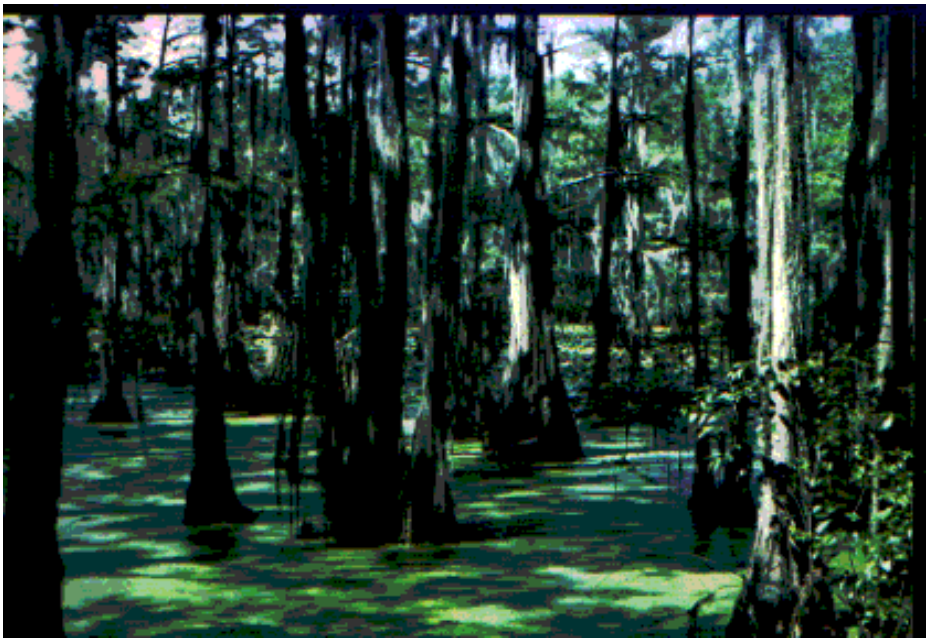
U. S. Fish and Wildlife Service
Region 2

# A CONTAMINANTS SURVEY OF THREE LENTIC SYSTEMS WITHIN THE CYPRESS CREEK WATERSHED, TEXAS 1993 - 1995



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**CONTAMINANTS SURVEY OF THREE LENTIC SYSTEMS WITHIN THE CYPRESS CREEK WATERSHED, TEXAS 1993 - 1995**

**PROJECT ID NO. 9320005/2F27**

## ABSTRACT

In 1993, a study was initiated by the U.S. Fish and Wildlife Service, Arlington, Texas, Field Office to determine organic and metal contaminant levels within three lentic systems in the Cypress Creek watershed in Northeast Texas. Cypress Springs Reservoir, Lake O' The Pines, and Caddo Lake were the three lentic bodies selected for this study. From 1993 through 1994, surface water, sediment, and biological samples were collected from each of these systems. Surface water samples were analyzed for dissolved aluminum, arsenic, barium, beryllium, cadmium, chromium, copper, iron, lead, magnesium, manganese, molybdenum, nickel, selenium, strontium, vanadium, zinc, and total mercury content. Sediment samples were analyzed for total aluminum, arsenic, barium, beryllium, cadmium, chromium, copper, iron, lead, magnesium, manganese, mercury, molybdenum, nickel, selenium, strontium, vanadium, and zinc content, as well as aliphatic hydrocarbons, polycyclic aromatic hydrocarbons, and organochlorine residues. Biological samples collected consisted of fish, macroinvertebrates, and nestling great blue herons (*Ardea herodias*). The fish samples collected consisted of whole body composites and fillets which were analyzed for organochlorine residues and the same total metal contaminants as mentioned above. The macroinvertebrate samples consisted of whole body composite grass shrimp (*Palaemonetes* sp.) which were also analyzed for total metals. Kidney and feather samples collected from the great blue herons were analyzed for total mercury content, while liver samples were analyzed for total metal content. Data resulting from this study were evaluated to determine potential health risks to fish and wildlife resources.

The results of this study indicated that Cypress Springs Reservoir was the least contaminated of the three lentic systems. Cadmium levels were detected in surface water samples in excess of the State of Texas water quality criteria in all three water bodies. Sediments collected at Lake O' The Pines contained concentrations of cadmium, lead, mercury, and zinc that exceeded the State of Texas chronic aquatic life protection criteria, while sediments collected from Caddo Lake contained lead and mercury levels which also exceeded the State chronic aquatic life criteria. Aliphatic hydrocarbon compounds were detected in sediments from all three systems in low concentrations. Polycyclic aromatic hydrocarbons were detected in sediments collected from Cypress Springs Reservoir and Caddo Lake in low concentrations in comparison to aquatic life criteria developed by the Ontario Ministry of the Environment, whereas sediment samples collected from Lake O' The Pines contained some elevated polycyclic aromatic hydrocarbons. Organochlorine residue concentrations were below the analytical detection limits in sediments collected from all three lentic bodies. Whole body composite fish samples collected from all three water bodies contained elevated mercury levels in excess of predatory protection limits recommended by the United States Fish and Wildlife Service; however, fillet samples contained mercury concentrations below the United States Food and Drug Administration action level for human consumption. Fish collected from Caddo Lake also contained chromium and selenium levels elevated above the predatory protection limits recommended by the United States Fish and Wildlife Service, but below current fish consumption advisory levels in the United States. Macroinvertebrates and great blue herons collected from Caddo Lake exhibited elevated levels of mercury. In addition, the great blue herons sampled at Caddo Lake contained elevated levels of zinc. Fish collected from all three systems contained low concentrations of dichlorodiphenyldichloroethylene (DDE) in comparison to the criterion developed by the National Academy of Sciences/National Academy of Engineering. One fish collected from Lake O' The Pines contained a concentration of total-polychlorinated biphenyl (PCB) in excess of the predatory protection level recommended by the Great Lakes International Joint Commission.

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## PROJECT ID NO. 9320005/2F27

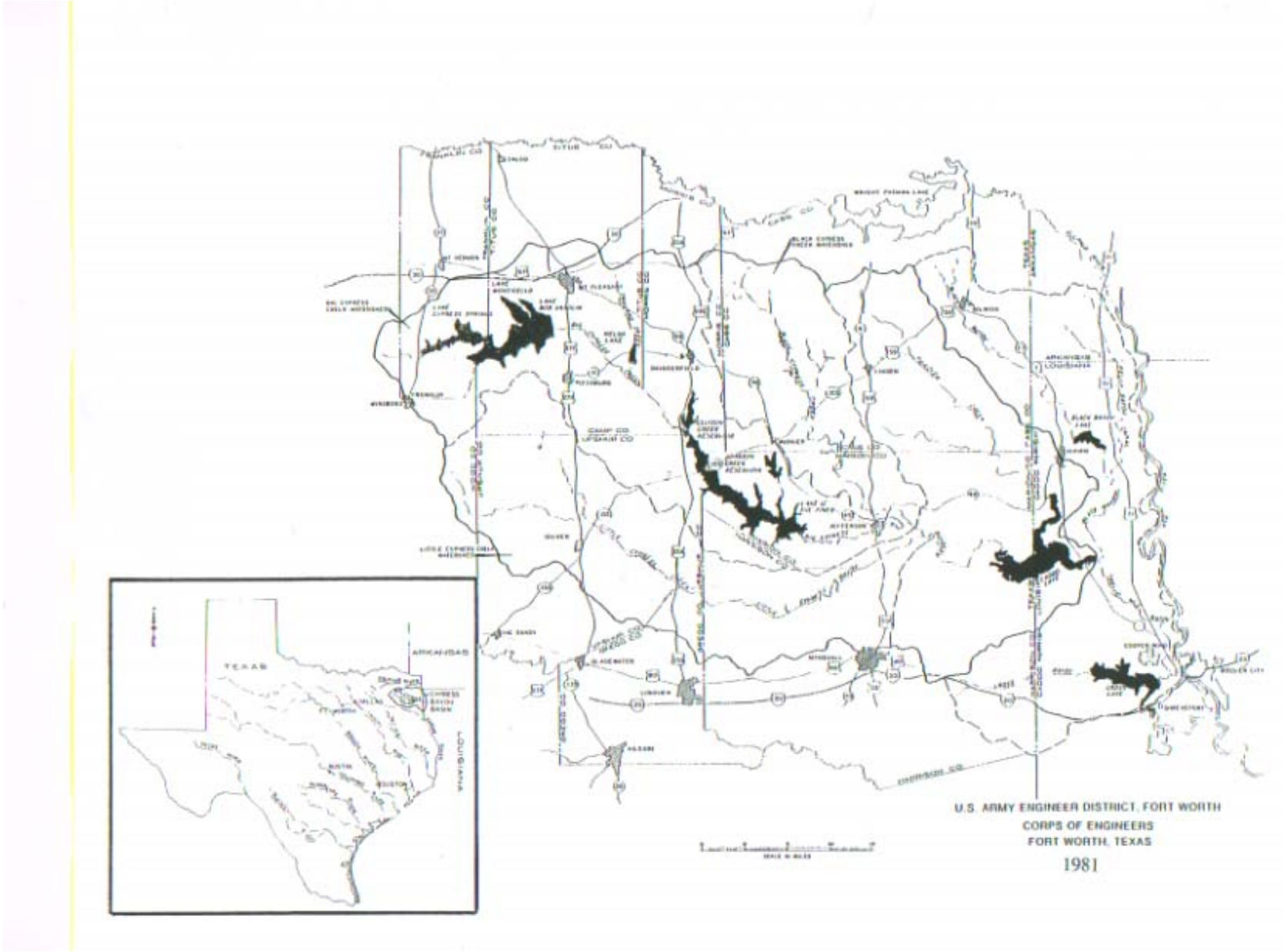
## INTRODUCTION

In 1993, a study was initiated by the U.S. Fish and Wildlife Service, Arlington, Texas, Field Office to determine organic and metal contaminant levels within three lentic systems in the Cypress Creek watershed. Cypress Springs Reservoir, Lake O' The Pines, and Caddo Lake were the three lentic bodies selected for this study. From 1993 through 1995, surface water, sediment, and biological samples were collected from each of these systems. Surface water samples were analyzed for dissolved metal and total mercury content. Sediment samples were analyzed for total metal, polycyclic aromatic hydrocarbon (PAH), aliphatic hydrocarbon, and organochlorine concentrations. The biological samples collected consisted of fish, macroinvertebrates, and nestling great blue herons (*Ardea herodias*). The fish collected were analyzed for total metal and organochlorine content, while macroinvertebrate and avian samples were analyzed for total metals. The resulting data were compared to criteria protective of wildlife developed by state, federal, and other agencies, to determine health risks to fish and wildlife resources within the watershed. In addition, results from the surface water, sediment, and fish metals analyses and the sediment aliphatic hydrocarbon analysis were statistically analyzed to determine differences among the three lentic systems.

## STUDY AREA

The Cypress Creek watershed consists of approximately 6,000 square miles (15,540 square kilometers) and encompasses portions of 11 counties (Camp, Cass, Franklin, Gregg, Harrison, Hopkins, Marion, Morris, Rains, Titus, and Upsher Counties) in northeast Texas and one parish (Caddo Parish) in northwest Louisiana (Figure 1). Primary lotic contributors to the watershed include Big Cypress Creek, Lilly Creek, Little Cypress Creek, Black Cypress Bayou, James Bayou, and Frazier Creek. Lentic systems within the watershed include Cypress Springs Reservoir, Bob Sandlin Reservoir, Monticello Reservoir, Lake O' The Pines, Caddo Lake, Welsh Reservoir, Ellison Creek Reservoir, Barnes Creek Reservoir, and Johnson Creek Reservoir (TWC, 1989a). Climate for the area is considered subtropical, characterized by hot, humid summers and mild winters. Normal temperatures range from 44/F (6.7/C) in the winter to 84/F (28.9/C) in the summer (USACOE, 1987). Average annual precipitation for the area is approximately 45 inches (114.3 cm). The majority of the watershed is located within the pineywoods ecological region which is characterized by pine-hardwood forest in upland areas and bottom land hardwoods in flood plain areas. Vegetation in the upland areas is dominated by short leaf and loblolly pine, red oak, overcup oak, blackjack oak, post oak, hickory, maple, beech, sweet gum and sycamore, while vegetation in the bottom land areas is typically dominated by willow oak, water oak, black willow, bald cypress, blackgum, sweetgum, river birch, green ash, water hickory, winged elm, and water elm (Cloud, 1995). The extreme western portion of the watershed is located within the post oak savannah ecological region. Vegetation commonly associated with this region includes blackjack oak, eastern red cedar, mesquite, black hickory, live oak, sandjack oak, cedar elm, hackberry, yaupon, poison oak, hawthorn, supplejack, trumpet creeper, dewberry, coral berry, little bluestem, silver bluestem, sand lovegrass, beaked panicum, three-awn, sprangle grass, and tickclover in the sandy uplands and beech, overcup oak, cherrybark oak, elm, sweetgum, sycamore, southern magnolia, white oak, black willow, bald cypress, swamp laurel oak, bush palmetto, common elderberry, southern arrowwood, crossvine, greenbriar, and blackberry in the lower

# FIGURE 1. CYPRESS CREEK WATERSHED.



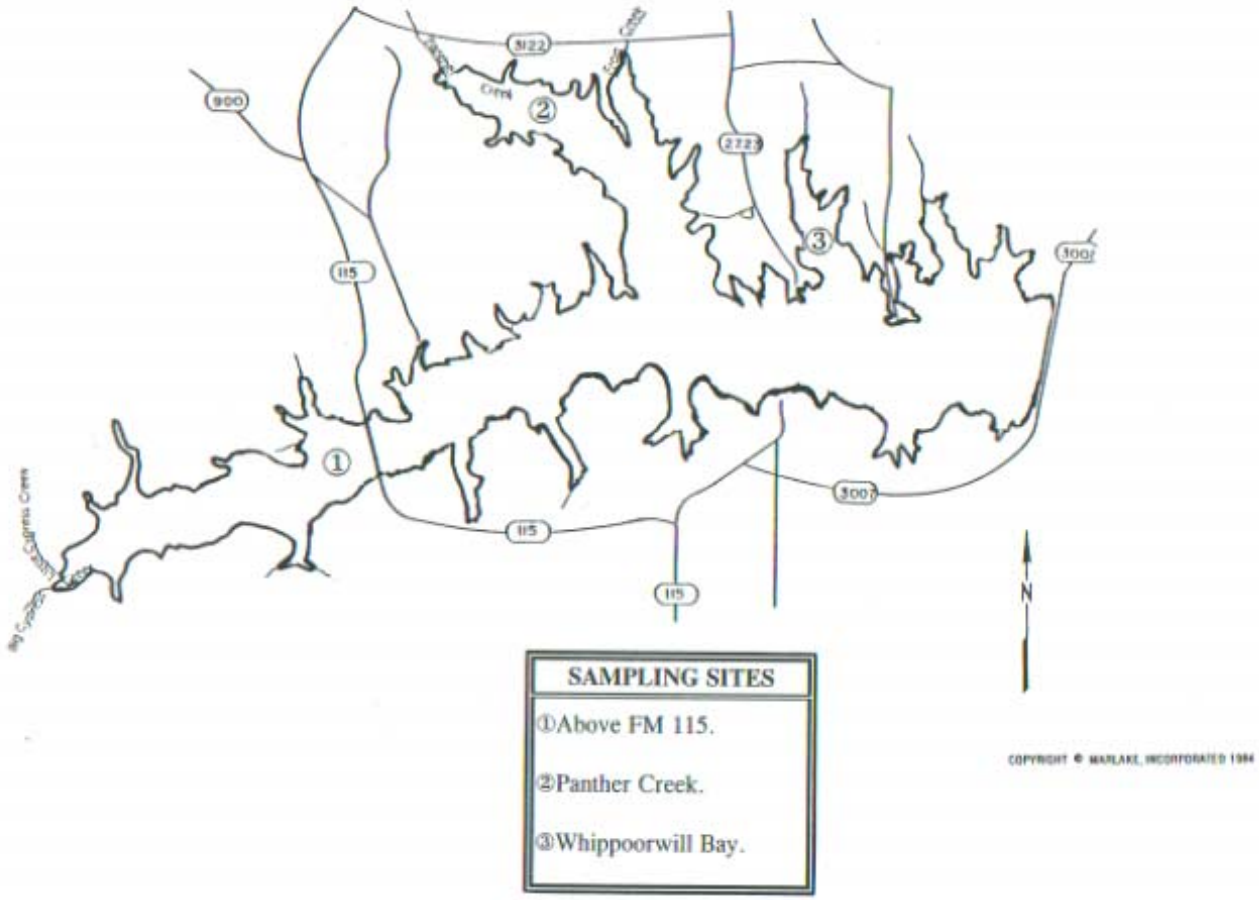
flood plain areas (McMahan *et al.*, 1984). The entire watershed provides viable habitat to support 98 species of fish, including five species listed by the State of Texas as threatened; 31 amphibian species; 60 species of reptiles, of which four are listed by the State of Texas as threatened and one is listed by the U.S. Department of Interior (DOI) as threatened; 55 mammal species, including one species listed as threatened by the State of Texas and one listed as threatened by both the State and the DOI; and over 300 avian species of which five are listed as threatened by the State of Texas, two are listed as threatened by both the State and the DOI, and two are classified by both the State and the DOI as endangered species (Appendix A, Tables IA - IE).

The watershed's topography is considered irregular with rolling, hilly, uplands dissected by broad flat floodplain. Soils in the upland areas are characterized as sandy to sandy loam, while soils in the floodplains are dominated by clays (Cloud,1995). Elevation for the watershed ranges from approximately 160 feet (48.8 meters) to approximately 600 feet (182.9 meters) above mean sea level. Hydrogeologically, the majority of the watershed is located within the East Texas Basin, a structural formation formed by the Sabine Uplift. The primary groundwater systems underlying the watershed include the Queen City Sand and the Carrizo - Wilcox Aquifers. The Queen City Sand formation is composed of sand, loosely cemented sandstone, and interbedded clays. Groundwater retained in this aquifer usually contains total dissolved solids (TDS) $< 1000$ mg/l, low pH, and a high iron content. This aquifer overlays the Carrizo - Wilcox Aquifer which is composed of the Carrizo Sand Formation and the Wilcox Group. These two geologic units are hydrologically connected and collectively are composed of ferruginous, cross bedded sand with clay, sandstone, silt, lignite, and gravel. Groundwater from this aquifer is high in iron ($> 5$ mg/l in some areas which exceeds the secondary safe drinking water standard of 3 mg/l), chlorides ($> 300$ mg/l in some areas which exceeds the secondary safe drinking water standard of 300 mg/l), sulfates ($> 300$ mg/l in isolated areas which exceeds the secondary drinking water standard of 300 mg/l) and low in TDS ($< 1000$ mg/l). Flow for both aquifers is in a south-southeast direction except where influenced by surface water bodies and draw down from pumpage (TWC, 1989b).

An estimated 593,564 people live in the counties and parish encompassed by the watershed (Appendix A, Table II). The economy of the area relies primarily on gas and oil exploration and production, lignite coal mining, forestry and associated industries, agriculture, and iron ore mining and related industries. Wastes attributed to forestry and its associated industries such as timber processing and paper mills include heavy metals, spent solvents, dioxins, bleaches, phenols, petroleum hydrocarbons, and spent acids (Shineldecker, 1992). In general, wastes associated with mining include slag, fly ash, PAH compounds, heavy metals, toxic inorganics, and spent acids. Lignite coal mined from East Texas is usually high in sulphur, selenium and arsenic (OTA, 1979; TWC, 1989b). Specific wastes associated with metallic ore mining include sulfuric acid, lead, copper, cadmium, arsenic, sulfates, thorium, vanadium, and cyanide (Shineldecker, 1992). Wastes attributed to gas and oil production and exploration include brine, corrosion inhibitors, drilling fluids, spent acids, heavy metals, and biocides (TWC, 1989b; Shineldecker, 1992). Typical constituents of oil field brine include sodium (12,000 - 150,000 mg/l), potassium (30 - 4000 mg/l), lithium (1 - 50 mg/l), rubidium (0.1 - 7 mg/l), cesium (0.01 - 3 mg/l), calcium (1000 - 120,000 mg/l), magnesium (500 - 25,000 mg/l), strontium (5 - 5000 mg/l), barium (0 - 1000 mg/l), chloride (20,000 - 250,000 mg/l), bromine (50 - 5000 mg/l), and iodine (1 - 300 mg/l), while in addition to PAHs, aliphatic hydrocarbons, sulfides, cadmium, chromium, lead, and zinc, crude oil can also contain elevated levels of mercury (TWC, 1989b).

Located at the upper portion of the watershed, Cypress Springs Reservoir (USGS Hydrologic Unit 11140305; Texas River Segment No. 0405) is an impoundment of the headwaters of Big Cypress Creek in Franklin County, Texas (Figure 2). This reservoir was constructed in 1971 to supply water to the surrounding area. The drainage area for the reservoir consists of approximately 75 square miles (194.3

# FIGURE 2. CYPRESS SPRINGS RESERVOIR.

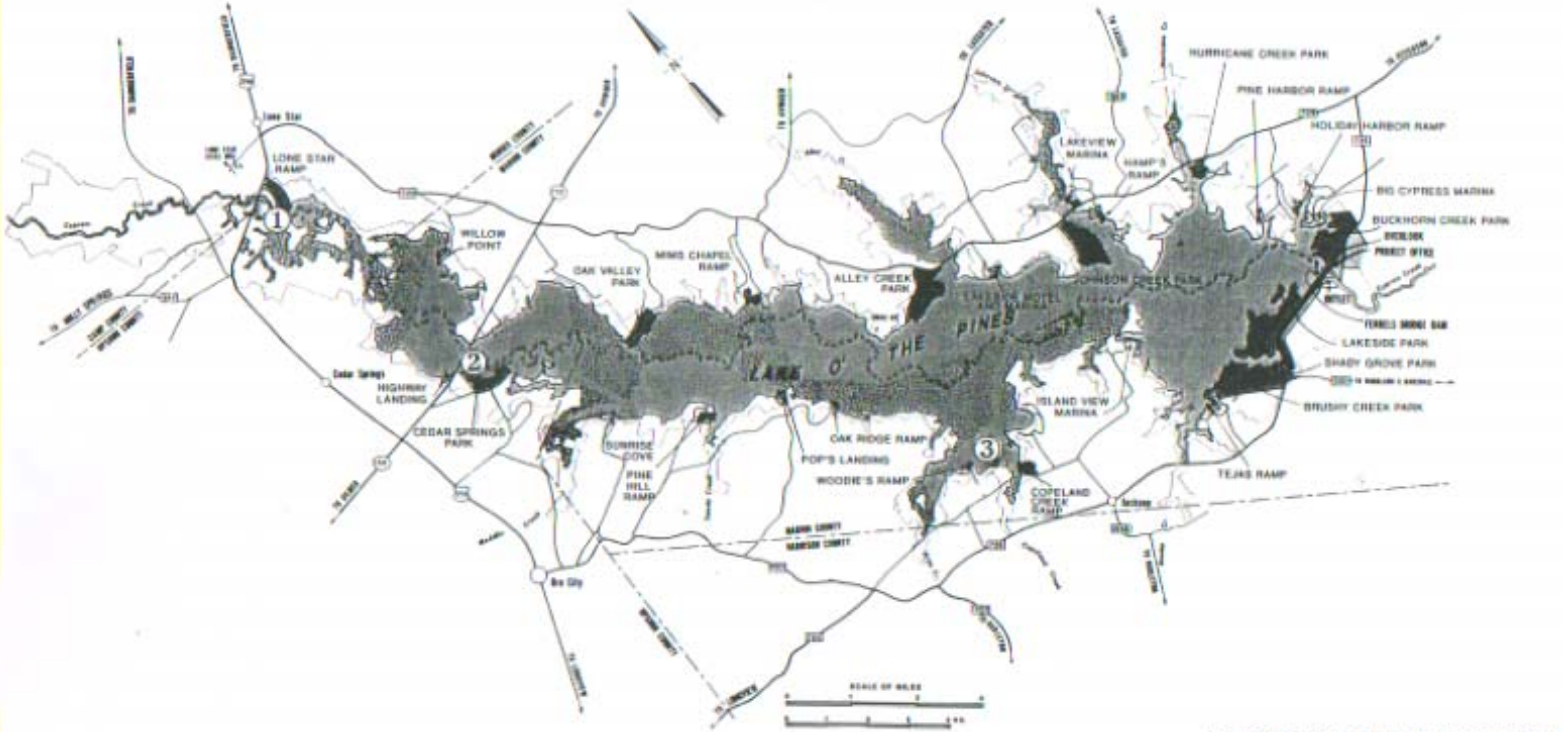


square kilometers). The reservoir is approximately 25 miles (40 kilometers) long and has a conservation surface area of 3,400 acres (13.75 square kilometers) and a conservation storage capacity of 72,800 acre-feet (89.76 cubic hectometers) (USACOE, 1981). Normal pool elevation is 378 feet (115.21 meters). Between 1974 and 1990, the largest volume of surface water contained within the reservoir was 85,050 acre-feet (104.87 cubic hectometers), while the lowest amount of water retained in the system was 59,440 acre-feet (73.29 cubic hectometers) (Buckner and Shelby, 1990). In addition to public water supply, other designated uses of the reservoir by the State of Texas include contact recreation and high aquatic life. State water quality standards for this reservoir designate that water temperature should not exceed 93/F (33.89/C), dissolved oxygen (DO) content should be no lower than 5.0 mg/l, pH should range from 6 - 8.5, chloride levels should not exceed 100 mg/l, and sulfate content should be less than 500 mg/l (TNRCC, 1996b). As of 1998, no facilities were permitted to discharge effluent directly into the reservoir (Prater, pers. comm., 1998).

In 1959, Lake O' The Pines (USGS Hydrologic Unit 11140305; Texas River Segment No. 0403), located mid-watershed, was constructed in Marion County, Texas, as an impoundment of Big Cypress Creek for flood control and water supply purposes (Figure 3). The drainage area for the reservoir encompasses 850 square miles (2201.50 square kilometers). This reservoir is approximately 31 miles (50 kilometers) long and one mile (1.6 kilometers) wide and contains a conservation surface area of 18,700 acres (75.68 square kilometers), a conservation storage capacity of 254,900 acre-feet (314.29 cubic hectometers), and a flood control capacity of 587,200 acre-feet (724.02 cubic hectometers) (USACOE, 1981). Normal pool elevation is 228.5 feet (69.65 meters) (TNRCC, 1996b). Between 1959 and 1996, the largest volume of surface water contained in the reservoir was 694,360 acre-feet (856.15 cubic hectometers), while the lowest amount of water retained in the system was 210,100 acre-feet (259.05 cubic hectometers) (Gandara et al., 1997). State water quality standards for this reservoir designate that water temperature should not exceed 93/F (33.89/C), DO content should be no lower than 5.0 mg/l, pH should range from 6 - 8.5, chloride levels should not exceed 80 mg/l, sulfate concentrations should be less than 50 mg/l, and TDS levels should not exceed 300 mg/l (TNRCC, 1996b). As of 1998, facilities permitted to discharge effluent into the reservoir included the City of Lone Star (Texas Permit No. WQ12411-001; NPDES Permit No. TX0088081; permitted to discharge 0.44 million gallons/day (MGD)), the R. Curlee Apartment Complex (Texas Permit No. WQ11260-001; NPDES Permit No. TX0066338; permitted to discharge 0.002 MGD), and the E.J. Slampa Apartment Complex (State Permit No. WQ12563-001; NPDES Permit No. TX0090697; 0.02 MGD permitted discharge). Lone Star Steel (Texas Permit No. WQ0348-000; NPDES Permit No. TX0000027), a steel manufacturing and pipe fabrication facility, is permitted to discharge into Big Cypress Creek immediately upstream of the reservoir. This facility has five permitted outfalls (Outfall 001 - 005). Outfall 001 is permitted to discharge 0.5 MGD of domestic wastewater; Outfall 002 is permitted to discharge up to 70 MGD of process wastewater, cooling water, boiler blowdown and stormwater; Outfall 003 is permitted to discharge stormwater at flow-variable rates; Outfall 004 is permitted to discharge non-contact cooling water and stormwater up to 55 MGD; and Outfall 005 is permitted to discharge filter backwash and stormwater up to 0.75 MGD. Outfalls 001 and 002 discharge into Big Cypress Creek, while outfalls 003 - 005 discharge into Ellison Creek Reservoir. In addition to public water supply, other designated uses of Lake O' The Pines by the State of Texas include contact recreation and high aquatic life. However, concentrations of dissolved zinc detected in the surface water have occasionally exceeded the criterion established to protect aquatic life in the lower half of the reservoir (TNRCC, 1996b). To address this issue, a total maximum daily load (TMDL) study by the Texas Natural Resource Conservation Commission (TNRCC) was scheduled to begin in the 1998 fiscal year (TNRCC, 1998).

Located at the base of the watershed, Caddo Lake (Texas River Segment No. 0401), a Ramsar internationally designated wetland (Figure 4), was originally formed during the early nineteenth century

# FIGURE 3. LAKE O' THE PINES.




**SAMPLING SITES**

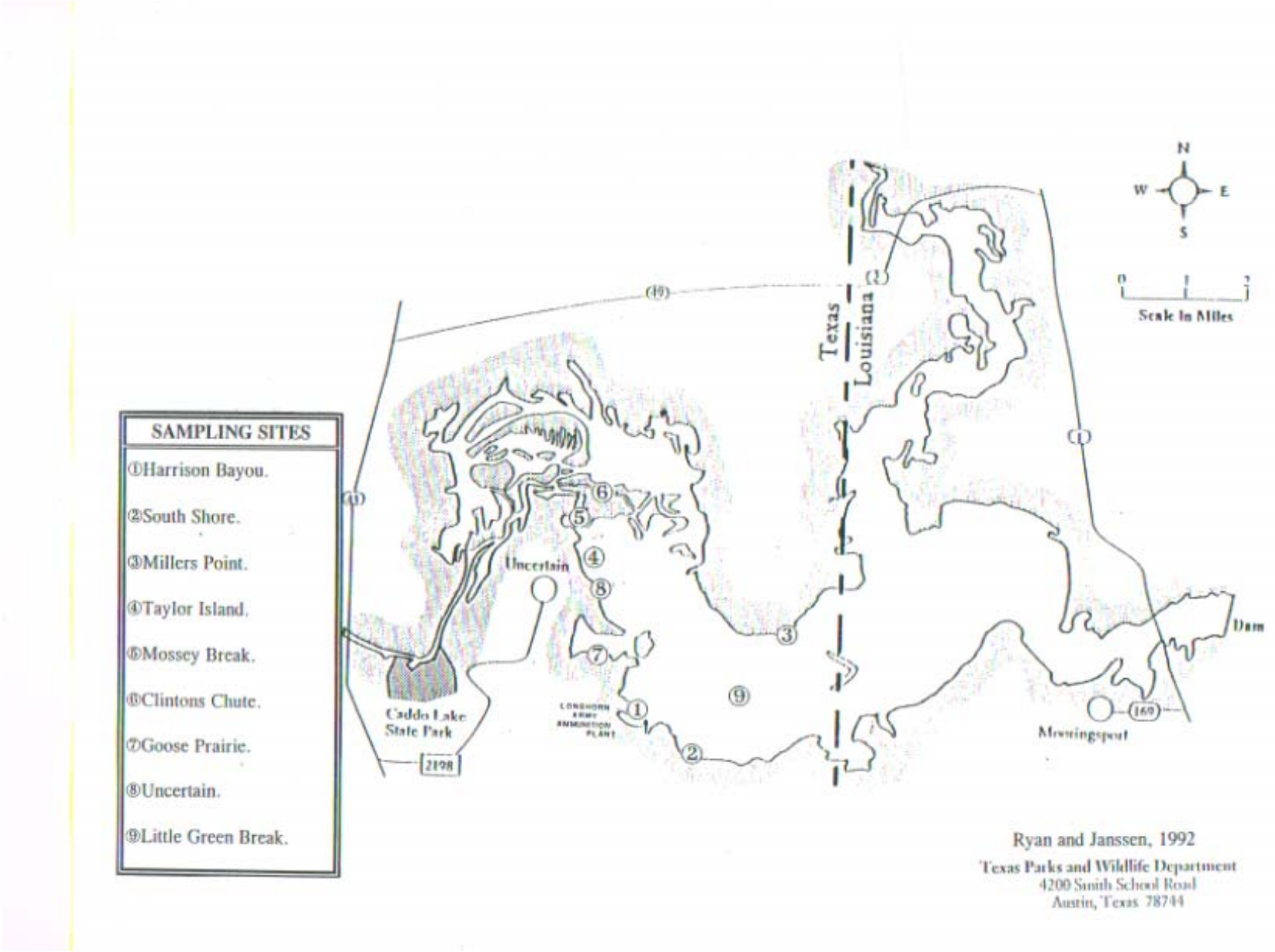
①Lone Star Steel.

②SH 155 Marina.

③Copeland Creek.

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS
1992

# FIGURE 4. CADDO LAKE.



as a natural impoundment of Cypress Creek resulting from a massive natural log jam. In 1914, a dam was constructed in Caddo Parish, Louisiana, so that the lake could be employed as a water supply source for the surrounding communities. This structure was replaced in 1971. The lake is approximately 12 miles (19 kilometers) long and has a conservation surface area of 26,800 acres (108.46 square kilometers) and a conservation storage capacity of 128,810 acre-feet (158.82 cubic hectometers) (USACOE, 1981). State water quality standards designate that water temperature should not exceed 90/F (32.22/C), DO levels should be no lower than 5.0 mg/l, pH should range from 6 - 8.5, chloride and sulfate concentrations should not exceed 25 mg/l, and TDS levels should not exceed 100 mg/l. In addition to public water supply, other designated uses of the lake by the State of Texas include contact recreation and high aquatic life (TNRCC, 1996b). Facilities permitted to discharge into the lake as of 1998 included Longhorn Army Ammunition Plant (Texas Permit No. WQ202713; NPDES Permit No. TX0000035; permitted to discharge 0.5 MGD), the Woodridge Limited Apartment Complex (Texas Permit No. WQ13474-001; NPDES Permit No. TX0104761; permitted to discharge 0.004 MGD), Swepco-Liberman (Louisiana Permit No. LA0002917), Athens Caddo Brick Co. (Louisiana Permit No.LA0045888), Caddo Parish Water District No.1 (Louisiana Permit No. LA0068438), Mooringsport STP (Louisiana Permit No. LA0044652), and the Mud Puppies Club (Louisiana Permit No. LAG530745). Longhorn Army Ammunition Plant is a federally owned armament production facility that occupies approximately 8,493 acres (3,437.12 square hectometers) immediately southwest and up gradient of Caddo Lake. This facility began munitions production in 1942 and continued operations until deactivated in 1997. In 1990, the facility was placed on the CERCLA National Priority List (NPL) because of groundwater and soil contamination by chlorinated solvents and spent explosives. In addition to the permitted facilities mentioned above, other potential sources of discharge into the lake include several active gas/oil production wells located in and around Caddo Lake. Minor crude oil and brine spills in the lake have been reported from these facilities since 1971 (TPWD, 1998). In 1995, the State of Texas imposed a fish consumption advisory at the lake for largemouth bass (*Micropterus salmoides*) and freshwater drum (*Aplodinotus grunniens*). This advisory was established because fish collected from the lake were detected to have total mercury levels comparable to the U.S. Food and Drug Administration (USFDA) total mercury action level of 1.0 mg/kg wet weight (USFDA, 1992). The scope of this advisory recommended that adults should consume no more than two meals, not to exceed 8 oz (226.80 g) of fish per serving per month, while children should consume no more than two meals, not to exceed 4 oz (113.40 g) of fish per serving per month (TDH, 1997). In the upper end of the lake, dissolved mercury concentrations in surface water samples have been detected to occasionally exceed the aquatic life protection criterion. In addition, dissolved zinc concentrations have been detected in surface water samples in excess of the aquatic life protection criterion in the middle of the lake (TNRCC, 1998).

## MATERIALS & METHODS

Surface water collection sites were selected above FM 115, at Panther Creek, and at Whippoorwill Bay in Cypress Springs Reservoir (Figure No. 2). At Lake O' The Pines, sampling sites were selected in the vicinity of Lone Star Steel, at the SH 155 Marina, and at Copeland Creek (Figure No. 3). In Caddo Lake, surface water sampling sites were selected at Harrison Bayou, South Little Green Break, and Clinton's Chute (Figure No. 4). Water temperature, DO, TDS, pH, and hardness were measured at depths of 1.0 and 3.0 feet (0.3 and 0.9 m) at each site with a Hydrolab Scout 2 submersible multiparameter water quality monitoring instrument (serial no. 12206). A single surface water grab sample was collected from each site (for a key to surface water samples, see Appendix B, Table III). All water samples were collected by direct immersion of rinsed polyethylene containers. Once collected, the samples were filtered on-site through a 0.45 micron mesh filter , preserved with nitric acid, and chilled. The samples were then submitted to a contract laboratory through the U.S. Fish and Wildlife Service's Patuxent Analytical Control Facility to be analyzed for dissolved aluminum, arsenic, barium, beryllium, boron, cadmium, chromium, copper, iron, magnesium, manganese, molybdenum, nickel, lead, selenium, strontium, vanadium, zinc, and total mercury content. Mercury concentrations were determined through the use of

a cold vapor atomic absorption spectrophotometer. Arsenic and selenium concentrations were determined by a graphite furnace technique, while all other metal concentrations were determined by inductively coupled plasma spectroscopy (for a synopsis of analytical methods, see Appendix C, method codes MC001, MC003, MC005, and MC007). The results of the analyses (Appendix D, Tables VII - IX) were compared to screening criteria protective of aquatic life and statistically analyzed using mainframe statistical analysis systems (SAS) to determine differences among the three lentic systems.

Sediment core samples were collected from the same three sites as mentioned above at Cypress Springs Reservoir and Lake O' The Pines (Figures No. 2 and No. 3). At Caddo Lake, sediment samples were collected at Harrison Bayou, South Little Green Break, and Goose Prairie (Figure No. 4). All sediment samples were collected to a depth of approximately 10 inches (25.4 cm), composited, and placed on ice until chilled. These samples were then submitted to a contract laboratory through the U.S. Fish and Wildlife Service's Patuxent Analytical Control Facility. Two samples from each collection site were analyzed for total aluminum, arsenic, barium, beryllium, boron, cadmium, chromium, copper, iron, magnesium, manganese, mercury, molybdenum, nickel, lead, selenium, strontium, vanadium, and zinc content. Mercury concentrations were determined through the use of a cold vapor atomic absorption spectrophotometer. Arsenic and selenium concentrations were determined by a graphite furnace technique, while all other metal concentrations were determined by inductively coupled plasma spectroscopy (for a synopsis of analytical methods, see Appendix C, method codes MC001, MC002, MC004, and MC006). A single sediment sample from each sampling site was analyzed for the PAH compounds 1,2-5,6-dibenzanthracene, 1,2-benzanthracene, 1-methylnaphthalene, 1-methylphenanthrene, 2,3,5-trimethylnaphthalene, 2,6-dimethylnaphthalene, 2-methylnaphthalene, C1-fluoranthenes & pyrenes, C1-chrysenes, C1-dibenzothiophenes, C1-fluorenes, C1-naphthalenes, C1-phenanthrenes, C2-chrysenes, C2-dibenzothiophenes, C2-fluorenes, C2-naphthalenes, C2-phenanthrenes, C3-chrysenes, C3-dibenzothiophenes, C3-fluorenes, C3-naphthalenes, C3-phenanthrenes, C4-chrysenes, C4-naphthalenes, C4-phenanthrenes, acenaphthalene, acenaphthene, anthracene, benzo(*a*)pyrene, benzo(*b*)fluoranthene, benzo(*e*)pyrene, benzo(*g,h,i*)perylene, benzo(*k*)fluoranthene, biphenyl, chrysene, dibenzothiophene, fluoranthene, fluorene, indeno(1,2,3-*cd*)pyrene, naphthalene, perylene, phenanthrene, and pyrene. Sediment samples collected from above FM 115 and Whippoorwill Bay at Cypress Springs Reservoir, from Lone Star Steel and Copeland Creek at Lake O' The Pines, and from Harrison Bayou and Goose Prairie at Caddo Lake were also analyzed for the aliphatic hydrocarbons n-decane, n-docosane, n-dodecane, n-dotriacontane, n-eicosane, n-heneicosane, n-hentriacontane, n-heptacosane, n-heptadecane, n-hexacosane, n-hexadecane, n-nonacosane, n-nonadecane, n-octacosane, n-octadecane, n-pentacosane, n-pentadecane, n-tetracosane, n-tetradecane, n-tetratriacontane, n-triacontane, n-tricosane, n-tridecane, n-tritriacontane, n-undecane, phytane, and pristane. PAH and aliphatic hydrocarbon concentrations were determined by a petroleum ether extraction technique (for a synopsis of analytical method, see Appendix C, method code MSCL004). A single sediment sample collected from each of the lentic bodies was analyzed for the organochlorine constituents hexachlorobenzene (HCB), total-polychlorinated biphenyls (PCB), alpha-benzene hexachloride (&-BHC), &-chlordane, beta-benzene hexachloride (&-BHC), cis-nonachlor, delta-benzene hexachloride (&-BHC), dieldrin, endrin, gamma-benzene hexachloride (&-BHC), &-chlordane, heptachlor epoxide, mirex, *o,p'*- dichlorodiphenyldichloroethane (DDD), *o,p'*-dichlorodiphenyldichloroethylene (DDE), *o,p'*- dichlorodiphenyltrichloroethane (DDT), oxychlordane, *p,p'*-DDD, *p,p'*-DDE, *p,p'*-DDT, toxaphene, and trans-nonachlor to determine residual pesticide content (for a key to sediment samples, see Appendix B, Table IV). Organochlorine concentrations were determined by the same petroleum ether procedure as mentioned above (for a synopsis of analytical method, see Appendix C, method code MSCL004). The results of the analyses were compared to screening criteria protective of aquatic life. In addition, the results of the metals analysis and the aliphatic hydrocarbon analysis were statistically analyzed using mainframe SAS to determine differences among the three lentic bodies.

Fish samples were collected from the same three sites at Cypress Springs Reservoir and Lake O' The Pines as previously discussed (Figures No. 2 and No. 3). At Caddo Lake, in addition to Harrison Bayou, South Little Green Break, and Goose Prairie, fish samples were collected at the South Shore, at Miller's Point, at Taylor Island, at Mossey Break, at Clinton's Chute, and in the vicinity of Uncertain (Figure No. 4). The fish collected included gizzard shad (*Dorosoma cepedianum*), killifish (*Fundulus* sp.), mosquitofish (*Gambusia affinis*), black bullhead (*Ictalurus melas*), channel catfish (*Ictalurus punctatus*), bluegill sunfish (*Lepomis macrochirus*), redear sunfish (*Lepomis microlophus*), spotted bass (*Micropterus punctulatus*), largemouth bass (*Micropterus salmoides*), white bass (*Morone chrysops*), and spotted gar (*Lepisosteus oculatus*) (for a key to fish samples, see Appendix B, Table V). All fish samples were collected using a direct-current-boom electrofishing boat. Once collected and prepared, whole body composite and fillet samples were wrapped in aluminum foil, preserved in ice, and frozen. All samples were submitted to contract laboratories through the U.S. Fish and Wildlife Service's Patuxent Analytical Control Facility for analysis. Whole body composite fish samples collected from the three lentic bodies and fillet samples collected from Caddo Lake were analyzed for the same total metal constituents as were the sediment samples. Fillet samples from Cypress Springs Reservoir and Lake O' The Pines were analyzed for total mercury content to address human health concerns. As with the surface water and sediment samples, mercury concentrations were determined through the use of a cold vapor atomic absorption spectrophotometer. Arsenic and selenium concentrations were determined by a graphite furnace technique, while all other metal concentrations were determined by inductively coupled plasma spectroscopy (for a synopsis of analytical methods, see Appendix C, method codes MC001, MC002, MC004, and MC006). In addition to the metals analyses, whole body composite samples and fillet samples were analyzed for the organochlorine compounds HCB, total-PCB, "-BHC, "-chlordane, $-BHC, dieldrin, endrin, (-BHC, (-chlordane, heptachlor epoxide, mirex, *o,p'*-DDD, *o,p'*-DDE, *o,p'*-DDT, oxychlordane, *p,p'*-DDD, *p,p'*-DDE, *p,p'*-DDT, toxaphene, and trans-nonachlor. Organochlorine content was determined by a soxhlet extraction technique (for a synopsis of analytical method, see Appendix C, method codes MC010 and MSCL001). Data resulting from these analyses were compared with criteria protective of fish and wildlife. In addition, the results of the metals analyses were statistically analyzed using mainframe SAS to determine differences in metal concentrations present in fish among the three lentic systems.

Whole body composite macroinvertebrate samples consisted of grass shrimp (*Palaemonetes* sp.) collected from macrophytic vegetation using dip nets (for a key to macroinvertebrate samples, see Table VI, Appendix B). These samples were collected from Caddo Lake at Harrison Bayou, South Shore, Millers Point, Taylor Island, Mossey Break, Goose Prairie, and Uncertain. Once collected, these samples were placed on ice until frozen and then submitted to a contract laboratory through the U.S. Fish and Wildlife Service's Patuxent Analytical Control Facility for analysis. Samples collected from Harrison Bayou, Millers Point, Taylor Island, Mossey Break, and Goose Prairie were analyzed for the same total metal constituents as mentioned above, while samples collected from the South Shore and Uncertain were analyzed only for mercury content (for a synopsis of analytical methods, see Appendix C, method codes MC001, MC002, MC004, and MC006). The resulting data were compared with criteria protective of fish and wildlife resources.

Seven great blue heron nestlings (*Ardea herodias*) were collected from Caddo Lake using a 12-gauge shotgun with steel shot. Once collected, these avian samples were preserved in ice until frozen. The samples were then submitted to a contract laboratory through the U.S. Fish and Wildlife Service's Patuxent Analytical Control Facility for analysis. The livers from these fledglings were analyzed for the same metal constituents as mentioned above, while the feathers and kidneys were analyzed for total mercury content (for a synopsis of analytical methods, see method codes Appendix C, MC001, MC002, MC004, and MC006). In addition, tissues from the fledgling samples were submitted to the National Biological Service, National Wildlife Health Center for histological analyses. Data resulting from these analyses were compared with previous studies conducted by the USFWS to evaluate contaminant trends.

## RESULTS & DISCUSSION

### Metals In Surface Water

Average surface water temperature, DO, TDS, pH, and hardness are summarized by depth from the three lentic bodies in Summary Table 1. The measured parameters fell within the State of Texas surface water

**Summary Table 1. Measured Water Quality Parameters Within The Three Lentic Systems.** (Note: DO is dissolved oxygen; and TDS is total dissolved solids)

| System | Cypress Springs | | Lake O' The Pines | | Caddo Lake | |
|---|---|---|---|---|---|---|
| Depth, meters | 0.3 | 0.9 | 0.3 | 0.9 | 0.3 | 0.9 |
| Temperature,/C | 30.5 | 29.9 | 30.6 | 29.6 | 26.8 | 26.5 |
| DO, mg/l | 8.51 | 7.88 | 7.46 | 6.68 | 3.73 | 3.58 |
| pH | 8.32 | 7.97 | 7.74 | 7.66 | 6.42 | 6.37 |
| TDS, mg/l | 85.8 | 85.1 | 97.8 | 97.4 | 67.3 | 67.2 |
| Hardness, mg/l | 35.0 | 34.6 | 37.0 | 37.0 | 28.0 | 27.3 |

quality standards established for each lentic body with the exception of DO at Caddo Lake. The low DO values could be attributed to normal biological respiration occurring within the shallow back waters where the samples were collected. However, minor fish kills which occurred in the summer of 1986 and the summer of 1993 at the lake were attributed to DO levels less than 0.5 mg/l (TPWD, 1998).

In analyzing the surface water samples, a one-way ANOVA (analysis of variance) with multiple range tests (MRTs) was used to determine statistical differences in metal concentrations present in the surface water among all three systems. Where concentrations were not detected above the detection limits, the conservative approach of selecting the numeric value immediately below the detection limit was employed for statistical purposes. The mean ($\bar{0}$) concentrations, reported in mg/l, for each metal analyte detected in surface water samples from the lentic bodies are reported in Summary Table 2.

Tukey's Studentized MRT ($p \$ 0.05$) and the Student-Newman-Keuls MRT ($p \$ 0.05$) demonstrated that there were no statistically significant differences in mean aluminum, boron, cadmium, chromium, copper, iron, manganese, nickel, strontium, vanadium, and zinc concentrations present in surface water samples collected from the three lentic systems. Barium concentrations were statistically significantly higher in Lake O' The Pines and Caddo Lake when compared to Cypress Springs Reservoir ($p < 0.05$). Mean magnesium concentrations were statistically significantly higher in Cypress Springs Reservoir and Lake O' The Pines in comparison to Caddo Lake ($p < 0.05$). Arsenic, beryllium, mercury, molybdenum, and selenium concentrations were below the detection limits (bdl) in all of the surface water samples collected.

**Summary Table 2. Results Of Surface Water - Metals Analyses For The Three Lentic Systems.** (Note: $\bar{0}$ (mean) is average concentration in mg/l; and bdl is below the analytical detection limit)

| Analyte | Cypress Springs ($\bar{0}$ in mg/l) | Lake O' The Pines ($\bar{0}$ in mg/l) | Caddo Lake ($\bar{0}$ in mg/l) |
|---|---|---|---|
| Aluminum (Al) | bdl | 0.027 | 0.027 |
| Arsenic (As) | bdl | bdl | bdl |
| Boron (B) | 0.076 | 0.085 | 0.080 |
| Barium (Ba) | 0.028 | 0.046 | 0.056 |
| Cadmium (Cd) | 0.006 | 0.006 | 0.006 |
| Chromium (Cr) | bdl | 0.002 | 0.001 |
| Copper (Cu) | 0.002 | 0.002 | bdl |
| Iron (Fe) | 0.031 | 0.370 | 0.717 |
| Magnesium (Mg) | 3.697 | 4.053 | 2.290 |
| Manganese (Mn) | 0.002 | 0.180 | 0.102 |
| Nickel (Ni) | 0.002 | 0.003 | 0.002 |
| Strontium (Sr) | bdl | 0.089 | 0.279 |
| Vanadium (V) | bdl | 0.001 | bdl |
| Zinc (Zn) | 0.004 | 0.005 | 0.005 |

Chronic aquatic life criteria addressing priority contaminants have been established by the federal and state governments to assure the protection of aquatic life within inland waters. These values are based on known chronic toxicological trends and are non-enforceable guidelines. Chronic toxicity refers to the effects of a toxicant to an organism or group of organisms over an extended time period and may be expressed in terms of an observation period equal to the lifetime of an organism or to the time span of more than one generation. Chronic effects often occur in the population rather than in the individual organism. Some chronic toxicological effects may be reversible, but most are not (USEPA, 1986). In the State of Texas, the equation $e^{(0.7852\,[\ln(\text{hardness})] - 3.490)}$ is used to determine chronic aquatic life protection criteria for cadmium detected in surface water (TNRCC, 1996a). Incorporating the measured hardness values into this equation, resulted in criteria values for cadmium of 0.0005 mg/l in Cypress Springs Reservoir and Lake O' The Pines, and 0.0007 mg/l for Caddo Lake. The detected concentrations were above these criteria in all three lentic bodies. Cadmium is listed as a priority pollutant by the United States Environmental Protection Agency (USEPA). This element is a rare heavy metal that is usually found as a natural component of zinc ores. Cadmium is used in electroplating, pigment production, and the manufacturing of plastic stabilizers and batteries (USEPA, 1994). Major anthropogenic sources releasing cadmium into an aquatic environment include particulate emissions from smelter operations, effluent and sludges discharged from municipal and industrial wastewater treatment facilities, fertilizers, and particulate emissions associated with incomplete combustion of fossil fuels (Eisler, 1985). Biologically, cadmium is neither essential nor beneficial (Hodges, 1977). The tolerable limit for cadmium consumed by humans is 0.055 mg/person/day. Chronic exposure in humans can result in renal damage and neurological birth defects (USEPA, 1994).

Lead concentrations were not detected above the detection limits in any of the water samples collected. Employing the measured hardness values into the equation $e^{(1.273\,[\ln(\text{hardness})] - 4.705)}$, which is used to calculate the State of Texas chronic aquatic life protection criteria for lead in surface waters, provided a criteria value of 0.0008 mg/l in Cypress Springs Reservoir, a value of 0.0009 mg/l in Lake O' The Pines, and a criteria value of 0.0006 mg/l in Caddo Lake. The detection limits (dl = 0.01 mg/l) used in the analysis of lead were greater than the surface water criteria in all three systems. Lead is listed by the USEPA as a priority pollutant and is a nonspecific poison affecting all body systems (Pain, 1996). It is used in pigment and chemical production, metallurgy and steel manufacturing, storage batteries, ceramics, petroleum products, cable sheathing, pipe and sheeting fabrication, ammunition production, and building construction. Major anthropogenic sources releasing lead into the environment include particulate

emissions from the incomplete combustion of fossil fuels in automobiles, emissions from lead mining and smelting operations, and discharges from municipal and industrial wastewater treatment facilities. When discharged into an aquatic environment, lead and its compounds tend to concentrate in the water surface micro layer, especially when surface organic materials are present in thin films, with the majority precipitated to the sediment as carbonates or hydroxides. In water, dissolved lead is typically more toxic than total lead and organic lead compounds are usually more toxic than inorganic lead compounds. (Eisler, 1988b).

Of the other detected metallic analytes, chromium, copper, nickel, and zinc concentrations were below the State of Texas chronic aquatic life protection criteria in surface water samples collected from all three lentic systems (TNRCC, 1996b). Aluminum, boron, and iron concentrations were below the federal ambient water quality criteria in all three systems (for water quality screening criteria, see Appendix J, Table XL). Barium, magnesium, manganese, strontium, and vanadium do not currently have designated acute or chronic aquatic life protection screening values for surface water. However, detected barium concentrations in all samples were below 50.0 mg/l which, according to the USEPA (1986), represents the concentration where toxicological effects to aquatic organisms would begin to be detected. According to Roline and Boehmke (1981), magnesium concentrations in water would have to exceed 500.0 mg/l to be toxic to aquatic organisms. Magnesium concentrations detected in the surface water samples from the watershed were well below this value. Detected manganese concentrations exceeded the worldwide average manganese concentration of 0.035 mg/l for surface waters in lentic and lotic systems (Wetzel, 1983). However, according to Wetzel (1983), surface water run-off from forest litter, especially coniferous forests, is often high in manganese. Strontium is used in metallurgy and the manufacturing of fireworks, red signal flares, and tracer bullets (Merck Index, 1983). Detected concentrations in Lake O' The Pines and Caddo Lake, systems which contain possible sources, were not statistically different than concentrations detected in Cypress Springs Reservoir, a system which has no known dischargers. Vanadium is a widespread element occurring naturally as a component of over 65 different minerals (Sax and Lewis, 1987). This element is used in the manufacturing of rust resistant steel and alloys, as a catalyst in synthetic rubber production, in x-rays, and to reduce mercuric and ferric salts to mercurous and ferrous salts in industrial processes (Merck Index, 1983; Sax and Lewis, 1987). The water sample collected in the vicinity of Lone Star Steel at Lake O' The Pines was the only sample which contained detectable levels of vanadium and this concentration was detected at the detection limit.

