2010 REGIONAL AMBIENT FISH TISSUE MONITORING PROGRAM; SUMMARY OF THE IOWA ANALYSES

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September 9, 2011

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. 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 five different types of monitoring sites: 1) status, 2) trend, 3) random, 4) follow-up and 5) turtle.

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 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://www.iowadnr.gov/portals/idnr/uploads/fish/fish_consumption_advisories.pdf. If needed, IDNR Fisheries Bureau will conduct followup monitoring separately from the RAFT program to verify high levels of contaminants or to better delineate lengths of river consumption advisories. These followup samples are collected before the annual RAFT sampling and are analyzed at SHL.

Turtle Monitoring:
In 2009, IDNR fisheries biologists first collected snapping turtles from nine Iowa lakes as part of RAFT monitoring to better define contaminant levels in Iowa turtle populations. This monitoring used the left front shoulder tissue from 2-3 turtles for the sample that was submitted for analysis following the same protocol used for fish. The turtle monitoring continued in 2010 at four Iowa lakes.

2010 Results:
The 2010 RAFT program in Iowa involved the collection of 50 samples from 35 waterbodies. In July through October 2010, 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 2010 RAFT in Iowa (IDNR 2010). Once frozen, samples were transported or shipped to the Ankeny office of the SHL. The frozen tissue samples were stored at the SHL 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 2010. 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 late May 2011.

Status monitoring in 2010 included collection of 18 composite fish fillet samples from nine sites (Tables 2 & 3; Figure 1). All the levels of contaminants were low with the exception of mercury at Three Mile Lake. This is currently being addressed by IDNR Fisheries bureau. Turtle monitoring included collection of four composite left front shoulder muscle tissue samples of snapping turtle from four sites. Levels of contaminants in all samples of turtle tissue were below IDPH/IDNR advisory trigger levels for chlordane, mercury, and total PCBs (Table 4, Figure 2). Trend monitoring in 2010 included collection of nine samples from nine sites (Table 5, Figure 3). The Des Moines River at Keosauqua trend site was not sampled due to poor sampling conditions and/or access caused by flooding. Follow-up monitoring included 19 collections of composite fish fillet samples from 13 sites (Tables 6 & 7; Figures 4 & 5). This monitoring

confirmed the need to continue an existing one meal per week PCB advisory at Cedar Lake in Cedar Rapids and to issue a one meal per week PCB advisory for McKinley Lake near Creston. The followup monitoring also indicated that the one meal per week PCB advisory for Cedar Bend Lake near Cedar Rapids could be removed. In addition, the followup monitoring indicated that the existing one meal per week mercury advisories for North and South Banner Lakes and the Upper Iowa River should continue but the mercury advisory on the Mississippi River could be removed. The followup monitoring also indicated that new one meal per week mercury consumption advisories should be issued for Lake Keomah, Lake Miami, West Fork Des Moines River near Bradgate and the Iowa River near Iowa Falls. The criteria used to evaluate the results of this monitoring are summarized in Table 1.

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. 2010. Sampling Procedures for the 2010 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. 30 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	*Cyprinus carpio*	12
ccat	channel catfish	*Ictalurus punctatus*	16
drum	freshwater drum	*Aplodinotus grunniens*	20
fcat	flathead catfish	*Pylodictis olivaris*	19
gordhrs	golden redhorse	*Moxostoma erythrurum*	390
lmb	largemouth bass	*Micropterus salmoides*	31
shdrdhrs	shorthead redhorse	*Moxostoma macrolepidotum*	192
smb	smallmouth bass	*Micropterus dolomieu*	47
turtle	snapping turtle	*Chelydra serpentina*	n/a
wbass	white bass	*Morone chrysops*	57
weye	walleye	*Sander vitreus*	55
yper	yellow perch	*Perca flavescens*	63

Table 1. Summary of contaminants and respective criteria for samples of fish collected for the 2010 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				
11	DDD, 4,4'-	0.004			sum = 5.0	sum = 2.5
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

[1]trend samples only

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

Table 2. Summary of the 2010 IA RAFT status sample bottom feeder fish results (fillets, results in mg/kg).

