

2015 IOWA FISH TISSUE MONITORING PROGRAM SUMMARY OF ANALYSES

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Introduction:

To supplement other environmental monitoring programs and to protect the health of people consuming fish from waters within this state, the state of Iowa conducts fish tissue monitoring. Since 1980, the Iowa Department of Natural Resources (IDNR), the United States Environmental Protection Agency Region VII (U.S. EPA), and the State Hygienic Laboratory (SHL) have cooperatively conducted annual statewide collections and analyses of fish for toxic contaminants. From 1983 to 2014, this monitoring effort was known as the Regional Ambient Fish Tissue Monitoring Program (RAFT). Beginning in 2015, the only statewide fish contaminant-monitoring program in Iowa was changed to the Iowa Fish Tissue Monitoring Program (IFTMP). The IFTMP is administered by IDNR and the tissue analyses are completed at the SHL. Historically, the data generated from the IFTMP have enabled IDNR to document temporal changes in contaminant levels and to identify Iowa lakes and rivers where high levels of contaminants in fish potentially threaten the health of fish-consuming Iowans (see IDNR 2006). The IFTMP incorporates five different types of monitoring sites: 1) status, 2) follow-up, 3) trend, 4) turtle, and 5) random.

Status monitoring:

The majority of IFTMP sites are sampled to determine whether the waterbodies meet the "fish consumption" portion of the fishable goal of the federal Clean Water Act. In other words, these sites are used to screen for contamination problems and to determine the water quality "status" of the waterbodies. Analyses for a variety of pesticides, other toxic organic compounds, and metals are conducted on samples of omnivorous bottom-dwelling fish and carnivorous predator fish. Most status sites on rivers and lakes have either never been sampled or have not been sampled within the last five years (rivers) or 10 years (lakes). Staff of the IDNR divisions of Environmental Services and Conservation and Recreation collaborate to select the status sites. Status monitoring occurs on most types of Iowa waterbodies (interior rivers, border rivers, and manmade and natural lakes) in both rural and urban areas. Lakes and river reaches known to support considerable recreational fishing receive highest priority, but IDNR attempts to sample all lakes and river reaches designated in the *Iowa Water Quality Standards* (<https://www.legis.iowa.gov/docs/ACO/chapter/567.61.pdf>) for recreational fishing. Approximately one-third to one-half of IFTMP status sites are located on lakes; the remaining sites are either located on interior rivers or located on the border rivers (Mississippi, Missouri or Big Sioux rivers).

Follow-up Monitoring:

If the level of a contaminant in a fish tissue sample exceeds IDPH/IDNR advisory trigger levels and/or IDNR levels of concern (Appendix A; IDPH 2007), the IFTMP conducts follow-up monitoring to better define the levels of contaminants. For example, if status monitoring shows that contaminant levels in fish from a waterbody exceed IDPH/IDNR advisory trigger levels, additional samples will be collected as part of follow-up monitoring for the next year's IFTMP. If follow-up monitoring confirms that levels of contamination exceed the advisory trigger levels for protection of human health, a fish consumption advisory is issued. For more information on consumption advisories see the IDNR IFTMP website: http://www.iowadnr.gov/portals/idnr/uploads/fish/fish_consumption_advisories.pdf. If needed, IDNR Fisheries Bureau will conduct follow-up monitoring separately from the IFTMP to verify high levels of contaminants or to better delineate lengths of river consumption advisories. These follow-up samples are collected before the annual IFTMP sampling and are also analyzed at SHL.

Trend monitoring:

In 1994 U.S. EPA Region VII in cooperation with the Region VII states (Iowa, Kansas, Missouri, and Nebraska), identified sites that would be monitored at regular intervals to determine trends in levels of contamination. One composite sample of three to five Common Carp from each site is submitted for whole-fish analysis. Whole-fish samples are more likely to contain detectable levels of most contaminants than are fillet samples (edible portions) or tissue plugs. Examination of the trend monitoring results may help identify temporal changes in contaminant concentrations and may expose new contaminants entering the food chain. From 1996-2005, half of the trend sites were sampled on odd years and the other half were sampled in even years. From 2006-2014, due to a change in old RAFT program design (U.S. EPA 2006), all 10 trend sites were sampled every other year. The following ten sites are current IFTMP trend sites:

Table 1. IFTMP trend site locations and sampling history.

Site #	IFTMP Trend Site Name	County	# Samples	First Sample Date	Last Sample Date
172	Des Moines River at Des Moines	Polk	10	8/17/1995	7/31/2014
173	Des Moines River NNW of Keosauqua	Van Buren	10	8/24/1994	8/8/2014
169	Iowa River E of Wapello	Louisa	10	9/14/1995	9/8/2014
177	Little Sioux River S of Washta	Ida	11	8/9/1994	8/12/2014
175	Maquoketa River NE of Maquoketa	Jackson	11	7/18/1995	8/25/2014
174	Mississippi River at Lansing	Allamakee	11	8/16/1995	8/21/2014
170	Mississippi River at Linwood	Scott	9	8/4/1994	8/1/2014
143	Mississippi River downstream of Dubuque	Dubuque	11	9/15/1994	8/18/2014
171	Skunk River NE of Wever	Lee	9	9/5/1997	9/8/2014
176	Wapsipinicon River SSE of Grand Mound	Scott	9	9/15/1994	9/25/2014

Turtle Monitoring:

In 2009, IDNR fisheries biologists collected snapping turtles from nine Iowa lakes as part of the IFTMP to better define contaminant levels in Iowa turtle populations. This monitoring used the left front shoulder muscle tissue from two or three turtles for the composite sample that was submitted for analysis following the same protocol used for fish.