**Metals In Sediment**

Metal concentrations in sediment samples collected from the three lentic bodies (for results, see Appendix E, Tables X - XII), reported in dry weight, were statistically analyzed using a nested ANOVA with the same MRTs used in the analyses of the surface water data. Where concentrations were below the detection limits, the conservative approach of selecting the numeric value immediately below the detection limit was employed for statistical analyses. For each lentic body, the mean dry weight values for the metal analytes are reported in mg/kg in Summary Table 3.

Both MRTs demonstrated that there were no statistically significant differences in mean arsenic, boron, copper, iron, manganese, nickel, or selenium concentrations between the three systems ($p \geq 0.05$). Sediments collected from Caddo Lake demonstrated statistically significantly higher in mean concentrations of aluminum, barium, beryllium, mercury, magnesium, lead, strontium, and vanadium than the other two systems ($p < 0.05$). Mean cadmium and zinc concentrations in Lake O' The Pines

**Summary Table 3. Results Of Sediments - Metals Analyses For The Three Lentic Systems.** (Note: $\bar{0}$ is average concentration in mg/kg dry weight; and bdl is below the analytical detection limit)

| Analyte | Cypress Springs ($\bar{0}$ in mg/kg dry weight) | Lake O' The Pines ($\bar{0}$ in mg/kg dry weight) | Caddo Lake ($\bar{0}$ in mg/kg dry weight) |
|---|---|---|---|
| Al | 7110.0 | 6256.0 | 14,348.0 |
| As | 2.318 | 4.005 | 3.492 |
| B | bdl | bdl | 2.535 |
| Ba | 97.62 | 103.26 | 162.93 |
| Be | 0.570 | 0.840 | 1.018 |
| Cd | 0.507 | 1.142 | 0.732 |
| Cr | 9.632 | 9.473 | 16.870 |
| Cu | 7.343 | 7.430 | 12.662 |
| Fe | 10,890.0 | 15,935.0 | 14,615.0 |
| Hg | 0.066 | 0.108 | 0.237 |
| Mg | 928.80 | 475.60 | 1,148.10 |
| Mn | 325.63 | 377.41 | 224.07 |
| Ni | 9.288 | 8.527 | 14.428 |
| Pb | 11.182 | 39.323 | 51.245 |
| Se | bdl | 0.610 | 0.475 |
| Sr | 15.317 | 13.555 | 30.738 |
| V | 20.957 | 26.132 | 35.690 |
| Zn | 29.110 | 164.050 | 59.720 |

sediments were statistically higher than in samples collected from Cypress Springs Reservoir and Caddo Lake ($p < 0.05$). Molybdenum concentrations were below the detection limits in all sediment samples collected. Cadmium concentrations were detected in excess of the Ontario Ministry of the Environment lowest effect level (LEL) of 0.6 mg/kg in sediments collected from Lake O' The Pines and Caddo Lake (Persaud *et al.*, 1993). The LEL indicates a level of sediment contamination which is non-toxic to the majority of benthic organisms whereas the severe effect level (SEL) is indicative of contaminated sediments that would be detrimental to a majority of benthic organisms (Persaud *et al.*, 1993). These values are non-enforceable guidelines developed to assist in assessing the degree of contamination. Sediment samples collected in the vicinity of Lone Star Steel at Lake O' The Pines also contained detectable concentrations of cadmium ($\bar{0}$ = 2.12 mg/kg dry weight) which were in excess of the State of Texas sediment screening criteria 85th percentile value for reservoirs of 2.0 mg/kg (TNRCC, 1996b). The 85th percentile values were established by the State of Texas as screening criteria to assure the protection of aquatic life (TNRCC, 1996b). In the United States, background soil concentrations of cadmium are < 1.0 mg/kg and average approximately 0.4 mg/kg nation wide (Menzer, 1991).

Mercury concentrations detected in sediment collected from Caddo Lake exceeded the State of Texas sediment screening criteria 85th percentile value of 0.16 mg/kg (TNRCC, 1996b) and the Ontario LEL of 0.2 mg/kg (Persaud *et al.*, 1993). Sediment collected from the Goose Prairie sampling site had the highest concentrations ($\bar{0}$ = 0.483 mg/kg dry weight). In addition, mercury concentrations in sediment collected from Lake O' The Pines in the vicinity of Lone Star Steel ($\bar{0}$ = 0.187 mg/kg dry weight) also exceeded the State's reservoir sediment screening criteria. Mercury is listed by the USEPA as a priority pollutant and unlike most other metals, it not only concentrates in biological tissue, but also biomagnifies in concentration in successive trophic levels. Mercury is used in metallurgy, the preparation of dental amalgams, in switches, thermometers, barometers, pharmaceuticals, and the electrolytic preparation of chlorine. Historically, this element was also used in anti-fouling and mildew proofing of paints and in controlling fungal diseases in plants. Major anthropogenic sources of mercury include pulp and paper mills, mining and reprocessing of metallic ores, and the incomplete combustion of fossil fuels (Eisler,

1987a). Mercury can exist in many forms in an aquatic environment, including elemental mercury, dissolved and particulate ionic forms, and/or dissolved and particulate methylmercury (Wiener and Spry, 1996). The production of methylmercury by methylation of inorganic mercury in sediments and in the water column is dependant on microbial activity, nutrient content, pH, and alkalinity (Eisler, 1987a; Wiener and Spry, 1996).

Lead is a naturally occurring element within the soil (Eisler, 1988b). The measured soil median level of lead in the United States is 19.0 mg/kg (Shacklette an Boerngen, 1984). Mean lead concentrations in sediment samples collected from Lake O' The Pines and Caddo Lake exceeded the nationwide soil median value and were in excess of the Ontario LEL of 31.0 mg/kg (Persaud *et al.*, 1993). Sediment samples collected in the vicinity of Lone Star Steel at Lake O' The Pines ($\bar{x}$ = 83.27 mg/kg dry weight) and from Goose Prairie at Caddo Lake ($\bar{x}$ = 113.53 mg/kg dry weight) also exceeded the State of Texas sediment screening criteria 85th percentile value of 61.5 mg/kg (TNRCC, 1996b). The bioavailability of lead from sediments to aquatic fauna increases under conditions of low pH, low organic content, low suspended sediments, and low concentrations of calcium, iron, manganese, zinc, and cadmium salts (Eisler, 1988b). Depending on the concentration, lead can adversely affect survival, growth, and/or reproduction in all fish species, but unlike mercury, it does not undergo biomagnification with successive trophic regimes (Eisler, 1988b).

Zinc concentrations in sediment collected from Lake O' The Pines exceeded the State of Texas 85th percentile value of 120.0 mg/kg (TNRCC, 1996b) and the Ontario LEL of 120.0 mg/kg (Persaud *et al.*, 1993). The highest concentrations were detected in sediments collected in the vicinity of Lone Star Steel ($\bar{x}$ = 375.26 mg/kg dry weight). Zinc is a naturally occurring metallic element found in soil but is also listed by the USEPA as a priority pollutant. The U.S. soil median level for this element is 48.0 mg/kg (Shacklette an Boerngen, 1984). Zinc is used in the production of noncorrosive alloys and brass and in galvanizing steel and iron products. Major anthropogenic sources releasing zinc into the environment include electroplaters, smelting and ore processors, drainage from active and inactive mining operations, domestic and industrial sewage, combustion of fossil fuels and solid wastes, road surface runoff, corrosion of zinc alloys and galvanized surfaces, and erosion of agricultural soils. The majority of zinc introduced into an aquatic environment is partitioned into the sediment. Bioavailability from sediments is enhanced under conditions of high DO, low salinity, low pH, and high levels of inorganic oxides and humic substances. In fish, zinc is essential for normal growth and reproduction; however excess levels can result in teratogenic effects in developing fish. (Eisler, 1993).

Mean arsenic, chromium, copper, iron, manganese, and nickel concentrations were detected in sediments from the three lentic bodies in concentrations below the Ontario LEL values. None of the metal constituents analyzed were detected in concentrations that approached the Ontario SEL values (for sediment screening criteria, see Appendix J, Table XL). In addition, mean arsenic, barium, chromium, copper, manganese, nickel, and selenium concentrations were detected in sediments from the three systems in concentrations below the State screening criteria (for sediment screening criteria, see Appendix J, Table XL). Sediment screening criteria for aluminum, boron, beryllium, iron, magnesium, strontium, and vanadium have not been developed by the State of Texas. Detected aluminum, boron, iron, magnesium, strontium, and vanadium concentrations in sediments from the three systems were all below U.S. soil median values (for median soil values, see Appendix J, Table XLI). Based on the assumption that mineral composition of sediments within a watershed reflect the mineral composition of surrounding soils and recognizing that sediments experience different geophysical processes, the detected concentrations do not appear to be elevated. Detected beryllium concentrations in sediments were above the U.S. soil median of 0.63 mg/kg dry weight in Lake O' The Pines and Caddo Lake, but well within the national range of $<$ 1.0 - 15.0 mg/kg dry weight (Shacklette and Boerngen, 1984).

## Hydrocarbons In Sediment

Polycyclic aromatic hydrocarbons compounds consist of hydrocarbons arranged in the form of two or more fused benzene rings in linear, angular, or cluster arrangements which may or may not have substituted groups attached to one or more of the rings. Lower molecular weight PAHs (molecular weight < 202.26) contain two or three benzene rings that often exhibit acute toxicity but are generally noncarcinogenic. High molecular weight PAHs (molecular weight $ 202.26) contain four to seven benzene rings and are considered carcinogenic, mutagenic and/or teratogenic to fish, birds, and mammals (Eisler, 1987b). Lower molecular weight PAHs undergo biodegradation more rapidly than heavy molecular weight PAHs and are more water soluble (USDOD, 1994). Sources of PAHs include coke production in the iron and steel industry, catalytic cracking in the petroleum industry, manufacturing of carbon black, coal tar pitch, asphalt, heating and power generation, refuse incineration, open burning, and emissions from internal combustion engines. Almost all surface waters within the United States contain PAHs in the :g/l and/or ng/l range. Typically, these compounds are released into aquatic environments by petroleum or oil spills, surface water run-off, industrial and municipal sewage discharges, and deposition of airborne particulates. PAHs in water may evaporate, disperse in the water column, or become incorporated into the sediments (Eisler, 1987b). In the PAH - sediment analysis, 93% of the analytical results (367 of 396 possibilities) demonstrated PAH values that were detected at or below the detection limits, consequentially statistical analyses were not employed in interpreting the PAH data (for analytical results, see Appendix F, Tables XIII - XV). Of the 44 PAH compounds analyzed, four were detected at or above the analytical detection limits in sediments collected from Cypress Springs Reservoir, 18 were detected at or above the detection limits in Lake O' The Pines, and nine were detected at or above the detection limits in sediments from Caddo Lake. Detected concentrations, reported in mg/kg dry weight, are summarized for sediments from each sampling site within the three lentic systems in Summary Table 4.

Of the detected compounds, acenaphthalene, anthracene, C1-naphthalene, fluoranthene, 1-methylnaphthalene, 2-methylnaphthalene, naphthalene, and phenanthrene are low molecular weight PAHs. Benzo(*g,h,i*)perylene, benzo(*k*)fluoranthene, perylene, and pyrene are heavy molecular weight compounds. Benzo(*e*)pyrene, chrysene, and indeno(1,2,3-*cd*)pyrene are heavy molecular weight PAH compounds that are considered weak carcinogens. Benzo(*b*)fluoranthene, 1,2,5,6-dibenzanthracene, and 1,2-benzanthracene are carcinogenic heavy molecular weight compounds, while benzo(*a*)pyrene is a heavy molecular weight PAH that is considered strongly carcinogenic (Eisler, 1987b; Merck Index, 1983; Verschueren, 1983). All of these compounds are considered semi-volatile (TNRCC, 1996b).

According to Long and others (1995), the low effects range (ER-L) of a detected chemical represents the lower 10th percentile of toxicological effects data for that specific chemical, whereas the median effects range (ER-M) represents the toxicological effects data for the chemical at the 50th percentile. Concentrations detected below the ER-L represent a value where minimal effects would be expected, whereas concentrations detected at or above the ER-L but below the ER-M, represent a possible effects range. Concentrations detected at or above the ER-M represent a probable effects range where adverse toxicological effects would frequently occur (Long *et al.*, 1995). As with the Ontario LEL and SEL values, ER-L and ER-M values are non-enforceable screening guidelines. In addressing compounds detected in sediments collected from all three lentic systems, naphthalene is listed as a priority pollutant by the USEPA and is the most abundant single component of coal tar. It is used in the manufacturing of solvents, lubricants, and motor fuels. This compound volatizes at room temperature and is insoluble in

**Summary Table 4. Results Of Sediments - PAH Analyses For The Three Lentic Systems.** (Note: bdl is below the analytical detection limit)

| Cypress Springs Reservoir | | | |
|---|---|---|---|
| Analyte | FM 115 (mg/kg dry weight) | Panther Creek Arm (mg/kg dry weight) | Whippoorwill Bay (mg/kg dry weight) |
| 2-methylnaphthalene | 0.019 | 0.018 | 0.015 |
| C1-naphthalene | 0.019 | 0.018 | 0.044 |
| naphthalene | 0.019 | 0.018 | 0.015 |
| perylene | 0.698 | 0.330 | 0.059 |
| Lake O' The Pines | | | |
| Analyte | Lone Star Steel (mg/kg dry weight) | SH 155 Marina (mg/kg dry weight) | Copeland Creek (mg/kg dry weight) |
| 1,2-5,6-dibenzanthracene | 0.081 | bdl | bdl |
| 1,2-benzanthracene | 0.210 | bdl | bdl |
| 1-methylnaphthalene | 0.016 | bdl | bdl |
| 2-methylnaphthalene | 0.032 | 0.036 | 0.017 |
| C1-naphthalene | 0.048 | 0.036 | 0.017 |
| acenaphthalene | 0.032 | bdl | bdl |
| anthracene | 0.098 | bdl | bdl |
| benzo(*a*)pyrene | 0.258 | bdl | bdl |
| benzo(*b*)fluoranthene | 0.274 | 0.073 | bdl |
| benzo(*e*)pyrene | 0.194 | bdl | bdl |
| benzo(*g,h,i*)perylene | 0.210 | bdl | bdl |
| benzo(*k*)fluoranthene | 0.242 | bdl | bdl |
| chrysene | 0.290 | bdl | bdl |
| fluoranthene | 0.290 | bdl | bdl |
| indeno(1,2,3-*cd*)pyrene | 0.210 | bdl | bdl |
| naphthalene | 0.065 | 0.036 | 0.017 |
| perylene | 0.258 | 1.164 | 0.252 |
| phenanthrene | 0.081 | bdl | bdl |
| pyrene | 0.226 | bdl | bdl |
| Caddo Lake | | | |
| Analyte | Harrison Bayou (mg/kg dry weight) | Goose Prairie (mg/kg dry weight) | Little Green Break (mg/kg dry weight) |
| 1,2-benzanthracene | bdl | bdl | 0.017 |
| 2-methylnaphthalene | 0.054 | 0.044 | 0.017 |
| C1-naphthalene | 0.054 | 0.044 | 0.017 |
| benzo(*a*)pyrene | bdl | bdl | 0.017 |
| chrysene | bdl | bdl | 0.017 |
| fluoranthene | bdl | bdl | 0.017 |
| naphthalene | 0.054 | 0.044 | 0.017 |
| perylene | 0.919 | 0.356 | 1.707 |
| pyrene | bdl | bdl | 0.052 |

water (Verschueren, 1983). Detected C1-naphthalene and naphthalene concentrations were less than the ER-L value of 0.16 mg/kg dry weight. Detected concentrations of 2-methylnaphthalene were below the ER-L value of 0.07 mg/kg dry weight (Long *et al.*, 1995).

In sediments collected from Lake O' The Pines and Caddo Lake, chrysene, a listed priority pollutant, was detected in concentrations below the ER-L value of 0.38 mg/kg dry and below the Ontario LEL of 0.34 mg/kg dry weight (Persaud *et al.*, 1993; Long *et al.*, 1995). Benzo(*a*)pyrene, another listed priority pollutant, was detected below the ER-L value of 0.43 mg/kg dry weight and the Ontario LEL value 0.37 mg/kg dry weight (Persaud *et al.*, 1993; Long *et al.*, 1995). Fluoranthene and pyrene, both listed priority pollutants, were detected below the respective ER-L values of 0.6 mg/kg dry weight and 0.67 mg/kg dry weight (Long *et al.*, 1995) and below the respective Ontario LEL values of 0.75 mg/kg dry weight and 0.49 mg/kg dry weight (Persaud *et al.*, 1993).

In sediment collected in the vicinity of Lone Star Steel at Lake O' The Pines, the detected phenanthrene concentration was below the ER-L value of 0.24 mg/kg dry weight and the Ontario LEL value of 0.56 mg/kg dry weight (Persaud *et al.*, 1993; Long *et al.*, 1995). Phenanthrene is a component of coal tar that is used in the manufacturing of dyes and explosives (Sax, 1987) and is also listed by the USEPA as a priority pollutant. Acenaphthalene and anthracene, both listed as priority pollutants, were detected below the respective ER-L values of 0.044 mg/kg dry weight and 0.085 mg/kg dry weight (Long *et al.*, 1995). Dibenz(*a,h*)anthracene, also known as 1,2-5,6-dibenzanthracene, is a component of wood preservative sludge, gasoline, and coal tar (Verschueren, 1983). The detected concentration exceeded the ER-L value of 0.0634 mg/kg dry weight and the Ontario LEL value of 0.06 mg/kg dry weight. However, the detected concentration was well below the ER-M value of 260.0 mg/kg dry weight and the Ontario SEL value of 130.0 mg/kg dry weight (Persaud *et al.*, 1993; Long *et al.*, 1995). Benzo(*k*)fluoranthene and indeno(1,2,3-*cd*)pyrene concentrations were detected just above the respective Ontario LEL values of 0.24 mg/kg dry weight and 0.2 mg/kg dry weight (Persaud *et al.*, 1993). Detected concentrations of benzo(*g,h,i*)perylene, a component of motor oil, gasoline, and crude oil (Verschueren, 1983), were above the Ontario LEL value of 0.17 mg/kg dry weight, but well below the Ontario SEL value of 320.0 mg/kg dry weight (Persaud *et al.*, 1993).

ER-L, ER-M, LEL, and SEL screening guidelines have not been developed for the remaining detected PAH compounds. Chronic aquatic life protection criteria for PAH compounds in sediments for lentic systems within the Cypress Creek watershed have not been developed by the State of Texas. However, the State has developed aquatic life criteria for lotic sediments for certain PAH compounds within the watershed. For the priority pollutant benzo(*b*)fluoranthene, the lotic screening value for sediments is 0.67 mg/kg dry weight (TNRCC, 1996b). This compound was detected at concentrations below this value in sediments collected in the vicinity of Lone Star Steel and from the SH 155 Marina at Lake O' The Pines. Of the remaining detected PAH compounds, 1-methylnaphthalene was detected at the detection limit in sediments collected from Lake O' The Pines. The listed priority pollutant 1,2-benzanthracene is a component of crude oil, gasoline, and wood preserving sludge (Verschueren, 1983). This compound was detected in sediments from Caddo Lake at the detection limit but above the analytical detection limits in sediments collected from Lake O' The Pines. Benzo(*e*)pyrene is a component of crude oil, gasoline, motor oils, lubricating oils, coal tar, and asphalts (Verschueren, 1983). Perylene is a component of motor oils, gasoline, coal tar, and crude oil (Verschueren, 1983). This compound was the only PAH compound that was detected above the detection limits in all of the sediments sampled.

Aliphatic hydrocarbon concentrations in sediment samples collected from the three lentic bodies (for results, see Appendix F, Table XVI), reported in dry weight, were statistically analyzed using a nested ANOVA with multiple range tests. Where concentrations were below the analytical detection limits, the conservative approach of selecting the numeric value immediately below the detection limit was employed for statistical analyses. For each lentic body, the mean dry weight values for the aliphatic hydrocarbon analytes are reported in mg/kg in Summary Table 5.

**Summary Table 5. Results Of Sediments - Aliphatic Hydrocarbon Analyses For The Three Lentic Systems.** (Note: bdl is below the detection limit)

| Analyte | Cypress Springs (mg/kg dry weight) | Lake O' The Pines (mg/kg dry weight) | Caddo Lake (mg/kg dry weight) |
|---|---|---|---|
| n-docosane | 0.046 | 0.049 | 0.523 |
| n-dotriacontane | 0.063 | 0.040 | bdl |
| n-eicosane | 0.036 | 0.049 | 0.256 |
| n-heneicosane | 0.054 | 0.066 | 0.856 |
| n-hentriacontane | 0.480 | 0.576 | 1.478 |
| n-heptacosane | 0.267 | 0.284 | 1.745 |
| n-heptadecane | 0.141 | 0.099 | 0.811 |
| n-hexacosane | 0.099 | 0.129 | 0.667 |
| n-hexadecane | bdl | 0.016 | bdl |
| n-nonacosane | 0.502 | 0.634 | 2.367 |
| n-nonadecane | 0.191 | 0.091 | 0.700 |
| n-octacosane | 0.189 | 0.163 | 1.589 |
| n-octadecane | bdl | 0.016 | 0.156 |
| n-pentacosane | 0.138 | 0.179 | 1.478 |
| n-pentadecane | bdl | 0.016 | 0.122 |
| n-tetracosane | 0.070 | 0.097 | 0.767 |
| n-tetradecane | bdl | 0.024 | bdl |
| n-tetratriacontane | 0.026 | 0.096 | 0.411 |
| n-triacontane | 0.136 | 0.139 | 3.200 |
| n-tricosane | 0.175 | 0.179 | 1.622 |
| n-tritriacontane | 0.199 | 0.456 | 0.767 |
| n-undecane | bdl | 0.016 | bdl |
| phytane | 0.046 | 0.041 | 0.889 |
| pristane | bdl | 0.083 | 0.367 |

Both of the MRTs performed on this data demonstrated that there were no statistically significant differences in n-docosane, n-eicosane, n-heneicosane, n-heptacosane, n-heptadecane, n-hexacosane, n-hexadecane, n-octadecane, n-pentacosane, n-tetracosane, n-tetradecane, n-tricosane, n-undecane, phytane, and pristane concentrations present in sediments among the three systems ($p \geq 0.05$). Sediments collected from Caddo Lake contained n-nonadecane and n-pentadecane concentrations which were statistically significantly higher than in sediments collected from the other two systems ($p < 0.05$). The aliphatic hydrocarbons n-decane, n-dodecane, and n-tridecane were not detected above the detection limits in sediment samples collected from any of the three lentic systems. In Cypress Springs Reservoir and Caddo Lake, n-hexadecane, n-tetradecane, and n-undecane concentrations were below the detection limits. In addition, the compounds n-octadecane, n-pentadecane, and pristane were not detected above the detection limits in Cypress Springs Reservoir. The compounds n-dotriacontane, n-hentriacontane, n-nonacosane, n-octacosane, n-tetratriacontane, n-triacontane, and n-tritriacontane were excluded from the statistical analyses and data interpretation because the values presented were considered estimates by the analytical laboratory and could be off by as much as a factor of two (for explanation, see method code Appendix C, MSCL004).

Aliphatic hydrocarbons are found in plants, crude oil, motor oil and almost all other petroleum products. Concentrations of these compounds in sediment can be indicative of oil and/or petroleum spills and contamination. These compounds can also be found in industrial and municipal wastewater, sludge and even occur naturally in low concentrations (Irwin, 1988). Aliphatics tend to be less toxic and carcinogenic than PAH compounds (Irwin, 1989). Even though only two of the compounds analyzed were statistically higher in Caddo Lake than in the other two systems, 12 of the remaining 15 detected compounds were

detected in greater concentrations in sediment from Caddo Lake which contains the largest number of active gas and oil production wells. However, historically all three systems have experienced oil and brine spills from production wells documented since the early 1970s (TPWD, 1998).

### Organochlorines In Sediment

Sediment samples were also analyzed for 22 organochlorine compounds, including PCBs. None of these compounds were detected in concentrations above the detection limits in any of the sediment samples collected from the three lentic systems (for results, see Table XVII, Appendix G).

### Metals In Fish

In aquatic trophic classifications, gizzard shad, channel catfish, and bullhead catfish can be considered omnivorous species. Killifish, mosquitofish, bluegill sunfish, and redear sunfish are considered insectivorous feeders, while spotted gar and bass are considered piscivorous (Kolbe and Luedke, 1993). One hundred- sixteen whole body composite fish samples (15 from Cypress Springs Reservoir, 15 from Lake O' The Pines, and 86 from Caddo Lake) representing the three trophic levels were analyzed for 19 metal constituents (for results, see Appendix H, Tables XVI - XXVI). Metal concentrations from omnivorous, insectivorous, and piscivorous fish species common to all three lentic bodies were statistically analyzed using a nested ANOVA with multiple range tests. Where concentrations were not detected above the detection limits, the conservative approach of selecting the numeric value immediately below the detection limit was employed for statistical purposes. The mean wet weight values for the metal analytes in the three species from each lentic body are reported in mg/kg in Summary Table 6.

For all three fish species, both Tukey's Studentized Range Test ($p \leq 0.05$) and the Student-Newman-Keuls Test ($p \leq 0.05$) demonstrated that there were no statistically significant differences in copper, iron, nickel, or strontium concentrations among the three lentic systems. These MRTs also demonstrated that among the three systems, there were no statistically significant differences in barium, boron, chromium, iron, magnesium, manganese, and zinc concentrations in spotted gar samples, no statistically significant differences in arsenic, lead, selenium, and zinc concentrations in gizzard shad, and no statistically significant differences in chromium, magnesium, lead, and vanadium levels in redear sunfish samples ($p \leq 0.05$).

In spotted gar samples, beryllium, cadmium, molybdenum, and vanadium were not detected above the detection limits in any of the samples collected. Mean mercury and selenium concentrations were statistically significantly higher in Caddo Lake than in the other two systems ($p < 0.05$). Arsenic levels were statistically higher in gar collected from Cypress Springs Reservoir and Caddo Lake than in samples from Lake O' The Pines ($p < 0.05$). Mean aluminum and lead concentrations were statistically significantly higher in samples collected from Cypress Springs Reservoir and Lake O' The Pines than in Caddo Lake ($p < 0.05$).

For gizzard shad, molybdenum concentrations were below the detection limits in all three lentic bodies. Barium, cadmium, and manganese concentrations were statistically significantly higher in shad from

**Summary Table 6. Mean (0) Results Of The Fish - Metals Analyses For The Three Lentic Systems in mg/kg Wet Weight.** (Note: bdl is below the analytical detection limit)

| Analyte | Cypress Springs | | | Lake O' The Pines | | | Caddo Lake | | |
|---|---|---|---|---|---|---|---|---|---|
| | Spotted Gar | Gizzard Shad | Redear Sunfish | Spotted Gar | Gizzard Shad | Redear Sunfish | Spotted Gar | Gizzard Shad | Redear Sunfish |
| Al | 3.80 | 136.40 | 20.73 | 3.27 | 170.52 | 7.65 | 1.03 | 72.58 | 18.74 |
| As | 0.19 | 0.36 | 0.27 | 0.07 | 0.31 | 0.09 | 0.27 | 0.33 | 0.14 |
| B | 0.66 | 0.75 | 1.69 | 0.66 | 0.62 | 0.61 | bdl | 0.32 | 0.18 |
| Ba | 6.88 | 8.24 | 13.57 | 8.08 | 9.16 | 7.18 | 9.61 | 13.56 | 7.92 |
| Be | bdl | bdl | bdl | bdl | 0.02 | bdl | bdl | 0.01 | bdl |
| Cd | bdl | bdl | bdl | bdl | bdl | bdl | bdl | 0.04 | bdl |
| Cr | 1.10 | 0.84 | 0.66 | 1.16 | 0.87 | 0.63 | 1.31 | 0.65 | 1.51 |
| Cu | 1.13 | 0.92 | 0.44 | 0.66 | 1.27 | 0.50 | 2.10 | 5.36 | 2.04 |
| Fe | 51.58 | 278.17 | 51.10 | 54.00 | 451.17 | 38.03 | 50.66 | 441.53 | 46.53 |
| Hg | 0.20 | 0.044 | 0.060 | 0.21 | 0.030 | 0.049 | 0.38 | 0.035 | 0.133 |
| Mg | 3673.3 | 391.67 | 448.33 | 3770.0 | 354.83 | 450.33 | 2761.5 | 327.99 | 485.10 |
| Mn | 26.73 | 56.02 | 14.70 | 31.03 | 66.58 | 9.65 | 38.99 | 176.24 | 19.78 |
| Mo | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | 0.18 |
| Ni | 1.06 | 0.36 | 0.17 | 0.57 | 0.37 | 0.13 | 1.72 | 1.63 | 0.25 |
| Pb | bdl | bdl | bdl | bdl | 0.61 | bdl | 0.41 | 0.62 | 0.49 |
| Se | 0.19 | 0.25 | 0.22 | 0.19 | 0.20 | 0.23 | 0.37 | 0.28 | 0.53 |
| Sr | 96.70 | 32.15 | 59.60 | 99.85 | 29.70 | 71.97 | 135.02 | 38.10 | 64.43 |
| V | bdl | 0.39 | 0.14 | bdl | 0.57 | 0.14 | bdl | 0.25 | 0.13 |
| Zn | 22.52 | 13.43 | 20.13 | 23.43 | 14.90 | 21.47 | 21.52 | 17.06 | 27.64 |

Caddo Lake than in the other two systems ($p < 0.05$). Aluminum, boron, and chromium levels were statistically significantly higher in shad samples collected from Cypress Springs Reservoir and Lake O' The Pines than in samples collected from Caddo Lake ($p < 0.05$). Beryllium and vanadium concentrations were statistically higher in Lake O' The Pines than in the other two systems ($p < 0.05$). Mercury concentrations were statistically significantly higher in shad from Cypress Springs Reservoir and Caddo Lake than shad collected from Lake O' The Pines ($p < 0.05$). Magnesium concentrations in shad were statistically higher in Cypress Springs Reservoir than in the other two lentic bodies ($p < 0.05$).

In redear sunfish samples, cadmium concentrations were not detected above the detection limits in any of the three lentic systems. Beryllium concentrations were detected above the detection in only one sample. This sample was collected at Clinton's Chute and the detected value was 0.03 mg/kg wet weight compared to a detection limit of 0.02 mg/kg wet weight. Arsenic, boron, and barium concentrations were statistically significantly higher in Cypress Springs Reservoir than in the other two systems ($p < 0.05$). Mercury, molybdenum, selenium, and zinc concentrations in redear sunfish were statistically significantly higher in Caddo Lake than in Lake O' The Pines and Cypress Springs Reservoir ($p < 0.05$). Aluminum and manganese levels were statistically higher in Cypress Springs Reservoir and Caddo Lake than in Lake O' The Pines ($p < 0.05$).

Based on dietary thresholds, predator protection limits are recommended concentrations below which no adverse toxicological effects are observed. As with the ER-L, ER-M, LEL, and SEL values previously discussed, predator protection limits are non-enforceable guidelines developed to assist in determining levels of contamination. Fish collected from Cypress Springs Reservoir and Lake O' The Pines did not contain chromium levels in excess of the predator protection limit of 4.0 mg/kg dry weight (Eisler, 1986a). Spotted gar collected from Caddo Lake at Harrison Bayou (0 = 4.06 mg/kg dry weight), the South Shore (0 = 4.23 mg/kg dry weight), Millers Point (0 = 5.44 mg/kg dry weight), Goose Prairie

($\bar{x}$ = 4.03 mg/kg dry weight), and Uncertain (one sample = 4.48 mg/kg dry weight) contained chromium concentrations in excess of the avian predator protection limit. Redear sunfish collected from Harrison Bayou ($\bar{x}$ = 6.84 mg/kg dry weight), the South Shore ($\bar{x}$ = 6.19 mg/kg dry weight), Millers Point ($\bar{x}$ = 4.5 mg/kg dry weight), Mossey Break ($\bar{x}$ = 5.02 mg/kg dry weight), Uncertain ($\bar{x}$ = 4.58 mg/kg dry weight), and Little Green Break ($\bar{x}$ =10.38 mg/kg dry weight ) also contained levels exceeding the predator protection limit (see Appendix H, Tables XXB - XXIIB, XXIVB, XXVIIB, and XXVIIIB). Chromium is listed by the USEPA as a priority pollutant and is a known teratogen, mutagen, and carcinogen. This element is used in metallurgy and chemical industries. Major anthropogenic sources releasing chromium into the environment include tanning wastes, particulate emissions from the incomplete combustion of coal, electroplating and metal finishing wastes, wastewater released from municipal and industrial sources, iron and steel foundries emissions, and particulate emissions from municipal incinerators. The amount of chromium released into an aquatic ecosystem by atmospheric deposition can be four to six times greater than the volume attributed to direct discharges of liquid wastes. Bioavailability and toxicity of chromium in an aqueous environment are more dependant on physical processes such as hydrolysis, precipitation, pH, temperature, hardness, and salinity rather than direct adsorption and bioaccumulation (Eisler, 1986a).

Mercury is toxic and has no known essential function in vertebrate organisms. Toxicologically, the target organ for mercury in vertebrates is the central nervous system. In fish, 95% to 99% of mercury present is in the form of methylmercury even though very little of the total mercury in water and sediment exists as methylmercury. Inorganic mercury is absorbed much less efficiently and eliminated much more rapidly than methylmercury. In addition, inorganic mercury does not readily methylate in tissues, but can be methylated within the digestive tract. Fish tend to obtain the majority of methylmercury from their diet and to a lesser extent, from water passing over the gills (Wiener and Spry, 1996). Spotted gar, the largest piscivorus species collected within the watershed, contained mercury levels in excess of the avian predator protection level of 0.1 mg/kg wet weight in all three lentic bodies. Redear sunfish collected from Caddo Lake also contained mercury levels in excess of the avian predator protection limit. However, neither the gar nor the redear sunfish samples contained mercury concentrations in excess of the recommended mammalian predator protection limit of 1.1 mg/kg wet weight (Eisler, 1987a).

Redear sunfish collected from Caddo Lake contained concentrations of selenium in excess of the recommended predator protection limit of 0.5 mg/kg wet weight (Irwin, 1988). Selenium is a trace element that is present in coal, crude oil, oil shale, coal conversion materials and their waste products, and is released into the environment principally through the procurement, processing, and combustion of fossil fuels. It can be leached directly from coal mining, preparation, and storage sites and is highly concentrated in fly and bottom ash. In fish, selenium tends to accumulate in hepatic and renal tissue. Elevated levels can result in reduced growth, reproductive failure, and mortality (Lemly, 1996). Fish consumption advisories for selenium were established by the State of Texas for Welsh Reservoir and Martin Creek Reservoir in 1992. Welsh Reservoir is located in Titus County, Texas, within the Cypress Creek watershed between Cypress Springs Reservoir and Lake O' The Pines. Martin Creek Reservoir is located within the Sabine River watershed, immediately south of the Cypress Creek drainage, in Rusk and Panola Counties, Texas. These advisories state that adults should consume no more than one meal, not to exceed 8.0 oz (226.80 g) of fish per serving per week, while children, older than six, should consume no more than one meal, not to exceed 4.0 oz (113.40 g) of fish per serving per week. Children under six and pregnant women should not consume any fish collected from either of these lentic bodies (TDH, 1997).

Whole body composite bass, bluegill sunfish, and mosquitofish samples collected from Caddo Lake were also analyzed for the same metal constituents. Results from these analyses, with the exception of mosquitofish data, were statistically analyzed with a one-way ANOVA and MRTs to determine differences among sampling sites at Caddo Lake. Where concentrations were below the detection limits, the

conservative approach of selecting the numeric value immediately below the detection limit was employed for statistical purposes. Due to the limited sample size, no statistical analyses were conducted on the mosquitofish samples. The mean wet weight values for the metal analytes are reported in mg/kg for each of the three species in Summary Table 7.

**Summary Table 7. Fish - Metals Analyses Results For Caddo Lake.** (Note: bdl is below detection limit)

| Analyte | Caddo Lake | | |
|---|---|---|---|
| | Bass (0 in mg/kg wet weight) | Bluegill Sunfish (0 in mg/kg wet weight) | Mosquitofish (0 in mg/kg wet weight) |
| Al | 1.31 | 10.44 | 6.20 |
| As | 0.19 | 0.27 | 0.22 |
| B | 0.41 | bdl | bdl |
| Ba | 4.31 | 12.68 | 14.05 |
| Cr | 0.54 | 0.63 | 0.62 |
| Cu | 3.68 | 0.76 | 1.88 |
| Fe | 18.12 | 47.05 | 71.6 |
| Hg | 0.29 | 0.13 | 0.03 |
| Mg | 456.70 | 513.70 | 333.00 |
| Mn | 7.18 | 65.77 | 82.85 |
| Ni | 0.23 | 0.12 | 0.60 |
| Pb | 0.54 | bdl | bdl |
| Se | 0.34 | 0.34 | 0.40 |
| Sr | 67.91 | 92.24 | 30.45 |
| V | bdl | 0.07 | bdl |
| Zn | 16.04 | 27.20 | 38.55 |

Beryllium, cadmium, and molybdenum concentrations were below the analytical detection limits for all three species sampled. In whole body composite bass samples, there were no statistically significant differences in mean aluminum, boron, barium, chromium, copper, mercury, magnesium, manganese, nickel, lead, selenium, strontium, and zinc concentrations among the sampling stations ($p \geq 0.05$). Statistically significant differences were demonstrated in arsenic and iron concentrations among the sampling sites ($p < 0.05$). The samples collected at South Little Green Break contained the highest arsenic levels ($0 = 0.3$ mg/kg wet weight) while samples collected at the South Shore contained the highest concentrations of iron ($0 = 30.15$ mg/kg wet weight). Vanadium concentrations were not detected above the analytical detection limits in any of the bass samples collected.

For bluegill sunfish samples, there were no statistically significant differences in arsenic, chromium, copper, magnesium, nickel, selenium, strontium, and zinc concentrations among the sampling stations ($p \geq 0.05$). There were statistically significant differences in barium, iron, mercury, manganese, and vanadium concentrations among the sampling sites ($p < 0.05$). The samples collected at the South Shore contained the highest concentrations of barium ($0 = 17.05$ mg/kg wet weight) while the samples collected at Clintons Chute contained the highest levels of iron ($0 = 91.65$ mg/kg wet weight). The highest concentration of mercury was detected at Mossey Break ($0 = 0.253$ mg/kg wet weight) while the highest concentration of manganese was detected at the South Shore ($0 = 149.00$ mg/kg wet weight). The highest levels of vanadium were detected in samples collected from the South Shore and Taylor Island ($0 = 0.075$ and 0.077 mg/kg wet weight, respectively). Boron and lead concentrations were not detected above the analytical detection limits in any of the bluegill samples collected.

Of these three species, one bluegill sunfish sample collected from Harrison Bayou at Caddo Lake ($\bar{x}$ = 4.63 mg/kg dry weight) was the only sample that contained chromium concentrations in excess of the predator protection limit of 4.0 mg/kg dry weight (see Appendix H, Table XXB). Bass contained mercury concentrations in excess of the avian predator protection limit of 0.1 mg/kg wet weight at all of the sites collected except at the South Shore. Bluegill samples contained mercury levels in excess of the avian predator protection limit at all sites collected except at Harrison Bayou, Millers Point, and the South Shore.

All fish species sampled within the watershed contained aluminum, arsenic, boron, barium, copper, iron, lead, manganese, molybdenum, nickel, strontium, and vanadium concentrations below recommended predator protection limits. Spotted gar collected from Cypress Spring Reservoir and Lake O' The Pines, contained magnesium concentrations in excess of the recommended avian predator protection limit of 3,000 mg/kg wet weight (NRC, 1980). The concentrations of magnesium detected in gar may be attributed to their natural physiology because gar sampled on the Rio Grande at Big Bend National Park, in south Texas, also exhibited elevated levels of magnesium (Irwin, 1989). This element is usually present in aquatic systems in large amounts relative to the needs of plants and typically does not play a major role in limiting the growth or distribution or organisms in most aquatic environments (Goldman and Horne, 1983). The only fish species collected which had detectable concentrations of cadmium were gizzard shad from Caddo Lake and these concentrations were well below the recommended predator protection limit (for predator protection limits, see Table XL, Appendix J). For zinc, there is no established predator protection level, however, Eisler (1993) stated that avian diets containing $>$ 178.0 mg/kg dry weight of zinc resulted in sublethal toxicological effects. All fish sampled within the watershed contained zinc concentrations below this value (see Appendix H, Tables XVIIIB - XXVIIIB).

Human exposure to methylmercury is almost wholly due to consumption of contaminated fish (Wiener and Spry, 1996). To address potential human health concerns, 15 bass fillet samples collected from Cypress Springs Reservoir, five bass fillets and 10 catfish fillets collected from Lake O' The Pines, and three Catfish fillets collected from Caddo Lake were analyzed for mercury content. In addition, the three catfish fillets collected from Caddo Lake were also analyzed for the same number of metal constituents as the whole body composite fish samples previously mentioned (for results, see Tables XXIX - XXXI, Appendix H). Mercury concentrations were statistically analyzed using a nested ANOVA with multiple range tests. The mean wet weight mercury concentrations from the respective fish species for each lentic system are reported in mg/kg in Summary Table 8.

**Summary Table 8. Mean Fish Fillet - Mercury Analyses Results For The Three Lentic Systems.**

| Analyte | Cypress Springs | Lake O' The Pines | | Caddo Lake |
|---|---|---|---|---|
| | Bass (mg/kg wet wt) | Bass (mg/kg wet wt) | Catfish (mg/kg wet wt) | Catfish (mg/kg wet wt) |
| Hg | 0.243 | 0.410 | 0.065 | 0.175 |

Both Tukey's Studentized Range Test and the Student-Newman-Keuls Test demonstrated that mercury concentrations retained in bass tissues were statistically significantly higher in samples collected from Lake O' The Pines than in samples collected from Cypress Springs Reservoir ($p < 0.05$). Within each lentic system, the MRTs demonstrated that there were no statistically significant differences in mercury concentrations present in bass tissue among the sampling sites at Cypress Springs Reservoir or at Lake O' The Pines ($p \geq 0.05$). Statistically significant differences in mercury concentrations detected in catfish tissues were demonstrated among the sampling sites at Lake O' The Pines and Caddo Lake ($p < 0.05$). In Lake O' The Pines, catfish tissue samples collected from the SH 155 Marina sampling site demonstrated the highest concentrations of mercury ($\bar{x}$ = 0.072 mg/kg wet weight). At Caddo Lake the highest

concentrations of mercury were detected in tissue samples from the Little Green Break site (0.367 mg/kg in one sample). Mercury concentrations were statistically higher in catfish collected from Caddo Lake than in Lake O' The Pines ($p < 0.05$). However, none of the fillet samples analyzed exceeded the USFDA action level of 1.0 mg/kg wet weight for human consumption or the Canadian action level of 0.5 mg/kg wet weight for human consumption (USEPA, 1989). In addition, none of the catfish fillets sampled from Caddo Lake exceeded the human health criteria established by the State of Texas for arsenic, cadmium, chromium, copper, lead, or selenium (for criteria, see Appendix J, Table XL). Beryllium, molybdenum, nickel, and vanadium concentrations were all below the detection limits in these fillet samples.

## Organochlorines In Fish

To determine the bioavailability of organochlorine pesticide residues within the watershed, 19 whole body composite fish samples (one from Cypress Springs Reservoir, one from Lake O' The Pines, and 17 from Caddo Lake) were analyzed for organochlorine content (for results, see Appendix I, Table XXXVII - XXXVIII). Largemouth bass were collected for this analysis in Cypress Springs Reservoir and Lake O' The Pines, while in Caddo Lake, largemouth bass, gizzard shad, spotted gar, bluegill sunfish, redear sunfish, and killifish were collected for the analysis. No statistical analyses were performed because of the 20 compounds analyzed, only two organochlorine compounds, *p,p'*-DDE and total-PCBs, were detected above the detection limits in fish collected from the three systems. The wet weight values for the detected organochlorine analytes from the respective fish species for each lentic system are reported in mg/kg in Summary Table 9.

**Summary Table 9. Mean Fish - Organochlorine Analyses Results For The Three Lentic Systems in mg/kg Wet Weight.** (Note: bdl is below the analytical detection limit)

| Analyte | Cypress Springs | Lake O' The Pines | Caddo Lake | | |
|---|---|---|---|---|---|
| | | | South Shore | Millers Point | |
| | Largemouth Bass | Largemouth Bass | Spotted Gar | Spotted Gar | Largemouth Bass |
| Total-PCBs | bdl | 0.22 | bdl | bdl | bdl |
| *p,p'*-DDE | 0.02 | 0.02 | 0.038 | 0.039 | 0.02 |

Polychlorinated biphenyls (PCBs) were used extensively in electrical transformers, capacitors, and electrical utilities as lubricants, insulators, and coolants until production was banned in the United States in 1979. Total PCBs represent a quantification of 209 separate congeners and are stable compounds which exhibit low water solubility, high heat capacity, low flammability, low electric conductivity, and low vapor pressure (USEPA, 1994). PCBs are stored in fat, liver, and brain tissue, and can be found in trace amounts in all tissues. These compounds are teratogenic and tumorigenic and demonstrate a trend to bioaccumulate and biomagnify in succeeding trophic levels. The NAS/NAE recommended fish-eating wildlife protection criteria is 0.5 mg/kg wet weight (Irwin, 1988). According to Eisler (1986b), total PCB concentrations greater than 3 mg/kg in the diet of avian species and greater than 0.4 mg/kg wet weight in whole body composites of fish would result in lethal and/or sublethal toxicological affects. Studies cited by Niimi (1996), suggest that PCB concentrations $> 25.0$ mg/kg wet weight in macroinvertebrates and $> 50.0$ mg/kg wet weight in fish tissues may adversely affect reproduction and growth. The detected concentration in largemouth bass collected from Lake O' The Pines was below all of these values. However, the predator protection limit recommended by the Great Lakes International Joint Commission for whole body fish is 0.1 mg/kg wet weight (Irwin, 1988), which the sample from Lake O' The Pines exceeded.

DDE is a residual metabolite of the pesticide DDT which was banned in the United States in 1972. Detection of DDT metabolites with a corresponding lack of DDT detections is indicative of a low rate of influx and demonstrates a continued weathering of residual DDT (Moring, 1997). DDE has a biological half life of eight years and is listed by the USEPA as a possible carcinogen (USEPA, 1994). Detected levels of *p,p'*-DDE in piscivorous fish collected from the three lentic bodies were below the National Academy of Sciences/National Academy of Engineering (NAS/NAE) recommended fish-eating wildlife protection criteria of 1.0 mg/kg wet weight (Nowell and Resek, 1994).

In addition to the organochlorine analysis of whole body composite fish samples, two channel catfish fillet samples collected from Goose Prairie and Little Green Break at Caddo Lake were analyzed for organochlorine and PCB content to address human health concerns. The State of Texas aquatic life protection screening criteria for PCBs present in tissues is 0.134 mg/kg wet weight (TNRCC, 1996b). The USFDA action level for human consumption of PCB contaminated fish is 2.0 mg/kg wet weight. Chronic exposure can result in dermal, hepatic, and renal damage (Niimi, 1996). However, no organochlorine compounds, including PCBs, were detected in concentrations above the detection limits in any of the tissue samples (for results, see Table Appendix I, XXXIX).

**Metals In Macroinvertebrates**

Nine composite grass shrimp (*Palaemonetes* sp.) samples collected from five sites at Caddo Lake, were analyzed for the same 19 metals as previously discussed. Four composite samples collected from three sites at Caddo Lake were analyzed for total mercury content (for results, see Appendix H, Tables XXXII and XXXIII). Due to the limited sample size, statistical analyses were not employed to interpret the data. Minimum, maximum, and calculated arithmetic mean values, reported in mg/kg wet weight, are presented in Summary Table 10. Where concentrations were below the detection limits, the conservative approach of selecting the numeric value immediately below the detection limit was employed in calculating the arithmetic mean.

Beryllium, boron, cadmium, lead, and molybdenum concentrations were below the detection limits in all samples collected. Vanadium concentrations were detected below the detection limits in all samples with the exception that one sample collected from Harrison Bayou contained a detectable concentration equal to the detection limit. Aluminum, arsenic, chromium, copper, iron, magnesium, nickel, and strontium concentrations were all detected below recommended predator protection limits (for predator protection limits, see Appendix J, Table XL). Barium levels exceeded the recommended predator protection limit of 20.0 mg/kg wet weight in samples collected at Millers Point, Taylor Island, and Mossey Break (NRC, 1980). Barium exists naturally as barite which is used as a weighting agent in gas and oil well drilling

**Summary Table 10. Macroinvertebrates - Metals Analyses Results For Caddo Lake.** (Note: bdl is below the analytical detection limit)

| Analyte | Minimum Concentration (mg/kg wet weight) | Maximum Concentration (mg/kg wet weight) | Arithmetic Mean (mg/kg wet weight) |
|---|---|---|---|
| Al | 1.33 | 17.0 | 5.30 |
| As | 0.03 | 1.75 | 0.61 |
| Ba | 14.50 | 30.10 | 21.70 |
| Cr | 0.16 | 0.27 | 0.20 |
| Cu | 6.05 | 17.30 | 11.22 |
| Fe | 14.20 | 87.70 | 47.41 |
| Hg | 0.018 | 0.106 | 0.059 |
| Mg | 124.00 | 241.00 | 204.00 |
| Mn | 23.40 | 77.50 | 44.60 |
| Ni | bdl | 0.20 | 0.14 |
| Se | bdl | 0.48 | 0.32 |
| Sr | 12.00 | 24.10 | 18.70 |
| V | bdl | 0.05 | 0.04 |
| Zn | 7.45 | 14.50 | 12.55 |

muds (Cain, 1993). Barium is also a component of oil field brine (TWC, 1989b). Macroinvertebrates have demonstrated a discrimination of calcium in favor of barium for uptake into the exoskeleton, hepatopancreas, and abdominal tissues (Cain, 1993). Mercury levels approached or exceeded the predator protection limit of 0.1 mg/kg wet weight in samples collected from Mossey Break and Uncertain (Eisler, 1987a). Selenium concentrations approached the predator protection limit of 0.5 mg/kg wet weight recommended by Irwin (1988) in samples collected at Taylor Island.

## Metals In Birds

Great blue herons, a colonial aquatic avian species, were selected for this study because they are piscivorous and can feed on relatively large fish (Gamble *et al.*, 1994). This is a migratory species that nests within the Cypress Creek watershed. Nestling herons obtain their food from their parents foraging in the area surrounding the nests. Livers collected from seven heron nestlings at Caddo Lake were analyzed for the same battery of 19 metals as discussed earlier, while kidney and feather samples collected from these organisms were analyzed for total mercury content (For results, see Appendix H, Tables XXXIV - XXXVI). Minimum, maximum, and calculated geometric mean values for metal content in the livers, reported in mg/kg wet weight, are presented in Summary Table 11. The geometric mean was calculated in place of an arithmetic mean due to the wide distribution of the data. Where concentrations were below the detection limits, the conservative approach of selecting the numeric value immediately below the detection limit was employed in calculating the geometric mean.

Arsenic, barium, beryllium, cadmium, and lead concentrations were below the analytical detection limits. Vanadium was detected above the detection limit in only one sample. Selenium concentrations were detected in sampled livers below 10.0 mg/kg wet weight, which according to Heinz (1996), is a level that would be considered harmful to young and adult birds. Levels of zinc detected in normal avian livers range from 21.0 to 33.0 mg/kg dry weight. The effects of zinc poisoning can be observed in livers which contain zinc concentrations ranging from 75.0 mg/kg dry weight to above 156.0 mg/kg dry weight (Eisler, 1993). Only two of the seven specimens collected contained zinc concentrations below 75.0 mg/kg dry weight, while one specimen contained a detectable zinc concentration of 181.0 mg/kg dry weight.

**Summary Table 11. Great Blue Heron Liver - Metals Analyses Results For Caddo Lake.** (Note: bdl is below the analytical detection limit)

| Analyte | Minimum Concentration (mg/kg wet weight) | Maximum Concentration (mg/kg wet weight) | Geometric Mean (mg/kg wet weight) |
|---|---|---|---|
| Al | bdl | 1.61 | 1.19 |
| B | 0.4 | 7.4 | 1.44 |
| Cr | 0.13 | 0.98 | 0.37 |
| Cu | 10.1 | 32.6 | 18.34 |
| Fe | 106.0 | 983.0 | 205.26 |
| Hg | 0.387 | 19.9 | 0.896 |
| Mg | 103.0 | 200.0 | 159.07 |
| Mn | 1.99 | 3.78 | 2.95 |
| Mo | 0.41 | 1.45 | 0.54 |
| Ni | bdl | 0.86 | 0.33 |
| Se | bdl | 9.38 | 1.01 |
| Sr | 0.08 | 0.24 | 0.12 |
| V | bdl | 0.26 | 0.05 |
| Zn | 24.0 | 58.1 | 39.44 |

Molybdenum concentrations detected in the livers were comparable to concentrations detected in livers from American coots (*Fulica americana*) sampled from an un-impacted control site in the study of the environmental effects of a coal-fired powered plant conducted by White and others (1986) in Goliad County, Texas. However, detected copper and nickel concentrations were similar to concentrations detected in livers collected from coots at the power plant site one year after operations were initiated (White *et al.*, 1986).

According to Welsh and Olson (1991), fish eating birds tend to have higher levels of mercury within the liver than other avian species, but are not necessarily more likely to exhibit toxic effects. The liver plays a major role in metabolism and elimination of methylmercury (Burger, 1993). In livers collected from Caddo Lake, the calculated geometric mean for mercury was below 2.715 mg/kg wet weight, which was the geometric mean determined in studies of livers in great blue heron nestlings collected from Lavaca Bay, an area documented to have mercury contamination (Gamble *et al.*, 1994). However, the maximum value of 19.9 mg/kg wet weight was 4.8 times higher than the highest value of 4.11 mg/kg wet weight reported in the Lavaca Bay study (Gamble *et al.*, 1994). Thompson (1996) stated that mercury concentrations greater than 30.0 mg/kg wet weight detected in livers and kidneys of raptors resulted in mercury intoxication.

