

**2009 REGIONAL AMBIENT FISH TISSUE MONITORING
PROGRAM;
SUMMARY OF THE IOWA 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 University of Iowa Hygienic Laboratory (UHL) have cooperatively conducted annual statewide collections and analyses of fish for toxic contaminants. Beginning in 1983, this monitoring effort became known as the Regional Ambient Fish Tissue Monitoring Program (RAFT). Currently, the RAFT program is the only statewide fish contaminant-monitoring program in Iowa. Historically, the data generated from the RAFT program 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 Iowa RAFT monitoring program incorporates four different types of monitoring sites: 1) status, 2) trend, 3) random and 4) follow-up. New for 2009 was the one-time inclusion of snapping turtle tissue as part of the Iowa RAFT sampling program.

Status monitoring:

The majority of RAFT sites sampled each year 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 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* for recreational fishing. Approximately one-third to one-half of Iowa RAFT status sites are on lakes; the remaining sites are either on interior rivers or on the border rivers (Mississippi, Missouri or Big Sioux).

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 sample of three to five common carp from each station 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). 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. In 2006, due to a change in RAFT program design (U.S. EPA 2006), all 10 trend sites were sampled. All 10 trend sites were sampled again in 2008 and will be sampled every other year in the future. The following ten sites are Iowa's part of the RAFT trend monitoring program:

1. Mississippi River downstream from Dubuque, Dubuque County
2. Mississippi River downstream from Linwood, Scott County
3. Wapsipinicon River north of Donahue, Scott County
4. Des Moines River at Keosauqua, Van Buren County
5. Little Sioux River near Washta, Ida County
6. Mississippi River at Lansing, Allamakee County
7. Maquoketa River at Maquoketa, Jackson County
8. Iowa River at Wapello, Louisa County
9. Skunk River at Augusta, Lee County
10. Des Moines River at Des Moines, Polk County

Random Monitoring:

In 2006, based on recommendations in U.S. EPA's RAFT workplan (U.S. EPA 2006), Iowa began sampling random 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 sample sites were selected from a random list of smaller public lakes and ponds. Given that U.S. EPA Region VII has recently changed the emphasis of the RAFT program again, the future of random sampling for Iowa fish contaminants is uncertain.

Follow-up Monitoring:

If the level of a contaminant in a fish tissue sample exceeds IDNR/IDPH advisory trigger levels and/or IDNR levels of concern (Table 1; IDPH 2007), the RAFT program 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 IDNR/IDPH advisory trigger levels, additional samples will be collected as part of follow-up monitoring for the next year's RAFT program. If follow-up monitoring confirms that levels of contamination exceed State guidelines for protection of human health, a fish consumption advisory is issued. For more information on consumption advisories see the IDNR RAFT website:

<http://wqm.igsb.uiowa.edu/wqa/raft.html>.

Turtle Monitoring:

In 2009, IDNR fisheries biologists collected snapping turtles from nine Iowa lakes to better define contaminant levels in Iowa turtle populations. This one-time endeavor used the left front shoulder tissue from 2-3 turtles for a sample that was submitted for analysis following the same protocol used for fish.

2009 Results:

The 2009 RAFT program in Iowa involved the collection of 54 samples from 31 waterbodies (Table 2). In July through October 2009, IDNR fisheries biologists collected, processed and prepared the RAFT samples for shipping. These activities were conducted according to procedures described in the workplan for the 2009 RAFT in Iowa (IDNR 2009). Once frozen, samples were transported or shipped to the Ankeny office of the UHL. The frozen tissue samples were stored at the UHL until shipment to the U.S. EPA Region VII laboratory in Kansas City, Kansas. All samples were shipped to the U.S. EPA Region VII laboratory for analysis by December 2009. Samples were analyzed for a variety of contaminants, including pesticides, other toxic organic compounds, and toxic metals (Table 1). IDNR received results of all sample analyses in May 2009.

Status monitoring in 2009 included collection of 36 composite fish fillet samples from 18 sites (Tables 3 and 4; Figures 2 and 3). As a result of this monitoring, follow-up monitoring will be conducted in 2010 at one site for PCBs and at five sites for mercury to determine if a fish consumption advisory should be issued. Turtle monitoring included collection of nine composite left front shoulder muscle tissue samples of snapping turtle from nine sites. Levels of contaminants in all samples of turtle tissue were below IDPH/IDNR advisory trigger levels for chlordane, mercury, and total PCBs (Table 2, Figure 1). Follow-up monitoring included nine collections of composite fish fillet samples from six sites (Table 5; Figure 4). This monitoring confirmed the need to continue existing one meal per week advisories for four waterbodies and showed that advisories were not justified at two follow-up locations. The criteria used to evaluate the results of this monitoring are summarized in Table 1. Levels of nearly all contaminants were low in all samples collected.