Random Monitoring:

In 2006, based on recommendations in U.S. EPA's RAFT workplan (U.S. EPA 2006), Iowa began sampling randomly selected sites across the state as part of an effort to determine the current level of contaminants in fish tissue on a statewide basis. The 2006 sampling sites were selected from a previous random sampling project and data were collected only from large interior rivers. In 2007, the sampling sites were selected from a random list of smaller public lakes and ponds. Due to the fact that EPA Region VII discontinued the RAFT program in 2014, the future of random sampling for Iowa fish contaminants is uncertain.

2015 IFTMP Results:

The 2015 IFTMP involved the collection of 169 samples from 36 waterbodies. The high number of samples reflects the switch from fillet predator samples to tissue plug predator samples where the samples are individually analyzed and not composited. The use of tissue plugs allows the Hg concentration in individual fish be compared to length data and theoretically, the fish can be released thus decreasing mortality rates of sampled fish. In June through October 2015, IDNR fisheries biologists collected, processed and prepared the IFTMP samples. These activities were conducted according to procedures described in the workplan for the IFTMP (IDNR 2014). Once frozen, samples were transported or shipped to the Ankeny office of the SHL. All fish tissue samples were analyzed at SHL facilities. Samples were analyzed for several contaminants, including pesticides, other toxic organic compounds, and toxic metals (Appendix A). IDNR received results of all sample analyses in March 2016.

Status monitoring in 2015 included the collection of 93 fish samples from 15 sites with 80 of those samples collected from predatory fish and 13 samples collected from bottom feeding fish.

Follow-up monitoring in 2015 included the collection of 74 fish samples from 15 sites with 71 of those samples collected from predatory fish and three samples collected from bottom feeding fish.

Turtle monitoring in 2015 included the collection of two turtle samples from two sites.

The 2015 IFTMP monitoring results for the primary contaminants of concern (chlordane, dieldrin mercury and PCBs) are summarized in Tables 2-6 and in Figures 1-2. In addition, Appendices D and E contain all the sampling data generated by the 2015 IFTMP.

The vast majority of contaminant levels in the 2015 IFTMP samples were low or not detected (Tables 2-6; Figures 1-2; Appendices D and E). Any contaminant results over, or near, their respective evaluation criteria (Appendix A) are currently being addressed by the IDNR Fisheries bureau with the assistance of the IDNR Water Quality Monitoring and Assessment section and the Iowa Department of Public Health. If contaminant levels were over their respective criteria for the first time in 2015, follow-up monitoring will be conducted in 2016. If contaminant levels were over their respective criteria for the second time in 2015, a fish consumption advisory will be issued in 2016.

Table 2. Summary of 2015 IFTMP mercury (Hg) status site sampling results from predatory fish. All samples were tissue plugs and Hg results are in mg/kg (or ppm). See Appendix C for explanation of species codes.

Site #	IFTMP Site Name	County	Species Code	# Fish	Hg AVE	Hg STDEV	Hg MAX	Hg MIN
9	Easter Lake SE of Des Moines	Polk	LMB	10	0.089	0.050	0.15	<0.05
16	Cedar River at Cedar Rapids	Linn	LMB	5	<0.05	0.000	<0.05	<0.05
66	Lake Manawa S of Council Bluffs	Pottawattamie	LMB	5	<0.05	0.000	<0.05	<0.05
84	East Okoboji Lake SE of Spirit Lake	Dickinson	WAE	5	0.052	0.004	0.06	<0.05
110	Shell Rock River S of Northwood	Worth	WAE	5	0.218	0.035	0.24	0.16
126	Iowa River at Iowa City	Johnson	WHB	5	<0.05	0.000	<0.05	<0.05
138	Black Hawk Lake at Lake View	Sac	WAE	5	0.19	0.023	0.22	0.17
144	Mississippi River ds Guttenberg	Clayton	LMB	5	0.124	0.111	0.3	<0.05
149	North Twin Lake N of Rockwell City	Calhoun	WAE	5	<0.05	0.000	<0.05	<0.05
151	Missouri River at Nebraska City, NE	Fremont	FCF	5	0.062	0.027	0.11	<0.05
154	French Creek N of Churchtown	Allamakee	BRT	5	<0.05	0.000	<0.05	<0.05
191	Little Cedar River at Chickasaw Park	Chickasaw	SMB	5	0.14	0.089	0.25	<0.05
199	Silver Lake - Delaware CO	Delaware	LMB	5	<0.05	0.000	<0.05	<0.05
339	Viking Lake	Montgomery	LMB	5	0.164	0.109	0.29	<0.05
352	Chatfield Lake	Lee	LMB	5	0.51	0.048	0.57	0.46

Table 3. Summary of 2015 IFTMP mercury (Hg) follow-up site sampling results from predatory fish. All samples were tissue plugs and Hg results are in mg/kg (or ppm). See Appendix C for explanation of species codes.

Site #	IFTMP Site Name	County	Species Code	# Fish	Hg AVE	Hg STDEV	Hg MAX	Hg MIN
40	North Raccoon River NW of Jefferson	Greene	WAE	3	0.273	0.199	0.5	0.13
73	Morman Trail Pond E of Bridgewater	Adair	LMB	5	0.274	0.098	0.42	0.15
101	Skunk River N of Brighton	Washington	FRD	4	0.113	0.056	0.19	0.06
131	Mississippi River ds Muscatine	Muscatine	WHB	5	0.112	0.139	0.36	<0.05
135	Winnebago River E of Mason City	Cerro Gordo	WAE	5	0.092	0.041	0.14	<0.05
150	Missouri River W of Sergeant Bluff	Woodbury	FCF	5	0.08	0.041	0.13	<0.05
158	Lake of Three Fires NE of Bedford	Taylor	LMB	5	0.238	0.026	0.27	0.2
168	Lake Keomah near Oskaloosa	Mahaska	LMB	4	0.3	0.092	0.42	0.21
183	Little Sioux River at Gillet Grove	Clay	WAE	5	0.174	0.054	0.24	0.1
195	Nine Eagles Lake near Davis City	Decatur	LMB	5	0.498	0.098	0.64	0.38
208	North Banner Lake near Indianola	Warren	LMB	5	0.256	0.088	0.37	0.18
209	South Banner Lake near Indianola	Warren	LMB	5	0.326	0.121	0.5	0.17
252	Upper Centerville Reservoir	Appanoose	LMB	5	0.336	0.280	0.76	<0.05
265	Mississippi River above Fort Madison	Lee	LMB	5	0.352	0.102	0.49	0.24
353	Plainfield Lake	Bremer	LMB	5	0.366	0.091	0.45	0.22

Table 4. Summary of 2015 IFTMP status site sampling for contaminants of concern in bottom-feeding fish. All fish samples were composited fillets and results are in mg/kg (or ppm). See Appendix C for explanation of species codes.