Feathers were selected for mercury analysis because avian species deposit heavy metals, including mercury, within the feathers during feather formation; the mineral profile of mercury remains stable within the feathers; a large percentage of a bird's body burden of mercury is incorporated into the feathers; and the mercury incorporated into the feathers is almost 100% methylmercury (Burger, 1993). Feathers also serve as a major excretory pathway for mercury during molting (Burger, 1993). The detected minimum values, maximum values, and geometric means of the feather and kidney mercury analyses, reported in mg/kg dry weight, are presented in Summary Table 12. The geometric mean was calculated in place of an arithmetic mean due to the wide distribution of the data.

In feathers, the calculated mean fell within the range of 1.1 - 2.5 mg/kg dry weight in feathers of nestling great blue herons collected in a study conducted in Ohio in 1972 - 1973 (Burger, 1993). However, the maximum value was 5.8 times higher than the highest level detected in the Ohio study.

**Summary Table 12. Great Blue Heron Feather And Kidney - Mercury Analyses Results For Caddo Lake in mg/kg Dry Weight.**

| Analyte | Feathers | | | Kidneys | | |
|---|---|---|---|---|---|---|
| | Minimum | Maximum | Geometric Mean | Minimum | Maximum | Geometric Mean |
| Hg | 1.23 | 14.50 | 2.16 | 0.513 | 2.37 | 0.76 |

Sections of spinal chords, livers, and kidneys from six of the fledglings were analyzed for lesions which could be attributed to mercury toxicity. The histologic lesions indicative of mercury poisoning were not present in any of the herons. Nephrogenetic and granulopoietic tissue was present in several of the herons. This is considered normal in young nestlings. Mild degenerative and/or inflammatory lesions were present in the liver and kidney of some of the herons, but these were non-specific lesions of unknown cause.

## CONCLUSIONS & RECOMMENDATIONS

Based on the overall results of this study, Cypress Springs Reservoir was the least contaminated of the three water bodies. Cadmium levels were detected in surface water samples in excess of the State of Texas water quality criteria in all three systems. However, cadmium concentrations were not detected at levels of concern in any of the fish samples collected. All three lentic bodies contained fish that were detected to have mercury levels which exceeded recommended wildlife protection levels.

Identifying all potential sources transporting contaminants into the Cypress Creek watershed and targeting point source dischargers was not within the scope of this study. However, levels of lead and mercury in excess of the State of Texas aquatic life protection criteria were detected in sediment samples collected at Goose Prairie in Caddo Lake down gradient from the Longhorn Army Ammunition Plant NPL Site. At Lake O' The Pines, concentrations of cadmium, lead, mercury, and zinc in sediment in excess of the State aquatic life protection criteria were detected in samples collected in the vicinity of Lone Star Steel. Further studies of sediments in these two systems is warranted because of the toxicological effects of these metals on benthic communities and aquatic ecosystems. In addition, in the case of Lake O' The Pines, the regulatory community may wish to consider re-evaluating permitted discharge limits of metals and other wastes in order to address cumulative impacts on the surrounding sediments and benthic communities.

Chromium levels in bass, spotted gar, bluegill sunfish, and redear sunfish collected from Caddo Lake exceeded the recommended wildlife protection values. These chromium levels represent a point of concern and warrant further studies. Selenium levels in redear sunfish collected from Caddo Lake exceeded the recommended wildlife protection limits. Even though only one species in one lentic system exhibited elevated levels of selenium it is recommended that periodic monitoring of this analyte be maintained because of selenium contamination documented elsewhere within the watershed. Zinc levels detected in great blue heron nestlings from Caddo Lake were elevated to a point of concern and warrant further study. Barium concentrations were slightly elevated in macroinvertebrates collected from Caddo Lake. Magnesium levels were slightly elevated in spotted gar samples collected throughout the watershed. However, at this time neither of these elements warrant further study.

In Caddo Lake, elevated levels of mercury were detected in macroinvertebrates, bass, bluegill sunfish, and redear sunfish. In addition, spotted gar collected from all three lentic systems contained elevated mercury levels. Bass, followed by spotted gar, contained the highest concentrations of mercury of any fish tested. Elevated levels of mercury were also detected in nestling great blue herons. Based on these results it appears that mercury is being absorbed by macroinvertebrates and prey fish then biomagnifying in

piscivorous fish and piscivorous avian species within Caddo Lake. Considering that Caddo Lake is a Ramsar designated wetland of international importance, a more intensive study is warranted to define the physical and biological extent of contamination within the lake, especially in the Goose Prairie and Harrison Bayou areas which are immediately down gradient of the Longhorn Army Ammunition NPL Site.

All fish fillets analyzed for metals were below the established action levels for human consumption. However, established fish consumption advisories must be maintained until further testing can be conducted, increasing the sampling size to verify these results. It is suggested that in any future studies conducted within the watershed to address contaminant concerns in fish, whole body composite catfish samples be analyzed as well as catfish fillet samples. As benthic species, catfish would be expected to come into contact with contaminants present in the sediments more readily than pelagic species such as gizzard shad. Analyses of just the fillets does not indicate the whole body burden of a particular contaminant within the fish. It is further recommended that future studies incorporate benthic turtles into the sampling strategy. These organisms are long-lived, resident species which function as tertiary predators and scavengers within the watershed. Whole body analyses of contaminants within these organisms should yield samples representative of chronic exposure to a contaminants of concern over an extended period of time.

Aliphatic compounds were detected in the sediments at low concentrations throughout all three systems. Polycyclic aromatic hydrocarbons were detected in sediments from Cypress Springs Reservoir and Caddo Lake in concentrations below levels of concern, whereas sediment samples collected from Lake O' The Pines contained elevated PAHs which may be affecting the health of the benthic community. With the presence of so many active gas/oil production wells and other potential point sources in the watershed, it is recommended that periodic monitoring of PAH concentrations in sediments be conducted, especially in Lake O' The Pines.

Based on the results of the study, residues of organochlorine pesticides and PCBs retained in sediment do not appear to represent an area of further concern. In fish, organochlorine pesticide residues do not appear to warrant further action at this time. Polychlorinated biphenyls in fish do not appear to be a point of concern except at Lake O' The Pines, where concentrations were detected at levels of concern in the one fish sample that was analyzed. It is recommended that additional sampling be conducted within this reservoir, increasing the sample size, to determine the status of PCB contaminants within the fish communities.

With this study, valid statistical correlations to establish more definitive causative relationships between sampled media and fauna could not be performed due to the limited sample size of certain media, ie., surface water. It is recommended that in any future studies conducted within the watershed, at least three replicate samples of a given medium be collected at a particular sampling site.

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# APPENDIX A
# (VERTEBRATE FAUNA INHABITING THE CYPRESS CREEK WATERSHED)

TABLE IA. FISH SPECIES INHABITING THE CYPRESS CREEK WATERSHED (Hubbs, 1976; Robison and Buchanan, 1988).

| | | | |
|---|---|---|---|
| Chestnut Lamprey - | *Ichthymyzon castaneus* | Southern Brook Lamprey - | *Ichthymyzon gagei* |
| Paddlefish* - | *Polydon spathula* | Spotted Gar - | *Lepiosteus oculatus* |
| Longnose Gar - | *Lepiosteus osseus* | Shortnose Gar - | *Lepiosteus platostomus* |
| Alligator Gar - | *Lepiosteus spatula* | Bowfin - | *Amia calva* |
| Skipjack Herring - | *Alosa chrysochloris* | Gizzard Shad - | *Dorosoma cepedianum* |
| Threadfin Shad - | *Dorosoma petenense* | Grass Pickerel - | *Esox americanus* |
| Chain Pickerel - | *Esox niger* | Carp - | *Cyprinus carpio* |
| Golden Shiner - | *Notemigonus crysoleucas* | Silver Chub - | *Hybopsis storeriana* |
| Creek Chub - | *Semotilus atromaculatus* | Suckermouth Minnow - | *Phenacobius mirabilis* |
| Pallid Shiner - | *Notropis amnis* | Emerald Shiner - | *Notropis atherinoides* |
| Blackspot Shiner - | *Notropis atrocaudalis* | Ghost Shiner - | *Notropis buchanani* |
| Striped Shiner - | *Notropis chrysocephalus* | Ironcolor Shiner - | *Notropis chalybaeus* |
| Pugnose Minnow - | *Notropis emiliae* | Ribbon Shiner - | *Notropis fumeus* |
| Bluehead Shiner* - | *Notropis hubbi* | Red Shiner - | *Notropis lutrensis* |
| Taillight Shiner - | *Notropis maculatus* | Chub Shiner - | *Notropis potteri* |
| Sabine Shiner - | *Notropis sabinae* | Silver Band Shiner - | *Notropis shumardi* |
| Weed Shiner - | *Notropis texanus* | Redfin Shiner - | *Notropis umbratilis* |
| Blacktail Shiner - | *Notropis venustus* | Mimic Shiner - | *Notropis volucellus* |
| Cypress Minnow - | *Hybognathus hayi* | Silvery Minnow - | *Hybognathus nuchalis* |
| Fathead Minnow - | *Pimephales promelas* | Bullhead Minnow - | *Pimephales vigilax* |
| Central Stoneroller - | *Campostoma anomalum* | Blue Sucker* - | *Cycleptus elongatus* |
| Smallmouth Buffalo - | *Ictiobus bubalus* | Bigmouth Buffalo - | *Ictiobus cyprinellus* |
| Black Buffalo - | *Ictiobus niger* | River Carpsucker - | *Carpiodes carpio* |
| Spotted Sucker - | *Minytrema melanops* | Blacktail Redhorse - | *Moxostoma poecilurum* |
| Creek Chubsucker* - | *Erimyzon oblongus* | Lake Chubsucker - | *Erimyzon sucetta* |
| Blue Catfish - | *Ictalurus furcatus* | Black Bullhead - | *Ictalurus melas* |
| Yellow Bullhead - | *Ictalurus natalis* | Channel Catfish - | *Ictalurus punctatus* |
| Flathead Catfish - | *Pylodictis olivaris* | Tadpole Madtom - | *Noturus gyrinus* |
| Freckled Madtom - | *Noturus nocturnus* | American Eel - | *Anguilla rostrata* |
| Pirate Perch - | *Aphredoderus sayanus* | Blair's Topminnow - | *Fundulus blairae* |
| Golden Topminnow - | *Fundulus chrysotus* | Blackstripe Topminnow - | *Fundulus notatus* |
| Blackspotted Topminnow - | *Fundulus olivaceus* | Mosquitofish - | *Gambusia affinis* |
| Brook Silverside - | *Labidesthes sicculus* | Inland Silverside - | *Menidia beryllina* |
| Spotted Bass - | *Micropterus punctulatus* | Largemouth Bass - | *Micropterus salmoides* |
| White Bass - | *Morone chrysops* | Yellow Bass - | *Morone mississippiensis* |
| Green Sunfish - | *Lepomis cyanellus* | Warmouth - | *Lepomis gulosus* |
| Orangespotted Sunfish - | *Lepomis humilis* | Bluegill - | *Lepomis macrochirus* |
| Dollar Sunfish - | *Lepomis marginatus* | Longear Sunfish - | *Lepomis megalotis* |
| Redear Sunfish - | *Lepomis microlophus* | Spotted Sunfish - | *Lepomis punctatus* |
| Bantam Sunfish - | *Lepomis symmetricus* | White Crappie - | *Pomoxis annularis* |
| Black Crappie - | *Pomoxis nigromaculatus* | Banded Pygmy Sunfish - | *Elassoma zonatum* |
| Flier - | *Centrarchus macropterus* | Logperch - | *Percina caprodes* |
| Blackside Darter* - | *Percina maculatus* | Dusky Darter - | *Percina sciera* |
| River Darter - | *Percina shumardi* | Western Sand Darter - | *Ammocryopta clara* |
| Scaly Sand Darter - | *Ammocryopta vivax* | Mud Darter - | *Etheostoma asprigene* |
| Bluntnose Darter - | *Etheostoma chlorosomum* | Swamp Darter - | *Etheostoma fusiforme* |
| Slough Darter - | *Etheostoma gracile* | Harlequin Darter - | *Etheostoma histrio* |
| Goldstripe Darter - | *Etheostoma parvipinne* | Cypress Darter - | *Etheostoma proeliare* |
| Freshwater Drum - | *Aplodinotus grunniens* | Striped Mullet - | *Mugil cephalus* |

TABLE IB. AMPHIBIAN SPECIES INHABITING THE CYPRESS CREEK WATERSHED (Dixon, 1987).

| | | | |
|---|---|---|---|
| Spotted Salamander - | *Ambystoma maculatum* | Marbled Salamander - | *Ambystoma opacum* |
| Mole Salamander - | *Ambystoma talpoideum* | Smallmouth Salamander - | *Ambystoma texanum* |
| Eastern Tiger Salamander - | *Ambystoma tigrinum* | Three-toed Amphiuma - | *Amphiuma tridactylum* |
| Southern Dusky Salamander- | *Desmognathus auriculatus* | Dwarf Salamander - | *Eurycea quadridigitata* |
| Gulf Coast Water Dog - | *Necturus beyeri* | Central Newt - | *Notophthalmus viridescens* |
| Slimy Salamander - | *Plethodon glutinosus* | Western Lesser Siren - | *Siren intermedia nettingi* |
| Northern Cricket Frog - | *Acris crepitans* | Cope's Gray Treefrog - | *Hyla chrysoscelis* |
| Green Treefrog - | *Hyla cinerea* | Northern Spring Peeper - | *Hyla crucifer* |
| Squirrel Treefrog - | *Hyla squirella* | Gray Treefrog - | *Hyla versicolor* |
| Spotted Chorus Frog - | *Pseudacris clarki* | Strecker's Chorus Frog - | *Pseudacris streckeri* |
| Upland Chorus Frog - | *Pseudacris triseriata feriarum* | Bullfrog - | *Rana catesbeiana* |
| Bronze Frog - | *Rana clamitans clamitans* | Pickerel Frog - | *Rana grylio* |
| Southern Leopard Frog - | *Rana sphenocephala* | Dwarf American Toad - | *Bufo americanus* |
| Gulf Coast Toad - | *Bufo valliceps valliceps* | East Texas Toad - | *Bufo woodhousei* |
| Eastern Narrowmouth Toad - | *Gastrophryne carolinensis* | Plains Narrowmouth Toad - | *Gastrophryne olivacea* |
| Hurter's Spadefoot - | *Scaphiopus holbrooki* | | |

TABLE IC. REPTILE SPECIES INHABITING THE CYPRESS CREEK WATERSHED (Dixon, 1987).

| | | | |
|---|---|---|---|
| Snapping Turtle - | *Chelydra serpentina* | Alligator Snapping Turtle* - | *Macroclemys temmincki* |
| Yellow Mud Turtle - | *Kinosternon flavescens* | Mississippi Mud Turtle - | *Kinosternon subrubrum* |
| Razorback Musk Turtle - | *Sternotherus carinatus* | Stinkpot Musk Turtle - | *Sternotherus odoratus* |
| Southern Painted Turtle - | *Chrysemys picta* | Western Chicken Turtle - | *Deirochelys reticularia* |
| Sabine Map Turtle - | *Graptemys pseudogeographica* | Mississippi Map Turtle - | *Graptemys kohni* |
| Metter's River Cooter - | *Pseudemys concinna* | Three-toed Box Turtle - | *Terrapene carolina* |
| Ornate Box Turtle - | *Terrapene ornata* | Red-eared Slider - | *Trachemys scripta* |
| Smooth Softshell - | *Trionyx muticus* | Pallid Spiny Softshell - | *Trionyx spiniferus* |
| American Alligator k - | *Alligator mississippiensis* | Green Anole - | *Anolis carolinensis* |
| Texas Spiny Lizard - | *Sceloporus olivaceus* | Northern Fence Lizard - | *Sceloporus undulatus* |
| Five-lined Skink - | *Eumeces fasciatus* | Broadhead Skink - | *Eumeces laticeps* |
| Southern Prairie Skink - | *Eumeces septentrionalis* | Ground Skink - | *Scincella lateralis* |
| Six-lined Racerunner - | *Cnemidophorus sexlineatus* | Texas Spotted Whiptail - | *Cnemidophorus gularis* |
| Slender Glass Lizard - | *Ophisaurus attenuatus* | Western Worm Snake - | *Carphophis amoenus* |
| Northern Scarlet Snake* - | *Cemophora coccinea* | Racer - | *Coluber constrictor* |
| Mississippi Ringneck Snake - | *Diadophis punctatus* | Corn Snake - | *Elaphe guttata* |
| Texas Rat Snake - | *Elaphe obsoleta* | Western Mud Snake - | *Farancia abacura* |
| Dusky Hognose Snake - | *Heterodon nasicus* | Eastern Hognose Snake - | *Heterodon platyrhinos* |
| Prairie Kingsnake - | *Lampropeltis calligaster* | Speckeld Kingsnake - | *Lampropeltis getulus* |
| Louisiana Milk Snake - | *Lampropeltis triangulum* | Texas Night Snake - | *Hypsiglena torquata* |
| Eastern Coachwhip - | *Masticophis flagellum* | Green Water Snake - | *Nerodia cyclopion* |
| Yellowbelly Water Snake - | *Nerodia erythrogaster* | Broad-banded Water Snake - | *Nerodia fasciata* |
| Diamondback Water Snake - | *Nerodia rhombifera* | Gulf Crayfish Snake - | *Regina rigida* |
| Louisiana Pine Snake* - | *Pituophis melanoleucus ruthveni* | Rough Green Snake - | *Opheodrys aestivus* |
| Florida Redbelly Snake - | *Storeria occipitomaculata* | Texas Brown Snake - | *Storeria dekayi* |
| Flathead Snake - | *Tantilla gracilis* | Western Ribbon Snake - | *Thamnophis proximus* |
| Central Lined Snake - | *Tropidoclonion lineatum* | Rough Earth Snake - | *Virginia striatula* |
| Western Earth Snake - | *Virginia valeriae* | Texas Coral Snake - | *Micrurus fulvius* |
| Copperhead - | *Agkistrodon contortrix* | Western Cottonmouth - | *Agkistrodon piscivorus* |
| Canebrake Rattlesnake* - | *Crotalus horridus atricaudatus* | Western Pigmy Rattlesnake - | *Sistrurus miliarus* |

TABLE ID. MAMMAL SPECIES INHABITING THE CYPRESS CREEK WATERSHED (Davis and Schmidly, 1994).

| | | | |
|---|---|---|---|
| Virginia opossum - | *Didelphis virginiana* | Short-tailed Shrew - | *Blarina carolinensis* |
| Least Shrew - | *Cryptotis parva* | Eastern Mole - | *Scalopus aquaticus* |
| Southeastern Myotis - | *Myotis austroriparius* | Silver-haired Bat - | *Lasionycteris noctivagans* |
| Eastern Pipistrelle - | *Pipistrellus subflavus* | Big Brown Bat - | *Eptesicus fuscus* |
| Eastern Red Bat - | *Lasiurus borealis* | Hoary Bat - | *Lasiurus cinereus* |
| Seminole Bat - | *Lasiurus seminolus* | Evening Bat - | *Nyctceius humeralis* |
| Spotted Bat - | *Euderma maculatum* | Rafinesque's Big-eared Bat* - | *Plecotus rafinesquii* |
| Brazilian Free-tailed Bat - | *Tadarida brasiliensis* | Nine-banded Armadillo - | *Dasypus novemcinctus* |
| Swamp Rabbit - | *Sylvilagus aquaticus* | Eastern Cottontail - | *Sylvilagus floridanus* |
| Black-tailed Jackrabbit - | *Lepus californicus* | Eastern Gray Squirrel - | *Sciurus carolinensis* |
| Eastern Fox Squirrel - | *Sciurus niger* | Eastern Flying Squirrel - | *Glaucomys volans* |
| Baird's Pocket Gopher - | *Geomys breviceps* | Hispid Pocket Mouse - | *Chaetodipus hispidus* |
| American Beaver - | *Castor canadensis* | Marsh Rice Rat - | *Oryzomys palustris* |
| Fulvous Harvest Mouse - | *Reithrodontomys fulvescens* | Eastern Harvest Mouse - | *Reithrodontomys humulis* |
| White-footed Mouse - | *Peromyscus leucopus* | Deer Mouse - | *Peromyscus maniculatus* |
| Golden Mouse - | *Ochrotomys nuttalli* | Northern Pygmy Mouse - | *Baiomys taylori* |
| Hispid Cotton Rat - | *Sigmodon hispidus* | Eastern Woodrat - | *Neotoma floridana* |
| Norway Rat - | *Rattus norvegicus* | Roof Rat - | *Rattus rattus* |
| House Mouse - | *Mus musculus* | Woodland Vole - | *Microtus pinetorum* |
| Muskrat - | *Ondatra zibethicus* | Nutria - | *Myocastor coypus* |
| Coyote - | *Canis latrans* | Red Fox - | *Vulpes vulpes* |
| Gray Fox - | *Urocyon cinereoargenteus* | Ringtail - | *Bassariscus astutus* |
| Raccoon - | *Procyon lotor* | Long-tailed Weasel - | *Mustela frenata* |
| Mink - | *Mustela vison* | American Badger - | *Taxidea taxus* |
| Eastern Spotted Skunk - | *Spilogale putorius* | Striped Skunk - | *Mephitis mephitis* |
| River Otter - | *Lutra canadensis* | Mountain Lion - | *Felis concolor* |
| Louisiana Black Bear* k - | *Ursus americanus luteolus* | Bobcat - | *Lynx rufus* |
| White-tailed Deer - | *Odocoileus virginianus* | | |

TABLE IE. AVIAN SPECIES OBSERVED IN THE CYPRESS CREEK WATERSHED (Hardy and Raymond, 1994; Ingold, 1995; TPWD, 1996).

| | | | |
|---|---|---|---|
| Red-throated Loon - | *Gavia stellata* | Yellow-billed Loon - | *Gavia adamsii* |
| Pacific Loon - | *Gavia pacifica* | Common Loon - | *Gavia immer* |
| Pied-billed Grebe - | *Podilymbus podiceps* | Horned Grebe - | *Podiceps auritus* |
| Eared Grebe - | *Podiceps nigricollis* | Red-necked Grebe - | *Podiceps grisegena* |
| Western Grebe - | *Aechmophorus occidentalis* | American White Pelican - | *Pelecanus erythrorhynchos* |
| Double-crested Cormorant - | *Phalacrocorax auritus* | Neotropic Cormorant - | *Phalacrocorax brasilanus* |
| Anhinga - | *Anhinga anhinga* | American Bittern - | *Botaurus lentiginosus* |
| Least Bittern - | *Ixobrychus exilis* | Great Blue Heron - | *Ardea herodias* |
| Great Egret - | *Casmerodius albus* | Snowy Egret - | *Egretta thula* |
| Reddish Egret* - | *Egretta rufescens* | Little Blue Heron - | *Egretta caerulea* |
| Tricolored Heron - | *Egretta tricolor* | Cattle Egret - | *Bubulcus ibis* |
| Green Heron - | *Butorides virescens* | Black-crowned Night Heron - | *Nycticorax nycticorax* |
| Yellow-crowned Night Heron - | *Nyctanassa violacea* | White Ibis - | *Eudocimus albus* |
| White-faced Ibis* - | *Plegadis chihi* | Roseate Spoonbill - | *Ajaia ajaja* |
| Wood Stork* - | *Mycteria americana* | Tundra Swan - | *Cygnus columbianus* |
| Black-bellied Whistling Duck - | *Dendrocygna autumnalis* | Snow Goose - | *Chen caerulescens* |
| Greater White-fronted Goose - | *Anser albifrons* | Canada Goose - | *Branta canadensis* |

Wood Duck - *Aix sponsa*
Green-winged Teal - *Anas crecca*
Mallard - *Anas platyrhynchos*
Northern Pintail - *Anas acuta*
Northern Shoveler - *Anas clypeata*
American Wigeon - *Anas americana*
Redhead - *Aythya americana*
Greater Scaup - *Aythya marila*
Oldsquaw - *Clangula hyemalis*
White-winged Scoter - *Melanitta fusca*
Common Goldeneye - *Bucephala clangula*
Bufflehead - *Bucephala albeola*
Common Merganser - *Mergus merganser*
Ruddy Duck - *Oxyura jamaicensis*
Turkey Vulture - *Cathartes aura*
Swallow-tailed Kite* - *Elanoides forficatus*
Bald Eagle*k - *Haliaeetus leucocephalus*
Sharp-shinned Hawk - *Accipiter striatus*
Red-shouldered Hawk - *Buteo lineatus*
Swainson's Hawk - *Buteo swainsoni*
Ferruginous Hawk - *Buteo regalis*
American Kestrel - *Falco sparverius*
Peregrine Falcony - *Falco peregrinus*
Wild Turkey - *Meleagris gallopavo*
Northern Bobwhite - *Colinus virginianus*
King Rail - *Rallus elegans*
Purple Gallinule - *Porphyrula martinica*
American Coot - *Fulica americana*
Lesser Golden Plover - *Pluvialis dominica*
Semipalmated Plover - *Charadrius semipalmatus*
Killdeer - *Charadrius vociferus*
Willet - *Catoptrophorus semipalmatus*
Lesser Yellowlegs - *Tringa flavipes*
Spotted Sandpiper - *Actitis macularia*
Long-blled Curlew - *Numenius americanus*
Whimbrel - *Numenius phaeopus*
Sanderling - *Calidris alba*
Least Sandpiper - *Calidris minutilla*
Baird's Sandpiper - *Calidris bairdii*
Dunlin - *Calidris alpina*
Buff-breasted Sandpiper - *Tryngites subruficollis*
Common Snipe - *Gallinago gallinago*
Wilson's Phalarope - *Phalaropus tricolor*
Laughing Gull - *Larus atricilla*
Bonaparte's Gull - *Larus philadelphia*
California Gull - *Larus californicus*
Caspian Tern - *Sterna caspia*
Least Terny - *Sterna antillarum*
Mourning Dove - *Zenaida macroura*
Yellow-billed Cuckoo - *Coccyzus americanus*
Greater Roadrunner - *Geococcyx californianus*
Eastern Screech Owl - *Otus asio*
Barred Owl - *Strix varia*
Long-eared Owl - *Asio otus*
American Black Duck - *Anas rubripes*
Mottled Duck - *Anas fulvigula*
Blue-winged Teal - *Anas discors*
Gadwall - *Anas strepera*
Canvasback - *Aythya valisineria*
Ring-necked Duck - *Aythya collaris*
Lesser Scaup - *Aythya affinis*
Black Scoter - *Melanitta nigra*
Surf Scoter - *Melanitta persicillata*
Barrow's Goldeneye - *Bucephala islandica*
Hooded Merganser - *Lophodytes cucullatus*
Red-breasted Merganser - *Mergus serrator*
Black Vulture - *Coragyps atratus*
Osprey - *Pnadion haliaetus*
Mississippi Kite - *Ictinia mississippiensis*
Northern Harrier - *Circus cyaneus*
Cooper's Hawk - *Accipiter cooperii*
Broad-winged Hawk - *Buteo platypterus*
Red-tailed Hawk - *Buteo jamaicensis*
Rough-legged Hawk - *Buteo lagopus*
Merlin - *Falco columbarius*
Sora - *Porzana carolina*
Common Moorhen - *Gallinula chloropus*
Black-bellied Plover - *Pluvialis squatarola*
Wilson's Plover - *Charadrius wilsonia*
Piping Plover*k - *Charadrius melodus*
American Avocet - *Recurvirostra americana*
Greater Yellowlegs - *Tringa melanoleuca*
Upland Sandpiper - *Bartramia longicauda*
Hudsonian Godwit - *Limosa haemastica*
Ruddy Turnstone - *Arenaria interpres*
Semipalmated Sandpiper - *Calidris pusilla*
White-rumped Sandpiper - *Calidris fuscicollis*
Pectoral Sandpiper - *Calidris melanotos*
Stilt Sandpiper - *Calidris himantopus*
Long-billed Dowithcer - *Limnodromus scolopaceus*
American Woodcock - *Scolopax minor*
Franklin's Gull - *Larus pipixan*
Ring-billed Gull - *Larus delawarensis*
Herring Gull - *Larus argentatus*
Black-legged Kittiwake - *Rissa tridactyla*
Forster's Tern - *Sterna forsteri*
Black Tern - *Chlidonias niger*
White-winged Dove - *Zenaida asiatica*
Common Ground Dove - *Columbina passerina*
Great Black-backed Gull - *Larus marinus*
Common Tern - *Sterna hirundo*
Rock Dove - *Columba livia*
Inca Dove - *Columbina inca*
Black-billed Cuckoo - *Coccyzus erythropthalmus*
Barn Owl - *Tyto alba*
Great Horned Owl - *Bubo virginianus*
Short-eared Owl - *Asio flammeus*
Common Nighthawk - *Chordeiles minor*

Chuck-will's-widow - *Caprimulgus carolinensis*
Chimney Swift - *Chaetura pelagica*
Broad-tailed Hummingbird - *Selasphorus platycercus*
Belted Kingfisher - *Ceryle alcyon*
Red-bellied Woodpecker - *Melanerpes carolinus*
Downy Woodpecker - *Picoides pubescens*
Northern Flicker - *Colaptes auratus*
Pileated Woodpecker - *Dryocopus pileatus*
Eastern Wood Pewee - *Contopus virens*
Least Flycatcher - *Empidonax minimus*
Say's Phoebe - *Sayornis saya*
Great Crested Flycatcher - *Myiarchus crinitus*
Eastern Kingbird - *Tyrannus tyrannus*
Horned Lark - *Eremophila alpestris*
Tree Swallow - *Tachycineta bicolor*
Bank Swallow - *Riparia riparia*
Barn Swallow - *Hirundo rustica*
American Crow - *Corvus brachyrhynchos*
Carolina Chickadee - *Parus carolinensis*
Red-breasted Nuthatch - *Sitta canadensis*
Brown-headed Nuthatch - *Sitta pusilla*
Bewick's Wren - *Thryomanes bewickii*
House Wren - *Troglodytes aedon*
Marsh Wren - *Cistothorus palustris*
Rock Wren - *Salpinctes obsoletus*
Ruby-crowned Kinglet - *Regulus calendula*
Blue-gray Gnatcatcher - *Polioptila caerulea*
Veery - *Catharus fuscescens*
Hermit Thrush - *Catharus guttatus*
American Robin - *Turdus migratorius*
Northern Mockingbird - *Mimus polyglottos*
American Pipit - *Anthus rubescens*
Cedar Waxwing - *Bombycilla cedrorum*
European Starling - *Sturnus vulgaris*
Bell's Vireo - *Vireo bellii*
Philadelphia Vireo - *Vireo philadelphicus*
Red-eyed Vireo - *Vireo olivaceus*
Golden-winged Warbler - *Vermivora chrysoptera*
Orange-crowned Warbler - *Vermivora celata*
Northern Parula - *Parula americana*
Chestnut-sided Warbler - *Dendroica pensylvanica*
Cape May Warbler - *Dendroica tigrina*
Black-throated Blue Warbler - *Dendroica caerulescens*
Blackburnian Warbler - *Dendroica fusca*
Pine Warbler - *Dendroica pinus*
Palm Warbler - *Dendroica palmarum*
Blackpoll Warbler - *Dendroica striata*
Black-and-white Warbler - *Mniotilta varia*
Prothonotary Warbler - *Protonotaria citrea*
Swainson's Warbler - *Limnothlypis swainsonii*
Northern Waterthrush - *Seiurus noveboracensis*
Kentucky Warbler - *Oporornis formosus*
Mourning Warbler - *Oporornis philadelphia*
Hooded Warbler - *Wilsonia citrina*

Whip-poor-will - *Caprimulgus vociferus*
Ruby-throated Hummingbird - *Archilochus colubris*
Rufous Hummingbird - *Selasphorus rufus*
Red-headed Woodpecker - *Melanerpes erythrocephalus*
Yellow-bellied Sapsucker - *Sphyrapicus varius*
Hairy Woodpecker - *Picoides villosus*
Alder Flycatcher - *Empidonax alnorum*
Olive-sided Flycatcher - *Contopus borealis*
Yellow-bellied Flycatcher - *Empidonax virescens*
Eastern Phoebe - *Sayornis phoebe*
Vermilion Flycatcher - *Pyrocephalus rubinus*
Western Kingbird - *Tyrannus verticalis*
Scissor-tailed Flycatcher - *Tyrannus forficatus*
Purple Martin - *Progne subis*
Rough-winged Swallow - *Stelgidopteryx serripennis*
Cliff Swallow - *Hirundo pyrrhonota*
Blue Jay - *Cyanocitta cristata*
Fish Crow - *Corvus ossifragus*
Tufted Titmouse - *Parus bicolor*
White-breasted Nuthatch - *Sitta carolinensis*
Brown Creeper - *Certhia americana*
Carolina Wren - *Thryothorus ludovicianus*
Winter Wren - *Troglodytes troglodytes*
Sedge Wren - *Cistothorus platensis*
Golden-crowned Kinglet - *Regulus satrapa*
Eastern Bluebird - *Sialia sialis*
Gray-cheeked Thrush - *Catharus minimus*
Wood Thrush - *Hylocichla mustelina*
Gray Catbird - *Dumetella carolinensis*
Brown Thrasher - *Toxostoma rufum*
Sprague's Pipit - *Anthus spragueii*
Loggerhead Shrike - *Lanius ludovicianus*
White-eyed Vireo - *Vireo griseus*
Yellow-throated Vireo - *Vireo flavifrons*
Warbling Vireo - *Vireo gilvus*
Blue-winged Warbler - *Vermivora pinus*
Tennessee Warbler - *Vermivora peregrina*
Nashville Warbler - *Vermivora ruficapilla*
Yellow Warbler - *Dendroica petechia*
Magnolia Warbler - *Dendroica magnolia*
Yellow-rumped Warbler - *Dendroica coronata*
Black-throat Green Warbler - *Dendroica virens*
Yellow-throated Warbler - *Dendroica dominica*
Prairie Warbler - *Dendroica discolor*
Bay-breasted Warbler - *Dendroica castanea*
Cerulean Warbler - *Dendroica cerulea*
American Redstart - *Setophaga ruticilla*
Worm-eating Warbler - *Helmitheros vermivorus*
Ovenbird - *Seiurus aurocapillus*
Louisiana Waterthrush - *Seiurus motacilla*
Connecticut Warbler - *Oporornis agilis*
Common Yellowthroat - *Geothlypis trichas*
Wilson's Warbler - *Wilsonia pusilla*
Canada Warbler - *Wilsonia canadensis*

| | | | |
|---|---|---|---|
| Yellow-breasted Chat - | *Icteria virens* | Scarlet Tanager - | *Piranga olivacea* |
| Summer Tanager - | *Piranga rubra* | Northern Cardinal - | *Cardinalis cardinalis* |
| Evening Grosbeak - | *Coccothraustes verpertinus* | Rose-breasted Grosbeak - | *Pheucticus ludovicianus* |
| Black-headed Grosbeak - | *Pheucticus melanocephalus* | Blue Grosbeak - | *Guiraca caerulea* |
| Indigo Bunting - | *Passerina cyanea* | Dickcissel - | *Spiza americana* |
| Painted Bunting - | *Passerina ciris* | Green-tailed Towhee - | *Piplo chlorurus* |
| Rufous-sided Towhee - | *Pipilo erythrophthalmus* | Bachman's Sparrow* - | *Aimophila aestivalis* |
| Lark Bunting - | *Calamospiza melanocorys* | Chipping Sparrow - | *Spizella passerina* |
| American Tree Sparrow - | *Spizella arborea* | Field Sparrow - | *Spizella pusilla* |
| Clay-colored Sparrow - | *Spizella pallida* | Lark Sparrow - | *Chondestes grammacus* |
| Vesper Sparrow - | *Pooecetes gramineus* | Grasshopper Sparrow - | *Ammodramus savannarum* |
| Savannah Sparrow - | *Passerculus sandwichensis* | Sharp-tailed Sparrow - | *Ammodramus caudacutus* |
| Henslow's Sparrow - | *Ammodramus henslowii* | Fox Sparrow - | *Passerella iliaca* |
| LeConte's Sparrow - | *Ammospiza leconteii* | Lincoln's Sparrow - | *Melospiza lincolnii* |
| Song Sparrow - | *Melospiza melodia* | White-throated Sparrow - | *Zonotrichia albicollis* |
| Swamp Sparrow - | *Melospiza georgiana* | Harris Sparrow - | *Zonotrichia querula* |
| White-crowned Sparrow - | *Zonotrichia leucophrys* | Lapland Lonspur - | *Calcarius lapponicus* |
| Dark-eyed Junco - | *Junco hyemalis* | Chestnut-collared Longspur - | *Calcarius ornatus* |
| Smith's Longspur - | *Calcarius pictus* | Red-winged Blackbird - | *Agelaius phoeniceus* |
| Bobolink - | *Dolichonyx oryzivorus* | Western Meadowlark - | *Sturnella neglecta* |
| Eastern Meadowlark - | *Sturnella magna* | Rusty Blackbird - | *Euphagus carolinus* |
| Yellow-headed Blackbird - | *Xanthocephalus xanthocephalus* | Great-tailed Grackle - | *Quiscalus mexicanus* |
| Brewer's Blackbird - | *Euphagus cyanocephalus* | Brown-headed Cowbird - | *Molothrus ater* |
| Common Grackle - | *Quiscalus quiscula* | Northern Oriole - | *Icterus galbula* |
| Orchard Oriole - | *Icterus spurius* | Purple Finch - | *Carpodacus purpureus* |
| House Finch - | *Carpodacus mexicanus* | Pine Siskin - | *Carduelis pinus* |
| American Goldfinch - | *Carduelis tristis* | House Sparrow - | *Passer domesticus* |

*Species listed by the State of Texas as threatened as of 1998.
y Federally listed endangered species as of 1998.
k Federally listed threatened species as of 1998. Note - the american alligator is listed as threatened because of its simularity to other endangered species.

TABLE II. HUMAN POPULATION INHABITING THE TEXAS COUNTIES AND LOUISIANA PARISH ENCOMPASSED BY THE CYPRESS CREEK WATERSHED

| COUNTY/PARISH | 1990 CENSUS | 1997 POPULATION ESTIMATE |
|---|---|---|
| Camp | 9,904 | 11,051 |
| Cass | 29,982 | 30,745 |
| Franklin | 7,802 | 8,888 |
| Gregg | 104,948 | 112,482 |
| Harrison | 57,483 | 61,309 |
| Hopkins | 28,833 | 31,100 |
| Marion | 9,984 | 10,414 |
| Morris | 13,200 | 13,661 |
| Rains | 6,715 | 7,509 |
| Titus | 24,009 | 26,533 |
| Upsher | 31,370 | 34,929 |
| Caddo | 248,253 | 244,943 |
| TOTAL | 572,483 | 593,564 |

(TAMU, 1997; Deseran pers. comm.)

**APPENDIX B**
**(SAMPLE KEYS)**

TABLE III. KEY TO WATER SAMPLES COLLECTED WITHIN THREE LENTIC SYSTEMS IN THE CYPRESS CREEK WATERSHED.

| | |
|---|---|
| CSWM01 | - sample collected at Cypress Springs Reservoir above FM 115. |
| CSWM02 | - sample collected at Cypress Springs Reservoir at Panther Creek. |
| CSWM03 | - sample collected at Cypress Springs Reservoir at Whippoorwill Bay. |
| LOPWM01 | - sample collected at Lake O' The Pines in the vicinity of Lone Star Steel. |
| LOPWM02 | - sample collected at Lake O' The Pines at SH 155 Marina. |
| LOPWM03 | - sample collected at Lake O' The Pines at Copeland Creek. |
| CLWM01 | - sample collected at Caddo Lake at Harrison Bayou. |
| CLWM02 | - sample collected at Caddo Lake at South Little Green Break. |
| CLWM03 | - sample collected at Caddo Lake at Clintons Chute. |

TABLE IV. KEY TO SEDIMENT SAMPLES COLLECTED WITHIN THREE LENTIC SYSTEMS IN THE CYPRESS CREEK WATERSHED.

| | |
|---|---|
| CS1S01 | - sample collected at Cypress Springs Reservoir above FM 115. |
| CS1S04 | - sample collected at Cypress Springs Reservoir above FM 115. |
| CS1S06 | - sample collected at Cypress Springs Reservoir above FM 115. |
| CS1S09 | - sample collected at Cypress Springs Reservoir above FM 115. |
| CS1S14 | - sample collected at Cypress Springs Reservoir above FM 115. |
| CS2S02 | - sample collected at Cypress Springs Reservoir at Panther Creek. |
| CS2S07 | - sample collected at Cypress Springs Reservoir at Panther Creek. |
| CS2S15 | - sample collected at Cypress Springs Reservoir at Panther Creek. |
| CS3S03 | - sample collected at Cypress Springs Reservoir at Whippoorwill Bay. |
| CS3S08 | - sample collected at Cypress Springs Reservoir at Whippoorwill Bay. |
| CS3S10 | - sample collected at Cypress Springs Reservoir at Whippoorwill Bay. |
| CS3S16 | - sample collected at Cypress Springs Reservoir at Whippoorwill Bay. |
| LP1S21 | - sample collected at Lake O' The Pines in the vicinity of Lone Star Steel. |
| LP1S25 | - sample collected at Lake O' The Pines in the vicinity of Lone Star Steel. |
| LP1S26 | - sample collected at Lake O' The Pines in the vicinity of Lone Star Steel. |
| LP1S29 | - sample collected at Lake O' The Pines in the vicinity of Lone Star Steel. |
| LP1S34 | - sample collected at Lake O' The Pines in the vicinity of Lone Star Steel. |
| LP2S22 | - sample collected at Lake O' The Pines at SH 155 Marina. |
| LP2S27 | - sample collected at Lake O' The Pines at SH 155 Marina. |
| LP2S35 | - sample collected at Lake O' The Pines at SH 155 Marina. |
| LP3S23 | - sample collected at Lake O' The Pines at Copeland Creek. |
| LP3S28 | - sample collected at Lake O' The Pines at Copeland Creek. |
| LP3S30 | - sample collected at Lake O' The Pines at Copeland Creek. |
| LP3S36 | - sample collected at Lake O' The Pines at Copeland Creek. |
| CL2S42 | - sample collected at Caddo Lake at Harrison Bayou. |
| CL2S45 | - sample collected at Caddo Lake at Harrison Bayou. |
| CL2S47 | - sample collected at Caddo Lake at Harrison Bayou. |
| CL2S50 | - sample collected at Caddo Lake at Harrison Bayou. |
| CL2S55 | - sample collected at Caddo Lake at Harrison Bayou. |
| CL9S41 | - sample collected at Caddo Lake at Goose Prairie. |
| CL9S46 | - sample collected at Caddo Lake at Goose Prairie. |
| CL9S49 | - sample collected at Caddo Lake at Goose Prairie. |
| CL9S54 | - sample collected at Caddo Lake at Goose Prairie. |
| CL11S43 | - sample collected at Caddo Lake at South Little Green Break. |
| CL11S48 | - sample collected at Caddo Lake at South Little Green Break. |
| CL11S56 | - sample collected at Caddo Lake at South Little Green Break. |

TABLE V. KEY TO FISH SAMPLES COLLECTED WITHIN THREE LENTIC SYSTEMS IN THE CYPRESS CREEK WATERSHED.

| | |
|---|---|
| CS1GAR01 | - spotted gar composite sample collected at Cypress Springs Reservoir above FM 115. |
| CS1GAR02 | - spotted gar composite sample collected at Cypress Springs Reservoir above FM 115. |
| CS1GS01 | - gizzard shad composite sample collected at Cypress Springs Reservoir above FM 115. |
| CS1GS02 | - gizzard shad composite sample collected at Cypress Springs Reservoir above FM 115. |
| CS1LMB03 | - largemouth bass composite sample collected at Cypress Springs Reservoir above FM 115. |
| CS1LMB06 | - largemouth bass sample collected at Cypress Springs Reservoir above FM 115. |
| CS1LMB07 | - largemouth bass sample collected at Cypress Springs Reservoir above FM 115. |
| CS1LMB08 | - largemouth bass sample collected at Cypress Springs Reservoir above FM 115. |
| CS1LMB09 | - largemouth bass sample collected at Cypress Springs Reservoir above FM 115. |
| CS1SF04 | - redear sunfish composite sample collected at Cypress Springs Reservoir above FM 115. |
| CS1SPB10 | - spotted bass sample collected at Cypress Springs Reservoir above FM 115. |
| CS2GAR01 | - spotted gar composite sample collected at Cypress Springs Reservoir at Panther Creek |
| CS2GAR02 | - spotted gar composite sample collected at Cypress Springs Reservoir at Panther Creek. |
| CS2GS01 | - gizzard shad composite sample collected at Cypress Springs Reservoir at Panther Creek. |
| CS2GS02 | - gizzard shad composite sample collected at Cypress Springs Reservoir at Panther Creek. |
| CS2LMB01 | - largemouth bass sample collected at Cypress Springs Reservoir at Panther Creek. |
| CS2LMB02 | - largemouth bass sample collected at Cypress Springs Reservoir at Panther Creek. |
| CS2LMB03 | - largemouth bass sample collected at Cypress Springs Reservoir at Panther Creek. |
| CS2LMB04 | - largemouth bass sample collected at Cypress Springs Reservoir at Panther Creek. |
| CS2LMB05 | - largemouth bass sample collected at Cypress Springs Reservoir at Panther Creek. |
| CS2SF04 | - redear sunfish composite sample collected at Cypress Springs Reservoir at Panther Creek. |
| CS3GAR01 | - spotted gar composite sample collected at Cypress Springs Reservoir at Whippoorwill Bay. |
| CS3GAR02 | - spotted gar composite sample collected at Cypress Springs Reservoir at Whippoorwill Bay. |
| CS3GS01 | - gizzard shad composite sample collected at Cypress Springs Reservoir at Whippoorwill Bay. |
| CS3GS02 | - gizzard shad composite sample collected at Cypress Springs Reservoir at Whippoorwill Bay. |
| CS3LMB04 | - largemouth bass sample collected at Cypress Springs Reservoir at Whippoorwill Bay. |
| CS3LMB05 | - largemouth bass sample collected at Cypress Springs Reservoir at Whippoorwill Bay. |
| CS3LMB06 | - largemouth bass sample collected at Cypress Springs Reservoir at Whippoorwill Bay. |
| CS3LMB07 | - largemouth bass sample collected at Cypress Springs Reservoir at Whippoorwill Bay. |
| CS3LMB08 | - largemouth bass sample collected at Cypress Springs Reservoir at Whippoorwill Bay. |
| CS3SF04 | - redear sunfish composite sample collected at Cypress Springs Reservoir at Whippoorwill Bay. |
| LP1GAR01 | - spotted gar composite sample collected at Lake O' The Pines at Lone Star Steel. |
| LP1GAR02 | - spotted gar composite sample collected at Lake O' The Pines at Lone Star Steel. |
| LP1GS01 | - gizzard shad composite sample collected at Lake O' The Pines at Lone Star Steel. |
| LP1GS02 | - gizzard shad composite sample collected at Lake O' The Pines at Lone Star Steel. |
| LP1LMB01 | - largemouth bass sample collected at Lake O' The Pines at Lone Star Steel. |
| LP1LMB02 | - largemouth bass sample collected at Lake O' The Pines at Lone Star Steel. |
| LP1LMB03 | - largemouth bass composite sample collected at Lake O' The Pines at Lone Star Steel. |
| LP1LMB05 | - largemouth bass sample collected at Lake O' The Pines at Lone Star Steel. |
| LP1LMB06 | - largemouth bass sample collected at Lake O' The Pines at Lone Star Steel. |
| LP1SF04 | - redear sunfish composite sample collected at Lake O' The Pines at Lone Star Steel. |
| LP1WB03 | - white bass sample collected at Lake O' The Pines at Lone Star Steel. |
| LP2CC01 | - channel catfish sample collected at Lake O' The Pines at SH 155 Marina. |
| LP2CC02 | - channel catfish sample collected at Lake O' The Pines at SH 155 Marina. |
| LP2CC03 | - channel catfish sample collected at Lake O' The Pines at SH 155 Marina. |
| LP2CC04 | - channel catfish sample collected at Lake O' The Pines at SH 155 Marina. |
| LP2CC06 | - channel catfish sample collected at Lake O' The Pines at SH 155 Marina. |
| LP2GAR01 | - spotted gar composite sample collected at Lake O' The Pines at SH 155 Marina. |
| LP2GAR02 | - spotted gar composite sample collected at Lake O' The Pines at SH 155 Marina. |
| LP2GS01 | - gizzard shad composite sample collected at Lake O' The Pines at SH 155 Marina. |
| LP2GS02 | - gizzard shad composite sample collected at Lake O' The Pines at SH 155 Marina. |

TABLE V. KEY TO FISH SAMPLES COLLECTED WITHIN THREE LENTIC SYSTEMS IN THE CYPRESS CREEK WATERSHED (continued).

| | |
|---|---|
| LP2SF04 | - redear sunfish composite sample collected at Lake O' The Pines at SH 155 Marina. |
| LP3CC01 | - channel catfish sample collected at Lake O' The Pines from Copeland Creek. |
| LP3CC02 | - channel catfish sample collected at Lake O' The Pines from Copeland Creek. |
| LP3CC03 | - channel catfish sample collected at Lake O' The Pines from Copeland Creek. |
| LP3CC04 | - channel catfish sample collected at Lake O' The Pines from Copeland Creek. |
| LP3CC05 | - channel catfish sample collected at Lake O' The Pines from Copeland Creek. |
| LP3GAR01 | - spotted gar composite sample collected at Lake O' The Pines from Copeland Creek. |
| LP3GAR02 | - spotted gar composite sample collected at Lake O' The Pines from Copeland Creek. |
| LP3GS01 | - gizzard shad composite sample collected at Lake O' The Pines from Copeland Creek. |
| LP3GS02 | - gizzard shad composite sample collected at Lake O' The Pines from Copeland Creek. |
| LP3SF04 | - redear sunfish composite sample collected at Lake O' The Pines from Copeland Creek. |
| S2B1 | - largemouth bass composite sample collected at Caddo Lake at Harrison Bayou. |
| S2B2 | - largemouth bass composite sample collected at Caddo Lake at Harrison Bayou. |
| S2B3 | - largemouth bass composite sample collected at Caddo Lake at Harrison Bayou. |
| S2BG1 | - largemouth bass composite sample collected at Caddo Lake at Harrison Bayou. |
| S2BG2 | - largemouth bass composite sample collected at Caddo Lake at Harrison Bayou. |
| S2G1 | - spotted gar composite sample collected at Caddo Lake at Harrison Bayou. |
| S2G2 | - spotted gar composite sample collected at Caddo Lake at Harrison Bayou. |
| S2R1 | - redear sunfish composite sample collected at Caddo Lake at Harrison Bayou. |
| S2R2 | - redear sunfish composite sample collected at Caddo Lake at Harrison Bayou. |
| S2R3 | - redear sunfish composite sample collected at Caddo Lake at Harrison Bayou. |
| S2S1 | - gizzard shad composite sample collected at Caddo Lake at Harrison Bayou. |
| S2S2 | - gizzard shad composite sample collected at Caddo Lake at Harrison Bayou. |
| S2S3 | - gizzard shad composite sample collected at Caddo Lake at Harrison Bayou. |
| S2S4 | - gizzard shad composite sample collected at Caddo Lake at Harrison Bayou. |
| S2S5 | - gizzard shad composite sample collected at Caddo Lake at Harrison Bayou. |
| S4B1 | - largemouth bass composite sample collected at Caddo Lake at South Shore. |
| S4B2 | - largemouth bass composite sample collected at Caddo Lake at South Shore. |
| S4BG1 | - bluegill sunfish composite sample collected at Caddo Lake at South Shore. |
| S4BG2 | - bluegill sunfish composite sample collected at Caddo Lake at South Shore. |
| S4BG3 | - bluegill sunfish composite sample collected at Caddo Lake at South Shore. |
| S4G1 | - spotted gar composite sample collected at Caddo Lake at South Shore. |
| S4G2 | - spotted gar composite sample collected at Caddo Lake at South Shore. |
| S4G3 | - spotted gar composite sample collected at Caddo Lake at South Shore. |
| S4R1 | - redear sunfish composite sample collected at Caddo Lake at South Shore. |
| S4S1 | - gizzard shad composite sample collected at Caddo Lake at South Shore. |
| S4S2 | - gizzard shad composite sample collected at Caddo Lake at South Shore. |
| S5B1 | - largemouth bass composite sample collected at Caddo Lake at Millers Point. |
| S5B2 | - largemouth bass composite sample collected at Caddo Lake at Millers Point. |
| S5B3 | - largemouth bass composite sample collected at Caddo Lake at Millers Point. |
| S5B4 | - largemouth bass composite sample collected at Caddo Lake at Millers Point. |
| S5BG1 | - bluegill sunfish composite sample collected at Caddo Lake at Millers Point. |
| S5BG2 | - bluegill sunfish composite sample collected at Caddo Lake at Millers Point. |
| S5G1 | - spotted gar composite sample collected at Caddo Lake at Millers Point. |
| S5G2 | - spotted gar composite sample collected at Caddo Lake at Millers Point. |
| S5G3 | - spotted gar composite sample collected at Caddo Lake at Millers Point. |
| S5R1 | - redear sunfish composite sample collected at Caddo Lake at Millers Point. |
| S5R2 | - redear sunfish composite sample collected at Caddo Lake at Millers Point. |
| S5R3 | - redear sunfish composite sample collected at Caddo Lake at Millers Point. |
| S5S1 | - gizzard shad composite sample collected at Caddo Lake at Millers Point. |
| S5S2 | - gizzard shad composite sample collected at Caddo Lake at Millers Point. |

TABLE V. KEY TO FISH SAMPLES COLLECTED WITHIN THREE LENTIC SYSTEMS IN THE CYPRESS CREEK WATERSHED (continued).

| | |
|---|---|
| S6B1 | - largemouth bass composite sample collected at Caddo Lake at Taylor Island. |
| S6B2 | - largemouth bass composite sample collected at Caddo Lake at Taylor Island. |
| S6BG1 | - bluegill sunfish composite sample collected at Caddo Lake at Taylor Island. |
| S6BG2 | - bluegill sunfish composite sample collected at Caddo Lake at Taylor Island. |
| S6BG3 | - bluegill sunfish composite sample collected at Caddo Lake at Taylor Island. |
| S6R1 | - redear sunfish composite sample collected at Caddo Lake at Taylor Island. |
| S6R2 | - redear sunfish composite sample collected at Caddo Lake at Taylor Island. |
| S6S1 | - gizzard shad composite sample collected at Caddo Lake at Taylor Island. |
| S6S3 | - gizzard shad composite sample collected at Caddo Lake at Taylor Island. |
| S6S4 | - gizzard shad composite sample collected at Caddo Lake at Taylor Island. |
| S6S5 | - gizzard shad composite sample collected at Caddo Lake at Taylor Island. |
| S6S6 | - gizzard shad composite sample collected at Caddo Lake at Taylor Island. |
| S7B1 | - largemouth bass composite sample collected at Caddo Lake at Mossey Break. |
| S7BG1 | - bluegill sunfish composite sample collected at Caddo Lake at Mossey Break. |
| S7BG2 | - bluegill sunfish composite sample collected at Caddo Lake at Mossey Break. |
| S7BG3 | - bluegill sunfish composite sample collected at Caddo Lake at Mossey Break. |
| S7R2 | - redear sunfish composite sample collected at Caddo Lake at Mossey Break. |
| S7R3 | - redear sunfish composite sample collected at Caddo Lake at Mossey Break. |
| S7R4 | - redear sunfish composite sample collected at Caddo Lake at Mossey Break. |
| S7S1 | - gizzard shad composite sample collected at Caddo Lake at Mossey Break. |
| S7S2 | - gizzard shad composite sample collected at Caddo Lake at Mossey Break. |
| S7S4 | - gizzard shad composite sample collected at Caddo Lake at Mossey Break. |
| S7S5 | - gizzard shad composite sample collected at Caddo Lake at Mossey Break. |
| S7S6 | - gizzard shad composite sample collected at Caddo Lake at Mossey Break. |
| S8B1 | - largemouth bass composite sample collected at Caddo Lake at Clintons Chute. |
| S8B2 | - largemouth bass composite sample collected at Caddo Lake at Clintons Chute. |
| S8B3 | - largemouth bass composite sample collected at Caddo Lake at Clintons Chute. |
| S8BG1 | - bluegill sunfish composite sample collected at Caddo Lake at Clintons Chute. |
| S8BG2 | - bluegill sunfish composite sample collected at Caddo Lake at Clintons Chute. |
| S8G1 | - spotted gar composite sample collected at Caddo Lake at Clintons Chute. |
| S8R1 | - redear sunfish composite sample collected at Caddo Lake at Clintons Chute. |
| S8R2 | - redear sunfish composite sample collected at Caddo Lake at Clintons Chute. |
| S8R3 | - redear sunfish composite sample collected at Caddo Lake at Clintons Chute. |
| S8S1 | - gizzard shad composite sample collected at Caddo Lake at Clintons Chute. |
| S9C1 | - channel catfish sample collected at Caddo Lake at Goose Prairie. |
| S9C2 | - channel catfish composite sample collected at Caddo Lake at Goose Prairie. |
| S9G1 | - spotted gar composite sample collected at Caddo Lake at Goose Prairie. |
| S9G2 | - spotted gar composite sample collected at Caddo Lake at Goose Prairie. |
| S9K1 | - killifish composite sample collected at Caddo Lake at Goose Prairie. |
| S9M1 | - mosquitofish composite sample collected at Caddo Lake at Goose Prairie. |
| S9M2 | - mosquitofish composite sample collected at Caddo Lake at Goose Prairie. |
| S10B1 | - largemouth bass composite sample collected at Caddo Lake at Uncertain. |
| S10B2 | - largemouth bass composite sample collected at Caddo Lake at Uncertain. |
| S10B3 | - largemouth bass composite sample collected at Caddo Lake at Uncertain. |
| S10BG1 | - bluegill sunfish composite sample collected at Caddo Lake at Uncertain. |
| S10BH1 | - black bullhead sample collected at Caddo Lake at Uncertain. |
| S10G1 | - spotted gar composite sample collected at Caddo Lake at Uncertain. |
| S10G2 | - spotted gar composite sample collected at Caddo Lake at Uncertain. |
| S10R1 | - redear sunfish composite sample collected at Caddo Lake at Uncertain. |
| S10R2 | - redear sunfish composite sample collected at Caddo Lake at Uncertain. |
| S10R3 | - redear sunfish composite sample collected at Caddo Lake at Uncertain. |

TABLE V. KEY TO FISH SAMPLES COLLECTED WITHIN THREE LENTIC SYSTEMS IN THE CYPRESS CREEK WATERSHED (continued).

| | |
|---|---|
| S10S1 | - gizzard shad composite sample collected at Caddo Lake at Uncertain. |
| S10S2 | - gizzard shad composite sample collected at Caddo Lake at Uncertain. |
| S10S3 | - gizzard shad composite sample collected at Caddo Lake at Uncertain. |
| S11B1 | - largemouth bass composite sample collected at Caddo Lake at South Little Green Break. |
| S11B2 | - largemouth bass composite sample collected at Caddo Lake at South Little Green Break. |
| S11B3 | - largemouth bass composite sample collected at Caddo Lake at South Little Green Break. |
| S11BG2 | - bluegill sunfish composite sample collected at Caddo Lake at South Little Green Break. |
| S11BG3 | - bluegill sunfish composite sample collected at Caddo Lake at South Little Green Break. |
| S11C1 | - channel catfish sample collected at Caddo Lake at South Little Green Break. |
| S11C2 | - channel catfish composite sample collected at Caddo Lake at South Little Green Break. |
| S11G1 | - spotted gar composite sample collected at Caddo Lake at South Little Green Break. |
| S11G2 | - spotted gar composite sample collected at Caddo Lake at South Little Green Break. |
| S11R1 | - redear sunfish composite sample collected at Caddo Lake at South Little Green Break. |
| S11R2 | - redear sunfish composite sample collected at Caddo Lake at South Little Green Break. |
| S11S1 | - gizzard shad composite sample collected at Caddo Lake at South Little Green Break. |
| S11S2 | - gizzard shad composite sample collected at Caddo Lake at South Little Green Break. |
| S11S4 | - gizzard shad composite sample collected at Caddo Lake at South Little Green Break. |

TABLE VI. KEY TO MACROINVERTEBRATE SAMPLES COLLECTED FROM CADDO LAKE.

