

# Antrim County

**Brown Trout**

**Cedar River**

**Antrim 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	9.1	8	9.1	11.2
Datasets available: 1998						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	2*	0.18	0.13	0.23	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
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	9.1	8	9.1	11.2
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*	0.004	0.003	0.005	--	--
Chlordane	2*	ND	--	--	--	--
Toxaphene	2*	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						--

\* - 10 fish were analyzed as 2 composite samples

**Existing MDHHS Advisory:** Brown trout from Cedar River in Antrim County are covered under the statewide advisory for mercury. No one should eat more than 4 meals per month of brown trout of any size due to mercury.

**Recommendation:** No change is recommended. MDHHS requires a minimum of five legal size fish samples to evaluate the need for waterbody specific fish consumption advisories.

**White Sucker**

**Cedar River**

**Antrim 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	1	15.7	na	15.7	15.7
Datasets available: 1998						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	1	0.20	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
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	1	15.7	na	15.7	15.7
Datasets available: 1998						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	1	ND	--	--	--	--
DDT	1	ND	--	--	--	--
Chlordane	1	ND	--	--	--	--
Toxaphene	1	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						--

**Existing MDHHS Advisory:** Suckers from Cedar River in Antrim County are covered under the statewide advisory for mercury. No one should eat more than 8 meals per month of suckers of any size due to mercury.

**Recommendation:** No change is recommended. MDHHS requires a minimum of five legal size fish samples to evaluate the need for waterbody specific fish consumption advisories.

**Brown Trout**

**Elk Lake**

**Grand Traverse & Antrim Counties**

**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	
2006	2006	3	18.8	15	18.8	35	
Datasets available: 2006							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
Mercury	3	0.46	0.15	0.73	--	--	
Chemical	Linear Regression	Exponential Regression					
	R <sup>2</sup>	R <sup>2</sup>					
Mercury	--	--					

**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	
2006	2006	3	18.8	15	18.8	35	
Datasets available: 2006							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
PCB	3	0.06	0.01	0.09	--	--	
DDT	3	0.12	0.03	0.20	--	--	
Chlordane	3	0.008	0.002	0.01	--	--	
Toxaphene	3	ND	--	--	--	--	
Chemical	Linear Regression	Exponential Regression					
	R <sup>2</sup>	R <sup>2</sup>					
PCB	--	--					
DDT	--	--					
Chlordane	--	--					
Toxaphene	--	--					
<b>Final meal category based on UCL:</b>							--

**Existing MDHHS Advisory:** Brown trout from Elk Lake in Antrim and Grand Traverse Counties are covered under the statewide advisory for mercury. No one should eat more than 4 meals per month of brown trout of any size due to mercury.

**Recommendation:** No change is recommended. MDHHS requires a minimum of five legal size fish samples to evaluate the need for waterbody specific fish consumption advisories.

**Lake Trout**

**Elk Lake**

**Grand Traverse & Antrim 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
1990	2006	27	17.7	15	17.7	35.7
Datasets available: 1990, 2006						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	27	0.36	0.14	0.77	0.43	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.536	0.575				

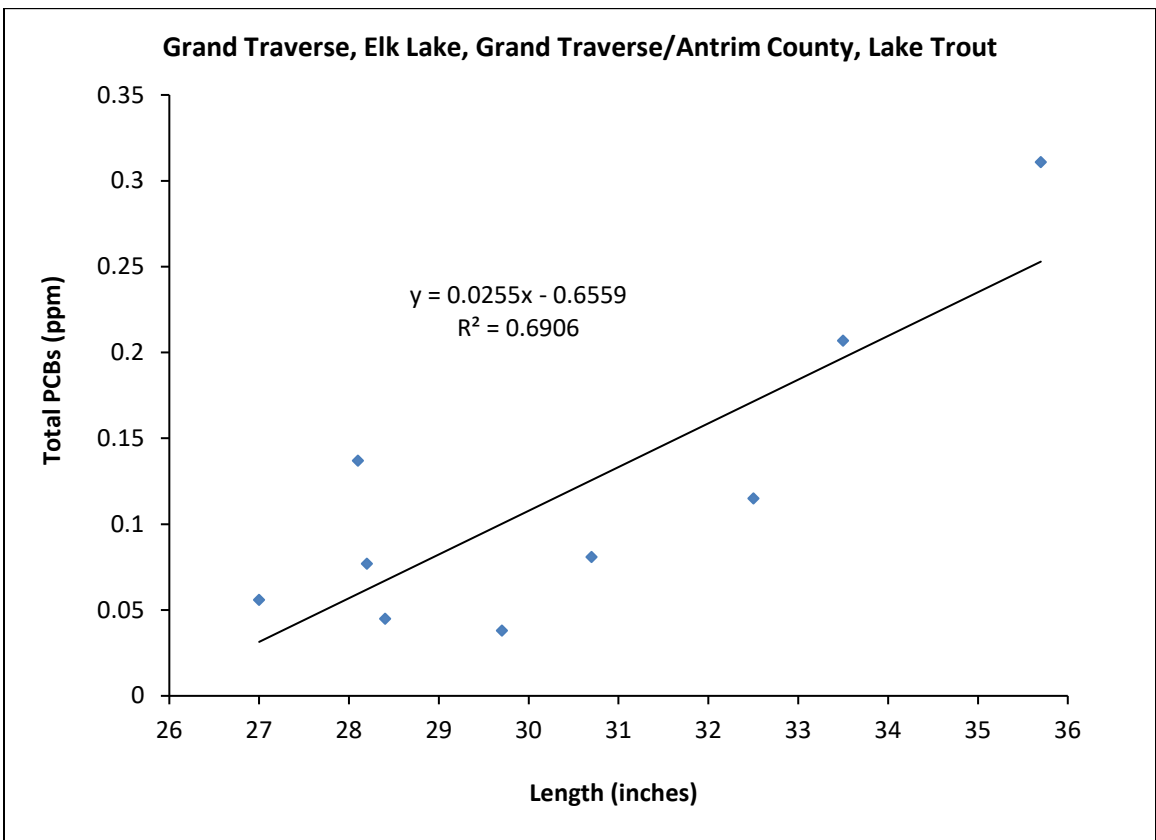
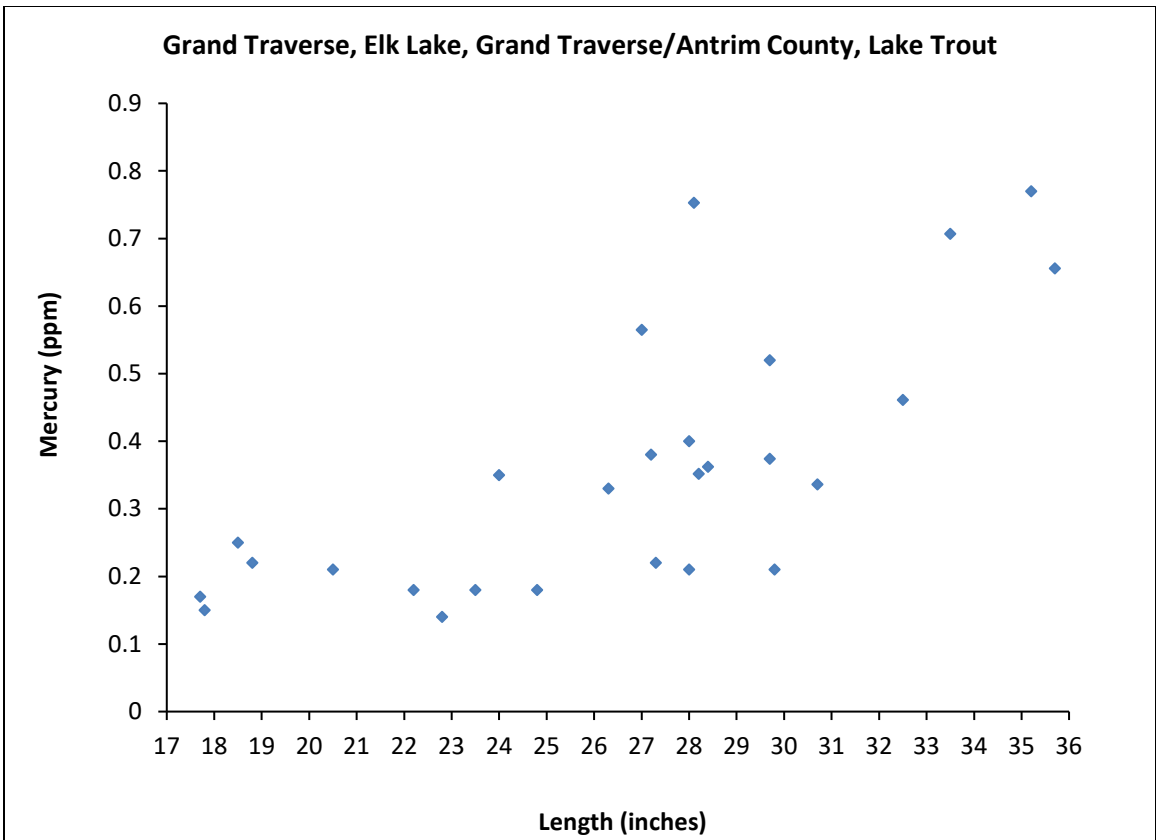
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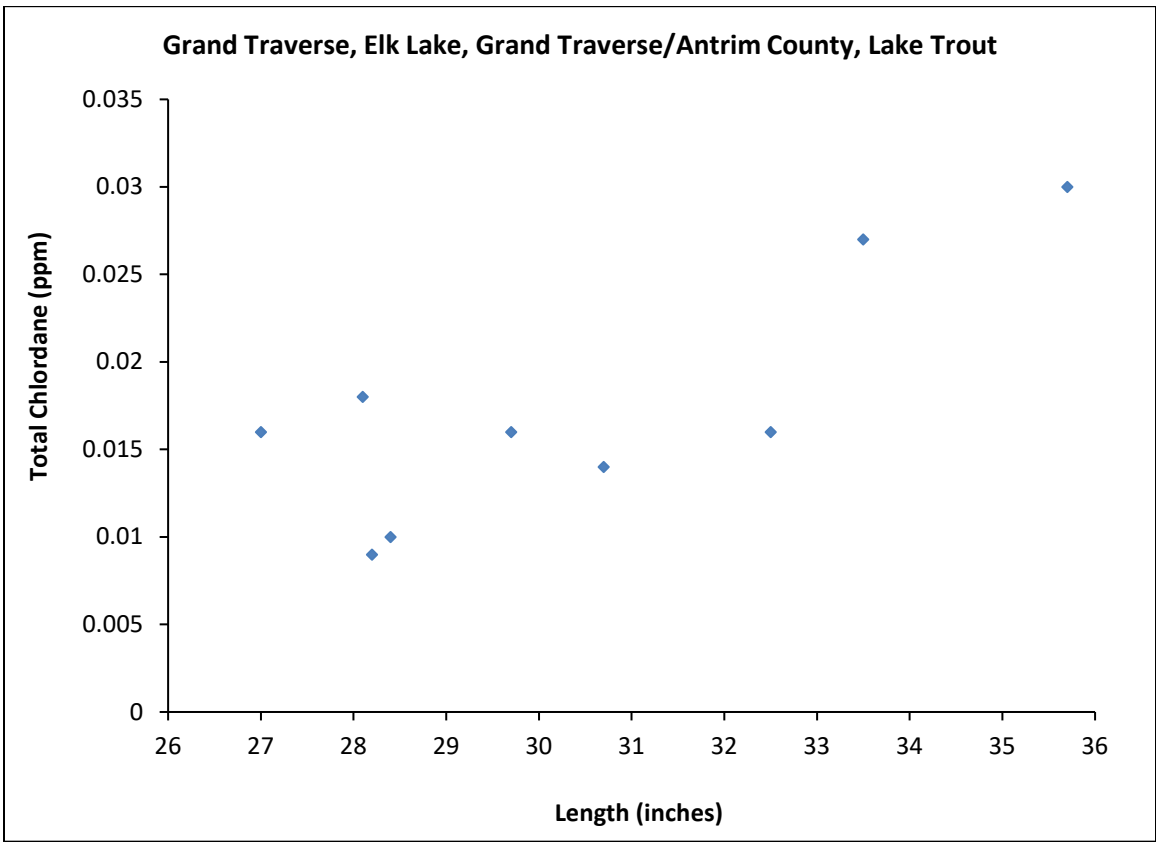
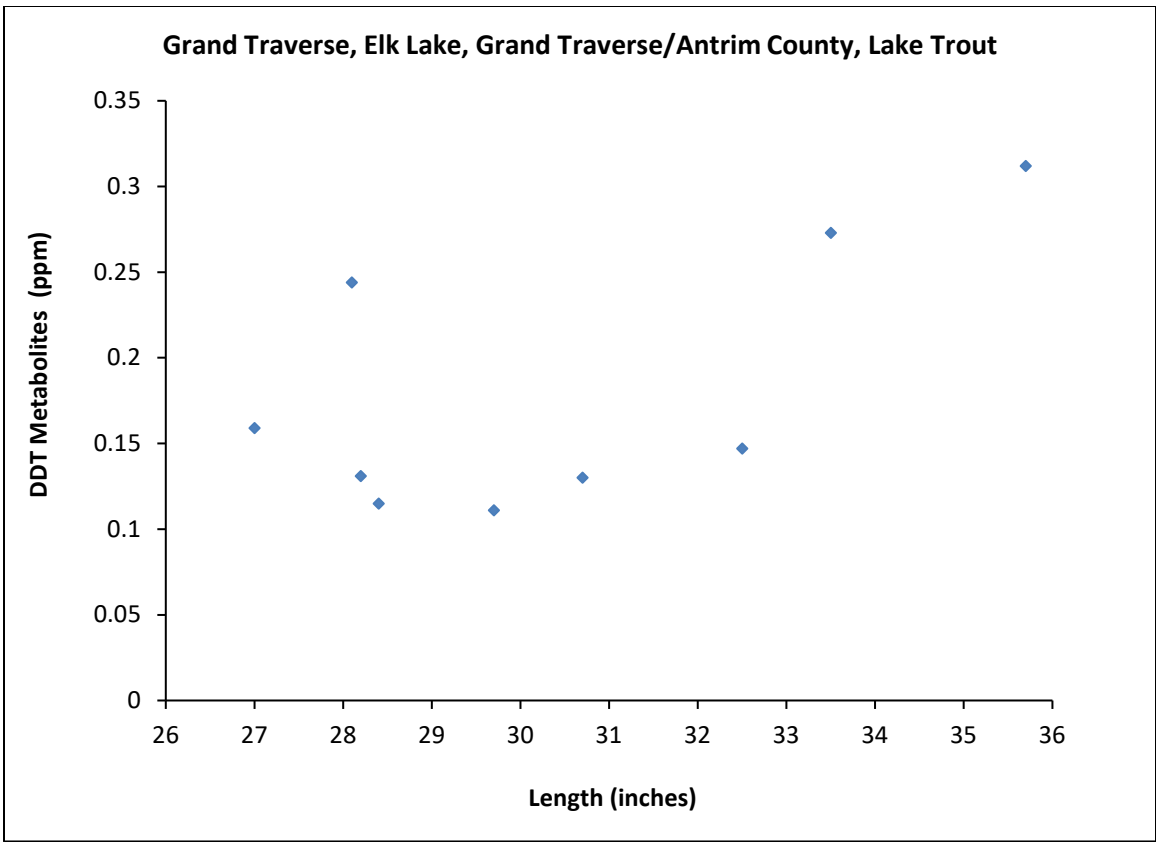
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2006	2006	9	27	15	27	35.7
Datasets available: 1990, 2006						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	9	0.12	0.04	0.31	0.19	1
DDT	9	0.18	0.11	0.31	0.24	4
Chlordane	9	0.02	0.009	0.03	0.02	--
Toxaphene	9	ND				
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.691	0.591				
DDT	0.398	0.343				
Chlordane	0.630	0.548				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>1</b>

**Existing MDHHS Advisory:** No one should eat more than one meal per week of lake trout from Elk Lake in Antrim and Grand Traverse Counties smaller than 22 inches or more than one meal per month of those fish larger than 22 inches due to PCBs and mercury.

**Recommendation:** No one should eat more than 2 meals per month of lake trout from Elk Lake smaller than 30 inches due to mercury or more than 1 meal per month of those fish larger than 30 inches due to PCBs. DDT would also cause an advisory.

Length (Inches)	PCB Regression Equation Estimate (ppm)	Meal Category
15	-0.273	16
18	-0.197	16
20	-0.146	16
22	-0.095	16
24	-0.044	16
26	0.007	16
28	0.058	2
30	0.109	2
32	0.160	1
<i>Shaded area denotes extrapolated estimates</i>		





**Northern Pike**

**Elk Lake**

**Grand Traverse & Antrim 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	5	26	24	26	39
Datasets available: 2006						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	5	0.68	0.41	0.88	0.96	1
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.859	0.869				

**Organics Analysis:**

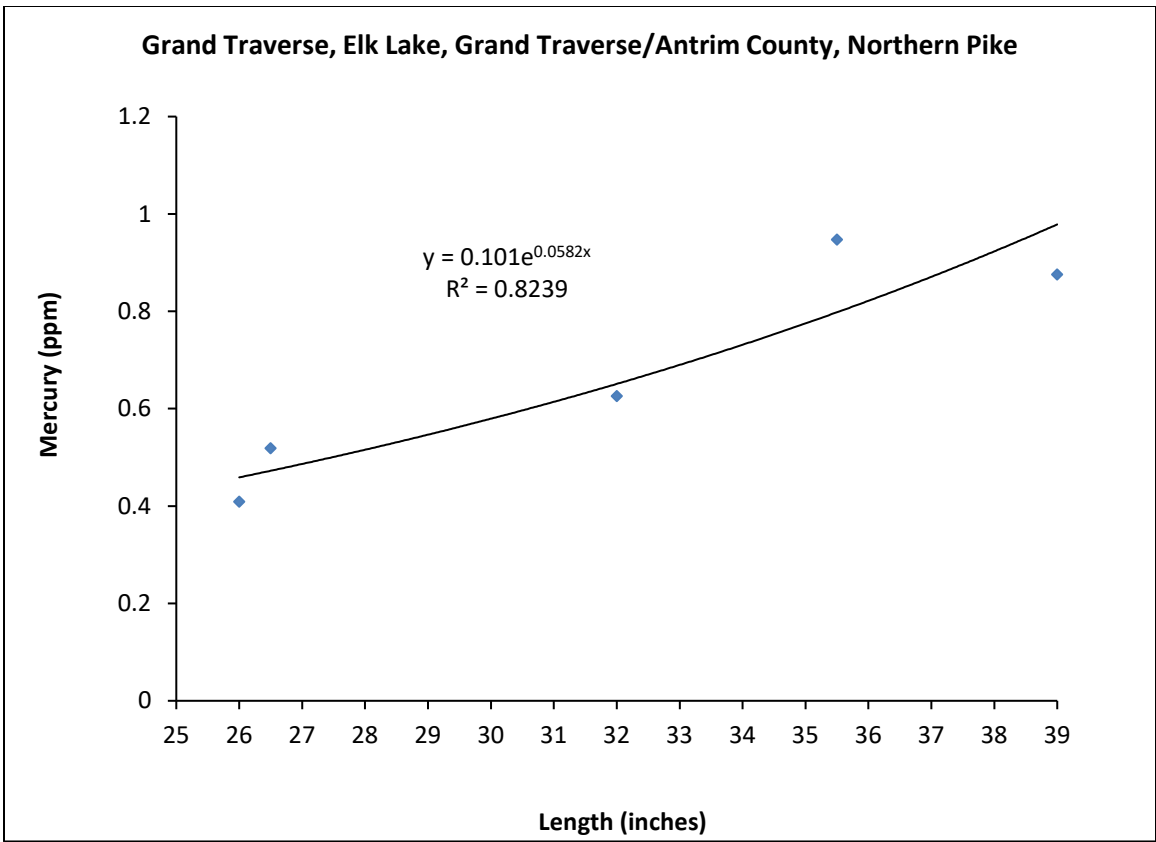
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available: --						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--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

**Existing MDHHS Advisory:** Northern pike from Elk Lake in Antrim and Grand Traverse Counties are covered under the statewide advisory for mercury. No one should eat more than 2 meals per month of northern pike smaller than 30" or no more than 1 meal per month of northern pike larger than 30" due to mercury.

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

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
24	0.408	2
25	0.433	2
26	0.459	2
27	0.486	2
28	0.515	2
29	0.546	1
30	0.579	1
31	0.614	1
32	0.650	1
<i>Shaded area denotes extrapolated estimates</i>		





**Walleye**

**Elk Lake**

**Grand Traverse & Antrim 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	5	22.8	15	22.8	25.6
Datasets available: 2006						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	5	0.87	0.65	1.25	1.15	0.5
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.725	0.667				

**Organics Analysis:**

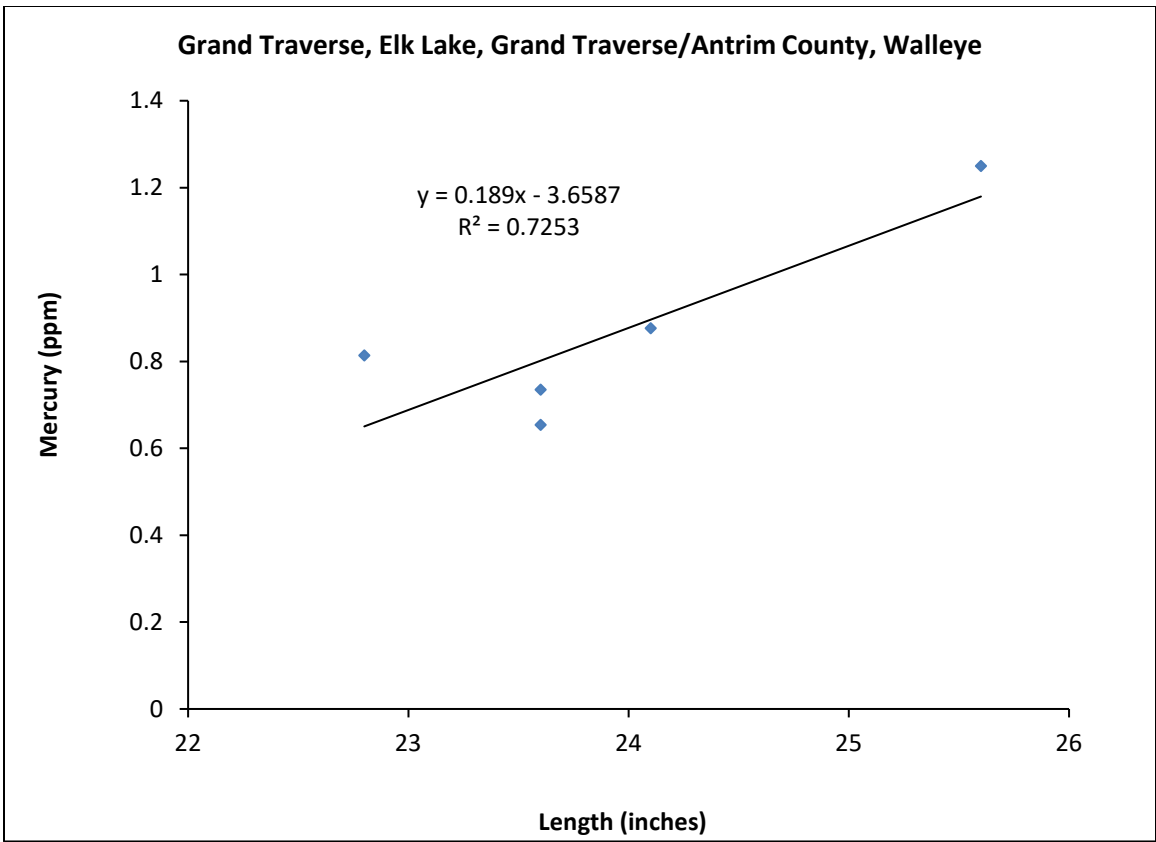
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available: --						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>0.5</b>

**Existing MDHHS Advisory:** Walleye from Elk Lake in Antrim and Grand Traverse Counties are covered under the statewide advisory for mercury. No one should eat more than 2 meals per month of walleye smaller than 20" or no more than 1 meal per month of walleye larger than 20" due to mercury.

**Recommendation:** No one should eat more than 1 meal per month of walleye from Elk Lake smaller than 24 inches or more than 6 meals per year of those fish larger than 24 inches due to mercury.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
15	-0.82	16
16	-0.63	16
18	-0.26	16
20	0.12	8
22	0.50	2
24	0.88	1
26	1.26	0.5
28	1.63	0.5
30	2.01	0.5

*Shaded area denotes extrapolated estimates*



## Brown Bullhead

## Ellsworth Lake

## Antrim 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
1994	1994	2	13.4	na	13.4	13.4
Datasets available: 1994						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	2	0.20	0.11	0.29	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
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
1994	1994	2	13.4	na	13.4	13.4
Datasets available: 1994						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	2	ND	--	--	--	--
DDT	2	0.004	0.003	0.004	--	--
Chlordane	2	ND	--	--	--	--
Toxaphene	2	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						--

**Existing MDHHS Advisory:** Bullhead from Ellsworth Lake in Antrim County are covered under the statewide advisory for mercury. No one should eat more than 4 meals per month of bullhead of any size due to mercury.

**Recommendation:** No change is recommended. MDHHS requires a minimum of five legal size fish samples to evaluate the need for waterbody specific fish consumption advisories.

**Largemouth Bass**

**Ellsworth Lake**

**Antrim County**

**Hg Analysis:**

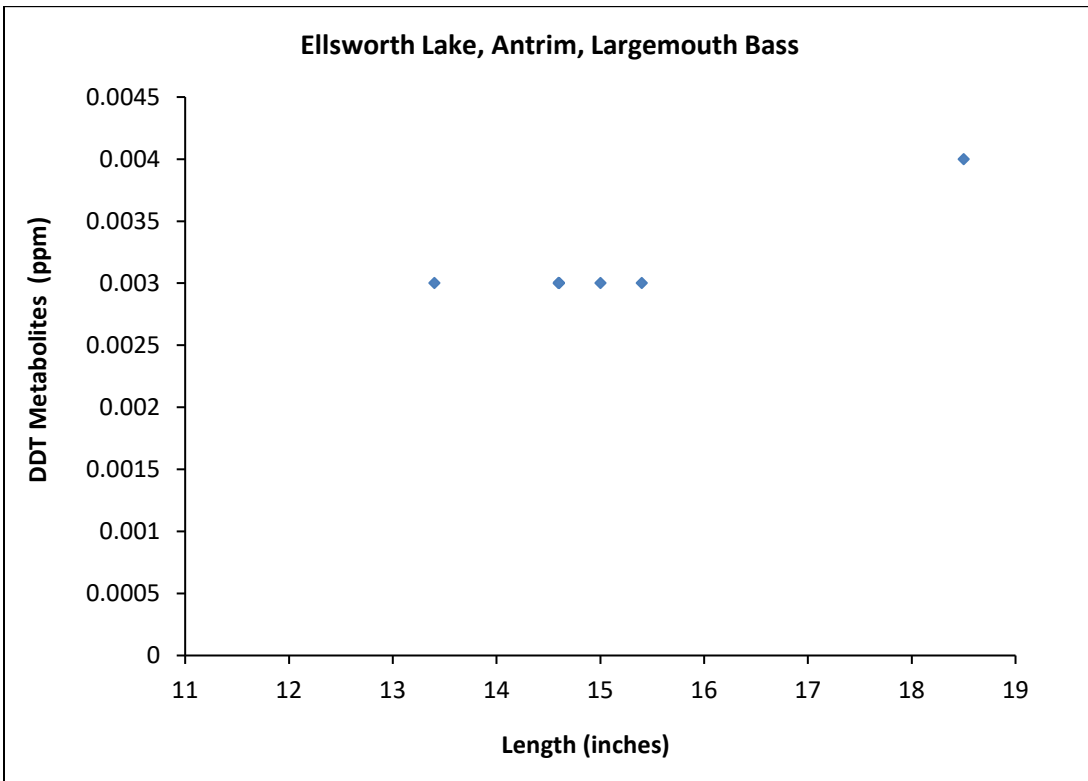
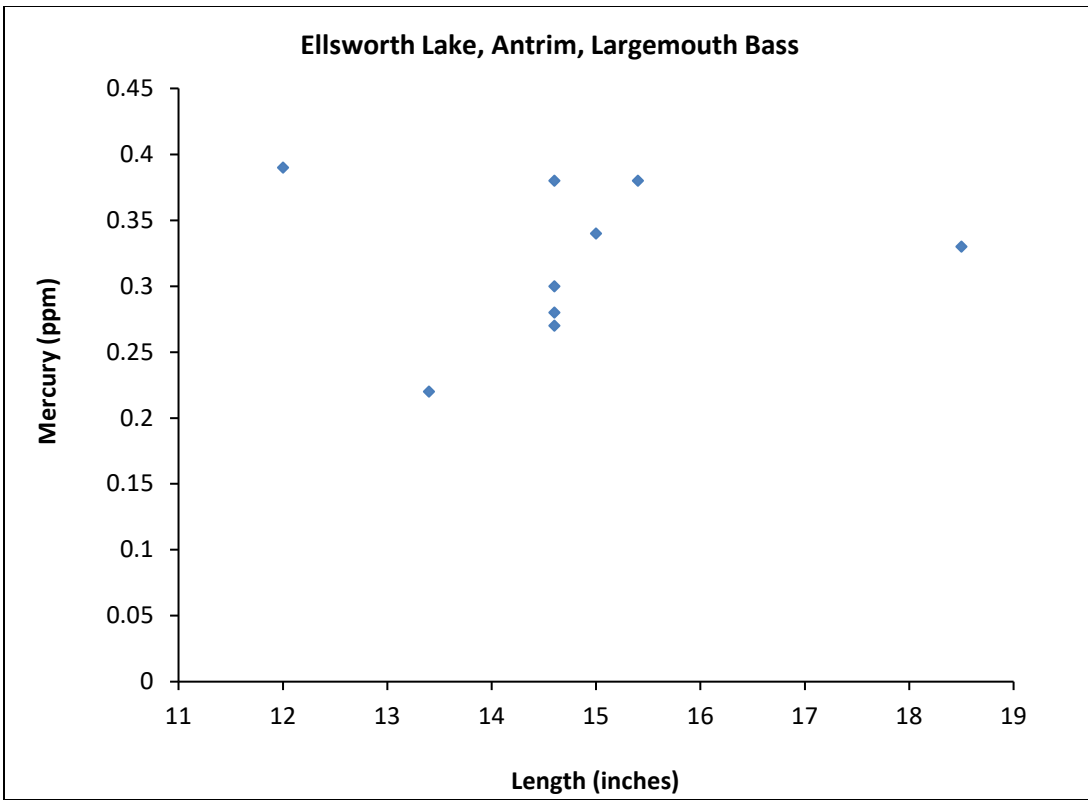
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1986	1994	9	12	14	14.6	18.5
Datasets available: 1986, 1994						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	7	0.33	0.27	0.38	0.37	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.029	0.039				

**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1994	1994	7	13.4	14	13.9	18.5
Datasets available: 1994						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	7	ND	--	--	--	--
DDT	7	0.003	0.003	0.004	0.004	16
Chlordane	7	ND	--	--	--	--
Toxaphene	7	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	0.856	0.856				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2</b>

**Existing MDHHS Advisory:** Largemouth and smallmouth bass from Ellsworth Lake in Antrim County are covered under the statewide advisory for 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 due to mercury.

**Recommendation:** No one should eat more than 2 meals per month of Ellsworth 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 length range was limited.



**Northern Pike**

**Ellsworth Lake**

**Antrim 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
1986	1986	8	12.6	24	12.6	22.6
Datasets available: 1986						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	8	0.38	0.15	0.72	0.53	2*
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.556	0.699				

**Organics Analysis:**

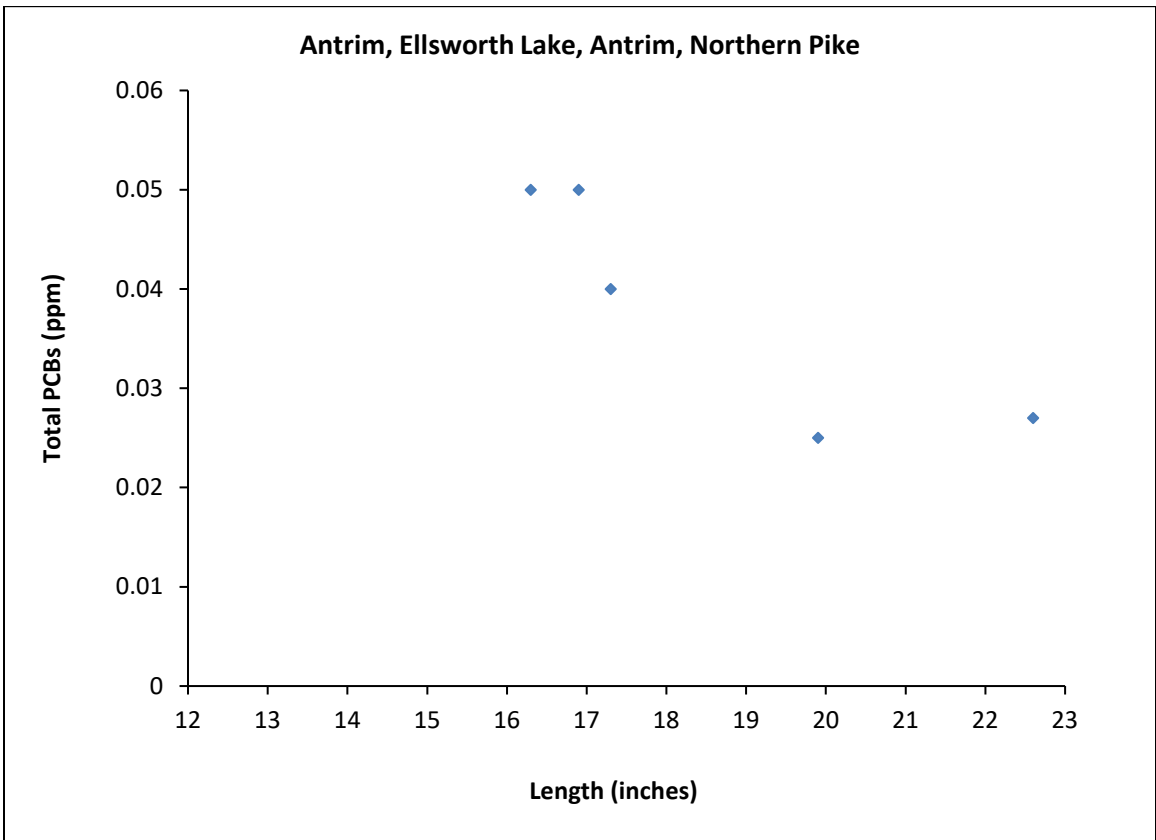
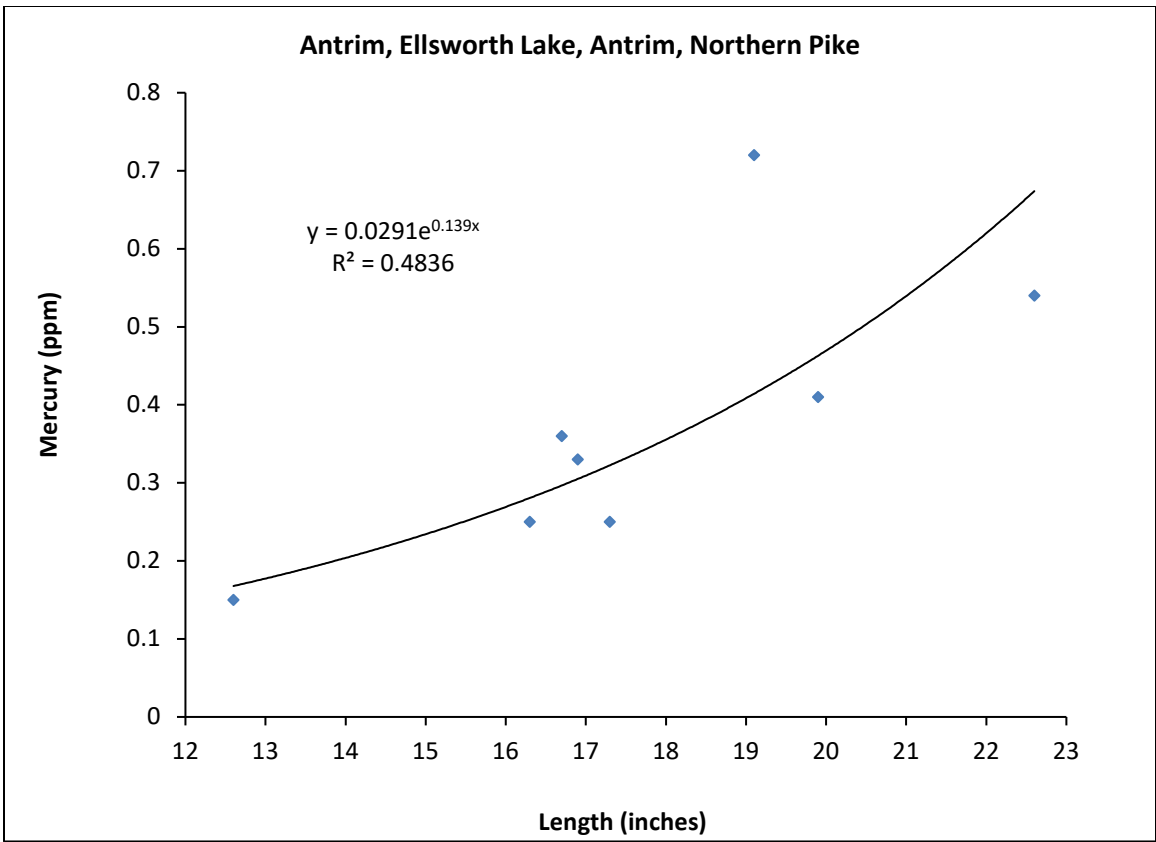
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Size Range of All Samples	
Earliest	Most Recent				Min	Max
1986	1986	5	16.3	24	16.3	22.6
Datasets available: 1986						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	5	0.04	0.025	0.05	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.776*	0.780*	*negative slope			
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2*</b>

**Existing MDHHS Advisory:** Northern pike from Ellsworth Lake in Antrim County are covered under the statewide advisory for mercury. 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 due to mercury.

**Recommendation:** No one should eat more than 1 meal per month of northern pike from Ellsworth Lake smaller than 30 inches or more than 6 meals per year of those fish larger than 30 inches. Regression estimates were not used beyond the length range of the sampled fish. The regression based meal category at 22 inches exceeds 1 meal per month. The statewide length range was applied as the length range was limited. \*The UCL was not used because it is based on sublegal samples.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
24	0.818	1
25	0.940	1
26	1.080	1
27	1.241	0.5
28	1.426	0.5
29	1.639	0.5
30	1.883	0.5
31	2.164	0.5
32	2.487	0

*Shaded area denotes extrapolated estimates*





**White Sucker**

**Ellsworth Lake**

**Antrim County**

**Hg Analysis:**

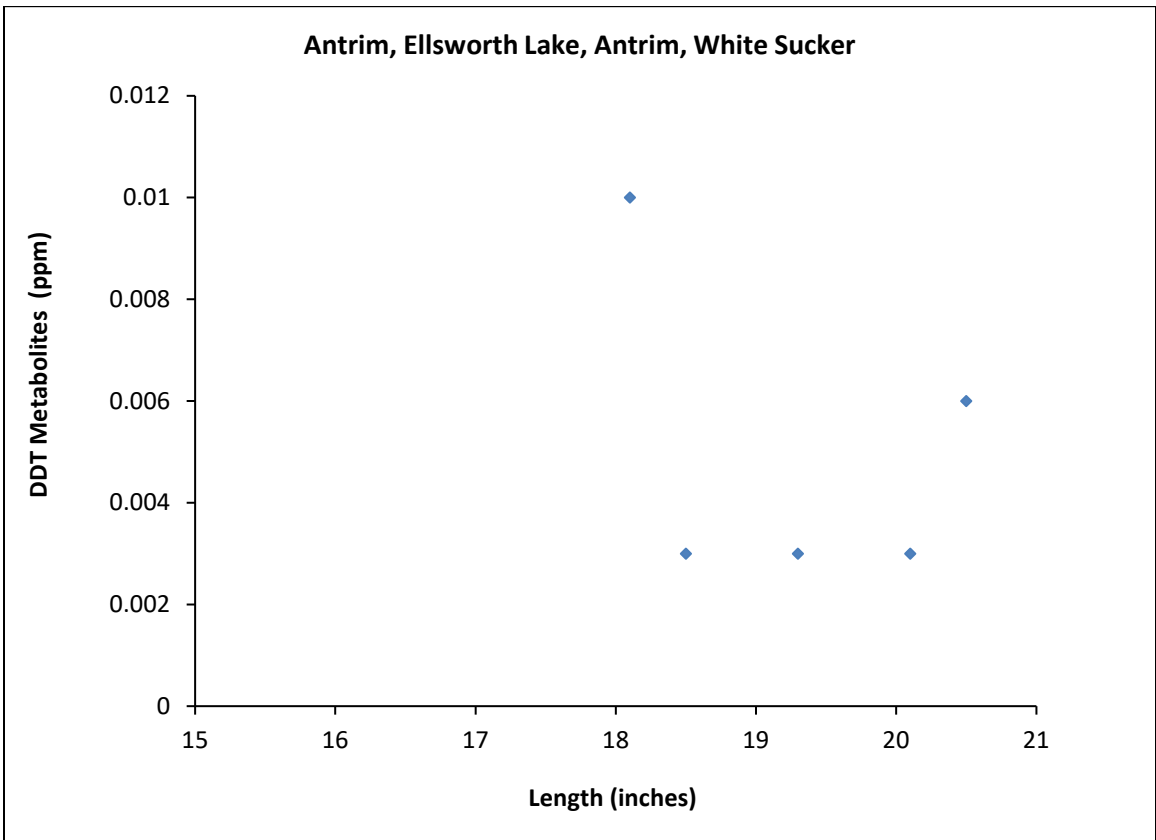
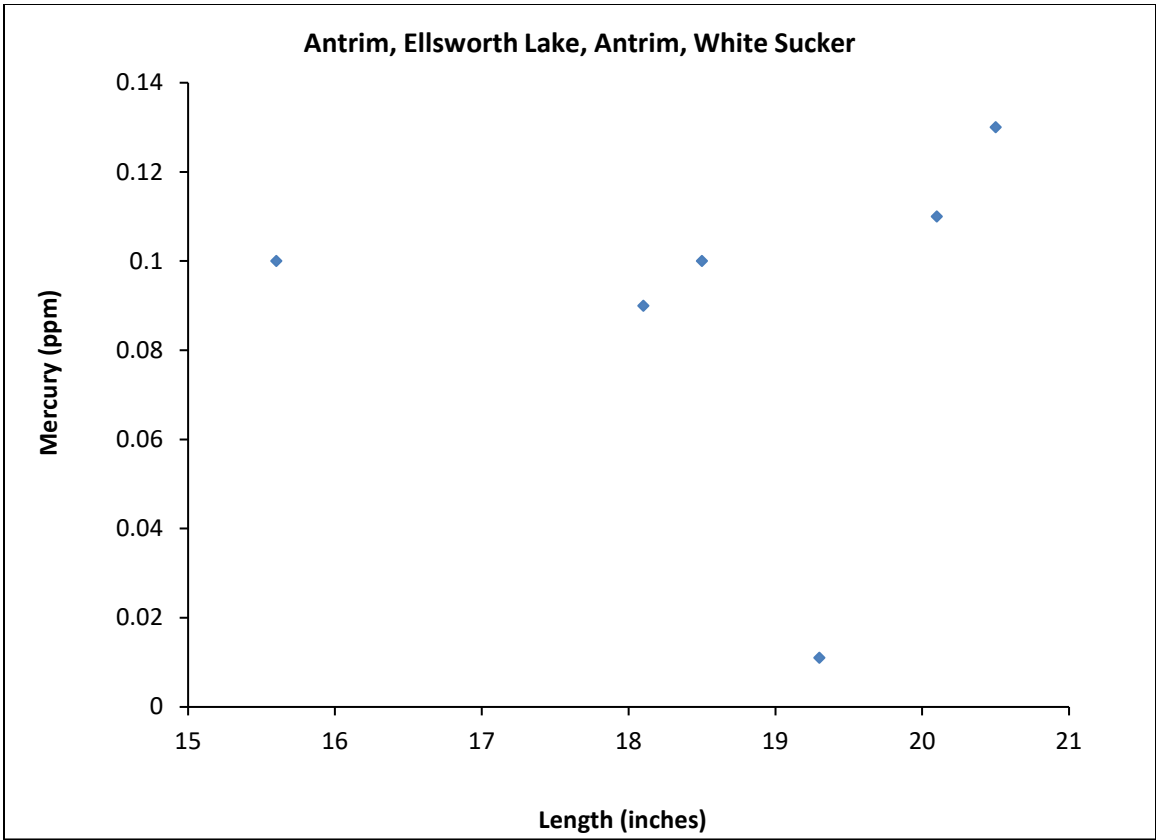
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1986	1994	6	15.6	na	15.6	20.5
Datasets available: 1986, 1994						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	6	0.09	0.011	0.13	0.13	8
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.003	0.007				

**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1986	1994	5	18.1	na	18.1	20.5
Datasets available: 1986, 1994						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	5	ND	--	--	--	--
DDT	5	0.005	0.003	0.01	0.01	16
Chlordane	5	ND	--	--	--	--
Toxaphene	5	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	0.146	0.075				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>8</b>

**Existing MDHHS Advisory:** Suckers from Ellsworth Lake in Antrim County are covered under the statewide advisory for mercury. No one should eat more than 8 meals per month of suckers of any size due to mercury.

**Recommendation:** No one should eat more than 8 meals per month of suckers from Ellsworth Lake due to mercury.



**Rock Bass**

**Intermediate Lake**

**Antrim 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	10	9.1	na	9.1	11.2
Datasets available: 1990						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.33	0.18	0.51	0.40	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.633	0.586				

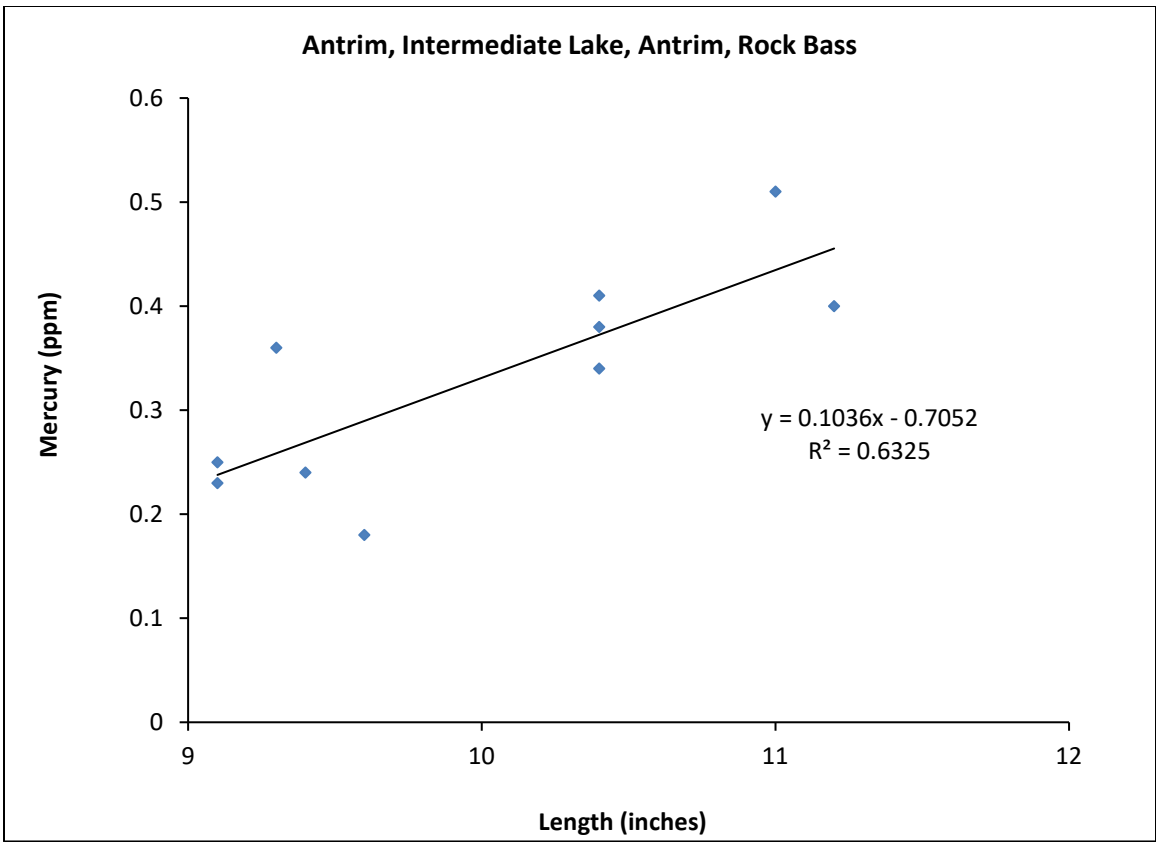
**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1990	1990	10	9.1	na	9.1	11.2
Datasets available: 1990						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	ND	--	--	--	--
DDT	10	ND	--	--	--	--
Chlordane	10	ND	--	--	--	--
Toxaphene	10	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2</b>

**Existing MDHHS Advisory:** Rock bass from Intermediate Lake in Antrim County are 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 4 meals per month of Intermediate Lake rock bass smaller than 9 inches or more than 2 meals per month of those fish larger than 9 inches due to mercury.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
7	0.02	16
8	0.12	8
9	0.23	4
10	0.33	2
11	0.43	2
12	0.54	1
13	0.64	1
14	0.74	1
<i>Shaded area denotes extrapolated estimates</i>		



**Smallmouth Bass**

**Intermediate Lake**

**Antrim 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	12.2	14	12.2	15.4
Datasets available: 1990						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	3	0.29	0.27	0.32	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
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
1990	1990	3	12.2	14	12.2	15.4
Datasets available: 1990						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	3	ND	--	--	--	--
DDT	3	0.008	0.004	0.012	--	--
Chlordane	3	ND	--	--	--	--
Toxaphene	3	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>--</b>

**Existing MDHHS Advisory:** Smallmouth bass from Intermediate Lake in Antrim County are covered under the statewide advisory for mercury. No one should eat more than 2 meals per month of largemouth or smallmouth bass less than 18 inches or 1 meal per month of largemouth or smallmouth bass greater than 18 inches due to mercury.

**Recommendation:** No change is recommended. MDHHS requires a minimum of five legal size fish samples to evaluate the need for waterbody specific fish consumption advisories.

**Walleye**

**Intermediate Lake**

**Antrim 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	10	14.8	15	14.8	21.5
Datasets available: 1990						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.34	0.22	0.57	0.45	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.694	0.634				

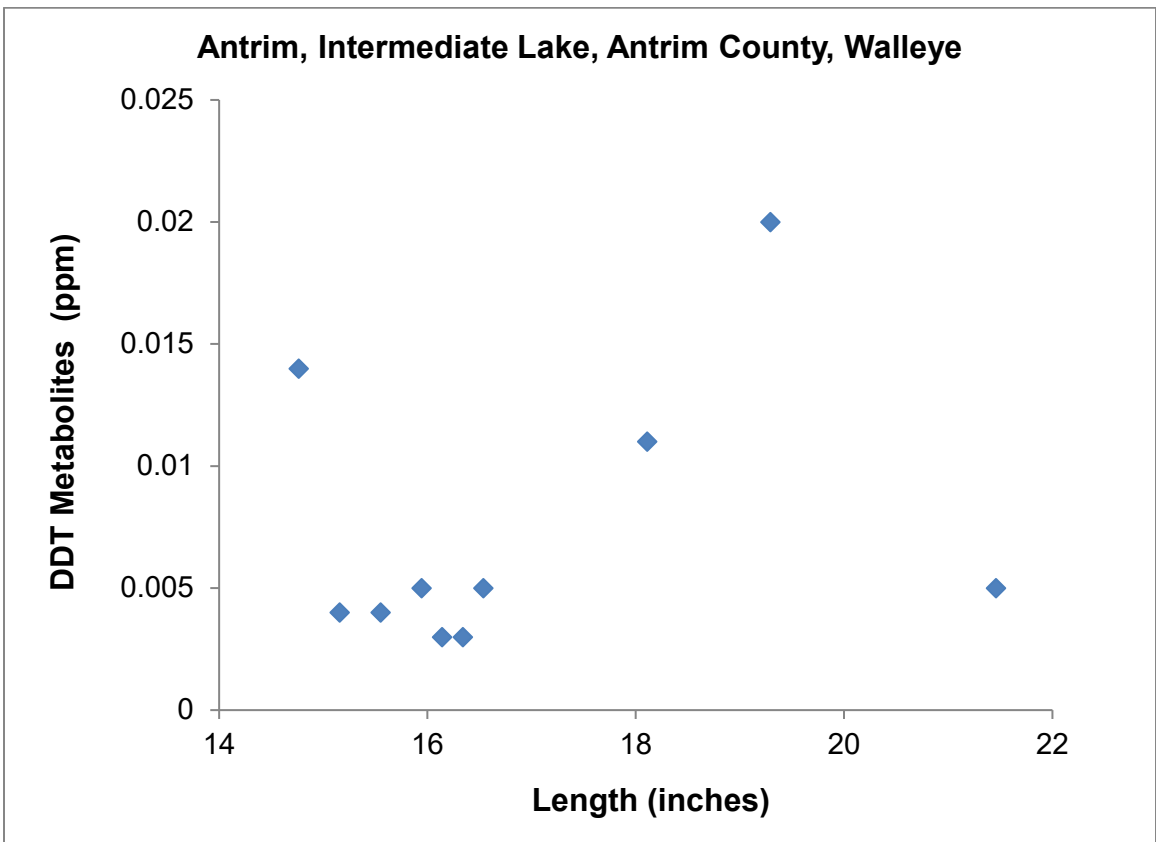
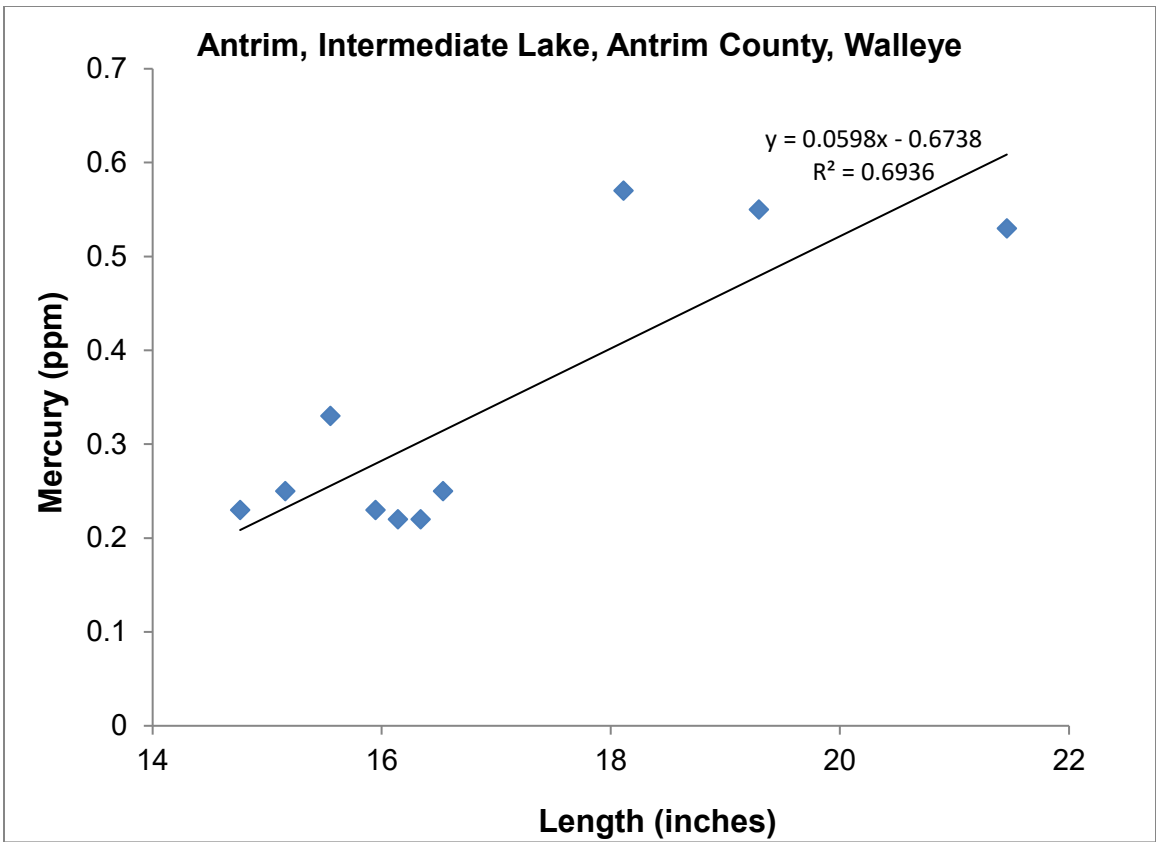
**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1990	1990	10	14.8	15	14.8	21.5
Datasets available: 1990						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	ND	--	--	--	--
DDT	10	0.007	0.003	0.020	0.011	16
Chlordane	10	ND	--	--	--	--
Toxaphene	10	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	0.072	0.074				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2</b>

**Existing MDHHS Advisory:** Walleye from Intermediate Lake in Antrim County are covered under the statewide advisory for mercury. No one should eat more than 2 meals per month of walleye smaller than 20" or no more than 1 meal per month of walleye larger than 20" due to mercury.

**Recommendation:** No one should eat more than 2 meals per month of Intermediate Lake walleye 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	0.223	4
16	0.283	2
17	0.342	2
18	0.402	2
19	0.462	2
20	0.522	2
21	0.582	1
22	0.642	1
23	0.702	1
<i>Shaded area denotes extrapolated estimates</i>		



**Splake**

**Lake Bellaire**

**Antrim 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	6	17.3	8	17.3	28.7
Datasets available: 1987						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	6	0.26	0.20	0.36	0.32	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.501	0.525				

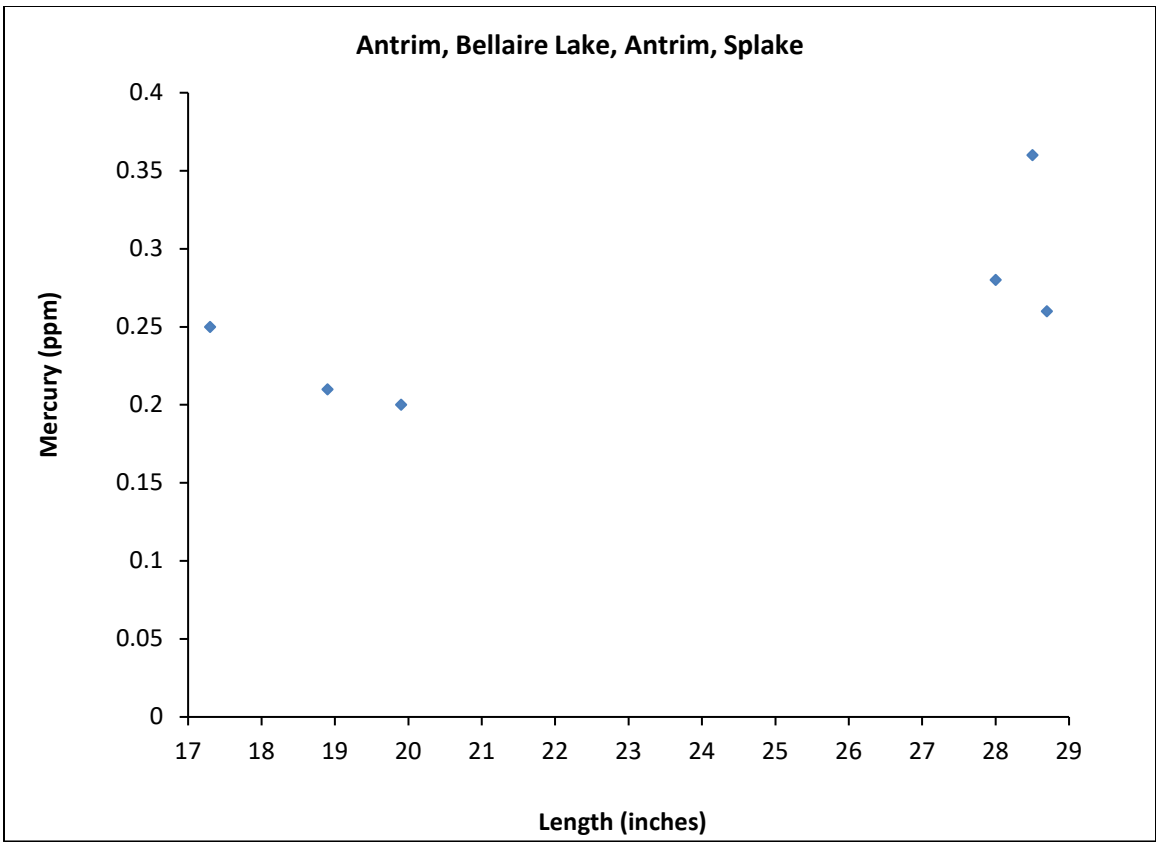
**Organics Analysis:**

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	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2</b>

**Existing MDHHS Advisory:** There are no current consumption advisories for Lake Bellaire splake.

**Recommendation:** No one should eat more than 2 meals per month of Lake Bellaire splake due to mercury.





**Walleye**

**Lake Bellaire**

**Antrim 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	7	9.1	15	14.8	23.6
Datasets available: 1987						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	6	0.51	0.19	0.70	0.69	1
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.810	0.885				

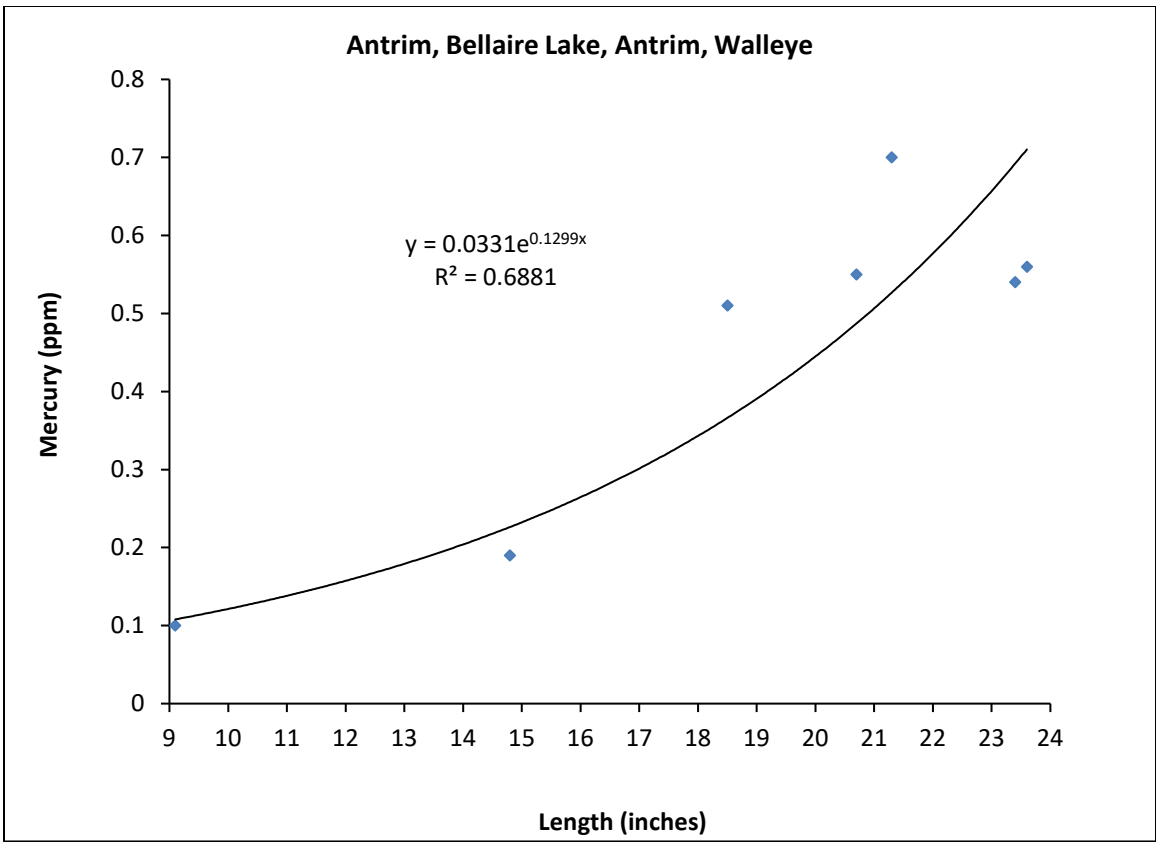
**Organics Analysis:**

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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>1</b>

**Existing MDHHS Advisory:** Walleye from Lake Bellaire in Antrim County are covered under the statewide advisory for mercury. 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 due to mercury.

**Recommendation:** No one should eat more than 2 meals per month of walleye from Lake Bellaire smaller than 22 inches or more than 1 meal per month of those fish larger than 22 inches due to mercury.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
15	0.232	4
16	0.265	4
17	0.301	2
18	0.343	2
19	0.391	2
20	0.445	2
21	0.506	2
22	0.577	1
23	0.657	1
<i>Shaded area denotes extrapolated estimates</i>		



**Brown Trout**

**Torch Lake**

**Antrim 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
1993	1993	10	15.7	15	15.7	26.4
Datasets available: 1993						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.26	0.10	0.46	0.32	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.714	0.618				

**Organics Analysis:**

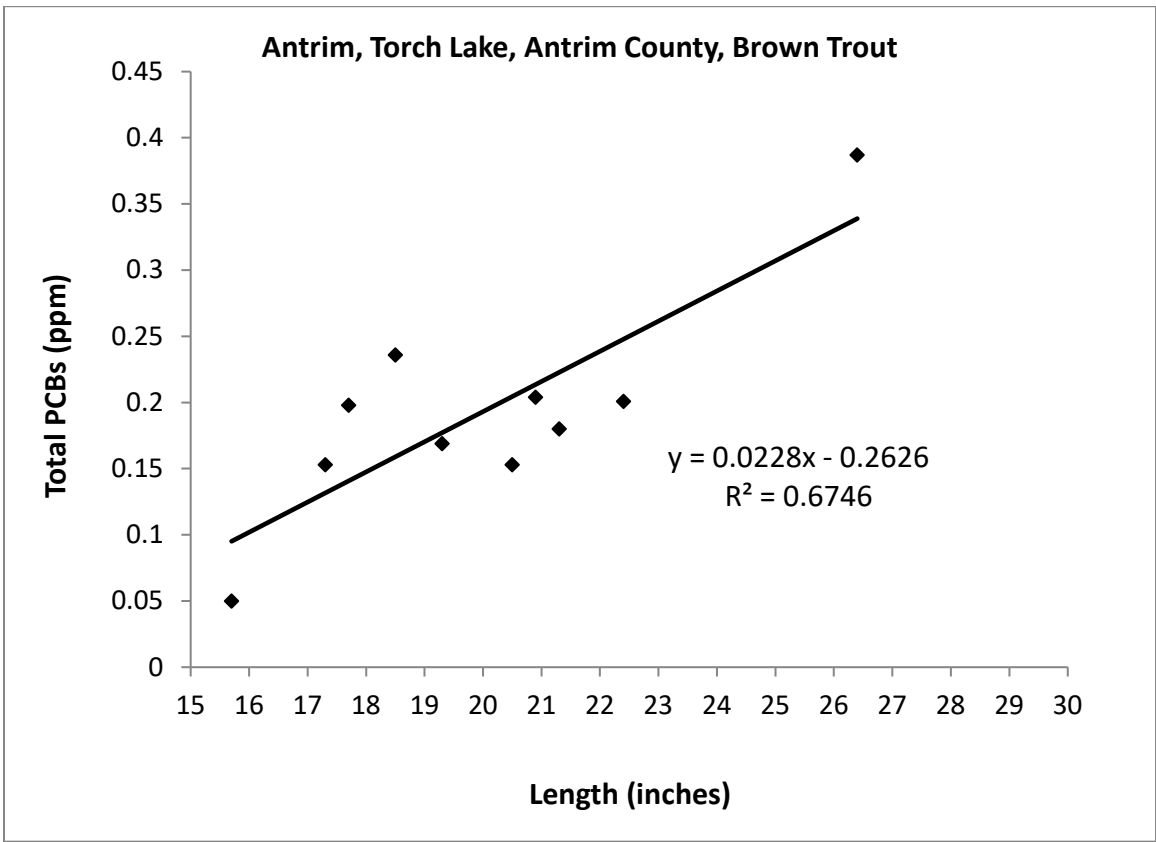
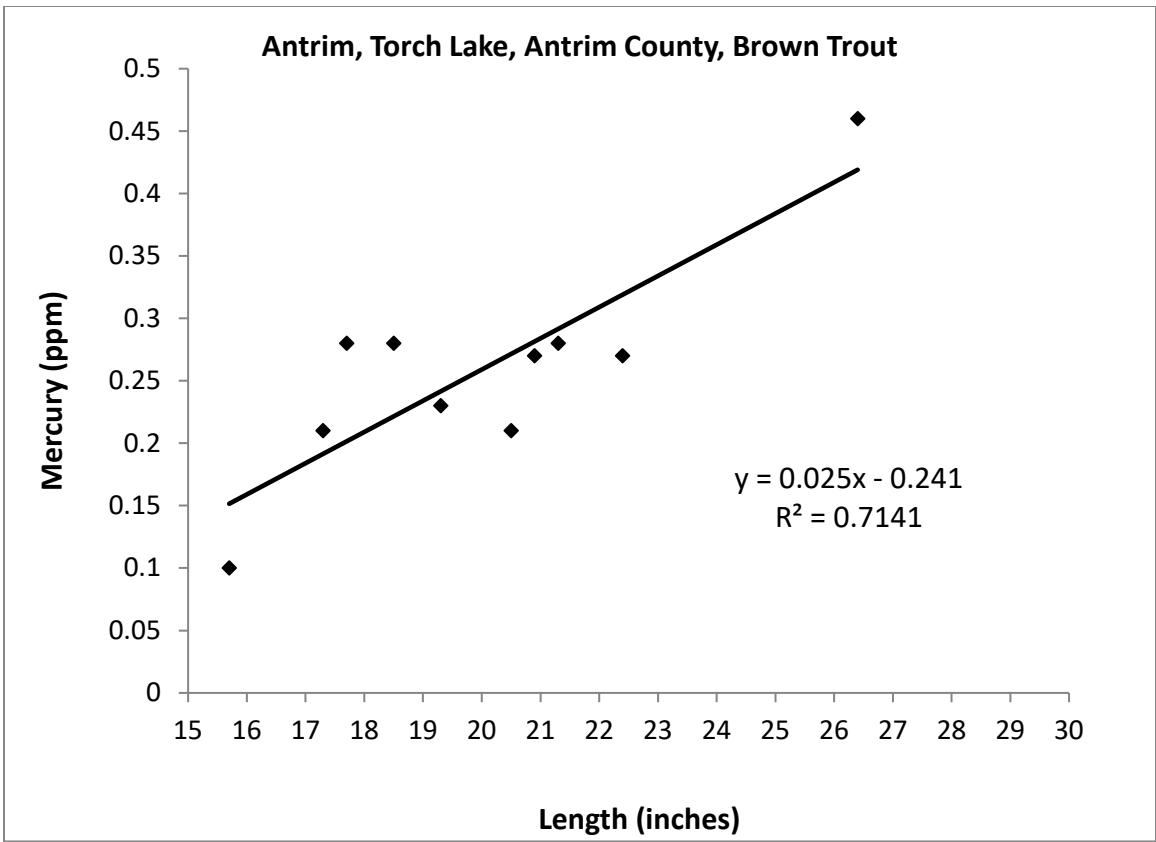
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1993	1993	10	15.7	15	15.7	26.4
Datasets available: 1993						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.19	0.05	0.39	0.25	0.5*
DDT	10	0.36	0.12	0.82	0.50	2*
Chlordane	10	0.08	0.008	0.15	0.11	--
Toxaphene	10	0.26	0.05	0.40	0.33	1*
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.675	0.562				
DDT	0.688	0.652				
Chlordane	0.680	0.468				
Toxaphene	0.453	0.385				
<b>Final meal category based on UCL:</b>						<b>0.5*</b>

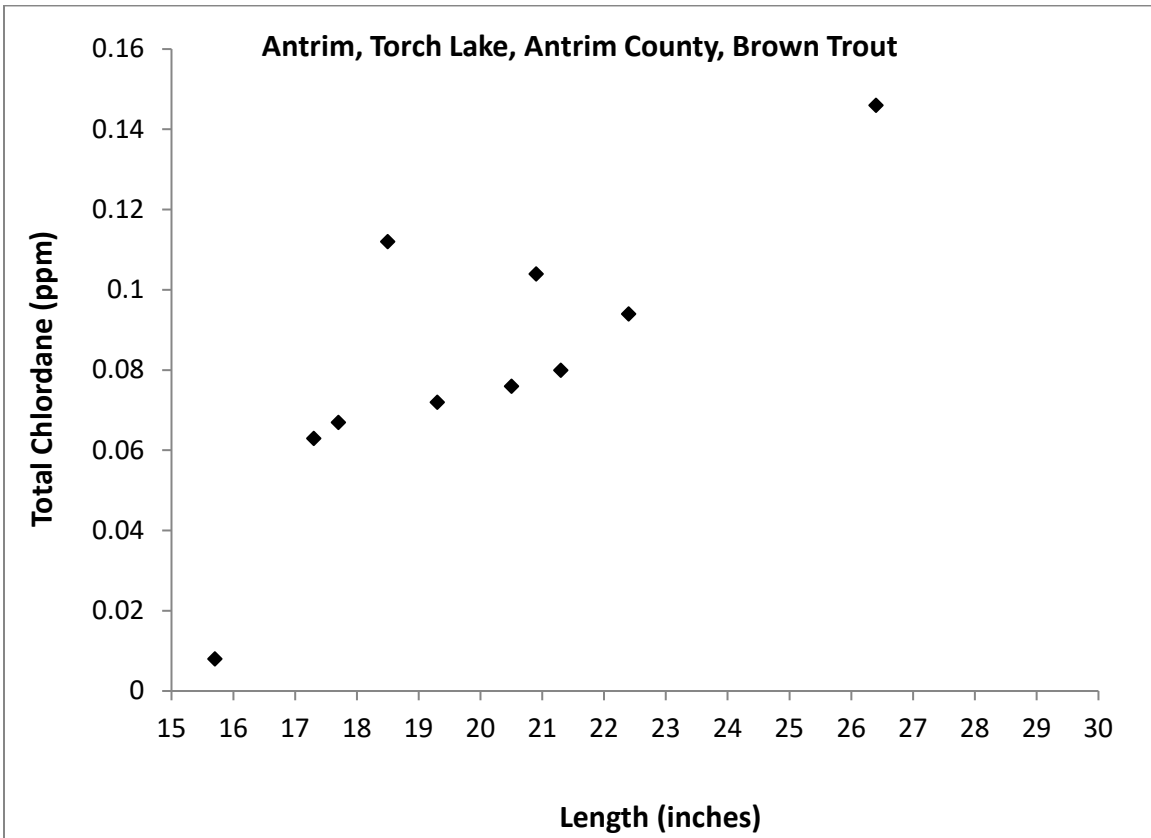
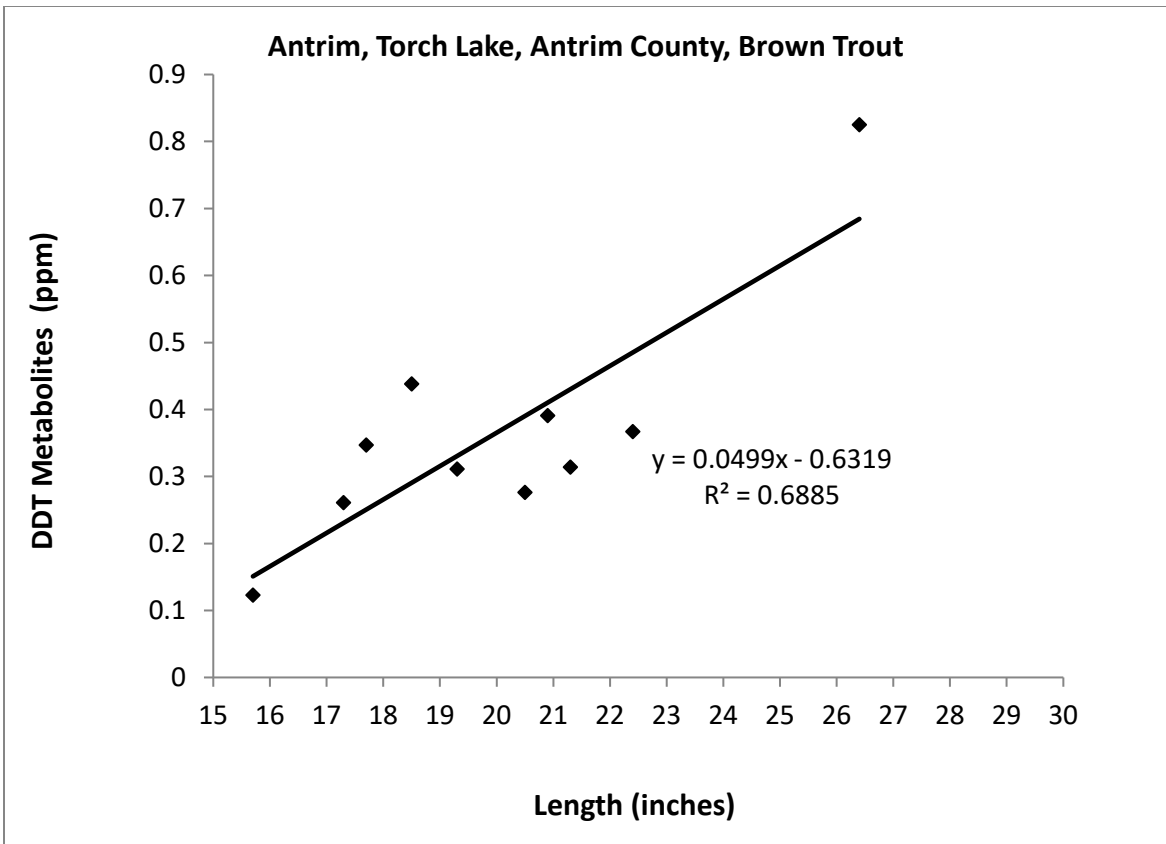
**Existing MDHHS Advisory:** Brown trout from Torch Lake in Antrim County are covered under the statewide advisory for mercury. No one should eat more than 4 meals per month of brown trout of any size due to mercury.

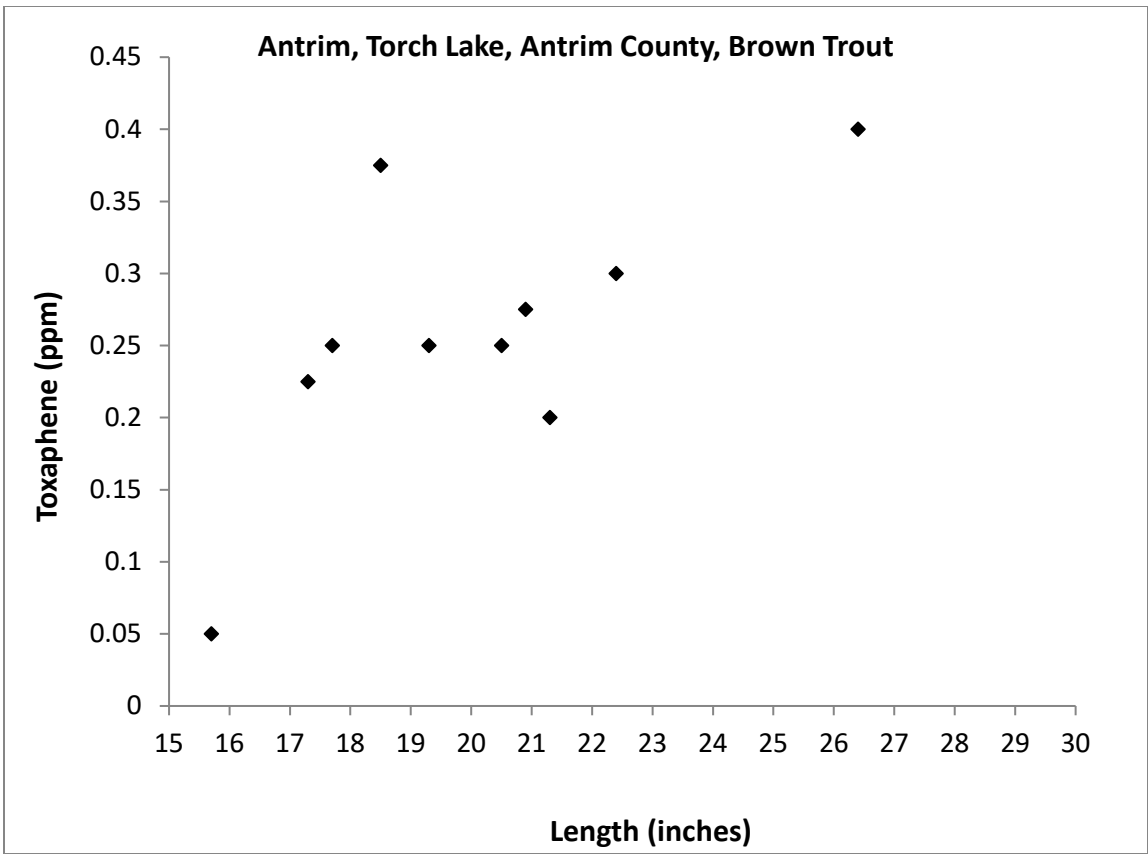
**Recommendation:** No one should eat more than 2 meals per month of brown trout from Torch Lake smaller than 20 inches due to PCBs and toxaphene or more than 1 meal per month of those fish larger than 20 inches due to PCBs. Mercury and DDT would also cause advisories. \*Based on the EGLE Fish Contaminant Monitoring Program, PCB, DDT, and Toxaphene concentrations ≥15 years old are expected to have declined to a concentration that allows a less restrictive meal category.

Length (Inches)	Hg		PCB	
	Regression Equation Estimate (ppm)	Meal Category	Regression Equation Estimate (ppm)	Meal Category
14	0.11	8	0.06	2*
16	0.16	4	0.10	2*
18	0.21	4	0.15	1*
20	0.26	4	0.19	1*
22	0.31	2	0.24	0.5*
24	0.36	2	0.28	0.5*
26	0.41	2	0.33	0.5*
28	0.46	2	0.38	0.5
30	0.51	2	0.42	0.5

*Shaded area denotes extrapolated estimates*







**Lake Trout**

**Torch Lake**

**Antrim 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	
1991	2009	31	14.2	15	15.4	29.9	
Datasets available: 1991, 1993, 2009							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	31	0.60		0.19	1.44	0.74	1
Chemical	Linear Regression	Exponential Regression					
	R <sup>2</sup>	R <sup>2</sup>					
Mercury	0.137	0.266					

**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	11	17.7	15	17.7	28.0	
Datasets available: 2009							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	11	0.329		0.06	0.64	0.45	Limited
DDT	11	0.502		0.08	1.10	0.69	2
Chlordane	11	0.080		0.01	0.16	0.11	--
Toxaphene	11	ND		--	--	--	--
TEQ*	11	42.7 ppt		8.3 ppt	75.6 ppt	51.8 ppt	Limited
Chemical	Linear Regression	Exponential Regression					
	R <sup>2</sup>	R <sup>2</sup>					
PCB	0.536	0.678					
DDT	0.381	0.589					
Chlordane	0.429	0.589					
Toxaphene	--	--					
TEQ*	0.478	0.613					
<b>Final meal category based on UCL:</b>							<b>Limited</b>

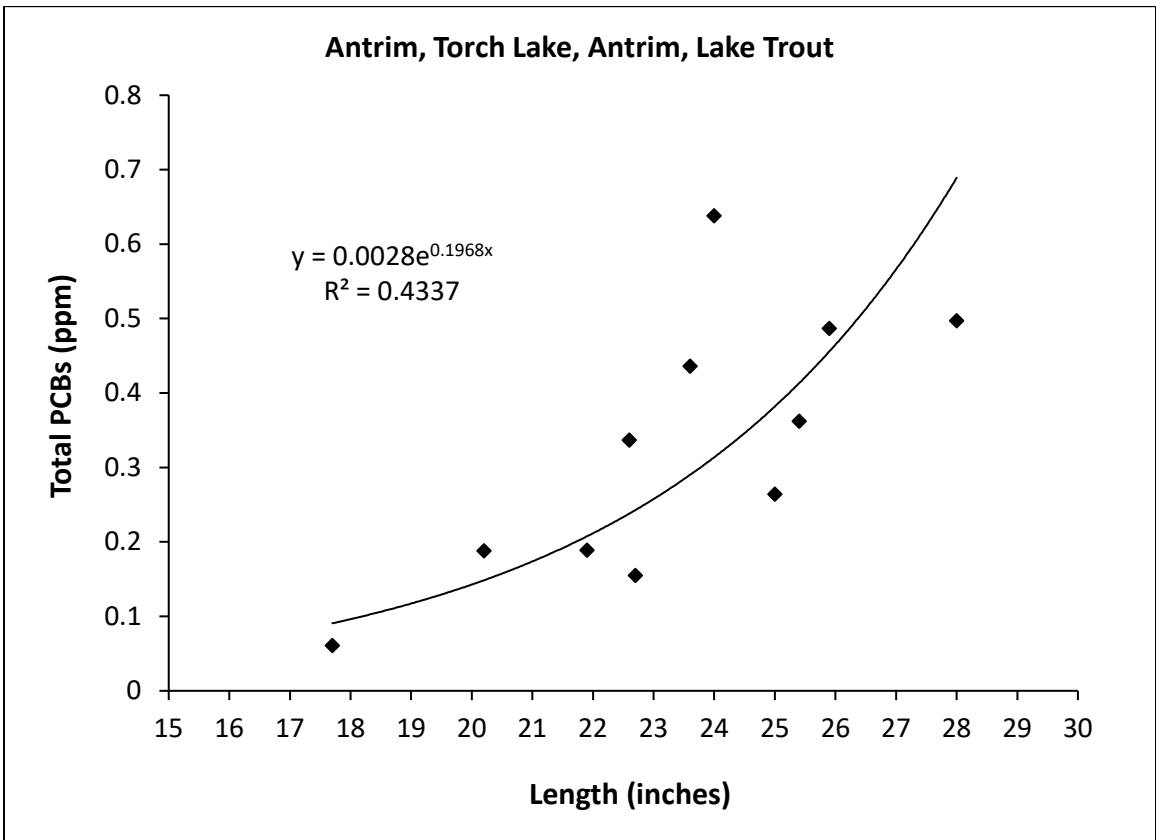
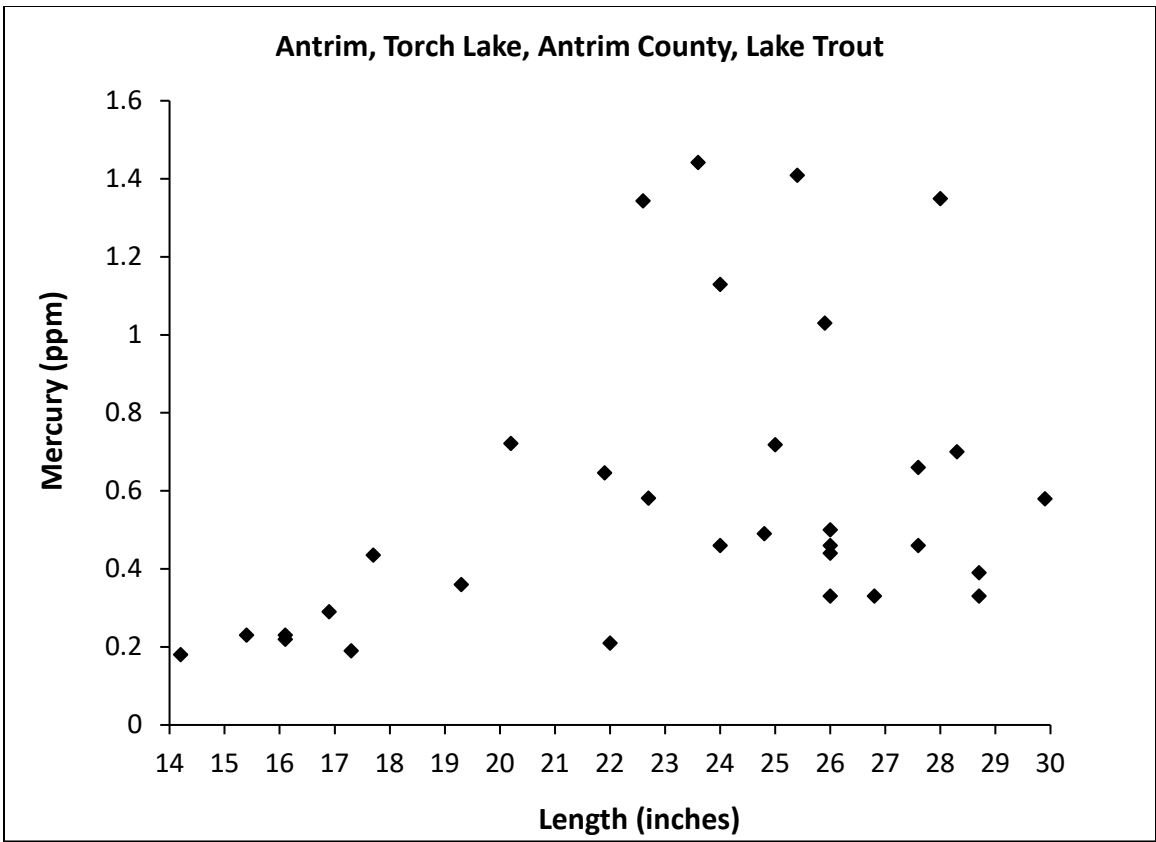
\* - 2005 WHO TEFs; dl-PCBs included

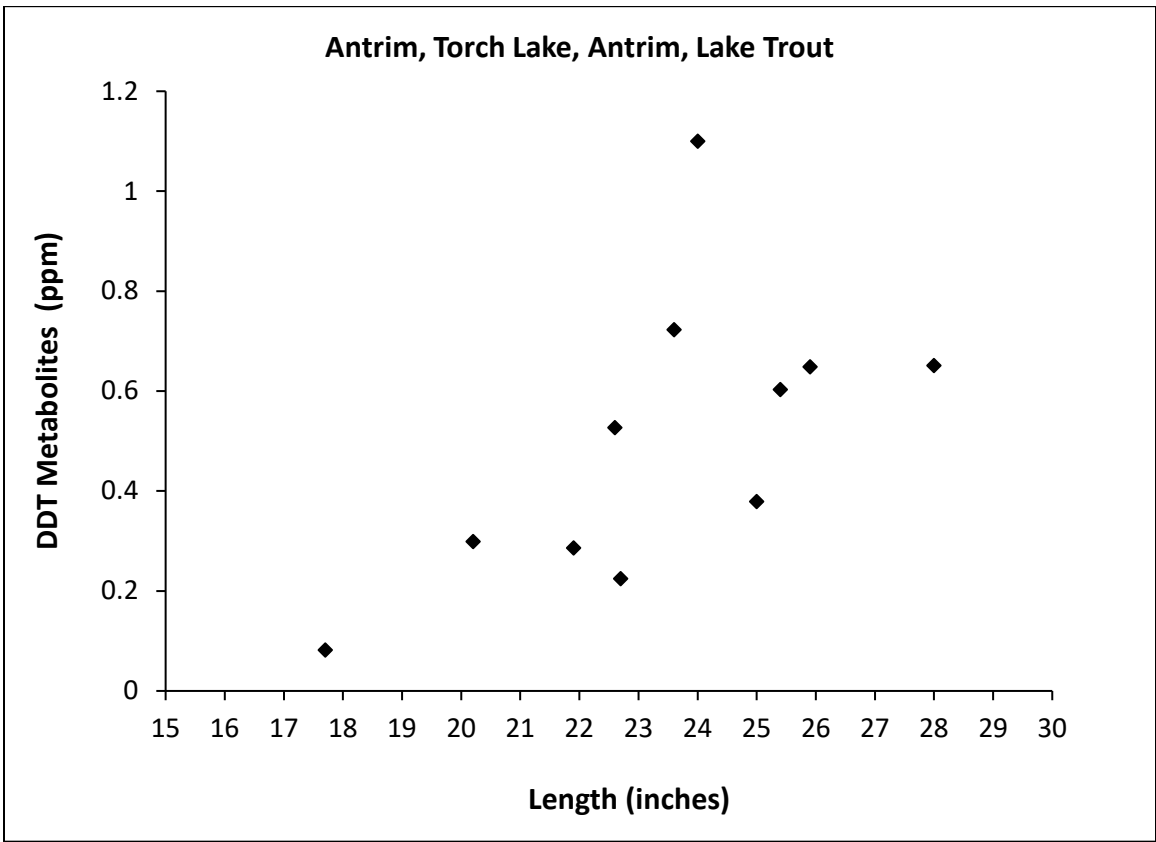
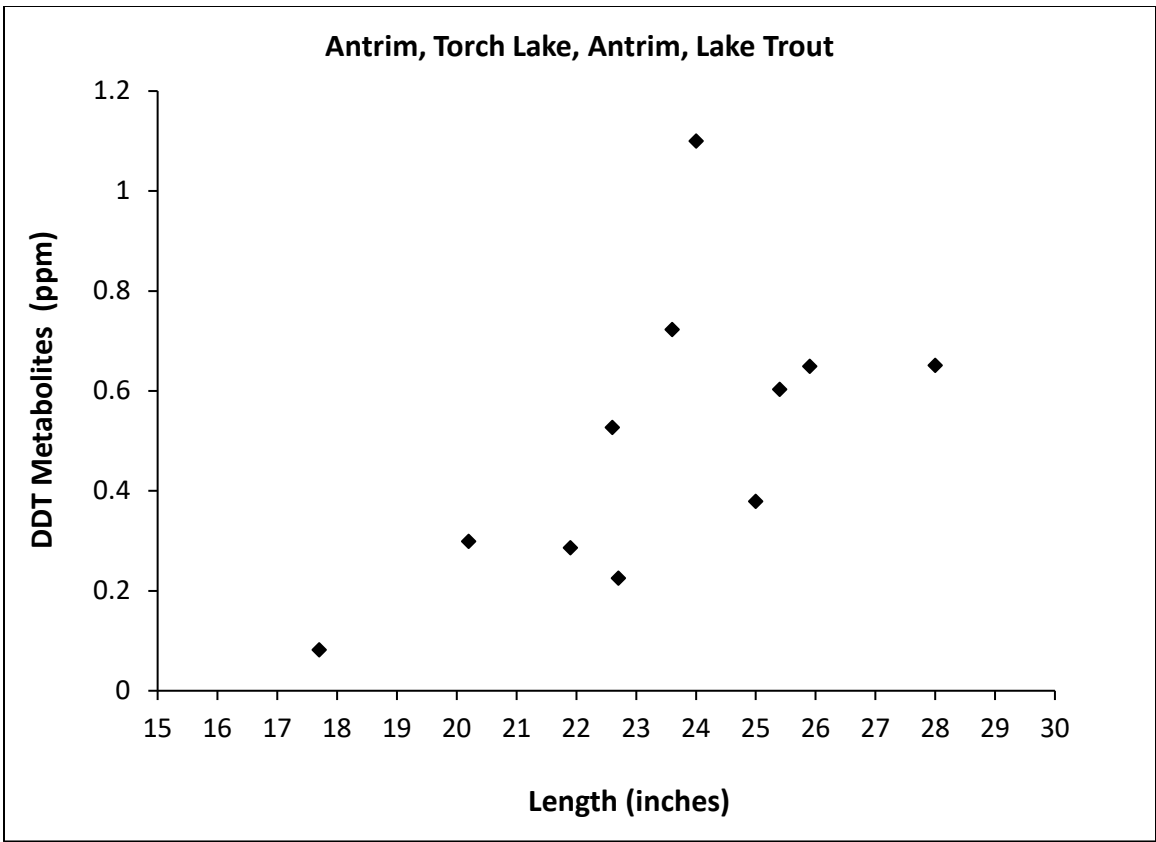
**Existing MDHHS Advisory:** No one should eat lake trout from Torch Lake due to mercury, dioxins and PCBs.

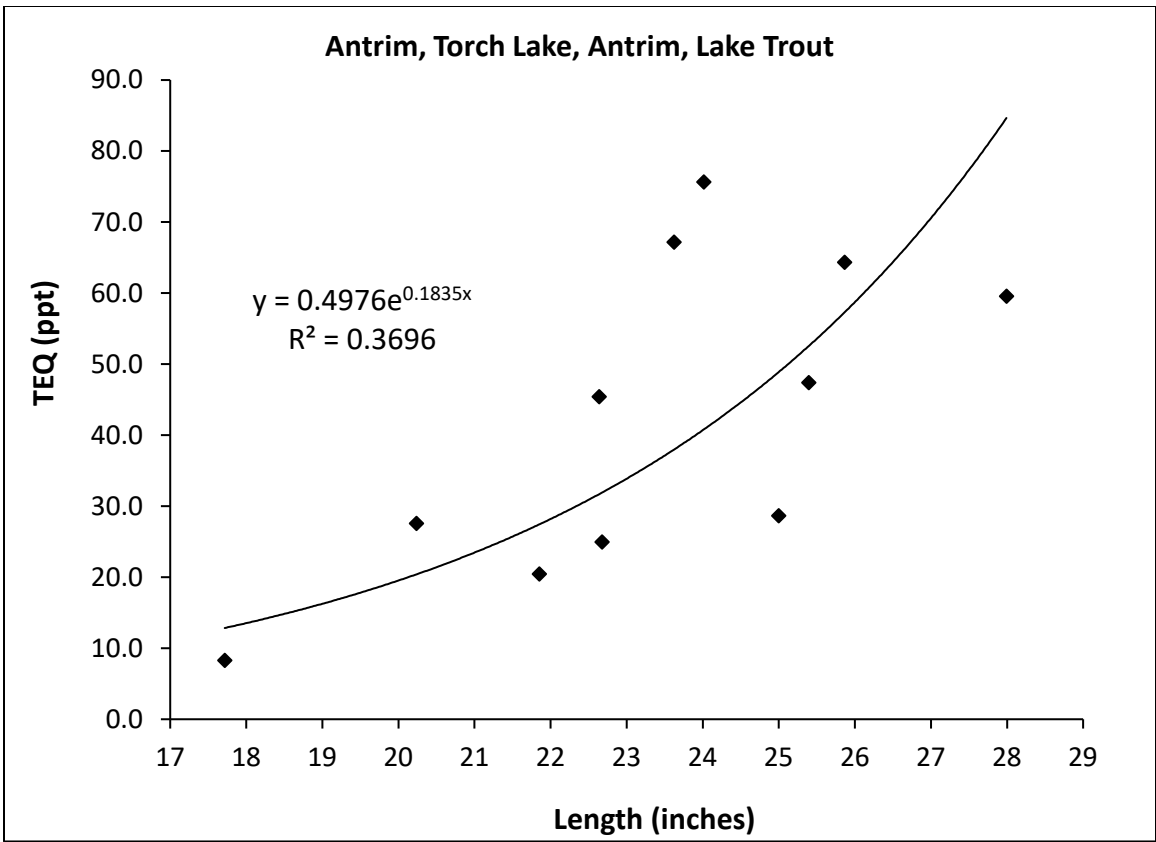
**Recommendation:** Sensitive populations should not eat these fish. Healthy adults should limit consumption of lake trout from Torch Lake smaller than 28 inches to 1 or 2 meals per year and should not eat any of those fish larger than 28 inches due to dioxins. PCBs, mercury, and DDT would also cause advisories.

Length (Inches)	PCB Regression Equation Estimate (ppm)	Meal Category	TEQ Regression Equation Estimate (ppm)	Meal Category
15	0.05	2	7.8	Limited
16	0.07	2	9.4	Limited
18	0.10	2	13.5	Limited
20	0.14	1	19.5	Limited
22	0.21	0.5	28.2	Limited
24	0.32	0.5	40.7	Limited
26	0.47	Limited	58.7	Limited
28	0.69	Limited	84.8	Limited
30	1.03	Limited	122.4	0
<i>Shaded area denotes extrapolated estimates</i>				









**Lake Whitefish**

**Torch Lake**

**Antrim 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
1994	2001	20	12.8	na	12.8	21.1
Datasets available: 1994, 2001						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	20	0.11	0.08	0.18	0.12	8
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.095	0.083				

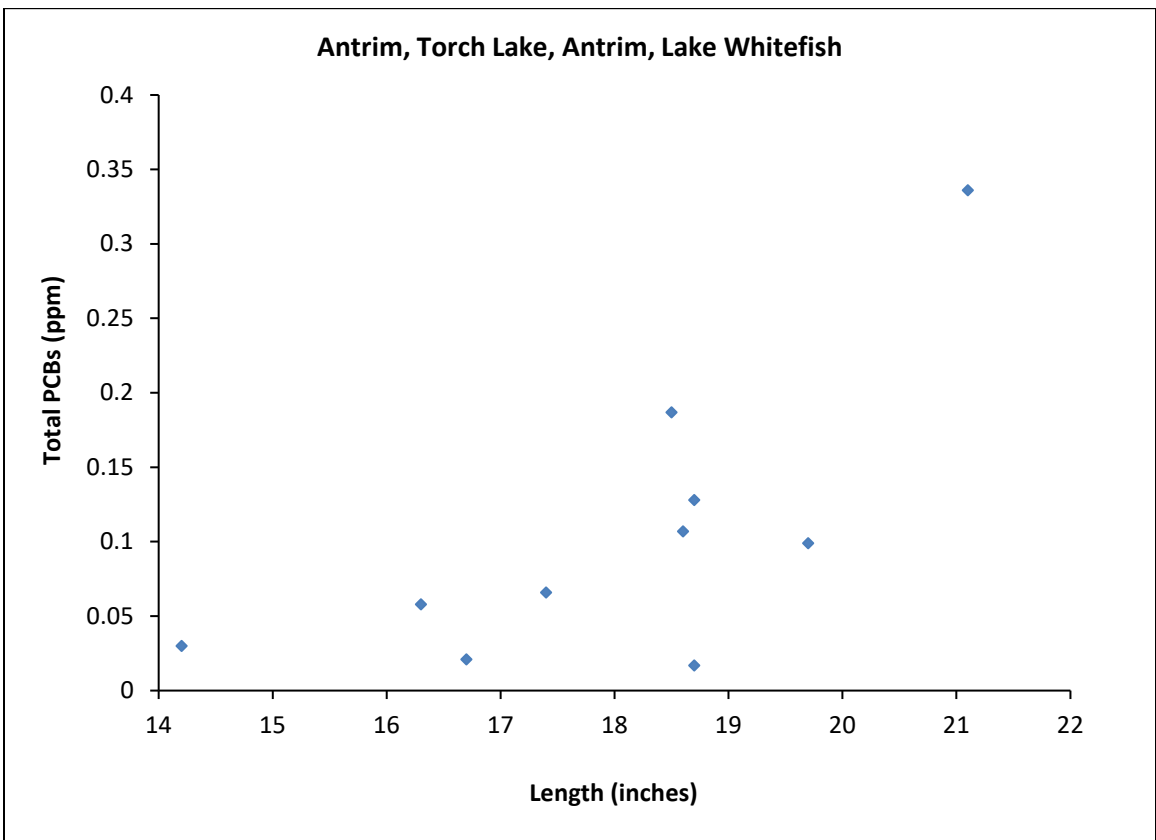
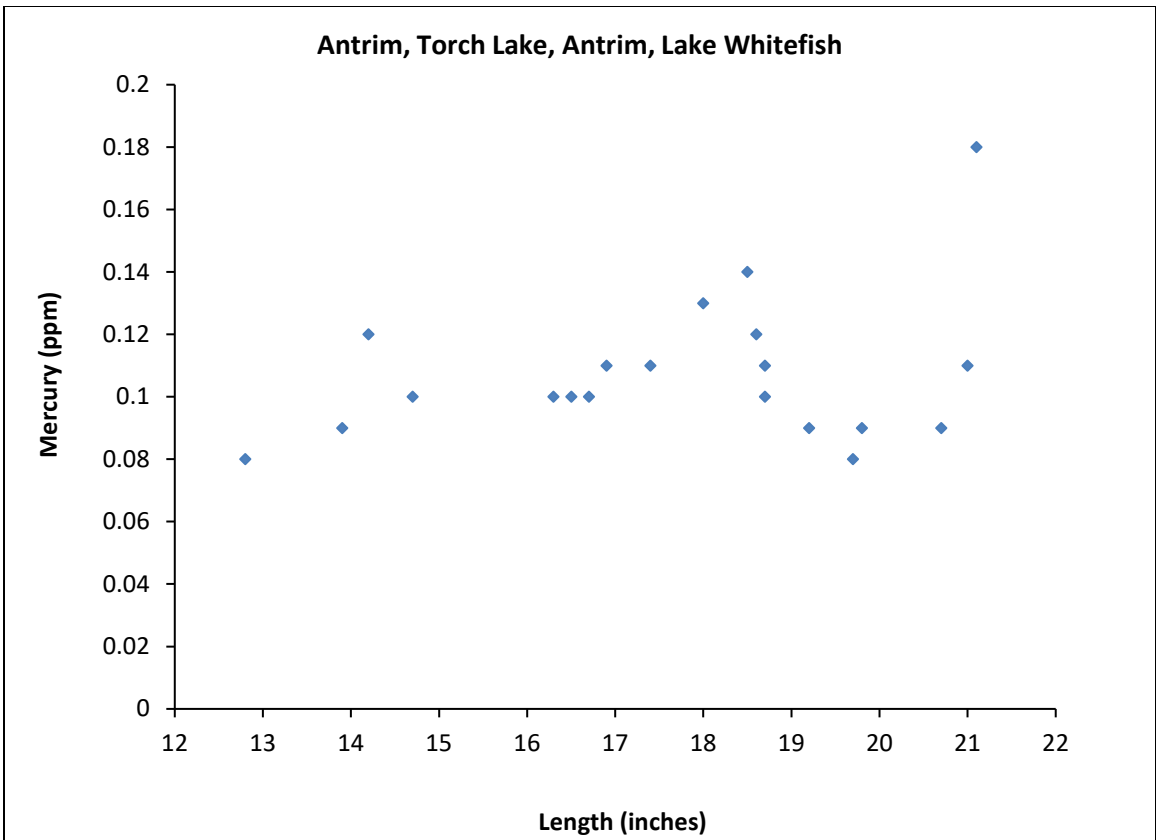
**Organics Analysis:**

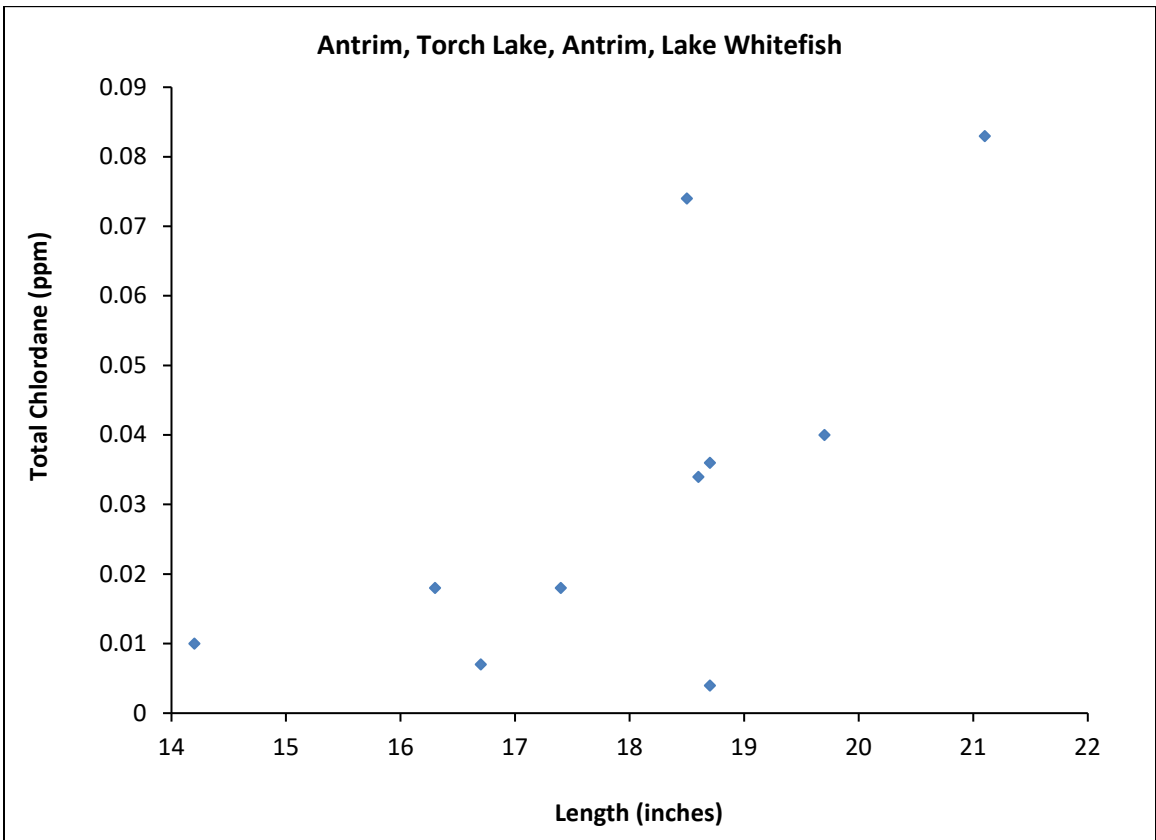
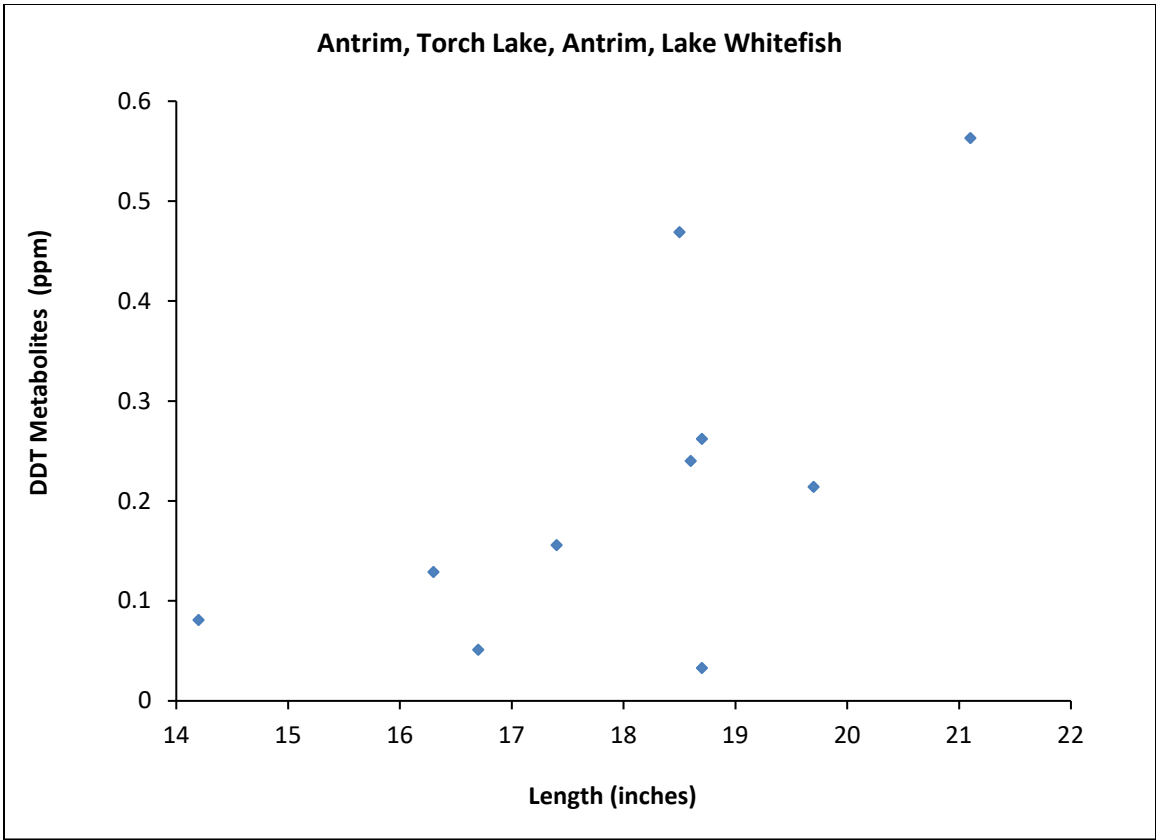
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2001	2001	10	14.2	na	14.2	21.1
Datasets available: 1994, 2001						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.10	0.02	0.34	0.17	1
DDT	10	0.22	0.03	0.56	0.35	4
Chlordane	10	0.03	0.004	0.08	0.05	--
Toxaphene	10	ND	--	--	--	--
TEQ*	10	5.7 ppt	0.9 ppt	17.3 ppt	6.9 ppt	1
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.507	0.418				
DDT	0.444	0.312				
Chlordane	0.470	0.341				
Toxaphene	--	--				
TEQ*	0.306	0.352				
<b>Final meal category based on UCL:</b>						<b>1</b>

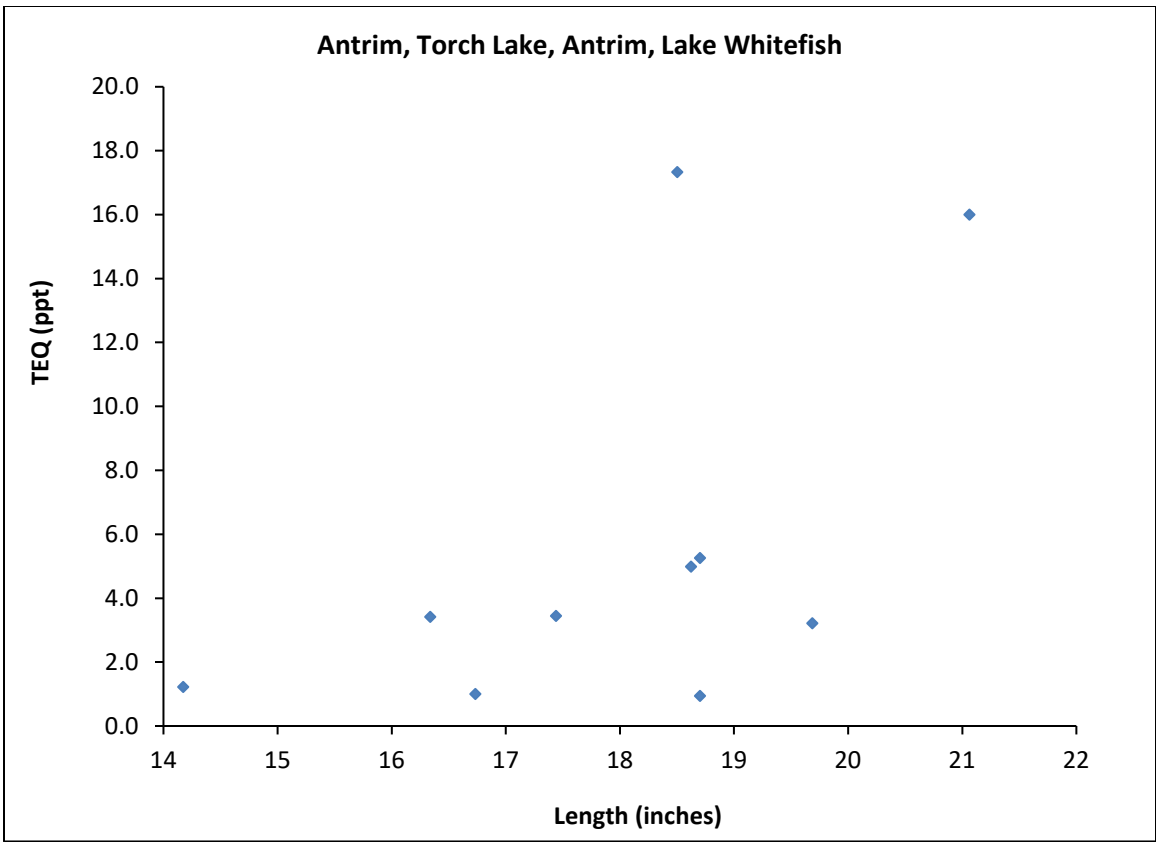
\* - 2005 WHO TEFs; dl-PCBs not included

**Existing MDHHS Advisory:** No one should eat more than one meal per week of lake whitefish from Torch Lake smaller than 18 inches and should not eat any of those fish larger than 18 inches due to PCBs and dioxins.

**Recommendation:** No one should eat more than 1 meal per month of lake whitefish from Torch Lake due to PCBs and dioxins. Mercury and DDT would also cause advisories.







**Smallmouth Bass**

**Torch Lake**

**Antrim 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
1991	1991	7	11.8	14	17.3	19.7
Datasets available: 1991						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	5	0.49	0.32	0.62	0.65	1
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.479	0.566				

**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1991	1991	7	11.8	14	17.3	19.7
Datasets available: 1991						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	5	0.049	0.035	0.074	0.070	2
DDT	5	0.069	0.038	0.097	0.100	16
Chlordane	5	0.011	0.006	0.022	0.020	--
Toxaphene	5	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.675	0.807				
DDT	0.754	0.868				
Chlordane	0.451	0.613				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>1</b>

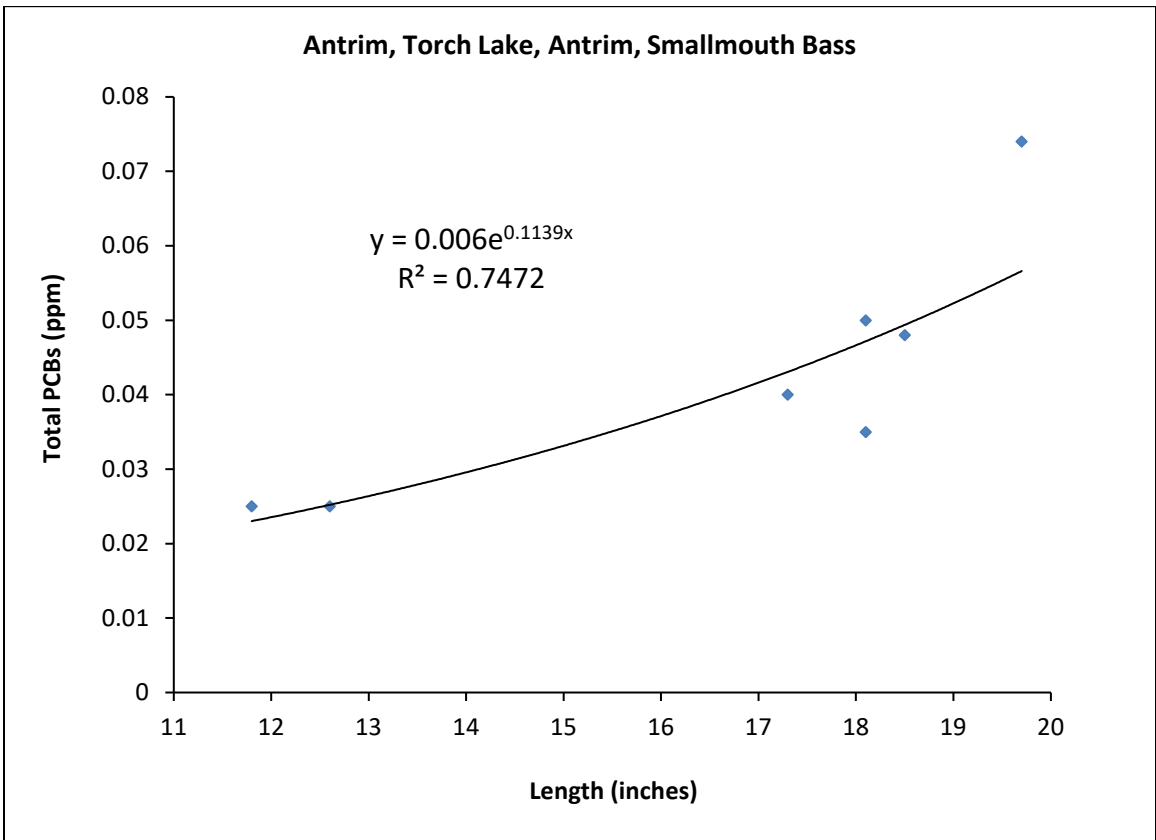
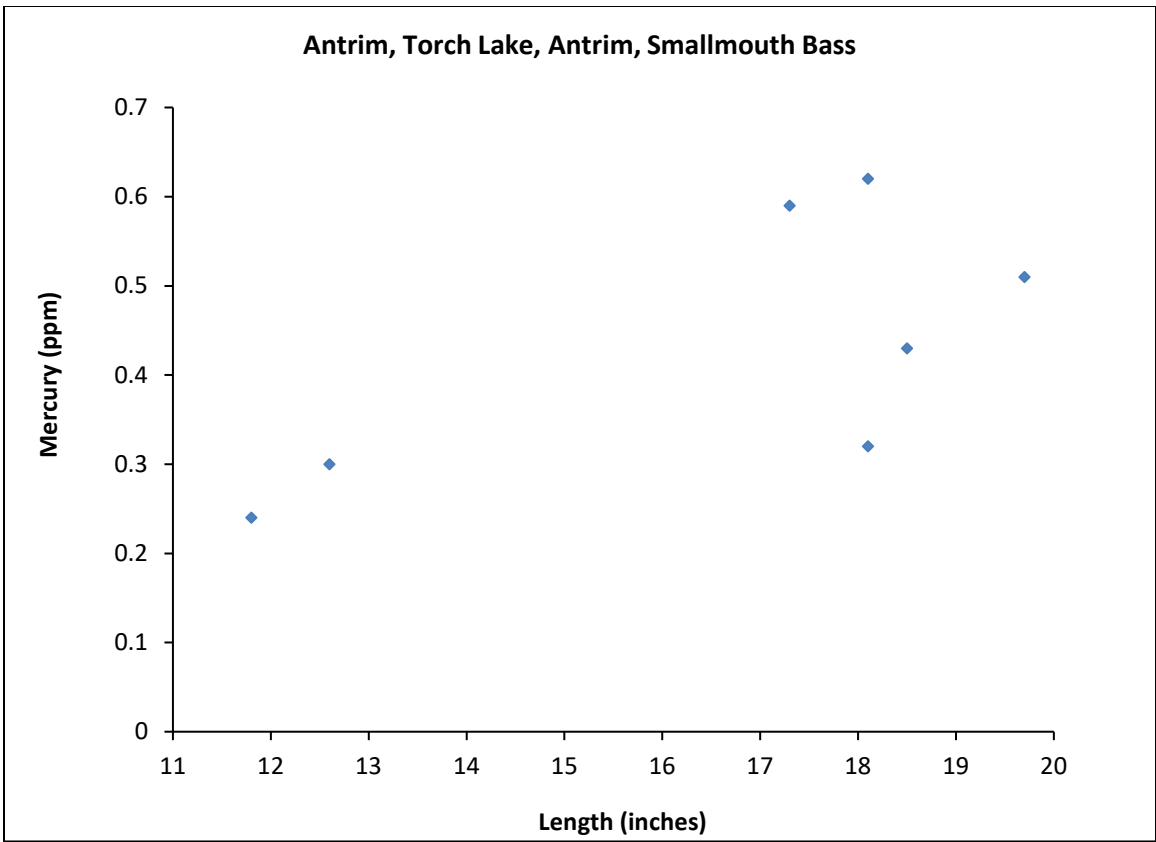
**Existing MDHHS Advisory:** Largemouth and smallmouth bass from Torch Lake in Antrim County are covered under the statewide advisory for mercury. No one should eat more than 2 meals per month of largemouth and smallmouth bass smaller than 18" or no more than 1 meal per month of largemouth and smallmouth bass larger than 18" due to mercury.

