

Detroit River

Bullhead

Detroit River

Wayne 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	2011	20	9.3	na	9.3	14.6
Datasets available: 2010, 2011						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	20	0.12	0.06	0.44	0.16	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.275	0.161				

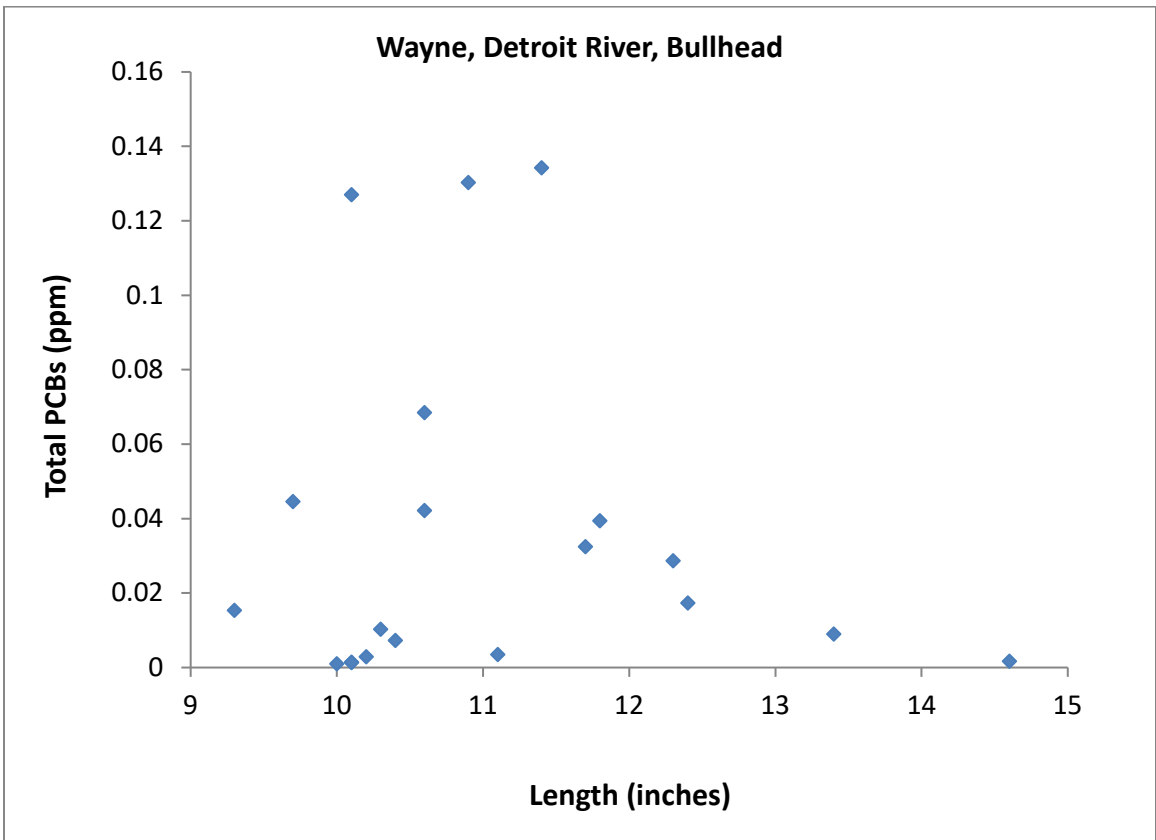
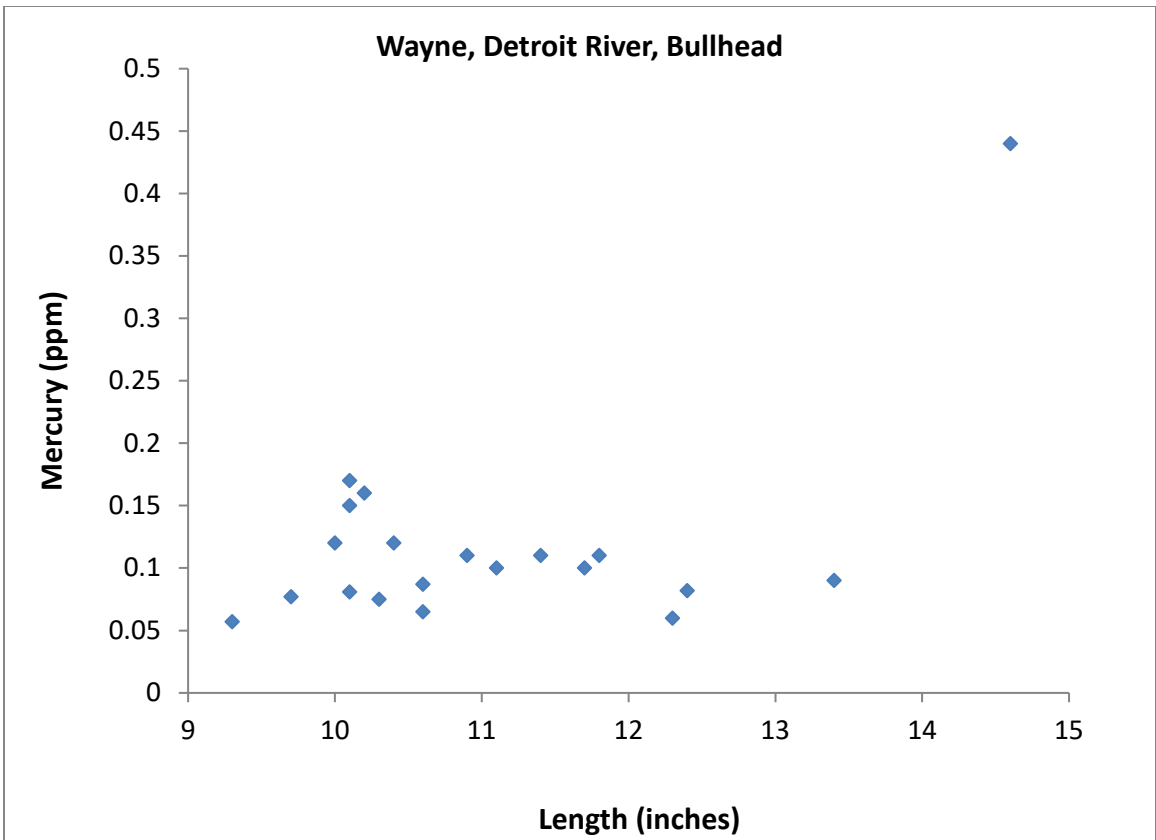
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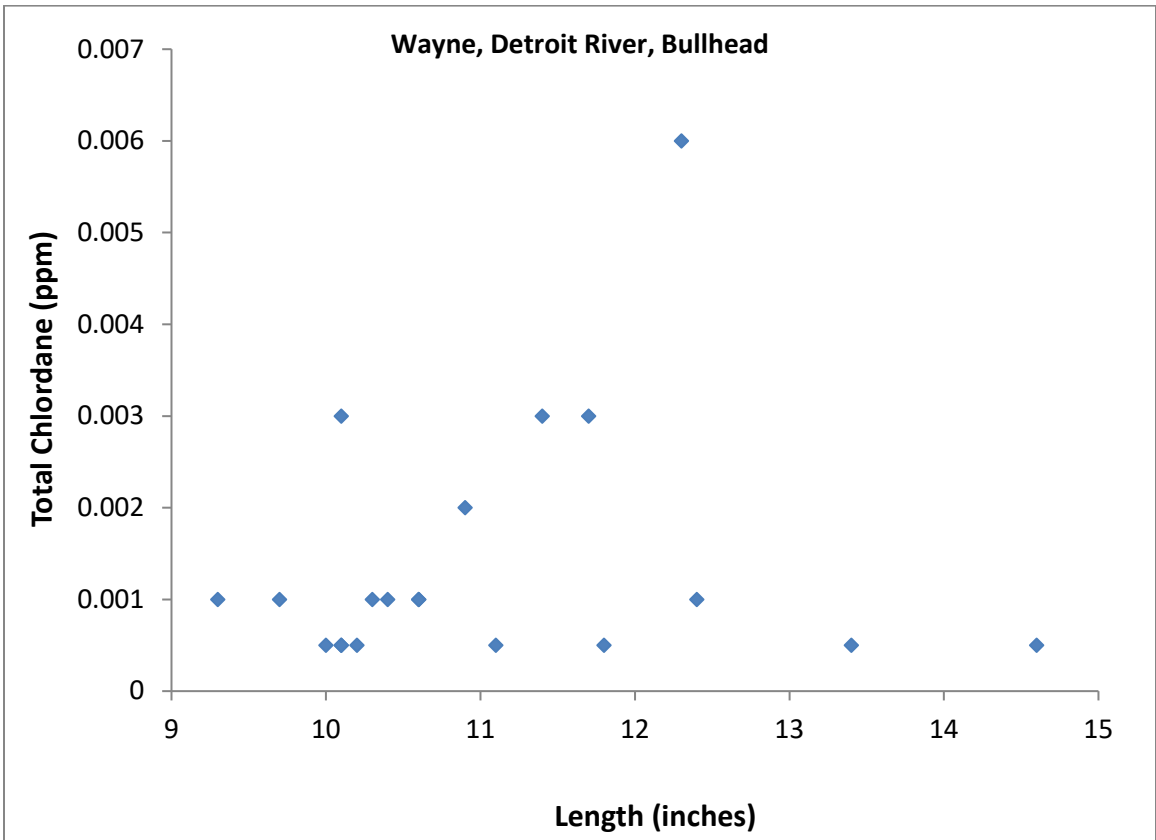
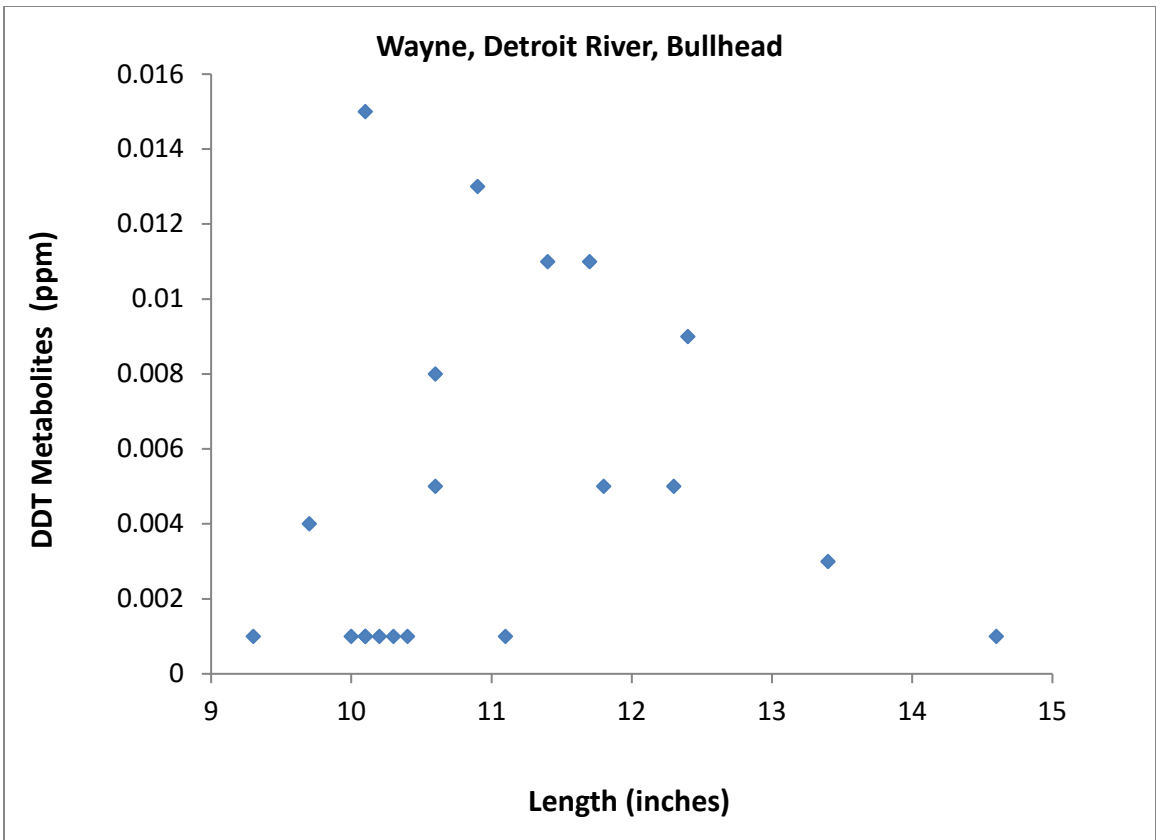
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2010	2011	20	9.3	na	9.3	14.6
Datasets available: 2010, 2011						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	20	0.036	0.001	0.134	0.060	2
DDT	20	0.005	0.001	0.015	0.010	16
Chlordane	20	0.001	0.001	0.006	0.002	--
Toxaphene	20	ND	--	--	--	--
TEQ	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.010	0.002				
DDT	0.006	0.030				
Chlordane	0.018	0.000				
Toxaphene	--	--				
TEQ	--	--				
Final meal category based on UCL:						2

Existing MDHHS Advisory: Women and children should not eat more than 1 meal per month of bullhead from the Detroit River due to elevated concentrations of mercury, PCBs, and dioxins (“All other species” designation).

Recommendation: No one should eat more than 2 meals per month of Detroit River bullhead due to PCBs. Mercury would cause an advisory.

Note: PCBs in the bullhead collected from near Grassy Island were higher than the fish collected upstream near Belle Isle; including the Belle Isle fish did not lead to a more relaxed advisory.





Carp

Detroit River

Wayne 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	
1985	2015	103	16.5	na	16.5	30.6	
Datasets available: 1985, 1986, 1990, 1994, 2004, 2010, 2011, 2015							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)		
Mercury	103	0.16	0.04	0.45	0.18	4	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.011	0.019					

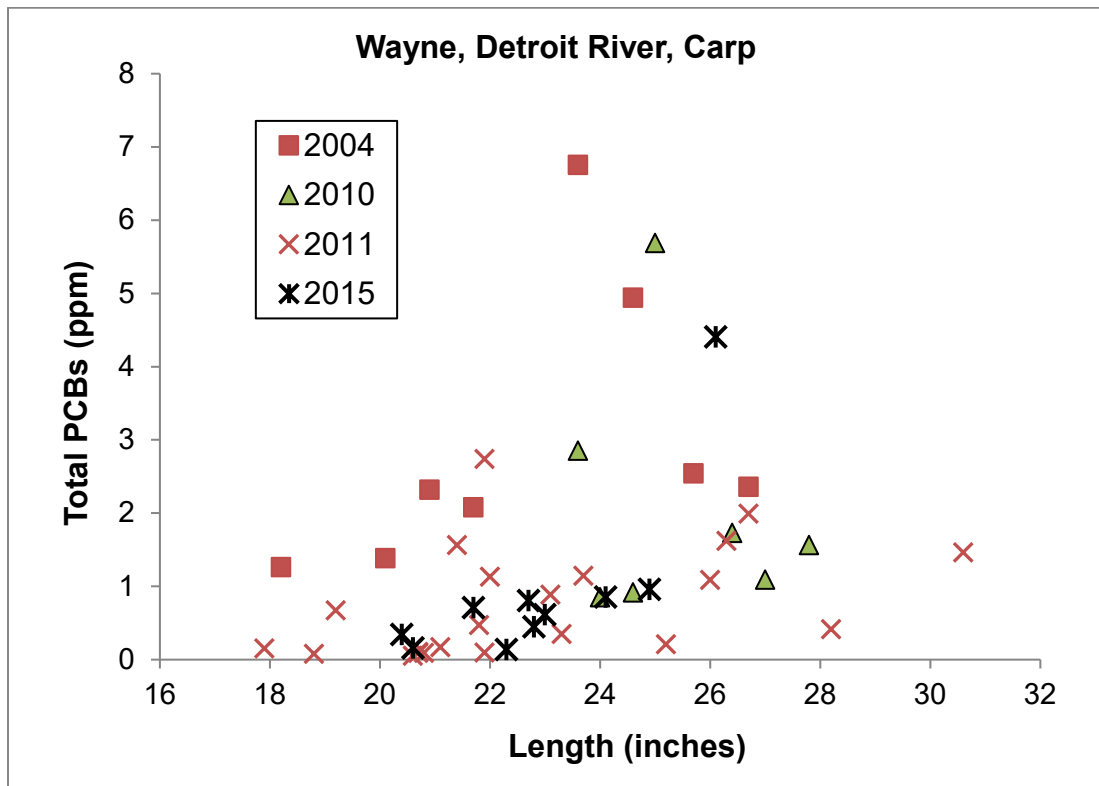
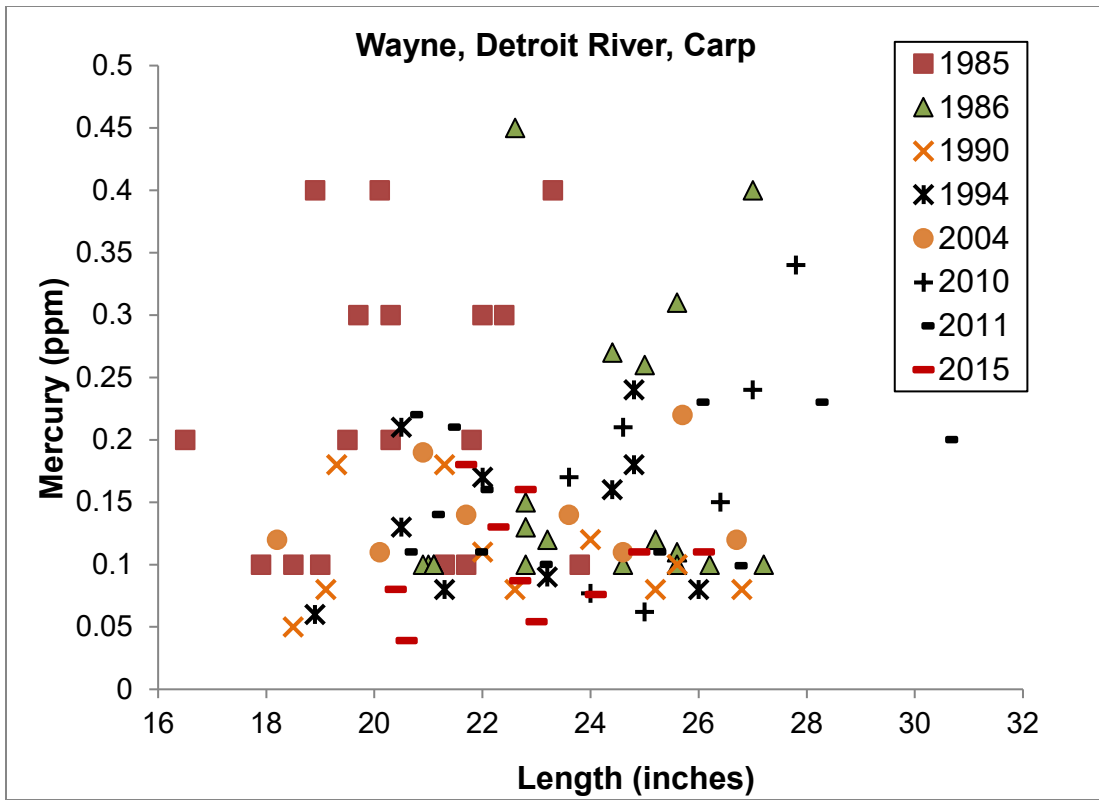
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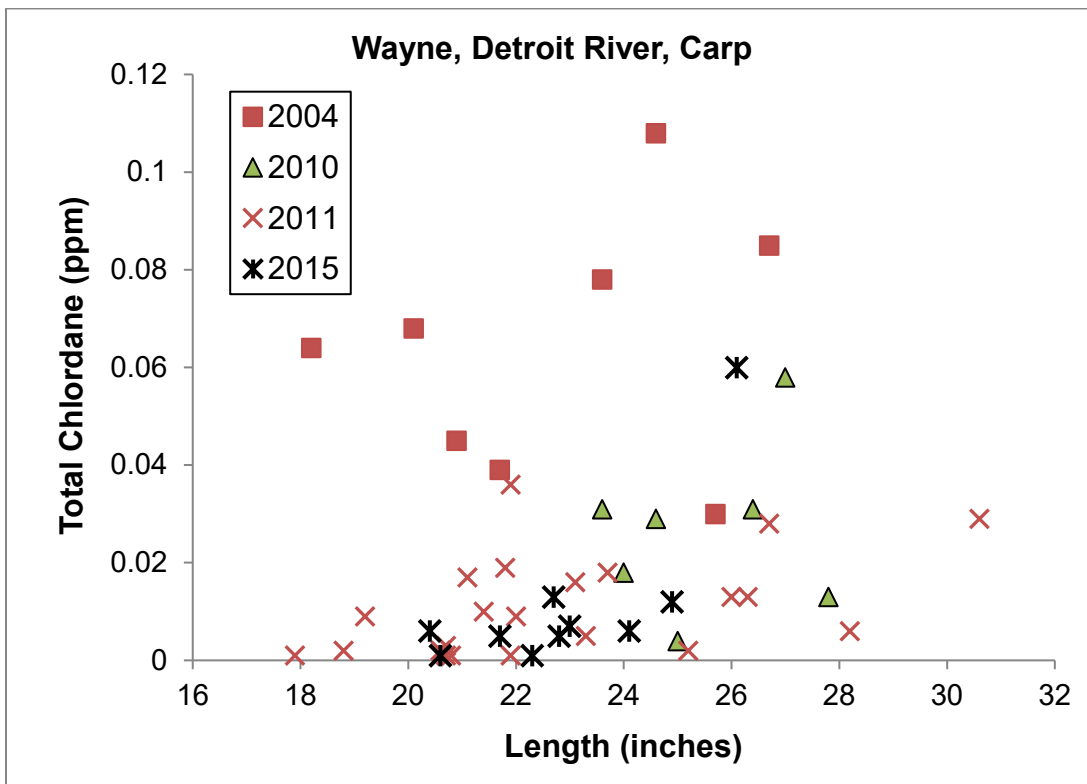
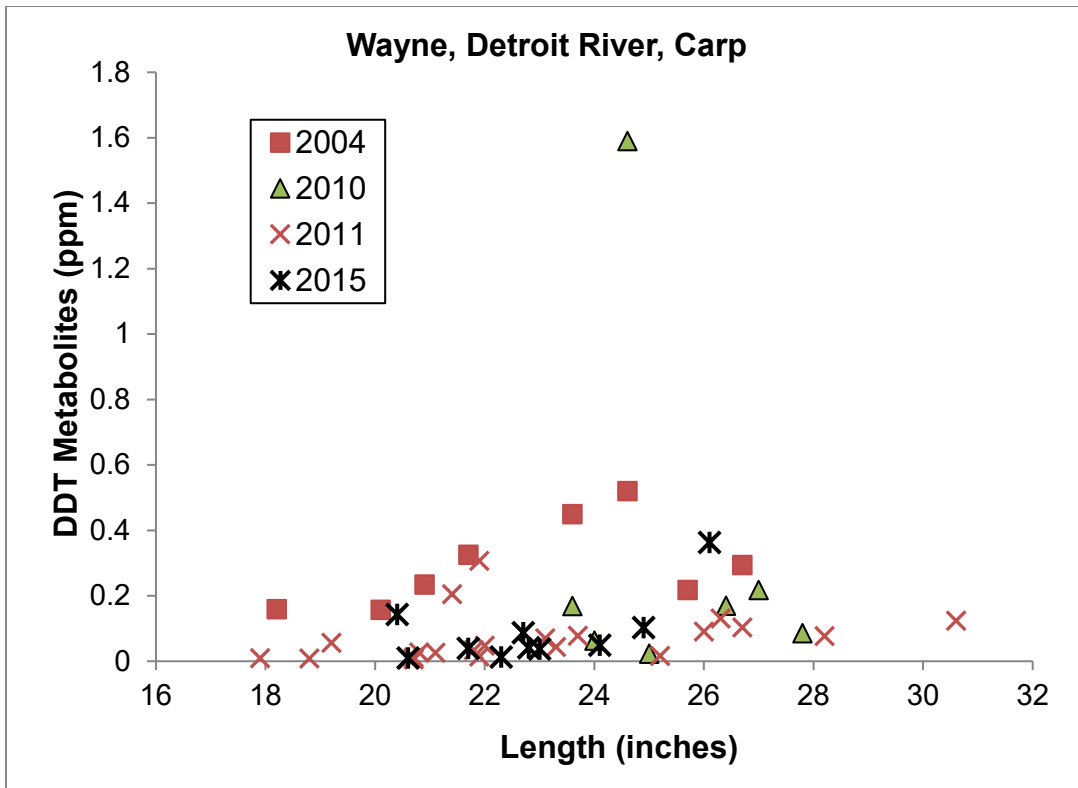
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
2004	2015	47	17.9	na	17.9	30.6	
Datasets available: 1985, 1986, 1990, 1994, 2004, 2010, 2011, 2015							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)		
PCB	47	1.37	0.05	6.75	1.81	Limited	
DDT	47	0.15	0.006	1.59	0.22	8	
Chlordane	47	0.02	0.001	0.11	0.03	--	
Toxaphene	47	ND	--	--	--	--	
TEQ*	29	16 ppt	2 ppt	80 ppt	22 ppt	Limited	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.105	0.233					
DDT	0.036	0.172					
Chlordane	0.046	0.142					
Toxaphene	--	--					
TEQ*	0.309	0.446					
Final meal category based on UCL:							Limited

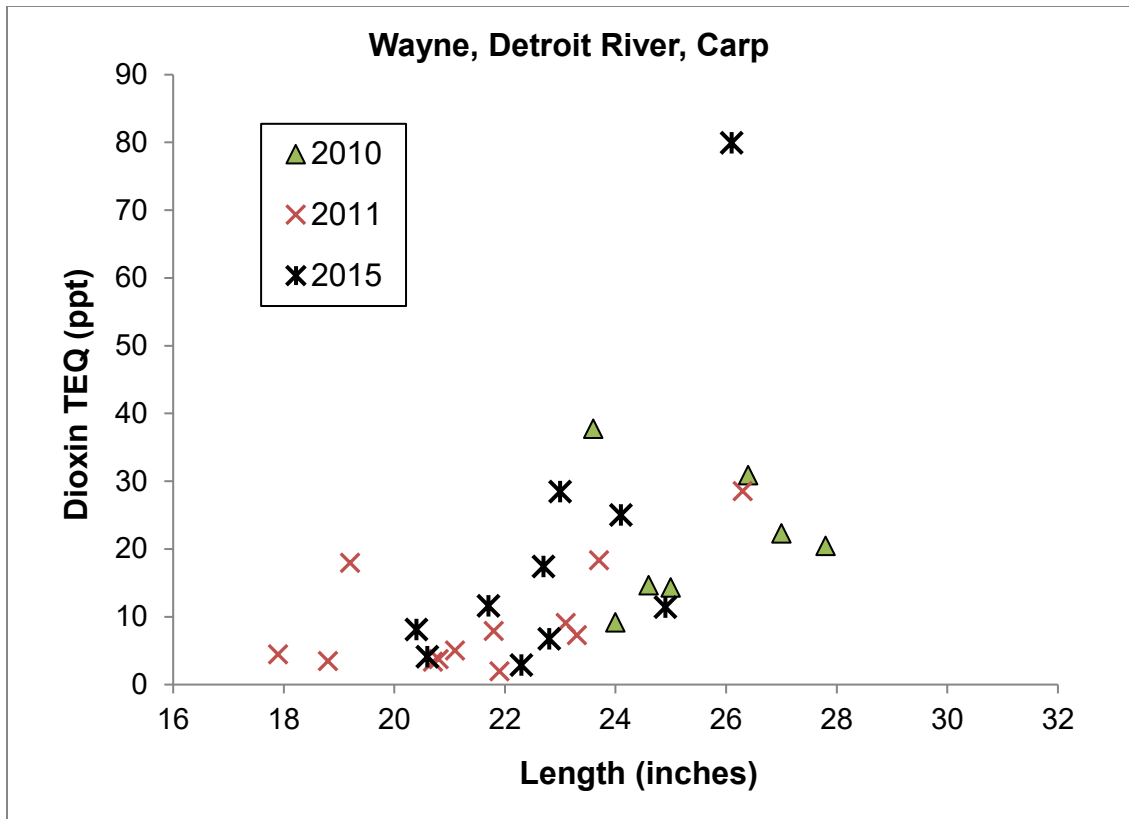
* 2005 WHO TEFs; dl-PCBs included

Existing MDHHS Advisory: Sensitive populations should not eat these fish. Healthy adults should limit consumption of carp from the Detroit River to no more than 1 or 2 meals per year due to PCBs and dioxins. Mercury and DDT would cause advisories.

Recommendation: No change is recommended.







Channel Catfish

Detroit River

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	2011	17	15.1	12	15.1	26.7
Datasets available: 2010, 2011						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	17	0.25	0.12	0.46	0.30	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.038	0.088				

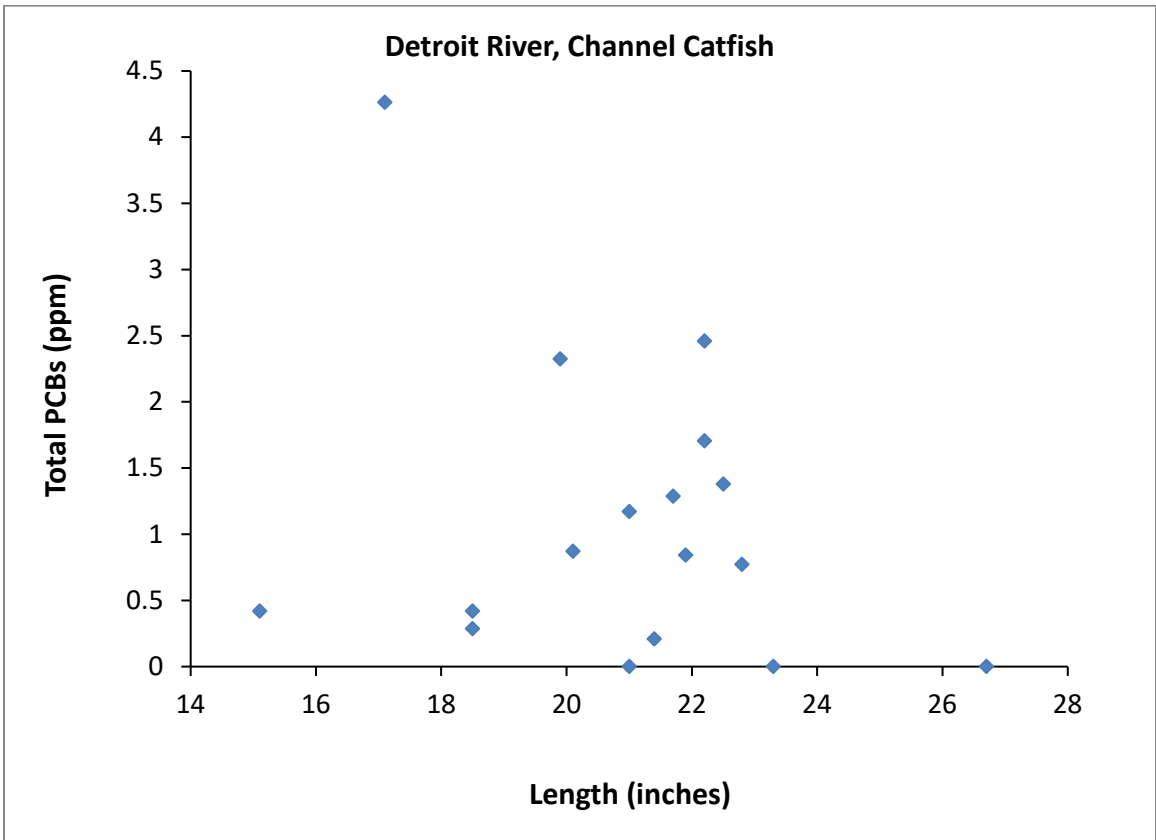
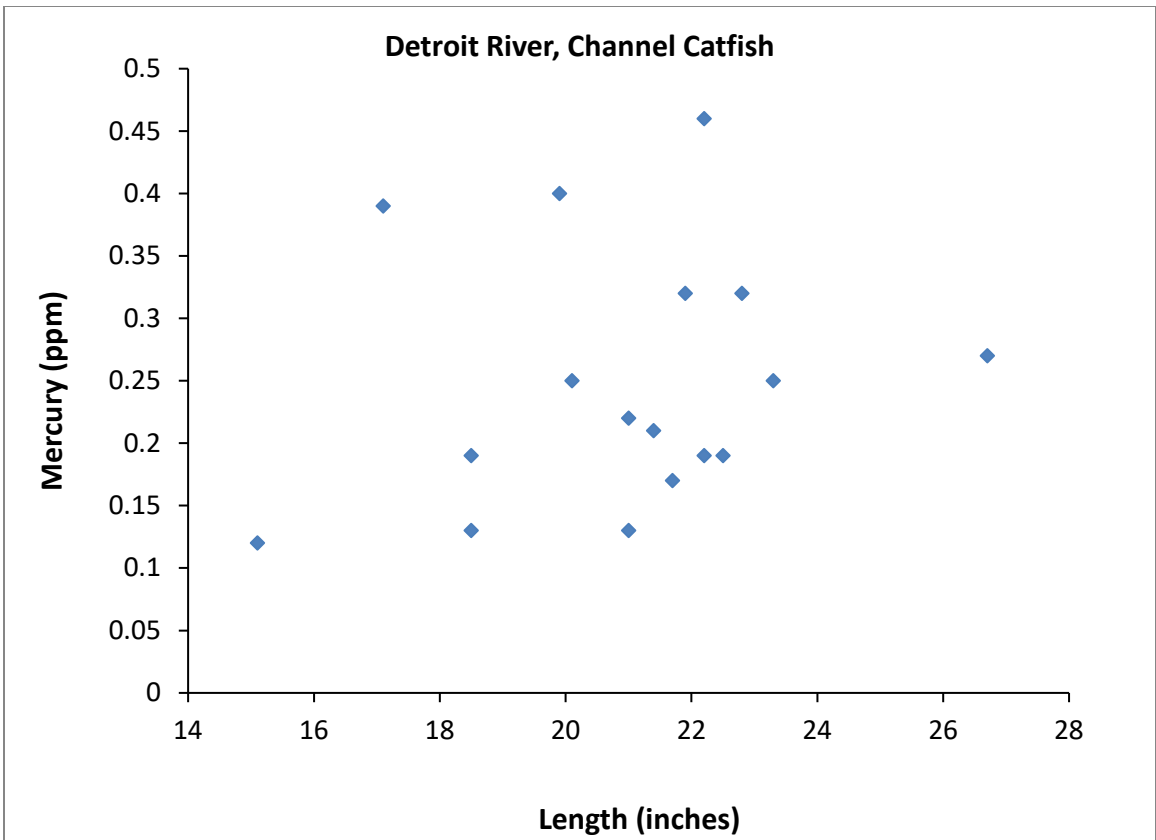
Organics Analysis:

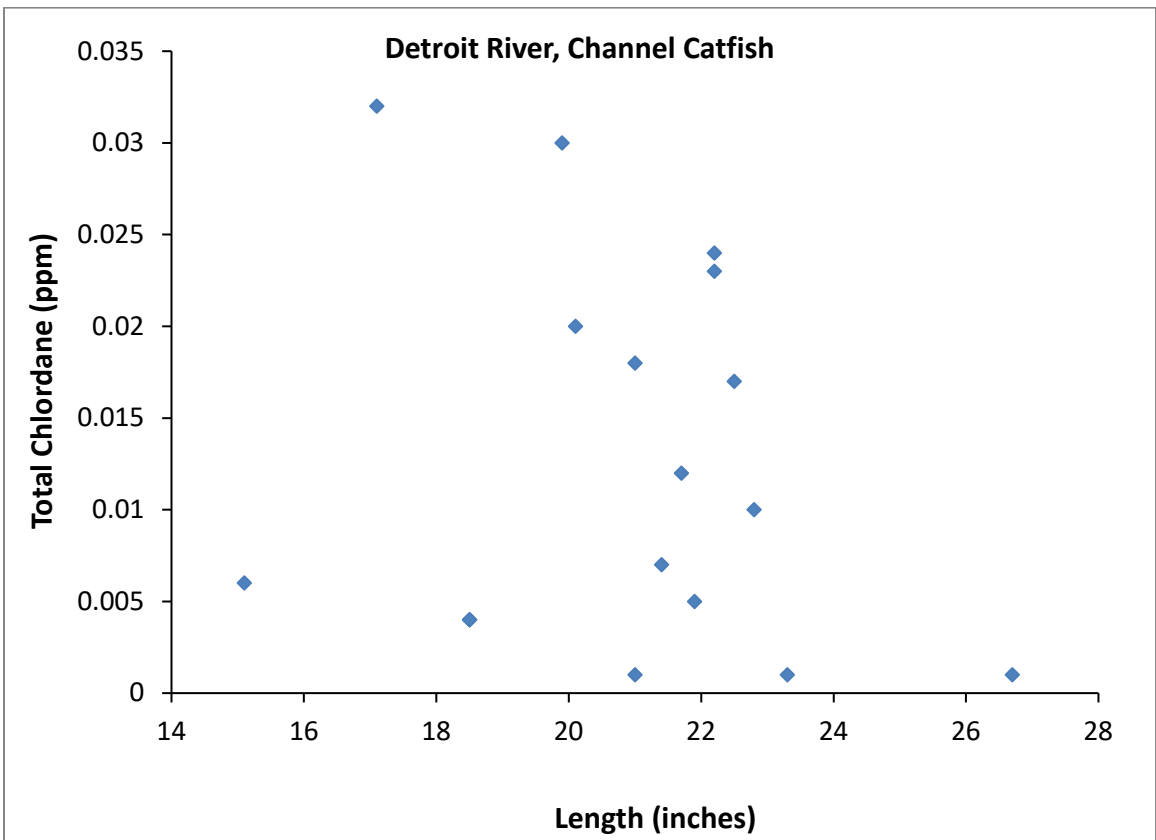
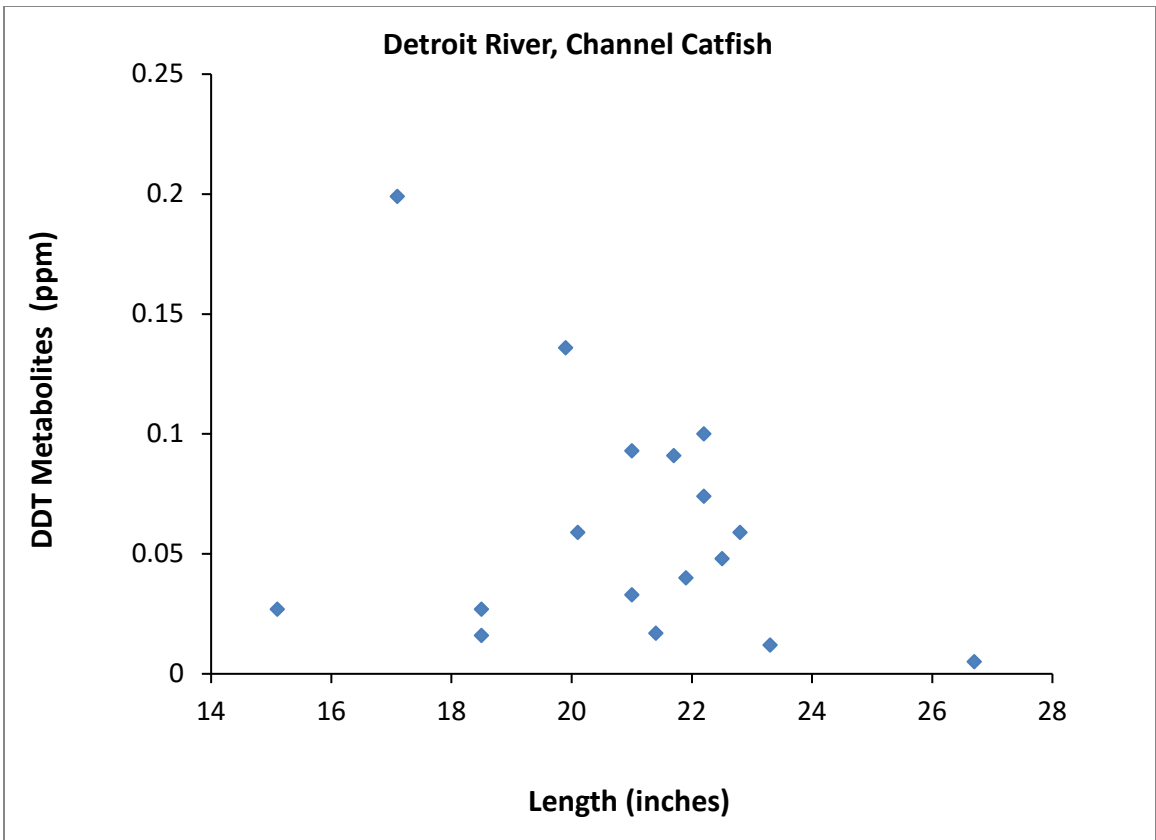
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2010	2011	17	15.1	12	15.1	26.7
Datasets available: 2010, 2011						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	17	1.084	0.001	4.264	1.660	Limited
DDT	17	0.061	0.005	0.199	0.087	16
Chlordane	17	0.013	0.001	0.032	0.018	--
Toxaphene	17	ND	--	--	--	--
TEQ*	17	27.82 ppt	4.85 ppt	104.8 ppt	40.9 ppt	Limited
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.073	0.204				
DDT	0.085	0.117				
Chlordane	0.046	0.092				
Toxaphene	--	--				
TEQ*	0.102	0.081				
Final meal category based on UCL:						Limited

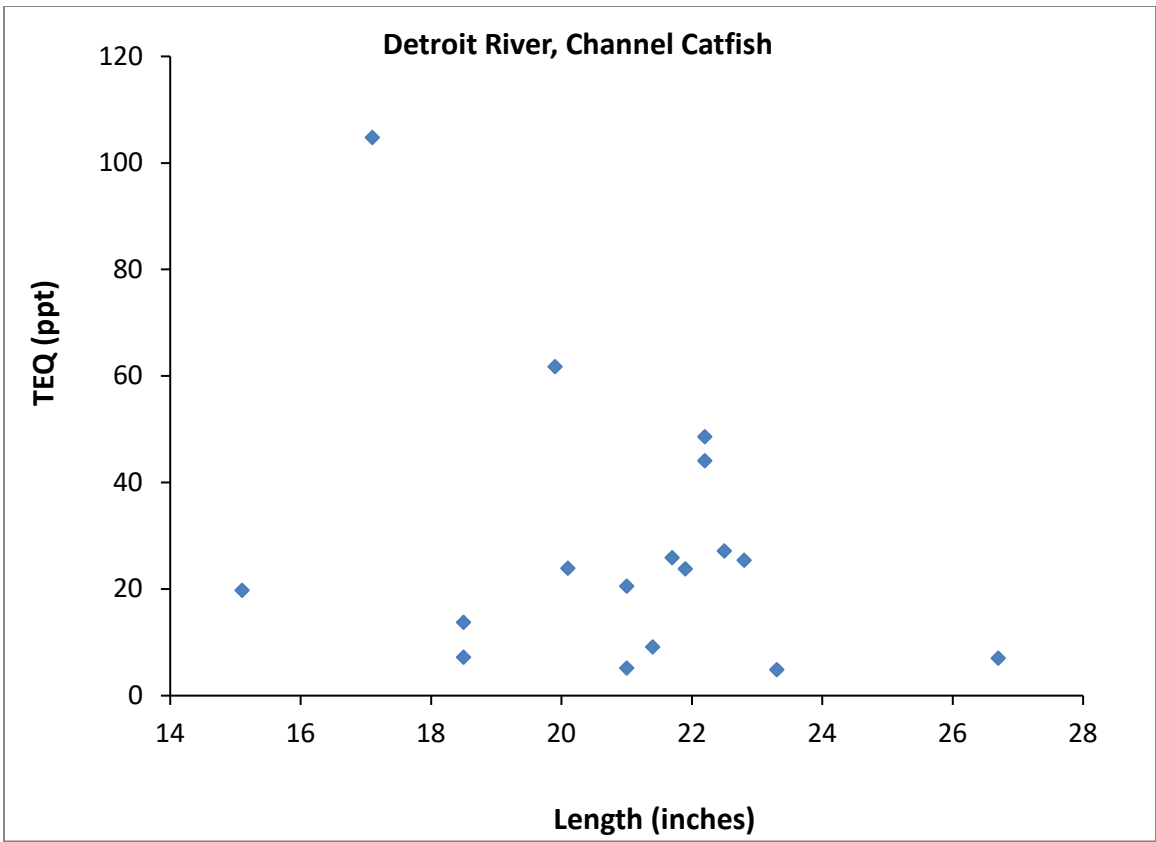
* 2005 WHO; dl-PCBs included

Existing MDHHS Advisory: Women and children should not eat more than 1 meal per month of channel catfish from the Detroit River due to elevated concentrations of mercury, PCBs, and dioxins ("All other species" designation).

Recommendation: Sensitive populations should not eat these fish. Healthy adults should limit consumption of channel catfish from the Detroit River to no more than 1 or 2 meals per year due to PCBs and dioxins. Mercury would cause advisories.







Freshwater Drum

Detroit River

Hg Analysis:

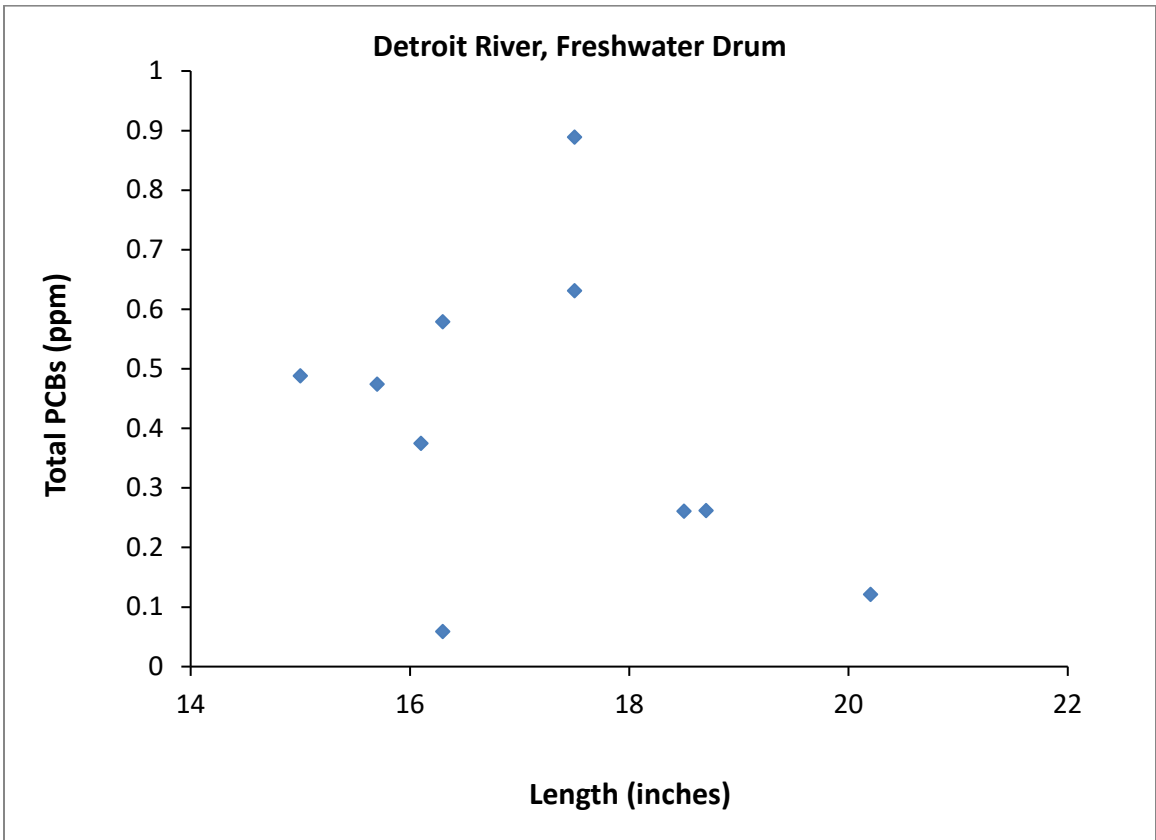
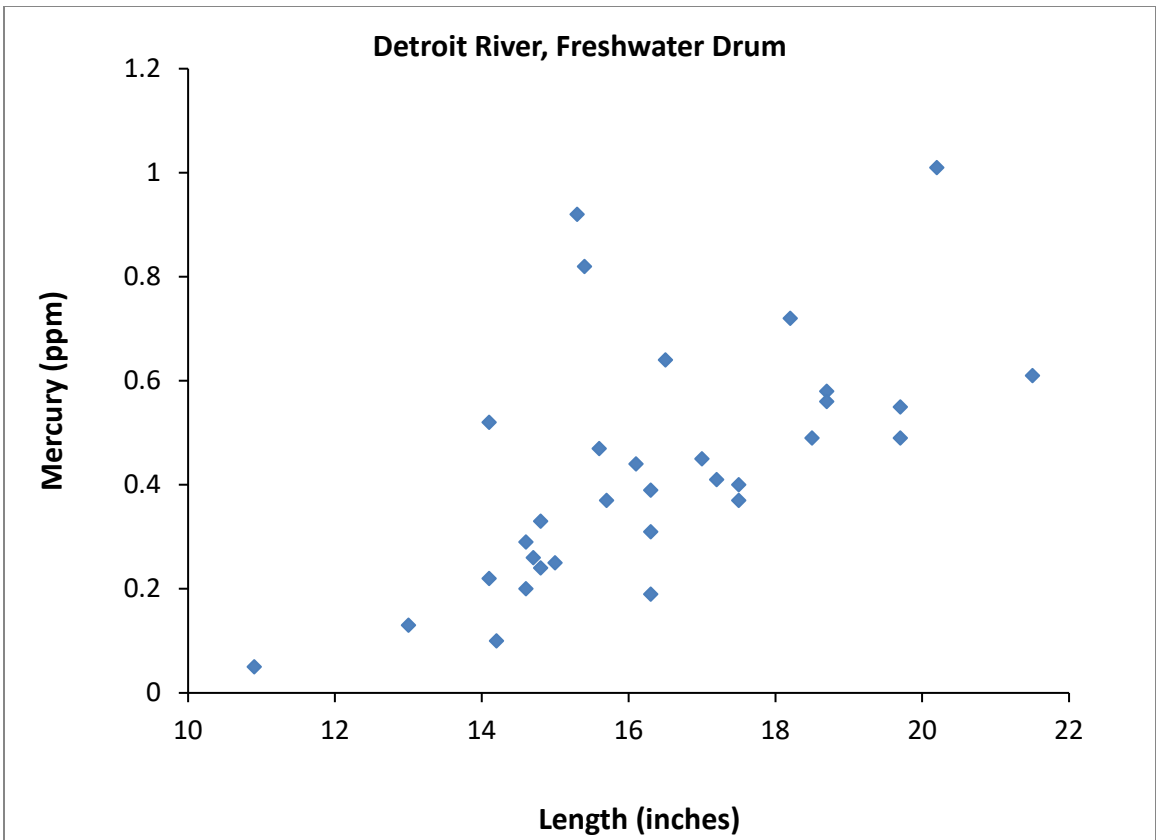
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
1990	2004	32	10.9	na	10.9	21.5	
Datasets available: 1990, 1993, 2004							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	32	0.43		0.05	1.01	0.51	2
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.373	0.499					

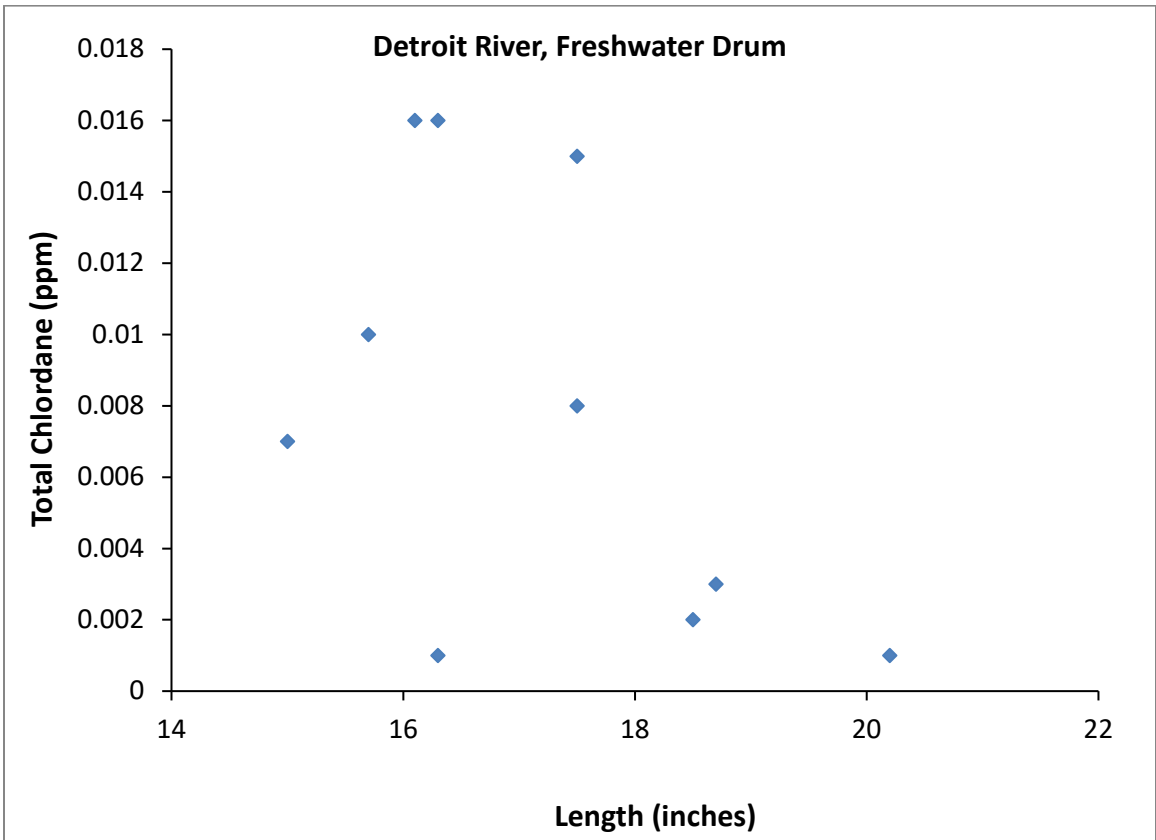
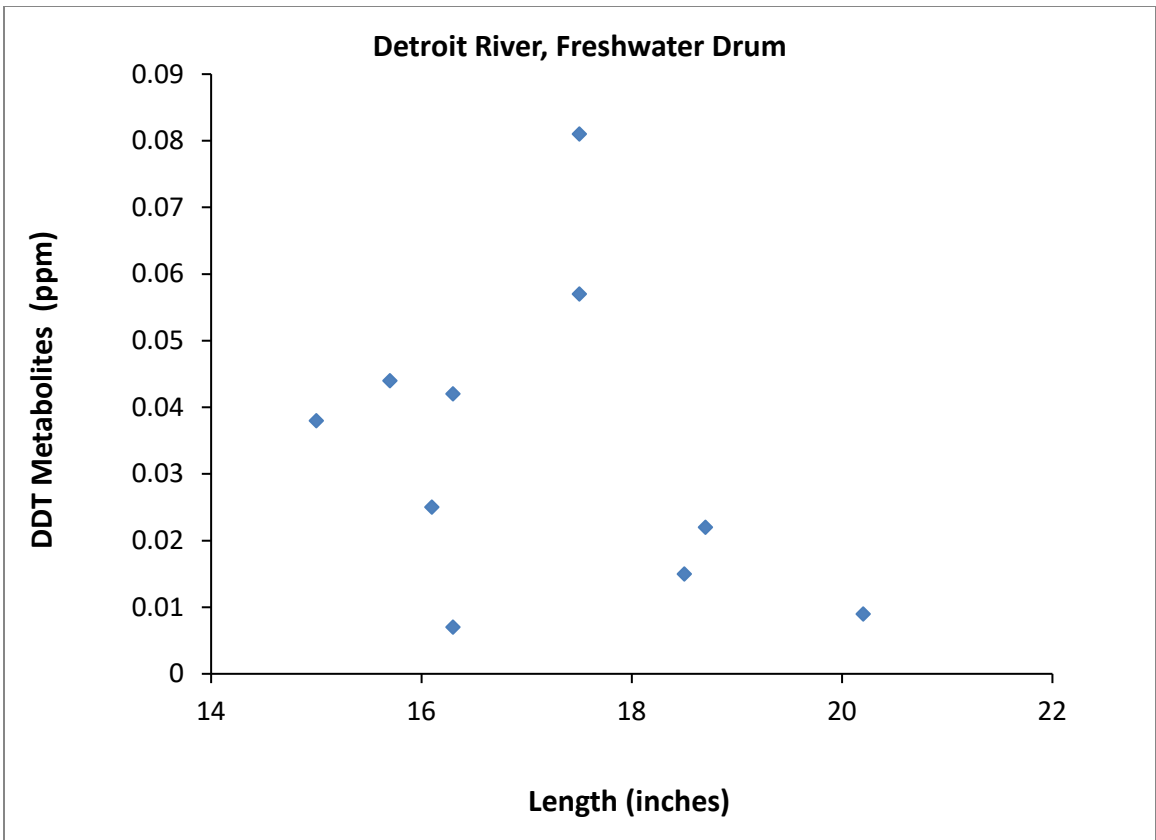
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
2004	2004	10	15	na	15	20.2	
Datasets available: 1990, 1993, 2004							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.414		0.059	0.889	0.594	Limited
DDT	10	0.034		0.007	0.081	0.051	16
Chlordane	10	0.008		0.001	0.016	0.012	--
Toxaphene	10	ND		--	--	--	--
TEQ	0	--		--	--	--	--
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.099	0.096					
DDT	0.078	0.147					
Chlordane	0.255	0.317					
Toxaphene	--	--					
TEQ	--	--					
Final meal category based on UCL:							Limited

Existing MDHHS Advisory: Women and children should not eat more than 1 meal per month of Detroit River freshwater drum due to elevated concentrations of mercury and PCBs.

Recommendation: Sensitive populations should not eat these fish. Healthy adults should limit consumption of freshwater drum from the Detroit River to no more than 1 or 2 meals per year due to PCBs. Mercury would cause an advisory.





**Largemouth and
Smallmouth Bass**

Detroit River

Wayne 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	2016	38	6.3	14	13.6	18.8
Datasets available: 2010, 2011, 2016						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	29	0.37	0.18	0.84	0.42	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.536	0.669				

Organics Analysis:

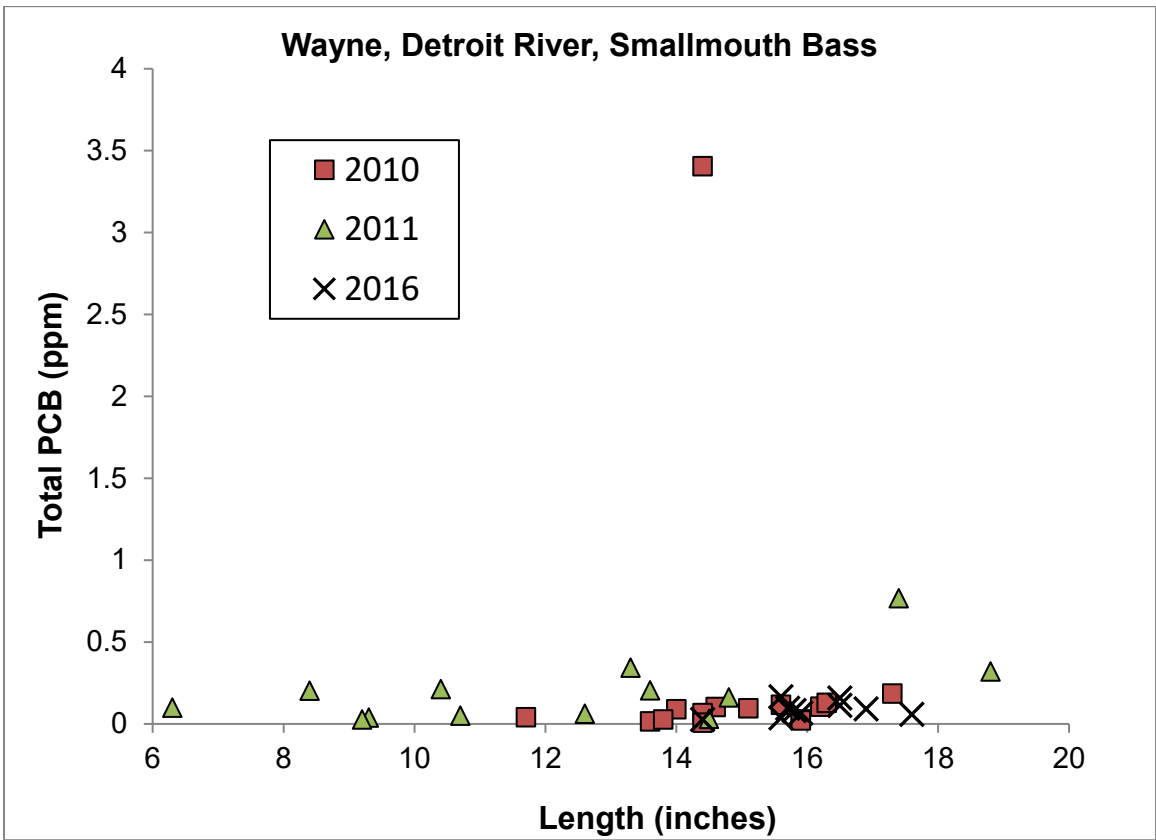
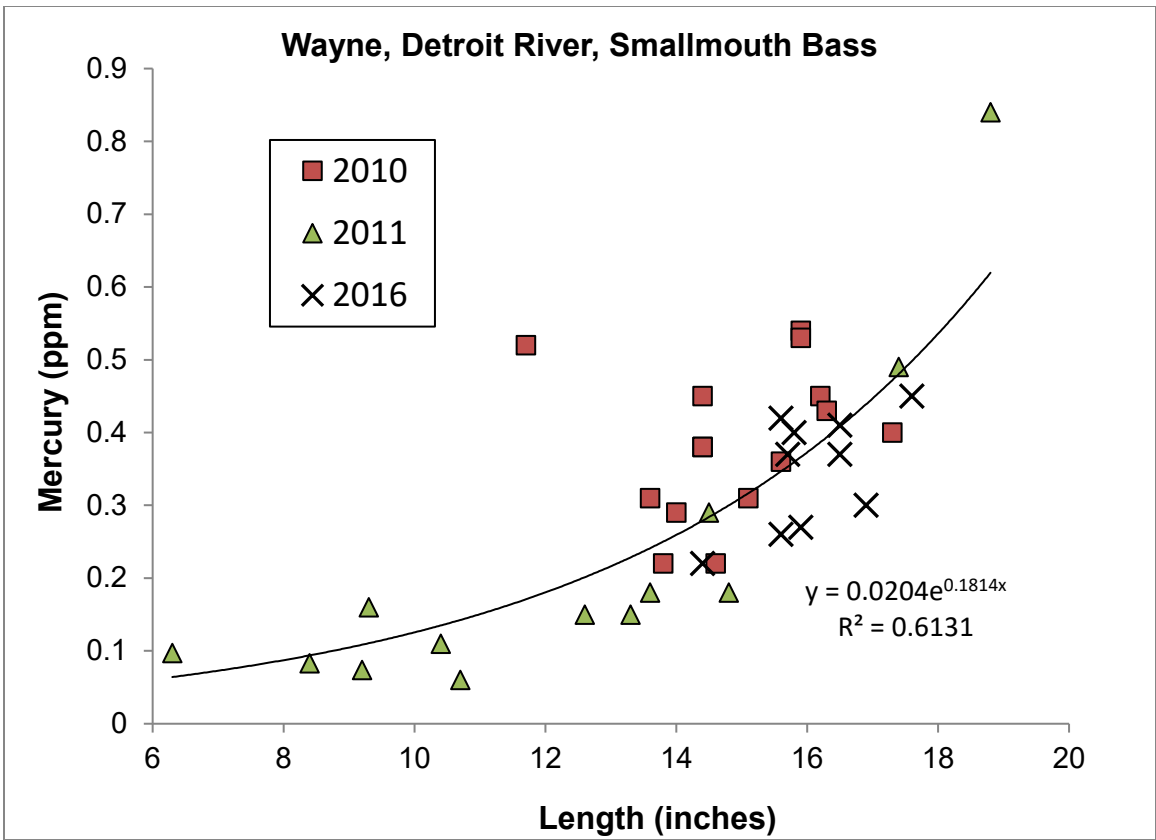
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2010	2016	38	6.3	14	13.6	18.8
Datasets available: 2010, 2011, 2016						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	29	0.2	0.007	3.4	0.5	Limited
DDT	29	0.01	0.001	0.06	0.01	16
Chlordane	29	0.001	0.001	0.006	0.002	--
Toxaphene	29	ND	< 0.05	< 0.05	--	--
TEQ*	8	2 ppt	0.5 ppt	3 ppt	3 ppt	2
PFOS	10	16 ppb	9.6 ppb	24 ppb	20 ppb	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.003	0.022				
DDT	0.107	0.113				
Chlordane	0.070	0.018				
Toxaphene	0.094	0.094				
TEQ*	0.121	0.111				
PFOS	0.436	0.356				
Final meal category based on UCL:						Limited

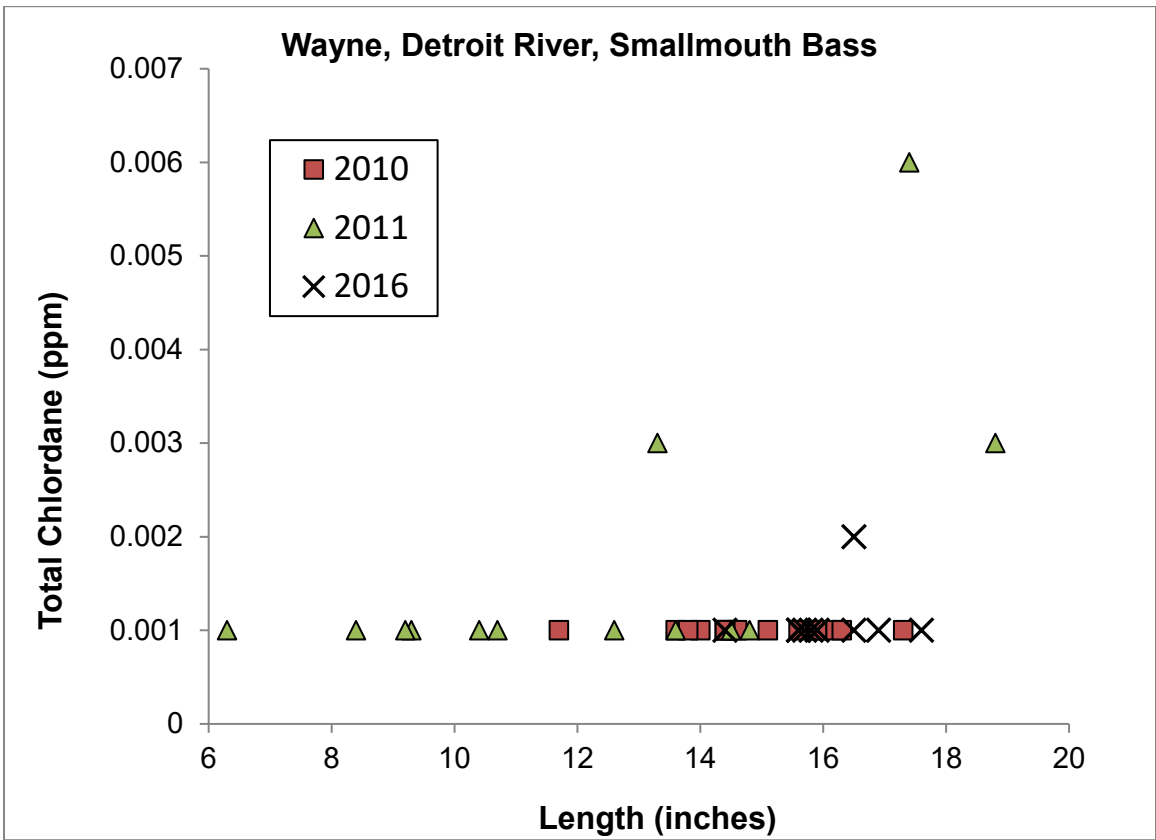
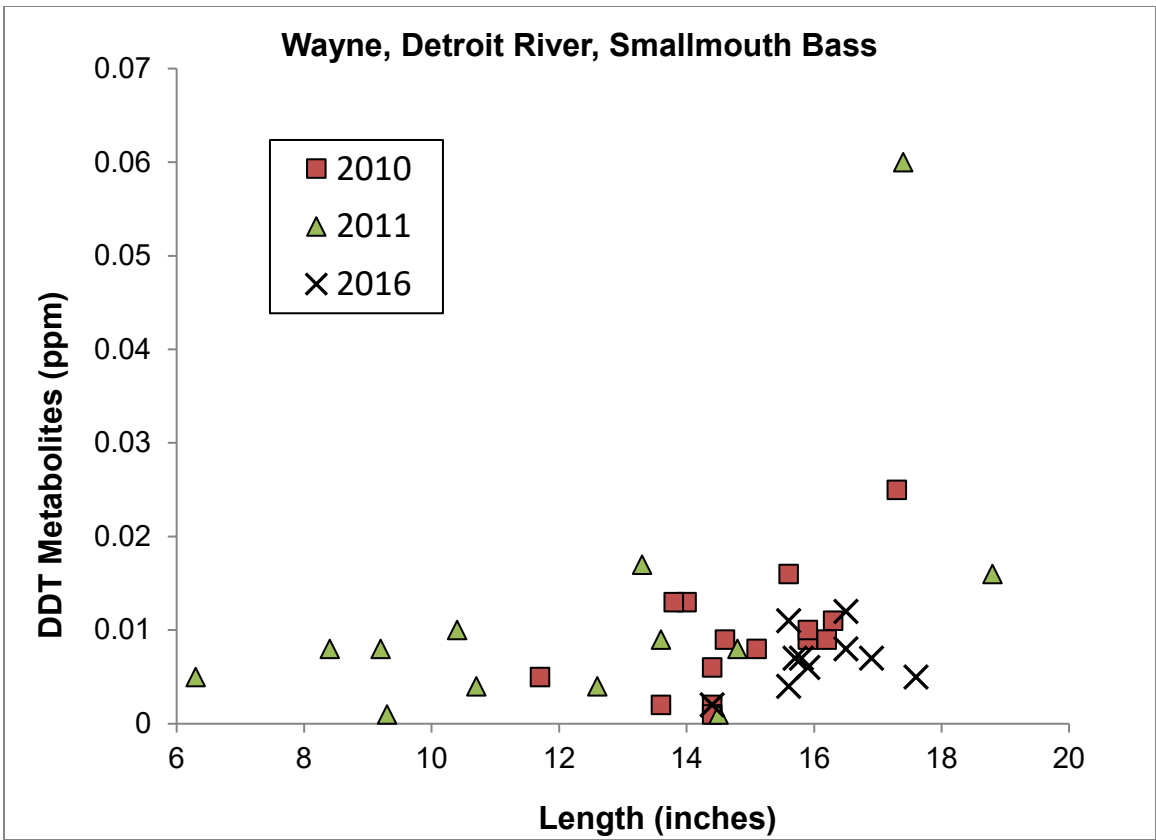
* - 2005 WHO TEFs; dioxin-like PCBs included

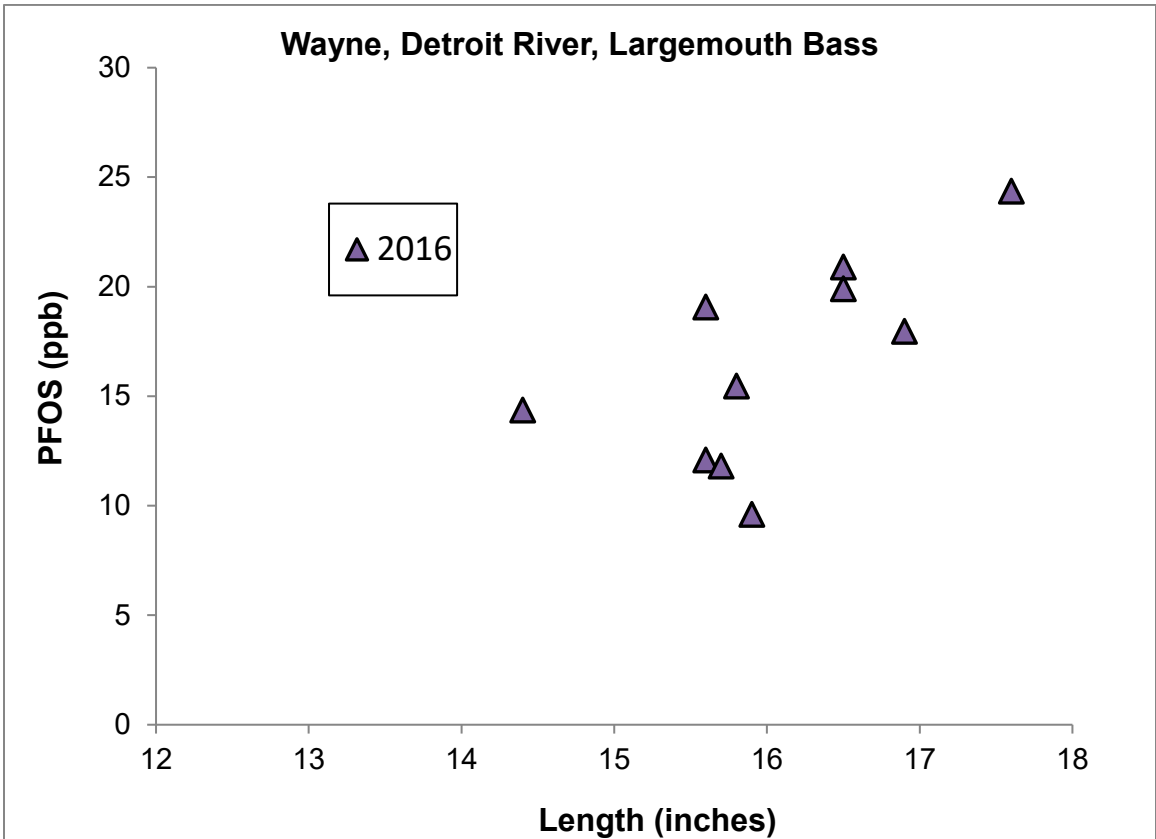
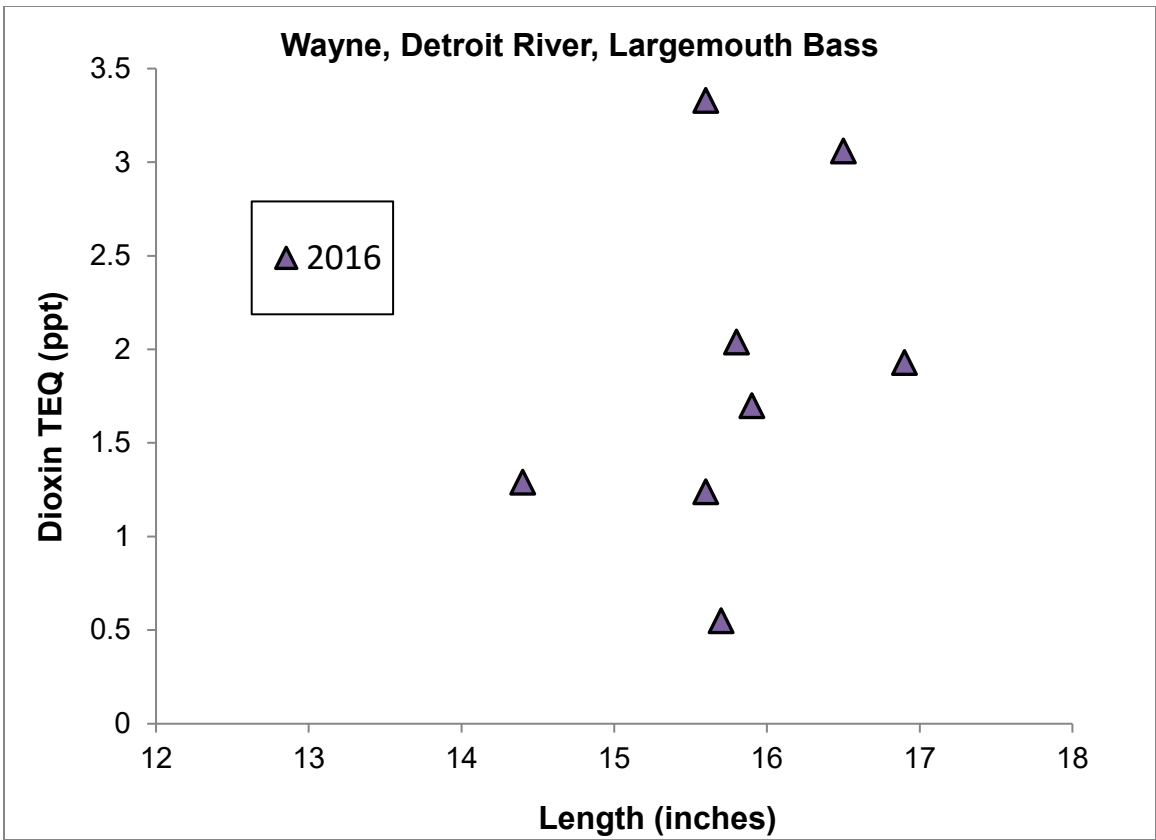
Existing MDHHS Advisory: Sensitive populations should not eat largemouth or smallmouth bass from the Detroit River due to PCBs. Healthy adults should limit consumption of to no more than 1 or 2 meals per year.

Recommendation: No change to the advisory is recommended. Mercury, dioxin, and PFOS would cause an advisory.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
12	0.18	4
14	0.26	4
16	0.37	2
18	0.53	2
19	0.64	1
20	0.77	1
<i>Shaded area denotes extrapolated estimates</i>		







Northern Pike

Detroit River

Wayne 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	2016	27	19.5	24		34.8
Datasets available: 1993, 2010, 2011, 2016						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	20	0.38	0.08	1.8	0.55	1
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.275	0.331				

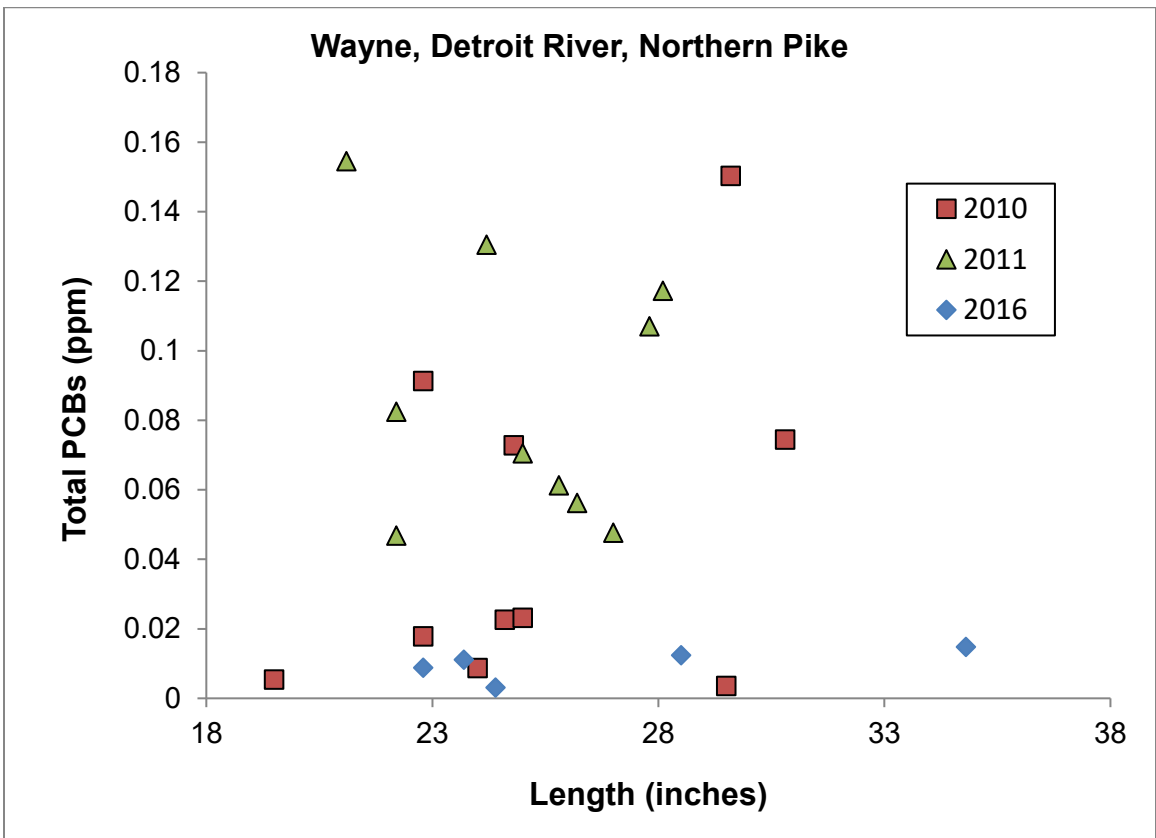
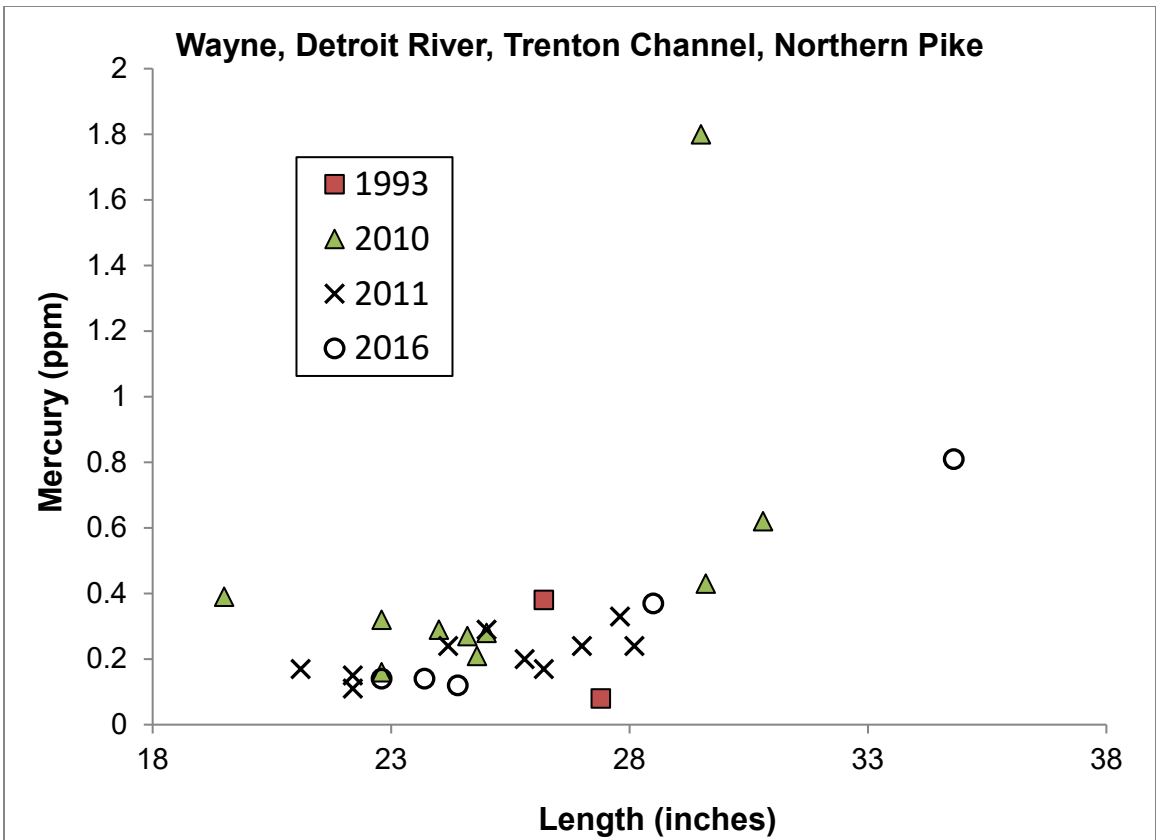
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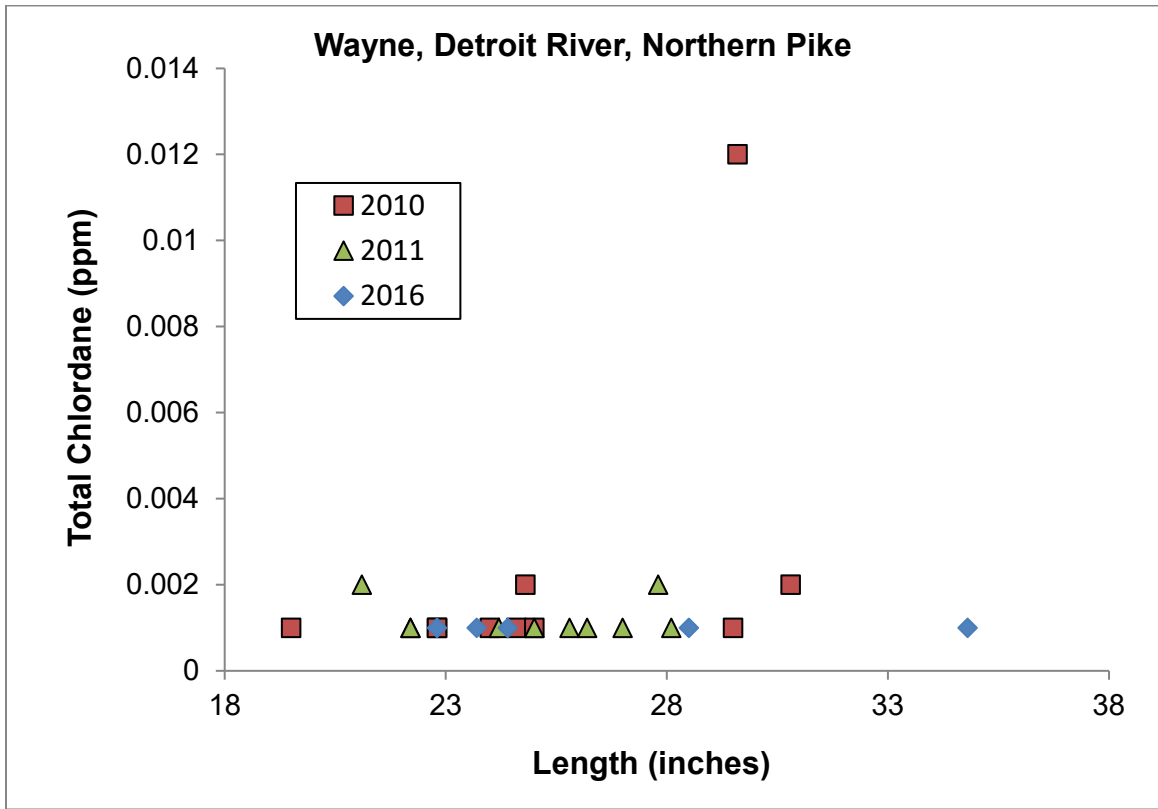
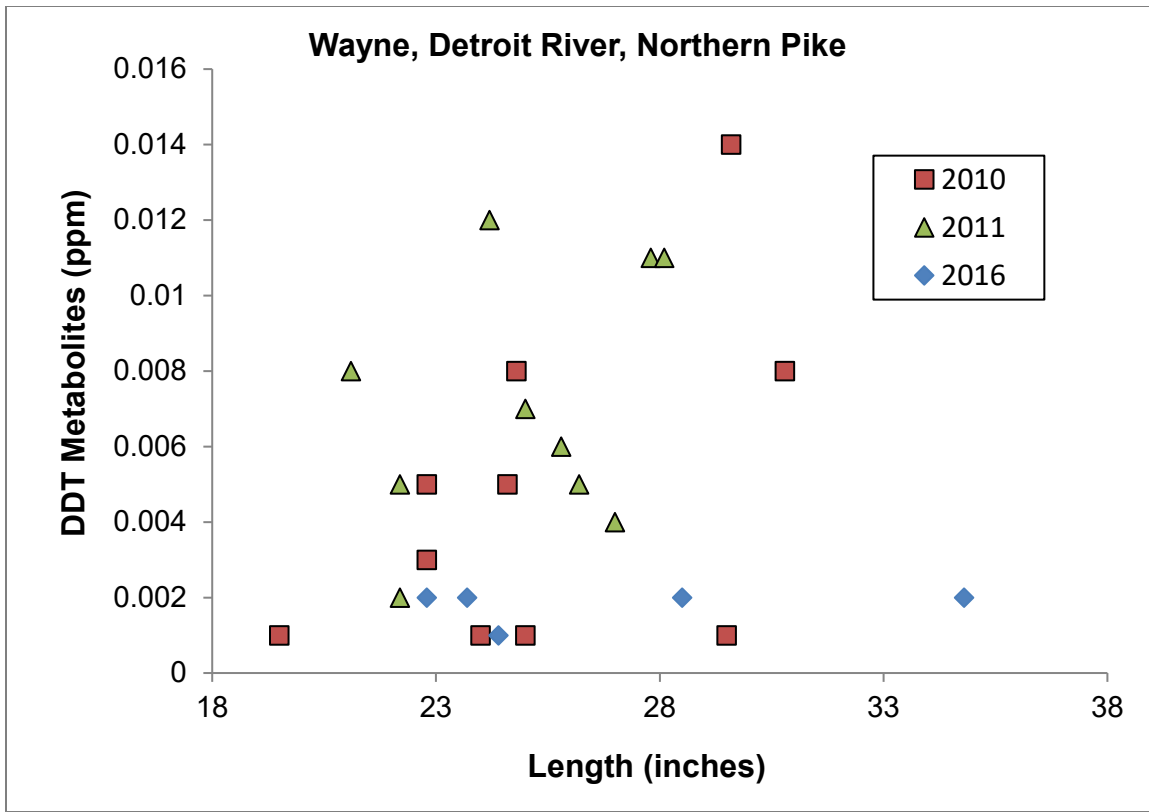
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2010	2016	25	19.5	24	23.7	34.8
Datasets available: 1993, 2010, 2011, 2016						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	18	0.06	0.003	0.15	0.08	2
DDT	18	0.006	< 0.001	0.01	0.008	16
Chlordane	18	0.002	< 0.001	0.01	0.003	--
Toxaphene	18	ND	< 0.05	< 0.05	--	--
TEQ*	11	2 ppt	0.3 ppt	4.210	3.164	2
PFOS	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.001	0.003				
DDT	0.045	0.027				
Chlordane	0.070	0.073				
Toxaphene	--	--				
TEQ*	0.004	0.000				
PFOS	--	--				
Final meal category based on UCL:						1

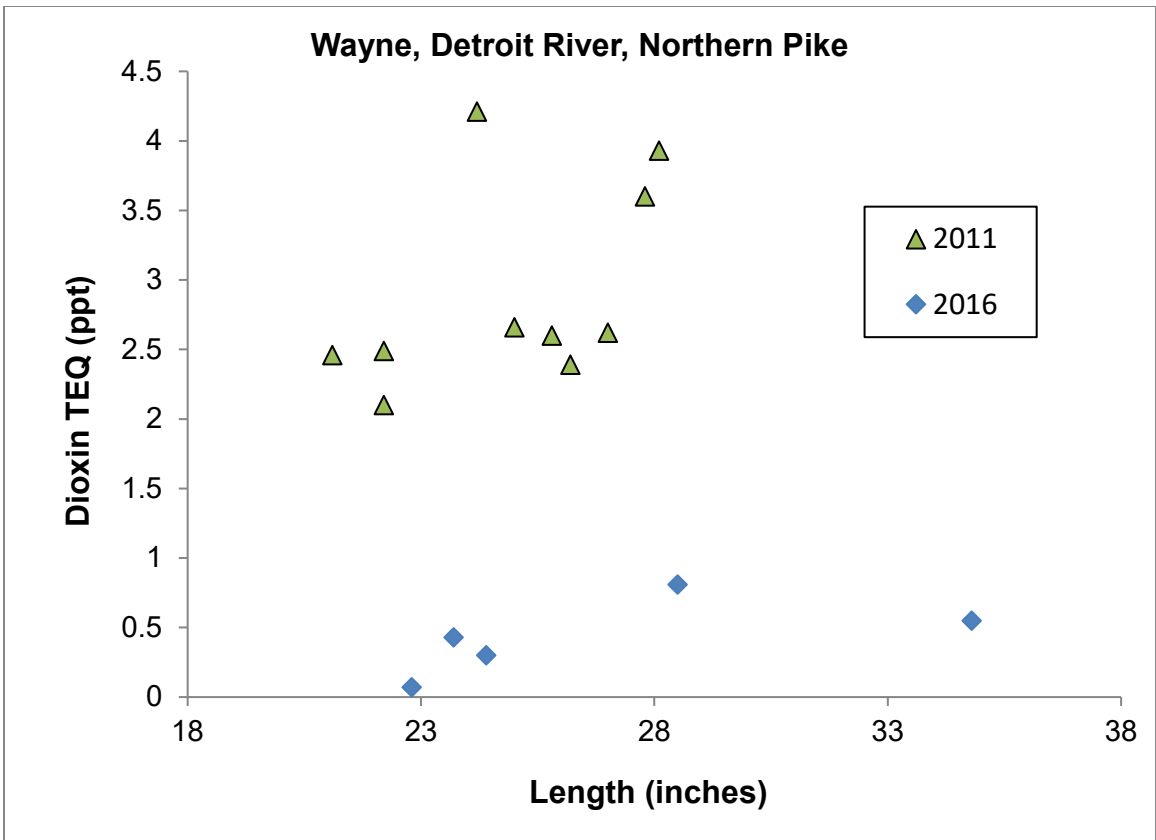
* - 2005 WHO TEFs; dioxin-like PCBs included

Existing MDHHS Advisory: No one should eat more than 1 meal per month of Detroit River northern pike due to dioxins and mercury. PCBs would cause an advisory.

Recommendation: No change to the advisory is recommended.







Redhorse Sucker

**Detroit River
Including Lower River Rouge**

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	2005	30	10.2	na	10.2	21.1	
Datasets available: 1993, 2004, 2005							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	30	0.16		0.02	0.46	0.20	4
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.449	0.538					

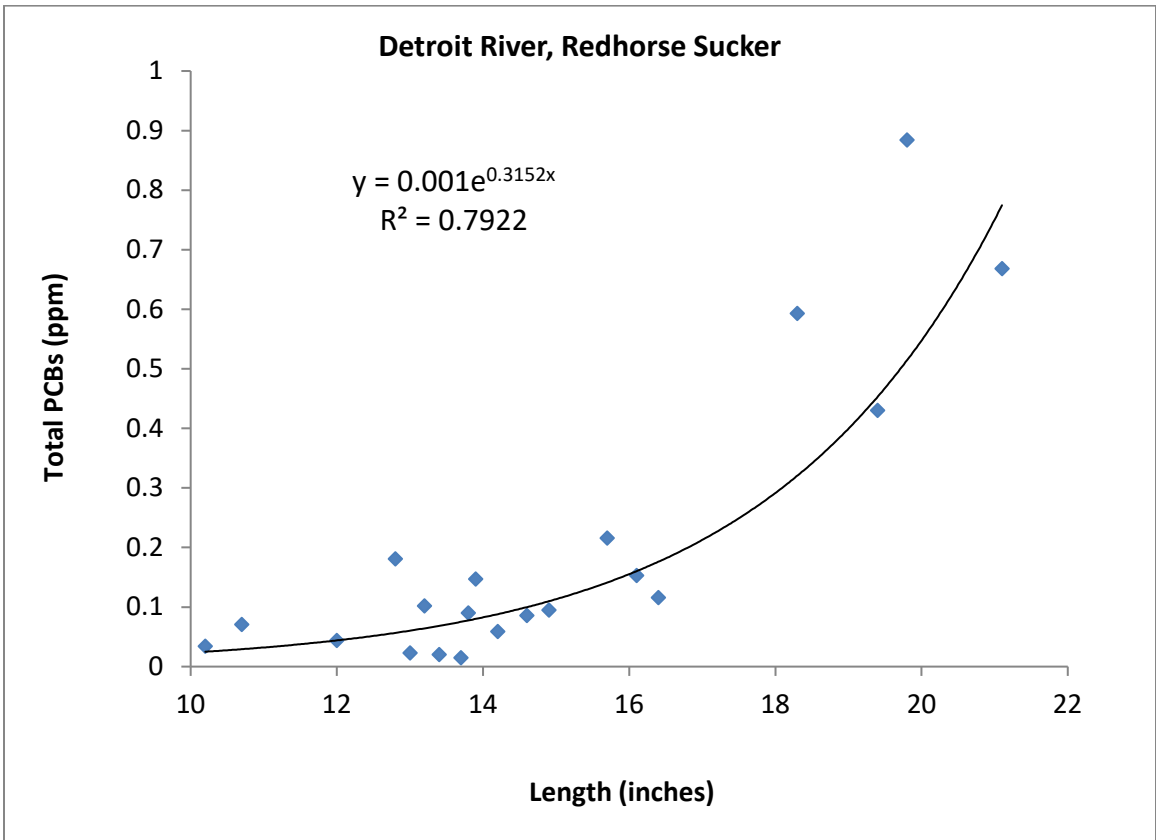
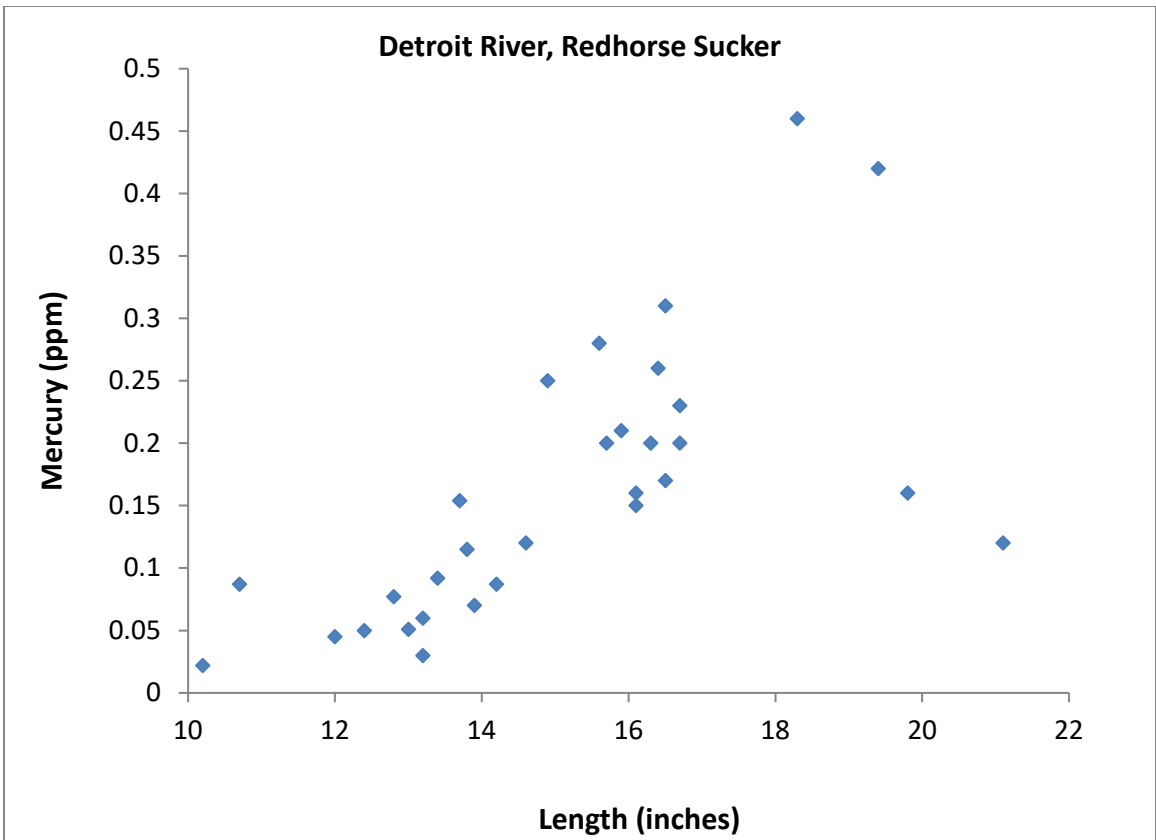
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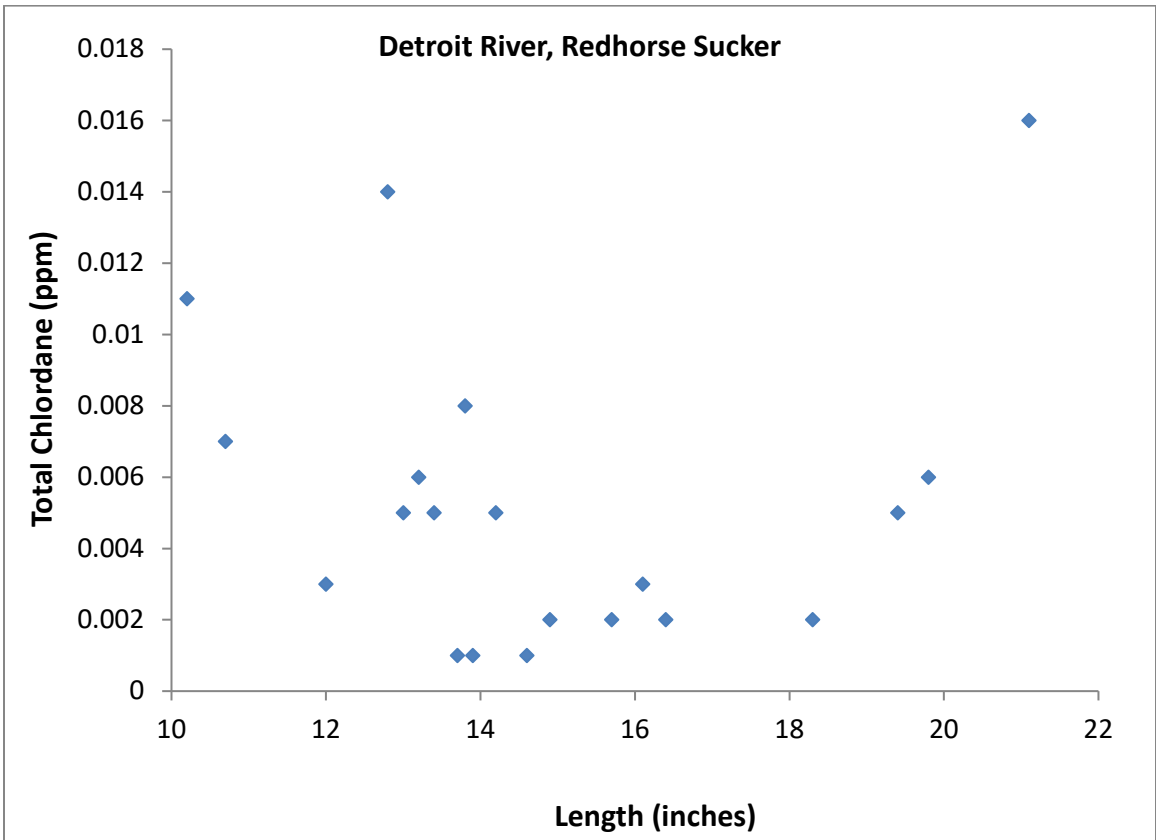
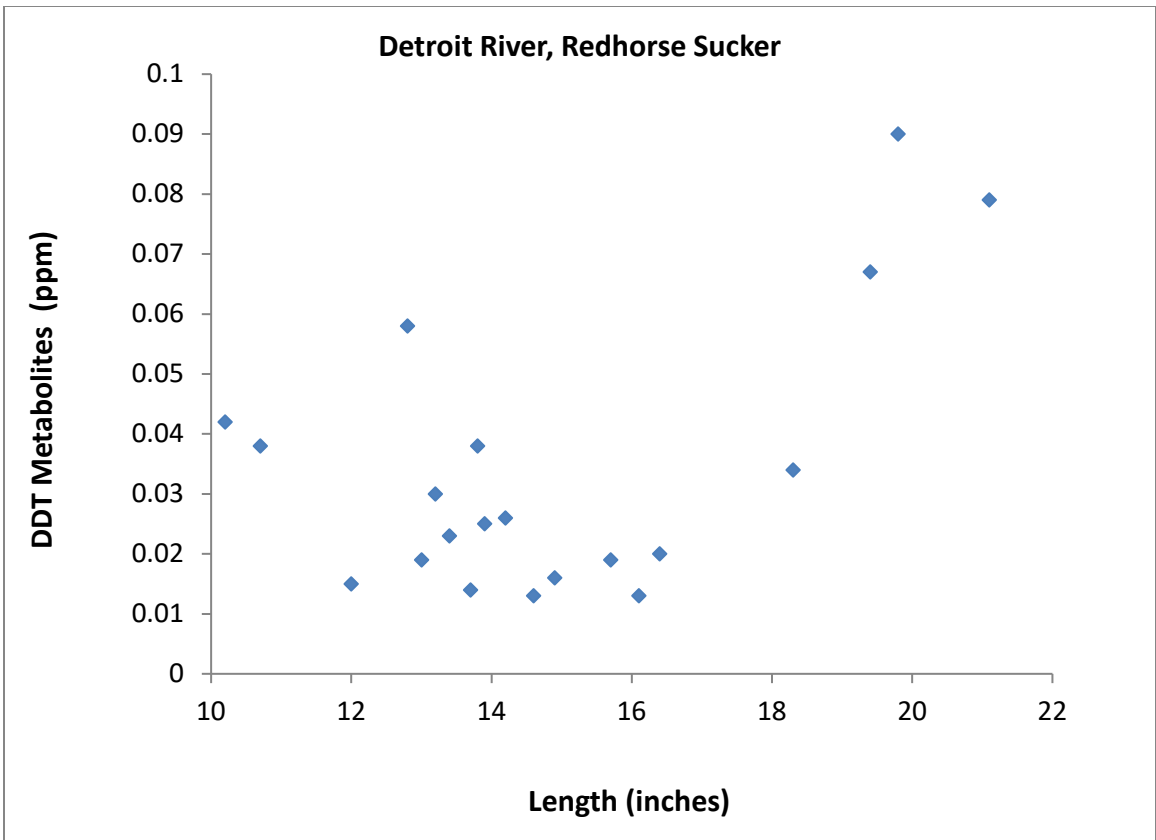
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
2004	2005	20	12.4	na	10.2	21.1	
Datasets available: 1993, 2004, 2005							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	20	0.200		0.015	0.884	0.316	0.5
DDT	20	0.030		0.013	0.090	0.045	16
Chlordane	20	0.005		0.001	0.016	0.007	--
Toxaphene	20	ND		--	--	--	--
TEQ	0	--		--	--	--	--
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.717	0.641					
DDT	0.292	0.170					
Chlordane	0.001	0.000					
Toxaphene	--	--					
TEQ	--	--					
Final meal category based on UCL:							0.5

Length (Inches)	PCB Regression Equation Estimate (ppm)	Meal Category
10	0.02	12
12	0.04	4
14	0.08	2
16	0.15	1
18	0.29	0.5
20	0.55	Limited
22	1.03	Limited
24	1.93	Limited
<i>Shaded area denotes extrapolated estimates</i>		

Existing MDHHS Advisory: Women and children should not eat more than 1 meal per month of Detroit River suckers larger than 18 inches or more than 1 meal per week of suckers less than 18 inches due to elevated concentrations of PCBs.

Recommendation: No one should eat more than 2 meals per month of Detroit River, including the Lower River Rouge, of suckers less than 14 inches or more than 6 meals per year of suckers between 14 and 18 inches in length due to PCBs. Sensitive populations should not eat any Detroit River suckers larger than 18 inches, and healthy adults should limit consumption of those fish larger than 18 inches to no more than 1 or 2 meals per year. Mercury would cause an advisory.





Rock Bass

**Detroit River
Belle Isle & Grassy Island**

Hg Analysis:

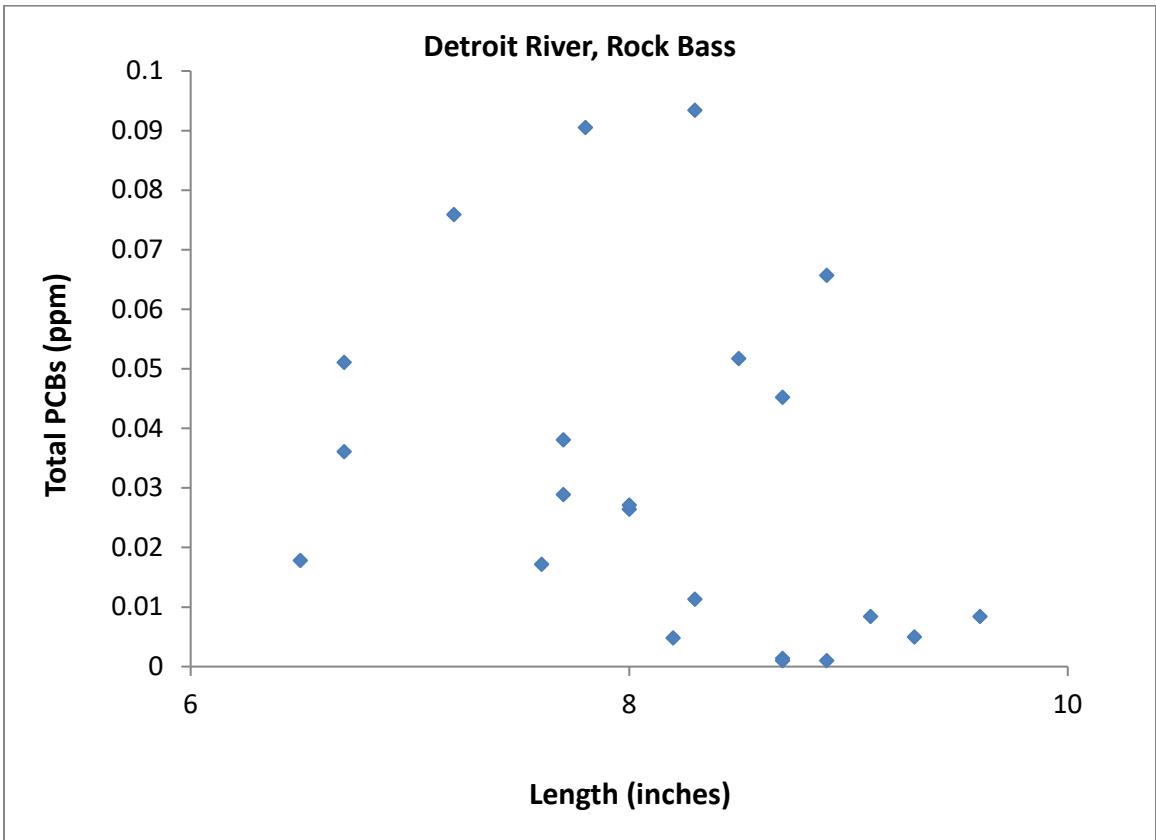
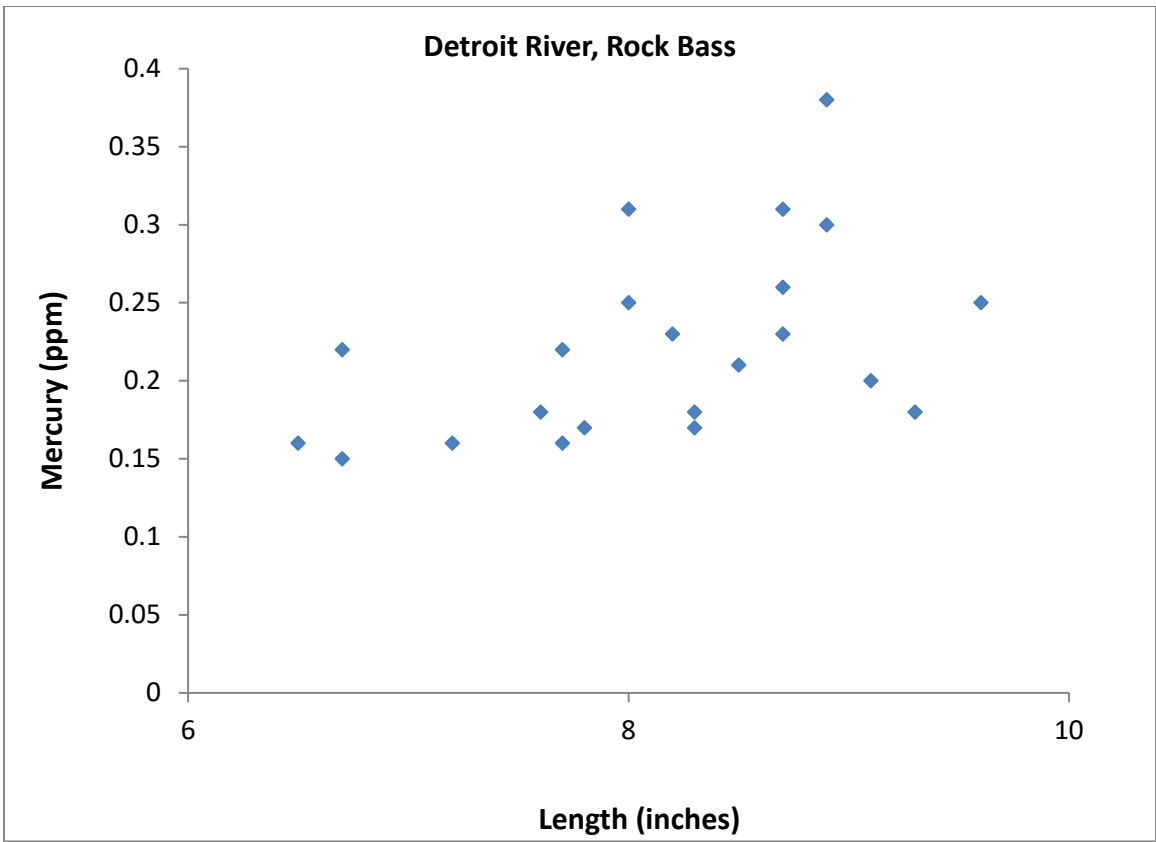
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2010	2011	22	6.5	na	6.5	9.6
Datasets available: 2010, 2011						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	22	0.22	0.15	0.38	0.25	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.233	0.266				

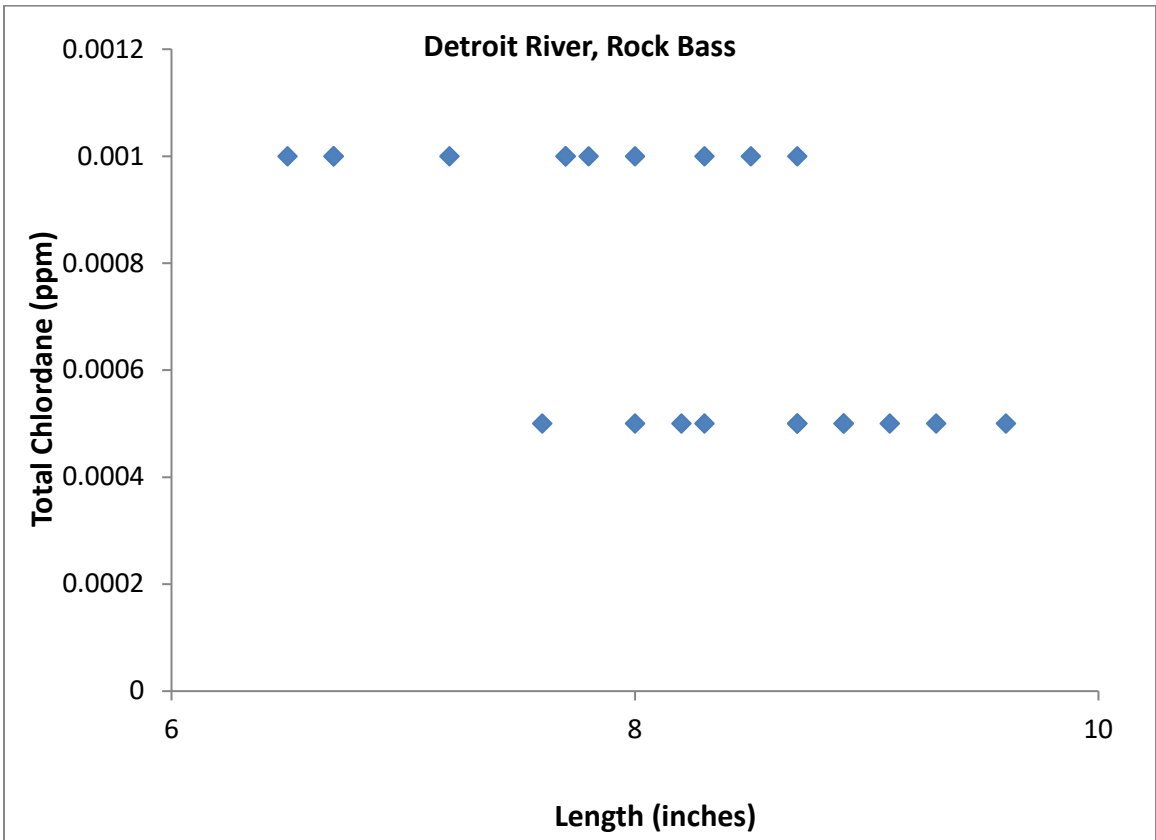
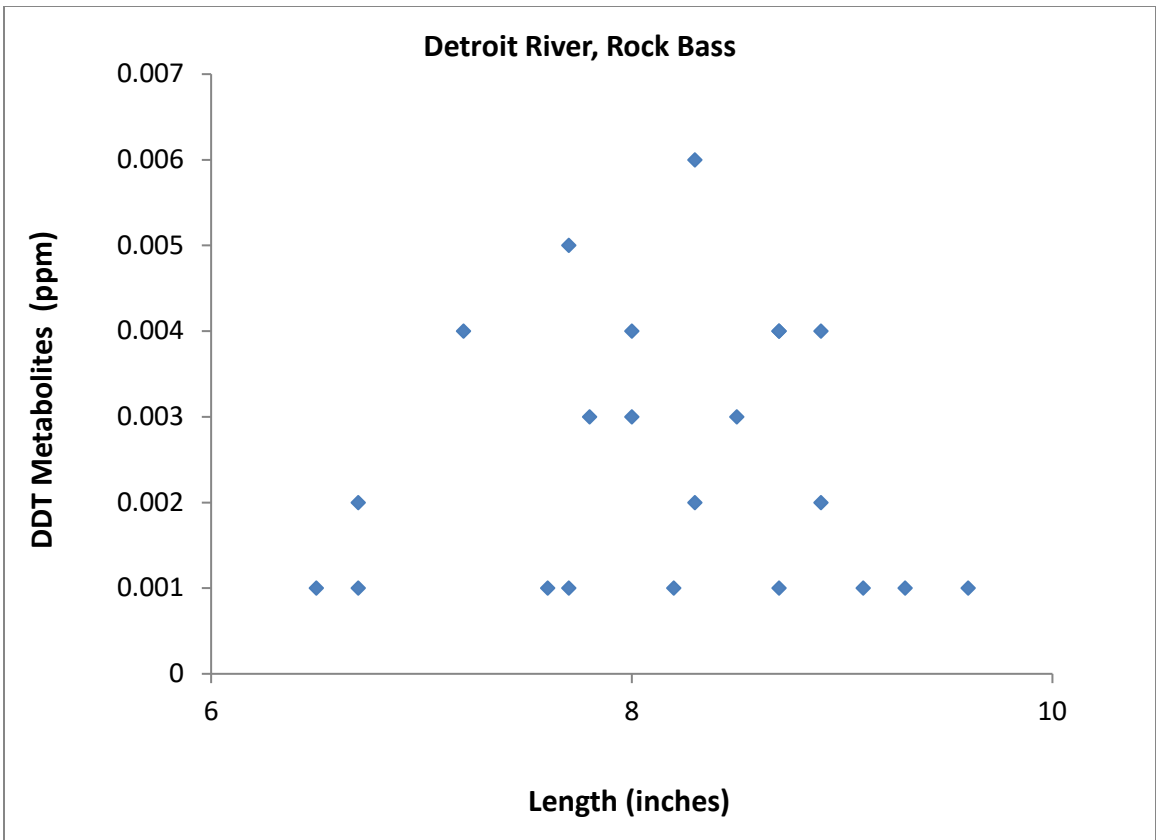
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2010	2011	22	6.5	na	6.5	9.6
Datasets available: 2010, 2011						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	22	0.032	0.001	0.093	0.040	4
DDT	22	0.003	0.001	0.006	0.003	16
Chlordane	22	0.001	0.001	0.001	0.001	--
Toxaphene	21	ND	--	--	--	--
TEQ	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.101	0.212				
DDT	0.001	0.000				
Chlordane	0.395	0.395				
Toxaphene	--	--				
TEQ	--	--				
Final meal category based on UCL:						4

Existing MDHHS Advisory: Women and children should not eat more than 1 meal per month of rock bass from the Detroit River due to elevated concentrations of mercury, PCBs, and dioxins (“All other species” designation).

Recommendation: No one should eat more than 4 meals per month of Detroit River rock bass due to mercury and PCBs.





White Bass

St. Clair River, Lake St. Clair, Detroit River, and Lake Erie
 [Dataset: Lake Erie, Plum Creek & River Raisin d/s Monroe Dam,
 Detroit River, Lake St. Clair]

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	2016	102	7.5	na	7.5	15.3
Datasets available: 1986, 1988, 1993, 1995, 1999, 2004, 2006, 2008, 2010, 2011, 2012, 2016						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	102	0.21	0.04	0.84	0.24	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.441	0.543				

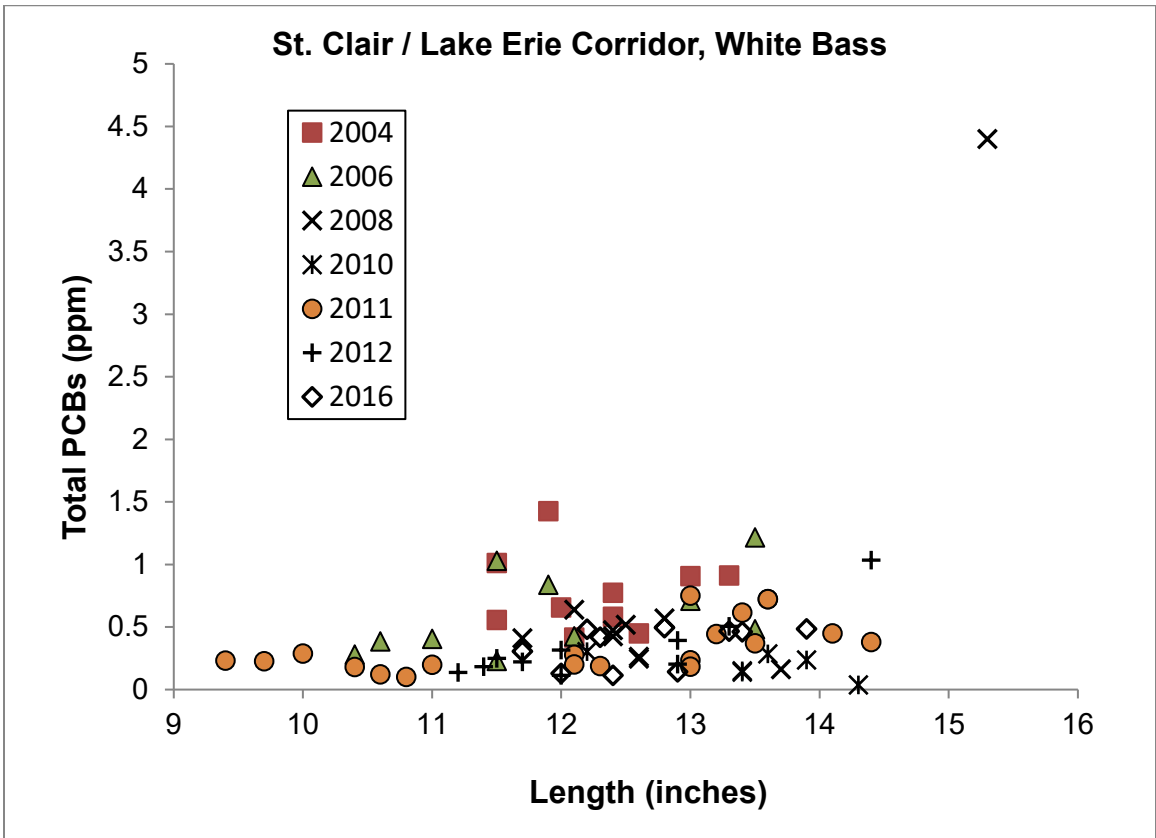
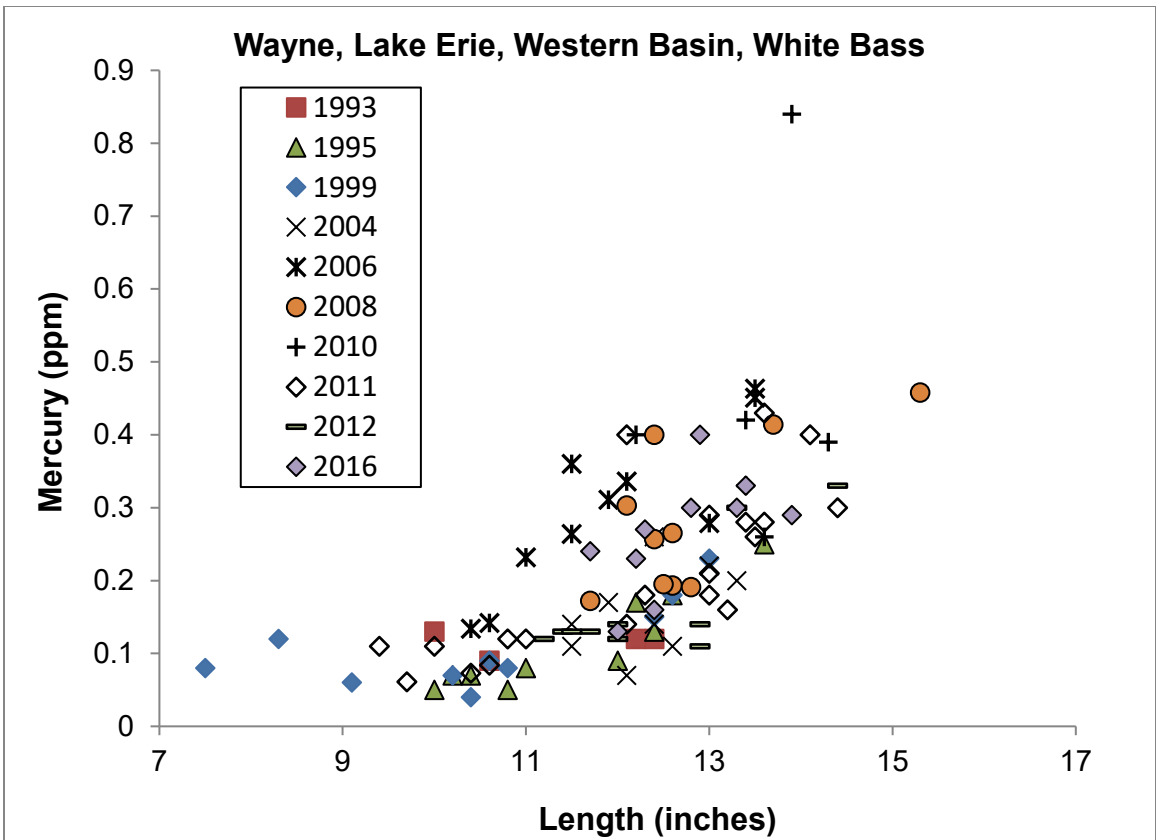
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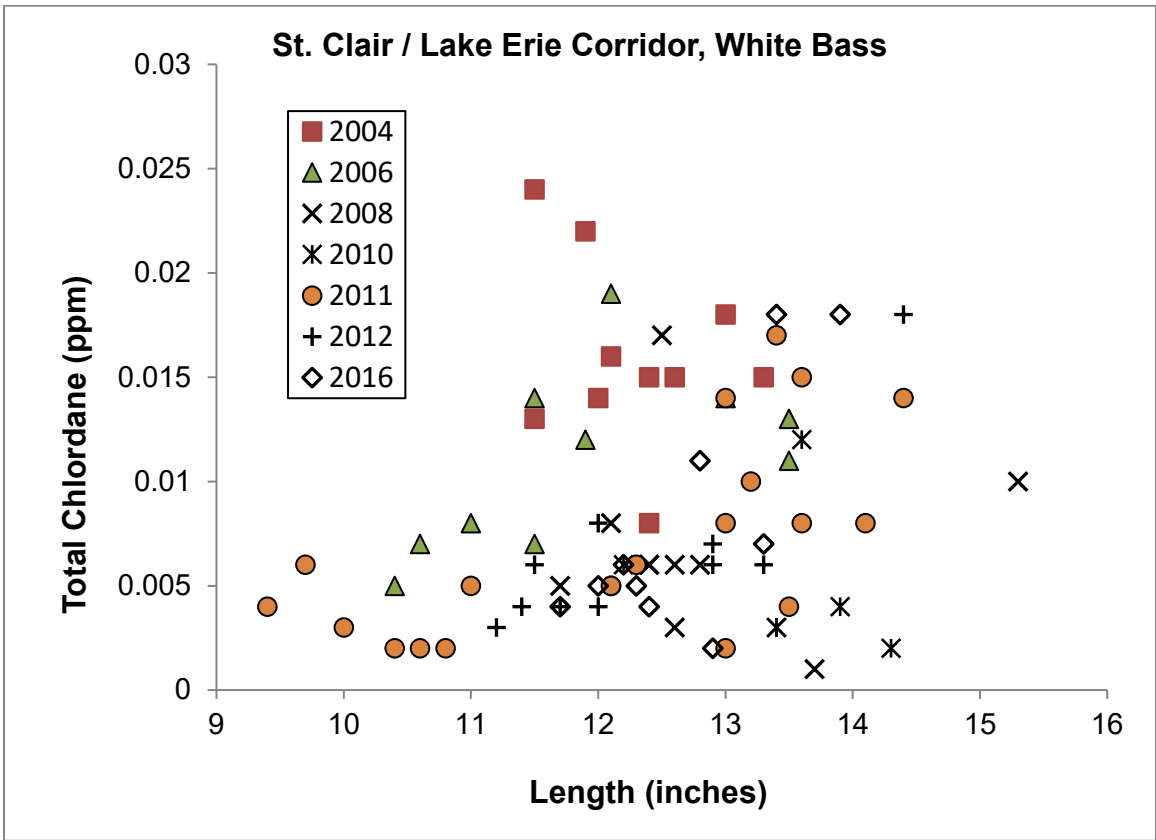
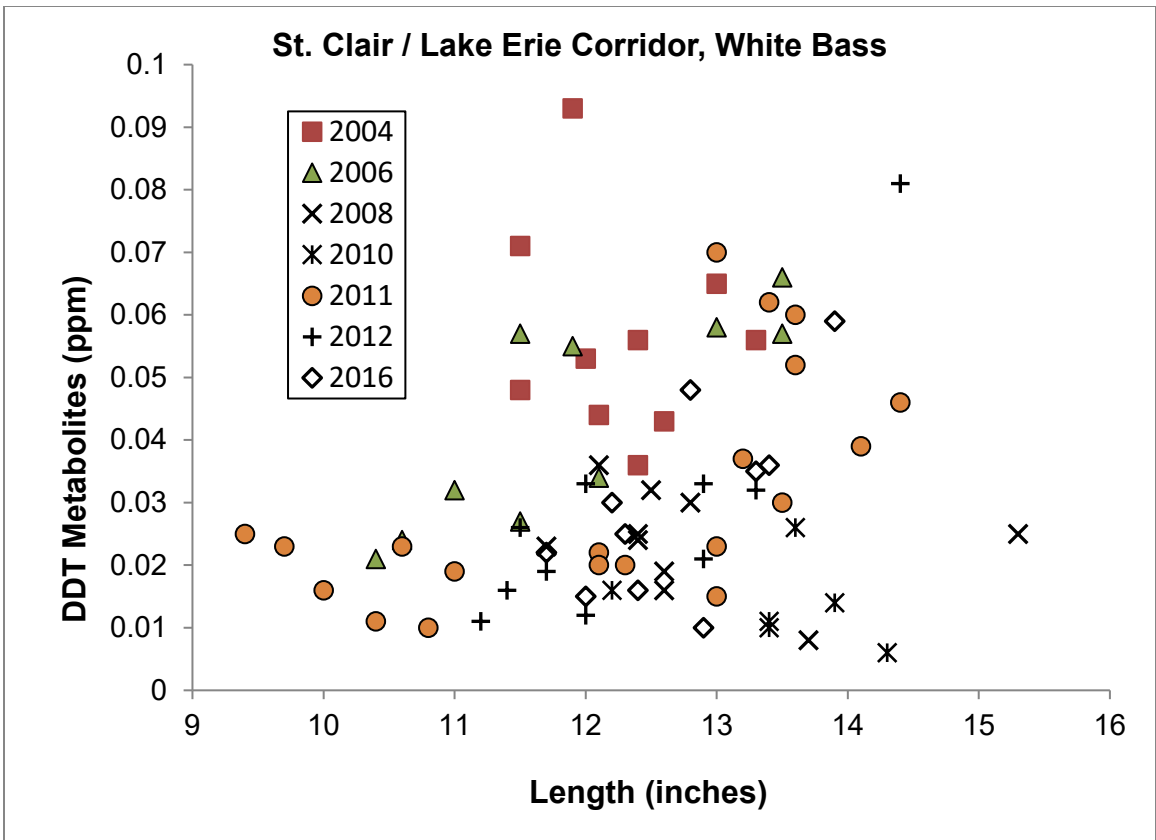
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2004	2016	76	9.4	na	9.4	15.3
Datasets available: 1988, 1993, 1995, 1999, 2004, 2006, 2008, 2010, 2011, 2012, 2016						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	76	0.48	0.037	4.400	0.605	Limited
DDT	76	0.03	0.006	0.093	0.038	16
Chlordane	76	0.009	0.001	0.024	0.010	--
Toxaphene	76	ND	< 0.05	< 0.05	--	--
TEQ*	30	2 ppt	0.1 ppt	5 ppt	2 ppt	2
PFOS	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.125	0.079				
DDT	0.062	0.037				
Chlordane	0.066	0.060				
Toxaphene	0.016	0.020				
TEQ*	0.411	0.334				
PFOS	--	--				
Final meal category based on UCL:						Limited

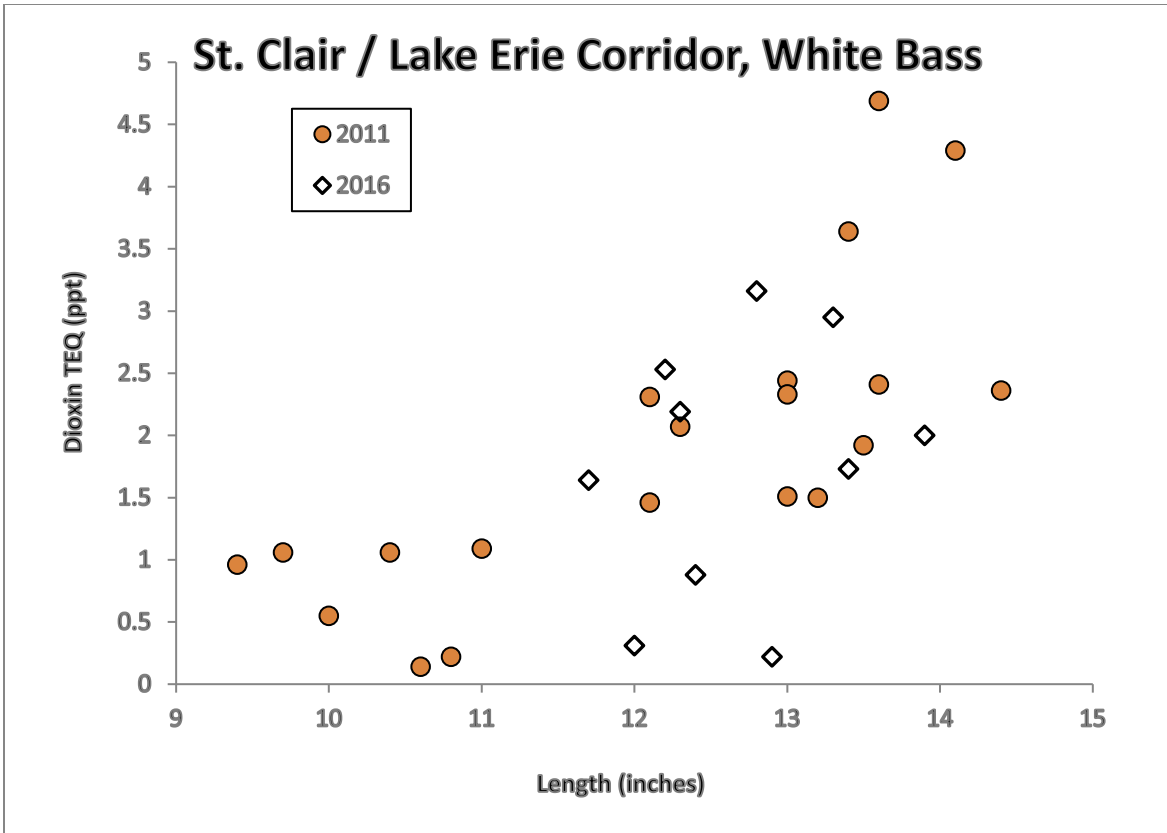
* - 2005 WHO TEFs; dioxin-like PCBs included

Existing MDHHS Advisory: Sensitive populations should not eat white bass from the St. Clair River, Lake St. Clair, Detroit River, Lake Erie, or the River Raisin downstream of the Dundee Dam due to PCBs. Healthy adults should limit consumption of white bass from those waters to no more than 1 or 2 meals per year. Dioxins and mercury would cause advisories.

Recommendation: No change in the advisory is recommended.







Yellow Perch

Detroit River

Wayne County

Hg Analysis:

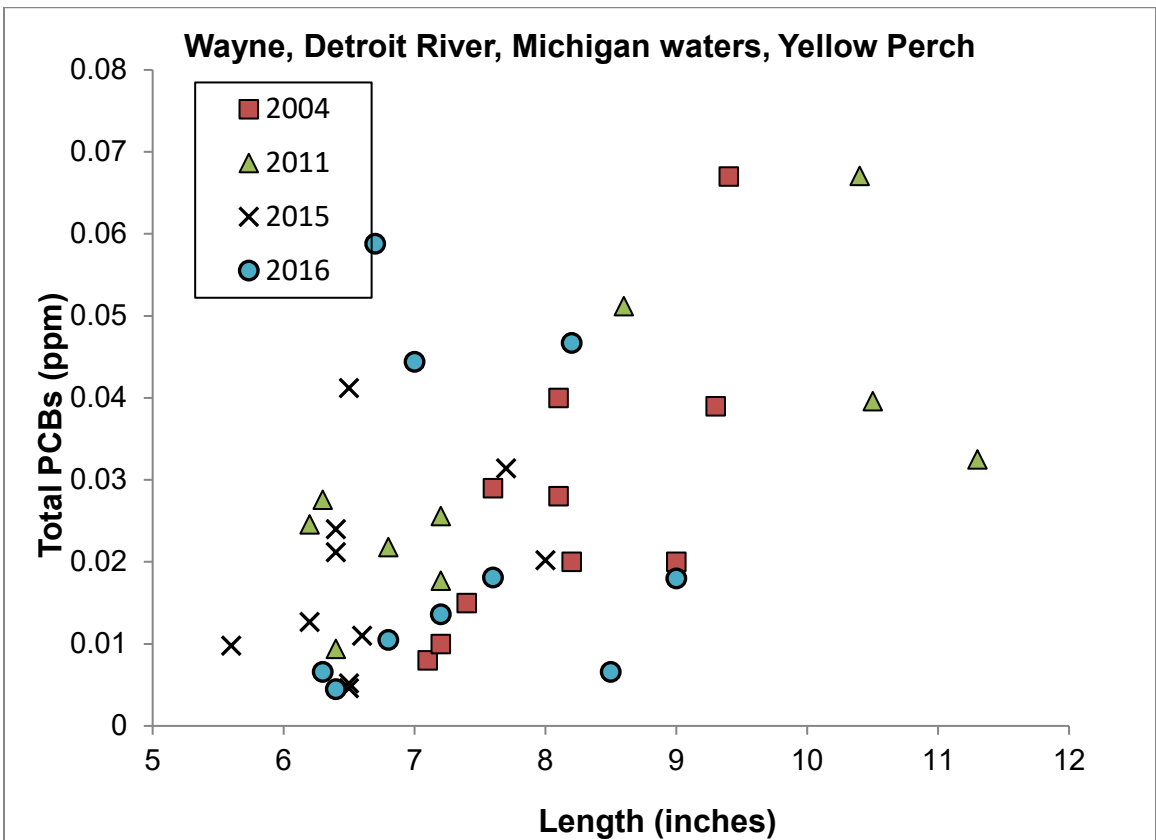
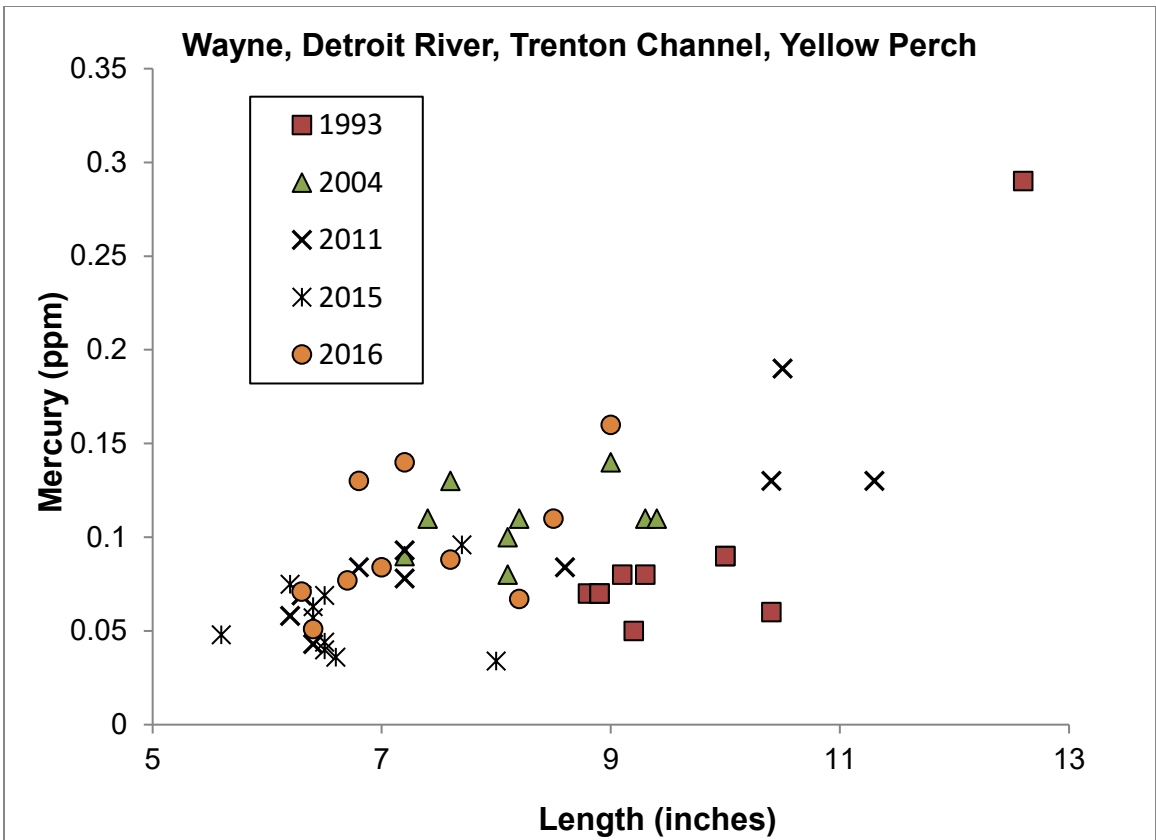
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1993	2016	49	5.6	na	5.6	12.6
Datasets available: 1993, 2004, 2011, 2015, 2016						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	49	0.09	0.03	0.29	0.10	8
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.380	0.334				

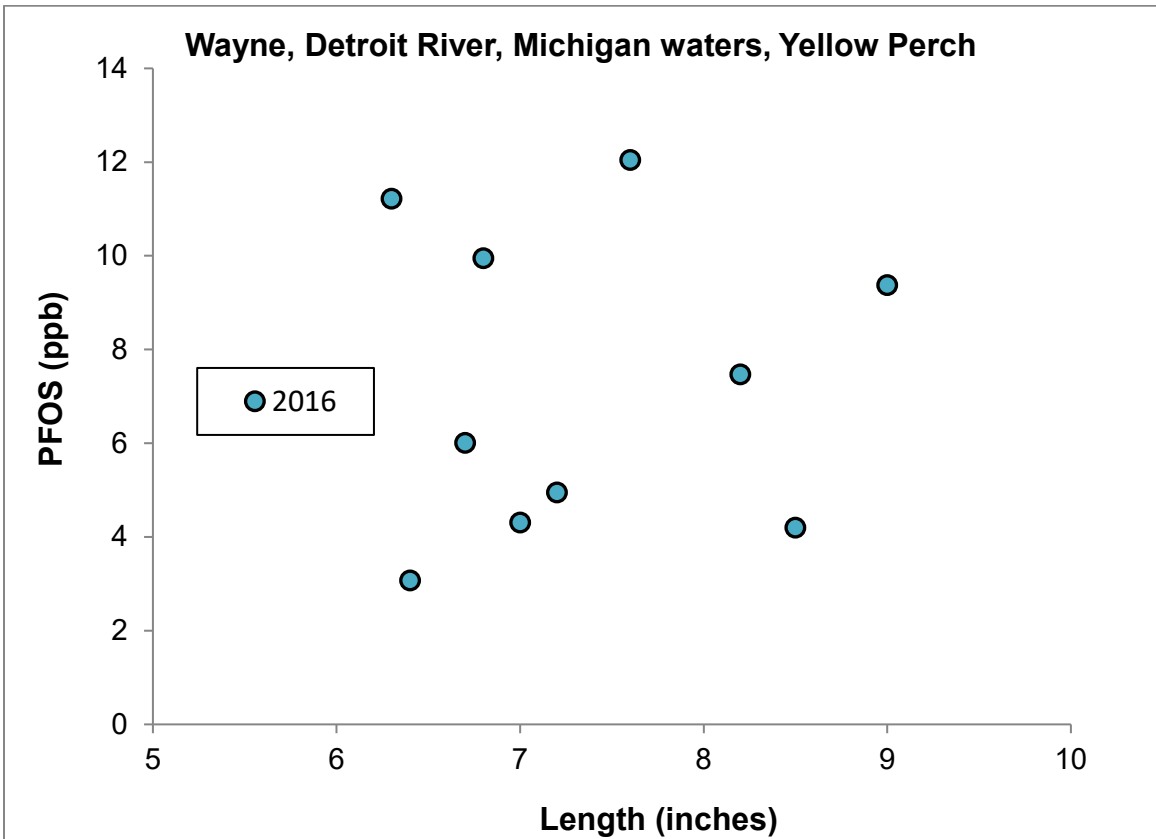
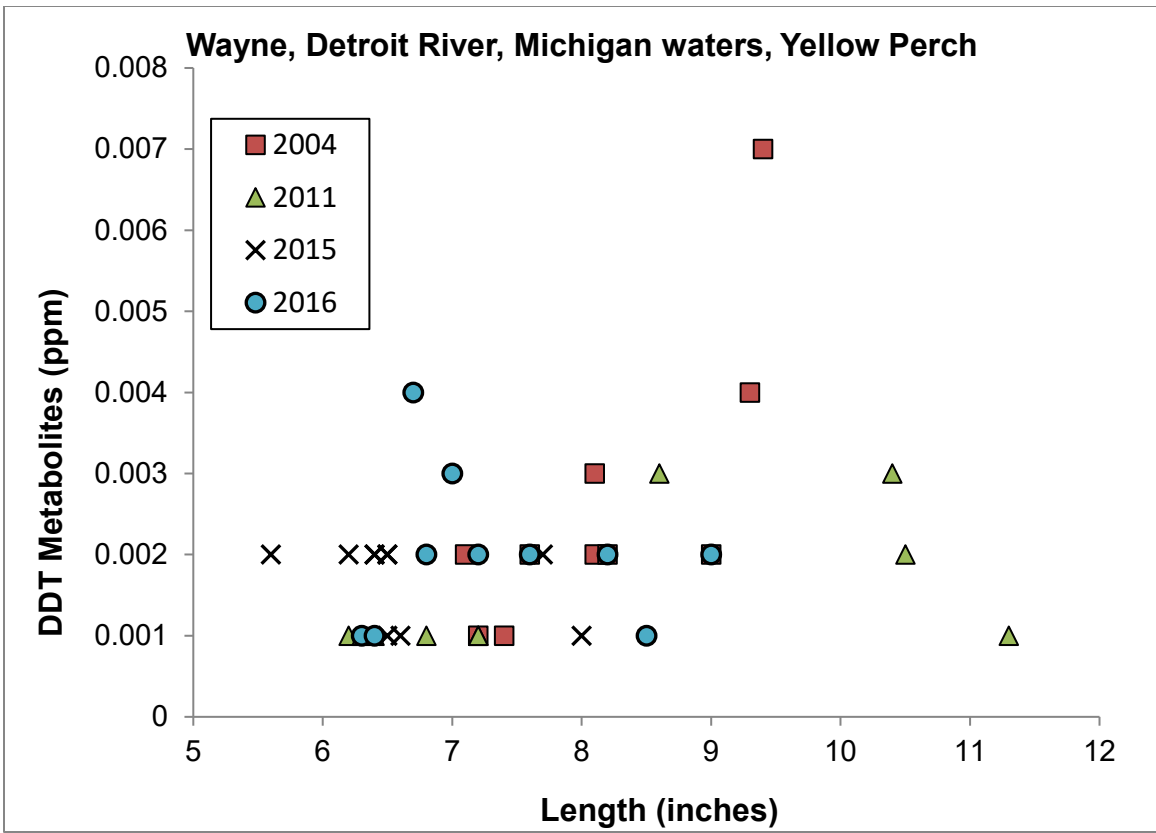
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2004	2016	40	5.6	na	5.6	11.3
PFOS: 2016	2016	10	6.4	na	6.4	9
Datasets available: PCBs: 1993, 2004, 2011, 2015, 2016; PFOS: 2016						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	40	0.02	0.005	0.07	0.03	8
DDT	40	0.002	0.001	0.007	0.002	16
Chlordane	40	ND	< 0.001	< 0.001	--	--
Toxaphene	40	ND	< 0.05	< 0.05	--	--
TEQ	0	--	--	--	--	--
PFOS	10	7 ppb	3 ppb	12 ppb	10 ppb	12
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.268	0.255				
DDT	0.112	0.100				
Chlordane	--	--				
Toxaphene	--	--				
TEQ	--	--				
PFOS	0.005	0.017				
Final meal category based on UCL:						8

Existing MDHHS Advisory: No one should eat more than 4 meals per month of Detroit River yellow perch due to PCBs. Mercury would cause an advisory.

Recommendation: No change in the advisory is recommended. PFOS should be added to the list of contaminants causing an advisory. Dioxin TEQ should be analyzed in the next set of samples to determine if the advisory could be relaxed.





Lake Erie

Carp

Lake Erie – Western Basin

Monroe County

[Dataset: Lake Erie, Plum Creek, River Raisin d/s
Dundee, Ottawa River mouth, N. Maumee Bay]

Hg Analysis:

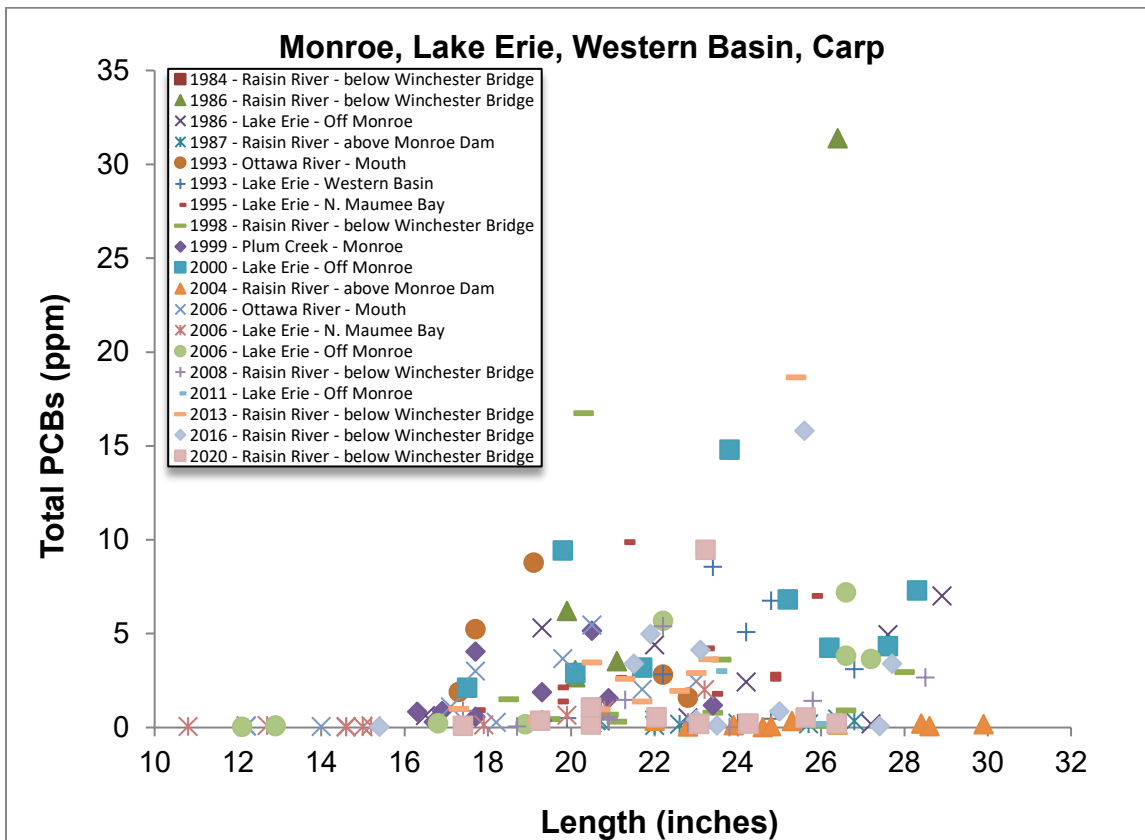
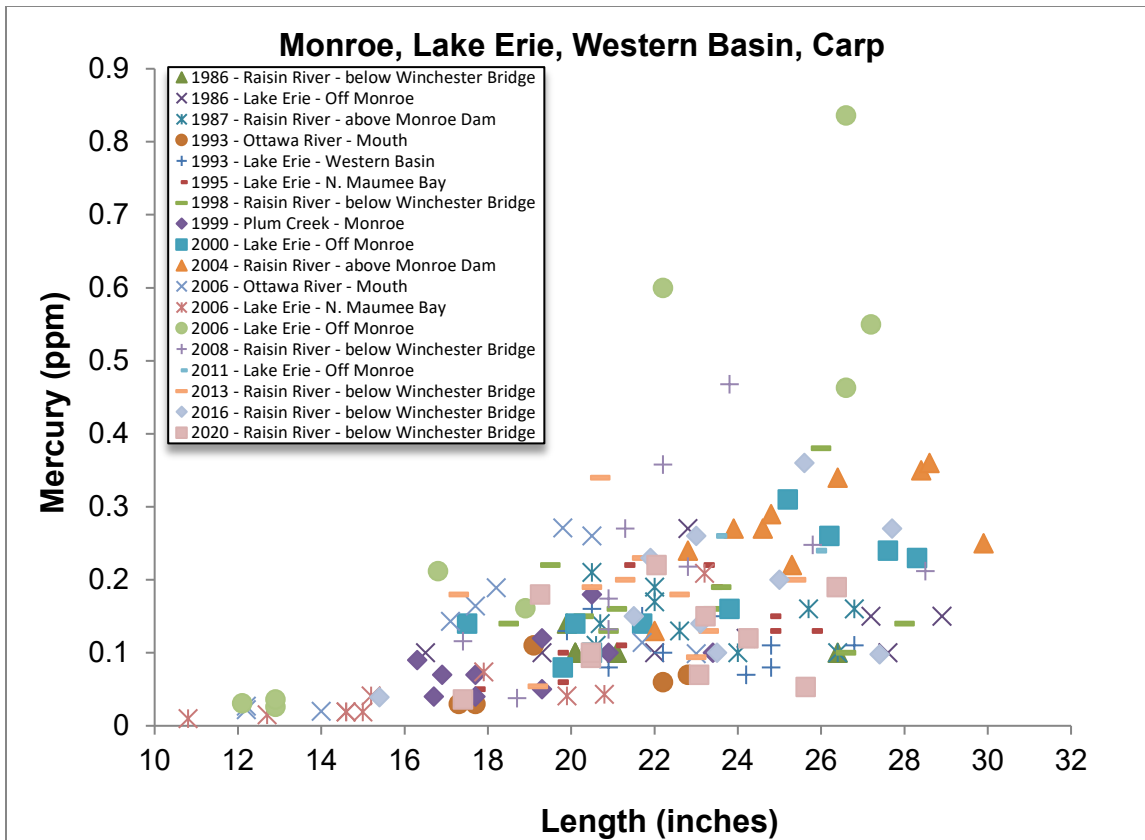
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
1986	2020	159	12.2	NA	12.2	29.9	
Datasets available: 1986, '87, '93, '95, '98, '99, 2000, '04, '06, '08, '11, '13, '16, '20							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	159	0.159		0.010	0.836	0.178	4
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.262	0.454					

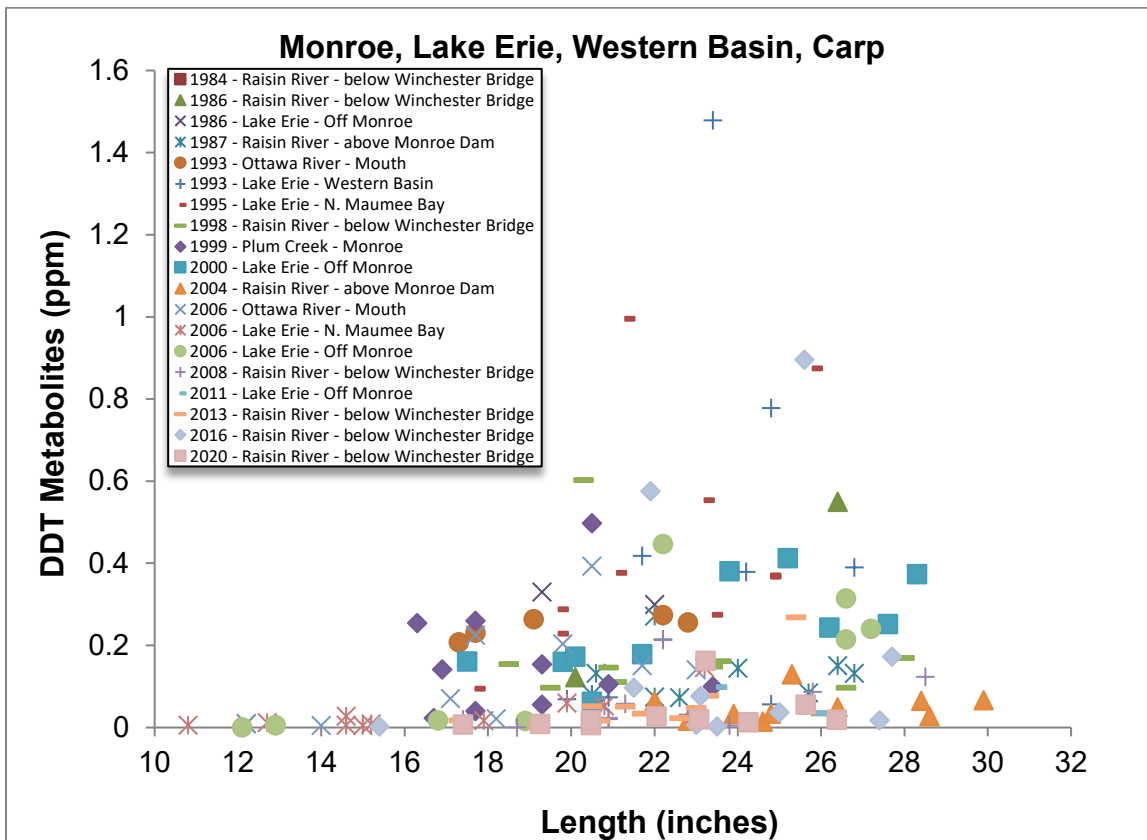
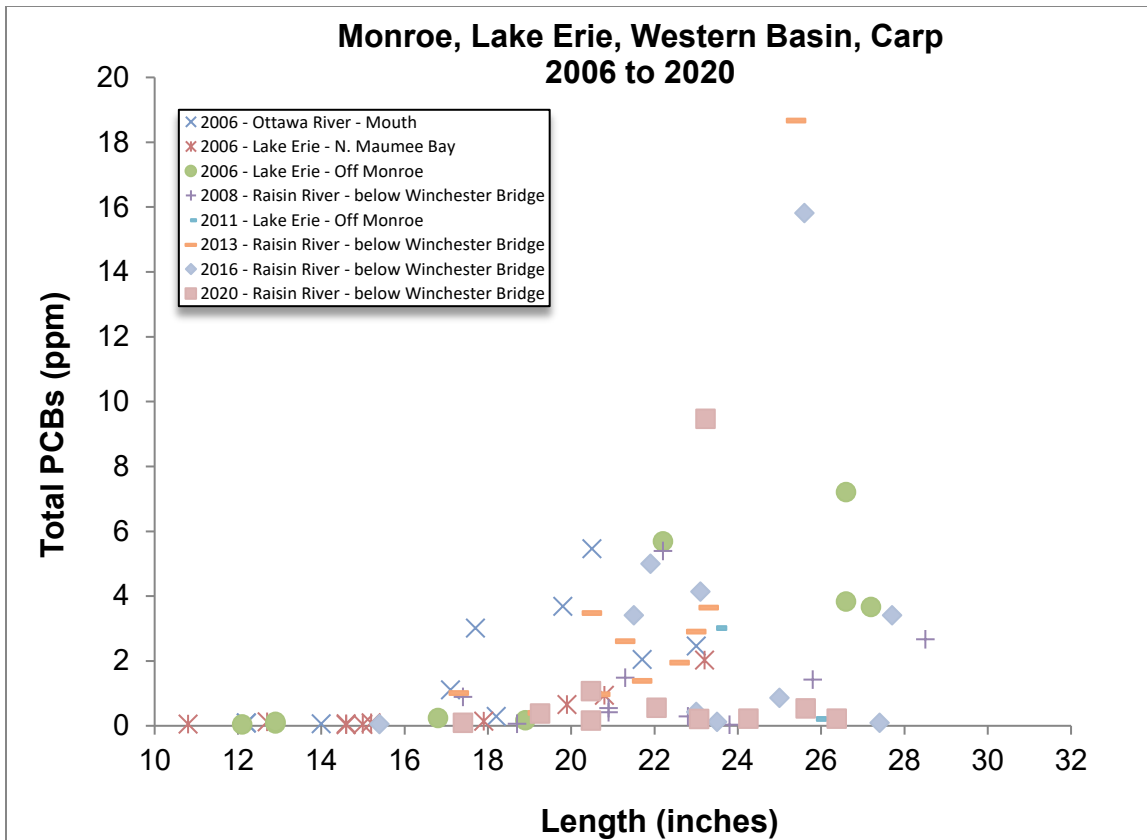
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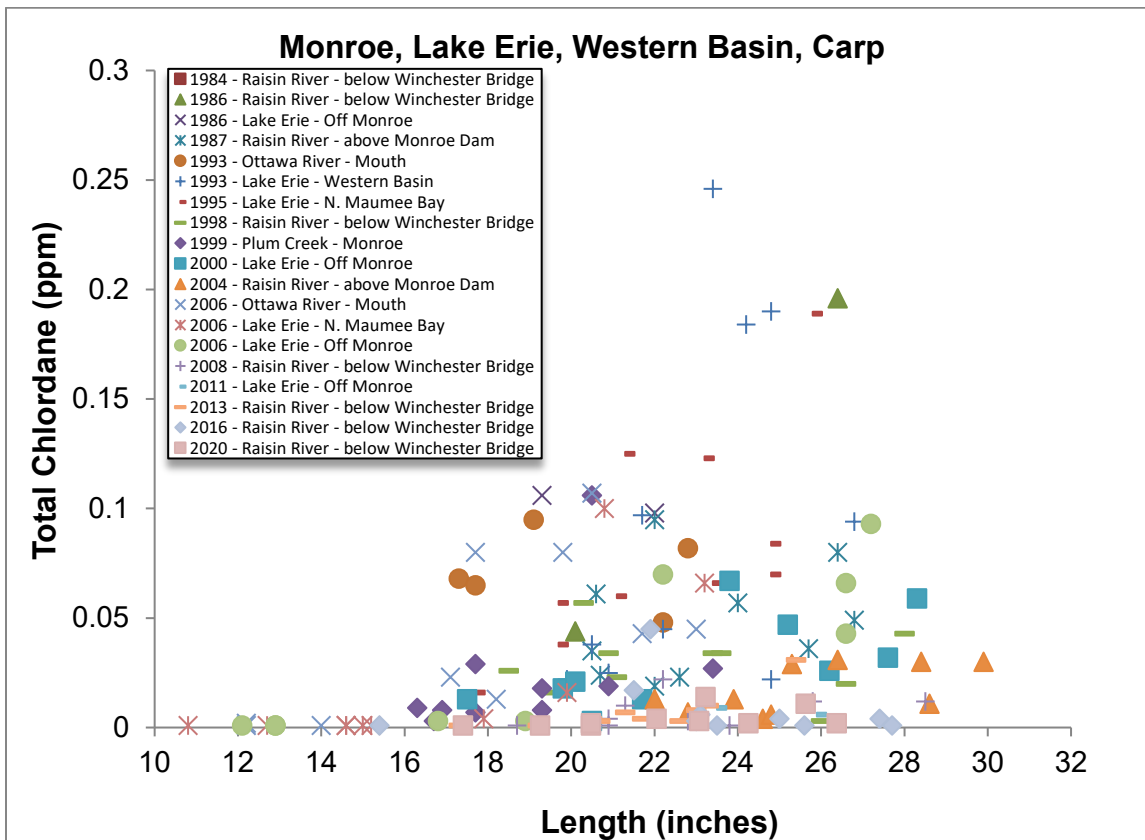
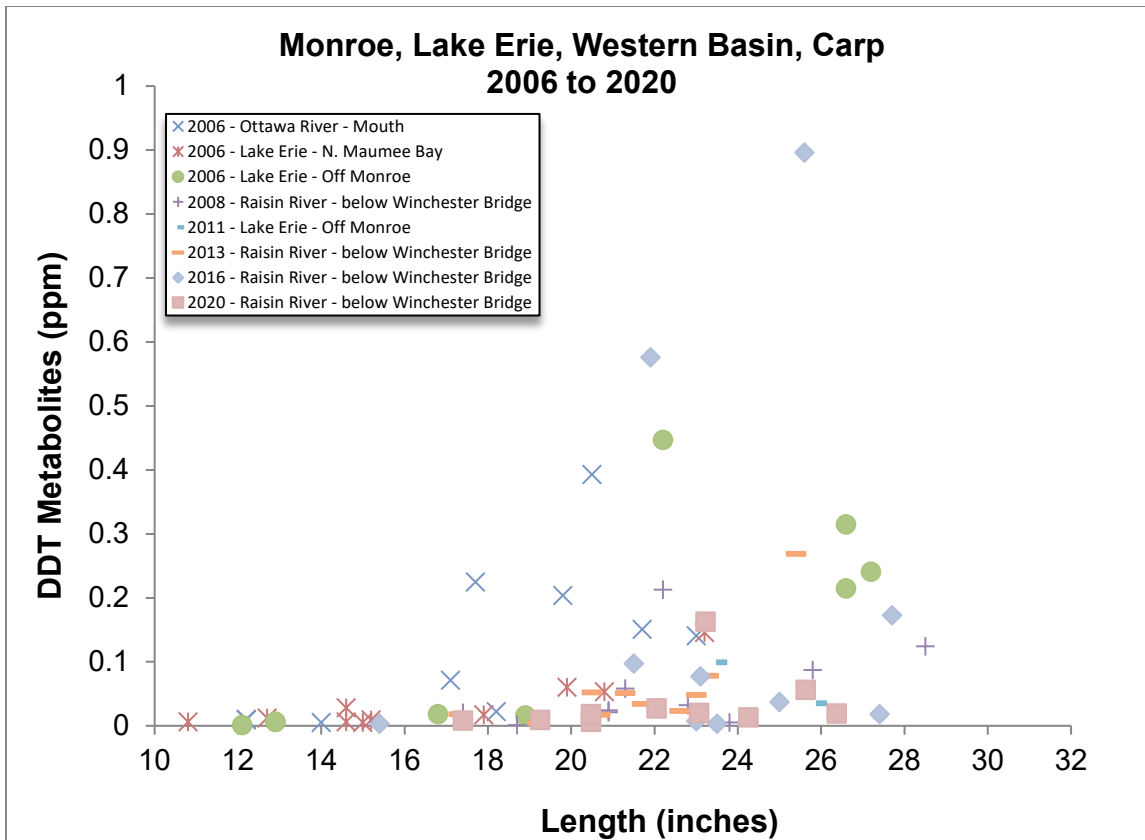
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
2006	2020	72	10.8	NA	12.2	19.8	
Datasets available: 1984, '86, '87, '93, '95, '98, '99, 2000, '04, '06, '08, '11, '13, '16, '20							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	72	2.080		0.034	18.665	2.853	0
DDT	72	0.093		0.001	0.896	0.129	12
Chlordane	72	0.017		0.001	0.107	0.023	16
Toxaphene	72	ND		--	--	--	--
TEQ	12	49.4 ppt		2.0 ppt	193.4 ppt	88.0 ppt	Limited
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.183	0.382					
DDT	0.159	0.354					
Chlordane	0.077	0.227					
Toxaphene	--	--					
TEQ	0.344	0.547					
Final meal category based on UCL:							0

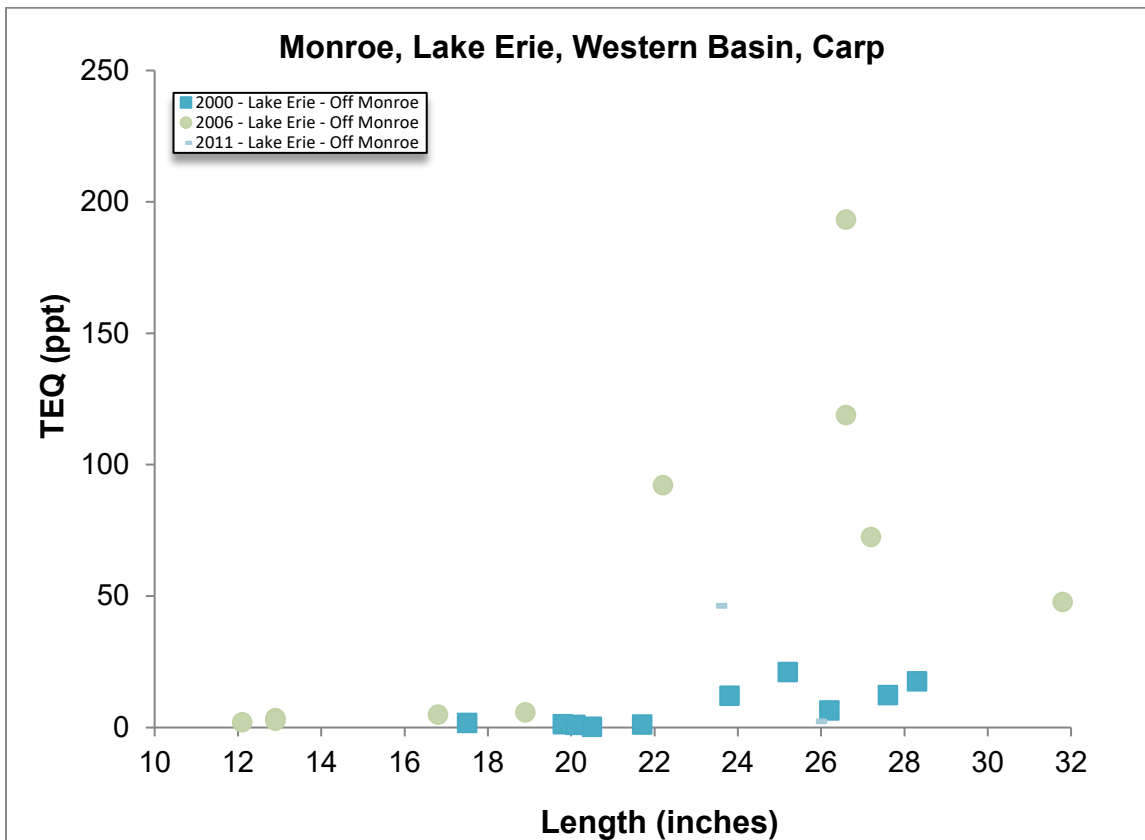
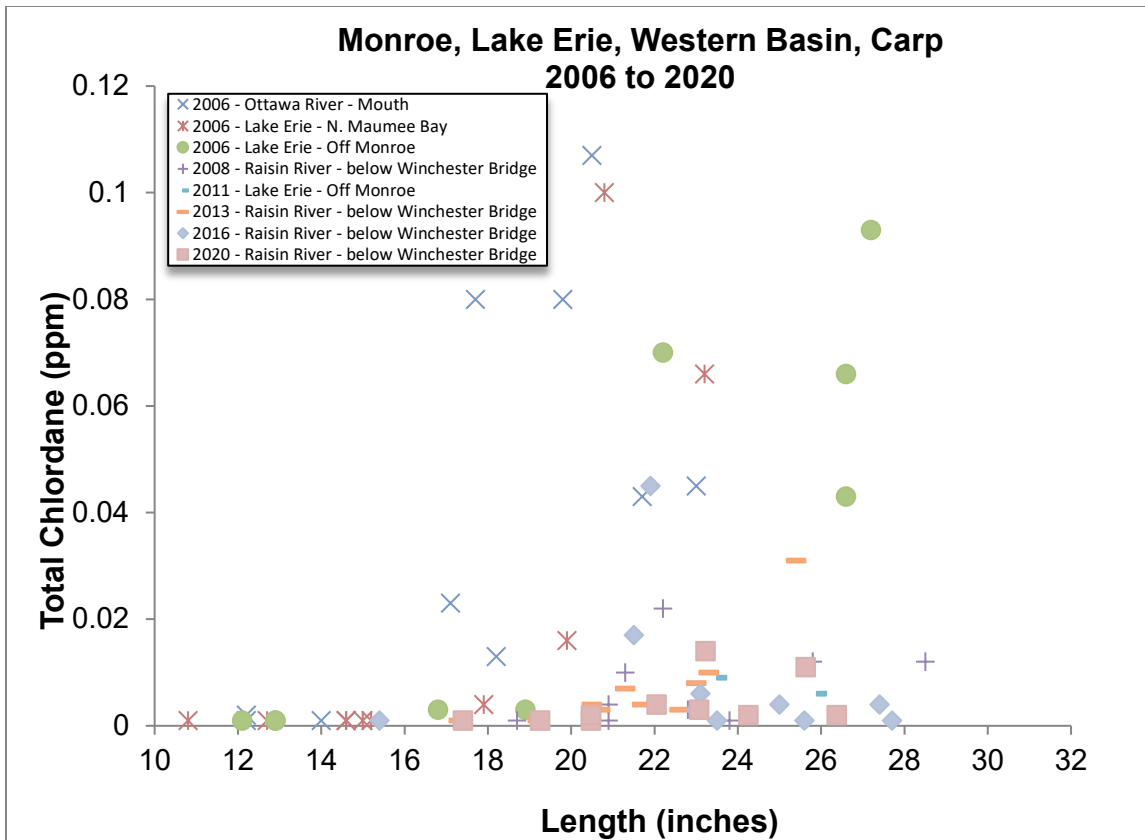
Existing MDHHS Advisory: No one should eat carp from the western basin of Lake Erie including N. Maumee Bay, or from tributaries up to the first dam (Ottawa River, Plum Creek, or the River Raisin downstream of the Dundee Dam) due to PCBs. Dioxin, mercury, and DDT would cause advisories.

Recommendation: No change to the advisory is recommended.









Channel Catfish

Lake Erie – Western Basin
 [Dataset: Lake Erie, Plum Creek,
 River Raisin d/s Dundee, Ottawa
 River mouth, N. Maumee Bay]

Monroe 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	2011	65	12.4	12	12.4	27.6
Datasets available: 1986, '93, '99, '02, '08, '11						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	65	0.15	0.04	0.48	0.18	4
Chemical	Linear Regression R ²	Exponential Regression R ²				
Mercury	0.227	0.205				

Organics Analysis:

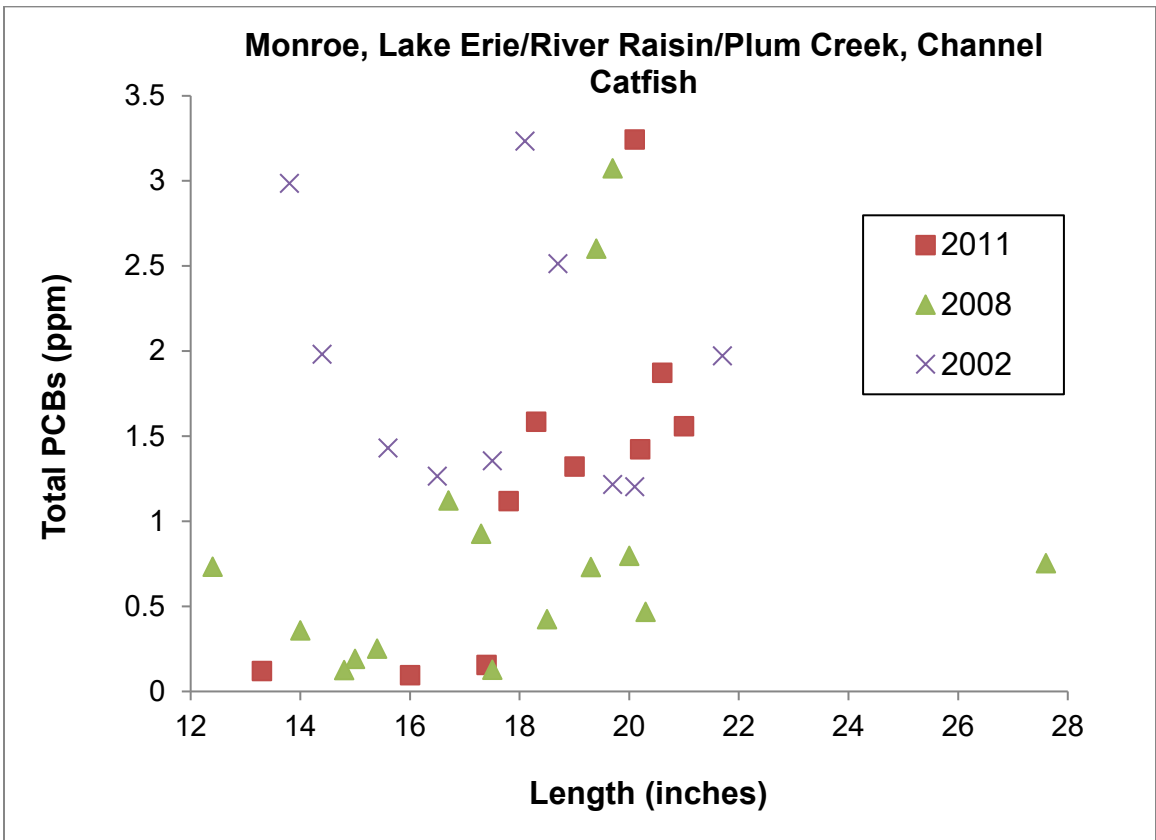
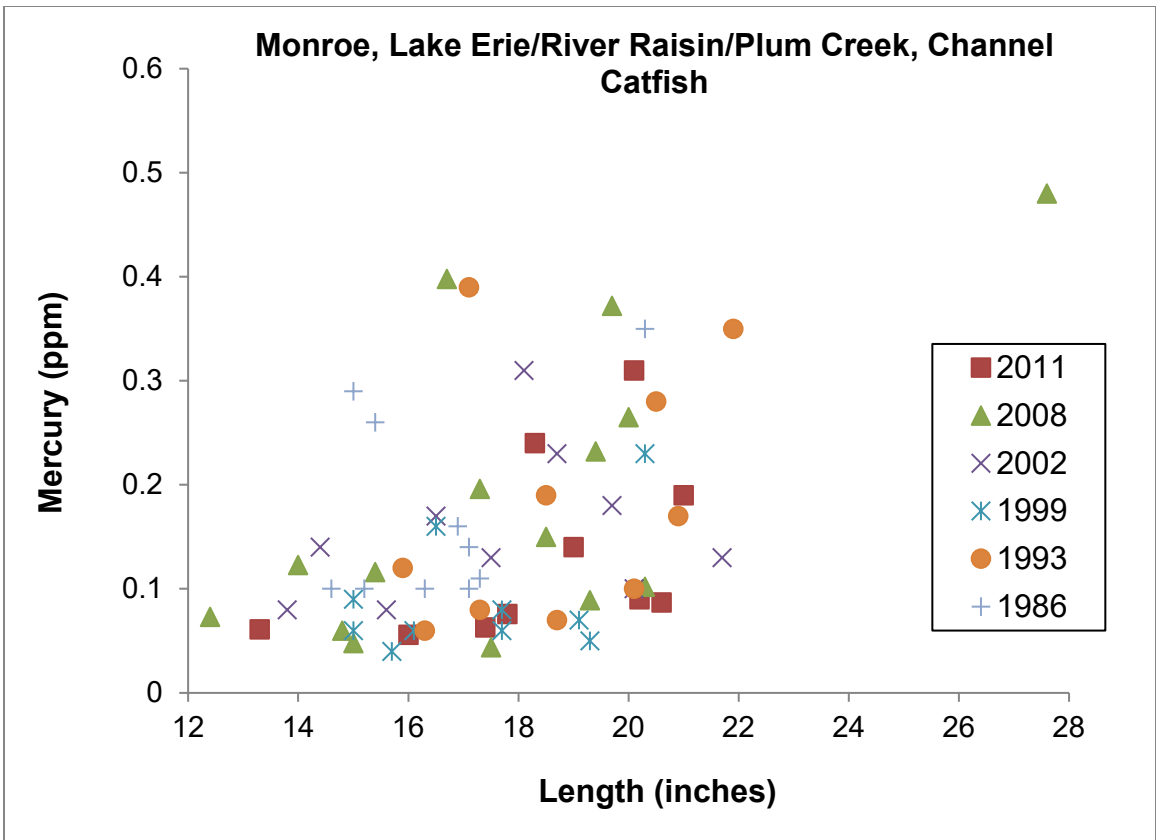
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2002	2011	35	12.4	12	12.4	27.6
Datasets available: 1986, '93, '99, '02, '08, '11						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	35	1.27	0.10	3.24	1.60	Limited
DDT	35	0.08	0.01	0.17	0.10	16
Chlordane	35	0.02	0.001	0.05	0.02	--
Toxaphene	35	0.06	0.05	0.16	0.07	4
TEQ*	18	19 ppt	4.4 ppt	50 ppt	25 ppt	Limited
Chemical	Linear Regression R ²	Exponential Regression R ²				
PCB	0.053	0.123				
DDT	0.017	0.091				
Chlordane	0.025	0.076				
Toxaphene	0.000	0.000				
TEQ*	0.589	0.640				
Final meal category based on UCL:						Limited

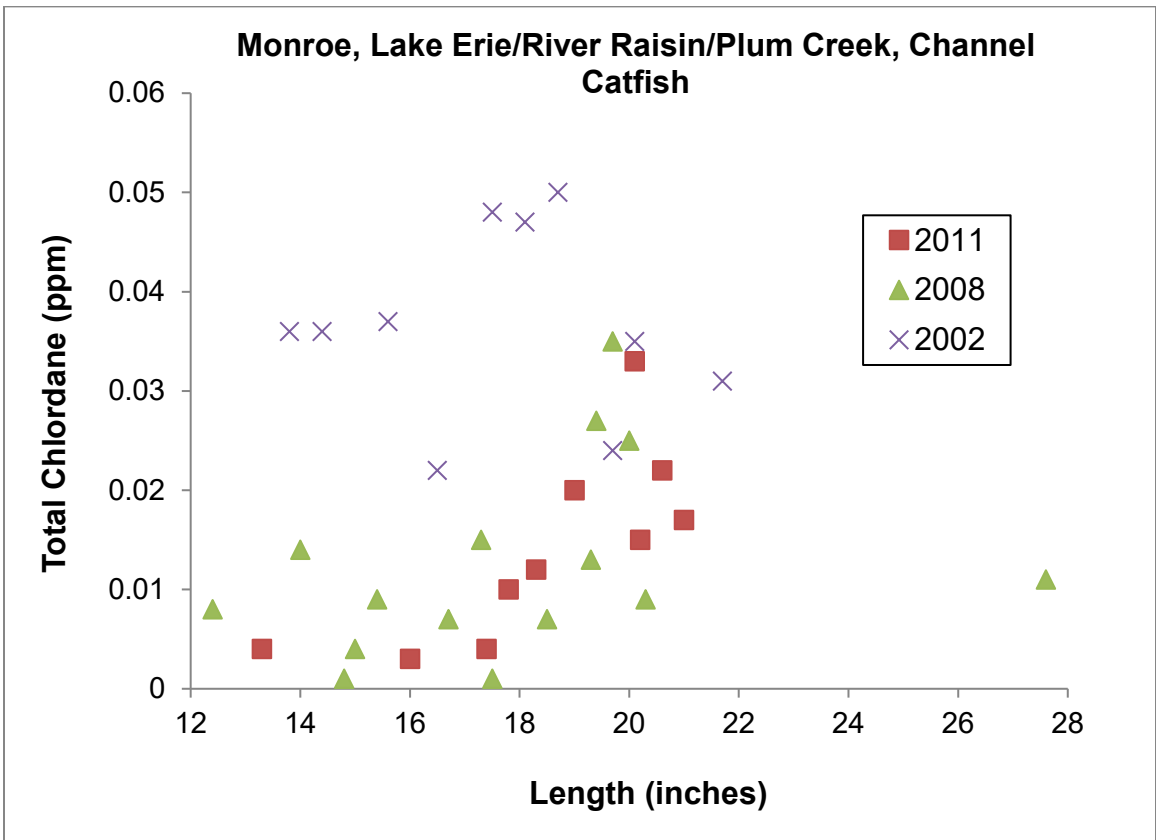
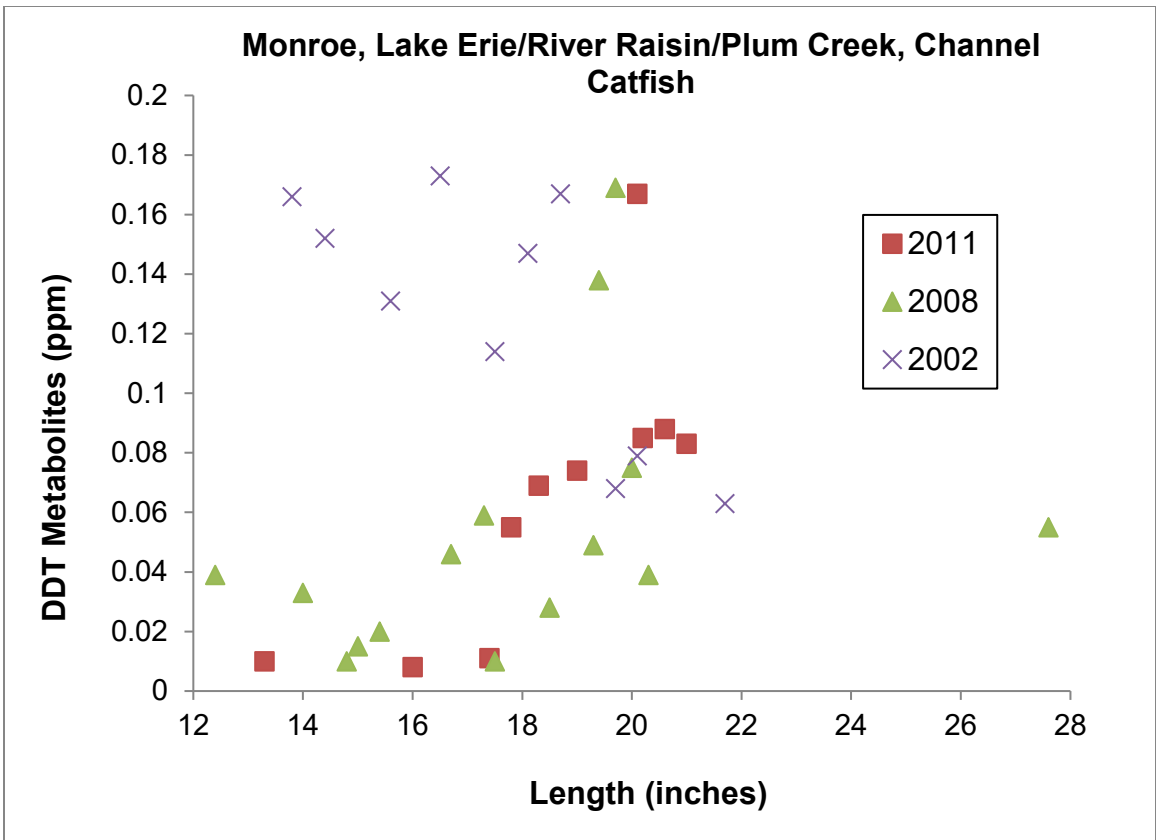
* 2005 WHO TEFS; dl-PCBs included

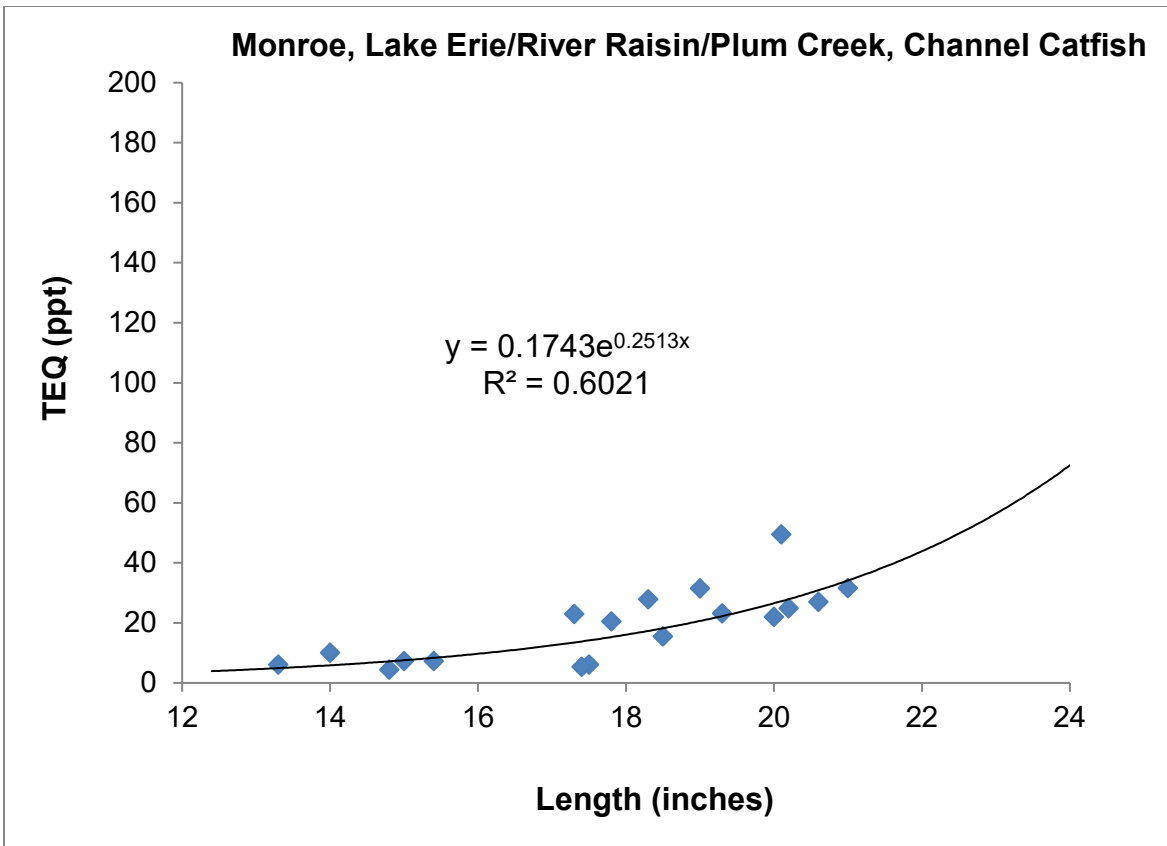
Existing MDHHS Advisory: Sensitive populations should not eat any of these fish. Healthy adults should limit consumption of channel catfish from Lake Erie, Plum Creek, or the River Raisin downstream of the Dundee Dam to no more than 1 or 2 meals per year due to PCBs and dioxin. Mercury and toxaphene would cause advisories.

Recommendation: No change.