References:

- IDNR. 2006. Fish tissue monitoring in Iowa. Water Fact Sheet 2006-5. Geological and Water Survey, Iowa Department of Natural Resources. 4 pgs
(<http://wqm.igsb.uiowa.edu/publications/fact%20sheets/2006FactSheets/2006-5%2011x17.pdf>).
- IDNR. 2009. Sampling Procedures for the 2009 Region VII Ambient Fish Tissue Monitoring Program in Iowa Including Supplemental Monitoring of Turtle Tissue. Geological and Water Survey Bureau, Environmental Services Division, Iowa Department of Natural Resources. 29 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.

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List of species:

abbreviation	common name	Scientific name	RAFT code
carp	common carp	<i>Cyprinus carpio</i>	12
ccat	channel catfish	<i>Ictalurus punctatus</i>	16
drum	freshwater drum	<i>Aplodinotus grunniens</i>	20
fcap	flathead catfish	<i>Pylodictis olivarius</i>	19
lmb	largemouth bass	<i>Micropterus salmoides</i>	31
smb	smallmouth bass	<i>Micropterus dolomieu</i>	47
turtle	snapping turtle	<i>Chelydra serpentina</i>	na
wbass	white bass	<i>Morone chrysops</i>	57
weye	walleye	<i>Sander vitreus</i>	55
yper	yellow perch	<i>Perca flavescens</i>	63

Table 1. Summary of contaminants and respective criteria for samples of fish collected for the 2009 Regional Ambient Fish Tissue (RAFT) monitoring program in Iowa.

	Contaminant	Detection Level (ppm ²)	IDNR/IDPH advisory level (ppm)	IDNR/IDPH advisory meal allowance	FDA Action Level (ppm)	IDNR "level of concern" wet weight (ppm)
1	chlordane, technical	0.03	0 to 0.6	unrestricted	0.3	
			>0.6 to <5.0	one meal per week		
			5.0 and over	do not eat		
2	mercury	0.0181	0 to 0.3	unrestricted	1.0	
			>0.3 to <1.0	one meal per week		
			1.0 and over	do not eat		
3	PCB, Aroclor 1248	0.04	sum = 0 to 0.2	unrestricted	sum = 2.0	sum = 1.0
4	PCB, Aroclor 1254	0.03	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	chlordane, cis-	0.002			sum = 0.3	sum = 0.15
7	chlordane, trans-	0.002				
8	nonachlor, cis-	0.002				
9	nonachlor, trans-	0.002				
10	oxychlordane	0.002			sum = 5.0	sum = 2.5
11	DDD, 4,4'-	0.004				
12	DDE, 4,4'-	0.005				
13	DDT, 4,4'-	0.005				
14	BHC (lindane)	0.002			none	0.1
15	cadmium	0.06			none	0.3
16	diazinon ¹	0.04			none	none
17	dieldrin	0.003			0.3	0.15
18	heptachlor	0.003			sum = 0.3	sum = 0.15
19	heptachlor epoxide	0.003				
20	hexachlorobenzene	0.001			none	0.01
21	lead	0.17			none	1.0
22	mirex ¹	0.003			0.1	0.05
23	pentacloroanisole	0.001			none	0.1
24	pentachlorobenzene ¹	0.001			none	none
25	selenium	0.5			none	none
26	1,2,4,5-tetrachlorobenzene ¹	0.004			none	none
27	trifluralin	0.003			none	0.2

¹trend samples only

²ppm = parts per million and is equivalent to milligrams/kilogram (mg/kg)

Table 2. Summary of the 2009 IA RAFT turtle sample results (results in mg/kg).