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|---|---|
| S2IM1 | - grass shrimp collected at Harrison Bayou. |
| S2IM2 | - grass shrimp collected at Harrison Bayou. |
| S4IM1 | - grass shrimp collected at South Shore. |
| S5IM1 | - grass shrimp collected at Millers Point. |
| S5IM2 | - grass shrimp collected at Millers Point. |
| S6IM1 | - grass shrimp collected at Taylor Island. |
| S6IM2 | - grass shrimp collected at Taylor Island. |
| S7IM1 | - grass shrimp collected at Mossey Break. |
| S7IM2 | - grass shrimp collected at Mossey Break. |
| S9IM1 | - grass shrimp collected at Goose Prairie. |
| S9IM2 | - grass shrimp collected at Goose Prairie. |
| S10IM1 | - grass shrimp collected at Uncertain. |
| S10IM2 | - grass shrimp collected at Uncertain. |

**APPENDIX C**
**(ANALYTICAL METHODS)**

Method Code 001: Elemental Analysis By Inductively Coupled Plasma Spectroscopy
Laboratory: Hazleton Laboratories America, Inc.

For Samples: CSWM01, CSWM02, CSWM03, LOPWM01, LOPWM02, LOPWM03, CLWM01, CLWM02, CLWM03, CS1S01, CS1S14, CS2S02, CS2S15, CS3S03, CS3S16, LP1S21, LP1S34, LP2S22, LP2S35, LP3S23, LP3S36, CL2S42, CL2S55, CL9S41, CL9S54, CL11S43, CL11S56, CS1GAR01, CS1GAR02, CS1GS01, CS1GS02, CS1SF04, CS2GAR01, CS2GAR02, CS2GS01, CS2GS02, CS2SF04, CS3GAR01, CS3GAR02, CS3GS01, CS3GS02, CS3SF04, LP1GAR01, LP1GAR02, LP1GS01, LP1GS02, LP1SF04, LP2GAR01, LP2GAR02, LP2GS01, LP2GS02, LP2SF04, LP3GAR01, LP3GAR02, LP3GS01, LP3GS02, LP3SF04, S2B1, S2BS, S2BG1, S2BG2, S2G1, S2G2, S2R1, S2S1, S2S2, S4B1, S4B2, S4BG2, S4BG3, S4G1, S4G2, S4S1, S4S2, S5B1, S5B2, S5B4, S5BG1, S5BG2, S5G1, S5G2, S5S1, S5S2, S6B1, S6B2, S6BG1, SGBG2, S6BG3, S6S3, S6S4, S7B1, S7BG2, S7BG3, S7S1, S7S4, S8B1, S8B3, S8BG1, S8BG2, S8G1, S8R2, S8R3, S8S1, S9G1, S9G2, S9M1, S9M2, S10B1, S10B3, S10BG1, S10G1, S10G2, S10S1, S10S2, S10S3, S11B1, S11B3, S11BG2, S11BG3, S11G1, S11G2, S11S1, S11S2, S2IM1, S2IM2, S4IM1, S5IM1, S5IM2, S6IM1, S6IM2, S7IM1, S7IM2, S9IM1, S9IM2, S10IM1, S10IM2, CLMSL01-CLMSL07

I. Scope:
This method (MC 001) is applicable to plant and animal tissue, soil/sediment, and water.

II. Sample Preparation:
(1) Plant and Animal Tissue:
Digest 5.00 g of tissue in Teflon vessel with 5 ml nitric acid in microwave digester. Transfer into 5 ml volumetric flask and dilute to volume with 0.005% Triton X-100 solution. Filter.
(2) Soil/Sediment:
Digest 1.00 g in covered Teflon beaker on hot plate using 10 ml nitric acid. Add 30% hydrogen peroxide in 1 ml aliquots until effervescence no longer occurs. Add 1.25 ml hydrochloric acid, heat 10 minutes, and transfer to a 50 ml volumetric flask. Dilute to volume with DDI water. Filter.
(3) Water:
Digest 100.0 ml sample in Teflon beaker on hot plate with 0.5 ml nitric acid and 2.5 ml hydrochloric acid. Reduce volume to 15 - 20 ml. Transfer into 50 ml volumetric flask. Dilute to volume with DDI water. Filter.

III. Principle:
Each analyte concentration in the sample solution is determined by comparing its emission intensity with the emission intensities of a known series of analyte standards. The analytical wavelengths are tabulated with the raw concentration data. Analytical data is corrected for background and interfering element effects by the spectrometer program. The detection limit of each analyte is listed in the data report with each respective unknown value, it is the function of the instrument detection limit (IDL), and the sample mass and volume to which it is diluted. With each batch of 20 samples of the same matrix type, at least one duplicate, one sample spike, one analytical blank, and one appropriate reference material are assayed.

IV. Reference:
(1) Test Methods For Evaluating Solid Waste USEPA Publication No. SW-846, 3rd Edition, Methods 3030, 3040 or 3050, and 6010, USEPA, Washington, D.C. (revised December 1987).
(2) Dahlquist, R.L. and Knoll, J.W., "Inductively Coupled Plasma - Atomic Emission Spectrometry: Analysis Of Biological Materials And Soils For Major, Trace, and Ultra-Trace Elements," Applied Spectroscopy, 32 (1) 1-29 (January/February 1978).
(3) Official Methods Of Analysis - 14th Edition, Method 43.292-43.296, AOAC: Arlington, Virginia (1984). (4) Official Methods Of Analysis - 1st Supplement, 14th Edition, Method 3.A01-3.A04, AOAC: Arlington, Virginia (1985).
(5) USEPA Contract Laboratory Program, Statement Of Work, Inorganic Analysis, Multimedia, Multiconcentration, SOW 7/88.
(6) "Inductively Coupled Plasma-Atomic Emission Spectrometric Method Of Trace Element Analysis Of Water and Wastes" Method 200.7, edited by T.D. Martin and J.F. Kopp, USEPA, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio.
(7) "Method Procedures, Analytical Chemistry Department, Inorganic Chemistry." Method MP-ICPS-MA, Hazelton Laboratories America, Inc., Madison, Wisconsin.

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Method Code 003: Mercury In Water By Cold Vapor Atomic Absorption
Laboratory: Hazleton Laboratories America, Inc.

For Samples: CSWM01, CSWM02, CSWM03, LOPWM01, LOPWM02, LOPWM03, CLWM01, CLWM02, CLWM03

I. Scope:
This method is applicable to drinking, surface, saline, and waste waters, and effluents.

II. Principle:
Sample volume for digest: 50 ml Final volume: 100 ml
Samples are digested with sulfuric acid, potassium permanganate, and potassium per sulfate. Mercury is reduced with sodium borohydride for determination. The amount of mercury is determined at a wavelength of 253.7 nm by comparing the signal of the unknown sample, measured by the atomic absorption spectrophotometer with the MHS-20 hydride generation unit, with the signal of the standard solutions. Using a 50 ml sample, the lowest detection limit of this assay is 0.0004 mg/l.

III. References:

(1) Method For Chemical Analysis Of Water And Wastes, USEPA Publication No. 600/4-79-020, Metals 1-19 and Method 245.2, USEPA: Cincinnati Ohio.

(2) Test Methods For Evaluating Solid Waste USEPA Publication No. SW-846, 2nd Edition, Methods 3020 and 7470, USEPA, Washington, D.C. (revised April 1984).

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Method Code 005: Arsenic In Water By Graphite Furnace
Laboratory: Hazleton Laboratories America, Inc.

For Samples: CSWM01, CSWM02, CSWM03, LOPWM01, LOPWM02, LOPWM03, CLWM01, CLWM02, CLWM03

I. Scope:
This method is applicable to waters and aqueous wastes.

II. Sample Preparation:
Sample volume: 25 ml (minimum) Final volume: 25 ml
Digest the sample with nitric acid and 30% hydrogen peroxide using covered glass beakers and hot plates. Transfer to 25 ml.

III. Principle:
The amount of arsenic is determined at a wavelength of 193.7 nm by comparing the signal of the unknown sample, measured by the graphite furnace atomic absorption spectrophotometer, with the signal of the standard solutions. The method of standard additions is used where interference are indicated. Nickel matrix modification is employed in the analysis. Using a 25 ml sample, the lowest detection limit of this assay is 1 mg/l.

IV. References:

(1) Method For Chemical Analysis Of Water And Wastes, USEPA Publication No. 600/4-79-020, Metals 1-19 and Method 206.2, USEPA: Cincinnati Ohio.

(2) Test Methods For Evaluating Solid Waste USEPA Publication No. SW-846, 2nd Edition, Methods 3020 and 7060, USEPA, Washington, D.C. (revised April 1984).

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Method Code 007: Selenium In Water By Graphite Furnace
Laboratory: Hazleton Laboratories America, Inc.

For Samples: CSWM01, CSWM02, CSWM03, LOPWM01, LOPWM02, LOPWM03, CLWM01, CLWM02, CLWM03

I. Scope:
This method is applicable to waters and aqueous wastes.

II. Sample Preparation: Sample volume: 25 ml (minimum) Final volume: 25 ml
Digest the sample with nitric acid and 30% hydrogen peroxide using covered glass beakers and hot plates. Transfer to 25 ml.

III. Principle:
The amount of selenium is determined at a wavelength of 196.0 nm by comparing the signal of the unknown sample, measured by the graphite furnace atomic absorption spectrophotometer, with the signal of the standard solutions. The method of standard additions is used where along with nickel matrix modification in the analysis. Using a 25 ml sample, the lowest detection limit of this assay is 1 mg/l.

IV. References:

(1) Method For Chemical Analysis Of Water And Wastes, USEPA Publication No. 600/4-79-020, Metals 1-19 and Method 270.2, USEPA: Cincinnati Ohio.

(2) Test Methods For Evaluating Solid Waste USEPA Publication No. SW-846, 2nd Edition, Methods 3020 and 7060, USEPA, Washington, D.C. (revised April 1984).

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Method Code 002: Mercury By Cold Vapor Atomic Absorption
Laboratory: Hazleton Laboratories America, Inc.

For Samples: CS1S01, CS1S14, CS2S02, CS2S15, CS3S03, CS3S16, LP1S21, LP1S34, LP2S22, LP2S35, LP3S23, LP3S36, CL2S42, CL2S55, CL9S41, CL9S54, CL11S43, CL11S56, CS1GAR01, CS1GAR02, CS1GS01, CS1GS02, CS1LMB06, CS1LMB07, CS1LMB08, CS1LMB09, CS1SPB10, CS1SF04, CS2GAR01, CS2GAR02, CS2GS01, CS2GS02, CS2LMB01, CS2LMB02, CS2LMB03, CS2LMB04, CS2LMB05, CS2SF04, CS3GAR01, CS3GAR02, CS3GS01, CS3GS02, CS3LMB04, CS3LMB05, CS3LMB06, CS3LMB07, CS3LMB08, CS3SF04, LP1GAR01, LP1GAR02, LP1GS01, LP1GS02, LP1LMB01, LP1LMB02, LP1LMB05, LP1LMB06, LP1SF04, LP1WB03, LP2CC01, LP2CC02, LP2CC03, LP2CC04, LP2CC06, LP2GAR01, LP2GAR02, LP2GS01, LP2GS02, LP2SF04, LP3CC01, LP3CC02, LP3CC03, LP3CC04, LP3CC05, LP3GAR01, LP3GAR02, LP3GS01, LP3GS02, LP3SF04, S2B1, S2BS, S2BG1, S2BG2, S2G1, S2G2, S2R1, S2S1, S2S2, S4B1, S4B2, S4BG2, S4BG3, S4G1, S4G2, S4S1, S4S2, S5B1, S5B2, S5B4, S5BG1, S5BG2, S5G1, S5G2, S5S1, S5S2, S6B1, S6B2, S6BG1, SGBG2, S6BG3, S6S3, S6S4, S7B1, S7BG2, S7BG3, S7S1, S7S4, S8B1, S8B3, S8BG1, S8BG2, S8G1, S8R2, S8R3, S8S1, S9G1, S9G2, S9M1, S9M2, S10B1, S10B3, S10BG1, S10G1, S10G2, S10S1, S10S2, S10S3, S11B1, S11B3, S11BG2, S11BG3, S11G1, S11G2, S11S1, S11S2, S2IM1, S2IM2, S4IM1, S5IM1, S5IM2, S6IM1, S6IM2, S7IM1, S7IM2, S9IM1, S9IM2, S10IM1, S10IM2, CLMSF01-CLMSF07, CLMSK01-CLMSK07, CLMSL01-CLMSL07

I. Scope:
This method (MC 002) is applicable to most materials including animal tissues, plants, and soils.

II. Principle:
Sample weight: 2.00 g Sample volume: 100 ml
Samples are digested with a mixture of sulfuric and nitric acid. Mercury is reduced with sodium borohydride for determination. The amount of mercury is determined at a wavelength of 253.7 nm by comparing the signal of the unknown sample, measured by the atomic absorption spectrophotometer with the MHS-20 hydride generation unit, with the signal of the standard solutions. Using a 2.0 g sample, the lowest detection limit of this assay is 0.025 ppm.

III. References:
(1) Digestion: Analyst, 86:608 (1961) with modifications.
(2) Determination: Analytical Chemistry, 40:2085 (1968).
(3) Test Methods For Evaluating Solid Waste, USEPA Publication No. SW-846, 2nd Edition, Methods 3030, 3040 or 3050, and 7470, USEPA: Washington , D.C. (Revised April 1984).

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Method Code 004: Arsenic By Graphite Furnace
Laboratory: Hazleton Laboratories America, Inc.

For Samples: CS1S01, CS1S14, CS2S02, CS2S15, CS3S03, CS3S16, LP1S21, LP1S34, LP2S22, LP2S35, LP3S23, LP3S36, CL2S42, CL2S55, CL9S41, CL9S54, CL11S43, CL11S56, CS1GAR01, CS1GAR02, CS1GS01, CS1GS02, CS1SF04, CS2GAR01, CS2GAR02, CS2GS01, CS2GS02, CS2SF04, CS3GAR01, CS3GAR02, CS3GS01, CS3GS02, CS3SF04, LP1GAR01, LP1GAR02, LP1GS01, LP1GS02, LP1SF04, LP2GAR01, LP2GAR02, LP2GS01, LP2GS02, LP2SF04, LP3GAR01, LP3GAR02, LP3GS01, LP3GS02, LP3SF04, S2B1, S2BS, S2BG1, S2BG2, S2G1, S2G2, S2R1, S2S1, S2S2, S4B1, S4B2, S4BG2, S4BG3, S4G1, S4G2, S4S1, S4S2, S5B1, S5B2, S5B4, S5BG1, S5BG2, S5G1, S5G2, S5S1, S5S2, S6B1, S6B2, S6BG1, SGBG2, S6BG3, S6S3, S6S4, S7B1, S7BG2, S7BG3, S7S1, S7S4, S8B1, S8B3, S8BG1, S8BG2, S8G1, S8R2, S8R3, S8S1, S9G1, S9G2, S9M1, S9M2, S10B1, S10B3, S10BG1, S10G1, S10G2, S10S1, S10S2, S10S3, S11B1, S11B3, S11BG2, S11BG3, S11G1, S11G2, S11S1, S11S2, S2IM1, S2IM2, S4IM1, S5IM1, S5IM2, S6IM1, S6IM2, S7IM1, S7IM2, S9IM1, S9IM2, S10IM1, S10IM2, CLMSL01-CLMSL07

I. Scope:
This method (MC 004) is applicable to animal tissues, plants, sediments, sludges, and soils.

II. Sample Preparation:
(1) Animal or Plant Tissue:
Digest 1.00 g with nitric acid in a microwave digester. Transfer to 100 ml.
(2) Sediment or Soil:
Digest 1.00 g with nitric acid and 30% hydrogen peroxide using covered glass beakers on hot plates. Transfer to 100 ml.

III. Principle:
The amount of arsenic is determined at a wavelength of 193.7 nm by comparing the signal of the unknown sample, measured by the graphite furnace atomic absorption spectrophotometer, with the signal of the standard solutions. The method of standard additions is used where interferences are indicated. Nickel matrix modification is employed in the analysis. Using a 1.00 g sample, the lowest detection limit of this assay is 0.1 ppm.

IV. References:

(1) Test Methods For Evaluating Solid Waste, USEPA Publication No. SW-846, 2nd Edition, Methods 3030, 3040 or 3050, and 7060, USEPA: Washington , D.C. (Revised April 1984).

(2) USEPA Contract Laboratory Program, Statement Of Work No. 785, Method 206.2 CLP-M, USEPA: Cincinnati, Ohio.

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Method Code 006: Selenium By Graphite Furnace
Laboratory: Hazleton Laboratories America, Inc.

For Samples: CS1S01, CS1S14, CS2S02, CS2S15, CS3S03, CS3S16, LP1S21, LP1S34, LP2S22, LP2S35, LP3S23, LP3S36, CL2S42, CL2S55, CL9S41, CL9S54, CL11S43, CL11S56, CS1GAR01, CS1GAR02, CS1GS01, CS1GS02, CS1SF04, CS2GAR01, CS2GAR02, CS2GS01, CS2GS02, CS2SF04, CS3GAR01, CS3GAR02, CS3GS01, CS3GS02, CS3SF04, LP1GAR01, LP1GAR02, LP1GS01, LP1GS02, LP1SF04, LP2GAR01, LP2GAR02, LP2GS01, LP2GS02, LP2SF04, LP3GAR01, LP3GAR02, LP3GS01, LP3GS02, LP3SF04, S2B1, S2BS, S2BG1, S2BG2, S2G1, S2G2, S2R1, S2S1, S2S2, S4B1, S4B2, S4BG2, S4BG3, S4G1, S4G2, S4S1, S4S2, S5B1, S5B2, S5B4, S5BG1, S5BG2, S5G1, S5G2, S5S1, S5S2, S6B1, S6B2, S6BG1, SGBG2, S6BG3, S6S3, S6S4, S7B1, S7BG2, S7BG3, S7S1, S7S4, S8B1, S8B3, S8BG1, S8BG2, S8G1, S8R2, S8R3, S8S1, S9G1, S9G2, S9M1, S9M2, S10B1, S10B3, S10BG1, S10G1, S10G2, S10S1, S10S2, S10S3, S11B1, S11B3, S11BG2, S11BG3, S11G1, S11G2, S11S1, S11S2, S2IM1, S2IM2, S4IM1, S5IM1, S5IM2, S6IM1, S6IM2, S7IM1, S7IM2, S9IM1, S9IM2, S10IM1, S10IM2, CLMSL01-CLMSL07

I. Scope:

This method (MC 006) is applicable to animal tissues, plants, sediments, sludges, and soils.

II. Sample Preparation:

(1) Animal or Plant Tissue:

Digest 1.00 g with nitric acid in a microwave digester. Transfer to 100 ml.

(2) Sediment or Soil:

Digest 1.00 g with nitric acid and 30% hydrogen peroxide using covered glass beakers on hot plates. Transfer to 100 ml.

III. Principle:

The amount of selenium is determined at a wavelength of 196.0 nm by comparing the signal of the unknown sample, measured by the graphite furnace atomic absorption spectrophotometer, with the signal of the standard solutions. The method of standard additions is used along with nickel matrix modification in the analysis. Using a 1.00 g sample, the lowest detection limit of this assay is 0.1 ppm.

IV. References:

(1) Test Methods For Evaluating Solid Waste, USEPA Publication No. SW-846, 2nd Edition, Methods 3030, 3040 or 3050, and 7740, USEPA: Washington , D.C. (Revised April 1984).

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Method Code 019: Moisture Determination
Laboratory: Hazleton Laboratories America, Inc.

For Samples: CS1S01, CS1S14, CS2S02, CS2S15, CS3S03, CS3S16, LP1S21, LP1S34, LP2S22, LP2S35, LP3S23, LP3S36, CL2S42, CL2S55, CL9S41, CL9S54, CL11S43, CL11S56, CS1GAR01, CS1GAR02, CS1GS01, CS1GS02, CS1SF04, CS2GAR01, CS2GAR02, CS2GS01, CS2GS02, CS2SF04, CS3GAR01, CS3GAR02, CS3GS01, CS3GS02, CS3SF04, LP1GAR01, LP1GAR02, LP1GS01, LP1GS02, LP1SF04, LP2GAR01, LP2GAR02, LP2GS01, LP2GS02, LP2SF04, LP3GAR01, LP3GAR02, LP3GS01, LP3GS02, LP3SF04, S2B1, S2BS, S2BG1, S2BG2, S2G1, S2G2, S2R1, S2S1, S2S2, S4B1, S4B2, S4BG2, S4BG3, S4G1, S4G2, S4S1, S4S2, S5B1, S5B2, S5B4, S5BG1, S5BG2, S5G1, S5G2, S5S1, S5S2, S6B1, S6B2, S6BG1, SGBG2, S6BG3, S6S3, S6S4, S7B1, S7BG2, S7BG3, S7S1, S7S4, S8B1, S8B3, S8BG1, S8BG2, S8G1, S8R2, S8R3, S8S1, S9G1, S9G2, S9M1, S9M2, S10B1, S10B3, S10BG1, S10G1, S10G2, S10S1, S10S2, S10S3, S11B1, S11B3, S11BG2, S11BG3, S11G1, S11G2, S11S1, S11S2, S2IM1, S2IM2, S4IM1, S5IM1, S5IM2, S6IM1, S6IM2, S7IM1, S7IM2, S9IM1, S9IM2, S10IM1, S10IM2, CLMSF01-CLMSF07, CLMSK01-CLMSK07, CLMSL01-CLMS07

I. Scope:

This method (MC 019) is applicable to plant tissue, animal tissue, and soil/sediment.

II. Principle:

The prepared sample is weighed in a tared aluminum dish and dried in an oven to constant weight (apprx. 12-18 hr) at 100/C.

III. Sensitivity:

This method is capable of detecting 0.1% moisture.

IV. References:

(1) Official Methods Of Analysis - 15th Edition, Methods 926.08, 925.09, AOAC: Arlington, Virginia (1990) modified.

(2) USEPA Contract Laboratory Program, Statement Of Work For Inorganics Analysis, Exhibit D, SOW 03/90, Document No. ILM01.0.

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Method Code 010: Extraction By Soxhlet
Laboratory: Hazleton Laboratories America, Inc.

For Samples: S2B3, S2S5, S4BG1, S4G3, S5B3, S5G3, S6R1, S6S1, S7BG1, S7S2, S8B2, S8R1, S9C2, S9K1, S11C2

I. Scope:

This method (MC 010) covers the extraction of Organochlorine Pesticides and Polychlorinated Biphenyls (PCBs) in biological tissues.

II. Sample Preparation:

Blend 20 g of ground tissue with 40 g of anhydrous sodium sulfate in a 250 ml beaker. If there is not 20 g of sample available then remove at least 1 g for % moisture and weigh the remainder for extracting. For wet samples, more sodium sulfate may be required. If a sufficient amount has been added, the sample will appear granular. Add 500 ul of the pesticide spiking solution to the matrix spike and the control spike. Add 100 ul of the 2,4,5,6-terachloro-m-xylene (TMX) surrogate spiking solution to all samples and QC samples. Allow the ground tissue/sodium sulfate to dry under a hood for a couple of hours, stirring it occasionally.

III. Procedure:

Load the prepared sample into the soxhlet extractor between two plugs of pre-extracted glass wool. Place 250 ml of methylene chloride into a pre-rinsed 500 ml Erlenmeyer flask containing 3 - 5 Teflon boiling chips. Attach the flask to the extractor. Add 100 ml of methylene chloride to the mixing beaker, swirl, and add the solvent to the extractor prior to attaching the condenser. Adjust the temperature of the heating mantle so that the extractors cycle at a rate of 12 - 15 cycles per hour. Allow the system to cycle for 16 - 20 hours. Allow the extract to cool after the extraction is complete. Rinse the condenser with extraction solvent and drain the soxhlet apparatus into the bottom collection flask. Pour the extract through a Whatman No.4 filter into a 500 ml K-D flask fitted with a 10 ml concentrator tube. Attach a 3-ball snyder column to the K-D flask and concentrate the extract on a hot water bath, adjusting the temperature so that the concentration is completed within 15 - 20 minutes. When the apparent volume reaches approximately 5.0 ml, remove the K-D apparatus from the water bath and allow it to drain and cool for at least 10 minutes. Bring up to a volume of 10 ml with methylene chloride.

IV. QA/QC Comments:

Spike Recovery results were somewhat lower than normal. However, this appears to have had little effect on the sample results since all results were reported as less than the detection limit except for three samples which had low levels of p,p'DDE.

V. References:

(1) Test Methods For Evaluating Solid Waste, USEPA Publication No. SW-846, 2nd Edition, Method 3050, USEPA: Washington , D.C. (September, 1986).

(2) "Determination Of Organochlorine Pesticides And Polychlorinated Biphenyls (PCBs) In Biological Tissues." Method MP-FWST-MA, Hazleton Laboratories America, Inc., Madison, Wisconsin.

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Method Code 011: Determination of % Lipids
Laboratory: Hazleton Laboratories America, Inc.

For Samples: S2B3, S2S5, S4BG1, S4G3, S5B3, S5G3, S6R1, S6S1, S7BG1, S7S2, S8B2, S8R1, S9C2, S9K1, S11C2

I. Scope:

This method (MC 011) covers the gravimetric determination of % lipids in biological tissue samples.

II. Procedure:

1 ml of the 10 ml extract is placed into a preweighed aluminum weighing pan. The pan is allowed to sit lightly covered in a hood overnight to allow the solvent to evaporate. The pan is weighed again. The following equation is then used to calculate the % lipid: ((weight (g) of pan + lipid) - weight (g) of pan) x 10 ml x 100 = % lipid (g) extracted.

III. References:

(1) “Determination Of Organochlorine Pesticides And Polychlorinated Biphenyls (PCBs) In Biological Tissues.” Method MP-FWST-MA, Hazleton Laboratories America, Inc., Madison, Wisconsin.

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Method Code 012: Determination of % Moisture
Laboratory: Hazleton Laboratories America, Inc.

For Samples: S2B3, S2S5, S4BG1, S4G3, S5B3, S5G3, S6R1, S6S1, S7BG1, S7S2, S8B2, S8R1, S9C2, S9K1, S11C2

I. Scope:
This method covers the gravimetric determination of % moisture in soil, sediment and biological tissue samples.

II. Procedure:
1 to 10 g of the sample is placed into a preweighed aluminum weighing pan. The pan is weighed again with the sample in it. The pan and sample are then placed into an oven at 105 C for 16 hours. The sample is allowed to cool in a desiccator and then weighed again. The following equation is used to calculate the % moisture: ((mass (g) pan + wet sample) - mass (g) pan + dry sample) x 100 = % moisture. If samples are to be calculated based on dry weight, the % moisture is converted to a correction factor (M). The calculation of the factor is: 100/(100 - % moisture) = M.

III. References:
(1) Test Methods For Evaluating Solid Waste, USEPA Publication No. SW-846, 2nd Edition, Method 3550, USEPA: Washington , D.C. (September, 1986).
(1) "Determination Of Organochlorine Pesticides And Polychlorinated Biphenyls (PCBs) In Soils And Sediments." Method MP-FWSS-MA, Hazleton Laboratories America, Inc., Madison, Wisconsin.

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Method Code 013: Gel-Permeation Chromatography Cleanup
Laboratory: Hazleton Laboratories America, Inc.

For Samples: S2B3, S2S5, S4BG1, S4G3, S5B3, S5G3, S6R1, S6S1, S7BG1, S7S2, S8B2, S8R1, S9C2, S9K1, S11C2

I. Scope:
This method covers the cleanup of soil, sediment and biological samples by gel-permeation chromatography (GPC).

II. Procedure:
After extraction, the sample extracts are concentrated in Kuderna-Danish (K-D) apparatus and the volume is adjusted to 10 ml with methylene chloride. 5 ml of this extract is then injected on an ABC Laboratories Model 1002B GPC system using a column packed with 70 g of S-X3 Bio-beads and methylene chloride as the carrier solvent. A dump, collect, and rinse cycle is then run which is consistent with exhibit D, section 7.1 of reference 1 below. The collected fraction is then quantitatively transferred to a 500 ml K-D apparatus fitted with a 10 ml concentrator tube. A 3 ball snyder column is attached and the extract is concentrated on a hot water bath, adjusting the temperature such that the concentration is completed within 15 - 20 minutes. When the apparent volume reaches approximately 5.0 ml, the K-D apparatus is removed from the water bath and allowed to cool for at least 10 minutes. 50 ml of hexane is added to the flask and it is returned to the hot water bath and the extract is concentrated to 5.0 ml.

III. References:
(1) USEPA Contract Laboratory Program, "Statement Of Work For Organic Analysis, Multi-media, Multi-concentration", Doc. No. OLM01.0 (March 1990) including revisions OLM01.1 (Dec 1990) and OLM01.2 (Jan 1991).
(2) "Determination Of Organochlorine Pesticides And Polychlorinated Biphenyls (PCBs) In Biological Tissues." Method MP-FWST-MA, Hazleton Laboratories America, Inc., Madison, Wisconsin.
(3) Instrument Operating Procedure For Gel-Permeation Chromatograph, Method OP-6004-36, Hazleton Laboratories America, Inc., Madison, Wisconsin.

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Method Code 017: Silica Gel Cleanup And Separation
Laboratory: Hazleton Laboratories America, Inc.

For Samples: S2B3, S2S5, S4BG1, S4G3, S5B3, S5G3, S6R1, S6S1, S7BG1, S7S2, S8B2, S8R1, S9C2, S9K1, S11C2

I. Scope:
This method is applicable to any sample extract in hexane which requires additional cleanup and the separation of polychlorinated biphenyls (PCBs) from many of the organochlorine pesticides.

II. Sample Preparation:
The sample extract should be at a volume of 5.0 ml in hexane.

III. Procedure:
The silica gel (100/200 mesh) is prepared by swirling it in a slurry of 40% acetonitrile and 60% methylene chloride, vacuum filtering, and then rinsing it successively with methylene chloride and hexane. It is then dyed at 140 C overnight and deactivated with 0.5% (w/v) distilled water. 15 g of this silica gel is then slurried in petroleum ether, poured into a chromatography column, and topped with anhydrous sodium sulfate. The sample extracts are then drawn into the top of the column. The first fraction is eluted with 250 ml of a mixture of 1% acetonitrile, 19% hexane, and 80% methylene chloride (v/v). The first fraction should include all PCBs, p,p"-DDE, hexachlorobenzene, and mirex. It may also include some portion of p,p'-DDT, o,p'-DDE, o,p'-DDT, and trans-nonachlor. The remaining portion of these 4 pesticides, along with all other organochlorine pesticides, will be found in the second fraction. Both fractions are then quantitatively transferred to a 500 ml K-D apparatus fitted with a 10 ml concentrator tube. A 3 ball snyder column is attached and the extract is concentrated on a hot water bath, adjusting the temperature such that the concentration is completed within 15 - 20 minutes. When the apparent volume reaches approximately 5.0 ml, the K-D apparatus is removed from the water bath and allowed to cool for at least 10 minutes. 50 ml of hexane is added to the flask and it is returned to the hot water bath. If the extract was cleaned by gel-permeation chromatography (GPC), it is concentrated to 5.0 ml. If it did not undergo GPC cleanup then it is concentrated to 10.0 ml.

IV. References:
(1)Technical Operating Procedure, "Silica Gel Cleanup And Separation Of Organochlorine Pesticides And PCBs", Method OP-6004-45, Hazleton Laboratories America, Inc., Madison, Wisconsin.

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Method Code MSCL001: Analysis For Organochlorine Pesticides And PCBs In Animal and Plant Tissue
Laboratory: Mississippi State Chemical Laboratory

For Samples: CS1LMB03 & LP1LMB03

I. Procedure:
10 g tissue samples are thoroughly mixed with anhydrous sodium sulfate and soxhlet extracted with hexane for 7 hours. The extract is concentrated by rotary evaporation; transferred to a tared test tube, and further concentrated to dryness for lipid determination. The weighed lipid sample is dissolved in petroleum ether and extracted 4 times with acetonitrile saturated with petroleum ether. Residues are partitioned into petroleum ether which is washed, concentrated, and transferred to a glass chromatographic column containing 20 grams of Florisil. The column is eluted with 200 ml 6% diethyl ether/94% petroleum ether (Fraction I) followed by 200 ml 15% diethyl ether/85% petroleum ether (Fraction II). Fraction II is concentrated to appropriate volume for quantification of residues by packed or capillary column electron gas chromatography. Fraction I is concentrated and transferred to a Silicic acid chromatographic column for additional cleanup required for separation of PCBs from other organochlorines. 3 fractions are eluted from the silicic acid column. Each is concentrated to appropriate volume for quantification of residues by packed or megabore column, electron capture gas chromatography. PCBs are found in Fraction II.

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Method Code MSCL004: Analysis For Organochlorine Pesticides And PCBs, Aliphatic And Polynuclear Aromatic Hydrocarbons In Soil And Sediment
Laboratory: Mississippi State Chemical Laboratory

For Samples: CS1S04, CS1S06, CS1S09, CS2S07, CS3S08, CS3S10, LP1S25, LP1S26, LP1S29, LP2S27, LP3S28, LP3S30, CL2S45, CL2S47, CL2S50, CL9S46, CL9S49, CL11S48

I. Procedure:
20 g soil or sediment samples are extracted with acetone, followed by petroleum ether, by allowing to soak one hour in each with intermittent shaking. A final acetone/petroleum ether extraction is done, and the extracts are combined, centrifuged, and transferred to a separatory funnel containing sufficient water to facilitate partitioning of residues into petroleum ether portion. The petroleum ether is washed twice with water and concentrated by Kuderna-Danish to appropriate volume. An aliquot of the concentrated extract for pesticide determination is transferred to a 1.6 g Florisil mini-column topped with 1.6 g sodium sulfate. Residues are eluted from the column in two elution fractions. Fraction I consists of 12 ml hexane followed by 12 ml of 1% methanol in hexane, and Fraction II consists of an additional 24 ml of 1% methanol in hexane. If additional cleanup is required to separate PCBs from other organochlorines in Fraction I, further chromatography on a Silicic acid column is performed. Quantification of residues in the two Florisil fractions and three Silicic acid fractions is packed or megabore column, electron capture gas chromatography. A second aliquot of the concentrated extract for hydrocarbon determination is transferred to a 20 g 1% deactivated silica gel column topped with 5 g neutral alumina. Aliphatic and polynuclear aromatic hydrocarbon residues are fractioned by eluting aliphatics from the column with 100 ml petroleum ether (Fraction I) followed by elution of aromatics using first 100 ml 40% methylene chloride/60% petroleum ether, then 50 ml methylene chloride (combined eluates, Fraction II). If needed, Fraction I containing aliphatics is subjected to additional cleanup by concentration and transferred to a deactivated (2% water) Florisil column. Aliphatic residues are eluted from the Florisil column using 200 ml 6% diethyl ether/94% petroleum ether. The eluate is concentrated to appropriate volume for quantification by capillary column, flame ionization gas

chromatography. The silica gel Fraction II containing aromatic hydrocarbons is concentrated, reconstituted in methylene chloride, and subjected to gel permeation chromatographic (GPC) cleanup prior to quantification by capillary, flame ionization gas chromatography and fluorescence HPLC.

II. QA/QC Comments:
Organochlorine and aromatic hydrocarbon results were acceptable. Spike recovery and degree of agreement between duplicates were unacceptable for the high molecular weight aliphatic hydrocarbons. The laboratory repeated these analyses with similar results. It appeared that the problem was a matrix effect that could not be resolved. Results for n-dotriacontane, n-hentriacontane, n-nonacosane, n-octacosane, n-teratriacontane, and n-tritriacontane should be considered estimates which could be off by as much as a factor of 2.

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Method Code MSCL019: Grain Size
Laboratory: Mississippi State Chemical Laboratory

For Samples: CS1S04, CS1S06, CS1S09, CS2S07, CS3S08, CS3S10, LP1S25, LP1S26, LP1S29, LP2S27, LP3S28, LP3S30, CL2S45, CL2S47, CL2S50, CL9S46, CL9S49, CL11S48

I. Procedure:
Disperse sample of soil or sediment to pass 2 mm sieve and place weighed 40 g sample in 600 ml beaker. Take additional 30 g sample for moisture determination so that air dried weight may be corrected to oven dried weight. Add 50 ml 10% “Calgon” solution (sodium metaphosphate with sufficient sodium carbonate to give a pH of approximately 8.3 in a 10% solution) to a 40 g sample and allow to soak for at least 10 minutes. After soaking, quantitatively transfer sample with distilled water to Waring blender cup so that cup is approximately half full. Blend for 4 minutes and transfer suspension to sedimentation cylinder adjusting liquid level to 1000 ml mark with distilled water. Place cylinder in constant temperature water bath (approximately 38 C). Prepare sample "blank" by adding 50 ml 10% "Calgon" solution to second sedimentation cylinder and add distilled water to the 1000 ml mark. When the suspension reaches water bath temperature, the mixture is thoroughly stirred prior initiation of sedimentation. The time that stirring ceases is noted as the zero settling time. At the end of 8 hours, lower the hydrometer (ASTM 152 H) gently into the suspension and read the scale at the end of the meniscus. Record the time of hydrometer reading, the hydrometer reading, and water bath temperature. After thorough mixing, record the hydrometer reading in the sample "blank" solution of water and "Calgon". After hydrometer readings are recorded, pour the suspension onto a 270 mesh, 53 micron sieve and wash all silt and clay out of the water. Transfer sample material remaining on the sieve into an evaporating dish; place in 110 C oven and allow to dry for 24 hours. After cooling, weigh the sample to determine the weight of oven-dry sand left on the sieve. Using moisture data determined, correct sample air-dry weight to oven-dry weight. Calculate the concentration of suspension in g/L from the following equation: C = R - R<; where C = concentration (g/L), R = hydrometer reading in suspension, R< = hydrometer reading in "Calgon" solution. Calculate the Clay percentage, PC from the following: Pc = C/100/Co; where Co represents the oven-dry weight of soil/L of suspension. Calculate the Sand percentage, Ps from the following: Ps = S/100/Co; where S is the weight of the oven-dry sand left on the screen and Co is as in the Clay formula. Silt percentage = 100 - Pc - Ps.

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Method Code RTI001: Homogenization
Laboratory: Research Triangle Institute

For Samples: S2R1, S2R2, S2R3, S2S3, S2S4, S4R1, S5R1, S5R2, S5R3, S6R2, S6S5, S6S6, S7R2, S7R3, S7R4, S7S5, S7S6, S9C1, S10BH1, S10R2, S10R3, S11C1, S11R1, S11R2

I. Procedure:
Tissue samples are prehomogenized using a food processor. A portion of the tissue sample (or sediment) is then freeze dried for determination of moisture content and ground to 100 mesh with a mill.

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Method Code RTI002: Preconcentration Digestion For Inductively Coupled Plasma Emission Measurement (ICP)
Laboratory: Research Triangle Institute

For Samples: S2R1, S2R2, S2R3, S2S3, S2S4, S4R1, S5R1, S5R2, S5R3, S6R2, S6S5, S6S6, S7R2, S7R3, S7R4, S7S5, S7S6, S9C1, S10BH1, S10R2, S10R3, S11C1, S11R1, S11R2

I. Procedure:
Using a CEM microwave oven, 0.5 g of freeze dried tissue is heated in a capped 120 ml Teflon vessel in the presence of 5 ml of Baker Instra-Analyzed nitric acid for 3 minutes at 120 watts, 3 minutes at 300 watts, and 35 minutes at 450 watts. The vessel contents are then allowed to cool and the cap is removed and rinsed carefully with 3 ml of HNO3 adding the rinsings to the vessels contents. The uncapped vessel is then returned to the microwave oven and heated until the vessel contents are less than 1 ml in volume. The contents are carefully rinsed with laboratory pure water into a 5 ml glass volumetric vessel and made to

volume with additional laboratory pure water. The flask contents are then immediately transferred to a clean plastic centrigure or auto sampler tube and centrifuged for 1 minute to precipitate the suspended matter. The sample is now ready for ICP analysis.

Method Code RTI006: ICP

I. Procedure:
ICP measurements are made using a Leeman Labs Plasma Spec I sequential or ES2000 simultaneous spectrometer.

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Method Code RTI004: Digestion For Graphite Furnace And Cold Vapor Atomic Absorption Measurement
Laboratory: Research Triangle Institute

For Samples: S2R1, S2R2, S2R3, S2S3, S2S4, S4R1, S5R1, S5R2, S5R3, S6R2, S6S5, S6S6, S7R2, S7R3, S7R4, S7S5, S7S6, S9C1, S10BH1, S10R2, S10R3, S11C1, S11R1, S11R2

I. Procedure:
Using a CEM microwave oven, 0.25 - 0.5 g of freeze dried sample is heated in a capped 120 ml Teflon vessel in the presence of 5 ml of Baker Instra-Analyzed nitric acid for 3 minutes at 120 watts, 3 minutes at 300 watts, and 15 minutes at 450 watts. The residue is then diluted to 50 ml with laboratory pure water.

Method Code RTI007: Graphite Furnace Atomic Absorption (GFAA)

I. Procedure:
GFAA measurements are made using a Perkin-Elmer Zeeman 3030 or 4100ZL atomic absorption spectrometer.

Method Code RTI008: Cold Vapor Atomic Absorption (CVAA)

I. Procedure:
Hg measurements are conducted using $SnCl_4$ as the reducing agent. A Leeman PS200 Hg Analyzer is employed.

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**APPENDIX D**
**(SURFACE WATER ANALYTICAL RESULTS)**

TABLE VII. RESULTS OF METALS ANALYSIS FOR SURFACE WATER COLLECTED FROM CYPRESS SPRINGS RESERVOIR.

| SAMPLE: | CSWM01 | CSWM02 | CSWM03 |
|---|---|---|---|
| Al (mg/l wet wt.): | bdl | bdl | bdl |
| d.l. (mg/l): | 0.02 | 0.02 | 0.02 |
| As (mg/l wet wt.): | bdl | bdl | bdl |
| d.l. (mg/l): | 0.001 | 0.001 | 0.001 |
| B (mg/l wet wt.): | 0.031 | 0.113 | 0.084 |
| d.l. (mg/l): | 0.008 | 0.008 | 0.008 |
| Ba (mg/l wet wt.): | 0.026 | 0.029 | 0.028 |
| d.l. (mg/l): | 0.004 | 0.004 | 0.004 |
| Be (mg/l wet wt.): | bdl | bdl | bdl |
| d.l. (mg/l): | 0 | 0 | 0 |
| Cd (mg/l wet wt.): | 0.008 | 0.006 | 0.005 |
| d.l. (mg/l): | 0.001 | 0.001 | 0.001 |
| Cr (mg/l wet wt.): | bdl | bdl | bdl |
| d.l. (mg/l): | 0.002 | 0.002 | 0.002 |
| Cu (mg/l wet wt.): | 0.003 | bdl | bdl |
| d.l. (mg/l): | 0.002 | 0.002 | 0.002 |
| Fe (mg/l wet wt.): | 0.038 | 0.035 | bdl |
| d.l. (mg/l): | 0.02 | 0.02 | 0.02 |
| Hg (mg/l wet wt.): | bdl | bdl | bdl |
| d.l. (mg/l): | 0.0002 | 0.0002 | 0.0002 |
| Mg (mg/l wet wt.): | 3.67 | 3.81 | 3.61 |
| d.l. (mg/l): | 0.02 | 0.02 | 0.02 |
| Mn (mg/l wet wt.): | bdl | 0.003 | bdl |
| d.l. (mg/l): | 0.002 | 0.002 | 0.002 |
| Mo (mg/l wet wt.): | bdl | bdl | bdl |
| d.l. (mg/l): | 0.008 | 0.008 | 0.008 |
| Ni (mg/l wet wt.): | bdl | 0.003 | bdl |
| d.l. (mg/l): | 0.002 | 0.003 | 0.002 |
| Pb (mg/l wet wt.): | bdl | bdl | bdl |
| d.l. (mg/l): | 0.01 | 0.01 | 0.01 |
| Se (mg/l wet wt.): | bdl | bdl | bdl |
| d.l. (mg/l): | 0.002 | 0.002 | 0.002 |
| Sr (mg/l wet wt.): | 0.071 | 0.073 | 0.07 |
| d.l. (mg/l): | 0.001 | 0.001 | 0.001 |
| V (mg/l wet wt.): | bdl | bdl | bdl |
| d.l. (mg/l): | 0.001 | 0.001 | 0.001 |
| Zn (mg/l wet wt.): | 0.005 | 0.004 | bdl |
| d.l. (mg/l): | 0.004 | 0.004 | 0.004 |

CSWM01 = sample collected above FM 115.
CSWM02 = sample collected at Panther Creek.
CSWM03 = sample collected at Whipporwill Bay.

d.l. = detection limit.
bdl = below detection limit.

TABLE VIII. RESULTS OF METALS ANALYSIS FOR SURFACE WATER COLLECTED FROM LAKE O' THE PINES.

| SAMPLE: | LOPWM01 | LOPWM02 | LOPWM03 |
|---|---|---|---|
| Al (mg/l wet wt.): | 0.044 | bdl | bdl |
| d.l. (mg/l): | 0.02 | 0.02 | 0.02 |
| As (mg/l wet wt.): | bdl | bdl | bdl |
| d.l. (mg/l): | 0.001 | 0.001 | 0.001 |
| B (mg/l wet wt.): | 0.095 | 0.077 | 0.082 |
| d.l. (mg/l): | 0.008 | 0.008 | 0.008 |
| Ba (mg/l wet wt.): | 0.066 | 0.037 | 0.036 |
| d.l. (mg/l): | 0.004 | 0.004 | 0.004 |
| Be (mg/l wet wt.): | bdl | bdl | bdl |
| d.l. (mg/l): | 0 | 0 | 0 |
| Cd (mg/l wet wt.): | 0.007 | 0.005 | 0.006 |
| d.l. (mg/l): | 0.001 | 0.001 | 0.001 |
| Cr (mg/l wet wt.): | 0.002 | 0.003 | bdl |
| d.l. (mg/l): | 0.002 | 0.002 | 0.002 |
| Cu (mg/l wet wt.): | 0.004 | bdl | bdl |
| d.l. (mg/l): | 0.002 | 0.002 | 0.002 |
| Fe (mg/l wet wt.): | 0.905 | 0.184 | 0.021 |
| d.l. (mg/l): | 0.02 | 0.02 | 0.02 |
| Hg (mg/l wet wt.): | bdl | bdl | bdl |
| d.l. (mg/l): | 0.0002 | 0.0002 | 0.0002 |
| Mg (mg/l wet wt.): | 4.22 | 4.72 | 3.22 |
| d.l. (mg/l): | 0.02 | 0.02 | 0.02 |
| Mn (mg/l wet wt.): | 0.53 | 0.004 | 0.007 |
| d.l. (mg/l): | 0.002 | 0.002 | 0.002 |
| Mo (mg/l wet wt.): | bdl | bdl | bdl |
| d.l. (mg/l): | 0.008 | 0.008 | 0.008 |
| Ni (mg/l wet wt.): | 0.004 | bdl | 0.003 |
| d.l. (mg/l): | 0.002 | 0.002 | 0.002 |
| Pb (mg/l wet wt.): | bdl | bdl | bdl |
| d.l. (mg/l): | 0.01 | 0.01 | 0.01 |
| Se (mg/l wet wt.): | bdl | bdl | bdl |
| d.l. (mg/l): | 0.002 | 0.002 | 0.002 |
| Sr (mg/l wet wt.): | 0.114 | 0.071 | 0.082 |
| d.l. (mg/l): | 0.001 | 0.001 | 0.001 |
| V (mg/l wet wt.): | 0.001 | bdl | bdl |
| d.l. (mg/l): | 0.001 | 0.001 | 0.001 |
| Zn (mg/l wet wt.): | 0.008 | 0.005 | bdl |
| d.l. (mg/l): | 0.004 | 0.004 | 0.004 |

LOPWM01 = sample collected at Lone Star Steel.
LOPWM02 = sample collected at SH 155 Marina.
LOPWM03 = sample collected at Copeland Creek.

d.l. = detection limit.
bdl = below detection limit.

TABLE IX. RESULTS OF METALS ANALYSIS FOR SURFACE WATER COLLECTED FROM CADDO LAKE.

| SAMPLE: | CLWM01 | CLWM02 | CLWM03 |
|---|---|---|---|
| Al (mg/l wet wt.): | 0.021 | bdl | 0.04 |
| d.l. (mg/l): | 0.02 | 0.02 | 0.02 |
| As (mg/l wet wt.): | bdl | bdl | bdl |
| d.l. (mg/l): | 0.001 | 0.001 | 0.001 |
| B (mg/l wet wt.): | 0.078 | 0.078 | 0.083 |
| d.l. (mg/l): | 0.008 | 0.008 | 0.008 |
| Ba (mg/l wet wt.): | 0.057 | 0.052 | 0.06 |
| d.l. (mg/l): | 0.004 | 0.004 | 0.004 |
| Be (mg/l wet wt.): | bdl | bdl | bdl |
| d.l. (mg/l): | 0 | 0 | 0 |
| Cd (mg/l wet wt.): | 0.006 | 0.005 | 0.006 |
| d.l. (mg/l): | 0.001 | 0.001 | 0.001 |
| Cr (mg/l wet wt.): | 0.002 | bdl | bdl |
| d.l. (mg/l): | 0.002 | 0.002 | 0.002 |
| Cu (mg/l wet wt.): | bdl | bdl | bdl |
| d.l. (mg/l): | 0.002 | 0.002 | 0.002 |
| Fe (mg/l wet wt.): | 0.817 | 0.403 | 0.93 |
| d.l. (mg/l): | 0.02 | 0.02 | 0.02 |
| Hg (mg/l wet wt.): | bdl | bdl | bdl |
| d.l. (mg/l): | 0.0002 | 0.0002 | 0.0002 |
| Mg (mg/l wet wt.): | 2.17 | 2.1 | 2.6 |
| d.l. (mg/l): | 0.02 | 0.02 | 0.02 |
| Mn (mg/l wet wt.): | 0.161 | 0.005 | 0.14 |
| d.l. (mg/l): | 0.002 | 0.002 | 0.002 |
| Mo (mg/l wet wt.): | bdl | bdl | bdl |
| d.l. (mg/l): | 0.008 | 0.008 | 0.008 |
| Ni (mg/l wet wt.): | 0.003 | bdl | 0.003 |
| d.l. (mg/l): | 0.002 | 0.002 | 0.002 |
| Pb (mg/l wet wt.): | bdl | bdl | bdl |
| d.l. (mg/l): | 0.01 | 0.01 | 0.01 |
| Se (mg/l wet wt.): | bdl | bdl | bdl |
| d.l. (mg/l): | 0.002 | 0.002 | 0.002 |
| Sr (mg/l wet wt.): | 0.69 | 0.066 | 0.082 |
| d.l. (mg/l): | 0.001 | 0.001 | 0.001 |
| V (mg/l wet wt.): | bdl | bdl | bdl |
| d.l. (mg/l): | 0.001 | 0.001 | 0.001 |
| Zn (mg/l wet wt.): | 0.005 | bdl | 0.006 |
| d.l. (mg/l): | 0.004 | 0.004 | 0.004 |

CLWM01 = sample collected at Harrison Bayou.
CLWM02 = sample collected at South Little Green Break.
CLWM03 = sample collected at Clintons Chute.

d.l. = detection limit.
bdl = below detection limit.

