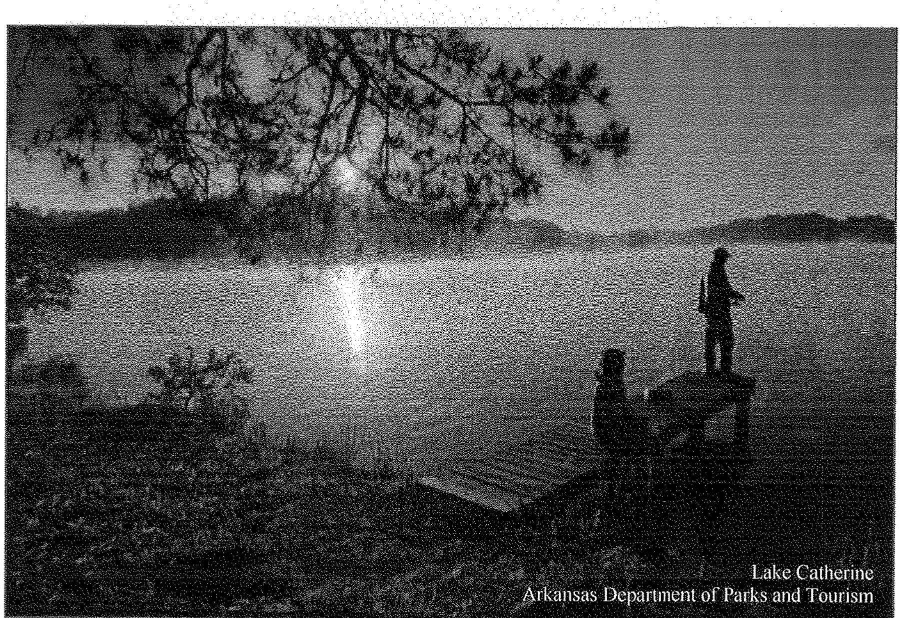

Lake Catherine
Water Quality and Fish Tissue Analysis
Final Technical Report

Arkansas Department of Environmental Quality
Water Division

Prepared for
Lake Catherine Technical Working Group

WQ13-06-01

ADEQ
ARKANSAS
Department of Environmental Quality

SUMMARY

Data presented within this document satisfied data gaps and questions posed by the Technical Working Group. Data from this study indicate that Lake Catherine is safe as a potential drinking water source, contains fish that are safe to eat, and is safe for primary contact recreation. Based on data reviewed, water quality would maintain Domestic Water Supply designated uses in Lake Catherine. However, on August 16, 2013, Act 954 of 2013 will remove Domestic Water Supply designated uses from waterbodies not currently serving in such a capacity. Fish tissue was analyzed for trace metals and organics. Lake Catherine tissue samples were below Arkansas Department of Health, Food and Drug Administration, and US Environmental Protection Agency action levels.There was one observed exceedance of *E. coli* during primary contact season (May-September), this exceedance occurred after a storm event.

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INTRODUCTION

Lake Catherine is an impoundment of the Ouachita River near Hot Springs, AR. Currently the Arkansas Department of Environmental Quality (ADEQ) has 19 active permits for dischargers into Lake Catherine (Figure 1). The dischargers include municipal and non-municipal wastewater treatment plants, mine reclamation sites and industrial facilities. In addition, the area surrounding the lake contains many additional non-point source influences to the lake. Due to the quantity of dischargers and the value of Lake Catherine for recreation and as a drinking water supply (from the Ouachita River directly downstream of Lake Catherine), significant concern regarding the water quality in Lake Catherine has been expressed by residents who live on or near the lake.

At the request of area residents, members of the Arkansas General Assembly and the Arkansas Pollution Control and Ecology Commission established a Technical Working Group to evaluate Lake Catherine. The Technical Working Group included representatives of state and federal agencies, municipal and industrial dischargers, and concerned area citizens. Participants of the Technical Working Group included:

1. ADEQ—Teresa Marks, Director; Ryan Benefield, Deputy Director; Dick Cassat, Environmental Preservation and Technical Services Division Chief.
2. AG&FC—Brett Hobbs, Fisheries Management Biologist.
3. USGS—Reed Green, Hydrologist (Limnologist), Arkansas Water Science Center
4. FTN—Dennis Ford, Principal (representing Stratcor)
5. ADH—Jeff Stone, P.E., Engineering Director
6. ADH—Lori Simmons, M.S., Environmental Epidemiology Section Chief/ATSDR Program Coordinator
7. ADH--Ashley Whitlow, M.S., ATSDR Health Assessor
8. City of Hot Springs—Steve Mallett, Jr., P.E., Deputy City Manager for Public Works and Utilities
9. Evraz Stratcor—Rebecca Tracy, Environmental Manager, Mike Woolery, Director of Technology
10. Umetco—Dr. Steven S. Brown, Senior Ecologist and Environmental Toxicologist
11. Entergy—Paul Means, Lobbyist; Bobby N. Pharr, Process Superintendent II, Entergy Hydro Operations Support
12. ANRC—Chris Soller, P.E. Water Planning Section
13. Dr. Joe Nix, Chemist
14. CJRW—Jordan Johnson

Many others participated through either organizational meetings or email. The Technical Working Group was tasked with answering the following questions:

1. Is the lake safe as a drinking water source?
2. Are the fish in the lake safe to eat?
3. Is the lake safe for body contact recreation?

The Technical Working Group determined that in order to answer the questions above, the group should: 1) gather and review all existing data for Lake Catherine including all available studies performed by state and federal agencies and those conducted by the dischargers into the lake, 2) identify any data gaps that may prevent the group from answering all three questions and 3) prepare a sampling plan to gather the needed additional information.

Summary of Existing Data

The Technical Working Group identified the following existing studies and reports and determined that these reports provided valuable information regarding Lake Catherine:

1. Paper documents offered by Dr. Nix from late 1960's to present
2. FTN report on Entergy-sponsored water quality studies
3. FTN report on Umetco discharge to Wilson Creek
4. FTN report on U. S. Vanadium mixing zone analyses in Lake Catherine
5. EPA National Lakes Assessment 2010 (data collected 2007)
6. ADEQ Lake Catherine data from 2010 and 2011
7. ADH/ATSDR Health Consultation of Umetco—December 1, 2011
8. Carpenter-Remmel Project Water Quality Study—1999 by FTN/Entergy
9. EPA Nation Eutrophication Survey in 1974.
10. 2011 Discharge Monitoring Reports for all dischargers into Lake Catherine
11. Arkansas Game And Fish/FTN 1990's Lake Study
12. Hot Springs Wastewater Report
13. AGFC Lake Catherine rotenone studies/annual lake reports (2000-2010)
14. Lake Catherine electrofishing studies (2003-2011)

Copies of the reports listed above were distributed to the Technical Working Group members. The reports were reviewed by the Technical Working Group to determine what data gaps might exist.

Identified Data Gaps

After reviewing all applicable and readily available data and reports related to Lake Catherine, the Technical Working Group identified the following areas where additional were needed. data

1. Current fish tissue analysis for metals and organics of fish in Lake Ouachita and Lake Catherine.
2. Additional seasonal water quality sampling including metals at multiple locations in, above, and below Lake Catherine.
3. High flow/storm event samples of Lake Catherine including bacteria samples for *Escherichia coli* analysis.

METHODS

Water Quality Sampling

Water sample collections followed ADEQ's Lake Sampling Plan at 13 stations (Table 1, Figure 2). As Lake Catherine is somewhat shallow, samples were collected at near surface (0.5 meters) and 1 meter above the bottom. If depth was sufficient to form a thermocline, a thermocline sample was collected. If there was no thermocline, a mid-depth sample was collected. Sample frequency followed the schedule below from April 2011 through February 2013.

1. April
2. June
3. July
4. August**
5. September
6. October
7. December*
8. February*

*at least one of these should be during draw down.

** eliminate if necessary

Storm sampling was attempted when a rain event increased flows of tributaries by at least 50%.

Table 1. Station information, location details, and sampling parameters for Lakes Catherine, Hamilton, and Ouachita monitoring stations.

STATION	LOCATION	LATITUDE	LONGITUDE	COUNTY	PARAMETERS*
LOUA016A	Lake Catherine - lower,1st inlet upstream from launch.	34.4275	-92.9017	Hot Spring	WQ, P, F
LOUA016C	Lake Catherine at Handicap Fishing Pier below Carpenter Dam	34.4427	-93.0207	Garland	WQ
LOUA016J	Lake Catherine near entrance to State Park Cove	34.4393	-92.9108	Hot Spring	WQ, P, F
LOUA016K	Lake Catherine off of Springbrook Point	34.4522	-92.9321	Garland	WQ, P, F
LOUA016L	Lake Catherine 0.5 miles downstream of Marina Point	34.4447	-92.9479	Garland	WQ, P
LOUA016M	Lake Catherine below Wilson Creek cove under power line	34.4576	-92.9624	Garland	WQ, P
LOUA016N	Lake Catherine 0.5 miles upstream from Camp Couchdale	34.4311	-92.9764	Garland	WQ, P, F
LOUA016R	Ouachita River at boat ramp below Remmel Dam	34.4267	-92.8907	Hot Spring	WQ, F
LOUA016S	Lake Catherine in Spencer Bay	34.4582	-92.9740	Garland	WQ, P, F
LOUA016T	Lake Catherine in Tigre Bay	34.4477	-92.9088	Hot Spring	WQ, P, F
LOUA016W	Lake Catherine in Wilson Creek Cove	34.4596	-92.9653	Garland	WQ, P
LOUA018A	Lake Hamilton Carpenter Dam	34.4275	-92.9017	Garland	WQ, P
LOUA020C	Lake Ouachita at Houlsey Point	34.6048	-93.4042	Montgomery	F

*WQ-Water Quality, P-Depth Profiles, F-Fish Tissue

Table 2. Station information and location details for Lake Catherine tributaries for storm flow bacteria monitoring.

STATION	LOCATION	LATITUDE	LONGITUDE	COUNTY
1	Unnamed tributary	34.4437	-93.0169	Garland
4	Unnamed tributary	34.4422	-92.9920	Garland
6A	Unnamed tributary	34.4317	-92.9805	Garland
6B	Unnamed tributary	34.4302	-92.9792	Garland
8	Cooper Creek	34.4281	-92.9665	Garland
18	Unnamed tributary	34.4552	-92.9370	Garland
22	Tigre Creek	34.4587	-92.9063	Hot Spring
25	Slunger Creek	34.4387	-92.9162	Hot Spring
27	Falls Creek	34.42625	-92.9103	Hot Spring

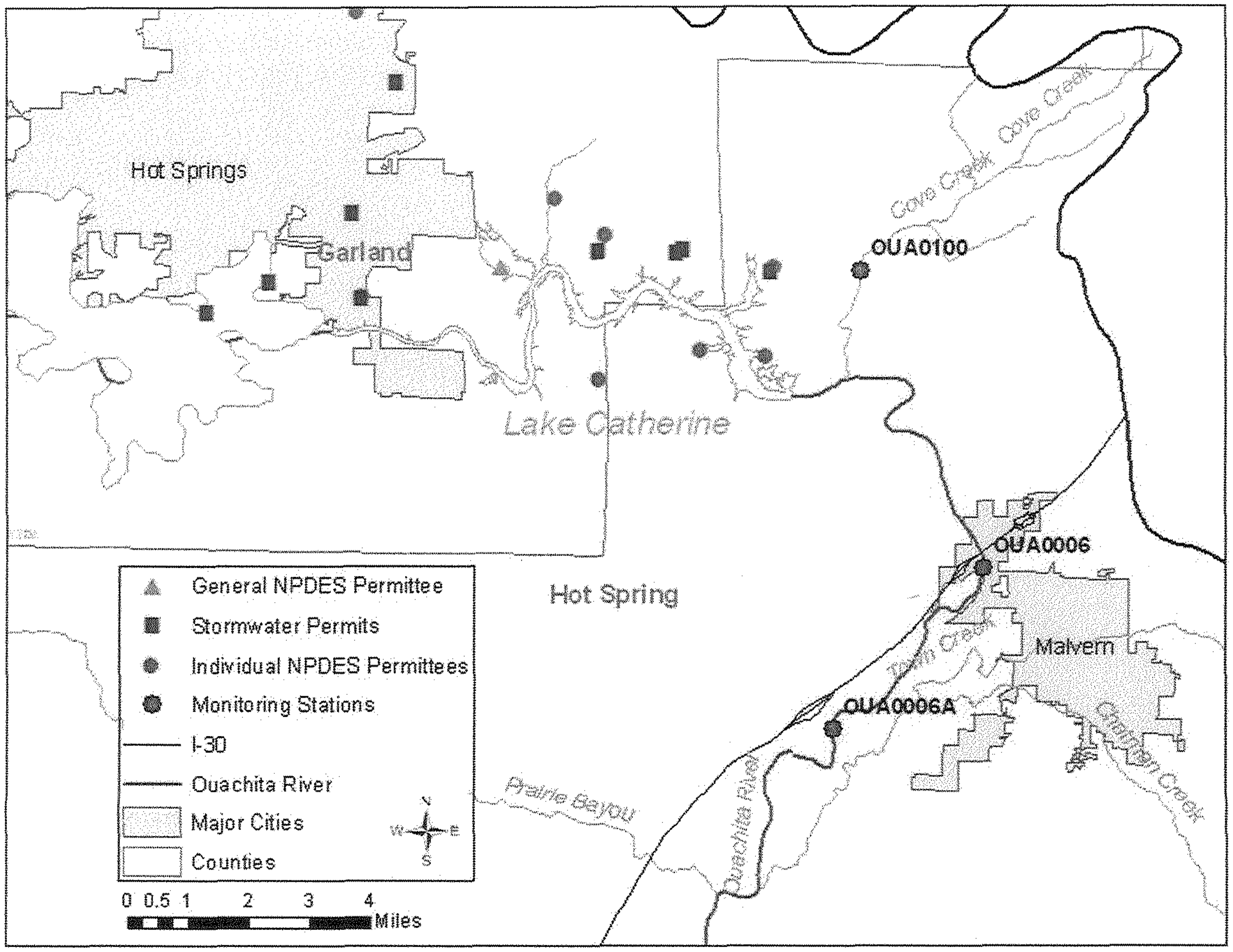


Figure 1. All permitted facilites discharging to Lake Catherine and Ouachita River below Remmel Dam.

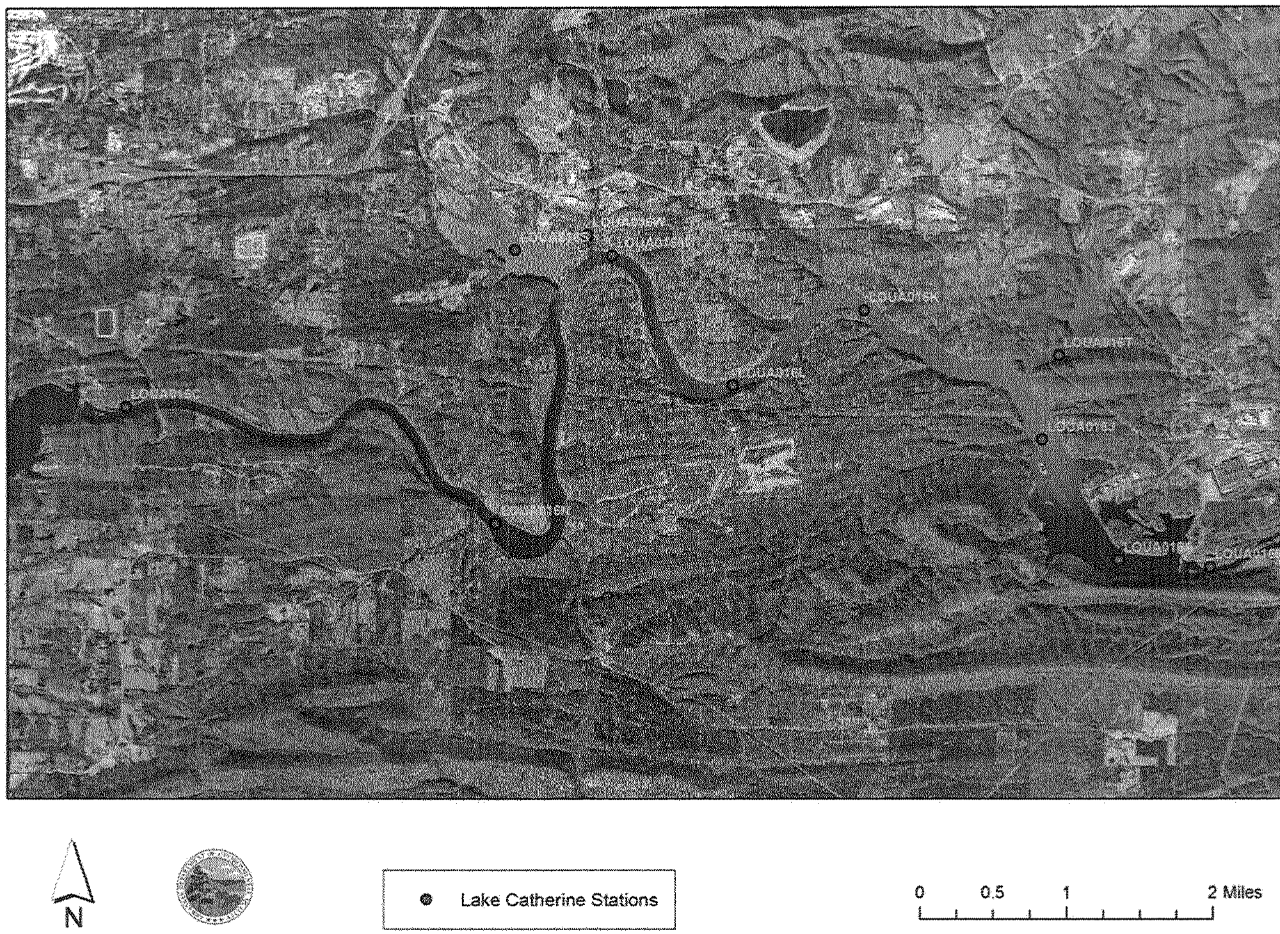


Figure 2. Monthly monitoring stations for Lakes Hamilton and Catherine and the Ouachita River below Remmel Dam.

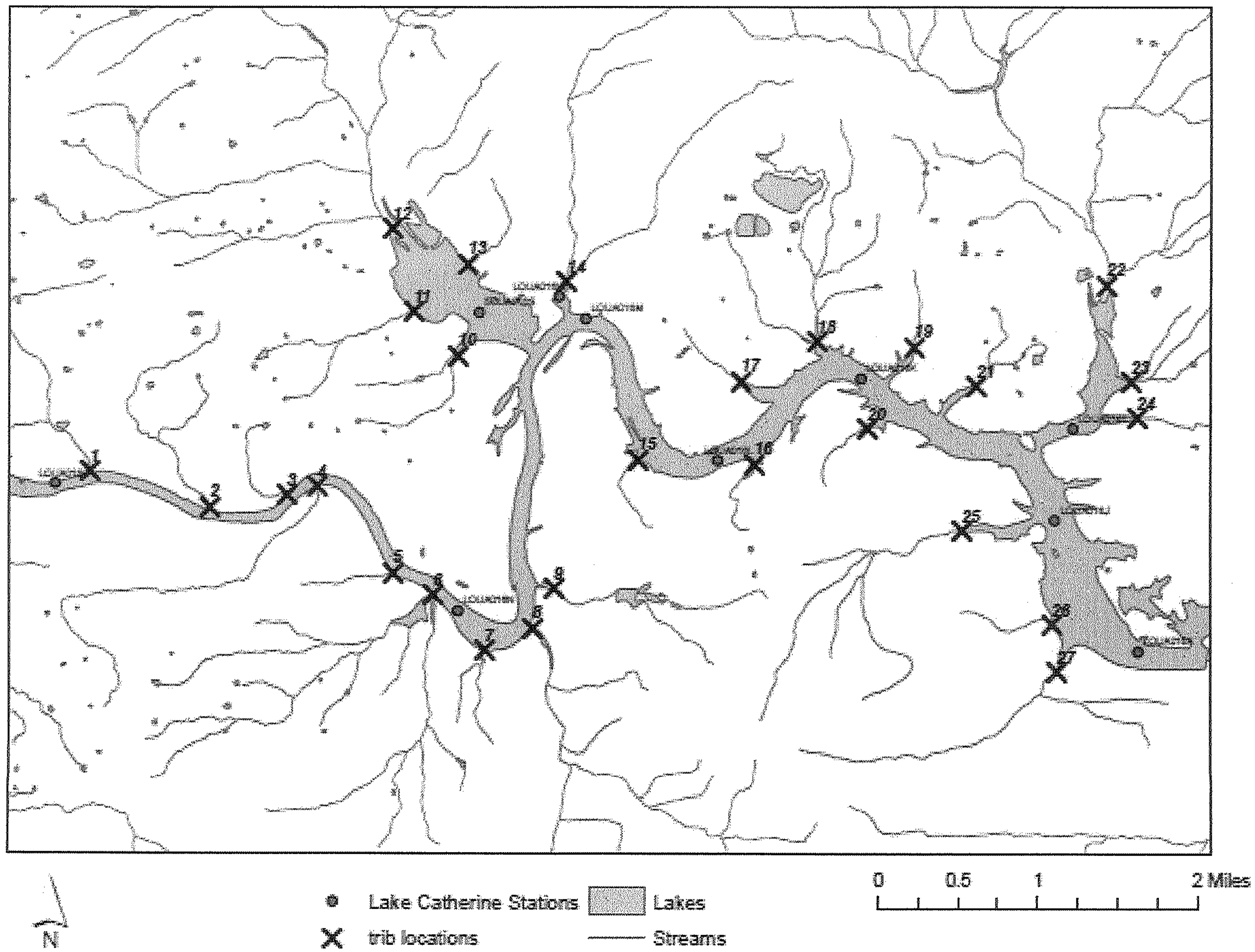


Figure 3. Monitoring stations of Lake Catherine tributaries for storm flow bacteria.

Water Quality Parameters

Samples from each location were tested for the following parameters:

1. Field measurements
   a. temperature
   b. dissolved oxygen
   c. specific conductance
   d. turbidity
   e. pH

   A profile of each lake station was generated for each sampling event that demonstrates changes in the field parameters over the depth profile.

2. Lab parameters
   a. Dissolved and Total Metals—aluminum, arsenic, boron, barium, beryllium, calcium, cadmium, cobalt, chromium, copper, iron, potassium, magnesium, manganese, sodium, nickel, lead, antimony, selenium, thallium, vanadium, zinc
   b. Nutrients—total phosphorus, orthophosphate, total Kjeldahl nitrogen, ammonia nitrogen, nitrate + nitrite nitrogen
   c. Anions—chloride, bromide, fluoride, sulfate
   d. Chlorophyll *a*
   e. Alkalinity
   f. Total Suspended Solids
   g. Total Dissolved Solids
   h. Turbidity
   i. Total Organic Carbon
   j. *E. coli* (Table 2, Figure 3)

Fish Tissue Parameters

At all locations designated as fish sites (Table 1), fish tissue samples were analyzed for metals (aluminum, arsenic, boron, barium, beryllium, calcium, cadmium, cobalt, chromium, copper, iron, potassium, magnesium, manganese, sodium, nickel, lead, antimony, selenium, thallium, vanadium, zinc) and mercury by the ADEQ laboratory. Largemouth bass tissue samples from these locations were also sent to the U.S. Geological Survey Columbia Environmental Science Center in Missouri for organics analysis. A tabular list of organics analyzed are located in Appendix D. Stations identified in Table 1 were sampled and analyzed once.

Fish Tissue Sampling and Analysis

Arkansas Game and Fish Commission District 8 fisheries biologists utilized boat electrofishing equipment from March to May of 2012 in order to collect fish for tissue analysis. The goal for each collection site was five largemouth bass (*Micropterus salmoides*) ranging 12-16 inches total length. Site collections were isolated and processed following ADEQ's established mercury sample methodology. Adult bluegill sunfish (*Lepmois macrochirus*) and channel catfish (*Ictalurus punctatus*) were also collected and processed following appropriate protocols. Samples were frozen and delivered to ADEQ within one week of collection. Submitted with each sample was a field record of site-specific information. After receiving the samples, ADEQ laboratory separated samples for in-house trace metals testing and organics analysis. Largemouth bass tissue samples were submitted to the U.S. Geological Survey Columbia Environmental Science Center in Missouri.

