

Chemical contaminants in fish from the Pensacola Bay System and offshore Northern Gulf of Mexico.

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A version of this document, as well as reports on other components of the PERCH project, are available as .pdf files and a series of web pages: <http://uwf.edu/cedb>

This report contains data on contaminant loads found in fish tissues during the PERCH project (2002-2009; UWF) and pre-sinking screening for PCBs for the ex-Oriskany Reef (<http://www.uwf.edu/cedb/Oriskany.cfm>). The purpose of this document is to provide a information to people who eat fish so that they can make decisions that affect their exposure to toxic materials.

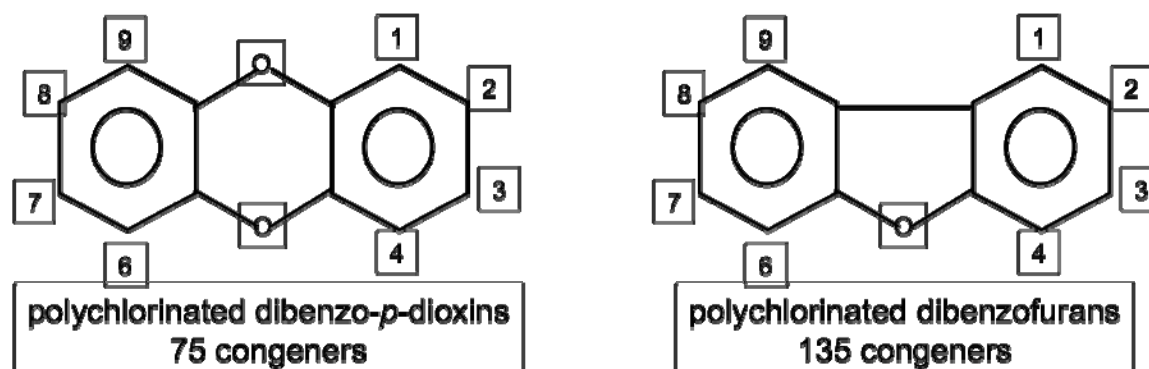
Within the State of Florida, fish consumption advisories exist for methyl mercury in several marine species within the Gulf of Mexico, and for freshwater species found in various rivers and estuarine systems (Adams and McMichael, 2001). Within the Pensacola Bay System, mercury advisories have been established for the major rivers (Escambia, Blackwater, Yellow). Consumption advisories based on mercury concentrations also exist for marine species such as the Spanish and king mackerels, which seasonally enter the Pensacola Bay System.

With a known history of PCB contamination in Escambia Bay, and elevated mercury levels in some fishes, our primary focus was on Polychlorinated Dioxins/Furans (DF), Polychlorinated biphenyls (PCBs), and mercury (Hg) in harvested seafood of the NW Florida region. Other compounds were found to be of minor significance. Results from CDC-supported PERCH project studies on contaminants in oysters and crabs in the Pensacola Bay System have previously been reported and can be found here: <http://www.uwf.edu/rsnyder/reports/reports.html>.

All analyses used a zero value for non-detected molecules instead of one half the detection limit.

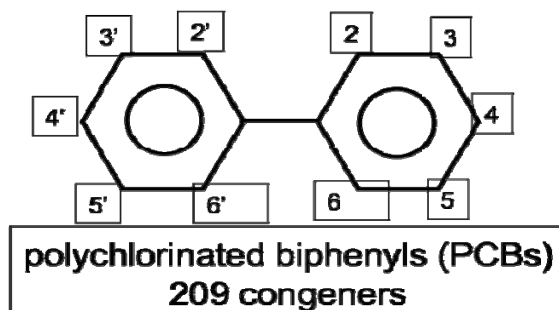
Dioxins/Furans and PCBs.

Polychlorinated dibenzo-p-dioxins, with potentially 75 different chlorinated molecular configurations (congeners), and polychlorinated dibenzofurans, with potentially 135 congeners, are by-products of natural and anthropogenic combustion and chemical manufacturing activities. These compounds are often collectively referred to as “Dioxins” or Dioxin/Furans” (DF).



Polychlorinated biphenyls (PCBs) with 209 possible congeners, were manufactured from 1929 to 1977 as industrial fluids and plasticizers. These compounds are refractory to degradation in the environment, tend to be hydrophobic and strongly partition into lipids. The tendency to absorb into lipids and fats has been used in modeling biological and environmental behavior of these

molecules as partitioning coefficients in octanol-water phases (K_{ow} ; <http://environ.nosc.mil/Projects/REEFEX/index.html>). PCB contamination derives from industrial use, spillage, and disposal of these synthetic compounds, mostly in freshwaters and estuaries, though some marine disposal has been suspected. PCBs are also known to be deposited from the atmosphere, but this flux is relatively minor compared to past direct discharges to aquatic systems.



Toxic Equivalency Quotients for Dioxin-Furan (DF) and Co-planar Polychlorinated Biphenyl (PCB) congeners.

Congener: One of a number of molecular configurations of Chlorines on DF or PCB molecules. XXX possible congeners for DFs, 209 possible congeners for PCBs.

Co-planar: Phenol is a flat ring structure molecule. When two phenols are linked (Biphenyl), they can either both be flat in the same plane (co-planar) or 90° relative to each other. The co-planar PCBs tend to have higher toxicity, and are considered “Dioxin-like” in their effects.

Toxicity equivalency Factor (TEF): each congener of DF or PCB potentially has different toxicity based on its configuration. The most toxic is given a value of 1. Other less toxic congeners are given a proportionally less toxic factor. The currently used values were adjusted in 2005: http://www.who.int/ipcs/assessment/tef_values.pdf.

Toxic Equivalency Quotient (TEQ): Any given sample will be a mixture of the various congeners at various concentrations. The concentration of selected DF and PCB congeners are multiplied by each respective TEF value, and all TEF adjusted concentrations are added to get the total toxicity for a sample, or the TEQ. A TEQ can be the sum of DF congener values (TEQ_{DF}), the TEQ of the PCB values (TEQ_P), or the sum of DF and PCB values (TEQ_{DFP}). The US EPA TEQ_{DFP} screening value for recreational fisher fish consumption is 0.26 ng/kg tissue.

Screening/threshold values for human health

Florida Department of Health

<http://www.doh.state.fl.us/environment/medicine/fishconsumptionadvisories/index.html>

Recommended Fish Consumption Rate vs *methyl*-mercury Concentration in Fish, as used for Florida Fish Consumption Advisories

Meal Frequency	Uncooked Filet Size	Advice Location	Sensitive population ¹ ppm	General Population ² ppm
2 meals per week	8 oz	Freshwater	<0.10	<0.37
1 meal per week	8 oz	Freshwater	<0.20	<0.60
1 meal per month	8 oz	Freshwater	<0.85	<1.50
None		Freshwater	≥0.85	≥1.50
1 meal per week	12 oz	Commercial	<0.122	
1 meal per week	4 oz	Commercial	<0.37	
None		Commercial	≥0.37	

¹Sensitive population= women of childbearing age and young children. Based on USEPA's reference dose (RfD) for methyl mercury, 1×10^{-4} mg/kg-body weight/day. Assumed body weight of 60 kg.

²General population = all other individuals. Based on USEPA's RfD for *methyl* mercury, 3×10^{-4} mg/kg-bodyweight/day. Assumed body weight of 70 kg.

Total PCB threshold value: 50 ppb

TEQ threshold value has not been designated

Federal

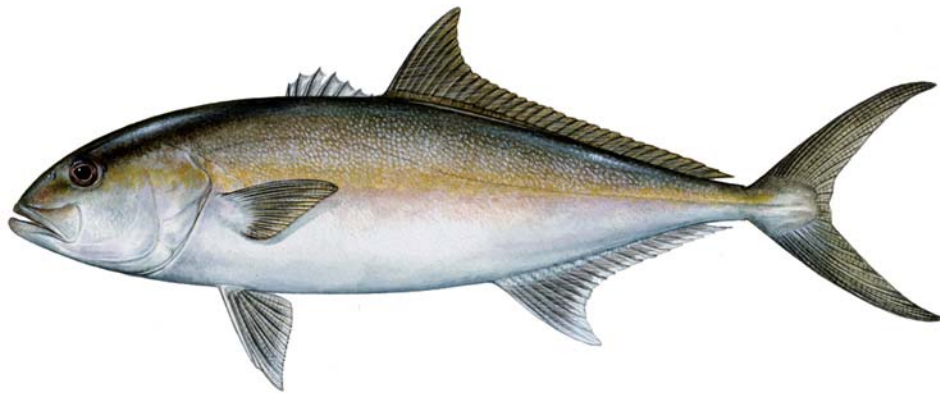
US EPA. 2000. Guidance for Assessing Chemical Contamination Data for Use in Fish Advisories. Volume 1. Fish Sampling and Analysis. 3rd ed. EPA 823-B-00-007.

Compound	US FDA action/tolerance level	US EPA Recreational Fishers Screening value	US EPA Subsistence Fishers Screening value
Mercury (Hg)	1.0 ppm	0.40 ppm	0.049 ppm
Total PCBs	2000 ppb	20 ppb	2.45 ppb
TEQ _{DFP}		0.256 ppt	0.14 ppt

Use of a human body weight of 70 kg (average adult) and a consumption rate of 17.5 g/d for recreational fishers and 142.4 g/d for subsistence fishers to calculate SVs .

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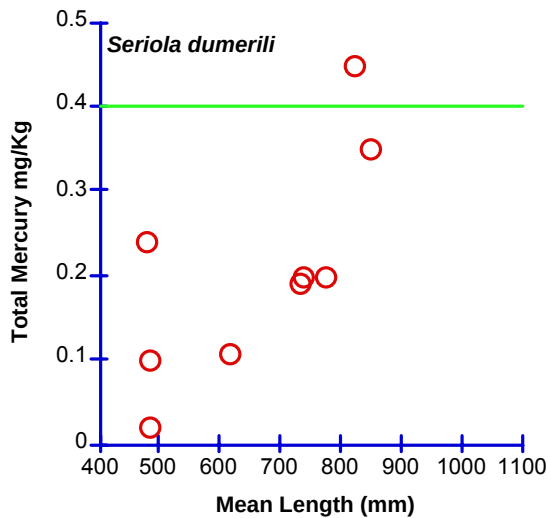


**Greater
Amberjack**
Seriola dumerilli

Sample locations: offshore

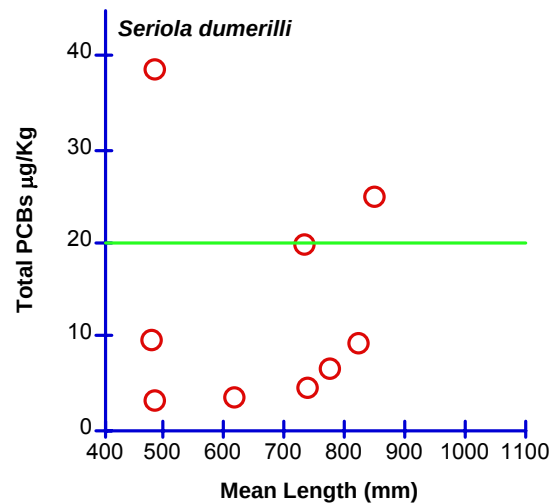
A total of 9 fish (7 Greater, 2 Lesser) were collected over offshore reefs. Mercury concentrations show a tendency to accumulate with size, but only one specimen out of nine (the larger of the two lesser amberjack) exceeded the US EPA screening value. Three fish out of nine were at or exceeded the US EPA screening value for PCBs

Mercury Content

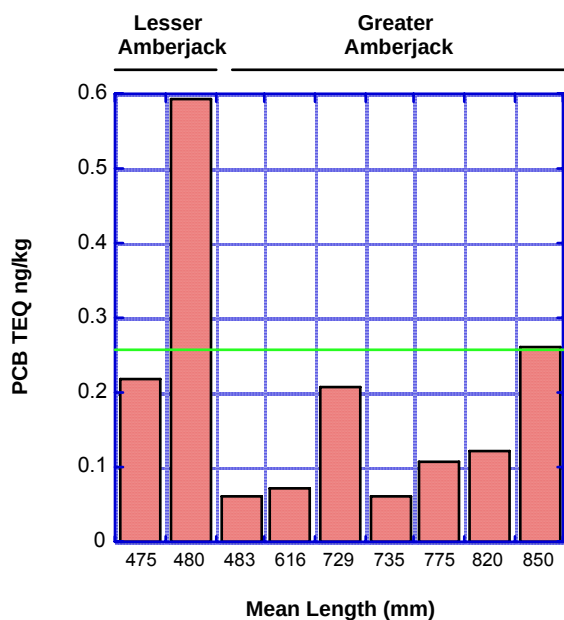


Green line: US EPA recreational consumption action limit at 0.40 mg/kg

PCB Content



Green line: US EPA recreational consumption action limit at 20 µg/kg. These fish were taken offshore.



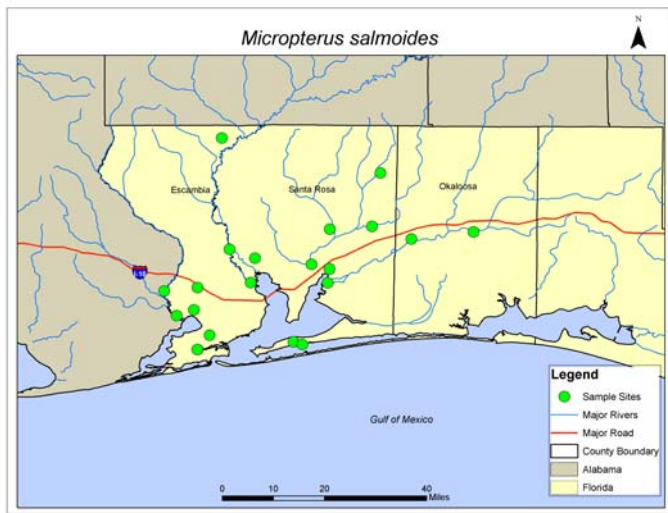
Toxicity of PCB molecules as a Toxic Equivalency Quotient (TEQ). The US EPA recreational consumption action limit for TEQ at 0.256 ng/kg is indicated by the green line.

Location	Species	n	Mean Length (mm)	Mean Weight (g)	% Lipid	TEQ _P ng/kg ND=0	ΣPCBs ug/kg	Hg mg/kg	LAT	LONG
Offshore outer shelf	<i>Seriola dumerilli</i>	1	475	2030.0	0.40	0.2202	9.7520	0.24	29.847	-87.304
Offshore outer shelf	<i>Seriola dumerilli</i>	1	616	3420.0	0.07	0.0734	3.550	0.11		
Offshore outer shelf	<i>Seriola dumerilli</i>	1	735	5380.0	0.06	0.0622	4.500	0.2		
Offshore outer shelf	<i>Seriola dumerilli</i>	1	729	6320.0	0.40	0.2093	19.900	0.19	29.300	-87.017
Offshore outer shelf	<i>Seriola dumerilli</i>	1	775	6450.0	0.10	0.1071	6.860	0.2	29.383	-87.917
Offshore outer shelf	<i>Seriola dumerilli</i>	1	820	9330.0	0.50	0.1234	9.59	0.45	29.847	-87.304
Offshore outer shelf	<i>Seriola dumerilli</i>	1	850	8150.0	0.13	0.2625	25.200	0.35	29.383	-87.917
Offshore outer shelf	<i>Seriola rivoliana</i>	1	480	2470.0	0.41	0.5934	38.800	0.1	30.043	-87.007
Offshore outer shelf	<i>Seriola rivoliana</i>	1	483	1970.0	0.00	0.0621	3.450	0.02	29.300	-88.017



Largemouth Bass *Micropterus salmoides*

Sample Locations



Mercury content

Generally high throughout the area, limited consumption advisory.

No-consumption advisory for Woodbine Springs Lake

Areas with High PCB content

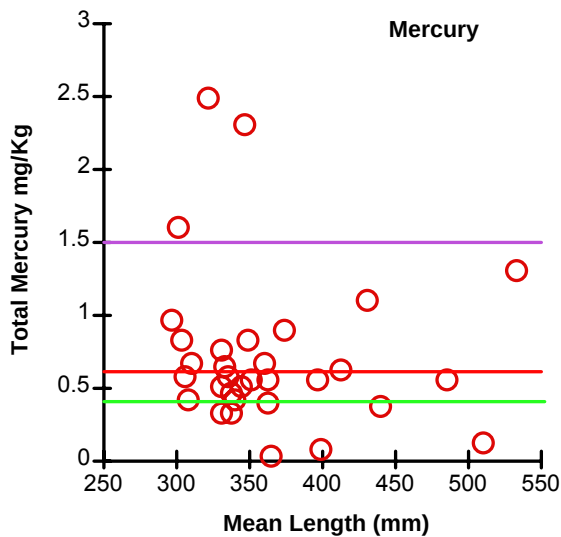
Lower Escambia River

Areas with low PCB content

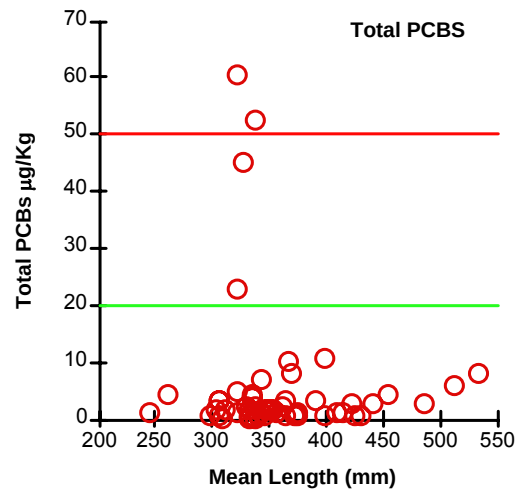
All other freshwaters sampled

A total of 163 fish from 20 locations were included in 55 samples. Single fish comprised nine samples, and the remaining 46 were composite samples of 3 or more fish. Mercury content was generally high throughout the area, and a State of Florida limited consumption advisory exists for most of the waterways sampled. A State of Florida no consumption advisory based on mercury content exists for Woodbine Lake. Samples from the lake had the highest mercury concentrations of any bass sampled.

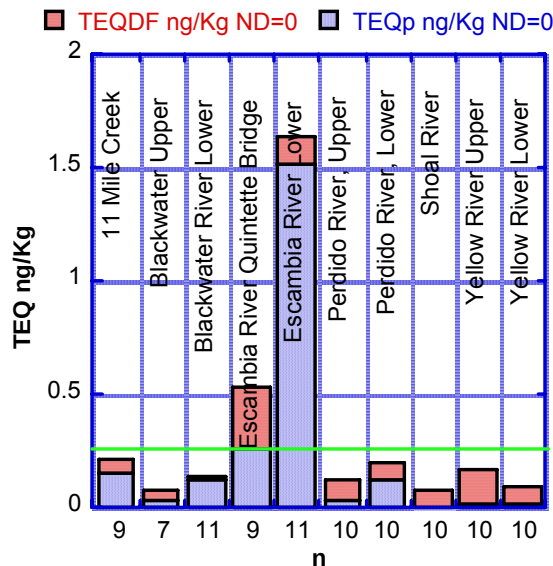
PCB and Dioxins/Furans content was low in all samples, except for the PCB loads in fish collected from the lower Escambia River, where PCB content in bass triggered a limited consumption advisory from the State of Florida.



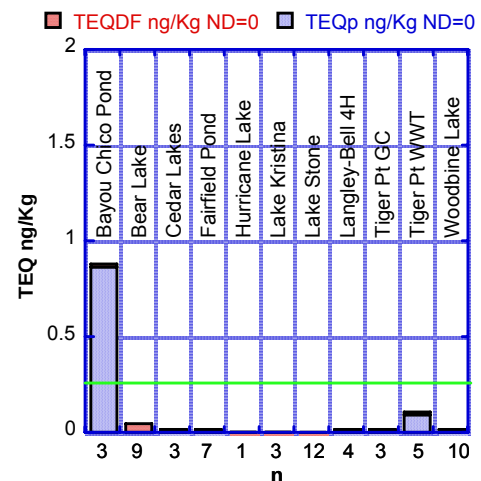
Green line: US EPA recreational consumption action limit. Red line: State of Florida threshold for limited consumption. Purple line: State of Florida threshold for no consumption advisory.



Green line: US EPA recreational consumption action limit at 20 µg/kg. Red line: State of Florida action limit at 50 µg/kg.



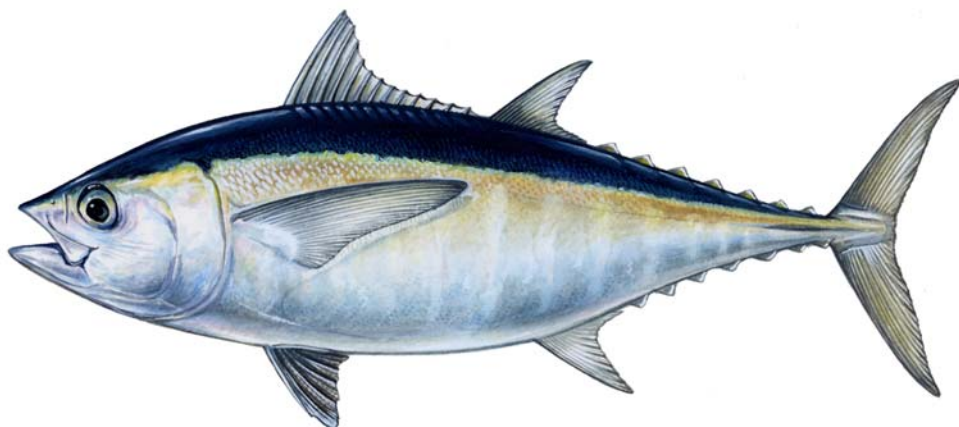
Toxicity of Dioxins Furans (TEQ_{DF}) and PCBs (TEQ_P) in Largemouth Bass from NW Florida Rivers. High values were obtained for fish collected in the Escambia river. The green line is the US EPA recreational consumption action limit at 0.26 ng/kg. State of Florida does not have an official action limit established for TEQ values.



Toxicity of Dioxin Furans (TEQ_{DF}) and PCBs (TEQ_P) in Largemouth Bass from NW Florida Ponds. The only high value recorded was for a composite of specimens from a borrow pit that received dredge spoil from Bayou Chico. The green line is the US EPA recreational consumption action limit at 0.256 ng/kg. State of Florida does not have an official action limit established for TEQ values.