**APPENDIX E**
**(ANALYTICAL RESULTS FOR METALS IN SEDIMENTS)**

TABLE XA. ANALYTICAL RESULTS OF METALS IN SEDIMENT SAMPLES COLLECTED FROM CYPRESS SPRINGS RESERVOIR (WET WEIGHT).

| SAMPLE: | CS1S01 | CS1S14 | CS2S02 | CS2S15 | CS3S03 | CS3S16 |
|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 488 | 458 | 471 | 429 | 553 | 209 |
| % MOISTURE: | 41.4 | 35.9 | 38.1 | 34.5 | 35.8 | 23.9 |
| Al (mg/kg wet wt.): | 3160 | 5330 | 3400 | 4340 | 4740 | 7190 |
| d.l. (mg/kg): | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| As (mg/kg wet wt.): | 0.99 | 1.76 | 1.29 | 1.48 | 2.07 | 1.45 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| B (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 1.0 | 0.97 | 0.97 | 0.98 | 0.97 | 0.97 |
| Ba (mg/kg wet wt.): | 66.3 | 83.9 | 50.8 | 67 | 54 | 55.7 |
| d.l. (mg/kg): | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Be (mg/kg wet wt.): | 0.38 | 0.46 | 0.34 | 0.4 | 0.28 | 0.35 |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| Cd (mg/kg wet wt.): | 0.38 | 0.38 | 0.32 | 0.34 | 0.31 | 0.2 |
| d.l. (mg/kg): | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 |
| Cr (mg/kg wet wt.): | 4.82 | 6.56 | 4.64 | 5.13 | 7.67 | 9.17 |
| d.l. (mg/kg): | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 |
| Cu (mg/kg wet wt.): | 4.95 | 5.19 | 4.11 | 4.2 | 5.63 | 4.33 |
| d.l. (mg/kg): | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 |
| Fe (mg/kg wet wt.): | 6020 | 6560 | 5870 | 5530 | 9860 | 8790 |
| d.l. (mg/kg): | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Hg (mg/kg wet wt.): | 0.044 | bdl | bdl | bdl | 0.042 | 0.052 |
| d.l. (mg/kg): | 0.02 | 0.04 | 0.04 | 0.04 | 0.02 | 0.02 |
| Mg (mg/kg wet wt.): | 505 | 614 | 561 | 613 | 694 | 639 |
| d.l. (mg/kg): | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Mn (mg/kg wet wt.): | 149 | 195 | 198 | 214 | 371 | 130 |
| d.l. (mg/kg): | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 |
| Mo (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 1.0 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Ni (mg/kg wet wt.): | 6.06 | 8.14 | 4.89 | 5.78 | 6.33 | 4.65 |
| d.l. (mg/kg): | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| Pb (mg/kg wet wt.): | 7.22 | 8.54 | 6.5 | 7.2 | 6.8 | 7.13 |
| d.l. (mg/kg): | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 |
| Se (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Sr (mg/kg wet wt.): | 9.08 | 9.55 | 10.1 | 11.1 | 10.2 | 9.4 |
| d.l. (mg/kg): | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 |
| V (mg/kg wet wt.): | 11.6 | 14.9 | 9.8 | 11.4 | 15.9 | 18.8 |
| d.l. (mg/kg): | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 |
| Zn (mg/kg wet wt.): | 20.8 | 23.1 | 18.4 | 19.4 | 16.2 | 14.1 |
| d.l. (mg/kg): | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |

CS1S01 - CS1S14= samples collected from above FM 115.
CS2S02 - CS2S15= samples collected from the Panther Creek Arm.
CS3S03 - CS3S16= samples collected from Whippoorwill Bay.

d.l. = detection limit.
bdl = below detection limit.

TABLE XB. ANALYTICAL RESULTS OF METALS IN SEDIMENT SAMPLES COLLECTED FROM CYPRESS SPRINGS RESERVOIR (DRY WEIGHT).

| SAMPLE: | CS1S01 | CS1S14 | CS2S02 | CS2S15 | CS3S03 | CS3S16 |
|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 488 | 458 | 471 | 429 | 553 | 209 |
| % MOISTURE: | 41.4 | 35.9 | 38.1 | 34.5 | 35.8 | 23.9 |
| Al (mg/kg dry wt.): | 5392.49 | 8315.13 | 5492.73 | 6625.95 | 7383.18 | 9448.09 |
| d.l. (mg/kg): | 4.27 | 3.9 | 4.04 | 3.82 | 3.89 | 3.29 |
| As (mg/kg dry wt.): | 1.69 | 2.75 | 2.08 | 2.26 | 3.22 | 1.91 |
| d.l. (mg/kg): | 0.17 | 0.16 | 0.16 | 0.15 | 0.16 | 0.13 |
| B (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 1.7 | 1.51 | 1.56 | 1.49 | 1.51 | 1.28 |
| Ba (mg/kg dry wt.): | 113.14 | 130.89 | 82.07 | 102.29 | 84.11 | 73.19 |
| d.l. (mg/kg): | 0.85 | 0.78 | 0.81 | 0.76 | 0.78 | 0.66 |
| Be (mg/kg dry wt.): | 0.65 | 0.72 | 0.55 | 0.61 | 0.43 | 0.46 |
| d.l. (mg/kg): | 0.09 | 0.08 | 0.08 | 0.08 | 0.08 | 0.07 |
| Cd (mg/kg dry wt.): | 0.66 | 0.59 | 0.53 | 0.52 | 0.48 | 0.26 |
| d.l. (mg/kg): | 0.26 | 0.23 | 0.24 | 0.23 | 0.23 | 0.2 |
| Cr (mg/kg dry wt.): | 8.23 | 10.23 | 7.5 | 7.83 | 11.95 | 12.05 |
| d.l. (mg/kg): | 0.43 | 0.39 | 0.4 | 0.38 | 0.39 | 0.33 |
| Cu (mg/kg dry wt.): | 8.45 | 8.1 | 6.64 | 6.41 | 8.77 | 5.69 |
| d.l. (mg/kg): | 0.43 | 0.39 | 0.4 | 0.38 | 0.39 | 0.33 |
| Fe (mg/kg dry wt.): | 10273.04 | 10234.01 | 9483.04 | 8442.75 | 15358.26 | 11550.59 |
| d.l. (mg/kg): | 4.27 | 3.9 | 4.04 | 3.82 | 3.89 | 3.29 |
| Hg (mg/kg dry wt.): | 0.075 | bdl | bdl | bdl | 0.065 | 0.068 |
| d.l. (mg/kg): | 0.034 | 0.062 | 0.065 | 0.061 | 0.031 | 0.026 |
| Mg (mg/kg dry wt.): | 861.77 | 947.88 | 906.3 | 935.88 | 1081 | 839.68 |
| d.l. (mg/kg): | 4.27 | 3.9 | 4.04 | 3.82 | 3.89 | 3.29 |
| Mn (mg/kg dry wt.): | 254.27 | 304.21 | 319.87 | 326.72 | 577.88 | 170.83 |
| d.l. (mg/kg): | 0.43 | 0.39 | 0.4 | 0.38 | 0.39 | 0.33 |
| Mo (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 1.7 | 1.51 | 1.56 | 1.48 | 1.51 | 1.28 |
| Ni (mg/kg dry wt.): | 10.34 | 12.7 | 7.9 | 8.82 | 9.86 | 6.11 |
| d.l. (mg/kg): | 0.51 | 0.47 | 0.48 | 0.46 | 0.47 | 0.39 |
| Pb (mg/kg dry wt.): | 12.32 | 13.32 | 10.5 | 10.99 | 10.59 | 9.37 |
| d.l. (mg/kg): | 2.13 | 1.95 | 2.02 | 1.91 | 1.95 | 1.64 |
| Se (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.34 | 0.31 | 0.32 | 0.31 | 0.31 | 0.26 |
| Sr (mg/kg dry wt.): | 15.49 | 14.9 | 16.32 | 16.95 | 15.89 | 12.35 |
| d.l. (mg/kg): | 0.21 | 0.2 | 0.2 | 0.19 | 0.19 | 0.16 |
| V (mg/kg dry wt.): | 19.8 | 23.24 | 15.83 | 17.4 | 24.77 | 24.7 |
| d.l. (mg/kg): | 0.21 | 0.2 | 0.2 | 0.19 | 0.19 | 0.16 |
| Zn (mg/kg dry wt.): | 35.49 | 36.04 | 29.73 | 29.62 | 25.23 | 18.53 |
| d.l. (mg/kg): | 0.85 | 0.78 | 0.81 | 0.76 | 0.78 | 0.66 |

CS1S01 - CS1S14= samples collected from above FM 115.
CS2S02 - CS2S15= samples collected from the Panther Creek Arm.
CS3S03 - CS3S16= samples collected from Whippoorwill Bay.

d.l. = detection limit.
bdl = below detection limit.

TABLE XIA. ANALYTICAL RESULTS OF METALS IN SEDIMENT SAMPLES COLLECTED FROM LAKE O' THE PINES (WET WEIGHT).

| SAMPLE: | LP1S21 | LP1S34 | LP2S22 | LP2S35 | LP3S23 | LP3S36 |
|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 454 | 490 | 268 | 444 | 509 | 585 |
| % MOISTURE: | 32.7 | 32.2 | 48.5 | 43.4 | 28.3 | 25.5 |
| Al (mg/kg wet wt.): | 3260 | 6710 | 4710 | 4440 | 1400 | 2870 |
| d.l. (mg/kg): | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| As (mg/kg wet wt.): | 3.01 | 4.51 | 3.19 | 1.89 | 1.18 | 1.29 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| B (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.98 | 1.0 | 0.98 | 0.97 | 1.0 | 1.0 |
| Ba (mg/kg wet wt.): | 62.7 | 100 | 90.4 | 61.7 | 28.5 | 40.7 |
| d.l. (mg/kg): | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Be (mg/kg wet wt.): | 0.56 | 0.93 | 0.66 | 0.57 | 0.16 | 0.24 |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| Cd (mg/kg wet wt.): | 1.17 | 1.69 | 0.59 | 0.47 | 0.19 | 0.28 |
| d.l. (mg/kg): | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 |
| Cr (mg/kg wet wt.): | 7.68 | 9.72 | 6.36 | 5.52 | 2.56 | 4.04 |
| d.l. (mg/kg): | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 |
| Cu (mg/kg wet wt.): | 6.68 | 7.02 | 6.13 | 4.23 | 1.61 | 2 |
| d.l. (mg/kg): | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 |
| Fe (mg/kg wet wt.): | 14600 | 15700 | 12400 | 8650 | 3650 | 4700 |
| d.l. (mg/kg): | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Hg (mg/kg wet wt.): | 0.15 | 0.102 | 0.05 | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.02 | 0.02 | 0.04 | 0.04 | 0.04 |
| Mg (mg/kg wet wt.): | 261 | 430 | 422 | 347 | 109 | 184 |
| d.l. (mg/kg): | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Mn (mg/kg wet wt.): | 300 | 259 | 343 | 331 | 78.1 | 57.3 |
| d.l. (mg/kg): | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 |
| Mo (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.98 | 1.0 | 0.98 | 0.97 | 1.0 | 1.0 |
| Ni (mg/kg wet wt.): | 6.18 | 7.3 | 8.05 | 5.66 | 1.96 | 2.12 |
| d.l. (mg/kg): | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| Pb (mg/kg wet wt.): | 55 | 57.5 | 16.7 | 14.2 | 3.78 | 4.93 |
| d.l. (mg/kg): | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 |
| Se (mg/kg wet wt.): | bdl | bdl | 0.3 | 0.24 | bdl | bdl |
| d.l. (mg/kg): | 0.2 | 0.5 | 0.2 | 0.2 | 1.0 | 0.2 |
| Sr (mg/kg wet wt.): | 7.56 | 10.3 | 15.3 | 7.73 | 4.03 | 4.41 |
| d.l. (mg/kg): | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 |
| V (mg/kg wet wt.): | 22.9 | 28.1 | 16.4 | 15.9 | 5.9 | 9.8 |
| d.l. (mg/kg): | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 |
| Zn (mg/kg wet wt.): | 249 | 258 | 64.6 | 48.6 | 8.14 | 8.29 |
| d.l. (mg/kg): | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |

LP1S21 - LP1S34 = samples collected at Lone Star Steel.
LP2S22 - LP2S35 = samples collected from SH 155 Marina.
LP3S23 - LP3S36 = samples collected from Copeland Creek.

d.l. = detection limit.
bdl = below detection limit.

TABLE XIB. ANALYTICAL RESULTS OF METALS IN SEDIMENT SAMPLES COLLECTED FROM LAKE O' THE PINES (DRY WEIGHT).

| SAMPLE: | LP1S21 | LP1S34 | LP2S22 | LP2S35 | LP3S23 | LP3S36 |
|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 454 | 490 | 268 | 444 | 509 | 585 |
| % MOISTURE: | 32.7 | 32.2 | 48.5 | 43.4 | 28.3 | 25.5 |
| Al (mg/kg dry wt.): | 4843.98 | 9896.76 | 9145.63 | 7844.52 | 1952.58 | 3852.35 |
| d.l. (mg/kg): | 3.71 | 3.69 | 4.85 | 4.42 | 3.49 | 3.36 |
| As (mg/kg dry wt.): | 4.47 | 6.65 | 6.19 | 3.34 | 1.65 | 1.73 |
| d.l. (mg/kg): | 0.15 | 0.15 | 0.19 | 0.18 | 0.14 | 0.13 |
| B (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 1.45 | 1.47 | 1.9 | 1.72 | 1.39 | 1.34 |
| Ba (mg/kg dry wt.): | 93.16 | 147.49 | 175.53 | 109.01 | 39.75 | 54.63 |
| d.l. (mg/kg): | 0.74 | 0.74 | 0.97 | 0.88 | 0.7 | 0.67 |
| Be (mg/kg dry wt.): | 0.83 | 1.37 | 1.28 | 1.01 | 0.22 | 0.33 |
| d.l. (mg/kg): | 0.07 | 0.07 | 0.1 | 0.09 | 0.07 | 0.07 |
| Cd (mg/kg dry wt.): | 1.74 | 2.49 | 1.15 | 0.83 | 0.27 | 0.37 |
| d.l. (mg/kg): | 0.22 | 0.22 | 0.29 | 0.27 | 0.21 | 0.2 |
| Cr (mg/kg dry wt.): | 11.41 | 14.34 | 12.35 | 9.75 | 3.57 | 5.42 |
| d.l. (mg/kg): | 0.37 | 0.37 | 0.49 | 0.44 | 0.35 | 0.34 |
| Cu (mg/kg dry wt.): | 9.93 | 10.35 | 11.9 | 7.47 | 2.25 | 2.68 |
| d.l. (mg/kg): | 0.37 | 0.37 | 0.49 | 0.44 | 0.35 | 0.34 |
| Fe (mg/kg dry wt.): | 21693.91 | 23156.34 | 24077.67 | 15282.69 | 5090.66 | 6308.72 |
| d.l. (mg/kg): | 3.71 | 3.69 | 4.85 | 4.42 | 3.49 | 3.36 |
| Hg (mg/kg dry wt.): | 0.223 | 0.15 | 0.097 | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.03 | 0.029 | 0.039 | 0.071 | 0.056 | 0.054 |
| Mg (mg/kg dry wt.): | 387.82 | 634.22 | 819.42 | 613.07 | 152.02 | 246.98 |
| d.l. (mg/kg): | 3.71 | 3.69 | 4.85 | 4.42 | 3.49 | 3.36 |
| Mn (mg/kg dry wt.): | 445.77 | 382.01 | 666.02 | 584.81 | 108.93 | 76.91 |
| d.l. (mg/kg): | 0.37 | 0.37 | 0.49 | 0.44 | 0.35 | 0.34 |
| Mo (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 1.45 | 1.47 | 1.9 | 1.72 | 1.39 | 1.34 |
| Ni (mg/kg dry wt.): | 9.18 | 10.77 | 15.63 | 10 | 2.73 | 2.85 |
| d.l. (mg/kg): | 0.45 | 0.44 | 0.58 | 0.53 | 0.42 | 0.4 |
| Pb (mg/kg dry wt.): | 81.72 | 84.81 | 32.43 | 25.09 | 5.27 | 6.62 |
| d.l. (mg/kg): | 1.86 | 1.84 | 2.43 | 2.21 | 1.74 | 1.68 |
| Se (mg/kg dry wt.): | bdl | bdl | 0.58 | 0.42 | bdl | bdl |
| d.l. (mg/kg): | 0.3 | 0.74 | 0.39 | 0.35 | 1.39 | 0.27 |
| Sr (mg/kg dry wt.): | 11.23 | 15.19 | 29.71 | 13.66 | 5.62 | 5.92 |
| d.l. (mg/kg): | 0.19 | 0.18 | 0.24 | 0.22 | 0.17 | 0.17 |
| V (mg/kg dry wt.): | 34.03 | 41.45 | 31.84 | 28.09 | 8.23 | 13.15 |
| d.l. (mg/kg): | 0.19 | 0.18 | 0.24 | 0.22 | 0.17 | 0.17 |
| Zn (mg/kg dry wt.): | 369.99 | 380.53 | 125.44 | 85.87 | 11.35 | 11.13 |
| d.l. (mg/kg): | 0.74 | 0.74 | 0.97 | 0.88 | 0.7 | 0.67 |

LP1S21 - LP1S34 = samples collected at Lone Star Steel.
LP2S22 - LP2S35 = samples collected from SH 155 Marina.
LP3S23 - LP3S36 = samples collected from Copeland Creek.

d.l. = detection limit.
bdl = below detection limit.

TABLE XIIA. ANALYTICAL RESULTS OF METALS IN SEDIMENT SAMPLES COLLECTED FROM CADDO LAKE (WET WEIGHT).

| SAMPLE: | CL2S42 | CL2S55 | CL9S41 | CL9S54 | CL11S43 | CL11S56 |
|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 318 | 440 | 220 | 403 | 437 | 425 |
| % MOISTURE: | 76.2 | 48.5 | 65 | 41.6 | 32.9 | 28.9 |
| Al (mg/kg wet wt.): | 4530 | 7180 | 6590 | 4040 | 6280 | 9150 |
| d.l. (mg/kg): | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| As (mg/kg wet wt.): | 1.54 | 1.67 | 1.68 | 1.73 | 1.98 | 0.38 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| B (mg/kg wet wt.): | 1.07 | 0.98 | 1.18 | 1.25 | bdl | 1.34 |
| d.l. (mg/kg): | 1.0 | 0.98 | 1.0 | 1.0 | 0.97 | 1.0 |
| Ba (mg/kg wet wt.): | 57.8 | 92.4 | 74 | 89.6 | 60.7 | 71.1 |
| d.l. (mg/kg): | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Be (mg/kg wet wt.): | 0.32 | 0.54 | 0.46 | 0.61 | 0.42 | 0.52 |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| Cd (mg/kg wet wt.): | 0.32 | 0.29 | 0.4 | 0.32 | 0.35 | 0.19 |
| d.l. (mg/kg): | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 |
| Cr (mg/kg wet wt.): | 4.77 | 7.63 | 10.5 | 8.66 | 6.34 | 8.59 |
| d.l. (mg/kg): | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 |
| Cu (mg/kg wet wt.): | 4.11 | 5.22 | 7.85 | 6.39 | 4.65 | 5.87 |
| d.l. (mg/kg): | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 |
| Fe (mg/kg wet wt.): | 4910 | 7260 | 6610 | 6300 | 7540 | 8570 |
| d.l. (mg/kg): | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Hg (mg/kg wet wt.): | 0.057 | 0.052 | 0.229 | 0.182 | 0.041 | bdl |
| d.l. (mg/kg): | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.04 |
| Mg (mg/kg wet wt.): | 433 | 670 | 467 | 522 | 470 | 597 |
| d.l. (mg/kg): | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Mn (mg/kg wet wt.): | 93.7 | 99.9 | 103 | 71.5 | 130 | 104 |
| d.l. (mg/kg): | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 |
| Mo (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.97 | 0.97 | 0.99 | 1.0 | 0.97 | 0.96 |
| Ni (mg/kg wet wt.): | 5.7 | 6.85 | 7.72 | 7.78 | 6.23 | 3.31 |
| d.l. (mg/kg): | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| Pb (mg/kg wet wt.): | 8.83 | 10.8 | 51.3 | 47 | 7.19 | 8.27 |
| d.l. (mg/kg): | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 |
| Se (mg/kg wet wt.): | bdl | bdl | 0.2 | bdl | bdl | 0.32 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Sr (mg/kg wet wt.): | 13.5 | 17.6 | 12.1 | 12.1 | 11.6 | 14.9 |
| d.l. (mg/kg): | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 |
| V (mg/kg wet wt.): | 10.3 | 17.9 | 16.7 | 17.9 | 17.7 | 22.3 |
| d.l. (mg/kg): | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 |
| Zn (mg/kg wet wt.): | 19 | 21.9 | 45.8 | 27.6 | 22.2 | 17.6 |
| d.l. (mg/kg): | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |

CL2S42 - CL2S55 = samples collected from Harrison Bayou.
CL9S41 - CL9S54 = samples collected from Goose Prairie.
CL11S43 - CL11S56 = samples collected from Little Green Break.

d.l. = detection limit.
bdl = below detection limit.

TABLE XIIB. ANALYTICAL RESULTS OF METALS IN SEDIMENT SAMPLES COLLECTED FROM CADDO LAKE (DRY WEIGHT).

| SAMPLE: | CL2S42 | CL2S55 | CL9S41 | CL9S54 | CL11S43 | CL11S56 |
|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 318 | 440 | 220 | 403 | 437 | 425 |
| % MOISTURE: | 76.2 | 48.5 | 65 | 41.6 | 32.9 | 28.9 |
| Al (mg/kg dry wt.): | 19033.61 | 13941.75 | 18828.57 | 12054.79 | 9359.17 | 12869.2 |
| d.l. (mg/kg): | 10.5 | 4.85 | 7.14 | 4.28 | 3.73 | 3.52 |
| As (mg/kg dry wt.): | 6.47 | 3.24 | 4.8 | 2.96 | 2.95 | 0.53 |
| d.l. (mg/kg): | 0.42 | 0.19 | 0.29 | 0.17 | 0.15 | 0.14 |
| B (mg/kg dry wt.): | 4.5 | 1.89 | 3.37 | 2.14 | bdl | 1.88 |
| d.l. (mg/kg): | 4.2 | 1.89 | 2.86 | 1.71 | 1.44 | 1.41 |
| Ba (mg/kg dry wt.): | 242.86 | 179.42 | 211.43 | 153.42 | 90.46 | 100 |
| d.l. (mg/kg): | 2.1 | 0.97 | 1.43 | 0.86 | 0.75 | 0.7 |
| Be (mg/kg dry wt.): | 1.35 | 1.05 | 1.31 | 1.05 | 0.62 | 0.73 |
| d.l. (mg/kg): | 0.21 | 0.1 | 0.14 | 0.09 | 0.07 | 0.07 |
| Cd (mg/kg dry wt.): | 1.36 | 0.55 | 1.14 | 0.55 | 0.52 | 0.27 |
| d.l. (mg/kg): | 0.63 | 0.29 | 0.43 | 0.26 | 0.22 | 0.21 |
| Cr (mg/kg dry wt.): | 20.04 | 14.82 | 30 | 14.83 | 9.45 | 12.08 |
| d.l. (mg/kg): | 1.05 | 0.49 | 0.71 | 0.43 | 0.37 | 0.35 |
| Cu (mg/kg dry wt.): | 17.27 | 10.14 | 22.43 | 10.94 | 6.93 | 8.26 |
| d.l. (mg/kg): | 1.05 | 0.49 | 0.71 | 0.43 | 0.37 | 0.35 |
| Fe (mg/kg dry wt.): | 20630.25 | 14097.09 | 18885.71 | 10787.67 | 11236.96 | 12053.45 |
| d.l. (mg/kg): | 10.5 | 4.85 | 7.14 | 4.28 | 3.73 | 3.52 |
| Hg (mg/kg dry wt.): | 0.239 | 0.101 | 0.654 | 0.312 | 0.061 | bdl |
| d.l. (mg/kg): | 0.084 | 0.039 | 0.057 | 0.034 | 0.03 | 0.056 |
| Mg (mg/kg dry wt.): | 1819.33 | 1300.97 | 1334.29 | 893.84 | 700.45 | 839.66 |
| d.l. (mg/kg): | 10.5 | 4.85 | 7.14 | 4.28 | 3.73 | 3.52 |
| Mn (mg/kg dry wt.): | 393.7 | 193.98 | 294.29 | 122.43 | 193.74 | 146.27 |
| d.l. (mg/kg): | 1.05 | 0.49 | 0.71 | 0.43 | 0.37 | 0.35 |
| Mo (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 4.08 | 1.89 | 2.81 | 1.7 | 1.44 | 1.35 |
| Ni (mg/kg dry wt.): | 23.95 | 13.3 | 22.06 | 13.32 | 9.28 | 4.66 |
| d.l. (mg/kg): | 1.26 | 0.58 | 0.86 | 0.51 | 0.45 | 0.42 |
| Pb (mg/kg dry wt.): | 37.1 | 20.97 | 146.57 | 80.48 | 10.72 | 11.63 |
| d.l. (mg/kg): | 5.25 | 2.43 | 3.57 | 2.14 | 1.86 | 1.76 |
| Se (mg/kg dry wt.): | bdl | bdl | 0.57 | bdl | bdl | 0.45 |
| d.l. (mg/kg): | 0.84 | 0.39 | 0.57 | 0.34 | 0.3 | 0.28 |
| Sr (mg/kg dry wt.): | 56.72 | 34.17 | 34.57 | 20.72 | 17.29 | 20.96 |
| d.l. (mg/kg): | 0.53 | 0.24 | 0.36 | 0.21 | 0.19 | 0.18 |
| V (mg/kg dry wt.): | 43.28 | 34.76 | 47.71 | 30.65 | 26.38 | 31.36 |
| d.l. (mg/kg): | 0.53 | 0.24 | 0.36 | 0.21 | 0.19 | 0.18 |
| Zn (mg/kg dry wt.): | 79.83 | 42.52 | 130.86 | 47.26 | 33.08 | 24.75 |
| d.l. (mg/kg): | 2.1 | 0.97 | 1.43 | 0.86 | 0.75 | 0.7 |

CL2S42 - CL2S55 = samples collected from Harrison Bayou.
CL9S41 - CL9S54 = samples collected from Goose Prairie.
CL11S43 - CL11S56 = samples collected from Little Green Break.

d.l. = detection limit.
bdl = below detection limit.

**APPENDIX F**
**(ANALYTICAL RESULTS FOR HYDROCARBONS IN SEDIMENTS)**

TABLE XIIIA. ANALYTICAL RESULTS OF POLYCYCLIC AROMATIC HYDROCARBONS IN SEDIMENT SAMPLES COLLECTED FROM CYPRESS SPRINGS RESERVOIR (WET WEIGHT).

| SAMPLE: | CS1S06 | CS2S07 | CS3S08 |
|---|---|---|---|
| SAMPLE WT. (g): | 283.0 | 491.0 | 321.0 |
| % MOISTURE: | 47.0 | 45.5 | 32.0 |
| % TOC: | 0.86 | 0.97 | 0.45 |
| 1,2,5,6-dibenzanthracene (mg/kg wet wt.): | bdl | bdl | bdl |
| 1,2-benzanthracene (mg/kg wet wt.): | bdl | bdl | bdl |
| 1-methylnaphthalene (mg/kg wet wt.): | bdl | bdl | bdl |
| 1-methylphenanthrene (mg/kg wet wt.): | bdl | bdl | bdl |
| 2,3,5-trimethylnaphthalene (mg/kg wet wt.): | bdl | bdl | bdl |
| 2,6-dimethylnaphthalene (mg/kg wet wt.): | bdl | bdl | bdl |
| 2-methylnaphthalene (mg/kg wet wt.): | 0.01 | 0.01 | 0.01 |
| C1-fluoranthenes & pyrenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C1-chrysenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C1-dibenzothiophenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C1-fluorenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C1-naphthalenes (mg/kg wet wt.): | 0.01 | 0.01 | 0.03 |
| C1-phenanthrenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C2-chrysenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C2-dibenzothiophenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C2-fluorenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C2-naphthalenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C2-phenanthrenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C3-chrysenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C3-dibenzothiophenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C3-fluorenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C3-naphthalenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C3-phenanthrenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C4-chrysenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C4-naphthalenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C4-phenanthrenes (mg/kg wet wt.): | bdl | bdl | bdl |
| acenaphthalene (mg/kg wet wt.): | bdl | bdl | bdl |
| acenaphthene (mg/kg wet wt.): | bdl | bdl | bdl |
| anthracene (mg/kg wet wt.): | bdl | bdl | bdl |
| benzo (a) pyrene (mg/kg wet wt.): | bdl | bdl | bdl |
| benzo (b) fluoranthene (mg/kg wet wt.): | bdl | bdl | bdl |
| benzo (e) pyrene (mg/kg wet wt.): | bdl | bdl | bdl |
| benzo (g,h,i) perylene (mg/kg wet wt.): | bdl | bdl | bdl |
| benzo (k) fluoranthene (mg/kg wet wt.): | bdl | bdl | bdl |
| biphenyl (mg/kg wet wt.): | bdl | bdl | bdl |
| chrysene (mg/kg wet wt.): | bdl | bdl | bdl |
| dibenzothiophene (mg/kg wet wt.): | bdl | bdl | bdl |
| fluoranthene (mg/kg wet wt.): | bdl | bdl | bdl |
| fluorene (mg/kg wet wt.): | bdl | bdl | bdl |
| indeno (1,2,3-cd) pyrene (mg/kg wet wt.): | bdl | bdl | bdl |
| naphthalene (mg/kg wet wt.): | 0.01 | 0.01 | 0.01 |
| perylene (mg/kg wet wt.): | 0.37 | 0.18 | 0.04 |
| phenanthrene (mg/kg wet wt.): | bdl | bdl | bdl |
| pyrene (mg/kg wet wt.): | bdl | bdl | bdl |

CS1S06 = sample collected above FM 115; detection limit = 0.01 mg/kg. bdl = below detection limit.
CS2S07 = sample collected from the Panther Creek Arm; detection limit = 0.01 mg/kg.
CS3S08 = sample collected from Whippoorwill Bay; detection limit = 0.01 mg/kg.

TABLE XIIIB. ANALYTICAL RESULTS OF POLYCYCLIC AROMATIC HYDROCARBONS IN SEDIMENT SAMPLES COLLECTED FROM CYPRESS SPRINGS RESERVOIR (DRY WEIGHT).

| SAMPLE: | CS1S06 | CS2S07 | CS3S08 |
|---|---|---|---|
| SAMPLE WT. (g): | 283.0 | 491.0 | 321.0 |
| % MOISTURE: | 47.0 | 45.5 | 32.0 |
| % TOC: | 0.86 | 0.97 | 0.45 |
| 1,2,5,6-dibenzanthracene (mg/kg dry wt.): | bdl | bdl | bdl |
| 1,2-benzanthracene (mg/kg dry wt.): | bdl | bdl | bdl |
| 1-methylnaphthalene (mg/kg dry wt.): | bdl | bdl | bdl |
| 1-methylphenanthrene (mg/kg dry wt.): | bdl | bdl | bdl |
| 2,3,5-trimethylnaphthalene (mg/kg dry wt.): | bdl | bdl | bdl |
| 2,6-dimethylnaphthalene (mg/kg dry wt.): | bdl | bdl | bdl |
| 2-methylnaphthalene (mg/kg dry wt.): | 0.019 | 0.018 | 0.015 |
| C1-fluoranthenes & pyrenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C1-chrysenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C1-dibenzothiophenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C1-fluorenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C1-naphthalenes (mg/kg dry wt.): | 0.019 | 0.018 | 0.044 |
| C1-phenanthrenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C2-chrysenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C2-dibenzothiophenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C2-fluorenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C2-naphthalenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C2-phenanthrenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C3-chrysenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C3-dibenzothiophenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C3-fluorenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C3-naphthalenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C3-phenanthrenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C4-chrysenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C4-naphthalenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C4-phenanthrenes (mg/kg dry wt.): | bdl | bdl | bdl |
| acenaphthalene (mg/kg dry wt.): | bdl | bdl | bdl |
| acenaphthene (mg/kg dry wt.): | bdl | bdl | bdl |
| anthracene (mg/kg dry wt.): | bdl | bdl | bdl |
| benzo (a) pyrene (mg/kg dry wt.): | bdl | bdl | bdl |
| benzo (b) fluoranthene (mg/kg dry wt.): | bdl | bdl | bdl |
| benzo (e) pyrene (mg/kg dry wt.): | bdl | bdl | bdl |
| benzo (g,h,i) perylene (mg/kg dry wt.): | bdl | bdl | bdl |
| benzo (k) fluoranthene (mg/kg dry wt.): | bdl | bdl | bdl |
| biphenyl (mg/kg dry wt.): | bdl | bdl | bdl |
| chrysene (mg/kg dry wt.): | bdl | bdl | bdl |
| dibenzothiophene (mg/kg dry wt.): | bdl | bdl | bdl |
| fluoranthene (mg/kg dry wt.): | bdl | bdl | bdl |
| fluorene (mg/kg dry wt.): | bdl | bdl | bdl |
| indeno (1,2,3-cd) pyrene (mg/kg dry wt.): | bdl | bdl | bdl |
| naphthalene (mg/kg dry wt.): | 0.019 | 0.018 | 0.015 |
| perylene (mg/kg dry wt.): | 0.698 | 0.330 | 0.059 |
| phenanthrene (mg/kg dry wt.): | bdl | bdl | bdl |
| pyrene (mg/kg dry wt.): | bdl | bdl | bdl |

CS1S06 = sample collected above FM 115; detection limit = 0.019 mg/kg. bdl = below detection limit.
CS2S07 = sample collected from the Panther Creek Arm; detection limit = 0.018 mg/kg.
CS3S08 = sample collected from Whippoorwill Bay; detection limit = 0.015 mg/kg.

TABLE XIVA. ANALYTICAL RESULTS OF POLYCYCLIC AROMATIC HYDROCARBONS IN SEDIMENT SAMPLES COLLECTED FROM LAKE O' THE PINES (WET WEIGHT).

| SAMPLE: | LP1S26 | LP2S27 | LP3S28 |
|---|---|---|---|
| SAMPLE WT. (g): | 457.0 | 252.0 | 389.0 |
| % MOISTURE: | 38.0 | 72.5 | 40.5 |
| % TOC: | 1.0 | 1.34 | 0.86 |
| 1,2,5,6-dibenzanthracene (mg/kg wet wt.): | 0.05 | bdl | bdl |
| 1,2-benzanthracene (mg/kg wet wt.): | 0.13 | bdl | bdl |
| 1-methylnaphthalene (mg/kg wet wt.): | 0.01 | bdl | bdl |
| 1-methylphenanthrene (mg/kg wet wt.): | bdl | bdl | bdl |
| 2,3,5-trimethylnaphthalene (mg/kg wet wt.): | bdl | bdl | bdl |
| 2,6-dimethylnaphthalene (mg/kg wet wt.): | bdl | bdl | bdl |
| 2-methylnaphthalene (mg/kg wet wt.): | 0.02 | 0.01 | 0.01 |
| C1-fluoranthenes & pyrenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C1-chrysenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C1-dibenzothiophenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C1-fluorenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C1-naphthalenes (mg/kg wet wt.): | 0.03 | 0.01 | 0.01 |
| C1-phenanthrenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C2-chrysenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C2-dibenzothiophenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C2-fluorenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C2-naphthalenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C2-phenanthrenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C3-chrysenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C3-dibenzothiophenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C3-fluorenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C3-naphthalenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C3-phenanthrenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C4-chrysenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C4-naphthalenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C4-phenanthrenes (mg/kg wet wt.): | bdl | bdl | bdl |
| acenaphthalene (mg/kg wet wt.): | 0.02 | bdl | bdl |
| acenaphthene (mg/kg wet wt.): | bdl | bdl | bdl |
| anthracene (mg/kg wet wt.): | 0.06 | bdl | bdl |
| benzo (a) pyrene (mg/kg wet wt.): | 0.16 | bdl | bdl |
| benzo (b) fluoranthene (mg/kg wet wt.): | 0.17 | 0.02 | bdl |
| benzo (e) pyrene (mg/kg wet wt.): | 0.12 | bdl | bdl |
| benzo (g,h,i) perylene (mg/kg wet wt.): | 0.13 | bdl | bdl |
| benzo (k) fluoranthene (mg/kg wet wt.): | 0.15 | bdl | bdl |
| biphenyl (mg/kg wet wt.): | bdl | bdl | bdl |
| chrysene (mg/kg wet wt.): | 0.18 | bdl | bdl |
| dibenzothiophene (mg/kg wet wt.): | bdl | bdl | bdl |
| fluoranthene (mg/kg wet wt.): | 0.18 | bdl | bdl |
| fluorene (mg/kg wet wt.): | bdl | bdl | bdl |
| indeno (1,2,3-cd) pyrene (mg/kg wet wt.): | 0.13 | bdl | bdl |
| naphthalene (mg/kg wet wt.): | 0.04 | 0.01 | 0.01 |
| perylene (mg/kg wet wt.): | 0.16 | 0.32 | 0.15 |
| phenanthrene (mg/kg wet wt.): | 0.05 | bdl | bdl |
| pyrene (mg/kg wet wt.): | 0.14 | bdl | bdl |

LP1S26 = sample collected at Lone Star Steel; detection limit = 0.01 mg/kg. bdl = below detection limit.
LP2S27 = sample collected at SH 155 Marina;detection limit = 0.01 mg/kg.
LP3S28 = sample collected from Copeland Creek; detection limit = 0.01 mg/kg.

TABLE XIVB. ANALYTICAL RESULTS OF POLYCYCLIC AROMATIC HYDROCARBONS IN SEDIMENT SAMPLES COLLECTED FROM LAKE O' THE PINES (DRY WEIGHT).

| SAMPLE: | LP1S26 | LP2S27 | LP3S28 |
|---|---|---|---|
| SAMPLE WT. (g): | 457.0 | 252.0 | 389.0 |
| % MOISTURE: | 38.0 | 72.5 | 40.5 |
| % TOC: | 1.0 | 1.34 | 0.86 |
| 1,2,5,6-dibenzanthracene (mg/kg dry wt.): | 0.081 | bdl | bdl |
| 1,2-benzanthracene (mg/kg dry wt.): | 0.210 | bdl | bdl |
| 1-methylnaphthalene (mg/kg dry wt.): | 0.016 | bdl | bdl |
| 1-methylphenanthrene (mg/kg dry wt.): | bdl | bdl | bdl |
| 2,3,5-trimethylnaphthalene (mg/kg dry wt.): | bdl | bdl | bdl |
| 2,6-dimethylnaphthalene (mg/kg dry wt.): | bdl | bdl | bdl |
| 2-methylnaphthalene (mg/kg dry wt.): | 0.032 | 0.036 | 0.017 |
| C1-fluoranthenes & pyrenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C1-chrysenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C1-dibenzothiophenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C1-fluorenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C1-naphthalenes (mg/kg dry wt.): | 0.048 | 0.036 | 0.017 |
| C1-phenanthrenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C2-chrysenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C2-dibenzothiophenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C2-fluorenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C2-naphthalenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C2-phenanthrenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C3-chrysenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C3-dibenzothiophenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C3-fluorenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C3-naphthalenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C3-phenanthrenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C4-chrysenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C4-naphthalenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C4-phenanthrenes (mg/kg dry wt.): | bdl | bdl | bdl |
| acenaphthalene (mg/kg dry wt.): | 0.032 | bdl | bdl |
| acenaphthene (mg/kg dry wt.): | bdl | bdl | bdl |
| anthracene (mg/kg dry wt.): | 0.098 | bdl | bdl |
| benzo (a) pyrene (mg/kg dry wt.): | 0.258 | bdl | bdl |
| benzo (b) fluoranthene (mg/kg dry wt.): | 0.274 | 0.073 | bdl |
| benzo (e) pyrene (mg/kg dry wt.): | 0.194 | bdl | bdl |
| benzo (g,h,i) perylene (mg/kg dry wt.): | 0.210 | bdl | bdl |
| benzo (k) fluoranthene (mg/kg dry wt.): | 0.242 | bdl | bdl |
| biphenyl (mg/kg dry wt.): | bdl | bdl | bdl |
| chrysene (mg/kg dry wt.): | 0.290 | bdl | bdl |
| dibenzothiophene (mg/kg dry wt.): | bdl | bdl | bdl |
| fluoranthene (mg/kg dry wt.): | 0.290 | bdl | bdl |
| fluorene (mg/kg dry wt.): | bdl | bdl | bdl |
| indeno (1,2,3-cd) pyrene (mg/kg dry wt.): | 0.210 | bdl | bdl |
| naphthalene (mg/kg dry wt.): | 0.065 | 0.036 | 0.017 |
| perylene (mg/kg dry wt.): | 0.258 | 1.164 | 0.252 |
| phenanthrene (mg/kg dry wt.): | 0.081 | bdl | bdl |
| pyrene (mg/kg dry wt.): | 0.226 | bdl | bdl |

LP1S26 = sample collected at Lone Star Steel; detection limit = 0.016 mg/kg. bdl = below detection limit.
LP2S27 = sample collected at SH 155 Marina; detection limit = 0.036 mg/kg.
LP3S28 = sample collected from Copeland Creek; detection limit = 0.017 mg/kg.

TABLE XVA. ANALYTICAL RESULTS OF POLYCYCLIC AROMATIC HYDROCARBONS IN SEDIMENT SAMPLES COLLECTED FROM CADDO LAKE (WET WEIGHT).

| SAMPLE: | CL2S47 | CL9S46 | CL11S48 |
|---|---|---|---|
| SAMPLE WT. (g): | 282.0 | 267.0 | 389.0 |
| % MOISTURE: | 81.5 | 77.5 | 42.0 |
| % TOC: | 1.22 | 1.28 | 0.76 |
| 1,2,5,6-dibenzanthracene (mg/kg wet wt.): | bdl | bdl | bdl |
| 1,2-benzanthracene (mg/kg wet wt.): | bdl | bdl | 0.01 |
| 1-methylnaphthalene (mg/kg wet wt.): | bdl | bdl | bdl |
| 1-methylphenanthrene (mg/kg wet wt.): | bdl | bdl | bdl |
| 2,3,5-trimethylnaphthalene (mg/kg wet wt.): | bdl | bdl | bdl |
| 2,6-dimethylnaphthalene (mg/kg wet wt.): | bdl | bdl | bdl |
| 2-methylnaphthalene (mg/kg wet wt.): | 0.01 | 0.01 | 0.01 |
| C1-fluoranthenes & pyrenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C1-chrysenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C1-dibenzothiophenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C1-fluorenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C1-naphthalenes (mg/kg wet wt.): | 0.01 | 0.01 | 0.01 |
| C1-phenanthrenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C2-chrysenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C2-dibenzothiophenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C2-fluorenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C2-naphthalenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C2-phenanthrenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C3-chrysenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C3-dibenzothiophenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C3-fluorenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C3-naphthalenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C3-phenanthrenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C4-chrysenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C4-naphthalenes (mg/kg wet wt.): | bdl | bdl | bdl |
| C4-phenanthrenes (mg/kg wet wt.): | bdl | bdl | bdl |
| acenaphthalene (mg/kg wet wt.): | bdl | bdl | bdl |
| acenaphthene (mg/kg wet wt.): | bdl | bdl | bdl |
| anthracene (mg/kg wet wt.): | bdl | bdl | bdl |
| benzo (a) pyrene (mg/kg wet wt.): | bdl | bdl | 0.01 |
| benzo (b) fluoranthene (mg/kg wet wt.): | bdl | bdl | bdl |
| benzo (e) pyrene (mg/kg wet wt.): | bdl | bdl | bdl |
| benzo (g,h,i) perylene (mg/kg wet wt.): | bdl | bdl | bdl |
| benzo (k) fluoranthene (mg/kg wet wt.): | bdl | bdl | bdl |
| biphenyl (mg/kg wet wt.): | bdl | bdl | bdl |
| chrysene (mg/kg wet wt.): | bdl | bdl | 0.01 |
| dibenzothiophene (mg/kg wet wt.): | bdl | bdl | bdl |
| fluoranthene (mg/kg wet wt.): | bdl | bdl | 0.01 |
| fluorene (mg/kg wet wt.): | bdl | bdl | bdl |
| indeno (1,2,3-cd) pyrene (mg/kg wet wt.): | bdl | bdl | bdl |
| naphthalene (mg/kg wet wt.): | 0.01 | 0.01 | 0.01 |
| perylene (mg/kg wet wt.): | 0.17 | 0.08 | 0.99 |
| phenanthrene (mg/kg wet wt.): | bdl | bdl | bdl |
| pyrene (mg/kg wet wt.): | bdl | bdl | 0.03 |

CL2S47 = sample collected from Harrison Bayou; detection limit = 0.01 mg/kg. bdl = below detection limit.
CL9S46 = sample collected from Goose Prairie; detection limit = 0.01 mg/kg.
CL11S48 = sample collected from Little Green Break; detection limit = 0.01 mg/kg.

TABLE XVB. ANALYTICAL RESULTS OF POLYCYCLIC AROMATIC HYDROCARBONS IN SEDIMENT SAMPLES COLLECTED FROM CADDO LAKE (DRY WEIGHT).

| SAMPLE: | CL2S47 | CL9S46 | CL11S48 |
|---|---|---|---|
| SAMPLE WT. (g): | 282.0 | 267.0 | 389.0 |
| % MOISTURE: | 81.5 | 77.5 | 42.0 |
| % TOC: | 1.22 | 1.28 | 0.76 |
| 1,2,5,6-dibenzanthracene (mg/kg dry wt.): | bdl | bdl | bdl |
| 1,2-benzanthracene (mg/kg dry wt.): | bdl | bdl | 0.017 |
| 1-methylnaphthalene (mg/kg dry wt.): | bdl | bdl | bdl |
| 1-methylphenanthrene (mg/kg dry wt.): | bdl | bdl | bdl |
| 2,3,5-trimethylnaphthalene (mg/kg dry wt.): | bdl | bdl | bdl |
| 2,6-dimethylnaphthalene (mg/kg dry wt.): | bdl | bdl | bdl |
| 2-methylnaphthalene (mg/kg dry wt.): | 0.054 | 0.044 | 0.017 |
| C1-fluoranthenes & pyrenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C1-chrysenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C1-dibenzothiophenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C1-fluorenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C1-naphthalenes (mg/kg dry wt.): | 0.054 | 0.044 | 0.017 |
| C1-phenanthrenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C2-chrysenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C2-dibenzothiophenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C2-fluorenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C2-naphthalenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C2-phenanthrenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C3-chrysenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C3-dibenzothiophenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C3-fluorenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C3-naphthalenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C3-phenanthrenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C4-chrysenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C4-naphthalenes (mg/kg dry wt.): | bdl | bdl | bdl |
| C4-phenanthrenes (mg/kg dry wt.): | bdl | bdl | bdl |
| acenaphthalene (mg/kg dry wt.): | bdl | bdl | bdl |
| acenaphthene (mg/kg dry wt.): | bdl | bdl | bdl |
| anthracene (mg/kg dry wt.): | bdl | bdl | bdl |
| benzo (a) pyrene (mg/kg dry wt.): | bdl | bdl | 0.017 |
| benzo (b) fluoranthene (mg/kg dry wt.): | bdl | bdl | bdl |
| benzo (e) pyrene (mg/kg dry wt.): | bdl | bdl | bdl |
| benzo (g,h,i) perylene (mg/kg dry wt.): | bdl | bdl | bdl |
| benzo (k) fluoranthene (mg/kg dry wt.): | bdl | bdl | bdl |
| biphenyl (mg/kg dry wt.): | bdl | bdl | bdl |
| chrysene (mg/kg dry wt.): | bdl | bdl | 0.017 |
| dibenzothiophene (mg/kg dry wt.): | bdl | bdl | bdl |
| fluoranthene (mg/kg dry wt.): | bdl | bdl | 0.017 |
| fluorene (mg/kg dry wt.): | bdl | bdl | bdl |
| indeno (1,2,3-cd) pyrene (mg/kg dry wt.): | bdl | bdl | bdl |
| naphthalene (mg/kg dry wt.): | 0.054 | 0.044 | 0.017 |
| perylene (mg/kg dry wt.): | 0.919 | 0.356 | 1.707 |
| phenanthrene (mg/kg dry wt.): | bdl | bdl | bdl |
| pyrene (mg/kg dry wt.): | bdl | bdl | 0.052 |

CL2S47 = sample collected from Harrison Bayou; detection limit = 0.054 mg/kg. bdl = below detection limit.
CL9S46 = sample collected from Goose Prairie; detection limit = 0.044 mg/kg.
CL11S48 = sample collected from Little Green Break; detection limit = 0.017 mg/kg.

TABLE XVIA. ANALYTICAL RESULTS OF ALIPHATIC HYDROCARBONS IN SEDIMENT SAMPLES COLLECTED FROM CYPRESS SPRINGS RESERVOIR, LAKE O' THE PINES AND CADDO LAKE (WET WEIGHT).

| SAMPLE: | CS1S09 | CS3S10 | LP1S29 | LP3S30 | CL2S50 | CL9S49 |
|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 349.0 | 235.0 | 532.0 | 404.0 | 291.0 | 234.0 |
| % MOISTURE: | 48.5 | 31.0 | 37.5 | 40.5 | 77.5 | 91.0 |
| n-decane (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl |
| n-docosane (mg/kg wet wt.): | 0.04 | bdl | 0.04 | 0.02 | 0.06 | 0.07 |
| n-dodecane (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl |
| n-dotriacontane (mg/kg wet wt.): | 0.05 | 0.02 | 0.04 | bdl | bdl | bdl |
| n-eicosane (mg/kg wet wt.): | 0.03 | bdl | 0.03 | 0.03 | 0.04 | 0.03 |
| n-heneicosane (mg/kg wet wt.): | 0.04 | 0.02 | 0.04 | 0.04 | 0.11 | 0.11 |
| n-hentriacontane (mg/kg wet wt.): | 0.39 | 0.14 | 0.52 | 0.19 | 0.14 | 0.21 |
| n-heptacosane (mg/kg wet wt.): | 0.23 | 0.06 | 0.24 | 0.11 | 0.16 | 0.25 |
| n-heptadecane (mg/kg wet wt.): | 0.10 | 0.06 | 0.05 | 0.07 | 0.09 | 0.11 |
| n-hexacosane (mg/kg wet wt.): | 0.08 | 0.03 | 0.13 | 0.03 | 0.05 | 0.10 |
| n-hexadecane (mg/kg wet wt.): | bdl | bdl | 0.01 | bdl | bdl | bdl |
| n-nonacosane (mg/kg wet wt.): | 0.42 | 0.13 | 0.53 | 0.25 | 0.24 | 0.33 |
| n-nonadecane (mg/kg wet wt.): | 0.13 | 0.09 | 0.03 | 0.08 | 0.14 | 0.07 |
| n-octacosane (mg/kg wet wt.): | 0.15 | 0.06 | 0.13 | 0.07 | 0.19 | 0.21 |
| n-octadecane (mg/kg wet wt.): | bdl | bdl | 0.01 | bdl | 0.02 | 0.02 |
| n-pentacosane (mg/kg wet wt.): | 0.12 | 0.03 | 0.14 | 0.08 | 0.14 | 0.21 |
| n-pentadecane (mg/kg wet wt.): | bdl | bdl | 0.01 | bdl | bdl | bdl |
| n-tetracosane (mg/kg wet wt.): | 0.05 | 0.03 | 0.09 | 0.03 | 0.07 | 0.11 |
| n-tetradecane (mg/kg wet wt.): | bdl | bdl | 0.02 | bdl | bdl | bdl |
| n-tetratriacontane (mg/kg wet wt.): | 0.02 | bdl | 0.11 | bdl | bdl | 0.07 |
| n-triacontane (mg/kg wet wt.): | 0.15 | 0.04 | 0.14 | 0.08 | 0.18 | 0.22 |
| n-tricosane (mg/kg wet wt.): | 0.11 | 0.04 | 0.08 | 0.09 | 0.34 | 0.44 |
| n-tridecane (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl |
| n-tritriacontane (mg/kg wet wt.): | 0.16 | 0.06 | 0.51 | 0.06 | 0.07 | 0.11 |
| n-undecane (mg/kg wet wt.): | bdl | bdl | 0.01 | bdl | bdl | bdl |
| phytane (mg/kg wet wt.): | 0.04 | bdl | 0.04 | 0.01 | 0.10 | 0.12 |
| pristane (mg/kg wet wt.): | bdl | bdl | 0.03 | 0.07 | 0.04 | 0.05 |

CS1S09 = sample collected above FM 115 at Cypress Springs Reservoir; detection limit = 0.01 mg/kg. bdl = below detection limit.
CS3S10 = sample collected from Whippoorwill Bay at Cypress Springs Reservoir; detection limit = 0.01 mg/kg.
LP1S29 = sample collected at Lone Star Steel at Lake O' The Pines; detection limit = 0.01 mg/kg.
LP3S30 = sample collected from Copeland Creek at Lake O' The Pines; detection limit = 0.01 mg/kg.
CL2S50 = sample collected from Harrison Bayou at Caddo Lake; detection limit = 0.01 mg/kg.
CL9S49 = sample collected from Goose Prairie at Caddo Lake; detection limit = 0.01 mg/kg.