Length (Inches)	TEQ Regression Equation Estimate (ppt)	Meal Category
10	2.2	2
12	3.6	2
14	5.9	1
16	9.7	0.5
18	16.1	Limited
20	26.5	Limited
22	43.9	Limited
24	72.5	Limited
26	119.9	0
<i>Shaded area denotes extrapolated estimates</i>		







Chinook Salmon

**Lake Erie
Western Basin**

Monroe County

Hg Analysis:

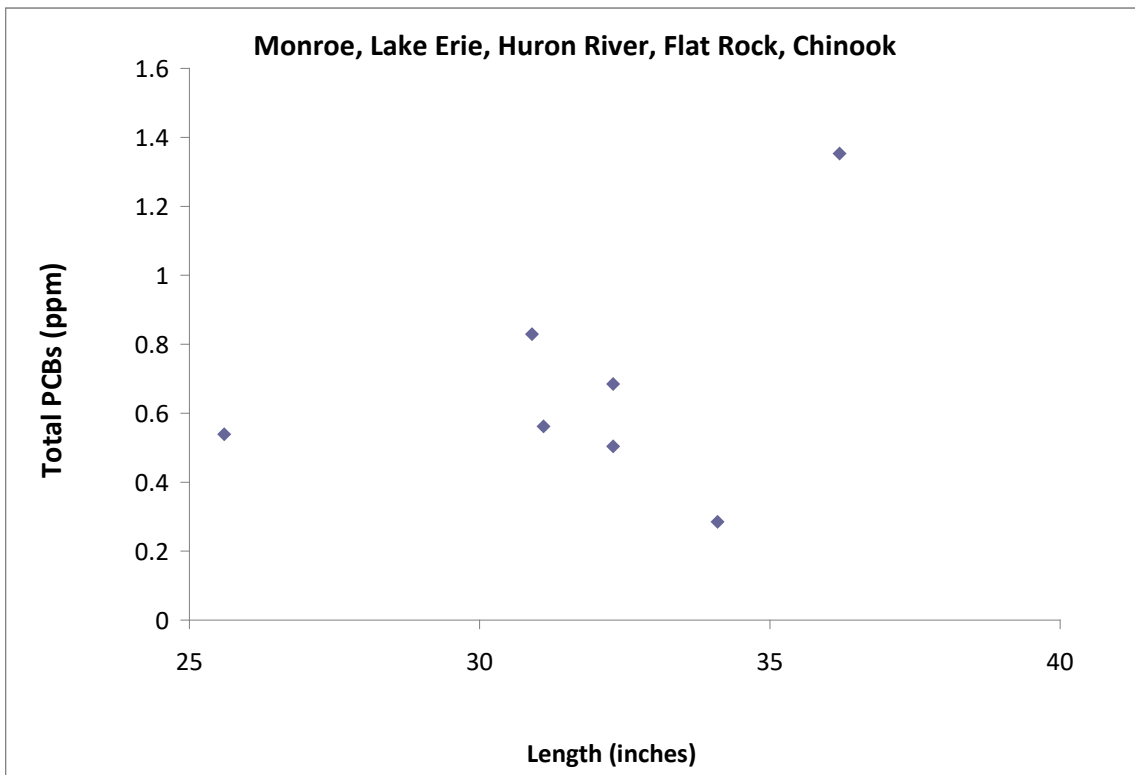
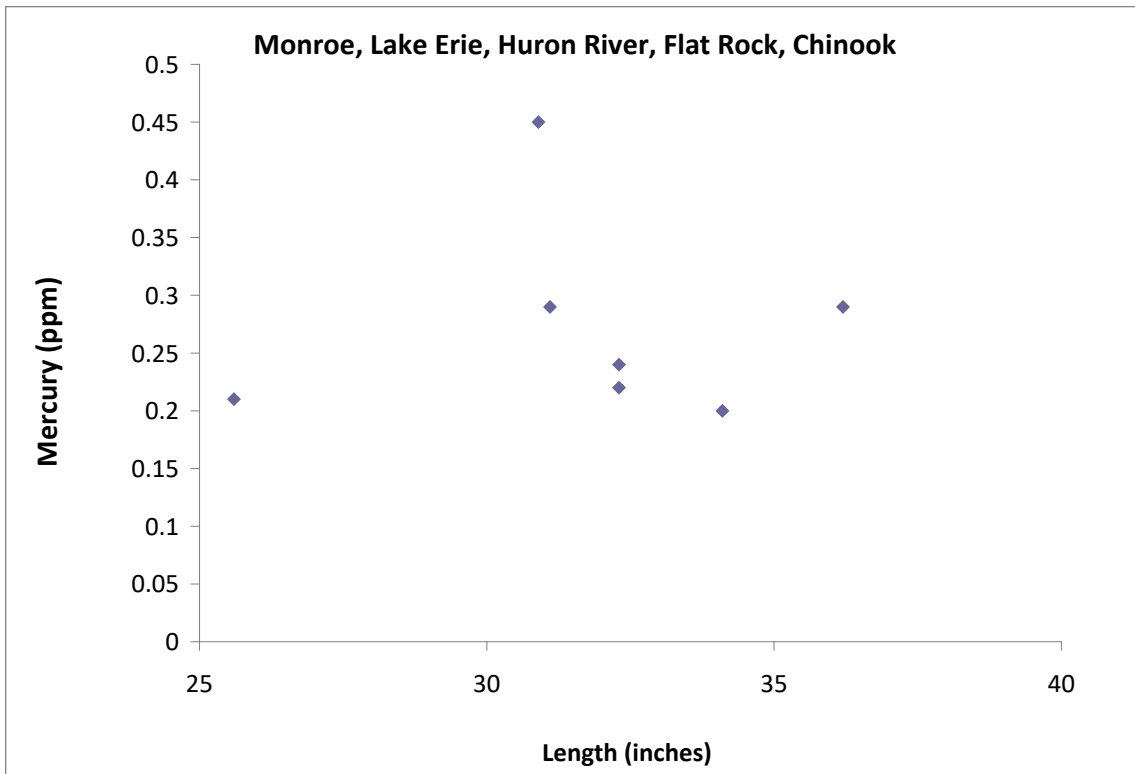
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples				
Earliest	Most Recent				Min	Max			
1997	1997	7	25.6	10	25.6	36.2			
Datasets available: 1997									
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category			
Mercury	7	0.271	0.200	0.450	0.350	2			
Chemical	Linear Regression	Exponential Regression							
	R ²	R ²							
Mercury	0.002	0.008							

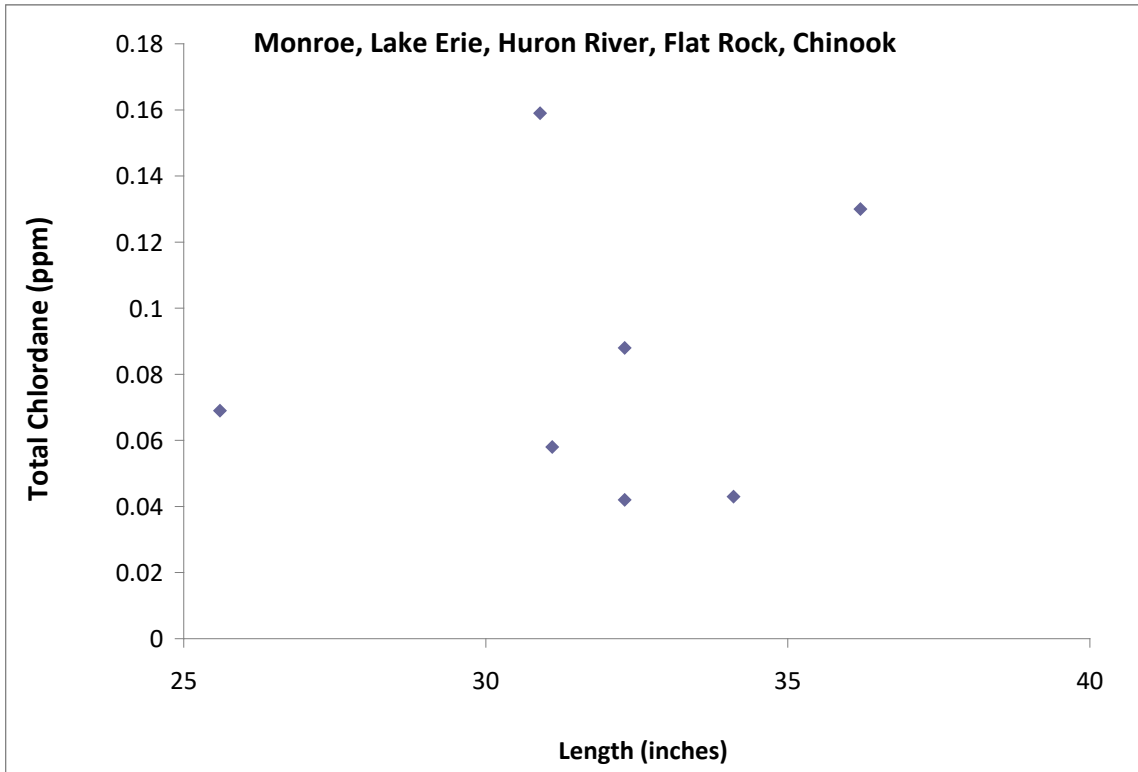
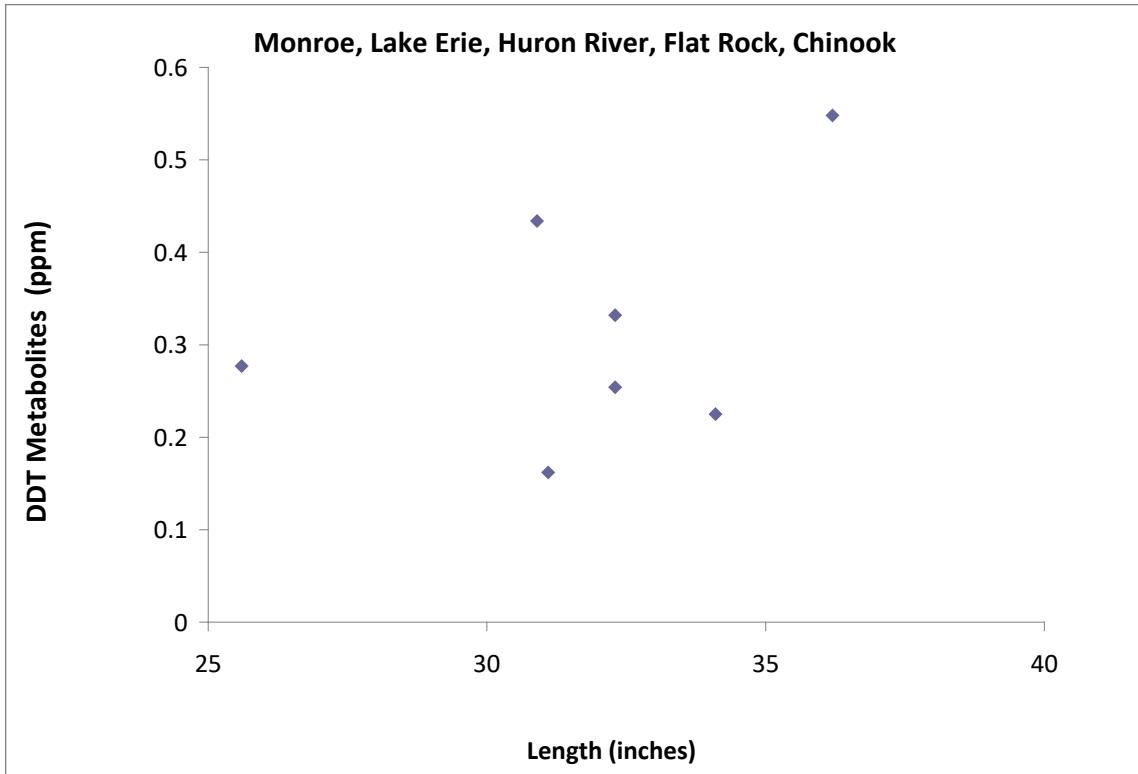
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples				
Earliest	Most Recent				Min	Max			
1997	1997	7	25.6	10	25.6	36.2			
Datasets available: 1997									
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category			
PCB	7	0.680	0.285	1.353	0.990	Limited			
DDT	7	0.319	0.162	0.548	0.440	4			
Chlordane	7	0.084	0.042	0.159	0.130	--			
Toxaphene	7	0.161	0.050	0.300	0.240	1			
TEQ	0	--	--	--	--	--			
Chemical	Linear Regression	Exponential Regression							
	R ²	R ²							
PCB	0.002	0.008							
DDT	0.172	0.057							
Chlordane	0.156	0.100							
Toxaphene	0.022	0.009							
TEQ	--	--							
						Final meal category based on UCL:		Limited	

Existing MDHHS Advisory: Women and children should not eat more than 1 meal per month of Lake Erie chinook salmon due to elevated levels of PCBs.

Recommendation: Sensitive populations should not eat these fish. Healthy adults should limit consumption of chinook salmon from Lake Erie to no more than 1 or 2 meals per year due to PCBs. Mercury, DDT, and toxaphene would cause 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
--	--	0				
Datasets available: --						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	--	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	--	--				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1984	1984	3*	21.3	10	21.3	28.7
Datasets available: 1984						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	3*	0.39	0.31	0.46	--	--
DDT	3*	0.07	0.04	0.11	--	--
Chlordane	3*	0.04	0.02	0.07	--	--
Toxaphene	3*	0.12	0.12	0.12	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						--

* - 3 composite samples of 5 fillets each

Existing MDHHS Advisory: Women and children should not eat more than 1 meal per month of Lake Erie coho salmon due to PCBs.

Recommendation: Sensitive populations should not eat these fish. Healthy adults should limit consumption of coho salmon from Lake Erie to no more than 1 or 2 meals per year due to PCBs. Mercury, DDT, and toxaphene would cause advisories. There are insufficient Lake Erie coho salmon data available to develop specific advice. This coho guideline is based on the Chinook salmon data for the following reasons. The data for Lake Huron coho salmon are limited due to the age of the data and the samples were analyzed as composites. Chinook salmon have a similar diet to coho and live 1 or 2 years longer than coho, thus the advisory for coho should be health protective for consumption of coho salmon. In addition, there may be some tendency for anglers to cross-identify the two species. *Note: Coho have not been planted in Lake Huron since 1989 and are relatively rare in the lake. Note: Temporal trends for mercury in Great Lakes fish are either staying the same or increasing. The 95% UCL for mercury in Lake Michigan coho salmon collected in 1994 and 2009 was 0.17 ppm.*

Freshwater Drum

Lake Erie - Western Basin
 [Dataset: Lake Erie, Plum Creek
 & River Raisin d/s Monroe Dam]

Monroe County

Hg Analysis:

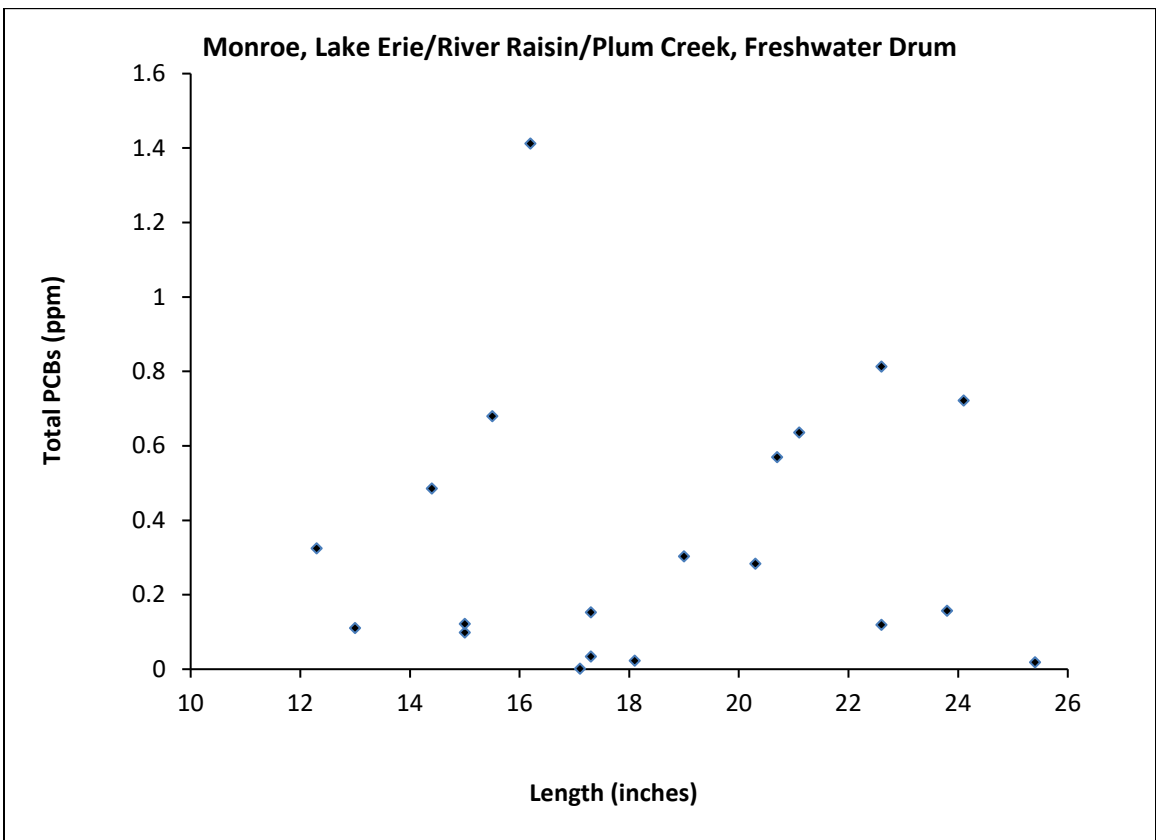
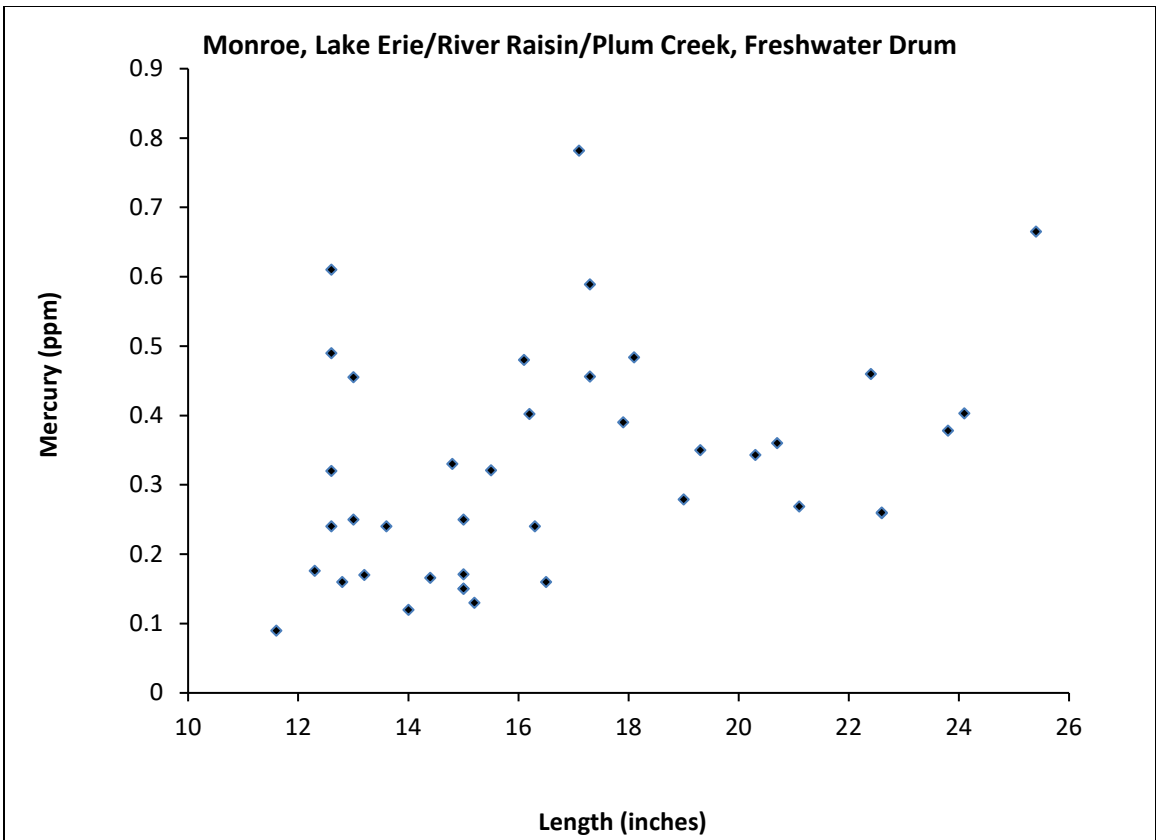
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
1995	2008	40	11.6	na	11.6	25.4	
Datasets available: 1995, 1998, 2006, 2008							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	40	0.325		0.09	0.78	0.38	2
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.121	0.169					

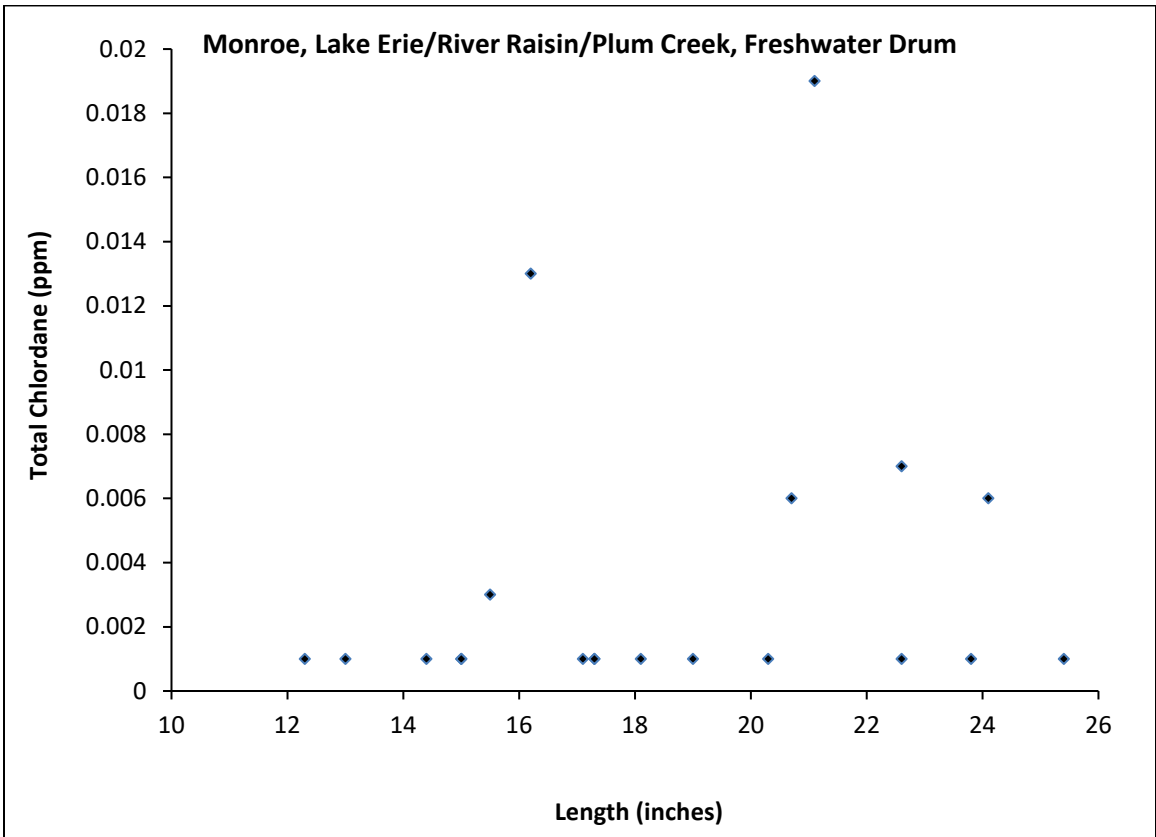
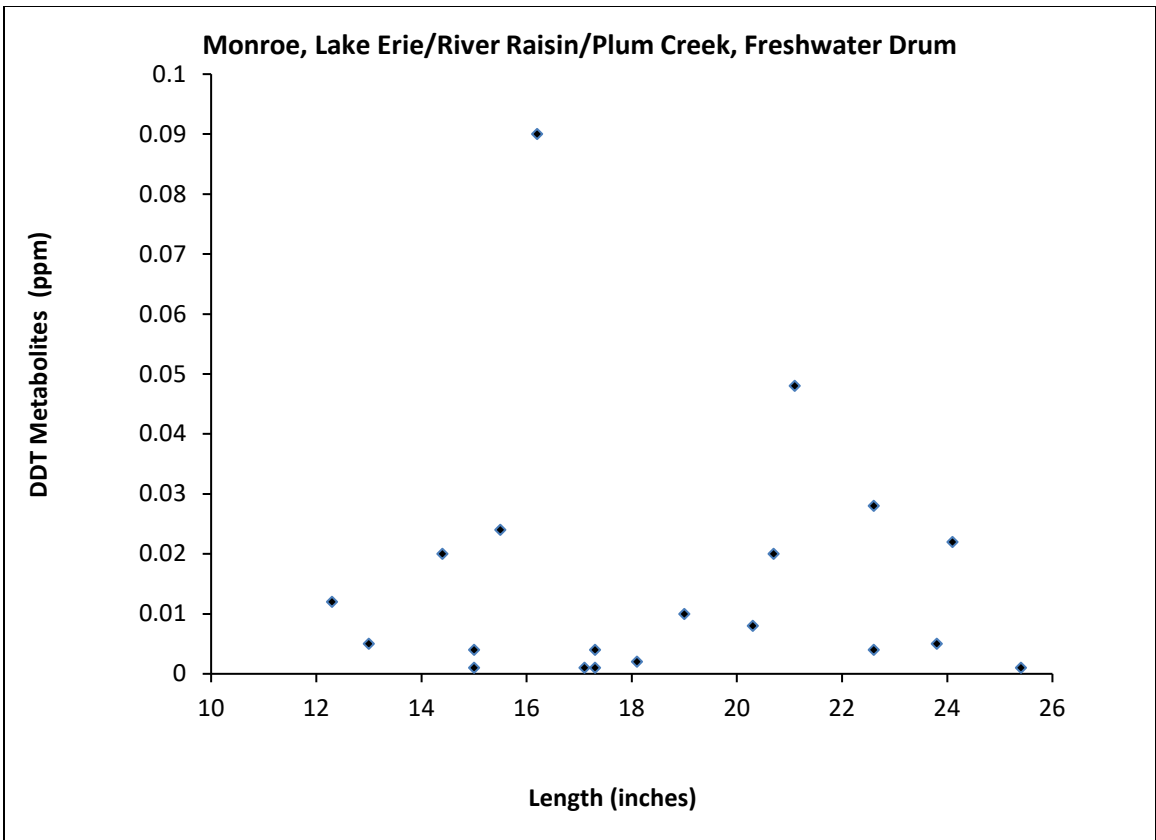
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
2006	2008	20	12.3	na	12.3	25.4	
Datasets available: 1995, 1998, 2006, 2008							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	20	0.354		0.002	1.4	0.52	Limited
DDT	20	0.016		0.001	0.09	0.03	16
Chlordane	20	0.003		0.001	0.02	0.01	--
Toxaphene	20	ND		--	--	--	--
TEQ	0	--		--	--	--	--
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.002	0.000					
DDT	0.000	0.000					
Chlordane	0.044	0.072					
Toxaphene	--	--					
TEQ	--	--					
Final meal category based on UCL:							Limited

Existing MDHHS Advisory: Women and children should not eat more than 1 meal per month of freshwater drum from Lake Erie, Plum Creek, or the River Raisin downstream of the Monroe Dam due to elevated levels of PCBs and mercury.

Recommendation: Sensitive populations should not eat any of these fish due to PCBs. Healthy adults should limit consumption of freshwater drum from Lake Erie, Plum Creek, or the River Raisin downstream of the Dundee Dam to no more than 1 or 2 meals per year due to PCBs. Mercury would cause an advisory.





Lake Whitefish

**Lake Erie
Western Basin**

Monroe 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	9	17.7	na	17.7	26.4
Datasets available: 1997						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	9	0.038	0.020	0.060	0.050	16
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.587	0.552				

Organics Analysis:

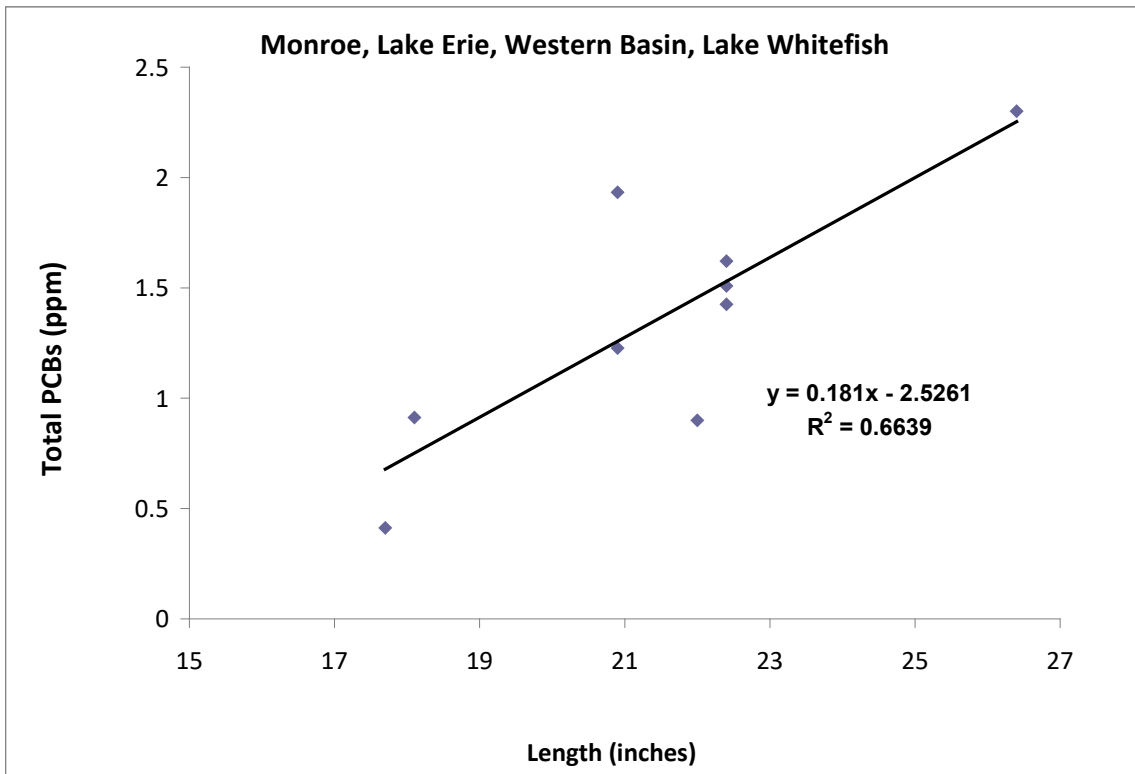
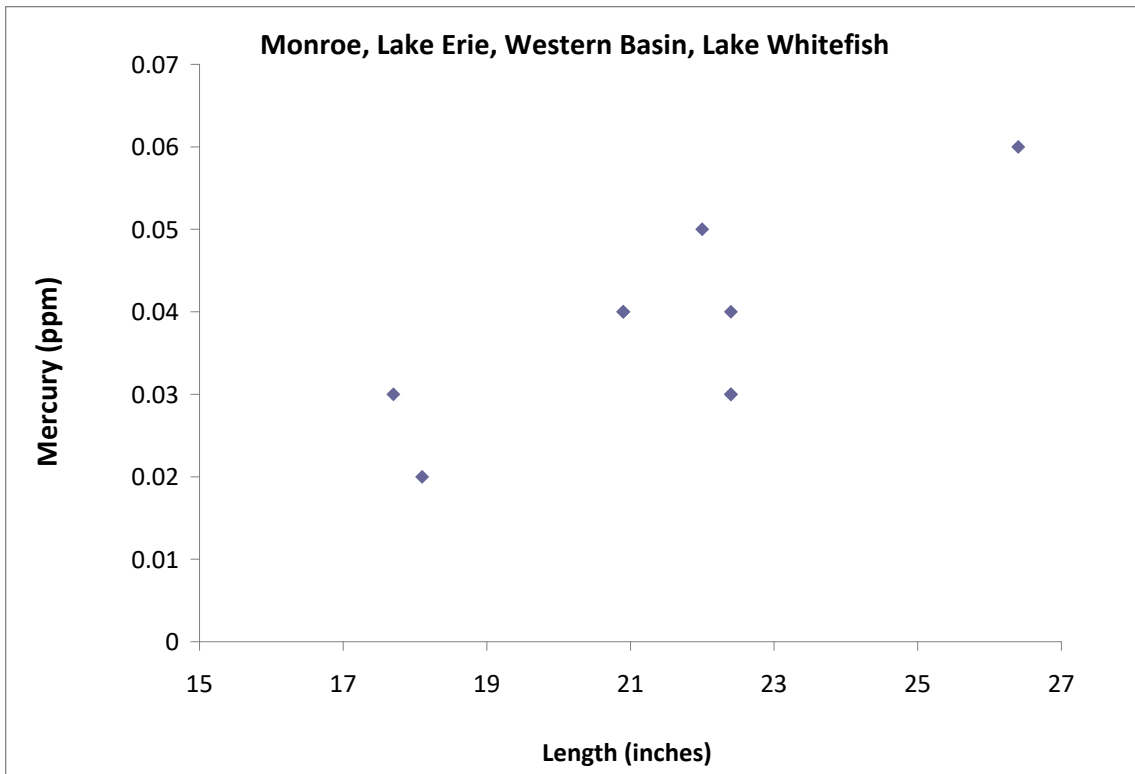
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1997	1997	9	17.7	na	17.7	26.4
Datasets available: 1997						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	9	1.360	0.412	2.301	1.800	Limited
DDT	9	0.307	0.117	0.533	0.410	4
Chlordane	9	0.117	0.027	0.168	0.150	--
Toxaphene	9	ND	--	--	--	--
TEQ*	9	8.0 ppt	4.6 ppt	13.0 ppt	10.2 ppt	0.5
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.664	0.620				
DDT	0.343	0.432				
Chlordane	0.606	0.552				
Toxaphene	--	--				
TEQ*	0.340	0.429				
Final meal category based on UCL:						Limited

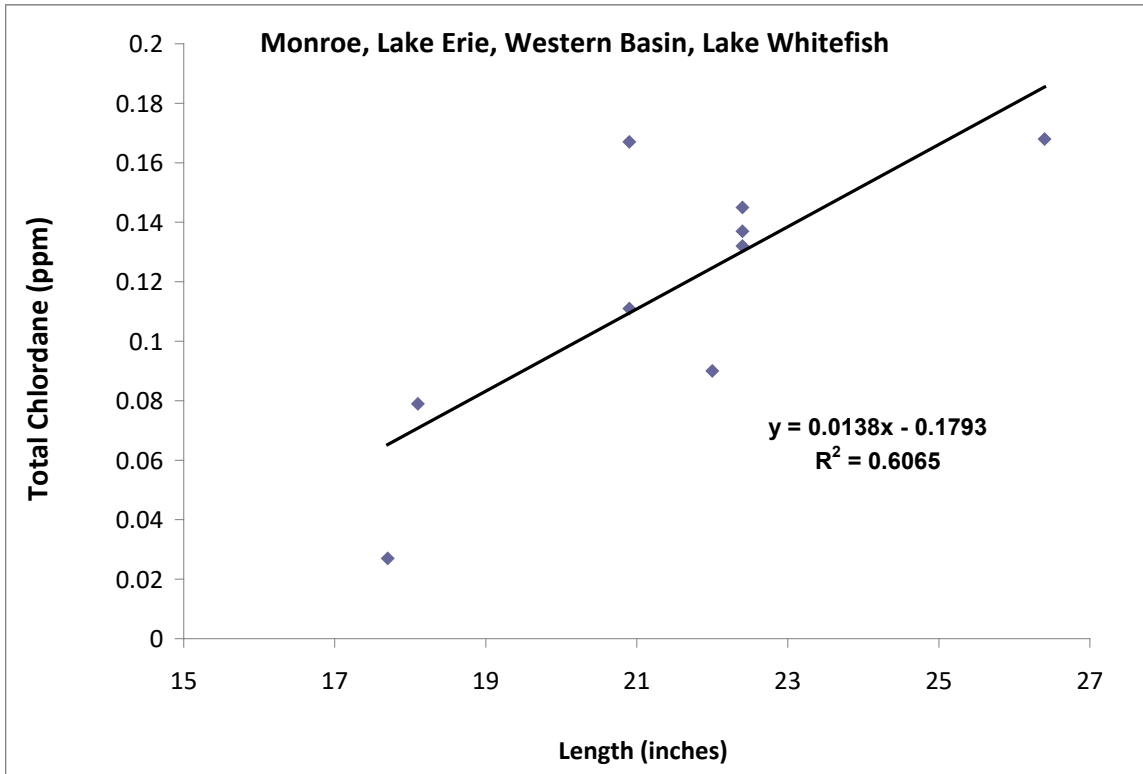
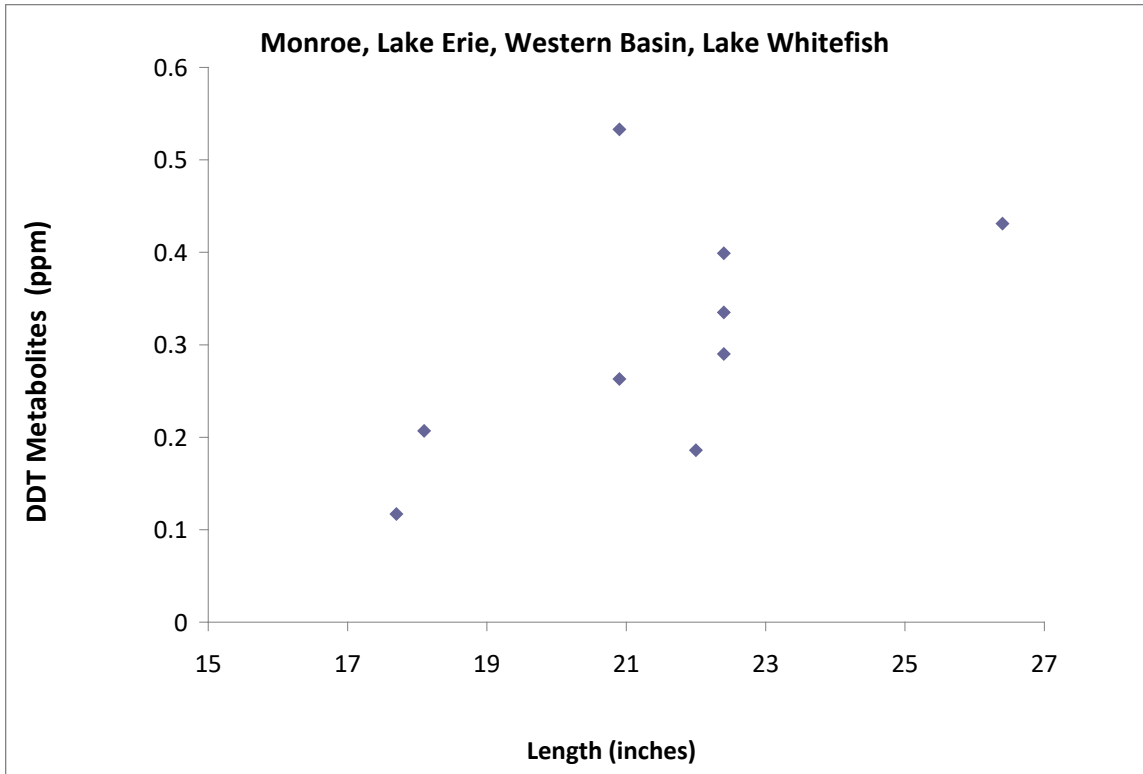
* 2005 WHO without dl-PCBs

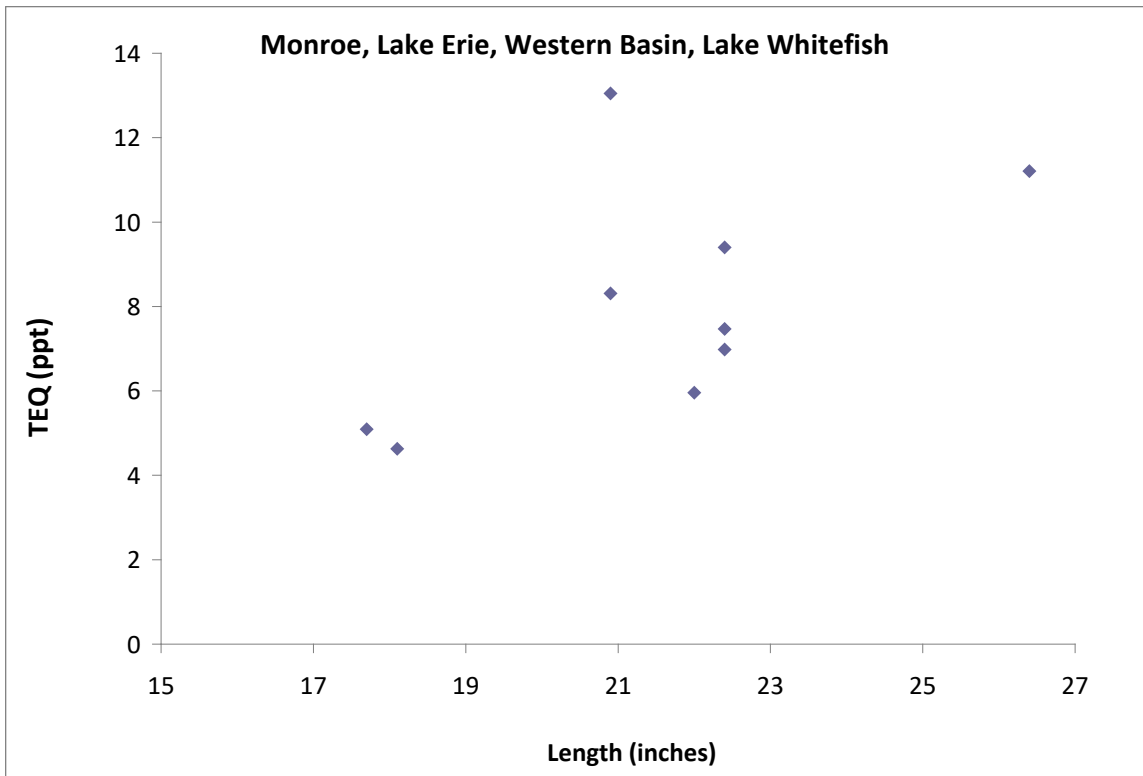
Existing MDHHS Advisory: Women and children should not eat Lake Erie lake whitefish due to elevated levels of PCBs and dioxins. The general population should not eat lake whitefish larger than 22 inches and should limit consumption of whitefish smaller than 22 inches to 1 meal per week.

Recommendation: Sensitive populations should not eat Lake Erie lake whitefish larger than 16 inches. No one should eat more than 6 meals per year of those fish smaller than 16 inches. Healthy adults should limit consumption of Lake Erie lake whitefish larger than 16 inches to no more than 1 or 2 meals per year due to PCBs and dioxins. Mercury and DDT would cause advisories.

Length (Inches)	PCB Regression Estimate (ppm)	Meal Category
14	0.0079	16
16	0.3699	0.5
18	0.7319	0
20	1.0939	0
22	1.4559	0
24	1.8179	0
26	2.1799	0
28	2.5419	0
<i>Shaded area denotes extrapolated estimates</i>		







**Largemouth and
Smallmouth Bass**

Lake Erie – Western Basin

Monroe County

[Dataset: Lake Erie, Plum Creek, River Raisin d/s
Dundee, Ottawa River mouth, N. Maumee Bay]

Hg Analysis:

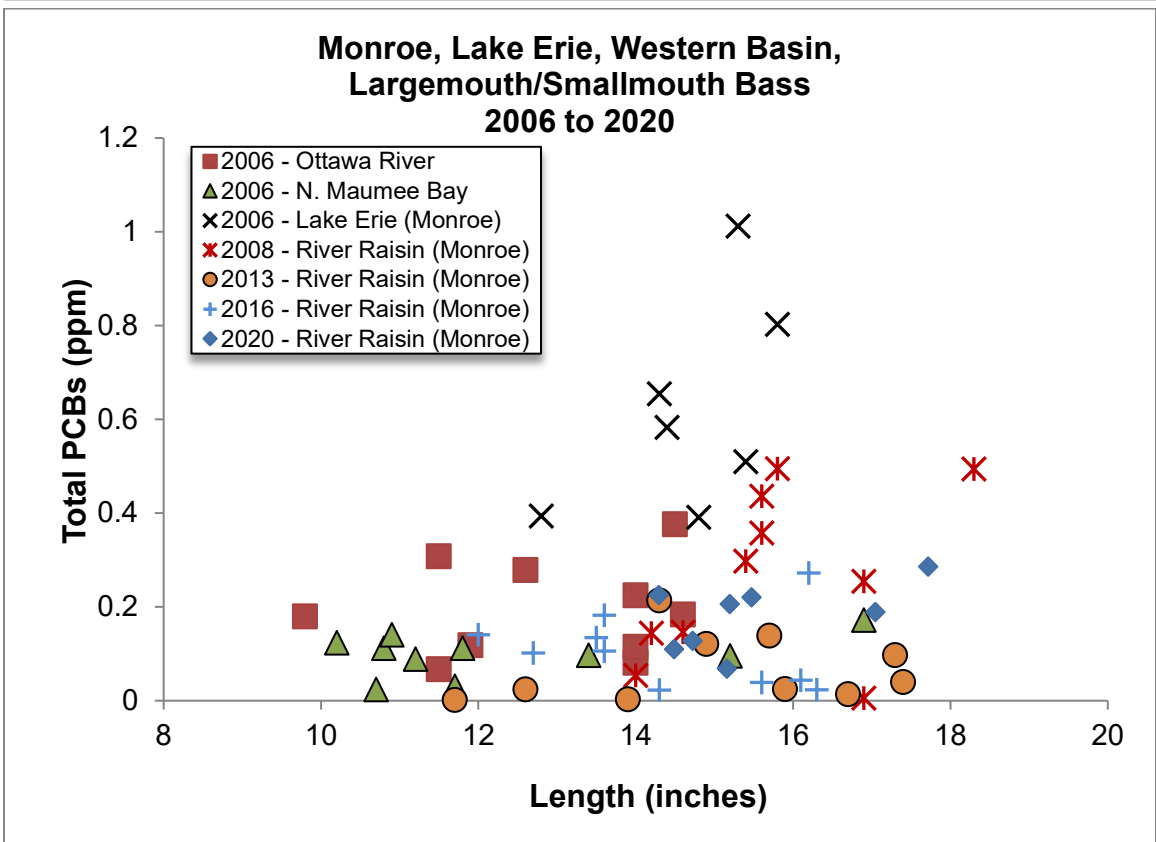
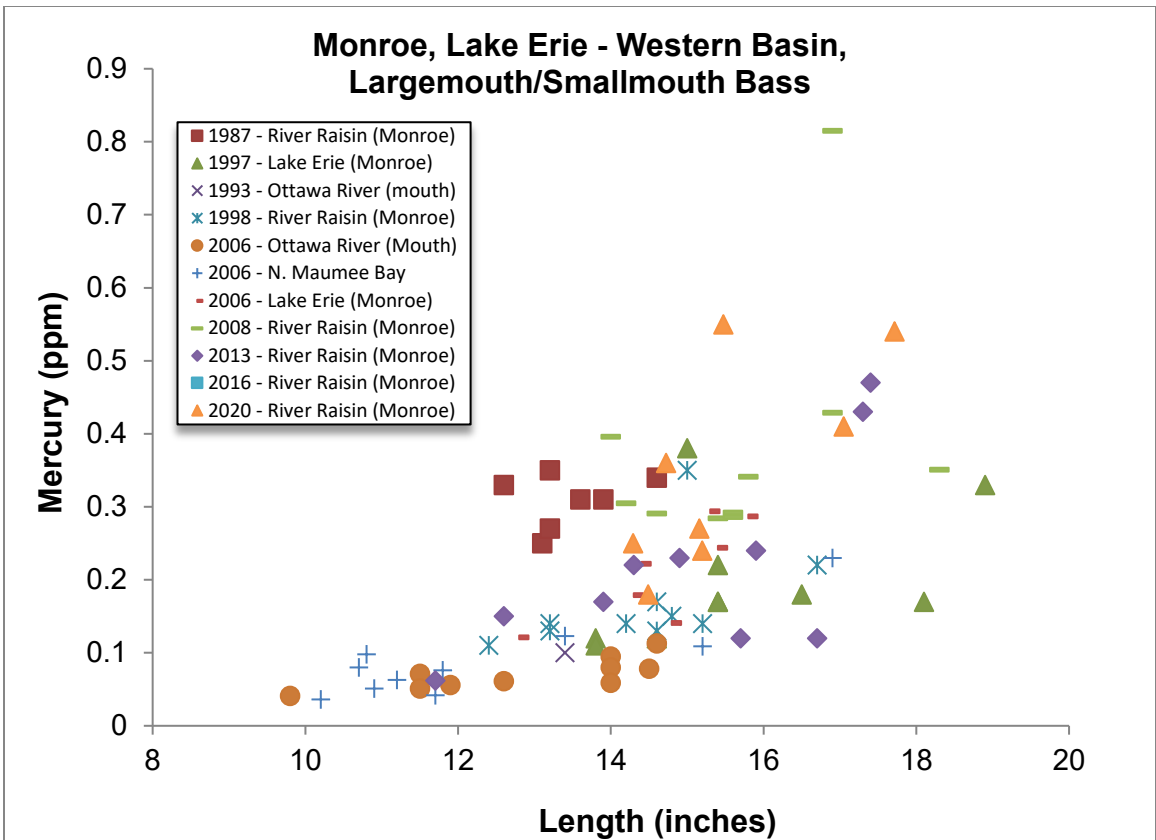
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
1987	2020	93	9.8	14.0	13.5	18.9	
Datasets available: 1987, '93, '97, '98, '06, '08, '13, '16, '20							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	67	0.261		0.059	0.815	0.295	2
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.209	0.199					

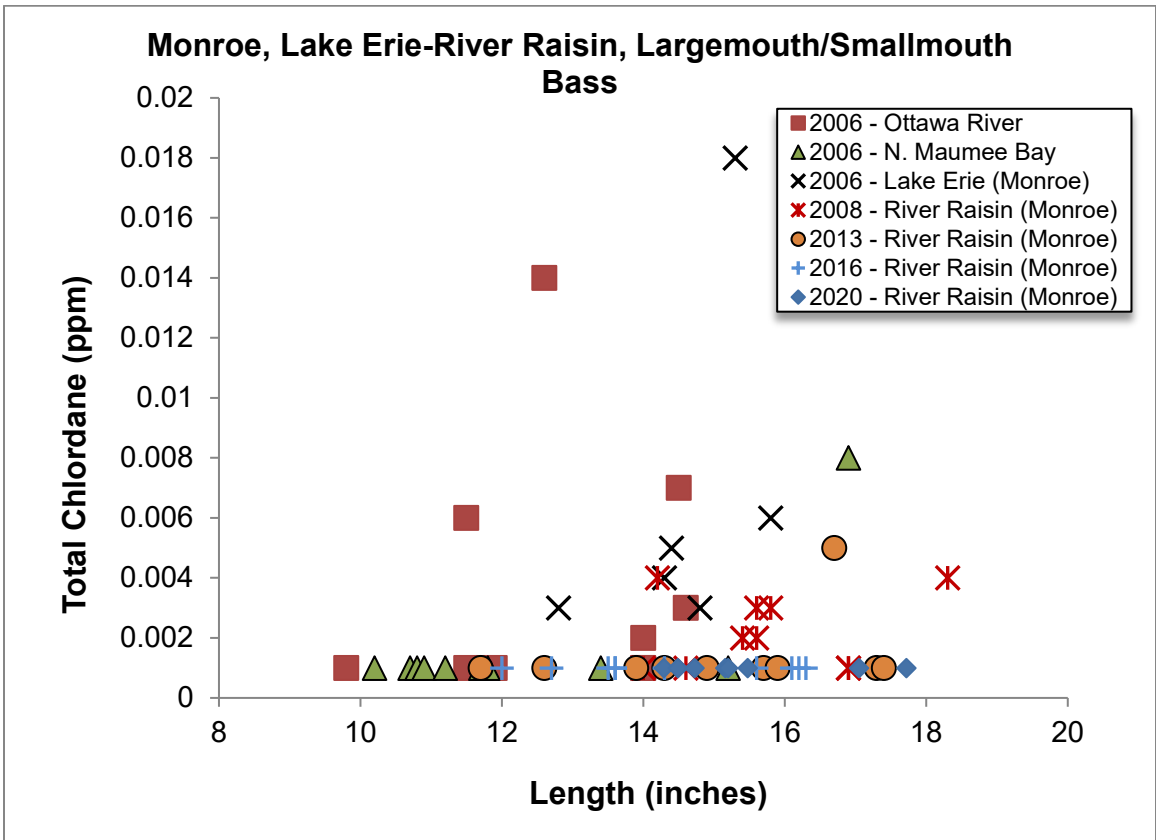
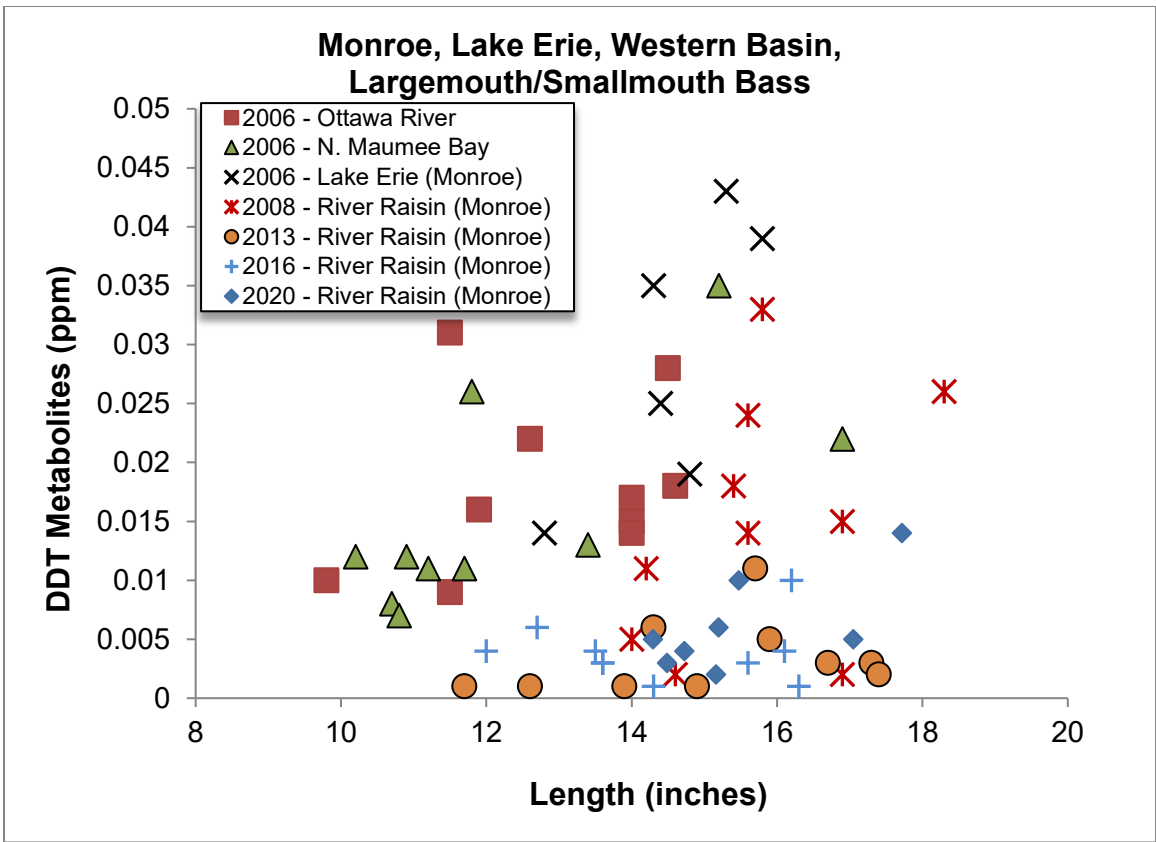
Organics Analysis:

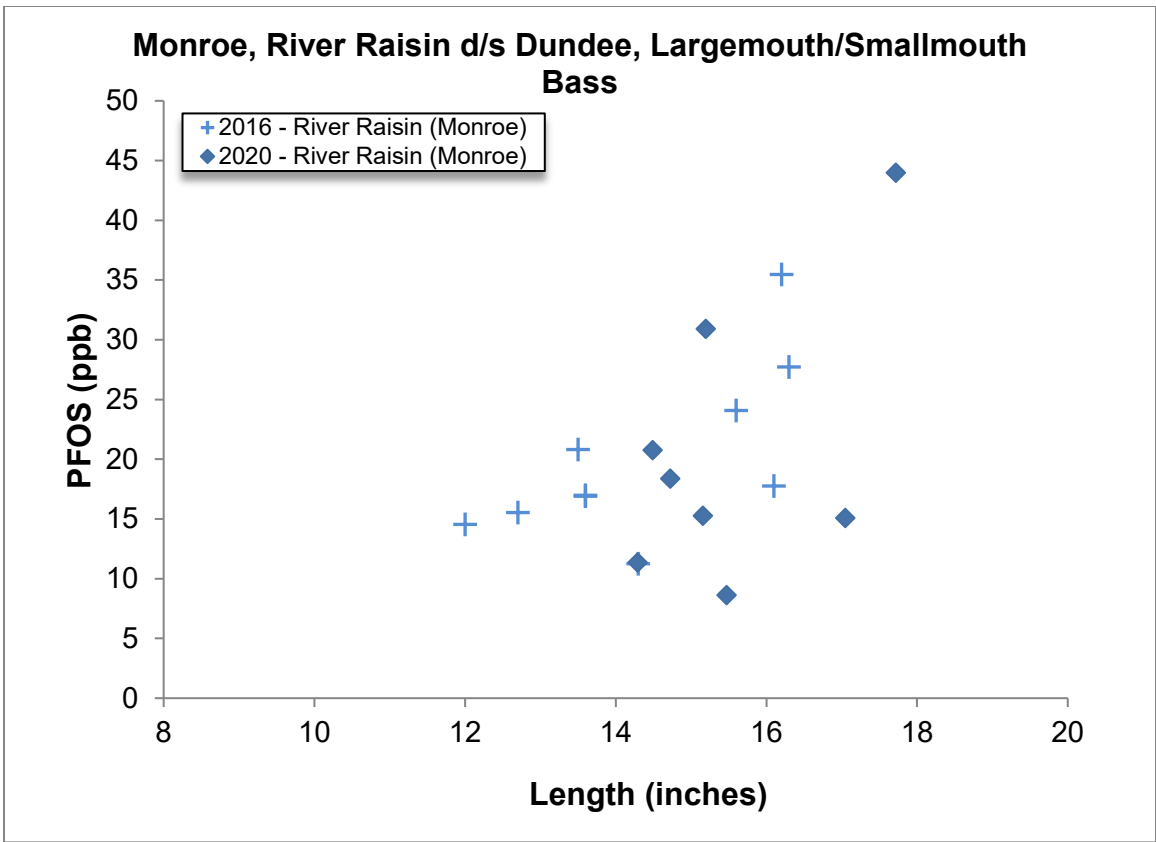
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
2006	2020	65	9.8	14.0	13.5	18.3	
Datasets available: 1984, '87, '93, '97, '98, '06, '08, '13, '16, '20							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	47	0.230		0.003	1.012	0.294	0.5
DDT	46	0.012		<0.001	0.043	0.016	16
Chlordane	46	0.002		<0.001	0.018	0.003	16
Toxaphene	47	ND		--	--	--	--
PFOS	16	21.0 ppb		8.6 ppb	44.0 ppb	26.0 ppb	4
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.049	0.020					
DDT	0.003	0.002					
Chlordane	0.009	0.026					
Toxaphene	--	--					
PFOS	0.297	0.214					
Final meal category based on UCL:							0.5

Existing MDHHS Advisory: Sensitive populations should not eat these fish. Healthy adults should limit consumption of largemouth and smallmouth bass from Lake Erie and the lower River Raisin (Ottawa River, Plum Creek, or the River Raisin downstream of the Dundee Dam) to no more than 1 or 2 meals per year due to PCBs. Mercury and dioxins would cause advisories.

Recommendation: No change is recommended. Additional samples should be collected from Lake Erie to determine if the advisory due to PCBs can be relaxed.







**Rainbow Trout
(Steelhead)**

Lake Erie

Monroe County

Hg Analysis:

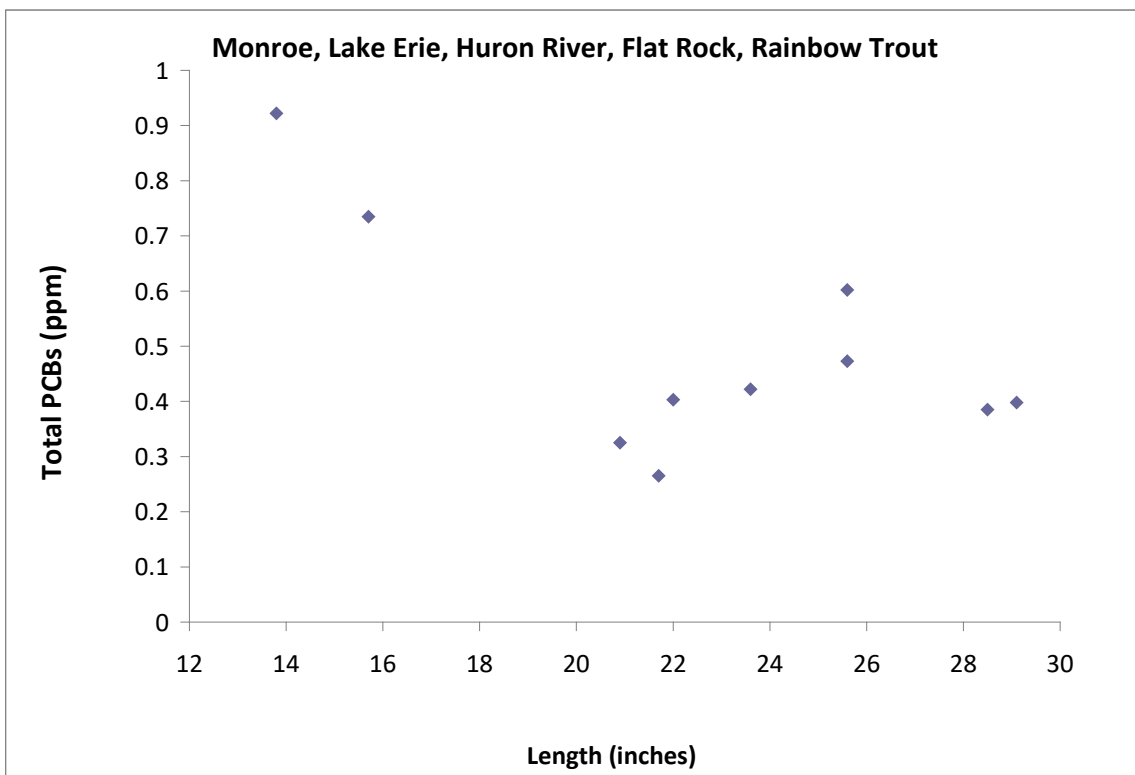
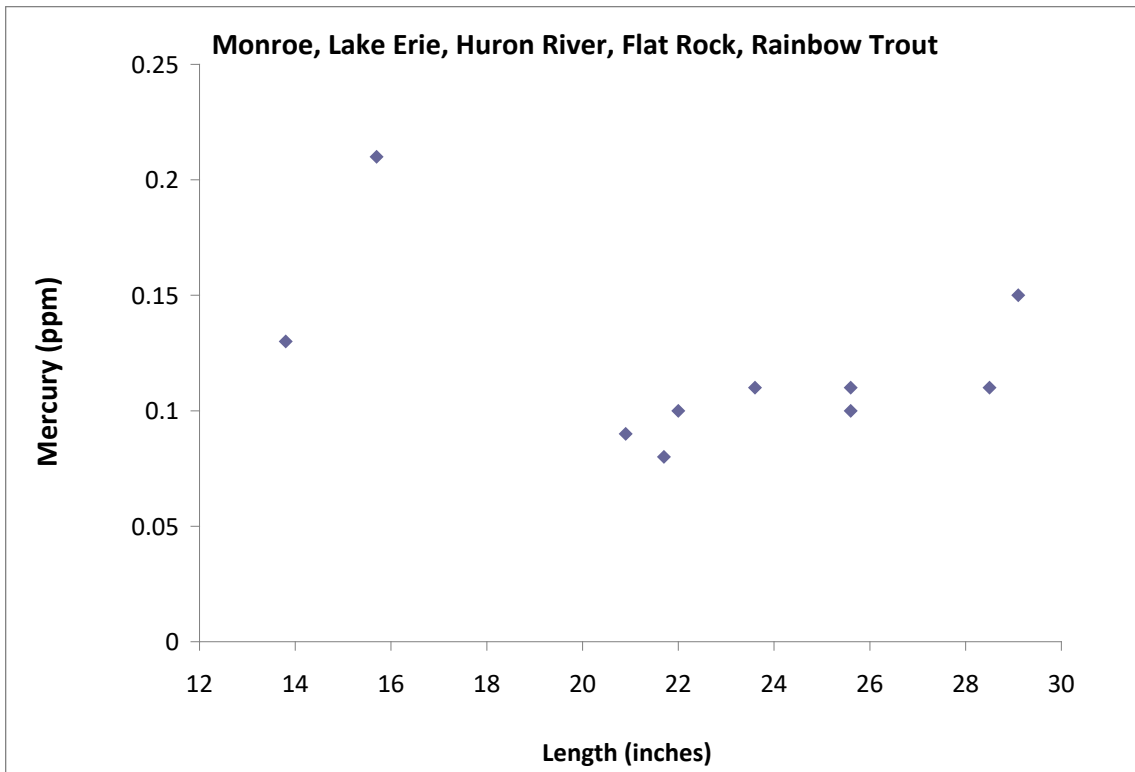
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1997	1997	10	13.8	10	13.8	29.1
Datasets available: 1997						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.12	0.08	0.21	0.15	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.115	0.081				

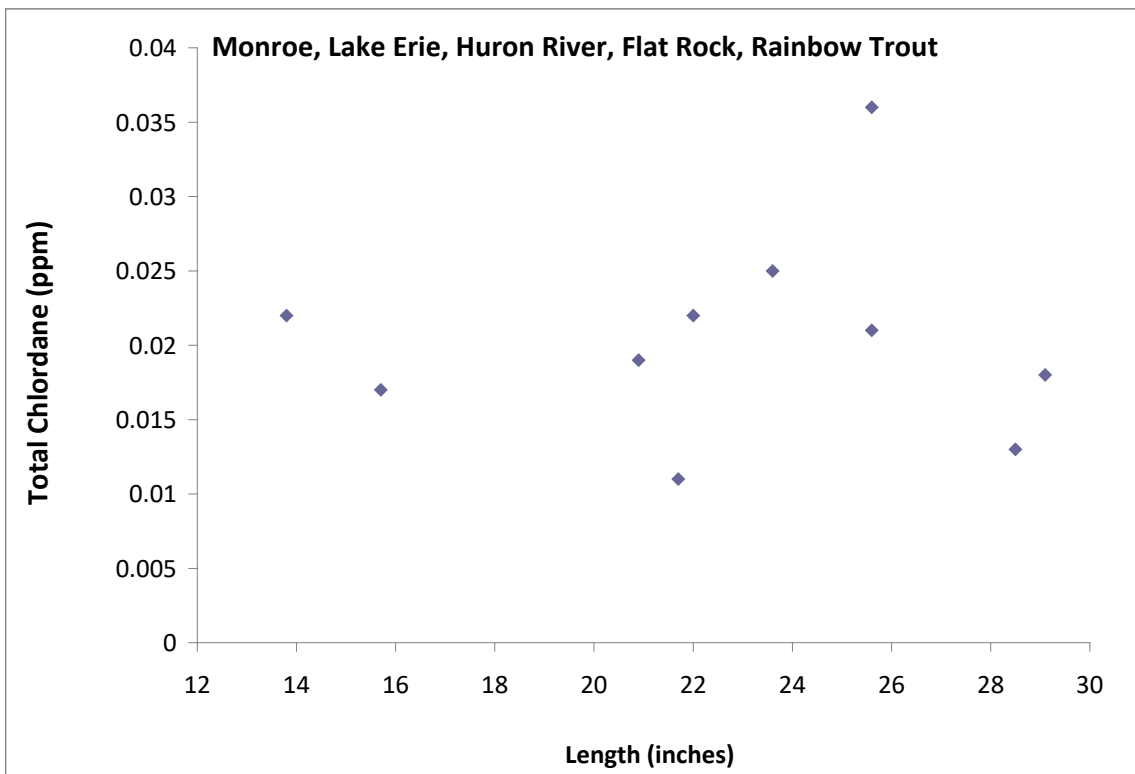
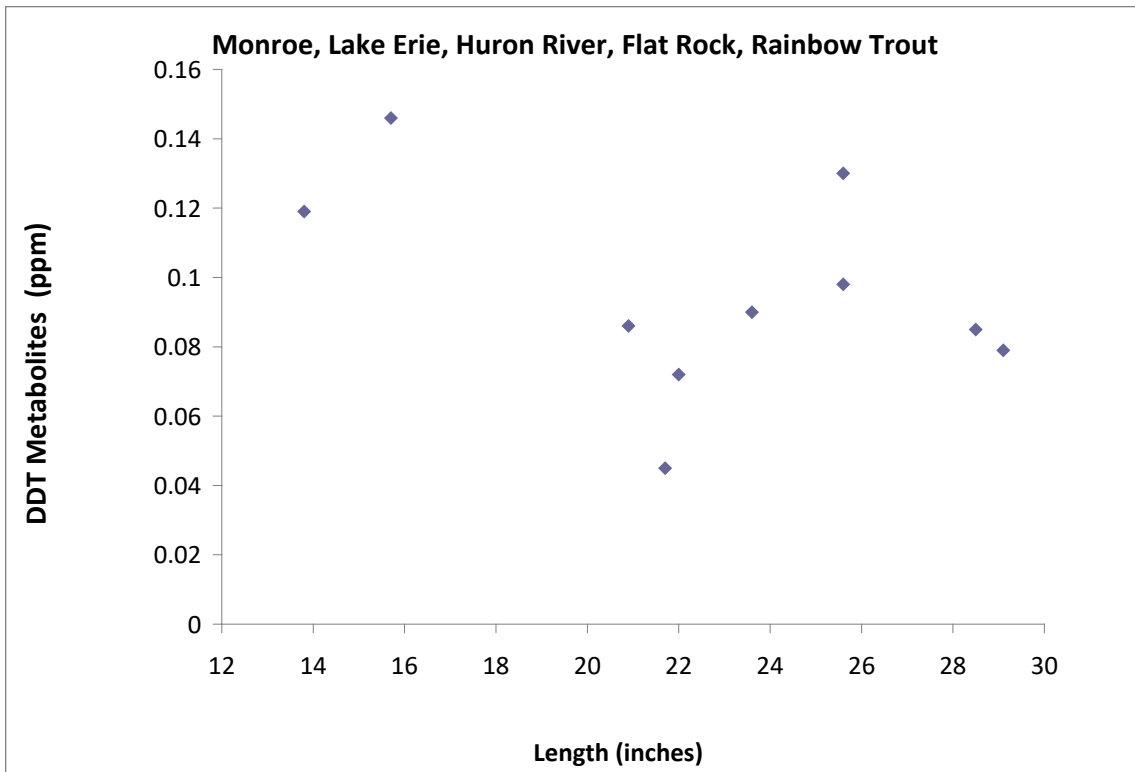
Organics Analysis:

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	13.8	10	13.8	29.1
Datasets available: 1997						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.493	0.265	0.922	0.640	Limited
DDT	10	0.095	0.045	0.146	0.120	12
Chlordane	10	0.020	0.011	0.036	0.030	--
Toxaphene	10	ND	--	--	--	--
TEQ	0	--				
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.427	0.305				
DDT	0.166	0.101				
Chlordane	0.002	0.000				
Toxaphene	--	--				
TEQ	--	--				
Final meal category based on UCL:						Limited

Existing MDHHS Advisory: Women and children should not eat more than 1 meal per month of Lake Erie rainbow trout due to elevated levels of PCBs.

Recommendation: Sensitive populations should not eat these fish. Healthy adults should limit consumption of rainbow trout (steelhead) from Lake Erie to no more than 1 or 2 meals per year due to PCBs. Mercury and DDT would cause advisories.





White Perch

**Lake Erie
Western Basin**

Monroe County

Hg Analysis:

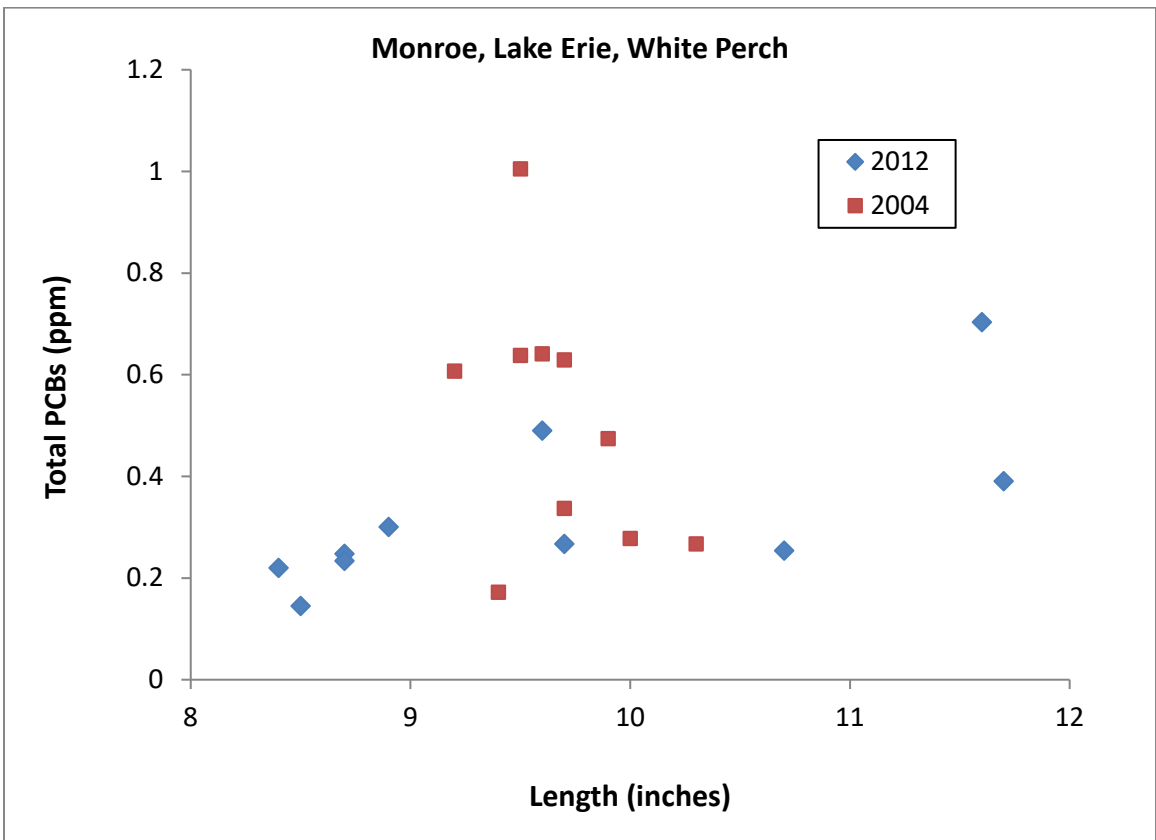
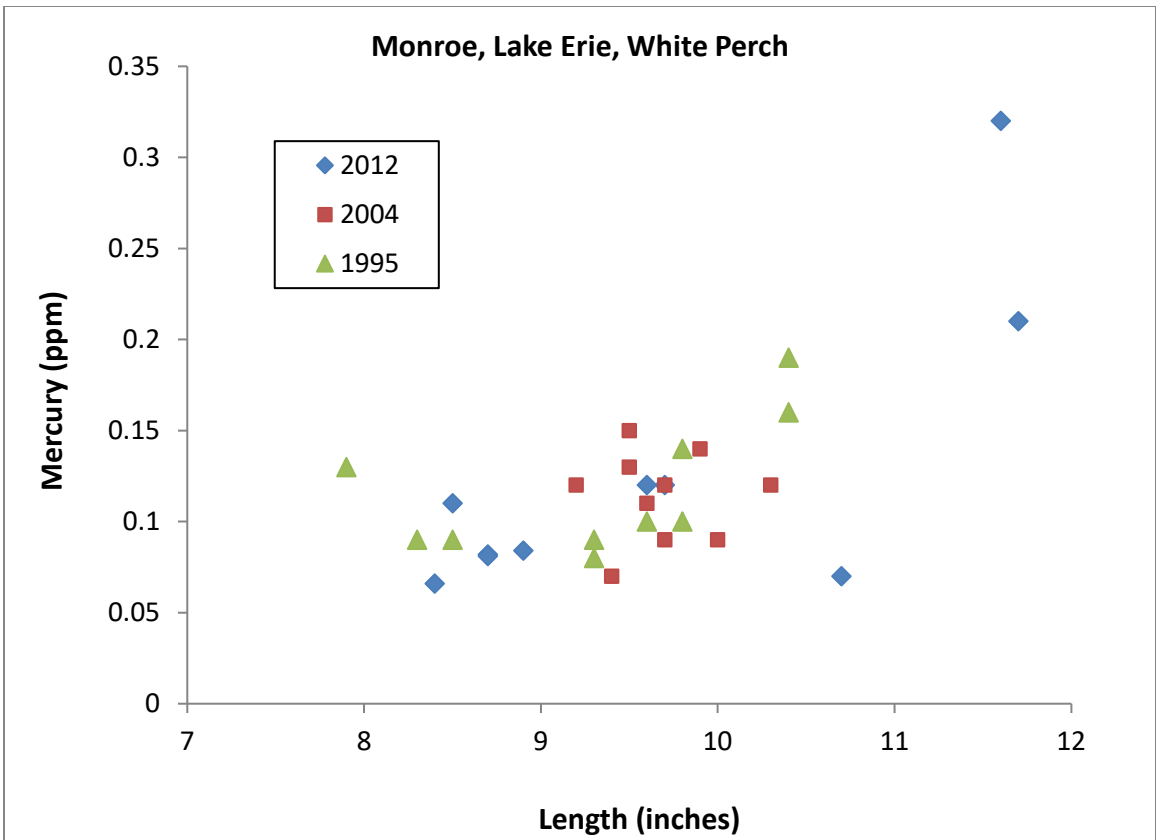
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
1995	2012	30	7.9	na	7.9	11.7	
Datasets available: 1995, 2004, 2012							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	30	0.12		0.07	0.32	0.14	4
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.435	0.382					

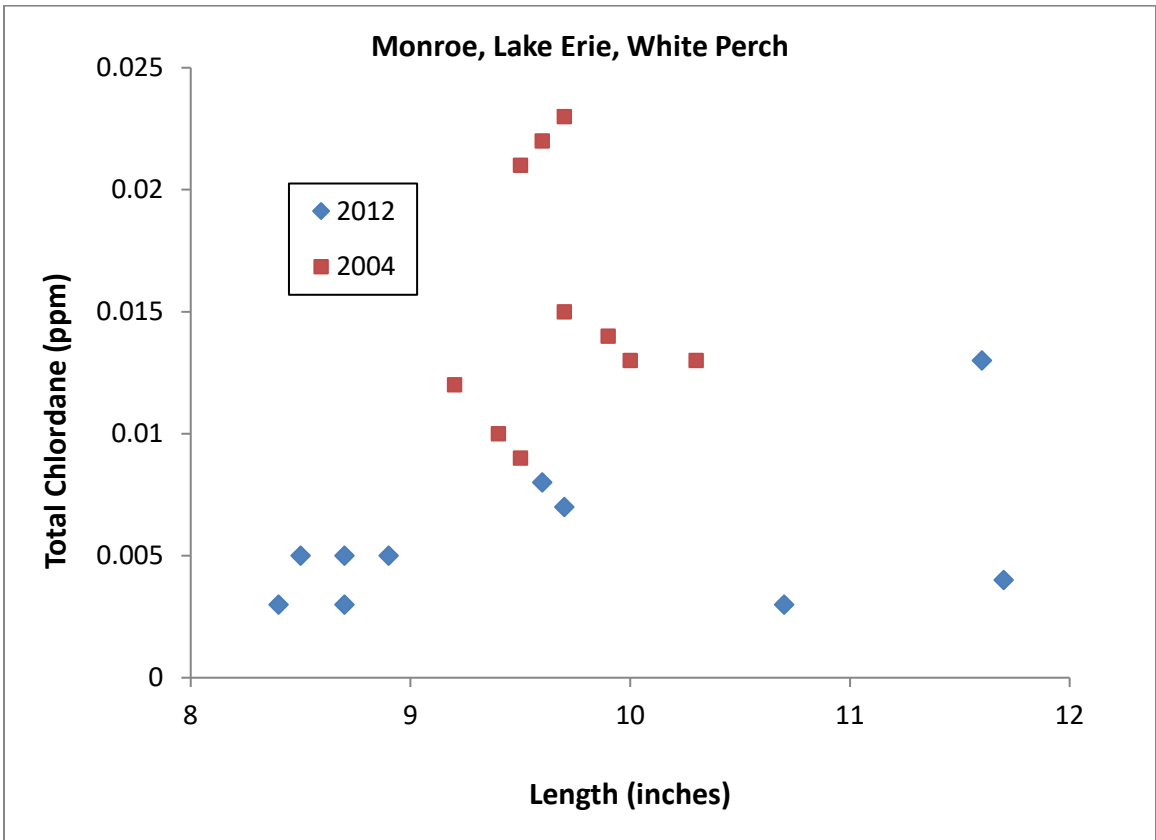
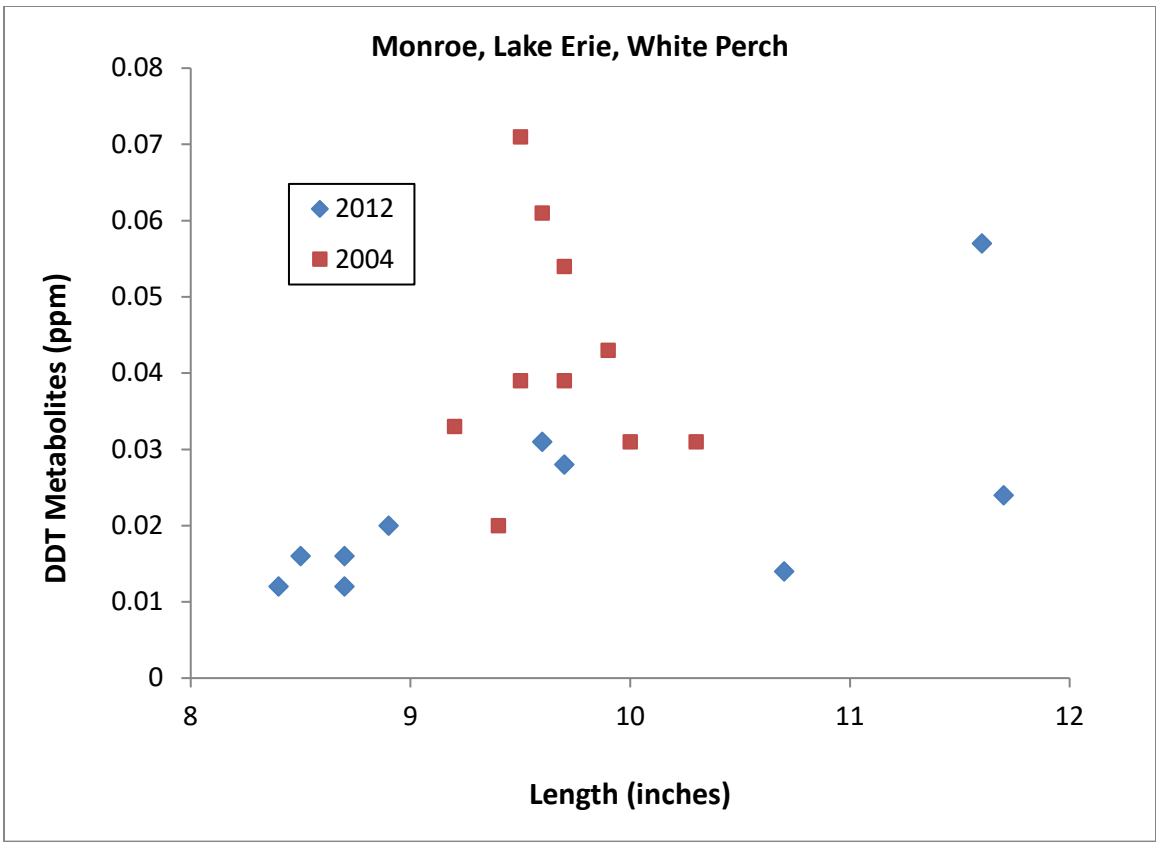
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
2004	2012	20	8.4	na	8.4	11.7	
Datasets available: 1995, 2004, 2012							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	20	0.42		0.14	1.0	0.52	Limited
DDT	20	0.03		0.01	0.07	0.04	16
Chlordane	20	0.01		0.003	0.02	0.01	--
Toxaphene	10	--		--	--	--	--
TEQ	0						
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.071	0.122					
DDT	0.108	0.155					
Chlordane	0.026	0.037					
Toxaphene	--	--					
TEQ	--	--					
Final meal category based on UCL:							Limited

Existing MDHHS Advisory: Sensitive populations should not eat these fish. Healthy adults should limit consumption of white perch from Lake Erie to no more than 1 or 2 meals per year due to PCBs. Mercury would cause an advisory.

Recommendation: No change.





Yellow Perch

**Lake Erie
Western Basin**

Monroe 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	2012	50	6.3	na	6.3	11.8
Datasets available: 1993, 1997, 2006, 2012						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	50	0.10	0.02	0.35	0.13	8
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.442	0.613				

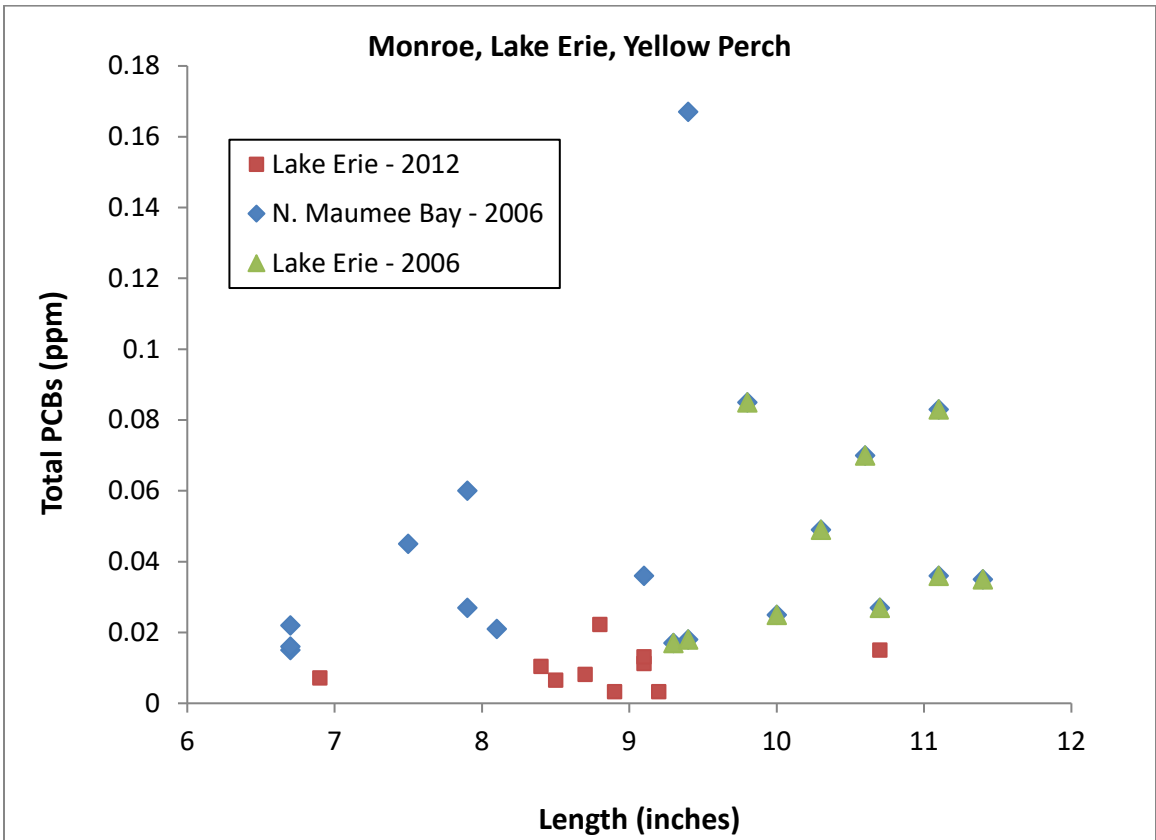
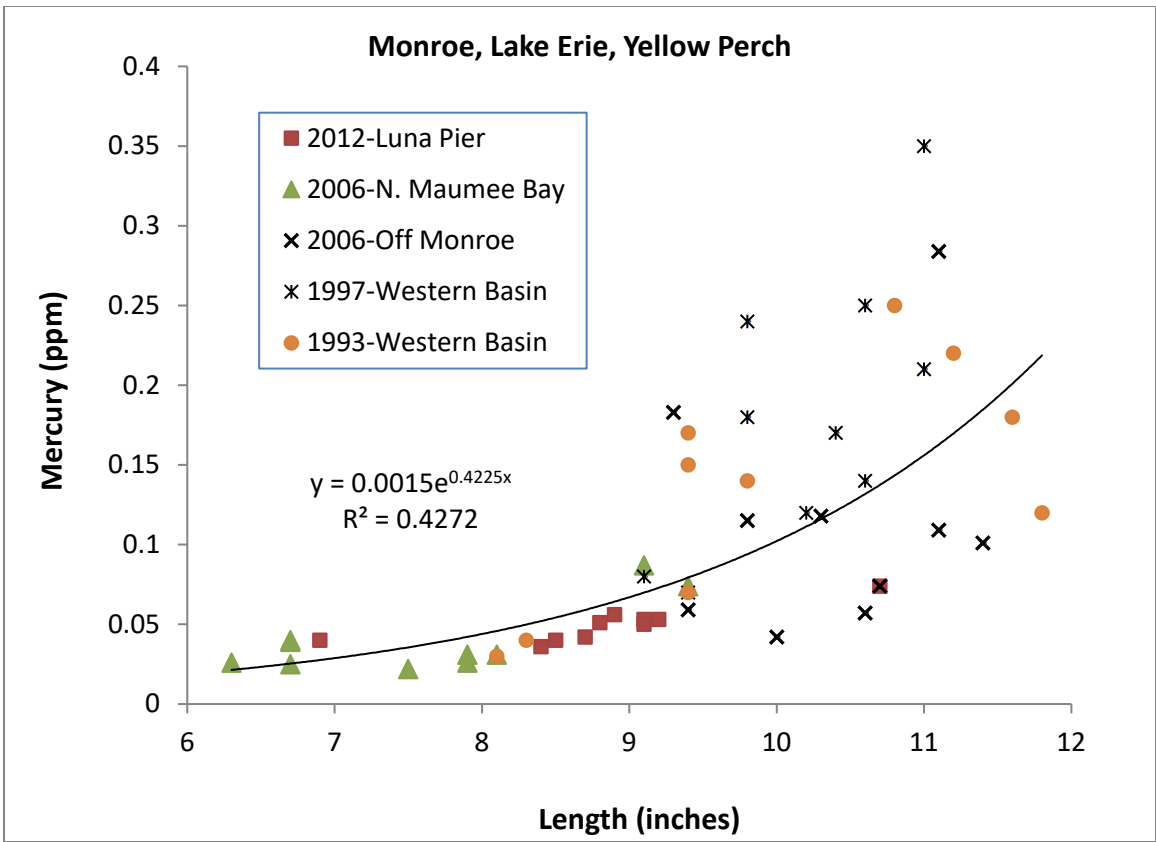
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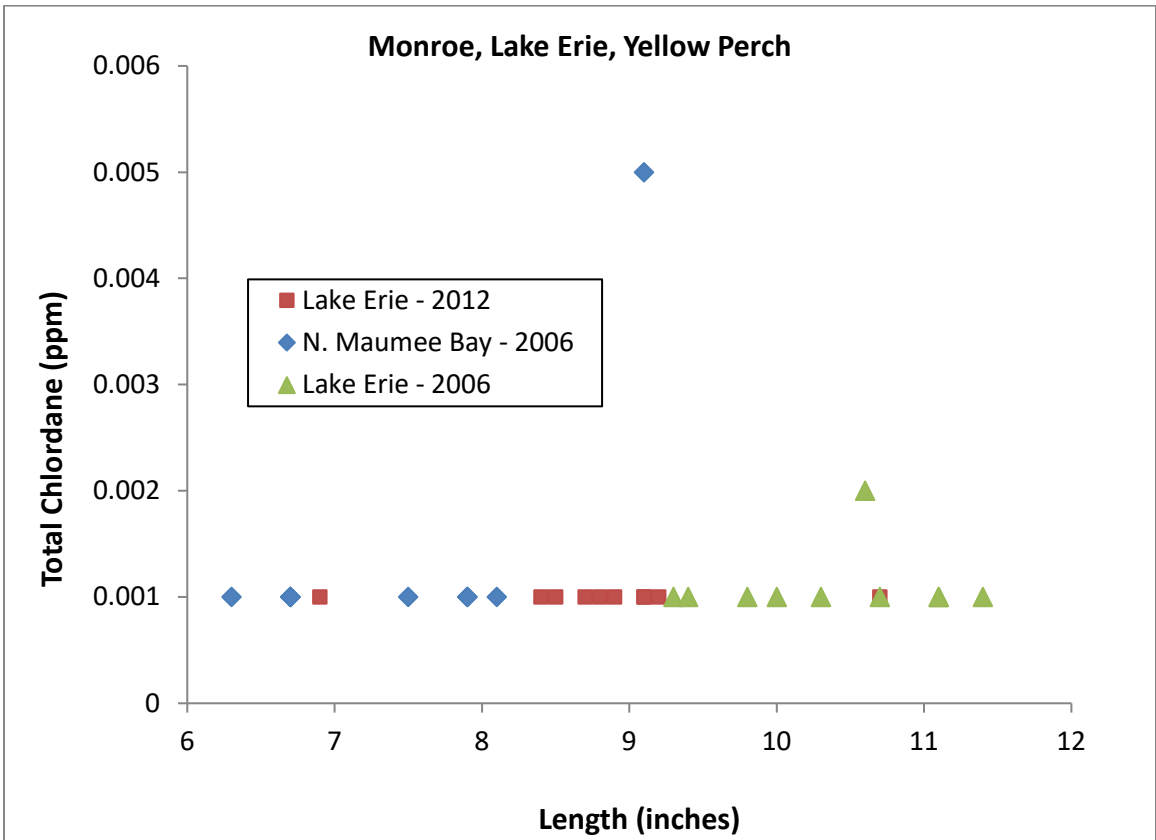
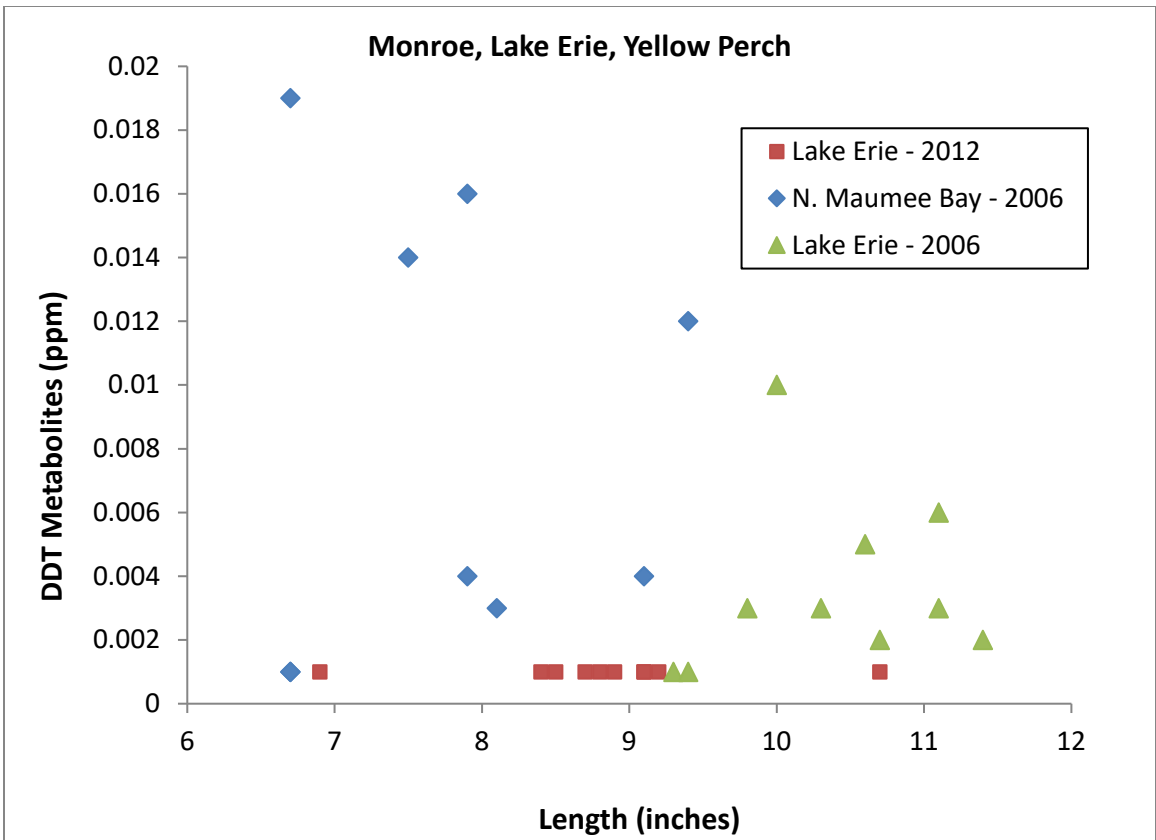
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2006	2012	20	6.3	na	6.3	11.4
Datasets available: 1993, 1997, 2006, 2012						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	29	0.03	0.003	0.17	0.05	4
DDT	29	0.004	0.001	0.02	0.01	16
Chlordane	29	0.001	0.001	0.005	0.001	--
Toxaphene	29	ND	--	--	--	--
TEQ	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.088	0.111				
DDT	0.048	0.000				
Chlordane	0.011	0.018				
Toxaphene	--	--				
TEQ	--	--				
Final meal category based on UCL:						4

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

Recommendation: No change. At least one more sampling event should be conducted before relaxing the advisory based on PCB concentrations.

Length (Inches)	Hg Regression Equation Estimate (ppt)	Meal Category
6	0.02	16
7	0.03	16
8	0.04	16
9	0.07	16
10	0.1	8
11	0.16	4
12	0.24	4
13	0.36	2
<i>Shaded area denotes extrapolated estimates</i>		





Lake Huron

Atlantic Salmon

Lake Huron

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	18.5	10	18.5	25.6
Datasets available: 2018						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.04	0.03	0.06	0.04	16
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.407	0.440				

Organics Analysis:

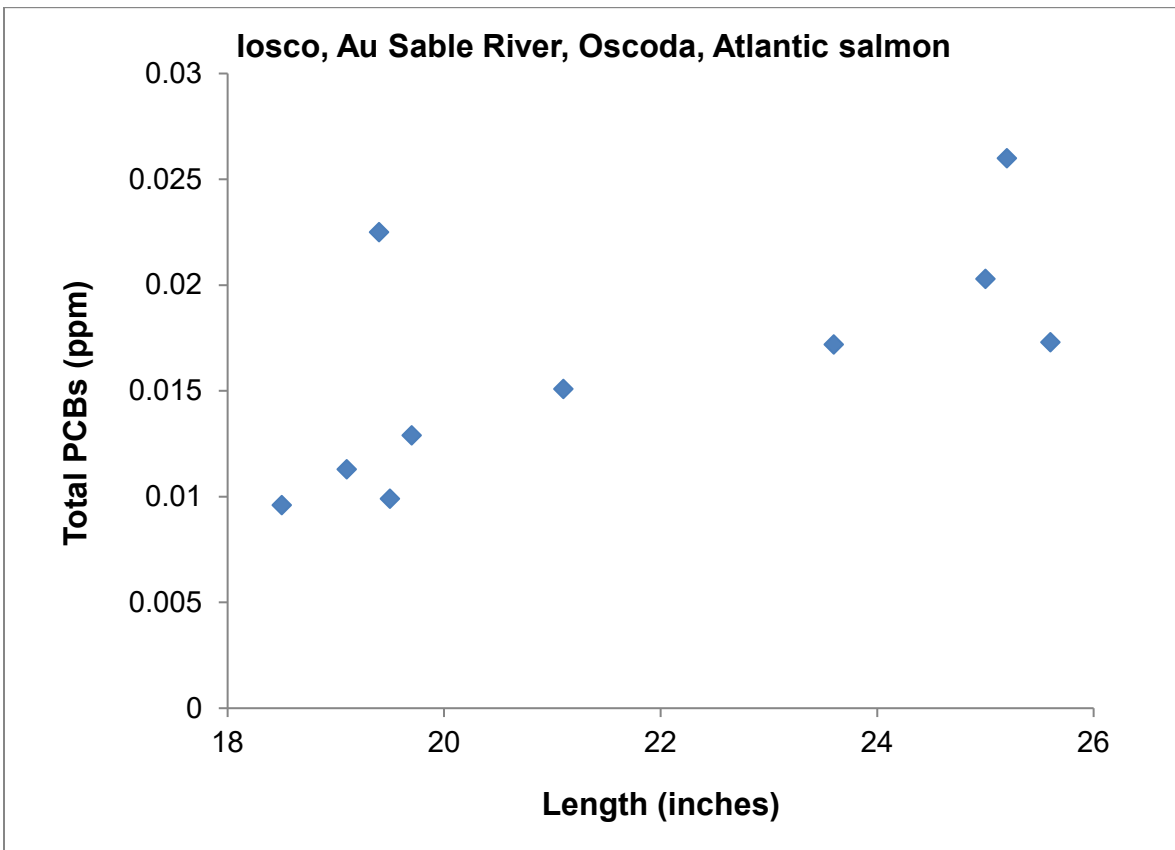
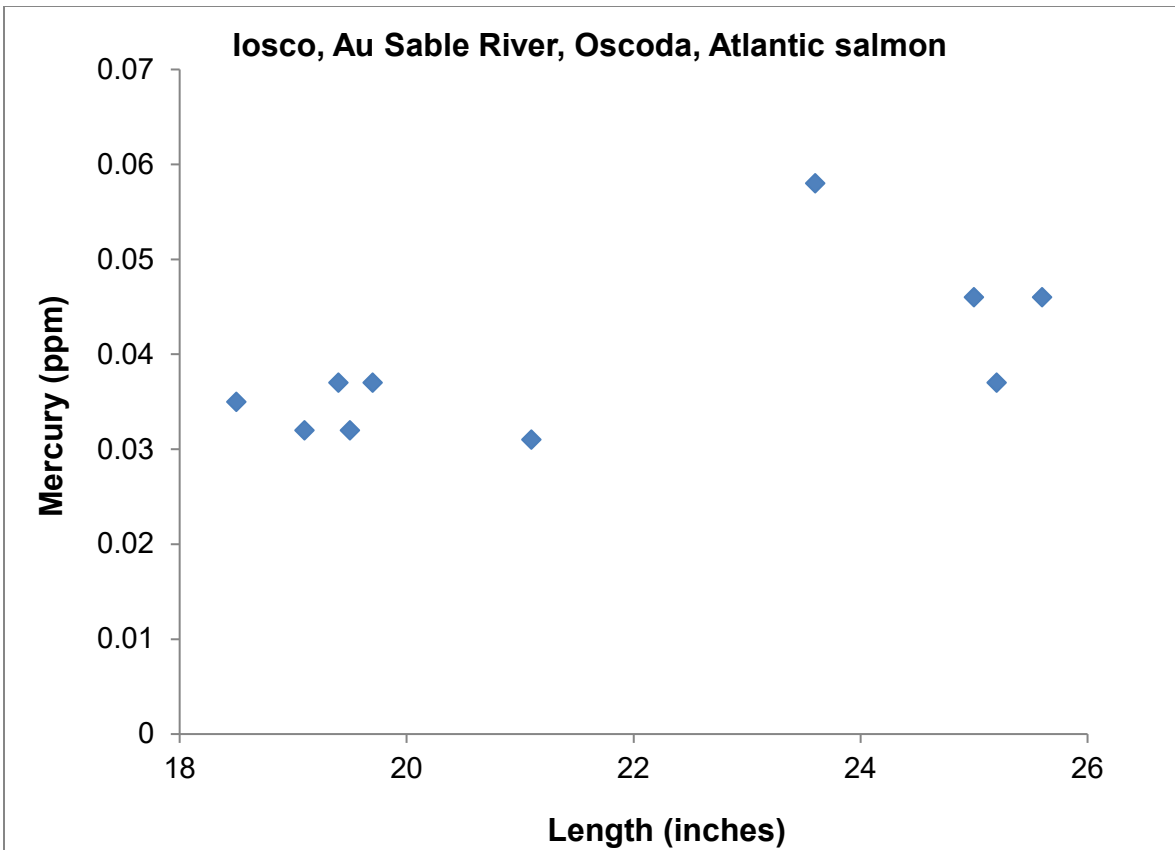
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2018	2018	10	18.5	10	18.5	25.6
Datasets available: 2018						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.02	0.01	0.03	0.02	12
DDT	10	0.006	0.003	0.01	0.01	16
Chlordane	10	0.002	0.001	0.002	0.002	--
Toxaphene	10	ND	--	--	--	--
TEQ*	10	2 ppt	1 ppt	3 ppt	2 ppt	2
PFOS	10	3 ppb	0.9 ppb	6 ppb	4 ppb	16
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.444	0.490				
DDT	0.905	0.873				
Chlordane	0.000	0.000				
Toxaphene	--	--				
TEQ*	0.399	0.418				
PFOS	0.001	0.034				
Final meal category based on UCL:						2

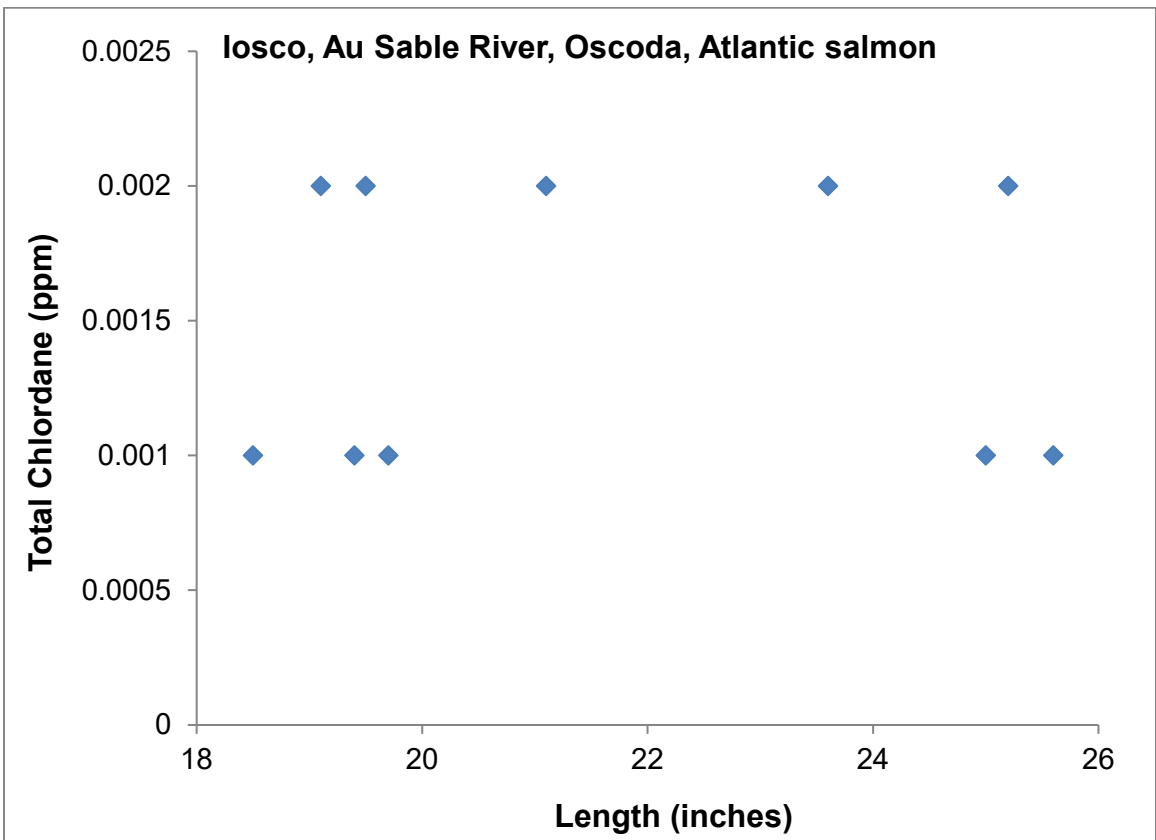
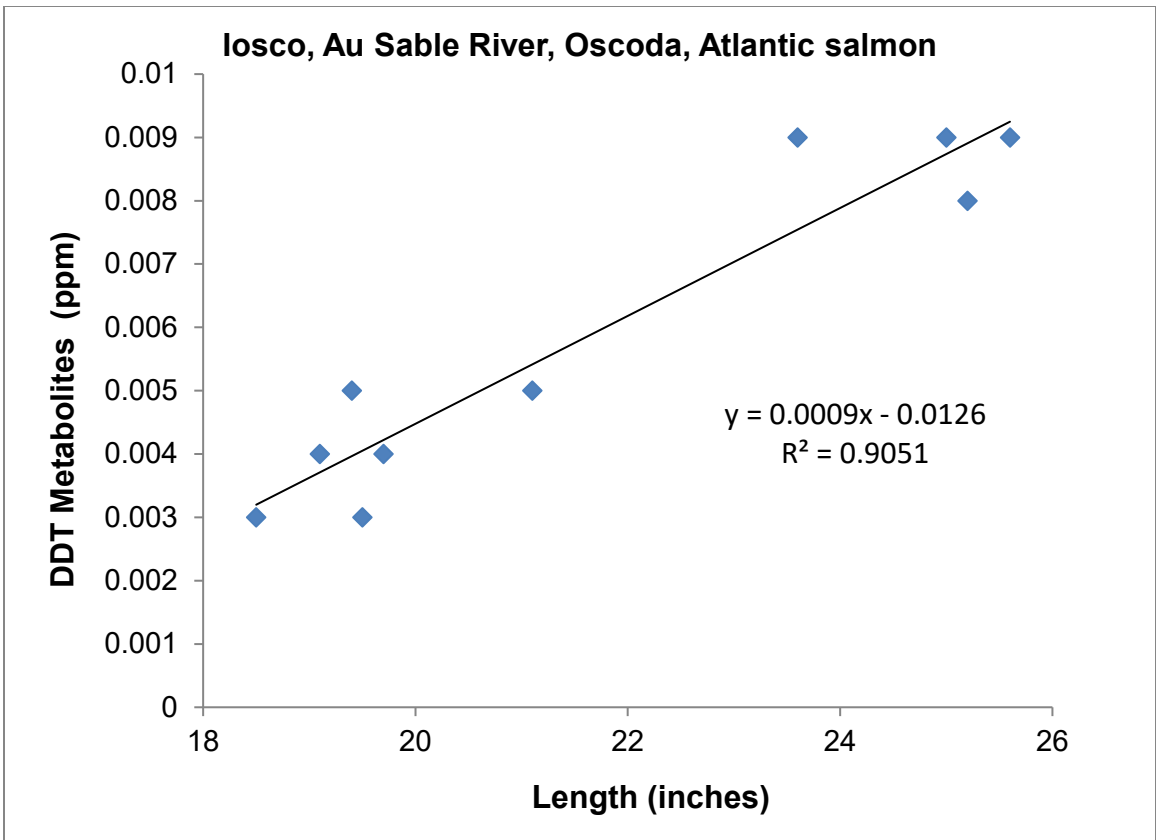
* 2005 WHO; dl-PCBs included

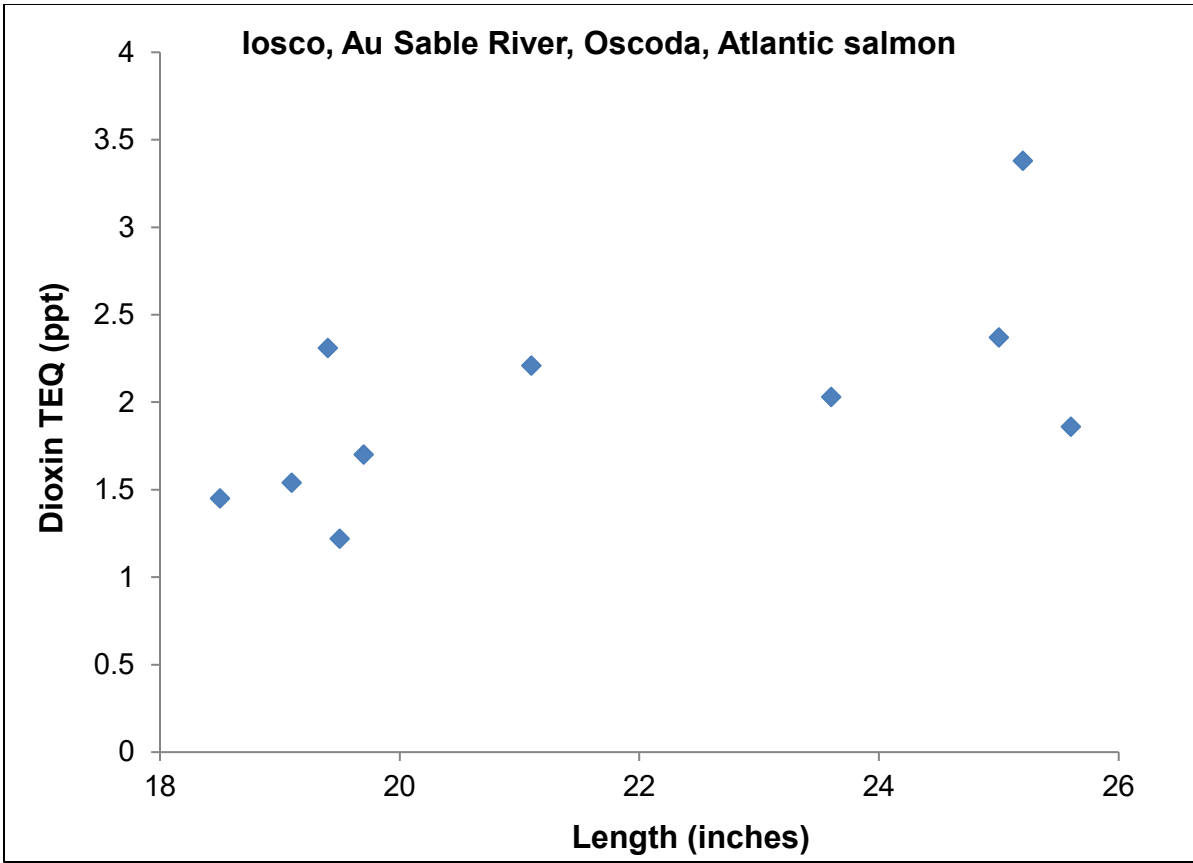
Existing MDHHS Advisory: Specific guidelines for Lake Huron Atlantic salmon were not developed since data were not available previously.

Recommendation: No one should eat more than 2 meals per month of Lake Huron Atlantic salmon of any size due to dioxins. PCBs would also cause an advisory.

Length (Inches)	DDT Regression Equation Estimate (ppm)	Meal Category
14	0	14
16	0.002	16
18	0.004	18
20	0.005	20
22	0.007	22
24	0.009	24
26	0.011	26
28	0.013	28
<i>Shaded area denotes extrapolated estimates</i>		







Brown Trout

Lake Huron

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	
1986	1993	57	15	10	15	28.3	
Datasets available: 1986, 1989, 1990, 1991, 1992, 1993							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)		
Mercury	57	0.13	0.06	0.30	0.14	4	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.321	0.369					

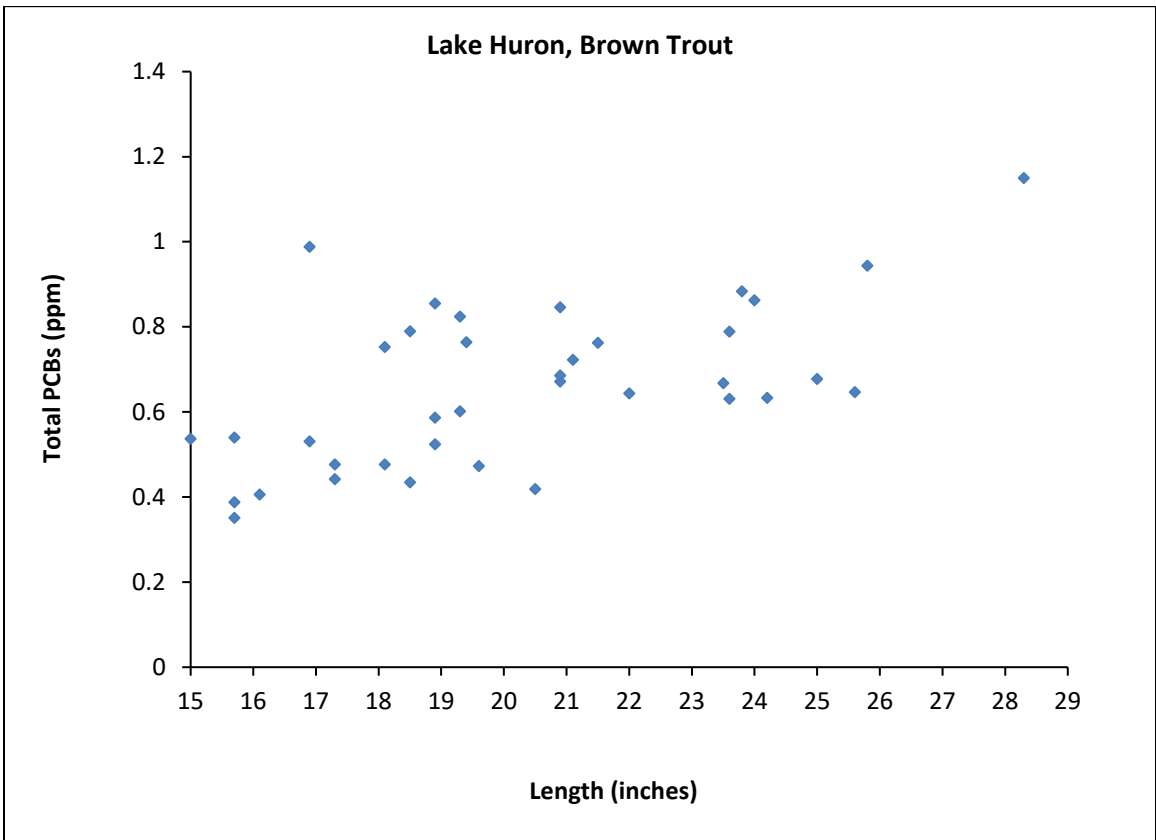
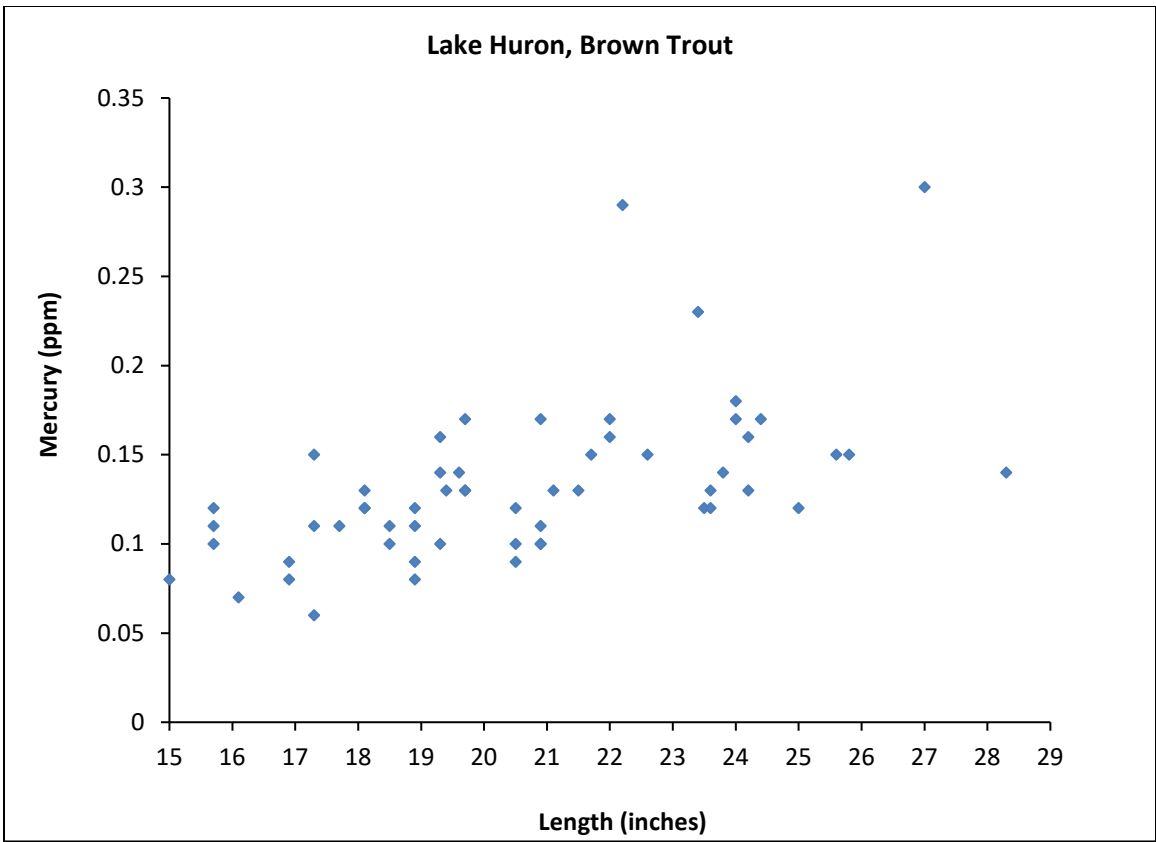
Organics Analysis:

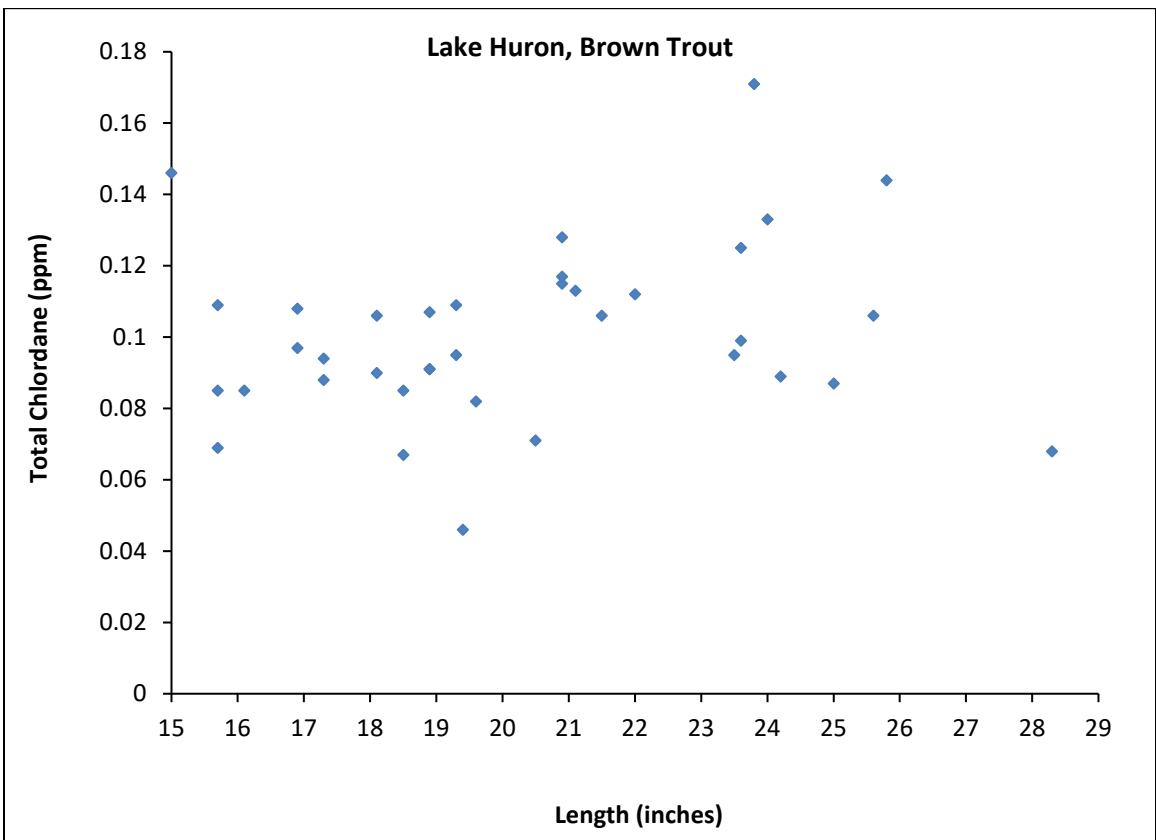
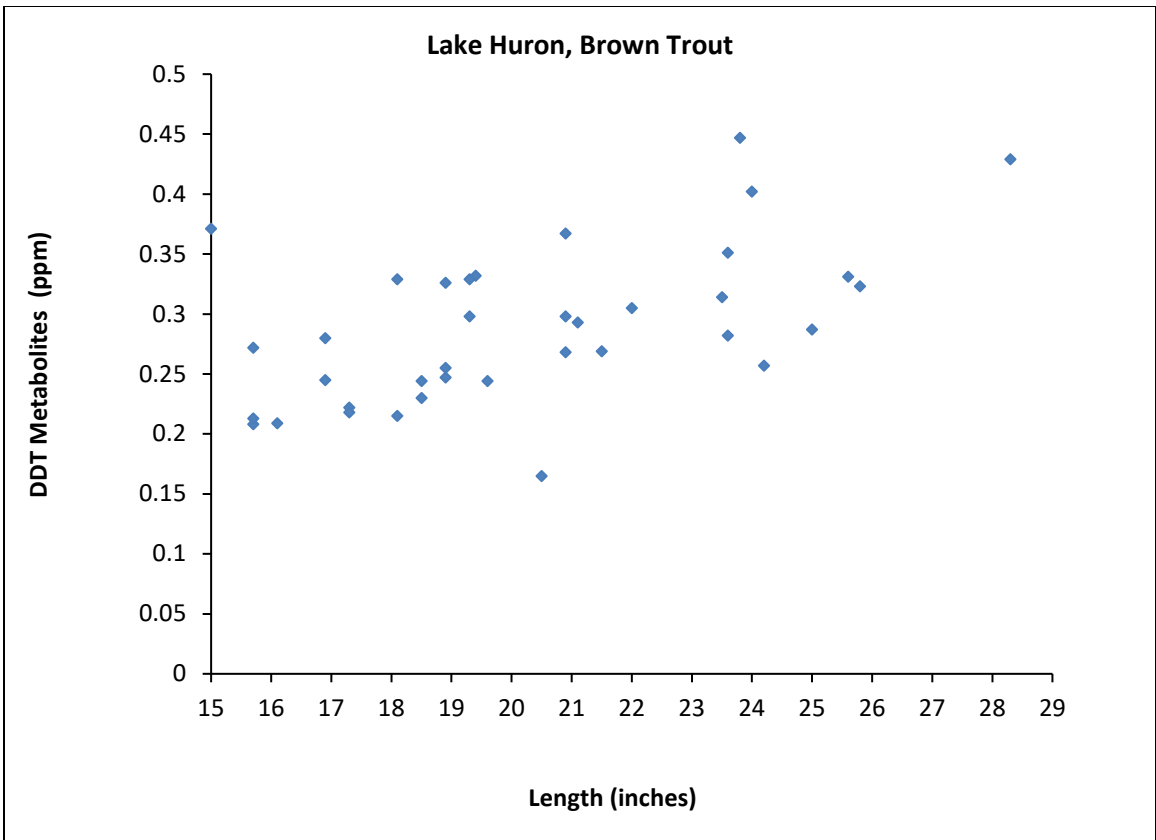
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
1990	1993	57	15	10	15	28.3	
Datasets available: 1986, 1989, 1990, 1991, 1992, 1993							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)		
PCB	37	0.66	0.35	1.15	0.72	Limited*	
DDT	37	0.29	0.16	0.45	0.31	4	
Chlordane	37	0.10	0.05	0.17	0.11	--	
Toxaphene	37	0.25	0.15	0.50	0.28	--	
TEQ	0	--	--	--	--	--	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.353	0.364					
DDT	0.299	0.288					
Chlordane	0.044	0.033					
Toxaphene	0.005	0.002					
TEQ	--	--					
Final meal category based on UCL:							Limited*

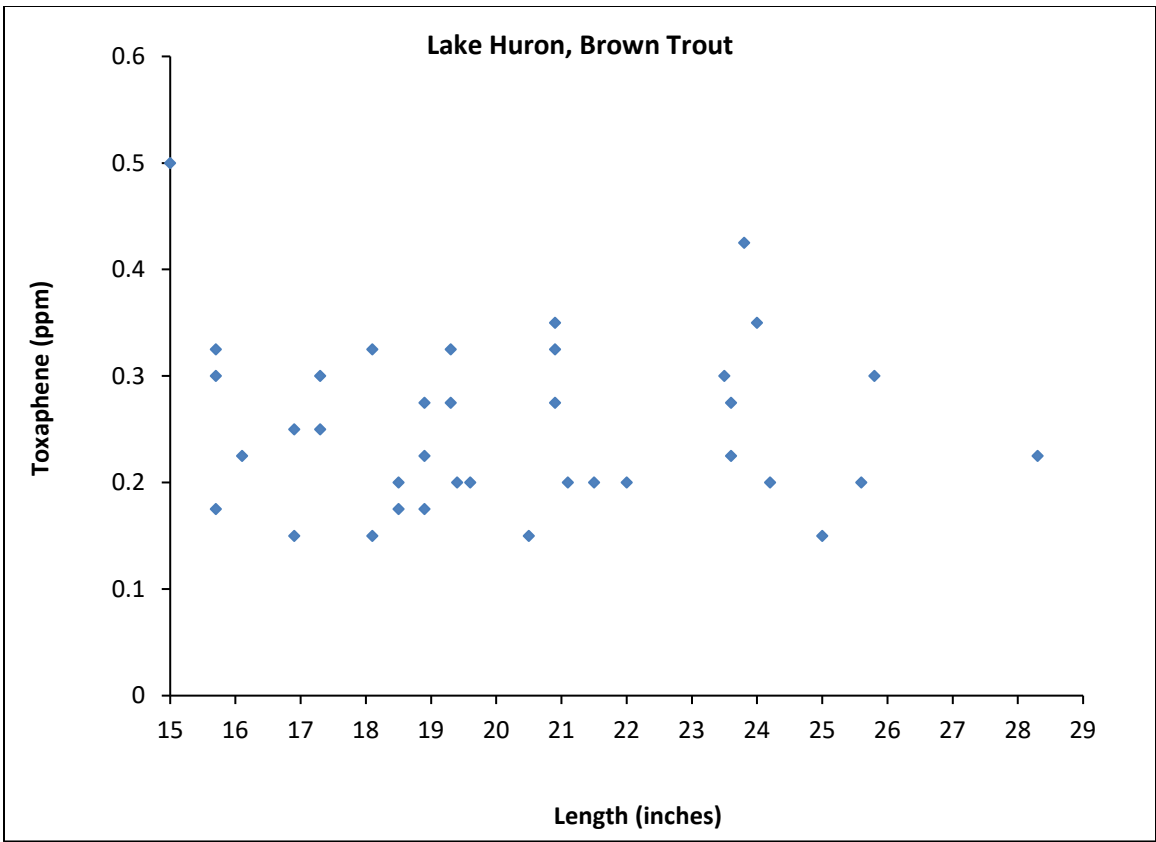
Existing MDHHS Advisory: Women and children should not eat more than one meal per month of Lake Huron brown trout between 10 and 18 inches in length and should not eat any Lake Huron brown trout greater than 18 inches in length due to PCBs.

Recommendation: No one should eat more than 6 meals per year of Lake Huron brown trout due to PCBs. Mercury and DDT would cause advisories.

*Note: The quality of this dataset is limited due to the age of the data. *Based on the EGLE Fish Contaminant Monitoring Program, PCB concentrations ≥15 years old are expected to have declined to a concentration that allows a less restrictive meal category than determined by the standard evaluation method.*







Burbot

Lake Huron

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples			
Earliest	Most Recent				Min	Max		
1990	1990	4	13	NA	13	22.6		
Datasets available:		1990						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category		
Mercury	4	0.105	0.040	0.190	--	--		
Chemical	Linear Regression	Exponential Regression						
	R ²	R ²						
Mercury	--	--						

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples			
Earliest	Most Recent				Min	Max		
1990	1990	4	13	NA	13	22.6		
Datasets available:		1990						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category		
PCB	4	0.161	0.079	0.370	--	--		
DDT	4	0.051	0.018	0.109	--	--		
Chlordane	4	0.006	0.003	0.009	--	--		
Toxaphene	4	ND	--	--	--	--		
TEQ	0	--	--	--	--	--		
Chemical	Linear Regression	Exponential Regression						
	R ²	R ²						
PCB	--	--						
DDT	--	--						
Chlordane	--	--						
Toxaphene	--	--						
TEQ	--	--						
						Final meal category based on UCL:		--

Existing MDHHS Advisory: Women and children should eat no more than one meal per week of Lake Huron burbot due to PCBs.

Recommendation: There are not sufficient data available to develop specific advice for Lake Huron burbot.

Carp

Lake Huron

Incl: Les Cheneaux, Thunder Bay, Saginaw Bay, Saginaw & Tittabawassee Rivers

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	2014	199	14.5	na	14.5	32.8
Datasets available: 1987, '88, '89, '91, '93, '98, '99, 2001, 2004, 2012, 2013, 2014						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	199	0.15	0.03	0.43	0.16	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.018	0.018				

Organics Analysis:

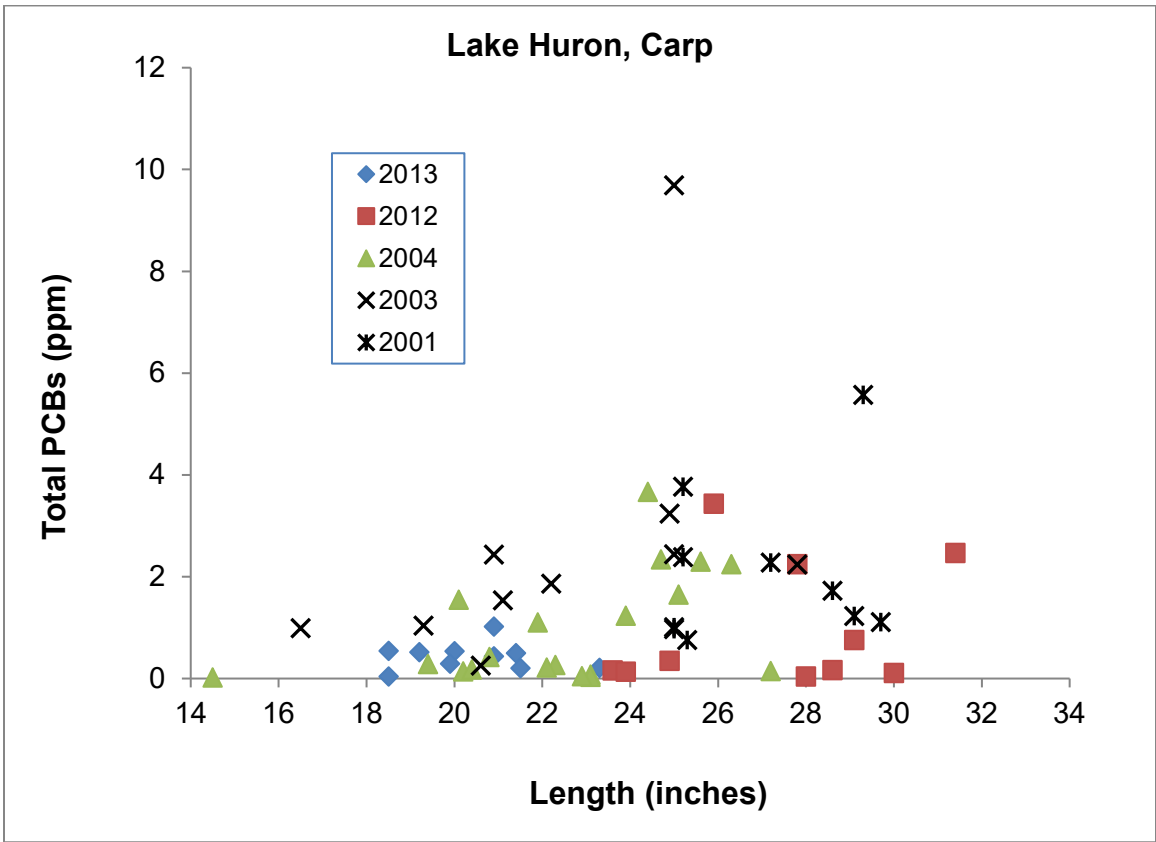
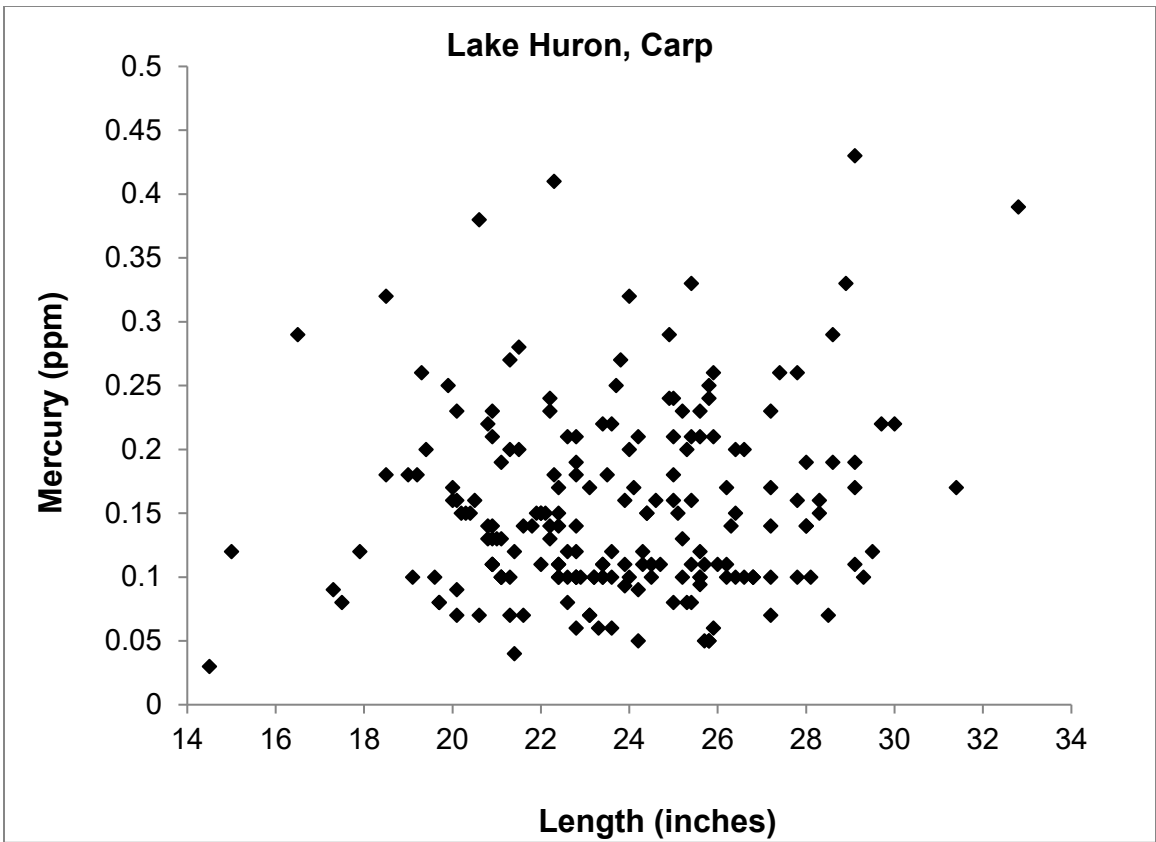
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2001	2013	62	14.5	na	14.5	32.8
Datasets available: 1987, '88, '89, '91, '93, '98, '99, 2001, 2004, 2012, 2013						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	62	1.3	0.02	9.7	1.7	Limited
DDT	62	0.56	0.004	14.6	1.06	1
Chlordane	62	0.04	0.0005	0.71	0.06	16
Toxaphene	62	0.10	0.05	1.16	0.14	2
PFOS	10	14 ppb	6 ppb	24 ppb	18 ppb	8
TEQ*	39	35 ppt	3 ppt	187 ppt	47 ppt	Limited
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.112	0.126				
DDT	0.020	0.108				
Chlordane	0.048	0.106				
Toxaphene	0.001	0.000				
PFOS	0.037	0.018				
TEQ*	0.013	0.040				
Final meal category based on UCL:						Limited

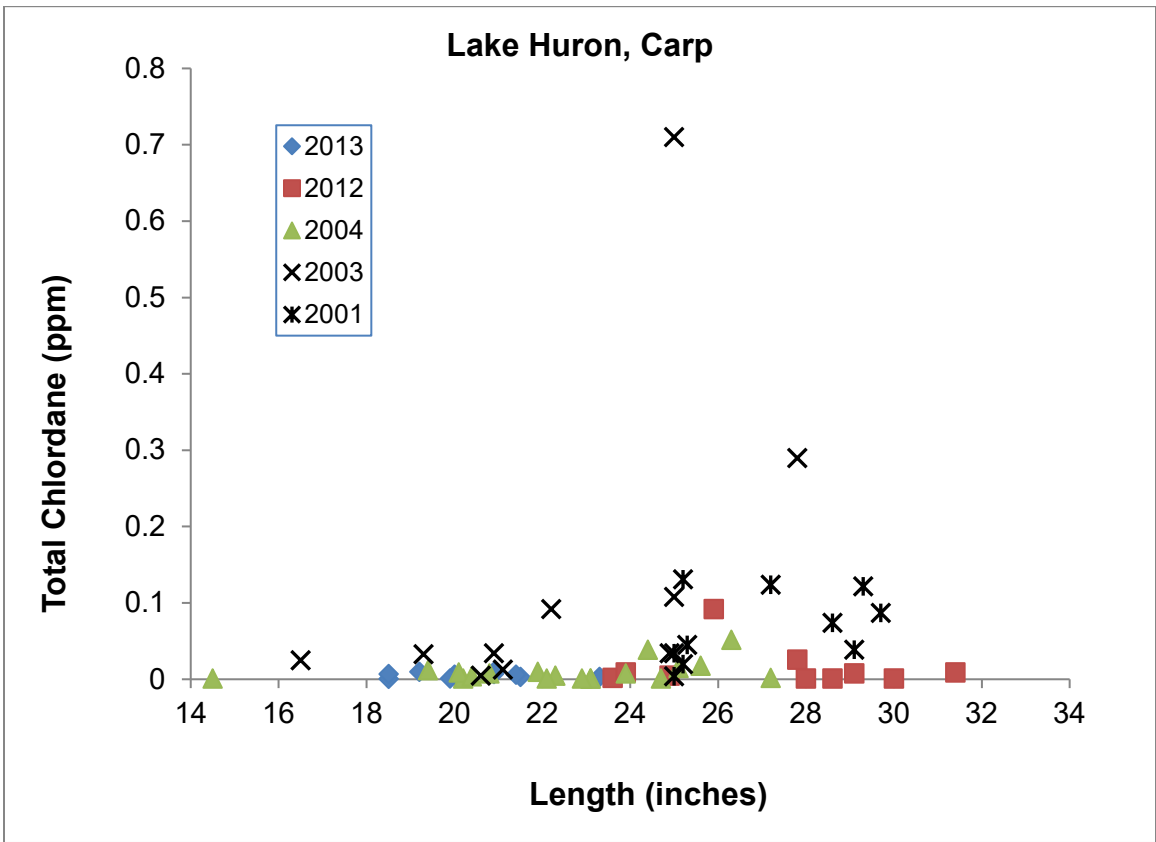
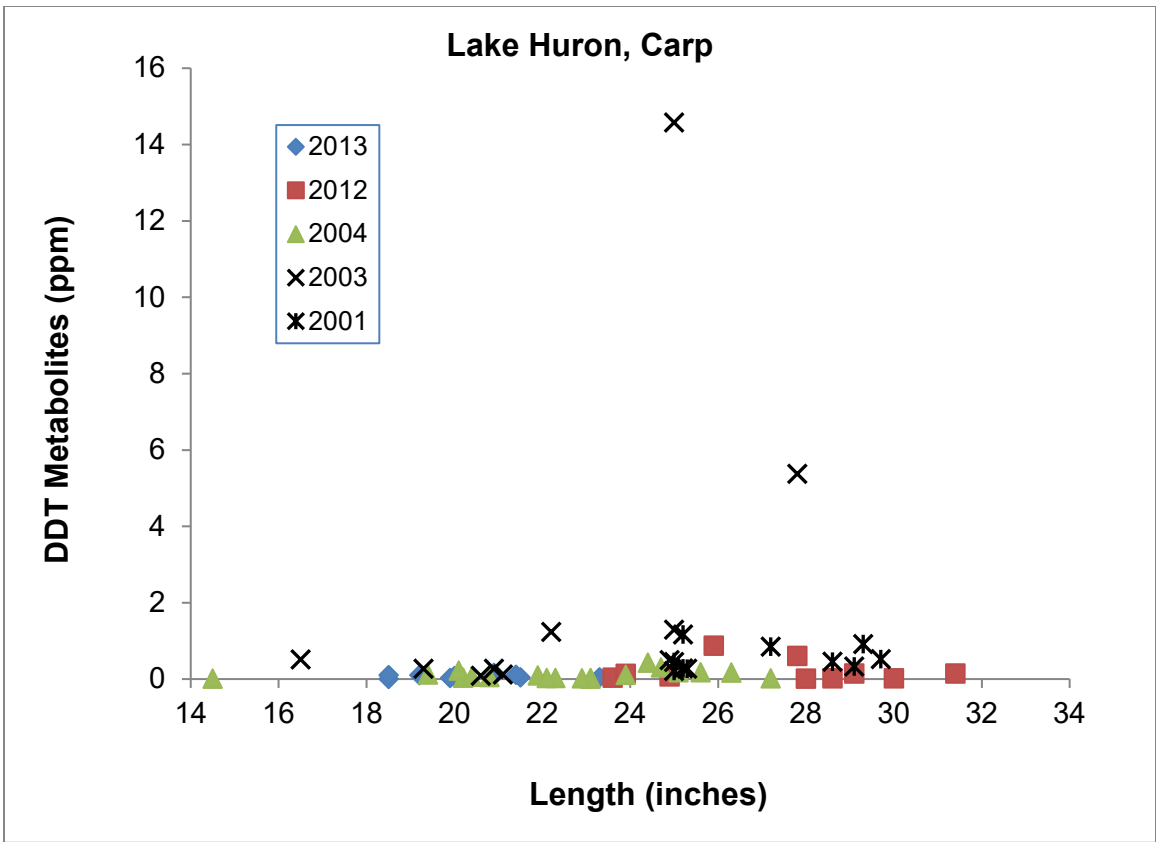
* - WHO 2005 TEFs; dl-PCBs included

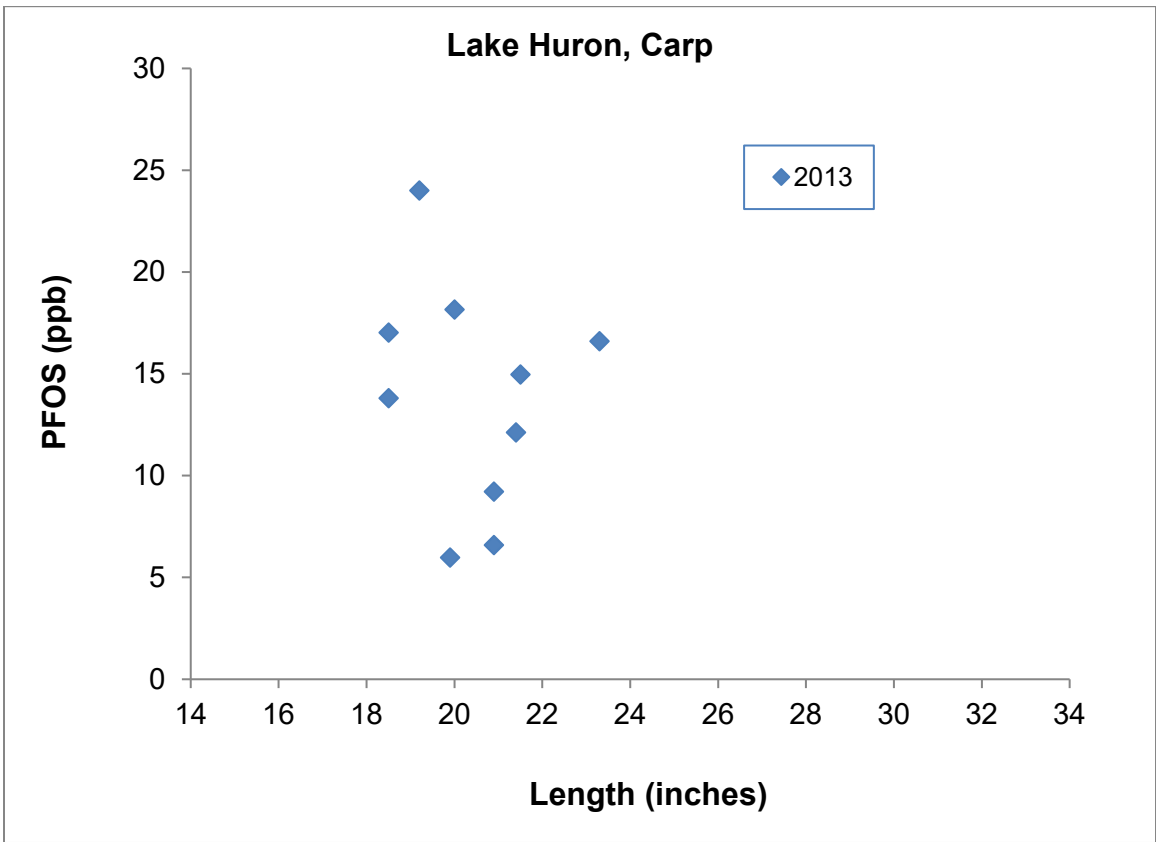
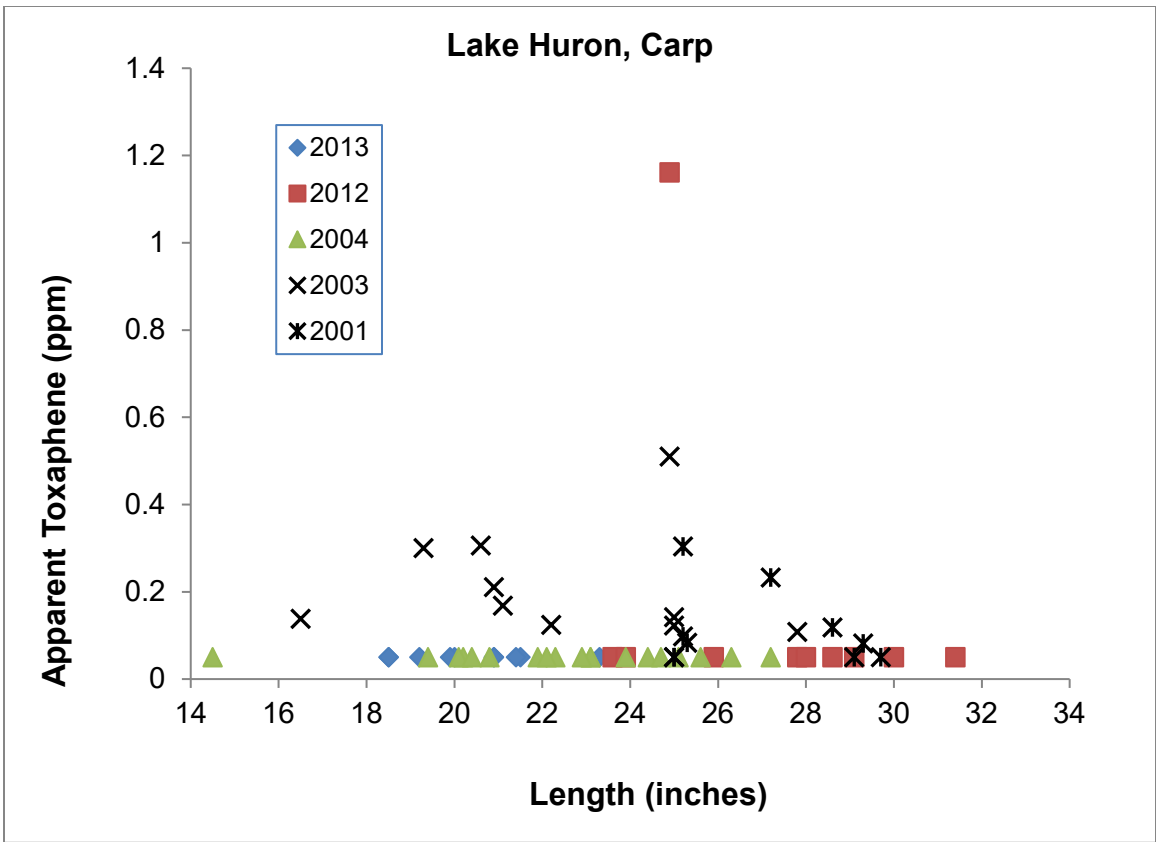
Existing MDHHS Advisory: No one should eat carp from Lake Huron, the Tittabawassee River, or the Saginaw River due to PCBs and dioxins.

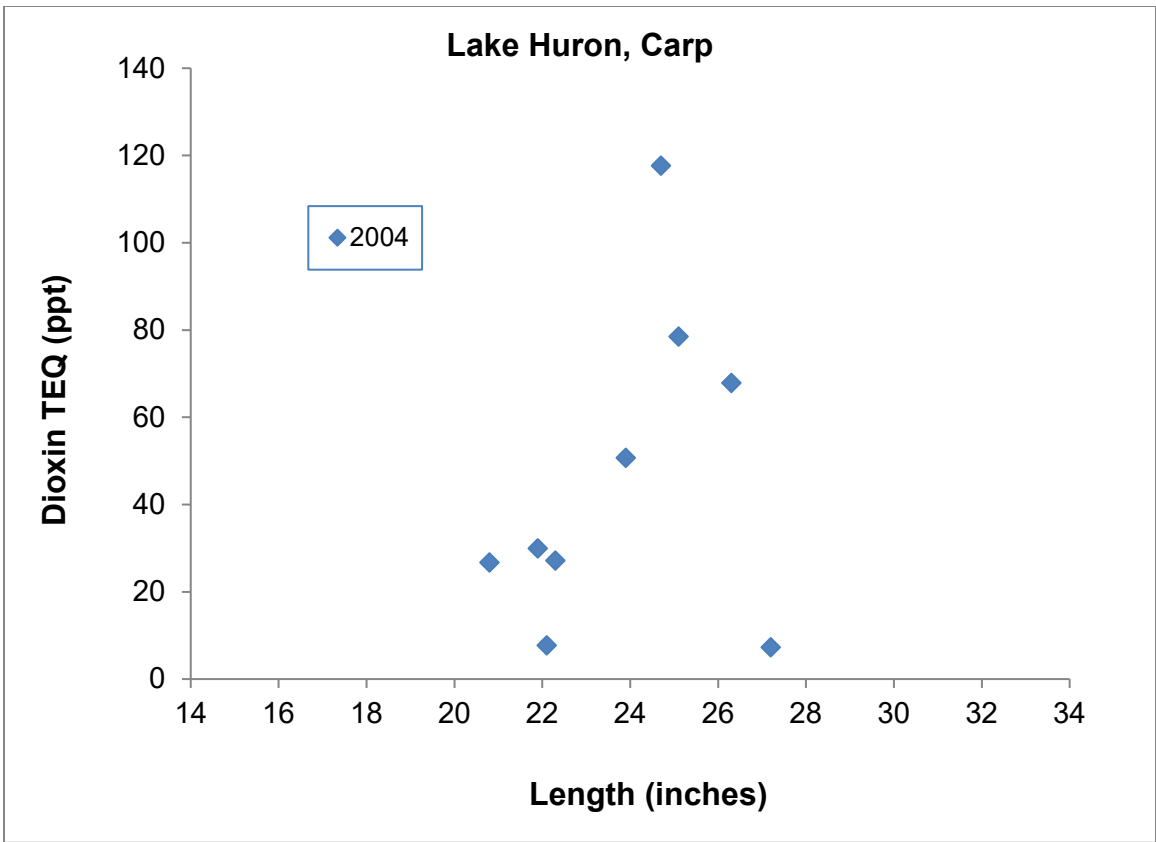
Recommendation: A management decision extended the advisory to Lake Huron as carp may travel long distances. No one should eat the carp from Lake Huron (including Les Cheneaux) Saginaw Bay, the Tittabawassee River, or the Saginaw River. Mercury, DDT, PFOS, and toxaphene would cause advisories.

Note: Evaluation with and without Les Cheneaux and Tittabawassee samples produces same advice.









Channel Catfish

**Lake Huron
Saginaw Bay**

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	2014	100	12	12	25.4	
Datasets available: 1986, '87, '88, '91, '98, '99, 2004, 2014						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	99	0.14	0.03	0.56	0.16	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.209	0.275				

Organics Analysis:

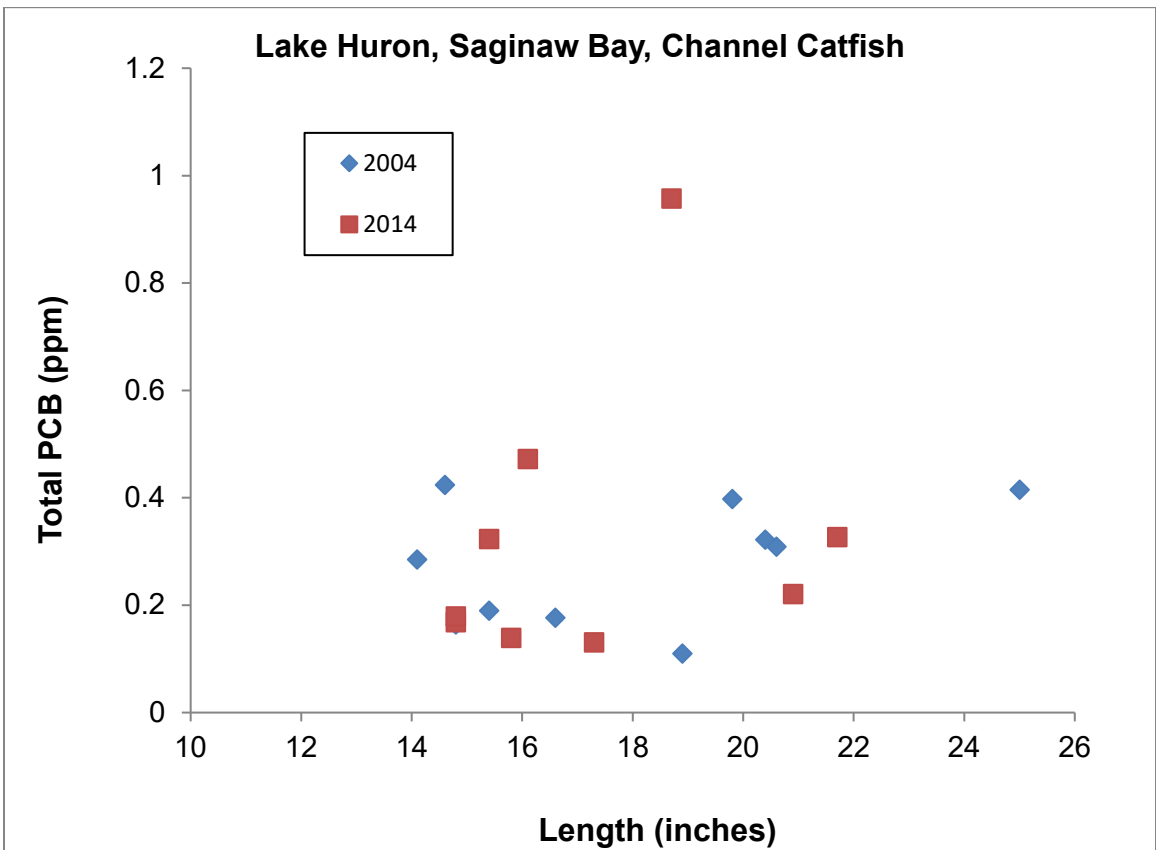
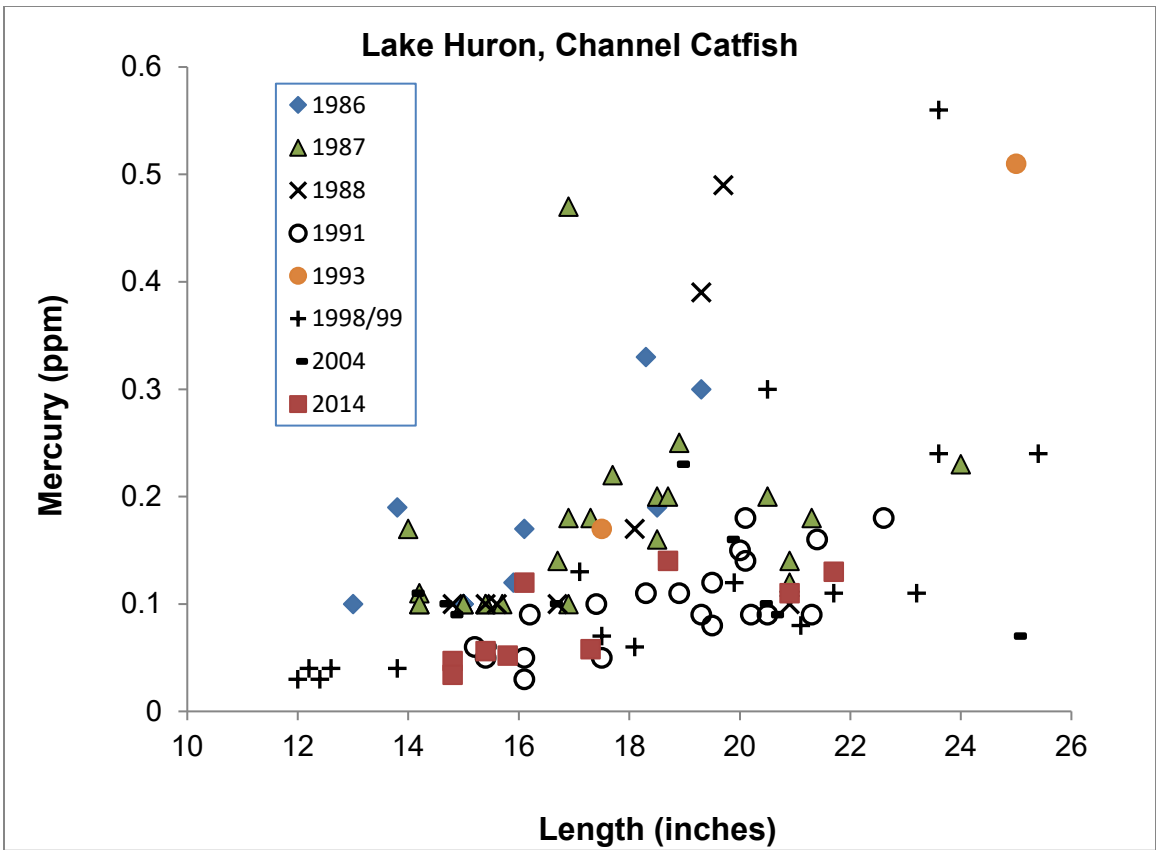
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2004	2014	19	14.1	14.1	25	
Datasets available: 1984, '85, '86, '87, '88, '91, '98, '99, 2004, 2014						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	19	0.30	0.11	0.9573	0.394	0.5
DDT	19	0.04	0.011	0.101	0.054	16
Chlordane	19	0.005	0.001	0.013	0.007	--
Toxaphene	19	ND	--	--	--	--
TEQ	19	15 ppt	5 ppt	40 ppt	19 ppt	Limited
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.061	0.092				
DDT	0.137	0.170				
Chlordane	0.265	0.282				
Toxaphene	--	--				
TEQ	0.037	0.028				
Final meal category based on UCL:						Limited

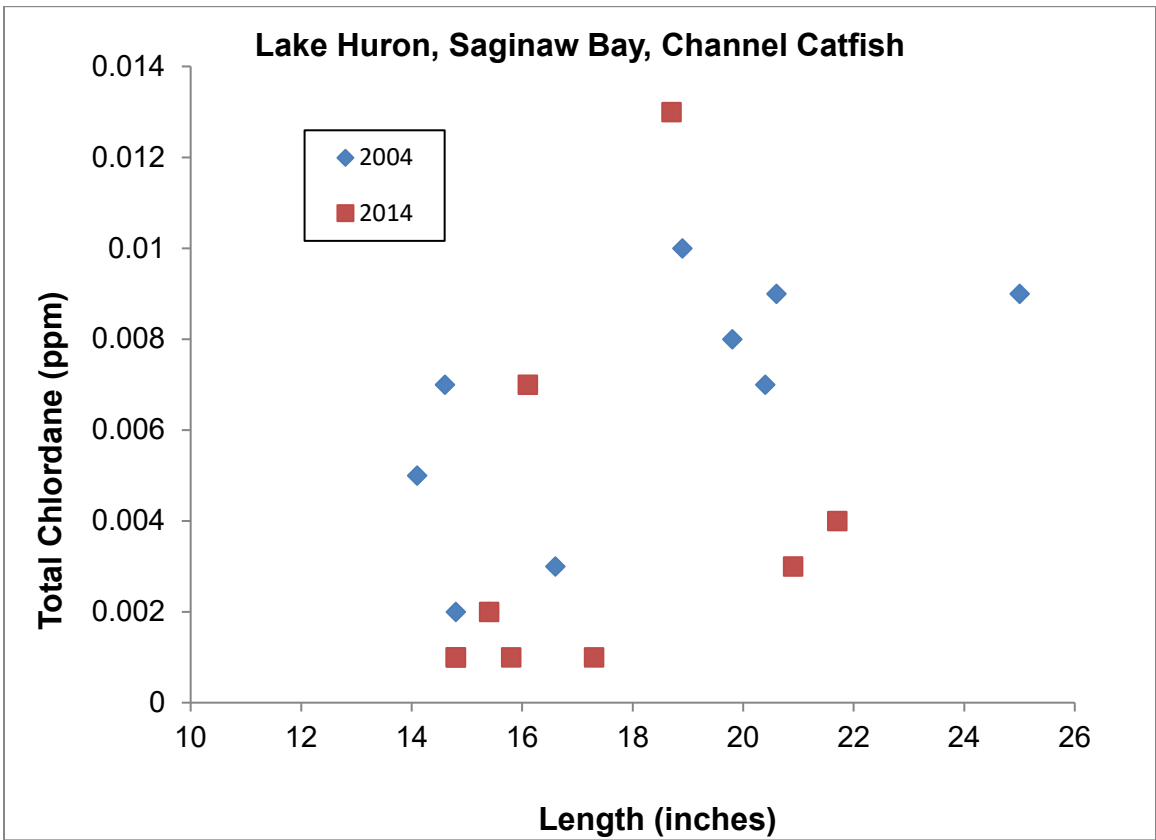
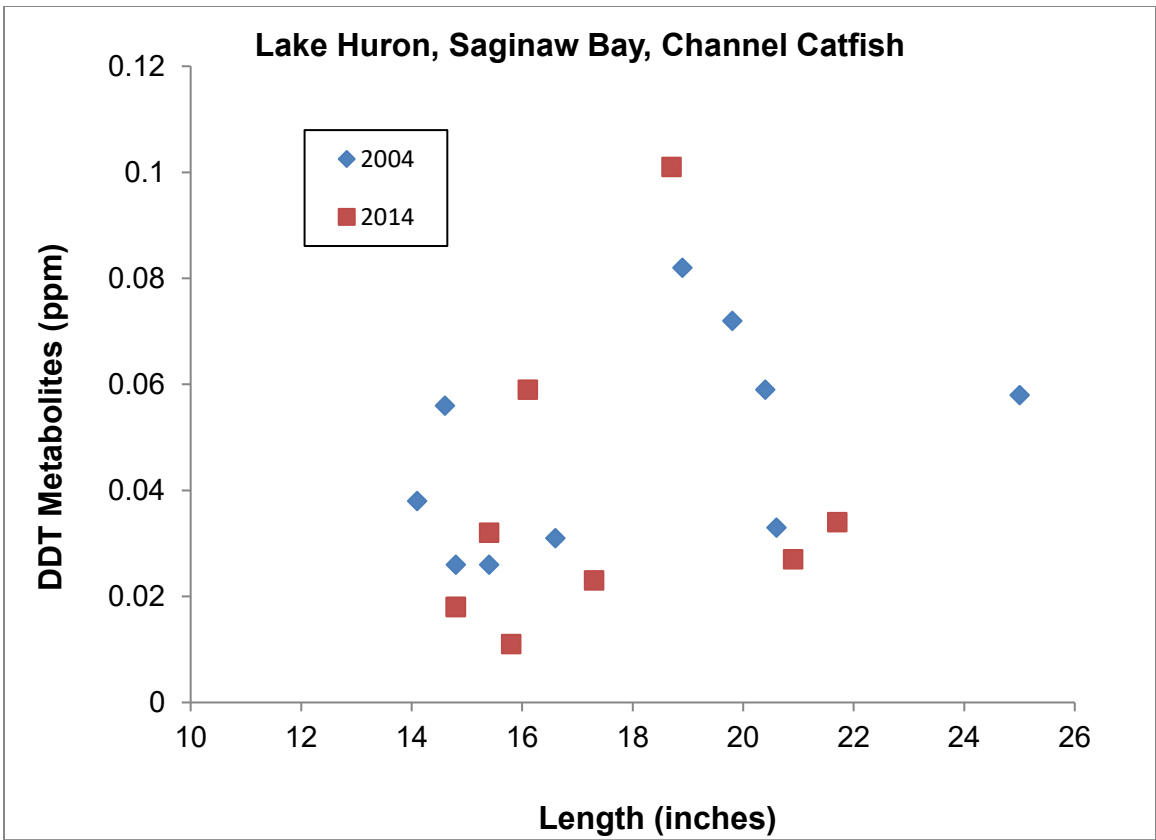
* 2005 WHO; dl-PCBs included

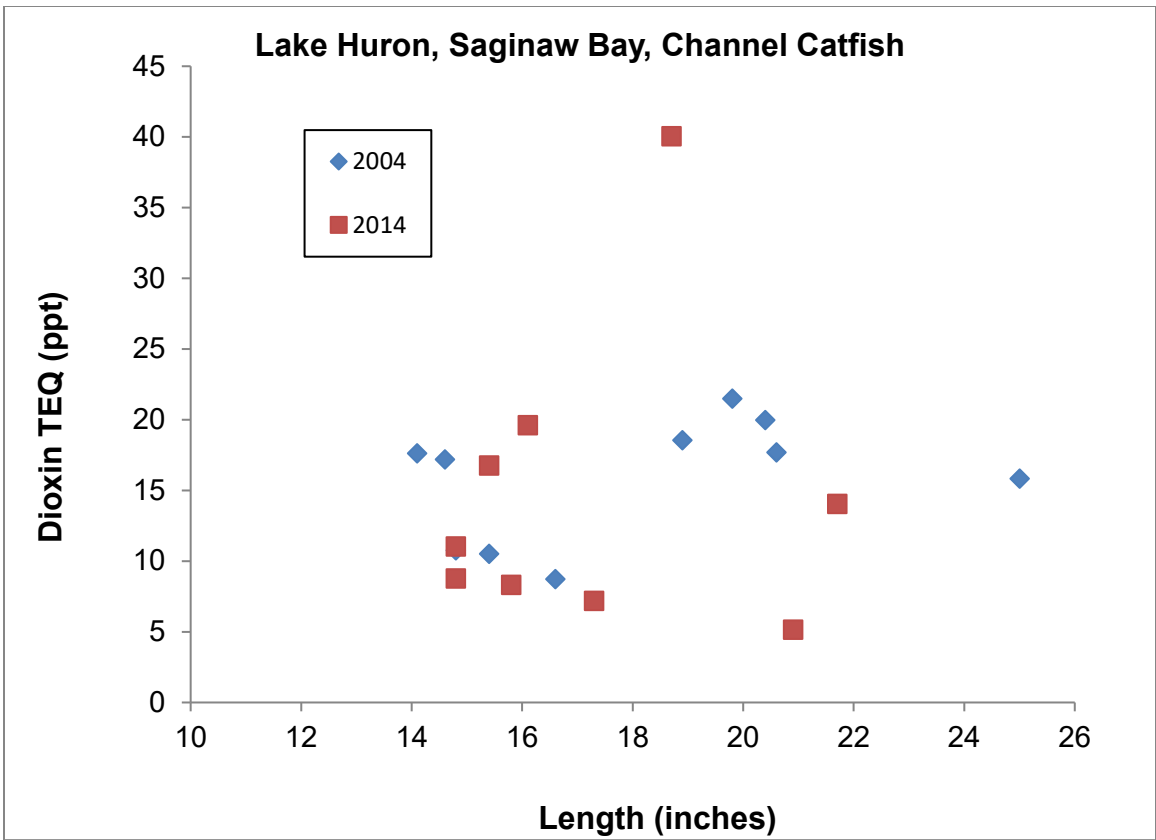
Existing Advisory: Sensitive populations should not eat these fish. Healthy adults should not eat more than 1 or 2 meals per year of Lake Huron, Saginaw River, or Tittabawassee River catfish due to dioxin. PCBs and mercury would cause advisories.

Recommendation: No change is recommended.

Note: 2 samples collected in 1993 were from Thunder Bay, all other channel catfish were collected from Saginaw Bay.







Chinook Salmon

Lake Huron

Hg Analysis:

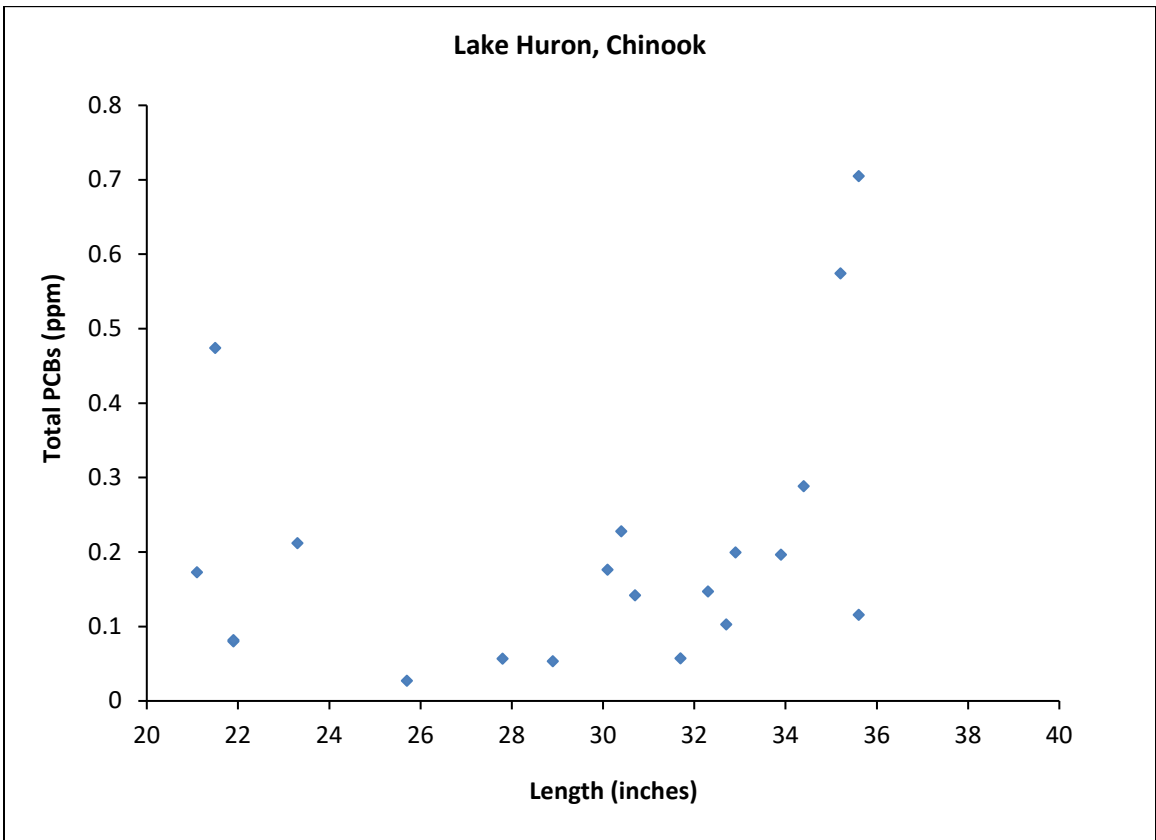
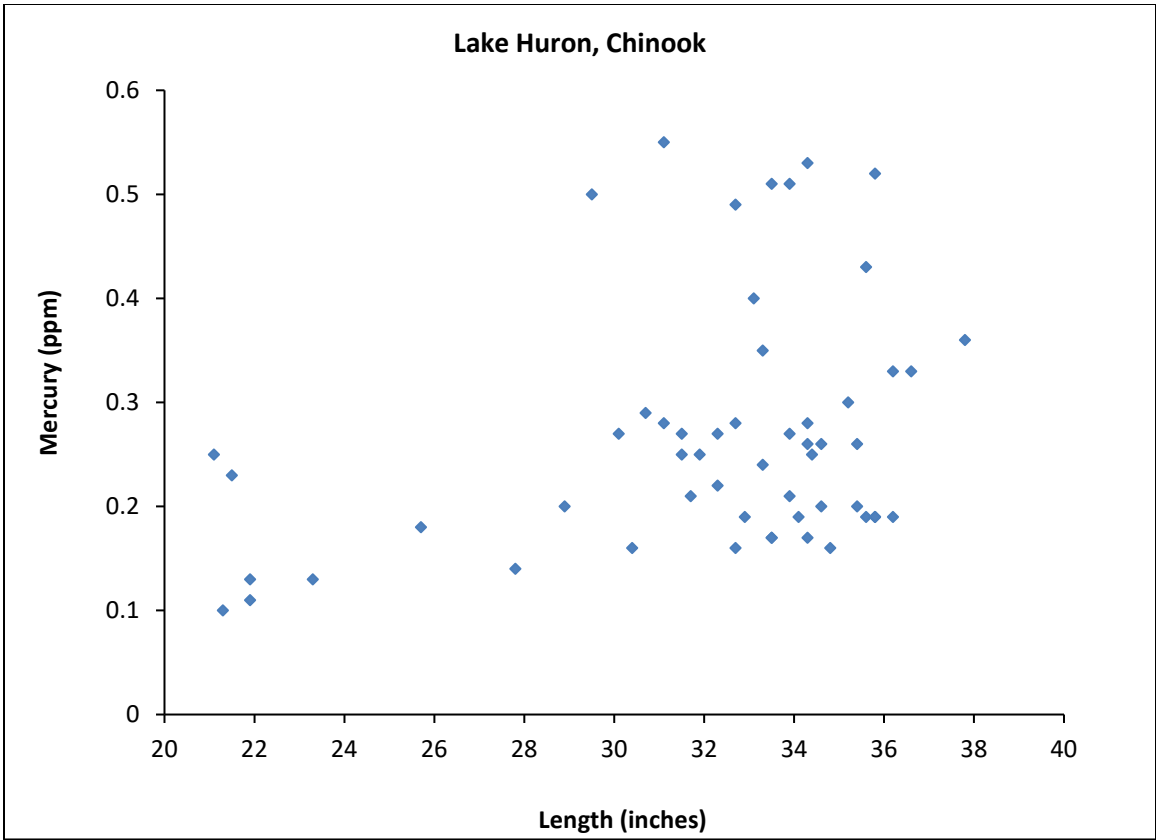
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
1986	2009	55	21.1	10	21.1	37.8	
Datasets available: 1986, 2009							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category	
Mercury	55	0.268	0.100	0.550	0.300	2	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.107	0.179					

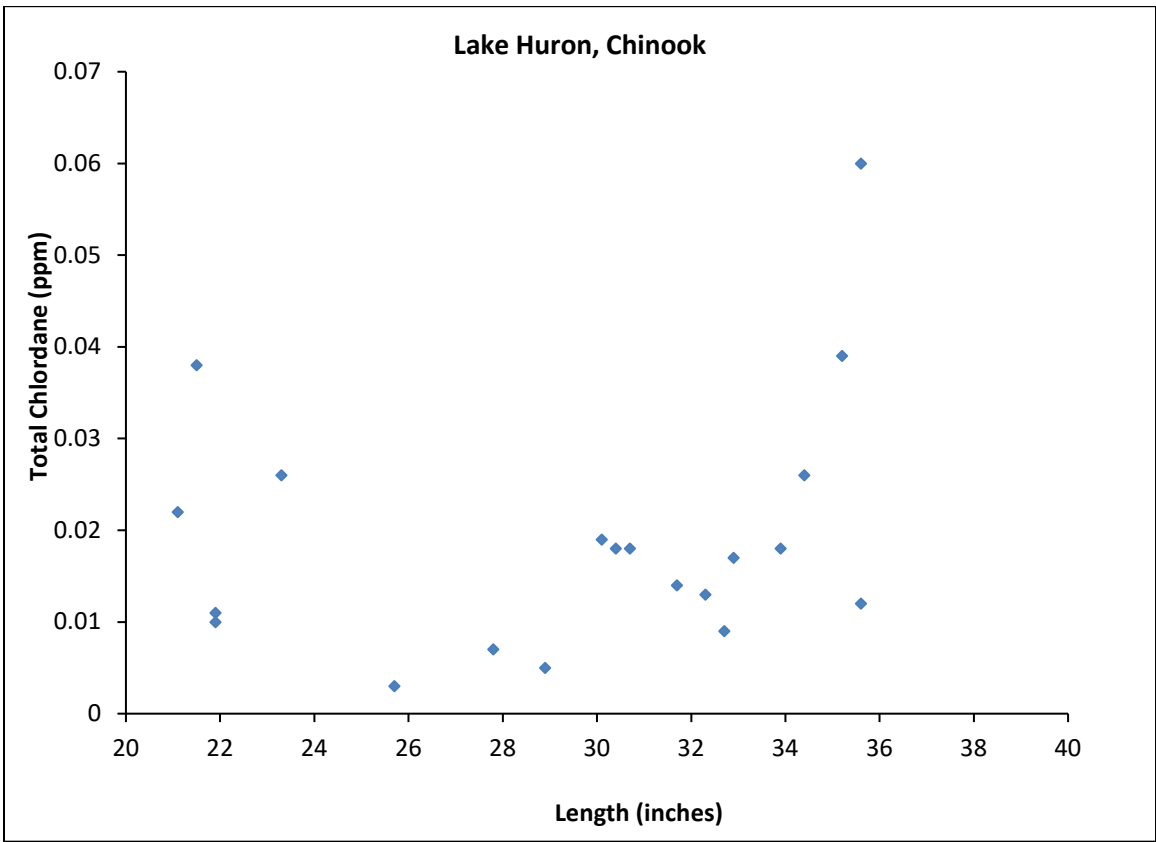
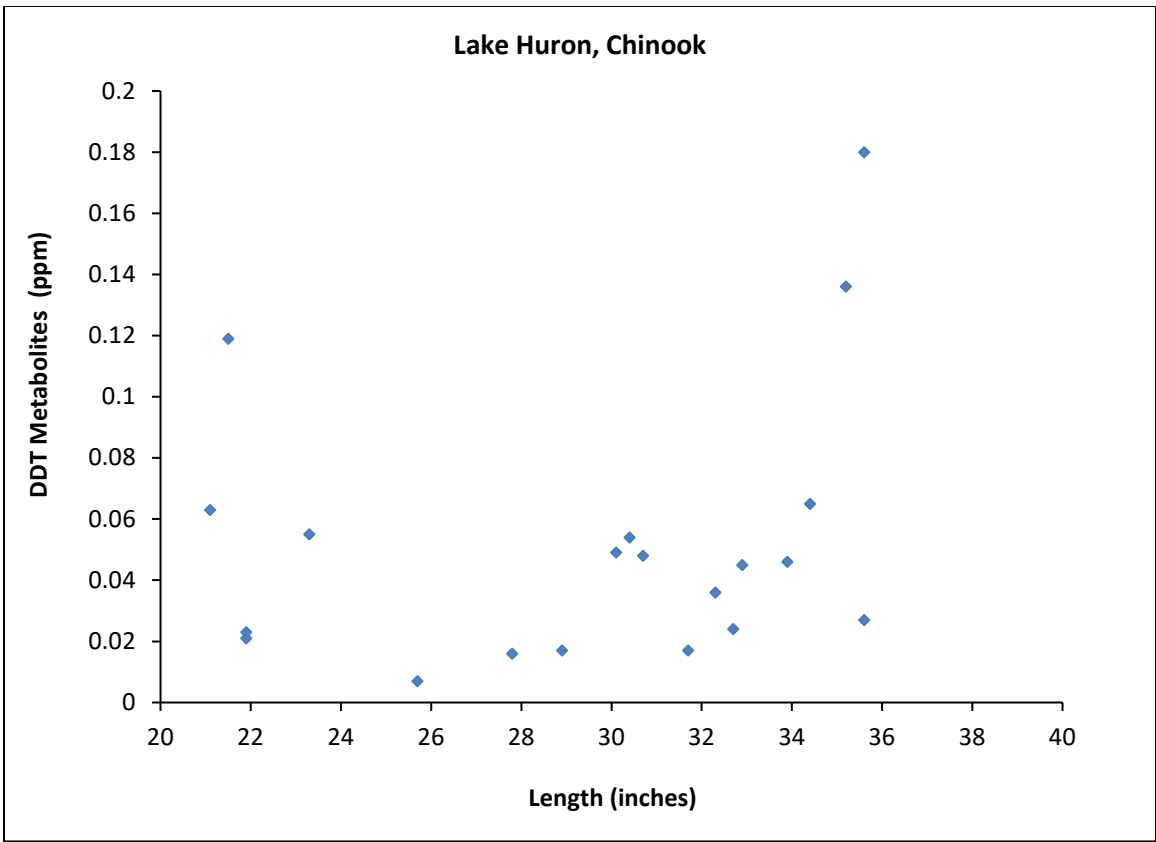
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
2009	2009	20	21.1	10	21.1	35.6	
Datasets available: 1983, '84, '86, '87, '88, '89, '91, '93, '95, '96, '97, '98, 2009							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category	
PCB	20	0.20	0.03	0.70	0.29	0.5	
DDT	20	0.05	0.007	0.18	0.07	16	
Chlordane	20	0.02	0.003	0.06	0.03	--	
Toxaphene	20	ND	--	--	--	--	
TEQ	0	--	--	--	--	--	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.083	0.084					
DDT	0.051	0.049					
Chlordane	0.046	0.043					
Toxaphene	--	--					
TEQ	--	--					
Final meal category based on UCL:							0.5

Existing MDHHS Advisory: Women and children should not eat more than one meal per month of Lake Huron chinook salmon due to PCBs.

Recommendation: No one should eat more than 6 meals per year of chinook salmon due to PCBs. Mercury would cause an advisory.





Chub

Lake Huron

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	2	10	NA	10	10.5		
Datasets available:		1993						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category		
Mercury	2	0.080	0.080	0.080	--	--		
Chemical	Linear Regression	Exponential Regression						
	R ²	R ²						
Mercury	--	--						

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples				
Earliest	Most Recent				Min	Max			
1993	1993	2	10	NA	10	10.5			
Datasets available:		1993							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category			
PCB	2	0.207	0.180	0.234	--	--			
DDT	2	0.127	0.112	0.141	--	--			
Chlordane	2	0.071	0.061	0.081	--	--			
Toxaphene	2	0.163	0.150	0.175	--	--			
TEQ	0	--	--	--	--	--			
Chemical	Linear Regression	Exponential Regression							
	R ²	R ²							
PCB	--	--							
DDT	--	--							
Chlordane	--	--							
Toxaphene	--	--							
TEQ	--	--					Final meal category based on UCL:		--

Existing MDHHS Advisory: Lake Huron chubs are not listed in the current advisory but are covered under an “All other species” advisory. Women and children should not eat more than one meal per month of Lake Huron chub due to PCBs and dioxin.

Recommendation: There are not sufficient data available to develop specific advice for Lake Huron chub.