Location	n	Mean Length (mm)	Mean Wt (g)	Sex	Mean Age	% Lipid	TEQ _{DF} ng/kg ND=0	TEQ _P ng/kg ND=0	TEQ _{DFP} ng/kg ND=0	ΣPCBs ug/kg	Hg mg/kg	LAT	LONG
11 Mile Creek	3	260	224.0		2.1	0.10	0.1045	0.3546	0.4591	4.710	0.3600	30.456	-87.377
11 Mile Creek	3	321	1836.3	F	3.6	0.10	0.0727	0.1175	0.1902	4.890	0.4200	30.456	-87.377
11 Mile Creek	3	335	518.0	M	2.6	0.30	0.0161	0.0011	0.0172	2.620	0.3200	30.456	-87.377
11 Mile Creek	1	439	1070.0	F						3.115	0.3667	30.456	-87.377
Bayou Chico Pond	3	366	573.8		3.3	0.20	0.0170	0.8609	0.8779	10.324	0.0400	30.402	-87.273
Bear Lake 1	3	362	703.1		3.7	0.40	0.0678	0.0000	0.0678	0.774	0.4100	30.863	-86.835
Bear Lake 2	3	330	481.7		2.0	0.50	0.0671	0.0000	0.0671	0.550	0.3400	30.863	-86.835
Bear Lake 3	3	338	555.1		2.7	0.60	0.0127	0.0000	0.0127	0.665	0.3400	30.863	-86.835
Blackwater River Lower	4	329	512.3			0.20	0.0062	0.0569	0.0631	2.670	0.5800	30.603	-87.030
Blackwater River Lower	3	352	655.3			0.20	0.0000	0.0678	0.0678	2.120	0.5500	30.603	-87.030
Blackwater River Lower	4	367	644.5	M		0.10	0.0474	0.2510	0.2984	8.270	0.5800	30.603	-87.030
Blackwater Upper	4	304	349.0			0.50	0.0598	0.0575	0.1173	0.841	0.7600	30.711	-86.858
Blackwater Upper	3	371	655.7			0.20	0.0422	0.0001	0.0423	0.872	1.0200	30.711	-86.858
Cedar Lakes	3	348	553.3		3.7	0.20	0.0171	0.0002	0.0173	2.058	0.8400	30.591	-86.979
Escambia River Quintette Bridge	4	244	431.8			0.80	0.1010	0.0005	0.1015	1.580	0.6000	30.646	-87.262
Escambia River Quintette Bridge	4	341	684.0			1.00	0.3550	0.8059	1.1609	1.640	0.5300	30.646	-87.262
Escambia River Quintette Bridge	1	396	990.0	F						0.807	0.5643	30.646	-87.262
Escambia River Quintette Bridge	1	407	1067.0	F			0.3495	0.0003	0.3498	1.410		30.646	-87.262
Escambia River Lower	4	320	400.8	M		0.10	0.1830	0.4273	0.6103	23.400	0.4700	30.554	-87.202
Escambia River Lower	3	322	487.7	M	4.3	0.30	0.0260	2.5088	2.5348	61.000	0.4500	30.554	-87.202
Escambia River Lower	4	326	441.3		2.0	0.10	0.1236	1.6401	1.7637	45.400	0.4600	30.554	-87.202
Escambia River Lower	3	337	516.7	M						52.697	0.4601	30.554	-87.202
Fairfield Pond	3	332	450.0		4.0	0.30	0.0090	0.0026	0.0116	4.320	0.6600	30.404	-87.319
Fairfield Pond	3	362	601.5		3.0	0.10	0.0130			3.776	0.5700	30.404	-87.319
Fairfield Pond	1	532	1970.0		6.0	0.20	0.0479			8.281	1.3000	30.404	-87.319
Hurricane Lake	1	340	376.9		4.0	0.20	0.0049	0.0001	0.0050	0.879	0.4200	30.201	-87.117
Lake Kristina	3	307	356.7		2.3	0.20	0.0100	0.0001	0.0101	0.161	0.4300	30.703	-86.978
Lake Stone 1	4	345	554.9		3.3	0.00	0.0064	0.0000	0.0064	0.728	0.5100	30.962	-87.284
Lake Stone 2	4	331	488.3		3.3	0.00	0.0063	0.0000	0.0063	0.666	0.5100	30.962	-87.284
Lake Stone 3	4	336	468.5		4.0	0.00	0.0085	0.0000	0.0085	0.537	0.5800	30.962	-87.284
Langley-Bell 4H	3	296	272.3		3.7	1.90	0.0240	0.0002	0.0242	1.060	0.9600	30.539	-87.352
Langley-Bell 4H	1	430	780.0		5.0	0.10	0.0076	0.0002	0.0078	1.070	1.1000	30.539	-87.352
Perdido River Lower	4	330	498.8			0.20	0.0995	0.0969	0.1964	2.170	0.6500	30.530	-87.447
Perdido River Lower	4	334	476.8			0.10	0.0709	0.1232	0.1941	4.240	0.4500	30.460	-87.412
Perdido River Lower	3	374	662.7	M		0.20	0.0843	0.0004	0.0847	1.280	0.8100	30.530	-87.447
Perdido River Lower	3	388	791.3			0.20	0.0970	0.1251	0.2221	3.340	0.6000	30.460	-87.412
Perdido River Lower	3	421	1079.3			0.10	0.0866	0.0053	0.0919	2.870	0.8600	30.530	-87.447

Location	n	Mean Length (mm)	Mean Weight (g)	Sex	Mean Age	% Lipids	TEQ _{DF} ng/kg ND=0	TEQ _P ng/kg ND=0	TEQ _{DFP} ng/kg ND=0	ΣPCBs ug/kg	Hg mg/kg	LAT	LONG
Perdido River Lower	3	454	1311.7	F		0.20	0.2270	0.1687	0.3957	4.320	0.6300	30.460	-87.412
Perdido River Lower	1	485	1665.0	F						2.912	0.5605	30.460	-87.412
Shoal River	4	305	373.3	M		0.50	0.1030	0.0078	0.1108	3.360	0.4700	30.696	-86.571
Shoal River	3	355	714.7	M		0.40	0.0000	0.0002	0.0002	1.510	0.7700	30.696	-86.571
Shoal River	3	413	1095.7	F		0.70	0.1140	0.0005	0.1145	1.250	0.6400	30.696	-86.571
Tiger Pt Golf Course	3	332	408.2		3.0	0.20	0.0200	0.0025	0.0225	4.194		30.385	-87.081
Tiger Pt WWTP effluent pond	3	305	361.3		1.0	0.20		0.1522		3.697	0.5800	30.378	-87.056
Tiger Pt WWTP effluent pond	1	398	750.0		3.0	0.20	0.0190	0.1524	0.1714	11.200	0.0900	30.378	-87.056
Tiger Pt WWTP effluent pond	1	510	1068.0		8.0	0.10	0.0097	0.0029	0.0126	6.080	0.1300	30.378	-87.056
Woodbine Springs 1	4	301	323.9		1.0	0.20	0.0070	0.0250	0.0320	1.764	1.6000	30.621	-87.190
Woodbine Springs 2	3	321	435.7		2.0	0.20	0.0000	0.0004	0.0004	1.241	2.5000	30.621	-87.190
Woodbine Springs 3	3	345	463.3		2.3	0.30	0.0083	0.0012	0.0095	2.006	2.3000	30.621	-87.190
Yellow River Lower	4	309	378.0			0.20	0.0500	0.0003	0.0503	1.670	0.6803	30.553	-86.984
Yellow River Lower	3	341	560.0			0.20	0.1730	0.0144	0.1874	7.330	0.8100	30.553	-86.984
Yellow River Lower	3	373	822.3	F		0.10	0.0140	0.0467	0.0607	1.090	0.7000	30.553	-86.984
Yellow River Upper	3	361	779.3			1.20	0.1215	0.0047	0.1262	2.540	0.7400	30.675	-86.747
Yellow River Upper	3	424	1225.7	F		2.80	0.2850	0.0004	0.2854	0.971	0.7400	30.675	-86.747
Yellow River, Upper	4	346	643.3	F	54.0	0.56	0.0515	0.0543	0.1058	1.980	0.6500	30.675	-86.747

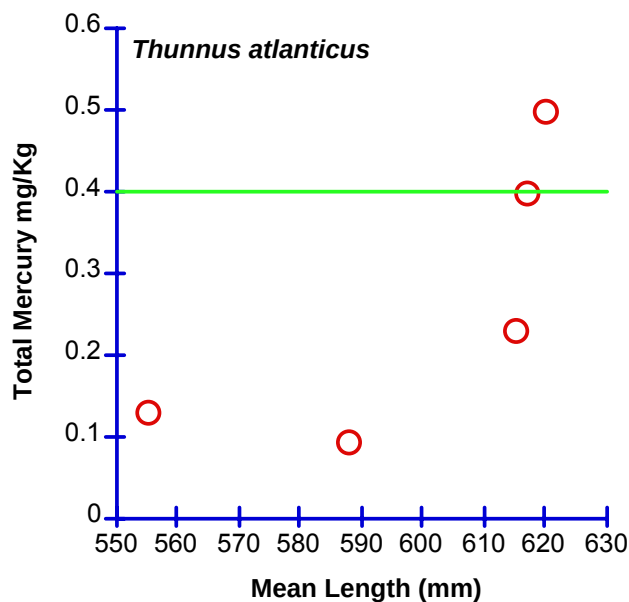


Blackfin Tuna
Thunnus atlanticus

Sample locations: offshore

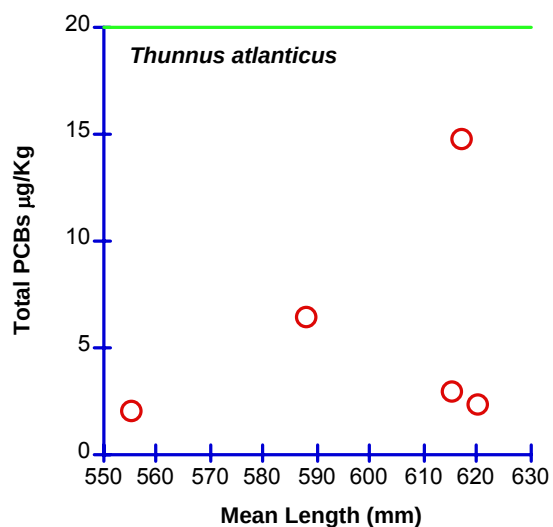
Five fish were sampled offshore. This limited sampling suggested bioaccumulation of both mercury and PCBs with size, with two of the larger fish exceeding the US EPA screening value for mercury content, although none of the fish (up to 62 cm) exceeded the PCB or TEQ thresholds.

Mercury Content

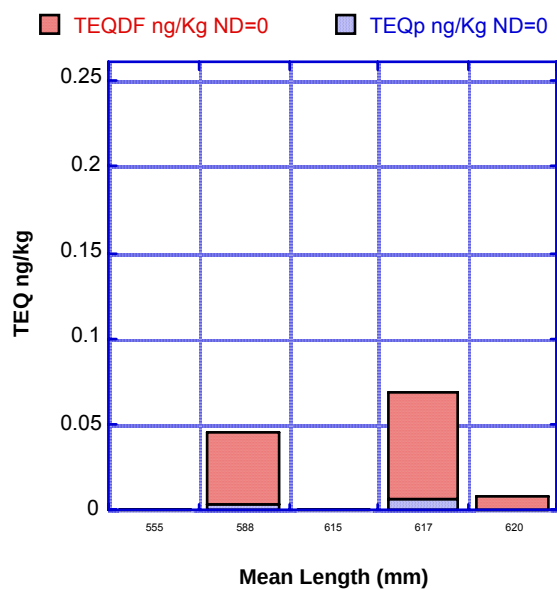


Green line: US EPA recreational consumption action limit at 0.40 mg/kg

PCB Content

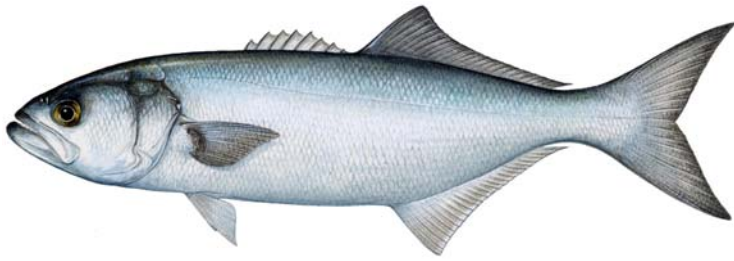


Green line: US EPA recreational consumption action limit at 20 µg/kg. These fish were taken offshore.



Toxicity of PCB molecules as a Toxic Equivalency Quotient (TEQ). The US EPA recreational consumption action limit for TEQ is 0.256 ng/kg.

Location	n	Mean Length (mm)	% Lipids	TEQ _{DF} ng/Kg ND=0	TEQ _P ng/Kg ND=0	TEQ _{DFP} ng/Kg ND=0	ΣPCBs ug/Kg	Hg mg/Kg	LAT	LONG
Offshore Ram Powell Rig	1	555	0.30		0.0010		2.140	0.130	29.0608	-88.0917
Offshore Ram Powell Rig	1	588	0.20	0.0425	0.0035	0.0460	6.510	0.096	29.0608	-88.0917
Offshore Ram Powell Rig	1	615	0.10		0.0013		2.930	0.230	29.0608	-88.0917
Offshore Ram Powell Rig	1	617	0.30	0.0621	0.0071	0.0692	14.800	0.400	29.0608	-88.0917
Offshore Ram Powell Rig	1	620	0.40	0.0076	0.0011	0.0087	2.430	0.500	29.0608	-88.0917



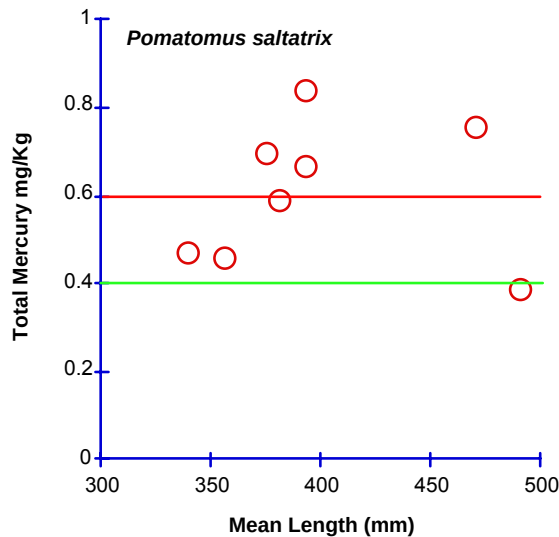
Bluefish *Pomatomus saltatrix*

Sample Locations: Pensacola Bay, Pensacola Pass, Santa Rosa Island Surf

Samples from 9 fish ranging in size from 34 to 49 cm were collected from Pensacola Bay, Pensacola Pass, and along Santa Rosa Island in the Gulf of Mexico. All fish were at or exceeded the US EPA screening value for mercury, and five out of nine exceeded the State of Florida threshold for limited consumption. Two of the larger fish exceeded the US EPA threshold for total PCB content, and one fish exceeded the State of Florida threshold for PCBs. Six out of nine fish exceeded the US EPA threshold for toxicity (TEQ) of Dioxins/Furans and PCBs.

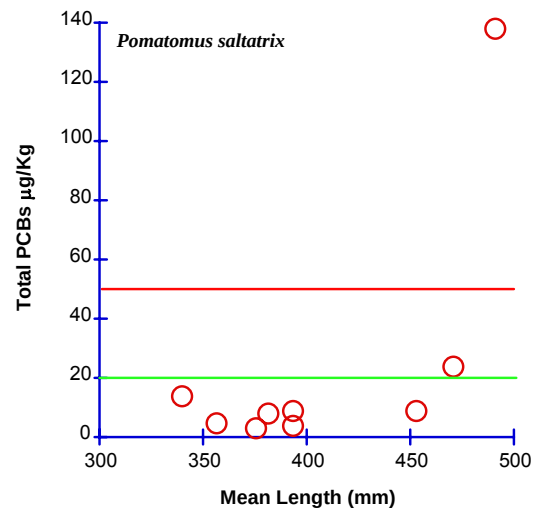
Mercury Content

Mercury content was high in sampled fish.

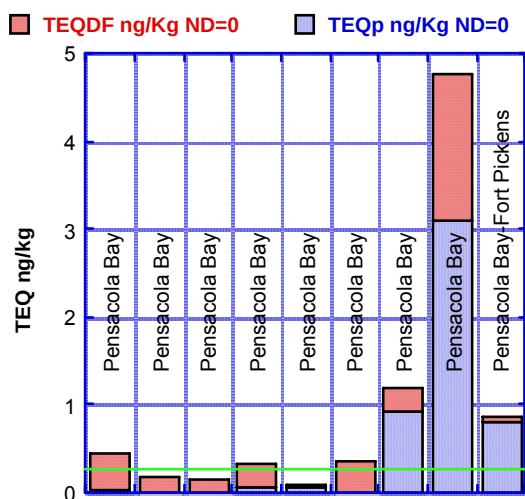


Red line: State of Florida action limit at 0.60 mg/kg. Green line: US EPA recreational consumption action limit at 0.40 mg/kg

PCB Content



Red line: State of Florida action limit at 50 µg/kg. Green line: US EPA recreational consumption action limit at 20 µg/kg



Toxicity of PCB molecules as a Toxic Equivalency Quotient (TEQ). The US EPA recreational consumption action limit for TEQ at 0.256 ng/kg is indicated by the green line.

Location	n	Mean Length (mm)	Mean Weight (g)	% Lipid	TEQ _{DF} ng/kg ND=0	TEQ _P ng/kg ND=0	TEQ _{DFP} ng/kg ND=0	ΣPCBs ug/kg	Hg mg/kg
Pensacola Bay	1	339	360.0	1.20	0.4404	0.0204	0.4608	13.80	0.47
Pensacola Bay	1	355	420.0	1.00	0.1649	0.0067	0.1716	4.93	0.46
Pensacola Bay	1	375	470.0	0.40	0.1431	0.0048	0.1479	3.10	0.7
Pensacola Bay	1	381	480.0	0.60	0.2500	0.0701	0.3201	8.29	0.59
Pensacola Bay	1	392	560.0		0.0524	0.0547	0.1071	4.280	0.67
Pensacola Bay	1	392	540.0	0.70	0.3351	0.0124	0.3475	8.96	0.84
Pensacola Bay	1	470	980.0	0.90	0.2740	0.9300	1.2040	24.20	0.76
Pensacola Bay	1	490	1080.0	1.40	1.6748	3.0968	4.7716	138.00	0.39
Pensacola Bay Fort Pickens	1	452	940.0	0.40	0.0646	0.8071	0.8717	8.940	

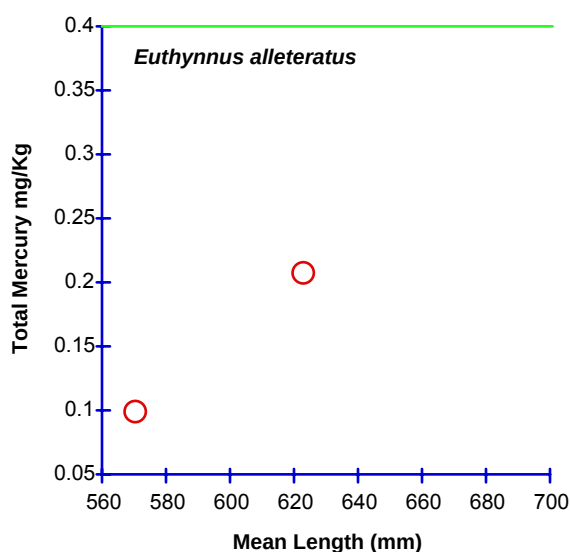


Bonita *Euthynnus alleteratus*

Sample locations: offshore

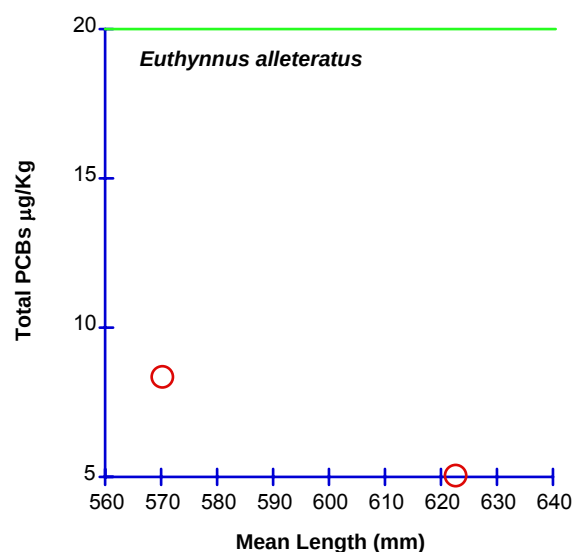
Two specimens were collected offshore, neither exceeded screening values for mercury, PCBs or TEQ.

Mercury Content



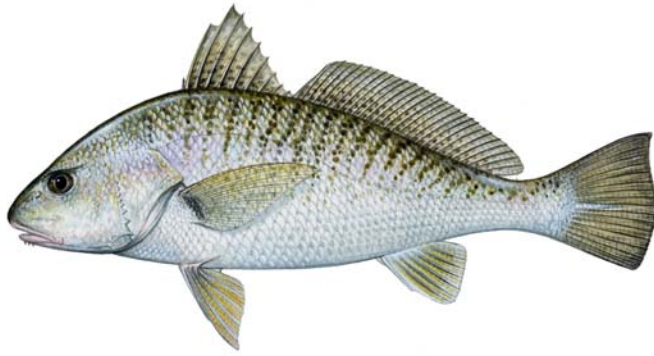
Green line: US EPA recreational consumption action limit at 0.40 mg/kg

PCB Content



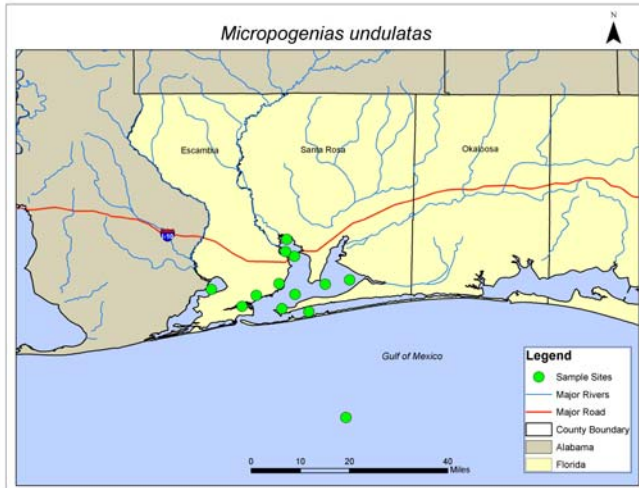
Green line: US EPA recreational consumption action limit at 20 µg/kg.

Location	n	Mean Length (mm)	Mean Weight (g)	Sex	% Lipids	TEQ _P ng/Kg ND=0	ΣPCBs ug/Kg	Hg mg/Kg	LAT	LONG
Pensacola Bay Pass	1	570	2050	F	1.50	0.1324	8.351	0.1	30.3261	-87.3077
Pensacola Bay Pass	1	622	2440	M	0.70	0.1151	5.108	0.21	30.3261	-87.3077



Atlantic Croaker *Micropogonias undulatus*

Sample locations



Mercury Content

Low Mercury content throughout the area.

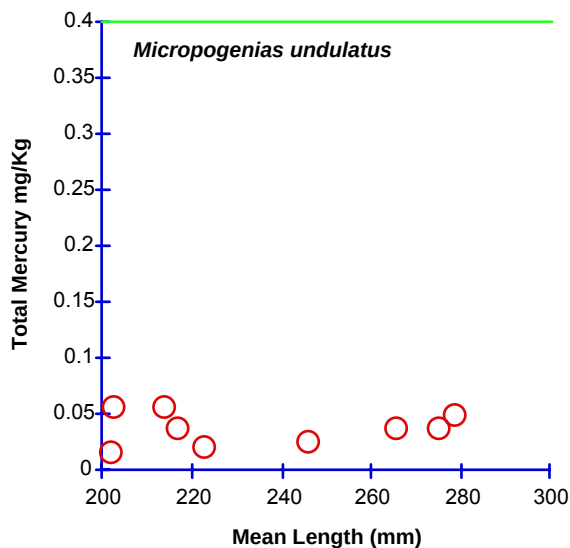
Areas with High PCB content

Upper Escambia Bay
Bayous Texar, Chico, Grande

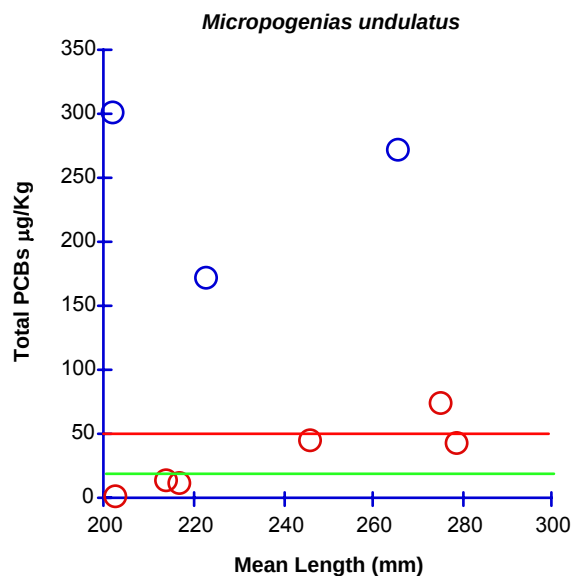
Areas with low PCB content

East Bay
Bayous Hoffman, Woodlawn
Bayous Texar, Grande
Offshore

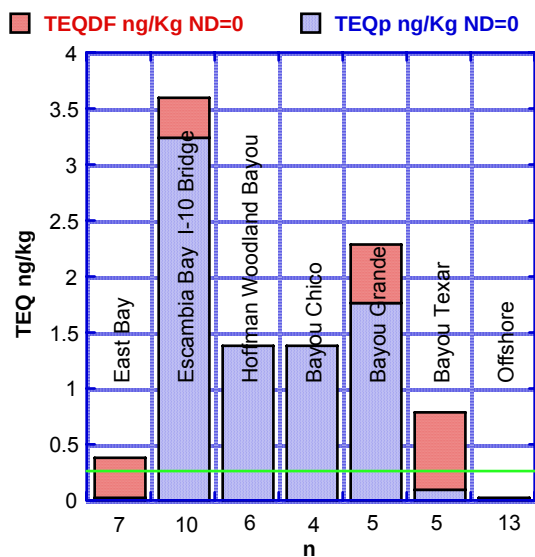
Nine samples containing 50 fish (2 to 13 per composite) had very low concentrations of mercury. PCB content, however, exceeded the US EPA threshold in six of nine samples, with three of those collected in the urban bayous (Texar, Chico, Grande) and three during the Escambia Bay I-10 Bridge demolition blast. The Escambia Bay samples were three to six times higher than the samples from the bayous. Samples from East Bay, Hoffman/Woodland Bayou, and offshore had lower concentrations of total PCBs. All samples except from offshore exceeded the US EPA screening value for TEQ (Dioxins/Furans and PCBs).