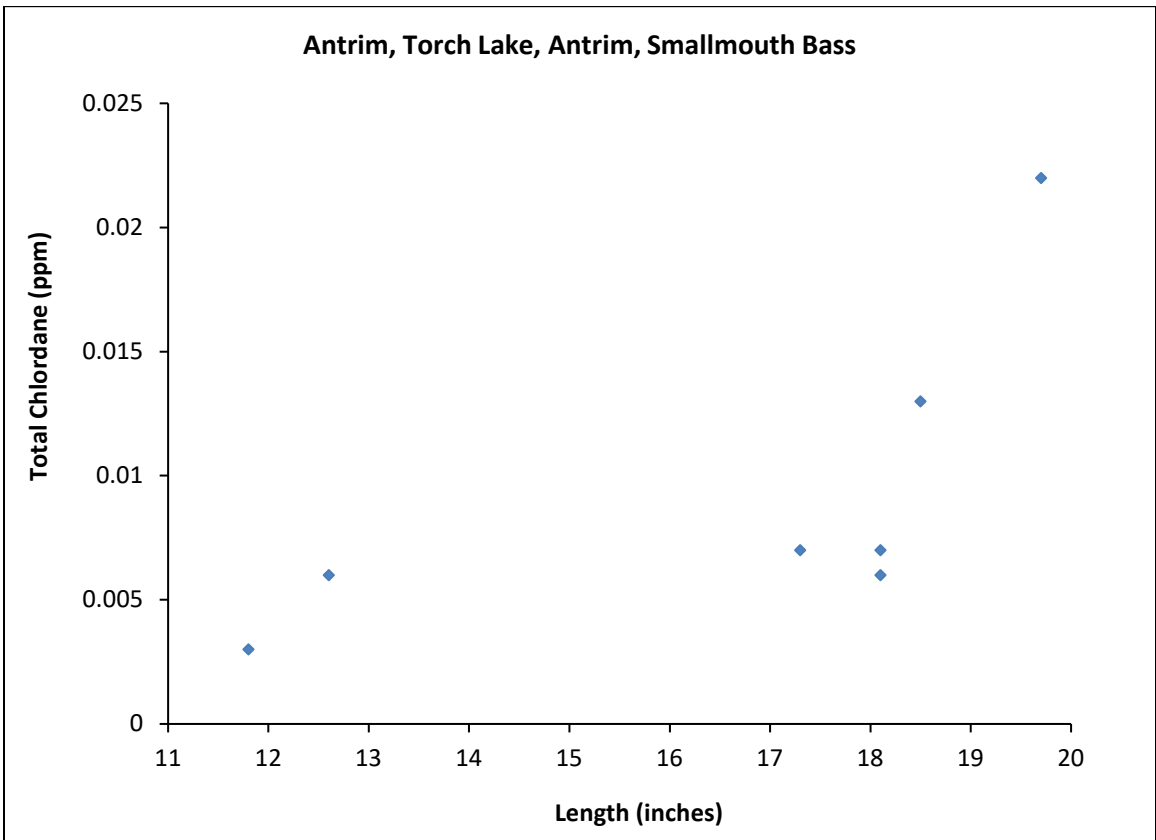
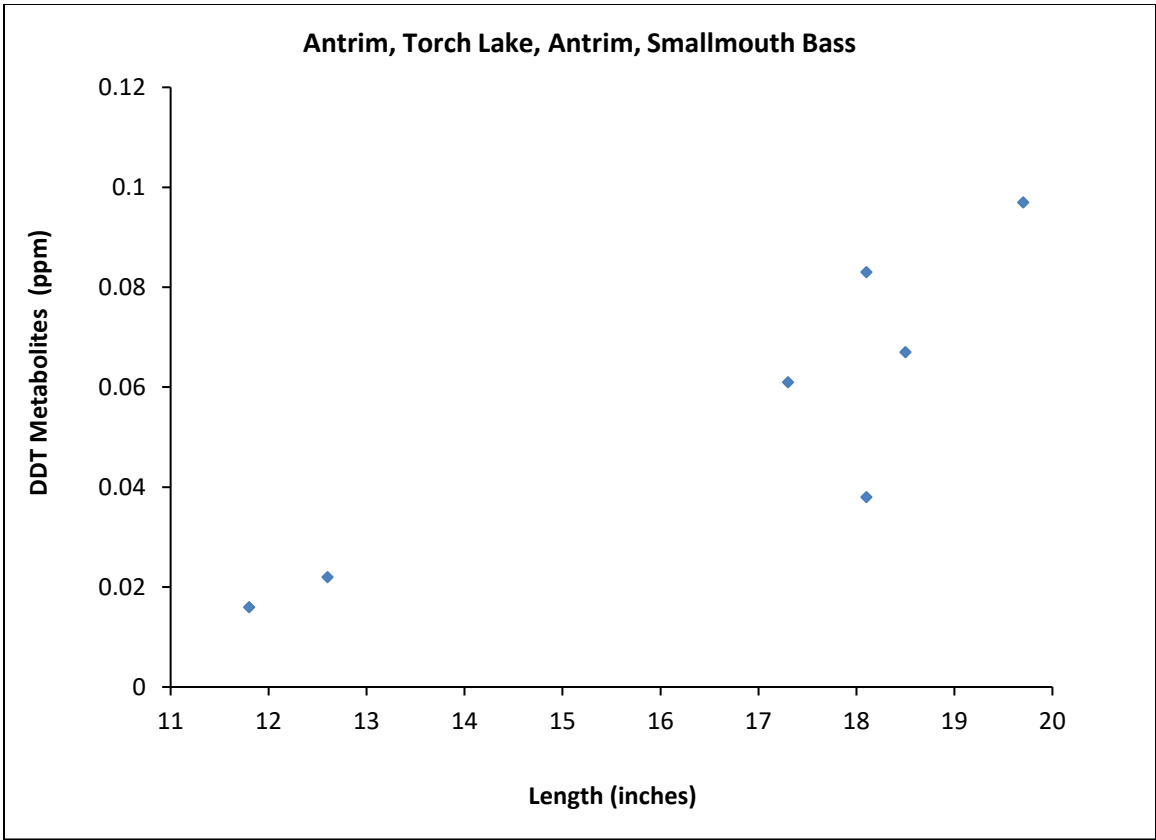
**Recommendation:** No one should eat more than 1 meal per month of largemouth or smallmouth bass from Torch Lake smaller than 18 inches or more than 6 meals per year of those fish larger than 18 inches due to mercury. PCBs would also cause an advisory. The statewide length break was applied as the size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

Length (Inches)	PCB Regression Equation Estimate (ppm)	Meal Category
14	0.03	8
15	0.03	8
16	0.04	4
17	0.04	4
18	0.05	4
19	0.05	2
20	0.06	2
21	0.07	2
22	0.07	2

*Shaded area denotes extrapolated estimates*







**Yellow Perch**

**Torch Lake**

**Antrim 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	6	10.4	na	10.4	12.2
Datasets available: 2001						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	6	0.39	0.31	0.46	0.45	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.843	0.860				

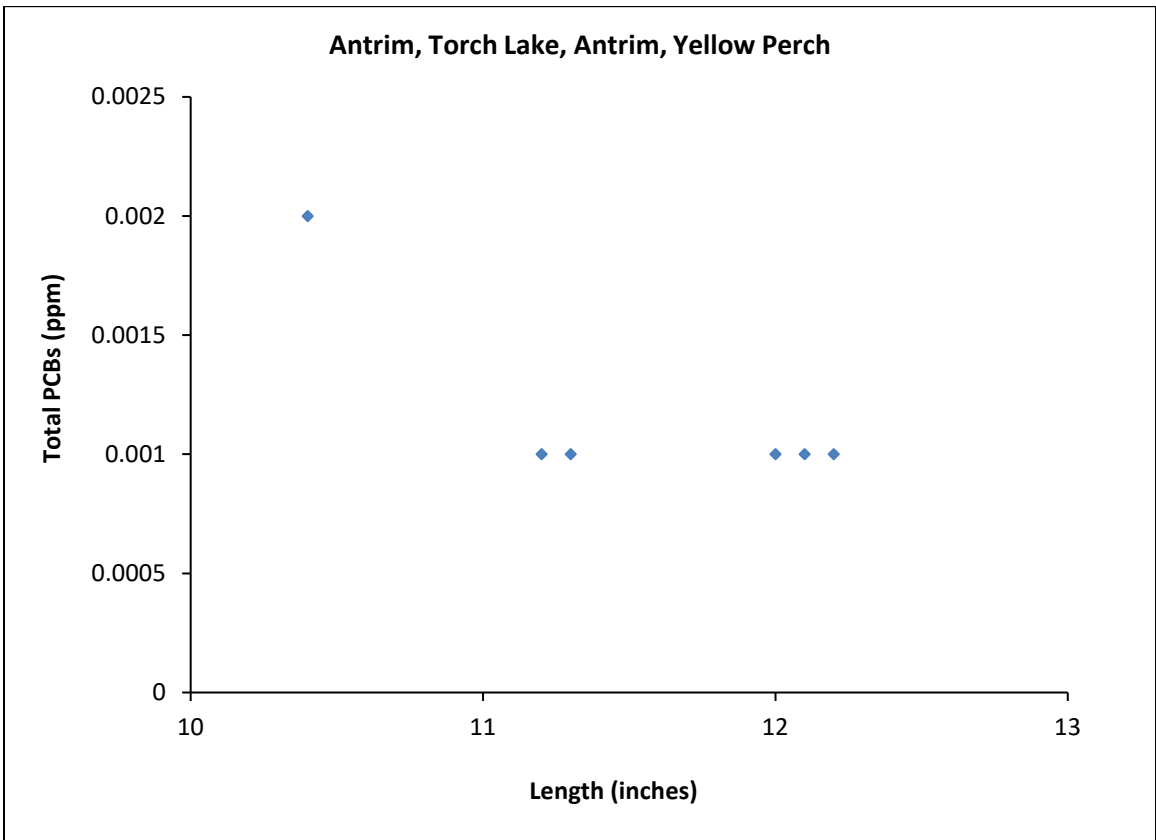
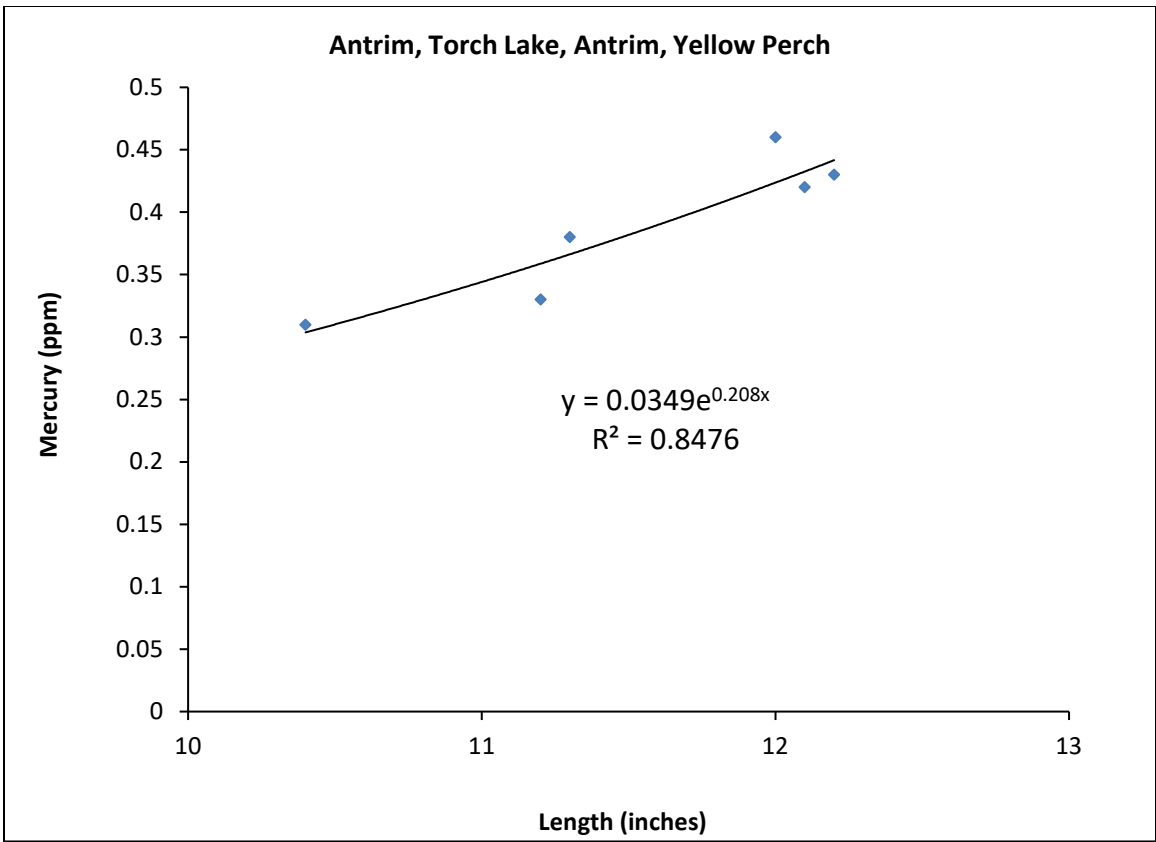
**Organics Analysis:**

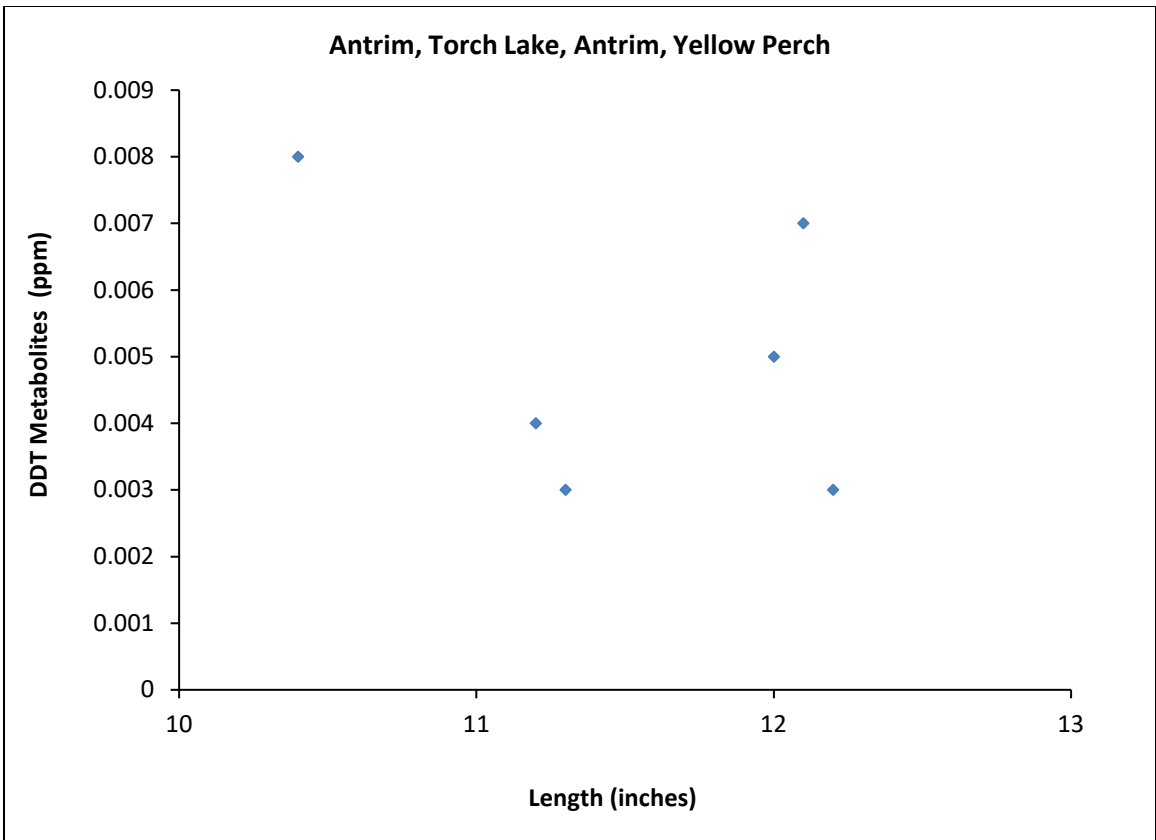
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2001	2001	6	10.4	na	10.4	12.2
Datasets available: 2001						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	6	0.001	0.001	0.002	0.002	16
DDT	6	0.005	0.003	0.008	0.007	16
Chlordane	6	ND	--	--	--	--
Toxaphene	6	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.633	0.633				
DDT	0.146	0.112				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2</b>

**Existing MDHHS Advisory:** Yellow perch from Torch Lake in Antrim County are covered under the statewide advisory for mercury. 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 from Torch Lake smaller than 9 inches or more than 2 meals per month of those fish larger than 9 inches due to mercury.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
6	0.122	8
7	0.150	4
8	0.184	4
9	0.227	4
10	0.279	2
11	0.344	2
12	0.423	2
13	0.521	2
14	0.642	1
<i>Shaded area denotes extrapolated estimates</i>		





# Benzie County

## Brown Trout

## Crystal Lake

## Benzie 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	15.4	15	15.4	20.9
Datasets available:		1989				
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	4	0.275	0.160	0.340	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
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	4	15.4	15	15.4	20.9
Datasets available:		1989				
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	4	0.19	0.16	0.21	--	--
DDT	4	0.46	0.41	0.57	--	--
Chlordane	4	0.06	0.05	0.07	--	--
Toxaphene	4	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						--

**Existing MDHHS Advisory:** Brown trout from Crystal Lake in Benzie County are covered under the statewide advisory for mercury. No one should eat more than 4 meals per month of brown trout of any size due to mercury.

**Recommendation:** No change is recommended. MDHHS requires a minimum of five legal size fish samples to evaluate the need for waterbody specific fish consumption advisories.

**Lake Trout**

**Crystal Lake**

**Benzie 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	2014	45	14.2	15	16.1	32
Datasets available: 1989, 1997, 2000, 2014						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	44	0.28	0.12	0.96	0.33	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.452	0.495				

**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2000	2014	25	14.2	15	16.1	32
Datasets available: 1989, 1997, 2000, 2014						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	24	0.14	0.03	0.52	0.19	1
DDT	24	0.23	0.05	0.68	0.30	4
Chlordane	24	0.04	0.006	0.11	0.05	--
Toxaphene	24	--	--	--	--	--
TEQ*	9	11.4 ppt	3.4 ppt	29.0 ppt	17.6 ppt	Limited
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.598	0.714				
DDT	0.535	0.560				
Chlordane	0.451	0.489				
Toxaphene	--	--				
TEQ*	0.509	0.779				
<b>Final meal category based on UCL:</b>						<b>Limited</b>

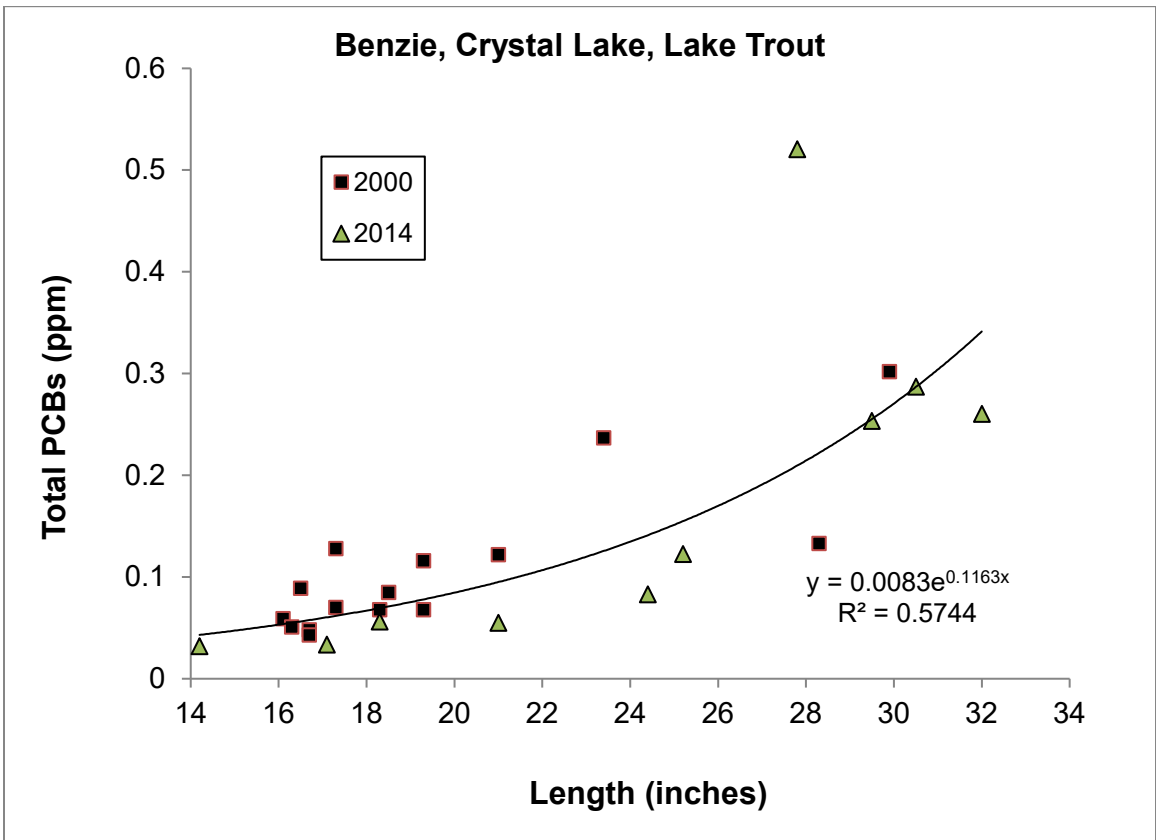
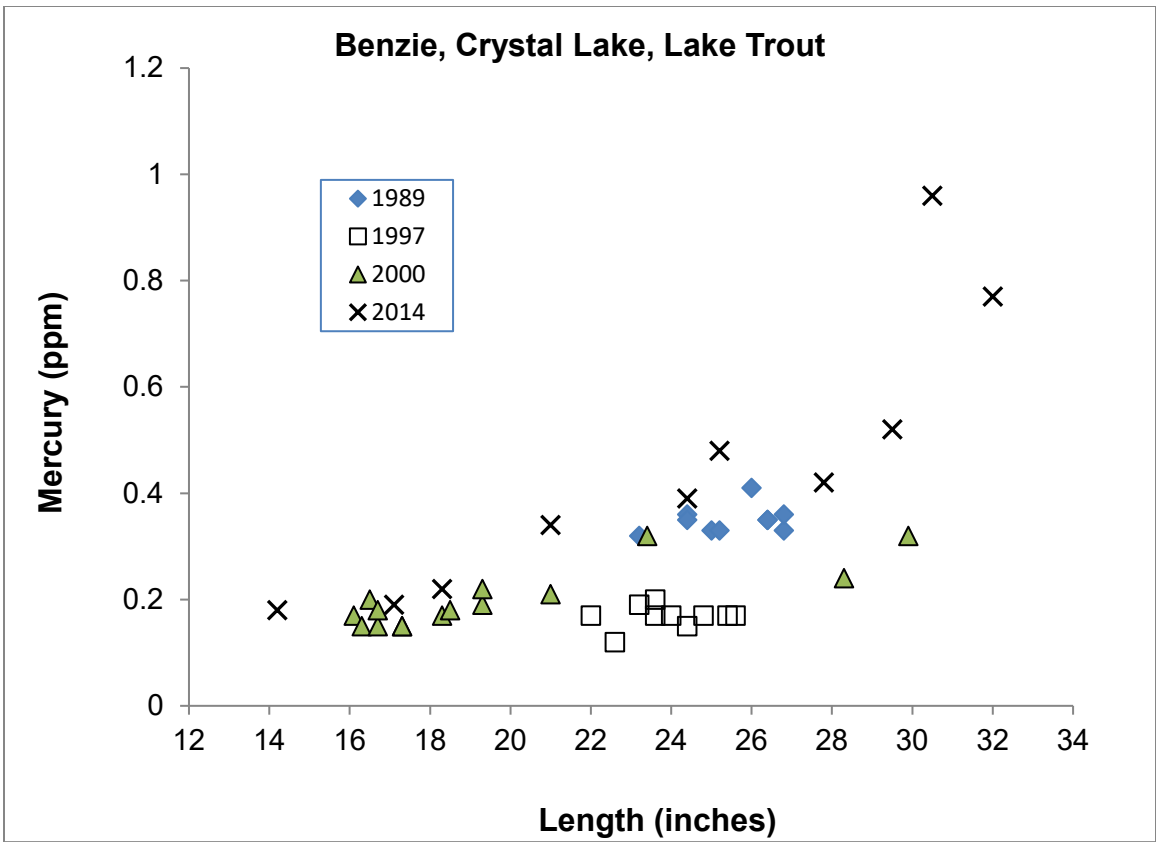
\*- WHO 2005 TEFs; dIPCBs included

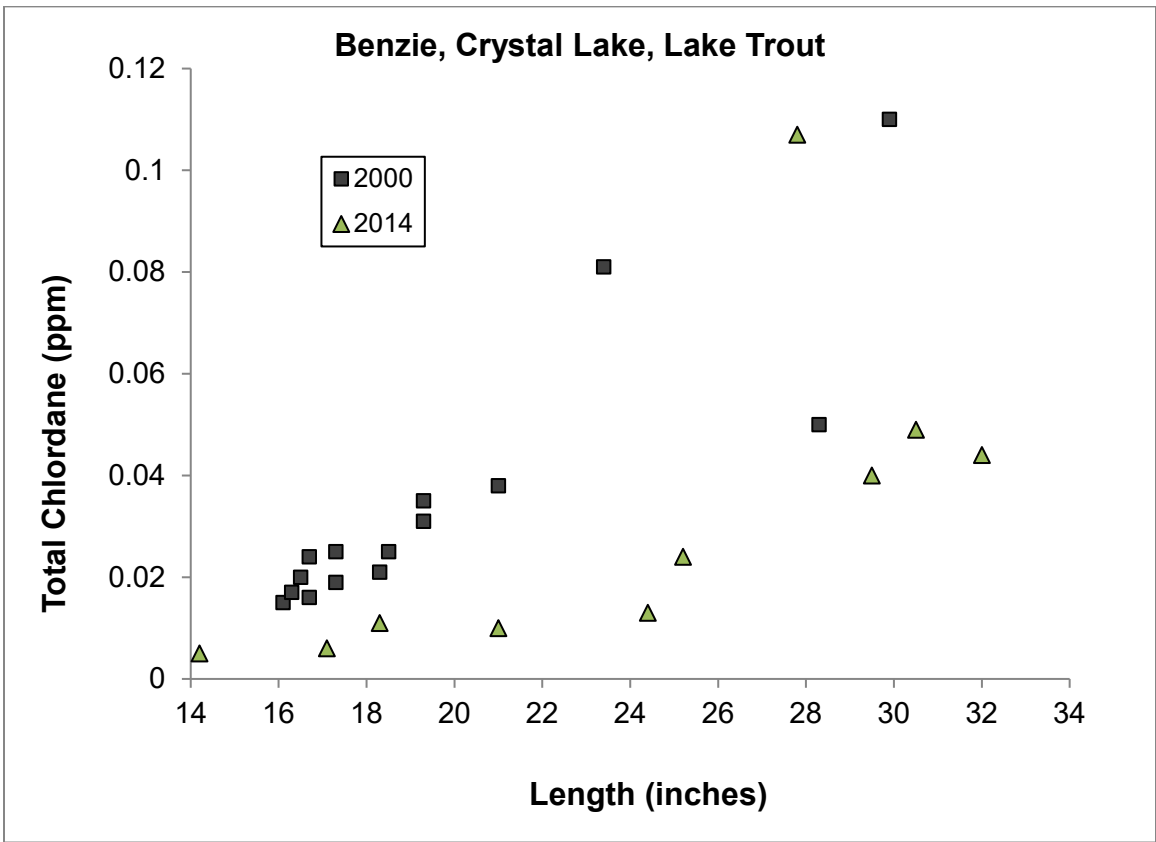
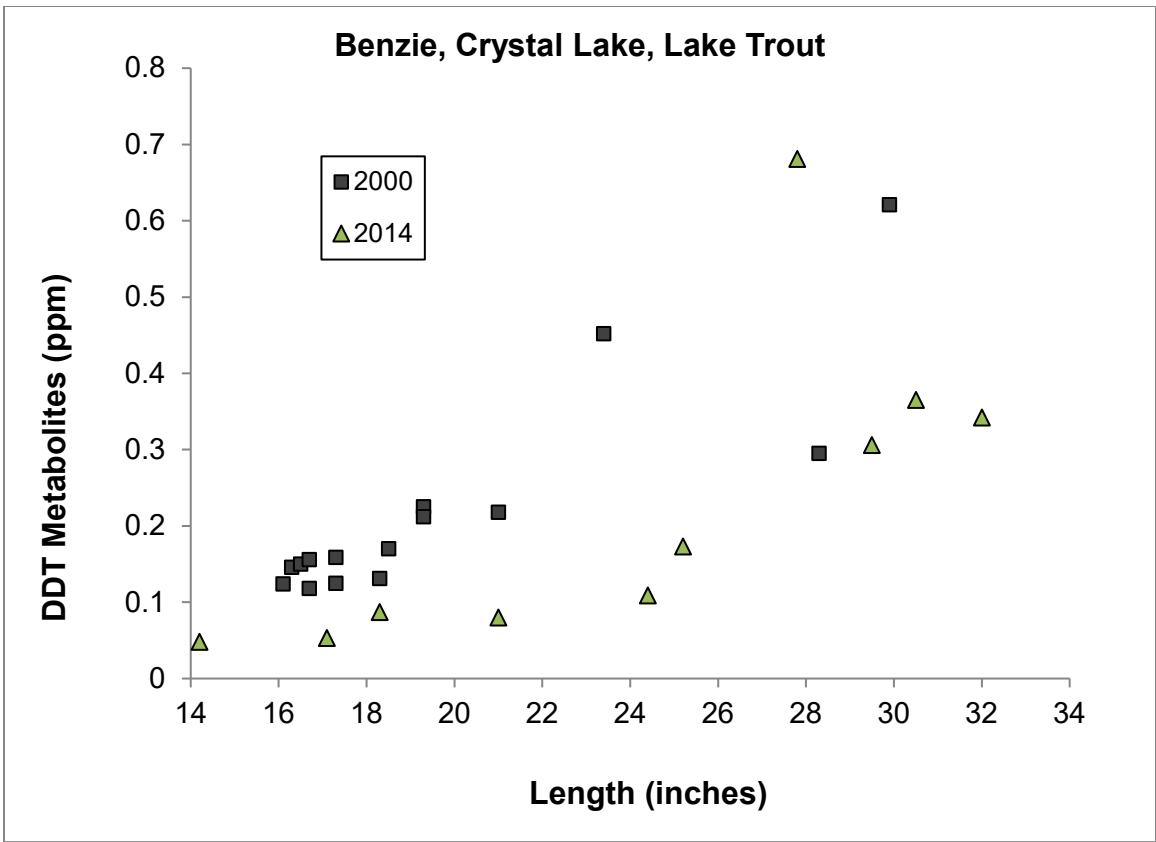
**Existing MDHHS Advisory:** No one should eat more than 2 meals per month of lake trout from Crystal Lake in Benzie County less than 18 inches or more than 1 meal per month of those fish larger than 18 inches due to PCBs.

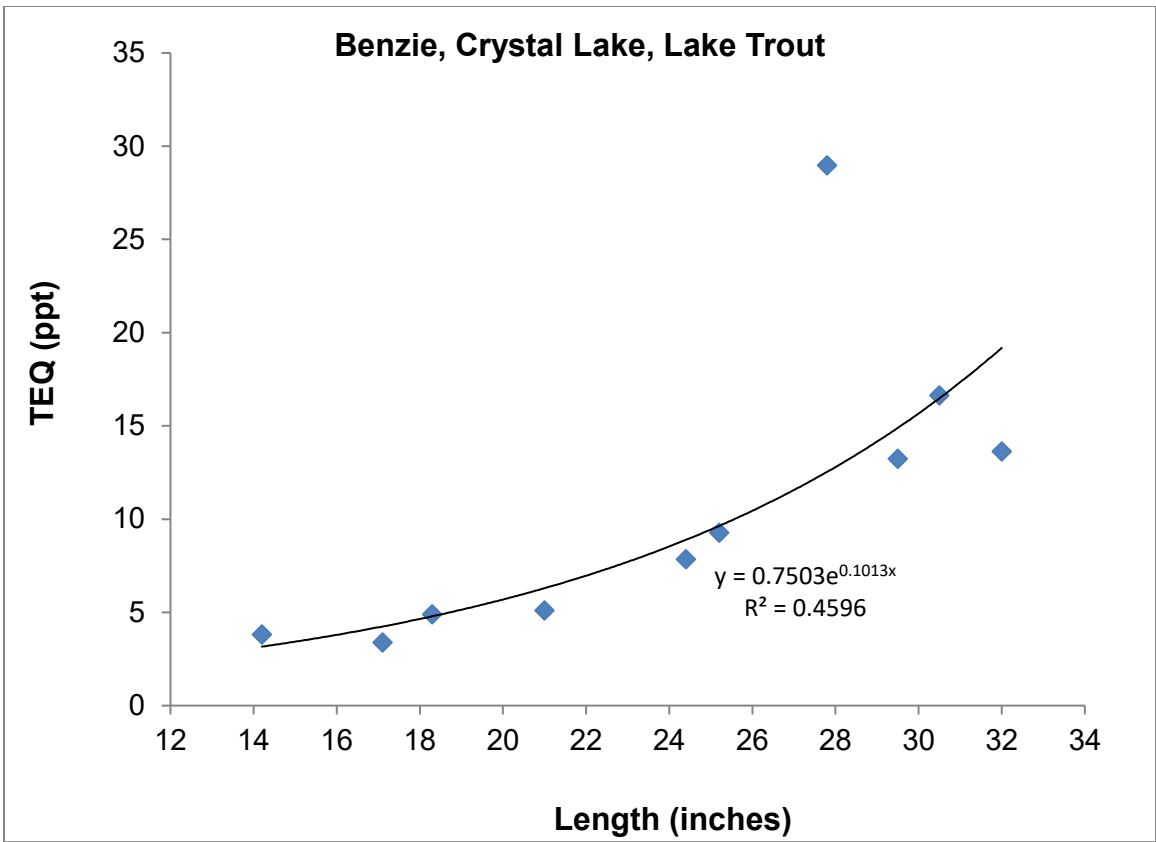
**Recommendation:** No one should eat more than 1 meal per month of lake trout from Crystal Lake in Benzie County smaller than 24 inches and no more than 6 meals per year for fish between 24 and 30 inches. Sensitive populations should not eat lake trout larger than 30 inches and healthy adults should limit consumption to more than 1 or 2 meals per year due to dioxins.

Length (Inches)	PCB	Meal Category	TEQ	Meal Category
	Regression Equation Estimate (ppm)		Regression Equation Estimate (ppt)	
14	0.042	4	3.1	2
16	0.053	2	3.8	1
18	0.067	2	4.6	1
20	0.085	2	5.7	1
22	0.107	2	7	1
24	0.135	1	8.5	0.5
26	0.171	1	10.4	0.5
28	0.215	0.5	12.8	0.5
30	0.272	0.5	15.7	Limited
32	0.343	0.5	19.2	Limited









**White Sucker**

**Crystal Lake**

**Benzie County**

**Hg Analysis:**

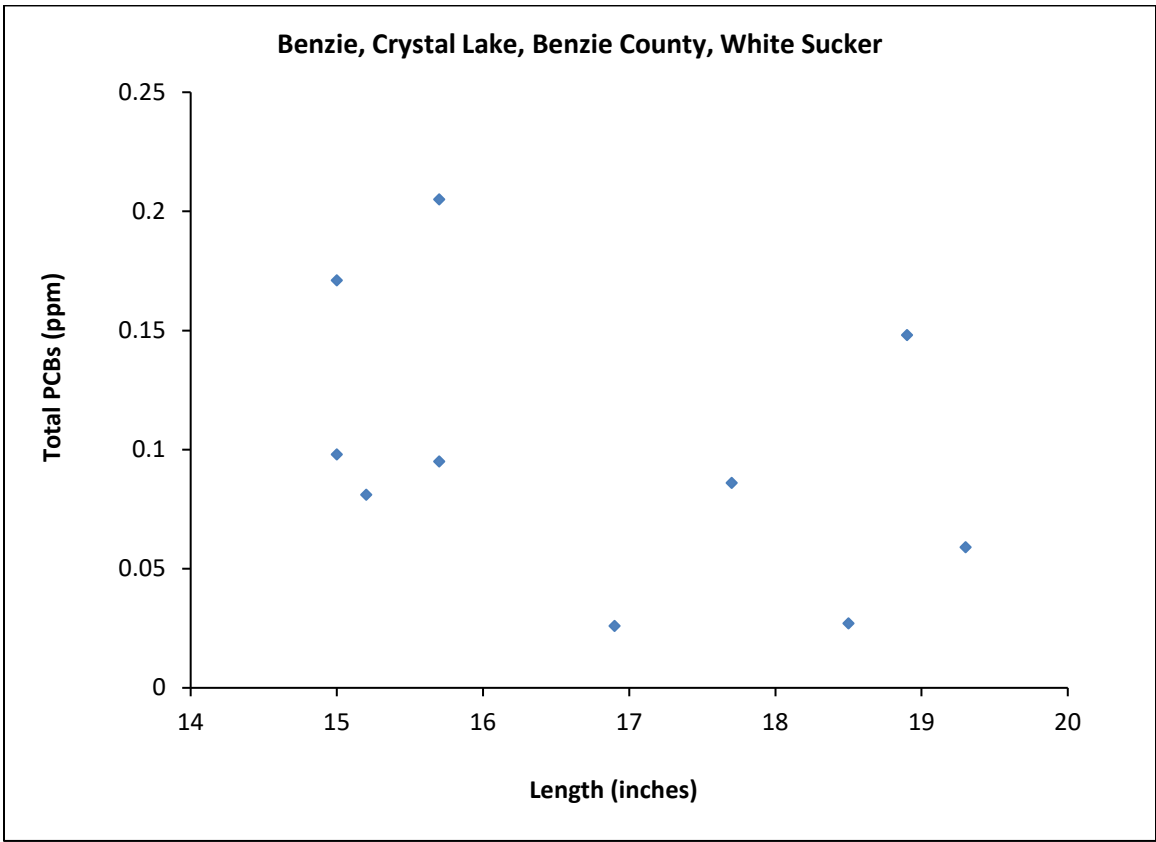
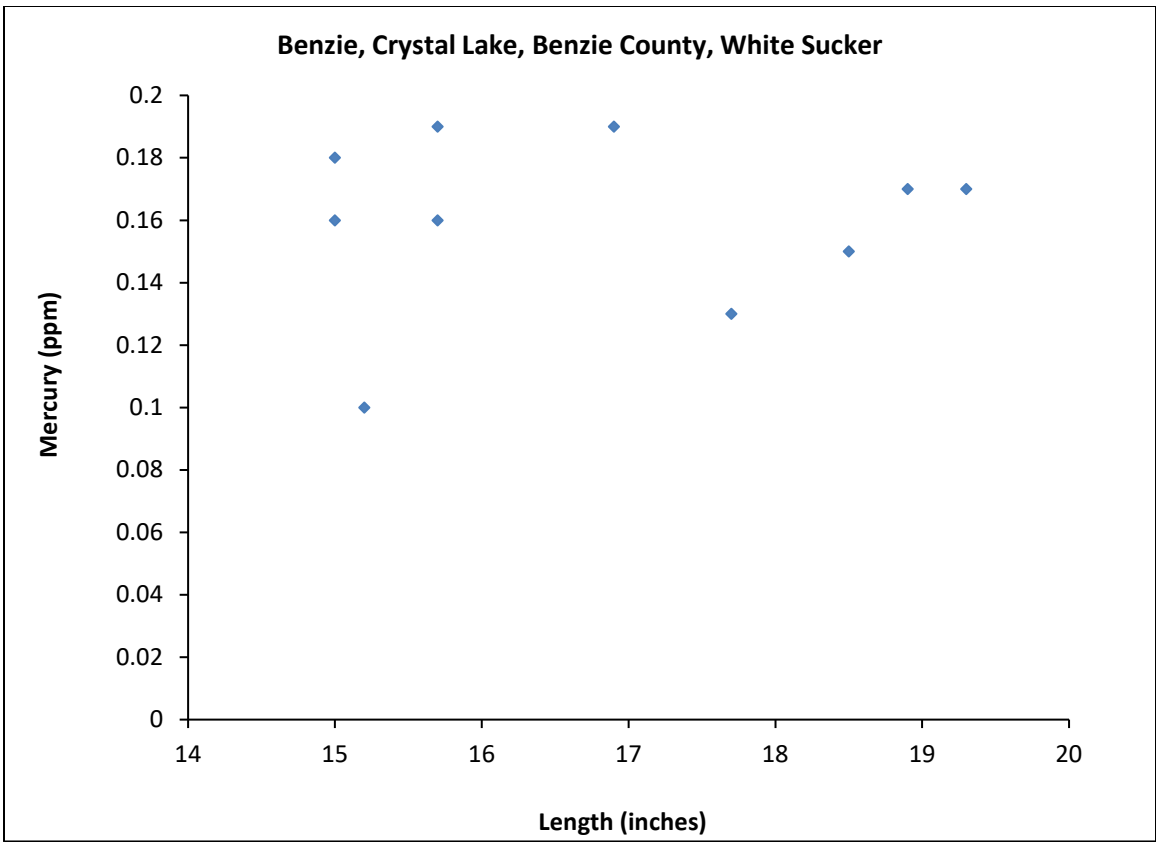
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1997	1997	10	15	na	15	19.3
Datasets available: 1997						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.16	0.10	0.19	0.18	4
		Linear Regression	Exponential Regression			
		R <sup>2</sup>	R <sup>2</sup>			
Mercury		0.006	0.014			

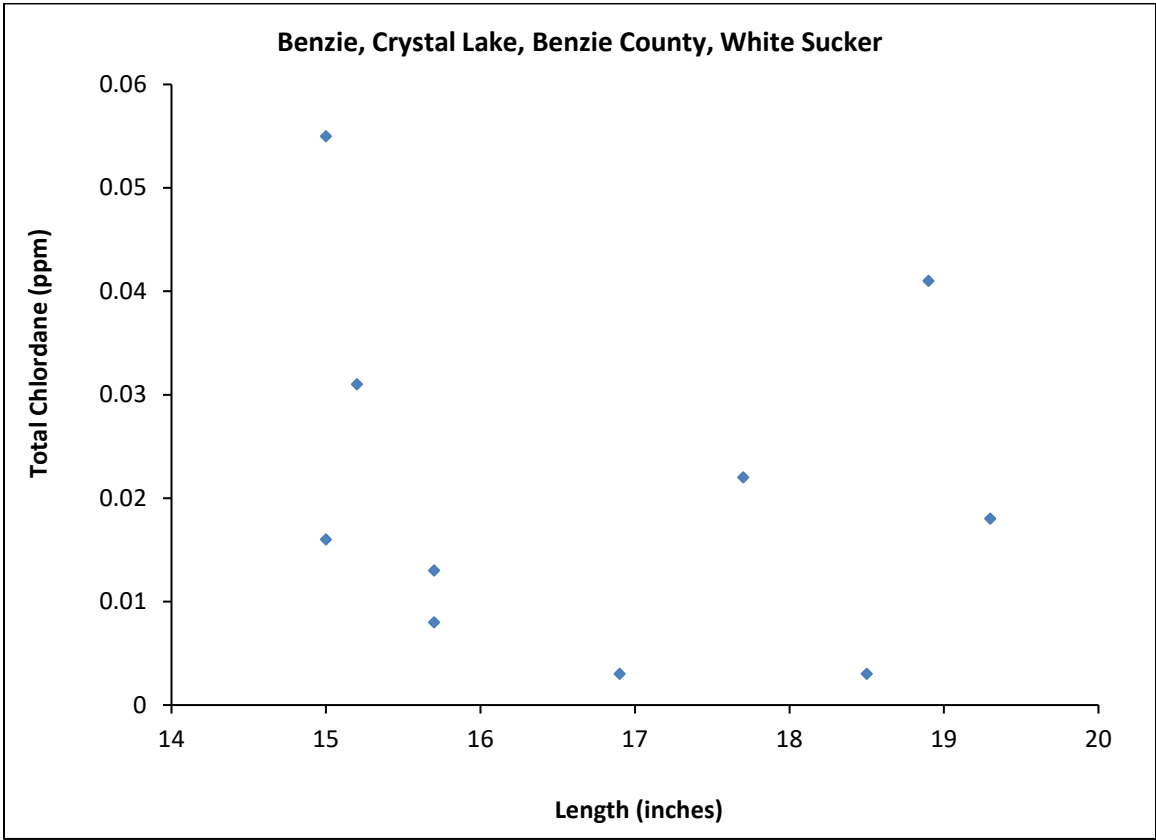
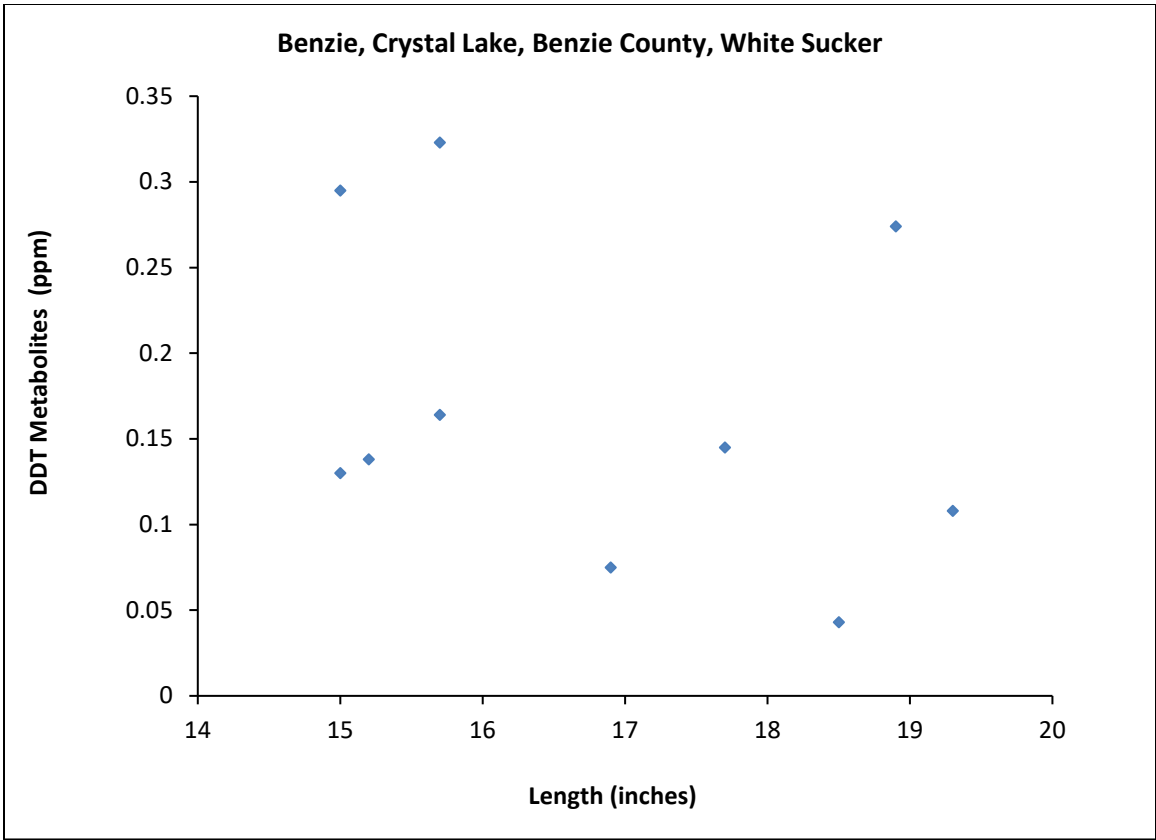
**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1997	1997	10	15	na	15	19.3
Datasets available: 1997						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.10	0.03	0.20	0.14	1*
DDT	10	0.17	0.04	0.32	0.24	4*
Chlordane	10	0.02	0.003	0.06	0.03	--
Toxaphene	10	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
		R <sup>2</sup>	R <sup>2</sup>			
PCB		0.151	0.164			
DDT		0.095	0.136			
Chlordane		0.027	0.033			
Toxaphene		--	--			
<b>Final meal category based on UCL:</b>						<b>1*</b>

**Existing MDHHS Advisory:** Suckers from Crystal Lake in Benzie County are covered under the statewide advisory for mercury. No one should eat more than 8 meals per month of suckers of any size due to mercury.

**Recommendation:** No one should eat more than 2 meals per month of Crystal Lake suckers due to PCBs. Mercury and DDT would also cause advisories. The quality of this dataset is limited due to the age of the data. \*Based on the EGLE Fish Contaminant Monitoring Program, PCB & DDT concentrations ≥15 years old are expected to have declined to a concentration that allows a less restrictive meal category.





**Yellow Perch**

**Crystal Lake**

**Benzie County**

**Hg Analysis:**

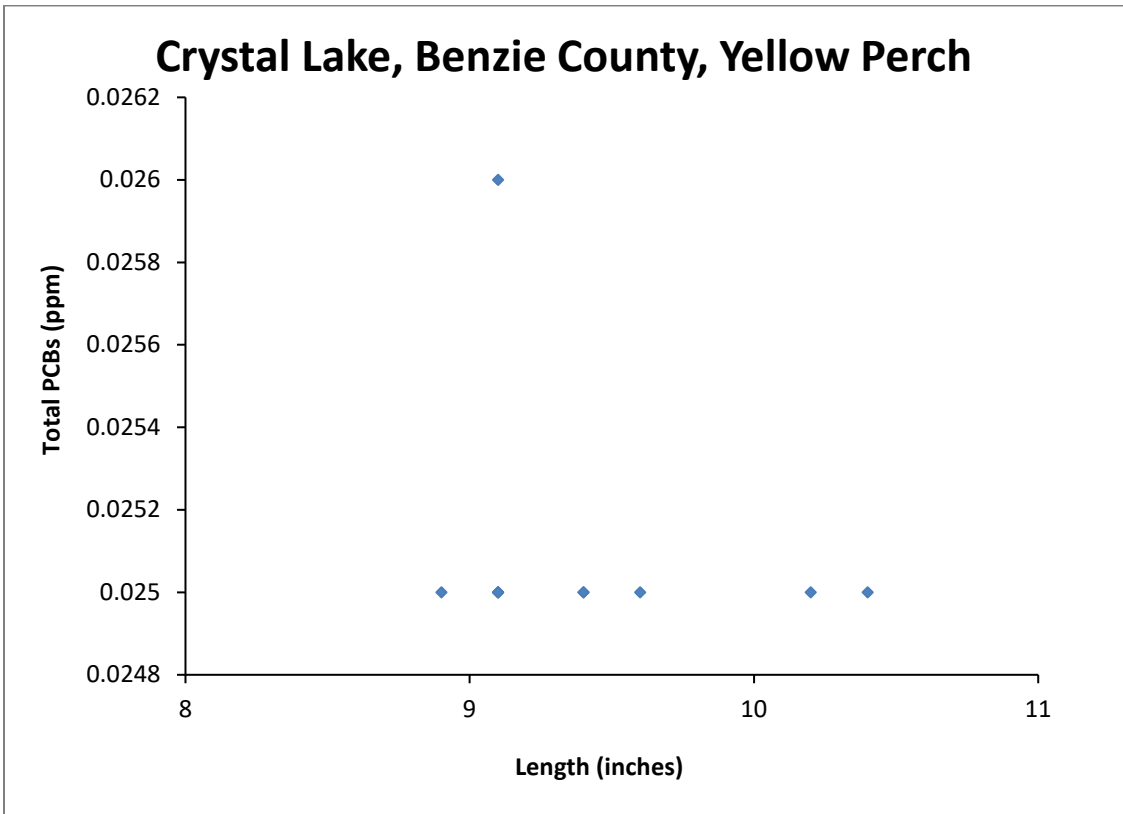
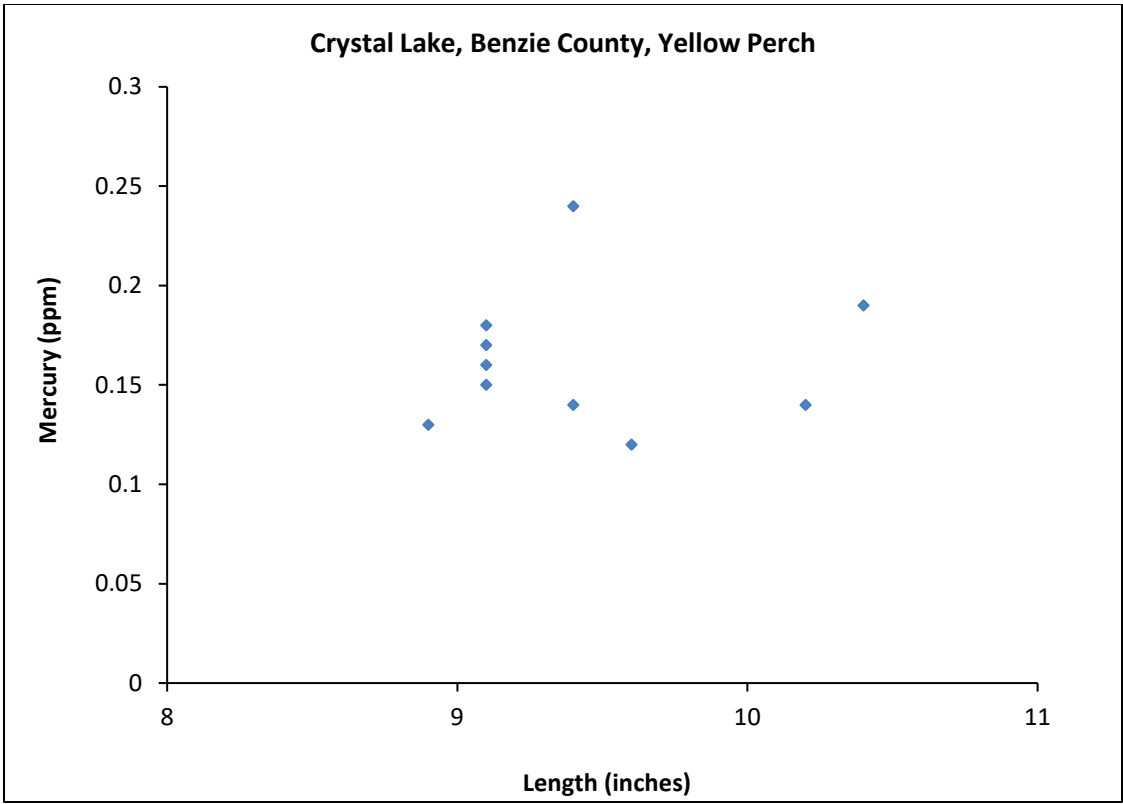
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1989	1989	10	8.9	na	8.9	10.4
Datasets available: 1989						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.16	0.12	0.24	0.19	4
		Linear Regression	Exponential Regression			
		R <sup>2</sup>	R <sup>2</sup>			
Mercury		0.008	0.007			

**Organics Analysis:**

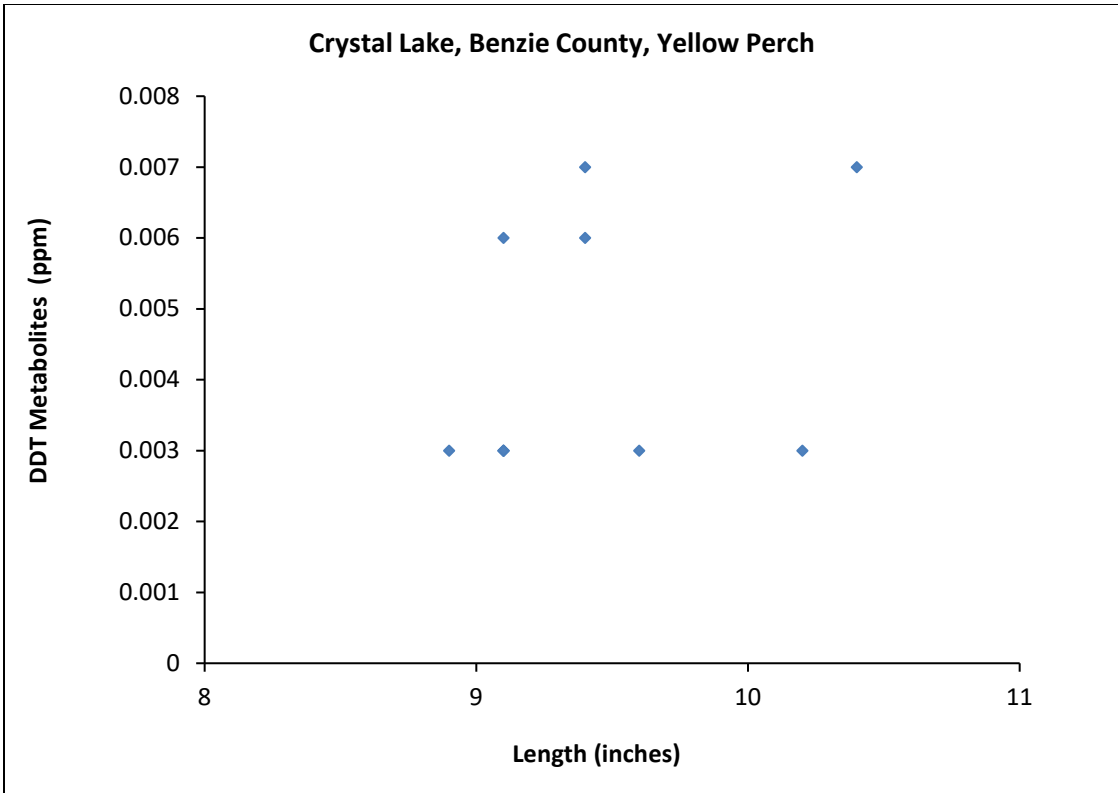
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1989	1989	10	8.9	na	8.9	10.4
Datasets available: 1989						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.02	0.02	0.03	0.03	8
DDT	10	0.004	0.003	0.007	0.01	16
Chlordane	10	ND	--	--	--	--
Toxaphene	10	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
		R <sup>2</sup>	R <sup>2</sup>			
PCB		0.053	0.053			
DDT		0.104	0.091			
Chlordane		--	--			
Toxaphene		--	--			
<b>Final meal category based on UCL:</b>						<b>4</b>

**Existing MDHHS Advisory:** Yellow perch from Crystal Lake in Benzie County are covered under the statewide advisory for mercury. 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 Crystal Lake yellow perch due to mercury. PCBs would also cause an advisory.







**Northern Pike**

**Lake Ann**

**Benzie 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	20.9	24	24	35.8
Datasets available: 1989						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	6	0.71	0.52	0.95	0.89	1
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.783	0.665				

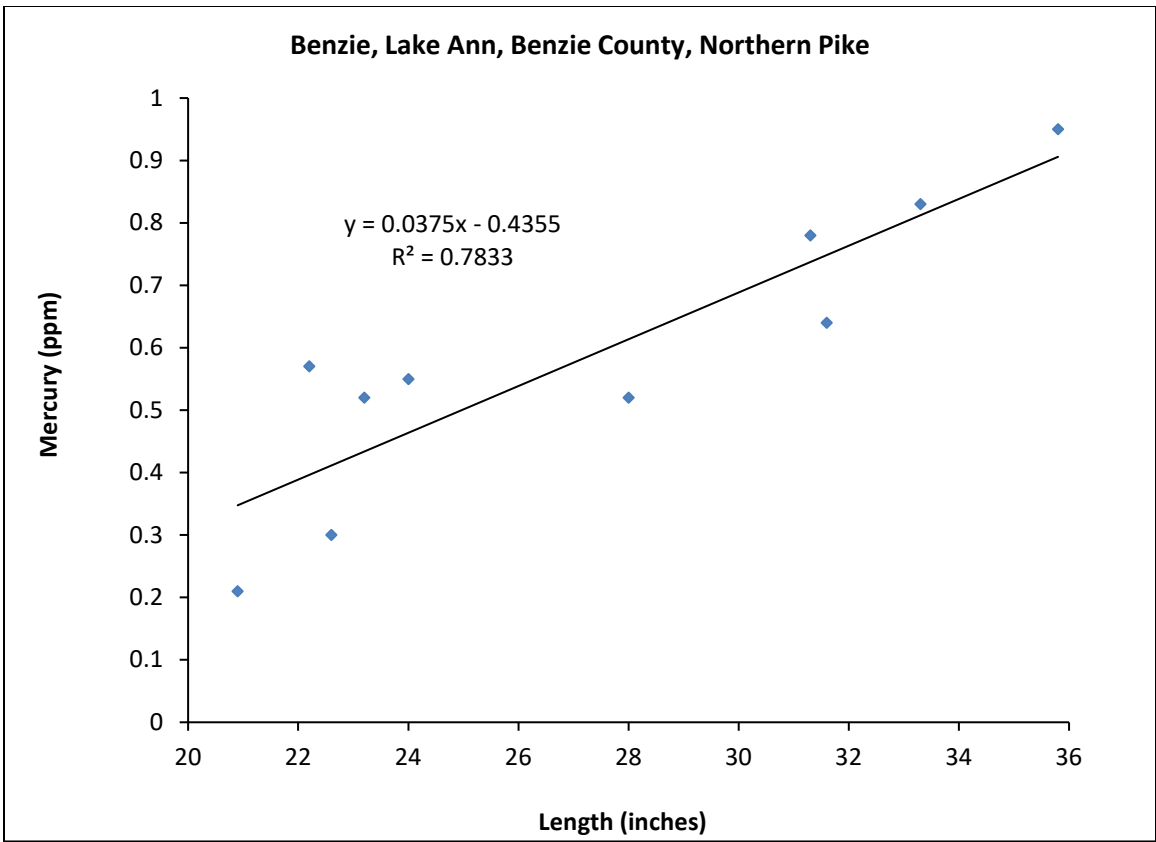
**Organics Analysis:**

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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>1</b>

**Existing MDHHS Advisory:** Northern pike from Lake Ann in Benzie County are covered under the statewide advisory for mercury. 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 due to mercury.

**Recommendation:** No one should eat more than 1 meal per month of northern pike from Lake Ann due to mercury.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
24	0.46	2
25	0.50	2
26	0.54	1
27	0.58	1
28	0.62	1
29	0.65	1
30	0.69	1
31	0.73	1
32	0.76	1
<i>Shaded area denotes extrapolated estimates</i>		



**Smallmouth Bass**

**Lake Ann**

**Benzie 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
1989	1989	10	11.6	14	11.6	16.6
Datasets available: 1989						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.27	0.18	0.4	0.34	2
		Linear Regression	Exponential Regression			
		R <sup>2</sup>	R <sup>2</sup>			
Mercury		0.805	0.842			

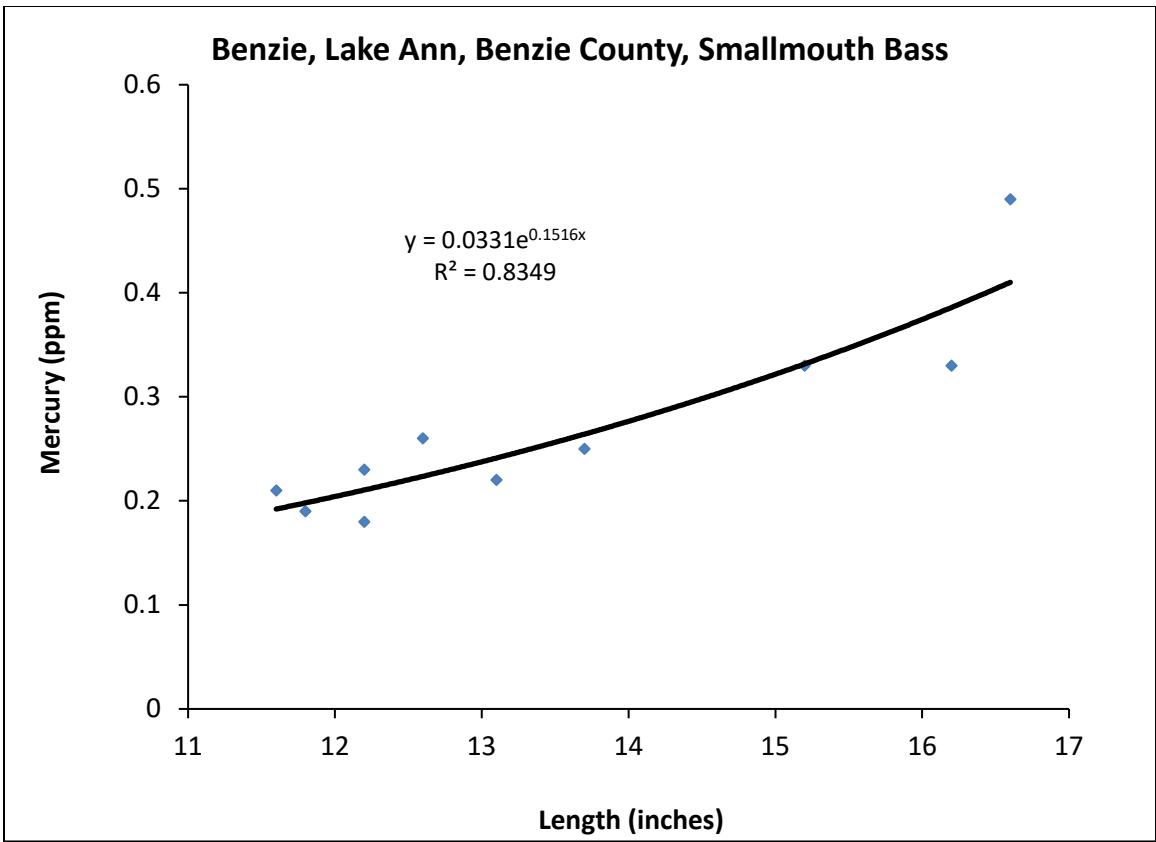
**Organics Analysis:**

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 (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 <sup>2</sup>	R <sup>2</sup>			
PCB		--	--			
DDT		--	--			
Chlordane		--	--			
Toxaphene		--	--			
<b>Final meal category based on UCL:</b>						<b>2</b>

**Existing MDHHS Advisory:** Largemouth and smallmouth bass from Lake Ann in Benzie County are covered under the statewide advisory for mercury. No one should eat more than 2 meals per month of largemouth and smallmouth bass smaller than 18" or no more than 1 meal per month of largemouth and smallmouth bass larger than 18" due to mercury.

**Recommendation:** No one should eat more than 2 meals per month of largemouth or smallmouth bass from Lake Ann 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 length range was limited.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
14	0.276	2
15	0.322	2
16	0.374	2
17	0.436	2
18	0.507	2
19	0.590	1
20	0.686	1
21	0.799	1
22	0.930	1
<i>Shaded area denotes extrapolated estimates</i>		



**Northern Pike**

**Pearl Lake**

**Benzie 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
1997	1997	3	23.4	24	23.4	26.4
Datasets available: 1997						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	3	0.533	0.370	0.620	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
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
--	--	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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						--

**Existing MDHHS Advisory:** Northern pike from Pearl Lake in Benzie County are covered under the statewide advisory for mercury. 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 due to mercury.

**Recommendation:** No change is recommended. MDHHS requires a minimum of five legal size fish samples to evaluate the need for waterbody specific fish consumption advisories.

**Channel Catfish**

**Platte Lake**

**Benzie 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	2	21.3	12	21.3	24.6
Datasets available: 2004						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	2	0.32	0.18	0.45	--	--
	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.783	0.665				

**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	2	21.3	12	21.3	24.6
Datasets available: 2004						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	2	0.526	0.419	0.633	--	--
DDT	2	0.310	0.268	0.351	--	--
Chlordane	2	0.061	0.038	0.084	--	--
Toxaphene	2	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						--

**Existing MDHHS Advisory:** Catfish from Platte Lake in Benzie County are covered under the statewide advisory for mercury and PCBs. No one should eat more than 4 meals per month of catfish of any size due to mercury and PCBs.

**Recommendation:** No change is recommended. MDHHS requires a minimum of five legal size fish samples to evaluate the need for waterbody specific fish consumption advisories.

**Northern Pike**

**Platte Lake**

**Benzie 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	1	33.8	24	33.8	33.8
Datasets available: 2004						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	1	0.544	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
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
2004	2004	1	33.8	24	33.8	33.8
Datasets available: 2004						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	1	0.070	--	--	--	--
DDT	1	0.048	--	--	--	--
Chlordane	1	0.005	--	--	--	--
Toxaphene	1	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						--

**Existing MDHHS Advisory:** Northern pike from Platte Lake in Benzie County are covered under the statewide advisory for mercury. 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 due to mercury.

**Recommendation:** No change is recommended. MDHHS requires a minimum of five legal size fish samples to evaluate the need for waterbody specific fish consumption advisories.



**Rock Bass**

**Platte Lake**

**Benzie 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	2010	15	7.8	na	7.8	11.1
Datasets available: 2005, 2010						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	15	0.21	0.08	0.36	0.27	4
	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.833	0.891				

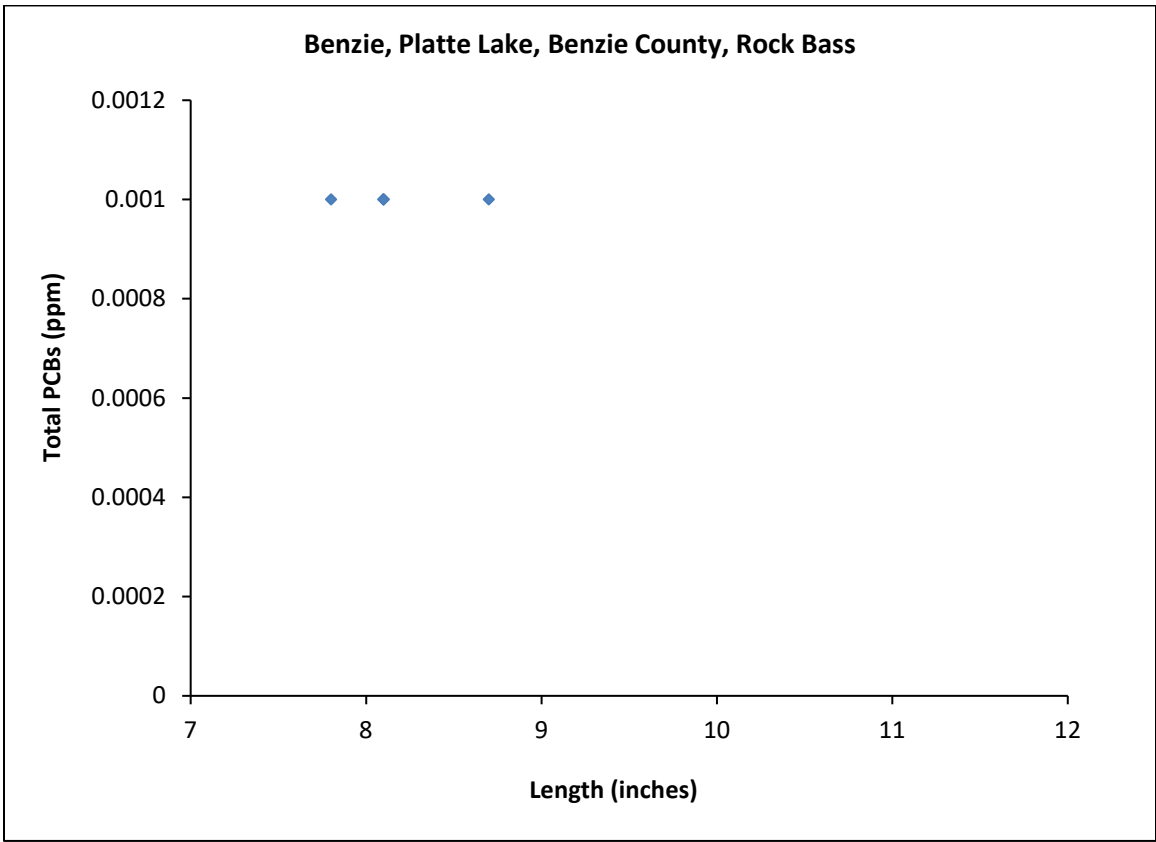
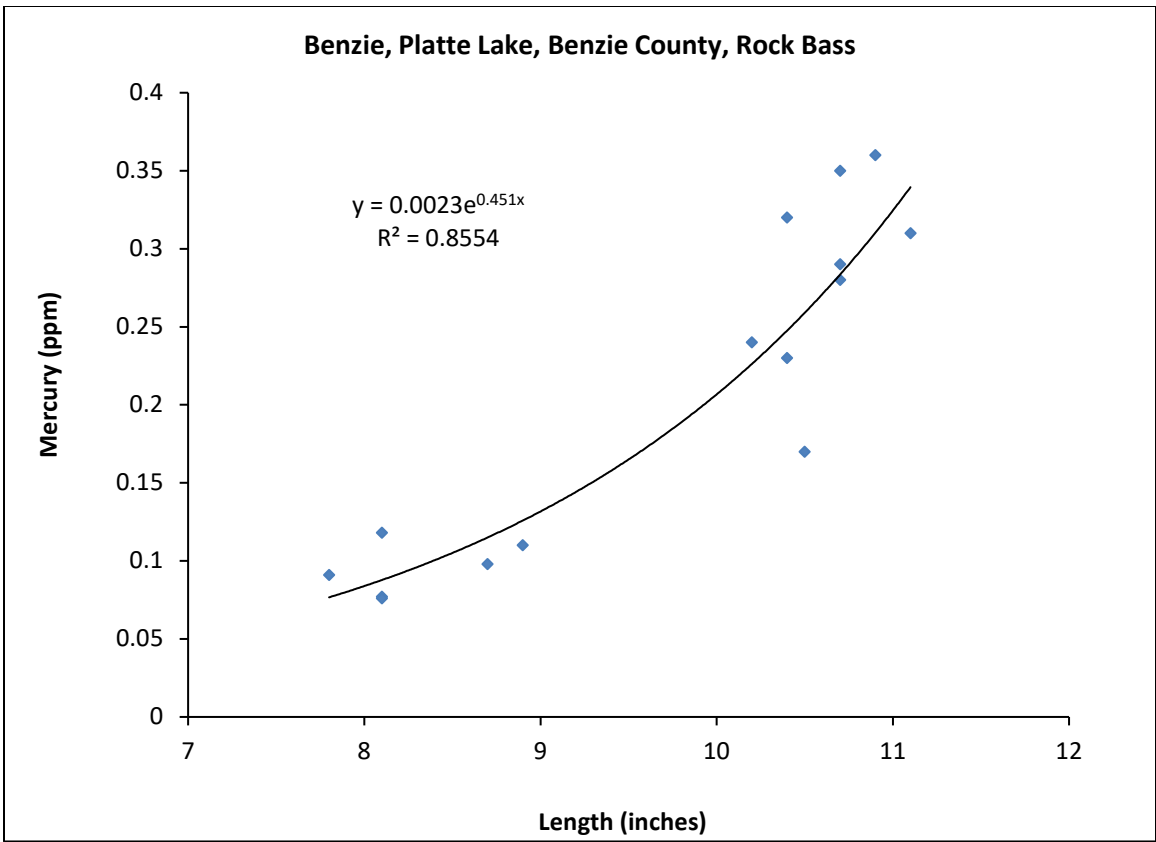
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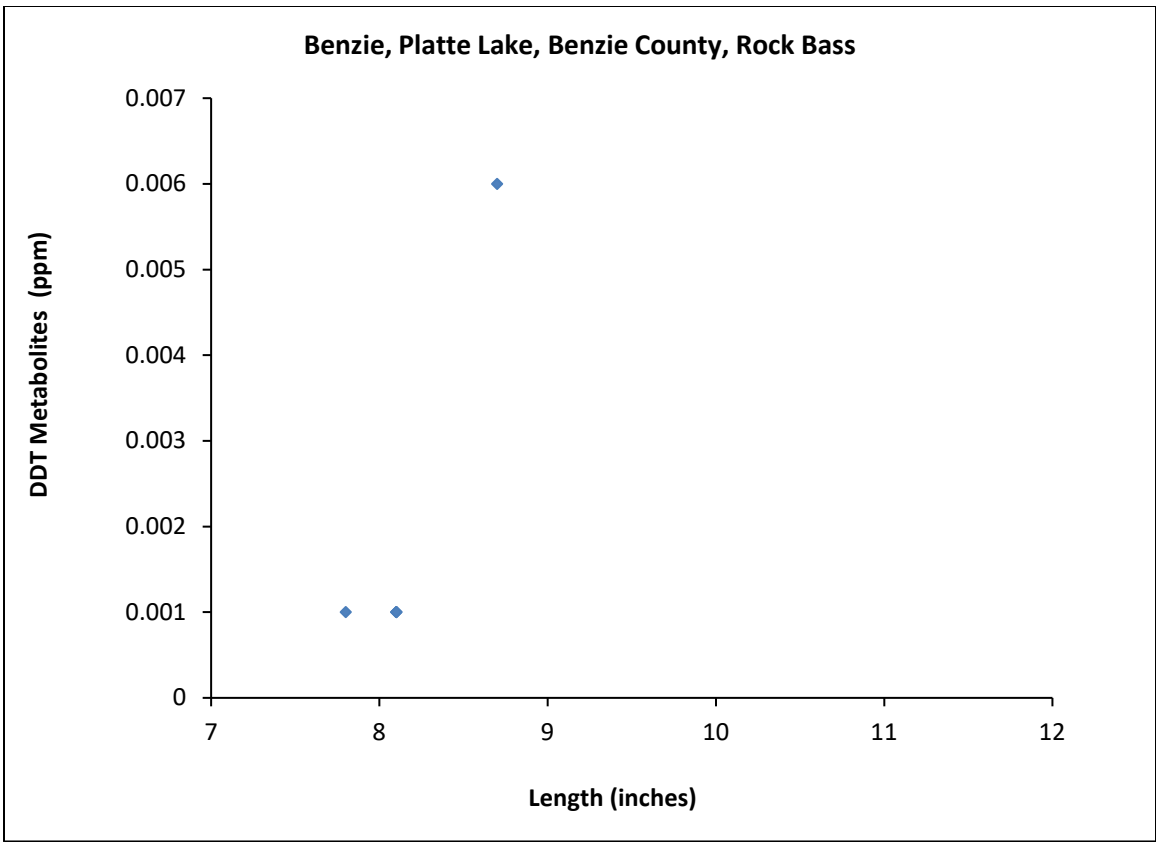
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2005	2005	5	7.8	na	7.8	8.7
Datasets available: 2005						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	5	0.001	0.001	0.001	0.001	16
DDT	5	0.002	0.001	0.006	0.005	16
Chlordane	5	ND	--	--	--	--
Toxaphene	5	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	0.844	0.844				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>4</b>

**Existing MDHHS Advisory:** No one should eat more than 4 meals per month of rock bass from Platte Lake smaller than 10 inches or more than 1 meal per month of those fish larger than 10 inches due to mercury.

**Recommendation:** No one should eat more than 8 meals per month of rock bass from Platte Lake less than 9 inches or 2 meals per month of those fish greater than 9 inches due to mercury.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
6	0.03	16
7	0.05	16
8	0.08	12
9	0.13	8
10	0.21	4
11	0.33	2
12	0.52	2
<i>Shaded area denotes extrapolated estimates</i>		





**Smallmouth Bass**

**Platte Lake**

**Benzie County**

**Hg Analysis:**

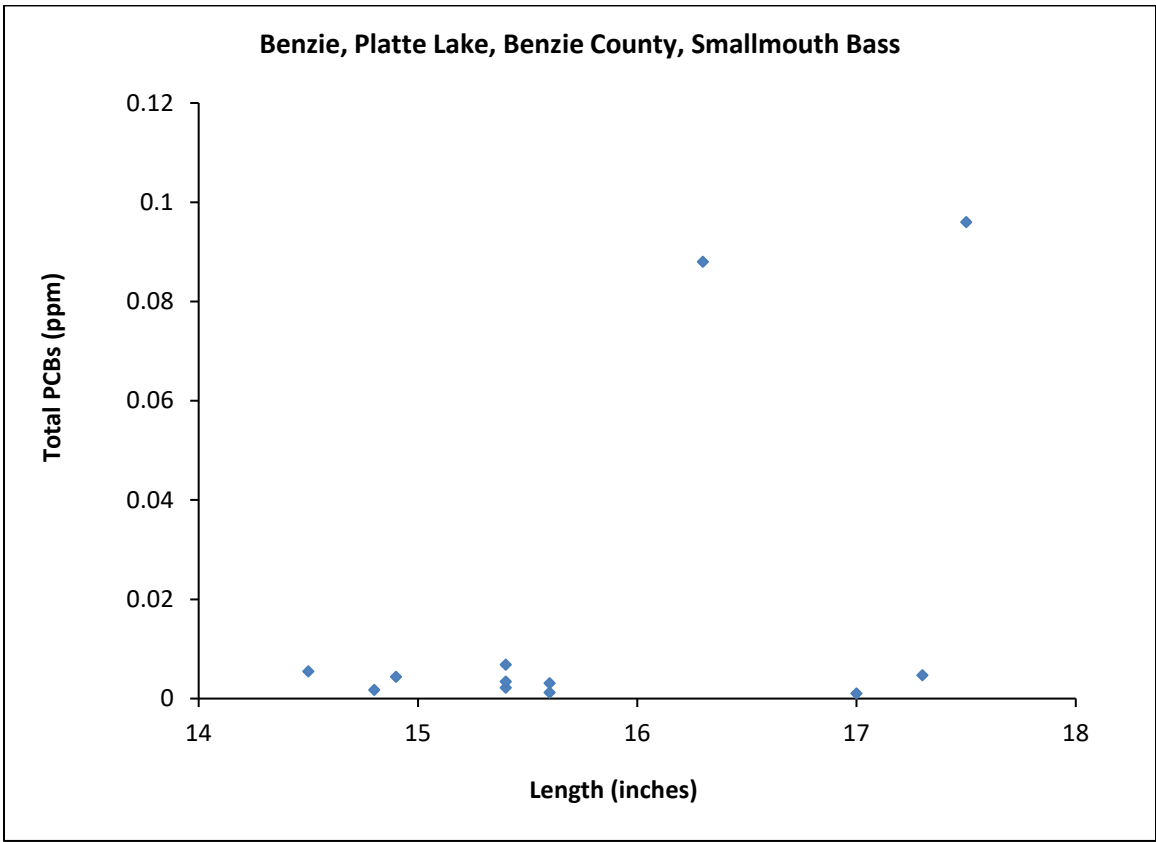
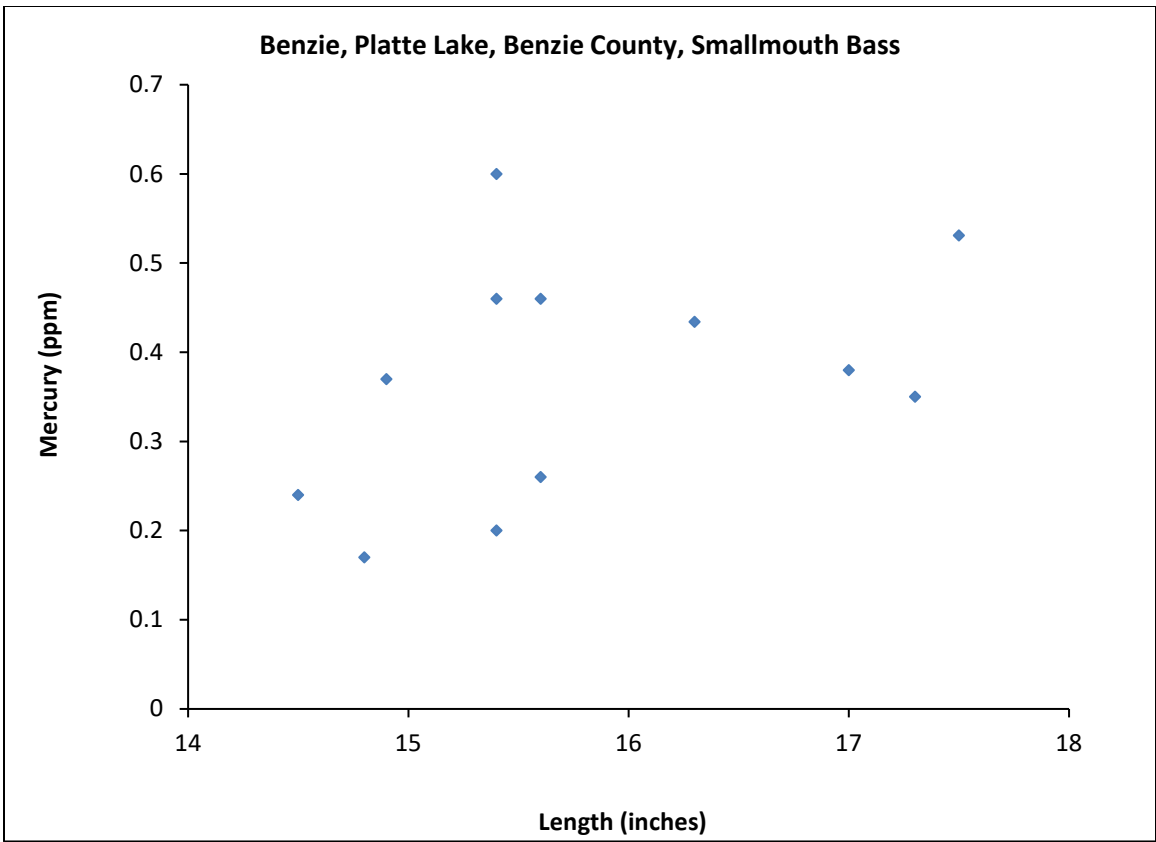
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2004	2010	12	14.5	14	14.5	17.5
Datasets available: 2004, 2010						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	12	0.37	0.17	0.60	0.46	2
Chemical	Linear Regression R <sup>2</sup>	Exponential Regression R <sup>2</sup>				
Mercury	0.168	0.208				

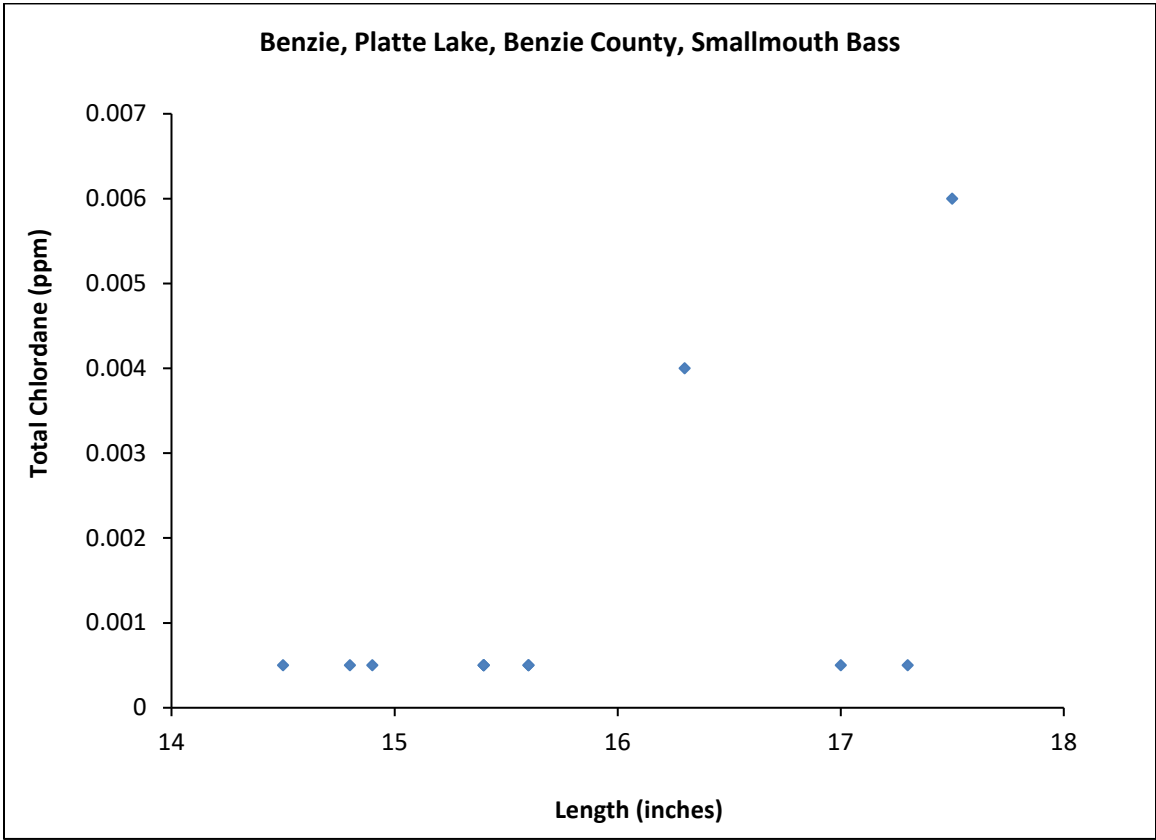
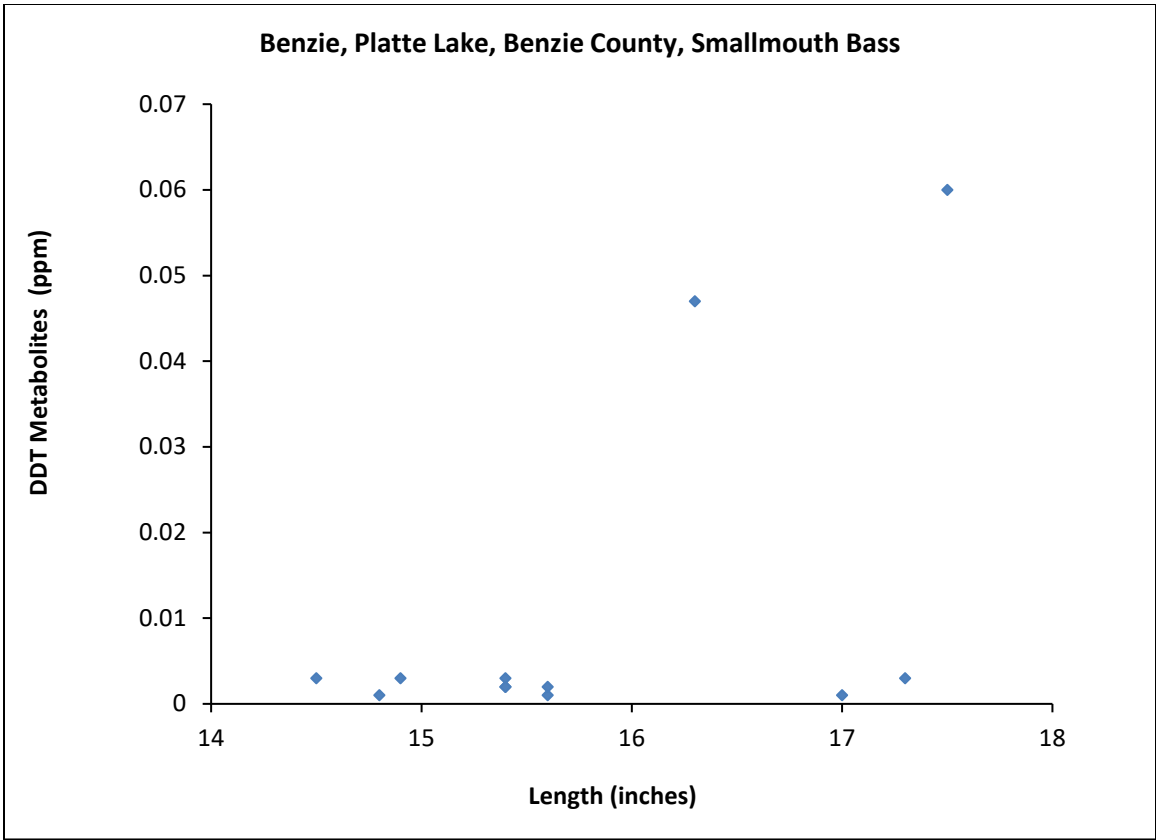
**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2004	2010	12	14.5	14	14.5	17.5
Datasets available: 2004, 2010						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	12	0.018	0.001	0.096	0.04	4
DDT	12	0.011	0.001	0.047	0.02	16
Chlordane	12	0.001	0.001	0.006	0.002	--
Toxaphene	12	ND	--	--	--	--
Chemical	Linear Regression R <sup>2</sup>	Exponential Regression R <sup>2</sup>				
PCB	0.266	0.150				
DDT	0.290	0.211				
Chlordane	0.312	0.286				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2</b>

**Existing MDHHS Advisory:** No one should eat more than one meal per month of smallmouth bass from Platte Lake due to mercury and PCBs.

**Recommendation:** No one should eat more than 2 meals per month of largemouth or smallmouth bass from Platte Lake 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. PCBs would also cause an advisory.





**Walleye**

**Platte Lake**

**Benzie County**

**Hg Analysis:**

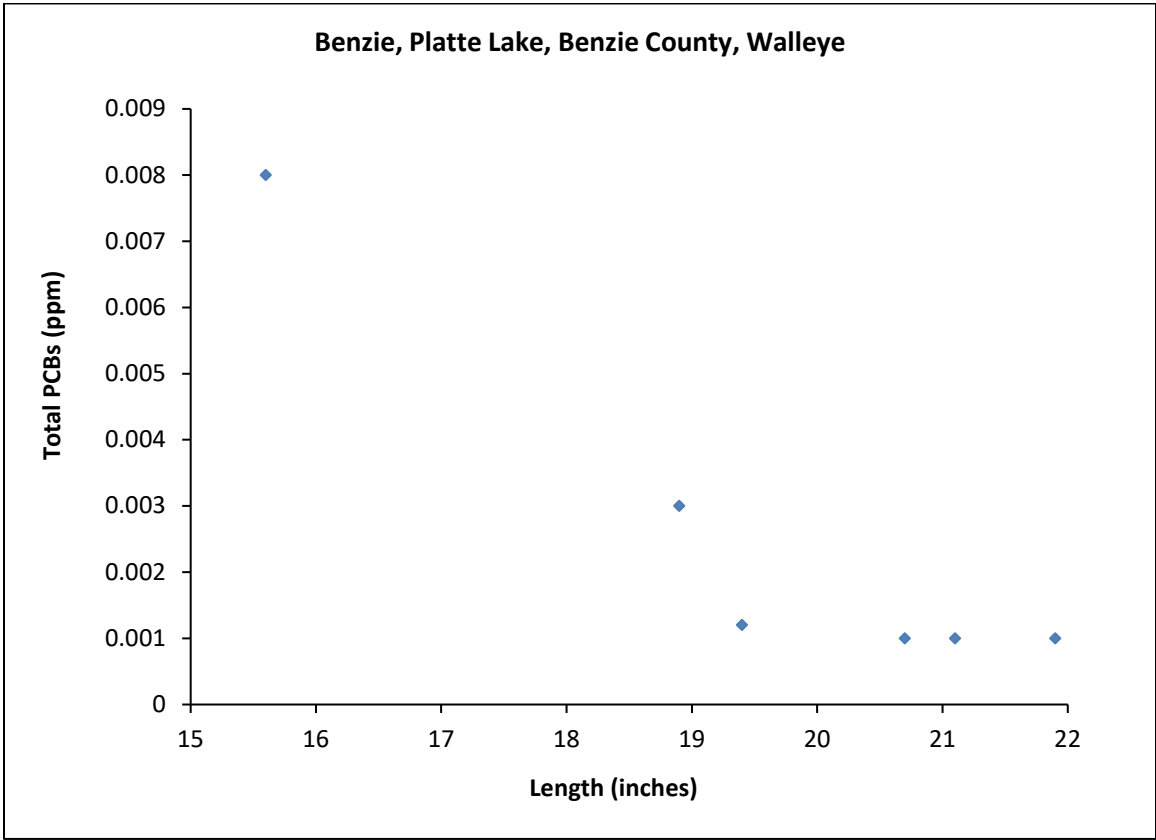
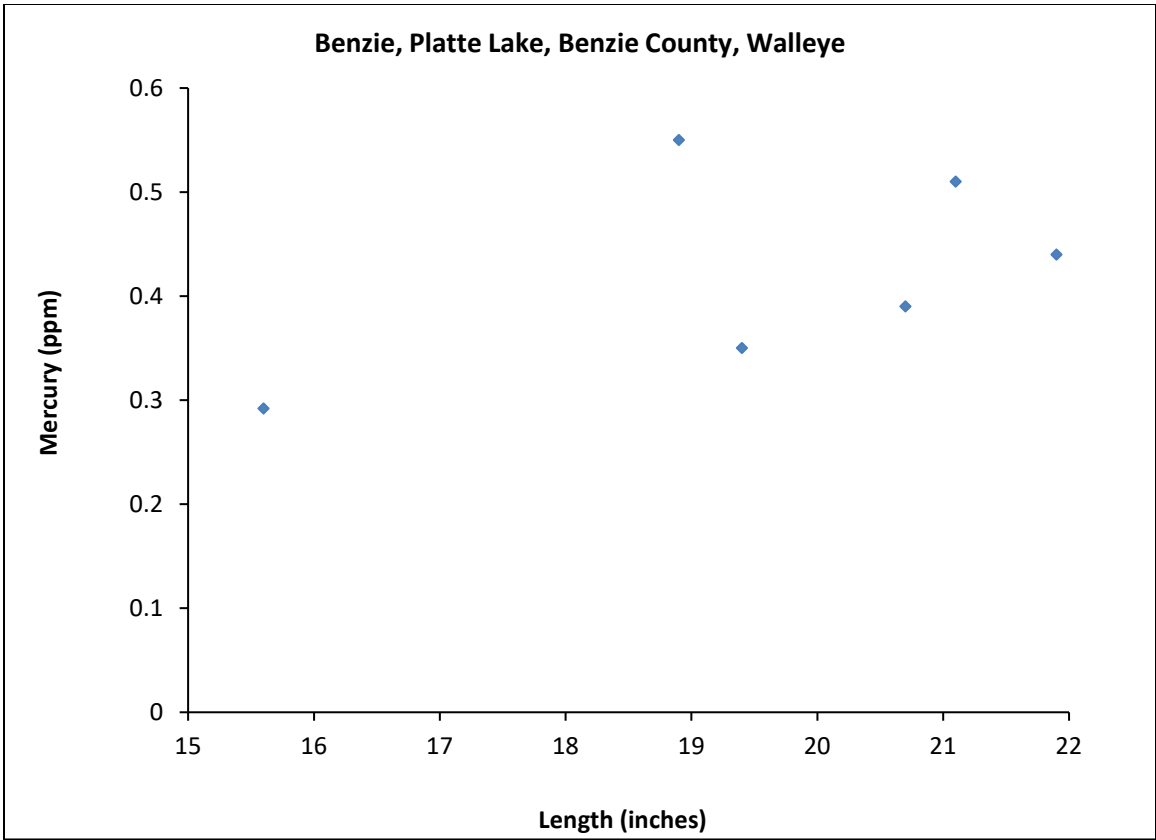
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2004	2010	6	15.6	15	15.6	21.9
Datasets available: 2004, 2010						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	6	0.42	0.29	0.55	0.52	2
	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.283	0.368				

**Organics Analysis:**

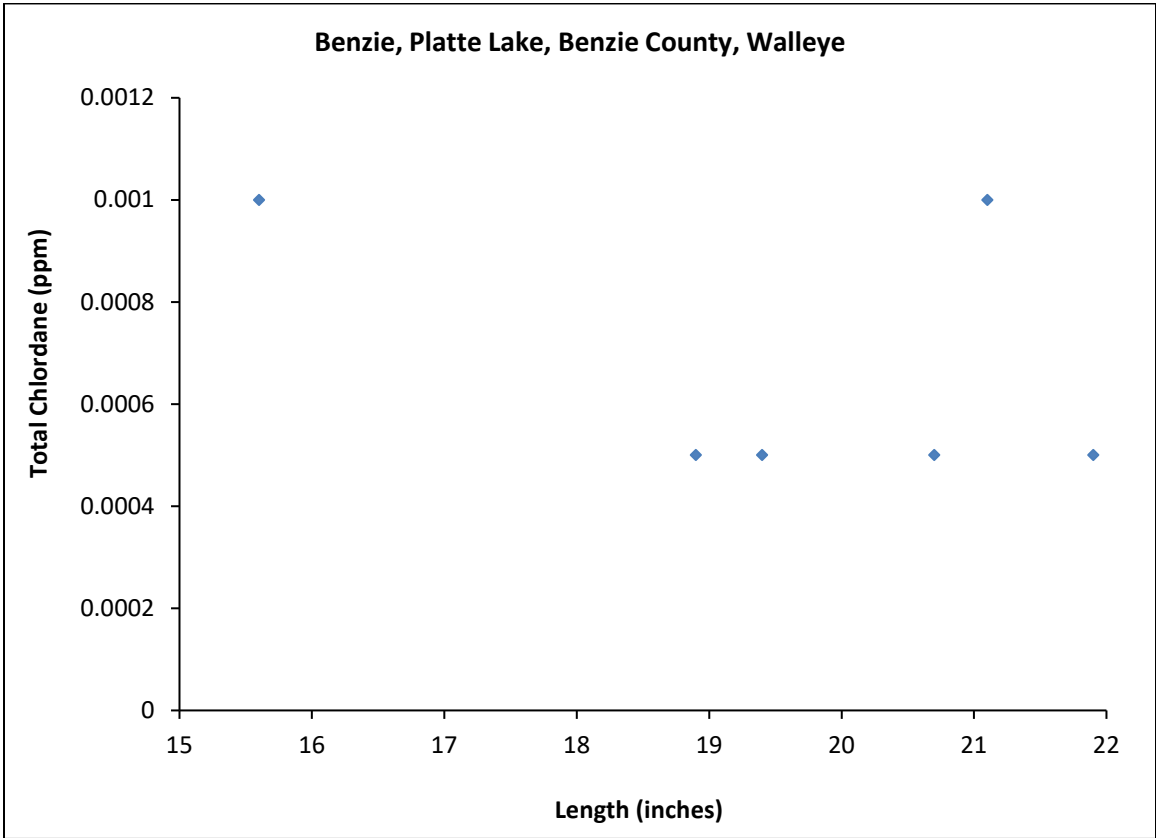
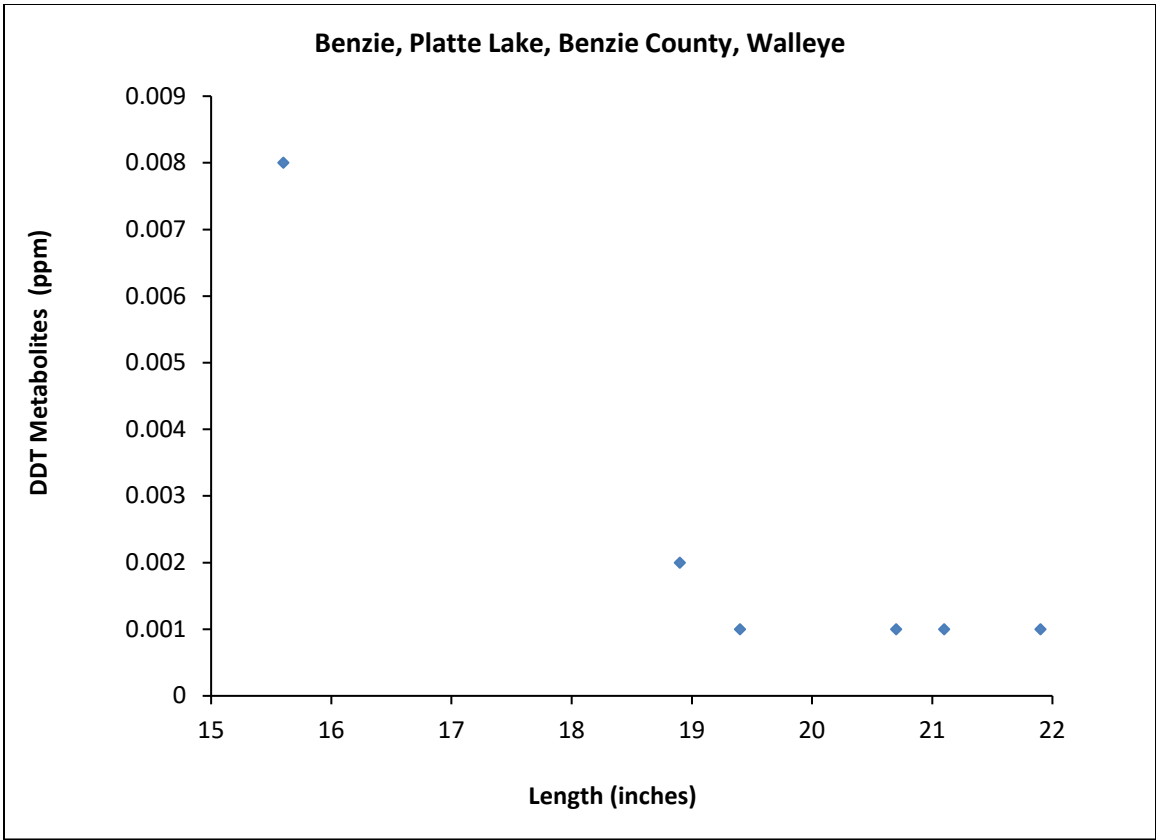
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2004	2010	6	15.6	15	15.6	21.9
Datasets available: 2004, 2010						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	6	0.003	0.001	0.008	0.010	16
DDT	6	0.002	0.001	0.008	0.010	16
Chlordane	6	0.001	0.001	0.001	0.001	--
Toxaphene	6	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.881*	0.894*	* - negative slope			
DDT	0.828*	0.870*				
Chlordane	0.185	0.185				
Toxaphene	--	--	<b>Final meal category based on UCL:</b>			<b>2</b>

**Existing MDHHS Advisory:** Walleye from Platte Lake in Benzie County are covered under the statewide advisory for mercury. 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 due to mercury.

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







**Brown Trout**

**Platte River**

**Benzie 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	8	9.3	10	9.8	15.2
Datasets available: 1998						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	2*	0.14	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
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	8	9.3	10	9.3	15.2
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*	0.009	--	--	--	--
Chlordane	2*	ND	--	--	--	--
Toxaphene	2*	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						--

\* - 8 fish analyzed as 2 composite samples comprised of fillets of 4 fish each

**Existing MDHHS Advisory:** Brown trout from Platte River in Benzie County are covered under the statewide advisory for mercury. No one should eat more than 4 meals per month of brown trout of any size due to mercury.

**Recommendation:** No change is recommended. MDHHS requires a minimum of five legal size fish samples to evaluate the need for waterbody specific fish consumption advisories.

**White Sucker**

**Platte River**

**Benzie 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	7	9.8	10	9.8	12.8
Datasets available: 1998						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	2*	0.06	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
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	7	9.8	10	9.8	12.8
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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						--

\* - 7 fish analyzed as 2 composite samples

**Existing MDHHS Advisory:** Suckers from Platte River in Benzie County are covered under the statewide advisory for mercury. No one should eat more than 8 meals per month of suckers of any size due to mercury.

**Recommendation:** No change is recommended. MDHHS requires a minimum of five legal size fish samples to evaluate the need for waterbody specific fish consumption advisories.

# Charlevoix 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	9	7.6	10	9.8	12
Datasets available: 1998						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	2*	0.11	0.07	0.13	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
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	9	7.6	10	9.8	12
Datasets available: 1998						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	2*	0.28	0.06	0.39	--	--
DDT	2*	0.14	0.03	0.19	--	--
Chlordane	2*	0.02	0.004	0.04	--	--
Toxaphene	2*	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						--

\* - 9 fish were analyzed as 2 composite samples

**Existing MDHHS Advisory:** Brown trout from Boyne River in Charlevoix County are covered under the statewide advisory for mercury. No one should eat more than 4 meals per month of brown trout of any size due to mercury.

**Recommendation:** No change is recommended. MDHHS requires a minimum of five legal size fish samples to evaluate the need for waterbody specific fish consumption advisories.

**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	5	10	na	10	11.7
Datasets available: 1998						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	1*	0.09	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
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	5	10	na	10	11.7
Datasets available: 1998						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	1*	ND	--	--	--	--
DDT	1*	0.01	--	--	--	--
Chlordane	1*	ND	--	--	--	--
Toxaphene	1*	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						--

\* - 5 fish were analyzed as 1 composite sample

**Existing MDHHS Advisory:** Suckers from Boyne River in Charlevoix County are covered under the statewide advisory for mercury. No one should eat more than 8 meals per month of suckers of any size due to mercury.

**Recommendation:** No change is recommended. MDHHS requires a minimum of five legal size fish samples to evaluate the need for waterbody specific fish consumption advisories.

**Largemouth Bass**

**Deer Lake**

**Charlevoix County**

**Hg Analysis:**

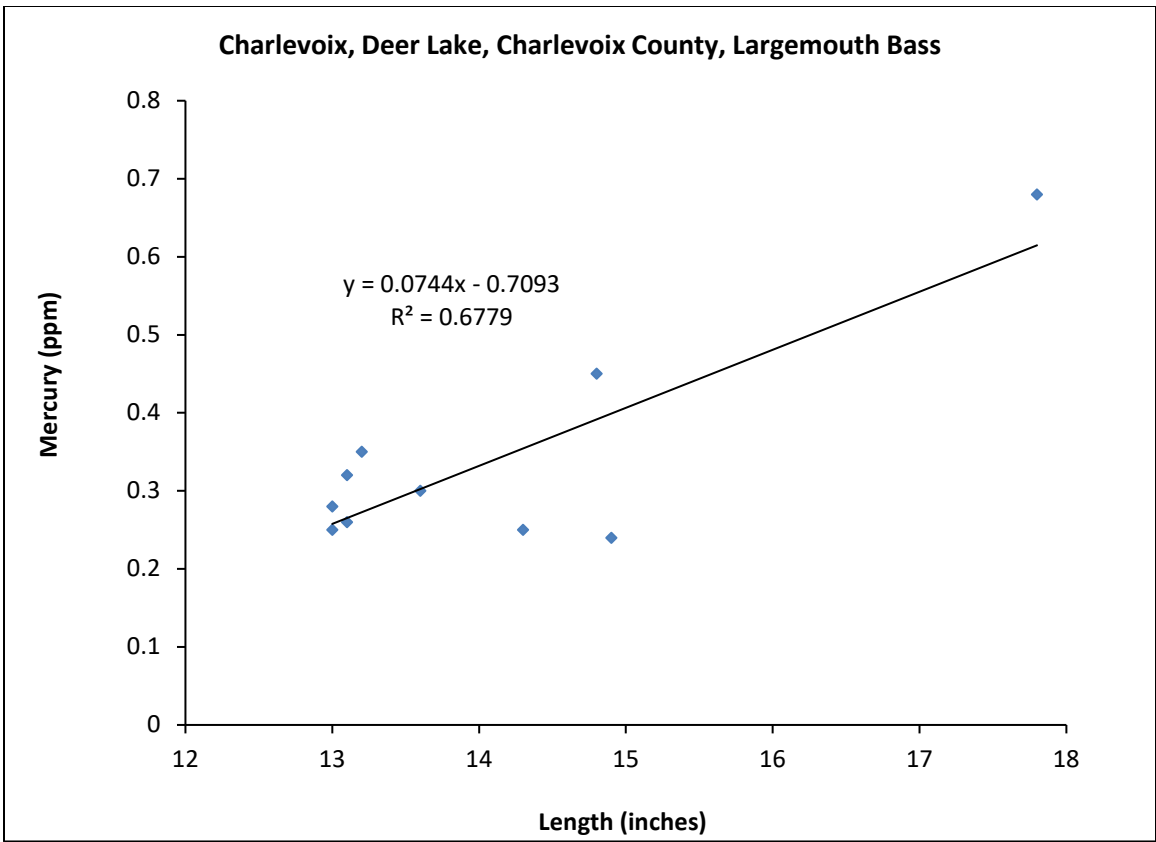
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
2003	2003	10	13	14	13	17.8	
Datasets available: 2003							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
Mercury	5	0.38	0.24	0.68	0.61	1	
Chemical	Linear Regression	Exponential Regression	Regression slope determined by single value, thus the regression was not used.				
	R <sup>2</sup>	R <sup>2</sup>					
Mercury	0.678	0.565					

**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Size Range of All Samples		Meal Category
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 <sup>2</sup>	R <sup>2</sup>					
PCB	--	--					
DDT	--	--					
Chlordane	--	--					
Toxaphene	--	--					
<b>Final meal category based on UCL:</b>							<b>1</b>

**Existing MDHHS Advisory:** Largemouth and smallmouth bass from Deer Lake in Charlevoix County are covered under the statewide advisory for mercury. No one should eat more than 2 meals per month of largemouth and smallmouth bass smaller than 18” or no more than 1 meal per month of largemouth and smallmouth bass larger than 18” due to mercury.

**Recommendation:** No one should eat more than 1 meal per month of largemouth or smallmouth bass from Deer Lake 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**

**Deer Lake**

**Charlevoix 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	5	14.7	na*	14.7	19.7
Datasets available: 2003						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	5	0.42	0.13	0.71	0.69	1
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.171	0.374				

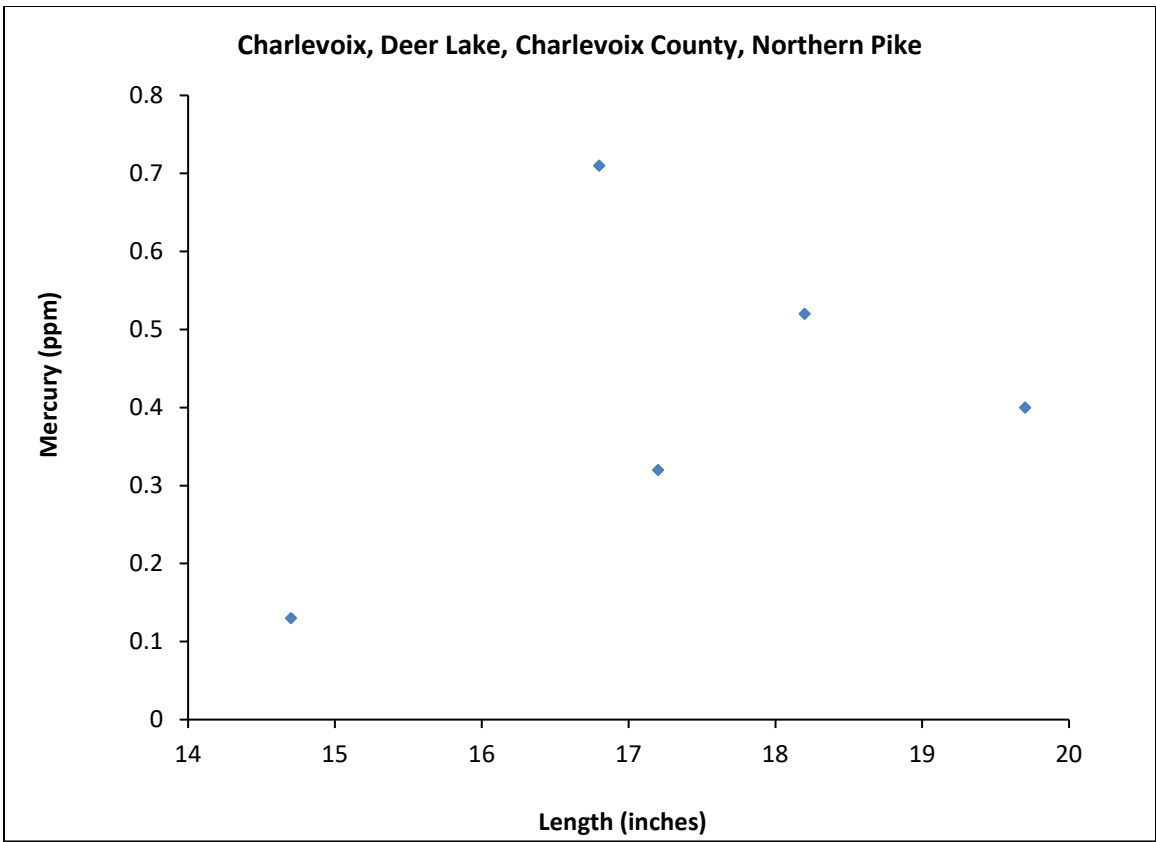
**Organics Analysis:**

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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>1</b>

\* - there is no minimum size limit on Deer Lake northern pike

**Existing MDHHS Advisory:** Northern pike from Deer Lake in Charlevoix County are covered under the statewide advisory for mercury. No one should eat more than 2 meals per month of northern pike smaller than 30" or no more than 1 meal per month of northern pike larger than 30" due to mercury.

**Recommendation:** No one should eat more than 1 meal per month of northern pike from Deer Lake smaller than 30 inches or more than 6 meals per year of those fish larger than 30 inches. Statewide length break applied as the size range of fish in this sample set is limited.