Quality Assurance/Quality Control

Water quality sampling followed ADEQ water monitoring QA project plan, which specifies 1 field duplicate for each 10 samples. Duplicate samples provide precision, and matrix spikes, which provide accuracy of the sampling process. The Quality Assurance Project Plan also specifies in-lab quality assurance and acceptance limits. Any results that were not within acceptance limits were flagged. If specific samples were flagged with an R, or reject, the site was resampled.

RESULTS

Water Quality

Nine sample events occurred over eight months at each monitoring station. Monitoring stations were most concentrated within Lake Catherine (10), with only one station occurring within Lake Ouachita and Ouachita River. In-situ measurements were recorded during each collection, which included dissolved oxygen (mg/L), temperature (°C), and pH (SU). On three occasions dissolved oxygen concentrations in Lake Catherine were observed below Arkansas Pollution Control and Ecology Commission (APCEC) water quality standards, which Regulation 2.505 has listed as 5 mg/L for reservoirs. These excursions were observed at LOUA016C in September and October with concentrations of 1.74mg/L and 3.67mg/L, respectively. LOUA016N also exceeded in September with a concentration of 4.73mg/L (Appendix A). All measured temperature values and pH concentrations were within listed standards of 32 °C and 6-9 SU, respectively.

Each sample was analyzed for 22 total and dissolved metal constituents. Lake Hamilton (LOUA018A) had the highest number of non-detectable constituents with Lake Catherine monitoring stations ranging from 9 to 12 non-detectable constituents (Table 3, 4). Of those constituents reported, vanadium was the only metal constituent not present in Lake Hamilton (LOUA018A). However, vanadium was consistently present throughout Lake Catherine with mean concentrations ranging from 39.8 µg/L at LOUA016S to 103.6 µg/L at LOUA016M (Table 4).

Mean values of anion constituents among all Lake Catherine stations were comparable and exhibited little variability (Table 5). Similarly, nutrient constituents showed little spatial variability, but elevated concentrations of total phosphorus were observed during summer months. Highest mean nitrogen (TKN and Nitrate+Nitrite) concentrations and some of the highest mean values of total phosphorus concentrations were reported at LOUA016N. Highest mean value for chlorophyll *a* was also reported at LOUA016N (Table 6). Highest mean concentration of total organic carbon (TOC), which is an indicator of organic enrichment, was also observed at this location. Turbidity and total suspend solids (TSS) values were similar throughout Lake Catherine with the exception of Spencer Bay (LOUA016S). Mean turbidity and TSS values were consistently higher in Spencer Bay. Elevated turbidity and TSS are likely a product of shallower depths.

Bacteria

Escherichia coli samples were collected at the routine water quality stations during the primary contact season (May – September). Additional tributary locations were sampled after a storm event (September 2012) in an attempt to determine potential non-point bacteria sources. Arkansas Pollution Control and Ecology Commission's Regulation 2.507 establishes a single-sample maximum *Escherichia coli* criteria of 298 col/100mL in lakes and reservoirs. All samples at all locations, from May through August 2012, were below this criteria. After the September 2012 storm event, *Escherichia coli* levels were greater than 298 col/100 ml in main lake stations

LOUA016M, LOUA016N and LOUA016S. Also, three unnamed tributaries (1, 4, and 6A,B) exceeded this level post storm event. Figure 4 shows results of the storm event sampling effort and associated bacteria levels. There was not a sampling event after the collection of the September 2012 storm event collection due to the end of primary contact season.

Fish Tissue

For each station, a maximum collection of five fish for per species was attempted for composite fish tissue analysis. A total of 35 largemouth bass, 12 channel catfish, and 28 bluegill sunfish were collected from seven monitoring stations between Lake Ouachita, Lake Catherine and the Ouachita River. Twenty-two metal constituents were analyzed for each composite sample. Highest mercury concentrations were observed among composite largemouth bass samples from Lake Ouachita, 1.18mg/Kg (LOUA020C) and the Ouachita River below Remmel Dam (LOUA016R), 0.51mg/Kg. (Table 7). Mercury concentrations in Lake Catherine largemouth bass composite samples were generally comparable, with LOUA016N having the highest concentration of 0.44mg/Kg (Table 7). While concentrations were reduced when compared to largemouth bass, mercury concentrations from Lake Ouachita channel catfish and bluegill were the highest observed for those species (Table 8, 9).

Fish tissue samples were submitted to the U.S. Geological Survey Columbia Environmental Science Center in Missouri for organics analysis. Results of organics analysis produced the presence of 23 different polychlorinated biphenyl (PCBs) congeners, 3 organochlorine pesticides, and 1 polybrominated diphenyl ether (PBDE) congener (Appendix D). Total measure of PCBs for largemouth bass composites from Lakes Ouachita and Catherine ranged from 7 µg/Kg to 46 µg/Kg. Pentachlorbenze and mirex were two of the organochlorine pestides present and both were the least abundant in all tissue composites. However, dichlorodiphenyldichloroethylene (p,p'-DDE), the most persistent metabolite of DDT, was present in all composite tissue samples. Value of p,p-DDE for composite largemouth bass samples ranged from 7.3 µg/Kg to 8 µg/Kg. All samples were below the Food and Drug Administration action level of 5ppm (5000 µg/Kg). Total measured PBDE's for largemouth bass composites ranged from <5 µg/Kg, reporting limit, to 12 µg/Kg.

Table 3. Summary of mean total metals data collected from surface samples Lake Hamilton (LOUA018A) and Ouachita River (LOUA016R).

	LOUA018A	LOUA016R
Aluminum (µg/L)	*	*
Antimony (µg/L)	*	*
Arsenic (µg/L)	0.68	0.62
Barium (µg/L)	13.83	12.49
Beryllium (µg/L)	*	*
Boron (µg/L)	8.76	9.58
Cadmium (µg/L)	*	*
Calcium (mg/L)	5.03	6.26
Chromium (µg/L)	*	*
Cobalt (µg/L)	*	*
Copper (µg/L)	0.71	0.93
Iron (µg/L)	*	*
Lead (µg/L)	*	*
Magnesium (mg/L)	1.48	1.50
Manganese (µg/L)	1.26	29.23
Nickel (µg/L)	*	0.76
Potassium (mg/L)	1.05	1.26
Selenium (µg/L)	*	*
Sodium (mg/L)	1.82	3.83
Thallium (µg/L)	*	*
Vanadium (µg/L)	*	57.2
Zinc (µg/L)	*	2.01

*Indicates below ADEQ Laboratory Detection Limit

Table 4. Summary of mean total metals data collected from surface samples Lake Catherine (LOUA016)

	A	C	J	K	L	M	N	S	T	W
Aluminum (μg/L)	*	*	*	*	*	*	*	*	*	*
Antimony (μg/L)	*	*	*	*	*	*	*	*	*	*
Arsenic (μg/L)	0.69	0.71	0.72	0.75	0.79	0.85	0.80	0.96	0.72	0.9
Barium (μg/L)	13.19	12.72	13.79	13.89	14.28	14.56	14.34	18.68	16.7	15.31
Beryllium (μg/L)	*	*	*	*	*	*	*	*	*	*
Boron (μg/L)	9.91	10.20	10.01	9.98	9.54	10.02	10.44	10.06	9.86	9.84
Cadmium (μg/L)	*	*	*	*	*	*	*	*	*	*
Calcium (mg/L)	6.41	6.21	6.34	6.54	6.59	6.69	6.60	7.18	6.31	7.37
Chromium (μg/L)	*	*	*	*	*	*	*	*	*	*
Cobalt (μg/L)	*	*	*	*	*	*	*	*	*	*
Copper (μg/L)	0.71	0.72	0.77	0.81	0.77	0.78	0.82	0.75	0.83	0.77
Iron (μg/L)	*	50.72	*	*	*	*	*	*	*	*
Lead (μg/L)	*	*	*	*	*	*	*	*	*	*
Magnesium (mg/L)	1.54	1.53	1.53	1.53	1.54	1.56	1.57	1.61	1.51	1.64
Manganese (μg/L)	7.54	33.32	3.89	3.63	3.85	3.74	14.64	7.91	3.74	7.29
Nickel (μg/L)	0.66	0.74	0.75	0.72	0.61	0.67	0.77	0.74	0.67	0.80
Potassium (mg/L)	1.27	1.18	1.23	1.26	1.28	1.30	1.32	1.28	1.25	1.33
Selenium (μg/L)	*	*	*	*	*	*	*	*	*	*
Sodium (mg/L)	3.90	2.81	4.17	4.39	4.55	4.87	3.91	4.37	3.97	4.79
Thallium (μg/L)	*	*	*	*	*	*	*	*	*	*
Vanadium (μg/L)	59.1	41.0	64.31	76.58	85.51	103.57	69.09	39.8	51.35	84.35
Zinc (μg/L)	1.72	1.64	1.13	1.11	1.24	*	1.53	*	*	1.28

*Indicates below ADEQ Laboratory Detection Limit

Table 5. Summary of mean anion data collected from surface samples Lake Catherine (LOUA016)

	A	C	J	K	L	M	N	S	T	W
Bromide (mg/L)	*	*	*	*	*	*	*	*	*	*
Chloride (mg/L)	2.61	2.46	2.61	2.64	2.64	2.73	2.69	2.85	2.62	2.88
Fluoride (mg/L)	0.08	0.89	0.07	0.08	0.08	0.08	0.08	0.08	0.08	0.09
Sulfate (mg/L)	8.25	5.43	8.62	9.42	9.83	10.9	8.10	9.74	8.28	12.54
TDS (mg/L)	50.5	47	48.25	48.88	50.63	49.25	49	53.75	45.88	54.25

*Indicates below ADEQ Laboratory Detection Limit

Table 6. Summary of mean nutrient and other data collected from surface samples Lake Catherine (LOUA016)

	A	C	J	K	L	M	N	S	T	W
Ammonia (mg/L)	0.09	0.05	0.08	0.05	0.06	0.06	0.05	*	0.05	0.06
Chlorophyll a (µg/L)	16.1	22.35	17.75	19.3	17.63	19.48	34.62	23.08	18.63	22.4
Nitrate+Nitrite Nitrogen (mg/L)	0.2	0.28	0.19	0.16	0.16	0.17	0.35	0.19	0.16	0.14
Orthophosphorus (mg/L)	0.01	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.01
Total Kjeldahl Nitrogen (mg/L)	0.38	0.48	0.41	0.41	0.41	0.46	0.52	0.48	0.40	0.47
Total Organic Carbon (mg/L)	3.59	3.82	3.73	3.8	3.86	3.94	4.25	4.01	3.78	3.97
Total Phosphorus (mg/L)	0.03	0.06	0.03	0.03	0.03	0.04	0.05	0.05	0.03	0.03
Total Suspended Solids (mg/L)	2.73	4.56	2.95	3.09	3.26	3.86	4.93	6.98	3.31	3.89
Turbidity (NTU)	3.03	3.05	3.31	3.23	3.19	3.53	4.31	6.77	3.43	4.23

*Indicates below ADEQ Laboratory Detection Limit

Table 7. Composite fish tissue sample results for largemouth bass (*Micropterus salmoides*) from Lakes Catherine and Ouachita.

	LOUA020C n=5	**LOUA16A/J** n=5	**LOUA016K** n=5	**LOUA016N** n=5	**LOUA016S** n=5	**LOUA016T** n=5	**LOUA016W** n=5
Aluminum (mg/Kg)	*	*	*	*	*	*	*
Antimony (mg/Kg)	*	*	*	*	*	*	*
Arsenic (mg/Kg)	*	*	*	*	*	*	*
Barium (mg/Kg)	*	*	*	*	*	*	*
Beryllium (mg/Kg)	*	*	*	*	*	*	*
Cadmium (mg/Kg)	*	*	*	*	*	*	*
Calcium (mg/Kg)	107	98.4	94.4	127	125	397	98.4
Chromium (mg/Kg)	*	*	*	*	*	*	*
Cobalt (mg/Kg)	*	*	*	*	*	*	*
Copper (mg/Kg)	*	*	*	*	*	*	*
Iron (mg/Kg)	*	*	*	*	*	*	*
Lead (mg/Kg)	*	*	*	*	*	*	*
Magnesium (mg/Kg)	309	310	320	361	337	331	358
Manganese (mg/Kg)	*	*	*	*	*	*	*
Nickel (mg/Kg)	*	*	*	*	*	*	*
Mercury (mg/Kg)	1.18	0.39	0.33	0.44	0.24	0.26	0.32
Potassium (mg/Kg)	4880	4500	4730	5330	5140	5000	4980
Selenium (mg/Kg)	*	*	*	*	*	*	*
Sodium (mg/Kg)	392	480	525	355	370	404	334
Thallium (mg/Kg)	*	*	*	*	*	*	*
Vanadium (mg/Kg)	*	*	*	*	*	*	*
Zinc (mg/Kg)	4.00	4.84	4.45	4.08	5.16	5.86	5.43

*Indicates below ADEQ Laboratory Detection Limit

Table 8. Composite fish tissue sample results for channel catfish (*Ictalurus punctatus*) from Lakes Catherine and Ouachita.

	LOUA020C n=3	**LOUA16A/J** n=2	**LOUA016K** n=2	**LOUA016N** n=1	**LOUA016S** n=1	**LOUA016T** n=2	**LOUA016W** n=1
Aluminum (mg/Kg)	*	*	*	*	*	*	*
Antimony (mg/Kg)	*	*	*	*	*	*	*
Arsenic (mg/Kg)	*	*	*	*	*	*	*
Barium (mg/Kg)	*	*	*	*	*	*	*
Beryllium (mg/Kg)	*	*	*	*	*	*	*
Cadmium (mg/Kg)	*	*	*	*	*	*	*
Calcium (mg/Kg)	107	89.9	91.1	79.6	102	77.3	106
Chromium (mg/Kg)	*	*	*	*	*	*	*
Cobalt (mg/Kg)	*	*	*	*	*	*	*
Copper (mg/Kg)	*	*	*	*	*	*	*
Iron (mg/Kg)	*	*	*	*	*	*	*
Lead (mg/Kg)	*	*	*	*	*	*	*
Magnesium (mg/Kg)	308	245	272	255	264	234	299
Manganese (mg/Kg)	*	*	*	*	*	*	*
Nickel (mg/Kg)	*	*	*	*	*	*	*
Mercury (mg/Kg)	0.3	0.12	0.09	0.29	0.16	0.08	0.05
Potassium (mg/Kg)	5200	4060	4280	4260	4400	3940	4910
Selenium (mg/Kg)	*	*	*	*	*	*	*
Sodium (mg/Kg)	397	547	390	411	403	556	456
Thallium (mg/Kg)	*	*	*	*	*	*	*
Vanadium (mg/Kg)	*	*	*	*	*	*	*
Zinc (mg/Kg)	5.07	5.46	4.95	4.30	5.87	3.97	4.66

*Indicates below ADEQ Laboratory Detection Limit

Table 9. Composite fish tissue sample results for bluegill sunfish (*Lepomis macrochirus*) from Lakes Catherine and Ouachita.

	LOUA020C n=4	**LOUA16A/J** n=4	**LOUA016K** n=5	**LOUA016N** n=3	**LOUA016S** n=4	**LOUA016T** n=5	**LOUA016W** n=3
Aluminum (mg/Kg)	*	*	*	*	*	*	*
Antimony (mg/Kg)	*	*	*	*	*	*	*
Arsenic (mg/Kg)	*	*	*	*	*	*	*
Barium (mg/Kg)	*	*	*	*	*	*	*
Beryllium (mg/Kg)	*	*	*	*	*	*	*
Cadmium (mg/Kg)	*	*	*	*	*	*	*
Calcium (mg/Kg)	149	126	144	102	2000	142	127
Chromium (mg/Kg)	*	*	*	*	*	*	*
Cobalt (mg/Kg)	*	*	*	*	*	*	*
Copper (mg/Kg)	*	*	*	*	*	*	*
Iron (mg/Kg)	*	*	*	*	*	*	*
Lead (mg/Kg)	*	*	*	*	*	*	*
Magnesium (mg/Kg)	316	303	396	256	340	328	328
Manganese (mg/Kg)	*	*	*	*	*	*	*
Nickel (mg/Kg)	*	*	*	*	*	*	*
Mercury (mg/Kg)	0.34	0.06	0.08	0.17	0.04	0.09	*
Potassium (mg/Kg)	4420	4220	5740	3610	4270	4610	4670
Selenium (mg/Kg)	*	*	*	*	*	*	*
Sodium (mg/Kg)	321	522	405	294	301	649	331
Thallium (mg/Kg)	*	*	*	*	*	*	*
Vanadium (mg/Kg)	*	*	*	*	*	*	*
Zinc (mg/Kg)	5.06	5.39	7.18	5.69	7.15	6.51	5.92

*Indicates below ADEQ Laboratory Detection Limit

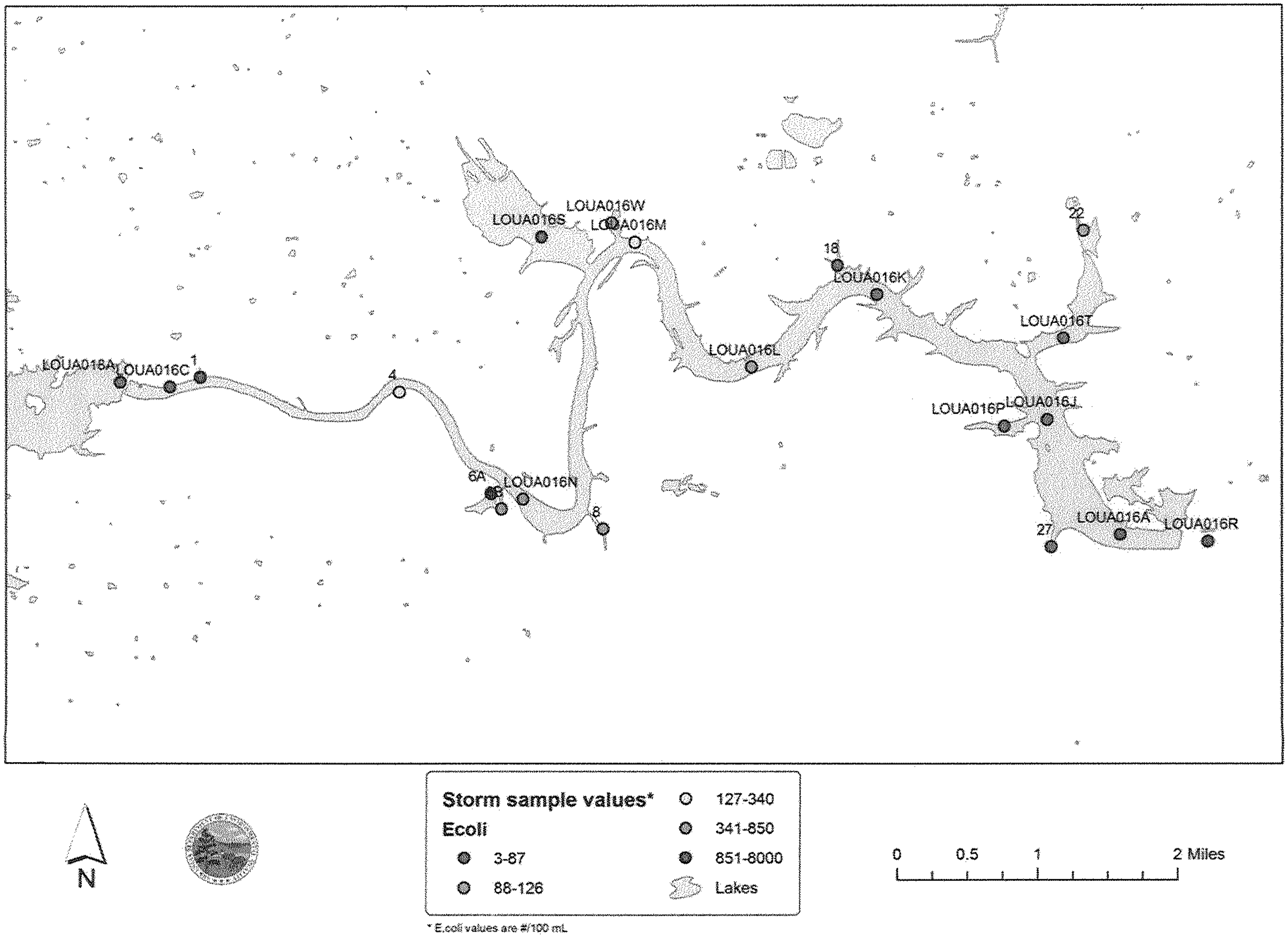


Figure 4. Depiction of Lake Catherine bacteria storm event monitoring stations and their associated *E. coli* count.

CONCLUSIONS

Data presented within this document have been focused on satisfying data gaps and questions posed by the Technical Working Group. Questions and associated data gaps were:

1. Is Lake Catherine safe as a drinking water source?
    a. Data Gap- Additional seasonal water quality sampling including metals at multiple locations in, above and below Lake Catherine.
2. Are the fish in the lake safe to eat?
    a. Data Gap- Current fish tissue analysis including a review of fish in Lake Ouachita and Lake Catherine, for metals and organics.
3. Is the lake safe for body contact recreation?
    a. Data Gap-High Flow/storm event samples of Lake Catherine including bacteria samples for *Escherichia coli* analysis.

Results of ADEQ's water quality and fish tissue sampling program-produced lines of evidence that suggest Lake Catherine is fully supporting Primary Contact, Secondary Contact, Industrial Water Supply, and Agricultural Water Supply. As it was not a primary objective of this study, Fisheries (Aquatic Life) designated uses were not assessed. Based on data reviewed, water quality would maintain Domestic Water Supply designated uses in Lake Catherine. However, as of August 16, 2013 Act 954 of 2013 will remove Domestic Water Supply designated uses from waterbodies not currently serving in such a capacity. This will include Lake Catherine, as it is not a drinking water source. Furthermore, Act 954 of 2013 offers domestic water supply protection to those waterbodies listed as potential water supply sources by Arkansas Natural Resource Commission's State Water Plan. Currently, Lake Catherine is not listed as a potential water supply within the State Water plan and therefore will no longer be given the Domestic Water Supply designated use.

Primary and Secondary Contact designated uses were not assessed for attainment, as there were not enough samples collected during primary contact season. However, the only observed exceedance for *E. coli* was recorded immediately following a storm event. All *E. coli* samples collected during non-storm events were within acceptable levels. The one time storm flow sampling event isolated areas of concern for potential non-point source impacts to Lake Catherine.

Three species of fish collected from six locations on Lake Catherine for trace metals analysis were below Food, and Drug Administration and Arkansas Department of Health mercury action level of 1.0 mg/Kg. Lake Catherine largemouth bass mercury levels were only slightly higher than U.S. Environmental Protection Agency estimate of 0.26mg/Kg as a background concentration. Channel catfish and bluegill sunfish were well below both values. Although, all Lake Catherine tissue samples were below mercury action levels, one site in Lake Catherine (LOUA016N) consistently had higher mercury concentrations through all species. Lake Ouachita

(LOUA020C) largemouth bass were the only sample to result in an mercury action level exceedance. The Arkansas Department of Environmental Quality has submitted results to the Arkansas Department of Health and Arkansas Game and Fish Commission to collaborate monitoring efforts. These monitoring efforts will be directed towards accurately assessing mercury concentrations in the Lake Ouachita largemouth bass population for public health. Of the organics present in the tissue samples, only PCBs have established criteria. The National Toxic Rule sets PCB criteria for fish tissue at 5.3 µg/Kg, all samples were below this value and the Food and Drug Administration action level is 2ppm (2000 µg/Kg). Currently, no state or federal entity has set forth criteria for PBDEs.