Site #	IFTMP Site Name	County	Species Code	# Fish	technical chlordane	dieldrin	sum PCBs ¹	Hg ²
9	Easter Lake	Polk	CCF	5	<0.02	<0.005	0.25	0.03
16	Cedar River at Cedar Rapids	Linn	CCF	5	<0.02	0.006	0.26	0.09
66	Lake Manawa	Pottawattamie	CCF	5	<0.02	<0.005	<0.06	0.02
84	East Okoboji Lake	Dickinson	CCF	5	<0.02	<0.005	<0.06	<0.05
110	Shell Rock River S of Northwood	Worth	CAP	5	<0.02	<0.005	<0.06	0.19
126	Iowa River at Iowa City	Johnson	CAP	5	<0.02	<0.005	<0.06	0.09
138	Black Hawk Lake at Lake View	Sac	CCF	5	<0.02	<0.005	<0.06	0.04
144	Mississippi River DS of Guttenberg	Clayton	CAP	4	<0.02	<0.005	<0.06	0.15
149	North Twin Lake N of Rockwell City	Calhoun	CCF	5	<0.02	<0.005	<0.06	0.04
151	Missouri River at Nebraska City, NE	Fremont	CAP	3	<0.02	<0.005	<0.06	0.11
191	Little Cedar River at Chickasaw Park	Chickasaw	GOR	5	<0.02	<0.005	<0.06	0.14
339	Viking Lake	Montgomery	CCF	5	<0.02	<0.005	<0.06	0.03
352	Chatfield Lake	Lee	CCF	3	0.02	0.01	<0.06	0.08
¹ sum PCBs = Aroclor 1248 + Aroclor 1254 + Aroclor 1260								
² Hg = mercury								

Table 5. Summary of 2015 IFTMP follow-up site sampling for contaminants of concern in bottom-feeding fish. All fish samples were composited fillets and results are in mg/kg (or ppm). See Appendix C for explanation of species codes.

Site #	IFTMP Site Name	County	Species Code	# Fish	technical chlordane	dieldrin	sum PCBs ¹	Hg ²
45	Mississippi River E of Bettendorf	Scott	CAP	5	<0.02	<0.005	<0.06	0.08
219	Wapsipinicon River - Central City	Linn	CCF	5	<0.02	<0.005	<0.06	0.12
262	McKinley Lake near Creston	Union	CAP	5	0.07	<0.005	0.49	0.09
¹ sum PCBs = Aroclor 1248 + Aroclor 1254 + Aroclor 1260								
² Hg = mercury								

Table 6. Summary of 2015 IFTMP turtle sampling results for contaminants of concern. All samples were composited left front shoulder tissue and results are in mg/kg (or ppm). See Appendix C for explanation of species codes.

Site #	IFTMP Site Name	County	Species Code	# Turtles	technical chlordane	dieldrin	sum PCBs ¹	Hg ²
346	Big Hollow Lake	Des Moines	SNAP	3	<0.02	0.006	<0.06	0.16
354	Belva Deer Lake	Keokuk	SNAP	2	<0.02	<0.005	<0.06	0.3
¹ sum PCBs = Aroclor 1248 + Aroclor 1254 + Aroclor 1260								
² Hg = mercury								