Site Name	Alice Wyth Lake near Waterloo	Cedar Lake at Cedar Rapids	Lake Anita SW of Anita	Lake Geode E of Lowell	Lake Hendricks NE of Riceville	Lake Macbride WSW of Solon	Morman Trail Pond E of Bridgewater	West Okoboji Lake N of Milford	Yellow Smoke Lake
County	Black Hawk	Linn	Cass	Henry	Howard	Johnson	Adair	Dickinson	Crawford
Date	7/29/2009	9/2/2009	8/11/2009	9/16/2009	8/26/2009	7/23/2009	8/11/2009	8/5/2009	8/28/2009
species	snapping turtle								
biopart	left front shoulder								
sample type	status								
1,2,4,5-tetrachlorobenzene	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
BHC (Lindane)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
cadmium (Total)	UJ0.02	UJ0.02	UJ0.02	UJ0.02	UJ0.02	UJ0.02	UJ0.02	J0.04	UJ0.02
chlordane, technical	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
DDD+DDE+DDT	<0.014	0.0166	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014
dieldrin	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
heptachlor	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
heptachlor epoxide	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
hexachlorobenzene	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
lead	UJ0.14	UJ0.14	UJ0.14	UJ0.14	UJ0.14	UJ0.14	UJ0.14	UJ0.14	UJ0.14
mercury	0.108	0.0486	0.171	0.284	0.132	0.113	0.138	0.153	0.122
mirex	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
total PCBs (Aroclors 1248+1254+1260)	<0.09	0.113	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
pentachloroanisole (PCA)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
pentachlorobenzene	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
selenium	UJ0.45	UJ0.45	UJ0.44	UJ0.45	UJ0.45	UJ0.45	UJ0.44	UJ0.44	UJ0.44
trifluralin	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
J = The identification of the analyte is acceptable; the reported value is an estimate.									
UJ = The analyte was not detected at or above the reporting limit. The reported value is an estimate.									

Table 3. Summary of the 2009 IA RAFT status sample results less mercury (results in mg/kg).

Site Name	Big Spirit Lake N of Spirit Lake	Copper Creek Lake near Pleasant Hill	Des Moines River near Boone	Des Moines River - Red Wing Access near Keokuk	Iowa River below Iowa Falls	Lake Keomah near Oskaloosa	Lake Miami ESE of Lovilia	Lake of the Hills W of Davenport	Lake Petoka near Bondurant	Little George Pond	McKinley Lake near Creston	Mississippi River at Lansing	Mississippi River near Sabula	Missouri River W of Little Sioux	Pleasant Creek Lake near Center Point	Mississippi River above Fort Madison	Mississippi River at Buffalo	West Fork Des Moines River SE of Bradgate
biopart	fillet																	
sample type	status																	
species	carp	ccat	carp	carp	ccat	ccat	ccat	ccat	ccat	ccat	ccat	carp	carp	carp	ccat	carp	carp	ccat
BHC (Lindane)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
cadmium (total)	UJ0.02	UJ0.02	UJ0.02	UJ0.02	UJ0.02	UJ0.02	UJ0.02	UJ0.02	UJ0.02	UJ0.02	UJ0.02	UJ0.02	UJ0.02	UJ0.02	UJ0.02	UJ0.02	UJ0.02	UJ0.02
chlordane, cis-	<0.002	<0.002	<0.002	0.0061	0.004	<0.002	<0.002	0.002	<0.002	<0.002	0.0078	<0.002	<0.002	<0.002	<0.002	0.0033	<0.002	<0.002
chlordane, technical	<0.03	<0.03	<0.03	0.086	0.055	<0.03	<0.03	<0.03	<0.03	<0.03	0.07	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
DDD+DDE+DDT	<0.014	0.0142	0.022	0.022	0.044	<0.014	<0.014	0.0249	0.0156	<0.014	0.0331	<0.014	<0.014	0.019	<0.014	0.0148	<0.014	<0.014
chlordane, trans-	<0.002	<0.002	<0.002	0.0035	0.0027	<0.002	<0.002	<0.002	<0.002	<0.002	0.0047	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
dieldrin	<0.003	0.003	0.0038	0.0083	0.013	<0.003	<0.003	0.0046	<0.003	<0.003	<0.0078	<0.003	<0.003	0.0036	<0.003	0.0091	<0.003	<0.003
heptachlor	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
heptachlor epoxide	<0.003	<0.003	<0.003	<0.003	0.0031	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
hexachloro-benzene	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0038	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
lead	UJ0.14	UJ0.13	UJ0.14	UJ0.14	UJ0.14	UJ0.14	UJ0.13	J0.16	UJ0.13	UJ0.13	UJ0.13	UJ0.13	UJ0.13	J0.21	UJ0.13	UJ0.14	UJ0.13	UJ0.13
nonachlor, cis-	<0.002	<0.002	<0.002	0.0048	0.0027	<0.002	<0.002	<0.002	<0.002	<0.002	0.0033	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
nonachlor, trans-	<0.002	<0.002	<0.002	0.015	0.0086	<0.002	<0.002	0.0031	<0.002	<0.002	0.0062	<0.002	<0.002	0.004	<0.002	0.0041	<0.002	<0.002
oxychlordane	<0.002	<0.002	<0.002	0.0023	0.0022	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
total PCBs (Aroclors 1248+1254+1260)	<0.09	<0.09	<0.09	0.136	0.135	<0.09	<0.09	<0.09	<0.09	<0.09	0.212	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
pentachloro-anisole (PCA)	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	0.0037	<0.001	0.0033	0.0022	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
selenium	J0.72	UJ0.43	J1.08	J0.65	UJ0.43	J0.51	UJ0.42	J0.45	J0.69	4.77	1.21	1.22	UJ0.43	UJ0.43	J0.5	UJ0.45	J0.72	J0.61
trifluralin	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

J = The identification of the analyte is acceptable; the reported value is an estimate.
 UJ = The analyte was not detected at or above the reporting limit. The reported value is an estimate.