Coho Salmon

Lake Huron

Hg Analysis:

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

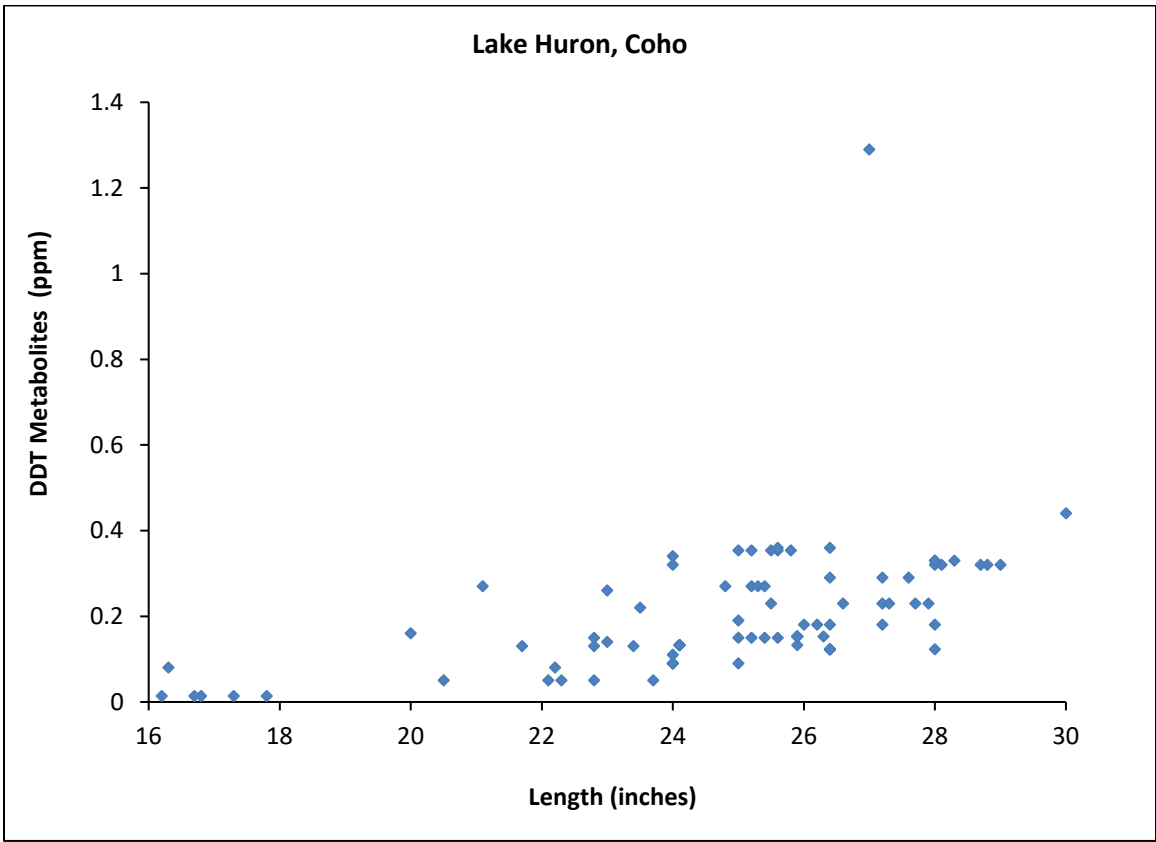
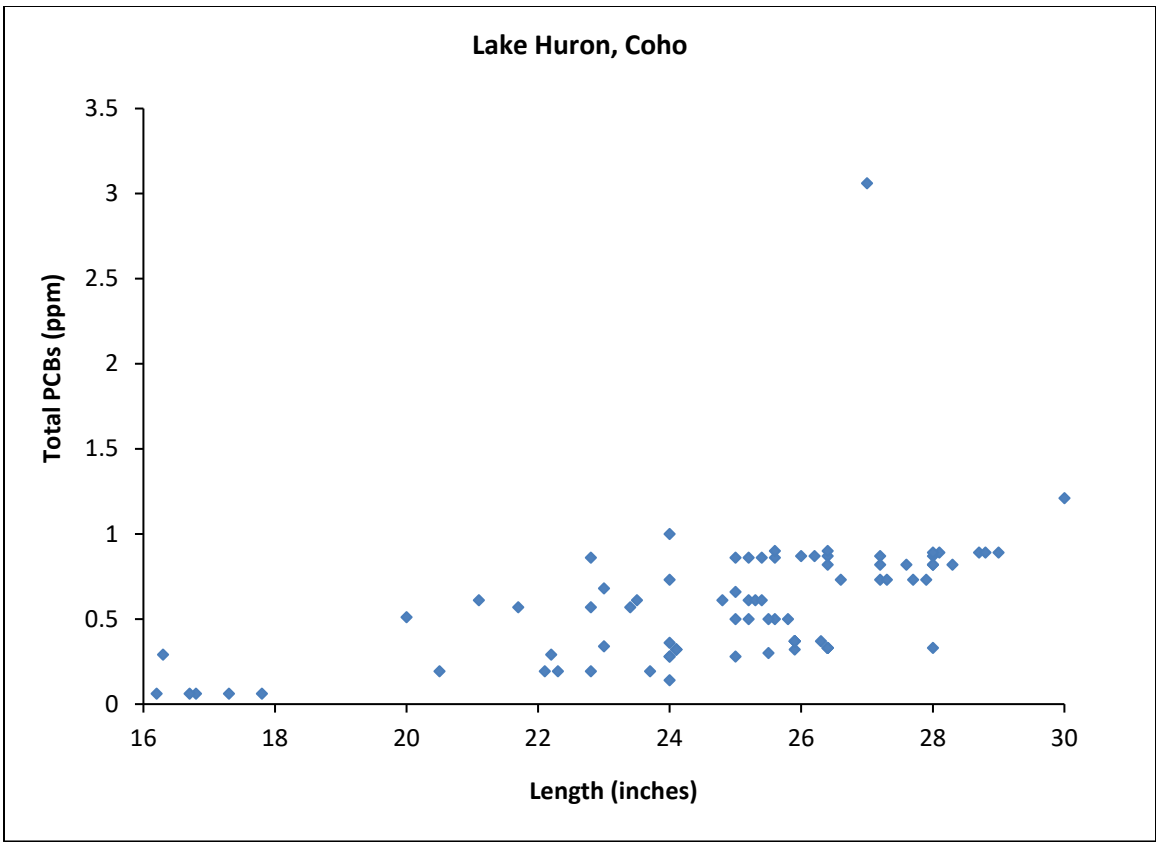
Organics Analysis:

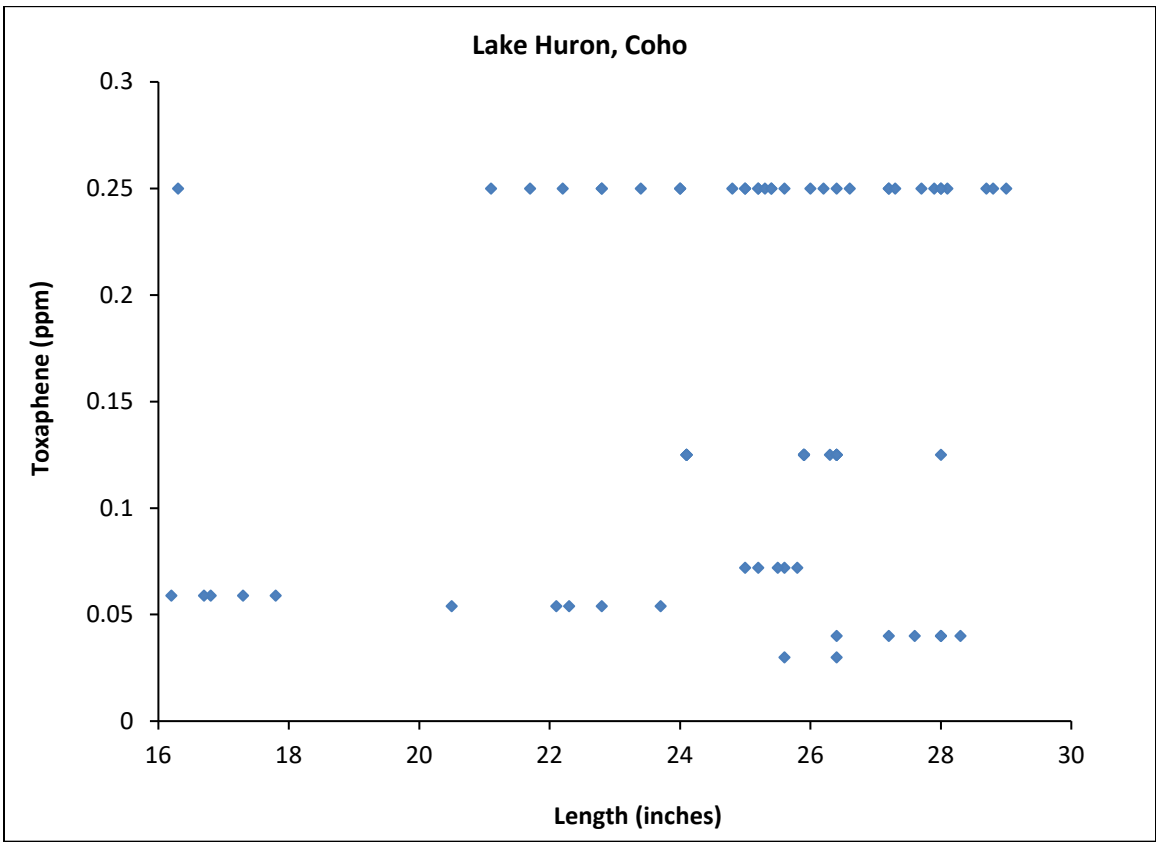
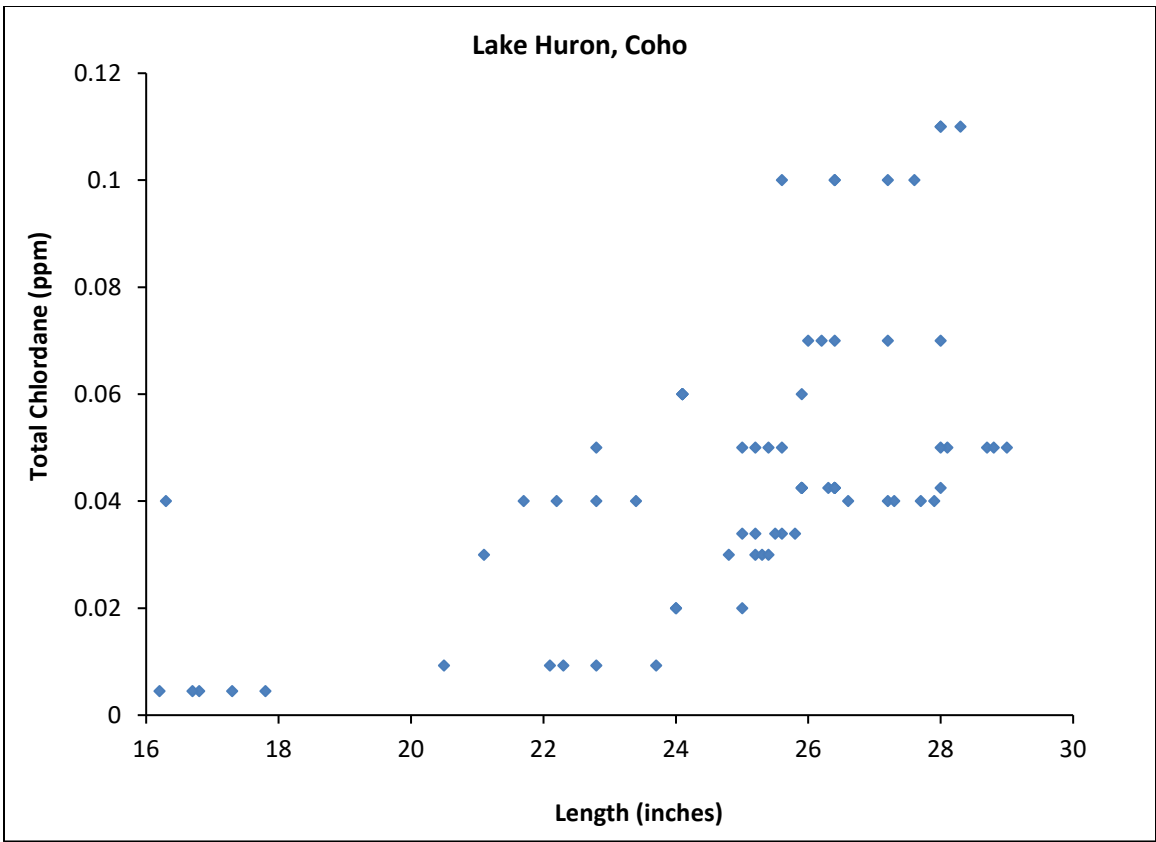
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1983	1998	83	16.2	10	16.2	30
Datasets available:		1983, '84, '85, '86, '96, '98				
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
PCB	83	0.580*	0.062*	3.060*	--	--
DDT	83	0.206*	0.014*	1.290*	--	--
Chlordane	71	0.046*	0.005*	0.110*	--	--
Toxaphene	71	0.160*	0.030*	0.250*	--	--
TEQ	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.268	0.541				
DDT	0.234	0.592				
Chlordane	0.362	0.581				
Toxaphene	0.043	0.036				
TEQ	--	--				
Final meal category based on UCL:						--

*- samples collected and analyzed by USEPA as composites of fillets. Three composite samples of 5 fish were analyzed per sampling event. Mercury data were not available for Lake Huron coho salmon.

Existing MDHHS Advisory: Women and children should not eat more than one meal per month of Lake Huron coho salmon due to PCBs.

Recommendation: No one should eat more than 6 meals per year of coho salmon due to PCBs. Mercury would cause an advisory. This coho guideline is based on the Chinook salmon data for the following reasons. The data for Lake Huron coho salmon are limited due to the age of the data and the samples were analyzed as composites. Chinook salmon have a similar diet to coho live 1 or 2 years longer than coho, thus the advisory for coho should be health protective for consumption of coho salmon. In addition, there may be some tendency for anglers to cross-identify the two species. *Note: Coho have not been planted in Lake Huron since 1989 and are relatively rare in the lake. Temporal trends for mercury in Great Lakes fish are either staying the same or increasing. The 95% UCL for mercury in Lake Michigan coho salmon collected in 1994 and 2009 was 0.17 ppm.*





Freshwater Drum

Lake Huron and Saginaw Bay

Hg Analysis:

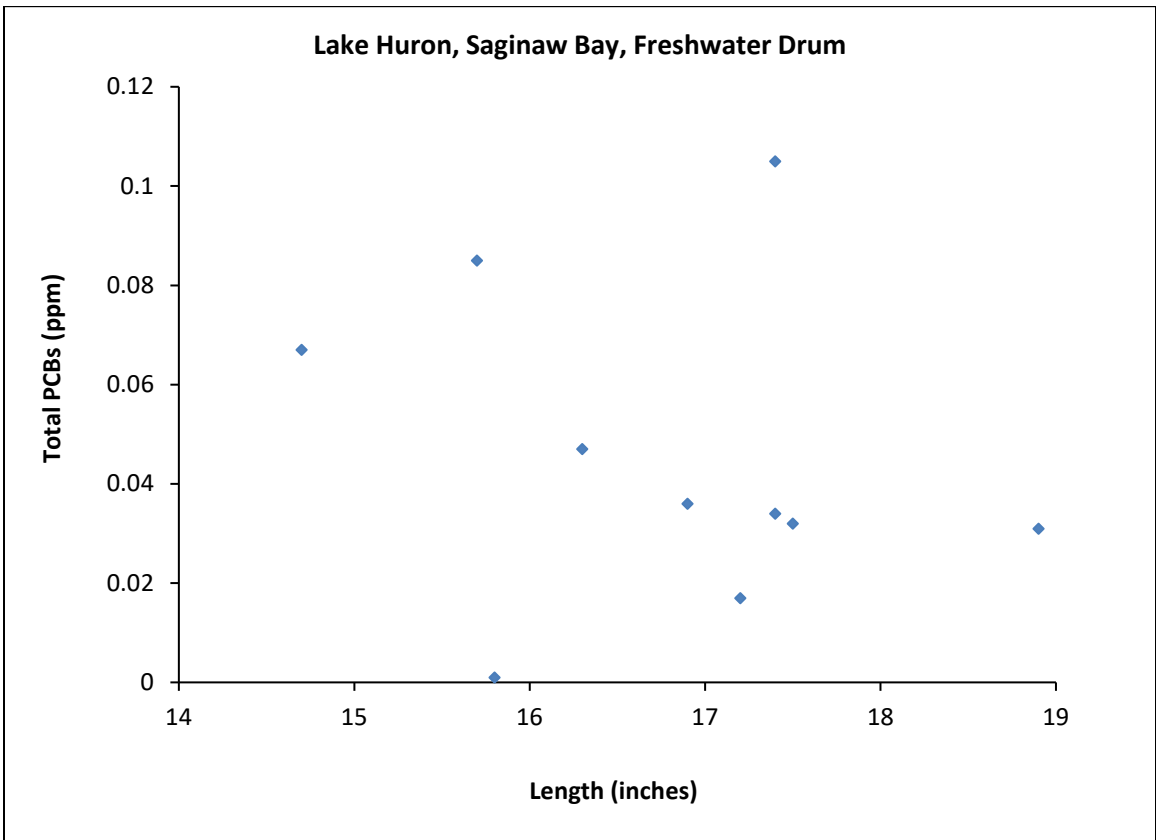
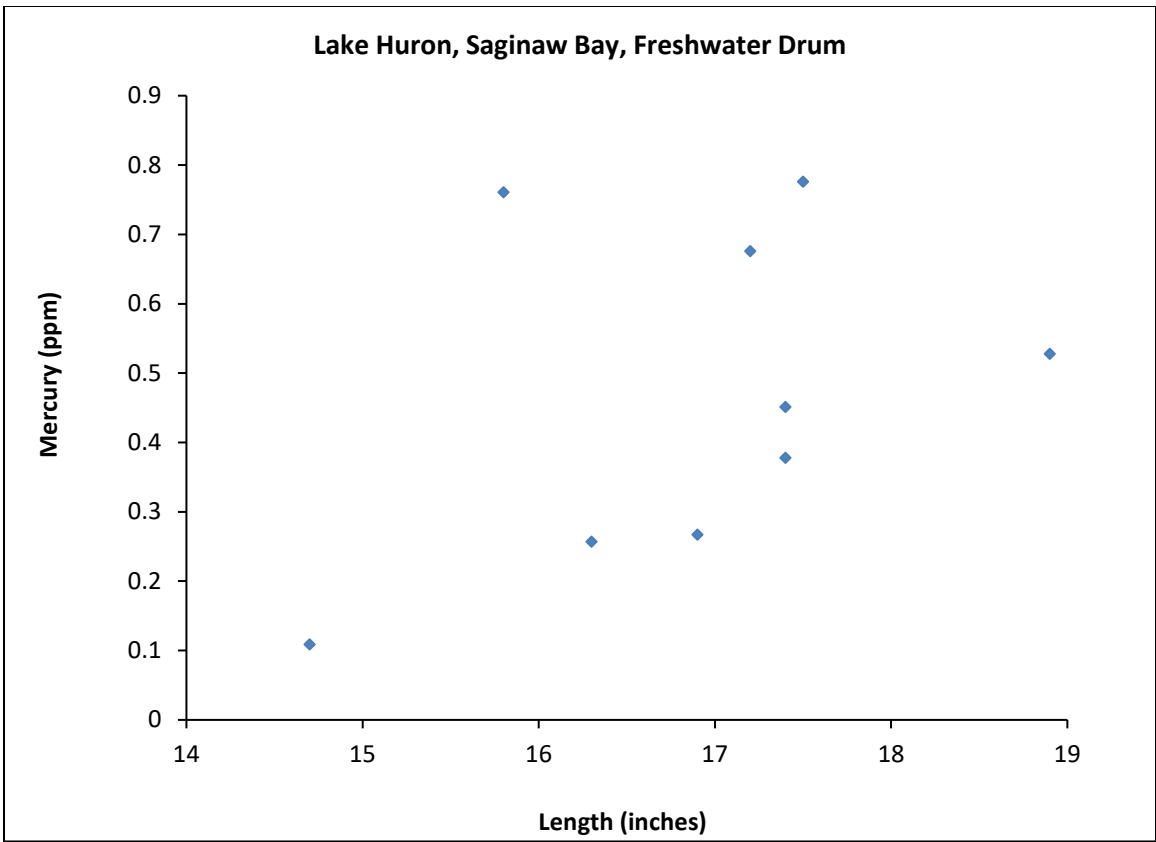
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
2007	2007	9	14.7	NA	14.7	18.9	
Datasets available: 2007							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL		
Mercury	9	0.467	0.109	0.776	0.650	1	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.161	0.341					

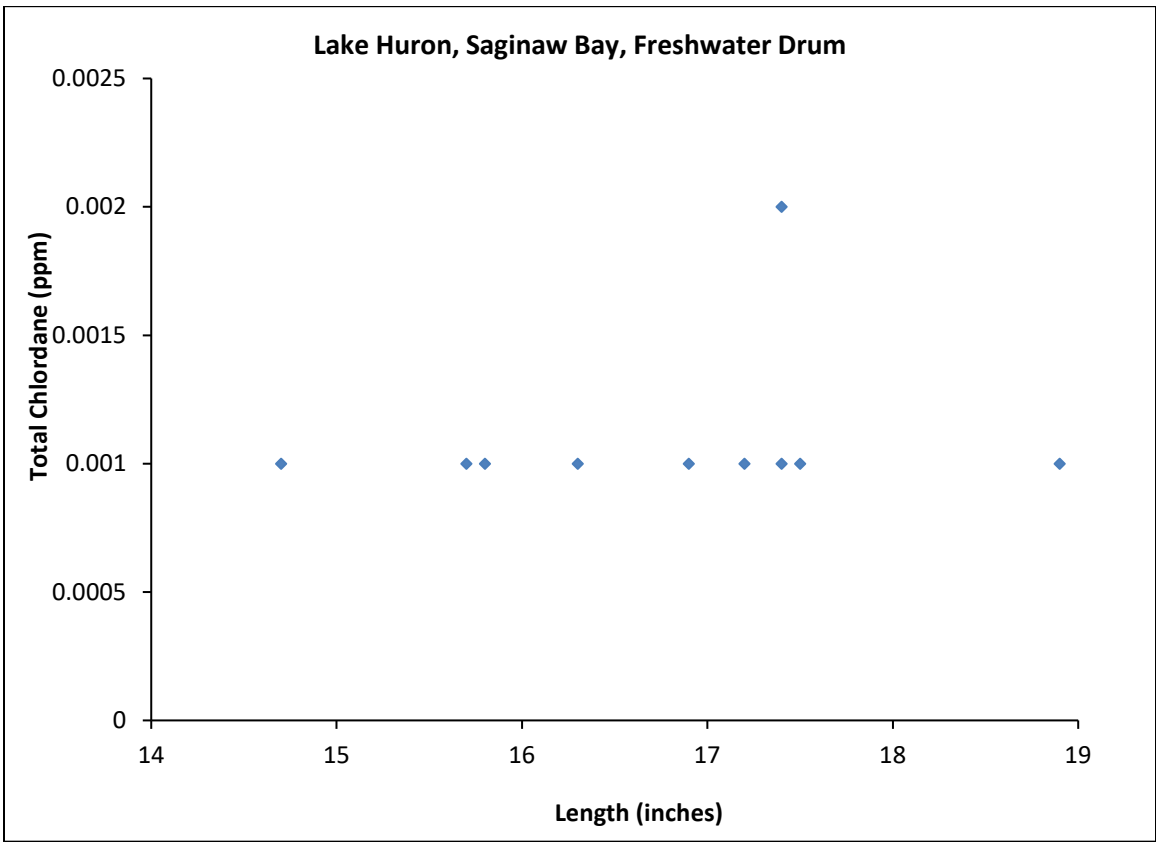
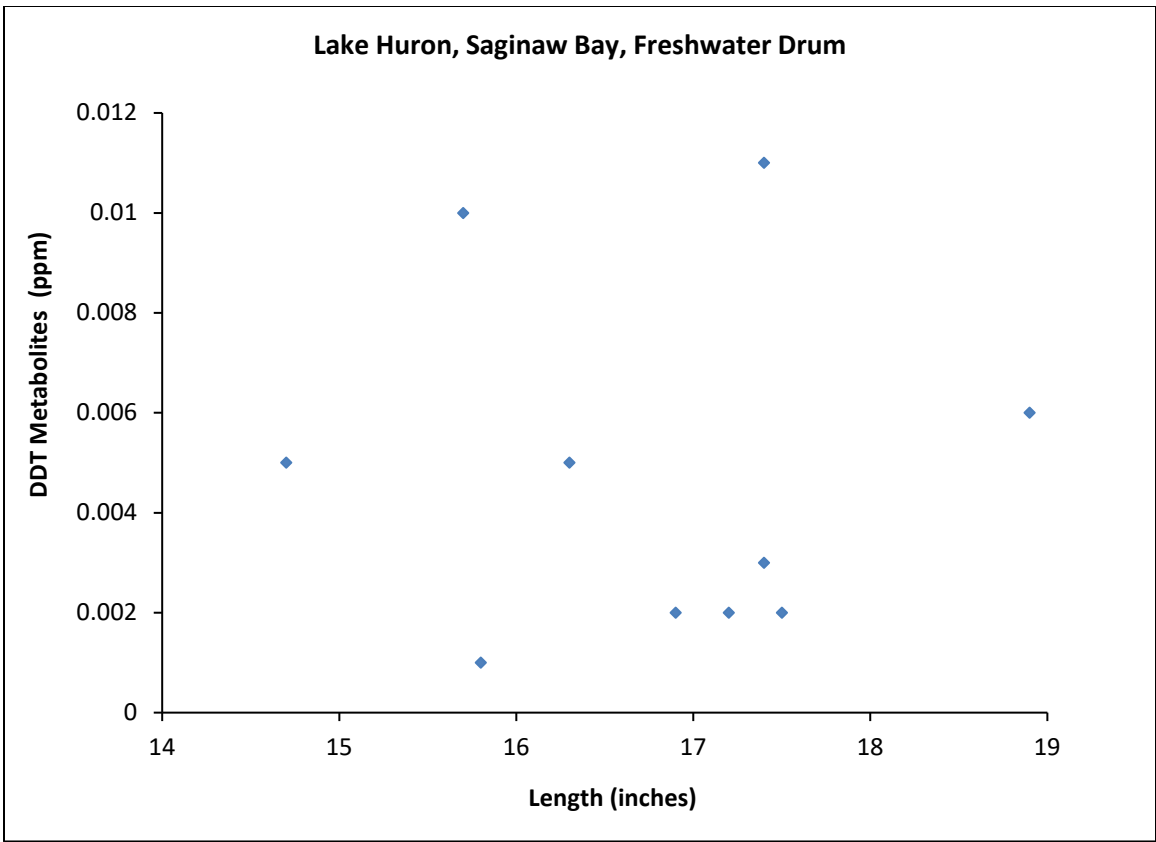
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
2007	2007	10	14.7	NA	14.7	18.9	
Datasets available: 2007							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL		
PCB	10	0.046	0.001	0.105	0.070	2	
DDT	10	0.005	0.001	0.011	0.010	16	
Chlordane	10	0.001	0.001	0.002	0.001	--	
Toxaphene	10	ND	--	--	--	--	
TEQ	0	--	--	--	--	--	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.041	0.006					
DDT	0.000	0.001					
Chlordane	0.034	0.034					
Toxaphene	--	--					
TEQ	--	--					
Final meal category based on UCL:							1

Existing Advisory: Women and children should not eat more than one meal per week of Lake Huron freshwater drum of any size.

Recommendation: No one should eat more than 1 meal per month of Lake Huron freshwater drum due to mercury. PCBs would cause an advisory.





Lake Trout

Lake Huron

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1983	2004	158	17	15	17	35.8
Datasets available: 1986, '89, '91, '92, '93, '96, 2004						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
Mercury	158	0.176	0.090	0.520	0.190	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.223	0.325				

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	158	21.3	15	21.3	29.4
Datasets available: 1986, '89, '91, '92, '93, '96, 2004						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
PCB	20	0.52	0.22	1.44	0.67	Limited
DDT	20	0.18	0.08	0.57	0.23	4
Chlordane	20	0.05	0.02	0.14	0.06	--
Toxaphene	20	0.07	0.05	0.20	0.09	--
TEQ*	10	5.6 ppt	4.4 ppt	9.1 ppt	6.7 ppt	1
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.635	0.658				
DDT	0.584	0.679				
Chlordane	0.533	0.582				
Toxaphene	0.559	0.635				
TEQ*	0.194	0.216				
Final meal category based on UCL:						Limited

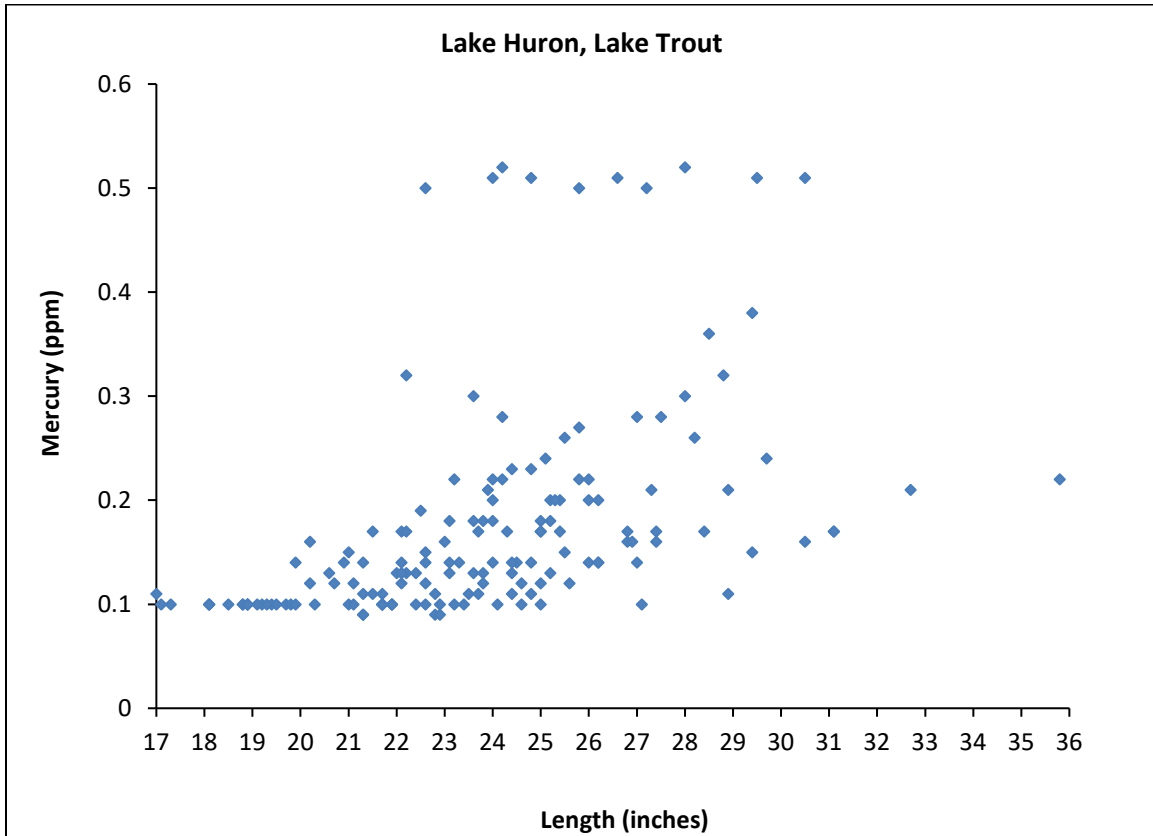
*- 2005 WHO; di-PCBs NOT included

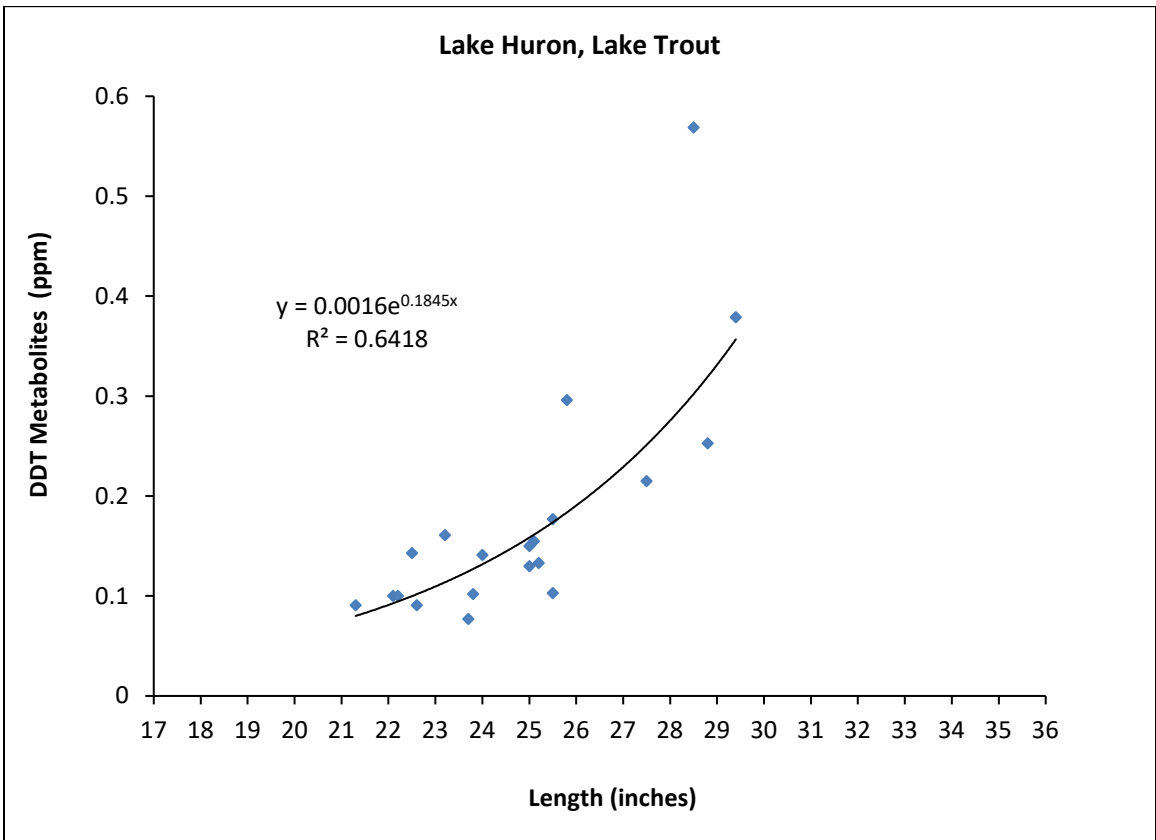
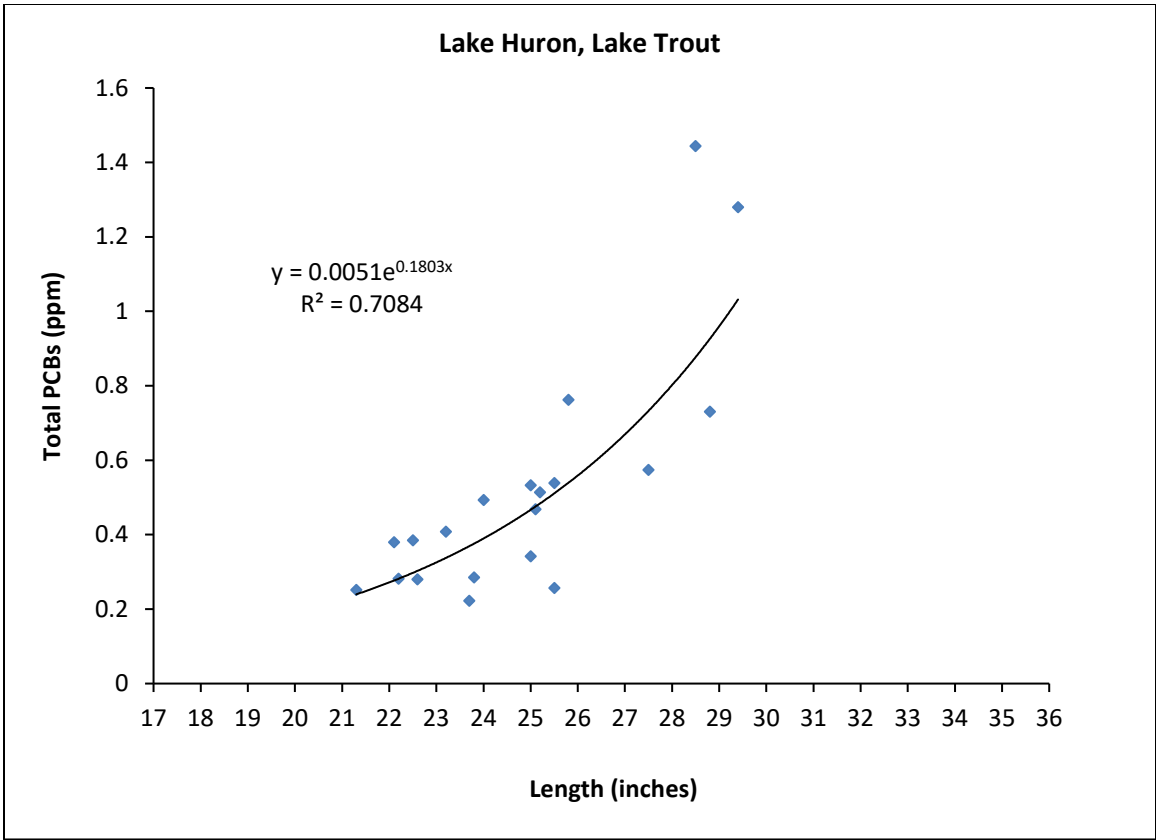
Length (Inches)	PCB Regression Equation Estimate (ppm)	Meal Category
14	0.064	2
16	0.091	2
18	0.131	1
20	0.188	1
22	0.269	0.5
24	0.386	0.5
26	0.554	Limited
28	0.794	Limited
30	1.139	Limited
<i>Shaded area denotes extrapolated estimates</i>		

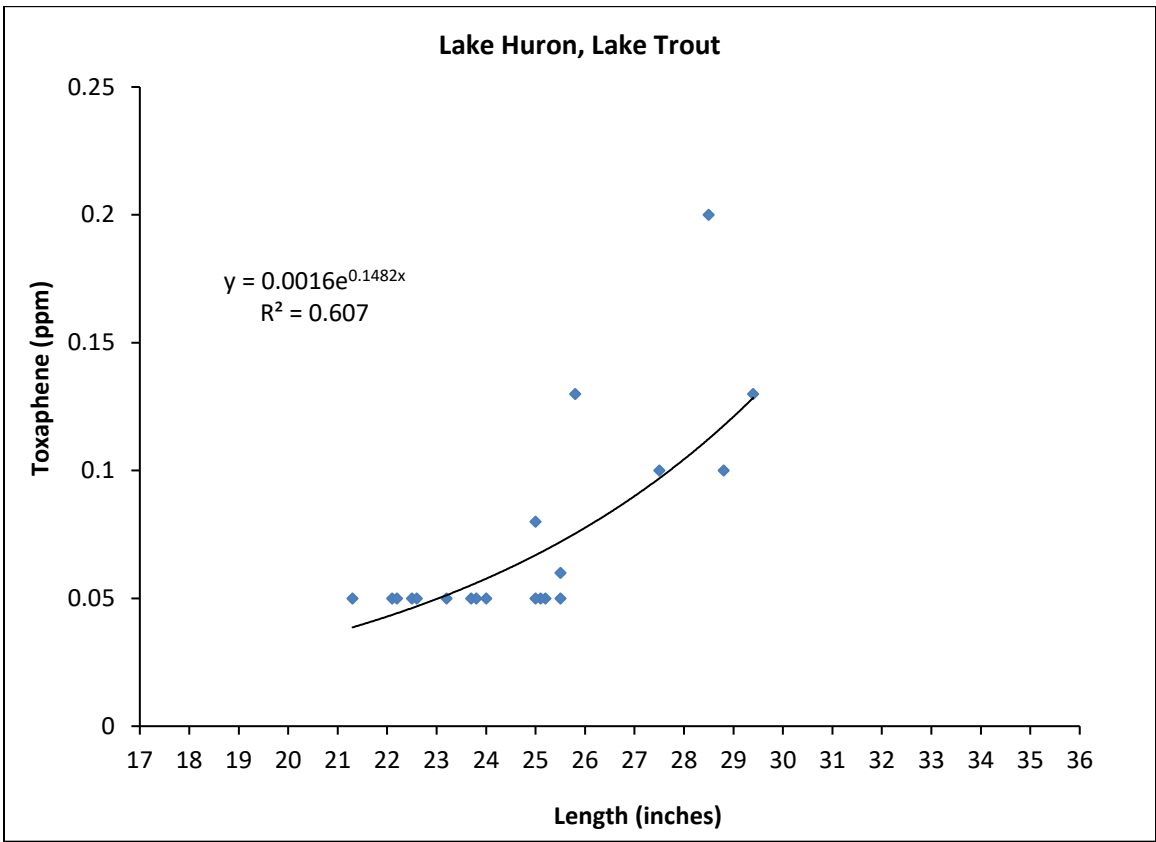
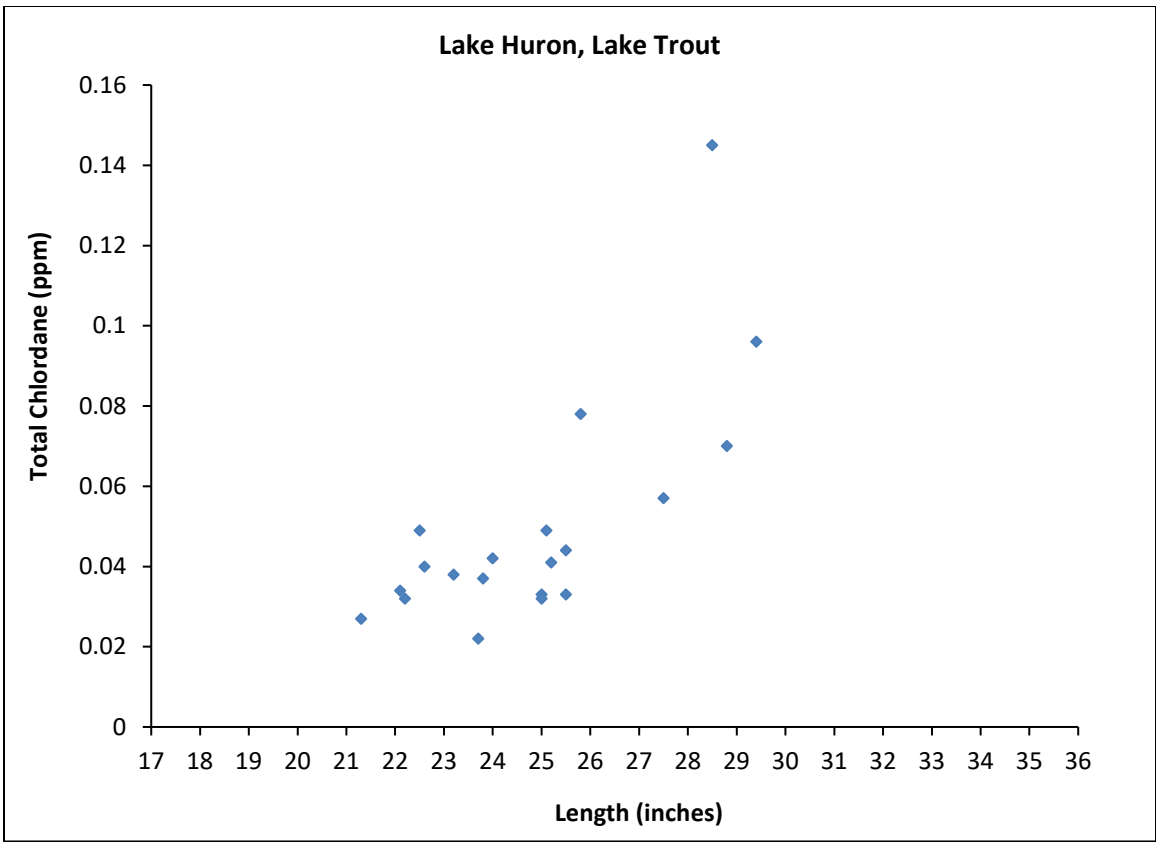
Length (Inches)	DDT Regression Equation Estimate (ppm)	Meal Category
14	0.021	16
16	0.031	16
18	0.044	16
20	0.064	16
22	0.093	16
24	0.134	16
26	0.194	16
28	0.280	8
30	0.405	4
<i>Shaded area denotes extrapolated estimates</i>		

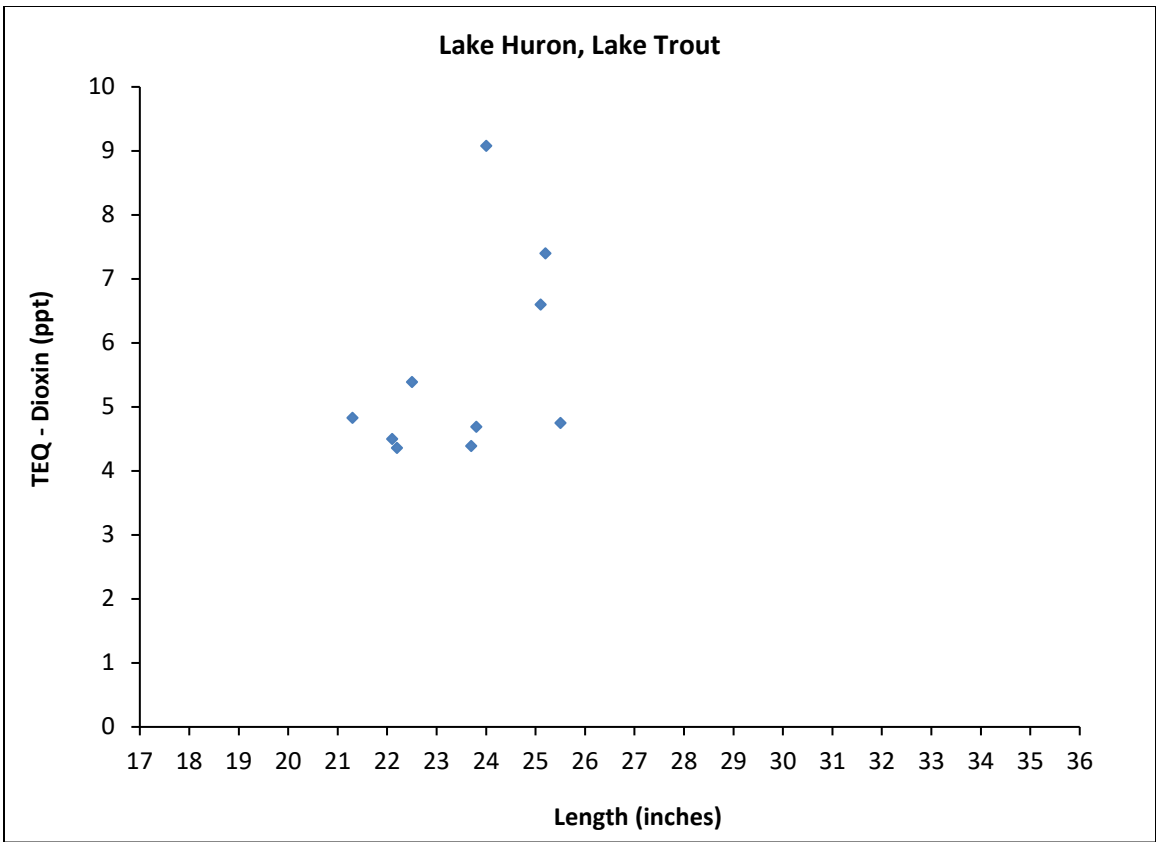
Existing MDHHS Advisory: Women and children should not eat Lake Huron lake trout due to PCBs and dioxin.

Recommendation: No one should eat more than 1 meal per month of Lake Huron lake trout smaller than 20 inches due to dioxins and PCBs, or more than 6 meals per year of lake trout between 20 and 24 inches due to PCBs. Healthy adults should not eat more than 1 or 2 meals per year and sensitive populations should not eat any Lake Huron lake trout larger than 24 inches due to PCBs. Mercury and DDT would cause advisories.









Lake Whitefish

Lake Huron

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	95	16.8	na	16.8	25.3
Datasets available: 1992, '96, '98, '99, 2007, 2016						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	95	0.09	0.02	0.29	0.10	8
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.130	0.178				

Organics Analysis:

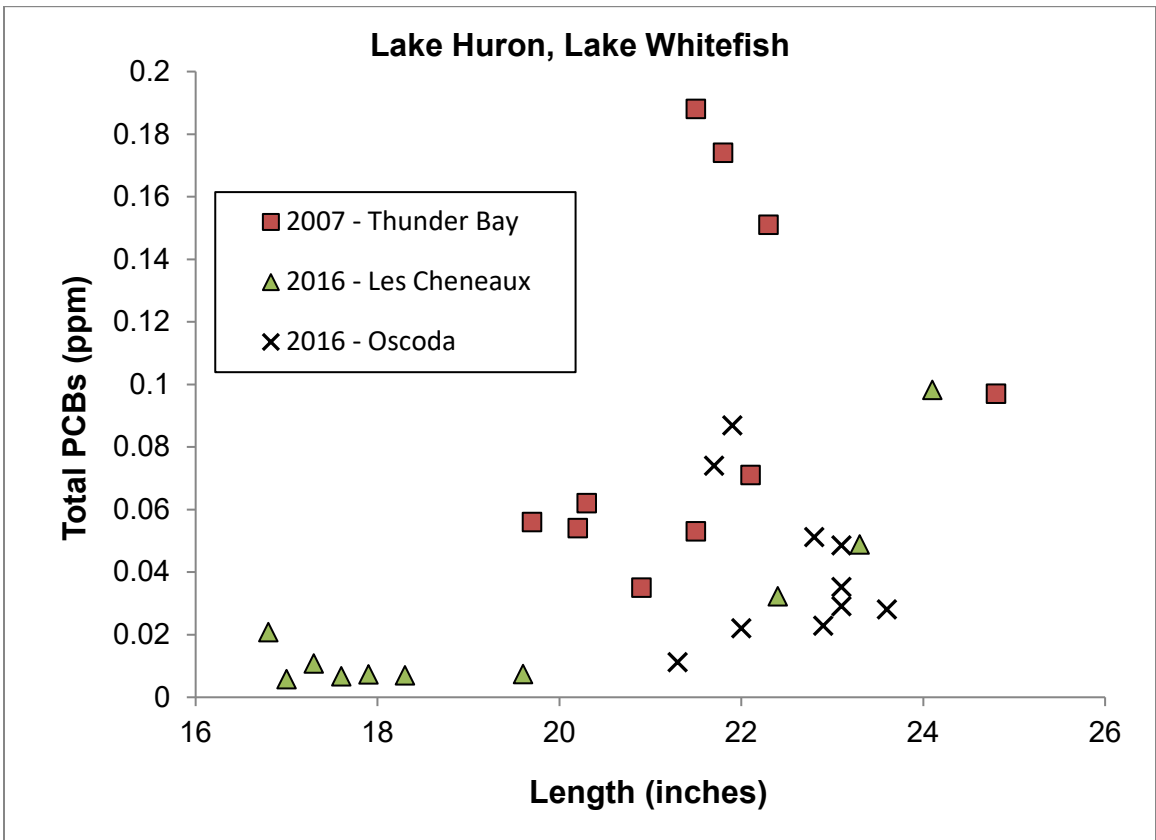
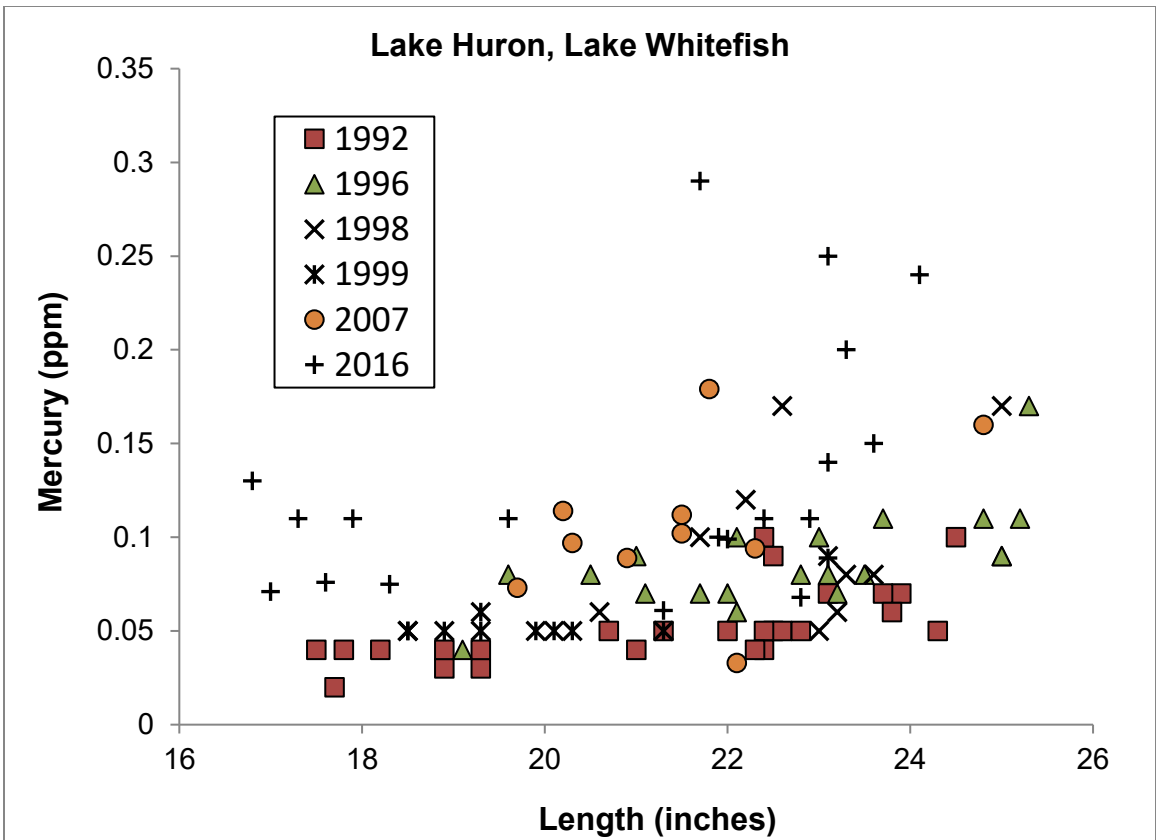
Range of Years Used			N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent	Min				Max	
PCBs	2007	2016	30	16.8	na	16.8	24.8
TEQ	2007	2016	20	17.3	na	17.3	24.8
Σ Tox †	2016	2016	10	17.3	na	17.3	24.1
PFOS	2016	2016	10	17.3	na	17.3	24.1
Datasets available: 1983, '92, '96, '98, '99, 2007, 2016							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
PCB	30	0.05	0.006	0.19	0.07	2	
DDT	30	0.02	0.002	0.06	0.02	16	
Chlordane	30	0.004	0.001	0.02	0.006	--	
Σ Tox †	10	0.6 ppb	0.2 ppb	1.5 ppb	0.9 ppb	16	
TEQ*	20	6 ppt	1 ppt	18 ppt	8 ppt	0.5	
PFOS	10	6 ppb	2 ppb	15 ppb	9 ppb	16	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.177	0.418					
DDT	0.182	0.410					
Chlordane	0.169	0.466					
Σ Tox †	0.328	0.538					
TEQ*	0.158	0.350					
PFOS	0.005	0.005					
Final meal category based on UCL:						0.5	

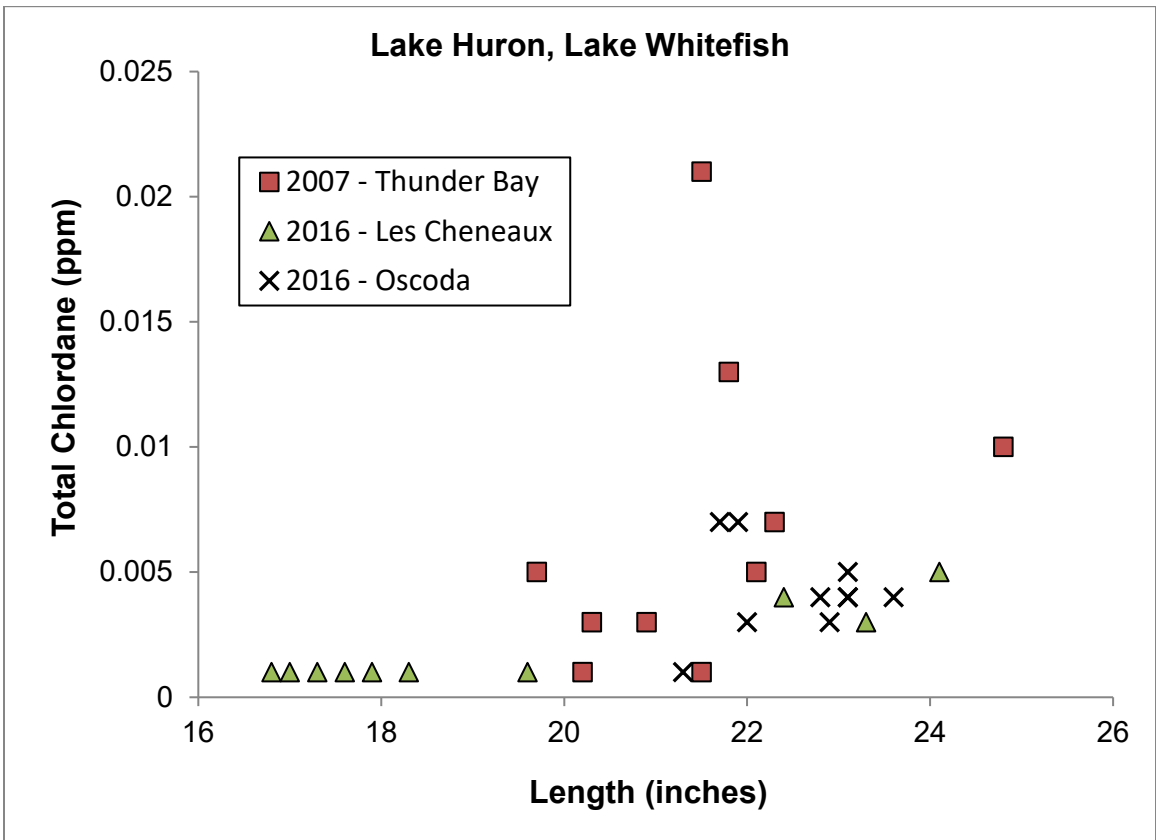
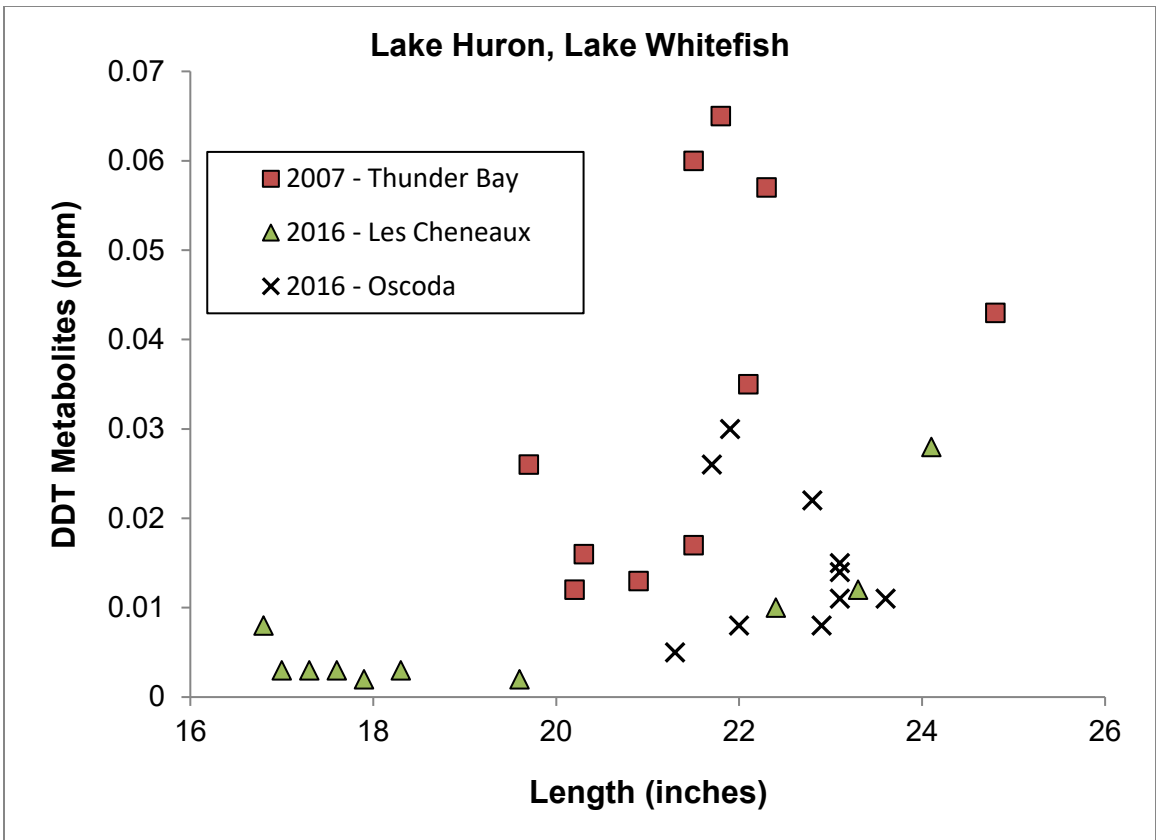
* 2005 WHO TEFs; dl-PCBs included

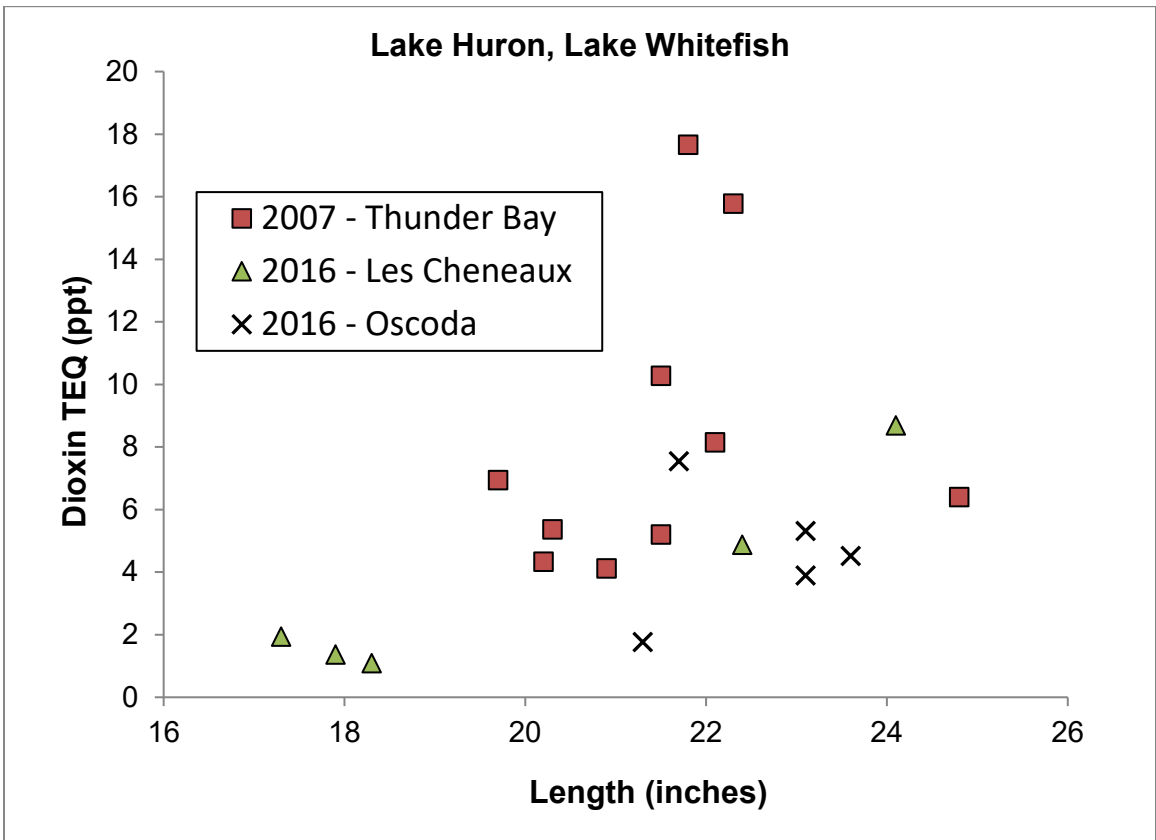
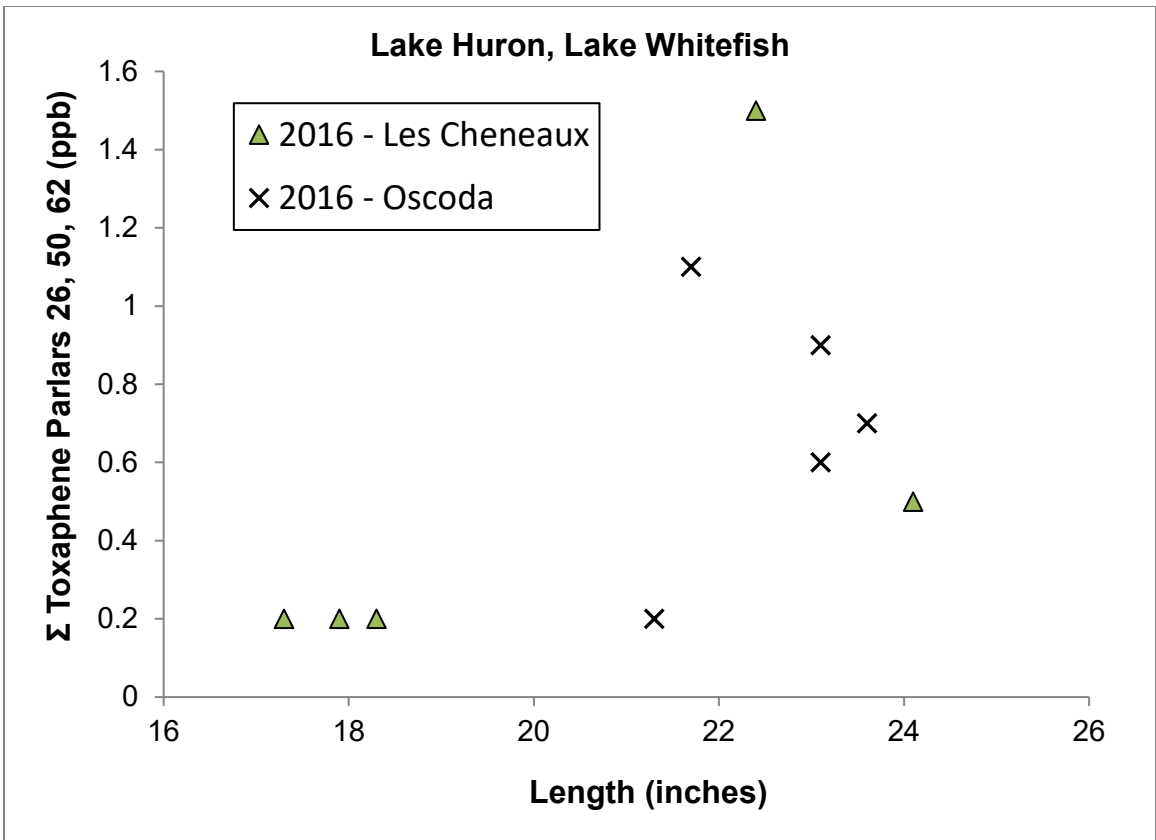
† Sum of Toxaphene Parlars 26, 50, 62

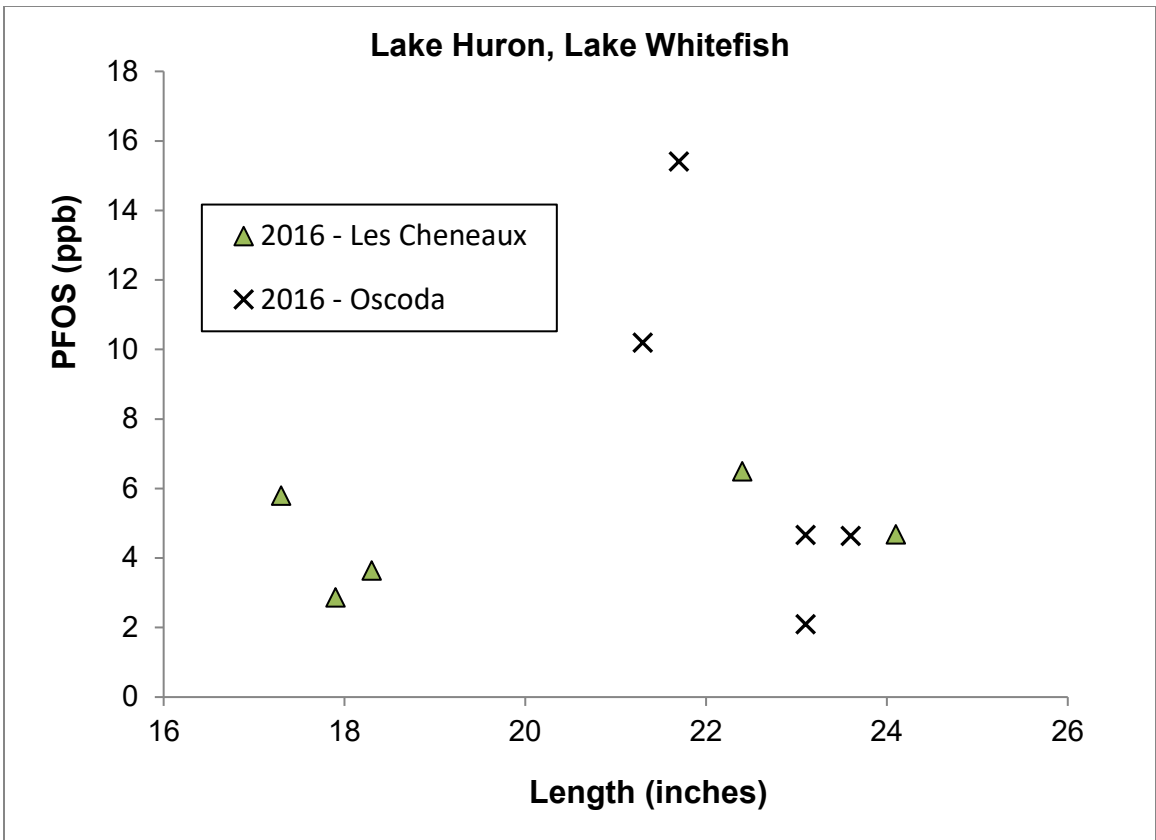
Existing MDHHS Advisory: No one should eat more than 6 meals per year of Lake Huron lake whitefish due to dioxins. PCBs and mercury would cause advisories.

Recommendation: No change is recommended.









Largemouth & Smallmouth Bass
Hg Analysis:

**Northern Lake Huron
Les Cheneaux & Thunder Bay**

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2012	2014	20	10	14	14.8	18.4
Datasets available: 2012, 2014						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	14	0.35	0.20	0.56	0.41	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.728	0.850				

Organics Analysis:

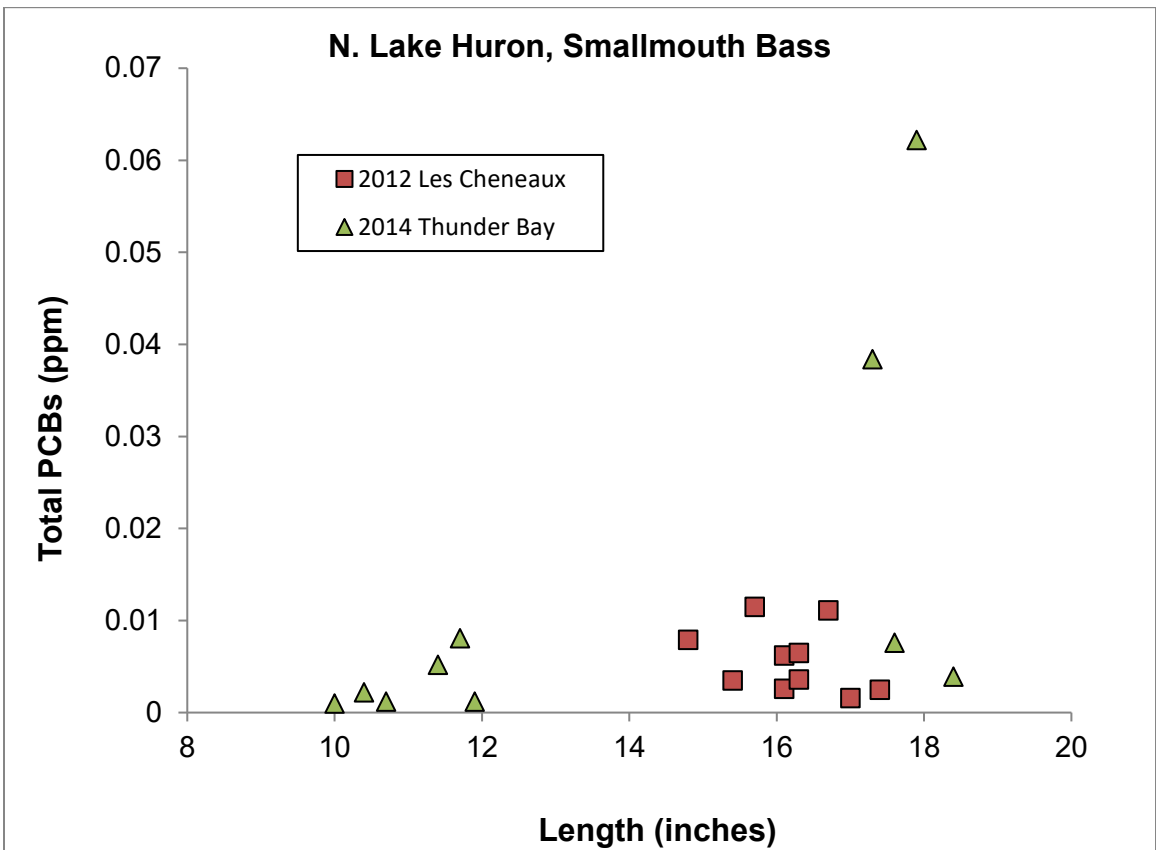
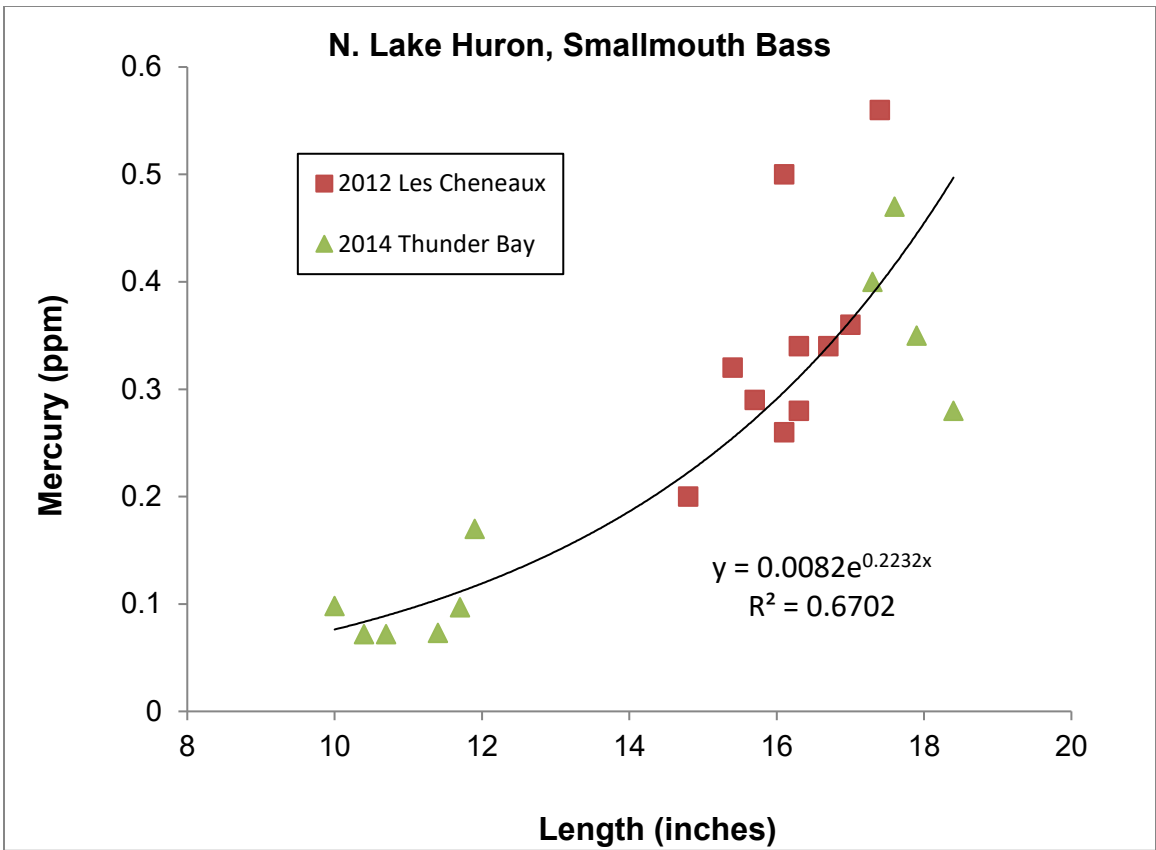
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2012	2014	20	10	14	14.8	18.4
Datasets available: 2012, 2014						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	14	0.01	0.002	0.06	0.02	8
DDT	14	0.002	0.001	0.004	0.003	16
Chlordane	14	ND	--	--	--	--
Toxaphene	14	ND	--	--	--	--
TEQ	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.143	0.270				
DDT	0.196	0.199				
Chlordane	--	--				
Toxaphene	--	--				
TEQ	--	--				
Final meal category based on UCL:						2

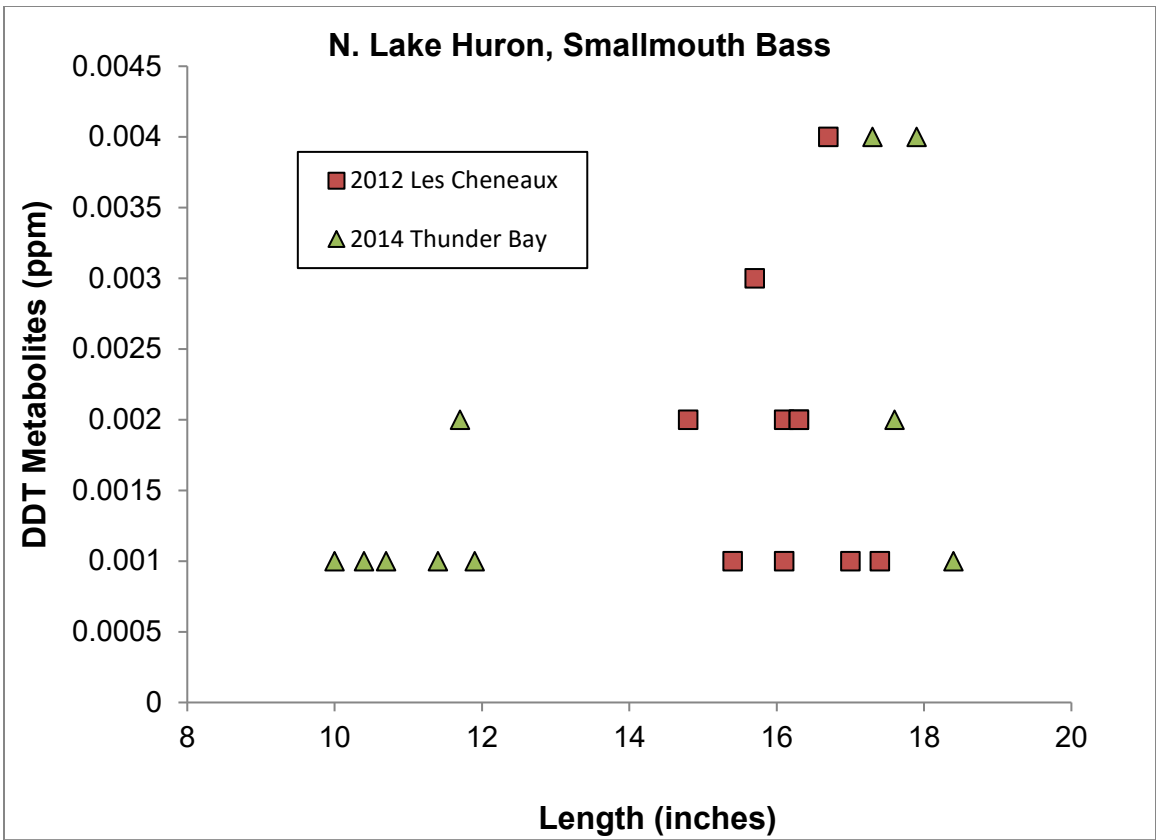
Existing Advisory: No one should eat more than 2 meals per month of Les Cheneaux area largemouth or smallmouth bass smaller than 18 inches or more than 1 meal per month of those fish larger than 18 inches. The statewide length break was applied as the size range of fish in this sample set is limited.

Recommendation: No change is recommended.

Length (Inches)	Hg Regression	
	Equation Estimate (ppm)	Meal Category
14	0.19	4
16	0.29	2
18	0.46	2
20	0.71	1
22	1.11	0.5

Shaded area denotes extrapolated estimates





Northern Pike

Lake Huron

Hg 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	
1993	1993	5	20.9	24	20.9	31.9	
Datasets available: 1993							
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category	
Mercury	5	0.13	0.10	0.18	0.18	4	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.936	0.901					

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	
1993	1993	5	20.9	24	20.9	31.9	
Datasets available: 1993							
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category	
PCB	5	0.16	0.07	0.32	0.30	0.5	
DDT	5	0.05	0.02	0.09	0.09	16	
Chlordane	5	0.01	0.005	0.02	0.02	--	
Toxaphene	5	ND	--	--	--	--	
TEQ	0	--	--	--	--	--	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.998	0.967					
DDT	0.842	0.849					
Chlordane	0.470	0.593					
Toxaphene	--	--					
TEQ	--	--					
Final meal category based on UCL:						0.5*	

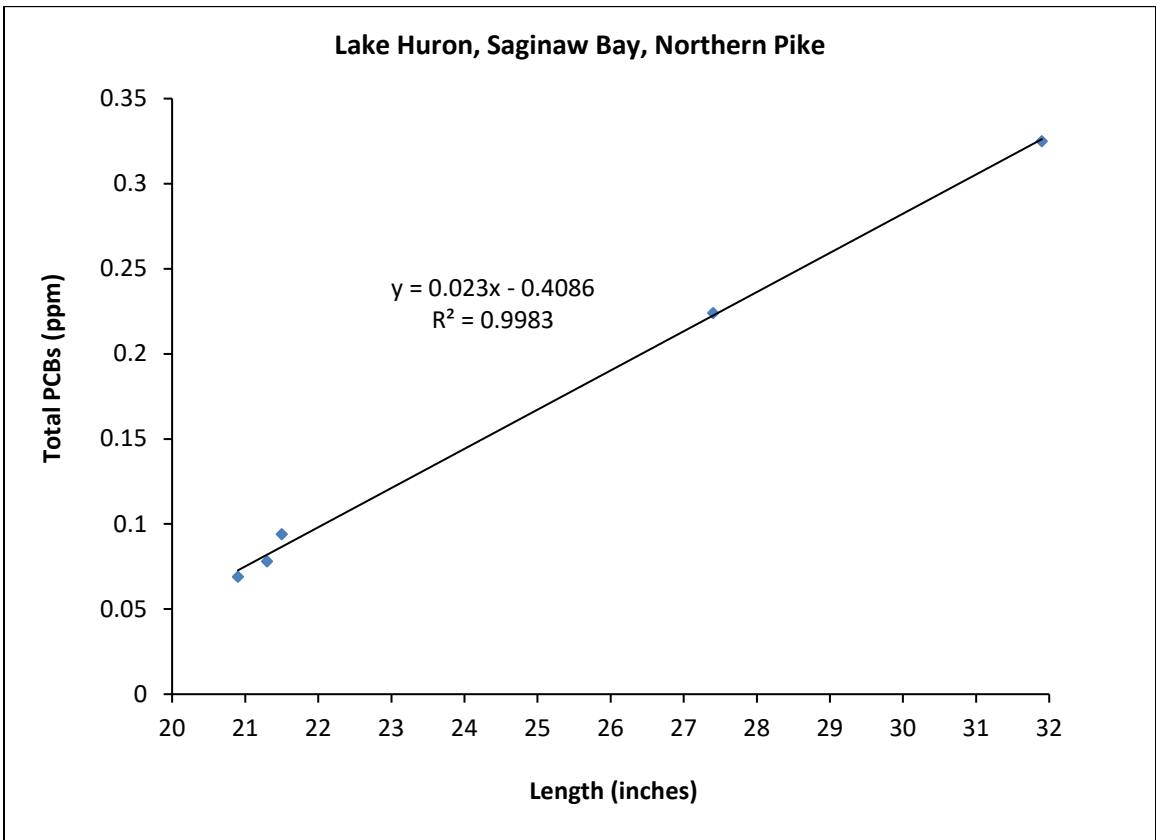
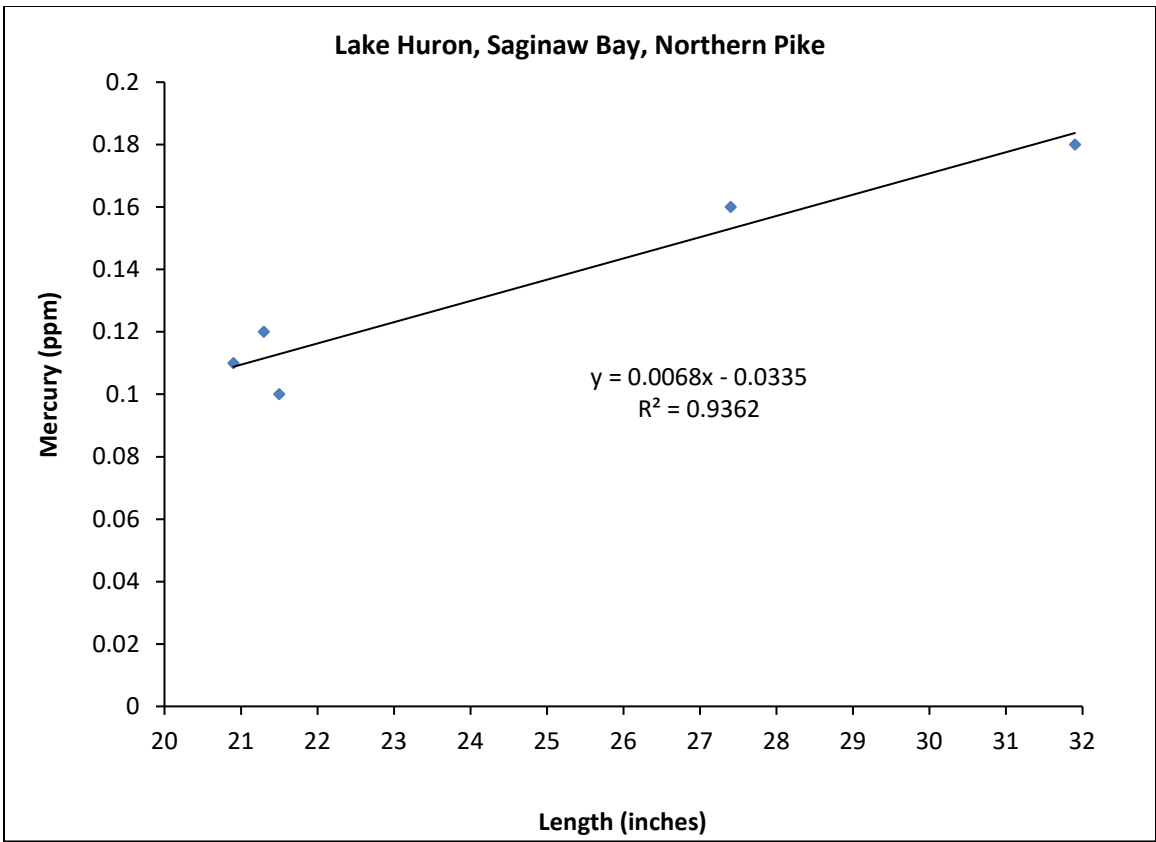
Existing Advisory: Lake Huron northern pike are not listed in the current advisory but are covered under an “All other species” advisory. Women and children should not eat more than one meal per month of Lake Huron northern pike due to PCBs and dioxin.

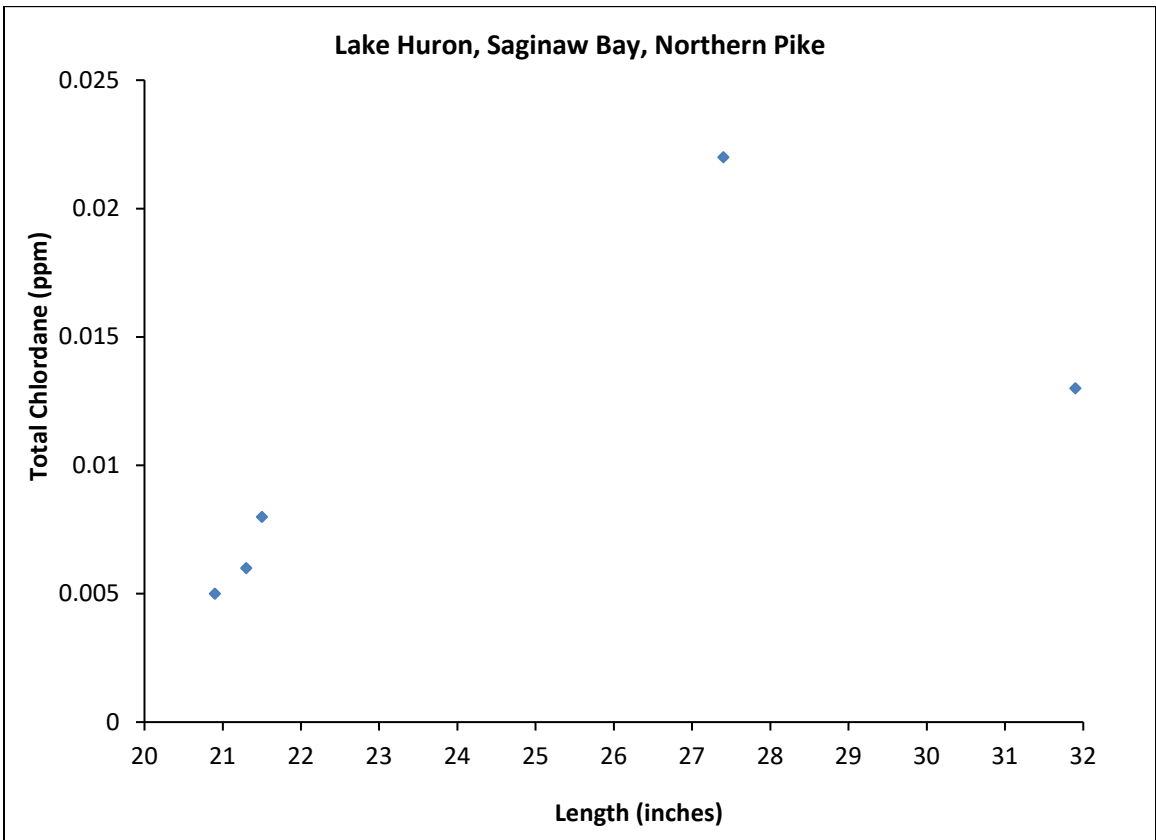
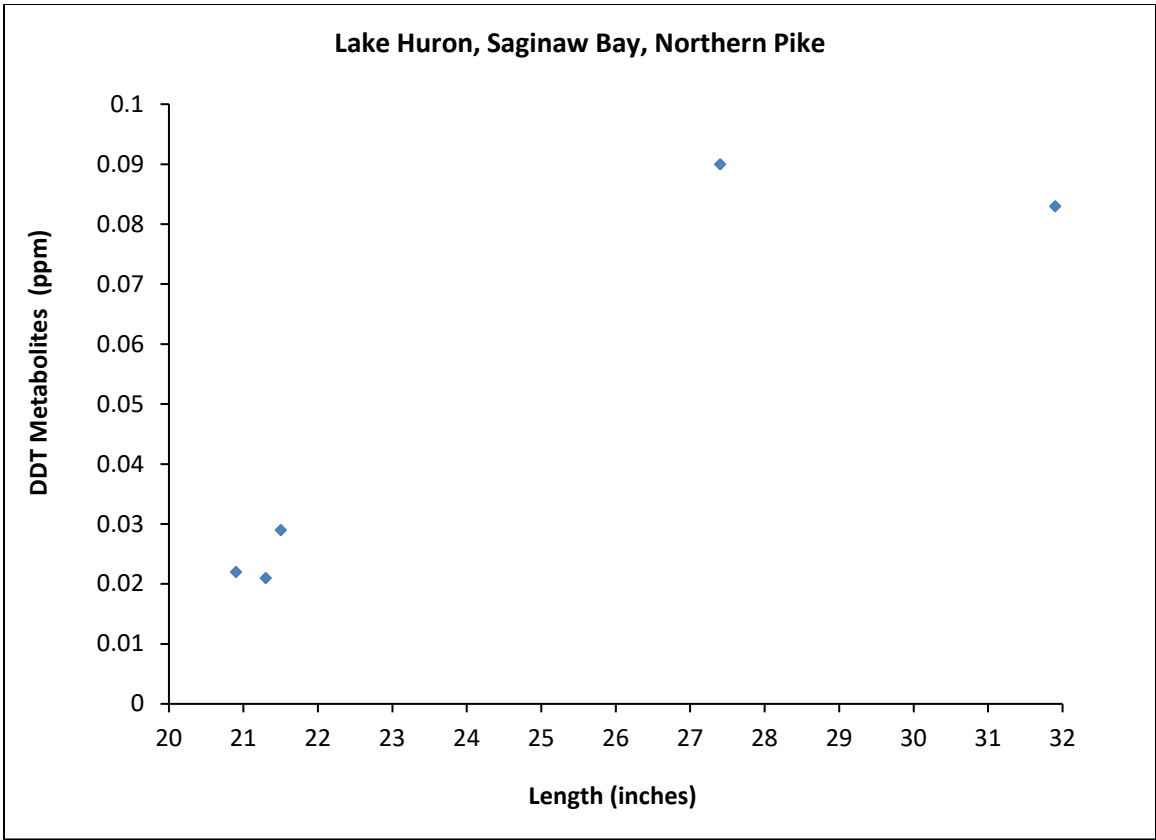
Recommendation: No one should eat more than 1 meal per month of Lake Huron northern pike due to PCBs. Mercury would cause an advisory. *Based on the EGLE Fish Contaminant Monitoring Program,

PCB concentrations ≥15 years old are expected to have declined to a concentration that allows a less restrictive meal category. *Note: small sample size causes regressions to be biased by two points and was not used to set this guideline.*

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category	PCB Regression Equation Estimate (ppm)	Meal Category
20	0.103	8	0.051	2
22	0.116	8	0.097	2
24	0.130	8	0.143	1
26	0.143	4	0.189	1
28	0.157	4	0.235	0.5
30	0.171	4	0.281	0.5
32	0.184	4	0.327	0.5
34	0.198	4	0.373	0.5
36	0.211	4	0.419	0.5

Shaded area denotes extrapolated estimates





Pumpkinseed

**Lake Huron
Les Cheneaux**

Mackinac County

Hg Analysis:

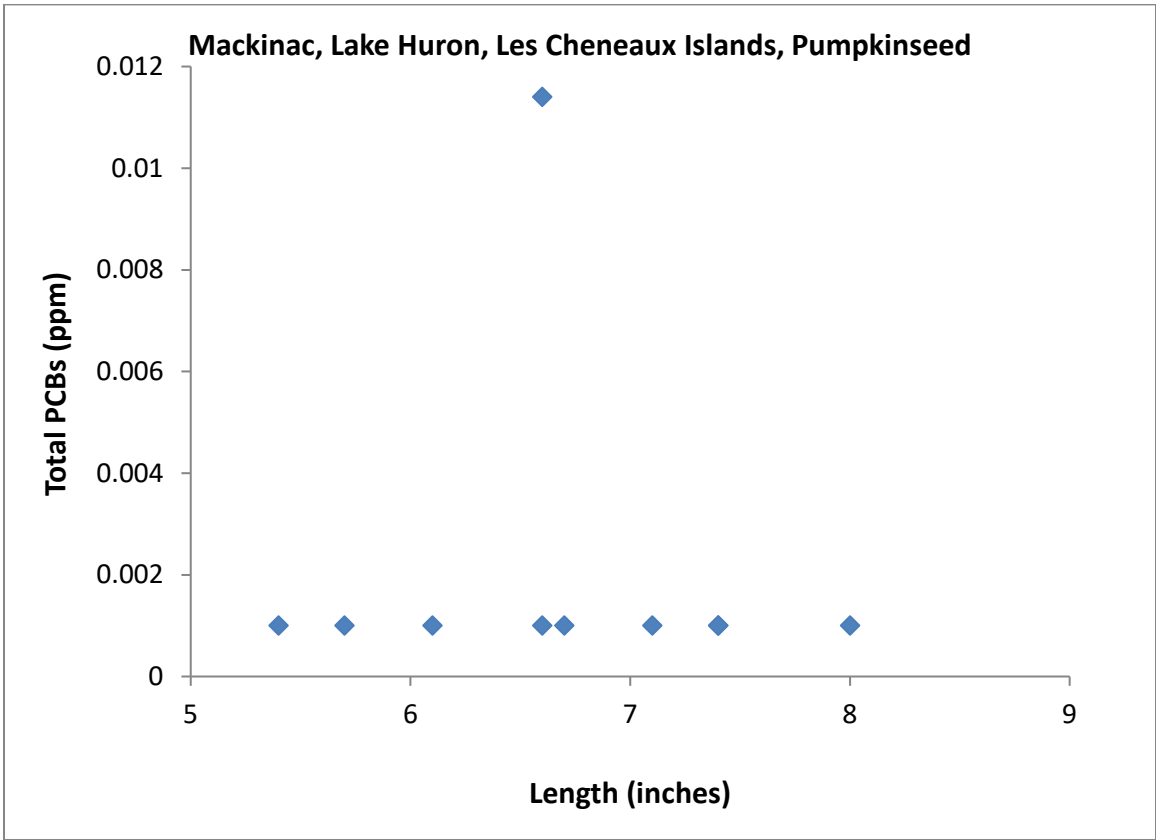
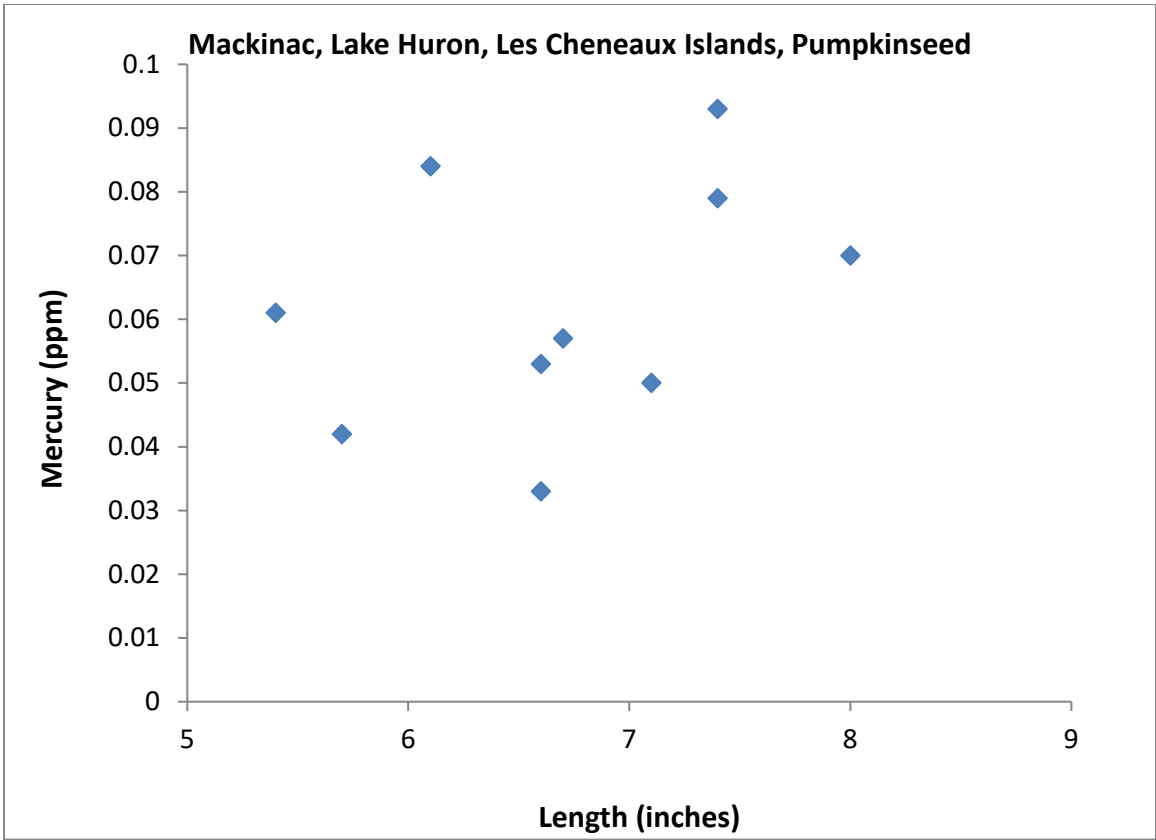
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2012	2012	10	5.4	na	5.4	8
Datasets available: 2012						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
Mercury	10	0.06	0.03	0.09	0.08	12
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.135	0.125				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2012	2012	10	5.4	na	5.4	8
Datasets available: 2012						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
PCB	10	0.002	0.001	0.01	0.004	16
DDT	10	ND	--	--	--	--
Chlordane	10	ND	--	--	--	--
Toxaphene	10	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.002	0.002				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						12

Existing Advisory: Specific guidelines for Lake Huron sunfish or bluegill were not developed since data were not available previously.

Recommendation: No one should eat more than 12 meals per month of sunfish or bluegill from the Les Cheneaux Island area of Lake Huron due to mercury.



Rainbow Smelt

Lake Huron

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	2021	12* [§]	--	--	--	--
Datasets available: 1993, 2019, 2021						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	12	0.044	0.040	0.050	0.047	16
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	--	--				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2019	2021	4* [§]	--	--	--	--
Datasets available: 1993 (No PFOS), 2019, 2021						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	2	0.004	0.004	0.005	--	16 [^]
DDT	2	0.002	0.001	0.003	--	16 [^]
Chlordane	2	0.002	0.001	0.003	--	16 [^]
Toxaphene	2	ND	--	--	--	--
TEQ	4 [']					
PFOS	4	135.3 ppb	15.7 ppb	347.6 ppb	--	1 [^]
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	--	--				
Final meal category based on mean PFOS:						1

*Composite samples of rainbow smelt were analyzed; consisting of 10 to 20 fish/composite sample. In 1993; ten composite samples (10 fish/sample) were analyzed from Nuns Creek; In 2019; one composite sample (20 fish) was collected from the Carp River (analyzed in 2022); In 2021, one composite sample (20 fish) was collected from the Thunder Bay River and from Lake Huron in the vicinity of Tawas and De Tour. No individual fish lengths were recorded for the 1993 or 2019 composited fish.

[^] Meal category based on the mean concentration since less than five samples were used in the analysis.

['] TEQ analytical results were not available at the time of this analysis. This recommendation will be updated once the dioxin, furan, and coplanar PCB data are available.

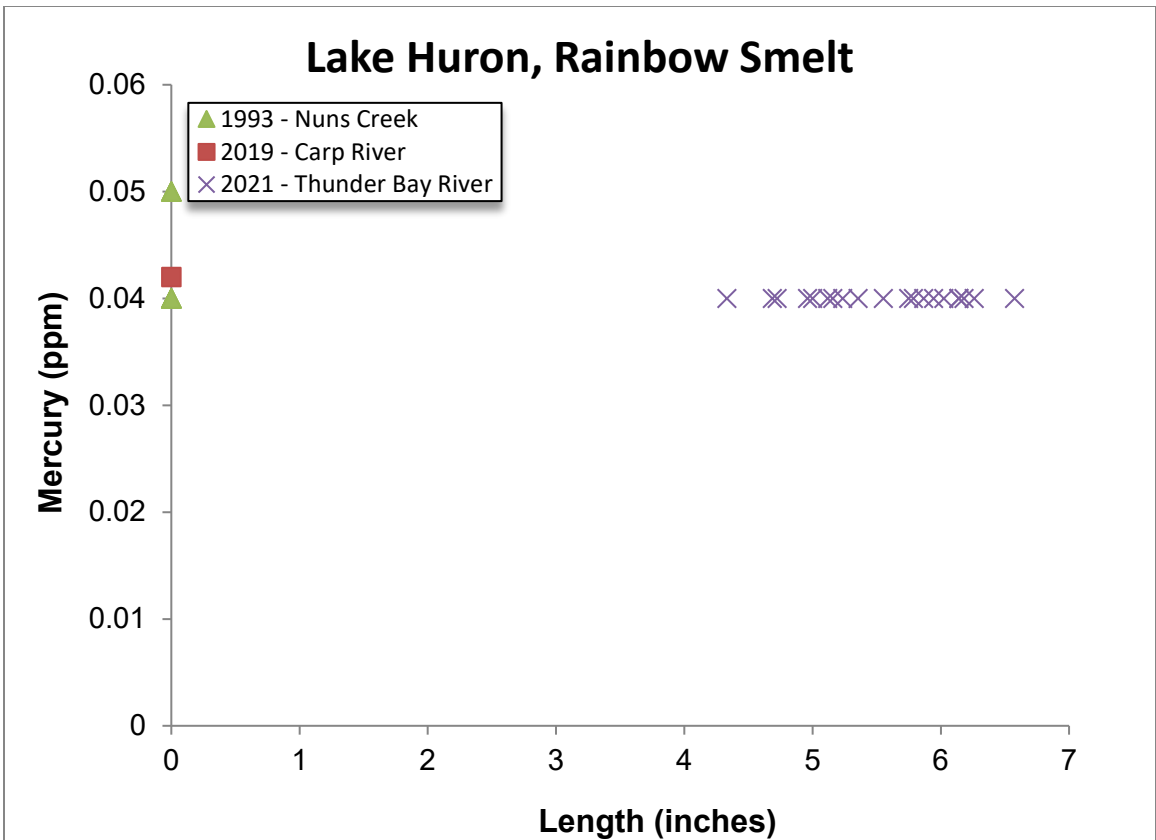
[§] Mercury and non-PFOS organics data are still pending for the Tawas and De Tour rainbow Smelt.

Existing MDHHS Advisory: No one should eat more than 4 meals per month of Lake Huron smelt due to PCBs. Toxaphene would cause an advisory. The quality of this dataset is limited due to the age of the data. Based on the EGLE Fish Contaminant Monitoring Program, PCB concentrations ≥ 15 years old are expected to have declined to a concentration that allows a less restrictive meal category than determined by the standard evaluation method.

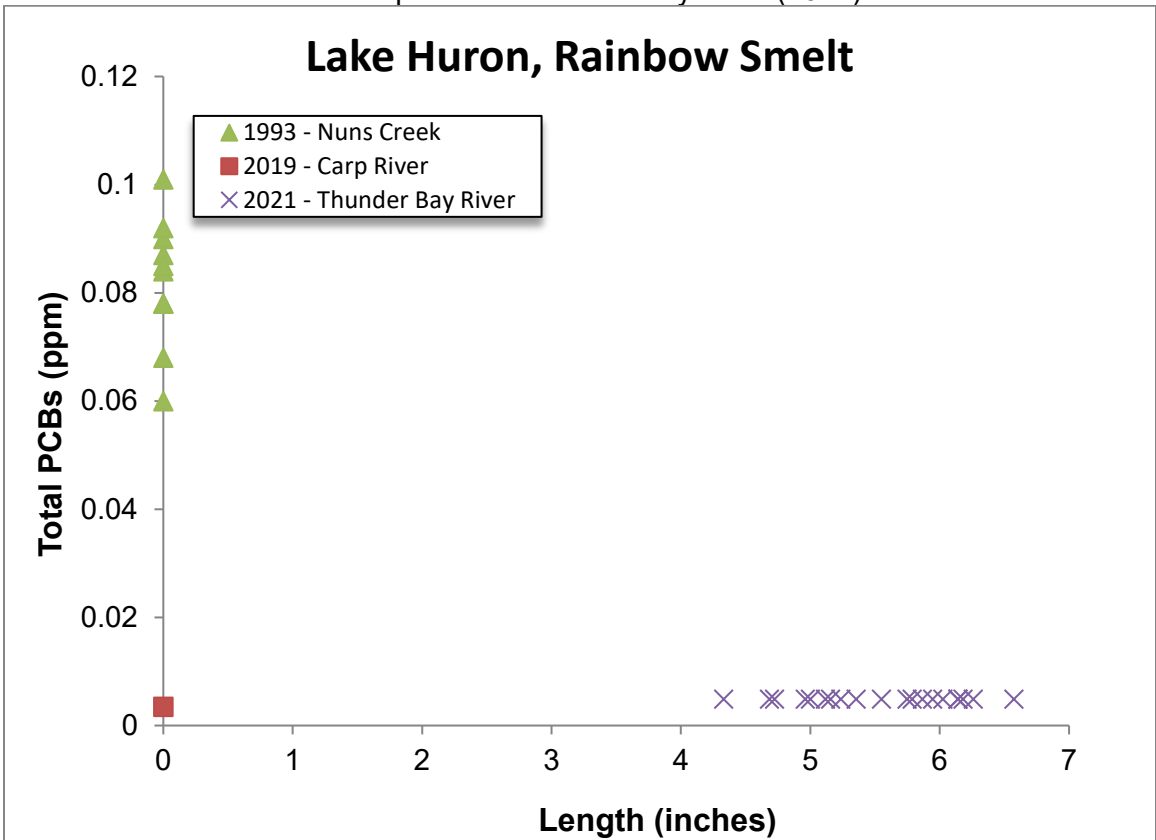
Recommendation: No one should eat more than 6 meals per year of Lake Huron smelt due to PFOS. Best professional judgment was used in the recommendation given the high variability in PFOS concentrations observed in the 4 composite rainbow smelt samples from Lake Huron.

A 95% UCL could not be calculated for PFOS as fewer than 5 samples have been tested for PFOS. Once enough samples are obtained, the 95% UCL of the mean concentration will likely exceed the meal category cutoff for 1 meal per month. Therefore, a meal category of 6 meals per year was assigned at this time as a health-protective approach.

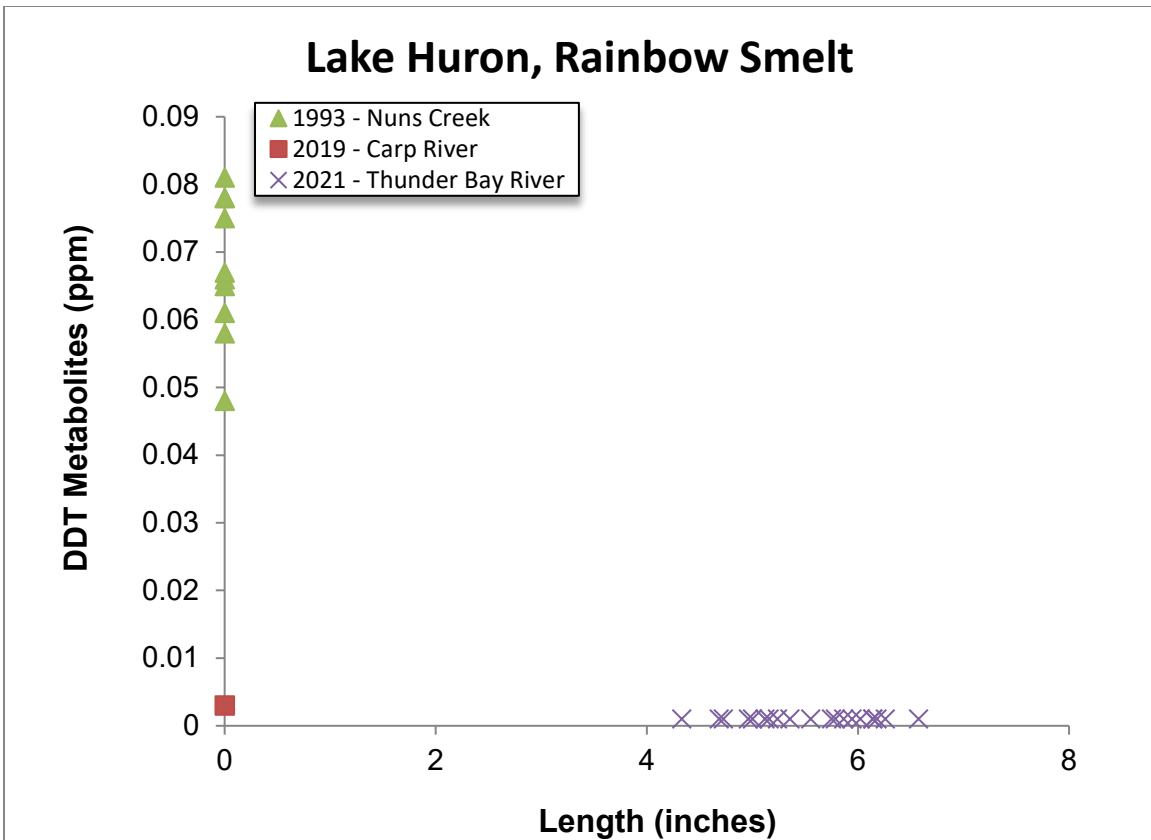
PCB, Toxaphene, and TEQ assessments will be completed once the full set of data are received for samples from Tawas and De Tour.



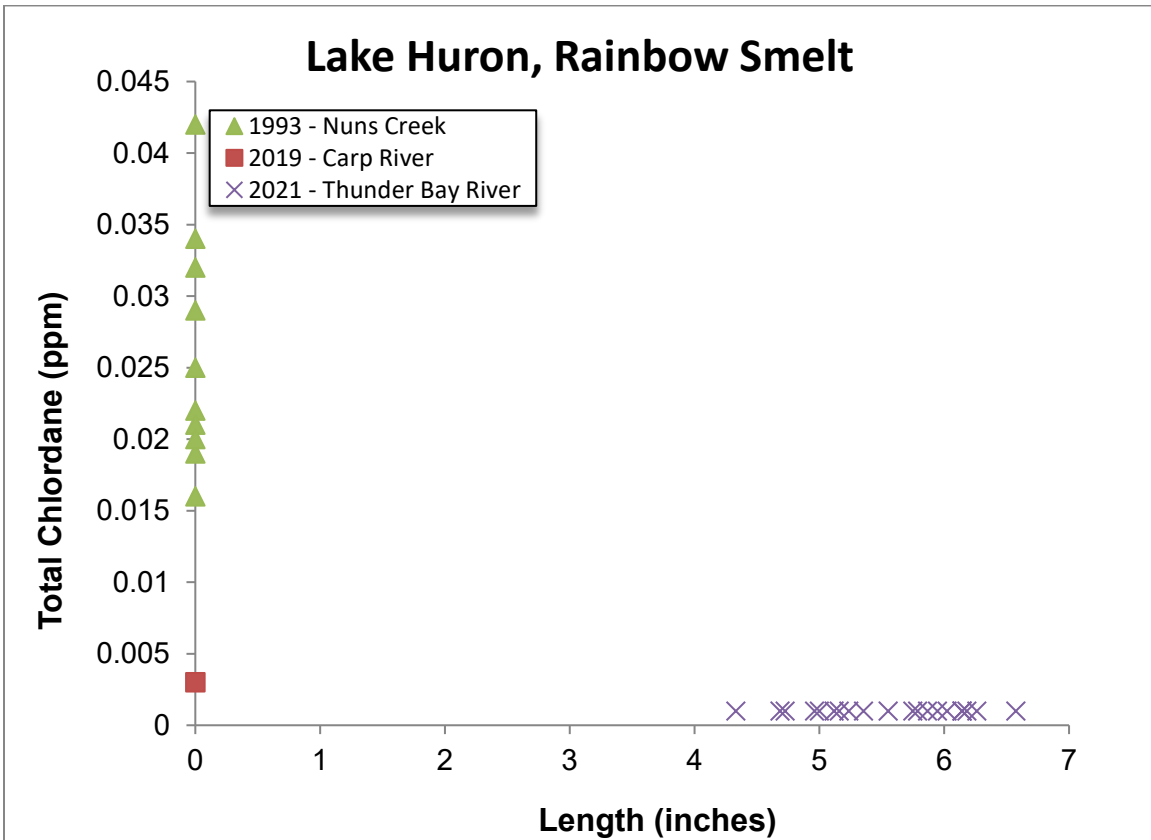
Note: Includes individual data points for Thunder Bay River (2021) rainbow smelt.



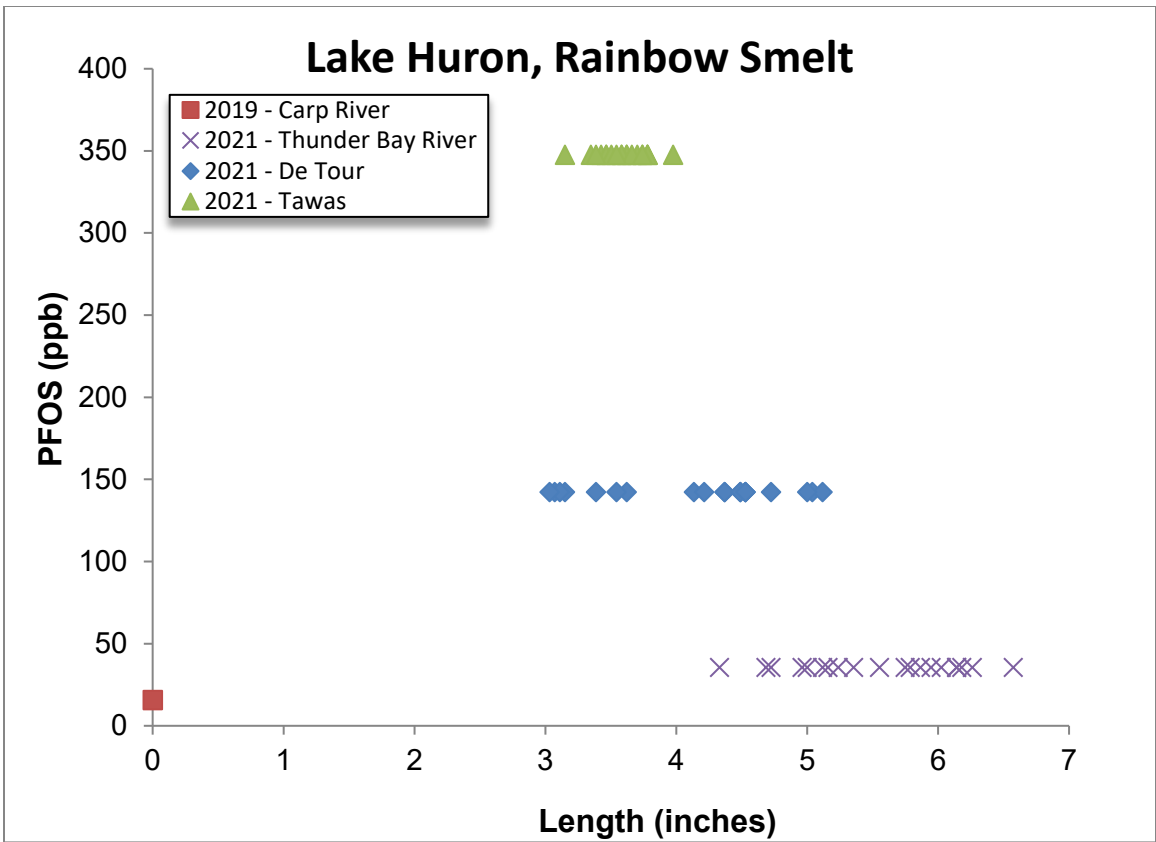
Note: Includes individual data points for Thunder Bay River (2021) rainbow smelt.



Note: Includes individual data points for Thunder Bay River (2021) rainbow smelt.



Note: Includes individual data points for Thunder Bay River (2021) rainbow smelt.



Note: Includes individual data points for Thunder Bay River, De Tour, and Tawas (2021) datasets.

**Rainbow Trout
(Steelhead)**

**Lake Huron
Au Sable River, d/s of Foote Dam**

Hg Analysis:

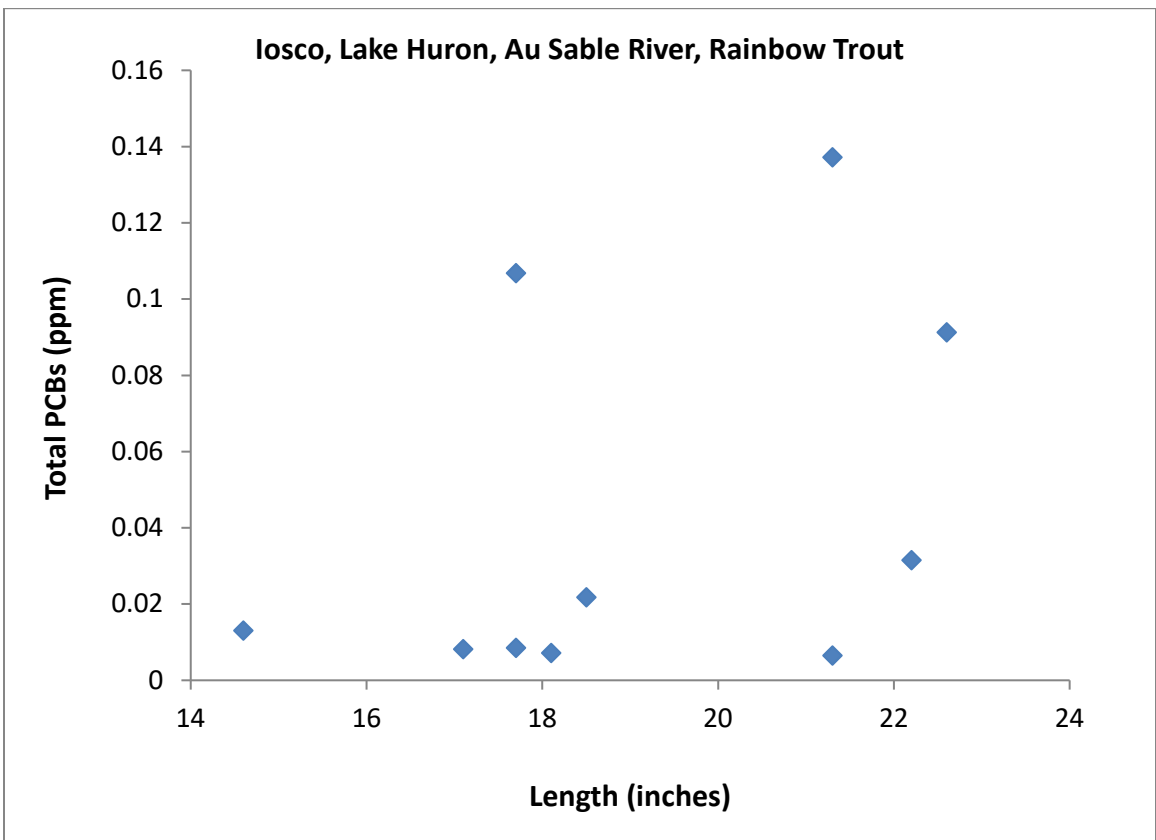
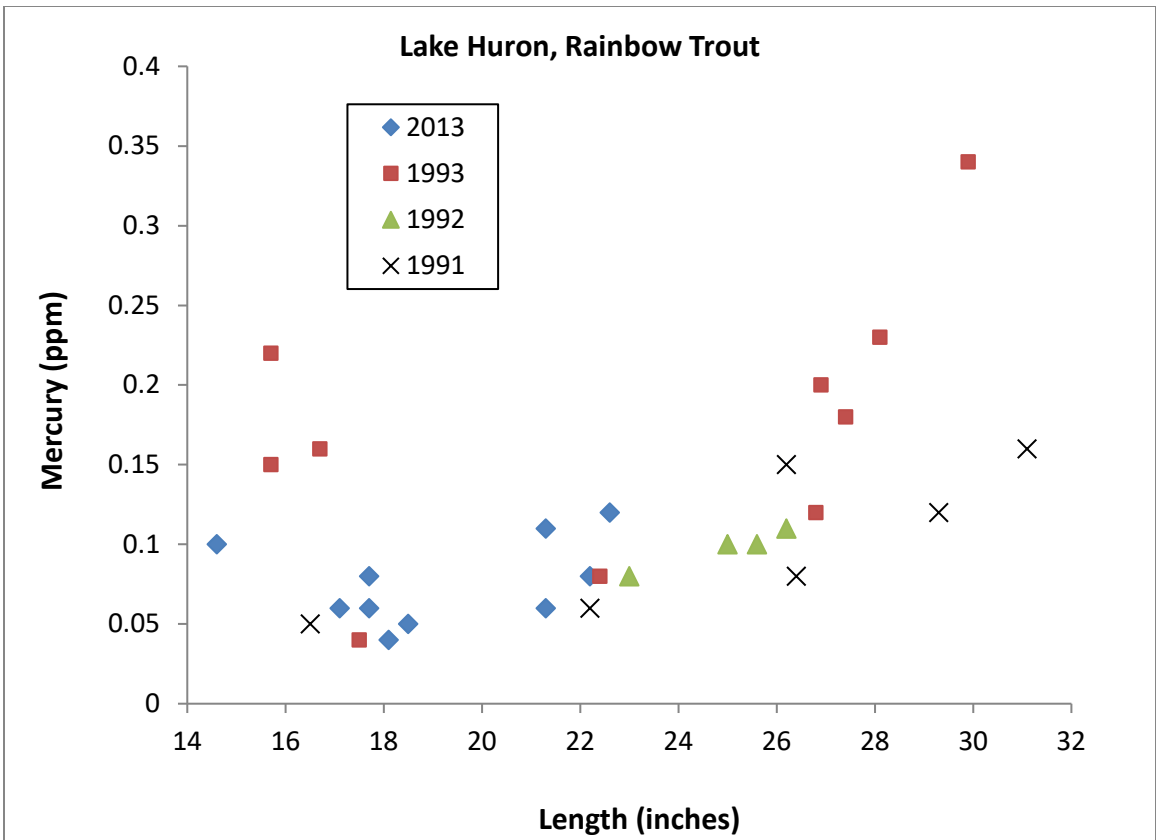
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
1991	2013	30	14.6	10	14.6	31.1	
Datasets available: 1991, 1992, 1993, 2013							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
Mercury	30	0.12		0.04	0.34	0.14	4
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.215	0.253					

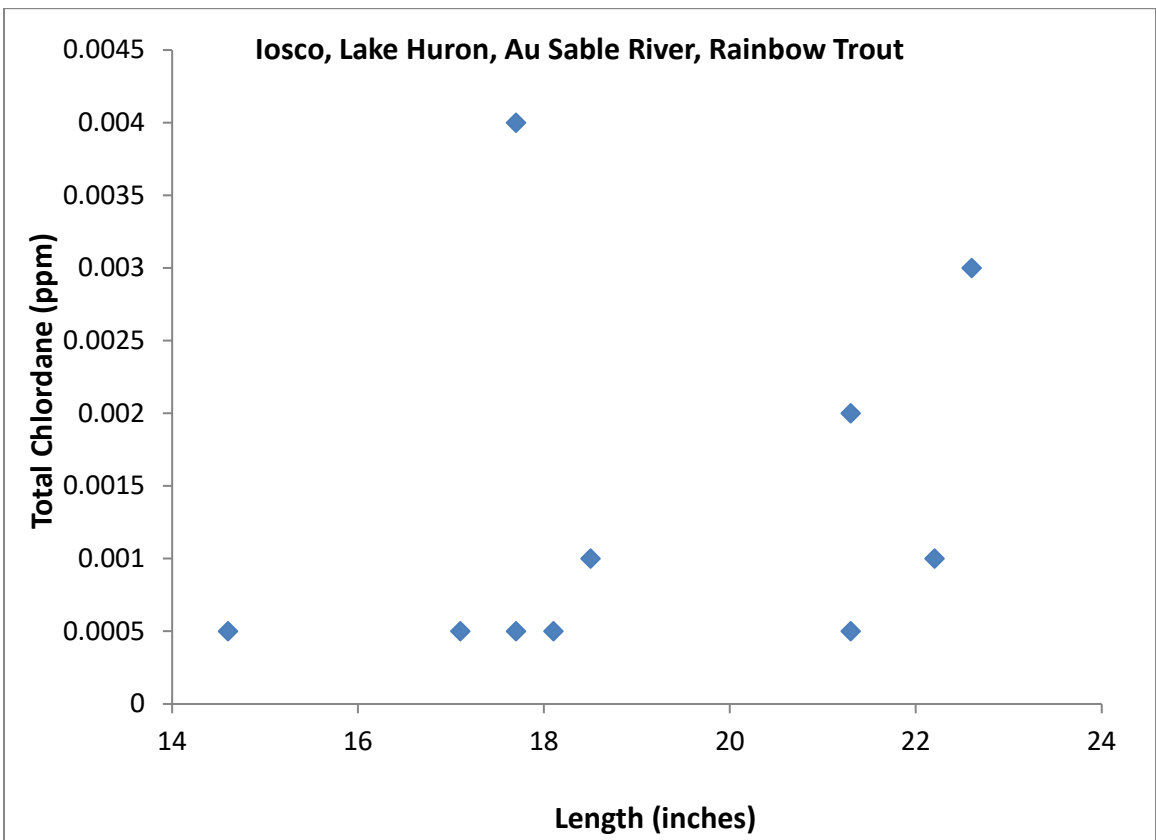
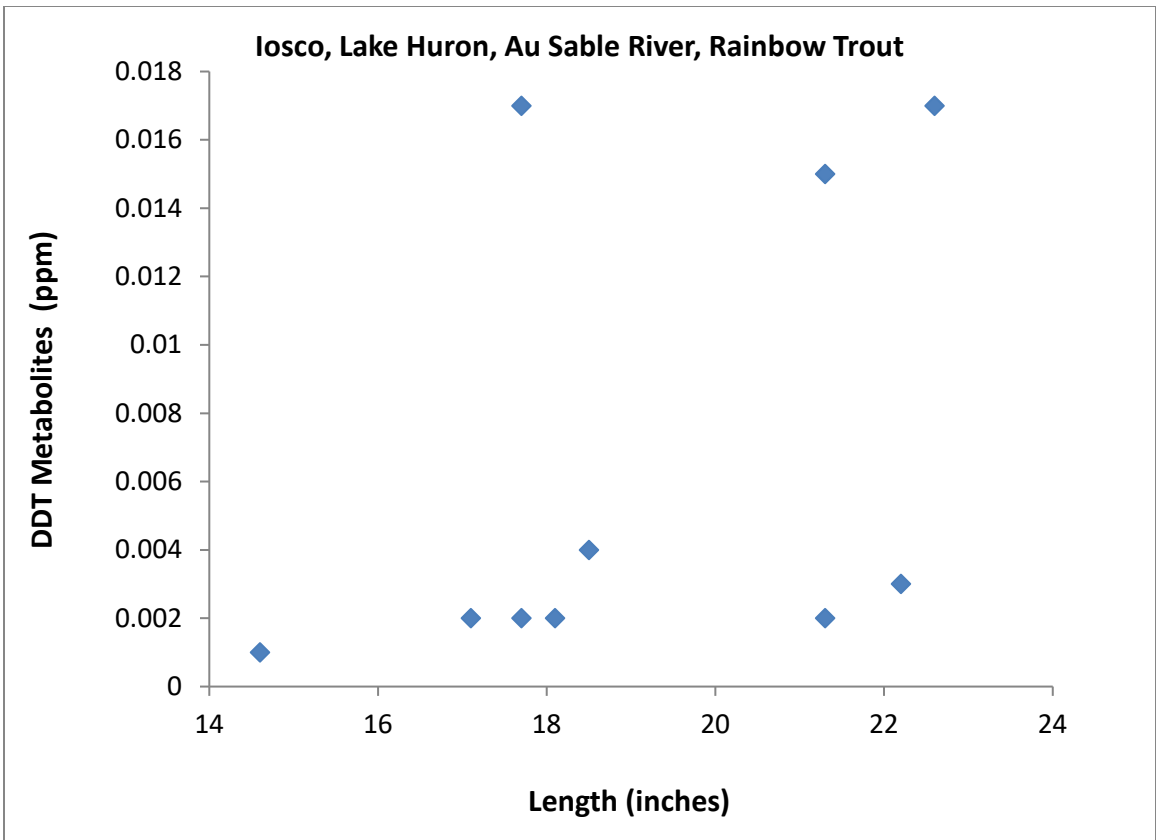
Organics Analysis:

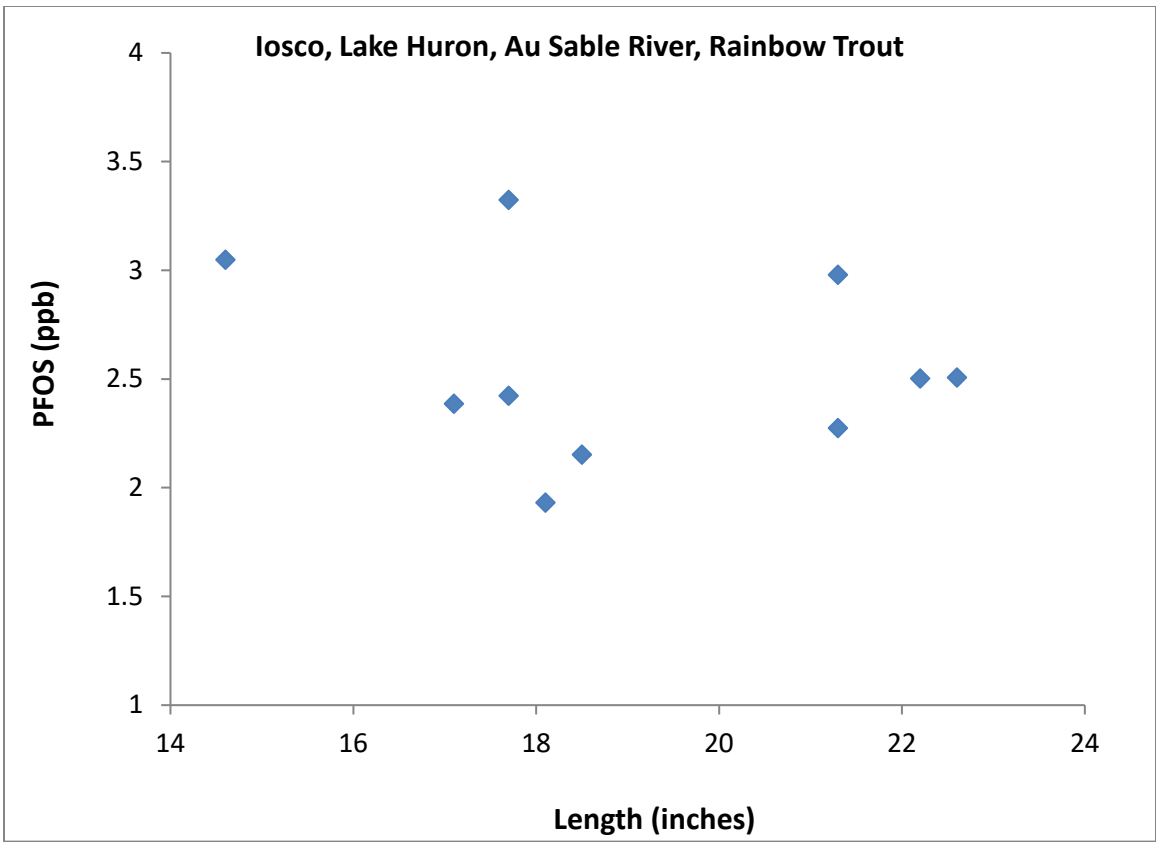
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
2013	2013	10	14.6	10	14.6	22.6	
Datasets available: 1991, 1993, 2013							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
PCB	10	0.04		0.01	0.14	0.08	2
DDT	10	0.01		0.001	0.02	0.01	16
Chlordane	10	0.001		0.001	0.004	0.002	--
Toxaphene	10	ND		--	--	--	--
PFOS	10	14 ppb		7 ppb	28 ppb	19 ppb	8
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.168	0.183					
DDT	0.169	0.273					
Chlordane	0.081	0.178					
Toxaphene	--	--					
PFOS	0.065	0.036					
Final meal category based on UCL:							2

Existing Advisory: No one should eat more than 6 meals per year of rainbow trout (aka steelhead) from Lake Huron or connected tributaries due to PCBs.

Recommendation: No change is recommended. An additional year of sampling is needed to verify the apparently significant reduction in PCB concentrations (previous 95% UCL based on 1991/1993 results was 0.62 ppm).







Rock Bass

**Lake Huron
Les Cheneaux**

Mackinac County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2012	2012	10	5.3	na	5.3	9.3
Datasets available: 2012						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
Mercury	10	0.10	0.08	0.15	0.12	8
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.684	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
2012	2012	10	5.3	na	5.3	9.3
Datasets available: 2012						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
PCB	10	0.002	0.001	0.001	0.004	16
DDT	10	ND	--	--	--	--
Chlordane	10	ND	--	--	--	--
Toxaphene	10	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.002	0.002				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						8

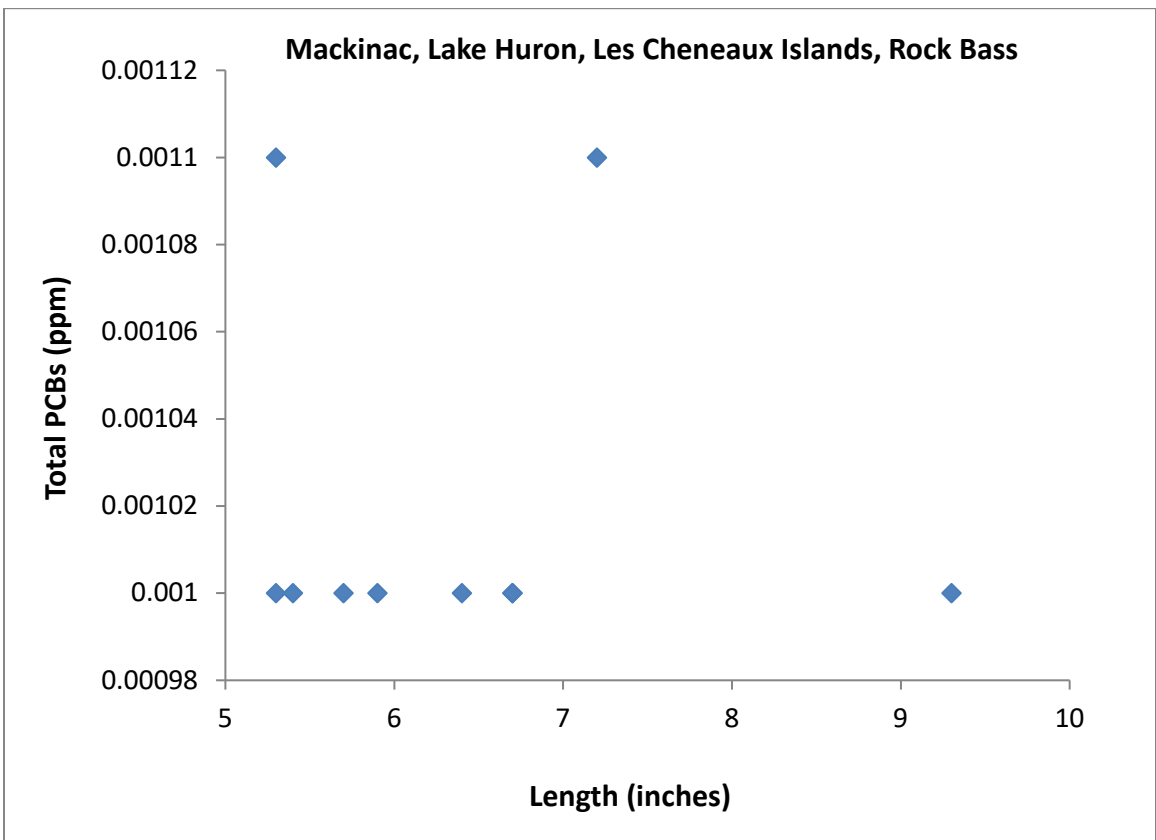
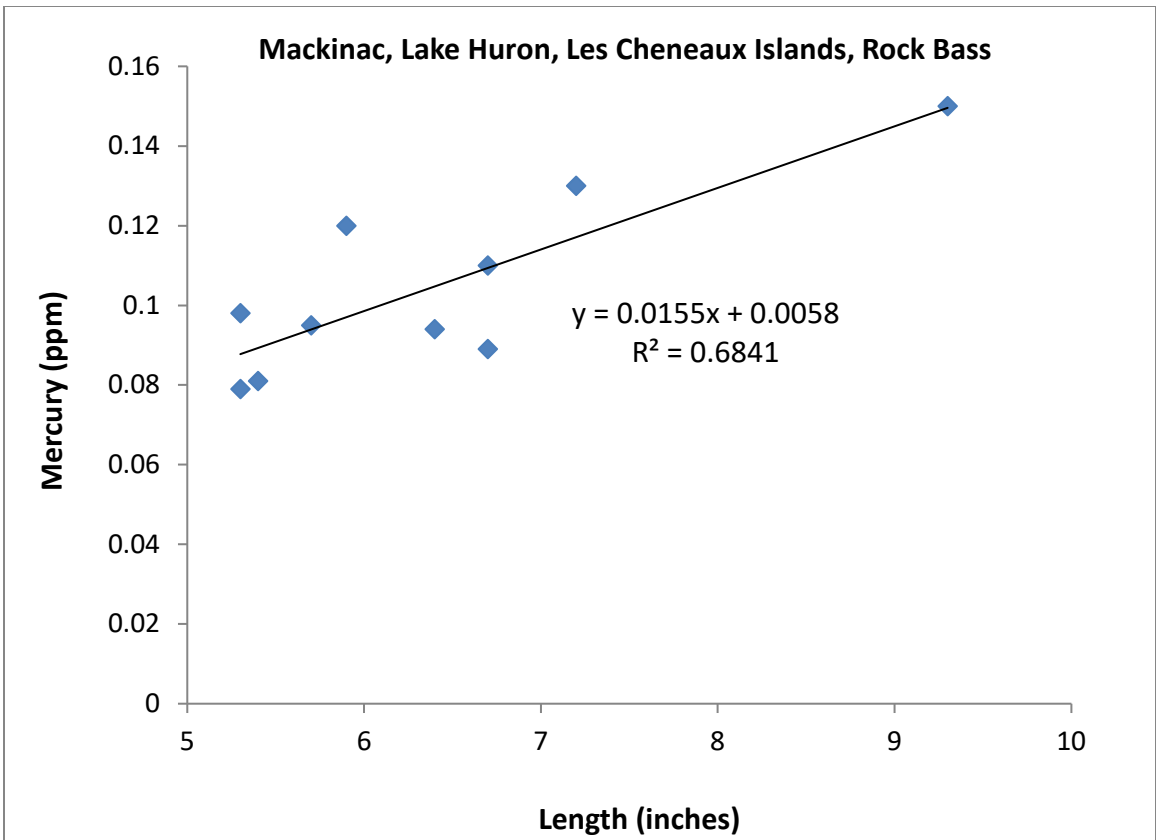
Existing Advisory: Specific guidelines for Lake Huron rock bass were not developed since data were not available previously.

Recommendation: No one should eat more than 8 meals per month of rock bass from the Les Cheneaux Island area of Lake Huron smaller than 8 inches or more than 4 meals per month of those fish larger than 8 inches due to mercury.

Note: Linear regression has only one sample over 8 inches.

A second justification is setting the advisory based on the UCL for fish less than 8 inches and one meal category more restrictive over 8 inches. Both approaches result in the same guidelines.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
5	0.08	12
6	0.1	8
7	0.11	8
8	0.13	8
9	0.15	4
10	0.16	4
11	0.18	4
<i>Shaded area denotes extrapolated estimates</i>		



Walleye

**Lake Huron
(Au Sable River [d/s of Foote Dam], Saginaw Bay,
Saginaw River, and Tittabawassee River)**

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	
1998	2014	67	14.2	15		25.2	
Datasets available: 1986, '87, '88, '89, '91, '92, '93, '94, '97, '98, '99, 2004, '05, '08, '13, '14							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
Mercury	66	0.19	0.03	0.7	0.23	4	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.639	0.665					

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	
2004	2014	42	14.2	15	14.8	22.6	
Datasets available: 1983, '84, '86, '87, '88, '89, '91, '92, '93, '94, '98, '99, 2004, '05, '08, '13, '14							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
PCB	42	0.04	0.001	0.62	0.07	2	
DDT	42	0.007	0.001	0.12	0.01	16	
Chlordane	42	0.002	0.0005	0.02	0.003	--	
Toxaphene	42	ND	--	--	--	--	
TEQ	30	4.5 ppt	0.2 ppt	39 ppt	7.1 ppt	1	
PFOS	13	19.7 ppb	7.9 ppb	31.3 ppb	24.6 ppb	4	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.211	0.240					
DDT	0.167	0.197					
Chlordane	0.187	0.267					
Toxaphene	--	--					
TEQ	0.282	0.372					
PFOS	0.260	0.230					
Final meal category based on UCL:							1

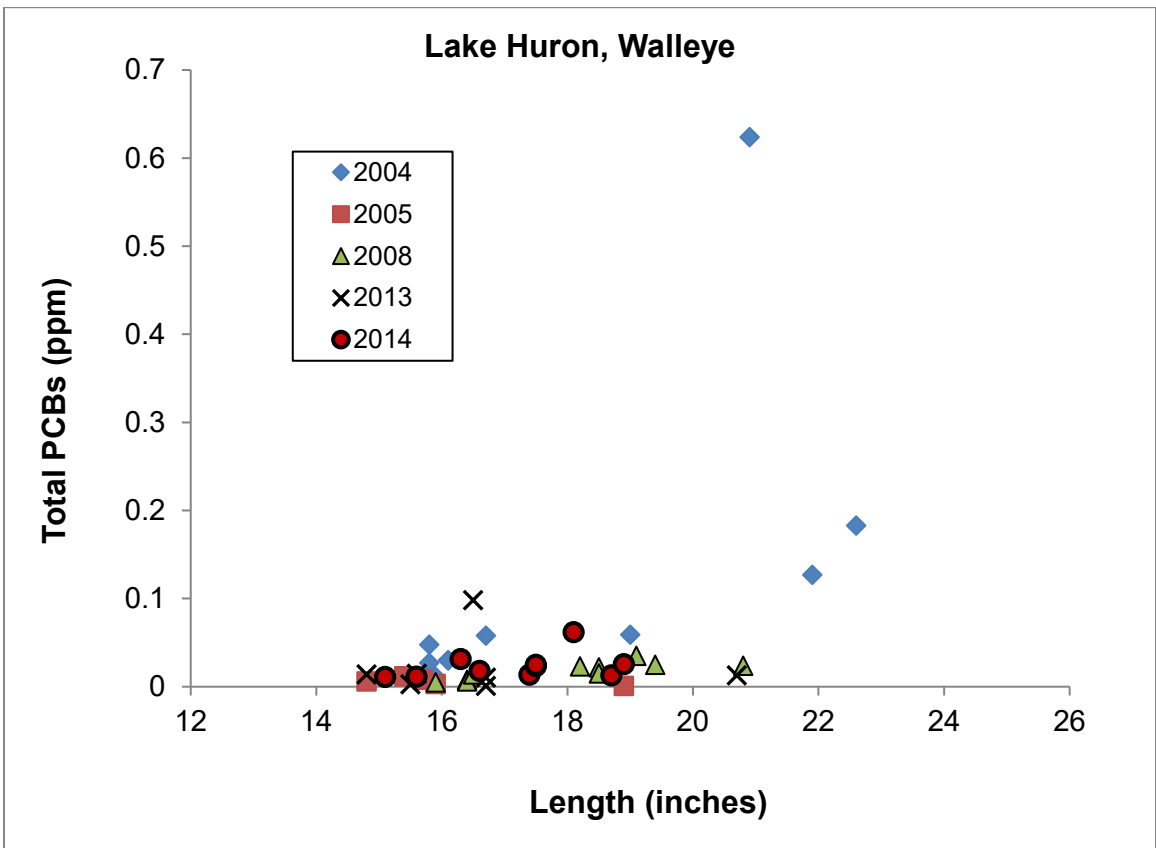
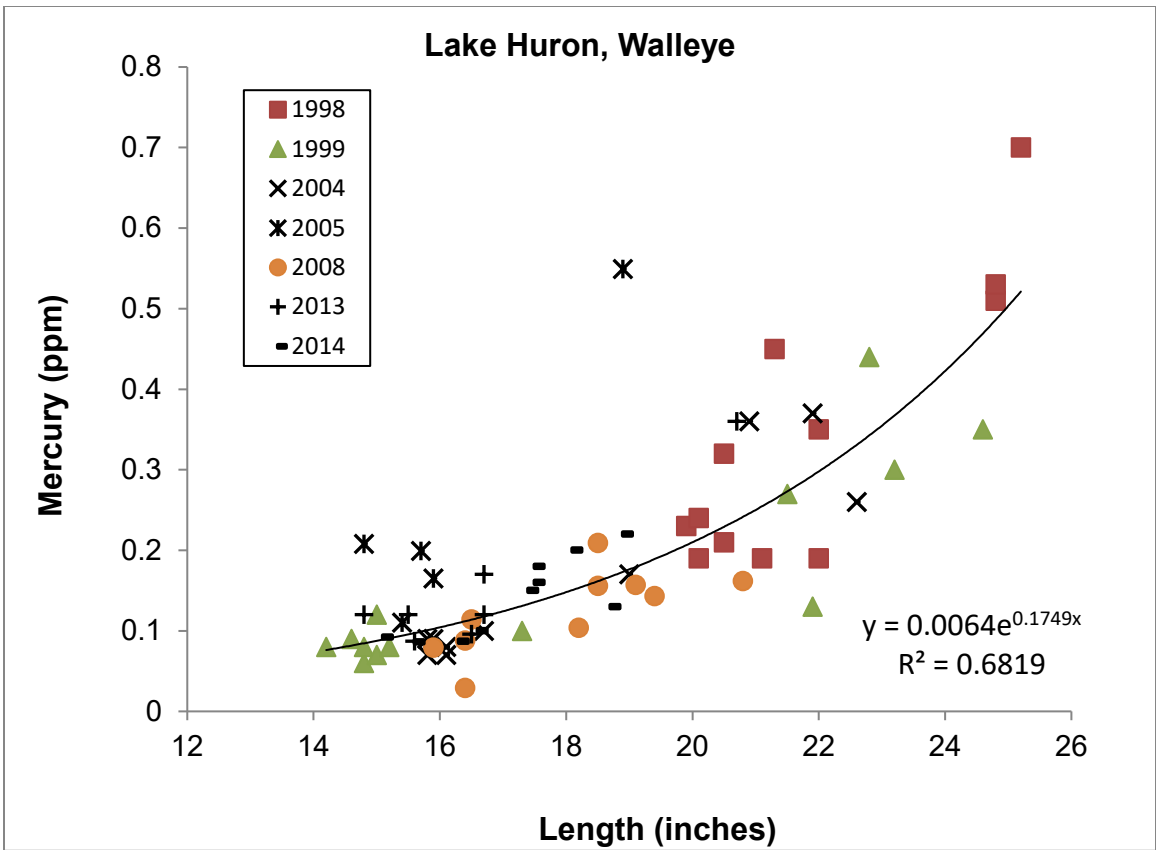
* 2005 WHO; dl-PCBs included

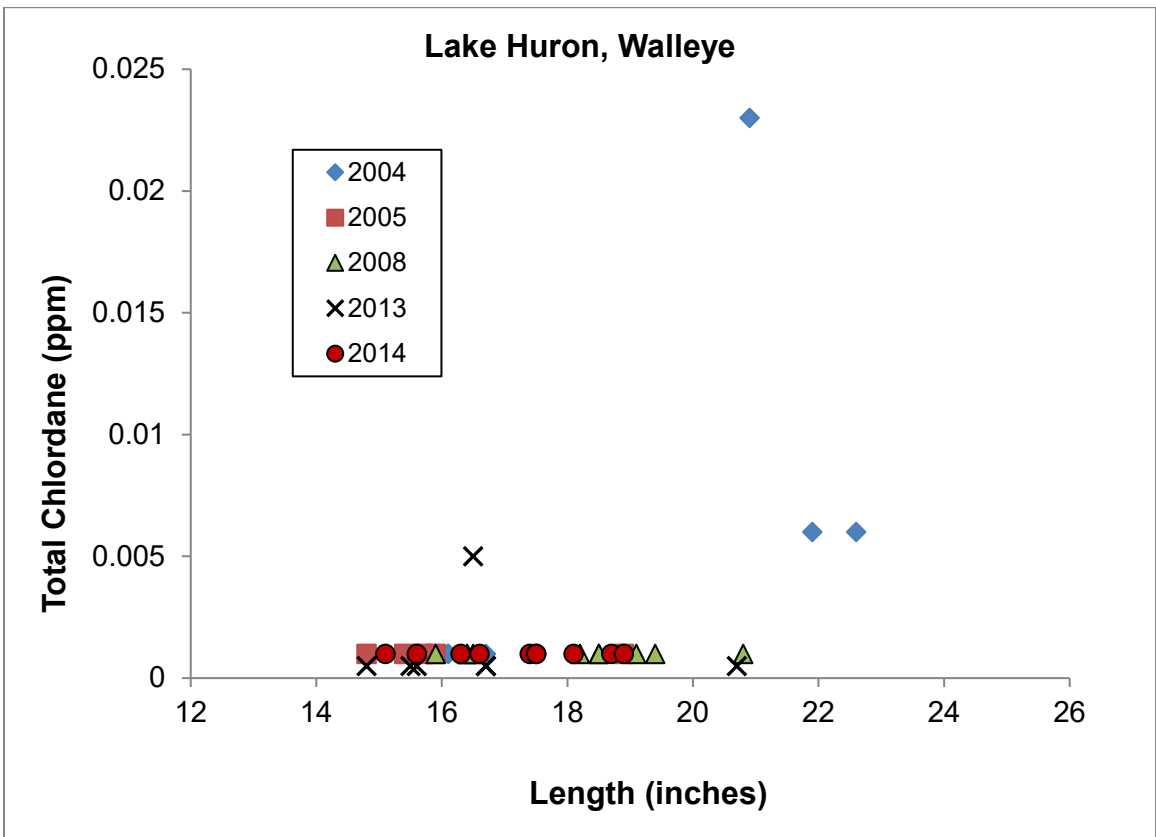
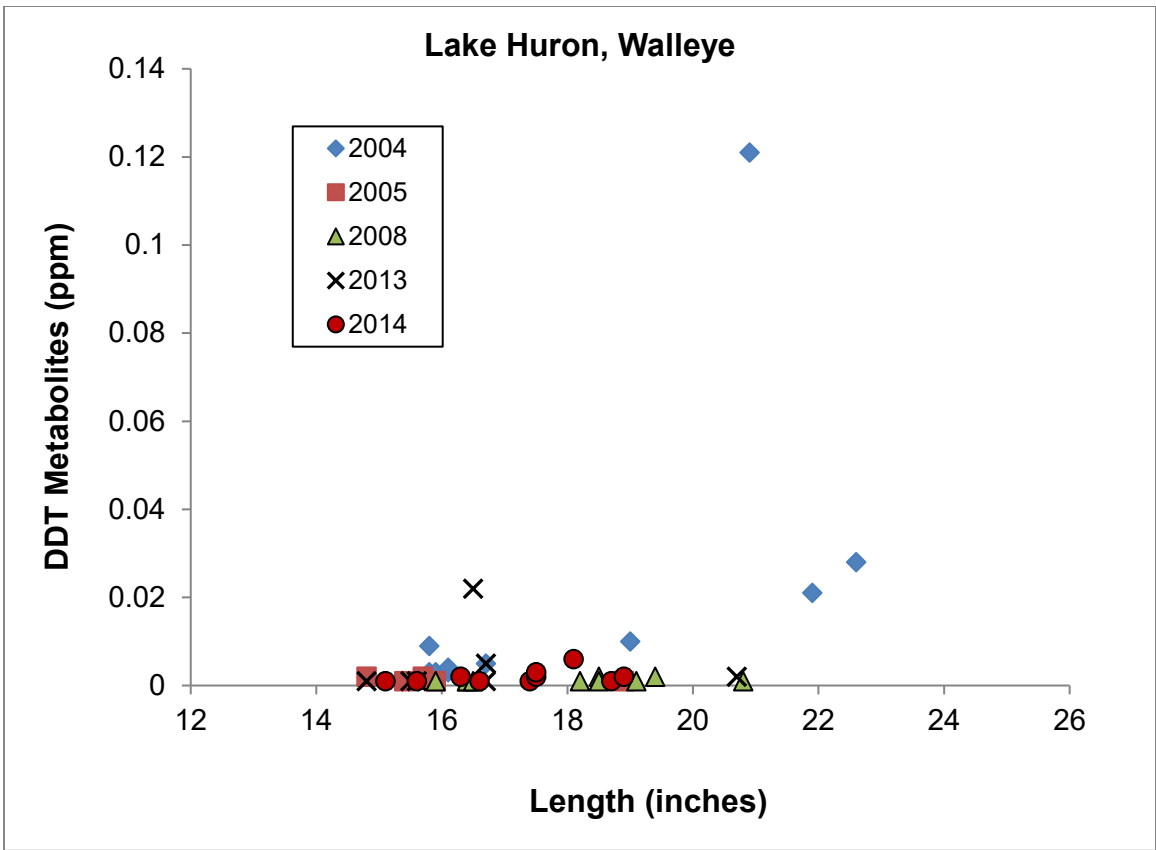
Existing Advisory: No one should eat more than 6 meals per year of walleye from Lake Huron, Saginaw Bay, or connected tributaries due to dioxins. PCBs and mercury would cause advisories.

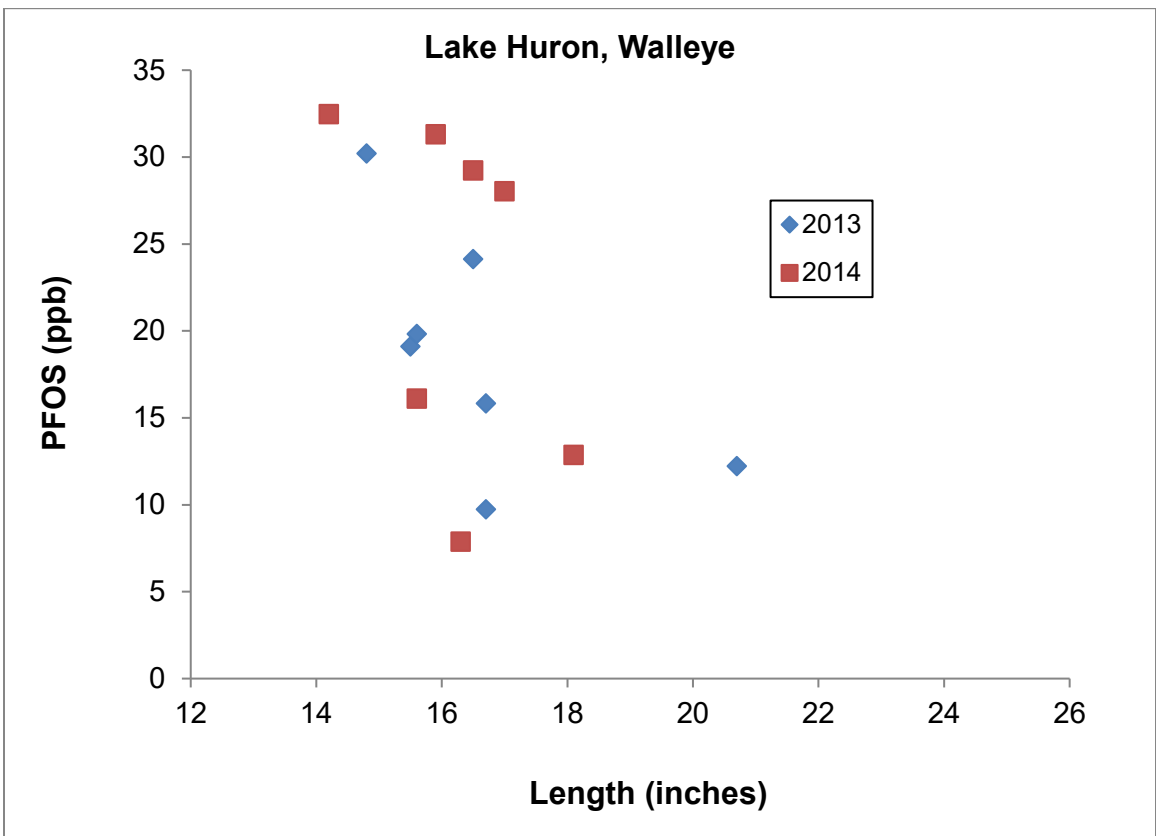
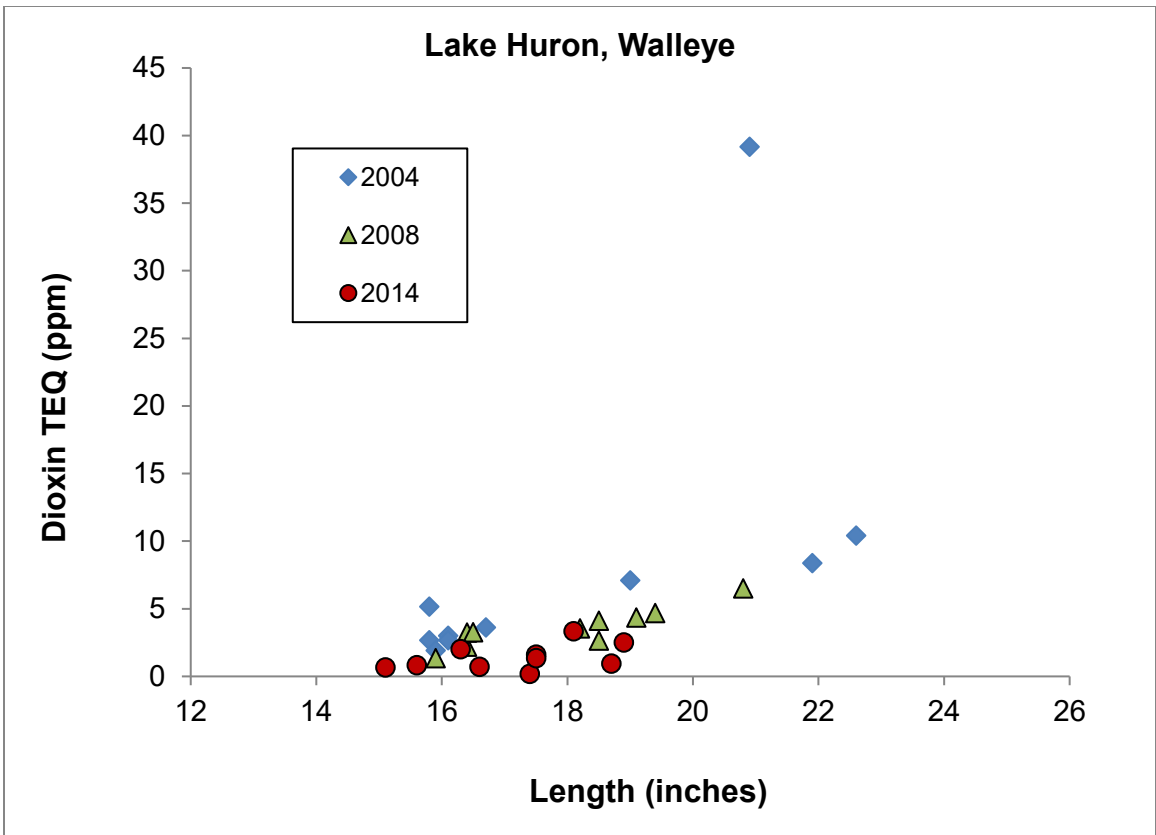
Recommendation: No change is recommended. Additional sampling may indicate the advisory due to dioxins can be relaxed.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
14	0.07	16
16	0.11	8
18	0.15	4
20	0.21	4
22	0.3	2
24	0.43	2
26	0.6	1
28	0.86	1

Shaded area denotes extrapolated estimates







White Bass

**Lake Huron, Saginaw Bay,
Saginaw River & Tittabawassee
River (South of Midland)**

**Bay, Midland, and
Saginaw 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	
1993	2014	51	8.5	na	8.5	15.6	
Datasets available: 1993, 1995, 2003, 2004, 2008, 2014							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	61	0.26		0.04	0.72	.30	4
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.524	0.677					

Organics Analysis:

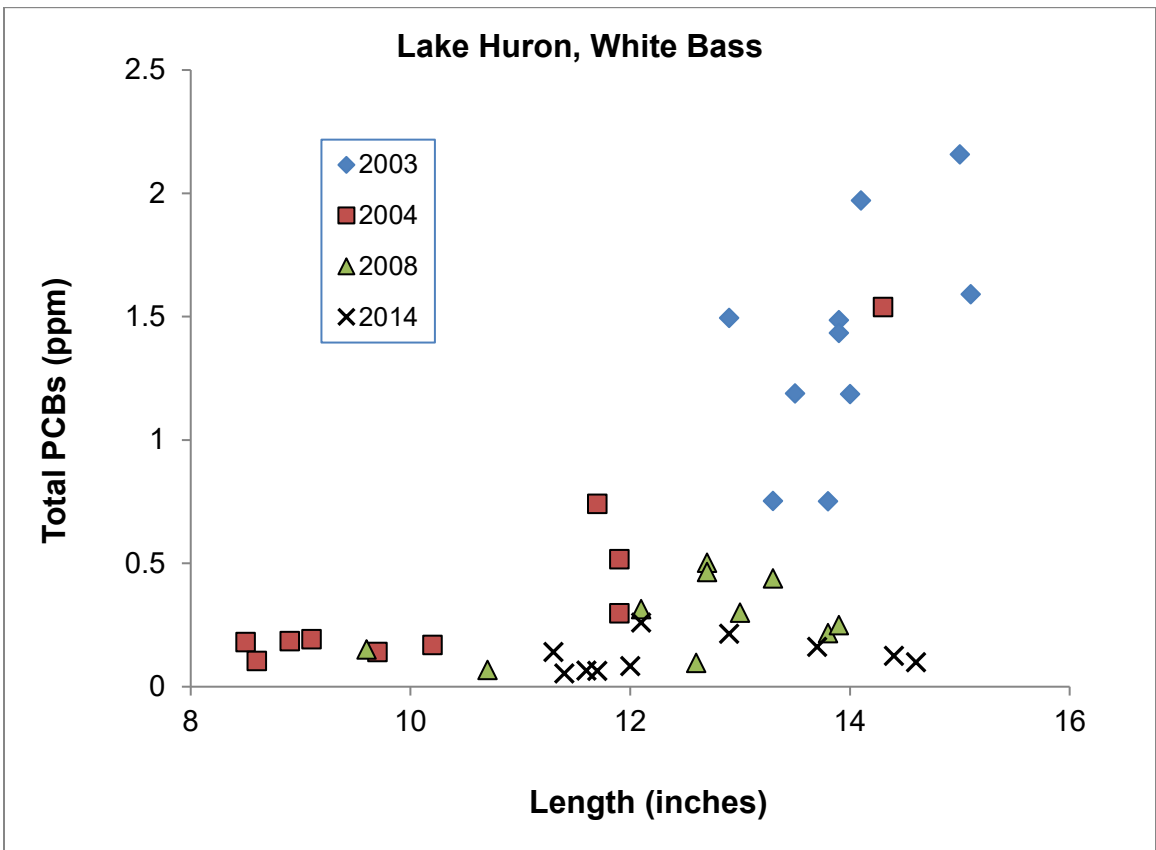
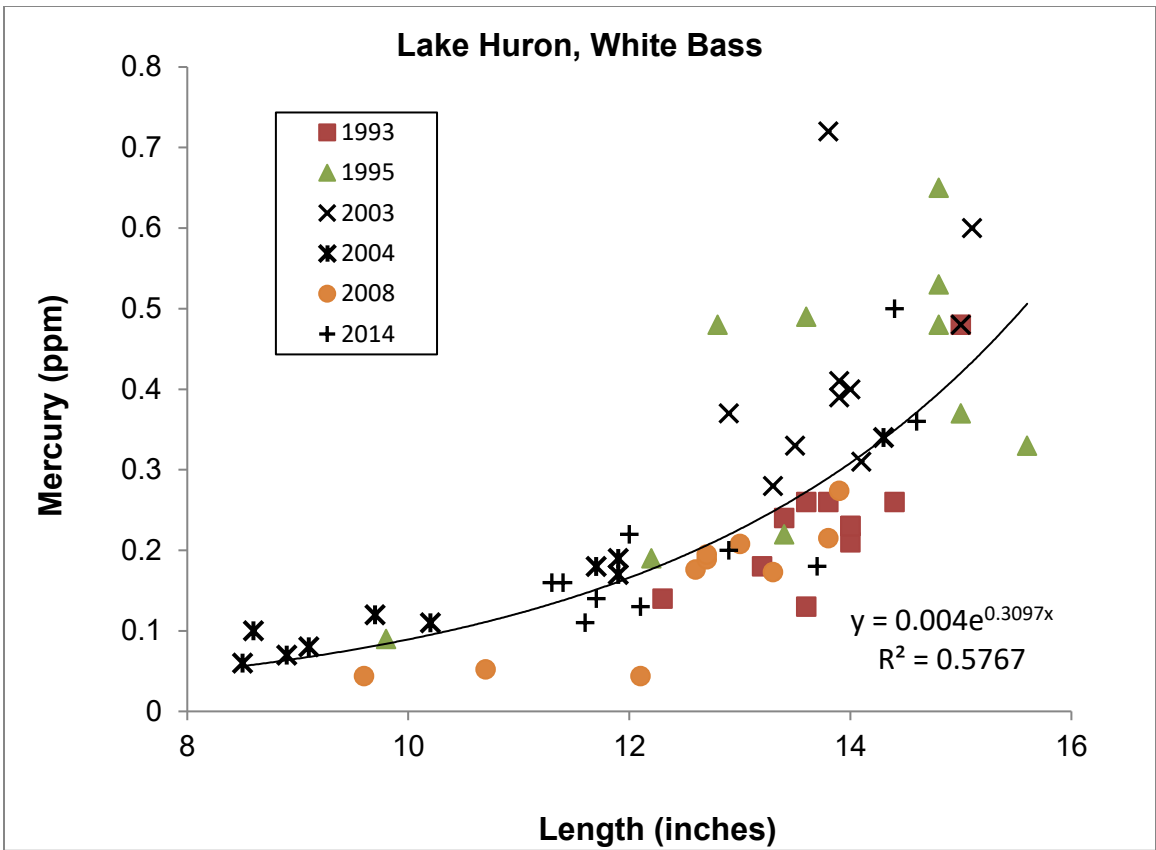
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
2003	2014	30	8.5	na	8.5	15.1	
Datasets available: 1984, '85, '93, '95, '03, '04, '08, '14							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	40	0.55		0.05	2.2	0.74	Limited
DDT	40	0.06		0.006	0.25	0.08	16
Chlordane	40	0.01		0.001	0.03	0.01	--
Toxaphene	40	0.05		0.05	0.08	0.06	4
TEQ	30	11 ppt		2.3 ppt	65 ppt	16 ppt	Limited
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.333	0.312					
DDT	0.206	0.164					
Chlordane	0.293	0.246					
Toxaphene	0.121	0.126					
TEQ	0.072	0.029					
Final meal category based on UCL:							Limited

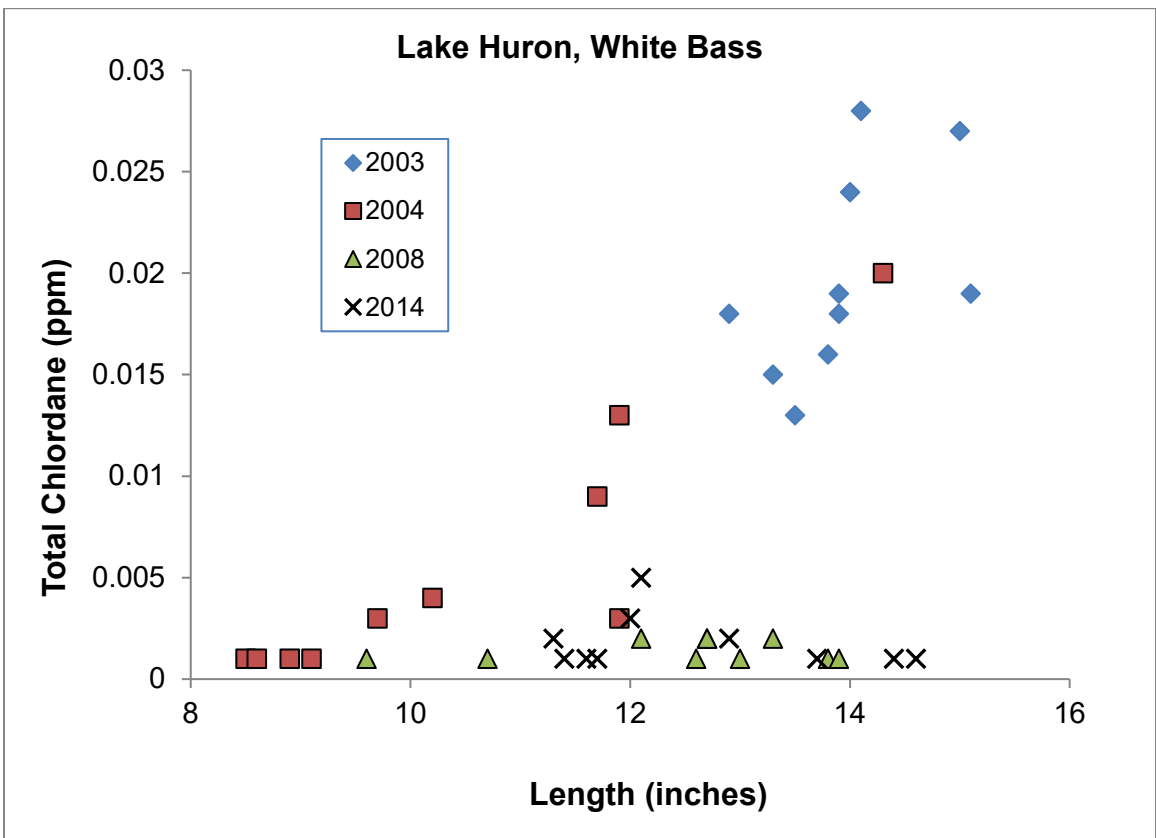
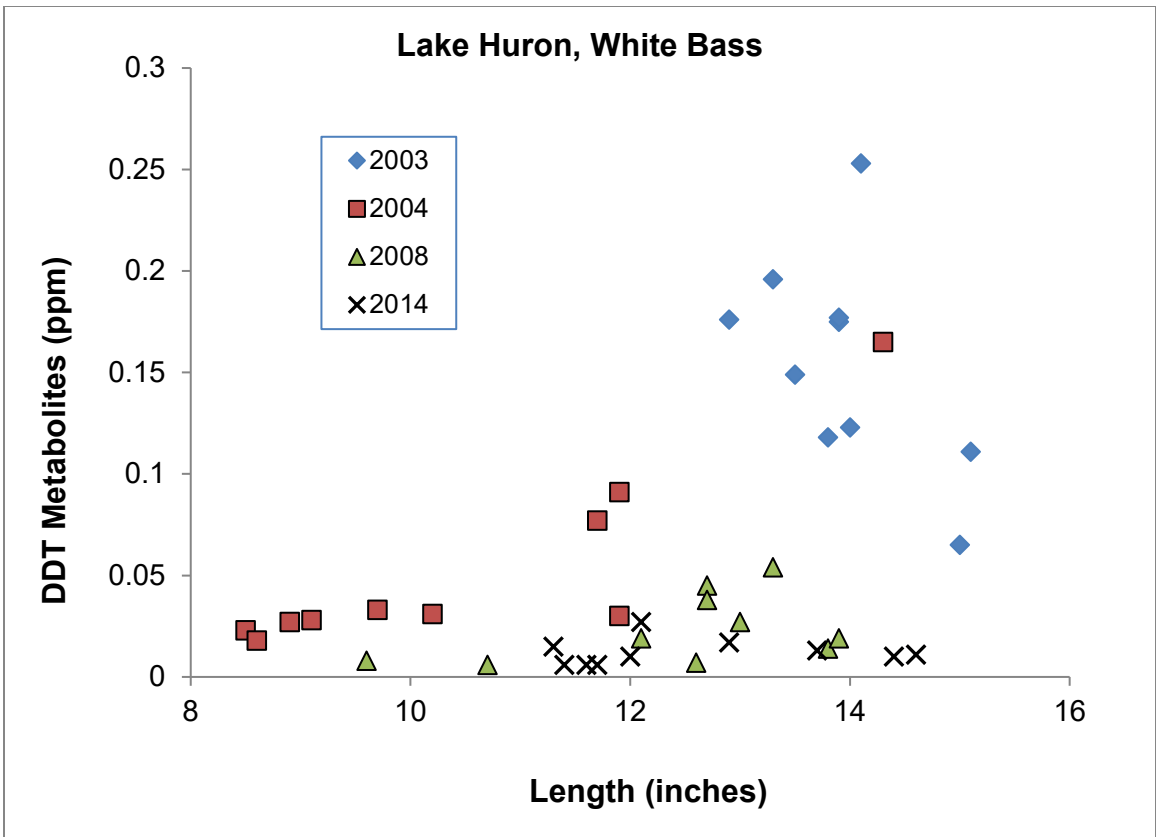
* 2005 WHO; dl-PCBs included

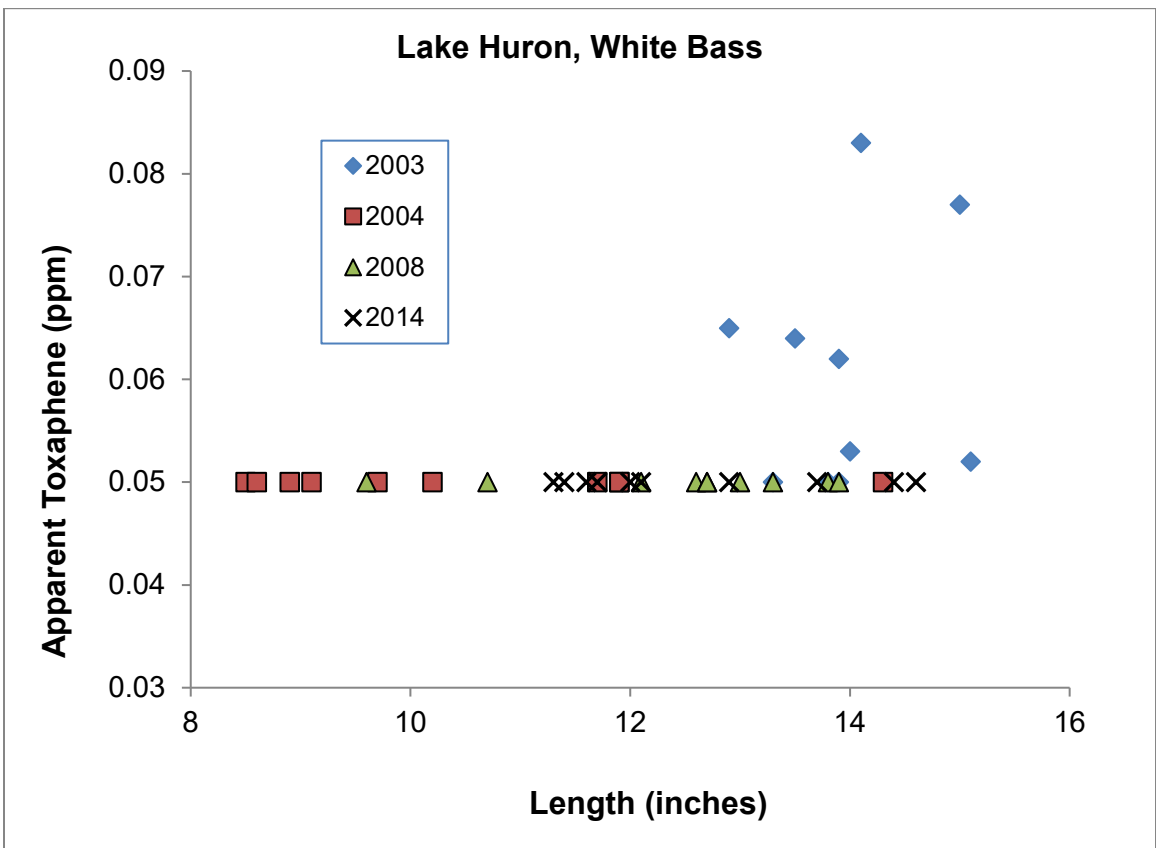
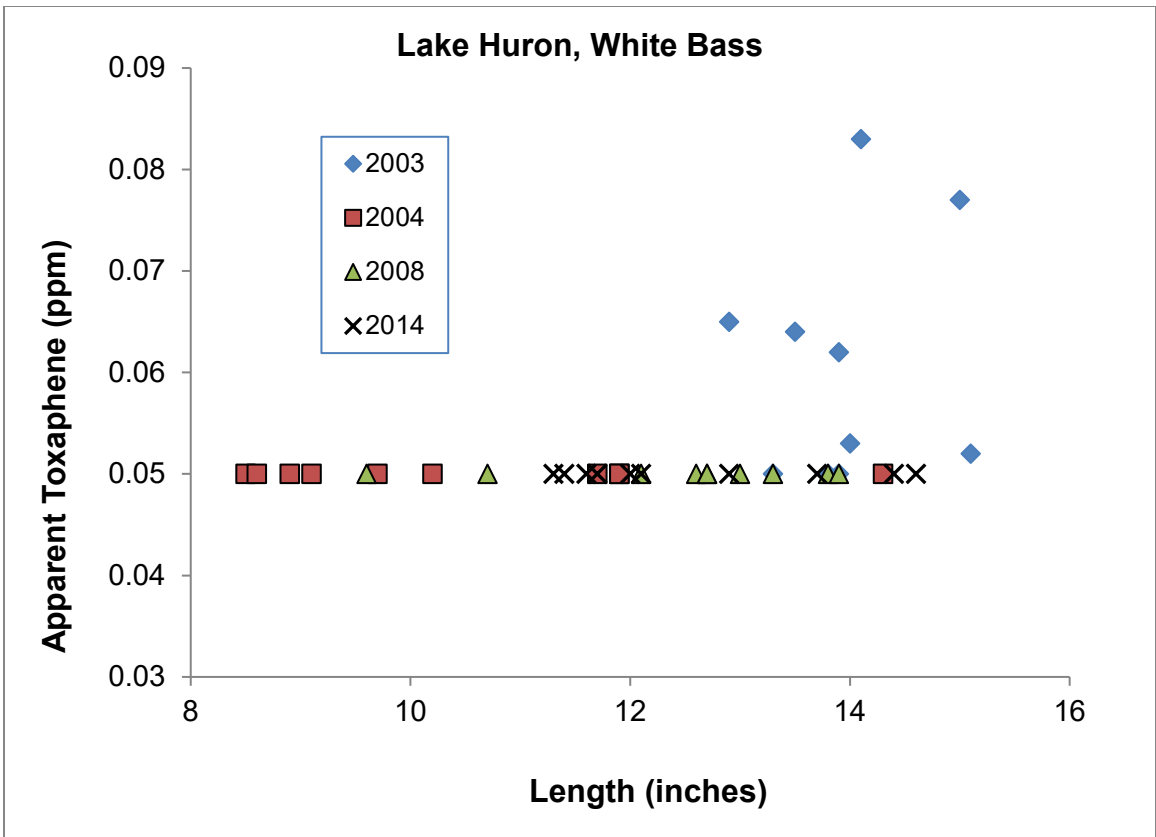
Existing Advisory: No one should eat white bass from the Tittabawassee River south of Midland, Saginaw River, or Saginaw Bay due to PCBs and dioxins. Sensitive populations should not eat these fish from Lake Huron. Healthy adults should not eat more than 1 or 2 meals per year of Lake Huron white bass due to PCBs and dioxins. Mercury would cause an advisory.

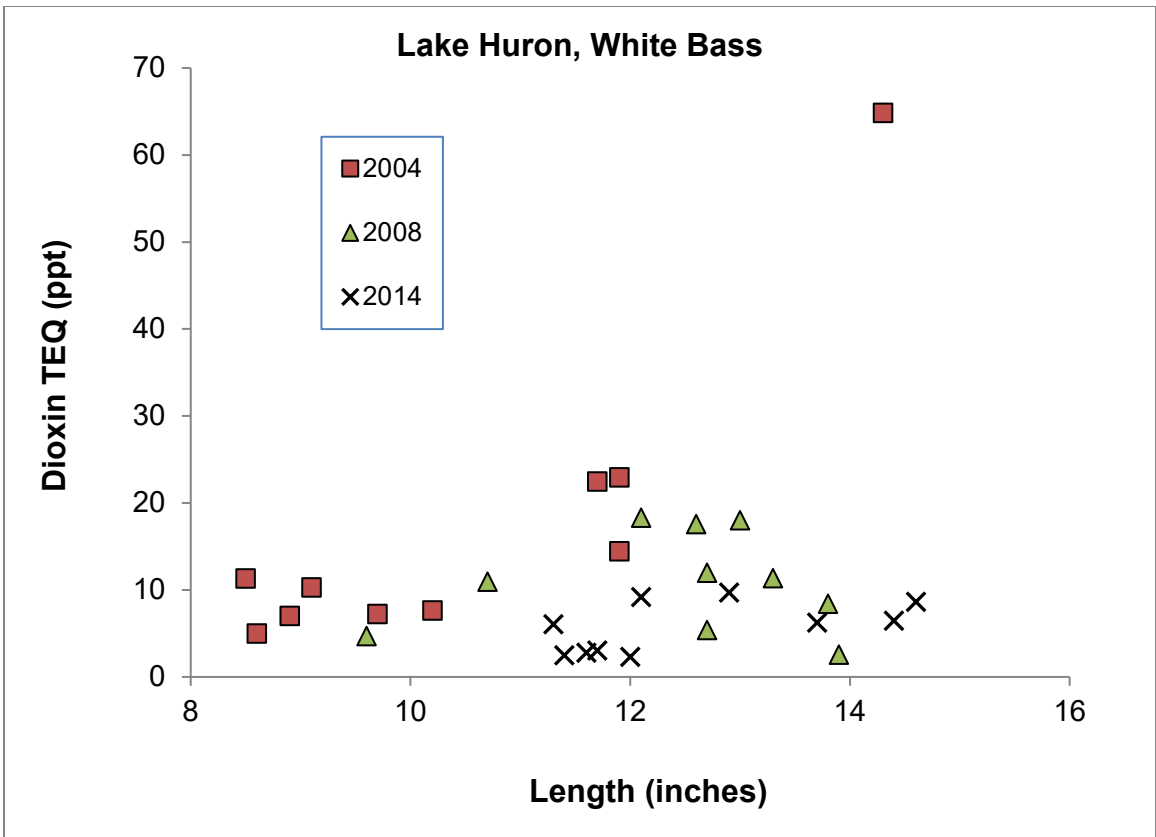
Recommendation: No change is recommended.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
6	0.03	16
8	0.05	16
10	0.09	12
12	0.16	4
14	0.31	2
16	0.57	1
<i>Shaded area denotes extrapolated estimates</i>		









White Perch

Lake Huron

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	
1994	1994	8	7.9	NA	7.9	12	
Datasets available: 1994							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category	
Mercury	8	0.086	0.060	0.220	0.130	8	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.877	0.895					

Organics Analysis:

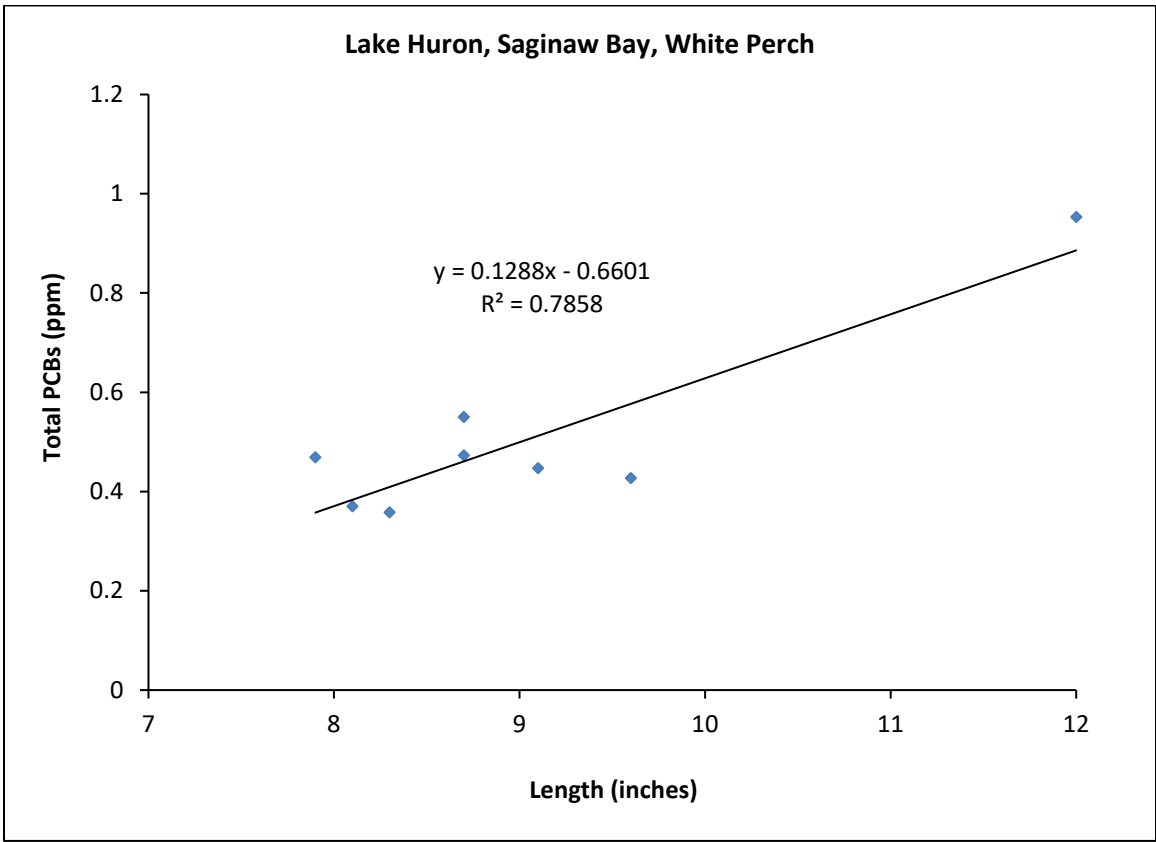
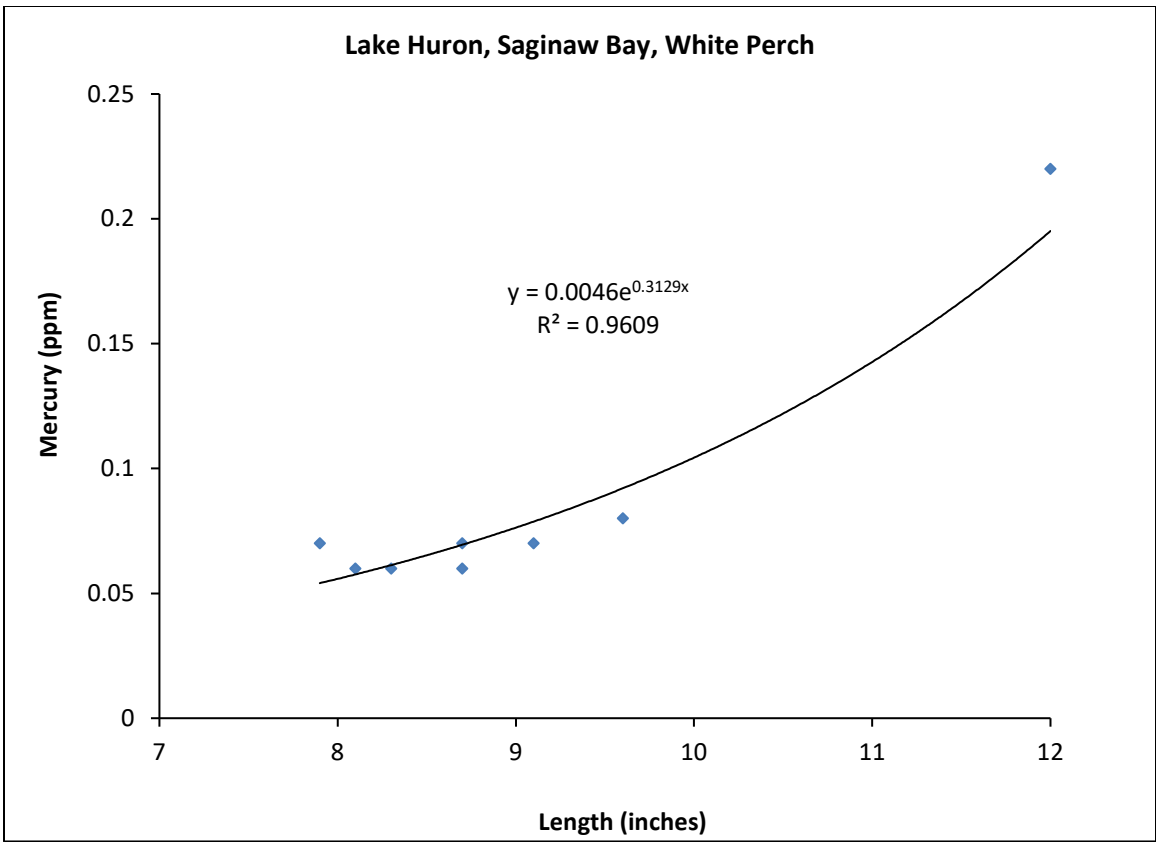
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
1994	1994	8	7.9	NA	7.9	12	
Datasets available: 1994							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category	
PCB	8	0.506	0.358	0.953	0.670	Limited	
DDT	8	0.076	0.051	0.153	0.100	16	
Chlordane	8	0.010	0.003	0.017	0.010	--	
Toxaphene	8	ND	--	--	--	--	
TEQ	0	--	--	--	--	--	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.786	0.727					
DDT	0.743	0.663					
Chlordane	0.561	0.331					
Toxaphene	--	--					
TEQ	--	--					
Final meal category based on UCL:							Limited*

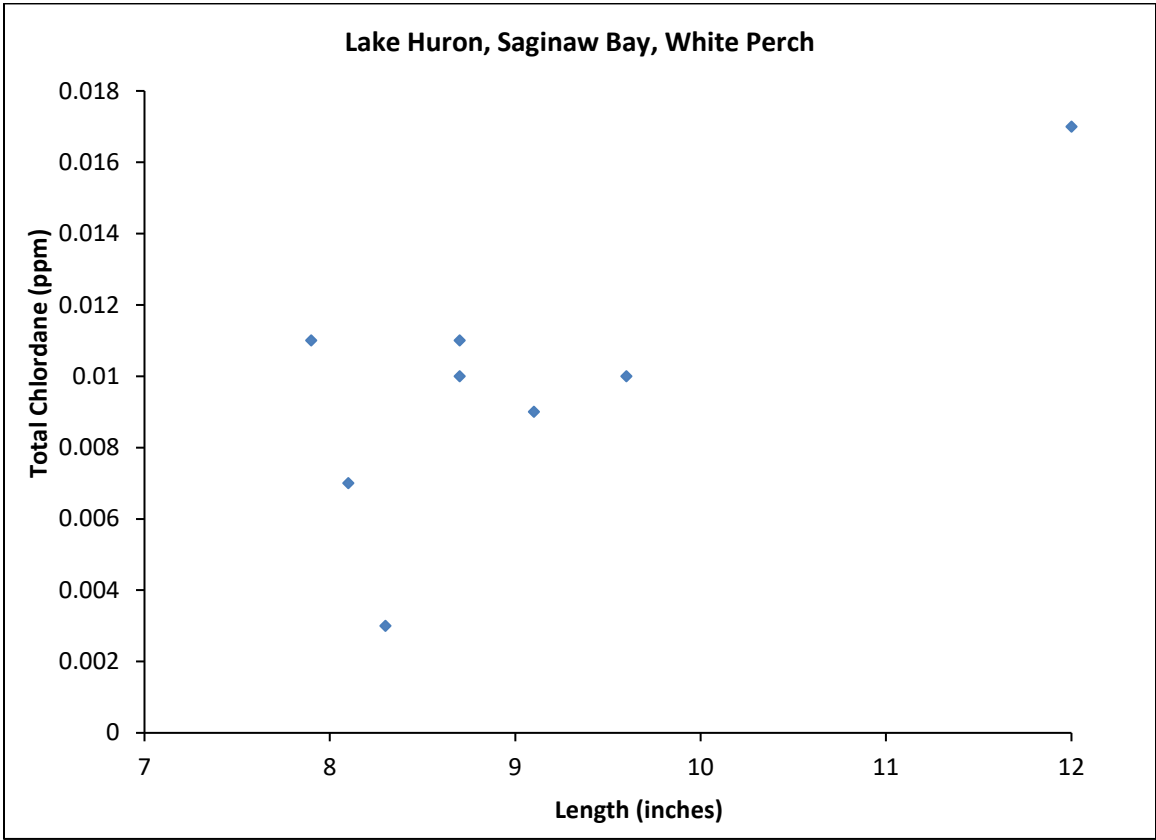
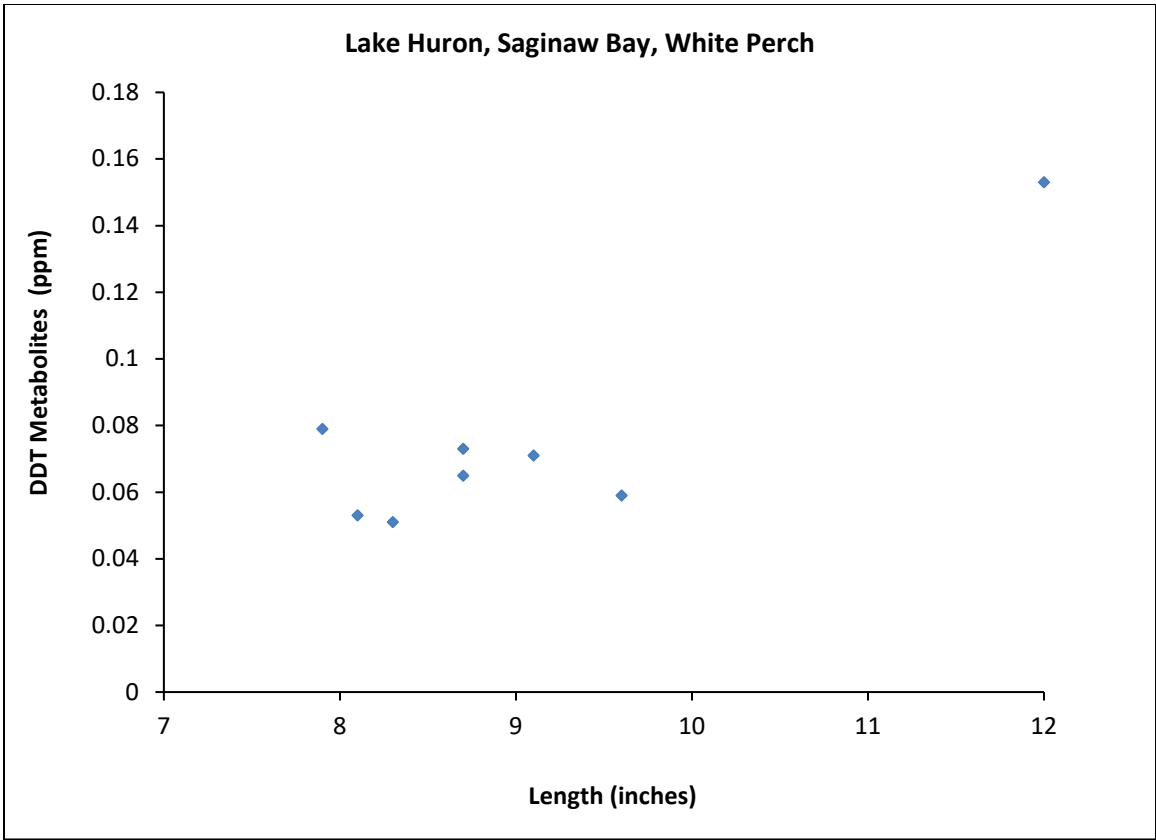
Existing Advisory: Lake Huron white perch are not listed in the current advisory but are covered under an “All other species” advisory. Women and children should not eat more than one meal per month of Lake Huron white perch due to PCBs and dioxin.