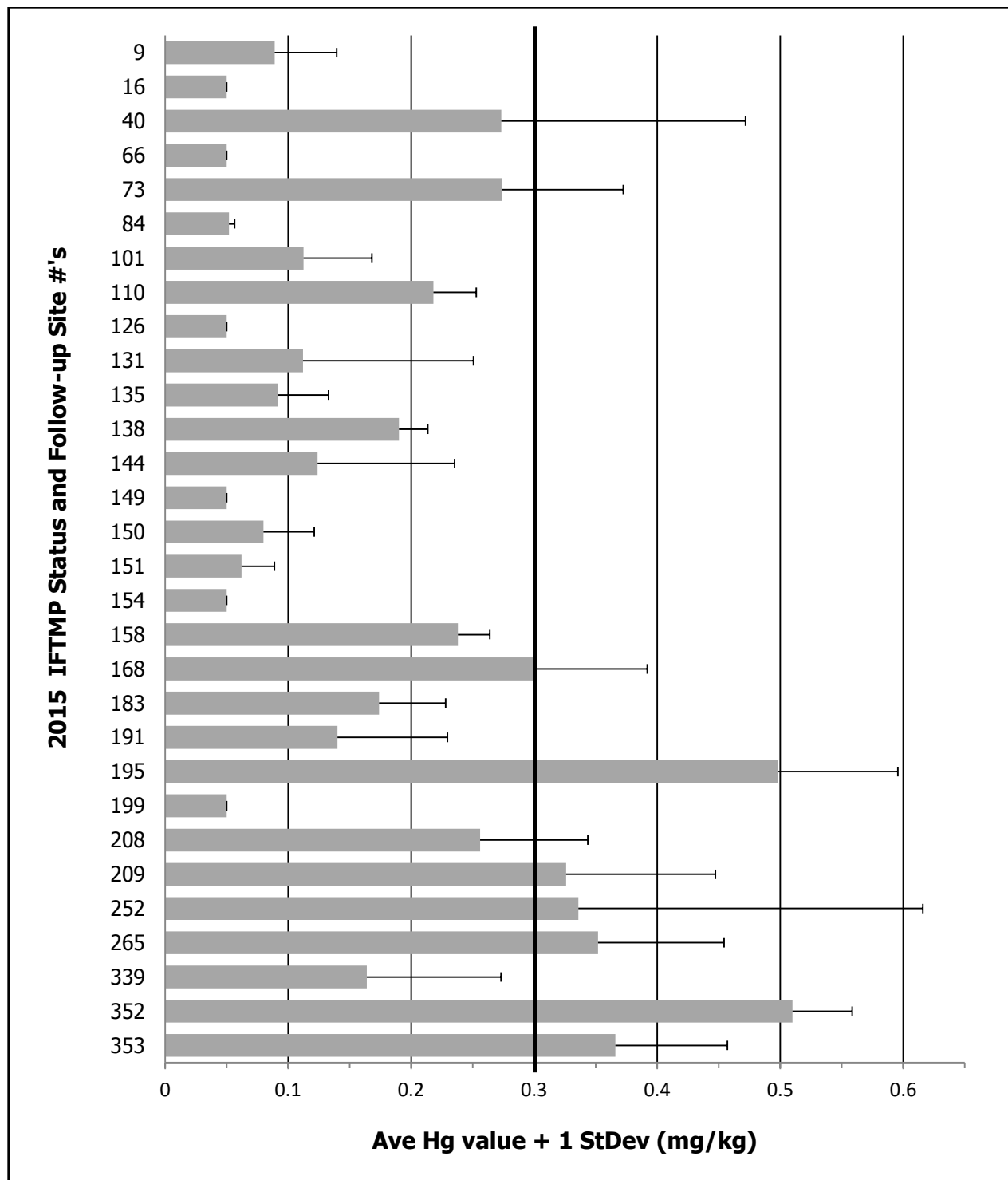


Figure 1. 2015 IFTMP mercury status and follow-up sample results for predatory fish. All samples were tissue plugs and results are in mg/kg (or ppm). All of the values above the 0.3 mg/kg evaluation criterion (Appendix A) have been, or will be, addressed by IDNR through the issuance or continuation of consumption advisories and/or with follow-up monitoring. See Appendix B for the full list of 2015 IFTMP sites.

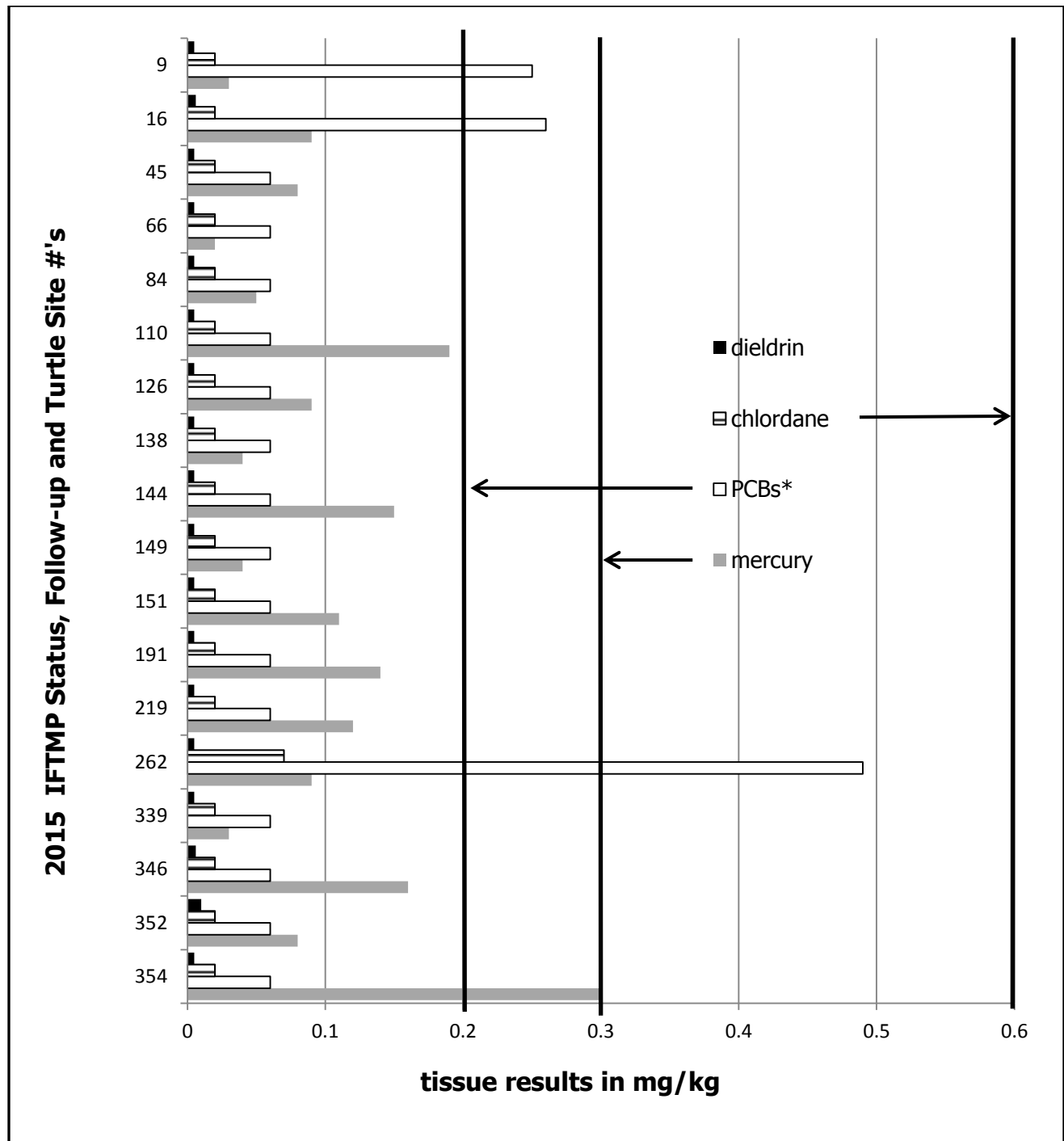


Figure 2. 2015 IFTMP status and follow-up sample results for bottom feeding fish and turtles. All samples were composites of fillets or shoulder tissue and results are in mg/kg (or ppm). Solid black lines indicate the evaluation criteria for chlordane, mercury and PCBs (Appendix A). All samples above the the corresponding criteria have, or will be, addressed by IDNR through the issuance or continuation of consumption advisories or with follow-up monitoring. See Appendix B for the full list of 2015 IFTMP sites.