It is the opinion of the ADEQ that Lake Catherine is safe for a potential water source, fish consumption, and recreation. Results of this study suggest, but do not implicate residential and mining non-point source run-off are influencing water quality of Lake Catherine. Evidence of residential non-point source affecting water quality was most clearly present at LOUA016N. Close proximity of residential areas to LOUA016N is suspect of causing slight organic enrichment, which was indicated through nutrient parameters and response variables chlorophyll a and low dissolved oxygen concentrations. Continued amplification of nutrients at LOUA016N and across Lake Catherine may further exacerbate periods of decreased dissolved oxygen during the critical season, which wereobserved during this study. Further eutrophication could affect Lake Catherine's biological integrity and fishable/swimmable designated use attainment. Evidence of mining non-point source run-off is most clearly presented when comparing average vanadium concentrations upstream to downstream through Lake Catherine. Water quality analyses indicate vanadium was not present in Lake Hamilton and had the lowest average concentration at the upper most portion of Lake Catherine. While highest average concentrations peaked near LOUA016M, which is located downstream of tributaries draining mine reclamation sites, average vanadium concentrations for the downstream most sample station (LOUA016A) were comparable to the uppermost station (LOUA016C). While vanadium was present through the water column, it was not present among any fish tissue samples. While there are currently no federal or state criteria for vanadium, it is the continued opinion of ADEQ that Lake Catherine is attaining its Primary Contact, Secondary Contact, Industrial Water Supply, Agricultural Water Supply and has potential to attain Domestic Water Supply designated uses.

Appendix A Monthly Dissolved Oxygen, Temperature, and pH

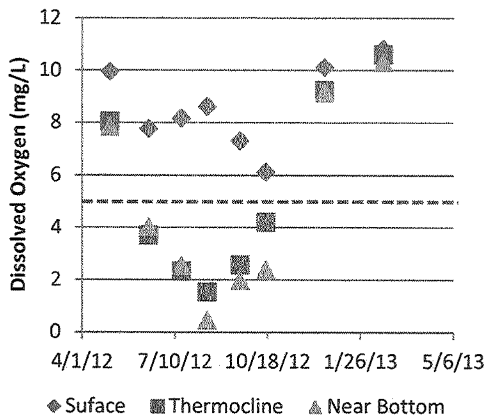
Arkansas Pollution Control and Ecology Commission specific surface water standards:

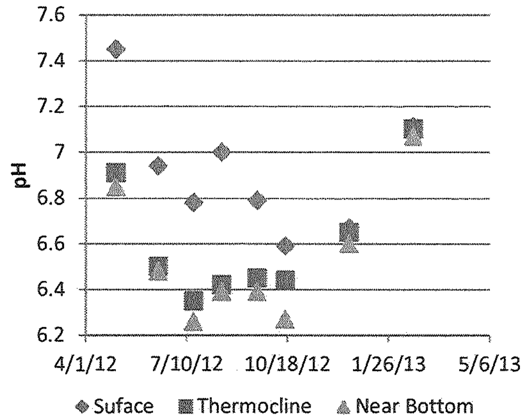
Dissolved oxygen criteria for lakes/reservoirs (5 mg/L)

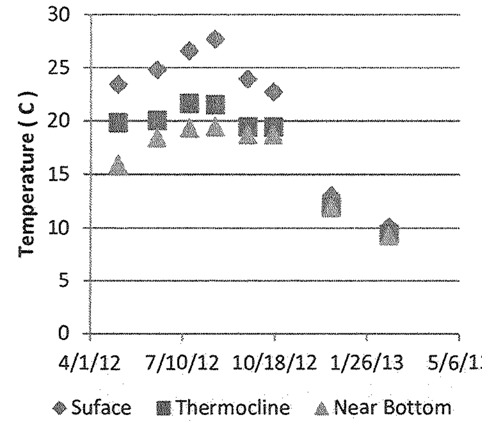
Temperature standard for lakes/reservoirs (32° C/ 89.6 ° F)

pH standard for lakes/reservoirs (6-9 SU)

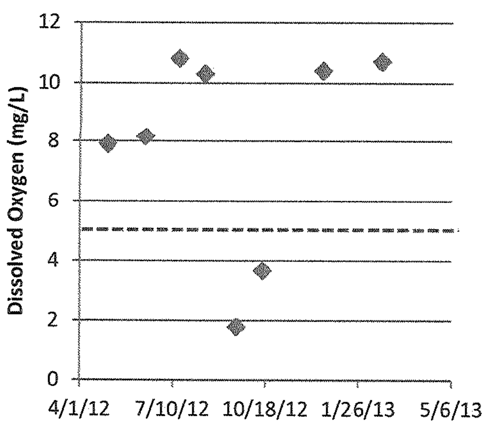
LOUA016A

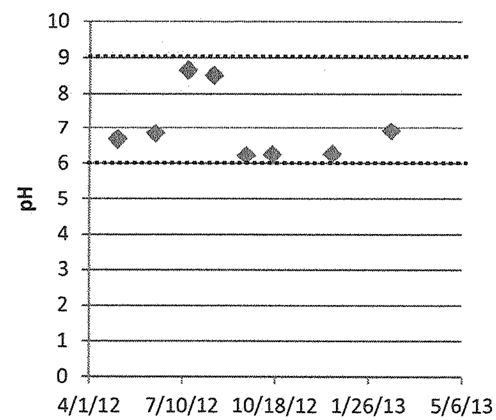


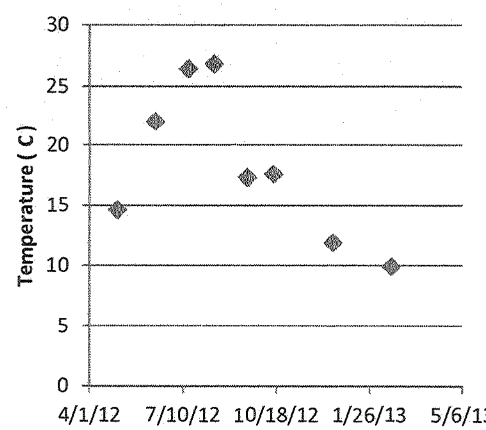




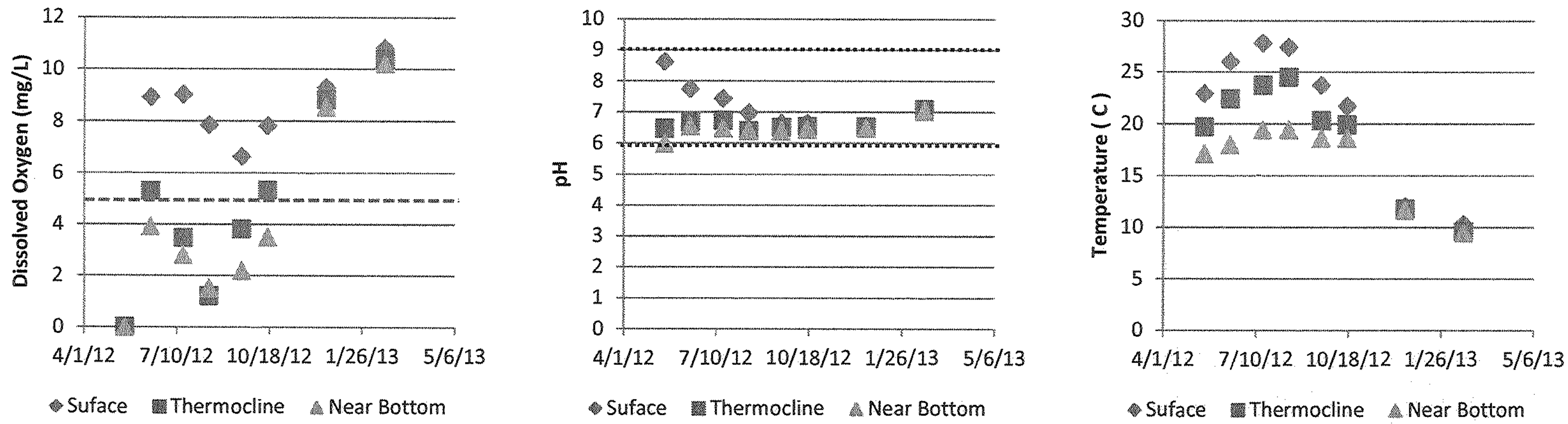
LOUA016C







LOUA016J



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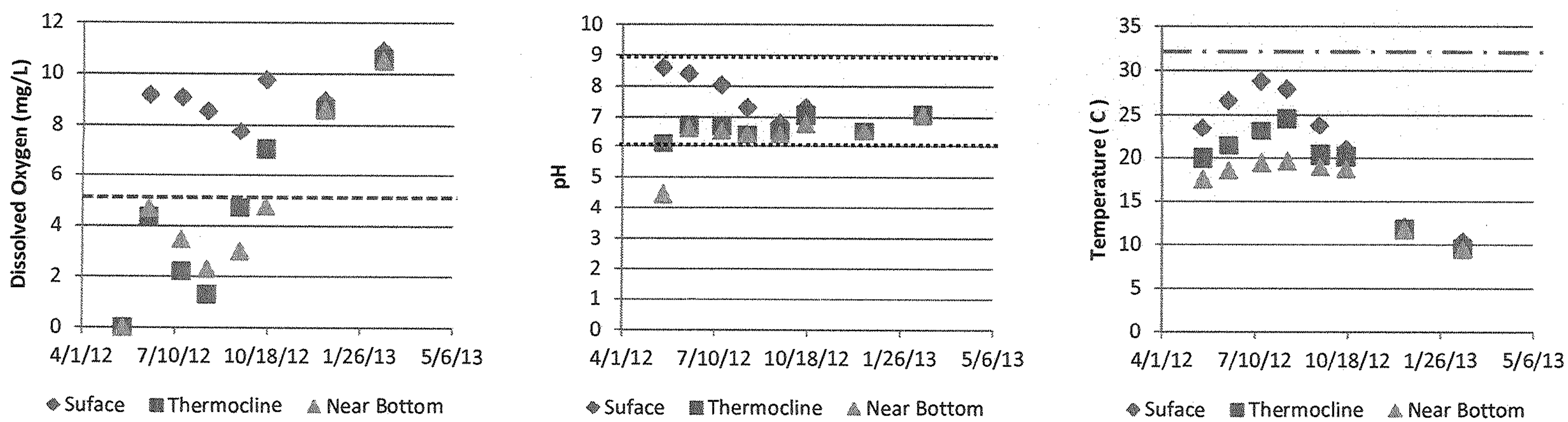
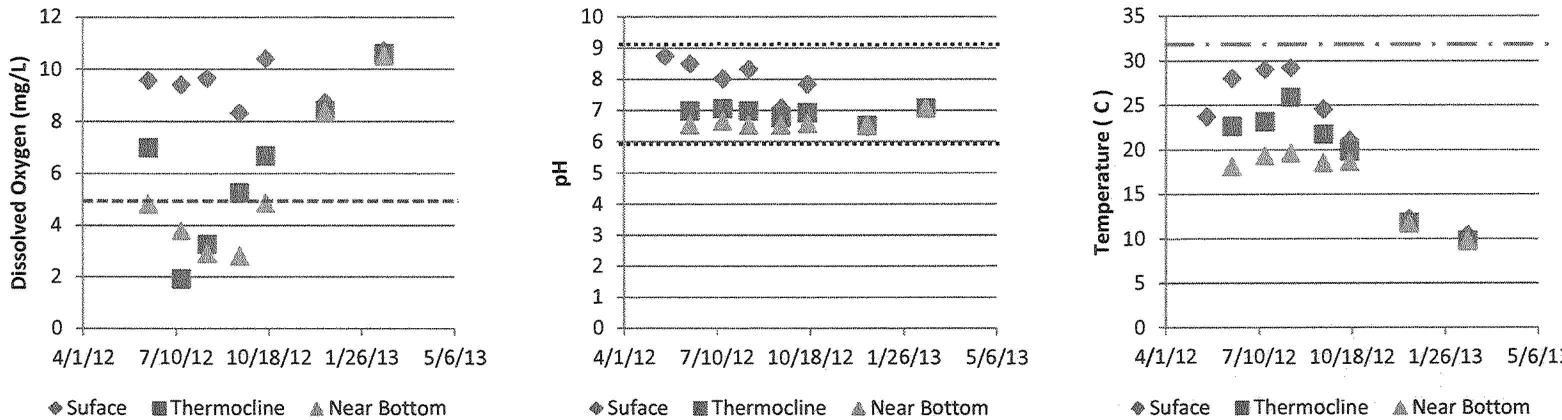


LOUA016L



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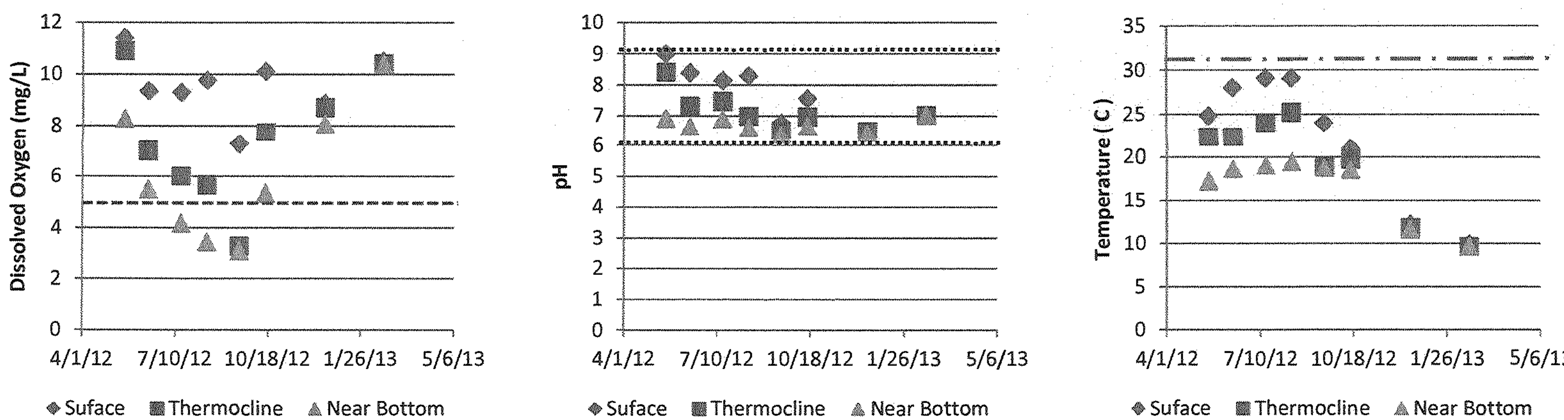
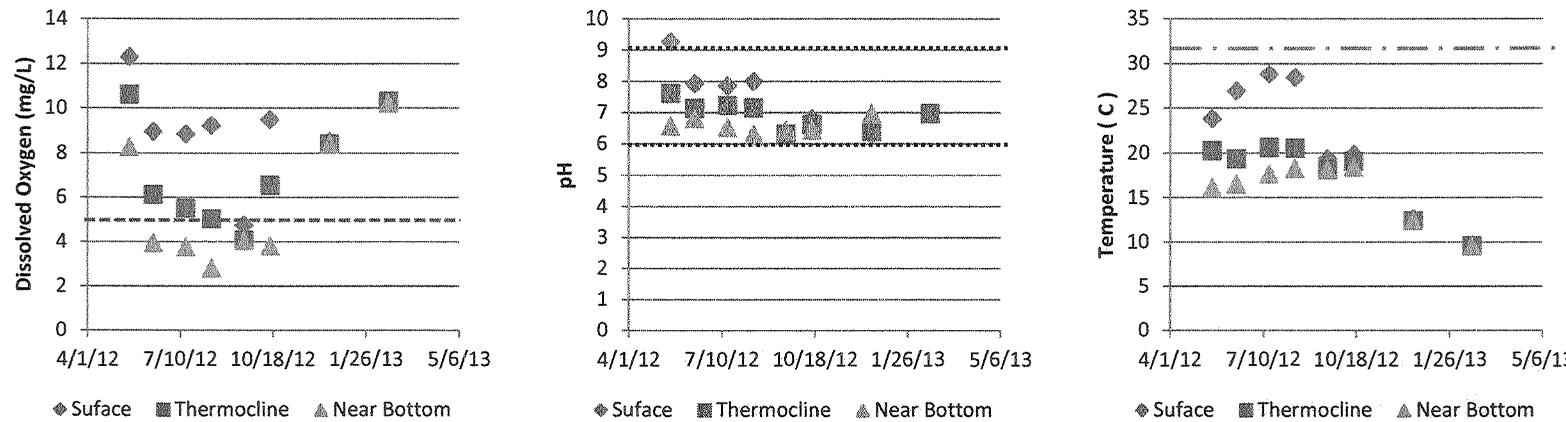
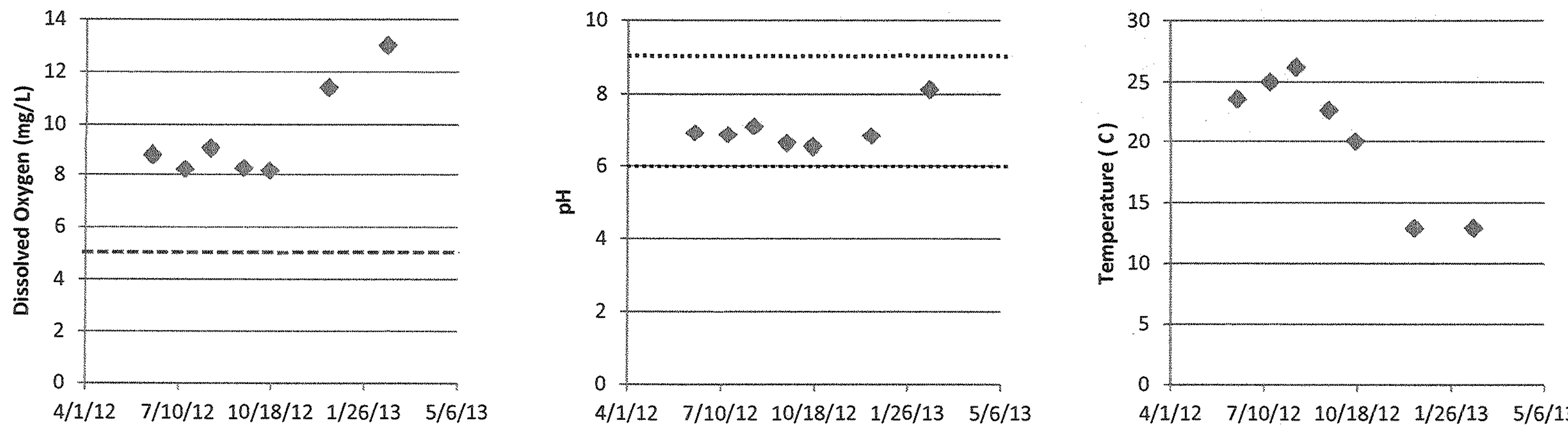


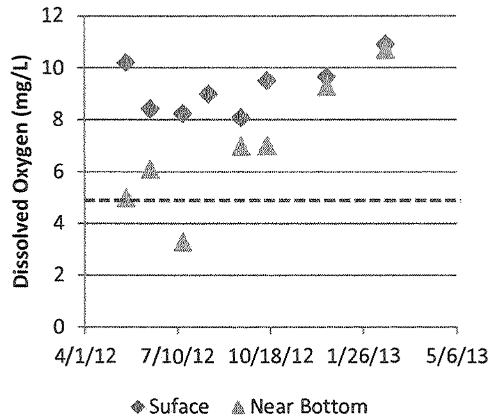
LOUA016N

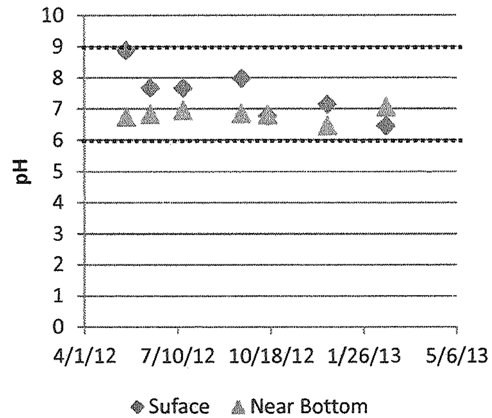


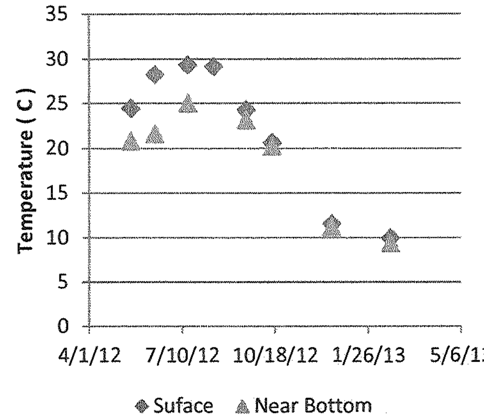
LOUA016R



LOUA016S







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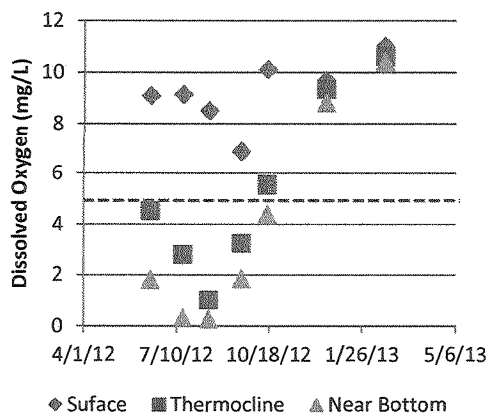
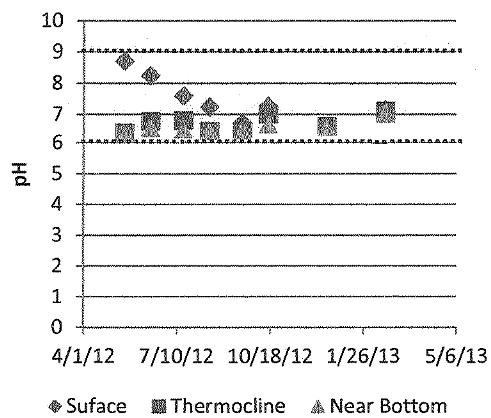
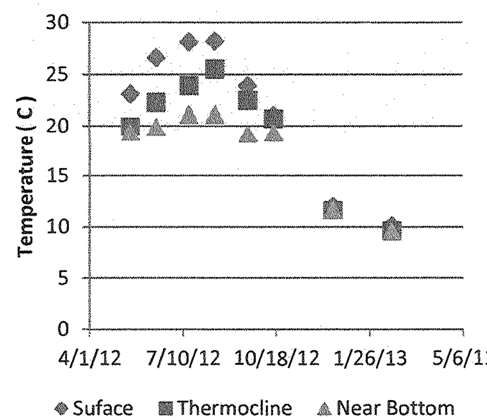
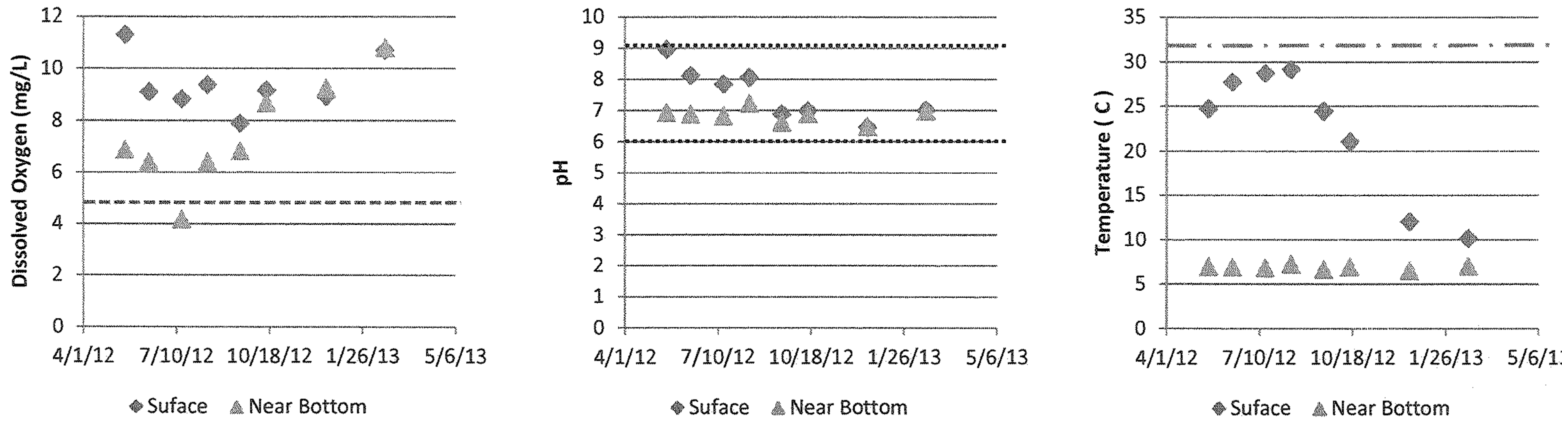