Recommendation: No one should eat more than 6 meals per year of Lake Huron white perch due to PCBs. Mercury would cause an advisory. *Based on the EGLE Fish

Contaminant Monitoring Program, PCB concentrations ≥15 years old are expected to have declined to a concentration that allows a less restrictive meal category.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category	PCB Regression Equation Estimate (ppm)	Meal Category
7	0.041	16	0.242	0.5
8	0.056	16	0.370	0.5
9	0.077	12	0.499	Limited
10	0.105	8	0.628	Limited
11	0.144	4	0.757	Limited
12	0.197	4	0.886	Limited
13	0.269	4	1.014	Limited
14	0.367	2	1.143	Limited
15	0.502	2	1.272	Limited
<i>Shaded area denotes extrapolated estimates</i>				





White Sucker

Lake Huron

Hg Analysis:

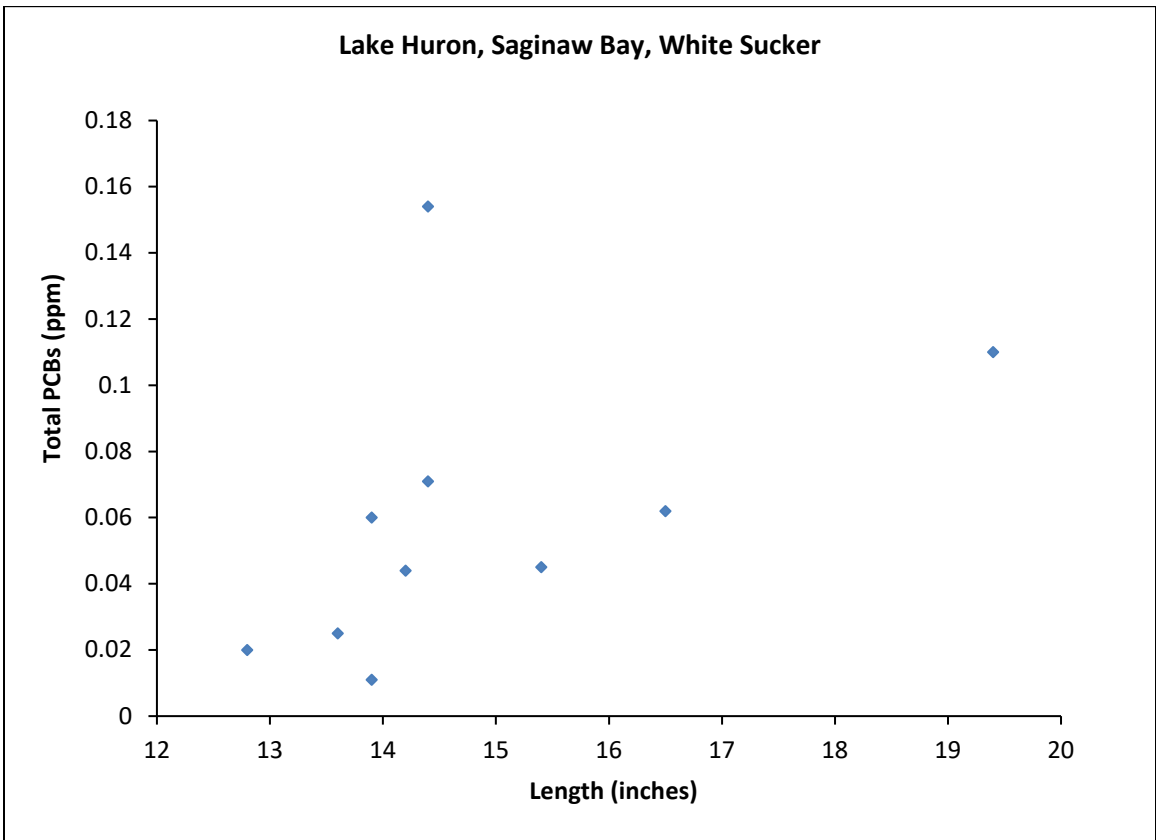
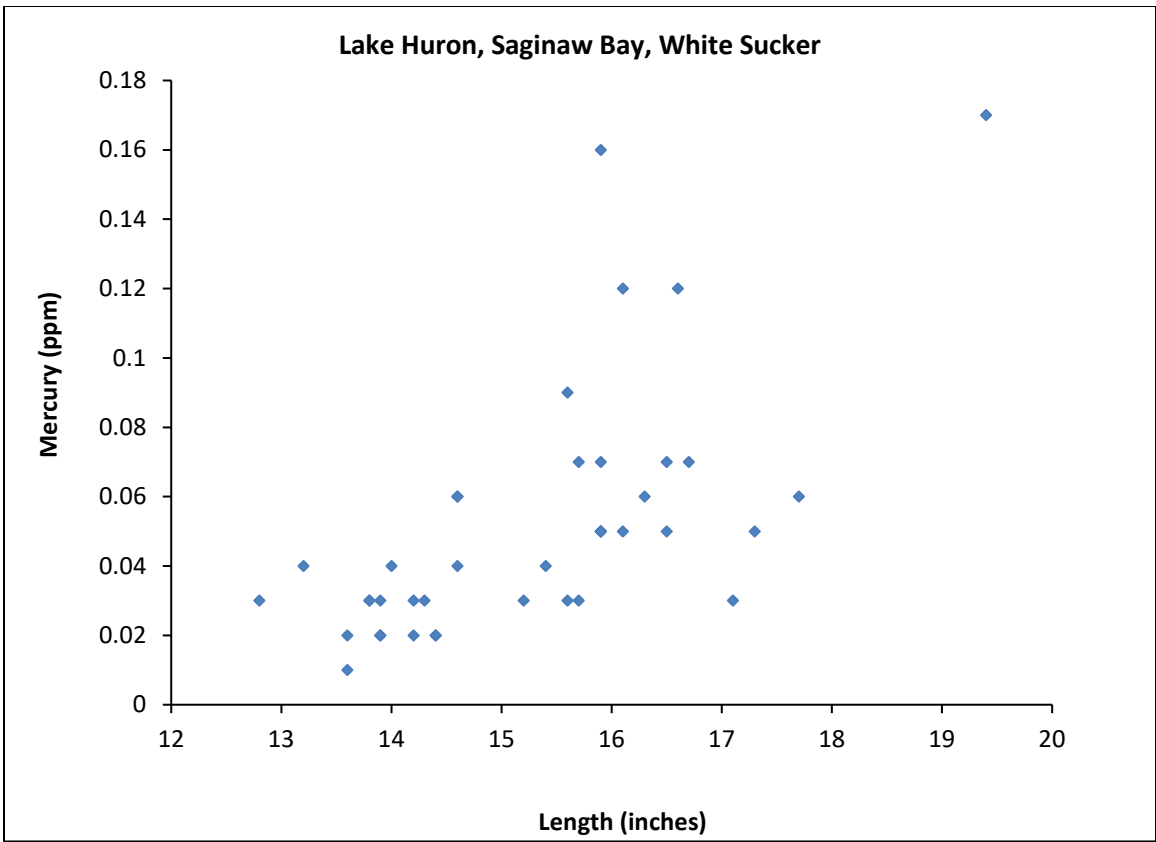
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
1991	2004	40	12.8	na	12.8	19.4	
Datasets available: 1991, 1993, 2004							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
Mercury	40	0.05		0.01	0.17	0.06	16
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.417	0.468					

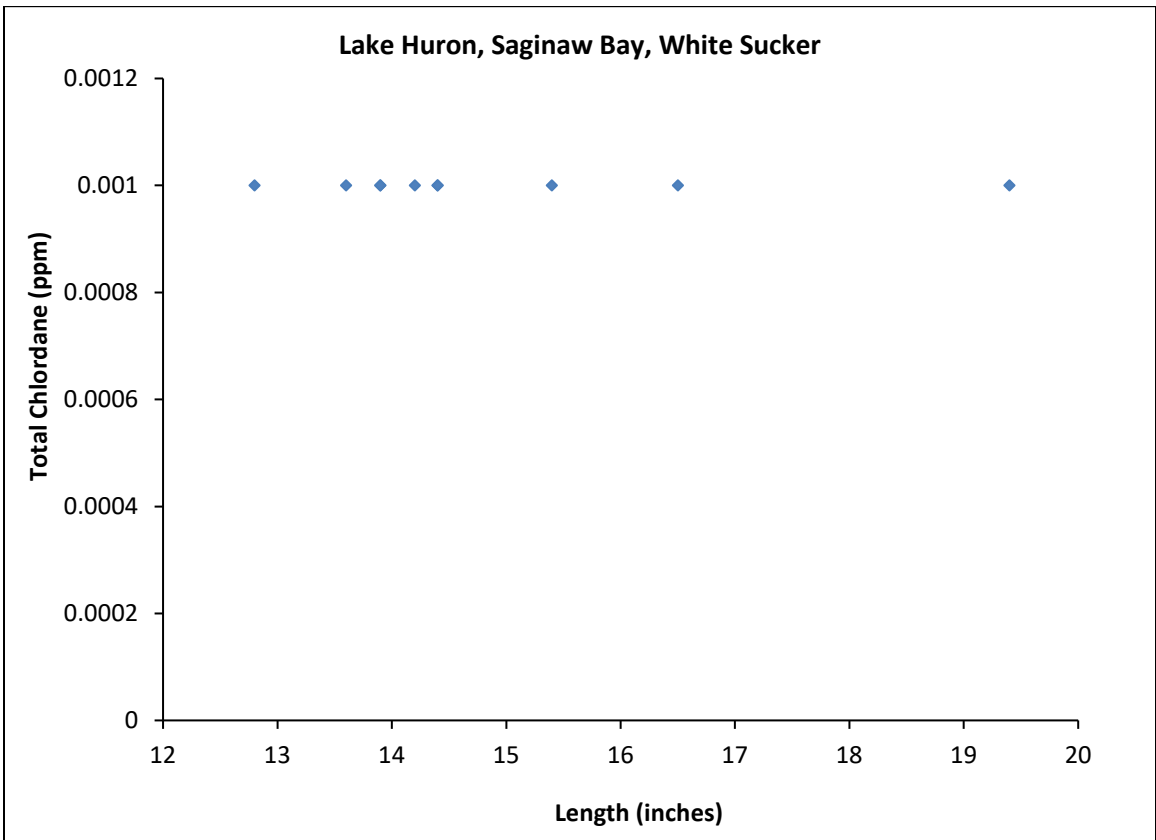
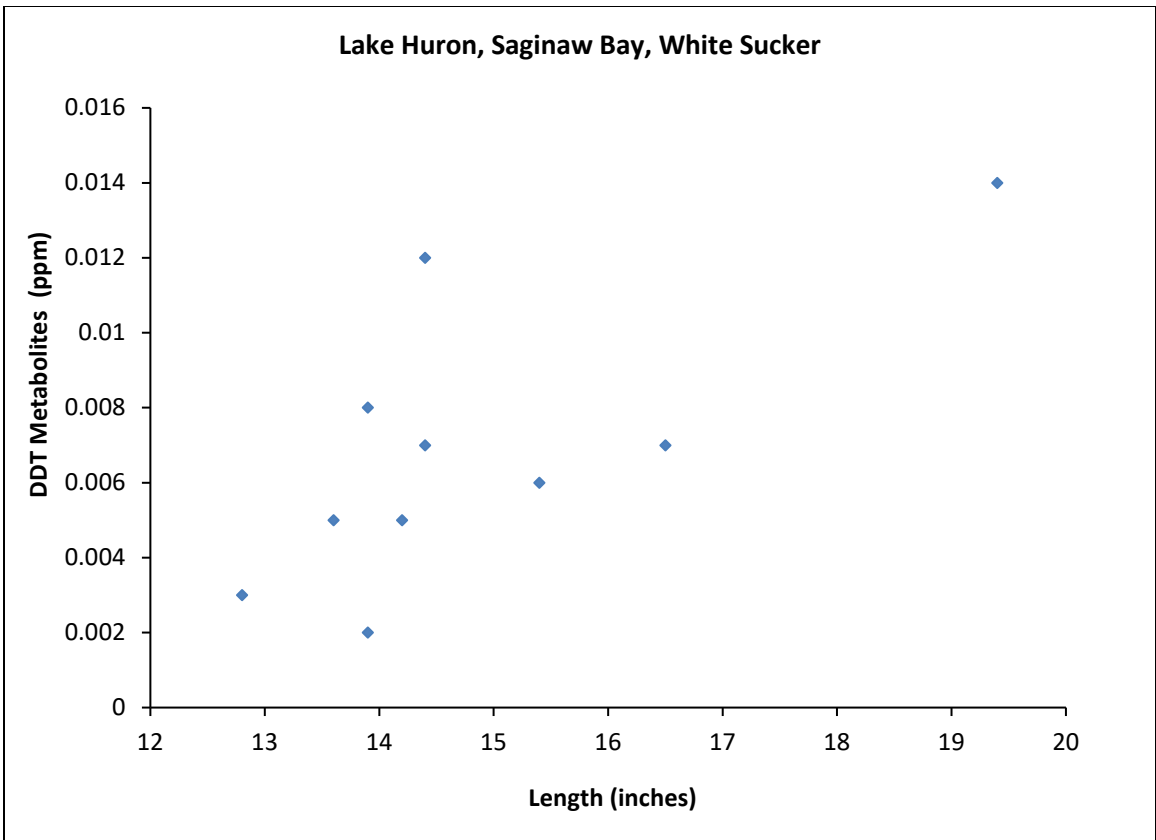
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
2004	2004	10	12.8	na	12.8	19.4	
Datasets available: 1991, 1993, 2004							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
PCB	10	0.06		0.011	0.154	0.090	2
DDT	10	0.01		0.002	0.014	0.010	16
Chlordane	10	0.001		0.001	0.001	0.001	--
Toxaphene	10	ND		--	--	--	--
TEQ	0	--		--	--	--	--
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.232	0.293					
DDT	0.501	0.396					
Chlordane	--	--					
Toxaphene	--	--					
TEQ	--	--					
Final meal category based on UCL:							2

Existing Advisory: Lake Huron white sucker are not listed in the current advisory but are covered under an “All other species” advisory. Women and children should not eat more than one meal per month of Lake Huron white sucker due to PCBs and dioxin.

Recommendation: No one should eat more than 2 meals per month of Lake Huron sucker due to PCBs.





Yellow Perch

Lake Huron Saginaw Bay & Les Cheneaux I.

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	
2004	2018	40	5.5	na	5.5	11.6	
Datasets available: 1987, 1988, 1991, 1993, 1995, 2004, 2012, 2014, 2018							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)		
Mercury	40	0.08	0.02	0.17	0.09	12	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.396	0.354					

Organics Analysis:

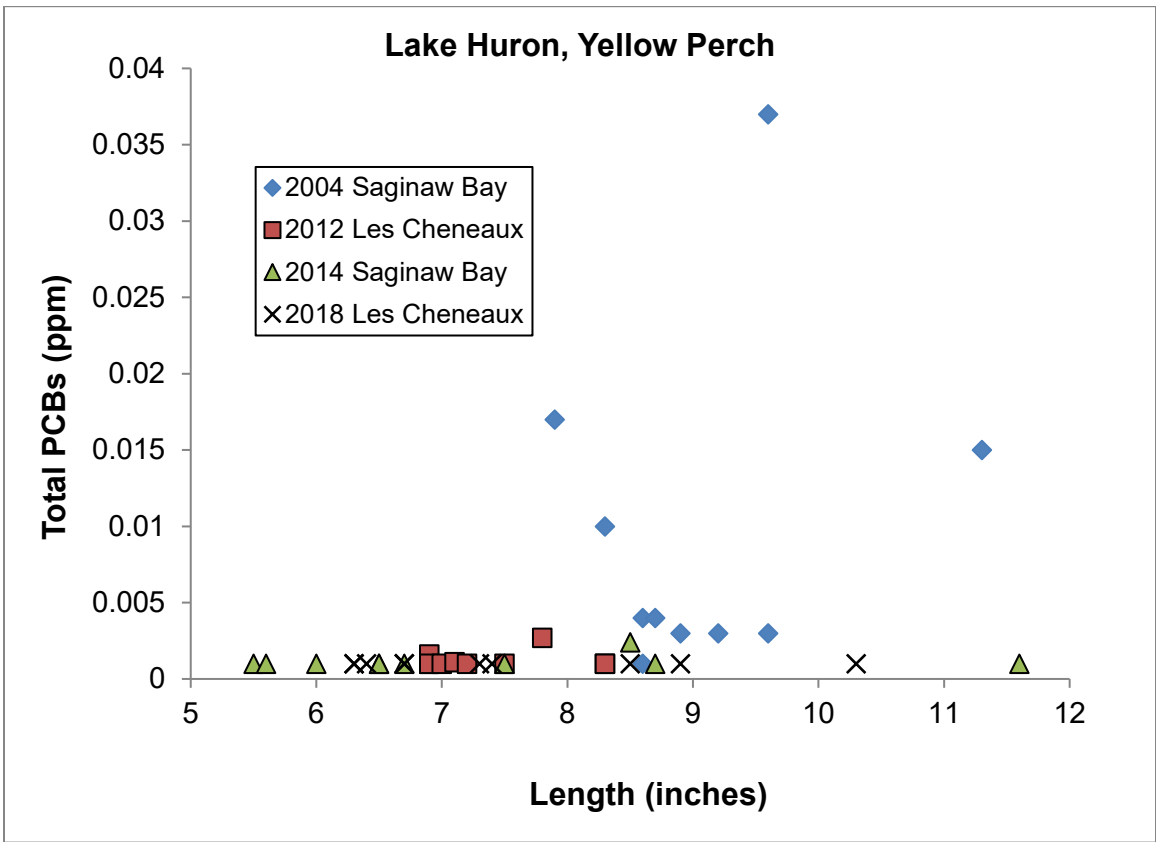
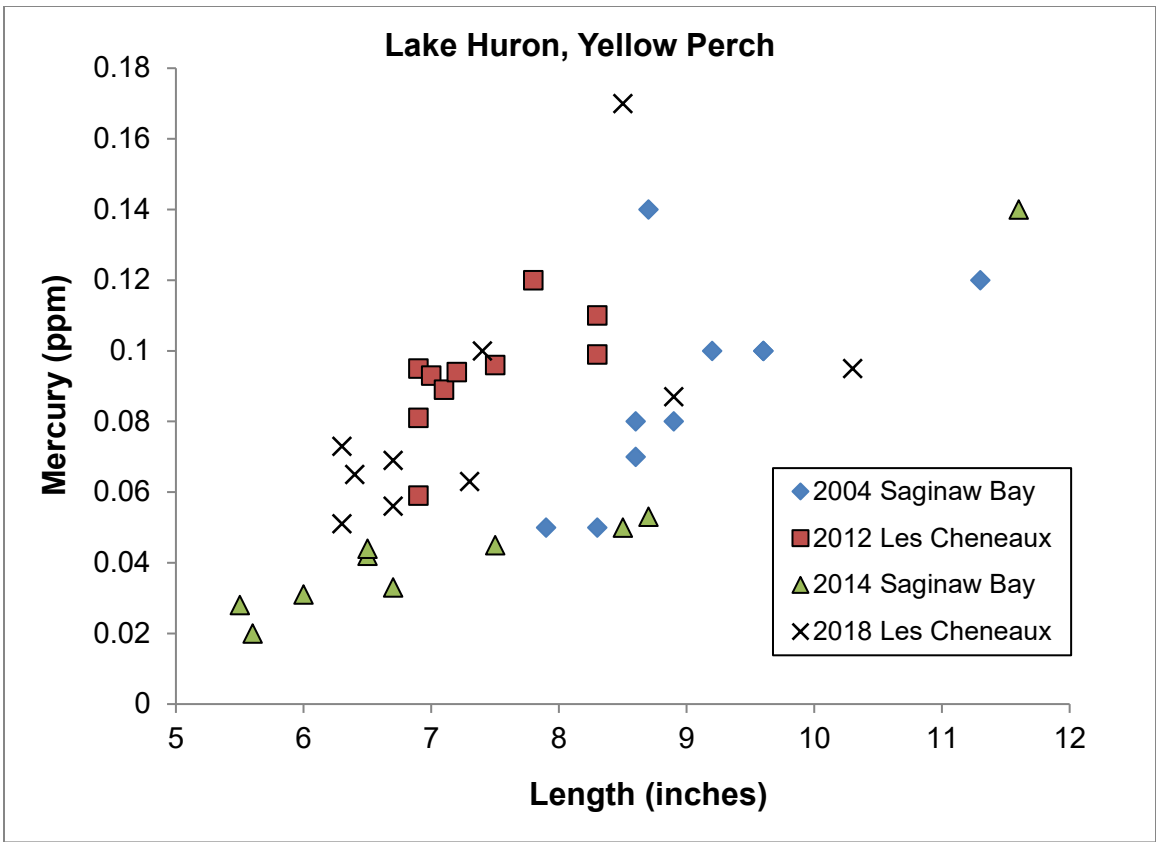
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
2004	2018	40	5.5	na	5.5	11.6	
Datasets available: 1987, 1988, 1991, 1993, 1995, 2004, 2012, 2014, 2018							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)		
PCB	40	0.003	0.001	0.037	0.005	16	
DDT	40	0.001	0.001	0.004	0.001	16	
Chlordane	40	ND	< 0.001	< 0.001	--	--	
Toxaphene	40	ND	< 0.05	< 0.05	--	--	
TEQ*	12	1 ppt	0.1 ppt	4 ppt	1.8 ppt	4	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.133	0.224					
DDT	0.025	0.030					
Chlordane	--	--					
Toxaphene	--	--					
TEQ*	0.105	0.060					
Final meal category based on UCL:							4

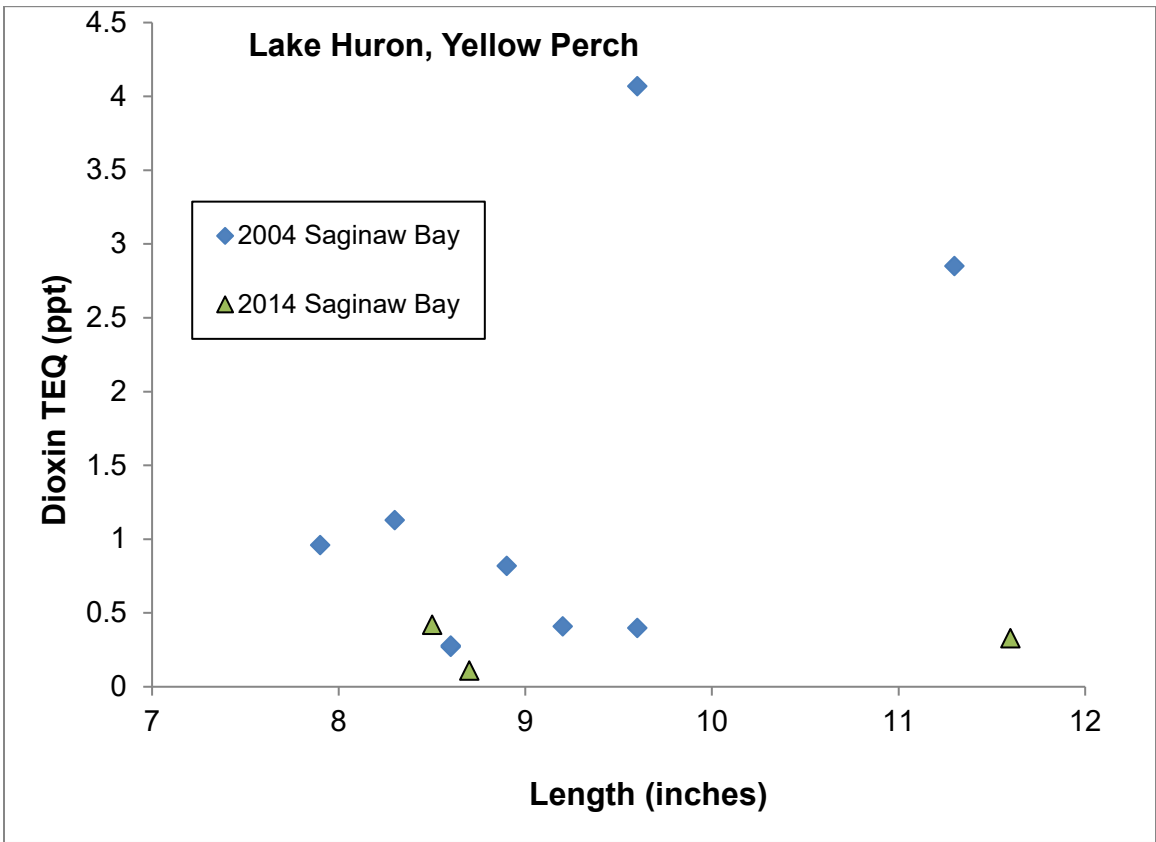
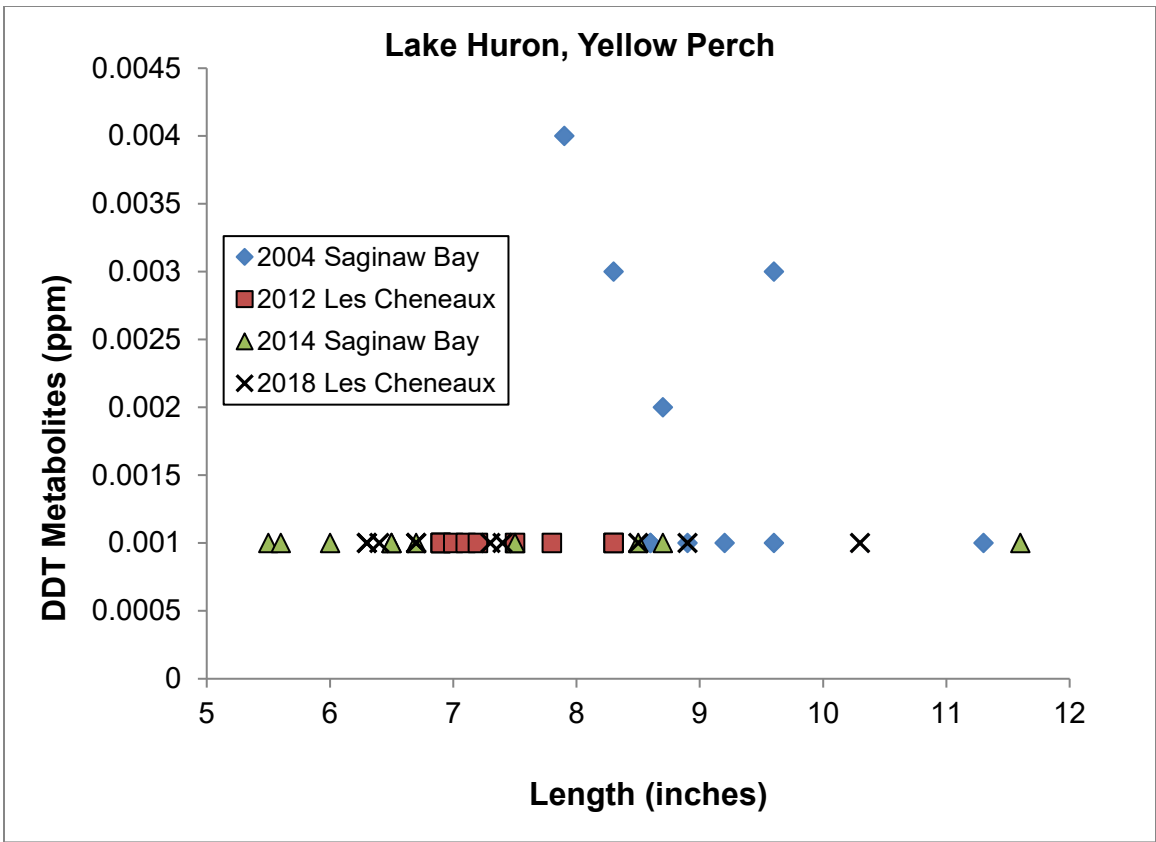
* 2005 WHO TEFs; dl-PCBs included

Existing MDHHS Advisory: No one should eat more than 2 meals per month of Lake Huron yellow perch due to dioxins. PCBs and mercury would cause advisories.

Recommendation: No change is recommended. Additional monitoring of yellow perch from Saginaw Bay may indicate that the advisory due to dioxins can be relaxed and that PCBs could be removed from the list of contaminants.

Note: dl-PCB results for only 3 of 10 samples from 2014.





Lake Michigan

Brown Trout

Lake Michigan

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	
2001	2003	12	19	10	19	29.2	
Datasets available: Entire Lake:1985,'86,'88,'89,'90,'91,'92,'93,2001,2002,2003							
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL		
Mercury	12	0.255	0.110	0.540	0.340	2	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.617	0.670					

Organics Analysis:

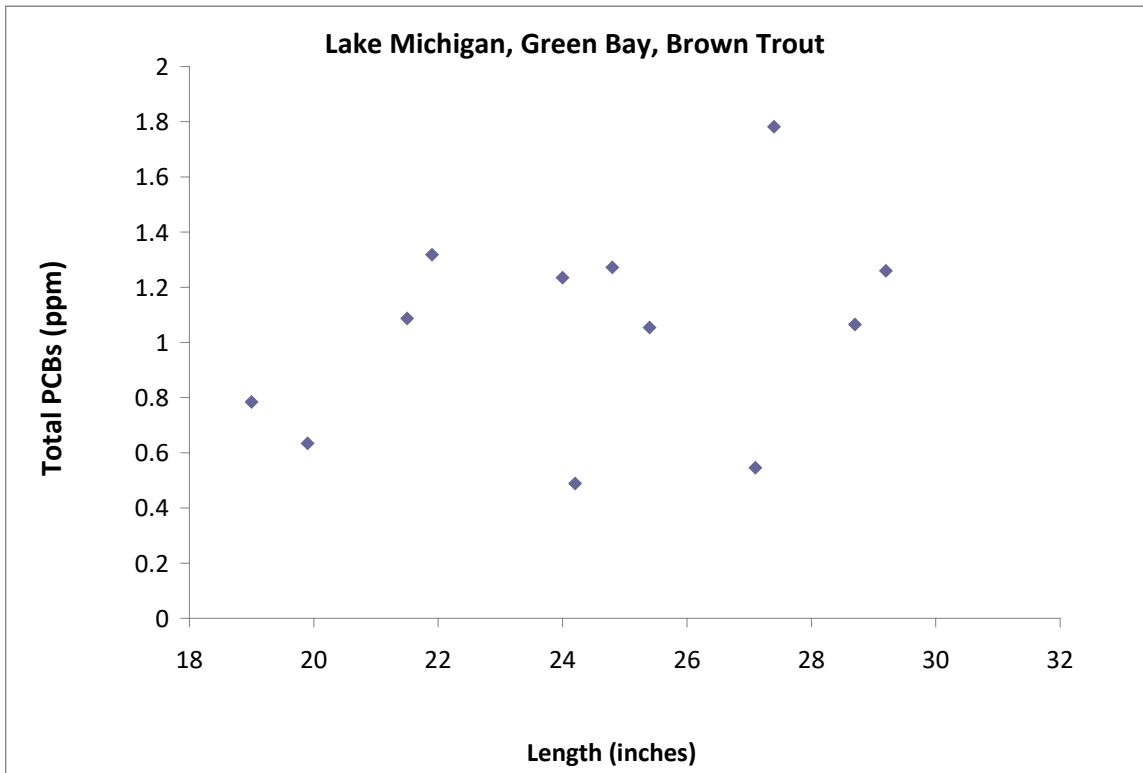
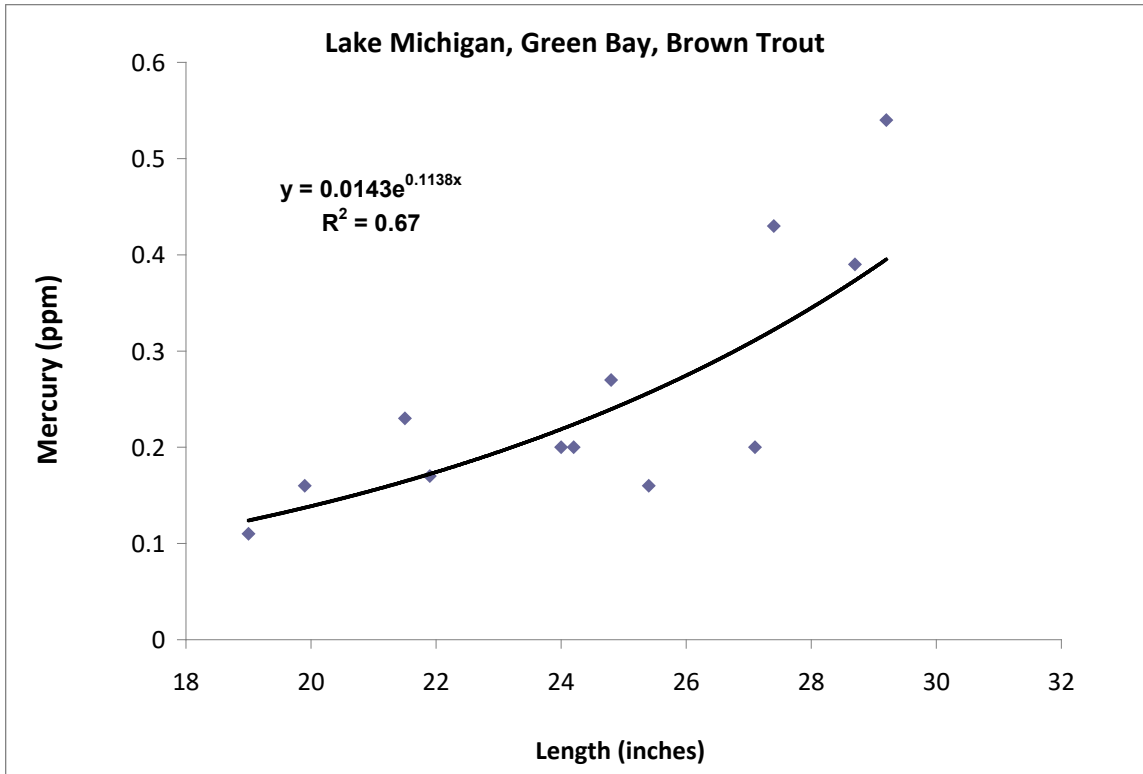
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
2001	2003	12	19	10	19	29.2	
Datasets available: Entire Lake:1985,'86,'88,'89,'90,'91,'92,'93,2001,2002,2003							
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL		
PCB	12	1.044	0.489	1.782	1.280	Limited	
DDT	12	0.215	0.096	0.418	0.270	4	
Chlordane	12	0.046	0.019	0.090	0.060	--	
Toxaphene	12	0.070	0.050	0.146	0.090	4	
Dioxin TEQ*	12	8.9 ppt	5.3 ppt	17.1 ppt	11.0 ppt	0.5	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.109	0.080					
DDT	0.316	0.263					
Chlordane	0.243	0.307					
Toxaphene	0.178	0.166					
TEQ*	0.010	0.010					
Final meal category based on UCL:						Limited	

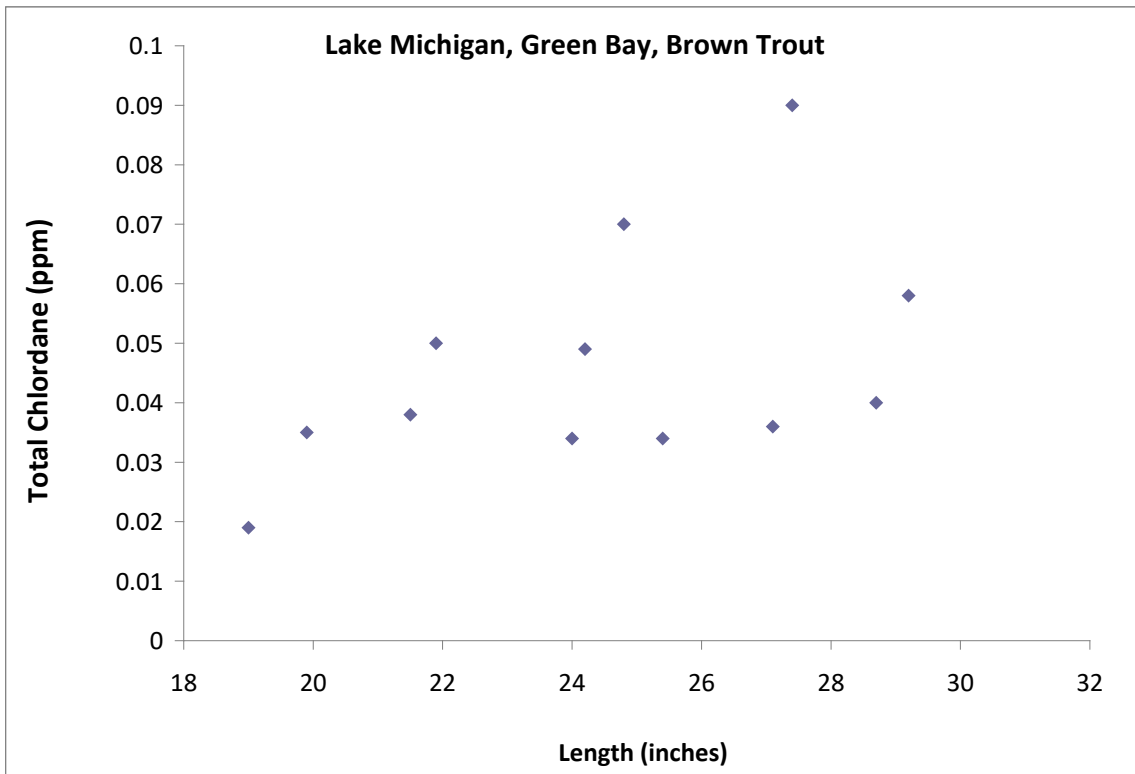
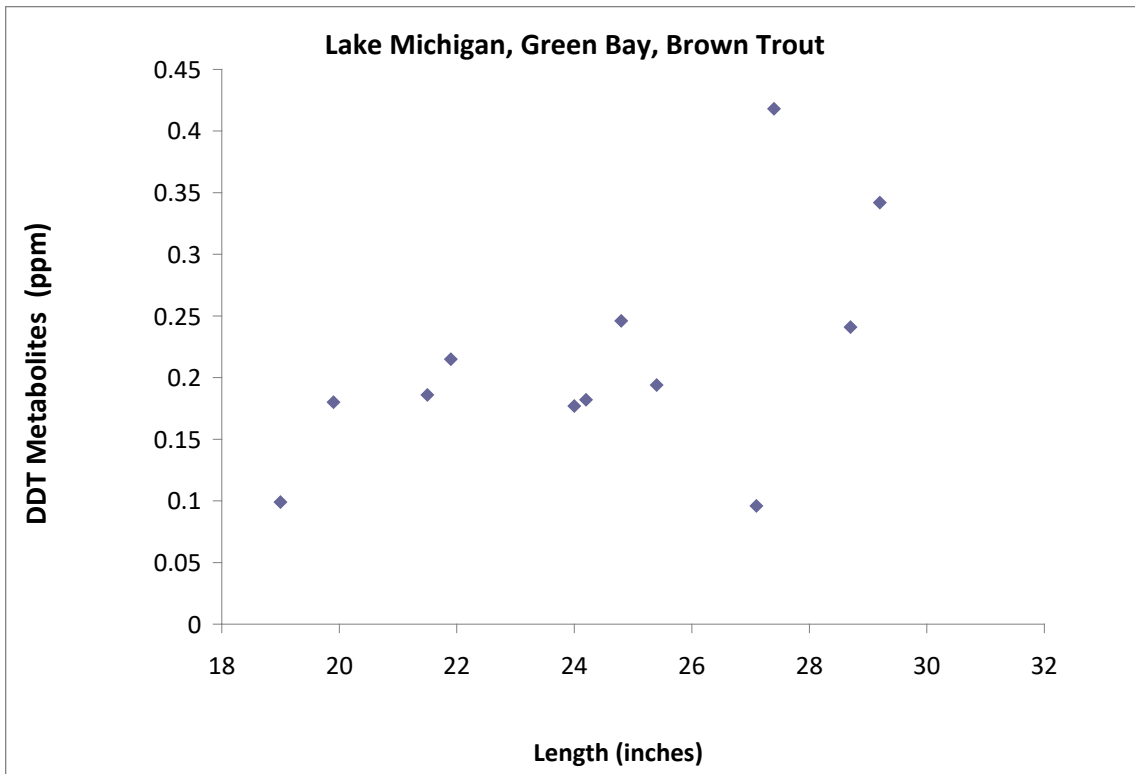
* 2005 WHO; dioxin-like -PCBs not included

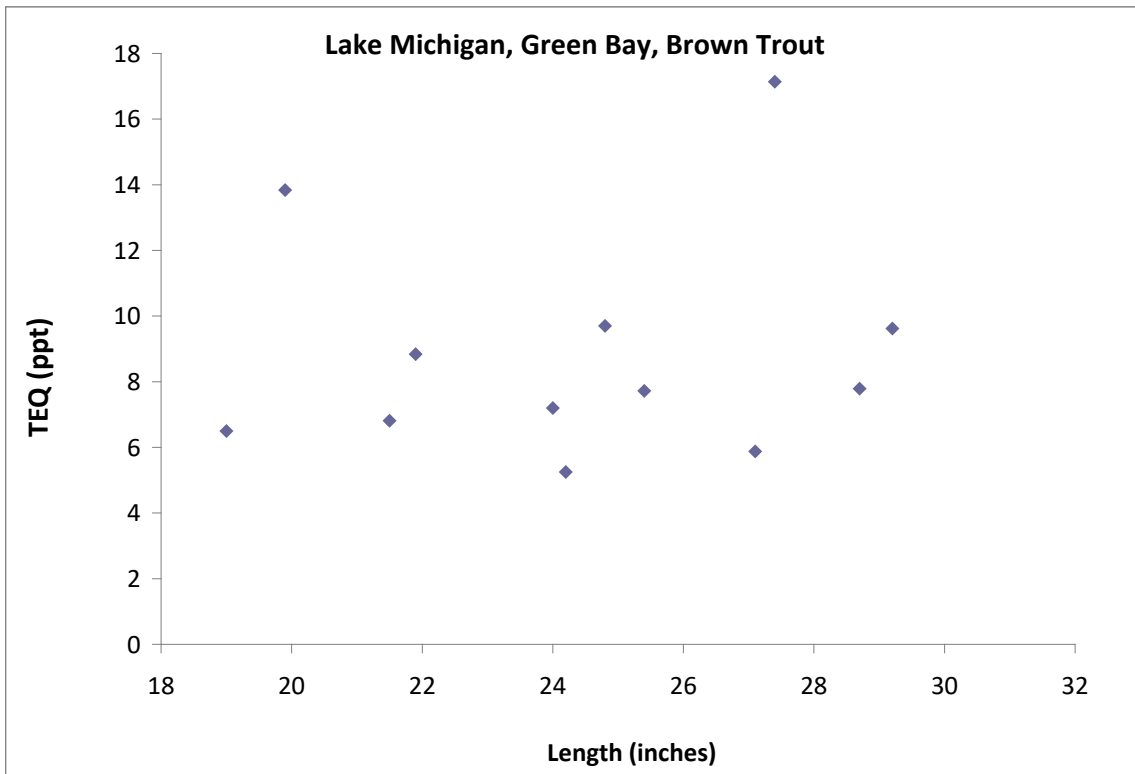
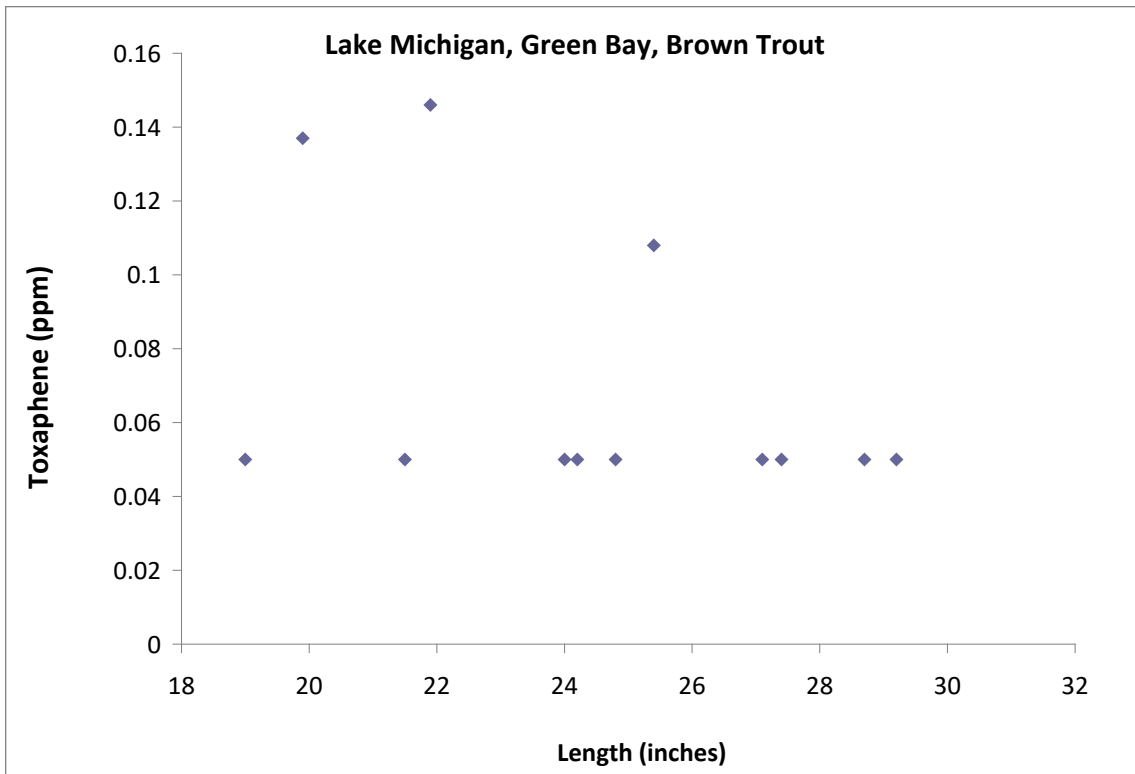
Existing Advisory: No one should eat Green Bay brown trout larger than 18 inches due to elevated levels of PCBs and dioxins. Women and children should not eat more than 1 meal per month of Green Bay brown trout less than 14 inches in length and no more than 6 meals per year of brown trout between 14 and 18 inches. The general population should not eat more than 1 meal per week of Green Bay brown trout smaller than 18 inches.

Recommendation: Sensitive populations should not eat these fish. Healthy adults should limit consumption to no more than 1 or 2 meals per year of Lake Michigan brown trout due to elevated concentrations of PCBs. Dioxin TEQ, mercury, toxaphene, and DDT would cause advisories.

Length (Inches)	Hg Regression Estimate (ppm)	Meal Category
16	0.09	12
18	0.11	8
20	0.14	4
22	0.17	4
24	0.22	4
26	0.28	2
28	0.35	2
30	0.43	2
<i>Shaded area denotes extrapolated estimates</i>		







Burbot

Lake Michigan

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	
2001	2001	10	22.6	na	22.6	29.3	
Datasets available: 1990, 2001							
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL		
Mercury	10	0.415	0.310	0.520	0.470	2	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.295	0.297					

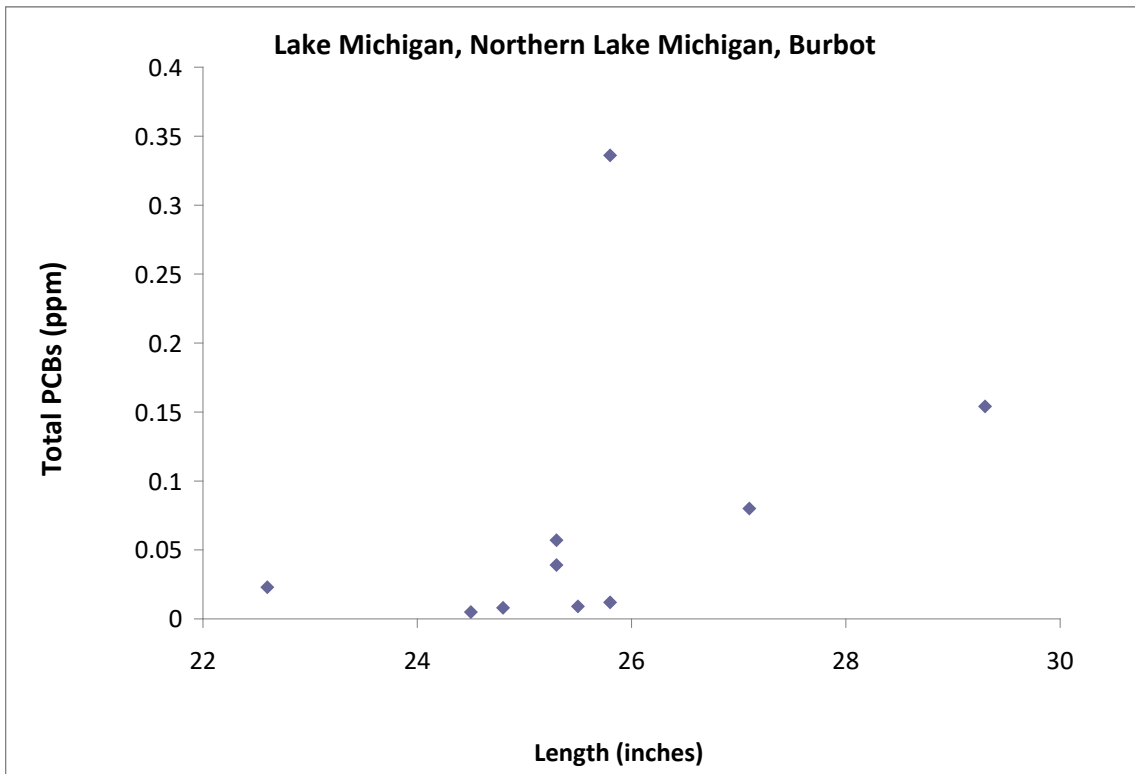
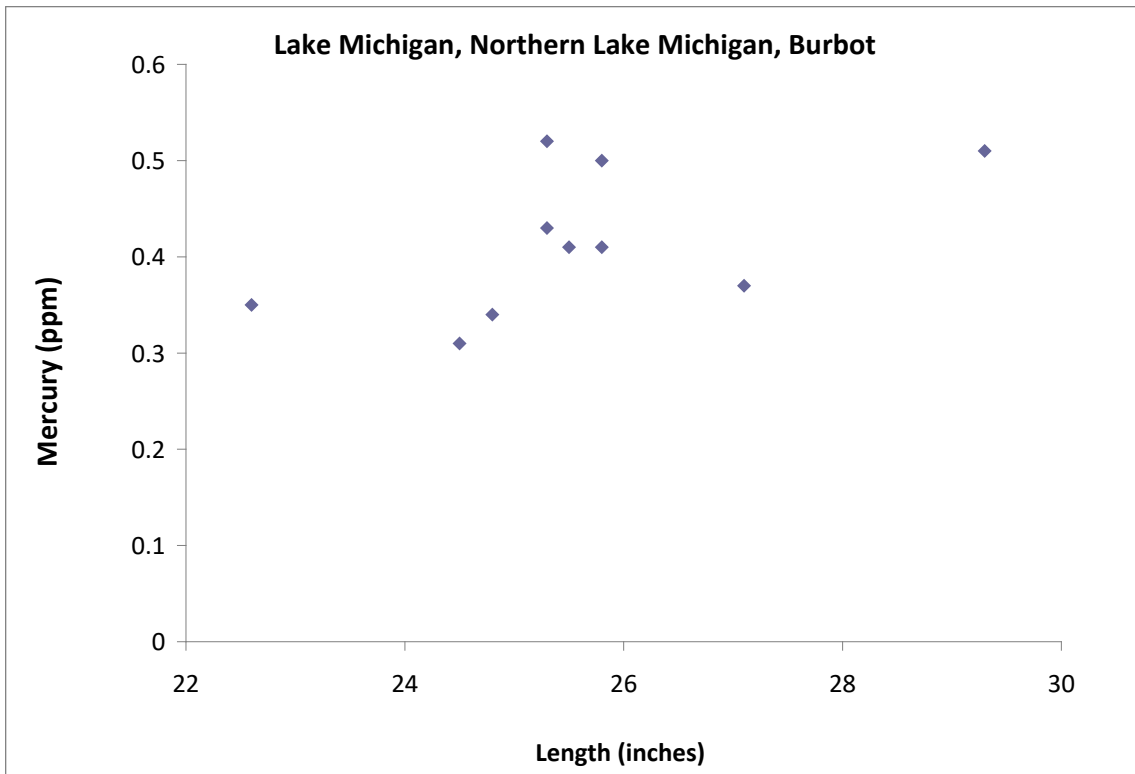
Organics Analysis:

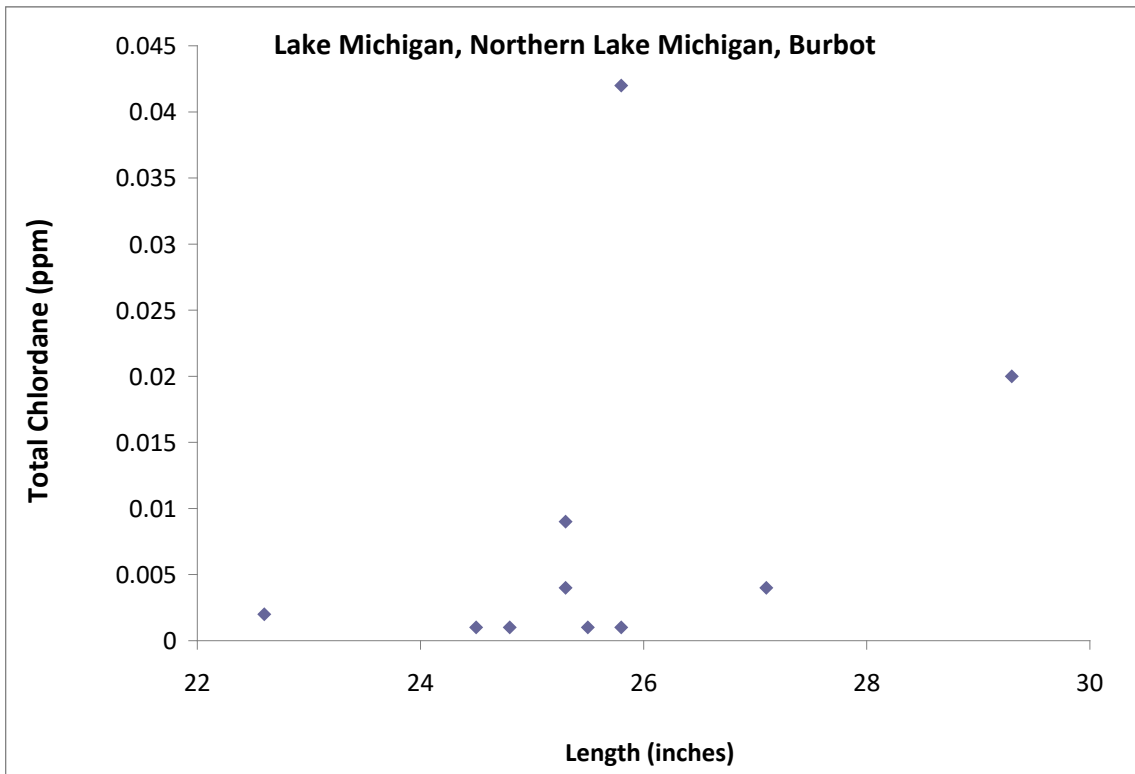
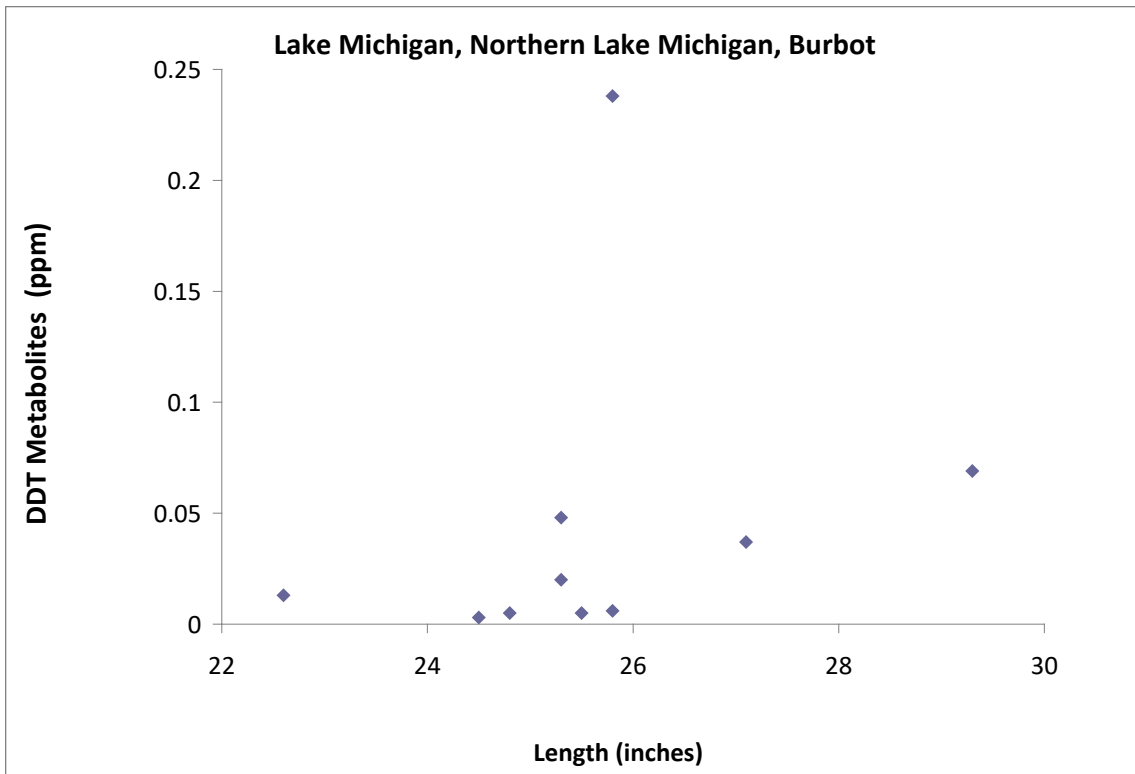
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
2001	2001	10	22.6	na	22.6	29.3	
Datasets available: 1990, 2001							
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL		
PCB	10	0.072	0.005	0.336	0.150	1	
DDT	10	0.044	0.003	0.238	0.100	16	
Chlordane	10	0.009	0.001	0.042	0.020	--	
Toxaphene	10	ND	--	--	--	--	
Dioxin TEQ*	4	1.3 ppt	0.4 ppt	2.7 ppt		--	
Chemical	Linear Regression	EXP Regression					
	R ²	R ²					
PCB	0.161	0.283					
DDT	0.069	0.213					
Chlordane	0.139	0.256					
Toxaphene	--	--					
TEQ*	0.069	0.183	Final meal category based on UCL:				1

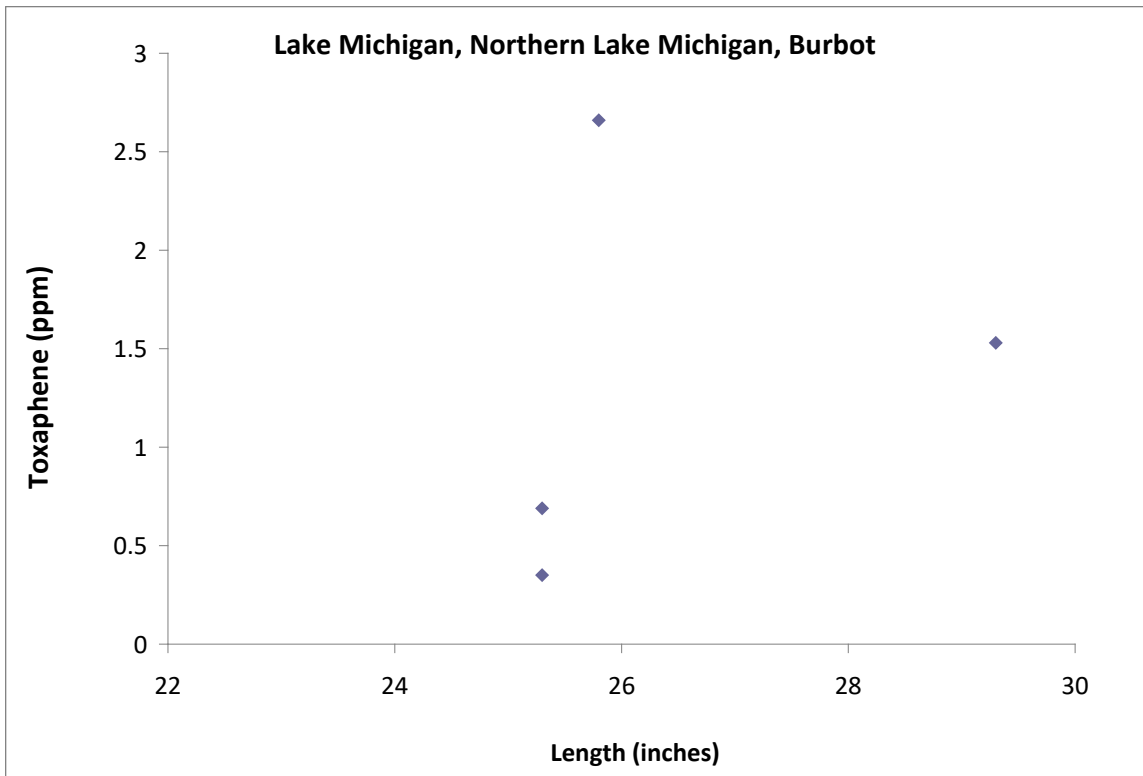
* 2005 WHO; dioxin-like -PCBs not included

Existing Advisory: Women and children should not eat more than 1 meal per week of northern Lake Michigan burbot larger than 26 inches in length due to elevated levels of PCBs.

Recommendation: No one should eat more than 1 meal per month of burbot from Lake Michigan due to elevated concentrations of PCBs. Dioxin and mercury would cause advisories.







Carp

Lake Michigan Green Bay & L. Bay De Noc

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1988	2012	64	20.1	na	20.1	34.6
Datasets available: 1988, '89, '93, 2000, 2004, 2008, 2012						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
Mercury	64	0.29	0.10	0.55	0.31	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.021	0.034				

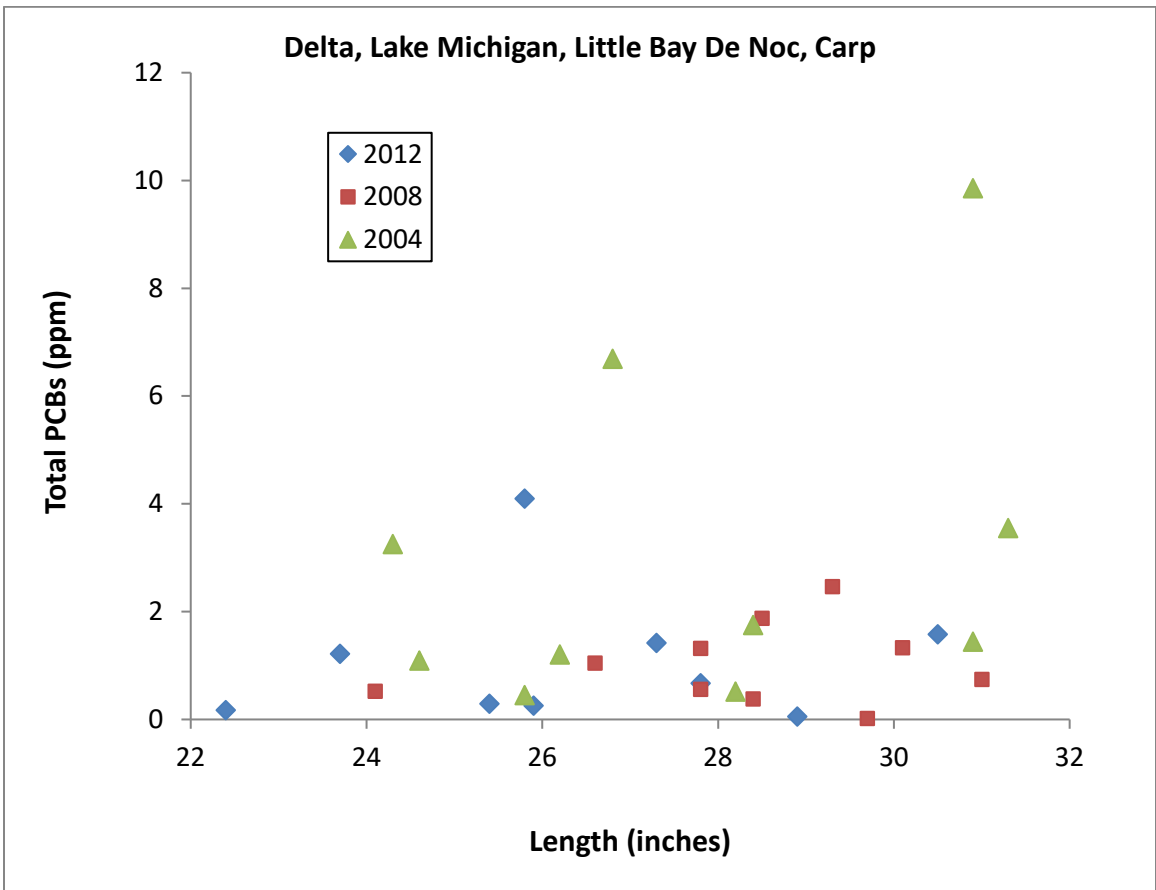
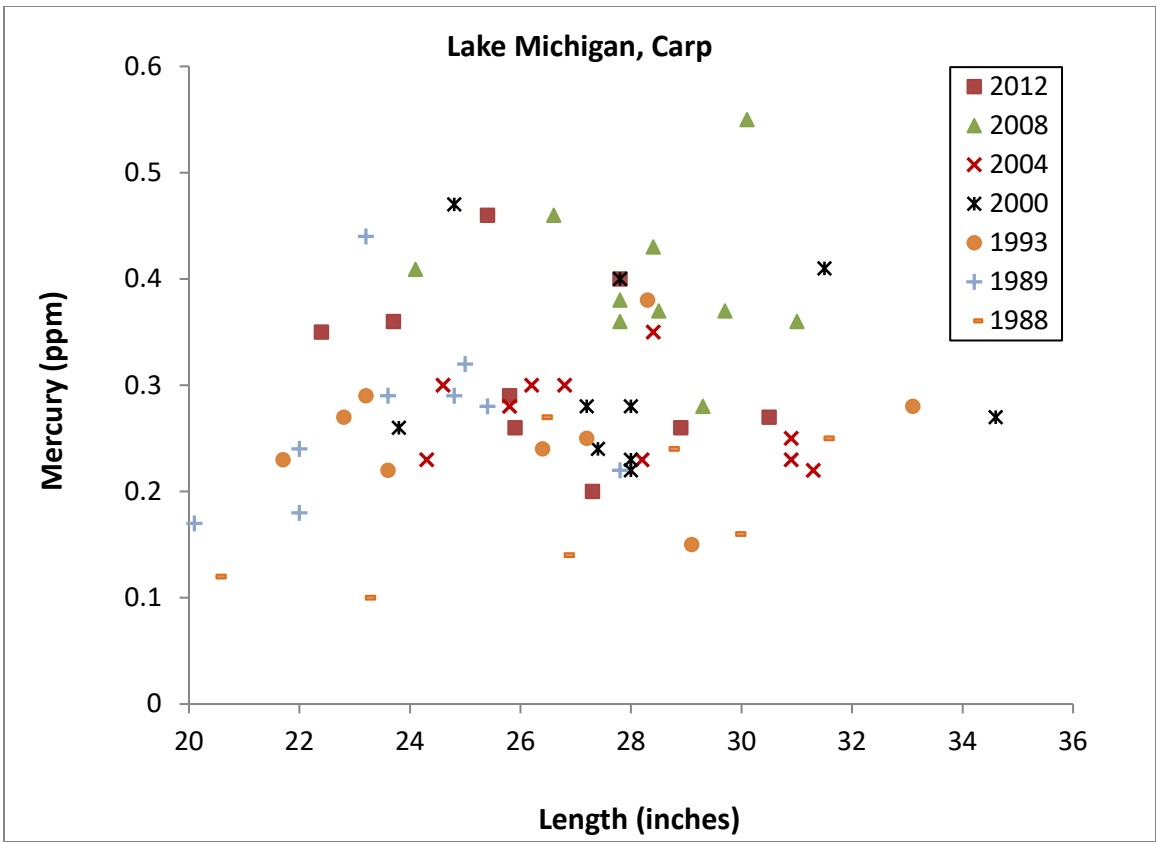
Organics Analysis:

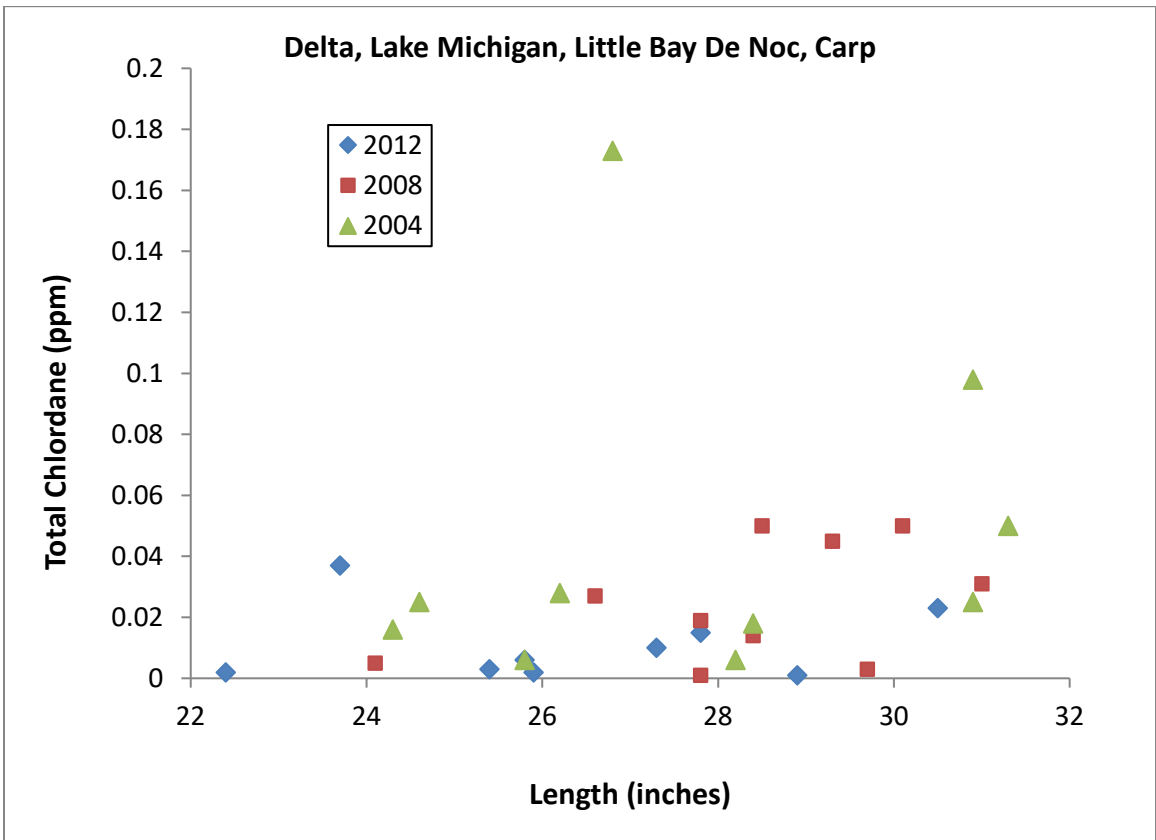
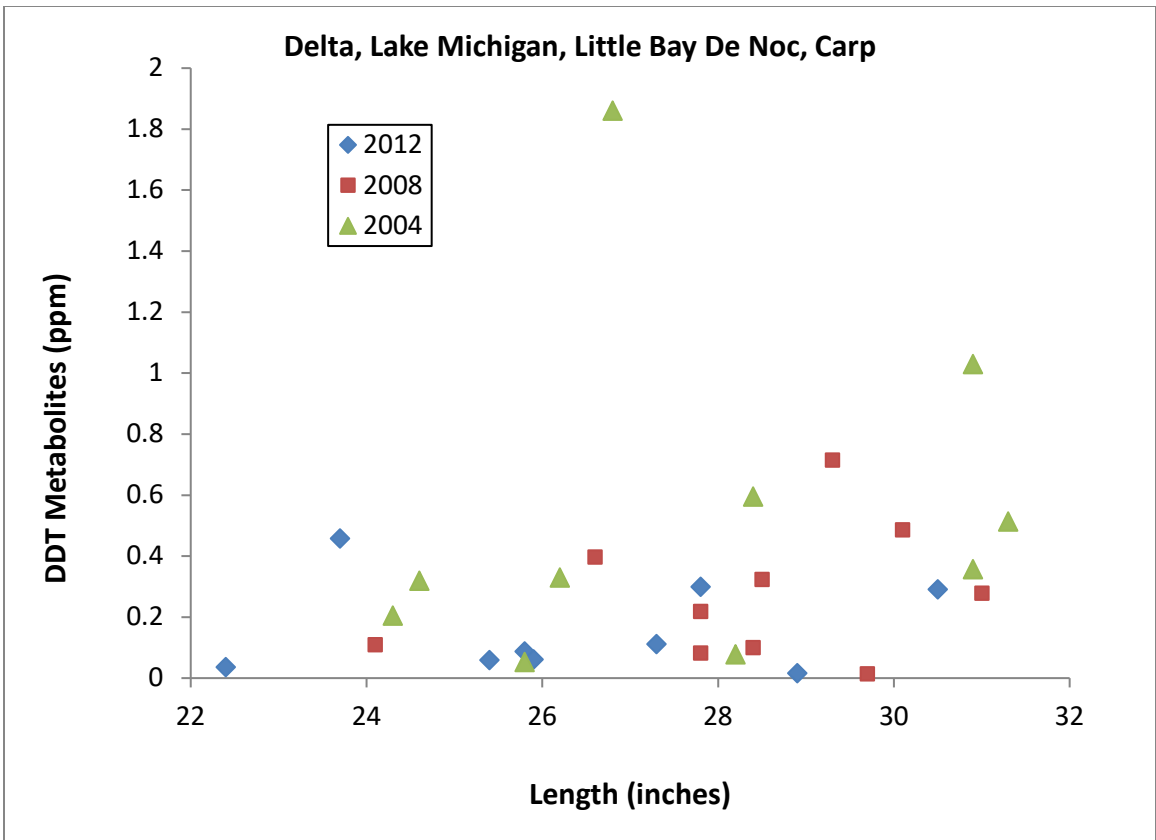
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2004	2012	29	22.4	na	22.4	31.3
Datasets available: 1988, '89, '93, 2000, 2004, 2008, 2012						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
PCB	29	1.72	0.02	9.86	2.53	Limited
DDT	29	0.33	0.01	1.86	0.47	2
Chlordane	29	0.03	0.001	0.17	0.04	--
Toxaphene	29	ND	--	--	--	--
TEQ*	9	22.8	4.6 ppt	46.6 ppt	35.8 ppt	Limited
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.054	0.018				
DDT	0.047	0.064				
Chlordane	0.056	0.110				
Toxaphene	--	--				
TEQ*	0.012	0.042				
Final meal category based on UCL:						Limited*

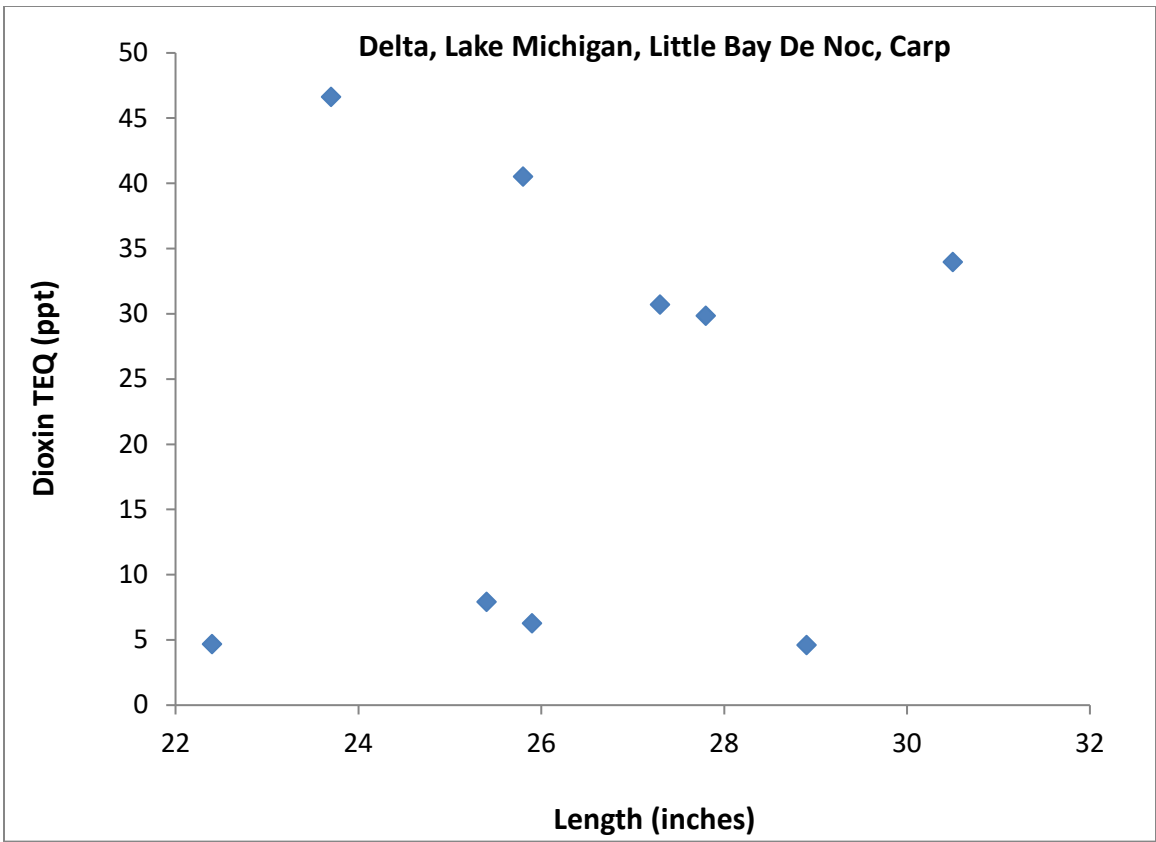
* - 2005 WHO TEFs; dl-PCBs included

Existing Advisory: No one should eat carp from Lake Michigan, Green Bay, or Little Bay De Noc, due to elevated concentrations of PCBs. Mercury and DDT would cause advisories.

Recommendation: Add TEQ to advisory cause, otherwise no change recommended. An additional year of sampling is needed to confirm the lowered PCB levels and monitor TEQ. Mercury and DDT would cause advisories.







Chinook Salmon

Lake Michigan

Hg Analysis:

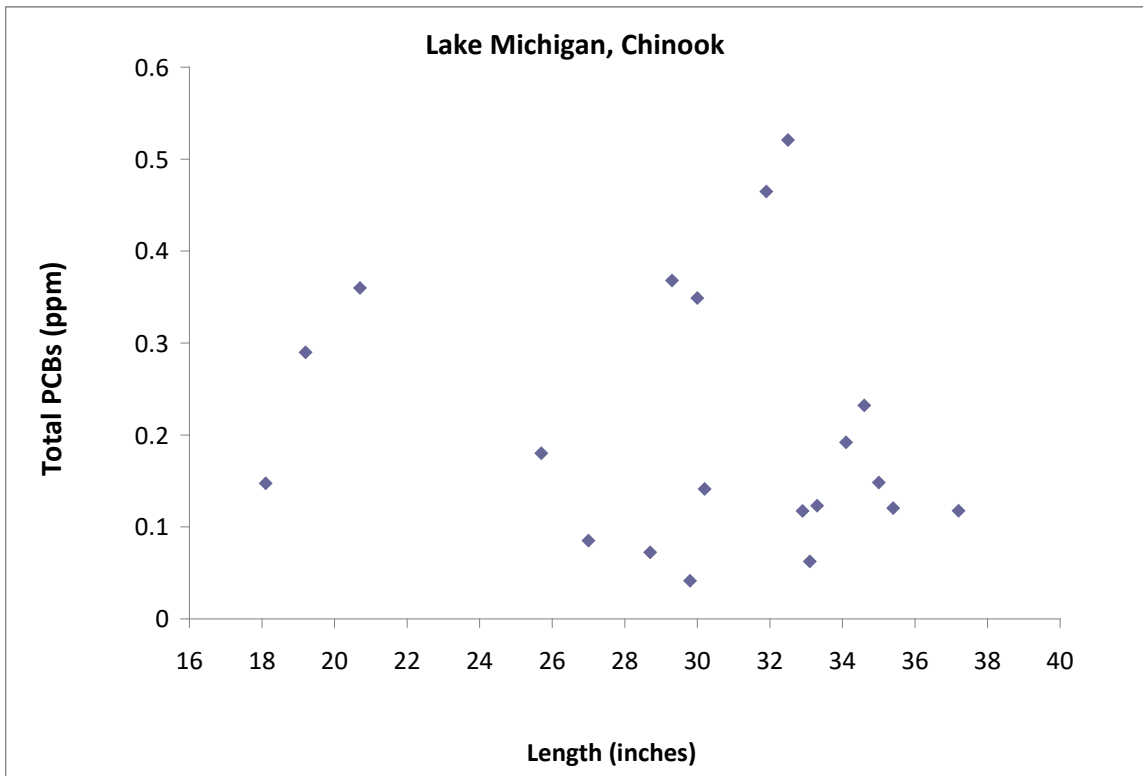
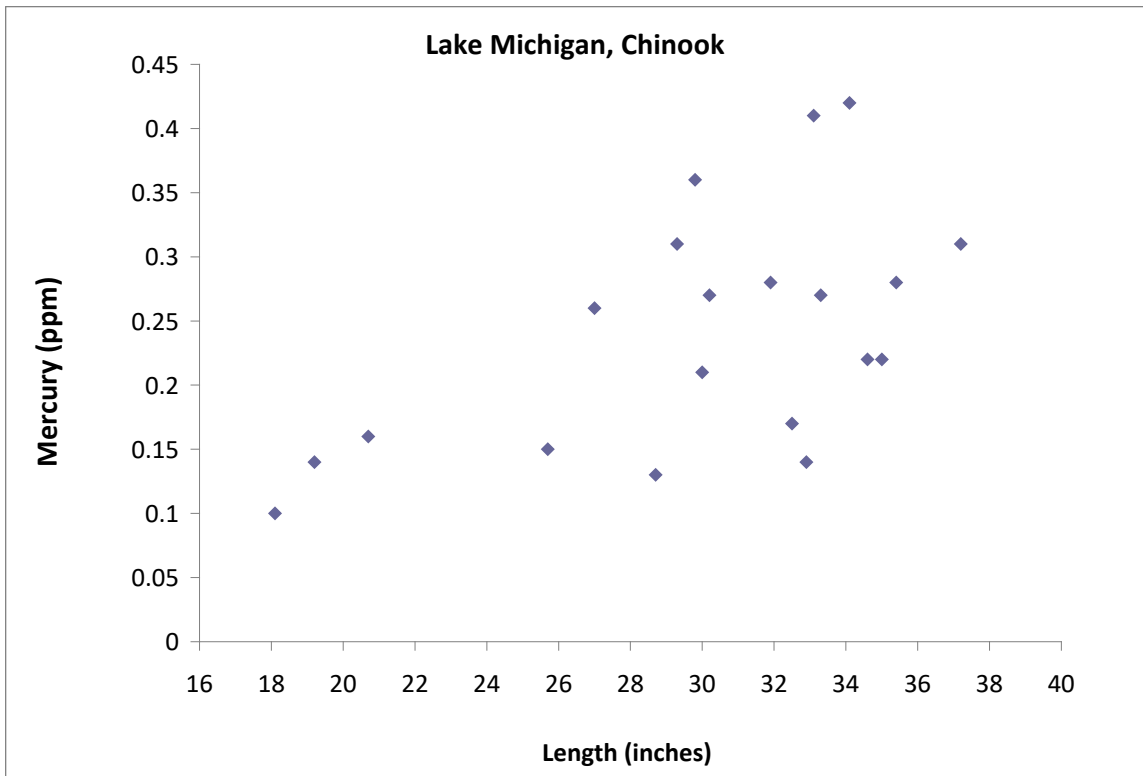
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
2009	2009	20	18.1	10	18.1	37.2	
Datasets available: 1983-1989, '91-'93, '95-'97, 2009							
Chemical	Sample Size (Legal)	Mean		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
Mercury	20	0.241		0.100	0.420	0.280	2
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.319	0.397					

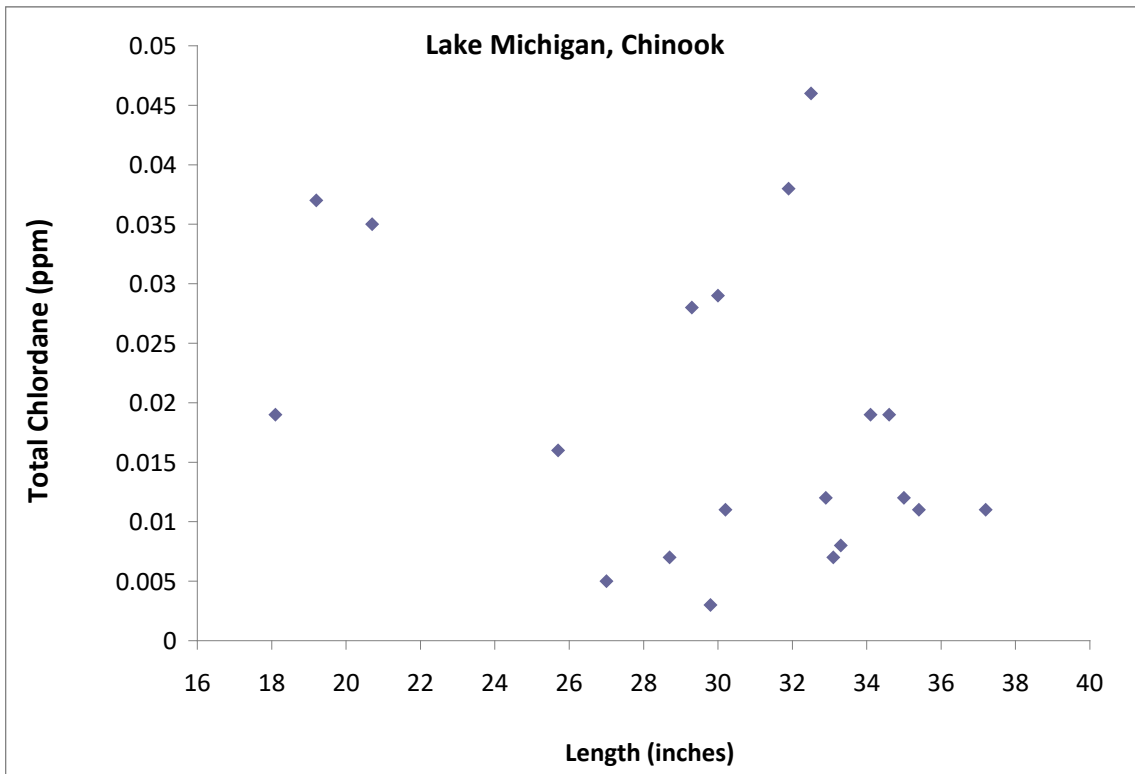
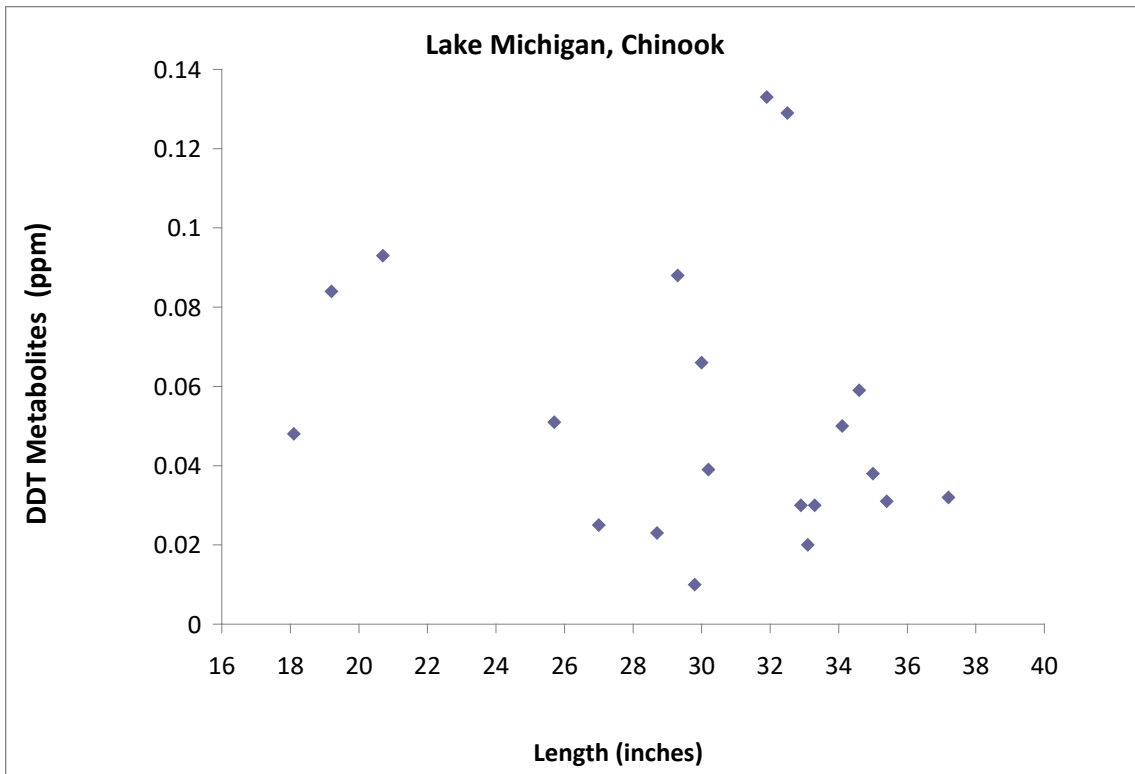
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
2009	2009	20	18.1	10	18.1	37.2	
Datasets available: 1983-1989, '91-'93, '95-'97, 2009							
Chemical	Sample Size (Legal)	Mean		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
PCB	20	0.207		0.042	0.521	0.270	0.5
DDT	20	0.054		0.010	0.133	0.070	16
Chlordane	20	0.019		0.003	0.046	0.020	--
Toxaphene	20	ND		--	--	--	--
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.022	0.030					
DDT	0.045	0.058					
Chlordane	0.097	0.070					
Toxaphene	--	--					
Final meal category based on UCL:							0.5

Existing Advisory: Women and children should not eat more than 6 meals per year of Lake Michigan chinook salmon larger than 26 inches in length or more than 1 meal per month of chinook salmon less than 26 inches due to elevated levels of PCBs.

Recommendation: No one should eat more than 6 meals per year of Lake Michigan chinook salmon due to elevated concentrations of PCBs. Mercury would cause an advisory.





Coho Salmon

Lake Michigan

Hg Analysis:

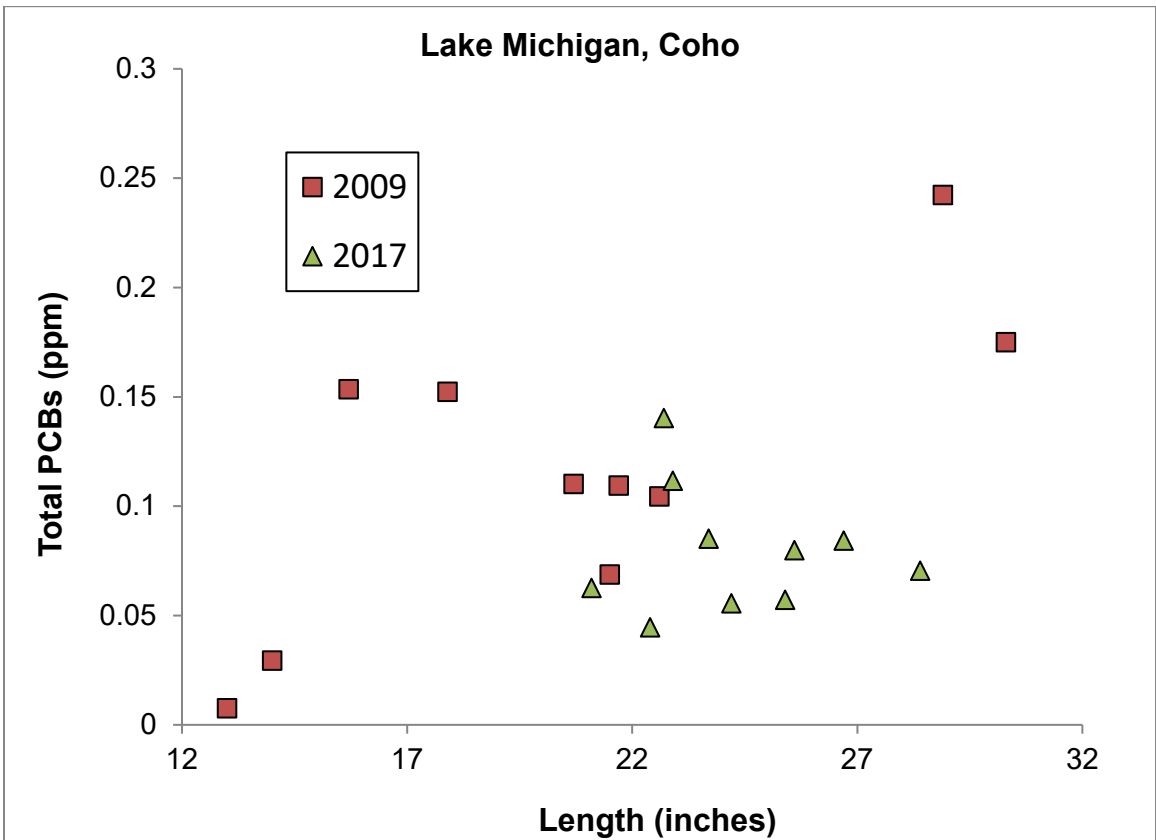
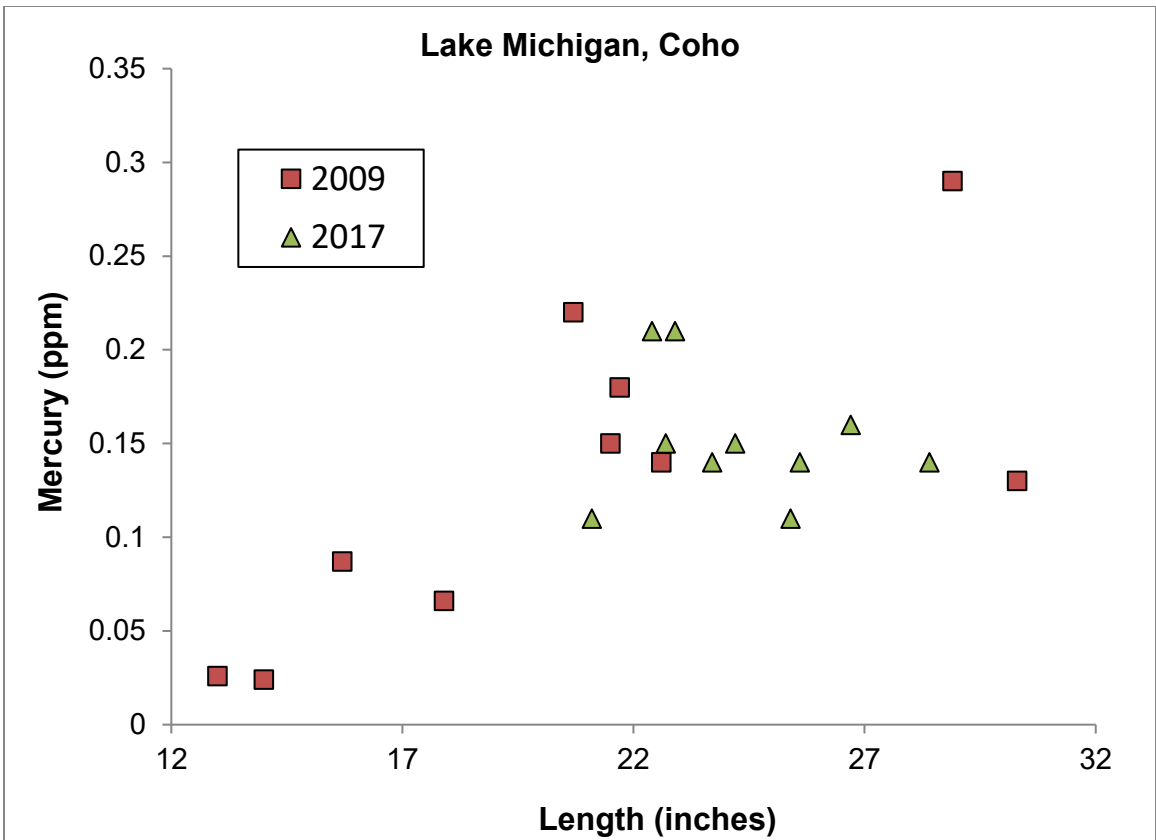
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
2009	2017	20	13	10	13	30.3	
Datasets available: 1983,'84,'85,'86,'88,'90,'92,'94,'96,'98,2009, 2017							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
Mercury	20	0.14	0.02	0.29	0.17	4	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.392	0.532					

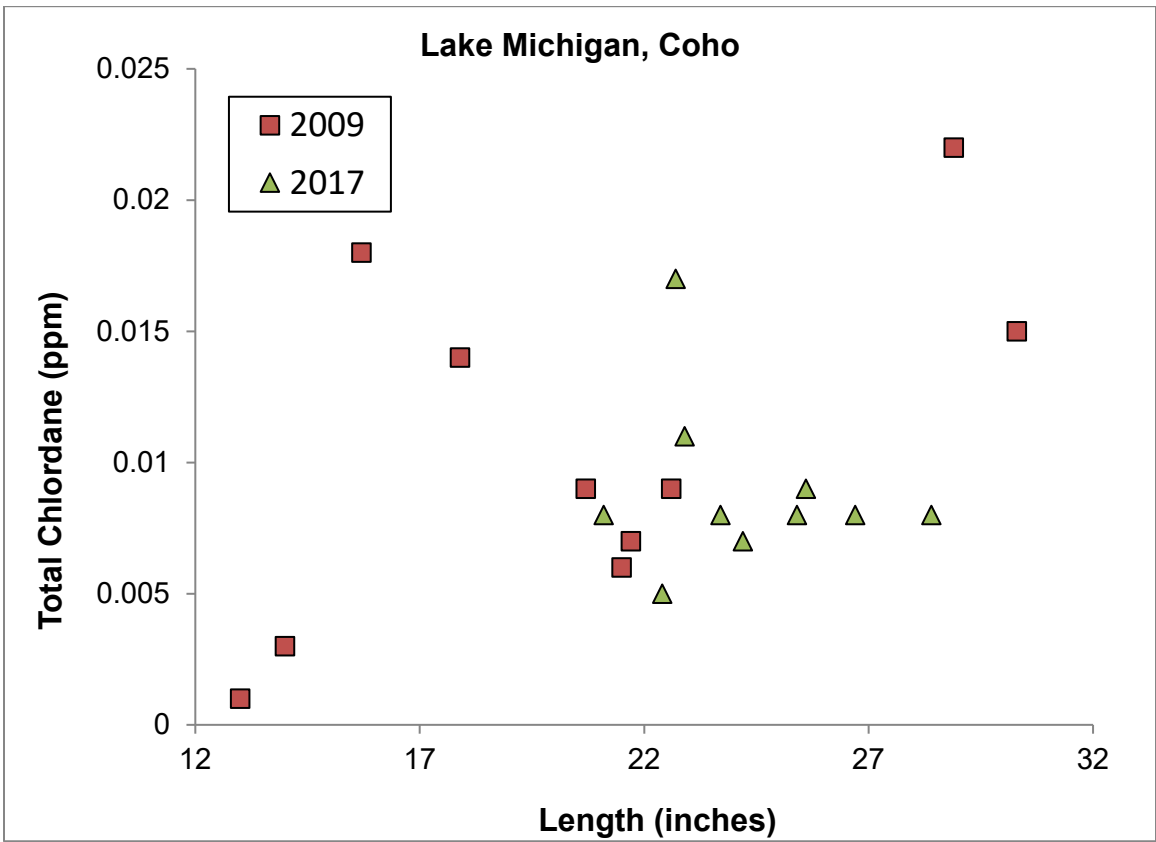
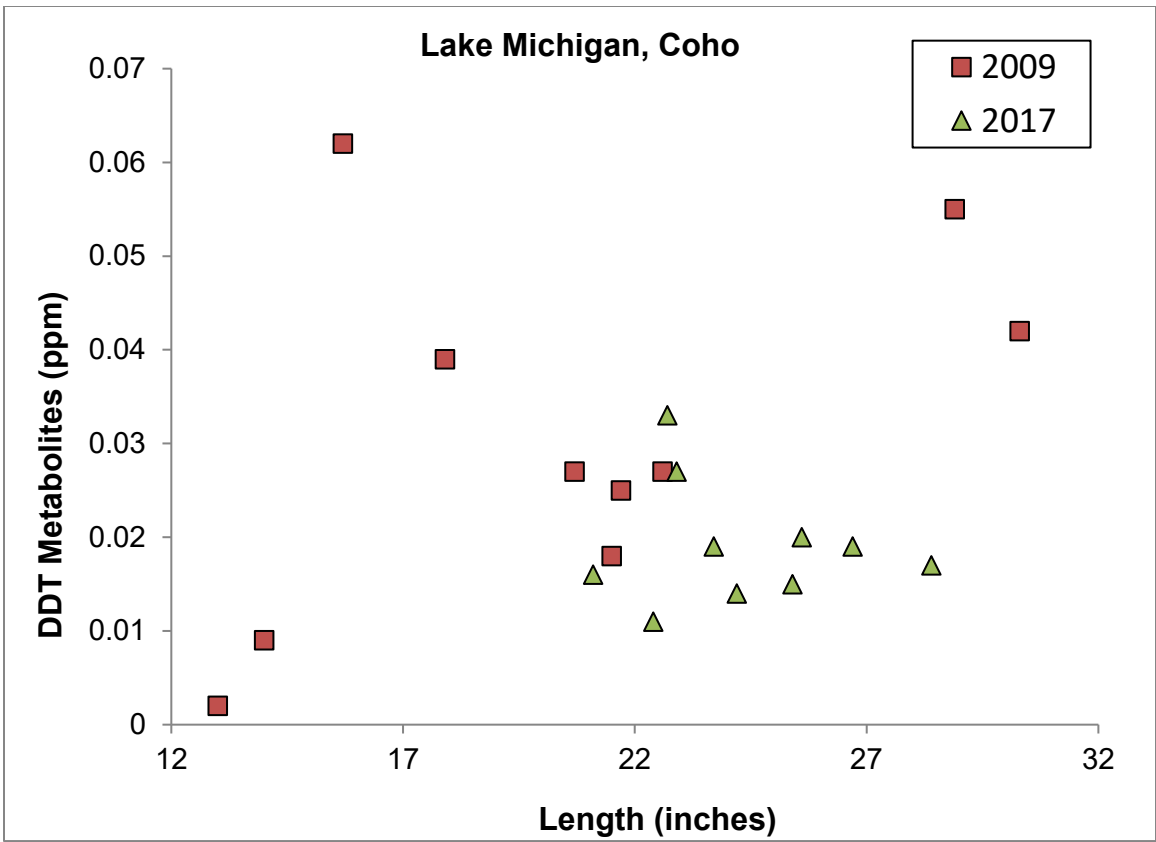
Organics Analysis:

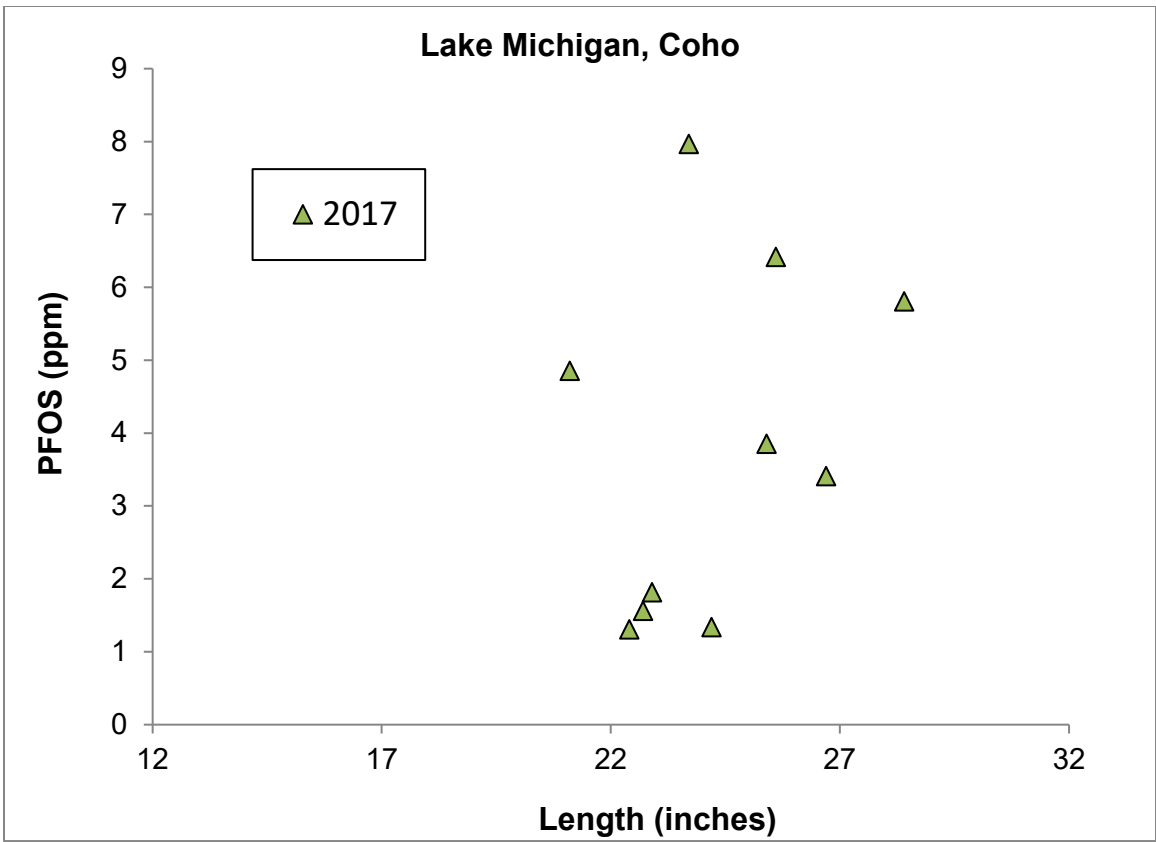
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
PCBs: 2009	2017	20	13	10	13	30.3	
PFOS: 2017	2017	10	21.1	10	21.1	28.4	
Datasets available: 1983,'84,'85,'86,'88,'90,'92,'94,'96,'98,2009, 2017							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
PCB	20	0.1	0.01	0.24	0.12	1	
DDT	20	0.02	0.002	0.06	0.03	16	
Chlordane	20	0.01	0.001	0.02	0.01	--	
Toxaphene	20	ND	< 0.05	< 0.05	--	--	
PFOS	10	4 ppb	1 ppb	8 ppb	6 ppb	16	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.155	0.274					
DDT	0.032	0.175					
Chlordane	0.128	0.285					
Toxaphene	--	--					
PFOS	0.117	0.163					
Final meal category based on UCL:							1

Existing MDHHS Advisory: No one should eat more than 1 meal per month of Lake Michigan coho salmon due to elevated concentrations of PCBs. Mercury would cause an advisory.

Recommendation: No change to the advisory is recommended.







Lake Trout

Lake Michigan

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	
1996	2014	59	19.3	20	20.5	33.4	
Datasets available: 1983,'84,'86,'87,'89,'91,'96,'97,'98,2009, 2014							
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category	
Mercury	58	0.21	0.09	0.40	0.23	4	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.640	0.606					

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	
2009	2014	15	19.3	20	21.7	32.4	
Datasets available: 1983,'84,'86,'87,'89,'91,'96,'97,'98,2009, 2014							
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category	
PCB	14	0.50	0.08	2.03	0.83	Limited	
DDT	14	0.16	0.04	0.55	0.24	4	
Chlordane	14	0.06	0.01	0.20	0.09	--	
Toxaphene	14	ND	--	--	--	--	
TEQ*	14	30 ppt	8.5 ppt	93 ppt	44 ppt	Limited	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.468	0.485					
DDT	0.581	0.694					
Chlordane	0.614	0.718					
Toxaphene	0.000	0.068					
TEQ*	0.611	0.718					
Final meal category based on UCL:							

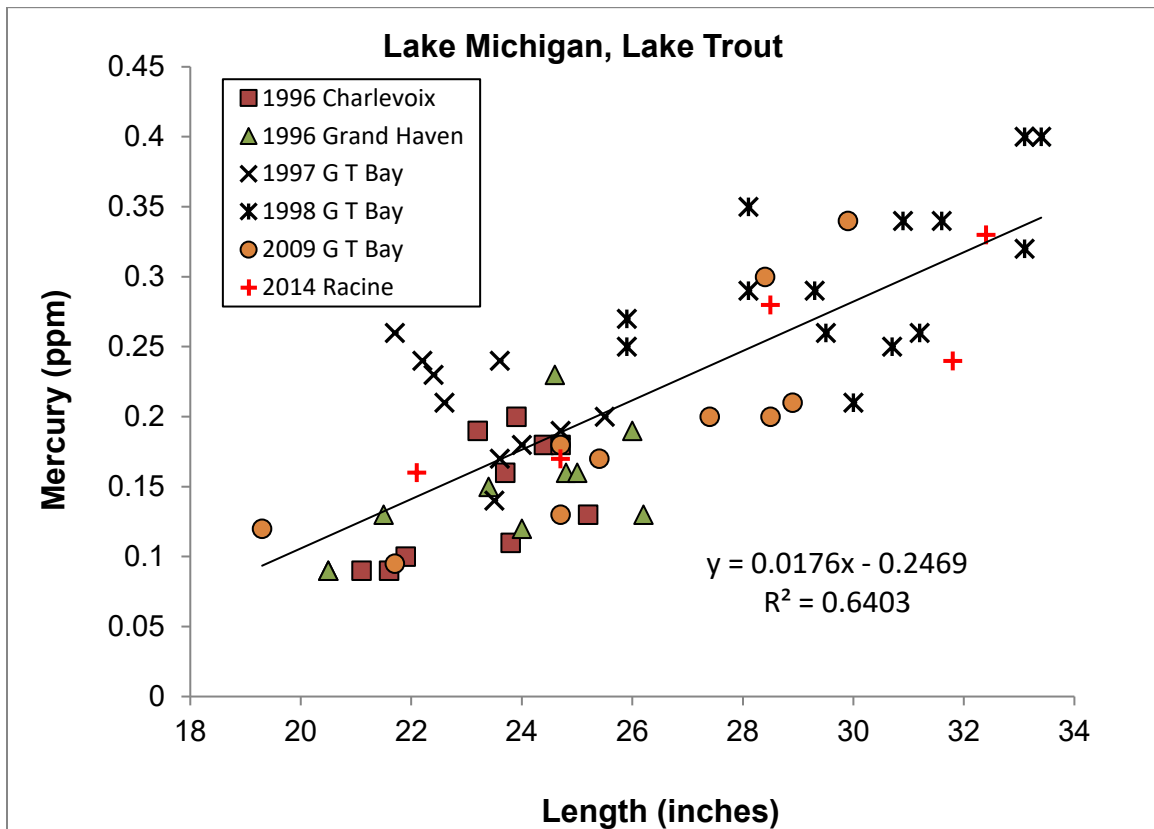
* 2005 WHO; dioxin-like PCBs included

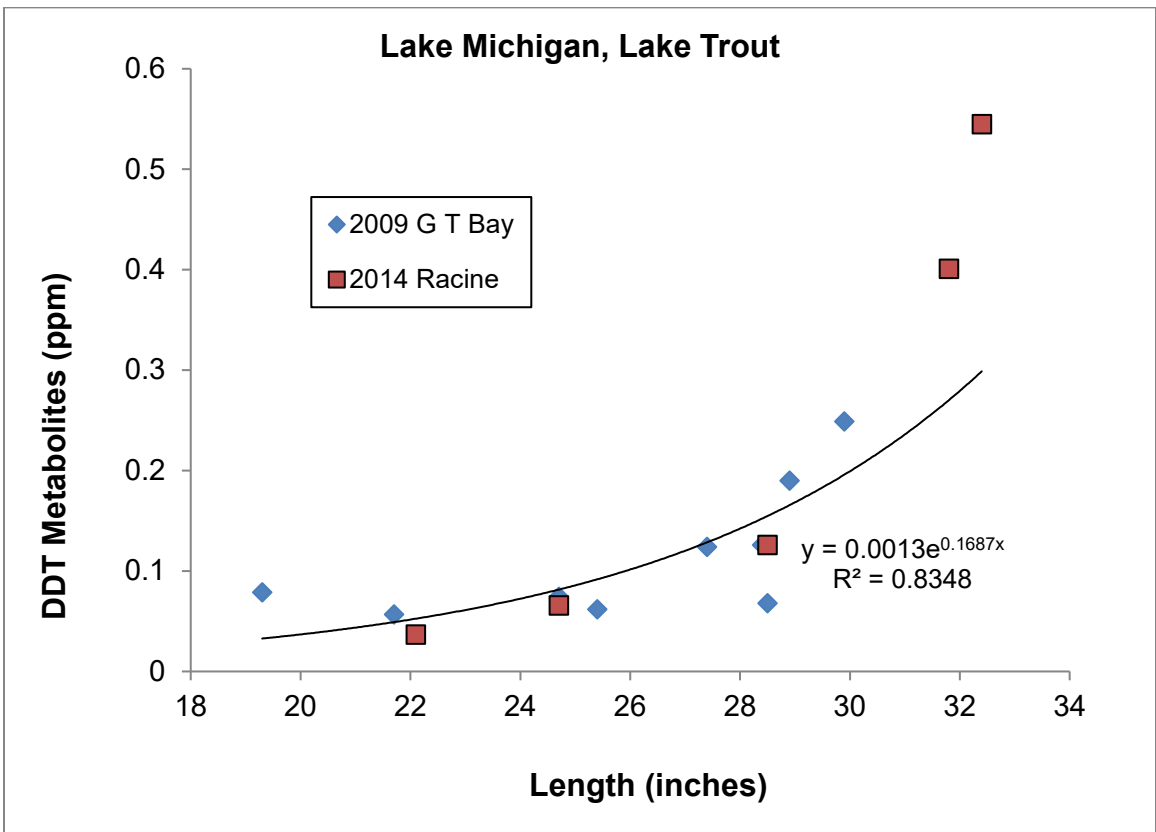
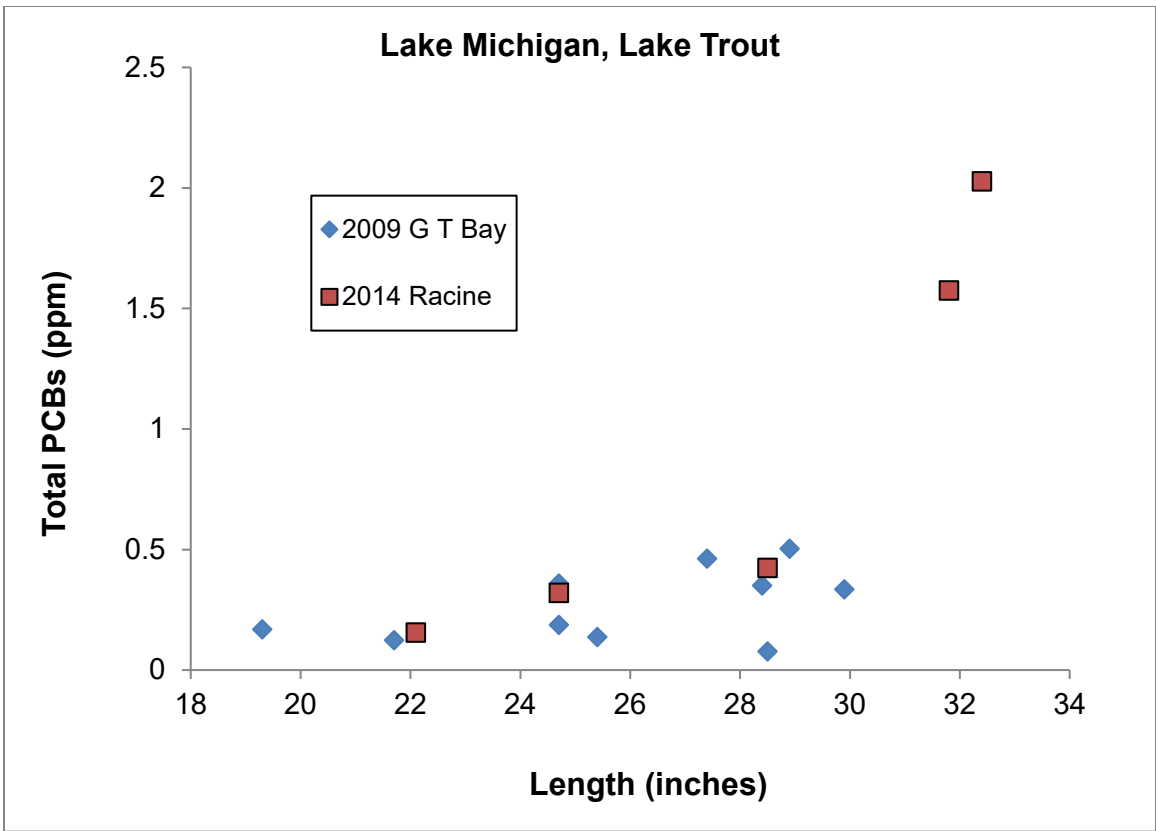
Existing Advisory: No one should eat more than 6 meals per year of lake trout less than 24 inches. Sensitive populations should not eat lake trout greater than 24 inches. Healthy adults should limit consumption of Lake Michigan lake trout greater than 24 inches to no more than 1 or 2 meals per year due to elevated concentrations of dioxin TEQ. PCBs, DDT, and mercury would cause advisories.

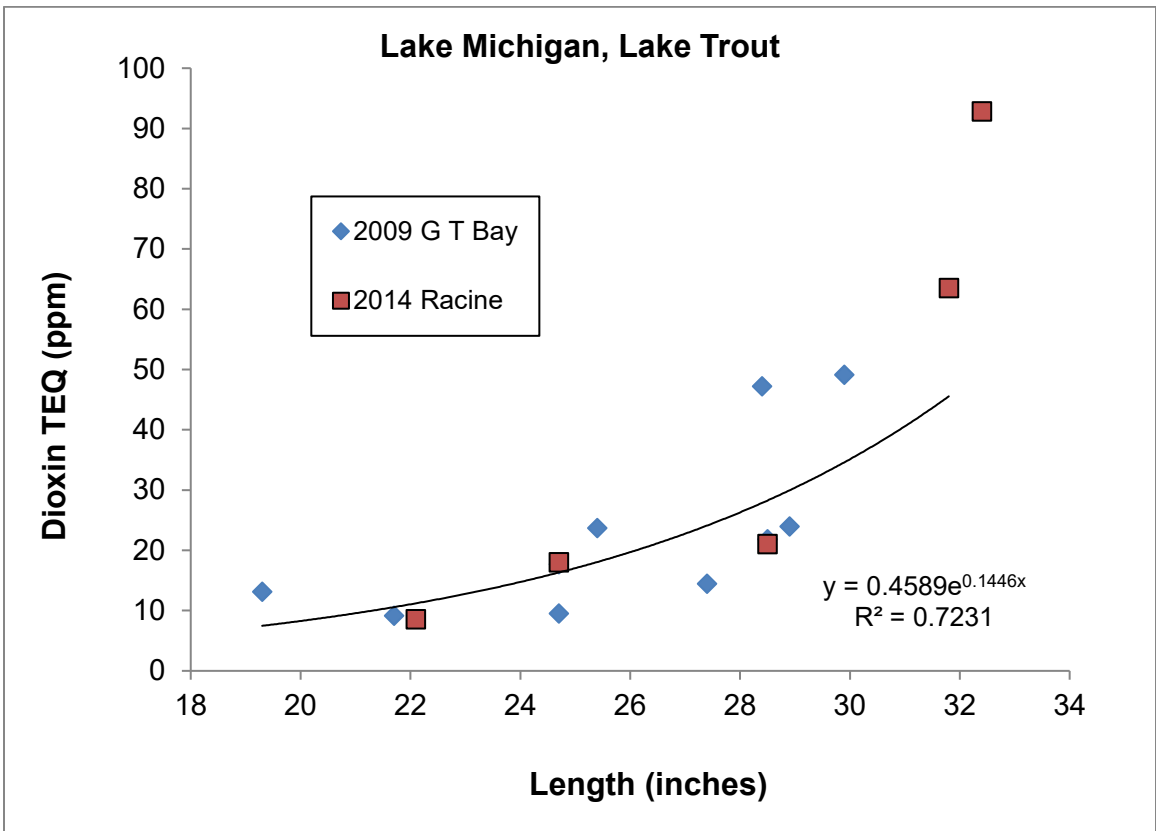
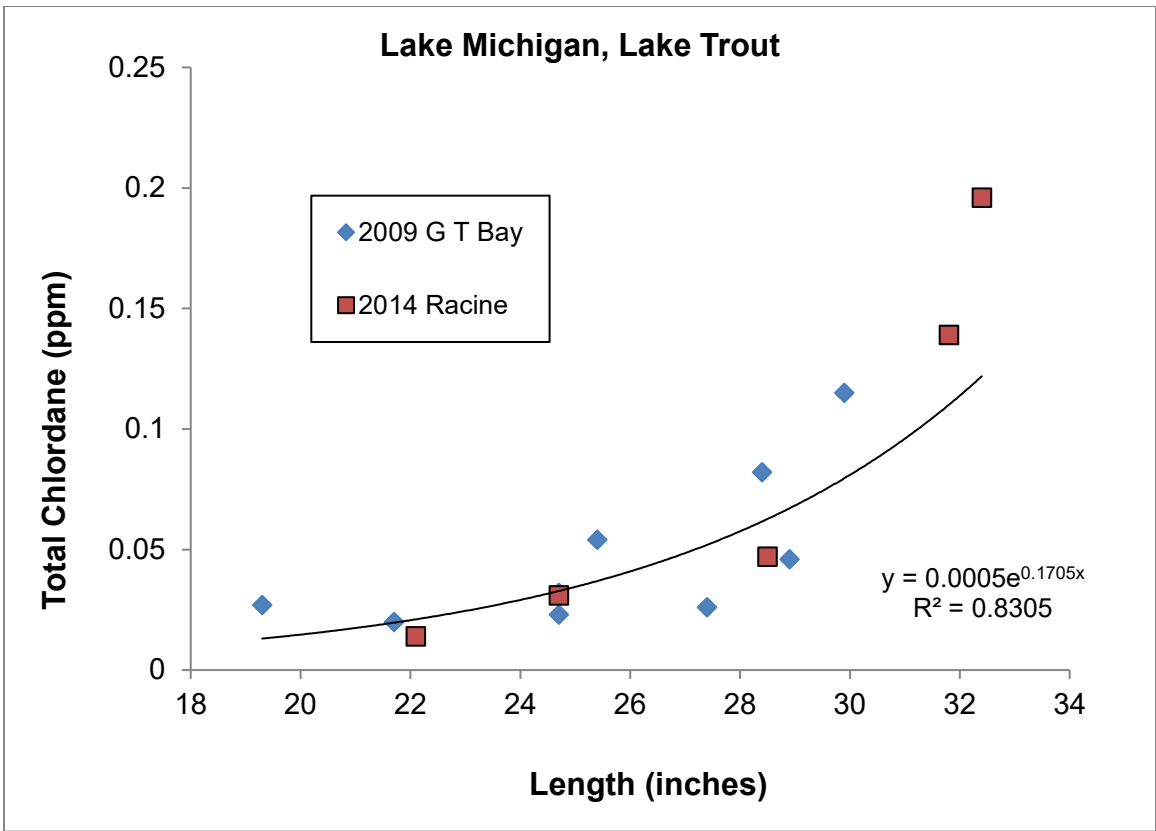
Recommendation: No change is recommended.

Length (Inches)	TEQ Regression Estimate (ppt)	Meal Category	Hg Regression Estimate (ppm)	Meal Category	DDT Regression Estimate (ppm)	Meal Category
20	8.3	0.5	0.11	8	0.04	16
22	11	0.5	0.14	4	0.05	16
24	14.8	0.5	0.18	4	0.07	16
26	19.7	Limited	0.21	4	0.1	16
30	26.3	Limited	0.25	4	0.15	12
32	35.1	Limited	0.28	2	0.21	8
34	46.9	Limited	0.32	2	0.29	4

Shaded area denotes extrapolated estimates







Lake Whitefish

Lake Michigan

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	2016	30	14.1	na	14.1	18.1	
Datasets available: 1990, '92, '93, '96, '97, '99, 2013, 2016							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	30	0.10		0.03	0.24	0.12	8
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.299	0.264					

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
2013	2016	30	14.1	na	14.1	23.8	
Datasets available: 1983, '90, '92, '93, '96, '97, '99, 2013, 2016							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	30	0.08		0.002	0.336	0.109	2
DDT	30	0.03		0.001	0.101	0.035	16
Chlordane	30	0.01		0.001	0.030	0.010	16
Σ Tox †	10	0.7 ppb		0.2 ppb	1.2 ppb	0.9 ppb	16
TEQ*	20	2.6 ppt		0.05 ppt	7 ppt	3.6 ppt	2
PFOS	10	5 ppb		1 ppb	12 ppb	7 ppb	16
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.057	0.374					
DDT	0.130	0.447					
Chlordane	0.107	0.268					
Toxaphene	0.115	0.042					
TEQ*	0.273	0.594					
PFOS	0.014	0.007					
Final meal category based on UCL:							2

* 2005 WHO TEFs; dl-PCBs included

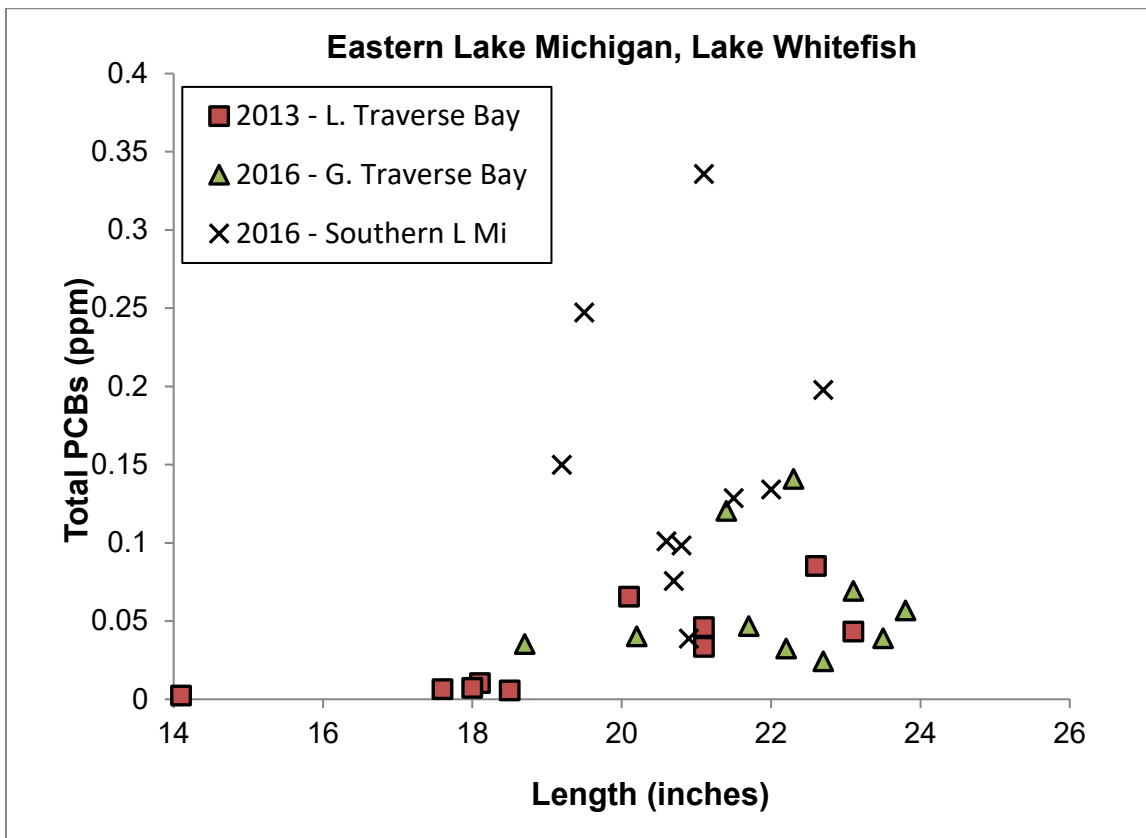
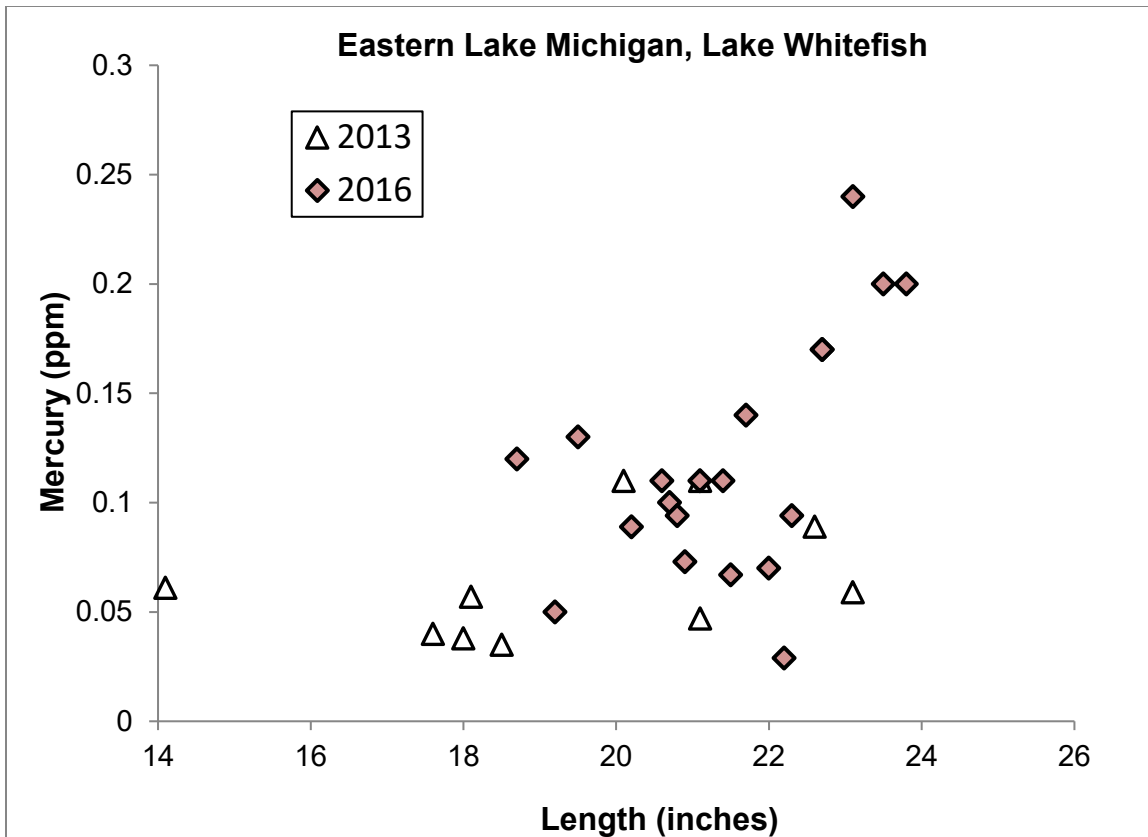
† Sum of Toxaphene Parlars 26, 50, 62

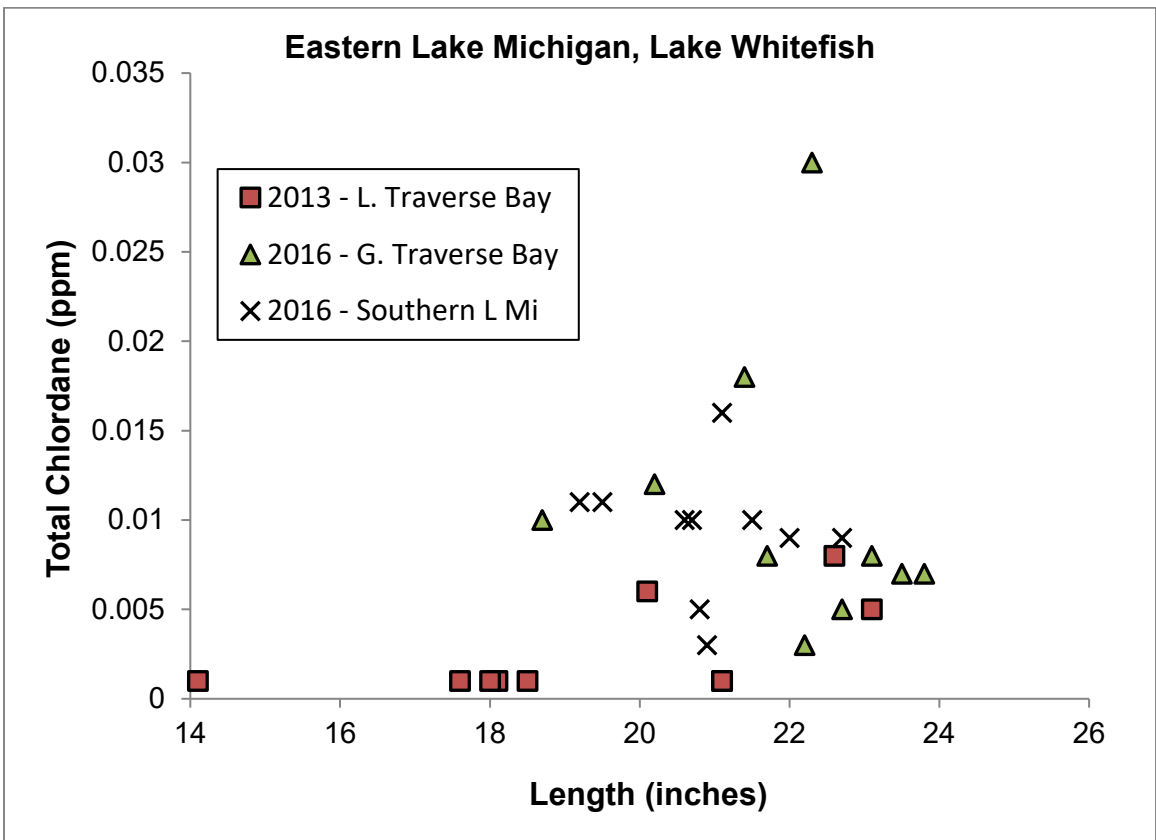
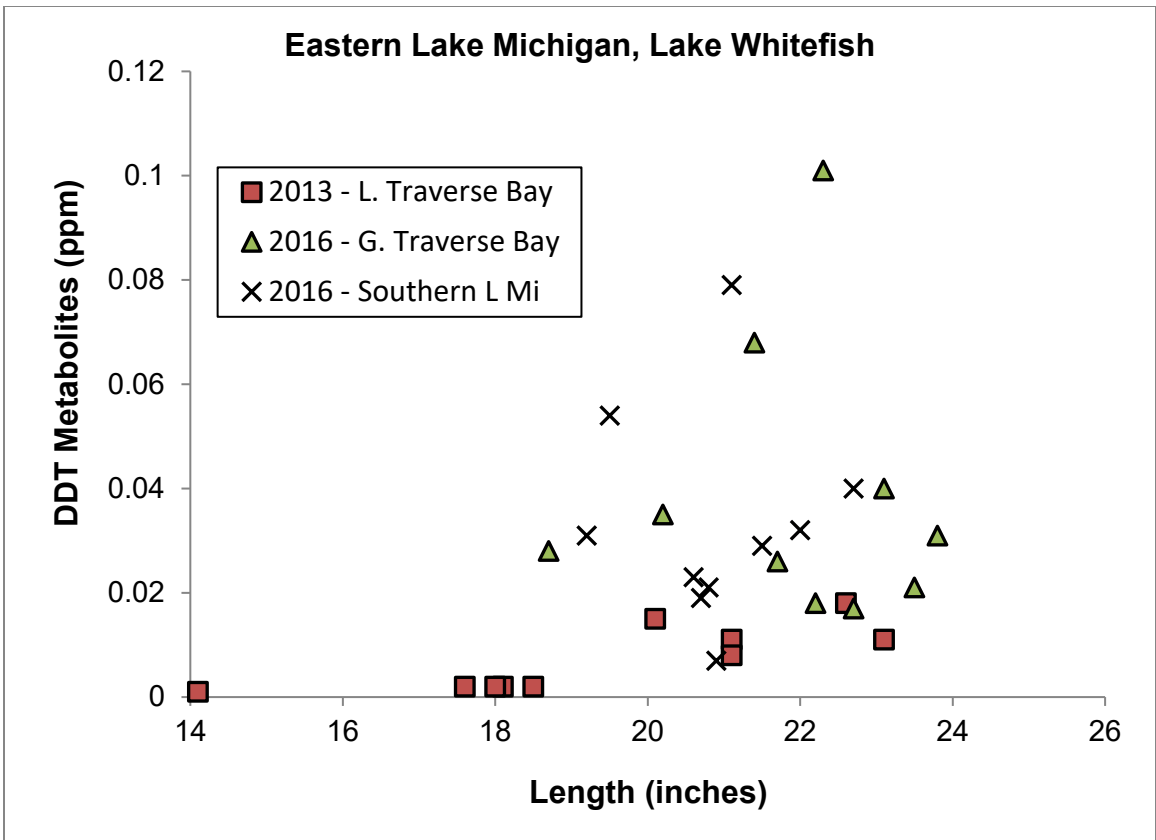
Existing MDHHS Advisory: Sensitive populations should not eat these fish. Healthy adults should limit consumption to no more than 1 or 2 meals per year of Lake Michigan lake whitefish due to elevated concentrations of PCBs and dioxins. DDT and toxaphene would cause advisories.

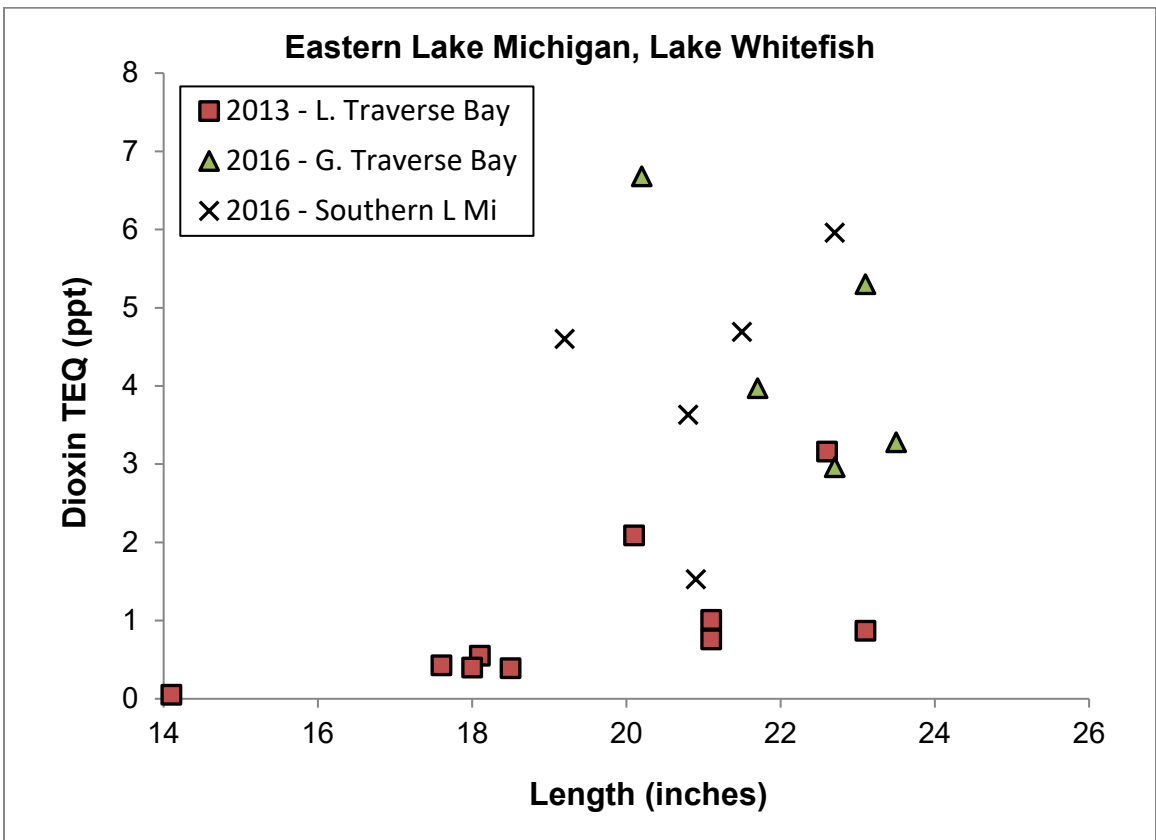
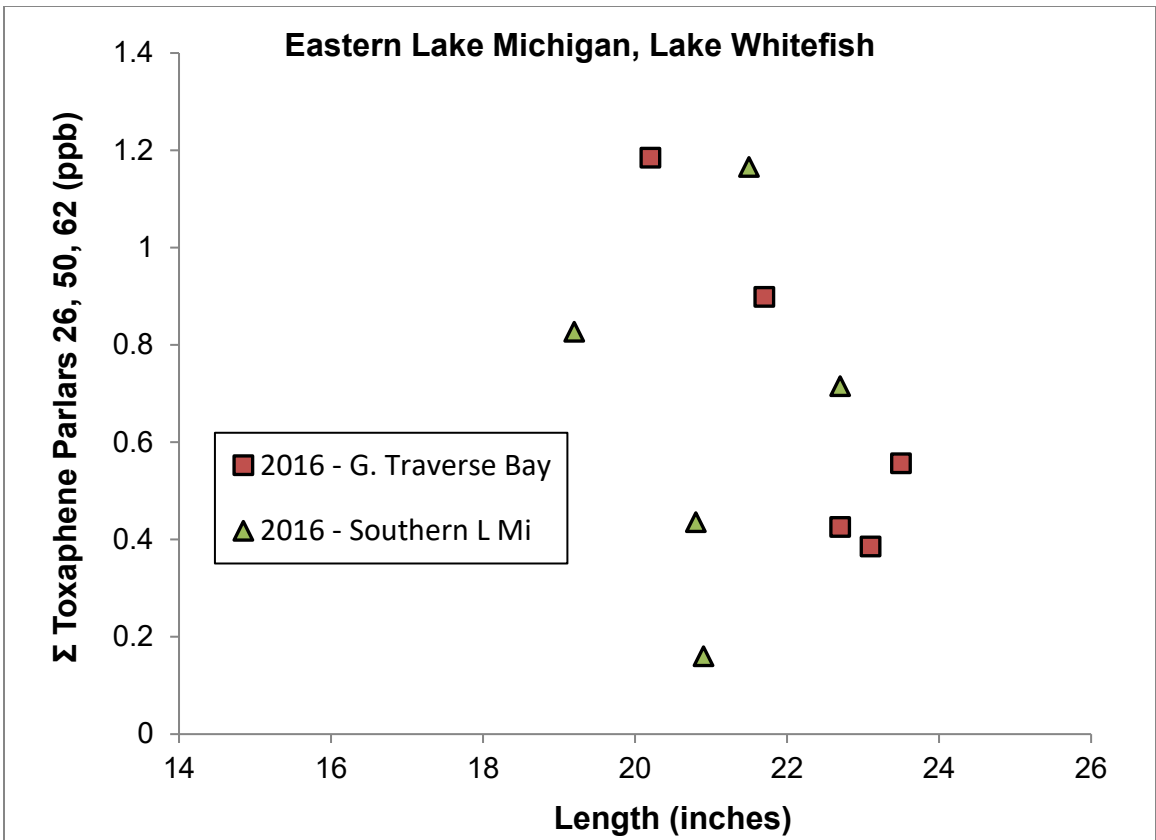
Recommendation: No one should eat more than 6 meals per year of lake whitefish from Lake Michigan due to PCBs and dioxins. Mercury would cause an advisory.

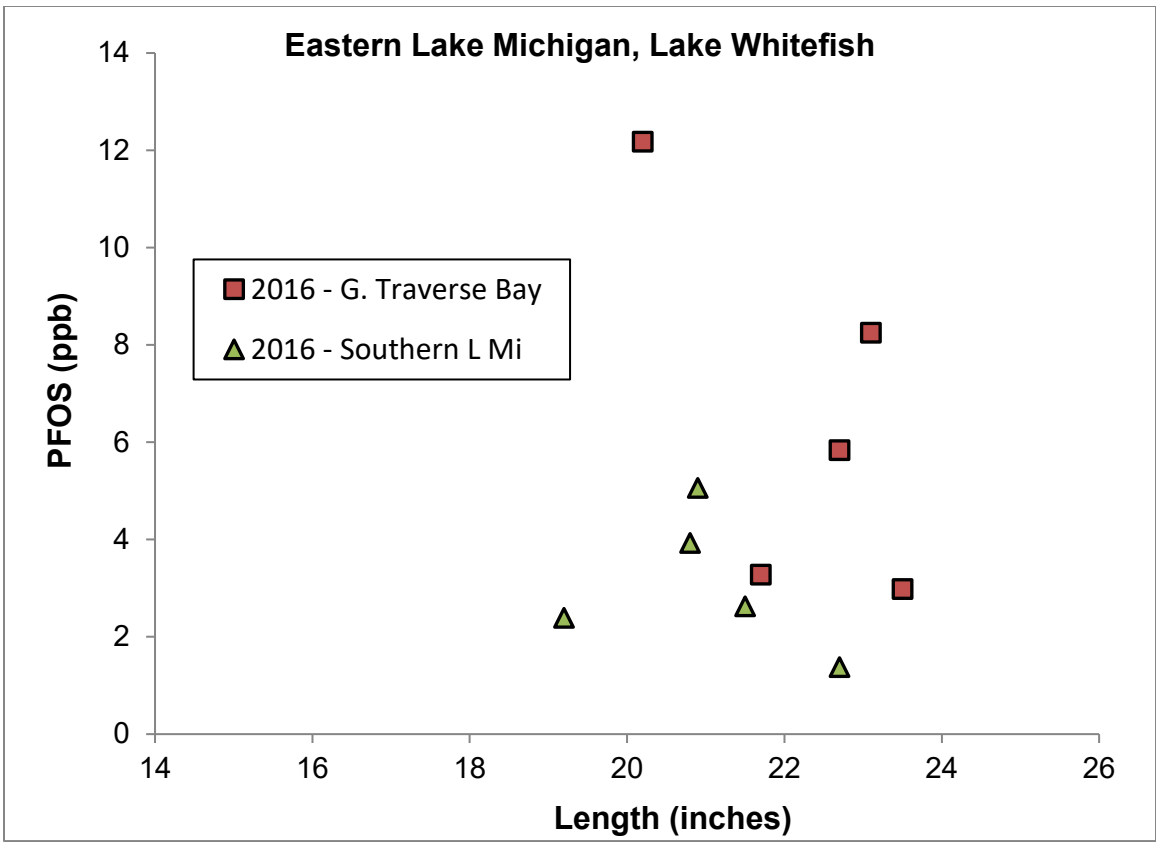
Note – this summary is based on samples collected from the eastern side of Lake Michigan (L. Traverse Bay, G. Traverse Bay, and southern Michigan waters of the lake). The previous recommendation was driven by results for samples collected in the 1990s from Green Bay, L. Bay De Noc, and Big Bay De Noc, areas impacted by significant legacy PCB contamination.

The recommendation is a conservative relaxation of the existing advice because EGLE contaminant trend data based on carp from Little Bay De Noc indicates little change in PCB concentrations since the early 1990s. Additional lake whitefish samples from northwest Lake Michigan may indicate the advice could be relaxed further.









Northern Pike

**Lake Michigan
Little Bay De Noc**

Hg Analysis:

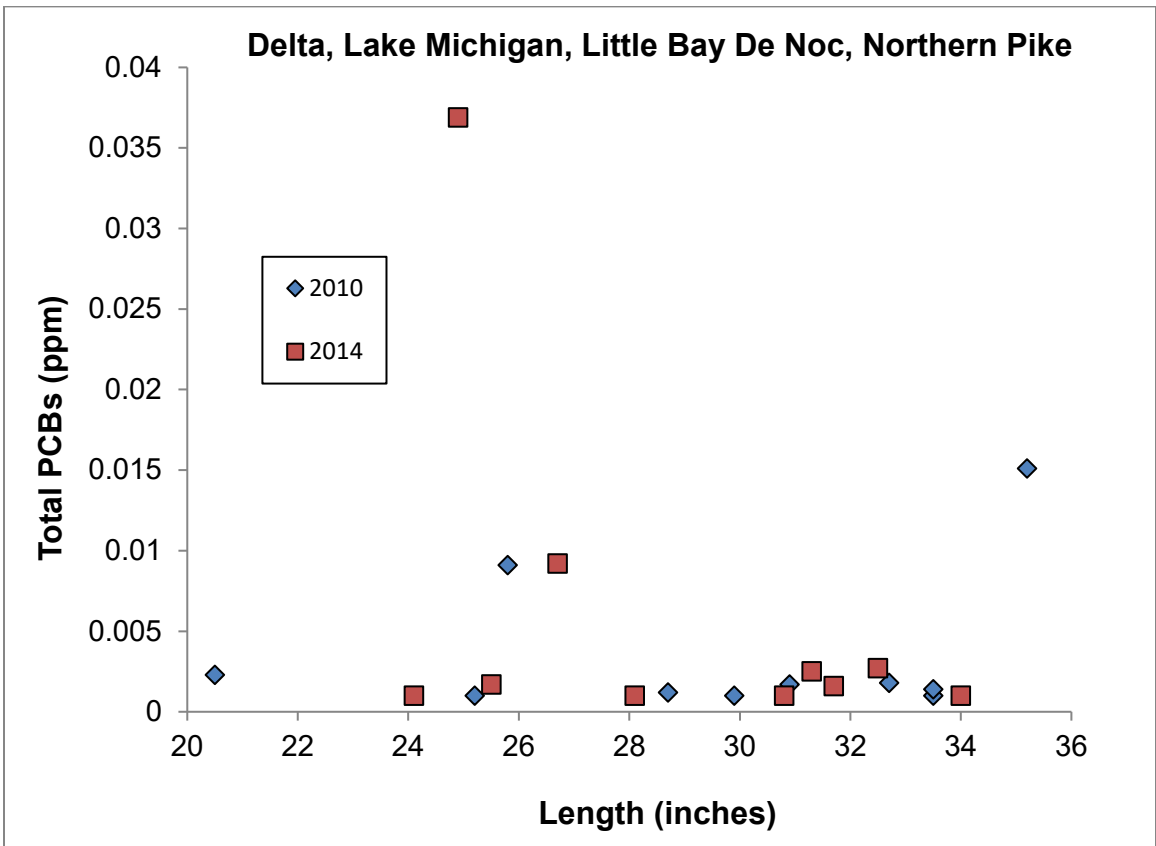
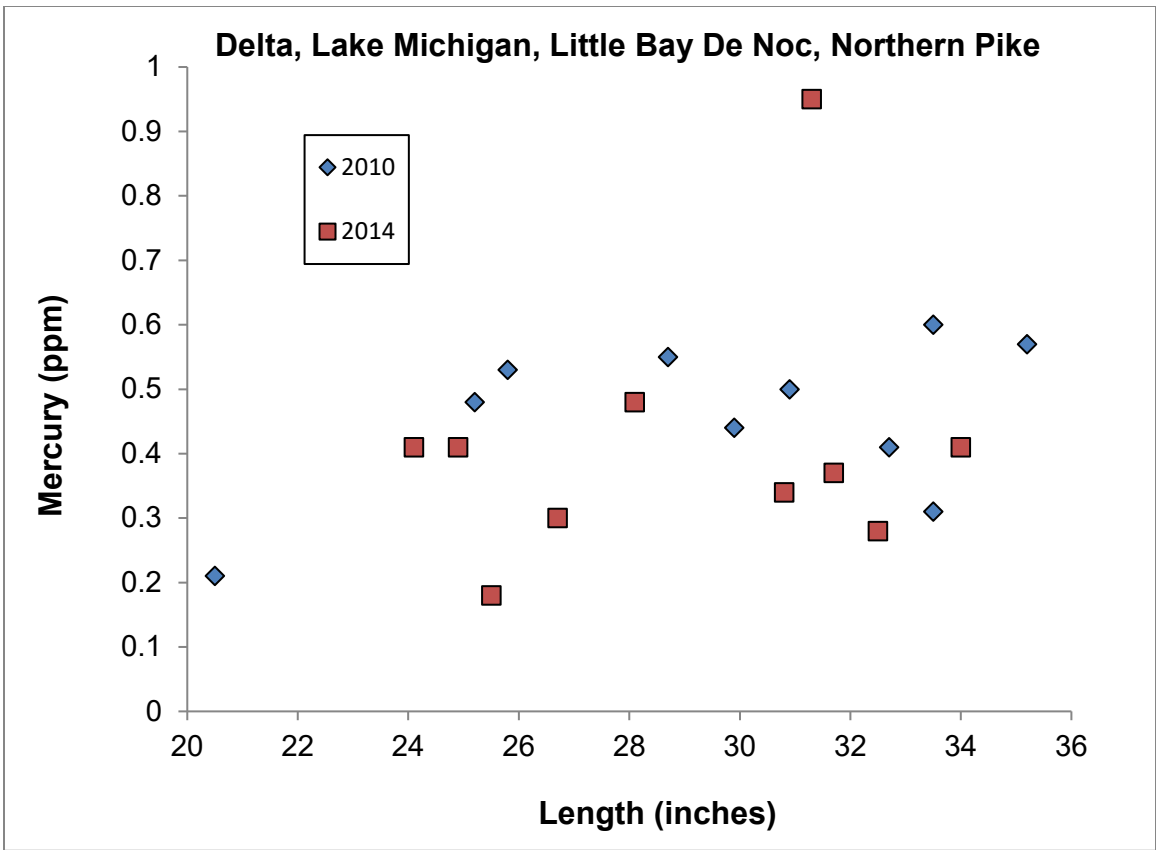
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
2010	2014	20	20.5	24	24.1	35.2	
Datasets available: 1987, 2010, 2014							
Chemical	Sample Size (Legal)	Mean		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	19	0.45		0.18	0.95	0.53	2
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.099	0.136					

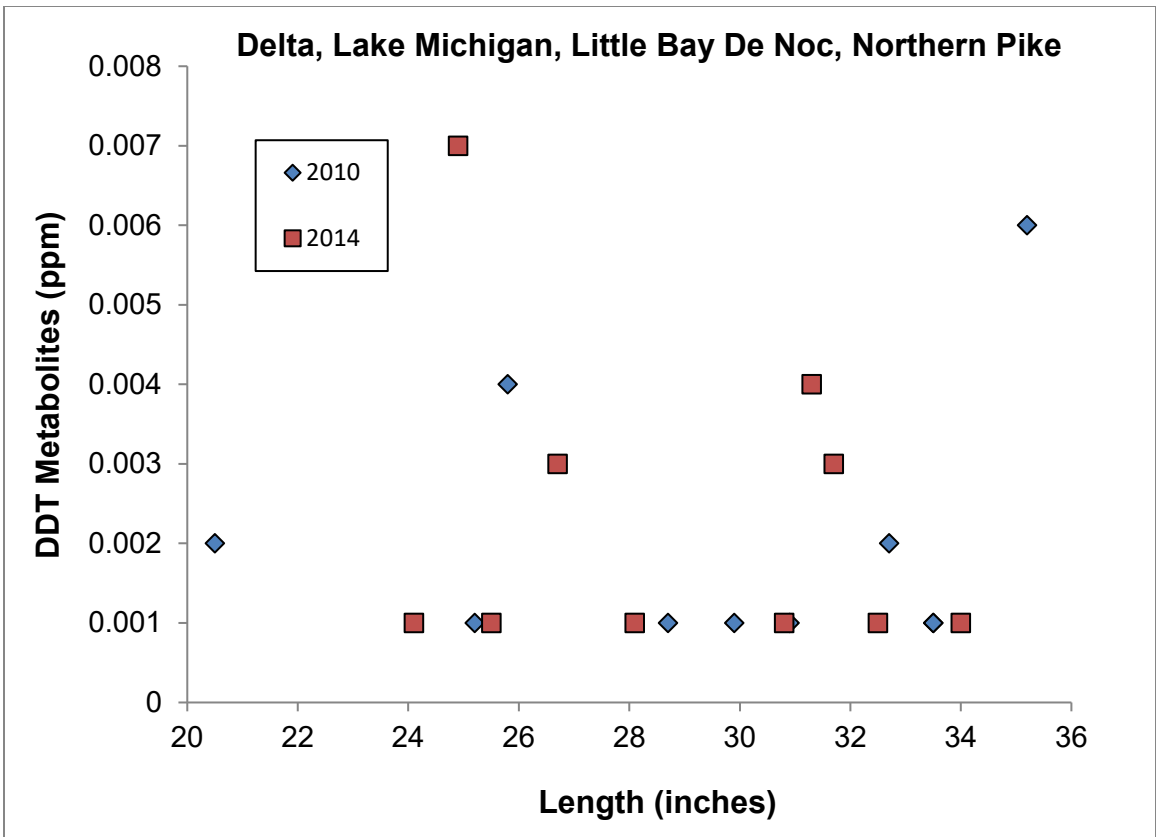
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
2010	2014	20	20.5	24	24.1	35.2	
Datasets available: 1987, 2010, 2014							
Chemical	Sample Size (Legal)	Mean		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	19	0.005		0.001	0.0369	0.009	16
DDT	19	0.002		0.001	0.007	0.003	16
Chlordane	19	ND		--	--	--	--
Toxaphene	19	ND		--	--	--	--
TEQ	0	--		--	--	--	--
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.036	0.023					
DDT	0.002	0.005					
Chlordane	0.007	0.007					
Toxaphene	0.020	0.020					
TEQ	--	--					
Final meal category based on UCL:							2

Existing Advisory: No one should eat more than 1 meal per month of Little Bay De Noc or Green Bay northern pike due to elevated concentrations of mercury.

Recommendation: No change is recommended. Additional sampling may indicate the advice could be relaxed.





Rainbow Smelt

Lake Michigan

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	2021	21*	3.3	NA	3.3	9.4
Datasets available: 1998, 2021						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	21	0.055	0.015	0.080	0.062	16
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	--	--				

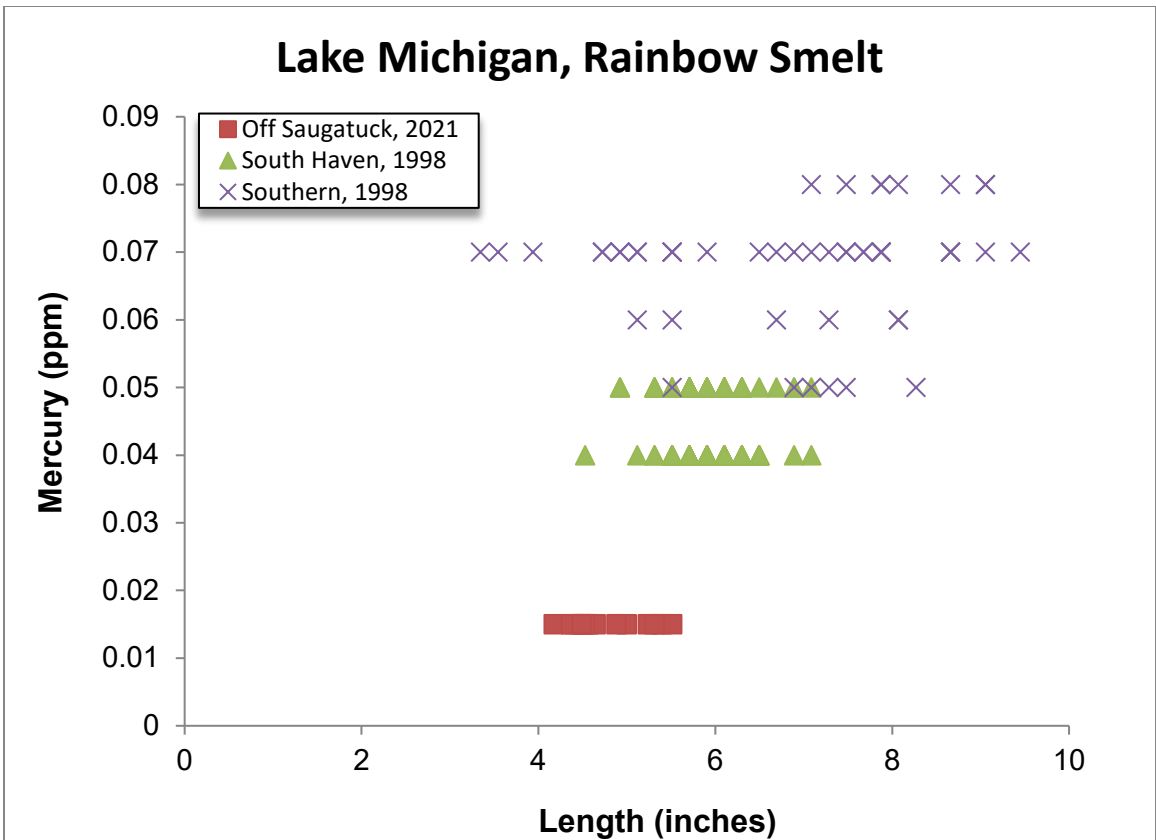
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1998	2021	21*	3.3	NA	3.3	9.4
Datasets available: 1998, 2021						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	21	0.164	0.003	0.242	0.190	1
DDT	21	0.093	<0.001	0.129	0.106	16
Chlordane	21	0.032	<0.001	0.051	0.037	16
Toxaphene	21	ND	--	--	--	--
PFOS	1	95.2 ppb	--	--	--	1
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	--	--	Final meal category based on mean PFOS: 1			

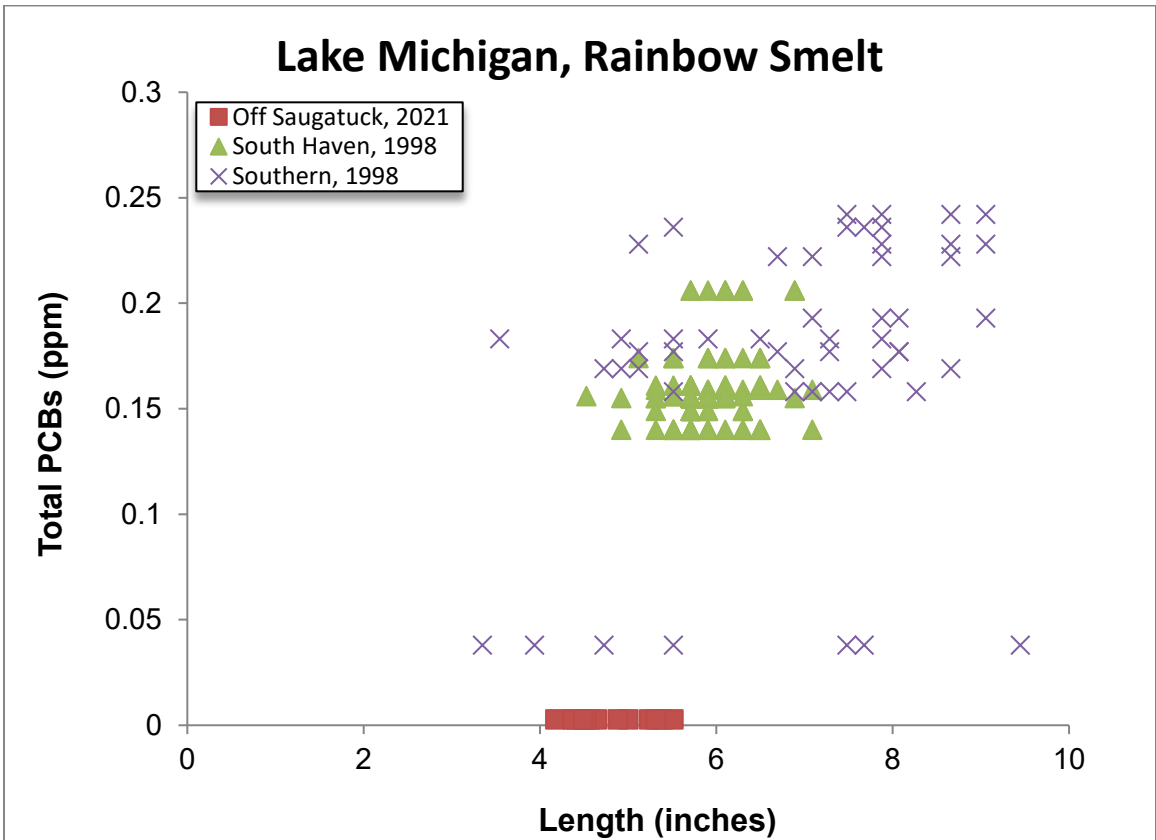
*Composite sample analyses of 166 fish. 20 composite samples in 1998 (151 fish) and 1 composite sample in 2021 (15 fish)

Existing MDHHS Advisory: No one should eat more than 2 meals per month of Lake Michigan smelt due to PCBs. The quality of this dataset is limited due to the age of the data. Based on the EGLE Fish Contaminant Monitoring Program, PCB concentrations ≥ 15 years old are expected to have declined to a concentration that allows a less restrictive meal category than determined by the standard evaluation method.

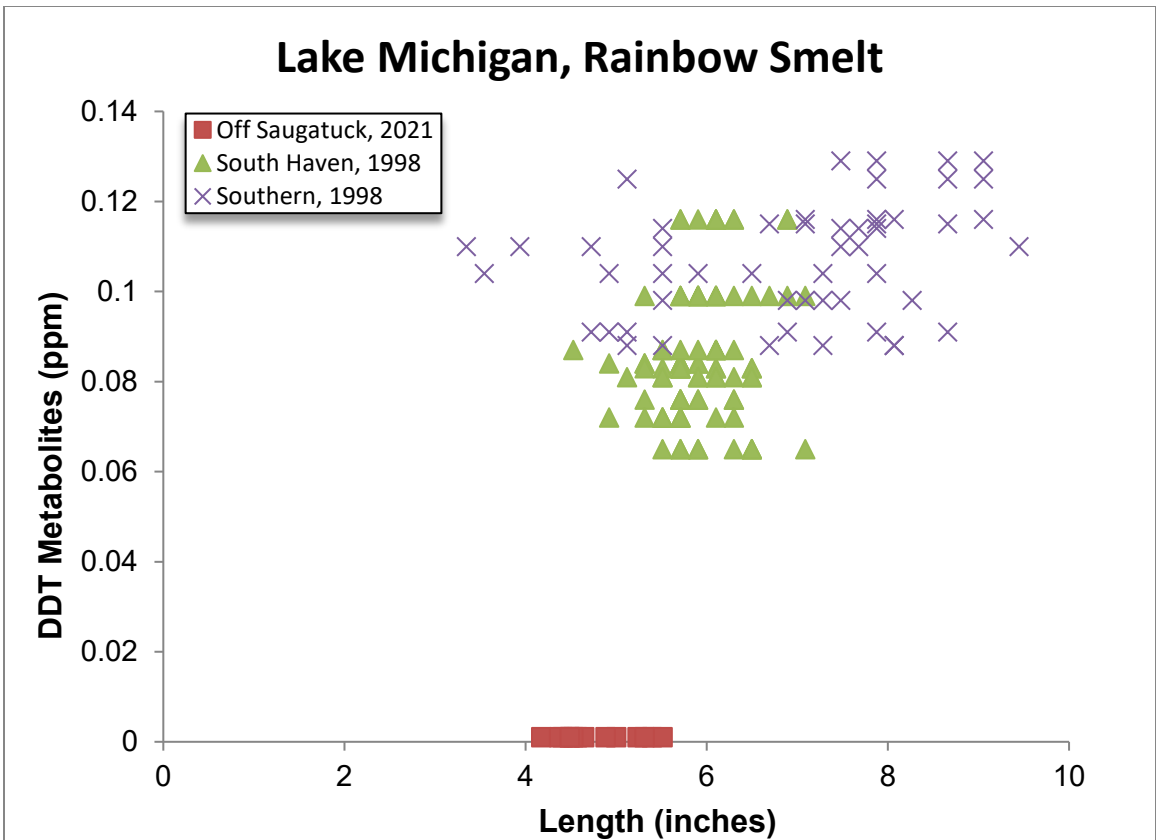
Recommendation: No one should eat more than 1 meal per month of Lake Michigan smelt due to PFOS. PCBs cause less restrictive advice. No change to the PCB advice is recommended given the limited sampling locations analyzed in 2021. Additional data are needed to relax the PCB advisory for Lake Michigan smelt.



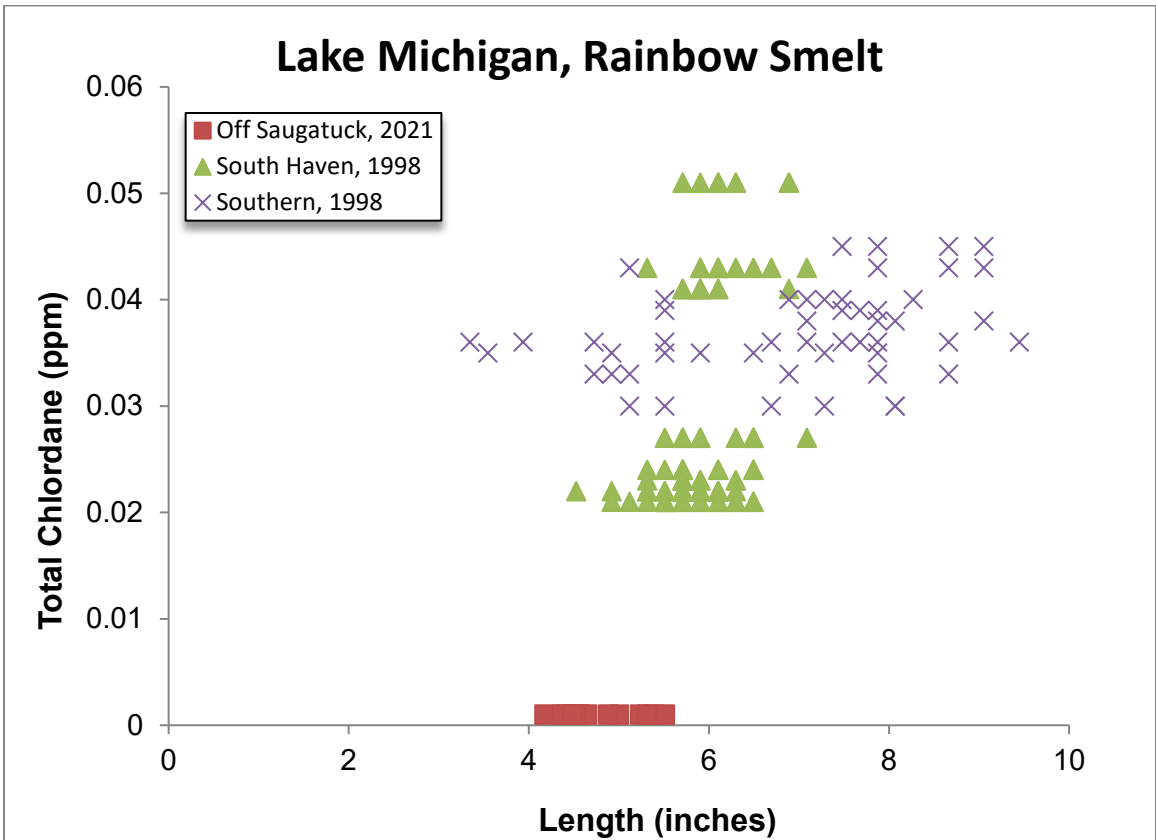
Note: Includes individual data points for each fish used in the composite samples.



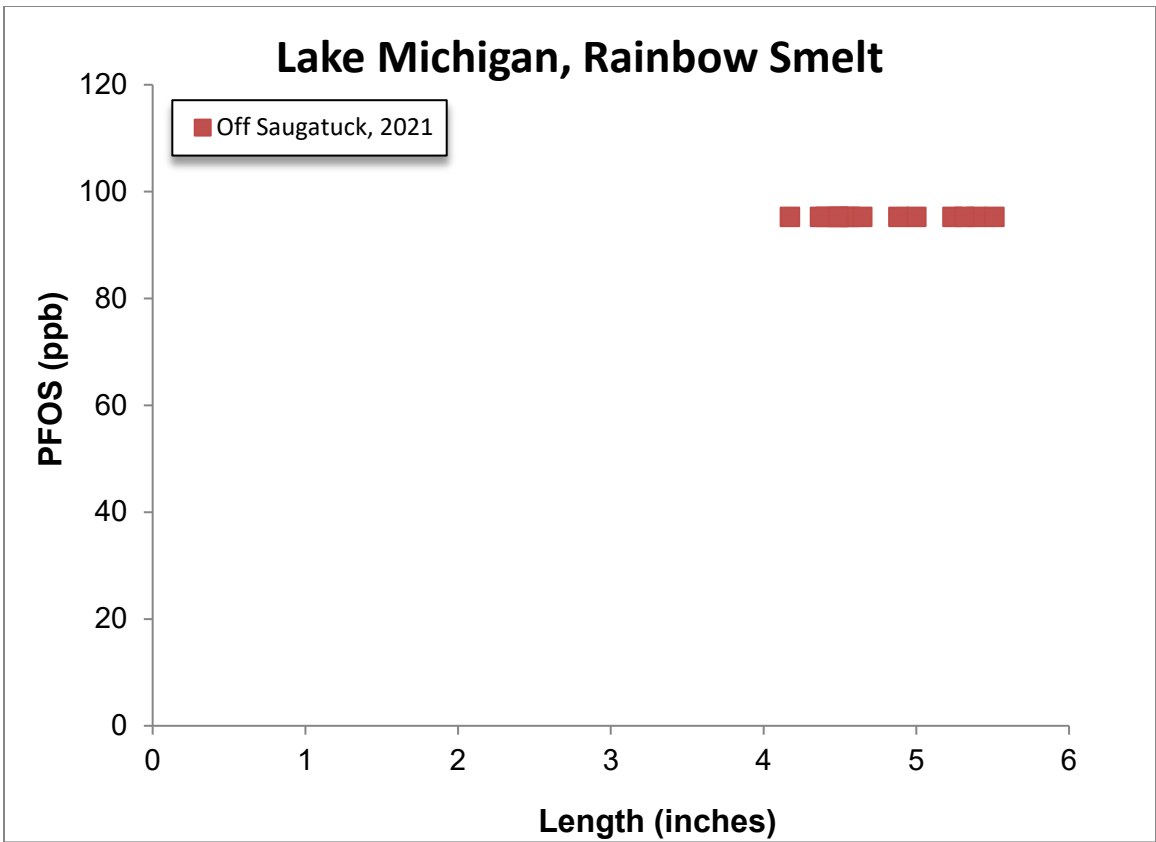
Note: Includes individual data points for each fish used in the composite samples.



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Note: Includes individual data points for each fish used in the composite sample.

**Rainbow Trout
(Steelhead)**

Lake Michigan

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	2017	29	19.7	10	19.7	32.7
Datasets available: 1985, '86, '87, '92, '94, 2004, 2017						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	29	0.15	0.05	0.40	0.18	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.486	0.624				

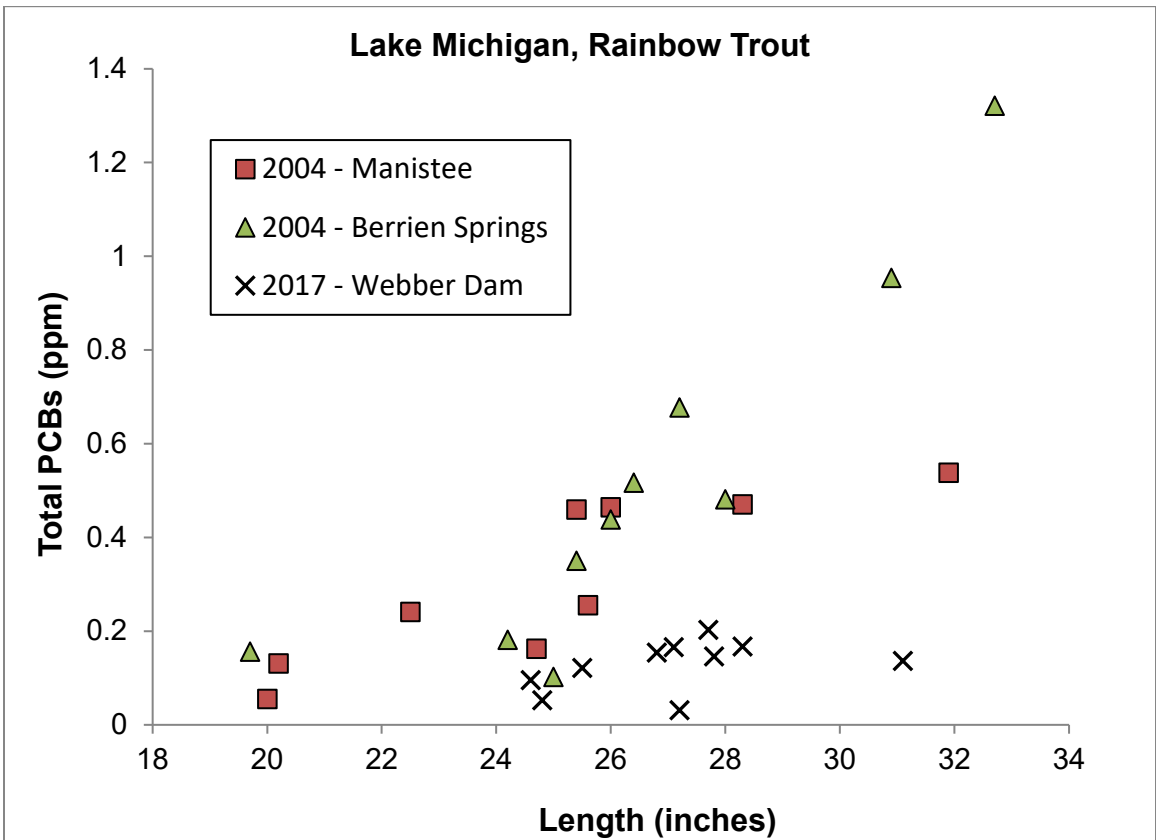
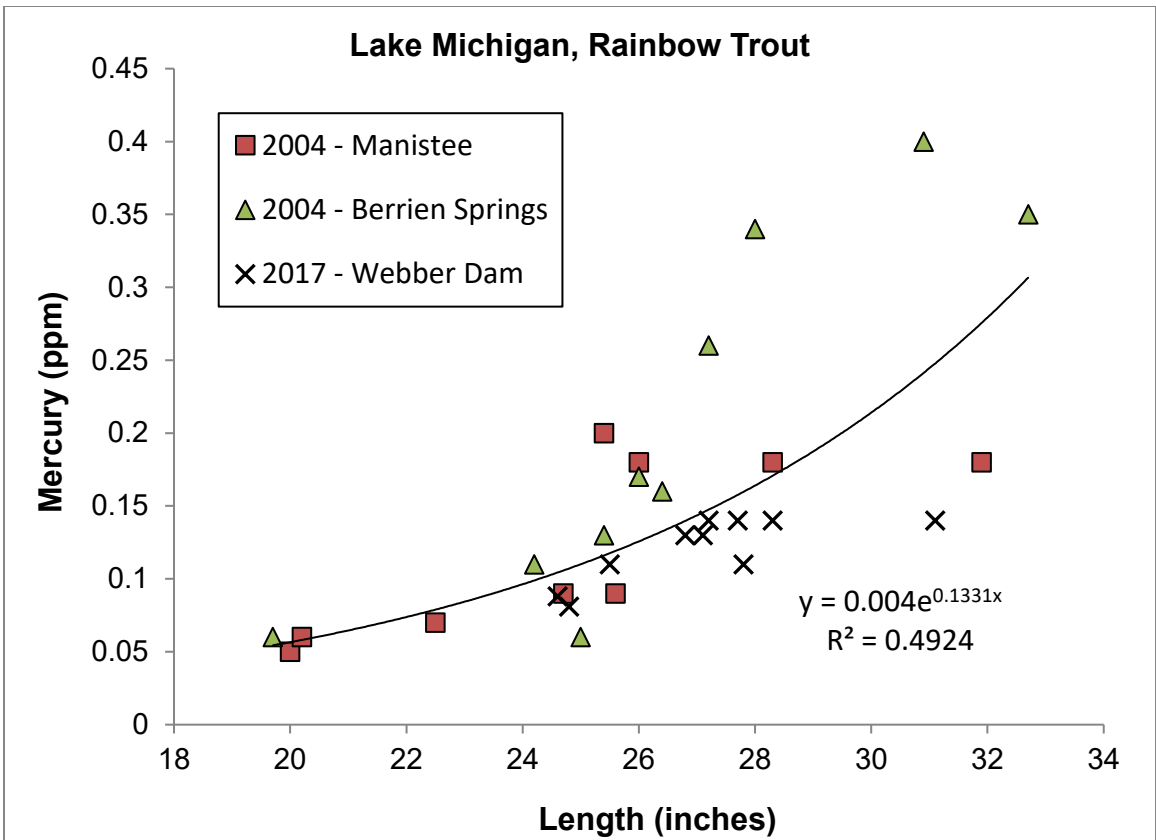
Organics Analysis:

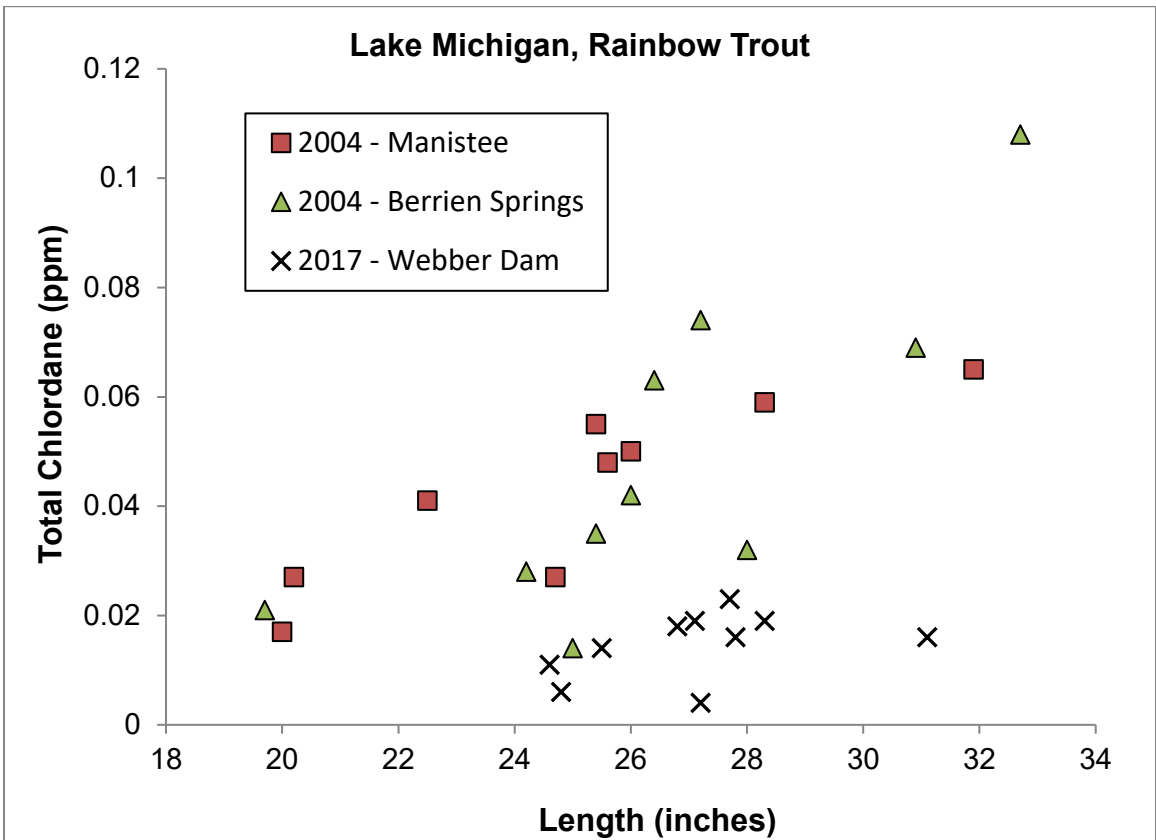
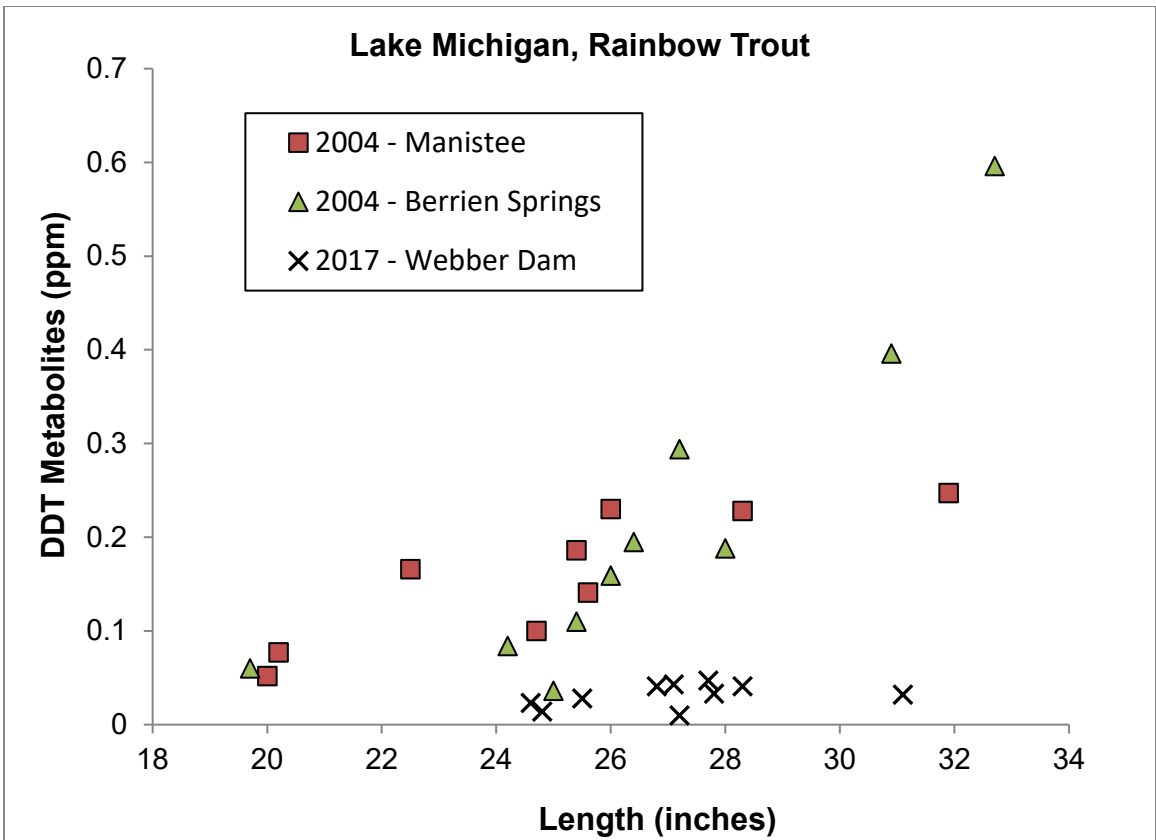
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2004	2017	29	19.7	10	19.7	32.7
Datasets available: 1985, '86, '87, '92, '94, 2004, 2017						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	29	0.32	0.03	1.3	0.4	0.5
DDT	29	0.13	0.01	0.6	0.2	8
Chlordane	29	0.04	0.004	0.108	0.04	--
Toxaphene	29	ND	< 0.05	< 0.05	--	--
PFOS	10	7 ppb	< 0.25 ppb	11 ppb	9.4 ppb	12
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.342	0.251				
DDT	0.255	0.087				
Chlordane	0.212	0.094				
Toxaphene	--	--				
PFOS	0.109	0.019				
Final meal category based on UCL:						0.5

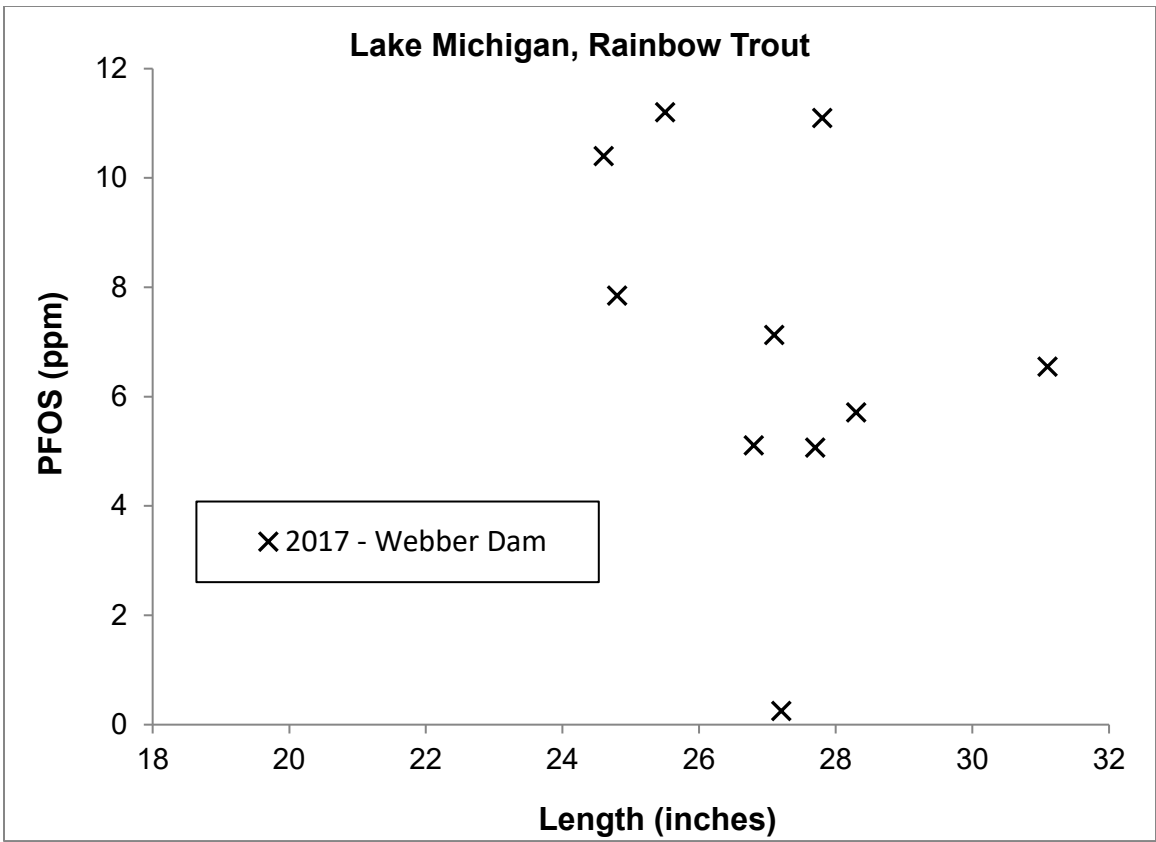
Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
20	0.06	16
22	0.07	16
24	0.1	8
26	0.13	8
28	0.17	4
30	0.22	4
32	0.28	2
34	0.37	2
<i>Shaded area denotes extrapolated estimates</i>		

Existing MDHHS Advisory: No one should eat more than 2 meals per month of Lake Michigan rainbow trout smaller than 20 inches or more than 6 meals per year of rainbow trout between 20 and 26 inches due to elevated concentrations of PCBs. Sensitive populations should not eat rainbow trout greater than 26 inches. Healthy adults should limit consumption of rainbow trout greater than 26 inches to no more than 1 or 2 meals per year of rainbow trout due to elevated concentrations of PCBs. Mercury and DDT would cause advisories.

Recommendation: No change to the advisory is recommended. An additional year of data is needed to relax the advisory. PFOS should be added to the list of contaminants causing an advisory.







