2017 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 (DNR) has conducted annual statewide collections of Iowa fish and sent tissue samples to either the United States Environmental Protection Agency Region 7 (EPA R7) or the Iowa State Hygienic Laboratory (SHL) for the analyses of toxic contaminants. From 1983 to 2013, this monitoring effort was known as the Regional Ambient Fish Tissue Monitoring Program (RAFT). Beginning in 2014, after EPA R7 changed their program support, the only statewide fish contaminant-monitoring program in Iowa was changed to the Iowa Fish Tissue Monitoring Program (IFTMP). The IFTMP is administered by DNR and the tissue analyses are completed at the SHL. Historically, the data generated from the IFTMP have enabled DNR 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 DNR 2006). The IFTMP has historically incorporated five different types of monitoring sites: 1) status, 2) follow-up, 3) trend, 4) turtle, and 5) random.

In 2017, DNR conducted an inter-laboratory largemouth bass mercury (Hg) concentration project. The two goals of the 2017 IFTMP were 1) analyze the laboratory variability of largemouth bass tissue Hg concentration and 2) conduct follow-up Hg sampling on several Iowa waterbodies.

2017 IFTMP Results:

For the 2017 IFTMP, DNR conducted an inter-laboratory project that involved collecting three largemouth bass from 20 sites. Tissue plug samples were randomly collected from each fish and sent to the three laboratories for analysis. Additionally, a larger volume sample (tissue chunk) was also collected and sent to one of the laboratories. The laboratories analyzed the 60 samples for Hg concentration and all the results were summarized and compared (see Appendix C).

The mean (or mean + standard deviation [sd]) mercury concentration found in the largemouth bass at eight of the sites was low and warranted no further action. The mean (or mean + sd) mercury concentration at 10 of the sites exceeded the advisory limit of 0.3 mg/kg (Appendix A). DNR will collect follow-up mercury samples from those sites in 2019 or 2020. Lastly, based on historic and the 2017 mercury sampling results at two sites, Little River Lake and Chatfield Lake, DNR will issue 1 meal/week consumption advisories for both lakes. Those advisories will be included in the 2020 annual fishing regulations and posted on the DNR website. The 2017 Hg results are summarized in Table 1 while Appendix C contains all of the individual 2017 Hg results.

Table 1. Summary of 2017 IFTMP mercury (Hg) sampling results from largemouth bass (n=3). All samples were tissue plugs or chunks and Hg results are in mg/kg (or ppm).

IFTMP Site Name	Lab A plug Hg mean (mean+sd) (mg/kg)	Lab A chunk Hg mean (mean+sd) (mg/kg)	Lab B plug Hg mean (mean+sd) (mg/kg)	Lab C plug Hg mean (mean+sd) (mg/kg)	DNR Action
Mississippi River at Davenport	0.147 (0.237)	0.117 (0.157)	0.159 (0.221)	0.159 (0.219)	No Action
Big Creek Lake	0.097 (0.120)	0.080 (0.097)	0.109 (0.132)	0.111 (0.130)	No Action
Lake Rathbun	0.223 (0.278)	0.207 (0.262)	0.281 (0.360)	0.265 (0.340)	Follow-up
Lake of the Hills	0.187 (0.222)	0.220 (0.281)	0.257 (0.322)	0.259 (0.320)	Follow-up
Little River Lake	0.357 (0.418)	0.333 (0.354)	0.445 (0.491)	0.416 (0.461)	Advisory
Briggs Woods Lake	0.247 (0.313)	0.263 (0.313)	0.342 (0.408)	0.335 (0.408)	Follow-up
Lake Meyers	0.193 (0.225)	0.243 (0.259)	0.251 (0.278)	0.262 (0.291)	No Action
East Okoboji	0.127 (0.152)	0.157 (0.206)	0.164 (0.198)	0.168 (0.204)	No Action
Lake Anita	0.240 (0.276)	0.330 (0.410)	0.343 (0.434)	0.320 (0.393)	Follow-up
Mississippi River ds Burlington	0.200 (0.244)	0.177 (0.237)	0.241 (0.309)	0.224 (0.277)	Follow-up
Lake of Three Fires	0.280 (0.341)	0.257 (0.323)	0.328 (0.393)	0.299 (0.368)	Follow-up
Yellow Smoke Lake	0.303 (0.402)	0.267 (0.351)	0.378 (0.522)	0.357 (0.501)	Follow-up
Lower Pine Lake	0.093 (0.145)	0.087 (0.117)	0.116 (0.179)	0.121 (0.196)	No Action
Mississippi River at McGregor	0.200 (0.272)	0.190 (0.251)	0.261 (0.369)	0.260 (0.356)	Follow-up
Meadow Lake	0.230 (0.286)	0.217 (0.252)	0.305 (0.354)	0.305 (0.354)	Follow-up
Cold Springs Lake	0.230 (0.292)	0.297 (0.422)	0.309 (0.427)	0.303 (0.409)	Follow-up
Roberts Creek Lake	0.143 (0.194)	0.133 (0.198)	0.180 (0.253)	0.176 (0.244)	No Action
Mississippi River at Bellevue	0.167 (0.197)	0.190 (0.200)	0.219 (0.243)	0.221 (0.238)	No Action
Chatfield Lake	0.550 (0.723)	0.613 (0.778)	0.772 (0.967)	0.768 (0.970)	Advisory
Snyder Bend Lake	0.067 (0.087)	0.053 (0.059)	0.072 (0.100)	0.073 (0.099)	No Action