## Brown Trout

## Lake Charlevoix

## Charlevoix County

## Hg Analysis:

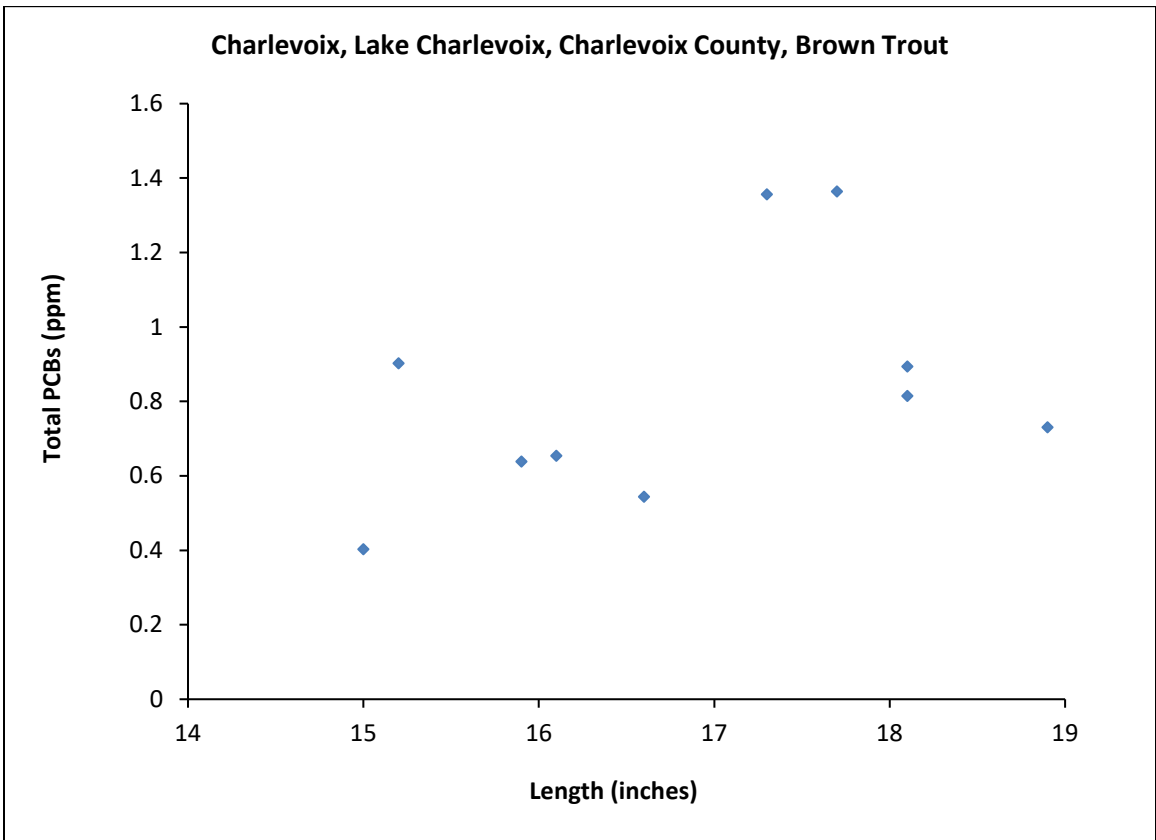
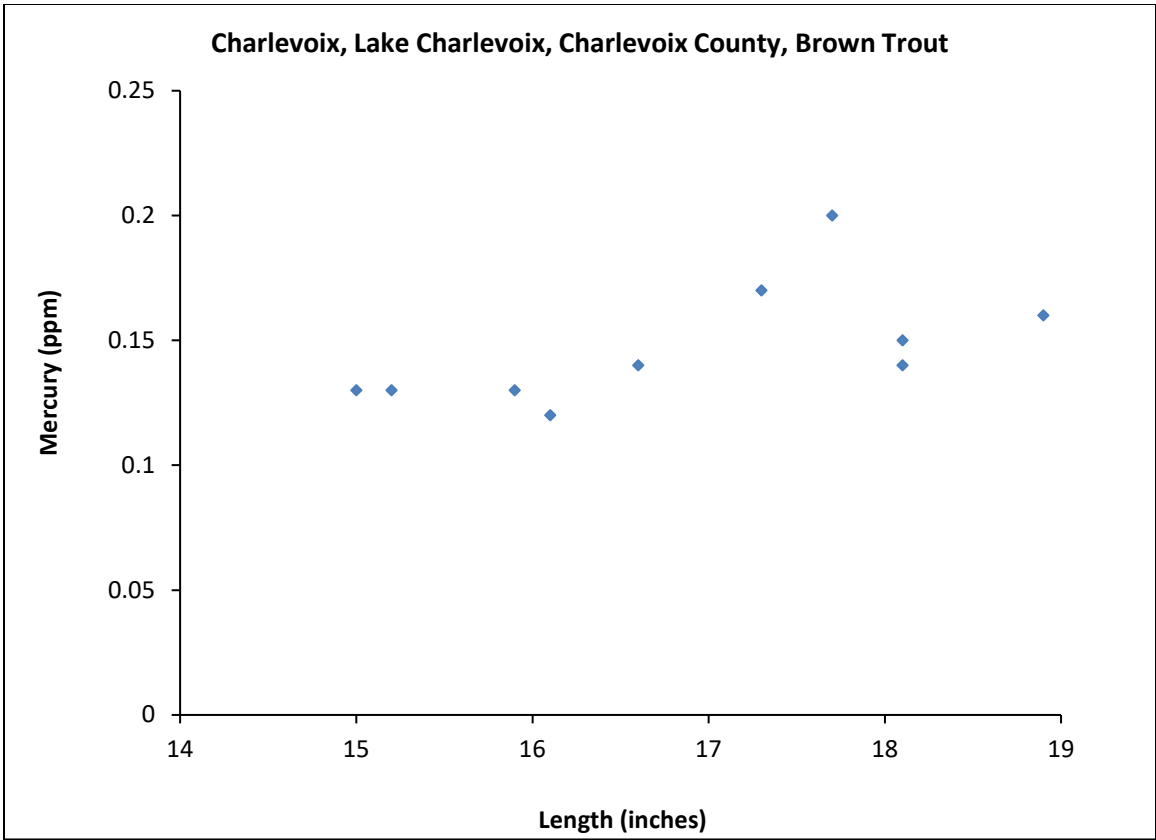
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1990	1990	10	15	15	18.9	
Datasets available: 1990						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.15	0.12	0.20	0.16	4
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.368	0.410				

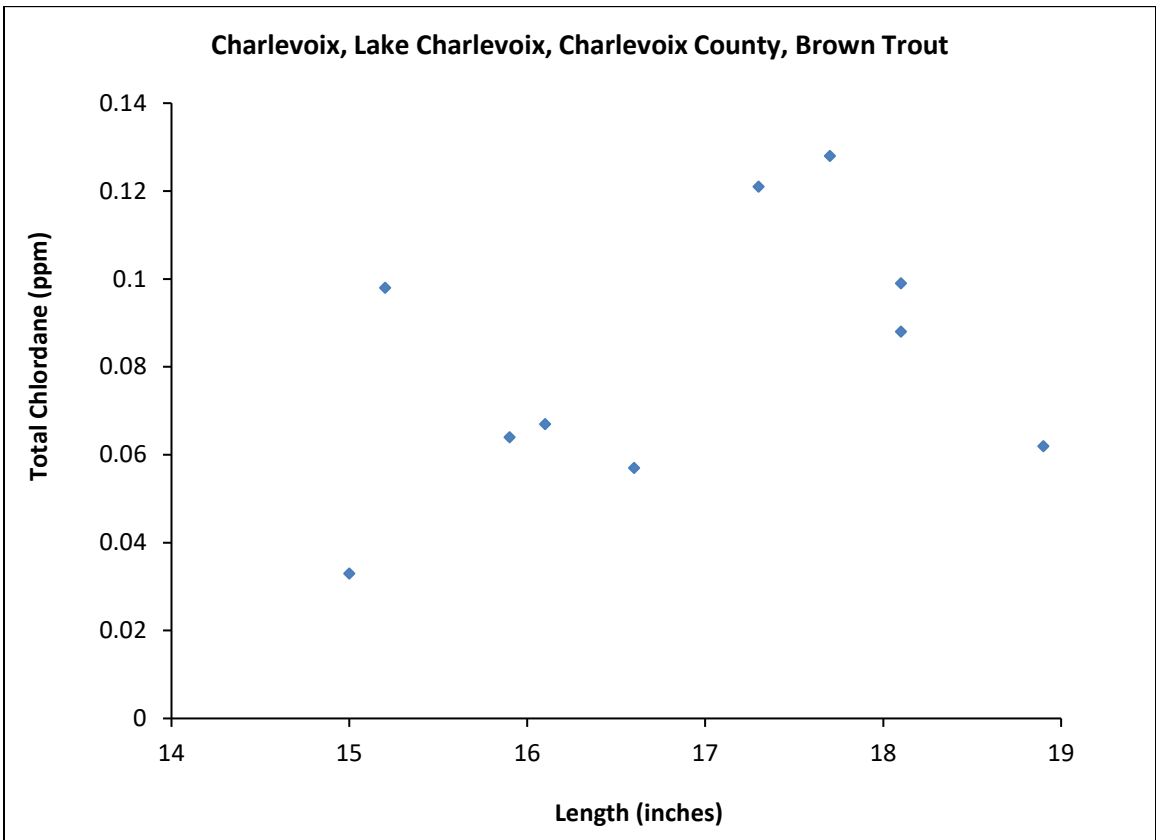
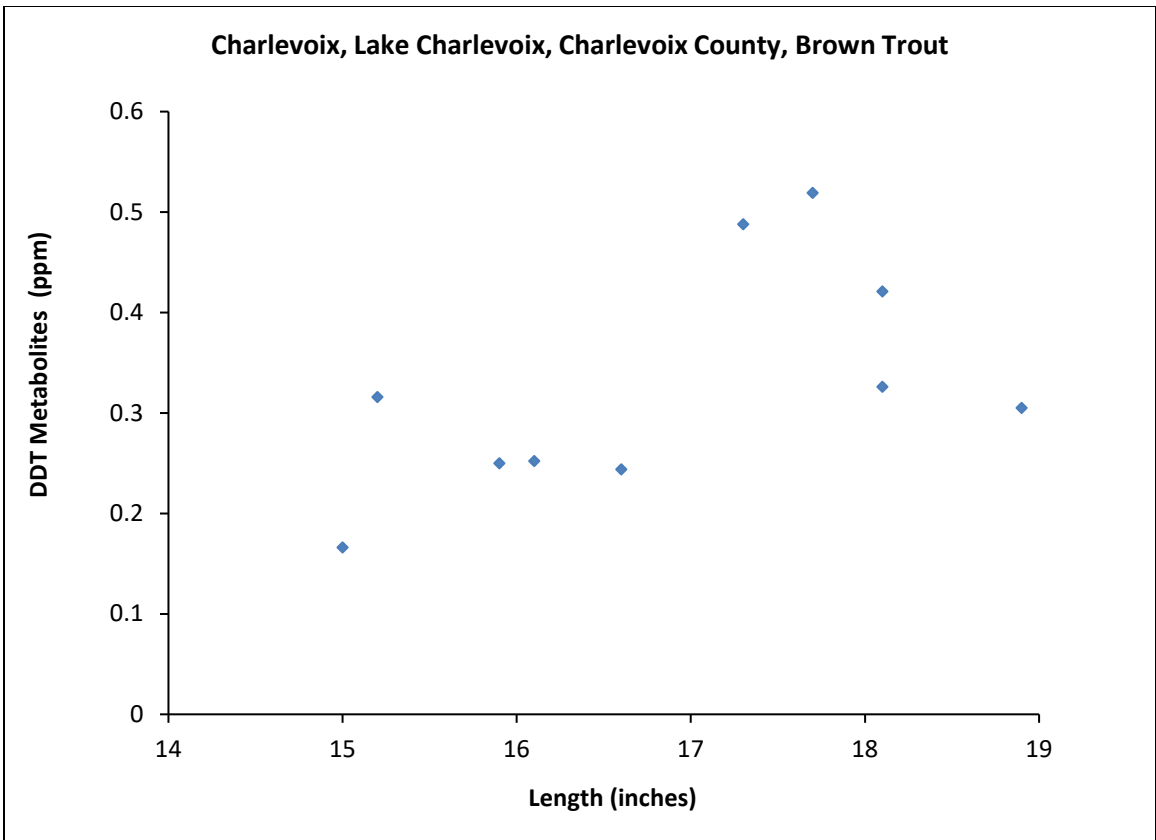
## Organics Analysis:

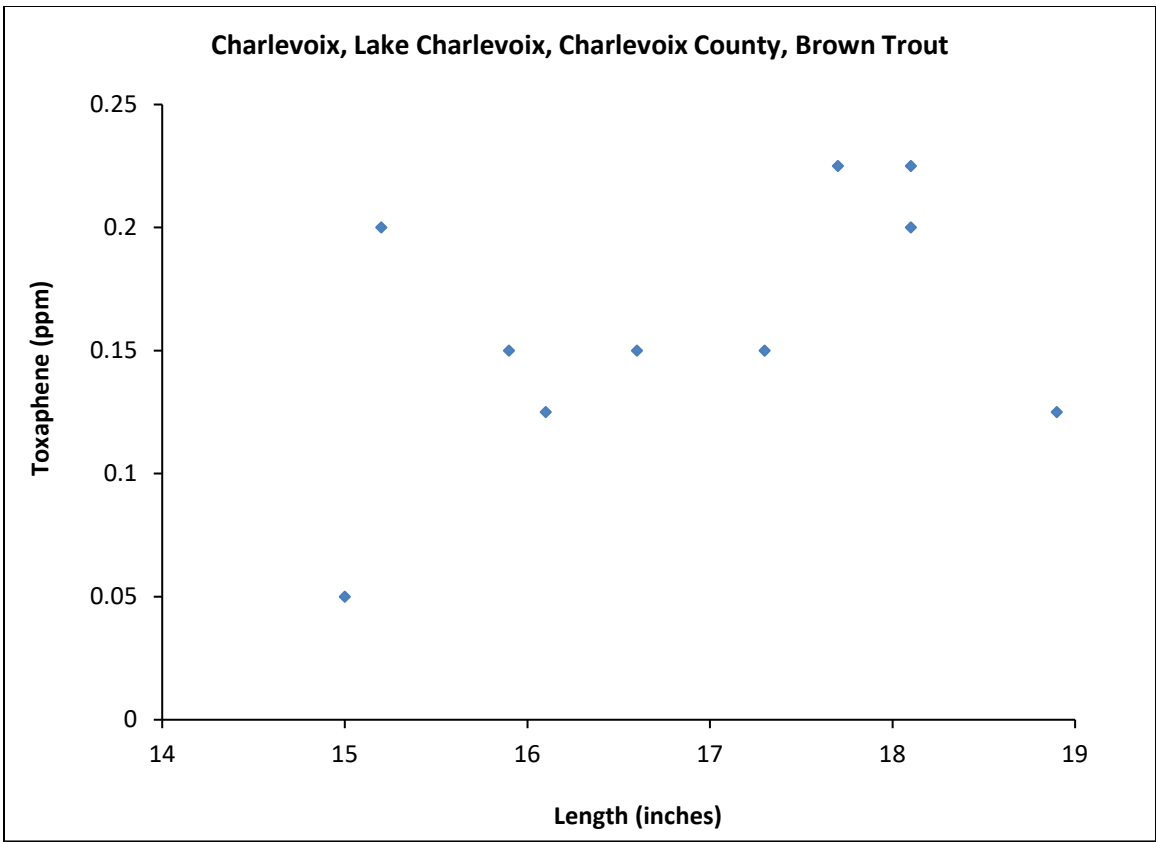
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1990	1990	10	15	15	18.9	
Datasets available: 1990						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.83	0.40	1.36	1.06	Limited*
DDT	10	0.33	0.17	0.52	0.41	4
Chlordane	10	0.08	0.03	0.13	0.10	--
Toxaphene	10	0.16	0.05	0.22	0.20	1
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.177	0.236				
DDT	0.322	0.383				
Chlordane	0.158	0.202				
Toxaphene	0.194	0.229				
<b>Final meal category based on UCL:</b>						<b>Limited*</b>

**Existing MDHHS Advisory:** Brown trout from Lake Charlevoix in Charlevoix County are covered under the statewide advisory for mercury. No one should eat more than 4 meals per month of brown trout of any size due to mercury.

**Recommendation:** Sensitive populations should not eat these fish. Healthy adults should limit consumption of brown trout from Lake Charlevoix to no more than 1 or 2 meals per year due to PCBs. Mercury, DDT, and toxaphene would also cause advisories. \*Based on the EGLE Fish Contaminant Monitoring Program, PCB, DDT, and Toxaphene concentrations  $\geq 15$  years old are expected to have declined. However, levels of PCBs may still be in the Limited category.







**Lake Trout**

**Lake Charlevoix**

**Charlevoix County**

**Hg Analysis:**

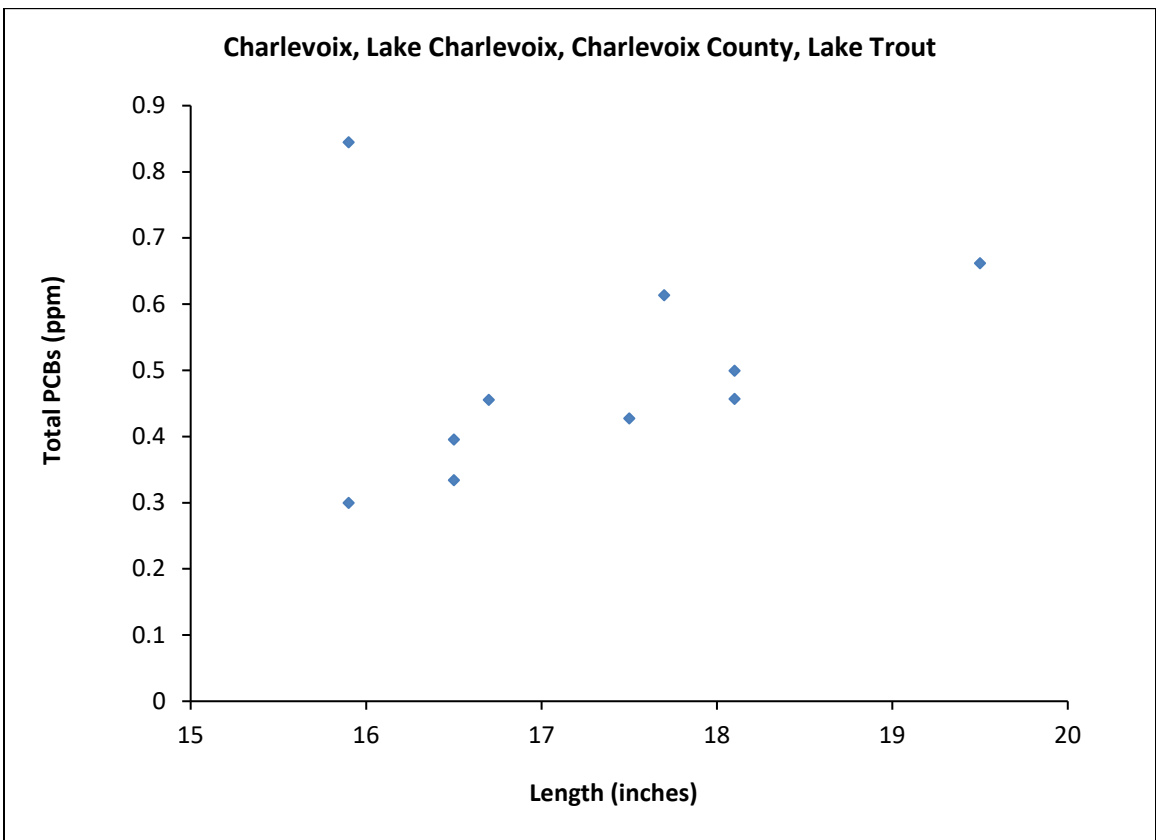
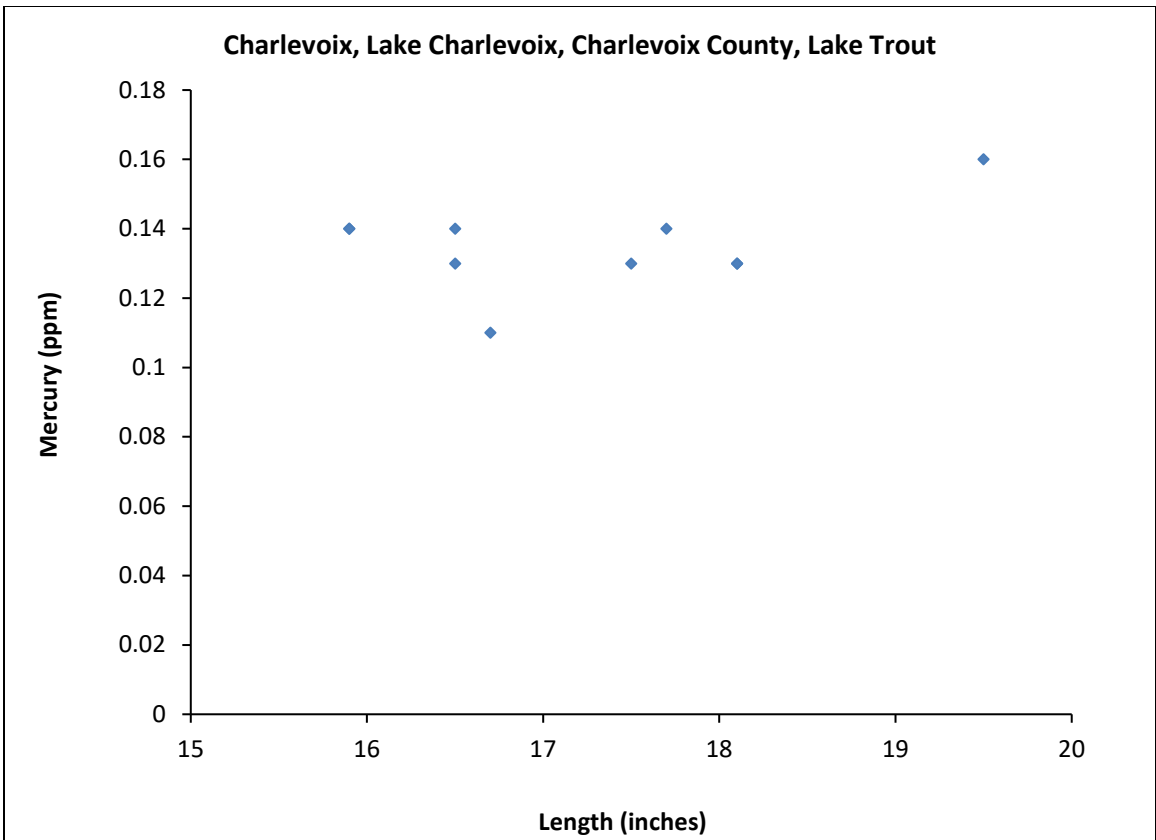
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1990	1990	10	15.9	15	15.9	19.5
Datasets available: 1990						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.14	0.11	0.16	0.14	4
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.140	0.120				

**Organics Analysis:**

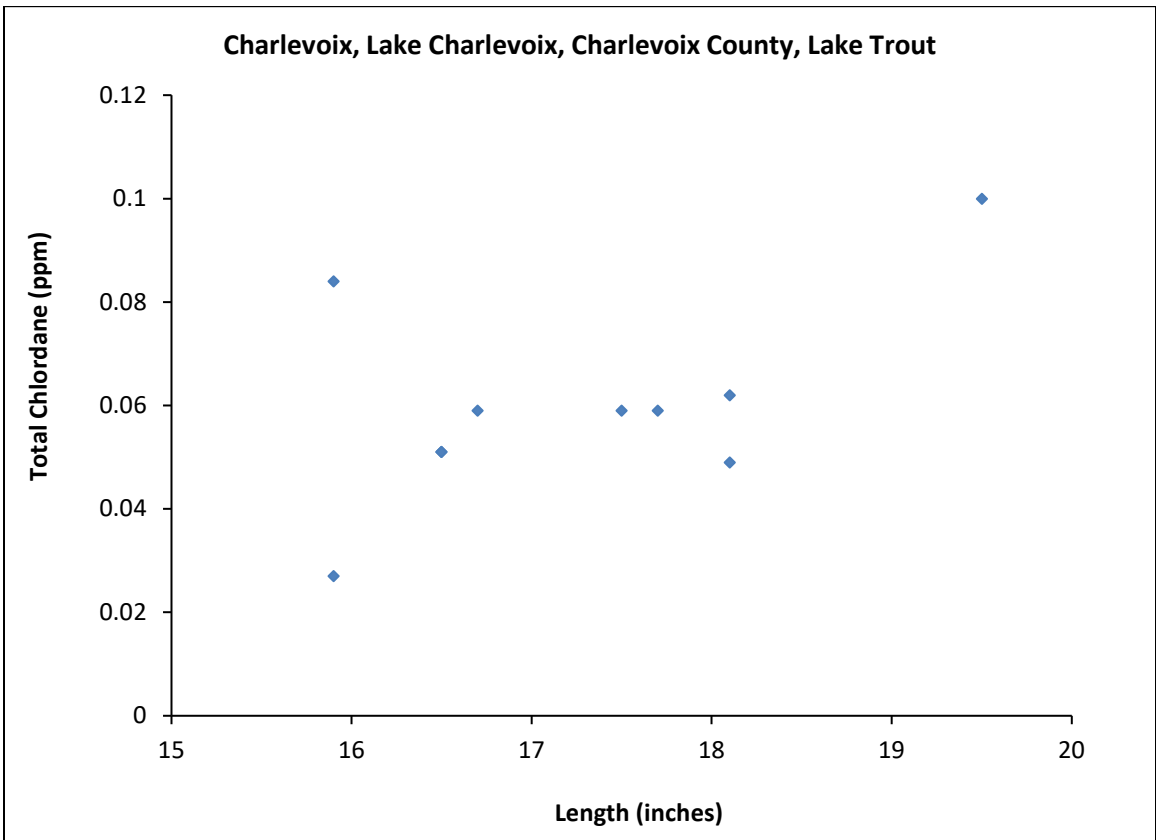
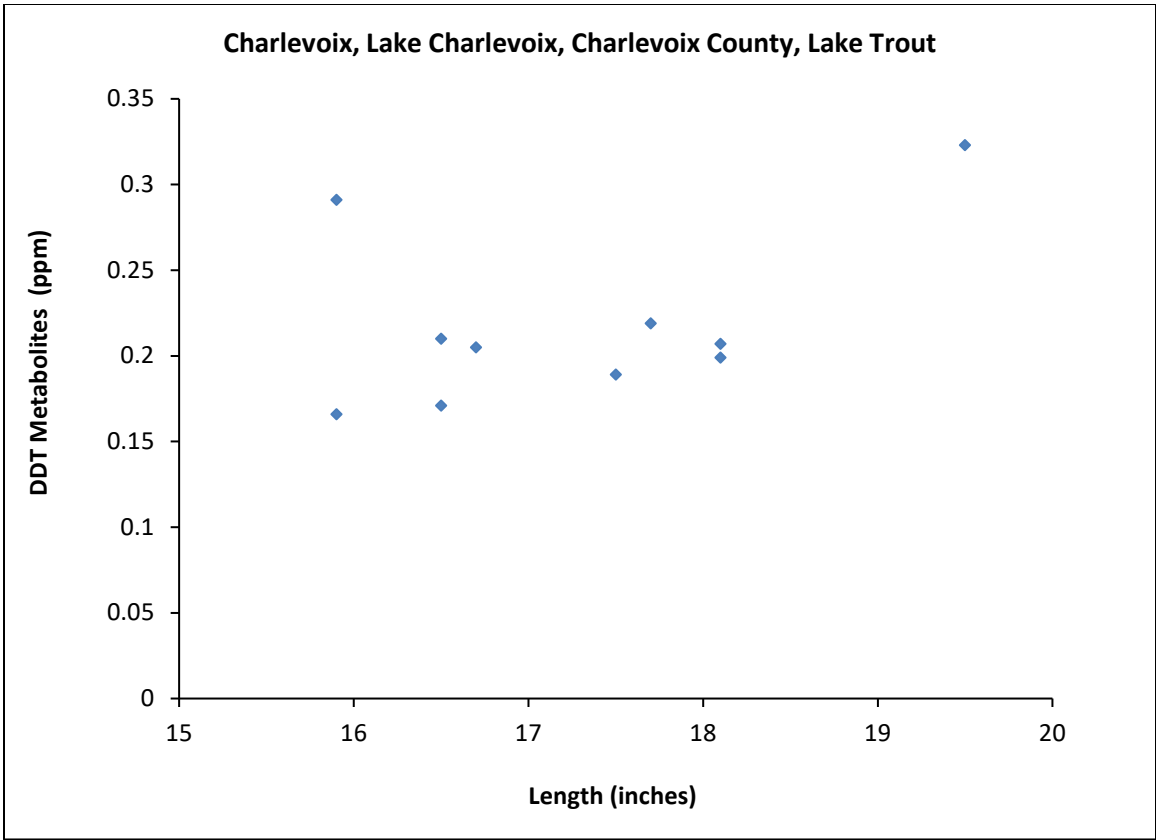
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1990	1990	10	15.9	15	15.9	19.5
Datasets available: 1990						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.50	0.30	0.84	0.62	Limited*
DDT	10	0.22	0.17	0.32	0.25	4
Chlordane	10	0.06	0.03	0.10	0.07	--
Toxaphene	10	0.12	0.05	0.25	0.16	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.053	0.118				
DDT	0.186	0.189				
Chlordane	0.276	0.271				
Toxaphene	0.337	0.309				
<b>Final meal category based on UCL:</b>						<b>Limited*</b>

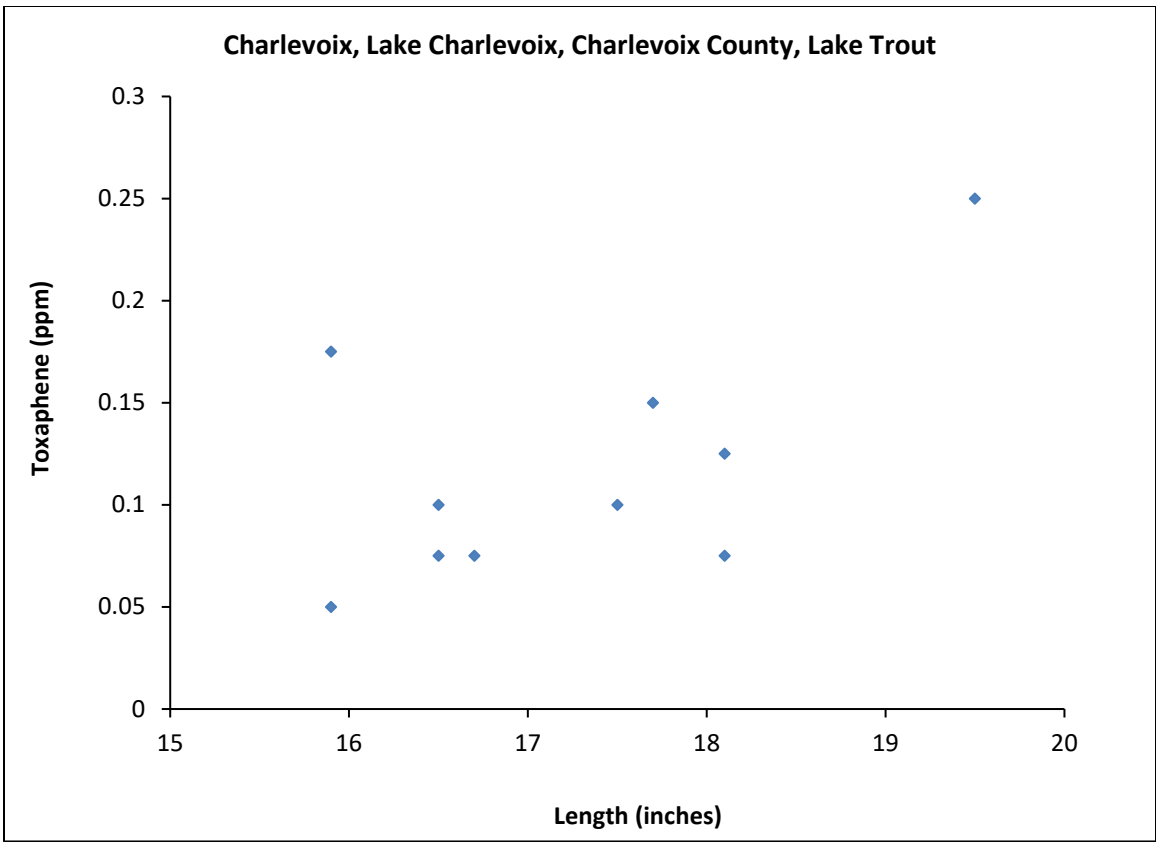
**Existing MDHHS Advisory:** There are no current consumption advisories for Lake trout from Lake Charlevoix. Lake trout are not covered by any statewide advisories.

**Recommendation:** Sensitive populations should not eat these fish. Healthy adults should limit consumption of Lake Charlevoix lake trout to no more than 1 or 2 meals per year due to PCBs. Mercury, DDT, and toxaphene would cause advisories. \*Based on the EGLE Fish Contaminant Monitoring Program, PCB, DDT, and Toxaphene concentrations ≥15 years old are expected to have declined. However, levels of PCBs may still be in the Limited category and the length range for lake trout is limited.









**Walleye**

**Lake Charlevoix**

**Charlevoix County**

**Hg Analysis:**

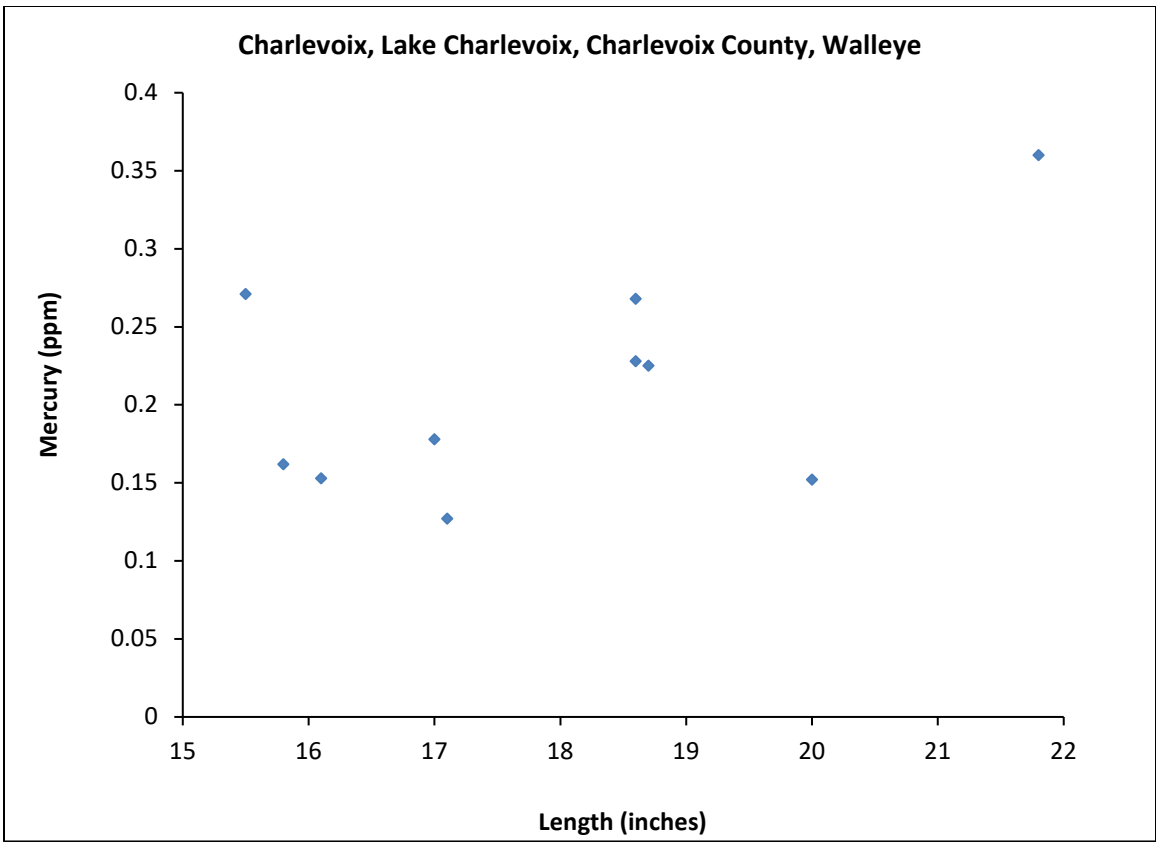
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2006	2006	10	15.5	15	15.5	21.8
Datasets available: 2006						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.21	0.13	0.36	0.26	4
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.273	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
--	--	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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>4</b>

**Existing MDHHS Advisory:** Walleye from Lake Charlevoix in Charlevoix County are covered under the statewide advisory for mercury. No one should eat more than 2 meals per month of walleye smaller than 20" or no more than 1 meal per month of walleye larger than 20" due to mercury.

**Recommendation:** No one should eat more than 4 meals per month of walleye from Lake Charlevoix smaller than 20 inches or more than 2 meals per month of those fish larger than 20 inches due to mercury. The statewide length break was applied as the size of the fish was limited.



**White Sucker**

**Lake Charlevoix**

**Charlevoix County**

**Hg Analysis:**

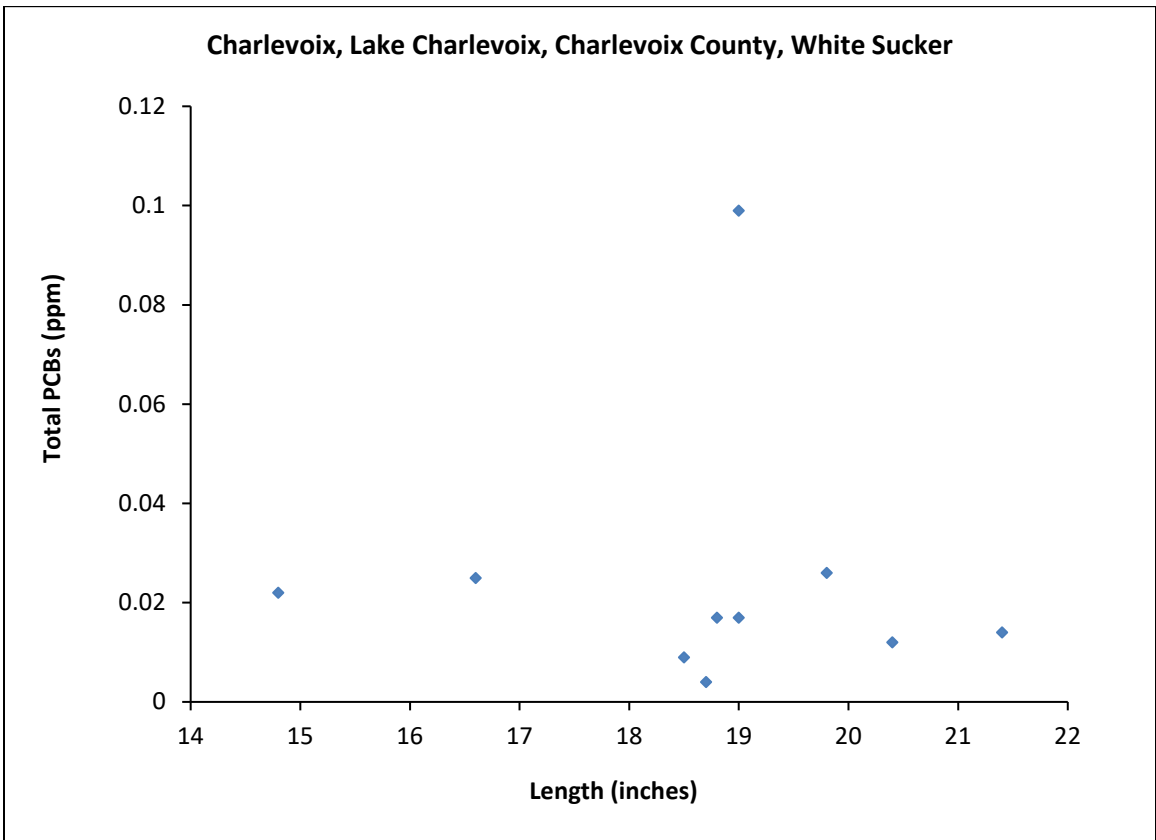
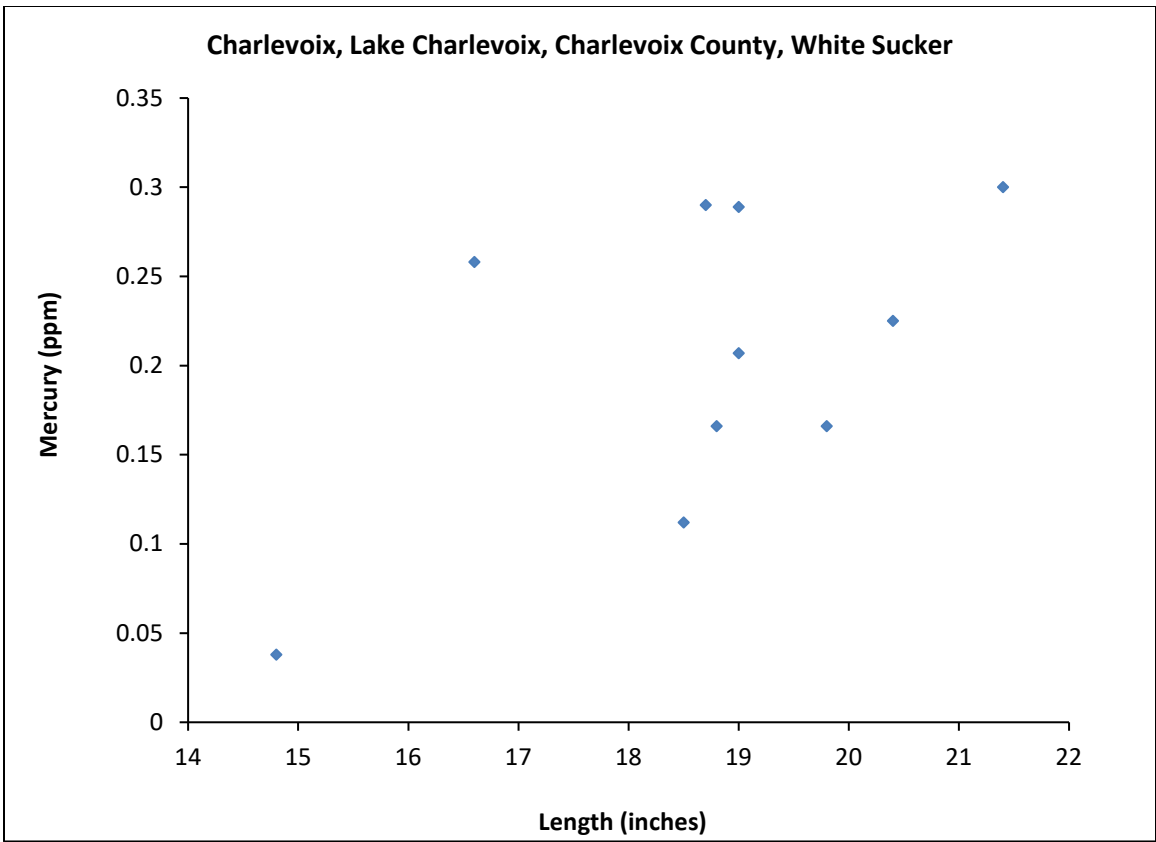
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2006	2006	10	14.8	na	14.8	21.4
Datasets available: 2006						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.20	0.04	0.29	0.27	4
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.332	0.471				

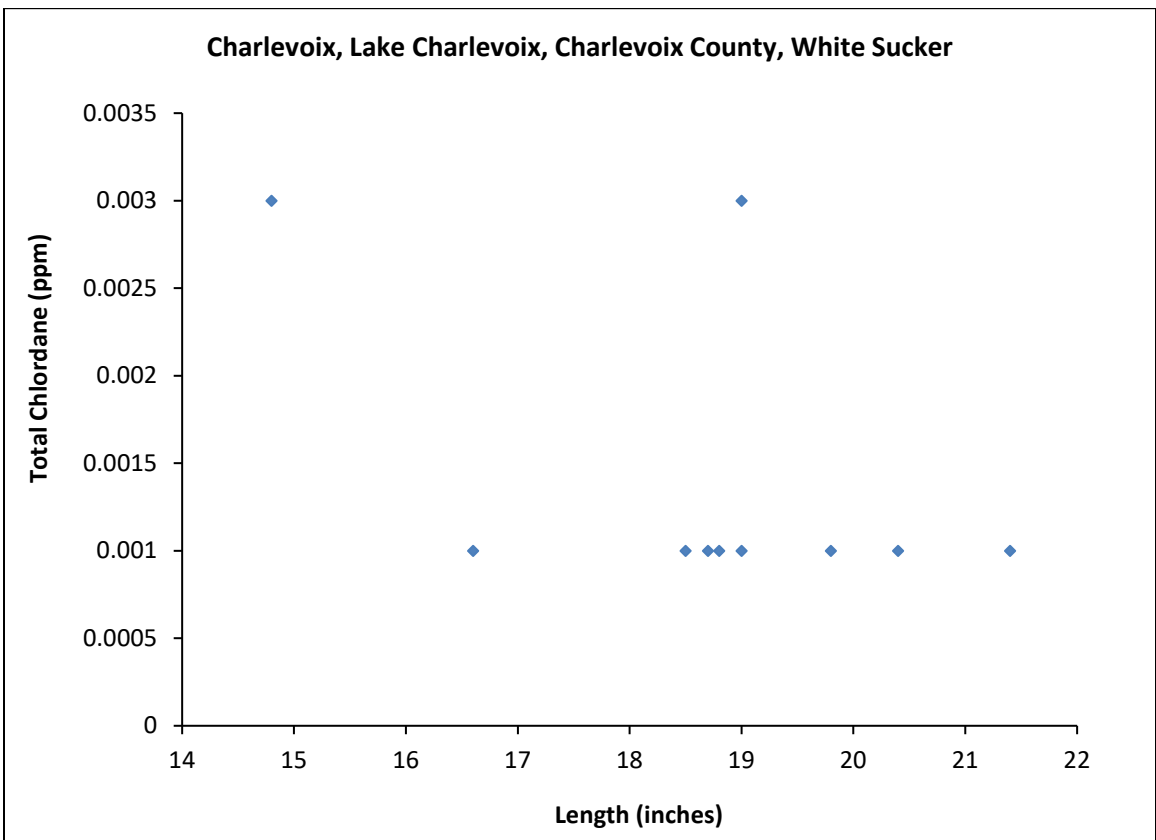
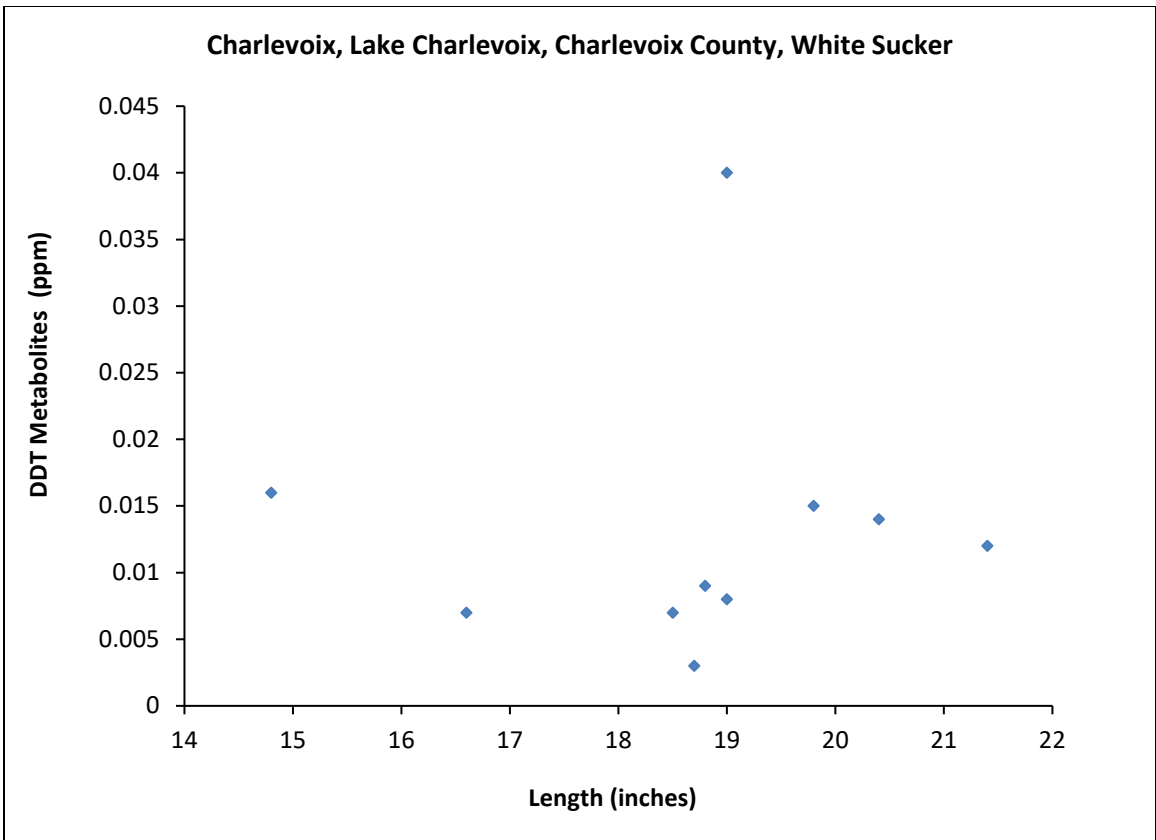
**Organics Analysis:**

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	14.8	na	14.8	21.4
Datasets available: 2006						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.03	0.004	0.10	0.04	4
DDT	10	0.01	0.003	0.02	0.02	16
Chlordane	10	0.001	0.001	0.003	0.002	--
Toxaphene	10	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.001	0.017				
DDT	0.003	0.005				
Chlordane	0.259	0.259				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>4</b>

**Existing MDHHS Advisory:** Suckers from Lake Charlevoix in Charlevoix County are covered under the statewide advisory for mercury. No one should eat more than 8 meals per month of suckers of any size due to mercury.

**Recommendation:** No one should eat more than 4 meals per month of Lake Charlevoix sucker due to mercury and PCBs.





**Largemouth Bass**

**Lake Geneserath**

**Charlevoix 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	4	12	14	12	14.6
Datasets available: 1990						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	4	0.52	0.22	0.89	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	--	--				

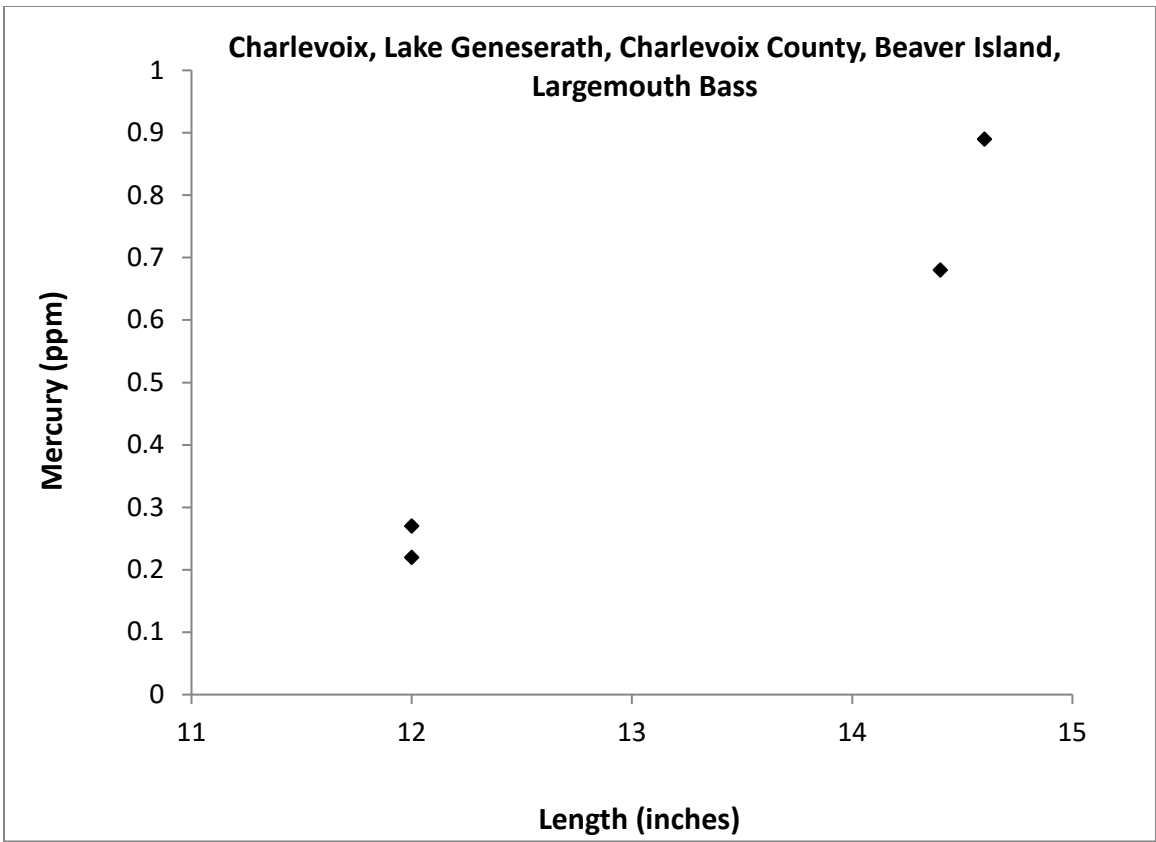
**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Size Range of All Samples	
Earliest	Most Recent				Min	Max
1990	1990	4	12	14	12	14.6
Datasets available: 1990						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	4	ND	--	--	--	--
DDT	4	0.011	0.004	0.02	--	--
Chlordane	4	ND	--	--	--	--
Toxaphene	4	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						--

**Existing Advisory:** Lake Geneserath largemouth bass are covered by 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 Geneserath 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

## Lake Geneserath

## Charlevoix 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	2	19.1	na*	19.1	20.1
Datasets available: 1990						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	2	0.34	0.30	0.37	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
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
1990	1990	2	19.1	24	19.1	20.1
Datasets available: 1990						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	2	ND	--	--	--	--
DDT	2	0.007	0.003	0.01	--	--
Chlordane	2	ND	--	--	--	--
Toxaphene	2	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						--

\* - There is no minimum size limit on Lake Geneserath northern pike

**Existing Advisory:** Lake Geneserath 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 Geneserath 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**

**Lake Geneserath  
Beaver Island**

**Charlevoix 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	14.4	15	14.6	21.9
Datasets available:						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	9	0.31	0.21	0.73	0.44	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.753	0.702				

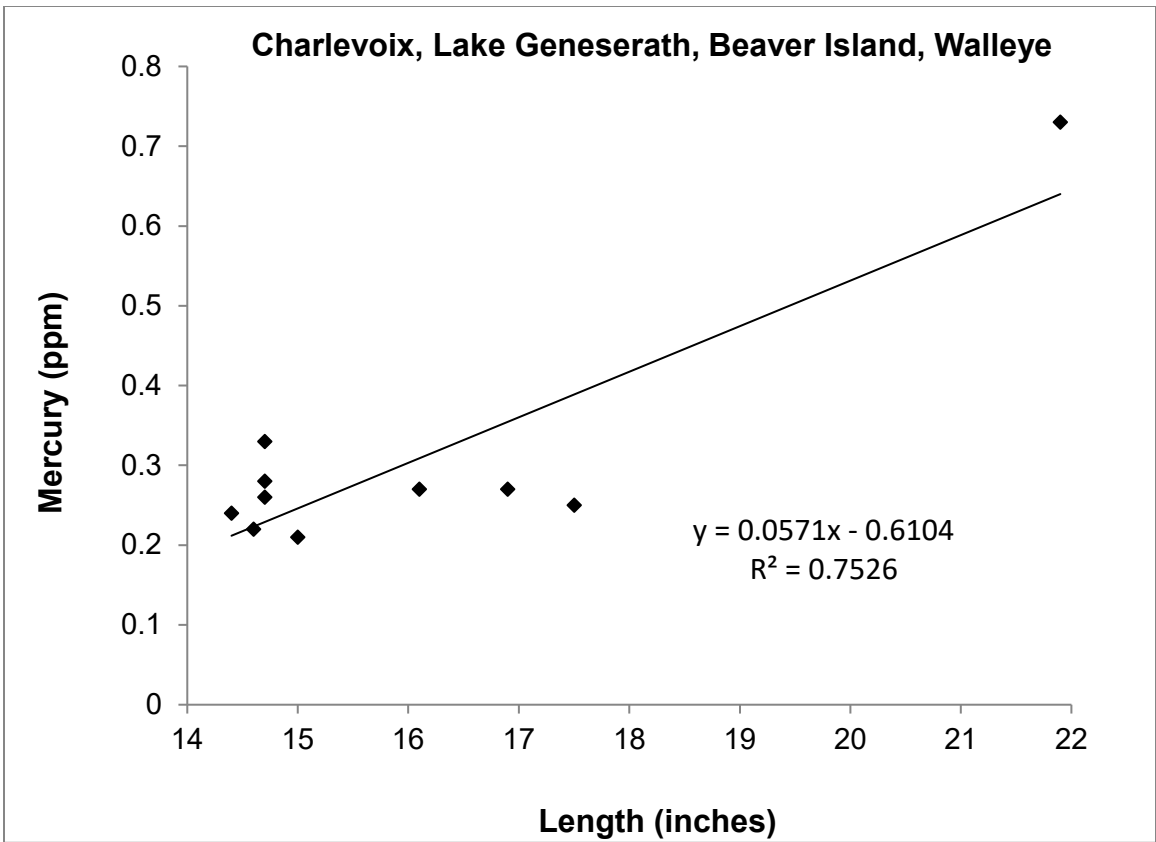
**Organics Analysis:**

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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2</b>

**Existing Advisory:** Lake Geneserath walleye are covered by the statewide advisory: No one should eat more than 2 meals of per month of walleye smaller than 20 inches or more than 1 meal per month of those fish larger than 20 inches.

**Recommendation:** No one should eat more than 2 meals of per month of walleye smaller than 20 inches or more than 1 meal per month of those fish larger than 20 inches.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
14	0.19	4
16	0.30	2
18	0.42	2
20	0.53	2
22	0.65	1
24	0.76	1
26	0.87	1
<i>Shaded area denotes extrapolated estimates</i>		



**Northern Pike**

**Six Mile Lake**

**Charlevoix 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	17.3	na*	17.3	24.1
Datasets available: 2003						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.37	0.21	0.52	0.46	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.412	0.358				

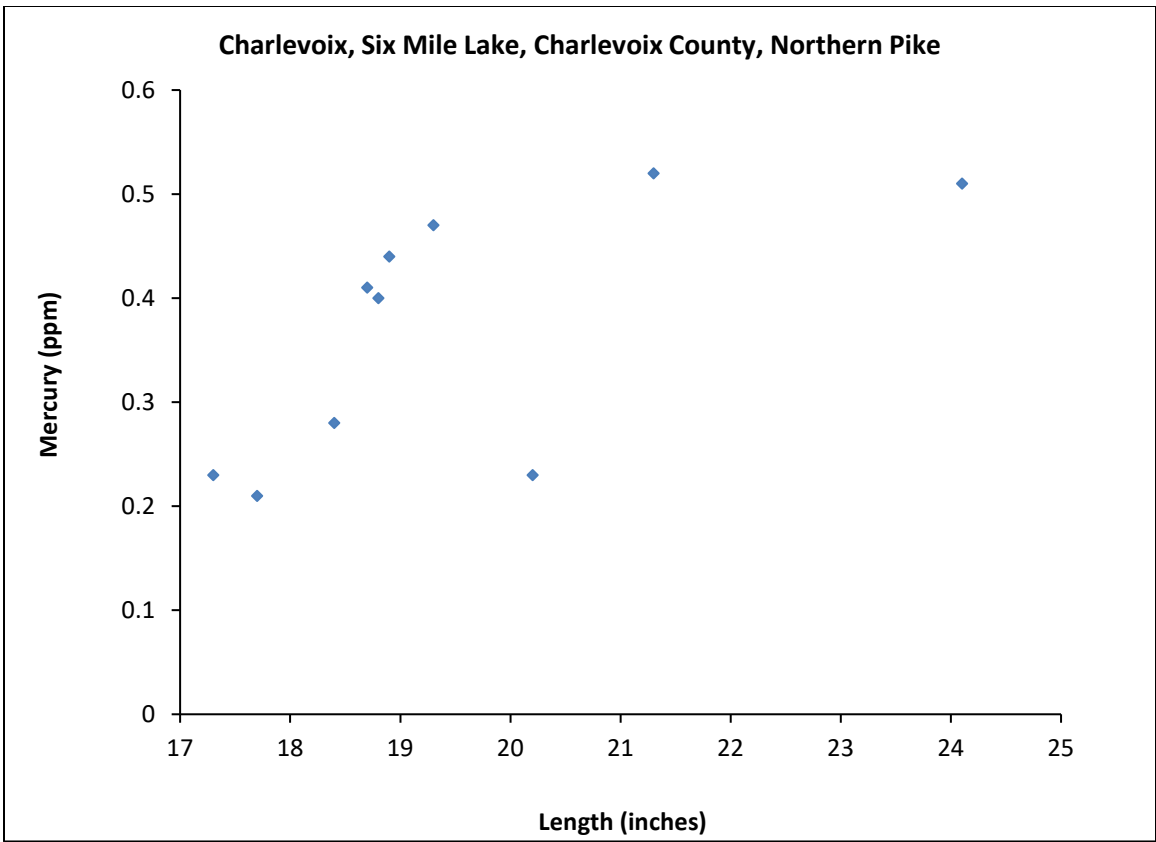
**Organics Analysis:**

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 (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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2</b>

\* - there is no minimum size limit on Six Mile Lake northern pike

**Existing Advisory:** Six Mile Lake northern pike are covered under the statewide mercury consumption advisory.

**Recommendation:** No one should eat more than 2 meals per month of Six Mile 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 was applied as the size of the fish was limited.



**Largemouth  
& Smallmouth Bass  
Hg Analysis:**

**Thumb Lake**

**Charlevoix County**

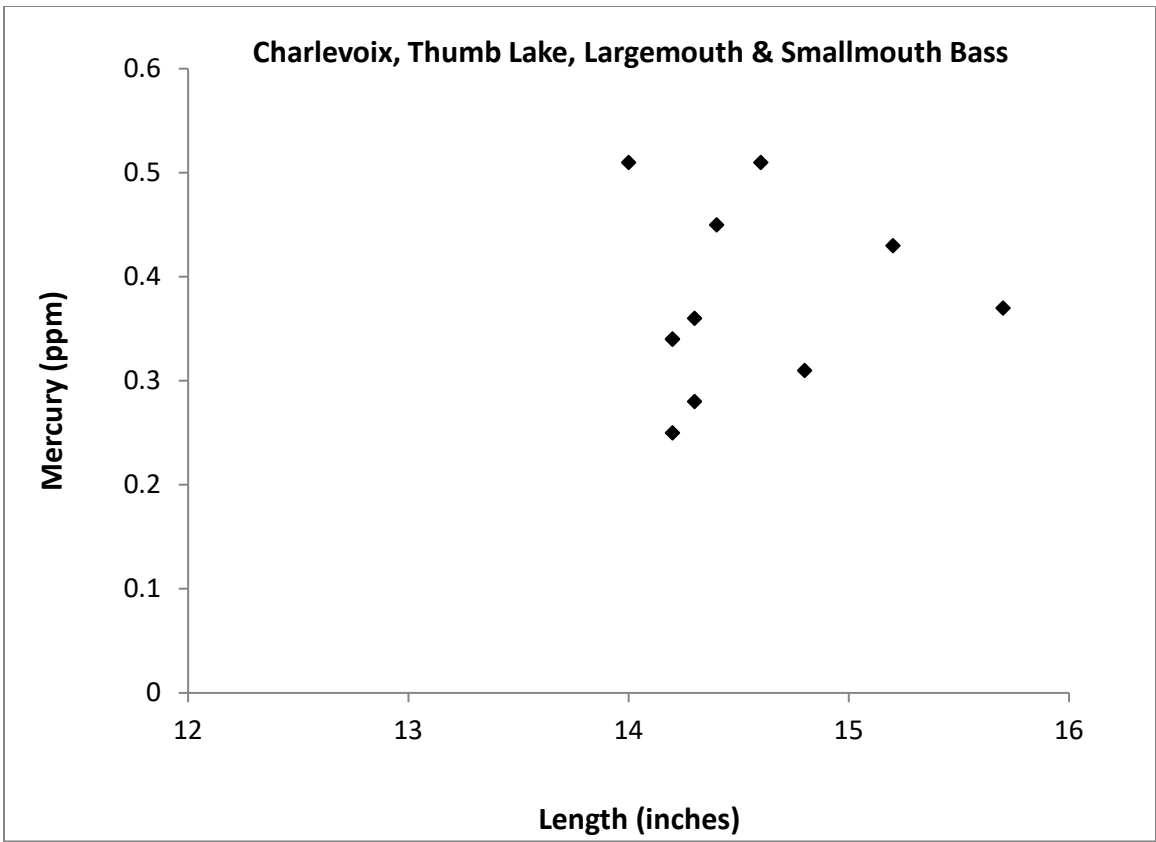
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2008	2008	12	13	14	14.2	15.7
Datasets available: 2008						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	11	0.38	0.25	0.51	0.44	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.177	0.269				

**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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2</b>

**Existing Advisory:** Thumb Lake largemouth and smallmouth bass are covered under the statewide mercury consumption advisory.

**Recommendation:** No one should eat more than 2 meals per month of Thumb 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 was applied as the length range was limited.





**Brown Bullhead  
Yellow Bullhead**

**Walloon Lake**

**Charlevoix County**

**Hg Analysis:**

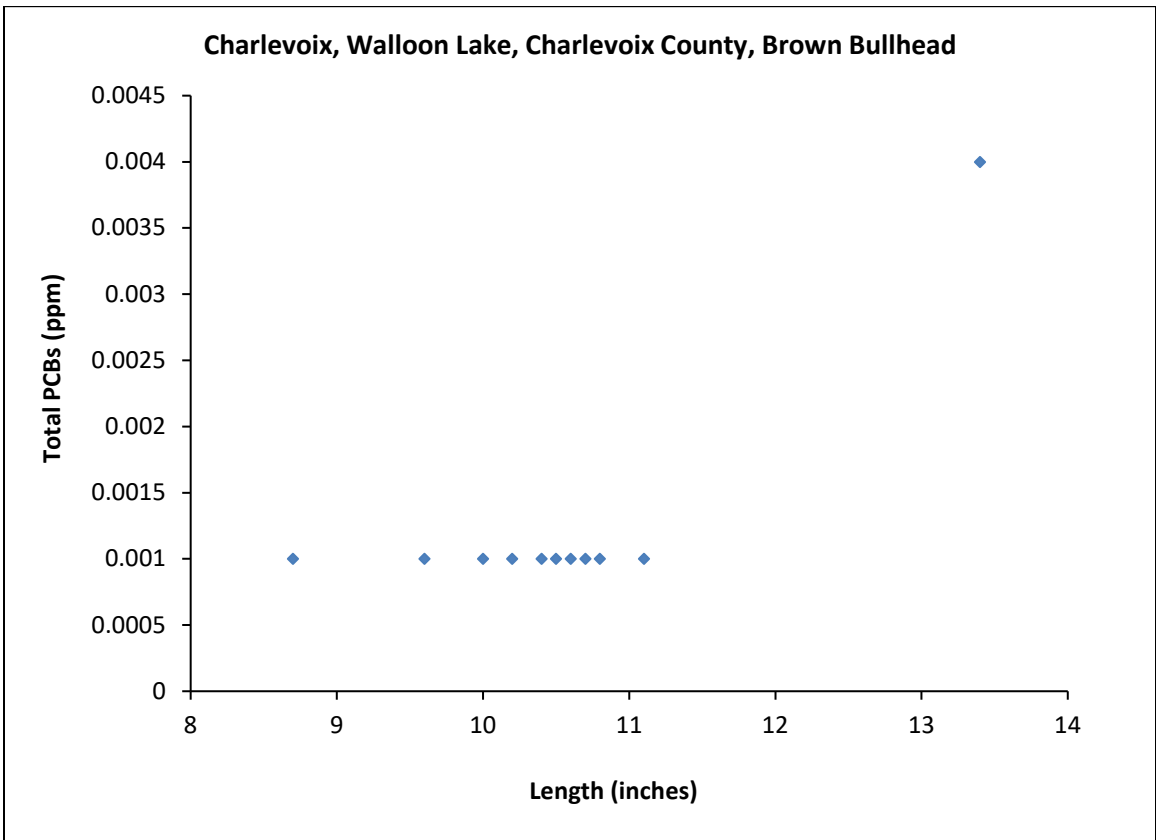
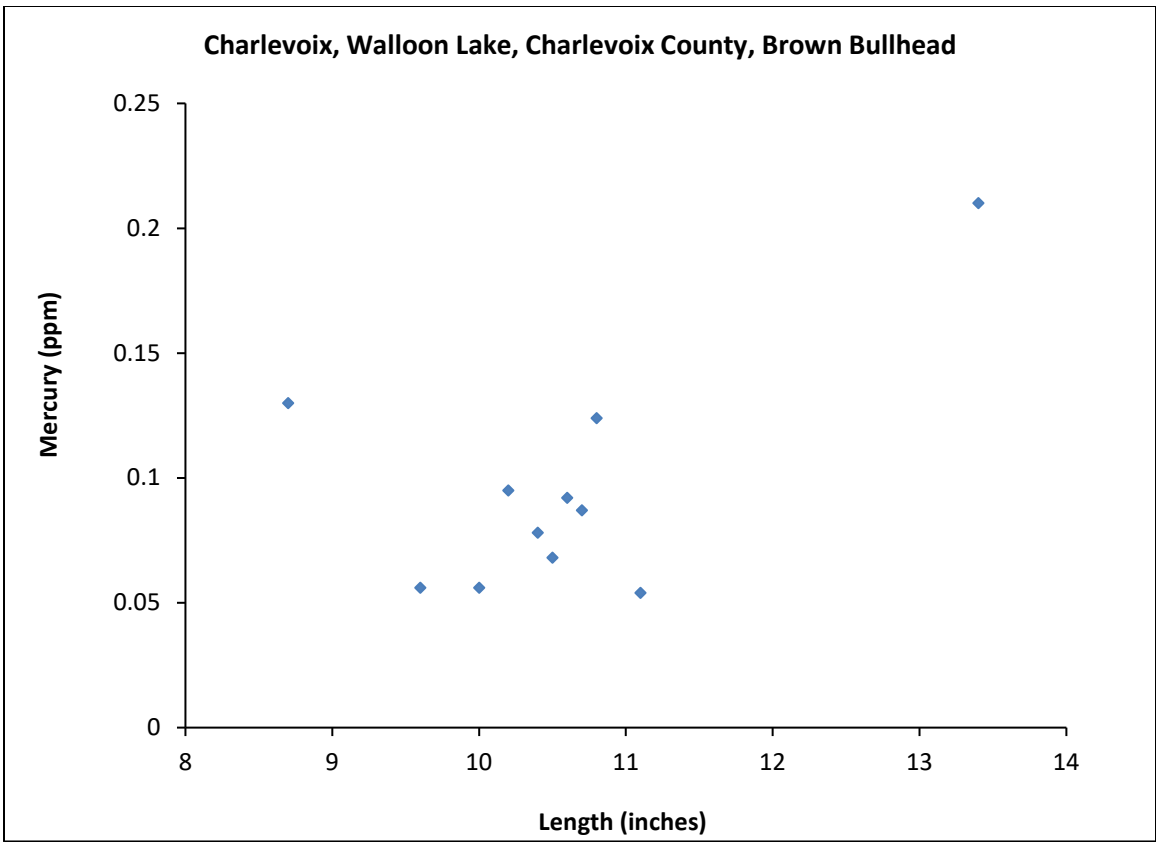
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2000	2006	11	8.7	na	8.7	13.4
Datasets available: 2000, 2006						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	11	0.10	0.06	0.21	0.13	8
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.340	0.217				

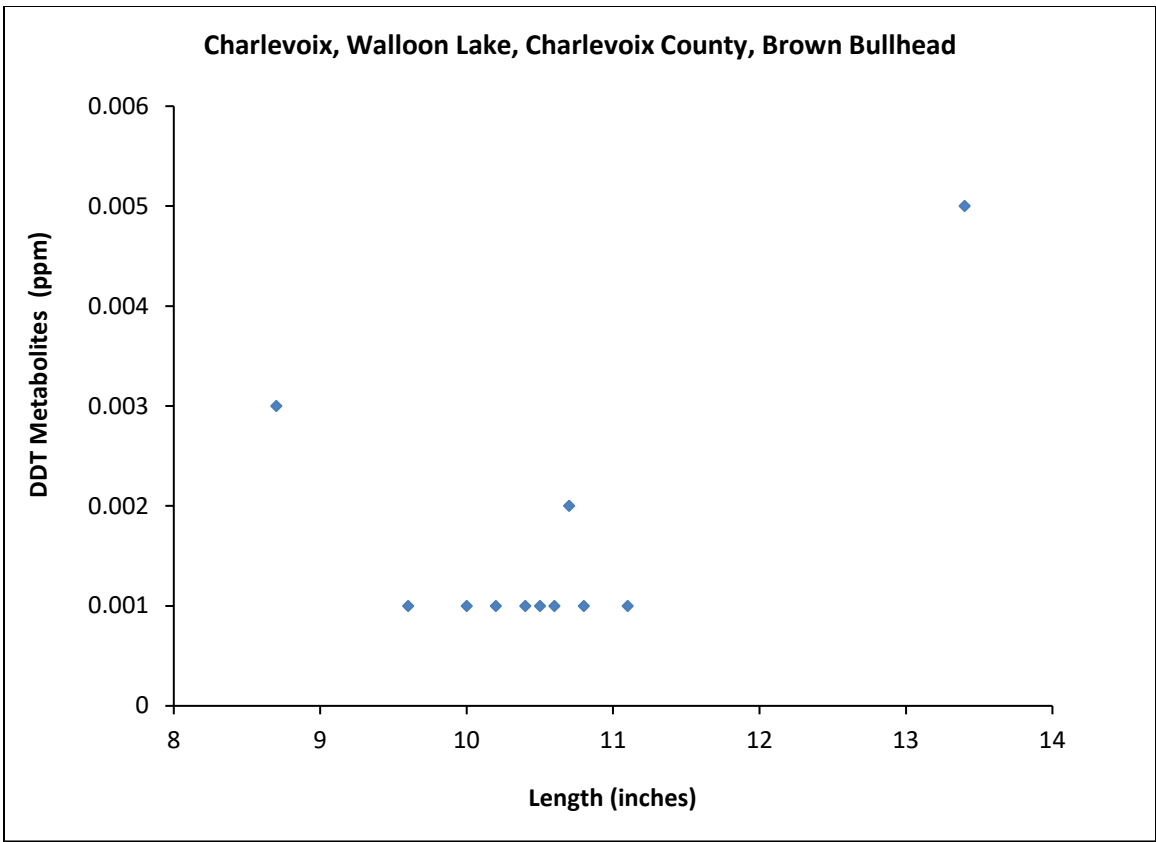
**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2000	2006	11	8.7	na	8.7	13.4
Datasets available: 2000, 2006						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	11	0.001	0.001	0.004	0.002	16
DDT	11	0.002	0.001	0.005	0.003	16
Chlordane	11	ND	--	--	--	--
Toxaphene	11	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.675*	0.675*	*Regression driven by single point			
DDT	0.283	0.167				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>8</b>

**Existing Advisory:** There are no current consumption advisories for Walloon Lake bullhead.

**Recommendation:** No one should eat more than 8 meals per month of Walloon Lake bullhead due to mercury.





**Northern Pike**

**Walloon Lake**

**Charlevoix County**

**Hg Analysis:**

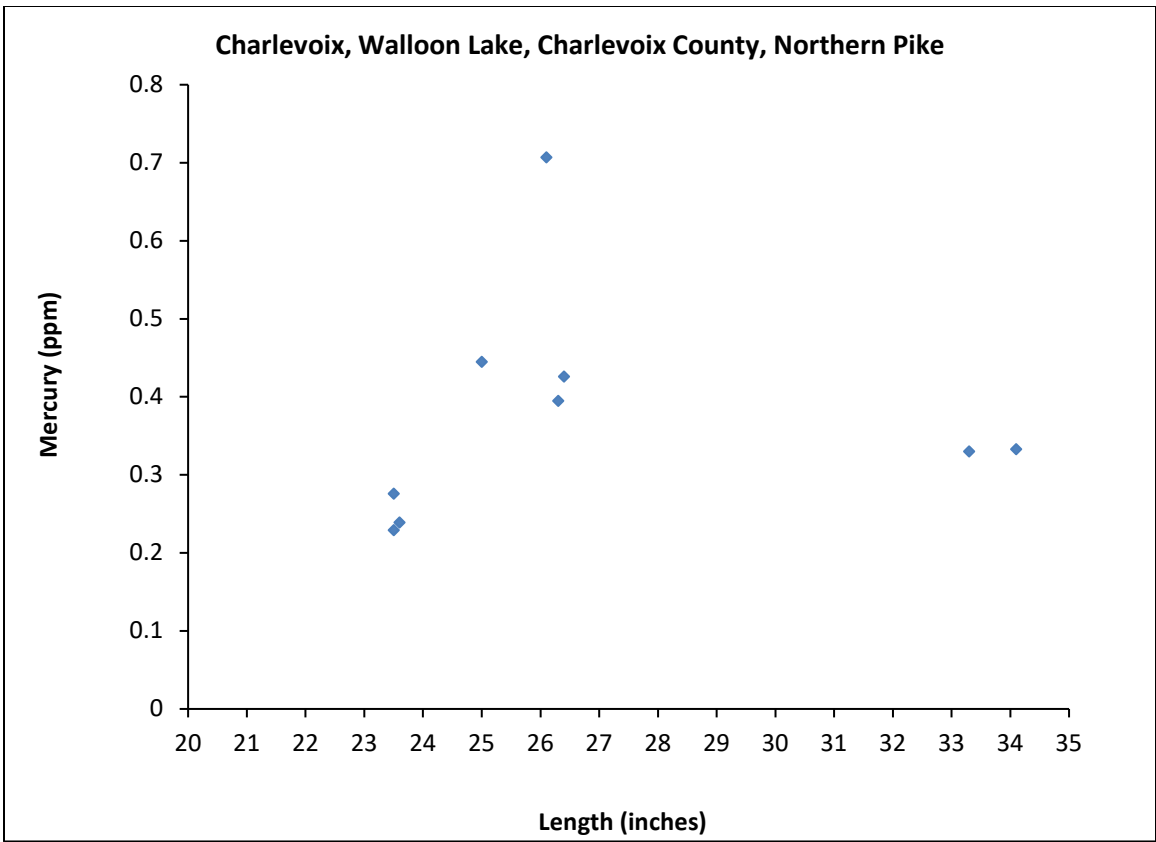
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2006	2006	10	20.7	24	23.5	34.1
Datasets available: 2006						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	9	0.38	0.23	0.71	0.49	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.058	0.135				

**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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2</b>

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

**Recommendation:** No one should eat more than 2 meals per month of Walloon Lake northern 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 was applied as the sample size about 30 inches was limited.



**Rainbow Trout**

**Walloon Lake**

**Charlevoix County**

**Hg Analysis:**

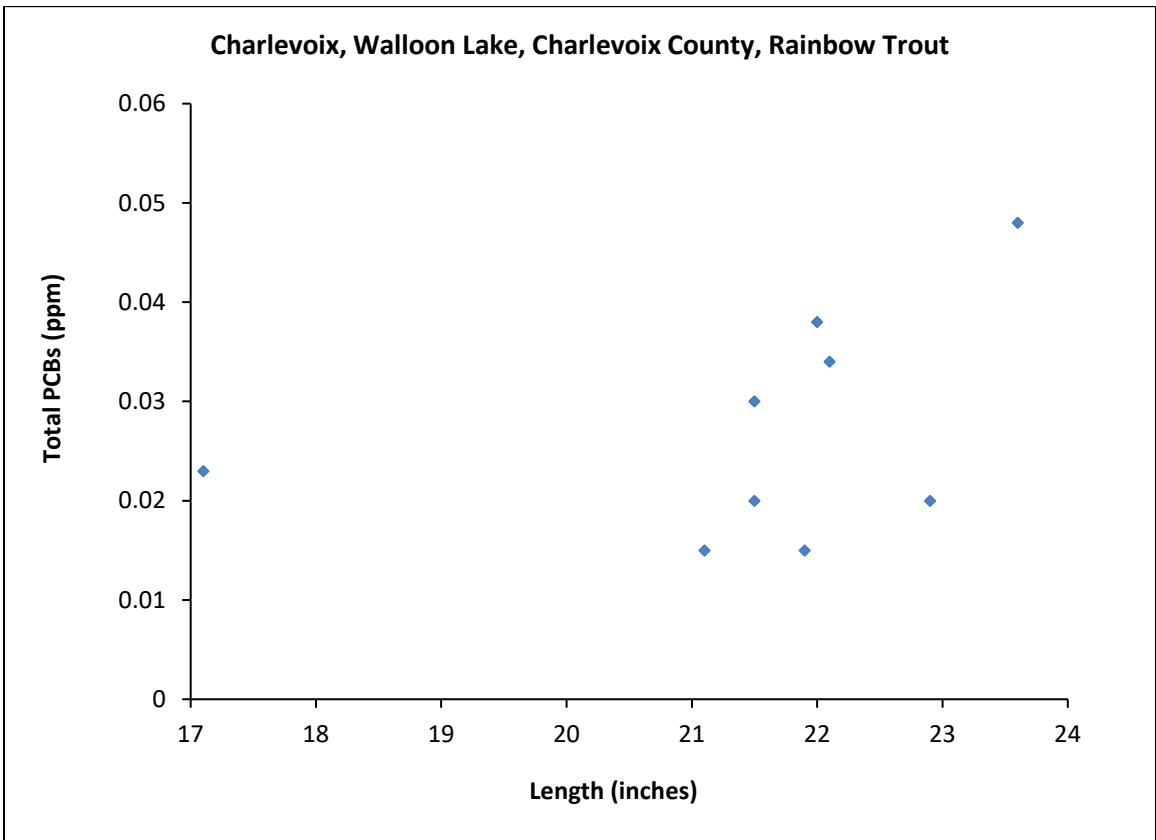
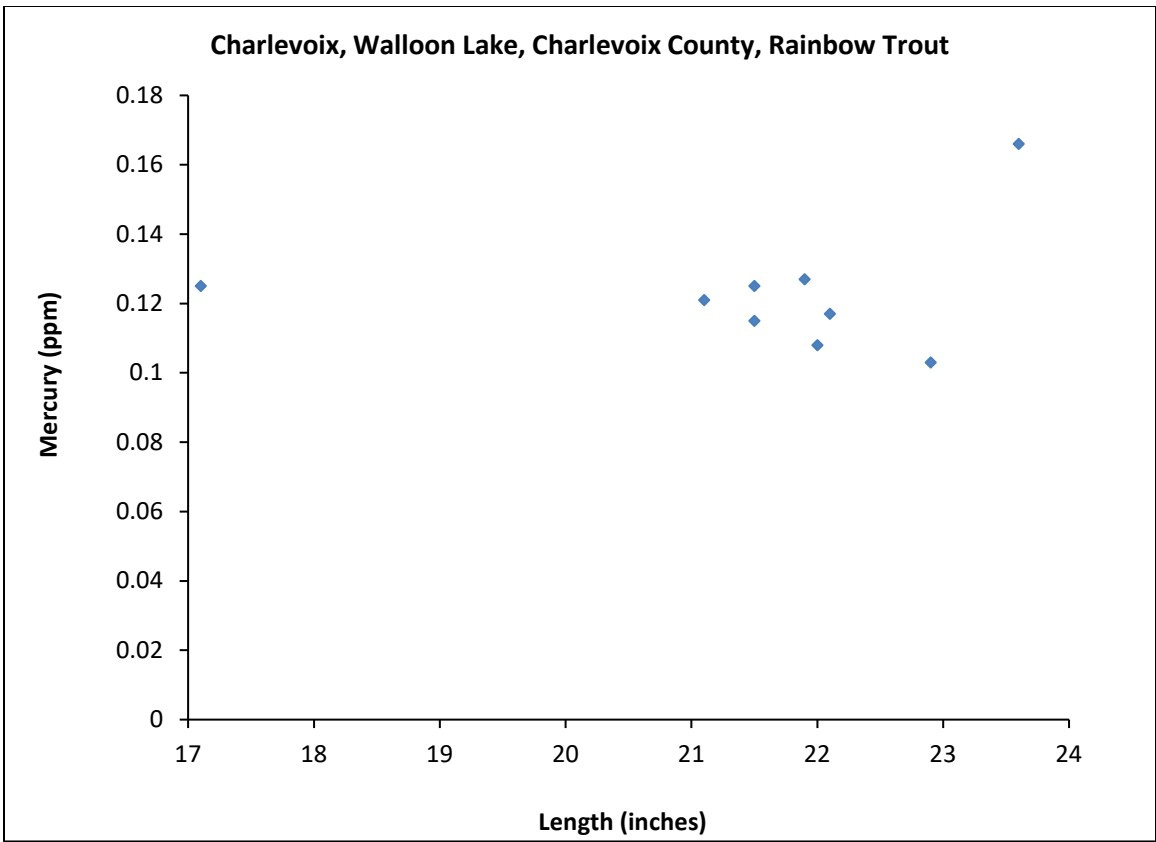
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2006	2006	9	17.1	12	17.1	23.6
Datasets available: 2006						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	9	0.12	0.10	0.17	0.14	4
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.029	0.014				

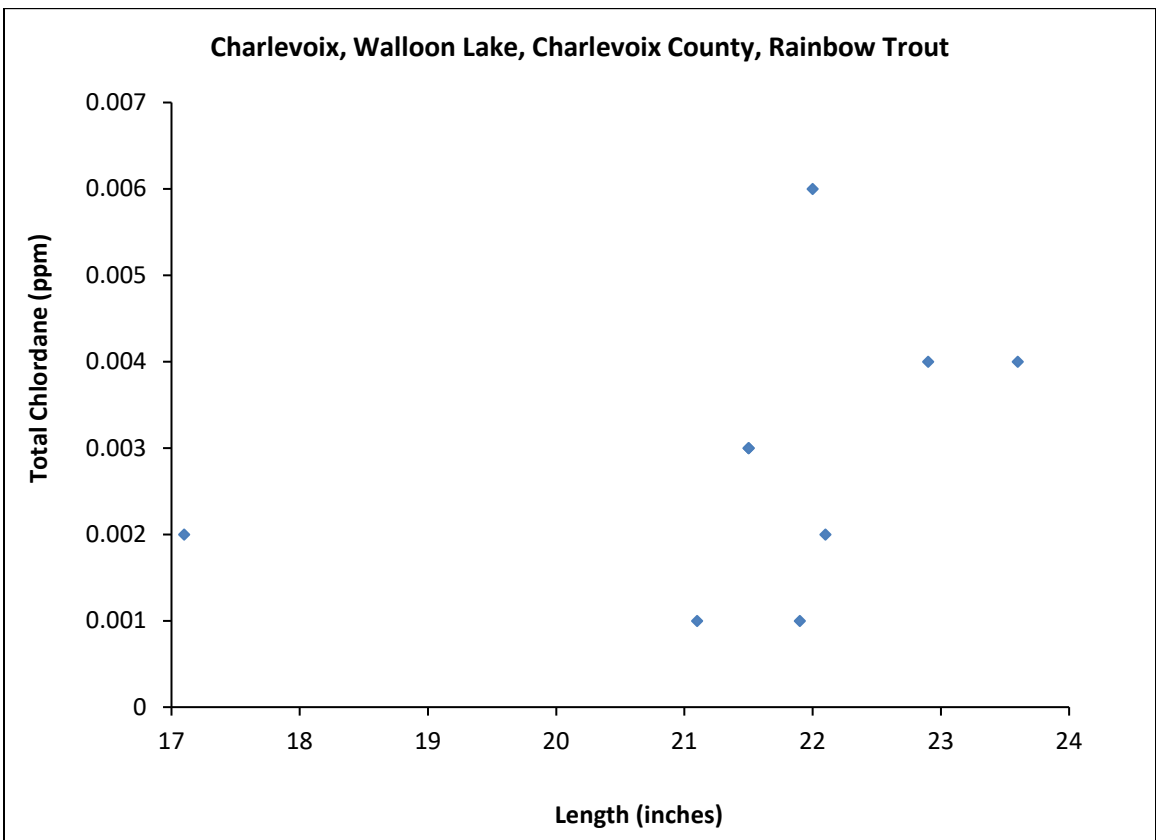
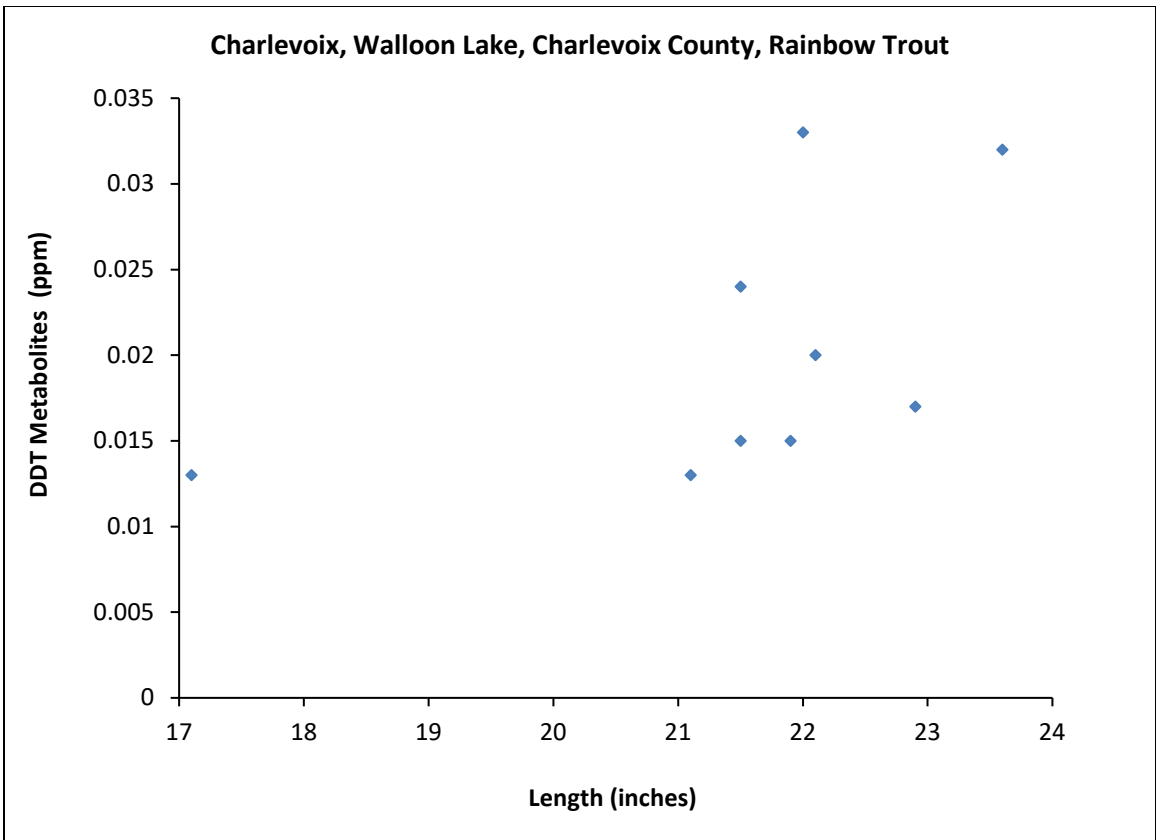
**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2006	2006	9	17.1	12	17.1	23.6
Datasets available: 2006						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	9	0.03	0.02	0.05	0.04	4
DDT	9	0.02	0.01	0.03	0.03	16
Chlordane	9	0.003	0.001	0.006	0.004	--
Toxaphene	9	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.139	0.091				
DDT	0.269	0.317				
Chlordane	0.140	0.106				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>4</b>

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

**Recommendation:** No one should eat more than 4 meals per month of Walloon Lake rainbow trout due to mercury or PCBs.







**Rock Bass**

**Walloon Lake**

**Charlevoix County**

**Hg Analysis:**

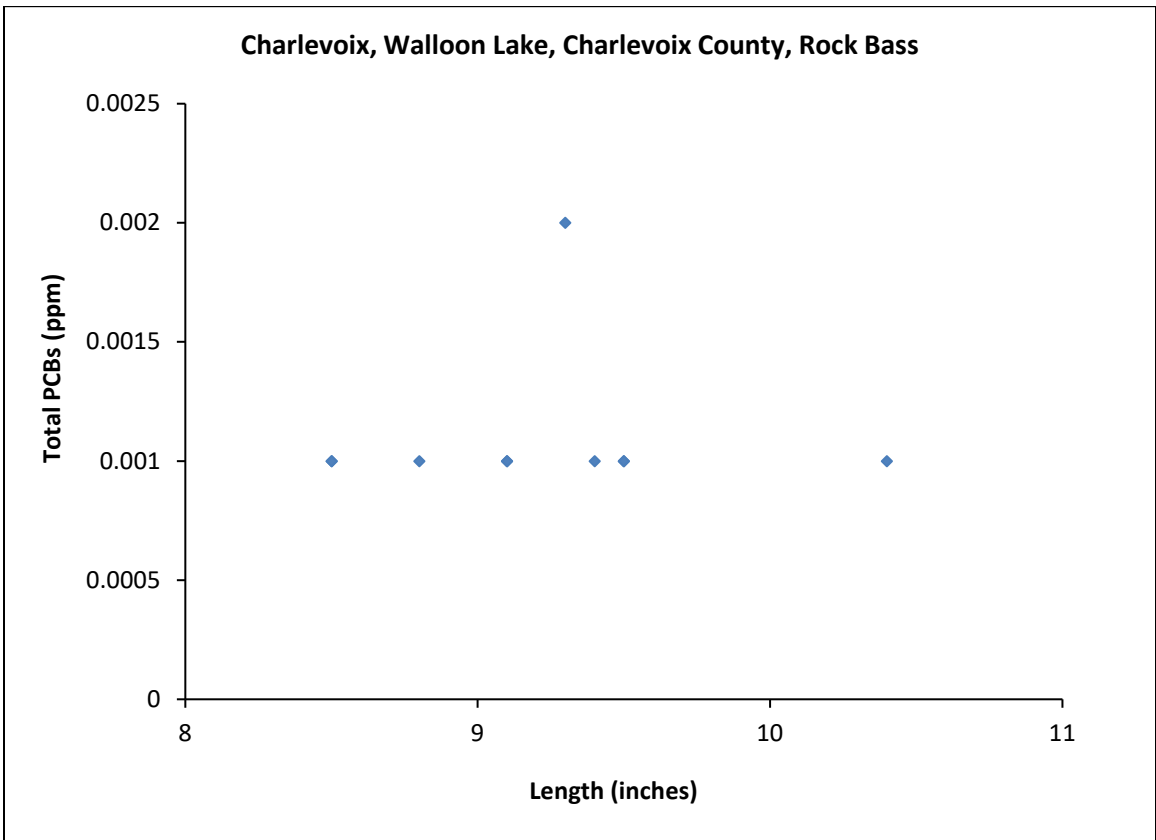
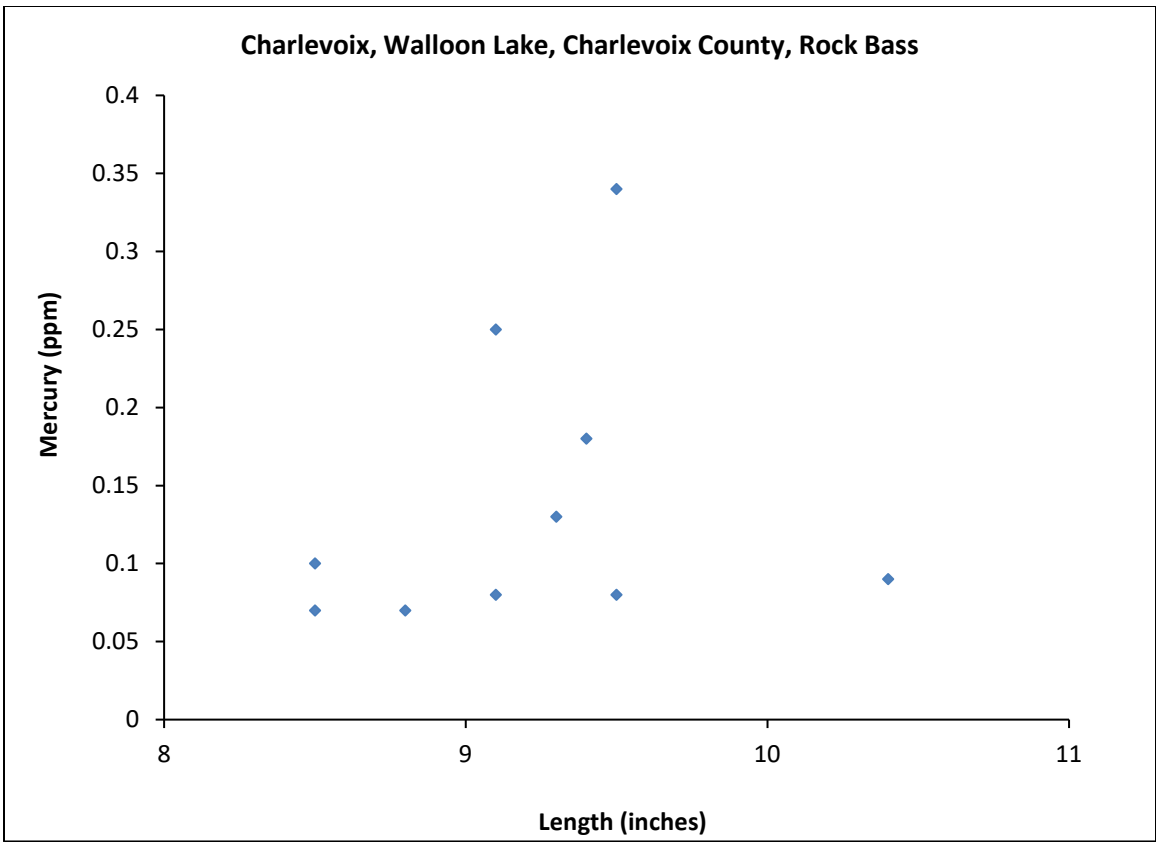
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2000	2000	10	8.5	na	8.5	10.4
Datasets available: 2000						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.14	0.07	0.34	0.2	4
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.037	0.049				

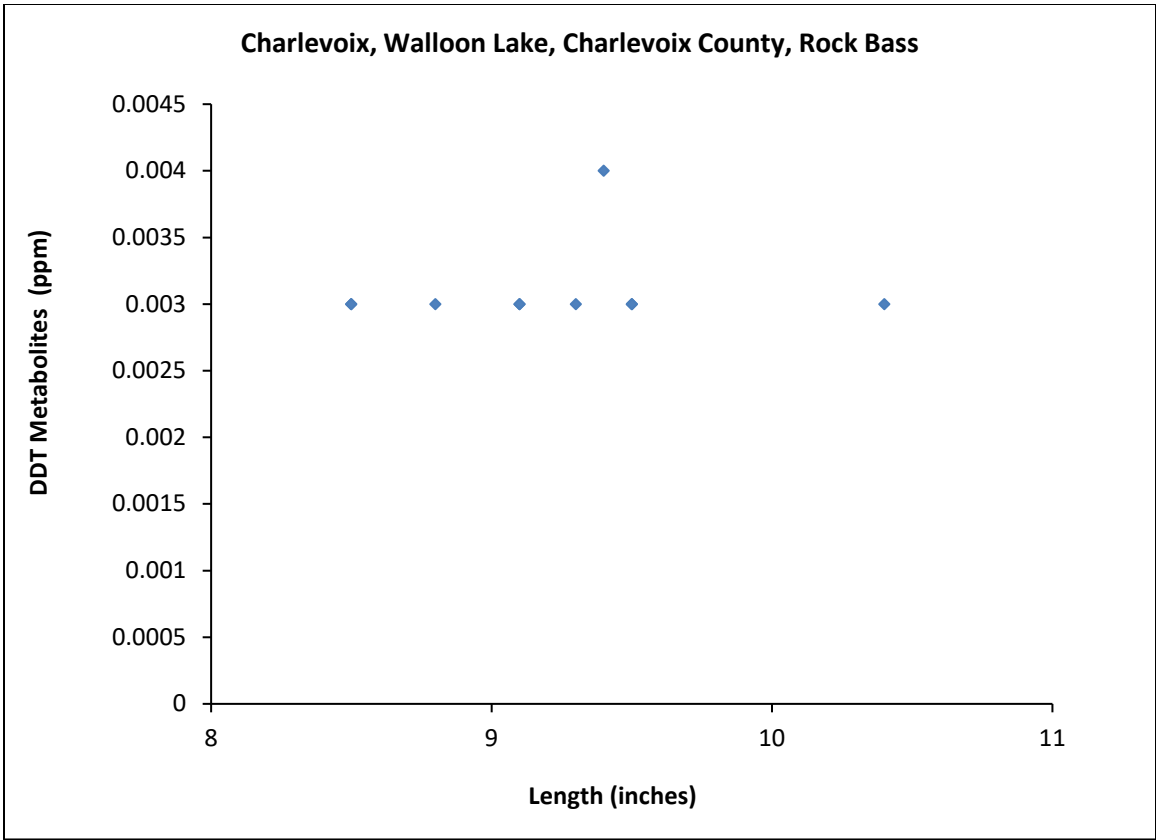
**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2000	2000	10	8.5	na	8.5	10.4
Datasets available: 2000						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.001	0.001	0.002	0.001	16
DDT	10	0.003	0.003	0.004	0.003	16
Chlordane	10	ND	--	--	--	--
Toxaphene	10	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.003	0.003				
DDT	0.014	0.014				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>4</b>

**Existing Advisory:** Walloon Lake rock bass are covered by the statewide mercury advisory.

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





**Smallmouth Bass**

**Walloon Lake**

**Charlevoix 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	2006	19	7.9	14	14	16.1
Datasets available: 1987, 2006						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	14	0.33	0.20	0.49	0.38	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.508	0.629				

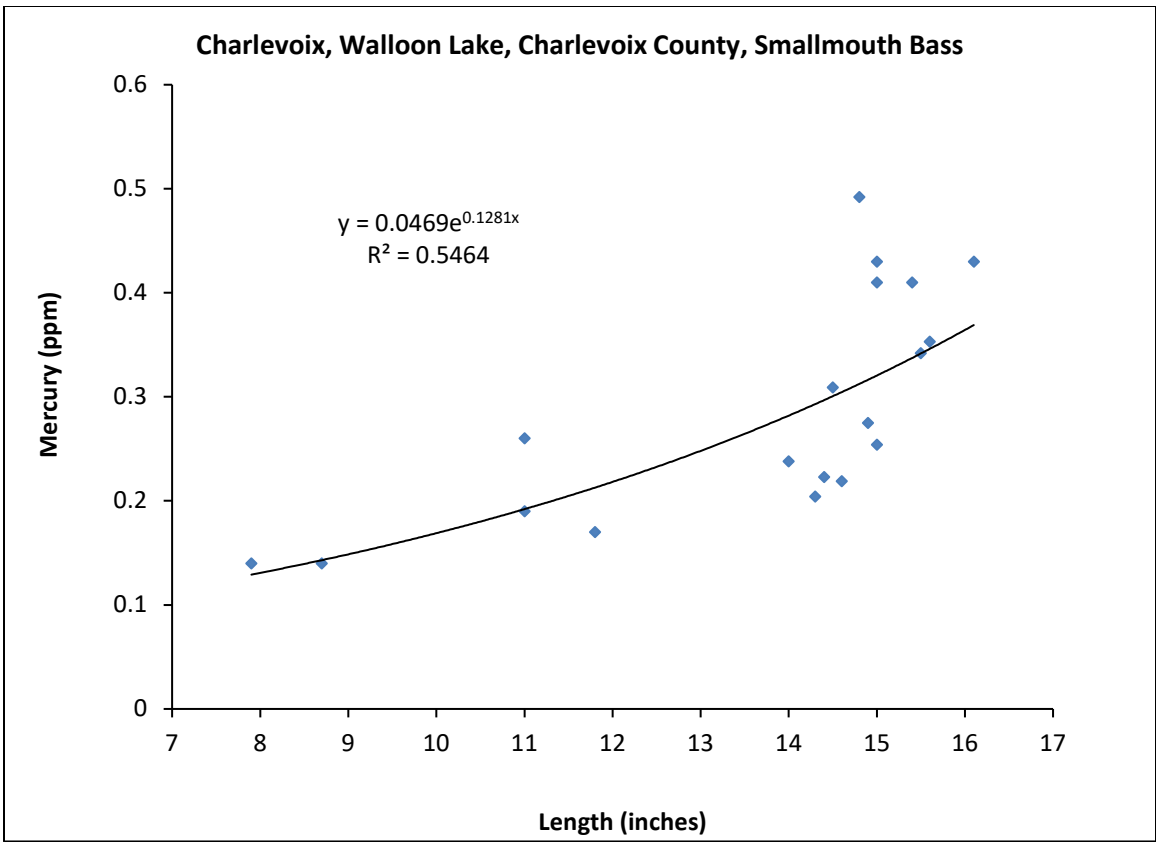
**Organics Analysis:**

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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2</b>

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

**Recommendation:** No one should eat more than 2 meals per month of Walloon 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 length range was limited.

Length (Inches)	Regression Equation Estimate (ppm)	Meal Category
14	0.282	2
15	0.320	2
16	0.364	2
17	0.414	2
18	0.471	2
19	0.535	1
20	0.608	1
21	0.691	1
22	0.785	1
<i>Shaded area denotes extrapolated estimates</i>		



**Walleye**

**Walloon Lake**

**Charlevoix 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	15	15	25.6	
Datasets available: 2006						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.30	0.13	0.85	0.45	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.836	0.902				

**Organics Analysis:**

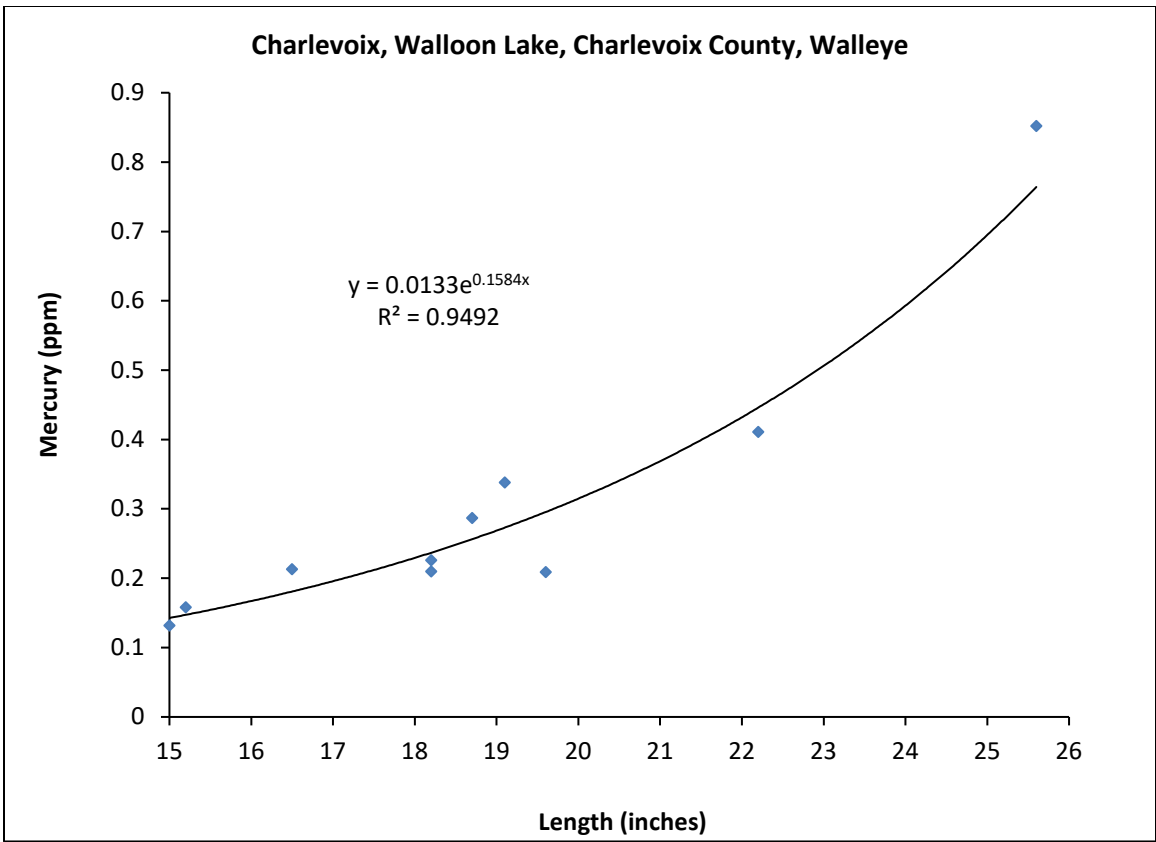
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	--	--	--	--	--
Datasets available: --						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT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

**Existing Advisory:** Women and children should not eat more than 1 meal per month of Walloon Lake walleye larger than 22 inches due to mercury.

**Recommendation:** No one should eat more than 2 meals per month of Walloon Lake walleye smaller than 22 inches or more than 1 meal per month of those fish larger than 22 inches due to mercury.

Length (Inches)	Regression Equation Estimate (ppm)	Meal Category
14	0.12	8
16	0.17	4
18	0.23	4
20	0.32	2
22	0.43	2
24	0.60	1
26	0.82	1
28	1.12	0.5
30	1.54	0.5

*Shaded area denotes extrapolated estimates*



**White Sucker**

**Walloon Lake**

**Charlevoix 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
2000	2006	20	15	na	15	18.9
Datasets available: 2006						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	20	0.12	0.04	0.24	0.14	4
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.035	0.102				

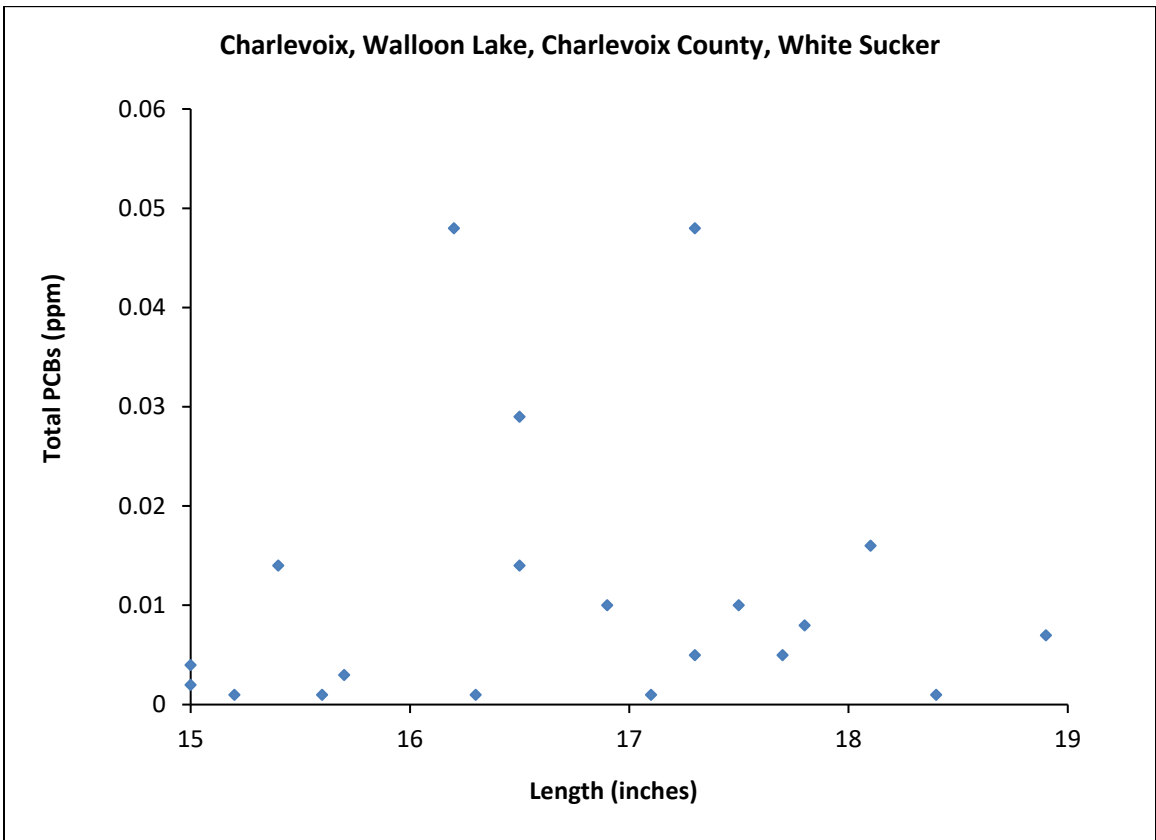
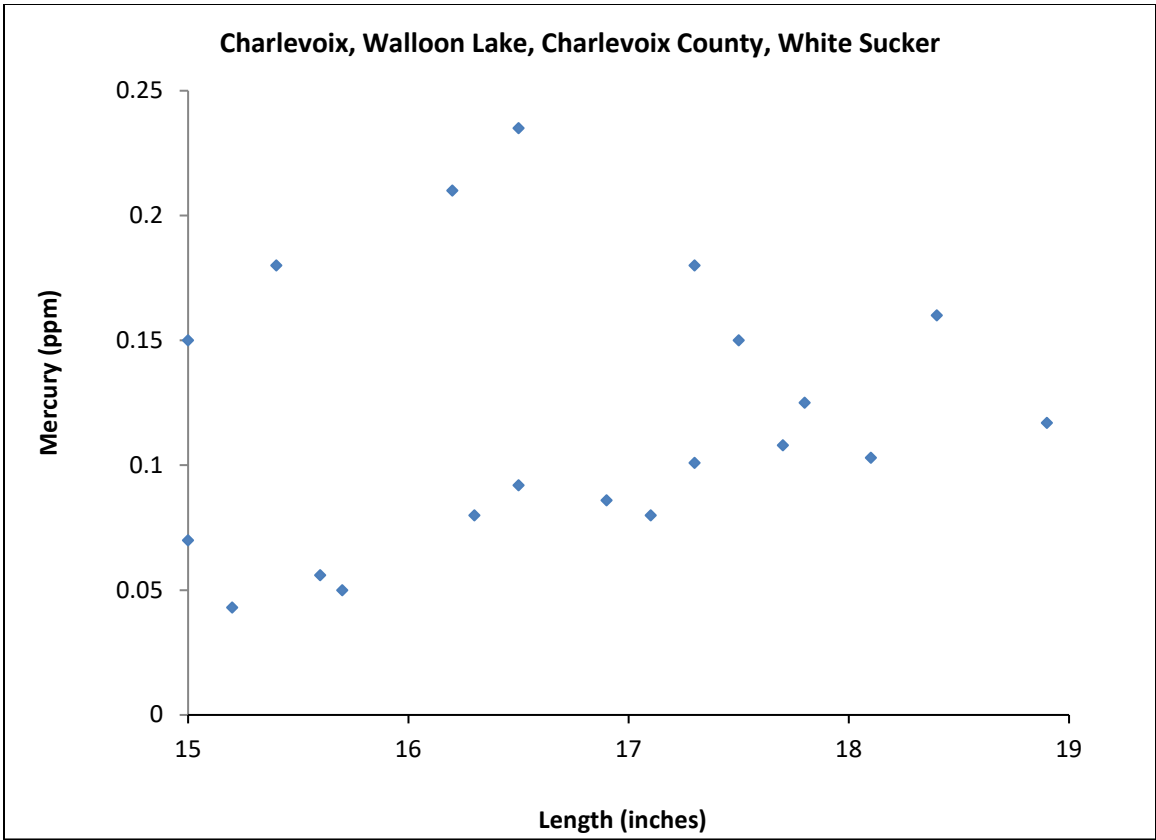
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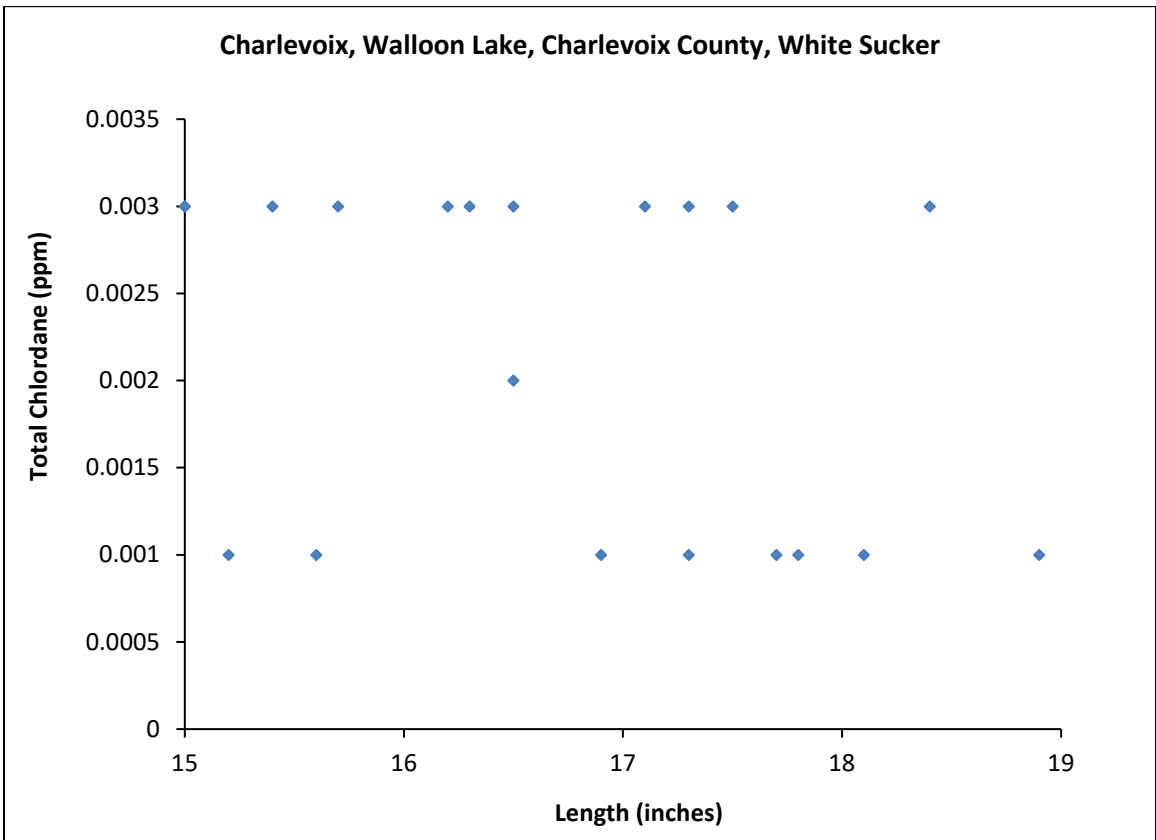
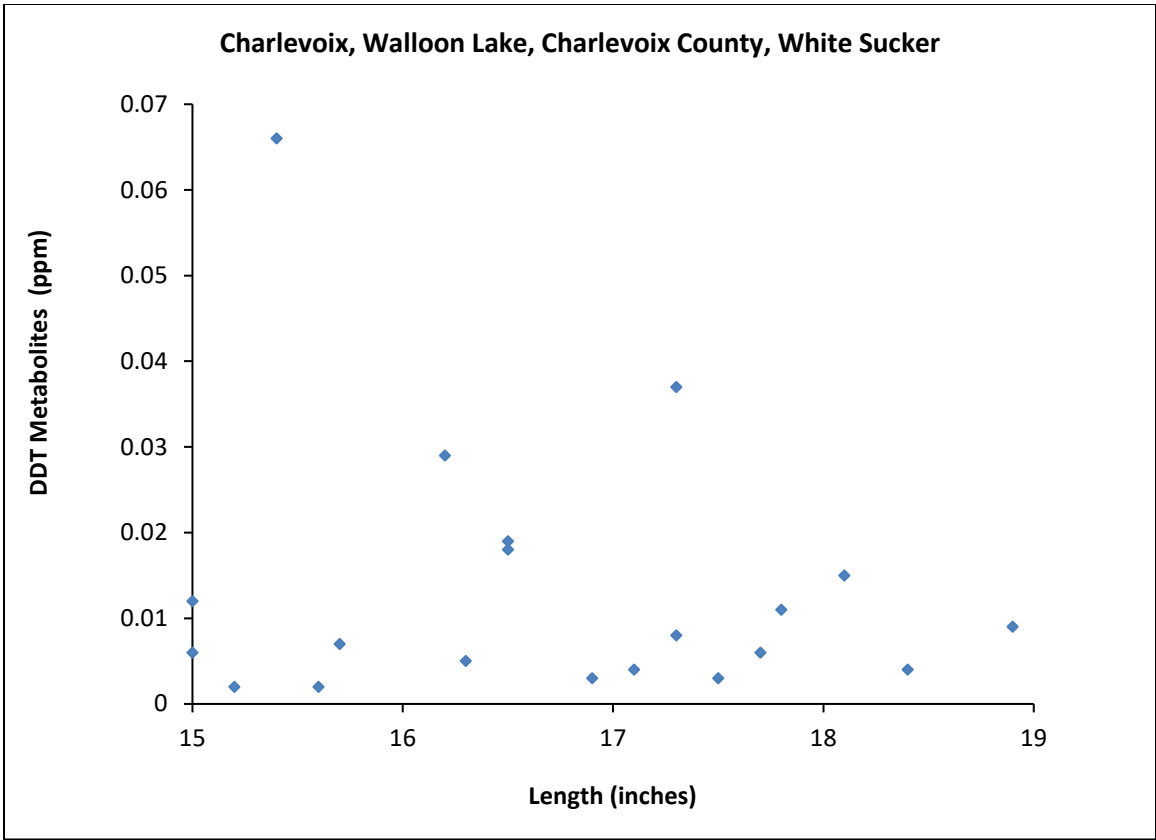
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2000	2006	20	15	na	15	18.9
Datasets available: 2006						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	20	0.01	0.001	0.05	0.02	12
DDT	20	0.01	0.002	0.07	0.02	16
Chlordane	20	0.002	0.001	0.003	0.003	--
Toxaphene	20	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.006	0.040				
DDT	0.031	0.000				
Chlordane	0.110	0.112				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>4</b>

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

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







**Hg Analysis:**

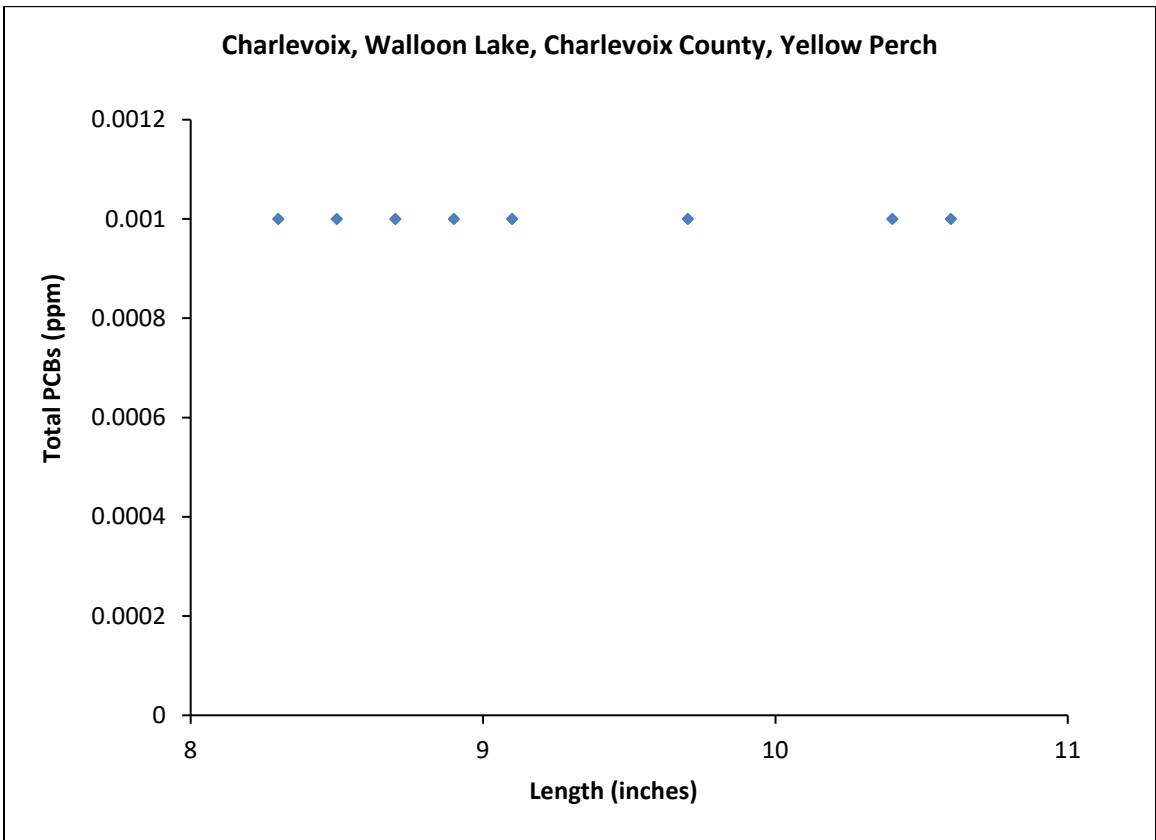
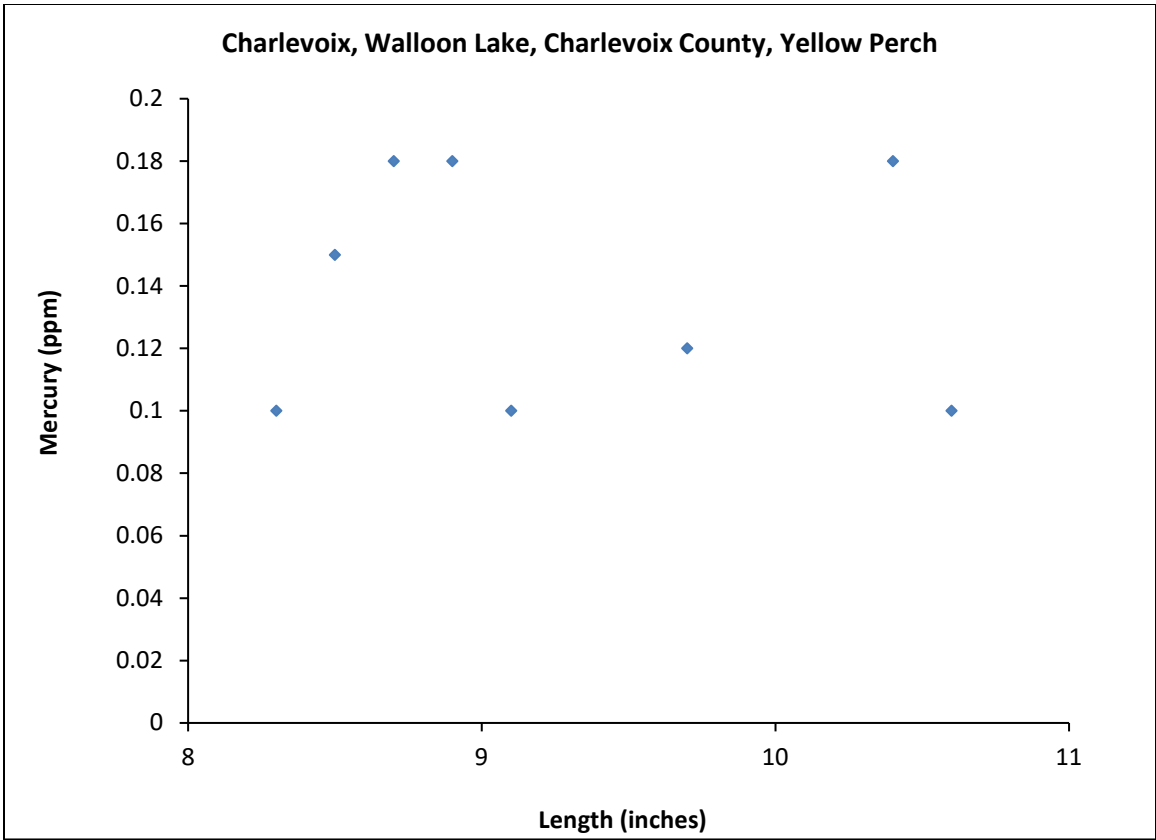
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2000	2000	8	8.3	na	8.3	10.6
Datasets available: 2000						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	8	0.14	0.10	0.18	0.17	4
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.005	0.006				

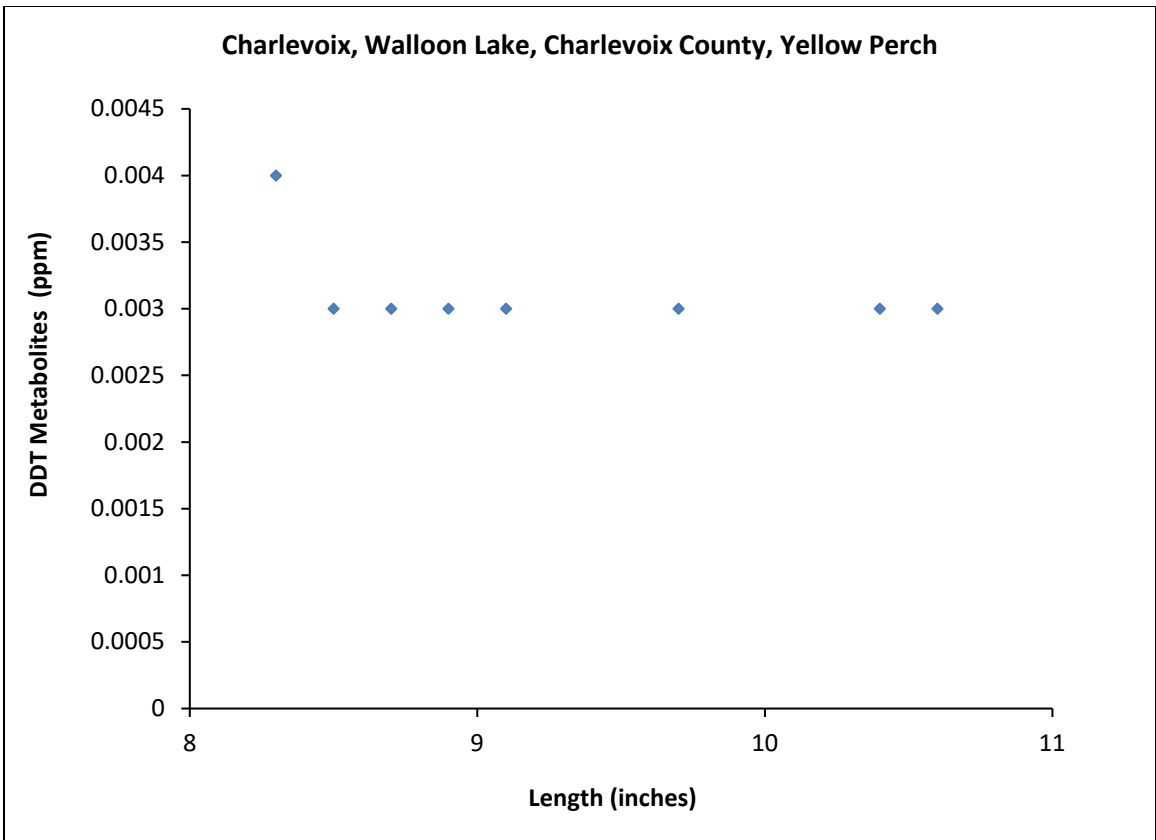
**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2000	2000	8	8.3	na	8.3	10.6
Datasets available: 2000						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	8	0.001	0.001	0.001	0.001	16
DDT	8	0.003	0.003	0.004	0.003	16
Chlordane	8	ND	--	--	--	--
Toxaphene	8	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	0.207	0.207				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>4</b>

**Existing Advisory:** Walloon Lake yellow perch are covered by the statewide mercury advisory.

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





# Clare County

**Largemouth Bass**

**Budd Lake**

**Clare 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	7	14	14	17.3	
Datasets available: 2007						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	7	0.12	0.09	0.17	0.14	4
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.656	0.569				

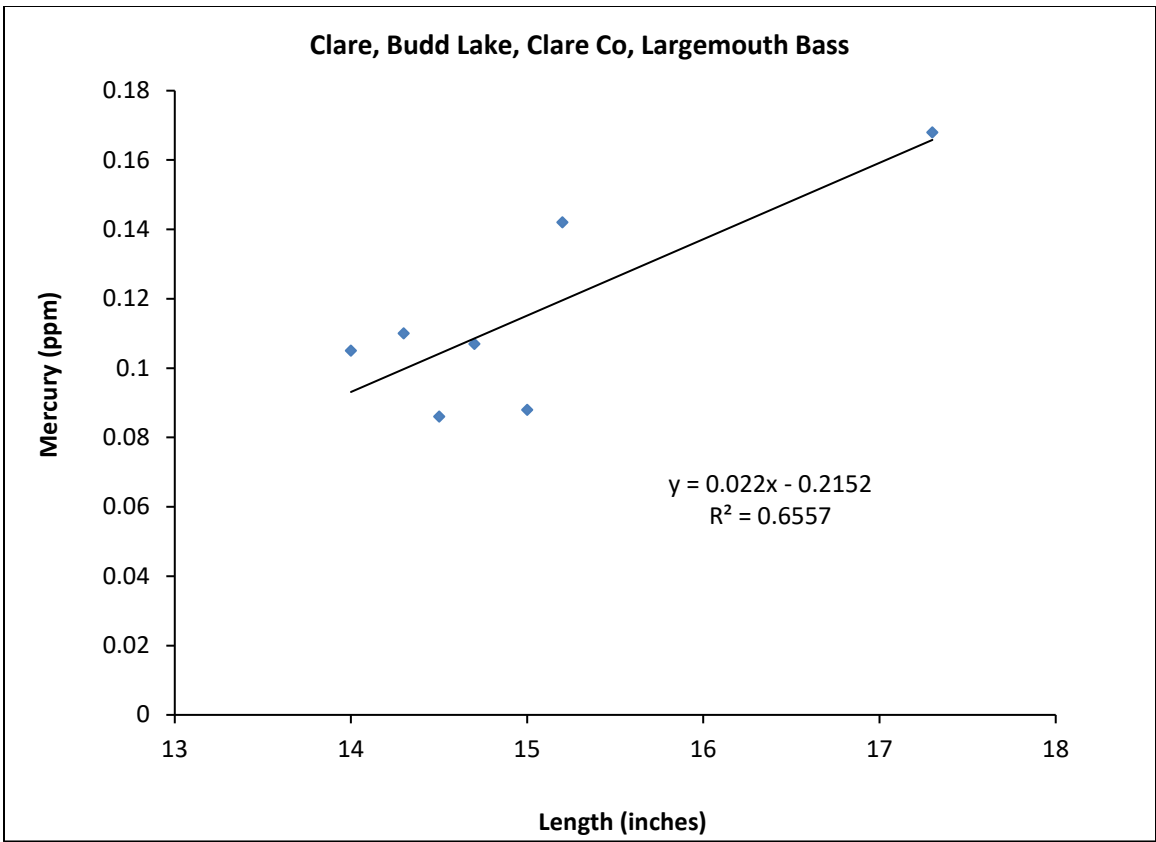
**Organics Analysis:**

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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>4</b>

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

**Recommendation:** No one should eat more than 4 meals per month of Budd 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. The statewide length break was applied as the size of the fish was limited.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
14	0.093	8
15	0.115	8
16	0.137	4
17	0.159	4
18	0.181	4
19	0.203	4
20	0.225	4
21	0.247	4
22	0.269	4
<i>Shaded area denotes extrapolated estimates</i>		





**Largemouth Bass**

**Cranberry Lake**

**Clare County**

**Hg Analysis:**

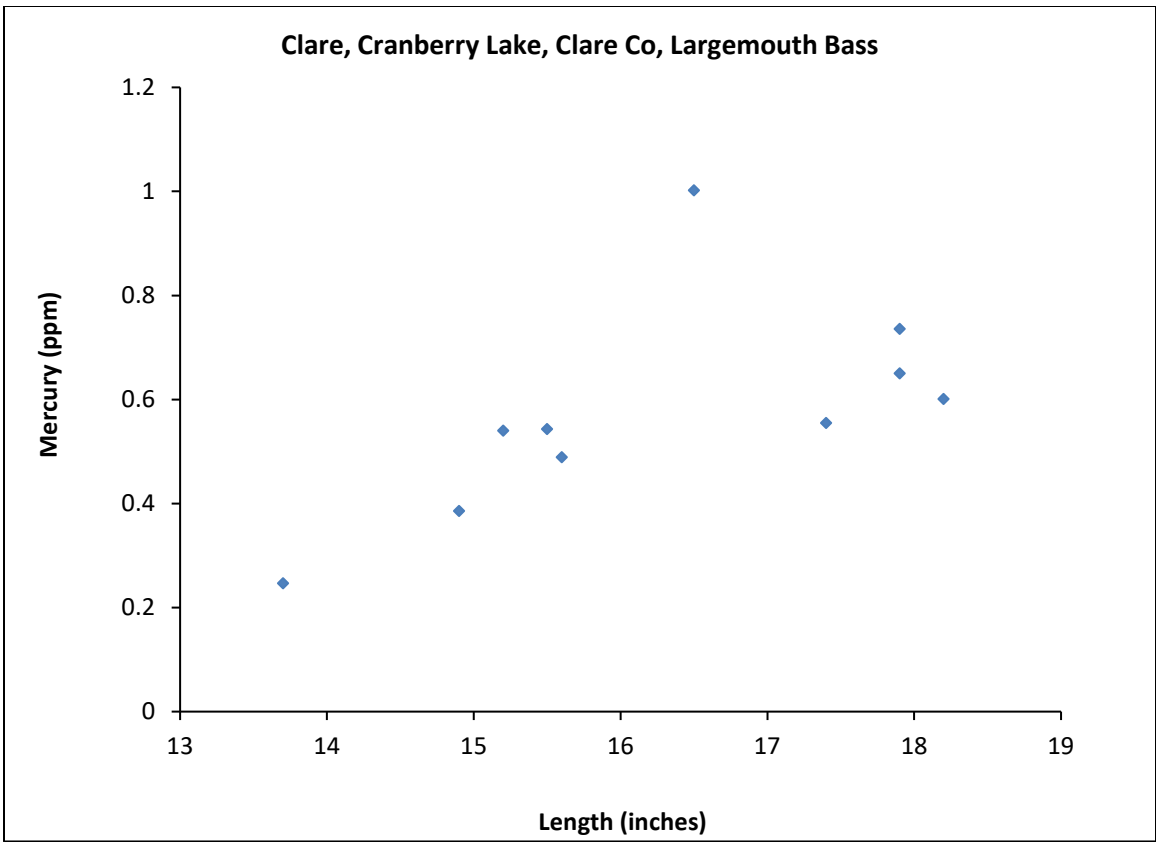
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2007	2007	10	13.7	14	13.7	18.2
Datasets available: 2007						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.58	0.25	1.00	0.72	1
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.388	0.522				

**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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>1</b>

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

**Recommendation:** No one should eat more than 1 meal per month of Cranberry 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.