Rock Bass

**Lake Michigan
Little Bay De Noc**

Hg Analysis:

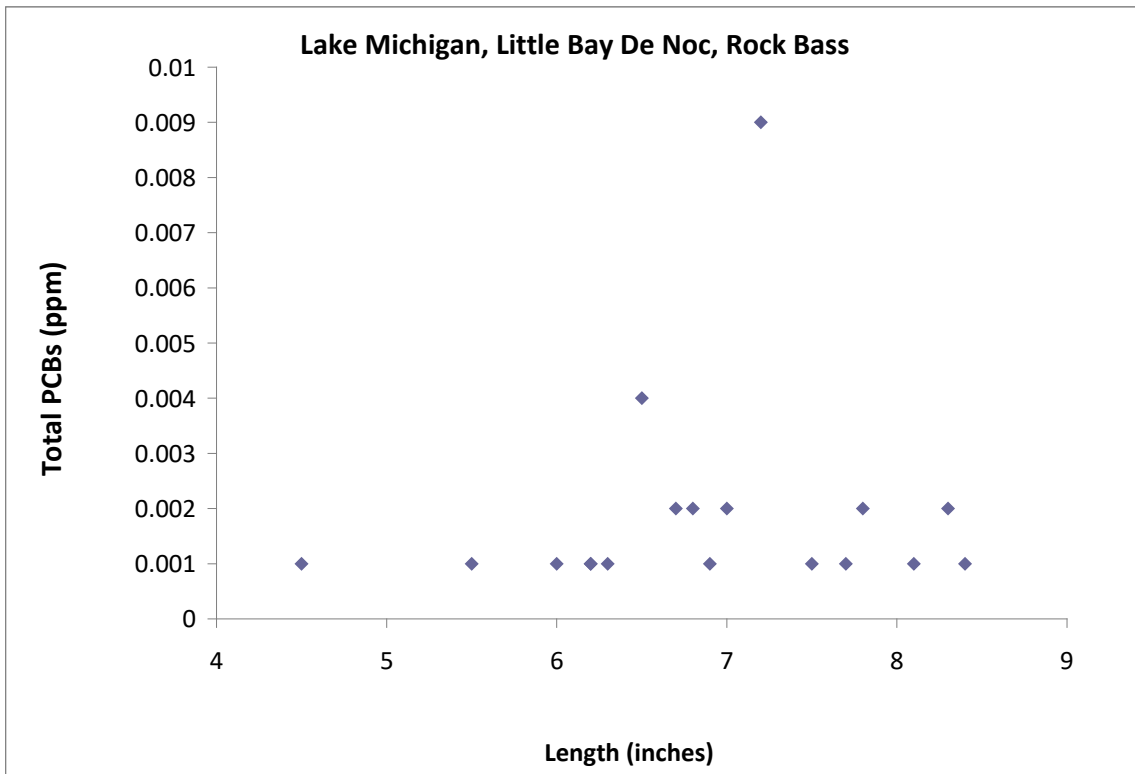
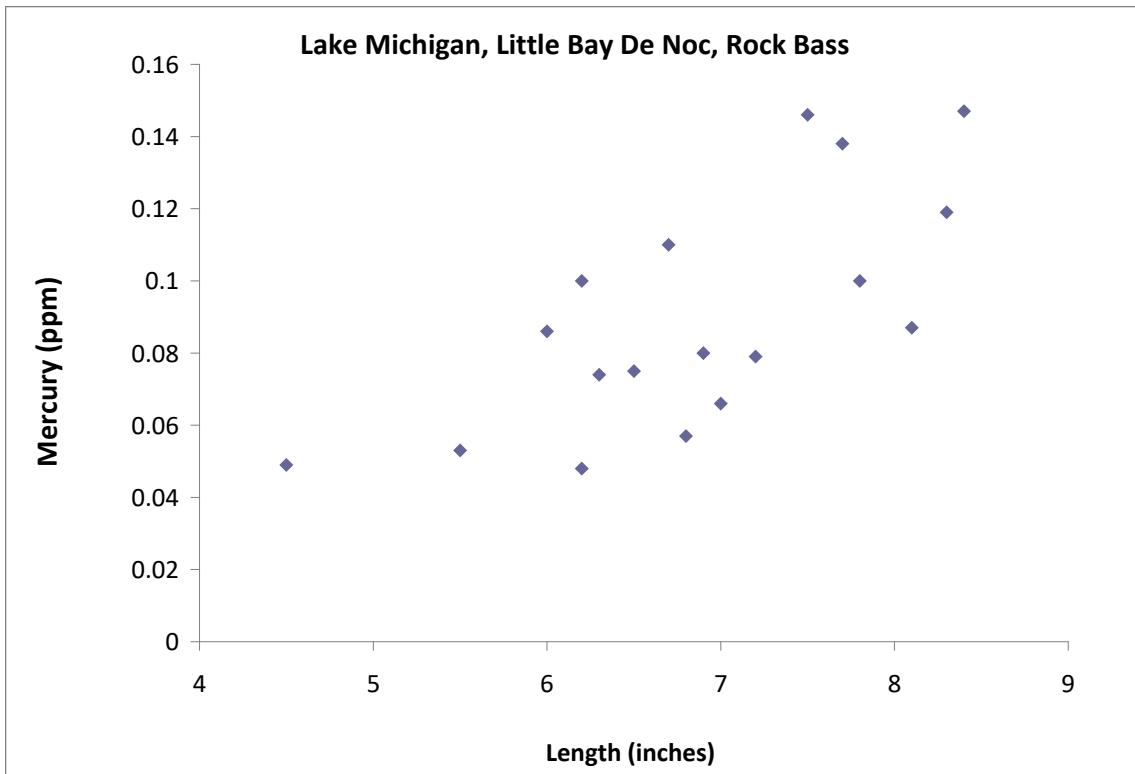
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
2004	2008	18	4.5	na	4.5	8.4	
Datasets available: 2004, 2008							
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL		
Mercury	18	0.090	0.048	0.147	0.110	8	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.495	0.529					

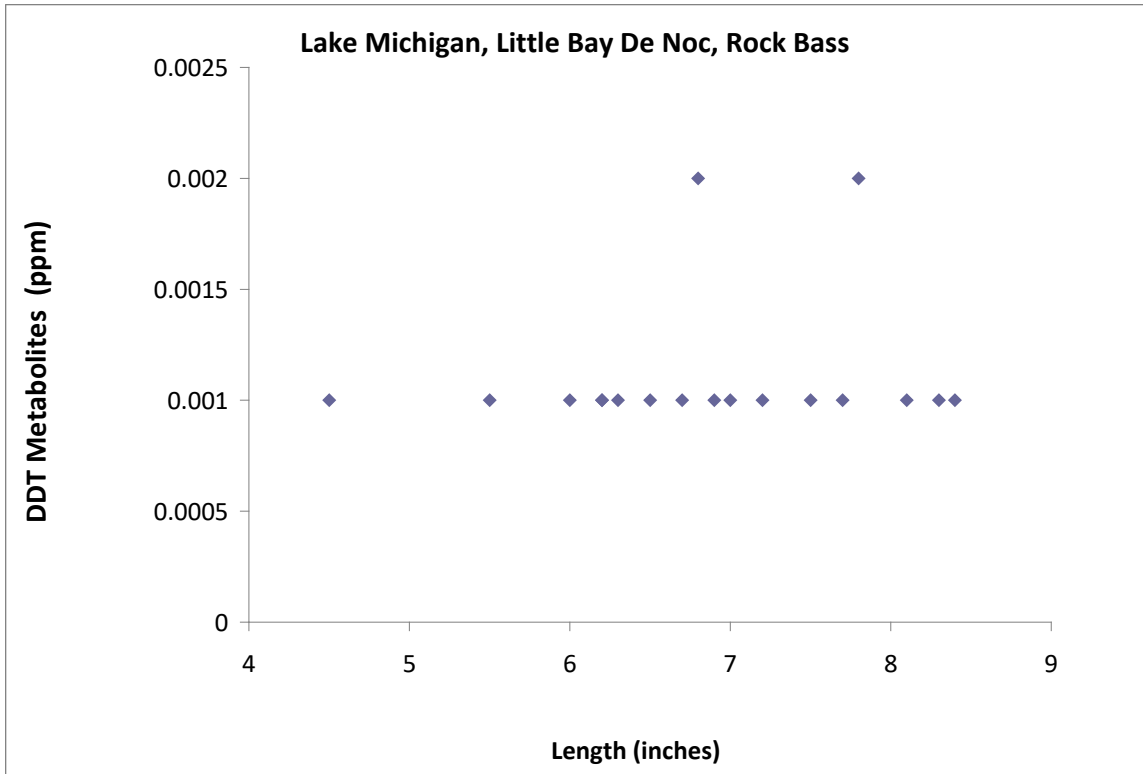
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
2004	2008	18	4.5	na	4.5	8.4	
Datasets available: 2004, 2008							
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL		
PCB	18	0.002	0.001	0.009	0.000	16	
DDT	18	0.001	0.001	0.002	0.000	16	
Chlordane	18	ND	--	--	--	--	
Toxaphene	18	ND	--	--	--	--	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.013	0.029					
DDT	0.024	0.024					
Chlordane	--	--					
Toxaphene	--	--					
Final meal category based on UCL:							8

Existing Advisory: There are currently no consumption advisories for Lake Michigan rock bass.

Recommendation: No one should eat more than 8 meals per month of rock bass from Little Bay De Noc or Green Bay due to elevated concentrations of mercury.





Smallmouth Bass

**Lake Michigan
Incl. Green Bay, L. Bay De Noc, and L. Traverse Bay**

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	2013	72	9.6	14	13.5	20
Datasets available: 1992, 2004, 2005, 2008, 2012, 2013						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	56	0.39	0.09	0.95	0.44	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.597	0.694				

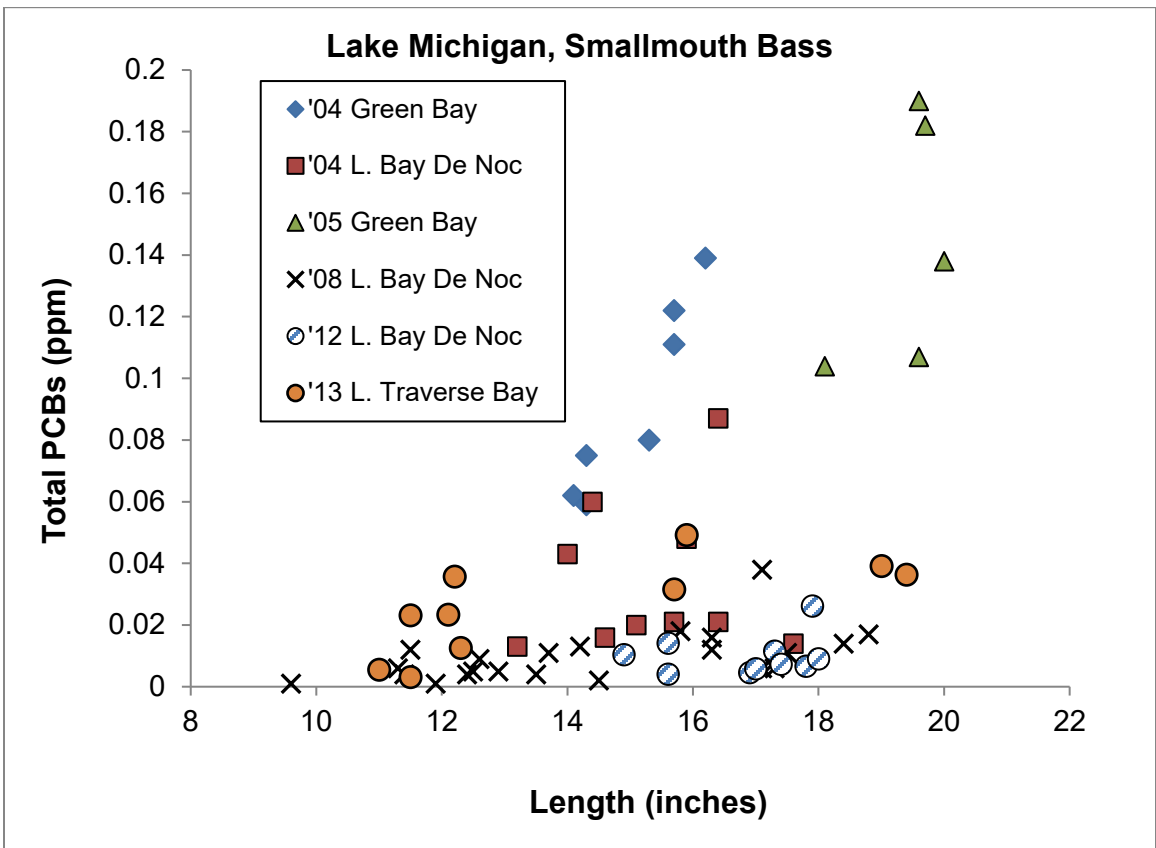
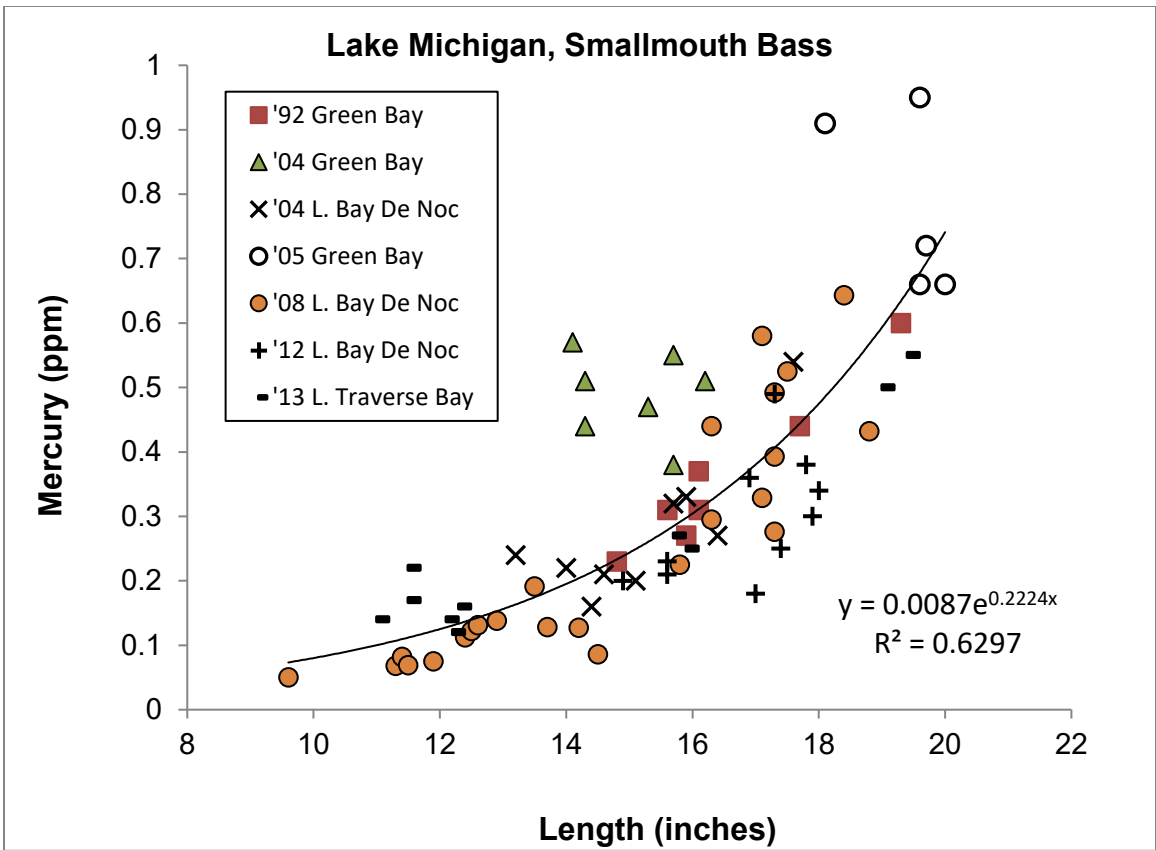
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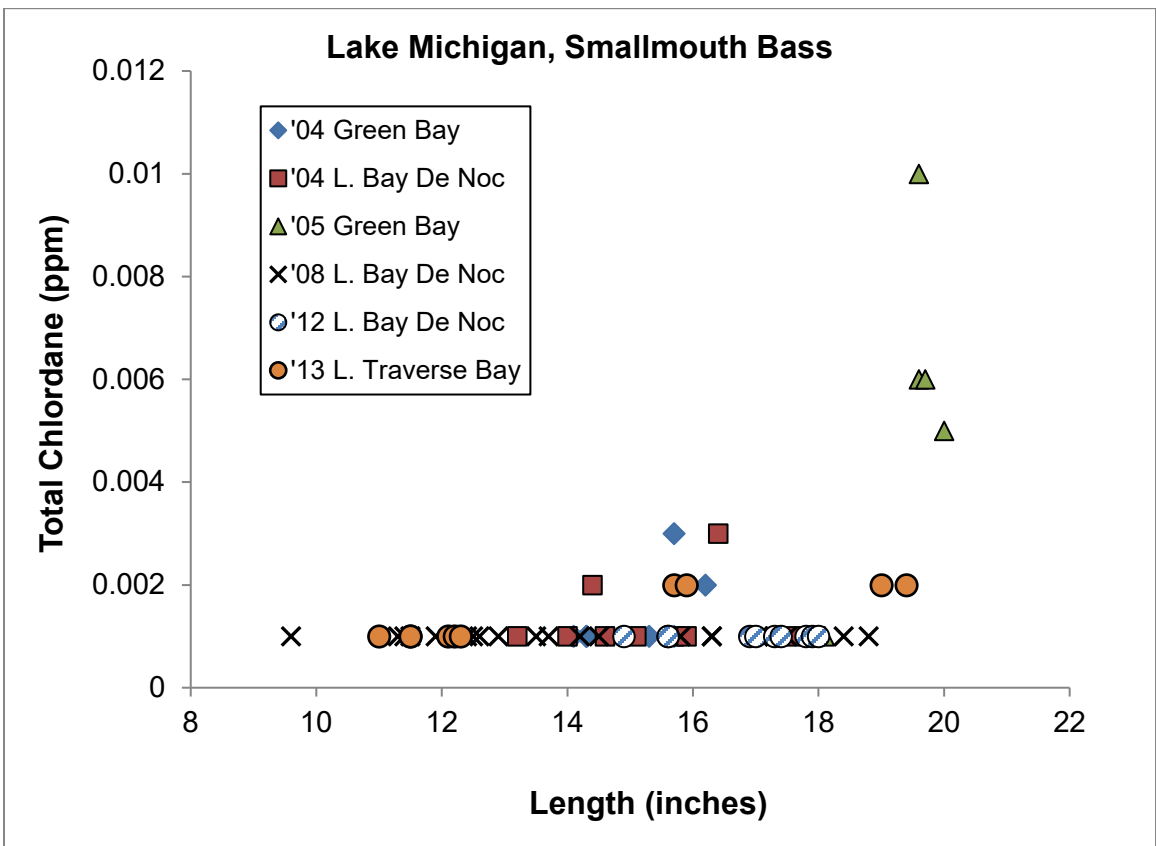
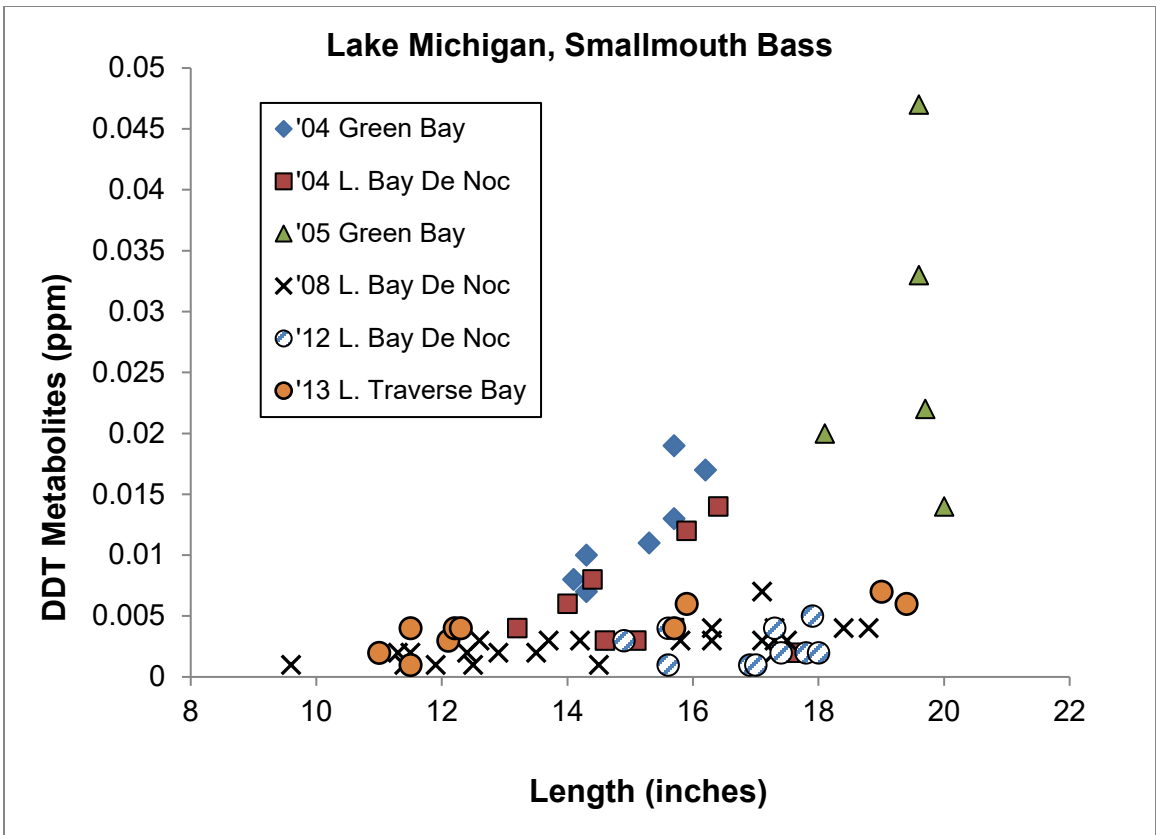
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2004	2013	66	9.6	14		20
Datasets available: 1992, 2004, 2005, 2008, 2012, 2013						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	50	0.04	0.002	0.19	0.06	2
DDT	49	0.008	0.001	0.05	0.01	16
Chlordane	49	0.002	0.001	0.01	0.002	--
Toxaphene	49	ND	--	--	--	--
TEQ	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.179	0.218				
DDT	0.203	0.237				
Chlordane	0.200	0.225				
Toxaphene	--	--				
TEQ	--	--				
Final meal category based on UCL:						2

Existing Advisory: No one should eat more than 2 meals per month of smallmouth or largemouth bass from Green Bay or Little Bay De Noc smaller than 18 inches or more than 1 meal per month of smallmouth or largemouth bass larger than 18 inches due to elevated concentrations of mercury and PCBs.

Recommendation: No one should eat more than 2 meals per month of smallmouth or largemouth bass from Lake Michigan, Green Bay, or Little Bay De Noc smaller than 18 inches due to mercury and PCBs or more than 1 meal per month of smallmouth or largemouth bass larger than 18 inches due to elevated concentrations of mercury. The statewide advice for largemouth and smallmouth bass is identical.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
12	0.13	8
14	0.2	4
16	0.31	2
18	0.48	2
20	0.74	1
22	1.16	0.5
24	1.81	0.5
<i>Shaded area denotes extrapolated estimates</i>		





Smallmouth Bass

**Lake Michigan (Northeast)
L. Traverse & Grand Traverse Bays**

**Emmet &
Grand Traverse**

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	2015	20	11	14	13.9	19.4
Datasets available: 2013, 2015						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	12	0.37	0.25	0.73	0.47	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.795	0.811				

Organics Analysis:

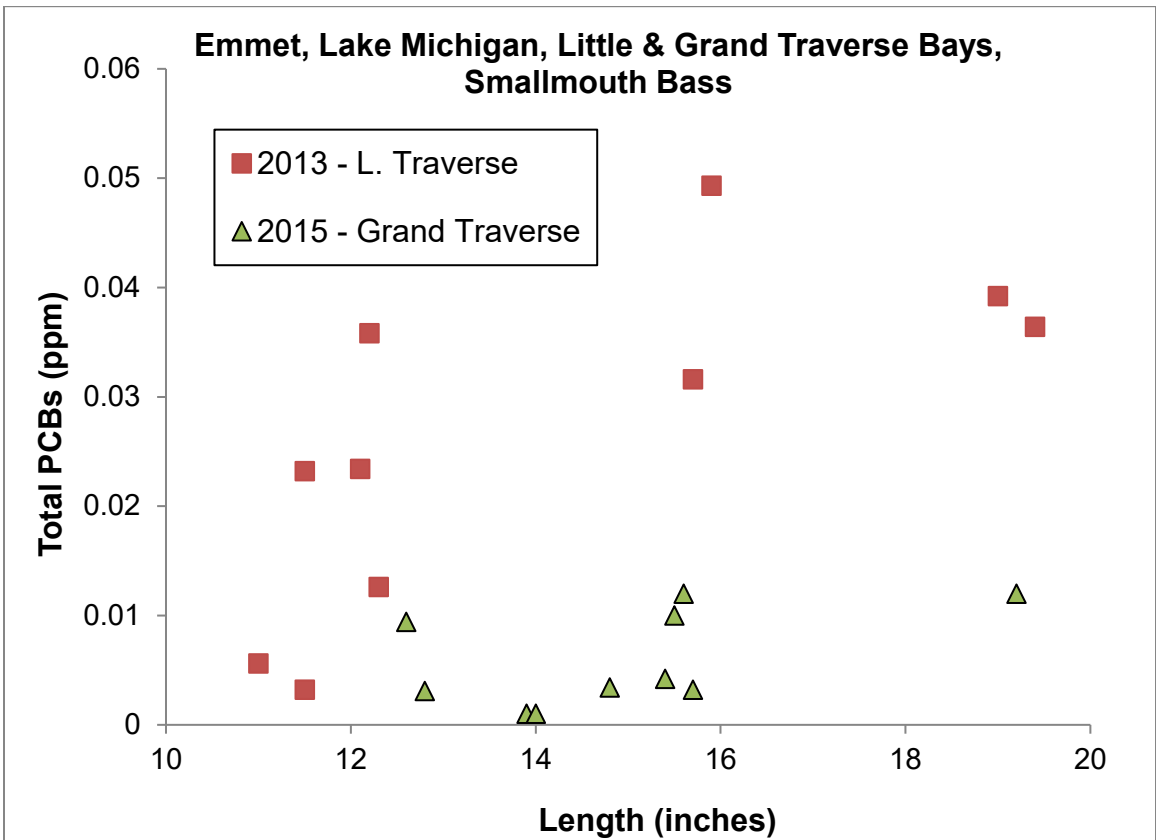
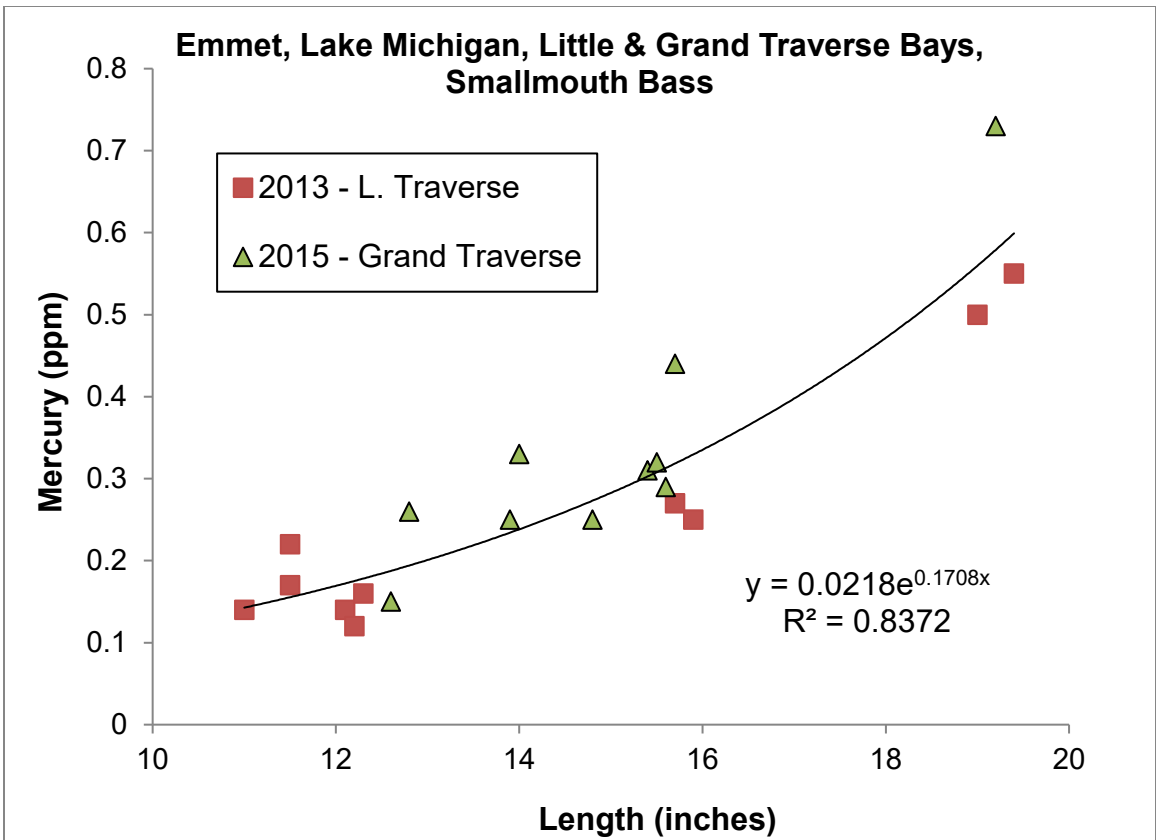
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2013	2015	20	11	14	13.9	19.4
Datasets available: 2013, 2015						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	12	0.02	0.001	0.049	0.028	8
DDT	12	0.005	0.002	0.009	0.006	16
Chlordane	12	0.002	0.001	0.002	0.002	16
Toxaphene	12	ND	--	--	--	--
TEQ	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.123	0.081				
DDT	0.434	0.420				
Chlordane	0.607	0.607				
Toxaphene	--	--				
TEQ	--	--				
Final meal category based on UCL:						2

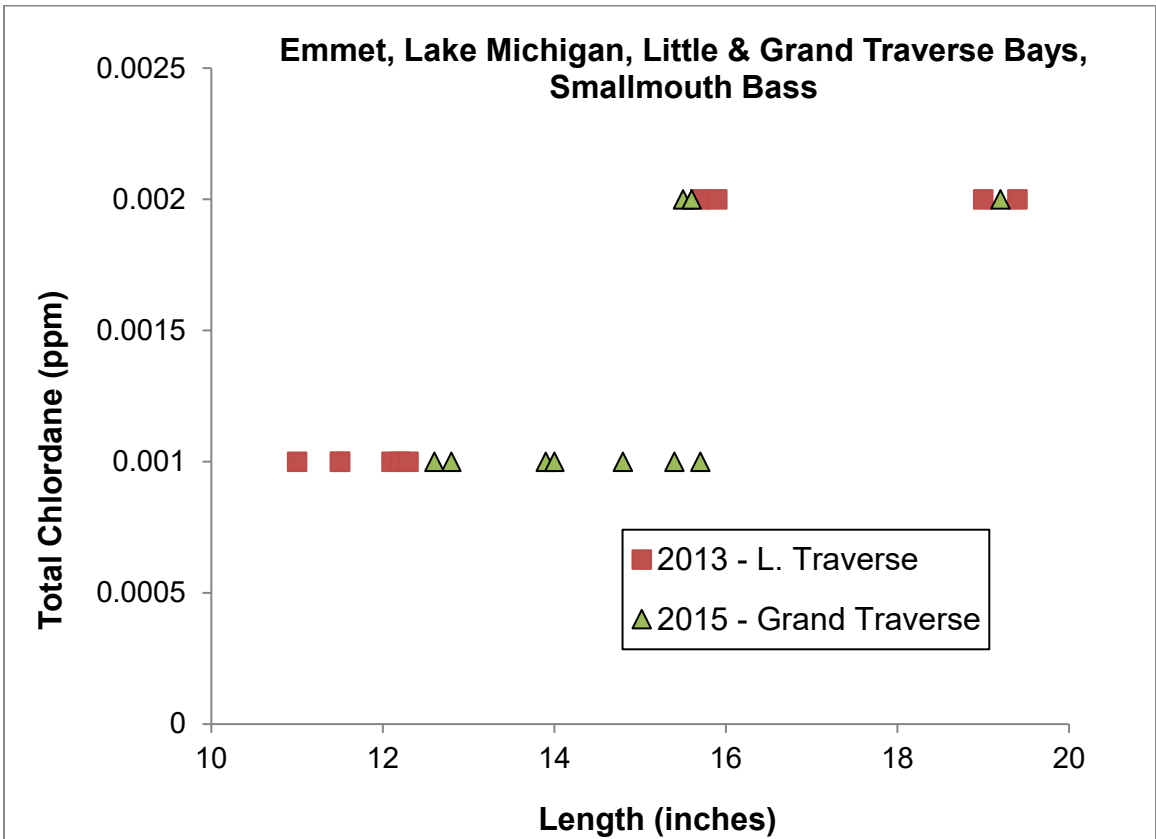
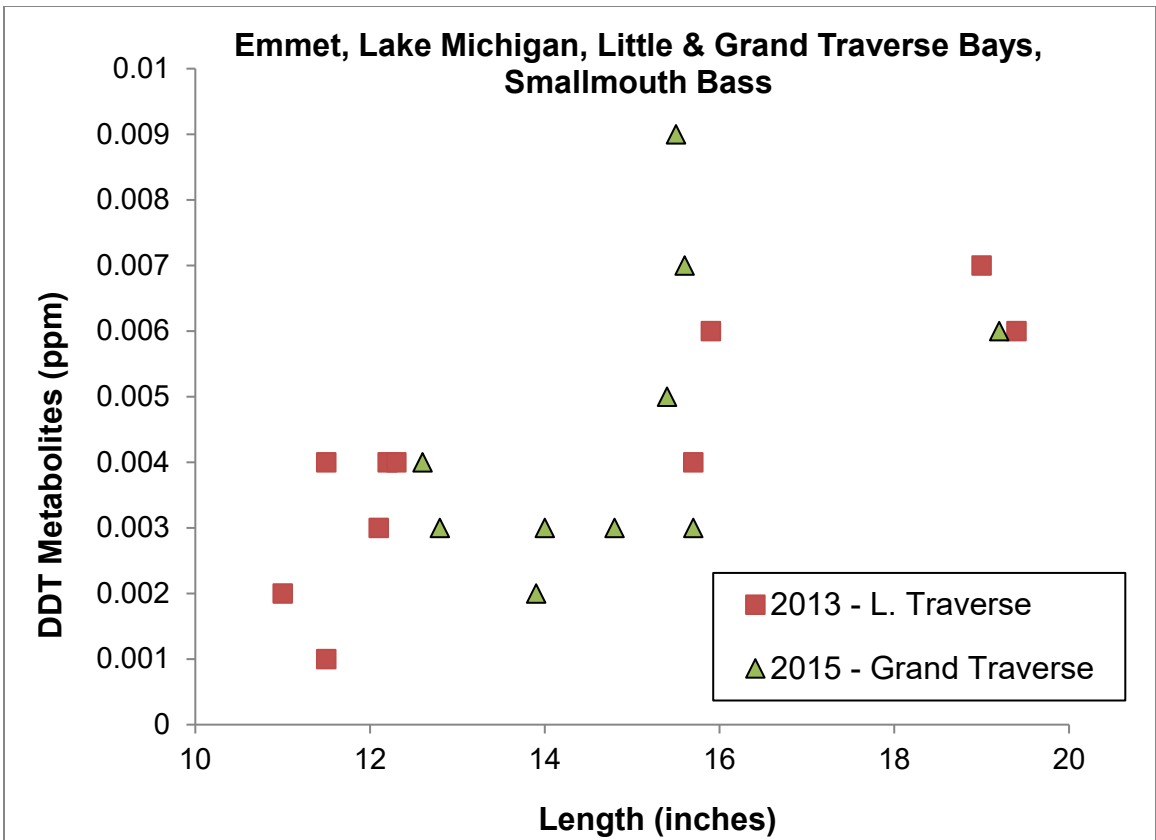
Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
12	0.17	4
14	0.24	4
16	0.34	2
18	0.47	2
20	0.66	1
22	0.93	1
24	1.31	0.5
<i>Shaded area denotes extrapolated estimates</i>		

Existing MDHHS Advisory: No one should eat more than 2 meals per month of smallmouth or largemouth bass from Lake Michigan, Green Bay, or Little Bay De Noc smaller than 18 inches due to mercury and PCBs or more than 1 meal per month of smallmouth or largemouth bass larger than 18 inches due to elevated concentrations of mercury.

Recommendation: No one should eat more than 2 meals per month of smallmouth or largemouth bass from Lake Michigan, including Little or Grand Traverse Bays, smaller than 18 inches or more than 1 meal per month of bass larger than 18 inches due to mercury.

Note: With the additional data from the east side of Lake Michigan it appears there may be a difference in contaminant burdens in bass as compared with those from Little Bay De Noc/Green Bay. Consider providing separate advice for eastern and western shores of the lake for species such as bass that have fairly high site fidelity.





Splake

**Lake Michigan
Green Bay**

**Delta & Menominee
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
1992	1993	7	13.8	15	15.7	25.2
Datasets available: 1992, 1993						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	6	0.14	0.08	0.23	0.20	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.325	0.340				

Organics Analysis:

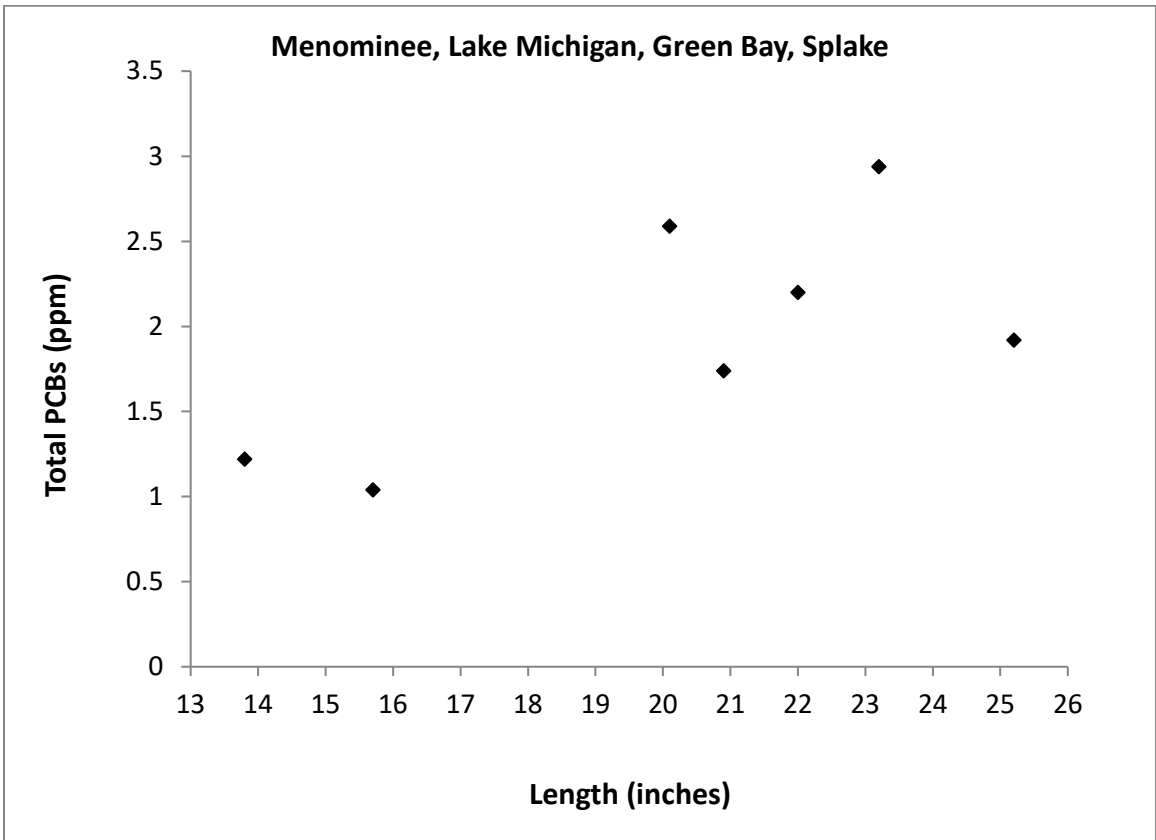
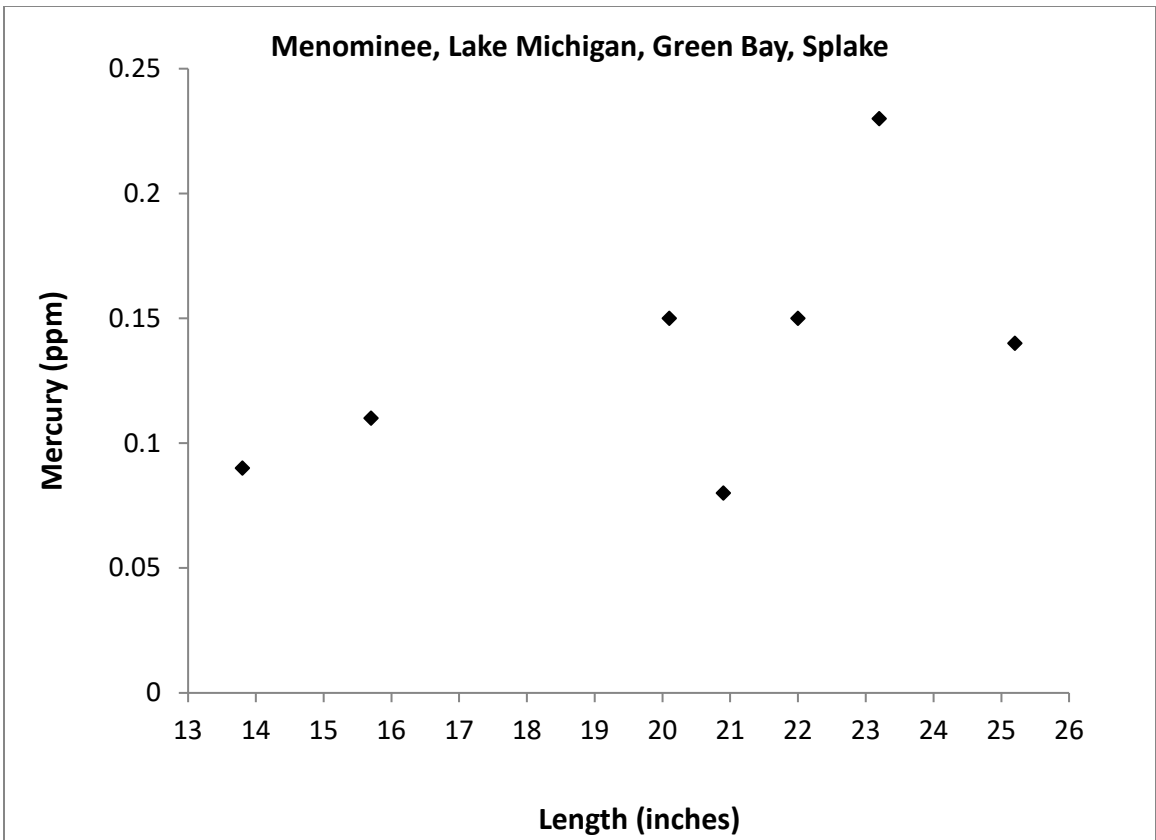
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1992	1993	7	13.8	15	15.7	25.2
Datasets available: 1992, 1993						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	6	2.07	1.04	2.94	2.77	0
DDT	6	0.50	0.25	0.78	0.70	2
Chlordane	6	0.19	0.08	0.26	0.26	16
Toxaphene	6	0.16	0.05	0.25	0.26	1
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.495	0.581				
DDT	0.748	0.856				
Chlordane	0.425	0.422				
Toxaphene	0.663	0.623				
Final meal category based on UCL:						0

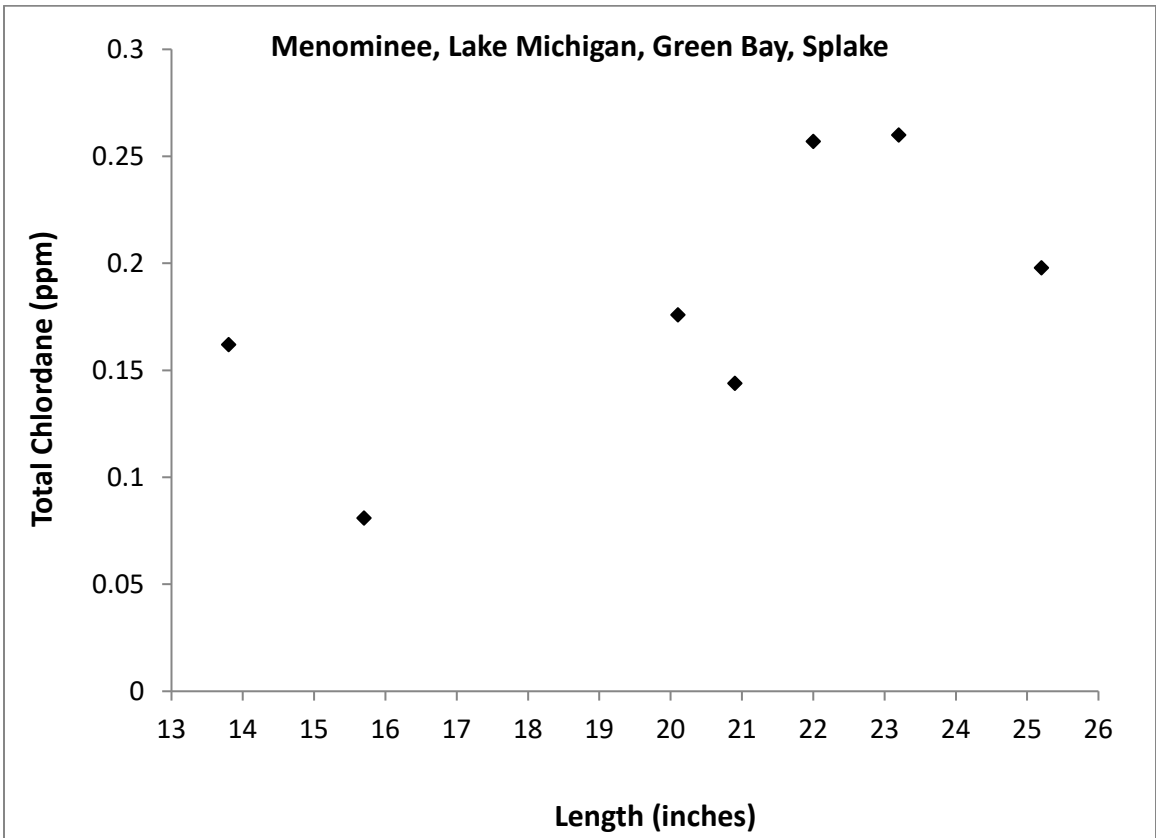
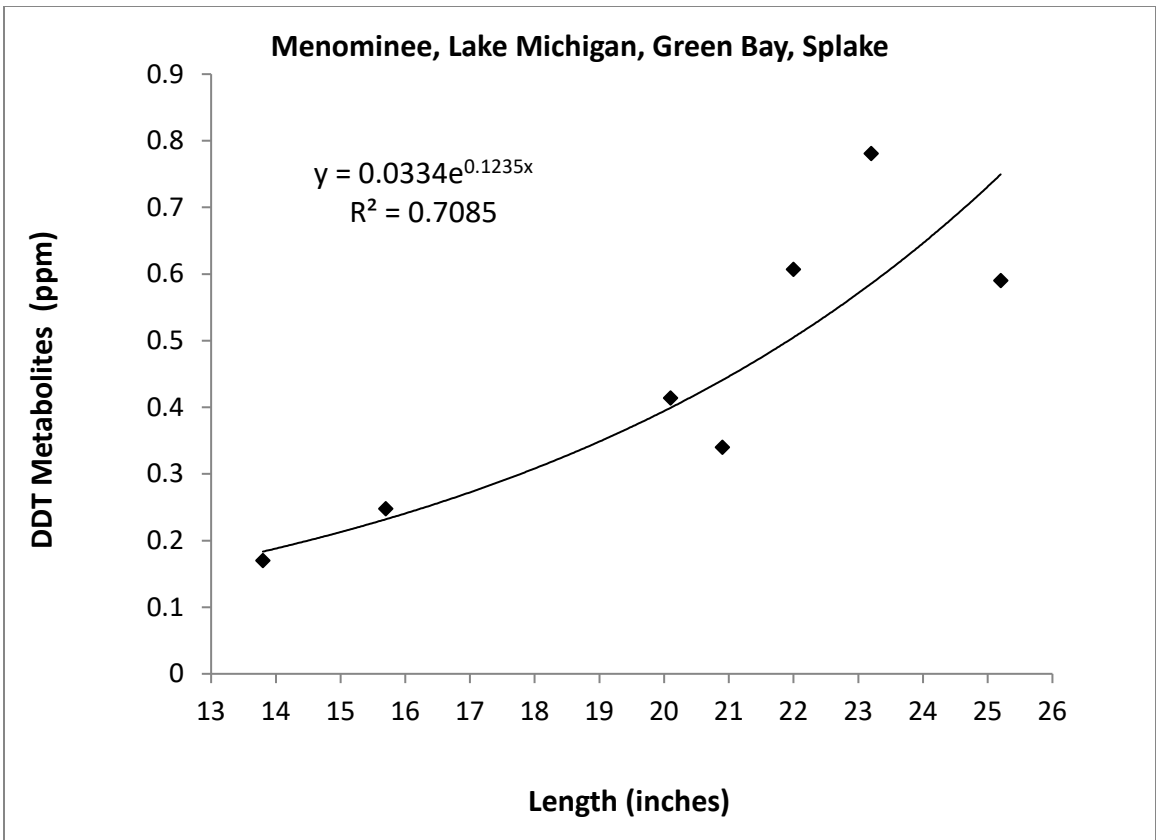
Existing Advisory: Women and children should not eat more than 6 meals per year of Green Bay splake smaller than 18 inches and no one should eat any of those fish larger than 18 inches due to PCBs.

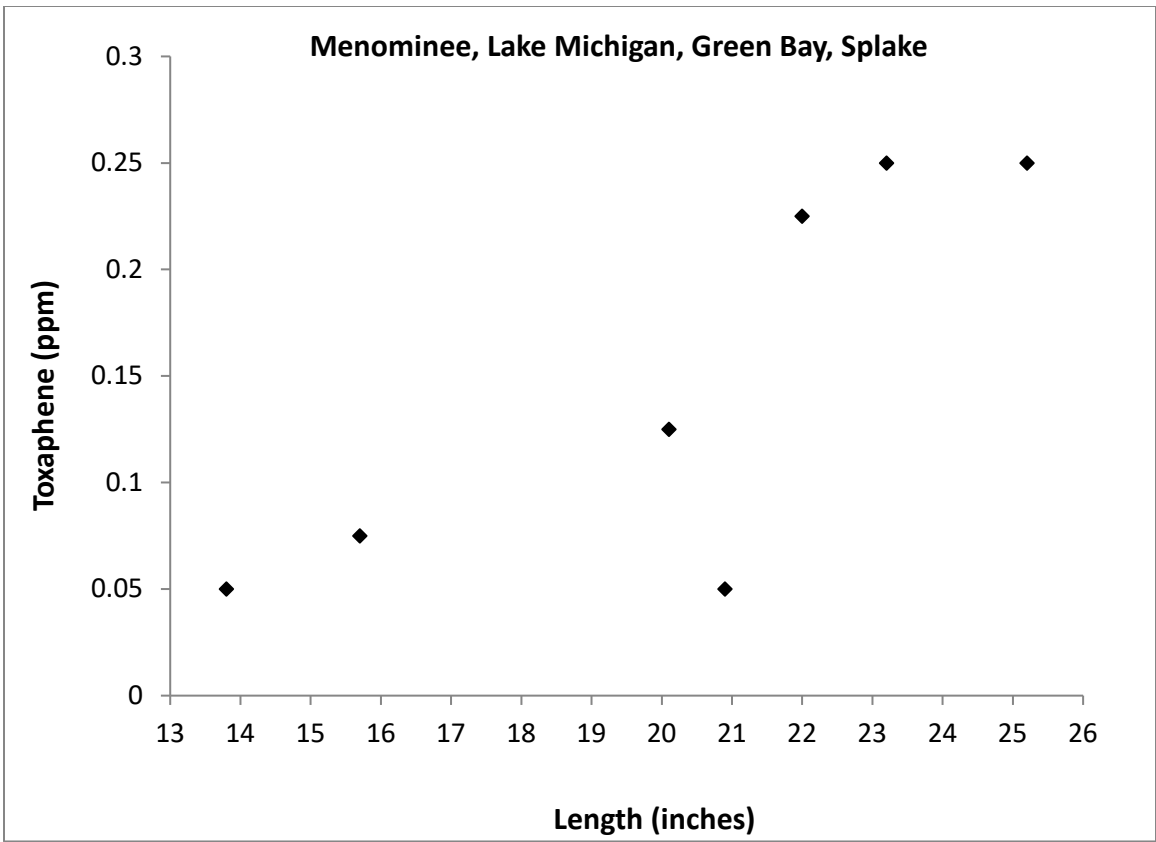
Recommendation: This dataset has limited use given the age and small sample size. A guideline for splake was not established.

Length (Inches)	DDT Regression Equation Estimate (ppm)	Meal Category	Toxaphene Regression Equation Estimate (ppm)	Meal Category
14	0.19	8	0.03	12
16	0.24	4	0.07	4
18	0.31	4	0.11	2
20	0.39	4	0.14	2
22	0.51	2	0.18	2
24	0.65	2	0.22	1
26	0.83	2	0.25	1
28	1.06	1	0.29	1

Shaded area denotes extrapolated estimates







Sucker
White, Longnose, Redhorse
Hg Analysis:

Lake Michigan
Green Bay & L. Bay De Noc

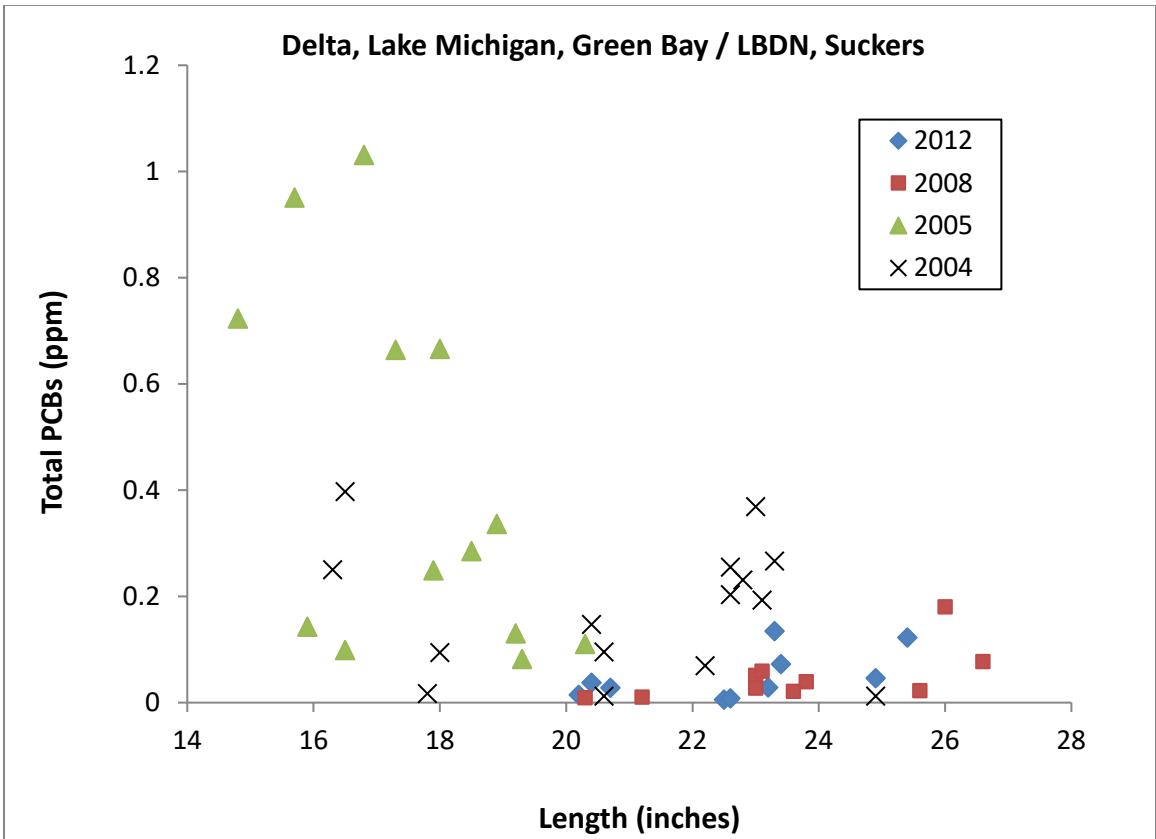
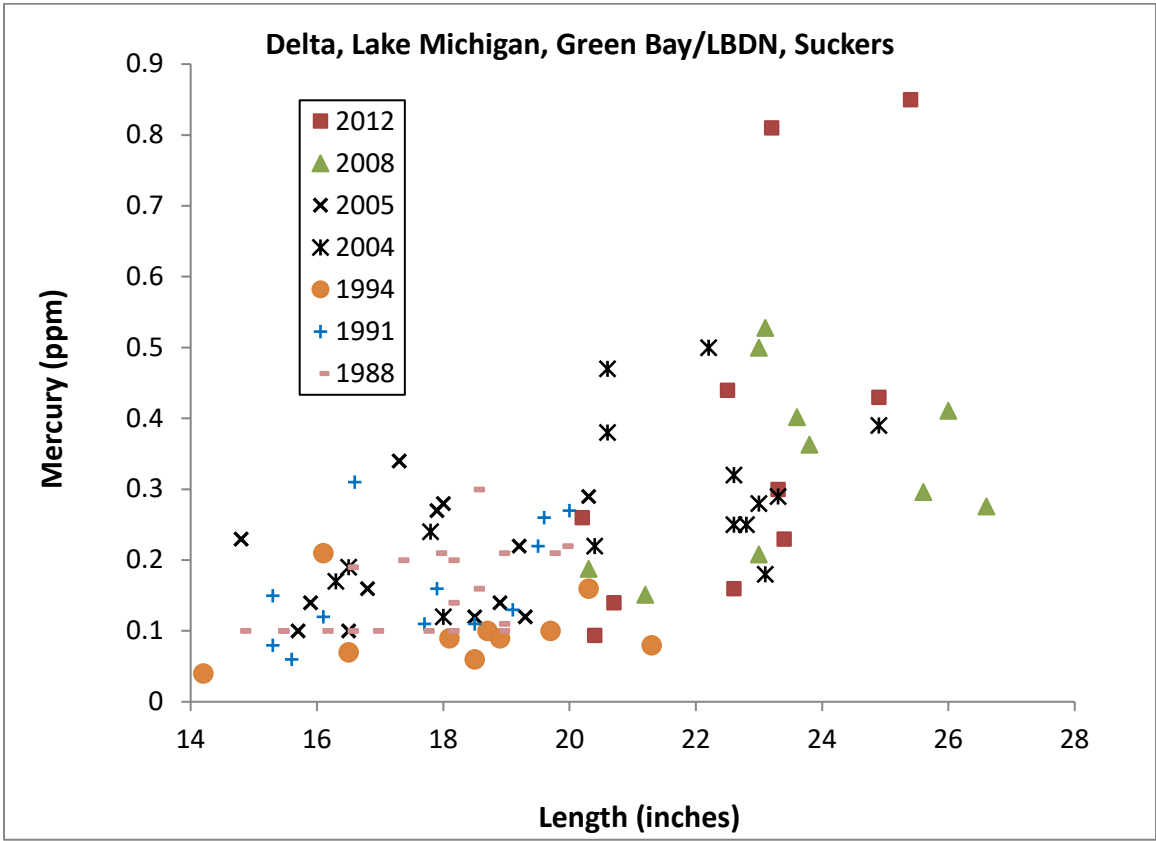
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
1988	2012	90	14.2	na	14.2	26.6	
Datasets available: 1988, 1991, 1994, 2004, 2005, 2012							
Chemical	Sample Size (Legal)	Mean		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
Mercury	90	0.22		0.04	0.85	0.25	4
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.397	0.429					

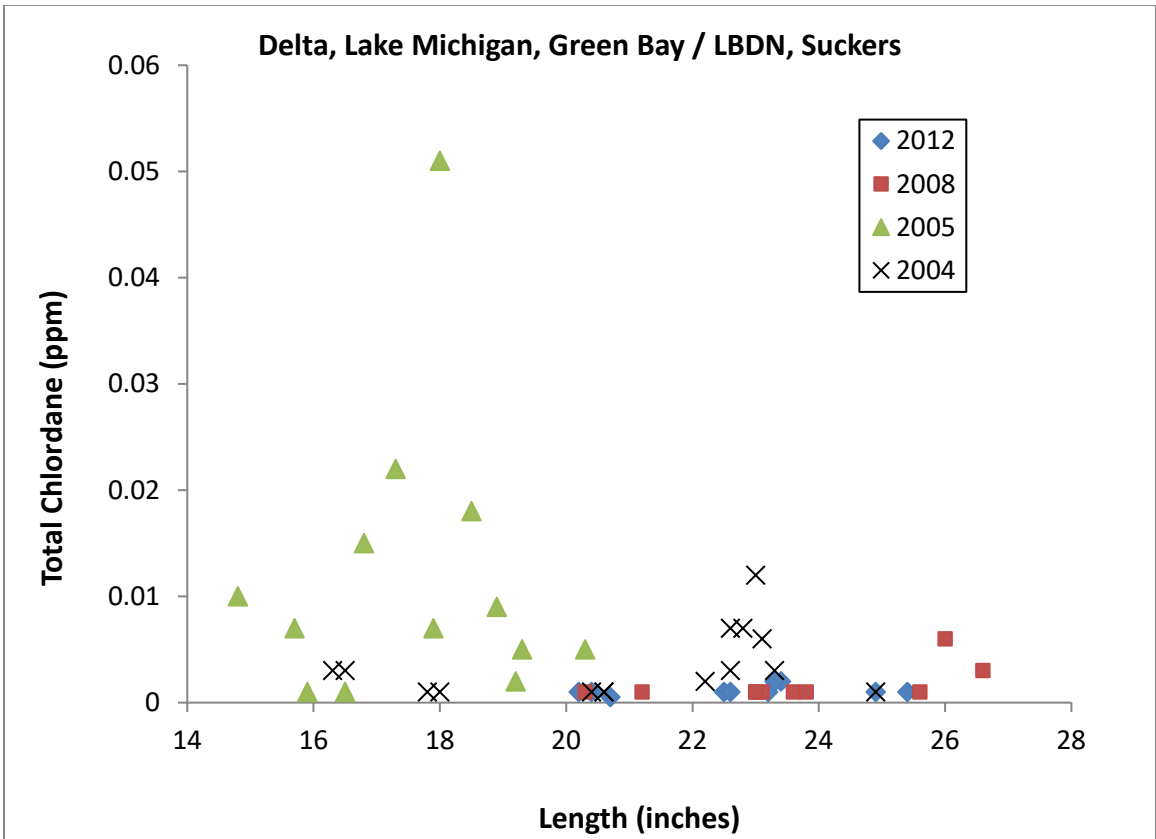
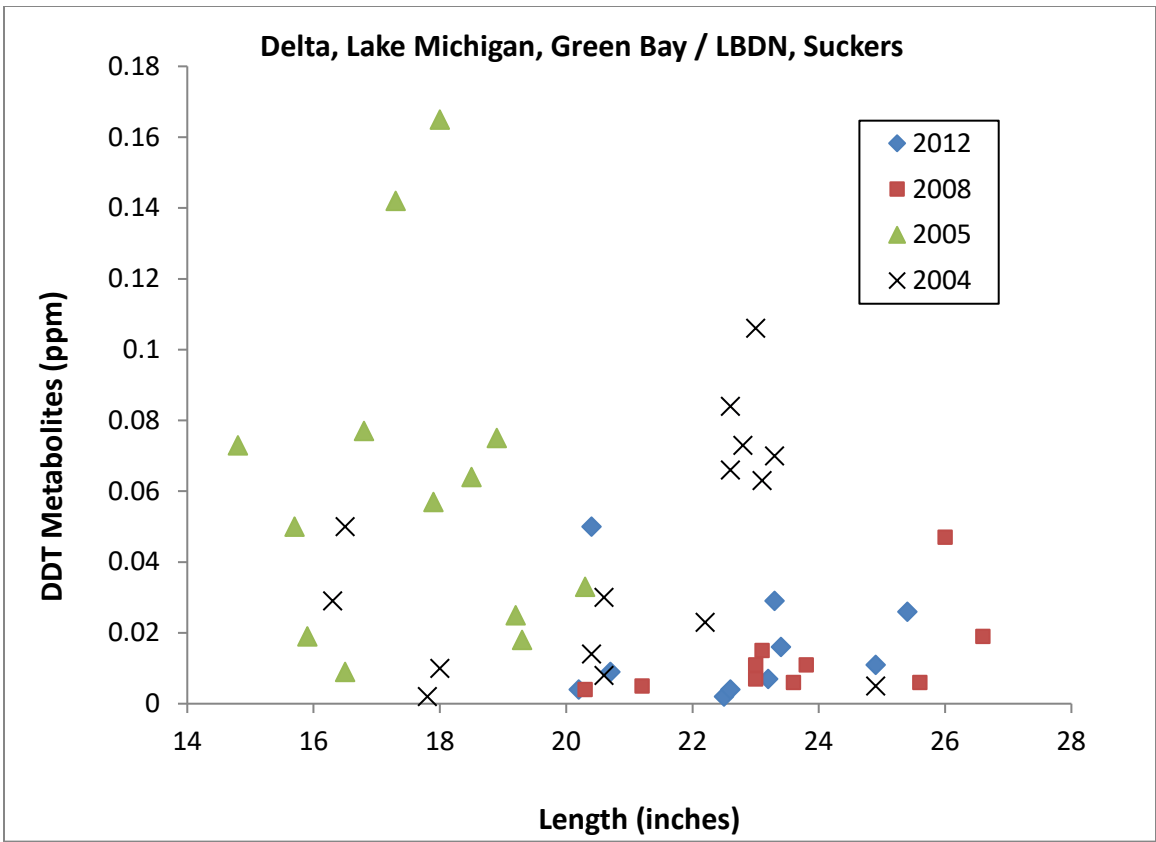
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
2004	2012	48	14.8	na	14.8	26.6	
Datasets available: 1988, 1991, 1994, 2004, 2005, 2012							
Chemical	Sample Size (Legal)	Mean		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
PCB	48	0.19		0.006	1.03	0.26	0.5
DDT	48	0.04		0.002	0.16	0.05	16
Chlordane	48	0.005		0.001	0.05	0.01	--
Toxaphene	48	ND		--	--	--	--
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.302	0.191					
DDT	0.080	0.063					
Chlordane	0.098	0.110					
Toxaphene	--	--					
Final meal category based on UCL:							0.5

Existing Advisory: No one should eat more than 6 meals per year of suckers from Lake Michigan, Green Bay or Little Bay De Noc due to elevated levels of PCBs. Mercury would cause an advisory.

Recommendation: No change.





Walleye

Lake Michigan

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	2013	80	15.4	15	15.4	29.4
Datasets available: 1987, 1991, 1992, 2004, 2005, 2012, 2013						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	80	0.43	0.10	1.15	0.50	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.646	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
2004	2013	36	15.6	15	15.6	29.4
Datasets available: 1987, 1991, 1992, 2004, 2005, 2012, 2013						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	36	0.31	0.009	2.5	0.48	Limited
DDT	36	0.08	0.003	0.70	0.13	12
Chlordane	36	0.02	0.001	0.14	0.02	--
Tox Σ3PC	10	0.66 ppb	ND	2.2 ppb	1.22 ppb	12
PFOS	10	9.6 ppb	4.3 ppb	14.8 ppb	11.9 ppb	12
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.466	0.555				
DDT	0.204	0.401				
Chlordane	0.340	0.595				
Tox Σ3PC	0.644	0.644				
PFOS	0.014	0.005				
Final meal category based on UCL:						Limited

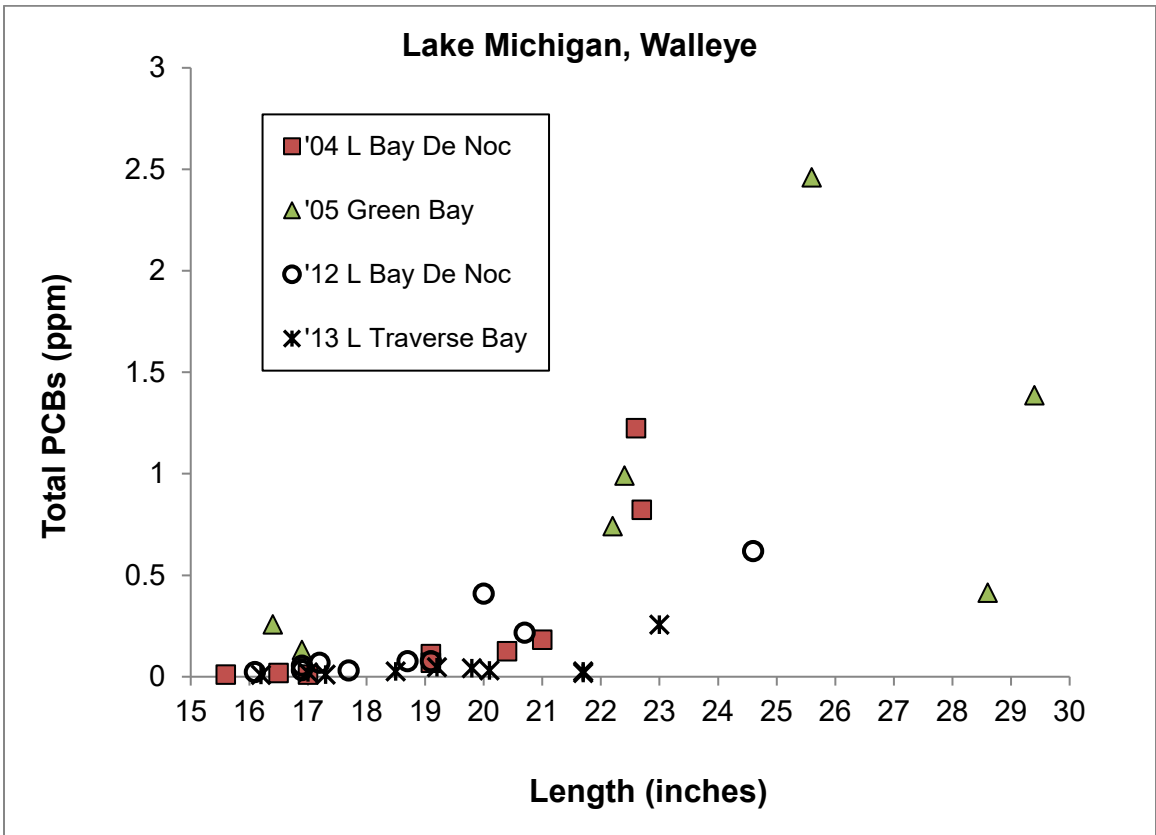
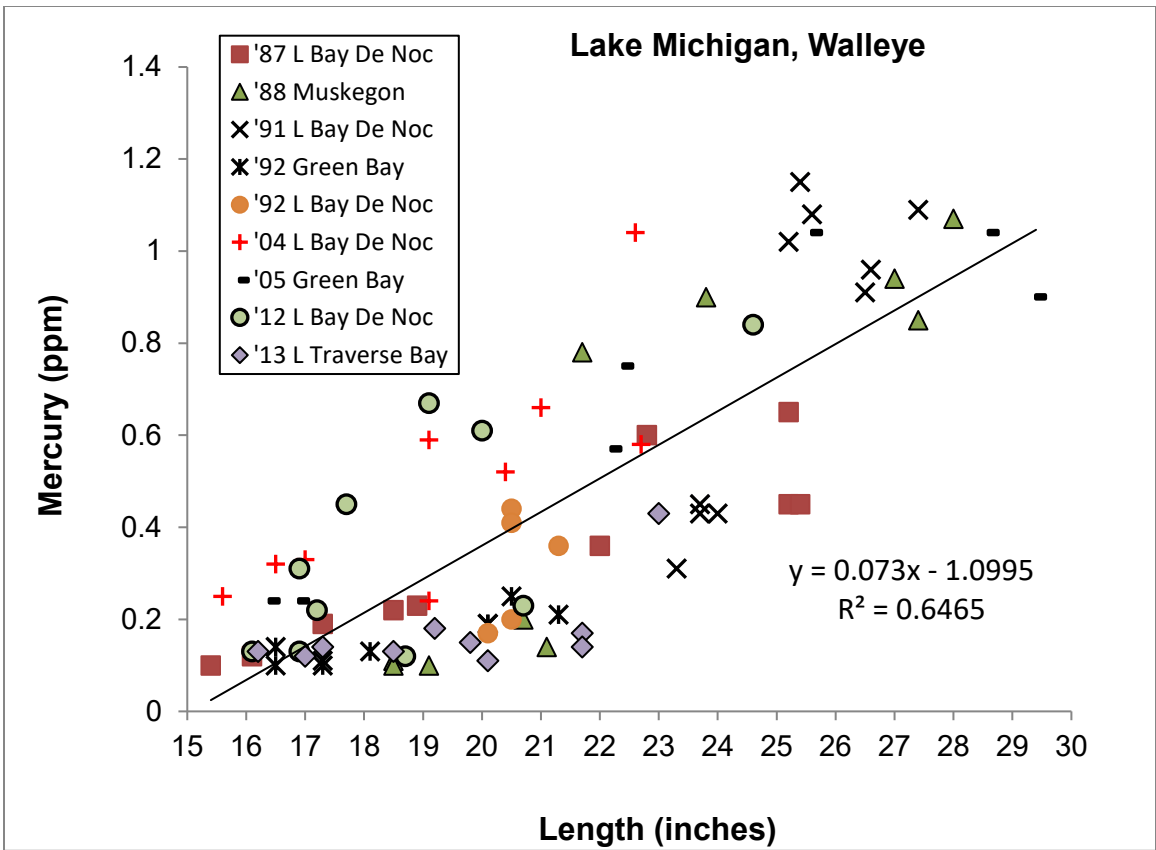
Length (Inches)	Hg Regression Estimate (ppm)	Meal Category	Toxaphene Regression Estimate (ppb)	Meal Category
14	-0.08	16	-0.5	16
16	0.07	16	0	16
18	0.21	4	0.5	16
20	0.36	2	1	16
22	0.51	2	1.5	12
24	0.65	1	1.9	12
26	0.8	1	2.4	8
28	0.94	1	2.9	8
30	1.09	1	3.4	4

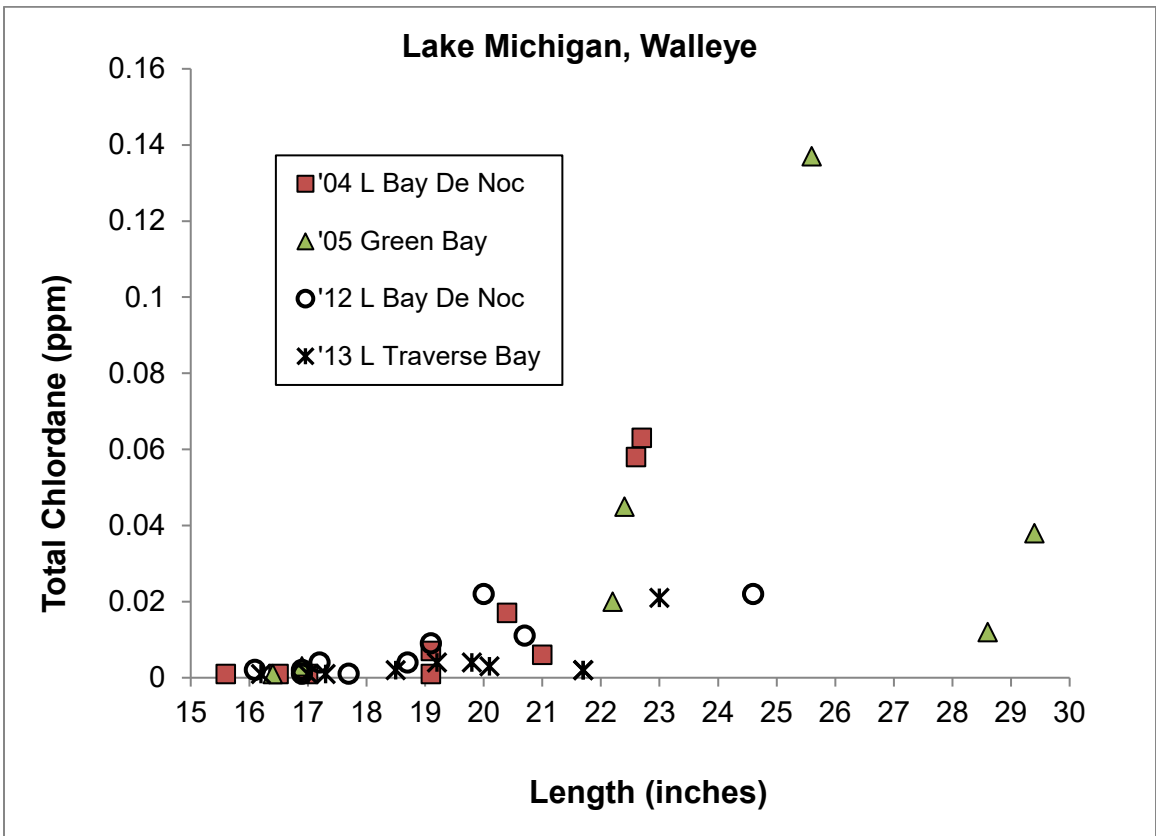
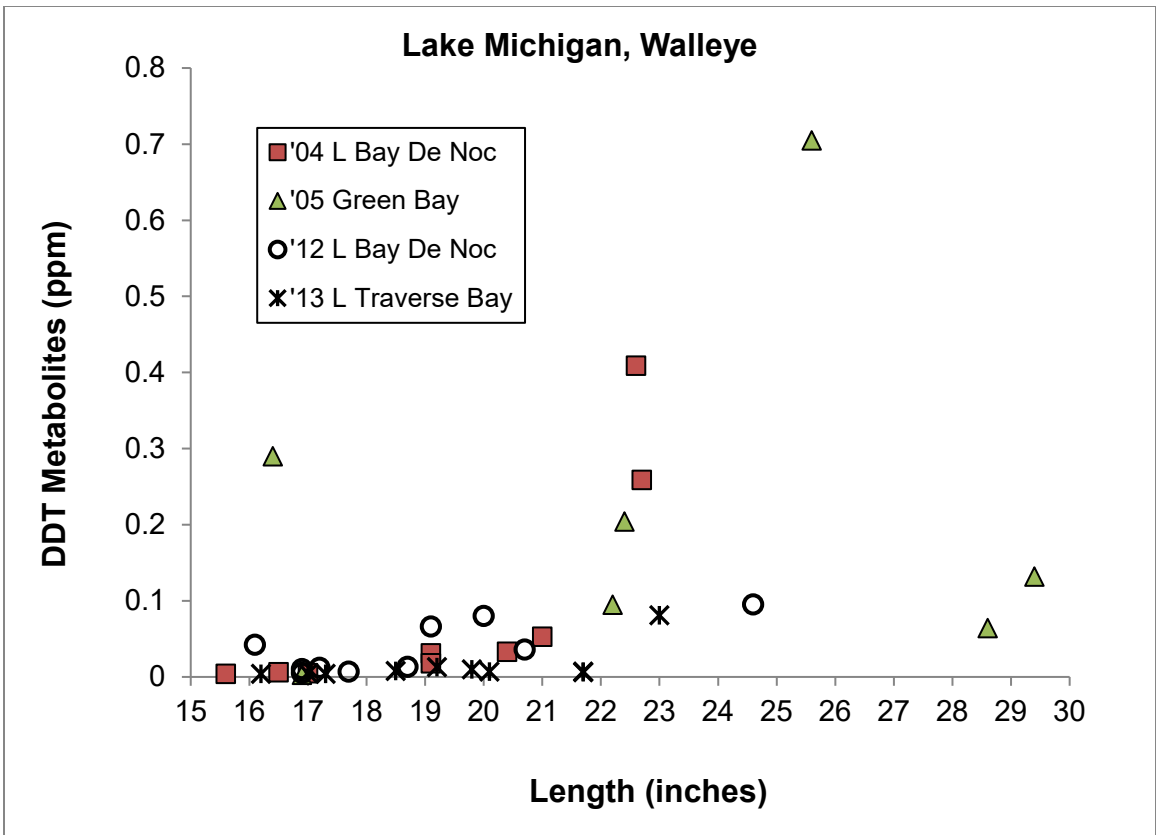
Shaded area denotes extrapolated estimates

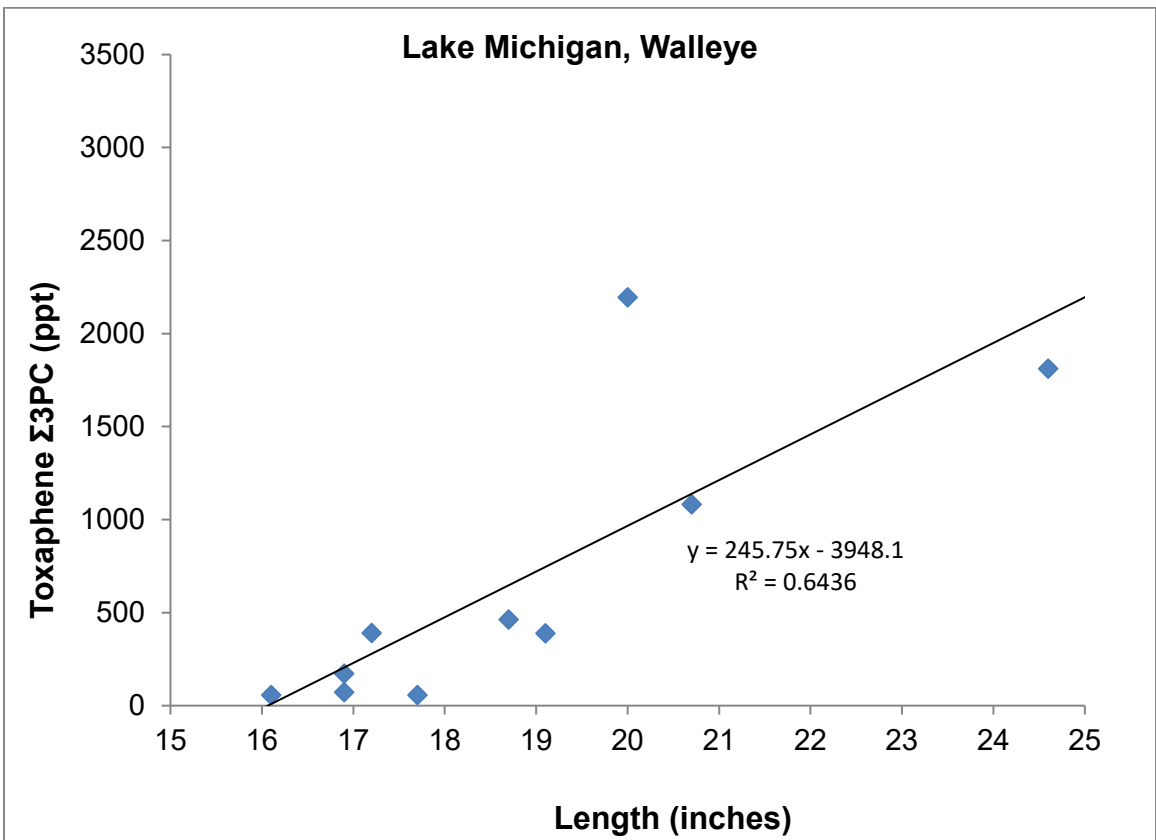
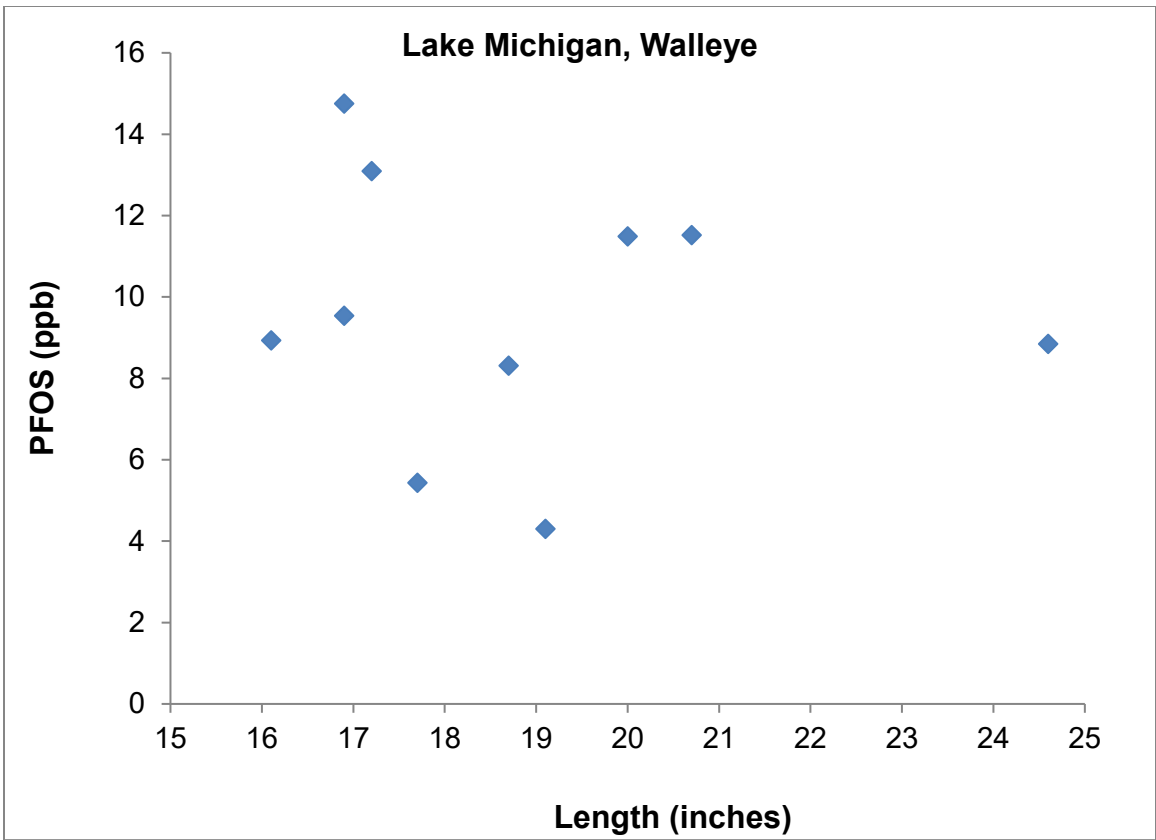
Existing Advisory: No one should eat more than 2 meals per month of Lake Michigan walleye smaller than 18 inches due to mercury and PCBs. No one should eat more than 6 meals per year of Lake Michigan walleye between 18 and 22 inches due to PCBs. Sensitive populations should not eat Lake Michigan walleye larger than 22 inches due to PCBs. Healthy adults should limit consumption to no more than 1 or 2 meals per year of walleye larger than 22 inches. PFOS, toxaphene, and DDT would cause advisories.

Recommendation: No change is recommended.

Note: In 2013 PCBs were low in walleye from L. Traverse Bay and resulted in loss of the PCB regression line. "Limited" consumption is not warranted for all sizes of walleye.







Yellow Perch

Lake Michigan

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	2013	69	6.9	na	6.9	14.8
Datasets available: 1986, 1990, 1993, 1997, 2013						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	69	0.12	0.05	0.39	0.14	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.630	0.650				

Organics Analysis:

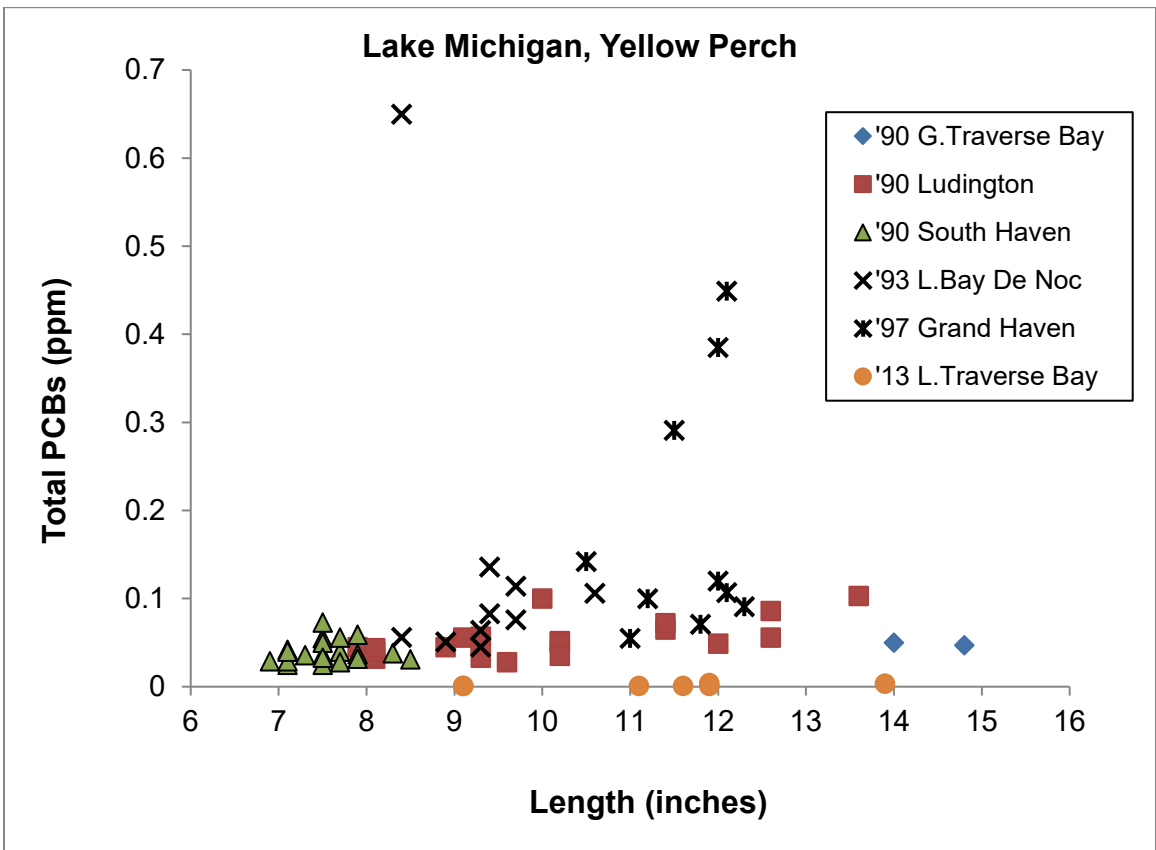
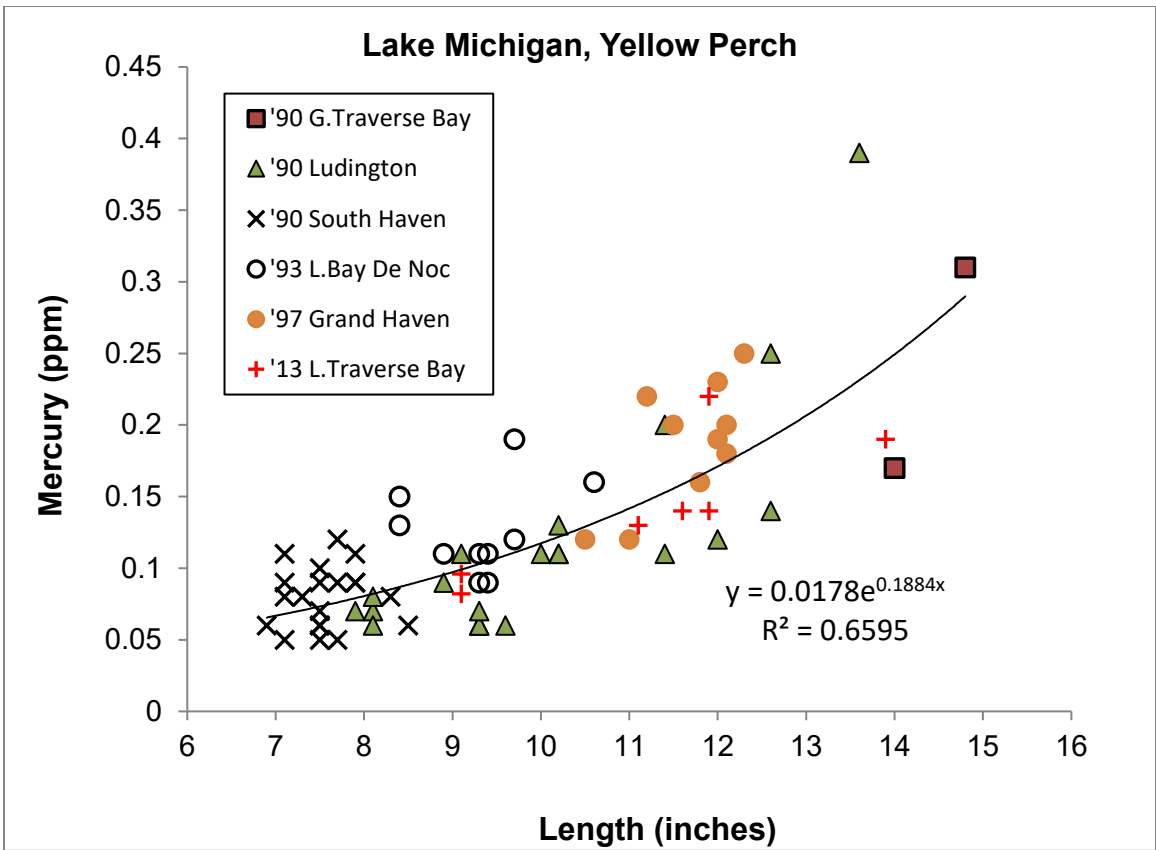
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1990	2013	17	9.1	na	9.1	13.9
Datasets available: 1986, 1990, 1993, 1997, 2013						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	69	0.12	0.05	0.39	0.14	2
DDT	69	0.08	0.001	0.65	0.10	16
Chlordane	69	0.02	0.001	0.20	0.03	--
Toxaphene	69	ND	--	--	--	--
TEQ	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.028	0.000				
DDT	0.118	0.029				
Chlordane	0.138	0.158				
Toxaphene	--	--				
TEQ	--	--				
Final meal category based on UCL:						2*

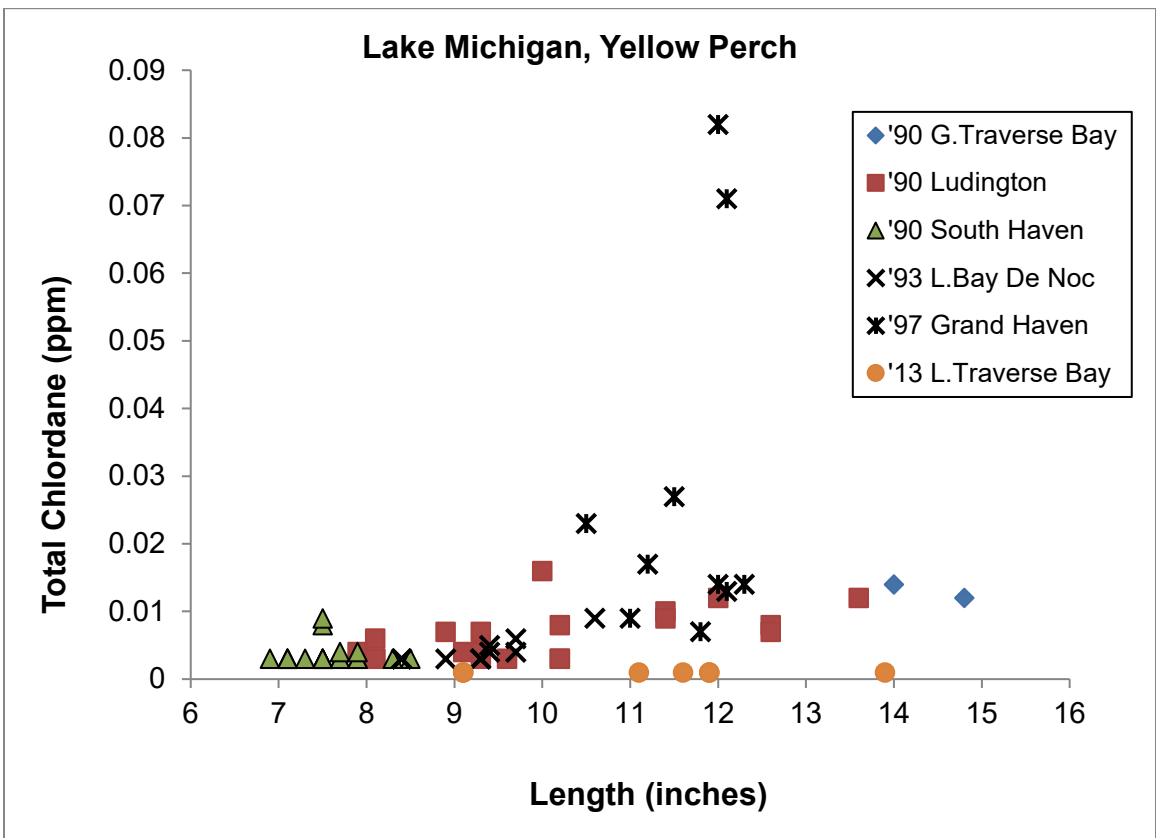
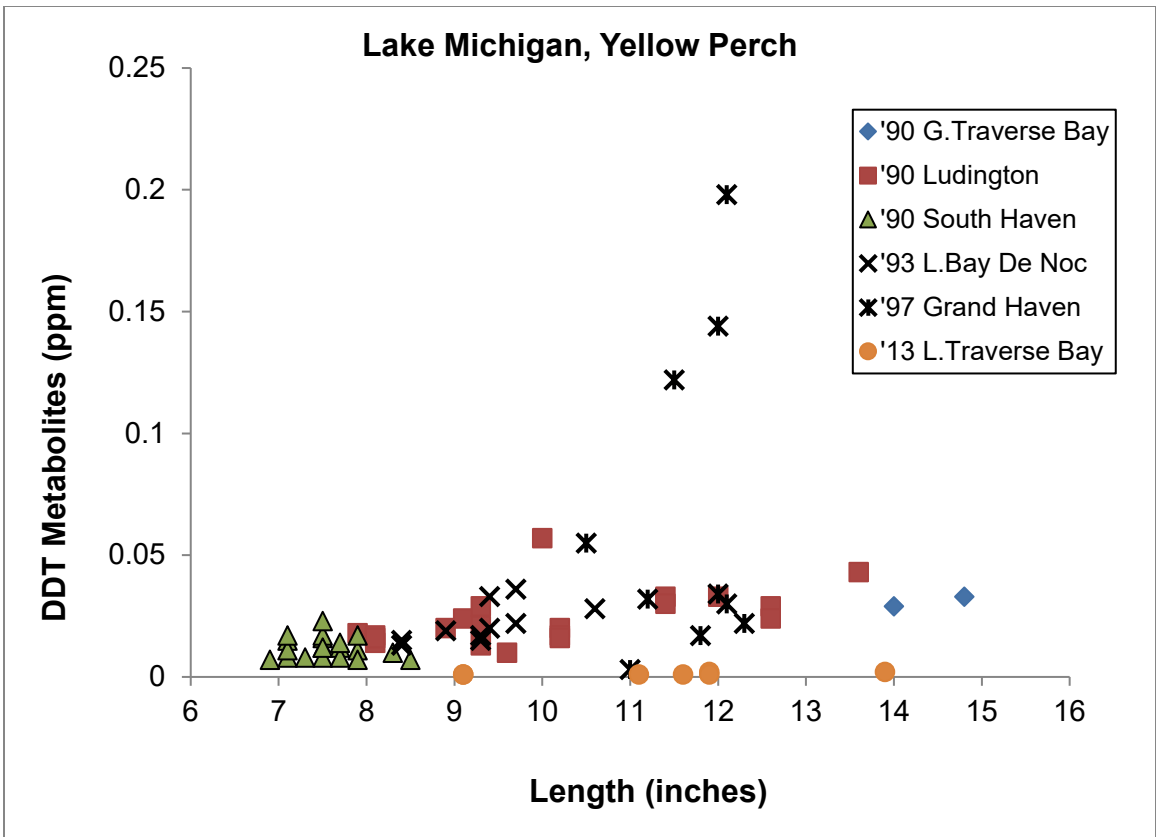
Existing Advisory: No one should eat more than 4 meals per month of Lake Michigan yellow perch less than 10 inches due to PCBs and no one should eat more than 4 meals per month of Lake Michigan yellow perch greater than 10 inches due to mercury and PCBs.

Recommendation: No change is recommended.

*Based on the EGLE Fish Contaminant Monitoring Program, PCB concentrations ≥ 15 years old are expected to have declined to a concentration that allows a less restrictive meal category than determined by the standard evaluation method. Additional sampling on a lake-wide basis may indicate that the PCB based advice can be relaxed.

Length (Inches)	Hg Regression Estimate (ppm)	Meal Category
6	0.051	16
7	0.063	16
8	0.077	12
9	0.095	8
10	0.117	8
11	0.143	4
12	0.176	4
14	0.266	4
<i>Shaded area denotes extrapolated estimates</i>		





Lake St. Clair

Including Lange & Revere Canals and Lake St. Clair within 2 miles of Lange & Revere Canals

Black Crappie

Lake St. Clair

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	2010	18	5.6	na	5.6	11.4
Datasets available: 1997, 2010						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
Mercury	18	0.16	0.04	0.43	0.22	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.694	0.892				

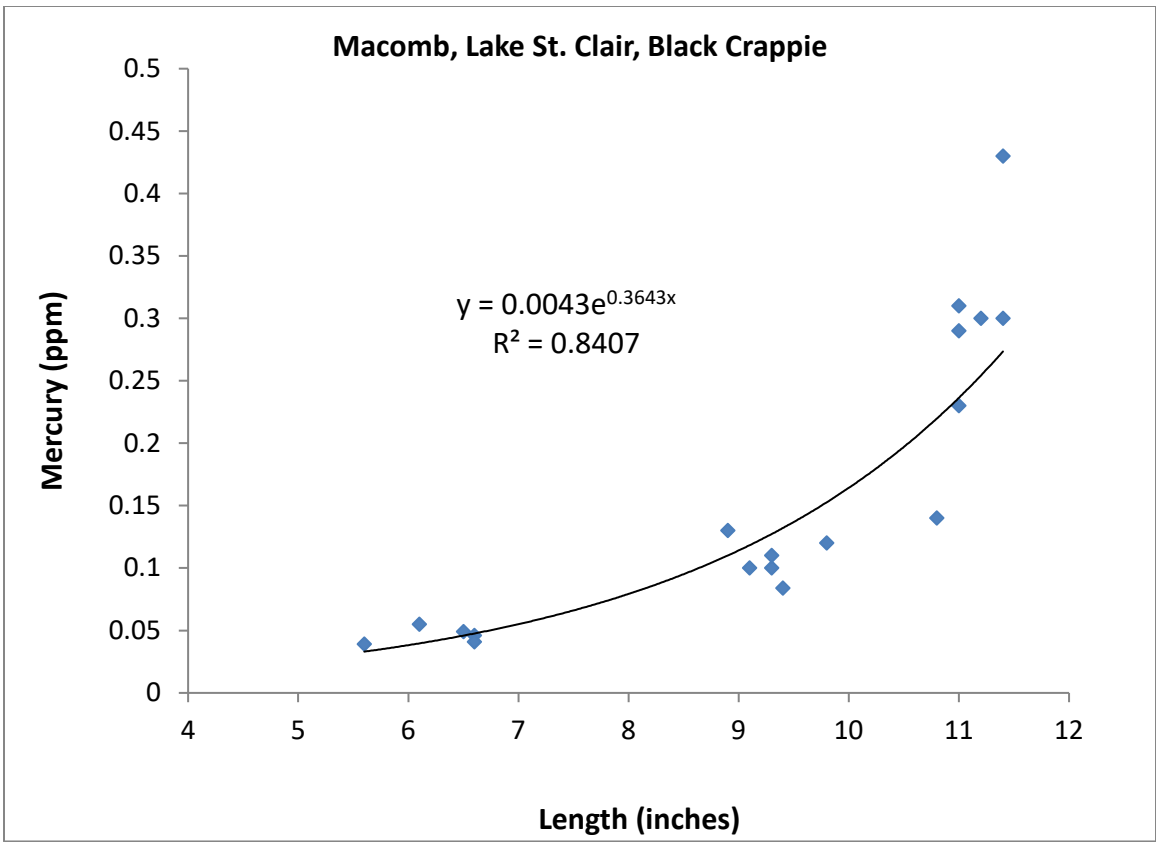
Organics Analysis:

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

Existing Advisory: Lake St. Clair crappie are not covered by an advisory.

Recommendation: No one should eat more than 1 meal per week of Lake St. Clair crappie larger than 9 inches or more than 8 meals per month of crappie less than 9 inches due to mercury. Dataset lacks PCB data, which is a limitation given that other species guidelines are caused by PCBs.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
5	0.03	16
6	0.04	16
7	0.06	16
8	0.08	12
9	0.11	8
10	0.16	4
11	0.24	4
12	0.34	2
13	0.49	2
<i>Shaded area denotes extrapolated estimates</i>		



**Bluegill and
Pumpkinseed
Hg Analysis:**

**Lake St. Clair
Over 2-Miles from Ten-Mile Canals**

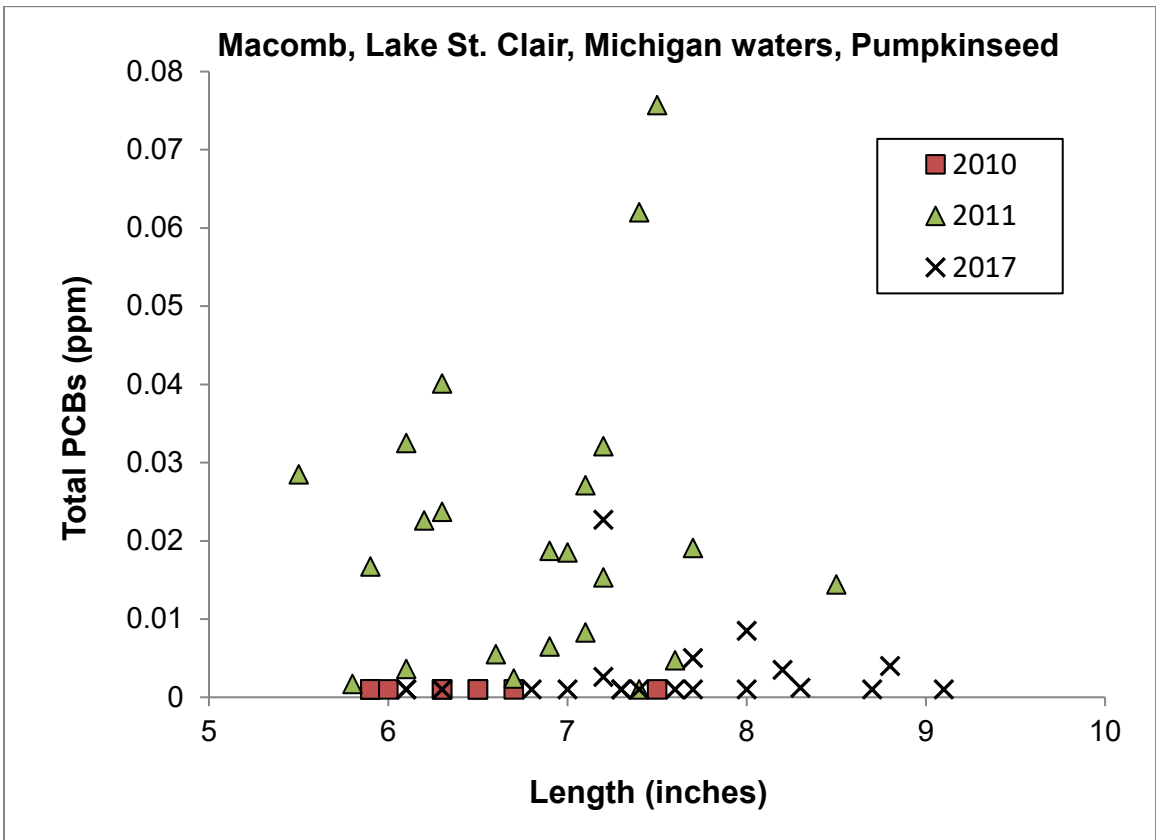
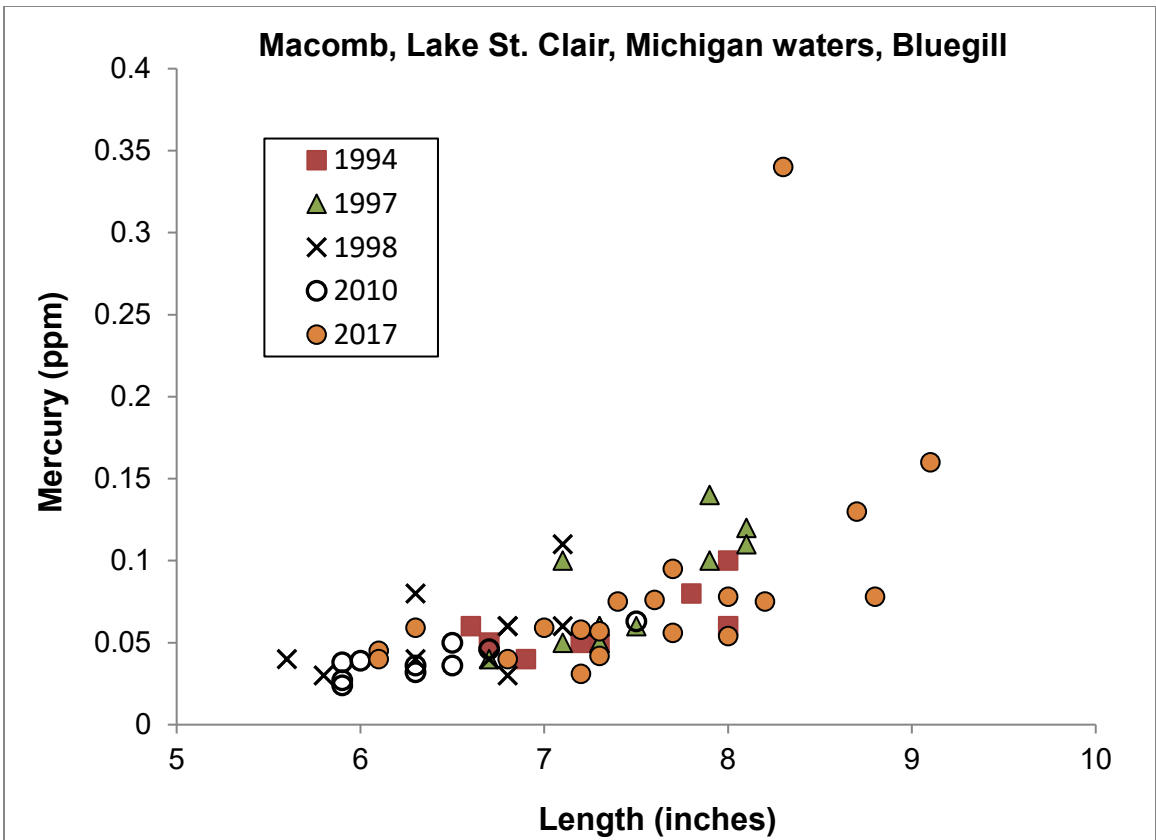
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
1994	2017	62	5.5	na	5.5	9.1	
Datasets available: 1994, 1997, 1998, 2010, 2017							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	62	0.07		0.02	0.34	0.08	12
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.365	0.559					

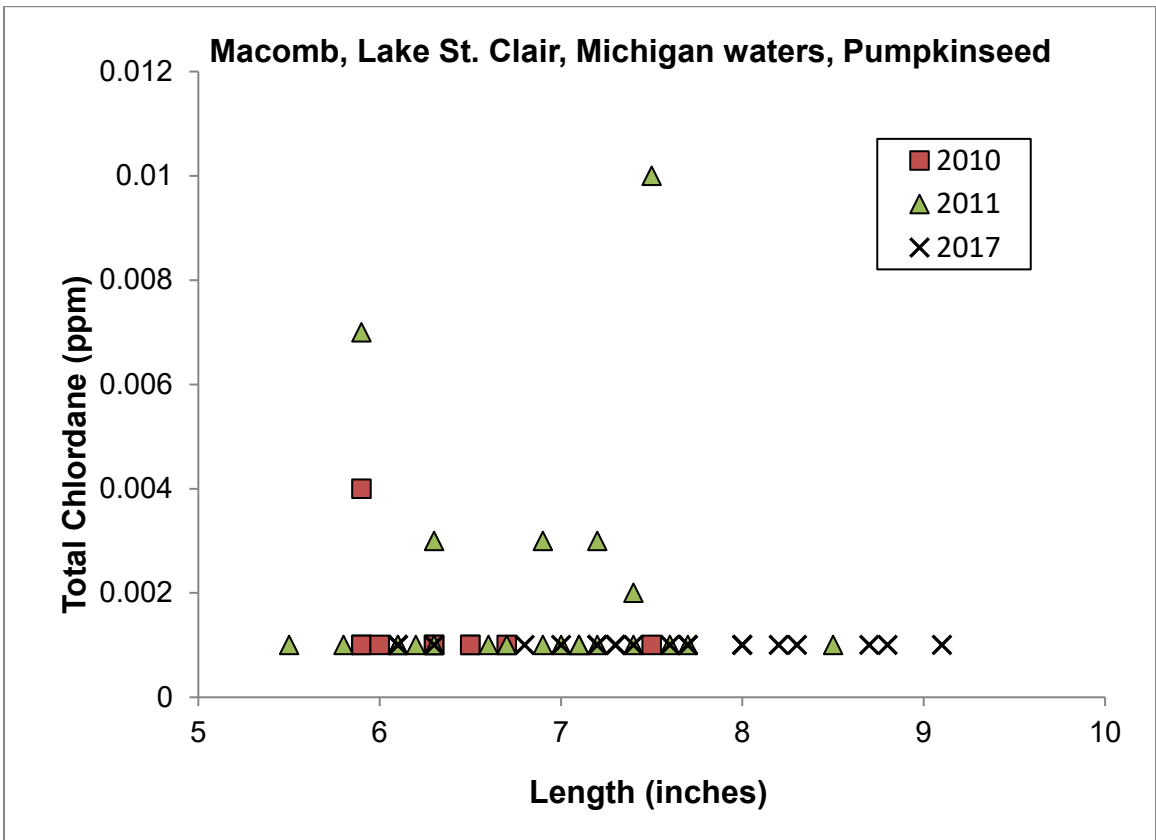
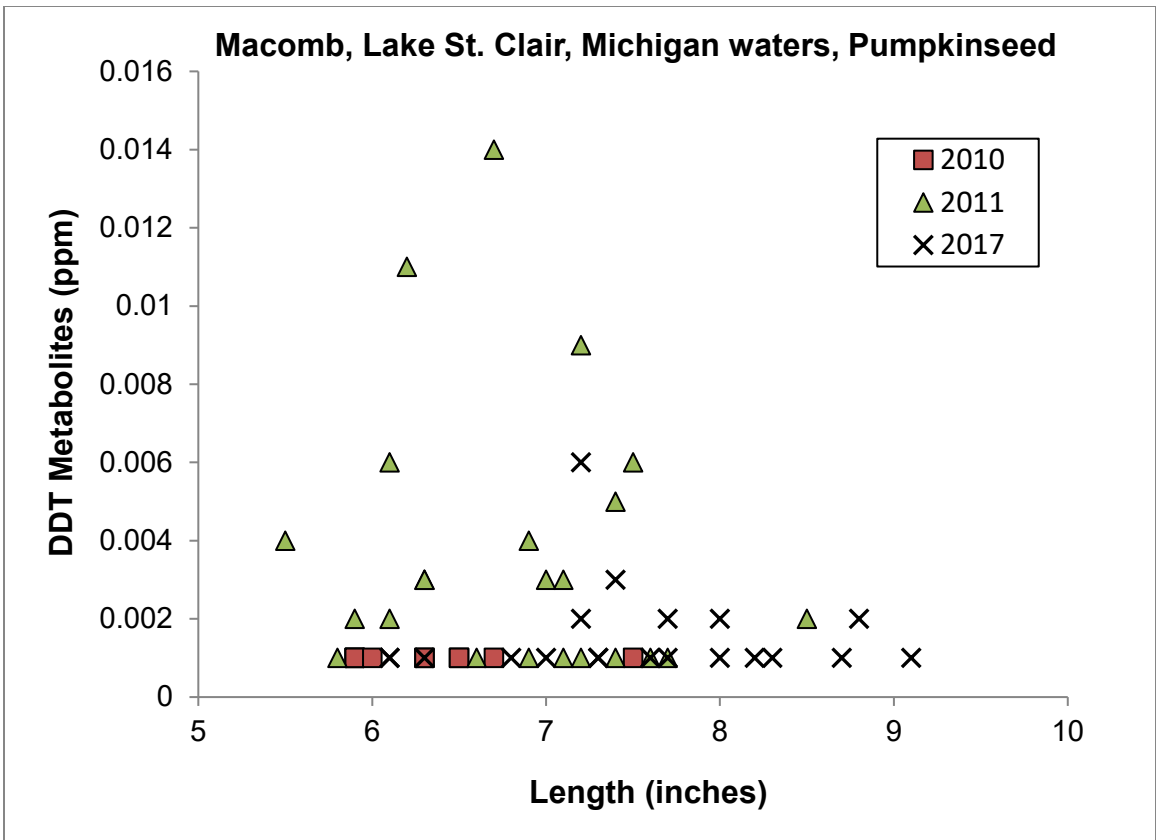
Organics Analysis:

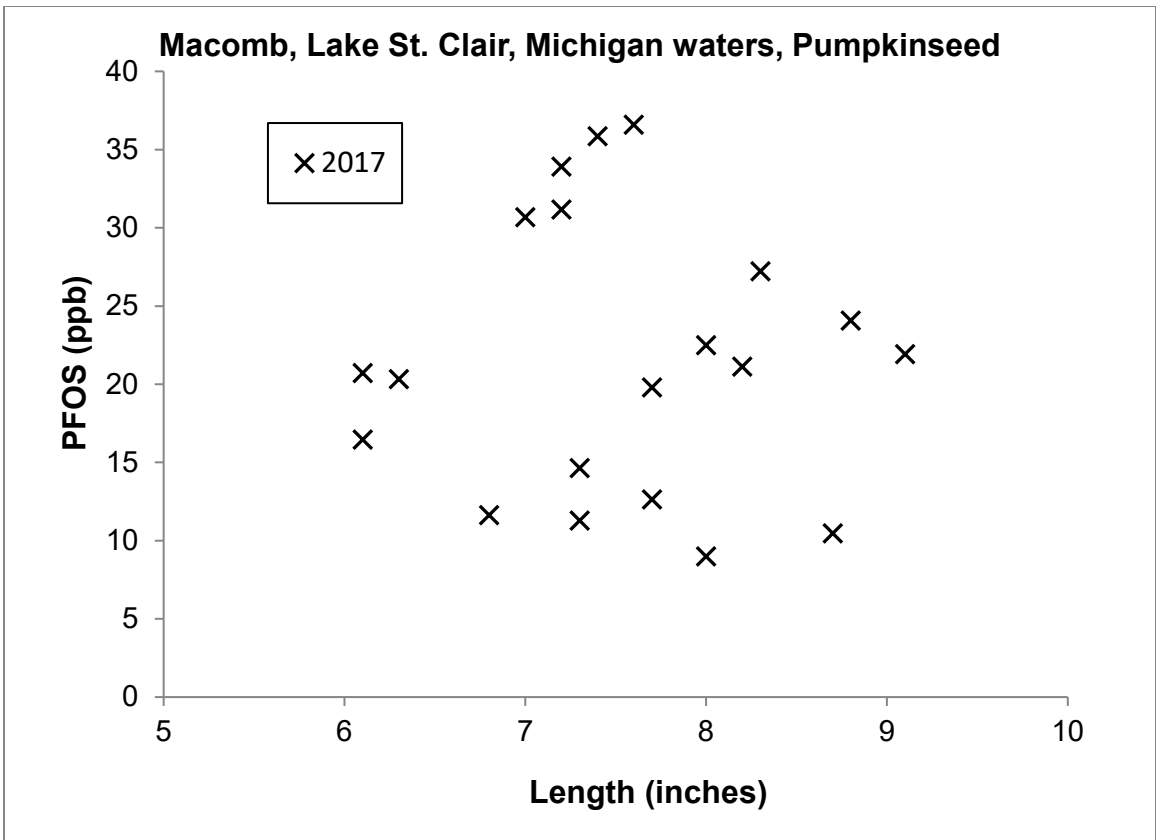
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
2010	2017	33	5.5	na	5.5	8.5	
Datasets available: 1987, 1988, 1997, 1998, 2010, 2011, 2017							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	33	0.015		< 0.001	0.076	0.021	8
DDT	33	0.003		< 0.001	0.014	0.004	16
Chlordane	33	0.002		< 0.001	0.010	0.002	--
Toxaphene	33	ND		< 0.05	< 0.05	--	--
PFOS	20	22 ppb		9 ppb	36 ppb	26 ppb	4
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.061	0.081					
DDT	0.000	0.001					
Chlordane	0.006	0.019					
Toxaphene	--	--					
PFOS	0.001	0.002					
Final meal category based on UCL:							4

Existing MDHHS Advisory: No one should eat more than 8 meals per month of bluegill or pumpkinseed taken from Lake St. Clair over 2 miles away from the 10-Mile canals (Lange/Revere Canals) due to PCBs.

Recommendation: No one should eat more than 4 meals per month of bluegill or pumpkinseed from Lake St. Clair over 2 miles from the 10-Mile canals (Lange/Revere Canals) due to PFOS. PCBs and mercury would cause advisories.







Brown Bullhead

Lake St. Clair

**Wayne, Macomb,
& St. Clair 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
1994	1994	2	10.8	na	10.8	12.2
Datasets available: 1994						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	2	0.08	0.07	0.08	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	--	--				

Organics Analysis:

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

Existing Advisory: Women and children should not eat more than 1 meal per month of Lake St. Clair brown bullhead larger than 14 inches due to mercury.

Recommendation: There are insufficient data available to develop specific advice for Lake St. Clair brown bullhead.

Carp

**Lake St. Clair
Including Lower Clinton River**

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1985	2012	68	12.2	na	12.2	31.9
Datasets available: 1985, 1986, 1994, 1998, 2001, 2004, 2010, 2011, 2012						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
Mercury	68	0.25	0.03	0.87	0.29	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.008	0.020				

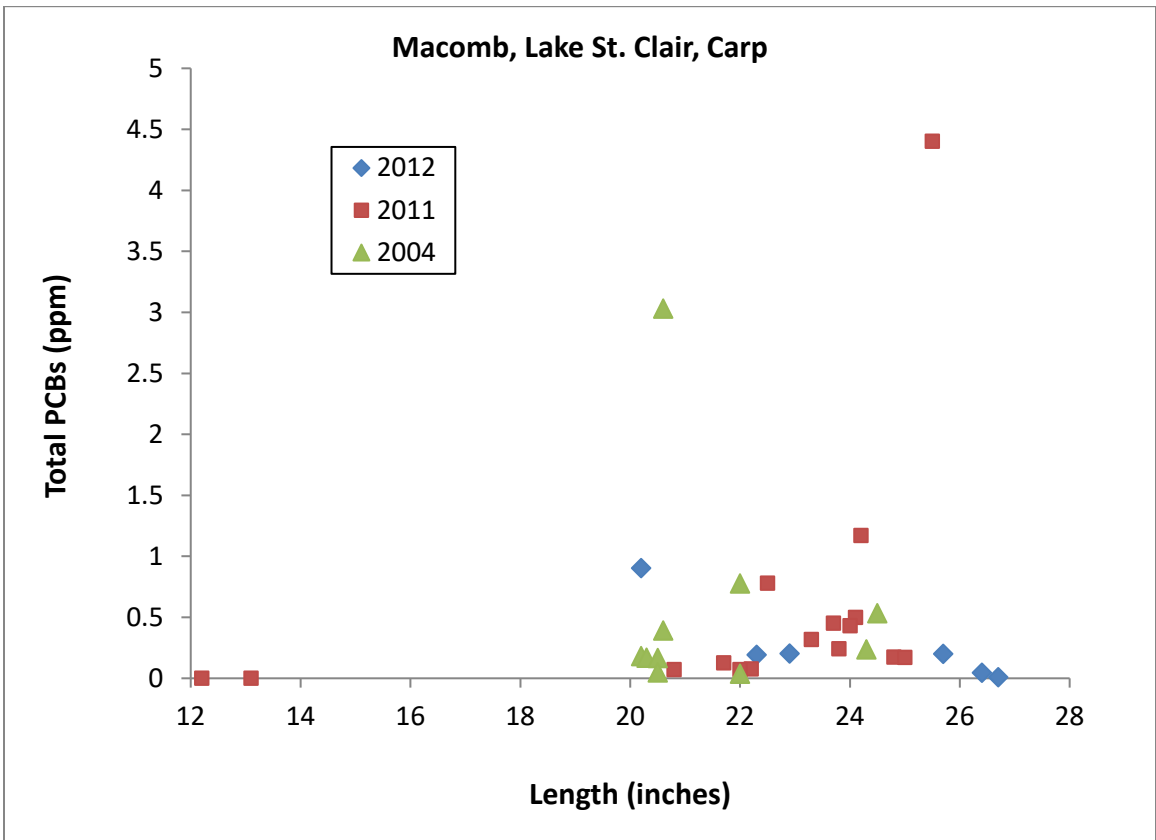
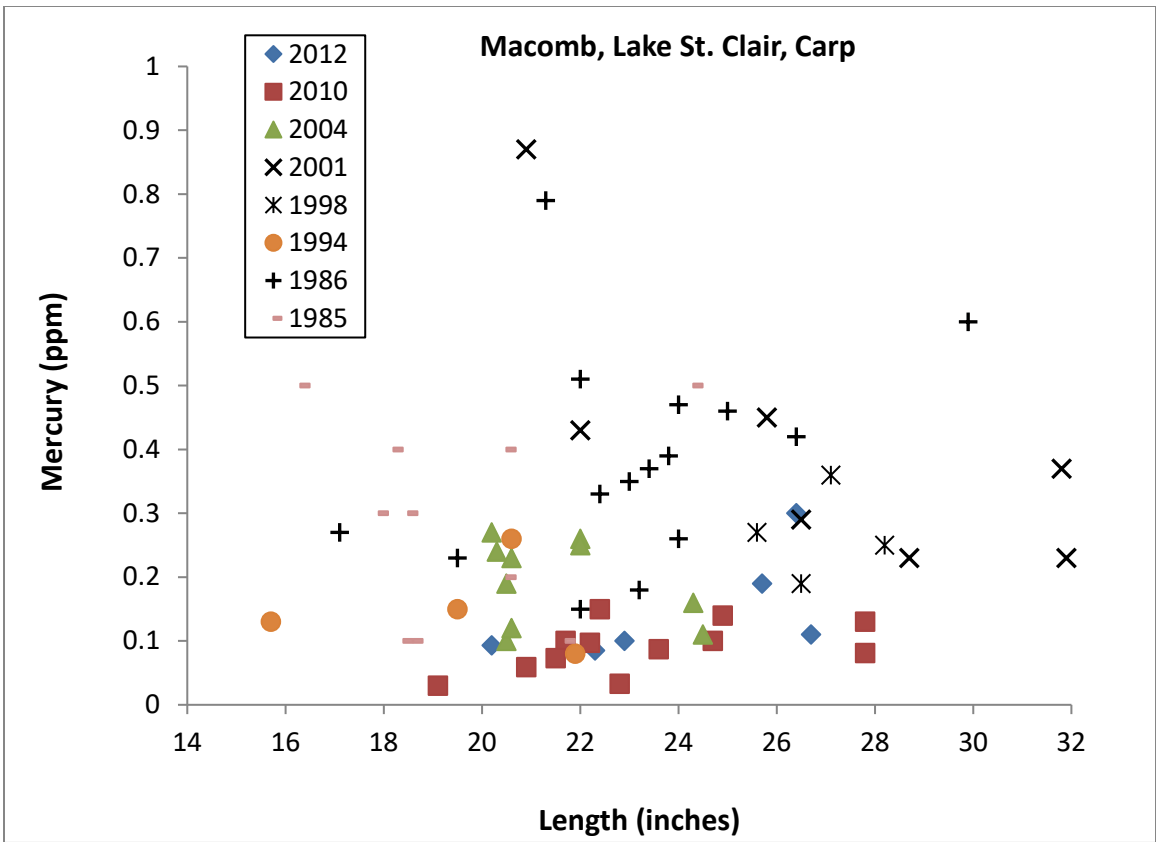
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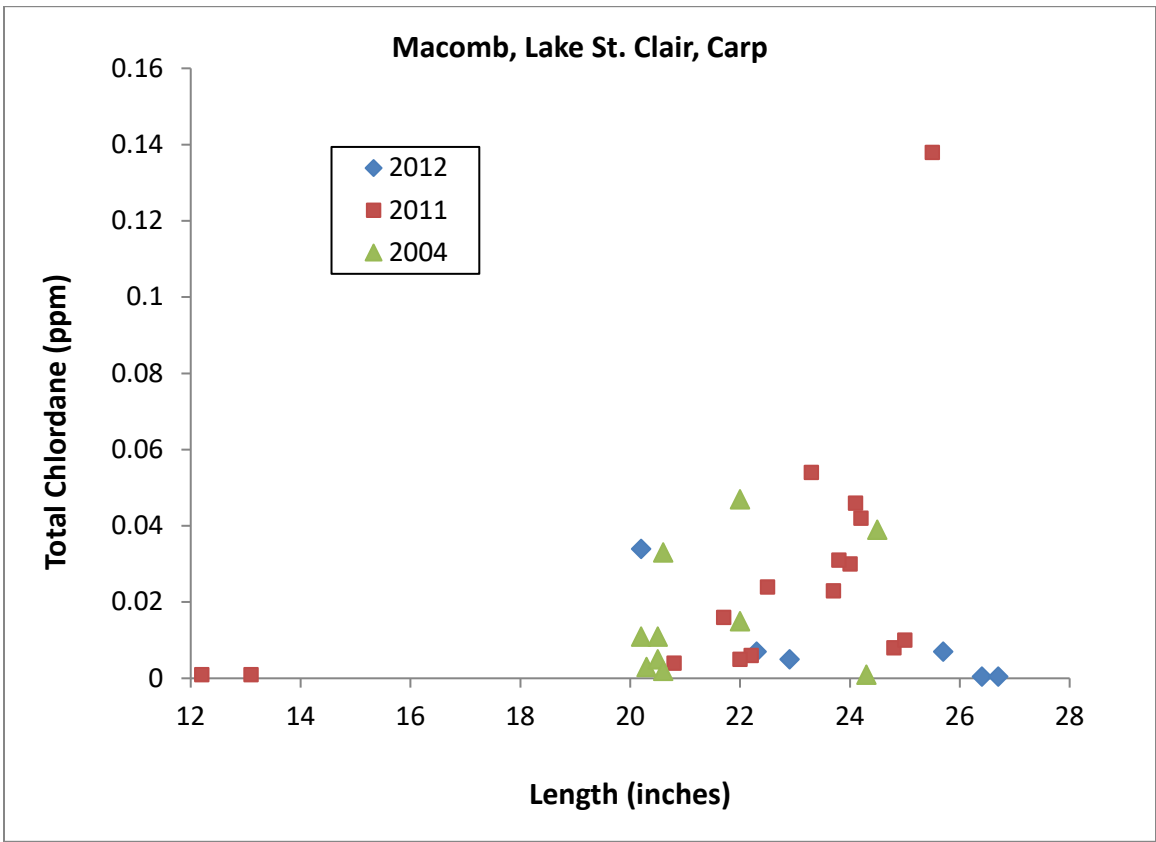
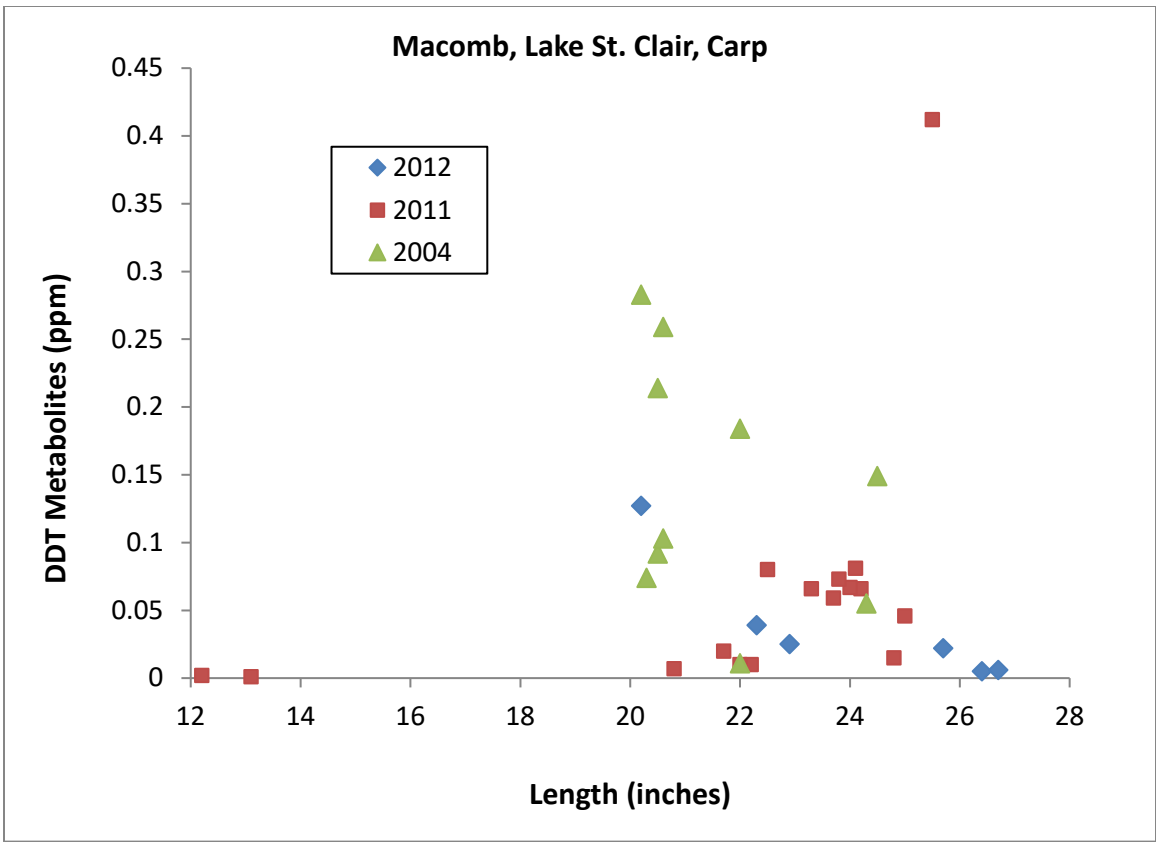
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2004	2012	32	12.2	na	12.2	26.7
Datasets available: 1985, 1986, 1994, 1998, 2001, 2004, 2011, 2012						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
PCB	32	0.50	0.001	4.40	0.83	Limited
DDT	32	0.08	0.001	0.41	0.12	12
Chlordane	32	0.02	0.001	0.14	0.03	--
Toxaphene	32	ND	--	--	--	--
TEQ*	4	1.1 ppt	0.2 ppt	1.7 ppt	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.026	0.292				
DDT	0.003	0.101				
Chlordane	0.078	0.069				
Toxaphene	--	--				
TEQ*	0.041	0.027				
Final meal category based on UCL:						Limited

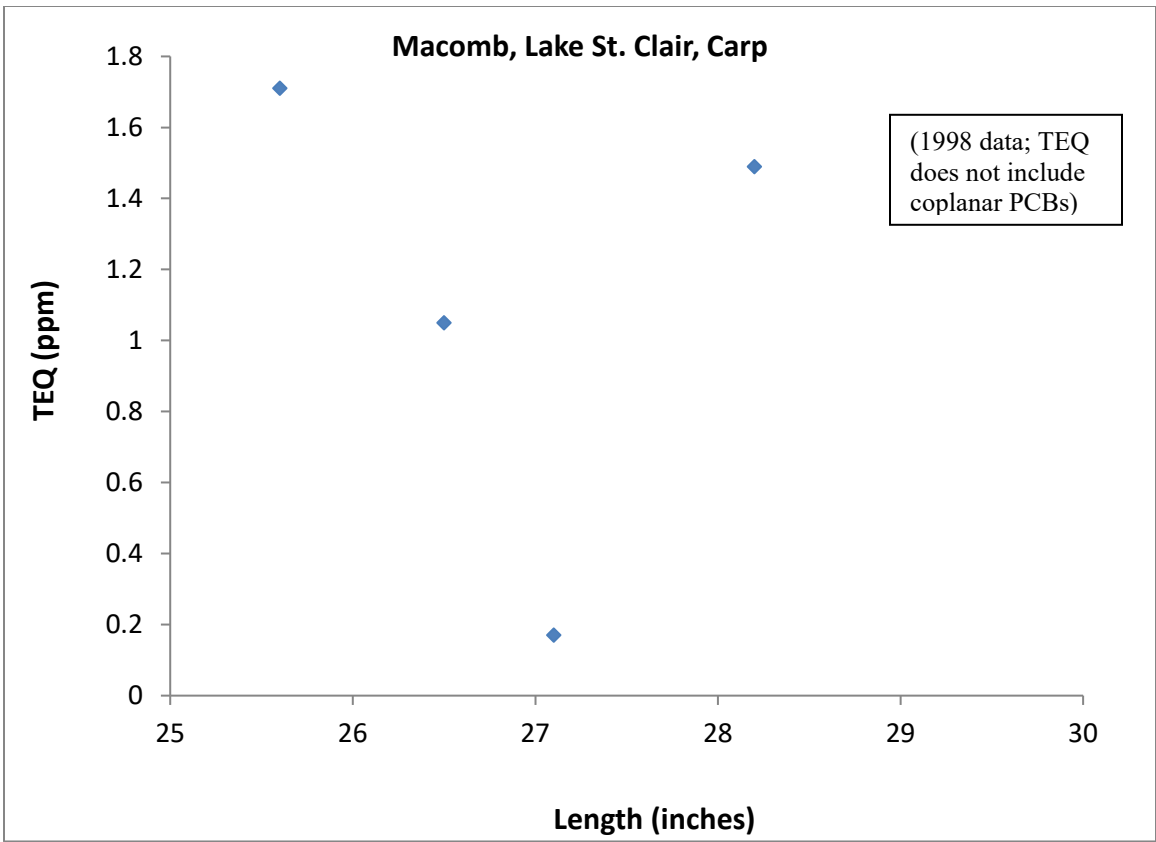
*1998 samples; 2005 WHO; dl-PCBs not included

Existing Advisory: Sensitive populations should not eat these fish. Healthy adults should not eat more than 1 or 2 meals per year of carp from the Lake St. Clair due to of PCBs. Mercury, DDT, and dioxin would cause advisories.

Recommendation: No change.







Channel Catfish

Lake St. Clair

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	2010	28	13.3	12	13.3	30.1
Datasets available: 1987, 1994, 1998, 2010						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
Mercury	28	0.315	0.08	1.00	0.4	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.486	0.546				

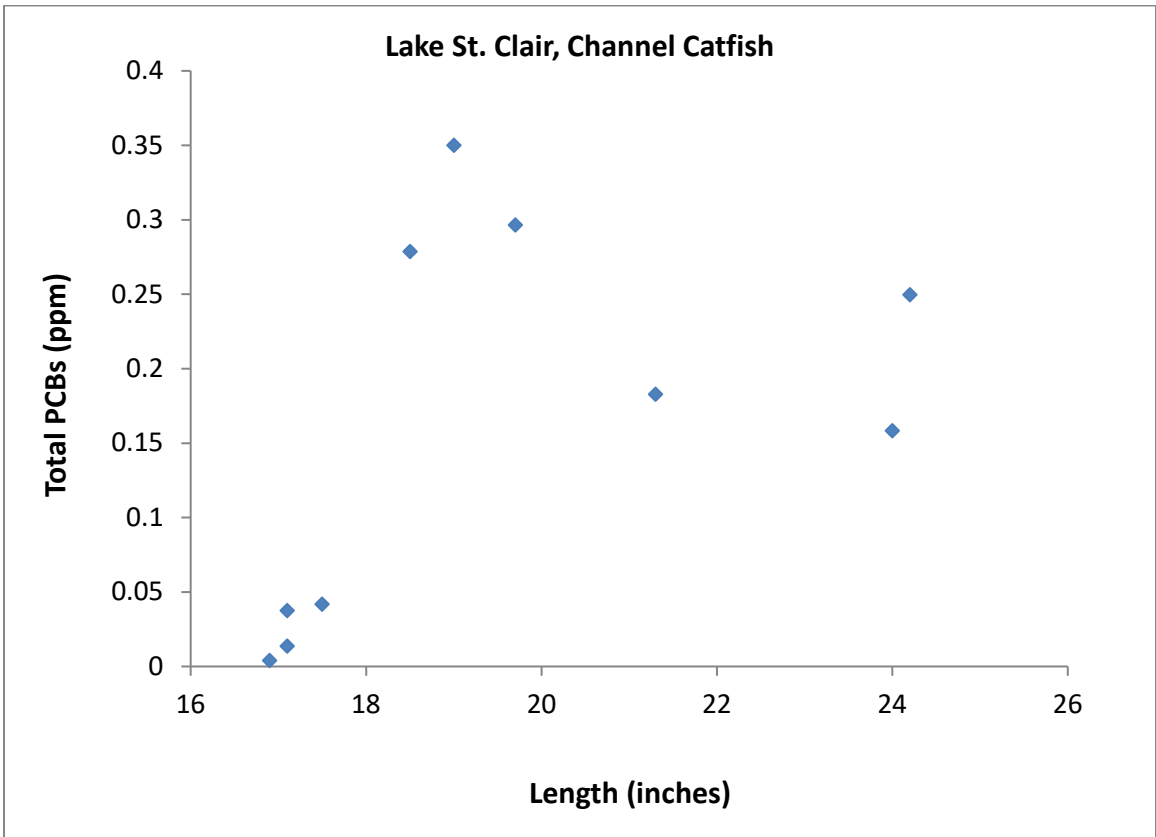
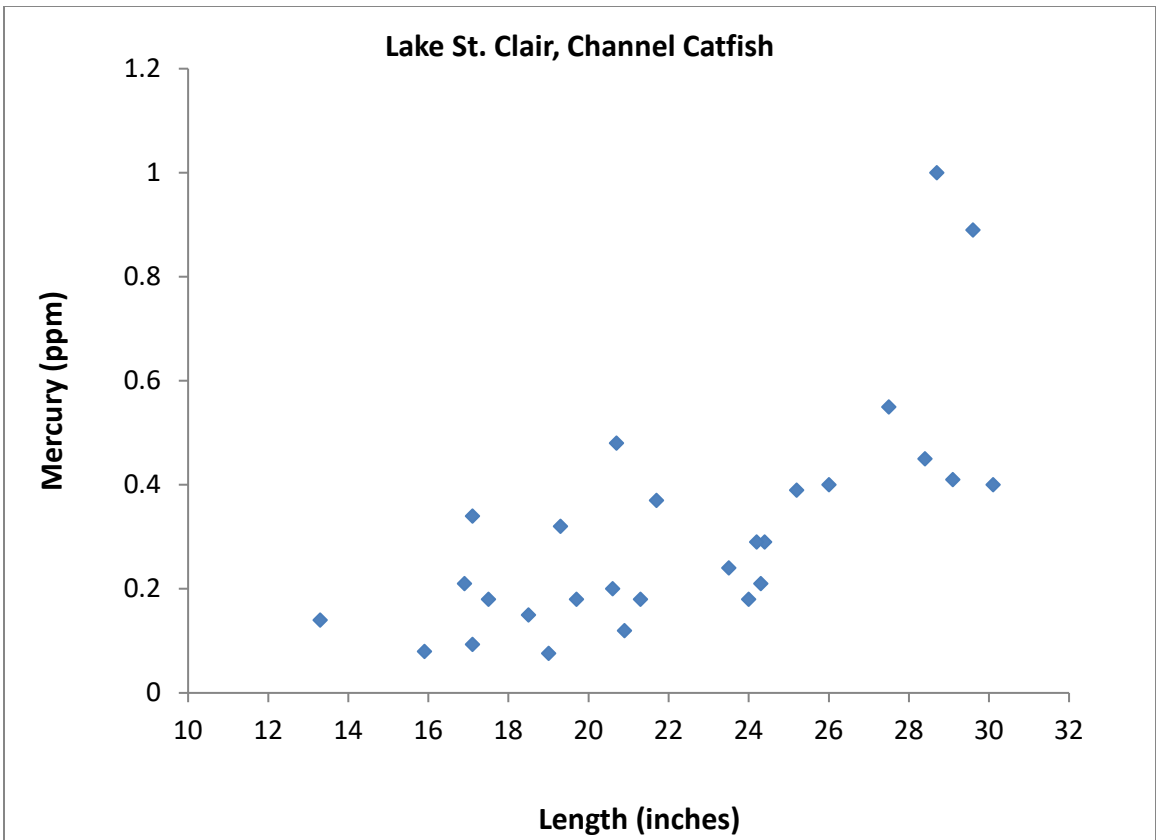
Organics Analysis:

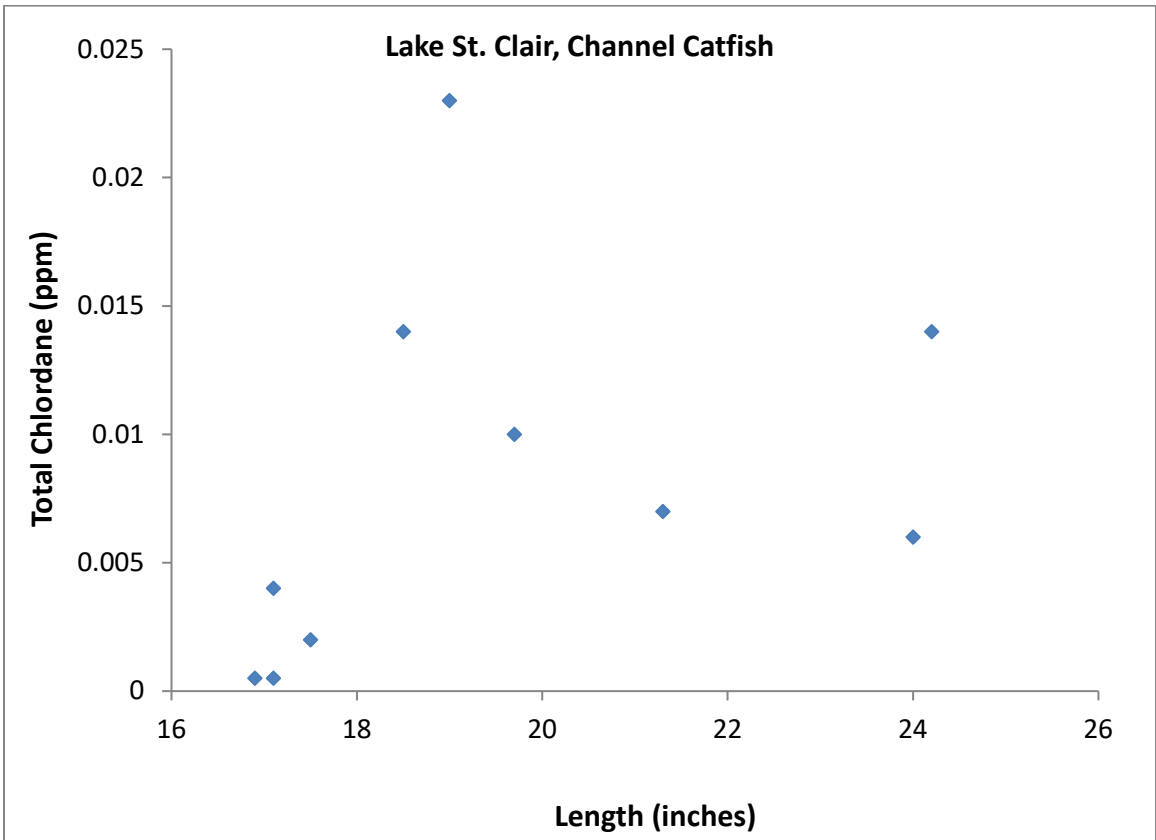
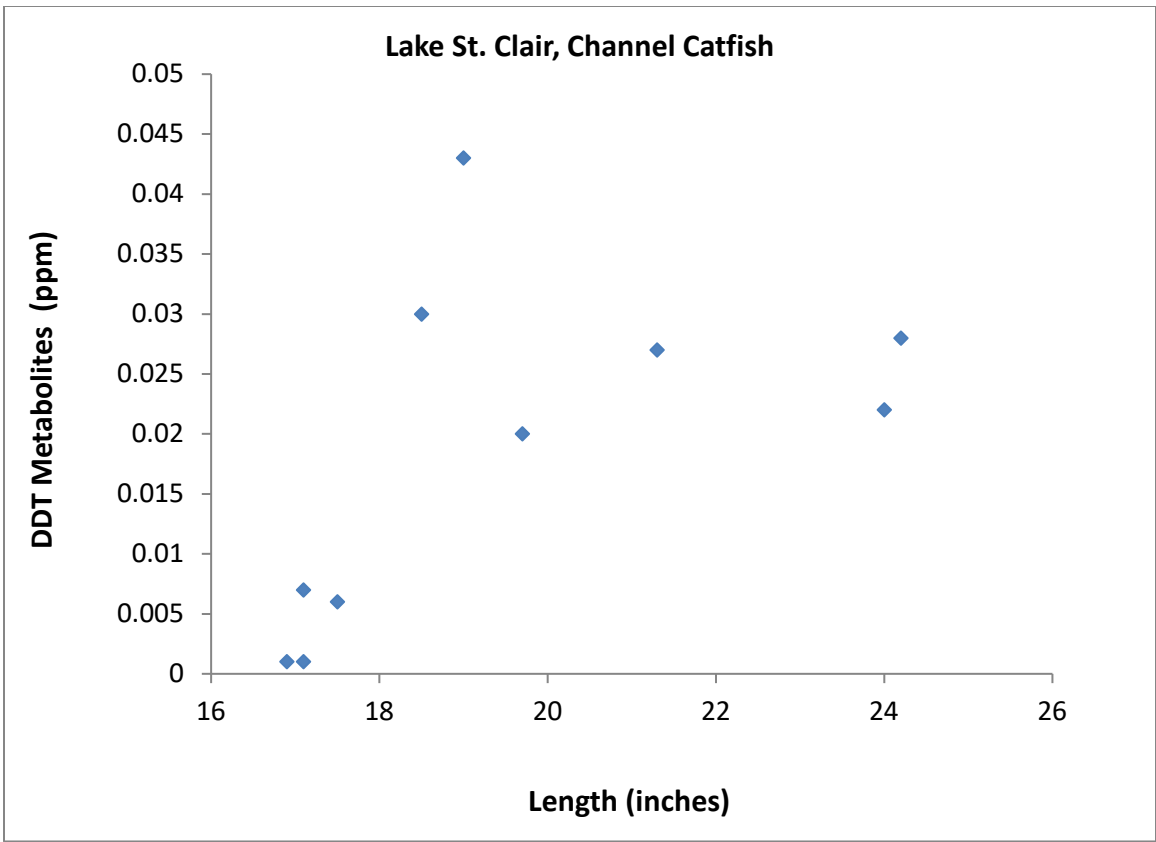
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2010	2010	10	16.9	12	16.9	24.2
Datasets available: 1987, 194, 1998, 2010						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
PCB	10	0.161	0.004	0.350	0.250	0.5
DDT	10	0.019	0.001	0.043	0.030	16
Chlordane	10	0.008	0.001	0.023	0.010	--
Toxaphene	9	ND	--	--	--	--
TEQ*	9	15 ppt	1.6 ppt	84 ppt	35 ppt	Limited
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.230	0.395				
DDT	0.296	0.395				
Chlordane	0.123	0.366				
Toxaphene	--	--				
TEQ*	0.057	0.006				
Final meal category based on UCL:						Limited

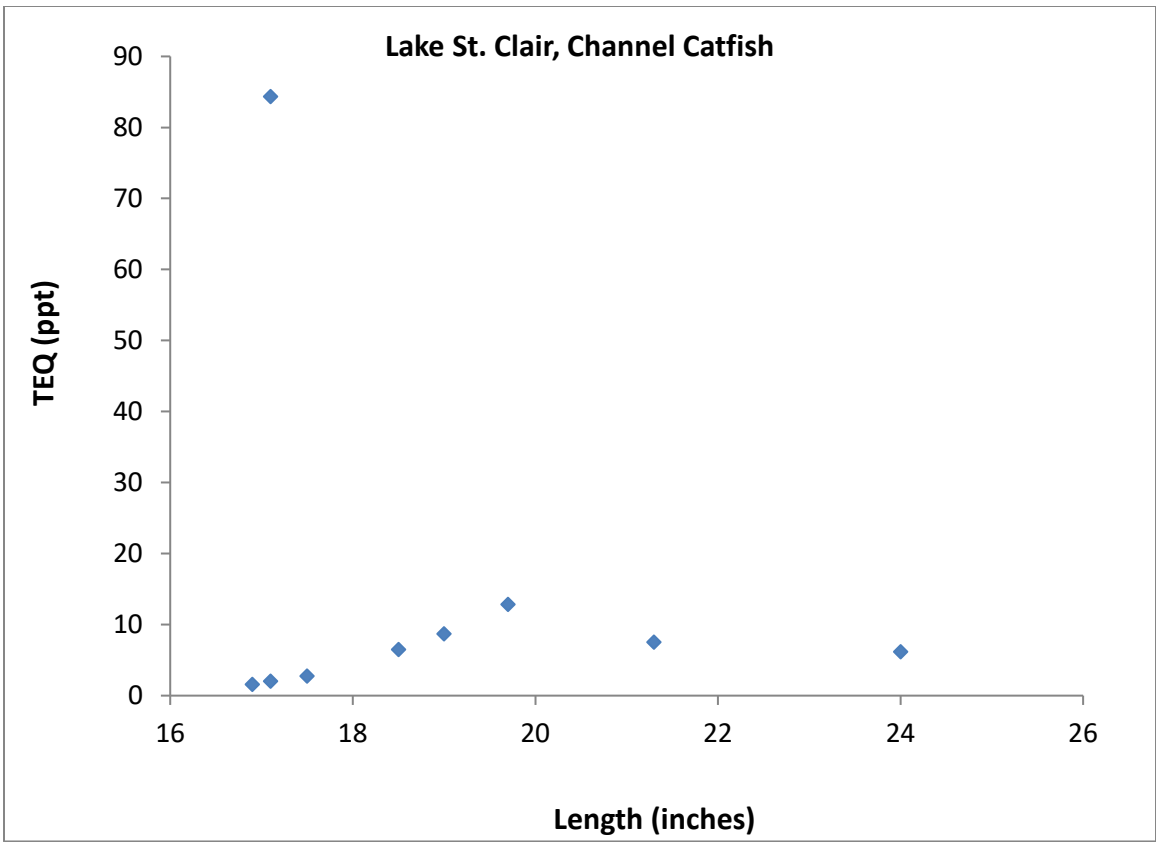
* 2005 WHO; dl-PCBs included

Existing Advisory: No one should eat Lake St. Clair channel catfish due to elevated concentrations of PCBs.

Recommendation: Sensitive populations should not eat these fish. Healthy adults should limit consumption of channel catfish from Lake St. Clair to no more than 1 or 2 meals per year due to dioxins. PCBs and mercury would cause advisories.







Freshwater Drum

Lake St. Clair

Hg Analysis:

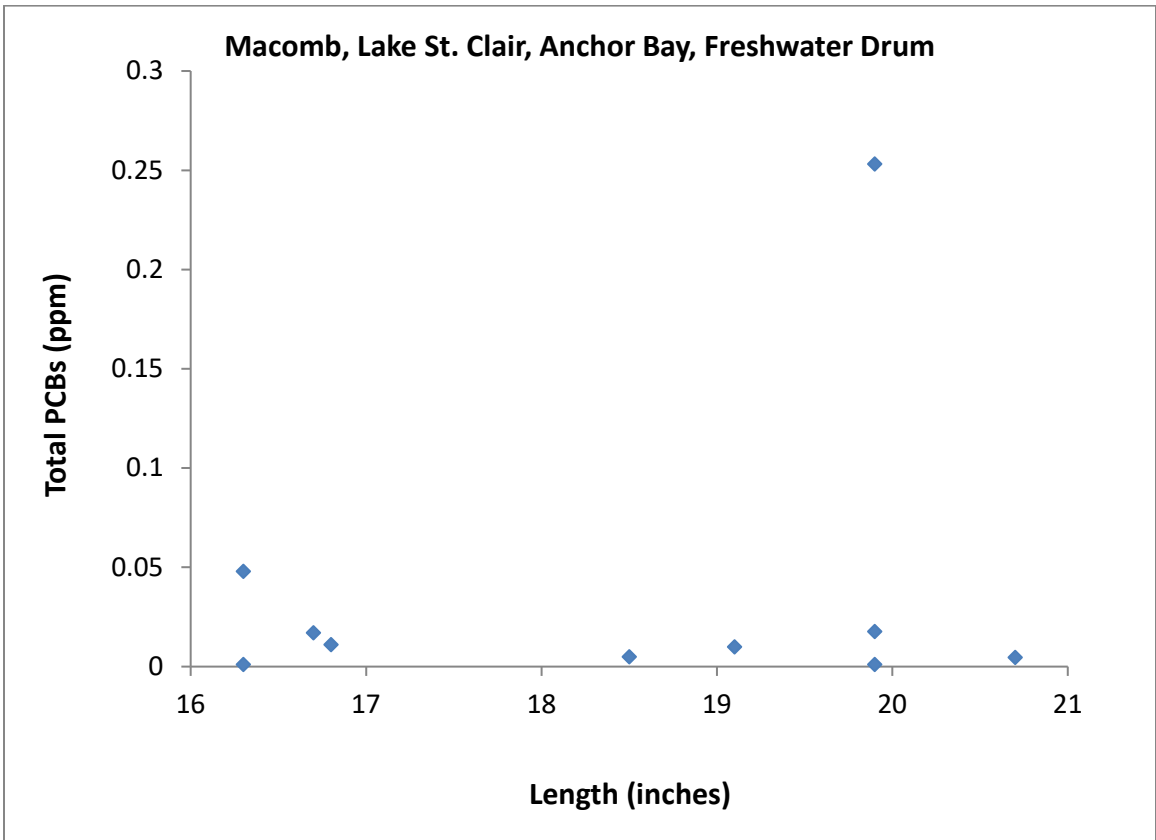
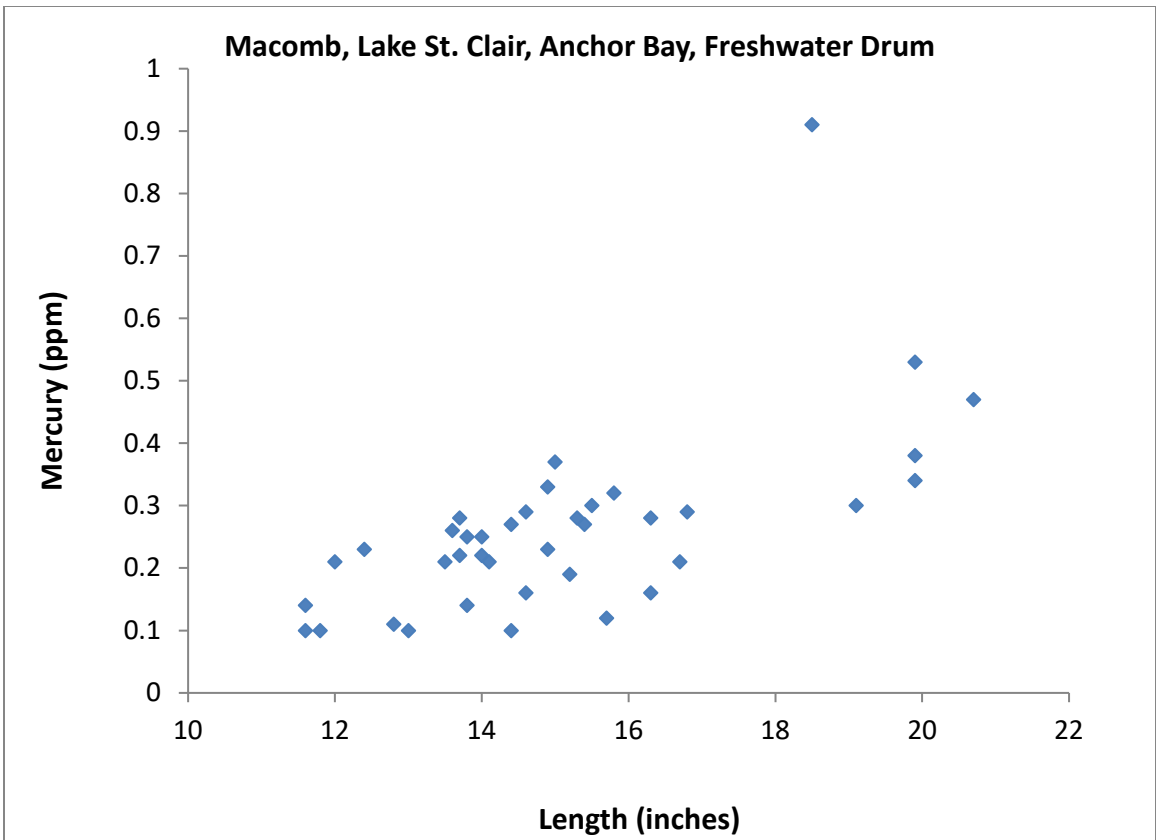
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1987	2010	39	11.6	na	11.6	20.7
Datasets available: 1987, '88, '94, '98, 2010						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
Mercury	39	0.26	0.10	0.91	0.31	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.195	0.374				

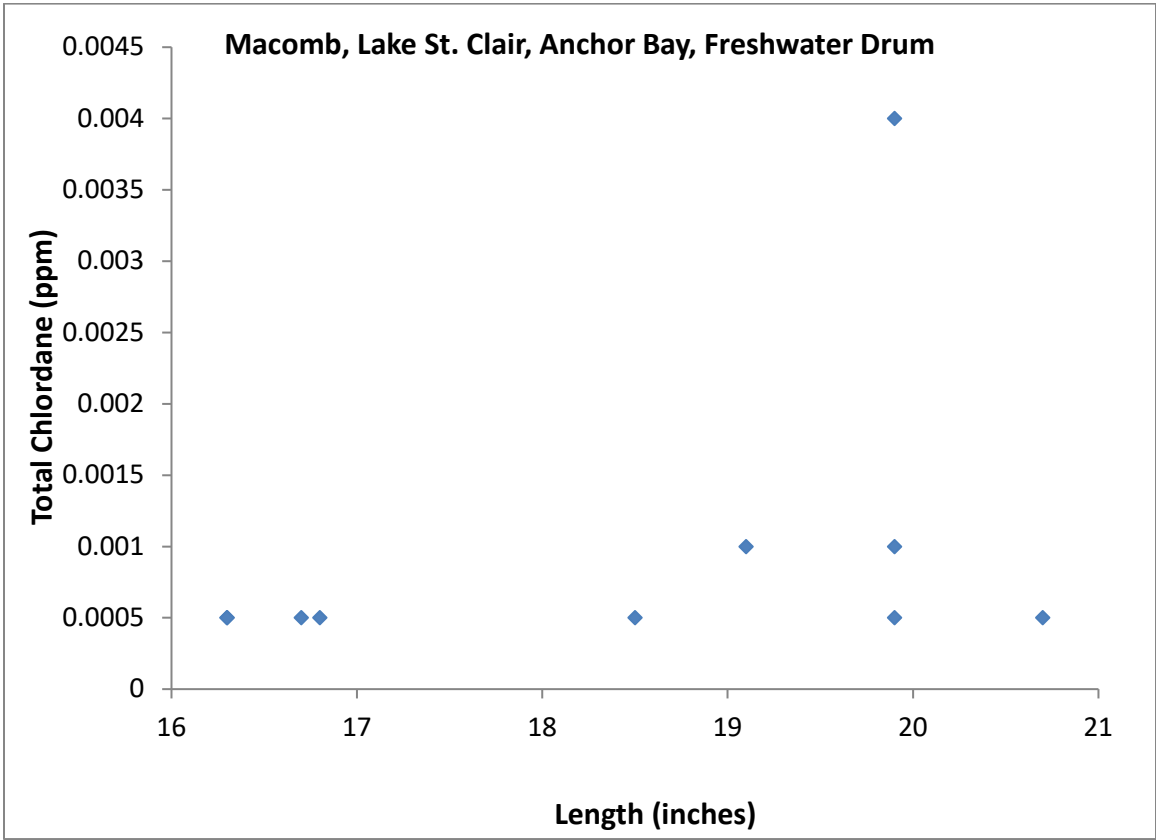
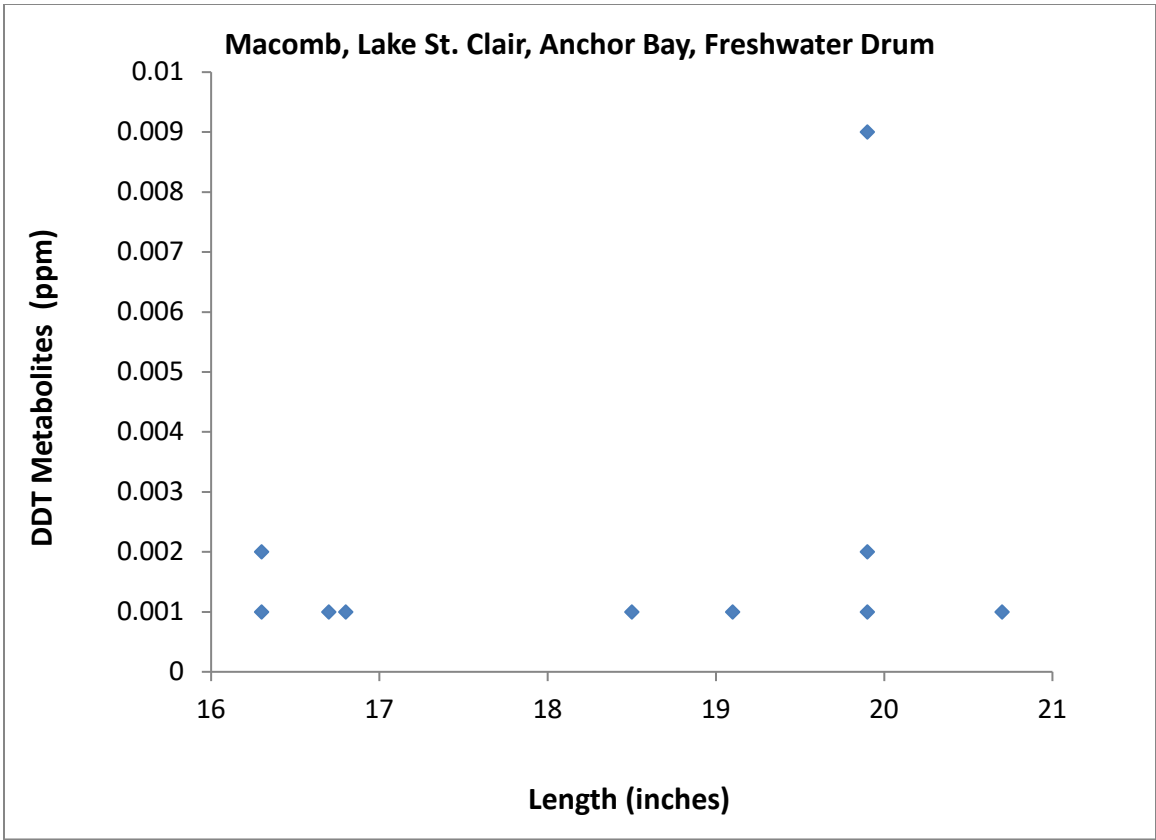
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2010	2010	10	16.3	na	16.3	20.7
Datasets available: 2010						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
PCB	10	0.037	0.001	0.253	0.090	2
DDT	10	0.002	0.001	0.009	0.004	16
Chlordane	10	0.001	0.001	0.004	0.002	--
Toxaphene	10	ND	--	--	--	--
TEQ	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.052	0.001				
DDT	0.085	0.067				
Chlordane	0.138	0.194				
Toxaphene	--	--				
TEQ	--	--				
Final meal category based on UCL:						2

Existing Advisory: Lake St. Clair freshwater drum are not covered by an advisory.

Recommendation: No one should eat more than 2 meals per month of Lake St. Clair freshwater drum due to mercury and PCBs.





Largemouth Bass

Lake St. Clair Over 2-Miles from Ten-Mile Canals

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	2017	46	11.2	14	13.5	20.5
Datasets available: 1986, 1987, 1988, 1994, 2001, 2003, 2010, 2011, 2017						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	40	0.40	0.09	1.1	0.46	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.644	0.675				

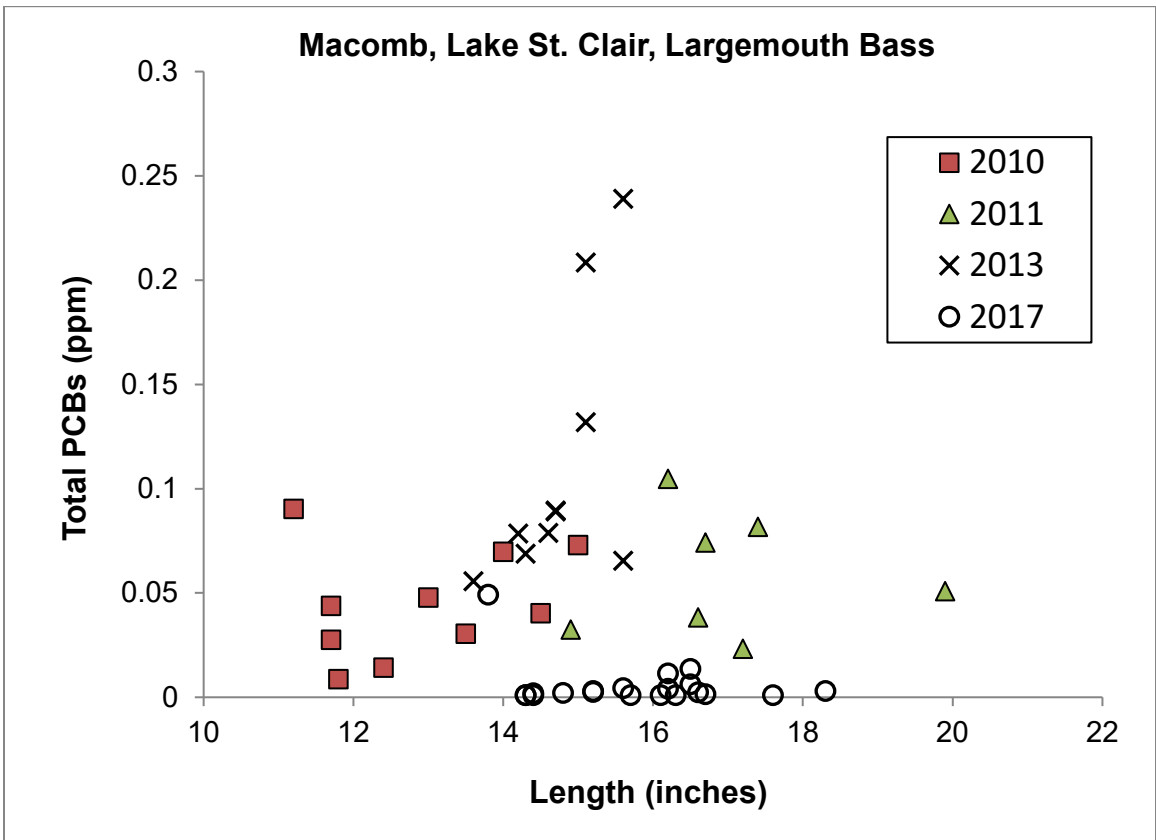
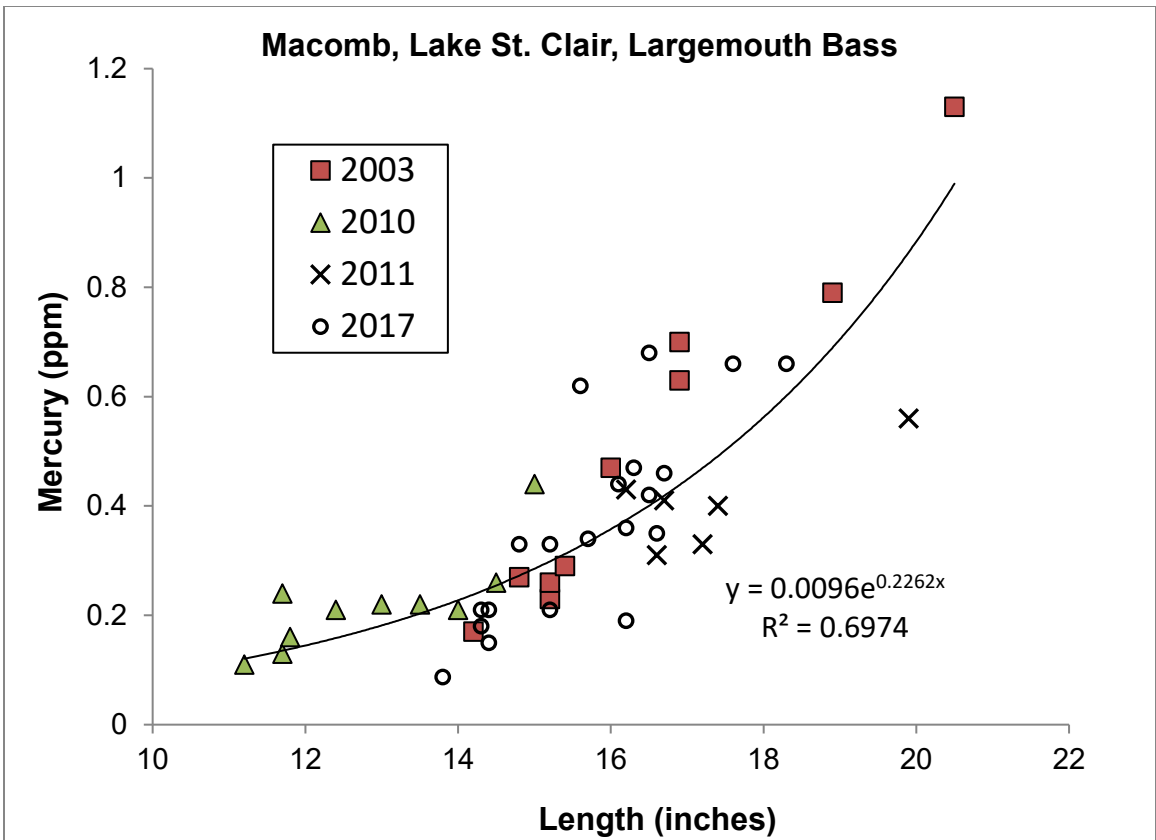
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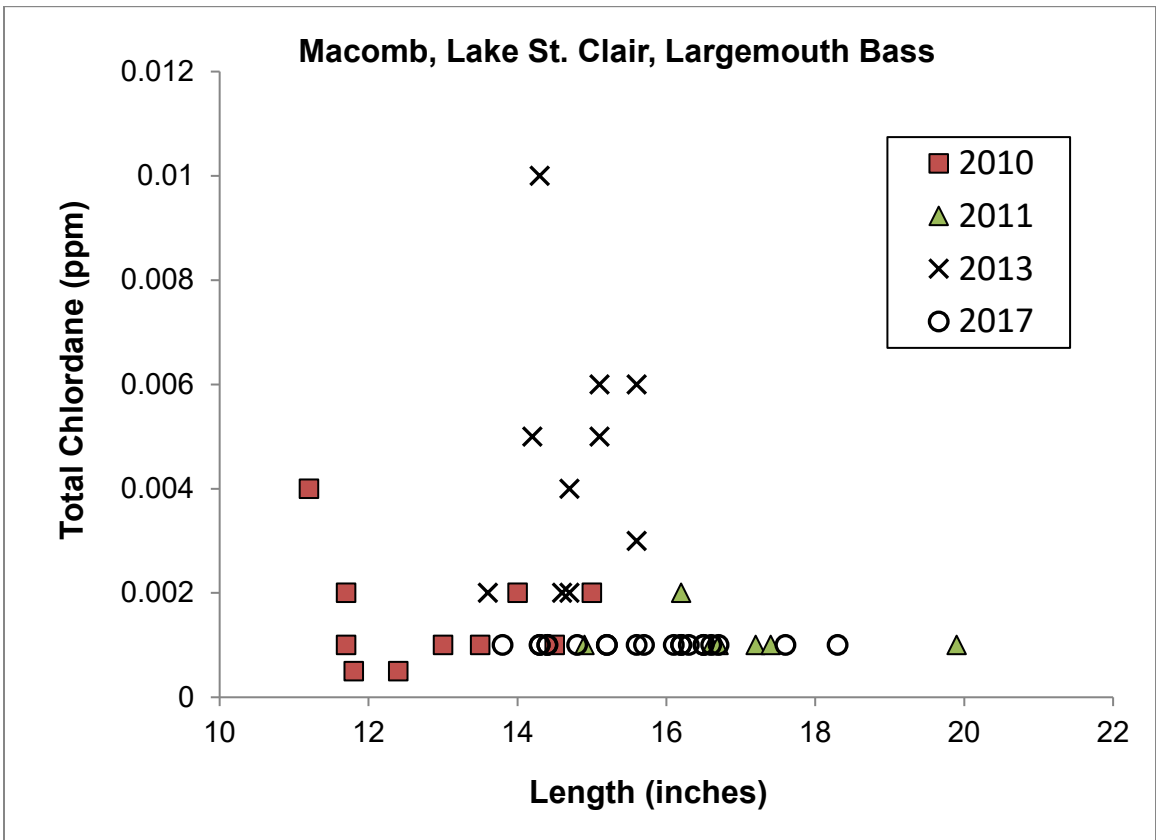
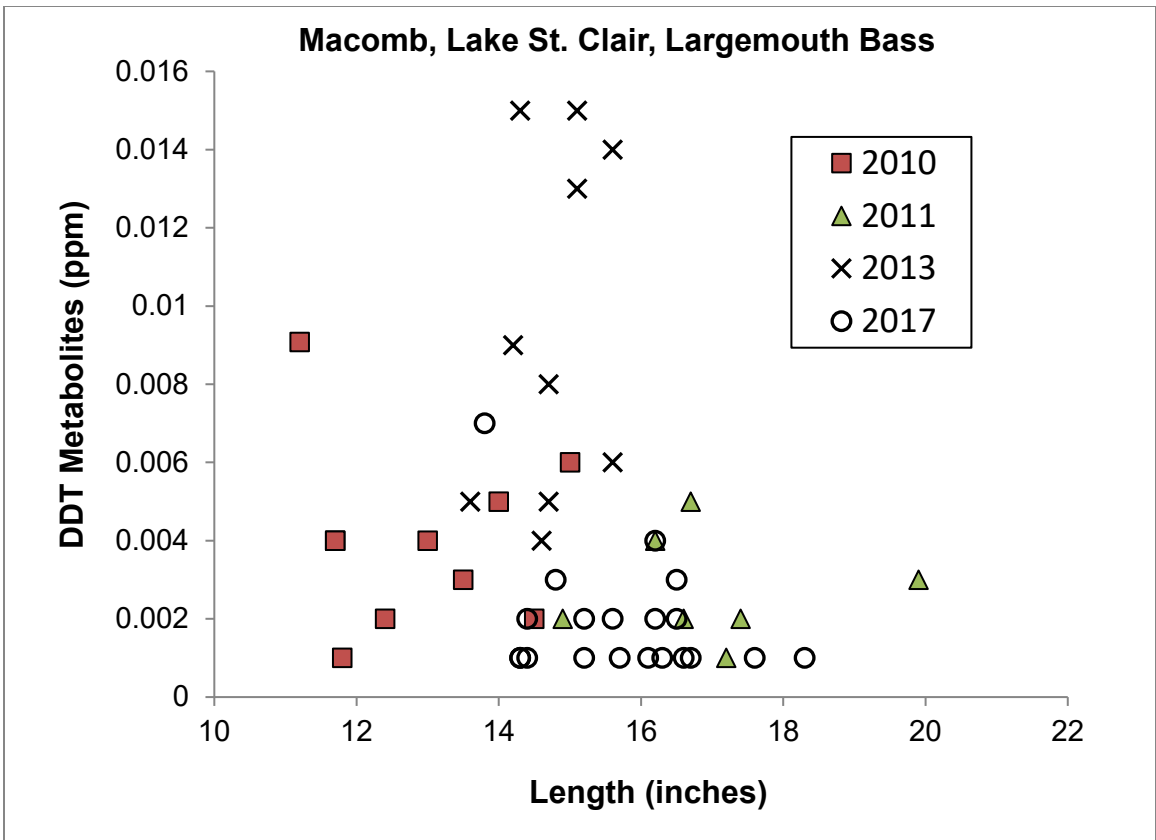
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2010	2017	47	11.2	14	13.5	19.9
Datasets available: 1987, 1988, 2001, 2003, 2010, 2011, 2017						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	41	0.045	< 0.001	0.24	0.06	2
DDT	41	0.004	< 0.001	0.02	0.005	16
Chlordane	41	0.002	< 0.001	0.01	0.003	--
Toxaphene	41	ND	< 0.05	< 0.05	--	--
PFOS	20	26 ppb	12 ppb	42 ppb	30 ppb	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.006	0.039				
DDT	0.049	0.083				
Chlordane	0.024	0.021				
Toxaphene	--	--				
PFOS	0.017	0.020				
Final meal category based on UCL:						2

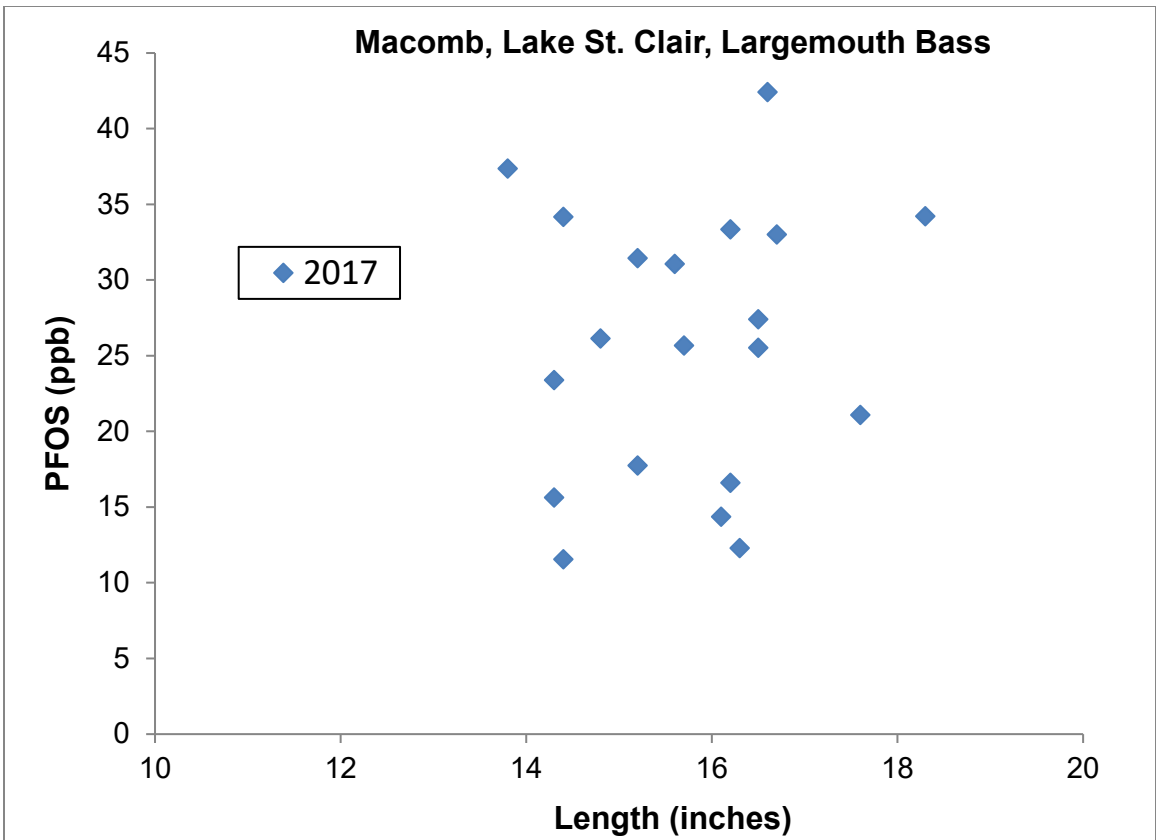
Existing MDHHS Advisory: No one should eat more than 2 meals per month of largemouth or smallmouth bass less than 20 inches or more than 1 meal per month greater than 20 inches from Lake St. Clair due to PCBs and mercury.

Recommendation: No one should eat more than 2 meals per month of largemouth or smallmouth bass less than 17 inches due to mercury and PCBs or more than 1 meal per month greater than 17 inches from Lake St. Clair due to mercury. PFOS should be added to the list of contaminants causing an advisory.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
12	0.14	4
14	0.23	4
16	0.36	2
17	0.45	2
18	0.56	1
20	0.89	1
22	1.39	0.5
24	2.19	0.5
<i>Shaded area denotes extrapolated estimates</i>		







Muskellunge

Lake St. Clair

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1985	2010	18	24.8	42	42	49
Datasets available: 1985, 2001, 2010						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
Mercury	8	2.03	1.2	3.1	2.6	0
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.303	0.621				

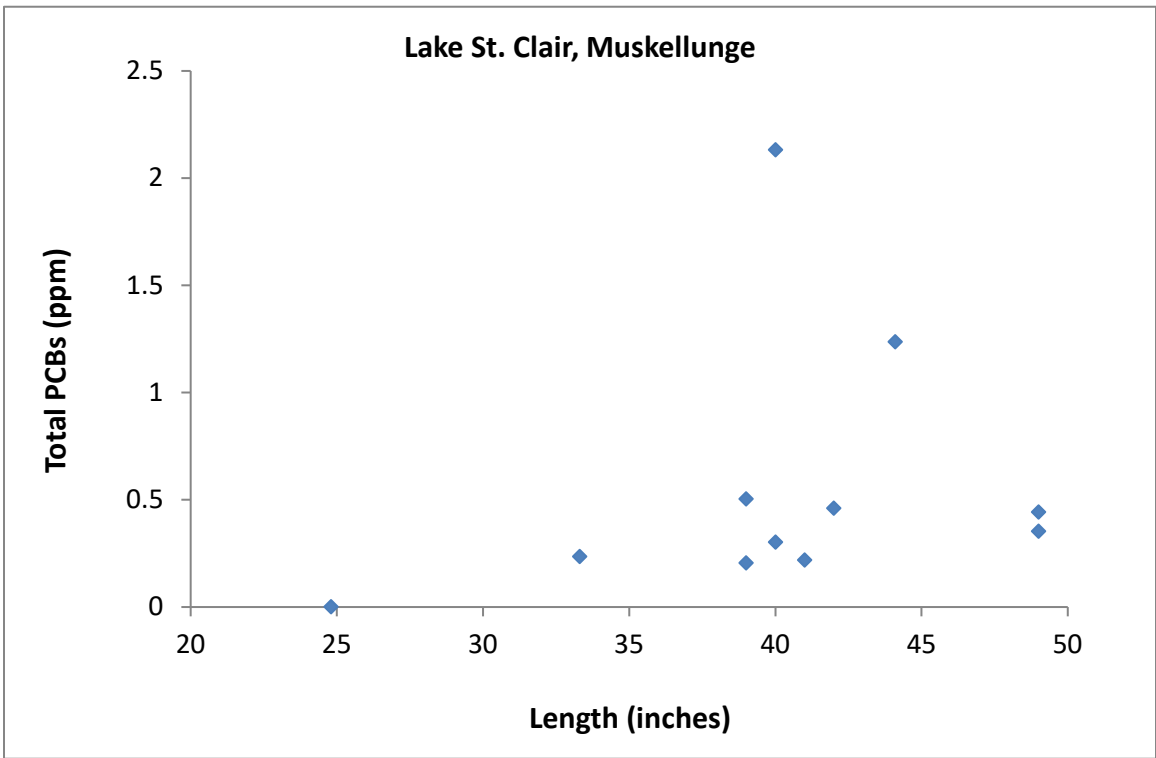
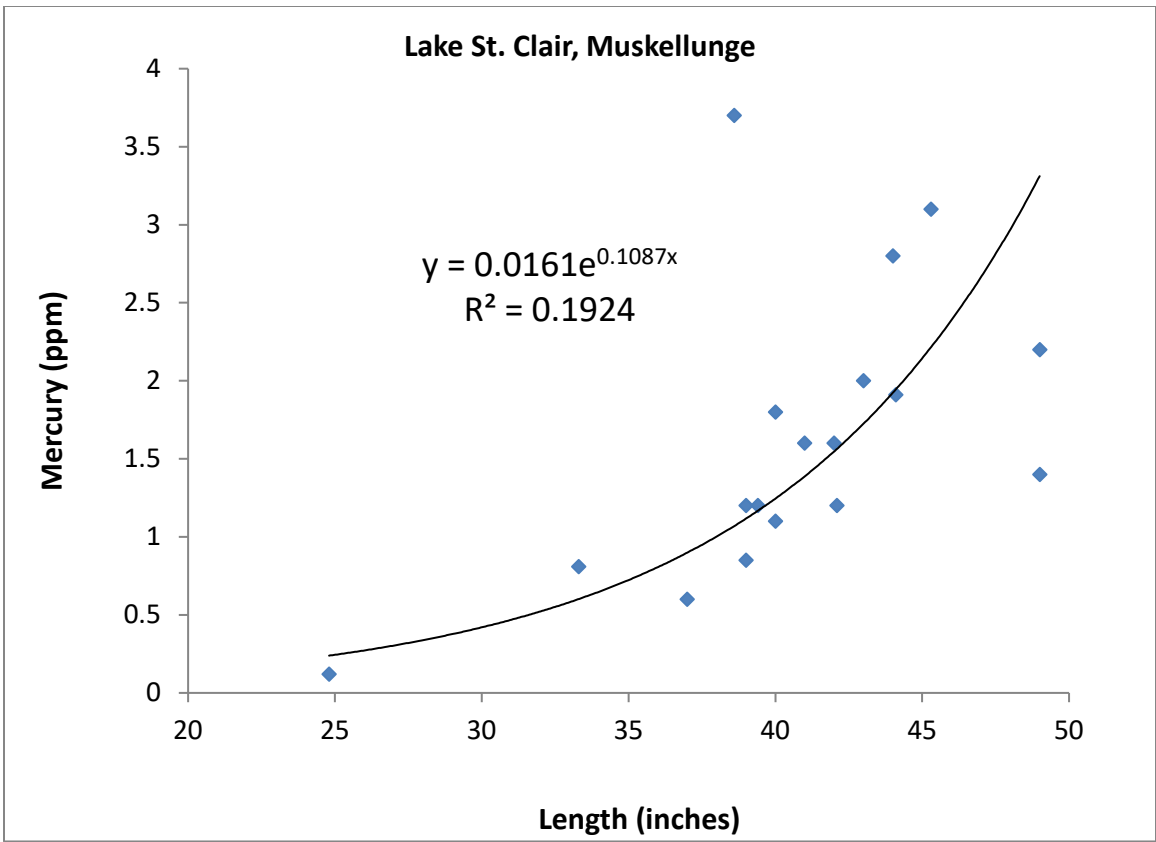
Organics Analysis:

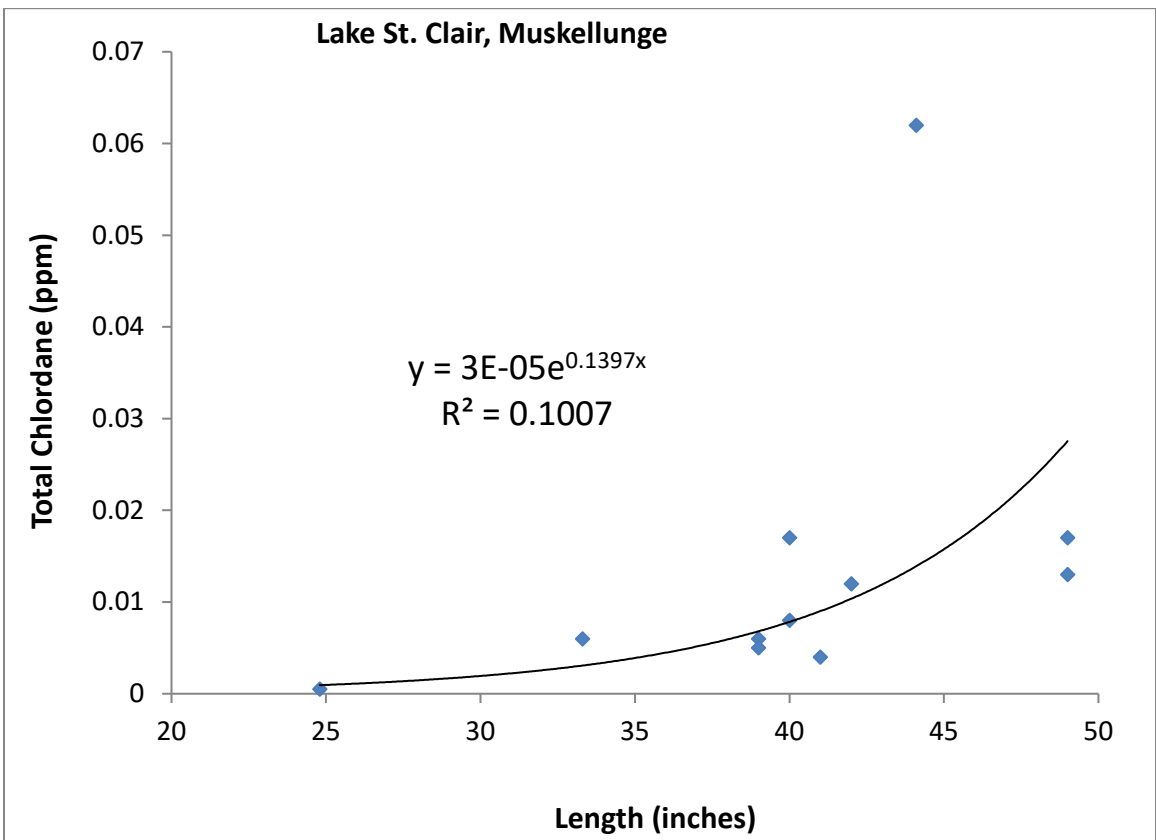
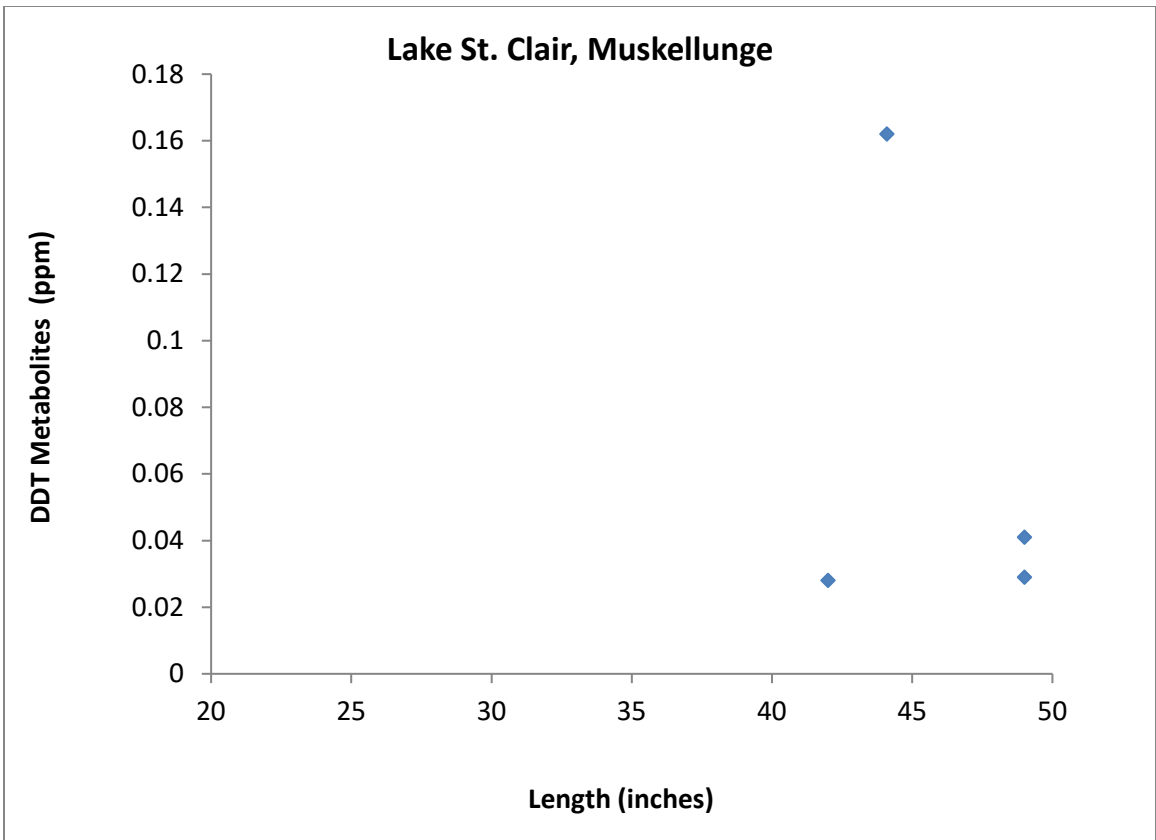
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2001	2010	11	24.8	42	42	49
Datasets available: 1985, 2001, 2010						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
PCB	4	0.62	0.35	1.24	--	--
DDT	4	0.06	0.03	0.16	--	--
Chlordane	4	0.03	0.01	0.06	--	--
Toxaphene	4	ND	--	--	--	--
TEQ	0	--				
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.063	0.544				
DDT	0.136	0.563				
Chlordane	0.173	0.631				
Toxaphene	--	--				
TEQ	--	--				
Final meal category based on UCL:						0

Existing Advisory: No one should eat Lake St. Clair muskellunge due to elevated concentrations of mercury and PCBs.

