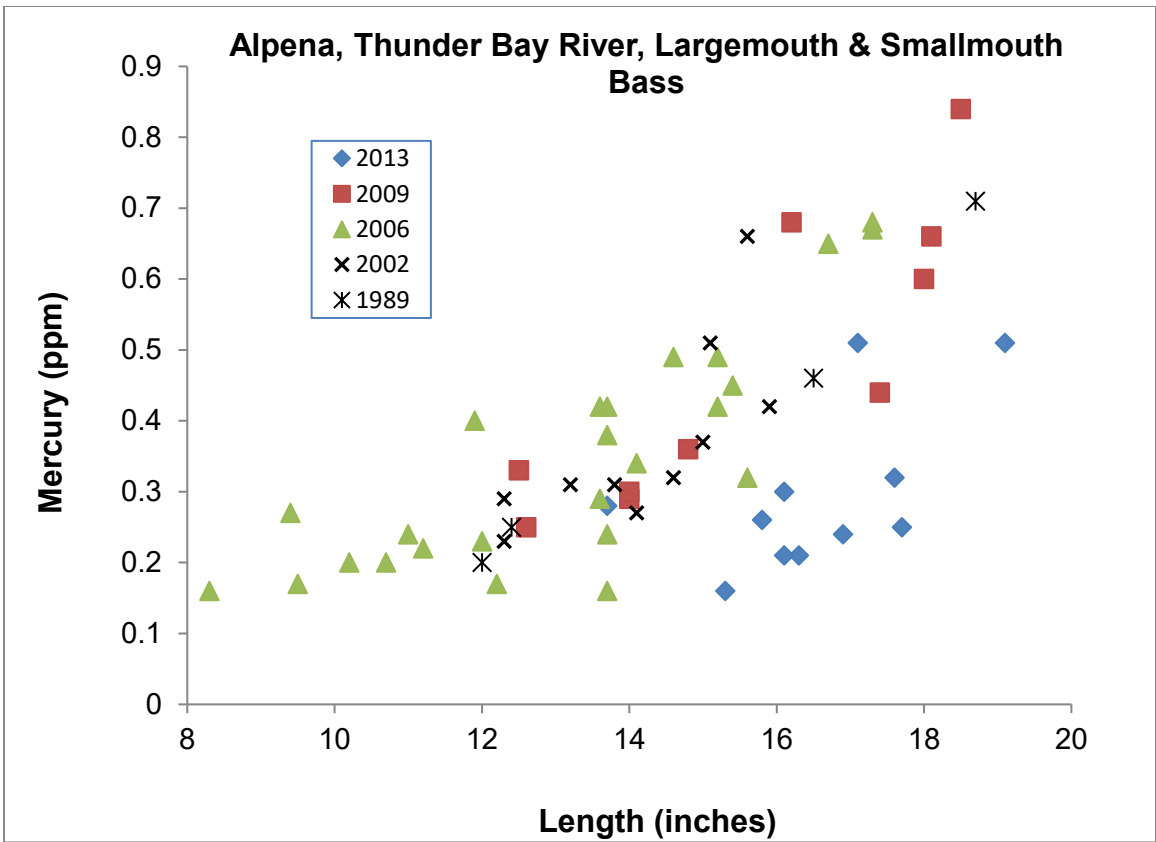
Organics Analysis:

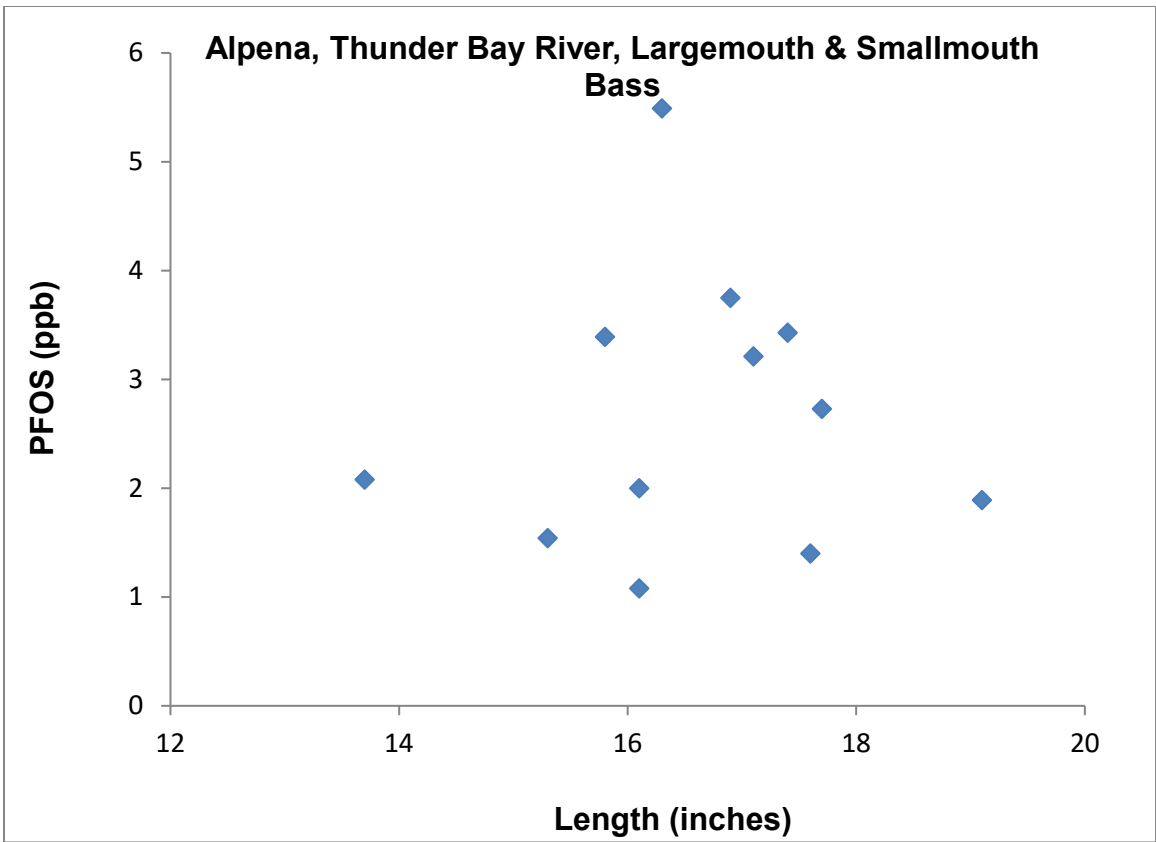
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2002	2013					
Datasets available: 1989, 2002, 2013*						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	7	ND	--	--	--	--
DDT	7	0.002	0.001	0.004	0.003	16
Chlordane	7	ND	--	--	--	--
Toxaphene	7	ND	--	--	--	--
PFOS	12	2.67 ppb	1.1 ppb	5.5 ppb	3.5 ppb	16
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	0.300	0.316				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	0.002	0.005				
Final meal category based on UCL:						2

* - 2013 samples analyzed for Hg & PFOS only

Existing Advisory: No one should eat more than 2 meals per month of largemouth or smallmouth bass from the Thunder Bay River or its impoundments downstream of Fletcher Dam smaller than 18 inches or more than 1 meal per month of those fish larger than 18 inches due to mercury.

Recommendation: No change is recommended. Additional sampling may indicate that mercury concentrations in bass have declined.





Northern Pike

**Thunder Bay River
Fletcher Pond & Lake Winyah**

Alpena County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2005	2017	27	21.3	24	23.5	29.5
Datasets available: 2005, 2017						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	20	0.46	0.24	0.70	0.52	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.125	0.146				