Green line: US EPA recreational consumption action limit at 0.40 mg/kg



Red line: State of Florida action limit at 50 µg/kg.
Green line: US EPA recreational consumption action limit at 20 µg/kg. Blue symbols from I-10 Bridge, Escambia Bay



Toxicity of PCB molecules as a Toxic Equivalency Quotient (TEQ). The US EPA recreational consumption action limit for TEQ at 0.256 ng/kg is indicated by the green line.

Location	n	Mean Length (mm)	Mean Weight (g)	% Lipids	TEQ _{DF} ng/kg ND=0	TEQ _P ng/kg ND=0	TEQ _{DFP} ng/kg ND=0	ΣPCBs ug/kg	Hg mg/kg	LAT	LONG
Bayou Chico	4	246	183.5	1.80		1.3774		45.800	0.026	30.404	-87.255
Bayou Grande	5	275	214.6	2.90	0.5255	1.7625	2.2880	75.940	0.040	30.372	-87.297
Bayou Texar	5	278	261.9	2.80	0.6950	0.1010	0.7960	44.999	0.052	30.439	-87.188
East Bay	7	214	123.7	1.20	0.3535	0.0304	0.3839	16.098	0.059	30.450	-86.980
Escambia Bay I-10 Bridge	6	202	99.8	2.40	0.3365	2.6980	3.0345	303.000	0.017	30.519	-87.143
Escambia Bay I-10 Bridge	2	223	130.0	1.50	0.1829	2.2893	2.4722	174.000	0.023	30.519	-87.143
Escambia Bay I-10 Bridge	2	265	245.0	3.40	0.5007	4.7609	5.2616	274.000	0.039	30.519	-87.143
Hoffman Woodland Bayou	6	217	121.8	2.30		1.3806		14.341	0.038	30.365	-87.179
Offshore outer shelf	13	202	98.2	1.00	0.0000	0.0145	0.0145	2.205	0.059	30.044	-86.991

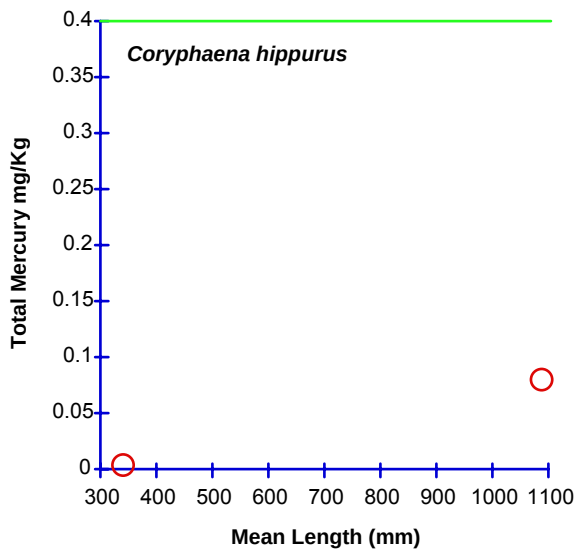


Dolphin (Mahi)
Coryphaena hippurus

Sample locations: offshore

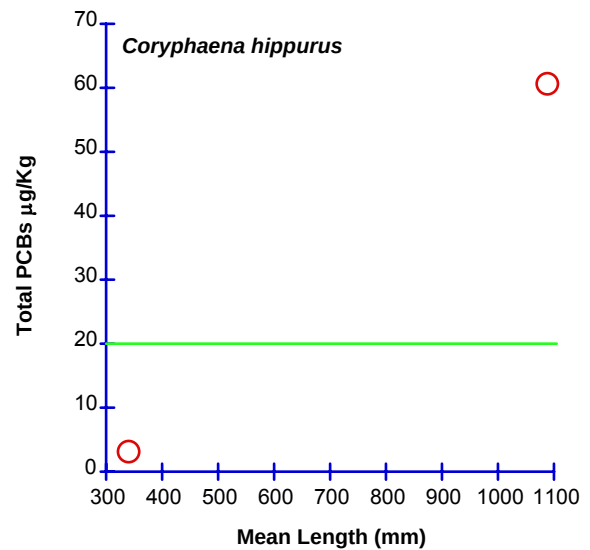
Two fish were sampled from offshore collections, 340 and 1080 cm. Both fish had low mercury content. However the larger fish had 3 times the US EPA total PCB threshold, and also had an elevated TEQ value three times the US EPA screening value for recreational fisher consumption.

Mercury Content

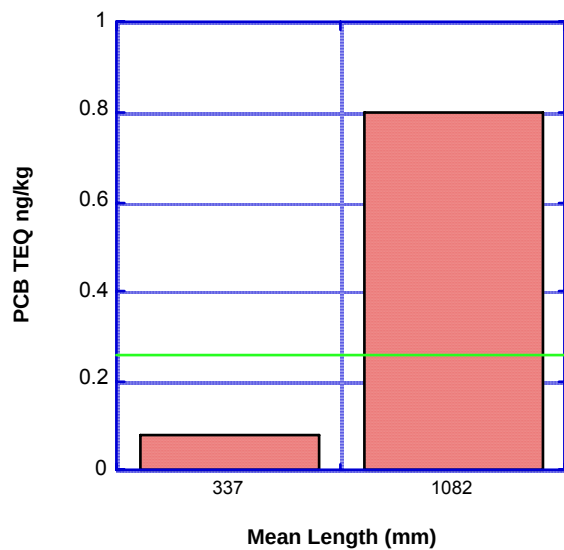


Green line: US EPA recreational consumption action limit at 0.40 mg/kg.

PCB Content

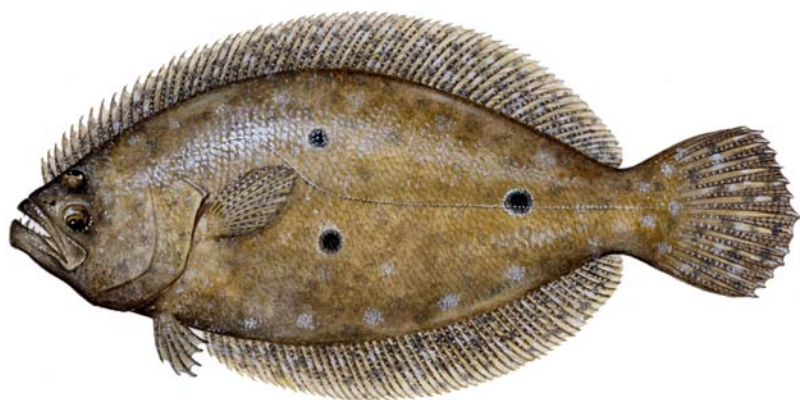


Green line: US EPA recreational consumption action limit at 20 µg/kg.



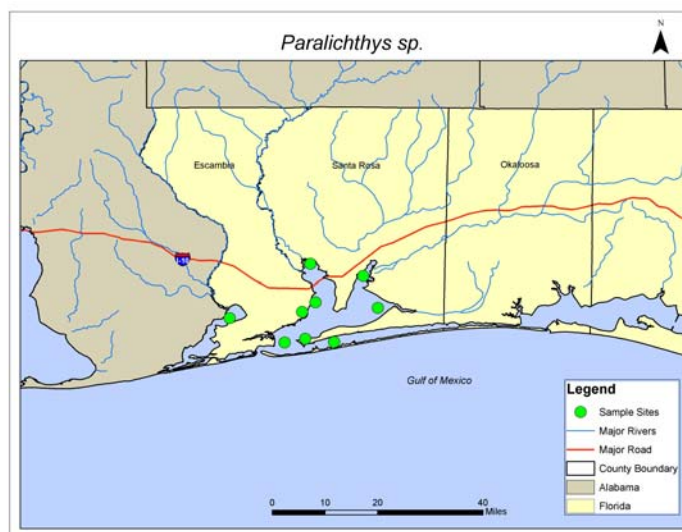
Toxicity of PCB molecules as a Toxic Equivalency Quotient (TEQ). The US EPA recreational consumption action limit for TEQ at 0.256 ng/kg is indicated by the green line

Location	n	Mean Length (mm)	Mean Weight (g)	Sex	% Lipids	TEQ _P ng/kg ND=0	ΣPCBs ug/kg	Hg mg/kg	LAT	LONG
Offshore outer shelf	1	337	510.0	F	0.01	0.0787	3.190	0.0046	30.204	-87.067
Offshore outer shelf	1	1082	nt	NT	1.80	0.7999	60.900	0.081	29.316	-88.237



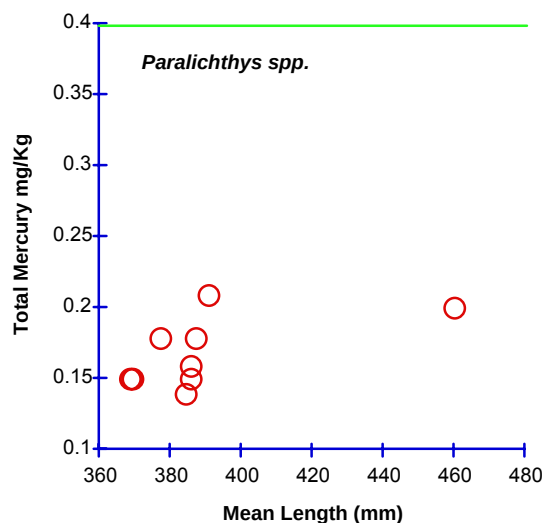
Flounder
Paralichthys spp

Sample Locations



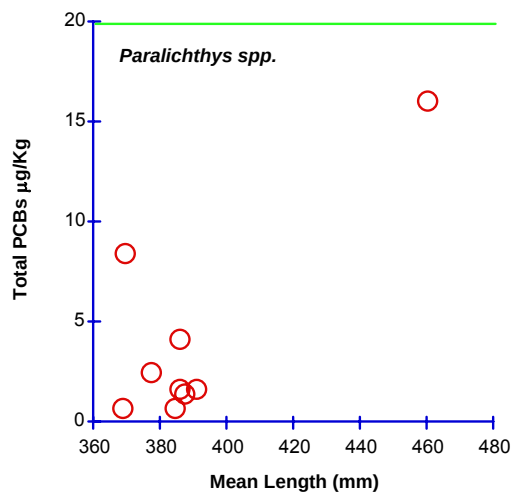
Fish were collected at various locations within the bay system. While there appeared a tendency for elevated mercury and PCBs with size, no fish exceeded US EPA thresholds for these compounds. One sample from the lower Escambia river did have an elevated TEQ value

Mercury Content

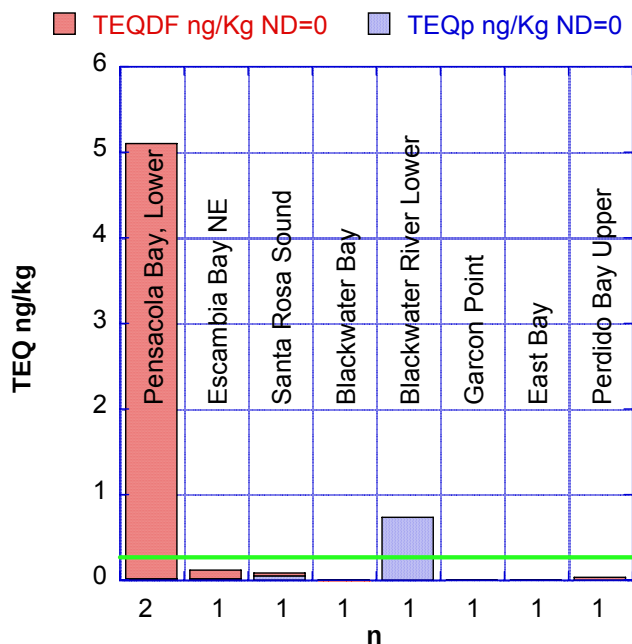


Green line: US EPA recreational consumption action limit at 0.40 mg/kg

PCB Content

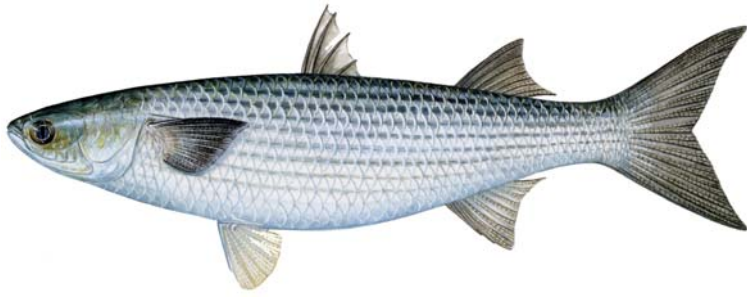


Red line: State of Florida action limit 50 µg/kg. Green line: US EPA recreational consumption limit 20 µg/kg.



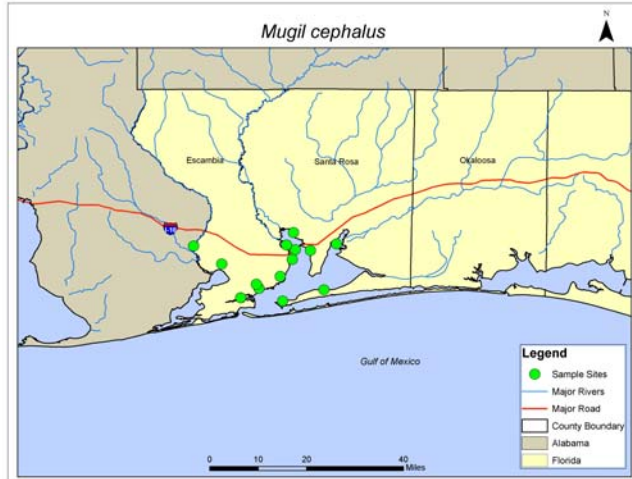
Toxicity of PCB molecules as a Toxic Equivalency Quotient (TEQ). The US EPA recreational consumption action limit for TEQ at 0.256 ng/kg is indicated by the green line.

Location	n	Mean Length (mm)	Mean Weight (g)	% Lipids	TEQ _{DF} ng/kg ND=0	TEQ _P ng/kg ND=0	TEQ _{DFP} ng/kg ND=0	ΣPCBs ug/kg	Hg mg/kg	LAT	LONG
Pensacola Bay, Lower	3	368	550.0	0.10	10.039	0.0014	10.041	0.711	0.150	30.355	-87.236
Blackwater Bay	3	384	596.7	0.10	0.0004	0.0009	0.0013	0.823	0.140	30.536	-87.020
Blackwater River Lower	4	385	607.5	0.30		0.7334		4.224	0.150	30.536	-87.020
East Bay	3	387	616.7	0.20	0.0000	0.0021	0.0021	1.420	0.180	30.450	-86.980
Garcon Point	3	386	613.3	0.30	0.0000	0.0030	0.0030	1.740	0.160	30.465	-87.151
Escambia Bay NE	3	369	684.6	0.30	0.1053	0.0201	0.1254	8.511	0.150	30.569	-87.165
Pensacola Bay, Lower	3	460	1160.0	0.40	0.1130	0.0316	0.1446	16.065	0.200	30.355	-87.236
Perdido Bay Upper	3	390	650.0	0.20	0.0350	0.0033	0.0383	1.718	0.210	30.422	-87.387
Santa Rosa Sound	3	377	682.5	0.40	0.0370	0.0493	0.0863	2.598	0.180	30.356	-87.100



Striped Mullet *Mugil cephalus*

Sample Locations



Areas with High PCB content

Lower Escambia River
Escambia River Delta
Upper and West Escambia Bay
Bayou Chico

Samples of skin-on fillets had twice the PCB load of skinless fillets.

Areas with low PCB content

Indian/Trout Bayous, East Escambia Bay
East Bay, Blackwater Bay
Pensacola Bay
Santa Rosa Sound
Bayous Hoffman, Woodlawn
Bayous Texar, Grande
Perdido Bay, Perdido River

Eighteen locations were targeted over the region providing 56 samples containing 170 fish. All samples were composites of 2 to 4 fish with at least three composites per location in nearly all cases, except four fish from the I-10 demolition blast on the Escambia Bay Bridge that were analyzed individually.

Mercury content was very low in all mullet tested.

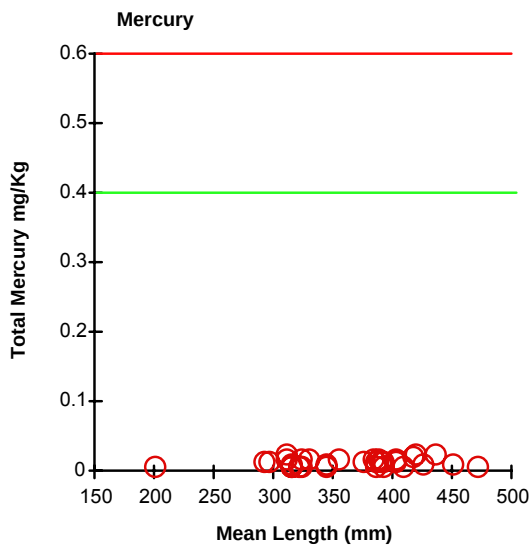
Mullet contained the highest PCB and Dioxins/Furans concentrations of any fish sampled during this study, especially those fish collected from known PCB contaminated areas. Thirty of 56 samples exceeded the US EPA screening value for total PCBs, and 45 out of 56 samples exceeded the US EPA combined PCB and Dioxins/Furans TEQ screening value. Thirty-two samples exceeded the TEQ value for Dioxins/Furans alone, and 29 samples exceeded the TEQ threshold for PCBs alone.

Samples of skin-on fillets had twice the PCB load of skinless fillets, but the toxicity (TEQ) was higher for the skinless fillet.

Locations with samples below the US EPA recreational consumption screening value for total PCBs and the combined PCB and Dioxins/Furans TEQ screening value were:

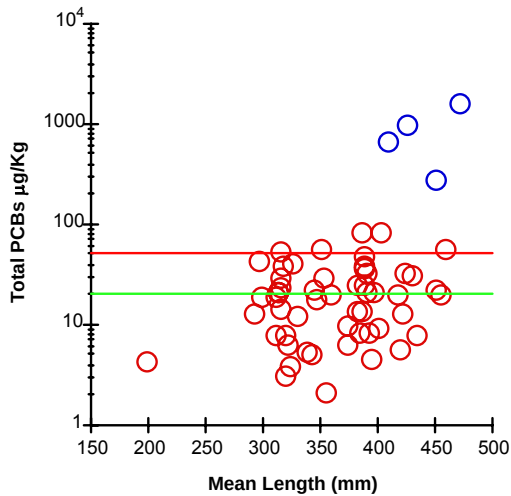
Yellow River, 2 of 3 samples
Bayou Texar, 1 of 3 samples
East Bay, 3 of 3 samples

Mercury Content

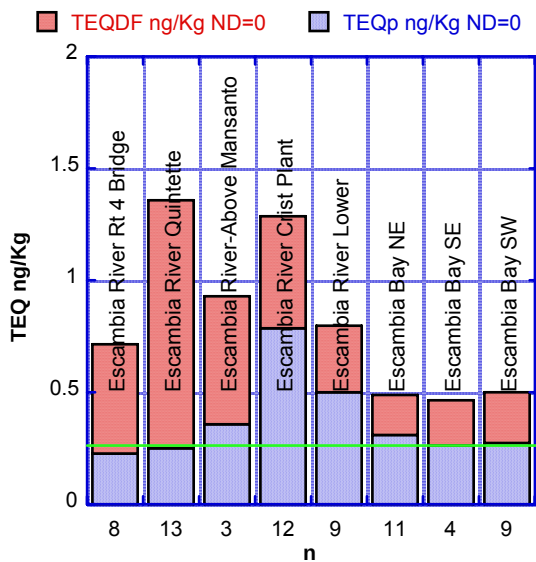


Red line: State of Florida action limit at 0.6 mg/kg.
Green line: US EPA recreational consumption action limit at 0.4 mg/kg

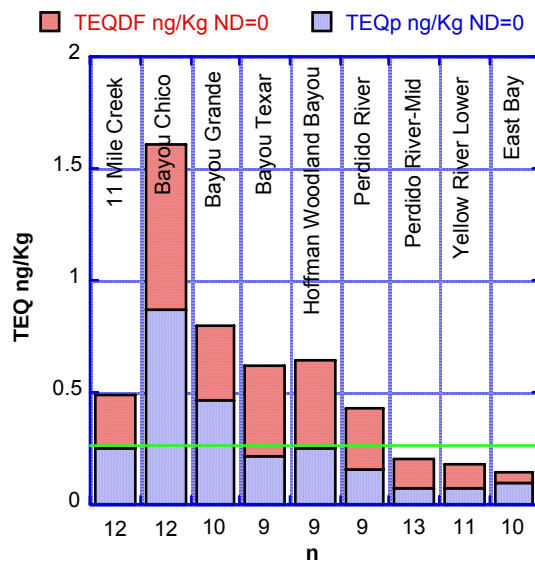
PCB content



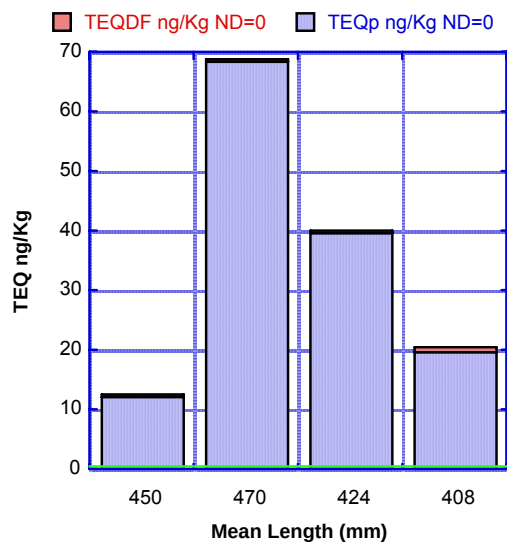
State of Florida limit 50 µg/kg (red line). US EPA recreational limit 20 µg/kg (green line). Note log scale on y-axis. Blue symbols I-10 Bridge, Esc. Bay



Toxicity of Dioxins Furans (TEQ_{DF}) and PCBs (TEQ_P) in Mullet within Escambia Bay except for I-10 bridge collections. The green line is the US EPA recreational consumption action limit at 0.256 ng/kg. State of Florida does not have an official action limit established for TEQ values.