**Largemouth Bass**

**Crooked Lake**

**Clare County**

**Hg Analysis:**

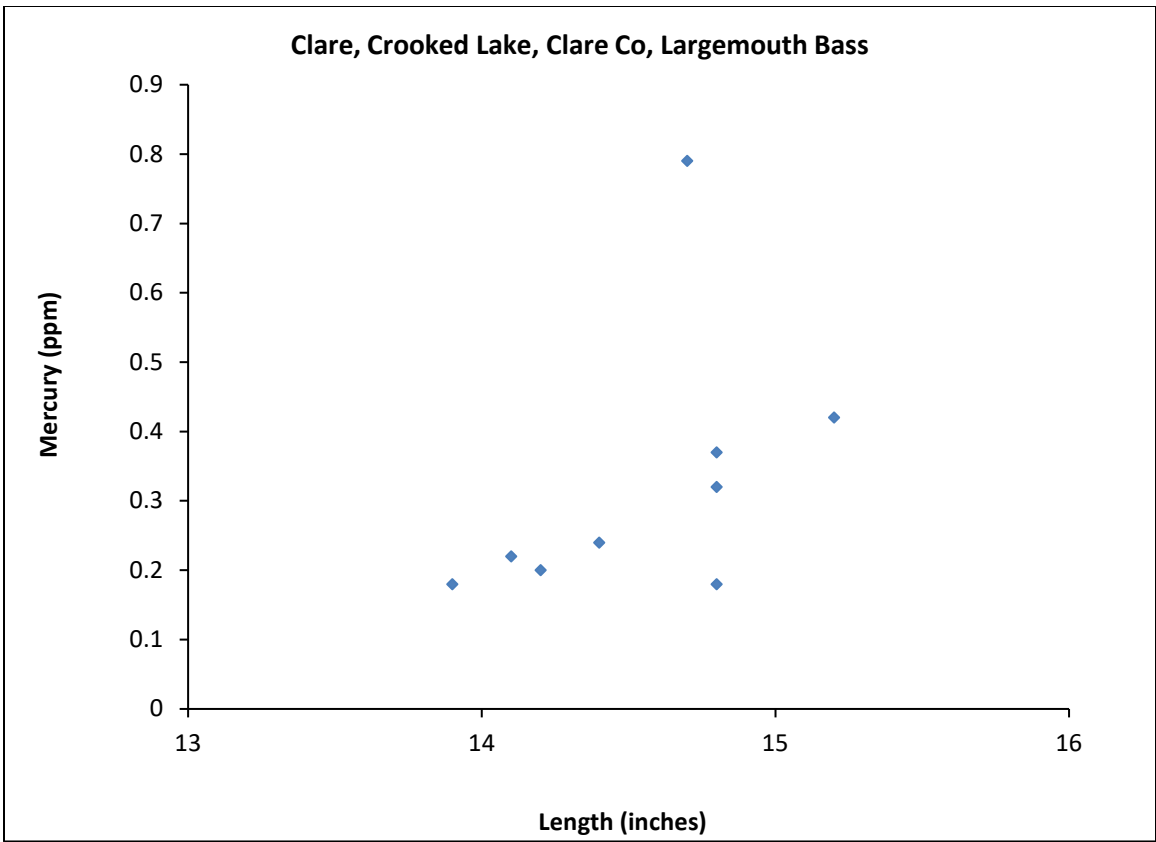
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2008	2008	9	13.9	14	13.9	15.2
Datasets available: 2008						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	9	0.32	0.18	0.42	0.47	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.216	0.336				

**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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2</b>

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

**Recommendation:** No one should eat more than 2 meals per month of Crooked 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.



**Largemouth Bass**

**Five Lakes**

**Clare County**

**Hg Analysis:**

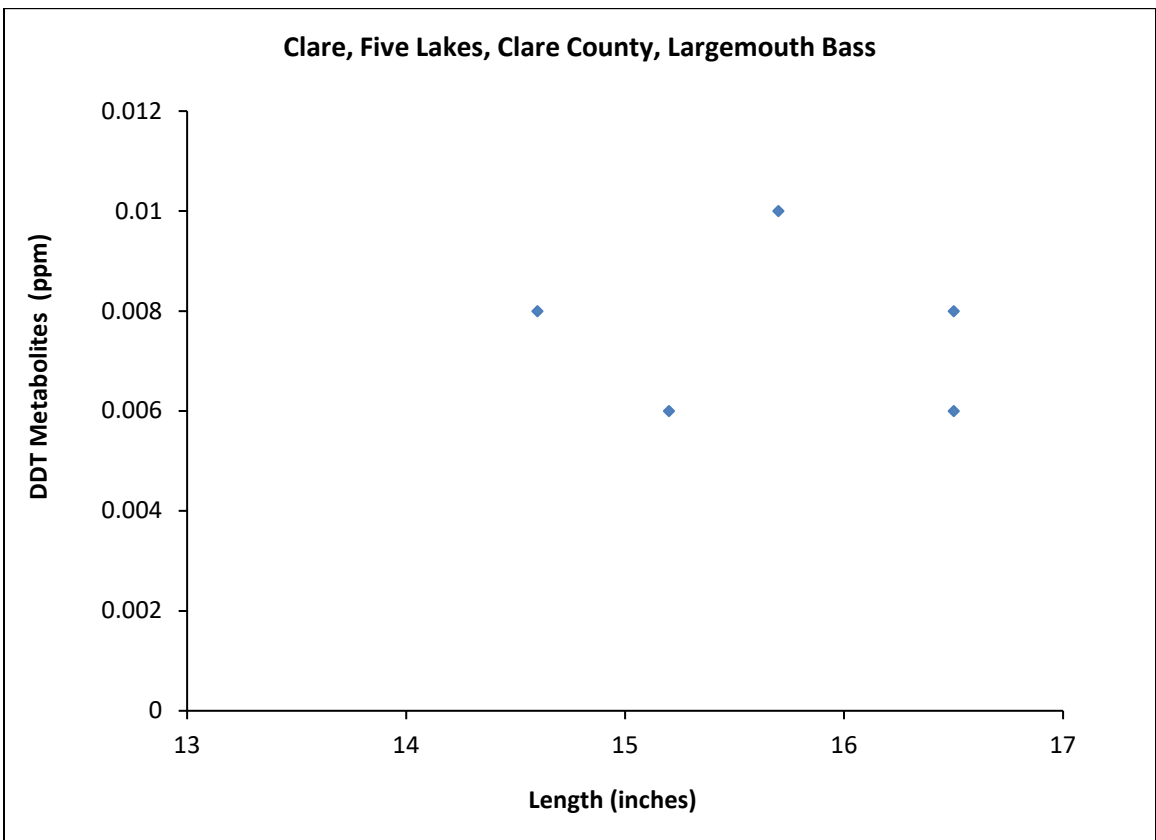
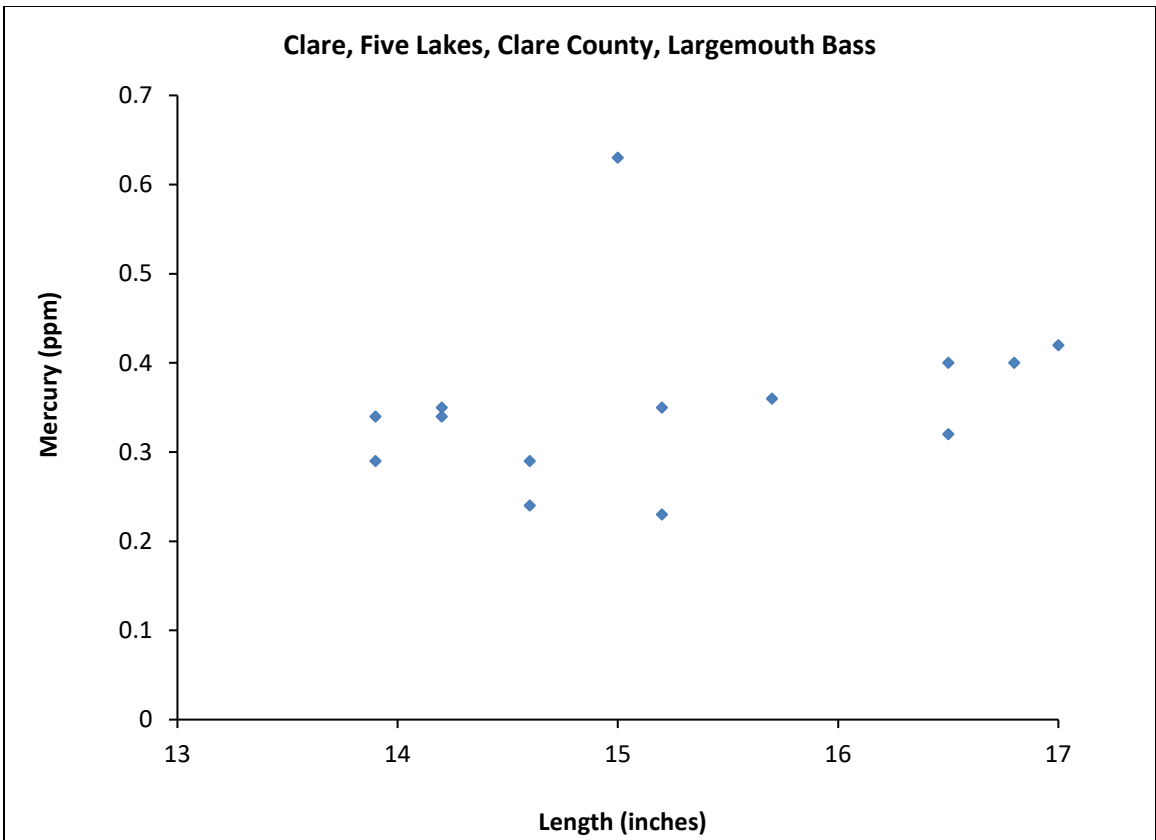
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1991	2004	14	13.9	14	13.9	17
Datasets available: 1991, 2004						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	14	0.354	0.23	0.63	0.41	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.076	0.106				

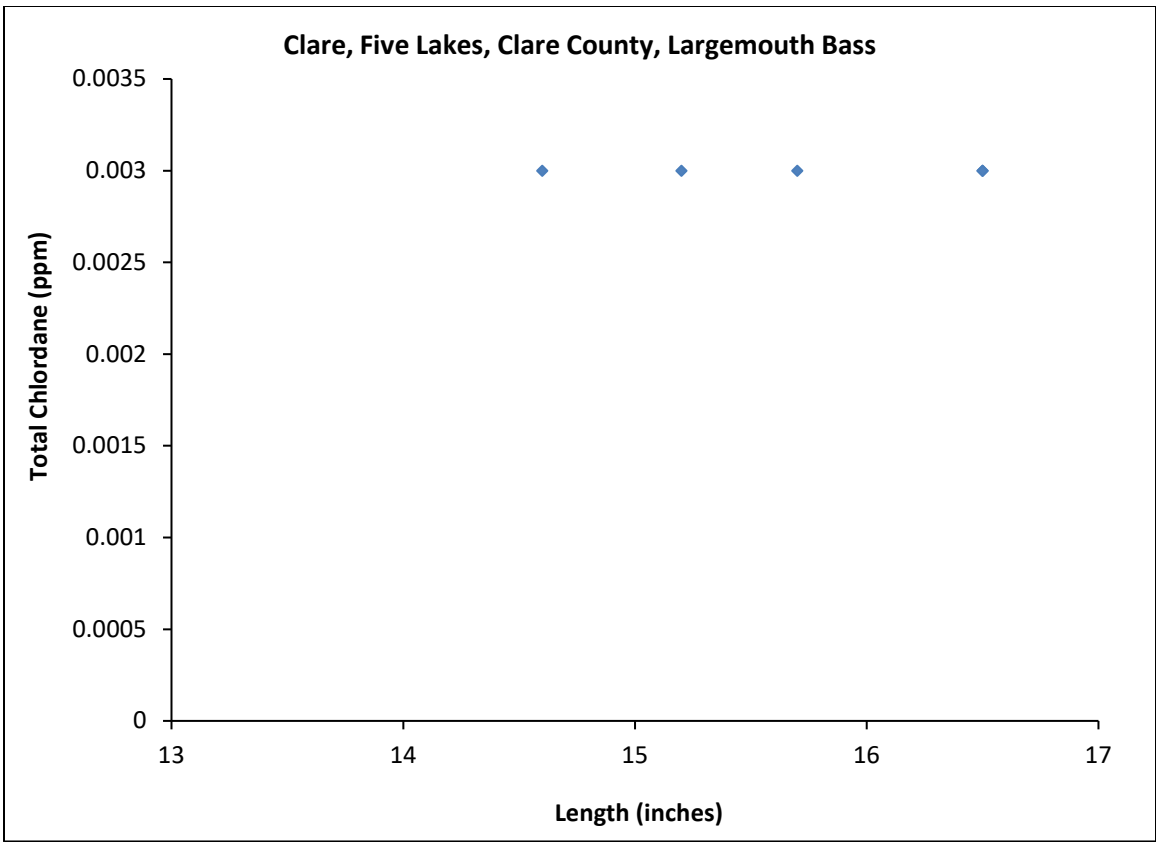
**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1991	1991	5	14.6	14	14.6	16.5
Datasets available: 1991						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	5	ND	--	--	--	--
DDT	5	0.008	0.003	0.010	0.010	16
Chlordane	5	0.003	0.003	0.003	0.003	--
Toxaphene	5	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	0.012	0.014				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2</b>

**Existing Advisory:** Five Lakes largemouth bass are covered under the statewide mercury consumption advisory.

**Recommendation:** No one should eat more than 2 meals per month of Five Lakes 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





**Northern Pike**

**Five Lakes**

**Clare 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
1991	1991	10	20.7	24	26.4	29.1
Datasets available: 1991						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	5	0.42	0.39	0.45	0.46	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.390	0.410				

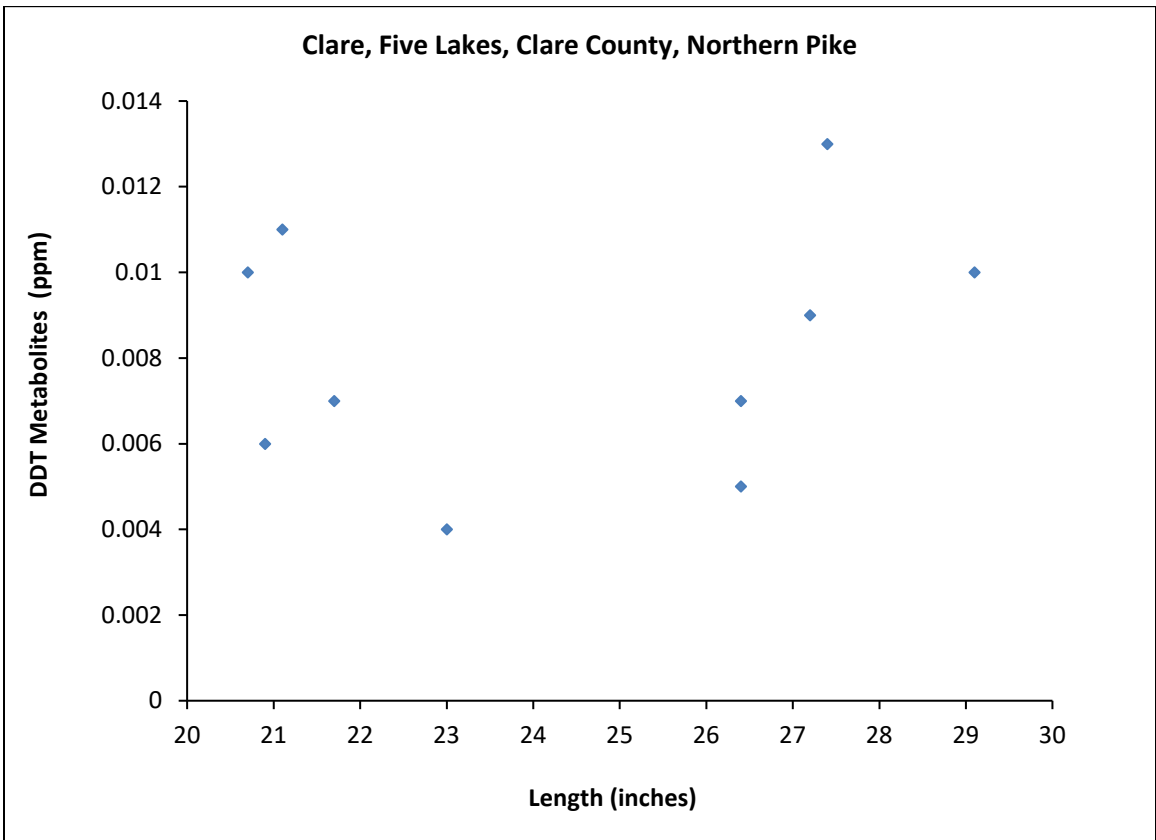
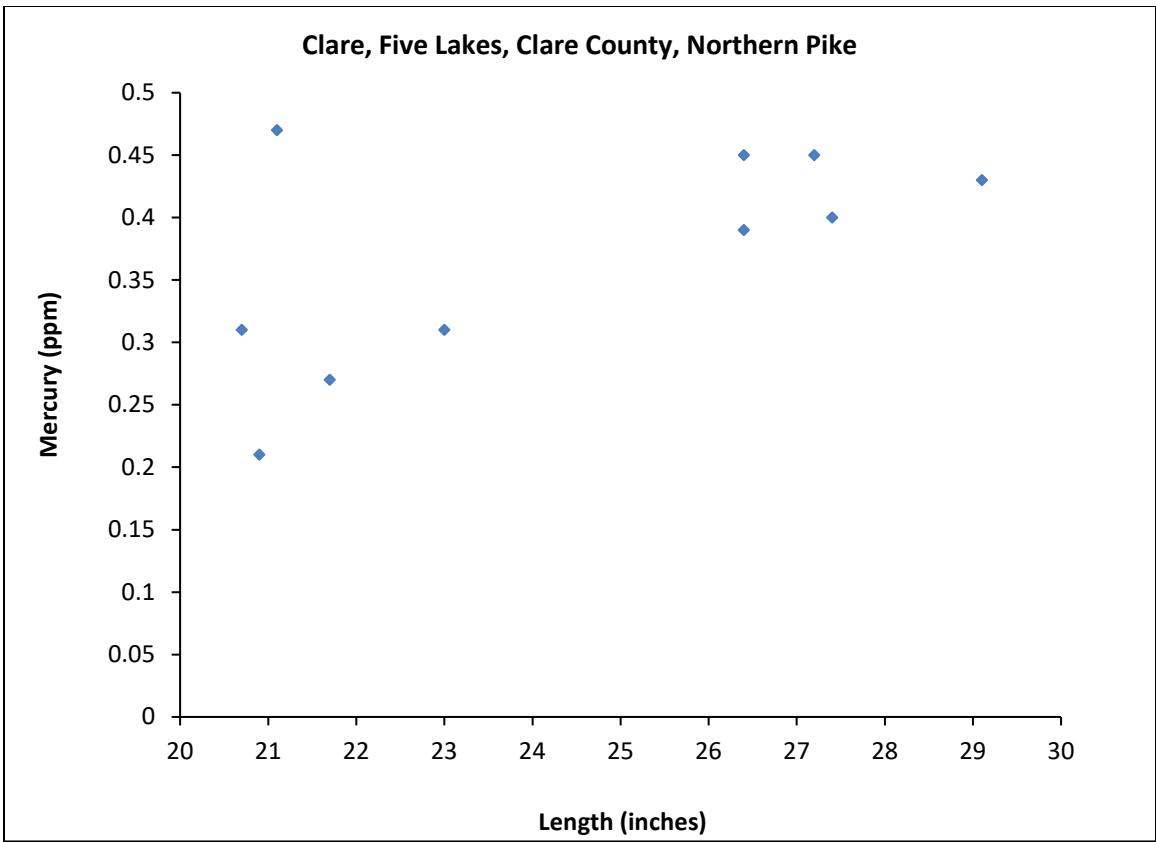
**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1991	1991	10	20.7	24	26.4	29.1
Datasets available: 1991						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	5	ND	--	--	--	--
DDT	5	0.009	0.005	0.01	0.01	16
Chlordane	5	ND	--	--	--	--
Toxaphene	5	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	0.043	0.037				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2</b>

**Existing Advisory:** Five Lakes northern pike are covered under the statewide mercury consumption advisory.

**Recommendation:** No one should eat more than 2 meals per month of Five Lakes 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 was applied as the size of the fish was limited





**Largemouth Bass**

**Lily Lake**

**Clare County**

**Hg Analysis:**

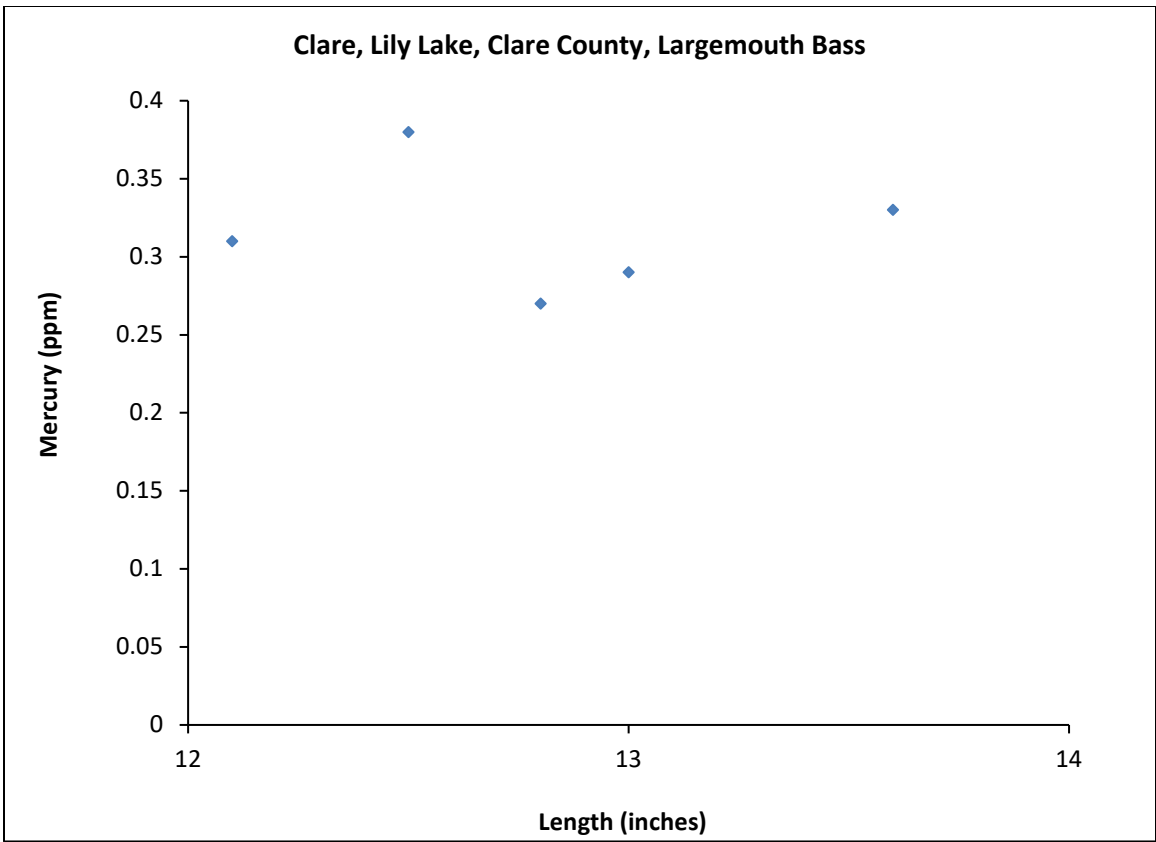
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Size Range of All Samples	
Earliest	Most Recent				Min	Max
1990	1990	5	12.1	14	12.1	13.6
Datasets available: 1990						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	5	0.316	0.27	0.38	0.37	2*
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.009	0.007				

**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 (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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2*</b>

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

**Recommendation:** \*Size range of fish in this sample set is limited and all samples are sublegal in length, which are insufficient to recommend a waterbody-species specific guideline. Statewide guidelines apply: No one should eat more than 2 meals per month of Lily Lake largemouth or smallmouth bass smaller than 18 inches or more than 1 meal per month of those fish larger than 18 inches.



**Northern Pike**

**Lily Lake**

**Clare County**

**Hg Analysis:**

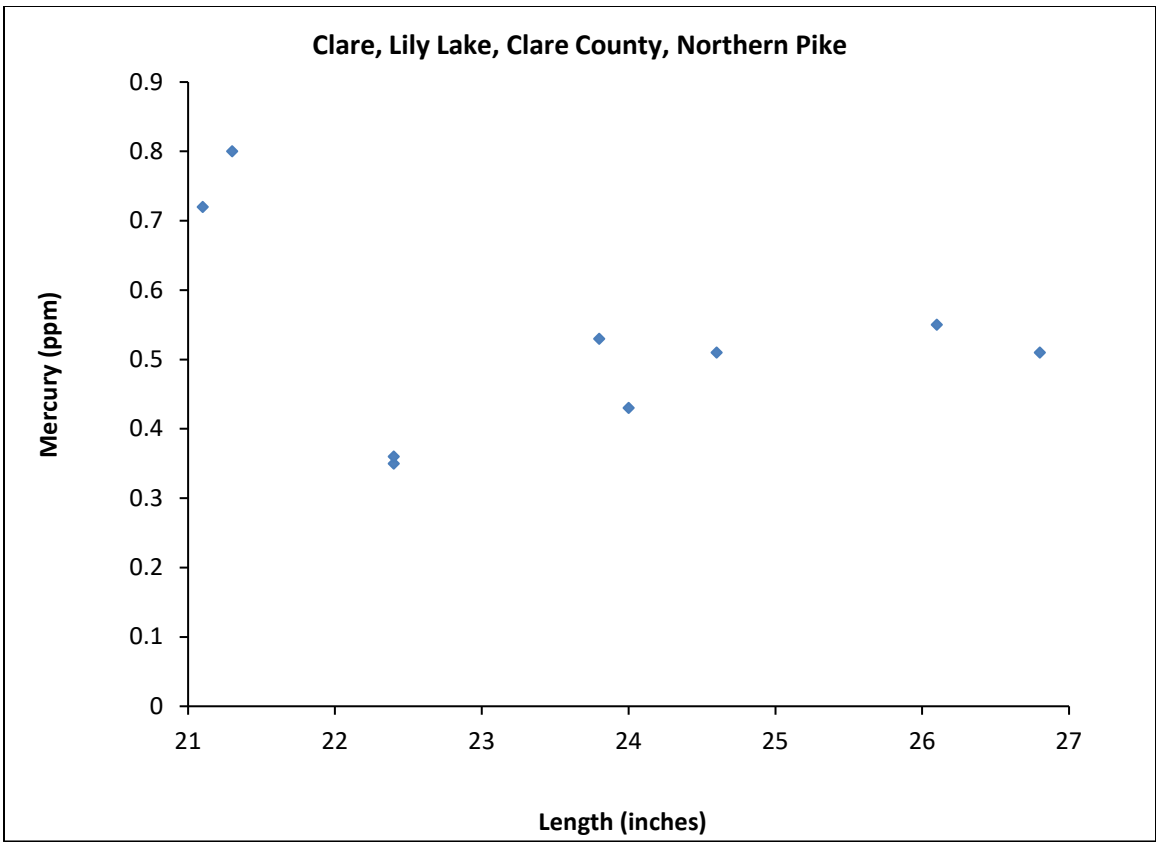
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Size Range of All Samples	
Earliest	Most Recent				Min	Max
1990	1990	10	21.1	24	23.8	26.8
Datasets available: 1990						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	5	0.51	0.43	0.55	0.56	1
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.096	0.041				

**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 (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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>1</b>

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

**Recommendation:** No one should eat more than 1 meal per month of Lily 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 as the size of the fish was limited.



# Emmet County

**Brown Trout**

**Bear River**

**Emmet 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	7.3	10	7.3	9.7
Datasets available: 1998						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	2*	0.06	0.05	0.06	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	--	--				

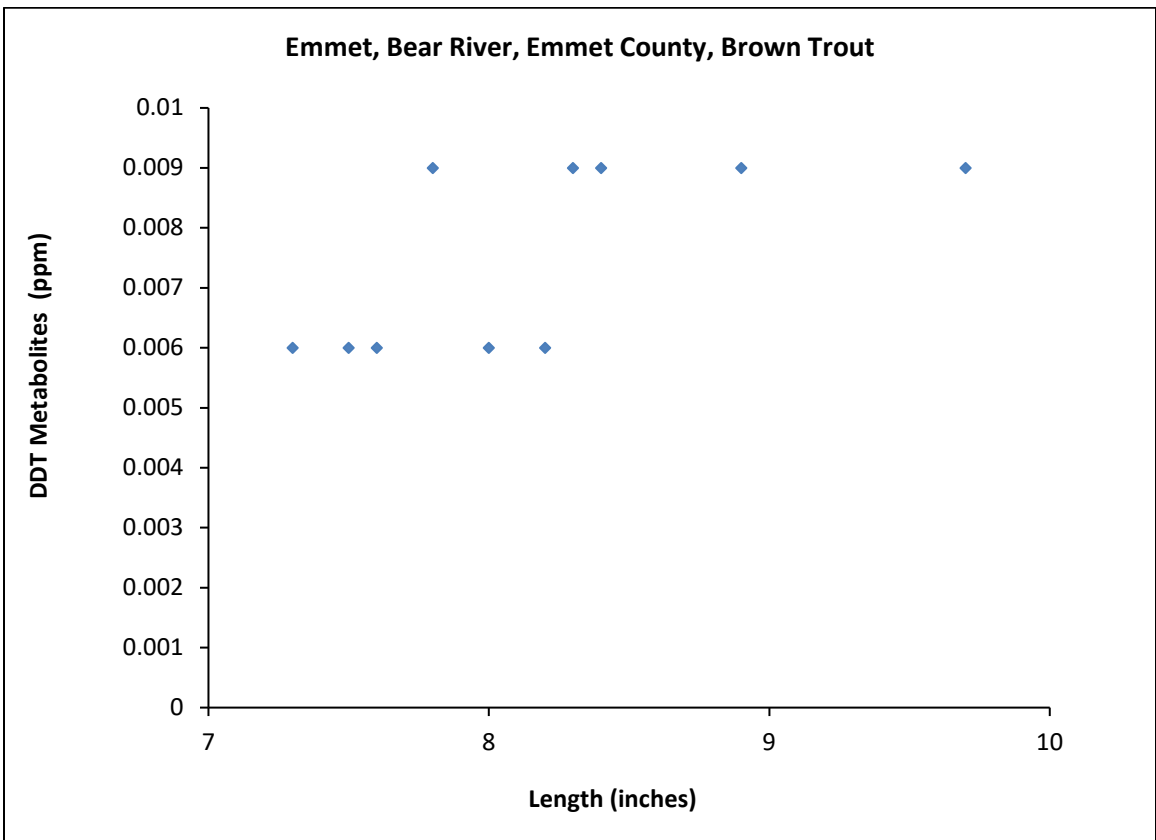
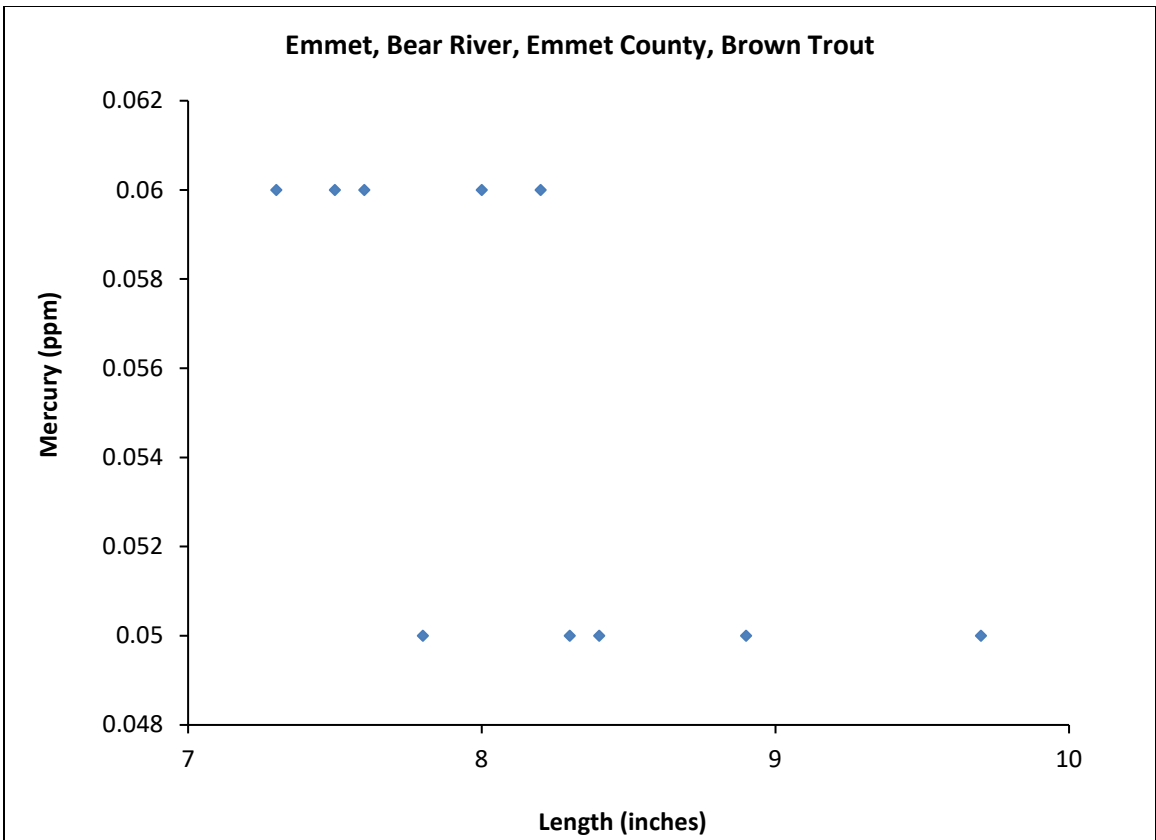
**Organics Analysis:**

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	7.3	10	7.3	9.7
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*	0.008	0.006	0.009	--	--
Chlordane	2*	ND	--	--	--	--
Toxaphene	2*	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						--

\* - 10 fish analyzed as 2 composite samples

**Existing Advisory:** Brown trout from Bear River in Emmet County are covered under the statewide advisory for mercury. No one should eat more than 4 meals per month of brown trout of any size due to mercury.

**Recommendation:** No change is recommended. MDHHS requires a minimum of five legal size fish samples to evaluate the need for waterbody specific fish consumption advisories.





**White Sucker**

**Bear River**

**Emmet 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	5	7.9	na	7.9	10.9
Datasets available: 1998						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	1*	0.05	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
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	5	7.9	na	7.9	10.9
Datasets available: 1998						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	1*	ND	--	--	--	--
DDT	1*	ND	--	--	--	--
Chlordane	1*	ND	--	--	--	--
Toxaphene	1*	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						--

**Existing MDHHS Advisory:** Suckers from Bear River in Emmet County are covered under the statewide advisory for mercury. No one should eat more than 8 meals per month of suckers of any size due to mercury.

**Recommendation:** No change is recommended. MDHHS requires a minimum of five legal size fish samples to evaluate the need for waterbody specific fish consumption advisories.

**Largemouth Bass**

**Crooked Lake**

**Emmet County**

**Hg Analysis:**

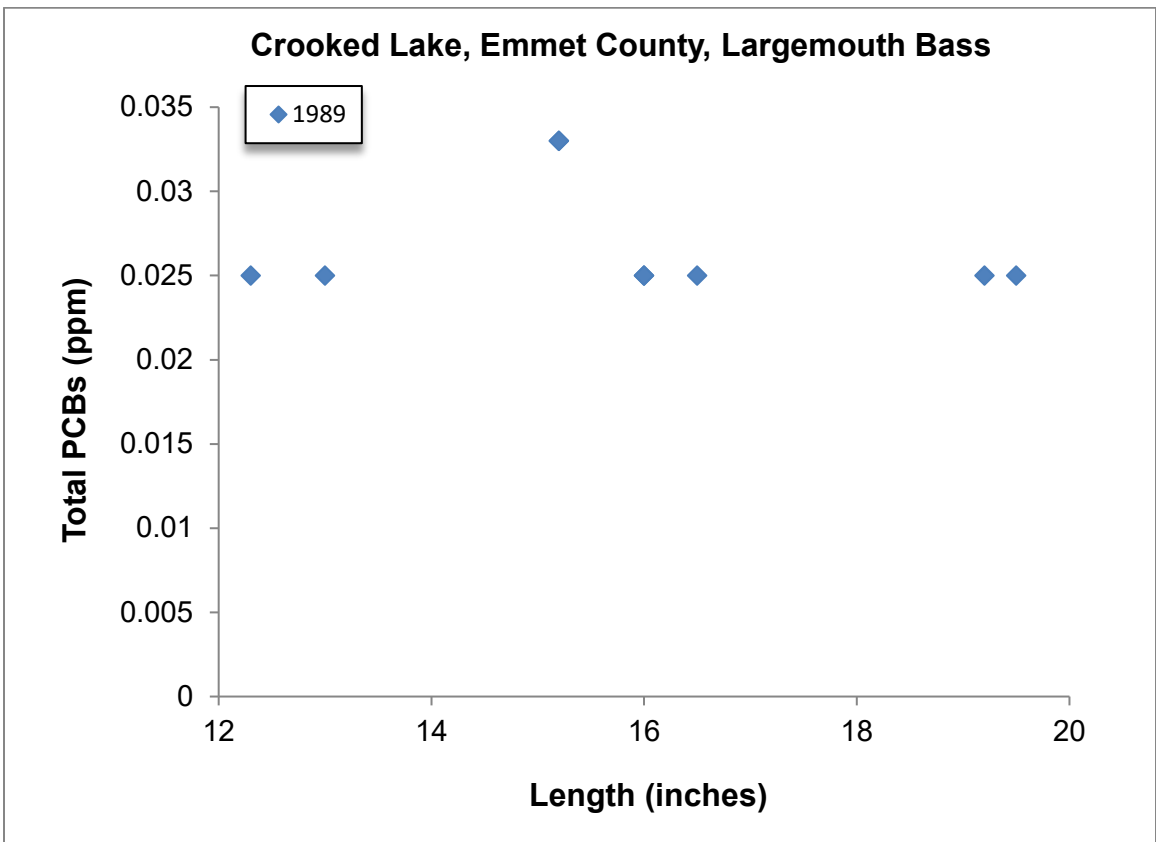
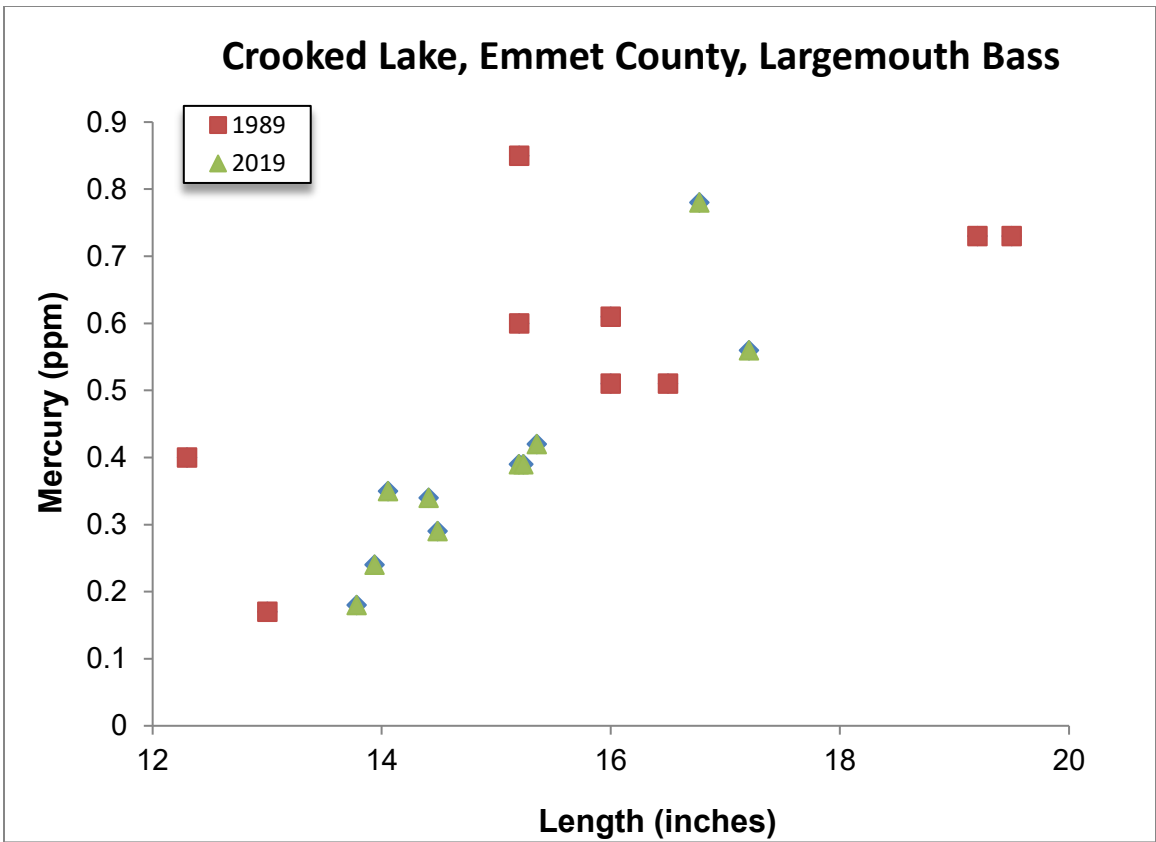
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent					
1989	2019	20	12.0	14	13.8	19.5
Datasets available: 1989, 2019						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	17	0.499	0.180	0.850	0.600	1
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.519	0.538				

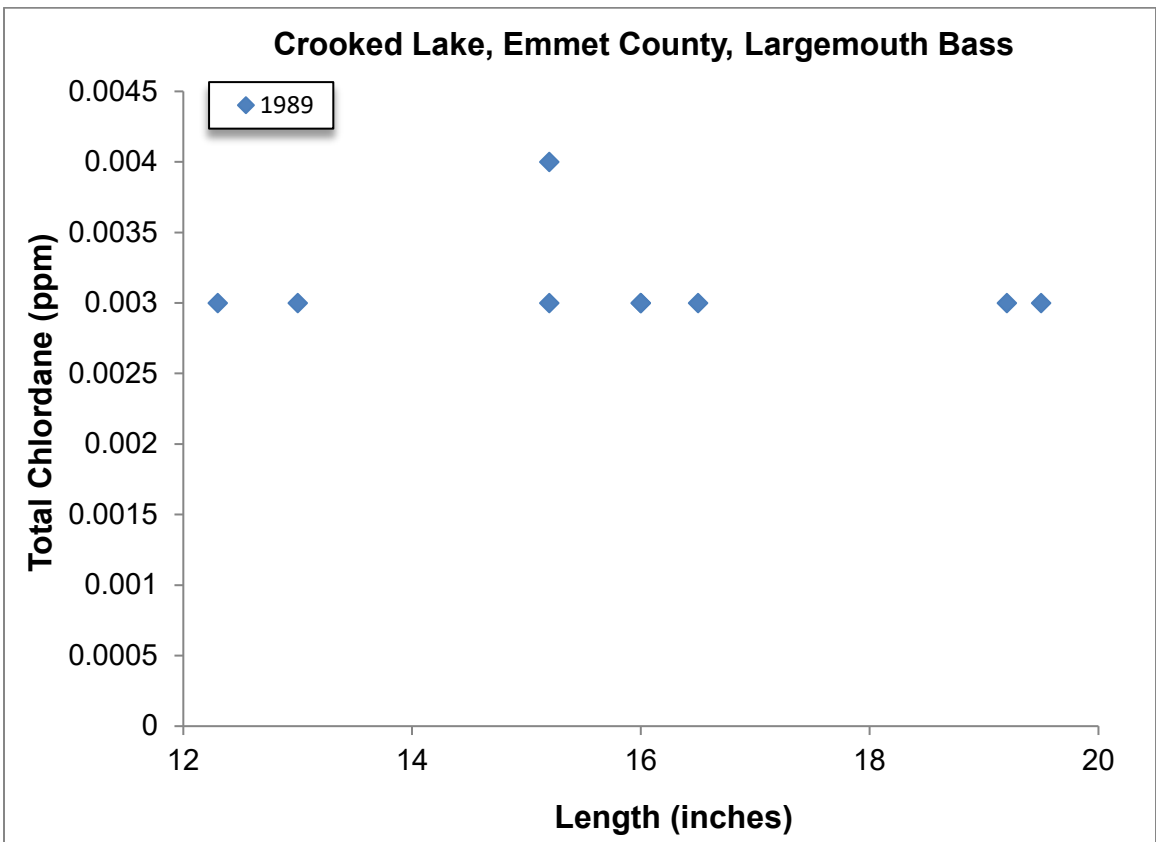
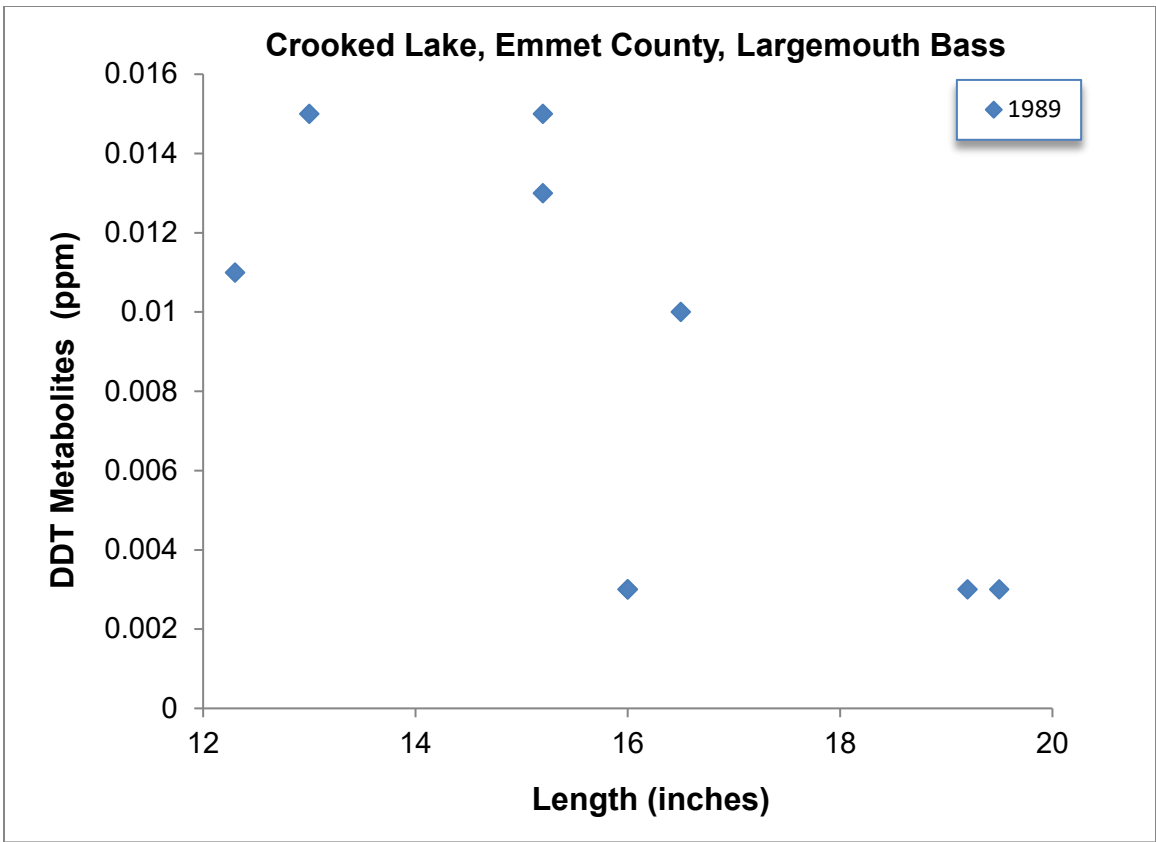
**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent					
1989	1989	10	12.0	14	15.2	19.5
Datasets available: 1989						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	7	0.027	<0.025	0.033	0.031	8
DDT	7	0.007	<0.003	0.015	0.012	16
Chlordane	7	0.003	<0.003	0.004	0.003	16
Toxaphene	7	ND	--	--	--	--
PFOS	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.367	0.367				
DDT	0.412	0.400				
Chlordane	0.153	0.153				
Toxaphene	--	--				
PFOS	--	--				
<b>Final meal category based on UCL:</b>						<b>1</b>

**Existing MDHHS Advisory:** No one should eat more than 1 meal per month of largemouth bass less than 18” in length or no more than 6 meals per year of largemouth bass greater than 18” in length from Crooked Lake in Emmet County due to mercury. The statewide length break was applied as the size of the fish was limited.

**Recommendation:** No change. The statewide length break should still be used as the 2019 dataset did not include any individuals over 18 inches.





**Walleye**

**Crooked Lake**

**Emmet County**

**Hg Analysis:**

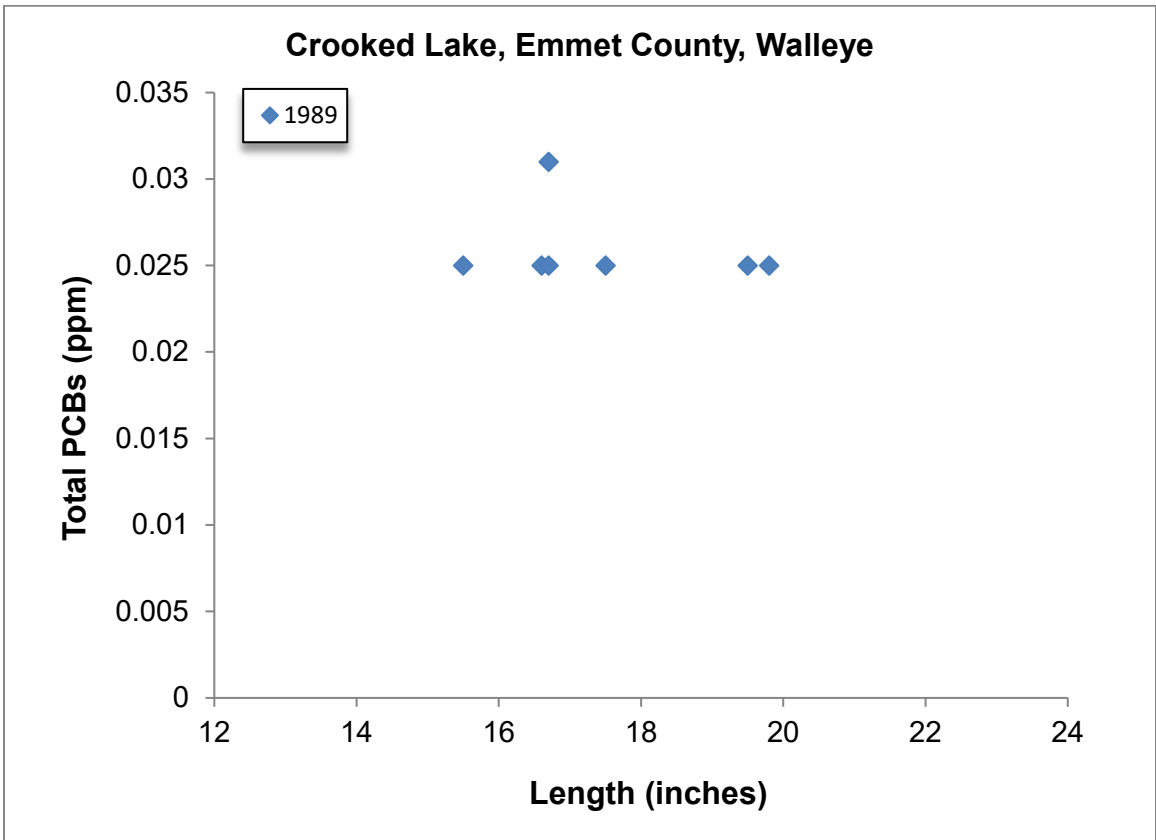
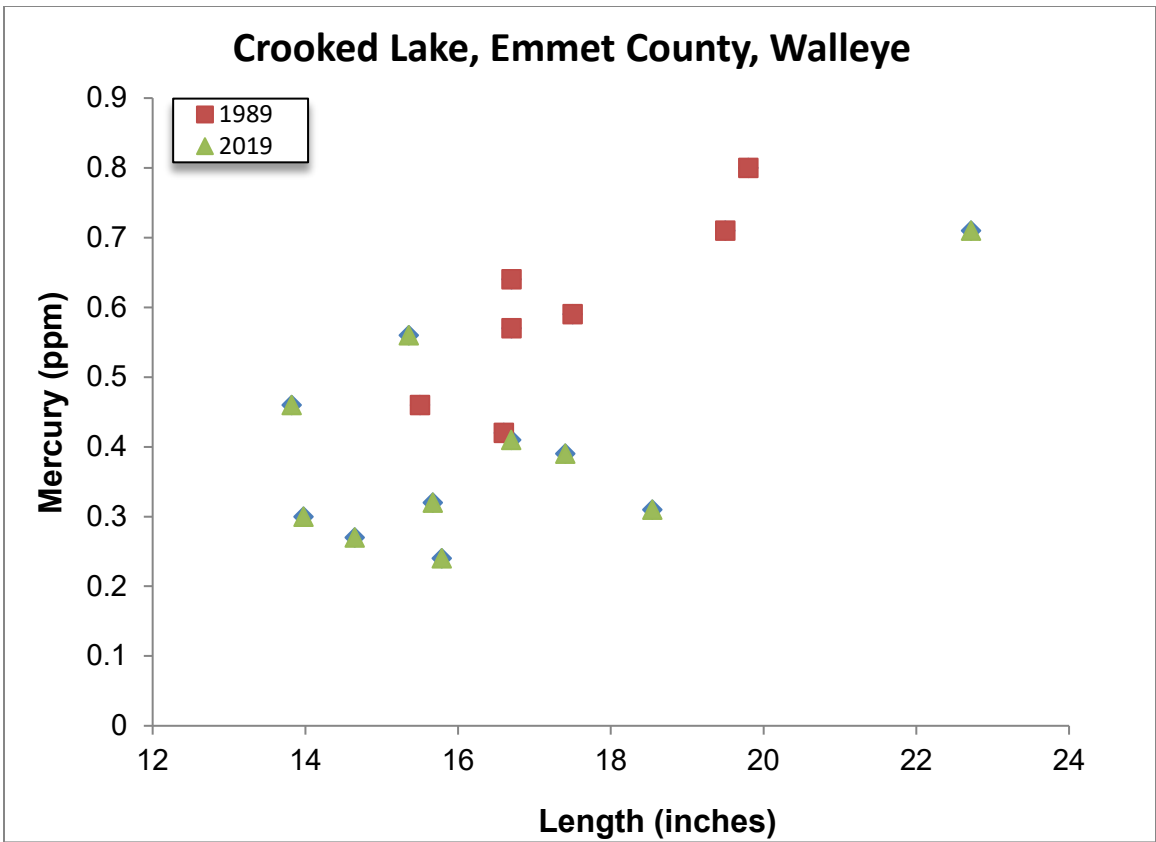
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent					
1989	2019	17	13.8	15	14.6	22.7
Datasets available: 1989, 2019						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	15	0.493	0.240	0.800	0.590	1
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.417	0.356				

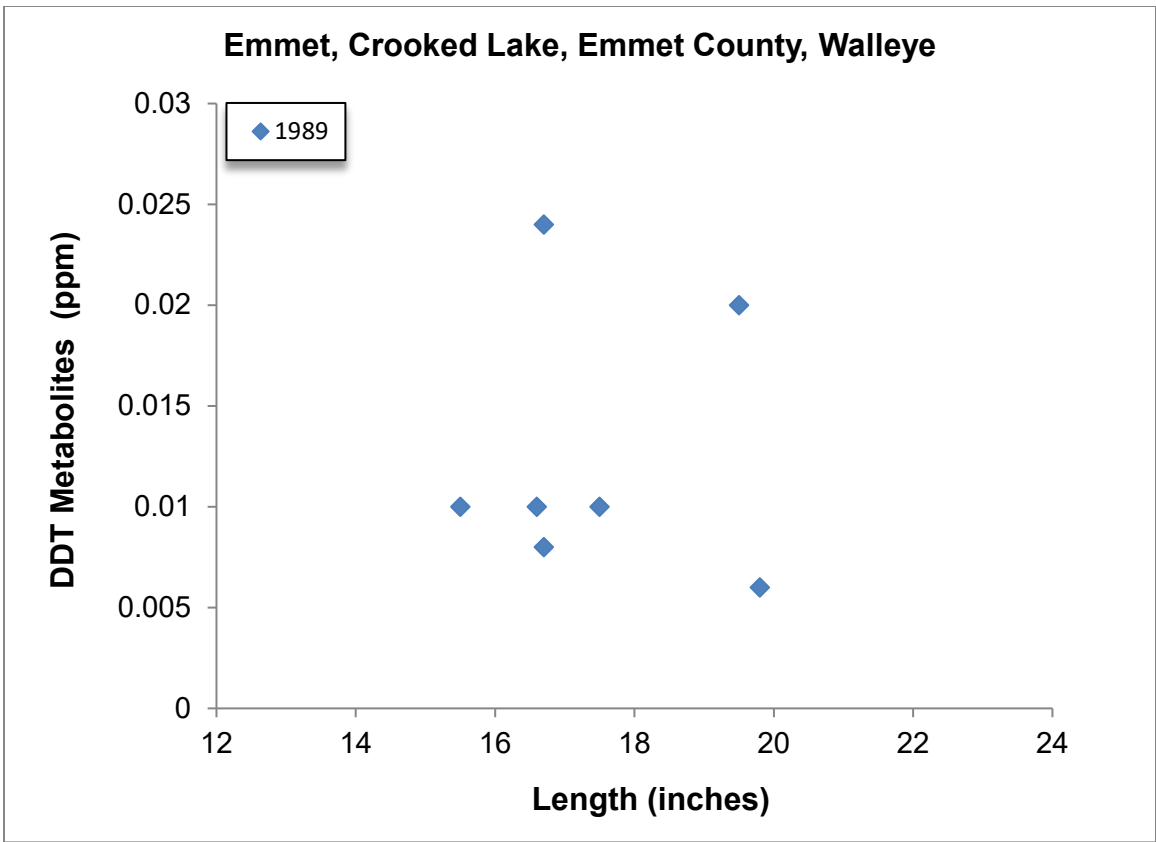
**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent					
1989	1989	7	13.8	15	15.5	19.8
Datasets available: 1989						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	7	0.026	<0.025	0.031	0.028	8
DDT	7	0.013	0.006	0.024	0.012	16
Chlordane	7	ND	--	--	--	--
Toxaphene	7	ND	--	--	--	--
PFOS	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.045	0.045				
DDT	0.001	0.004				
Chlordane	NA	NA				
Toxaphene	NA	NA				
PFOS	--	--				
<b>Final meal category based on UCL:</b>						<b>1</b>

**Existing MDHHS Advisory:** No one should eat more than 1 meal per month of walleye less than 20" in length or no more than 6 meals per year of walleye greater than 20" in length from Crooked Lake in Emmet County due to mercury.

**Recommendation:** No change to the advisory is recommended. A second year of data is necessary to remove the length-specific recommendation for walleye greater than 20".





**Largemouth Bass & Smallmouth Bass**

**Lake Paradise**

**Emmet 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	13.5	14	13.5	17.5
Datasets available: 2001						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.25	0.11	0.45	0.35	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.756	0.703				

**Organics Analysis:**

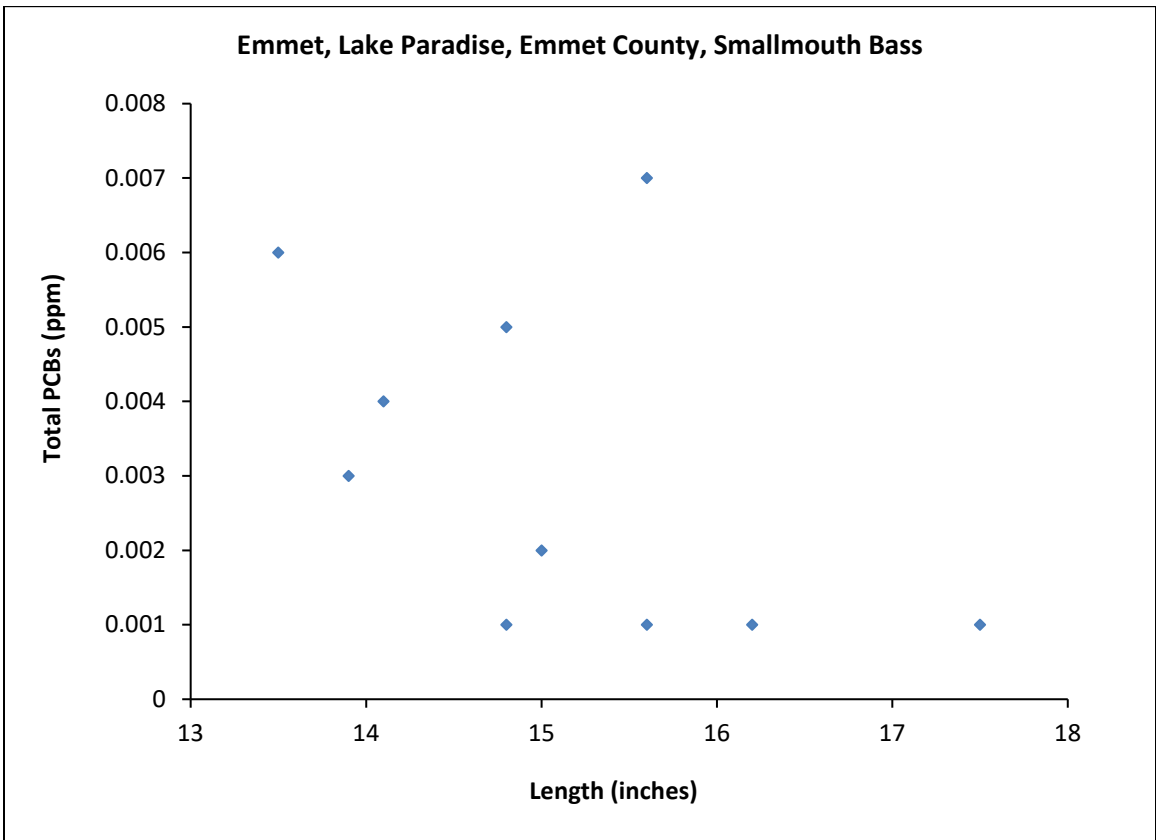
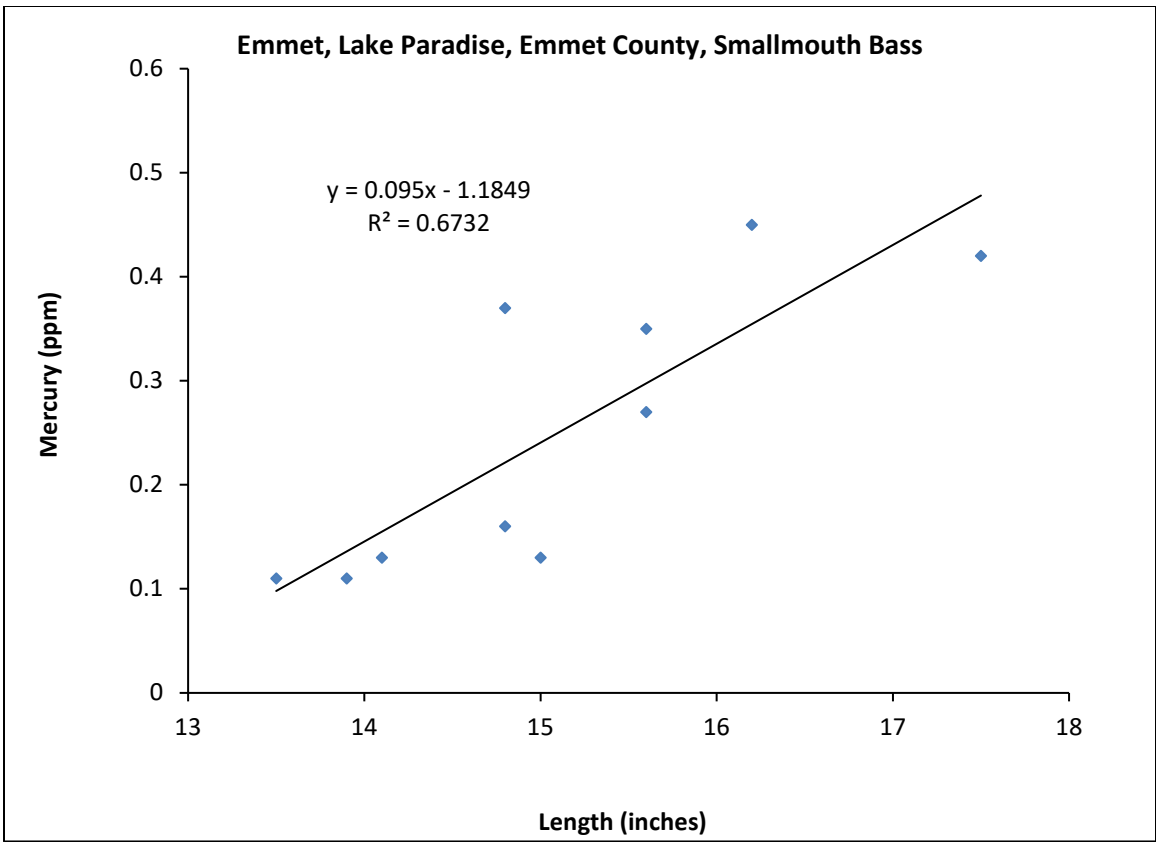
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2001	2001	10	13.5	14	13.5	17.5
Datasets available: 2001						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.003	0.001	0.007	0.005	16
DDT	10	0.003	0.001	0.007	0.005	16
Chlordane	10	0.001	0.001	0.005	0.002	--
Toxaphene	10	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.231	0.353				
DDT	0.555	0.533				
Chlordane	0.008	0.008				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2</b>

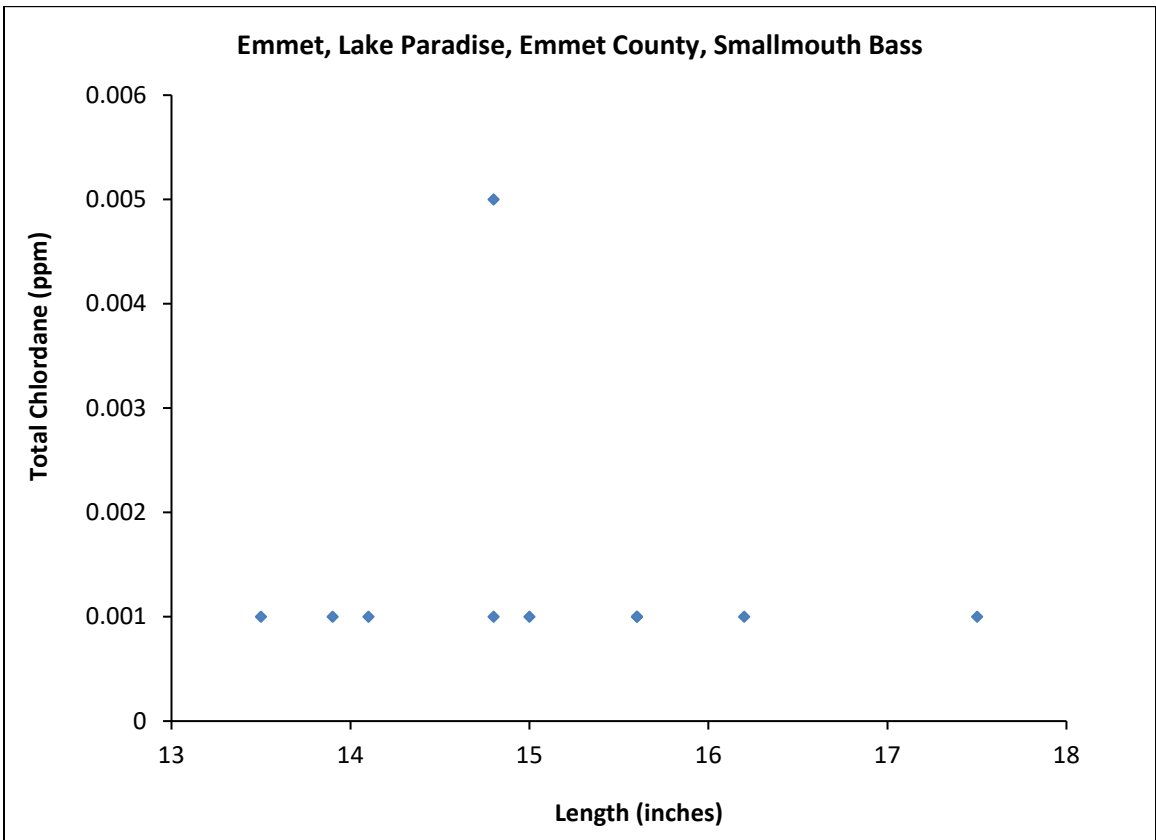
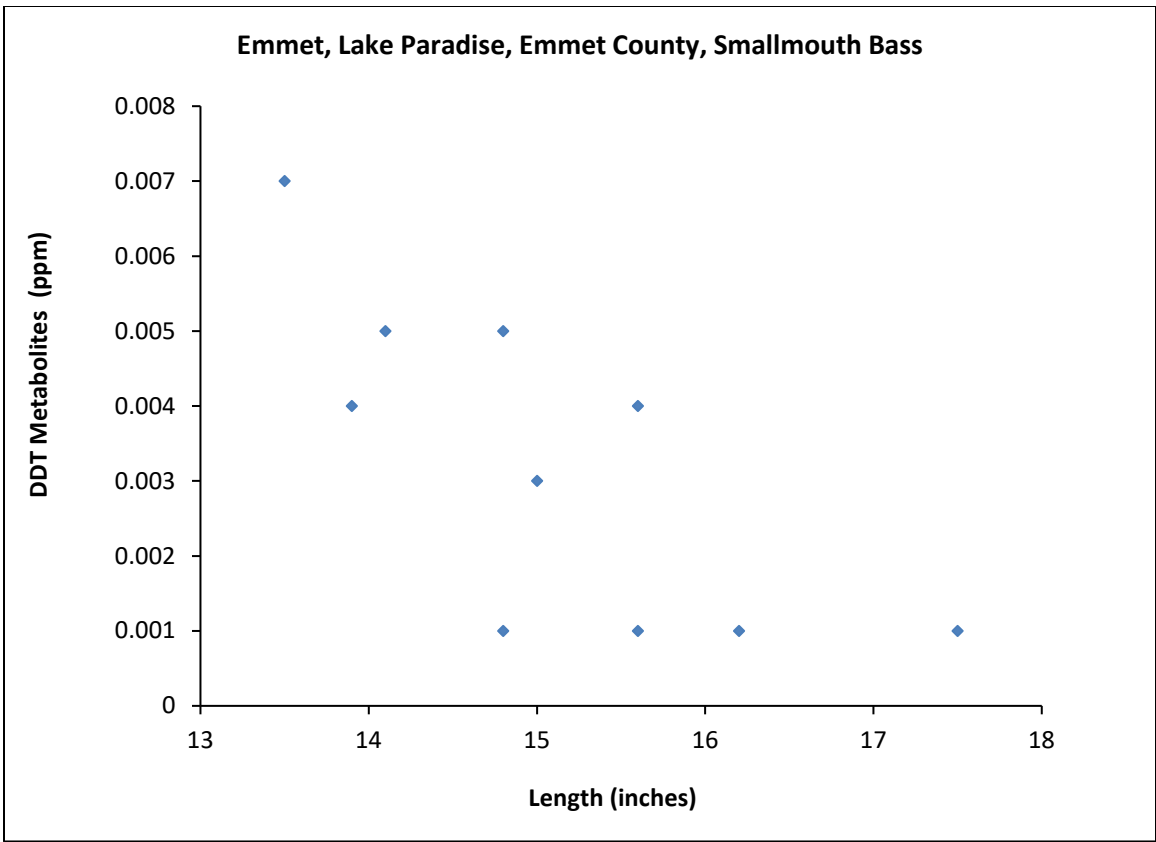
**Existing Advisory:** Largemouth and smallmouth bass from Lake Paradise in Emmet County are covered under the statewide advisory for mercury. No one should eat more than 2 meals per month of largemouth and smallmouth bass smaller than 18" or no more than 1 meal per month of largemouth and smallmouth bass larger than 18" due to mercury.

**Recommendation:** No one should eat more than 2 meals per month of largemouth or smallmouth bass from Lake Paradise 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	0.15	4
15	0.24	4
16	0.34	2
17	0.43	2
18	0.53	2
19	0.62	1
20	0.72	1
21	0.81	1
22	0.91	1
<i>Shaded area denotes extrapolated estimates</i>		







**White Sucker**

**Lake Paradise**

**Emmet 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	6	16.4	na	16.4	20.6
Datasets available: 2001						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	6	0.06	0.04	0.10	0.08	12
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.805*	0.696*	* - regression driven by 1 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
2001	2001	6	16.4	na	16.4	20.6
Datasets available: 2001						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	6	0.003	0.001	0.007	0.010	16
DDT	6	0.004	0.001	0.010	0.010	16
Chlordane	6	ND	--	--	--	--
Toxaphene	6	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.019	0.084				
DDT	0.002	0.004				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>12</b>

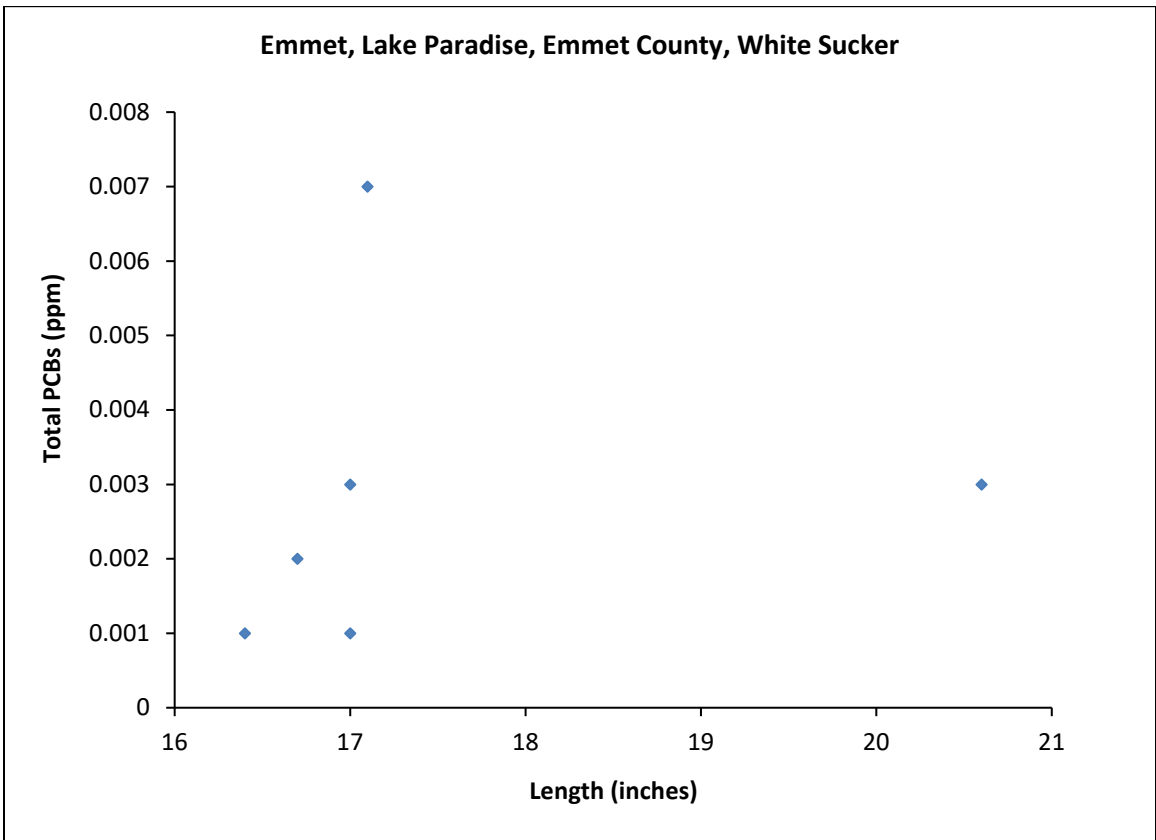
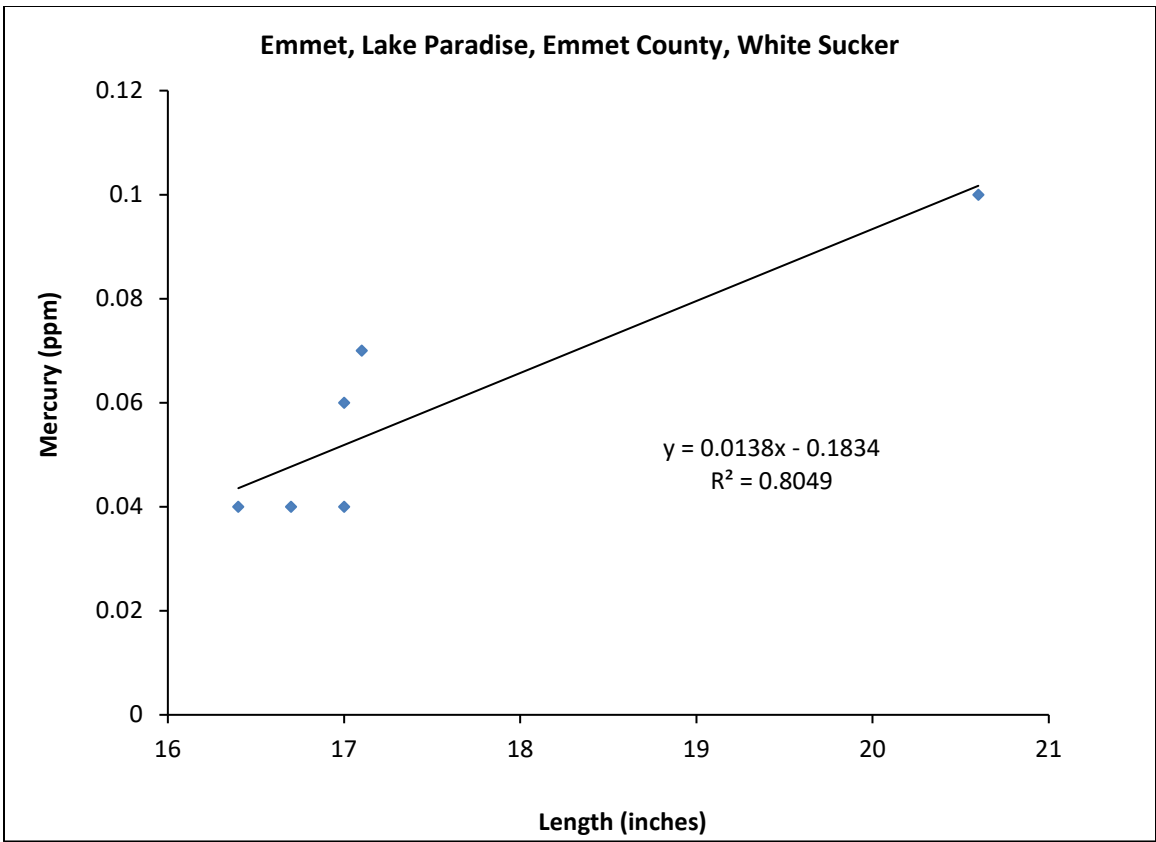
**Existing Advisory:** Suckers from Lake Paradise in Emmet County are covered under the statewide advisory for mercury. No one should eat more than 8 meals per month of suckers of any size due to mercury.

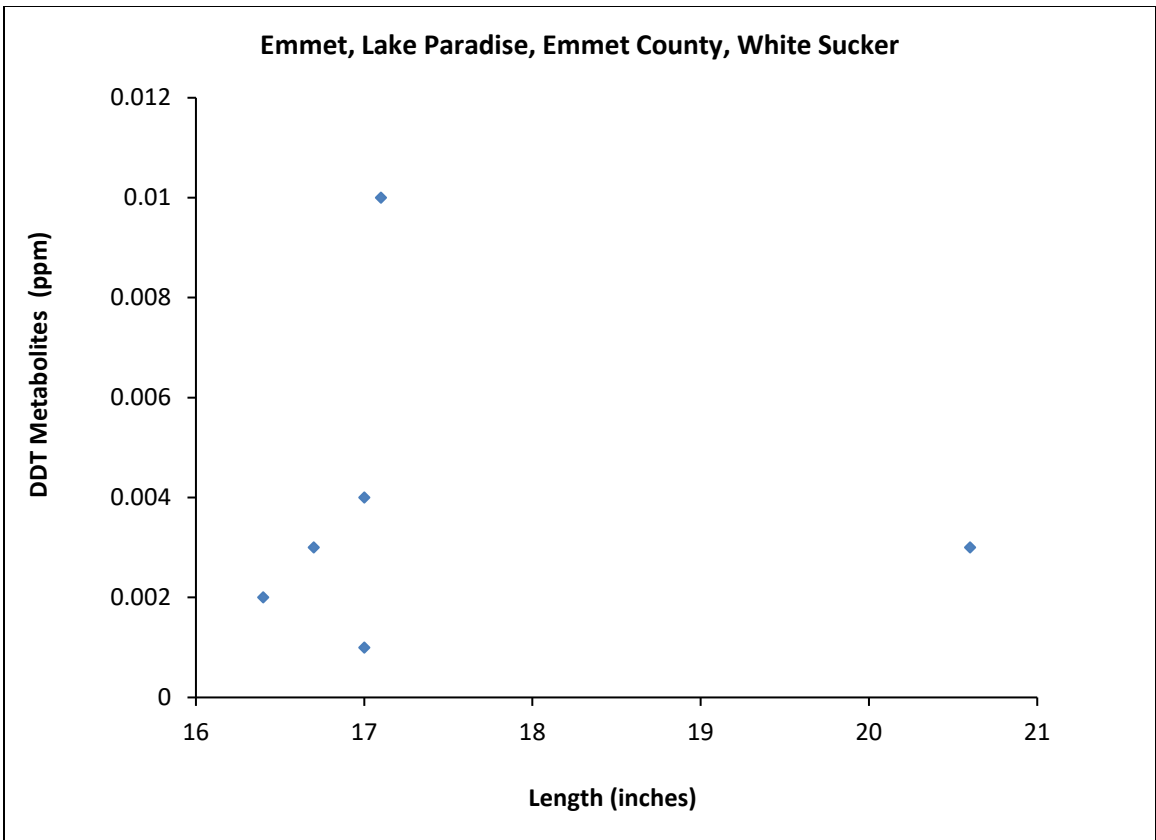
**Recommendation:** No one should eat more than 12 meals per month of suckers from Lake Paradise due to mercury. The regression is driven by one point and was not used.

*Note: 95% UCL for Hg without 20-inch fish is 0.07 ppm.*

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
14	0.01	16
15	0.02	16
16	0.04	16
17	0.05	16
18	0.07	16
19	0.08	12
20	0.09	8
21	0.11	8
22	0.12	8

*Shaded area denotes extrapolated estimates*





**Brook Trout**

**Maple River**

**Emmet County**

**Hg Analysis:**

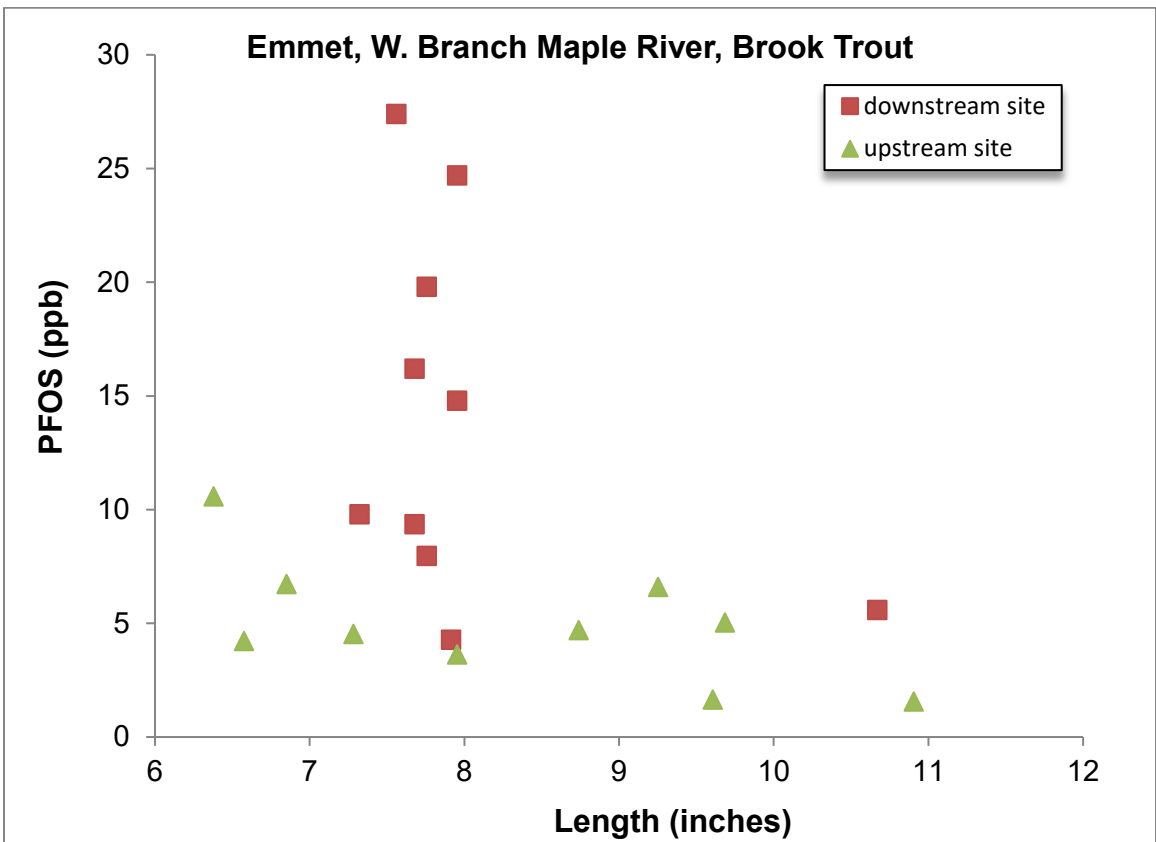
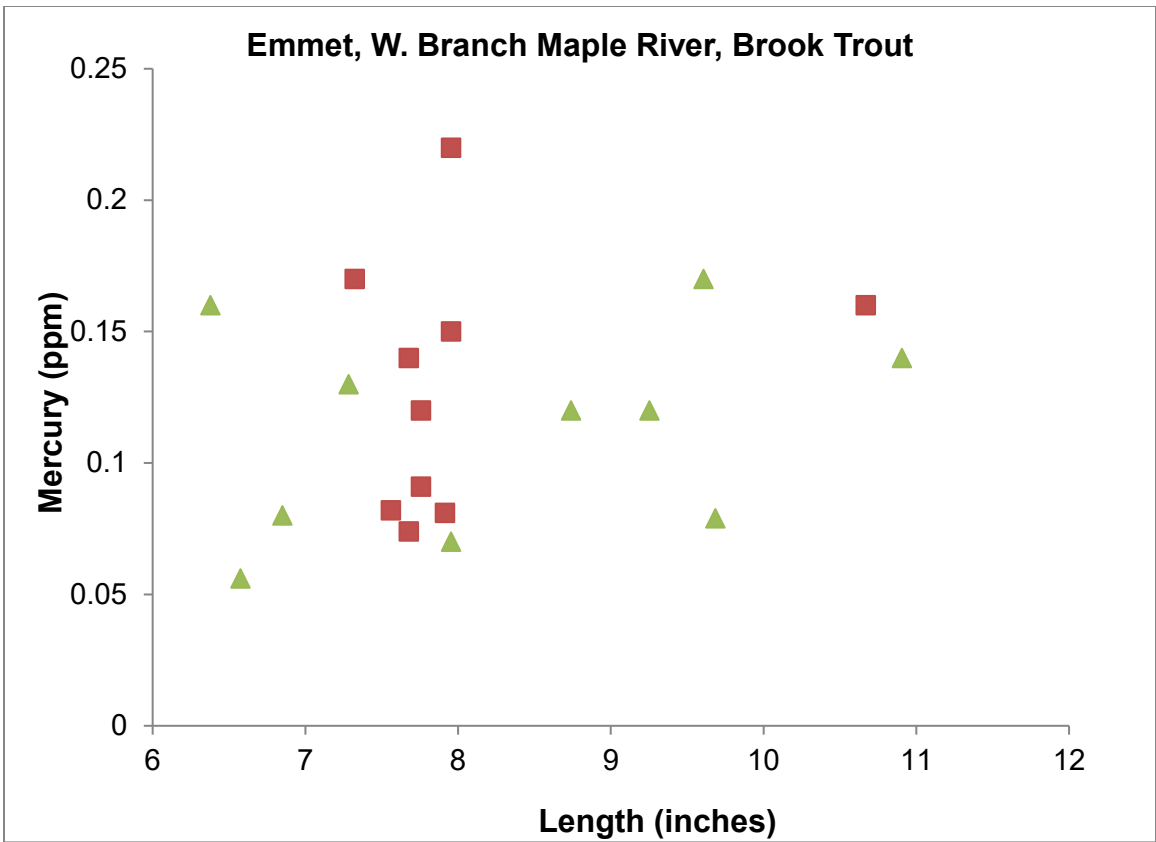
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2020	2020	20	6.4	7.0	6.6	10.9
Datasets available: 2020						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	19	0.119	0.056	0.220	0.140	4
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.107	0.143				

**Organics 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	20	6.4	7.0	6.6	10.9
Datasets available: 2020						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	--	--	--	--	--	--
DDT	--	--	--	--	--	--
Chlordane	--	--	--	--	--	--
Toxaphene	--	--	--	--	--	--
PFOS	19	9.4 ppb	1.6 ppb	27.4 ppb	13.0 ppb	8
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	0.124	0.236				
<b>Final meal category based on UCL:</b>						<b>4</b>

**Existing MDHHS Advisory:** Brook trout from the Maple River in Emmet County are not currently covered under a consumption advisory.

**Recommendation:** No one should eat more than 4 meals per month of brook trout of any size from the Maple River, including the east and west branches, in Emmet County due to mercury. PFOS causes less restrictive advice.



**Brown Trout**

**West Branch Maple River**

**Emmet 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	4	10.1	10	10.1	20.7
Datasets available: 1998						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	1*	0.18	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
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	4	10.1	10	10.1	20.7
Datasets available: 1998						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	1*	ND	--	--	--	--
DDT	1*	ND	--	--	--	--
Chlordane	1*	ND	--	--	--	--
Toxaphene	1*	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						--

\* - 4 fish analyzed as 1 composite sample

**Existing Advisory:** There are no current consumption advisories for West Branch Maple 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.



**White Sucker**

**West Branch Maple River**

**Emmet 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*	9.8	na	9.8	11.5
Datasets available: 1998						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	2*	0.17	0.17	0.17	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	--*	--*				

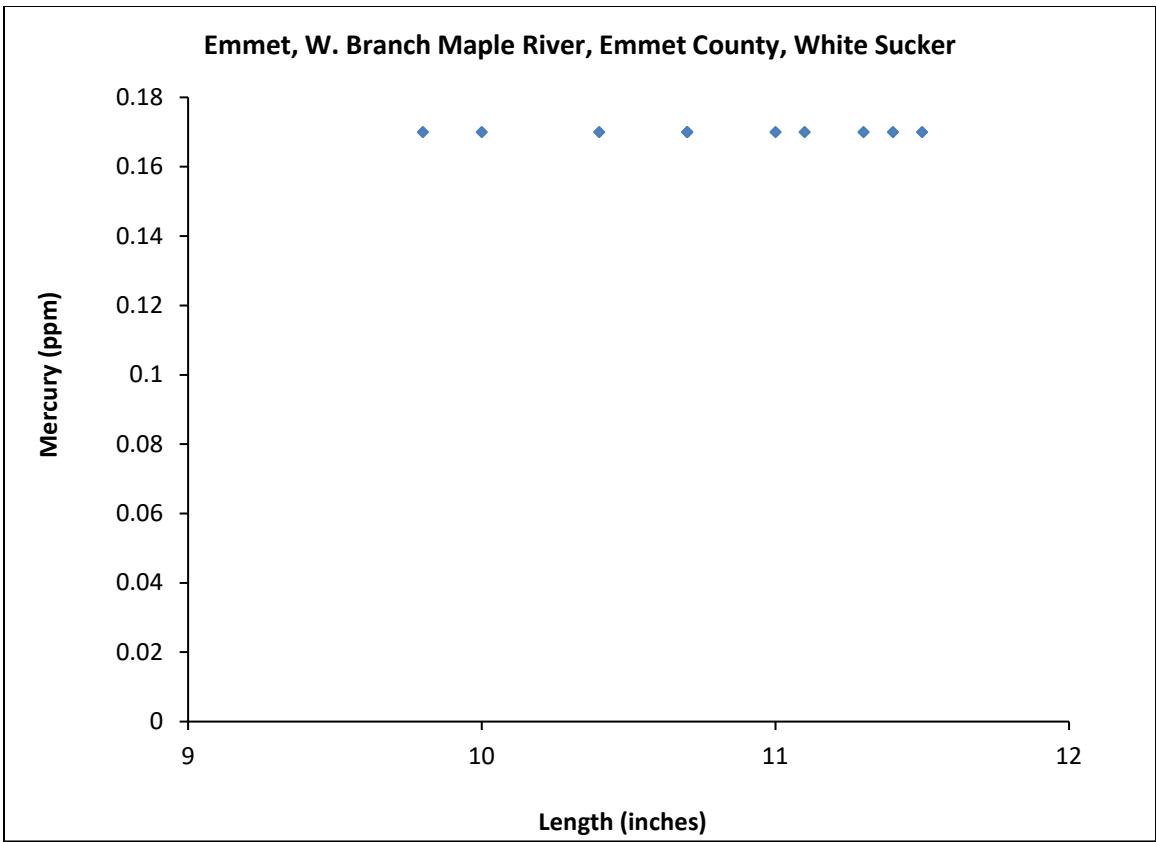
**Organics Analysis:**

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	9.8	na	9.8	11.5
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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						--

\* - 10 fish analyzed as 2 composite samples

**Existing Advisory:** There are no current consumption advisories for West Branch Maple 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.



**Largemouth Bass & Smallmouth Bass**

**Pickerel Lake**

**Emmet County**

**Hg Analysis:**

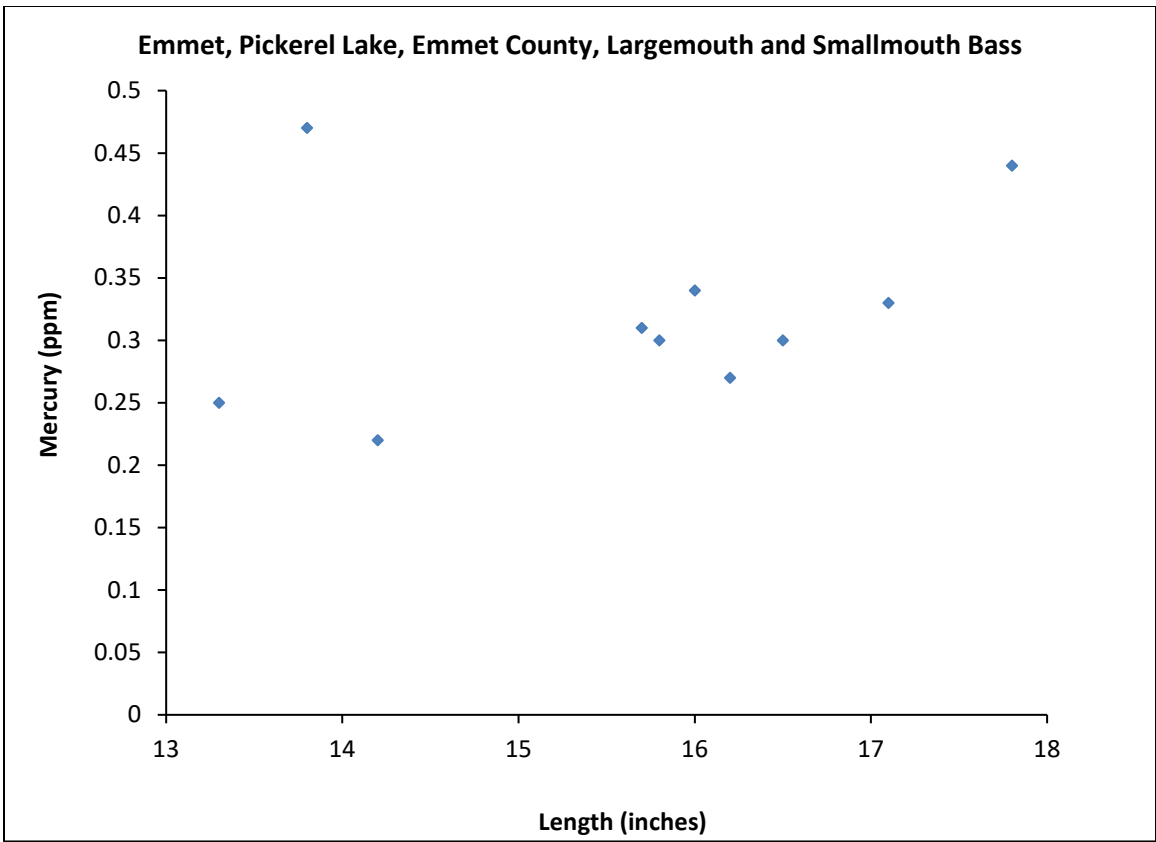
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1989	1989	10	13.3	14	13.8	17.8
Datasets available: 1989						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	9	0.33	0.22	0.47	0.39	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.066	0.108				

**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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2</b>

**Existing Advisory:** Largemouth and smallmouth bass from Pickerel Lake in Emmet County are covered under the statewide advisory for mercury. No one should eat more than 2 meals per month of largemouth and smallmouth bass smaller than 18” or no more than 1 meal per month of largemouth and smallmouth bass larger than 18” due to mercury.

**Recommendation:** No one should eat more than 2 meals per month of largemouth or smallmouth bass from Pickerel Lake 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**

**Pickerel Lake**

**Emmet 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	5	15.5	15	15.5	22
Datasets available: 1989						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	5	0.73	0.55	1.08	1.01	1
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.672*	0.612*	* - regression driven by 1 point			

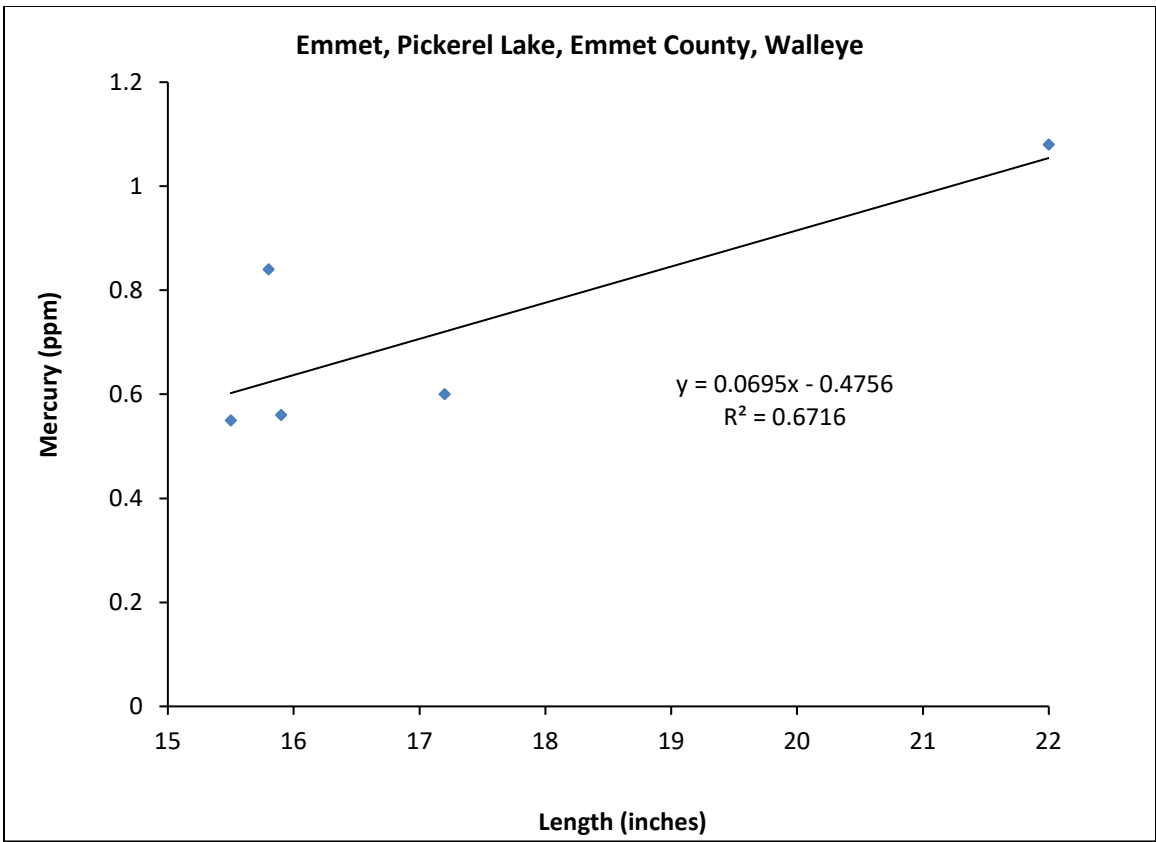
**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>1</b>

**Existing Advisory:** Walleye from Pickerel Lake in Emmet County are covered under the statewide advisory for mercury. No one should eat more than 2 meals per month of walleye smaller than 20" or no more than 1 meal per month of walleye larger than 20" due to mercury.

**Recommendation:** No one should eat more than 1 meal per month of Pickerel 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 was applied as the size of the fish was limited.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
15	0.57	1
16	0.64	1
17	0.71	1
18	0.78	1
19	0.84	1
20	0.91	1
21	0.98	1
22	1.05	1
23	1.12	0.5
<i>Shaded area denotes extrapolated estimates</i>		



**Brook Trout**

**Tannery Creek**

**Emmet 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	7	6.3	8	6.3	10.2
Datasets available:		1987				
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	7	0.17	0.11	0.27	0.23	4
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.583	0.487				

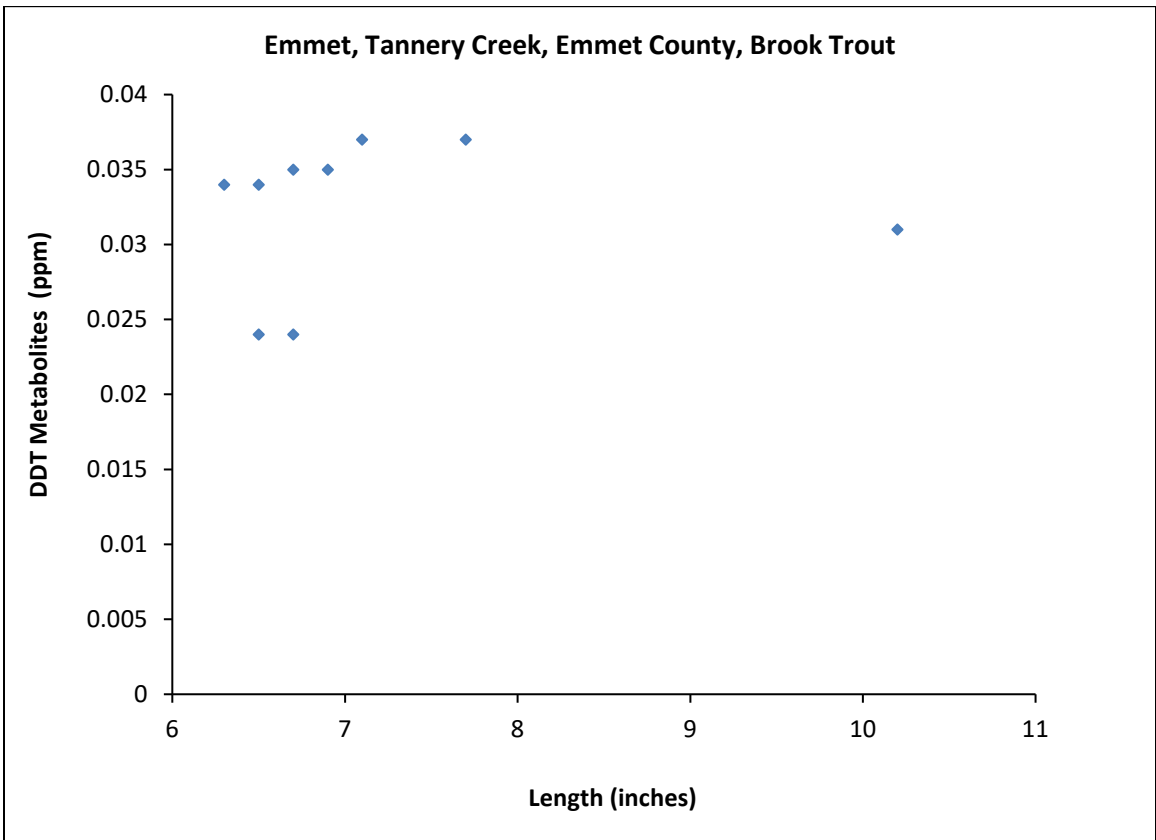
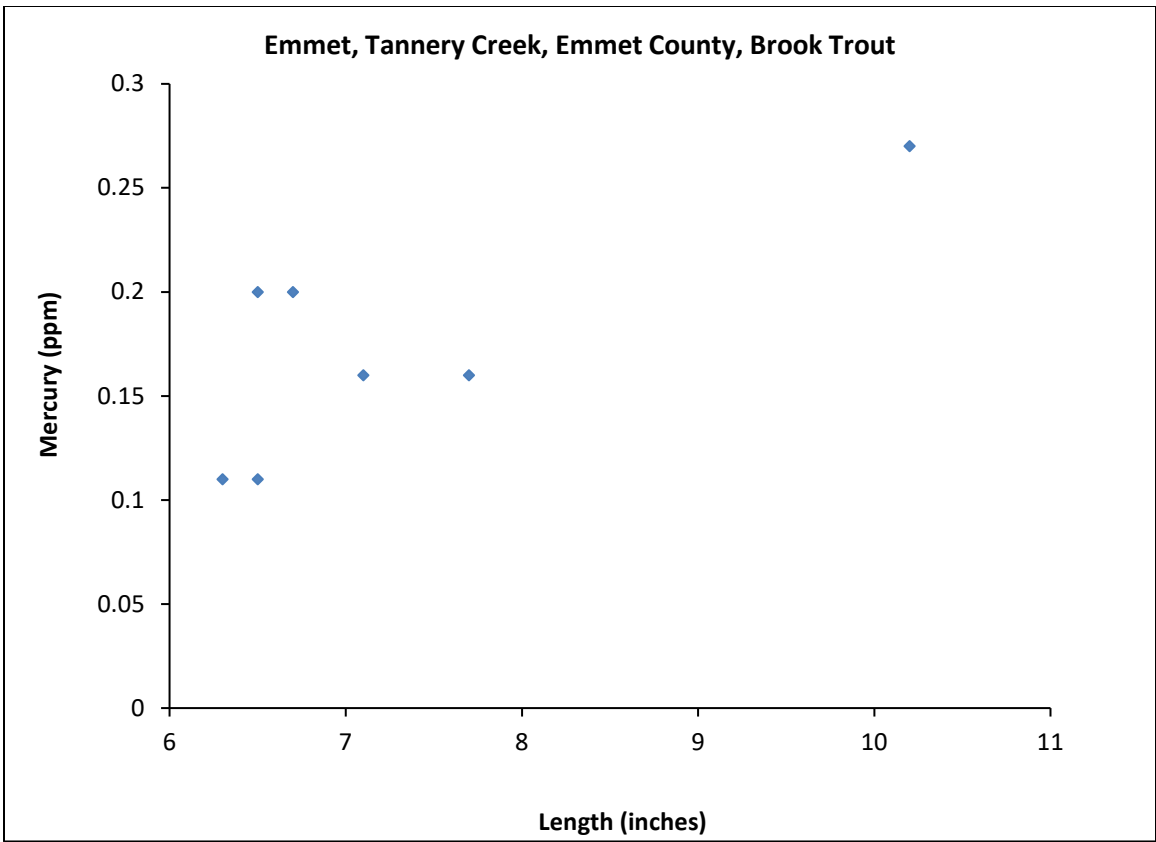
**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Size Range of All Samples	
Earliest	Most Recent				Min	Max
1987	1987	7	6.3	8	6.3	10.2
Datasets available:		1987				
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	9	ND	--	--	--	--
DDT	9	0.03	0.02	0.04	0.04	16
Chlordane	9	0.01	0.01	0.02	0.01	--
Toxaphene	9	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	0.004	0.007				
Chlordane	0.223	0.193				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>4</b>

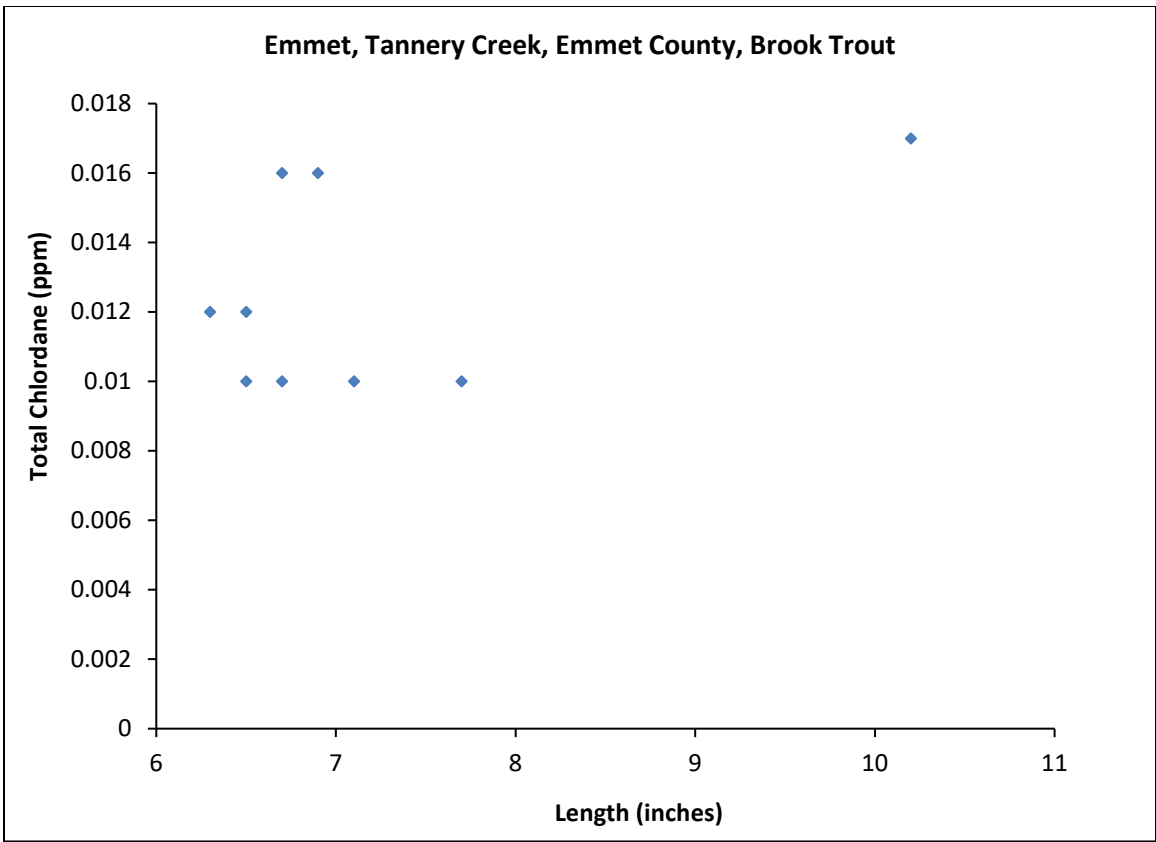
**Existing MDHHS Advisory:** There are no current consumption advisories for Tannery Creek brook trout.