References:

DNR. 2006. Fish tissue monitoring in Iowa. Water Fact Sheet 2006-5. Geological and Water Survey, Iowa Department of Natural Resources. 4 pgs (https://www.iihr.uiowa.edu/igs/publications/uploads/wfs-2006-05.pdf).

DNR. 2017. Sampling Procedures for the Iowa DNR Fish Tissue Monitoring Program (IFTMP). Water Quality Bureau, Environmental Services Division, Iowa Department of Natural Resources. 4 pp.

IDPH. 2007. Fish consumption advisory protocol in Iowa. Iowa Department of Public Health. 8 pgs.

Appendix A

Summary of contaminants of concern and respective evaluation criteria for IFTMP tissue samples. Advisory levels from the 2007 IDPH Fish consumption advisory protocol document.

#	contaminant	SHL current lowest detection levels (ppm)	DNR/IDPH advisory trigger level (ppm)	DNR/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	0.005		
7	DDE, 4,4'-	0.005		

Appendix B

Complete list of the 2017 IFTMP sampling sites.

Site #	IFTMP Site Name	County	Waterbody Type
47	Mississippi River at Davenport	Scott	River
52	Big Creek Lake	Polk	Lake
53	Lake Rathbun	Appanoose	Lake
74	Lake of the Hills	Scott	Lake
75	Little River Lake	Decatur	Lake
77	Briggs Woods Lake	Hamilton	Lake
78	Lake Meyers	Winneshiek	Lake
84	East Okoboji	Dickinson	Lake
100	Lake Anita	Cass	Lake
102	Mississippi River at Burlington	Des Moines	River
158	Lake of Three Fires	Taylor	Lake
162	Yellow Smoke Lake	Crawford	Lake
193	Lower Pine Lake	Hardin	Lake
206	Mississippi River at McGregor	Clayton	River
269	Meadow Lake	Adair	Lake
289	Cold Springs Lake	Cass	Lake
325	Roberts Creek Lake	Marion	Lake
350	Mississippi River at Bellevue	Jackson	River
352	Chatfield Lake	Lee	Lake
359	Snyder Bend Lake	Woodbury	Lake

Appendix C

Complete listing of the 2017 IFTMP predator fish sampling results. See Appendix B for a list of 2017 IFTMP site information.