*PCBs = Aroclor 1248 + Aroclor 1254 + Aroclor 1260.

References:

- IDNR. 2006. Fish tissue monitoring in Iowa. Water Fact Sheet 2006-5. Geological and Water Survey, Iowa Department of Natural Resources. 4 pgs
(<ftp://ftp.igsb.uiowa.edu/igspubs/pdf/WFS-2006-05.pdf>).
- IDNR. 2014. Sampling Procedures for the Iowa DNR Fish Tissue Monitoring Program (IFTMP). Water Quality Bureau, Environmental Services Division, Iowa Department of Natural Resources. 16 pp.
- IDPH. 2007. Fish consumption advisory protocol in Iowa. Iowa Department of Public Health. 8 pgs.
- U.S. EPA. 2006. EPA Region 7 Regional Ambient Fish Tissue Monitoring Program (RAFTMP) program rationale, design and implementation plans for 2006 - 2010. Environmental Services Division, U.S. Environmental Protection Agency Region 7 and the Region 7 Fish Tissue Monitoring Workgroup. 24 pgs.

Appendix A

Summary of contaminants of concern and respective evaluation criteria for IFTMP tissue samples.

#	contaminant	SHL current lowest detection levels (ppm)	IDNR/IDPH advisory trigger level (ppm)	IDNR/IDPH advisory meal allowance
1	chlordane, technical	0.02	0 to 0.6	unrestricted
			>0.6 to <5.0	one meal per week
			≥5.0	do not eat
2	mercury	0.05	0 to 0.3	unrestricted
			>0.3 to <1.0	one meal per week
			≥1.0	do not eat
3	PCB, Aroclor 1248	0.02	sum = 0 to 0.2	unrestricted
4	PCB, Aroclor 1254	0.02	sum >0.2 to <2.0	one meal per week
5	PCB, Aroclor 1260	0.02	sum 2.0 and over	do not eat
6	dieldrin	0.01		
7	DDE, 4,4'-	0.01		

Appendix B

Complete list of the 2015 IFTMP sampling sites.

Site #	IFTMP Site Name	County	Waterbody Type	NAD 83 UTM Easting	NAD 83 UTM Northing
9	Easter Lake SE of Des Moines	Polk	Lake	453743	4599265
16	Cedar River at Cedar Rapids	Linn	River/Stream	620208	4642950
40	North Raccoon River NW of Jefferson	Greene	River/Stream	370002	4661683
45	Mississippi River E of Bettendorf	Scott	River/Stream	712281	4600952
66	Lake Manawa S of Council Bluffs	Pottawattamie	Lake	260365	4565986
73	Morman Trail Pond E of Bridgewater	Adair	Lake	363124	4566985
84	East Okoboji Lake SE of Spirit Lake	Dickinson	Lake	332128	4808432
101	Skunk River N of Brighton	Washington	River/Stream	599960	4561039
110	Shell Rock River S of Northwood	Worth	River/Stream	482155	4807424
126	Iowa River at Iowa City	Johnson	River/Stream	621502	4613056
131	Mississippi River DS of Muscatine	Muscatine	River/Stream	661447	4579411
135	Winnebago River E of Mason City	Cerro Gordo	River/Stream	486815	4777472
138	Black Hawk Lake at Lake View	Sac	Lake	331835	4685098
144	Mississippi River DS of Guttenberg	Clayton	River/Stream	656217	4737032
149	North Twin Lake N of Rockwell City	Calhoun	Lake	365463	4704370
150	Missouri River W of Sergeant Bluff	Woodbury	River/Stream	218621	4694335
151	Missouri River at Nebraska City, NE	Fremont	River/Stream	260319	4506497
154	French Creek N of Churchtown	Allamakee	River/Stream	628777	4805306
158	Lake of Three Fires NE of Bedford	Taylor	Lake	357248	4507836
168	Lake Keomah near Oskaloosa	Mahaska	Lake	538559	4571053
183	Little Sioux River at Gillet Grove	Clay	River/Stream	333494	4764902
191	Little Cedar River at Chickasaw Park	Chickasaw	River/Stream	540356	4764742
195	Nine Eagles Lake near Davis City	Decatur	Lake	434837	4494468
199	Silver Lake - Delaware CO	Delaware	Lake	637935	4698317
208	North Banner Lake near Indianola	Warren	Lake	454083	4588162
209	South Banner Lake near Indianola	Warren	Lake	453851	4587635
219	Wapsipinicon River - Central City	Linn	River/Stream	629707	4668667
252	Upper Centerville Reservoir	Appanoose	Lake	509343	4506835
262	McKinley Lake near Creston	Union	Lake	383529	4545527
265	Mississippi River above Fort Madison	Lee	River/Stream	653625	4501455
339	Viking Lake	Montgomery	Lake	328985	4538158
346	Big Hollow Lake	Des Moines	Lake	648200	4533847
352	Chatfield Lake	Lee	Lake		
353	Plainfield Lake	Bremer	Lake		
354	Belva Deer Lake	Keokuk	Lake		

Appendix C

Fish and turtle species table that includes: species codes, common and scientific names.