**Recommendation:** No one should eat more than 4 meals per month of brook trout FROM Tannery Creek due to mercury.

*Note: All but 2 fish were sub-legal; largest fish had a Hg concentration of 0.27 ppm, next largest 0.16 ppm (both in 4/month range).*







# Grand Traverse County

**Northern Pike**

**Arbutus Lake**

**Grand Traverse 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
1993	1993	6	19.3	24	26.4	28.7
Datasets available: 1993						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	3	0.96	0.62	1.41	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.699	0.799				

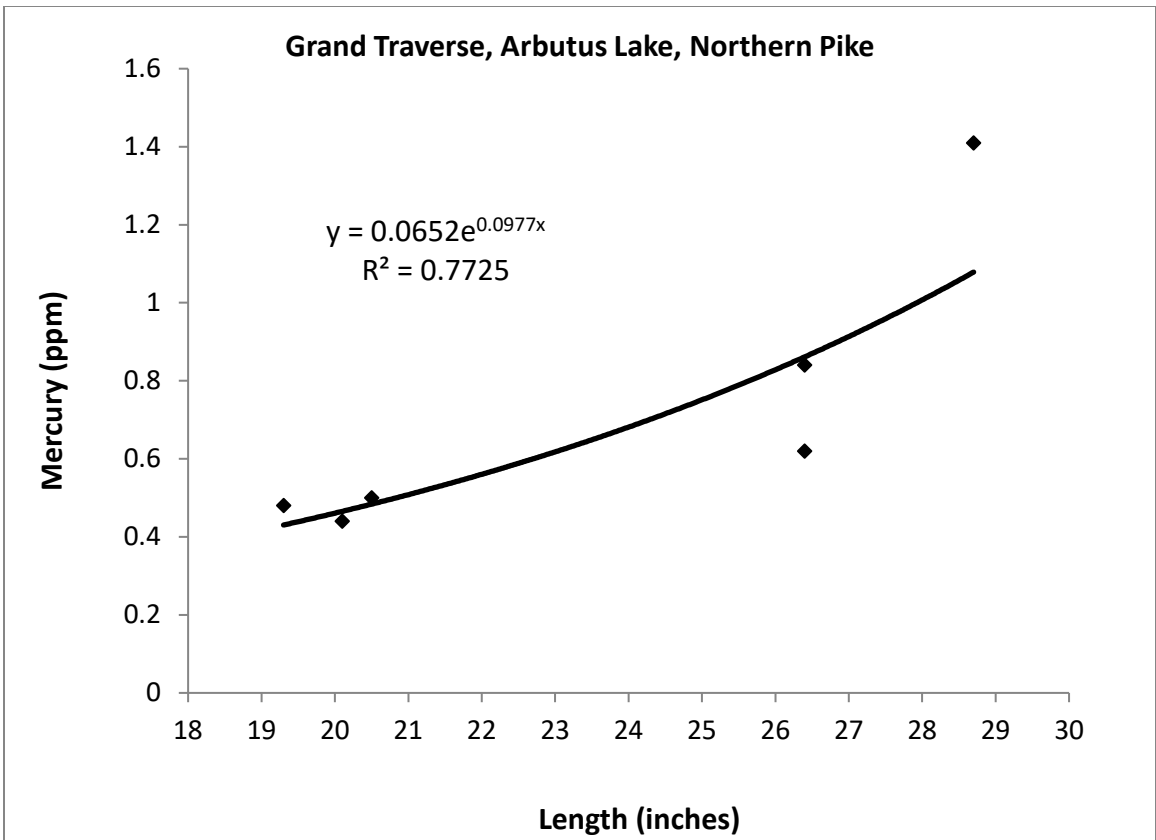
**Organics Analysis:**

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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						--

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

**Recommendation:** No one should eat more than 1 meal per month of Arbutus Lake northern pike smaller than 28 inches or more than 6 meals per month of those fish larger than 28 inches due to mercury.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
24	0.680	1
25	0.750	1
26	0.827	1
27	0.912	1
28	1.005	1
29	1.108	0.5
30	1.222	0.5
31	1.348	0.5
32	1.486	0.5
<i>Shaded area denotes extrapolated estimates</i>		



**Bluegill**

**Bass Lake**

**Grand Traverse 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	8.1	na	8.1	10.6
Datasets available: 1995						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.16	0.07	0.24	0.19	4
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.506	0.610				

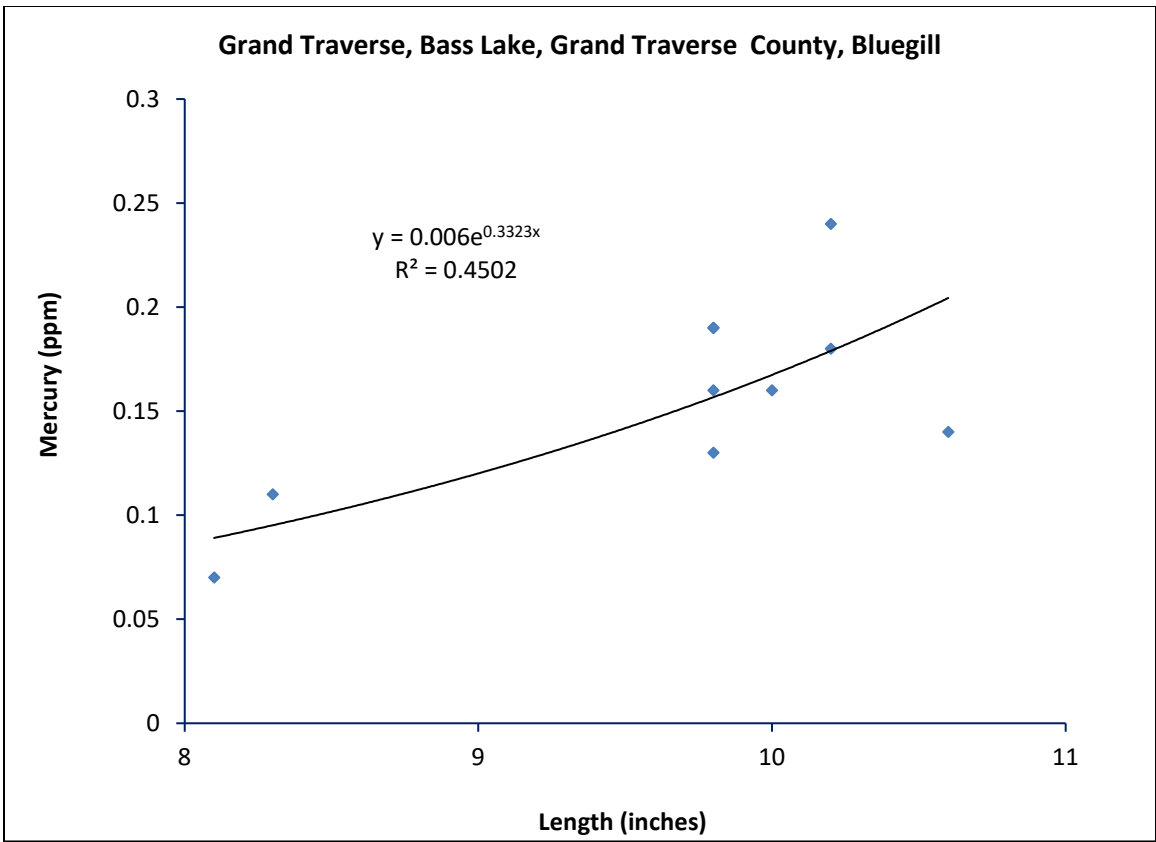
**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>4</b>

**Existing Advisory:** There are no current consumption advisories for Bass Lake bluegill.

**Recommendation:** No one should eat more than 8 meals per month of Bass Lake bluegill or other sunfish smaller than 9 inches or more than 4 meals per month of bluegill or other sunfish larger than 9 inches due to mercury.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
5	0.03	16
6	0.04	16
7	0.06	16
8	0.09	12
9	0.12	8
10	0.17	4
11	0.23	4
12	0.32	2
13	0.45	2
<i>Shaded area denotes extrapolated estimates</i>		



**Northern Pike**

**Bass Lake**

**Grand Traverse County**

**Hg Analysis:**

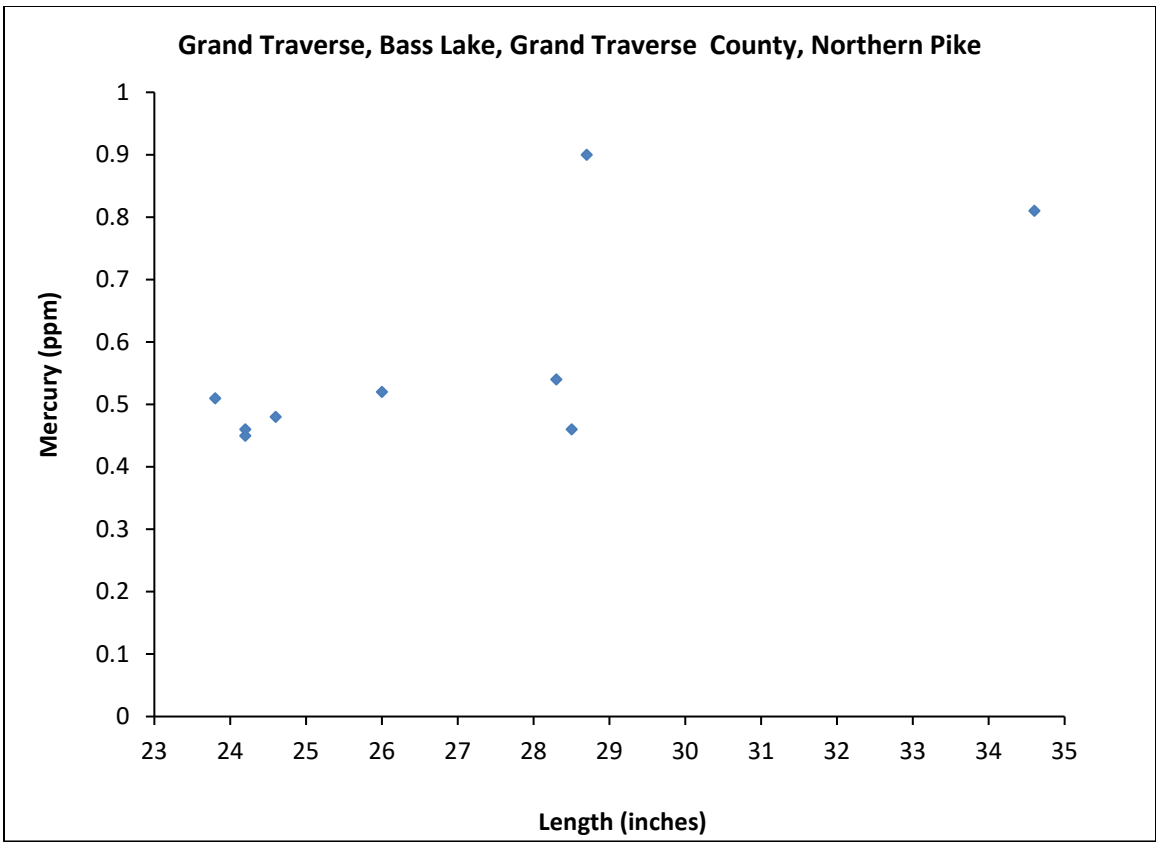
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1995	1995	9	23.8	24	23.8	34.6
Datasets available: 1995						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	9	0.57	0.45	0.90	0.70	1
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.503	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 (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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>1</b>

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

**Recommendation:** No one should eat more than 1 meal per month of Bass 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 as the size range of 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
1995	1995	2	9.8	na	9.8	11
Datasets available: 1995						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	2	0.215	0.200	0.230	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
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 (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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						--

**Existing Advisory:** Bass Lake yellow perch 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: No one should eat more than 4 meals per month of yellow perch from inland waters.

**Northern Pike**

**Boardman River  
Boardman Lake & Brown Bridge Pond**

**Grand Traverse  
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
1991	2007	10	18.2	na*	18.2	24.6
Datasets available: 1991, 2007						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.39	0.25	0.60	0.48	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.117	0.167				

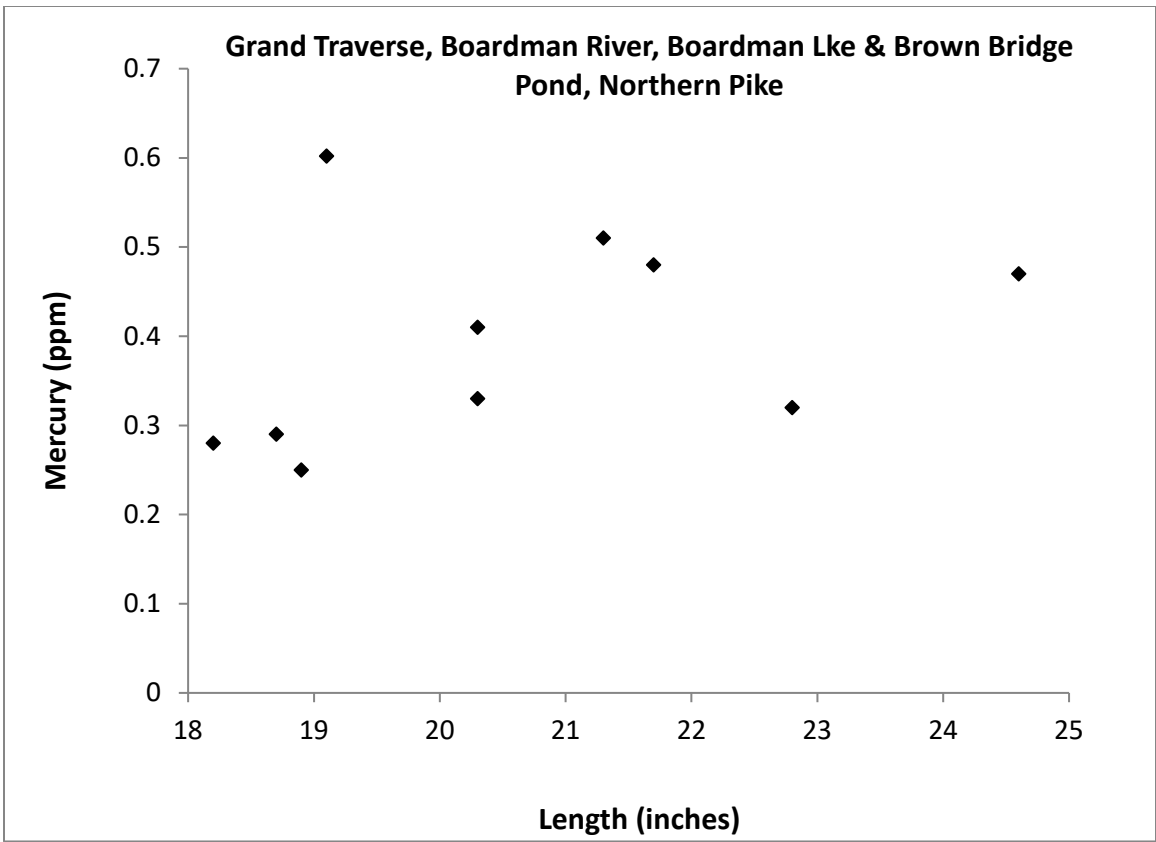
**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2007	2007	6	18.2	na*	18.2	24.6
Datasets available: 1991, 2007						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	6	ND	--	--	--	--
DDT	6	ND	--	--	--	--
Chlordane	6	ND	--	--	--	--
Toxaphene	6	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2</b>

\* - there is no minimum size limit on these fish

**Existing Advisory:** Northern pike from Boardman River impoundments are covered by the statewide mercury consumption advisory.

**Recommendation:** No one should eat more than 2 meals per month of northern pike from the Boardman River or its impoundments upstream of the Sixth Street 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 range of fish was limited.



**Walleye**

**Boardman River  
Boardman Lake**

**Grand Traverse 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
1991	1991	10	13	15	15	20.3
Datasets available: 1991						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	9	0.28	0.13	0.65	0.39	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.554	0.581				

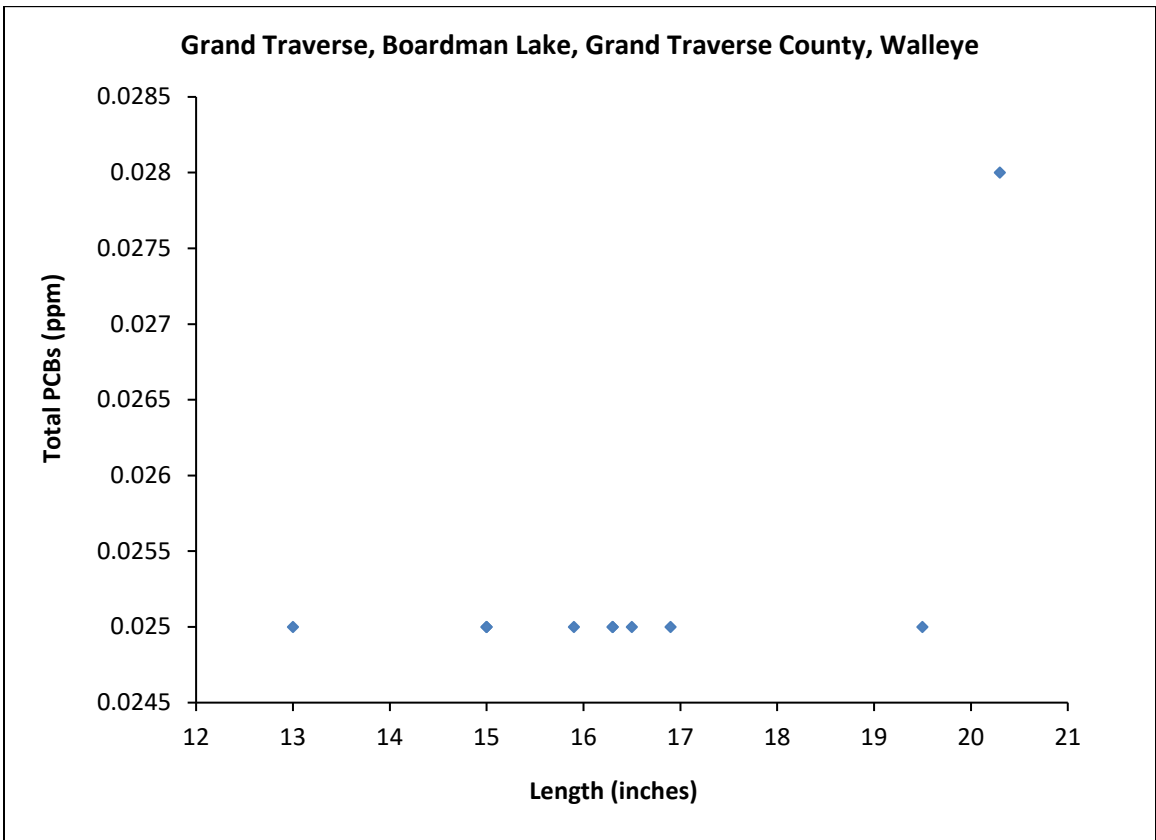
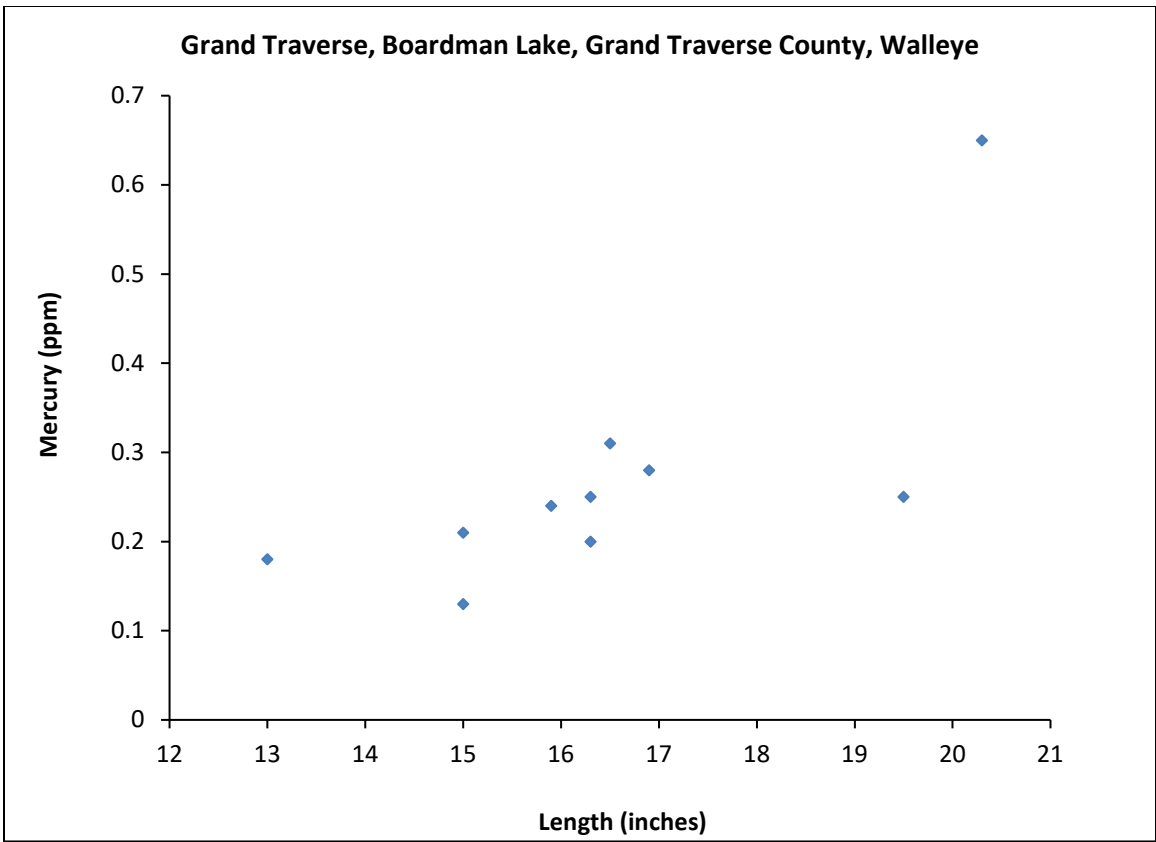
**Organics Analysis:**

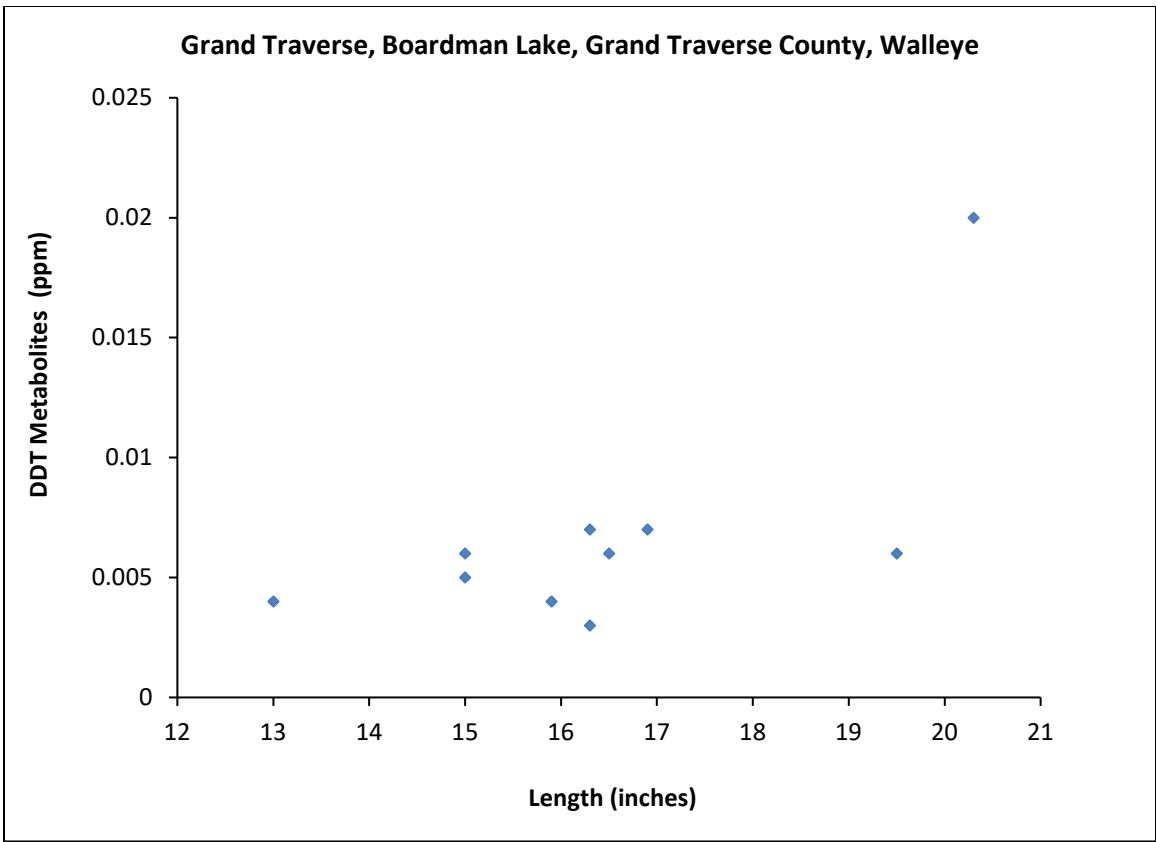
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1991	1991	10	13	15	15	20.3
Datasets available: 1991						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	9	0.02*	0.02	0.03	0.03	8*
DDT	9	0.007	0.003	0.007	0.01	16
Chlordane	9	ND	--	--	--	--
Toxaphene	9	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.400	0.400				
DDT	0.478	0.468				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2</b>

\* - PCB concentrations were at or near the detection level of 0.025 ppm

**Existing Advisory:** Boardman 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 from the Boardman River or its impoundments upstream of the Sixth Street Dam or more than 1 meal per month of those fish larger than 20 inches due to mercury. The statewide length break applied as the size range of the fish was limited. PCBs would cause an advisory. \*However, based on the MDEQ Fish Contaminant Monitoring Program, PCB, DDT, and Toxaphene concentrations ≥15 years old are expected to have declined.





**White Sucker**

**Boardman River  
Boardman Lake, Sabin Pond, Brown Bridge Pond**

**Grand Traverse  
County**

**Hg Analysis:**

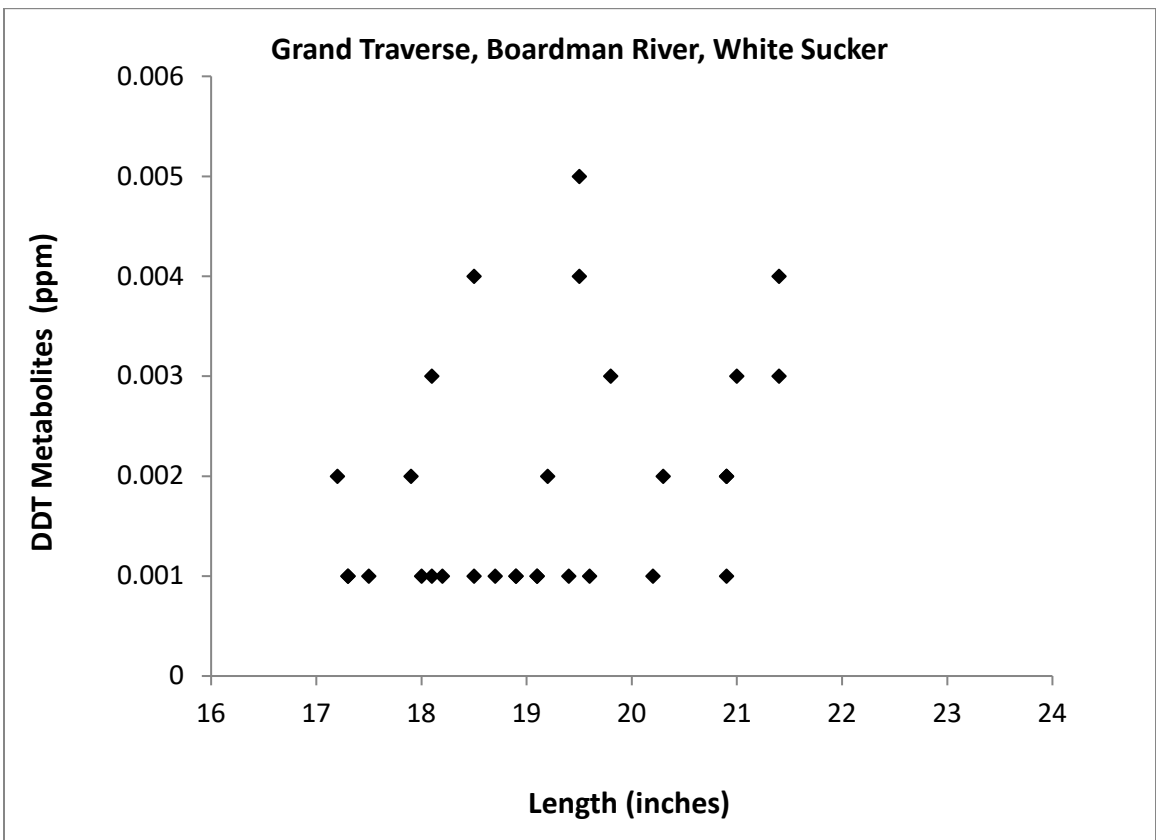
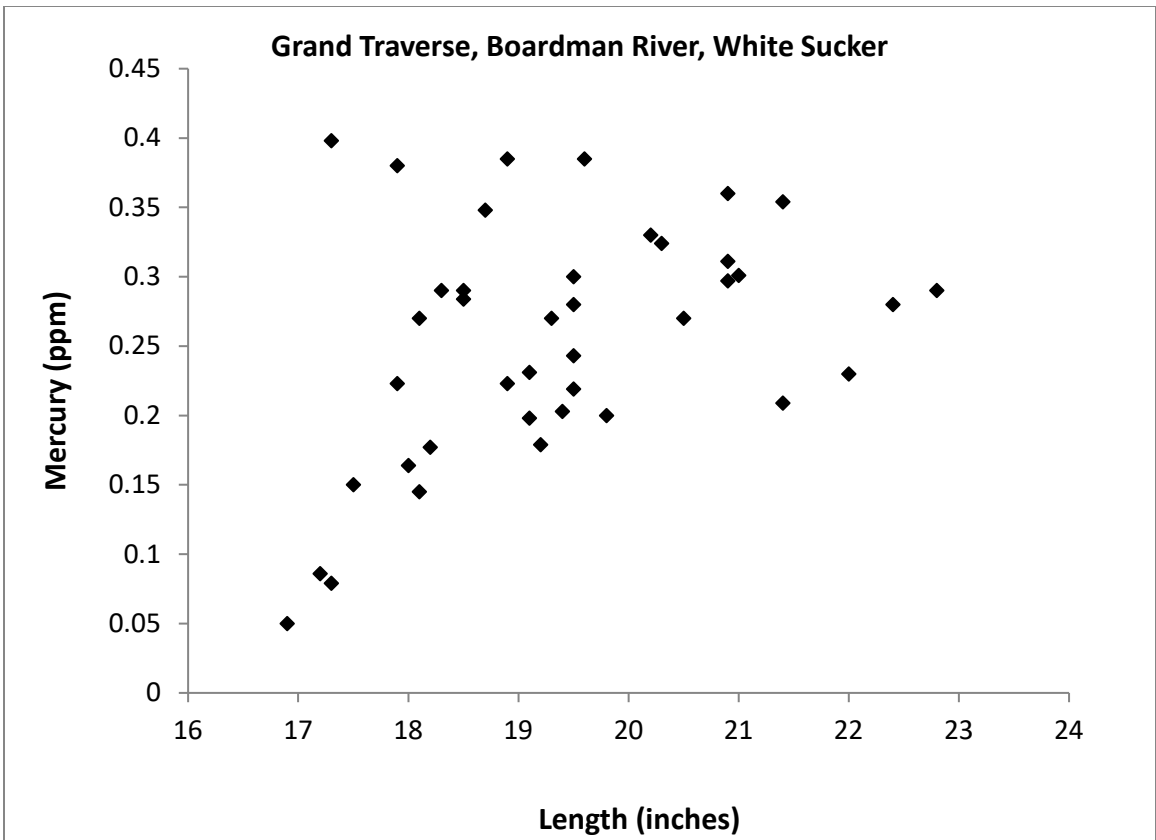
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1991	2007	40	16.9	na	16.9	22.8
Datasets available: 1991, 2007						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	40	0.26	0.05	0.40	0.28	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.153	0.223				

**Organics 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	18.5	na	17.2	21.4
Datasets available: 1991, 2007						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	30	ND	--	--	--	--
DDT	30	0.002	0.001	0.005	0.002	16
Chlordane	30	ND	--	--	--	--
Toxaphene	30	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	0.125	0.148				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2</b>

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

**Recommendation:** No one should eat more than 2 meals per month of sucker from the Boardman River or its impoundments upstream of the Sixth Street Dam due to mercury.





**Largemouth  
and Smallmouth Bass  
Hg Analysis:**

**Fife Lake**

**Grand Traverse County**

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	13.7	14	13.7	15.8
Datasets available: 2013						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.32	0.22	0.40	0.36	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.654	0.621				

**Organics Analysis:**

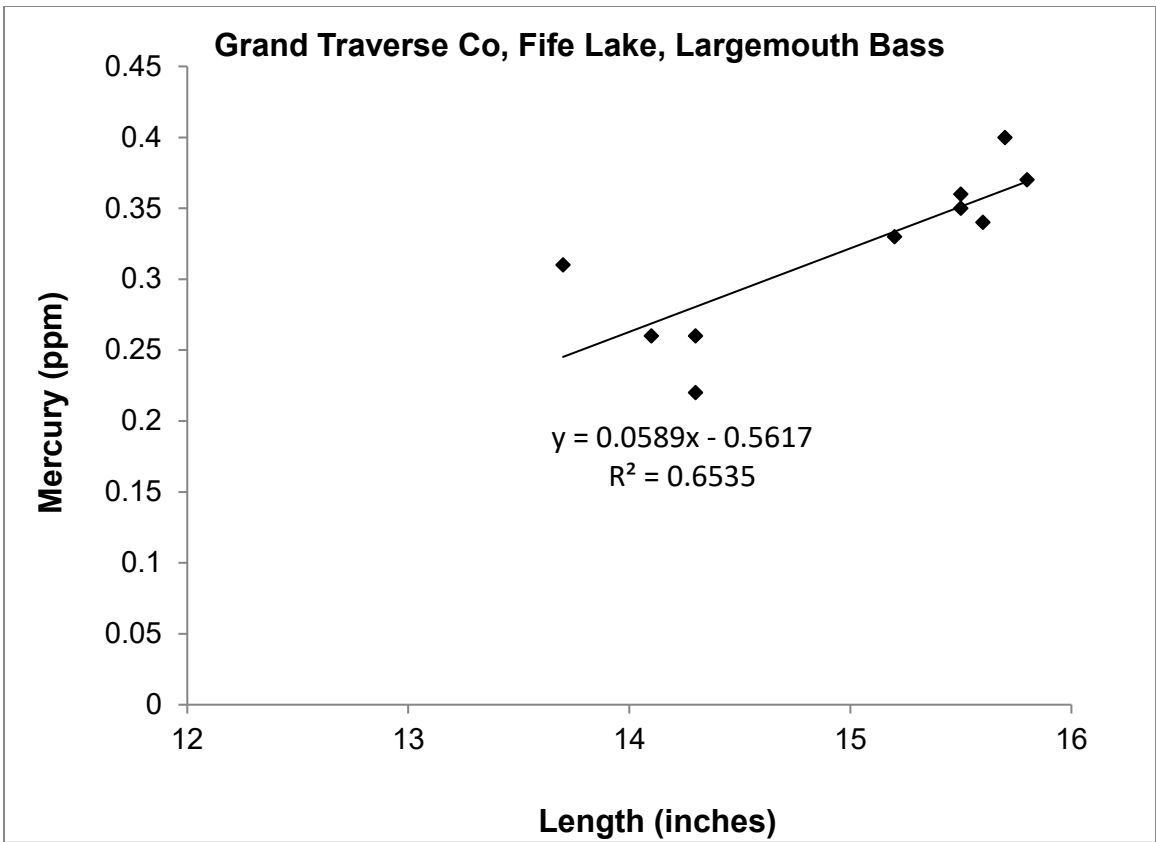
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0	--	--	--	--
Datasets available: --						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT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

**Existing Advisory:** Fife Lake largemouth 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 due to mercury.

**Recommendation:**

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 due to mercury. The statewide length break was applied as the size range of fish was limited.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
12	0.15	4
14	0.26	4
16	0.38	2
18	0.5	2
20	0.62	1
<i>Shaded area denotes extrapolated estimates</i>		



Lake Trout

Green Lake

Grand Traverse 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	2013	20	22	15	22	32
Datasets available: 2003, 2013						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	20	0.69	0.54	1.1	0.77	1
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.074	0.072				

Organics Analysis:

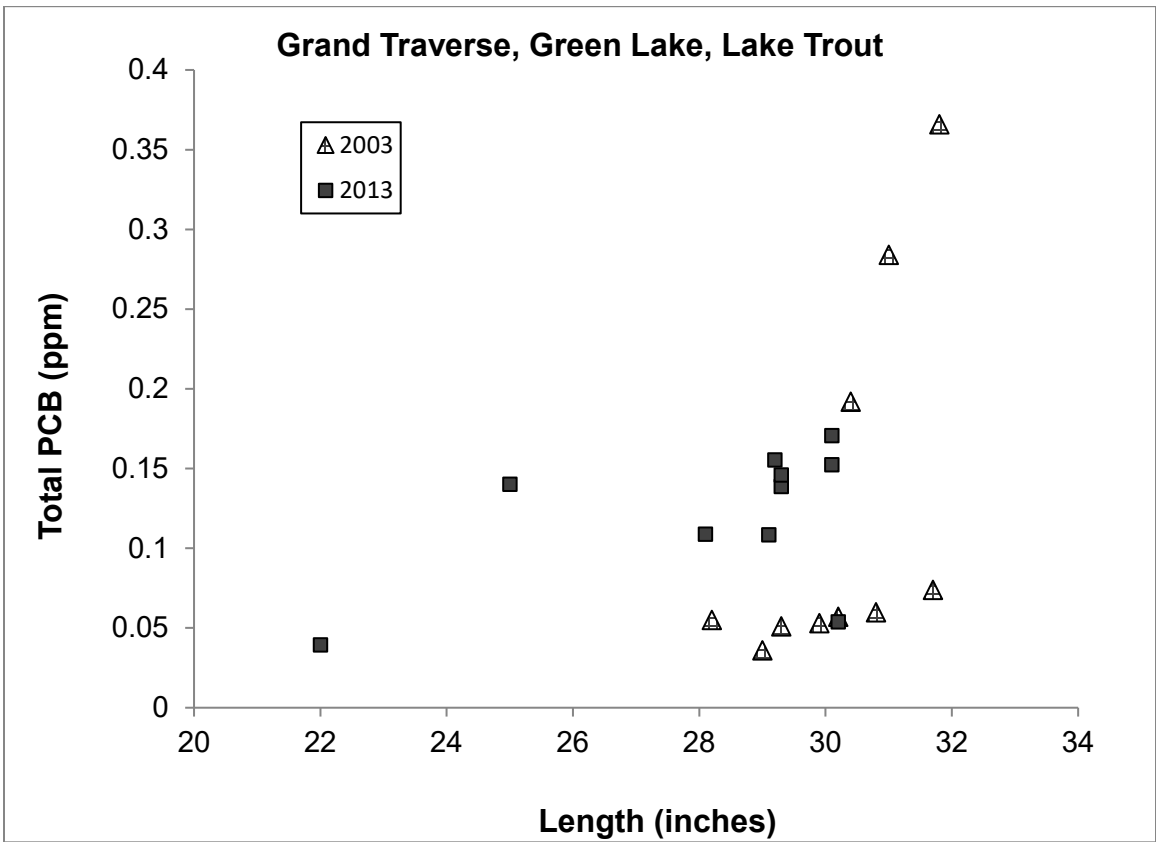
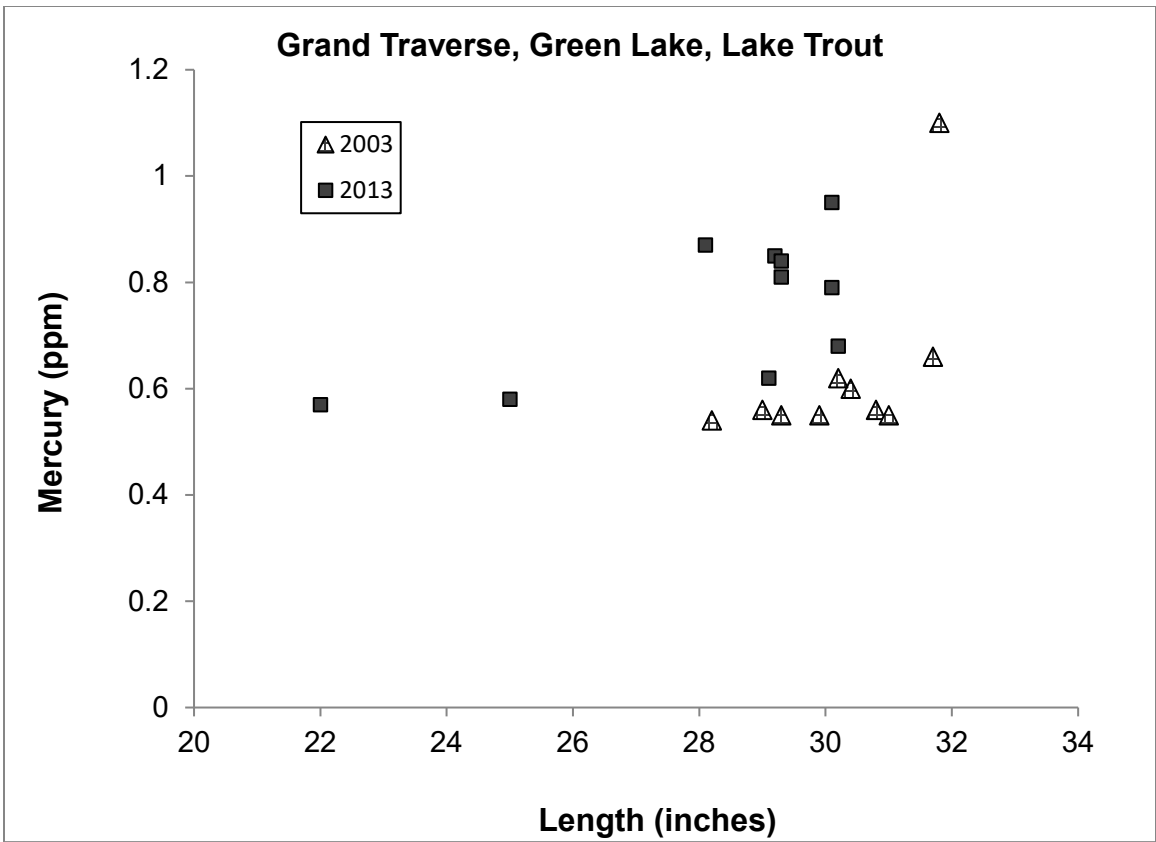
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2003	2013	20	22	15	22	32
Datasets available: 2003, 2013						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	20	0.122	0.036	0.366	0.162	1
DDT	20	0.249	0.07	0.722	0.317	4
Chlordane	20	0.028	0.007	0.098	0.037	--
Toxaphene	20	ND	--	--	--	--
TEQ*	10	7.8 ppt	3.5 ppt	11.1 ppt	9.6 ppt	0.5
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.125	0.117				
DDT	0.212	0.348				
Chlordane	0.217	0.412				
Toxaphene	--	--				
TEQ*	0.628	0.759				
<b>Final meal category based on UCL:</b>						<b>0.5</b>

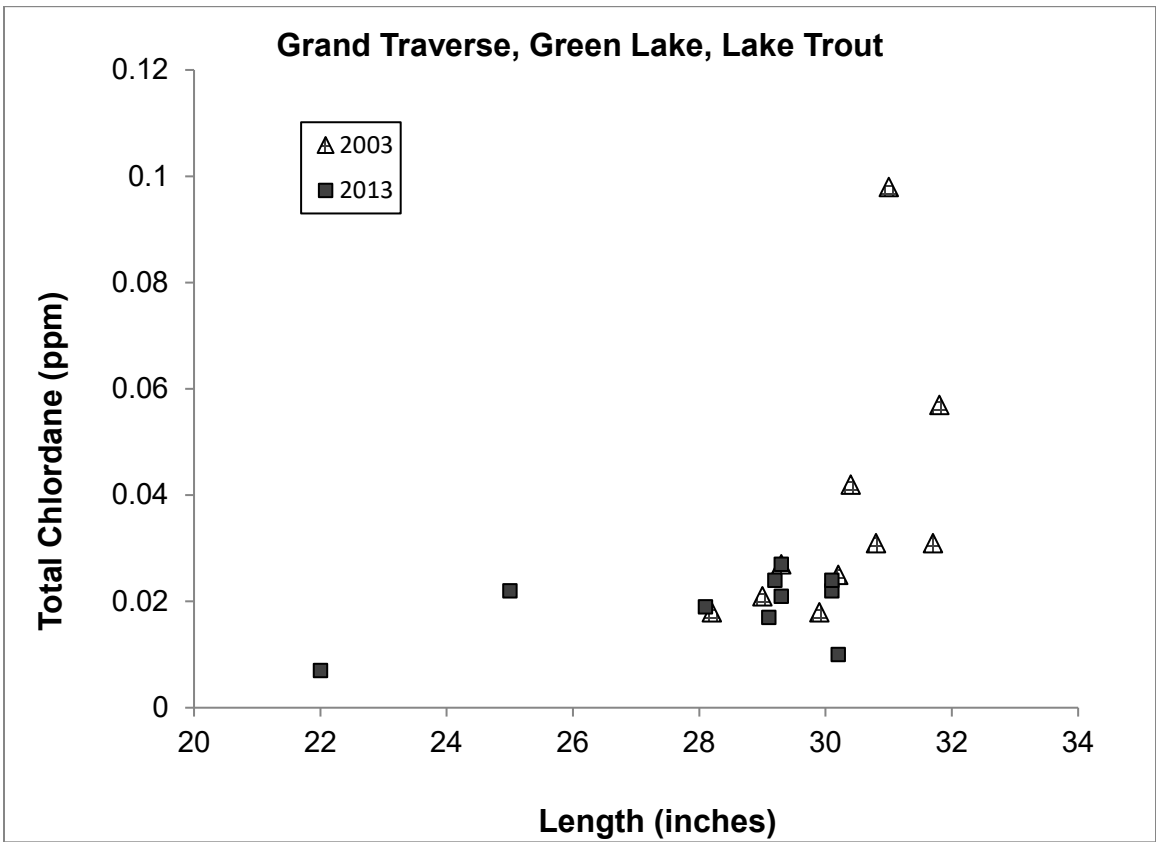
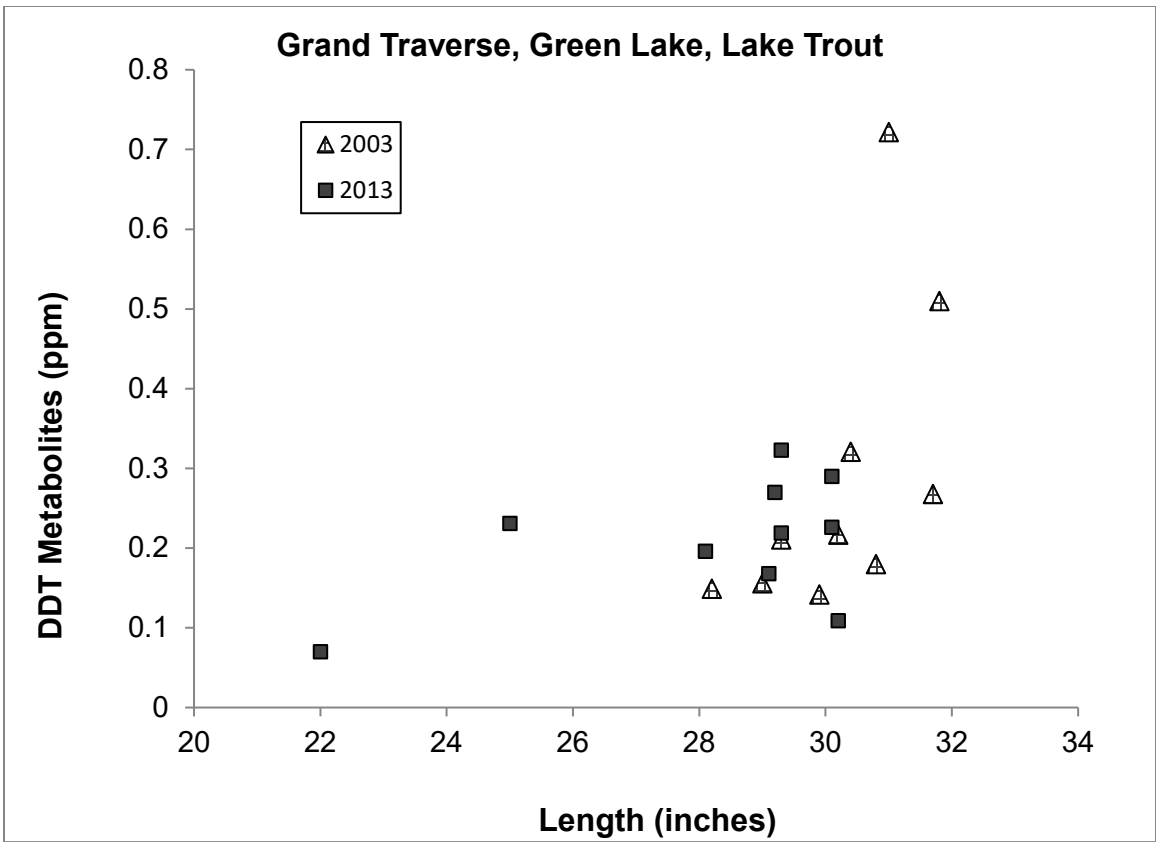
\* - WHO 2005 TEFs; dIPCBs included

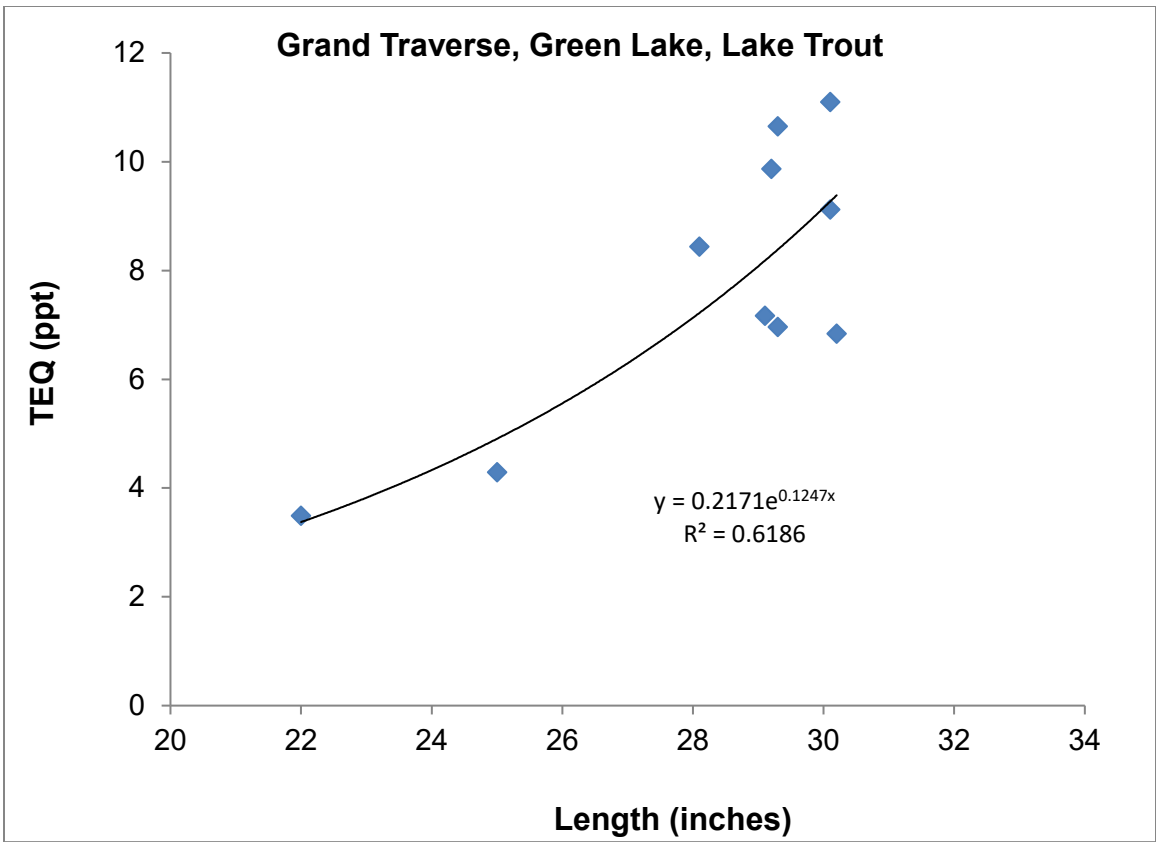
**Existing Advisory:** No one should eat more than 1 meal per month of Green Lake lake trout due to dioxins, PCBs, and mercury. DDT would cause an advisory.

**Recommendation:** No one should eat more than 1 meal per month of Green Lake lake trout smaller than 28 inches or more than 6 meals per year of those fish larger than 28 inches due to dioxins. PCBs, mercury, and DDT would cause advisories.

Length (Inches)	TEQ Regression Equation Estimate (ppt)	Meal Category
20	2.6	2
22	3.4	2
24	4.3	1
26	5.6	1
28	7.1	1
30	9.2	0.5
32	11.7	0.5
34	15.1	Limited
<i>Shaded area denotes extrapolated estimates</i>		







**Hg Analysis:**

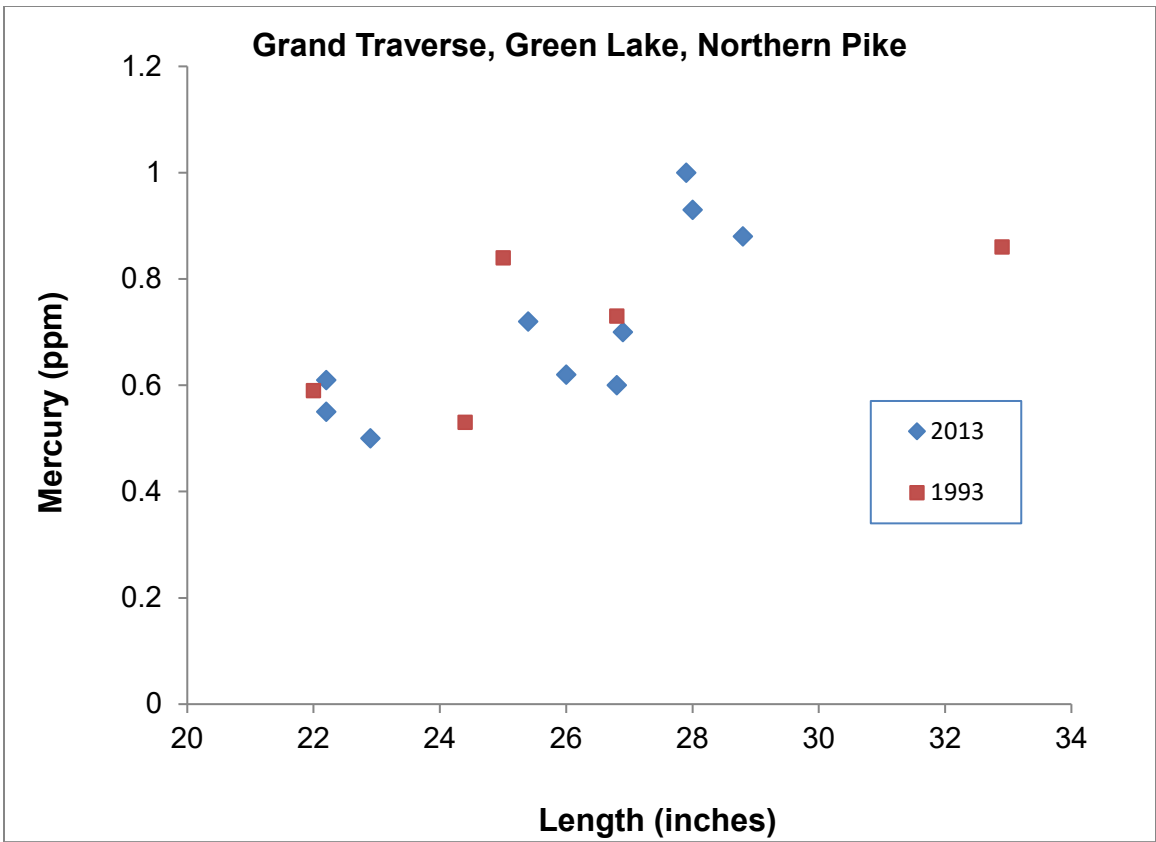
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1993	2013	15	22	24	24.4	32.9
Datasets available: 1993, 2013						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	11	0.76	0.53	1.0	0.86	1
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.513	0.527				

**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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>1</b>

**Existing Advisory:** No one should eat more than 1 meal per month of Green Lake northern pike smaller than 30 inches or more than 6 meals per year of those fish larger than 30 inches due to mercury.

**Recommendation:** No change is recommended. The statewide length break was applied as the number of samples larger than 30 inches is limited.





**White Sucker**

**Green Lake**

**Grand Traverse County**

**Hg Analysis:**

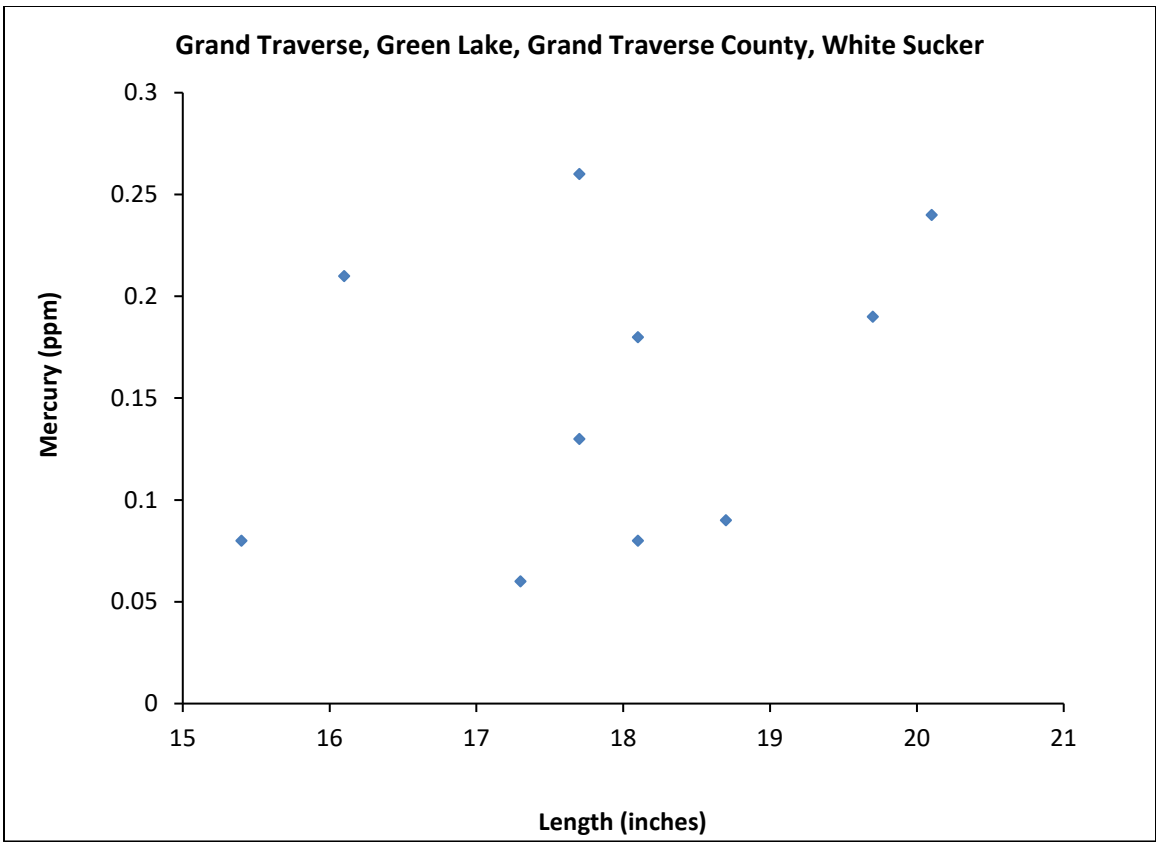
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1993	1993	10	15.4	na	15.4	20.1
Datasets available: 1993						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.15	0.06	0.26	0.20	4
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.112	0.120				

**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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>4</b>

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

**Recommendation:** No one should eat more than 4 meals per month of Green Lake sucker due to mercury.



**Walleye**

**Long Lake**

**Grand Traverse 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	6	14.4	15	14.4	19.6
Datasets available: 2007						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	6	0.35	0.27	0.42	0.39	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.632	0.671				

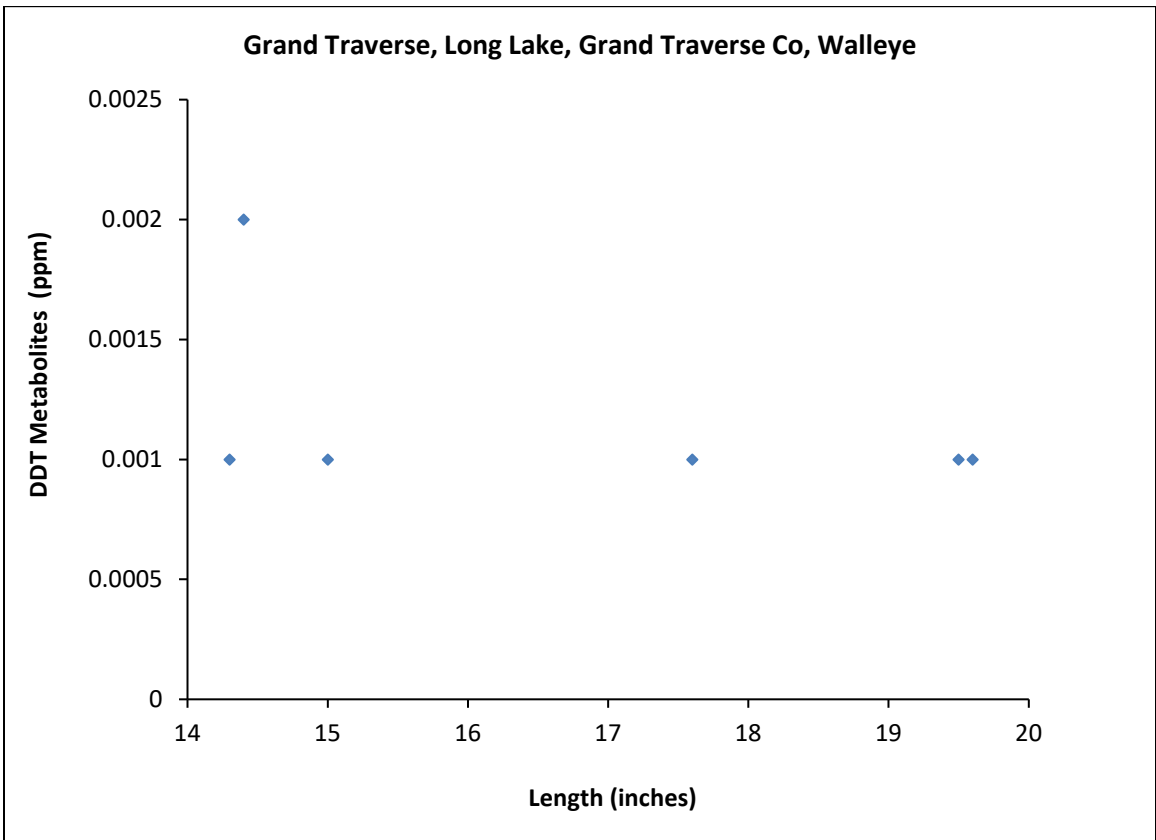
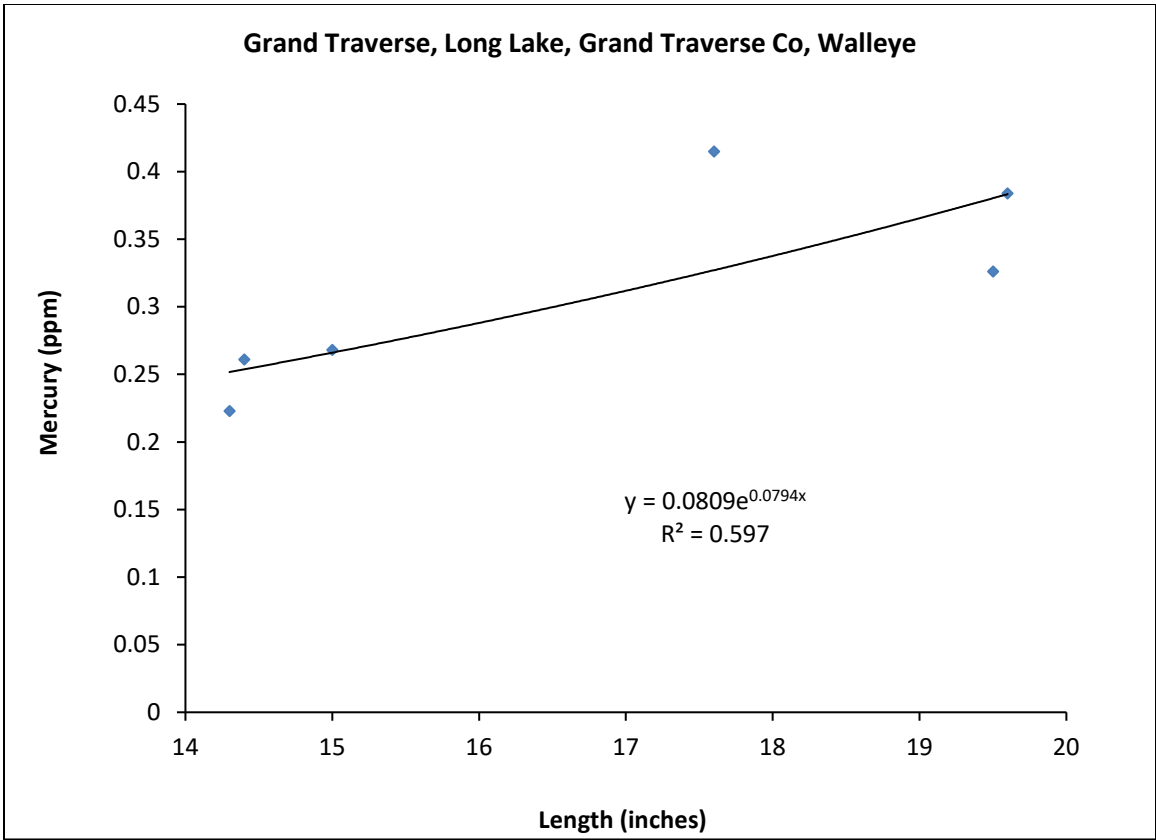
**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2007	2007	6	14.4	15	14.4	19.6
Datasets available: 2007						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	6	ND	--	--	--	--
DDT	6	0.001	0.001	0.002	--	--
Chlordane	6	ND	--	--	--	--
Toxaphene	6	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	0.211	0.211				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2</b>

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

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

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
15	0.27	4
16	0.29	2
17	0.31	2
18	0.34	2
19	0.37	2
20	0.40	2
21	0.43	2
22	0.46	2
23	0.50	2
<i>Shaded area denotes extrapolated estimates</i>		



**Hg Analysis:**

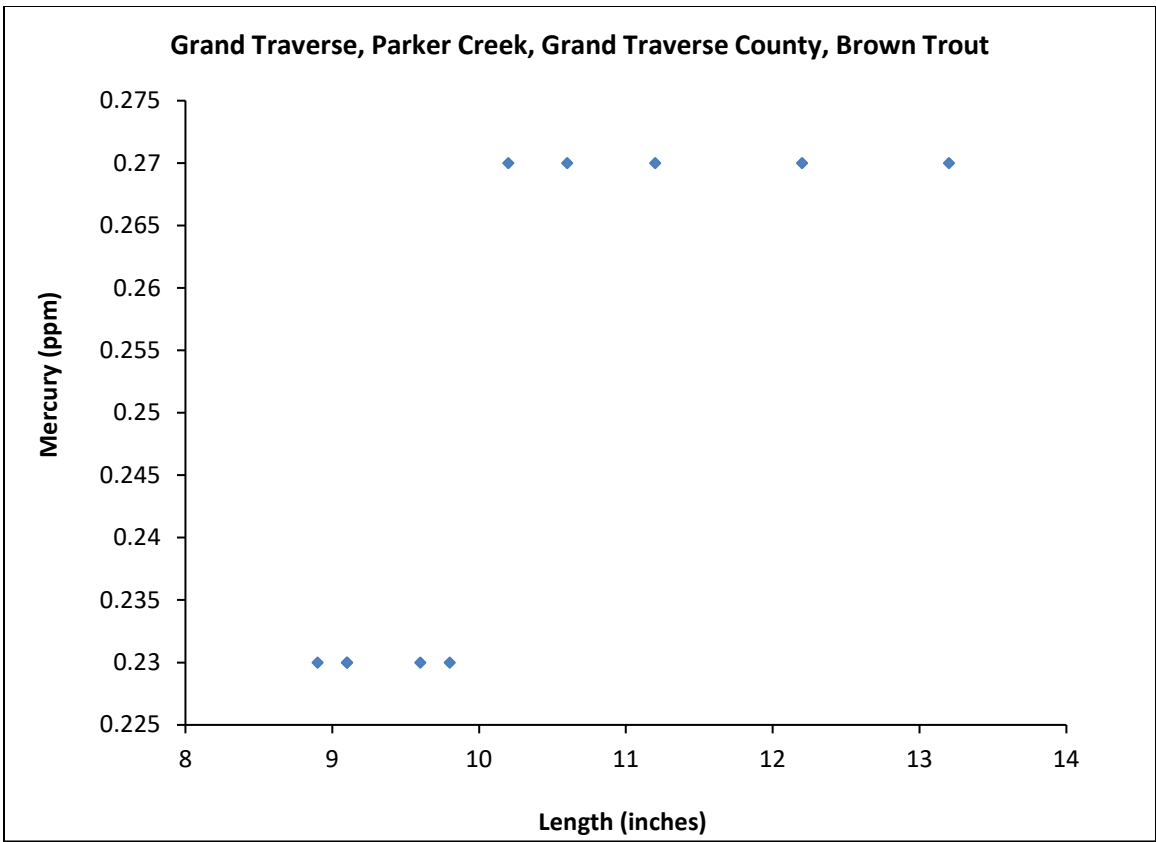
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1998	1998	10	8.9	8	8.9	13.2
Datasets available: 1998						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	2*	0.25	0.23	0.27	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
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	8.9	8	8.9	13.2
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*	0.006	0.006	0.006	--	--
Chlordane	2*	ND	--	--	--	--
Toxaphene	2*	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						--

**Existing Advisory:** There are no current consumption advisories for Parker Creek 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.



**Walleye**

**Silver Lake**

**Grand Traverse 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	13.8	15	14.6	18.4
Datasets available: 2007						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	8	0.39	0.19	0.56	0.52	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.856	0.922				

**Organics Analysis:**

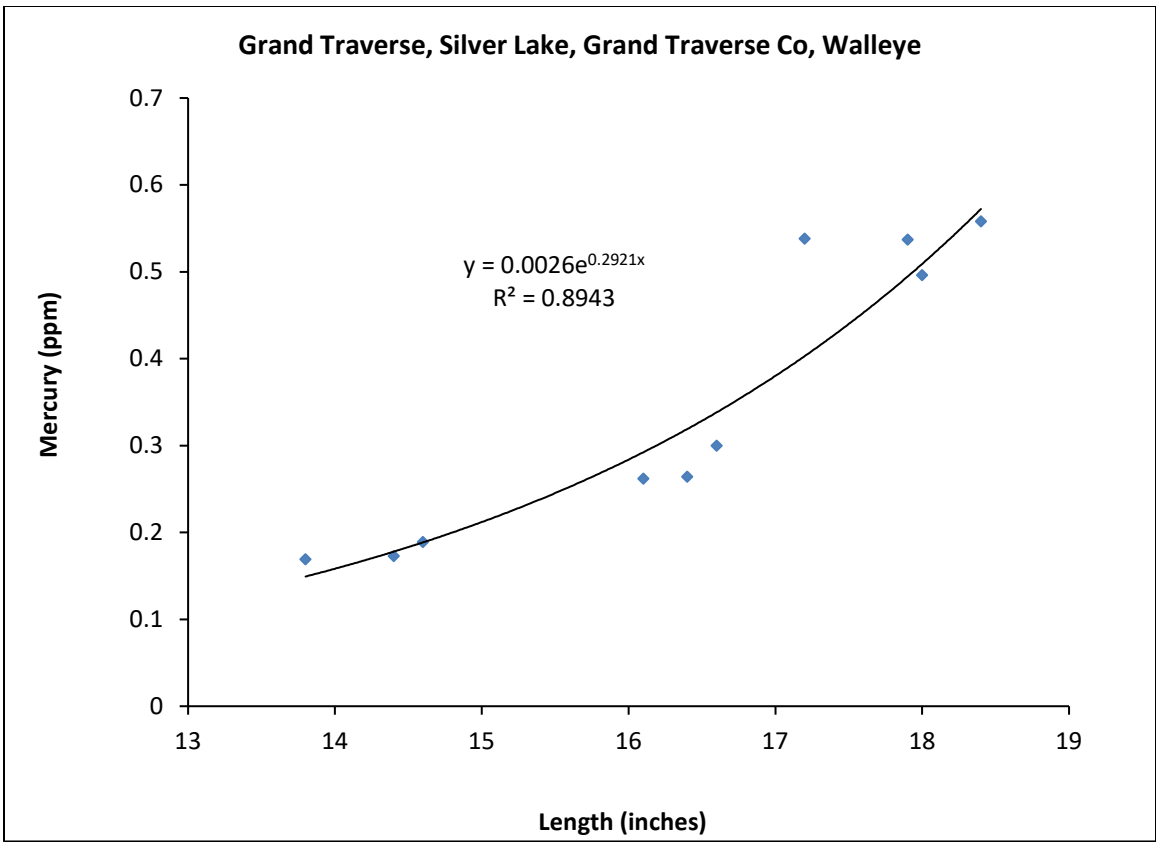
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available: --						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--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

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

**Recommendation:** No one should eat more than 2 meals per month of Silver Lake walleye 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
15	0.208	4
16	0.278	2
17	0.373	2
18	0.499	2
19	0.669	1
20	0.896	1
21	1.199	0.5
22	1.606	0.5
23	2.151	0.5

*Shaded area denotes extrapolated estimates*





# Kalkaska County

**Brown Trout**

**Bear Lake**

**Kalkaska 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	4	12.2	12	12.2	14.2		
Datasets available:		1987						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category		
Mercury	4	ND*	--	--	--	--		
Chemical	Linear Regression	Exponential Regression						
	R <sup>2</sup>	R <sup>2</sup>						
Mercury	--	--	* - detection level = 0.10 ppm					

**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 <sup>2</sup>	R <sup>2</sup>							
PCB	--	--							
DDT	--	--							
Chlordane	--	--							
Toxaphene	--	--					<b>Final meal category based on UCL:</b>		--

**Existing Advisory:** There are no current consumption advisories for Bear Lake 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.

**Smallmouth Bass**

**Bear Lake**

**Kalkaska 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	7	8.7	14	14.0	16.1
Datasets available: 1987						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	7	0.23	0.12	0.35	0.32	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.833	0.877				

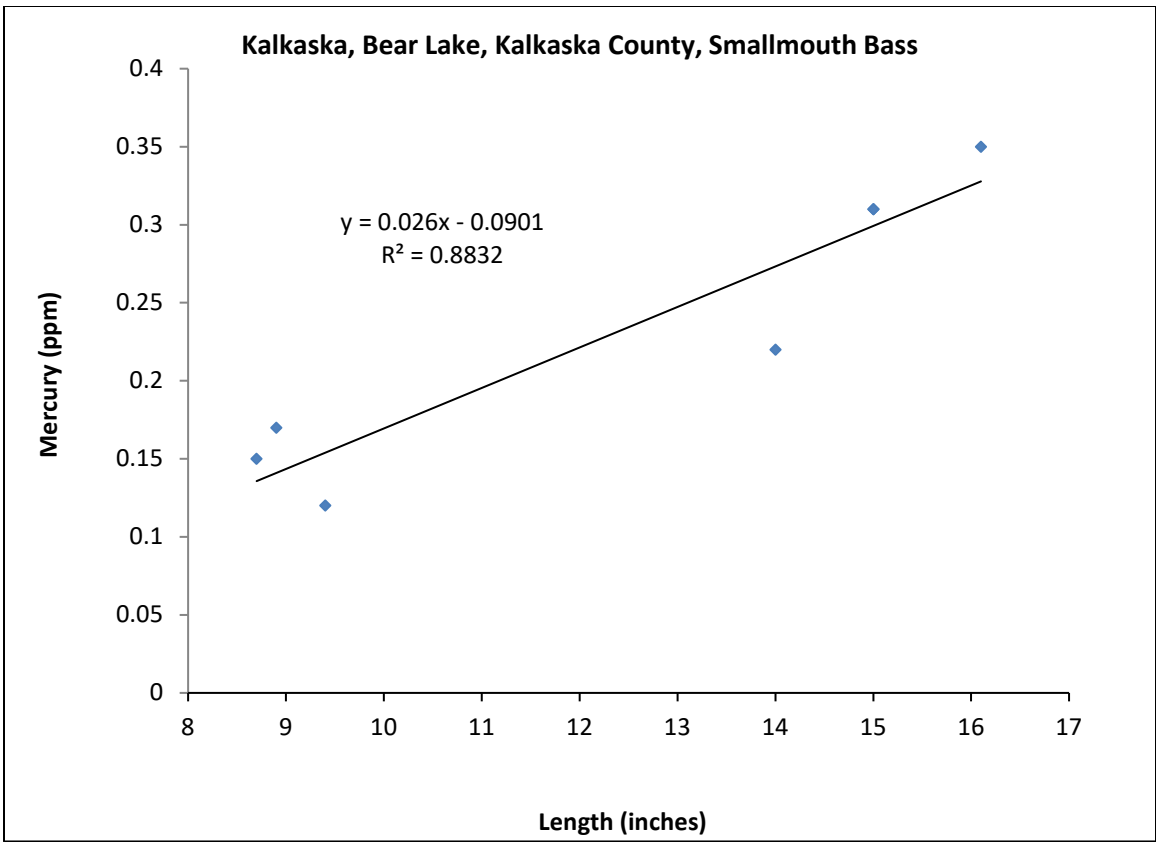
**Organics Analysis:**

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 (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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2</b>

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

**Recommendation:** No one should eat more than 2 meals per month of Bear Lake 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.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
14	0.27	2
15	0.30	2
16	0.33	2
17	0.35	2
18	0.38	2
19	0.40	2
20	0.43	2
21	0.46	2
22	0.48	2
<i>Shaded area denotes extrapolated estimates</i>		



**Northern Pike**

**Big Blue Lake**

**Kalkaska 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	24.8	24.0	24.8	43.0
Datasets available: 2018						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.816	0.570	1.300	0.989	1
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.845	0.849				

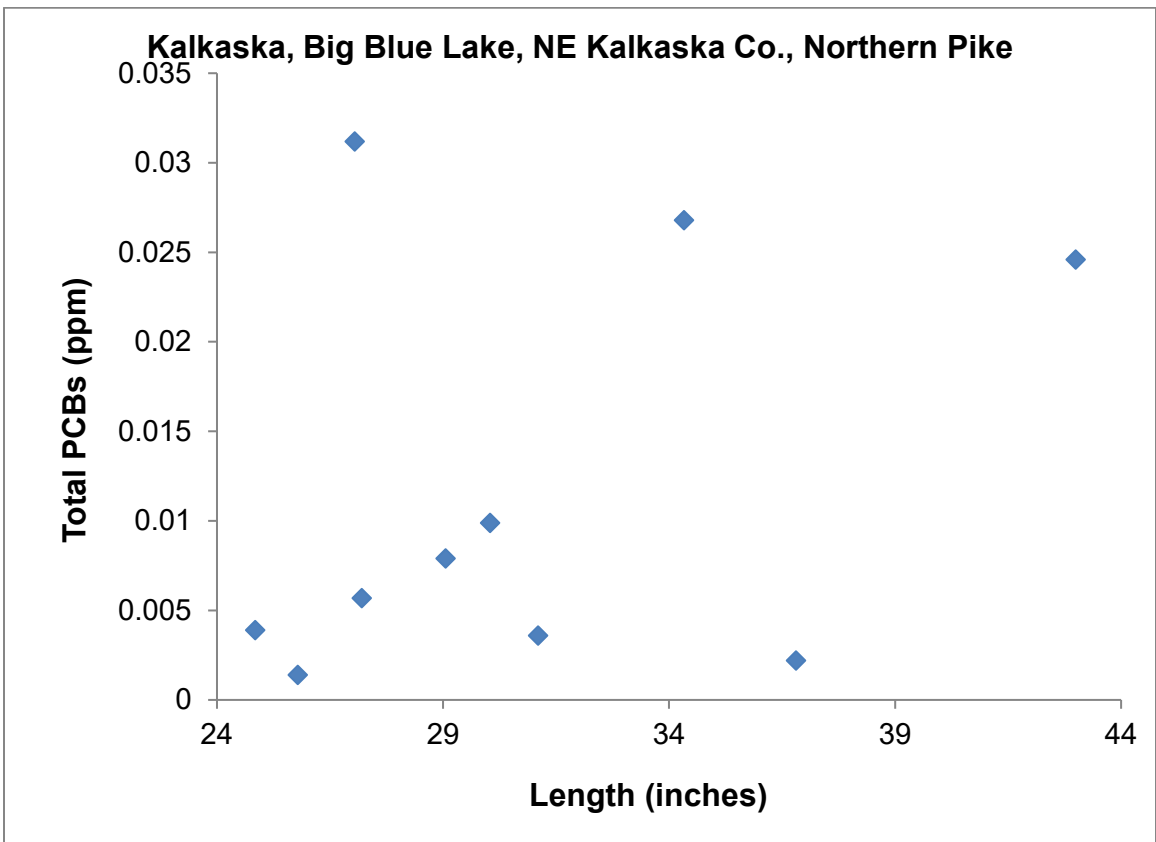
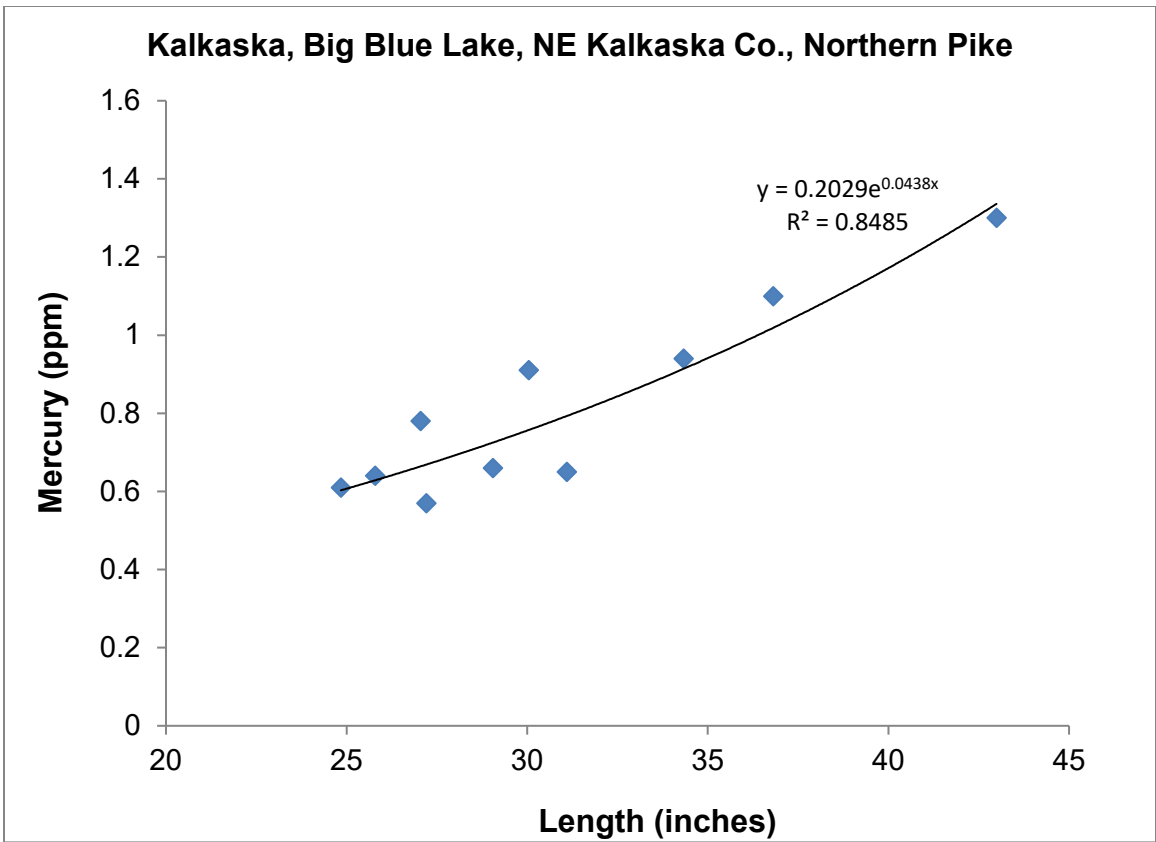
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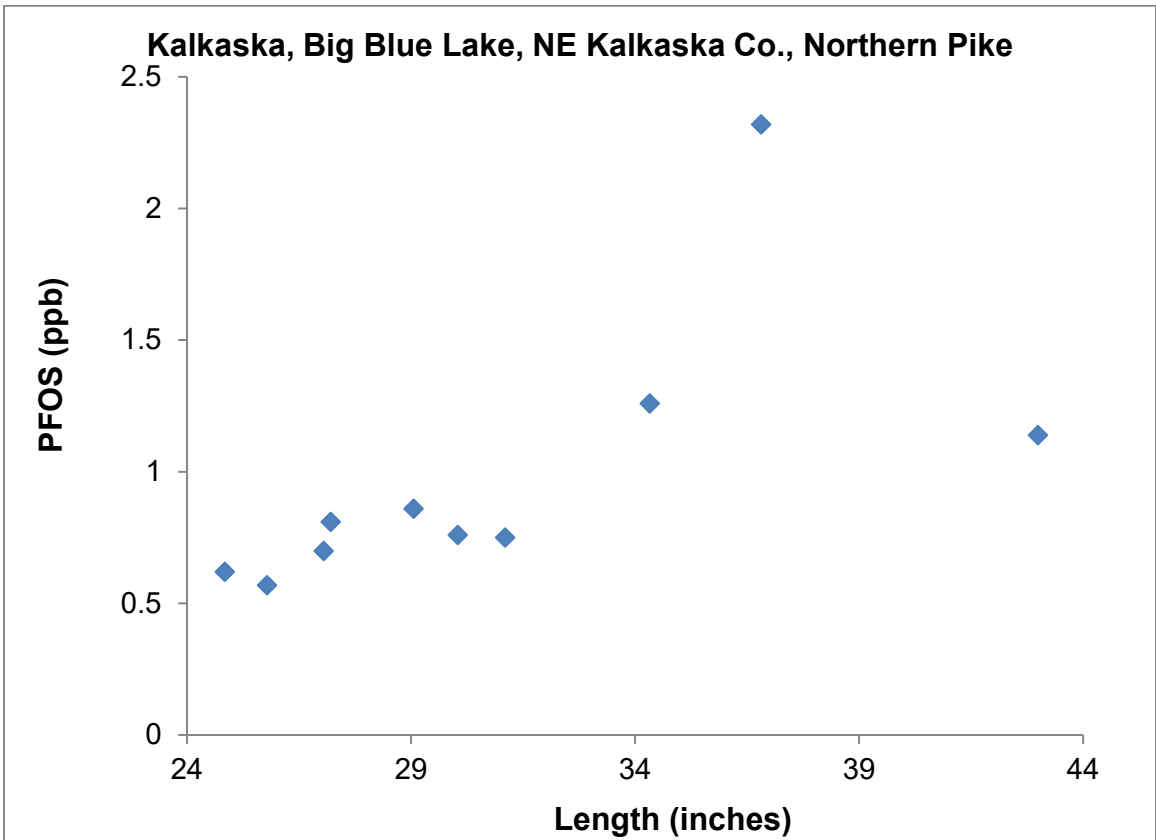
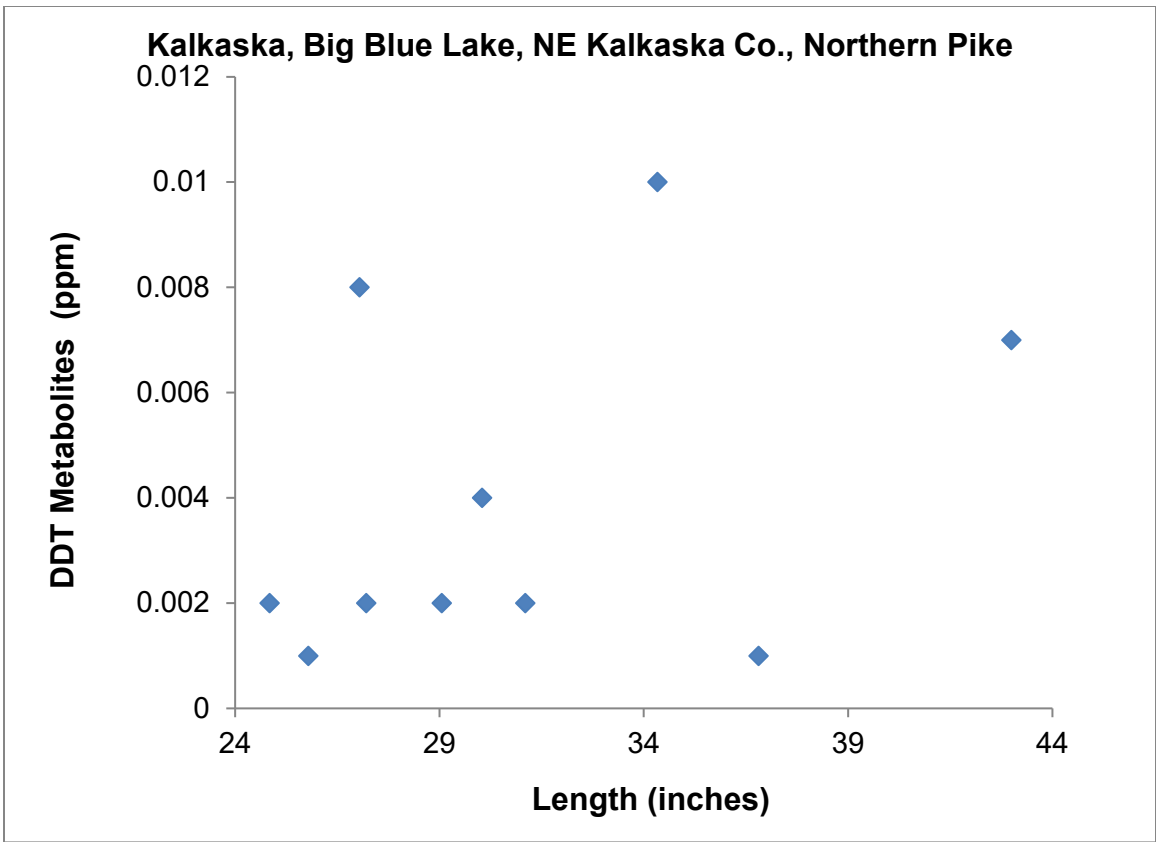
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2018	2018	10	24.8	24.0	24.8	43.0
Datasets available: 2018						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.012	<0.001	0.031	0.020	12
DDT	10	0.004	<0.001	0.010	0.006	16
Chlordane	10	0.001	<0.001	0.002	0.001	16
Toxaphene	10	ND	--	--	--	--
PFOS	10	1.0 ppb	0.6 ppb	2.3 ppb	1.4 ppb	16
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.127	0.120				
DDT	0.140	0.110				
Chlordane	0.045	0.045				
Toxaphene	--	--				
PFOS	0.422	0.555				
<b>Final meal category based on UCL:</b>						<b>1</b>

**Existing MDHHS Advisory:** Northern pike from Big Blue Lake in Kalkaska 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 these fish larger than 30 inches.

**Recommendation:** No one should eat more than 1 meal per month of northern pike smaller than 40 inches from Big Blue Lake in Kalkaska County or no more than 6 meals per year of these fish larger than 40 inches due to mercury. PCBs cause less restrictive guidance.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
24	0.281	1
26	0.634	1
28	0.692	1
30	0.755	1
32	0.824	1
34	0.900	1
36	0.982	1
38	1.072	1
40	1.170	0.5
42	1.277	0.5





**Lake Herring**

**Big Twin Lake**

**Kalkaska 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
2006	2006	5	13	na	13	14.1
Datasets available: 2006						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	5	0.31	0.22	0.35	0.37	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.002	0.004				

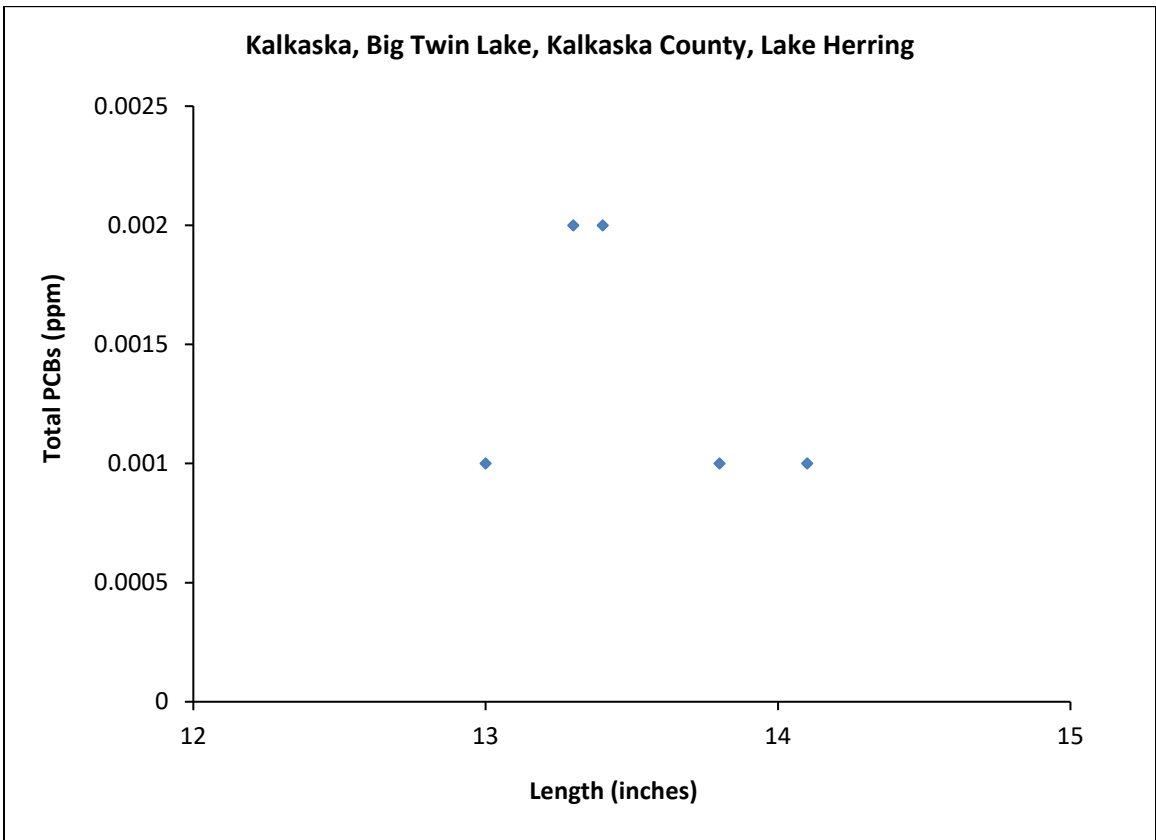
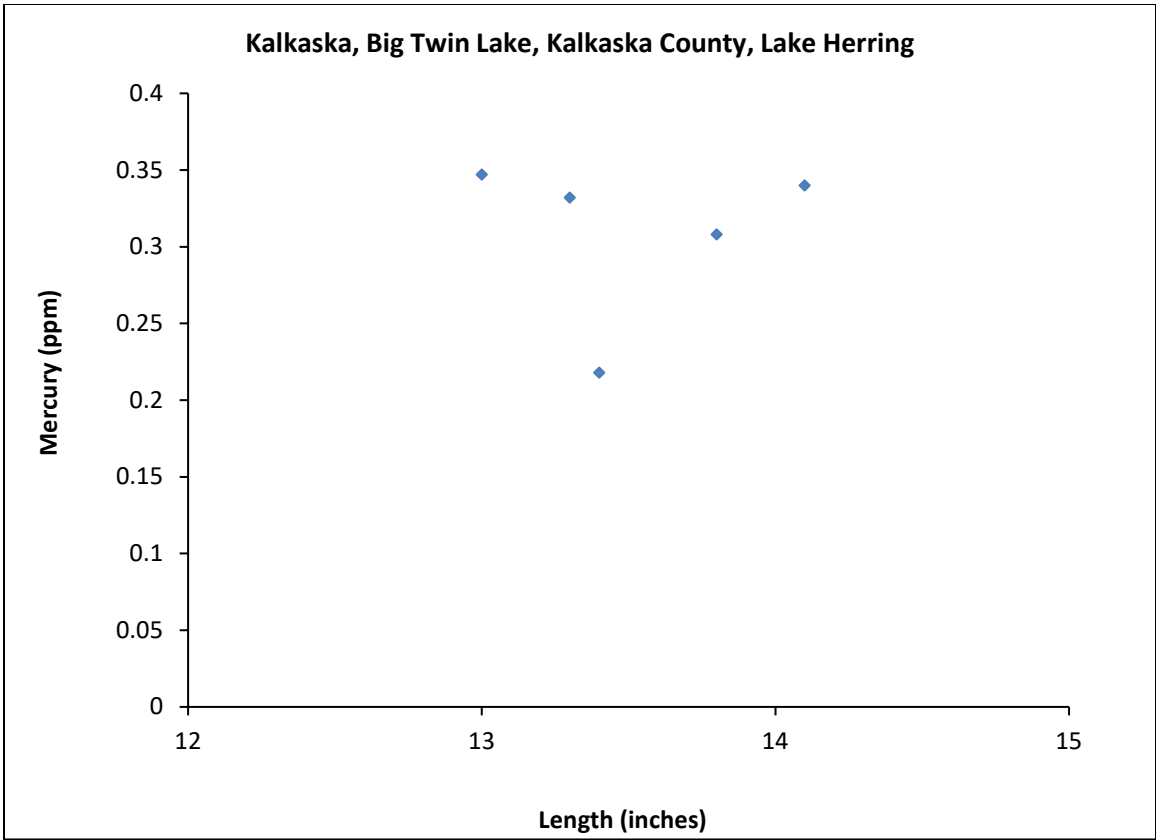
**Organics Analysis:**

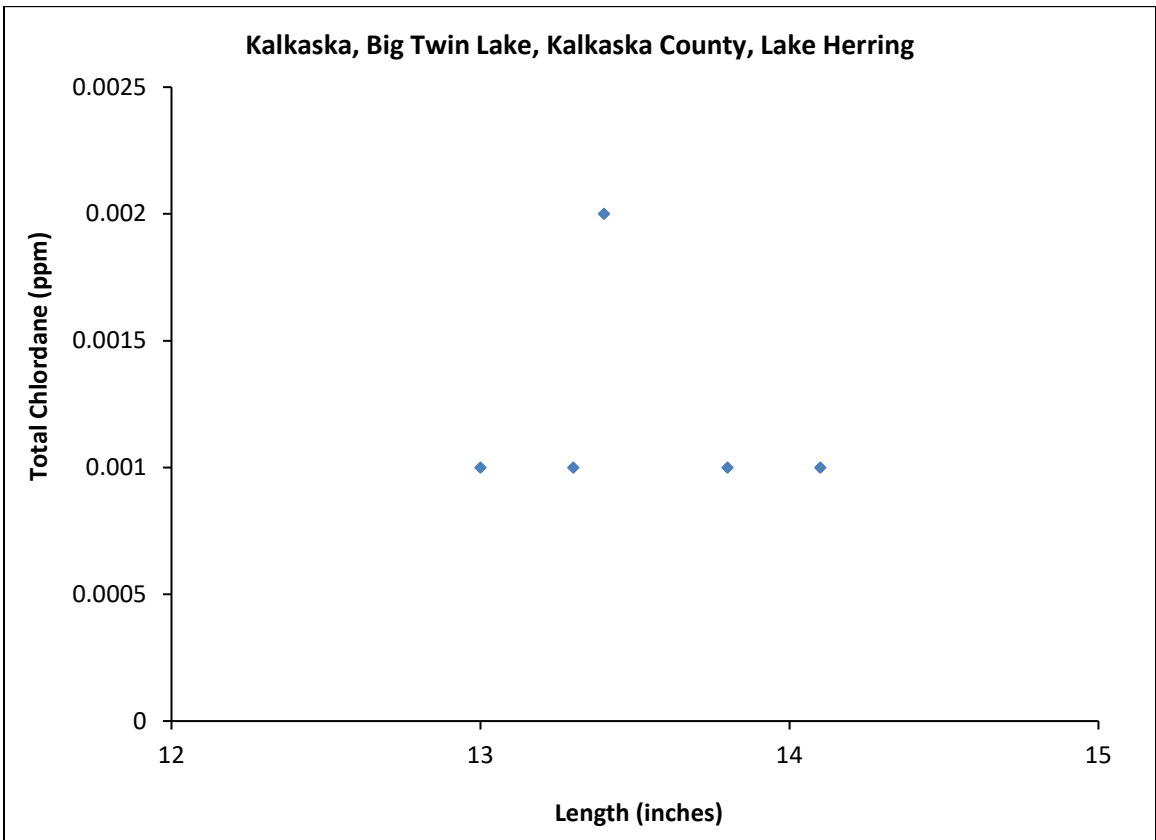
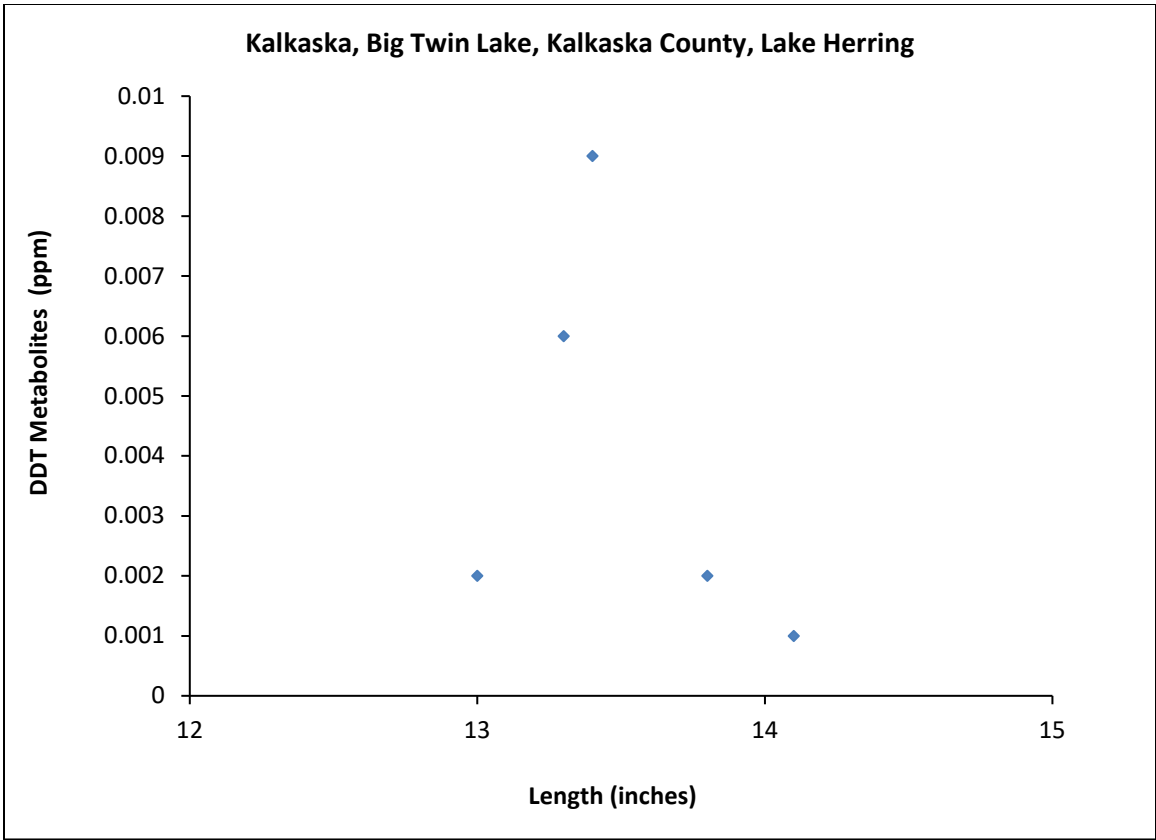
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Size Range of All Samples	
Earliest	Most Recent				Min	Max
2006	2006	5	13	na	13	14.1
Datasets available: 2006						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	5	0.001	0.001	0.002	0.002	16
DDT	5	0.004	0.001	0.009	0.01	16
Chlordane	5	0.001	0.001	0.002	0.002	16
Toxaphene	5	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.129	0.129				
DDT	0.154	0.282				
Chlordane	0.024	0.024				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2</b>

**Existing Advisory:** There are no current consumption advisories for Big Twin Lake lake herring.

**Recommendation:** No one should eat more than 2 meals per month of Big Twin Lake lake herring due to mercury.







**Species**  
Walleye

**Water Body – Location**  
Manistee Lake  
NE of Kalkaska  
(44.78153, -85.02216)

**County**  
Kalkaska

**Table 1: Edible portion chemistry data sets available.** Check marks indicate the chemical was analyzed in that data set. Non-bolded check marks indicate those data were retired and not used in the analysis.

Year	Sample Size (N)	Min Length (in)	Max Length (in)	Legal Size (in)	Hg	PCBs	DDT	Chlordane	Toxaphene	PFOS	TEQ
2014	10	14.8	20.1	15.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Table 2: Chemical analysis summary.** NA = Not analyzed; ND = Non-detect; Conc. = Concentration; ppm = parts per million; ppb = parts per billion; ppt = parts per trillion; Sub-legal? = if checked, sub-legal sized fish were used in the chemical specific analysis; UCL = Upper Confidence Limit

Chemical	N	Sub-legal ?	Min Length (in)	Max Length (in)	Conc. Unit	Mean Conc.	Min Conc.	Max Conc.	95% UCL Conc.	Meal Category
Mercury	10	<input type="checkbox"/>	14.8	20.1	ppm	0.450	0.240	0.650	0.537	1
PCB	0	<input type="checkbox"/>	--	--	ppm	--	--	--	--	--
DDT	0	<input type="checkbox"/>	--	--	ppm	--	--	--	--	--
Chlordane	0	<input type="checkbox"/>	--	--	ppm	--	--	--	--	--
Toxaphene	0	<input type="checkbox"/>	--	--	ppm	--	--	--	--	--
TEQ	0	<input type="checkbox"/>	--	--	ppt	--	--	--	--	--
PFOS	0	<input type="checkbox"/>	--	--	ppb	--	--	--	--	--

**Table 3: Final meal category and basis for recommendation.**

Final Meal Category	Basis	Chemical Driver
1	UCL	Hg

**Table 4: Regression analysis.** R<sup>2</sup> = Coefficient of Determination for the regression analysis. R<sup>2</sup> ≥ 0.6 considered a significant correlation. -- indicates the R<sup>2</sup> was not calculated due to insufficient sample size and/or non-detectable concentrations.

Chemical	Linear R <sup>2</sup>	Exponential R <sup>2</sup>
Mercury	0.732	0.724
PCBs	--	--
DDT	--	--
Chlordane	--	--
Toxaphene	--	--
TEQ	--	--
PFOS	--	--

**Existing MDHHS Advisory:** Walleye from Manistee Lake in Kalkaska County are currently covered under the statewide mercury advice. No one should eat more than 2 meals per month of walleye under 20 inches or no more than 1 meal per month of walleye larger than 20 inches.

**MDHHS Recommendation:** No one should eat more than 1 meal per month of walleye of any size from Manistee Lake in Kalkaska County due to mercury.

Length (Inches)	Hg Regression Estimate (ppm)	Meal Category
14	0.246	4
16	0.400	2
18	0.554	1
20	0.708	1
22	0.862	1
24	1.016	1

*Shaded area denotes extrapolated estimates.*

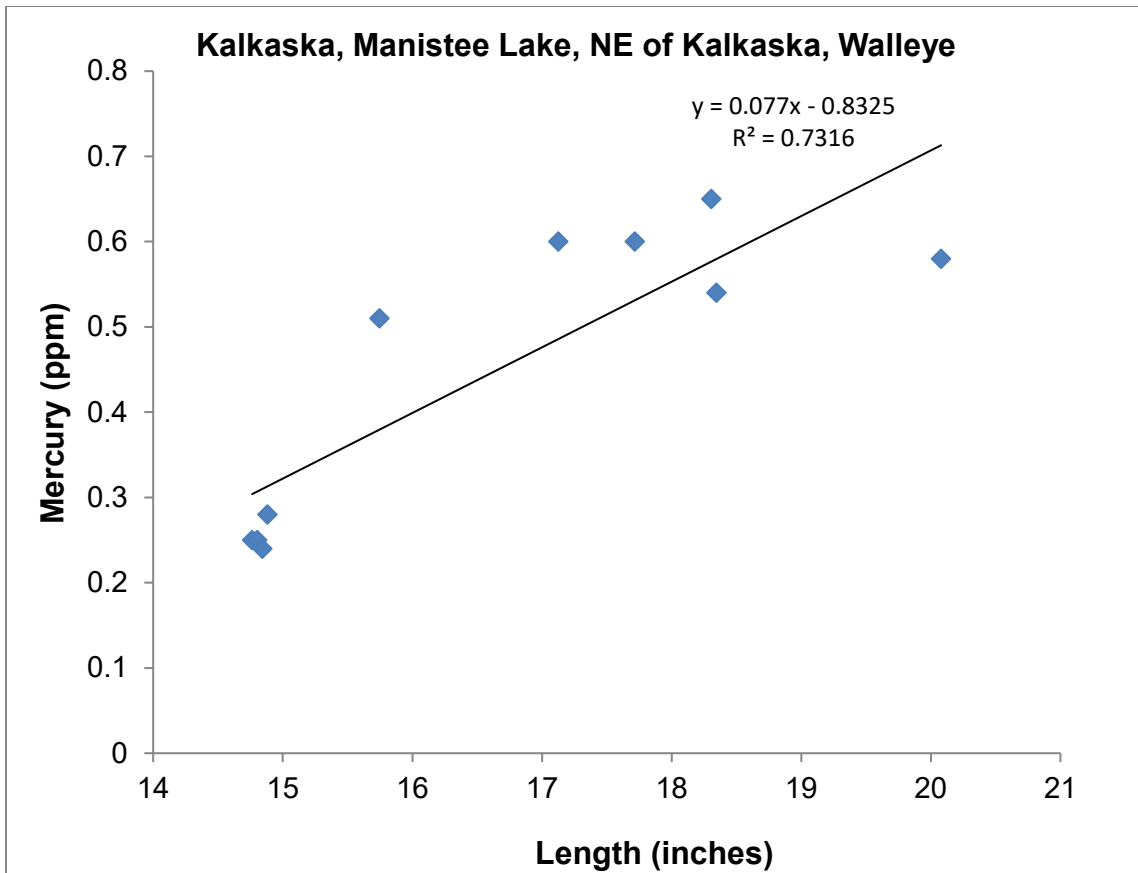


Figure 1. Relationship between fish length and mercury concentration in the edible portion of the fish.

## Brown Trout

## Rapid River

## Kalkaska 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	5	8.3	8	8.3	12.2
Datasets available: 1998						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	2*	0.19	0.15	0.24	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.841	0.841				

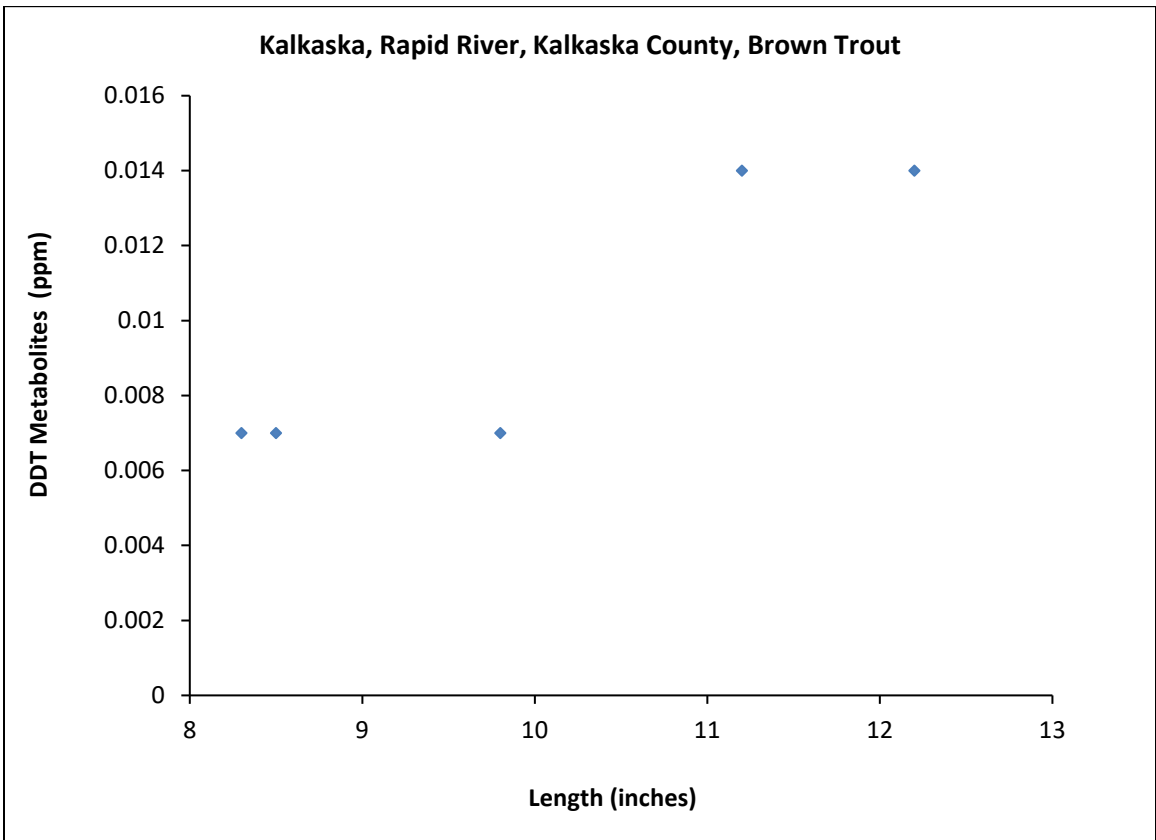
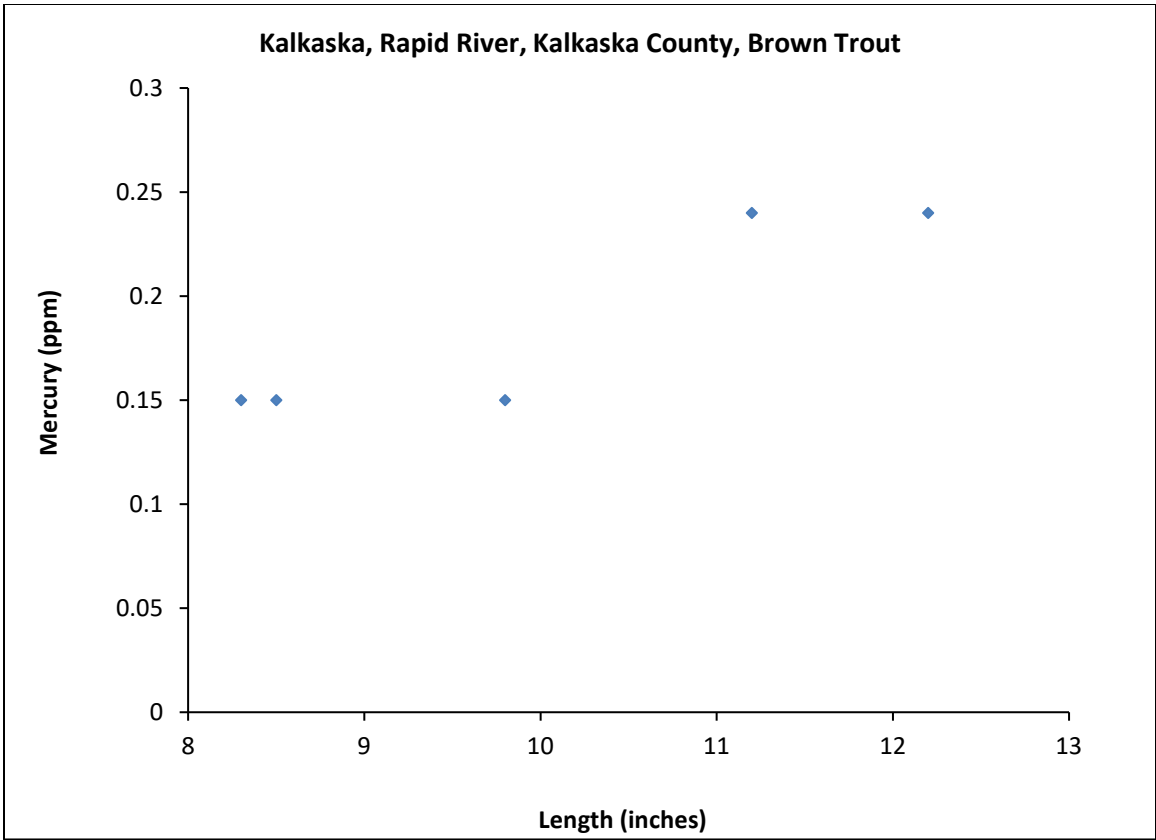
## Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Size Range of All Samples	
Earliest	Most Recent				Min	Max
1998	1998	5	8.3	8	8.3	12.2
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*	0.01	0.007	0.01	0.01	16
Chlordane	2*	ND	--	--	--	--
Toxaphene	2*	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	0.841	0.841				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						--

\* - 5 fish were analyzed as 2 composite samples

**Existing Advisory:** There are no current consumption advisories for Rapid 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.



# Lake County



**Largemouth Bass**

**Big Bass Lake**

**Lake County**

**Hg Analysis:**

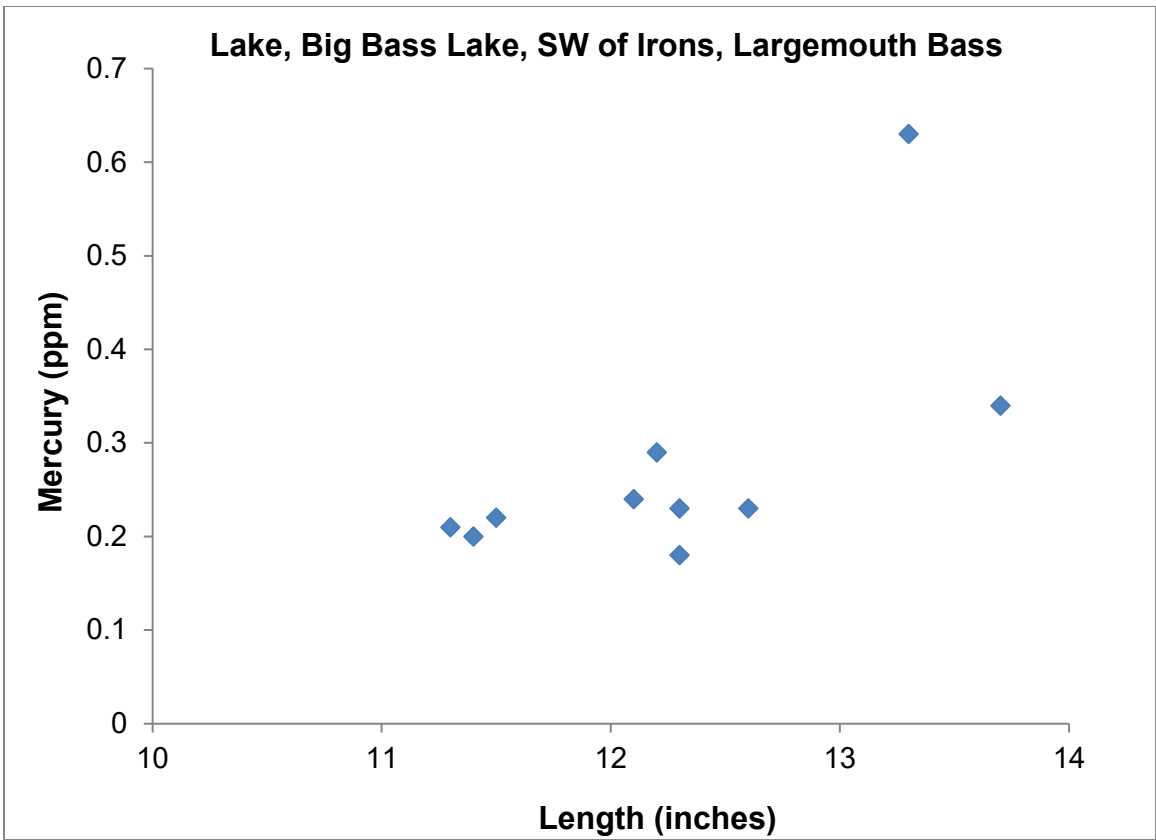
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
2018	2018	10	11.3	14	13.7	13.7	
Datasets available: 2018							
Chemical	Sample Size (ALL)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
Mercury	10	0.28	0.18	0.63	0.37	(2)	
Chemical	Linear Regression	Exponential Regression					
	R <sup>2</sup>	R <sup>2</sup>					
Mercury	0.433	0.501					

**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	--	--	--	--	--	
PFOS	0	--	--	--	--	--	
	R <sup>2</sup>	R <sup>2</sup>					
PCB	--	--					
DDT	--	--					
Chlordane	--	--					
Toxaphene	--	--					
PFOS	--	--					
<b>Final meal category based on UCL:</b>							<b>(2)</b>

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

**Recommendation:** No change to the advisory is recommended. The MDHHS protocol requires a minimum of 5 legal size fish to develop consumption advice for a specific waterbody and species. This sample only includes 1 legal size fish.