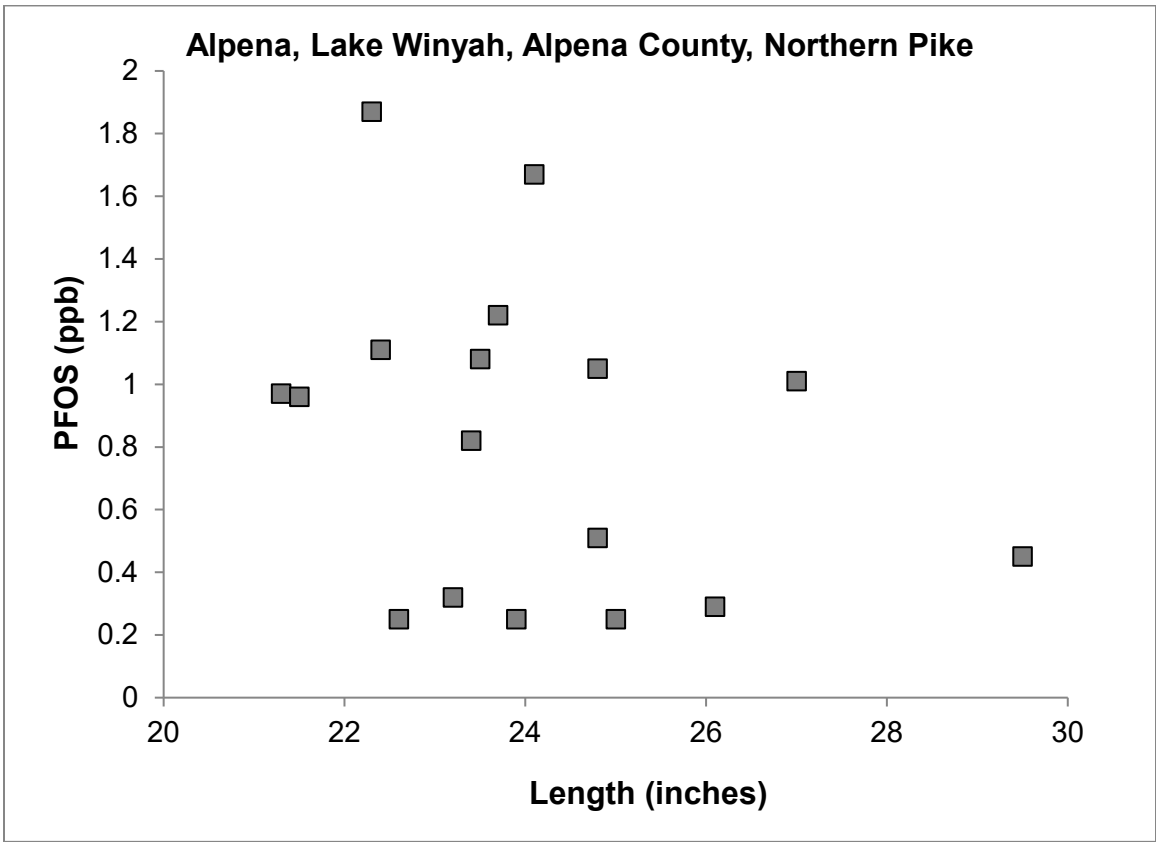
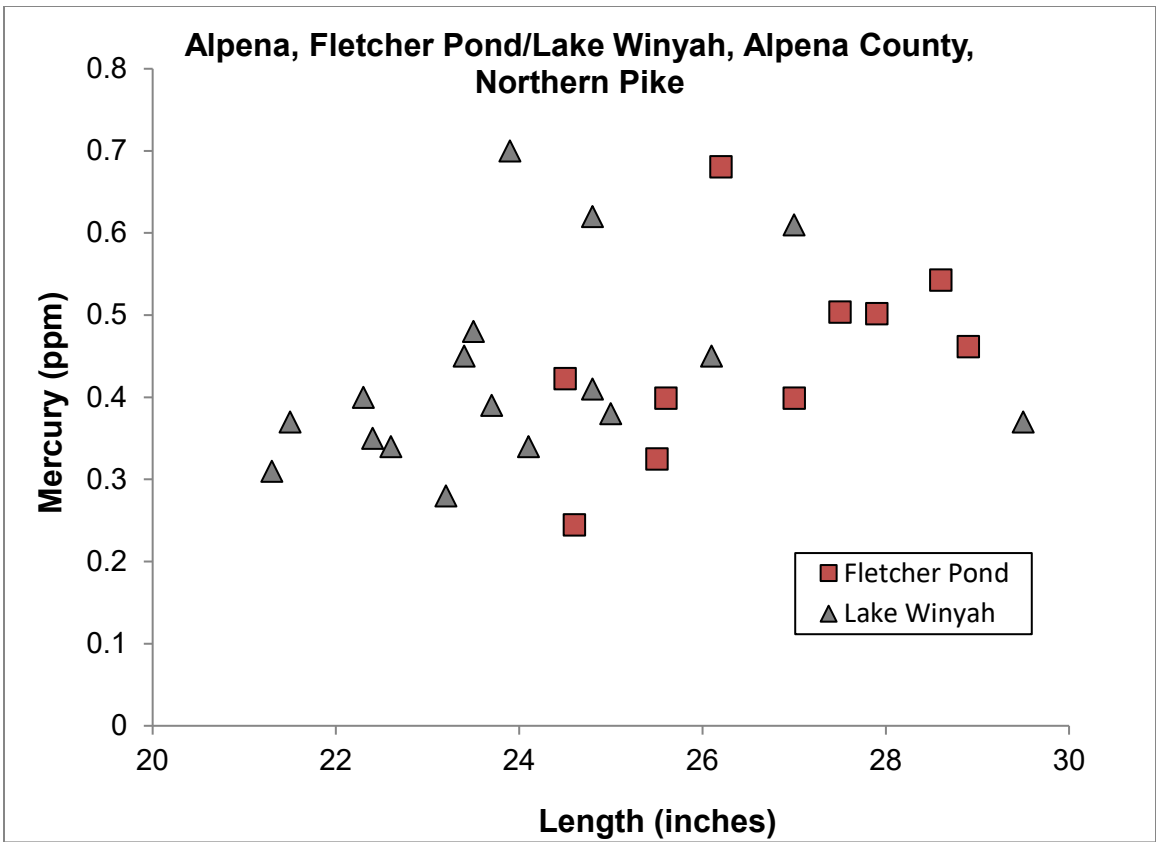
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2017	2017	17	21.3	24	23.5	29.5
Datasets available: 2017						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	ND	< 0.001	< 0.001	--	16
DDT	10	ND	< 0.001	< 0.001	--	16
Chlordane	10	ND	< 0.001	< 0.001	--	--
Toxaphene	10	ND	< 0.05	< 0.05	--	--
PFOS	17*	0.83 ppb	< 0.25 ppb	1.9 ppb	1.1 ppb	16
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	0.097	0.077	Final meal category based on UCL:			2