TABLE XVIB. ANALYTICAL RESULTS OF ALIPHATIC HYDROCARBONS IN SEDIMENT SAMPLES COLLECTED FROM CYPRESS SPRINGS RESERVOIR, LAKE O' THE PINES AND CADDO LAKE (DRY WEIGHT).

| SAMPLE: | CS1S09 | CS3S10 | LP1S29 | LP3S30 | CL2S50 | CL9S49 |
|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 349.0 | 235.0 | 532.0 | 404.0 | 291.0 | 234.0 |
| % MOISTURE: | 48.5 | 31.0 | 37.5 | 40.5 | 77.5 | 91.0 |
| n-decane (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl |
| n-docosane (mg/kg dry wt.): | 0.078 | bdl | 0.064 | 0.034 | 0.267 | 0.778 |
| n-dodecane (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl |
| n-dotriacontane (mg/kg dry wt.): | 0.097 | 0.029 | 0.064 | bdl | bdl | bdl |
| n-eicosane (mg/kg dry wt.): | 0.058 | bdl | 0.048 | 0.050 | 0.178 | 0.333 |
| n-heneicosane (mg/kg dry wt.): | 0.078 | 0.029 | 0.064 | 0.067 | 0.489 | 1.222 |
| n-hentriacontane (mg/kg dry wt.): | 0.757 | 0.203 | 0.832 | 0.319 | 0.622 | 2.333 |
| n-heptacosane (mg/kg dry wt.): | 0.447 | 0.087 | 0.384 | 0.184 | 0.711 | 2.778 |
| n-heptadecane (mg/kg dry wt.): | 0.194 | 0.087 | 0.080 | 0.118 | 0.400 | 1.222 |
| n-hexacosane (mg/kg dry wt.): | 0.155 | 0.043 | 0.208 | 0.050 | 0.222 | 1.111 |
| n-hexadecane (mg/kg dry wt.): | bdl | bdl | 0.016 | bdl | bdl | bdl |
| n-nonacosane (mg/kg dry wt.): | 0.816 | 0.188 | 0.848 | 0.420 | 1.067 | 3.667 |
| n-nonadecane (mg/kg dry wt.): | 0.252 | 0.130 | 0.048 | 0.134 | 0.622 | 0.778 |
| n-octacosane (mg/kg dry wt.): | 0.291 | 0.087 | 0.208 | 0.118 | 0.844 | 2.333 |
| n-octadecane (mg/kg dry wt.): | bdl | bdl | 0.016 | bdl | 0.089 | 0.222 |
| n-pentacosane (mg/kg dry wt.): | 0.233 | 0.043 | 0.224 | 0.134 | 0.622 | 2.333 |
| n-pentadecane (mg/kg dry wt.): | bdl | bdl | 0.016 | bdl | 0.133 | bdl |
| n-tetracosane (mg/kg dry wt.): | 0.097 | 0.043 | 0.144 | 0.050 | 0.311 | 1.222 |
| n-tetradecane (mg/kg dry wt.): | bdl | bdl | 0.032 | bdl | bdl | bdl |
| n-tetratriacontane (mg/kg dry wt.): | 0.039 | bdl | 0.176 | bdl | bdl | 0.778 |
| n-triacontane (mg/kg dry wt.): | 0.291 | 0.058 | 0.224 | 0.134 | 0.800 | 2.444 |
| n-tricosane (mg/kg dry wt.): | 0.214 | 0.058 | 0.128 | 0.151 | 1.511 | 4.889 |
| n-tridecane (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl |
| n-tritriacontane (mg/kg dry wt.): | 0.311 | 0.087 | 0.816 | 0.101 | 0.311 | 1.222 |
| n-undecane (mg/kg dry wt.): | bdl | bdl | 0.016 | bdl | bdl | bdl |
| phytane (mg/kg dry wt.): | 0.078 | bdl | 0.064 | 0.017 | 0.444 | 1.333 |
| pristane (mg/kg dry wt.): | bdl | bdl | 0.048 | 0.118 | 0.178 | 0.556 |

CS1S09 = sample collected above FM 115 at Cypress Springs Reservoir; detection limit = 0.019 mg/kg. bdl = below detection limit.
CS3S10 = sample collected from Whippoorwill Bay at Cypress Springs Reservoir; detection limit = 0.014 mg/kg.
LP1S29 = sample collected at Lone Star Steel at Lake O' The Pines; detection limit = 0.016 mg/kg.
LP3S30 = sample collected from Copeland Creek at Lake O' The Pines; detection limit = 0.017 mg/kg.
CL2S50 = sample collected from Harrison Bayou at Caddo Lake; detection limit = 0.044 mg/kg.
CL9S49 = sample collected from Goose Prairie at Caddo Lake; detection limit = 0.111 mg/kg.

**APPENDIX G**
**(ANALYTICAL RESULTS FOR ORGANOCHLORINES IN SEDIMENTS)**

TABLE XVIIA. RESULTS OF ORGANOCHLORINE ANALYSIS FOR SEDIMENTS COLLECTED FROM CYPRESS SPRINGS RESERVOIR, LAKE O' THE PINES AND CADDO LAKE (WET WEIGHT).

| SAMPLE: | CS1S04 | LP1S25 | CL2S45 |
|---|---|---|---|
| SAMPLE WT. (g): | 274.0 | 454.0 | 331.0 |
| % MOISTURE: | 50.5 | 40.5 | 80.0 |
| HCB (mg/kg wet wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 |
| Total PCB (mg/kg wet wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 |
| " BHC (mg/kg wet wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 |
| " chlordane (mg/kg wet wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 |
| $ BHC (mg/kg wet wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 |
| cis-nonachlor (mg/kg wet wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 |
| ) BHC (mg/kg wet wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 |
| dieldrin (mg/kg wet wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 |
| endrin (mg/kg wet wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 |
| ( BHC (mg/kg wet wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 |
| ( chlordane (mg/kg wet wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 |
| heptachlor epoxide (mg/kg wet wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 |
| mirex (mg/kg wet wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 |
| o,p'-DDD (mg/kg wet wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 |
| o,p'-DDE (mg/kg wet wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 |
| o,p'-DDT (mg/kg wet wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 |
| oxychlordane (mg/kg wet wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 |
| p,p'-DDD (mg/kg wet wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 |
| p,p'-DDE (mg/kg wet wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 |
| p,p'-DDT (mg/kg wet wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 |
| toxaphene (mg/kg wet wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 |
| trans-nonachlor (mg/kg wet wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 |

CS1S04 = sample collected above FM 115 at Cypress Springs Reservoir.
LP1S25 = sample collected at Lone Star Steel at Lake O' The Pines.
CL2S45 = sample collected from Harrison Bayou at Caddo Lake.

d.l. = detection limit.
bdl = below detection limit.

TABLE XVIIB. RESULTS OF ORGANOCHLORINE ANALYSIS FOR SEDIMENTS COLLECTED FROM CYPRESS SPRINGS RESERVOIR, LAKE O' THE PINES AND CADDO LAKE (DRY WEIGHT).

| SAMPLE: | CS1S04 | LP1S25 | CL2S45 |
|---|---|---|---|
| SAMPLE WT. (g): | 274.0 | 454.0 | 331.0 |
| % MOISTURE: | 50.5 | 40.5 | 80.0 |
| HCB (mg/kg dry wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.017 | 0.05 |
| Total PCB (mg/kg dry wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.10 | 0.08 | 0.25 |
| " BHC (mg/kg dry wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.017 | 0.05 |
| " chlordane (mg/kg dry wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.017 | 0.05 |
| $ BHC (mg/kg dry wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.017 | 0.05 |
| cis-nonachlor (mg/kg dry wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.017 | 0.05 |
| ) BHC (mg/kg dry wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.017 | 0.05 |
| dieldrin (mg/kg dry wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.017 | 0.05 |
| endrin (mg/kg dry wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.017 | 0.05 |
| ( BHC (mg/kg dry wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.017 | 0.05 |
| ( chlordane (mg/kg dry wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.017 | 0.05 |
| heptachlor epoxide (mg/kg dry wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.017 | 0.05 |
| mirex (mg/kg dry wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.017 | 0.05 |
| o,p'-DDD (mg/kg dry wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.017 | 0.05 |
| o,p'-DDE (mg/kg dry wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.017 | 0.05 |
| o,p'-DDT (mg/kg dry wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.017 | 0.05 |
| oxychlordane (mg/kg dry wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.017 | 0.05 |
| p,p'-DDD (mg/kg dry wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.017 | 0.05 |
| p,p'-DDE (mg/kg dry wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.017 | 0.05 |
| p,p'-DDT (mg/kg dry wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.017 | 0.05 |
| toxaphene (mg/kg dry wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.10 | 0.08 | 0.25 |
| trans-nonachlor (mg/kg dry wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.017 | 0.05 |

CS1S04 = sample collected above FM 115 at Cypress Springs Reservoir.
LP1S25 = sample collected at Lone Star Steel at Lake O' The Pines.
CL2S45 = sample collected from Harrison Bayou at Caddo Lake.
d.l. = detection limit.
bdl = below detection limit.

**APPENDIX H**
**(ANALYTICAL RESULTS FOR METALS IN BIOLOGICAL SAMPLES)**

TABLE XVIIIA. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CYPRESS SPRINGS RESERVOIR (WET WEIGHT).

| SAMPLE: | CS1GAR01 | CS1GAR02 | CS1GS01 | CS1GS02 | CS1SF04 | CS2GAR01 | CS2GAR02 | CS2GS01 |
|---|---|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 4040 | 2080 | 1180 | 1300 | 670 | 4120 | 3540 | 1800 |
| % MOISTURE: | 63.7 | 64.6 | 70.2 | 66.8 | 70.4 | 61.3 | 64.7 | 69.8 |
| Al (mg/kg wet wt.): | 1.09 | 2.72 | 52.4 | 127 | 11.9 | 6.24 | 7.52 | 109 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| As (mg/kg wet wt.): | 0.27 | 0.15 | 0.43 | 0.32 | 0.43 | 0.23 | 0.14 | 0.19 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| B (mg/kg wet wt.): | bdl | bdl | bdl | bdl | 1.59 | bdl | 1.72 | 1.51 |
| d.l. (mg/kg): | 0.4 | 0.39 | 0.4 | 0.39 | 0.4 | 0.36 | 0.4 | 0.4 |
| Ba (mg/kg wet wt.): | 7.06 | 7.32 | 7.55 | 9.68 | 6.1 | 8.45 | 6.98 | 7.08 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Be (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |
| Cd (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 |
| Cr (mg/kg wet wt.): | 0.98 | 1.37 | 0.72 | 0.93 | 0.65 | 1.17 | 1.0 | 0.72 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Cu (mg/kg wet wt.): | 0.41 | 0.7 | 0.88 | 0.9 | 0.39 | 0.46 | 1.98 | 0.82 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Fe (mg/kg wet wt.): | 40.3 | 89.3 | 144 | 328 | 57.7 | 34.8 | 54.2 | 209 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Hg (mg/kg wet wt.): | 0.191 | 0.163 | 0.039 | 0.038 | 0.057 | 0.181 | 0.213 | 0.054 |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| Mg (mg/kg wet wt.): | 3590 | 3770 | 365 | 358 | 434 | 4550 | 3300 | 415 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Mn (mg/kg wet wt.): | 30.9 | 28.5 | 51.5 | 84.3 | 8.61 | 38.4 | 19.1 | 40 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Mo (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.4 | 0.39 | 0.4 | 0.39 | 0.4 | 0.39 | 0.39 | 0.39 |
| Ni (mg/kg wet wt.): | bdl | 4.18 | 0.26 | 0.5 | 0.24 | bdl | 1.59 | 0.2 |
| d.l. (mg/kg): | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 |
| Pb (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.49 | 0.49 | 0.5 | 0.49 | 0.5 | 0.49 | 0.49 | 0.49 |
| Se (mg/kg wet wt.): | bdl | bdl | 0.31 | 0.24 | 0.29 | bdl | bdl | 0.27 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.1 |
| Sr (mg/kg wet wt.): | 92.2 | 93.6 | 30.3 | 28.6 | 56.8 | 127 | 88.9 | 37 |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| V (mg/kg wet wt.): | bdl | bdl | 0.18 | 0.48 | 0.19 | bdl | bdl | 0.29 |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| Zn (mg/kg wet wt.): | 20.7 | 22 | 11.5 | 13 | 18.2 | 25.3 | 24.6 | 13.9 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XVIIIA. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CYPRESS SPRINGS RESERVOIR (WET WEIGHT) (continued).

| SAMPLE: | CS2GS02 | CS2SF04 | CS3GAR01 | CS3GAR02 | CS3GS01 | CS3GS02 | CS3SF04 |
|---|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 1680 | 759.2 | 3820 | 4150 | 1250 | 872 | 829.77 |
| % MOISTURE: | 71.3 | 70.1 | 64.4 | 70.6 | 66.8 | 70.7 | 70 |
| Al (mg/kg wet wt.): | 112 | 26.9 | 2.33 | 2.88 | 208 | 210 | 23.4 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| As (mg/kg wet wt.): | 0.41 | 0.23 | 0.2 | 0.13 | 0.18 | 0.63 | 0.16 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| B (mg/kg wet wt.): | bdl | 1.74 | 0.51 | 0.58 | 1.24 | 0.61 | 1.74 |
| d.l. (mg/kg): | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| Ba (mg/kg wet wt.): | 7.55 | 12.1 | 7.12 | 4.36 | 8.78 | 8.78 | 22.5 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Be (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |
| Cd (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 |
| Cr (mg/kg wet wt.): | 0.84 | 0.65 | 1.14 | 0.86 | 0.86 | 0.96 | 0.69 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Cu (mg/kg wet wt.): | 1.0 | 0.54 | 0.52 | 2.72 | 0.96 | 0.97 | 0.38 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Fe (mg/kg wet wt.): | 285 | 48.3 | 41.8 | 49.1 | 340 | 363 | 47.2 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Hg (mg/kg wet wt.): | 0.051 | 0.058 | 0.239 | 0.205 | 0.043 | 0.038 | 0.066 |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| Mg (mg/kg wet wt.): | 389 | 416 | 4390 | 2440 | 403 | 420 | 495 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Mn (mg/kg wet wt.): | 38.8 | 14.9 | 27.1 | 16.4 | 59.4 | 62.1 | 20.6 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Mo (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.4 | 0.4 | 0.39 | 0.4 | 0.4 | 0.4 | 0.4 |
| Ni (mg/kg wet wt.): | 0.48 | bdl | 0.13 | 0.21 | 0.33 | 0.37 | 0.17 |
| d.l. (mg/kg): | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 |
| Pb (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.5 | 0.5 | 0.49 | 0.49 | 0.5 | 0.5 | 0.5 |
| Se (mg/kg wet wt.): | bdl | bdl | 0.2 | bdl | 0.27 | bdl | bdl |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Sr (mg/kg wet wt.): | 32.4 | 59 | 110 | 68.5 | 32.8 | 31.8 | 63 |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| V (mg/kg wet wt.): | 0.33 | 0.12 | bdl | bdl | 0.51 | 0.53 | 0.1 |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| Zn (mg/kg wet wt.): | 12.3 | 19.3 | 23.6 | 18.9 | 14.7 | 15.2 | 22.9 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XVIIIB. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CYPRESS SPRINGS RESERVOIR (DRY WEIGHT).

| SAMPLE: | CS1GAR01 | CS1GAR02 | CS1GS01 | CS1GS02 | CS1SF04 | CS2GAR01 | CS2GAR02 | CS2GS01 |
|---|---|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 4040 | 2080 | 1180 | 1300 | 670 | 4120 | 3540 | 1800 |
| % MOISTURE: | 63.7 | 64.6 | 70.2 | 66.8 | 70.4 | 61.3 | 64.7 | 69.8 |
| Al (mg/kg dry wt.): | 3 | 7.68 | 175.84 | 382.53 | 40.2 | 16.12 | 21.3 | 360.93 |
| d.l. (mg/kg): | 2.75 | 2.82 | 3.36 | 3.01 | 3.38 | 2.58 | 2.83 | 3.31 |
| As (mg/kg dry wt.): | 0.74 | 0.42 | 1.44 | 0.96 | 1.45 | 0.59 | 0.4 | 0.63 |
| d.l. (mg/kg): | 0.28 | 0.28 | 0.34 | 0.3 | 0.34 | 0.26 | 0.28 | 0.33 |
| B (mg/kg dry wt.): | bdl | bdl | bdl | bdl | 5.37 | bdl | 4.87 | 5 |
| d.l. (mg/kg): | 1.09 | 1.12 | 1.34 | 1.19 | 1.35 | 0.93 | 1.13 | 1.32 |
| Ba (mg/kg dry wt.): | 19.45 | 20.68 | 25.34 | 29.16 | 20.61 | 21.83 | 19.77 | 23.44 |
| d.l. (mg/kg): | 0.55 | 0.56 | 0.67 | 0.6 | 0.68 | 0.52 | 0.57 | 0.66 |
| Be (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.06 | 0.06 | 0.07 | 0.06 | 0.07 | 0.05 | 0.06 | 0.07 |
| Cd (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.16 | 0.17 | 0.2 | 0.18 | 0.2 | 0.15 | 0.17 | 0.2 |
| Cr (mg/kg dry wt.): | 2.69 | 3.87 | 2.4 | 2.79 | 2.19 | 3.02 | 2.82 | 2.4 |
| d.l. (mg/kg): | 0.28 | 0.28 | 0.34 | 0.3 | 0.34 | 0.26 | 0.28 | 0.33 |
| Cu (mg/kg dry wt.): | 1.13 | 1.97 | 2.95 | 2.73 | 1.33 | 1.19 | 5.61 | 2.73 |
| d.l. (mg/kg): | 0.28 | 0.28 | 0.34 | 0.3 | 0.34 | 0.26 | 0.28 | 0.33 |
| Fe (mg/kg dry wt.): | 111.02 | 252.26 | 483.22 | 987.95 | 194.93 | 89.92 | 153.54 | 692.05 |
| d.l. (mg/kg): | 2.75 | 2.82 | 3.36 | 3.01 | 3.38 | 2.58 | 2.83 | 3.31 |
| Hg (mg/kg dry wt.): | 0.526 | 0.46 | 0.131 | 0.114 | 0.193 | 0.468 | 0.603 | 0.179 |
| d.l. (mg/kg): | 0.028 | 0.028 | 0.034 | 0.03 | 0.034 | 0.026 | 0.028 | 0.033 |
| Mg (mg/kg dry wt.): | 9889.81 | 10649.72 | 1224.83 | 1078.31 | 1466.22 | 11757.11 | 9348.44 | 1374.17 |
| d.l. (mg/kg): | 2.75 | 2.82 | 3.36 | 3.01 | 3.38 | 2.58 | 2.83 | 3.31 |
| Mn (mg/kg dry wt.): | 85.12 | 80.51 | 172.82 | 253.92 | 29.09 | 99.22 | 54.11 | 132.45 |
| d.l. (mg/kg): | 0.28 | 0.28 | 0.34 | 0.3 | 0.34 | 0.26 | 0.28 | 0.33 |
| Mo (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 1.09 | 1.12 | 1.34 | 1.19 | 1.34 | 1.02 | 1.11 | 1.3 |
| Ni (mg/kg dry wt.): | bdl | 11.81 | 0.87 | 1.5 | 0.82 | bdl | 4.5 | 0.67 |
| d.l. (mg/kg): | 0.33 | 0.34 | 0.4 | 0.36 | 0.41 | 0.31 | 0.34 | 0.4 |
| Pb (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 1.36 | 1.4 | 1.67 | 1.48 | 1.68 | 1.28 | 1.39 | 1.63 |
| Se (mg/kg dry wt.): | bdl | bdl | 1.03 | 0.71 | 0.96 | bdl | bdl | 0.91 |
| d.l. (mg/kg): | 0.55 | 0.56 | 0.34 | 0.3 | 0.34 | 0.51 | 0.56 | 0.33 |
| Sr (mg/kg dry wt.): | 253.99 | 264.41 | 101.68 | 86.14 | 191.89 | 328.17 | 251.84 | 122.52 |
| d.l. (mg/kg): | 0.14 | 0.14 | 0.17 | 0.15 | 0.17 | 0.13 | 0.14 | 0.17 |
| V (mg/kg dry wt.): | bdl | bdl | 0.6 | 1.44 | 0.65 | bdl | bdl | 0.94 |
| d.l. (mg/kg): | 0.13 | 0.14 | 0.17 | 0.15 | 0.17 | 0.13 | 0.14 | 0.17 |
| Zn (mg/kg dry wt.): | 57.02 | 62.15 | 38.59 | 39.16 | 61.49 | 65.37 | 69.69 | 46.03 |
| d.l. (mg/kg): | 0.55 | 0.56 | 0.67 | 0.6 | 0.68 | 0.52 | 0.57 | 0.66 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XVIIIB. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CYPRESS SPRINGS RESERVOIR (DRY WEIGHT) (continued).

| SAMPLE: | CS2GS02 | CS2SF04 | CS3GAR01 | CS3GAR02 | CS3GS01 | CS3GS02 | CS3SF04 |
|---|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 1680 | 759.2 | 3820 | 4150 | 1250 | 872 | 829.77 |
| % MOISTURE: | 71.3 | 70.1 | 64.4 | 70.6 | 66.8 | 70.7 | 70 |
| Al (mg/kg dry wt.): | 390.24 | 89.97 | 6.54 | 9.8 | 626.51 | 716.72 | 78 |
| d.l. (mg/kg): | 3.48 | 3.34 | 2.81 | 3.4 | 3.01 | 3.41 | 3.33 |
| As (mg/kg dry wt.): | 1.43 | 0.77 | 0.56 | 0.44 | 0.54 | 2.15 | 0.53 |
| d.l. (mg/kg): | 0.35 | 0.33 | 0.28 | 0.34 | 0.3 | 0.34 | 0.33 |
| B (mg/kg dry wt.): | bdl | 5.82 | 1.44 | 1.98 | 3.73 | 2.08 | 5.8 |
| d.l. (mg/kg): | 1.38 | 1.34 | 1.12 | 1.36 | 1.2 | 1.37 | 1.33 |
| Ba (mg/kg dry wt.): | 26.31 | 40.47 | 20 | 14.83 | 26.45 | 29.97 | 75 |
| d.l. (mg/kg): | 0.7 | 0.67 | 0.56 | 0.68 | 0.6 | 0.68 | 0.67 |
| Be (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.07 | 0.07 | 0.06 | 0.07 | 0.06 | 0.07 | 0.07 |
| Cd (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.21 | 0.2 | 0.17 | 0.2 | 0.18 | 0.2 | 0.2 |
| Cr (mg/kg dry wt.): | 2.94 | 2.16 | 3.2 | 2.94 | 2.58 | 3.27 | 2.29 |
| d.l. (mg/kg): | 0.35 | 0.33 | 0.28 | 0.34 | 0.3 | 0.34 | 0.33 |
| Cu (mg/kg dry wt.): | 3.48 | 1.82 | 1.45 | 9.25 | 2.89 | 3.32 | 1.27 |
| d.l. (mg/kg): | 0.35 | 0.33 | 0.28 | 0.34 | 0.3 | 0.34 | 0.33 |
| Fe (mg/kg dry wt.): | 993.03 | 161.54 | 117.42 | 167.01 | 1024.1 | 1238.91 | 157.33 |
| d.l. (mg/kg): | 3.48 | 3.34 | 2.81 | 3.4 | 3.01 | 3.41 | 3.33 |
| Hg (mg/kg dry wt.): | 0.178 | 0.194 | 0.671 | 0.697 | 0.13 | 0.13 | 0.22 |
| d.l. (mg/kg): | 0.035 | 0.033 | 0.028 | 0.034 | 0.03 | 0.034 | 0.033 |
| Mg (mg/kg dry wt.): | 1355.4 | 1391.3 | 12331.46 | 8299.32 | 1213.86 | 1433.45 | 1650 |
| d.l. (mg/kg): | 3.48 | 3.34 | 2.81 | 3.4 | 3.01 | 3.41 | 3.33 |
| Mn (mg/kg dry wt.): | 135.19 | 49.83 | 76.12 | 55.78 | 178.92 | 211.95 | 68.67 |
| d.l. (mg/kg): | 0.35 | 0.33 | 0.38 | 0.34 | 0.3 | 0.34 | 0.33 |
| Mo (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 1.38 | 1.33 | 1.11 | 1.35 | 1.2 | 1.36 | 1.33 |
| Ni (mg/kg dry wt.): | 1.66 | bdl | 0.35 | 0.73 | 1.01 | 1.26 | 0.56 |
| d.l. (mg/kg): | 0.42 | 0.4 | 0.34 | 0.41 | 0.36 | 0.41 | 0.4 |
| Pb (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 1.73 | 1.66 | 1.39 | 1.68 | 1.5 | 1.7 | 1.66 |
| Se (mg/kg dry wt.): | bdl | bdl | 0.57 | bdl | 0.8 | bdl | bdl |
| d.l. (mg/kg): | 0.69 | 0.67 | 0.28 | 0.67 | 0.3 | 0.34 | 0.67 |
| Sr (mg/kg dry wt.): | 112.89 | 197.32 | 308.99 | 232.99 | 98.8 | 108.53 | 210 |
| d.l. (mg/kg): | 0.17 | 0.17 | 0.14 | 0.17 | 0.15 | 0.17 | 0.17 |
| V (mg/kg dry wt.): | 1.14 | 0.41 | bdl | bdl | 1.55 | 1.8 | 0.33 |
| d.l. (mg/kg): | 0.17 | 0.17 | 0.14 | 0.17 | 0.15 | 0.17 | 0.17 |
| Zn (mg/kg dry wt.): | 42.86 | 64.55 | 66.29 | 64.29 | 44.28 | 51.88 | 76.33 |
| d.l. (mg/kg): | 0.7 | 0.67 | 0.56 | 0.68 | 0.6 | 0.68 | 0.67 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XIXA. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM LAKE O' THE PINES (WET WEIGHT).

| SAMPLE: | LP1GAR01 | LP1GAR02 | LP1GS01 | LP1GS02 | LP1SF04 | LP2GAR01 | LP2GAR02 | LP2GS01 |
|---|---|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 1380 | 2240 | 1430 | 1240 | 423.89 | 3150 | 2400 | 1790 |
| % MOISTURE: | 64.8 | 66.5 | 67 | 68.6 | 70.2 | 64.8 | 63.4 | 67.2 |
| Al (mg/kg wet wt.): | 4.31 | 2.72 | 240 | 362 | 12.3 | 4.09 | 5.04 | 121 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| As (mg/kg wet wt.): | bdl | 0.11 | 0.6 | 0.4 | 0.12 | 0.07 | bdl | 0.23 |
| d.l. (mg/kg): | 0.05 | 0.1 | 0.1 | 0.1 | 0.1 | 0.05 | 0.05 | 0.1 |
| B (mg/kg wet wt.): | 0.73 | 0.88 | 1.41 | 0.7 | 0.94 | 0.81 | 0.41 | bdl |
| d.l. (mg/kg): | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| Ba (mg/kg wet wt.): | 8.56 | 7.17 | 8.17 | 9.83 | 5.56 | 5.29 | 6.65 | 9.92 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Be (mg/kg wet wt.): | bdl | bdl | 0.02 | 0.03 | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |
| Cd (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 |
| Cr (mg/kg wet wt.): | 1.36 | 1.23 | 0.83 | 0.96 | 0.63 | 1.02 | 1.1 | 0.69 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Cu (mg/kg wet wt.): | 0.98 | 0.72 | 1.02 | 1.06 | 0.38 | 0.78 | 0.39 | 0.95 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Fe (mg/kg wet wt.): | 80.8 | 62.8 | 449 | 622 | 30.7 | 38.8 | 44.1 | 351 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Hg (mg/kg wet wt.): | 0.17 | 0.263 | 0.024 | 0.034 | 0.077 | 0.196 | 0.197 | 0.035 |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| Mg (mg/kg wet wt.): | 4420 | 3700 | 357 | 378 | 452 | 3440 | 3860 | 360 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Mn (mg/kg wet wt.): | 36.5 | 32.7 | 83.6 | 88.7 | 10.6 | 19.5 | 33.8 | 53.2 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Mo (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.39 | 0.4 | 0.4 |
| Ni (mg/kg wet wt.): | 2.57 | 0.16 | 0.36 | 0.5 | bdl | 0.22 | 0.15 | 0.36 |
| d.l. (mg/kg): | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 |
| Pb (mg/kg wet wt.): | bdl | bdl | 0.61 | 1.12 | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.49 | 0.5 | 0.5 |
| Se (mg/kg wet wt.): | bdl | bdl | bdl | bdl | 0.24 | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 |
| Sr (mg/kg wet wt.): | 94.1 | 81.9 | 20.9 | 27.6 | 55.4 | 88.1 | 100 | 33.6 |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| V (mg/kg wet wt.): | bdl | bdl | 0.66 | 0.97 | 0.17 | bdl | bdl | 0.33 |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| Zn (mg/kg wet wt.): | 24.9 | 24.8 | 14.7 | 20.5 | 23.1 | 22.1 | 23.5 | 15 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XIXA. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM LAKE O' THE PINES (WET WEIGHT) (continued).

| SAMPLE: | LP2GS02 | LP2SF04 | LP3GAR01 | LP3GAR02 | LP3GS01 | LP3GS02 | LP3SF04 |
|---|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 1910 | 645.17 | 729 | 3450 | 1700 | 1520 | 485.4 |
| % MOISTURE: | 67.2 | 70.1 | 65.2 | 65.7 | 69.9 | 67.9 | 73.1 |
| Al (mg/kg wet wt.): | 99 | 6.92 | 2.0 | 1.44 | 198 | 3.12 | 3.72 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| As (mg/kg wet wt.): | 0.19 | 0.05 | 0.05 | 0.11 | 0.22 | 0.21 | 0.1 |
| d.l. (mg/kg): | 0.1 | 0.05 | 0.05 | 0.1 | 0.1 | 0.1 | 0.1 |
| B (mg/kg wet wt.): | 0.4 | 0.5 | 0.57 | 0.58 | 0.43 | 0.5 | bdl |
| d.l. (mg/kg): | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.39 |
| Ba (mg/kg wet wt.): | 8.23 | 7.52 | 10.8 | 10 | 9.84 | 8.97 | 8.45 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Be (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |
| Cd (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 |
| Cr (mg/kg wet wt.): | 1.03 | 0.63 | 1.24 | 1.03 | 0.81 | 0.91 | 0.63 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Cu (mg/kg wet wt.): | 2.53 | 0.62 | 0.4 | 0.69 | 0.91 | 1.13 | 0.49 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Fe (mg/kg wet wt.): | 268 | 55.7 | 42.8 | 54.7 | 494 | 523 | 27.7 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Hg (mg/kg wet wt.): | 0.029 | 0.026 | 0.203 | 0.227 | 0.025 | 0.031 | 0.045 |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| Mg (mg/kg wet wt.): | 348 | 435 | 3760 | 3440 | 341 | 345 | 464 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Mn (mg/kg wet wt.): | 48.7 | 9.81 | 27 | 36.7 | 65.5 | 59.8 | 8.53 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Mo (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.39 | 0.4 | 0.4 | 0.39 | 0.4 | 0.4 | 0.39 |
| Ni (mg/kg wet wt.): | 0.55 | bdl | 0.17 | 0.13 | 0.27 | 0.19 | 0.18 |
| d.l. (mg/kg): | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 |
| Pb (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.49 | 0.5 | 0.5 | 0.49 | 0.5 | 0.5 | 0.49 |
| Se (mg/kg wet wt.): | bdl | 0.26 | bdl | bdl | 0.2 | 0.21 | bdl |
| d.l. (mg/kg): | 0.2 | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 | 0.2 |
| Sr (mg/kg wet wt.): | 31 | 76.8 | 123 | 112 | 32.4 | 32.7 | 83.7 |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| V (mg/kg wet wt.): | 0.24 | 0.15 | bdl | bdl | 0.66 | 0.55 | 0.09 |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| Zn (mg/kg wet wt.): | 13.9 | 20.2 | 22.1 | 23.2 | 12.4 | 12.9 | 21.1 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XIXB. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM LAKE O' THE PINES (DRY WEIGHT).

| SAMPLE: | LP1GAR01 | LP1GAR02 | LP1GS01 | LP1GS02 | LP1SF04 | LP2GAR01 | LP2GAR02 | LP2GS01 |
|---|---|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 1380 | 2240 | 1430 | 1240 | 423.89 | 3150 | 2400 | 1790 |
| % MOISTURE: | 64.8 | 66.5 | 67 | 68.6 | 70.2 | 64.8 | 63.4 | 67.2 |
| Al (mg/kg dry wt.): | 12.24 | 8.12 | 727.27 | 1152.87 | 41.28 | 11.62 | 13.77 | 368.9 |
| d.l. (mg/kg): | 2.84 | 2.99 | 3.03 | 3.18 | 3.36 | 2.84 | 2.73 | 3.05 |
| As (mg/kg dry wt.): | bdl | 0.33 | 1.82 | 1.27 | 0.4 | 0.2 | bdl | 0.7 |
| d.l. (mg/kg): | 0.14 | 0.3 | 0.3 | 0.32 | 0.34 | 0.14 | 0.14 | 0.3 |
| B (mg/kg dry wt.): | 2.08 | 2.63 | 4.27 | 2.24 | 3.17 | 2.29 | 1.13 | bdl |
| d.l. (mg/kg): | 1.14 | 1.19 | 1.21 | 1.27 | 1.34 | 1.14 | 1.09 | 1.21 |
| Ba (mg/kg dry wt.): | 24.32 | 21.4 | 24.76 | 31.31 | 18.66 | 15.03 | 18.17 | 30.24 |
| d.l. (mg/kg): | 0.57 | 0.6 | 0.61 | 0.64 | 0.67 | 0.57 | 0.55 | 0.61 |
| Be (mg/kg dry wt.): | bdl | bdl | 0.07 | 0.09 | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.06 | 0.06 | 0.07 | 0.09 | 0.07 | 0.06 | 0.05 | 0.06 |
| Cd (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.17 | 0.18 | 0.18 | 0.19 | 0.2 | 0.17 | 0.16 | 0.18 |
| Cr (mg/kg dry wt.): | 3.86 | 3.67 | 2.53 | 3.05 | 2.12 | 2.9 | 3.01 | 2.09 |
| d.l. (mg/kg): | 0.28 | 0.3 | 0.3 | 0.32 | 0.34 | 0.28 | 0.27 | 0.3 |
| Cu (mg/kg dry wt.): | 2.78 | 2.16 | 3.09 | 3.38 | 1.26 | 2.22 | 1.08 | 2.88 |
| d.l. (mg/kg): | 0.28 | 0.3 | 0.3 | 0.32 | 0.34 | 0.28 | 0.27 | 0.3 |
| Fe (mg/kg dry wt.): | 229.55 | 187.46 | 1360.61 | 1980.89 | 103.02 | 110.23 | 120.49 | 1070.12 |
| d.l. (mg/kg): | 2.84 | 2.99 | 3.03 | 3.18 | 3.36 | 2.84 | 2.73 | 3.05 |
| Hg (mg/kg dry wt.): | 0.483 | 0.785 | 0.073 | 0.108 | 0.258 | 0.557 | 0.538 | 0.107 |
| d.l. (mg/kg): | 0.028 | 0.03 | 0.03 | 0.032 | 0.034 | 0.028 | 0.027 | 0.03 |
| Mg (mg/kg dry wt.): | 12556.82 | 11044.78 | 1081.82 | 1203.82 | 1516.78 | 9772.73 | 10546.45 | 1097.56 |
| d.l. (mg/kg): | 2.84 | 2.99 | 3.03 | 3.18 | 3.36 | 2.84 | 2.73 | 3.05 |
| Mn (mg/kg dry wt.): | 103.69 | 97.61 | 253.33 | 282.48 | 35.57 | 55.4 | 92.35 | 162.2 |
| d.l. (mg/kg): | 0.28 | 0.3 | 0.3 | 0.32 | 0.34 | 0.28 | 0.27 | 0.3 |
| Mo (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 1.13 | 1.19 | 1.21 | 1.27 | 1.33 | 1.12 | 1.09 | 1.21 |
| Ni (mg/kg dry wt.): | 7.3 | 0.47 | 1.1 | 1.59 | bdl | 0.63 | 0.4 | 1.1 |
| d.l. (mg/kg): | 0.34 | 0.36 | 0.36 | 0.38 | 0.4 | 0.34 | 0.33 | 0.36 |
| Pb (mg/kg dry wt.): | bdl | bdl | 1.86 | 3.57 | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 1.41 | 1.48 | 1.52 | 1.59 | 1.66 | 1.4 | 1.36 | 1.51 |
| Se (mg/kg dry wt.): | bdl | bdl | bdl | bdl | 0.81 | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.56 | 0.59 | 0.61 | 0.63 | 0.34 | 0.56 | 0.54 | 0.6 |
| Sr (mg/kg dry wt.): | 267.33 | 244.48 | 63.33 | 87.9 | 185.91 | 250.28 | 273.22 | 102.44 |
| d.l. (mg/kg): | 0.14 | 0.15 | 0.15 | 0.16 | 0.17 | 0.14 | 0.14 | 0.15 |
| V (mg/kg dry wt.): | bdl | bdl | 2 | 3.09 | 0.58 | bdl | bdl | 1 |
| d.l. (mg/kg): | 0.14 | 0.15 | 0.15 | 0.16 | 0.17 | 0.14 | 0.14 | 0.15 |
| Zn (mg/kg dry wt.): | 70.74 | 74.03 | 44.55 | 65.29 | 77.52 | 62.78 | 64.21 | 45.73 |
| d.l. (mg/kg): | 0.57 | 0.6 | 0.61 | 0.64 | 0.67 | 0.57 | 0.55 | 0.61 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XIXB. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM LAKE O' THE PINES (DRY WEIGHT) (continued).

| SAMPLE: | LP2GS02 | LP2SF04 | LP3GAR01 | LP3GAR02 | LP3GS01 | LP3GS02 | LP3SF04 |
|---|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 1910 | 645.17 | 729 | 3450 | 1700 | 1520 | 485.4 |
| % MOISTURE: | 67.2 | 70.1 | 65.2 | 65.7 | 69.9 | 67.9 | 73.1 |
| Al (mg/kg dry wt.): | 301.83 | 23.14 | 5.75 | 4.2 | 657.81 | 451.71 | 41.26 |
| d.l. (mg/kg): | 3.05 | 3.34 | 2.87 | 2.92 | 3.32 | 3.12 | 3.72 |
| As (mg/kg dry wt.): | 0.58 | 0.17 | 0.14 | 0.32 | 0.73 | 0.65 | 0.37 |
| d.l. (mg/kg): | 0.3 | 0.17 | 0.14 | 0.29 | 0.33 | 0.31 | 0.37 |
| B (mg/kg dry wt.): | 1.23 | 1.68 | 1.63 | 1.69 | 1.44 | 1.55 | bdl |
| d.l. (mg/kg): | 1.22 | 1.34 | 1.15 | 1.17 | 1.33 | 1.25 | 1.47 |
| Ba (mg/kg dry wt.): | 25.09 | 25.15 | 31.03 | 29.15 | 32.69 | 27.94 | 31.41 |
| d.l. (mg/kg): | 0.61 | 0.67 | 0.57 | 0.58 | 0.66 | 0.62 | 0.74 |
| Be (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.06 | 0.07 | 0.06 | 0.06 | 0.07 | 0.06 | 0.07 |
| Cd (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.18 | 0.2 | 0.17 | 0.17 | 0.2 | 0.19 | 0.22 |
| Cr (mg/kg dry wt.): | 3.14 | 2.09 | 3.56 | 3 | 2.7 | 2.83 | 2.32 |
| d.l. (mg/kg): | 0.3 | 0.33 | 0.29 | 0.29 | 0.33 | 0.31 | 0.37 |
| Cu (mg/kg dry wt.): | 7.71 | 2.09 | 1.16 | 2 | 3.04 | 3.52 | 1.82 |
| d.l. (mg/kg): | 0.3 | 0.33 | 0.29 | 0.29 | 0.33 | 0.31 | 0.37 |
| Fe (mg/kg dry wt.): | 817.07 | 186.29 | 122.99 | 159.48 | 1641.2 | 1629.28 | 102.97 |
| d.l. (mg/kg): | 3.05 | 3.34 | 2.87 | 2.92 | 3.32 | 3.12 | 3.72 |
| Hg (mg/kg dry wt.): | 0.088 | 0.087 | 0.583 | 0.662 | 0.083 | 0.097 | 0.167 |
| d.l. (mg/kg): | 0.03 | 0.033 | 0.029 | 0.029 | 0.033 | 0.031 | 0.037 |
| Mg (mg/kg dry wt.): | 1060.98 | 1454.85 | 10804.6 | 10029.15 | 1132.89 | 1074.77 | 1724.91 |
| d.l. (mg/kg): | 3.05 | 3.34 | 2.87 | 2.92 | 3.32 | 3.12 | 3.72 |
| Mn (mg/kg dry wt.): | 148.48 | 32.81 | 77.59 | 107 | 217.61 | 186.29 | 31.71 |
| d.l. (mg/kg): | 0.3 | 0.33 | 0.29 | 0.29 | 0.33 | 0.31 | 0.37 |
| Mo (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 1.2 | 1.33 | 1.14 | 1.15 | 1.32 | 1.25 | 1.47 |
| Ni (mg/kg dry wt.): | 1.69 | bdl | 0.5 | 0.37 | 0.88 | 0.6 | 0.65 |
| d.l. (mg/kg): | 0.37 | 0.4 | 0.34 | 0.35 | 0.4 | 0.37 | 0.45 |
| Pb (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 1.51 | 1.66 | 1.42 | 1.44 | 1.65 | 1.56 | 1.84 |
| Se (mg/kg dry wt.): | bdl | 0.86 | bdl | bdl | 0.66 | 0.66 | bdl |
| d.l. (mg/kg): | 0.6 | 0.33 | 0.57 | 0.58 | 0.33 | 0.31 | 0.73 |
| Sr (mg/kg dry wt.): | 94.51 | 256.86 | 353.45 | 326.53 | 107.64 | 101.87 | 311.15 |
| d.l. (mg/kg): | 0.15 | 0.17 | 0.14 | 0.15 | 0.17 | 0.16 | 0.19 |
| V (mg/kg dry wt.): | 0.72 | 0.5 | bdl | bdl | 2.21 | 1.7 | 0.34 |
| d.l. (mg/kg): | 0.15 | 0.17 | 0.14 | 0.14 | 0.17 | 0.16 | 0.19 |
| Zn (mg/kg dry wt.): | 42.38 | 67.56 | 63.51 | 67.64 | 41.2 | 40.19 | 78.44 |
| d.l. (mg/kg): | 0.61 | 0.67 | 0.57 | 0.58 | 0.66 | 0.62 | 0.74 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXA. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE AT HARRISON BAYOU (WET WEIGHT).

| SAMPLE: | S2B1 | S2B2 | S2BG1 | S2BG2 | S2G1 | S2G2 | S2R1 | S2R2 |
|---|---|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 126.62 | 290.0 | 50.33 | 60.44 | 147.04 | 116.29 | 249.0 | 251.0 |
| % MOISTURE: | 72.1 | 70.9 | 72.2 | 72.2 | 65.6 | 69.3 | 73.48 | 72.56 |
| Al (mg/kg wet wt.): | bdl | bdl | 22.1 | 11.3 | 1.05 | bdl | 16.699644 | 22.780688 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.3366876 | 1.374744 |
| As (mg/kg wet wt.): | 0.26 | 0.3 | 0.38 | 0.64 | 0.44 | 0.13 | bdl | bdl |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1328652 | 0.1374744 |
| B (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | 0.2898636 | bdl |
| d.l. (mg/kg): | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.1336608 | 0.1374744 |
| Ba (mg/kg wet wt.): | 6.76 | 5.39 | 9.22 | 8.97 | 8.7 | 15.9 | 8.0223 | 6.080704 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1336608 | 0.1374744 |
| Be (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.0267322 | 0.0274949 |
| Cd (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.0267322 | 0.0274949 |
| Cr (mg/kg wet wt.): | 0.56 | 0.64 | 0.54 | 0.58 | 1.27 | 1.36 | 2.418624 | 1.8033568 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1336608 | 0.1374744 |
| Cu (mg/kg wet wt.): | 0.55 | 0.6 | 0.54 | 0.84 | 0.88 | 0.54 | 2.872116 | 2.1266 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1336608 | 0.1374744 |
| Fe (mg/kg wet wt.): | 15.7 | 13.0 | 65.3 | 32.8 | 47.5 | 32.4 | 38.66616 | 46.42848 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 2.6733751 | 2.749488 |
| Hg (mg/kg wet wt.): | 0.374 | 0.18 | 0.079 | 0.085 | 0.366 | 0.354 | 0.0959759 | 0.1044366 |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.026573 | 0.0274949 |
| Mg (mg/kg wet wt.): | 467.0 | 509.0 | 465.0 | 496.0 | 2490.0 | 2670.0 | 556.3896 | 452.76 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 2.6733751 | 2.749488 |
| Mn (mg/kg wet wt.): | 3.61 | 7.09 | 24.6 | 24.0 | 31.1 | 22.7 | 13.267956 | 15.81916 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1069286 | 0.1099795 |
| Mo (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.1336608 | 0.1374744 |
| Ni (mg/kg wet wt.): | 0.3 | bdl | bdl | bdl | 1.85 | 0.88 | 0.505206 | 0.2641649 |
| d.l. (mg/kg): | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.1336608 | 0.1374744 |
| Pb (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | 0.4418232 | 0.5249272 |
| d.l. (mg/kg): | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.1336608 | 0.1374744 |
| Se (mg/kg wet wt.): | 0.26 | 0.45 | 0.32 | 0.25 | 0.29 | 0.55 | 0.493272 | 0.510384 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1328652 | 0.1374744 |
| Sr (mg/kg wet wt.): | 86.8 | 94.5 | 91.8 | 97.0 | 119.0 | 181.0 | 72.16092 | 51.53232 |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.0534643 | 0.0549898 |
| V (mg/kg wet wt.): | bdl | bdl | 0.05 | 0.06 | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.1336608 | 0.1374744 |
| Zn (mg/kg wet wt.): | 16.3 | 21.1 | 25.5 | 32.1 | 20.3 | 22.4 | 30.33888 | 27.300056 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2673481 | 0.2749488 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXA. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE AT HARRISON BAYOU (WET WEIGHT) (continued).

| SAMPLE: | S2R3 | S2S1 | S2S2 | S2S3 | S2S4 |
|---|---|---|---|---|---|
| SAMPLE WT. (g): | 107.0 | 143.73 | 140.69 | 74.0 | 94.0 |
| % MOISTURE: | 73.42 | 72.3 | 69.9 | 79.67 | 77.16 |
| Al (mg/kg wet wt.): | 16.152666 | 42.1 | 150.0 | 13.118949 | 48.10104 |
| d.l. (mg/kg): | 1.3343426 | 1.0 | 1.0 | 1.0165 | 1.146598 |
| As (mg/kg wet wt.): | bdl | 0.15 | 0.11 | 0.115881 | bdl |
| d.l. (mg/kg): | 0.1321026 | 0.1 | 0.1 | 0.1026868 | 0.11605 |
| B (mg/kg wet wt.): | bdl | bdl | bdl | bdl | 0.1532107 |
| d.l. (mg/kg): | 0.1334316 | 0.4 | 0.4 | 0.10165 | 0.1146568 |
| Ba (mg/kg wet wt.): | 5.826336 | 6.07 | 8.56 | 5.16382 | 11.200736 |
| d.l. (mg/kg): | 0.1334316 | 0.2 | 0.2 | 0.10165 | 0.1146568 |
| Be (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.0266863 | 0.2 | 0.2 | 0.02033 | 0.0229314 |
| Cd (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.0266863 | 0.06 | 0.06 | 0.02033 | 0.0229314 |
| Cr (mg/kg wet wt.): | 1.2806244 | 0.46 | 0.64 | 0.9416856 | 0.551586 |
| d.l. (mg/kg): | 0.1334316 | 0.1 | 0.1 | 0.10165 | 0.1146568 |
| Cu (mg/kg wet wt.): | 2.1109836 | 43.6 | 0.76 | 3.712258 | 2.0587976 |
| d.l. (mg/kg): | 0.1334316 | 0.1 | 0.1 | 0.10165 | 0.1146568 |
| Fe (mg/kg wet wt.): | 29.47722 | 175.0 | 294.0 | 23.25752 | 695.478 |
| d.l. (mg/kg): | 2.6686852 | 1.0 | 1.0 | 2.033 | 2.2931817 |
| Hg (mg/kg wet wt.): | 0.0935616 | 0.034 | 0.027 | 0.0376308 | 0.0232054 |
| d.l. (mg/kg): | 0.0264205 | 0.01 | 0.01 | 0.0205333 | 0.0232054 |
| Mg (mg/kg wet wt.): | 469.9344 | 292.0 | 340.0 | 380.3743 | 316.334 |
| d.l. (mg/kg): | 2.6686852 | 1.0 | 1.0 | 2.033 | 2.2931817 |
| Mn (mg/kg wet wt.): | 11.94771 | 35.8 | 32.5 | 10.622425 | 282.5308 |
| d.l. (mg/kg): | 0.1067453 | 0.1 | 0.1 | 0.08132 | 0.0917254 |
| Mo (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.1334316 | 0.4 | 0.4 | 0.10165 | 0.1146568 |
| Ni (mg/kg wet wt.): | 0.3370344 | 1.63 | 1.35 | 0.201389 | 0.1172834 |
| d.l. (mg/kg): | 0.1334316 | 0.12 | 0.12 | 0.10165 | 0.1146568 |
| Pb (mg/kg wet wt.): | 0.6536022 | 2.59 | bdl | 0.4795847 | 0.6872556 |
| d.l. (mg/kg): | 0.1334316 | 0.5 | 0.5 | 0.10165 | 0.1146568 |
| Se (mg/kg wet wt.): | 0.459834 | bdl | 0.29 | 0.24396 | 0.287784 |
| d.l. (mg/kg): | 0.1321026 | 0.2 | 0.1 | 0.1026868 | 0.11605 |
| Sr (mg/kg wet wt.): | 58.476 | 25.2 | 38.8 | 52.55305 | 26.7228 |
| d.l. (mg/kg): | 0.0533726 | 0.05 | 0.05 | 0.04066 | 0.0458627 |
| V (mg/kg wet wt.): | bdl | 0.13 | 0.32 | bdl | 0.1522971 |
| d.l. (mg/kg): | 0.1334316 | 0.05 | 0.05 | 0.10165 | 0.1146568 |
| Zn (mg/kg wet wt.): | 31.33782 | 12.3 | 13.2 | 25.47349 | 19.886788 |
| d.l. (mg/kg): | 0.2668632 | 0.2 | 0.2 | 0.2033 | 0.2293136 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXB. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE AT HARRISON BAYOU (DRY WEIGHT).

| SAMPLE: | S2B1 | S2B2 | S2BG1 | S2BG2 | S2G1 | S2G2 | S2R1 | S2R2 |
|---|---|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 126.62 | 290.0 | 50.33 | 60.44 | 147.04 | 116.29 | 249.0 | 251.0 |
| % MOISTURE: | 72.1 | 70.9 | 72.2 | 72.2 | 65.6 | 69.3 | 73.48 | 72.56 |
| Al (mg/kg dry wt.): | bdl | bdl | 79.5 | 40.65 | 3.05 | bdl | 62.97 | 83.02 |
| d.l. (mg/kg): | 3.58 | 3.44 | 3.60 | 3.60 | 2.91 | 3.26 | 5.04 | 5.01 |
| As (mg/kg dry wt.): | 0.93 | 1.03 | 1.37 | 2.3 | 1.28 | 0.42 | bdl | bdl |
| d.l. (mg/kg): | 0.36 | 0.34 | 0.36 | 0.36 | 0.29 | 0.33 | 0.501 | 0.501 |
| B (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | 1.093 | bdl |
| d.l. (mg/kg): | 1.43 | 1.37 | 1.44 | 1.44 | 1.16 | 1.30 | 0.504 | 0.501 |
| Ba (mg/kg dry wt.): | 24.23 | 18.52 | 33.17 | 32.27 | 25.29 | 51.79 | 30.25 | 22.16 |
| d.l. (mg/kg): | 0.72 | 0.69 | 0.72 | 0.72 | 0.58 | 0.65 | 0.504 | 0.501 |
| Be (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.07 | 0.07 | 0.07 | 0.72 | 0.06 | 0.07 | 1.01 | 0.1002 |
| Cd (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.22 | 0.21 | 0.22 | 0.22 | 0.17 | 0.20 | 0.101 | 0.1002 |
| Cr (mg/kg dry wt.): | 2.01 | 2.20 | 1.96 | 2.08 | 3.69 | 4.43 | 9.12 | 6.572 |
| d.l. (mg/kg): | 0.36 | 0.34 | 0.36 | 0.36 | 0.29 | 0.33 | 0.504 | 0.501 |
| Cu (mg/kg dry wt.): | 1.98 | 2.05 | 1.95 | 3.03 | 2.56 | 1.76 | 10.83 | 7.75 |
| d.l. (mg/kg): | 0.36 | 0.34 | 0.36 | 0.36 | 0.29 | 0.33 | 0.504 | 0.501 |
| Fe (mg/kg dry wt.): | 56.27 | 44.67 | 234.89 | 117.99 | 138.08 | 105.54 | 145.80 | 169.2 |
| d.l. (mg/kg): | 3.58 | 3.44 | 3.60 | 3.60 | 2.91 | 3.26 | 10.081 | 10.02 |
| Hg (mg/kg dry wt.): | 1.341 | 0.619 | 0.284 | 0.306 | 1.064 | 1.153 | 0.3619 | 0.3806 |
| d.l. (mg/kg): | 0.036 | 0.034 | 0.036 | 0.036 | 0.029 | 0.033 | 0.1002 | 0.1002 |
| Mg (mg/kg dry wt.): | 1673.84 | 1749.14 | 1672.66 | 1784.17 | 7238.37 | 8697.07 | 2098 | 1650 |
| d.l. (mg/kg): | 3.58 | 3.44 | 3.60 | 3.60 | 2.91 | 3.26 | 10.081 | 10.02 |
| Mn (mg/kg dry wt.): | 12.94 | 24.36 | 88.49 | 86.33 | 90.41 | 73.94 | 50.03 | 57.65 |
| d.l. (mg/kg): | 0.36 | 0.34 | 0.36 | 0.36 | 0.29 | 0.33 | 0.403 | 0.401 |
| Mo (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 1.43 | 1.37 | 1.44 | 1.44 | 1.16 | 1.3 | 0.504 | 0.501 |
| Ni (mg/kg dry wt.): | 1.08 | bdl | bdl | bdl | 5.38 | 2.87 | 1.905 | 0.9627 |
| d.l. (mg/kg): | 0.43 | 0.41 | 0.43 | 0.43 | 0.35 | 0.39 | 0.504 | 0.501 |
| Pb (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | 1.666 | 1.913 |
| d.l. (mg/kg): | 1.79 | 1.72 | 1.8 | 1.8 | 1.45 | 1.63 | 0.504 | 0.501 |
| Se (mg/kg dry wt.): | 0.94 | 1.54 | 1.14 | 0.92 | 0.83 | 1.78 | 1.86 | 1.86 |
| d.l. (mg/kg): | 0.36 | 0.34 | 0.36 | 0.36 | 0.29 | 0.33 | 0.501 | 0.501 |
| Sr (mg/kg dry wt.): | 311.11 | 324.74 | 330.22 | 348.92 | 345.93 | 589.58 | 272.10 | 187.80 |
| d.l. (mg/kg): | 0.18 | 0.17 | 0.18 | 0.18 | 0.15 | 0.16 | 0.2016 | 0.2004 |
| V (mg/kg dry wt.): | bdl | bdl | 0.18 | 0.23 | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.18 | 0.17 | 0.18 | 0.18 | 0.15 | 0.16 | 0.504 | 0.501 |
| Zn (mg/kg dry wt.): | 58.42 | 72.51 | 91.73 | 115.47 | 59.01 | 72.96 | 114.40 | 99.49 |
| d.l. (mg/kg): | 0.72 | 0.69 | 0.72 | 0.72 | 0.58 | 0.65 | 1.0081 | 1.002 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXB. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE AT HARRISON BAYOU (DRY WEIGHT) (continued).