Table 4. Summary of the 2009 IA RAFT status sample results for mercury.

Site Name	County	Date	Species	bio-part	sample type	mercury value (mg/kg)
Big Spirit Lake N of Spirit Lake	Dickinson	8/10/2009	common carp	fillet	status	0.0343
Big Spirit Lake N of Spirit Lake	Dickinson	8/13/2009	yellow perch	fillet	status	0.043
Copper Creek Lake near Pleasant Hill	Polk	9/18/2009	channel catfish	fillet	status	0.114
Copper Creek Lake near Pleasant Hill	Polk	9/2/2009	largemouth bass	fillet	status	0.254
Des Moines River - Red Wing Access near Keokuk	Lee	9/29/2009	common carp	fillet	status	0.22
Des Moines River - Red Wing Access near Keokuk	Lee	9/29/2009	freshwater drum	fillet	status	0.181
Des Moines River near Boone	Boone	9/18/2009	common carp	fillet	status	0.2
Des Moines River near Boone	Boone	9/30/2009	walleye	fillet	status	0.181
Iowa River below Iowa Falls	Hardin	8/12/2009	channel catfish	fillet	status	0.366
Iowa River below Iowa Falls	Hardin	8/12/2009	smallmouth bass	fillet	status	0.346
Lake Keomah near Oskaloosa	Mahaska	10/26/2009	channel catfish	fillet	status	0.027
Lake Keomah near Oskaloosa	Mahaska	10/26/2009	largemouth bass	fillet	status	0.464
Lake Miami ESE of Lovilia	Monroe	10/26/2009	channel catfish	fillet	status	0.109
Lake Miami ESE of Lovilia	Monroe	10/26/2009	largemouth bass	fillet	status	0.353
Lake of the Hills W of Davenport	Scott	9/24/2009	channel catfish	fillet	status	0.0701
Lake of the Hills W of Davenport	Scott	9/18/2009	largemouth bass	fillet	status	0.342
Lake Petoka near Bondurant	Polk	9/2/2009	channel catfish	fillet	status	0.0402
Lake Petoka near Bondurant	Polk	9/2/2009	largemouth bass	fillet	status	0.0847
Little George Pond	Shelby	8/28/2009	channel catfish	fillet	status	0.00783
Little George Pond	Shelby	8/28/2009	largemouth bass	fillet	status	0.0839
McKinley Lake near Creston	Union	8/5/2009	channel catfish	fillet	status	0.0825
McKinley Lake near Creston	Union	8/5/2009	largemouth bass	fillet	status	0.136
Mississippi River above Fort Madison	Lee	8/27/2009	common carp	fillet	status	0.154
Mississippi River above Fort Madison	Lee	8/27/2009	largemouth bass	fillet	status	0.282
Mississippi River at Buffalo	Scott	8/10/2009	common carp	fillet	status	0.0697
Mississippi River at Buffalo	Scott	8/10/2009	white bass	fillet	status	0.218
Mississippi River at Lansing	Allamakee	8/31/2009	common carp	fillet	status	0.113
Mississippi River at Lansing	Allamakee	8/31/2009	largemouth bass	fillet	status	0.15
Mississippi River near Sabula	Jackson	8/11/2009	common carp	fillet	status	0.0612
Mississippi River near Sabula	Jackson	8/11/2009	largemouth bass	fillet	status	0.153
Missouri River W of Little Sioux	Harrison	8/11/2009	common carp	fillet	status	0.0617
Missouri River W of Little Sioux	Harrison	8/11/2009	flathead catfish	fillet	status	0.156
Pleasant Creek Lake near Center Point	Linn	7/16/2009	channel catfish	fillet	status	0.212
Pleasant Creek Lake near Center Point	Linn	7/16/2009	largemouth bass	fillet	status	0.042
West Fork Des Moines River SE of Bradgate	Humboldt	9/4/2009	channel catfish	fillet	status	0.134
West Fork Des Moines River SE of Bradgate	Humboldt	9/4/2009	walleye	fillet	status	0.328

Table 5. Summary of the 2009 IA RAFT follow-up samples.