Site #	Fish	Date	Species	Biopart	Length (mm)	Weight (g)	Lab A plug Hg (mg/kg)	Lab A chunk Hg (mg/kg)	Lab B plug Hg (mg/kg)	Lab C plug Hg (mg/kg)
47	LMB1	8/9/2017	LMB	plug	347	610	0.25	0.16	0.227	0.224
47	LMB2	8/9/2017	LMB	plug	337	582	0.11	0.11	0.143	0.147
47	LMB3	8/9/2017	LMB	plug	308	424	0.08	0.08	0.106	0.105
52	LMB1	6/14/2017	LMB	plug	406	892	0.11	0.07	0.104	0.1
52	LMB2	6/14/2017	LMB	plug	422	1350	0.11	0.1	0.134	0.132
52	LMB3	6/14/2017	LMB	plug	404	1060	0.07	0.07	0.089	0.101
53	LMB1	6/21/2017	LMB	plug	409	1005	0.25	0.21	0.292	0.272
53	LMB2	6/21/2017	LMB	plug	434	1040	0.26	0.26	0.354	0.336
53	LMB3	6/21/2017	LMB	plug	419	1110	0.16	0.15	0.196	0.186
74	LMB1	8/3/2017	LMB	plug	445	1115	0.19	0.26	0.285	0.3
74	LMB2	8/3/2017	LMB	plug	408	954	0.15	0.15	0.183	0.189
74	LMB3	8/3/2017	LMB	plug	385	734	0.22	0.25	0.303	0.289
75	LMB1	5/23/2017	LMB	plug	386	703	0.41	0.34	0.445	0.429
75	LMB2	5/23/2017	LMB	plug	384	717	0.29	0.31	0.399	0.367
75	LMB3	5/23/2017	LMB	plug	409	953	0.37	0.35	0.491	0.453
77	LMB1	5/30/2017	LMB	plug	407	1000	0.23	0.23	0.288	0.282
77	LMB2	5/30/2017	LMB	plug	393	875	0.19	0.24	0.323	0.306
77	LMB3	5/30/2017	LMB	plug	411	1030	0.32	0.32	0.415	0.418
78	LMB1	6/29/2017	LMB	plug	358	608	0.18	0.24	0.249	0.251
78	LMB2	6/29/2017	LMB	plug	368	668	0.17	0.23	0.224	0.239
78	LMB3	6/29/2017	LMB	plug	345	585	0.23	0.26	0.279	0.295
84	LMB1	8/2/2017	LMB	plug	384	904	0.13	0.19	0.171	0.176
84	LMB2	8/2/2017	LMB	plug	405	1110	0.15	0.18	0.194	0.199
84	LMB3	8/2/2017	LMB	plug	376	806	0.1	0.1	0.126	0.129
100	LMB1	6/19/2017	LMB	plug	432	997	0.27	0.41	0.435	0.386
100	LMB2	6/19/2017	LMB	plug	368	740	0.2	0.25	0.254	0.241
100	LMB3	6/19/2017	LMB	plug	394	844	0.25	0.33	0.342	0.333
102	LMB1	7/18/2017	LMB	plug	371	763	0.18	0.17	0.217	0.204
102	LMB2	7/18/2017	LMB	plug	395	852	0.25	0.24	0.318	0.284
102	LMB3	7/18/2017	LMB	plug	374	859	0.17	0.12	0.188	0.184
158	LMB1	5/19/2017	LMB	plug	412	971	0.31	0.3	0.372	0.331
158	LMB2	5/19/2017	LMB	plug	412	1080	0.21	0.18	0.255	0.22
158	LMB3	5/19/2017	LMB	plug	432	1197	0.32	0.29	0.359	0.346
162	LMB1	7/18/2017	LMB	plug	343	524	0.19	0.17	0.216	0.195
162	LMB2	7/18/2017	LMB	plug	363	602	0.35	0.32	0.423	0.41
162	LMB3	7/18/2017	LMB	plug	348	490	0.37	0.31	0.494	0.467
193	LMB1	7/12/2017	LMB	plug	359	660	0.08	0.08	0.098	0.0988
193	LMB2	7/12/2017	LMB	plug	352	600	0.05	0.06	0.064	0.0591
193	LMB3	7/12/2017	LMB	plug	377	550	0.15	0.12	0.186	0.205
206	LMB1	7/18/2017	LMB	plug	335	613	0.14	0.15	0.173	0.179
206	LMB2	7/18/2017	LMB	plug	355	773	0.18	0.16	0.229	0.233
206	LMB3	7/18/2017	LMB	plug	346	717	0.28	0.26	0.381	0.367
269	LMB1	6/19/2017	LMB	plug	368	667	0.22	0.22	0.286	0.286
269	LMB2	6/19/2017	LMB	plug	384	717	0.18	0.18	0.267	0.269
269	LMB3	6/19/2017	LMB	plug	399	873	0.29	0.25	0.361	0.361
289	LMB1	6/9/2017	LMB	plug	353	567	0.18	0.21	0.221	0.221
289	LMB2	6/9/2017	LMB	plug	351	536	0.21	0.24	0.263	0.265
289	LMB3	6/9/2017	LMB	plug	409	775	0.3	0.44	0.443	0.423
325	LMB1	6/14/2017	LMB	plug	405	1108	0.09	0.07	0.105	0.108
325	LMB2	6/14/2017	LMB	plug	405	1036	0.15	0.13	0.184	0.177
325	LMB3	6/14/2017	LMB	plug	420	1296	0.19	0.2	0.251	0.243
350	LMB1	7/28/2017	LMB	plug	387	822	0.16	0.18	0.197	0.212
350	LMB2	7/28/2017	LMB	plug	386	888	0.14	0.19	0.216	0.209
350	LMB3	7/28/2017	LMB	plug	396	944	0.2	0.2	0.244	0.241
352	LMB1	8/9/2017	LMB	plug	395	757	0.45	0.55	0.670	0.674
352	LMB2	8/9/2017	LMB	plug	411	671	0.75	0.8	0.997	1
352	LMB3	8/9/2017	LMB	plug	336	531	0.45	0.49	0.649	0.631
359	LMB1	7/17/2017	LMB	plug	343	764	0.05	0.05	0.065	0.0665
359	LMB2	7/17/2017	LMB	plug	320	680	0.06	0.05	0.049	0.0507
359	LMB3	7/17/2017	LMB	plug	358	724	0.09	0.06	0.103	0.102