* Sub-legal sized individuals were used in the PFOS data summary.

Existing MDHHS Advisory: No one should eat more than two meals per month of Fletcher Pond northern pike smaller than 30 inches or more than one meal per month of those fish larger than 30 inches due to mercury.

Recommendation: No one should eat more than two meals per month of Thunder Bay River northern pike smaller than 30 inches or more than one meal per month of those fish larger than 30 inches due to mercury. The statewide length break was applied due to the limited range of sizes sampled. This guideline includes Fletcher Pond, Lake Winyah (aka Seven Mile Pond), Four Mile Pond, Lake Besser, the Upper South Branch of the Thunder Bay River downstream of Fletcher Dam, and the Main Branch of the Thunder Bay River.



Redhorse Sucker

**Thunder Bay River
d-s Fletcher Dam**

**Alpena & Montmorency
Counties**

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1989	1989	1	18.5	na	--	--
Datasets available: 1989						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	1	0.14	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	--	--				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1989	1989	1	18.5	na	--	--
Datasets available: 1989						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	1	ND	--	--	--	--
DDT	1	0.03	--	--	--	--
Chlordane	1	ND	--	--	--	--
Toxaphene	1	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						--

Existing Advisory: Thunder Bay River sucker are not covered by an advisory.

Recommendation: A dataset of less than five data points for a given chemical, species and waterbody is considered insufficient for evaluation using the standard evaluation method. The statewide advice applies to sucker from the Thunder Bay River downstream of Fletcher Dam: No one should eat more than 8 meals per month of sucker from inland waters.

Rock Bass

**Thunder Bay River
d-s Fletcher Dam**

**Alpena & Montmorency
Counties**

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2013	2013	10	5.6	na	5.6	7.5
Datasets available: 2013						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.12	0.08	0.28	0.16	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.691	0.703				