Recommendation: No one should eat Lake St. Clair muskellunge due to mercury. PCBs and DDT would cause advisories.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
30	0.42	2
35	0.72	1
40	1.24	0.5
45	2.14	0.5
50	3.69	0
55	6.36	0
<i>Shaded area denotes extrapolated estimates</i>		





Northern Pike

Lake St. Clair

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	
1994	2010	30	20.3	24	23.6	35.8	
Datasets available: 1994, 1997, 2010							
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL		
Mercury	25	0.36	0.12	0.64	0.41	2	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.100	0.109					

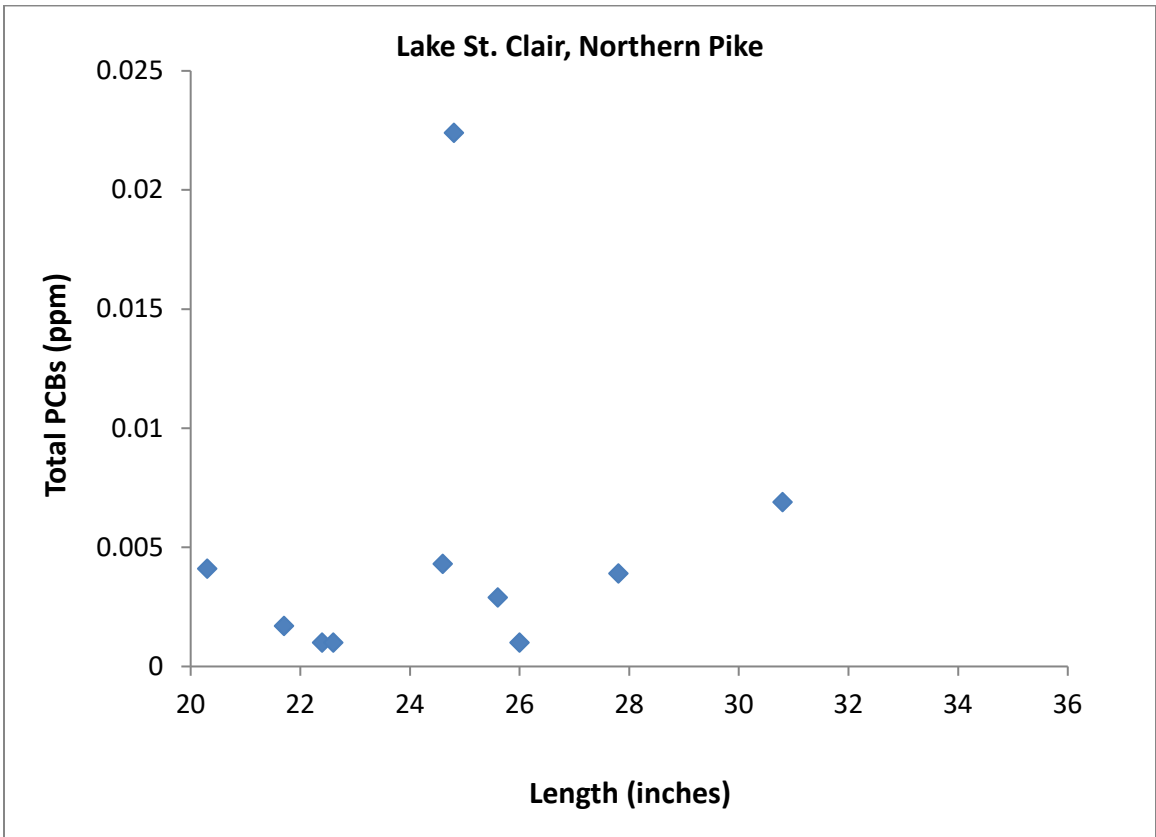
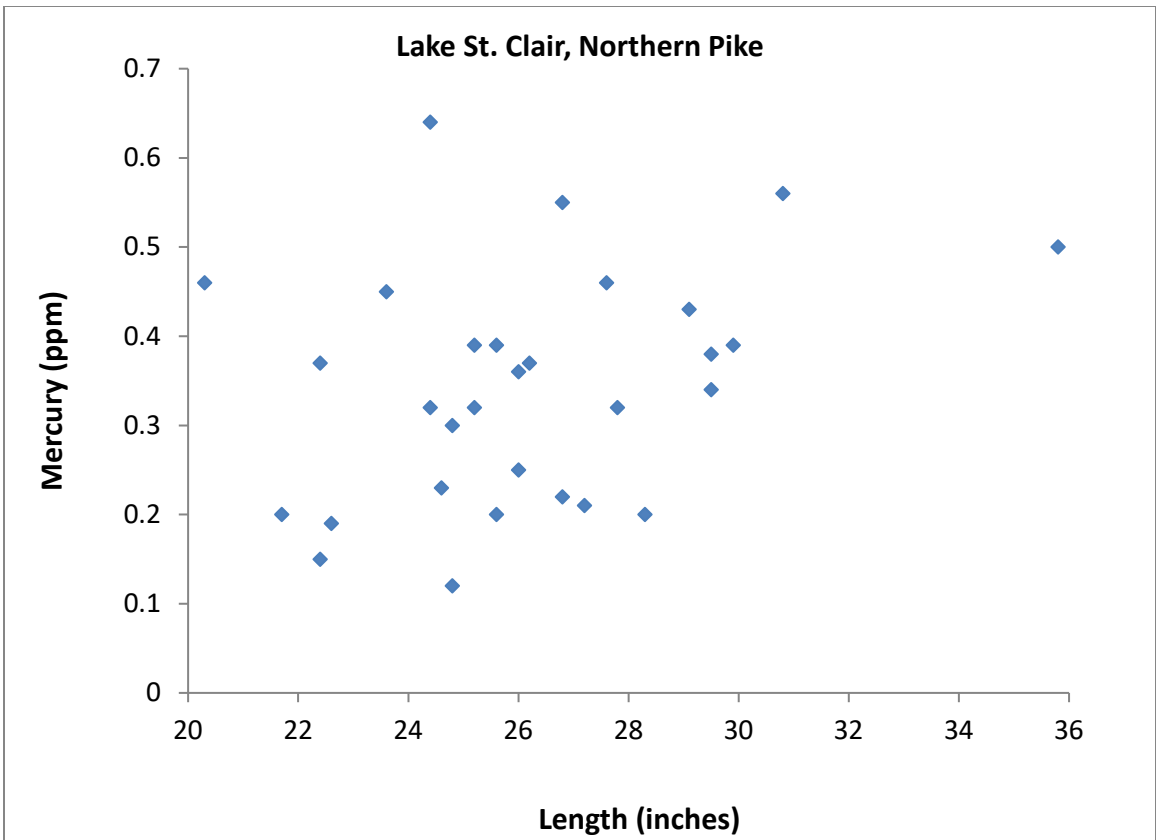
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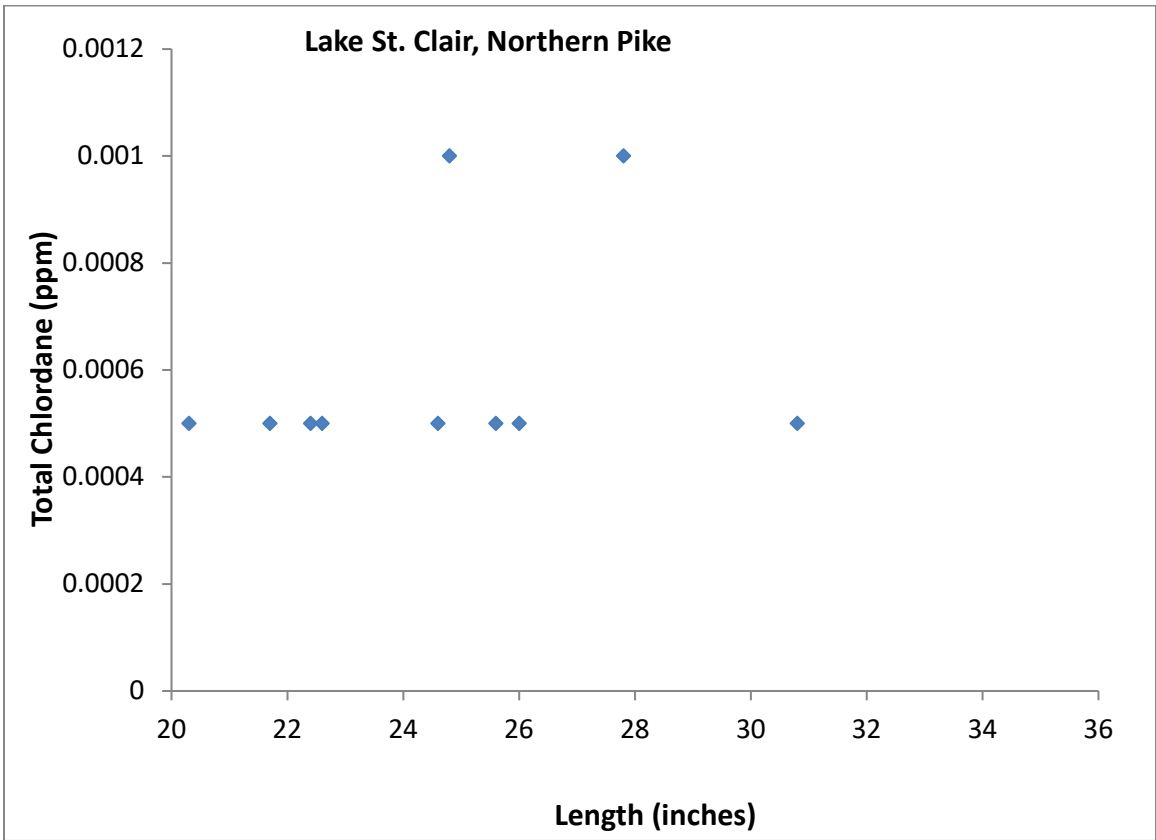
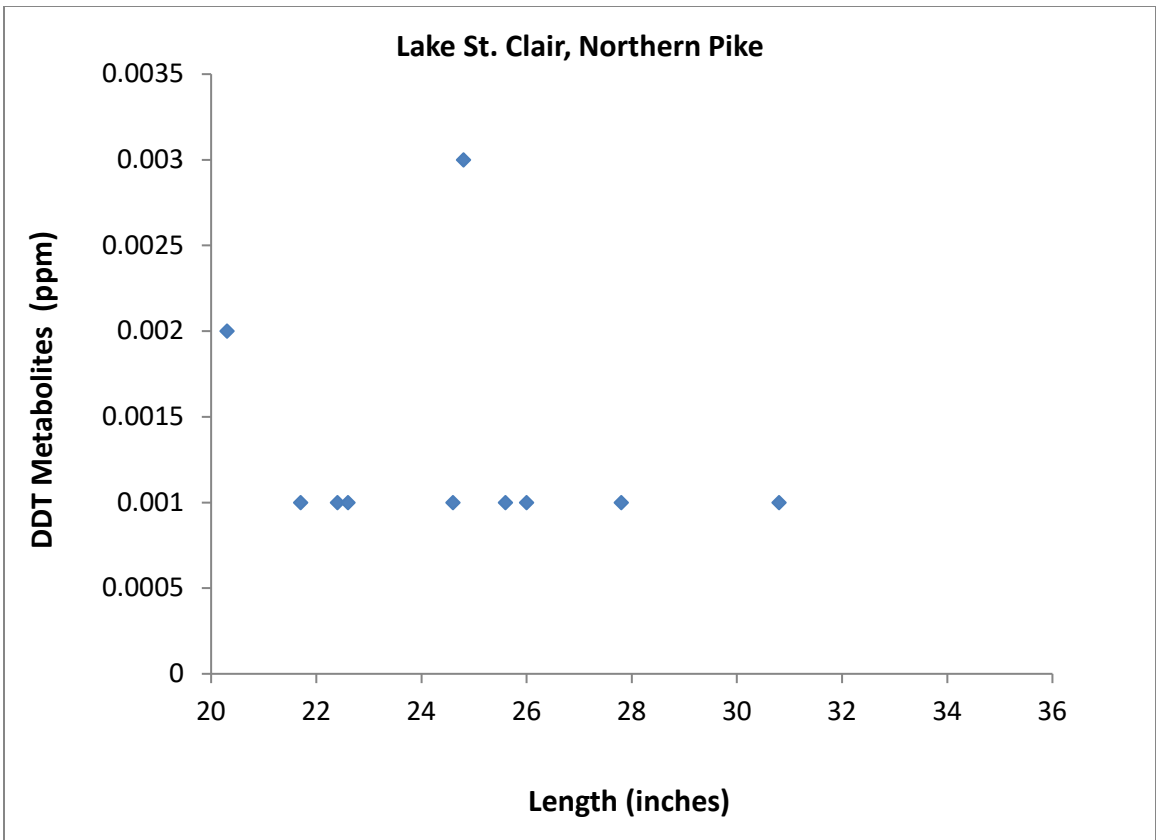
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
2010	2010	10	20.3	24	24.6	30.8	
Datasets available: 1994, 1997, 2010							
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL		
PCB	6	0.007	0.001	0.022	0.015	12	
DDT	6	0.001	0.001	0.003	0.002	16	
Chlordane	6	0.001	0.001	0.001	0.001	--	
Toxaphene	6	ND	--	--	--	--	
TEQ	0	--	--	--	--	--	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.036	0.121					
DDT	0.046	0.069					
Chlordane	0.077	0.077					
Toxaphene	0.023	0.023					
TEQ	--	--					
Final meal category based on UCL:							2

Existing Advisory: Women and children should not eat more than 1 meal per month of northern pike larger than 26 inches from Lake St. Clair due to elevated concentrations of mercury.

Recommendation: No one should eat more than 2 meals per month of Lake St. Clair northern pike due to mercury. PCBs would cause an advisory.

Note: These fish were not collected in the vicinity of the Lange/Revere canals.





Rock Bass

Lake St. Clair

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	2010	29	7.7	na	7.1	10.7	
Datasets available: 1987, 1994, 2010							
Chemical	Sample Size (Legal)	Mean		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
Mercury	29	0.18		0.09	0.31	0.20	4
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.163	0.166					

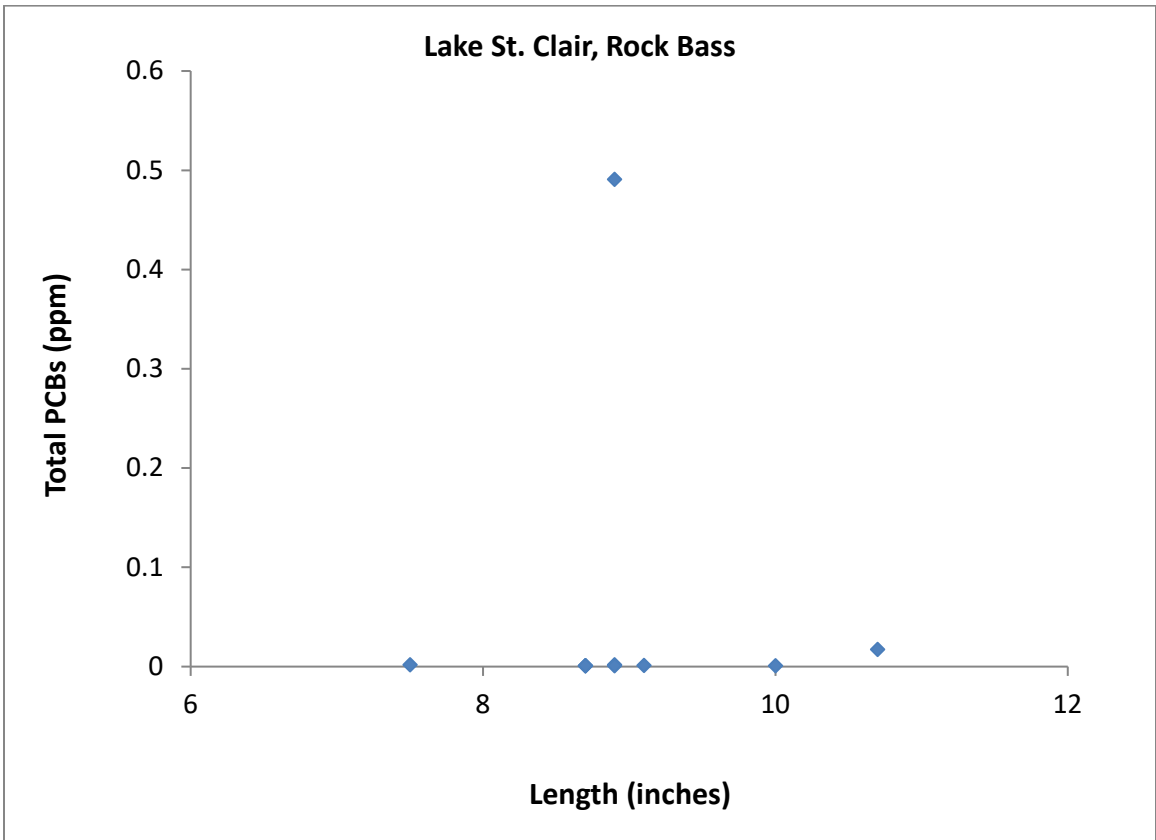
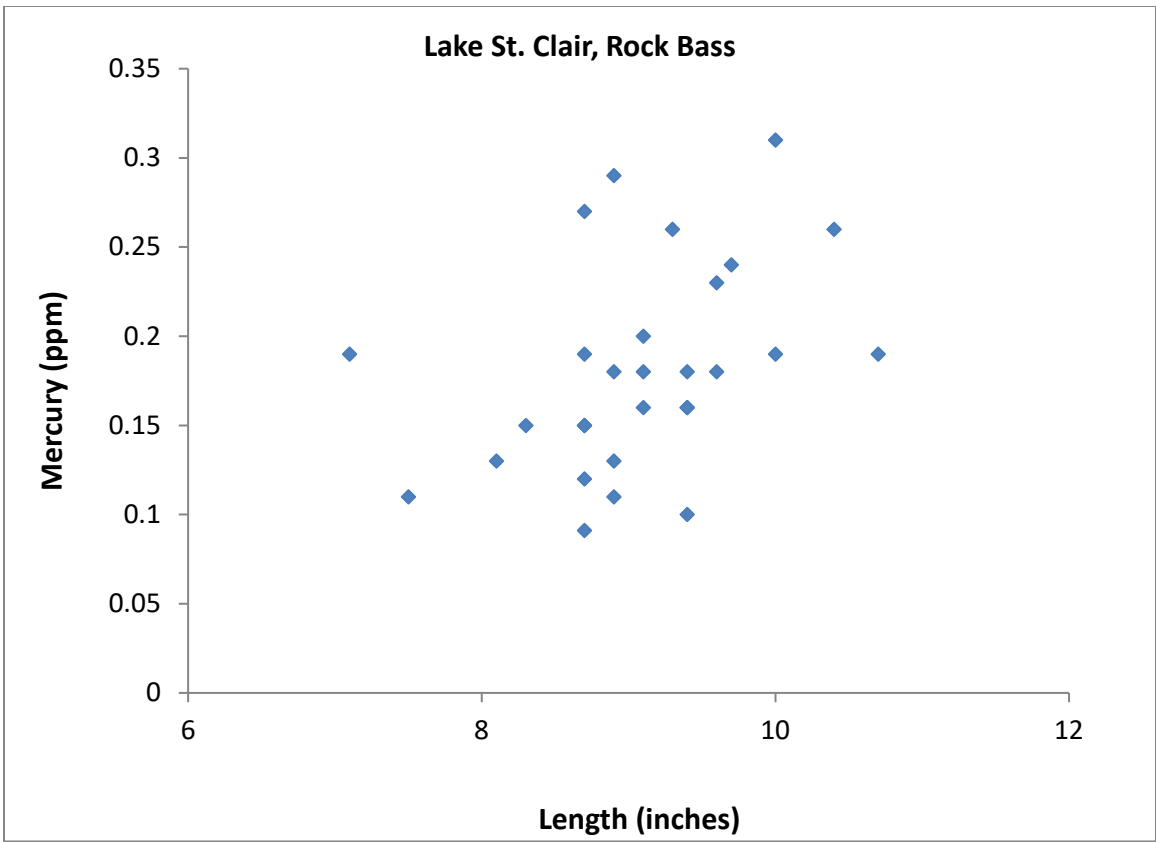
Organics Analysis:

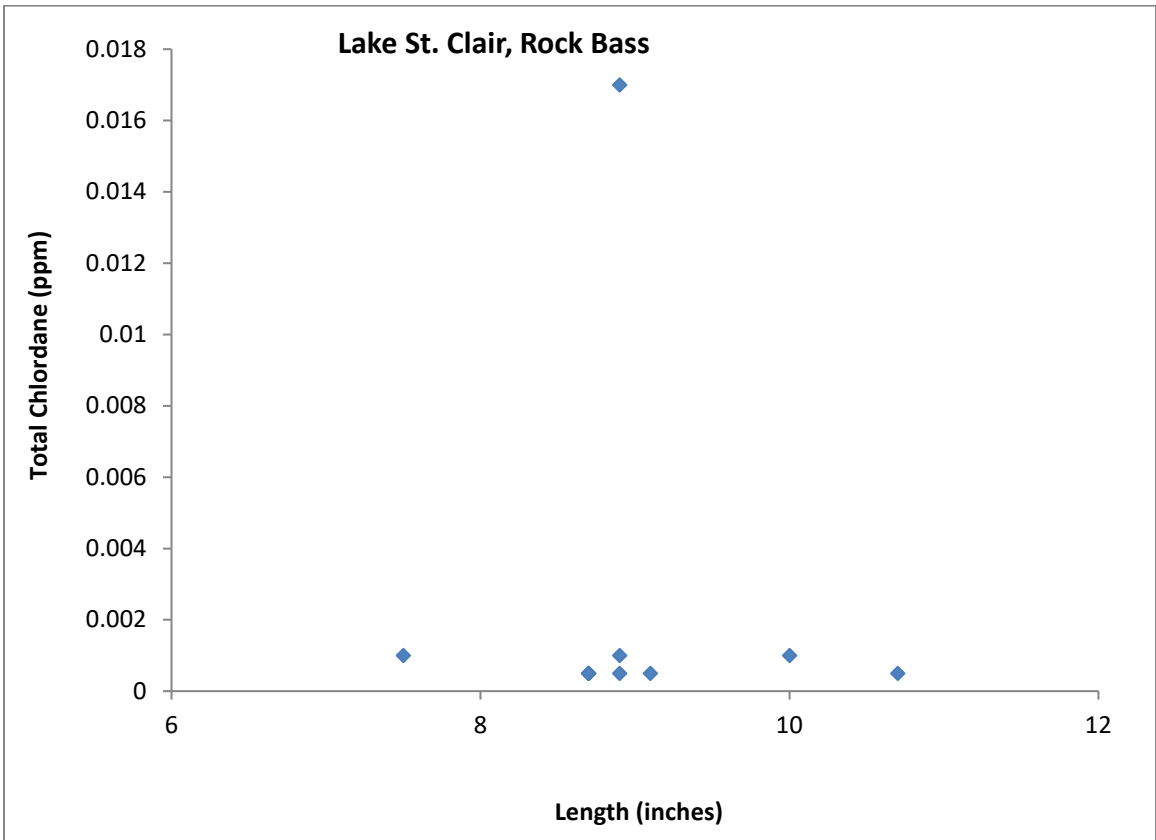
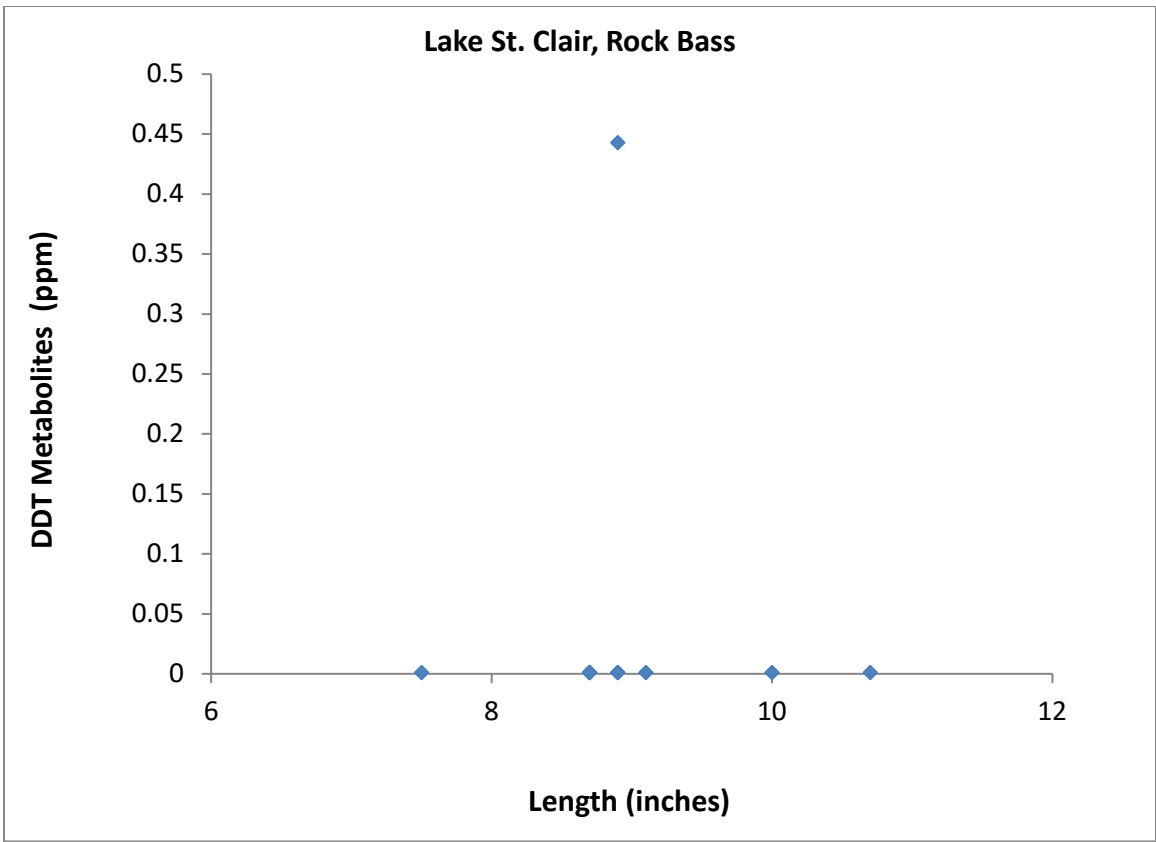
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
2010	2010	10	7.5	na	7.5	10.7	
Datasets available: 1987, 2010							
Chemical	Sample Size (Legal)	Mean		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
PCB	10	0.052		0.001	0.491	0.160	1
DDT	10	0.045		0.001	0.443	0.150	12
Chlordane	10	0.002		0.001	0.017	0.010	--
Toxaphene	10	ND		--	--	--	--
TEQ	0	--		--	--	--	--
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.001	0.041					
DDT	0.002	0.002					
Chlordane	0.003	0.010					
Toxaphene	--	--					
TEQ	--	--					
Final meal category based on UCL:							1

Existing Advisory: Lake St. Clair rock bass are not covered by an advisory.

Recommendation: No one should eat more than 1 meal per month of Lake St. Clair rock bass due to PCBs. Mercury and DDT would cause advisories.

Note: PCB and DDT advisories would be driven by 1 sample collected in 2010 with relatively high concentrations. All other 2010 samples were at or near detection levels.





Yellow Perch

**Lake St. Clair
Over 2-Miles from Ten-Mile Canals**

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
1988	2010	27	6.7	na	6.7	12.2	
Datasets available: 1988, 1994, 2010							
Chemical	Sample Size (Legal)	Mean		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
Mercury	27	0.15		0.07	0.98	0.22	4
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.248	0.345					

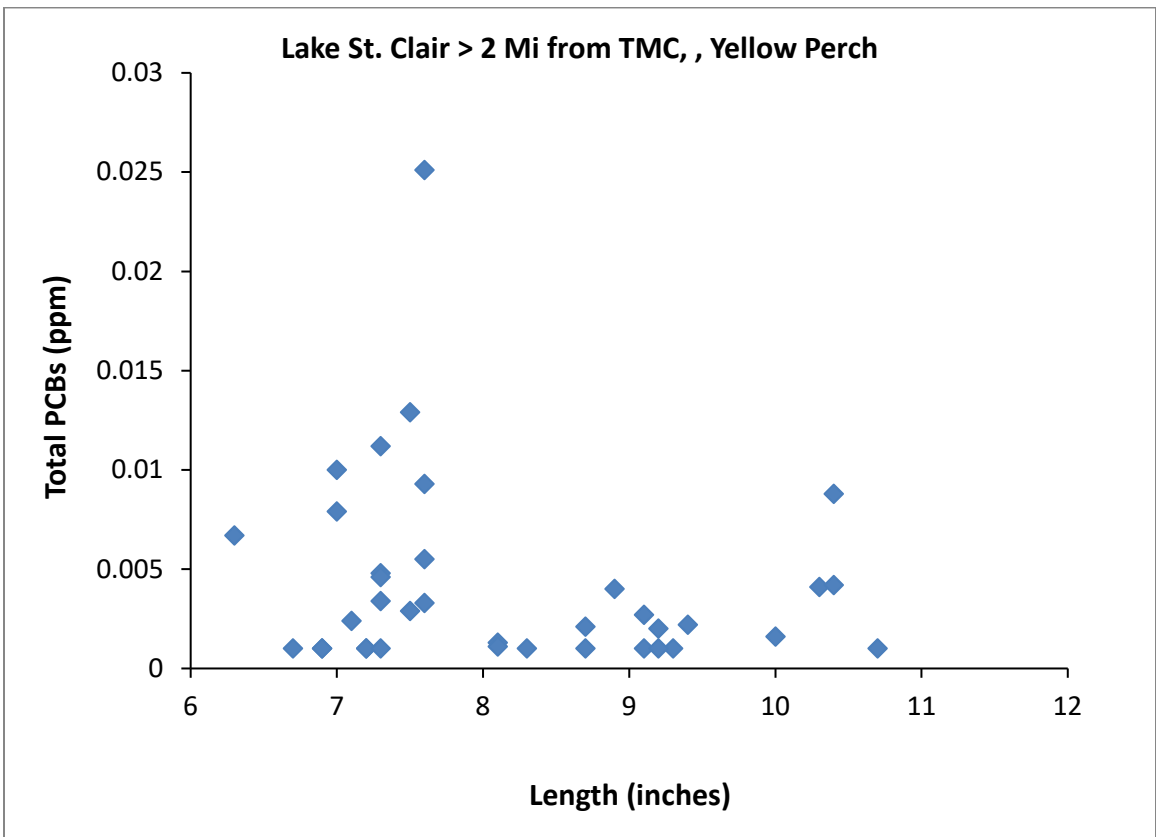
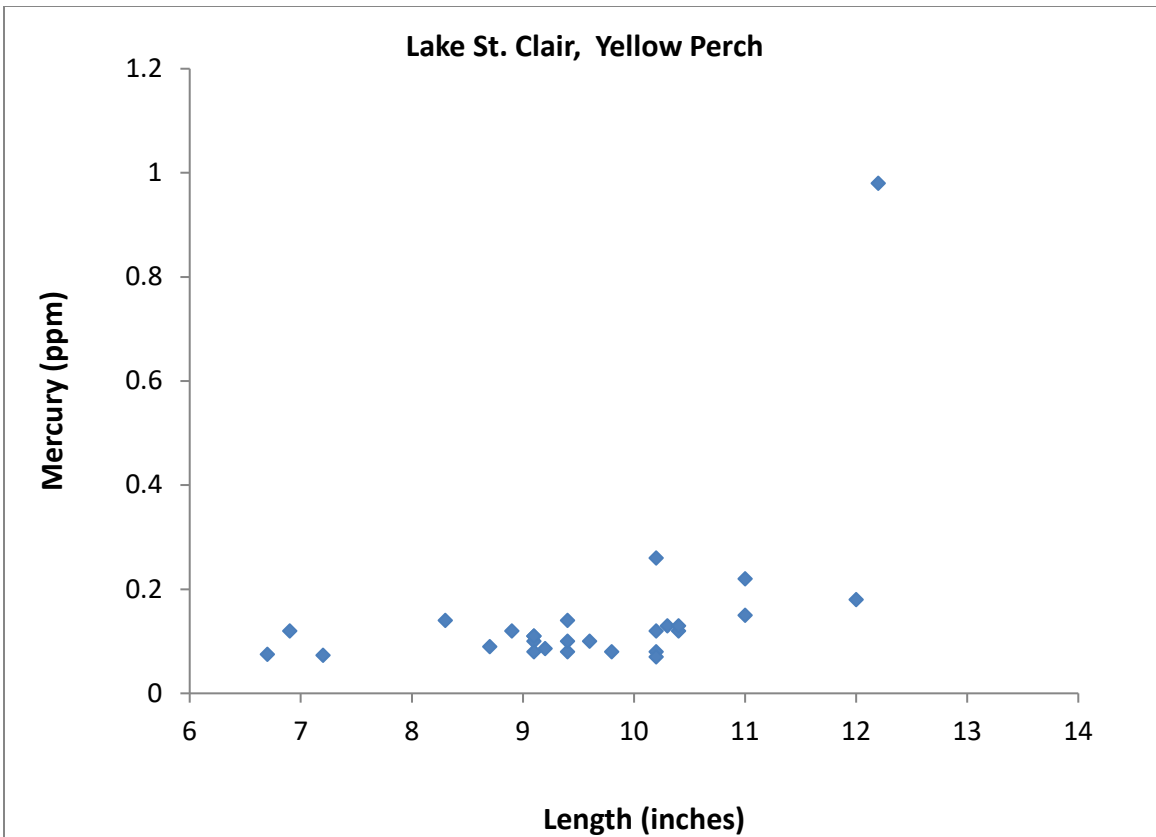
Organics Analysis:

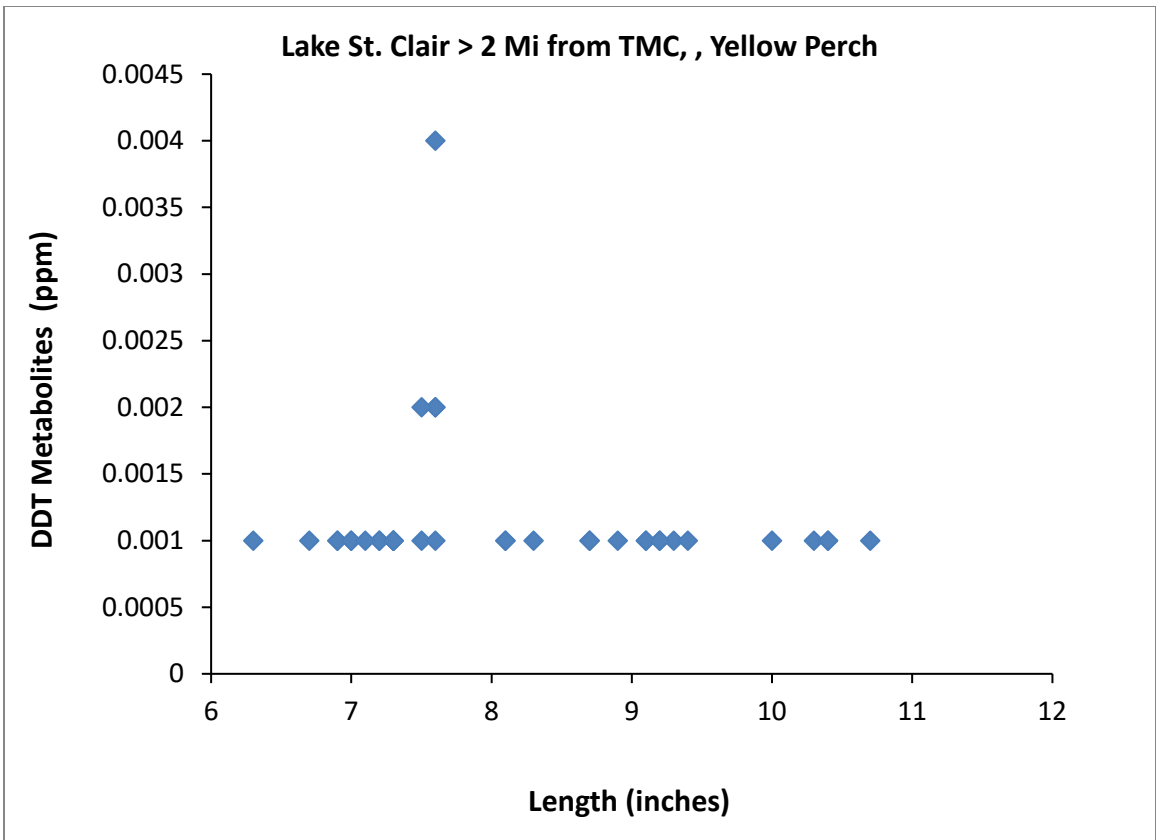
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
2010	2011	37	6.3	na	6.3	10.7	
Datasets available: 1988, 1994, 2010, 2011							
Chemical	Sample Size (Legal)	Mean		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
PCB	37	0.004		0.001	0.025	0.006	16
DDT	37	0.001		0.001	0.004	0.001	16
Chlordane	37	ND		--	--	--	--
Toxaphene	37	ND		--	--	--	--
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.037	0.026					
DDT	0.021	0.026					
Chlordane	0.165	0.165					
Toxaphene	--	--					
Final meal category based on UCL:							4

Existing Advisory: Lake St. Clair yellow perch are not covered by an advisory.

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

Note: Including yellow perch caught within 2 mile radius of Lange/Revere canals produces a 95% UCL of 0.03 ppm.





Black Crappie

**Lake St. Clair
Lange/Revere Canals**

Macomb 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	8	5.6	na	5.6	9.8
Datasets available: 2010						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	8	0.07	0.039	0.12	0.090	12
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.887	0.901				

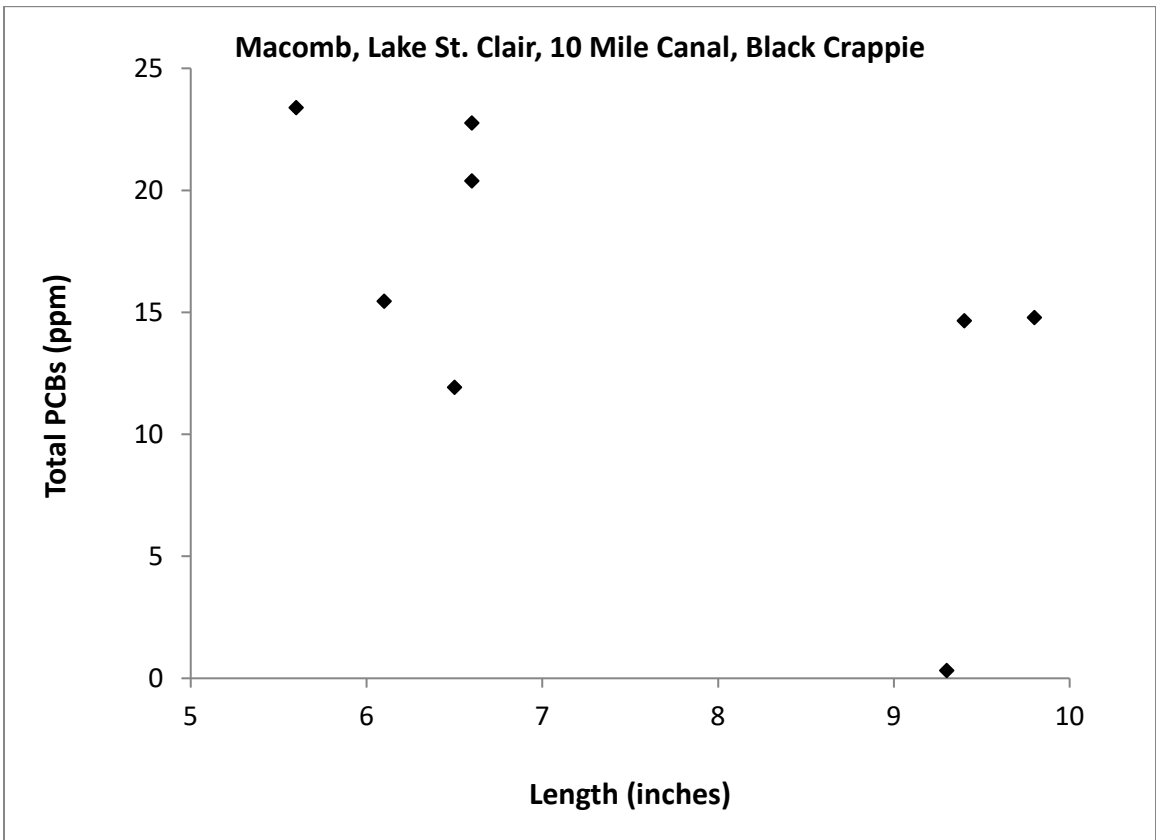
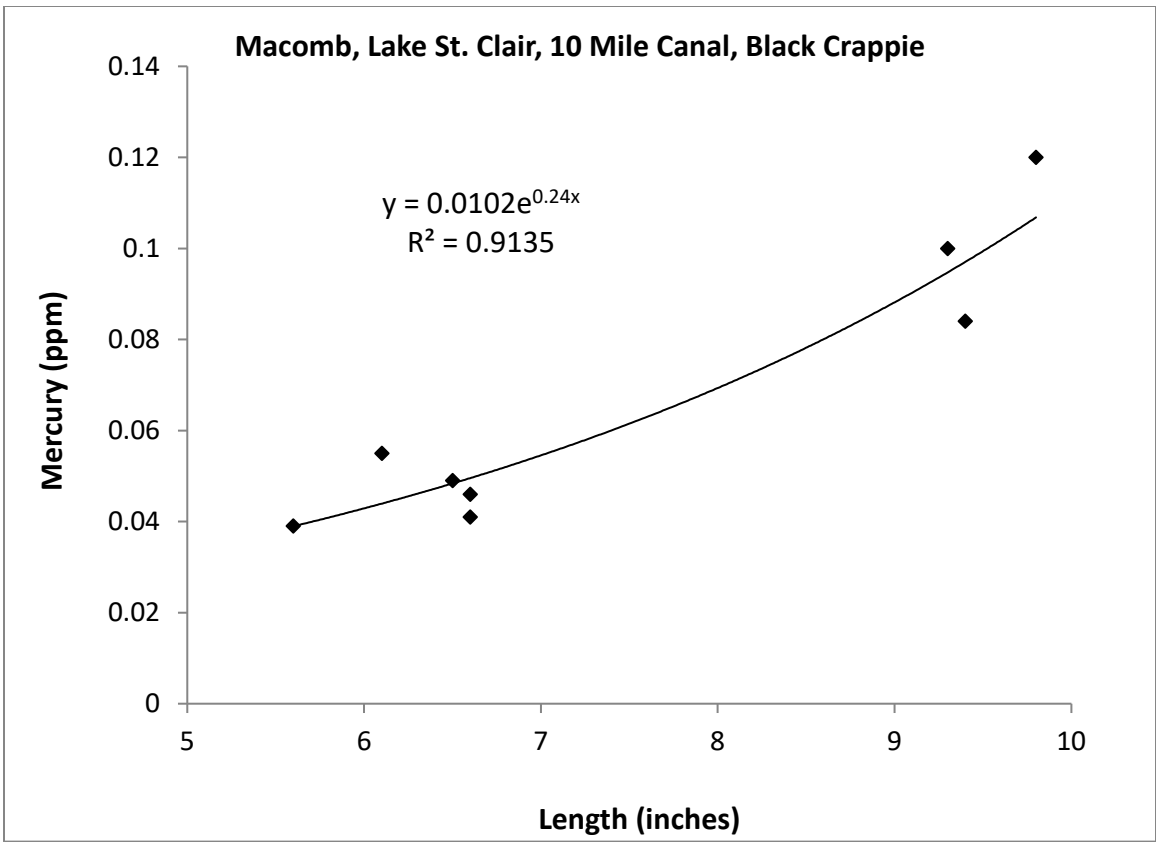
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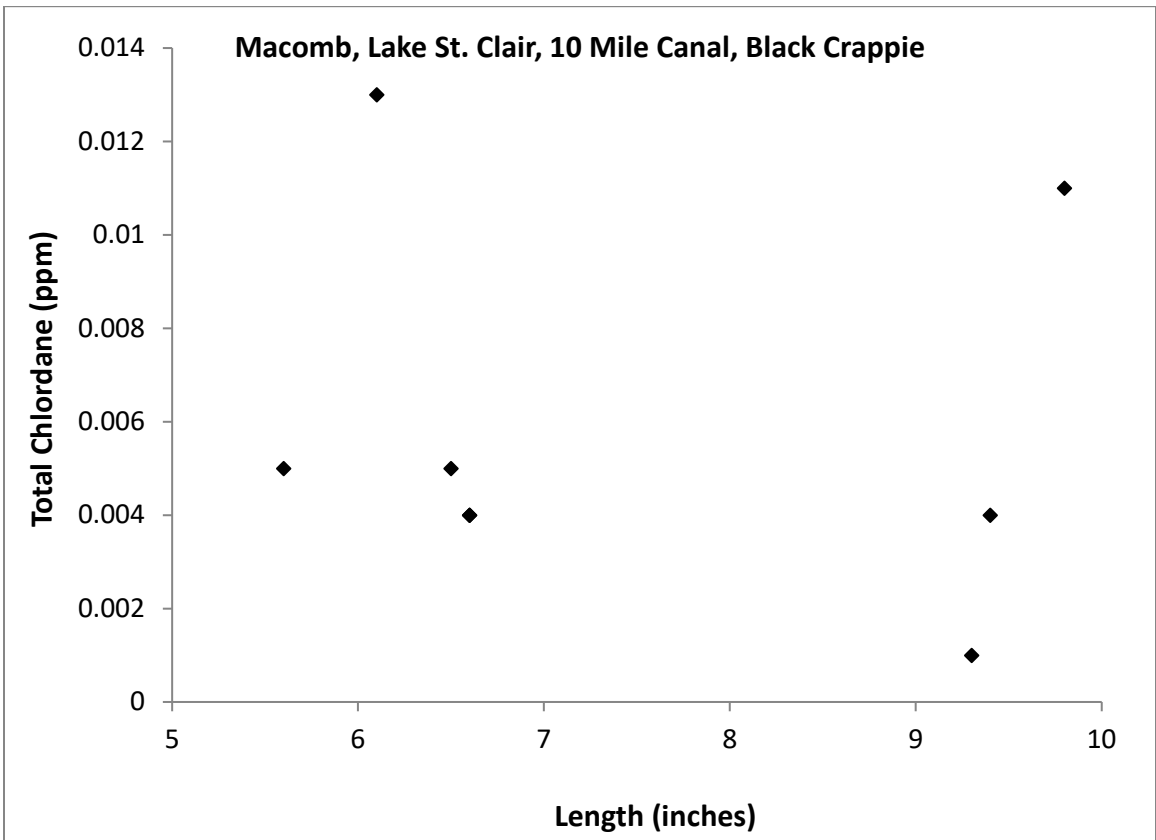
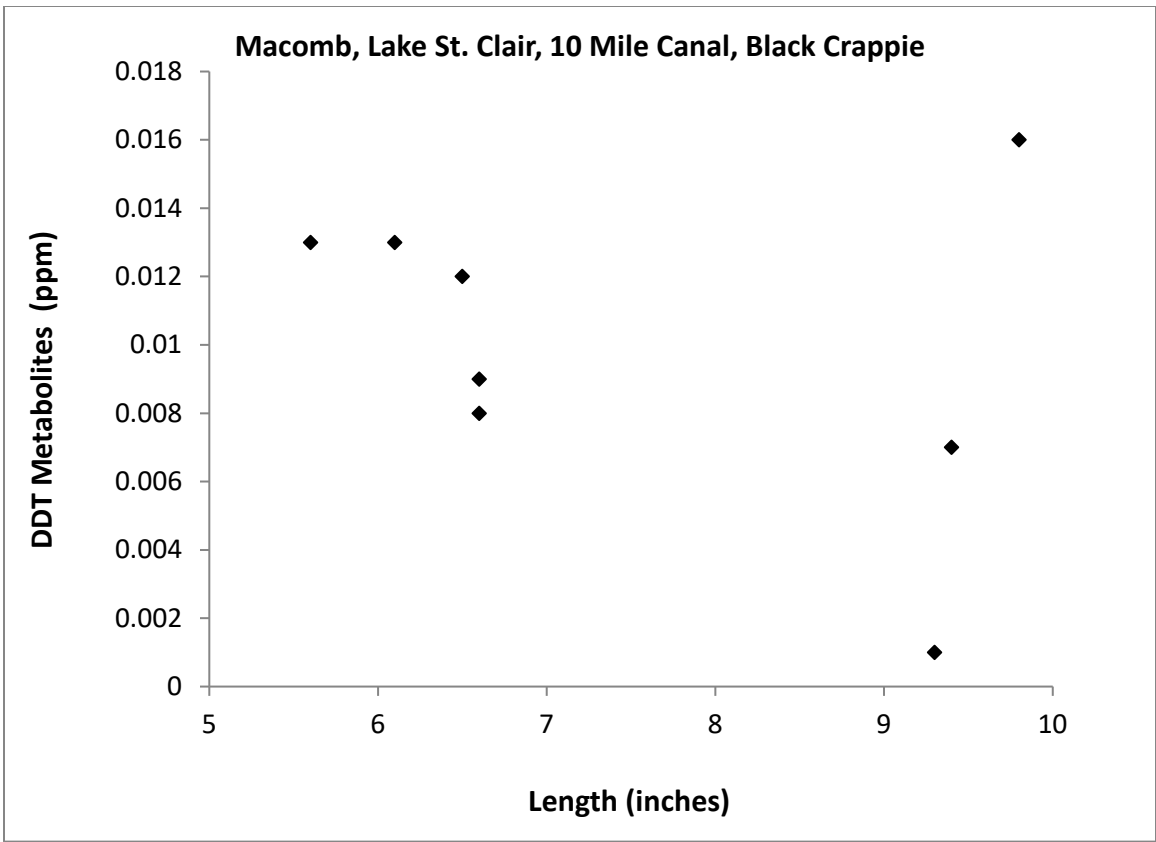
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2010	2010	8	5.6	na	5.6	9.8
Datasets available: 2010						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	8	15.46	0.316	23.39	21.65	0
DDT	8	0.01	0.001	0.02	0.01	16
Chlordane	8	0.006	0.001	0.01	0.01	--
Toxaphene	8	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.359	0.240				
DDT	0.096	0.183				
Chlordane	0.009	0.070				
Toxaphene	--	--				
Final meal category based on UCL:						0

Existing Advisory: In 2010 an emergency do not eat advisory was placed on all species of fish caught from the Lange/Revere (10-Mile) canals.

Recommendation: No one should eat crappie from the Lange/Revere canals in St. Clair Shores due to PCBs. Mercury would cause an advisory.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
5	0.03	16
6	0.04	16
7	0.05	16
8	0.07	16
9	0.09	12
10	0.11	8
11	0.14	4
<i>Shaded area denotes extrapolated estimates</i>		





Bluegill/Pumpkinseed

**Lake St. Clair
Lange/Revere Canals**

Macomb County

Hg Analysis:

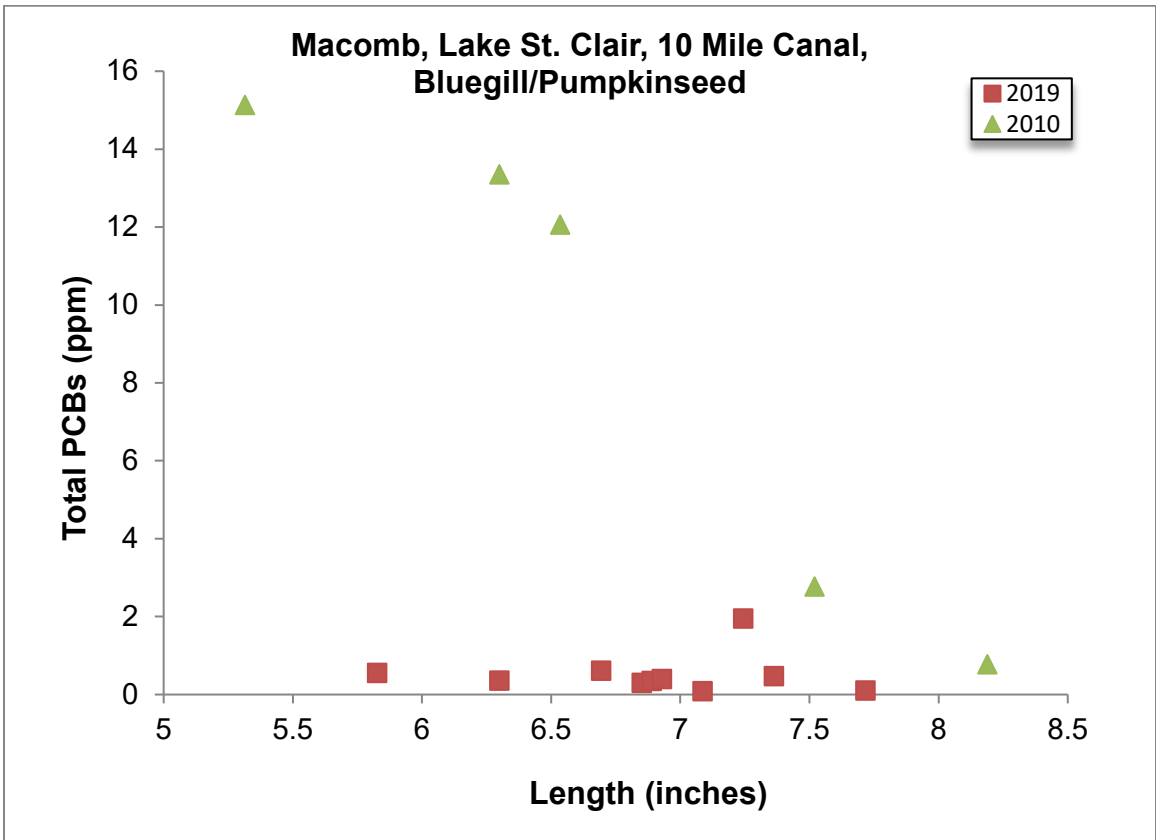
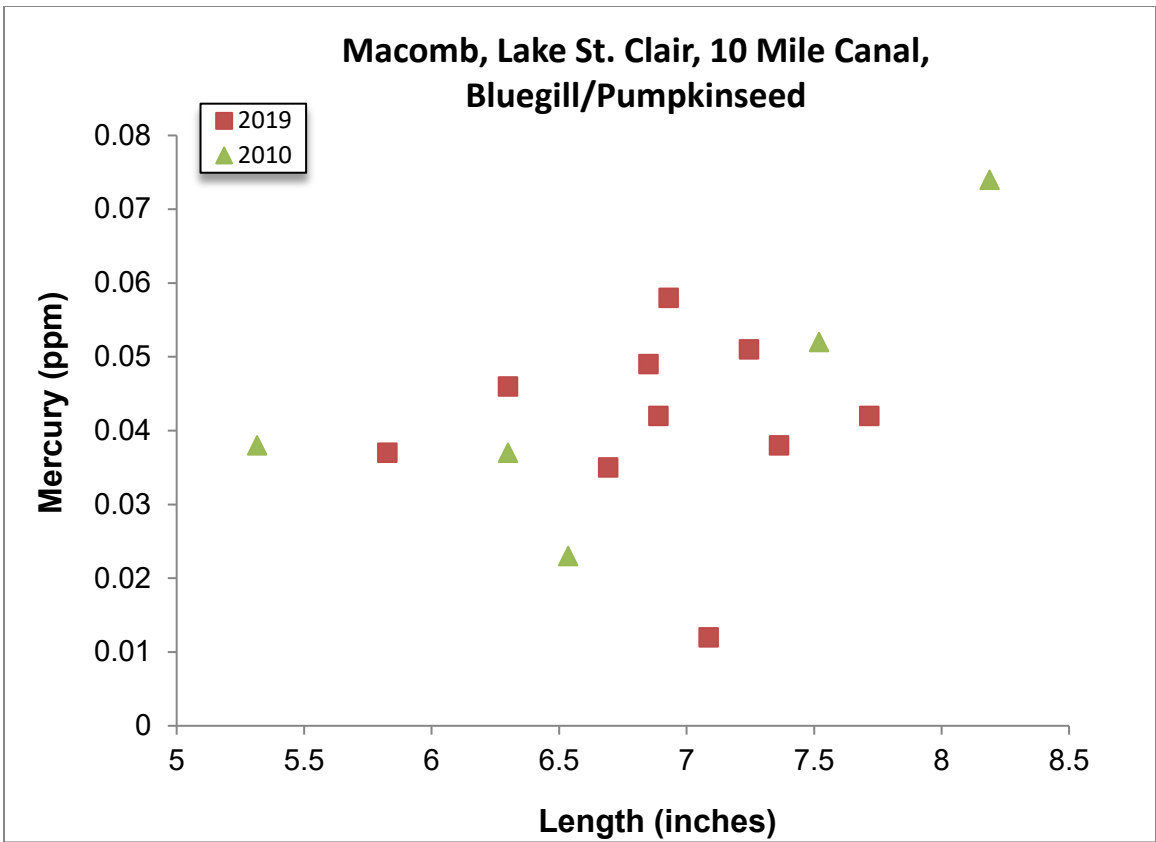
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent						
2010	2019	15	5.3	NA	5.3	8.2	
Datasets available: 2010, 2019							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)		
Mercury	15	0.042	0.012	0.074	0.050	16	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.185	0.073					

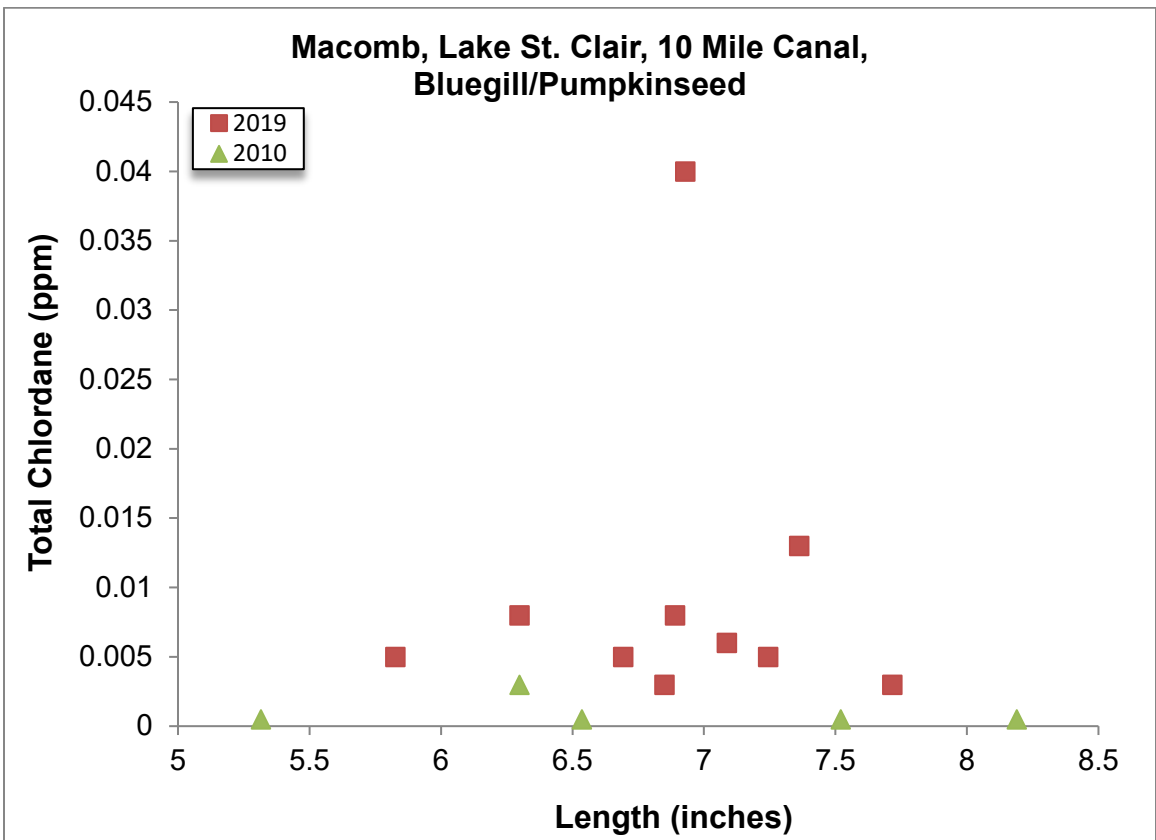
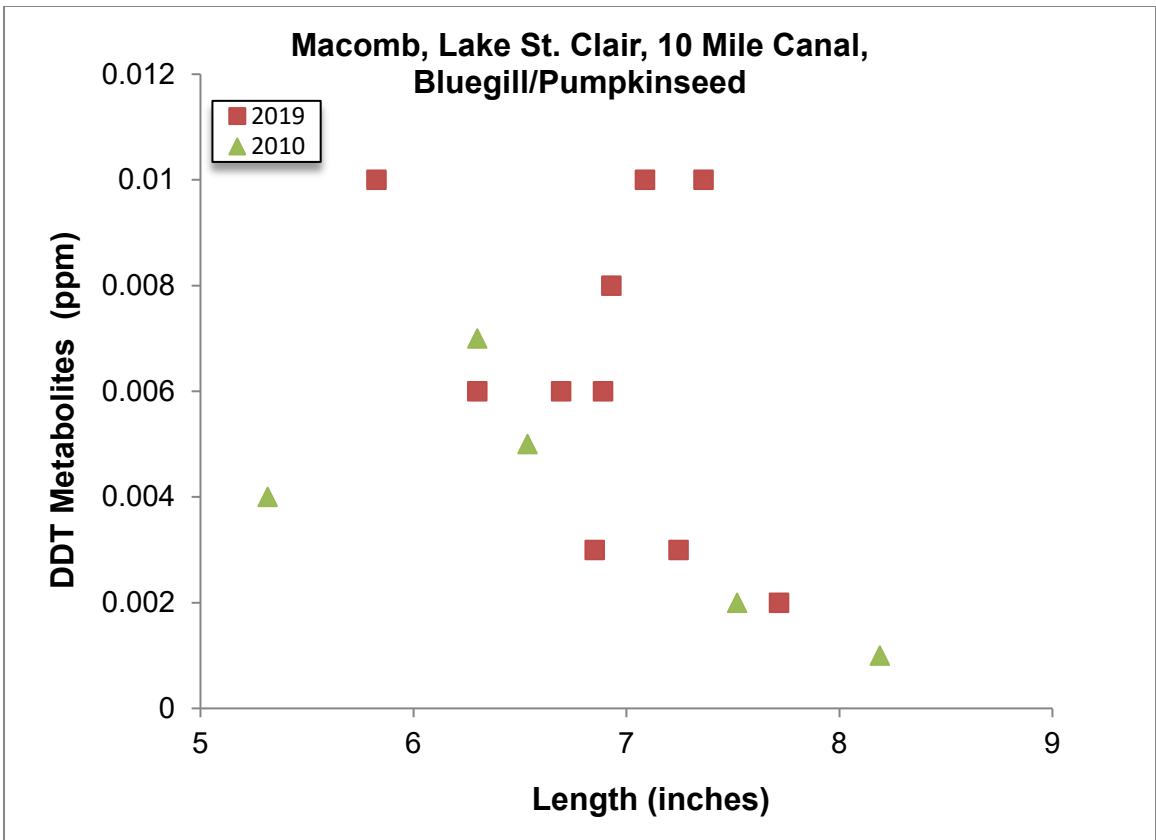
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent						
2010	2019	15	5.3	NA	5.3	8.2	
Datasets available: 2010, 2019							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)		
PCB	15	3.29	0.091	15.14	6.27	0	
DDT	15	0.006	< 0.001	0.010	0.007	16	
Chlordane	15	0.007	< 0.001	0.040	0.012	16	
Toxaphene	15	ND	--	--	--	--	
PFOS	--	--	--	--	--	--	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.316	0.197					
DDT	0.149	0.300					
Chlordane	0.002	0.000					
Toxaphene	NA	NA					
PFOS	--	--					
Final meal category based on UCL:							0

Existing MDHHS Advisory: No one should eat pumpkinseed or other sunfish from the Lange/Revere canals due to PCBs.

Recommendation: No change to the advisory is recommended. Additional fish should be collected once remediation efforts are complete to determine if PCB concentrations in the fish have further declined.





Carp

Lake St. Clair
Lange/Revere Canals

Macomb County

Hg Analysis:

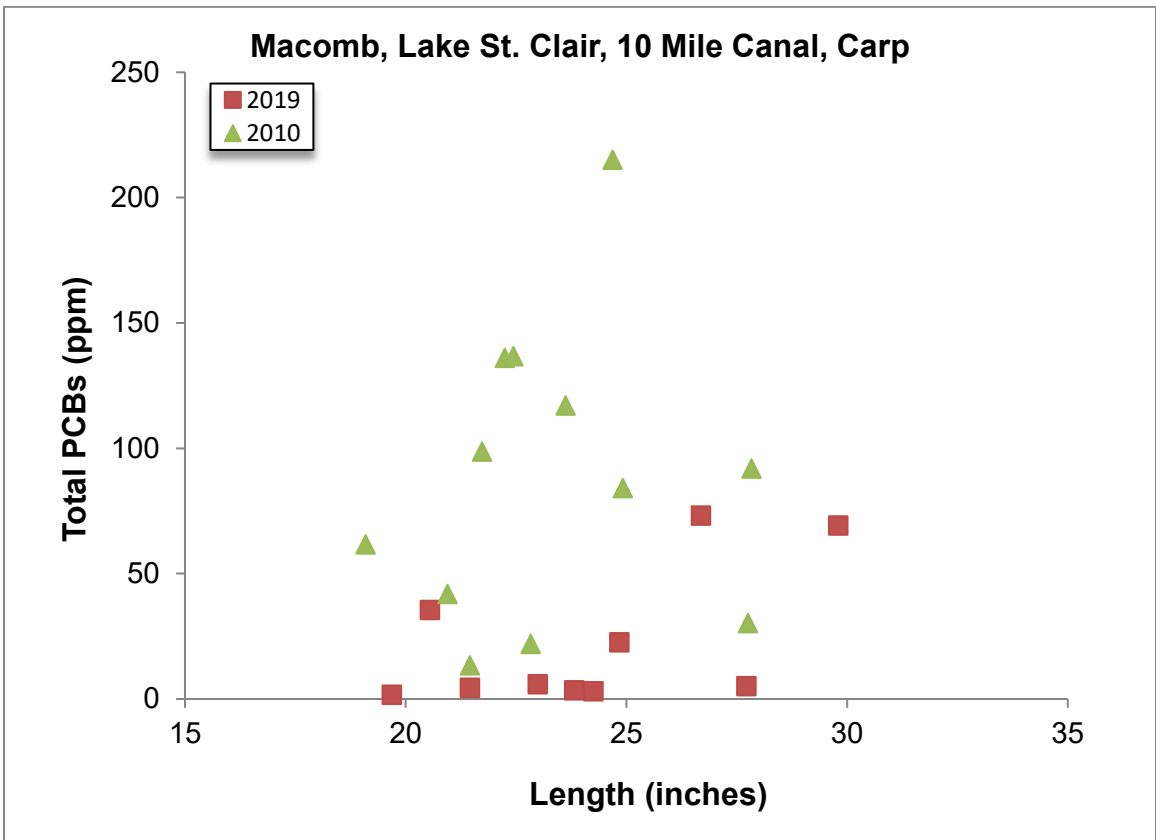
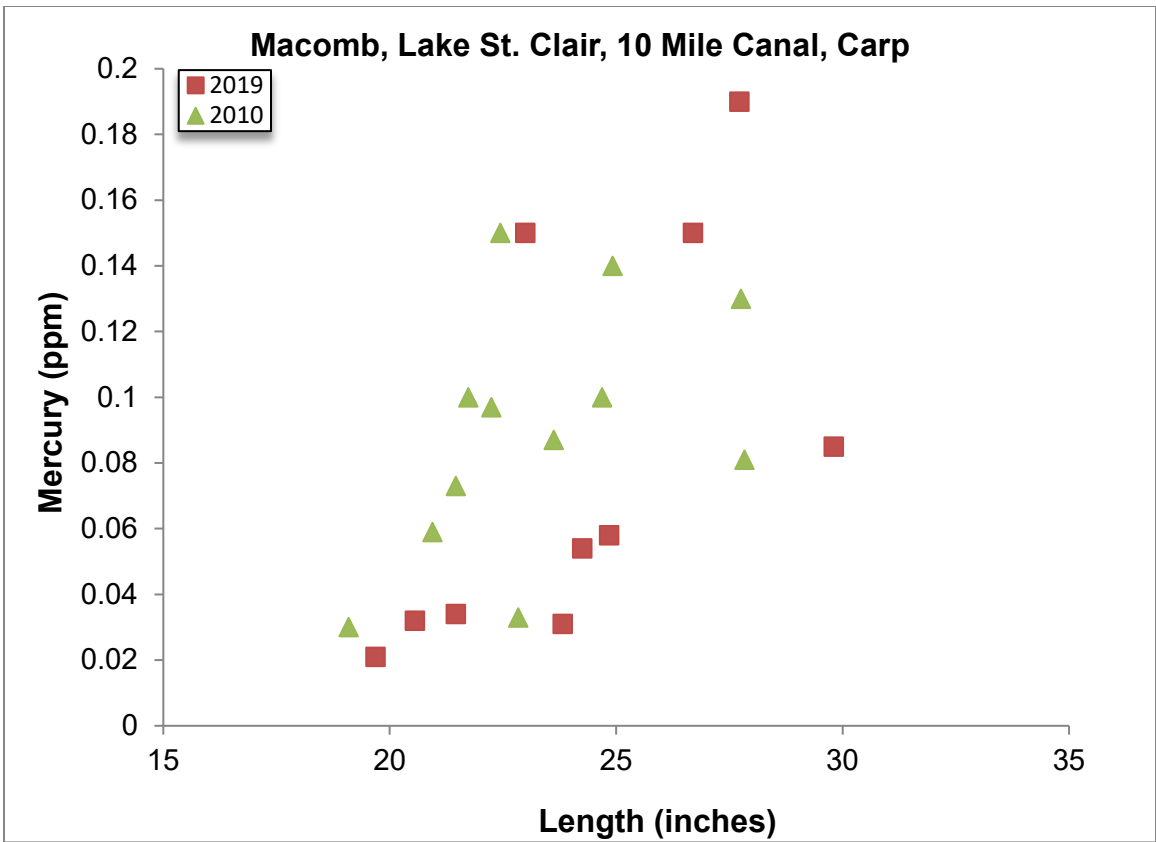
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent					
2010	2019	22	19.1	NA	19.1	29.8
Datasets available: 2010, 2019						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	22	0.086	0.021	0.190	0.107	8
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.284	0.334				

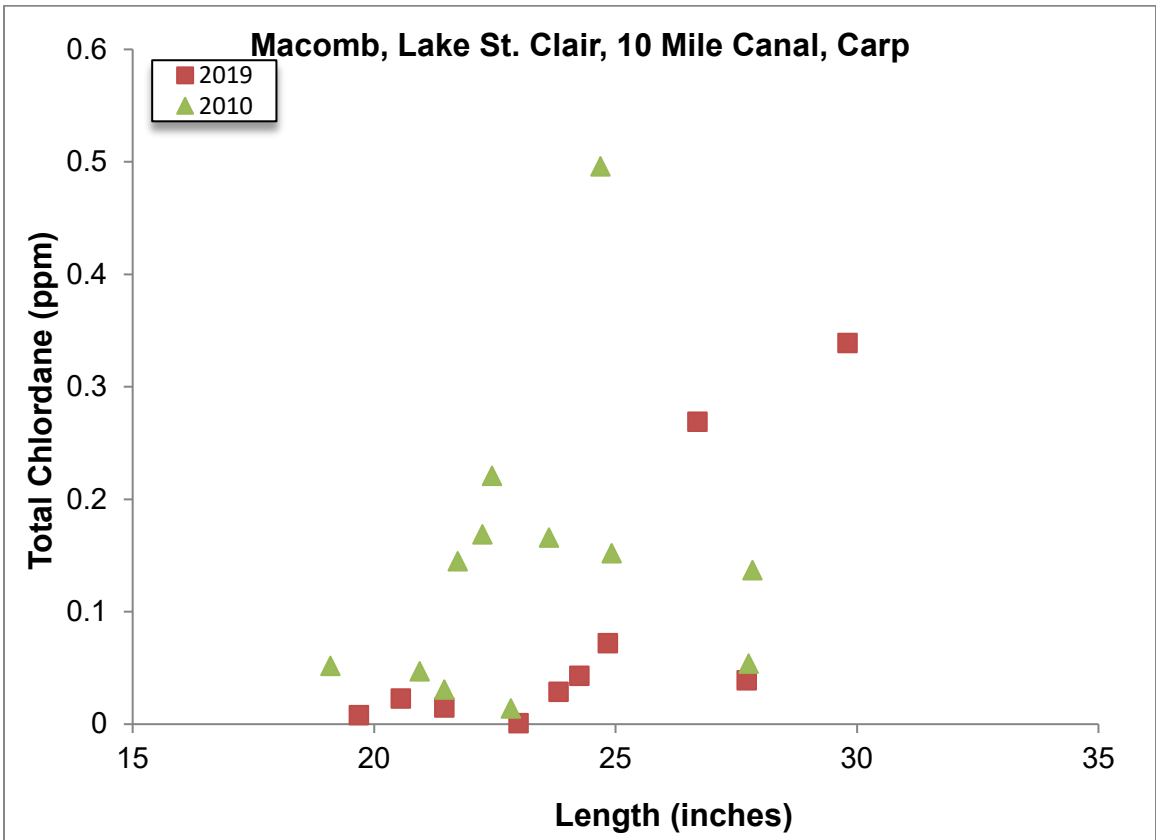
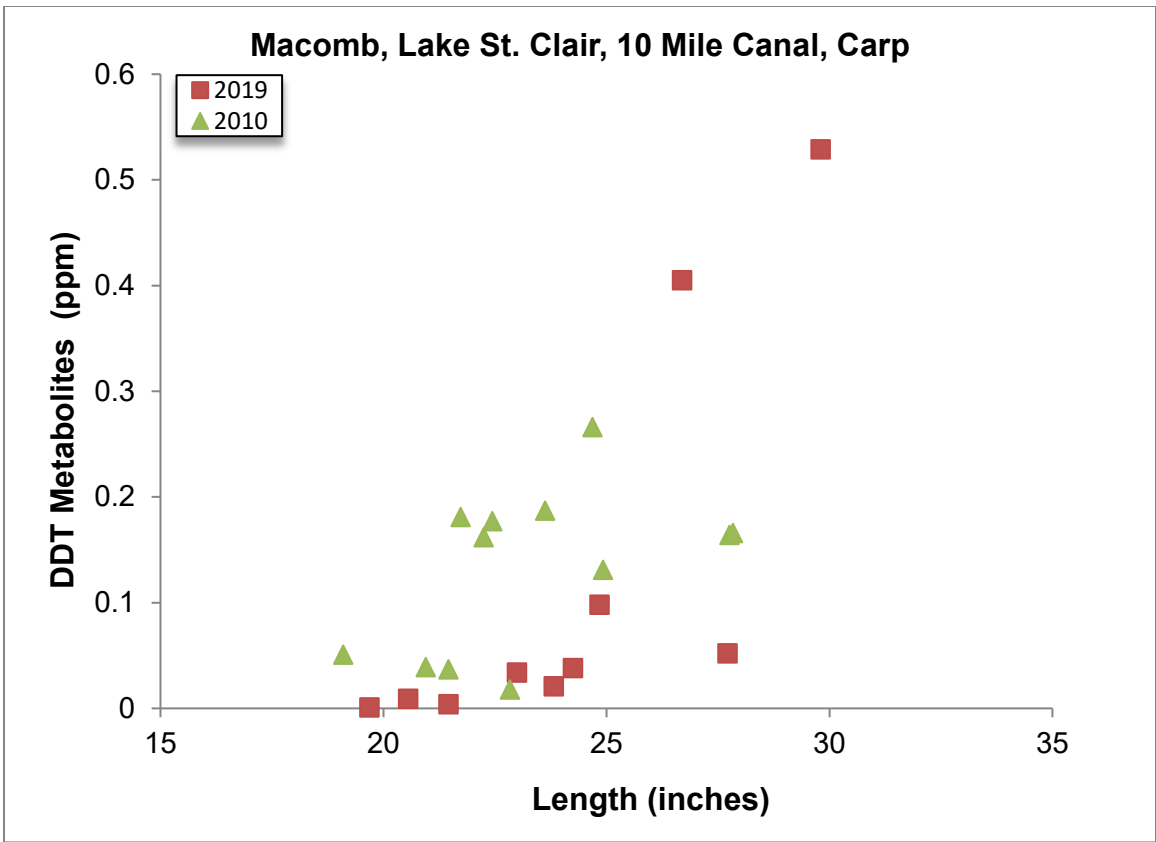
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent					
2010	2019	22	19.1	NA	19.1	29.8
Datasets available: 2010, 2019						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	22	57.87	1.609	215.0	83.1	0
DDT	22	0.126	< 0.001	0.529	0.186	8
Chlordane	22	0.115	< 0.001	0.496	0.170	16
Toxaphene	22	ND	--	--	--	--
PFOS	--	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.011	0.027				
DDT	0.409	0.381				
Chlordane	0.177	0.171				
Toxaphene	NA	NA				
PFOS	--	--				
Final meal category based on UCL:						0

Existing MDHHS Advisory: No one should eat carp from the Lange/Revere canals in St. Clair Shores due to PCBs. Mercury and DDT cause less restrictive advisories.

Recommendation: No change to the advisory is recommended. Additional fish should be collected once remediation efforts are complete to determine if PCB concentrations in the fish have further declined.





Largemouth Bass

**Lake St. Clair
Lange/Revere Canals**

Macomb County

Hg Analysis:

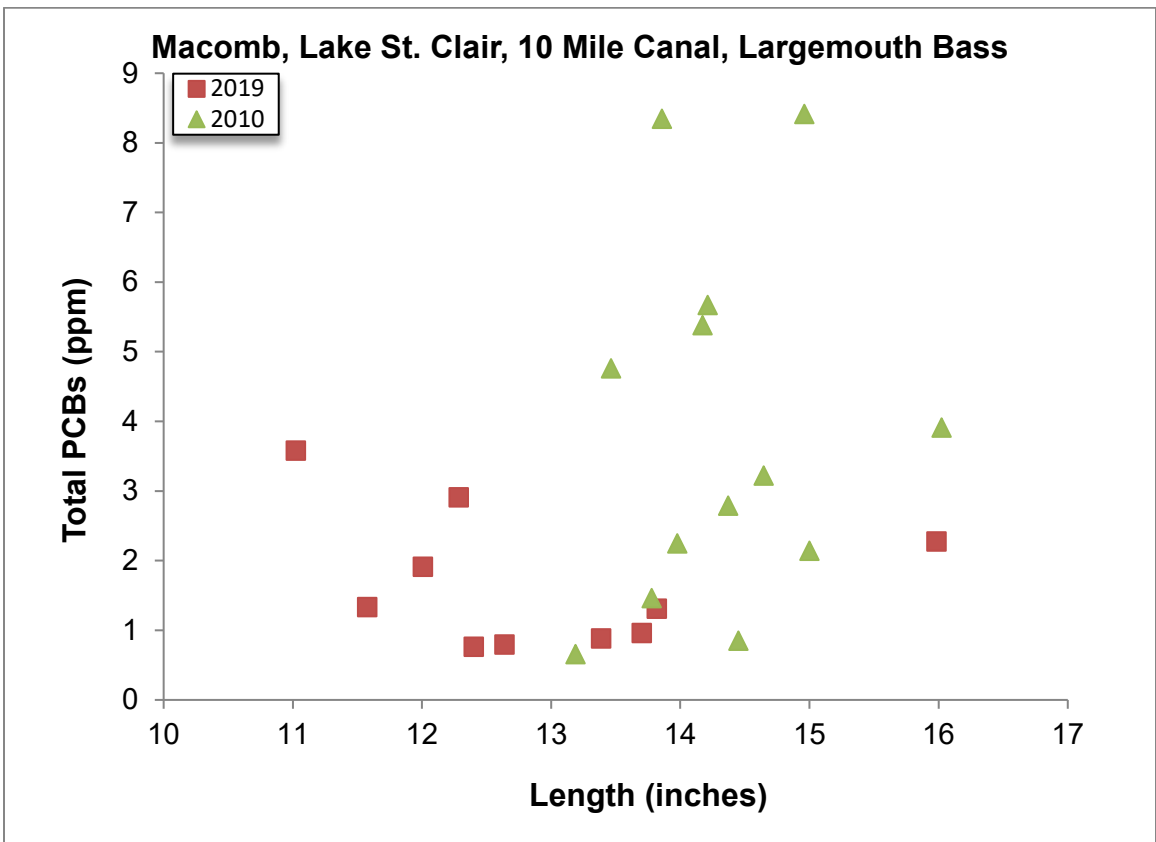
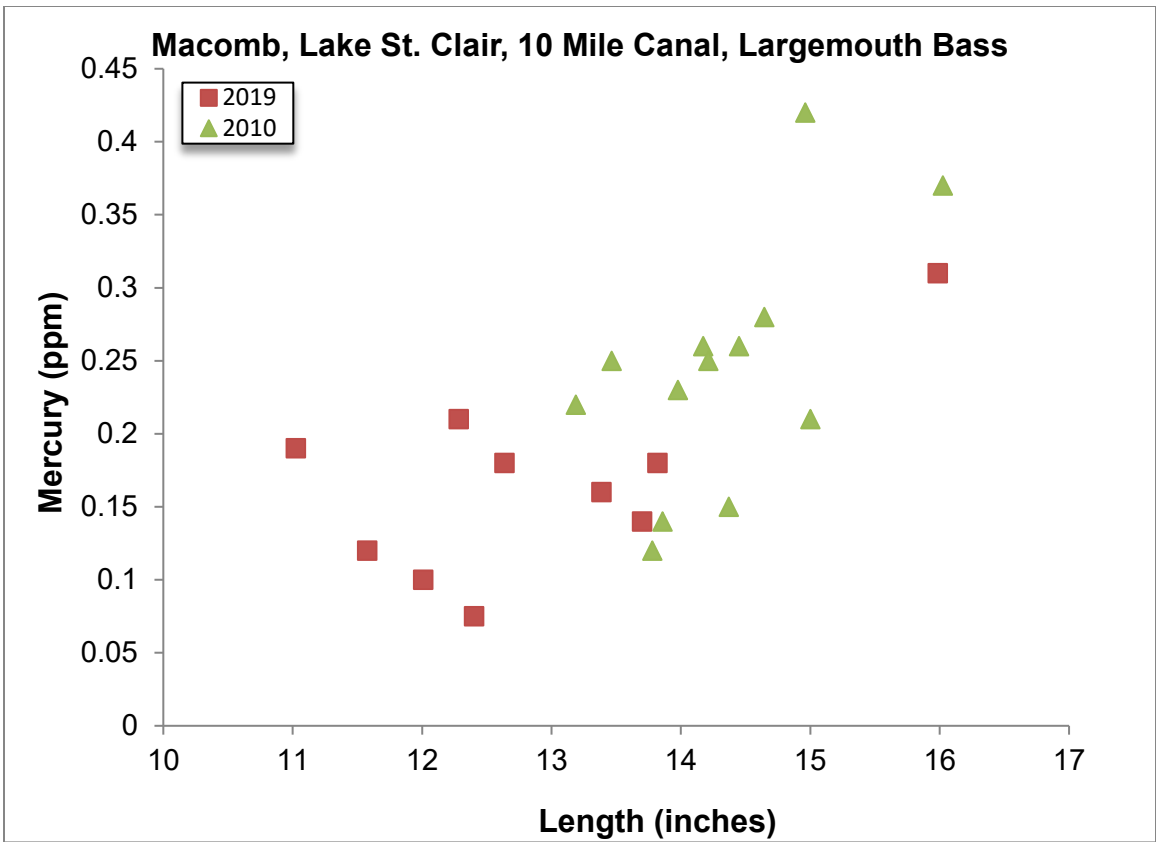
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent						
2010	2019	23	11.0	14.0	13.7	16.0	
Datasets available: 2010, 2019							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
Mercury	14	0.237	0.120	0.420	0.289	2	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.445	0.413					

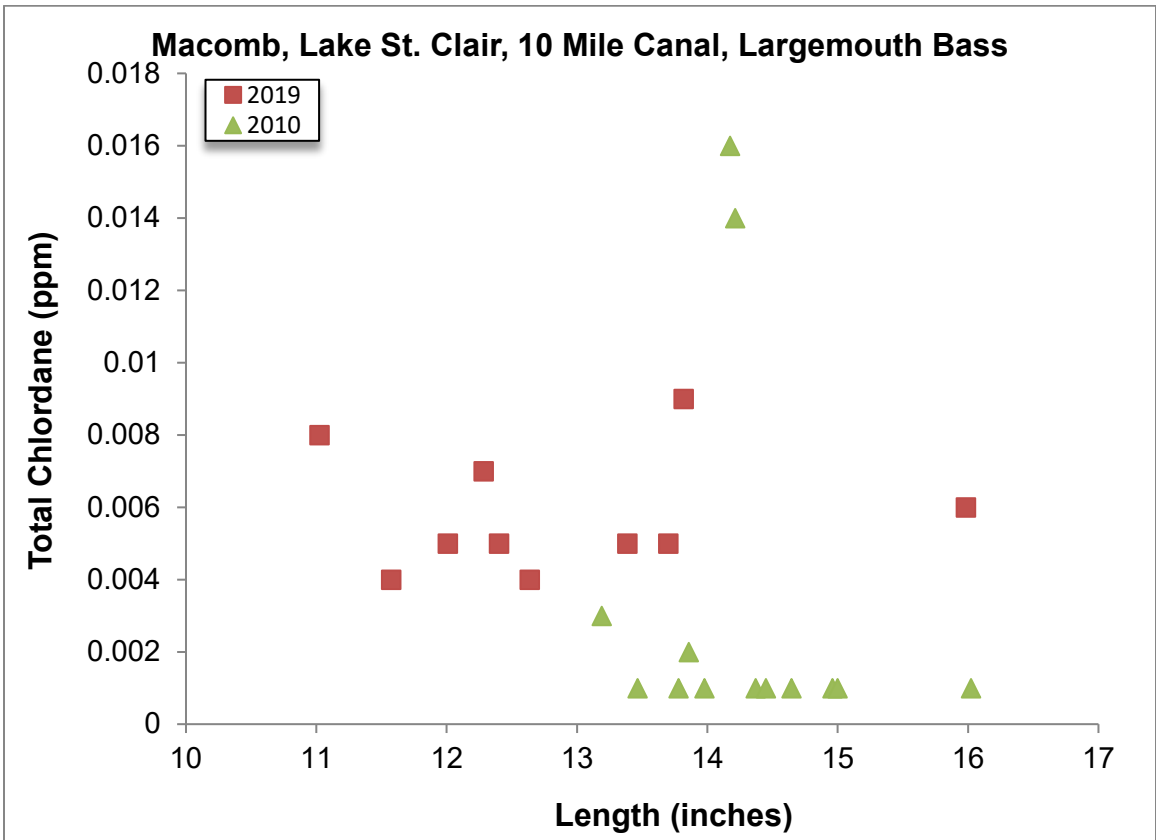
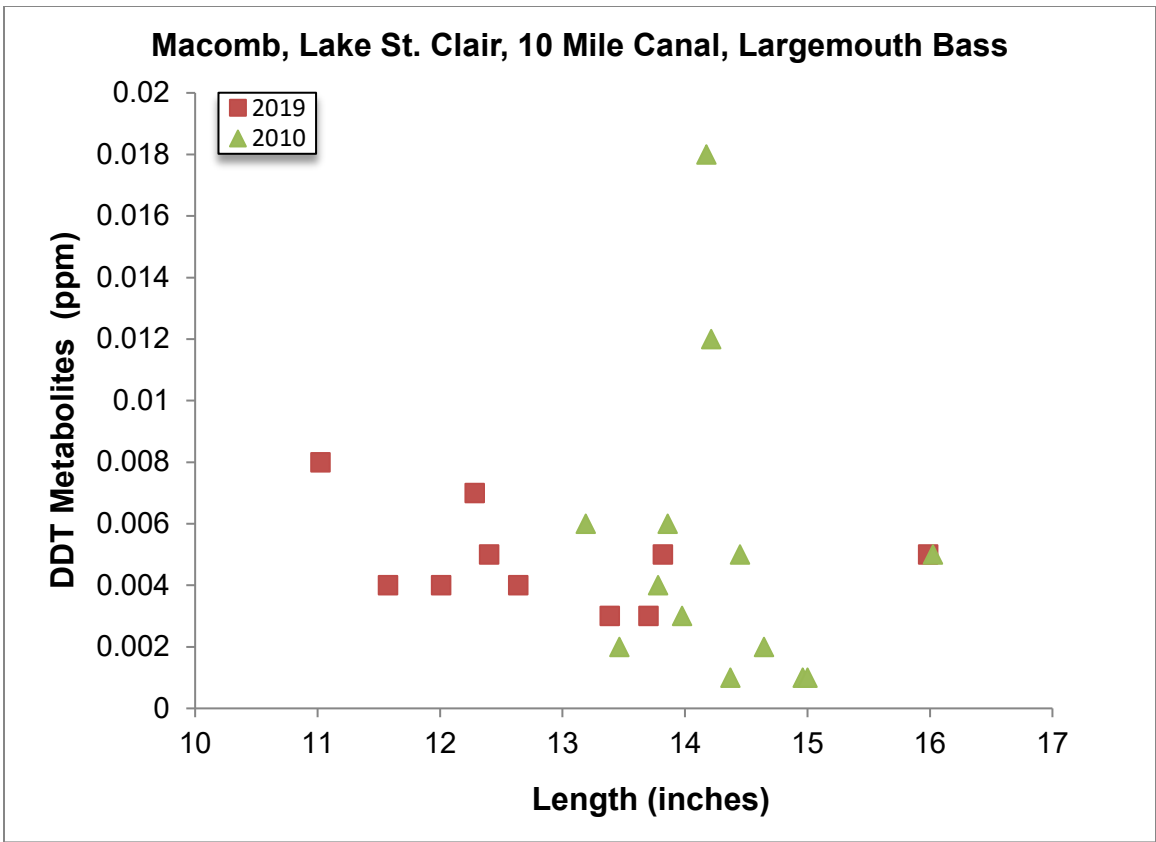
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent						
2010	2019	23	11.0	14.0	13.7	16.0	
Datasets available: 2010, 2019							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
PCB	14	3.501	0.852	8.417	4.968	0	
DDT	14	0.005	< 0.001	0.018	0.008	16	
Chlordane	14	0.004	< 0.001	0.016	0.007	16	
Toxaphene	14	ND	--	--	--	--	
PFOS	--	--	--	--	--	--	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.079	0.092					
DDT	0.012	0.172					
Chlordane	0.042	0.170					
Toxaphene	NA	NA					
PFOS	--	--					
Final meal category based on UCL:							0

Existing MDHHS Advisory: No one should eat smallmouth or largemouth bass from the Lange/Reveres canals due to PCBs. Mercury cause a less restrictive advisory.

Recommendation: No change to the advisory is recommended. Additional legal-sized fish should be collected once remediation efforts are complete to determine if PCB concentrations in the fish have further declined.





Bluegill / Pumpkinseed

**Lake St. Clair
Within 2-Miles of Lange/Revere Canals**

Hg Analysis:

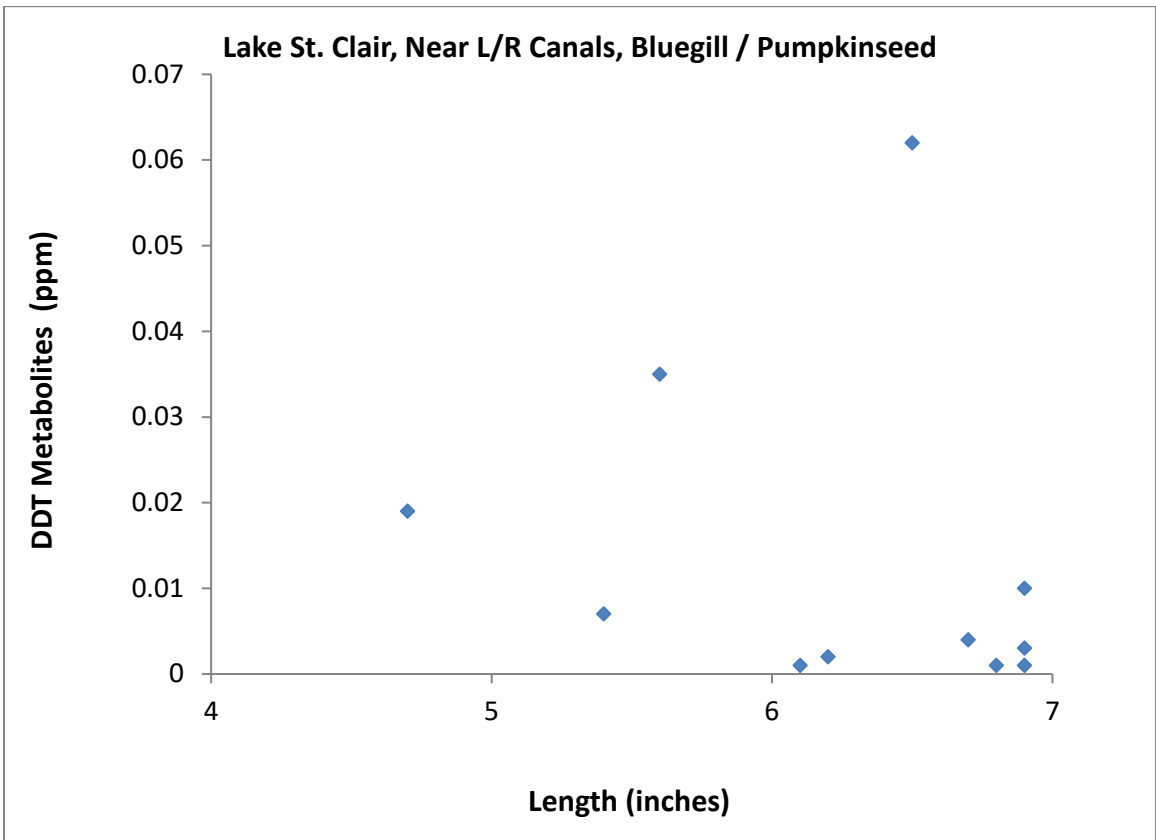
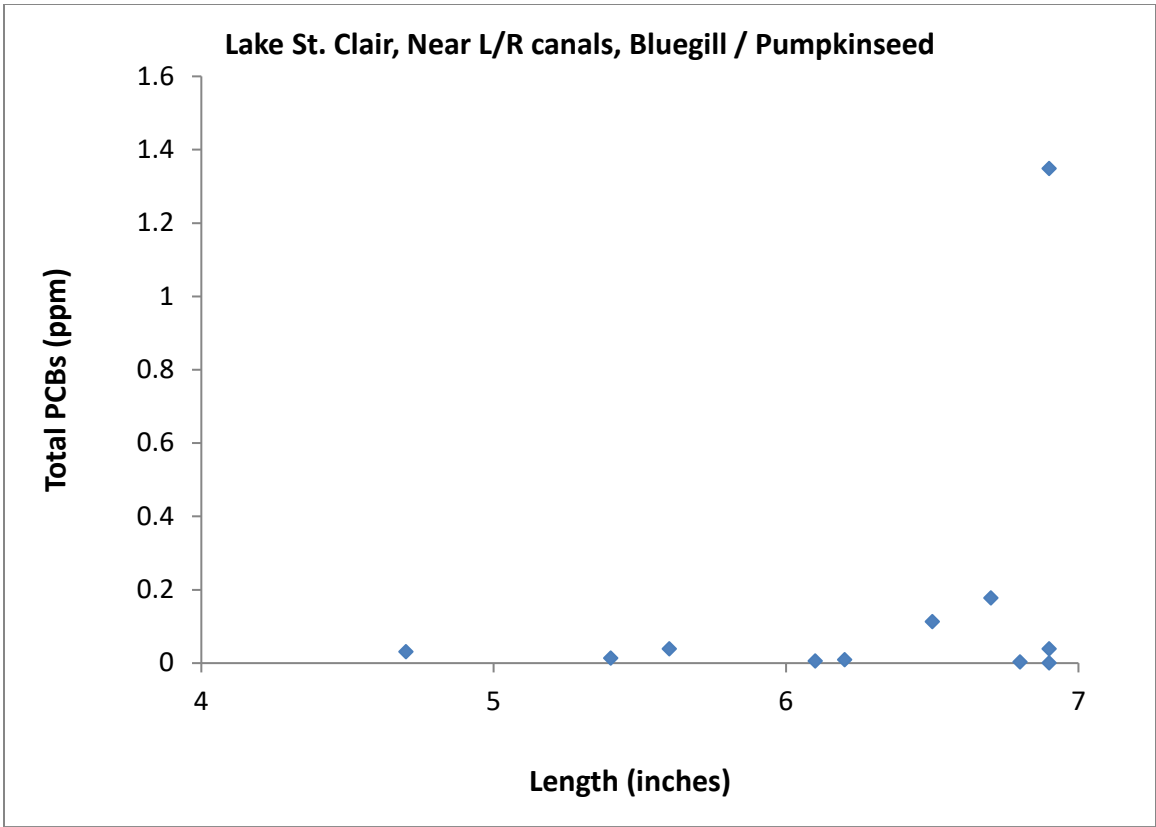
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0				
Datasets available:						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
Mercury	--	--	--	--	--	--
Chemical	Linear Regression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

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2011	2011	11	4.7	na	4.7	6.9
Datasets available: 2011						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
PCB	11	0.162	0.001	1.349	0.430	0.5
DDT	11	0.013	0.001	0.062	0.030	16
Chlordane	11	0.002	0.001	0.010	0.004	--
Toxaphene	11	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.102	0.005				
DDT	0.047	0.184				
Chlordane	0.031	0.103				
Toxaphene	--	--				
Final meal category based on UCL:						0.5

Existing Advisory: Women and children should not eat more than 1 meal per week of Lake St. Clair bluegill due to elevated levels of PCBs.

Recommendation: No one should eat more than 6 meals per year of bluegill, pumpkinseed, or other sunfish from Lake St. Clair within 2 miles of the Lange/Revere canals due to PCBs.



Carp

Lake St. Clair
Within 2-Miles of Lange/Revere Canals

Macomb 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
1985	2012	49	16.3	na	16.3	31.9
Datasets available: 1985, '86, '98, 2001, '10, '12						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	49	0.27	0.03	0.87	0.32	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.000	0.018				

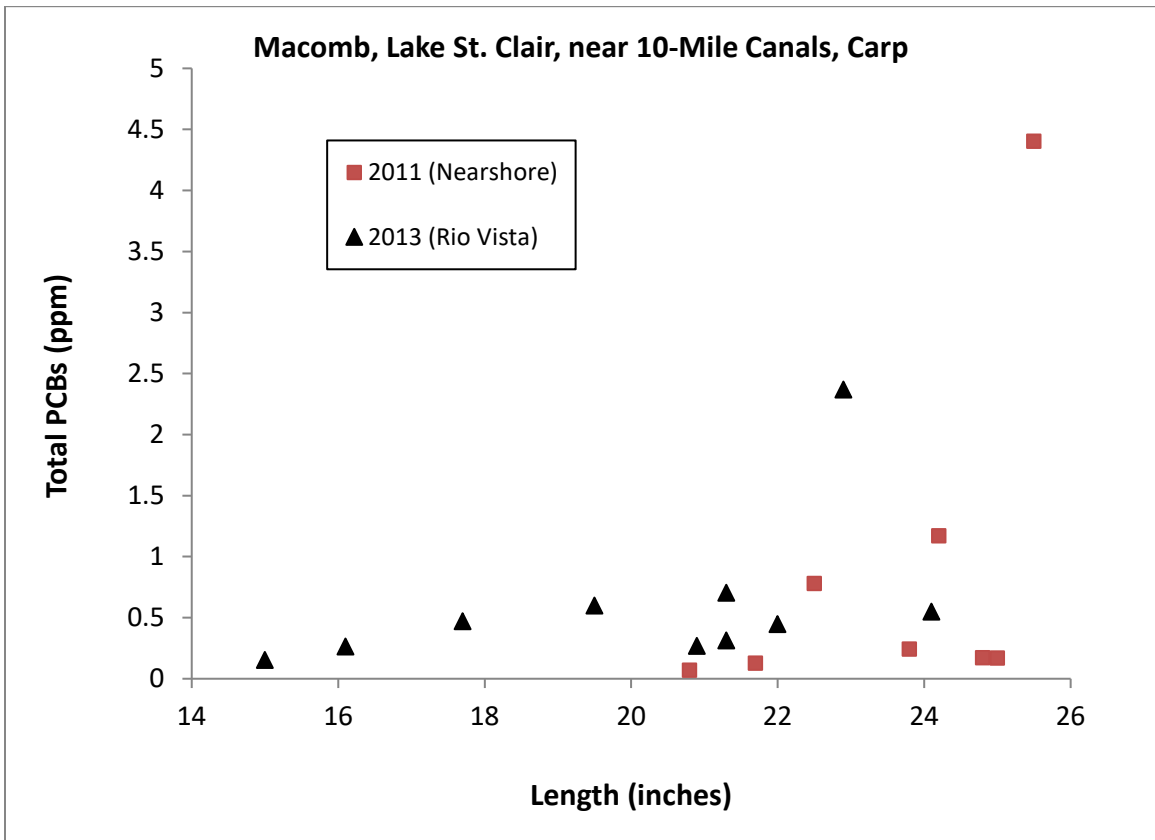
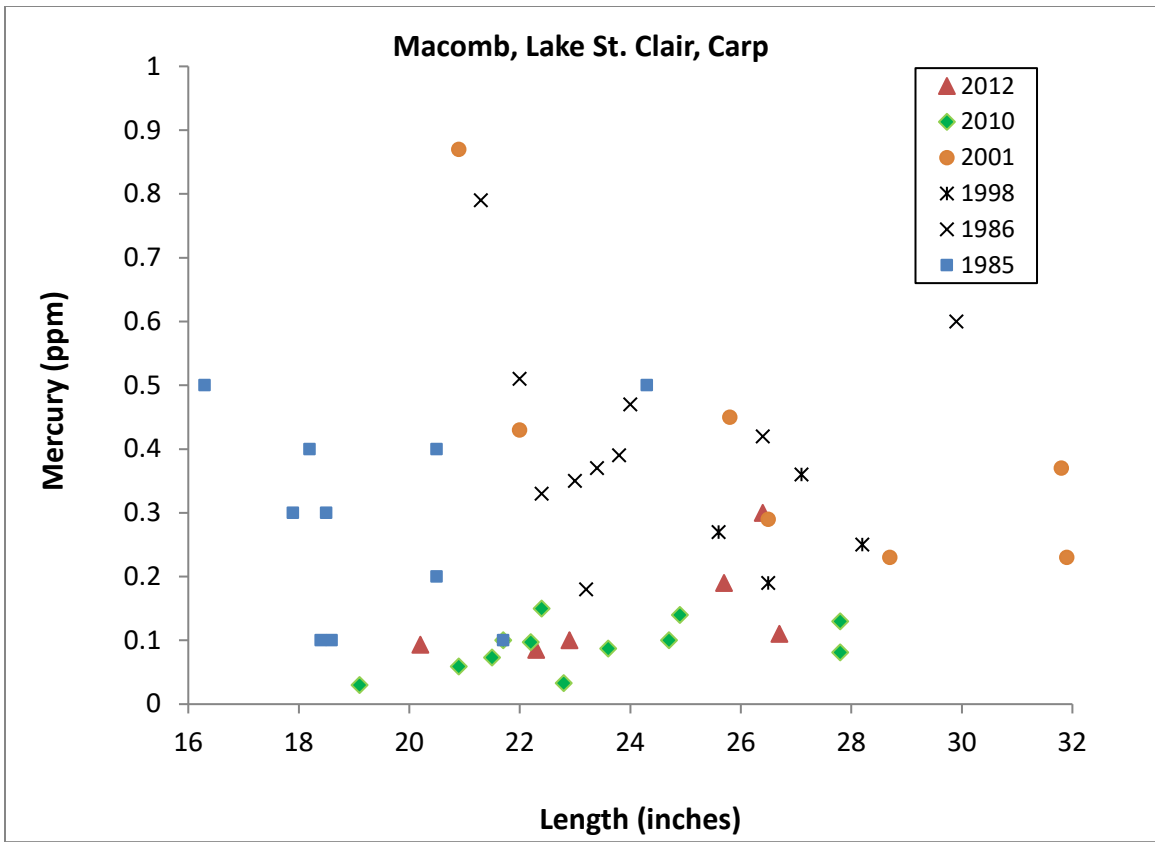
Organics Analysis:

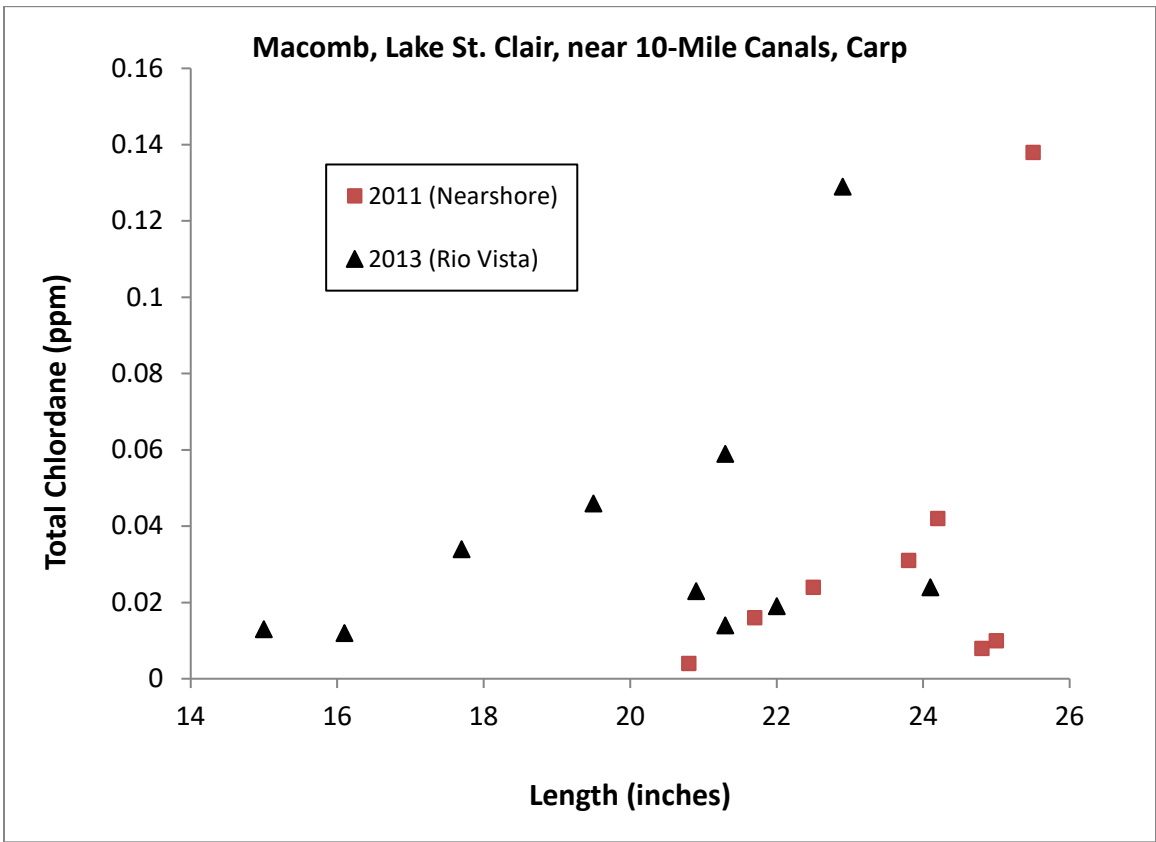
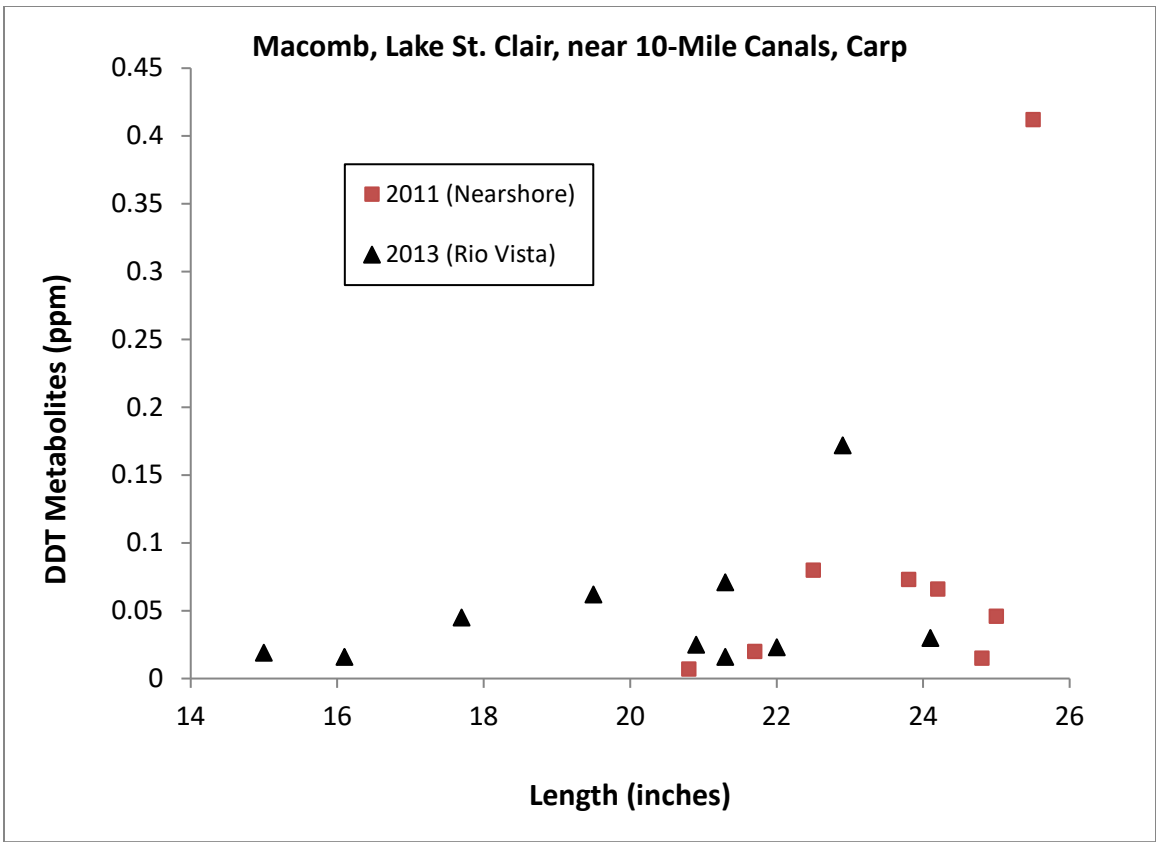
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2011	2013	18	15	na	15	25.5
Datasets available: 2011, 2013						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	18	0.74	0.07	4.40	1.27	Limited
DDT	18	0.07	0.007	0.41	0.11	16
Chlordane	18	0.04	0.004	0.14	0.05	--
Toxaphene	18	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.150	0.113				
DDT	0.162	0.113				
Chlordane	0.095	0.055				
Toxaphene	--	--				
Final meal category based on UCL:						Limited

Existing Advisory: Sensitive individuals should not eat these fish. Healthy adults should eat no more than 1 or 2 meals of carp from anywhere in Lake St. Clair due to PCBs. (In addition, no one should eat any fish taken from the Lange/Revere canals due to PCB.

Recommendation: No change.

* Mercury evaluation is based on samples collected throughout Lake St. Clair; special guidance for consumption of fish taken from within two miles of the Lange-Revere canals was instituted due to high concentrations of PCBs in fish from the canals and near the canals. The source(s) of the PCB contamination continue to be investigated and remediated, but there are no known significant sources of mercury involved.





**Largemouth and
Smallmouth Bass**

**Lake St. Clair
Within 2-Miles of Lange/Revere Canals**

Macomb 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	2011	96	11.2	14	13.5	20.5
Datasets available: 1986, '87, '88, '94, 2001, '03, '10, 2011						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	80	0.37	0.12	1.13	0.41	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.473	0.442				

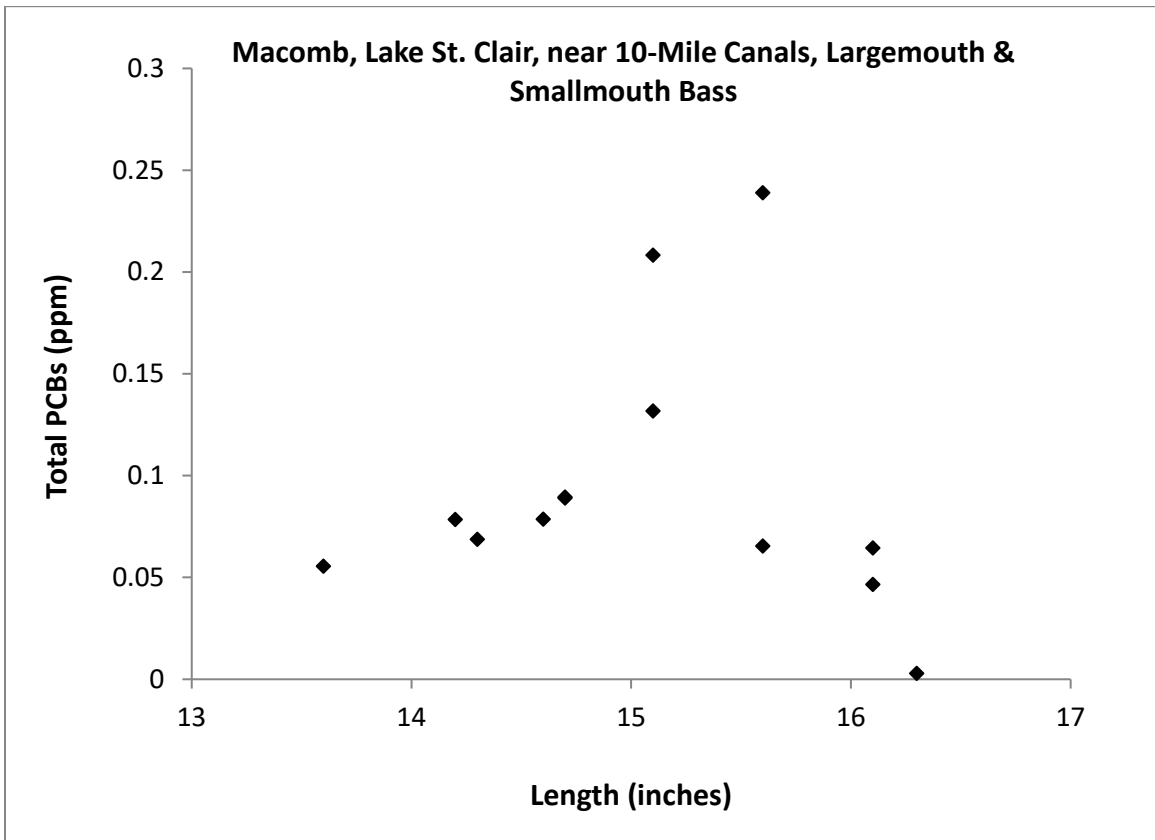
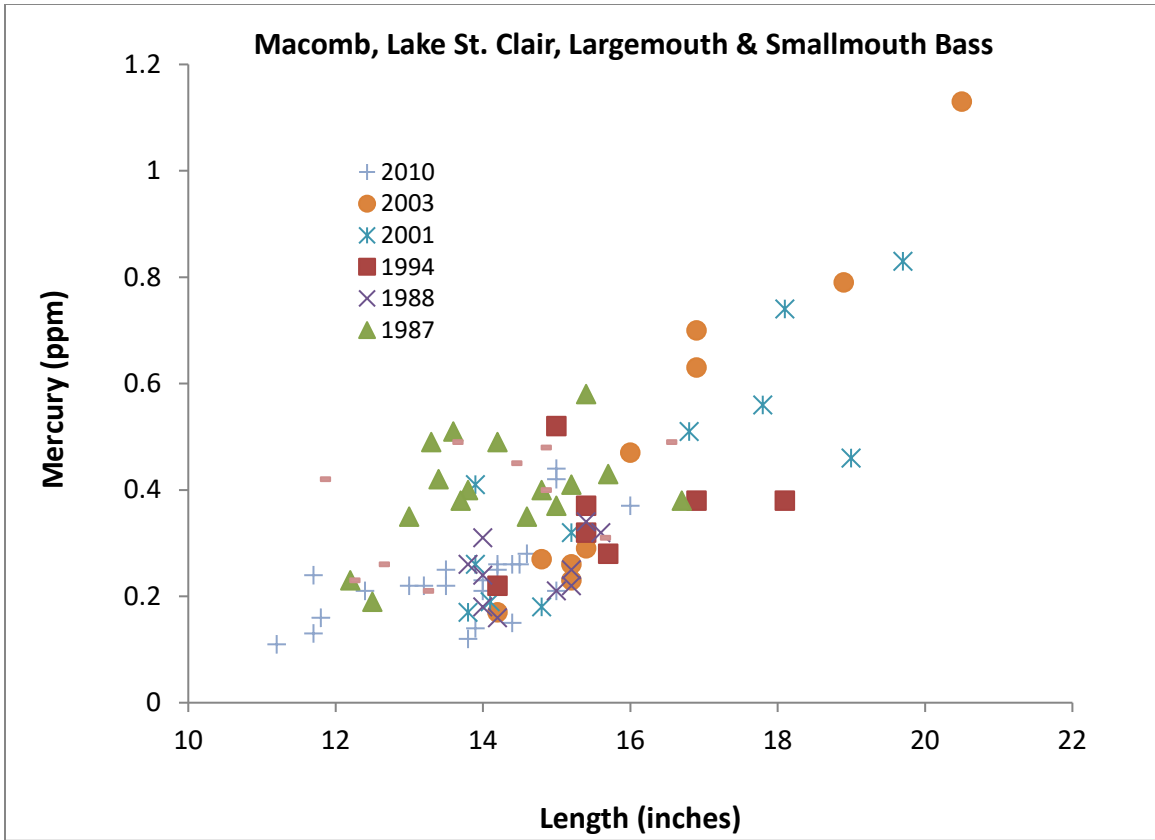
Organics Analysis:

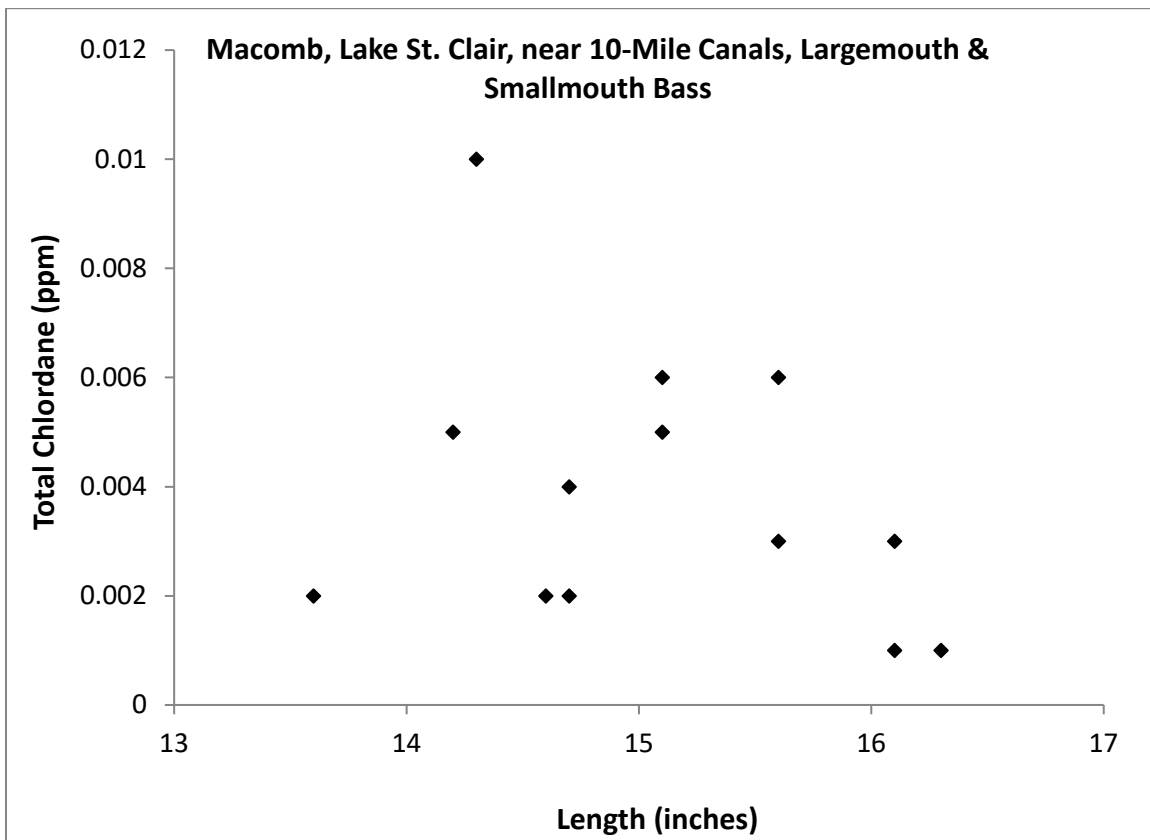
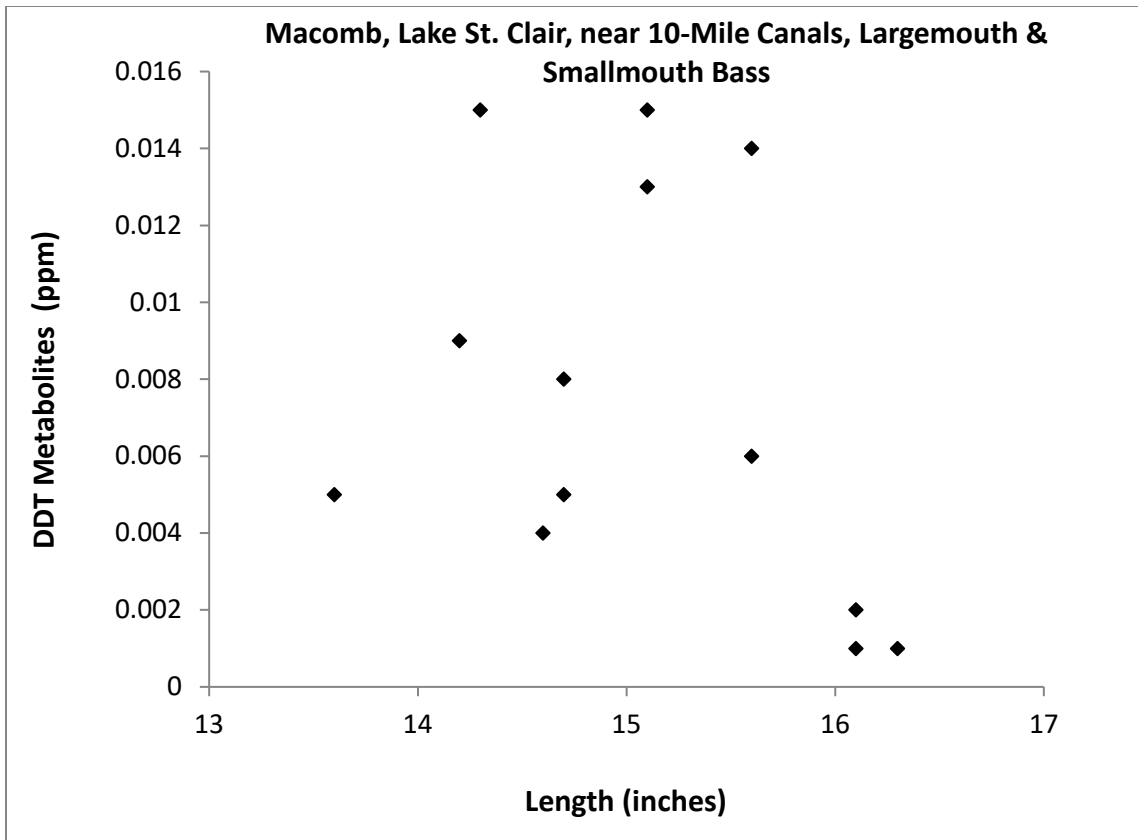
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2011	2013	13	13.6	14	13.6	16.3
Datasets available: 2011, 2013						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	13	0.09	0.003	0.24	0.13	1
DDT	13	0.008	0.001	0.02	0.01	16
Chlordane	13	0.004	0.001	0.01	0.01	--
Toxaphene	13	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.001	0.124				
DDT	0.125	0.124				
Chlordane	0.102	0.142				
Toxaphene	--	--				
Final meal category based on UCL:						1

Existing Advisory: Sensitive individuals should not eat these fish. Healthy adults should eat no more than 1 or 2 meals of largemouth or smallmouth bass from Lake St. Clair within two miles of the Lange/Revere canals due to PCB.

Recommendation: No one should eat more than 1 meal per month of largemouth or smallmouth bass smaller than 20 inches from Lake St Clair, including within two miles of the Lange/Revere canals, due to PCBs or more than 1 meal per month of fish larger than 20 inches due to PCBs and mercury. The statewide length break was applied as the size range of the fish were limited.

Note: Mercury evaluation is based on samples collected throughout Lake St. Clair; special guidance for consumption of fish taken from within two miles of the Lange-Revere canals was instituted due to high concentrations of PCBs in fish from the canals and near the canals. The source(s) of the PCB contamination continue to be investigated and remediated, but there are no known significant sources of mercury involved.





Yellow Perch

**Lake St. Clair
Within 2 Miles of Ten-Mile Canals**

Macomb County

Hg Analysis:

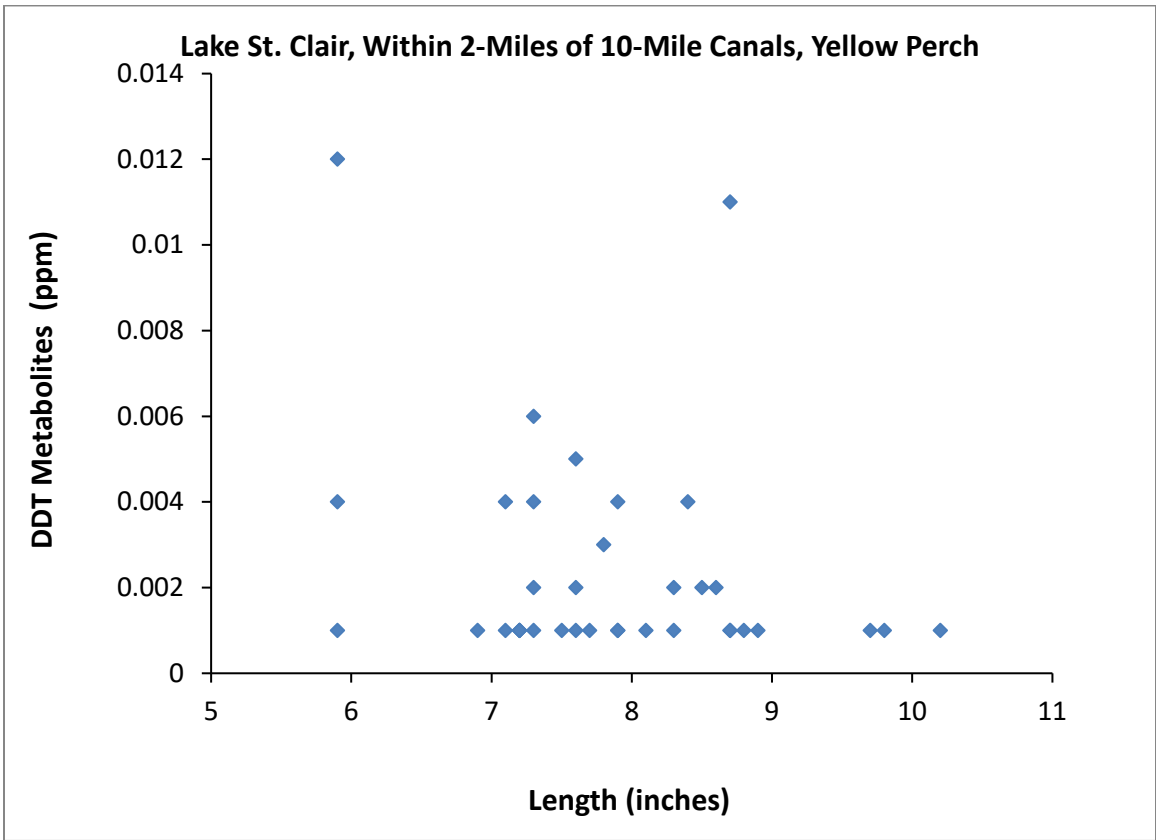
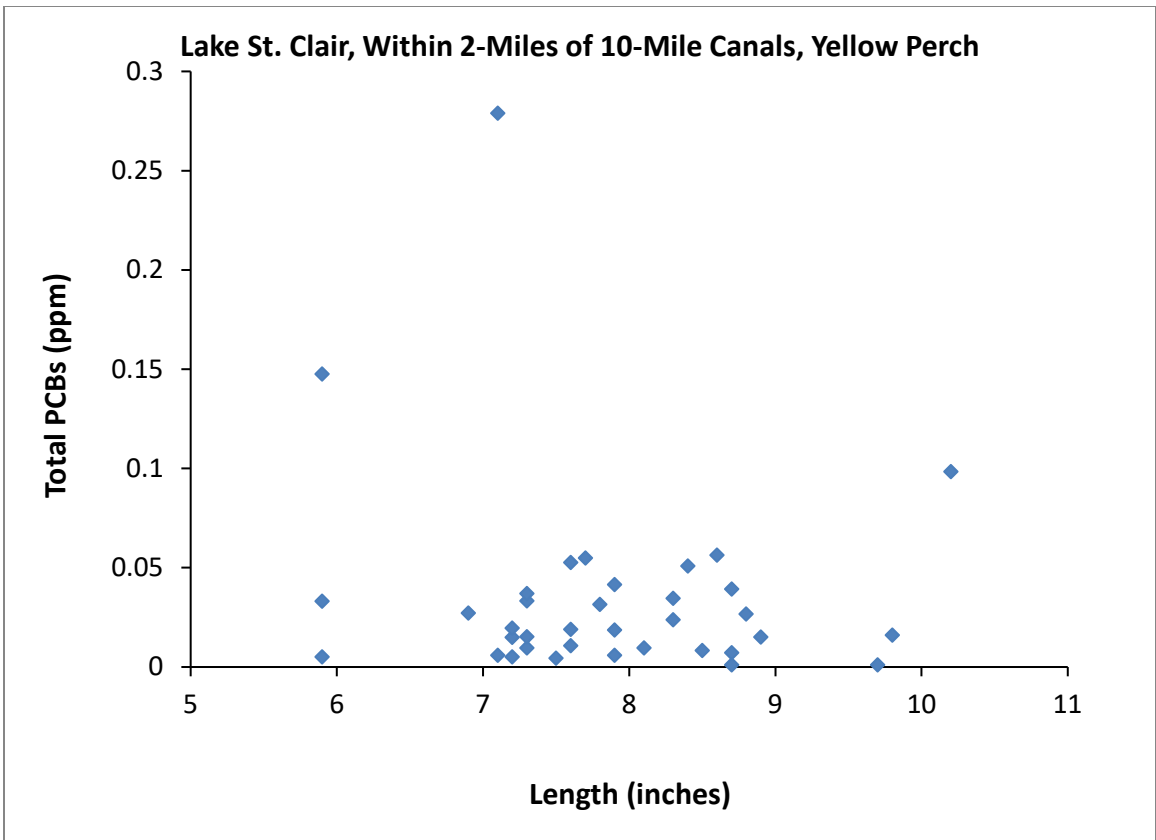
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
--	--	0	--	--	--	--
Datasets available:						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
Mercury	0	--	--	--	--	--
Chemical	Linear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

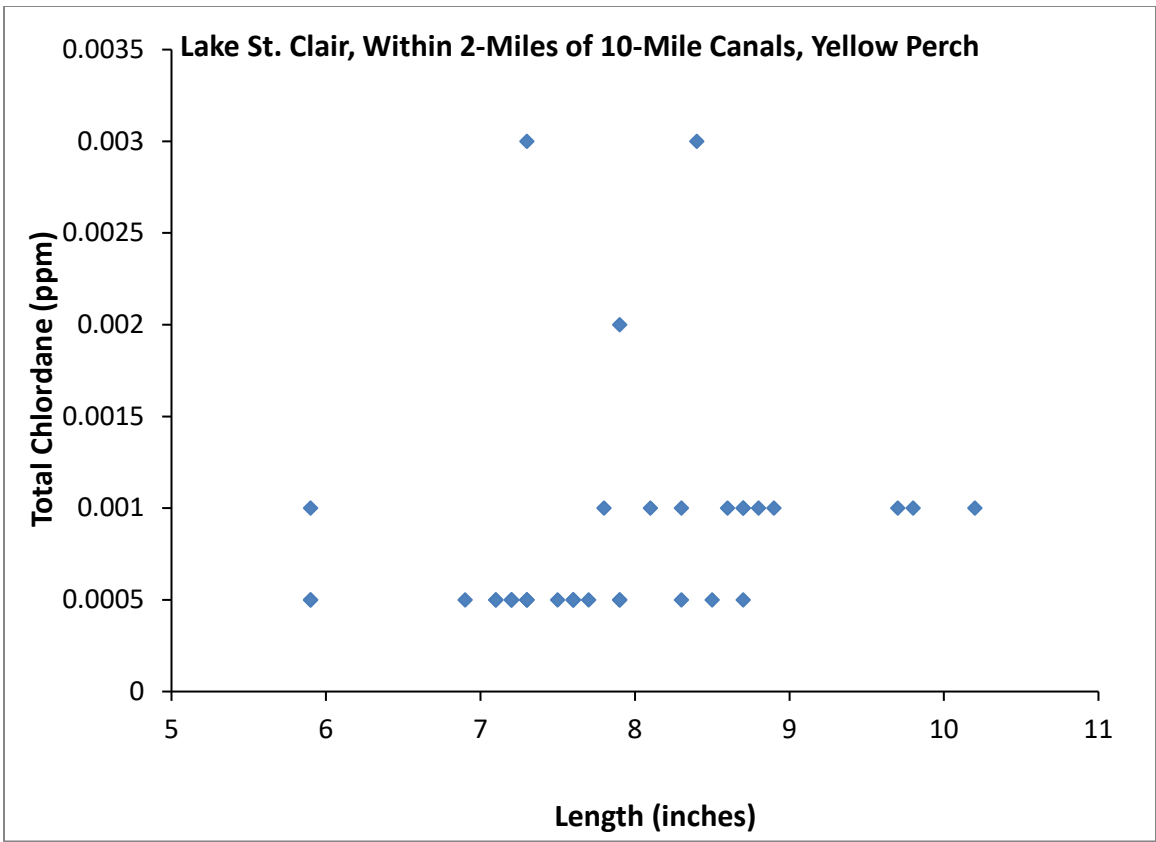
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2011	2011	36	5.9	na	5.9	10.2
Datasets available: 2011						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
PCB	36	0.035	0.001	0.279	0.052	2
DDT	36	0.002	0.001	0.012	0.003	16
Chlordane	36	0.001	0.001	0.003	0.001	--
Toxaphene	36	ND	--	--	--	--
TEQ*	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.022	0.024				
DDT	0.068	0.076				
Chlordane	0.046	0.129				
Toxaphene	--	--				
TEQ*	--	--				
Final meal category based on UCL:						2

Existing Advisory: Lake St. Clair yellow perch are not covered by an advisory.

Recommendation: No one should eat more than 2 meals per month of yellow perch from Lake St. Clair within 2 miles of the Lange/Revere canals due to PCBs. Mercury would cause an advisory.





Lake Superior

Brown Trout

**Lake Superior
Ontonagon River**

Hg Analysis:

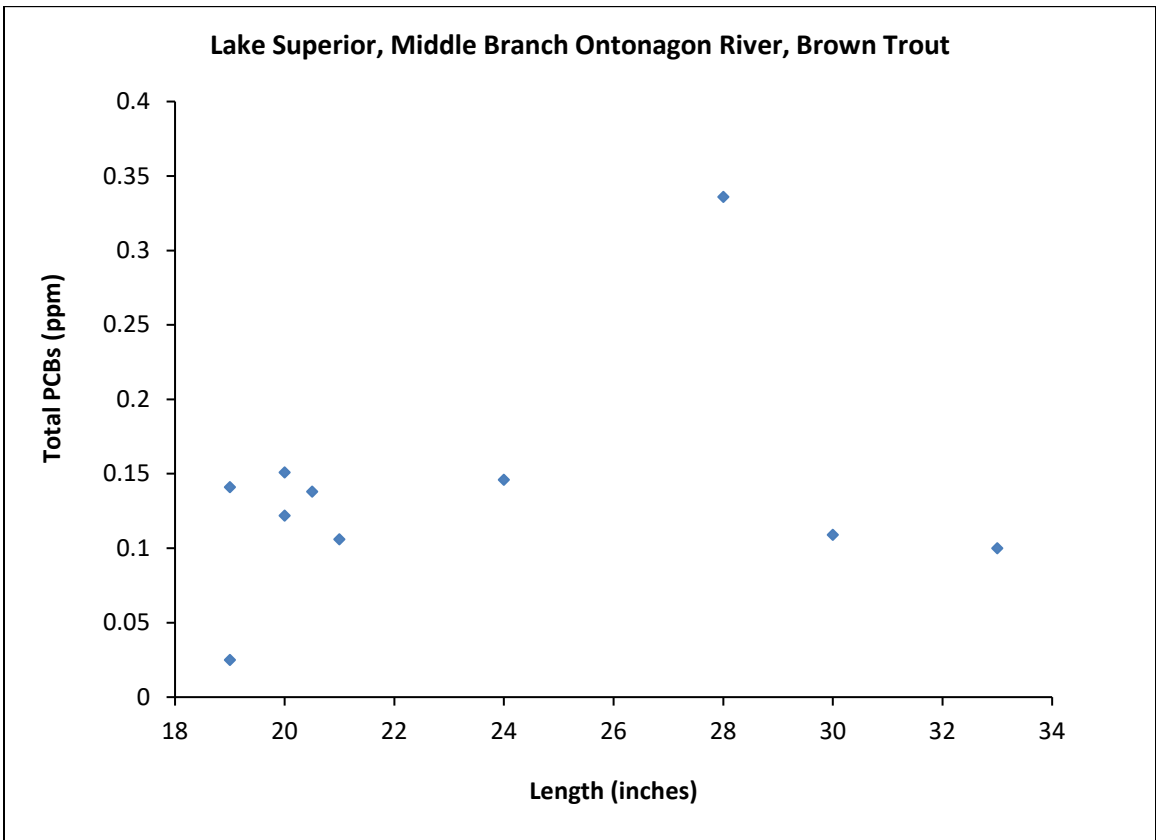
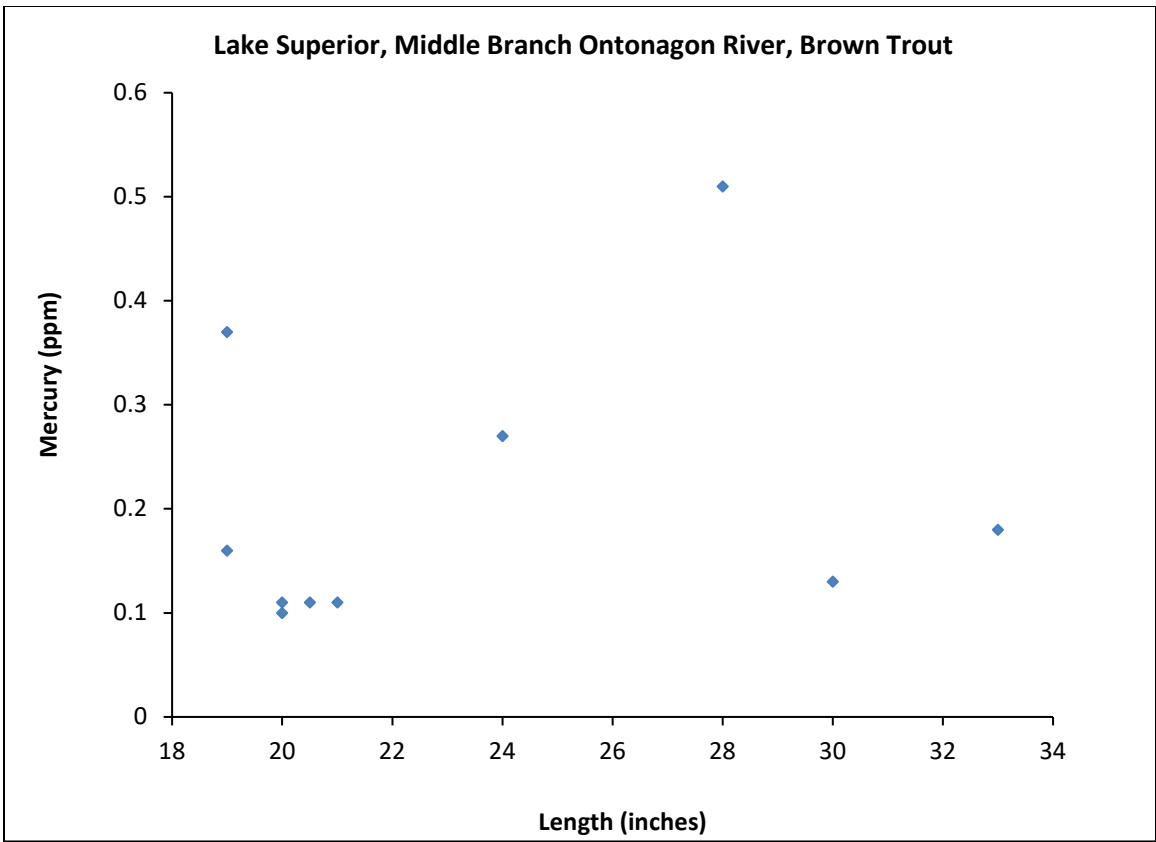
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1999	1999	10	19	10	19	33
Datasets available: 1999						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.20	0.10	0.51	0.30	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.047	0.062				

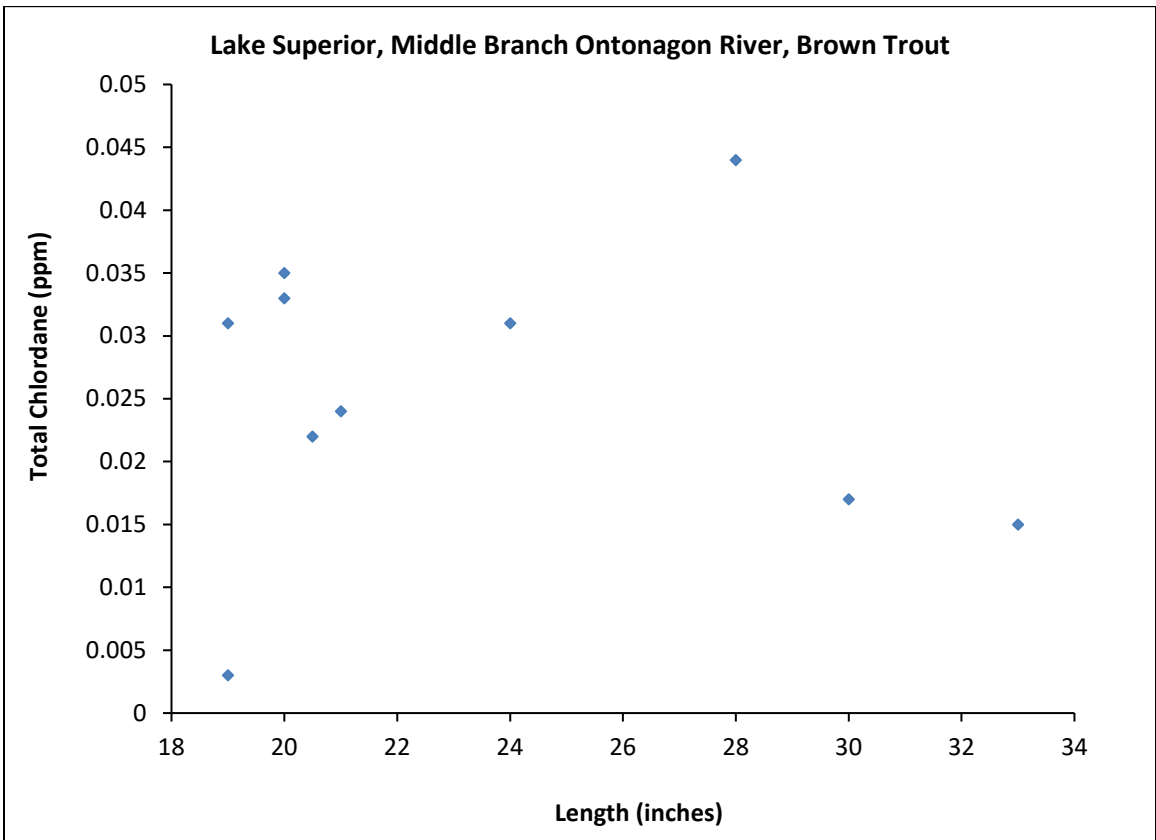
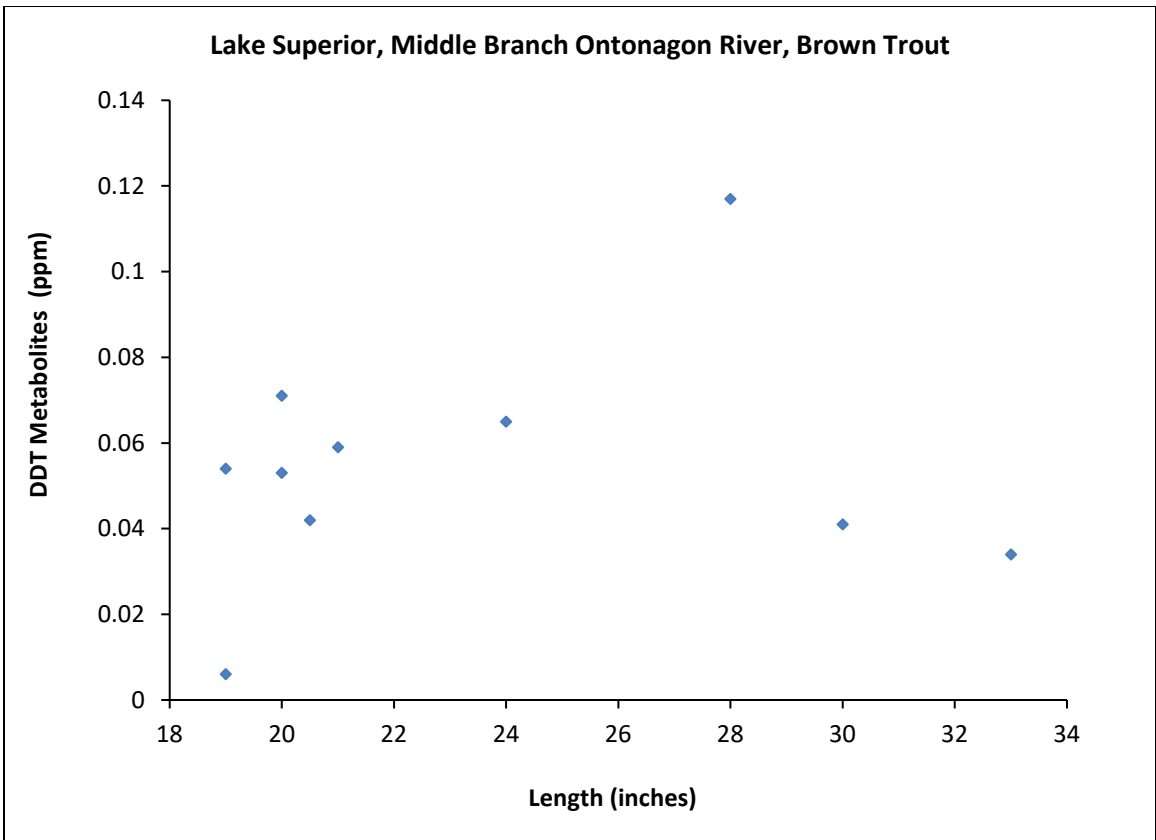
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1999	1999	10	19	10	19	33
Datasets available: 1999						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.14	0.02	0.34	0.19	1
DDT	10	0.05	0.006	0.12	0.07	16
Chlordane	10	0.03	0.003	0.04	0.03	--
Toxaphene	10	ND	--	--	--	--
TEQ*	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.067	0.069				
DDT	0.023	0.036				
Chlordane	0.005	0.004				
Toxaphene	--	--				
TEQ*	--	--				
Final meal category based on UCL:						1

Existing Advisory: Women and children should not eat more than one meal per week of Lake Superior brown trout due to PCBs.

Recommendation: No one should eat more than 1 meal per month of brown trout from Lake Superior and its tributary streams due to PCBs. Mercury would cause an advisory.





Burbot

**Lake Superior
Sturgeon River**

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	14.2	na	14.2	24.4
Datasets available: 2006						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.27	0.11	0.67	0.39	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.641	0.519				

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	14.2	na	14.2	24.4
Datasets available: 2006						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.02	0.006	0.03	0.03	8
DDT	10	0.007	0.003	0.01	0.01	16
Chlordane	10	0.003	0.001	0.006	0.001	--
Toxaphene	10	ND	--	--	--	--
TEQ*	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.011	0.006				
DDT	0.000	0.002				
Chlordane	0.085	0.081				
Toxaphene	--	--				
TEQ*	--	--				
Final meal category based on UCL:						2

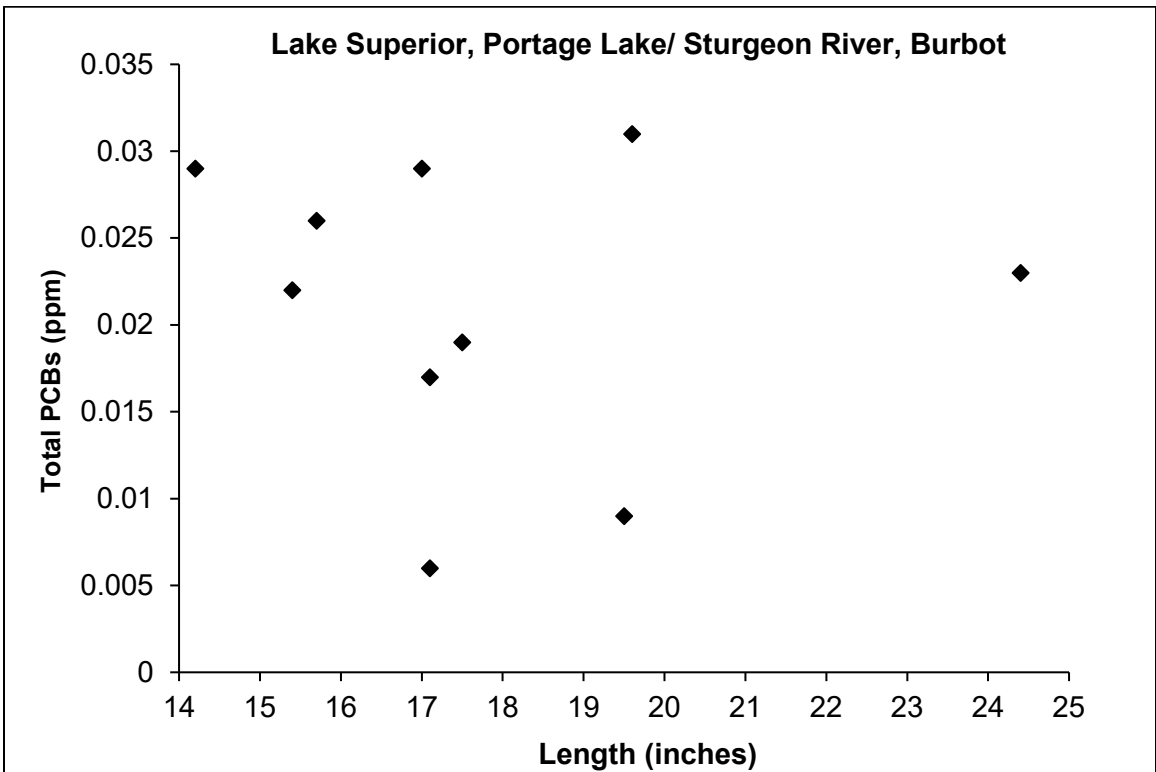
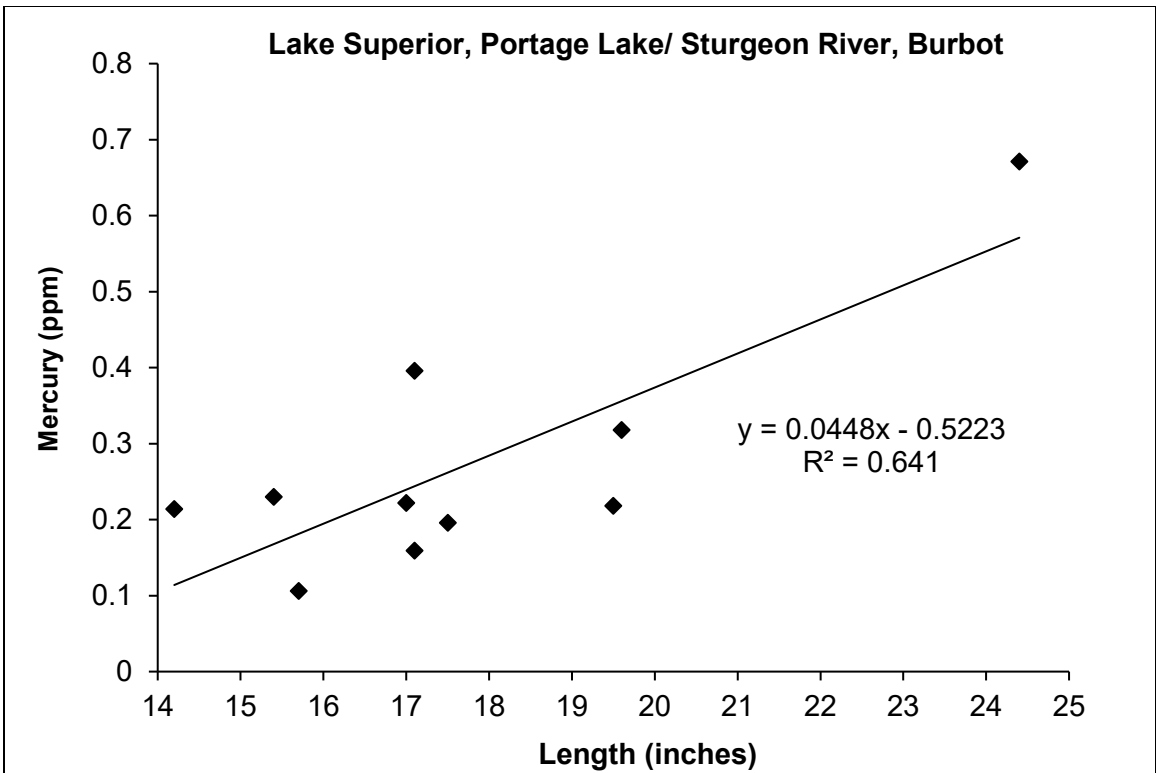
Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
12	0.02	16
14	0.1	8
16	0.19	4
18	0.28	2
20	0.37	2
22	0.46	2
24	0.55	1
26	0.64	1

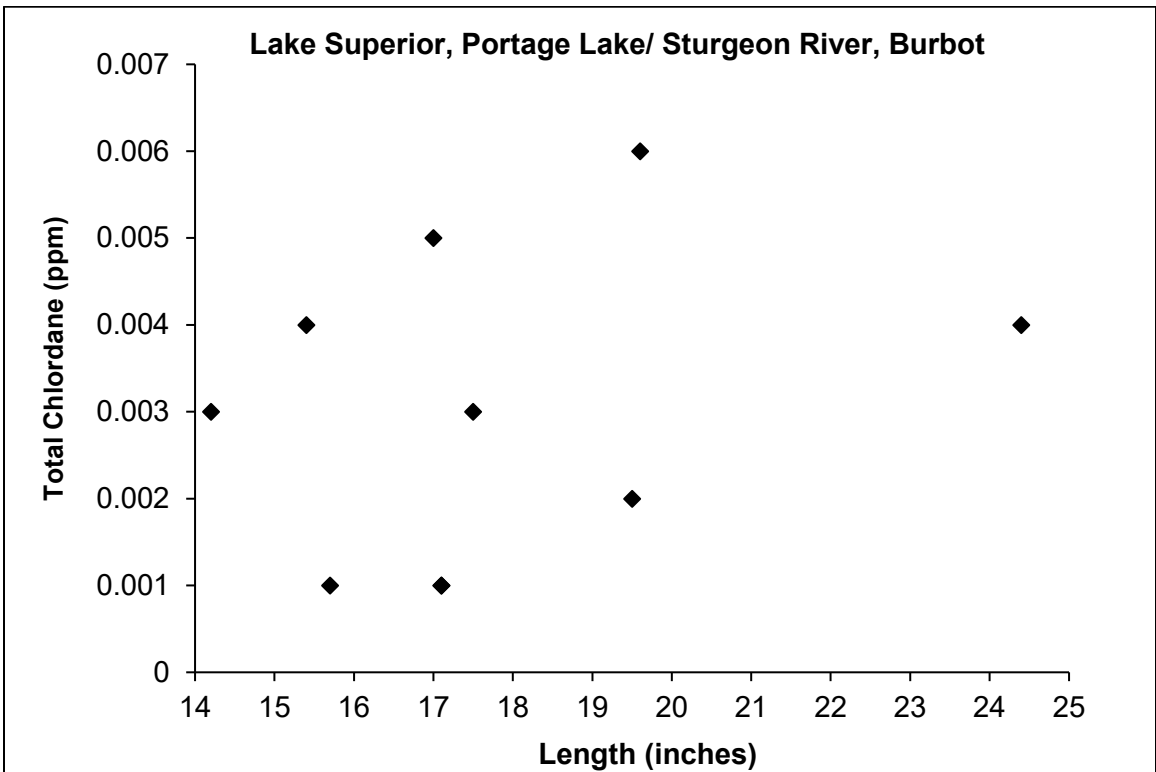
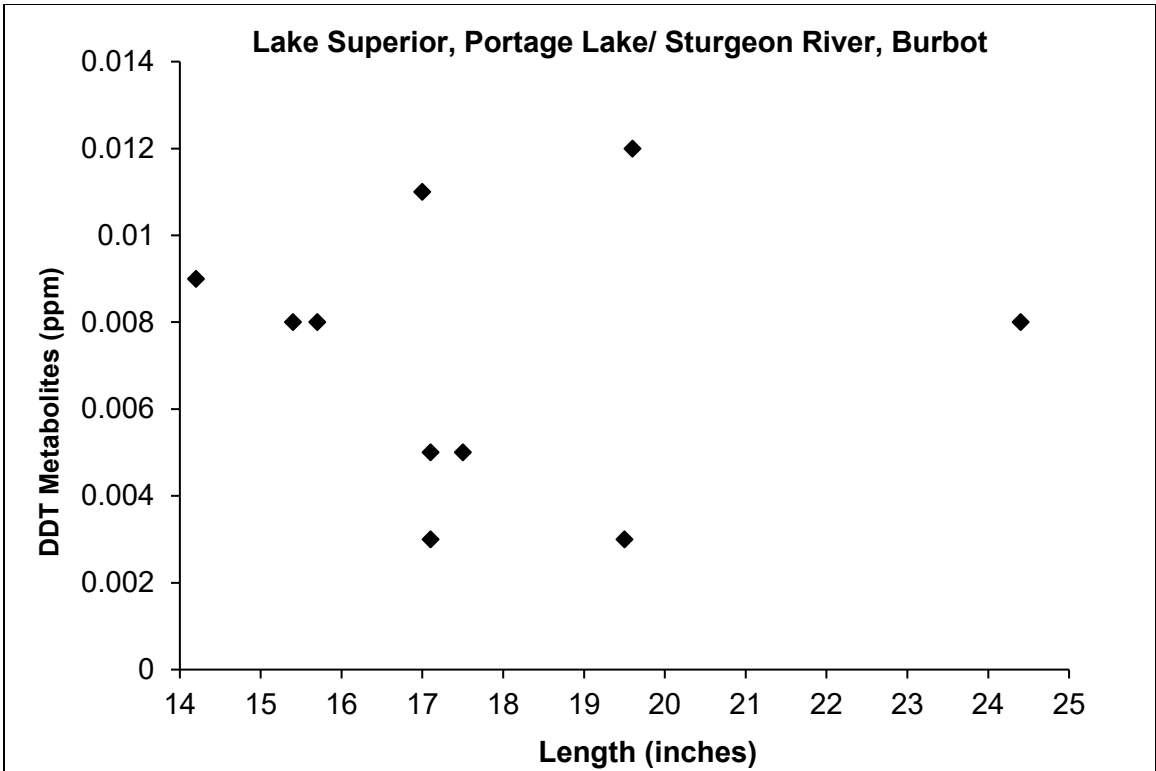
Shaded area denotes extrapolated estimates

Existing MDHHS Advisory:* Sensitive populations should not eat these fish. Healthy adults should limit consumption of burbot from Lake Superior and its tributary streams to no more than 1 or 2 meals per year due to PCBs. Mercury and DDT would cause advisories.

Recommendation: No one should eat more than 4 meals per month of burbot from Lake Superior smaller than 18 inches or more than 2 meals per month of those fish larger than 18 inches due to mercury. PCBs would cause an advisory.

*- an error was made in the original ESF evaluation; corrected and re-evaluated 5/31/2017.





Chinook Salmon

**Lake Superior
Carp & Laughing Whitefish Rivers**

Hg Analysis:

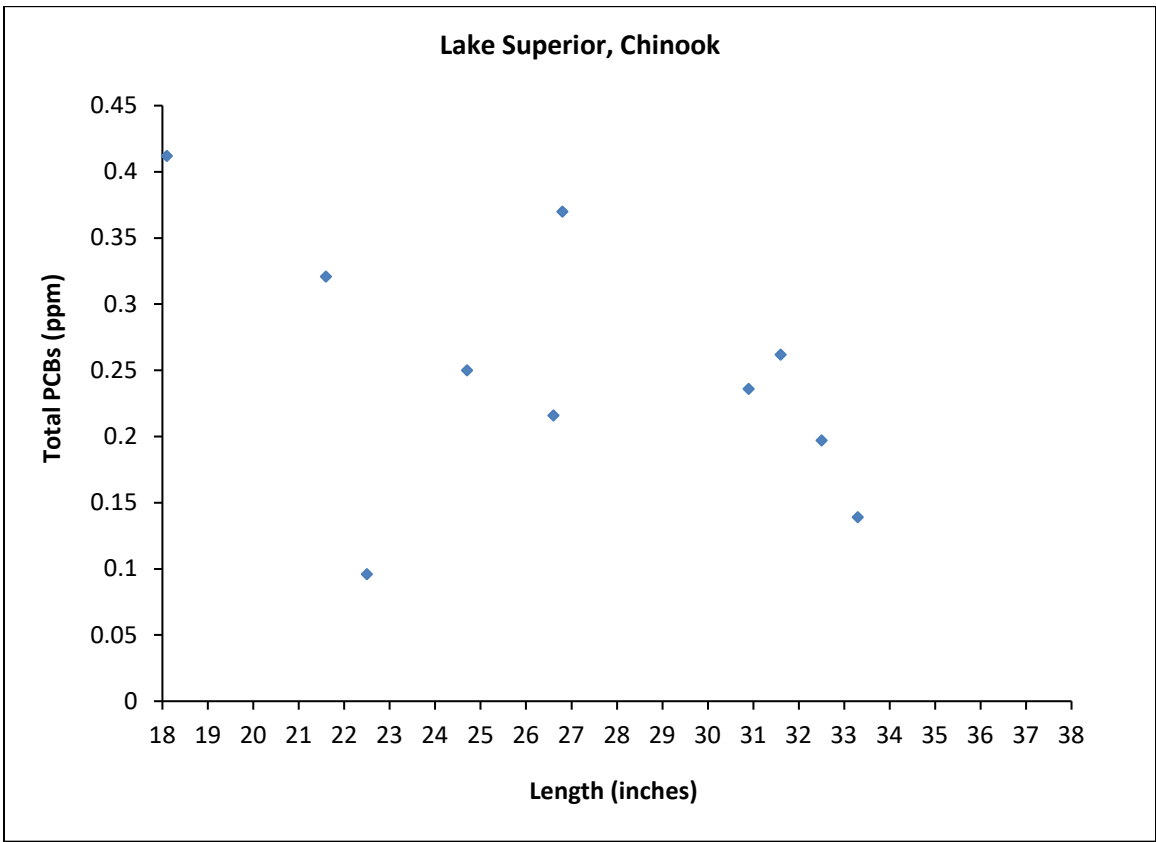
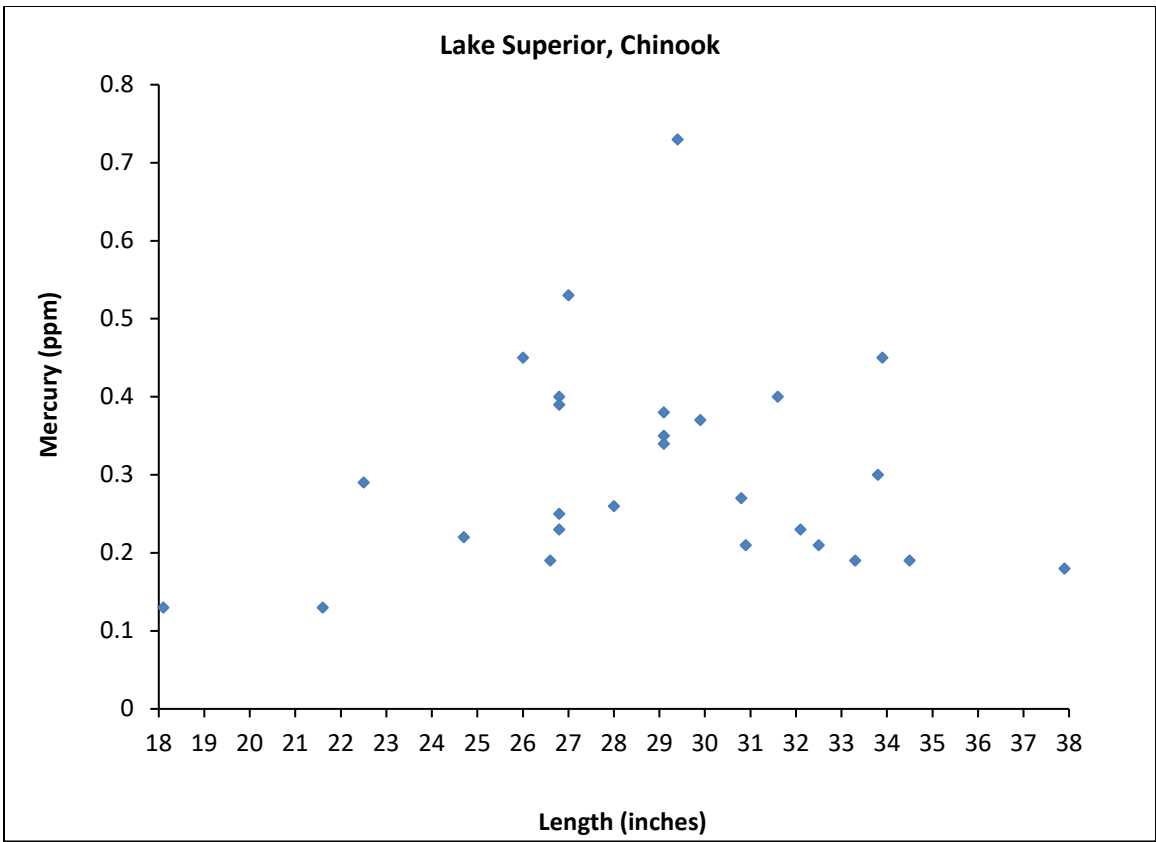
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1988	2000	27	18.1	10	18.1	33.3
Datasets available: 1988, 1997, 2000						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	27	0.31	0.13	0.73	0.36	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.006	0.020				

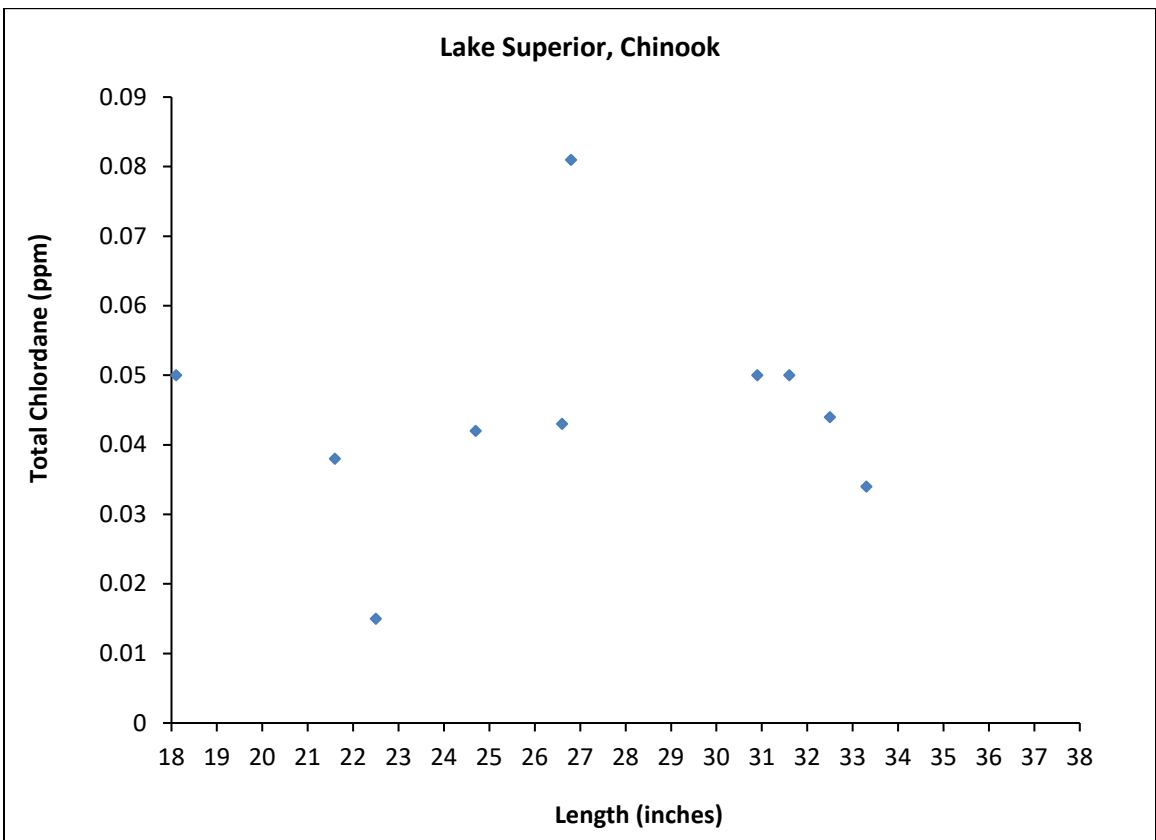
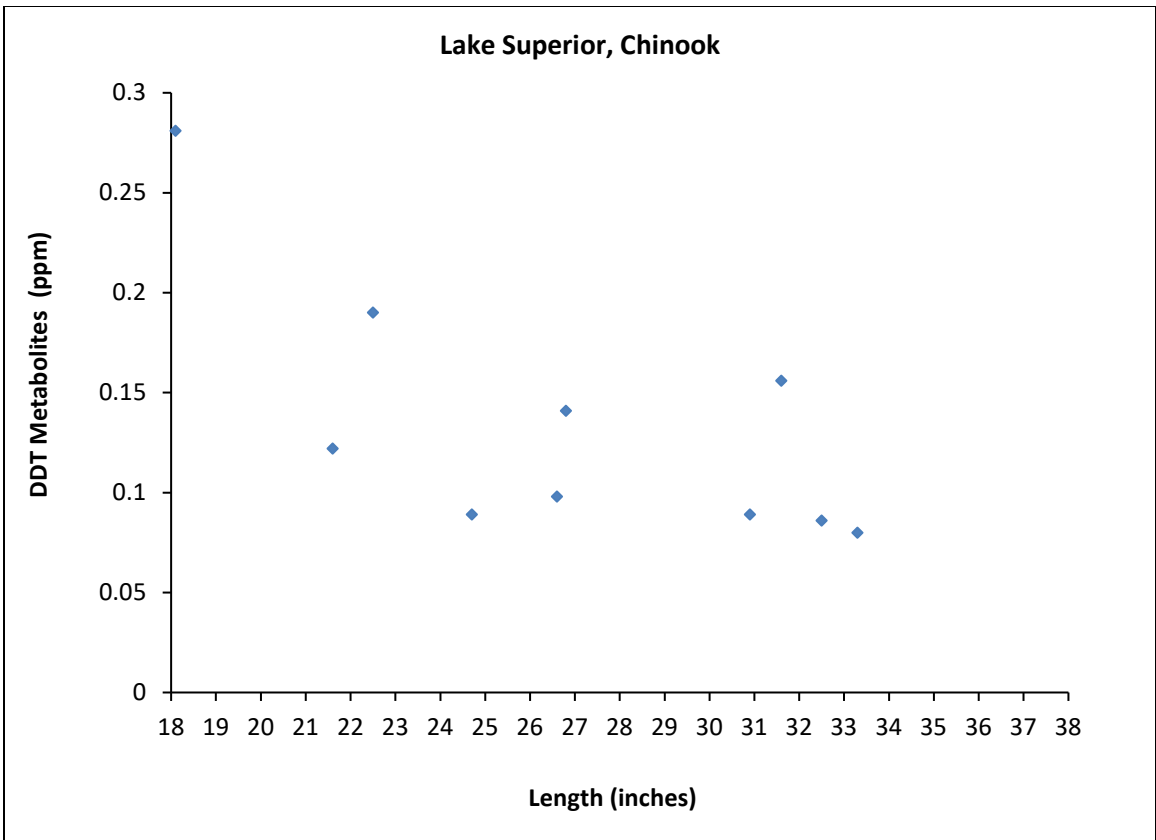
Organics Analysis:

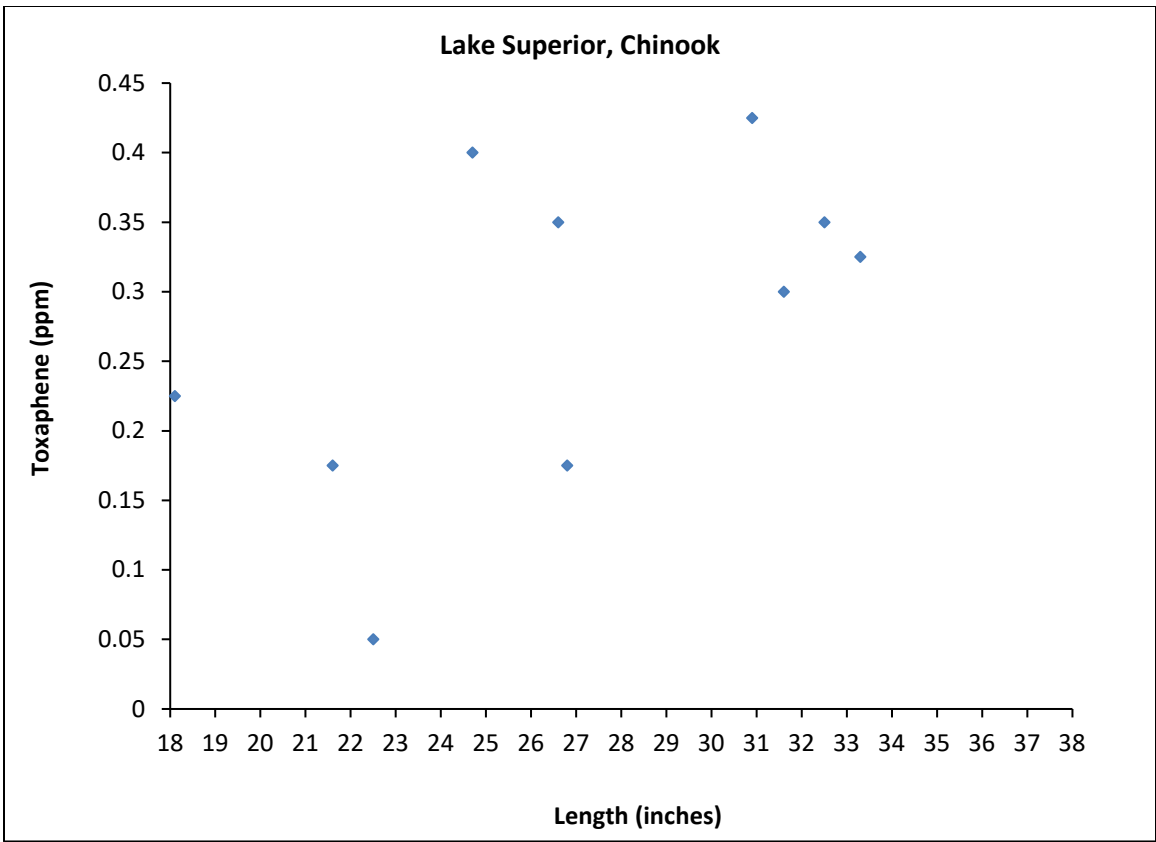
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2000	2000	10	18.1	10	18.1	37.9
Datasets available: 1988, 1997, 2000						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.25	0.10	0.41	0.32	0.5
DDT	10	0.13	0.08	0.28	0.18	8
Chlordane	10	0.04	0.02	0.08	0.06	--
Toxaphene	10	0.28	0.05	0.42	0.36	1
TEQ*	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.220	0.105				
DDT	0.490	0.485				
Chlordane	0.016	0.038				
Toxaphene	0.325	0.266				
TEQ*	--	--				
Final meal category based on UCL:						0.5

Existing Advisory: Women and children should not eat more than one meal per month of Lake Superior chinook salmon due to PCBs.

Recommendation: No one should eat more than 6 meals per year of chinook salmon from Lake Superior and its tributary streams due to PCBs. Mercury, DDT, and toxaphene would cause advisories.







Coho Salmon

**Lake Superior
Carp & Chocloy Rivers; Chink & Pendills Creeks**

Hg Analysis:

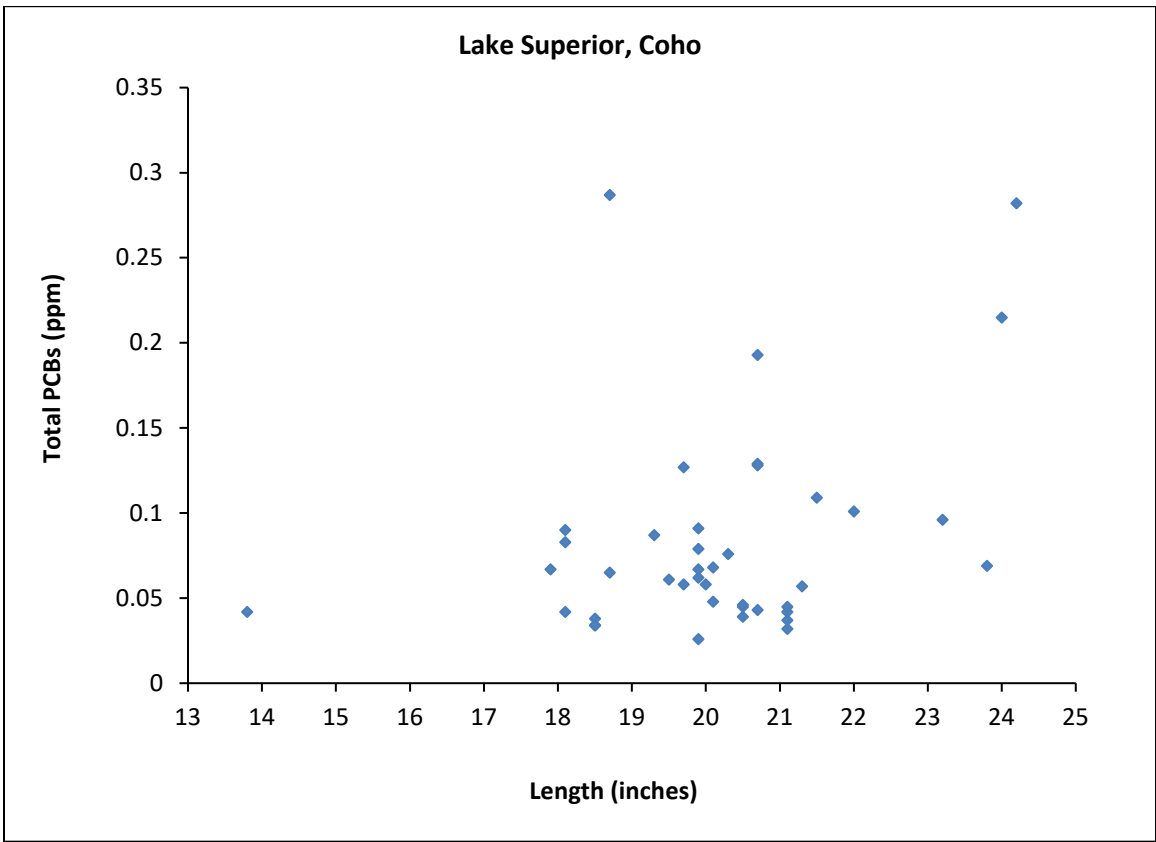
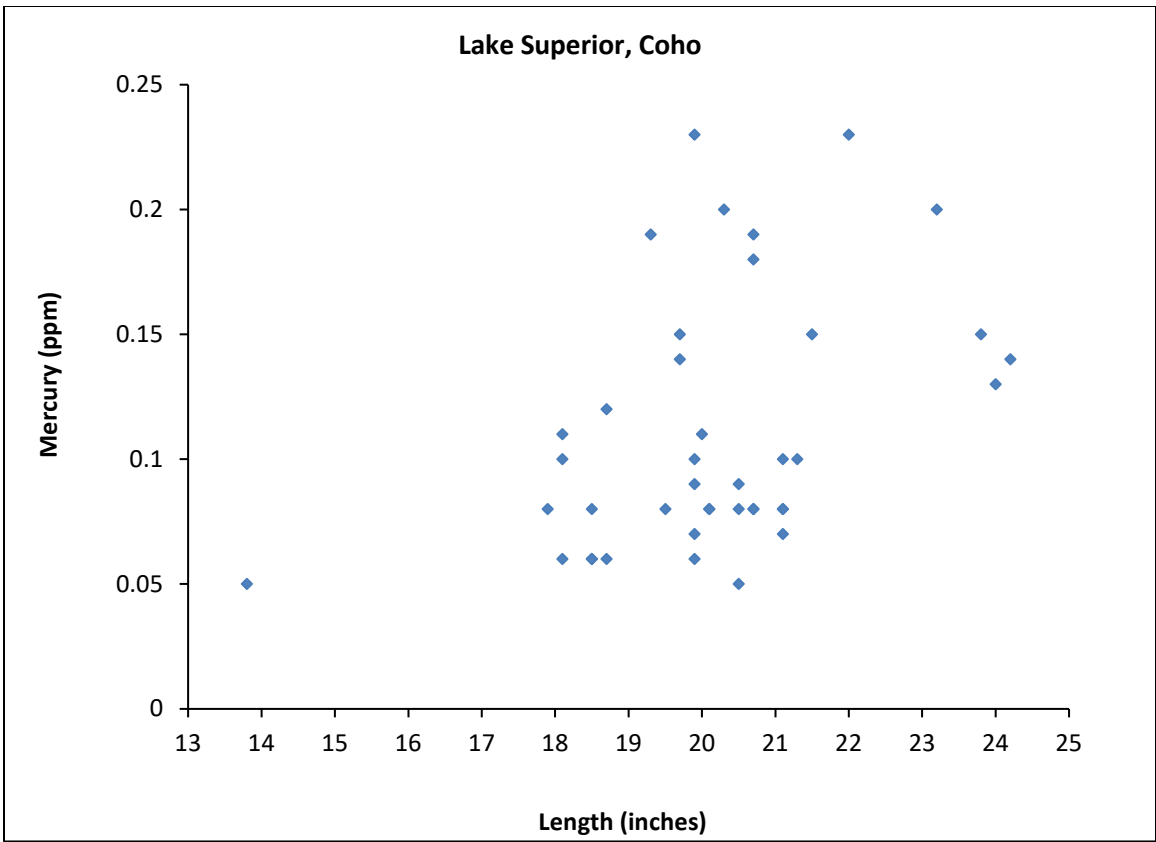
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
1994	1997	41	13.8	10	13.8	24.2	
Datasets available: 1994, 1995, 1996, 1997							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
Mercury	41	0.111	0.050	0.230	0.130	8	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.174	0.223					

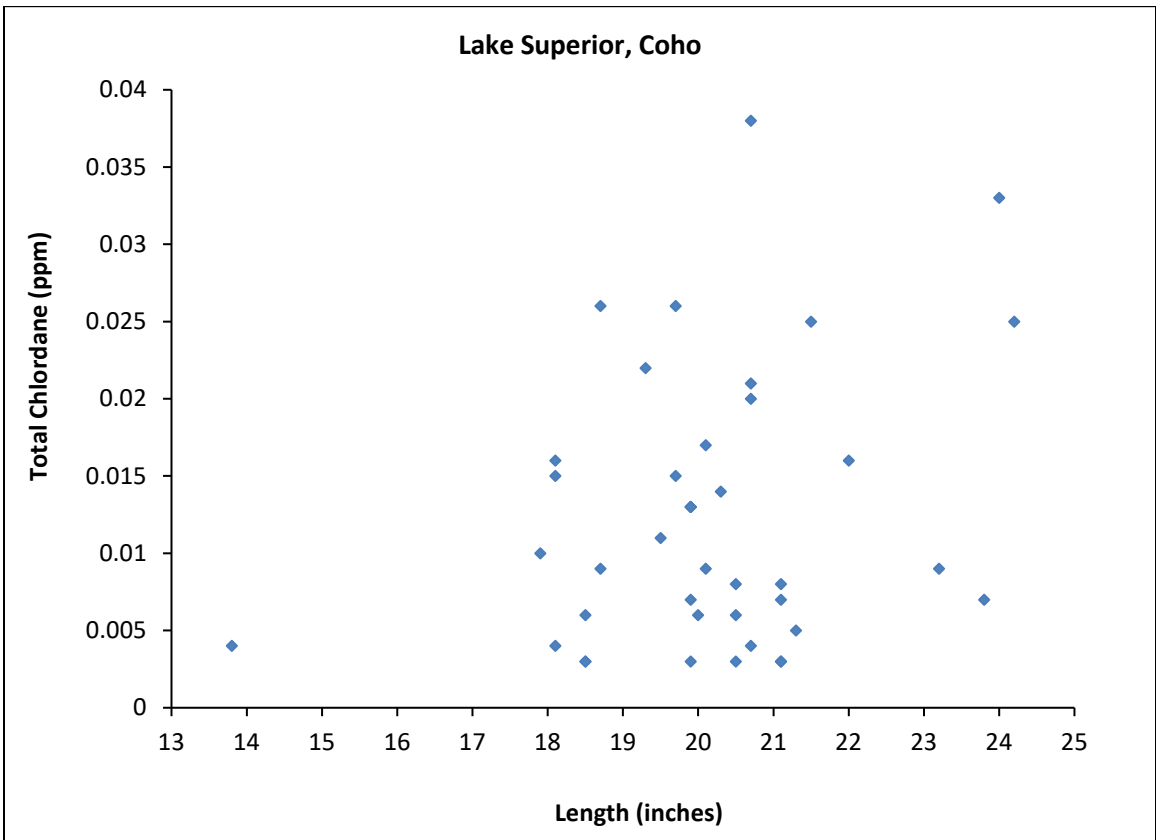
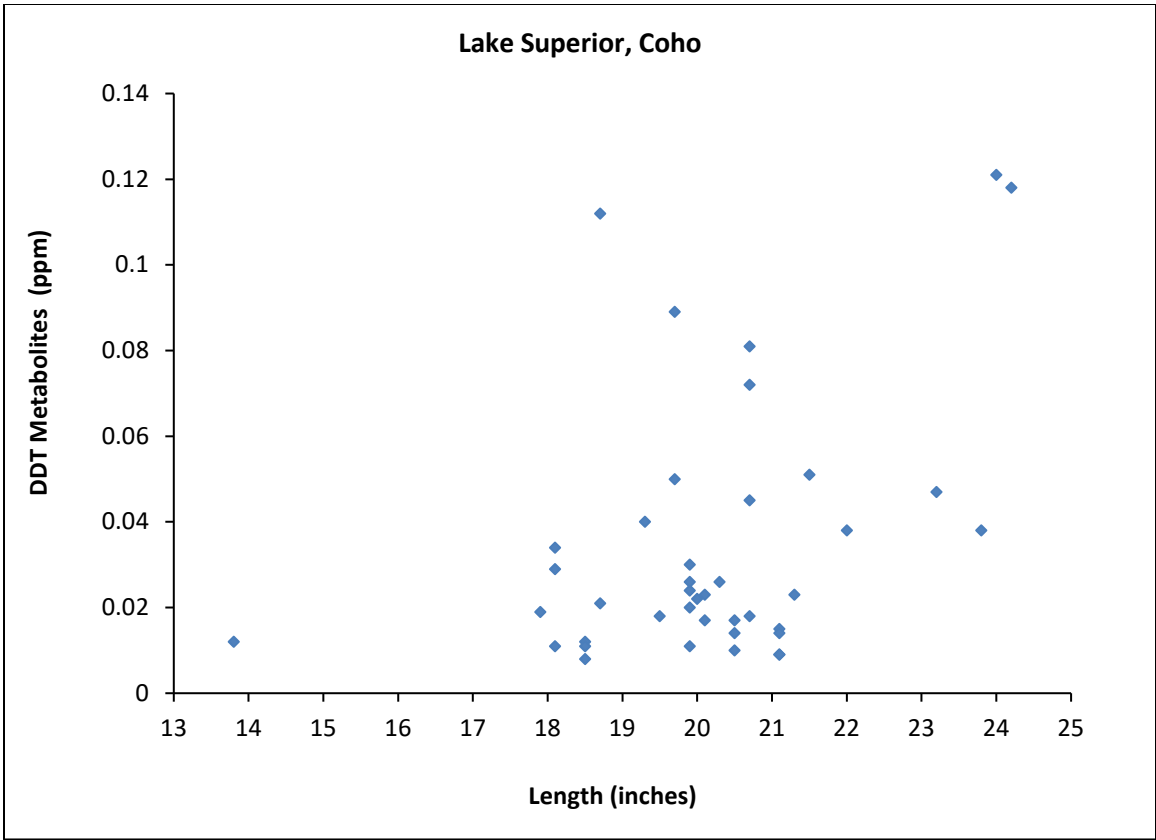
Organics Analysis:

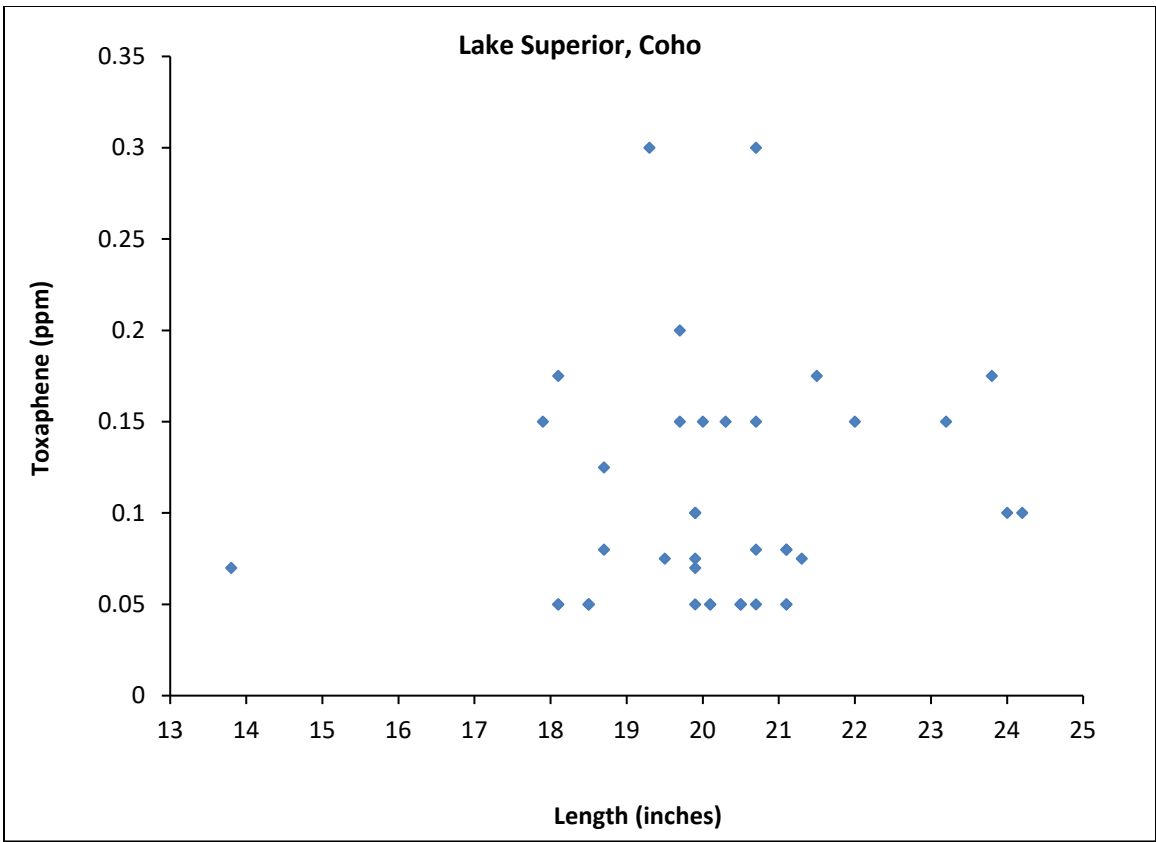
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
1994	1997	41	13.8	10	13.8	24.2	
Datasets available: 1994, 1995, 1996, 1997							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
PCB	41	0.083	0.026	0.287	0.100	2	
DDT	41	0.034	0.008	0.121	0.040	16	
Chlordane	41	0.012	0.003	0.038	0.020	--	
Toxaphene	41	0.105	0.050	0.300	0.120	2	
TEQ*	0	--	--	--	--	--	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.120	0.121					
DDT	0.170	0.168					
Chlordane	0.074	0.062					
Toxaphene	0.021	0.038					
TEQ*	--	--	Final meal category based on UCL:				2*

Existing Advisory: Women and children should not eat more than one meal per week of Lake Superior coho salmon due to PCBs.