**Largemouth Bass**

**Big Star Lake**

**Lake County**

**Hg Analysis:**

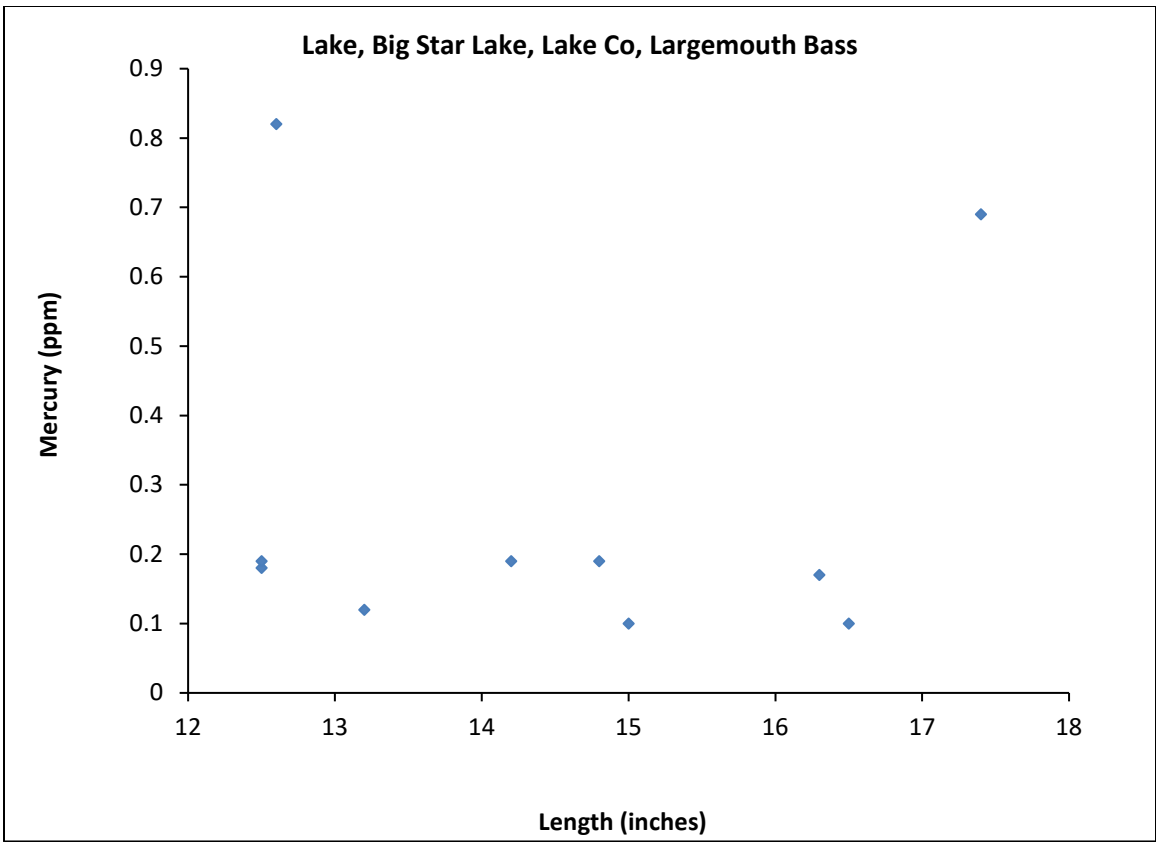
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2007	2007	10	12.5	14	14.8	17.4
Datasets available: 2007						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	6	0.24	0.10	0.69	0.48	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.001	0.000				

**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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2</b>

**Existing Advisory:** Big Star Lake largemouth bass are covered under the statewide mercury consumption advisory.

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



# Leelanau County

**Lake Trout**

**Glen Lake**

**Leelanau 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	2009	19	17.9	15	17.9	34.3
Datasets available: 1990, 2009						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	19	0.67	0.18	1.57	0.88	1
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.829	0.840				

**Organics Analysis:**

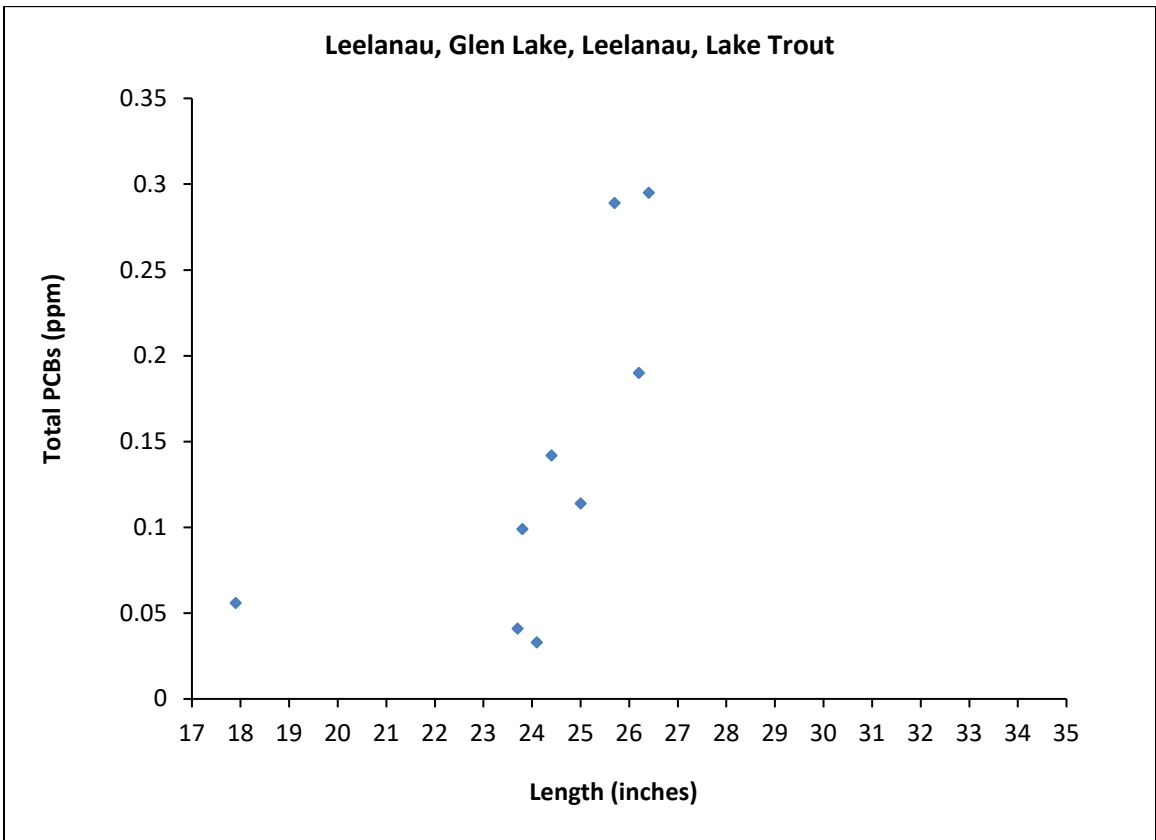
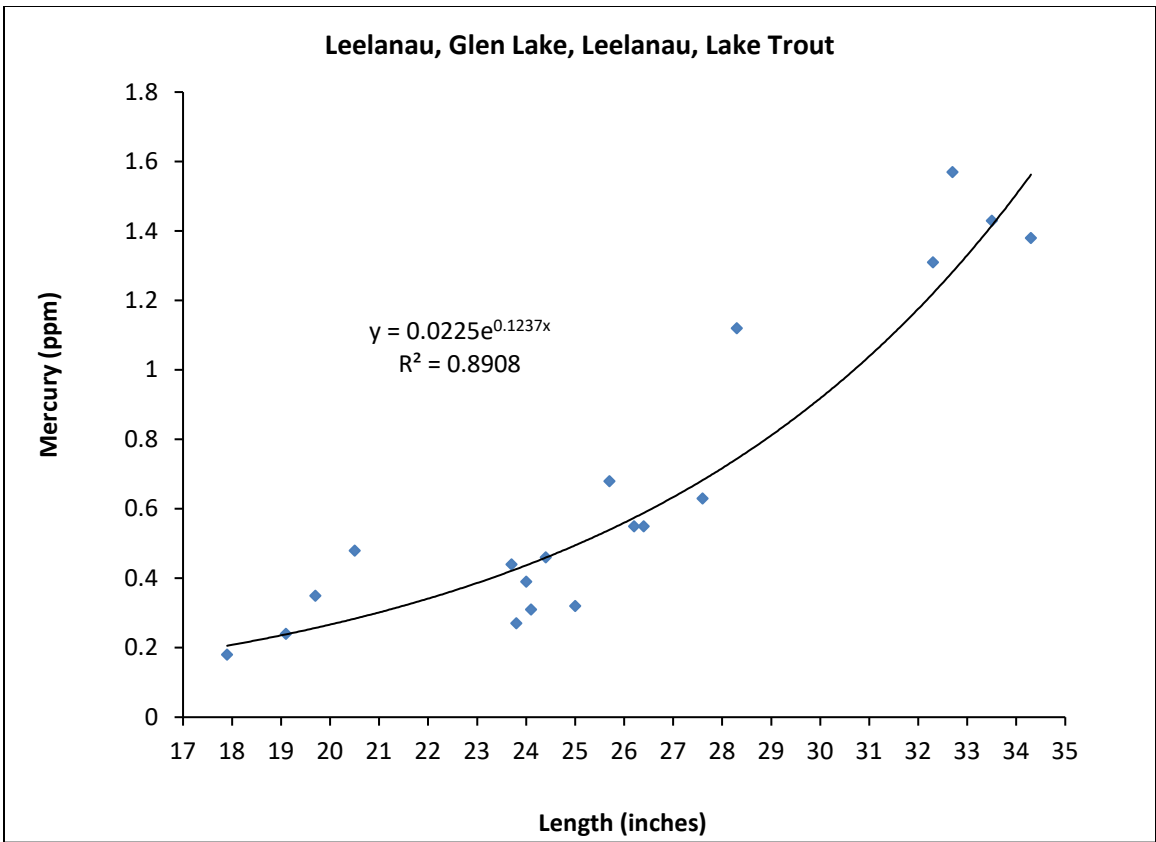
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2009	2009	9	17.9	15	17.9	26.4
Datasets available: 1990, 2009						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	9	0.14	0.03	0.30	0.22	0.5
DDT	9	0.19	0.08	0.38	0.28	4
Chlordane	9	0.04	0.01	0.06	0.05	--
Toxaphene	9	0.19	0.05	1.30	0.51	0.5
TEQ*	9	11.0 ppt	5.6 ppt	19.2 ppt	12.7 ppt	0.5
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.380	0.351				
DDT	0.414	0.523				
Chlordane	0.504	0.639				
Toxaphene	0.004	0.004				
TEQ*	0.402	0.429				
<b>Final meal category based on UCL:</b>						<b>0.5</b>

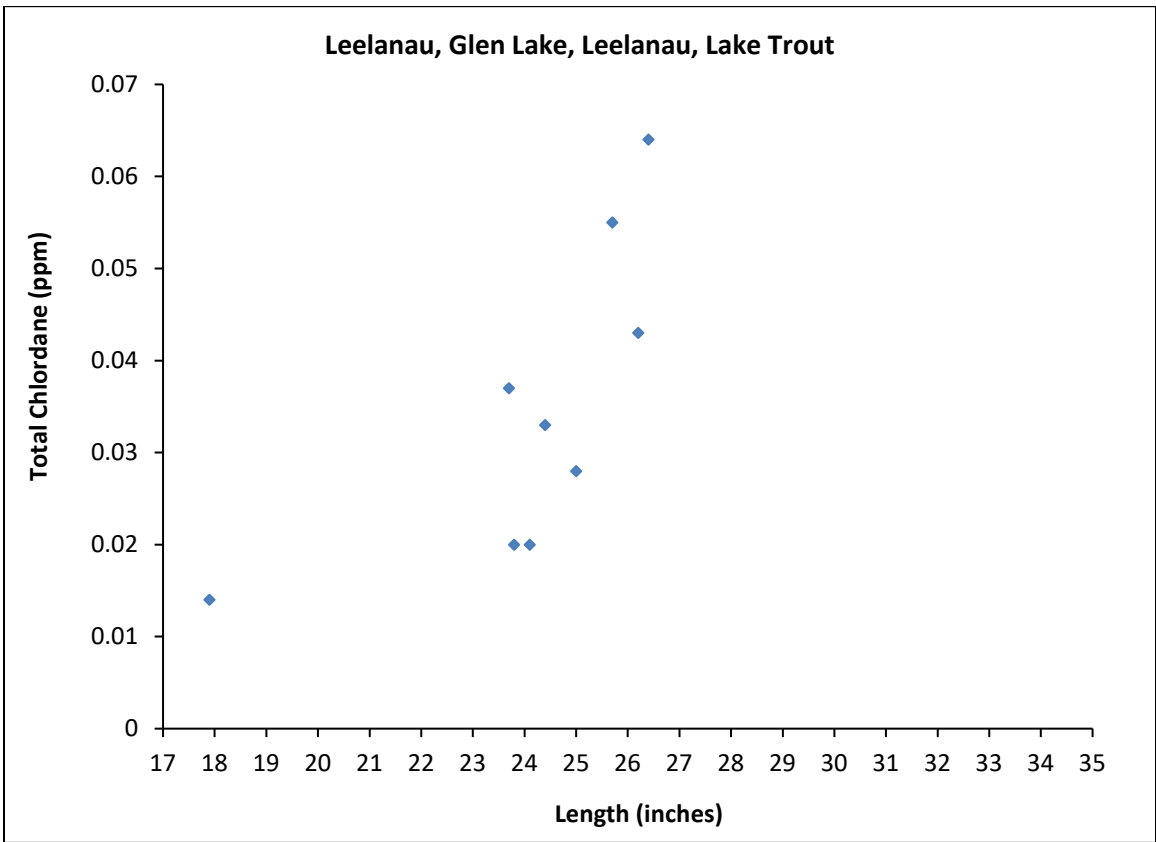
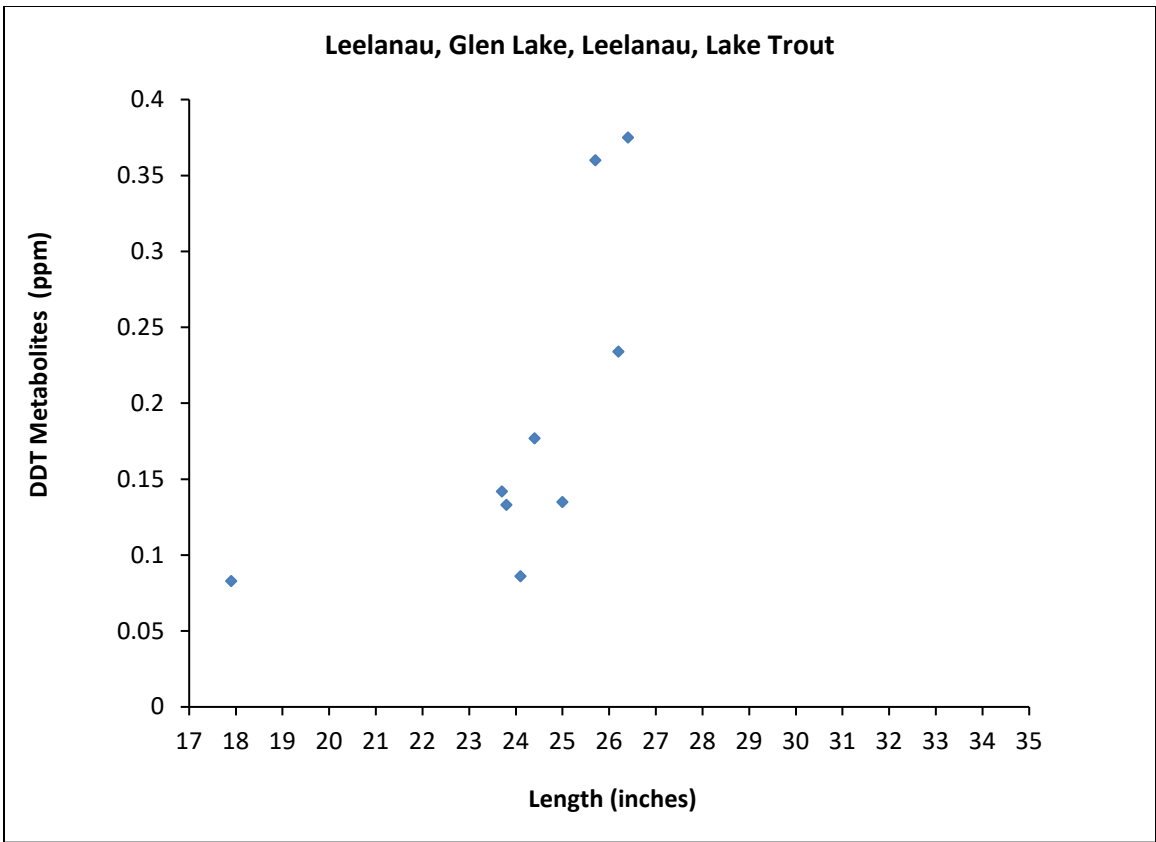
\* - 2005 WHO TEFs; dl-PCBs included

**Existing Advisory:** Due to elevated levels of mercury, PCBs and chlordane; women and children should not eat Glen Lake lake trout greater than 14 inches in length.

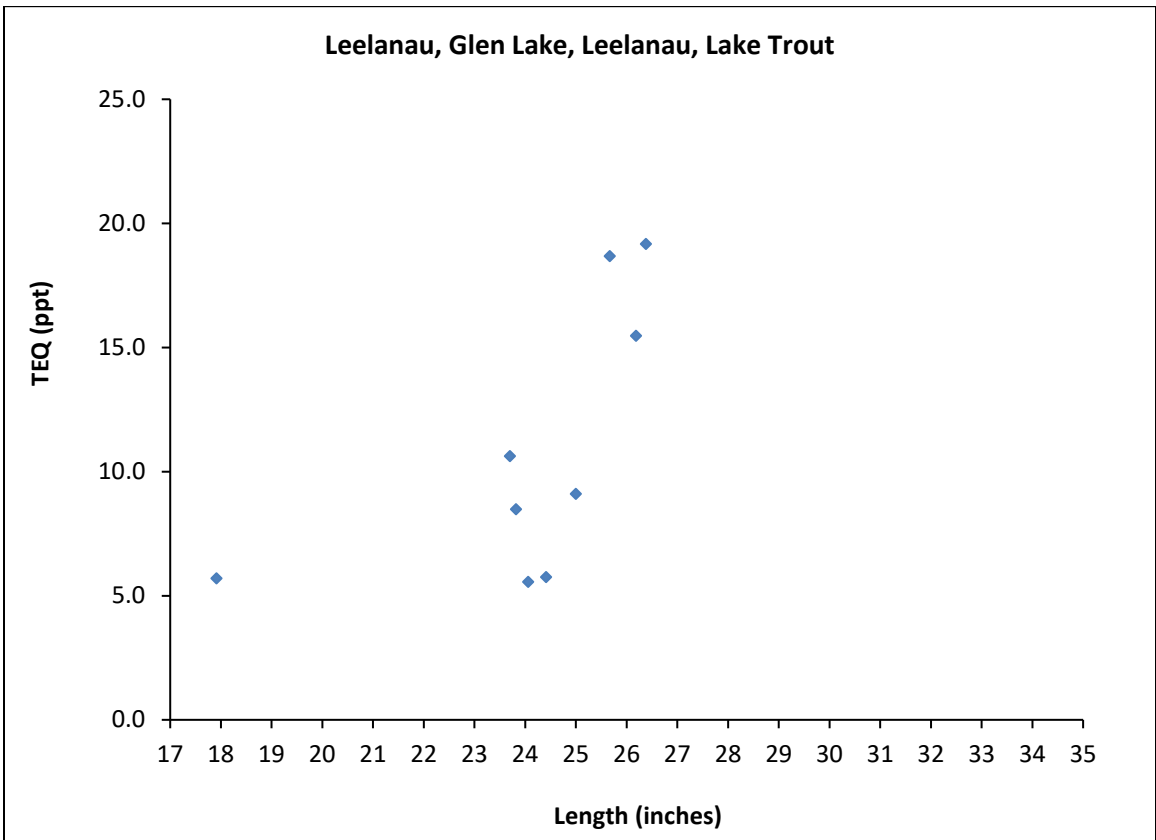
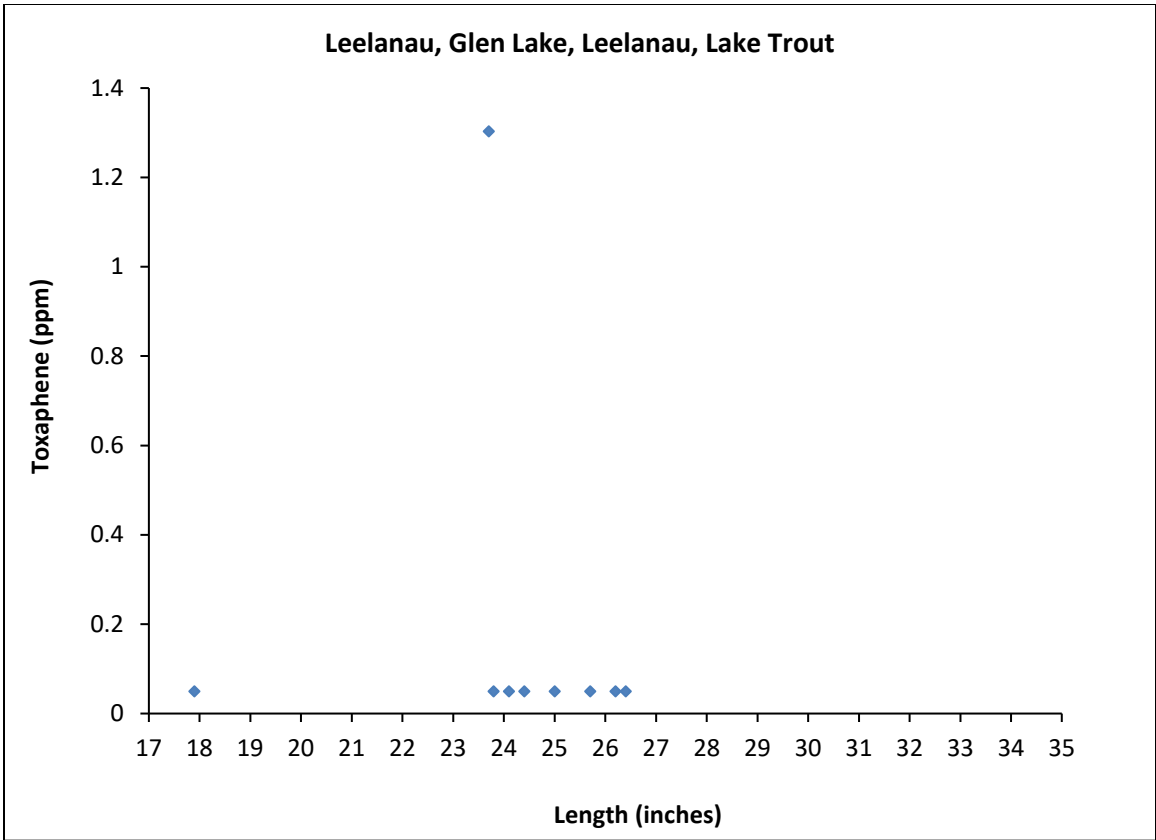
**Recommendation:** No one should eat more than 6 meals per year of Glen Lake lake trout smaller than 32 inches due to dioxins, PCBs, and toxaphene or more than 6 meals per year of lake trout greater than 32 inches due to mercury, dioxins, PCBs, and toxaphene. DDT would cause an advisory.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
16	0.163	4
18	0.209	4
20	0.267	4
22	0.342	2
24	0.438	2
26	0.561	1
28	0.718	1
30	0.920	1
32	1.178	0.5
<i>Shaded area denotes extrapolated estimates</i>		









**Rainbow Trout**

**Glen Lake**

**Leelanau 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	11	13.3	15	15.1	25.4
Datasets available: 2007						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	7	0.19	0.10	0.32	0.28	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.862	0.842				

**Organics Analysis:**

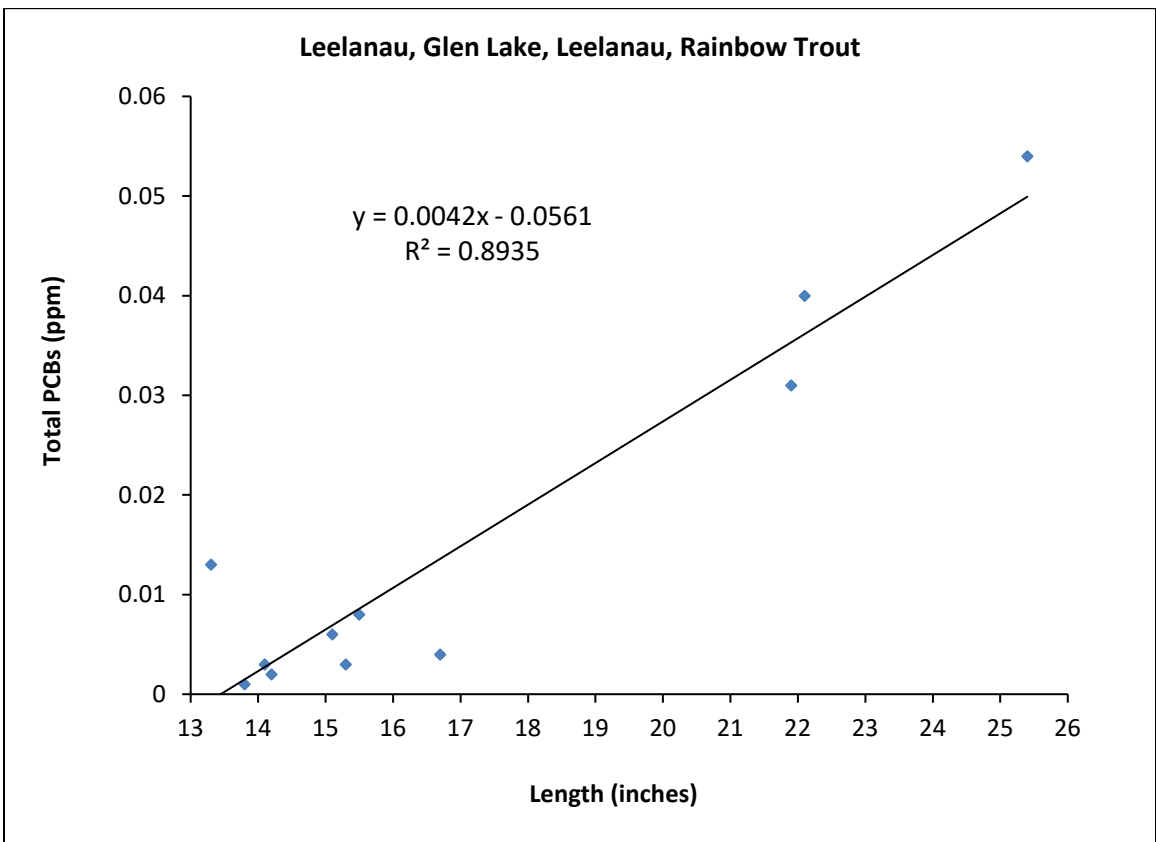
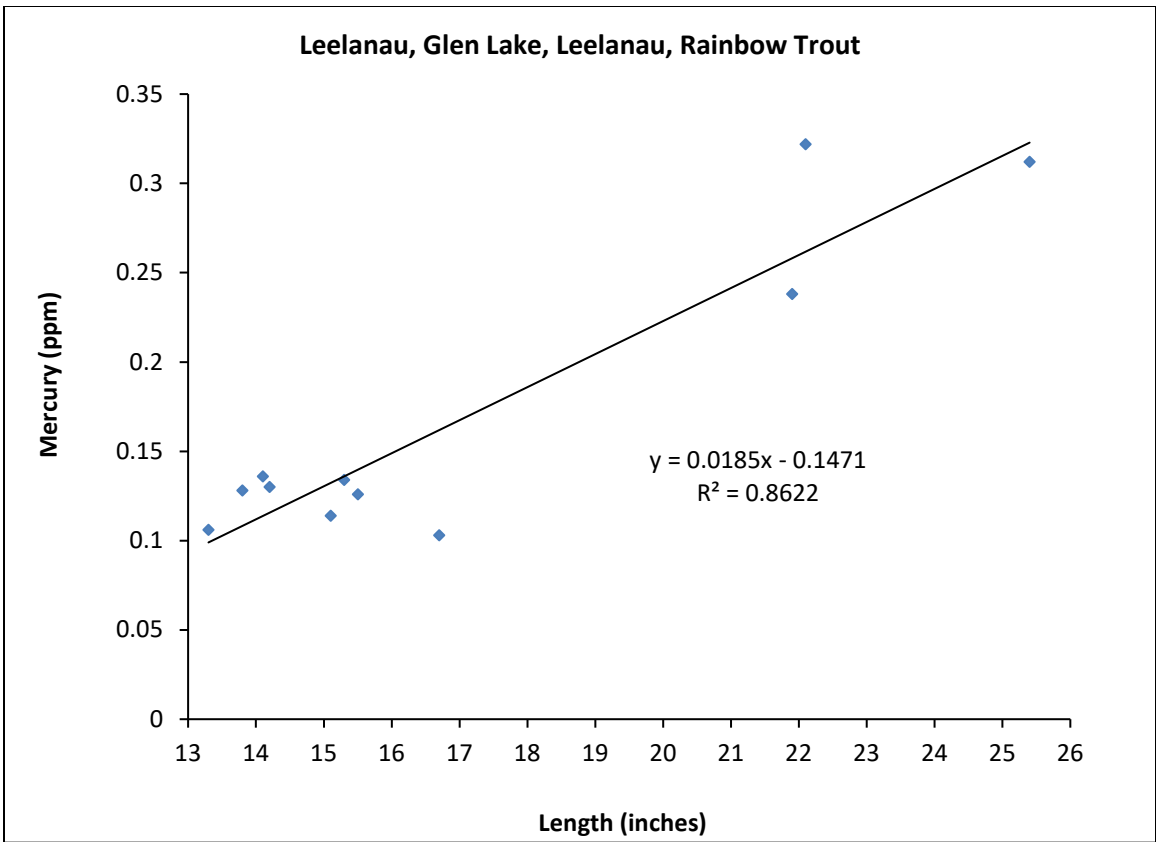
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2007	2007	11	13.3	15	15.1	25.4
Datasets available: 2007						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	7	0.021	0.003	0.054	0.040	4
DDT	7	0.036	0.008	0.084	0.060	16
Chlordane	7	0.010	0.001	0.022	0.020	--
Toxaphene	7	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.894	0.703				
DDT	0.799	0.548				
Chlordane	0.819	0.649				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2</b>

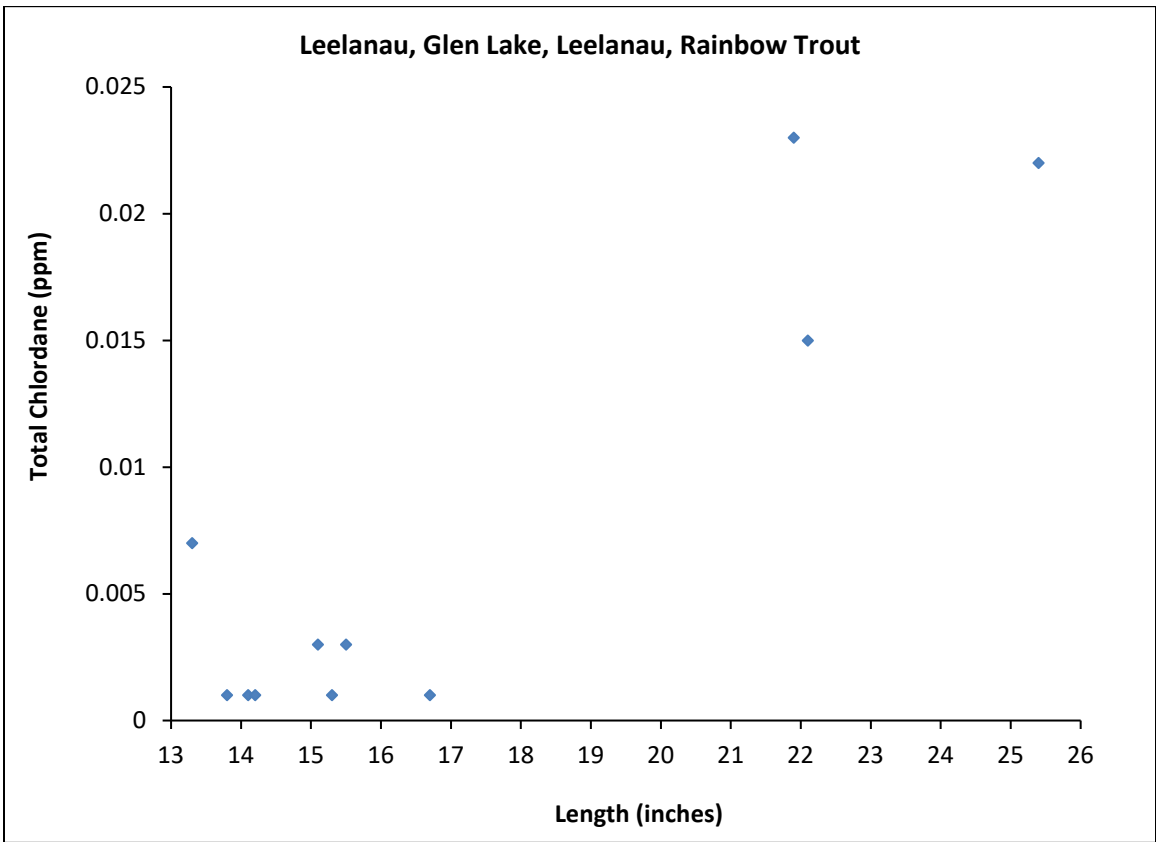
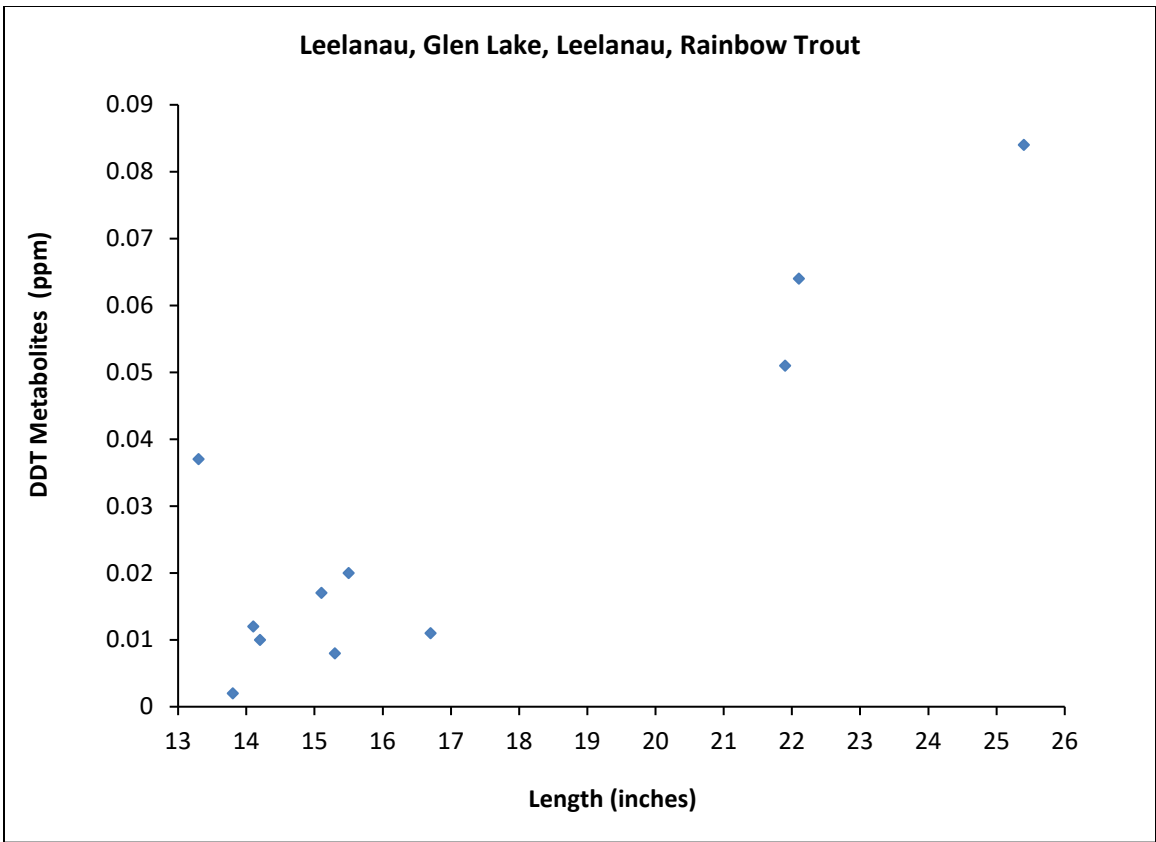
**Existing Advisory:** Women and children should not eat more than one meal per week of Glen Lake rainbow trout larger than 22 inches due to PCBs.

**Recommendation:** No one should eat more than 4 meals per month of Glen Lake rainbow trout smaller than smaller than 22 inches due to mercury and PCBs or more than 2 meals per month of those fish larger than 22 inches due to mercury.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category	PCB Regression Equation Estimate (ppm)	Meal Category
14	0.11	8	0	16
16	0.15	4	0.01	16
18	0.19	4	0.02	12
20	0.22	4	0.03	8
22	0.26	4	0.04	4
24	0.30	2	0.04	4
26	0.33	2	0.05	4
28	0.37	2	0.06	2
30	0.41	2	0.07	2

*Shaded area denotes extrapolated estimates*





**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	7	12	14	12	15.6
Datasets available: 1990						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	7	0.25	0.12	0.39	0.35	2*
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.488	0.455				

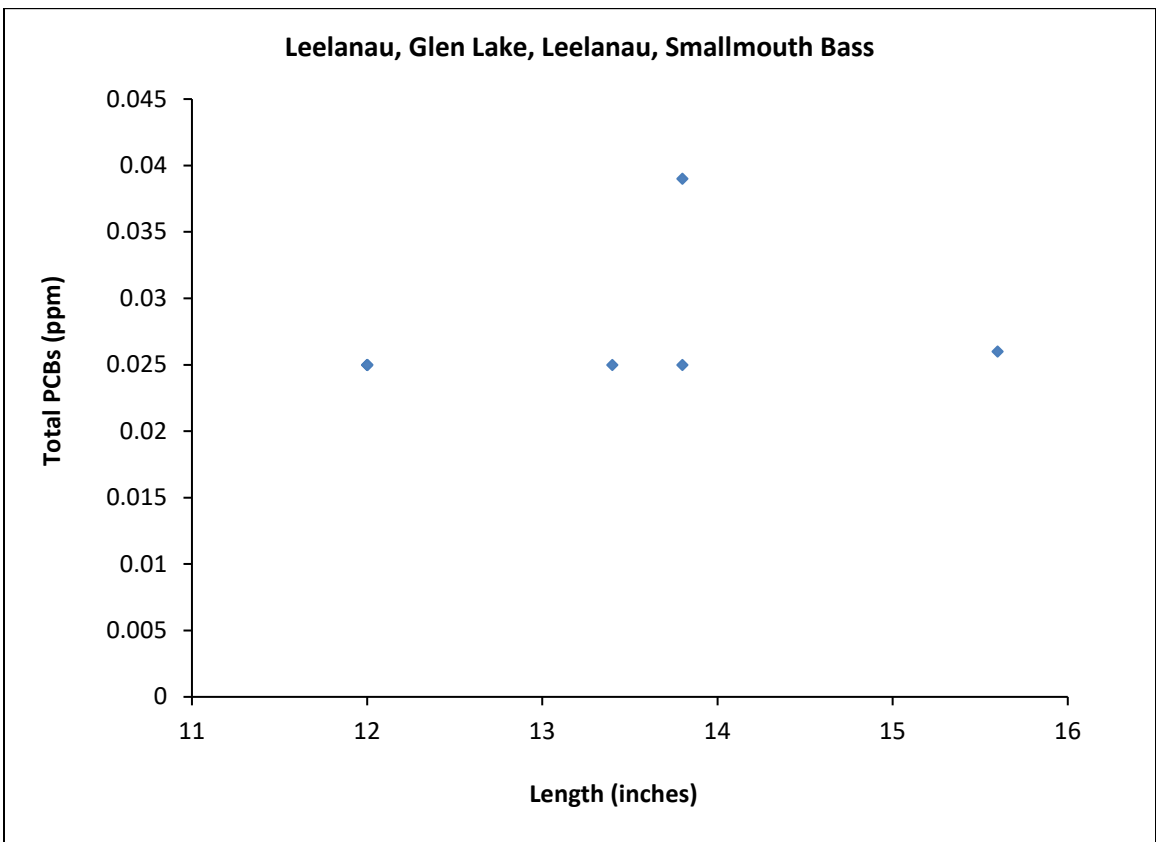
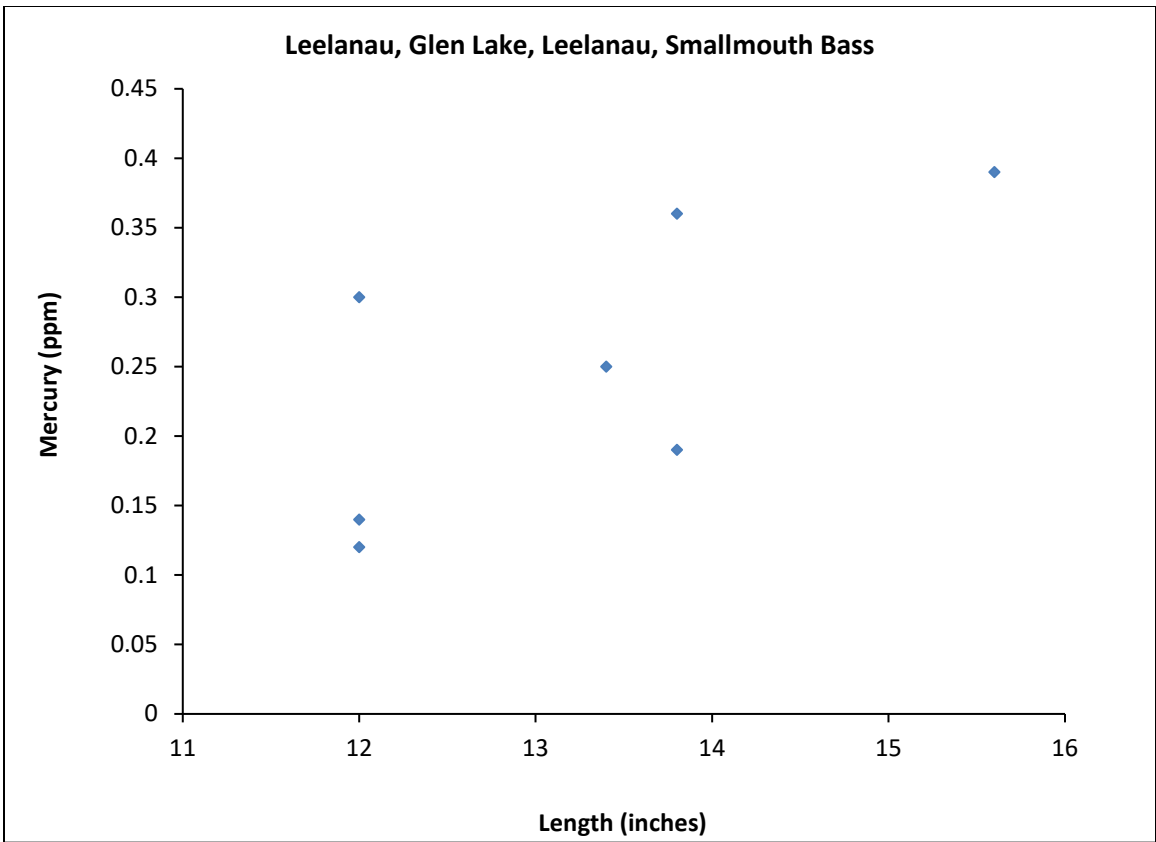
**Organics Analysis:**

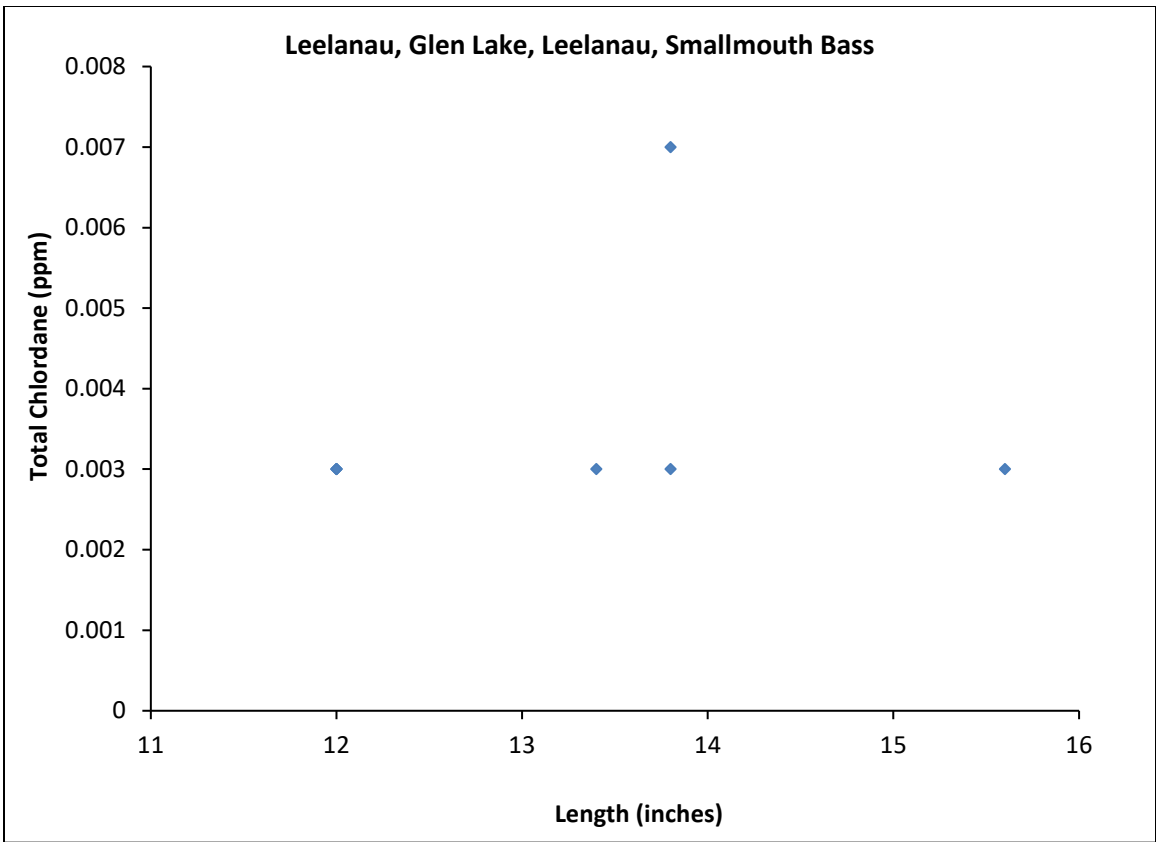
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Size Range of All Samples	
Earliest	Most Recent				Min	Max
1990	1990	7	12	14	12	15.6
Datasets available: 1990						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	7	0.03	0.02	0.04	--	--
DDT	7	0.03	0.02	0.04	--	--
Chlordane	7	0.004	0.003	0.007	--	--
Toxaphene	7	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.060	0.067				
DDT	0.432	0.483				
Chlordane	0.035	0.035				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2*</b>

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

**Recommendation:** No one should eat more than 2 meals per month of Glen 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.

\*Note: Evaluation was based on 95%UCL of 0.35 ppm Hg calculated using all 7 samples, 3 of which were of sub-legal size.





**Northern Pike**

**Little Traverse Lake**

**Leelanau 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	8	17.8	24	24.1	29.9
Datasets available: 2013						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	4	0.63	0.49	0.77	0.81	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.578	0.595				

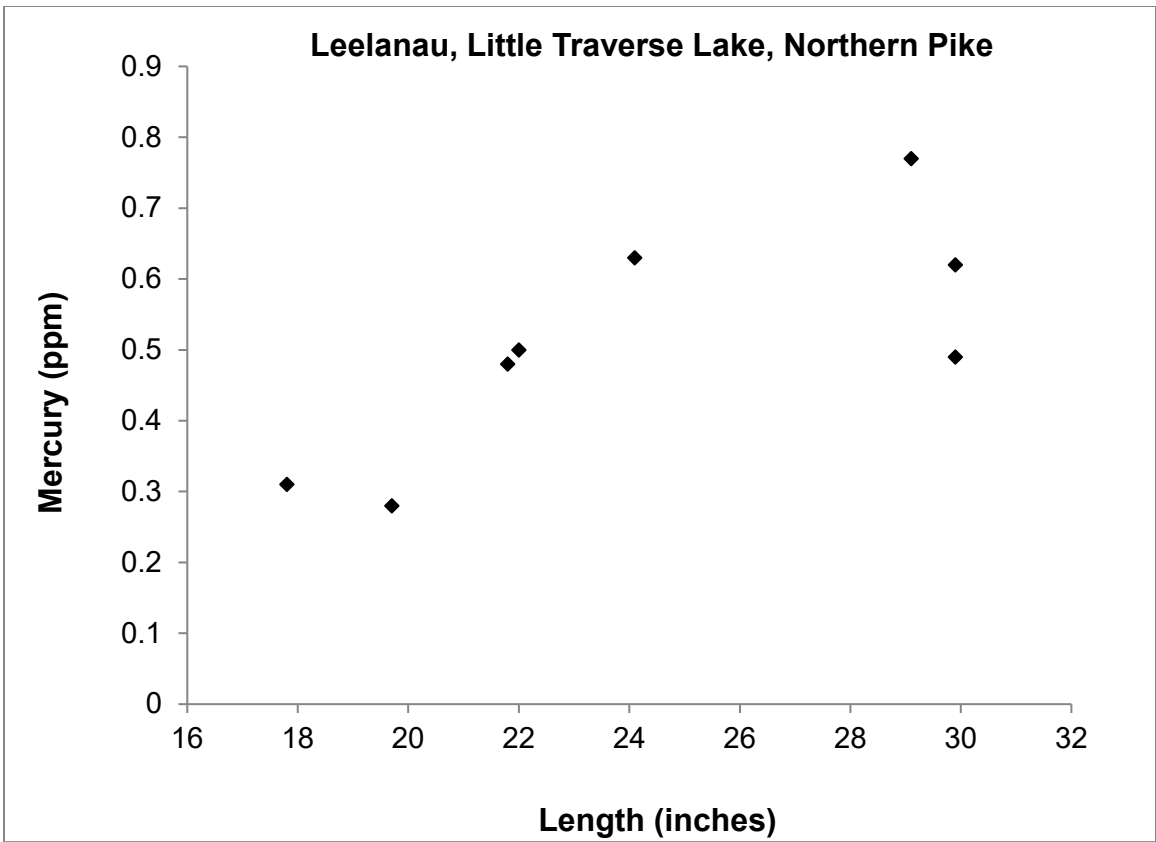
**Organics Analysis:**

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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						--

**Existing Advisory:** Little Traverse Lake northern pike are covered under the Statewide Guidelines. No one should eat more than 2 meals per month of northern pike under 30 inches or more than 1 meal per month of those fish over 30 inches in length due to mercury.

**Recommendation:** No change is recommended. There are insufficient data available to develop specific advice for Little Traverse Lake northern pike.





**Lake Trout**

**North Lake Leelanau**

**Leelanau 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	12	25.2	15	25.2	34.3
Datasets available: 2003						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	12	0.62	0.54	0.78	0.68	1
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.649	0.621				

**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	12	25.2	15	25.2	34.3
Datasets available: 2003						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	12	0.27	0.13	0.62	0.36	0.5
DDT	12	0.46	0.23	1.04	0.60	2
Chlordane	12	0.07	0.04	0.16	0.10	--
Toxaphene	12	ND	--	--	--	--
TEQ*	12	6.9 ppt	3.5 ppt	15.3 ppt	7.3 ppt	1
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.734	0.737				
DDT	0.636	0.675				
Chlordane	0.673	0.667				
Toxaphene	--	--				
TEQ*	0.673	0.675				
<b>Final meal category based on UCL:</b>						<b>0.5</b>

\* - 2005 WHO TEFs; dl-PCBs not included

**Existing Advisory:** Women and children should not eat more than 1 meal per month of North Lake Leelanau lake trout due to mercury and PCBs.

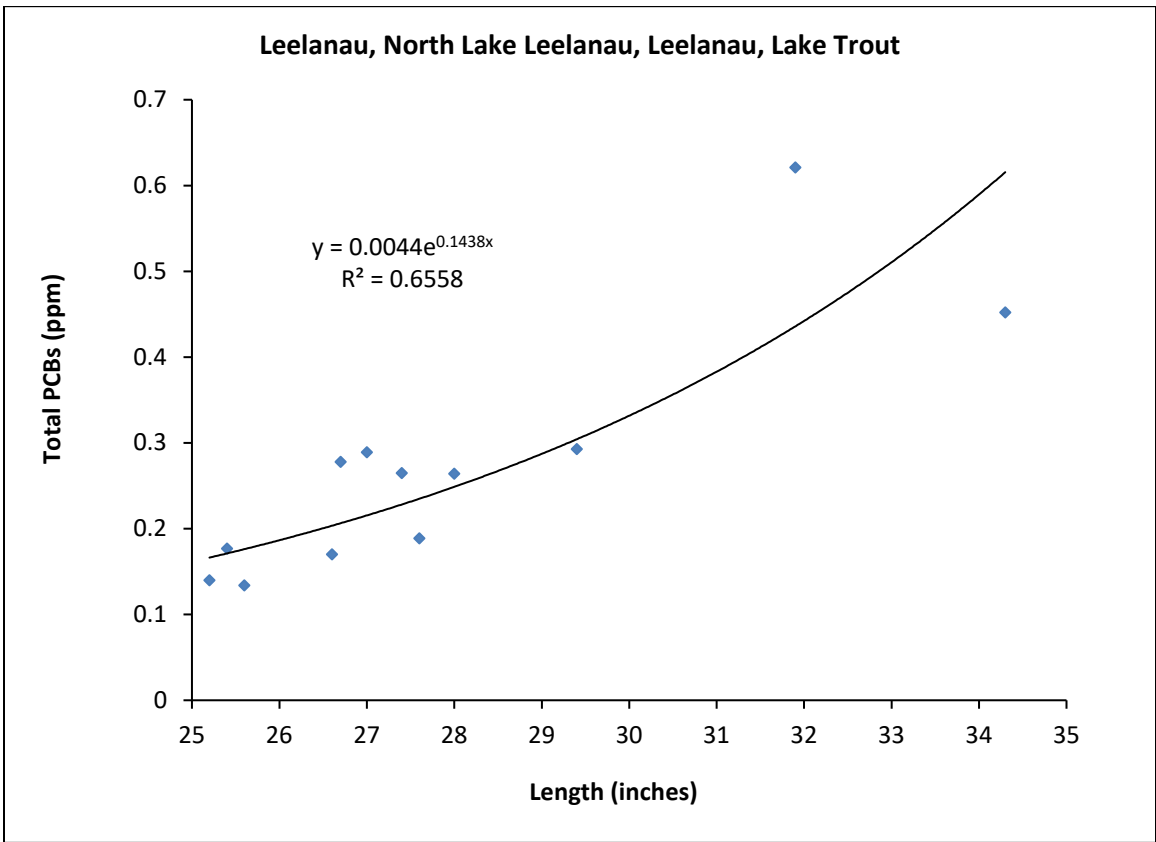
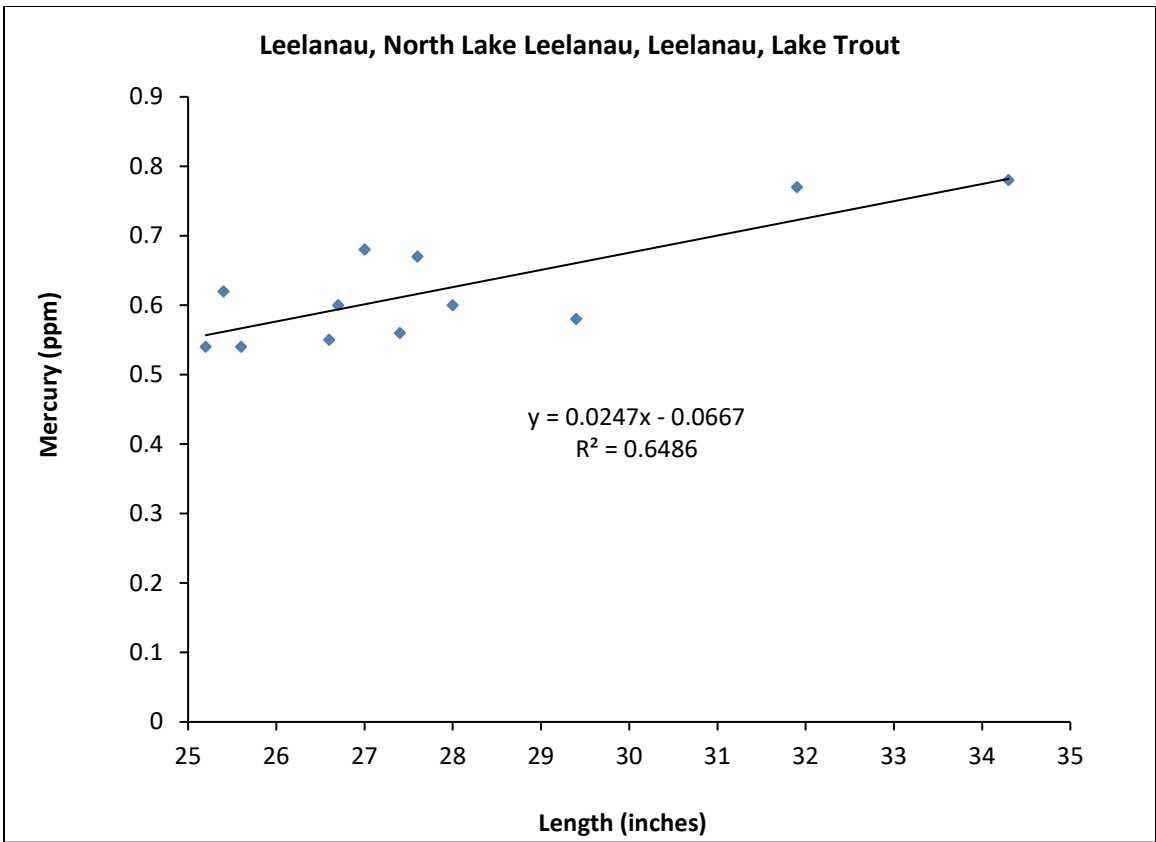
**Recommendation:** No one should eat more than 1 meal per month of North Lake Leelanau lake trout smaller than 26 inches or more than 6 meals per year of those fish between 26 and 32 inches due to PCBs and dioxins. In addition, sensitive populations should not eat North Lake Leelanau lake trout larger than 32 inches and healthy adults should limit consumption of those fish to no more than 1 or 2 meals per year due to PCBs. Mercury would cause an advisory.

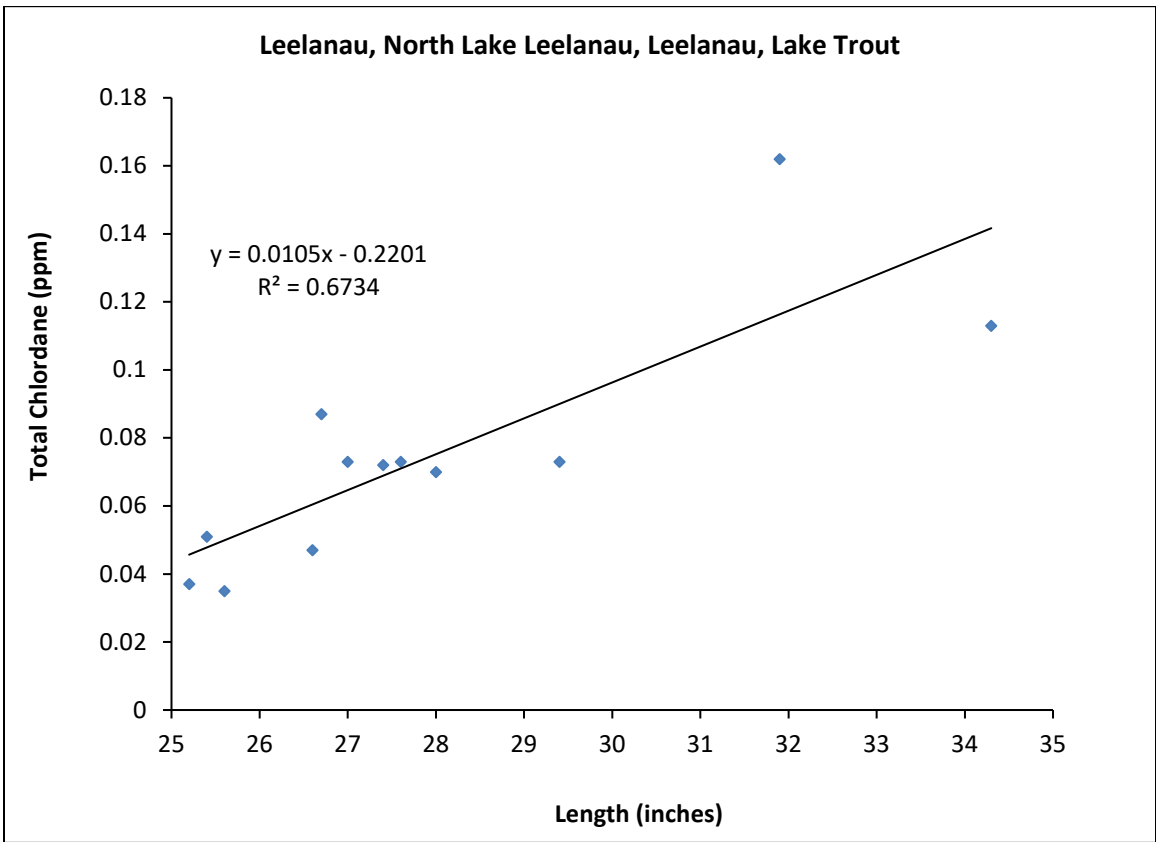
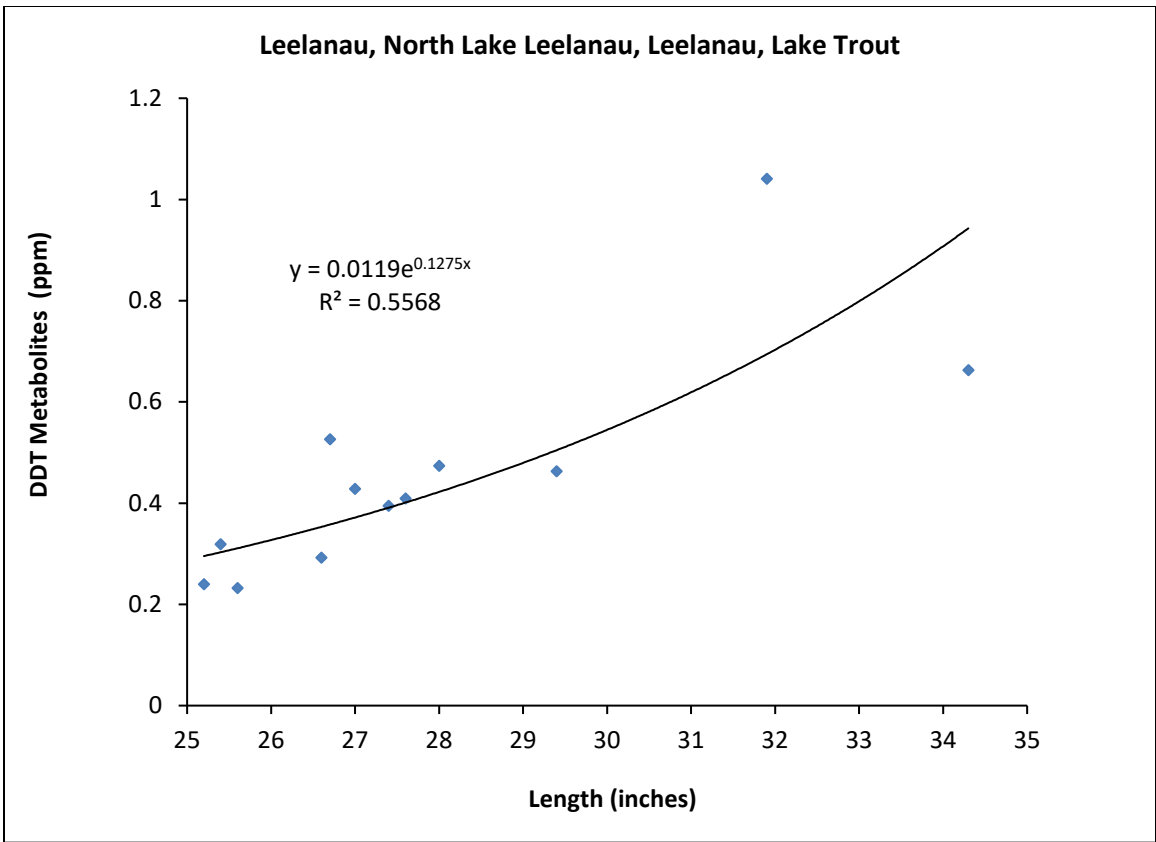
Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
20	0.43	2
22	0.48	2
24	0.53	2
26	0.58	1
28	0.62	1
30	0.67	1
32	0.72	1
34	0.77	1
36	0.82	1
<i>Shaded area denotes extrapolated estimates</i>		

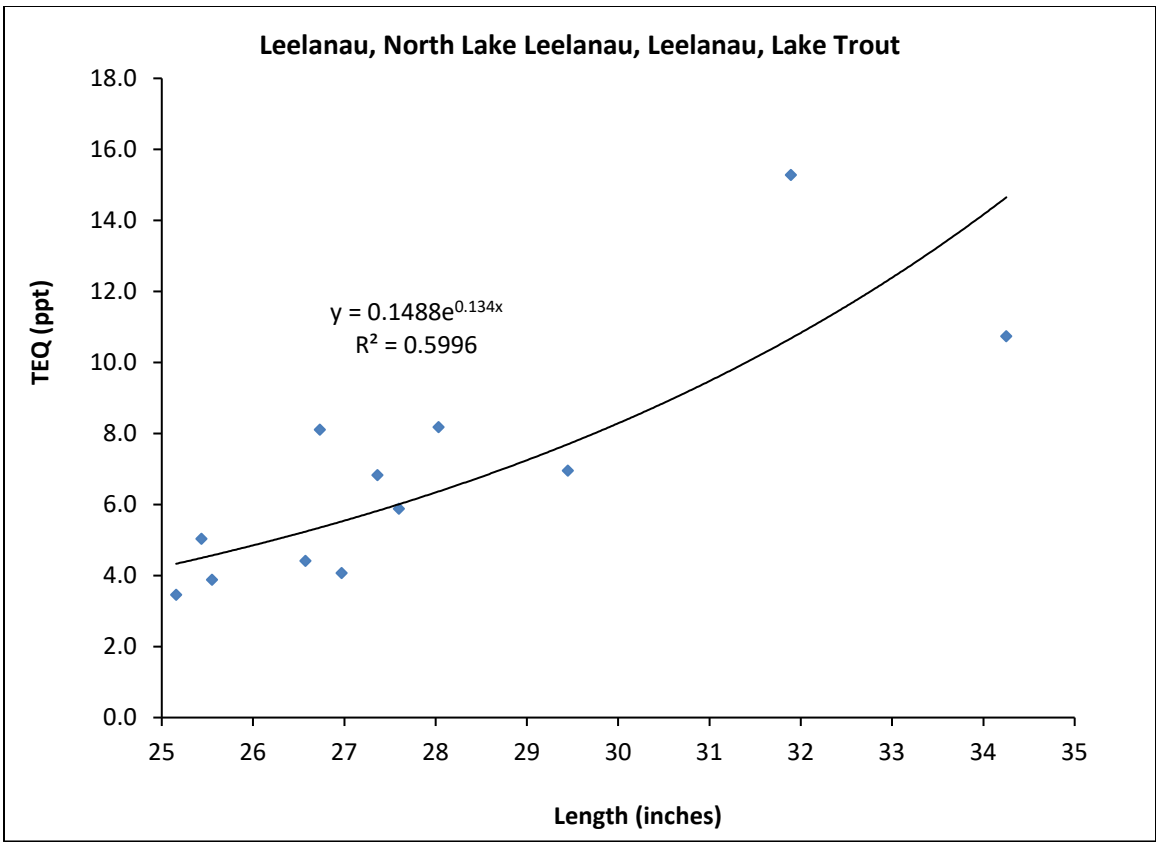
Length (Inches)	PCB Regression Equation Estimate (ppm)	Meal Category
20	0.08	2
22	0.10	2
24	0.14	1
26	0.19	1
28	0.25	0.5
30	0.33	0.5
32	0.44	Limited
34	0.58	Limited
36	0.78	Limited
<i>Shaded area denotes extrapolated estimates</i>		

Length (Inches)	DDT Regression Equation Estimate (ppm)	Meal Category
20	0.15	8
22	0.20	8
24	0.25	4
26	0.33	4
28	0.42	4
30	0.55	2
32	0.70	2
34	0.91	1
36	1.17	1
<i>Shaded area denotes extrapolated estimates</i>		

Length (Inches)	TEQ Regression Equation Estimate (ppt)	Meal Category
20	2.2	2
22	2.8	2
24	3.7	1
26	4.8	1
28	6.3	1
30	8.3	0.5
32	10.8	0.5
34	14.2	0.5
36	18.5	Limited
<i>Shaded area denotes extrapolated estimates</i>		







**Hg Analysis:**

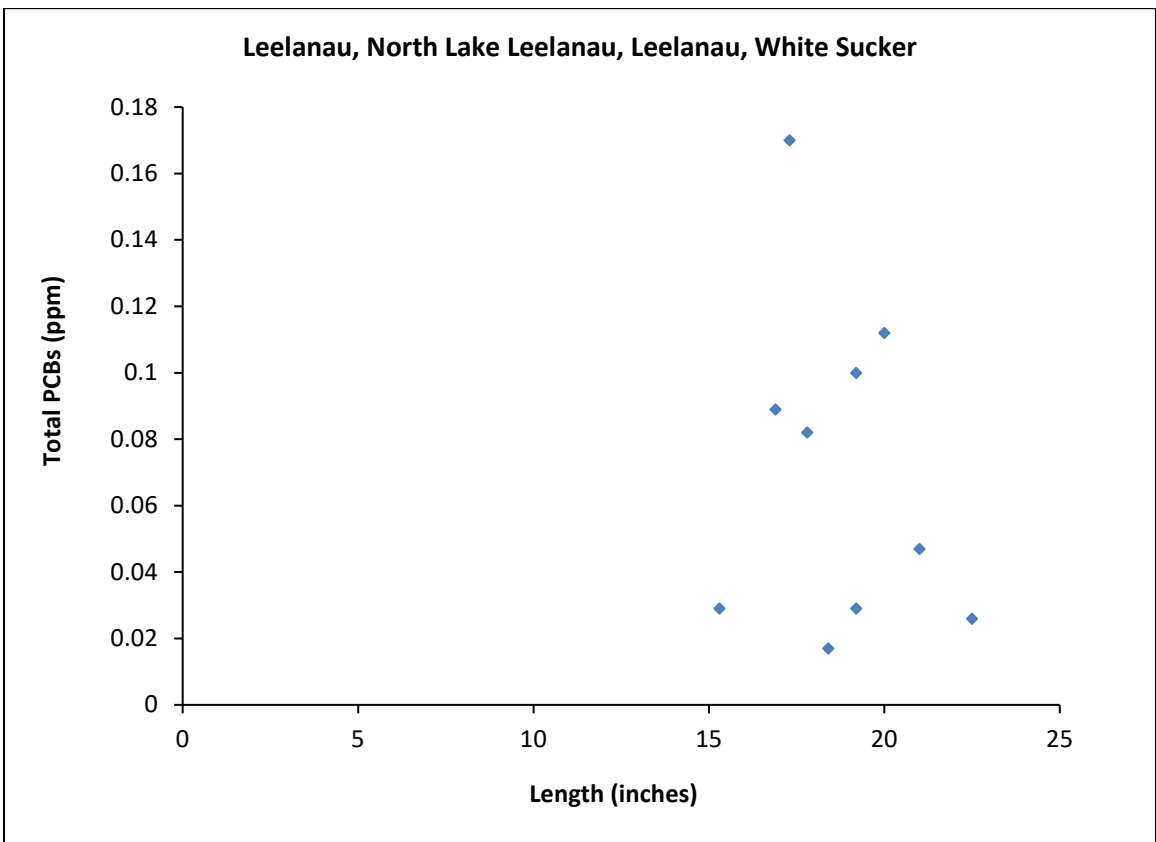
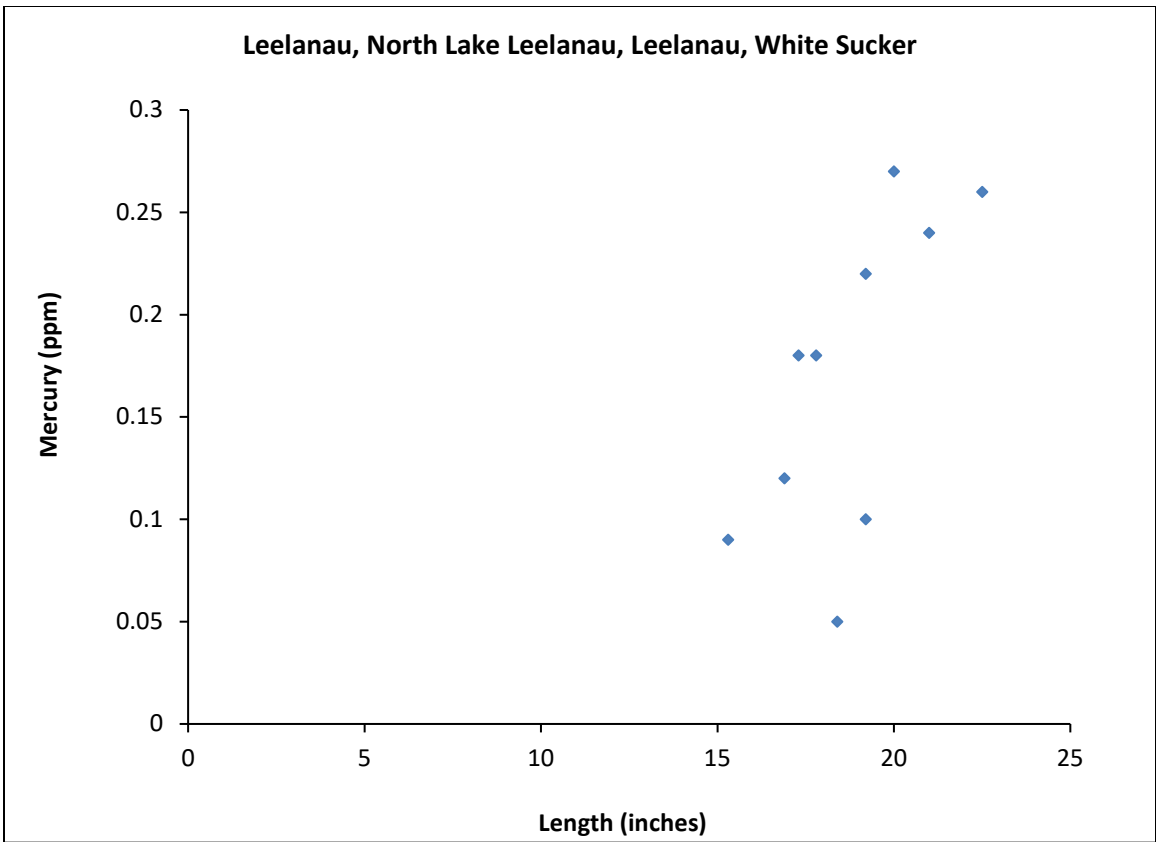
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2002	2002	10	15.3	na	15.3	22.5
Datasets available: 2002						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.17	0.05	0.27	0.23	4
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.467	0.326				

**Organics Analysis:**

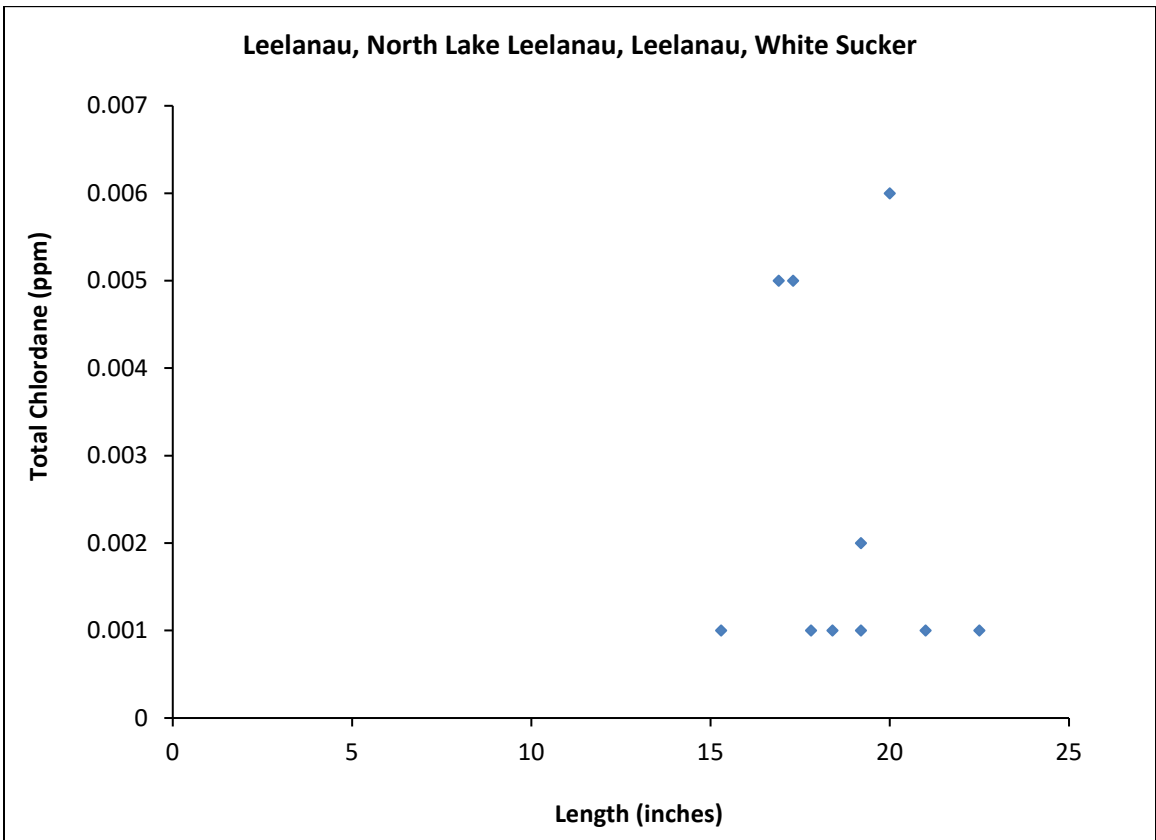
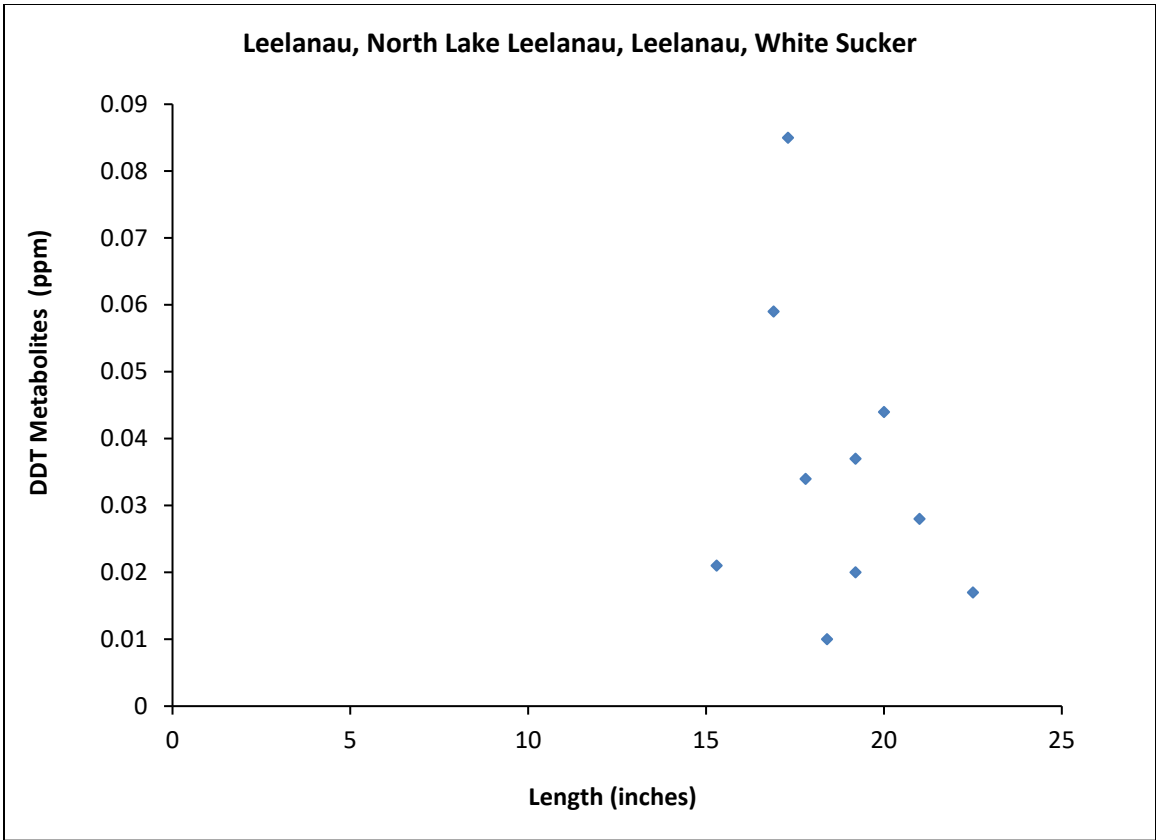
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2002	2002	10	15.3	na	15.3	22.5
Datasets available: 2002						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.07	0.02	0.17	0.11	2
DDT	10	0.04	0.01	0.08	0.05	16
Chlordane	10	0.002	0.001	0.006	0.004	--
Toxaphene	10	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.047	0.032				
DDT	0.103	0.071				
Chlordane	0.029	0.036				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2</b>

**Existing Advisory:** There are no current consumption advisories for North Lake Leelanau white sucker.

**Recommendation:** No one should eat more than 2 meals per month of North Lake Leelanau sucker due to PCBs. Mercury would cause an advisory.







**Walleye**

**South Lake Leelanau**

**Leelanau 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	10	14.9	15	14.9	18
Datasets available: 2015						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.45	0.28	0.71	0.55	1
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.712	0.630				

**Organics Analysis:**

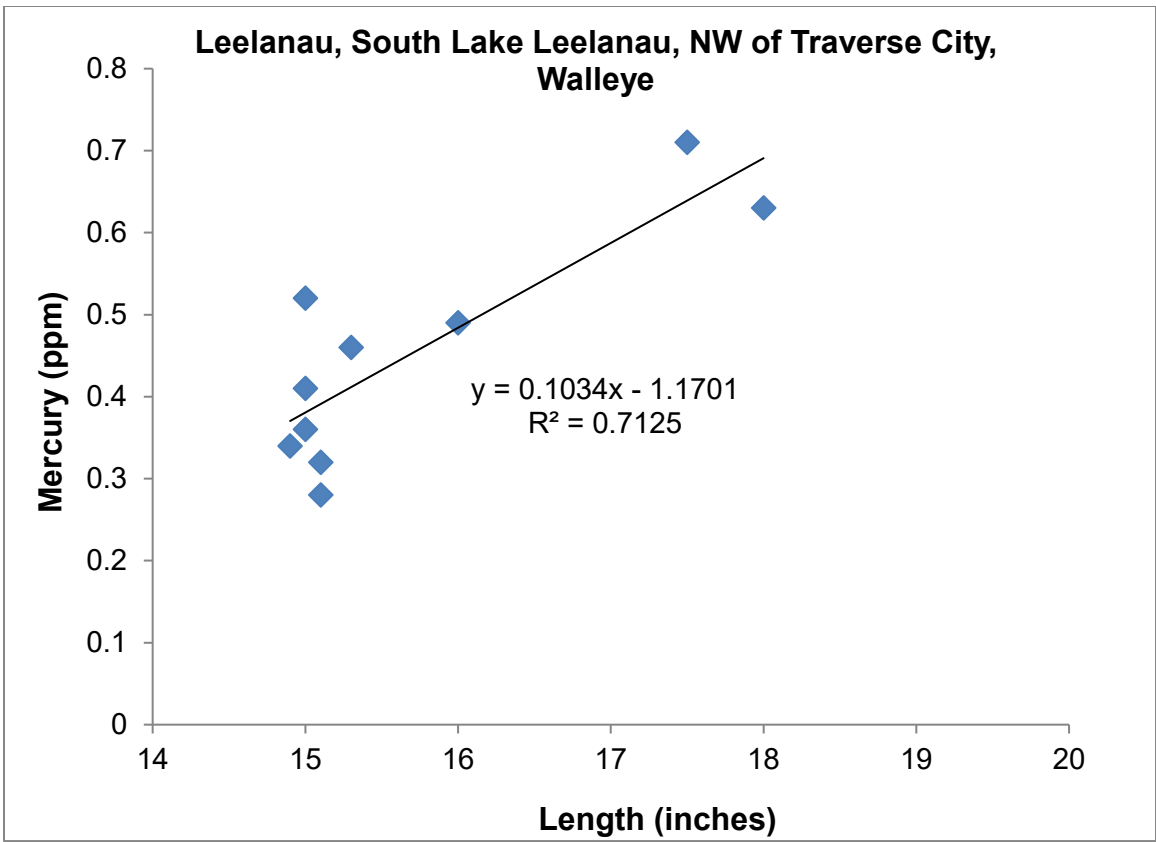
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2015	2015	10	14.9	15	14.9	18
Datasets available: 2015						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	ND	--	--	--	16
DDT	10	ND	--	--	--	16
Chlordane	10	ND	--	--	--	--
Toxaphene	10	ND	--	--	--	--
TEQ	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
TEQ	--	--				
<b>Final meal category based on UCL:</b>						<b>1</b>

**Existing MDHHS Advisory:** Walleye from South Lake Leelanau in Leelanau County are covered by the statewide advisory due to mercury: 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.

**Recommendation:** No one should eat more than 2 meals per month of walleye from South Lake Leelanau smaller than 16 inches or more than 1 meal per month of those fish larger than 16 inches due to mercury.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
14	0.28	2
15	0.38	2
16	0.48	2
17	0.59	1
18	0.69	1
19	0.79	1
20	0.9	1
21	1	1
22	1.1	1

*Shaded area denotes extrapolated estimates*



## Brown Bullhead

## Tucker Lake

## Leelanau County

## Hg Analysis:

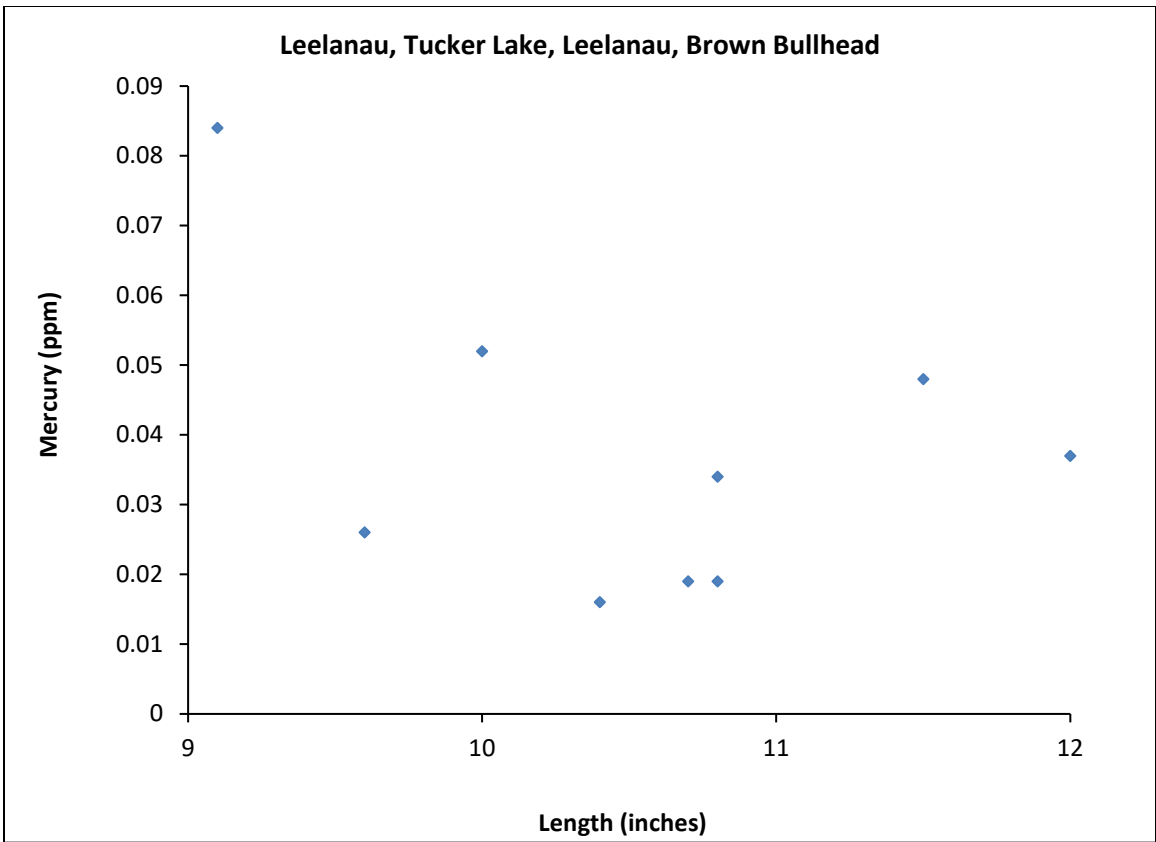
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2005	2005	9	9.1	na	9.1	12
Datasets available: 2005						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	9	0.04	0.02	0.08	0.05	16
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.149	0.059				

## Organics 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	9	9.1	na	9.1	12
Datasets available: 2005						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	ND	--	--	--	--
DDT	10	ND	--	--	--	--
Chlordane	10	ND	--	--	--	--
Toxaphene	10	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>16</b>

**Existing Advisory:** There are no current consumption advisories for Tucker Lake bullhead.

**Recommendation:** Consumption of 16 meals per month poses minimal risk to the consumer. No analyzed chemical causes a guideline. The maximum guideline of 16 meals per month will be listed in the guide.



# Manistee County

**Black Crappie**

**Manistee Lake**

**Manistee 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
1992	2016	20	8.7	na	8.7	12.4
Datasets available: 1992, 2016						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	20	0.15	0.06	0.39	0.19	4
Chromium	10	ND	--	(0.5 MDL)	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.185	0.093				
Chromium	--	--				

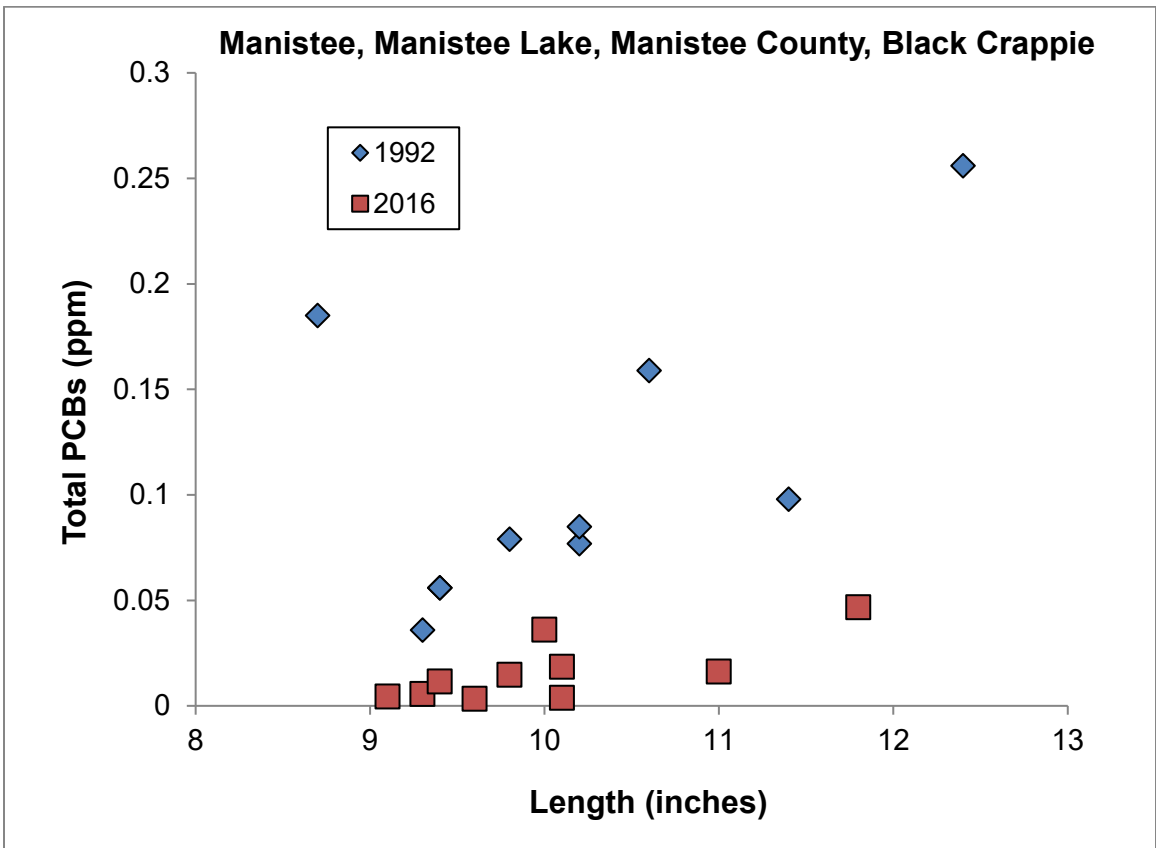
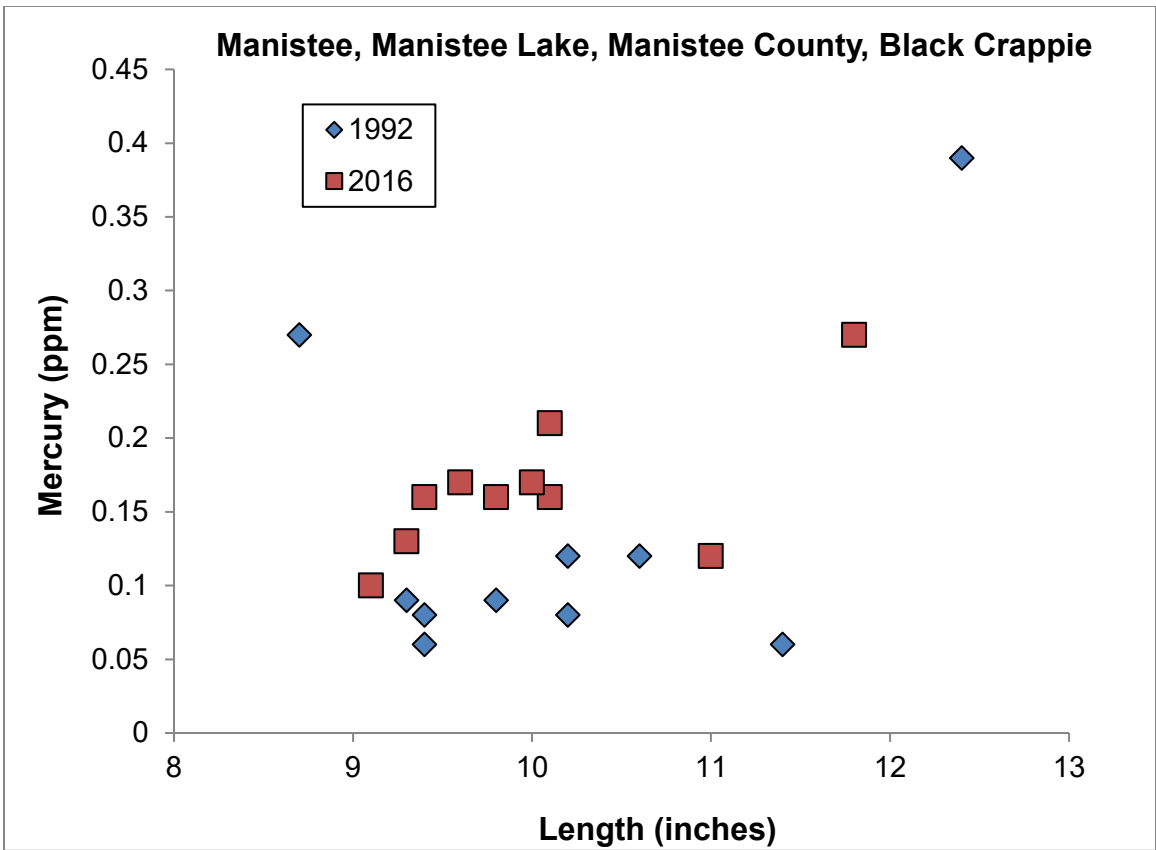
**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2016	2016	10	9.1	na	9.1	11.8
Datasets available: 1992, 2016						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.02	0.003	0.047	0.027	8
DDT	10	0.003	0.002	0.007	0.005	16
Chlordane	10	0.001	0.001	0.002	0.002	16
Toxaphene	10	ND	--	--	--	--
PFOS	10	10 ppb	6 ppb	17 ppb	13 ppb	12
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.546	0.444				
DDT	0.424	0.461				
Chlordane	0.317	0.317				
Toxaphene	--	--				
PFOS	0.369	0.331				
<b>Final meal category based on UCL:</b>						<b>4</b>

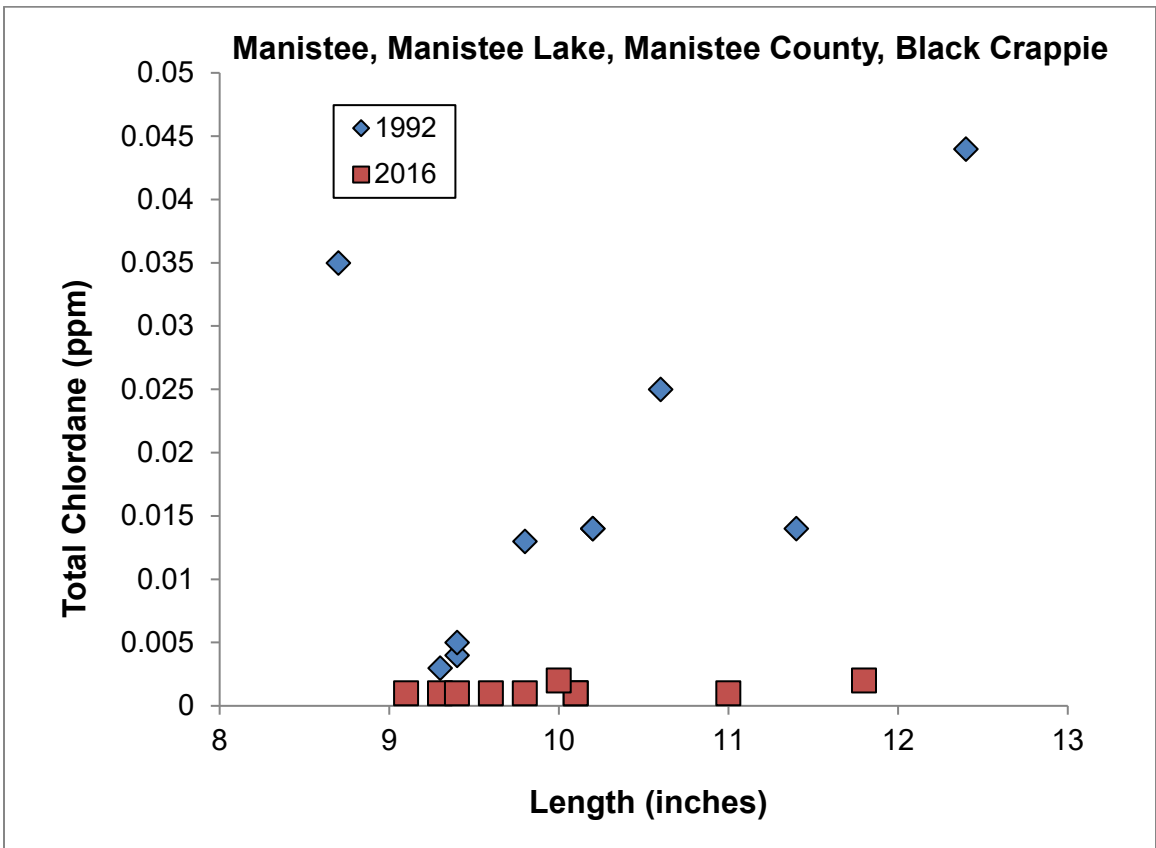
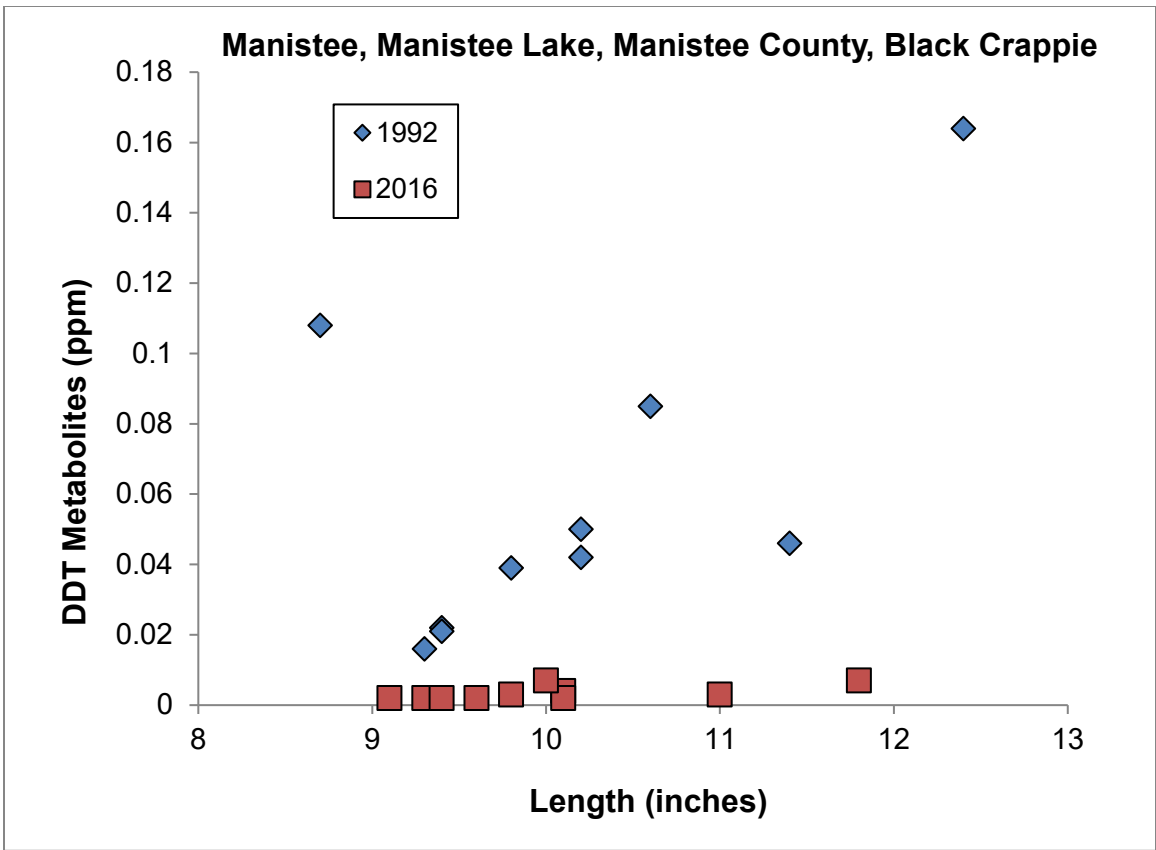
**Existing MDHHS Advisory:** No one should eat more than 2 meals per month of Manistee Lake crappie due to PCBs. Mercury would cause an advisory.

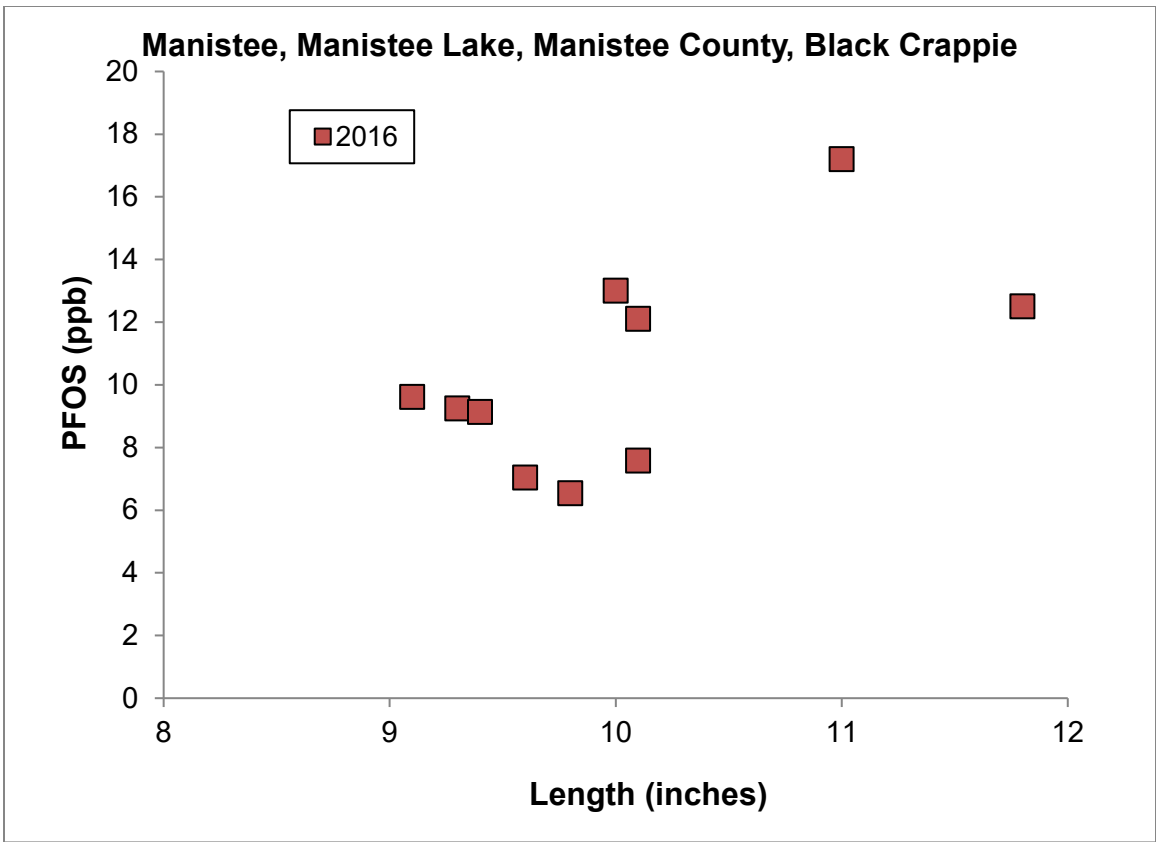
**Recommendation:** No one should eat more than 4 meals per month of Manistee Lake crappie due to mercury. PCBs and PFOS would cause advisories.

Note: 1992 PCB data was retired due to age. Chromium was analyzed for these samples at the request of local citizens and DNR Fisheries Division staff after an accidental discharge to the lake.









**Hg Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples			
Earliest	Most Recent							
1995	2019	15	5.5	NA	5.5	8.9		
Datasets available: 1995, 2019								
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
Mercury	15	0.135		0.065	0.200	0.156	4	
Chemical	Linear Regression	Exponential Regression						
	R <sup>2</sup>	R <sup>2</sup>						
Mercury	0.229	0.247						

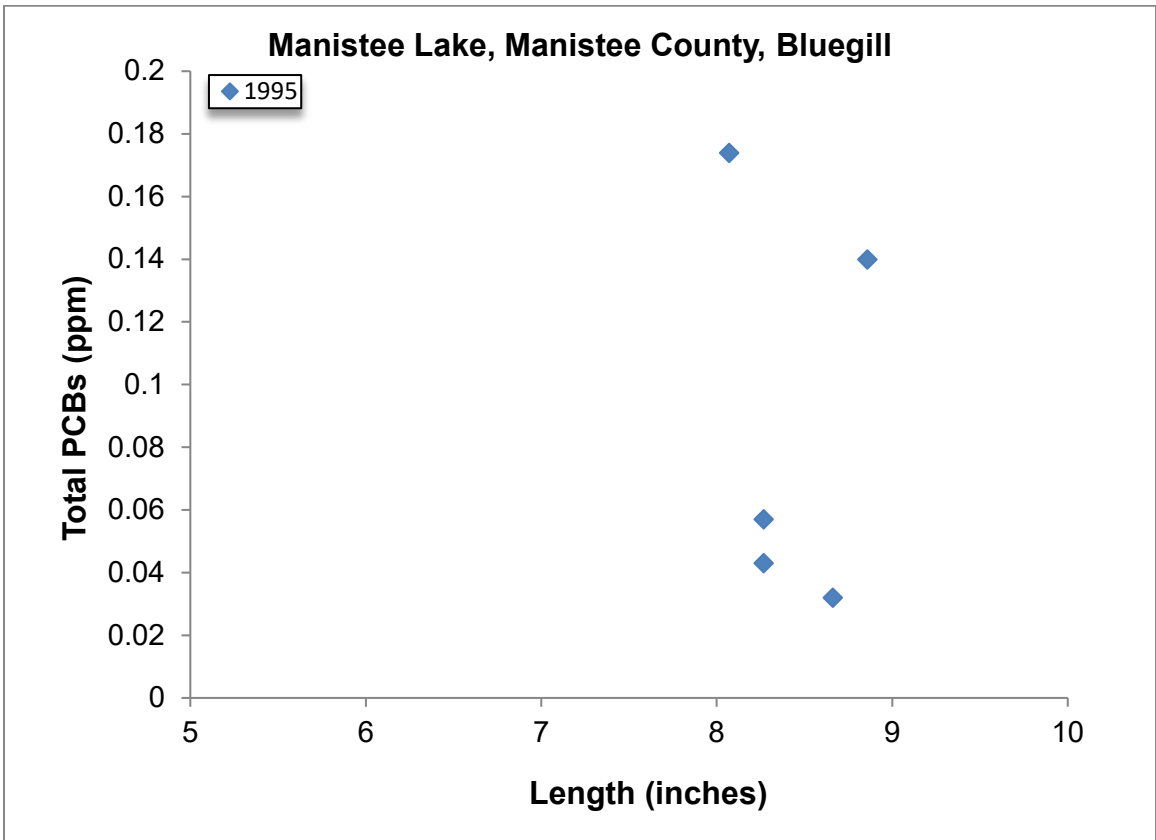
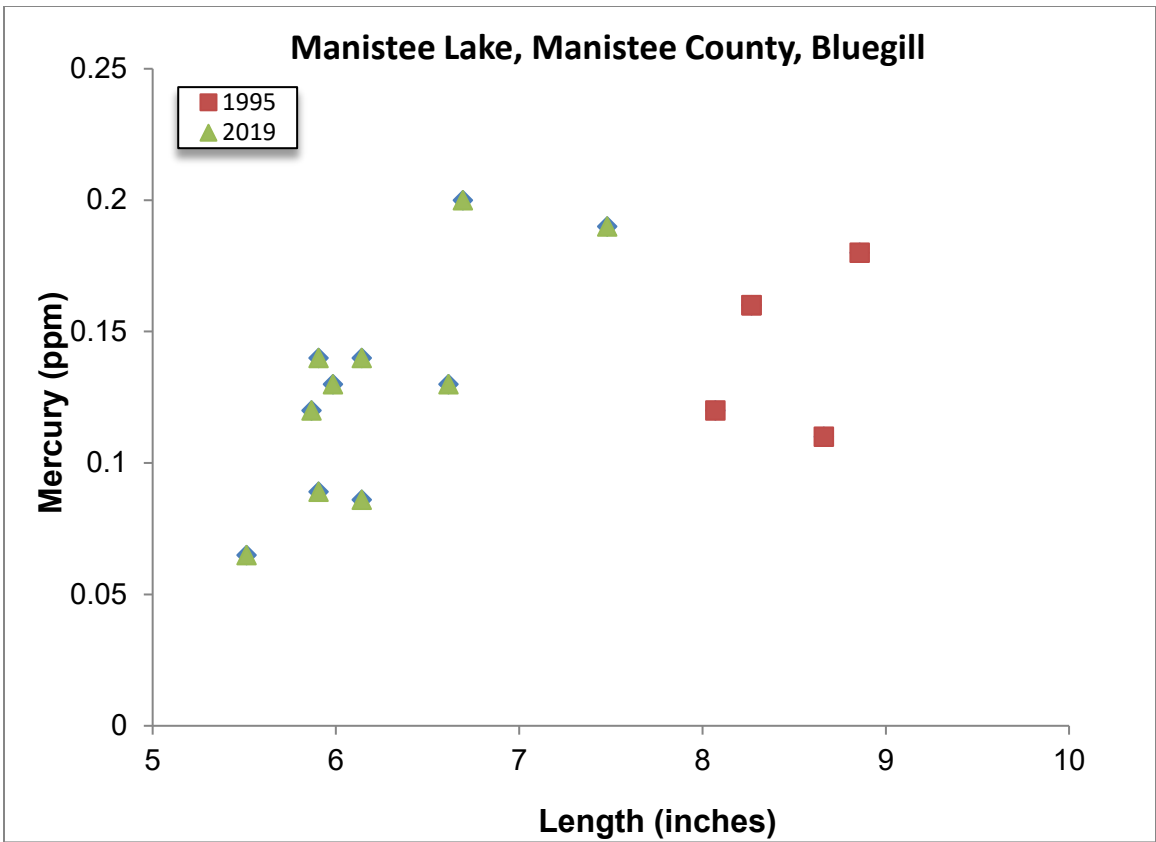
**Organics Analysis:**

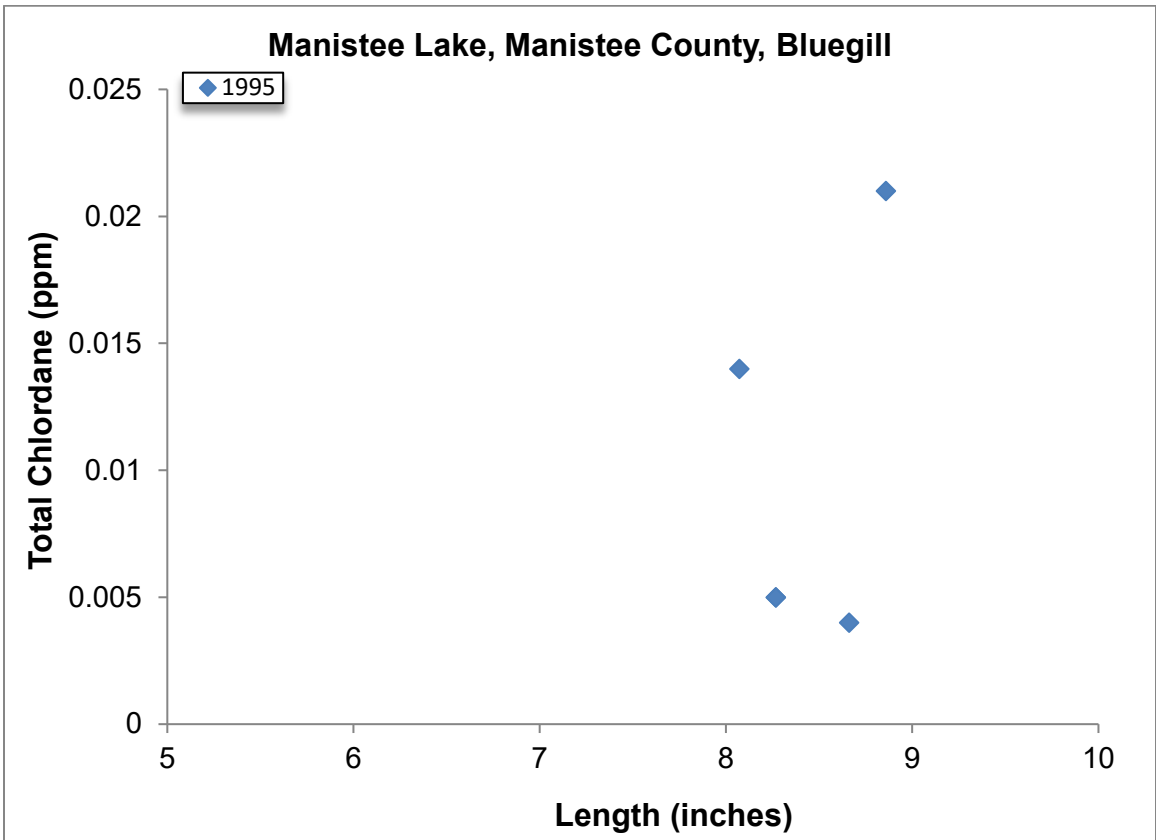
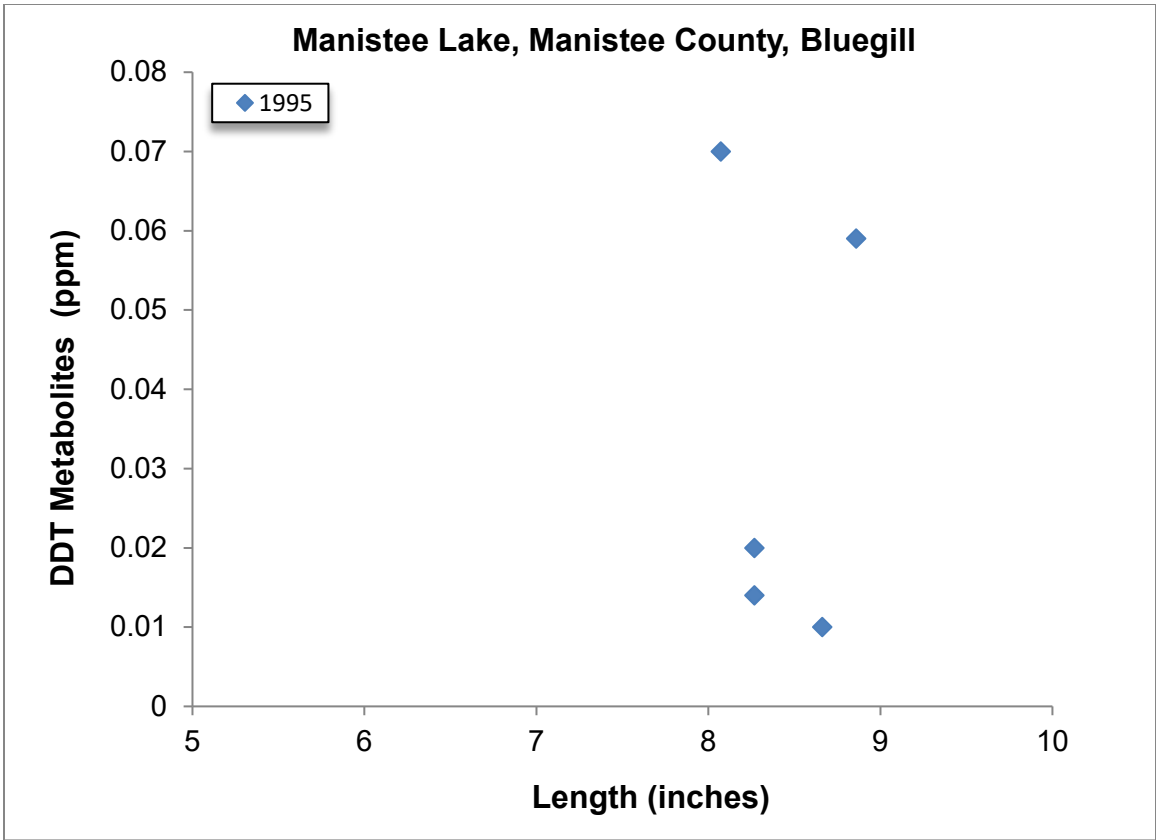
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples			
Earliest	Most Recent							
1995	2019	15	4.4	NA	5.5	8.9		
Datasets available: 1995 (Organics); 2019 (PFOS only)								
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
PCB	5	0.089		0.032	0.174	0.168	1*	
DDT	5	0.035		0.010	0.070	0.069	16	
Chlordane	5	0.010		0.004	0.021	0.019	16	
Toxaphene	5	ND		--	--	--	--	
PFOS	10	< 0.25 ppb		--	--	--	16	
Chemical	Linear Regression	Exponential Regression						
	R <sup>2</sup>	R <sup>2</sup>						
PCB	0.013	0.010						
DDT	0.004	0.005						
Chlordane	0.132	0.046						
Toxaphene	--	--						
PFOS	--	--						
							<b>Final meal category based on UCL: 1</b>	

\*Based on EGLE's Fish Contaminant Monitoring Program, PCB concentrations  $\geq 15$  years old are expected to have declined to a concentration that allows a less restrictive meal category than determined by the standard evaluation method.

**Existing MDHHS Advisory:** No one should eat more than 2 meals per month of bluegill or sunfish from Manistee Lake, including Manistee River downstream of Tippy Dam, due to PCBs. Mercury would cause an advisory.

**Recommendation:** No change to the advisory is warranted.





**Largemouth Bass & Smallmouth Bass**

**Manistee Lake**

**Manistee 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
1991	2016	23	11.4	14	13.8	17.5
Datasets available: 1991, 1992, 2016						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	15	0.37	0.20	0.69	0.45	2
Chromium	10	ND	--	(0.5 MDL)	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.750	0.834				
Chromium	--	--				

**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2016	2016	10	13.8	14	13.8	17.5
Datasets available: 1991, 1992, 2016						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.002	0.001	0.006	0.003	16
DDT	10	0.001	0.001	0.002	0.002	16
Chlordane	10	ND	--	--	--	--
Toxaphene	10	ND	--	--	--	--
PFOS	10	6 ppb	< 0.25 ppb	10 ppb	8 ppb	16
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.637	0.693				
DDT	0.218	0.218				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	0.101	0.074				
<b>Final meal category based on UCL:</b>						<b>2</b>

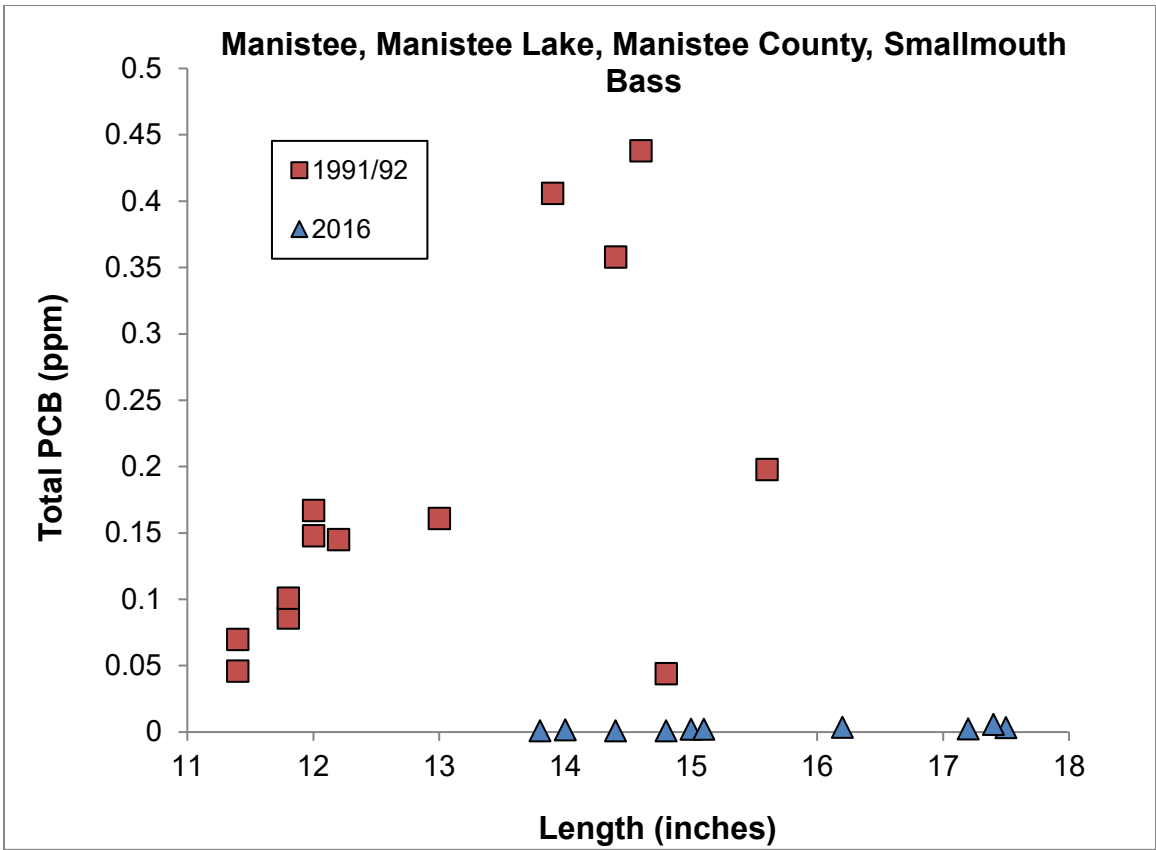
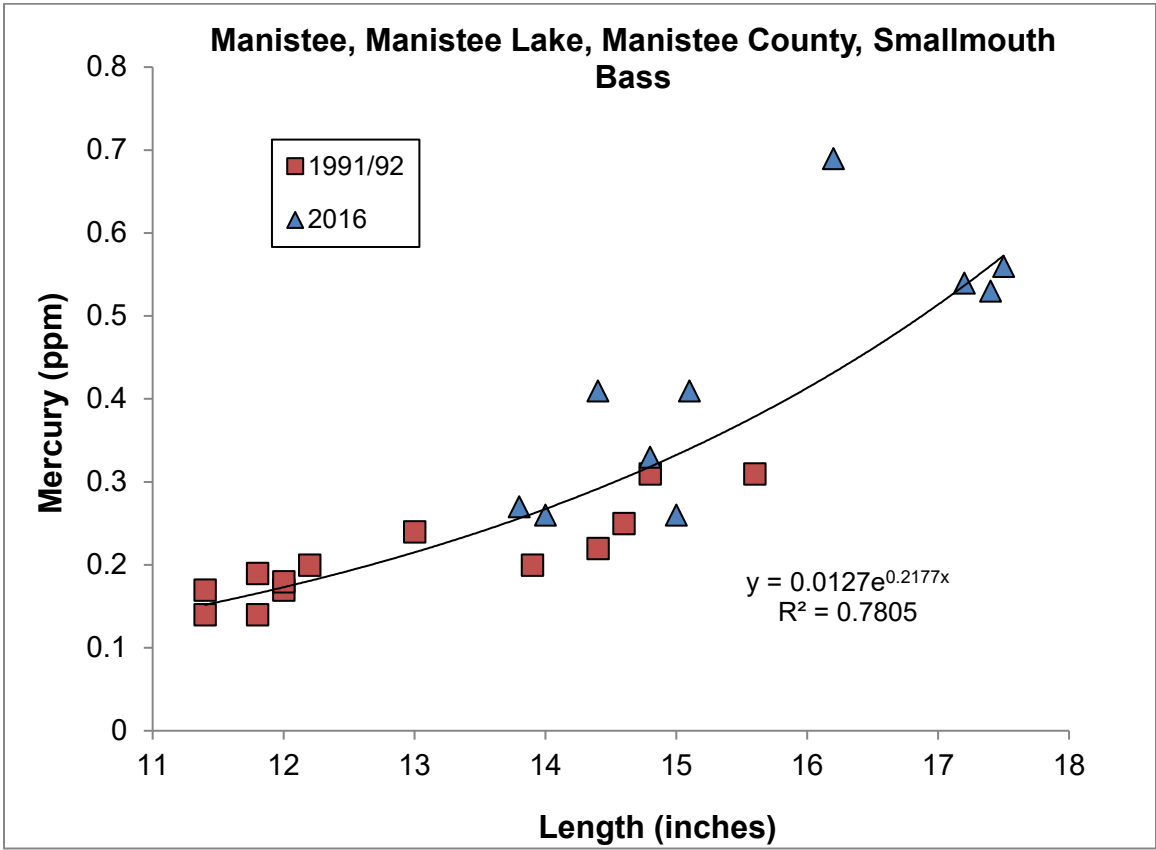
**Existing MDHHS Advisory:** No one should eat more than 6 meals per year of largemouth or smallmouth bass from Manistee Lake due to PCBs.