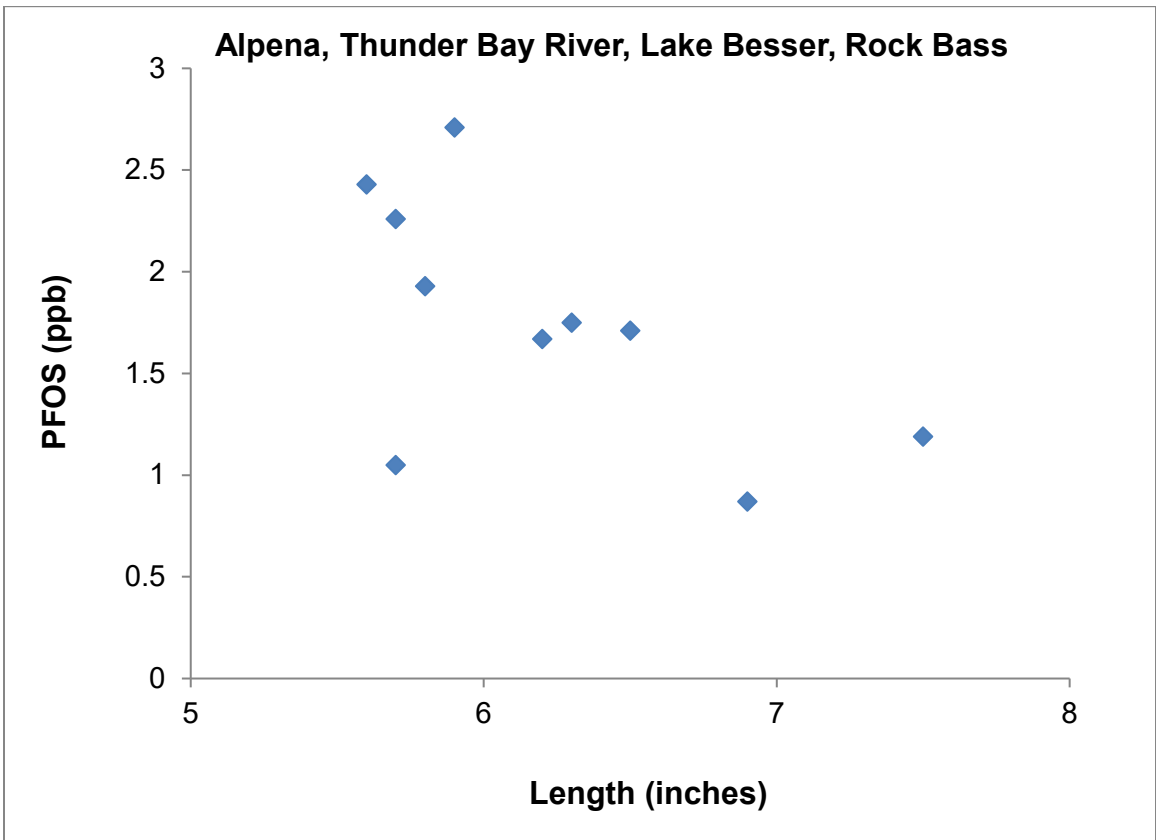
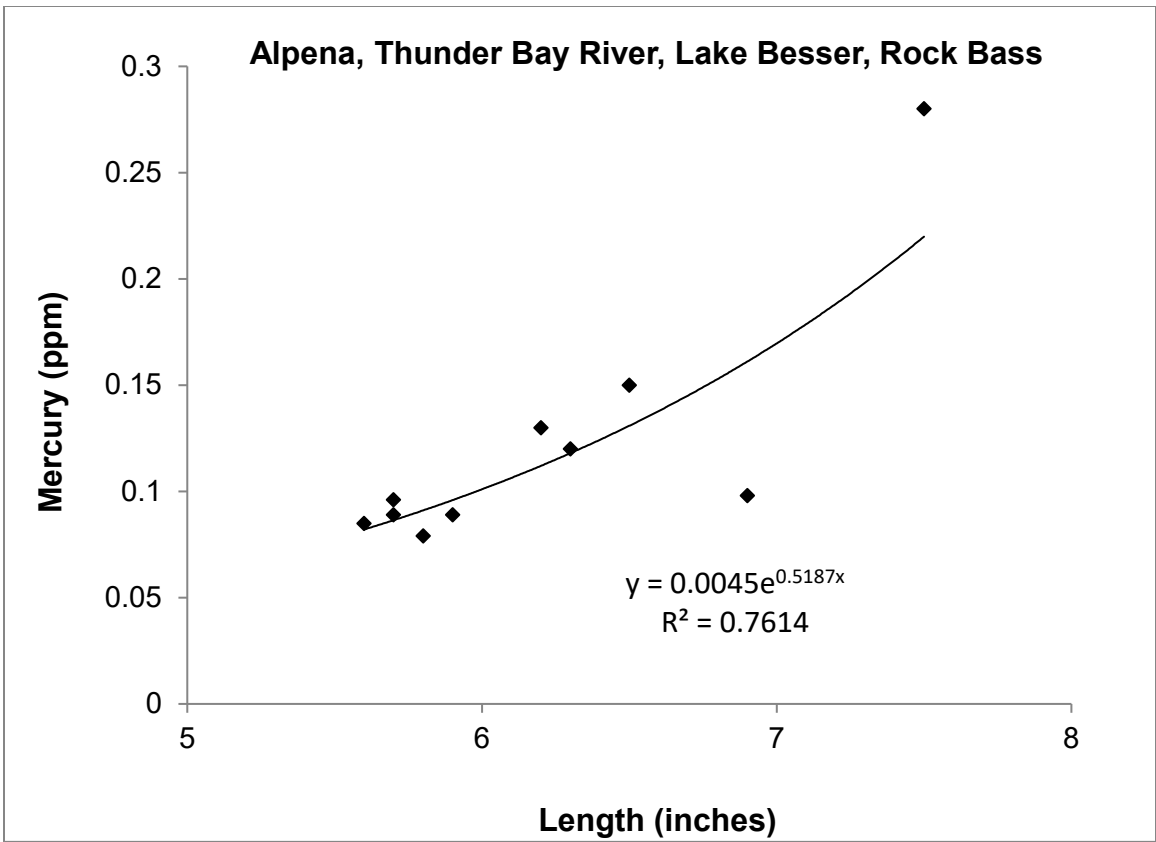
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2013	2013	10	5.6	na	5.6	7.5
Datasets available: 2013						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
PFOS	10	1.76 ppb	0.87 ppb	2.71 ppb	2.19 ppb	16
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	0.373	0.360				
Final meal category based on UCL:						4