Recommendation: No one should eat more than 4 meals per month of coho salmon from Lake Superior and its tributary streams due to PCBs & Toxaphene. Mercury would cause advisories. *Based on the EGLE Fish Contaminant Monitoring Program, PCB and toxaphene concentrations ≥15 years old are expected to have declined to a concentration that allows a less restrictive meal category.







Lake Herring

**Lake Superior
Keweenaw Bay and Munising**

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	2007	31	12.6	na	12.6	25.4	
Datasets available: 1994, 1995, 2000, 2007							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	31	0.09		0.03	0.22	0.11	8
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.279	0.303					

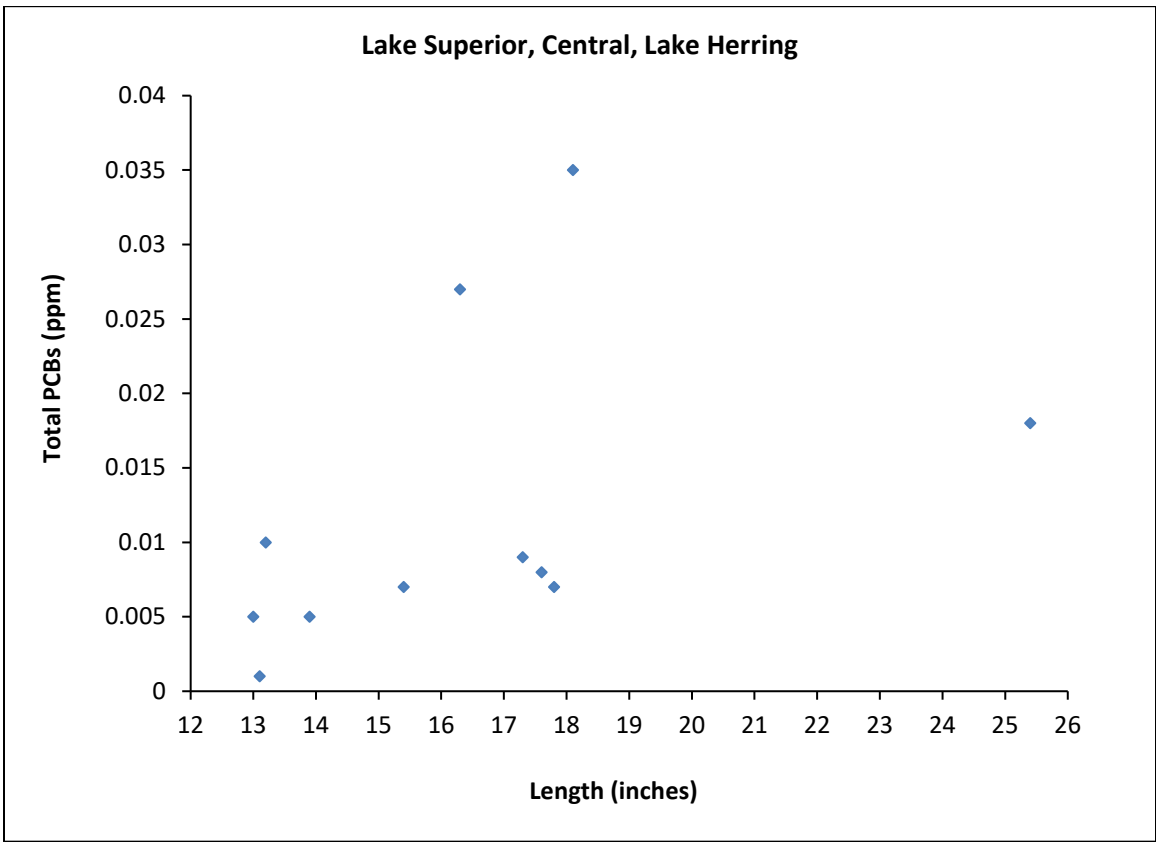
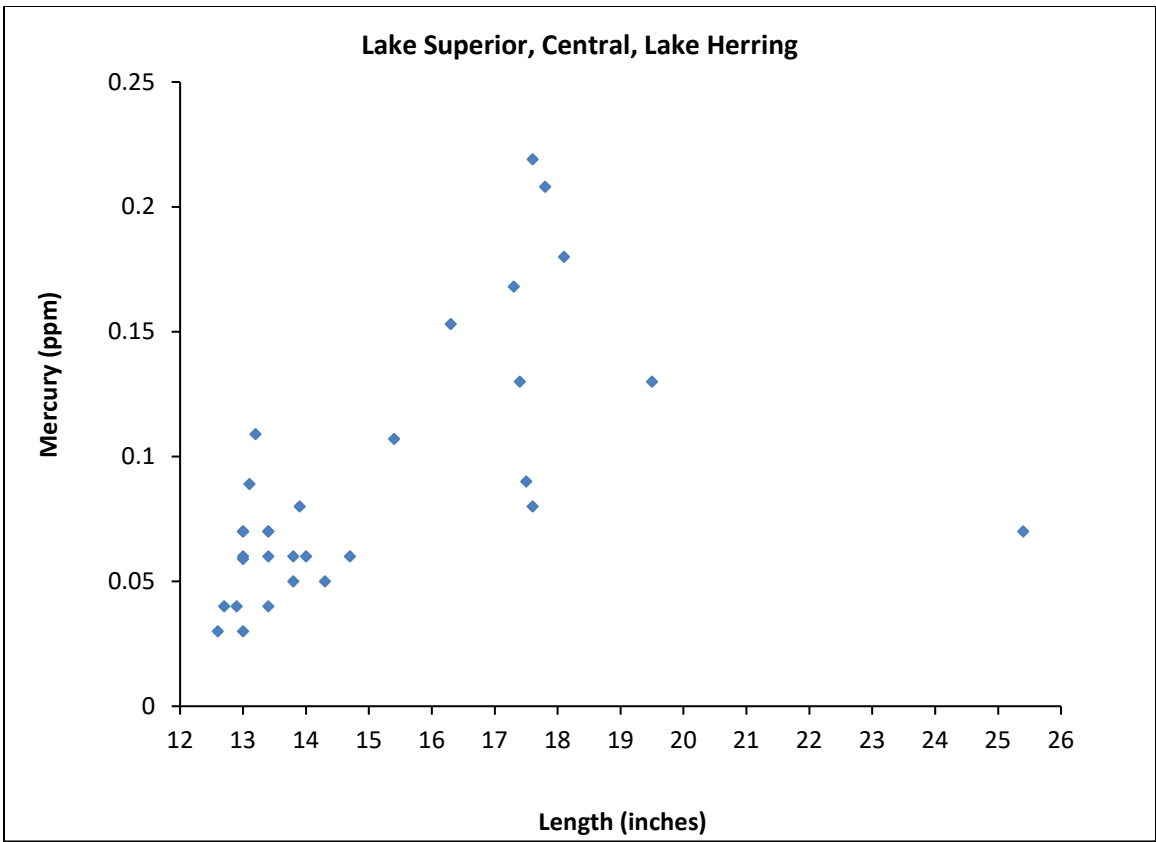
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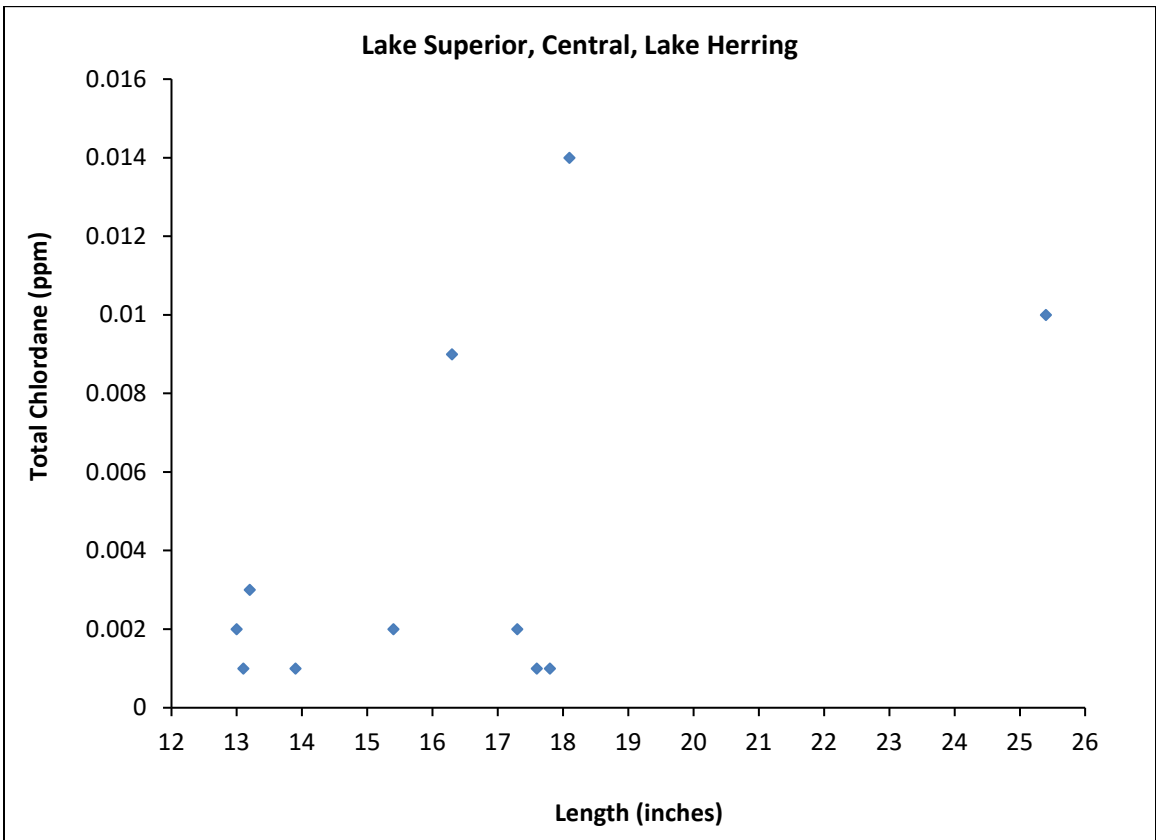
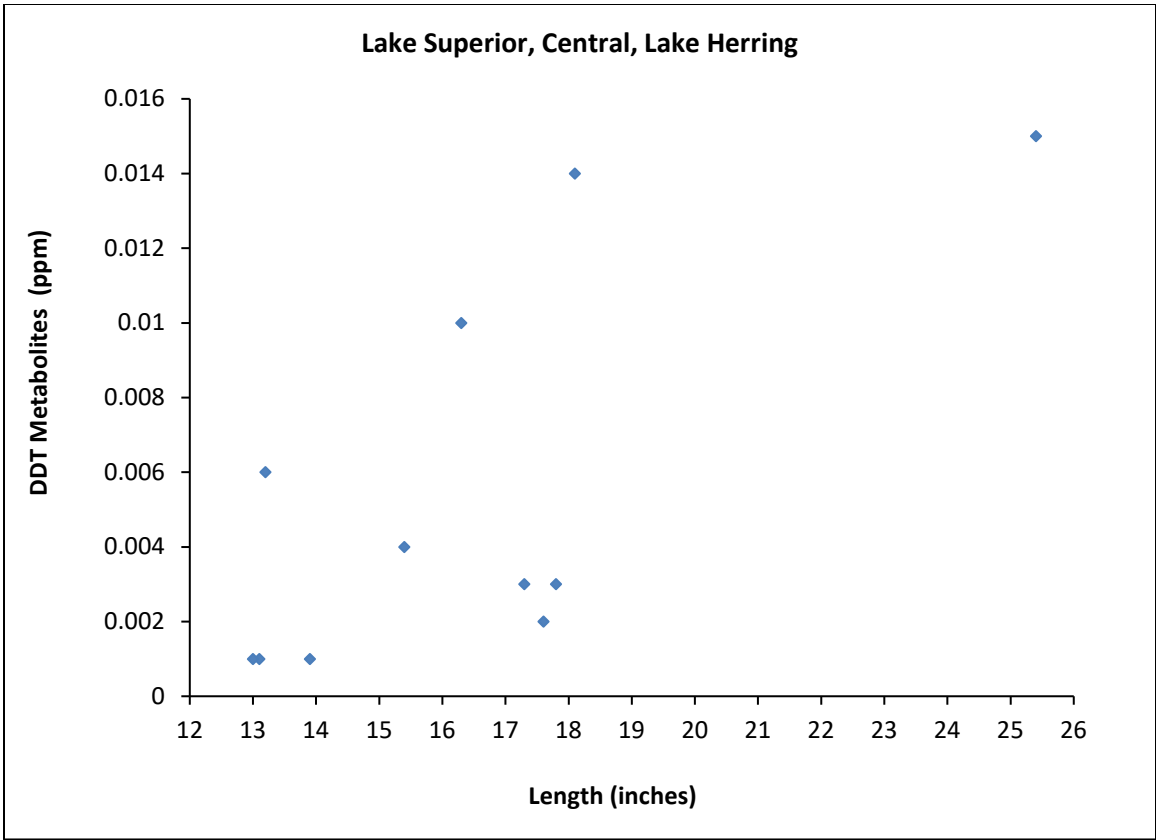
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
2000	2007	11	13	na	13	25.4	
Datasets available: 1994, 1995, 2000, 2007							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	11	0.01		0.001	0.04	0.02	12
DDT	11	0.005		0.001	0.02	0.01	16
Chlordane	11	0.004		0.001	0.01	0.01	--
Toxaphene	11	ND		--	--	--	--
TEQ*	1	2.1		2.1	2.1	--	--
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.198	0.296					
DDT	0.494	0.428					
Chlordane	0.303	0.262					
Toxaphene	--	--					
TEQ*	--	--					
Final meal category based on UCL:							8

* - 2005 WHO TEFs; dl-PCBs not included

Existing Advisory: Women and children should not eat more than one meal per week of Lake Superior lake herring due to PCBs.

Recommendation: No one should eat more than 8 meals per month of Lake Superior lake herring due to mercury. PCBs would cause an advisory.





Lake Trout

Lake Superior

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1984	2008	187	13.8	15	15.3	37.6
Datasets available: 1984, '85, '86', '87, '89, '91, '92, '96, 2002, 2008						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	186	0.25	0.08	1.16	0.28	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.242	0.287				

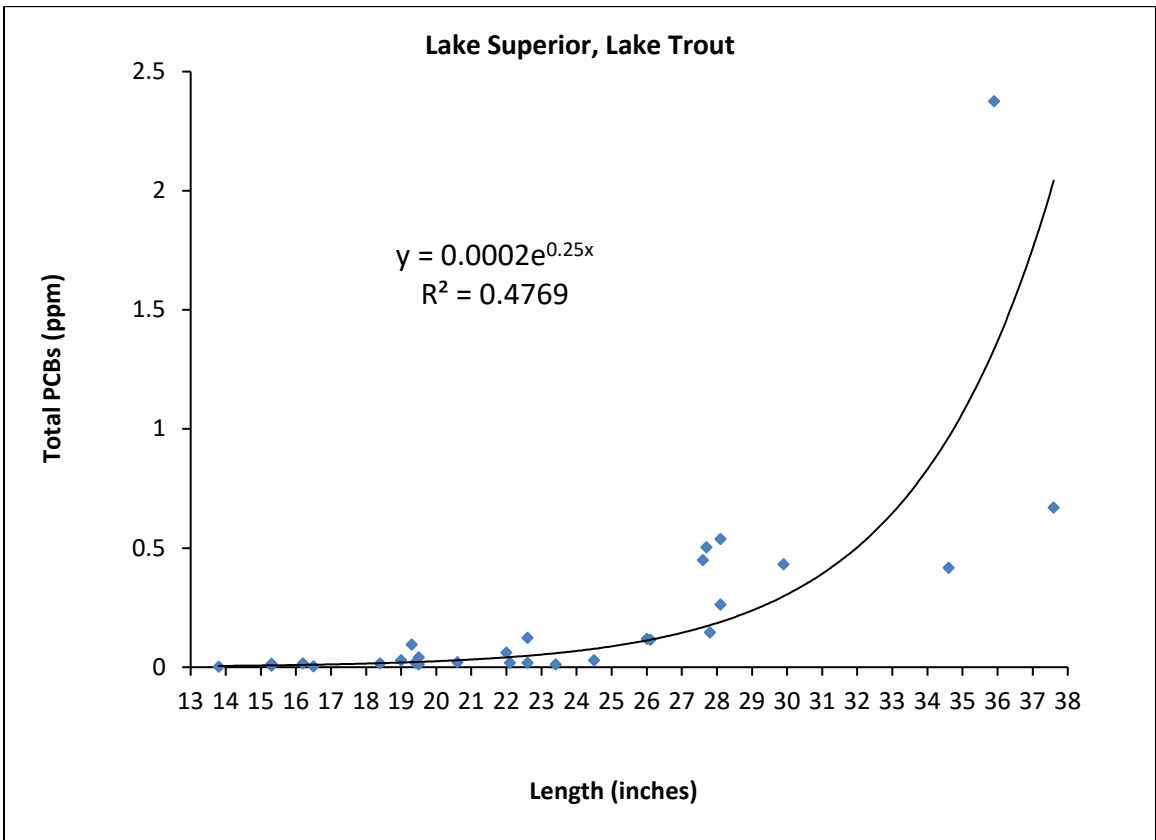
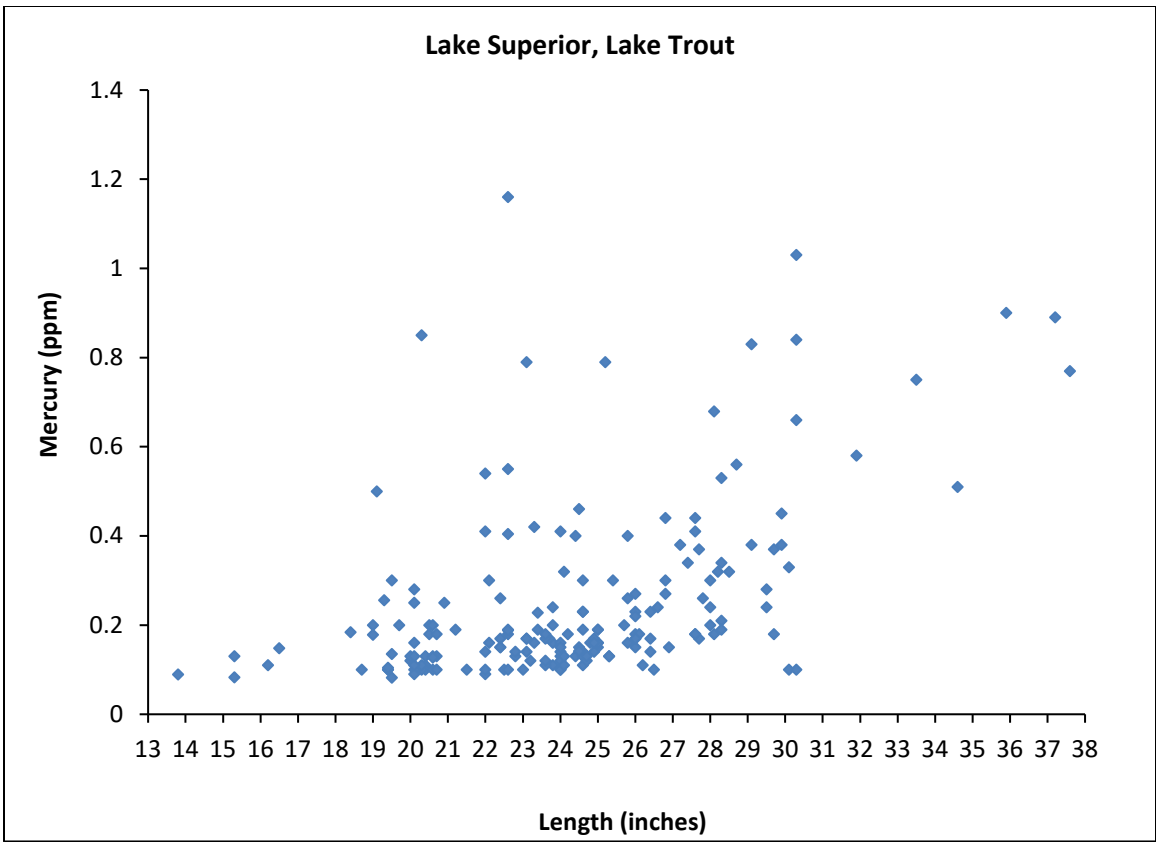
Organics Analysis:

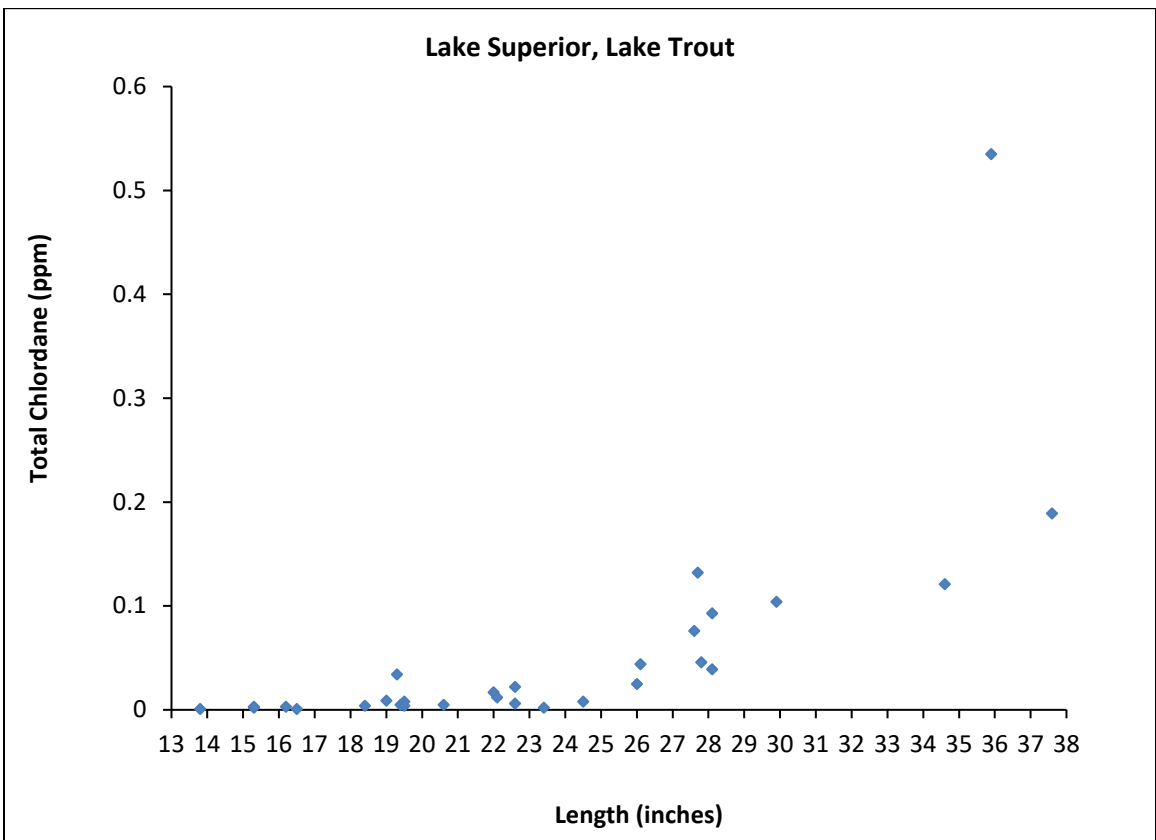
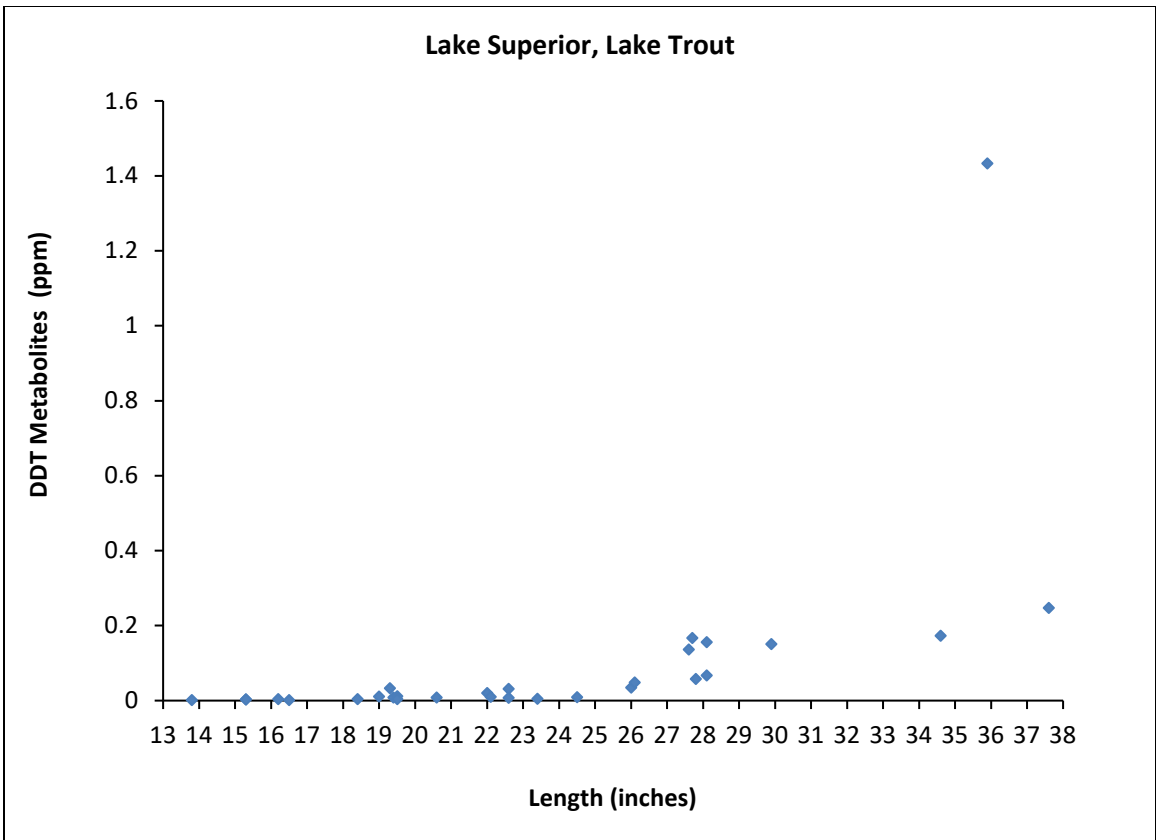
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2002	2008	28	13.8	15	15.3	37.6
Datasets available: 1984, '85, '86', '87, '89, '91, '92, '96, 2002, 2008						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	28	0.24	0.004	2.38	0.41	0.5
DDT	28	0.10	0.001	1.43	0.21	8
Chlordane	28	0.06	0.001	0.54	0.10	--
Toxaphene	28	0.07	0.05	0.44	0.10	2
TEQ*	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.461	0.794				
DDT	0.331	0.828				
Chlordane	0.499	0.804				
Toxaphene	0.255	0.385				
TEQ*	--	--				
Final meal category based on UCL:						0.5

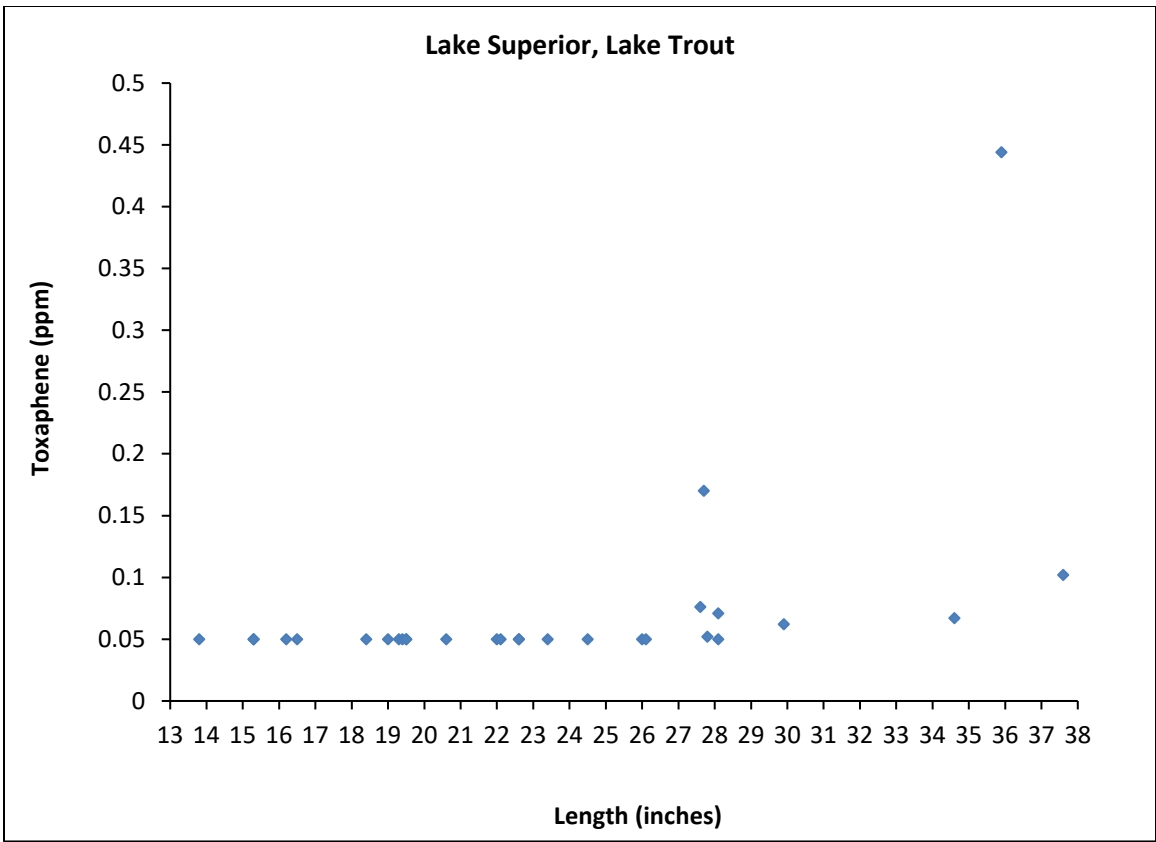
Existing Advisory: Women and children should not eat more than one meal per week of Lake Superior lake trout smaller than 26 inches, more than one meal per month of those fish between 26 and 30 inches, or any of those fish larger than 30 inches due to PCBs, chlordane, and mercury.

Recommendation: No one should eat more than 2 meals per month of lake trout less than 24 inches from Lake Superior and its tributary streams due to mercury and toxaphene, 1 meal per month of those fish between 24 and 28 inches due to PCBs, or 6 meals per year of fish larger than 28 inches due to PCBs. Sample size is limited over 30 inches, which increased the uncertainty of regression estimates over 30 inches.

Length (Inches)	PCB Regression Equation Estimate (ppm)	Meal Category
18	0.02	12
20	0.03	8
22	0.05	4
24	0.08	2
26	0.13	1
28	0.22	0.5
30	0.36	0.5
32	0.6	Limited
36	1.62	Limited
<i>Shaded area denotes extrapolated estimates</i>		







Lake Whitefish

Lake Superior

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	2016	73	18.1	na	18.1	29.8
Datasets available: 1984, '85, '86, '92, '93, '96, 2000, '02, '07, '16						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	73	0.08	0.04	0.30	0.08	12
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.000	0.006				

Organics Analysis:

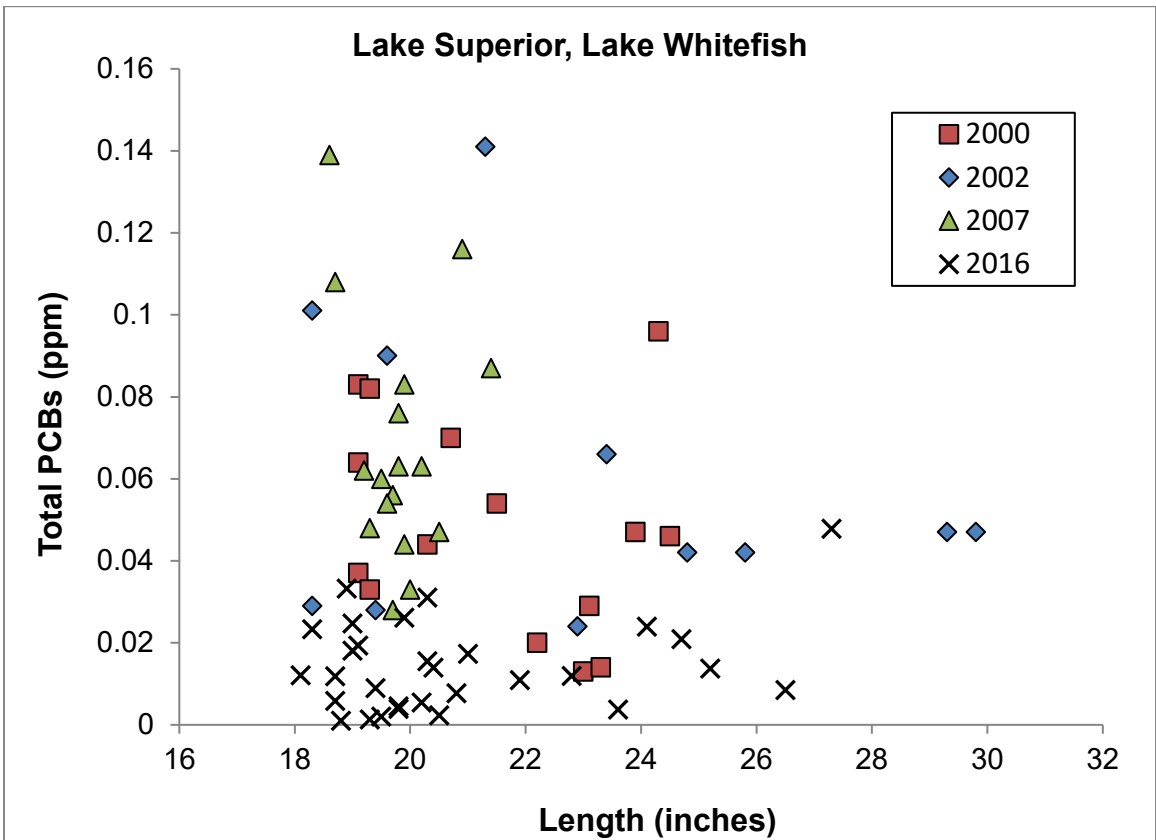
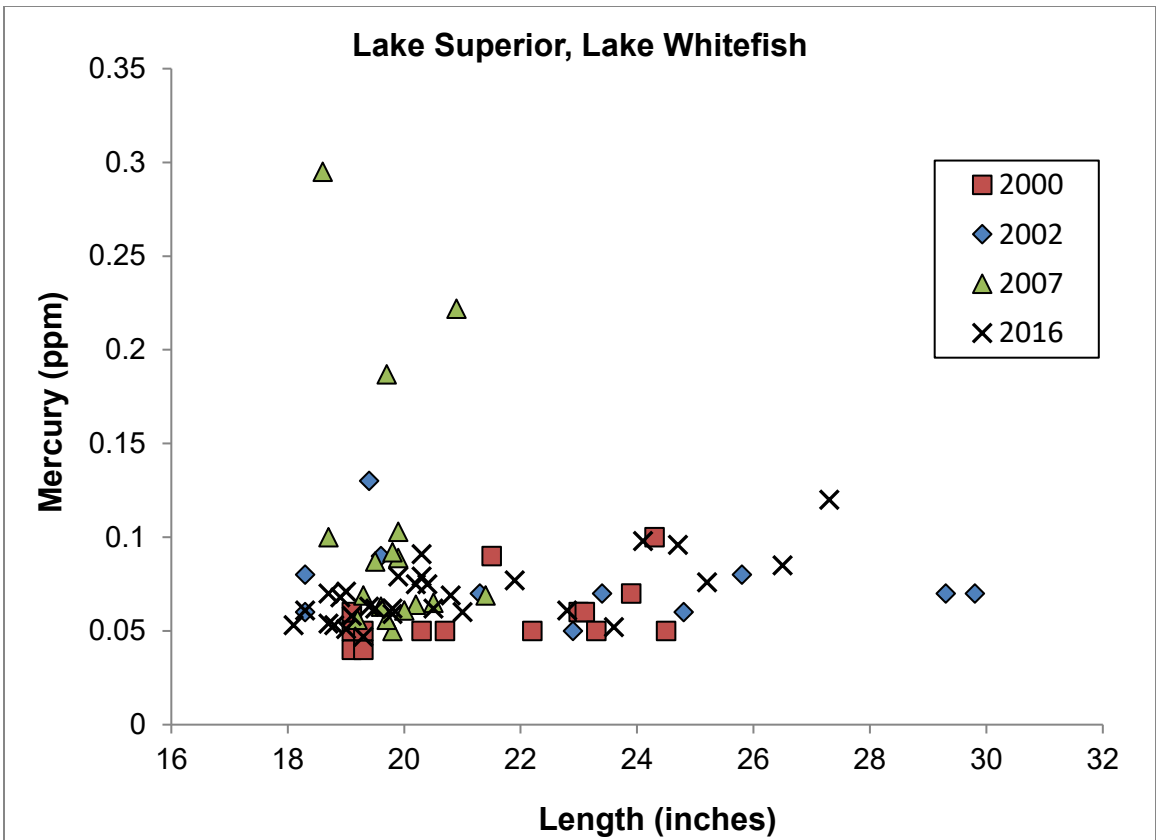
Range of Years Used			N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent	Min				Max	
PCBs	2000	2016	73	18.1	na	18.1	29.8
TEQ	2016	2016	15	18.1	na	18.1	27.3
Σ Tox †	2016	2016	15	18.1	na	18.1	27.3
PFOS	2016	2016	15	18.1	na	18.1	27.3
Datasets available: 1983, '92, '96, '98, '99, 2007, 2016							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
PCB	73	0.04	< 0.001	0.141	0.049	4	
DDT	73	0.02	0.001	0.065	0.020	16	
Chlordane	73	0.01	< 0.001	0.044	0.017	--	
Σ Tox †	15	7 ppb	1 ppb	23.200	9.826	2	
TEQ*	15	4 ppt	1 ppt	17 ppt	6 ppt	1	
PFOS	15	7 ppb	0.8 ppb	16 ppb	10 ppb	12	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.004	0.003					
DDT	0.001	0.011					
Chlordane	0.013	0.003					
Σ Tox †	0.315	0.155					
TEQ*	0.367	0.002					
PFOS	0.007	0.006					
Final meal category based on UCL:						1	

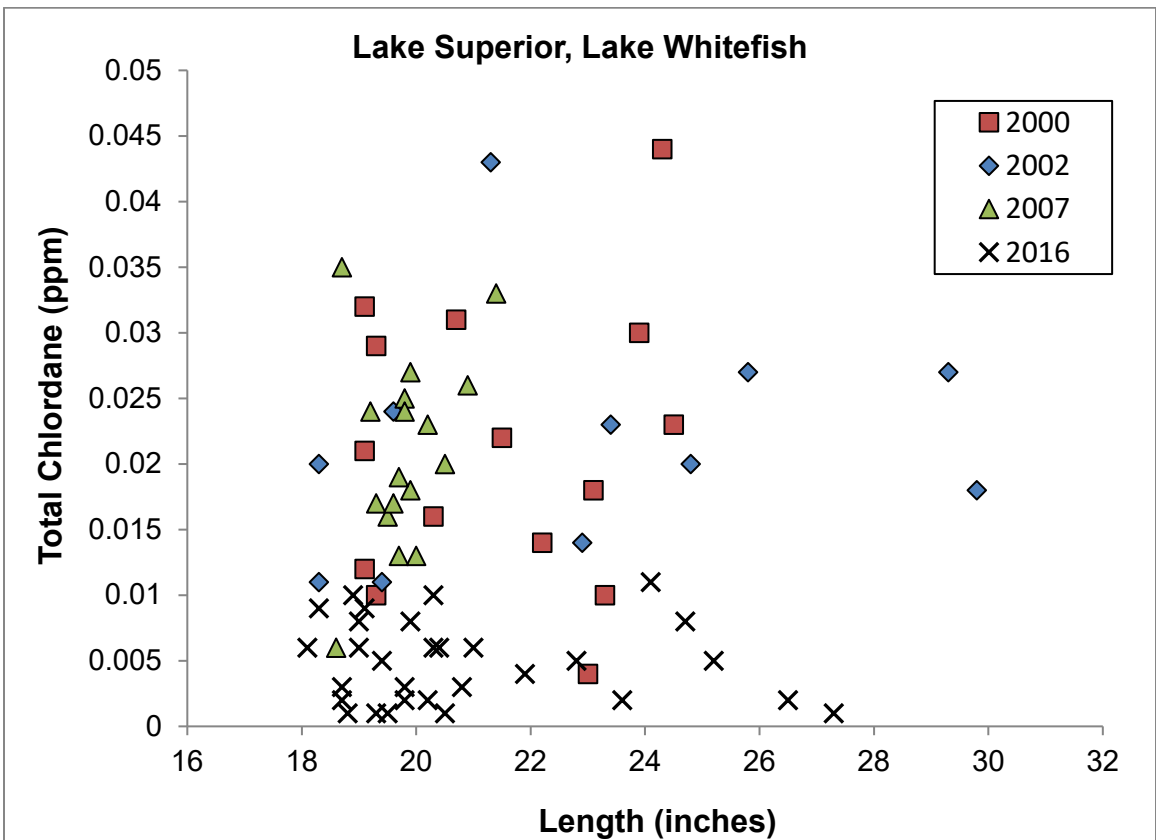
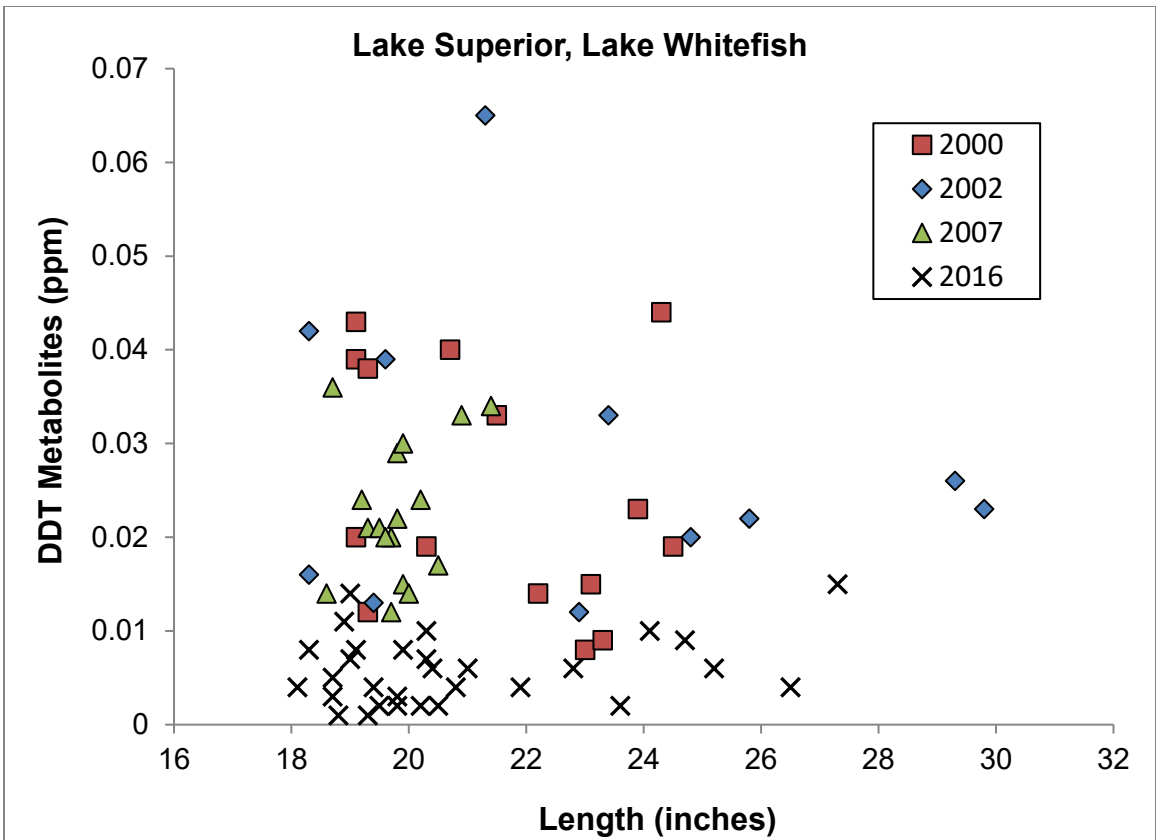
* 2005 WHO TEFs; dl-PCBs included

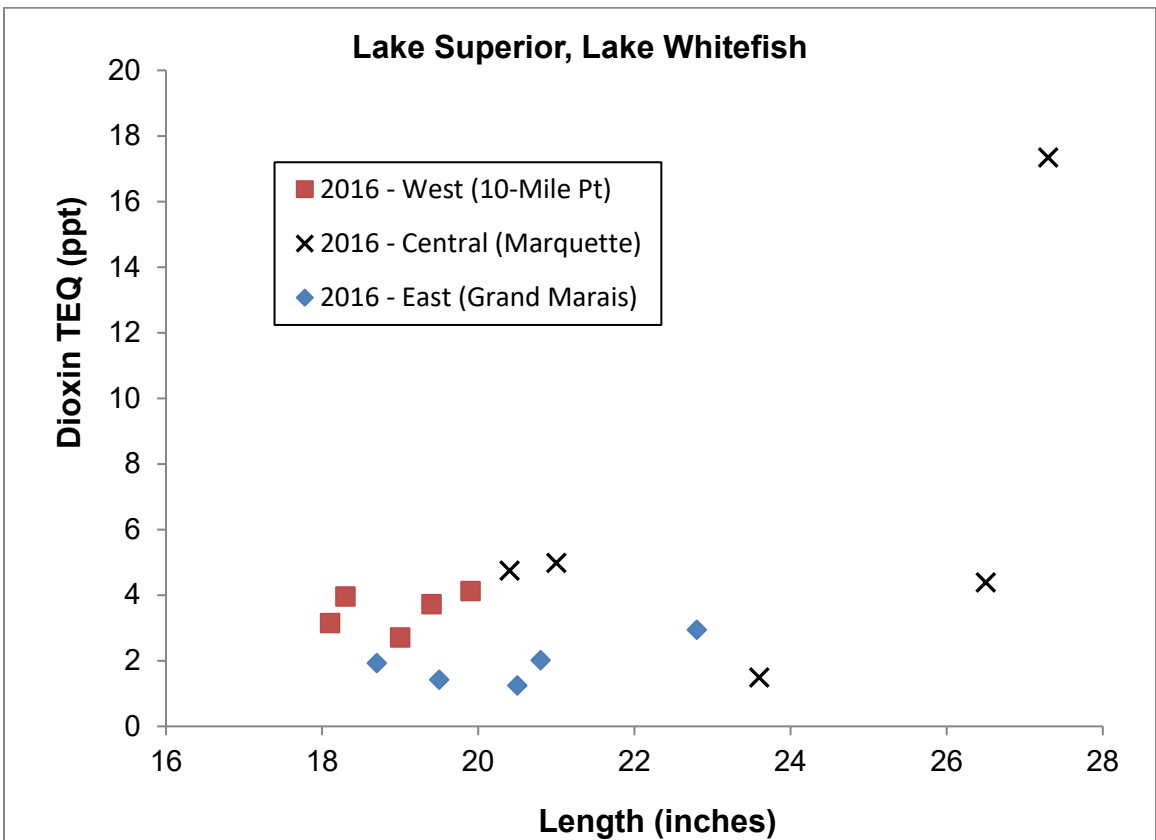
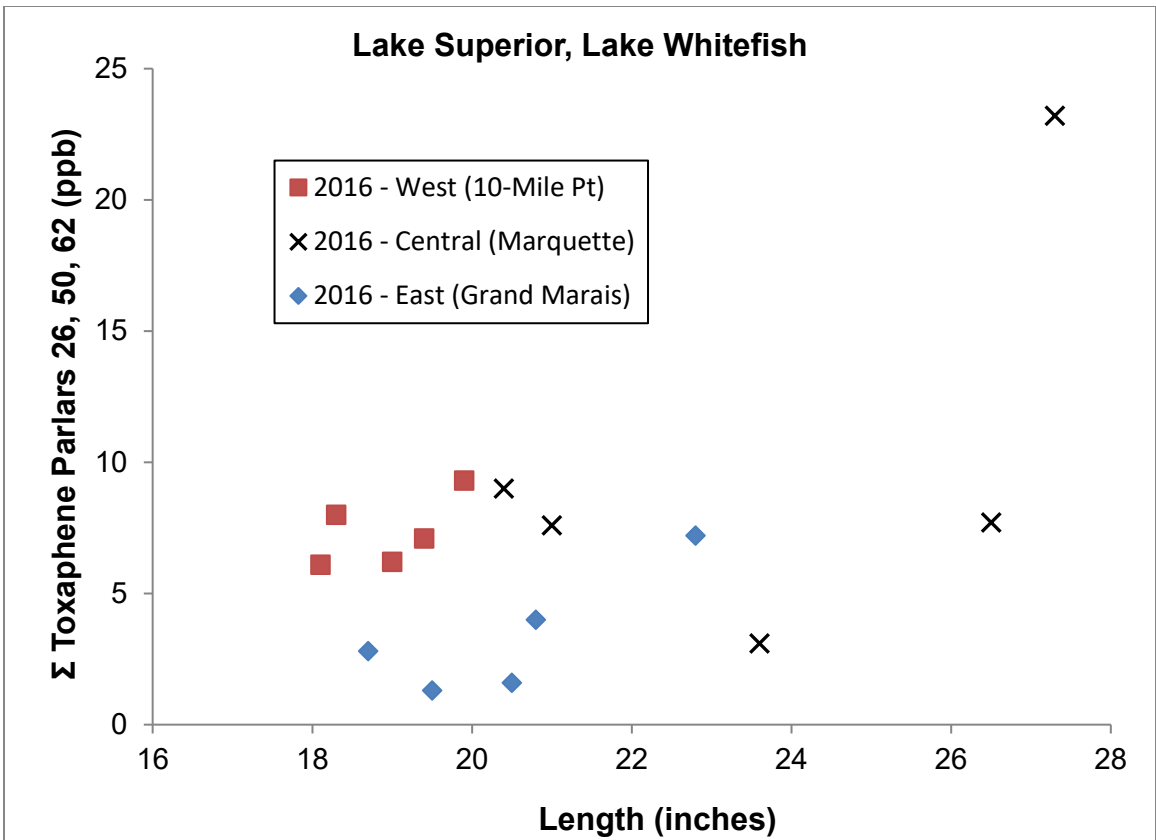
† Sum of Toxaphene Parlars 26, 50, 62

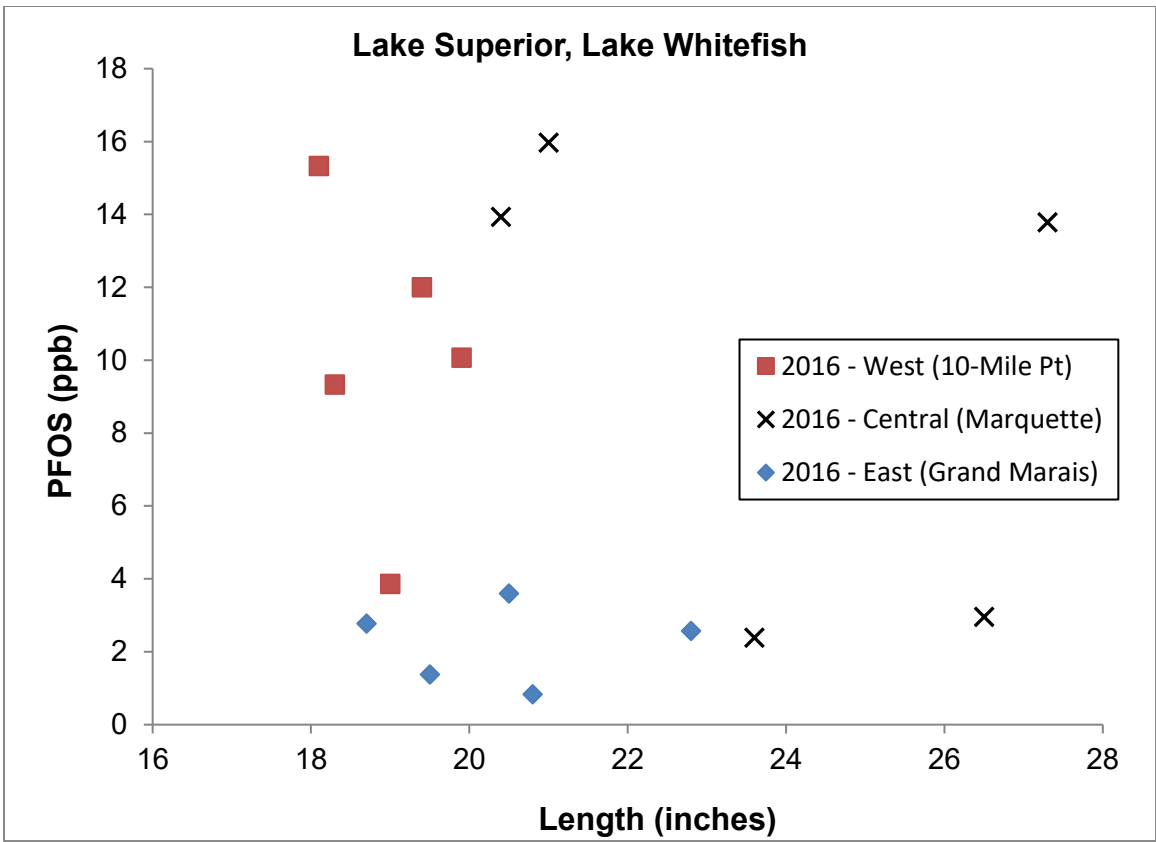
Existing MDHHS Advisory: No one should eat more than 2 meals per month of Lake Superior lake whitefish due to dioxins, PCBs, and toxaphene. Mercury would cause advisories.

Recommendation: No one should eat more than 1 meal per month of Lake Superior lake whitefish due to dioxins. Toxaphene, PCBs, PFOS, and mercury would cause advisories.









**Longnose Sucker
White Sucker**

Lake Superior

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1985	1998	19	12.9	na	12.9	19.4
Datasets available: 1985, 1998						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	19	0.17	0.07	0.50	0.22	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.516	0.667				

Organics Analysis:

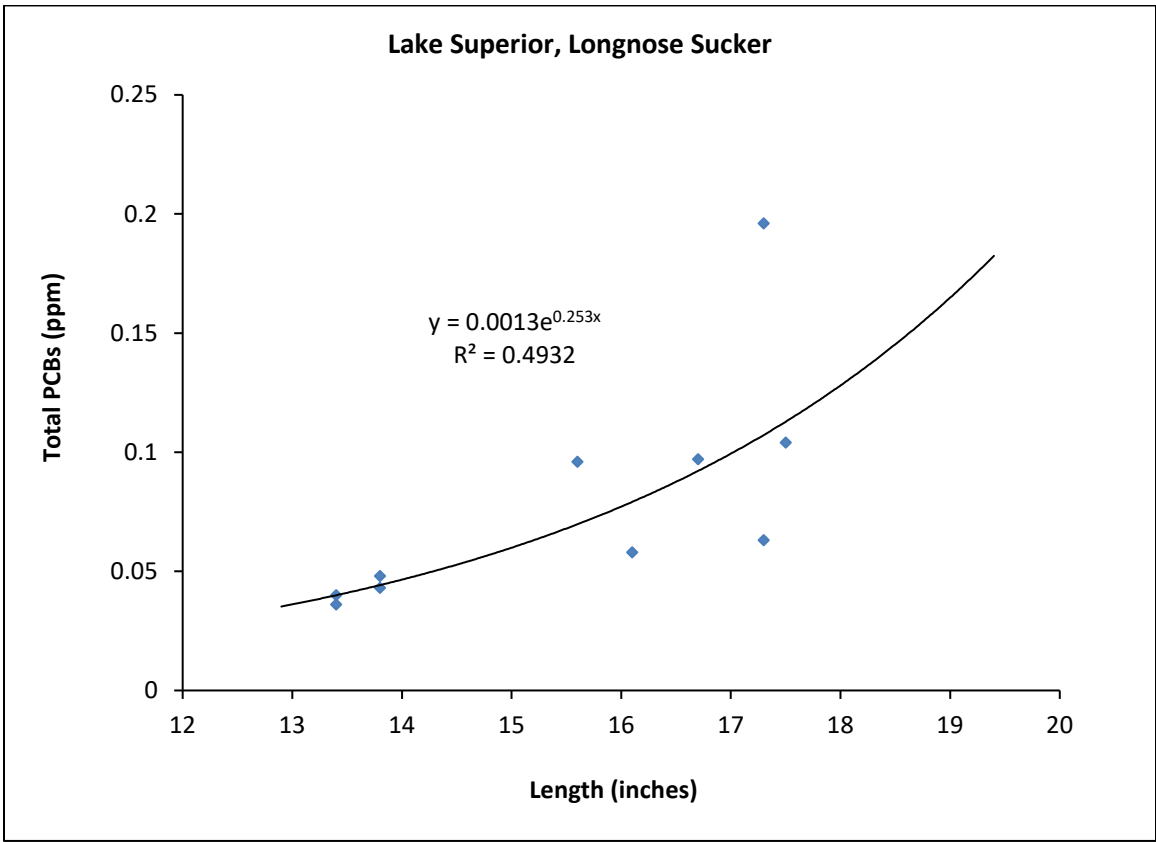
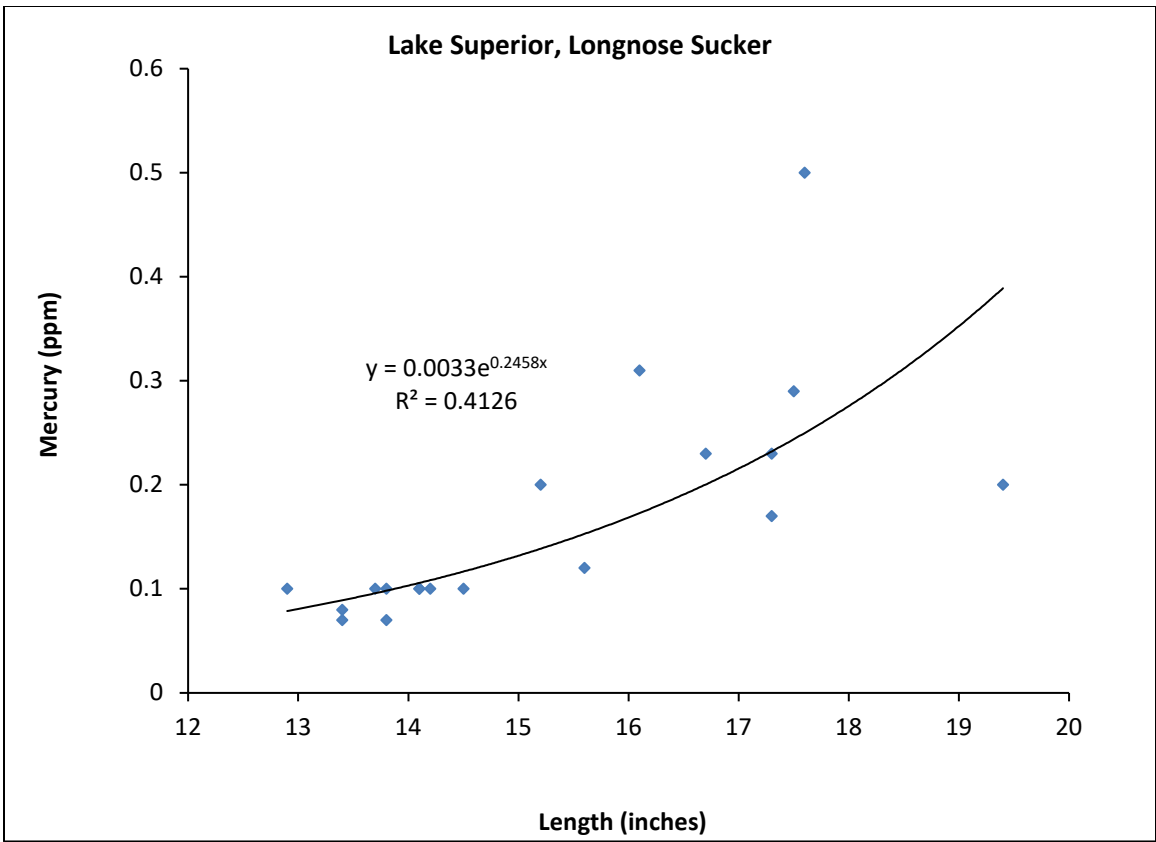
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1998	1998	10	13.4	na	13.4	17.5
Datasets available: 1985, 1998						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.08	0.04	0.20	0.11	2
DDT	10	0.03	0.01	0.04	0.04	16
Chlordane	10	0.03	0.0	0.05	0.03	--
Toxaphene	10	0.22	0.12	0.42	0.29	1
TEQ*	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.489	0.664				
DDT	0.577	0.598				
Chlordane	0.255	0.316				
Toxaphene	0.046	0.046				
TEQ*	--	--				
Final meal category based on UCL:						1*

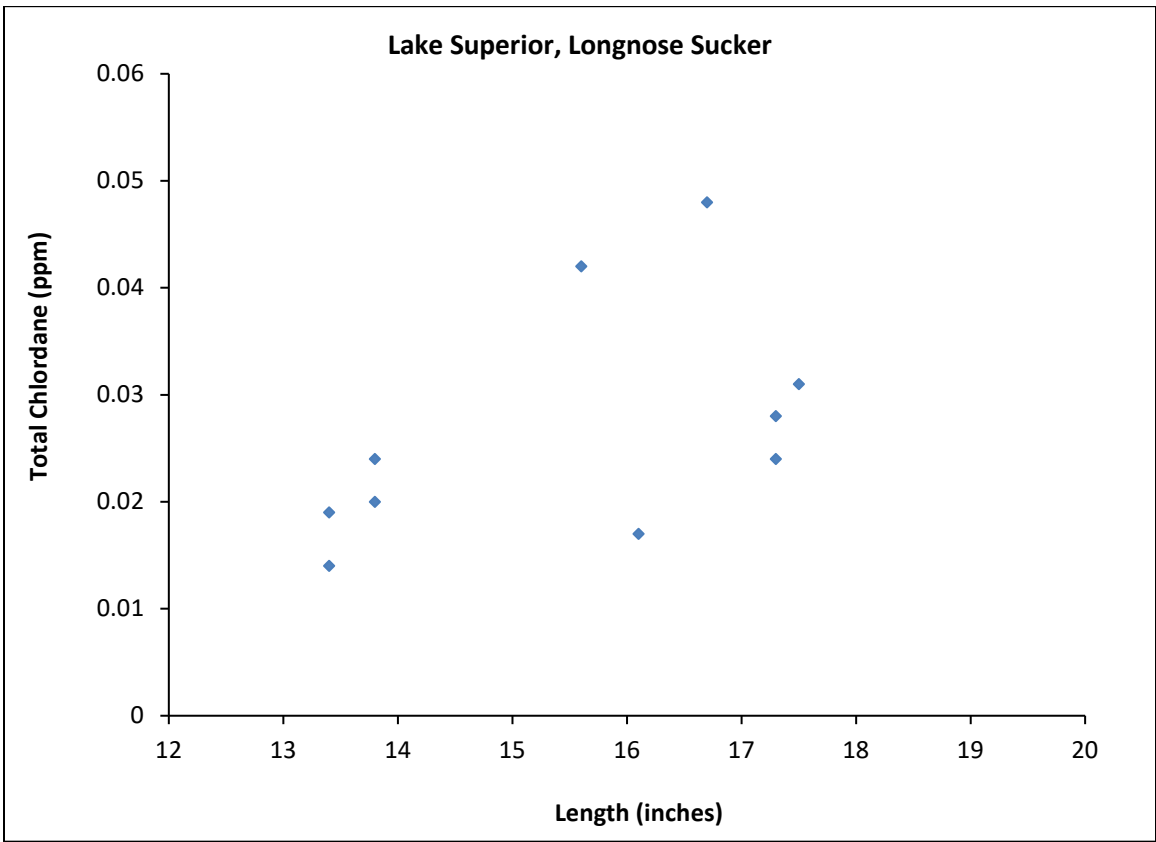
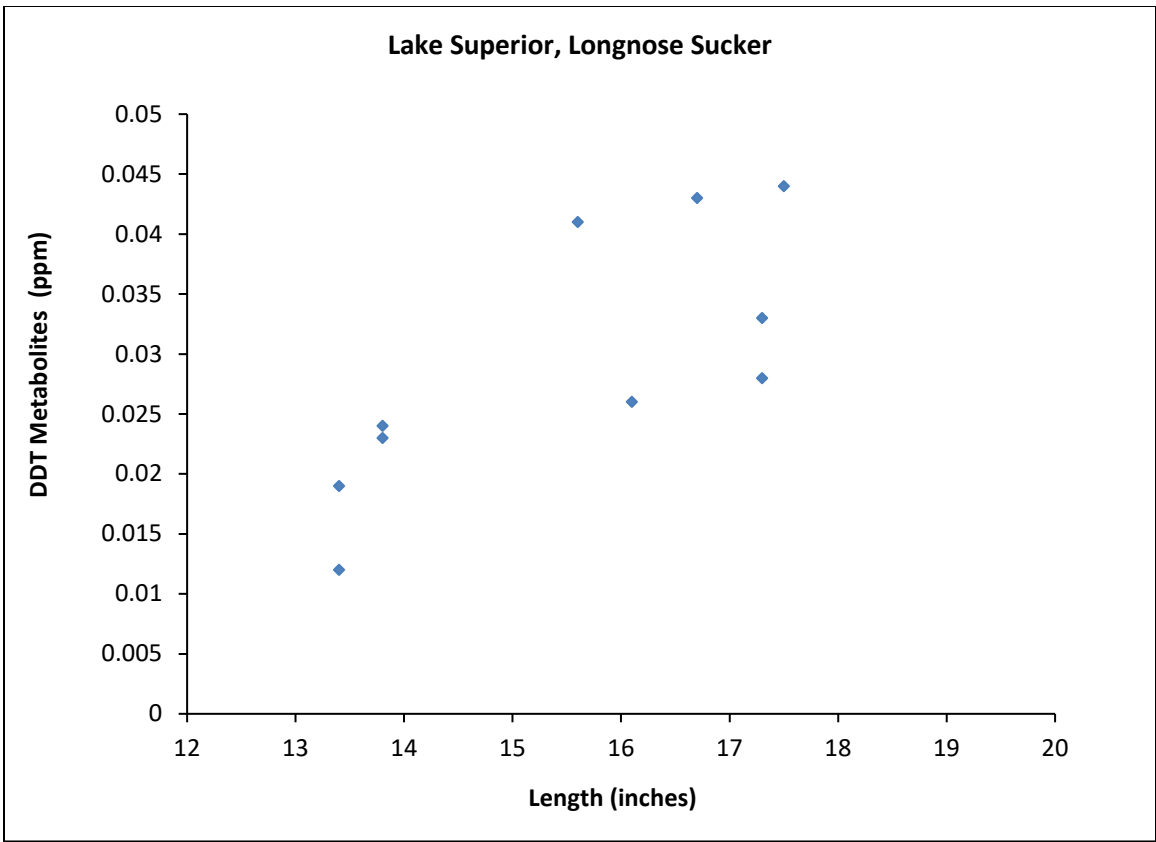
Existing Advisory: Women and children should not eat more than one meal per week of Lake Superior sucker due to PCBs.

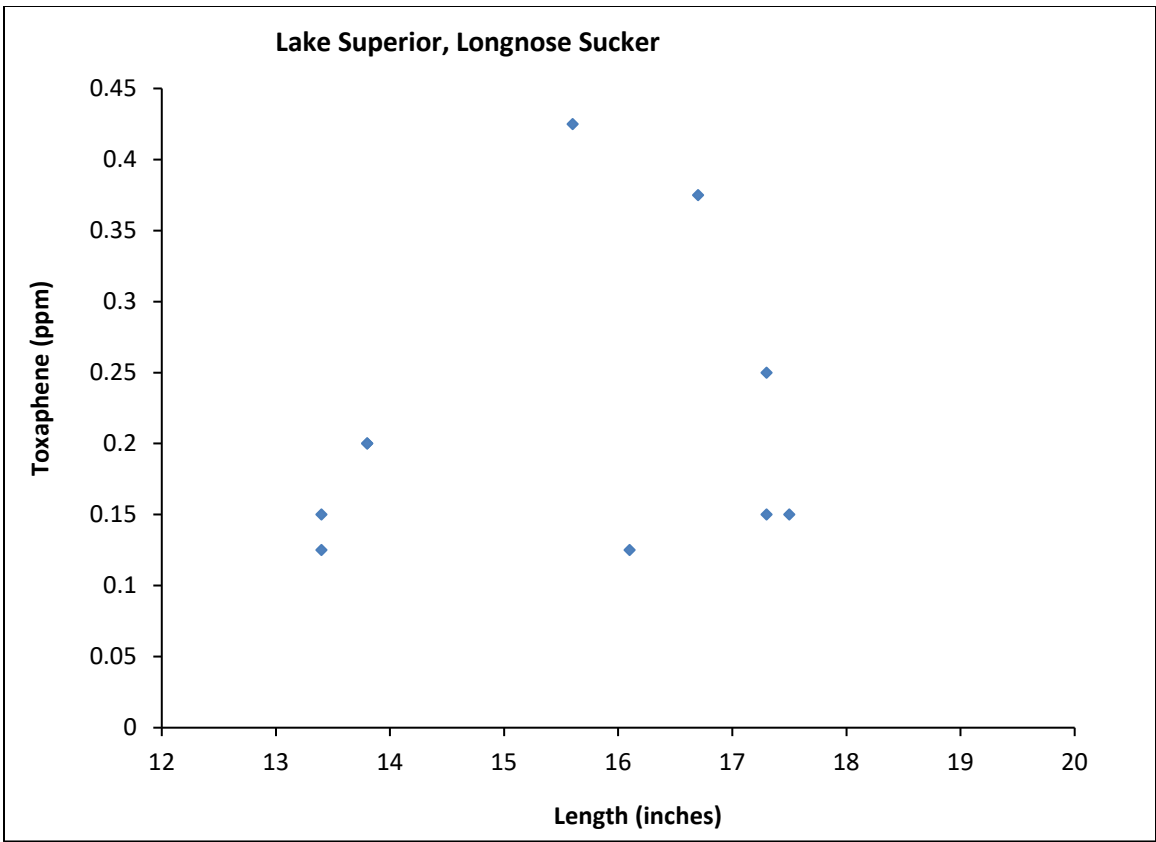
Recommendation: No one should eat more than 2 meals per month of sucker from Lake Superior and its tributary streams due to toxaphene. PCBs and mercury would cause advisories. *Based on the EGLE Fish Contaminant Monitoring Program, PCB and toxaphene concentrations ≥ 15 years old are expected to have declined to a concentration that allows a less restrictive meal category.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category	PCB Regression Equation Estimate (ppm)	Meal Category
12	0.063	16	0.027	8
13	0.081	12	0.035	4
14	0.103	8	0.045	4
15	0.132	4	0.058	2
16	0.168	4	0.074	2
17	0.215	4	0.096	2
18	0.275	2	0.124	1
19	0.352	2	0.159	1
20	0.450	2	0.205	1

Shaded area denotes extrapolated estimates







Northern Pike

**Lake Superior
Keweenaw & Huron Bays**

**Baraga, Houghton,
& Keweenaw Counties**

Hg Analysis:

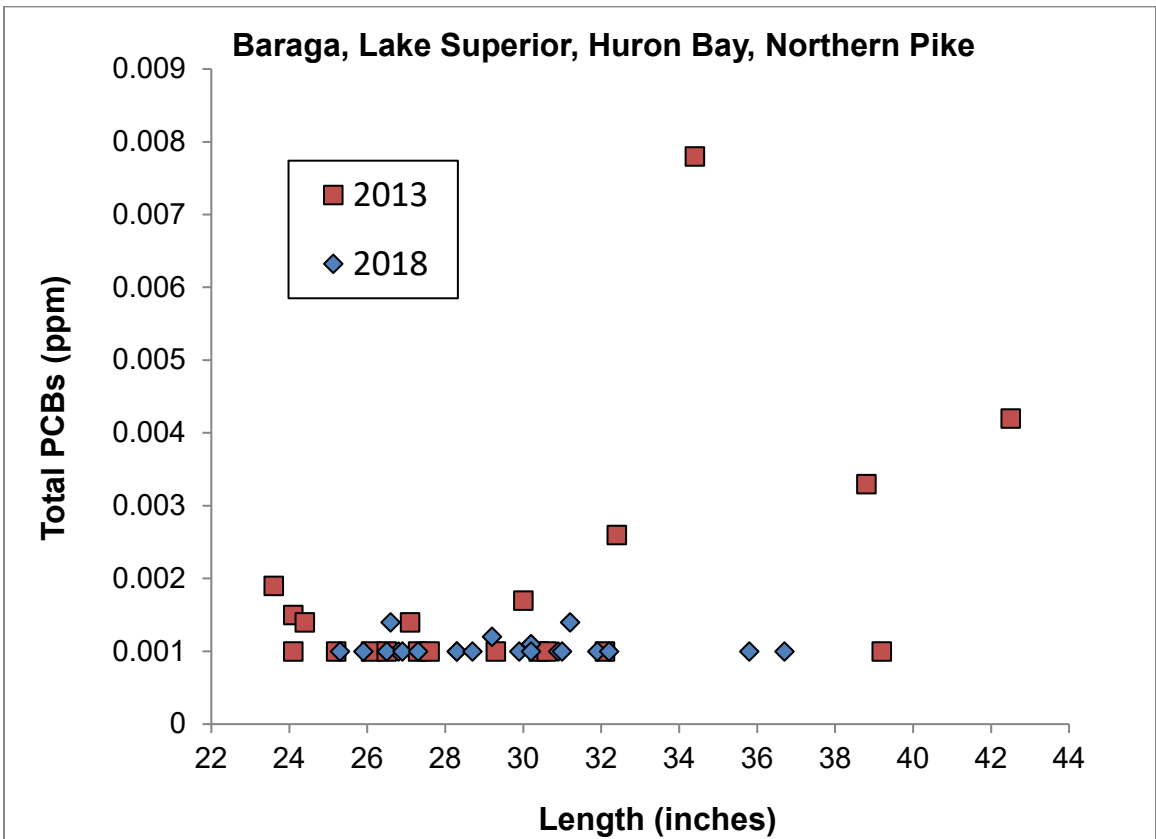
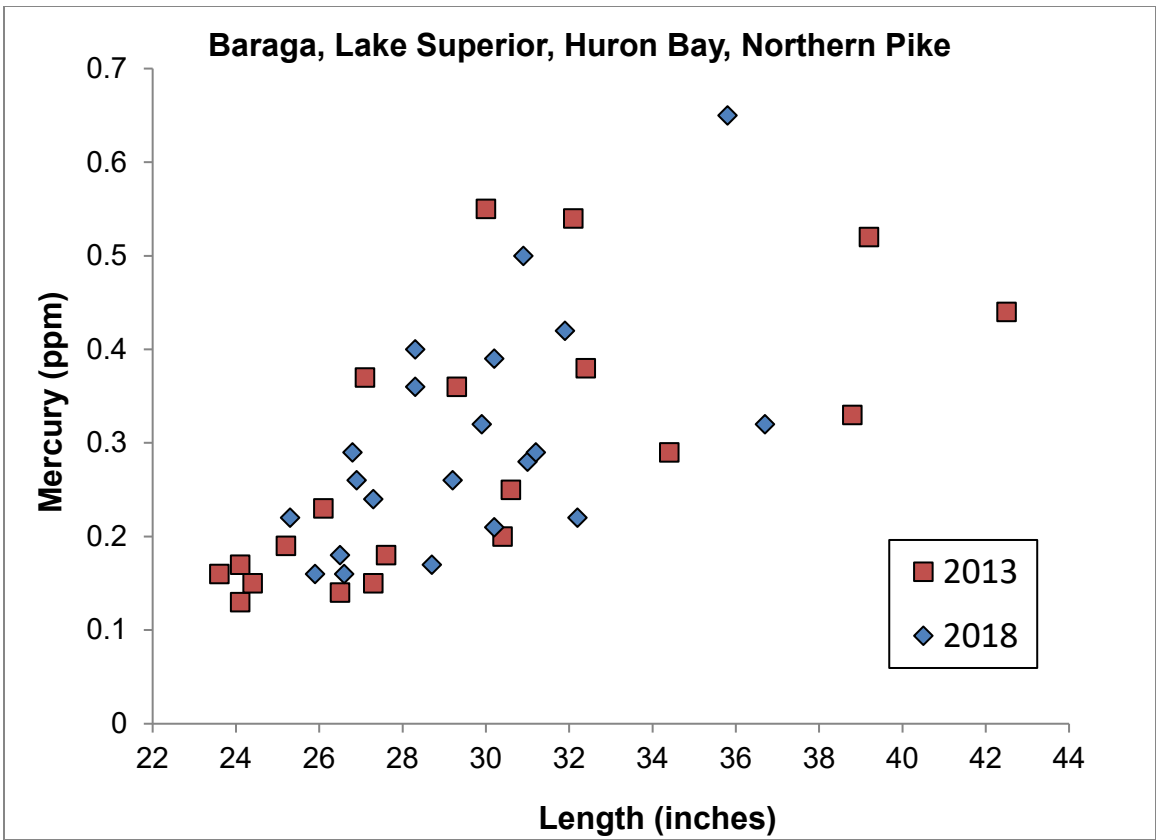
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2013	2018	41	23.6	24	23.6	42.5
Datasets available: 2013, 2018						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	41	0.29	0.13	0.65	0.34	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.403	0.437				

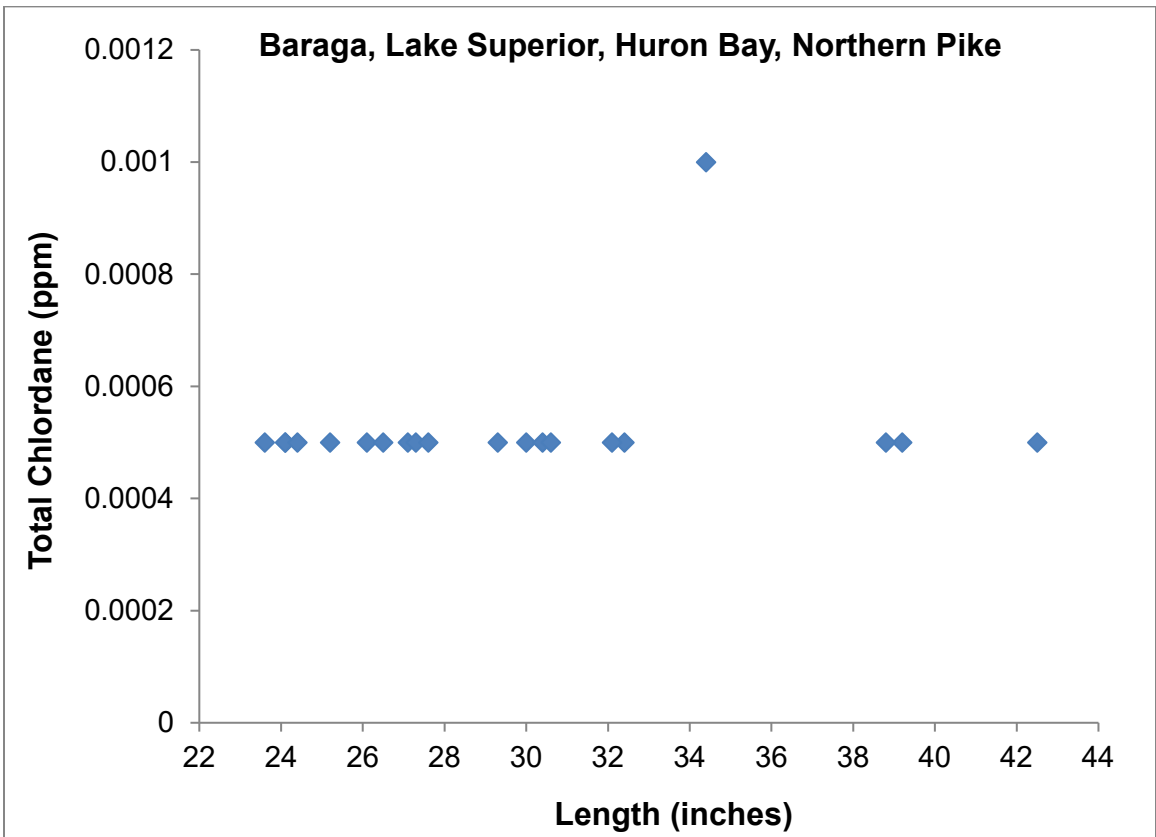
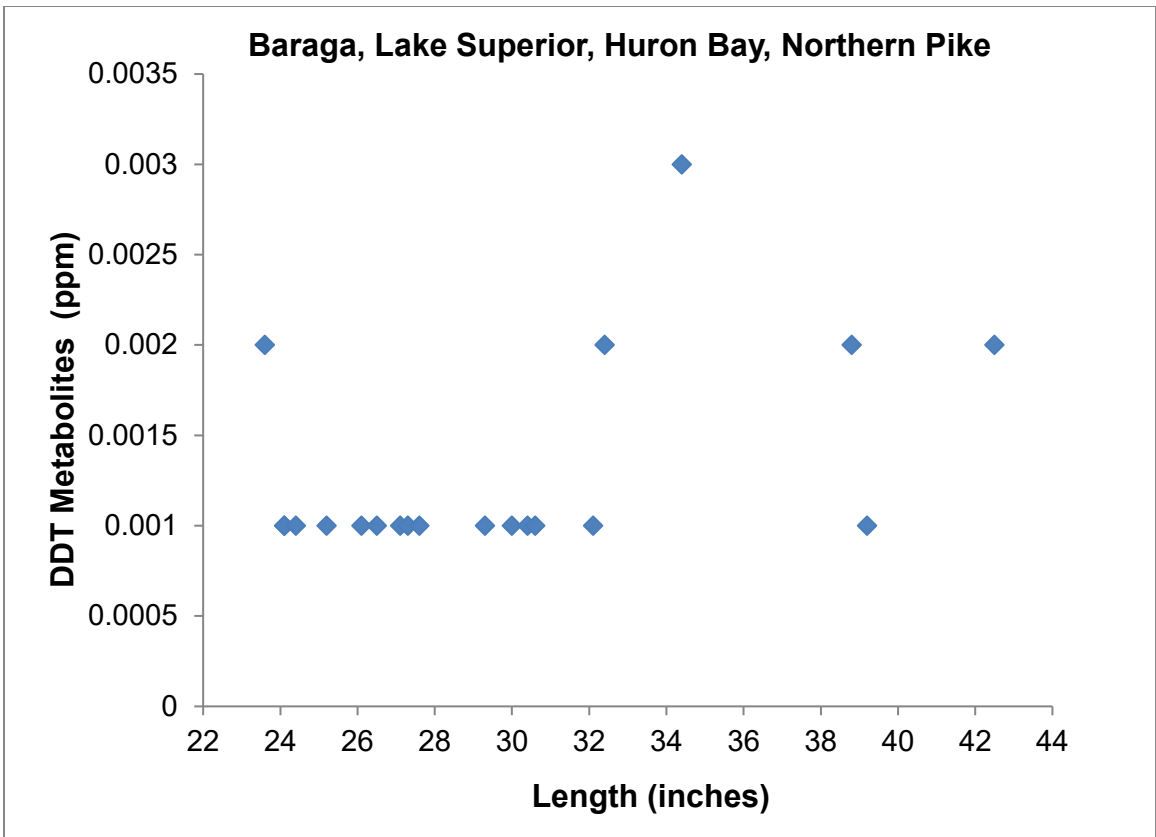
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2013	2018	41	23.6	24	23.6	42.5
Datasets available: PCBs: 2013 & 2018; others 2013 only						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	41	0.001	< 0.001	0.008	0.002	16
DDT	20	0.001	< 0.001	0.003	0.002	16
Chlordane	20	0.001	< 0.001	0.001	0.001	--
Toxaphene	20	ND	< 0.05	< 0.05	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.173	0.177				
DDT	0.215	0.233				
Chlordane	0.040	0.040				
Toxaphene						
Final meal category based on UCL:						2

Existing MDHHS Advisory: No one should eat more than 2 meals per month of northern pike from Keweenaw Bay or Huron Bay (Lake Superior) or tributary rivers due to mercury.

Recommendation: No change is recommended.





Rainbow Smelt

Lake Superior

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	2021	11	3.1	NA	3.1	8.7
Datasets available: 1993, 2016, 2021						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	11*	0.060	0.049	0.080	0.067	16
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	NA	NA				

Organics Analysis:

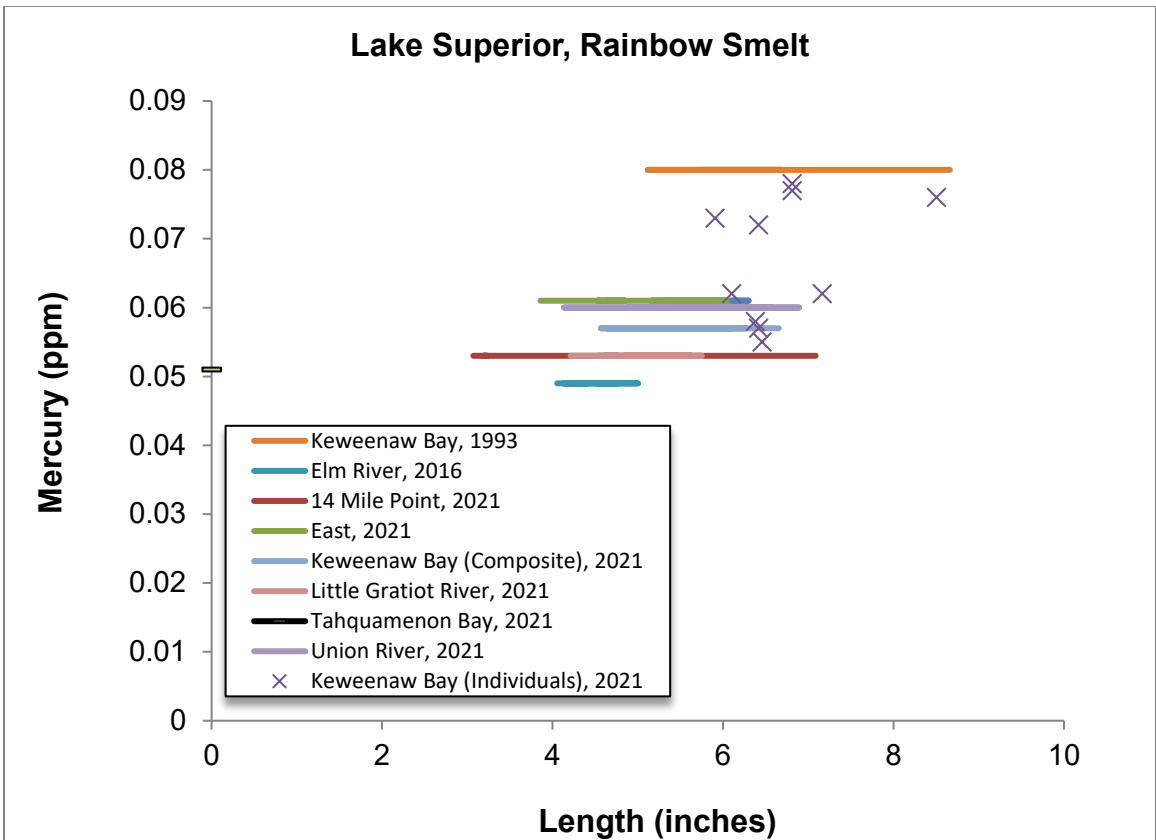
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2016	2021	10	3.1	NA	3.1	8.7
Datasets available: 1993 (No PFOS), 2016 (No PFOS), 2021						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	9*	0.002	<0.001	0.003	0.002	16
DDT	9*	0.001	<0.001	0.002	0.002	16
Chlordane	9*	0.001	<0.001	0.001	0.001	16
Toxaphene	9*	ND	--	--	--	--
PFOS	7*	47.3 ppb	2.8 ppb	112.0 ppb	81.0 ppb	1
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	NA	NA				
DDT	NA	NA				
Chlordane	NA	NA				
Toxaphene	NA	NA				
PFOS	NA	NA				
Final meal category based on UCL:						1

* The majority of these samples were composite samples comprised of between 15 and 20 individuals. A subset of 10 individuals were analyzed individually from Keweenaw Bay in 2021 for PFOS. To avoid biasing the entire dataset on this location, the average contaminant concentration was used in this analysis for those 10 individuals.

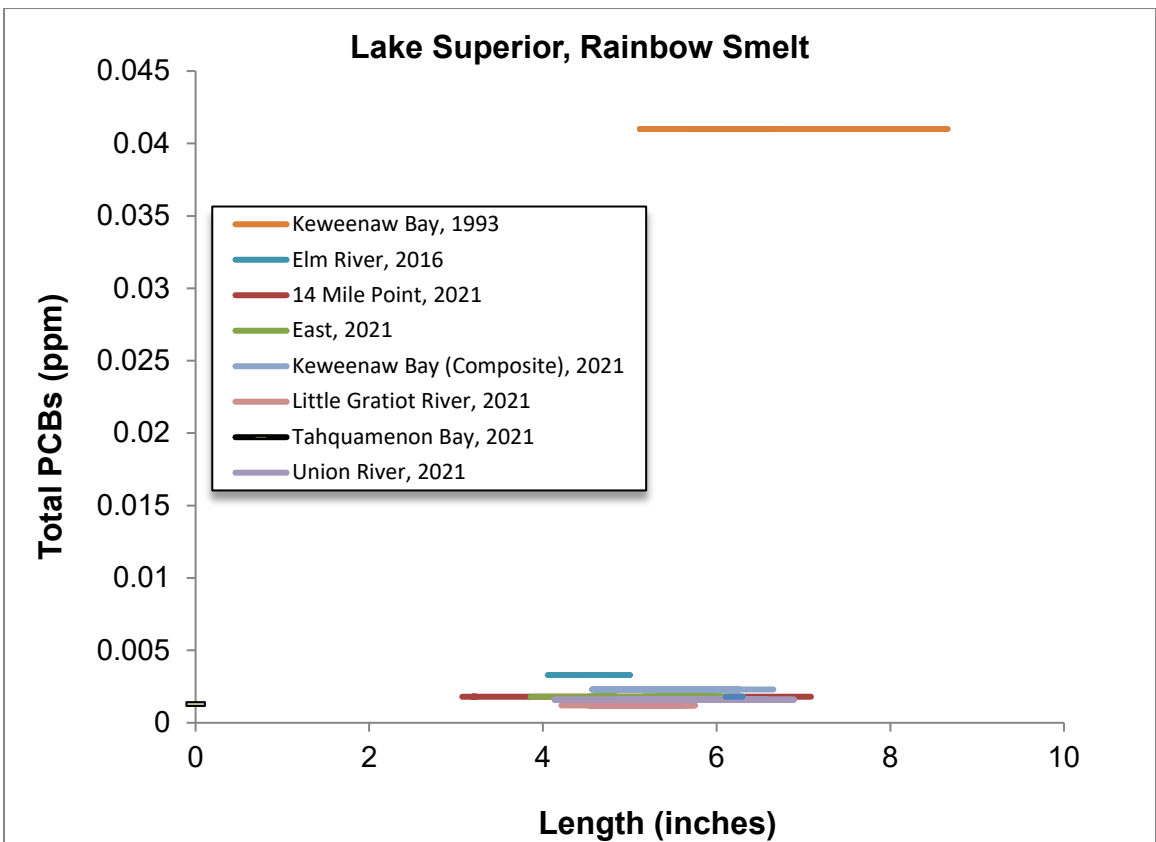
Existing MDHHS Advisory: No one should eat more than 1 meal per month of Lake Superior smelt due to PFOS.

Recommendation: No change to the existing guideline is recommended.

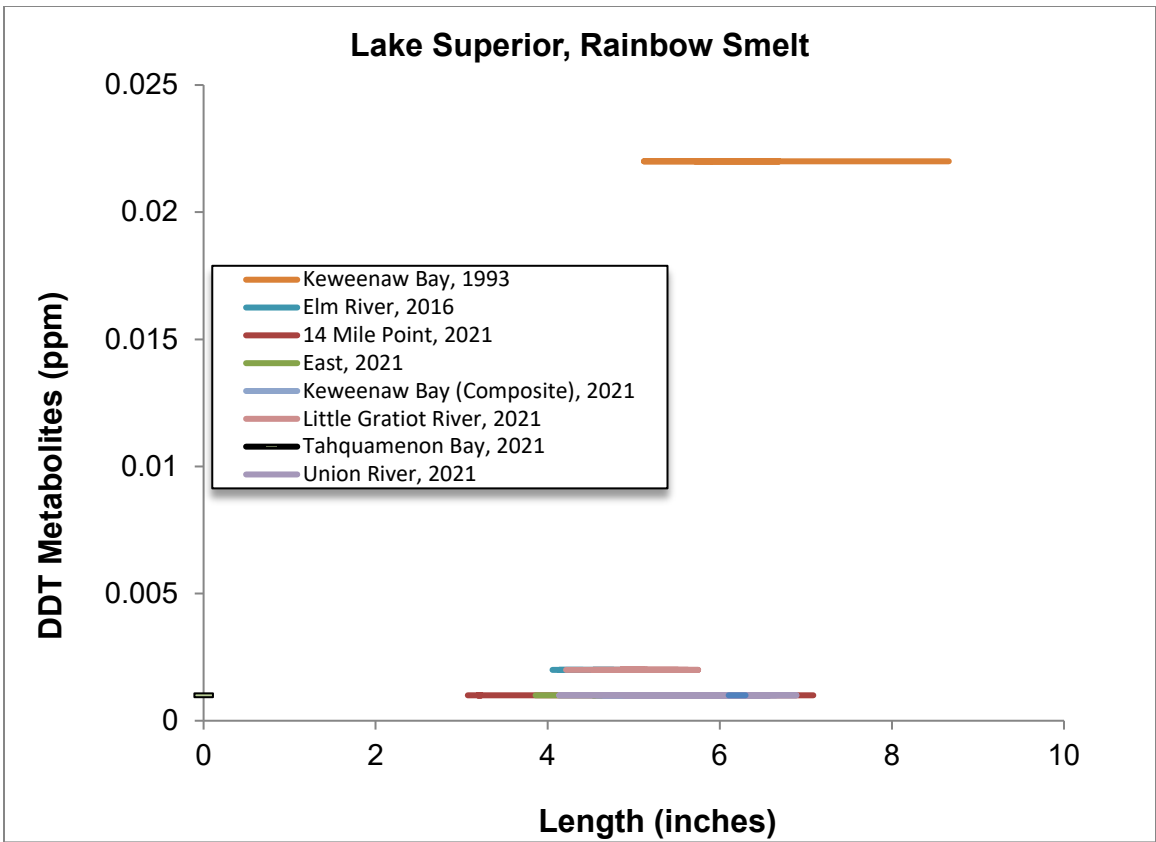
Note: Regression statistics are not possible since the evaluation was based on composite samples.



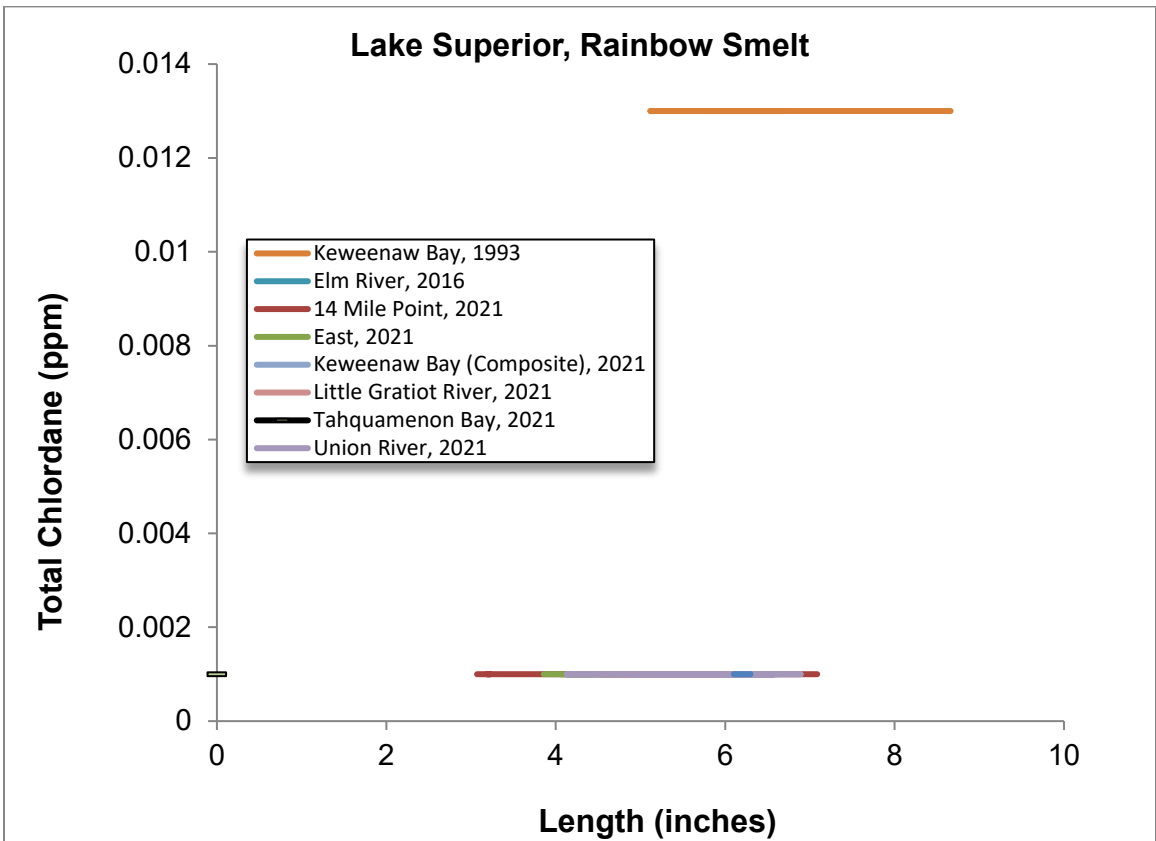
Note: The Tahquamenon Bay, 2021 smelt were processed prior to lengths being recorded.
 Note: The average Keweenaw Bay (individuals) concentration was used in the analysis.



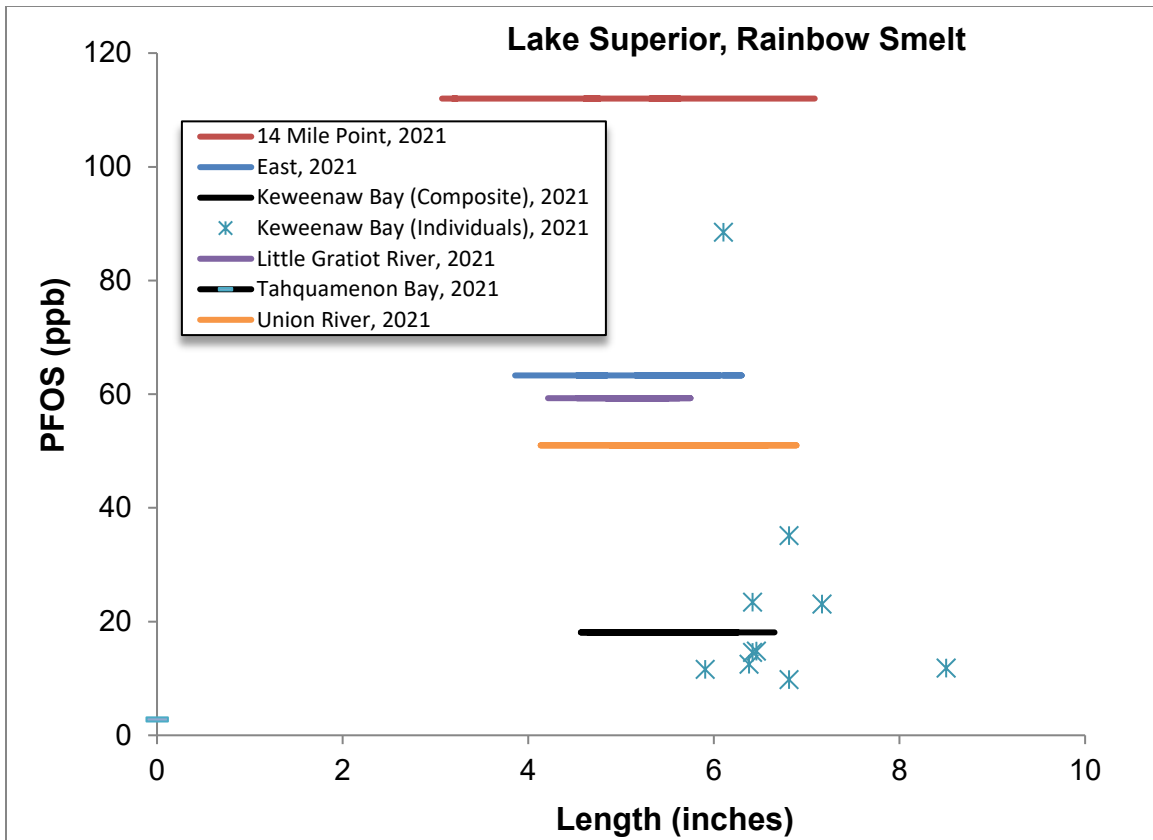
Note: The Tahquamenon Bay, 2021 smelt were processed prior to lengths being recorded.



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Note: The Tahquamenon Bay, 2021 smelt were processed prior to lengths being recorded.
 Note: The average Keweenaw Bay (individuals) concentration was used in the analysis.

Rainbow Trout

Lake Superior

Hg Analysis:

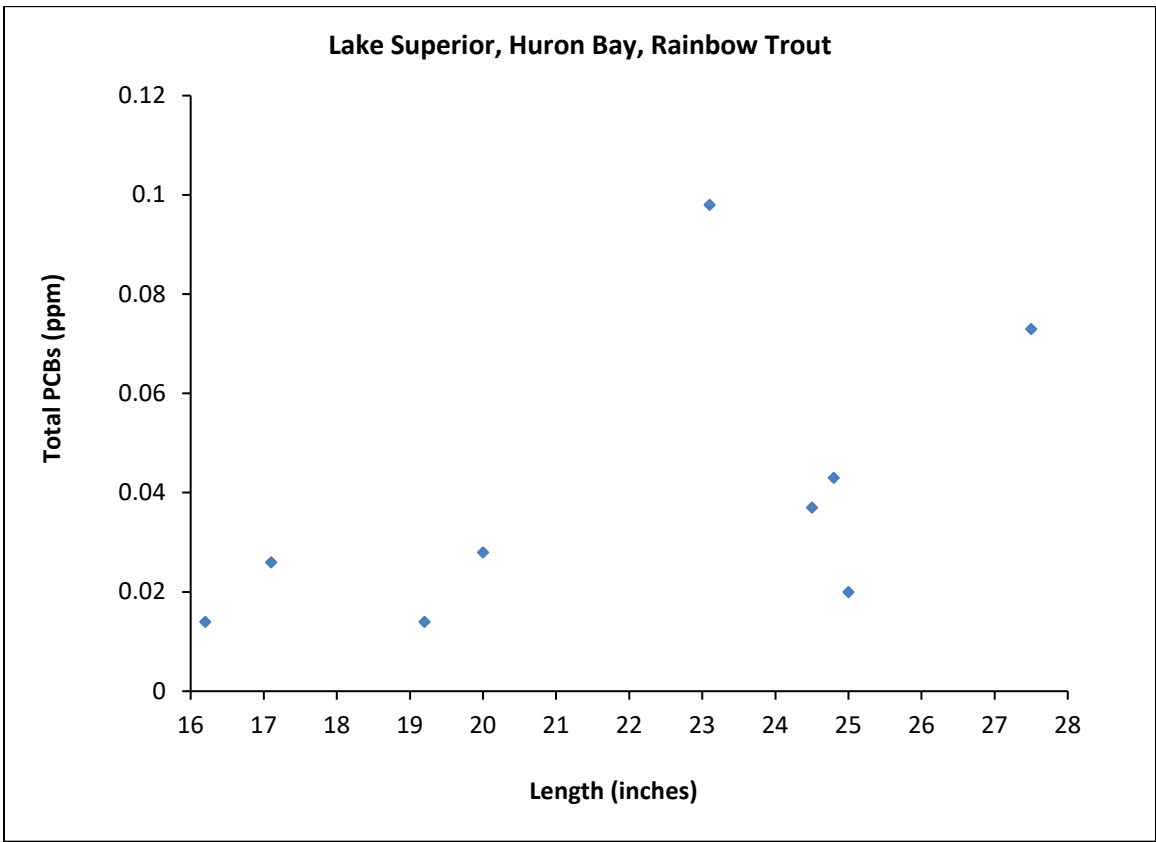
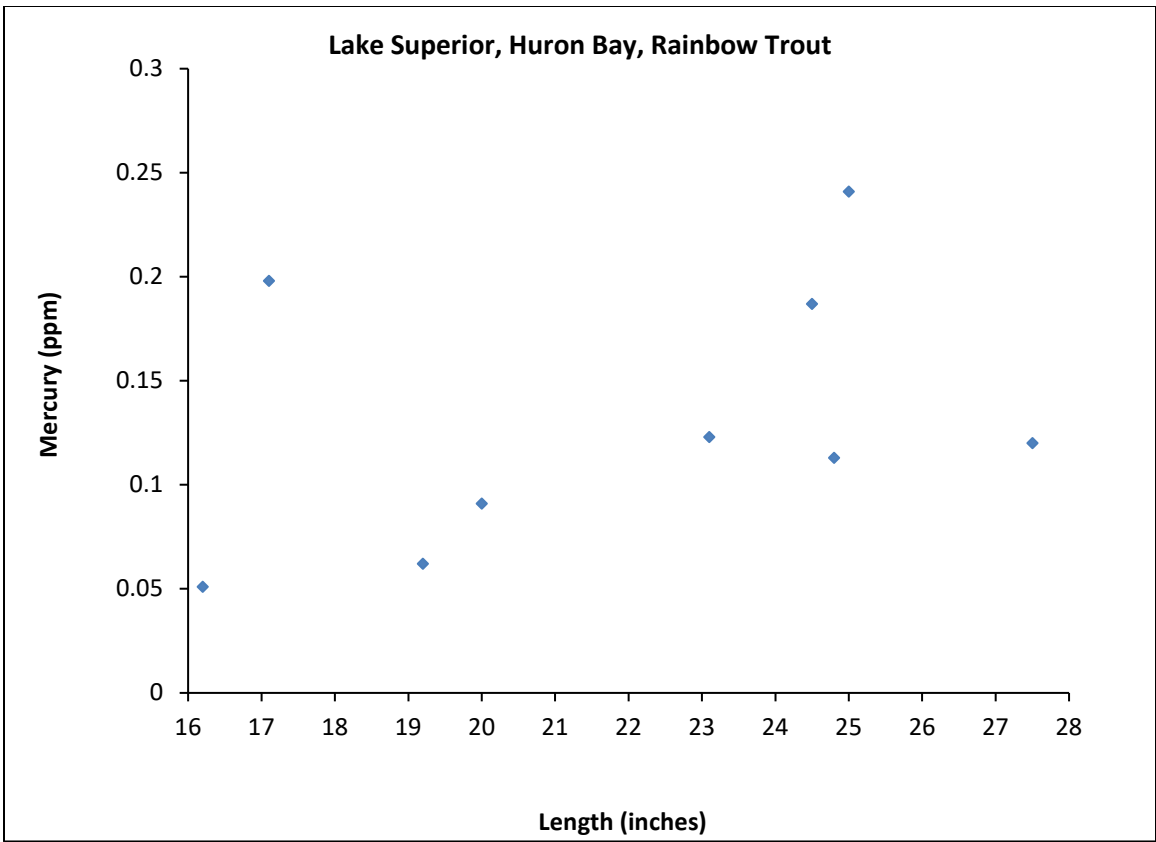
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
2006	2006	9	16.2	10	16.2	27.5	
Datasets available: 2006							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
Mercury	9	0.13	0.05	0.24	0.18	4	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.141	0.234					

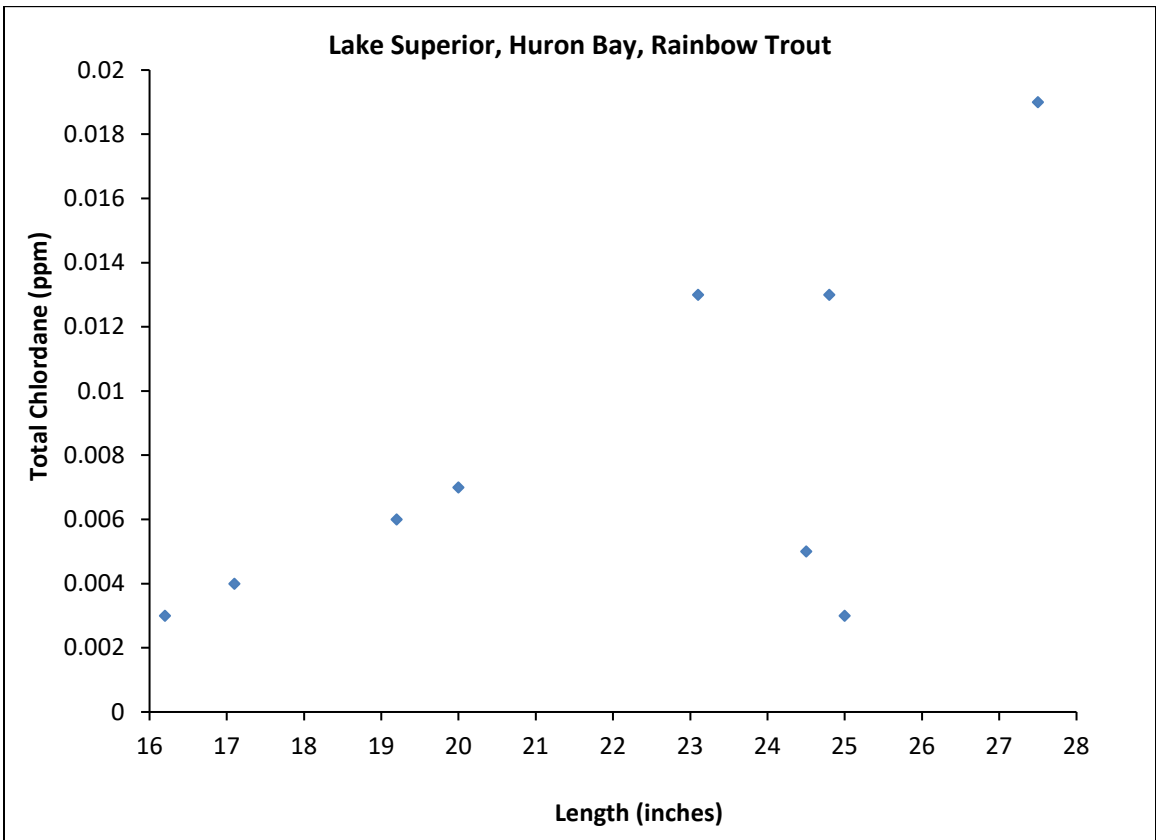
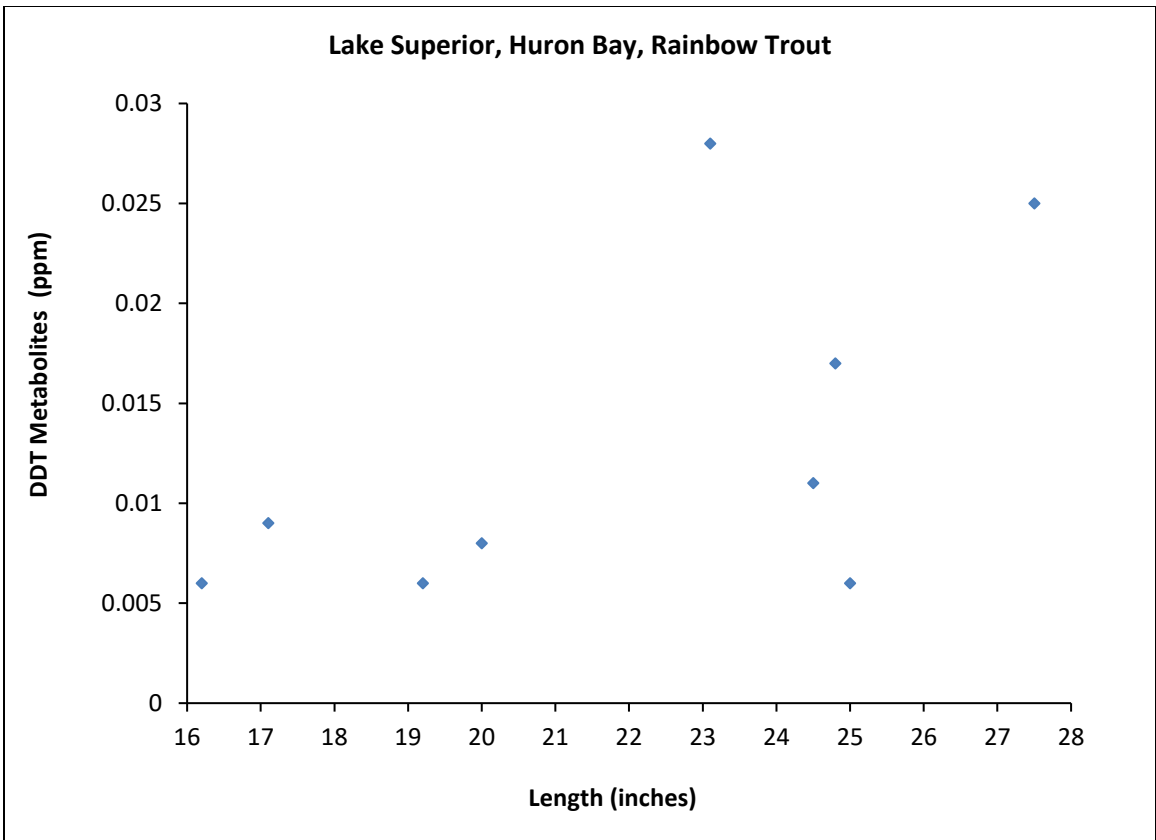
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		Meal Category
Earliest	Most Recent				Min	Max	
2006	2006	9	16.2	10	16.2	27.5	
Datasets available: 2006							
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category	
PCB	9	0.04	0.01	0.10	0.06	2	
DDT	9	0.01	0.006	0.03	0.02	16	
Chlordane	9	0.008	0.003	0.02	0.01	--	
Toxaphene	9	ND	--	--	--	--	
TEQ*	0	--	--	--	--	--	
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.310	0.425					
DDT	0.346	0.375					
Chlordane	0.416	0.352					
Toxaphene	--	--					
TEQ*	--	--					
Final meal category based on UCL:							2

Existing Advisory: Women and children should not eat more than one meal per week of Lake Superior rainbow trout larger than 26 inches due to PCBs.

Recommendation: No one should eat more than 2 meals per month of rainbow trout (steelhead) from Lake Superior and its tributary streams due to PCBs. Mercury would cause an advisory.





**Siscowet
(aka Fat Lake Trout)**

Lake Superior

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	2007	130	15.7	15	15.7	28.1
Datasets available: 1987, '91, '92, '95, '96, 2001, 2003, 2007						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	130	0.36	0.02	1.00	0.39	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.181	0.139				

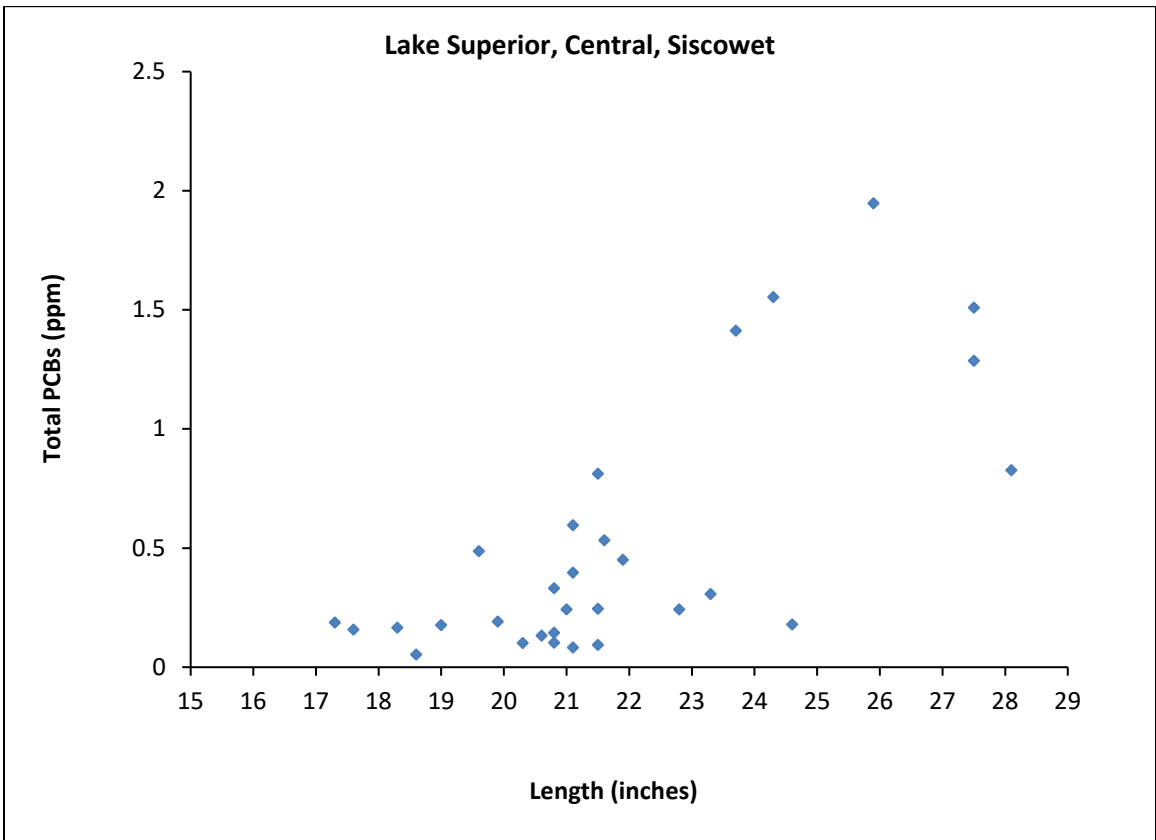
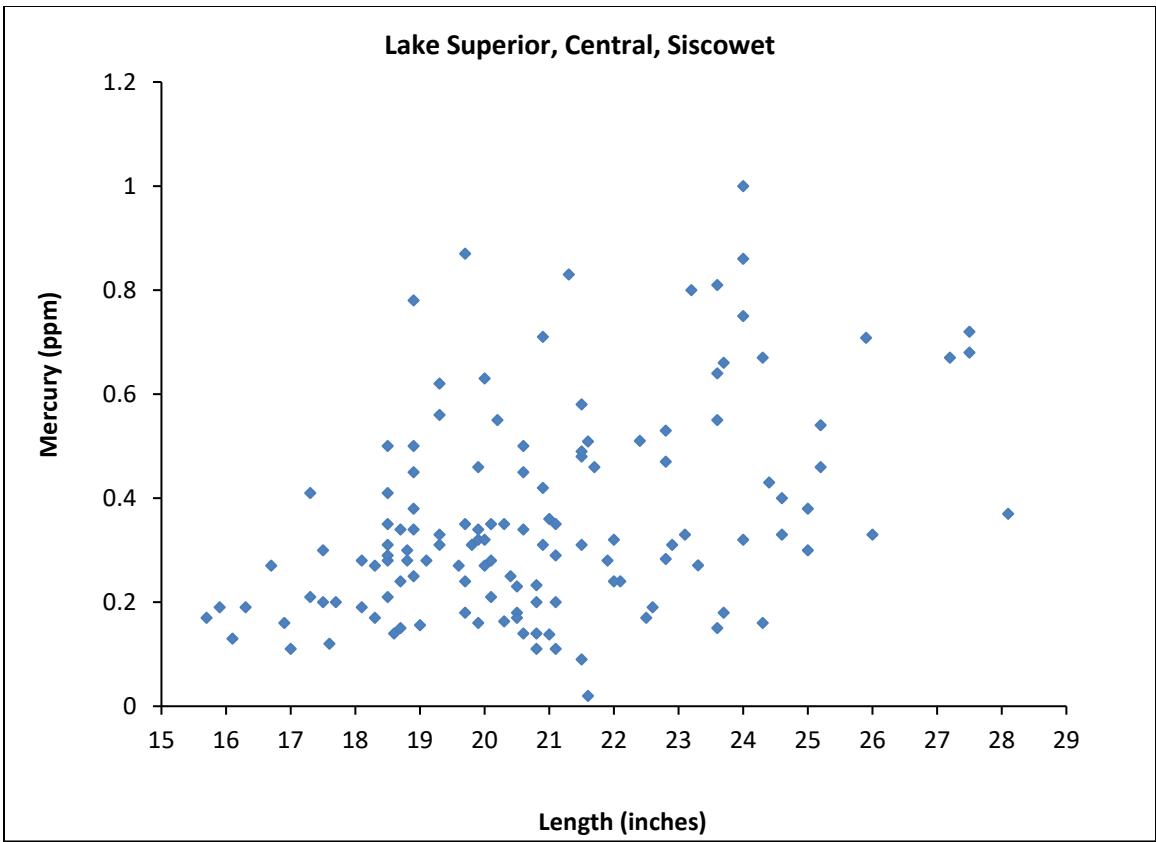
Organics Analysis:

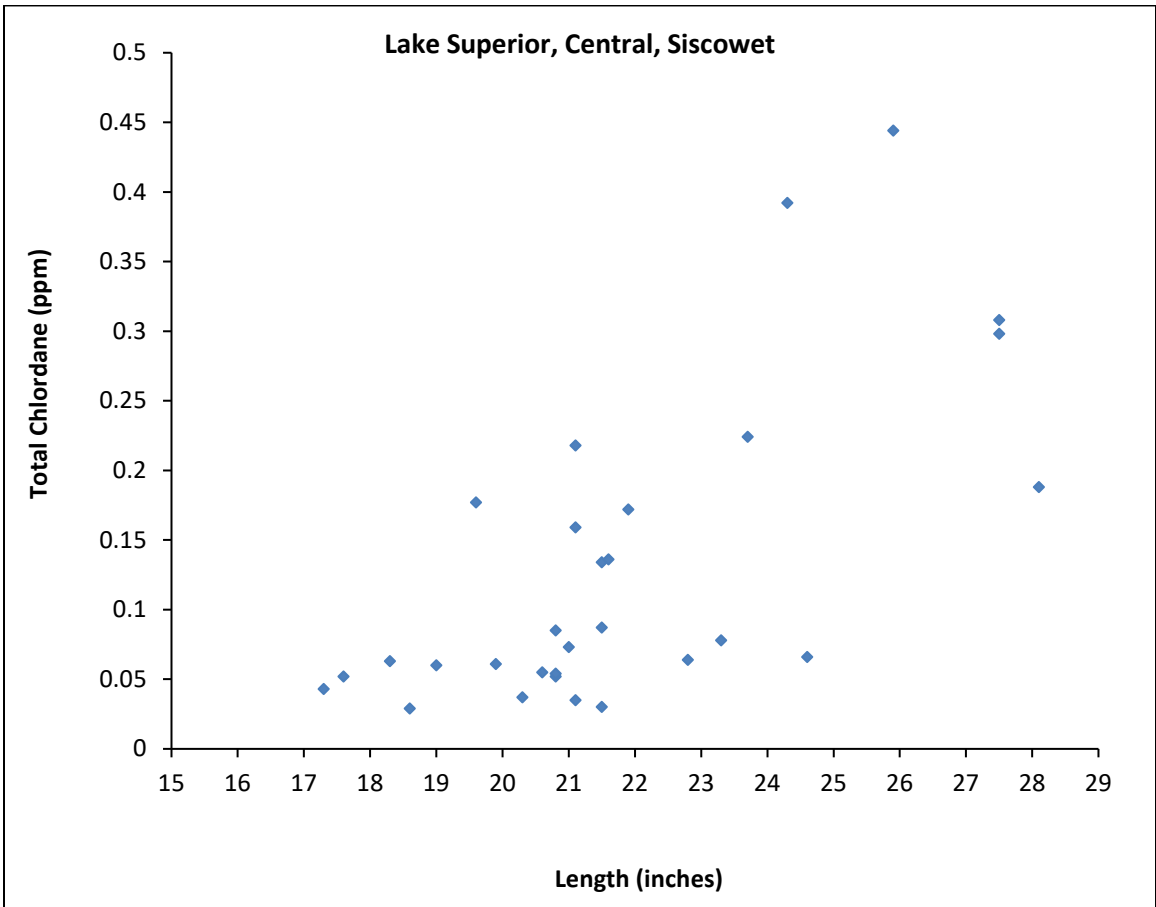
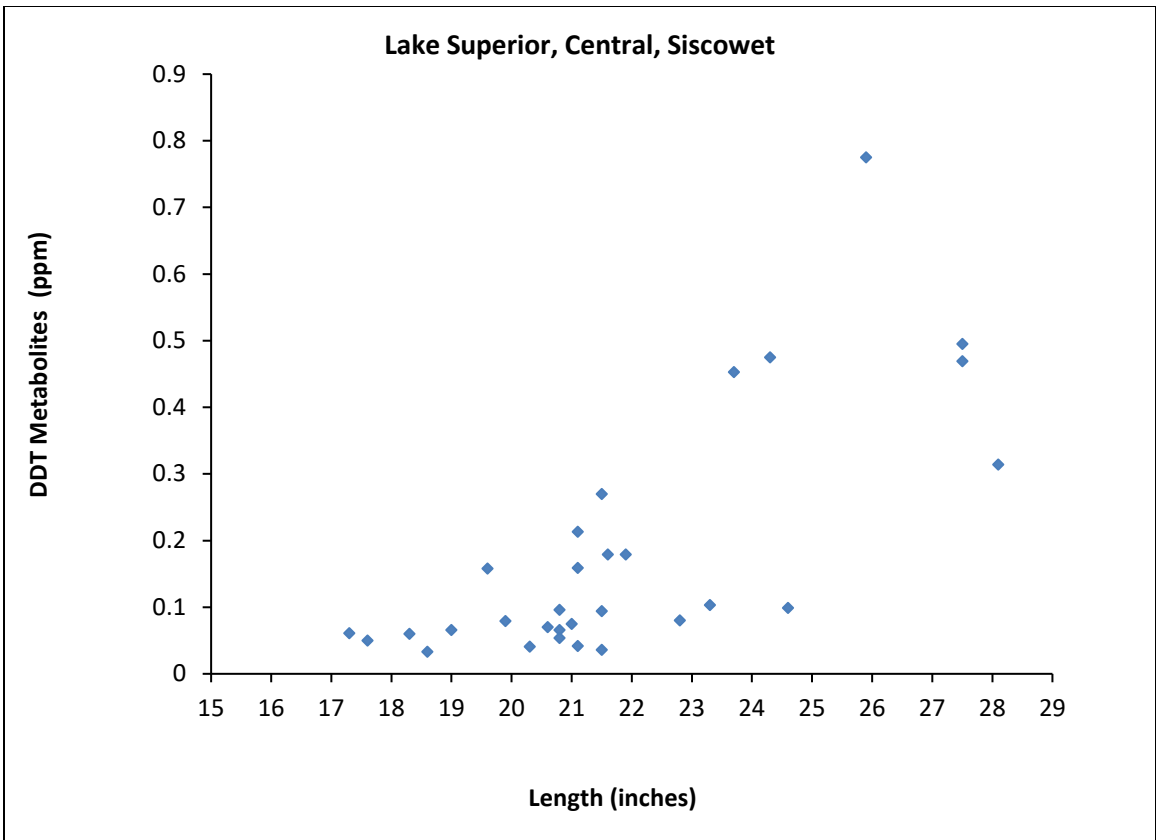
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2001	2007	148	15.7	15	15.7	28.1
Datasets available: 1987, '91, '92, '95, '96, 2001, 2003, 2007						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	30	0.50	0.05	6.86	0.95	Limited
DDT	30	0.18	0.03	6.29	0.52	2
Chlordane	30	0.13	0.03	1.53	0.35	--
Toxaphene	30	0.41	0.05	10.0	2.51	Limited
TEQ*	29	6.7	1.9	28.0	10.9	0.5
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.521	0.481				
DDT	0.545	0.560				
Chlordane	0.467	0.454				
Toxaphene	0.238	0.133				
TEQ*	0.258	0.294				
Final meal category based on UCL:						Limited

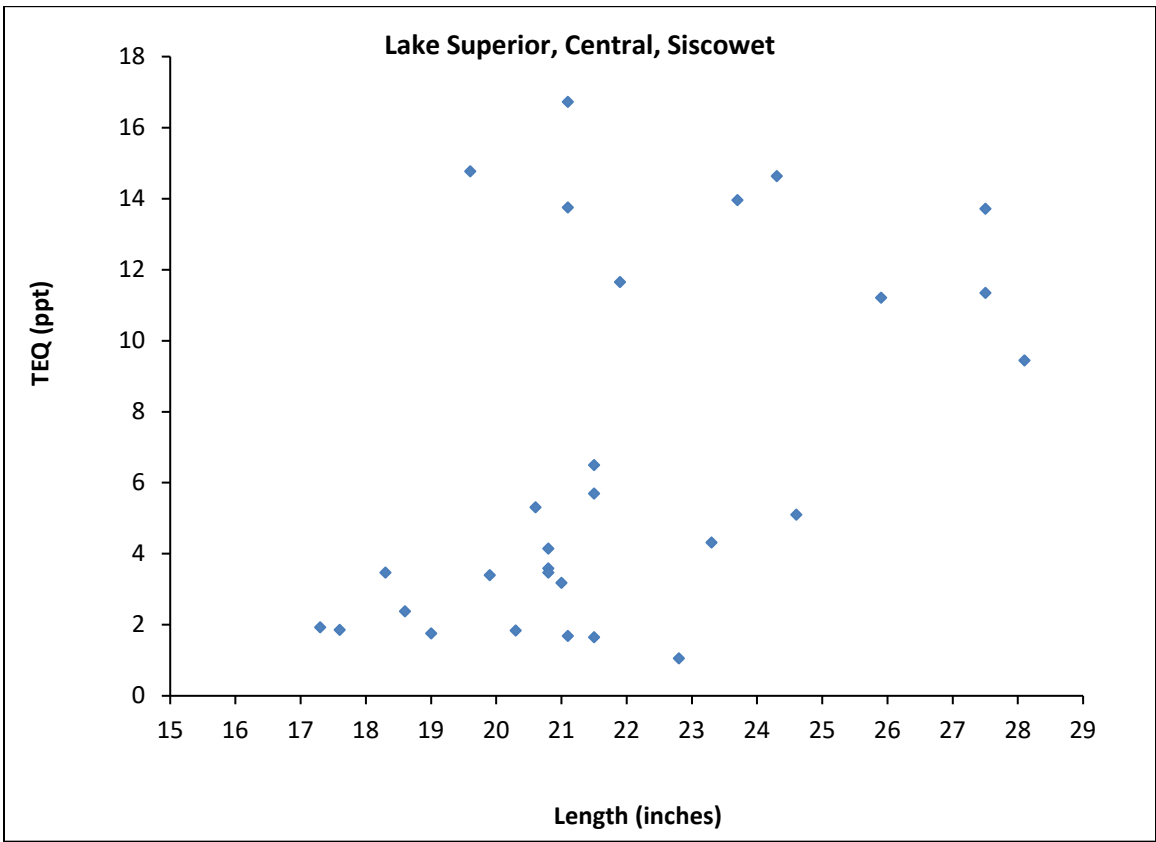
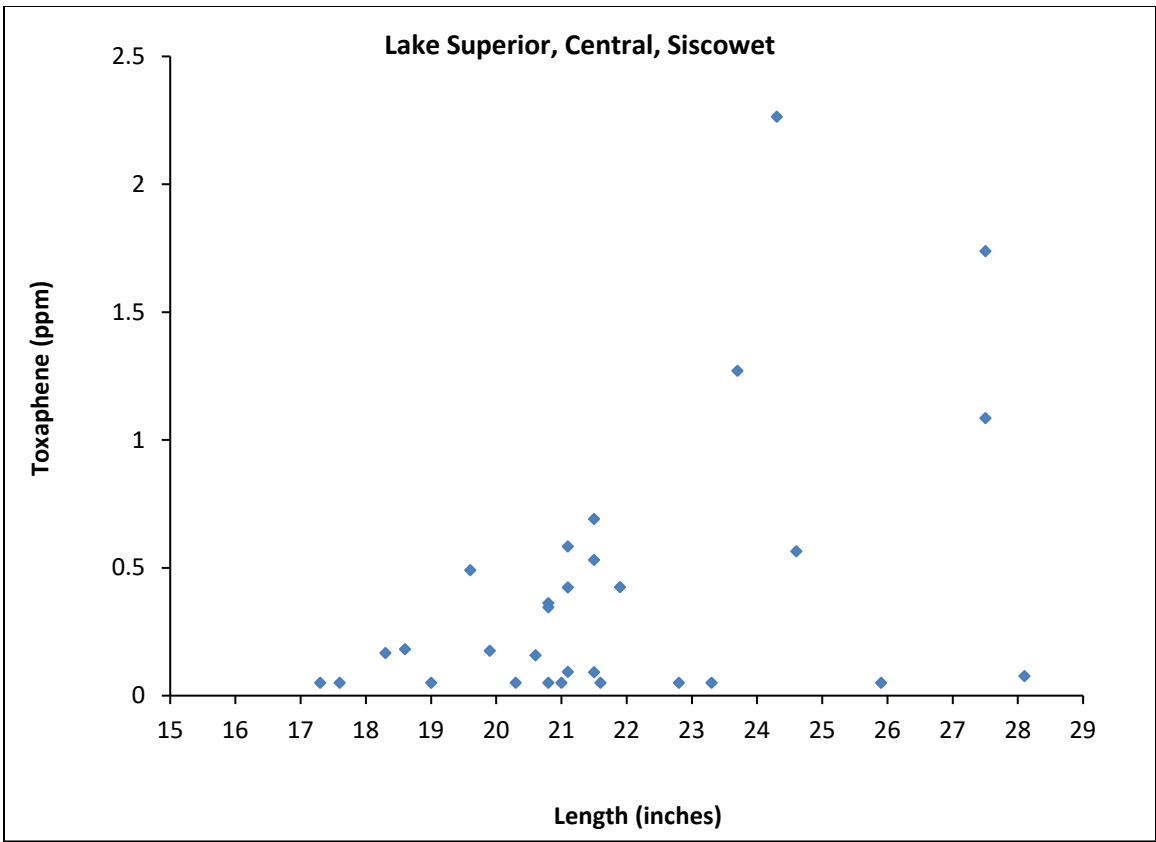
* - 2005 WHO TEFs; dl-PCBs not included

Existing Advisory: Women and children should not eat more than one meal per month of Lake Superior siscowet smaller than 18 inches and should not eat any Lake Superior siscowet larger than 18 inches due to chlordane, dioxins and PCBs.

Recommendation: Sensitive populations should not eat these fish. Healthy adults should limit consumption of siscowet from Lake Superior and its tributary streams to 1 or 2 meals per year due to PCBs and toxaphene. Dioxins, mercury, and DDT would cause advisories.







Walleye

**Lake Superior
Huron & Keweenaw Bays, Tahquamenon River d/s of Falls**

Hg Analysis:

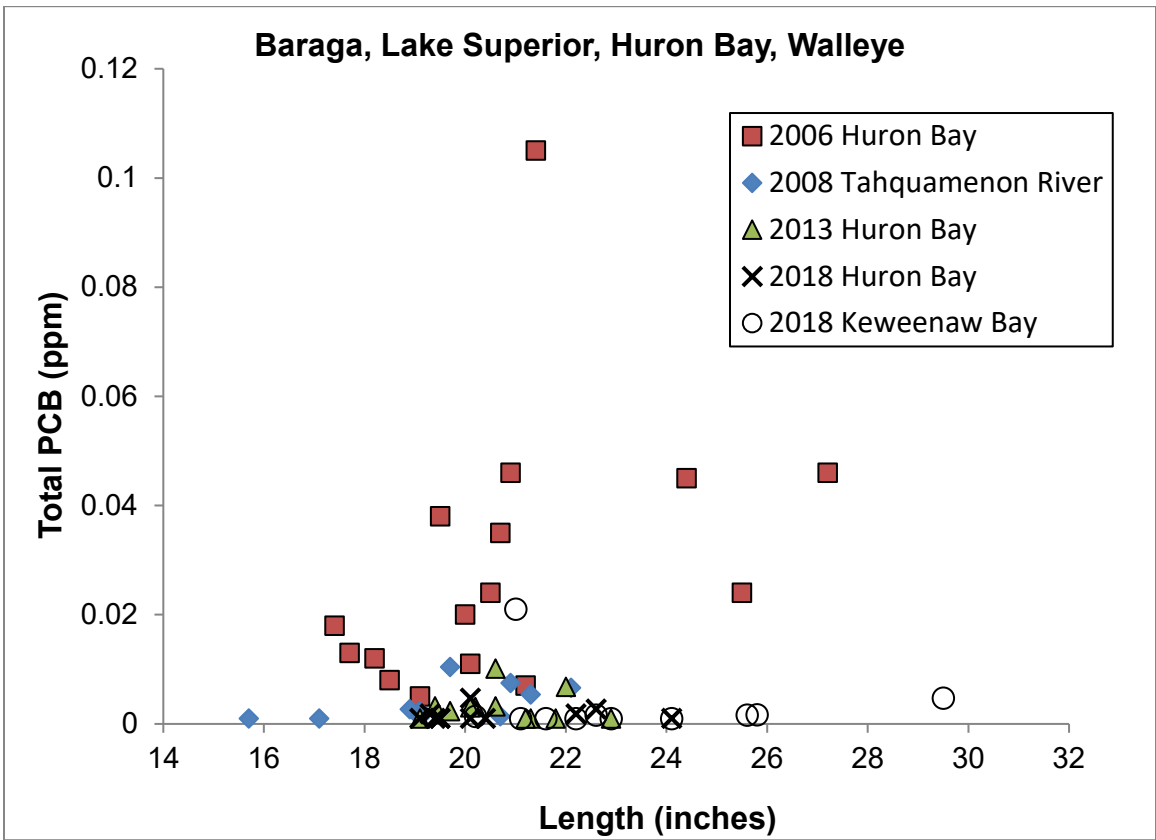
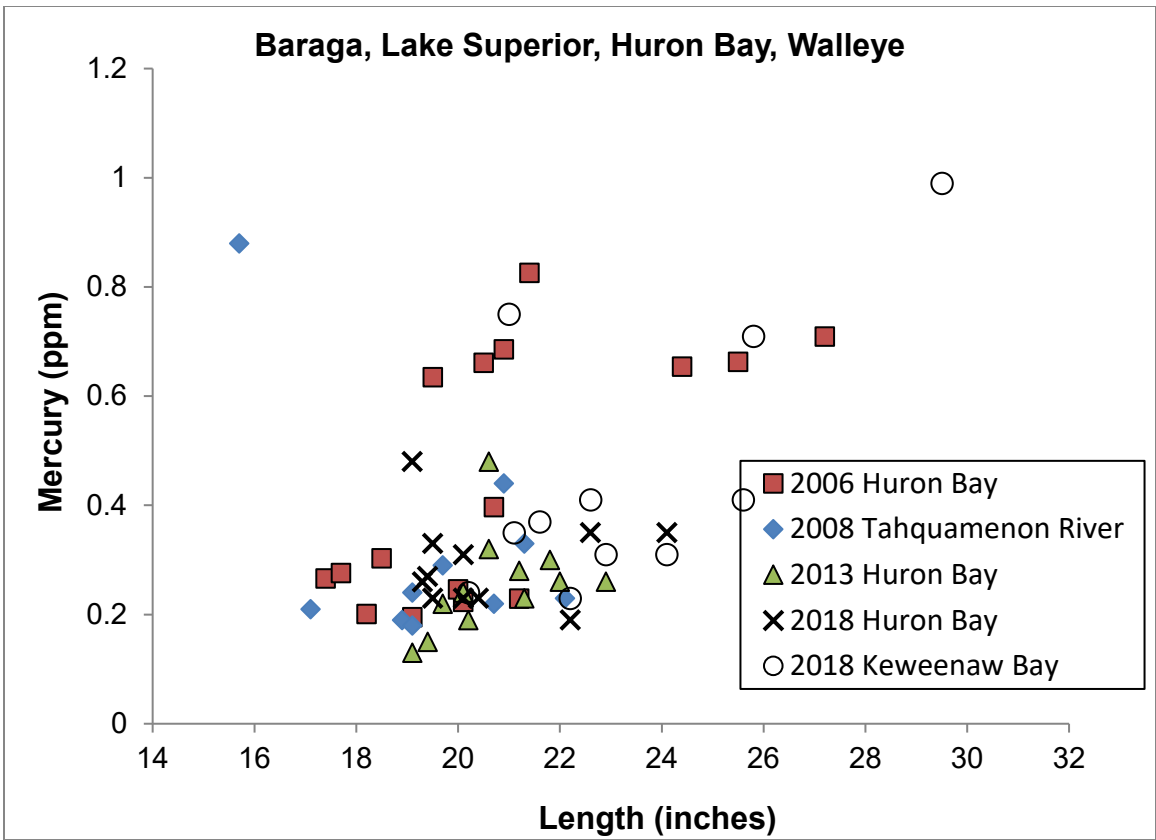
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
2006	2018	60	15.7	15	15.7	29.5	
Datasets available: 2006, 2008, 2013, 2018							
Chemical	Sample Size (Legal)	Mean		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	60	0.36		0.13	0.99	0.41	2
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.192	0.202					

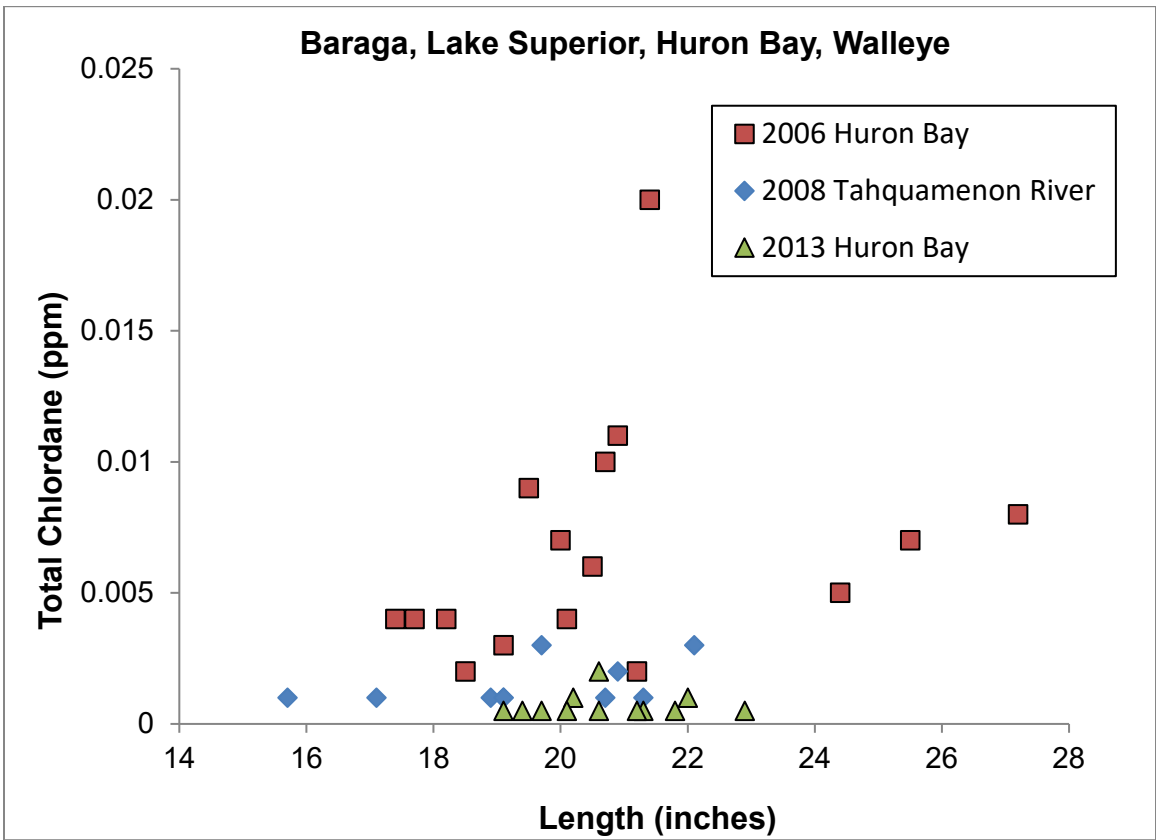
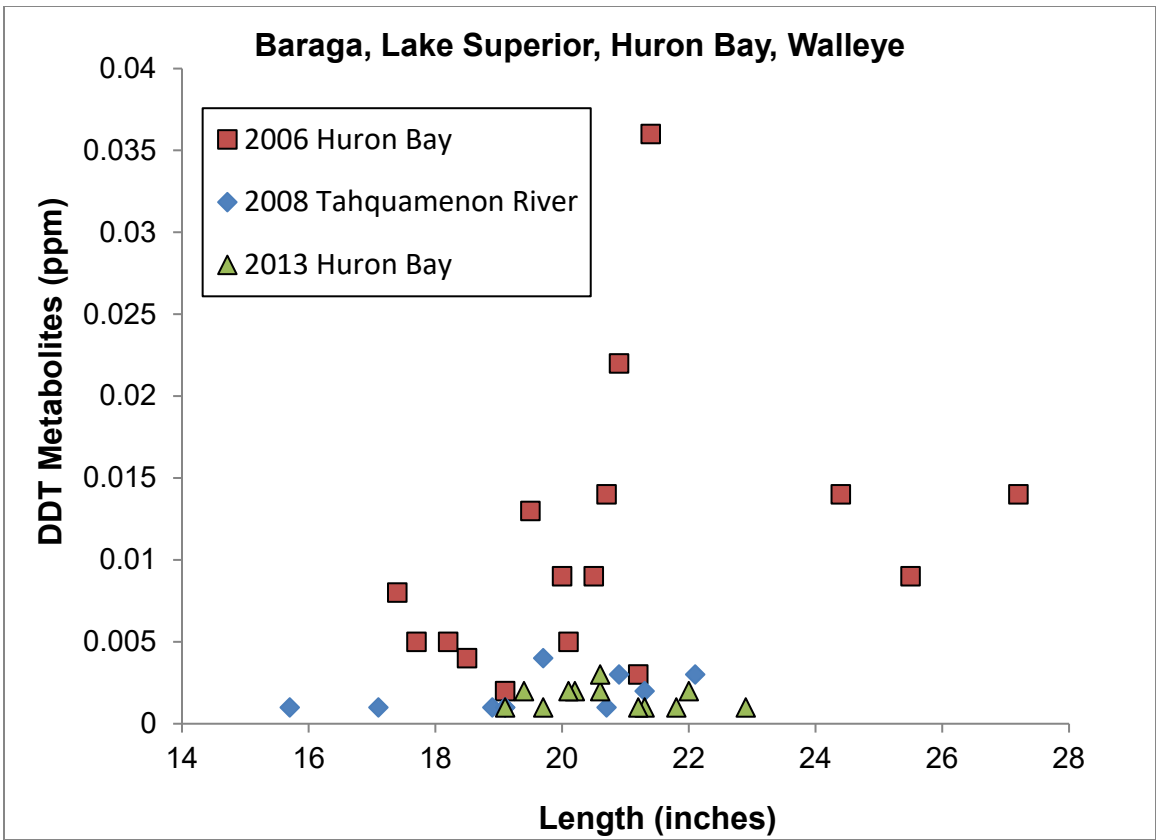
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
2006	2018	60	15.7	15	15.7	29.5	
Datasets available: PCBs: 2006, 2008, 2013, 2018; others: 2006, 2008, 2013							
Chemical	Sample Size (Legal)	Mean		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	60	0.010		< 0.001	0.105	0.014	12
DDT	38	0.006		< 0.001	0.036	0.008	16
Chlordane	38	0.003		< 0.001	0.020	0.005	--
Toxaphene	38	ND		< 0.05	< 0.05	--	--
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.018	0.007					
DDT	0.089	0.104					
Chlordane	0.066	0.045					
Toxaphene	--	--					
Final meal category based on UCL:							2

Existing MDHHS Advisory: No one should eat more than 2 meals per month of walleye from Lake Superior and its tributary streams due to mercury. PCBs would cause an advisory.

Recommendation: No change is recommended.





Yellow Perch

Lake Superior

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	8.7	na	8.7	11.8
Datasets available: 1993						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.193	0.090	0.880	0.370	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.725*	0.723*	*Regression driven by a single point.			

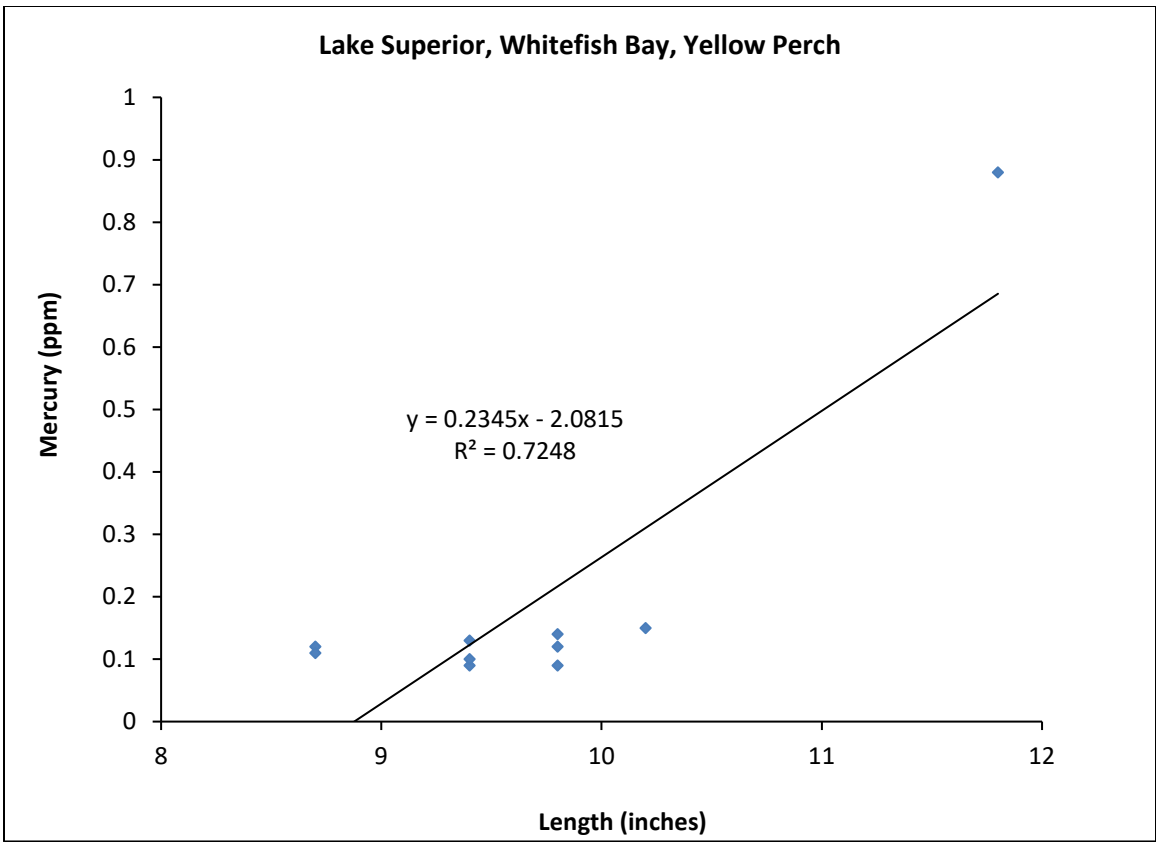
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1993	1993	10	8.7	na	8.7	11.8
Datasets available: 1993						
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	--	--	--	--
TEQ*	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
TEQ*	--	--				
Final meal category based on UCL:						2

Existing Advisory: Lake Superior yellow perch are not covered by a consumption advisory.

Recommendation: No one should eat more than 2 meals per month of Lake Superior yellow perch due to mercury.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
4	0	16
5	0	16
6	0	16
7	0	16
8	0	16
9	0.029	16
10	0.264	4
11	0.498	2
12	0.733	1
<i>Shaded area denotes extrapolated estimates</i>		



St. Clair River

Carp

St. Clair River

St. Clair 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	2016	48	16.1	na	16.1	32.1	
Datasets available: 1986, 1994, 2006, 2012, 2016							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	48	0.20		0.04	0.58	0.23	4
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.047	0.046					

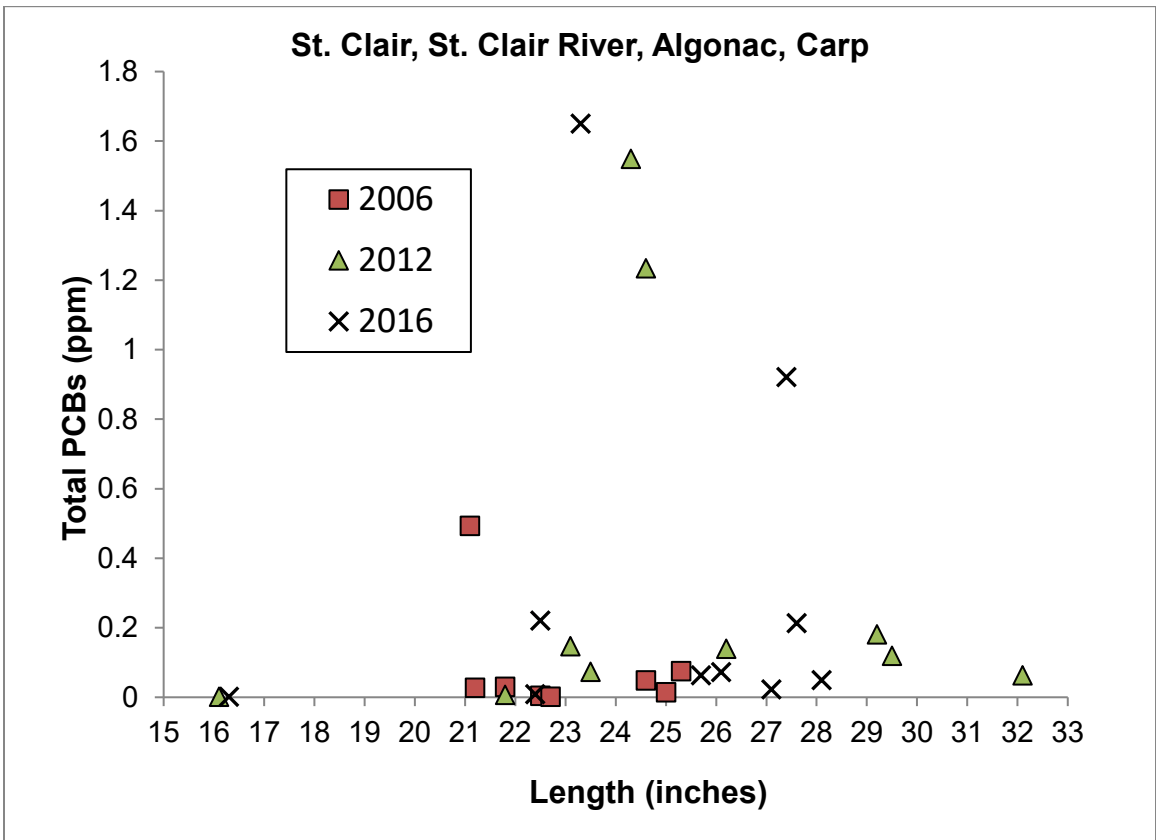
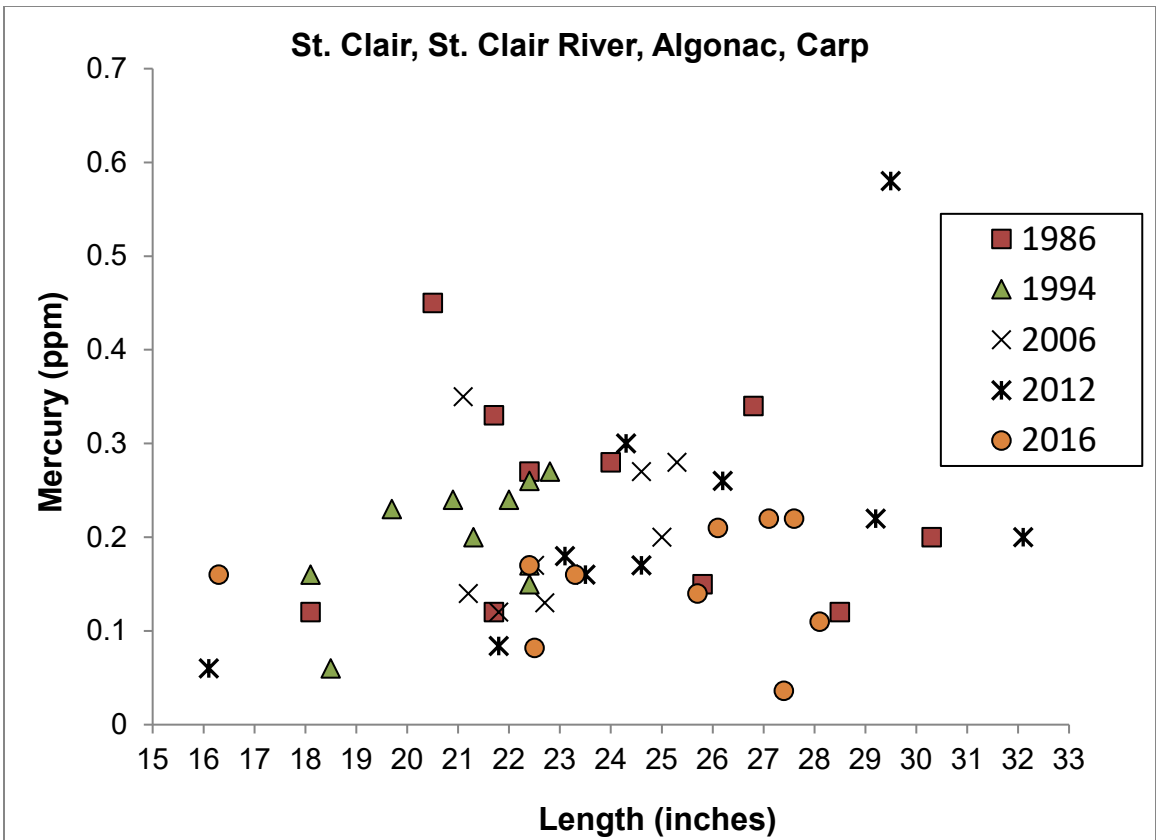
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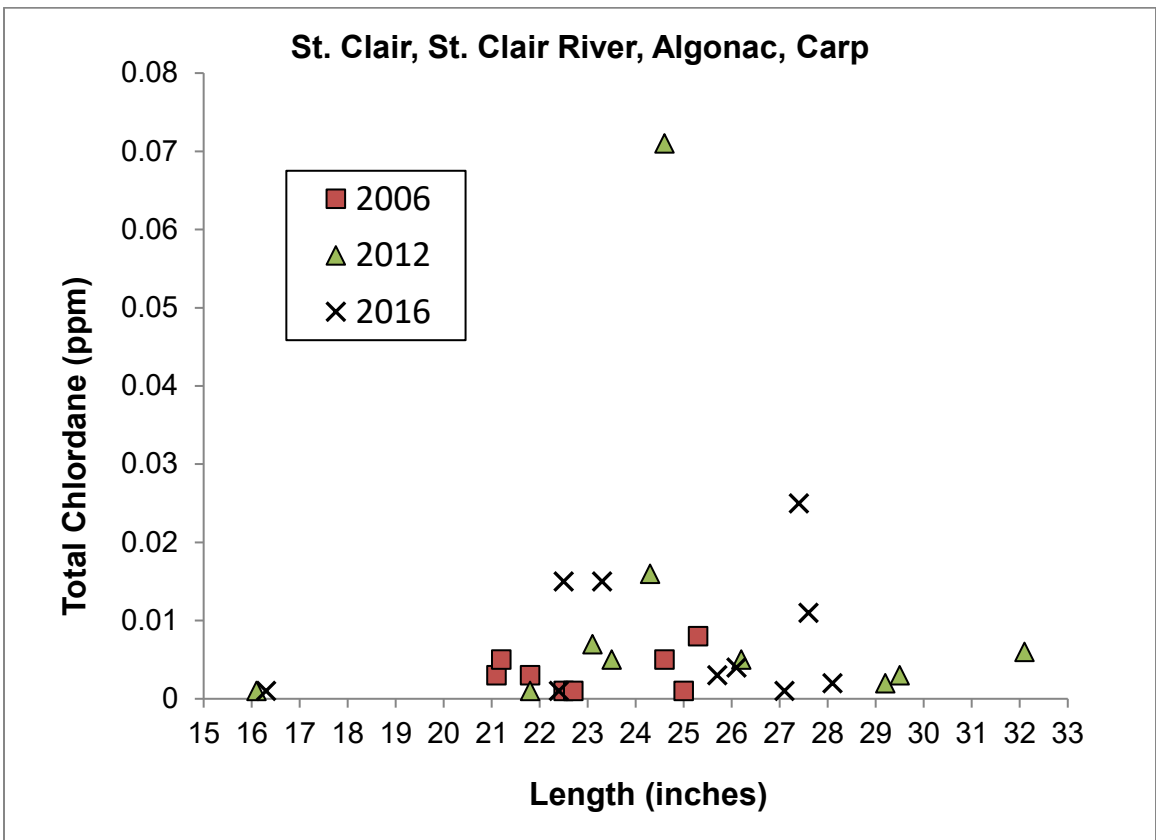
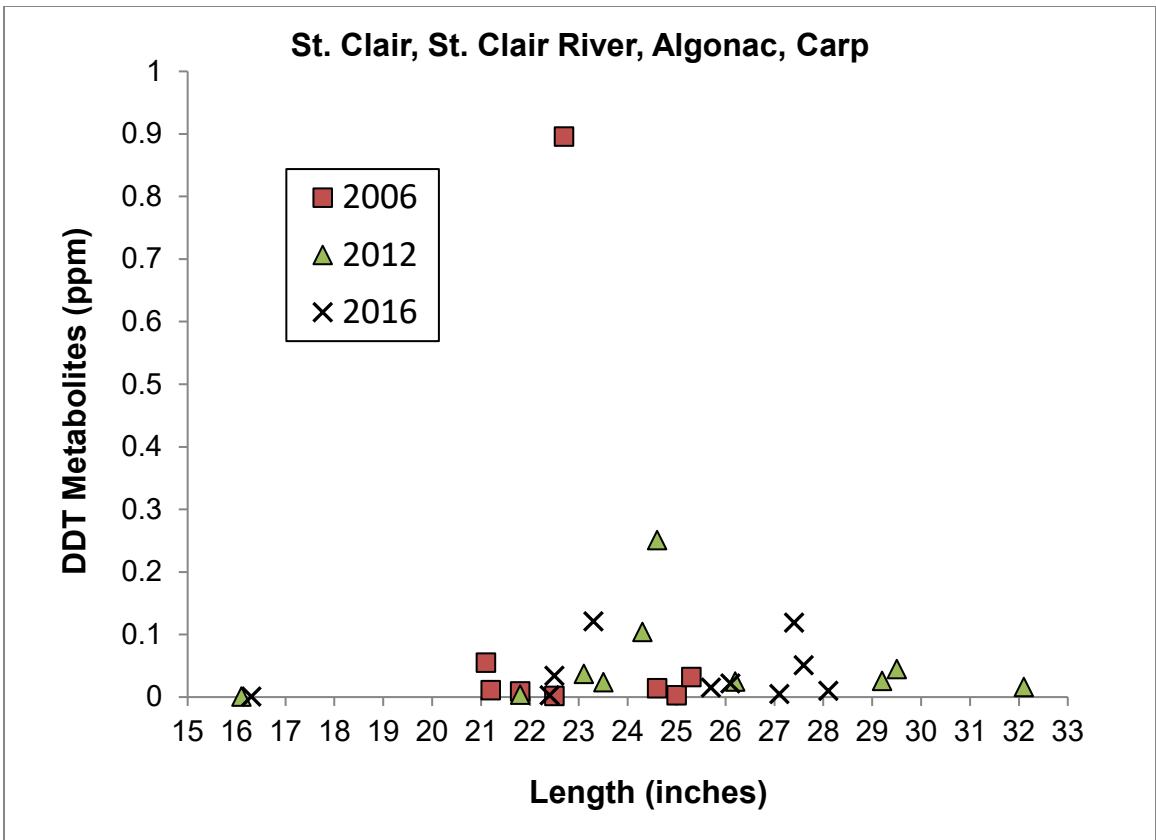
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
2006	2016	28	16.1	na	16.1	32.1	
Datasets available: 1986, 1994, 2006, 2012, 2016							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	28	0.265		0.001	1.650	0.448	Limited
DDT	28	0.069		0.001	0.896	0.135	12
Chlordane	28	0.008		0.001	0.071	0.013	--
Toxaphene	28	ND		--	--	--	--
PFOS	10	5 ppb		2 ppb	14 ppb	8 ppb	16
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.003	0.237					
DDT	0.002	0.135					
Chlordane	0.010	0.079					
Toxaphene	--	--					
PFOS	0.282	0.423					
Final meal category based on UCL:							Limited

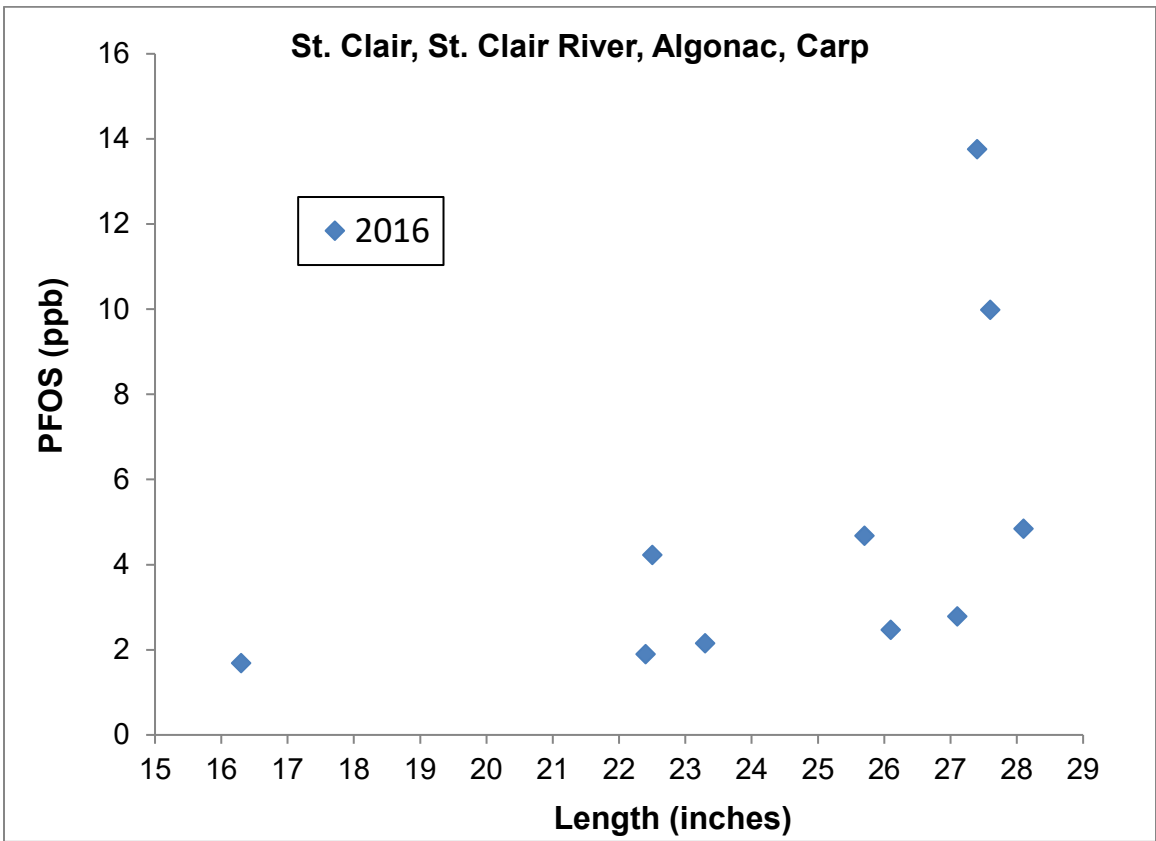
Existing MDHHS Advisory: Sensitive populations should not eat these fish. For healthy adults, limit consumption to no more than 1 or 2 meals per year of St. Clair River carp due to PCBs. Mercury and DDT would cause an advisory.

Recommendation: No change is recommended.

Note: Mercury results for 2006 through 2016 only produced the same advice.







Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1986	1994	11	12.6	na	12.6	17.7
Datasets available: 1986, 1994						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
Mercury	11	0.26	0.15	0.42	0.32	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.000	0.003				

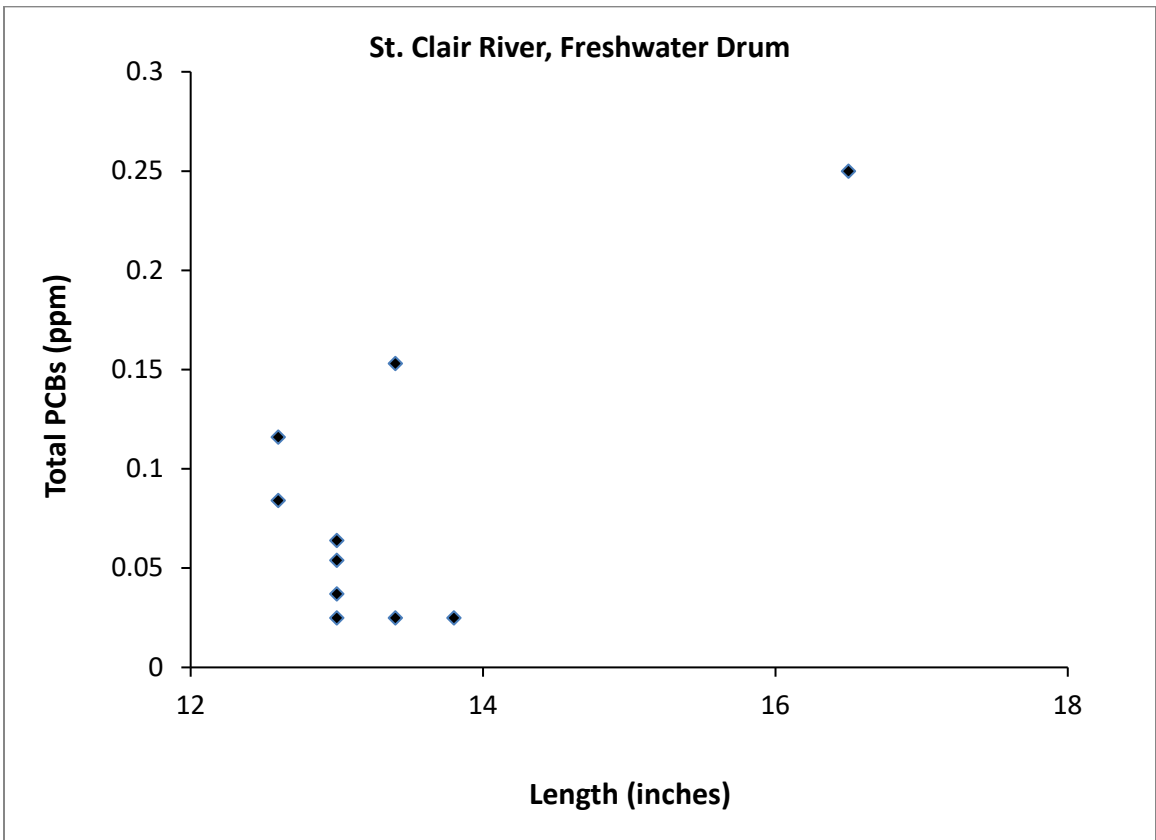
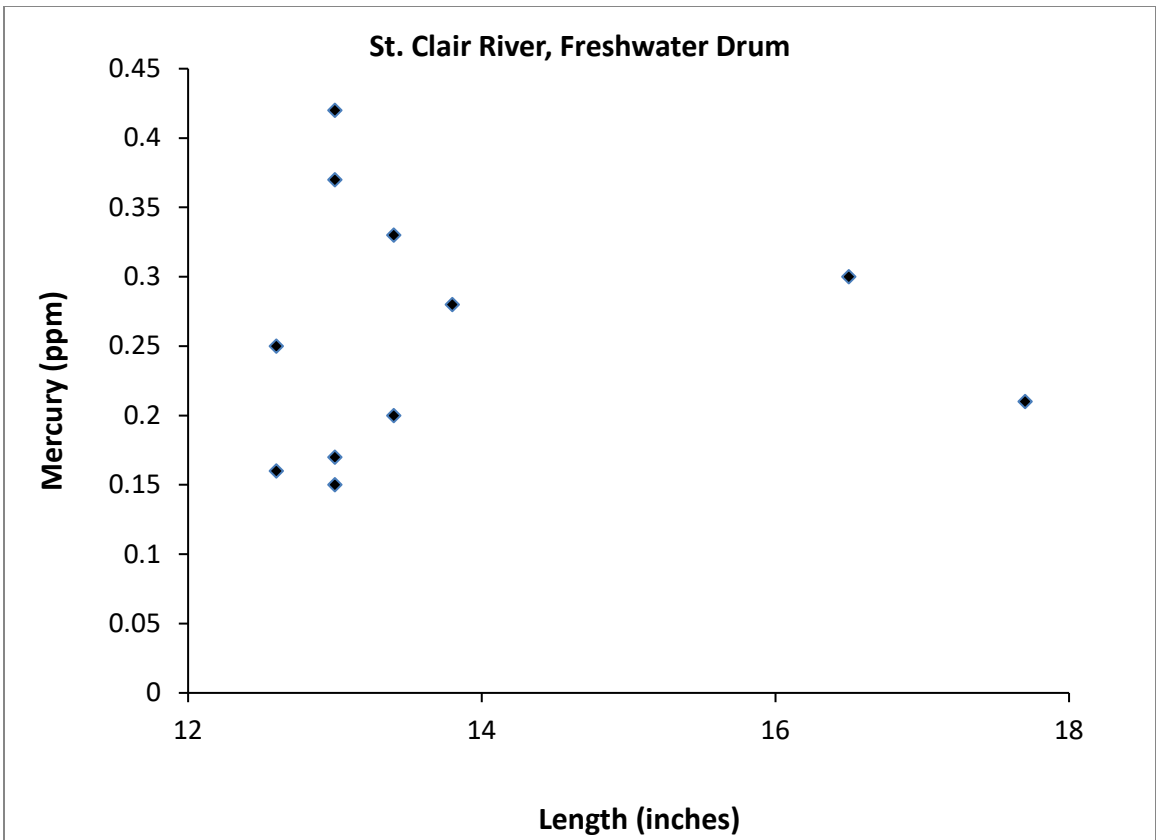
Organics Analysis:

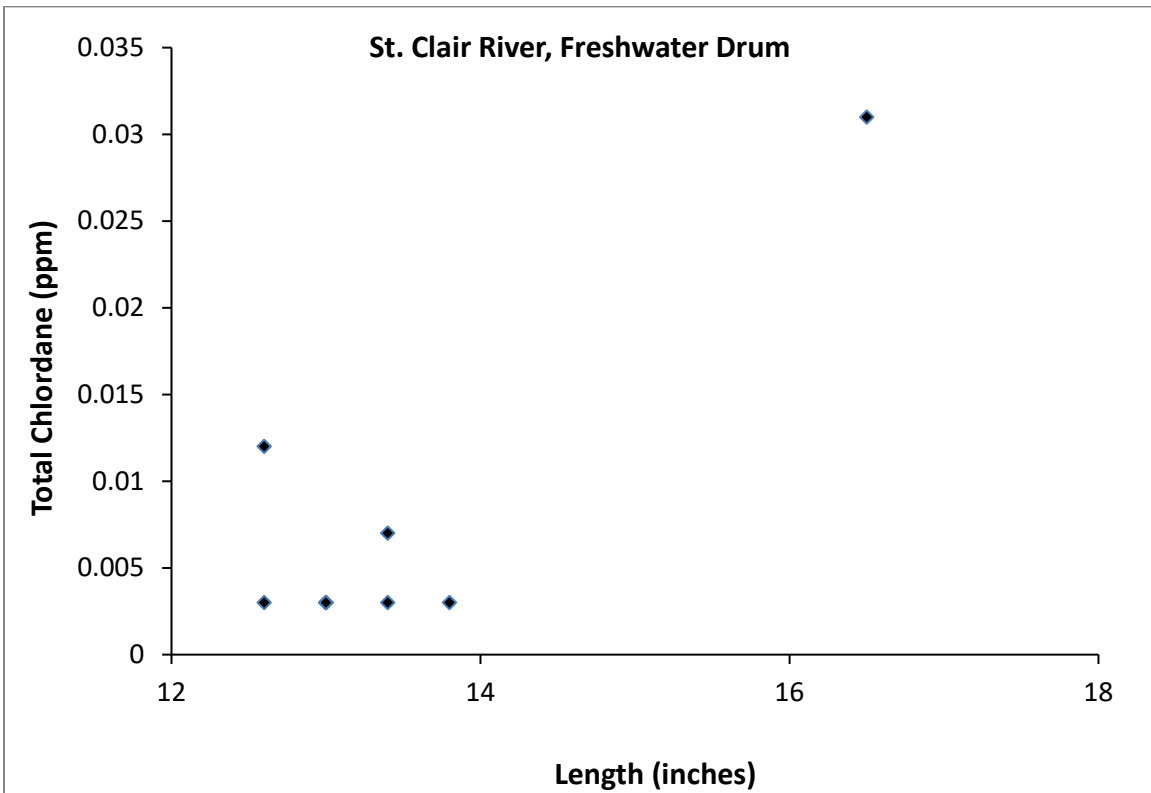
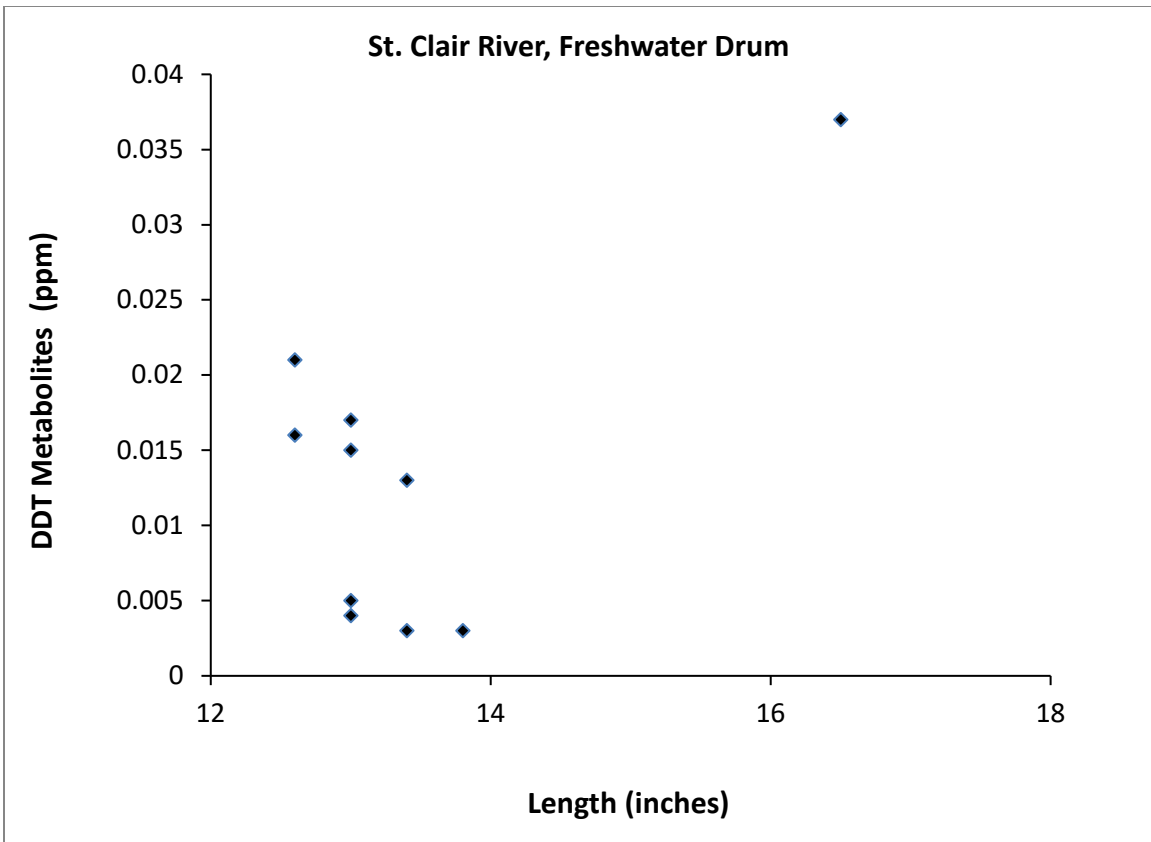
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1994	1994	10	12.6	na	12.6	17.7
Datasets available: 1986, 1994						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
PCB	10	0.083	0.025	0.250	0.135	1*
DDT	10	0.013	0.003	0.037	0.021	16
Chlordane	10	0.007	0.003	0.031	0.014	--
Toxaphene	10	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.505	0.209				
DDT	0.367	0.099				
Chlordane	0.738	0.512				
Toxaphene	--	--				
Final meal category based on UCL:						1*

Existing Advisory: Women and children should not eat more than 1 meal per month of St. Clair River freshwater drum larger than 14 inches due to elevated concentrations of mercury and PCBs

Recommendation: No one should eat more than 2 meals per month of St. Clair River freshwater drum due to PCBs. *Based on EGLE's Fish Contaminant Monitoring Program, PCB concentrations \geq 15 years old are expected to have declined allowing one meal category less restrictive advice for PCBs and mercury.

Note: Chlordane regression was driven by one point and was not used.





**Largemouth and
Smallmouth Bass**

St. Clair River

St. Clair County

Hg Analysis:

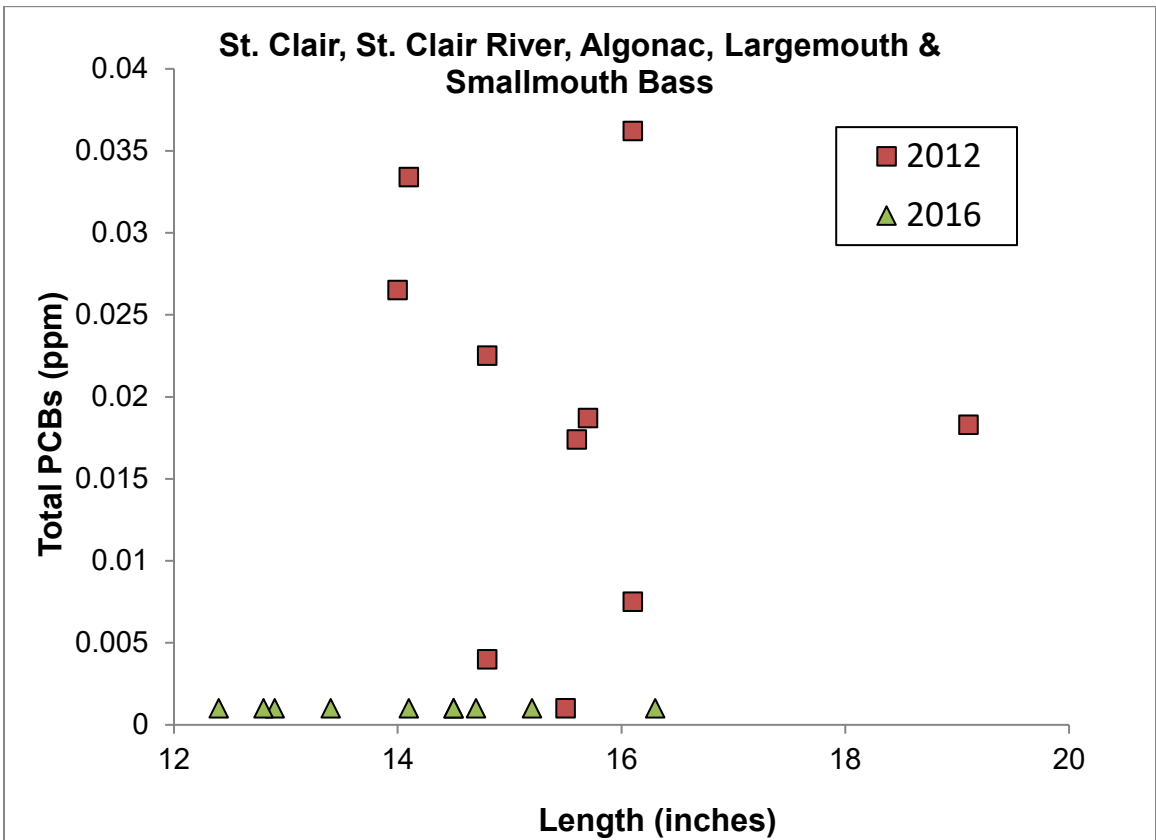
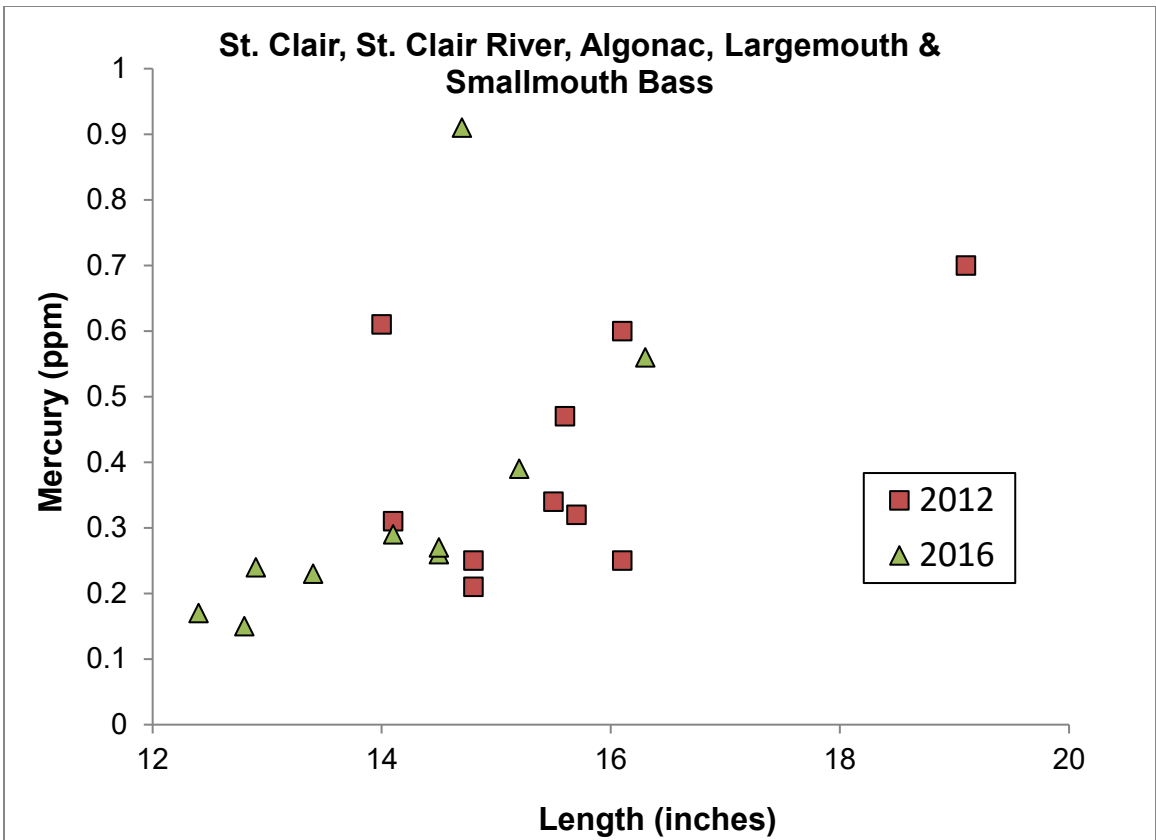
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2012	2016	20	12.4	14	14	19.1
Datasets available: 2012, 2016						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	16	0.42	0.21	0.91	0.53	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.295	0.388				

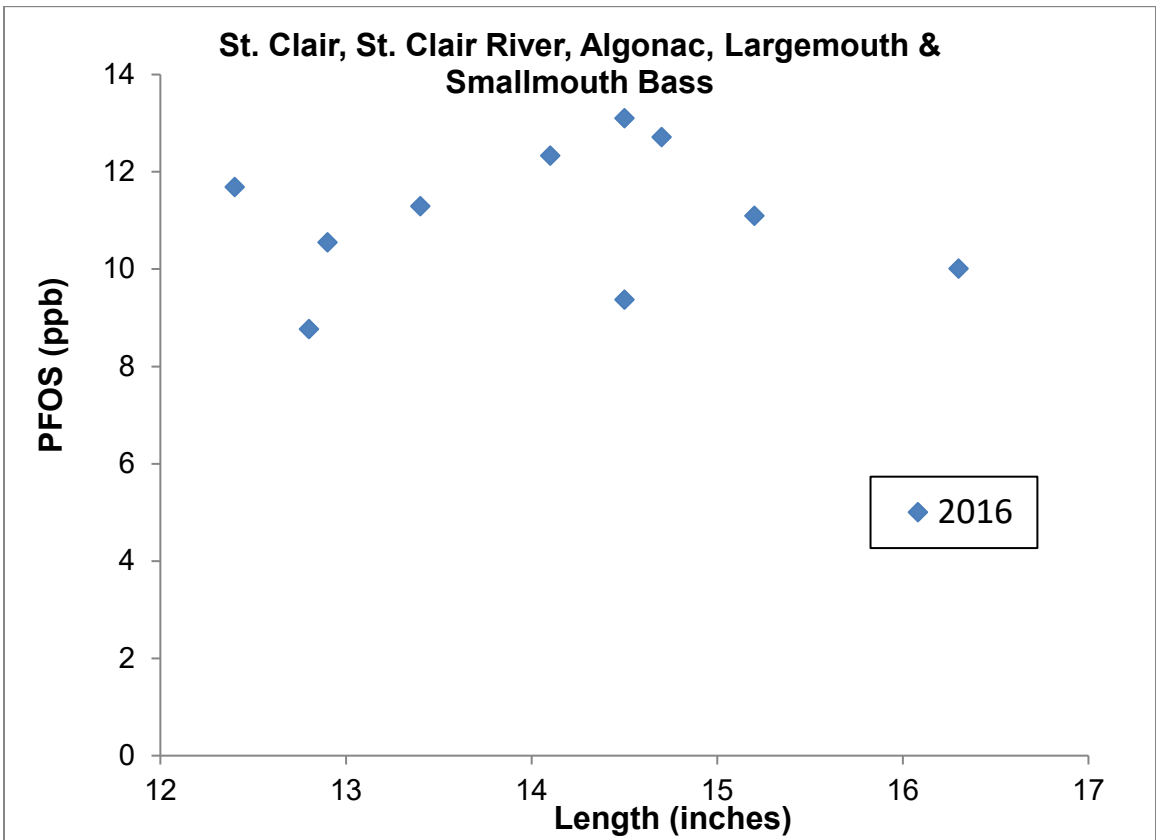
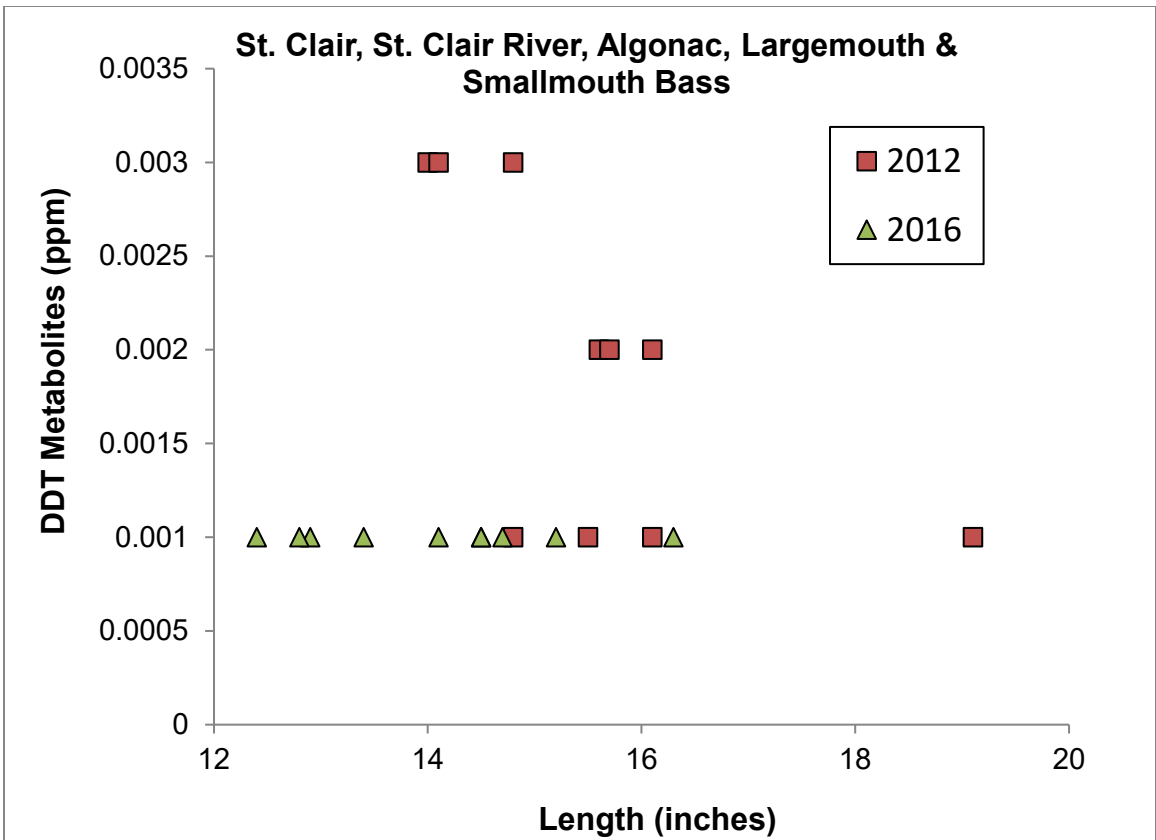
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2012	2016	20	12.4	14	14	19.1
Datasets available: 2012, 2016						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	16	0.012	< 0.001	0.04	0.02	12
DDT	16	0.002	< 0.001	0.003	0.002	16
Chlordane	16	ND	< 0.001	< 0.001	--	--
Toxaphene	16	ND	< 0.05	< 0.05	--	--
PFOS	6	11 ppb	9 ppb	13 ppb	13 ppb	8
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.099	0.186				
DDT	0.000	0.000				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	0.006	0.007				
Final meal category based on UCL:						2

Existing MDHHS Advisory: No one should eat more than 2 meals per month of St. Clair River smallmouth or largemouth bass smaller than 18 inches or more than 1 meal per month of fish larger than 18 inches due to mercury. PCBs would cause an advisory.