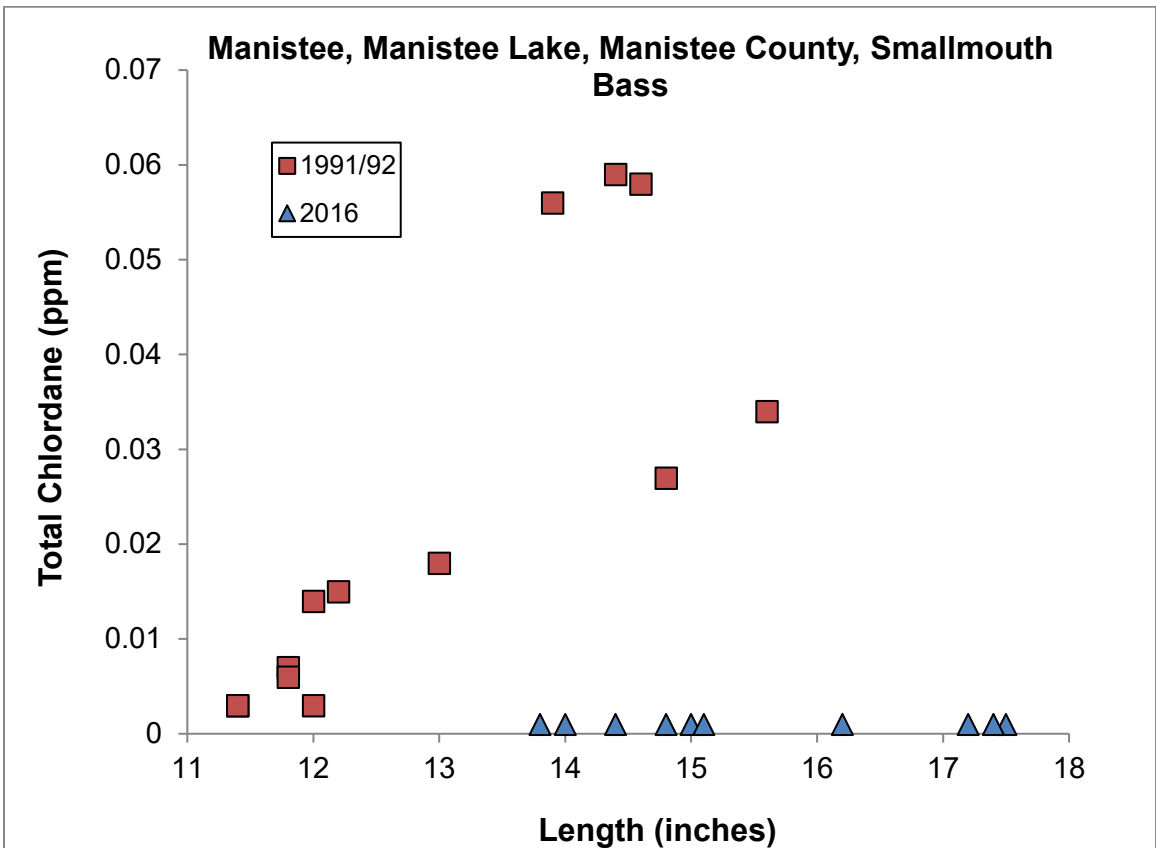
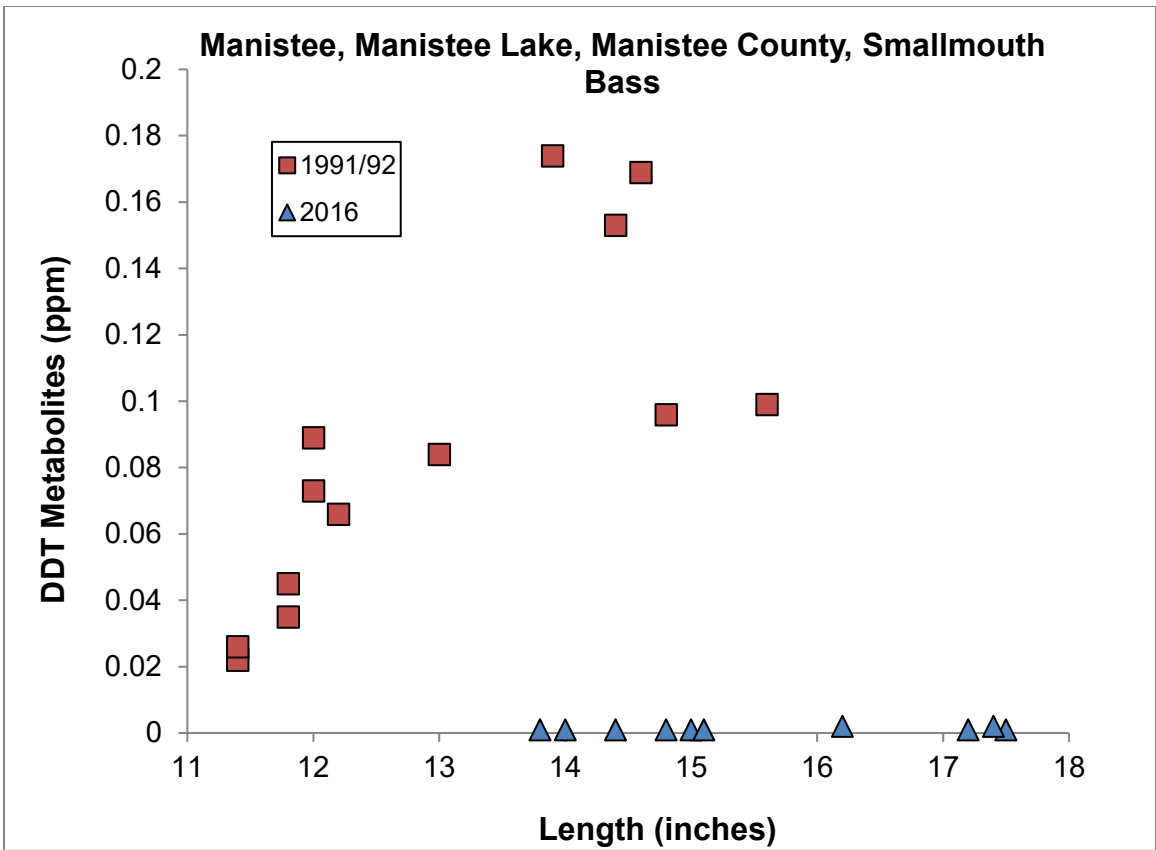
**Recommendation:** No one should eat more than 1 meal per month of largemouth or smallmouth bass from Manistee Lake, including Manistee River downstream of Tippy Dam, due to PCBs. Additional sampling may indicate that the advisory due to PCBs could be removed. Mercury would cause an advisory.

Note: 1992 PCB data was retired due to age. Chromium was analyzed for these samples at the request of local citizens and DNR Fisheries Division staff due to concerns over periodic combined sewer overflows with elevated metal concentrations.

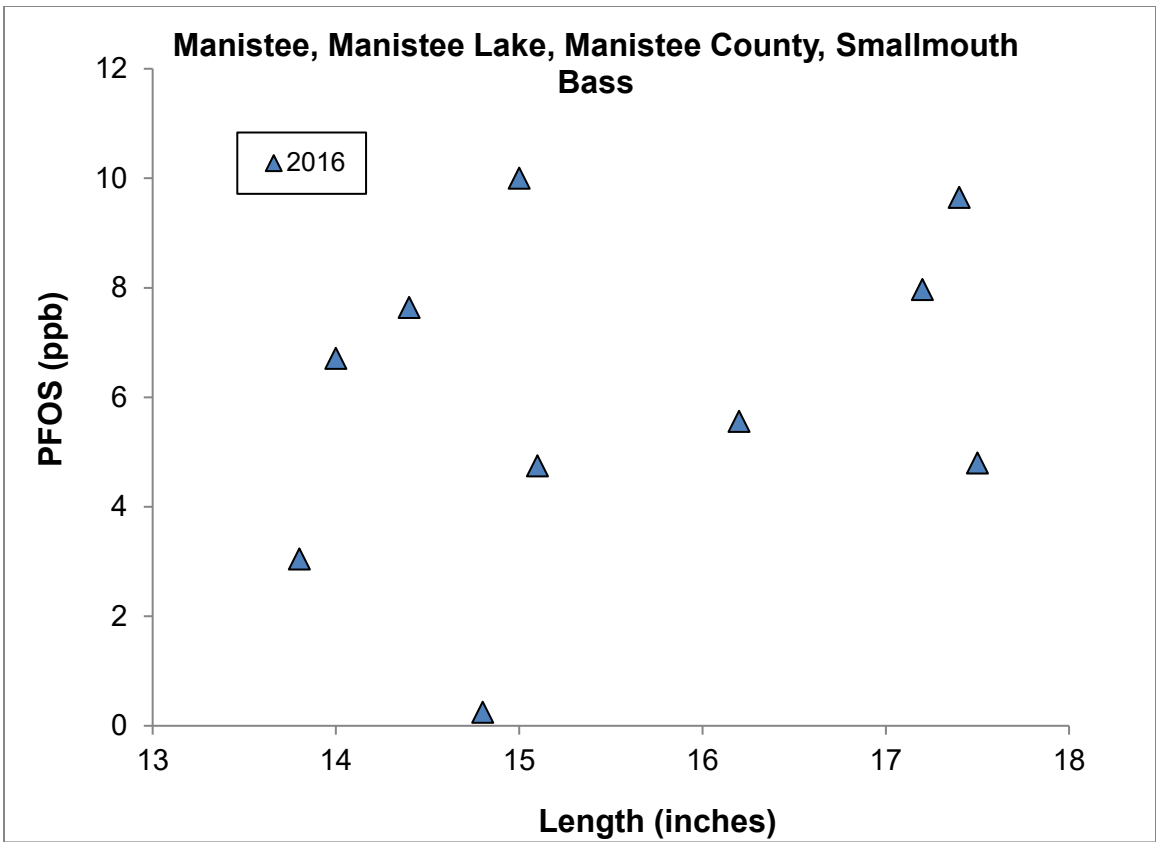
Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
14	0.27	4
15	0.33	2
16	0.41	2
17	0.51	2
18	0.64	1
19	0.79	1
20	0.99	1

*Shaded area denotes extrapolated estimates*









**Hg Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent						
1992	2019	30	6.0	NA	6.0	9.1	
Datasets available: 1992, 2019*							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	30	0.224		0.130	0.460	0.259	4
Chemical	Linear Regression	Exponential Regression					
	R <sup>2</sup>	R <sup>2</sup>					
Mercury	0.265	0.270					

**Organics Analysis:**

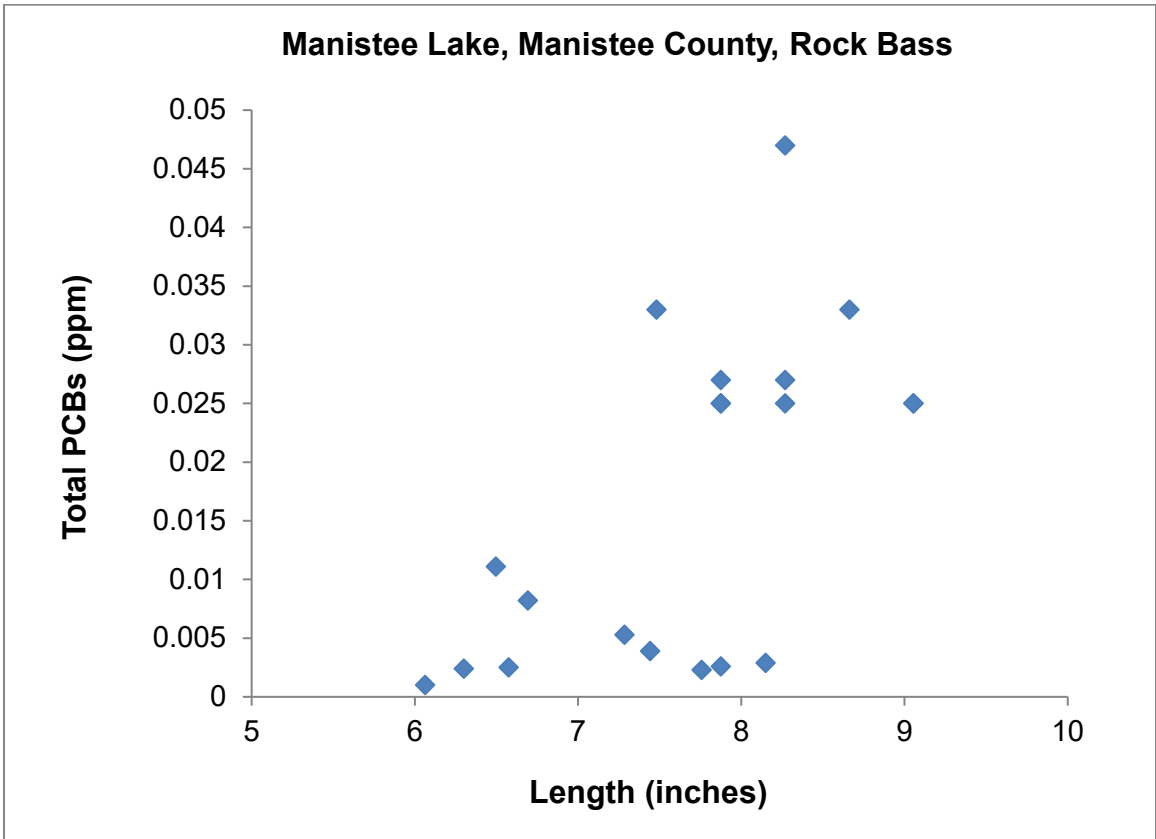
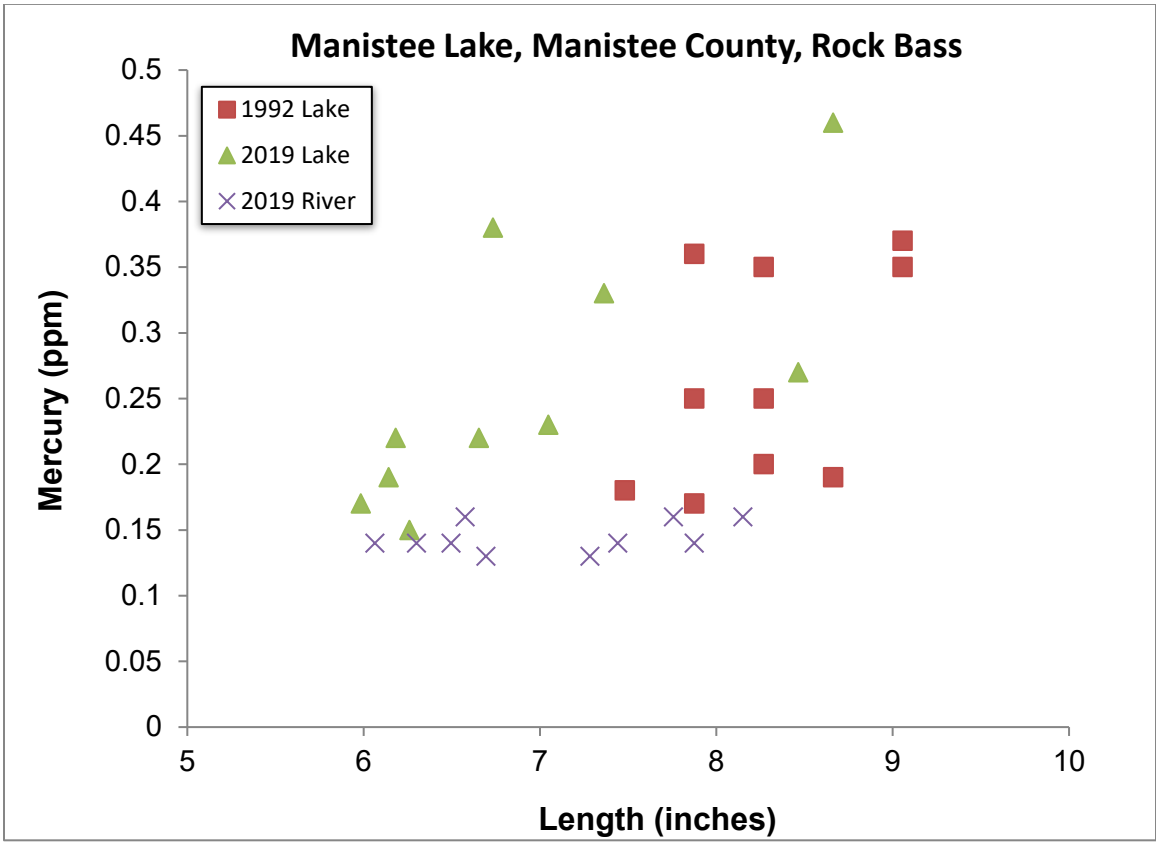
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent						
1992	2019	30	6.0	NA	6.0	9.1	
Datasets available: 1992 (Organics); 2019 (PFAS+Organics)*							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	20	0.017		< 0.001	0.047	0.023	8
DDT	20	0.005		< 0.001	0.018	0.008	16
Chlordane	20	0.002		< 0.001	0.003	0.002	16
Toxaphene	20	ND		--	--	--	--
PFOS	20	2.3 ppb		<0.25 ppb	6.4 ppb	3.3 ppb	16
Chemical	Linear Regression	Exponential Regression					
	R <sup>2</sup>	R <sup>2</sup>					
PCB	0.383	0.413					
DDT	0.252	0.422					
Chlordane	0.500	0.500					
Toxaphene	NA	NA					
PFOS	0.031	0.010					
<b>Final meal category based on UCL:</b>							<b>4</b>

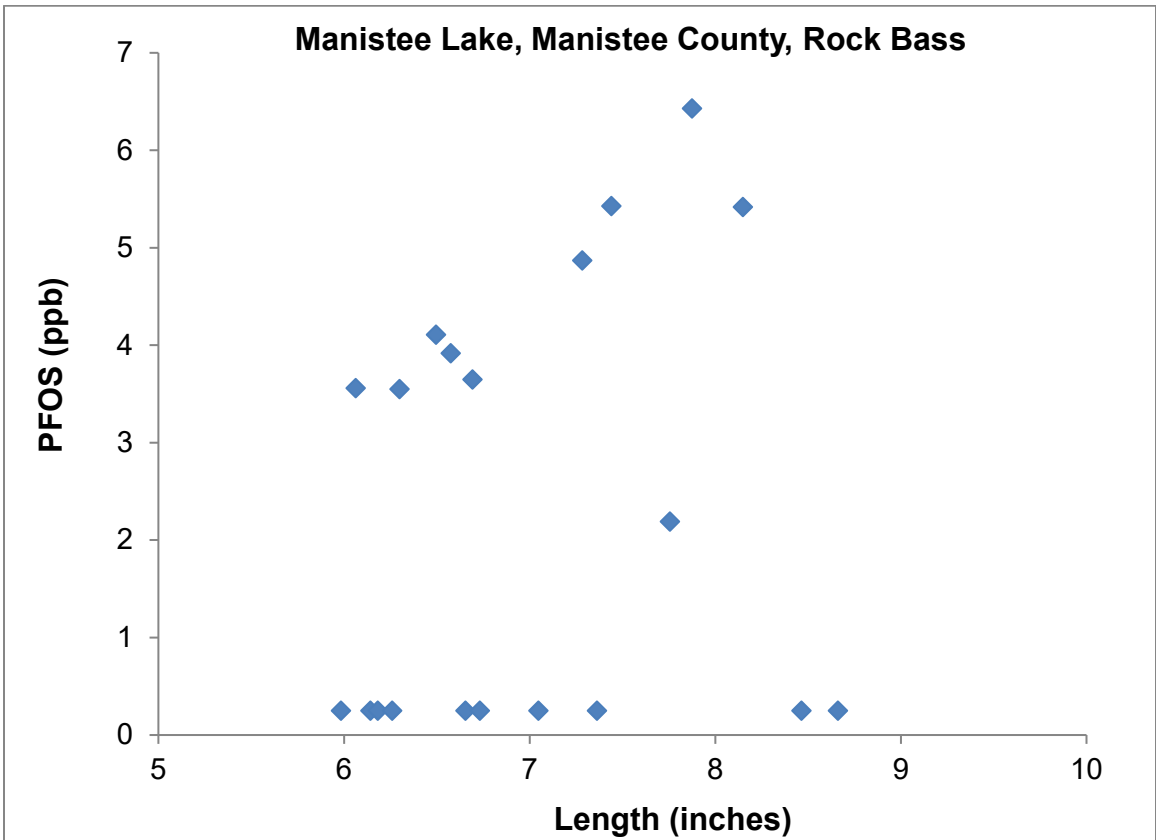
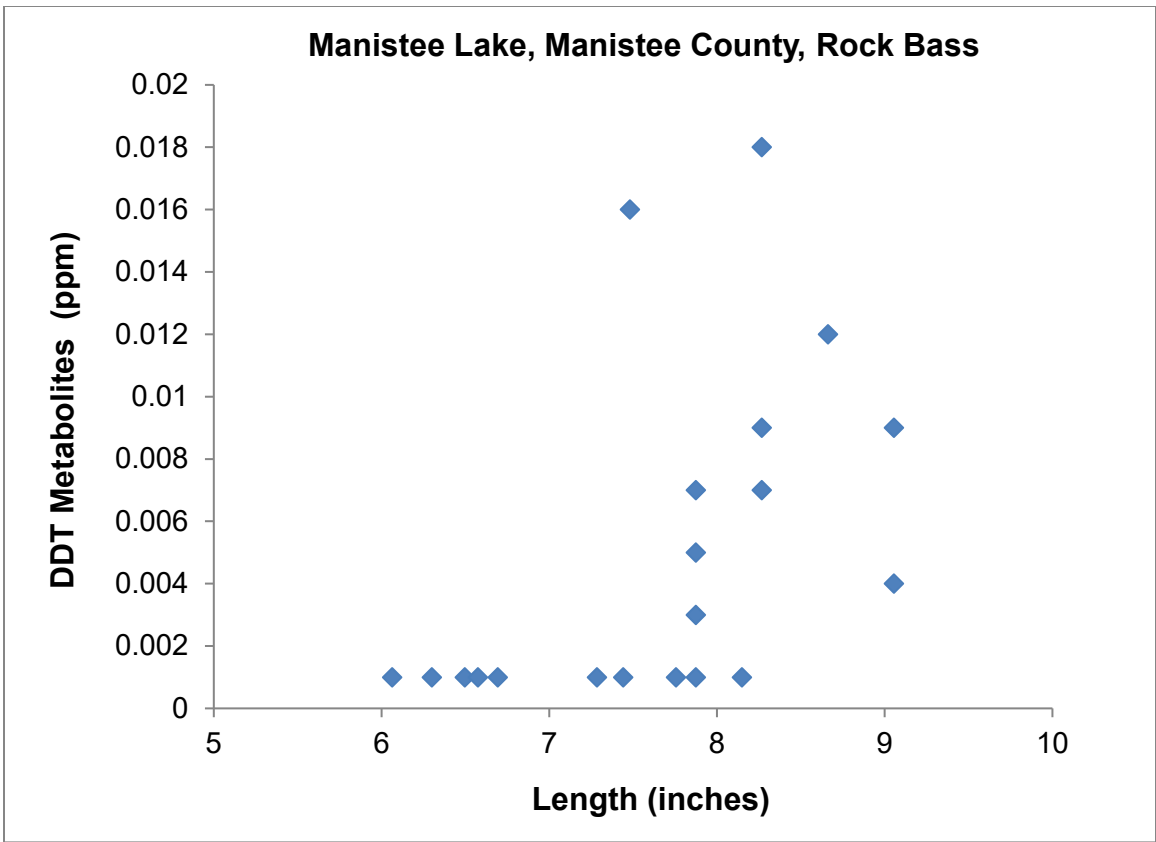
\*The 2019 dataset include 10 individuals from Manistee Lake and 10 individuals from Manistee River. Only the individuals from Manistee River were tested for organics.

**Existing MDHHS Advisory:** No one should eat more than 2 meals per month of rock bass from Manistee Lake, including Manistee River downstream of Tippy Dam, due to mercury. PCBs would cause an advisory.

**Recommendation:** No change to the advisory is warranted. An additional year of monitoring is needed to determine if the mercury advisory can be relaxed.

Note: The 1992 organics dataset was not retired as those fish were collected from Manistee Lake, and Manistee Lake fish collected in 2019 were not analyzed for organics.





**Walleye**

**Manistee Lake**

**Manistee 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
1991	1991	4	16.1	15	16.1	24.4
Datasets available: 1991						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	4	0.26	0.11	0.32	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	--	--				

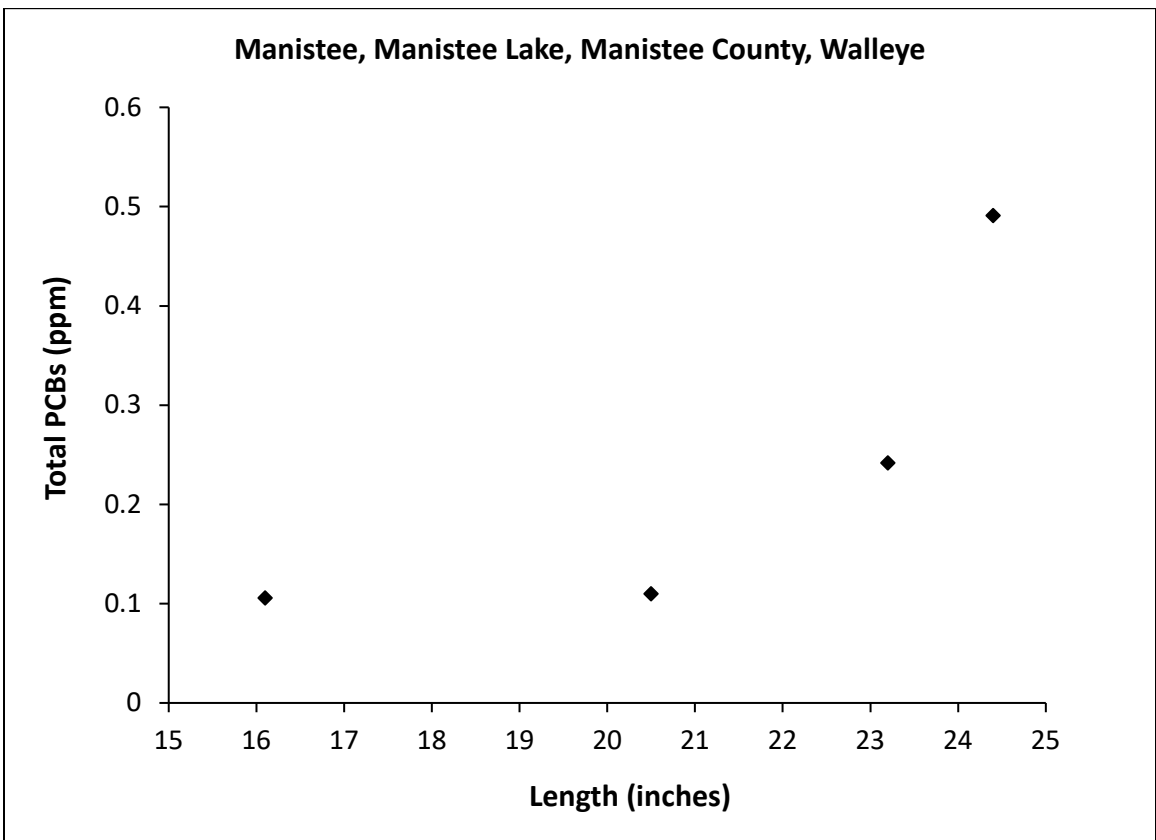
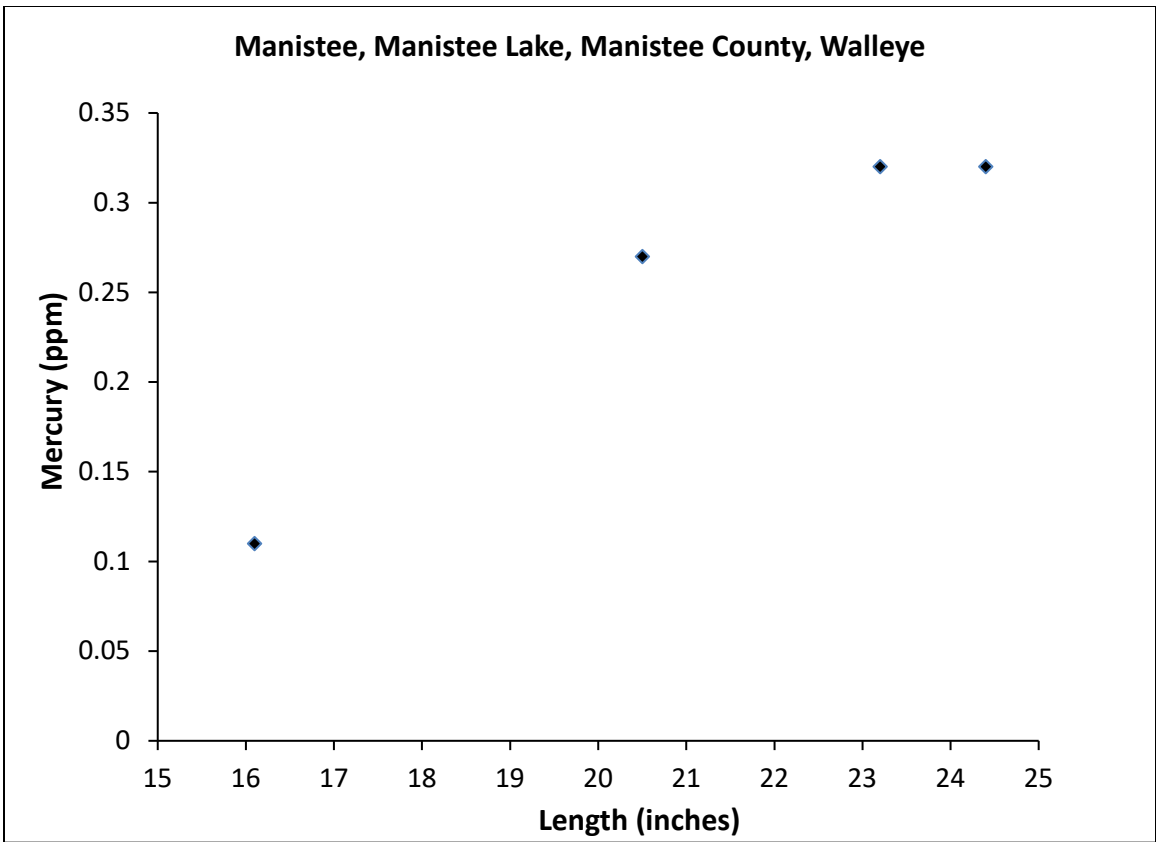
**Organics Analysis:**

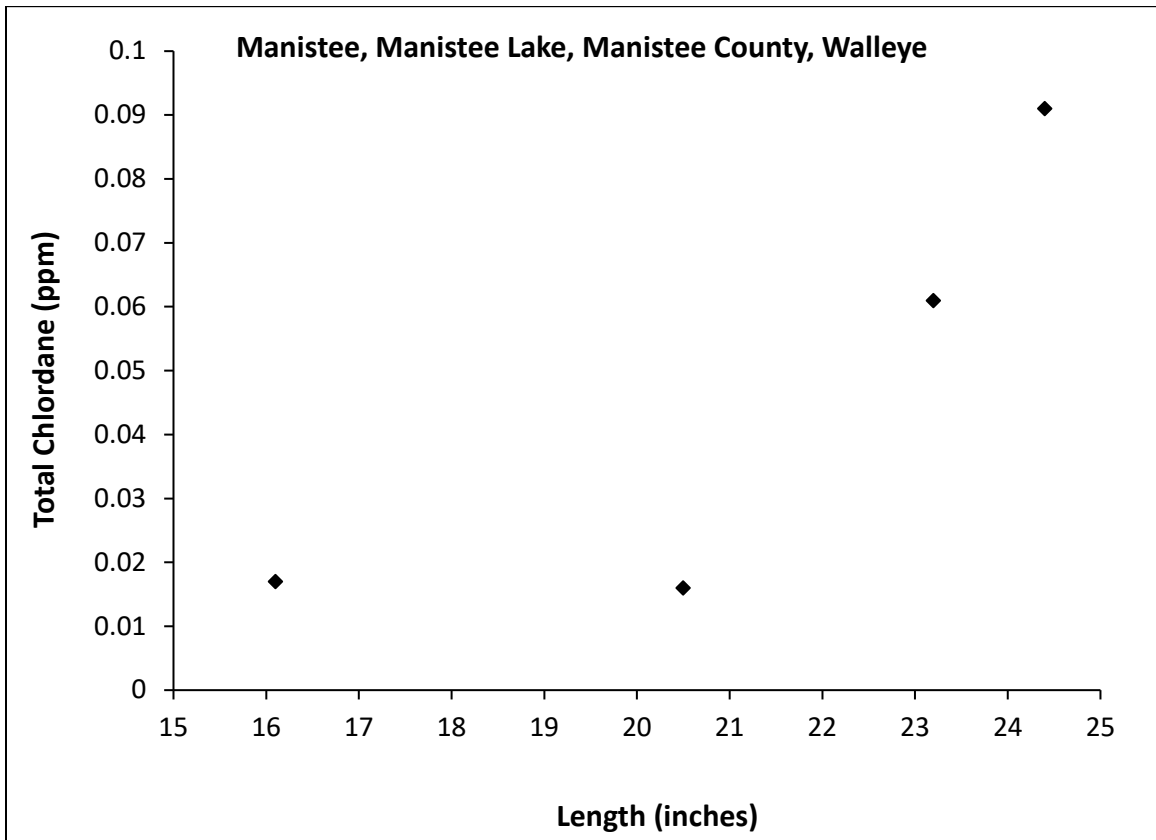
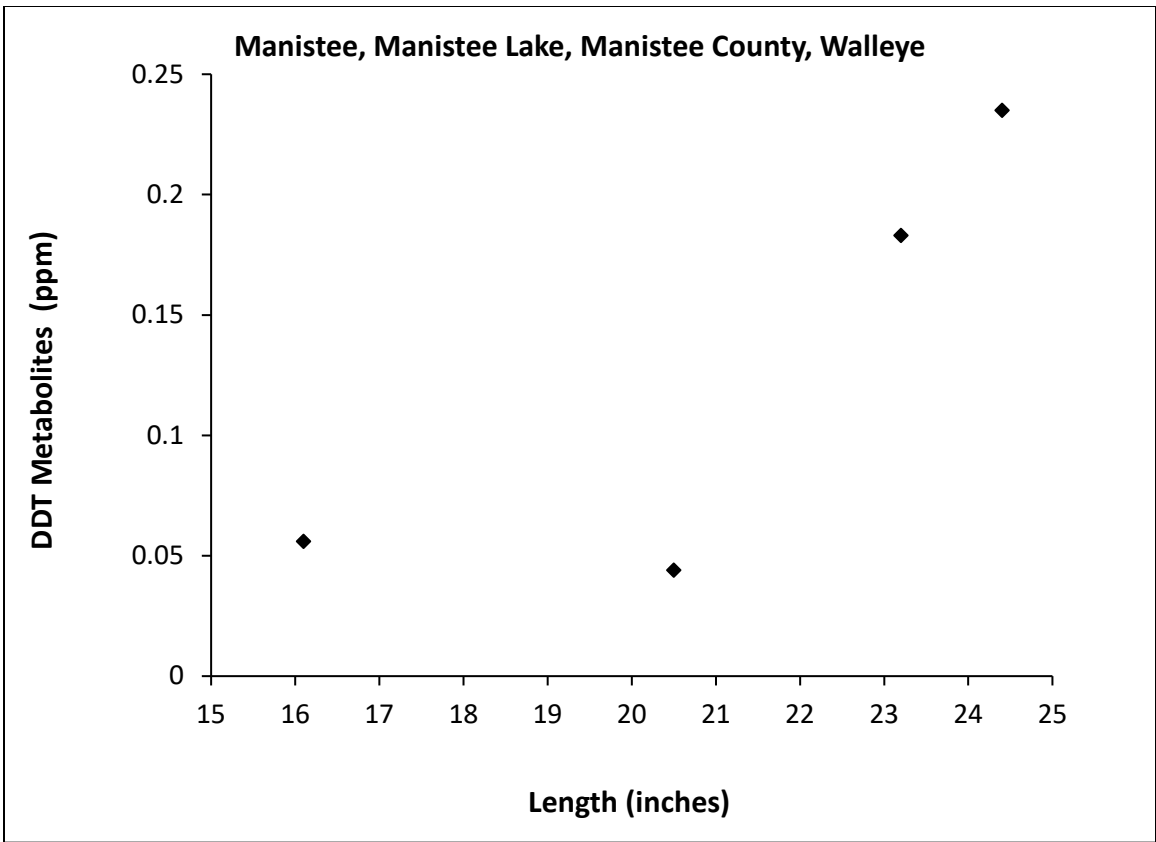
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1991	1991	4	16.1	15	16.1	24.4
Datasets available: 1991						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	4	0.24	0.11	0.49	--	--
DDT	4	0.13	0.04	0.24	--	--
Chlordane	4	0.05	0.02	0.09	--	--
Toxaphene	4	0.09	0.05	0.12	--	--
TEQ*	4	0.2 ppt	0.05 ppt	0.6 ppt	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
TEQ*	--	--				
<b>Final meal category based on UCL:</b>						--

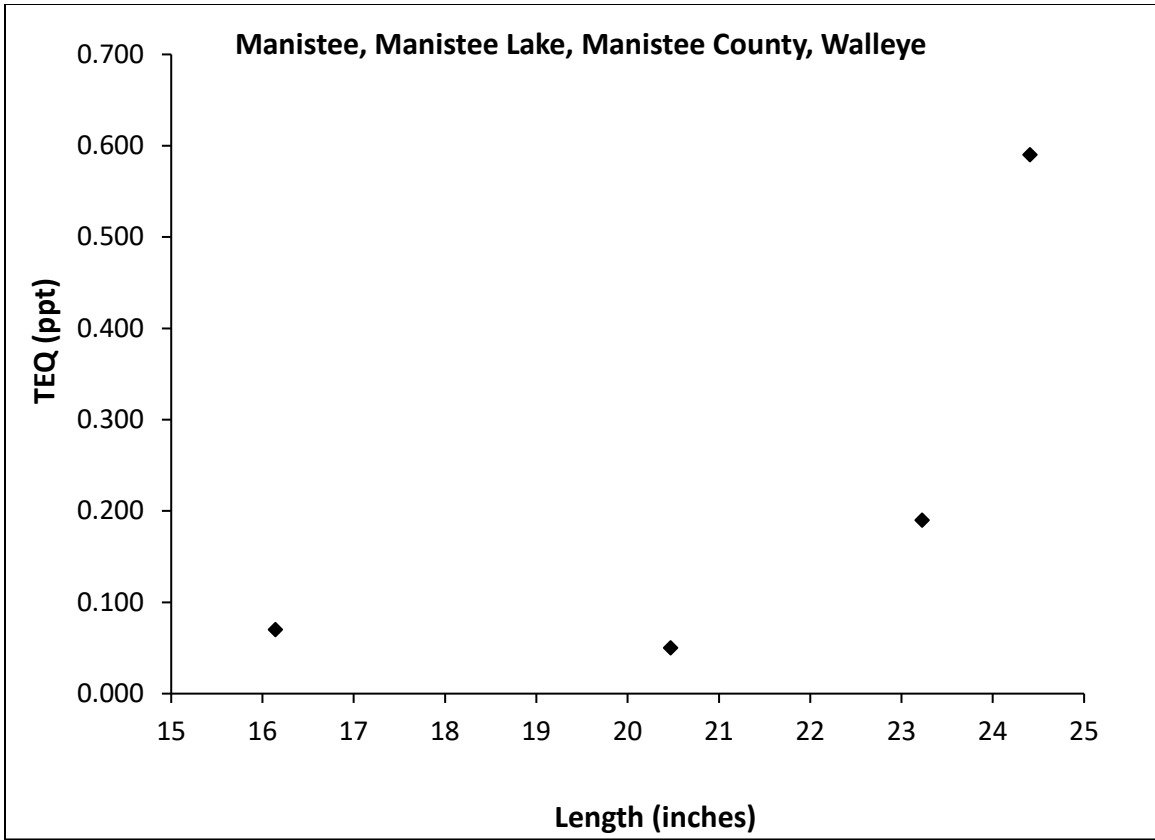
\* - 2005 WHO TEFs; dl-PCBs not included

**Existing Advisory:** Women and children should not eat more than one meal per month of Manistee Lake walleye due to mercury and 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 mercury applies: 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.









**Northern Pike**

**Manistee River  
Tippy Dam Impoundment**

**Manistee County**

**Hg Analysis:**

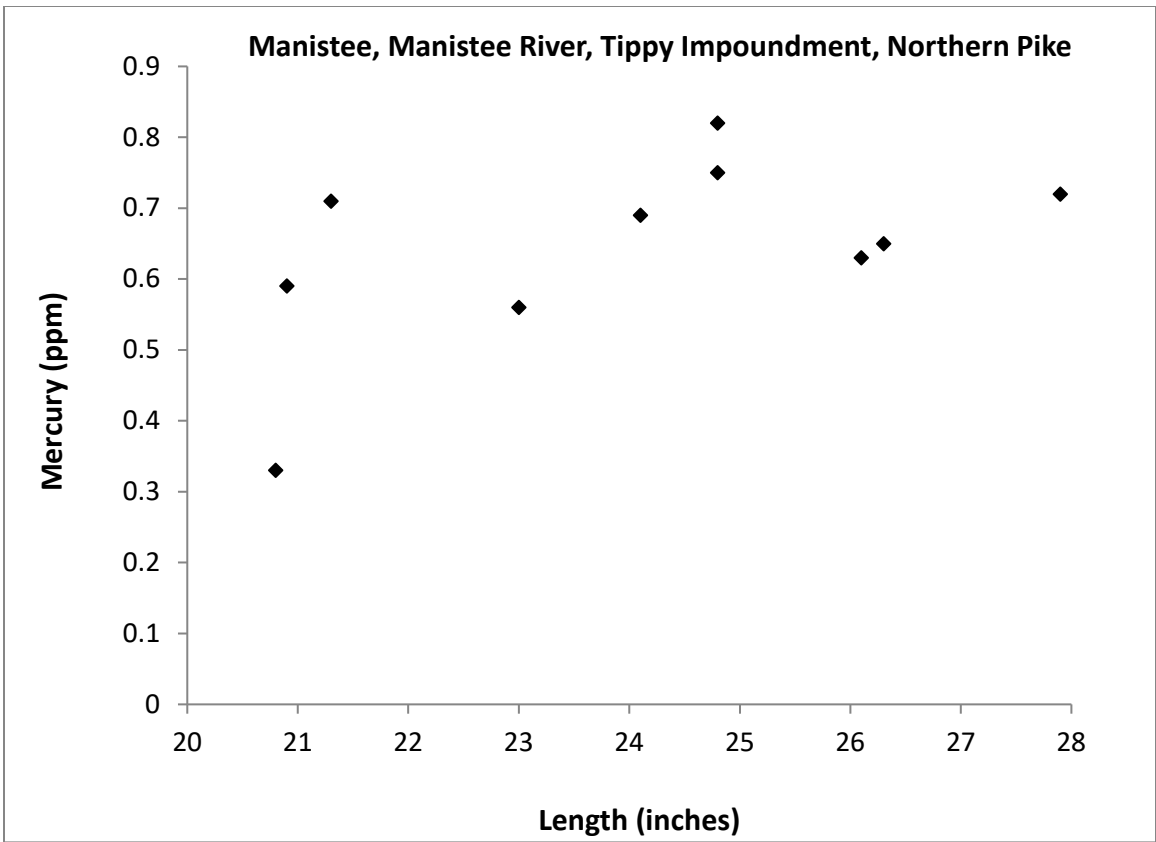
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2011	2011	10	20.8	24	24.1	27.9
Datasets available: 2011						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	6	0.71	0.63	0.82	0.78	1
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.285	0.291				

**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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>1</b>

**Existing Advisory:** Tippy Impoundment northern pike are covered by the statewide mercury advisory.

**Recommendation:** No one should eat more than 1 meal per northern pike smaller than 30 inches from the Manistee River upstream of Tippy Dam or more than 6 meals per year of those fish larger than 30 inches due to mercury. The statewide length break was applied as the size range of fish was limited.



**Rock Bass**

**Manistee River – Tippy Pond**

**Manistee**

**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	5.0	NA	5.0	8.3
Datasets available: 2021						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.169	0.074	0.310	0.216	4
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.705	0.738				

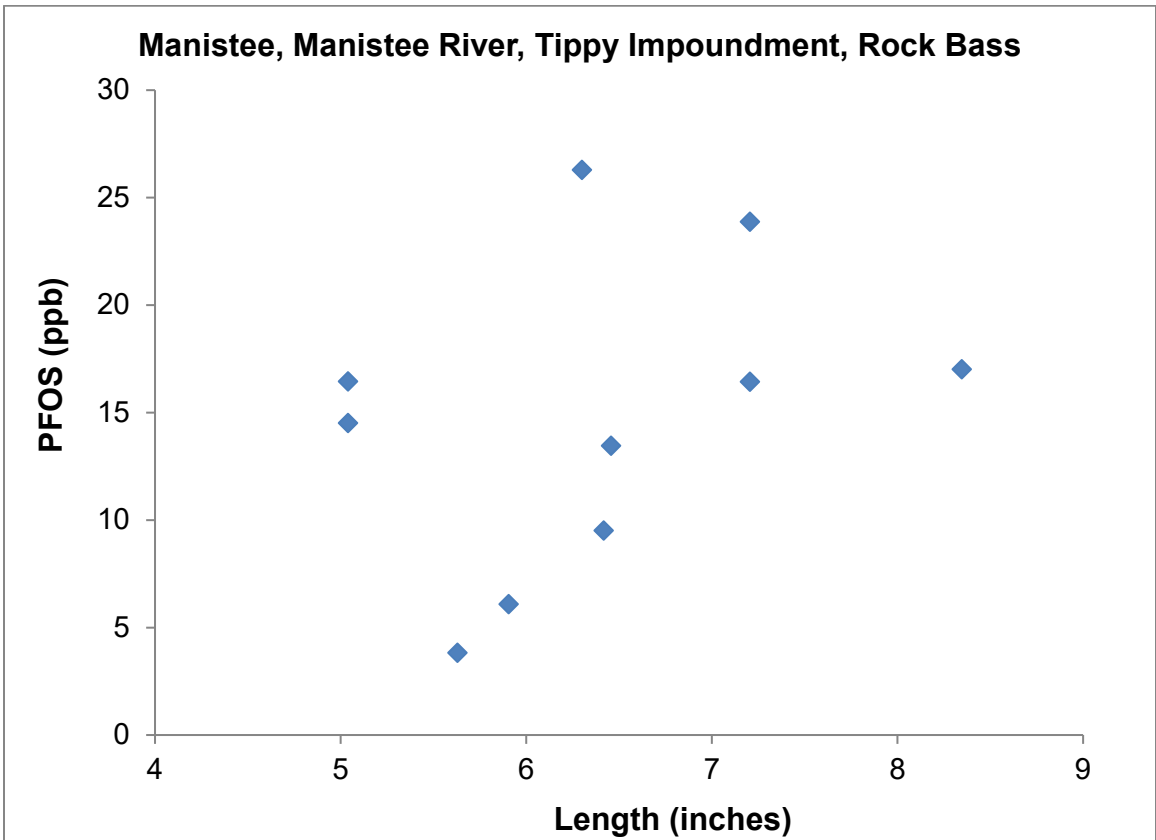
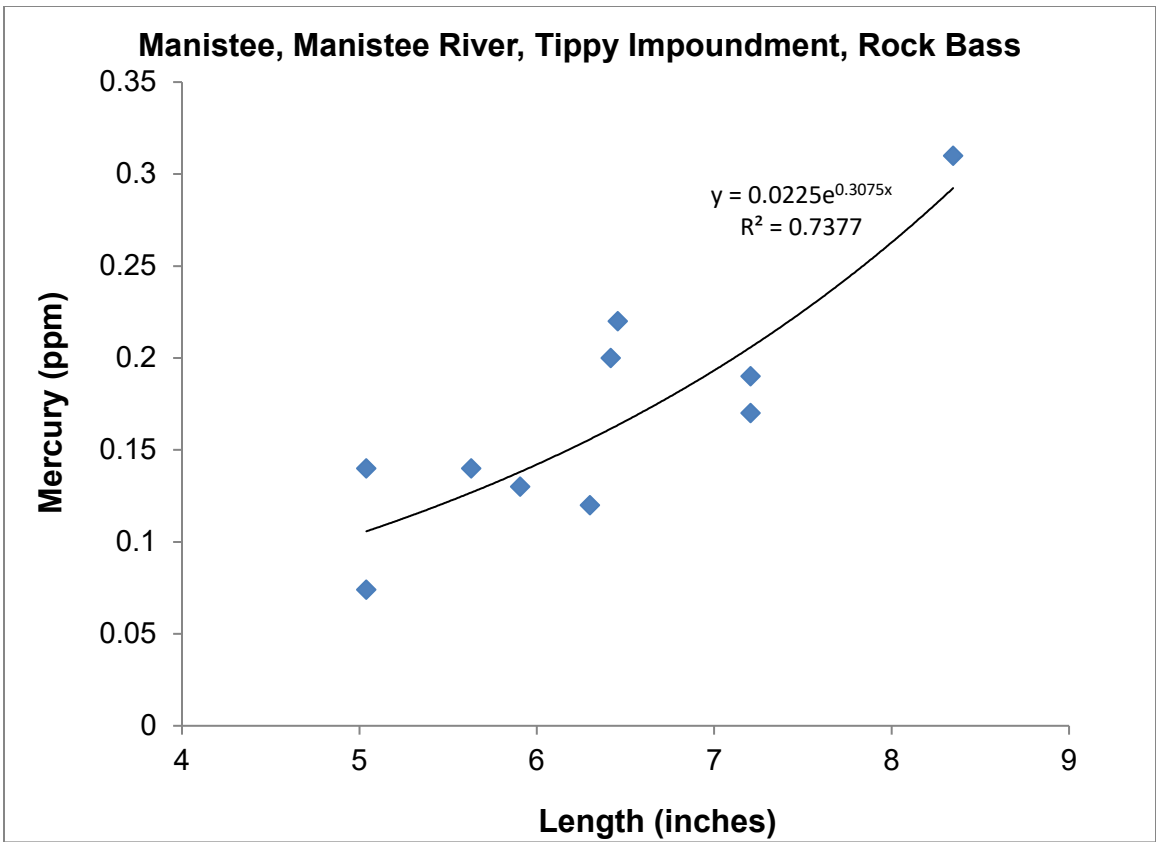
**Organics Analysis:**

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	5.0	NA	5.0	8.3
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	14.7 ppb	3.8 ppb	26.3 ppb	19.8 ppb	4
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	0.116	0.125				
<b>Final meal category based on UCL:</b>						<b>4</b>

**Existing MDHHS Advisory:** Rock bass from the Manistee River upstream of the Tippy Dam in Manistee County are currently covered under the statewide advice 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 4 meals per month of rock bass under 9 inches from the Manistee River upstream of Tippy Dam in Manistee County due to mercury and PFOS or no more than 2 meals per month of these fish larger than 9 inches due to mercury.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
6	0.142	4
7	0.194	4
8	0.263	4
9	0.358	2
10	0.487	2
<i>Shaded area denotes extrapolated estimates</i>		



**Brown Trout**

**Pine Lake**

**Manistee 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	1	20.9	8	--	--
Datasets available:		1987				
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	1	0.26	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
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
--	--	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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						--

**Existing Advisory:** Pine Lake brown trout 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.

**Largemouth Bass**

**Pine Lake**

**Manistee County**

**Hg Analysis:**

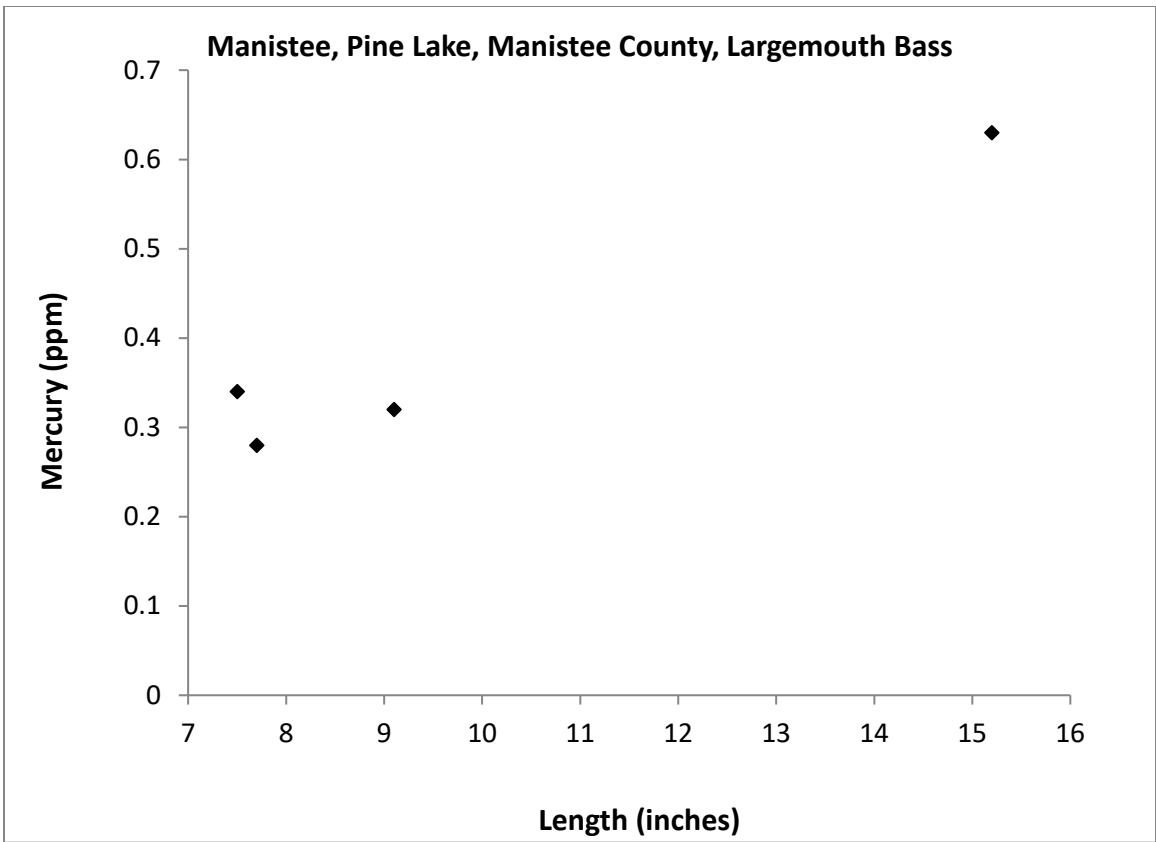
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Size Range of All Samples	
Earliest	Most Recent				Min	Max
1987	1987	4	7.5	14	7.5	15.2
Datasets available:		1987				
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	4	0.39	0.28	0.63	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
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
--	--	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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						--

**Existing Advisory:** Pine 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: 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.



**Rock Bass**

**Pine Lake**

**Manistee 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	5.5	na	5.5	9.4
Datasets available: 1987						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	9	0.31	0.12	0.54	0.43	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.712	0.654				

**Organics Analysis:**

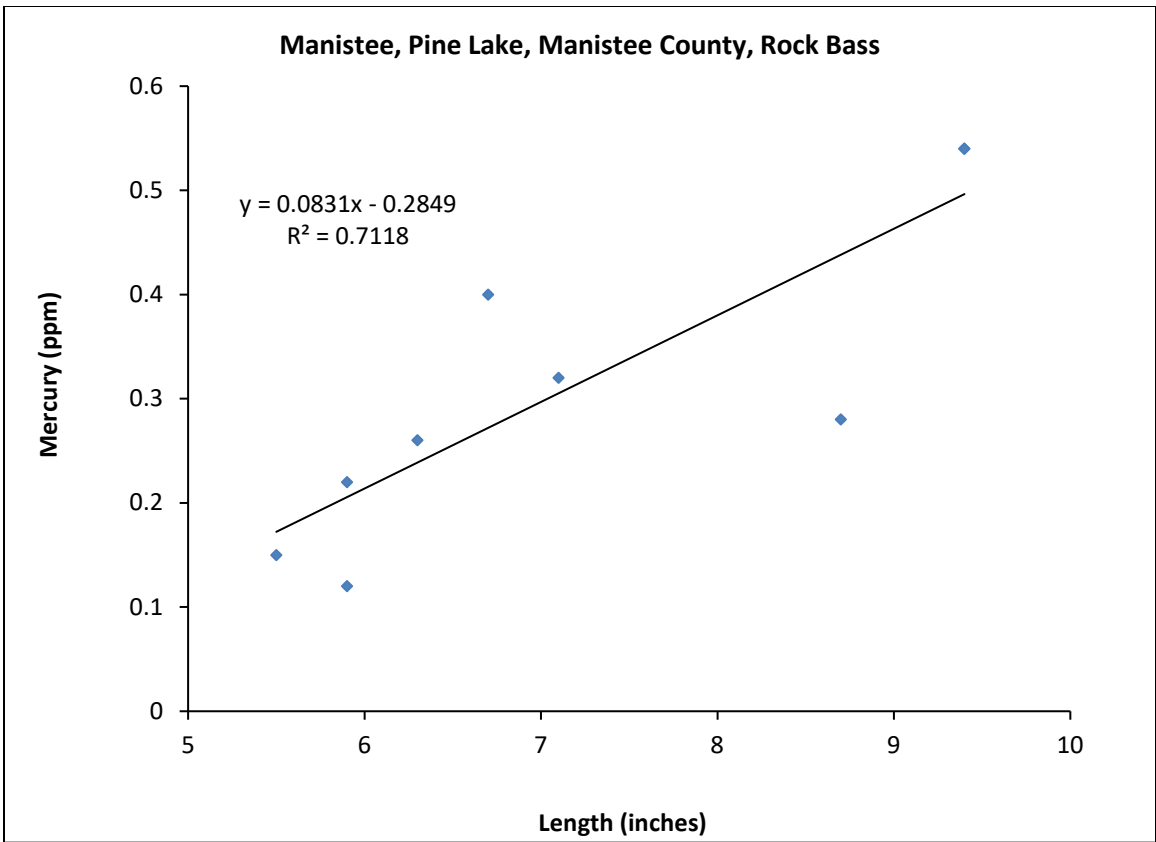
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available: --						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--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

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

**Recommendation:** No one should eat more than 2 meals per month of Pine Lake rock bass less than 9 inches or more than 1 meal per month of rock bass larger than 9 inches due to mercury.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
5	0.13	4
6	0.21	4
7	0.30	2
8	0.38	2
9	0.46	2
10	0.55	1
11	0.63	1
12	0.71	1
13	0.80	1
<i>Shaded area denotes extrapolated estimates</i>		





**Carp**

**Portage Lake**

**Manistee 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	10	16.7	na	16.7	33
Datasets available: 2004						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.13	0.08	0.15	0.15	4
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.149	0.184				

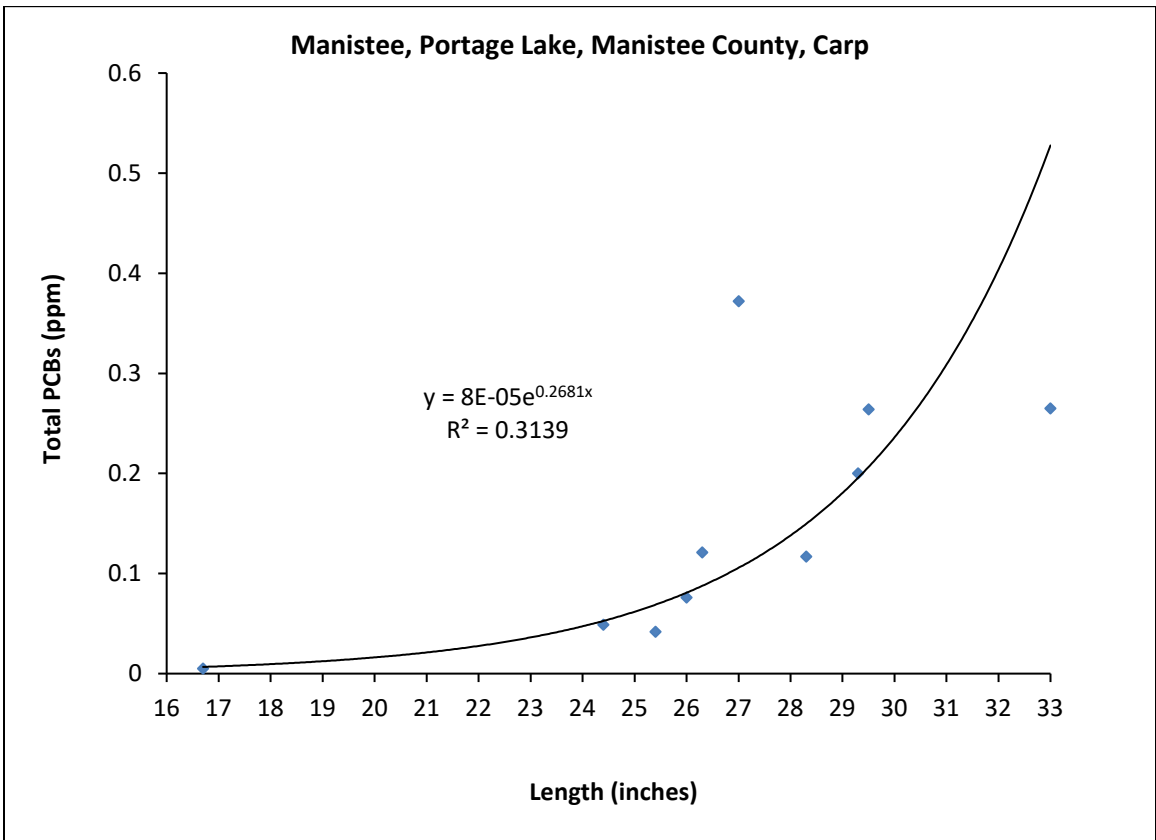
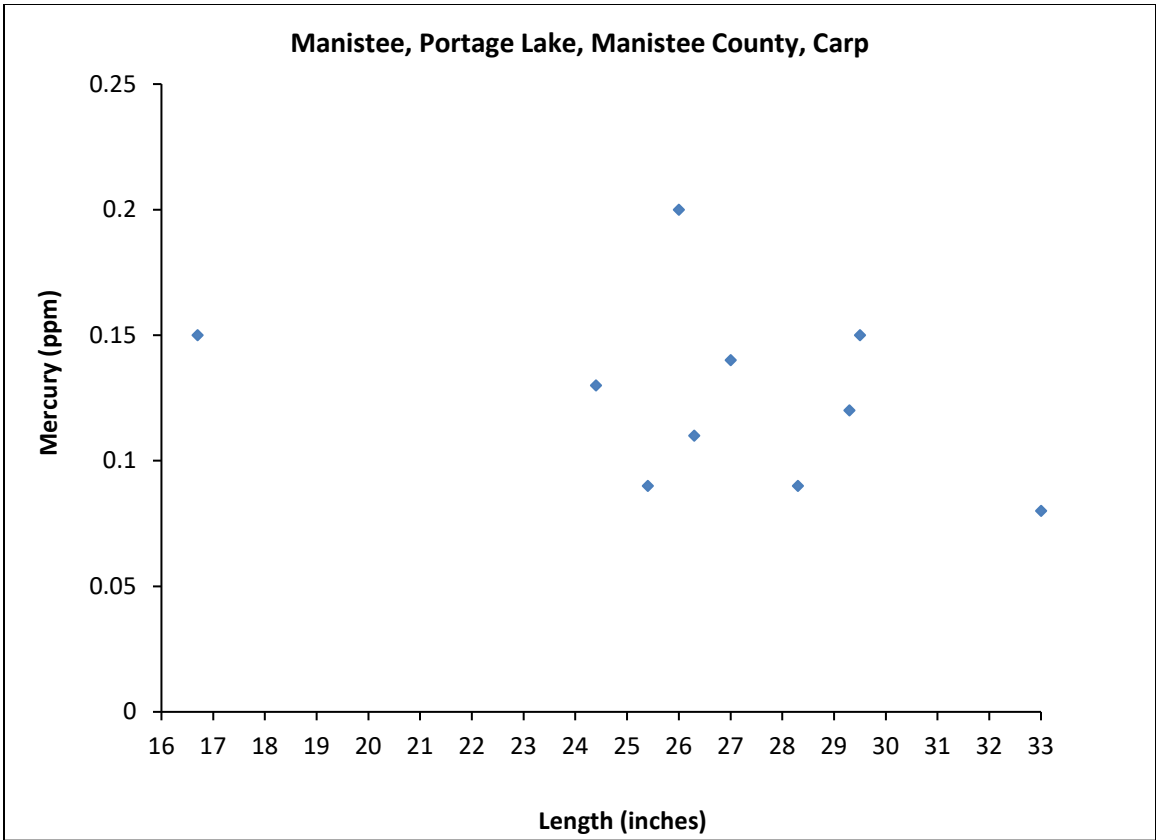
**Organics Analysis:**

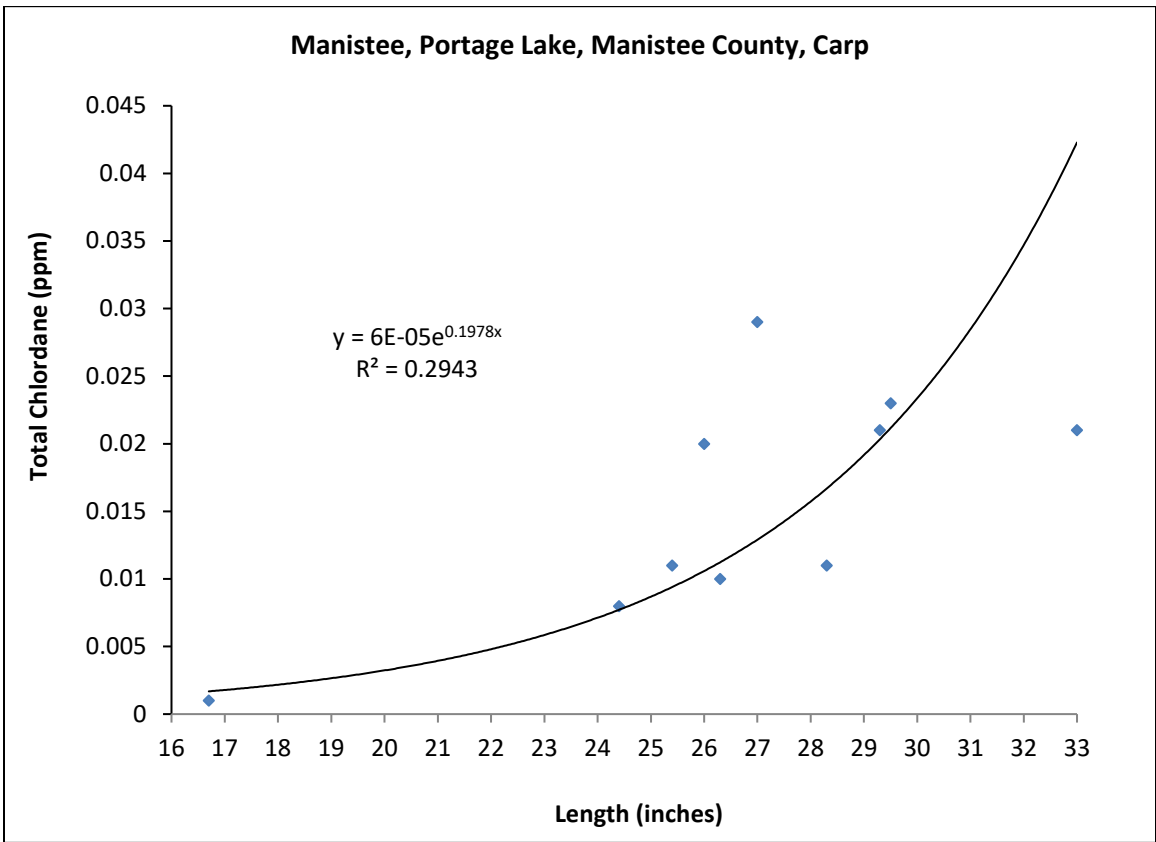
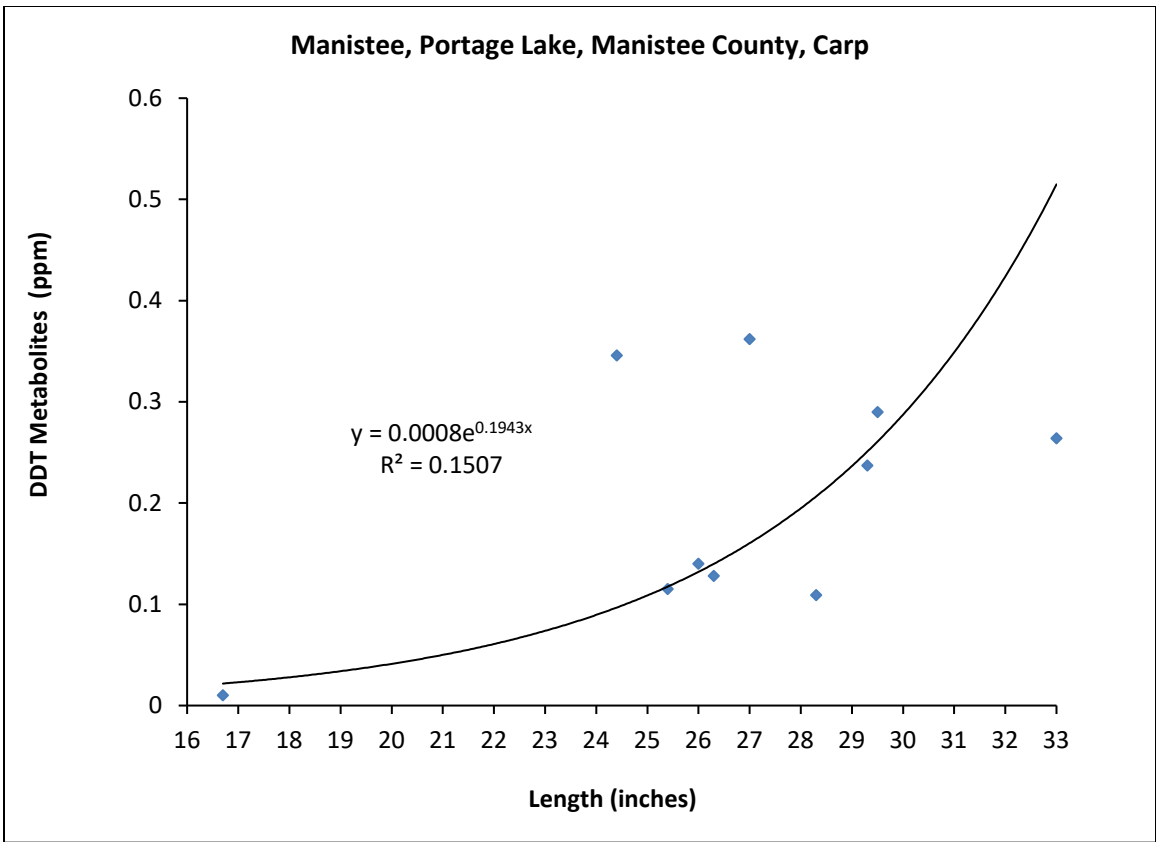
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2004	2004	10	16.7	na	16.7	33
Datasets available: 2004						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.15	0.005	0.37	0.24	0.5
DDT	10	0.20	0.01	0.36	0.28	4
Chlordane	10	0.02	0.001	0.03	0.02	--
Toxaphene	10	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.448	0.818				
DDT	0.288	0.623				
Chlordane	0.507	0.759				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>0.5</b>

**Existing Advisory:** Women and children should not eat more than one meal per month of Portage Lake carp greater than 26 inches due to PCBs.

**Recommendation:** No one should eat more than 4 meals per month of Portage Lake carp smaller than 24 inches due to mercury and PCBs or more than 1 meal per month of those fish larger than 24 inches due to PCBs. DDT would cause an advisory.

Length (Inches)	PCB	Meal Category	DDT	Meal Category
	Regression Equation Estimate (ppm)		Regression Equation Estimate (ppm)	
16	0.01	16	0.01	16
20	0.02	12	0.04	16
23	0.04	4	0.08	16
24	0.05	4	0.10	16
26	0.08	2	0.14	12
27	0.11	1	0.17	8
28	0.15	1	0.20	8
29	0.19	1	0.24	4
30	0.25	0.5	0.28	4
<i>Shaded area denotes extrapolated estimates</i>				





**Largemouth and  
Smallmouth Bass**

**Portage Lake**

**Manistee 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	2018	35	12	14	13.5	20.3
Datasets available: 1990, 2004, 2018						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	29	0.32	0.12	0.58	0.37	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.681	0.666				

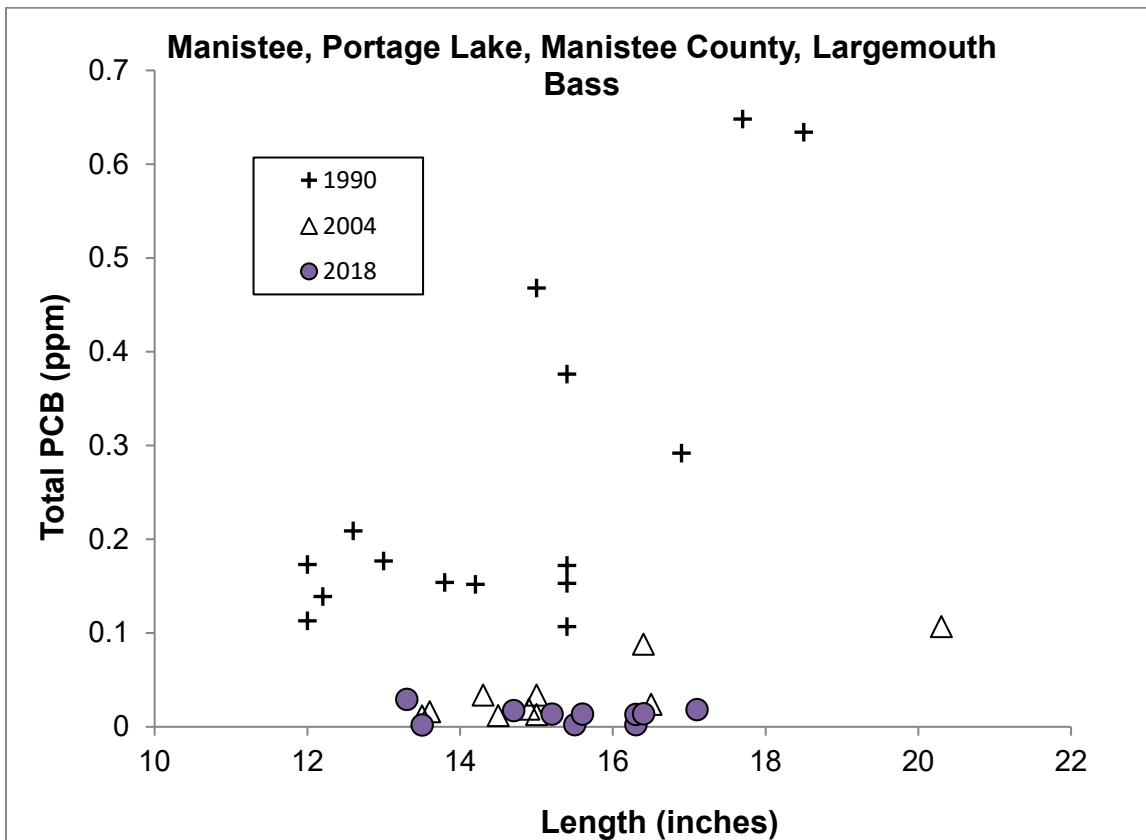
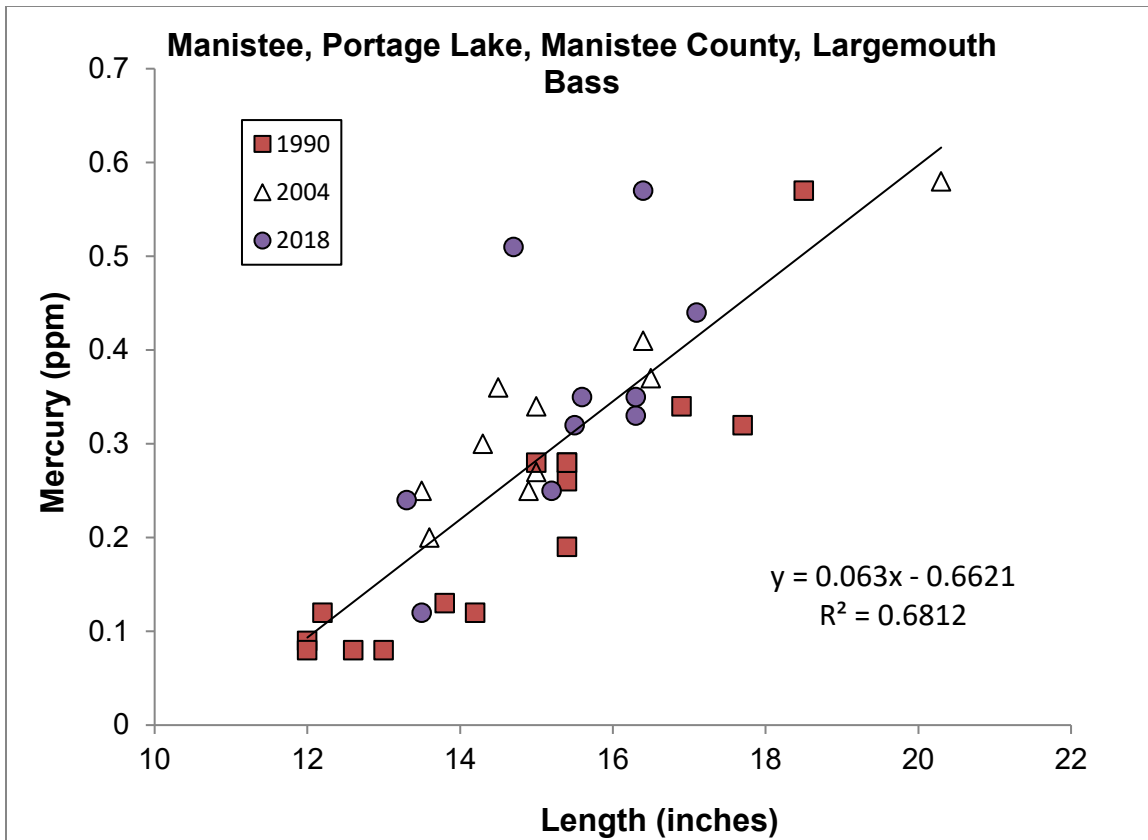
**Organics Analysis:**

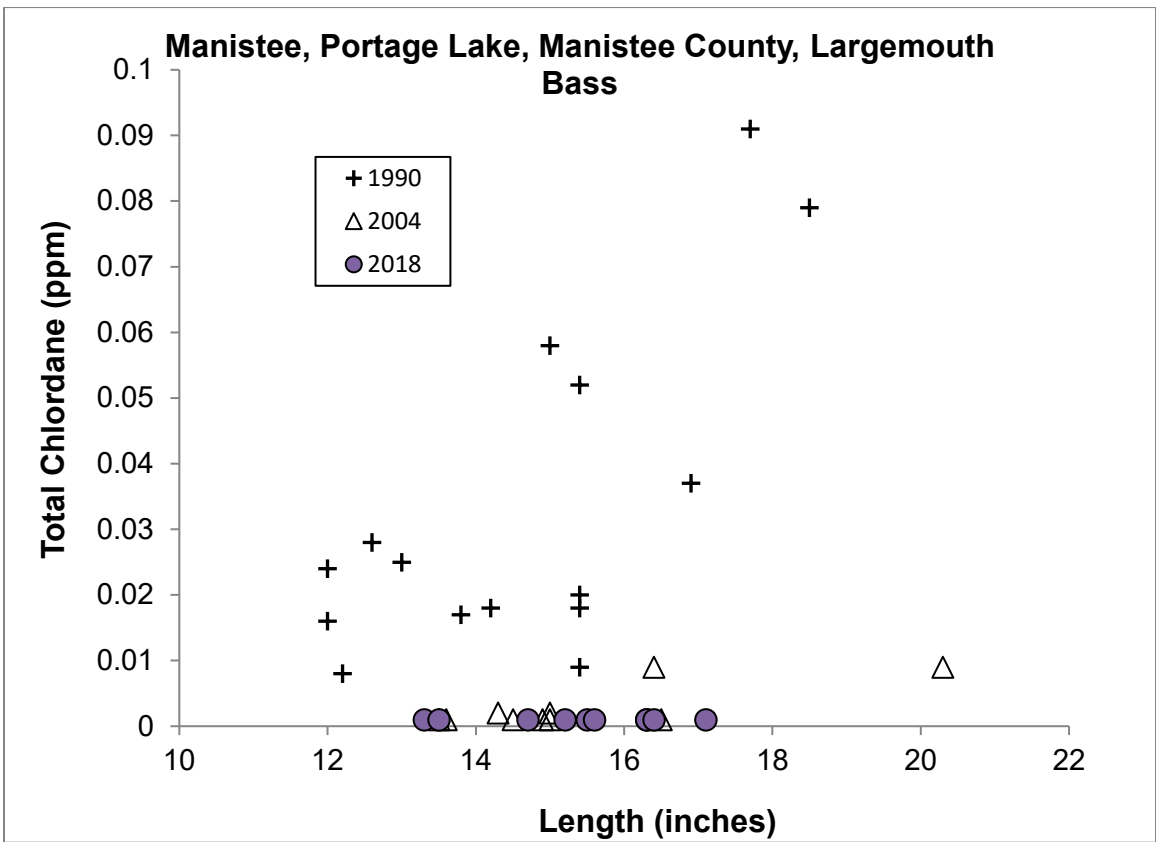
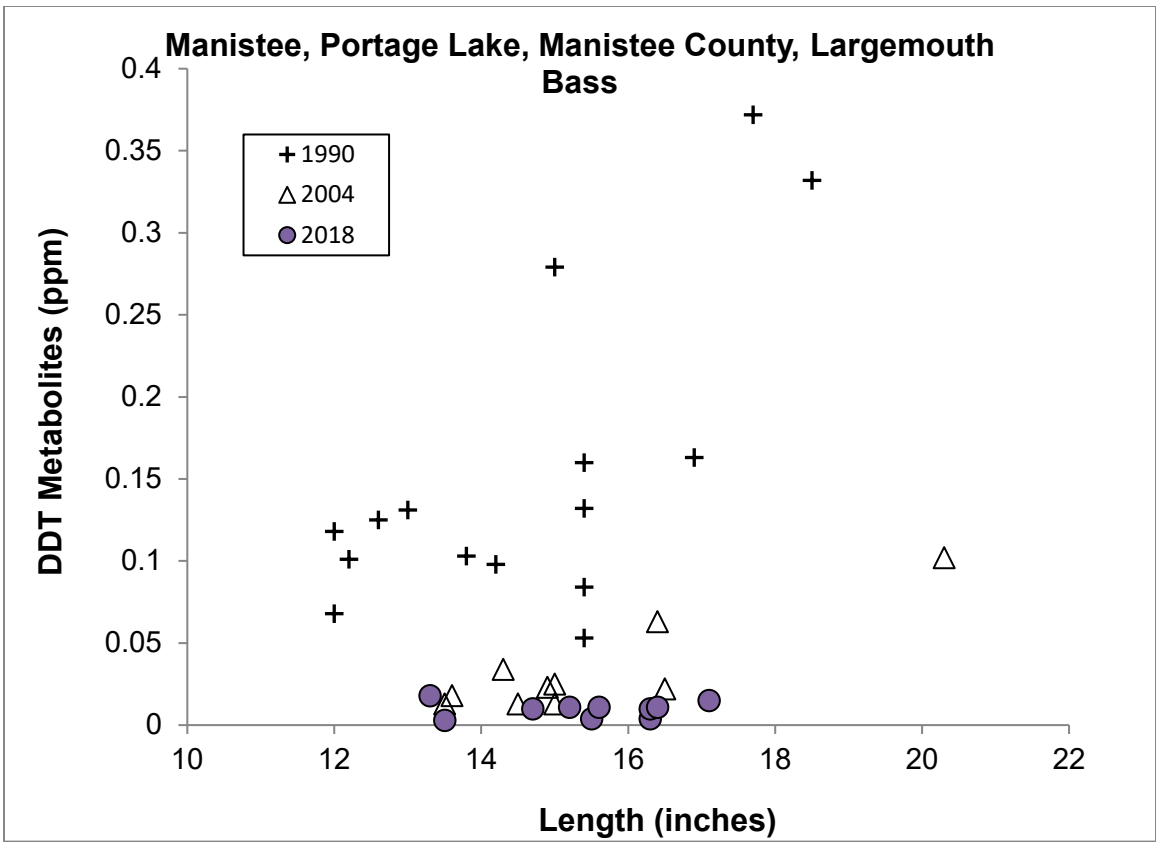
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2004	2018	20	13.3	14	13.5	20.3
Datasets available: 1990, 2004, 2018						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	19	0.024	0.002	0.11	0.04	4
DDT	19	0.021	0.003	0.10	0.03	16
Chlordane	19	0.002	0.001	0.009	0.003	--
Toxaphene	19	ND	< 0.05	< 0.05	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.358	0.139				
DDT	0.413	0.184				
Chlordane	0.373	0.318				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2</b>

**Existing MDHHS Advisory:** No one should eat more than two meals per month of Portage Lake largemouth or smallmouth bass smaller than 18 inches or more than one meal per month of those fish larger than 18 inches due to mercury and PCBs.

**Recommendation:** No one should eat more than two meals per month of Portage Lake largemouth or smallmouth bass smaller than 18 inches or more than one meal per month of those fish larger than 18 inches due to mercury. PCBs would cause an advisory but can be removed as a driving contaminant. An additional year of data is needed to relax the length break cutoff from 18 inches to 19 inches.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
14	0.22	4
15	0.28	2
16	0.35	2
17	0.41	2
18	0.47	2
19	0.53	2
20	0.6	1
22	0.72	1
<i>Shaded area denotes extrapolated estimates</i>		





**Northern Pike**

**Portage Lake**

**Manistee 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	2004	20	22	24	23.7	37
Datasets available: 1990, 2004						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	18	0.26	0.17	0.46	0.30	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.820	0.766				

**Organics Analysis:**

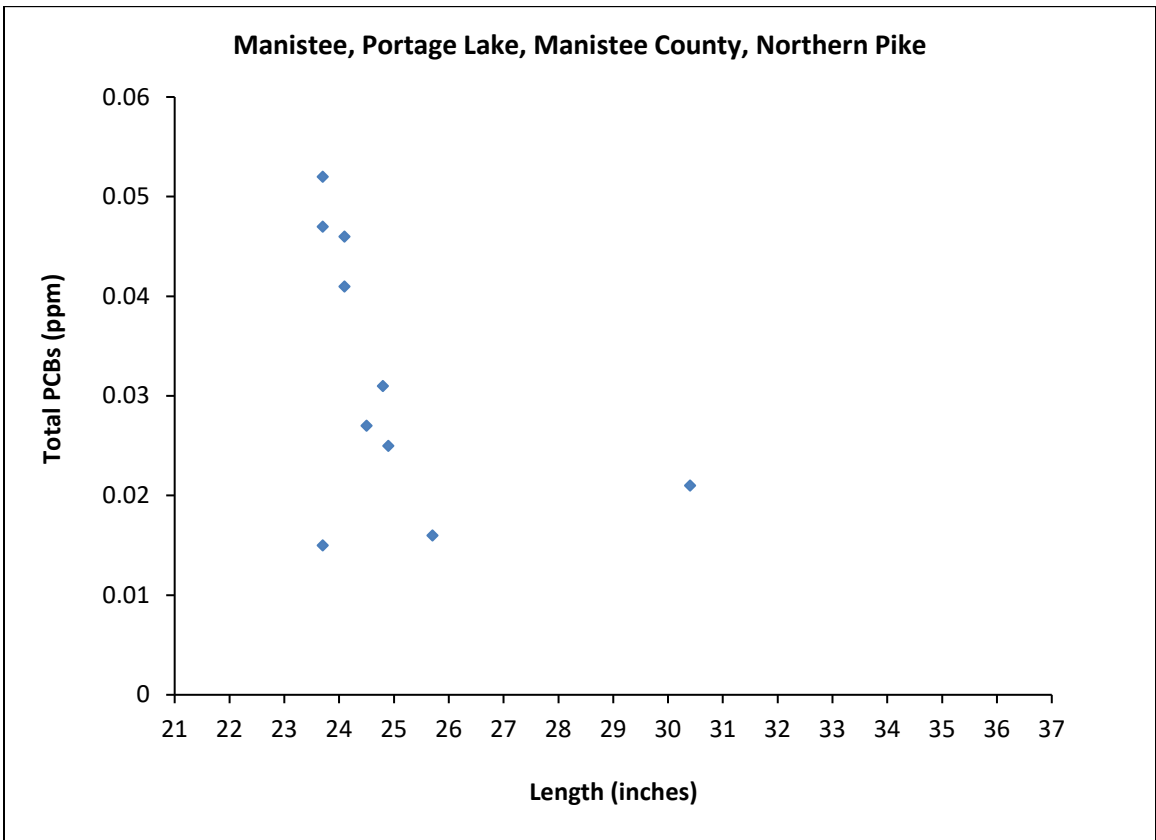
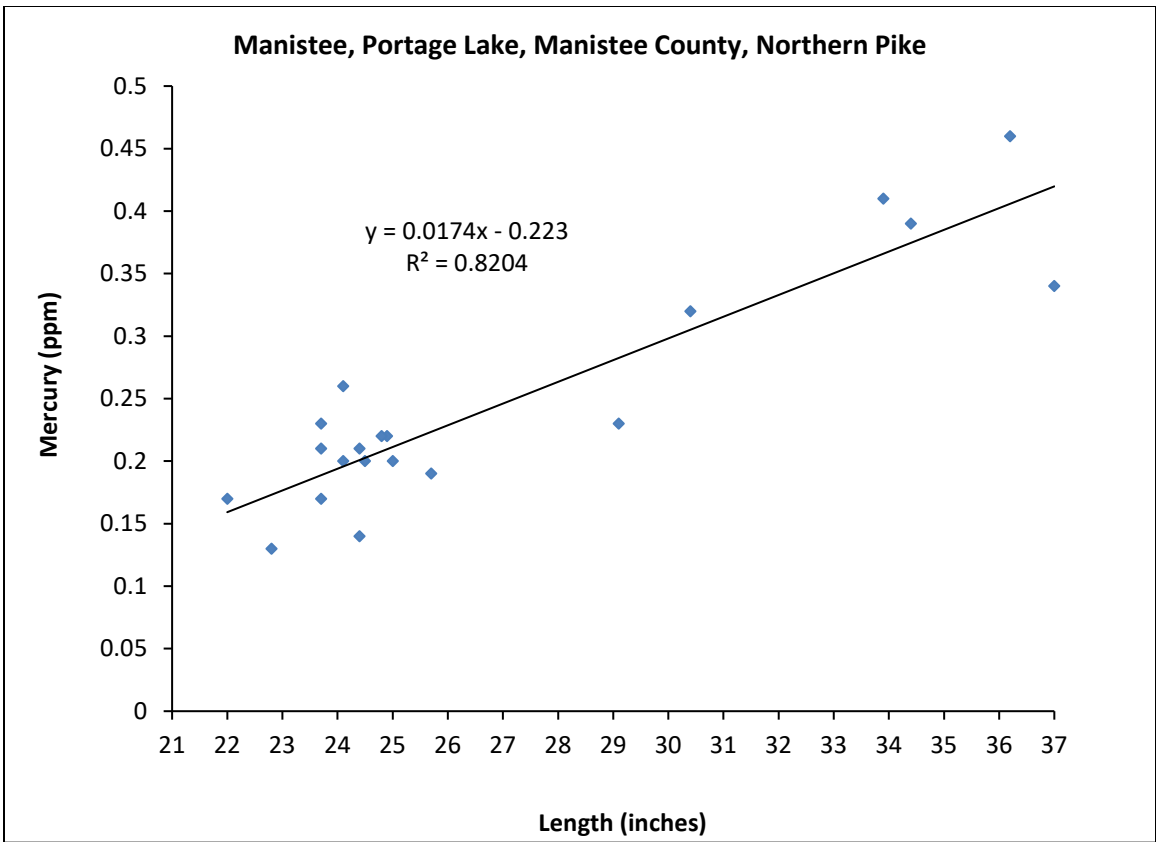
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2004	2004	10	23.7	24	23.7	30.4
Datasets available: 1990, 2004						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.03	0.02	0.05	0.04	4
DDT	10	0.03	0.01	0.06	0.04	16
Chlordane	10	0.003	0.001	0.006	0.004	--
Toxaphene	10	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.206	0.170				
DDT	0.104	0.125				
Chlordane	0.190	0.242				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2</b>

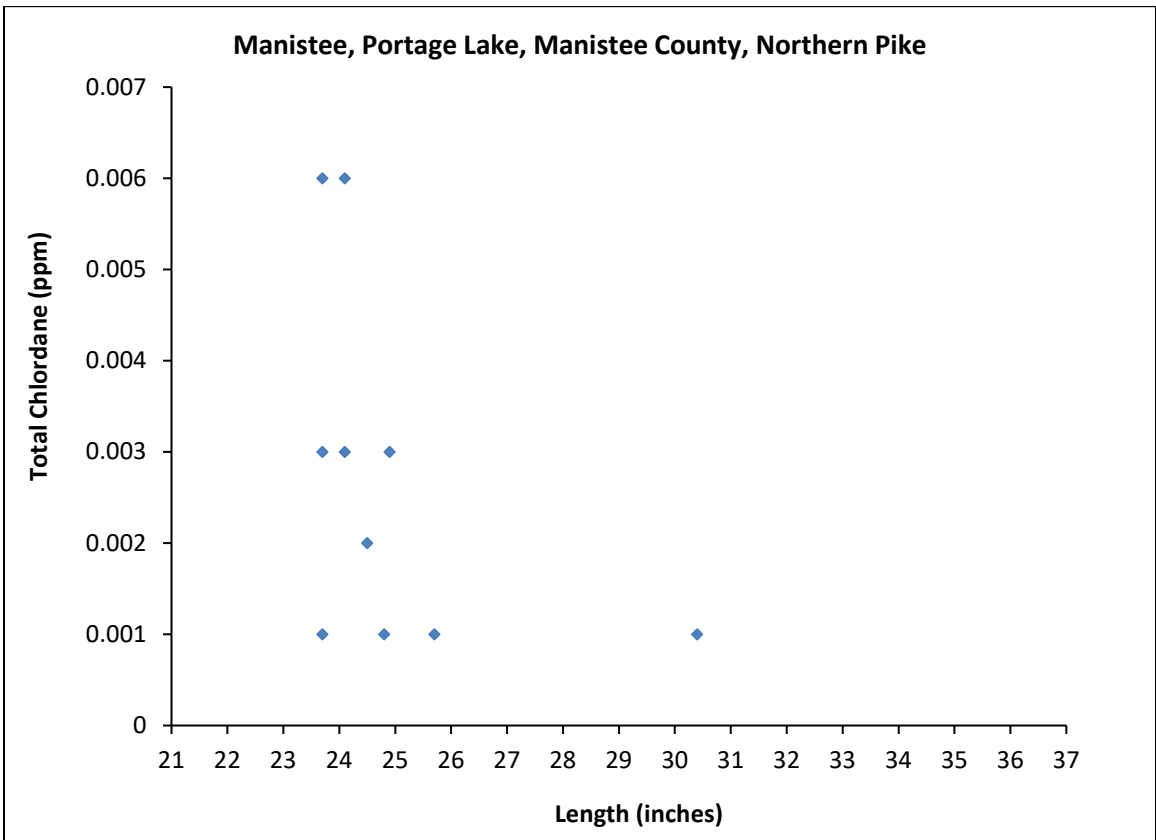
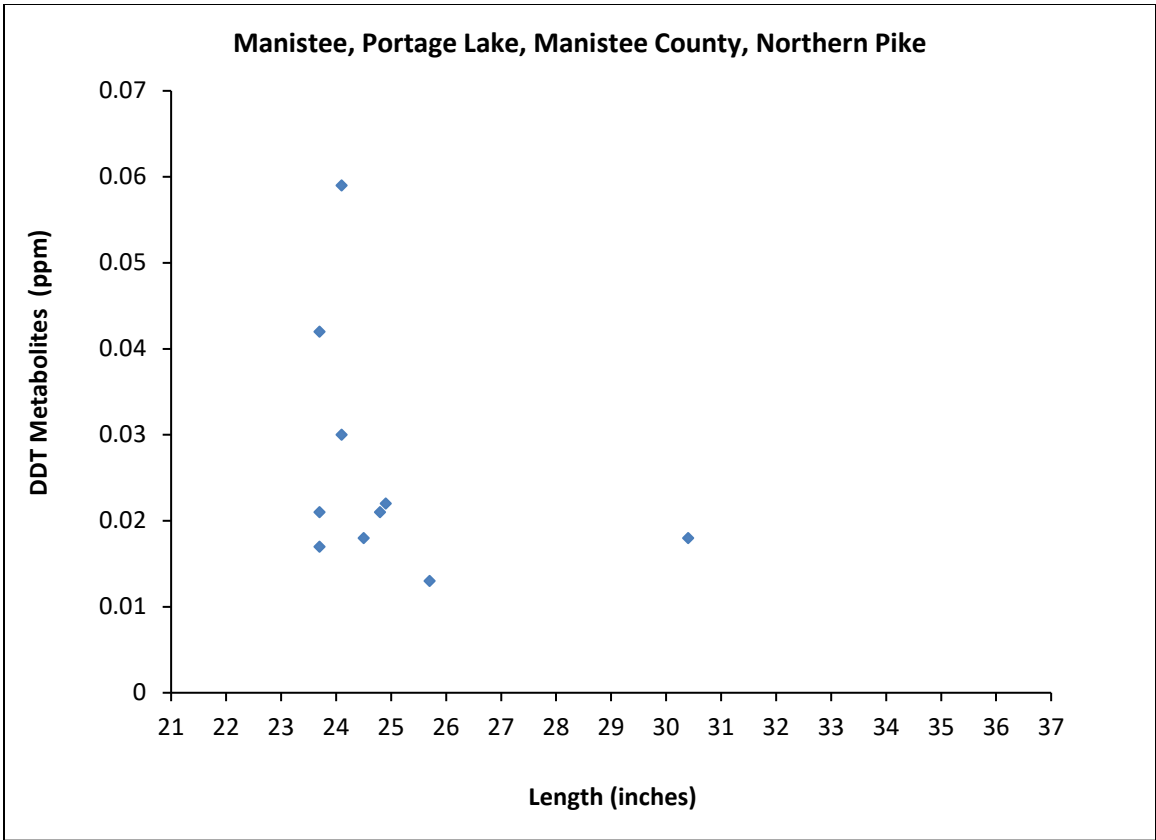
**Existing Advisory:** Women and children should not eat more than one meal per month of Portage Lake northern pike greater than 30 inches due to PCBs.

**Recommendation:** No one should eat more than 4 meals per month of Portage Lake northern pike smaller than 30 inches due to PCBs and mercury or more than 2 meals per month of those fish larger than 30 inches due to mercury.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
22	0.160	4
24	0.195	4
26	0.229	4
28	0.264	4
30	0.299	2
32	0.334	2
34	0.369	2
36	0.403	2
38	0.438	2
<i>Shaded area denotes extrapolated estimates</i>		







# Mason County

**Black Crappie**

**Hamlin Lake**

**Mason County**

**Hg Analysis:**

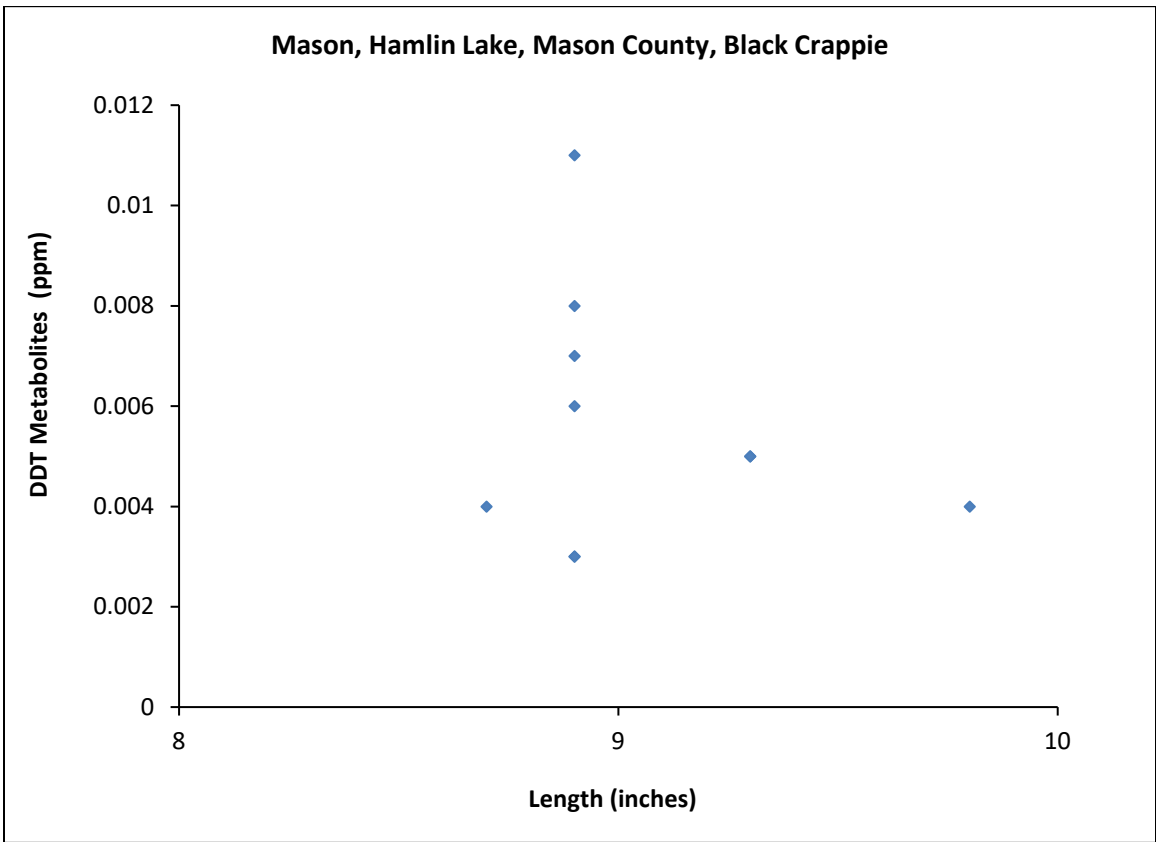
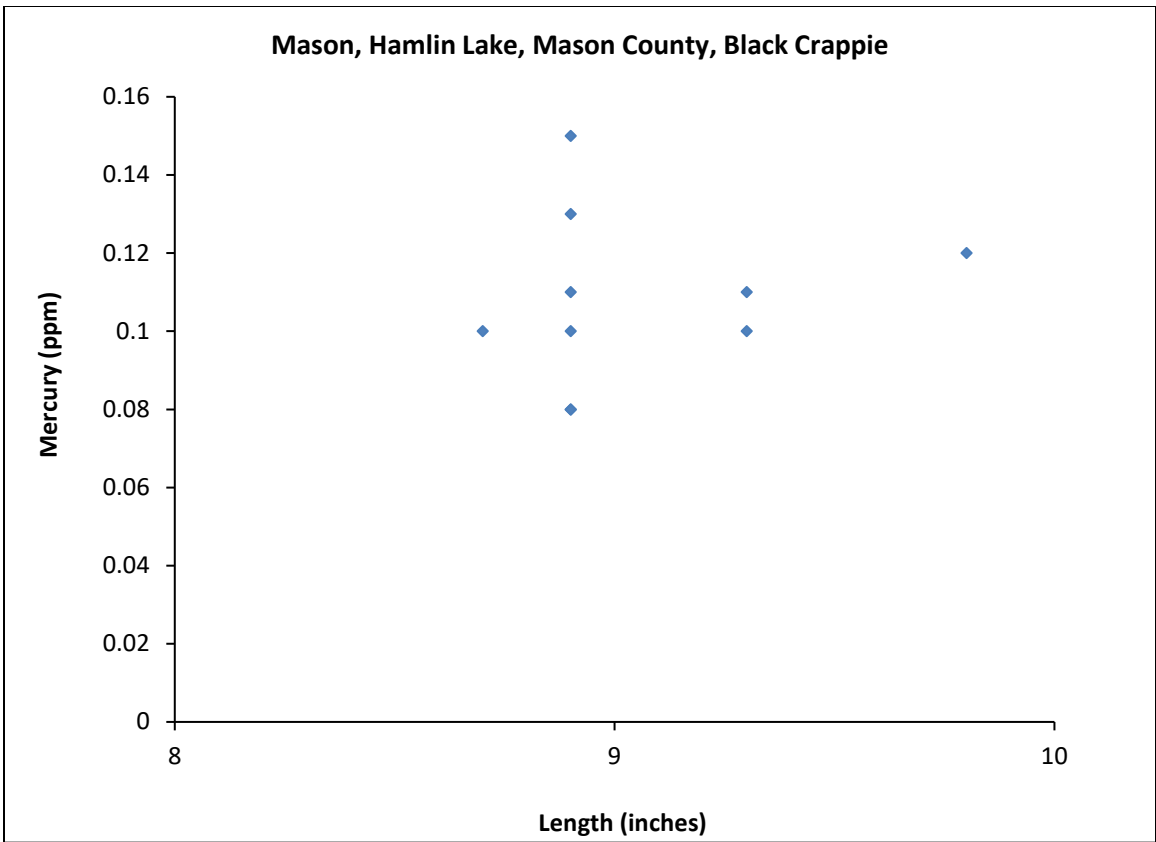
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1991	1991	10	8.7	na	8.7	9.8
Datasets available: 1991						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.11	0.08	0.15	0.12	8
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.025	0.039				

**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1991	1991	10	8.7	na	8.7	9.8
Datasets available: 1991						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	ND	--	--	--	--
DDT	10	0.006	0.003	0.01	0.01	16
Chlordane	10	ND	--	--	--	--
Toxaphene	10	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	0.048	0.027				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>8</b>

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

**Recommendation:** No one should eat more than 8 meals per month of Hamlin Lake crappie due to mercury.



**Largemouth Bass**

**Hamlin Lake**

**Mason County**

**Hg Analysis:**

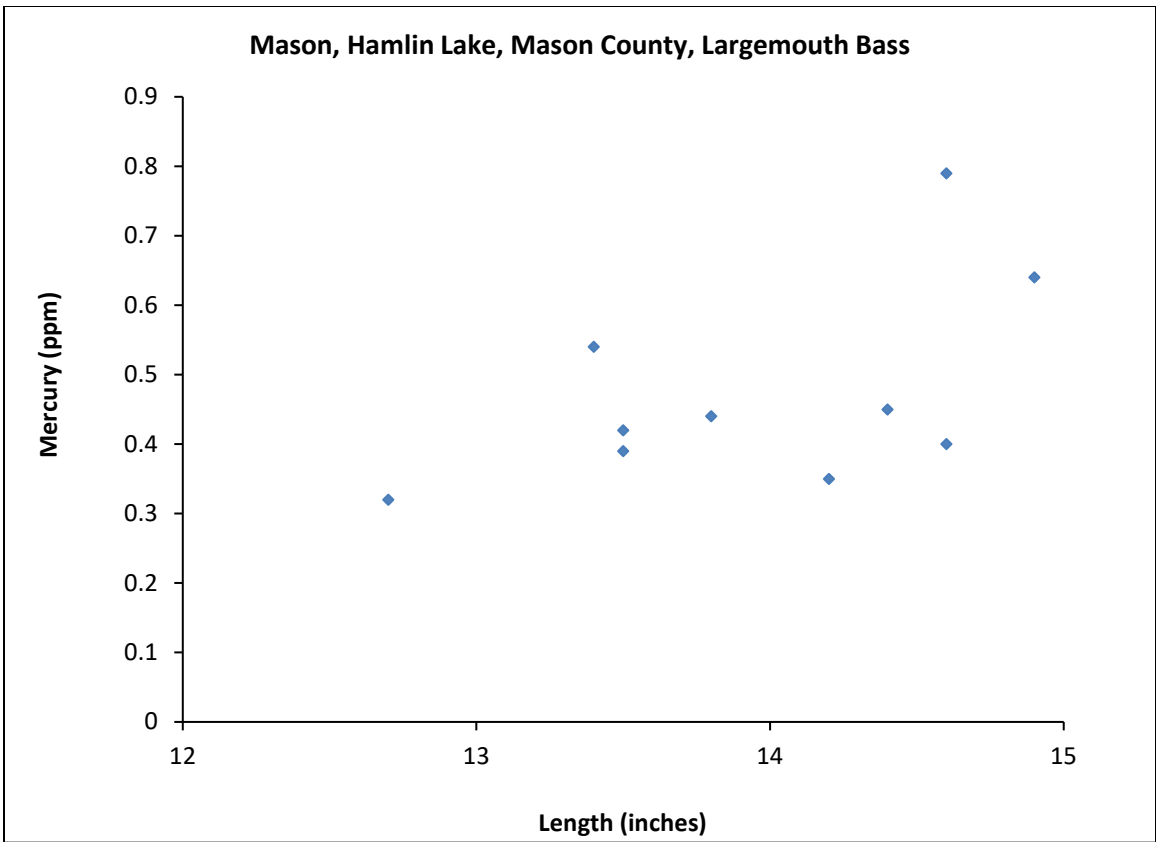
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2010	2010	10	12.7	14	13.5	14.9
Datasets available: 2010						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	8	0.48	0.35	0.79	0.61	1
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.305	0.326				

**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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>1</b>

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

**Recommendation:** No one should eat more than 1 meal per week of Hamlin 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 range of fish was limited.



**Northern Pike**

**Hamlin Lake**

**Mason 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
1991	1991	10	19.3	24	25	27.6
Datasets available: 1991						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	5	0.56	0.43	0.61	0.65	1
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.597	0.526				

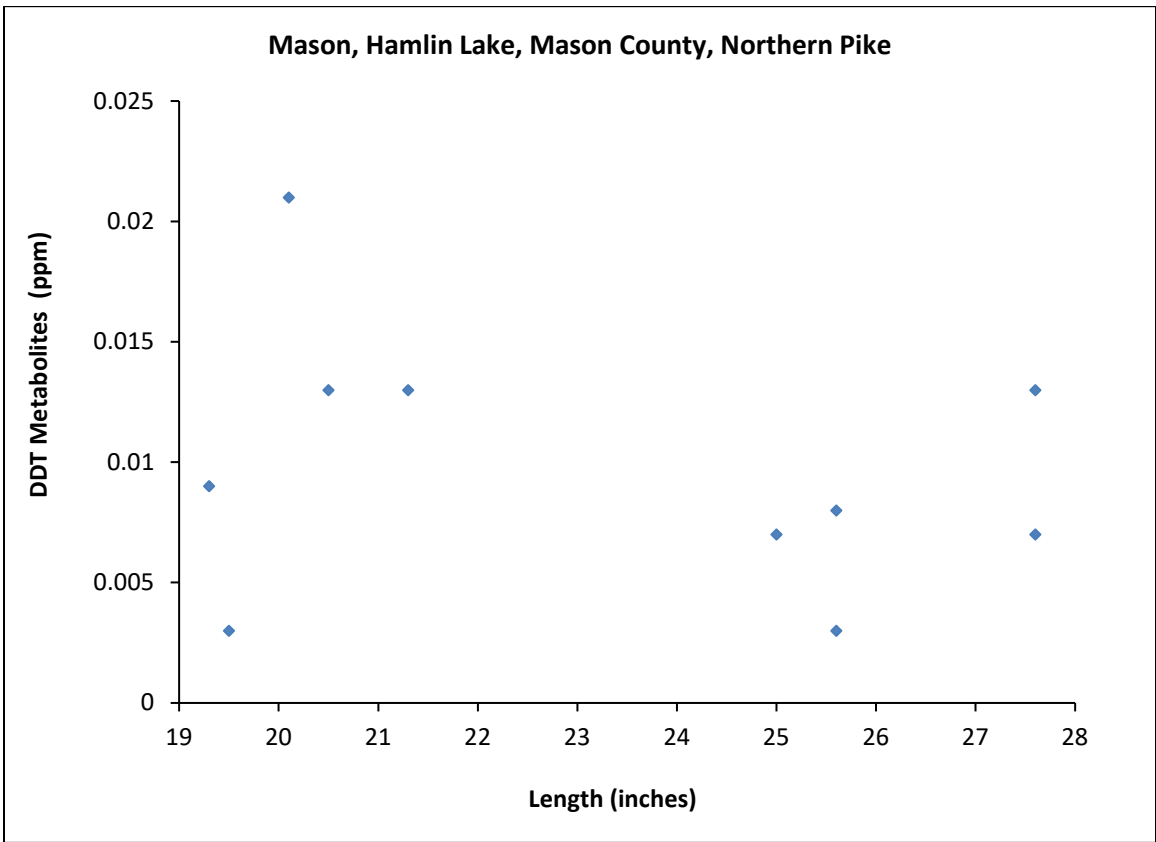
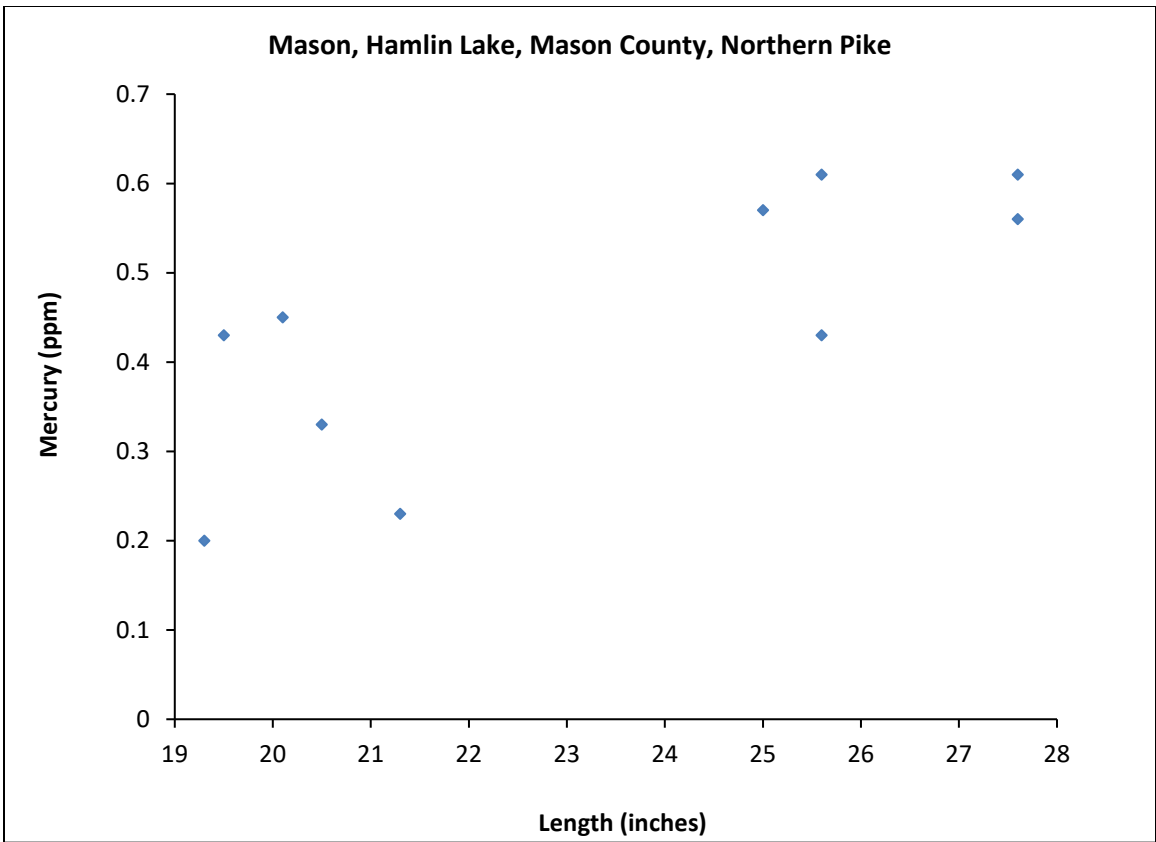
**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1991	1991	10	19.3	24	25	27.6
Datasets available: 1991						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	5	ND	--	--	--	--
DDT	5	0.008	0.003	0.01	0.01	16
Chlordane	5	ND	--	--	--	--
Toxaphene	5	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	0.074	0.026				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>1</b>

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

**Recommendation:** No one should eat more than 1 meal per month of Hamlin 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 as the size range of fish was limited.





**Walleye**

**Hamlin Lake**

**Mason 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	15.4	15	15.4	23.6
Datasets available: 2010						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.52	0.39	0.81	0.63	1
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.799	0.746				

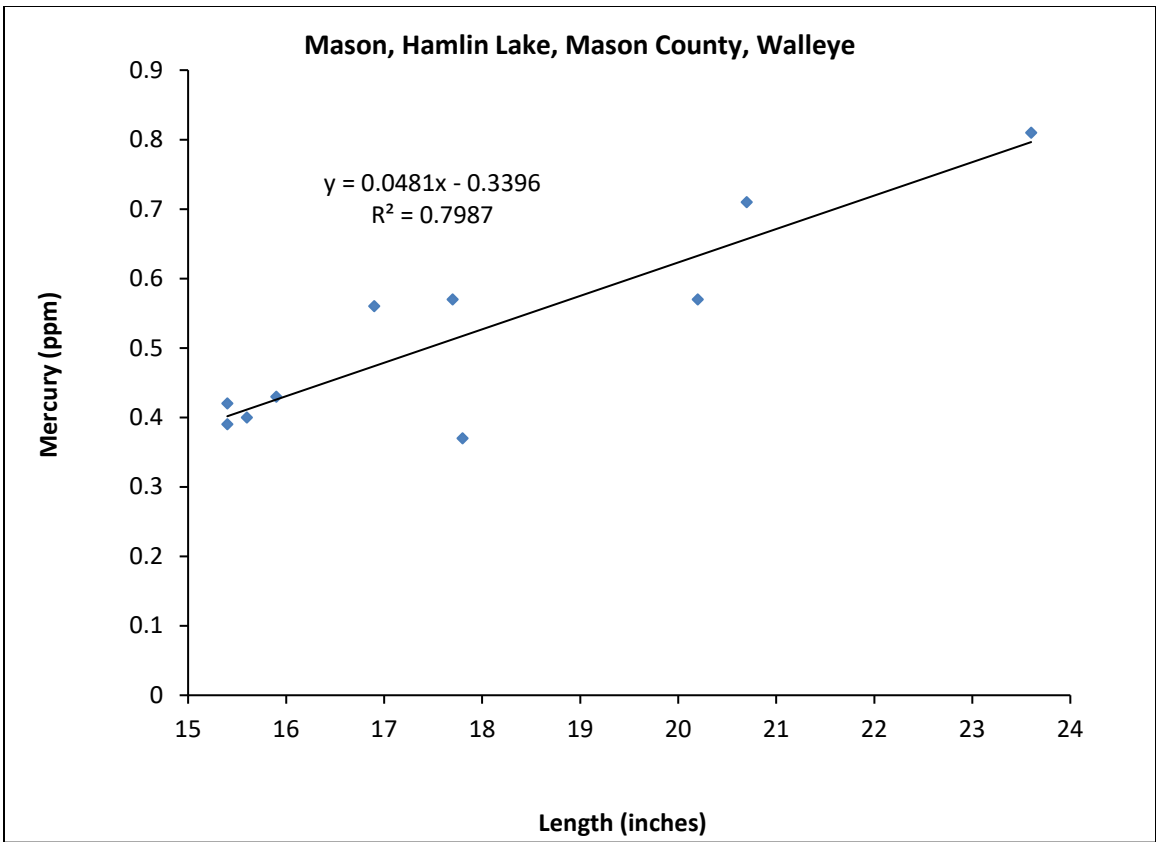
**Organics Analysis:**

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 <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>1</b>

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

**Recommendation:** No one should eat more than 2 meals per month of Hamlin Lake walleye 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
15	0.382	2
16	0.430	2
17	0.478	2
18	0.526	2
19	0.574	1
20	0.622	1
21	0.671	1
22	0.719	1
23	0.767	1
<i>Shaded area denotes extrapolated estimates</i>		



# Missaukee County

**Northern Pike**

**Lake Missaukee**

**Missaukee 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	20.1	na*	20.1	28.3
Datasets available: 2018						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.54	0.38	0.71	0.61	1
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.021	0.027				

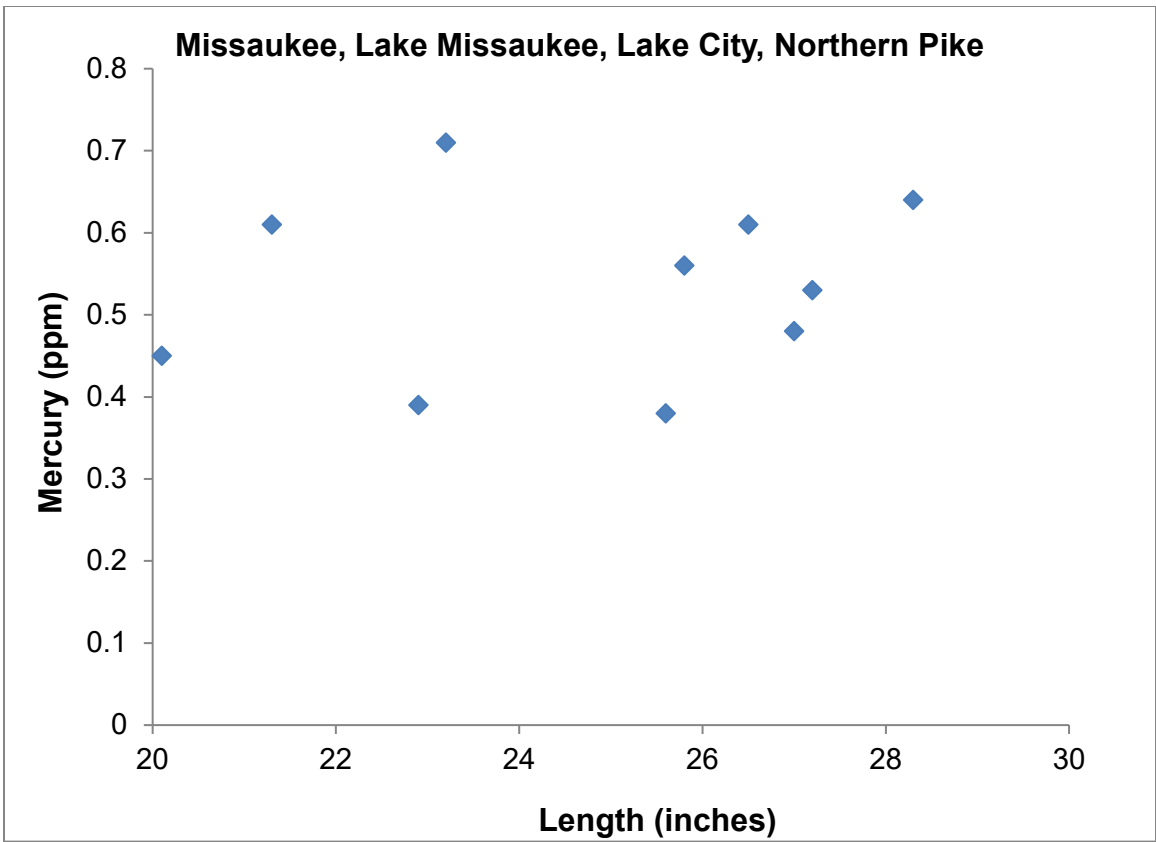
**Organics Analysis:**

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	--	--	--	--	--
PFOS	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	--	--				
<b>Final meal category based on UCL:</b>						<b>1</b>

**Existing MDHHS Advisory:** Lake Missaukee northern pike are covered by the statewide advisory due to mercury: No one should eat more than 2 meals per month of northern pike less than 30 inches or 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 Lake Missaukee northern pike less 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 due to the limited size range of the sample.