RAFT Site	Lake Icaria (near the dam)	Browns Lake W of Salix	Don Williams Lake N of Ogden	Three Mile Lake near Afton	Lake Oelwein	Volga (Frog Hollow) Lake near Fayette	DeSoto Bend Lake near Missouri Valley	Raccoon River at Booneville Access	Frenchtown Lake, N of boat ramp
County	Adams	Woodbury	Boone	Union	Fayette	Fayette	Harrison	Dallas	Clayton
Fish	ccat	ccat	ccat	ccat	ccat	ccat	carp	carp	shdrdhrs
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	J0.03	UJ0.02
chlordane, cis-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0021	<0.002
chlordane, technical	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
chlordane, trans-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
DDD+DDE+DDT	<0.014	<0.014	0.0152	<0.014	0.0249	<0.014	0.022	0.022	<0.014
dieldrin	<0.003	<0.003	0.0049	<0.003	<0.003	<0.003	<0.003	0.0082	<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	UJ0.1	UJ0.11	UJ0.11	UJ0.11	UJ0.11	UJ0.11	UJ0.11	UJ0.11	UJ0.11
mercury	0.0322	0.0247	0.0443	0.189	0.0466	0.0948	0.106	0.105	0.193
nonachlor, cis-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
nonachlor, trans-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0028	<0.002
oxychlordane	<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	<0.09	<0.09	<0.09	<0.09	<0.09	0.098
pentachloroanisole (PCA)	<0.001	<0.001	<0.001	<0.001	0.0022	<0.001	<0.001	0.0014	<0.001
selenium	J0.34	UJ0.33	UJ0.33	UJ0.33	UJ0.33	UJ0.33	UJ0.33	J0.82	J0.49
trifluralin	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003

< (U or K) = The analyte was not detected at or above the reporting limit.
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 2010 IA RAFT status sample predator fish results (fillets, results in mg/kg).

RAFT Site	County	Fish	mercury (mg/kg)
Lake Icaria (near the dam)	Adams	largemouth bass	0.21
Browns Lake W of Salix	Woodbury	largemouth bass	0.149
Don Williams Lake N of Ogden	Boone	largemouth bass	0.0978
Three Mile Lake near Afton	Union	walleye	0.653
Lake Oelwein	Fayette	largemouth bass	0.162
Volga (Frog Hollow) Lake near Fayette	Fayette	largemouth bass	0.119
DeSoto Bend Lake near Missouri Valley	Harrison	largemouth bass	0.164
Raccoon River at Booneville Access	Dallas	flathead catfish	0.152
Frenchtown Lake, N of boat ramp	Clayton	largemouth bass	0.22

Table 4. Summary of the 2010 IA RAFT turtle sample results (results in mg/kg). The turtle samples used left front shoulder tissue for the analyses.

Site Name	Browns Lake W of Salix	Iowa Army Ammunition Plant Lake	Meadow Lake	Pollmiller Park Lake
County	Woodbury	Des Moines	Adair	Lee
BHC (Lindane)	<0.002	<0.002	<0.002	<0.002
cadmium (Total)	J0.04	J0.03	UJ0.02	UJ0.02
chlordane, technical	<0.03	<0.03	<0.03	<0.03
DDD+DDE+DDT	<0.014	<0.014	<0.014	<0.014
dieldrin	<0.003	<0.003	<0.003	<0.003
heptachlor	<0.003	<0.003	<0.003	<0.003
heptachlor epoxide	<0.003	<0.003	<0.003	<0.003
hexachlorobenzene	<0.001	<0.001	<0.001	<0.001
lead	UJ0.11	UJ0.11	J0.14	UJ0.1
mercury	0.0582	0.134	0.119	0.297
total PCBs (Aroclors 1248+1254+1260)	<0.09	<0.09	<0.09	<0.09
pentachloroanisole (PCA)	<0.001	<0.001	<0.001	<0.001
selenium	J0.36	UJ0.33	J0.48	UJ0.32
trifluralin	<0.003	<0.003	<0.003	<0.003

< (U or K) = The analyte was not detected at or above the reporting limit.
J = The identification of the analyte is acceptable; the reported value is an estimate.
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Table 5. Summary of the 2010 IA RAFT trend sample results (whole fish, common carp, results in mg/kg).