Recommendation: No change to the advisory is recommended. The statewide length break was applied previously since the size range in the sample was limited. PFOS should be added to the list of contaminants that would cause an advisory.





Rock Bass

St. Clair River

St. Clair County

Hg Analysis:

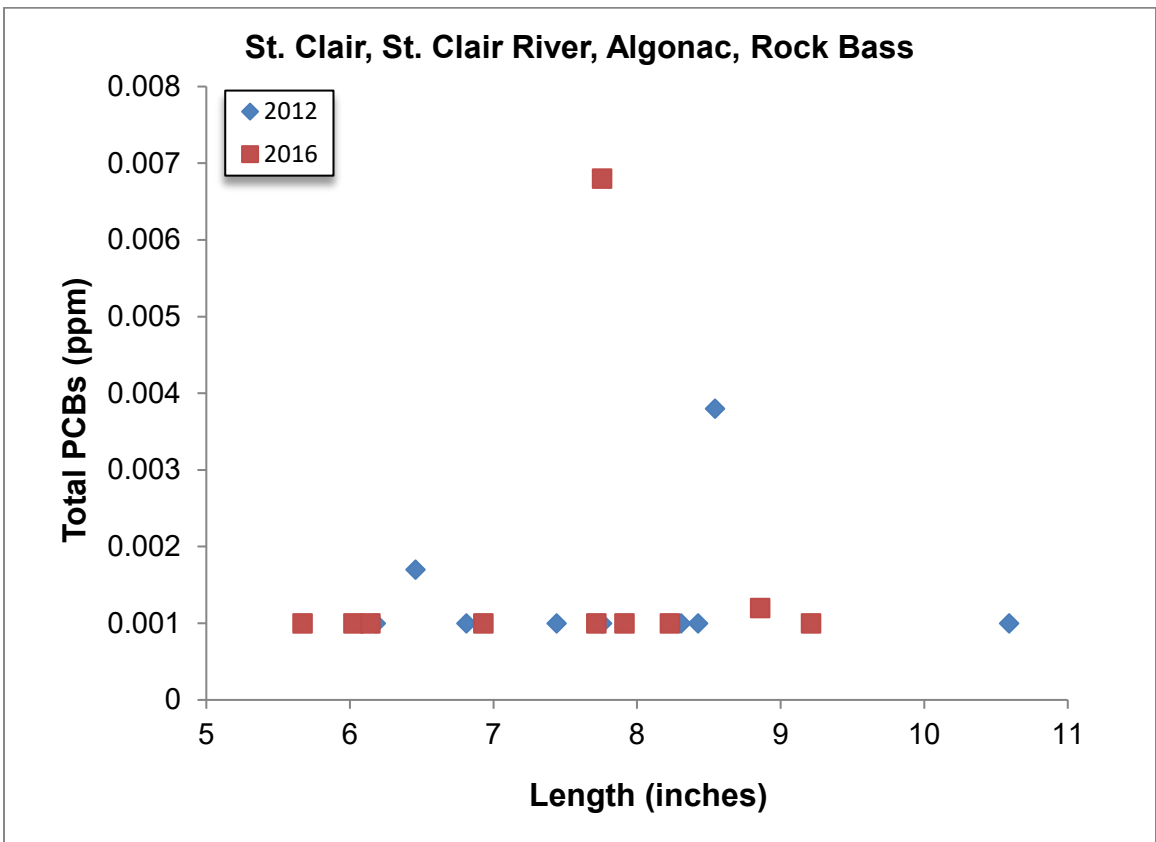
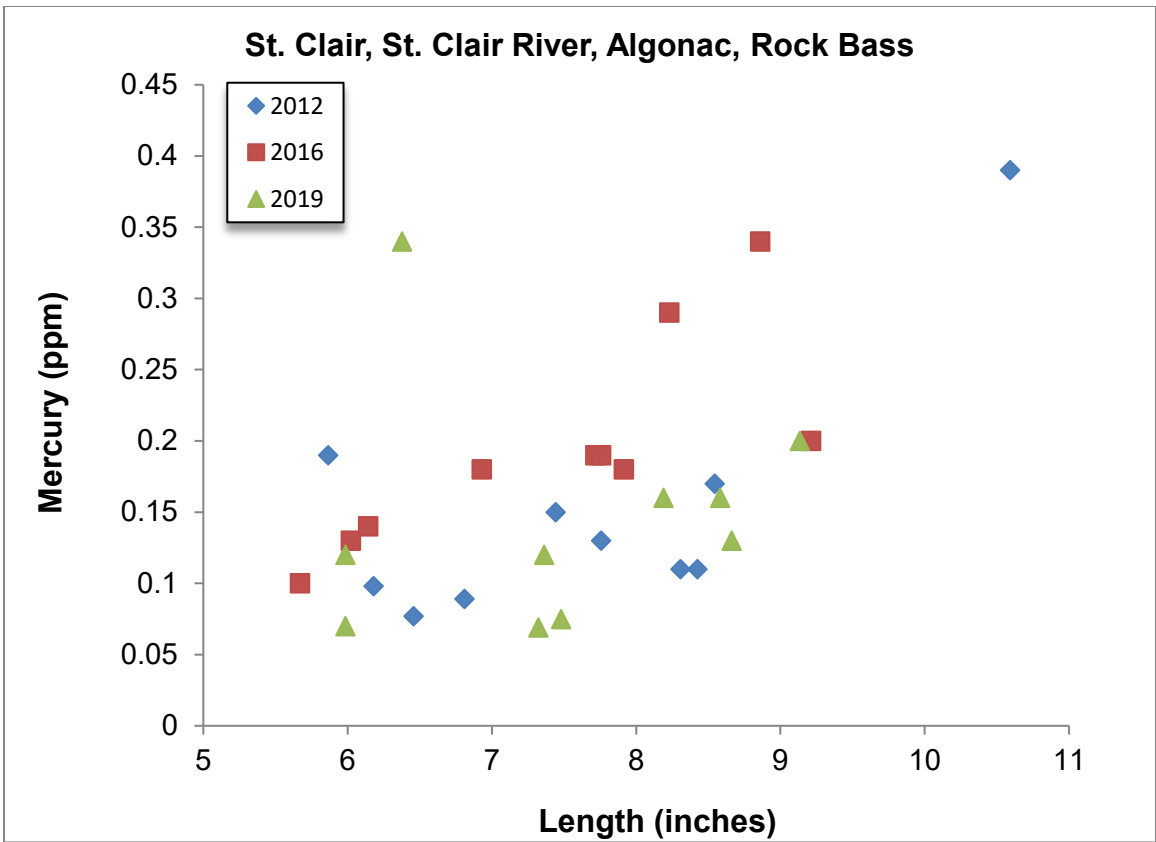
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent						
2012	2019	30	5.7	NA	5.7	10.6	
Datasets available: 2012, 2016, 2019							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	30	0.163		0.069	0.390	0.194	4
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.247	0.250					

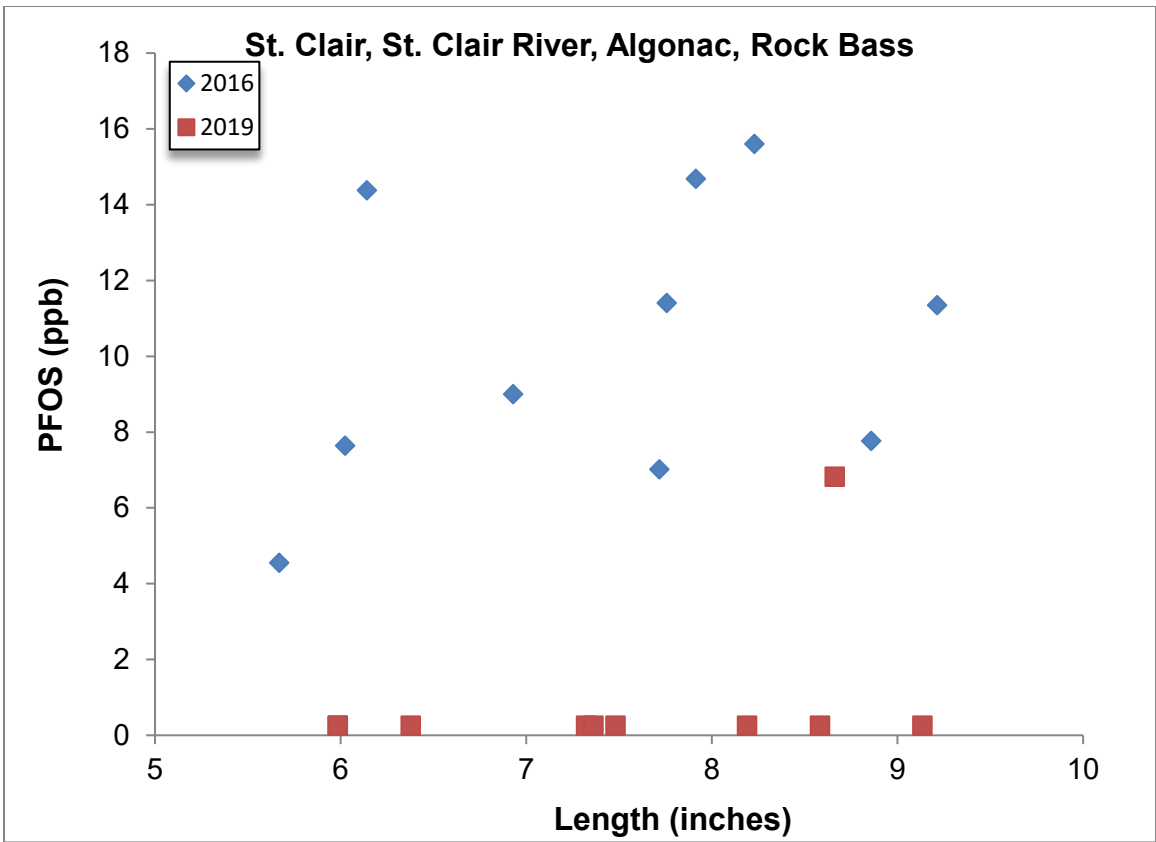
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent						
2012	2019	30	5.7	NA	5.7	10.6	
Datasets available: 2012, 2016, 2019							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	19	0.002		< 0.001	0.007	0.002	16
DDT	19	0.001		< 0.001	0.001	0.001	16
Chlordane	19	ND		--	--	--	--
Toxaphene	19	ND		--	--	--	--
PFOS	20	5.6 ppb		<0.25 ppb	15.6 ppb	8.3 ppb	16
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.247	0.250					
DDT	NA	NA					
Chlordane	NA	NA					
Toxaphene	NA	NA					
PFOS	0.021	0.012					
Final meal category based on UCL:							4

Existing MDHHS Advisory: No one should eat more than 4 meals per month of rock bass of any size from the St. Clair River due to mercury.

Recommendation: No change to the advisory is recommended. PFOS no longer causes an advisory; however, additional fish should be collected before removing this contaminant from the advisory to confirm concentrations are lower than those observed in 2016.





Hg Analysis:

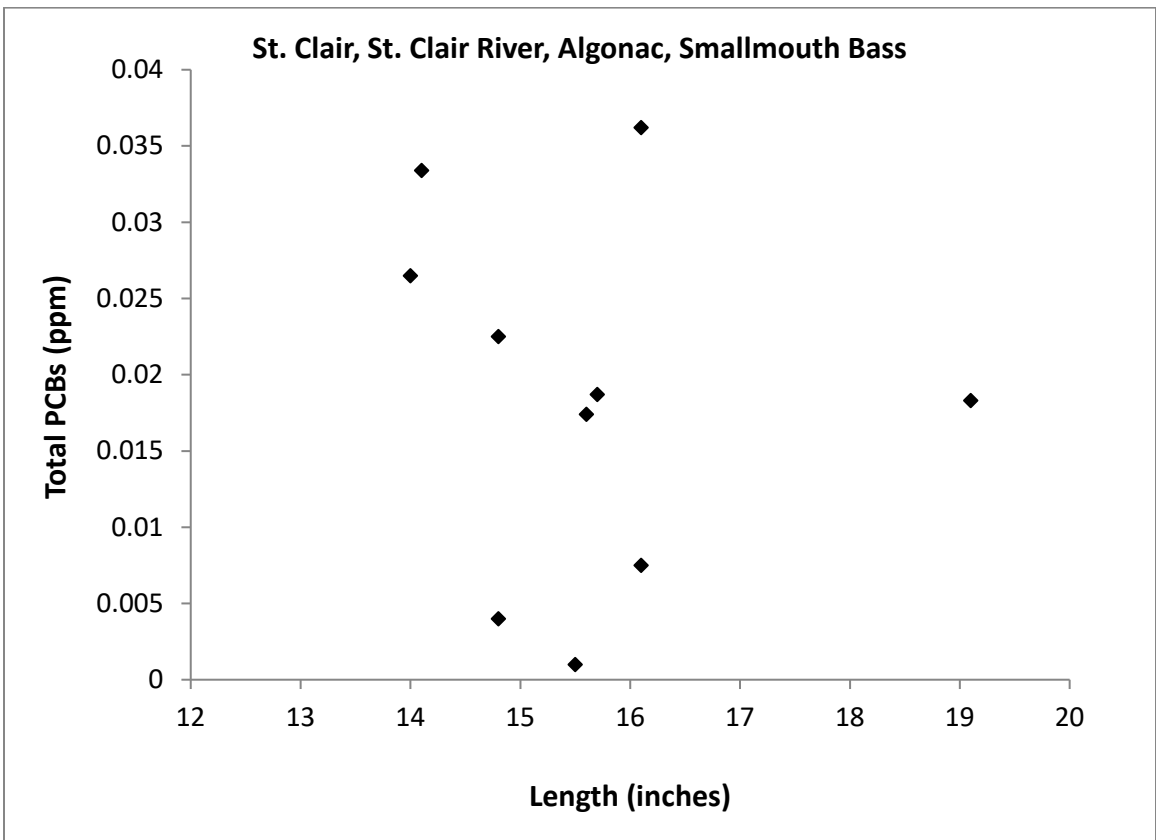
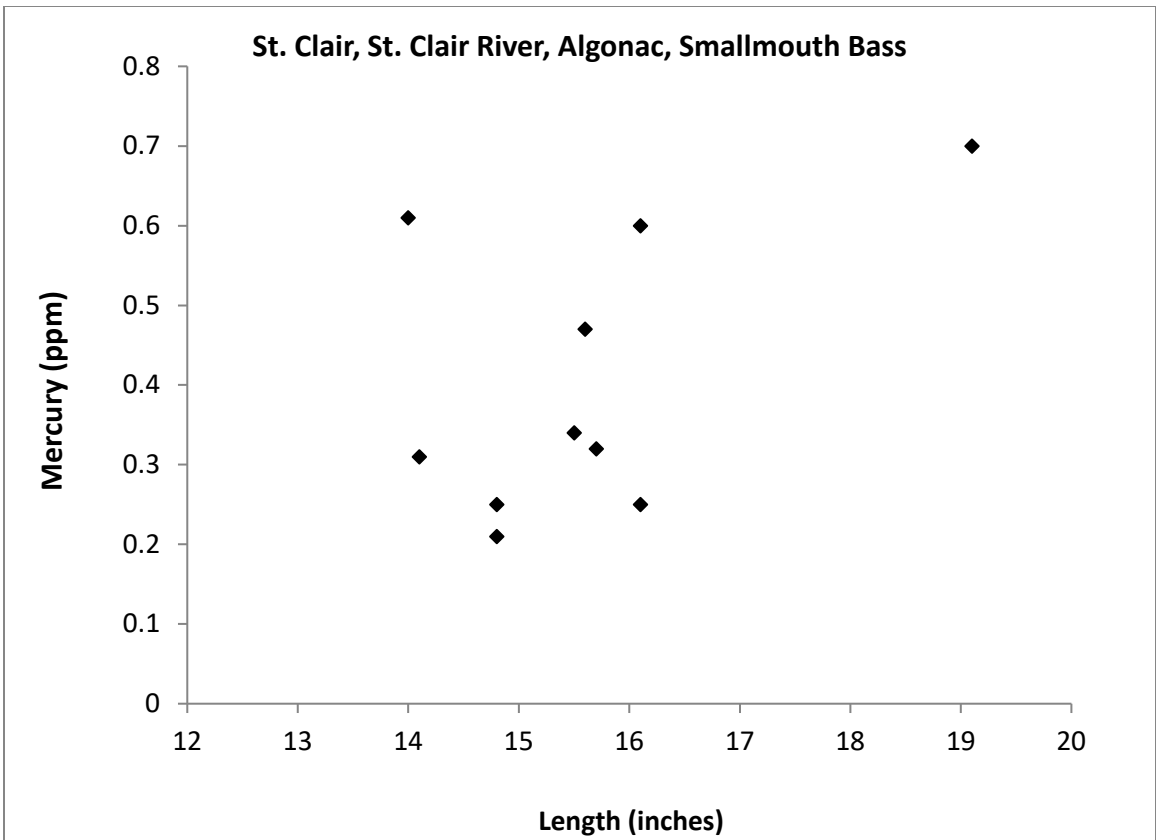
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2012	2012	10	14	14	19.1	
Datasets available: 2012						
Chemical	Sample Size (Legal)	Mean Conc. (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.41	0.21	0.70	0.53	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.250	0.204				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2012	2012	10	14	14	19.1	
Datasets available: 2012						
Chemical	Sample Size (Legal)	Mean Conc. (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.019	0.001	0.0362	0.027	8
DDT	10	0.002	0.001	0.003	0.003	16
Chlordane	10	ND	--	--	--	--
Toxaphene	10	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.021	0.000				
DDT	0.379	0.345				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						2

Existing Advisory: Specific guidelines for St. Clair River smallmouth bass were not developed since data were not available previously.

Recommendation: No one should eat more than 2 meals per month of St. Clair River smallmouth or largemouth bass smaller than 18 inches or more than 1 meal per month of fish larger than 18 inches due to mercury. The Statewide length break was used as the size range of the fish was limited. PCBs would cause an advisory.



Walleye

St. Clair River, Lake St. Clair, Detroit River, and Lake Erie

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1985	2012	225	9.1	15	14.6	28.5
Datasets available: 1985, '86, '87, '90, '91, '92, '94, '97, '98, '99, 2001, 2004, 2006, 2011, 2012						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
Mercury	210	0.28	0.07	1.08	0.31	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.336	0.331				

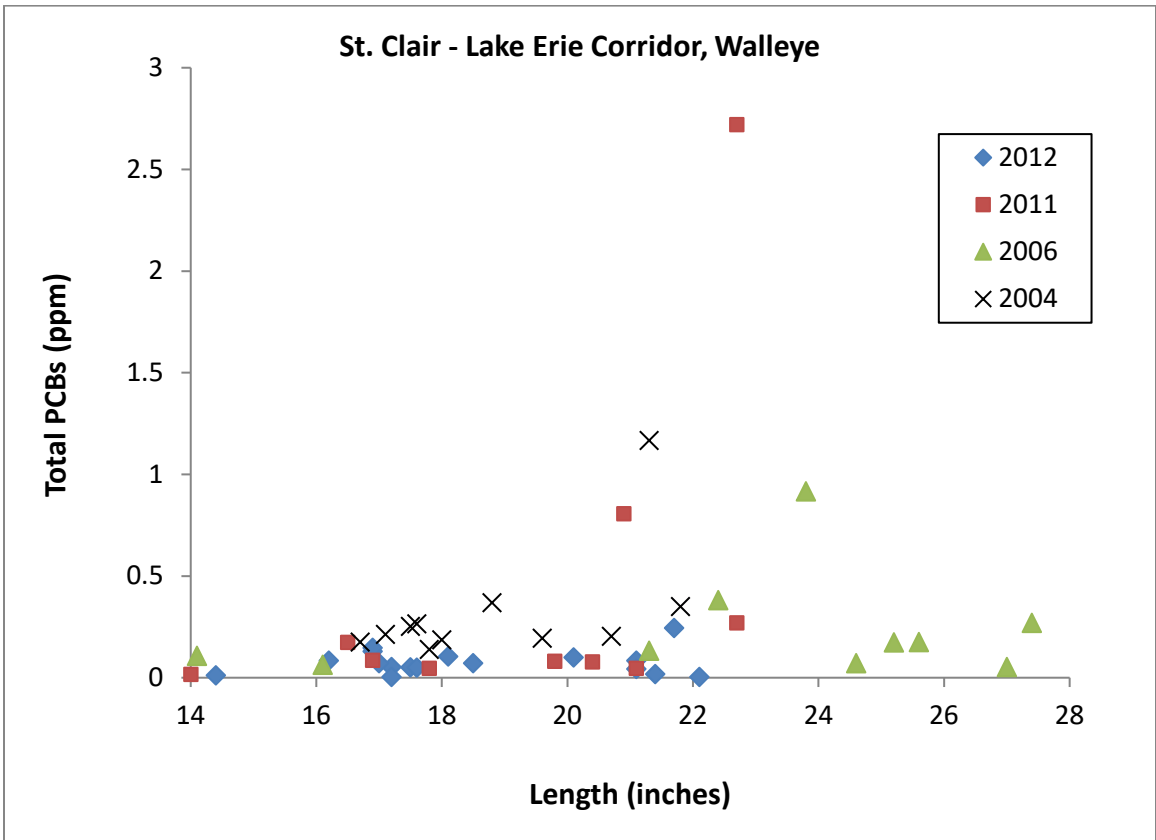
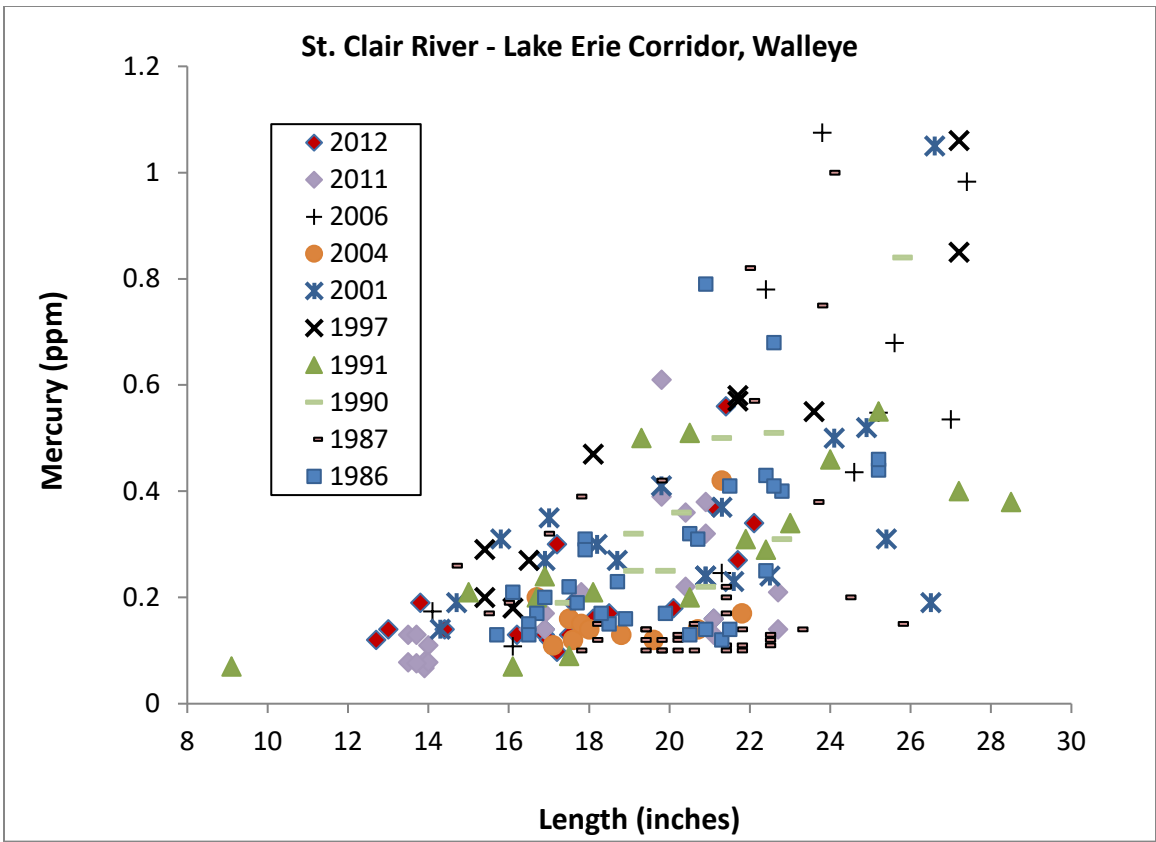
Organics Analysis:

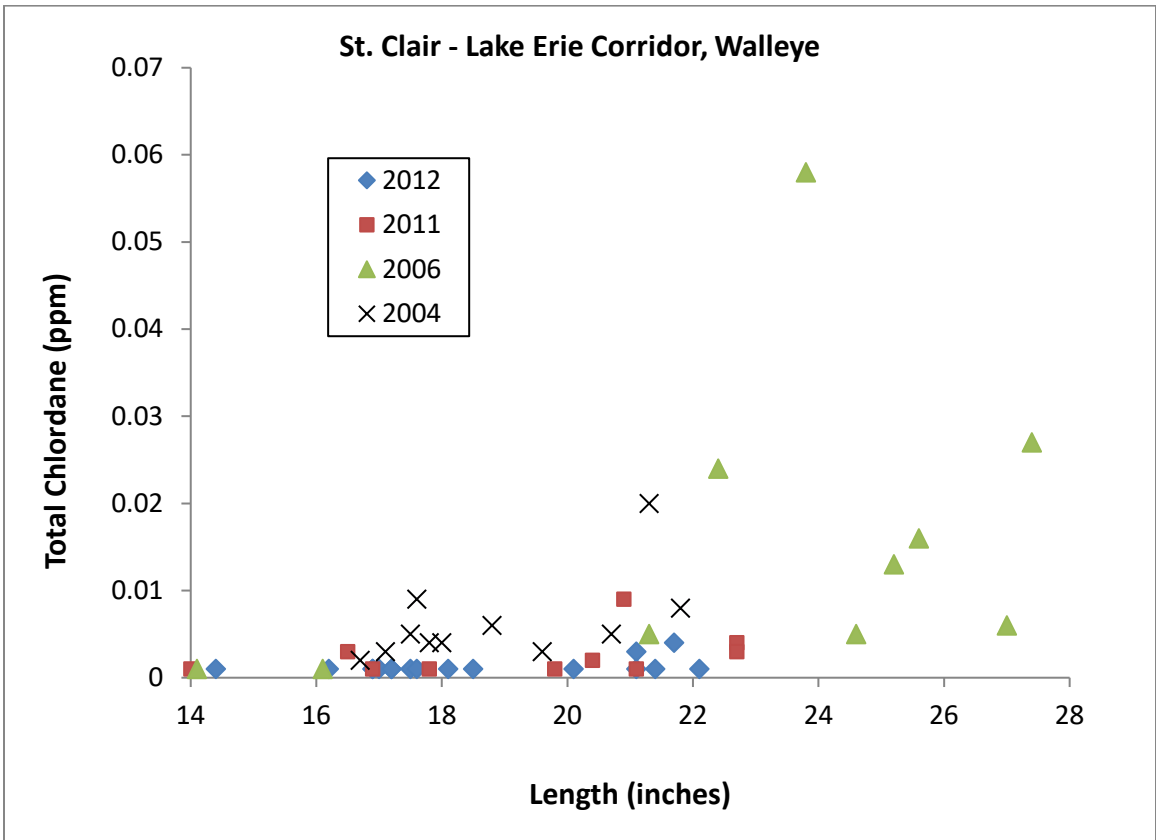
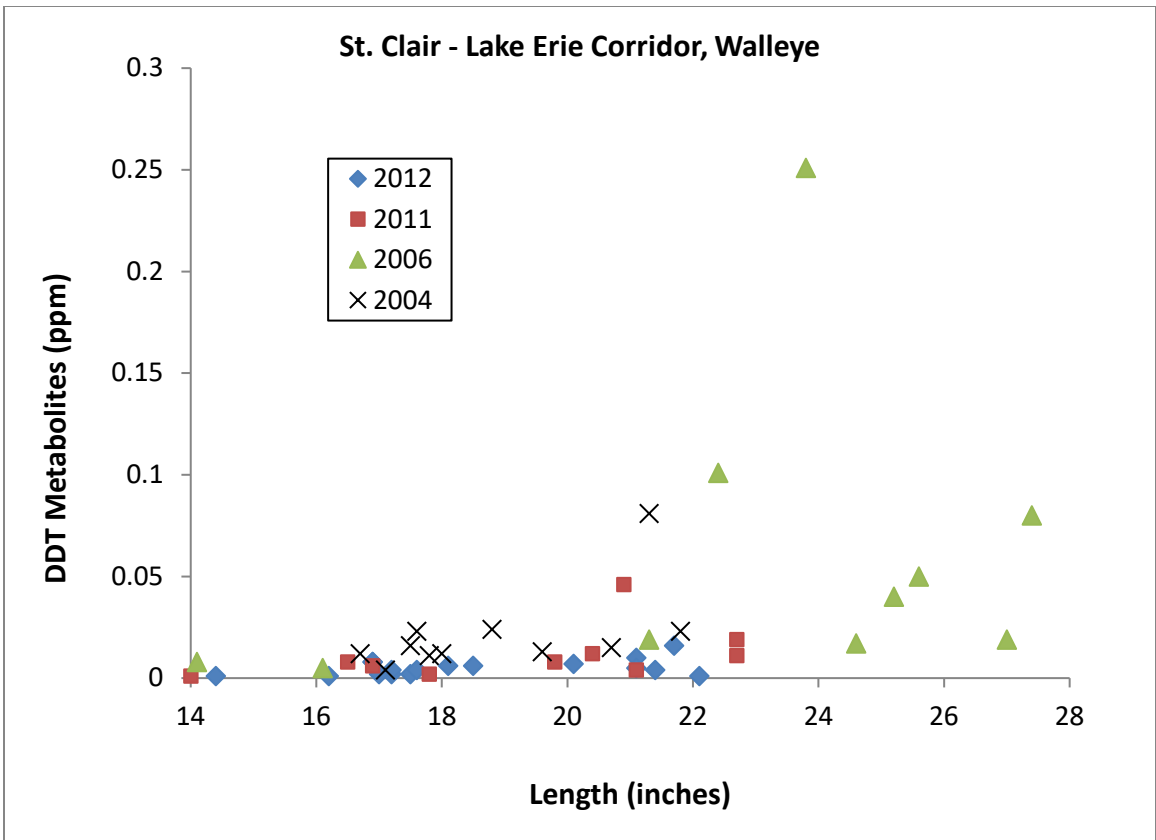
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2004	2012	54	12.7	15	16.1	27.4
Datasets available: 1985, '86, '87, '90, '91, '92, '94, '95, '97, '98, '99, '01, '04, '06, 2011, 2012						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL	Meal Category
PCB	45	0.25	0.004	2.72	0.38	0.5
DDT	45	0.02	0.001	0.25	0.04	16
Chlordane	45	0.01	0.001	0.06	0.01	--
Toxaphene	45	ND	--	--	--	--
TEQ*	6	7.3 ppt	1.6 ppt	18.6 ppt	13.8 ppt	0.5
PFOS	10	17.7 ppb	9.7 ppb	44.1 ppb	25.6 ppb	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.097	0.227				
DDT	0.214	0.504				
Chlordane	0.258	0.459				
Toxaphene	--	--				
TEQ*	0.160	0.243				
PFOS	0.283	0.236				
Final meal category based on UCL:						0.5

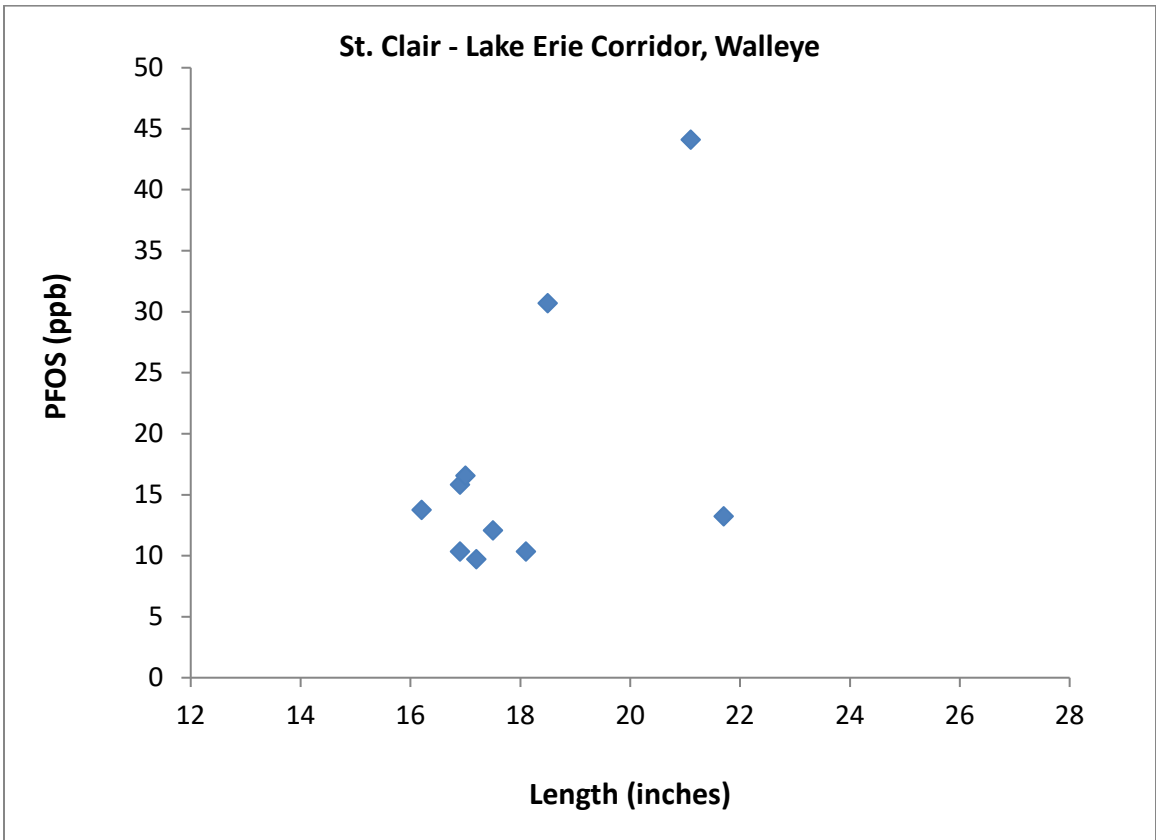
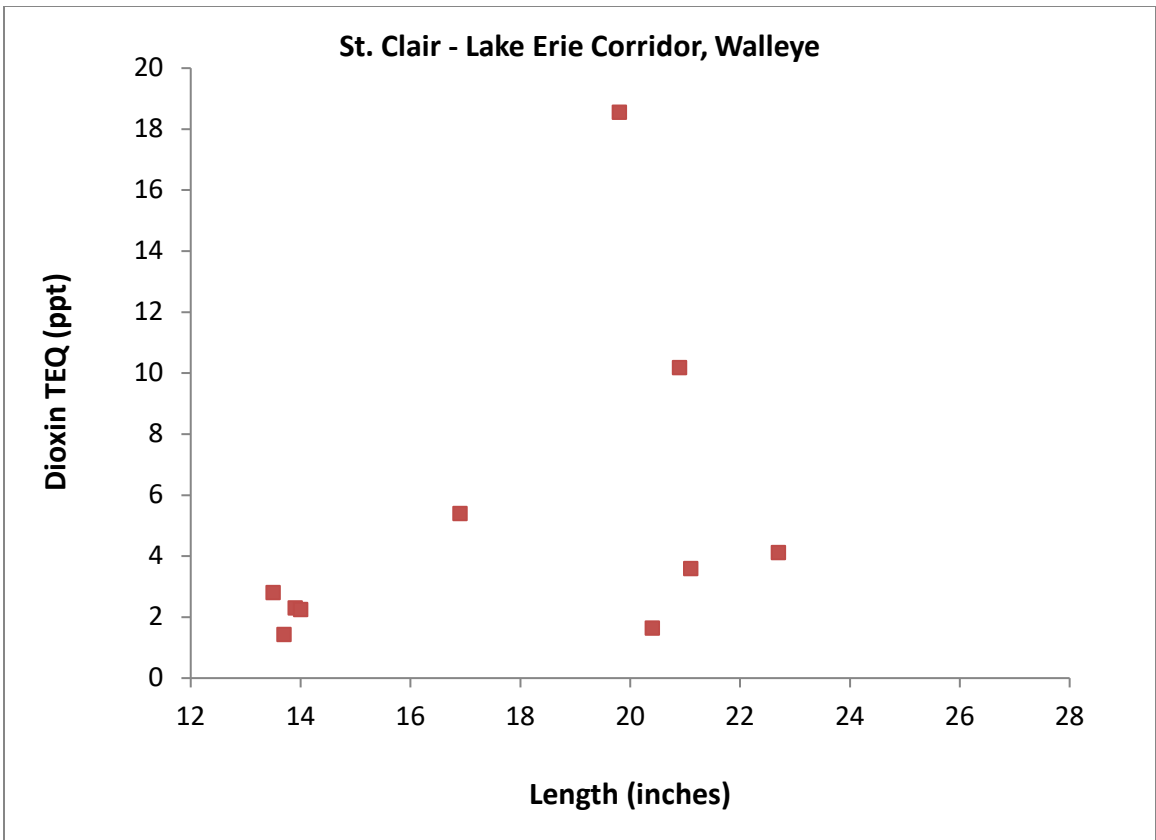
* 2005 WHO; dl-PCBs included

Existing Advisory: No one should eat more than 6 meals per year of walleye from the St. Clair River, Lake St. Clair, the Detroit River, or Lake Erie due to elevated concentrations of PCBs and dioxin. Mercury would cause an advisory.

Recommendation: No change.







White Bass

St. Clair River, Lake St. Clair, Detroit River, and Lake Erie
 [Dataset: Lake Erie, Plum Creek & River Raisin d/s Monroe Dam,
 Detroit River, Lake St. Clair]

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	2012	106	7.5	na	7.5	15.3	
Datasets available: 1986, 1988, 1993, 1995, 1999, 2004, 2006, 2008, 2010, 2011, 2012							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	106	0.22		0.04	0.91	0.25	4
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.335	0.468					

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	2012	66	9.4	na	9.4	15.3	
Datasets available: 1988, 1993, 1995, 1999, 2004, 2006, 2008, 2010, 2011, 2012							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	66	0.50		0.037	4.4	0.64	Limited
DDT	66	0.03		0.01	0.09	0.04	16
Chlordane	66	0.01		0.001	0.02	0.01	--
Toxaphene	ND	--		--	--	--	--
TEQ*	20	12.4 ppt		1.9 ppt	33.4 ppt	16.2 ppt	Limited
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.134	0.082					
DDT	0.054	0.031					
Chlordane	0.050	0.050					
Toxaphene	--	--					
TEQ*	0.586	0.647					
Final meal category based on UCL:							Limited

* - 2005 WHO; dl-PCBs included

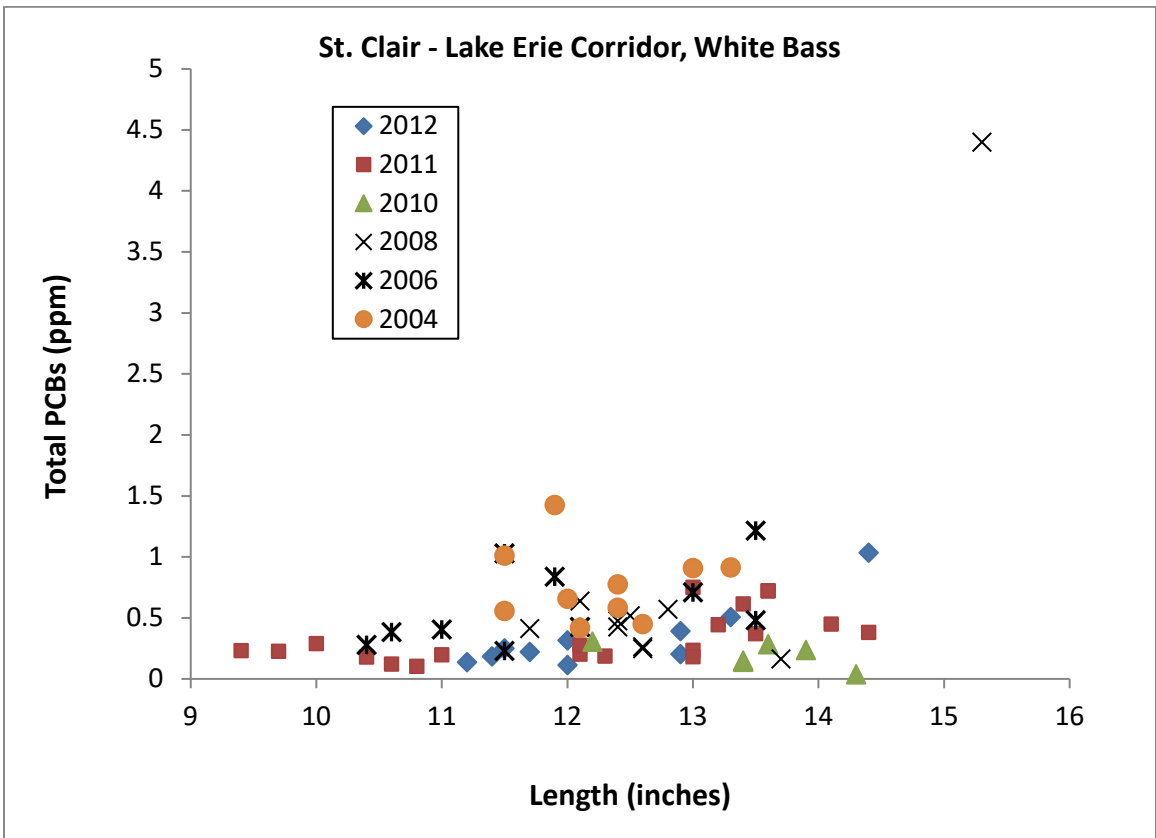
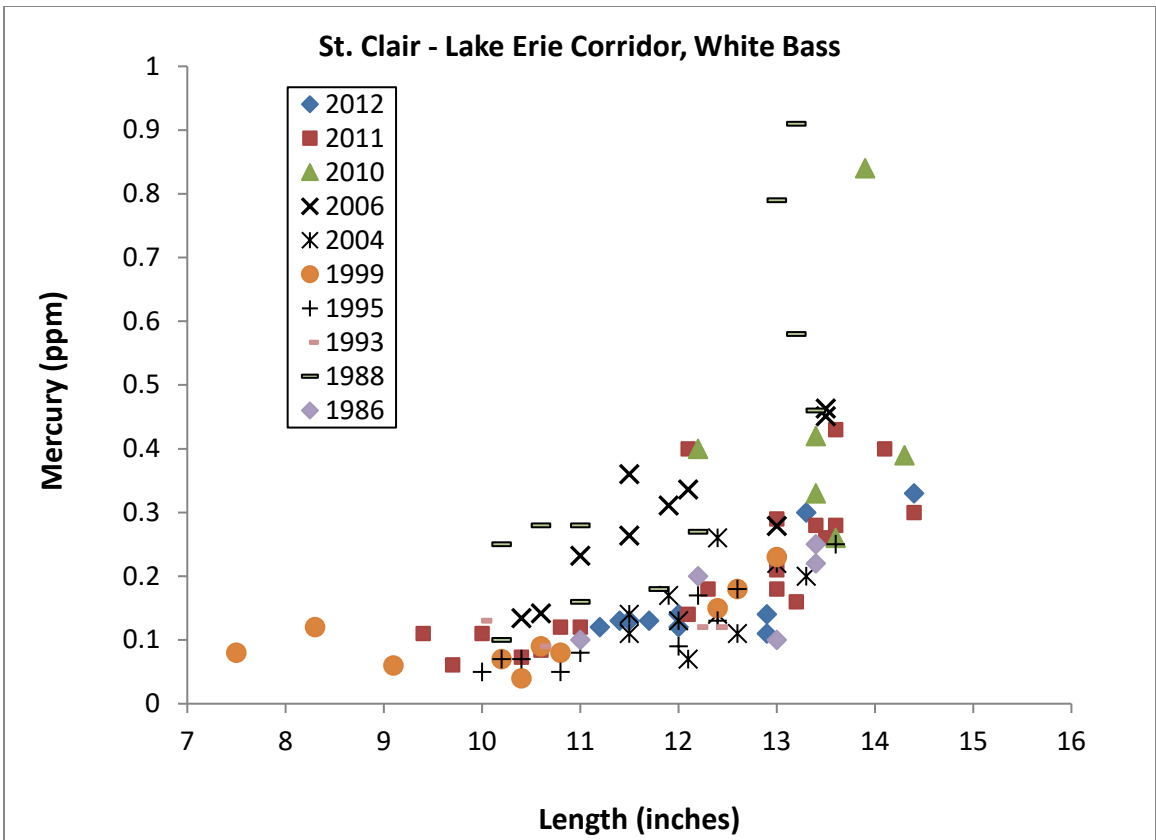
Existing Advisory: Sensitive populations should not eat white bass from Lake Erie, Plum Creek, or the River Raisin downstream of the Dundee Dam due to PCBs, the Detroit River due to PCBs and dioxin, or Lake St. Clair due to PCBs. Healthy adults should limit consumption of white bass to no more than 1 or 2 meals per year. Mercury would cause an advisory.

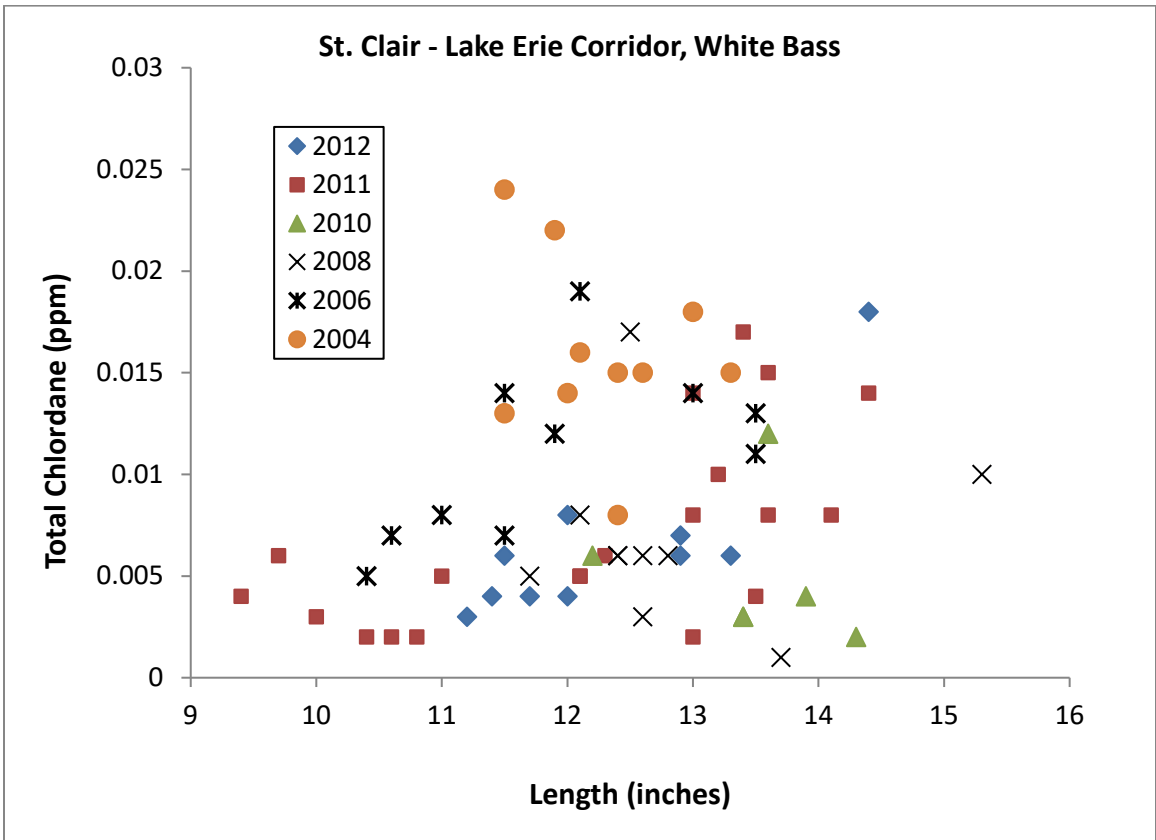
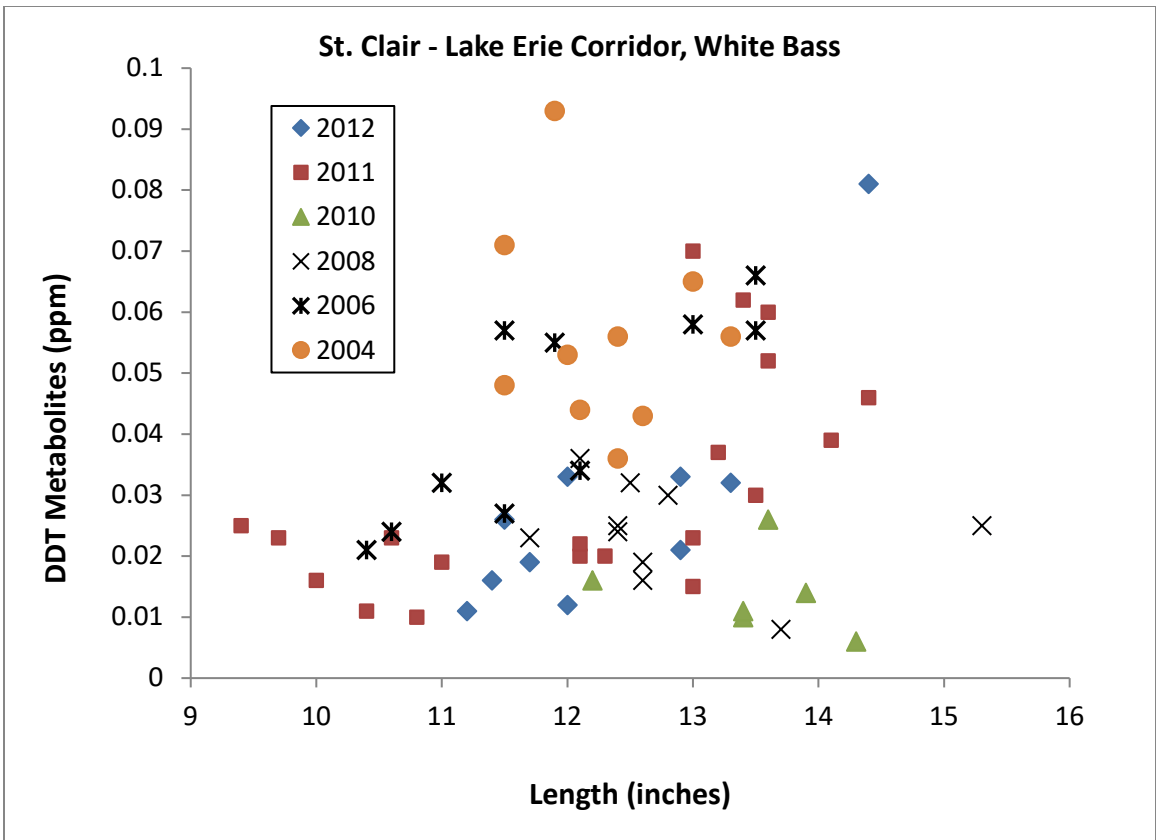
Recommendation: No change. Sensitive populations should not eat St Clair River white bass due to PCBs. Healthy adults should limit consumption of white bass to no more than 1 or 2 meals per year.

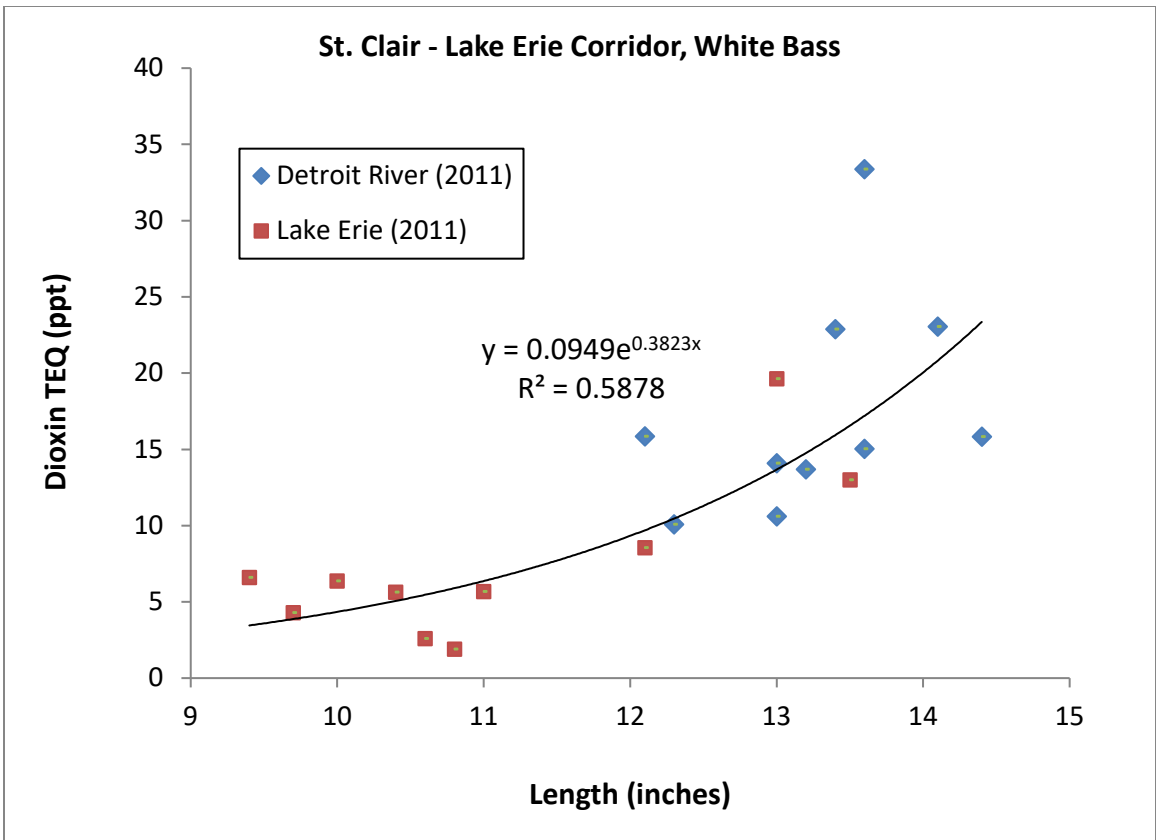
Note: Monroe Dam in River Raisin is no longer a barrier to fish. The applicable stretch of the River Raisin is to the Dundee Dam.

Length (Inches)	TEQ Regression Equation Estimate (ppt)	Meal Category
8	2	2
9	3	2
10	4.3	1
11	6.4	1
12	9.3	0.5
13	13.7	0.5
14	20	Limited
15	29.4	Limited
16	43	Limited

Shaded area denotes extrapolated estimates







Hg Analysis:

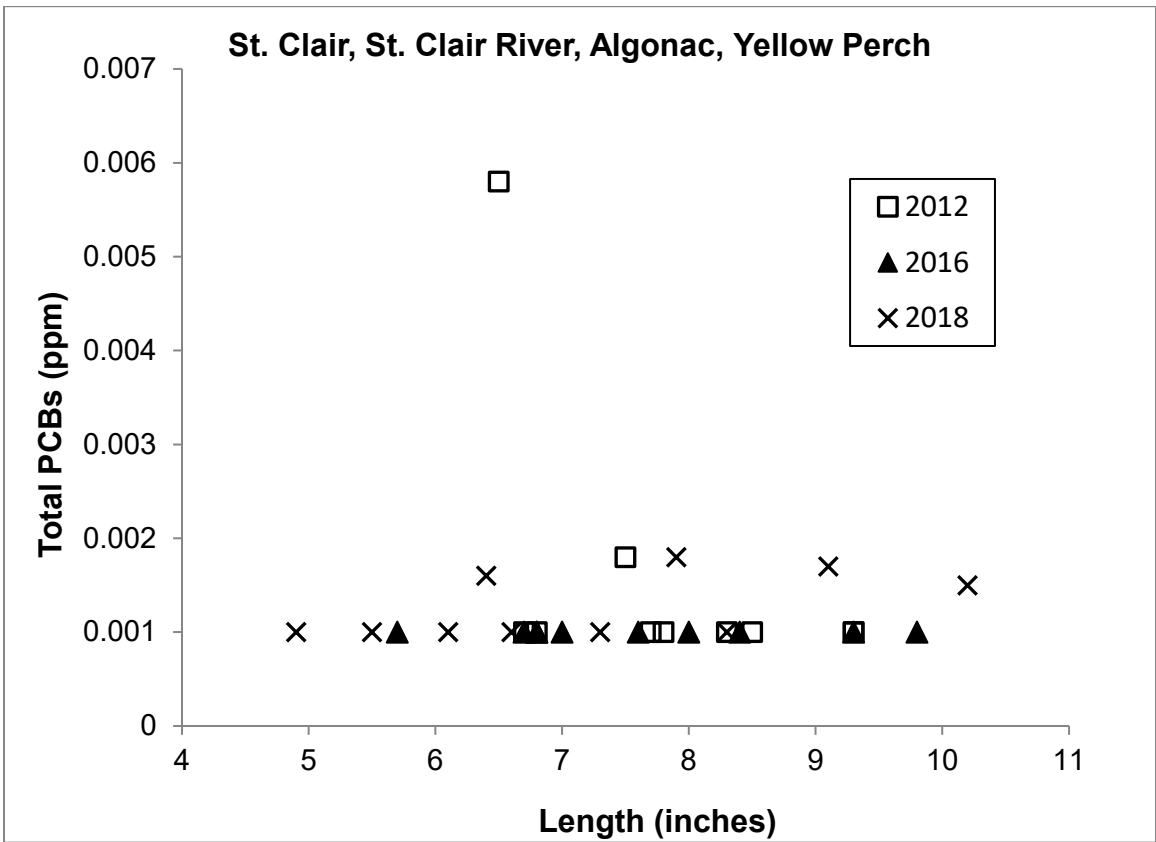
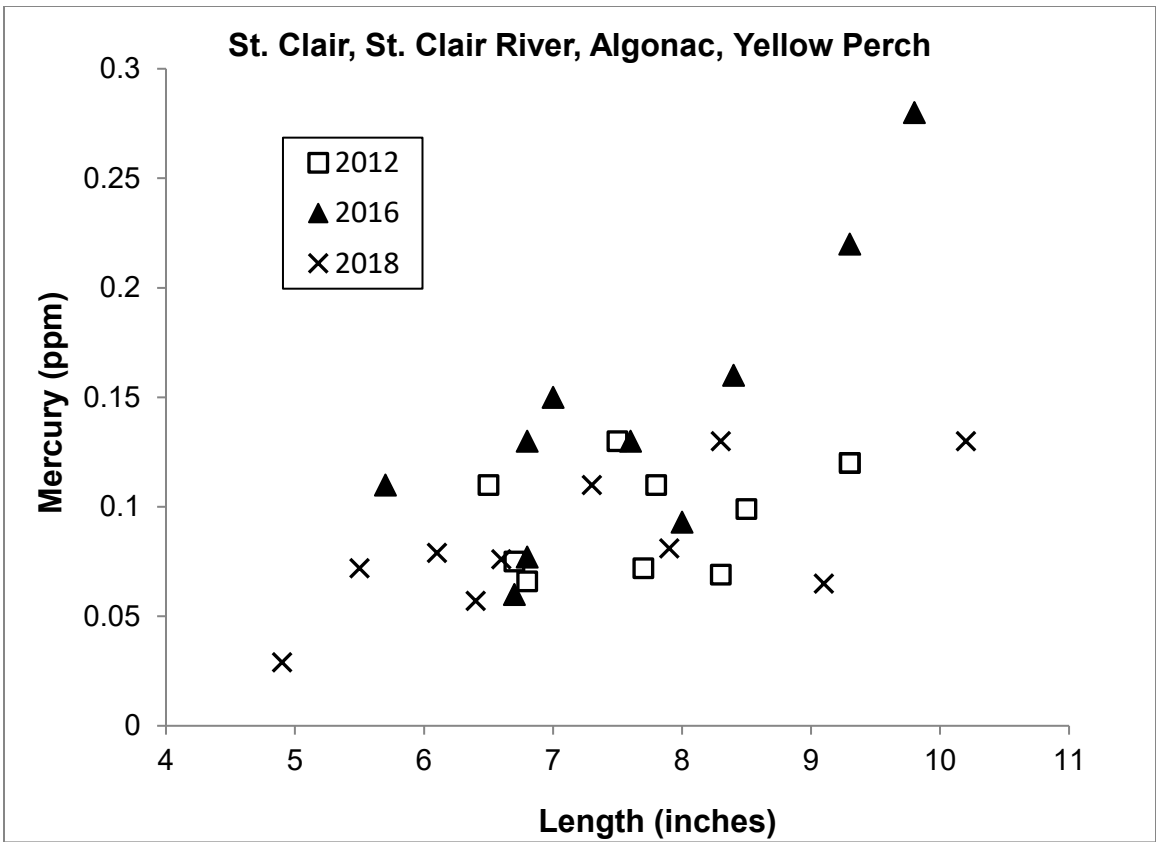
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2012	2018	30	4.9	na	4.9	10.2
Datasets available: 2012, 2016, 2018						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	30	0.11	0.03	0.28	0.13	8
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.335	0.367				

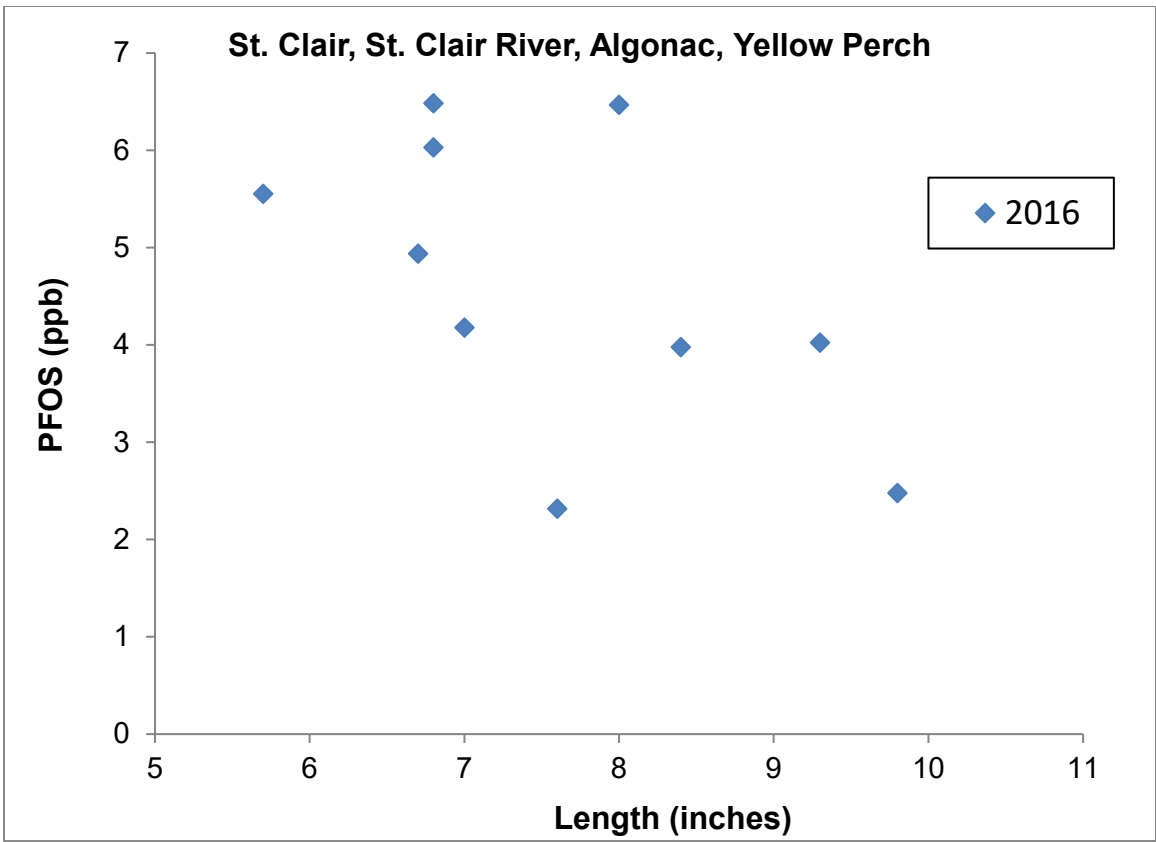
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2012	2018	30	4.9	na	4.9	10.2
Datasets available: 2012, 2016, 2018						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	30	0.001	< 0.001	0.006	0.002	16
DDT	30	0.001	< 0.001	0.001	0.001	16
Chlordane	30	ND	< 0.001	< 0.001	--	--
Toxaphene	30	ND	< 0.05	< 0.05	--	--
PFOS	10	5 ppb	2 ppb	6 ppb	6 ppb	16
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.009	0.001				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
PFOS	0.326	0.327				
Final meal category based on UCL:						8

Existing MDHHS Advisory: No one should eat more than 8 meals per month of St. Clair River yellow perch due to mercury.

Recommendation: No change is recommended.





St. Marys River

Hg Analysis:

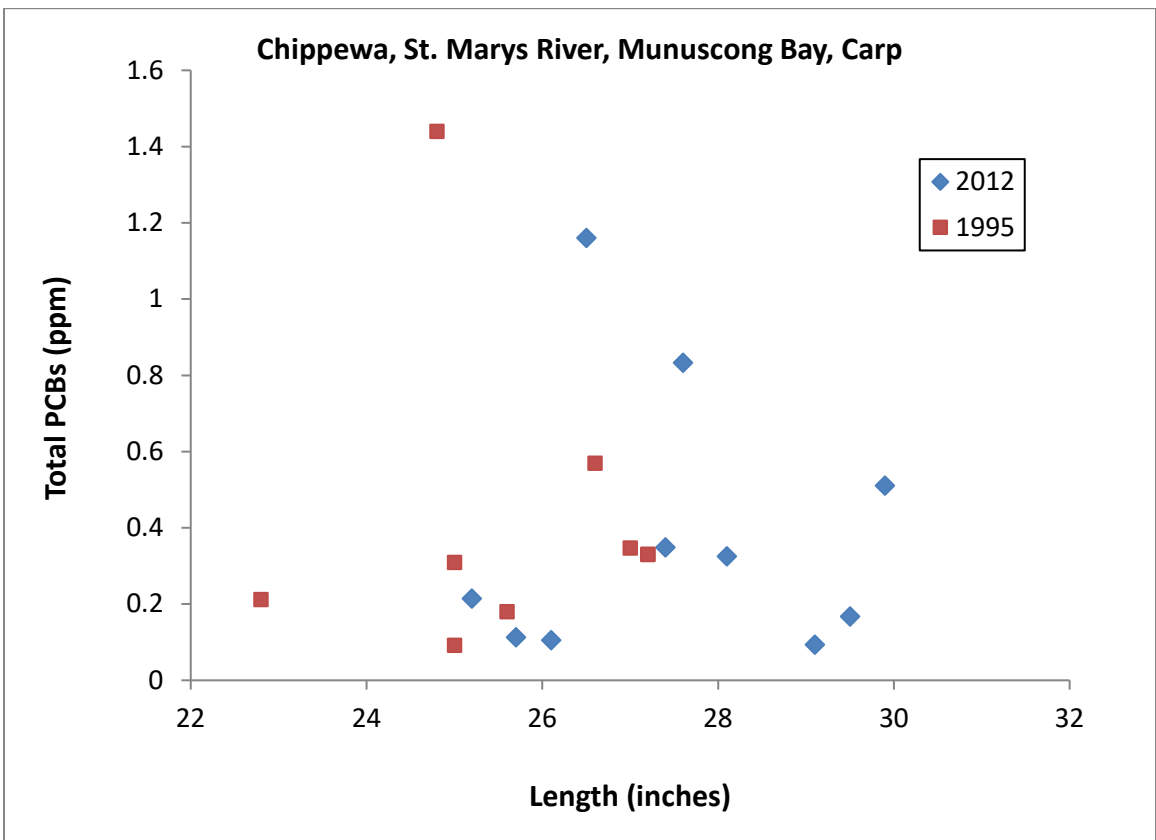
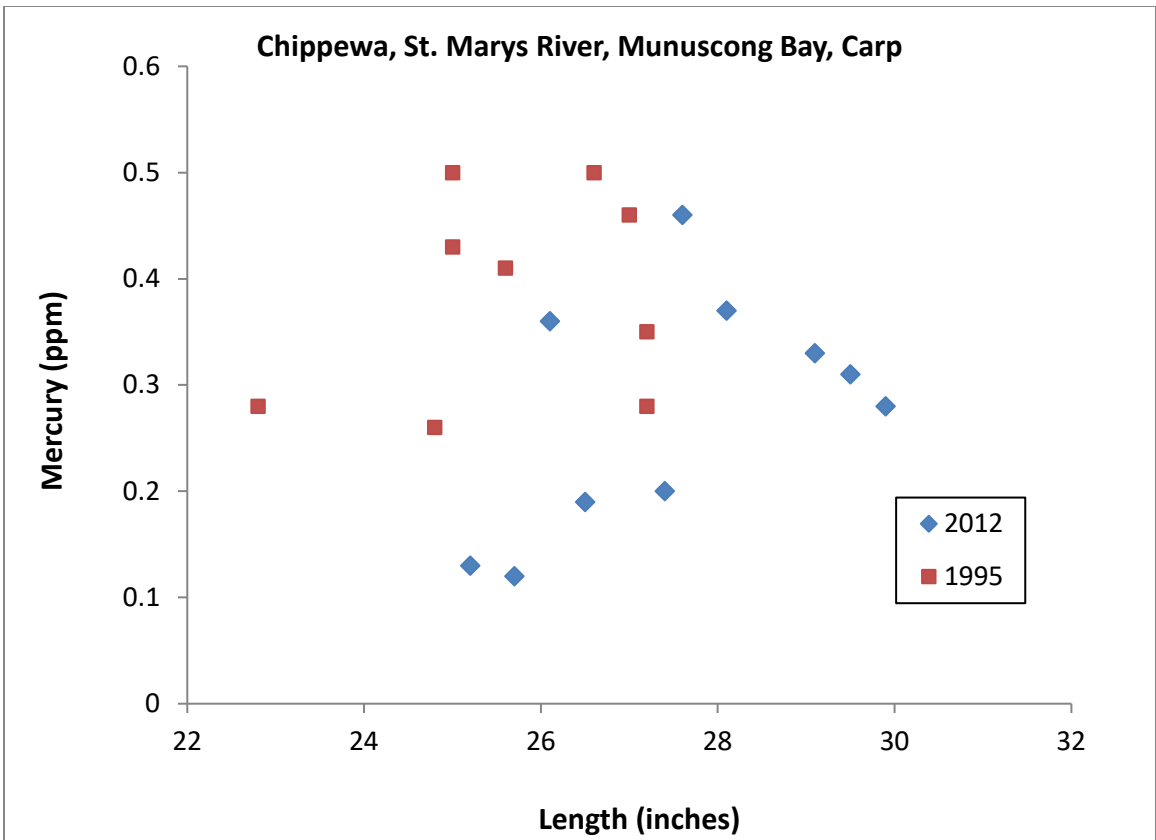
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1995	2012	19	22.8	na	22.8	29.9
Datasets available: 1995, 2012						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	19	0.33	0.12	0.50	0.38	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.002	0.012				

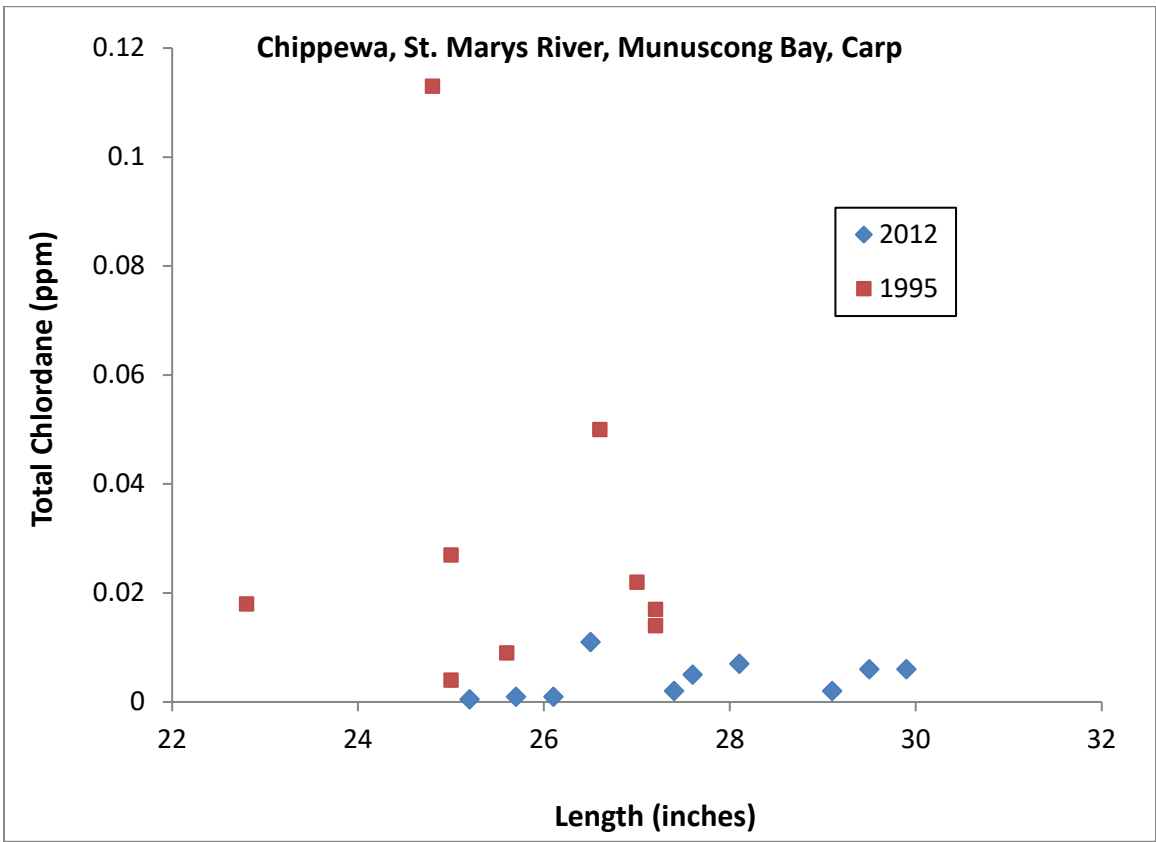
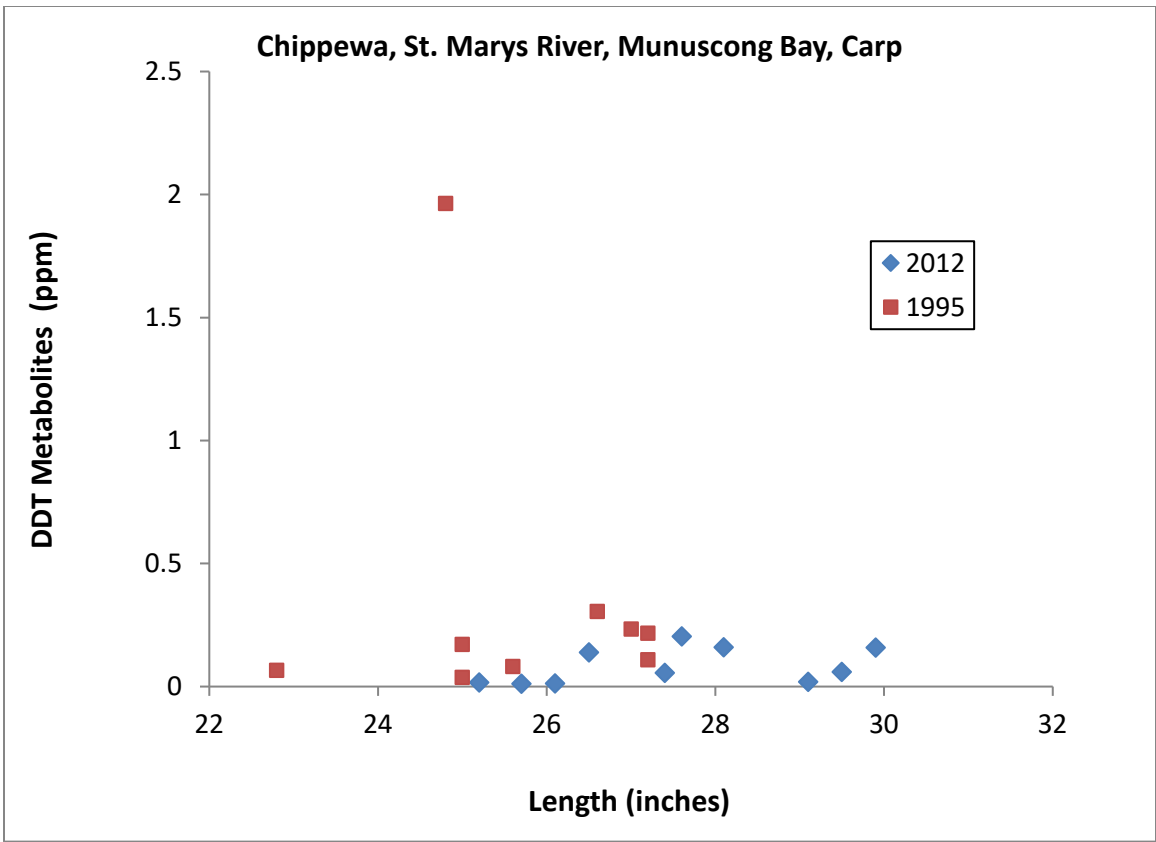
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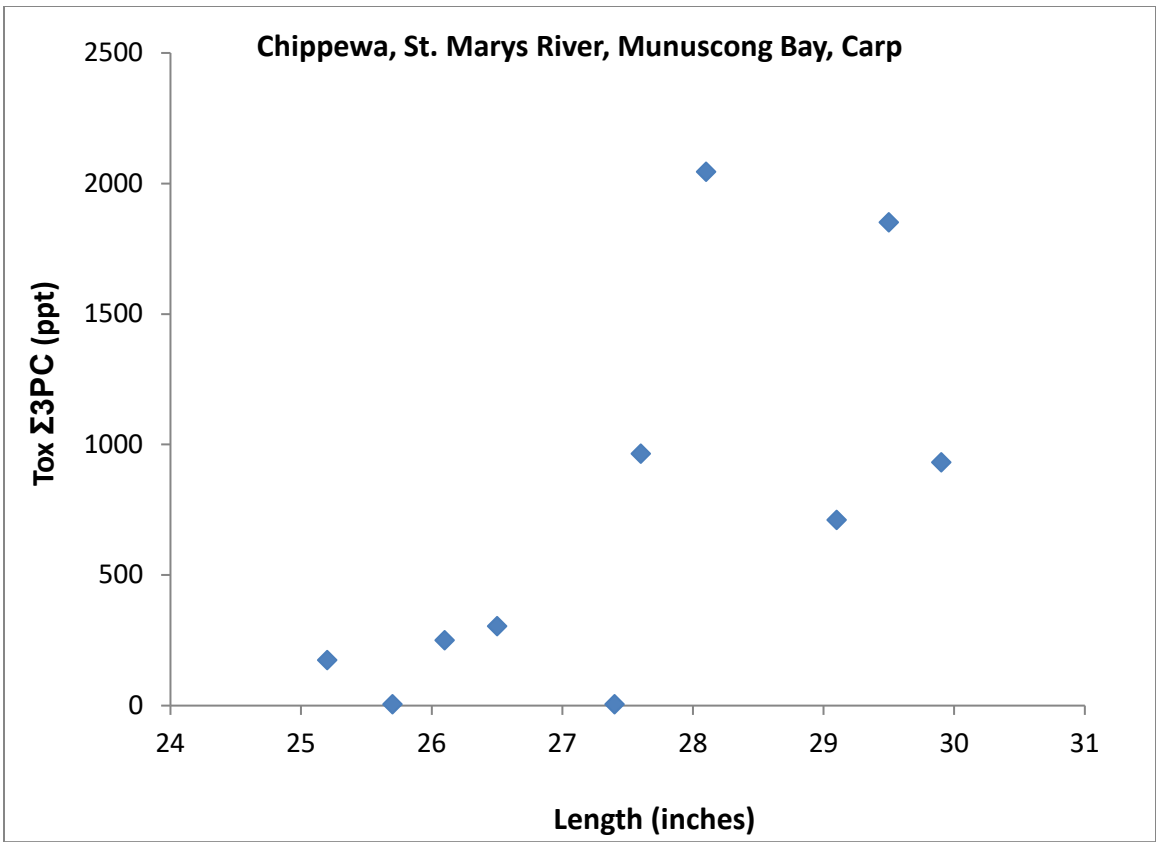
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1995	2012	19	22.8	na	22.8	29.9
Datasets available: 1995, 2012						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	19	0.40	0.09	1.44	0.58	Limited
DDT	19	0.21	0.01	1.96	0.42	4
Chlordane	19	0.02	0.001	0.11	0.03	--
Tox Σ3PC	10	0.72	ND	2.04 ppb	1.25 ppb	12
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.003	0.002				
DDT	0.044	0.000				
Chlordane	0.097	0.030				
Tox Σ3PC	0.449	0.316				
Final meal category based on UCL:						Limited

Existing Advisory: No one should eat more than 6 meals per year of St. Marys River carp due to PCBs. Mercury and DDT would cause advisories.

Recommendation: Sensitive populations should not eat these fish. Healthy adults should not eat more than 1 or 2 meals per year of St. Marys River carp due to PCBs. Mercury, DDT, and toxaphene would cause advisories.







Northern Pike

St. Marys River

Chippewa County

Hg Analysis:

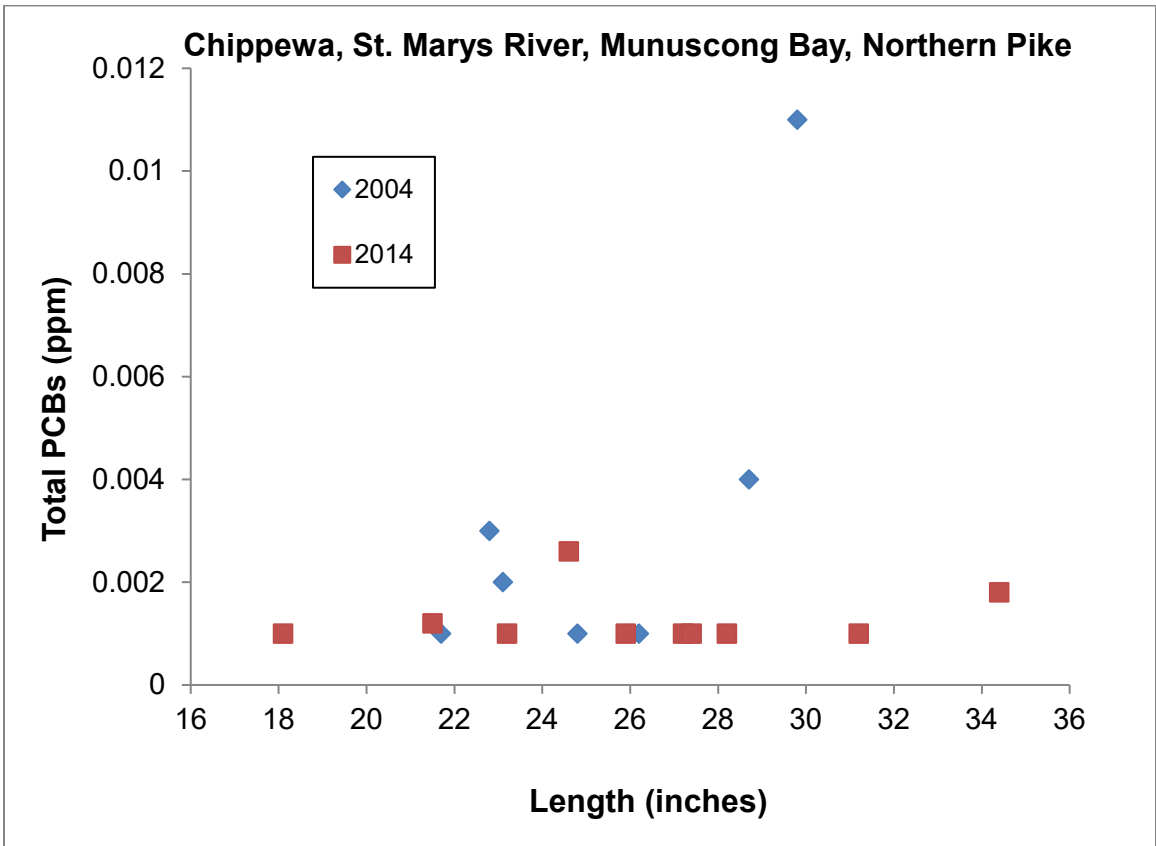
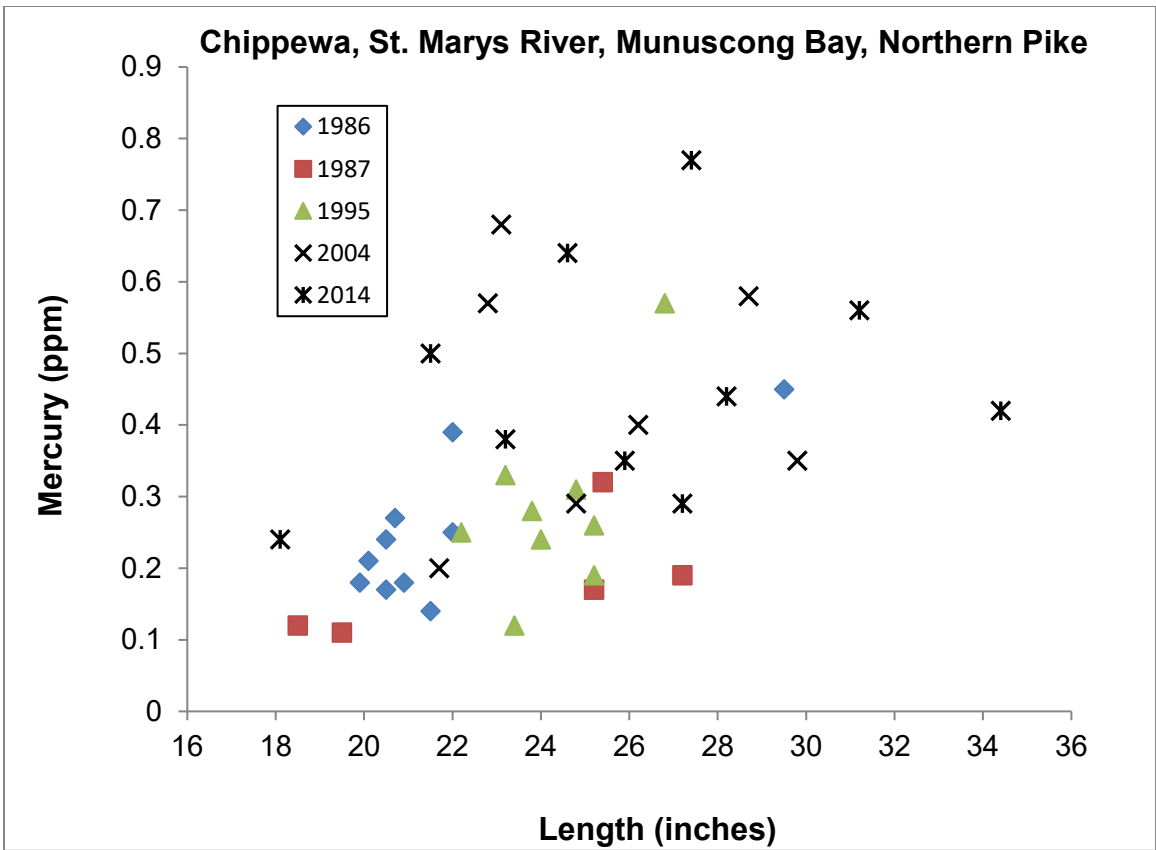
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1986	2014	41	18.1	24	23.8	34.4
Datasets available: 1986, 1987, 1995, 2004, 2014						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	21	0.38	0.17	0.77	0.46	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.243	0.293				

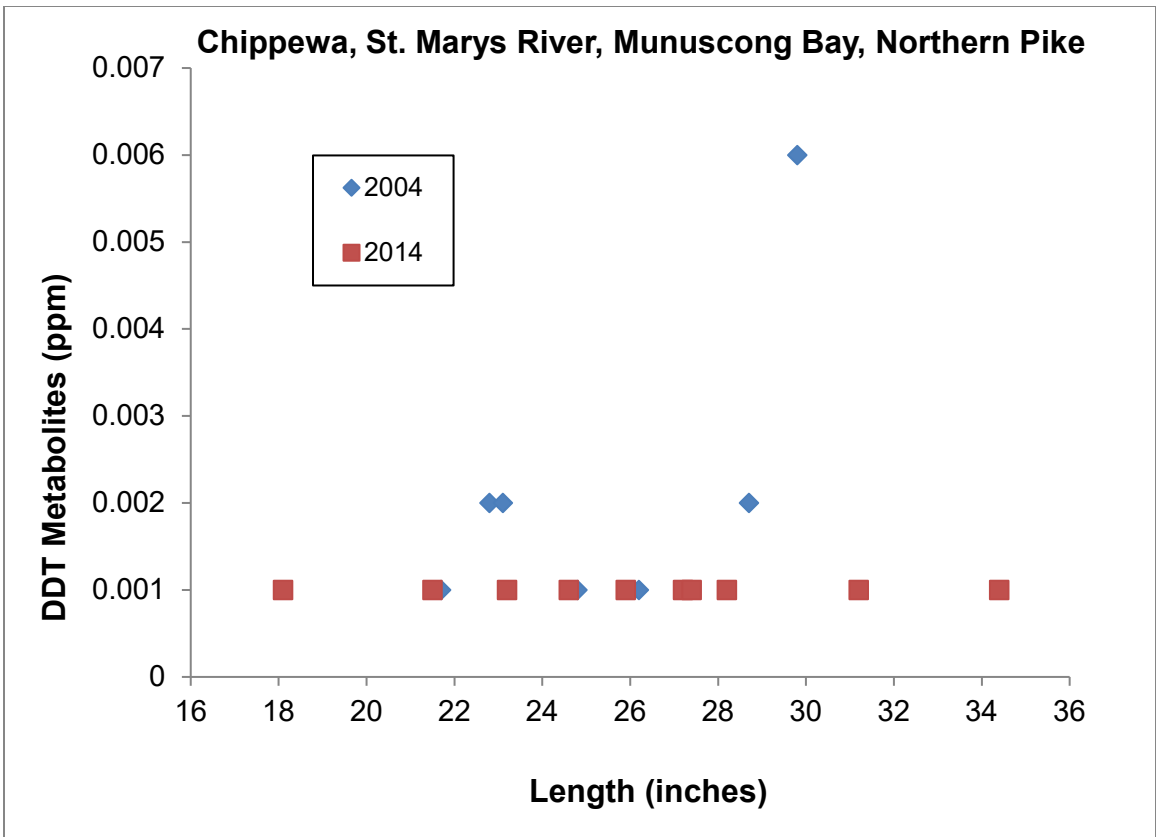
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2004	2014	17	18.1	24	23.8	34.4
Datasets available: 1986, 1987, 1995, 2004, 2014						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	11	0.002	0.001	0.01	0.004	16
DDT	11	0.002	0.001	0.006	0.003	16
Chlordane	11	ND				
Toxaphene	11	ND				
TEQ	0	--				
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.077	0.068				
DDT	0.047	0.028				
Chlordane	--	--				
Toxaphene	--	--				
TEQ	--	--				
Final meal category based on UCL:						2

Existing Advisory: No one should eat more than 2 meals per month of St Marys River northern pike smaller than 30 inches and no more than 1 meal per month of fish larger than 30 inches due to mercury. The statewide length break was applied as the size range of the fish was limited.

Recommendation: No change is recommended.





Hg Analysis:

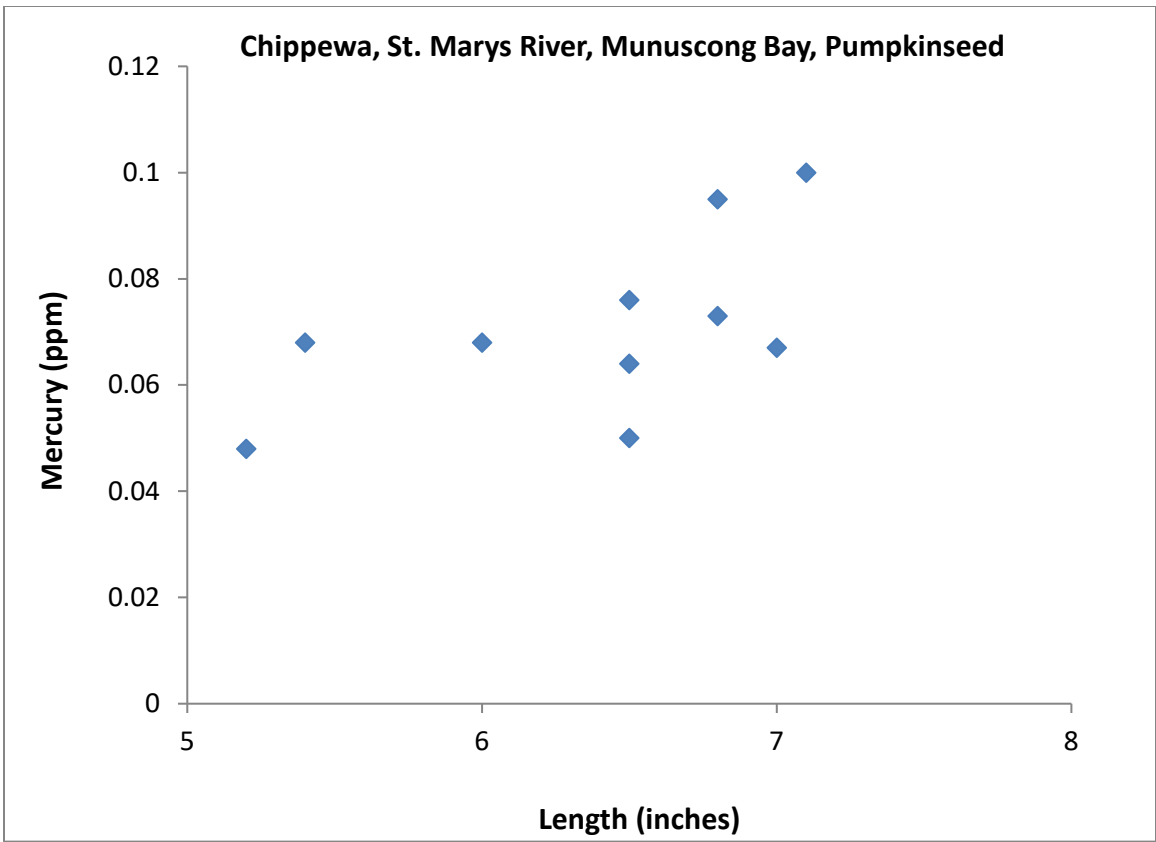
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2012	2012	10	5.2	na	5.2	7.1
Datasets available: 2012						
Chemical	Sample Size (Legal)	Mean Conc. (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.07	0.05	0.10	0.08	12
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.352	0.357				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2012	2012	10	5.2	na	5.2	7.1
Datasets available: 2012						
Chemical	Sample Size (Legal)	Mean Conc. (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 ²	R ²				
PCB	--	--				
DDT	--	--				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						12

Existing Advisory: Specific guidelines for St. Marys River pumpkinseed were not developed since no data were available previously.

Recommendation: No one should eat more than 12 meals per month of St. Marys River sunfish or bluegill due to elevated concentrations of mercury.



Redhorse and White Sucker

St. Marys River

Chippewa County

Hg Analysis:

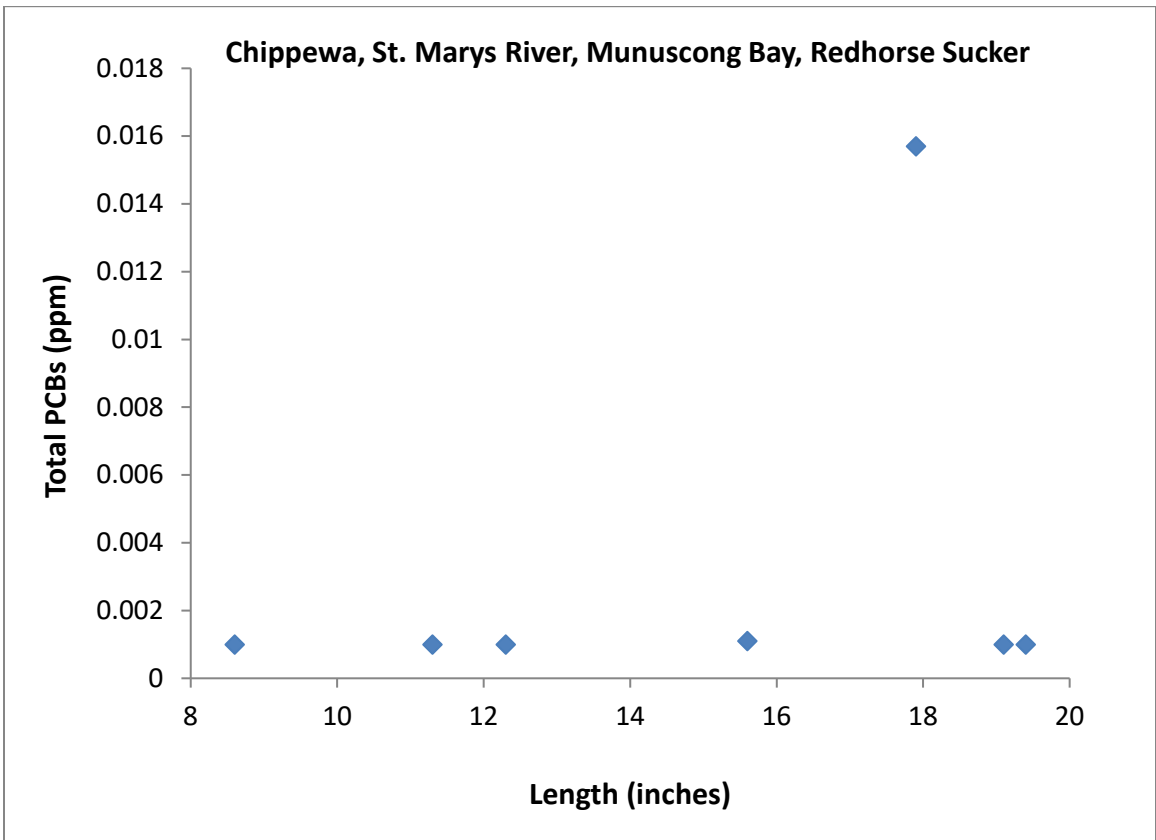
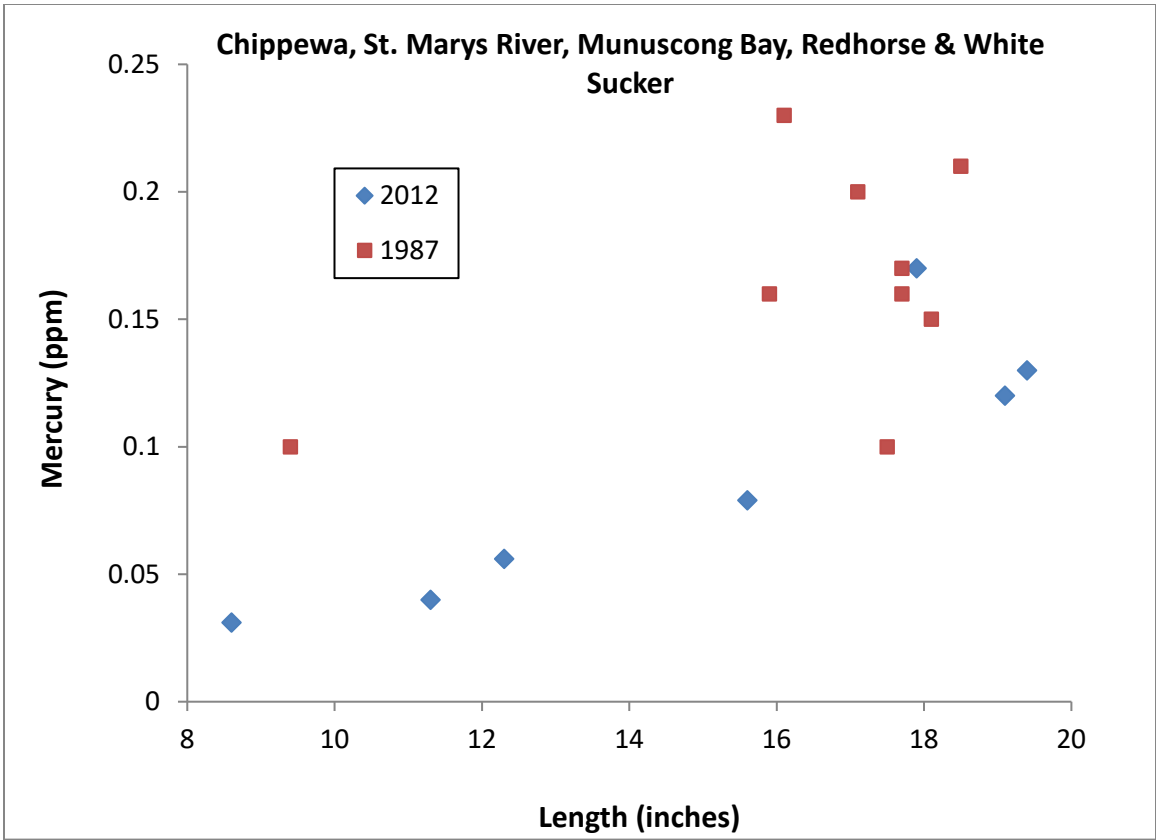
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1987	2012	16	8.6	na	8.6	19.4
Datasets available: 1987, 2012						
Chemical	Sample Size (Legal)	Mean Conc. (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	16	0.13	0.03	0.23	0.16	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.454	0.582				

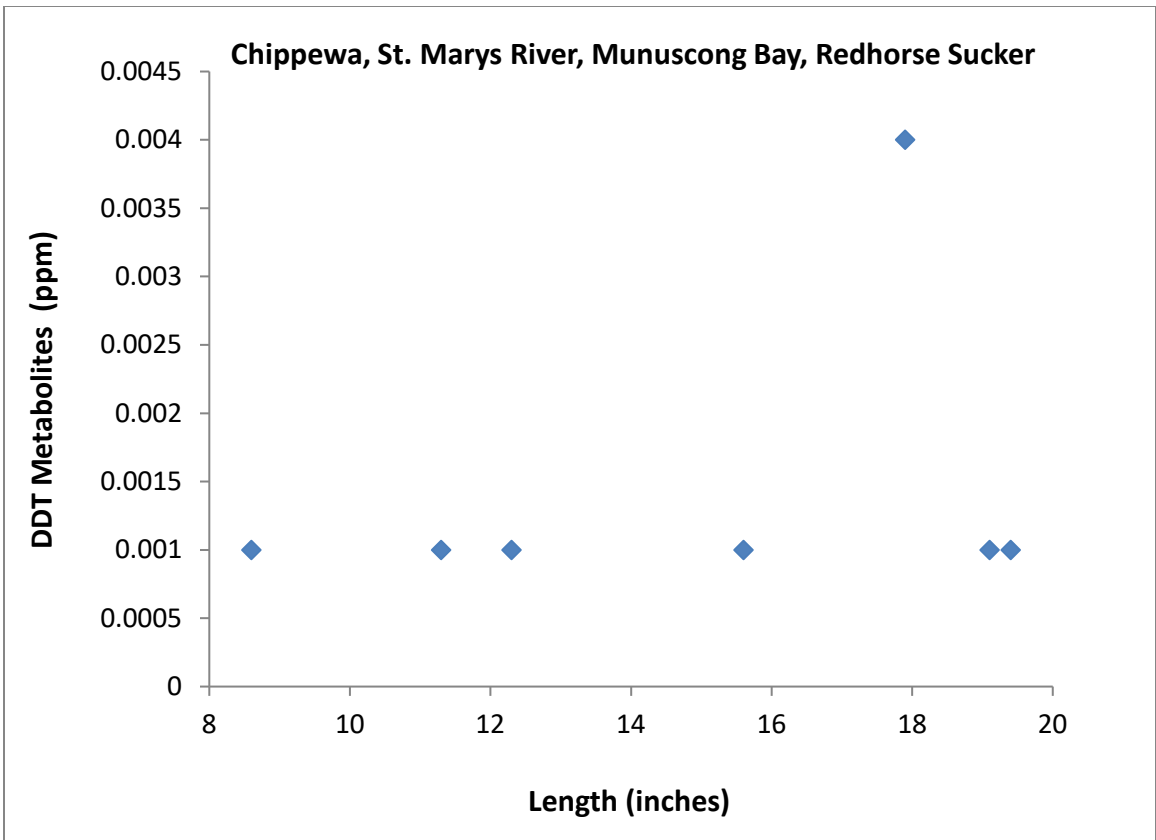
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2012	2012	7	8.6	na	8.6	19.4
Datasets available: 1987, 2012						
Chemical	Sample Size (Legal)	Mean Conc. (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	7	0.003	0.001	0.02	0.01	16
DDT	7	0.001	0.001	0.004	0.002	16
Chlordane	7	ND	--	--	--	--
Toxaphene	7	ND	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.100	0.102				
DDT	0.099	0.099				
Chlordane	--	--				
Toxaphene	--	--				
Final meal category based on UCL:						4

Existing Advisory: No one should eat more than 4 meals per month of St. Marys River sucker due to mercury. PCBs would cause an advisory.

Recommendation: No one should eat more than 4 meals per month of St. Marys River sucker due to mercury.





Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
2012	2020	26	4.5	NA	4.5	9.5	
Datasets available: 2012, 2014, 2020							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	26	0.191		0.075	0.510	0.237	4
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.560	0.651					

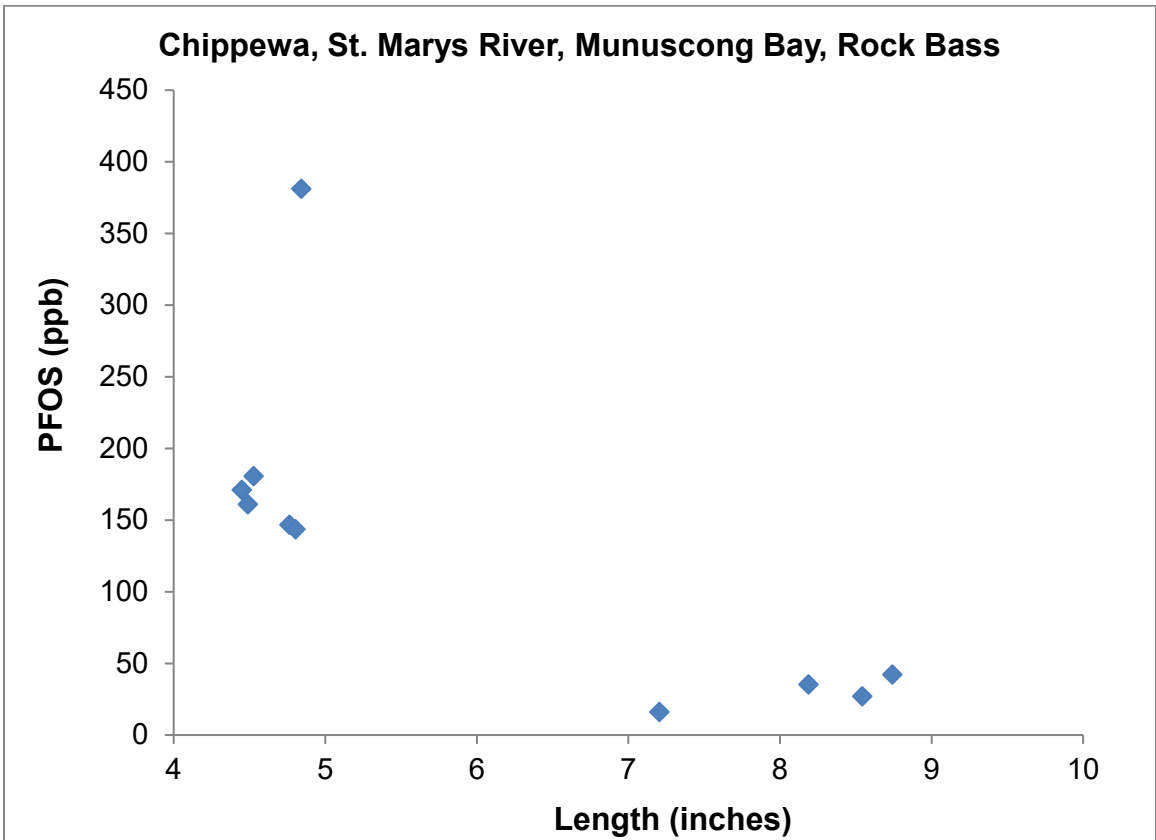
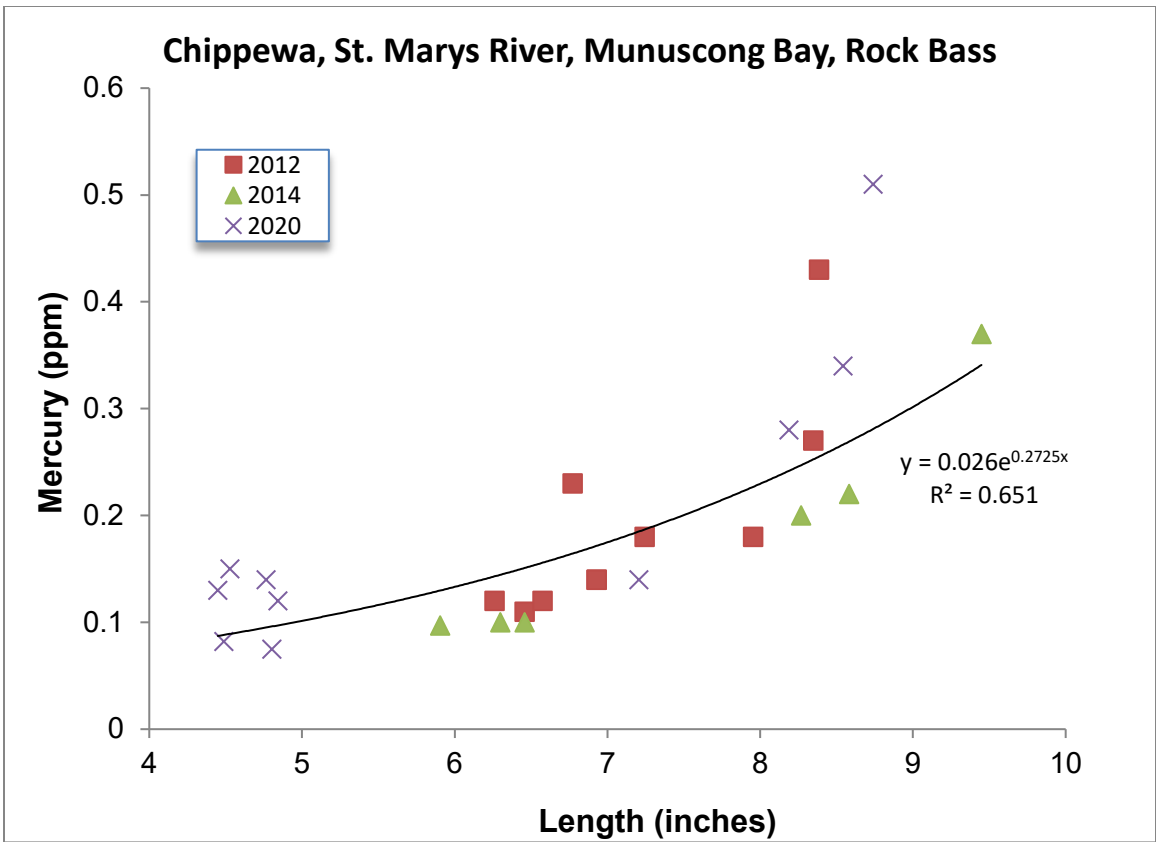
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples		
Earliest	Most Recent				Min	Max	
2012	2020	26	4.5	NA	4.5	9.5	
Datasets available: 2012 (No PFOS), 2014 (No PFOS), 2020							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	26	ND		--	--	--	16
DDT	26	ND		--	--	--	16
Chlordane	26	ND		--	--	--	--
Toxaphene	26	ND		--	--	--	--
PFOS	10	130.6 ppb		16.3 ppb	381.3 ppb	209.3 ppb	0.5
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	--	--					
DDT	--	--					
Chlordane	--	--					
Toxaphene	--	--					
PFOS	0.541	0.531					
Final meal category based on UCL:							0.5

Existing MDHHS Advisory: No one should eat more than 4 meals per month of rock bass from the St. Marys River less than 8 inches due to mercury or no more than 2 meals per month of these fish larger than 8 inches due to mercury.

Recommendation: No one should eat more than 6 meals per year of rock bass from the St. Marys River due to PFOS. Mercury causes a less restrictive guideline.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
6	0.133	4
7	0.175	4
8	0.230	4
9	0.302	2
10	0.396	2
11	0.521	2
<i>Shaded area denotes extrapolated estimates</i>		



Hg Analysis:

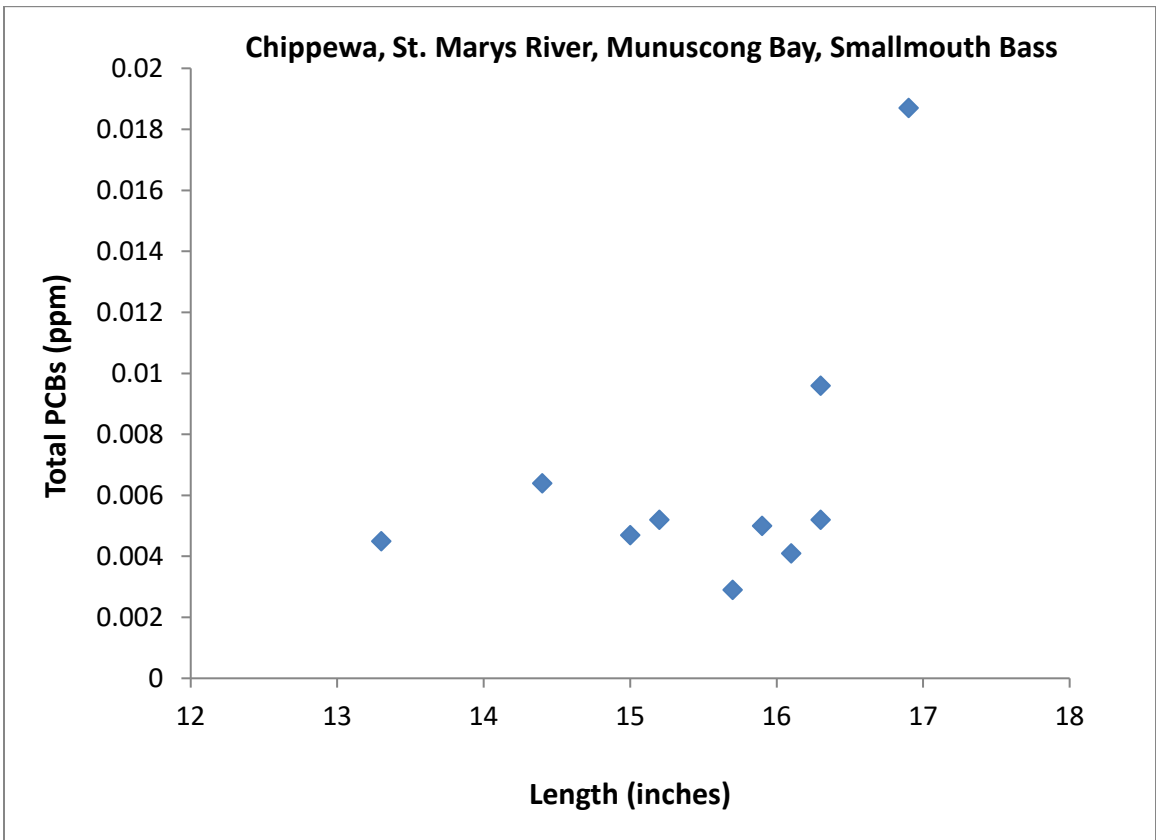
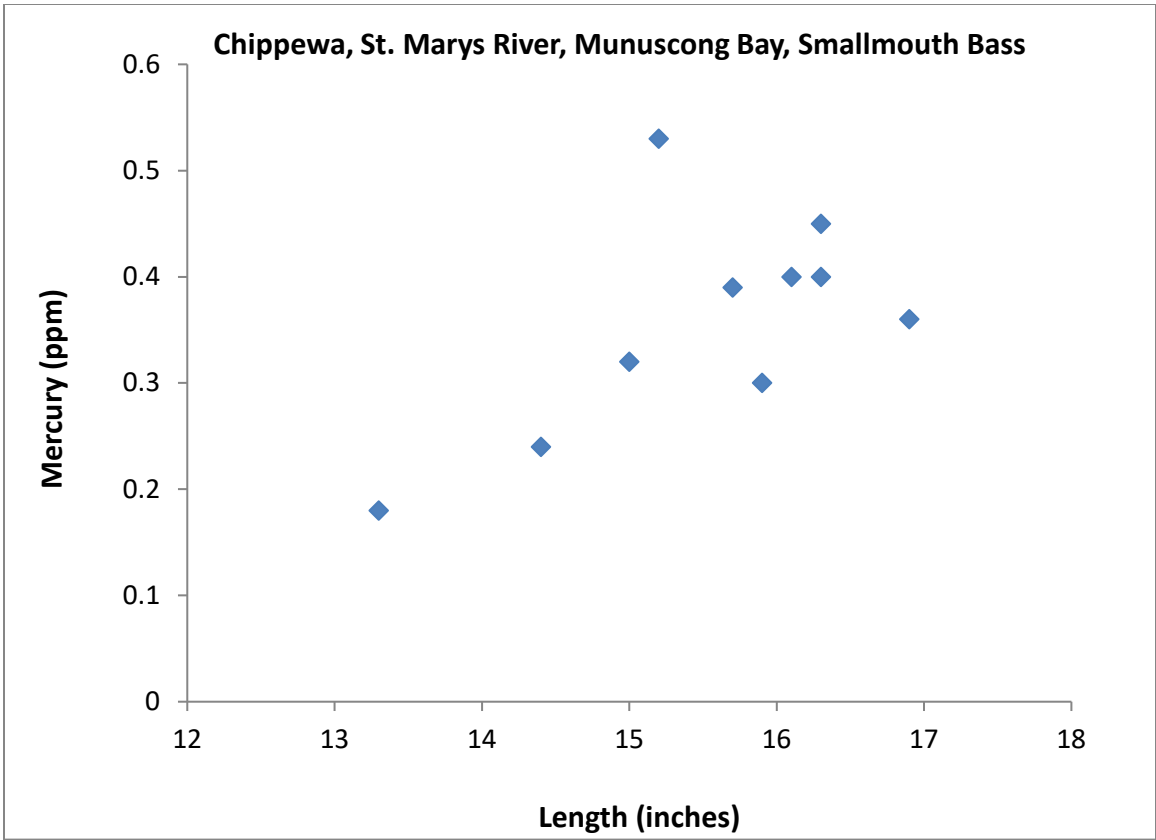
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2012	2012	10	13.3	14	14.4	16.9
Datasets available: 2012						
Chemical	Sample Size (Legal)	Mean Conc. (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	9	0.38	0.24	0.53	0.44	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.389	0.525				

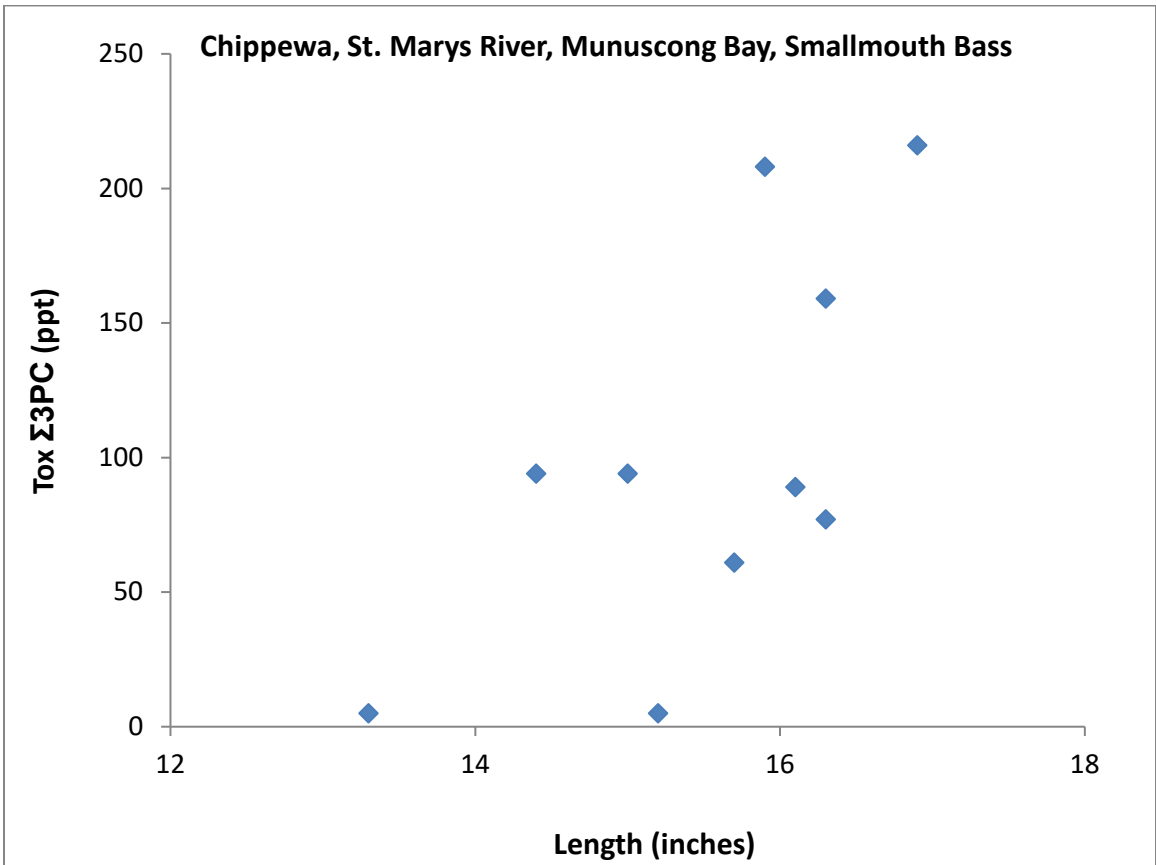
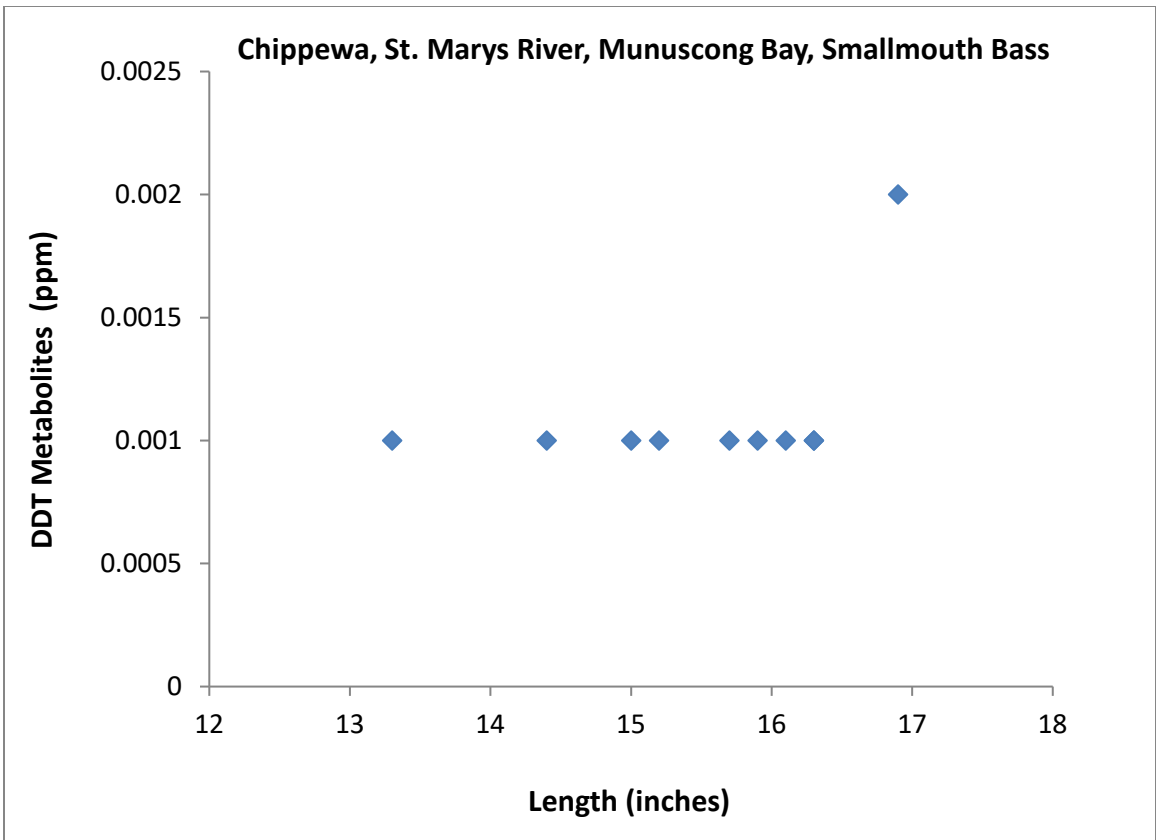
Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2012	2012	10	13.3	14	14.4	16.9
Datasets available: 2012						
Chemical	Sample Size (Legal)	Mean Conc. (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	9	0.007	0.003	0.02	0.01	16
DDT	9	0.001	0.001	0.002	0.001	16
Chlordane	9	ND	--	--	--	--
Tox Σ3PC	9	0.11 ppb	ND	0.22 ppb	0.16 ppb	16
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.240	0.188				
DDT	0.211	0.211				
Chlordane	--	--				
Tox Σ3PC	0.438	0.465				
Final meal category based on UCL:						2

Existing Advisory: Specific guidelines for St. Marys River smallmouth bass were not developed since data were not available previously.

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





Walleye

St. Marys River

Chippewa 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	2012	44	13	15	14.6	27.6
Datasets available: 1986, 1987, 1991, 1995, 2004, 2012						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	40	0.43	0.10	1.0	0.52	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.663	0.709				

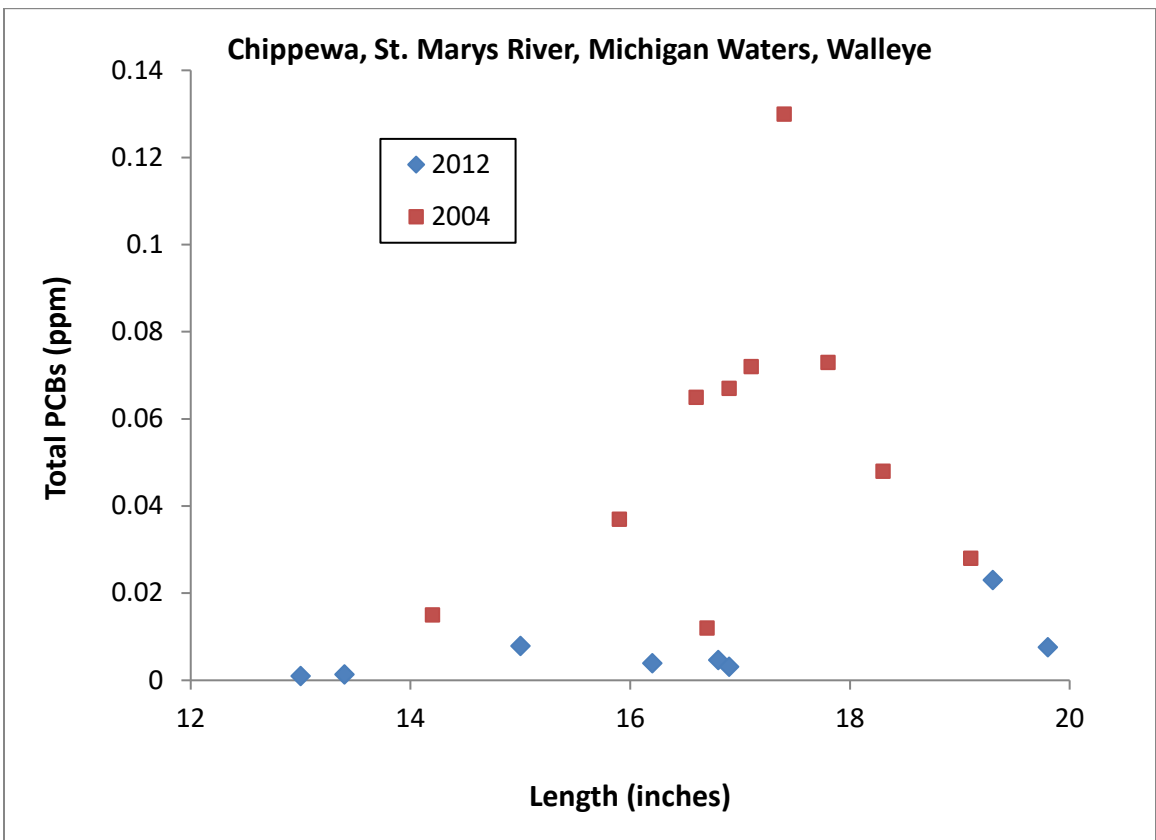
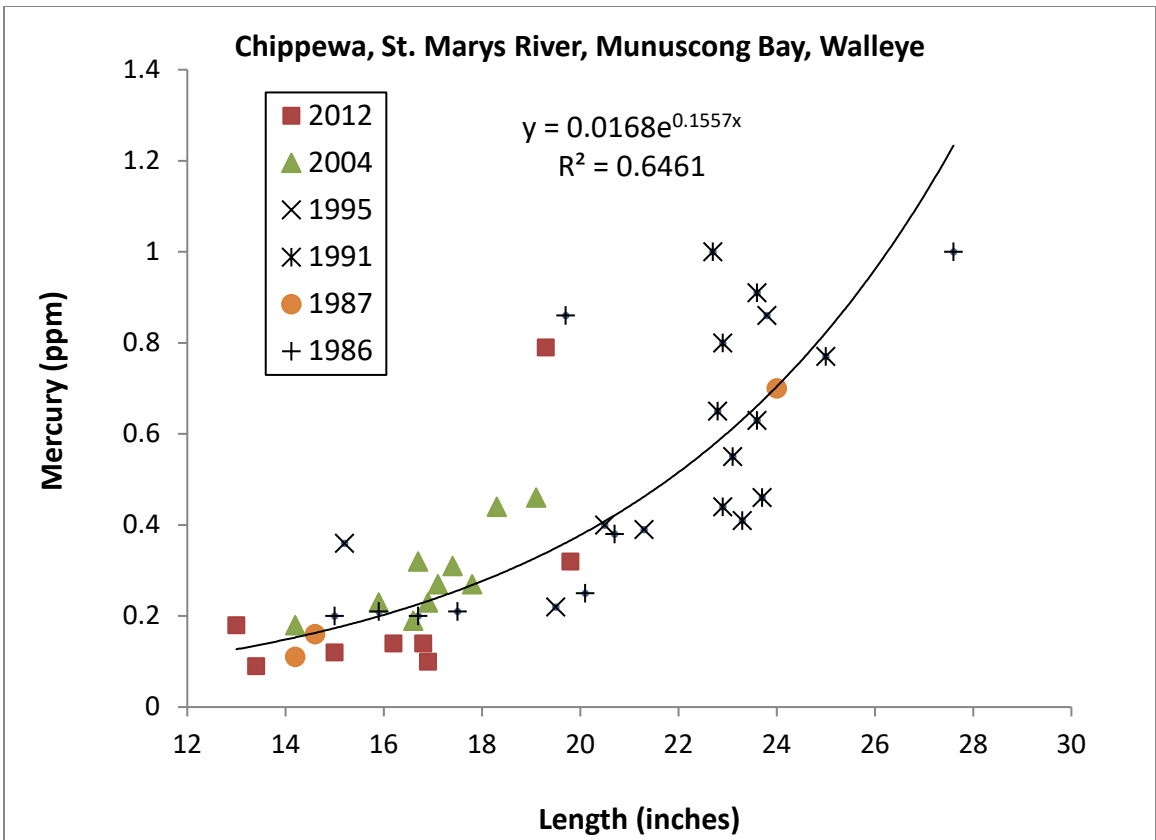
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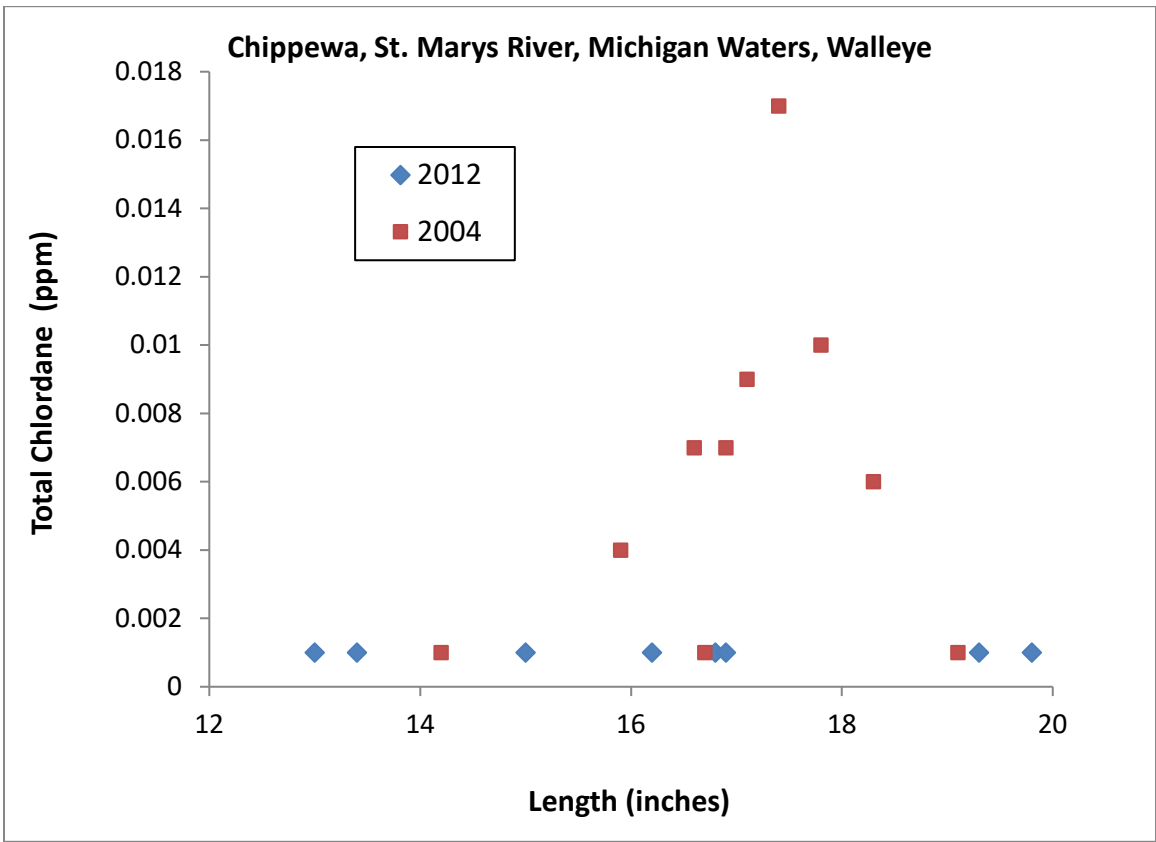
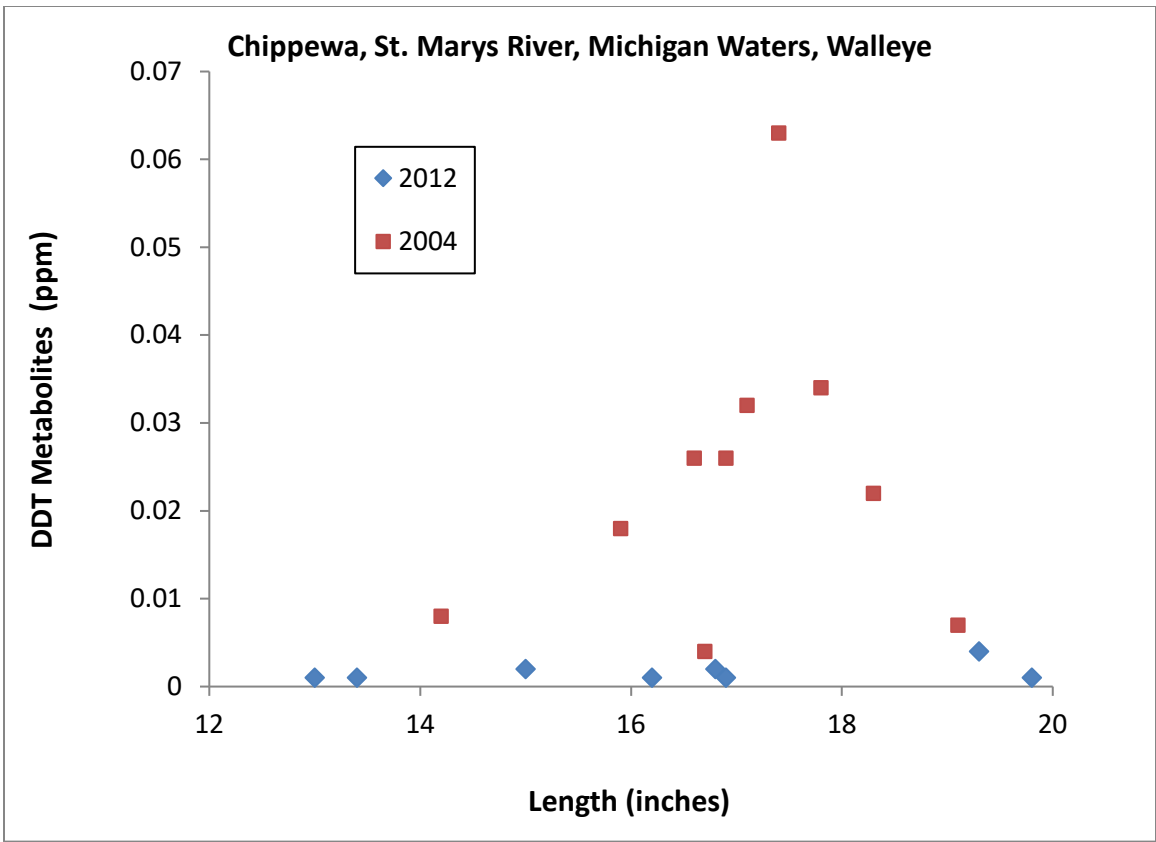
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2004	2012	18	13	15	15	19.8
Datasets available: 1986, 1987, 1991, 1995, 2004, 2012						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	15	0.04	0.003	0.13	0.06	2
DDT	15	0.02	0.001	0.06	0.03	16
Chlordane	15	0.01	0.001	0.02	0.01	16
Tox Σ3PC	6	0.24 ppb	ND	0.43 ppb	0.42 ppb	16
PFOS	6	0.005	0.0009	0.008	0.008	16
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.093	0.278				
DDT	0.048	0.079				
Chlordane	0.045	0.048				
Tox Σ3PC	0.018	0.008				
PFOS	0.090	0.059				
Final meal category based on UCL:						2

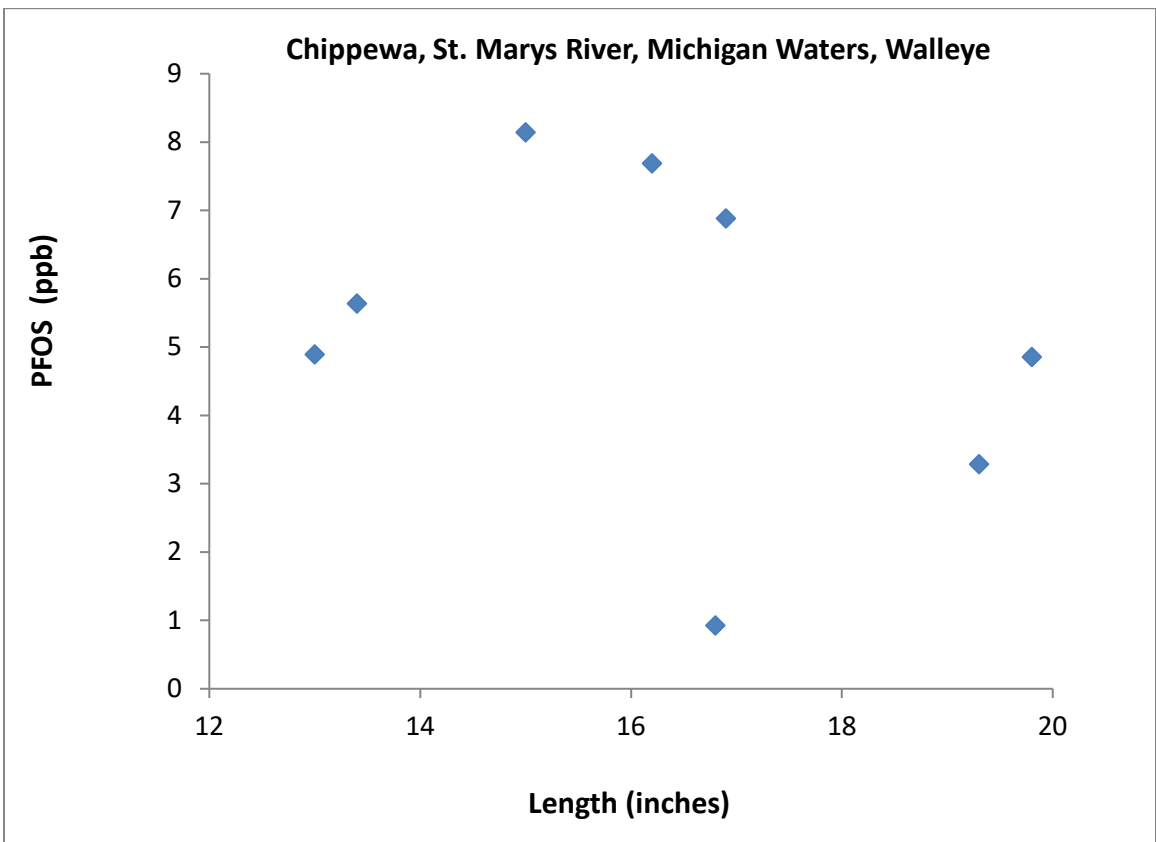
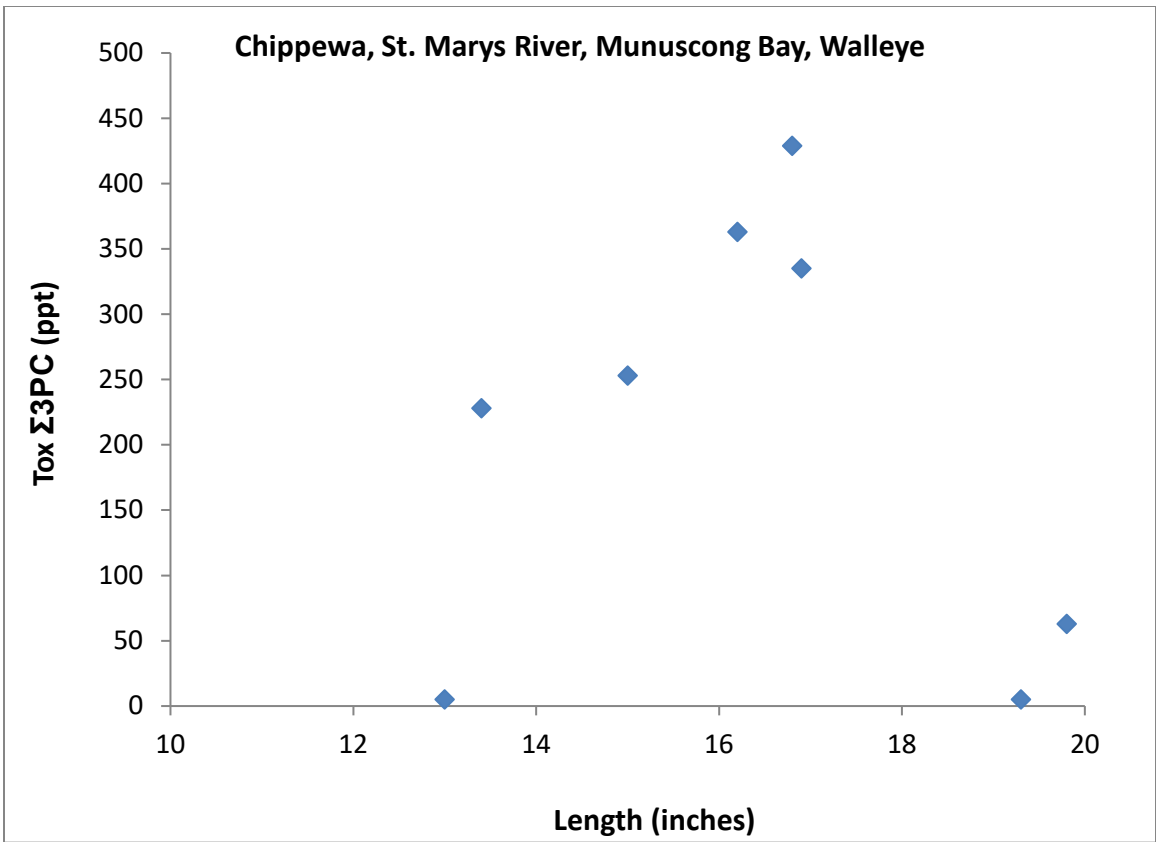
Existing Advisory: No one should eat more than 2 meals per month of St. Marys River walleye smaller than 24 inches due to PCBs and mercury or more than 1 meal per month of those fish larger than 24 inches due to mercury.

Recommendation: No one should eat more than 2 meals per month of St. Marys River walleye smaller than 22 inches due to PCBs and mercury 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
14	0.15	4
16	0.2	4
18	0.28	2
20	0.38	2
22	0.52	2
24	0.7	1
26	0.96	1
28	1.31	0.5
30	1.79	0.5
<i>Shaded area denotes extrapolated estimates</i>		







White Perch

St. Marys River

Chippewa County

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2014	2014	10	8.5	na	8.5	11.4
Datasets available: 2014						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	10	0.18	0.09	0.31	0.23	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.838	0.816				

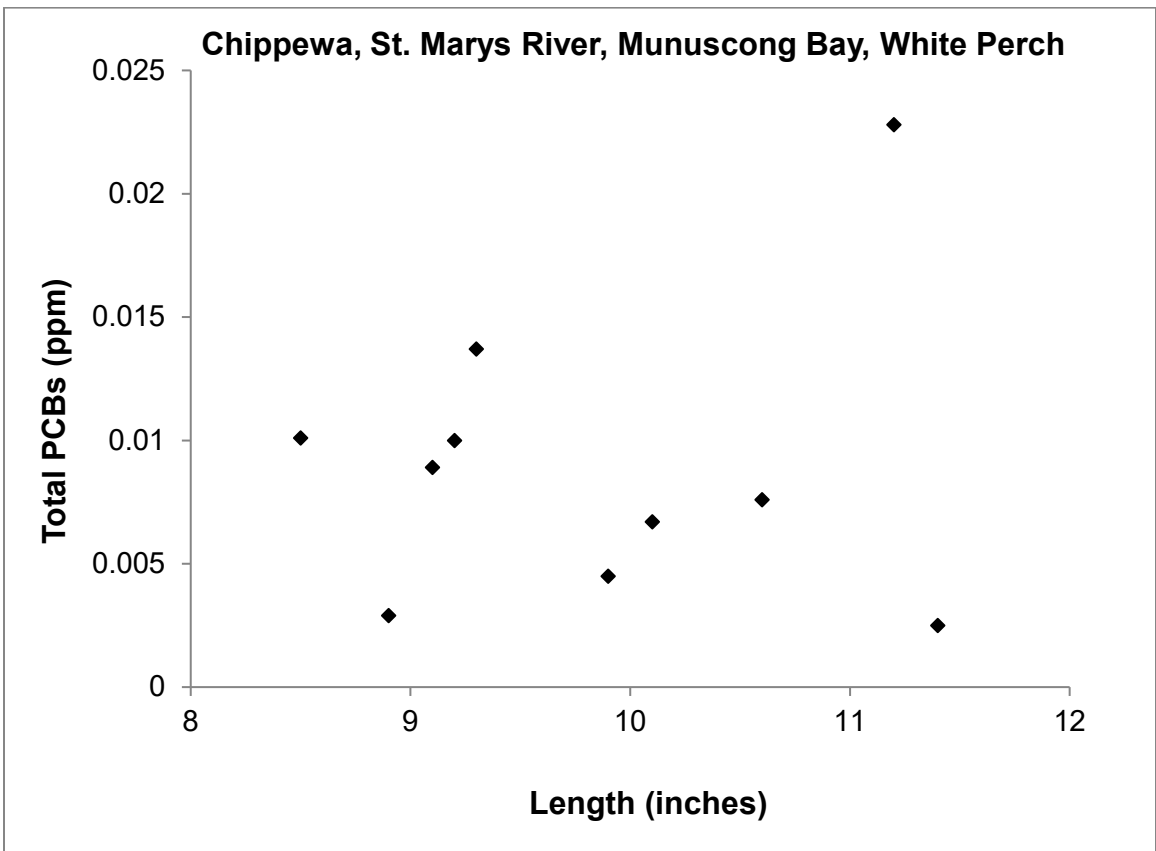
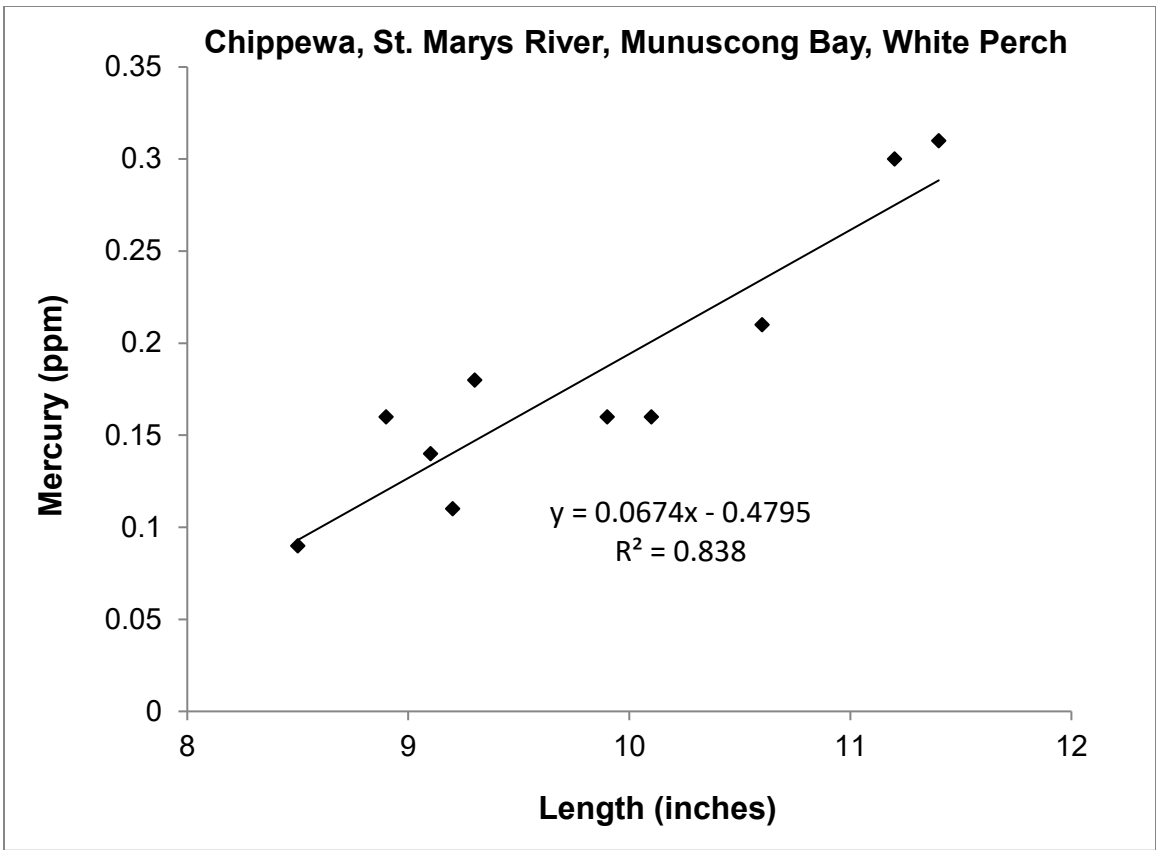
Organics Analysis:

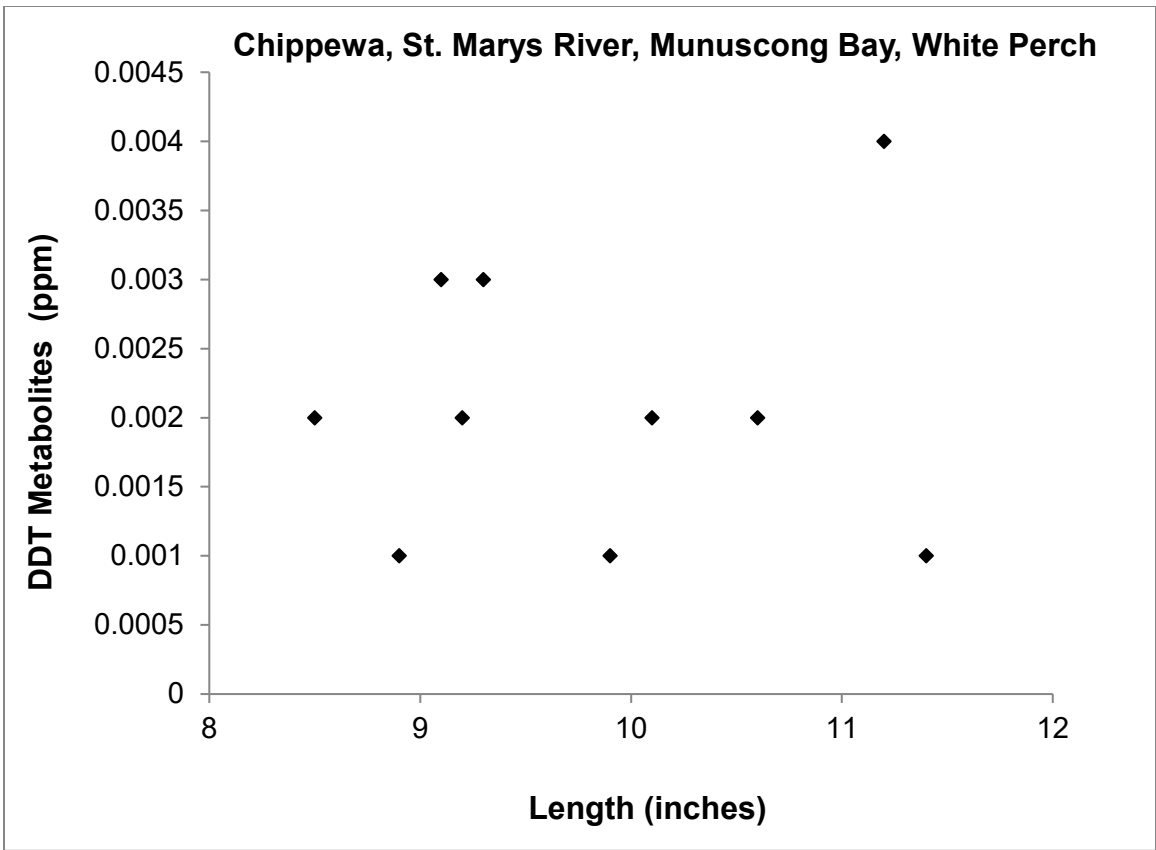
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2014	2014	10	8.5	na	8.5	11.4
Datasets available: 2014						
Chemical	Sample Size (Legal)	Mean	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	10	0.009	0.002	0.02	0.01	12
DDT	10	0.002	0.001	0.004	0.003	16
Chlordane	10	ND	--	--	--	--
Toxaphene	10	ND	--	--	--	--
TEQ	0	--	--	--	--	--
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.022	0.004				
DDT	0.008	0.000				
Chlordane	--	--				
Toxaphene	--	--				
TEQ	--	--				
Final meal category based on UCL:						4

Existing Advisory: The MDHHS does not have specific advice for St. Marys River white perch. The ESF Guide recommends no more than 6 meals per year of Lake Huron white perch (based on samples collected from Saginaw Bay in 1994).

Recommendation: No one should eat more than 4 meals per year of St. Marys River white perch smaller than 11 inches or more than 2 meals per month of those fish larger than 11 inches due to mercury. PCBs would cause an advisory.

Length (Inches)	Hg Regression Equation Estimate (ppm)	Meal Category
8	0.06	16
9	0.13	8
10	0.19	4
11	0.26	4
12	0.33	2
13	0.4	2
<i>Shaded area denotes extrapolated estimates</i>		





Hg Analysis:

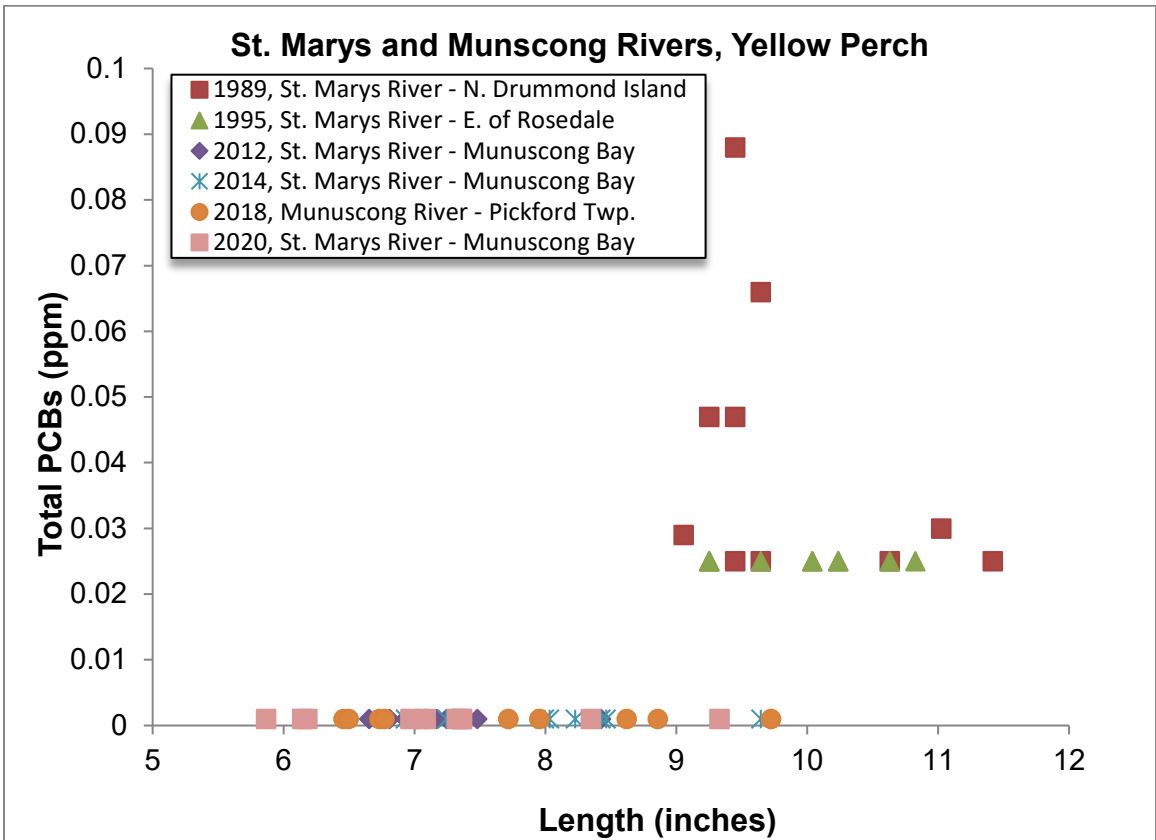
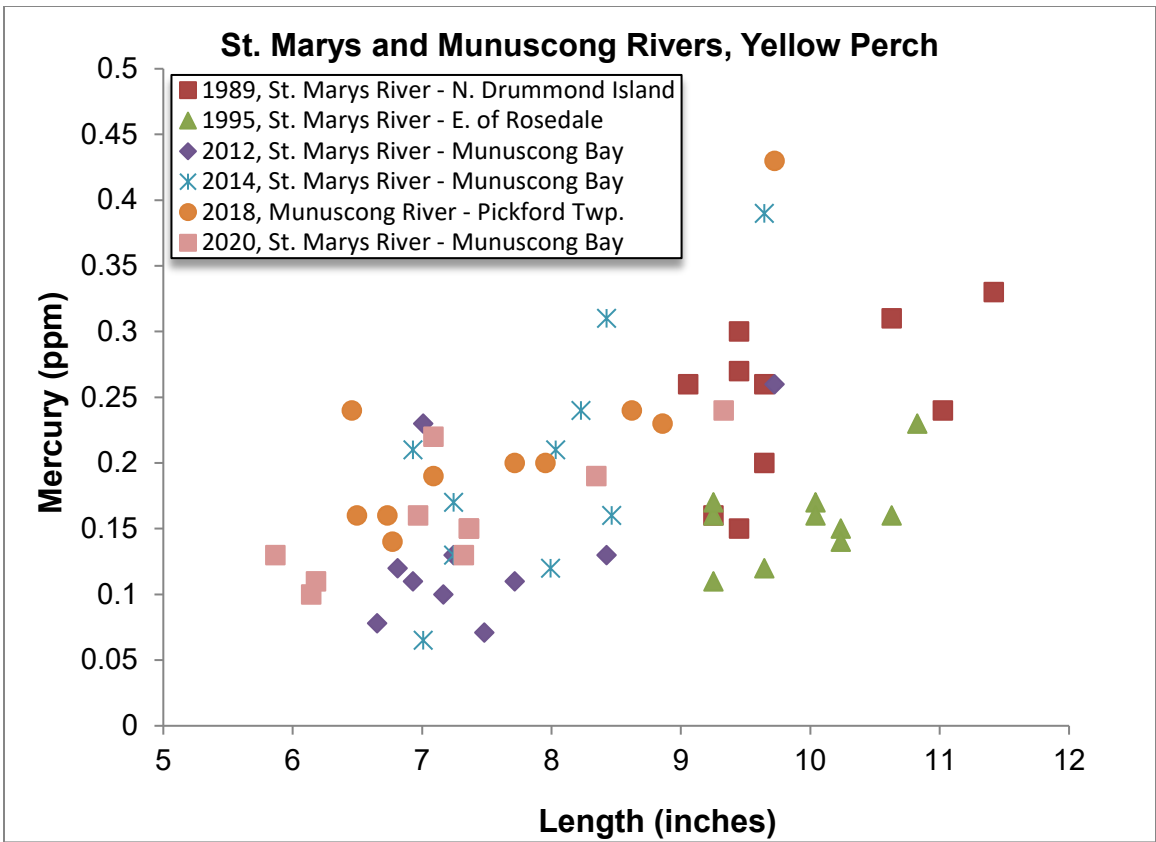
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
1989	2020	60	5.9	NA	5.9	11.4
Datasets available: 1989, 1995, 2012, 2014, 2018, 2020						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	60	0.186	0.065	0.430	0.206	4
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.243	0.248				

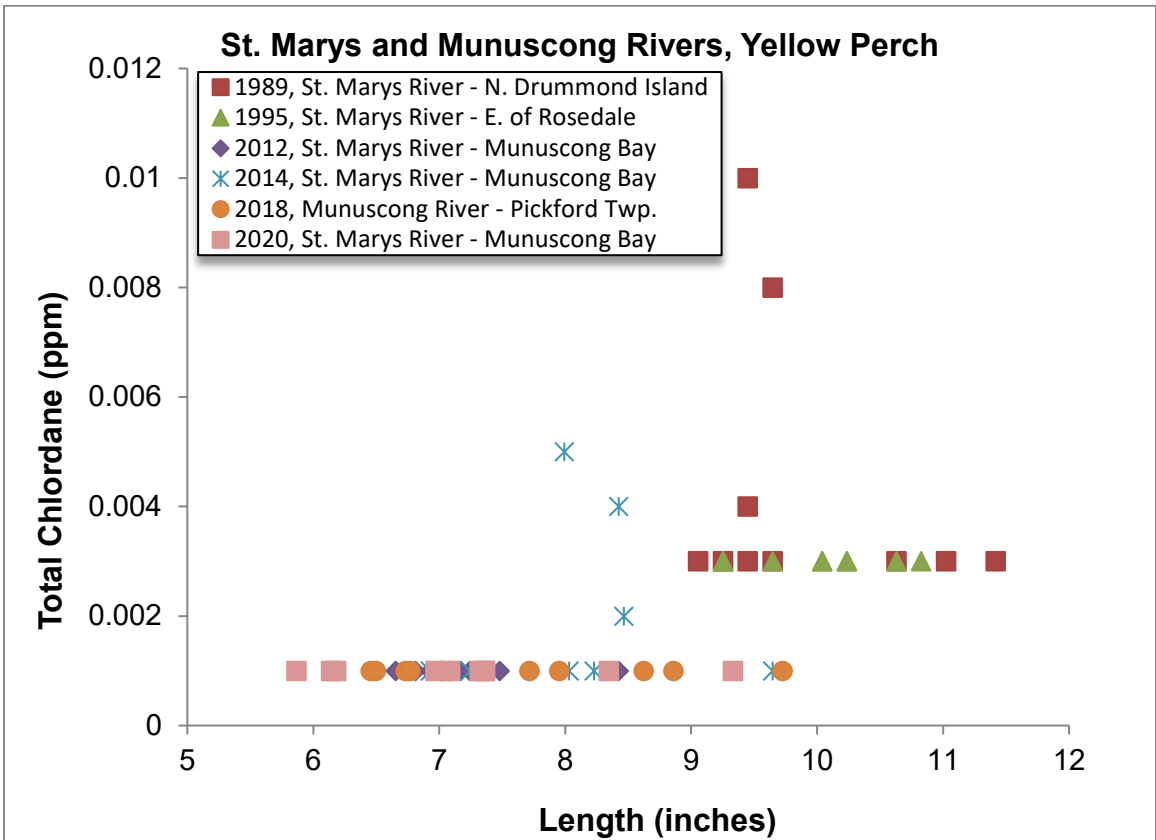
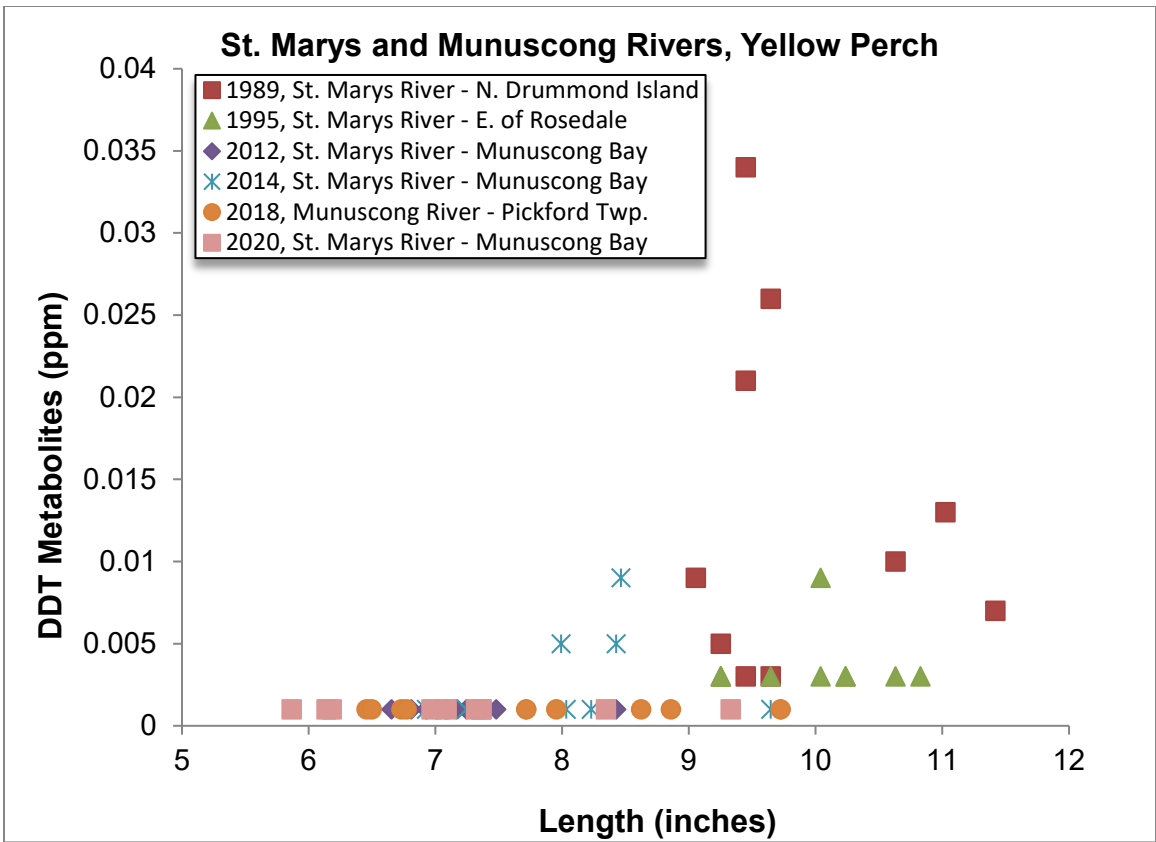
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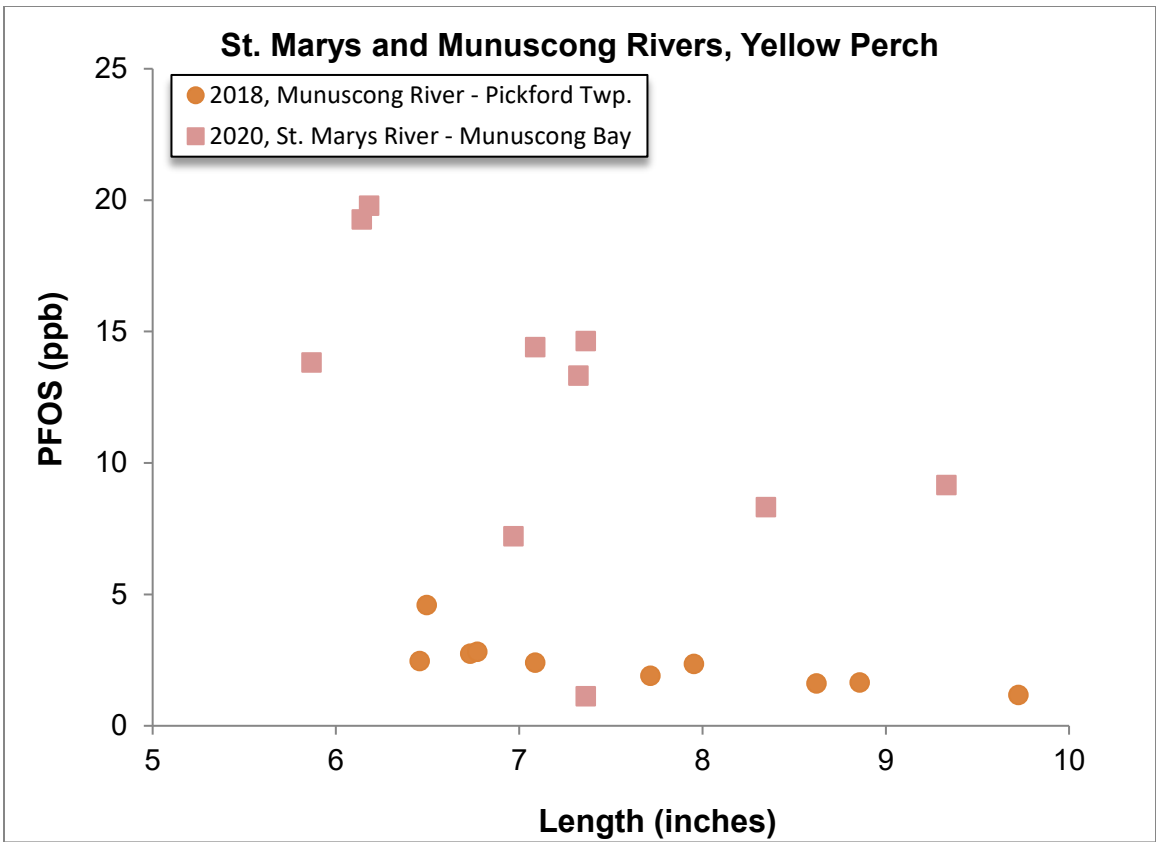
Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of Legal Sized Samples	
Earliest	Most Recent				Min	Max
2012	2020	40	5.9	NA	5.9	9.7
Datasets available: Without PFOS: 1989, 1995, 2012, 2014; With PFOS: 2018, 2020						
Chemical	Sample Size (Legal)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	40	ND	--	--	--	--
DDT	40	0.001	<0.001	0.009	0.002	16
Chlordane	40	0.001	<0.001	0.005	0.001	16
Toxaphene	40	ND	--	--	--	--
PFOS	20	7.2 ppb	1.1 ppb	19.8 ppb	10.2 ppb	12
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	--	--				
DDT	0.044	0.046				
Chlordane	0.028	0.035				
Toxaphene	--	--				
PFOS	0.193	0.200				
Final meal category based on UCL:						4

Existing MDHHS Advisory: No one should eat more than 4 meals per month of yellow perch of any size from the St. Marys River or Munuscong River due to mercury.

Recommendation: No change to the advisory is warranted. PFOS causes less restrictive guidance.







Great Lakes & Connecting Channels Lake Sturgeon

Lake Sturgeon

Great Lakes & Connecting Channels

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	2011	46	20.9	†	20.9	74	
Datasets available: 1990, '91, '93, '94, '95, '97, 2000, '01, '02, '03, '04, '05, '06, '10, '11							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	46	0.28		0.02	0.98	0.35	2
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
Mercury	0.212	0.188					

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	2011	16	20.9	†	20.9	74	
Datasets available: 1990, '91, '93, '94, '95, '97, 2000, '01, '02, '03, '04, '05, '06, '10, '11							
Chemical	Sample Size (Legal)	Mean (ppm)		Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	16	3.61		0.03	46.7	9.74	0
DDT	16	1.57		0.008	19.1	4.06	Limited
Chlordane	14	0.15		0.001	1.03	0.30	--
Toxaphene	16	0.11		0.05	0.37	0.17	2
TEQ*	2	9.42		9.37	9.48	--	--
Chemical	Linear Regression	Exponential Regression					
	R ²	R ²					
PCB	0.005	0.278					
DDT	0.007	0.187					
Chlordane	0.054	0.528					
Toxaphene	0.195	0.226					
TEQ*	--	--					
Final meal category based on UCL:							0

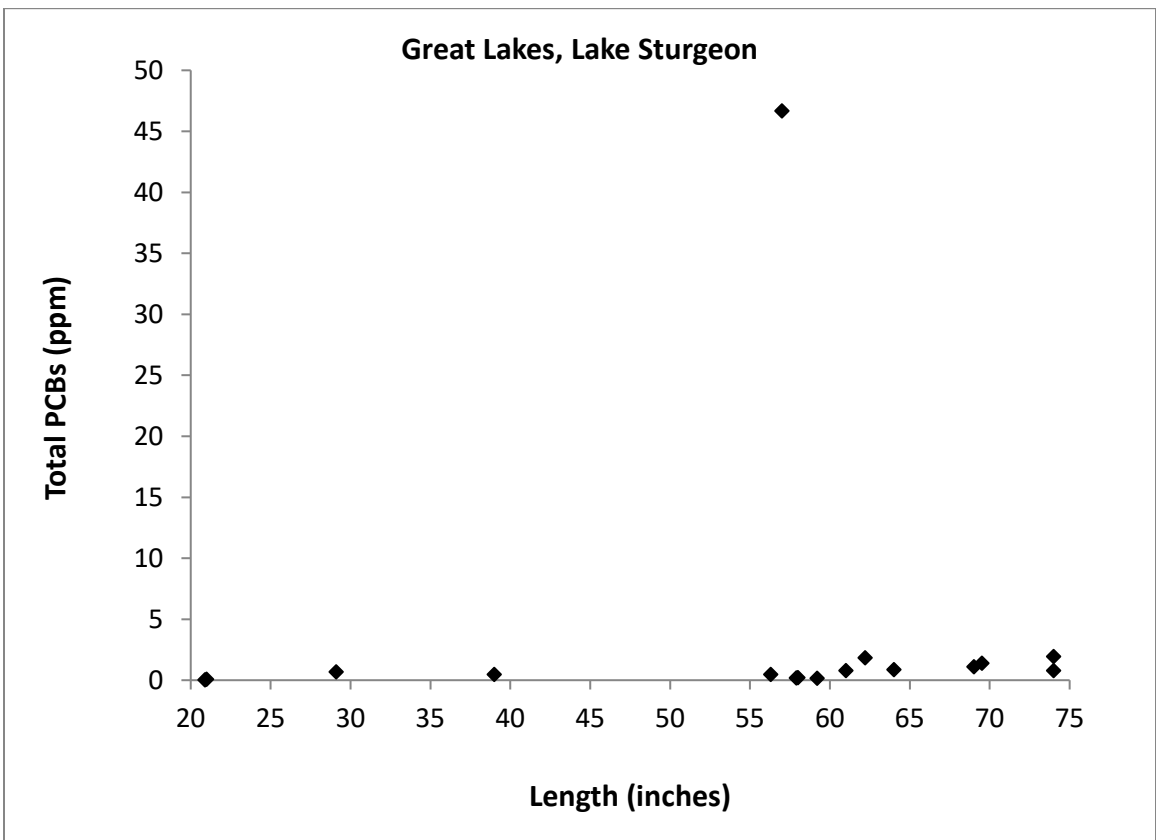
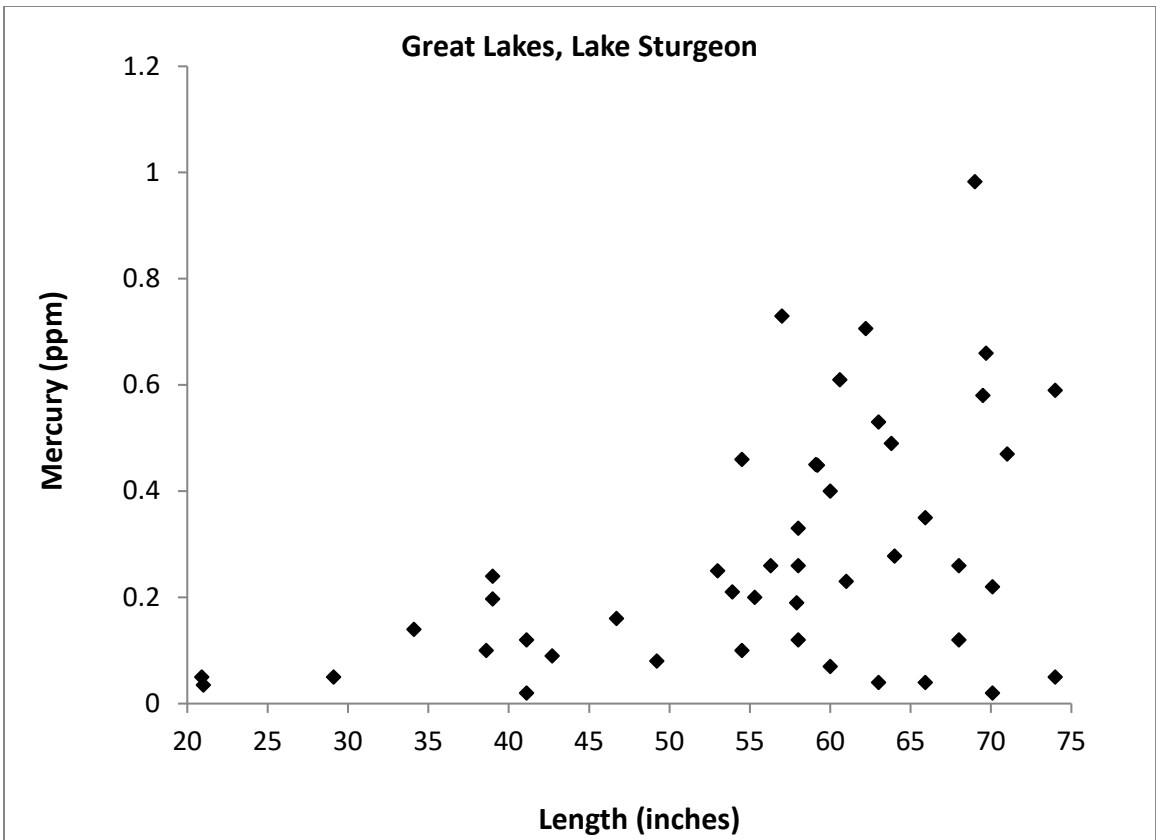
† - possession and size limits vary significantly

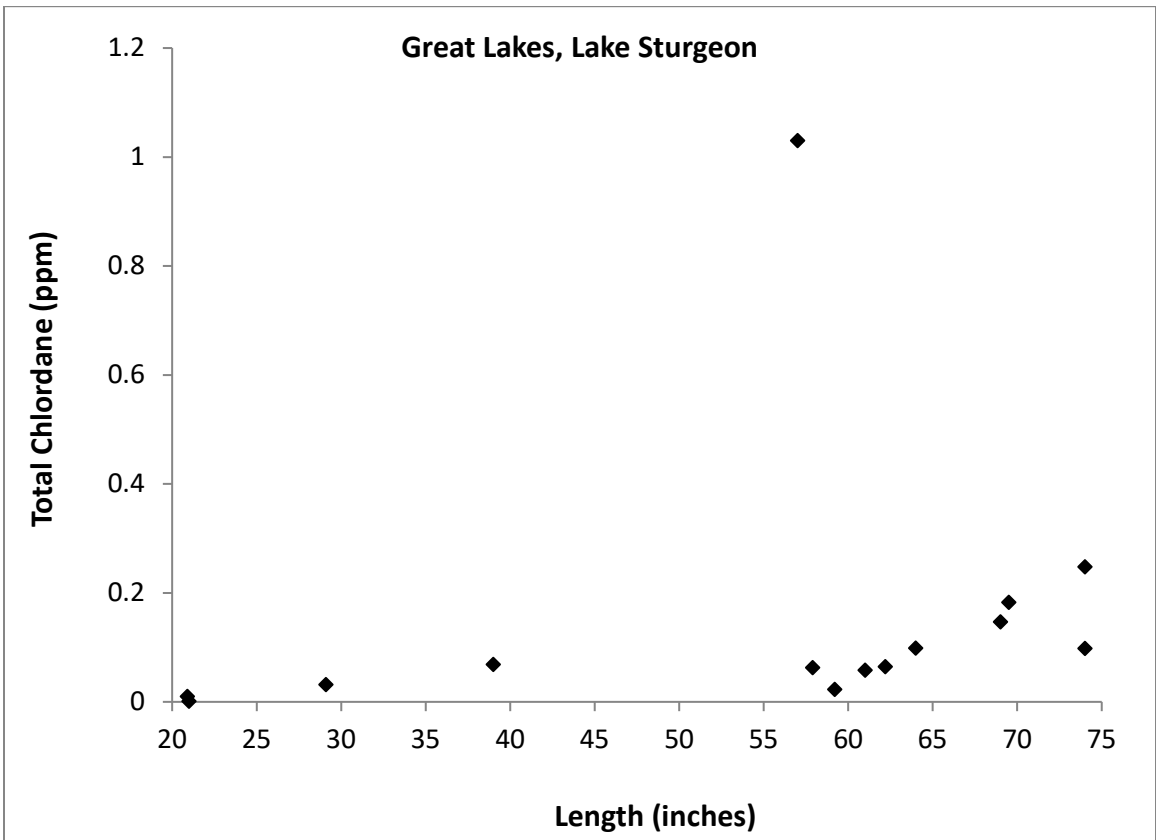
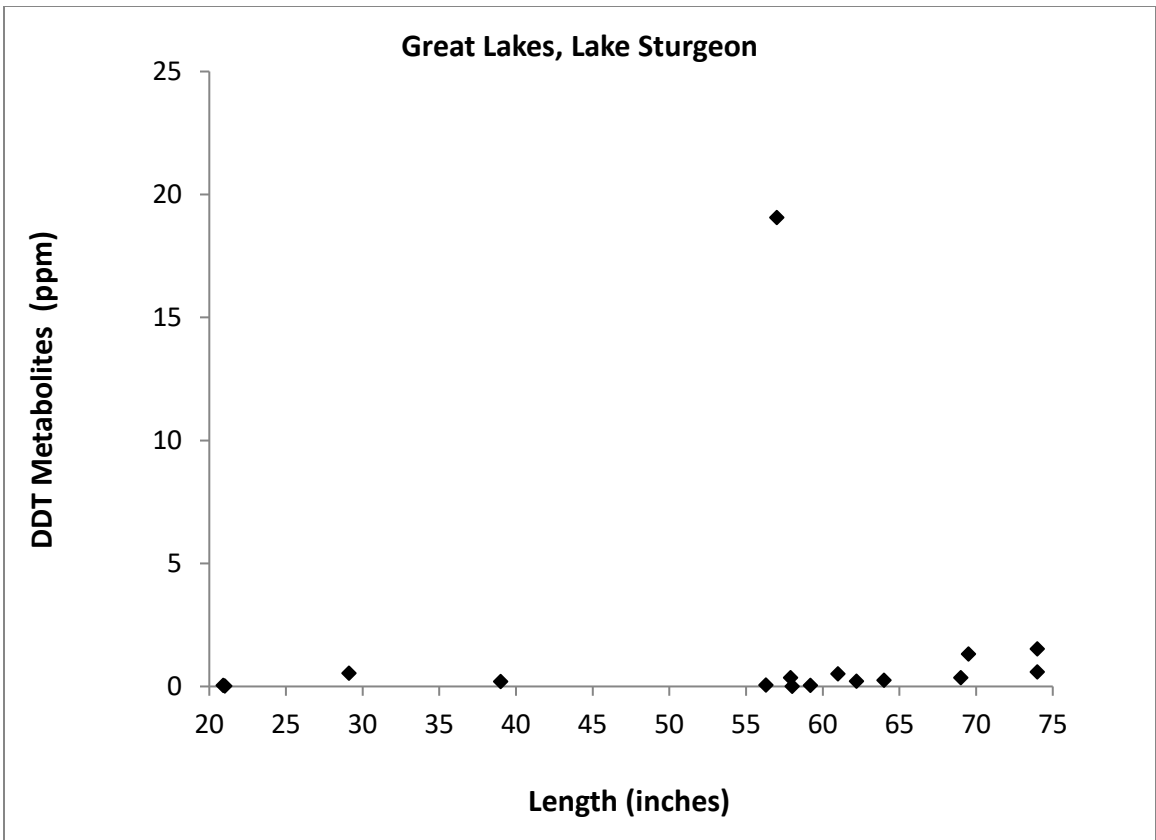
* - 2005 WHO TEFs; dioxin-like PCBs included

Existing MDHHS Advisory: Women and children should not eat more than 1 meal per month of Lake St. Clair lake sturgeon due to PCBs and no one should eat lake sturgeon from Lake Michigan (including Green Bay) due to PCBs, DDT, chlordane, and dioxins.

Recommendation: There is insufficient data to provide advice for sturgeon from the Great lakes or connecting channels.

Note: Advice for Lake St. Clair and the St. Clair River sturgeon are provided on other pages.





Lake Sturgeon

**Lake St. Clair
& St. Clair River**

**Macomb, St. Clair,
& Wayne Counties**

Hg Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of All Samples	
Earliest	Most Recent				Min	Max
1990	2010	17	34.1	*	34.1	65.9
Datasets available: 1990, 1991, 2000, 2005, 2010						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
Mercury	17	0.20	0.02	0.46	0.28	2
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
Mercury	0.155	0.075				

Organics Analysis:

Range of Years Used		N (All)	Overall Min Length	Legal Min (Inches)	Range of All Samples	
Earliest	Most Recent				Min	Max
2000	2010	13	34.1	*	34.1	65.9
Datasets available: 1990, 1991, 2000, 2005, 2010						
Chemical	Sample Size (All)	Mean (ppm)	Min. Conc. (ppm)	Max Conc. (ppm)	95%UCL (ppm)	Meal Category
PCB	14	0.42	0.06	1.55	0.65	Limited
DDT	14	0.11	0.02	0.33	0.17	8
Chlordane	13	0.04	0.005	0.12	0.06	--
Toxaphene	14	0.12	0.05	0.50	0.19	1
Chemical	Linear Regression	Exponential Regression				
	R ²	R ²				
PCB	0.065	0.202				
DDT	0.094	0.226				
Chlordane	0.150	0.242				
Toxaphene	0.000	0.003				
Final meal category based on UCL:						Limited

* - Lake St. Clair and St. Clair River lake sturgeon must be between 42 and 50 inches to be legal

Existing Advisory: Women and children should not eat more than 1 meal per month of Lake St. Clair lake sturgeon due to PCBs.

Recommendation: Sensitive populations should not eat these fish. Healthy adults should not eat more than 1 or 2 meals per year of Lake St. Clair or St. Clair River lake sturgeon due to PCBs. Mercury, toxaphene, and DDT would cause advisories.