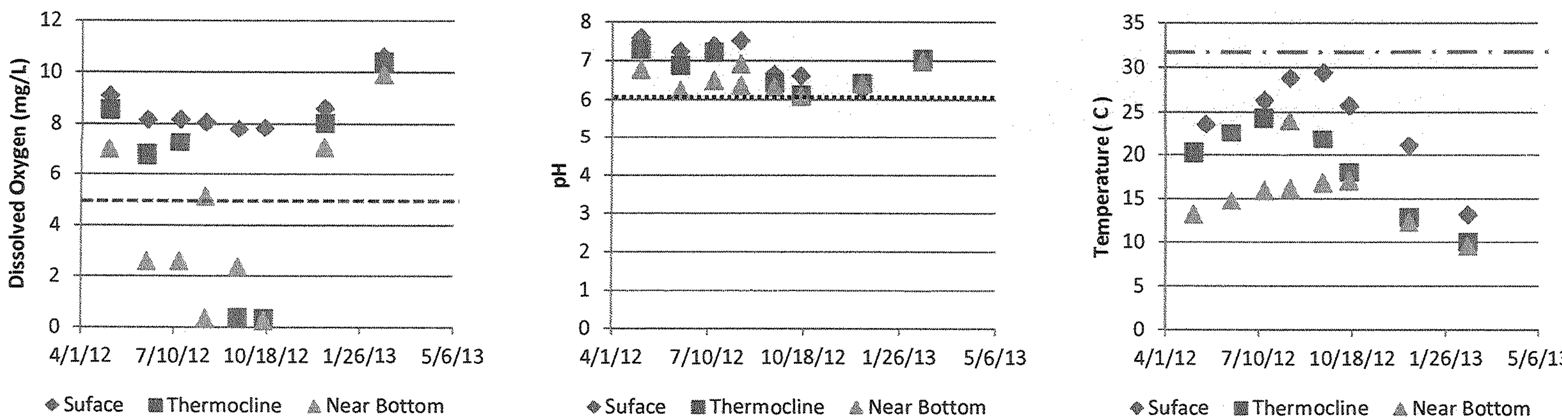




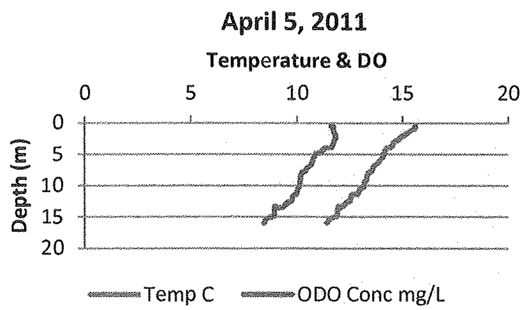
LOUA016W

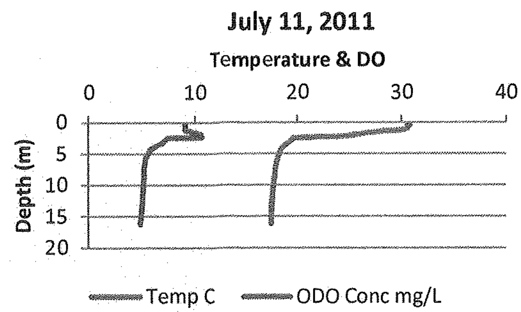


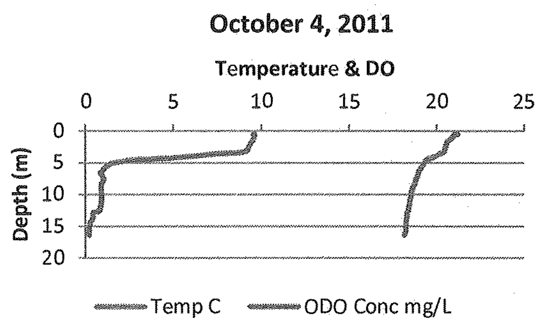
LOUA018A

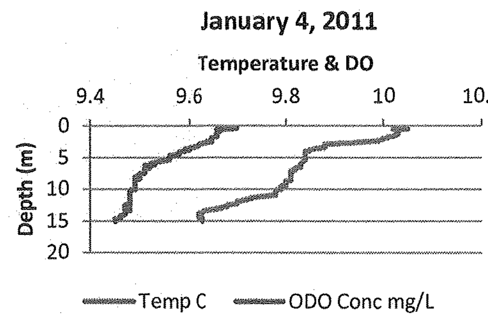


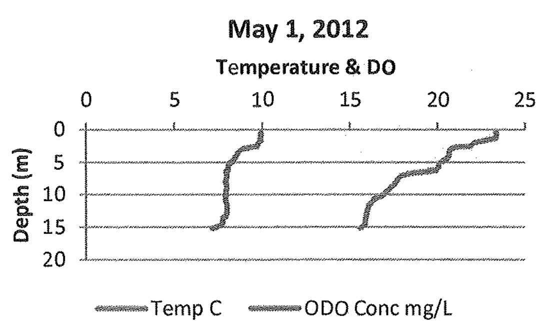
Appendix B Monthly Dissolved Oxygen and Temperature Profiles

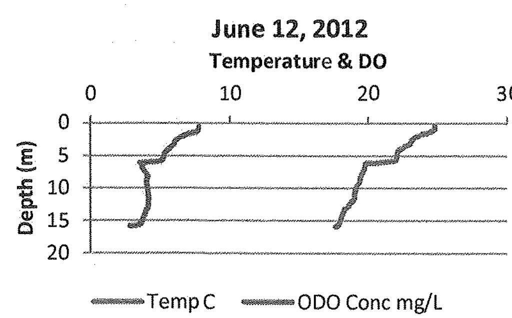

April 5, 2011
Temperature & DO
0
5
10
15
20
Depth (m)
Temp C
ODO Conc mg/L

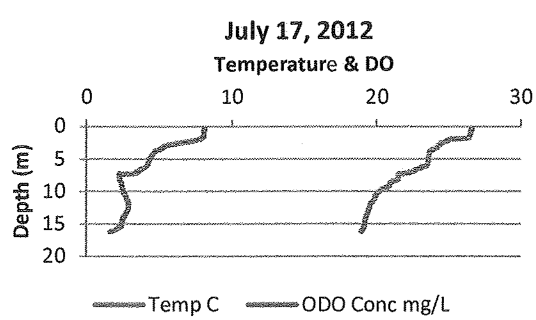

July 11, 2011
Temperature & DO
0
10
20
30
40
Depth (m)
Temp C
ODO Conc mg/L

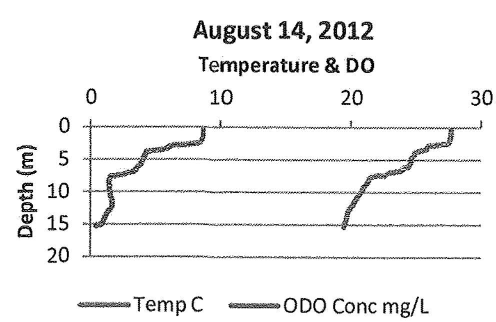

October 4, 2011
Temperature & DO
0
5
10
15
20
25
Depth (m)
Temp C
ODO Conc mg/L


January 4, 2011
Temperature & DO
9.4
9.6
9.8
10
10.2
Depth (m)
Temp C
ODO Conc mg/L

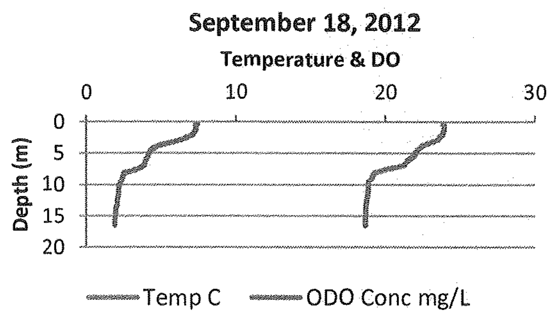

May 1, 2012
Temperature & DO
0
5
10
15
20
25
Depth (m)
Temp C
ODO Conc mg/L

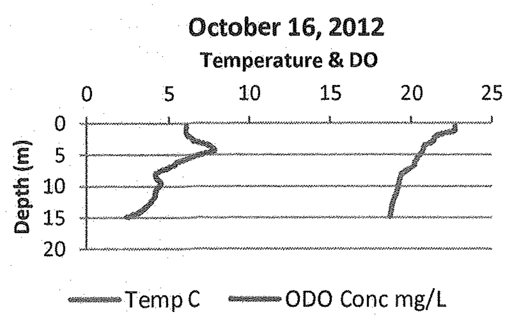

June 12, 2012
Temperature & DO
0
10
20
30
Depth (m)
Temp C
ODO Conc mg/L

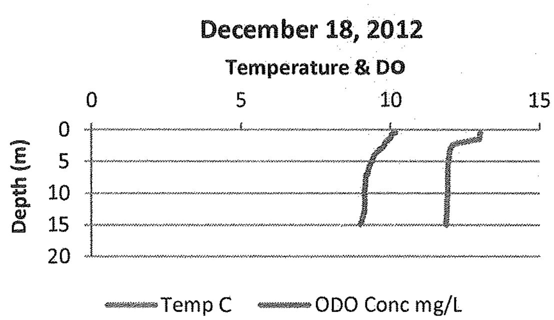

July 17, 2012
Temperature & DO
0
10
20
30
Depth (m)
Temp C
ODO Conc mg/L

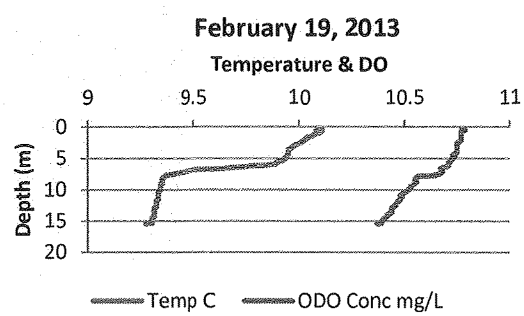

August 14, 2012
Temperature & DO
0
10
20
30
Depth (m)
Temp C
ODO Conc mg/L

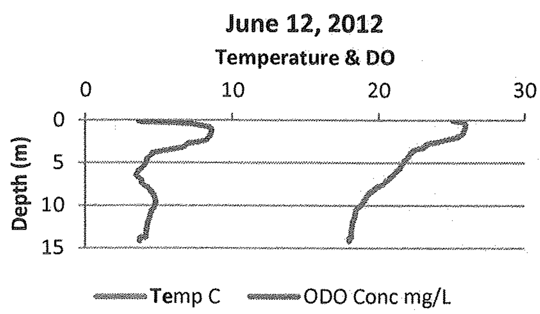
LOUA016A continued

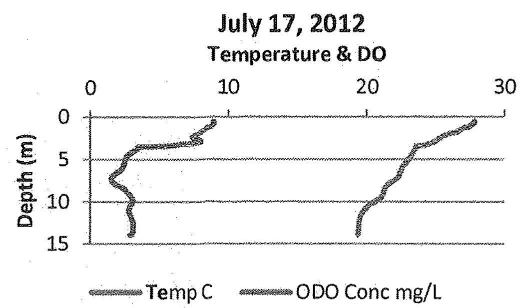


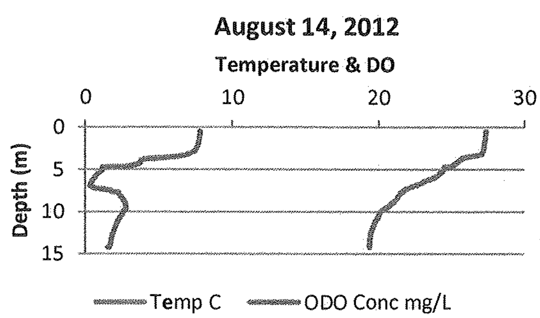







June 12, 2012
Temperature & DO
0 10 20 30
Depth (m)
0 5 10 15
Temp C
ODO Conc mg/L


July 17, 2012
Temperature & DO
0 10 20 30
Depth (m)
0 5 10 15
Temp C
ODO Conc mg/L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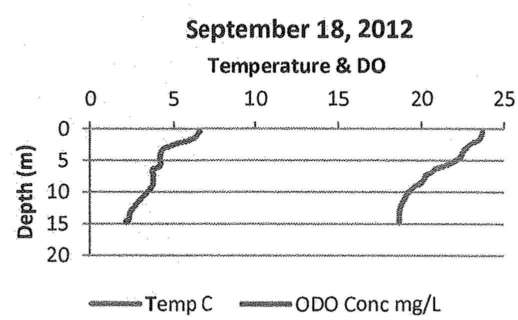
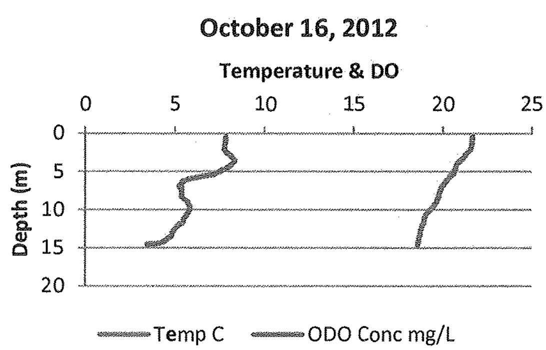
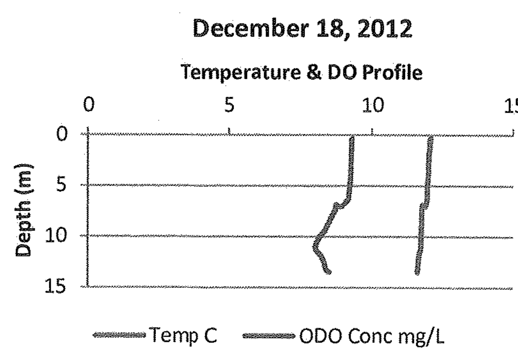
Temperature & DO
0 10 20 30
Depth (m)
0 5 10 15
Temp C
ODO Conc mg/L


September 18, 2012
Temperature & DO
0 5 10 15 20 25
Depth (m)
0 5 10 15 20
Temp C
ODO Conc mg/L


October 16, 2012
Temperature & DO
0 5 10 15 20 25
Depth (m)
0 5 10 15 20
Temp C
ODO Conc mg/L


December 18, 2012
Temperature & DO Profile
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Depth (m)
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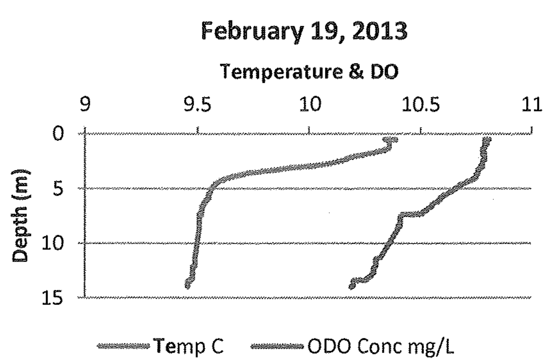
Temp C
ODO Conc mg/L


February 19, 2013
Temperature & DO
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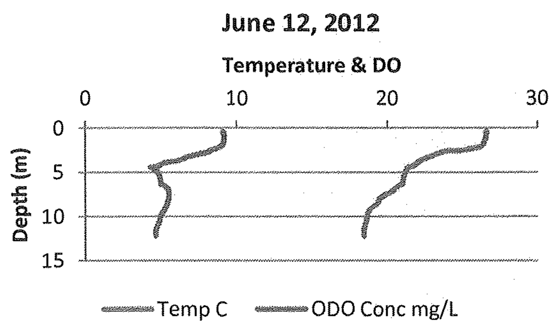
Depth (m)
0 5 10 15
Temp C
ODO Conc mg/L


June 12, 2012
Temperature & DO
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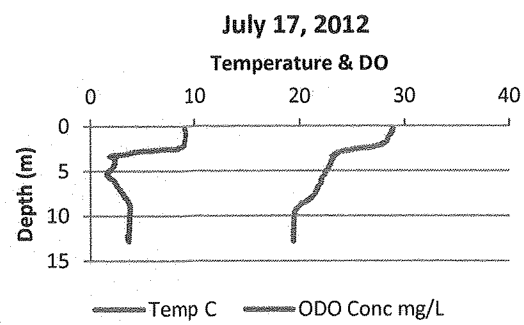
Depth (m)
0 5 10 15
Temp C
ODO Conc mg/L


July 17, 2012
Temperature & DO
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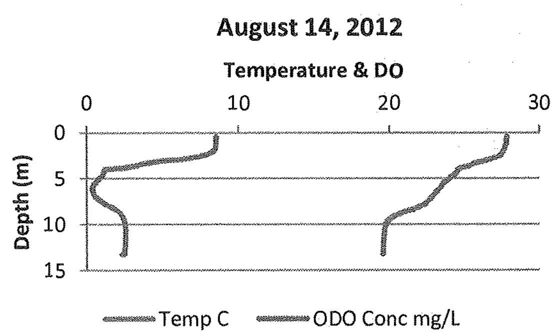
Depth (m)
0 5 10 15
Temp C
ODO Conc mg/L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Temperature & DO
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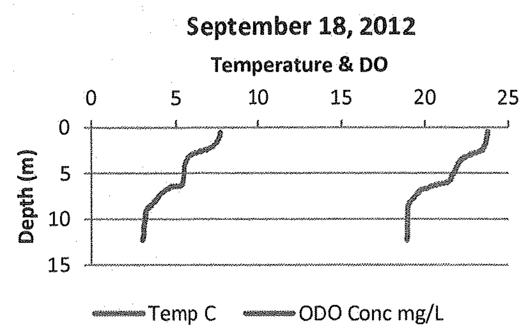
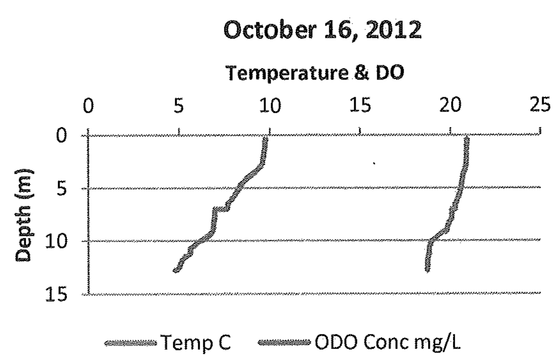
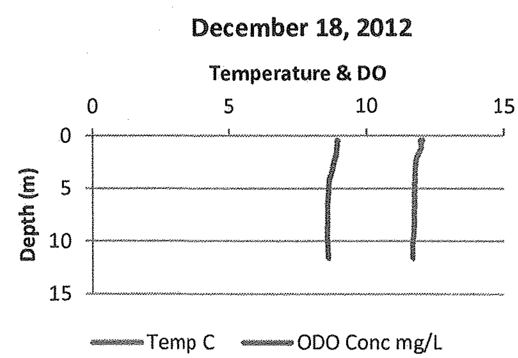
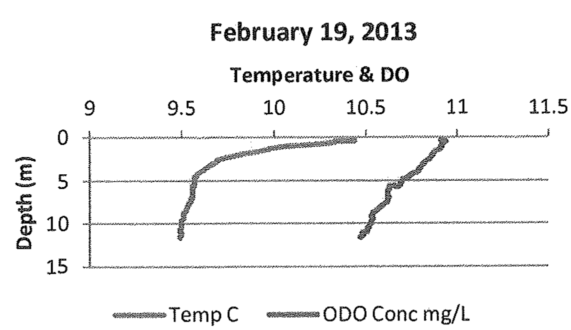
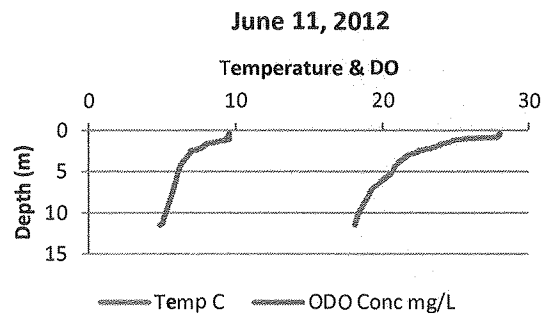
Depth (m)
0 5 10 15
Temp C
ODO Conc mg/L

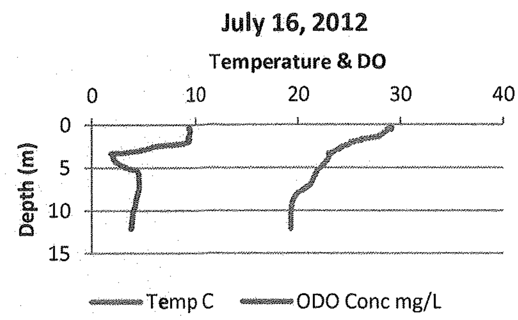

September 18, 2012
Temperature & DO
0 5 10 15 20 25
Depth (m)
0 5 10 15
Temp C
ODO Conc mg/L

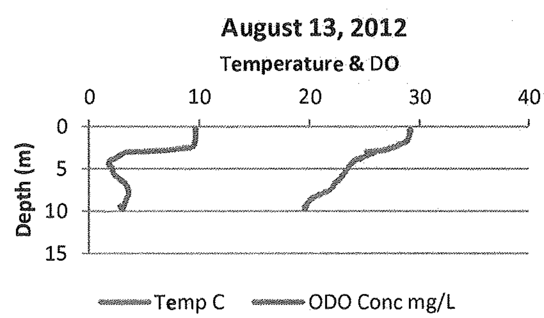

October 16, 2012
Temperature & DO
0 5 10 15 20 25
Depth (m)
0 5 10 15
Temp C
ODO Conc mg/L

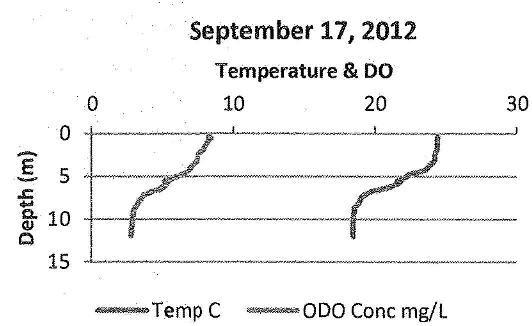

December 18, 2012
Temperature & DO
0 5 10 15
Depth (m)
0 5 10 15
Temp C
ODO Conc mg/L

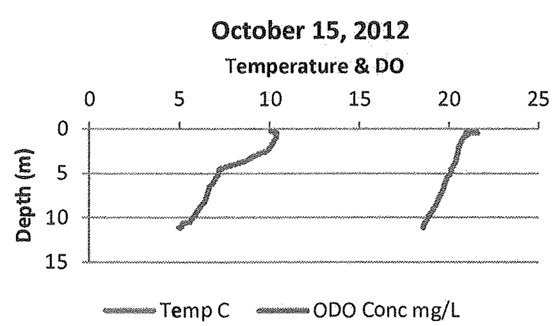

February 19, 2013
Temperature & DO
9 9.5 10 10.5 11 11.5
Depth (m)
0 5 10 15
Temp C
ODO Conc mg/L