RAFT Site	Mississippi River downstream of Dubuque	Iowa River E of Wapello	Mississippi River at Linwood	Skunk River NE of Wever	Des Moines River at Des Moines	Mississippi River at Lansing	Maquoketa River NE of Maquoketa	Wapsipinicon River SSE of Grand Mound	Little Sioux River S of Washta
County	Dubuque	Louisa	Scott	Lee	Polk	Allamakee	Jackson	Scott	Cherokee
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)	0.18	0.1	0.14	0.16	0.17	0.1	0.13	0.19	0.14
chlordane, technical	0.031	0.091	<0.03	0.092	0.2	<0.03	0.03	0.052	<0.03
DDD+DDE+DDT	0.0291	0.0267	0.017	0.0313	0.089	0.0167	0.0158	0.0172	0.019
dieldrin	<0.0047	0.034	0.013	0.044	0.03	<0.003	0.0093	0.023	0.014
heptachlor	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
heptachlor epoxide	<0.003	0.0092	0.0037	0.013	0.013	<0.003	<0.003	0.011	0.0056
hexachlorobenzene	0.0015	<0.001	<0.001	0.0012	0.0019	<0.001	<0.001	0.0014	<0.001
lead	0.35	UJ0.11	J0.11	UJ0.11	UJ0.11	J0.24	UJ0.11	UJ0.11	UJ0.11
mercury	0.111	0.0614	0.0702	0.117	0.0683	0.0667	0.0306	0.0768	0.044
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)	0.277	0.111	0.129	0.162	0.195	0.174	0.107	<0.09	<0.09
pentachloroanisole (PCA)	0.0037	0.0028	0.0035	0.006	0.0096	0.0018	0.0017	0.0054	0.0019
pentachlorobenzene	<0.0012	<0.001	0.0012	<0.001	0.0017	<0.001	<0.001	<0.001	<0.001
selenium	UJ0.33	UJ0.33	UJ0.33	UJ0.33	J0.41	UJ0.33	UJ0.33	UJ0.33	UJ0.33
trifluralin	<0.003	<0.003	<0.003	<0.003	0.0069	<0.003	<0.003	0.0095	0.0054

< (U or K) = The analyte was not detected at or above the reporting limit.
J = The identification of the analyte is acceptable; the reported value is an estimate.
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Table 6. Summary of the 2010 IA RAFT follow-up mercury sample results (all fillets, results in mg/kg).

RAFT Site	County	Fish	mercury (mg/kg)
Cedar Bend Lake at Cedar Rapids	Linn	common carp	0.116
Cedar Lake at Cedar Rapids	Linn	channel catfish	0.0507
Cedar Lake at Cedar Rapids	Linn	common carp	0.0104
Fort Des Moines Pond	Polk	largemouth bass	0.244
Iowa River below Iowa Falls	Hardin	channel catfish	0.16
Iowa River below Iowa Falls	Hardin	smallmouth bass	0.497
Lake Keomah near Oskaloosa	Mahaska	largemouth bass	0.432
Lake Miami ESE of Lovilia	Monroe	largemouth bass	0.394
Lake of the Hills W of Davenport	Scott	largemouth bass	0.252
McKinley Lake near Creston	Union	common carp	0.116
Mississippi River at Hamm Island - Dubuque	Dubuque	largemouth bass	0.188
Mississippi River at Hamm Island - Dubuque	Dubuque	walleye	0.207
North Banner Lake near Indianola	Warren	largemouth bass	0.361
South Banner Lake near Indianola	Warren	largemouth bass	0.643
Upper Iowa River near Kendallville	Winneshiek	golden redhorse	0.169
Upper Iowa River near Kendallville	Winneshiek	smallmouth bass	0.247
Upper Iowa River SE of Dorchester	Allamakee	golden redhorse	0.318
Upper Iowa River SE of Dorchester	Allamakee	smallmouth bass	0.392
West Fork Des Moines River SE of Bradgate	Humboldt	walleye	0.37

Table 7. Summary of the 2010 IA RAFT follow-up samples results less mercury (fillets, results in mg/kg).

RAFT Site	Cedar Bend Lake at Cedar Rapids	Cedar Lake at Cedar Rapids	Cedar Lake at Cedar Rapids	Iowa River below Iowa Falls	McKinley Lake near Creston
County	Linn	Linn	Linn	Hardin	Union
Fish	common carp	channel catfish	common carp	channel catfish	common carp
BHC (Lindane)	<0.002	<0.002	<0.002	<0.002	<0.002
cadmium (Total)	UJ0.02	UJ0.02	UJ0.02	UJ0.02	UJ0.02
chlordane, cis-	0.0095	0.011	0.0025	<0.002	0.0028
chlordane, technical	0.08	0.093	<0.03	<0.03	<0.03
chlordane, trans-	0.0056	0.0054	<0.002	<0.002	<0.002
DDD+DDE+DDT	0.079	0.0937	0.0155	0.0166	0.0164
dieldrin	<0.003	<0.003	<0.003	0.0073	<0.003
heptachlor	<0.003	<0.003	<0.003	<0.003	<0.003
heptachlor epoxide	<0.003	<0.003	<0.003	0.0033	<0.003
hexachlorobenzene	<0.001	<0.001	<0.001	<0.001	0.0045
lead	UJ0.11	UJ0.11	UJ0.1	UJ0.11	UJ0.11
nonachlor, cis-	0.0031	0.004	<0.002	<0.002	<0.002
nonachlor, trans-	0.0062	0.0091	0.0028	0.0024	0.0024
oxychlordane	<0.002	<0.002	<0.002	<0.002	<0.002
total PCBs (Aroclors 1248+1254+1260)	0.149	0.191	0.19	<0.09	0.263
pentachloroanisole (PCA)	0.0017	0.0013	<0.001	0.0011	<0.001
selenium	J0.7	J0.96	1.04	J0.76	J0.86
trifluralin	<0.003	<0.003	<0.003	<0.003	<0.003