\* Note: MDNR fishing regulations for Lake Missaukee allow a daily possession of up to 5 northern pike of any size with only 1 greater than 24 inches.



# Osceola County

**Brown Trout**

**Hersey River**

**Osceola 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	2017	32	9.4	8	7.9	21.9
Datasets available: 1986, 1998†, 2017						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	23	0.19	0.08	1.2	0.29	4
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.645*	0.588				

\* - regression driven by 1 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
2017	2017	10	9.6	8	9.6	12.6
Datasets available: 1986, 1998†, 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	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
TEQ	0	--	--	--	--	--
PFOS	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
TEQ	--	--				
PFOS	--	--				
<b>Final meal category based on UCL:</b>						<b>4</b>

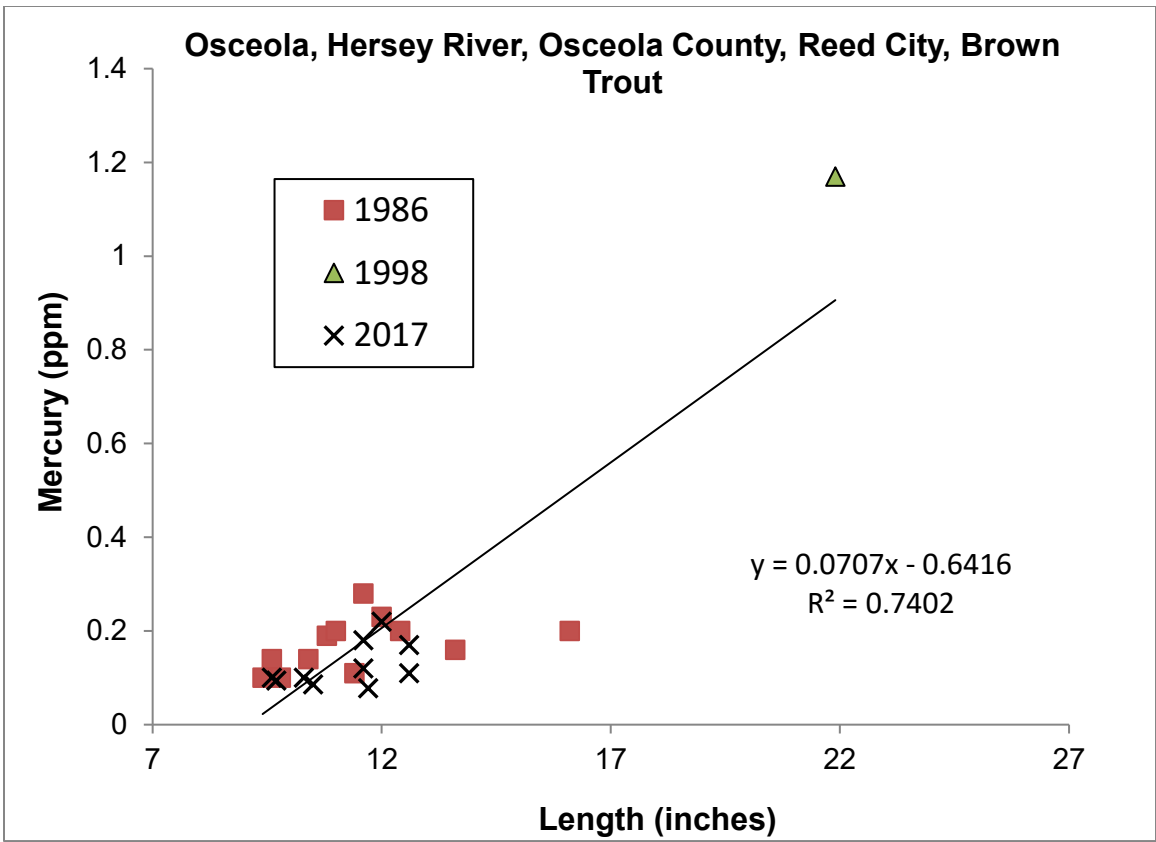
† - 1998 samples analyzed as composites not used in evaluation

**Existing MDHHS Advisory:** No one should eat more than 4 meals per month of Hersey River brown trout due to PCBs and mercury.

**Recommendation:** No change to the advisory is recommended. PCBs can be removed from the list of contaminants causing an advisory.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
7	-0.15	16
8	-0.08	16
9	-0.01	16
10	0.07	16
11	0.14	4
12	0.21	4
13	0.28	2





**Northern Pike**

**Hersey River**

**Osceola 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	1986	1	28.9	24	28.9	28.9
Datasets available:		1986				
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	1	0.79	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
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
1986	1986	1	28.9	24	28.9	28.9
Datasets available:		1986				
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	1	0.053	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						--

**Existing Advisory:** There are no current consumption advisories for Hersey River northern pike.

**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: 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.

**White Sucker**

**Hersey River**

**Osceola County**

**Hg Analysis:**

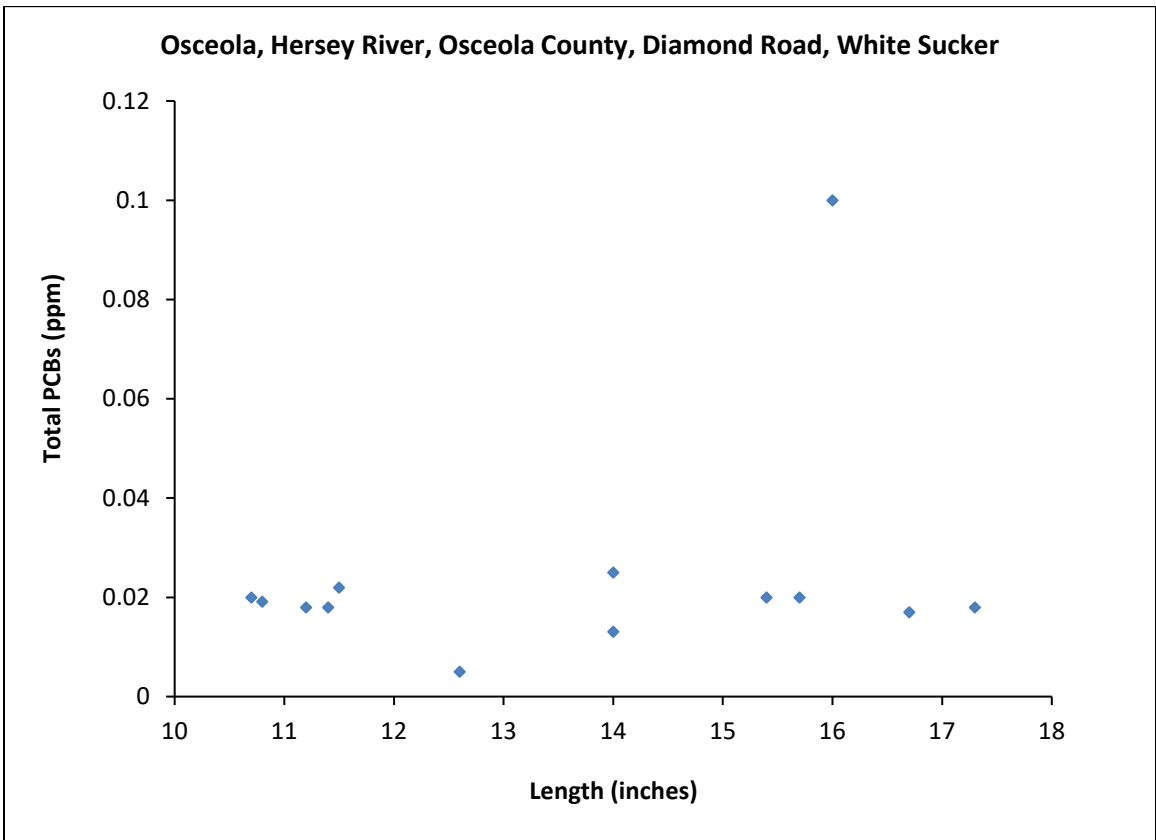
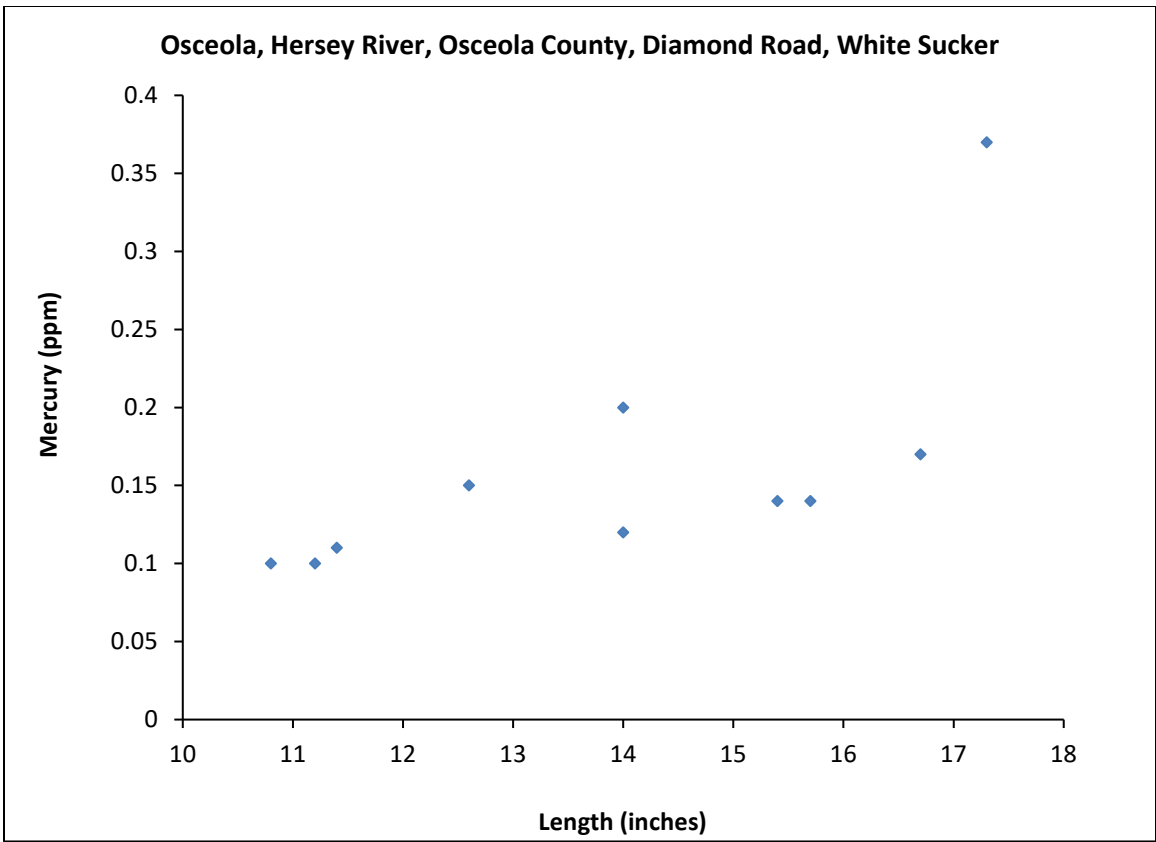
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1986	1986	10	10.7	na	10.7	17.3
Datasets available: 1986						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.16	0.10	0.37	0.22	4
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.468	0.577				

**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1985	1986	10	10.7	na	10.7	17.3
Datasets available: 1985, 1986						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	13	0.02	0.005	0.02	0.04	4*
DDT	3	0.01	0.001	0.03	0.06	16
Chlordane	3	0.003	0.001	0.007	0.010	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.085	0.067				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>4</b>

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

**Recommendation:** No one should eat more than 4 meals per month of Hersey River sucker due to mercury. PCBs would cause an advisory. \*Based on the MDEQ 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.



**Largemouth Bass**

**Todd Lake**

**Osceola 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	8	8.3	14	13.8	18.9
Datasets available: 1987						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	5	0.84	0.52	1.48	1.30	0.5
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.795	0.871				

**Organics Analysis:**

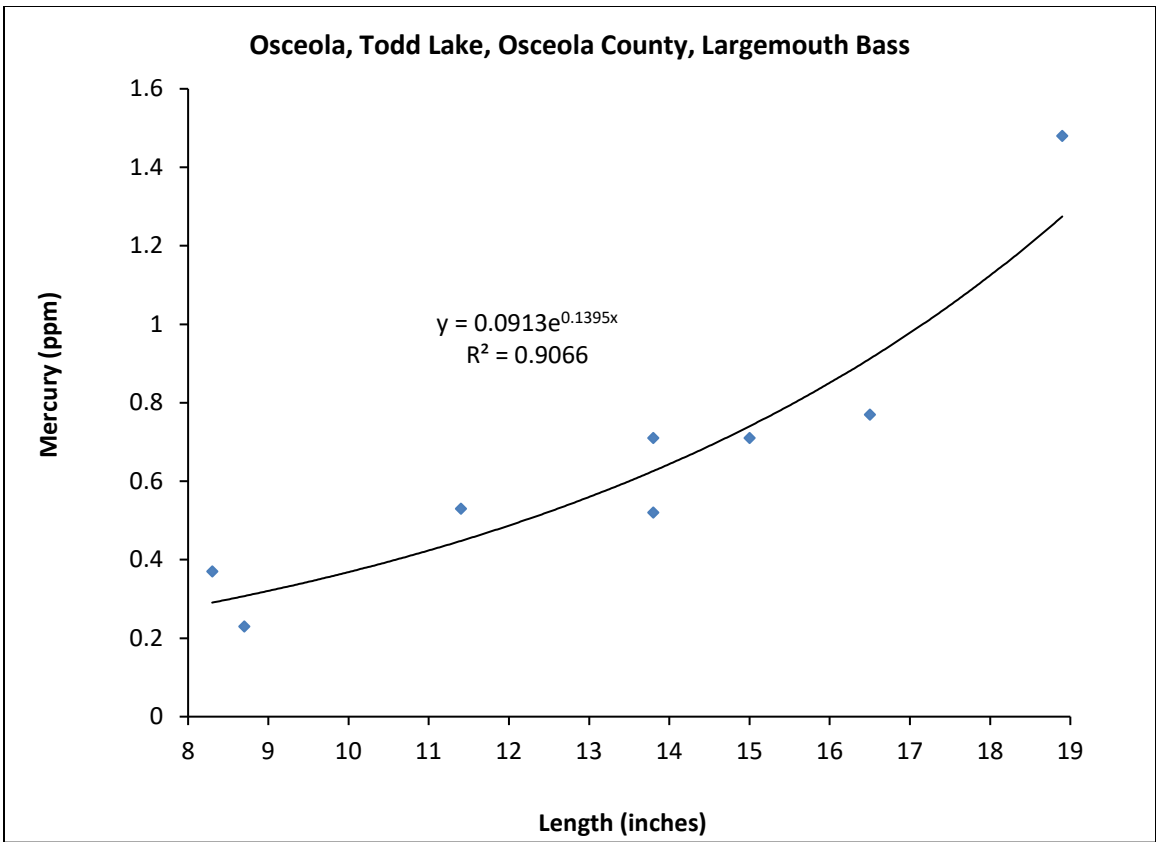
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Size Range of All Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available: --						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--	--	--
Chlordane	0	--	--	--	--	--
Toxaphene	0	--	--	--	--	--
Chemical	Linear Regression	LN Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>0.5</b>

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

**Recommendation:** No one should eat more than 1 meal per month of largemouth or smallmouth bass from Todd Lake smaller than 18 inches or more than 6 meals per year of those fish larger than 18 inches due to mercury.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
14	0.64	1
15	0.74	1
16	0.85	1
17	0.98	1
18	1.12	0.5
19	1.29	0.5
20	1.49	0.5
21	1.71	0.5
22	1.96	0.5

*Shaded area denotes extrapolated estimates*



**Northern Pike**

**Todd Lake**

**Osceola 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	7	22	24	22	33.9
Datasets available: 1987						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	7	0.903	0.620	1.320	1.150	0.5
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.013	0.031				

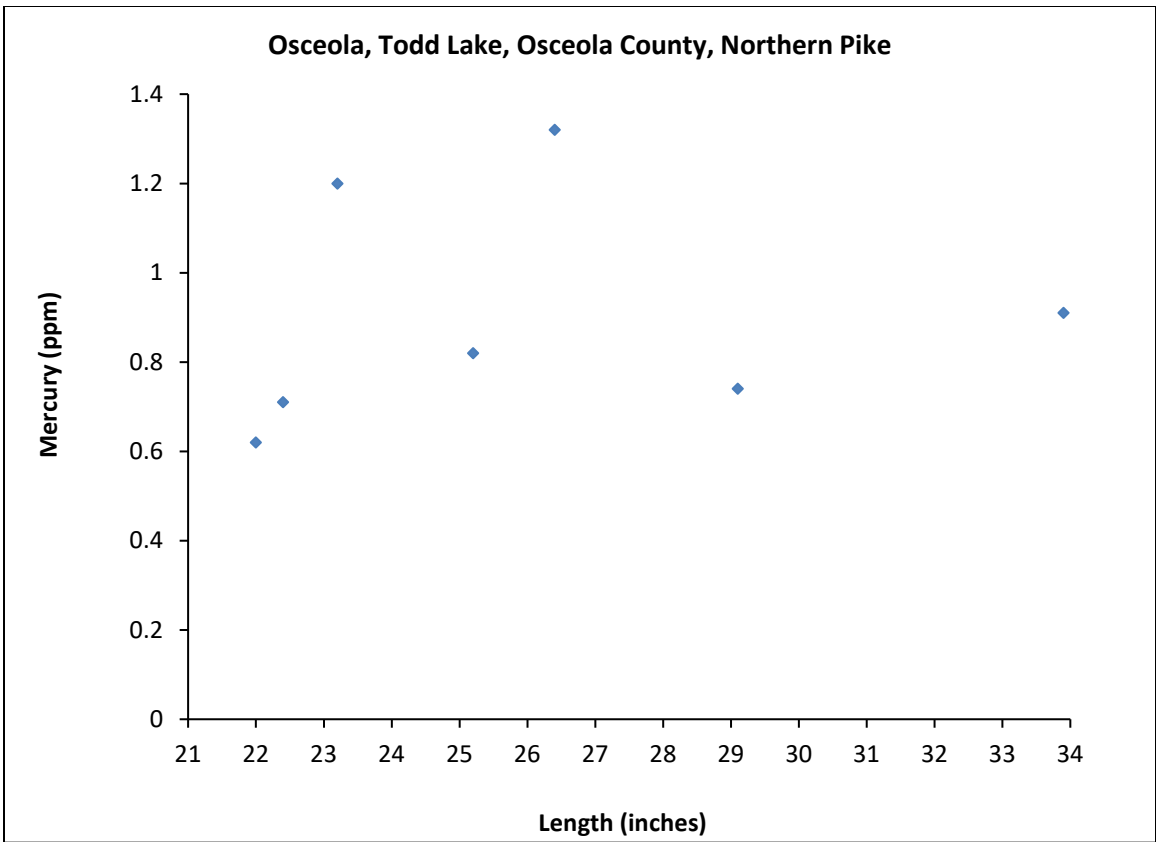
**Organics Analysis:**

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 (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	LN Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>0.5</b>

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

**Recommendation:** No one should eat more than 6 meals per year of Todd Lake northern pike due to mercury.

*Note: Evaluation includes 3 fish less than the legal minimum size but there is no apparent relationship between fish length and mercury concentration.*





**Northern Pike**

**Wells Lake**

**Osceola 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
2006	2006	7	10.9	na*	10.9	21.9
Datasets available: 2006						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	7	0.23	0.12	0.29	0.28	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.761	0.728				

**Organics Analysis:**

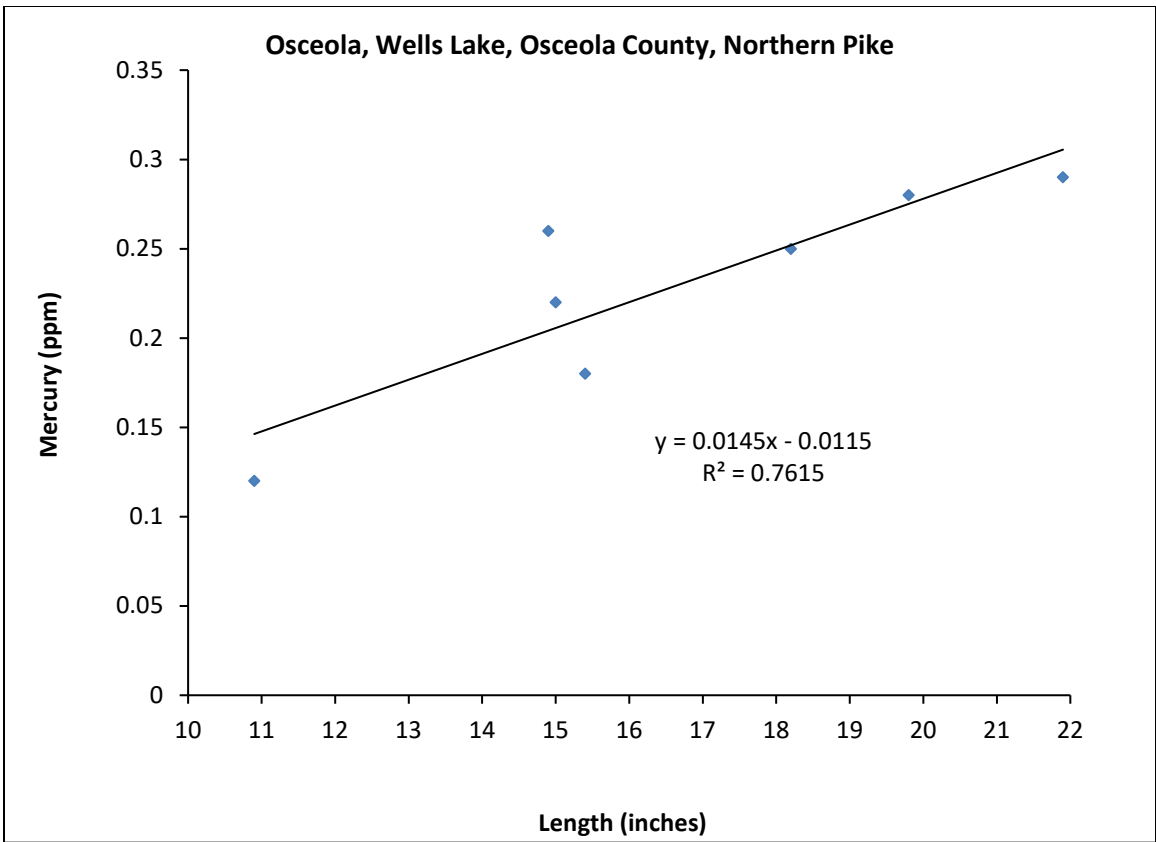
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Size Range of All Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available: --						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	0	--	--	--	--	--
DDT	0	--	--	--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

\* - there is no minimum legal size on Wells Lake northern pike

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

**Recommendation:** No one should eat more than 4 meals per month of Wells Lake northern pike smaller than 20 inches or more than 2 meals per month of those fish larger than 20 inches due to mercury.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
12	0.16	4
14	0.19	4
16	0.22	4
18	0.25	4
20	0.28	2
22	0.31	2
24	0.34	2
<i>Shaded area denotes extrapolated estimates</i>		



# Pere Marquette River Lake, Mason, Newaygo, and Oceana Counties

**Redhorse  
& White Sucker**

**Pere Marquette River**

**Lake, Mason, Newaygo,  
& Oceana 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	2004	17	9.9	na	8.9	20.1
Datasets available: 1993, 2003, 2004 *						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	17	0.14	0.08	0.37	0.18	4
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.321	0.441				

**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	2004	17	9.9	na	8.9	20.1
Datasets available: 1993, 2003, 2004 *						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	17	0.09	0.001	0.41	0.15	1
DDT	17	0.04	0.002	0.18	0.07	16
Chlordane	17	0.01	0.001	0.03	0.01	--
Toxaphene	17	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.381	0.880				
DDT	0.384	0.803				
Chlordane	0.256	0.564				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>1</b>

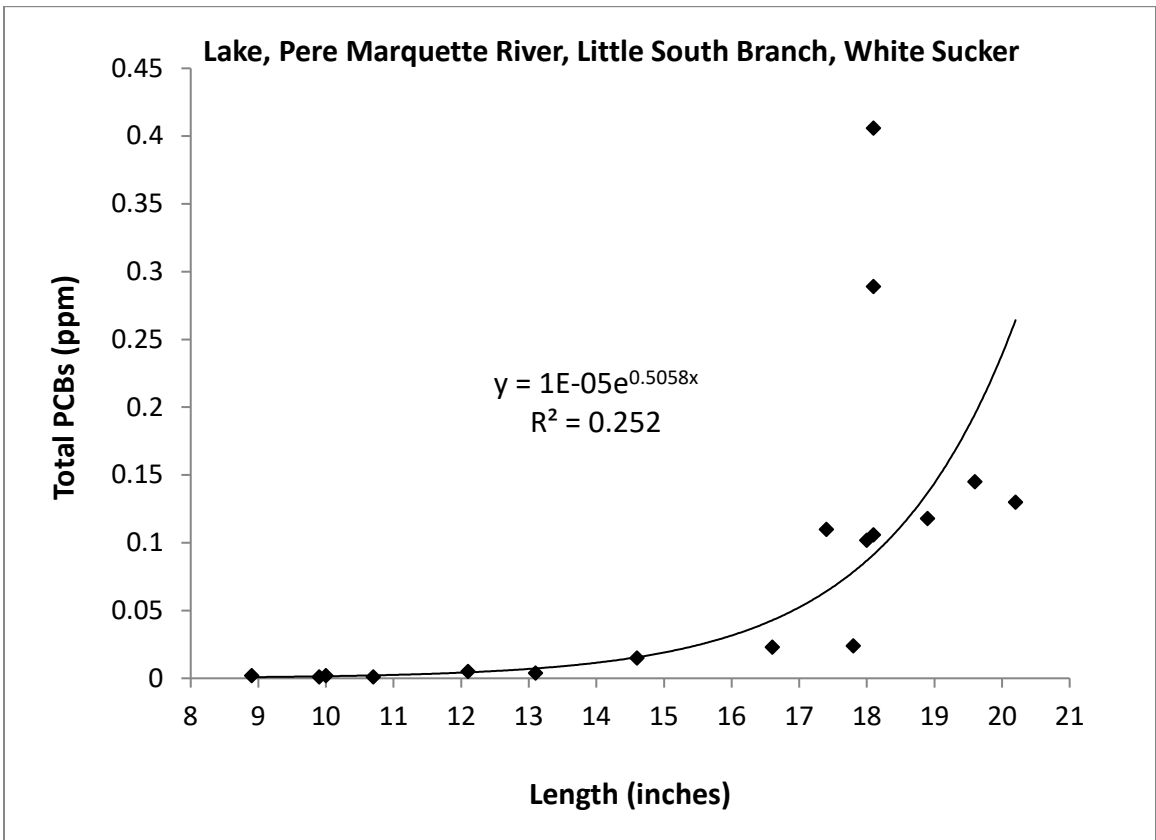
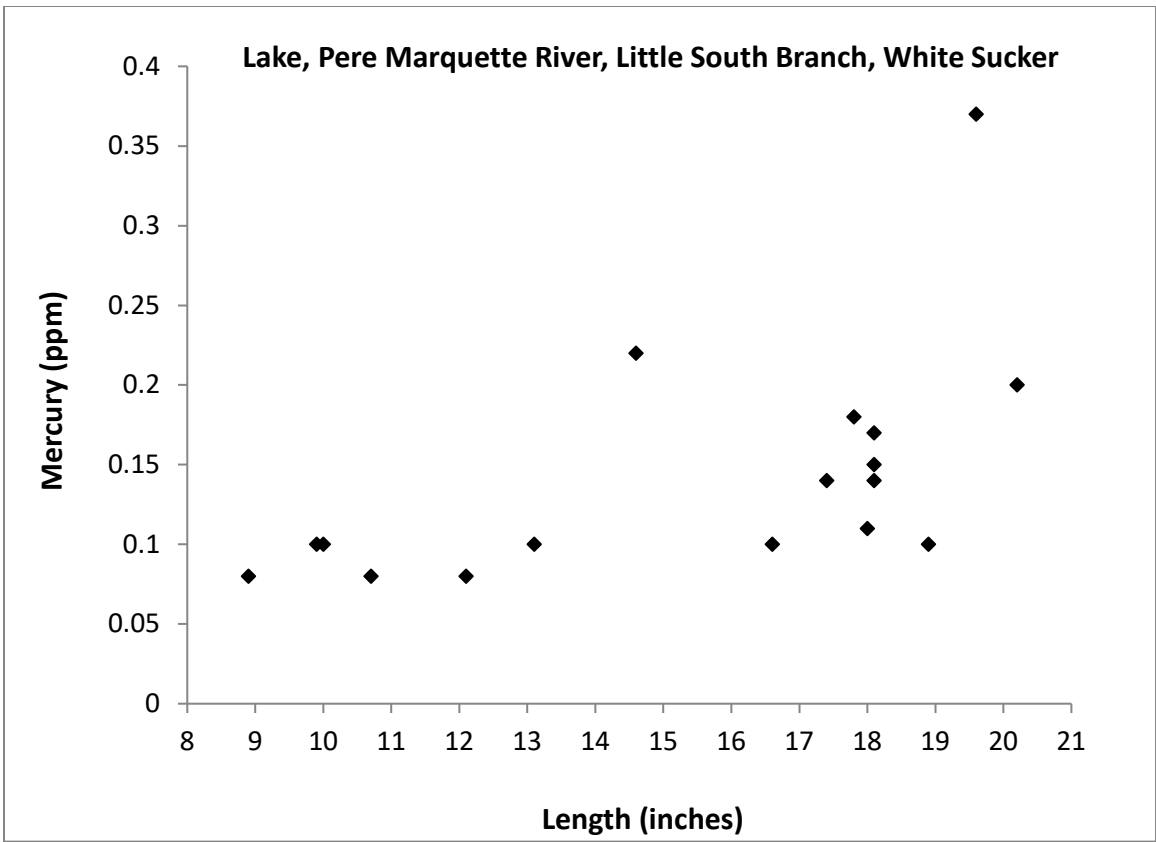
\* - 1993 samples analyzed as 1 composite, results not used in evaluation

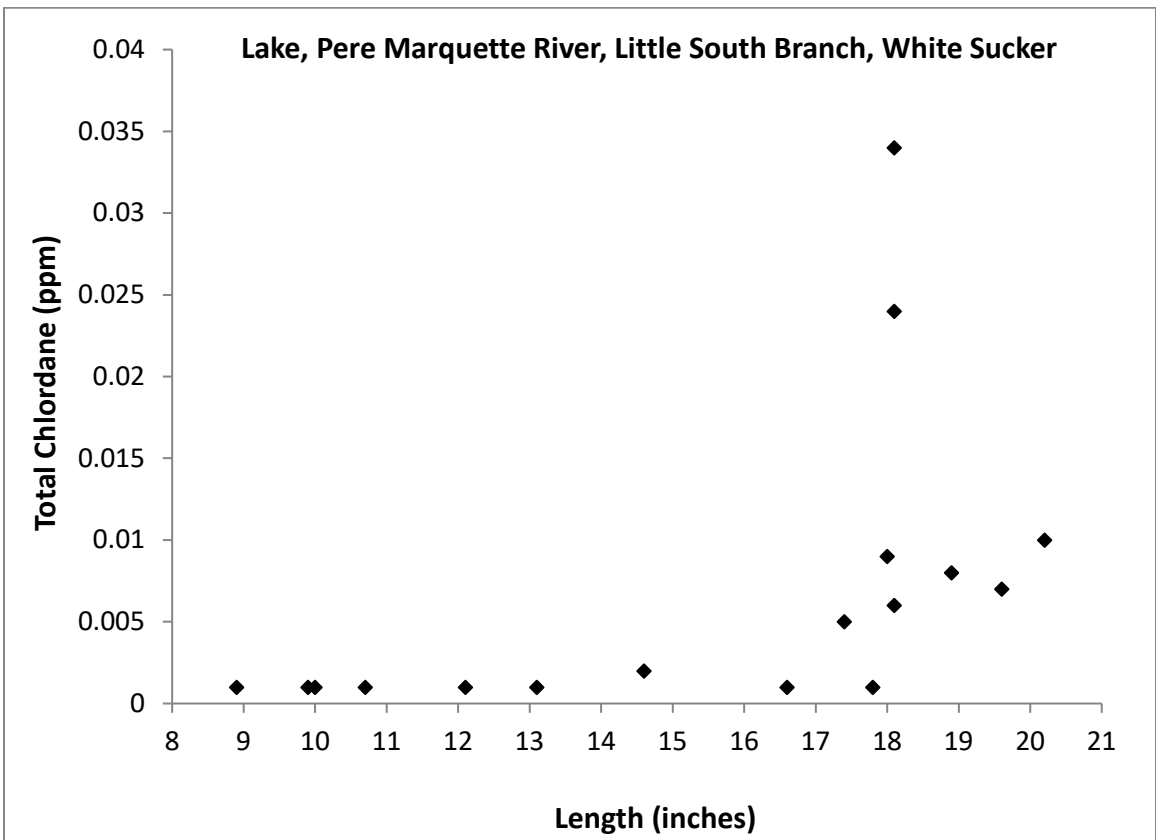
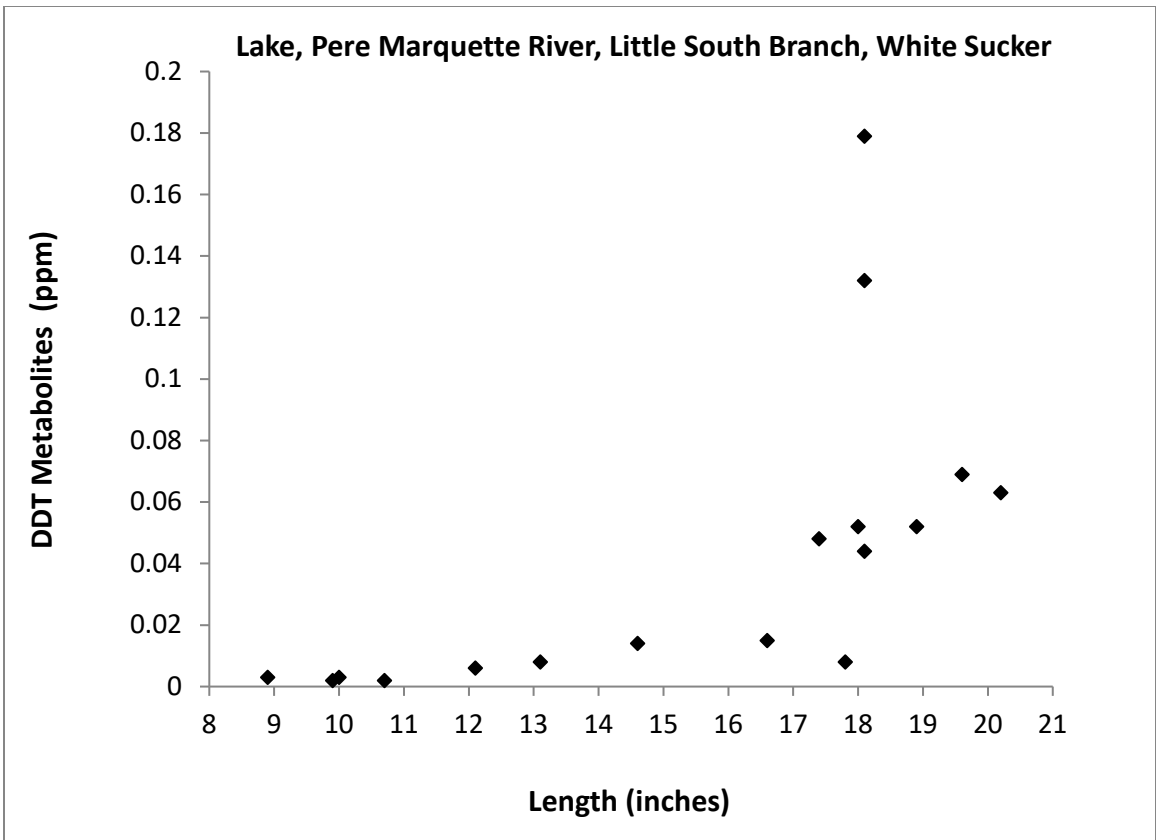
**Existing Advisory:** Women and children should not eat more than 1 meal per month of sucker from the Pere Marquette Lake or Pere Marquette River due to PCBs.

**Recommendation:** No one should eat more than 4 meals per month of sucker from the Pere Marquette Lake or Pere Marquette River smaller than 18 inches due to mercury and PCBs or more than 6 meals per year of those fish larger than 18 inches due to PCBs.

Length (Inches)	PCB Regression Equation Estimate (ppm)	Meal Category
8	0.001	16
10	0.002	16
12	0.004	16
14	0.01	12
16	0.03	4
18	0.09	2
20	0.25	0.5
22	0.68	Limited
24	1.87	Limited

*Shaded area denotes extrapolated estimates*





**Brown Trout**

**Pere Marquette and Baldwin Rivers**

**Lake, Mason, Newaygo, & Oceana Counties**

**Hg Analysis:**

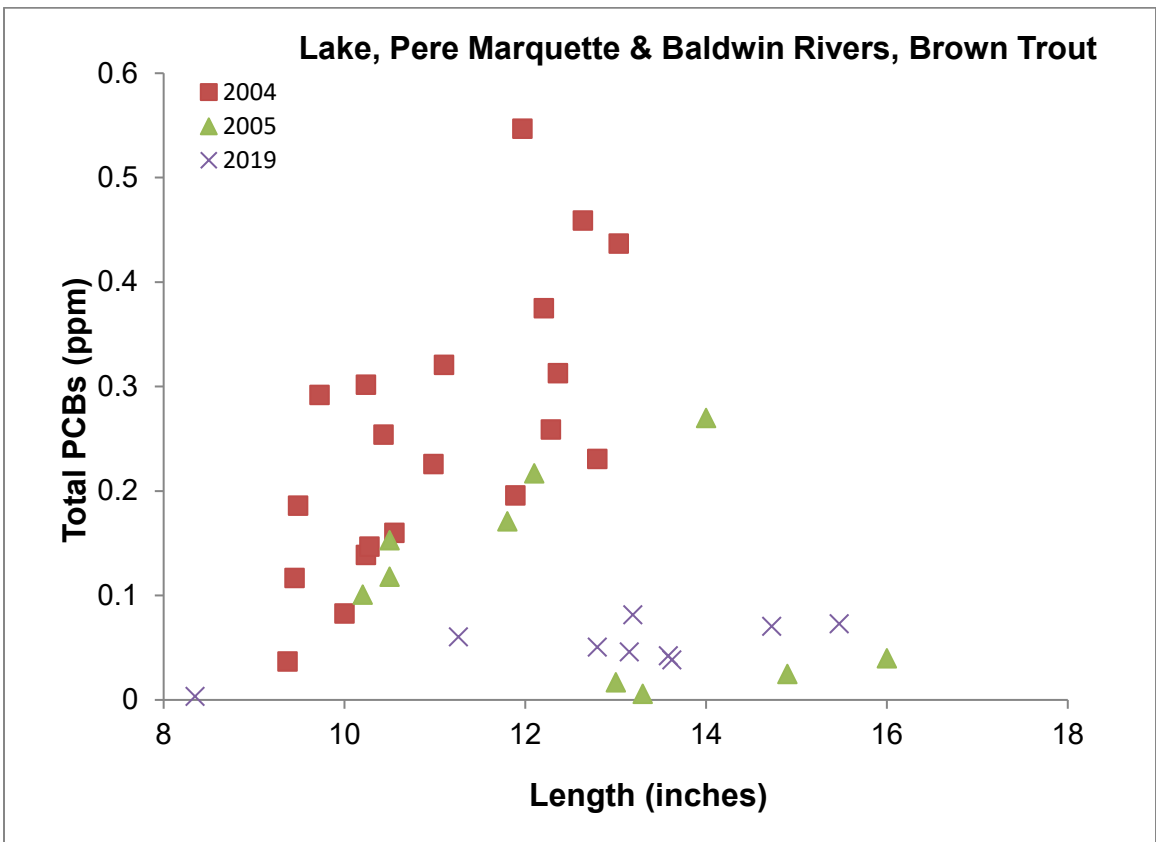
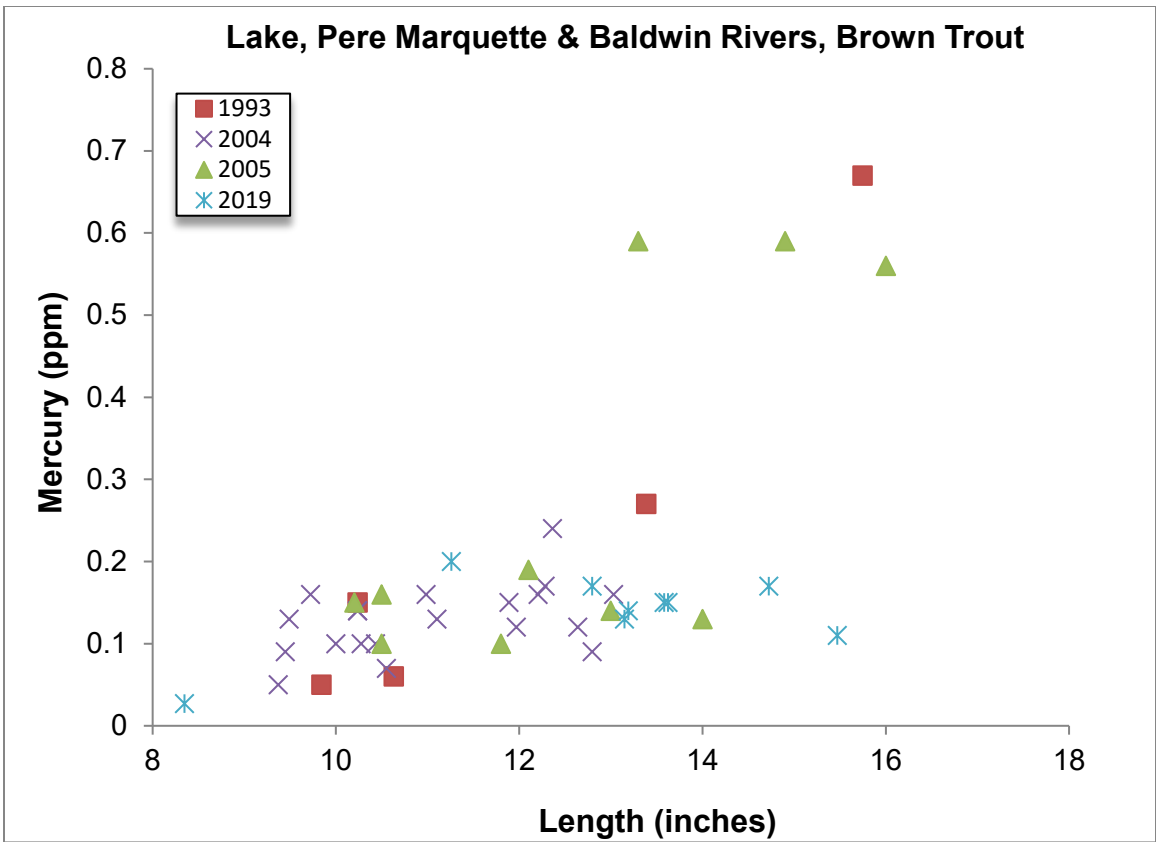
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent						
1993	2019	44	8.3	8.0	8.3	16.0	
Datasets available: 1993, 2004, 2005, 2019							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	44	0.176		0.027	0.670	0.220	4
Chemical	Linear Regression	Exponential Regression					
	R <sup>2</sup>	R <sup>2</sup>					
Mercury	0.382	0.450					

**Organics Analysis:**

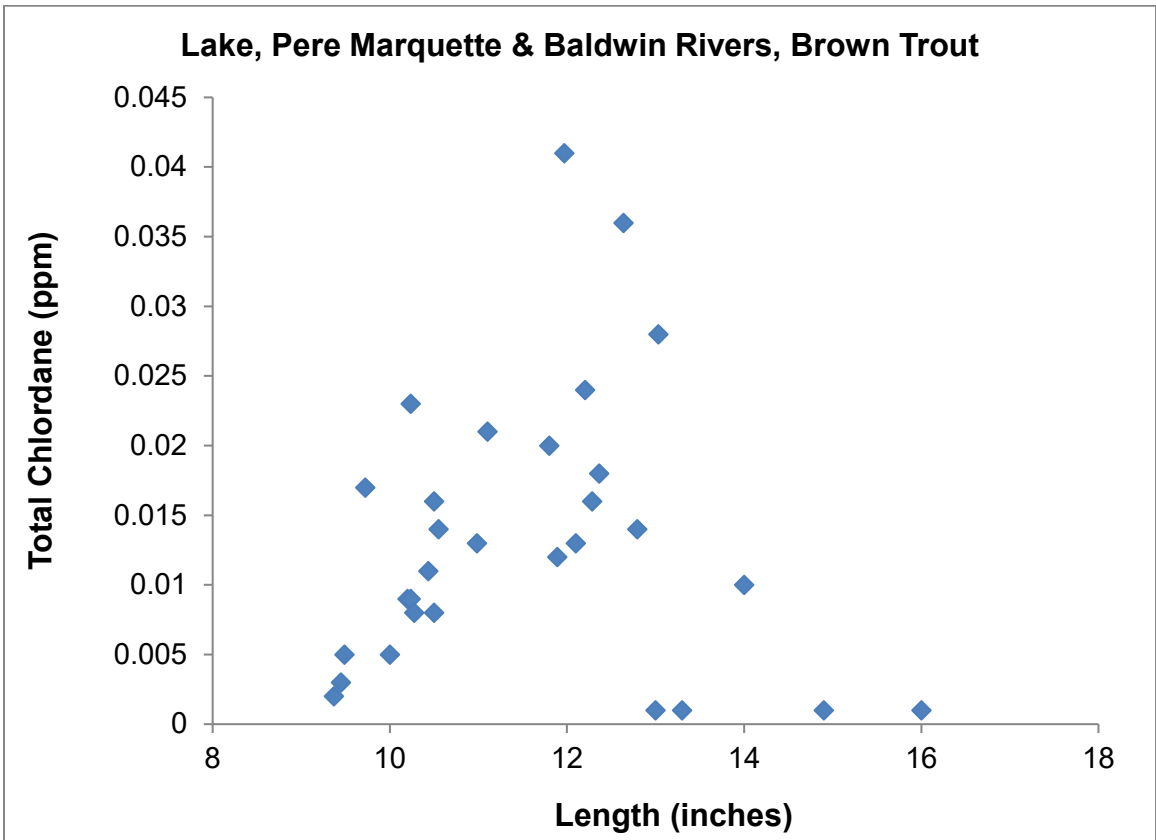
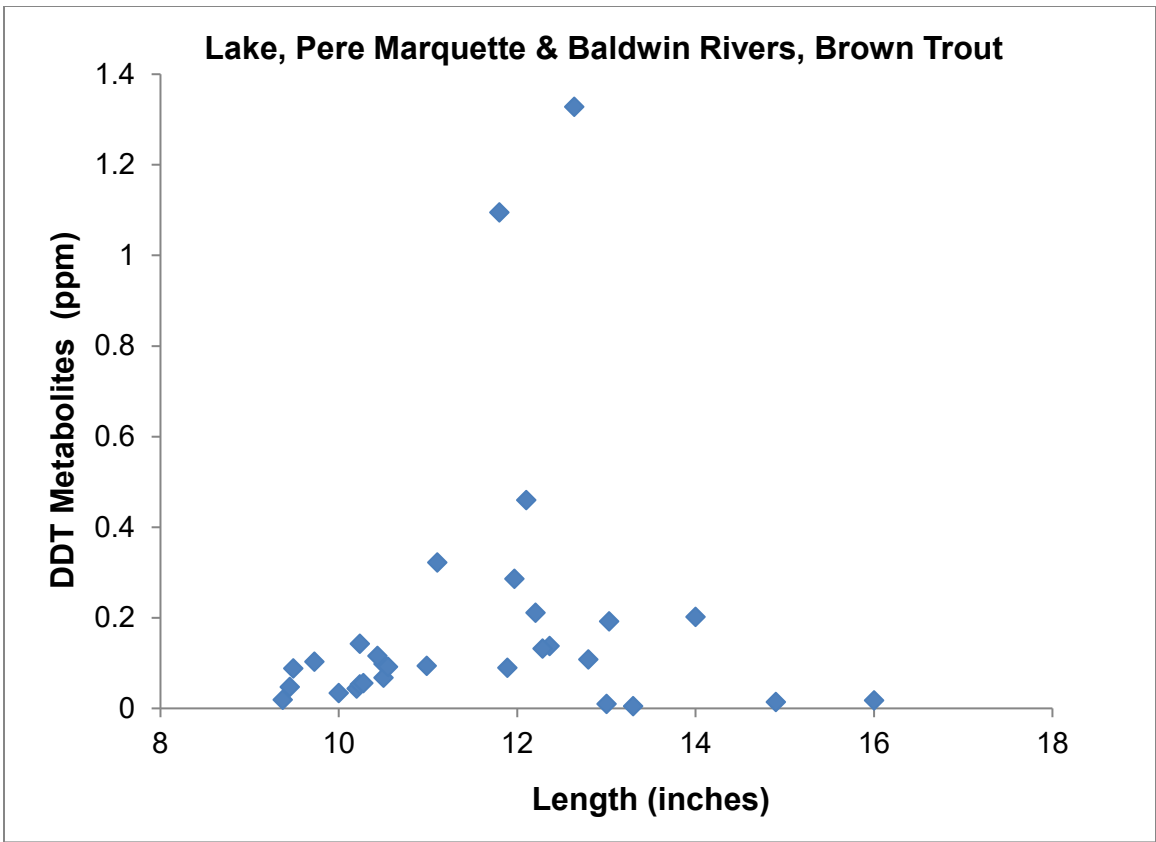
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent	39	8.3	8.0	8.3	16.0	
2004	2019						
Datasets available: 1993, 2004, 2005, 2019 (PCBs only + PFAS)							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	39	0.171		0.004	0.547	0.215	0.5
DDT	30	0.189		0.005	1.328	0.300	4
Chlordane	30	0.013		0.001	0.041	0.017	16
Toxaphene	30	ND		--	--	--	--
PFOS	9	5.7 ppb		0.7 ppb	11.1 ppb	8.5 ppb	16
Chemical	Linear Regression	Exponential Regression					
	R <sup>2</sup>	R <sup>2</sup>					
PCB	0.012	0.017					
DDT	0.016	0.007					
Chlordane	0.000	0.067					
Toxaphene	NA	NA					
PFOS	0.000	0.002					
<b>Final meal category based on UCL:</b>							<b>0.5*</b>

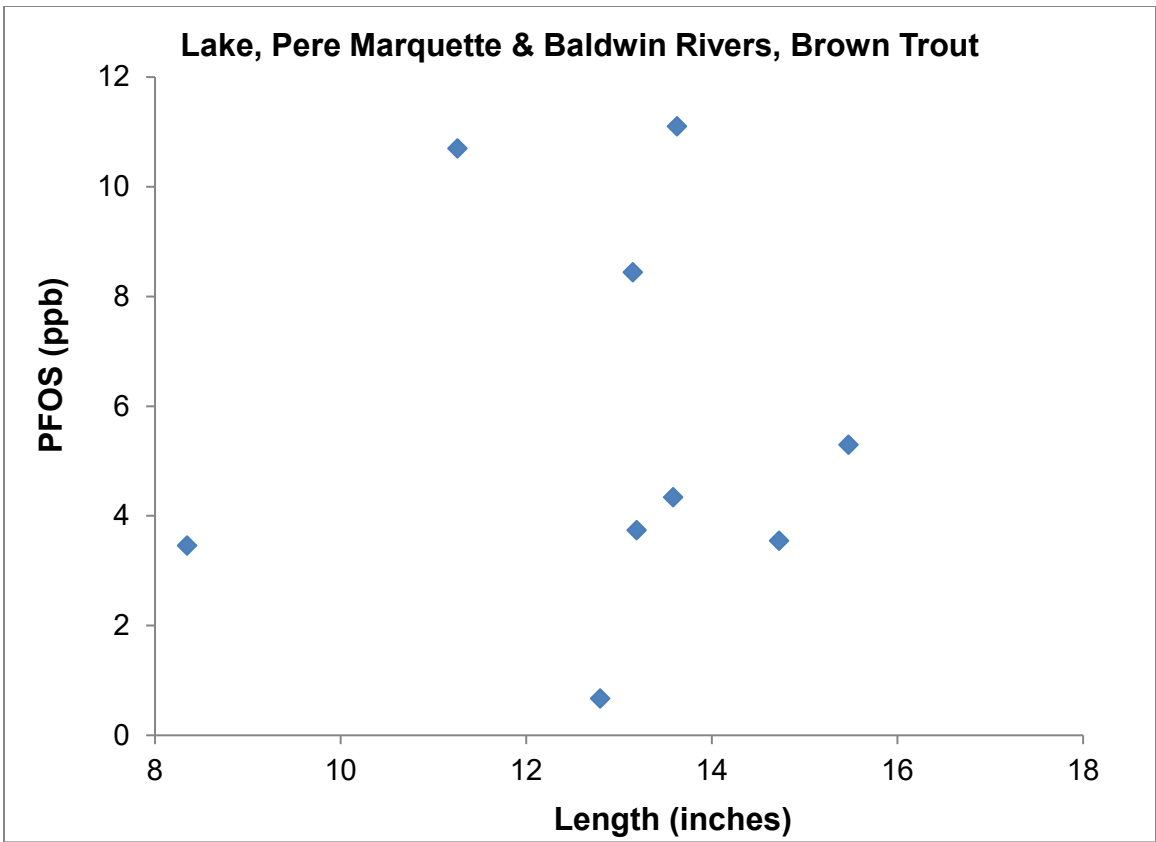
**Existing MDHHS Advisory:** No one should eat more than 6 meals per year of brown trout from the Pere Marquette Lake or Pere Marquette River due to PCBs. Mercury and DDT would cause advisories.

**Recommendation:** No one should eat more than 1 meal per month of brown trout from the Pere Marquette Lake, Pere Marquette River, or Baldwin River due to PCBs. Mercury and DDT would cause advisories.\*Based on EGLE’s 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. Brown trout should be collected in 2024 to see if further relaxation of the advisory due to PCB decline is warranted.









**Largemouth Bass**

**Pere Marquette River  
(Pere Marquette Lake)**

**Lake, Mason, Newaygo,  
& Oceana 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	15.7	14	15.7	15.7
Datasets available:		1989				
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	1	0.49	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
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	15.7	14	15.7	15.7
Datasets available:		1989				
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	1	0.15	--	--	--	--
DDT	1	0.07	--	--	--	--
Chlordane	1	0.02	--	--	--	--
Toxaphene	1	0.05	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						--

**Existing Advisory:** Pere Marquette Lake largemouth bass are covered by the statewide mercury 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. Statewide guidelines apply: 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**

**Pere Marquette River  
(Pere Marquette Lake)**

**Lake, Mason, Newaygo,  
& Oceana 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	2007	24	13.2	24	23.9	32.3
Datasets available: 1989, 2003, 2007						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.30	0.19	0.52	0.37	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.369	0.434				

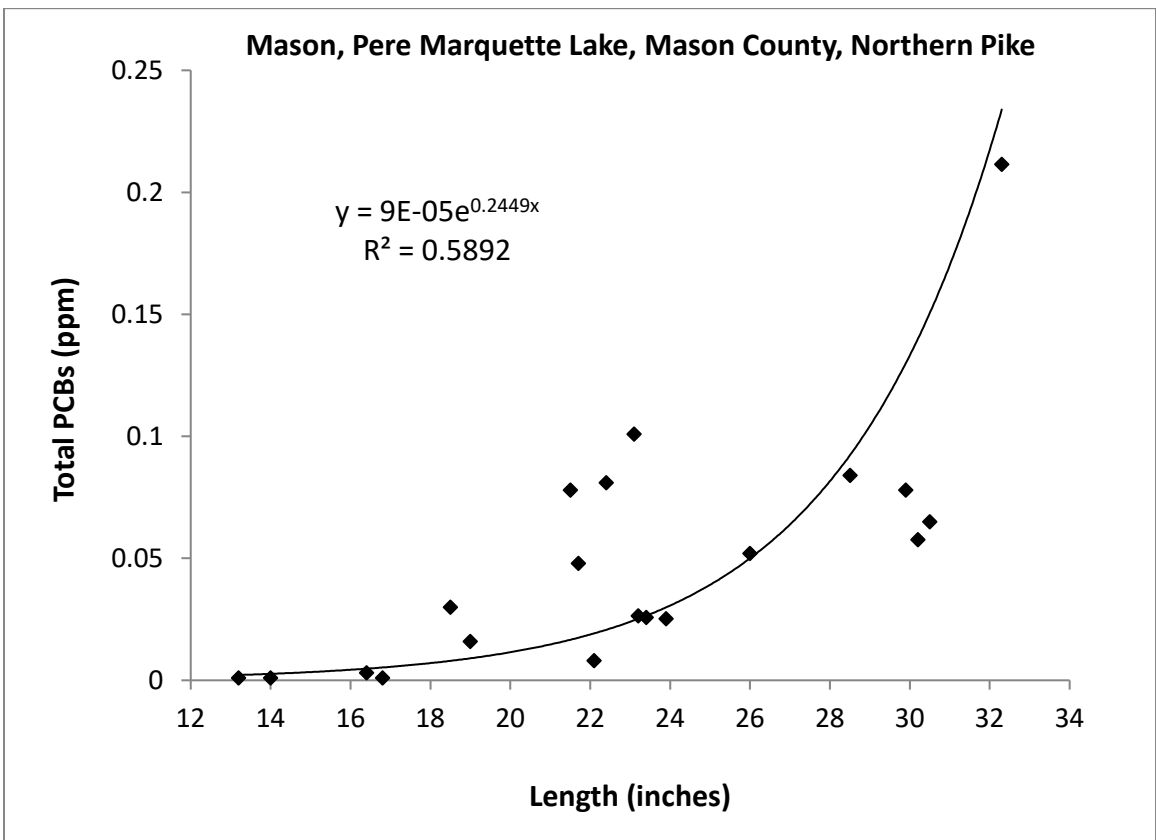
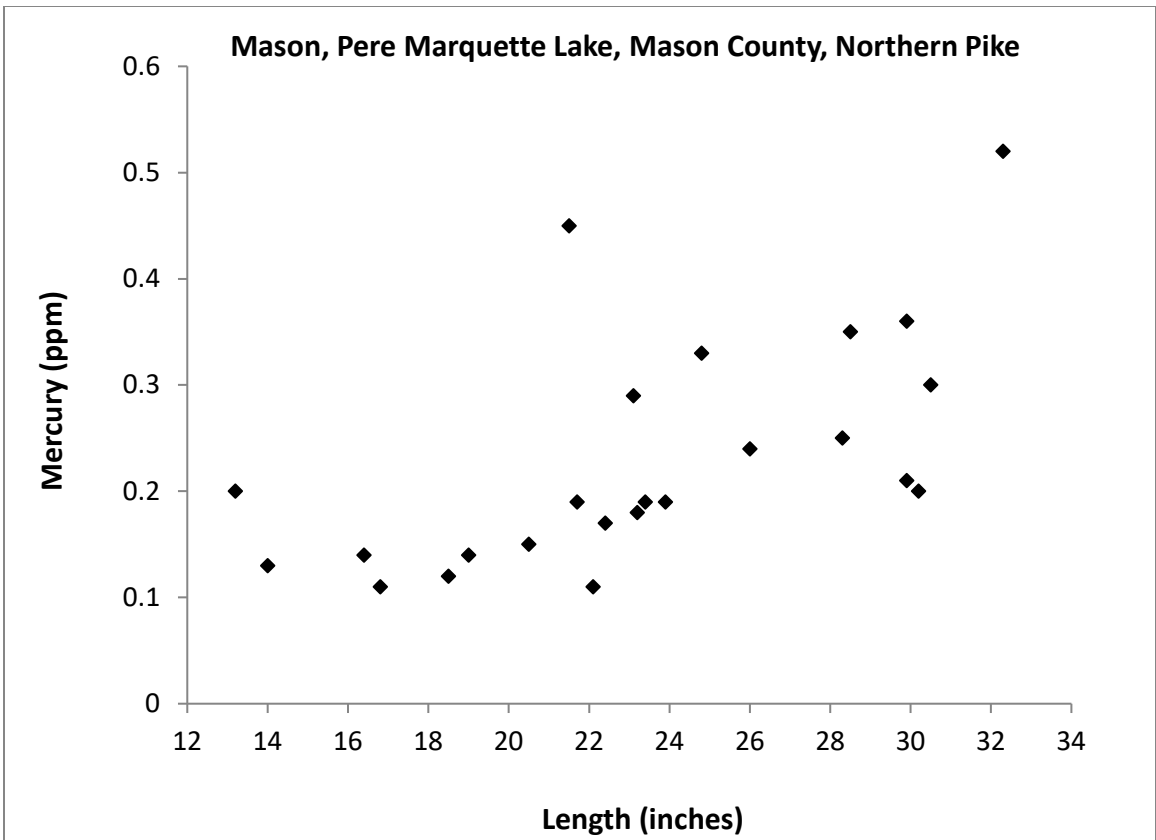
**Organics Analysis:**

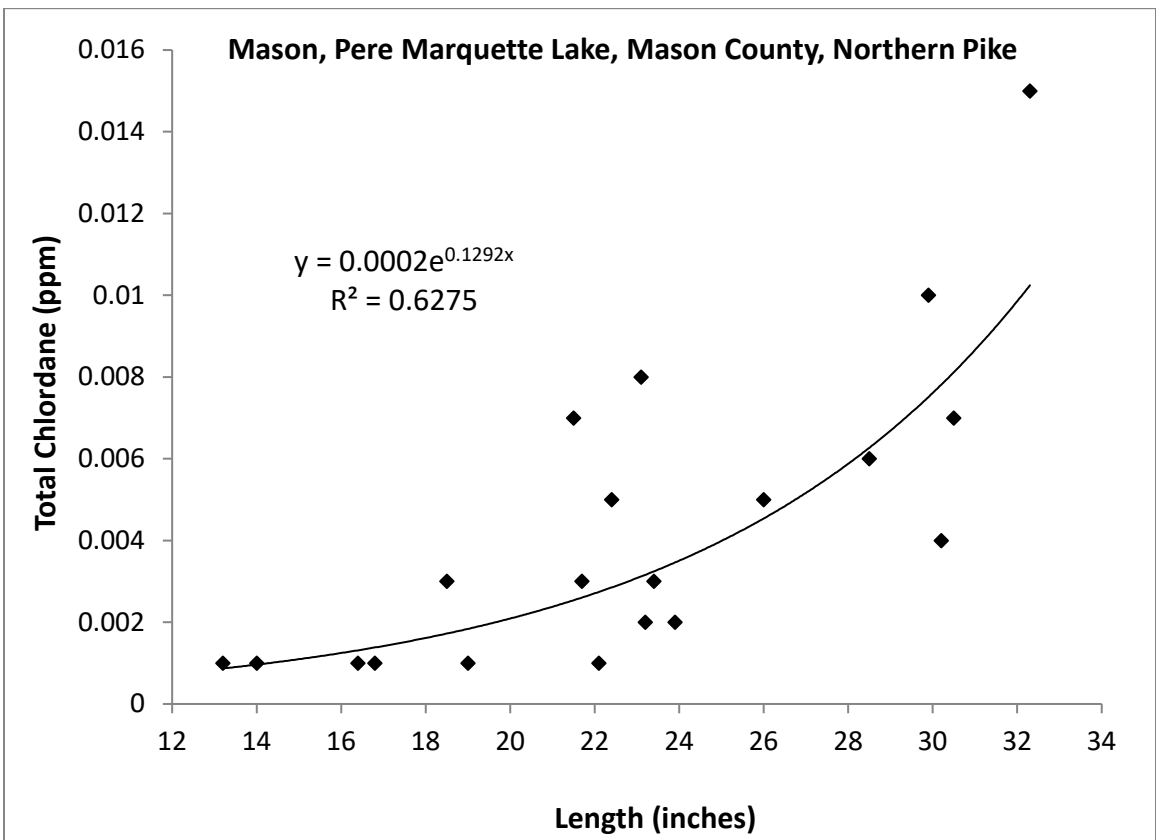
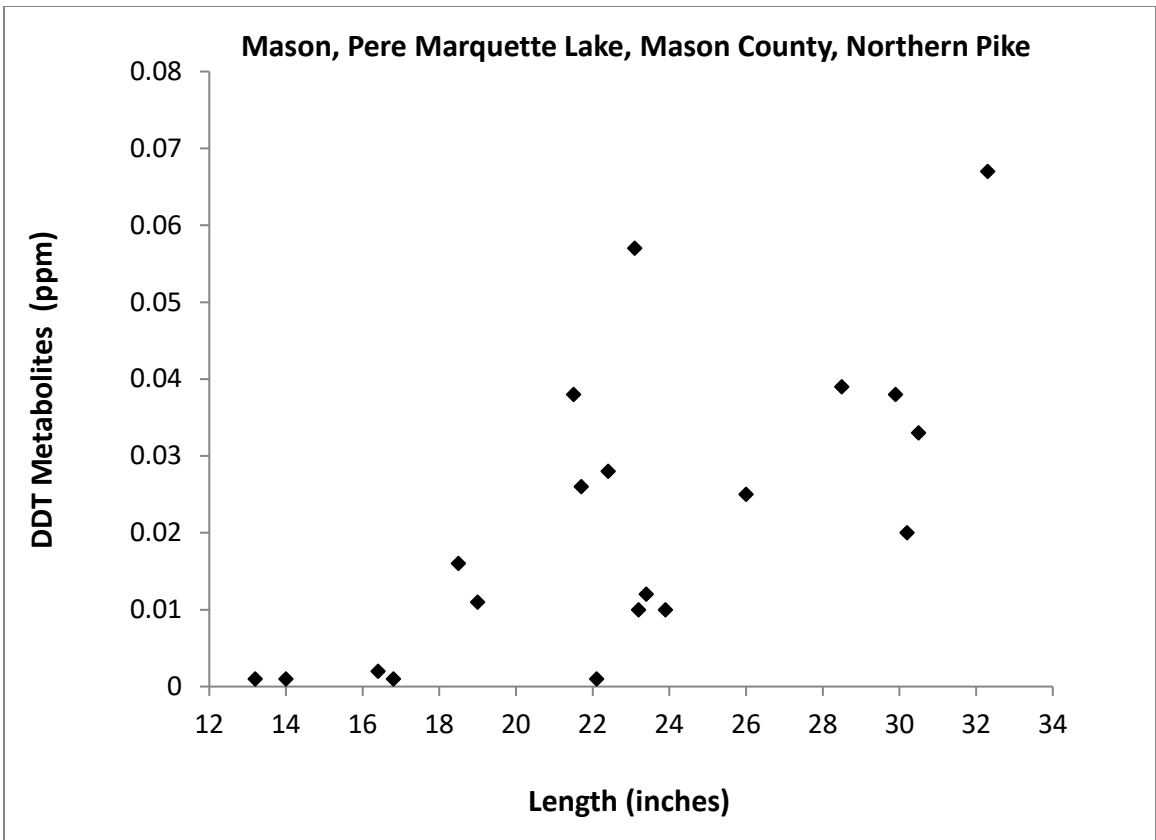
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2003	2007	20	13.2	24	23.9	32.3
Datasets available: 1989, 2003, 2007						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	7	0.08	0.03	0.21	0.14	1
DDT	7	0.03	0.01	0.07	0.05	16
Chlordane	7	0.01	0.002	0.02	0.01	--
Toxaphene	7	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.516	0.681				
DDT	0.484	0.566				
Chlordane	0.552	0.644				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>1</b>

**Existing Advisory:** Women and children should not eat more than 1 meal per month of northern pike from Pere Marquette Lake due to PCBs.

**Recommendation:** No one should eat more than 2 meals per month of Pere Marquette Lake or Pere Marquette River northern pike smaller than 30 inches due to mercury and PCBs or more than 6 meals per year of those fish larger than 30 inches due to PCBs.

Length (Inches)	PCB Regression Equation Estimate (ppm)	Meal Category
22	0.02	12
24	0.03	8
26	0.05	4
28	0.09	2
30	0.14	1
32	0.23	0.5
34	0.37	0.5
36	0.61	Limited
<i>Shaded area denotes extrapolated estimates</i>		





**Hg Analysis:**

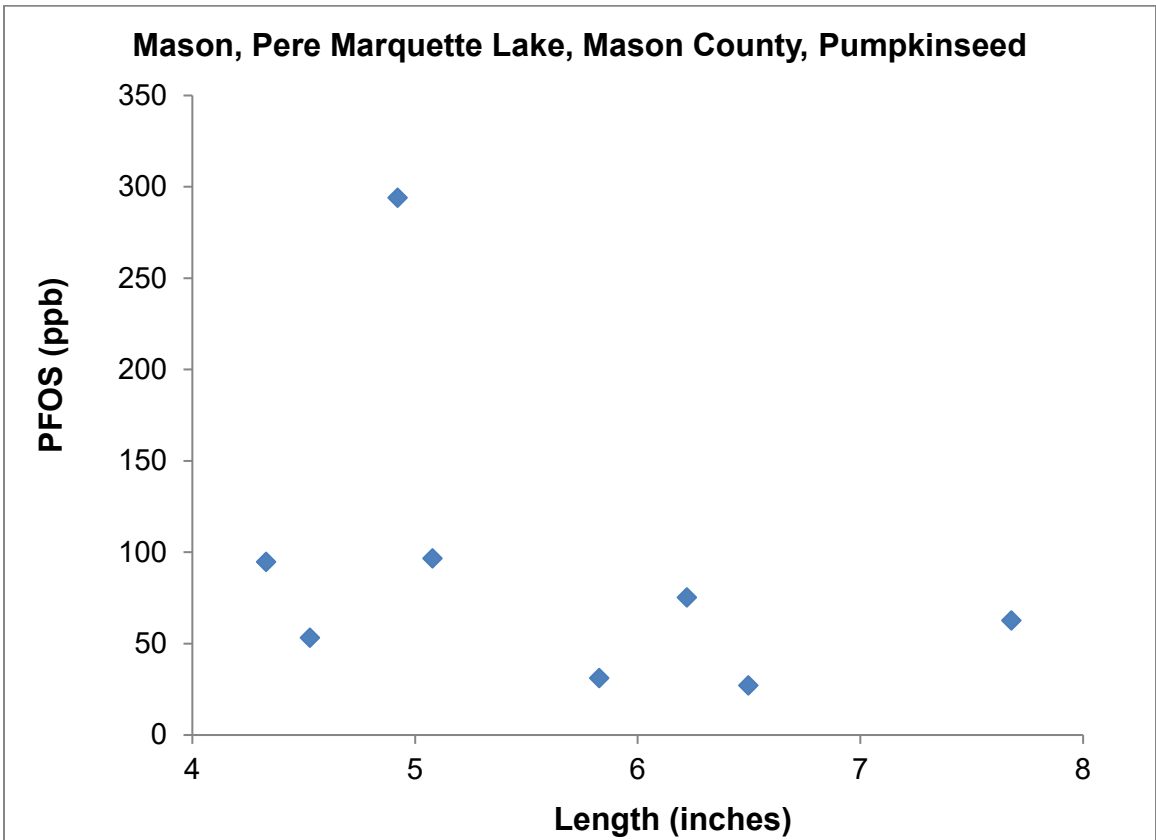
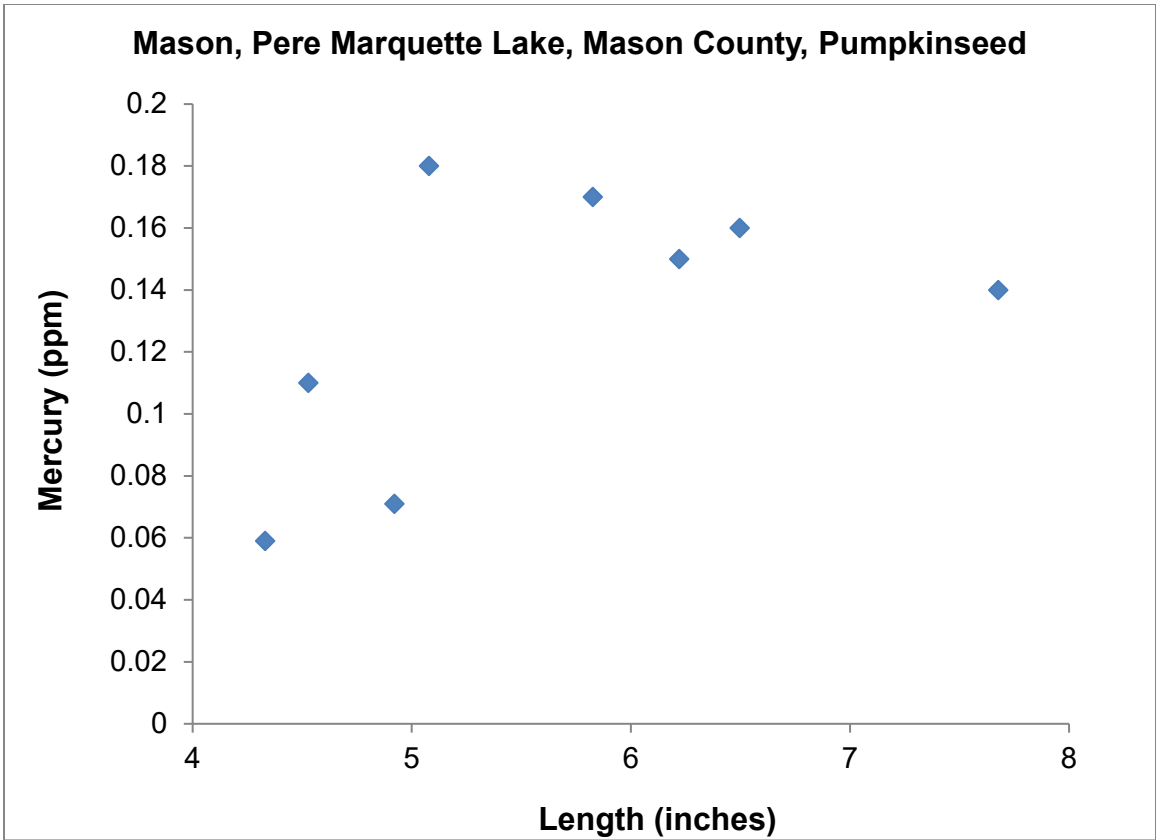
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2020	2020	8	4.3	NA	4.3	7.7
Datasets available: 2020						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	8	0.130	0.059	0.180	0.168	4
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.291	0.336				

**Organics 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	8	4.3	NA	4.3	7.7
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	8	92 ppb	27.2 ppb	294.1 ppb	163.6 ppb	0.5
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	0.129	0.171				
<b>Final meal category based on UCL:</b>						<b>0.5</b>

**Existing MDHHS Advisory:** Bluegill and sunfish from Pere Marquette Lake in Mason 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.

**Recommendation:** No one should eat more than 6 meals per year of bluegill or sunfish of any size from Pere Marquette Lake and Pere Marquette River in Mason and Lake Counties due to PFOS. Mercury causes less restrictive advice.





**Rock Bass**

**Pere Marquette Lake**

**Mason County**

**Hg Analysis:**

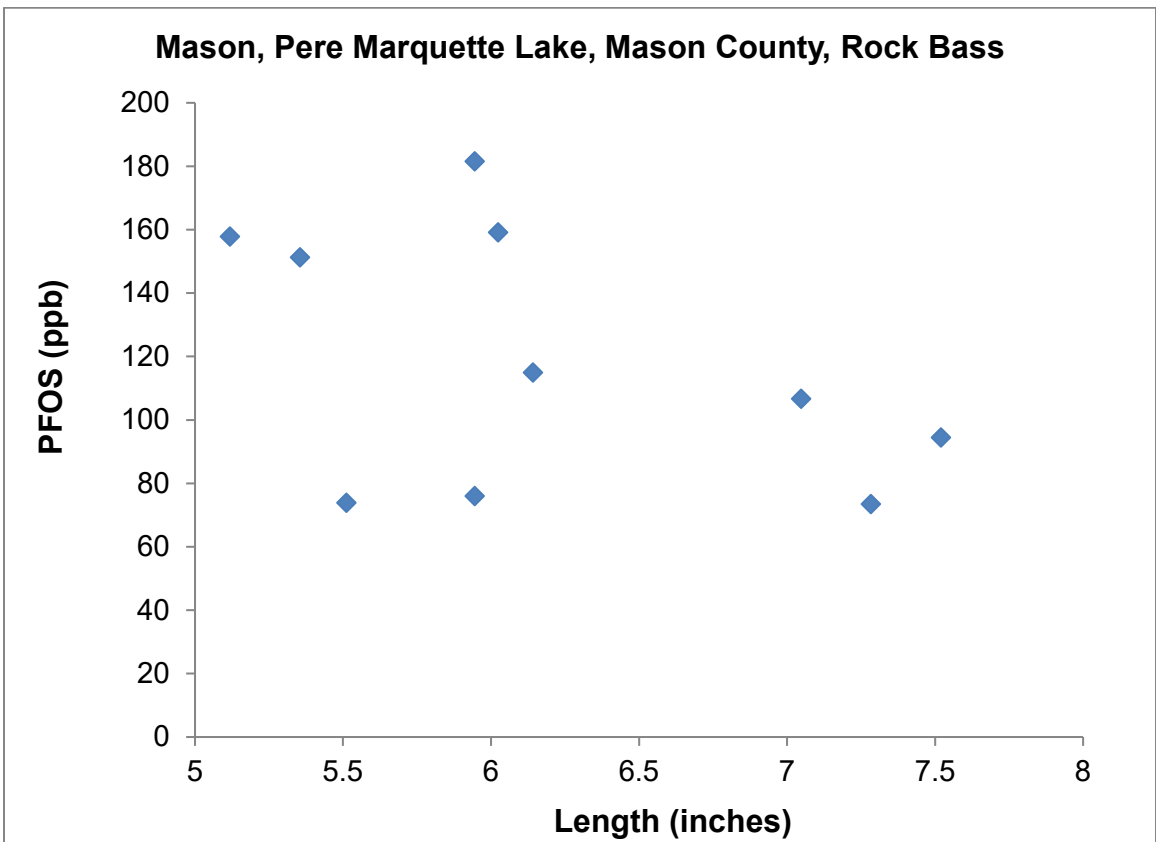
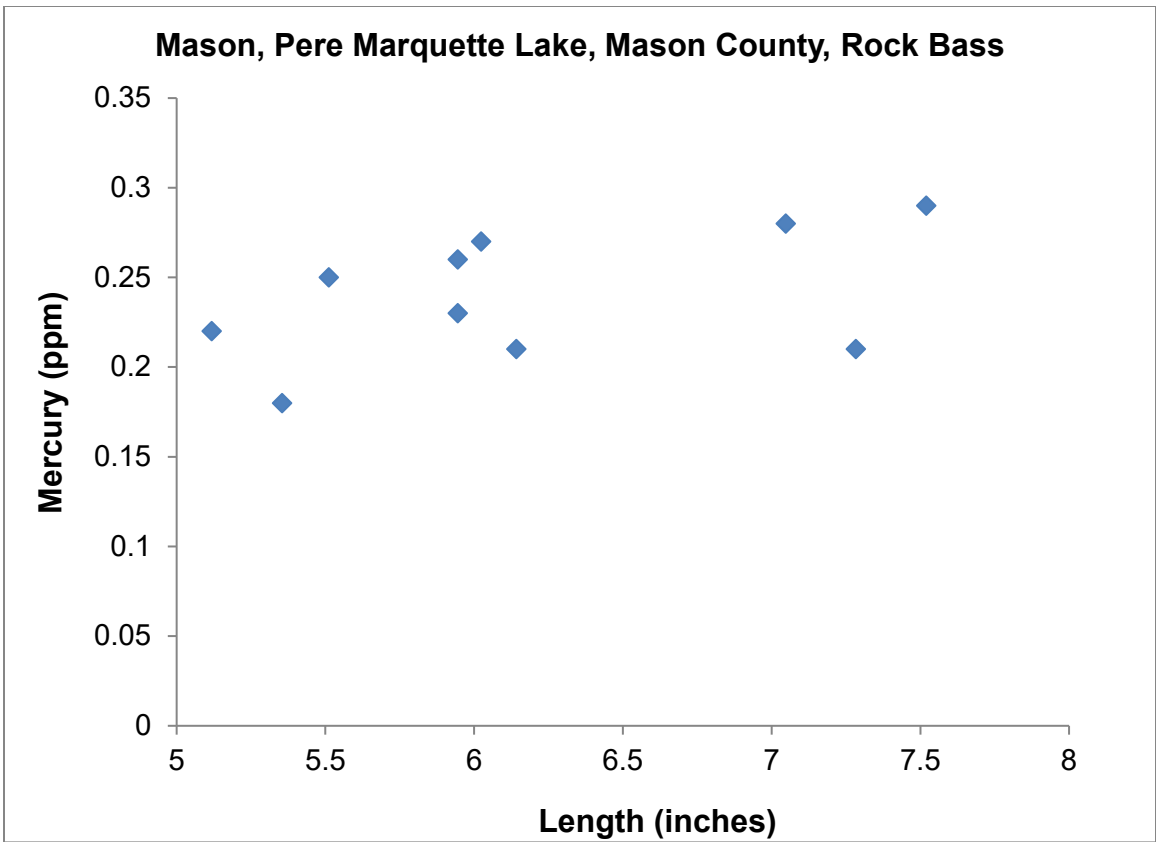
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2020	2020	10	5.1	NA	5.1	7.5
Datasets available: 2020						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.240	0.180	0.290	0.265	4
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.229	0.212				

**Organics 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	5.1	NA	5.1	7.5
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	119 ppb	73.6 ppb	181.6 ppb	148.0 ppb	1
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	0.222	0.195				
<b>Final meal category based on UCL:</b>						<b>1</b>

**Existing MDHHS Advisory:** Rock Bass from Pere Marquette Lake in Mason 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.

**Recommendation:** No one should eat more than 1 meal per month of rock bass of any size from Pere Marquette Lake and Pere Marquette River in Mason and Lake Counties due to PFOS. Mercury causes less restrictive advice.



**Yellow Perch**

**Pere Marquette Lake**

**Mason 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
2020	2020	9	5.1	NA	5.1	10.4
Datasets available: 2020						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	9	0.149	0.068	0.280	0.201	4
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.949	0.835				

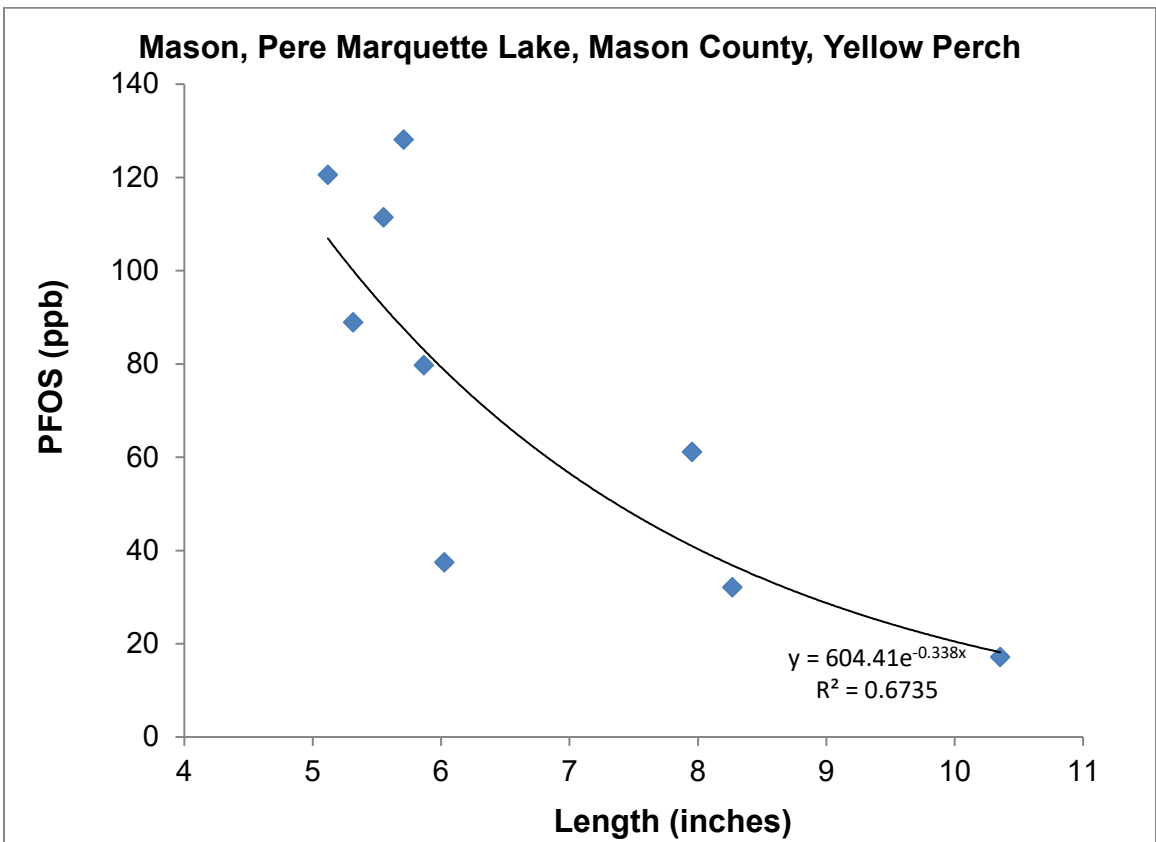
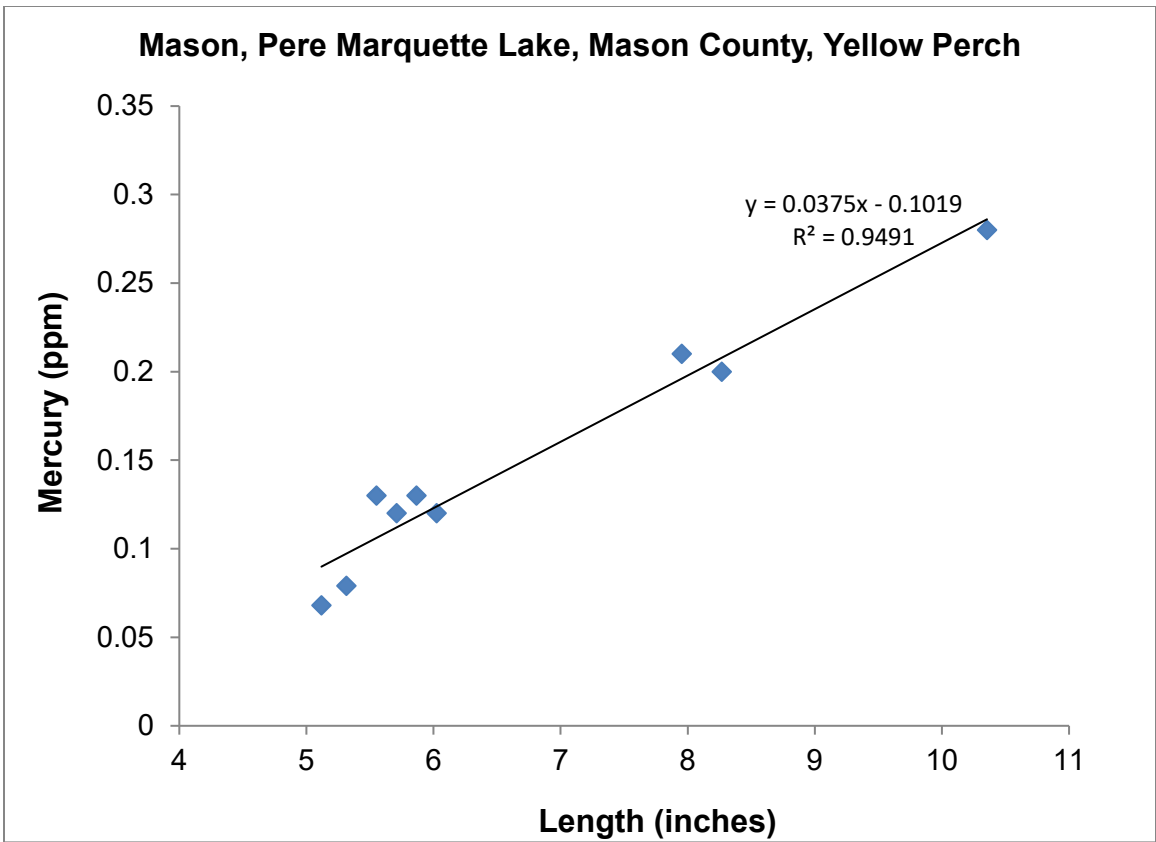
**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2020	2020	9	5.1	NA	5.1	10.4
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	9	75.2 ppb	17.2 ppb	128.1 ppb	106.5 ppb	1
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	--	--				
Chlordane	--	--	* negative slope on regression			
Toxaphene	--	--				
PFOS	0.634*	0.674*	<b>Final meal category based on UCL:</b>			<b>1</b>

**Existing MDHHS Advisory:** Yellow perch from Pere Marquette Lake in Mason County are currently covered under the statewide mercury advisory. No one should eat more than 4 meals per month of yellow perch of any size.

**Recommendation:** No one should eat more than 1 meal per month of yellow perch of any size from Pere Marquette Lake and Pere Marquette River in Mason and Lake Counties due to PFOS. Mercury causes less restrictive advice. Note: while there was a significant negative correlation between PFOS and fish size, we do not recommend length specific guidance as there has not been a significant relationship observed in the statewide dataset.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
7	0.161	4
8	0.198	4
9	0.236	4
10	0.273	2
11	0.311	2
12	0.348	2
<i>Shaded area denotes extrapolated estimates</i>		



# Wexford County

**Northern Pike**

**Lake Cadillac**

**Wexford County**

**Hg Analysis:**

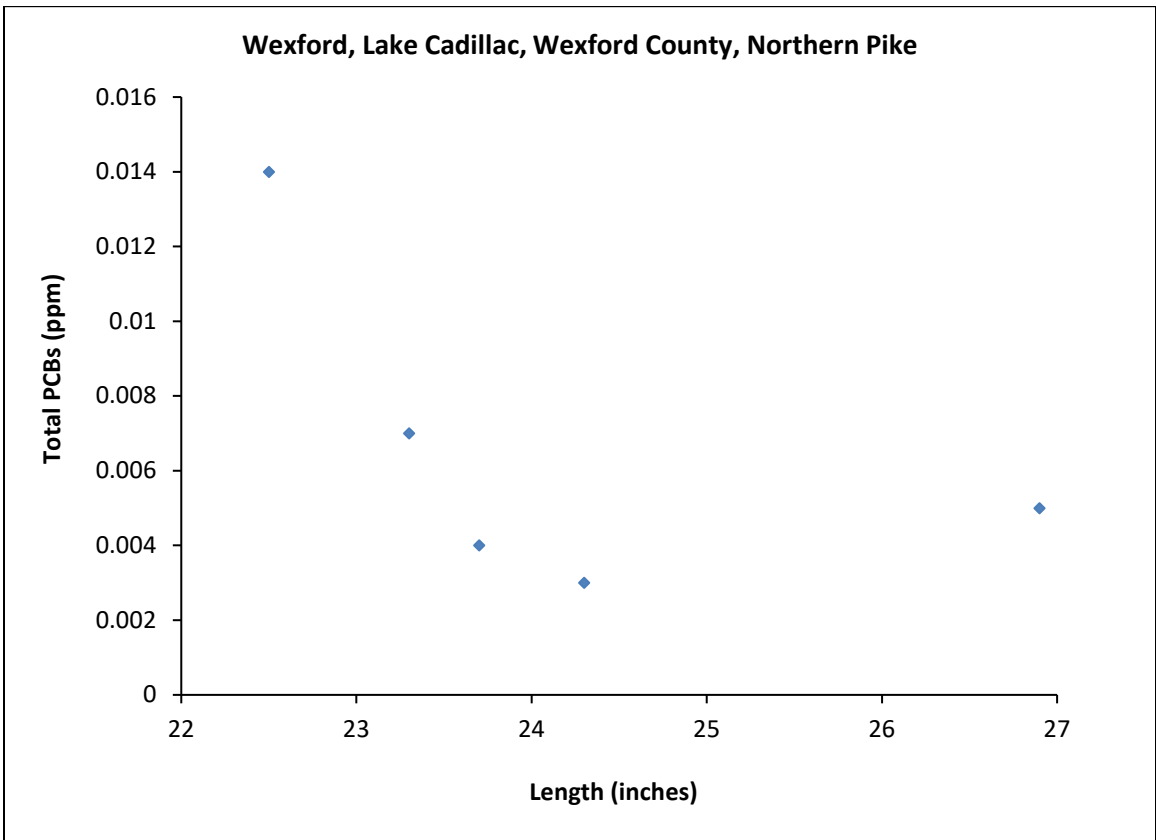
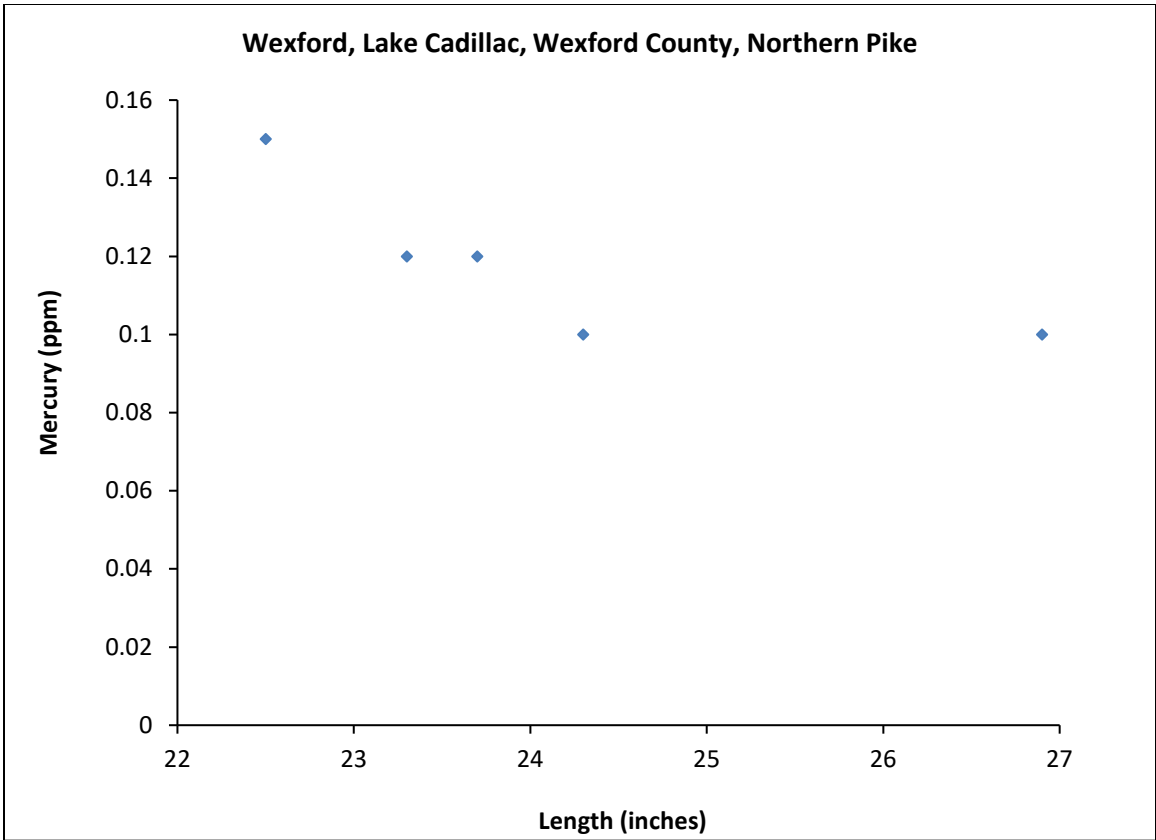
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Size Range of All Samples	
Earliest	Most Recent				Min	Max
2004	2004	5	22.5	24	22.5	26.9
Datasets available: 2004						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	5	0.12	0.10	0.15	0.14	4
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.614*	0.640*	* negative slope on regression			

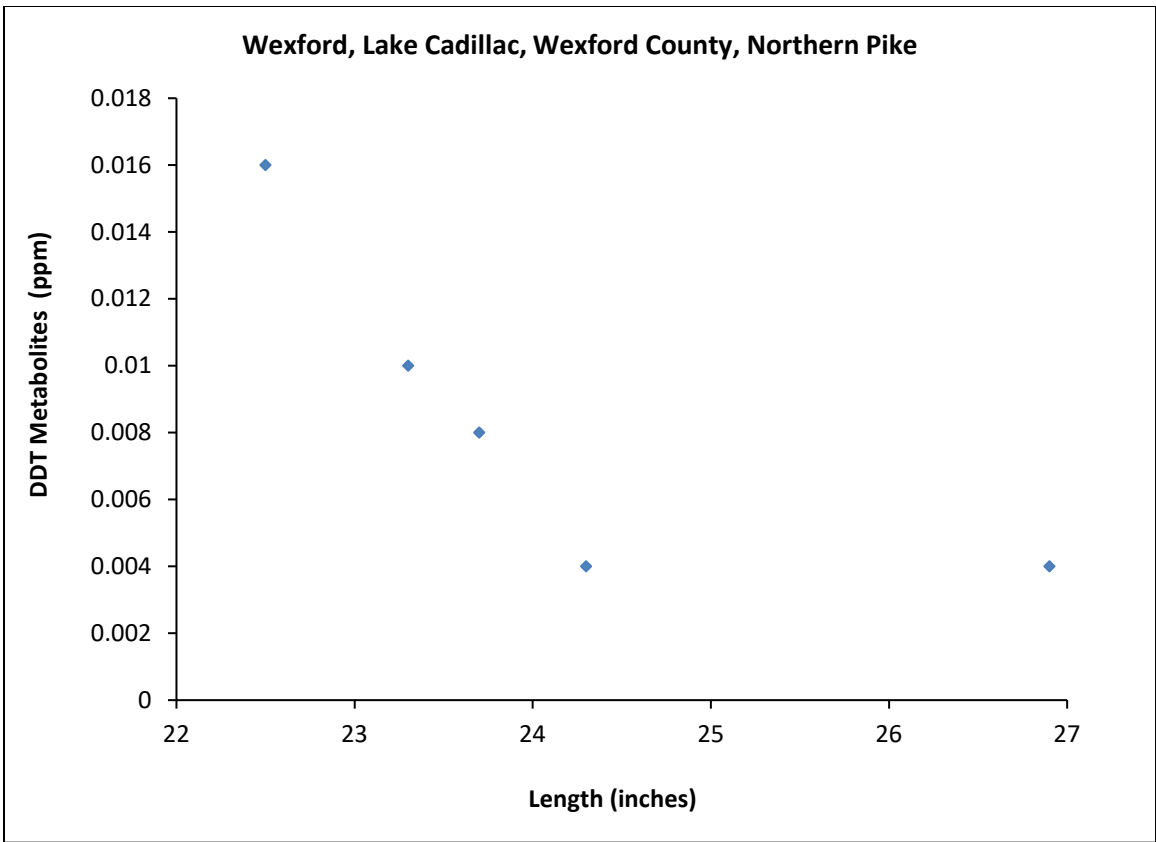
**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Size Range of All Samples	
Earliest	Most Recent				Min	Max
2004	2004	5	22.5	24	22.5	26.9
Datasets available: 2004						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	5	0.007	0.003	0.01	0.01	16
DDT	5	0.008	0.004	0.02	0.01	16
Chlordane	5	na	--	--	--	--
Toxaphene	5	na	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.307	0.242				
DDT	0.629*	0.690*	* negative slope on regression			
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>4</b>

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

**Recommendation:** No one should eat more than 4 meals per month of Lake Cadillac northern pike smaller than 30 inches or more than 2 meals per month of those fish larger than 30 inches due to mercury. The statewide length break was applied as the size range of fish was limited.







**Smallmouth Bass**

**Lake Cadillac**

**Wexford 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	5	13.6	14	13.6	18.5
Datasets available: 2004						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	5	0.30	0.21	0.59	0.51	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.965*	0.960*	* - regression driven by 1 point			

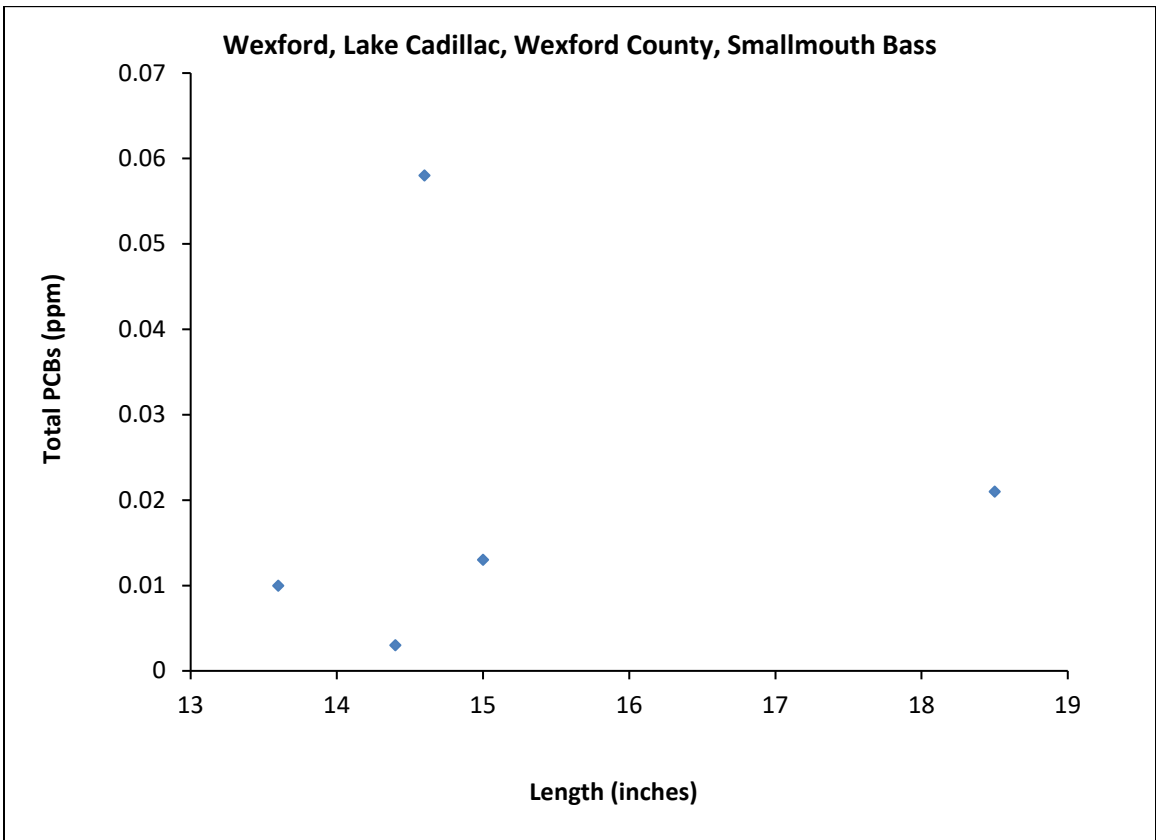
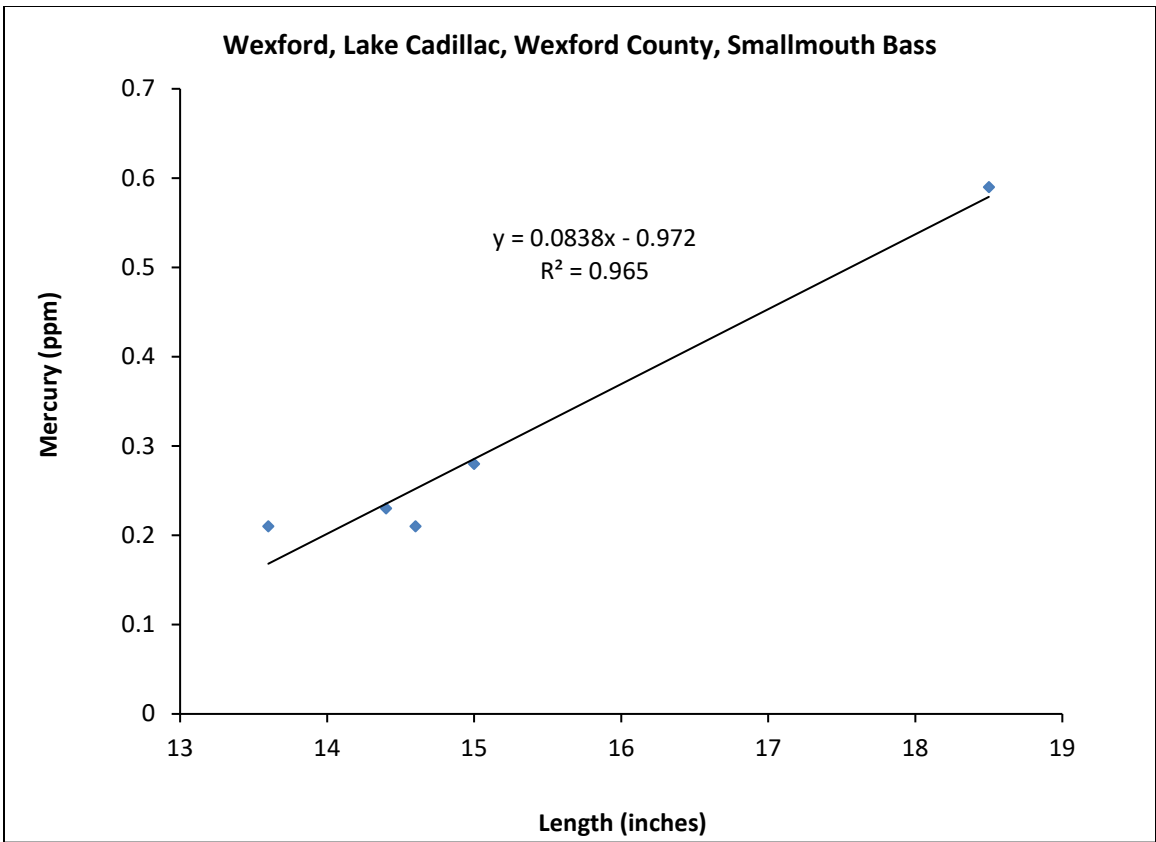
**Organics Analysis:**

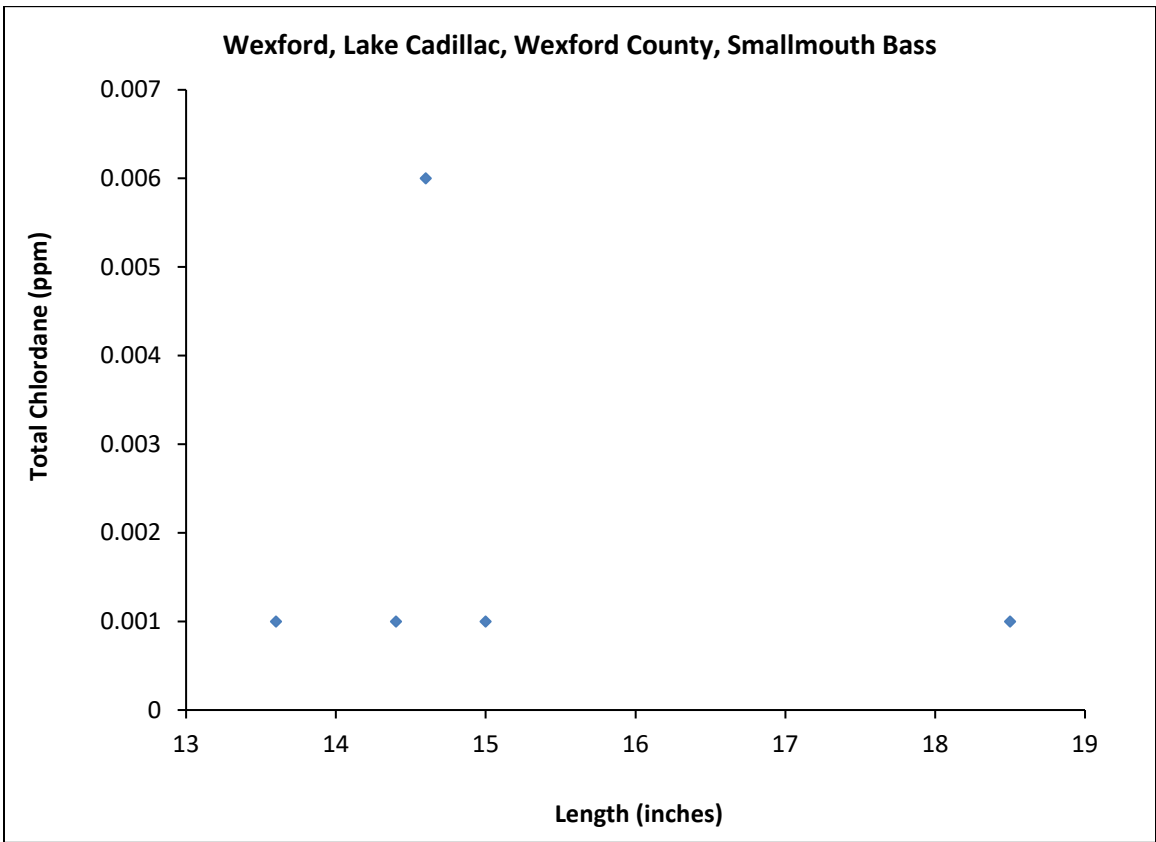
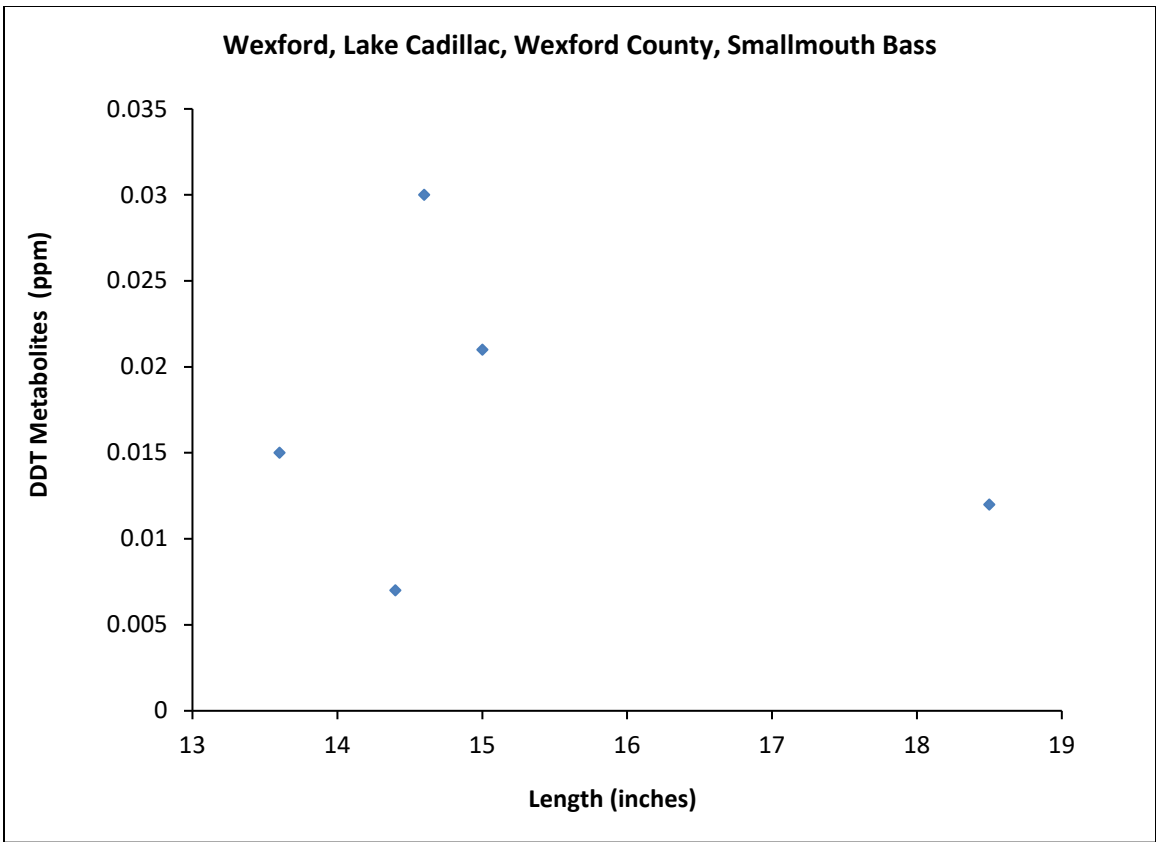
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2004	2004	5	13.6	14	13.6	18.5
Datasets available: 2004						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	5	0.02	0.003	0.06	0.05	4
DDT	5	0.02	0.007	0.03	0.03	16
Chlordane	5	0.002	0.001	0.006	0.005	--
Toxaphene	5	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.005	0.076				
DDT	0.042	0.021				
Chlordane	0.033	0.033				
Toxaphene	--	-				
<b>Final meal category based on UCL:</b>						<b>2</b>

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

**Recommendation:** No one should eat more than 2 meals per month of Lake Cadillac 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 the fish was limited.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
14	0.20	4
15	0.28	2
16	0.37	2
17	0.45	2
18	0.54	1
19	0.62	1
20	0.70	1
21	0.79	1
22	0.87	1
<i>Shaded area denotes extrapolated estimates</i>		





**Largemouth Bass**

**Lake Mitchell**

**Wexford 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
1989	2003	17	11.8	14	13.9	17
Datasets available: 1989, 2003						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	12	0.36	0.25	0.58	0.44	2
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.683	0.741				

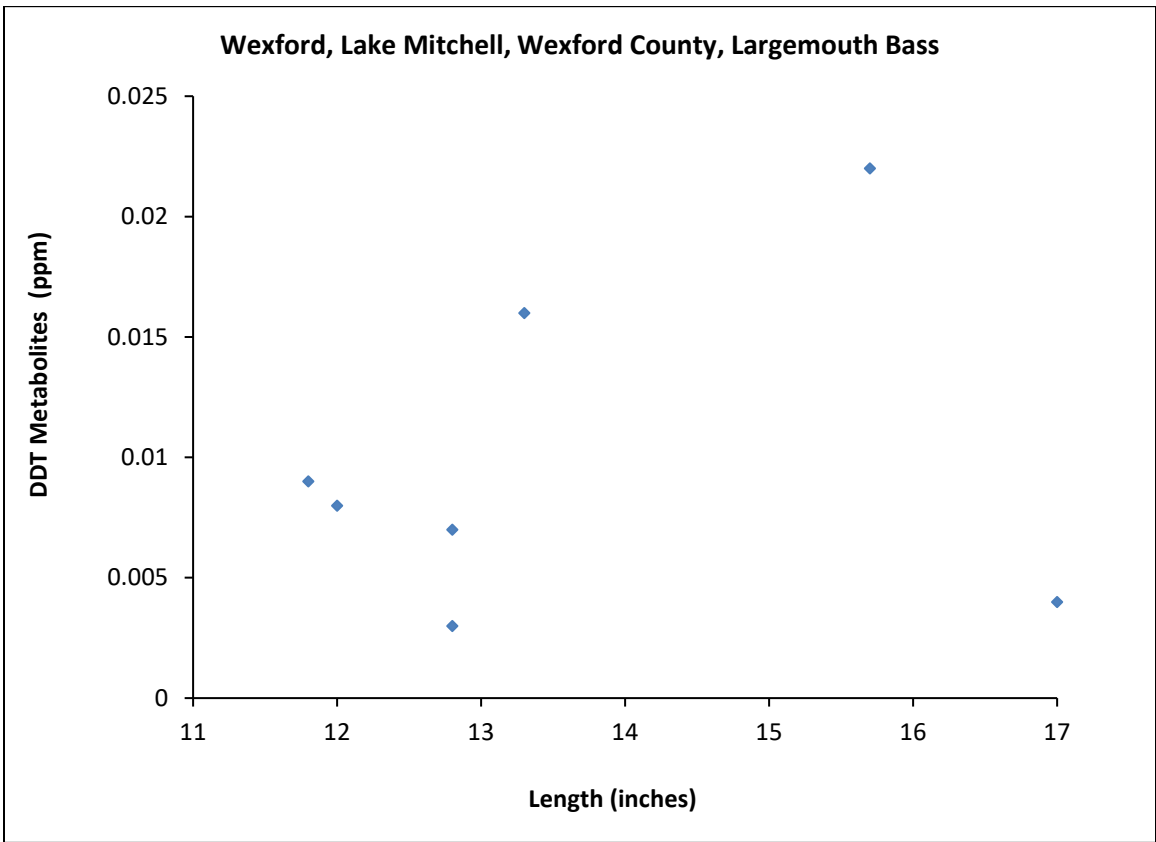
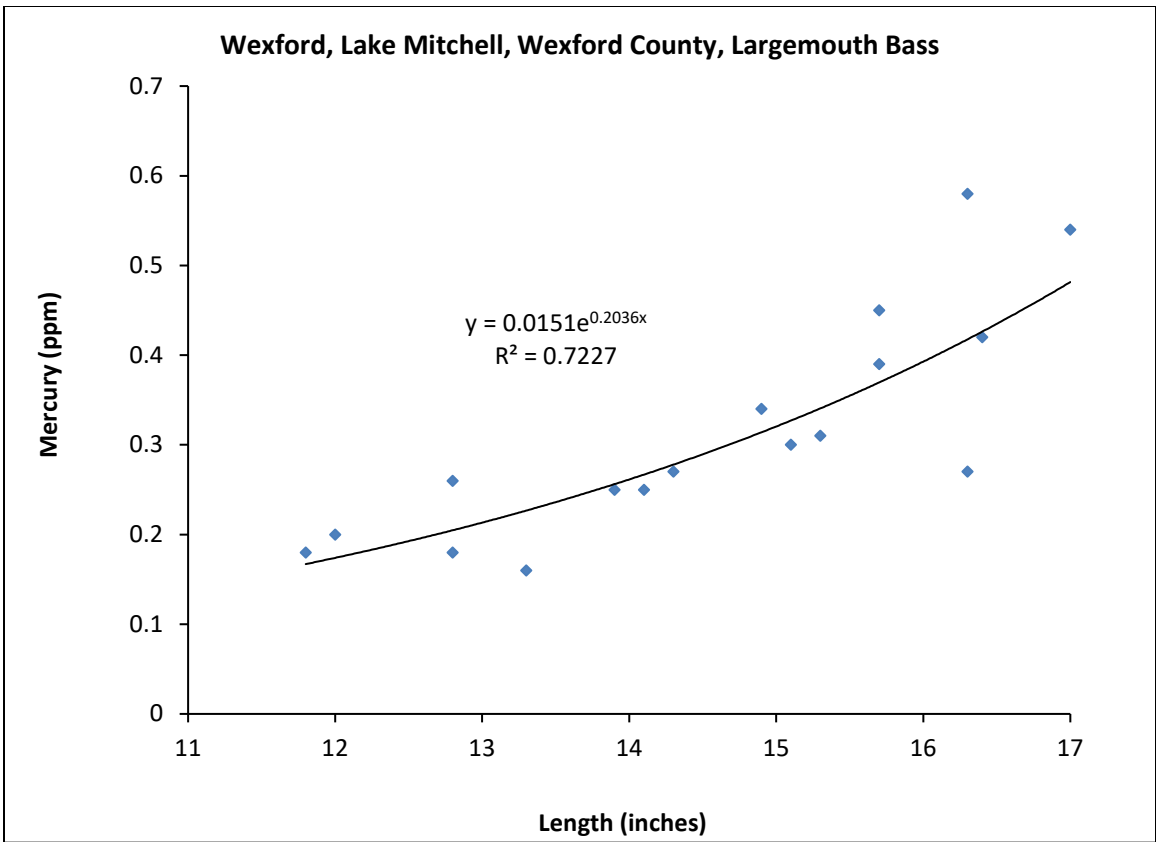
**Organics Analysis:**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Size Range of All Samples	
Earliest	Most Recent				Min	Max
1989	1989	7	11.8	14	11.8	17
Datasets available: 1989						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	7	ND	--	--	--	--
DDT	7	0.01	0.003	0.02	0.0	16
Chlordane	7	ND	--	--	--	--
Toxaphene	7	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	--	--				
DDT	0.040	0.001				
Chlordane	--	--				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>2</b>

**Existing Advisory:** Women and children should not eat more than one meal per week of Lake Mitchell largemouth bass smaller than 18 inches in length or more than one meal per month of those fish larger than 18 inches due to mercury.

**Recommendation:** No one should eat more than 2 meals per month of Lake Mitchell 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
14	0.261	4
15	0.320	2
16	0.392	2
17	0.481	2
18	0.590	1
19	0.723	1
20	0.886	1
21	1.086	1
22	1.331	0.5
<i>Shaded area denotes extrapolated estimates</i>		



**Walleye**

**Lake Mitchell**

**Wexford 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	16.1	15	16.1	24.8
Datasets available: 1989						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.76	0.42	1.29	0.95	1
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
Mercury	0.425	0.406				

**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	16.1	15	16.1	24.8
Datasets available: 1989						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.02	0.02	0.03	0.03	8*
DDT	10	0.01	0.007	0.02	0.02	16
Chlordane	10	0.003	0.003	0.004	0.004	--
Toxaphene	10	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R <sup>2</sup>	R <sup>2</sup>				
PCB	0.077	0.077				
DDT	0.087	0.029				
Chlordane	0.077	0.077				
Toxaphene	--	--				
<b>Final meal category based on UCL:</b>						<b>1</b>

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

**Recommendation:** No one should eat more than 1 meal per month of Lake Mitchell walleye due to mercury. \*PCB concentrations were at or near the reporting level of 0.025 ppm in 1989; based on the MDEQ 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 and are unlikely to cause an advisory in this case.