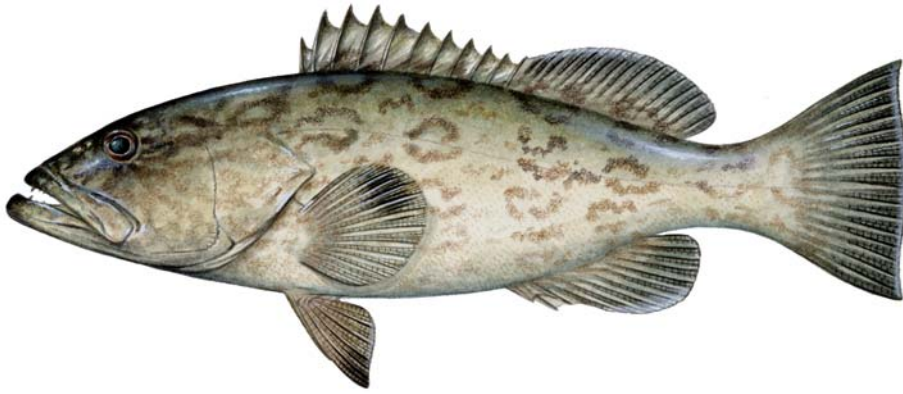
TEQ_{DF} and TEQ_P in Mullet in NW Florida waters except Escambia Bay. The green line is the US EPA recreational consumption action limit at 0.256 ng/kg. State of Florida does not have an official action limit established for TEQ values..



TEQ_{DF} and TEQ_P in Mullet from the I-10 bridge in Esc. Bay. US EPA recreational consumption limit 0.256 ng/kg (green line). State of Florida does not have an official action limit established for TEQ values.

Location	n	Mean Length (mm)	Mean Weight (g)	Sex	Mean Age	% Lipids	TEQ _{DF} ng/kg ND=0	TEQ _P ng/kg ND=0	TEQ _{DFP} ng/kg ND=0	ΣPCBs ug/kg	Hg mg/kg	LAT	LONG
11 Mile Creek	4	314	351.8		2.1	2.10	0.3270	0.2712	0.5982	21.188		30.456	-87.377
11 Mile Creek	4	329	415.3		2.5	2.10	0.3490	0.2913	0.6403	12.400	0.018	30.456	-87.377
11 Mile Creek	4	382	623.3		3.0	1.50	0.1480	0.1717	0.3197	14.027	0.018	30.456	-87.377
Bayou Chico	4	312	311.5		1.5		0.3420	0.5009	0.8429	21.269		30.404	-87.255
Bayou Chico	4	314	332.5		1.7	0.40	1.2398	0.9612	2.2010	29.392	0.008	30.404	-87.255
Bayou Chico	4	326	328.8		2.4	1.10	0.6560	1.1278	1.7838	40.800		30.404	-87.255
Bayou Grande	4	314	370.8		2.2	0.30	0.5299	0.3020	0.8319	14.500	0.0083	30.372	-87.297
Bayou Grande	3	344	323.3		2.3	0.90	0.3600	0.5792	0.9392	22.103	0.008	30.372	-87.297
Bayou Grande	3	358	431.0		2.5	0.50	0.1230	0.5139	0.6369	20.351		30.372	-87.297
Bayou Texar	3	373	496.0		1.8	1.00	0.0110	0.0219	0.0329	9.859		30.439	-87.188
Bayou Texar	3	385	563.7		2.0	0.50	0.0840	0.2389	0.3229	14.113	0.010	30.439	-87.188
Bayou Texar	3	390	493.3		1.7	1.30	1.1360	0.3630	1.4990	21.500	0.0096	30.439	-87.188
East Bay	4	419	617.5		3.1	1.10	0.0000	0.2119	0.2119	5.800	0.026	30.450	-86.980
East Bay	3	422	633.3		3.2	2.80	0.0350	0.0564	0.0914	13.100		30.450	-86.980
East Bay	3	434	693.3		3.5	0.60	0.0980	0.0203	0.1183	7.759	0.026	30.450	-86.980
Esc. Bay I-10 Bridge	1	408	750.0	F		4.40	1.0701	19.6102	20.6803	678.000	0.0095	30.519	-87.143
Esc. Bay I-10 Bridge	1	424	750.0	F		2.20	0.5219	39.5867	40.1086	1003.255	0.011	30.519	-87.143
Esc. Bay I-10 Bridge	1	450	930.0	F		3.90	0.4382	12.1610	12.5992	284.000	0.013	30.519	-87.143
Esc. Bay I-10 Bridge	1	470	1010.0	F		3.30	0.4668	68.5075	68.9743	1580.000	0.0099	30.519	-87.143
Escambia Bay NE	4	387	607.5		2.6	1.10	0.3030	0.0834	0.3864	36.724		30.569	-87.165
Escambia Bay NE	4	388	562.5		2.7	1.70	0.1640	0.7789	0.9429	24.600	0.018	30.569	-87.165
Escambia Bay NE	3	424	716.7		4.0	2.10	0.0670	0.0662	0.1332	33.600		30.569	-87.165
Escambia River Lower	3	381	602.3	F	2.4	2.00	0.3750	0.0577	0.4327	24.852		30.533	-87.169
Escambia River Lower	3	388	675.0	F	2.7	2.20	0.0480	0.5199	0.5679	48.605	0.017	30.533	-87.169
Escambia River Lower	3	402	763.3	F	4.0	1.90	0.4420	0.9390	1.3810	84.000	0.017	30.533	-87.169
Escambia Bay SE	2	392	564.0			0.60	0.3630	0.2393	0.6023	8.570	0.014	30.465	-87.151
Escambia Bay SE	2	401	563.5			0.70	0.0463	0.2750	0.3213	9.140	0.021	30.465	-87.151
Escambia Bay SW	3	387	556.7		2.9	1.90	0.4930	0.0787	0.5717	38.699		30.494	-87.113
Escambia Bay SW	3	395	566.7		3.3	1.30	0.0310	0.4469	0.4779	21.200		30.494	-87.113
Escambia Bay SW	3	417	633.3		3.0	1.40	0.1490	0.3064	0.4554	20.100	0.024	30.494	-87.113
Esc. River Crist Plant	3	316	288.1		1.3	1.10	0.0910	0.3508	0.4418	39.000		30.554	-87.212
Esc. River Crist Plant	3	350	374.6	F	1.3	1.00	0.2160	0.7479	0.9639	57.700		30.554	-87.212
Esc. River Crist Plant	3	385	516.7	M	2.0	1.20	1.0959	1.2081	2.3040	85.100		30.554	-87.212
Esc. River Crist Plant	3	457	776.7	F	3.3	1.70	0.5802	0.8412	1.4214	56.700		30.554	-87.212
Escambia River Mid (above Mansanto)	3	450	1160.0	F	5.0	6.50	0.5750	0.3556	0.9306	22.480			
Escambia River Quintette Bridge	4	346	427.5	F	1.0	1.00	0.3990	0.1675	0.5665	18.600		30.670	-87.267
Escambia River Quintette Bridge	3	390	620.0		1.0	2.80	1.6293	0.5613	2.1906	33.300		30.670	-87.267
Escambia River Quintette Bridge	3	430	760.0	F	1.3	3.60	1.4059	0.0410	1.4469	32.100		30.670	-87.267
Escambia River Quintette Bridge	3	455	856.7		3.7	1.10	0.9838	0.2267	1.2105	20.400		30.670	-87.267

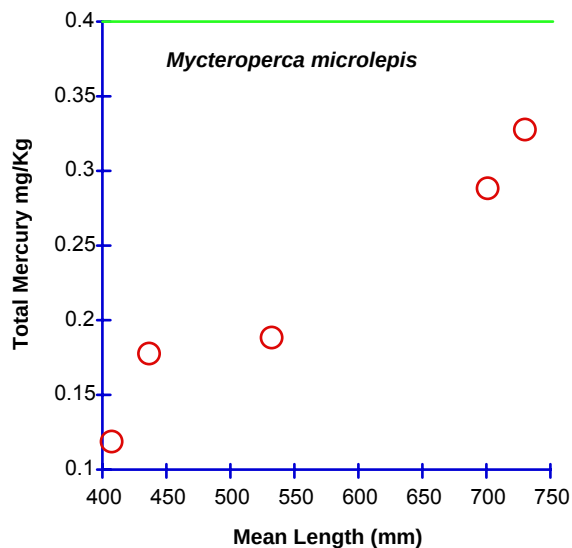
Location	n	Mean Length (mm)	Mean Weight (g)	Sex	Mean Age	% Lipids	TEQ _{DF} ng/kg ND=0	TEQ _P ng/kg ND=0	TEQ _{DFP} ng/kg ND=0	ΣPCBs ug/kg	Hg mg/kg	LAT	LONG
Escambia River Rt 4 Bridge	2	199	186.5	F	2.0	0.90	0.5365	0.0253	0.5618	4.390	0.008	30.967	87.234
Escambia River Rt 4 Bridge	3	295	660.0	F	2.7	3.20	0.1655	0.4048	0.5703	42.600	0.017	30.967	87.234
Escambia River Rt 4 Bridge	3	353	946.7	F	3.8	4.70	0.7760	0.2420	1.0180	29.800	0.021	30.967	87.234
Perdido River	3	310	321.7		1.5	1.70	0.3060	0.1674	0.4734	8.050	0.021	30.460	-87.412
Perdido River	3	318	320.3		2.2	2.80	0.3800	0.1999	0.5799	8.087		30.460	-87.412
Perdido River	3	322	311.0		2.0	1.50	0.1450	0.0823	0.2273	3.843	0.021	30.460	-87.412
Perdido River Lower	5	320	319.0		2.0	1.00	0.1130	0.0982	0.2112	3.110	0.0097	30.530	-87.447
Perdido River Lower	4	321	315.8		2.0	1.30	0.1630	0.0090	0.1720	6.363	0.010	30.530	-87.447
Perdido River Mid	4	338	358.5		2.0	2.10	0.1240	0.1078	0.2318	5.283		30.530	-87.447
Yellow River Lower	4	342	382.5		2.0	1.40	0.2170	0.1209	0.3379	5.050	0.012	30.536	-87.020
Yellow River Lower	4	355	425.3		1.8	1.00	0.0000	0.0038	0.0038	2.080		30.536	-87.020
Yellow River Lower	3	394	552.0		3.5	1.30	0.1280	0.0721	0.2001	4.517		30.536	-87.020
Hoffman Woodland Bayou	2	374	457.0			0.80	0.5920	0.1312	0.7232	6.300	0.014	30.365	-87.179
Hoffman Woodland Bayou	2	384	493.0			0.70	0.3230	0.1546	0.4776	8.310	0.014	30.365	-87.179
Hoffman Woodland Bayou	2	292	205.5							12.705	0.014	30.365	-87.179
Hoffman Woodland Bayou	2	297	229.5			4.20	0.0687	0.3309	0.3996	19.445		30.365	-87.179
Hoffman Woodland Bayou	3	311	321.5		1.3	4.80	0.5510	0.3975	0.9485	19.000	0.027	30.365	-87.179



Gag (grouper)
Mycteroperca microlepis

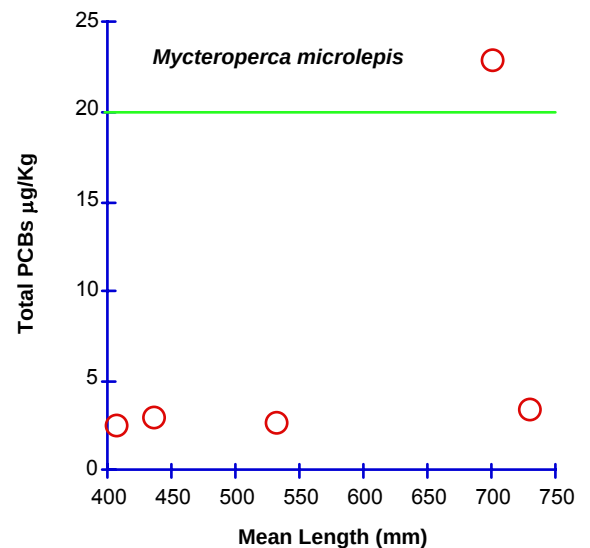
Sample Locations: Offshore

Mercury Content

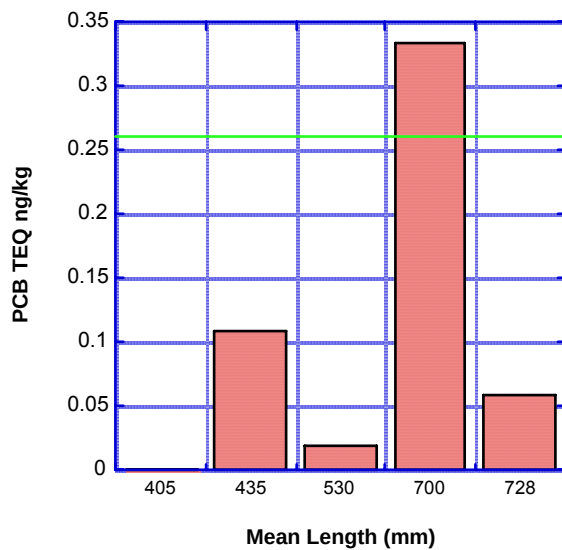


Green line: US EPA recreational consumption action limit at 0.40 mg/kg

PCB Content

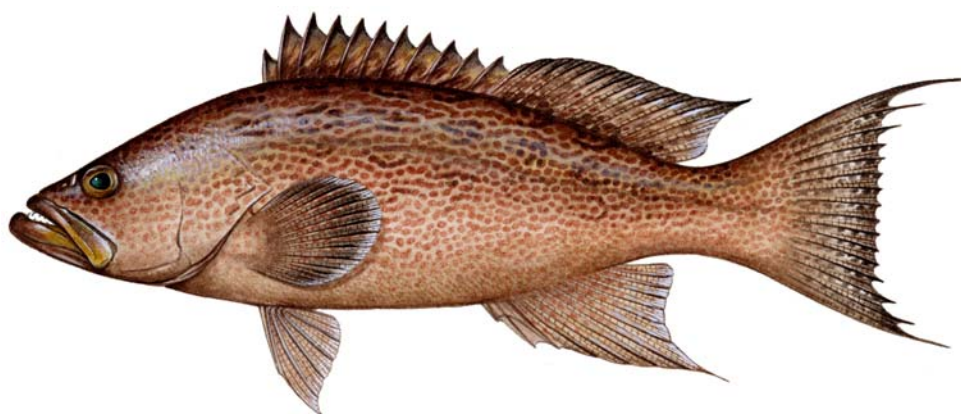


Green line: US EPA recreational consumption action limit at 20 µg/kg. These fish were taken offshore.



Toxicity of PCBs (TEQ_P) in Scamp from offshore Pensacola, FL. Two samples were close to zero. The US EPA recreational consumption action limit is indicated by the green line at 0.256 ng/kg.

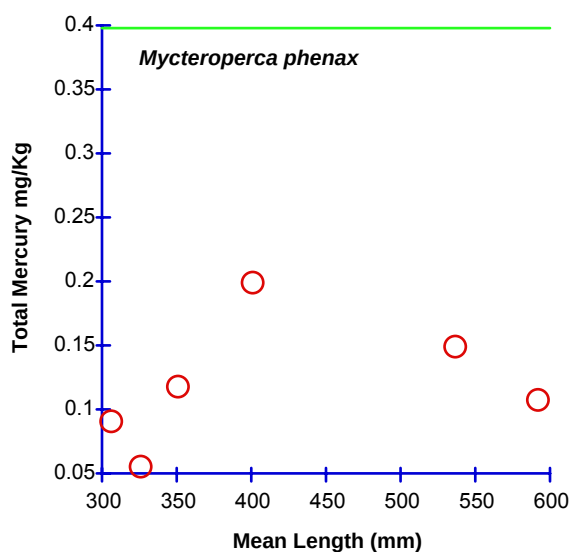
Location	n	Mean Length (mm)	Mean Weight (g)	% Lipids	TEQ _P ng/kg ND=0	ΣPCBs ug/kg	Hg mg/kg	LAT	LONG
Offshore midshelf	1	435	840.0	0.10	0.1095	2.994	0.18	30.1849	-87.2367
Offshore midshelf	1	700	4670.0	0.70	0.3335	22.980	0.29	30.1963	-87.2385
Offshore outer shelf	1	405	1230.0	0.20	0.0012	2.62	0.12	29.8472	-87.3042
Offshore outer shelf	1	530	1890.0	0.10	0.0197	2.792	0.19	30.0672	-87.0922
Offshore outer shelf	1	728	8960.0	0.80	0.0591	3.504	0.33	29.7167	-87.3167



Scamp Grouper
Mycteroperca phenax

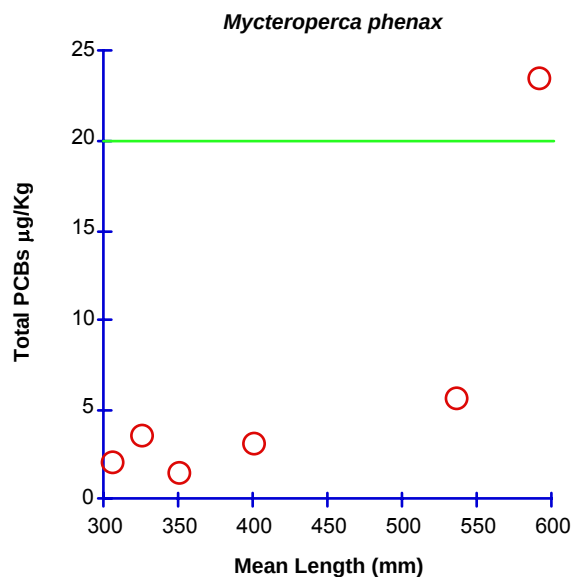
Sampling Locations: Offshore

Mercury Content

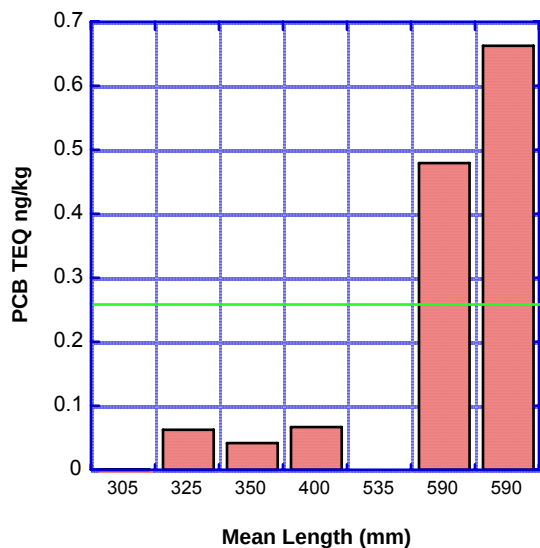


Green line: US EPA recreational consumption action limit at 0.40 mg/kg

PCB Content



Green line: US EPA recreational consumption action limit at 20 µg/kg. These fish were taken offshore.

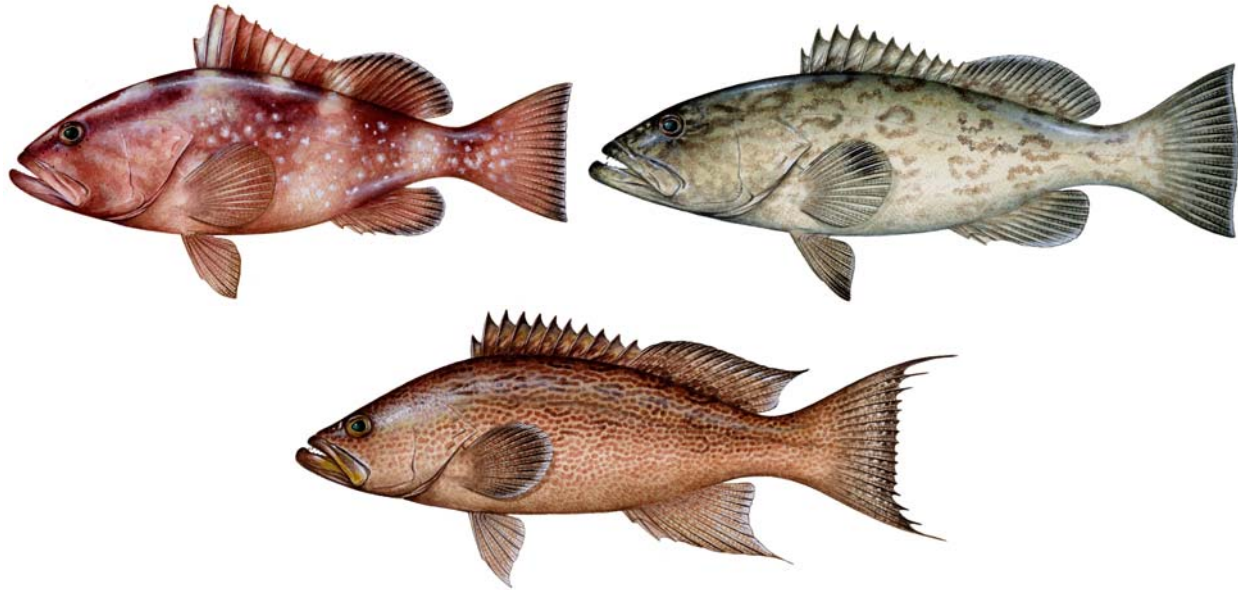


Toxicity of PCBs (TEQ_p) in Scamp from offshore Pensacola, FL. Two samples were close to zero. The US EPA recreational consumption action limit is indicated by the green line at 0.256 ng/kg.

Location	n	Mean Length (mm)	Mean Weight (g)	% Lipids	TEQ _p ng/kg ND=0	ΣPCBs ug/kg	Hg mg/kg	LAT	LONG
Offshore outer shelf	1	305	570.0	0.10	0.0004	2.08	0.092	29.8472	-87.3042
Offshore outer shelf	1	325	820.0	0.50	0.0641	3.646	0.058	29.3000	-88.0167
Offshore outer shelf	1	350	90.0	0.10	0.0422	1.580	0.12	29.8472	-87.3042
Offshore outer shelf	1	400	570.0	2.20	0.0679	3.160	0.2	29.8472	-87.3042
Offshore outer shelf	1	535	2070.0	0.60		5.668	0.15	29.4333	-87.7167
Offshore outer shelf	1	590	5250.0	2.10	0.6646	32.066	0.098	29.1833	-88.1833
Offshore outer shelf	1	590	5250.0	2.20	0.4822	23.600	0.11	29.1833	-88.1833

Red, Gag, & Scamp Groupers

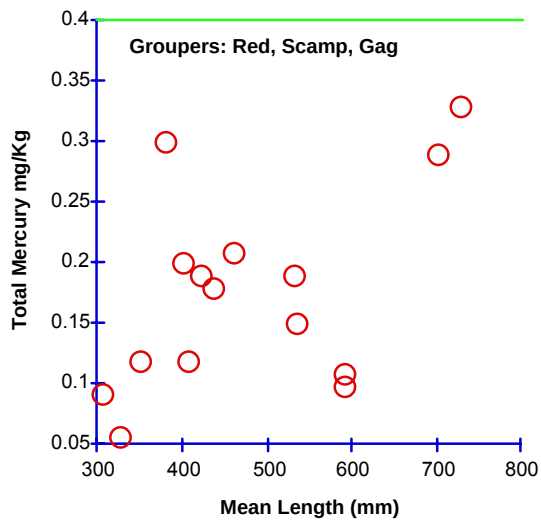
Epinephalus morio, *Mycteroperca microlepis*, *Mycteroperca phenax*



Sampling Location: Offshore

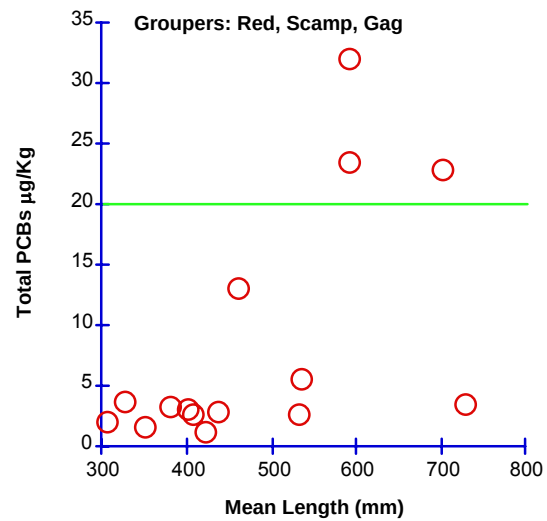
Fifteen groupers were sampled from offshore reefs. These fishes show a tendency for bioaccumulation with age for both mercury and PCBs. No samples exceeded the US EPA screening value for mercury, although three samples exceeded the screening value for total PCBs, and four samples exceed the TEQ value for PCBs alone (Dioxin/Furans were not analyzed in these fish).