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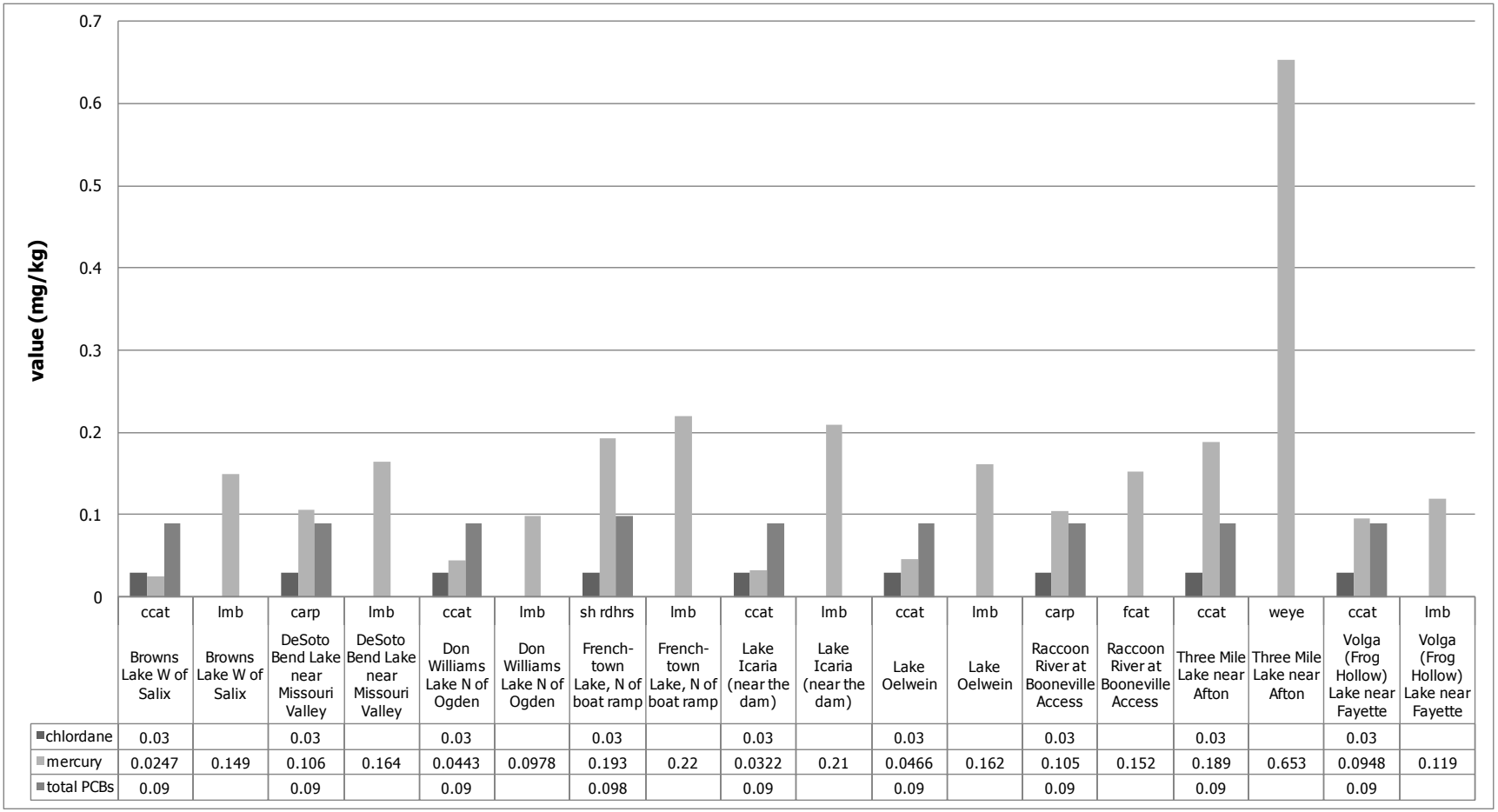
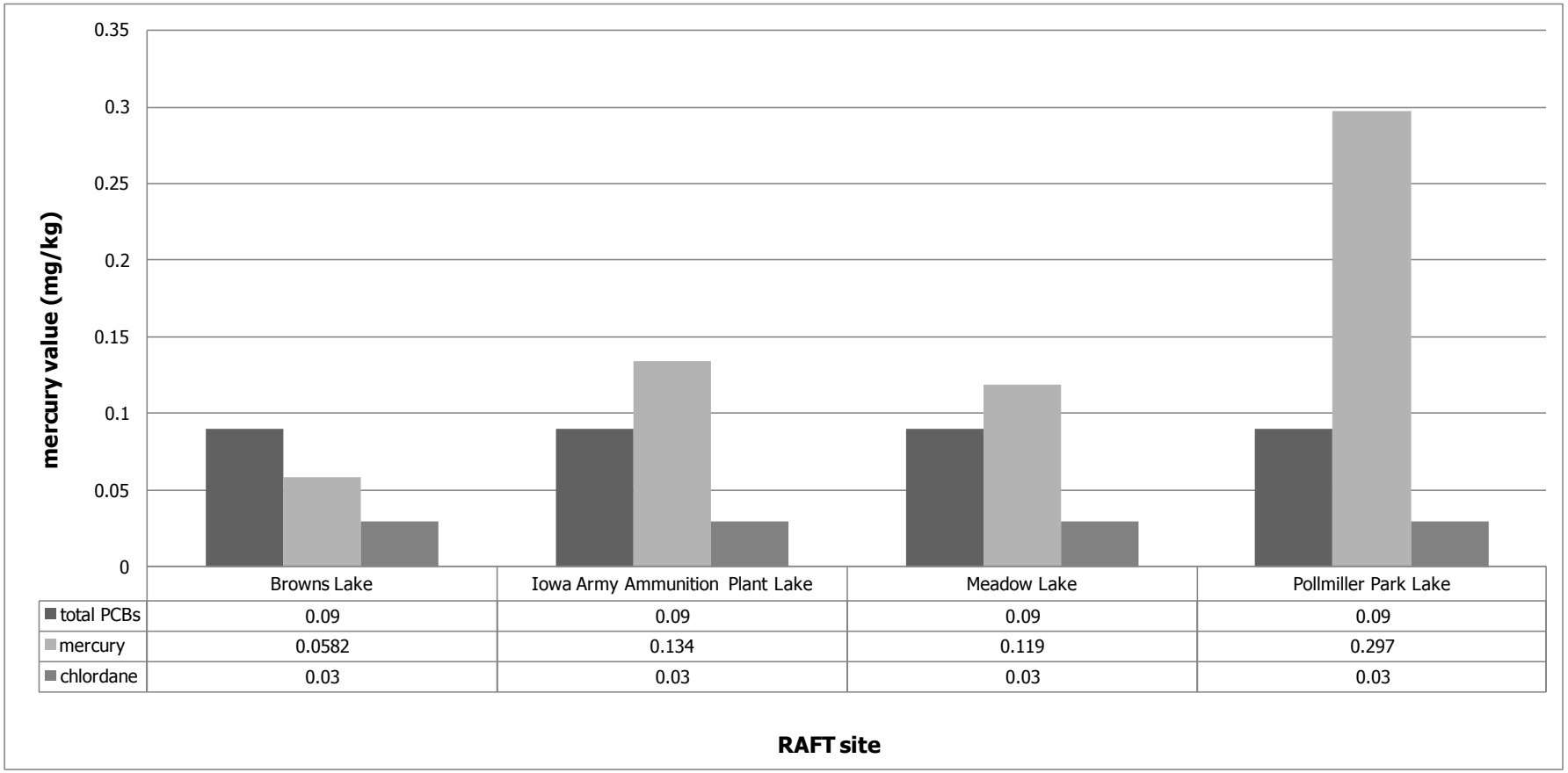
UJ = The analyte was not detected at or above the reporting limit. The reported value is an estimate.