Species Code	Common Name	Scientific Name
BGB	Bigmouth Buffalo	<i>Ictiobus cyprinellus</i>
BKB	Black Buffalo	<i>Ictiobus niger</i>
BLB	Black Bullhead	<i>Ameiurus melas</i>
BLC	Black Crappie	<i>Pomoxis nigromaculatus</i>
BLG	Bluegill	<i>Lepomis macrochirus</i>
BRT	Brown Trout	<i>Salmo trutta</i>
CCF	Channel Catfish	<i>Ictalurus punctatus</i>
CAP	Common Carp	<i>Cyprinus carpio</i>
FCF	Flathead Catfish	<i>Pylodictis olivaris</i>
FRD	Freshwater Drum	<i>Aplodinotus grunniens</i>
GOR	Golden Redhorse	<i>Moxostoma erythrurum</i>
LMB	Largemouth Bass	<i>Micropterus salmoides</i>
NHS	Northern Hog Sucker	<i>Hypentelium nigricans</i>
NOP	Northern Pike	<i>Esox lucius</i>
PAH	Paddlefish	<i>Polyodon spathula</i>
ULL	Quillback Carpsucker	<i>Carpodes cyprinus</i>
RBT	Rainbow Trout	<i>Oncorhynchus mykiss</i>
RVC	River Carpsucker	<i>Carpodes carpio</i>
SAR	Sauger	<i>Sander canadensis</i>
SHR	Shorthead Redhorse	<i>Moxostoma macrolepidotum</i>
SHG	Shortnose Gar	<i>Lepisosteus platostomus</i>
SMB	Smallmouth Bass	<i>Micropterus dolomieu</i>
SAB	Smallmouth Buffalo	<i>Ictiobus bubalus</i>
SNAP	Snapping Turtle	<i>Chelydra serpentina</i>
SOFT	Softshell Turtle	<i>Apalone spp.</i>
WAE	Walleye	<i>Sander vitreus</i>
WHB	White Bass	<i>Morone chrysops</i>
WHC	White Crappie	<i>Pomoxis annularis</i>
WHS	White Sucker	<i>Catostomus commersonii</i>
YLB	Yellow Bass	<i>Morone mississippiensis</i>
YEB	Yellow Bullhead	<i>Ameiurus natalis</i>
YEP	Yellow Perch	<i>Perca flavescens</i>

Appendix D

Complete listing of the 2015 IFTMP predator fish sampling results. See Appendix B for a list of 2015 IFTMP site numbers and Appendix C for a list of fish names and species codes.

Site #	Sample #	Lab	Species Code	Biopart	Sample Type	Total Length (cm)	Weight (g)	mercury (mg/kg)
9	1715	SHL	LMB	plug	status	45.2	1500	0.14
9	1716	SHL	LMB	plug	status	40.9	1006	<0.05
9	1717	SHL	LMB	plug	status	40	894	<0.05
9	1718	SHL	LMB	plug	status	41.4	1088	<0.05
9	1719	SHL	LMB	plug	status	48.3	1858	0.15
9	1720	SHL	LMB	plug	status	38.9	846	<0.05
9	1721	SHL	LMB	plug	status	45.2	1312	0.15
9	1722	SHL	LMB	plug	status	37.2	634	<0.05
9	1723	SHL	LMB	plug	status	46.5	1374	0.15
9	1724	SHL	LMB	plug	status	37	722	<0.05
16	1700	SHL	LMB	plug	status	32.5	505	<0.05
16	1701	SHL	LMB	plug	status	34.5	590	<0.05
16	1702	SHL	LMB	plug	status	33.7	580	<0.05
16	1703	SHL	LMB	plug	status	32.2	475	<0.05
16	1704	SHL	LMB	plug	status	31.7	395	<0.05
40	1819	SHL	WAE	plug	followup	40.9	719	0.13
40	1820	SHL	WAE	plug	followup	52.8	1573	0.5
40	1821	SHL	WAE	plug	followup	40.1	575	0.19
66	1686	SHL	LMB	plug	status	38.4	880	<0.05
66	1687	SHL	LMB	plug	status	38.4	859	<0.05
66	1688	SHL	LMB	plug	status	43.4	1146	<0.05
66	1689	SHL	LMB	plug	status	38.6	837	<0.05
66	1690	SHL	LMB	plug	status	33.2	593	<0.05
73	1681	SHL	LMB	plug	followup	39.6	872	0.3
73	1682	SHL	LMB	plug	followup	39.1	948	0.42
73	1683	SHL	LMB	plug	followup	39.6	883	0.24
73	1684	SHL	LMB	plug	followup	37.6	807	0.15
73	1685	SHL	LMB	plug	followup	38.6	847	0.26
84	1774	SHL	WAE	plug	status	32.5	298	0.06
84	1775	SHL	WAE	plug	status	31.5	297	<0.05
84	1776	SHL	WAE	plug	status	31	288	<0.05
84	1777	SHL	WAE	plug	status	32.3	279	<0.05
84	1778	SHL	WAE	plug	status	30.7	273	0.05
101	1791	SHL	FRD	plug	followup	35	517	0.09
101	1792	SHL	FRD	plug	followup	42.8	996	0.19
101	1793	SHL	FRD	plug	followup	33	473	0.11
101	1794	SHL	FRD	plug	followup	30	305	0.06
110	1736	SHL	WAE	plug	status	45.1	920	0.16
110	1738	SHL	WAE	plug	status	46.9	1090	0.24
110	1739	SHL	WAE	plug	status	47.2	1130	0.24
110	1740	SHL	WAE	plug	status	41.5	775	0.21
110	1741	SHL	WAE	plug	status	41.7	805	0.24

Appendix D, continued.

Complete listing of the 2015 IFTMP predator fish sampling results, continued.