Site Name	Cedar River W of Osage	Des Moines River downstream of Fort Dodge	Des Moines River downstream of Fort Dodge	Lake Geode E of Lowell	Mississippi River at Hamm Island - Dubuque	Mississippi River at Hamm Island - Dubuque	Morman Trail Pond E of Bridgewater	Morman Trail Pond E of Bridgewater	Nine Eagles Lake near Davis City
County	Mitchell	Webster	Webster	Henry	Dubuque	Dubuque	Adair	Adair	Decatur
Date	8/6/2009	8/14/2009	8/14/2009	8/13/2009	8/10/2009	8/10/2009	8/11/2009	9/23/2009	7/30/2009
Fish	smb	carp	drum	lmb	lmb	walleye	lmb	walleye	lmb
Biopart	fillet								
Sample Type	follow-up								
BHC (Lindane)		<0.002							
cadmium (total)		UJ0.02							
chlordane, cis-		<0.002							
chlordane, technical		<0.03							
chlordane, trans-		<0.002							
dieldrin		<0.003							
heptachlor		<0.003							
heptachlor epoxide		<0.003							
hexachlorobenzene		<0.001							
lead		UJ0.14							
mercury	0.351	0.193	0.149	0.437	0.193	0.234	0.341	0.245	0.534
nonachlor, cis-		<0.002							
nonachlor, trans-		<0.002							
DDD+DDE+DDT		<0.014							
oxychlordane		<0.002							
total PCBs (Aroclors 1248+1254+1260)		<0.09							
pentachloroanisole (PCA)		<0.001							
selenium		J0.49							
trifluralin		<0.003							
<p>J = The identification of the analyte is acceptable; the reported value is an estimate. UJ = The analyte was not detected at or above the reporting limit. The reported value is an estimate.</p>									