Existing Advisory: Lake Besser (Thunder Bay River) rock bass are covered under the statewide mercury consumption advisory: No one should eat more than 4 meals per month of rock bass of any size.

Recommendation: No one should eat more than 4 meals per month of rock bass smaller than 8 inches from the Thunder Bay River or more than 2 meals per month of those fish larger than 8 inches due to mercury.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
5	0.06	16
5.5	0.08	12
6	0.1	8
6.5	0.13	8
7	0.17	4
7.5	0.22	4
8	0.29	2
8.5	0.37	2
<i>Shaded area denotes extrapolated estimates</i>		



Walleye

**Thunder Bay River
Lake Winyah & Lake Besser**

Alpena County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1989	2017	19	10.8	15	14.6	24.9
Datasets available: 1989, 2017						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	15	0.62	0.24	1.1	0.77	1
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.633	0.714				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2017	2017	14	10.8	15	16.1	24.6
Datasets available: 1989, 2017						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	ND	< 0.001	< 0.001	--	16
DDT	10	ND	< 0.001	< 0.001	--	16
Chlordane	10	ND	< 0.001	< 0.001	--	--
Toxaphene	10	ND	< 0.05	< 0.05	--	--
PFOS	14*	3.8 ppb	1.4 ppb	8.0 ppb	4.8 ppb	16
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	0.064	0.046	Final meal category based on UCL:			1

* Sub-legal sized individuals were used in the PFOS data summary.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
14	0.29	2
16	0.36	2
18	0.45	2
20	0.57	1
22	0.71	1
24	0.89	1
26	1.12	0.5
<i>Shaded area denotes extrapolated estimates</i>		

Existing MDHHS Advisory: No one should eat more than 1 meal per month of walleye smaller than 20 inches from the Thunder Bay River or the Upper South Branch Thunder Bay River downstream of the Fletcher Pond Dam, or more than 6 meals per year of those fish larger than 20 inches due to mercury.

Recommendation: No one should eat more than two meals per month of walleye smaller than 18 inches from the Thunder Bay River downstream of the Fletcher Pond Dam, or more than one meal per month of those fish over 18 inches due to mercury (see next page for more details).

This guideline includes Lake Winyah (aka Seven Mile Pond), Four Mile Pond, Lake Besser, the Upper South Branch of the Thunder Bay River downstream of Fletcher Pond, and the Main Branch of the Thunder Bay River.

Note: The previous guidance was based on only 5 samples from Lake Besser (see scatter plot).