Site #	Sample #	Lab	Species Code	Biopart	Sample Type	Total Length (cm)	Weight (g)	mercury (mg/kg)
126	1695	SHL	WHB	plug	status	35.1	565	<0.05
126	1696	SHL	WHB	plug	status	37.4	775	<0.05
126	1697	SHL	WHB	plug	status	40.3	815	<0.05
126	1698	SHL	WHB	plug	status	32.7	470	<0.05
126	1699	SHL	WHB	plug	status	32.3	415	<0.05
131	1705	SHL	WHB	plug	followup	32.2	411	<0.05
131	1706	SHL	WHB	plug	followup	32.8	430	0.36
131	1707	SHL	WHB	plug	followup	25	430	<0.05
131	1708	SHL	WHB	plug	followup	28.9	303	<0.05
131	1709	SHL	WHB	plug	followup	29.6	324	<0.05
135	1742	SHL	WAE	plug	followup	43.2	770	0.1
135	1743	SHL	WAE	plug	followup	41.5	615	<0.05
135	1744	SHL	WAE	plug	followup	42.1	665	0.14
135	1745	SHL	WAE	plug	followup	39.6	550	<0.05
135	1746	SHL	WAE	plug	followup	43.4	770	0.12
138	1796	SHL	WAE	plug	status	48	1091	0.21
138	1797	SHL	WAE	plug	status	43.4	770	0.22
138	1798	SHL	WAE	plug	status	38.6	510	0.17
138	1799	SHL	WAE	plug	status	40.1	612	0.18
138	1800	SHL	WAE	plug	status	39.6	628	0.17
144	1768	SHL	LMB	plug	status	35.5	680	0.3
144	1769	SHL	LMB	plug	status	29.7	386	<0.05
144	1770	SHL	LMB	plug	status	33.6	722	<0.05
144	1771	SHL	LMB	plug	status	31.1	395	0.17
144	1772	SHL	LMB	plug	status	28.8	354	<0.05
149	1802	SHL	WAE	plug	status	50.3	1242	<0.05
149	1803	SHL	WAE	plug	status	46.5	1030	<0.05
149	1804	SHL	WAE	plug	status	48	1026	<0.05
149	1805	SHL	WAE	plug	status	43.2	741	<0.05
149	1806	SHL	WAE	plug	status	49.5	1106	<0.05
150	1657	SHL	FCF	plug	followup	46	1105	<0.05
150	1658	SHL	FCF	plug	followup	44	841	<0.05
150	1659	SHL	FCF	plug	followup	42	841	0.12
150	1660	SHL	FCF	plug	followup	41.5	723	<0.05
150	1661	SHL	FCF	plug	followup	43	762	0.13
151	1667	SHL	FCF	plug	status	37	514	<0.05
151	1668	SHL	FCF	plug	status	38.5	600	<0.05
151	1669	SHL	FCF	plug	status	38.4	571	<0.05
151	1670	SHL	FCF	plug	status	37.7	514	0.11
151	1671	SHL	FCF	plug	status	39	592	<0.05
154	1814	SHL	BRT	plug	status	37	533	<0.05
154	1815	SHL	BRT	plug	status	42.2	745	<0.05
154	1816	SHL	BRT	plug	status	37.3	522	<0.05
154	1817	SHL	BRT	plug	status	32.2	365	<0.05
154	1818	SHL	BRT	plug	status	31.5	358	<0.05

Complete listing of the 2015 IFTMP predator fish sampling results, continued.

Site #	Sample #	Lab	Species Code	Biopart	Sample Type	Total Length (cm)	Weight (g)	mercury (mg/kg)
158	1662	SHL	LMB	plug	followup	41.9	1060	0.25
158	1663	SHL	LMB	plug	followup	38.1	860	0.2
158	1664	SHL	LMB	plug	followup	39.9	930	0.24
158	1665	SHL	LMB	plug	followup	38.1	860	0.27
158	1666	SHL	LMB	plug	followup	42.4	1175	0.23
168	1747	SHL	LMB	plug	followup	39.6	865	0.21
168	1748	SHL	LMB	plug	followup	38.3	655	0.32
168	1749	SHL	LMB	plug	followup	39.1	805	0.25
168	1750	SHL	LMB	plug	followup	38.3	670	0.42
183	1779	SHL	WAE	plug	followup	34.5	311	0.15
183	1780	SHL	WAE	plug	followup	38.4	430	0.17
183	1781	SHL	WAE	plug	followup	38.9	425	0.24
183	1782	SHL	WAE	plug	followup	32.8	269	0.1
183	1783	SHL	WAE	plug	followup	42.7	690	0.21
191	1808	SHL	SMB	plug	status	34.2	589	0.25
191	1809	SHL	SMB	plug	status	35.8	592	0.2
191	1810	SHL	SMB	plug	status	31.5	426	0.15
191	1811	SHL	SMB	plug	status	30.5	379	<0.05
191	1812	SHL	SMB	plug	status	31.5	426	<0.05
195	1652	SHL	LMB	plug	followup	33.7	425	0.38
195	1653	SHL	LMB	plug	followup	33	430	0.54
195	1654	SHL	LMB	plug	followup	32.6	400	0.47
195	1655	SHL	LMB	plug	followup	32.6	380	0.46
195	1656	SHL	LMB	plug	followup	35.7	530	0.64
199	1763	SHL	LMB	plug	status	29.5	420	<0.05
199	1764	SHL	LMB	plug	status	28.6	346	<0.05
199	1765	SHL	LMB	plug	status	29.5	407	<0.05
199	1766	SHL	LMB	plug	status	29.6	470	<0.05
199	1767	SHL	LMB	plug	status	27.8	370	<0.05
208	1725	SHL	LMB	plug	followup	29.7	324	0.18
208	1726	SHL	LMB	plug	followup	31.1	374	0.33
208	1727	SHL	LMB	plug	followup	30.3	334	0.37
208	1728	SHL	LMB	plug	followup	29.5	284	0.21
208	1729	SHL	LMB	plug	followup	36.5	664	0.19
209	1730	SHL	LMB	plug	followup	30.3	382	0.28
209	1731	SHL	LMB	plug	followup	27.9	254	0.31
209	1732	SHL	LMB	plug	followup	31	362	0.5
209	1733	SHL	LMB	plug	followup	29	300	0.37
209	1734	SHL	LMB	plug	followup	27	286	0.17
252	1751	SHL	LMB	plug	followup	49.5	1820	0.76
252	1752	SHL	LMB	plug	followup	43.1	1185	0.43
252	1753	SHL	LMB	plug	followup	39.3	915	0.13
252	1754	SHL	LMB	plug	followup	44.9	1305	0.31
252	1755	SHL	LMB	plug	followup	38.6	705	<0.05