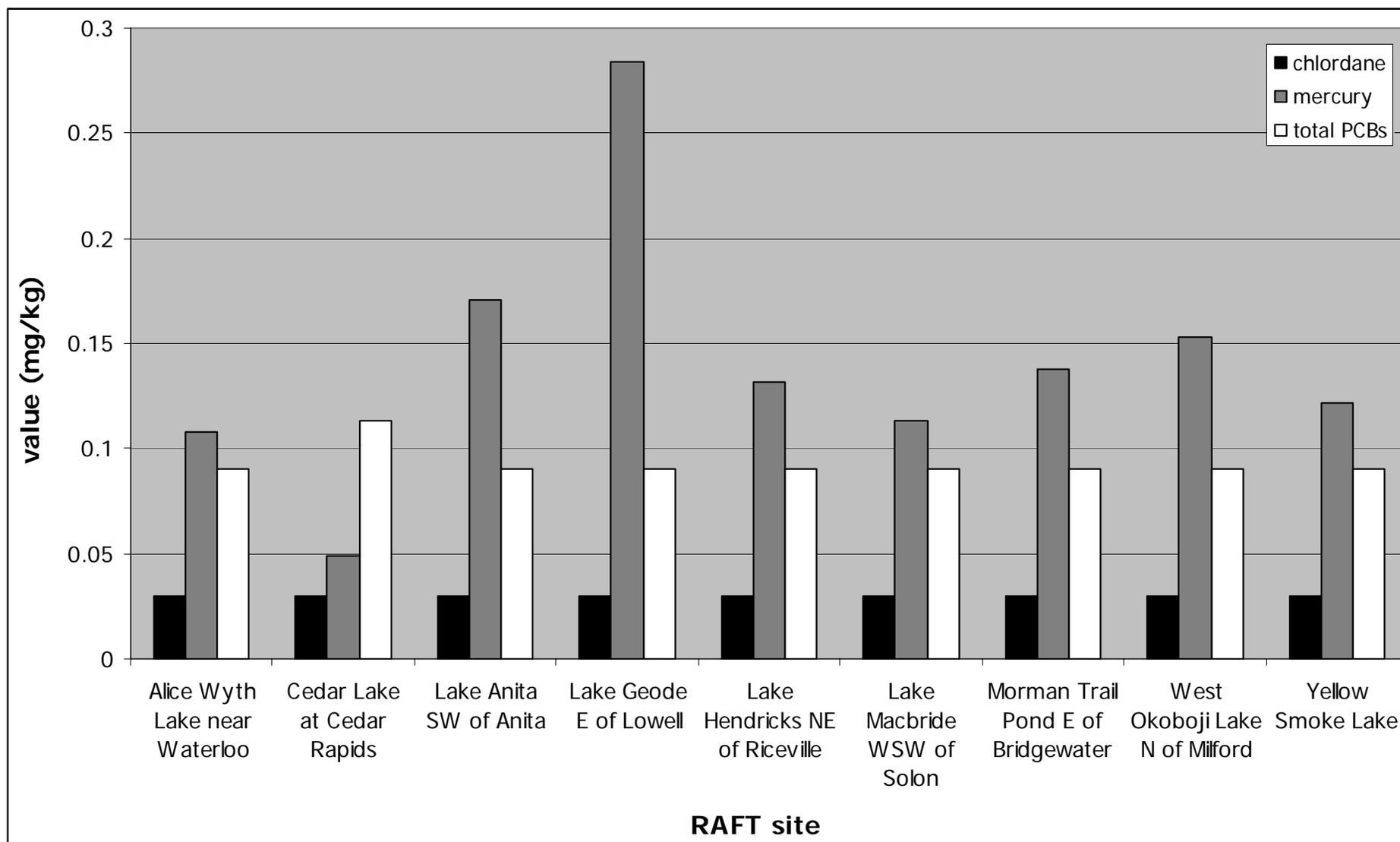


Figure 1. 2009 Iowa RAFT turtle sample results for chlordane, mercury and total PCBs using front left shoulder tissue from snapping turtles.