| SAMPLE: | S2R3 | S2S1 | S2S2 | S2S3 | S2S4 |
|---|---|---|---|---|---|
| SAMPLE WT. (g): | 107.0 | 143.73 | 140.69 | 74.0 | 94.0 |
| % MOISTURE: | 73.42 | 72.3 | 69.9 | 79.67 | 77.16 |
| Al (mg/kg dry wt.): | 60.77 | 151.99 | 498.34 | 64.53 | 210.6 |
| d.l. (mg/kg): | 5.02 | 3.61 | 3.32 | 5.0 | 5.02 |
| As (mg/kg dry wt.): | bdl | 0.54 | 0.37 | 0.57 | bdl |
| d.l. (mg/kg): | 0.497 | 0.36 | 0.33 | 0.505 | 0.508 |
| B (mg/kg dry wt.): | bdl | bdl | bdl | bdl | 0.671 |
| d.l. (mg/kg): | 0.502 | 1.44 | 1.33 | 0.50 | 0.502 |
| Ba (mg/kg dry wt.): | 21.92 | 21.91 | 28.44 | 25.4 | 49.04 |
| d.l. (mg/kg): | 0.502 | 0.72 | 0.66 | 0.50 | 0.502 |
| Be (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.1004 | 0.07 | 0.07 | 0.1 | 0.1004 |
| Cd (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.1004 | 0.22 | 0.2 | 0.1 | 0.1004 |
| Cr (mg/kg dry wt.): | 4.818 | 1.67 | 2.14 | 4.632 | 2.415 |
| d.l. (mg/kg): | 0.502 | 0.36 | 0.33 | 0.50 | 0.502 |
| Cu (mg/kg dry wt.): | 7.942 | 157.4 | 2.51 | 18.26 | 9.014 |
| d.l. (mg/kg): | 0.502 | 0.36 | 0.33 | 0.50 | 0.502 |
| Fe (mg/kg dry wt.): | 110.9 | 631.77 | 976.74 | 114.4 | 3045.0 |
| d.l. (mg/kg): | 10.04 | 3.61 | 3.32 | 10.0 | 10.04 |
| Hg (mg/kg dry wt.): | 0.352 | 0.123 | 0.09 | 0.1851 | bdl |
| d.l. (mg/kg): | 0.099 | 0.036 | 0.033 | 0.101 | 0.102 |
| Mg (mg/kg dry wt.): | 1768.0 | 1054.15 | 1129.57 | 1871.0 | 1385.0 |
| d.l. (mg/kg): | 10.04 | 3.61 | 3.32 | 10.0 | 10.04 |
| Mn (mg/kg dry wt.): | 44.95 | 129.24 | 107.97 | 52.25 | 1237.0 |
| d.l. (mg/kg): | 0.402 | 0.36 | 0.33 | 0.40 | 0.402 |
| Mo (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.502 | 1.44 | 1.33 | 0.50 | 0.502 |
| Ni (mg/kg dry wt.): | 1.268 | 5.88 | 4.49 | 0.991 | 0.514 |
| d.l. (mg/kg): | 0.502 | 0.43 | 0.40 | 0.50 | 0.502 |
| Pb (mg/kg dry wt.): | 2.459 | 9.35 | bdl | 2.359 | 3.009 |
| d.l. (mg/kg): | 0.502 | 1.81 | 1.66 | 0.50 | 0.502 |
| Se (mg/kg dry wt.): | 1.73 | bdl | 0.96 | 1.20 | 1.26 |
| d.l. (mg/kg): | 0.497 | 0.71 | 0.33 | 0.505 | 0.508 |
| Sr (mg/kg dry wt.): | 220.0 | 90.97 | 128.9 | 258.5 | 117.0 |
| d.l. (mg/kg): | 0.201 | 0.18 | 0.17 | 0.20 | 0.201 |
| V (mg/kg dry wt.): | bdl | 0.47 | 1.07 | bdl | 0.667 |
| d.l. (mg/kg): | 0.502 | 0.18 | 0.17 | 0.50 | 0.502 |
| Zn (mg/kg dry wt.): | 117.9 | 44.4 | 43.85 | 125.3 | 87.07 |
| d.l. (mg/kg): | 1.004 | 0.72 | 0.66 | 1.0 | 1.004 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXIA. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE AT SOUTH SHORE (WET WEIGHT).

| SAMPLE: | S4B1 | S4B2 | S4BG2 | S4BG3 | S4G1 | S4G2 | S4R1 | S4S1 | S4S2 |
|---|---|---|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 91.14 | 145.91 | 95.96 | 43.86 | 147.2 | 156.34 | 362.0 | 110.06 | 111.84 |
| % MOISTURE: | 73.7 | 74.0 | 70.3 | 72.5 | 67.1 | 71.5 | 72.61 | 65.5 | 66.9 |
| Al (mg/kg wet wt.): | 2.6 | bdl | 5.71 | 13.4 | bdl | bdl | 31.00548 | 34.6 | 39.3 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.3805382 | 1.0 | 1.0 |
| As (mg/kg wet wt.): | bdl | 0.18 | 0.11 | 0.16 | bdl | 0.11 | bdl | 0.13 | 0.39 |
| d.l. (mg/kg): | 0.05 | 0.1 | 0.1 | 0.1 | 0.05 | 0.1 | 0.1361283 | 0.1 | 0.1 |
| B (mg/kg wet wt.): | bdl | 0.49 | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.1380456 | 0.4 | 0.4 |
| Ba (mg/kg wet wt.): | 5.94 | 2.63 | 18.2 | 17.5 | 10.4 | 6.26 | 9.233169 | 12.1 | 18.6 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1380456 | 0.2 | 0.2 |
| Be (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.0276091 | 0.02 | 0.02 |
| Cd (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | 0.07 | bdl |
| d.l. (mg/kg): | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.0276091 | 0.06 | 0.06 |
| Cr (mg/kg wet wt.): | 0.44 | 0.4 | 0.7 | 0.62 | 1.42 | 1.18 | 1.6965366 | 1.15 | 0.79 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1380456 | 0.1 | 0.1 |
| Cu (mg/kg wet wt.): | 0.73 | 0.53 | 0.53 | 0.58 | 0.39 | 0.66 | 1.6376481 | 2.62 | 0.68 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1380456 | 0.1 | 0.1 |
| Fe (mg/kg wet wt.): | 36.9 | 23.4 | 57.7 | 69.0 | 39.3 | 41.3 | 70.52925 | 443.0 | 481.0 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 2.7610763 | 1.0 | 1.0 |
| Hg (mg/kg wet wt.): | 0.093 | 0.084 | 0.079 | 0.067 | 0.264 | 0.247 | 0.0938655 | 0.037 | 0.039 |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.0272257 | 0.01 | 0.01 |
| Mg (mg/kg wet wt.): | 401.0 | 383.0 | 541.0 | 535.0 | 3900.0 | 2020.0 | 482.064 | 331.0 | 302.0 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 2.7610763 | 1.0 | 1.0 |
| Mn (mg/kg wet wt.): | 24.8 | 12.2 | 142.0 | 156.0 | 41.6 | 20.5 | 22.314633 | 141.0 | 338.0 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1104365 | 0.1 | 0.1 |
| Mo (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.1380456 | 0.4 | 0.4 |
| Ni (mg/kg wet wt.): | bdl | 0.22 | bdl | bdl | 1.27 | 1.46 | bdl | 10.4 | 4.76 |
| d.l. (mg/kg): | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.1380456 | 0.12 | 0.12 |
| Pb (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | 0.4212582 | bdl | bdl |
| d.l. (mg/kg): | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.1380456 | 0.5 | 0.5 |
| Se (mg/kg wet wt.): | 0.34 | 0.21 | 0.46 | 0.38 | 0.33 | 0.51 | 0.654621 | 0.2 | 0.33 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1361283 | 0.1 | 0.01 |
| Sr (mg/kg wet wt.): | 57.5 | 50.7 | 117.0 | 98.5 | 183.0 | 78.1 | 65.13342 | 41.5 | 36.1 |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.0552182 | 0.05 | 0.05 |
| V (mg/kg wet wt.): | bdl | bdl | 0.07 | 0.08 | bdl | bdl | bdl | 0.27 | 0.25 |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.1380456 | 0.05 | 0.05 |
| Zn (mg/kg wet wt.): | 17.1 | 14.0 | 23.4 | 33.4 | 22.5 | 16.6 | 26.70525 | 11.7 | 11.1 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2761186 | 0.2 | 0.2 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXIB. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE AT SOUTH SHORE (DRY WEIGHT).

| SAMPLE: | S4B1 | S4B2 | S4BG2 | S4BG3 | S4G1 | S4G2 | S4R1 | S4S1 | S4S2 |
|---|---|---|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 91.14 | 145.91 | 95.96 | 43.86 | 147.2 | 156.34 | 362.0 | 110.06 | 111.84 |
| % MOISTURE: | 73.7 | 74.0 | 70.3 | 72.5 | 67.1 | 71.5 | 72.61 | 65.5 | 66.9 |
| Al (mg/kg dry wt.): | 9.89 | bdl | 19.23 | 48.73 | bdl | bdl | 113.2 | 100.29 | 118.73 |
| d.l. (mg/kg): | 3.8 | 3.85 | 3.37 | 3.64 | 3.04 | 3.51 | 5.04 | 2.9 | 3.02 |
| As (mg/kg dry wt.): | bdl | 0.69 | 0.37 | 0.58 | bdl | 0.39 | bdl | 0.38 | 1.18 |
| d.l. (mg/kg): | 0.19 | 0.38 | 0.34 | 0.36 | 0.15 | 0.35 | 0.497 | 0.29 | 0.3 |
| B (mg/kg dry wt.): | bdl | 1.87 | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 1.52 | 1.54 | 1.35 | 1.45 | 1.22 | 1.4 | 0.504 | 1.16 | 1.21 |
| Ba (mg/kg dry wt.): | 22.59 | 10.12 | 61.28 | 63.64 | 31.61 | 21.96 | 33.71 | 35.07 | 56.19 |
| d.l. (mg/kg): | 0.76 | 0.77 | 0.67 | 0.73 | 0.61 | 0.70 | 0.504 | 0.58 | 0.60 |
| Be (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.08 | 0.08 | 0.07 | 0.07 | 0.06 | 0.07 | 0.101 | 0.06 | 0.06 |
| Cd (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | 0.19 | bdl |
| d.l. (mg/kg): | 0.23 | 0.23 | 0.20 | 0.22 | 0.18 | 0.21 | 0.101 | 0.17 | 0.18 |
| Cr (mg/kg dry wt.): | 1.66 | 1.55 | 2.35 | 2.27 | 4.32 | 4.14 | 6.19 | 3.33 | 2.39 |
| d.l. (mg/kg): | 0.38 | 0.38 | 0.34 | 0.36 | 0.30 | 0.35 | 0.504 | 0.29 | 0.30 |
| Cu (mg/kg dry wt.): | 2.76 | 2.03 | 1.8 | 2.11 | 1.19 | 2.33 | 5.979 | 7.59 | 2.07 |
| d.l. (mg/kg): | 0.38 | 0.38 | 0.34 | 0.36 | 0.30 | 0.35 | 0.504 | 0.29 | 0.30 |
| Fe (mg/kg dry wt.): | 140.3 | 90.0 | 194.28 | 250.91 | 119.45 | 144.91 | 257.5 | 1284.06 | 1453.17 |
| d.l. (mg/kg): | 3.8 | 3.85 | 3.37 | 3.64 | 3.04 | 3.51 | 10.081 | 2.9 | 3.02 |
| Hg (mg/kg dry wt.): | 0.354 | 0.323 | 0.266 | 0.244 | 0.802 | 0.867 | 0.3427 | 0.107 | 0.118 |
| d.l. (mg/kg): | 0.038 | 0.038 | 0.034 | 0.036 | 0.03 | 0.035 | 0.0994 | 0.029 | 0.03 |
| Mg (mg/kg dry wt.): | 1524.71 | 1473.08 | 1821.55 | 1945.45 | 11854.11 | 7087.72 | 1760.0 | 959.42 | 912.39 |
| d.l. (mg/kg): | 3.8 | 3.85 | 3.37 | 3.64 | 3.04 | 3.51 | 10.081 | 2.9 | 3.02 |
| Mn (mg/kg dry wt.): | 94.3 | 46.92 | 478.11 | 567.27 | 126.44 | 71.93 | 81.47 | 408.7 | 1021.15 |
| d.l. (mg/kg): | 0.38 | 0.38 | 0.34 | 0.36 | 0.30 | 0.35 | 0.403 | 0.29 | 0.30 |
| Mo (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 1.52 | 1.54 | 1.35 | 1.45 | 1.22 | 1.40 | 0.504 | 1.16 | 1.21 |
| Ni (mg/kg dry wt.): | bdl | 0.84 | bdl | bdl | 3.86 | 5.12 | bdl | 30.14 | 14.38 |
| d.l. (mg/kg): | 0.46 | 0.46 | 0.40 | 0.44 | 0.36 | 0.42 | 0.504 | 0.35 | 0.36 |
| Pb (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | 1.538 | bdl | bdl |
| d.l. (mg/kg): | 1.90 | 1.92 | 1.68 | 1.82 | 1.52 | 1.75 | 0.504 | 1.45 | 1.51 |
| Se (mg/kg dry wt.): | 1.28 | 0.8 | 1.55 | 1.37 | 0.99 | 1.78 | 2.39 | 0.59 | 0.99 |
| d.l. (mg/kg): | 0.38 | 0.38 | 0.34 | 0.36 | 0.30 | 0.35 | 0.497 | 0.29 | 0.30 |
| Sr (mg/kg dry wt.): | 218.3 | 195.0 | 393.94 | 358.18 | 556.23 | 274.04 | 237.8 | 120.29 | 109.06 |
| d.l. (mg/kg): | 0.19 | 0.19 | 0.17 | 0.18 | 0.15 | 0.18 | 0.504 | 0.14 | 0.15 |
| V (mg/kg dry wt.): | bdl | bdl | 0.24 | 0.29 | bdl | bdl | bdl | 0.79 | 0.77 |
| d.l. (mg/kg): | 0.19 | 0.19 | 0.17 | 0.18 | 0.15 | 0.18 | 0.504 | 0.14 | 0.15 |
| Zn (mg/kg dry wt.): | 65.02 | 53.85 | 78.79 | 121.45 | 68.39 | 58.25 | 97.5 | 33.91 | 33.53 |
| d.l. (mg/kg): | 0.76 | 0.77 | 0.67 | 0.73 | 0.61 | 0.7 | 1.01 | 0.58 | 0.6 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXIIA. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE AT MILLERS POINT (WET WEIGHT).

| SAMPLE: | S5B1 | S5B2 | S5B4 | S5BG1 | S5BG2 | S5G1 | S5G2 | S5R1 | S5R2 |
|---|---|---|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 141.24 | 111.79 | 104.65 | 59.86 | 61.09 | 159.42 | 142.94 | 234.0 | 134.0 |
| % MOISTURE: | 69.3 | 72.4 | 71.0 | 76.0 | 73.1 | 70.9 | 71.0 | 69.68 | 72.47 |
| Al (mg/kg wet wt.): | bdl | bdl | bdl | 2.1 | 3.94 | bdl | bdl | 23.100808 | 18.742424 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.5009916 | 1.3601747 |
| As (mg/kg wet wt.): | 0.1 | 0.18 | 0.1 | 0.1 | 0.13 | bdl | bdl | bdl | 0.140403 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.05 | 0.05 | 0.1525096 | 0.1370994 |
| B (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.150084 | 0.136026 |
| Ba (mg/kg wet wt.): | 3.23 | 2.98 | 4.77 | 9.01 | 9.78 | 13.6 | 10.3 | 12.59796 | 7.730424 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.150084 | 0.1360257 |
| Be (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.0300168 | 0.027200 |
| Cd (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.0300168 | 0.027200 |
| Cr (mg/kg wet wt.): | 0.53 | 0.59 | 0.62 | 0.52 | 0.51 | 1.74 | 1.42 | 1.899548 | 1.1972797 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.150084 | 0.1360257 |
| Cu (mg/kg wet wt.): | 1.0 | 0.48 | 0.48 | 0.86 | 0.54 | 0.72 | 0.72 | 0.5142272 | 1.2603234 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.150084 | 0.1360257 |
| Fe (mg/kg wet wt.: | 17.2 | 18.0 | 10.0 | 31.3 | 49.3 | 49.7 | 64.8 | 59.03304 | 39.80838 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 3.0019832 | 2.7203494 |
| Hg (mg/kg wet wt.): | 0.283 | 0.308 | 0.167 | 0.131 | 0.06 | 0.447 | 0.379 | 0.1153373 | 0.1017784 |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.0305019 | 0.0274199 |
| Mg (mg/kg wet wt.): | 413.0 | 478.0 | 531.0 | 435.0 | 473.0 | 4020.0 | 3530.0 | 647.0288 | 490.8599 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 3.0019832 | 2.7203494 |
| Mn (mg/kg wet wt.): | 6.69 | 3.25 | 4.97 | 30.7 | 33.4 | 49.9 | 37.8 | 20.432648 | 13.101527 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1200672 | 0.1088261 |
| Mo (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.150084 | 0.136026 |
| Ni (mg/kg wet wt.): | 0.24 | 0.49 | bdl | 0.26 | bdl | 1.64 | 2.64 | 0.2645117 | 0.1806794 |
| d.l. (mg/kg): | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.150084 | 0.1360257 |
| Pb (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | 0.7801336 | 0.6282346 |
| d.l. (mg/kg): | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.150084 | 0.1360257 |
| Se (mg/kg wet wt.): | 0.25 | 0.45 | 0.28 | 0.27 | 0.29 | 0.22 | 0.29 | 0.639752 | 0.1525096 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.602907 | 0.1370994 |
| Sr (mg/kg wet wt.): | 61.1 | 70.5 | 81.5 | 81.7 | 79.0 | 211.0 | 195.0 | 92.83984 | 60.0154 |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.0600336 | 0.0543993 |
| V (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.150084 | 0.136026 |
| Zn (mg/kg wet wt.): | 13.3 | 16.4 | 17.6 | 21.8 | 28.8 | 28.6 | 27.0 | 30.38064 | 26.7041 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3001983 | 0.2720239 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXIIA. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE AT MILLERS POINT (WET WEIGHT) (continued).

| SAMPLE: | S5R3 | S5S1 | S5S2 |
|---|---|---|---|
| SAMPLE WT. (g): | 69 | 91.78 | 120.6 |
| % MOISTURE: | 73.61 | 67.3 | 68.9 |
| Al (mg/kg wet wt.): | 20.877129 | 32.6 | 71.4 |
| d.l. (mg/kg): | 1.3301352 | 1.0 | 1.0 |
| As (mg/kg wet wt.): | 0.137228 | 0.89 | 0.58 |
| d.l. (mg/kg): | 0.1301291 | 0.1 | 0.1 |
| B (mg/kg wet wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.1330056 | 0.4 | 0.4 |
| Ba (mg/kg wet wt.): | 6.961682 | 29.0 | 28.4 |
| d.l. (mg/kg): | 0.1330056 | 0.2 | 0.2 |
| Be (mg/kg wet wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.0266011 | 0.02 | 0.02 |
| Cd (mg/kg wet wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.0266011 | 0.06 | 0.06 |
| Cr (mg/kg wet wt.): | 0.7568652 | 0.51 | 0.44 |
| d.l. (mg/kg): | 0.1330056 | 0.1 | 0.1 |
| Cu (mg/kg wet wt.): | 2.63370984 | 0.94 | 1.0 |
| d.l. (mg/kg): | 0.1330056 | 0.1 | 0.1 |
| Fe (mg/kg wet wt.): | 48.00341 | 771.0 | 829.0 |
| d.l. (mg/kg): | 2.6602703 | 1.0 | 1.0 |
| Hg (mg/kg wet wt.): | 0.0584802 | 0.037 | 0.022 |
| d.l. (mg/kg): | 0.0260205 | 0.01 | 0.01 |
| Mg (mg/kg wet wt.): | 465.7835 | 349.0 | 320.0 |
| d.l. (mg/kg): | 2.6602703 | 1.0 | 1.0 |
| Mn (mg/kg wet wt.): | 16.747094 | 407.0 | 580.0 |
| d.l. (mg/kg): | 0.1064045 | 0.1 | 0.1 |
| Mo (mg/kg wet wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.1330056 | 0.4 | 0.4 |
| Ni (mg/kg wet wt.): | bdl | bdl | 0.45 |
| d.l. (mg/kg): | 0.1330056 | 0.12 | 0.12 |
| Pb (mg/kg wet wt.): | 0.5982613 | bdl | bdl |
| d.l. (mg/kg): | 0.1330056 | 0.5 | 0.5 |
| Se (mg/kg wet wt.): | 0.577941 | 0.24 | bdl |
| d.l. (mg/kg): | 0.1301291 | 0.1 | 0.2 |
| Sr (mg/kg wet wt.): | 59.56223 | 50.0 | 33.1 |
| d.l. (mg/kg): | 0.0532022 | 0.05 | 0.05 |
| V (mg/kg wet wt.): | bdl | 0.17 | 0.21 |
| d.l. (mg/kg): | 0.1330056 | 0.05 | 0.05 |
| Zn (mg/kg wet wt.): | 28.97622 | 13.0 | 12.0 |
| d.l. (mg/kg): | 0.2660376 | 0.2 | 0.2 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXIIB. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE AT MILLERS POINT (DRY WEIGHT).

| SAMPLE: | S5B1 | S5B2 | S5B4 | S5BG1 | S5BG2 | S5G1 | S5G2 | S5R1 | S5R2 |
|---|---|---|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 141.24 | 111.79 | 104.65 | 59.86 | 61.09 | 159.42 | 142.94 | 234.0 | 134.0 |
| % MOISTURE: | 69.3 | 72.4 | 71.0 | 76.0 | 73.1 | 70.9 | 71.0 | 69.68 | 72.47 |
| Al (mg/kg dry wt.): | bdl | bdl | bdl | 8.75 | 14.65 | bdl | bdl | 69.68 | 72.47 |
| d.l. (mg/kg): | 3.26 | 3.62 | 3.45 | 4.17 | 3.72 | 3.44 | 3.45 | 4.95 | 4.94 |
| As (mg/kg dry wt.): | 0.33 | 0.65 | 0.34 | 0.42 | 0.48 | bdl | bdl | bdl | 0.51 |
| d.l. (mg/kg): | 0.33 | 0.36 | 0.34 | 0.42 | 0.37 | 0.17 | 0.17 | 0.503 | 0.498 |
| B (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 1.3 | 1.45 | 1.38 | 1.67 | 1.49 | 1.37 | 1.38 | 0.495 | 0.494 |
| Ba (mg/kg dry wt.): | 10.52 | 10.8 | 16.45 | 37.54 | 36.36 | 46.74 | 35.52 | 41.55 | 28.08 |
| d.l. (mg/kg): | 0.65 | 0.72 | 0.69 | 0.83 | 0.74 | 0.69 | 0.69 | 0.495 | 0.494 |
| Be (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.07 | 0.07 | 0.07 | 0.08 | 0.07 | 0.07 | 0.07 | 0.099 | 0.099 |
| Cd (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.2 | 0.22 | 0.21 | 0.25 | 0.22 | 0.21 | 0.21 | 0.099 | 0.099 |
| Cr (mg/kg dry wt.): | 1.72 | 2.12 | 2.14 | 2.18 | 1.88 | 5.98 | 4.9 | 6.265 | 4.349 |
| d.l. (mg/kg): | 0.33 | 0.36 | 0.34 | 0.42 | 0.37 | 0.17 | 0.17 | 0.495 | 0.494 |
| Cu (mg/kg dry wt.): | 3.26 | 1.75 | 1.66 | 3.6 | 2.01 | 2.46 | 2.47 | 1.696 | 4.578 |
| d.l. (mg/kg): | 0.33 | 0.36 | 0.34 | 0.42 | 0.37 | 0.17 | 0.17 | 0.495 | 0.494 |
| Fe (mg/kg dry wt.): | 56.03 | 65.22 | 34.48 | 130.42 | 183.27 | 170.79 | 223.45 | 194.7 | 144.6 |
| d.l. (mg/kg): | 3.26 | 3.62 | 3.45 | 4.17 | 3.72 | 3.44 | 3.45 | 9.90 | 9.88 |
| Hg (mg/kg dry wt.): | 0.922 | 1.116 | 0.576 | 0.546 | 0.223 | 1.536 | 1.307 | 0.380 | 0.370 |
| d.l. (mg/kg): | 0.033 | 0.036 | 0.034 | 0.042 | 0.037 | 0.034 | 0.034 | 0.101 | 0.099 |
| Mg (mg/kg dry wt.): | 1345.28 | 1731.88 | 1831.03 | 1812.5 | 1758.36 | 13814.43 | 12172.41 | 2134.0 | 1783.0 |
| d.l. (mg/kg): | 3.26 | 3.62 | 3.45 | 4.17 | 3.72 | 3.44 | 3.45 | 9.90 | 9.88 |
| Mn (mg/kg dry wt.): | 21.79 | 11.78 | 17.14 | 127.92 | 124.16 | 171.48 | 130.34 | 67.39 | 47.59 |
| d.l. (mg/kg): | 0.33 | 0.36 | 0.34 | 0.42 | 0.37 | 0.34 | 0.34 | 0.396 | 0.395 |
| Mo (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 1.3 | 1.45 | 1.38 | 1.67 | 1.49 | 1.37 | 1.38 | 0.495 | 0.494 |
| Ni (mg/kg dry wt.): | 0.79 | 1.76 | bdl | 1.09 | bdl | 5.64 | 9.1 | 0.872 | 0.656 |
| d.l. (mg/kg): | 0.39 | 0.43 | 0.41 | 0.50 | 0.45 | 0.41 | 0.41 | 0.495 | 0.494 |
| Pb (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | 2.573 | 2.282 |
| d.l. (mg/kg): | 1.63 | 1.81 | 1.72 | 2.08 | 1.86 | 1.72 | 1.72 | 0.495 | 0.494 |
| Se (mg/kg dry wt.): | 0.81 | 1.62 | 0.96 | 1.15 | 1.07 | 0.75 | 0.99 | 2.11 | 2.19 |
| d.l. (mg/kg): | 0.33 | 0.36 | 0.34 | 0.42 | 0.37 | 0.34 | 0.34 | 0.503 | 0.498 |
| Sr (mg/kg dry wt.): | 199.02 | 255.43 | 281.03 | 340.42 | 293.68 | 725.09 | 672.41 | 306.20 | 218.0 |
| d.l. (mg/kg): | 0.16 | 0.18 | 0.17 | 0.21 | 0.19 | 0.17 | 0.17 | 0.198 | 0.197 |
| V (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.16 | 0.18 | 0.17 | 0.21 | 0.19 | 0.17 | 0.17 | 0.495 | 0.494 |
| Zn (mg/kg dry wt.): | 43.32 | 59.42 | 60.69 | 90.83 | 107.06 | 98.28 | 93.1 | 100.2 | 97.0 |
| d.l. (mg/kg): | 0.65 | 0.72 | 0.69 | 0.83 | 0.74 | 0.69 | 0.69 | 0.99 | 0.98 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXIIB. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE AT MILLERS POINT (DRY WEIGHT) (continued).

| SAMPLE: | S5R3 | S5S1 | S5S2 |
|---|---|---|---|
| SAMPLE WT. (g): | 69 | 91.78 | 120.6 |
| % MOISTURE: | 73.61 | 67.3 | 68.9 |
| Al (mg/kg dry wt.): | 79.11 | 99.69 | 229.58 |
| d.l. (mg/kg): | 5.04 | 3.06 | 3.22 |
| As (mg/kg dry wt.): | 0.52 | 2.72 | 1.86 |
| d.l. (mg/kg): | 0.49 | 0.31 | 0.32 |
| B (mg/kg dry wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.504 | 1.67 | 1.49 |
| Ba (mg/kg dry wt.): | 26.38 | 88.69 | 91.32 |
| d.l. (mg/kg): | 0.504 | 0.61 | 0.64 |
| Be (mg/kg dry wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.101 | 0.06 | 0.06 |
| Cd (mg/kg dry wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.101 | 0.18 | 0.19 |
| Cr (mg/kg dry wt.): | 2.868 | 1.56 | 1.40 |
| d.l. (mg/kg): | 0.101 | 0.18 | 0.19 |
| Cu (mg/kg dry wt.): | 8.856 | 2.86 | 3.21 |
| d.l. (mg/kg): | 0.504 | 0.31 | 0.32 |
| Fe (mg/kg dry wt.): | 181.9 | 2357.8 | 2665.59 |
| d.l. (mg/kg): | 10.081 | 3.06 | 3.22 |
| Hg (mg/kg dry wt.): | 0.222 | 0.113 | 0.071 |
| d.l. (mg/kg): | 0.099 | 0.031 | 0.032 |
| Mg (mg/kg dry wt.): | 1765.0 | 1067.28 | 1028.94 |
| d.l. (mg/kg): | 10.081 | 3.06 | 3.22 |
| Mn (mg/kg dry wt.): | 63.46 | 1244.65 | 1864.95 |
| d.l. (mg/kg): | 0.403 | 0.31 | 0.32 |
| Mo (mg/kg dry wt.): | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.504 | 1.22 | 1.29 |
| Ni (mg/kg dry wt.): | bdl | bdl | 1.45 |
| d.l. (mg/kg): | 0.504 | 0.37 | 0.39 |
| Pb (mg/kg dry wt.): | 2.267 | bdl | bdl |
| d.l. (mg/kg): | 0.504 | 1.53 | 1.61 |
| Se (mg/kg dry wt.): | 2.19 | 0.73 | bdl |
| d.l. (mg/kg): | 0.493 | 0.31 | 0.63 |
| Sr (mg/kg dry wt.): | 225.7 | 152.91 | 106.43 |
| d.l. (mg/kg): | 0.202 | 0.15 | 0.16 |
| V (mg/kg dry wt.): | bdl | 0.53 | 0.68 |
| d.l. (mg/kg): | 0.504 | 0.15 | 0.16 |
| Zn (mg/kg dry wt.): | 109.8 | 39.76 | 38.59 |
| d.l. (mg/kg): | 1.01 | 0.61 | 0.64 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXIIIA. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE AT TAYLOR ISLAND (WET WEIGHT).

| SAMPLE: | S6B1 | S6B2 | S6BG1 | S6BG2 | S6BG3 | S6R2 | S6S3 | S6S4 |
|---|---|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 145.84 | 108.07 | 97.11 | 91.4 | 66.9 | 200.0 | 115.31 | 113.92 |
| % MOISTURE: | 71.3 | 71.0 | 72.4 | 70.5 | 72.5 | 72.53 | 73.4 | 69.7 |
| Al (mg/kg wet wt.): | bdl | bdl | 3.18 | 11.5 | 1.73 | 23.764297 | 11.5 | 29.5 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.3845704 | 1.0 | 1.0 |
| As (mg/kg wet wt.): | 0.28 | 0.22 | 0.17 | 0.14 | 0.57 | bdl | 0.2 | 0.1 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1370753 | 0.1 | 0.1 |
| B (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.1384488 | 0.4 | 0.4 |
| Ba (mg/kg wet wt.): | 3.83 | 4.4 | 11.7 | 13.3 | 11.1 | 7.274056 | 6.03 | 9.51 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1384488 | 0.2 | 0.2 |
| Be (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.0276898 | 0.02 | 0.02 |
| Cd (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.0276898 | 0.06 | 0.06 |
| Cr (mg/kg wet wt.): | 0.46 | 0.62 | 0.57 | 0.73 | 0.68 | 1.0155659 | 0.36 | 0.48 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1384488 | 0.1 | 0.1 |
| Cu (mg/kg wet wt.): | 0.51 | 0.33 | 0.74 | 0.78 | 0.4 | 3.35134 | 0.74 | 0.74 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1384488 | 0.1 | 0.1 |
| Fe (mg/kg wet wt.): | 12.6 | 9.48 | 28.8 | 54.8 | 15.4 | 58.20893 | 110.0 | 175.0 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 2.7691408 | 1.0 | 1.0 |
| Hg (mg/kg wet wt.): | 0.449 | 0.285 | 0.132 | 0.145 | 0.097 | 0.1147697 | 0.04 | 0.03 |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.0274151 | 0.01 | 0.01 |
| Mg (mg/kg wet wt.): | 426.0 | 586.0 | 520.0 | 581.0 | 528.0 | 461.496 | 285.0 | 331.0 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 2.7691408 | 1.0 | 1.0 |
| Mn (mg/kg wet wt.): | 3.1 | 4.8 | 50.0 | 70.2 | 26.0 | 24.022515 | 53.1 | 72.0 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.110759 | 0.1 | 0.1 |
| Mo (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | 0.1820162 | bdl | bdl |
| d.l. (mg/kg): | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.1384488 | 0.4 | 0.4 |
| Ni (mg/kg wet wt.): | 0.27 | bdl | bdl | bdl | bdl | 0.1514421 | 0.39 | bdl |
| d.l. (mg/kg): | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.1384488 | 0.12 | 0.12 |
| Pb (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | 0.5021516 | bdl | bdl |
| d.l. (mg/kg): | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.1384488 | 0.5 | 0.5 |
| Se (mg/kg wet wt.): | 0.26 | 0.33 | 0.25 | 0.27 | 0.55 | 0.461496 | 0.32 | 0.43 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1370753 | 0.1 | 0.1 |
| Sr (mg/kg wet wt.): | 57.1 | 77.7 | 86.2 | 98.7 | 94.8 | 59.71978 | 34.9 | 46.6 |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.0553795 | 0.05 | 0.05 |
| V (mg/kg wet wt.): | bdl | bdl | 0.07 | 0.07 | 0.09 | bdl | bdl | 0.12 |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.1384488 | 0.05 | 0.05 |
| Zn (mg/kg wet wt.): | 12.3 | 14.9 | 25.8 | 26.7 | 29.7 | 30.87628 | 11.5 | 12.1 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2769251 | 0.2 | 0.2 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXIIIA. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE AT TAYLOR ISLAND (WET WEIGHT) (continued).

| SAMPLE: | S6S5 | S6S6 |
|---|---|---|
| SAMPLE WT. (g): | 157.0 | 210.0 |
| % MOISTURE: | 74.16 | 76.67 |
| Al (mg/kg wet wt.): | 105.40136 | 98.96586 |
| d.l. (mg/kg): | 1.289416 | 1.168833 |
| As (mg/kg wet wt.): | bdl | 0.128315 |
| d.l. (mg/kg): | 0.1305178 | 0.1178398 |
| B (mg/kg wet wt.): | bdl | bdl |
| d.l. (mg/kg): | 0.1289416 | 0.1168833 |
| Ba (mg/kg wet wt.): | 9.253304 | 9.026377 |
| d.l. (mg/kg): | 0.1289416 | 0.1168833 |
| Be (mg/kg wet wt.): | bdl | bdl |
| d.l. (mg/kg): | 0.0257883 | 0.0233767 |
| Cd (mg/kg wet wt.): | bdl | bdl |
| d.l. (mg/kg): | 0.0257883 | 0.0233767 |
| Cr (mg/kg wet wt.): | 0.6956128 | 0.473599 |
| d.l. (mg/kg): | 0.1289416 | 0.1168833 |
| Cu (mg/kg wet wt.): | 1.9881296 | 2.631624 |
| d.l. (mg/kg): | 0.1289416 | 0.1168833 |
| Fe (mg/kg wet wt.): | 438.2464 | 445.1364 |
| d.l. (mg/kg): | 2.578832 | 2.337666 |
| Hg (mg/kg wet wt.): | 0.0382174 | 0.0324987 |
| d.l. (mg/kg): | 0.0260984 | 0.0235633 |
| Mg (mg/kg wet wt.): | 326.1008 | 322.8872 |
| d.l. (mg/kg): | 2.578832 | 2.337666 |
| Mn (mg/kg wet wt.): | 129.94936 | 130.78798 |
| d.l. (mg/kg): | 0.1031533 | 0.0935066 |
| Mo (mg/kg wet wt.): | bdl | bdl |
| d.l. (mg/kg): | 0.1289416 | 0.1168833 |
| Ni (mg/kg wet wt.): | 0.2130508 | 0.1242789 |
| d.l. (mg/kg): | 0.1289416 | 0.1168833 |
| Pb (mg/kg wet wt.): | 0.301036 | 0.3746798 |
| d.l. (mg/kg): | 0.1289416 | 0.1168833 |
| Se (mg/kg wet wt.): | 0.359176 | 0.331286 |
| d.l. (mg/kg): | 0.1305178 | 0.1178398 |
| Sr (mg/kg wet wt.): | 27.28704 | 25.26639 |
| d.l. (mg/kg): | 0.0515766 | 0.0467533 |
| V (mg/kg wet wt.): | 0.2268235 | 0.2207951 |
| d.l. (mg/kg): | 0.1289416 | 0.1168833 |
| Zn (mg/kg wet wt.): | 25.86584 | 25.663 |
| d.l. (mg/kg): | 0.2578832 | 0.2337666 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXIIIB. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE AT TAYLOR ISLAND (DRY WEIGHT).

| SAMPLE: | S6B1 | S6B2 | S6BG1 | S6BG2 | S6BG3 | S6R2 | S6S3 | S6S4 |
|---|---|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 145.84 | 108.07 | 97.11 | 91.4 | 66.9 | 200.0 | 115.31 | 113.92 |
| % MOISTURE: | 71.3 | 71.0 | 72.4 | 70.5 | 72.5 | 72.53 | 73.4 | 69.7 |
| Al (mg/kg dry wt.): | bdl | bdl | 11.52 | 38.98 | 6.29 | 86.51 | 43.23 | 97.36 |
| d.l. (mg/kg): | 3.48 | 3.45 | 3.62 | 3.39 | 3.64 | 5.04 | 3.76 | 3.30 |
| As (mg/kg dry wt.): | 0.98 | 0.76 | 0.62 | 0.47 | 2.07 | bdl | 0.75 | 0.33 |
| d.l. (mg/kg): | 0.35 | 0.34 | 0.36 | 0.34 | 0.36 | 0.499 | 0.38 | 0.33 |
| B (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 1.39 | 1.38 | 1.45 | 1.36 | 1.45 | 0.504 | 1.50 | 1.32 |
| Ba (mg/kg dry wt.): | 13.34 | 15.17 | 42.39 | 45.08 | 40.36 | 26.48 | 22.67 | 31.39 |
| d.l. (mg/kg): | 0.7 | 0.69 | 0.72 | 0.68 | 0.73 | 0.504 | 0.75 | 0.66 |
| Be (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.101 | 0.08 | 0.07 |
| Cd (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.21 | 0.21 | 0.22 | 0.20 | 0.22 | 0.101 | 0.23 | 0.20 |
| Cr (mg/kg dry wt.): | 1.61 | 2.12 | 2.05 | 2.46 | 2.47 | 3.697 | 1.34 | 1.57 |
| d.l. (mg/kg): | 0.35 | 0.34 | 0.36 | 0.34 | 0.36 | 0.504 | 0.38 | 0.33 |
| Cu (mg/kg dry wt.): | 1.79 | 1.13 | 2.66 | 2.64 | 1.47 | 12.20 | 2.77 | 2.46 |
| d.l. (mg/kg): | 0.35 | 0.34 | 0.36 | 0.34 | 0.36 | 0.504 | 0.38 | 0.33 |
| Fe (mg/kg dry wt.): | 43.9 | 32.69 | 104.35 | 185.76 | 56.0 | 211.9 | 413.53 | 577.56 |
| d.l. (mg/kg): | 3.48 | 3.45 | 3.62 | 3.39 | 3.64 | 10.081 | 3.76 | 3.30 |
| Hg (mg/kg dry wt.): | 1.564 | 0.983 | 0.478 | 0.492 | 0.353 | 0.4718 | 0.15 | 0.099 |
| d.l. (mg/kg): | 0.035 | 0.034 | 0.036 | 0.034 | 0.036 | 0.099 | 0.038 | 0.033 |
| Mg (mg/kg dry wt.): | 1484.32 | 202.69 | 1884.06 | 1969.49 | 1920.0 | 1680.0 | 1071.43 | 1092.41 |
| d.l. (mg/kg): | 3.48 | 3.45 | 3.62 | 3.39 | 3.64 | 10.081 | 3.76 | 3.30 |
| Mn (mg/kg dry wt.): | 10.8 | 16.55 | 181.16 | 237.97 | 94.55 | 87.45 | 199.62 | 237.62 |
| d.l. (mg/kg): | 0.35 | 0.34 | 0.36 | 0.34 | 0.36 | 0.403 | 0.38 | 0.33 |
| Mo (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | 0.663 | bdl | bdl |
| d.l. (mg/kg): | 1.39 | 1.38 | 1.45 | 1.36 | 1.45 | 0.504 | 1.50 | 1.32 |
| Ni (mg/kg dry wt.): | 0.93 | bdl | bdl | bdl | bdl | 0.551 | 1.45 | bdl |
| d.l. (mg/kg): | 0.42 | 0.41 | 0.43 | 0.41 | 0.44 | 0.504 | 0.45 | 0.40 |
| Pb (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | 1.83 | bdl | bdl |
| d.l. (mg/kg): | 1.74 | 1.72 | 1.81 | 1.69 | 1.82 | 0.504 | 1.88 | 1.65 |
| Se (mg/kg dry wt.): | 0.92 | 1.14 | 0.92 | 0.91 | 1.99 | 1.68 | 1.20 | 1.43 |
| d.l. (mg/kg): | 0.35 | 0.34 | 0.36 | 0.34 | 0.36 | 0.499 | 0.38 | 0.33 |
| Sr (mg/kg dry wt.): | 198.95 | 267.93 | 312.32 | 334.58 | 344.73 | 217.40 | 131.20 | 153.80 |
| d.l. (mg/kg): | 0.17 | 0.17 | 0.18 | 0.17 | 0.18 | 0.202 | 0.19 | 0.17 |
| V (mg/kg dry wt.): | bdl | bdl | 0.27 | 0.22 | 0.33 | bdl | bdl | 0.40 |
| d.l. (mg/kg): | 0.17 | 0.17 | 0.18 | 0.17 | 0.18 | 0.495 | 0.19 | 0.17 |
| Zn (mg/kg dry wt.): | 42.86 | 51.38 | 93.48 | 90.51 | 108.0 | 112.4 | 43.23 | 39.23 |
| d.l. (mg/kg): | 0.7 | 0.69 | 0.72 | 0.68 | 0.73 | 1.01 | 0.75 | 0.66 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXIIIB RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE AT TAYLOR ISLAND (DRY WEIGHT) (continued).

| SAMPLE: | S6S5 | S6S6 |
|---|---|---|
| SAMPLE WT. (g): | 157.0 | 210.0 |
| % MOISTURE: | 74.16 | 76.67 |
| Al (mg/kg dry wt.): | 407.9 | 424.2 |
| d.l. (mg/kg): | 4.99 | 5.01 |
| As (mg/kg dry wt.): | bdl | 0.55 |
| d.l. (mg/kg): | 0.505 | 0.505 |
| B (mg/kg dry wt.): | bdl | bdl |
| d.l. (mg/kg): | 0.499 | 0.501 |
| Ba (mg/kg dry wt.): | 35.81 | 38.69 |
| d.l. (mg/kg): | 0.499 | 0.501 |
| Be (mg/kg dry wt.): | bdl | bdl |
| d.l. (mg/kg): | 0.0998 | 0.1002 |
| Cd (mg/kg dry wt.): | bdl | bdl |
| d.l. (mg/kg): | 0.0998 | 0.1002 |
| Cr (mg/kg dry wt.): | 2.692 | 2.03 |
| d.l. (mg/kg): | 0.499 | 0.501 |
| Cu (mg/kg dry wt.): | 7.694 | 11.28 |
| d.l. (mg/kg): | 0.499 | 0.501 |
| Fe (mg/kg dry wt.): | 1696.0 | 1908.0 |
| d.l. (mg/kg): | 9.98 | 10.02 |
| Hg (mg/kg dry wt.): | 0.1479 | 0.1393 |
| d.l. (mg/kg): | 0.101 | 0.101 |
| Mg (mg/kg dry wt.): | 1262.0 | 1384.0 |
| d.l. (mg/kg): | 9.98 | 10.02 |
| Mn (mg/kg dry wt.): | 502.9 | 560.6 |
| d.l. (mg/kg): | 0.3992 | 0.4008 |
| Mo (mg/kg dry wt.): | bdl | bdl |
| d.l. (mg/kg): | 0.499 | 0.501 |
| Ni (mg/kg dry wt.): | 0.8245 | 0.5327 |
| d.l. (mg/kg): | 0.499 | 0.501 |
| Pb (mg/kg dry wt.): | 1.165 | 1.606 |
| d.l. (mg/kg): | 0.499 | 0.501 |
| Se (mg/kg dry wt.): | 1.39 | 1.42 |
| d.l. (mg/kg): | 0.505 | 0.505 |
| Sr (mg/kg dry wt.): | 105.6 | 108.3 |
| d.l. (mg/kg): | 0.1996 | 0.2004 |
| V (mg/kg dry wt.): | 0.8778 | 0.9464 |
| d.l. (mg/kg): | 0.499 | 0.501 |
| Zn (mg/kg dry wt.): | 100.1 | 110.0 |
| d.l. (mg/kg): | 0.998 | 1.002 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXIVA. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE AT MOSSEY BREAK (WET WEIGHT).

| SAMPLE: | S7B1 | S7BG2 | S7BG3 | S7R2 | S7R3 | S7R4 | S7S1 | S7S4 |
|---|---|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 153.36 | 104.37 | 42.6 | 267.0 | 246.0 | 90.0 | 101.72 | 124.71 |
| % MOISTURE: | 71.1 | 69.7 | 70.4 | 71.86 | 71.41 | 74.09 | 70.4 | 68.0 |
| Al (mg/kg wet wt.): | 1.06 | 5.87 | 6.66 | 23.58132 | 19.952961 | 20.328986 | 69.8 | 35.5 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.4212107 | 1.4497989 | 1.3138961 | 1.0 | 1.0 |
| As (mg/kg wet wt.): | 0.08 | 0.14 | 0.35 | 0.163212 | 0.160104 | 0.163233 | 0.32 | 0.18 |
| d.l. (mg/kg): | 0.08 | 0.1 | 0.1 | 0.1382237 | 0.1440936 | 0.1305864 | 0.1 | 0.1 |
| B (mg/kg wet wt.): | bdl | bdl | bdl | 0.2935002 | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.4 | 0.4 | 0.4 | 0.1421351 | 0.1449799 | 0.1313896 | 0.4 | 0.4 |
| Ba (mg/kg wet wt.): | 3.75 | 16.6 | 11.0 | 8.233764 | 7.450554 | 7.5139 | 11.0 | 7.76 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.1421351 | 0.1449799 | 0.1313896 | 0.2 | 0.2 |
| Be (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.02 | 0.02 | 0.0284214 | 0.0289903 | 0.0262727 | 0.02 | 0.02 |
| Cd (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.06 | 0.06 | 0.06 | 0.0284214 | 0.0289903 | 0.0262727 | 0.06 | 0.06 |
| Cr (mg/kg wet wt.): | 0.52 | 0.73 | 0.61 | 1.4762244 | 0.9794934 | 1.6538353 | 0.57 | 0.7 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1421351 | 0.1449799 | 0.131396 | 0.1 | 0.1 |
| Cu (mg/kg wet wt.): | 0.45 | 0.49 | 0.58 | 4.963896 | 1.7111115 | 0.9330191 | 1.07 | 0.64 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1421351 | 0.1449799 | 0.1313896 | 0.1 | 0.1 |
| Fe (mg/kg wet wt.): | 18.7 | 37.9 | 40.0 | 48.85104 | 39.56856 | 52.83049 | 372.0 | 195.0 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 2.8424214 | 2.8995978 | 2.6277922 | 1.0 | 1.0 |
| Hg (mg/kg wet wt.): | 0.449 | 0.221 | 0.284 | 0.1475943 | 0.2046758 | 0.19347 | 0.021 | 0.064 |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 | 0.0276335 | 0.0288187 | 0.0261173 | 0.01 | 0.01 |
| Mg (mg/kg wet wt.): | 406.0 | 560.0 | 546.0 | 469.0938 | 474.8799 | 464.3072 | 304.0 | 343.0 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 2.8424214 | 2.8995978 | 2.6277922 | 1.0 | 1.0 |
| Mn (mg/kg wet wt.): | 3.94 | 97.5 | 54.3 | 23.755788 | 26.754522 | 35.03032 | 60.3 | 64.0 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1136856 | 0.1159896 | 0.1051169 | 0.1 | 0.1 |
| Mo (mg/kg wet wt.): | bdl | bdl | bdl | 0.2881536 | 0.2023028 | 0.2101819 | bdl | bdl |
| d.l. (mg/kg): | 0.4 | 0.4 | 0.4 | 0.1421351 | 0.1449799 | 0.1313896 | 0.4 | 0.4 |
| Ni (mg/kg wet wt.): | 0.3 | bdl | bdl | 0.2442833 | 0.2505342 | 0.2640457 | 0.27 | 2.65 |
| d.l. (mg/kg): | 0.12 | 0.12 | 0.12 | 0.1421351 | 0.1449799 | 0.1313896 | 0.12 | 0.12 |
| Pb (mg/kg wet wt.): | bdl | bdl | bdl | 0.8045226 | 0.3465108 | 0.5581014 | bdl | bdl |
| d.l. (mg/kg): | 0.5 | 0.5 | 0.5 | 0.1421351 | 0.1449799 | 0.1313896 | 0.5 | 0.5 |
| Se (mg/kg wet wt.): | 0.33 | 0.53 | 0.36 | 0.644406 | 0.611826 | 0.559656 | bdl | 0.25 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1382237 | 0.1440936 | 0.1305864 | 0.2 | 0.1 |
| Sr (mg/kg wet wt.): | 58.3 | 117.0 | 90.0 | 64.5813 | 59.29566 | 56.7429 | 40.5 | 42.5 |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.0568428 | 0.0579805 | 0.0525455 | 0.05 | 0.05 |
| V (mg/kg wet wt.): | bdl | 0.08 | bdl | bdl | bdl | bdl | 0.39 | 0.17 |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.1421351 | 0.1449799 | 0.1313896 | 0.05 | 0.05 |
| Zn (mg/kg wet wt.): | 12.3 | 24.8 | 25.0 | 27.636294 | 27.320604 | 26.71321 | 11.6 | 12.9 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2842421 | 0.2899598 | 0.2627792 | 0.2 | 0.2 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXIVA. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE AT MOSSEY BREAK (WET WEIGHT) (continued).

| SAMPLE: | S7S5 | S7S6 |
|---|---|---|
| SAMPLE WT. (g): | 121.0 | 116.0 |
| % MOISTURE: | 77.86 | 78.41 |
| Al (mg/kg wet wt.): | 174.26394 | 205.62316 |
| d.l. (mg/kg): | 1.1114501 | 1.2863538 |
| As (mg/kg wet wt.): | 0.170478 | 0.164084 |
| d.l. (mg/kg): | 0.1120505 | 0.1088136 |
| B (mg/kg wet wt.): | 0.1617106 | 0.1791106 |
| d.l. (mg/kg): | 0.1111428 | 0.1286332 |
| Ba (mg/kg wet wt.): | 11.262618 | 12.599924 |
| d.l. (mg/kg): | 0.1111428 | 0.1286332 |
| Be (mg/kg wet wt.): | bdl | bdl |
| d.l. (mg/kg): | 0.0222286 | 0.0257353 |
| Cd (mg/kg wet wt.): | bdl | bdl |
| d.l. (mg/kg): | 0.0222286 | 0.0257353 |
| Cr (mg/kg wet wt.): | 0.6976314 | 0.6910959 |
| d.l. (mg/kg): | 0.1111428 | 0.1286332 |
| Cu (mg/kg wet wt.): | 2.962332 | 2.0428458 |
| d.l. (mg/kg): | 0.1111428 | 0.1286332 |
| Fe (mg/kg wet wt.): | 486.1944 | 637.3368 |
| d.l. (mg/kg): | 2.2229003 | 2.572686 |
| Hg (mg/kg wet wt.): | 0.0235348 | 0.0227775 |
| d.l. (mg/kg): | 0.0224057 | 0.0217627 |
| Mg (mg/kg wet wt.): | 348.4836 | 348.6785 |
| d.l. (mg/kg): | 2.2229003 | 2.572686 |
| Mn (mg/kg wet wt.): | 107.29044 | 125.20041 |
| d.l. (mg/kg): | 0.0889142 | 0.1028979 |
| Mo (mg/kg wet wt.): | bdl | bdl |
| d.l. (mg/kg): | 0.1111428 | 0.1286332 |
| Ni (mg/kg wet wt.): | 0.2371194 | 0.2640457 |
| d.l. (mg/kg): | 0.1111428 | 0.1286332 |
| Pb (mg/kg wet wt.): | 0.5929092 | 0.6975729 |
| d.l. (mg/kg): | 0.1111428 | 0.1286332 |
| Se (mg/kg wet wt.): | 0.37638 | 0.379984 |
| d.l. (mg/kg): | 0.1120505 | 0.1088136 |
| Sr (mg/kg wet wt.): | 31.06242 | 29.70784 |
| d.l. (mg/kg): | 0.0444571 | 0.051449 |
| V (mg/kg wet wt.): | 0.3847932 | 0.4622419 |
| d.l. (mg/kg): | 0.1111428 | 0.1286332 |
| Zn (mg/kg wet wt.): | 26.2359 | 27.03068 |
| d.l. (mg/kg): | 0.2222856 | 0.2572664 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXIVB. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE AT MOSSEY BREAK (DRY WEIGHT).