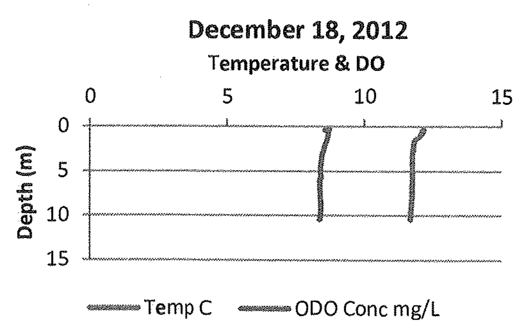

June 11, 2012
Temperature & DO
0
10
20
30
Depth (m)
0
5
10
15
Temp C
ODO Conc mg/L

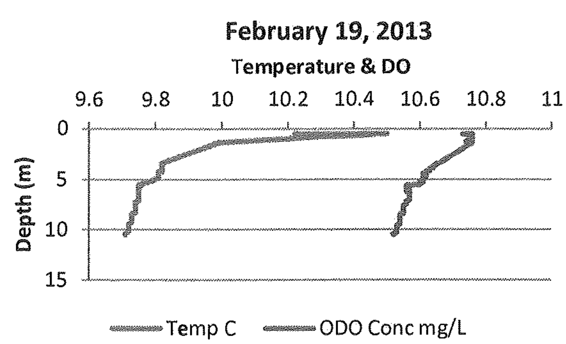

July 16, 2012
Temperature & DO
0
10
20
30
40
Depth (m)
0
5
10
15
Temp C
ODO Conc mg/L


August 13, 2012
Temperature & DO
0
10
20
30
40
Depth (m)
0
5
10
15
Temp C
ODO Conc mg/L

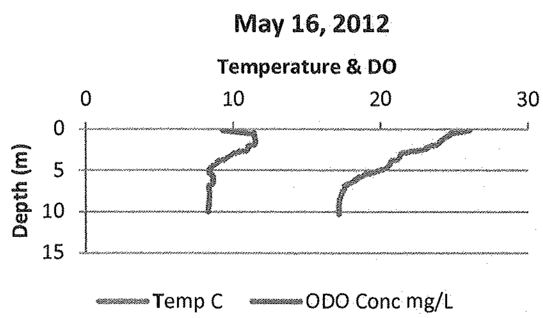

September 17, 2012
Temperature & DO
0
10
20
30
Depth (m)
0
5
10
15
Temp C
ODO Conc mg/L

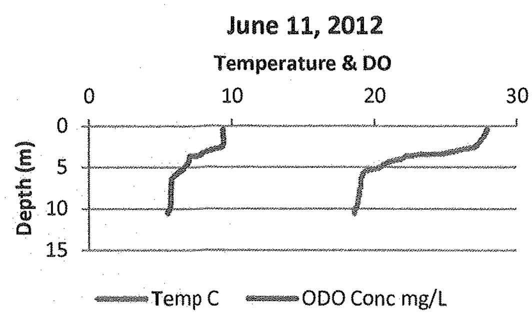

October 15, 2012
Temperature & DO
0
5
10
15
20
25
Depth (m)
0
5
10
15
Temp C
ODO Conc mg/L

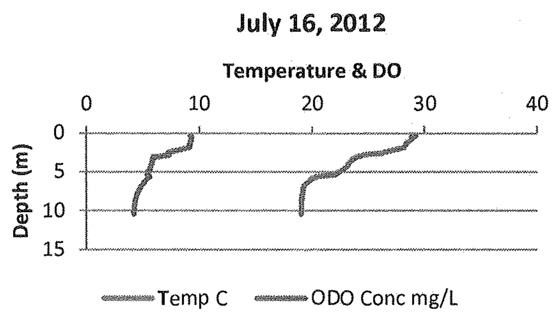

December 18, 2012
Temperature & DO
0
5
10
15
Depth (m)
0
5
10
15
Temp C
ODO Conc mg/L

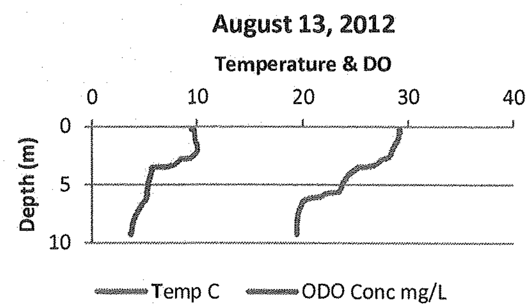

February 19, 2013
Temperature & DO
9.6
9.8
10
10.2
10.4
10.6
10.8
11
Depth (m)
0
5
10
15
Temp C
ODO Conc mg/L

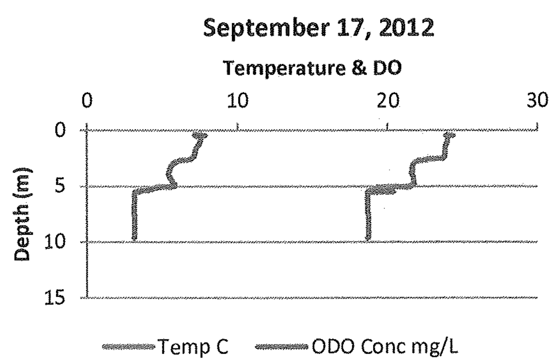
LOUA016M

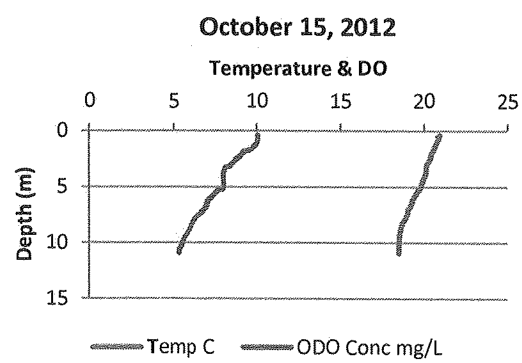

May 16, 2012
Temperature & DO
0 10 20 30
0 5 10 15
Depth (m)
Temp C
ODO Conc mg/L

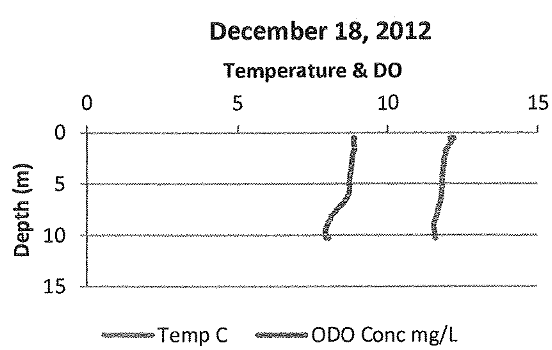

June 11, 2012
Temperature & DO
0 10 20 30
0 5 10 15
Depth (m)
Temp C
ODO Conc mg/L

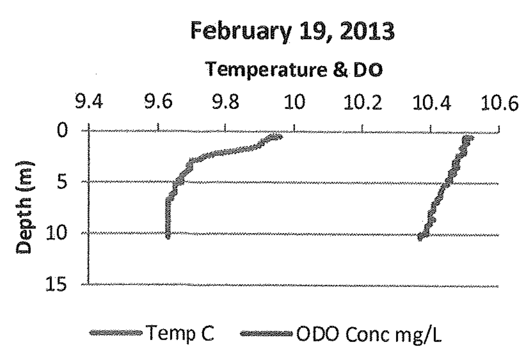

July 16, 2012
Temperature & DO
0 10 20 30 40
0 5 10 15
Depth (m)
Temp C
ODO Conc mg/L

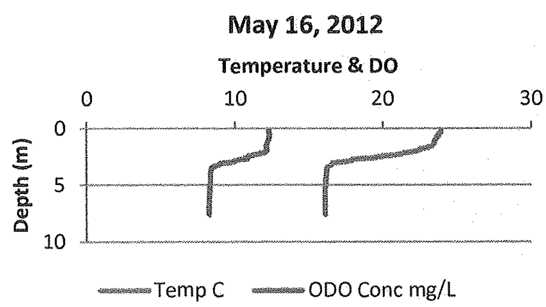

August 13, 2012
Temperature & DO
0 10 20 30 40
0 5 10
Depth (m)
Temp C
ODO Conc mg/L

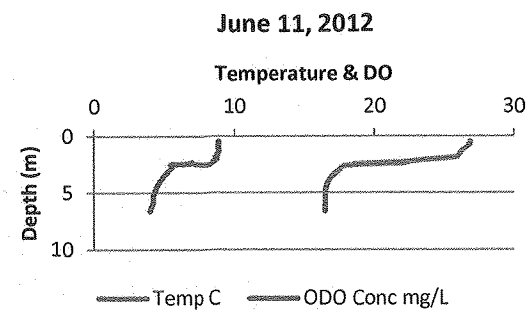

September 17, 2012
Temperature & DO
0 10 20 30
0 5 10 15
Depth (m)
Temp C
ODO Conc mg/L

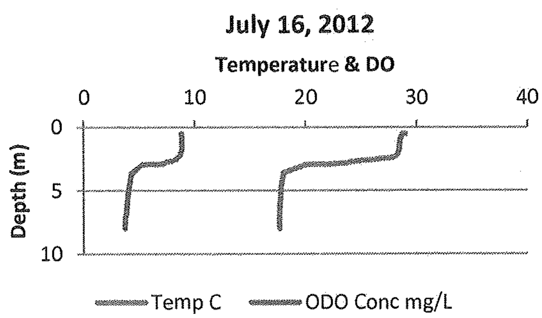

October 15, 2012
Temperature & DO
0 5 10 15 20 25
0 5 10 15
Depth (m)
Temp C
ODO Conc mg/L

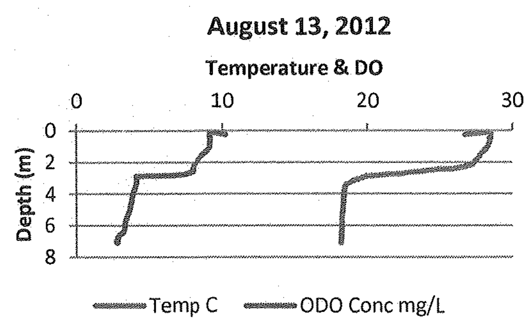

December 18, 2012
Temperature & DO
0 5 10 15
0 5 10 15
Depth (m)
Temp C
ODO Conc mg/L

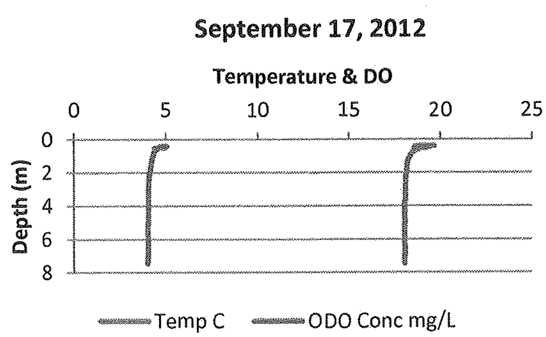

February 19, 2013
Temperature & DO
9.4 9.6 9.8 10 10.2 10.4 10.6
0 5 10 15
Depth (m)
Temp C
ODO Conc mg/L

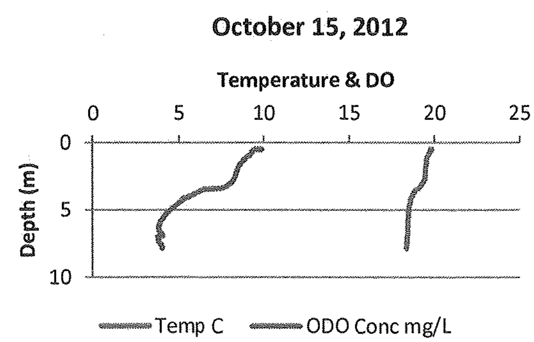

May 16, 2012
Temperature & DO
0
10
20
30
0
5
10
Depth (m)
Temp C
ODO Conc mg/L

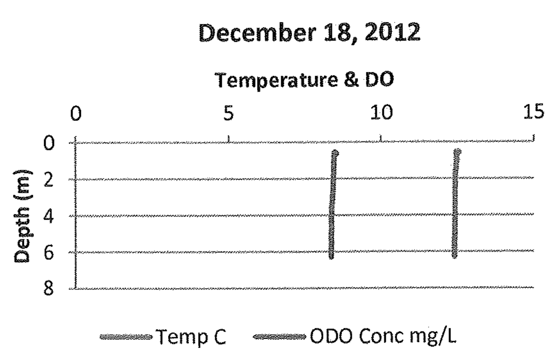

June 11, 2012
Temperature & DO
0
10
20
30
0
5
10
Depth (m)
Temp C
ODO Conc mg/L

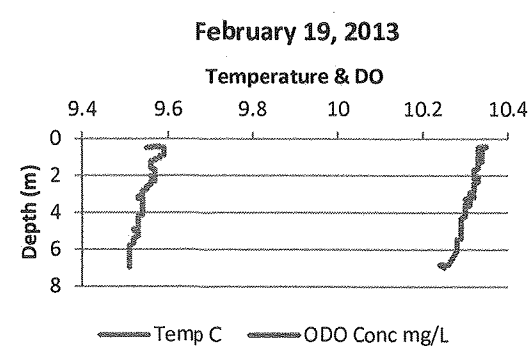

July 16, 2012
Temperature & DO
0
10
20
30
40
0
5
10
Depth (m)
Temp C
ODO Conc mg/L

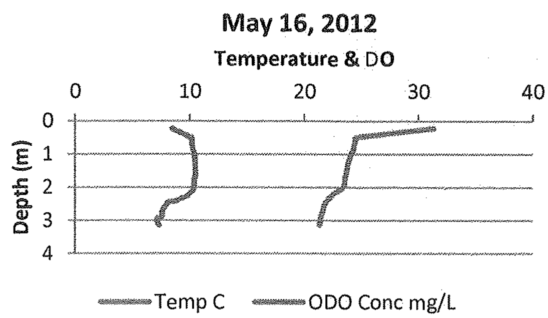

August 13, 2012
Temperature & DO
0
10
20
30
0
2
4
6
8
Depth (m)
Temp C
ODO Conc mg/L

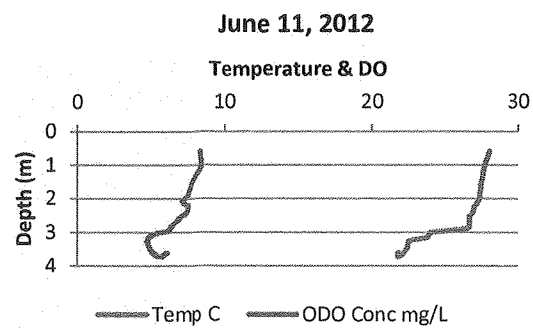

September 17, 2012
Temperature & DO
0
5
10
15
20
25
0
2
4
6
8
Depth (m)
Temp C
ODO Conc mg/L

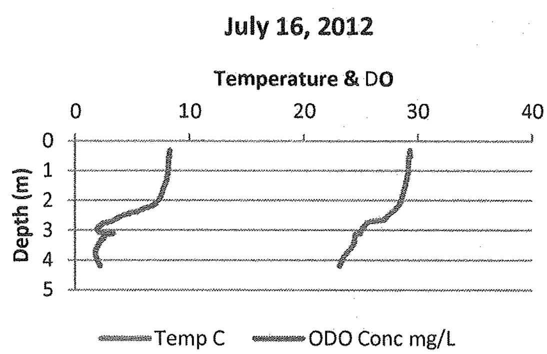

October 15, 2012
Temperature & DO
0
5
10
15
20
25
0
5
10
Depth (m)
Temp C
ODO Conc mg/L

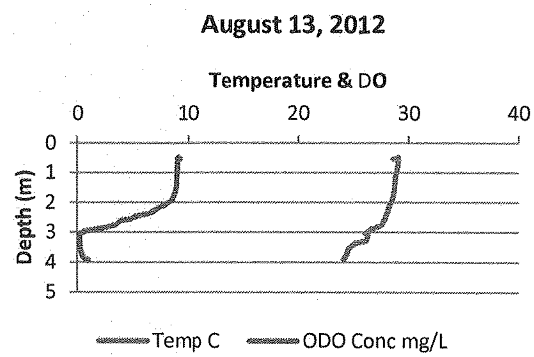

December 18, 2012
Temperature & DO
0
5
10
15
0
2
4
6
8
Depth (m)
Temp C
ODO Conc mg/L

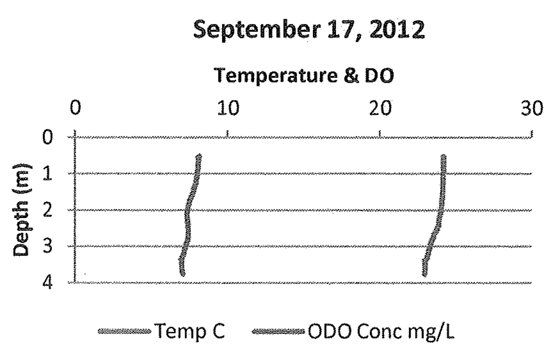

February 19, 2013
Temperature & DO
9.4
9.6
9.8
10
10.2
10.4
0
2
4
6
8
Depth (m)
Temp C
ODO Conc mg/L

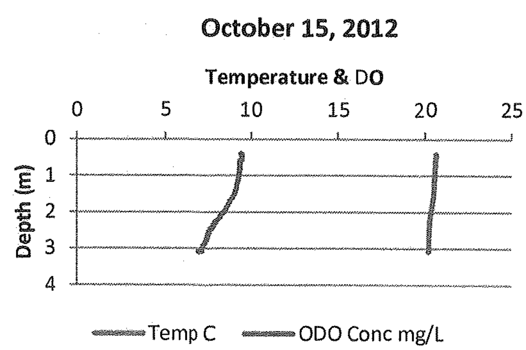

May 16, 2012
Temperature & DO
0 10 20 30 40
Depth (m)
0 1 2 3 4
Temp C
ODO Conc mg/L

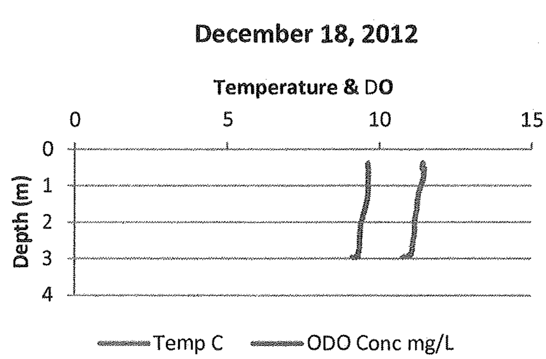

June 11, 2012
Temperature & DO
0 10 20 30
Depth (m)
0 1 2 3 4
Temp C
ODO Conc mg/L

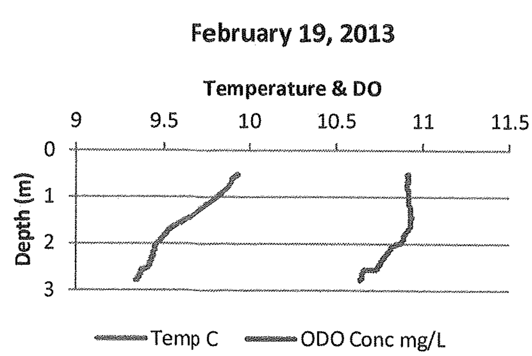

July 16, 2012
Temperature & DO
0 10 20 30 40
Depth (m)
0 1 2 3 4 5
Temp C
ODO Conc mg/L

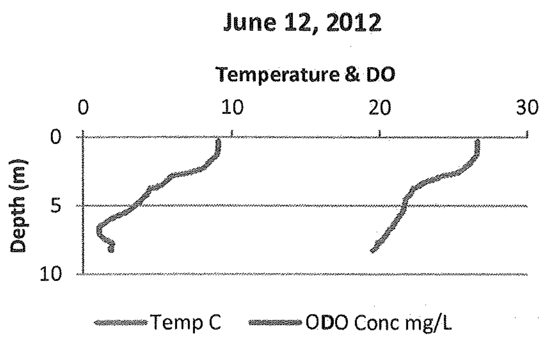

August 13, 2012
Temperature & DO
0 10 20 30 40
Depth (m)
0 1 2 3 4 5
Temp C
ODO Conc mg/L

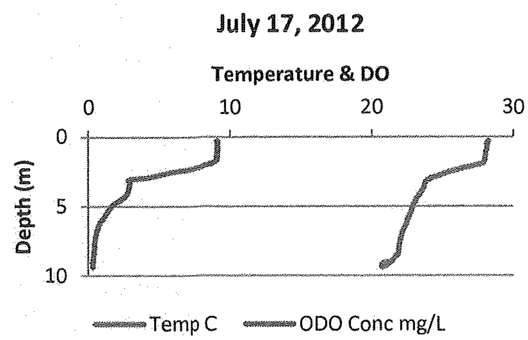

September 17, 2012
Temperature & DO
0 10 20 30
Depth (m)
0 1 2 3 4
Temp C
ODO Conc mg/L

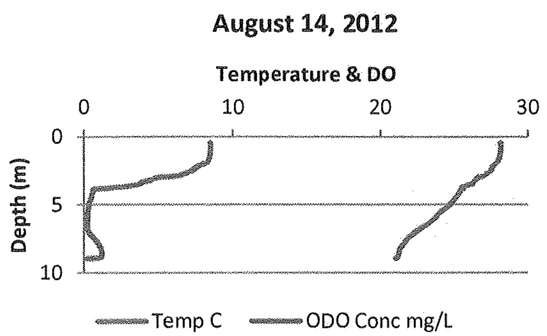

October 15, 2012
Temperature & DO
0 5 10 15 20 25
Depth (m)
0 1 2 3 4
Temp C
ODO Conc mg/L

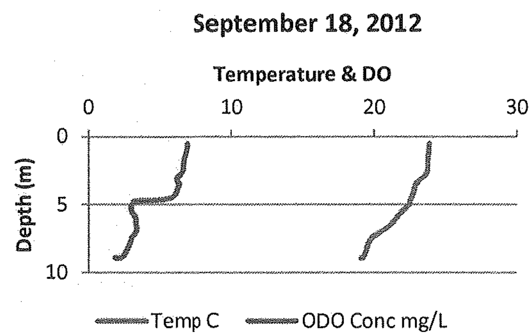

December 18, 2012
Temperature & DO
0 5 10 15
Depth (m)
0 1 2 3 4
Temp C
ODO Conc mg/L

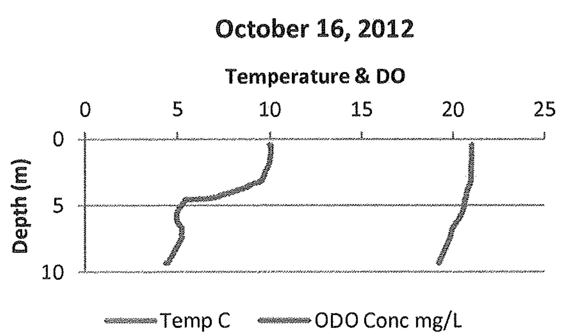

February 19, 2013
Temperature & DO
9 9.5 10 10.5 11 11.5
Depth (m)
0 1 2 3
Temp C
ODO Conc mg/L