Mercury Content

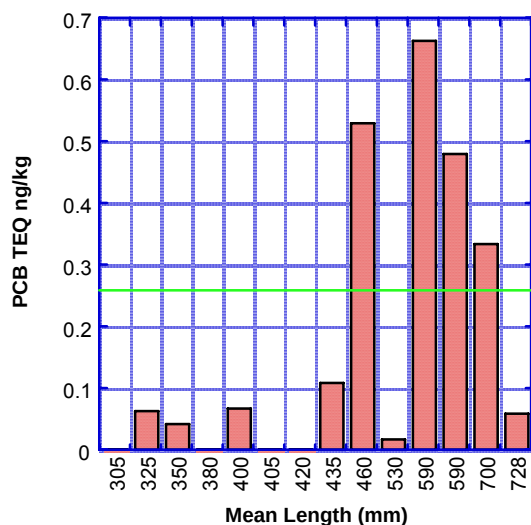


Green line: US EPA recreational consumption action limit at 0.40 mg/kg

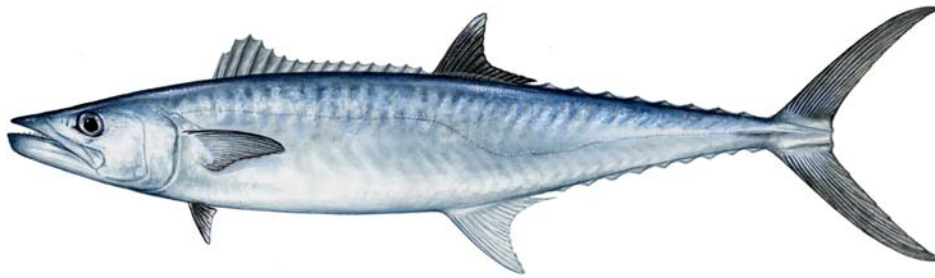
PCB Content



Green line: US EPA recreational consumption action limit at 20 µg/kg



Toxicity of PCB molecules as a Toxic Equivalency Quotient (TEQ). The US EPA recreational consumption action limit for TEQ at 0.256 ng/kg is indicated by the green line.

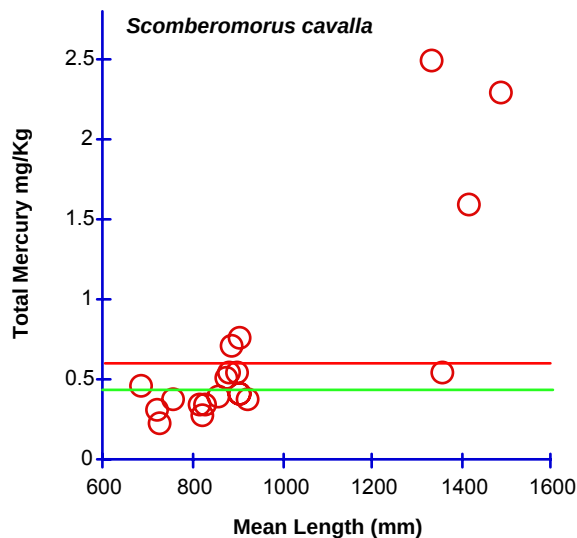


King Mackerel *Scomberomorus cavalla*

Sample locations: Offshore

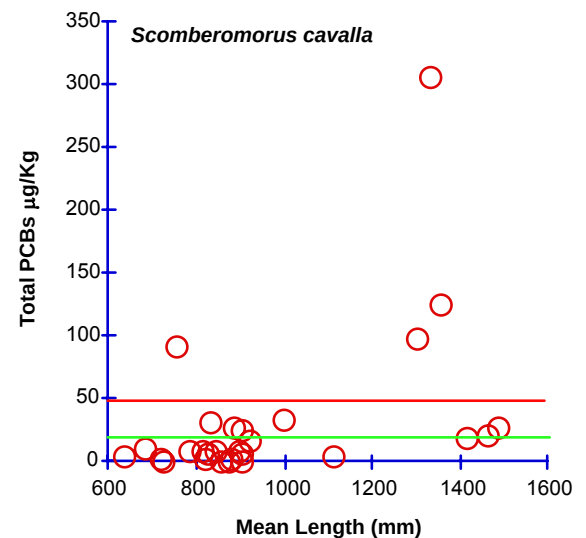
Twenty-eight fish were sampled from offshore Pensacola. Both PCBs and Hg accumulate with age in this species. Mercury content was high in these fish, and an existing consumption advisory exists based on the mercury content of larger specimens (>32"), which agrees with the recorded sizes of those fishes in this study exceeding the US EPA screening value. PCB content also exceeded the US EPA screening value at about the same size. The highest PCB loads of any offshore fish sampled were recorded for this species (92.5 µg/kg). Combined Dioxins/Furans and PCB TEQ values exceeded the US EPA screening value in 11 of 22 fish for which this data was available.

Mercury Content

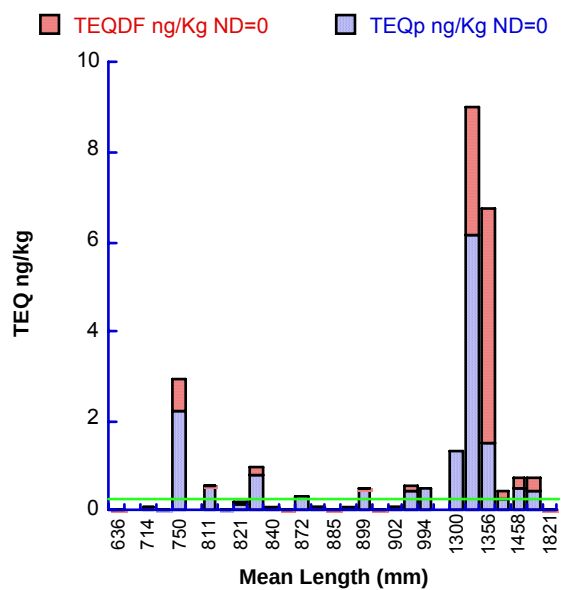


Green line: US EPA recreational consumption action limit at 0.40 mg/kg. Red line: State of Florida threshold for limited consumption at 0.60 mg/kg.

PCB Content



Red line: State of Florida action limit at 50 µg/kg. Green line: US EPA recreational consumption action limit at 20 µg/kg. These fish were taken offshore.



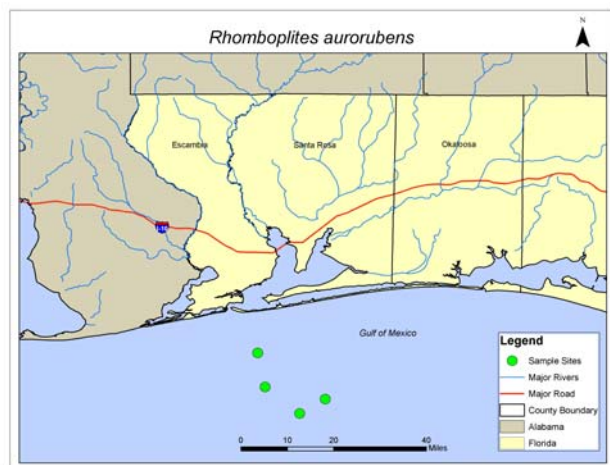
Toxicity of PCB molecules as a Toxic Equivalency Quotient (TEQ). The US EPA recreational consumption action limit for TEQ at 0.256 ng/kg is indicated by the green line.

Location	Mean Length (mm)	Mean Weight (g)	Sex	Mean Age	% Lipid	TEQ _{DF} ng/kg ND=0	TEQ _P ng/kg ND=0	TEQ _{DFP} ng/kg ND=0	ΣPCBs ug/kg	Hg mg/kg	LAT	LONG
Nearshore 3 Barges	714	1740.0	F		0.10	0.0032	0.0610	0.0642	3.030	0.32	30.289	-87.220
Nearshore 3 Barges	721	1700.0	F		0.10		0.0005		1.430	0.24	30.289	-87.220
Nearshore 3 Barges	811	2790.0	F	2.0	0.10	0.0178	0.5429	0.5607	9.610	0.36	30.289	-87.220
Nearshore 3 Barges	817	2860.0	F	3.0	0.80	0.0000	0.0462	0.0462	3.100	0.29	30.289	-87.220
Nearshore 3 Barges	821	2650.0	F		0.60	0.0832	0.1415	0.2247	7.910	0.35	30.289	-87.220
Nearshore 3 Barges	880	3590.0	F		0.30	0.0016	0.1033	0.1049	2.960	0.55	30.289	-87.220
Nearshore 3 Barges	885	3140.0	F	2.0	0.10	0.0090		0.0090	27.700	0.73	30.289	-87.220
Nearshore 3 Barges	893	4180.0	M	2.0	0.20	0.0000	0.0804	0.0804	8.460	0.56	30.289	-87.220
Nearshore 3 Barges	899	3910.0	F	2.0	0.30	0.0141	0.5034	0.5175	25.900	0.42	30.289	-87.220
Nearshore 3 Barges	994	5300.0	M	9.0	0.10		0.4776		34.100		30.289	-87.220
Nearshore Paradise Hole	636	1260.0	M	2.0	0.10	0.0093	0.0018	0.0111	5.120		30.216	-87.446
Nearshore Paradise Hole	681	1450.0	NT		0.50				11.900	0.47	30.216	-87.446
Nearshore Paradise Hole	840	2930.0	F	3.0	0.10		0.1058		8.840		30.216	-87.446
Nearshore Paradise Hole	855	3170.0	F	3.0	0.20	0.0081	0.0008	0.0089	1.860	0.41	30.216	-87.446
Nearshore Paradise Hole	872	2610.0	F	3.0	0.50	0.0000	0.3362	0.3362	1.410	0.52	30.216	-87.446
Offshore outer shelf	750	5090.0	M		6.00	0.7228	2.2172	2.9400	92.459	0.39	29.847	-87.304
Offshore outer shelf	900	3680.0	F		0.20	0.0013	0.0008	0.0021	1.680	0.77		
Offshore outer shelf	902	3480.0	F		0.10	0.0069	0.0639	0.0708	6.630	0.43		
Offshore outer shelf	919	3870.0	F		0.30	0.1255	0.4262		17.700	0.39		
Offshore outer shelf	1109	7440.0	F	11.0	0.80				4.980			
Offshore outer shelf	1300	1255.0	F	13.0	0.50		1.3320		98.300			
Offshore outer shelf	1330	15000.0	F		8.00	2.8670	6.1700	9.0370	307	2.5		
Offshore outer shelf	1356	14840.0	F		5.30	5.2370	1.4995	6.7365	125	0.55		
Offshore outer shelf	1413	17540.0	F		0.40	0.2077	0.2560	0.4637	18.8	1.6		
Offshore outer shelf	1458	23500.0	F		0.30	0.2606	0.4977	0.7583	22.7	3.6		
Offshore outer shelf	1484	18080.0	F		0.50	0.2946	0.4368	0.7314	27.4	2.3		
Offshore outer shelf	1821	28360.0	F		0.10	0.0055	0.0028	0.0083	2.82	4.9		
Pensacola Beach Pier	780	3855.0	F		0.20				8.412		30.330	-87.141
Pensacola Beach Pier	830	4820.0	F		6.40	0.2081	0.7822	0.9903	32.185		30.330	-87.141



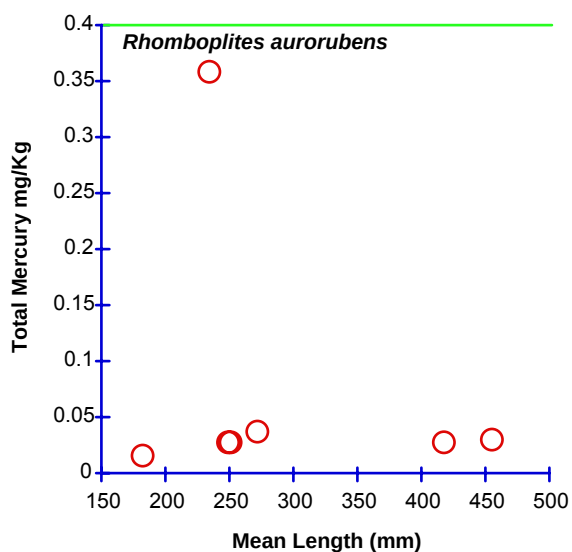
Mingo (Vermillion) Snapper *Rhomboplites aurorubens*

Sample Locations



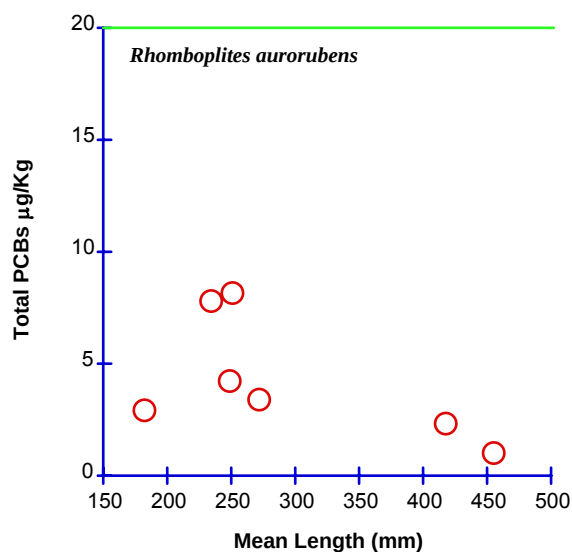
Specimens were obtained over offshore reefs representing 8 samples comprised of 20 fish, with 6 samples as individual specimens. TEQ values, PCBs and mercury content were all low in sampled fish.

Mercury Content

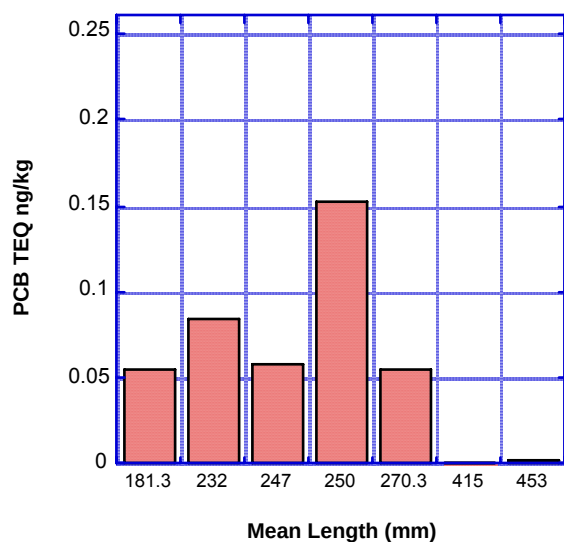


Green line: US EPA recreational consumption action limit at 0.4 mg/kg

PCB Content

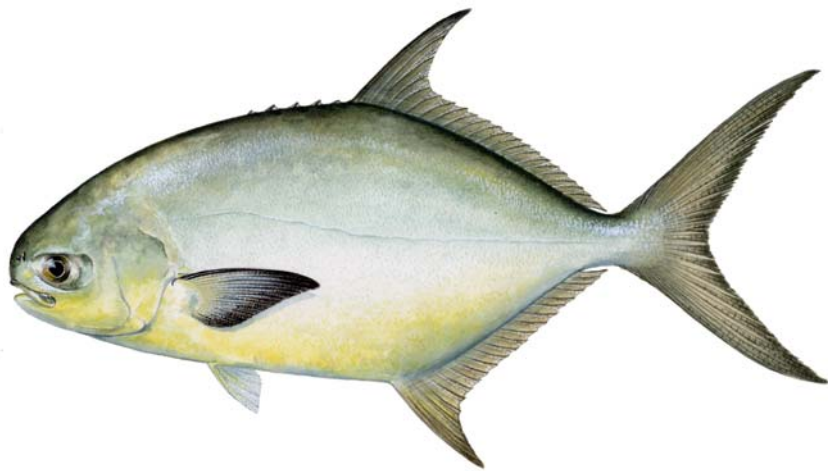


Green line: US EPA recreational consumption action limit at 20 µg/kg



Toxicity of PCB molecules as a Toxic Equivalency Quotient (TEQ). The US EPA recreational consumption action limit for TEQ is 0.256 ng/kg.

Location	n	Mean Length (mm)	Mean Weight (g)	% Lipids	TEQ _P ng/kg ND=0	ΣPCBs ug/kg	Hg mg/kg	LAT	LONG
Offshore midshelf	3	270	333.7	1.50	0.0547	3.47	0.039	30.188	-87.217
Offshore midshelf reef permit zone	1	173	72.1					30.081	-87.194
Offshore midshelf reef permit zone	11	181	86.9	1.50	0.0548	2.95	0.017	30.081	-87.194
Offshore outer shelf	1	232	380.0	1.58	0.0836	7.820	0.36	30.043	-87.006
Offshore outer shelf	1	247	460.0	1.01	0.0573	4.2746	0.029	30.043	-87.006
Offshore outer shelf	1	250	430.0	1.48	0.1524	8.260	0.029	30.043	-87.006
Offshore outer shelf	1	415	980.0	0.80	0.0003	2.32	0.03	29.998	-87.086
Offshore outer shelf	1	453	1180.0	1.00	0.0020	1.050	0.032	29.998	-87.086

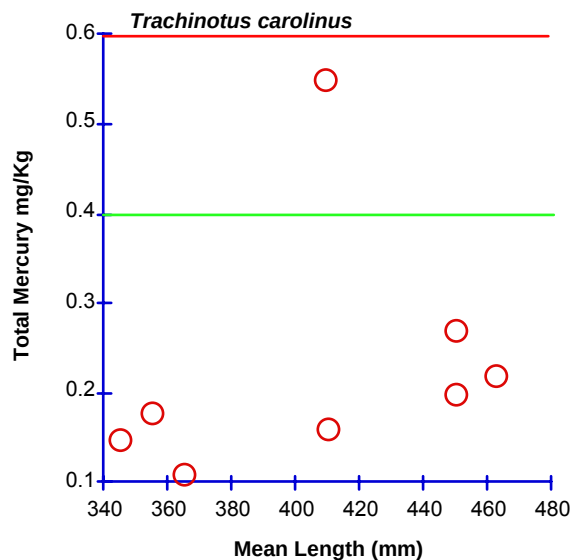


Pompano *Trachinotus carolinus*

Sample locations: Santa Rosa Island Surf

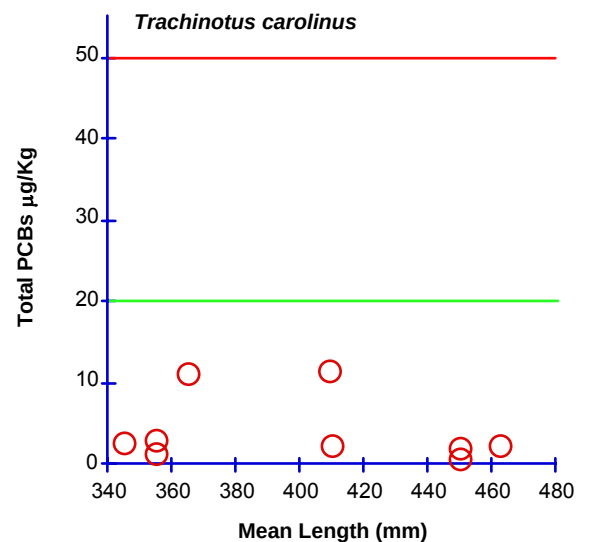
Nine fish were collected from Santa Rosa Island Surf and analyzed as individuals. Mercury accumulation with size was apparent, but only one mid-sized fish of nine samples exceeded the US EPA screening value. None of the PCB concentrations were above the US EPA screening value, and higher concentrations were found in smaller fish, consistent with estuarine utilization by juveniles in this species. The fish with the two highest PCB concentrations also had high Dioxins/Furans, and the TEQ values for these fish exceeded the US EPA TEQ screening value for recreational fisher consumption.

Mercury Content

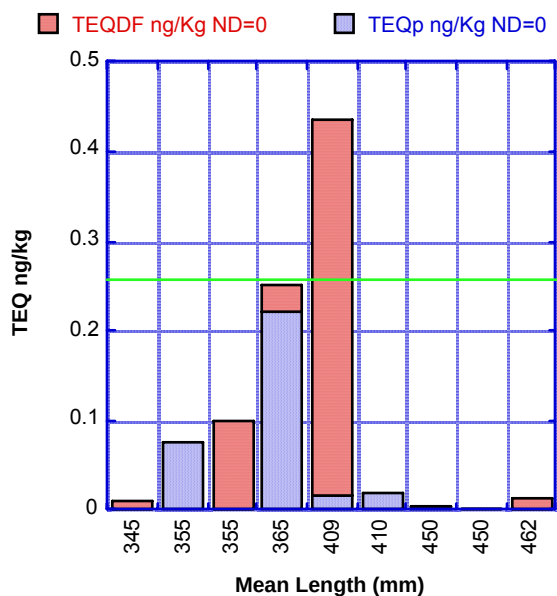


Green line: US EPA recreational consumption action limit at 0.40 mg/kg. Red line: State of Florida action limit at 0.6 mg/kg..