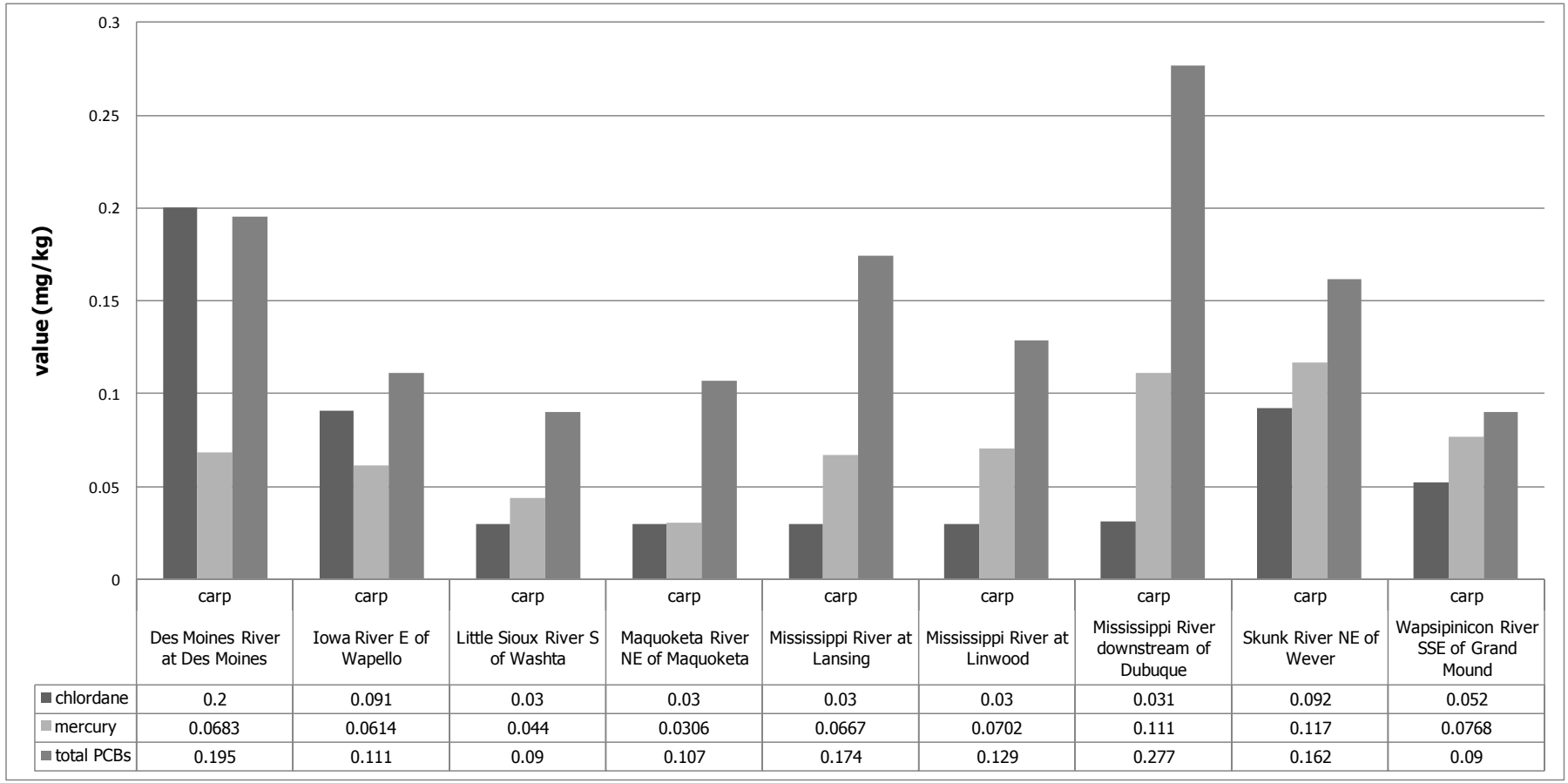
	ccat Browns Lake W of Salix	lmb Browns Lake W of Salix	carp DeSoto Bend Lake near Missouri Valley	lmb DeSoto Bend Lake near Missouri Valley	ccat Don Williams Lake N of Ogden	lmb Don Williams Lake N of Ogden	sh rdhrs French-town Lake, N of boat ramp	lmb French-town Lake, N of boat ramp	ccat Lake Icaria (near the dam)	lmb Lake Icaria (near the dam)	ccat Lake Oelwein	lmb Lake Oelwein	carp Raccoon River at Booneville Access	fcat Raccoon River at Booneville Access	ccat Three Mile Lake near Afton	weye Three Mile Lake near Afton	ccat Volga (Frog Hollow) Lake near Fayette	lmb Volga (Frog Hollow) Lake near Fayette
chlordane	0.03		0.03		0.03		0.03		0.03		0.03		0.03		0.03		0.03	
mercury	0.0247	0.149	0.106	0.164	0.0443	0.0978	0.193	0.22	0.0322	0.21	0.0466	0.162	0.105	0.152	0.189	0.653	0.0948	0.119
total PCBs	0.09		0.09		0.09		0.098		0.09		0.09		0.09		0.09		0.09	