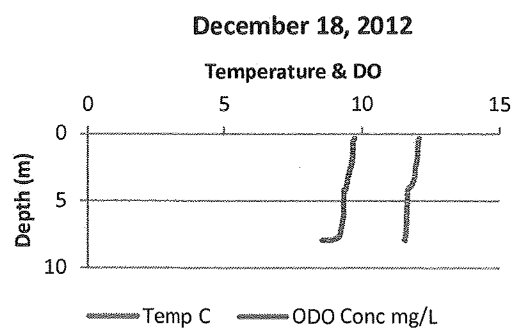

June 12, 2012
Temperature & DO
0 10 20 30
0 5 10
Depth (m)
Temp C
ODO Conc mg/L

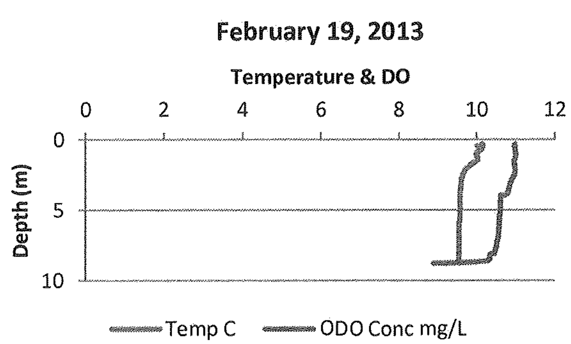

July 17, 2012
Temperature & DO
0 10 20 30
0 5 10
Depth (m)
Temp C
ODO Conc mg/L

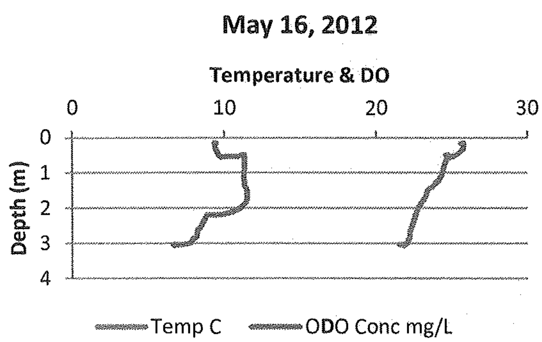

August 14, 2012
Temperature & DO
0 10 20 30
0 5 10
Depth (m)
Temp C
ODO Conc mg/L

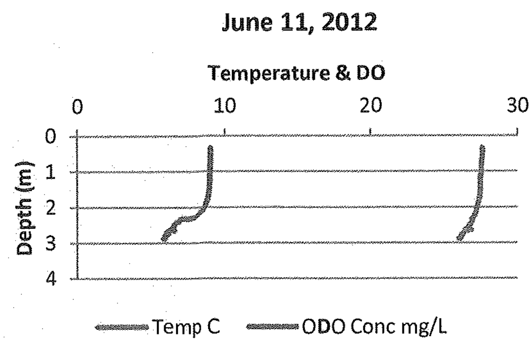

September 18, 2012
Temperature & DO
0 10 20 30
0 5 10
Depth (m)
Temp C
ODO Conc mg/L

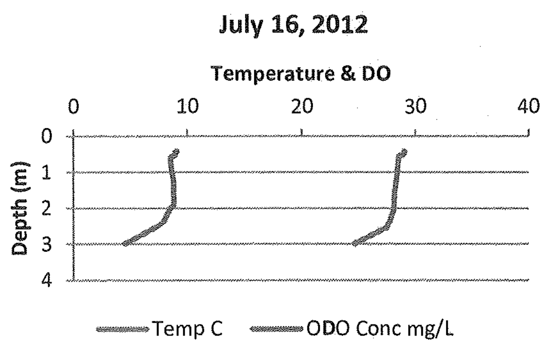

October 16, 2012
Temperature & DO
0 5 10 15 20 25
0 5 10
Depth (m)
Temp C
ODO Conc mg/L

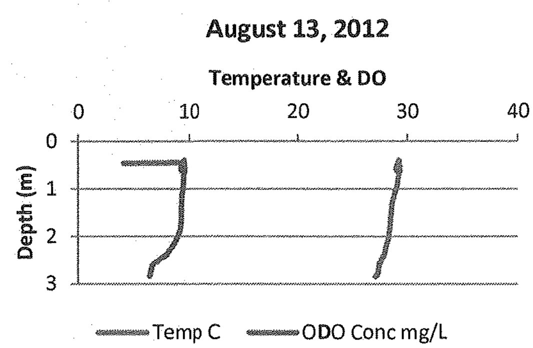

December 18, 2012
Temperature & DO
0 5 10 15
0 5 10
Depth (m)
Temp C
ODO Conc mg/L

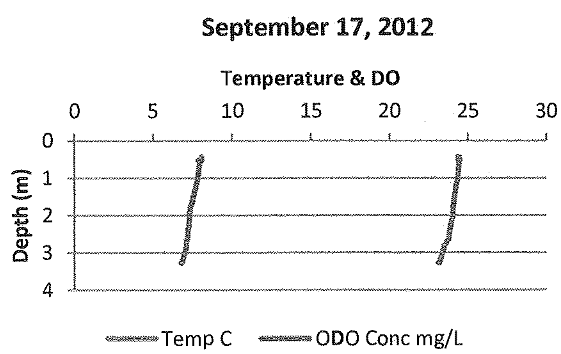

February 19, 2013
Temperature & DO
0 2 4 6 8 10 12
0 5 10
Depth (m)
Temp C
ODO Conc mg/L

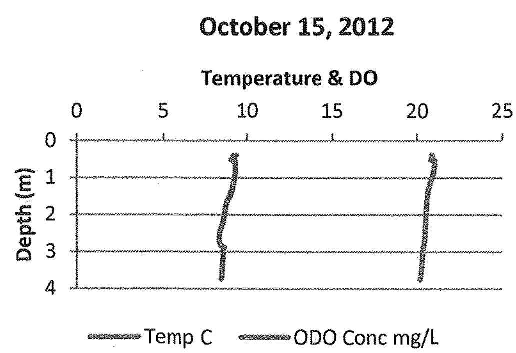

May 16, 2012
Temperature & DO
0 10 20 30
Depth (m)
0 1 2 3 4
Temp C
ODO Conc mg/L

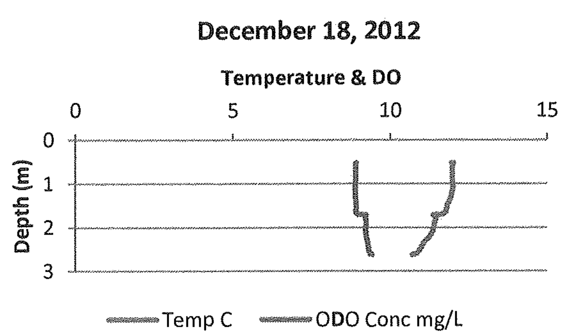

June 11, 2012
Temperature & DO
0 10 20 30
Depth (m)
0 1 2 3 4
Temp C
ODO Conc mg/L

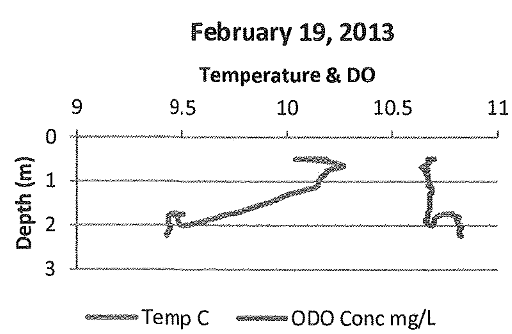

July 16, 2012
Temperature & DO
0 10 20 30 40
Depth (m)
0 1 2 3 4
Temp C
ODO Conc mg/L


August 13, 2012
Temperature & DO
0 10 20 30 40
Depth (m)
0 1 2 3
Temp C
ODO Conc mg/L


September 17, 2012
Temperature & DO
0 5 10 15 20 25 30
Depth (m)
0 1 2 3 4
Temp C
ODO Conc mg/L


October 15, 2012
Temperature & DO
0 5 10 15 20 25
Depth (m)
0 1 2 3 4
Temp C
ODO Conc mg/L


December 18, 2012
Temperature & DO
0 5 10 15
Depth (m)
0 1 2 3
Temp C
ODO Conc mg/L


February 19, 2013
Temperature & DO
9 9.5 10 10.5 11
Depth (m)
0 1 2 3
Temp C
ODO Conc mg/L

Appendix C ADEQ Fish Tissue Data-Metals

Point name	sample point name map	Sampled Date	Mercury (mg/Kg)	Total Recoverable Aluminum (mg/Kg)	Total Recoverable Antimony (mg/Kg)	Total Recoverable Arsenic (mg/Kg)	Total Recoverable Barium (mg/Kg)	Total Recoverable Beryllium (mg/Kg)
LOUA016A&J	C1/C2 - BG	5/2/2012	0.06	<19.6	<9.82	<0.982	<9.82	<0.491
LOUA016A&J	C1/C2 - CC	5/2/2012	0.12	<20	<10	<1	<10	<0.5
LOUA016A&J	C1/C2 - LBM	5/2/2012	0.39	<19.9	<9.96	<0.996	<9.96	<0.498
LOUA016K	C3 - BG	5/2/2012	0.08	<19.7	<9.87	<0.987	<9.87	<0.493
LOUA016K	C3 - CC	5/2/2012	0.09	<19.5	<9.74	<0.974	<9.74	<0.487
LOUA016K	C3 - LBM	5/2/2012	0.33	<19.8	<9.92	<0.992	<9.92	<0.496
LOUA016N	C6 - BG	4/3/2012	0.17	<19.9	<9.97	<0.997	<9.97	<0.498
LOUA016N	C6 - CC	4/3/2012	0.29	<19.7	<9.83	<0.983	<9.83	<0.492
LOUA016N	C6 - LMB	4/3/2012	0.44	<19.7	<9.83	<0.983	<9.83	<0.492
LOUA016R	OR1 - BG	5/15/2012	0.05	<19.8	<9.92	<0.992	<9.92	<0.496
LOUA016R	OR1 - CC	5/15/2012	0.15	<19.6	<9.82	<0.982	<9.82	<0.491
LOUA016R	OR1 - LBM	5/15/2012	0.51	<19.6	<9.82	<0.982	<9.82	<0.491
LOUA016S	SB1 - BG	4/5/2012	0.04	<19.8	<9.91	<0.991	<9.91	<0.496
LOUA016S	SB1 - CC	4/5/2012	0.16	<20	<10	<1	<10	<0.5
LOUA016S	SB1 - LMB	4/5/2012	0.24	<20.0	<9.98	<0.998	<9.98	<0.499
LOUA016T	TB1 - CC	4/24/2012	0.08	<20.0	<9.98	<0.998	<9.98	<0.499
LOUA016T	TB1 - BG	4/24/2012	0.09	<19.6	<9.82	<0.982	<9.82	<0.491
LOUA016T	TB1 - LMB	4/24/2012	0.26	<19.6	<9.78	<0.978	<9.78	<0.489
LOUA016W	WC1 - CC	4/18/2012	0.05	<19.5	<9.76	<0.976	<9.76	<0.488
LOUA016W	WC1 - LMB	4/18/2012	0.32	<19.7	<9.86	<0.986	<9.86	<0.493
LOUA016W	WC1 - BG	4/18/2012	<0.02	<19.3	<9.67	<0.967	<9.67	<0.483
LOUA020C	L Ouachita - CC	3/29/2012	0.3	<19.8	<9.92	<0.992	<9.92	<0.496
LOUA020C	L Ouachita - BG	3/29/2012	0.34	<19.4	<9.68	<0.968	<9.68	<0.484
LOUA020C	L Ouachita - LMB	3/29/2012	1.18	<19.4	<9.71	<0.971	<9.71	<0.486

Point name	sample point name map	Total Recoverable Cadmium (mg/Kg)	Total Recoverable Calcium (mg/Kg)	Total Recoverable Chromium (mg/Kg)	Total Recoverable Cobalt (mg/Kg)	Total Recoverable Copper (mg/Kg)	Total Recoverable Iron (mg/Kg)	Total Recoverable Lead (mg/Kg)
LOUA016A&J	C1/C2 - BG	<0.982	126	<0.982	<0.982	<0.982	<19.6	<0.982
LOUA016A&J	C1/C2 - CC	<1	89.9	<1	<1	<1	<20	<1
LOUA016A&J	C1/C2 - LBM	<0.996	98.4	<0.996	<0.996	<0.996	<19.9	<0.996
LOUA016K	C3 - BG	<0.987	144	<0.987	1.08	<0.987	<19.7	<0.987
LOUA016K	C3 - CC	<0.974	91.1	<0.974	<0.974	<0.974	<19.5	<0.974
LOUA016K	C3 - LBM	<0.992	94.4	<0.992	<0.992	<0.992	<19.8	<0.992
LOUA016N	C6 - BG	<0.997	102	<0.997	<0.997	<0.997	<19.9	<0.997
LOUA016N	C6 - CC	<0.983	79.6	<0.983	<0.983	<0.983	<19.7	<0.983
LOUA016N	C6 - LMB	<0.983	127	<0.983	<0.983	<0.983	<19.7	<0.983
LOUA016R	OR1 - BG	<0.992	128	<0.992	<0.992	<0.992	<19.8	<0.992
LOUA016R	OR1 - CC	<0.982	78.6	<0.982	<0.982	<0.982	<19.6	<0.982
LOUA016R	OR1 - LBM	<0.982	141	<0.982	<0.982	<0.982	<19.6	<0.982
LOUA016S	SB1 - BG	<0.991	2000	<0.991	<0.991	<0.991	<19.8	<0.991
LOUA016S	SB1 - CC	<1	102	<1	<1	<1	<20	<1
LOUA016S	SB1 - LMB	<0.998	125	<0.998	<0.998	<0.998	<20.0	<0.998
LOUA016T	TB1 - CC	<0.998	77.3	<0.998	<0.998	<0.998	<20.0	<0.998
LOUA016T	TB1 - BG	<0.982	142	<0.982	<0.982	<0.982	<19.6	<0.982
LOUA016T	TB1 - LMB	<0.978	397	<0.978	<0.978	<0.978	<19.6	<0.978
LOUA016W	WC1 - CC	<0.976	106	<0.976	<0.976	<0.976	<19.5	<0.976
LOUA016W	WC1 - LMB	<0.986	119	<0.986	<0.986	<0.986	<19.7	<0.986
LOUA016W	WC1 - BG	<0.967	127	<0.967	<0.967	<0.967	<19.3	<0.967
LOUA020C	L Ouachita - CC	<0.992	107	<0.992	<0.992	<0.992	<19.8	<0.992
LOUA020C	L Ouachita - BG	<0.968	149	<0.968	<0.968	<0.968	<19.4	<0.968
LOUA020C	L Ouachita - LMB	<0.971	107	<0.971	<0.971	<0.971	<19.4	<0.971

Point name	sample point name map	Total Recoverable Magnesium (mg/Kg)	Total Recoverable Manganese (mg/Kg)	Total Recoverable Nickel (mg/Kg)	Total Recoverable Potassium (mg/Kg)	Total Recoverable Selenium (mg/Kg)	Total Recoverable Silver (mg/Kg)	Total Recoverable Sodium (mg/Kg)
LOUA016A&J	C1/C2 - BG	303	<0.98	<2.4	4220	<1.96	<4.91	522
LOUA016A&J	C1/C2 - CC	245	<1	<2.5	4060	<2	<5	547
LOUA016A&J	C1/C2 - LBM	310	<1.0	<2.5	4500	<1.99	<4.98	480
LOUA016K	C3 - BG	396	<0.99	<2.5	5740	<1.97	<4.93	405
LOUA016K	C3 - CC	272	<0.97	<2.4	4280	<1.95	<4.87	390
LOUA016K	C3 - LBM	320	<0.99	<2.5	4730	<1.98	<4.96	525
LOUA016N	C6 - BG	256	<1.0	<2.5	3610	<1.99	<4.98	294
LOUA016N	C6 - CC	255	<0.98	<2.4	4260	<1.97	<4.92	411
LOUA016N	C6 - LMB	361	<0.98	<2.4	5330	<1.97	<4.92	355
LOUA016R	OR1 - BG	321	<0.99	<2.5	4570	<1.98	<4.96	266
LOUA016R	OR1 - CC	250	<0.98	<2.4	4190	<1.96	<4.91	449
LOUA016R	OR1 - LBM	318	<0.98	<2.4	4900	<1.96	<4.91	353
LOUA016S	SB1 - BG	340	4.3	<2.5	4270	<1.98	<4.96	301
LOUA016S	SB1 - CC	264	<1	<2.5	4400	<2	<5	403
LOUA016S	SB1 - LMB	337	<1.0	<2.5	5140	<2.00	<4.99	370
LOUA016T	TB1 - CC	234	<1.0	<2.5	3940	<2.00	<4.99	556
LOUA016T	TB1 - BG	328	<0.98	<2.4	4610	<1.96	<4.91	649
LOUA016T	TB1 - LMB	331	<0.98	<2.4	5000	<1.96	<4.89	404
LOUA016W	WC1 - CC	299	<0.98	<2.4	4910	<1.95	<4.88	456
LOUA016W	WC1 - LMB	358	<0.99	<2.5	4980	<1.97	<4.93	334
LOUA016W	WC1 - BG	328	<0.97	<2.4	4670	<1.93	<4.83	331
LOUA020C	L Ouachita - CC	308	<0.99	<2.5	5200	<1.98	<4.96	397
LOUA020C	L Ouachita - BG	316	<0.97	<2.4	4420	<1.94	<4.84	321
LOUA020C	L Ouachita - LMB	309	<0.97	<2.4	4880	<1.94	<4.86	392

Point name	sample point name map	Total Recoverable Thallium (mg/Kg)	Total Recoverable Vanadium (mg/Kg)	Total Recoverable Zinc (mg/Kg)
LOUA016A&J	C1/C2 - BG	<2.46	<2.46	5.39
LOUA016A&J	C1/C2 - CC	<2.5	<2.5	5.46
LOUA016A&J	C1/C2 - LBM	<2.49	<2.49	4.84
LOUA016K	C3 - BG	<2.47	<2.47	7.18
LOUA016K	C3 - CC	<2.43	<2.43	4.95
LOUA016K	C3 - LBM	<2.48	<2.48	4.45
LOUA016N	C6 - BG	<2.49	<2.49	5.69
LOUA016N	C6 - CC	<2.46	<2.46	4.30
LOUA016N	C6 - LMB	<2.46	<2.46	4.08
LOUA016R	OR1 - BG	<2.48	<2.48	6.19
LOUA016R	OR1 - CC	<2.46	<2.46	4.88
LOUA016R	OR1 - LBM	<2.45	<2.45	4.28
LOUA016S	SB1 - BG	<2.48	<2.48	7.15
LOUA016S	SB1 - CC	<2.5	<2.5	5.87
LOUA016S	SB1 - LMB	<2.49	<2.49	5.16
LOUA016T	TB1 - CC	<2.49	<2.49	3.97
LOUA016T	TB1 - BG	<2.45	<2.45	6.51
LOUA016T	TB1 - LMB	<2.44	<2.44	5.86
LOUA016W	WC1 - CC	<2.44	<2.44	4.66
LOUA016W	WC1 - LMB	<2.47	<2.47	5.43
LOUA016W	WC1 - BG	<2.42	<2.42	5.92
LOUA020C	L Ouachita - CC	<2.48	<2.48	5.07
LOUA020C	L Ouachita - BG	<2.42	<2.42	5.06
LOUA020C	L Ouachita - LMB	<2.43	<2.43	4.00

Appendix D USGS Fish Tissue Data-Organics

Table 1. Sample description and percent lipid values in Lake Catherine 2012 Collection Largemouth Bass fillets.

[USGS, U.S. Geological Survey; ID, identification; Average, Average of replicate analyses; SD, Standard Deviation; RSD, Percent Relative Standard Deviation.]

These data are preliminary and are subject to revision. They are being provided to meet the need for timely best science. The data are provided on the condition that neither the U.S. Geological Survey nor the U.S. Government may be held liable for any damages resulting from the authorized or unauthorized use of the data.

USGS ID Number	Field ID	Fish Common Name	Sample Type	Location	Lipid (percent)
56518	LMB big Fir/Housley Pt. 3-29-12	Largemouth Bass	fillet	Lake Catherine, Arkansas	0.44
56519	LMB C6 4-3-12	Largemouth Bass	fillet	Lake Catherine, Arkansas	0.44
56520	LMB SB1 4-5-12	Largemouth Bass	fillet	Lake Catherine, Arkansas	0.70
56521-R1	LMB WC1 4-18-12	Largemouth Bass	fillet	Lake Catherine, Arkansas	0.74
56521-R2	LMB WC1 4-18-12	Largemouth Bass	fillet	Lake Catherine, Arkansas	0.69
56521-R3	LMB WC1 4-18-12	Largemouth Bass	fillet	Lake Catherine, Arkansas	0.74
	Average:				**0.72**
	RSD:				**4**
56522	LMB TB1 4-24-12	Largemouth Bass	fillet	Lake Catherine, Arkansas	0.77
56523	LMB C1/C2 4-24-12	Largemouth Bass	fillet	Lake Catherine, Arkansas	0.53
56524	LMB C3 5-2-12	Largemouth Bass	fillet	Lake Catherine, Arkansas	0.62
56525	LMB R1 5-15-12	Largemouth Bass	fillet	Lake Catherine, Arkansas	0.68
PB100512	Procedural Blank	--	--	--	0.08
MB100512	Matrix Blank	Control Bluegill 654C	Ground Whole Fish	CERC	3.73
MSPCB100512	Matrix Spike - PCBs/PBDEs	Control Bluegill 654C	Ground Whole Fish	CERC	4.05
MSOC100512	Matrix Spike - OCPs	Control Bluegill 654C	Ground Whole Fish	CERC	3.79
PC100512	Positive Control	Common Carp 6806	Ground Whole Fish	Saginaw Bay, MI	13.87

Table 2. Total polychlorinated biphenyl and congener concentrations in Lake Catherine 2012 Collection Largemouth Bass fillets
[USGS, U.S. Geological Survey; ID, identification; PCB, Polychlorinated Biphenyl; ng/g, nanogram per gram; All values are adjusted for surrogate recoveries and procedural blank sample background values;
Average, Average of replicate analyses; SD, Standard Deviation; RSD, Percent Relative Standard Deviation; --, not reported.]

Measured [1] Total PCBs (ng/g)	PCB-001 (ng/g)	PCB-002 (ng/g)	PCB-003 (ng/g)	PCB-004/010 (ng/g)	PCB-007 (ng/g)	PCB-009 (ng/g)	PCB-006 (ng/g)	PCB-005 (ng/g)	PCB-008 (ng/g)	PCB-014 (ng/g)	PCB-019 (ng/g)	PCB-012 (ng/g)
7	< 0.1	< 1	< 1	< 2	< 0.1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.1	< 3
17	< 0.1	< 1	< 1	< 2	< 0.1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.1	< 3
25	< 0.1	< 1	< 1	< 2	< 0.1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.1	< 3
27	< 0.1	< 1	< 1	< 2	< 0.1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.1	< 3
22	< 0.1	< 1	< 1	< 2	< 0.1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.1	< 3
22	< 0.1	< 1	< 1	< 2	< 0.1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.1	< 3
23	--	--	--	--	--	--	--	--	--	--	--	--
12	--	--	--	--	--	--	--	--	--	--	--	--
23	< 0.1	< 1	< 1	< 2	< 0.1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.1	< 3
44	< 0.1	< 1	< 1	< 2	< 0.1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.1	< 3
46	< 0.1	< 1	< 1	< 2	< 0.1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.1	< 3
39	< 0.1	< 1	< 1	< 2	< 0.1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.1	< 3
25	< 0.1	< 1	< 1	< 2	< 0.1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.1	< 3
41	< 0.1	< 1	< 1	< 2	< 0.1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.1	< 3
993	< 0.1	< 1	1.1	5.7	0.7	0.8	2.7	< 1	16.1	< 1	2.3	< 3
126	--	--	--	**142**	--	**109**	**133**	--	**134**	--	**163**	--
47	< 0.1	< 1	< 1	< 2	< 0.1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.1	< 3
5761	< 0.1	< 1	< 1	< 2	< 0.1	0.8	< 0.1	< 1	< 1	< 1	< 0.1	< 3
834	4.6	< 1	< 1	34.4	< 0.1	4.1	14.5	< 1	67.3	< 1	7.8	< 3
675	3.6	< 1	< 1	< 2	< 0.1	< 0.1	< 0.1	< 1	3.8	< 1	1.9	< 3
479	< 0.1	< 1	< 1	< 2	< 0.1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.1	< 3
477	< 0.1	< 1	< 1	< 2	< 0.1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.1	< 3

Table 2. Total polychlorinated biphenyl and congener concentrations in Lake Catherine 2012 Collection Largemouth Bass fillets

[USGS, U.S. Geological Survey; ID, identification; PCB, Polychlorinated Biphenyl; ng/g, nanogram per gram; All values are adjusted for surrogate recoveries and procedural blank sample background values;
Average, Average of replicate analyses; SD, Standard Deviation; RSD, Percent Relative Standard Deviation; --, not reported.]