PCB Content

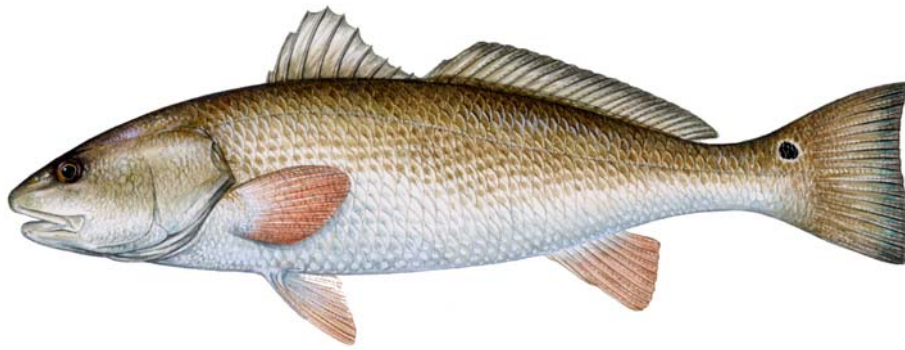


Green line: US EPA recreational consumption action limit at 20 µg/kg. These fish were taken offshore. Red line: State of Florida action limit at 50 µg/kg



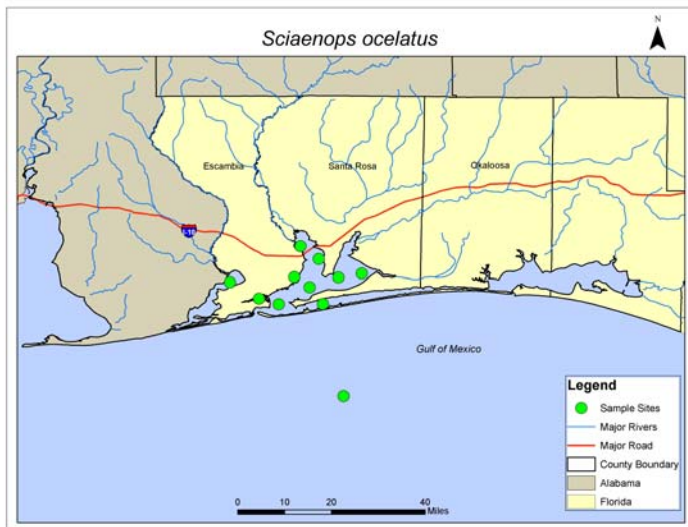
Toxicity of Dioxins Furans (TEQ_{DF}) and PCBs (TEQ_P) in Pompano from Santa Rosa Island Surf. The green line is the US EPA recreational consumption action limit at 0.256 ng/k

Location	n	Mean Lgth (mm)	Mean Wght (g)	Sex	% Lipid	TEQ _{DF} ng/kg ND=0	TEQ _P ng/kg ND=0	TEQ _{DFP} ng/kg ND=0	ΣPCBs ug/kg	Hg mg/kg	LAT	LONG
Santa Rosa Island surf	1	345	490.0	F	0.40	0.0081	0.0014	0.0095	2.850	0.15	30.349	-87.041
Santa Rosa Island surf	1	355	520.0	F	0.30	0.0000	0.0748	0.0748	3.030	0.18	30.349	-87.041
Santa Rosa Island surf	1	355	510.0	F	1.50	0.1000	0.0004	0.1004	0.59	0.18	30.349	-87.041
Santa Rosa Island surf	1	365	610.0	F	2.30	0.0280	0.2228	0.2508	11.400	0.11	30.349	-87.041
Santa Rosa Island surf	1	409	500.0	M	0.40	0.4206	0.0162	0.4368	11.50	0.55	30.349	-87.041
Santa Rosa Island surf	1	410	870.0	F	2.50	0.0000	0.0192	0.0192	2.560	0.16	30.349	-87.041
Santa Rosa Island surf	1	450	1090.0	F	0.30	0.0000	0.0038	0.0038	2.050	0.27	30.349	-87.041
Santa Rosa Island surf	1	450	960.0	F	0.10	0.0000	0.0002	0.0002	0.746	0.2	30.349	-87.041
Santa Rosa Island surf	1	462	1180.0	F	0.10	0.0108	0.0010	0.0118	2.560	0.22	30.349	-87.041



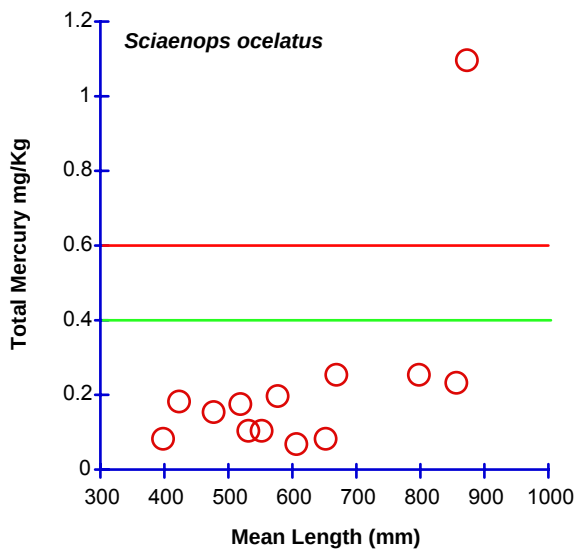
Red Drum *Sciaenops ocellatus*

Sample Locations



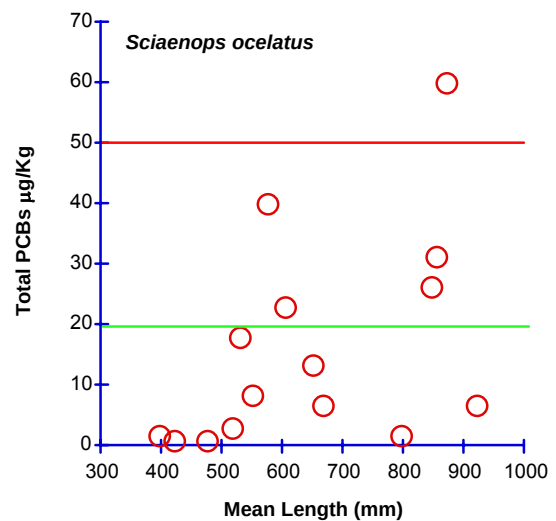
Fifteen samples including 28 fish from 10 locations were analyzed. With the exception of a single sample, mercury content increased slightly with size but was low in all samples. PCB content increased with size, with 5 samples over the US EPA screening value. Three fish had TEQ values that exceeded that US EPA screening value.

Mercury Content

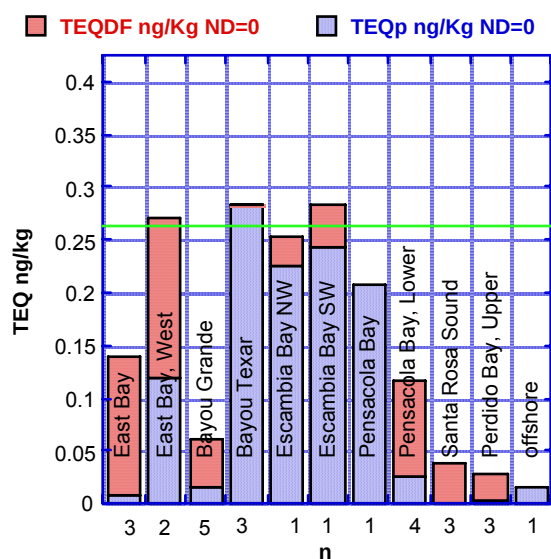


Red line: State of Florida action limit at 0.6 mg/kg.
Green line: US EPA recreational consumption action limit at 0.4 mg/kg.

PCB Content



Red line: State of Florida action limit at 50 µg/kg
Green line: US EPA recreational consumption action limit at 20 µg/kg



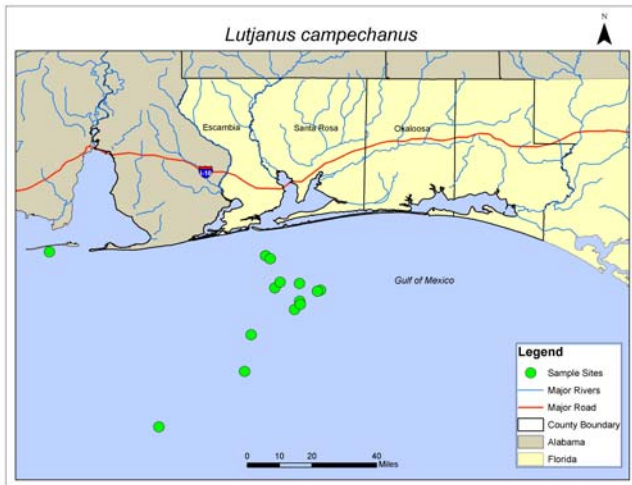
Toxicity of PCB molecules as a Toxic Equivalency Quotient (TEQ). The US EPA recreational consumption action limit for TEQ at 0.256 ng/kg is indicated by the green line.

Location	n	Mean Lgth (mm)	Mean Wght (g)	Age	% Lipid	TEQ _{DF} ng/kg ND=0	TEQ _P ng/kg ND=0	TEQ _{DFP} ng/kg ND=0	ΣPCBs ug/kg	Hg mg/kg	LAT	LONG
Pens. Bay	1	845	6730	14.0			0.248		26.400		30.407	-87.141
Pens. Bay	1	920	10510	15.0	0.10		0.167		6.690		30.407	-87.141
Bayou Grande	1	395	560.0	1.2	0.30	0.027	0.002	0.0286	1.729	0.090	30.372	-87.297
Bayou Grande	4	526	1447.5	1.3	0.40	0.068	0.027	0.0946	18.233	0.110	30.372	-87.297
Bayou Texar	3	550	1616.7	1.3	0.30	0.001	0.283	0.2840	8.310	0.110	30.439	-87.188
East Bay	3	515	1250.0	1.0	0.30	0.131	0.008	0.1389	3.053	0.180	30.450	-86.980
East Bay, W	1	667	3080.0	2.0	0.20	0.012	0.130	0.1422	6.897	0.260	30.437	-87.052
East Bay, W	1	868	5060.0	8.0	0.20	0.288	0.110	0.3985	60.322	1.100	30.470	-87.052
Escambia Bay NW	1	650	2730.0	3.0	0.10	0.027	0.226	0.2536	13.658	0.092	30.533	-87.169
Escambia Bay SW	1	601	1810.0	2.0	0.20	0.041	0.242	0.2827	23.153	0.073	30.494	-87.113
Offshore	1	796	4630.0		0.30	0.000	0.015	0.0154	1.650	0.26	30.071	-87.035
Pensacola Bay, Lower	3	473	976.7	1.0	0.20	0.020	0.001	0.0204	0.916	0.160	30.355	-87.236
Pensacola Bay, Lower	1	853	6230.0	17.0	0.40	0.165	0.048	0.2134	31.314	0.240	30.355	-87.236
Perdido Bay Upper	3	420	740.0	1.0	0.20	0.024	0.003	0.0271	1.150	0.190	30.420	-87.387
Santa Rosa Sound	3	573	1250.0	2.0	0.20	0.038	0.000	0.0380	40.304	0.200	30.356	-87.100



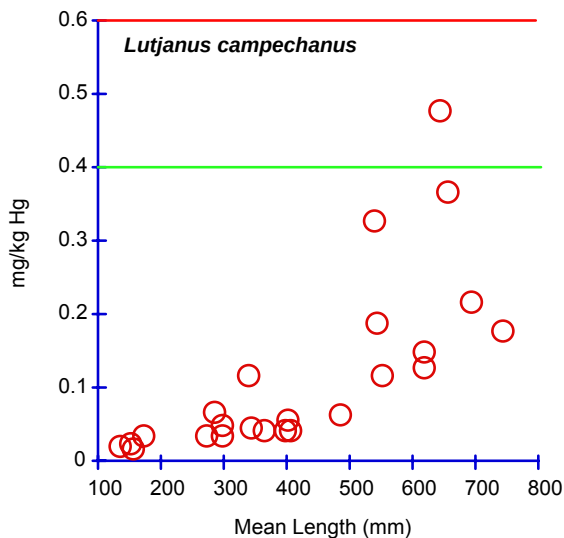
Red Snapper *Lutjanus campechanus*

Sample Locations



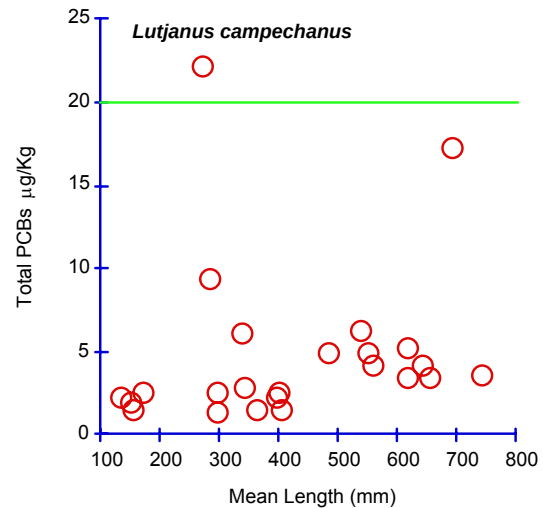
Forty-two fish in 24 samples were collected from offshore reefs, with smaller sized fish making up composites of 2 to 6 fish. Mercury content increased with size, with larger fish approaching the US EPA screening value and one fish exceeding it. PCB content was generally low with one larger fish close to the US EPA screening value and one smaller fish exceeding it. TEQ values followed a similar pattern, with only one smaller fish exceeding the screening value.

Mercury Content

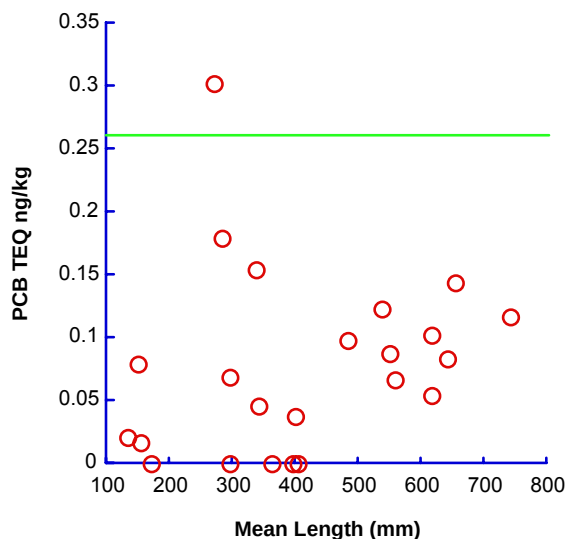


Red line: State of Florida action limit at 0.6 mg/kg.
Green line: US EPA recreational consumption action limit at 0.4 mg/kg.

PCB Content



Red line: State of Florida action limit at 20 µg/kg.
Green line: US EPA recreational consumption action limit at 20 µg/kg.



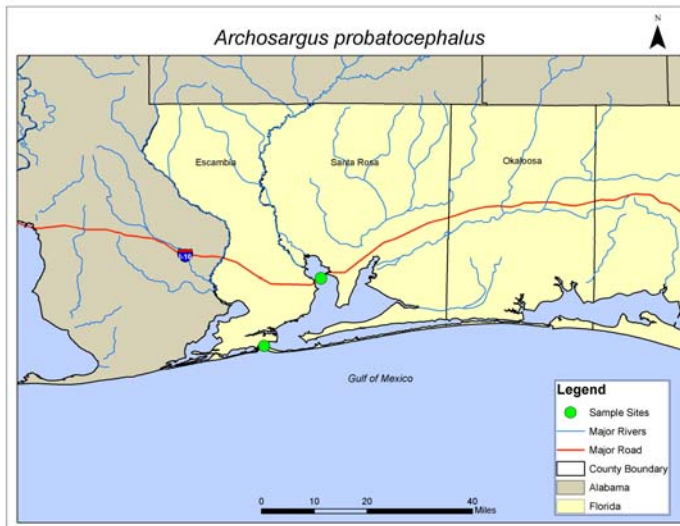
Toxicity of PCBs (TEQ_P) in Red Snapper from offshore Pensacola, FL. The green line is the US EPA recreational consumption action limit at 0.256 ng/kg.

Location	n	Mean Length (mm)	Mean Weight (g)	% Lipid	TEQ _P ng/kg ND=0	ΣPCBs ug/kg	Hg mg/kg	LAT	LONG
Inshore	3	130	76.1	1.90	0.0215	2.23	0.023	30.208	-87.120
Inshore	2	170	146.2	0.10	0.0011	2.64	0.037	30.208	-87.120
Offshore midshelf	2	295	480.0	0.20	0.0686	2.631	0.05	30.189	-87.218
Offshore midshelf	3	337	770.0	1.70	0.1550	6.13	0.12	30.189	-87.218
Offshore midshelf	1	400	960.0	0.10	0.0380	2.600	0.06	30.202	-87.239
Offshore midshelf	1	550	2300.0	0.20	0.0881	4.980	0.12	30.202	-87.239
Offshore midshelf	1	613	3400.0	0.50	0.1030	5.315	0.13	30.202	-87.239
midshelf reef permit zone	1	295	380.0	0.40	0.0006	1.477	0.036	30.083	-87.174
midshelf reef permit zone	1	338	550.0	0.70	0.0475	2.86	0.049	30.083	-87.174
midshelf reef permit zone	1	614	316.0	0.10	0.0559	3.505	0.15	30.058	-87.198
Offshore outer shelf	4	151	122.9	0.60	0.0809	1.97	0.028	29.961	-87.110
Offshore outer shelf	6	153	131.3	0.20	0.0171	1.597	0.021	29.984	-87.084
Offshore outer shelf	1	270	620.0	0.13	0.3024	22.300	0.038	30.043	-87.007
Offshore outer shelf	1	280	690.0	0.15	0.1801	9.370	0.07	30.043	-87.007
Offshore outer shelf	1	362	652.8	0.70	0.0005	1.55	0.043	29.998	-87.086
Offshore outer shelf	1	395	780.0	0.10	0.0012	2.35	0.044	29.998	-87.086
Offshore outer shelf	1	401	920.0	0.10	0.0005	1.54	0.044	29.998	-87.086
Offshore outer shelf	1	480	1520.0	1.50	0.0995	4.92	0.066	29.998	-87.086
Offshore outer shelf	1	535	4480.0	0.40	0.1231	6.323	0.33	29.683	-87.333
Offshore outer shelf	4	540	220.3				0.19		
Offshore outer shelf	1	558	2610.0	1.70	0.0676	4.23		30.078	-87.087
Offshore outer shelf	1	640	7600.0	0.40	0.0845	4.180	0.48	29.433	-87.717
Offshore outer shelf	1	652	3690.0	0.10	0.1456	3.512	0.37	29.998	-87.086
Offshore outer shelf	1	690	1068.0	0.50		17.37	0.22	30.220	-88.208
Offshore outer shelf	1	740	5680.0	0.00	0.1184	3.576	0.18	29.847	-87.304



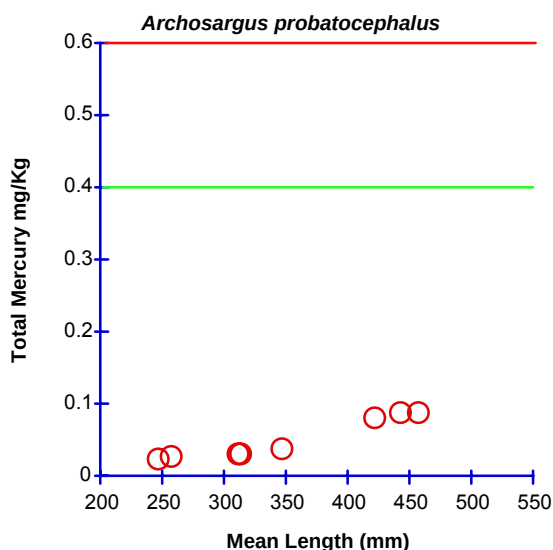
Sheepshead *Archosargus probatocephalus*

Sample Locations



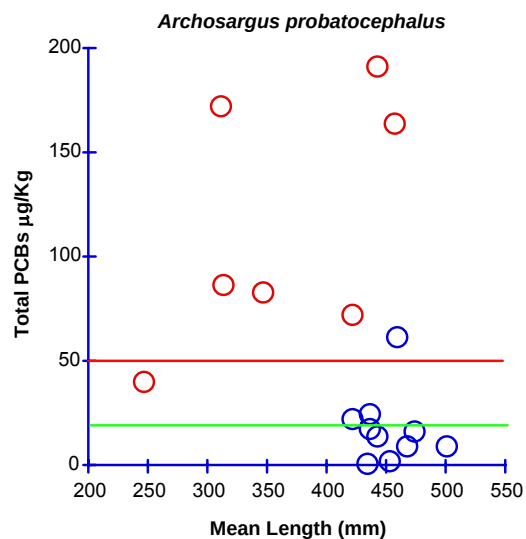
Eighteen fish were sampled from two locations: Pensacola Pass during the annual spawning aggregation, and from the Escambia Bay I-10 Bridge demolition blast. Mercury content was determined for the 8 samples taken from Pensacola pass, and although accumulation with age was observed, the concentrations were all well below the US EPA screening value. PCB content, however, was above the US EPA screening value for three of the eight samples from Pensacola Pass where fish had congregated for the annual spawning. All of the samples from the I-10 Escambia Bay Bridge were well above the US EPA Screening value. Only one sample from both locations was below the US EPA screening value for TEQ.

Mercury Content

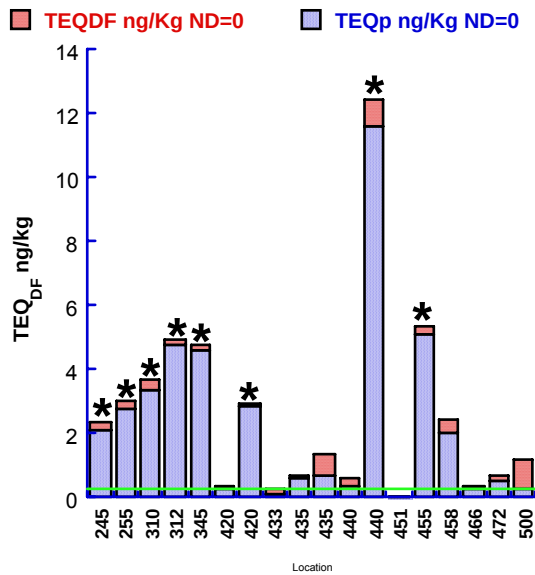


Red line: State of Florida action limit at 0.6 mg/kg.
Green line: US EPA recreational consumption action limit at 0.4 mg/kg

PCB content



State of Florida action limit 50 µg/kg (red line). US EPA recreational consumption action limit 20 µg/kg (green line). Red symbols I-10 Bridge, Esc. Bay



Toxicity of Dioxins Furans (TEQ_{DF}) and PCBs (TEQ_P) in Sheephead from Pensacola Bay. High values, with one exception, were obtained for fish collected at the I-10 bridge (starred samples) in Escambia Bay. The green line is the US EPA recreational consumption action limit at 0.256 ng/kg. State of Florida does not have an official action limit established for TEQ values.

Location	n	Mean Lgth (mm)	Mean Weight (g)	% Lipid	TEQ _{DF} ng/kg ND=0	TEQ _P ng/kg ND=0	TEQ _{DFP} ng/kg ND=0	ΣPCBs ug/kg	Hg mg/kg	LAT	LONG
Escambia Bay I-10	1	245	280.0	1.00	0.1846	2.1508	2.3354	41.100	0.025	30.519	-87.143
Escambia Bay I-10	1	255	340.0	0.80	0.1913	2.8072	2.9985	54.100	0.03	30.519	-87.143
Escambia Bay I-10	1	310	610.0	1.80	0.3154	3.4060	3.7214	173.00	0.035	30.519	-87.143
Escambia Bay I-10	1	312	550.0	0.70	0.2094	4.7738	4.9832	87.700	0.035	30.519	-87.143
Escambia Bay I-10	1	345	700.0	0.70	0.1699	4.6129	4.7828	83.700	0.039	30.519	-87.143
Escambia Bay I-10	1	420	1350.0	0.60	0.1026	2.8624	2.9650	73.600	0.085	30.519	-87.143
Escambia Bay I-10	1	440	1580.0	2.60	0.8599	11.599	12.459	192.00	0.089	30.519	-87.143
Escambia Bay I-10	1	455	1770.0	1.60	0.2838	5.1068	5.3906	165.00	0.092	30.519	-87.143
Pensacola Pass	1	420	1230.0	0.20	0.0956	0.2458	0.3414	23.000		30.334	-87.299
Pensacola Pass	1	433	1400.0	0.30	0.1414	0.1105	0.2519	2.150		30.334	-87.299
Pensacola Pass	1	435	1620.0	0.40	0.0841	0.6006	0.6847	25.100		30.334	-87.299
Pensacola Pass	1	435	1310.0	1.00	0.6197	0.7205	1.3402	18.200		30.334	-87.299
Pensacola Pass	1	440	1670.0	0.90	0.2482	0.3786	0.6268	14.600		30.334	-87.299
Pensacola Pass	1	451	1650.0	0.30	0.0000	0.0166	0.0166	2.570		30.334	-87.299
Pensacola Pass	1	458	1550.0	0.60	0.4506	2.0207	2.4713	62.300		30.334	-87.299
Pensacola Pass	1	466	1470.0	0.40	0.0857	0.2980	0.3837	10.200		30.334	-87.299
Pensacola Pass	1	472	1530.0	0.40	0.1522	0.5279	0.6801	16.700		30.334	-87.299
Pensacola Pass	1	500	1980.0	0.70	0.9019	0.3197	1.2216	9.640		30.334	-87.299



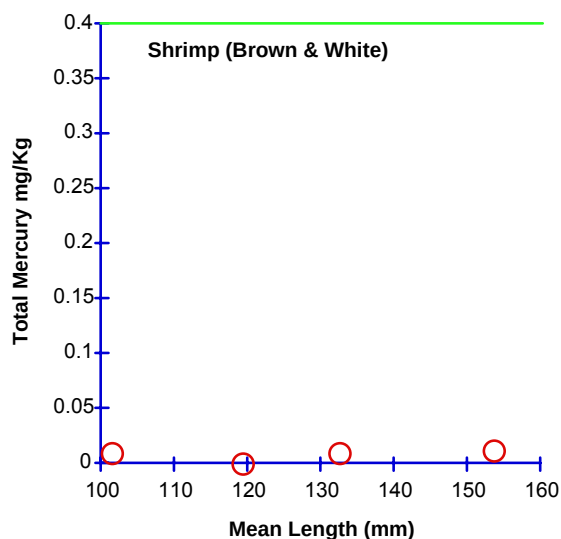
Shrimp

Farfantepenaeus spp.