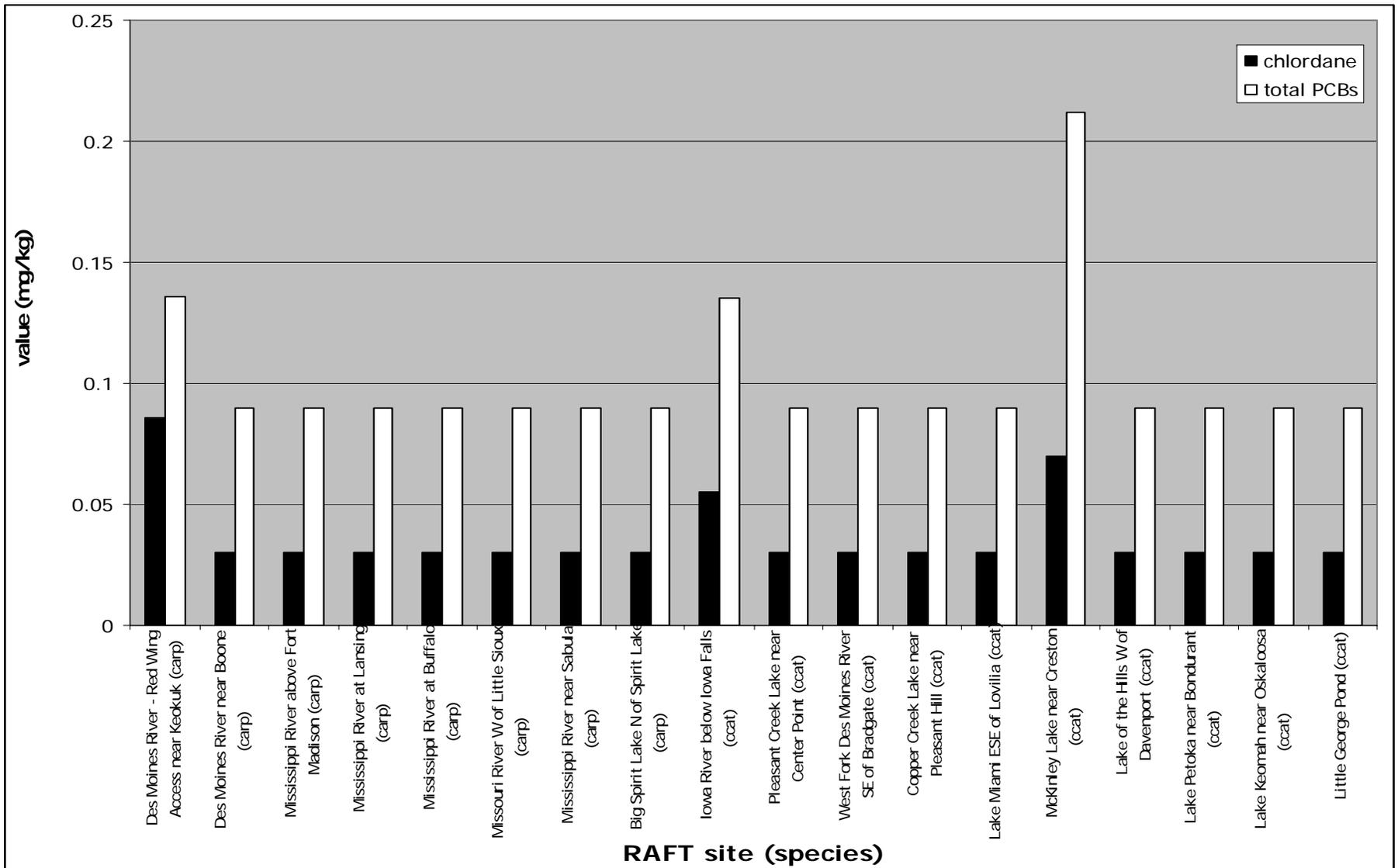


Figure 2. 2009 Iowa RAFT status sample results for chlordane and total PCBs. Waters with samples having levels of total PCBs above the IDNR/IDPH one meal per week advisory trigger of 0.2 ppm are being sampled as part of RAFT follow-up monitoring in 2010.

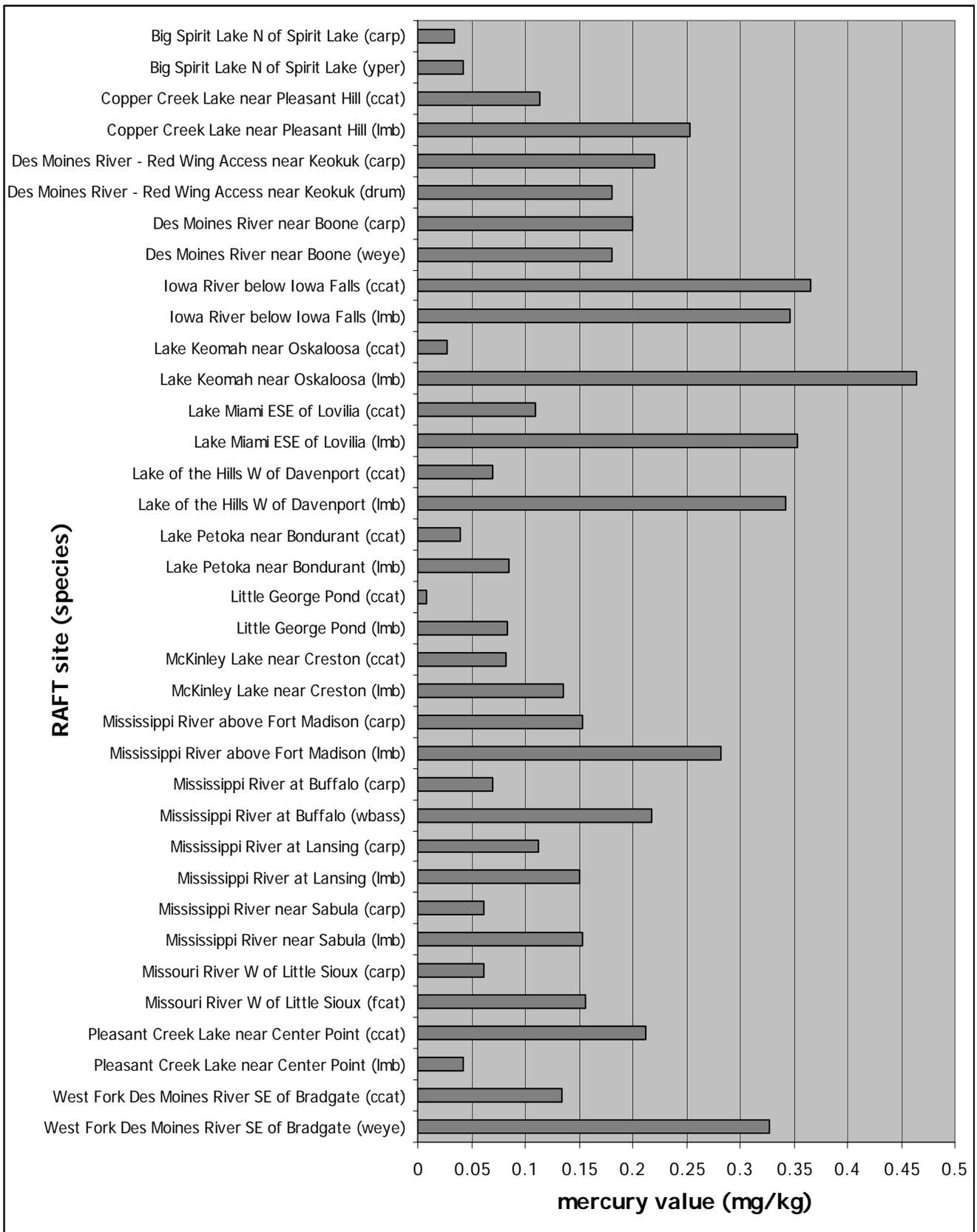


Figure 3. 2009 Iowa RAFT status sample results for mercury.