PCB-018 (ng/g)	PCB-013 (ng/g)	PCB-017 (ng/g)	PCB-015 (ng/g)	PCB-024/027 (ng/g)	PCB-016 (ng/g)	PCB-032 (ng/g)	PCB-034 (ng/g)	PCB-054 (ng/g)	PCB-025/026 (ng/g)	PCB-028/031 (ng/g)	PCB-053 (ng/g)
< 0.3	< 3	< 0.1	< 3	< 0.2	0.1	< 0.1	< 0.1	< 0.1	< 0.3	0.3	< 0.1
< 0.3	< 3	< 0.1	< 3	< 0.2	0.1	< 0.1	< 0.1	< 0.1	< 0.3	0.7	< 0.1
< 0.3	< 3	0	< 3	< 0.2	0.2	0	< 0.1	< 0.1	< 0.3	1.1	< 0.1
< 0.3	< 3	0	< 3	< 0.2	0.2	0	< 0.1	< 0.1	< 0.3	0.9	< 0.1
< 0.3	< 3	0	< 3	< 0.2	0.2	< 0.1	< 0.1	< 0.1	< 0.3	0.9	< 0.1
< 0.3	< 3	< 0.1	< 3	< 0.2	0.2	< 0.1	< 0.1	< 0.1	< 0.3	0.9	< 0.1
--	--	--	--	--	**0.2**	--	--	--	--	**0.9**	--
--	--	--	--	--	**4**	--	--	--	--	**4**	--
< 0.3	< 3	< 0.1	< 3	< 0.2	0.1	< 0.1	< 0.1	< 0.1	< 0.3	0.7	< 0.1
< 0.3	< 3	< 0.1	< 3	< 0.2	0.2	< 0.1	< 0.1	< 0.1	< 0.3	0.6	< 0.1
< 0.3	< 3	0.1	< 3	< 0.2	0.2	0.1	< 0.1	< 0.1	< 0.3	0.8	< 0.1
< 0.3	< 3	< 0.1	< 3	< 0.2	0.2	< 0.1	< 0.1	< 0.1	< 0.3	0.8	< 0.1
< 0.3	< 3	< 0.1	< 3	< 0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.3	< 0.2	< 0.1
< 0.3	< 3	< 0.1	< 3	< 0.2	0.1	< 0.1	< 0.1	< 0.1	< 0.3	0.4	< 0.1
24.1	< 3	10.4	< 3	2.2	12.7	5.7	< 0.1	< 0.1	7.0	60.7	4.8
104	--	**135**	--	**235**	**152**	**134**	--	--	**168**	**140**	**126**
0.3	< 3	0.1	< 3	< 0.2	0.2	< 0.1	< 0.1	< 0.1	< 0.3	0.6	< 0.1
61.0	4.4	21.1	< 3	< 0.2	11.3	28.6	< 0.1	< 0.1	77.1	124.6	27.7
85.3	8.1	29.1	16.1	5.2	29.1	20.5	0.3	0.1	19.0	122.9	6.9
41.5	3.6	11.4	< 3	1.0	10.9	9.9	< 0.1	0.2	4.1	74.0	8.8
0.8	< 3	0.4	< 3	< 0.2	0.3	0.2	< 0.1	< 0.1	< 0.3	1.3	0.6
< 0.3	< 3	< 0.1	< 3	< 0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.3	< 0.2	< 0.1

Table 2. Total polychlorinated biphenyl and congener concentrations in Lake Catherine 2012 Collection Largemouth Bass fillets

[USGS, U.S. Geological Survey; ID, identification; PCB, Polychlorinated Biphenyl; ng/g, nanogram per gram; All values are adjusted for surrogate recoveries and procedural blank sample background values;
Average, Average of replicate analyses; SD, Standard Deviation; RSD, Percent Relative Standard Deviation; --, not reported.]

PCB-020/033 (ng/g)	PCB-051 (ng/g)	PCB-022 (ng/g)	PCB-045 (ng/g)	PCB-046 (ng/g)	PCB-069 (ng/g)	PCB-073 (ng/g)	PCB-052 (ng/g)	PCB-047/048/049/075 (ng/g)	PCB-104 (ng/g)	PCB-035 (ng/g)
< 0.2	< 0.1	< 1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.4	< 0.1	< 3
0.3	< 0.1	< 1	< 0.1	< 0.1	< 0.1	< 0.1	0.7	0.9	< 0.1	< 3
0.3	< 0.1	< 1	< 0.1	< 0.1	< 0.1	< 0.1	0.7	0.9	< 0.1	< 3
0.3	< 0.1	< 1	< 0.1	< 0.1	< 0.1	< 0.1	0.7	1.1	< 0.1	< 3
0.3	< 0.1	< 1	< 0.1	< 0.1	< 0.1	< 0.1	0.7	1.0	< 0.1	< 3
0.3	< 0.1	< 1	< 0.1	< 0.1	< 0.1	< 0.1	0.6	1.0	< 0.1	< 3
0.3	--	--	--	--	--	--	**0.7**	**1.0**	--	--
4	--	--	--	--	--	--	**5**	**9**	--	--
< 0.2	< 0.1	< 1	< 0.1	< 0.1	< 0.1	< 0.1	0.6	0.9	< 0.1	< 3
0.2	< 0.1	< 1	< 0.1	< 0.1	< 0.1	< 0.1	1.2	1.1	< 0.1	< 3
0.2	< 0.1	< 1	< 0.1	< 0.1	< 0.1	< 0.1	1.0	1.4	< 0.1	< 3
< 0.2	< 0.1	< 1	< 0.1	< 0.1	< 0.1	< 0.1	0.9	1.4	< 0.1	< 3
< 0.2	< 0.1	< 1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.4	< 0.1	< 3
0.2	< 0.1	< 1	< 0.1	< 0.1	< 0.1	< 0.1	0.9	< 0.4	< 0.1	< 3
20.7	1.7	10.9	5.2	2.7	< 0.1	< 0.1	29.1	28.4	< 0.1	4.3
121	**182**	**125**	**142**	**142**	--	--	**108**	**114**	--	**79**
0.3	< 0.1	< 1	< 0.1	< 0.1	< 0.1	< 0.1	0.7	0.5	< 0.1	< 3
19.7	11.7	19.9	24.7	9.7	1.5	1.6	264.8	341.5	0.1	23.0
48.6	2.1	24.9	7.2	3.6	< 0.1	< 0.1	27.7	38.2	< 0.1	7.4
24.3	2.4	12.3	9.2	4.1	< 0.1	< 0.1	49.9	51.9	< 0.1	11.4
0.3	< 0.1	< 1	0.2	< 0.1	< 0.1	< 0.1	34.4	6.1	< 0.1	3.5
< 0.2	< 0.1	< 1	< 0.1	< 0.1	< 0.1	< 0.1	1.6	< 0.4	< 0.1	< 3

Table 2. Total polychlorinated biphenyl and congener concentrations in Lake Catherine 2012 Collection Largemouth Bass fillets

[USGS, U.S. Geological Survey; ID, identification; PCB, Polychlorinated Biphenyl; ng/g, nanogram per gram; All values are adjusted for surrogate recoveries and procedural blank sample background values;
Average, Average of replicate analyses; SD, Standard Deviation; RSD, Percent Relative Standard Deviation; --, not reported.]

PCB-044/059 (ng/g)	PCB-042 (ng/g)	PCB-037 (ng/g)	PCB-071 (ng/g)	PCB-041 (ng/g)	PCB-064 (ng/g)	PCB-103 (ng/g)	PCB-040 (ng/g)	PCB-100 (ng/g)	PCB-067 (ng/g)	PCB-063 (ng/g)	PCB-074 (ng/g)
< 0.2	< 0.1	< 3	< 0.1	< 0.1	< 0.1	< 0.3	< 0.1	< 0.1	< 0.1	< 0.1	< 0.3
0.9	0.3	< 3	0.2	< 0.1	0.4	< 0.3	< 0.1	< 0.1	< 0.1	< 0.1	1.1
1.1	0.4	< 3	0.3	< 0.1	0.6	< 0.3	0.3	< 0.1	< 0.1	< 0.1	1.3
0.7	0.2	< 3	0.2	< 0.1	0.4	< 0.3	0.2	< 0.1	< 0.1	< 0.1	1.0
0.8	0.3	< 3	0.2	< 0.1	0.4	< 0.3	< 0.1	< 0.1	< 0.1	< 0.1	1.0
0.8	0.3	< 3	0.3	< 0.1	0.4	< 0.3	< 0.1	< 0.1	< 0.1	< 0.1	1.0
0.8	**0.3**	--	**0.2**	--	**0.4**	--	--	--	--	--	**1.0**
6	**10**	--	**16**	--	**2**	--	--	--	--	--	**0.4**
0.9	0.3	< 3	0.2	< 0.1	0.5	< 0.3	< 0.1	< 0.1	< 0.1	< 0.1	1.1
1.0	0.3	< 3	0.3	< 0.1	0.5	< 0.3	< 0.1	< 0.1	< 0.1	< 0.1	1.0
0.7	0.3	< 3	0.2	< 0.1	0.5	< 0.3	< 0.1	< 0.1	< 0.1	< 0.1	0.9
0.6	0.2	< 3	0.2	< 0.1	0.3	< 0.3	< 0.1	< 0.1	< 0.1	< 0.1	0.7
< 0.2	< 0.1	< 3	< 0.1	< 0.1	< 0.1	< 0.3	< 0.1	< 0.1	< 0.1	< 0.1	< 0.3
0.3	< 0.1	< 3	0.1	< 0.1	0.2	< 0.3	< 0.1	< 0.1	< 0.1	< 0.1	0.4
27.0	9.5	19.1	9.0	4.1	13.4	< 0.3	5.9	< 0.1	1.4	2.2	16.7
137	**158**	**316**	**158**	**143**	**140**	--	**181**	--	**337**	**295**	**149**
0.5	< 0.1	< 3	< 0.1	< 0.1	0.2	< 0.3	< 0.1	< 0.1	< 0.1	< 0.1	0.7
203.2	106.2	< 3	87.4	< 0.1	137.7	6.2	45.1	4.0	3.7	35.8	170.9
27.1	10.1	16.6	8.7	4.6	13.5	< 0.3	5.5	< 0.1	1.1	1.1	12.9
40.9	13.7	11.4	11.9	5.9	20.7	< 0.3	7.3	< 0.1	0.5	1.7	19.6
10.6	0.5	< 3	0.6	< 0.1	2.9	< 0.3	0.4	< 0.1	< 0.1	< 0.1	3.2
< 0.2	< 0.1	< 3	< 0.1	< 0.1	< 0.1	< 0.3	< 0.1	< 0.1	< 0.1	< 0.1	< 0.3

Table 2. Total polychlorinated biphenyl and congener concentrations in Lake Catherine 2012 Collection Largemouth Bass fillets
[USGS, U.S. Geological Survey; ID, identification; PCB, Polychlorinated Biphenyl; ng/g, nanogram per gram; All values are adjusted for surrogate recoveries and procedural blank sample background values;
Average, Average of replicate analyses; SD, Standard Deviation; RSD, Percent Relative Standard Deviation; --, not reported.]

PCB-093 (ng/g)	PCB-070 (ng/g)	PCB-095 (ng/g)	PCB-066 (ng/g)	PCB-091 (ng/g)	PCB-056/060 (ng/g)	PCB-092 (ng/g)	PCB-084 (ng/g)	PCB-090 (ng/g)	PCB-101 (ng/g)	PCB-099 (ng/g)	PCB-119 (ng/g)
< 1	< 0.3	1	< 0.3	< 0.3	< 0.2	< 1	< 1	< 1	< 1	< 1	< 1
< 1	1.0	0.4	0.8	< 0.3	0.6	< 1	< 1	< 1	0.7	< 1	< 1
< 1	1.7	0.7	1.1	< 0.3	0.6	< 1	< 1	< 1	1.0	< 1	< 1
< 1	1.0	0.5	0.9	< 0.3	0.5	< 1	< 1	< 1	0.9	< 1	< 1
< 1	1.1	0.5	0.9	< 0.3	0.6	< 1	< 1	< 1	0.9	< 1	< 1
< 1	1.0	0.3	0.9	< 0.3	0.6	< 1	< 1	< 1	0.8	< 1	< 1
--	**1.0**	**0.4**	**0.9**	--	**0.6**	--	--	--	**0.9**	--	--
--	**7**	**26**	**0.3**	--	**6**	--	--	--	**4**	--	--
< 1	1.5	0.6	0.9	< 0.3	0.6	< 1	< 1	< 1	0.9	< 1	< 1
< 1	2.1	1.6	1.4	0.5	0.6	< 1	< 1	< 1	3.2	2.7	< 1
< 1	0.8	0.6	1.5	0.4	0.4	< 1	< 1	< 1	1.4	2.1	< 1
< 1	0.8	0.6	1.1	0.5	0.4	< 1	< 1	< 1	1.0	1.7	< 1
< 1	0.7	0.8	< 0.3	< 0.3	< 0.2	< 1	< 1	< 1	1.6	< 1	< 1
< 1	0.8	0.5	0.5	< 0.3	< 0.2	< 1	< 1	< 1	2.0	2.3	< 1
2.1	28.0	23.0	20.9	5.8	21.5	7.2	9.2	2.0	28.0	12.4	< 1
171	**111**	**105**	**134**	**157**	**134**	**140**	**129**	--	**110**	**135**	--
< 1	1.1	0.7	0.5	< 0.3	< 0.2	< 1	< 1	< 1	2.7	2.3	< 1
28.7	81.0	101.7	269.6	63.0	104.4	49.3	60.9	32.8	230.2	175.6	19.6
< 1	20.5	5.4	21.7	1.5	17.9	< 1	2.9	< 1	4.2	2.9	< 1
1.8	36.7	12.9	29.7	4.0	25.1	2.4	6.0	1.3	10.2	7.5	< 1
1.4	22.8	36.3	4.1	5.7	3.0	7.7	10.7	< 1	43.0	14.2	< 1
< 1	2.7	15.8	< 0.3	< 0.3	0.2	2.9	1.0	< 1	22.3	< 1	< 1

Table 2. Total polychlorinated biphenyl and congener concentrations in Lake Catherine 2012 Collection Largemouth Bass fillets
[USGS, U.S. Geological Survey; ID, identification; PCB, Polychlorinated Biphenyl; ng/g, nanogram per gram; All values are adjusted for surrogate recoveries and procedural blank sample background values;
Average, Average of replicate analyses; SD, Standard Deviation; RSD, Percent Relative Standard Deviation; --, not reported.]

PCB-083 (ng/g)	PCB-097 (ng/g)	PCB-117 (ng/g)	PCB-115 (ng/g)	PCB-087 (ng/g)	PCB-081 (ng/g)	PCB-085 (ng/g)	PCB-136 (ng/g)	PCB-154 (ng/g)	PCB-110 (ng/g)	PCB-077 (ng/g)	PCB-151 (ng/g)
< 1	< 1	< 1	< 1	< 1	< 3	< 1	< 0.1	< 0.3	1.2	< 1	< 0.3
< 1	< 1	< 1	< 1	< 1	< 3	< 1	< 0.1	< 0.3	0.0	< 1	< 0.3
< 1	< 1	< 1	< 1	< 1	< 3	< 1	< 0.1	< 0.3	0.2	< 1	< 0.3
< 1	< 1	< 1	< 1	< 1	< 3	< 1	0	< 0.3	2.2	< 1	0
< 1	< 1	< 1	< 1	< 1	< 3	< 1	< 0.1	< 0.3	2.4	< 1	< 0.3
< 1	< 1	< 1	< 1	< 1	< 3	< 1	< 0.1	< 0.3	2.0	< 1	< 0.3
--	--	--	--	--	--	--	--	--	**2.2**	--	--
--	--	--	--	--	--	--	--	--	**8**	--	--
< 1	< 1	< 1	< 1	< 1	< 3	< 1	0.3	< 0.3	0.3	< 1	< 0.3
< 1	< 1	< 1	< 1	1.8	< 3	< 1	0.3	< 0.3	2.1	< 1	0.4
< 1	< 1	< 1	< 1	< 1	< 3	< 1	0.3	< 0.3	0.3	< 1	1.0
< 1	1.0	< 1	< 1	1.1	< 3	< 1	0.0	< 0.3	0.4	< 1	0.6
< 1	< 1	< 1	< 1	< 1	< 3	< 1	0.3	< 0.3	2.4	< 1	0.3
< 1	1.1	< 1	< 1	1.5	< 3	1.4	0.0	< 0.3	0.9	< 1	0.7
2.8	11.3	1.3	< 1	14.1	< 3	7.2	6.9	< 0.3	23.9	4.0	10.1
157	**134**	--	--	**129**	--	**145**	**120**	--	**104**	**243**	**116**
< 1	1.2	< 1	< 1	1.6	< 3	< 1	0.0	< 0.3	1.1	< 1	0.7
34.0	128.8	24.4	13.3	114.6	14.9	85.2	15.4	7.0	216.0	10.0	33.7

PCB-083 (ng/g)	PCB-097 (ng/g)	PCB-117 (ng/g)	PCB-115 (ng/g)	PCB-087 (ng/g)	PCB-081 (ng/g)	PCB-085 (ng/g)	PCB-136 (ng/g)	PCB-154 (ng/g)	PCB-110 (ng/g)	PCB-077 (ng/g)	PCB-151 (ng/g)
< 1	2.6	< 1	< 1	2.8	< 3	2.3	< 0.1	< 0.3	4.7	< 1	< 0.3
1.6	7.0	< 1	< 1	6.9	< 3	5.3	0.4	< 0.3	12.2	2.3	0.3
2.6	13.8	1.0	< 1	18.9	< 3	6.9	4.3	< 0.3	40.6	< 1	4.1
< 1	< 1	< 1	< 1	3.2	< 3	< 1	7.8	< 0.3	8.4	< 1	14.1

Table 2. Total polychlorinated biphenyl and congener concentrations in Lake Catherine 2012 Collection Largemouth Bass fillets

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Average, Average of replicate analyses; SD, Standard Deviation; RSD, Percent Relative Standard Deviation; --, not reported.]

PCB-082 (ng/g)	PCB-135/144 (ng/g)	PCB-147 (ng/g)	PCB-124 (ng/g)	PCB-149 (ng/g)	PCB-107/123 (ng/g)	PCB-118 (ng/g)	PCB-134 (ng/g)	PCB-131 (ng/g)	PCB-165 (ng/g)	PCB-114 (ng/g)	PCB-122 (ng/g)
< 1	< 0.2	< 0.3	< 1	0.9	< 2	1.7	< 0.3	< 1	< 1	< 1	< 1
< 1	< 0.2	< 0.3	< 1	1.6	< 2	0.3	< 0.3	< 1	< 1	< 1	< 1
< 1	< 0.2	< 0.3	< 1	0.2	< 2	1.0	< 0.3	< 1	< 1	< 1	< 1
< 1	0	< 0.3	< 1	1.8	< 2	0.5	< 0.3	< 1	< 1	< 1	< 1
< 1	< 0.2	< 0.3	< 1	1.7	< 2	0.2	< 0.3	< 1	< 1	< 1	< 1
< 1	< 0.2	< 0.3	< 1	1.6	< 2	0.6	< 0.3	< 1	< 1	< 1	< 1
--	--	--	--	**1.7**	--	**0.4**	--	--	--	--	--
--	--	--	--	**6**	--	**41**	--	--	--	--	--
< 1	0.4	< 0.3	< 1	0.0	< 2	0.7	< 0.3	< 1	< 1	< 1	< 1
< 1	0.0	< 0.3	< 1	1.0	< 2	3.7	< 0.3	< 1	< 1	< 1	< 1
< 1	0.0	< 0.3	< 1	0.9	< 2	0.0	< 0.3	< 1	< 1	< 1	< 1
< 1	0.1	< 0.3	< 1	0.8	< 2	0.7	< 0.3	< 1	< 1	< 1	< 1
< 1	0.5	< 0.3	< 1	1.8	< 2	3.2	< 0.3	< 1	< 1	< 1	< 1
< 1	0.1	< 0.3	< 1	1.2	< 2	2.1	0.3	< 1	< 1	< 1	< 1
5.7	9.7	1.0	1.8	22.7	7.4	20.7	3.5	2.3	< 1	3.0	< 1
115	**117**	**169**	--	**97**	**109**	**112**	**137**	**149**	--	**66**	--
< 1	0.2	< 0.3	< 1	1.5	< 2	2.8	0.4	< 1	< 1	< 1	< 1
48.1	32.1	10.1	11.2	74.2	56.2	245.9	14.8	13.5	2.2	18.9	5.6
1.3	< 0.2	< 0.3	< 1	0.4	< 2	3.7	< 0.3	< 1	< 1	< 1	< 1
4.1	0.5	< 0.3	< 1	1.4	2.0	9.6	< 0.3	< 1	< 1	< 1	< 1
4.8	5.0	0.7	1.2	13.5	4.4	29.2	2.3	1.6	< 1	1.6	< 1
4.0	11.4	< 0.3	< 1	37.7	< 2	3.6	2.6	1.1	< 1	< 1	< 1

Table 2. Total polychlorinated biphenyl and congener concentrations in Lake Catherine 2012 Collection Largemouth Bass fillets
[USGS, U.S. Geological Survey; ID, identification; PCB, Polychlorinated Biphenyl; ng/g, nanogram per gram; All values are adjusted for surrogate recoveries and procedural blank sample background values;
Average, Average of replicate analyses; SD, Standard Deviation; RSD, Percent Relative Standard Deviation; --, not reported.]

PCB-146 (ng/g)	PCB-153 (ng/g)	PCB-132 (ng/g)	PCB-105 (ng/g)	PCB-179 (ng/g)	PCB-141 (ng/g)	PCB-137 (ng/g)	PCB-176 (ng/g)	PCB-130 (ng/g)	PCB-163/164 (ng/g)	PCB-138/158 (ng/g)
< 1	< 1	< 1	< 1	< 0.1	< 0.3	< 1	< 0.1	< 1	0.5	1.0
< 1	0.2	< 1	< 1	< 0.1	< 0.3	< 1	< 0.1	< 1	0.9	2.0
< 1	1.8	< 1	< 1	0.1	0	< 1	< 0.1	< 1	0.2	2.7
< 1	1.9	< 1	0.1	0.1	1	< 1	< 0.1	< 1	0.1	3.4
< 1	1.0	< 1	< 1	0.1	< 0.3	< 1	< 0.1	< 1	1.0	2.0
< 1	1.4	< 1	< 1	0.1	< 0.3	< 1	< 0.1	< 1	1.0	2.2
--	**1.4**	**--**	**--**	**0.1**	**--**	**--**	**--**	**--**	**0.7**	**2.5**
--	**34**	**--**	**--**	**19**	**--**	**--**	**--**	**--**	**78**	**29**
< 1	1.7	< 1	< 1	0.1	0.6	< 1	< 0.1	< 1	1.1	2.3
< 1	4.2	< 1	1.4	0.1	0.2	< 1	< 0.1	< 1	0.5	1.9
1.1	3.1	< 1	< 1	0.1	0.6	< 1	< 0.1	< 1	1.1	2.8
1.2	3.0	1.2	0.3	0.1	0.1	< 1	< 0.1	< 1	0.5	1.3
< 1	2.3	1.4	1.3	0.1	0.7	< 1	< 0.1	< 1	1.1	3.6
1.6	3.7	1.3	0.8	0.1	0.4	< 1	< 0.1	< 1	1.6	2.6
6.9	27.6	10.4	11.1	6.4	10.4	3.2	2.7	3.9	14.4	26.1
135	**103**	**88**	**120**	**119**	**115**	**160**	**133**	**145**	**116**	**97**
1.7	4.2	0.1	1.2	0.1	0.6	< 1	< 0.1	< 1	1.9	3.6
41.3	224.3	31.0	106.5	16.5	35.0	18.6	8.2	25.6	65.5	115.9
< 1	< 1	< 1	2.1	< 0.1	< 0.3	< 1	< 0.1	< 1	< 0.2	0.4
< 1	< 1	< 1	6.6	0.2	0.4	< 1	< 0.1	< 1	0.4	1.1
3.5	14.5	9.1	12.2	0.6	5.1	2.5	0.4	2.9	8.1	22.1
5.9	39.0	12.4	< 1	9.5	12.9	< 1	4.0	1.7	15.8	31.1

Table 2. Total polychlorinated biphenyl and congener concentrations in Lake Catherine 2012 Collection Largemouth Bass fillets
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Average, Average of replicate analyses; SD, Standard Deviation; RSD, Percent Relative Standard Deviation; --, not reported.]