Sample Locations

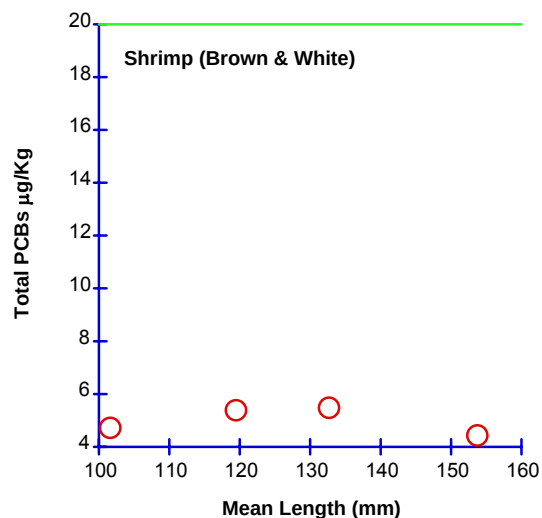
Shrimp samples (4) from Pensacola Bay were all well below screening values for mercury, PCBs and TEQ.

Mercury Content



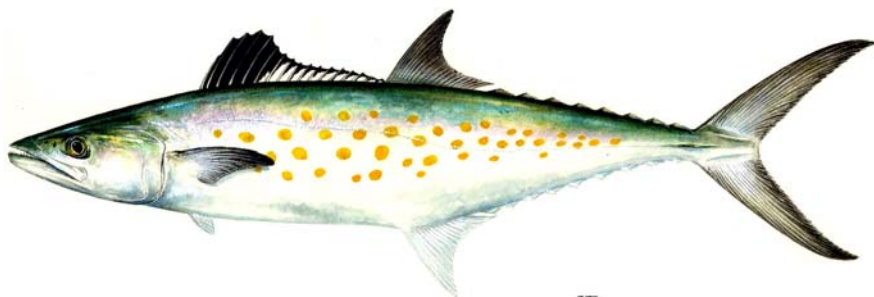
Red line: State of Florida action limit at 0.5 mg/kg.
Green line: US EPA recreational consumption action limit at 0.4 mg/kg.

PCB Content



Red line: State of Florida action limit at 50 µg/kg.
Green line: US EPA recreational consumption action limit at 20 µg/kg.

Location	n	Mean Length (mm)	Mean Weight (g)	% Lipid	TEQ _{DF} ng/kg ND=0	TEQ _P ng/kg ND=0	TEQ _{DFP} ng/kg ND=0	ΣPCBs ug/kg	Hg mg/kg	LAT	LONG
Pens. Bay	34	101	7.0	0.50		0.082		4.779	0.011	30.407	-87.141
Pens. Bay	13	132	15.3	0.40	0.376	0.012	0.3877	5.49	0.011	30.394	-87.185
Pens. Bay	7	153	24.4	0.60	0.263	0.005	0.2676	4.42	0.014	30.394	-87.185
Pens. Bay	74	119		0.30				5.37	0		

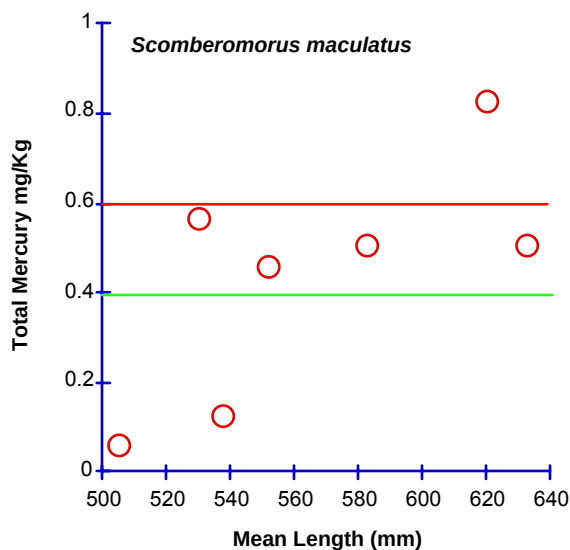


Spanish Mackerel *Scomberomorus maculatus*

Sample locations: Pensacola Pass, offshore

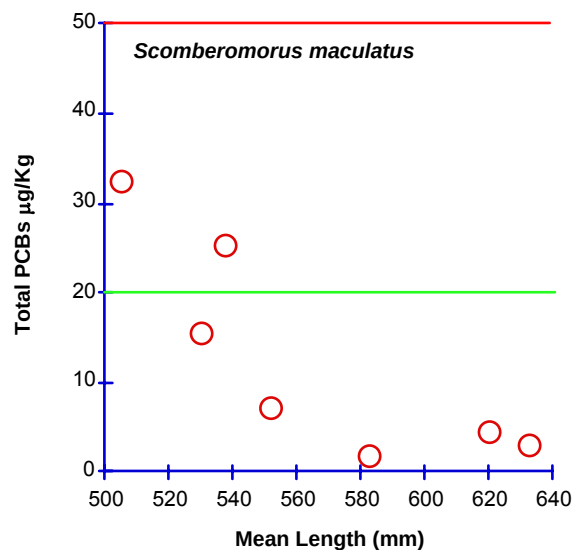
Seven samples of individual fish were collected from Pensacola pass and along the gulf shoreline of Santa Rosa Island. Mercury content increased with size of the fish, with five of seven samples exceeding the US EPA screening value. PCBs however, decreased with increasing size, with the two smallest fish exceeding the US EPA Screening value for total PCBs, consistent with younger fish foraging in the estuary and older fish moving offshore. The highest PCB toxicity as TEQ was for two of the larger specimens, indicating that despite lower total PCB, more toxic congeners were more prevalent with age.

Mercury Content

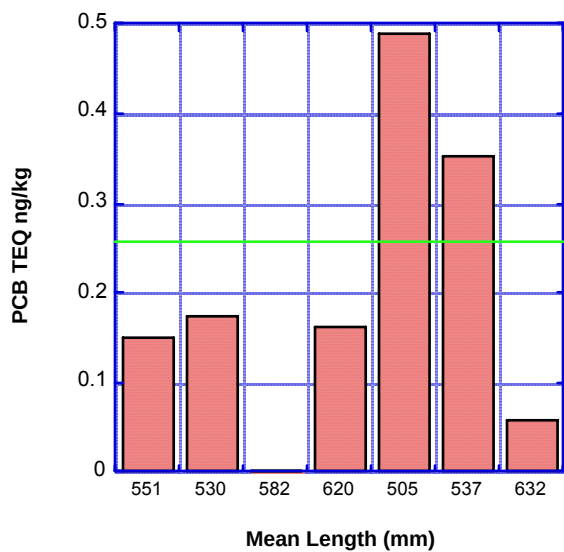


Green line: US EPA recreational consumption action limit at 0.40 mg/kg. Red line: State of Florida threshold for limited consumption at 0.60 mg/kg.

PCB Content

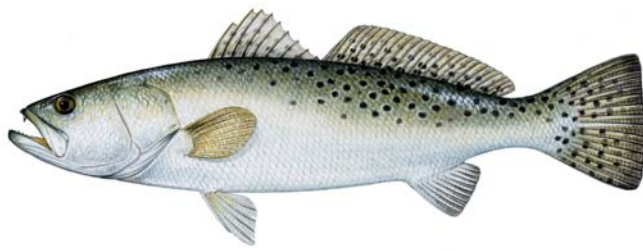


Red line: State of Florida action limit at 50 µg/kg. Green line: US EPA recreational consumption action limit at 20 µg/kg. These fish were taken offshore.



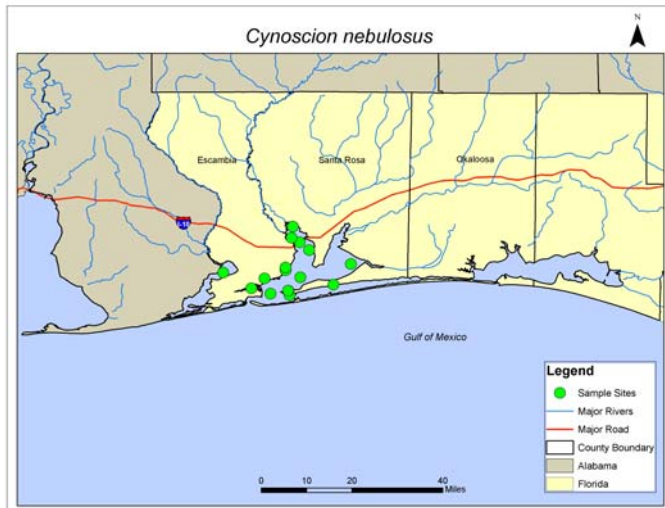
Toxicity of PCBs (TEQ_P) in Spanish mackerel from inshore and offshore Pensacola, FL. One sample was close to zero. The US EPA recreational consumption action limit is indicated by the green line at 0.256 ng/kg.

Location	n	Mean Length (mm)	Mean Weight (g)	% Lipids	TEQ _{DF} ng/kg ND=0	TEQ _P ng/kg ND=0	TEQ _{DFP} ng/kg ND=0	ΣPCBs ug/kg	Hg mg/kg	LAT	LONG
Nearshore 3 Barges	1	551	960.0	1.60	0.1026	0.1515	0.2541	7.350	0.46	30.288	-
Offshore outer shelf	1	530	900.0	1.00	0.2643	0.1733	0.4376	15.700	0.57		
Offshore outer shelf	1	582	1020.0	0.10	0.0210	0.0008	0.0218	2.010	0.51		
Offshore outer shelf	1	620	13750.0	0.30	0.0930	0.1619	0.2549	4.570	0.83		
Pensacola Bay Pass	1	505	680.0	3.20		0.4892		32.423	0.062	30.326	-
Pensacola Bay Pass	1	537	870.0	2.30		0.3539		25.354	0.13	30.326	-
Pensacola Bay Pass	1	632	128.0	0.10	0.0012	0.0587	0.0599	3.020	0.51	30.326	-



Spotted Seatrout *Cynoscion nebulosus*

Sample Locations



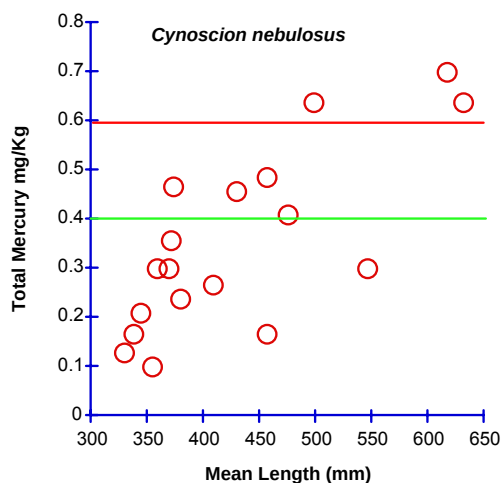
Mercury content is higher in larger fish throughout the area.

Areas with High PCB samples

Upper and West Escambia Bay
Bayou Grande

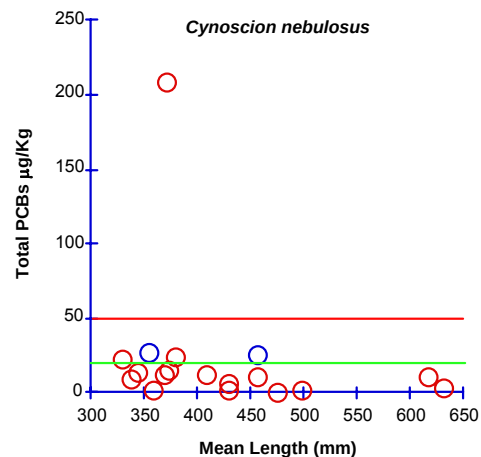
Twelve Sample locations provided 18 samples and 49 fish. Five samples were individual fish, the others were composites of 3 to 5 fish each. Mercury increased with fish size throughout the area to the point where 8 samples had mercury concentrations higher than the US EPA screening value. With the exception of a single sample, PCB content was lower than for other species sampled in the same locations, including the Escambia I-10 bridge site which had the highest PCB concentrations found during the course of the study. Five of 18 samples were above the US EPA screening value for total PCBs. Eight of 18 samples exceeded the US EPA screening value for TEQ.

Mercury Content



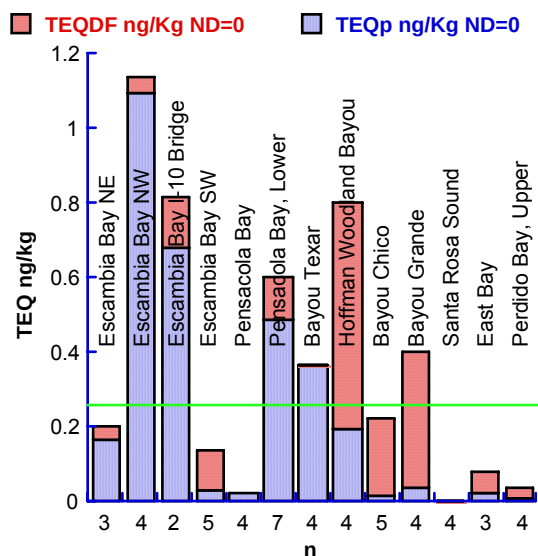
Red line: State of Florida action limit at 0.6 mg/kg.
Green line: US EPA recreational consumption action limit at 0.4 mg/kg.

PCB content



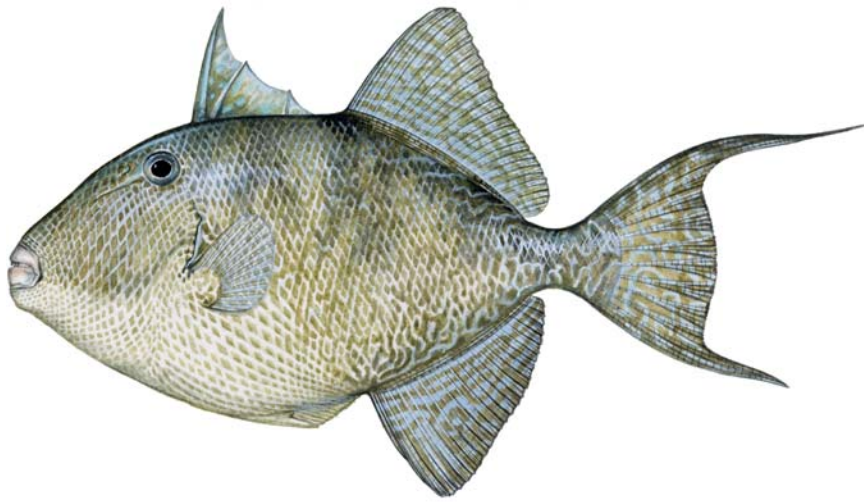
Red line: State of Florida action limit at 50 µg/kg.
Green line: US EPA recreational consumption action limit at 20 µg/kg. Blue symbols from I-10 Bridge,

Escambia Bay



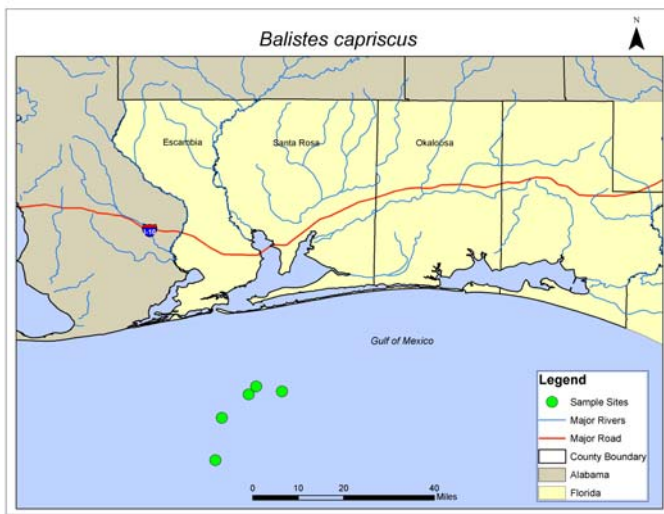
Toxicity of Dioxins Furans (TEQ_{DF}) and PCBs (TEQ_P) in Spotted Seatrout from NW Florida waters. Low values were recorded from East Bay, Santa Rosa Sound, and Perdido Bay. The green line is the US EPA recreational consumption action limit at 0.256 ng/kg. State of Florida does not have an official action limit established for TEQ values.

Location	n	Mean Lgth (mm)	Mean Wgt (g)	Mean Age	% Lipid	TEQ _{DF} ng/Kg ND=0	TEQ _P ng/Kg ND=0	TEQ _{DFP} ng/Kg ND=0	ΣPCBs ug/Kg	Hg mg/kg	LAT	LONG
Bayou Chico	5	336	343.2	1.1	0.30	0.2014	0.0177	0.2191	9.276	0.170	30.404	-87.255
Bayou Grande	4	328	284.6	1.1	0.20	0.3620	0.0367	0.3987	23.401	0.130	30.372	-87.297
Bayou Texar	3	428	626.7	2.7	0.40	0.0059	0.6300	0.6359	6.110	0.460	30.439	-87.188
Bayou Texar	1	630	1790.0	6.0	0.50	0.0000	0.0971	0.0971	4.030	0.64	30.439	-87.188
East Bay	3	455	836.7	3.5	0.50	0.0548	0.0219	0.0767	10.976	0.490	30.450	-86.980
Esc. Bay I-10	1	354	350.0		0.20	0.0768	0.6807	0.7575	27.000	0.1	30.519	-87.142
Esc. Bay I-10	1	455	820.0		0.30	0.1951	0.6826	0.8777	26.300	0.17	30.519	-87.142
Esc. Bay NE	3	407	623.3	1.8	0.30	0.0360	0.1638	0.1998	12.928	0.270	30.569	-87.165
Esc. Bay NW	1	371	370.0	1.0	0.30	0.0185	2.1435	2.1620	209.32	0.360	30.533	-87.169
Esc. Bay NW	3	379	466.1	1.0	0.40	0.0639	0.0488	0.1127	24.572	0.240	30.533	-87.169
Esc. Bay SW	5	343	330.6	1.0	0.30	0.1085	0.0286	0.1371	14.640	0.210	30.494	-87.113
Hoffman-Woodland	4	497	1050.0	2.9	0.70	0.6048	0.1940	0.7988	2.320	0.640	30.365	-87.179
Pensacola Bay	4	368	420.0	1.7	0.60	0.0000	0.0234	0.0234	11.900	0.300	30.407	-87.141
Pensacola Bay, Lower	3	373	516.7	3.6	0.10	0.3480	0.0396	0.3876	16.197	0.470	30.355	-87.236
Penscola Bay	3	428	646.7	2.6	0.40	0.0000	0.0028	0.0028	1.630	0.370	30.355	-87.236
Penscola Bay	1	615	1430.0		0.20	0.0000	1.4071	1.4071	10.383	0.700	30.355	-87.236
Perdido Bay	4	358	393.6	1.1	0.20	0.0320	0.0043	0.0363	1.805	0.300	30.422	-87.387
Santa Rosa Sound	3	475	850.0	2.1	0.20	0.0006	0.0009	0.0015	0.500	0.410	30.356	-87.100



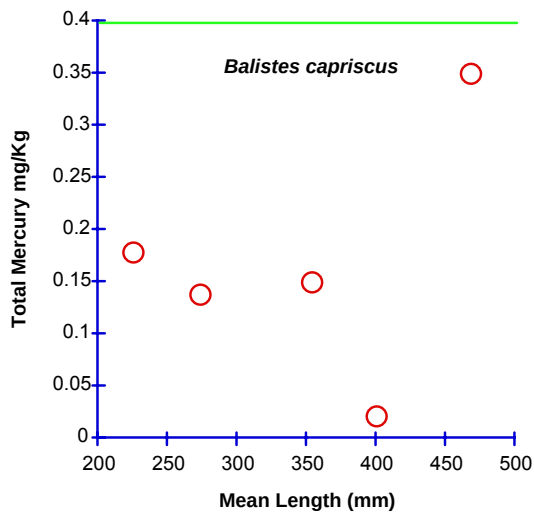
Gray Trigger
Balistes capriscus

Sample locations



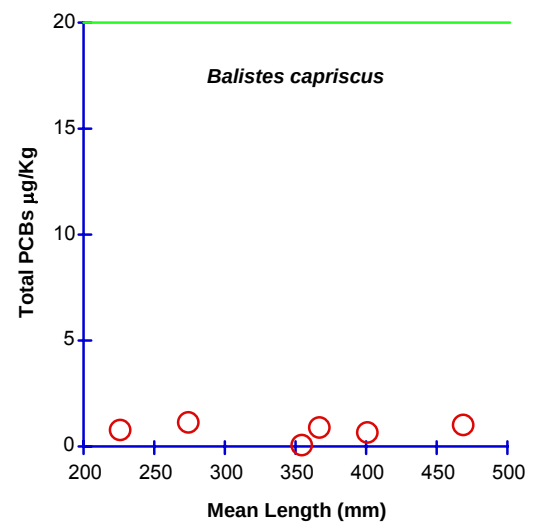
Seven samples, 6 as individual fish and one 3 fish composite were collected on offshore reefs. All fish had low mercury, PCBs, and TEQ values well below US EPA screening values.

Mercury Content

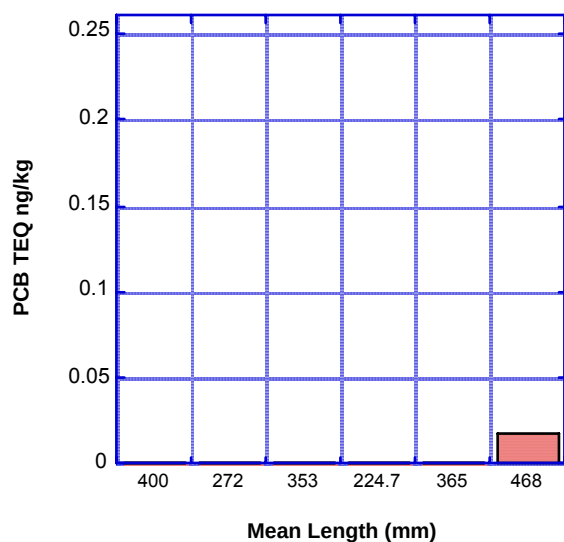


Green line: US EPA recreational consumption action limit at 0.4 mg/kg.

PCB Content



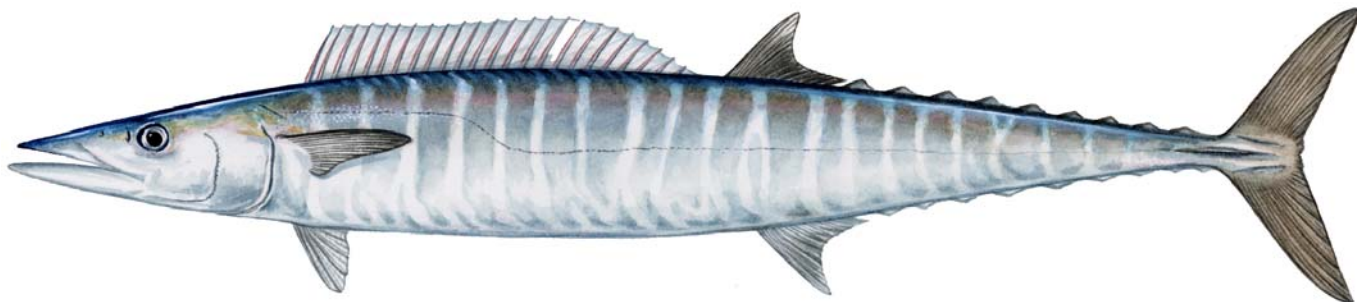
Green line: US EPA recreational consumption action limit at 20 µg/kg.



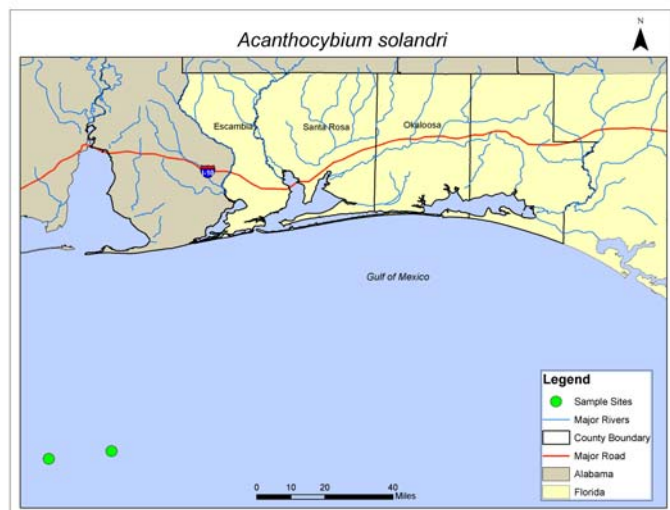
Toxicity of PCBs (TEQ_P) in Gray Trigger fish from offshore Pensacola, FL. Five of six samples were close to zero. The US EPA recreational consumption action limit is 0.256 ng/kg.