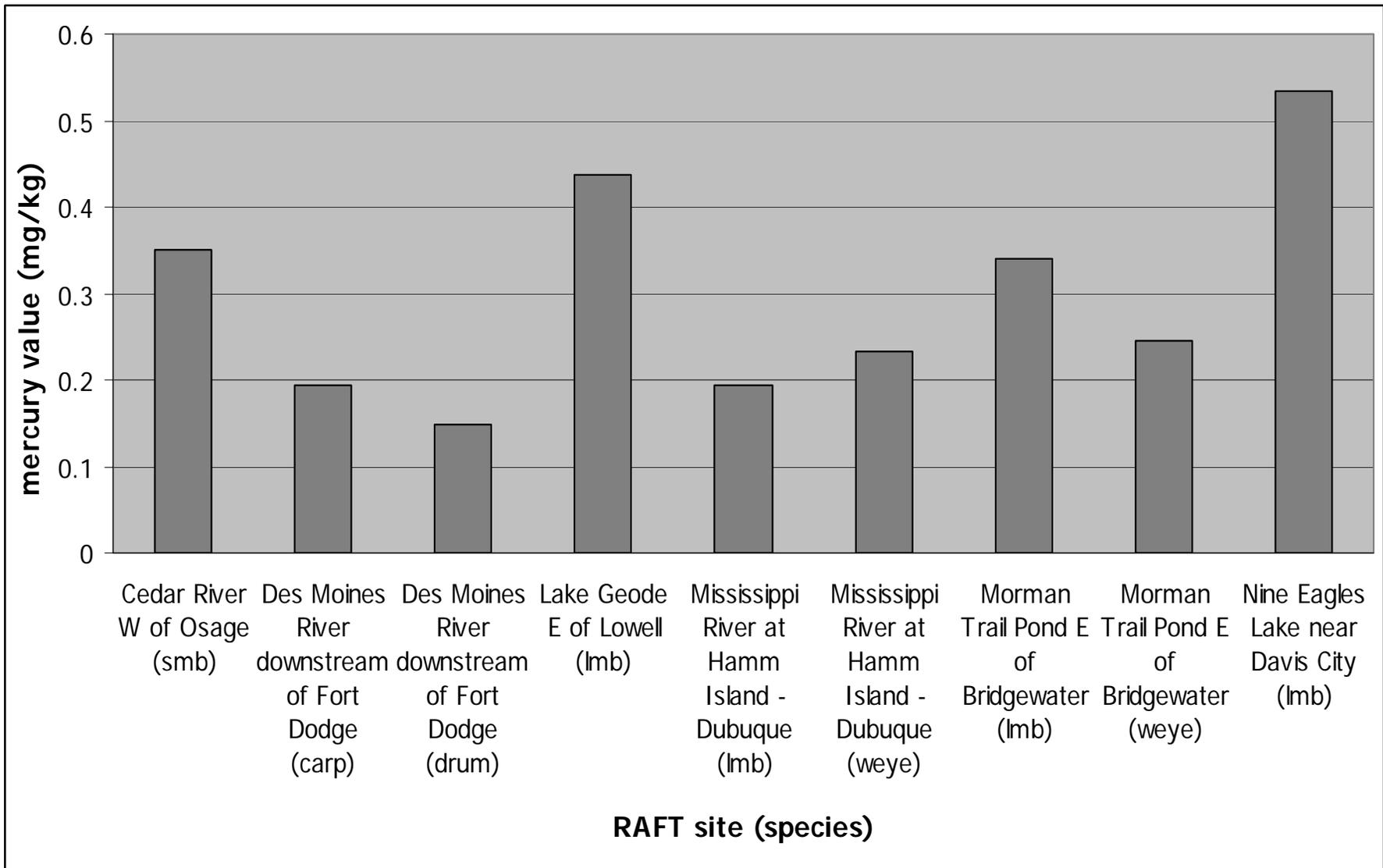


Figure 4. 2009 Iowa RAFT follow-up sample results for mercury. Waters with samples having levels of mercury above the IDNR/IDPH one meal per week advisory trigger of 0.3 ppm are either covered by existing consumption advisories or are being sampled as part of RAFT follow-up monitoring in 2010.