Figure 1. 2010 Iowa RAFT status sample results for chlordane, mercury and total PCBs. All of the values above 0.3 mg/kg have, or will be, addressed by IDNR through the issuance or continuation of consumption advisories or with follow-up monitoring in 2011.



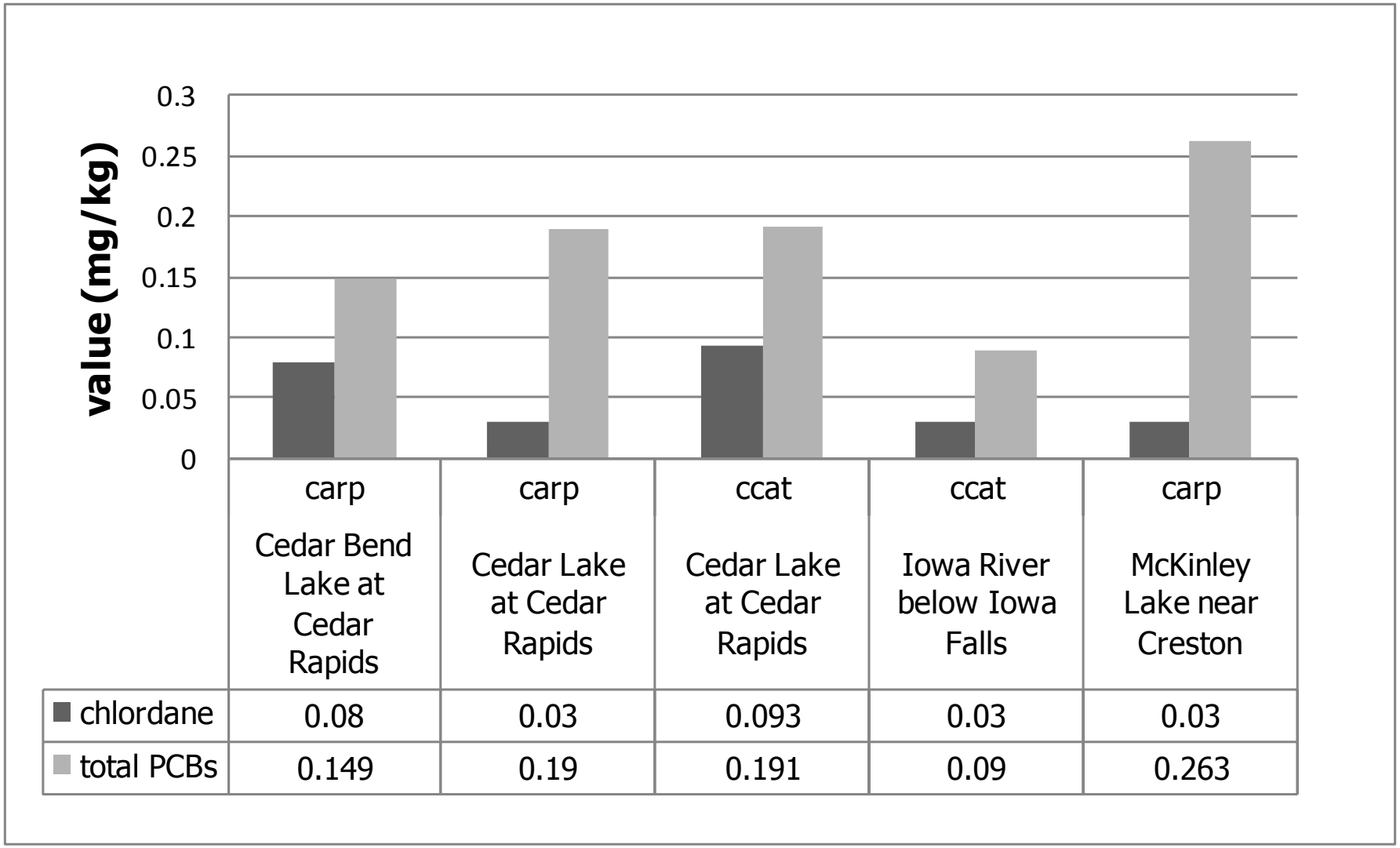
	Browns Lake	Iowa Army Ammunition Plant Lake	Meadow Lake	Pollmiller Park Lake
total PCBs	0.09	0.09	0.09	0.09
mercury	0.0582	0.134	0.119	0.297
chlordane	0.03	0.03	0.03	0.03

Figure 2. 2010 Iowa RAFT turtle sample results for chlordane, mercury and total PCBs.



	carp Des Moines River at Des Moines	carp Iowa River E of Wapello	carp Little Sioux River S of Washta	carp Maquoketa River NE of Maquoketa	carp Mississippi River at Lansing	carp Mississippi River at Linwood	carp Mississippi River downstream of Dubuque	carp Skunk River NE of Wever	carp Wapsipinicon River SSE of Grand Mound
chlordane	0.2	0.091	0.03	0.03	0.03	0.03	0.031	0.092	0.052
mercury	0.0683	0.0614	0.044	0.0306	0.0667	0.0702	0.111	0.117	0.0768
total PCBs	0.195	0.111	0.09	0.107	0.174	0.129	0.277	0.162	0.09

Figure 3. 2010 Iowa RAFT trend sample results for chlordane, mercury and total PCBs.



	carp Cedar Bend Lake at Cedar Rapids	carp Cedar Lake at Cedar Rapids	ccat Cedar Lake at Cedar Rapids	ccat Iowa River below Iowa Falls	carp McKinley Lake near Creston
chlordane	0.08	0.03	0.093	0.03	0.03
total PCBs	0.149	0.19	0.191	0.09	0.263

Figure 4. 2010 Iowa RAFT follow-up sample results for chlordane and total PCBs.