Location	n	Mean Length (mm)	Mean Weight (g)	% Lipids	TEQ _P ng/kg ND=0	ΣPCBs ug/kg	Hg mg/kg	LAT	LONG
Offshore outer shelf	1	400	1560.0	0.02	0.0001	0.800	0.059		
Offshore outer shelf				0.20	0.0001	0.3233	0.061	29.983	-87.284
Offshore midshelf reef permit zone	1	272	460.0	0.20	0.0003	1.270	0.13	30.058	-87.198
Offshore midshelf reef permit zone	1	353	940.0	0.20	0.0001	0.2085	0.15	30.083	-87.174
Offshore outer shelf	3	225	486.7	0.20	0.0001	0.831	0.053	29.983	-87.284
Offshore outer shelf	1	365	1790.0	0.30	0.0001	1.020	0.16	29.847	-87.304
Offshore outer shelf	1	468	1800.0	0.10	0.0180	1.148	0.12	30.067	-87.092

Wahoo, *Acanthocybium solandri*

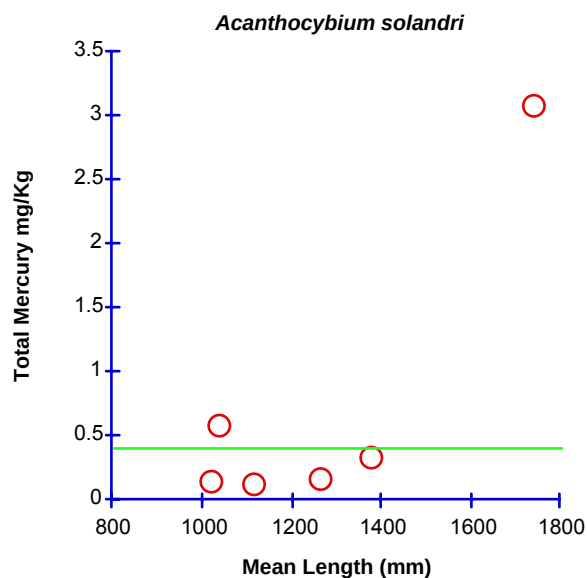


Sample Locations



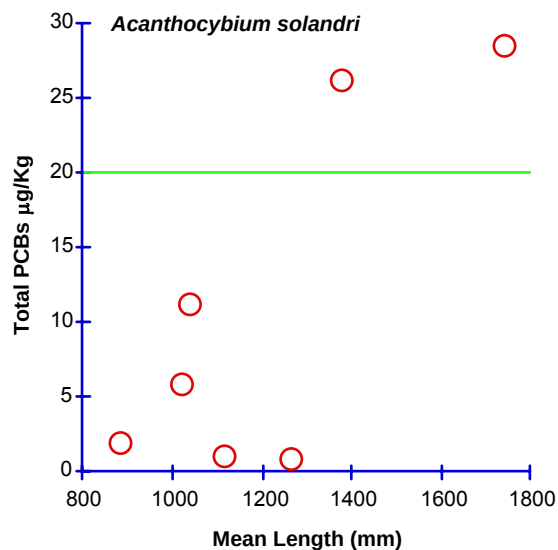
Seven specimens were sampled from offshore of Pensacola in The Gulf of Mexico. Two samples had mercury concentrations above the US EPA screening value, two samples exceeded the US EPA screening value for total PCBs, and had TEQ values based on PCB content that exceeded the screening value for TEQ.

Mercury Content

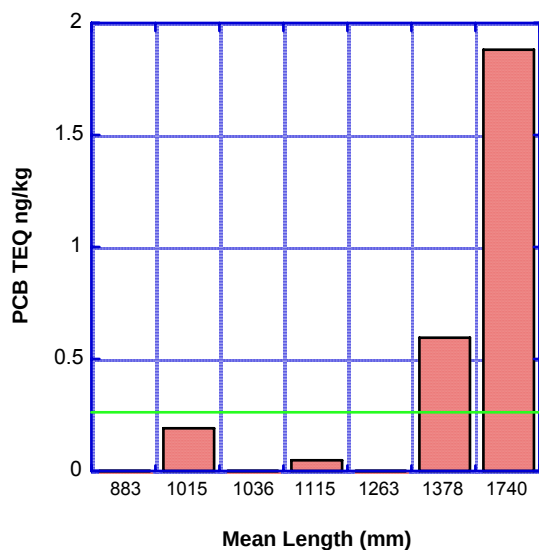


Green line: US EPA recreational consumption action limit at 0.4 mg/kg.

PCB content

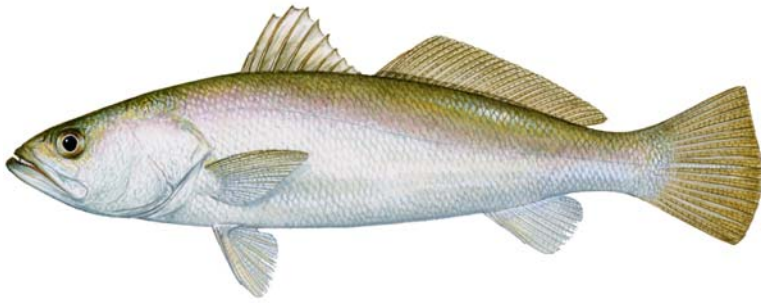


Green line: US EPA recreational consumption action limit at 20 µg/kg



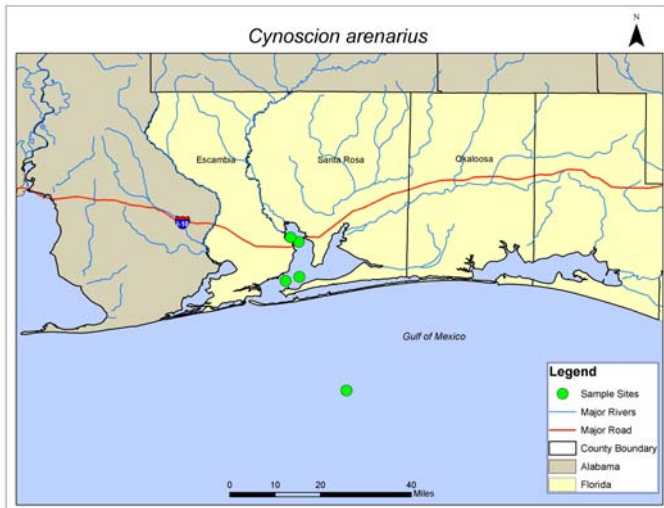
Toxicity of PCBs (TEQ_P) in Wahoo from offshore Pensacola, FL. Three samples were close to zero. The US EPA recreational consumption action limit is indicated by the green line at 0.256 ng/kg.

Location	n	Mean Length (mm)	Mean Weight (g)	Sex	% Lipids	TEQ _P ng/kg ND=0	ΣPCBs ug/kg	Hg mg/kg	LAT	LONG
Offshore outer shelf	1	883		M	0.10	0.0006	1.99		30.083	-87.167
Offshore outer shelf	1	1015	6770.0	F	0.02	0.1906	6.020	0.15	29.383	-87.717
Offshore outer shelf	1	1036	nt	NT	0.90	0.0057	11.400	0.6	29.317	-88.238
Offshore outer shelf	1	1115	8520.0	F	0.05	0.0494	1.160	0.14	29.350	-88.183
Offshore outer shelf	1	1263	1237.0	F	0.06	0.0001	0.880	0.18	29.350	-88.183
Offshore outer shelf	1	1378	nt	NT	0.40	0.5983	26.400	0.35	29.282	-88.204
Offshore outer shelf	1	1740	nt	NT	1.00	1.8916	28.700	3.1	29.267	-88.188



White Trout *Cynoscion arenarius*

Sample Locations



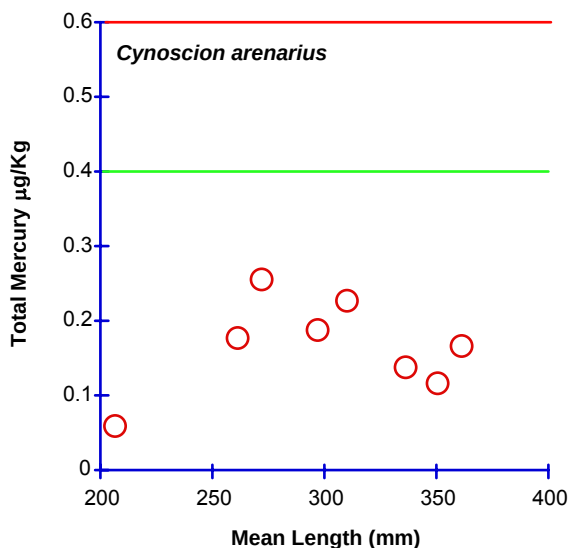
Low mercury content in sampled fish.

Areas with High PCB content

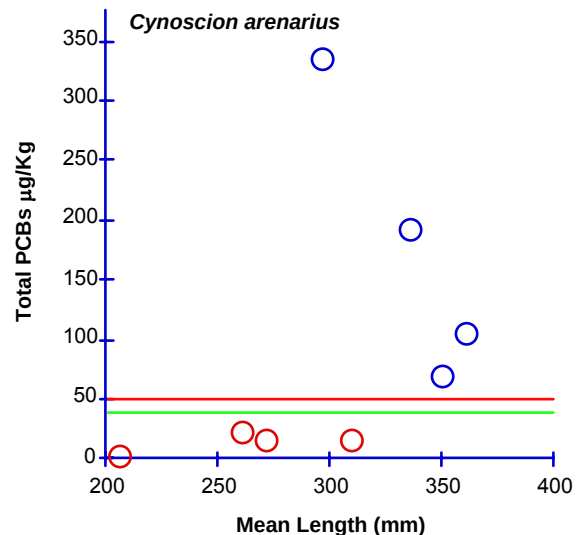
Upper Escambia Bay/I-10 bridge

Eight samples were obtained from offshore, the Pensacola Bay three mile bridge and Escambia Bay. All samples were below US EPA screening values for mercury content, and accumulation with size was not apparent. Samples from the Escambia Bay I-10 bridge were the only ones that exceeded the screening value for total PCBs and TEQ

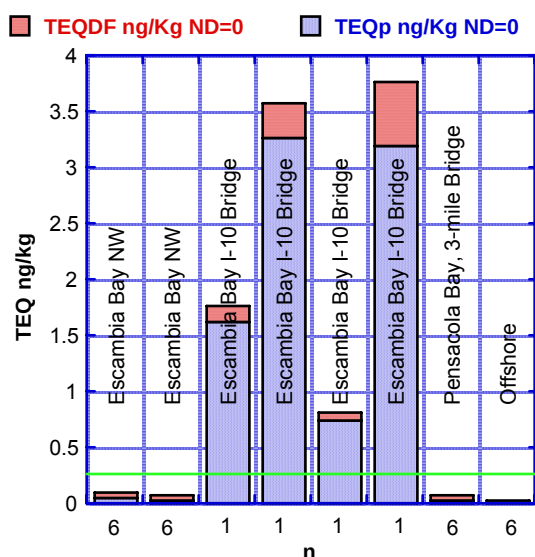
Mercury Content



Red line: State of Florida action limit at 0.60 mg/kg.
Green line: US EPA recreational consumption action limit at 0.40 mg/kg

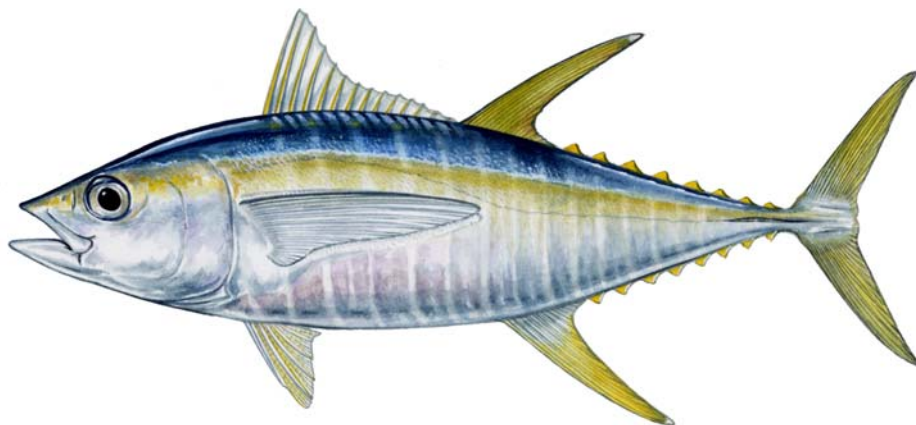


Red line: State of Florida action limit at 50 µg/kg.
Green line: US EPA recreational consumption action limit at 20 µg/kg. Blue symbols from I-10 Bridge, Escambia Bay



Toxicity of Dioxins Furans (TEQ_{DF}) and PCBs (TEQ_P) in white trout from NW Florida waters. All four high values were obtained for fish collected at the Escambia Bay I-10 Bridge. The green line is the US EPA recreational consumption action limit at 0.256 ng/kg. State of Florida does not have an official action limit established for TEQ values.

Location	n	Mean Length (mm)	Mean Weight (g)	% Lipid	TEQ_{DF} ng/kg ND=0	TEQ_P ng/kg ND=0	TEQ_{DFP} ng/kg ND=0	$\Sigma PCBs$ ug/kg	Hg mg/kg	LAT	LONG
Offshore outer shelf	6	206	151.2	1.30	0.0000	0.0369	0.0369	2.358	0.063	30.044	-86.991
Escambia Bay NW	6	260	159.3	0.60	0.0463	0.0481	0.0944	22.472	0.180	30.533	-87.169
Escambia Bay NW	6	271	177.3	0.50	0.0399	0.0295	0.0694	15.820	0.260	30.533	-87.169
Escambia Bay I-10 Bridge	4	296	237.5	0.30	0.1590	1.6121	1.7711	336.00	0.19	30.519	-87.143
Pensacola Bay, 3-mile Bridge	6	309	284.9	1.00	0.0463	0.0263	0.0726	15.727	0.230	30.394	-87.185
Escambia Bay I-10 Bridge	1	335	330.0	0.60	0.3196	3.2589	3.5785	192.00	0.14	30.519	-87.143
Escambia Bay I-10 Bridge	1	350	440.0	0.30	0.0570	0.7504	0.8074	70.900	0.12	30.519	-87.143
Escambia Bay I-10 Bridge	1	360	460.0	0.60	0.5696	3.2012	3.7708	105.00	0.17	30.519	-87.143

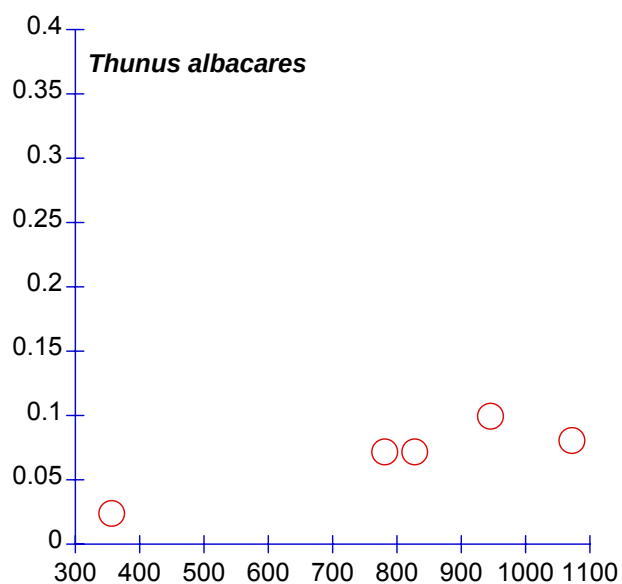


Yellowfin Tuna *Thunnus albacares*

Sample locations: offshore

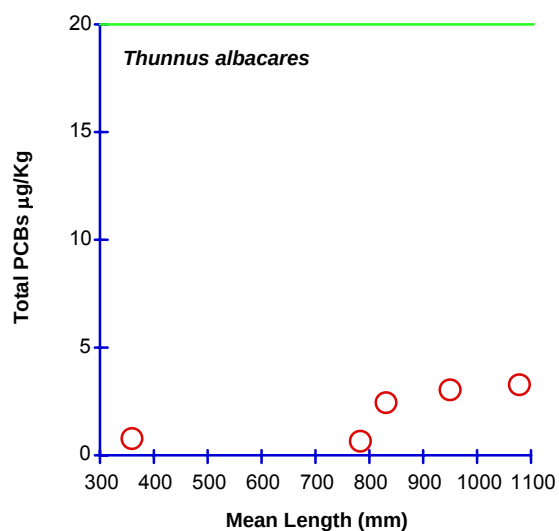
Six samples from individual fish were obtained from Offshore, and all were below screening values for mercury, total PCBs and TEQ

Mercury Content

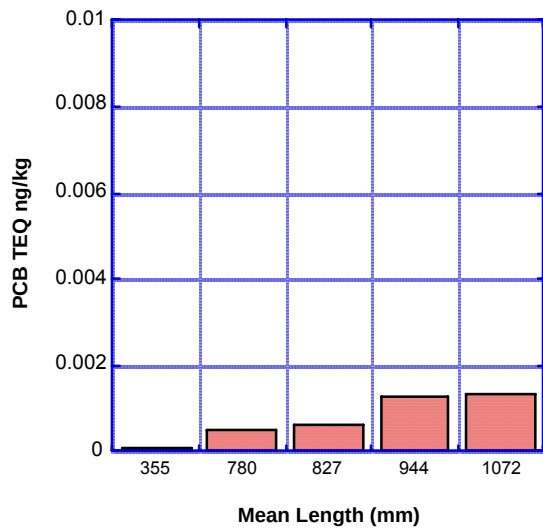


Green line: US EPA recreational consumption action limit at 0.40 mg/kg

PCB Content



Green line: US EPA recreational consumption action limit at 20 µg/kg. These fish were taken offshore.



Toxicity of PCBs (TEQ_P) in yellow fin tuna from offshore Pensacola, FL. All samples were close to zero. The US EPA recreational consumption action limit is 0.256 ng/kg.

Location	n	Mean Length (mm)	% Lipids	TEQ _{DF} ng/kg ND=0	TEQ _P ng/kg ND=0	TEQ _{DFP} ng/kg ND=0	ΣPCBs ug/kg	Hg mg/kg	LAT	LONG
Offshore Ram Powell	1	355	0.30		0.0001		0.907	0.025	29.060	-88.091
Offshore Ram Powell	1	780	0.20	0.0000	0.0005	0.0005	0.714	0.072	29.060	-88.091
Offshore Ram Powell	1	827	0.20	0.0161	0.0006	0.0167	2.520	0.072	29.060	-88.091
Offshore Ram Powell	1	944	0.20	0.0061	0.0013	0.0074	3.130	0.1	29.060	-88.091
Offshore Ram Powell	1	1072	0.10	0.0005	0.0014	0.0019	3.440	0.081	29.060	-88.091
Offshore Ram Powell	1		0.20	0.0449	0.0028	0.0477	6.720		29.060	-88.091

Miscellaneous Species

Location	Species	n	Mean L (mm)	Mean Wgt (g)	Sex	% Lipid	TEQ _{DF} ng/kg ND=0	TEQ _P ng/kg ND=0	TEQ _{DFP} ng/kg ND=0	ΣPCBs ug/kg	Hg mg/kg	LAT	LONG
Offshore outer shelf Teneco Reef	<i>Calamus leucosteus</i>	2	385	970.0		0.20		0.0526		2.183	0.25	29.998	-87.086
Offshore outer shelf	<i>Caranx crysos</i>	1	307	700.0		0.24		0.1323		7.9053	0.32	30.043	-87.007
Offshore outer shelf	<i>Centropristis ocyura</i>	13	102	35.7		0.30		0.0402		2.25	0.052	29.984	-87.084
Offshore outer shelf	<i>Centropristis ocyura</i>	18	108	42.6		0.00		0.0002		1.136	0.054	30.044	-86.991
ex-Oriskany	<i>Etrumeus teres</i>	18	139	22.0		2.00	0.1808	0.3643	0.5451	4.35	0.023	30.043	-87.007
ex-Oriskany	<i>Etrumeus teres</i>	10											
		2	145			2.20		0.2221		8.61	0.017	30.043	-87.007
Offshore midshelf	<i>Haemulon aurolineatum</i>	11	210	139.5		0.20		0.0005		1.804	0.073	30.189	-87.218
Offshore midshelf reef permit zone	<i>Haemulon aurolineatum</i>	10	198	124.0		0.00		0.0008		2.028	0.047	30.082	-87.195
Escambia River	<i>Ictalurus punctatus</i>	1	510	1140.0	F	1.80	0.5705	0.7067	1.2772	114.88		30.646	-87.262
Escambia River Upper	<i>Ictalurus punctatus</i>	1		880.0	F	3.50	1.0479	0.7067	0.6757	17.984		30.646	-87.262
Offshore outer shelf	<i>Lagodon rhomboides</i>	15	140	75.1		0.60		0.0294		2.819	0.086	30.044	-86.991
Offshore outer shelf	<i>Leiostomus xanthurus</i>	15	153	91.4		0.60	0.0000	0.0192	0.0192	1.825	0.074	30.044	-86.991
Pensacola Bay, Lower	<i>Leiostomus xanthurus</i>	5	259	217.8		2.00	0.2480	0.0382	0.2862	21.215	0.071	30.355	-87.236
Inshore	<i>Loligo</i> sp.	2	157	99.3		1.20		0.1012		4.21	0.056	30.188	-87.278
Offshore outer shelf	<i>Loligo</i> sp.	4	120	58.9		0.30		0.0010		2.42	0.039	29.984	-87.084
Offshore outer shelf	<i>Lutjanus griseus</i>	1	252	420.0		0.60	0.0000	0.0016	0.0016	1.701	0.083	30.052	-87.306
Offshore outer shelf	<i>Lutjanus griseus</i>	1	270	510.0	M	0.50	0.0000	0.0755		2.228	0.13	29.983	-87.284
Offshore midshelf reef permit zone	<i>Pagrus pagrus</i>	1	317	435.0		0.40		0.1197		2.98	0.31	30.083	-87.174
Offshore outer shelf	<i>Pagrus pagrus</i>	3	205	248.8		0.10		0.0002		1.38	0.078	29.961	-87.110
Offshore outer shelf	<i>Pagrus pagrus</i>	5	319	384.7		0.50		0.0338		2	0.15	30.078	-87.087
Offshore outer shelf	<i>Prionotus scitulus</i>	6	189	153.6				0.0002		0.567		29.984	-87.084
Offshore outer shelf	<i>Prionotus scitulus</i>	6	231	153.6						0.6026		29.984	-87.084
Offshore outer shelf	<i>Rachycentron canadum</i>	1	875			0.25		0.1236		13.300	0.021		
Inshore	Sand Dollars	20	30	1.1		0.30		0.0008		2.36	0.004	30.192	-87.278
Offshore outer shelf	<i>Serranus phobe</i>	9	123	54.2						1.090		30.048	-86.993
Offshore outer shelf	<i>Sphaena barracuda</i>	1	847	5030	F	0.11		0.1391		8.230	0.48	29.383	-87.917
Offshore outer shelf	<i>Syacium papillosum</i>	1	215	170.0		0.01		0.0624		4.550	0.023	30.043	-87.007
Offshore outer shelf	<i>Synodus foetens</i>	6	208	92.2		0.50				1.89	0.029	30.044	-86.991
Offshore outer shelf	<i>Synodus foetens</i>	1	374	640.0		0.80		0.0004		1.86	0.37	29.961	-87.110
Offshore outer shelf	<i>Trachinocephalus myops</i>	1	195	137.0		0.20		0.0192		1.9		30.048	-86.993
Offshore outer shelf	<i>Trachurus lathami</i>	41	98	10.9		0.10		0.0590		2.164	0.01	29.961	-87.110

Acknowledgements

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