Complete listing of the 2015 IFTMP predator fish sampling results, continued.

Site #	Sample #	Lab	Species Code	Biopart	Sample Type	Total Length (cm)	Weight (g)	mercury (mg/kg)
265	1710	SHL	LMB	plug	followup	40.1	850	0.42
265	1711	SHL	LMB	plug	followup	36.6	800	0.24
265	1712	SHL	LMB	plug	followup	39.4	949	0.28
265	1713	SHL	LMB	plug	followup	37.9	756	0.33
265	1714	SHL	LMB	plug	followup	44	1380	0.49
339	1676	SHL	LMB	plug	status	37.3	730	0.23
339	1677	SHL	LMB	plug	status	35	642	<0.05
339	1678	SHL	LMB	plug	status	35.6	680	<0.05
339	1679	SHL	LMB	plug	status	35.8	564	0.2
339	1680	SHL	LMB	plug	status	34.5	533	0.29
352	1786	SHL	LMB	plug	status	34.1	564	0.57
352	1787	SHL	LMB	plug	status	36.5	608	0.47
352	1788	SHL	LMB	plug	status	33.5	487	0.46
352	1789	SHL	LMB	plug	status	35.7	601	0.55
352	1790	SHL	LMB	plug	status	34.7	528	0.5
353	1758	SHL	LMB	plug	followup	39.5	744	0.42
353	1759	SHL	LMB	plug	followup	35.5	537	0.34
353	1760	SHL	LMB	plug	followup	35.4	507	0.22
353	1761	SHL	LMB	plug	followup	36.3	631	0.45
353	1762	SHL	LMB	plug	followup	35	527	0.4

Appendix E

Complete listing of the 2015 IFTMP bottom feeding fish and turtle sampling results (in mg/kg). See Appendix B for a list of 2015 IFTMP site descriptions and Appendix C for a list of names and species codes. All samples were analyzed as a composite of fillet or shoulder tissue from two to five specimens.

Site #	Sample #	Lab	Species Code	Bio-part	Sample Type	chlordane, technical	DDE	dieldrin	mercury	PCB, Aroclor 1248	PCB, Aroclor 1254	PCB, Aroclor 1260	*sum PCBs	mean Total Length (cm)	mean Weight (g)	# in Sample
9	1691	SHL	CCF	fillet	status	0.02		0.005	0.03	<0.02	0.21	<0.02	0.25	45	985	5
16	1692	SHL	CCF	fillet	status	0.02	0.01	0.006	0.09	<0.02	0.22	<0.02	0.26	41.3	633	5
45	1757	SHL	CAP	fillet	followup	0.02		0.005	0.08	<0.02	<0.02	<0.02	<0.06	48.4	1748	5
66	1675	SHL	CCF	fillet	status	0.02		0.005	0.02	<0.02	<0.02	<0.02	<0.06	46.5	968	5
84	1773	SHL	CCF	fillet	status	0.02	0.007	0.005	0.05	<0.02	<0.02	<0.02	<0.06	50.1	1297	5
110	1735	SHL	CAP	fillet	status	0.02		0.005	0.19	<0.02	<0.02	<0.02	<0.06	46.6	1835	5
126	1693	SHL	CAP	fillet	status	0.02	0.008	0.005	0.09	<0.02	<0.02	<0.02	<0.06	48.8	1456	5
138	1801	SHL	CCF	fillet	status	0.02		0.005	0.04	<0.02	<0.02	<0.02	<0.06	48.1	1139	5
144	1756	SHL	CAP	fillet	status	0.02		0.005	0.15	<0.02	<0.02	<0.02	<0.06	54.9	2127	4
149	1807	SHL	CCF	fillet	status	0.02	0.02	0.005	0.04	<0.02	<0.02	<0.02	<0.06	47.2	951	5
151	1672	SHL	CAP	fillet	status	0.02		0.005	0.11	<0.02	<0.02	<0.02	<0.06	50.6	1790	3
191	1813	SHL	GOR	fillet	status	0.02		0.005	0.14	<0.02	<0.02	<0.02	<0.06	46.3	1013	5
219	1694	SHL	CCF	fillet	followup	0.02		0.005	0.12	<0.02	<0.02	<0.02	<0.06	41.5	644	5
262	1673	SHL	CAP	fillet	followup	0.07		0.005	0.09	<0.02	0.45	<0.02	0.49	53.2	1744	5
339	1674	SHL	CCF	fillet	status	0.02		0.005	0.03	<0.02	<0.02	<0.02	<0.06	46.6	1019	5
346	1795	SHL	SNAP	shlder	followup	0.02		0.006	0.16	<0.02	<0.02	<0.02	<0.06	28.3	5491	3
352	1785	SHL	CCF	fillet	status	0.02		0.01	0.08	<0.02	<0.02	<0.02	<0.06	54.8	1751	3
354	1784	SHL	SNAP	shlder	followup	0.02		0.005	0.3	<0.02	<0.02	<0.02	<0.06	26.8	5136	2

*sum PCBs = Aroclor 1248 + Aroclor 1254 + Aroclor 1260