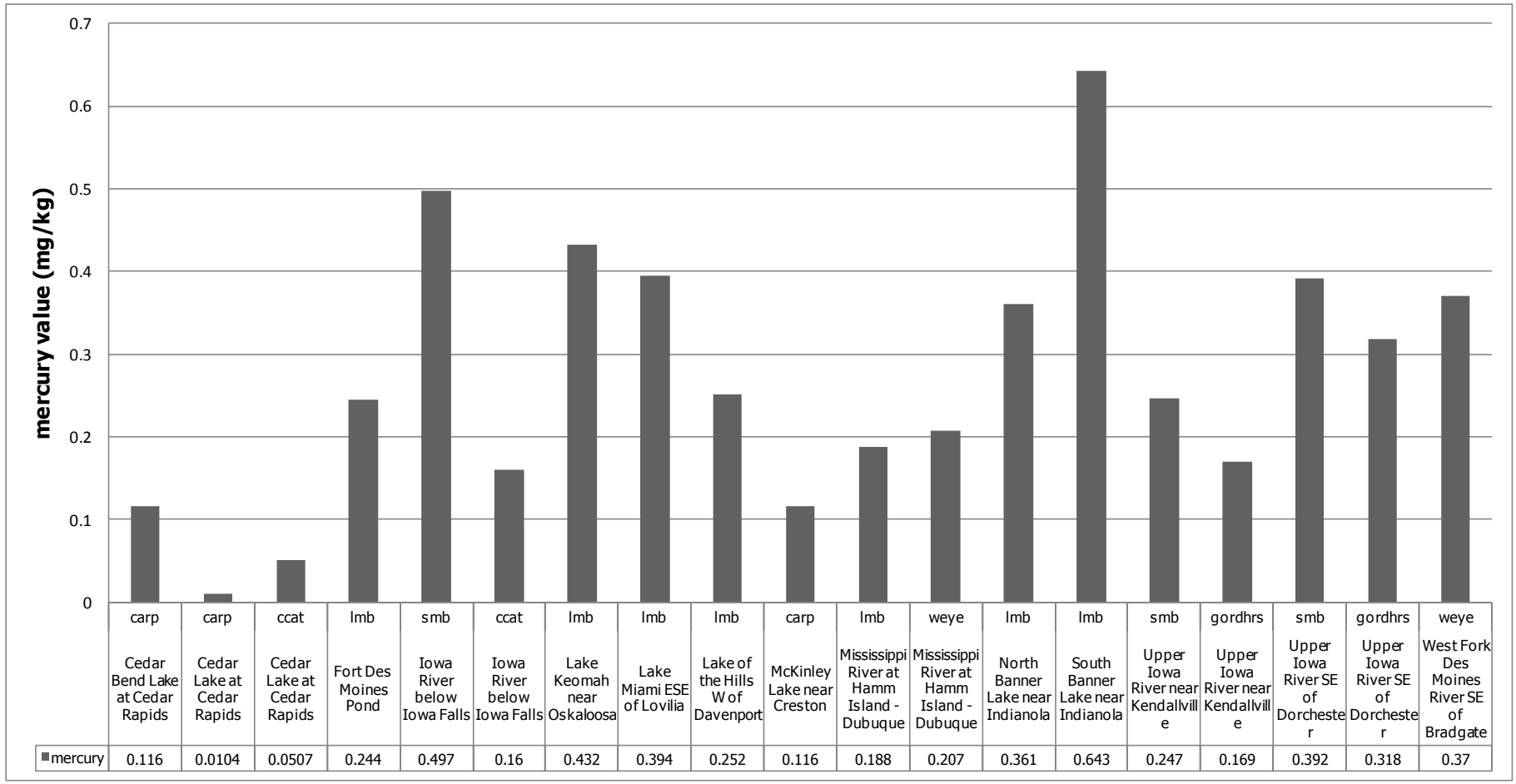


Figure 5. 2010 Iowa RAFT follow-up sample results mercury. All of the values above 0.3 mg/kg have, or will be, addressed by IDNR through the issuance or continuation of consumption advisories or with follow-up monitoring in 2011.