PCB-178 (ng/g)	PCB-129 (ng/g)	PCB-175 (ng/g)	PCB-187 (ng/g)	PCB-183 (ng/g)	PCB-128 (ng/g)	PCB-185 (ng/g)	PCB-167 (ng/g)	PCB-174 (ng/g)	PCB-177 (ng/g)	PCB-202 (ng/g)	PCB-171 (ng/g)
< 0.1	< 1	< 0.3	< 0.3	< 0.1	< 1	< 0.3	< 2	< 0.3	< 0.1	< 1	< 0.3
< 0.1	< 1	< 0.3	0.5	0.2	< 1	< 0.3	< 2	< 0.3	0.2	< 1	< 0.3
0.3	< 1	< 0.3	1.2	0.6	< 1	< 0.3	< 2	< 0.3	0.1	< 1	< 0.3
0.2	< 1	< 0.3	0.8	0.4	< 1	< 0.3	< 2	< 0.3	< 0.1	< 1	< 0.3
0.2	< 1	< 0.3	0.8	0.3	< 1	< 0.3	< 2	< 0.3	0.1	< 1	< 0.3
0.2	< 1	< 0.3	1.0	0.5	< 1	< 0.3	< 2	< 0.3	< 0.1	< 1	< 0.3
0.2	--	--	**0.9**	**0.4**	--	--	--	--	--	--	--
2	--	--	**13**	**16**	--	--	--	--	--	--	--
0.3	< 1	< 0.3	1.2	0.5	< 1	< 0.3	< 2	< 0.3	0.0	< 1	< 0.3
0.3	< 1	< 0.3	1.5	0.7	< 1	< 0.3	< 2	0.6	0.2	< 1	< 0.3
0.3	< 1	< 0.3	2.1	0.6	< 1	< 0.3	< 2	1.2	0.6	< 1	< 0.3
0.3	< 1	< 0.3	1.6	0.5	0.1	< 0.3	2.0	0.7	0.1	< 1	< 0.3
< 0.1	< 1	< 0.3	0.3	0.2	1.1	< 0.3	< 2	< 0.3	0.3	< 1	< 0.3
0.4	< 1	< 0.3	2.9	0.5	0.4	< 0.3	< 2	0.6	0.3	< 1	< 0.3
3.7	3.4	1.1	14.1	8.1	6.3	2.6	10.8	13.1	8.7	2.2	5.7
137	**123**	**169**	**125**	**117**	**114**	**130**	**155**	**121**	**129**	**157**	**140**
0.4	< 1	< 0.3	3.3	0.6	0.6	< 0.3	< 2	0.8	0.4	< 1	< 0.3
16.7	18.7	5.3	64.1	30.7	39.2	9.4	30.1	38.2	36.0	10.9	23.1
< 0.1	< 1	< 0.3	< 0.3	< 0.1	< 1	< 0.3	< 1	< 0.3	< 0.1	< 1	< 0.3
< 0.1	< 1	< 0.3	0.5	< 0.1	< 1	< 0.3	< 1	0.3	< 0.1	< 1	< 0.3
0.4	2.7	< 0.3	1.5	1.1	5.9	< 0.3	1.4	2.2	1.2	< 1	0.8
4.8	< 1	1.3	21.2	11.6	3.2	3.5	1.4	18.3	10.8	3.1	6.3

Table 2. Total polychlorinated biphenyl and congener concentrations in Lake Catherine 2012 Collection Largemouth Bass fillets
[USGS, U.S. Geological Survey; ID, identification; PCB, Polychlorinated Biphenyl; ng/g, nanogram per gram; All values are adjusted for surrogate recoveries and procedural blank sample background values;
Average, Average of replicate analyses; SD, Standard Deviation; RSD, Percent Relative Standard Deviation; --, not reported.]

PCB-173 (ng/g)	PCB-156 (ng/g)	PCB-201 (ng/g)	PCB-157 (ng/g)	PCB-172 (ng/g)	PCB-197 (ng/g)	PCB-180/193 (ng/g)	PCB-191 (ng/g)	PCB-200 (ng/g)	PCB-170/190 (ng/g)	PCB-199 (ng/g)	PCB-196/203 (ng/g)
< 0.3	< 0.3	< 1	< 1	< 0.3	< 1	< 0.6	< 1	< 1	< 0.6	< 1	< 2
< 0.3	< 0.3	< 1	< 1	< 0.3	< 1	1.3	< 1	< 1	< 0.6	< 1	< 2
< 0.3	< 0.3	< 1	< 1	< 0.3	< 1	2.3	< 1	< 1	1.5	< 1	< 2
< 0.3	< 0.3	< 1	< 1	< 0.3	< 1	2.0	< 1	< 1	1.4	< 1	< 2
< 0.3	< 0.3	< 1	< 1	< 0.3	< 1	1.9	< 1	< 1	< 0.6	< 1	< 2
< 0.3	< 0.3	< 1	< 1	< 0.3	< 1	1.7	< 1	< 1	< 0.6	< 1	< 2
--	--	--	--	--	--	**1.9**	--	--	--	--	--
--	--	--	--	--	--	**8**	--	--	--	--	--
< 0.3	< 0.3	< 1	< 1	< 0.3	< 1	2.3	< 1	< 1	1.3	< 1	< 2
< 0.3	< 0.3	< 1	< 1	< 0.3	< 1	2.7	< 1	< 1	1.6	< 1	< 2
< 0.3	< 0.3	< 1	< 1	< 0.3	< 1	8.3	< 1	< 1	4.4	2.4	< 2
< 0.3	0.4	< 1	< 1	< 0.3	< 1	2.5	< 1	< 1	1.5	1.8	2.3
< 0.3	< 0.3	< 1	< 1	< 0.3	< 1	< 0.6	< 1	< 1	< 0.6	< 1	< 2
< 0.3	0.5	< 1	< 1	< 0.3	< 1	2.3	< 1	< 1	1.6	1.4	< 2
0.4	4.5	< 1	1.4	3.8	< 1	28.3	< 1	1.5	20.8	8.9	12.3
127	**152**	--	--	**150**	--	**120**	--	--	**143**	**165**	**176**
< 0.3	0.4	< 1	< 1	< 0.3	< 1	2.9	< 1	< 1	1.9	1.3	< 2
3.5	22.5	6.1	11.5	19.7	2.8	107.9	5.7	6.7	68.8	32.9	39.8
< 0.3	< 0.3	< 1	< 1	< 0.3	< 1	< 0.6	< 1	< 1	< 0.6	< 1	< 2
< 0.3	< 0.3	< 1	< 1	< 0.3	< 1	0.7	< 1	< 1	< 0.6	< 1	< 2
< 0.3	2.8	< 1	< 1	0.4	< 1	2.9	< 1	< 1	3.0	< 1	< 2
0.6	3.0	2.2	< 1	3.8	< 1	41.2	2.2	2.5	21.4	10.0	13.7

These data are preliminary and are subject to revision. They are being provided to meet the need for timely best science. The data are provided on the condition that neither the U.S. Geological Survey nor the U.S. Government may be held liable for any damages resulting from the authorized or unauthorized use of the data.

Table 2. Total polychlorinated biphenyl and congener concentrations in Lake Catherine 2012 Collection Largemouth Bass fillets
[USGS, U.S. Geological Survey; ID, identification; PCB, Polychlorinated Biphenyl; ng/g, nanogram per gram; All values are adjusted for surrogate recoveries and procedural blank sample background values;
Aveage, Average of replicate analyses; SD, Standard Deviation; RSD, Percent Relative Standard Deviation; --, not reported.]

PCB-189 (ng/g)	PCB-195 (ng/g)	PCB-194 (ng/g)	PCB-205 (ng/g)	PCB-206 (ng/g)	PCB-209 (ng/g)
< 0.3	< 3	< 3	< 1	< 1	0.2
< 0.3	< 3	< 3	< 1	< 1	0.4
< 0.3	< 3	< 3	< 1	< 1	0.3
< 0.3	< 3	< 3	< 1	< 1	0.2
< 0.3	< 3	< 3	< 1	< 1	0.2
< 0.3	< 3	< 3	< 1	< 1	0.3
--	--	--	--	--	**0.2**
--	--	--	--	--	**24**
< 0.3	< 3	< 3	< 1	< 1	0.2
< 0.3	< 3	< 3	< 1	< 1	0.4
< 0.3	< 3	< 3	< 1	< 1	0.8
< 0.3	< 3	< 3	< 1	1.1	0.6
< 0.3	< 3	< 3	< 1	< 1	0.6
< 0.3	< 3	< 3	< 1	< 1	0.6
1.3	4.6	9.9	< 1	3.4	0.7
233	--	**177**	--	**223**	**78**
< 0.3	< 3	< 3	< 1	< 1	0.5
8.6	16.8	32.6	4.0	18.1	20.2

< 0.3	< 3	< 3	< 1	< 1	0.4
< 0.3	< 3	< 3	< 1	< 1	< 0.3
< 0.3	< 3	< 3	< 1	< 1	< 0.3
< 0.3	4.8	10.1	< 1	2.9	0.4

Table 3. Organochlorine pesticide concentrations in Lake Catherine 2012 Collection Largemouth Bass fillets.

[USGS, U.S. Geological Survey; ID, identification; ng/g, nanogram per gram; All values are adjusted for surrogate recoveries and procedural blank sample background values; BHC, Benzene hexachloride;
HCH, Hexachlorocyclohexane; Average, Average of replicate analyses; SD, Standard Deviation; RSD, Percent Relative Standard Deviation.]

USGS ID Number	Field ID	PENTACHLOROBENZENE (ng/g)	A-BHC (ng/g)	B-BHC (ng/g)	HCB (ng/g)	PCA (ng/g)	LINDANE (ng/g)	D-BHC (ng/g)	HEPTACHLOR (ng/g)
56518	LMB big Fir/Housley Pt. 3-29-12	3.6	< 0.5	< 2	< 3	< 2	< 2	< 2.5	< 7
56519	LMB C6 4-3-12	3.5	< 0.5	< 2	< 3	< 2	< 2	< 2.5	< 7
56520	LMB SB1 4-5-12	< 1	< 0.5	< 2	< 3	< 2	< 2	< 2.5	< 6
56521-R1	LMB WC1 4-18-12	< 1	< 0.5	< 2	< 3	< 2	< 2	< 2.5	< 3
56521-R2	LMB WC1 4-18-12	< 1	< 0.5	< 2	< 3	< 2	< 2	< 2.5	< 3
56521-R3	LMB WC1 4-18-12	4	< 0.5	< 2	< 3	< 2	< 2	< 2.5	< 4
	Average:	--	--	--	--	--	--	--	--
	RSD:	--	--	--	--	--	--	--	--
56522	LMB TB1 4-24-12	< 1	< 0.5	< 2	< 4	< 2	< 2	< 2.5	< 4
56523	LMB C1/C2 4-24-12	< 1	< 0.5	< 2	< 4	< 2	< 2	< 2.5	< 4
56524	LMB C3 5-2-12	< 1	< 0.5	< 2	< 3	< 2	< 2	< 2.5	< 4
56525	LMB R1 5-15-12	< 1	< 0.5	< 2	< 3	< 2	< 2	< 2.5	< 4
PB100512	Procedural Blank[7]	< 1	< 2	< 2	< 3	< 2	< 2	< 2.5	< 1
MB100512	Matrix Blank	< 1	< 0.5	< 2	< 3	< 2	< 2	< 2.5	< 4
MSOC100512	Matrix Spike - OCPs[8]	18	28	32	19	20	26	38	23
	Percent Recovery:	**59**	**67**	**77**	**65**	**47**	**65**	**88**	**61**
MSPCB100512	Matrix Spike - PCBs/PBDEs[8]	< 1	< 0.5	< 2	< 3	< 2	< 2	< 2.5	< 5
PC100512	Positive Control	< 1	3	< 2	< 3	< 2	< 2	< 2.5	< 1

[1]Summation of α-HCH, β-HCH, γ-HCH, δ-HCH.

[2]Summation of endrin, endrin aldehyde, endrin ketone. Note increased reporting limits and loss of endrin aldehyde.
[3]Summation of *o,p'*-DDD, *o,p'*-DDE, *o,p'*-DDT,*p,p'*-DDD, *p,p'*-DDE, *p,p'*-DDT.

[4]Summation of *cis*-chlordane, *trans*-chlordane, *cis*-nonachlor, *trans*-nonachlor, oxychlordane, heptachlor, heptachlor epoxide, methoxychlor.

[5]Summation of aldrin, dieldrin, total endrin. See notes for endrin, endrin aldehyde and endrin ketone.

[6]Summation of endosulfan I, endosulfan II, endosulfan sulfate. Note increased reporting limits.

[7] Procedural Blank values are adjusted for surrogate recovery and are not corrected for background values.

[8] Matrix Spikes - PCBs fortified with 250 ng each Aroclor; PBDEs fortified with 20 ng each congener; - OCPs fortified with 40 ng each pesticide.

Table 3. Organochlorine pesticide concentrations in Lake Catherine 2012 Collection Largemouth Bass fillets.
[USGS, U.S. Geological Survey; ID, identification; ng/g, nanogram per gram; All values are adjusted for surrogate recoveries and procedural blank sample background values; BHC, Benzene hexachloride;
HCH, Hexachlorocyclohexane; Average, Average of replicate analyses; SD, Standard Deviation; RSD, Percent Relative Standard Deviation.]

ALDRIN (ng/g)	DACTHAL (ng/g)	HEPTACHLOR EPOXIDE (ng/g)	OXYCHLORDANE (ng/g)	T-CHLORDANE (ng/g)	o,p'-DDE (ng/g)	ENDOSULFAN I (ng/g)	C-CHLORDANE (ng/g)
< 2.5	--[9]	< 2	< 2	< 1	< 1	< 5[10]	< 2
< 2.5	--	< 2	< 2	< 1	< 1	< 5	< 2
< 2.5	--	< 2	< 2	< 1	< 1	< 5	< 2
< 2.5	--	< 2	< 2	< 2	< 1	< 5	< 2
< 2.5	--	< 2	< 2	< 1	< 1	< 5	< 2
< 2.5	--	< 2	< 2	< 1	< 1	< 5	< 2
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--
< 2.5	--	< 2	< 2	< 1	< 1	< 5	< 2
< 2.5	--	< 2	< 2	< 1	< 1	< 5	< 2
< 2.5	--	< 2	< 2	< 1	< 1	< 5	< 2
< 2.5	--	< 2	< 2	< 1	< 1	< 5	< 2
< 2.5	--	< 2	< 2	< 1	< 1	< 5	< 2
< 2.5	--	< 2	< 2	< 1	< 1	< 5	< 2
14	--	31	37	31	27	23	32
56	--	**61**	**63**	**66**	**65**	**44**	**65**
< 2.5	--	< 2	2	< 1	< 1	< 5	< 2
< 2.5	--	< 2	< 2	9	4	< 5	23

[9]Dacthal not detected, matrix degradation and column activity.
[10]Endosulfan-I, endosulfan-II, and endosulfan sulfate, increased reporting limits, column activity.

Table 3. Organochlorine pesticide concentrations in Lake Catherine 2012 Collection Largemouth Bass fillets.
[USGS, U.S. Geological Survey; ID, identification; ng/g, nanogram per gram; All values are adjusted for surrogate recoveries and procedural blank sample background values; BHC, Benzene hexachloride;
HCH, Hexachlorocyclohexane; Average, Average of replicate analyses; SD, Standard Deviation; RSD, Percent Relative Standard Deviation.]

T-NONACHLOR (ng/g)	DIELDRIN (ng/g)	TOTAL p,p'-DDE (ng/g)	o,p'-DDD (ng/g)	ENDRIN (ng/g)	ENDOSULFAN II (ng/g)	ENDRIN ALDEHYDE (ng/g)	p,p'-DDD (ng/g)	C-NONACHLOR (ng/g)	o,p'-DDT (ng/g)	ENDOSULFATE (ng/g)	p,p'-DDT (ng/g)
< 2	< 2.5	7.7[11]	< 2	< 15[12]	< 5[10]	--[13]	< 2	< 2	< 2.5	< 7.5[10]	< 2
< 2	< 2.5	7.3	< 2	< 19	< 5	--	< 2	< 2	< 2.5	< 7.5	< 2
< 2	< 2.5	7.6	< 2	< 13	< 5	--	< 2	< 2	< 2.5	< 7.5	< 2
< 2	< 2.5	7.4	< 2	< 40	< 5	--	< 2	< 2	< 2.5	< 7.5	< 2
< 2	< 2.5	7.4	< 2	< 17	< 5	--	< 2	< 2	< 2.5	< 7.5	< 2
< 2	< 2.5	7.3	< 2	< 35	< 5	--	< 2	< 2	< 2.5	< 7.5	< 2
--	--	**7.4**	--	--	--	--	--	--	--	--	--
--	--	**10**	--	--	--	--	--	--	--	--	--
< 2	< 2.5	8	< 2	< 13	< 5	--	< 2	< 2	< 2.5	< 7.5	< 2
< 2	< 2.5	7	< 2	< 22	< 5	--	< 2	< 2	< 2.5	< 7.5	< 2
< 2	< 2.5	7	< 2	< 27	< 5	--	< 2	< 2	< 2.5	< 7.5	< 2
< 2	< 2.5	8	< 2	< 37	< 5	--	< 2	< 2	< 2.5	< 7.5	< 2
						--					
< 2	< 2.5	< 2	< 2	< 20	< 5	--	< 2	< 2	< 2.5	< 7.5	< 2
< 2	< 2.5	8.0	< 2	< 20	< 5	--	< 2	< 2	< 2.5	< 7.5	< 2
35	58	33	33	8	50	--	35	40	29	25	34
75	**118**	**79**	**79**	**16**	**90**	--	**79**	**78**	**69**	**44**	**80**
3	< 2.5	7.7	< 2	< 12	< 5	--	< 2	< 2	< 2.5	< 7.5	< 2
						--					
25	57	355	65	< 5	< 5	--	250	10	< 2.5	< 7.5	< 2

[10]Endosulfan-I, endosulfan-II, and endosulfan sulfate, increased reporting limits, column activity.

[11]*p,p'*-DDE.increased reporting limit, matrix interference.

[12]Endrin and endrin ketone, increased reporting limit, column activity..

[13]Endrin aldehyde, not detected, column activity..

Table 3. Organochlorine pesticide concentrations in Lake Catherine 2012 Collection Largemouth Bass fillets.

[USGS, U.S. Geological Survey; ID, identification; ng/g, nanogram per gram; All values are adjusted for surrogate recoveries and procedural blank sample background values; BHC, Benzene hexachloride;
HCH, Hexachlorocyclohexane; Average, Average of replicate analyses; SD, Standard Deviation; RSD, Percent Relative Standard Deviation.]

ENDRIN KETONE (ng/g)	METHOXYCHLOR (ng/g)	MIREX (ng/g)	Total BHCs[1] (ng/g)	Total Endrin[2] (ng/g)	Total DDT Series[3] (ng/g)	Total Chlordanes[4] (ng/g)	Total Isodrins[5] (ng/g)	Total Endosulfans[6]
< 20[12]	< 5	< 2.5	< 7	--	< 10	< 20	--	< 20
< 20	< 5	< 2.5	< 7	--	7	< 20	--	< 20
< 20	< 5	< 2.5	< 7	--	< 10	< 20	--	< 20
< 20	< 5	< 2.5	< 7	--	< 10	< 20	--	< 20
< 20	< 5	4	< 7	--	< 10	< 20	--	< 20
< 20	< 5	< 2.5	< 7	--	< 10	< 20	--	< 20
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
< 20	< 5	< 2.5	< 7	--	< 10	< 20	--	< 20
< 20	< 5	< 2.5	< 7	--	< 10	< 20	--	< 20
< 20	< 5	< 2.5	< 7	--	< 10	< 20	--	< 20
< 20	< 5	< 2.5	< 7	--	< 10	< 20	--	< 20
< 20	< 5	< 2.5	< 7	--	< 10	< 20	--	< 20
16	< 5	< 2.5	< 7	--	< 10	< 20	--	< 20
7	5	32	123	15	192	235	88	98
38	**12**	**101**	**74**	**27**	**75**	**60**	**67**	**60**
< 20	< 5	< 14	< 7	--	< 10	< 20	--	< 20
< 20	< 5	40	3	--	673	66	--	< 20

[12]Endrin and endrin ketone, increased reporting limit, column activity..

Table 4. Total polybrominated diphenyl ether and congener concentrations in Lake Catherine 2012 Collection Largemouth Bass fillets.
[USGS, U.S. Geological Survey; ID, identification; PBDE, Polybrominated Diphenyl Ether; ng/g, nanogram per gram; All values are adjusted for surrogate recoveries and procedural blank sample background values;
Average, Average of replicate analyses; SD, Standard Deviation; RSD, Percent Relative Standard Deviation; --, not reported.]

USGS ID Number	Field ID	Measured[1] Total PBDEs (ng/g)	PBDE-028 (ng/g)	PBDE-047 (ng/g)	PBDE-066 (ng/g)	PBDE-100 (ng/g)	PBDE-099 (ng/g)	PBDE-085 (ng/g)	PBDE-154 (ng/g)	PBDE-153 (ng/g)	PBDE-183 (ng/g)
56518	LMB big Fir/Housley Pt. 3-29-12	< 5	< 2.5	< 2.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
56519	LMB C6 4-3-12	7	< 2.5	7	< 5	< 5	< 5	< 5	< 5	< 5	< 5
56520	LMB SB1 4-5-12	10	< 2.5	10	< 5	< 5	< 5	< 5	< 5	< 5	< 5
56521-R1	LMB WC1 4-18-12	11	< 2.5	11	< 5	< 5	< 5	< 5	< 5	< 5	< 5
56521-R2	LMB WC1 4-18-12	8	< 2.5	8	< 5	< 5	< 5	< 5	< 5	< 5	< 5
56521-R3	LMB WC1 4-18-12	10	< 2.5	10	< 5	< 5	< 5	< 5	< 5	< 5	< 5
	Average:	**10**	--	**10**	--	--	--	--	--	--	--
	RSD:	**14**	--	**14**	--	--	--	--	--	--	--
56522	LMB TB1 4-24-12	12	< 2.5	12	< 5	< 5	< 5	< 5	< 5	< 5	< 5
56523	LMB C1/C2 4-24-12	12	< 2.5	12	< 5	< 5	< 5	< 5	< 5	< 5	< 5
56524	LMB C3 5-2-12	8	< 2.5	8	< 5	< 5	< 5	< 5	< 5	< 5	< 5
56525	LMB R1 5-15-12	12	< 2.5	12	< 5	< 5	< 5	< 5	< 5	< 5	< 5
PB100512	Procedural Blank[2]	3	< 2.5	2.3	< 5	< 5	< 5	< 5	< 5	< 5	< 5
MB100512	Matrix Blank	< 2	< 2.5	< 2.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
MSPCB100512	Matrix Spike - PCBs/PBDEs[3]	370	44	54	56	29	32	40	30	35	50
	Percent Recovery:	**125**	**109**	**115**	**133**	**119**	**131**	**144**	**105**	**125**	**142**
MSOC100512	Matrix Spike - OCPs[3]	< 5	< 2.5	< 2.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
PC100512	Positive Control	< 5	< 2.5	< 2.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5

[1] Summation of Individual Congeners.
[2] Procedural Blank values are adjusted for surrogate recovery and are not corrected for background values.
[3] Matrix Spikes - PCBs fortified with 250 ng each Aroclor; PBDEs fortified with 20 ng each congener; - OCPs fortified with 40 ng each pesticide.

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