| SAMPLE: | S7B1 | S7BG2 | S7BG3 | S7R2 | S7R3 | S7R4 | S7S1 | S7S4 |
|---|---|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 153.36 | 104.37 | 42.6 | 267.0 | 246.0 | 90.0 | 101.72 | 124.71 |
| % MOISTURE: | 71.1 | 69.7 | 70.4 | 71.86 | 71.41 | 74.09 | 70.4 | 68.0 |
| Al (mg/kg dry wt.): | 3.67 | 19.37 | 22.5 | 83.8 | 69.79 | 78.46 | 235.81 | 110.94 |
| d.l. (mg/kg): | 3.46 | 3.30 | 3.38 | 5.051 | 5.071 | 5.071 | 3.38 | 3.13 |
| As (mg/kg dry wt.): | 0.28 | 0.46 | 1.18 | 0.58 | 0.56 | 0.63 | 1.08 | 0.56 |
| d.l. (mg/kg): | 0.28 | 0.33 | 0.34 | 0.491 | 0.504 | 0.504 | 0.34 | 0.31 |
| B (mg/kg dry wt.): | bdl | bdl | bdl | 1.043 | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 1.38 | 1.32 | 1.35 | 0.505 | 0.507 | 0.507 | 1.35 | 1.25 |
| Ba (mg/kg dry wt.): | 12.98 | 54.79 | 37.16 | 29.26 | 26.06 | 29.0 | 37.16 | 24.25 |
| d.l. (mg/kg): | 0.69 | 0.66 | 0.68 | 0.505 | 0.507 | 0.507 | 0.68 | 0.63 |
| Be (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.07 | 0.07 | 0.07 | 0.101 | 0.1014 | 0.1014 | 0.07 | 0.06 |
| Cd (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.21 | 0.2 | 0.2 | 0.101 | 0.1014 | 0.1014 | 0.2 | 0.19 |
| Cr (mg/kg dry wt.): | 1.8 | 2.41 | 2.05 | 5.246 | 3.426 | 6.383 | 1.92 | 2.2 |
| d.l. (mg/kg): | 0.35 | 0.33 | 0.34 | 0.505 | 0.507 | 0.507 | 0.34 | 0.31 |
| Cu (mg/kg dry wt.): | 1.57 | 1.60 | 1.97 | 17.64 | 5.99 | 3.60 | 3.61 | 2.01 |
| d.l. (mg/kg): | 0.35 | 0.33 | 0.34 | 0.505 | 0.507 | 0.507 | 0.34 | 0.31 |
| Fe (mg/kg dry wt.): | 64.71 | 125.08 | 135.14 | 173.6 | 138.4 | 203.9 | 1256.76 | 609.38 |
| d.l. (mg/kg): | 3.46 | 3.3 | 3.38 | 10.101 | 10.142 | 10.142 | 3.38 | 3.13 |
| Hg (mg/kg dry wt.): | 1.554 | 0.729 | 0.959 | 0.5245 | 0.7159 | 0.7467 | 0.071 | 0.20 |
| d.l. (mg/kg): | 0.035 | 0.033 | 0.034 | 0.098 | 0.101 | 0.101 | 0.034 | 0.031 |
| Mg (mg/kg dry wt.): | 1404.84 | 1848.18 | 1844.59 | 1667.0 | 1661.0 | 1792.0 | 1027.03 | 1071.88 |
| d.l. (mg/kg): | 3.46 | 3.30 | 3.38 | 10.101 | 10.142 | 10.142 | 3.38 | 3.13 |
| Mn (mg/kg dry wt.): | 13.63 | 321.78 | 183.45 | 84.42 | 93.58 | 135.20 | 203.72 | 200.0 |
| d.l. (mg/kg): | 0.35 | 0.33 | 0.34 | 0.404 | 0.406 | 0.406 | 0.34 | 0.31 |
| Mo (mg/kg dry wt.): | bdl | bdl | bdl | 1.024 | 0.708 | 0.8112 | bdl | bdl |
| d.l. (mg/kg): | 1.38 | 1.32 | 1.35 | 0.505 | 0.507 | 0.507 | 1.35 | 1.25 |
| Ni (mg/kg dry wt.): | 1.05 | bdl | bdl | 0.868 | 0.876 | 1.202 | 0.91 | 8.28 |
| d.l. (mg/kg): | 0.42 | 0.40 | 0.41 | 0.505 | 0.507 | 0.507 | 0.41 | 0.38 |
| Pb (mg/kg dry wt.): | bdl | bdl | bdl | 2.859 | 1.212 | 2.154 | bdl | bdl |
| d.l. (mg/kg): | 1.73 | 1.65 | 1.69 | 0.505 | 0.507 | 0.507 | 1.69 | 1.56 |
| Se (mg/kg dry wt.): | 1.14 | 1.74 | 1.22 | 2.29 | 2.14 | 2.16 | bdl | 0.79 |
| d.l. (mg/kg): | 0.35 | 0.33 | 0.34 | 0.491 | 0.504 | 0.504 | 0.66 | 0.31 |
| Sr (mg/kg dry wt.): | 201.73 | 386.14 | 304.05 | 229.5 | 207.4 | 219.0 | 136.82 | 132.81 |
| d.l. (mg/kg): | 0.17 | 0.17 | 0.17 | 0.202 | 0.203 | 0.203 | 0.17 | 0.16 |
| V (mg/kg dry wt.): | bdl | 0.26 | bdl | bdl | bdl | bdl | 1.31 | 0.53 |
| d.l. (mg/kg): | 0.17 | 0.17 | 0.17 | 0.505 | 0.507 | 0.507 | 0.17 | 0.16 |
| Zn (mg/kg dry wt.): | 42.56 | 81.85 | 84.46 | 98.21 | 95.56 | 103.10 | 39.19 | 40.31 |
| d.l. (mg/kg): | 0.69 | 0.66 | 0.68 | 1.01 | 1.0142 | 1.0142 | 0.68 | 0.63 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXIVB. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE AT MOSSEY BREAK (DRY WEIGHT) (continued).

| SAMPLE: | S7S5 | S7S6 |
|---|---|---|
| SAMPLE WT. (g): | 121.0 | 116.0 |
| % MOISTURE: | 77.86 | 78.41 |
| Al (mg/kg dry wt.): | 787.1 | 952.4 |
| d.l. (mg/kg): | 5.02 | 5.96 |
| As (mg/kg dry wt.): | 0.77 | 0.76 |
| d.l. (mg/kg): | 0.506 | 0.504 |
| B (mg/kg dry wt.): | 0.7304 | 0.8296 |
| d.l. (mg/kg): | 0.502 | 0.596 |
| Ba (mg/kg dry wt.): | 50.87 | 58.36 |
| d.l. (mg/kg): | 0.502 | 0.596 |
| Be (mg/kg dry wt.): | bdl | bdl |
| d.l. (mg/kg): | 0.1004 | 0.1192 |
| Cd (mg/kg dry wt.): | bdl | bdl |
| d.l. (mg/kg): | 0.1004 | 0.1192 |
| Cr (mg/kg dry wt.): | 3.151 | 3.201 |
| d.l. (mg/kg): | 0.502 | 0.596 |
| Cu (mg/kg dry wt.): | 13.38 | 9.46 |
| d.l. (mg/kg): | 0.502 | 0.596 |
| Fe (mg/kg dry wt.): | 2196.0 | 2952.0 |
| d.l. (mg/kg): | 10.04 | 11.92 |
| Hg (mg/kg dry wt.): | 0.1063 | 0.1008 |
| d.l. (mg/kg): | 0.1012 | 0.1008 |
| Mg (mg/kg dry wt.): | 1574.0 | 1615.0 |
| d.l. (mg/kg): | 10.04 | 11.92 |
| Mn (mg/kg dry wt.): | 484.6 | 579.9 |
| d.l. (mg/kg): | 0.402 | 0.477 |
| Mo (mg/kg dry wt.): | bdl | bdl |
| d.l. (mg/kg): | 0.502 | 0.596 |
| Ni (mg/kg dry wt.): | 1.071 | 1.223 |
| d.l. (mg/kg): | 0.502 | 0.596 |
| Pb (mg/kg dry wt.): | 2.678 | 3.231 |
| d.l. (mg/kg): | 0.502 | 0.596 |
| Se (mg/kg dry wt.): | 1.70 | 1.76 |
| d.l. (mg/kg): | 0.506 | 0.504 |
| Sr (mg/kg dry wt.): | 140.3 | 137.6 |
| d.l. (mg/kg): | 0.201 | 0.238 |
| V (mg/kg dry wt.): | 1.738 | 2.141 |
| d.l. (mg/kg): | 0.502 | 0.596 |
| Zn (mg/kg dry wt.): | 118.5 | 125.2 |
| d.l. (mg/kg): | 1.004 | 1.192 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXVA. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE AT CLINTONS CHUTE (WET WEIGHT).

| SAMPLE: | S8B1 | S8B3 | S8BG1 | S8BG2 | S8G1 | S8R2 | S8R3 | S8S1 |
|---|---|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 127.36 | 107.99 | 92.06 | 43.21 | 146.94 | 101.06 | 83.96 | 121.65 |
| % MOISTURE: | 72.5 | 71.5 | 68.6 | 72.7 | 70.2 | 68.2 | 73.0 | 69.0 |
| Al (mg/kg wet wt.): | bdl | 2.4 | 34.3 | 35.8 | 1.45 | 8.91 | 8.83 | 3.23 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| As (mg/kg wet wt.): | 0.05 | 0.14 | 0.18 | 0.25 | 0.24 | 0.17 | 0.25 | 0.34 |
| d.l. (mg/kg): | 0.05 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| B (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| Ba (mg/kg wet wt.): | 3.5 | 6.07 | 15.9 | 11.4 | 6.09 | 10.7 | 10.0 | 12.3 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Be (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | 0.03 |
| d.l. (mg/kg): | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |
| Cd (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 |
| Cr (mg/kg wet wt.): | 0.53 | 0.55 | 0.71 | 0.6 | 1.06 | 0.77 | 0.63 | 1.22 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Cu (mg/kg wet wt.): | 1.32 | 0.55 | 1.1 | 0.5 | 0.59 | 1.23 | 1.41 | 1.17 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Fe (mg/kg wet wt.): | 17.1 | 13.4 | 92.4 | 90.9 | 77.6 | 41.5 | 40.3 | 562.0 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Hg (mg/kg wet wt.): | 0.451 | 0.353 | 0.124 | 0.119 | 0.374 | 0.178 | 0.186 | 0.056 |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| Mg (mg/kg wet wt.): | 446.0 | 510.0 | 516.0 | 471.0 | 1420.0 | 459.0 | 488.0 | 336.0 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Mn (mg/kg wet wt.): | 2.39 | 6.48 | 82.0 | 51.5 | 27.0 | 12.8 | 18.0 | 64.1 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Mo (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| Ni (mg/kg wet wt.): | 0.31 | bdl | bdl | bdl | 3.27 | bdl | bdl | 7.85 |
| d.l. (mg/kg): | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 |
| Pb (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Se (mg/kg wet wt.): | 0.28 | 0.49 | 0.32 | 0.5 | 0.5 | 0.57 | 0.32 | 0.36 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Sr (mg/kg wet wt.): | 65.1 | 77.2 | 106.0 | 83.4 | 64.1 | 92.7 | 88.6 | 45.7 |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| V (mg/kg wet wt.): | bdl | bdl | 0.17 | 0.16 | bdl | 0.12 | 0.1 | 0.59 |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| Zn (mg/kg wet wt.): | 13.0 | 23.5 | 24.1 | 26.8 | 15.3 | 22.2 | 25.3 | 14.7 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXVB. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE AT CLINTONS CHUTE (DRY WEIGHT).

| SAMPLE: | S8B1 | S8B3 | S8BG1 | S8BG2 | S8G1 | S8R2 | S8R3 | S8S1 |
|---|---|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 127.36 | 107.99 | 92.06 | 43.21 | 146.94 | 101.06 | 83.96 | 121.65 |
| % MOISTURE: | 72.5 | 71.5 | 68.6 | 72.7 | 70.2 | 68.2 | 73.0 | 69.0 |
| Al (mg/kg dry wt.): | bdl | 8.42 | 109.24 | 131.14 | 4.87 | 28.02 | 32.7 | 464.52 |
| d.l. (mg/kg): | 3.64 | 3.51 | 3.18 | 3.66 | 3.36 | 3.14 | 3.70 | 3.23 |
| As (mg/kg dry wt.): | 0.18 | 0.49 | 0.57 | 0.92 | 0.81 | 0.53 | 0.93 | 1.1 |
| d.l. (mg/kg): | 0.18 | 0.35 | 0.32 | 0.37 | 0.34 | 0.31 | 0.37 | 0.32 |
| B (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 1.45 | 1.40 | 1.27 | 1.47 | 1.34 | 1.26 | 1.48 | 1.29 |
| Ba (mg/kg dry wt.): | 12.73 | 21.30 | 50.64 | 41.76 | 20.44 | 33.65 | 37.04 | 39.68 |
| d.l. (mg/kg): | 0.73 | 0.70 | 0.64 | 0.73 | 0.67 | 0.63 | 0.74 | 0.65 |
| Be (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | 0.08 |
| d.l. (mg/kg): | 0.07 | 0.07 | 0.06 | 0.07 | 0.07 | 0.06 | 0.07 | 0.06 |
| Cd (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.22 | 0.21 | 0.19 | 0.22 | 0.20 | 0.19 | 0.22 | 0.19 |
| Cr (mg/kg dry wt.): | 1.94 | 1.94 | 2.25 | 2.19 | 3.56 | 2.42 | 2.33 | 3.94 |
| d.l. (mg/kg): | 0.36 | 0.35 | 0.32 | 0.37 | 0.34 | 0.31 | 0.37 | 0.32 |
| Cu (mg/kg dry wt.): | 4.82 | 1.94 | 3.5 | 1.82 | 1.97 | 3.87 | 5.22 | 3.77 |
| d.l. (mg/kg): | 0.36 | 0.35 | 0.32 | 0.37 | 0.34 | 0.31 | 0.37 | 0.32 |
| Fe (mg/kg dry wt.): | 62.18 | 47.02 | 294.27 | 332.97 | 260.4 | 130.5 | 149.26 | 1812.9 |
| d.l. (mg/kg): | 3.64 | 3.51 | 3.18 | 3.66 | 3.36 | 3.14 | 3.70 | 3.23 |
| Hg (mg/kg dry wt.): | 1.641 | 1.239 | 0.395 | 0.436 | 1.255 | 0.56 | 0.689 | 0.181 |
| d.l. (mg/kg): | 0.036 | 0.035 | 0.032 | 0.037 | 0.034 | 0.031 | 0.037 | 0.032 |
| Mg (mg/kg dry wt.): | 1621.82 | 1789.47 | 1643.31 | 1725.27 | 4765.1 | 1443.4 | 1807.41 | 1083.87 |
| d.l. (mg/kg): | 3.64 | 3.51 | 3.18 | 3.66 | 3.36 | 3.14 | 3.70 | 3.23 |
| Mn (mg/kg dry wt.): | 8.69 | 22.74 | 261.15 | 188.64 | 90.6 | 40.25 | 66.67 | 206.77 |
| d.l. (mg/kg): | 0.36 | 0.35 | 0.32 | 0.37 | 0.34 | 0.31 | 0.37 | 0.32 |
| Mo (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 1.45 | 1.4 | 1.27 | 1.47 | 1.34 | 1.26 | 1.48 | 1.29 |
| Ni (mg/kg dry wt.): | 1.11 | bdl | bdl | bdl | 10.97 | bdl | bdl | 25.32 |
| d.l. (mg/kg): | 0.44 | 0.42 | 0.38 | 0.44 | 0.40 | 0.38 | 0.44 | 0.39 |
| Pb (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 1.82 | 1.75 | 1.59 | 1.83 | 1.68 | 1.57 | 1.85 | 1.61 |
| Se (mg/kg dry wt.): | 1.0 | 1.71 | 1.02 | 1.84 | 1.69 | 1.78 | 1.20 | 1.16 |
| d.l. (mg/kg): | 0.36 | 0.35 | 0.32 | 0.37 | 0.34 | 0.31 | 0.37 | 0.32 |
| Sr (mg/kg dry wt.): | 236.73 | 270.88 | 337.58 | 305.49 | 215.10 | 291.51 | 328.15 | 147.42 |
| d.l. (mg/kg): | 0.18 | 0.18 | 0.16 | 0.18 | 0.17 | 0.16 | 0.19 | 0.16 |
| V (mg/kg dry wt.): | bdl | bdl | 0.55 | 0.59 | bdl | 0.39 | 0.37 | 1.91 |
| d.l. (mg/kg): | 0.18 | 0.18 | 0.16 | 0.18 | 0.17 | 0.16 | 0.19 | 0.16 |
| Zn (mg/kg dry wt.): | 42.27 | 82.46 | 76.75 | 98.17 | 51.34 | 69.81 | 93.70 | 47.42 |
| d.l. (mg/kg): | 0.73 | 0.70 | 0.64 | 0.73 | 0.67 | 0.63 | 0.74 | 0.65 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXVIA. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE AT GOOSE PRAIRIE (WET WEIGHT).

| SAMPLE: | S9G1 | S9G2 | S9M1 | S9M2 |
|---|---|---|---|---|
| SAMPLE WT. (g): | 152.95 | 114.0 | 7.77 | 5.89 |
| % MOISTURE: | 65.8 | 69.9 | 76.9 | 75.5 |
| Al (mg/kg wet wt.): | bdl | bdl | 11.4 | bdl |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 |
| As (mg/kg wet wt.): | 0.38 | 0.21 | 0.22 | 0.21 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 |
| B (mg/kg wet wt.): | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.4 | 0.4 | 0.4 | 0.4 |
| Ba (mg/kg wet wt.): | 10.3 | 11.8 | 14.6 | 13.5 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 |
| Be (mg/kg wet wt.): | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.02 | 0.02 | 0.02 |
| Cd (mg/kg wet wt.): | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.06 | 0.06 | 0.06 | 0.06 |
| Cr (mg/kg wet wt.): | 1.69 | 0.94 | 0.78 | 0.45 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 |
| Cu (mg/kg wet wt.): | 0.55 | 5.4 | 2.41 | 1.34 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 |
| Fe (mg/kg wet wt.): | 48.5 | 47.2 | 93.6 | 49.6 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 |
| Hg (mg/kg wet wt.): | 0.364 | 0.441 | 0.035 | 0.031 |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 | 0.01 |
| Mg (mg/kg wet wt.): | 3300.0 | 1820.0 | 361.0 | 305.0 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 |
| Mn (mg/kg wet wt.): | 50.6 | 53.0 | 87.6 | 78.1 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 |
| Mo (mg/kg wet wt.): | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.4 | 0.4 | 0.4 | 0.4 |
| Ni (mg/kg wet wt.): | 1.13 | 1.15 | 0.86 | 0.33 |
| d.l. (mg/kg): | 0.12 | 0.12 | 0.12 | 0.12 |
| Pb (mg/kg wet wt.): | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.5 | 0.5 | 0.5 | 0.5 |
| Se (mg/kg wet wt.): | 0.25 | 0.31 | 0.4 | 0.4 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 |
| Sr (mg/kg wet wt.): | 116.0 | 68.0 | 33.1 | 27.8 |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.05 |
| V (mg/kg wet wt.): | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.05 |
| Zn (mg/kg wet wt.): | 25.4 | 19.4 | 40.8 | 36.3 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXVIB. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE AT GOOSE PRAIRIE (DRY WEIGHT).

| SAMPLE: | S9G1 | S9G2 | S9M1 | S9M2 |
|---|---|---|---|---|
| SAMPLE WT. (g): | 152.95 | 114.0 | 7.77 | 5.89 |
| % MOISTURE: | 65.8 | 69.9 | 76.9 | 75.5 |
| Al (mg/kg dry wt.): | bdl | bdl | 49.35 | bdl |
| d.l. (mg/kg): | 2.92 | 3.32 | 4.33 | 4.08 |
| As (mg/kg dry wt.): | 1.11 | 0.70 | 0.95 | 0.86 |
| d.l. (mg/kg): | 0.29 | 0.33 | 0.43 | 0.41 |
| B (mg/kg dry wt.): | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 1.17 | 1.33 | 1.73 | 1.63 |
| Ba (mg/kg dry wt.): | 30.12 | 39.2 | 63.2 | 55.1 |
| d.l. (mg/kg): | 0.58 | 0.66 | 0.87 | 0.82 |
| Be (mg/kg dry wt.): | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.06 | 0.07 | 0.09 | 0.08 |
| Cd (mg/kg dry wt.): | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.18 | 0.20 | 0.26 | 0.24 |
| Cr (mg/kg dry wt.): | 4.94 | 3.12 | 3.39 | 1.82 |
| d.l. (mg/kg): | 0.29 | 0.33 | 0.43 | 0.41 |
| Cu (mg/kg dry wt.): | 1.61 | 17.94 | 10.43 | 5.47 |
| d.l. (mg/kg): | 0.29 | 0.33 | 0.43 | 0.41 |
| Fe (mg/kg dry wt.): | 141.81 | 156.81 | 405.19 | 202.45 |
| d.l. (mg/kg): | 2.92 | 3.32 | 4.33 | 4.08 |
| Hg (mg/kg dry wt.): | 1.064 | 1.465 | 0.152 | 0.127 |
| d.l. (mg/kg): | 0.029 | 0.033 | 0.043 | 0.041 |
| Mg (mg/kg dry wt.): | 9649.13 | 6046.51 | 1562.77 | 1244.9 |
| d.l. (mg/kg): | 2.92 | 3.32 | 4.33 | 4.08 |
| Mn (mg/kg dry wt.): | 147.95 | 176.08 | 379.22 | 318.78 |
| d.l. (mg/kg): | 0.29 | 0.33 | 0.43 | 0.41 |
| Mo (mg/kg dry wt.): | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 1.17 | 1.33 | 1.73 | 1.63 |
| Ni (mg/kg dry wt.): | 3.30 | 3.82 | 3.71 | 1.37 |
| d.l. (mg/kg): | 0.35 | 0.40 | 0.52 | 0.49 |
| Pb (mg/kg dry wt.): | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 1.46 | 1.66 | 2.16 | 2.04 |
| Se (mg/kg dry wt.): | 0.75 | 1.02 | 1.71 | 1.65 |
| d.l. (mg/kg): | 0.29 | 0.33 | 0.43 | 0.41 |
| Sr (mg/kg dry wt.): | 339.18 | 225.91 | 143.29 | 113.47 |
| d.l. (mg/kg): | 0.15 | 0.17 | 0.22 | 0.20 |
| V (mg/kg dry wt.): | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.15 | 0.17 | 0.22 | 0.20 |
| Zn (mg/kg dry wt.): | 74.27 | 64.45 | 176.62 | 148.16 |
| d.l. (mg/kg): | 0.58 | 0.66 | 0.87 | 0.82 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXVIIA. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE AT UNCERTAIN (WET WEIGHT).

| SAMPLE: | S10B1 | S10B3 | S10BG1 | S10G1 | S10G2 | S10R2 | S10R3 | S10S1 |
|---|---|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 126.35 | 126.46 | 92.87 | 140.19 | 140.93 | 307.0 | 239.0 | 131.05 |
| % MOISTURE: | 73 | 70.6 | 71.9 | 67.4 | 64.1 | 73.79 | 71.69 | 70.3 |
| Al (mg/kg wet wt.): | bdl | 1.84 | 4.3 | 0.99 | bdl | 14.221546 | 13.968154 | 38.5 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 0.99 | 1.0 | 1.3210626 | 1.438516 | 1.0 |
| As (mg/kg wet wt.): | 0.32 | 0.24 | 0.27 | 0.6 | 0.47 | bdl | bdl | 0.41 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1318363 | 0.1423993 | 0.1 |
| B (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | 0.1481389 | bdl | bdl |
| d.l. (mg/kg): | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.1320984 | 0.1438431 | 0.4 |
| Ba (mg/kg wet wt.): | 3.58 | 4.1 | 13.4 | 7.36 | 7.28 | 5.496237 | 6.293313 | 11.3 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1320984 | 0.1438431 | 0.2 |
| Be (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.0264197 | 0.028763 | 0.02 |
| Cd (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.0264197 | 0.028763 | 0.06 |
| Cr (mg/kg wet wt.): | 0.58 | 0.52 | 0.63 | 1.46 | 1.06 | 1.1503569 | 1.3484053 | 0.55 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1320984 | 0.1438431 | 0.1 |
| Cu (mg/kg wet wt.): | 3.79 | 0.6 | 1.36 | 5.94 | 0.61 | 1.4216304 | 3.346242 | 0.65 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1320984 | 0.1438431 | 0.1 |
| Fe (mg/kg wet wt.): | 16.3 | 24.4 | 28.2 | 80.4 | 35.3 | 30.19392 | 33.17932 | 232.0 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 2.6421253 | 2.8770321 | 1.0 |
| Hg (mg/kg wet wt.): | 0.485 | 0.242 | 0.123 | 0.409 | 0.479 | 0.1481127 | 0.1257813 | 0.043 |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.0263673 | 0.0284799 | 0.01 |
| Mg (mg/kg wet wt.): | 454.0 | 434.0 | 527.0 | 3160.0 | 2350.0 | 425.6504 | 428.0472 | 327.0 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 2.6421253 | 2.8770321 | 1.0 |
| Mn (mg/kg wet wt.): | 3.39 | 9.35 | 95 | 51.4 | 54.2 | 12.245312 | 14.123859 | 189.0 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1056787 | 0.1150802 | 0.1 |
| Mo (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | 0.1511188 | bdl |
| d.l. (mg/kg): | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.1320984 | 0.1438431 | 0.4 |
| Ni (mg/kg wet wt.): | 0.29 | 0.16 | bdl | 3.24 | 0.74 | 0.1469817 | 0.2613013 | 0.46 |
| d.l. (mg/kg): | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.1320984 | 0.1438431 | 0.12 |
| Pb (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | 0.4976898 | bdl |
| d.l. (mg/kg): | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.1320984 | 0.1438431 | 0.5 |
| Se (mg/kg wet wt.): | 0.24 | 0.36 | 0.26 | 0.46 | 0.38 | 0.539926 | 0.685102 | 0.24 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1318363 | 0.1423993 | 0.1 |
| Sr (mg/kg wet wt.): | 60.7 | 58.8 | 95.1 | 148.0 | 103.0 | 46.3917 | 48.83475 | 41.9 |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.0528394 | 0.0575542 | 0.05 |
| V (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | 0.12 |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.1320984 | 0.1438431 | 0.05 |
| Zn (mg/kg wet wt.): | 14.6 | 14.6 | 28.0 | 21.4 | 19.7 | 27.91365 | 27.842885 | 12.9 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.264223 | 0.2877145 | 0.2 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXVIIA. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE AT UNCERTAIN (WET WEIGHT) (continued).

| SAMPLE: | S10S2 | S10S3 |
|---|---|---|
| SAMPLE WT. (g): | 101.3 | 104.03 |
| % MOISTURE: | 73.1 | 73.7 |
| Al (mg/kg wet wt.): | 124.0 | 94.8 |
| d.l. (mg/kg): | 1.0 | 1.0 |
| As (mg/kg wet wt.): | 0.29 | 0.31 |
| d.l. (mg/kg): | 0.1 | 0.1 |
| B (mg/kg wet wt.): | 0.4 | bdl |
| d.l. (mg/kg): | 0.4 | 0.4 |
| Ba (mg/kg wet wt.): | 12.4 | 12.5 |
| d.l. (mg/kg): | 0.2 | 0.2 |
| Be (mg/kg wet wt.): | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.02 |
| Cd (mg/kg wet wt.): | bdl | bdl |
| d.l. (mg/kg): | 0.06 | 0.06 |
| Cr (mg/kg wet wt.): | 0.53 | 0.49 |
| d.l. (mg/kg): | 0.1 | 0.1 |
| Cu (mg/kg wet wt.): | 1.16 | 1.43 |
| d.l. (mg/kg): | 0.1 | 0.1 |
| Fe (mg/kg wet wt.): | 507.0 | 464.0 |
| d.l. (mg/kg): | 1.0 | 1.0 |
| Hg (mg/kg wet wt.): | 0.04 | 0.027 |
| d.l. (mg/kg): | 0.01 | 0.01 |
| Mg (mg/kg wet wt.): | 340.0 | 326.0 |
| d.l. (mg/kg): | 1.0 | 1.0 |
| Mn (mg/kg wet wt.): | 168.0 | 162.0 |
| d.l. (mg/kg): | 0.1 | 0.1 |
| Mo (mg/kg wet wt.): | bdl | bdl |
| d.l. (mg/kg): | 0.4 | 0.4 |
| Ni (mg/kg wet wt.): | bdl | bdl |
| d.l. (mg/kg): | 0.12 | 0.12 |
| Pb (mg/kg wet wt.): | bdl | bdl |
| d.l. (mg/kg): | 0.5 | 0.5 |
| Se (mg/kg wet wt.): | 0.22 | 0.5 |
| d.l. (mg/kg): | 0.1 | 0.1 |
| Sr (mg/kg wet wt.): | 37.8 | 38.6 |
| d.l. (mg/kg): | 0.05 | 0.05 |
| V (mg/kg wet wt.): | 0.35 | 0.26 |
| d.l. (mg/kg): | 0.05 | 0.05 |
| Zn (mg/kg wet wt.): | 24.5 | 24.2 |
| d.l. (mg/kg): | 0.2 | 0.2 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXVIIB. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE AT UNCERTAIN (DRY WEIGHT).

| SAMPLE: | S10B1 | S10B3 | S10BG1 | S10G1 | S10G2 | S10R2 | S10R3 | S10S1 |
|---|---|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 126.35 | 126.46 | 92.87 | 140.19 | 140.93 | 307.0 | 239.0 | 131.05 |
| % MOISTURE: | 73 | 70.6 | 71.9 | 67.4 | 64.1 | 73.79 | 71.69 | 70.3 |
| Al (mg/kg dry wt.): | bdl | 6.26 | 15.30 | 3.05 | bdl | 54.26 | 49.34 | 129.63 |
| d.l. (mg/kg): | 3.7 | 3.4 | 3.56 | 3.05 | 2.79 | 5.04 | 5.08 | 3.37 |
| As (mg/kg dry wt.): | 1.19 | 0.82 | 0.96 | 1.84 | 1.31 | bdl | bdl | 1.38 |
| d.l. (mg/kg): | 0.37 | 0.34 | 0.36 | 0.31 | 0.28 | 0.503 | 0.503 | 0.34 |
| B (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | 0.5652 | bdl | bdl |
| d.l. (mg/kg): | 1.48 | 1.36 | 1.42 | 1.23 | 1.11 | 0.504 | 0.508 | 1.35 |
| Ba (mg/kg dry wt.): | 13.26 | 13.95 | 47.69 | 22.58 | 20.28 | 20.97 | 22.23 | 38.05 |
| d.l. (mg/kg): | 0.74 | 0.68 | 0.71 | 0.61 | 0.56 | 0.504 | 0.508 | 0.67 |
| Be (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.07 | 0.07 | 0.07 | 0.06 | 0.06 | 0.101 | 0.102 | 0.07 |
| Cd (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.22 | 0.20 | 0.20 | 0.18 | 0.17 | 0.101 | 0.102 | 0.20 |
| Cr (mg/kg dry wt.): | 2.13 | 1.77 | 2.23 | 4.48 | 2.95 | 4.39 | 4.76 | 1.84 |
| d.l. (mg/kg): | 0.37 | 0.34 | 0.36 | 0.31 | 0.28 | 0.504 | 0.508 | 0.34 |
| Cu (mg/kg dry wt.): | 14.04 | 2.03 | 4.84 | 18.22 | 1.70 | 5.424 | 11.82 | 2.20 |
| d.l. (mg/kg): | 0.37 | 0.34 | 0.36 | 0.31 | 0.28 | 0.504 | 0.508 | 0.34 |
| Fe (mg/kg dry wt.): | 60.37 | 82.99 | 100.36 | 246.63 | 98.33 | 115.20 | 117.20 | 781.14 |
| d.l. (mg/kg): | 3.70 | 3.40 | 3.56 | 3.07 | 2.79 | 10.081 | 10.163 | 3.37 |
| Hg (mg/kg dry wt.): | 1.796 | 0.823 | 0.438 | 1.255 | 1.334 | 0.5651 | 0.4443 | 0.145 |
| d.l. (mg/kg): | 0.037 | 0.034 | 0.036 | 0.031 | 0.028 | 0.101 | 0.101 | 0.034 |
| Mg (mg/kg dry wt.): | 1681.48 | 1476.19 | 1875.44 | 9693.25 | 6545.96 | 1624.0 | 1512.0 | 1101.01 |
| d.l. (mg/kg): | 3.7 | 3.4 | 3.56 | 3.07 | 2.79 | 10.081 | 10.163 | 3.37 |
| Mn (mg/kg dry wt.): | 12.56 | 31.8 | 338.08 | 157.67 | 150.97 | 46.72 | 49.89 | 636.36 |
| d.l. (mg/kg): | 0.37 | 0.34 | 0.36 | 0.31 | 0.28 | 0.403 | 0.407 | 0.34 |
| Mo (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | 0.5338 | bdl |
| d.l. (mg/kg): | 1.48 | 1.36 | 1.42 | 1.23 | 1.11 | 0.504 | 0.508 | 1.35 |
| Ni (mg/kg dry wt.): | 1.07 | 0.54 | bdl | 9.94 | 2.05 | 0.565 | 0.923 | 1.55 |
| d.l. (mg/kg): | 0.44 | 0.41 | 0.43 | 0.37 | 0.33 | 0.504 | 0.508 | 0.40 |
| Pb (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | 1.758 | bdl |
| d.l. (mg/kg): | 1.85 | 1.70 | 1.78 | 1.53 | 1.39 | 0.504 | 0.508 | 1.68 |
| Se (mg/kg dry wt.): | 0.87 | 1.22 | 0.91 | 1.41 | 1.07 | 2.06 | 2.42 | 0.81 |
| d.l. (mg/kg): | 0.37 | 0.34 | 0.36 | 0.31 | 0.28 | 0.503 | 0.503 | 0.34 |
| Sr (mg/kg dry wt.): | 224.81 | 200.0 | 338.43 | 453.99 | 286.91 | 177.0 | 172.5 | 141.08 |
| d.l. (mg/kg): | 0.19 | 0.17 | 0.18 | 0.15 | 0.14 | 0.202 | 0.203 | 0.17 |
| V (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | 0.39 |
| d.l. (mg/kg): | 0.19 | 0.17 | 0.18 | 0.15 | 0.14 | 0.504 | 0.508 | 0.17 |
| Zn (mg/kg dry wt.): | 54.07 | 49.66 | 99.64 | 65.64 | 54.87 | 106.5 | 98.35 | 43.43 |
| d.l. (mg/kg): | 0.74 | 0.68 | 0.71 | 0.61 | 0.56 | 1.01 | 1.02 | 0.67 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXVIIB. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE AT UNCERTAIN (DRY WEIGHT) (continued).

| SAMPLE: | S10S2 | S10S3 |
|---|---|---|
| SAMPLE WT. (g): | 101.3 | 104.03 |
| % MOISTURE: | 73.1 | 73.7 |
| Al (mg/kg dry wt.): | 460.97 | 360.46 |
| d.l. (mg/kg): | 3.72 | 3.80 |
| As (mg/kg dry wt.): | 1.08 | 1.18 |
| d.l. (mg/kg): | 0.37 | 0.38 |
| B (mg/kg dry wt.): | 1.51 | bdl |
| d.l. (mg/kg): | 1.49 | 1.52 |
| Ba (mg/kg dry wt.): | 46.1 | 47.53 |
| d.l. (mg/kg): | 0.74 | 0.76 |
| Be (mg/kg dry wt.): | bdl | bdl |
| d.l. (mg/kg): | 0.07 | 0.08 |
| Cd (mg/kg dry wt.): | bdl | bdl |
| d.l. (mg/kg): | 0.22 | 0.23 |
| Cr (mg/kg dry wt.): | 1.99 | 1.86 |
| d.l. (mg/kg): | 0.37 | 0.38 |
| Cu (mg/kg dry wt.): | 4.31 | 5.44 |
| d.l. (mg/kg): | 0.37 | 0.38 |
| Fe (mg/kg dry wt.): | 1884.76 | 1764.26 |
| d.l. (mg/kg): | 3.72 | 3.80 |
| Hg (mg/kg dry wt.): | 0.149 | 0.103 |
| d.l. (mg/kg): | 0.037 | 0.038 |
| Mg (mg/kg dry wt.): | 1263.94 | 1239.54 |
| d.l. (mg/kg): | 3.72 | 3.80 |
| Mn (mg/kg dry wt.): | 624.54 | 615.97 |
| d.l. (mg/kg): | 0.37 | 0.38 |
| Mo (mg/kg dry wt.): | bdl | bdl |
| d.l. (mg/kg): | 1.49 | 1.52 |
| Ni (mg/kg dry wt.): | bdl | bdl |
| d.l. (mg/kg): | 0.45 | 0.46 |
| Pb (mg/kg dry wt.): | bdl | bdl |
| d.l. (mg/kg): | 1.86 | 1.90 |
| Se (mg/kg dry wt.): | 0.84 | 1.89 |
| d.l. (mg/kg): | 0.37 | 0.38 |
| Sr (mg/kg dry wt.): | 140.52 | 146.77 |
| d.l. (mg/kg): | 0.19 | 0.19 |
| V (mg/kg dry wt.): | 1.29 | 0.99 |
| d.l. (mg/kg): | 0.19 | 0.19 |
| Zn (mg/kg dry wt.): | 91.08 | 92.02 |
| d.l. (mg/kg): | 0.74 | 0.76 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXVIIIA. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE AT SOUTH LITTLE GREEN BREAK (WET WEIGHT).

| SAMPLE: | S11B1 | S11B3 | S11BG2 | S11BG3 | S11G1 | S11G2 | S11R1 | S11R2 |
|---|---|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 128.78 | 84.49 | 55.91 | 31.6 | 149.9 | 133.76 | 153.0 | 252.0 |
| % MOISTURE: | 68.4 | 74.0 | 71.7 | 73.0 | 70.1 | 65.4 | 74.15 | 72.79 |
| Al (mg/kg wet wt.): | bdl | 2.12 | 2.4 | 2.69 | bdl | bdl | 15.18429 | 20.467362 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.3003067 | 1.3659692 |
| As (mg/kg wet wt.): | 0.32 | 0.28 | 0.3 | 0.44 | 0.54 | 0.28 | bdl | bdl |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1305684 | 0.1368663 |
| B (mg/kg wet wt.): | bdl | 0.63 | bdl | bdl | bdl | bdl | 0.1366948 | bdl |
| d.l. (mg/kg): | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.1300255 | 0.1365942 |
| Ba (mg/kg wet wt.): | 2.85 | 5.24 | 13.8 | 11.8 | 5.08 | 11.9 | 6.449575 | 8.84325 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1300255 | 0.1365942 |
| Be (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.0260051 | 0.0273188 |
| Cd (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.0260051 | 0.0273188 |
| Cr (mg/kg wet wt.): | 0.53 | 0.53 | 0.7 | 0.63 | 1.07 | 1.32 | 0.96679 | 4.631142 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1300255 | 0.1365942 |
| Cu (mg/kg wet wt.): | 49.2 | 0.92 | 0.73 | 1.35 | 9.37 | 0.97 | 1.785201 | 1.3692072 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1300255 | 0.1365942 |
| Fe (mg/kg wet wt.): | 18.0 | 25.7 | 25.4 | 33.7 | 50.9 | 43.7 | 35.4145 | 78.96342 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 2.6006134 | 2.7319384 |
| Hg (mg/kg wet wt.): | 0.263 | 0.1 | 0.161 | 0.111 | 0.497 | 0.304 | 0.1186257 | 0.1765657 |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.0261085 | 0.0273733 |
| Mg (mg/kg wet wt.): | 416.0 | 442.0 | 543.0 | 482.0 | 2130.0 | 3090.0 | 471.7625 | 539.5743 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 2.6006134 | 2.73419384 |
| Mn (mg/kg wet wt.): | 4.37 | 14.5 | 58.7 | 56.4 | 20.0 | 47.1 | 24.85219 | 31.04661 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1040204 | 0.1092754 |
| Mo (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.1300255 | 0.1365942 |
| Ni (mg/kg wet wt.): | 0.51 | bdl | bdl | bdl | 1.89 | 1.21 | bdl | 0.7934436 |
| d.l. (mg/kg): | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.1300255 | 0.1365942 |
| Pb (mg/kg wet wt.): | 2.62 | bdl | bdl | bdl | 0.58 | bdl | bdl | 0.546921 |
| d.l. (mg/kg): | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.1300255 | 0.1365942 |
| Se (mg/kg wet wt.): | 0.38 | 0.46 | bdl | 0.38 | 0.43 | 0.33 | 0.478225 | 0.593178 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1305684 | 0.1368663 |
| Sr (mg/kg wet wt.): | 60.7 | 68.3 | 105.0 | 82.6 | 142.0 | 147.0 | 51.20885 | 67.45359 |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.0520102 | 0.0546377 |
| V (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.1300255 | 0.1365942 |
| Zn (mg/kg wet wt.): | 14.5 | 21.2 | 30.1 | 29.2 | 18.1 | 23.0 | 24.58335 | 27.80862 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.260051 | 0.2731884 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXVIIIA. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE AT SOUTH LITTLE GREEN BREAK (WET WEIGHT) (continued).

| SAMPLE: | S11S1 | S11S2 |
|---|---|---|
| SAMPLE WT. (g): | 110.41 | 123.86 |
| % MOISTURE: | 67.7 | 67.1 |
| Al (mg/kg wet wt.): | 96.9 | 77.6 |
| d.l. (mg/kg): | 1.0 | 1.0 |
| As (mg/kg wet wt.): | 1.04 | 0.93 |
| d.l. (mg/kg): | 0.1 | 0.1 |
| B (mg/kg wet wt.): | bdl | bdl |
| d.l. (mg/kg): | 0.4 | 0.4 |
| Ba (mg/kg wet wt.): | 27.1 | 27.1 |
| d.l. (mg/kg): | 0.2 | 0.2 |
| Be (mg/kg wet wt.): | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.02 |
| Cd (mg/kg wet wt.): | bdl | bdl |
| d.l. (mg/kg): | 0.06 | 0.06 |
| Cr (mg/kg wet wt.): | 0.62 | 0.77 |
| d.l. (mg/kg): | 0.1 | 0.1 |
| Cu (mg/kg wet wt.): | 0.8 | 44.5 |
| d.l. (mg/kg): | 0.1 | 0.1 |
| Fe (mg/kg wet wt.): | 734.0 | 644.0 |
| d.l. (mg/kg): | 1.0 | 1.0 |
| Hg (mg/kg wet wt.): | 0.032 | 0.034 |
| d.l. (mg/kg): | 0.01 | 0.01 |
| Mg (mg/kg wet wt.): | 321.0 | 326.0 |
| d.l. (mg/kg): | 1.0 | 1.0 |
| Mn (mg/kg wet wt.): | 332.0 | 392.0 |
| d.l. (mg/kg): | 0.1 | 0.1 |
| Mo (mg/kg wet wt.): | bdl | bdl |
| d.l. (mg/kg): | 0.4 | 0.4 |
| Ni (mg/kg wet wt.): | 1.44 | 2.67 |
| d.l. (mg/kg): | 0.12 | 0.12 |
| Pb (mg/kg wet wt.): | bdl | 2.31 |
| d.l. (mg/kg): | 0.5 | 0.5 |
| Se (mg/kg wet wt.): | 0.28 | 0.25 |
| d.l. (mg/kg): | 0.1 | 0.1 |
| Sr (mg/kg wet wt.): | 54.0 | 38.4 |
| d.l. (mg/kg): | 0.05 | 0.05 |
| V (mg/kg wet wt.): | 0.35 | 0.25 |
| d.l. (mg/kg): | 0.05 | 0.05 |
| Zn (mg/kg wet wt.): | 13.5 | 14.0 |
| d.l. (mg/kg): | 0.2 | 0.2 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXVIIIB. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE AT SOUTH LITTLE GREEN BREAK (DRY WEIGHT).

| SAMPLE: | S11B1 | S11B3 | S11BG2 | S11BG3 | S11G1 | S11G2 | S11R1 | S11R2 |
|---|---|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 128.78 | 84.49 | 55.91 | 31.6 | 149.9 | 133.76 | 153.0 | 252.0 |
| % MOISTURE: | 68.4 | 74.0 | 71.7 | 73.0 | 70.1 | 65.4 | 74.15 | 72.79 |
| Al (mg/kg dry wt.): | bdl | 8.15 | 8.48 | 9.96 | bdl | bdl | 58.74 | 75.22 |
| d.l. (mg/kg): | 3.16 | 3.85 | 3.53 | 3.70 | 3.34 | 2.89 | 5.03 | 5.02 |
| As (mg/kg dry wt.): | 1.01 | 1.08 | 1.06 | 1.63 | 1.81 | 0.81 | bdl | bdl |
| d.l. (mg/kg): | 0.32 | 0.38 | 0.35 | 0.37 | 0.33 | 0.29 | 0.505 | 0.503 |
| B (mg/kg dry wt.): | bdl | 2.4 | bdl | bdl | bdl | bdl | 0.529 | bdl |
| d.l. (mg/kg): | 1.27 | 1.54 | 1.41 | 1.48 | 1.34 | 1.16 | 0.503 | 0.502 |
| Ba (mg/kg dry wt.): | 9.02 | 20.15 | 48.76 | 43.70 | 16.99 | 34.39 | 24.95 | 32.50 |
| d.l. (mg/kg): | 0.63 | 0.77 | 0.71 | 0.74 | 0.67 | 0.58 | 0.503 | 0.502 |
| Be (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.06 | 0.08 | 0.07 | 0.07 | 0.07 | 0.06 | 0.101 | 0.1004 |
| Cd (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.19 | 0.23 | 0.21 | 0.22 | 0.20 | 0.17 | 0.101 | 0.1004 |
| Cr (mg/kg dry wt.): | 1.69 | 2.03 | 2.47 | 2.34 | 3.58 | 3.82 | 3.74 | 17.02 |
| d.l. (mg/kg): | 0.32 | 0.38 | 0.35 | 0.37 | 0.33 | 0.29 | 0.503 | 0.502 |
| Cu (mg/kg dry wt.): | 155.70 | 3.55 | 2.59 | 5.0 | 31.34 | 2.81 | 6.906 | 5.032 |
| d.l. (mg/kg): | 0.32 | 0.38 | 0.35 | 0.37 | 0.33 | 0.29 | 0.503 | 0.502 |
| Fe (mg/kg dry wt.): | 56.96 | 98.85 | 89.75 | 124.81 | 170.23 | 126.3 | 137.0 | 290.2 |
| d.l. (mg/kg): | 3.16 | 3.85 | 3.53 | 3.70 | 3.34 | 2.89 | 10.06 | 10.04 |
| Hg (mg/kg dry wt.): | 0.832 | 0.385 | 0.569 | 0.411 | 1.662 | 0.879 | 0.4589 | 0.6489 |
| d.l. (mg/kg): | 0.032 | 0.038 | 0.035 | 0.037 | 0.033 | 0.029 | 0.101 | 0.101 |
| Mg (mg/kg dry wt.): | 1316.46 | 1700.0 | 1918.73 | 1785.19 | 7123.75 | 8930.63 | 1825.0 | 1983.0 |
| d.l. (mg/kg): | 3.16 | 3.85 | 3.53 | 3.70 | 3.34 | 2.89 | 10.06 | 10.04 |
| Mn (mg/kg dry wt.): | 13.83 | 55.77 | 207.42 | 208.89 | 66.89 | 136.13 | 96.14 | 114.10 |
| d.l. (mg/kg): | 0.32 | 0.38 | 0.35 | 0.37 | 0.33 | 0.29 | 0.402 | 0.402 |
| Mo (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 1.27 | 1.54 | 1.41 | 1.48 | 1.34 | 1.16 | 0.503 | 0.502 |
| Ni (mg/kg dry wt.): | 1.62 | bdl | bdl | bdl | 6.32 | 3.50 | bdl | 2.916 |
| d.l. (mg/kg): | 0.38 | 0.46 | 0.42 | 0.44 | 0.40 | 0.35 | 0.503 | 0.502 |
| Pb (mg/kg dry wt.): | 8.29 | bdl | bdl | bdl | 1.93 | bdl | bdl | 2.01 |
| d.l. (mg/kg): | 1.58 | 1.92 | 1.77 | 1.85 | 1.67 | 1.45 | 0.503 | 0.502 |
| Se (mg/kg dry wt.): | 1.22 | 1.78 | bdl | 1.39 | 1.45 | 0.94 | 1.85 | 2.18 |
| d.l. (mg/kg): | 0.32 | 0.38 | 0.71 | 0.37 | 0.33 | 0.29 | 0.505 | 0.503 |
| Sr (mg/kg dry wt.): | 192.09 | 262.69 | 371.02 | 305.93 | 474.92 | 424.86 | 198.18 | 247.90 |
| d.l. (mg/kg): | 0.16 | 0.19 | 0.18 | 0.19 | 0.17 | 0.14 | 0.201 | 0.201 |
| V (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.16 | 0.19 | 0.18 | 0.19 | 0.17 | 0.14 | 0.503 | 0.502 |
| Zn (mg/kg dry wt.): | 45.89 | 81.54 | 106.36 | 108.15 | 60.54 | 66.47 | 95.10 | 102.20 |
| d.l. (mg/kg): | 0.63 | 0.77 | 0.71 | 0.74 | 0.67 | 0.58 | 1.01 | 1.004 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXVIIIB. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE AT SOUTH LITTLE GREEN BREAK (DRY WEIGHT) (continued).

| SAMPLE: | S11S1 | S11S2 |
|---|---|---|
| SAMPLE WT. (g): | 110.41 | 123.86 |
| % MOISTURE: | 67.7 | 67.1 |
| Al (mg/kg dry wt.): | 300.97 | 235.87 |
| d.l. (mg/kg): | 3.10 | 3.04 |
| As (mg/kg dry wt.): | 3.22 | 2.83 |
| d.l. (mg/kg): | 0.31 | 0.30 |
| B (mg/kg dry wt.): | bdl | bdl |
| d.l. (mg/kg): | 1.24 | 1.22 |
| Ba (mg/kg dry wt.): | 83.9 | 82.37 |
| d.l. (mg/kg): | 0.62 | 0.61 |
| Be (mg/kg dry wt.): | bdl | bdl |
| d.l. (mg/kg): | 0.06 | 0.06 |
| Cd (mg/kg dry wt.): | bdl | bdl |
| d.l. (mg/kg): | 0.19 | 0.18 |
| Cr (mg/kg dry wt.): | 1.93 | 2.35 |
| d.l. (mg/kg): | 0.31 | 0.30 |
| Cu (mg/kg dry wt.): | 2.48 | 135.26 |
| d.l. (mg/kg): | 0.31 | 0.30 |
| Fe (mg/kg dry wt.): | 2272.45 | 1957.45 |
| d.l. (mg/kg): | 3.10 | 3.04 |
| Hg (mg/kg dry wt.): | 0.099 | 0.103 |
| d.l. (mg/kg): | 0.031 | 0.03 |
| Mg (mg/kg dry wt.): | 993.81 | 990.88 |
| d.l. (mg/kg): | 3.10 | 3.04 |
| Mn (mg/kg dry wt.): | 1027.86 | 1191.49 |
| d.l. (mg/kg): | 0.31 | 0.30 |
| Mo (mg/kg dry wt.): | bdl | bdl |
| d.l. (mg/kg): | 1.24 | 1.22 |
| Ni (mg/kg dry wt.): | 4.46 | 8.12 |
| d.l. (mg/kg): | 0.37 | 0.36 |
| Pb (mg/kg dry wt.): | bdl | 7.02 |
| d.l. (mg/kg): | 1.55 | 1.52 |
| Se (mg/kg dry wt.): | 0.87 | 0.76 |
| d.l. (mg/kg): | 0.31 | 0.3 |
| Sr (mg/kg dry wt.): | 167.18 | 116.72 |
| d.l. (mg/kg): | 0.15 | 0.15 |
| V (mg/kg dry wt.): | 1.07 | 0.78 |
| d.l. (mg/kg): | 0.15 | 0.15 |
| Zn (mg/kg dry wt.): | 41.80 | 42.55 |
| d.l. (mg/kg): | 0.62 | 0.61 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXIX. RESULTS FOR MERCURY ANALYSIS OF MUSCLE TISSUE FROM FISH COLLECTED AT CYPRESS SPRINGS RESERVOIR.

| SAMPLE | SAMPLE WT. (g) | % MOISTURE | Hg (mg/kg dry wt.) | d.l. | Hg (mg/kg wet wt.) | d.l. |
|---|---|---|---|---|---|---|
| CS1LMB06 | 275.94 | 76.8 | 1.069 | 0.043 | 0.248 | 0.01 |
| CS1LMB07 | 213.4 | 76.9 | 1.299 | 0.043 | 0.3 | 0.01 |
| CS1LMB08 | 181.8 | 77 | 0.943 | 0.043 | 0.217 | 0.01 |
| CSILMB09 | 144.26 | 77.4 | 0.642 | 0.044 | 0.145 | 0.01 |
| CS1SPB10 | 84.28 | 78.5 | 1.191 | 0.047 | 0.256 | 0.01 |
| CS2LMB01 | 120.7 | 78.4 | 1.065 | 0.046 | 0.23 | 0.01 |
| CS2LMB02 | 247.83 | 77.8 | 1.27 | 0.045 | 0.282 | 0.01 |
| CS2LMB03 | 199.74 | 78.3 | 1.521 | 0.046 | 0.33 | 0.01 |
| CS2LMB04 | 134.19 | 78.1 | 1.055 | 0.046 | 0.231 | 0.01 |
| CS2LMB05 | 86.42 | 78.7 | 0.831 | 0.047 | 0.177 | 0.01 |
| CS3LMB04 | 217.46 | 77.8 | 1.167 | 0.045 | 0.259 | 0.01 |
| CS3LMB05 | 153.12 | 78.9 | 1.014 | 0.047 | 0.214 | 0.01 |
| CS3LMB06 | 229.63 | 77.1 | 1.157 | 0.044 | 0.265 | 0.01 |
| CS3LMB07 | 157.22 | 78.1 | 1.484 | 0.046 | 0.325 | 0.01 |
| CS3LMB08 | 130.02 | 77.8 | 0.743 | 0.045 | 0.165 | 0.01 |

d.l. = detection limit.

TABLE XXX. RESULTS FOR MERCURY ANALYSIS OF MUSCLE TISSUE FROM FISH COLLECTED AT LAKE O' THE PINES.

| SAMPLE | SAMPLE WT. (g) | % MOISTURE | Hg (mg/kg dry wt.) | d.l. | Hg (mg/kg wet wt.) | d.l. |
|---|---|---|---|---|---|---|
| LP1LMB01 | 143.07 | 79.1 | 2.263 | 0.048 | 0.473 | 0.01 |
| LP1LMB02 | 242.17 | 79 | 1.438 | 0.048 | 0.302 | 0.01 |
| LP1LMB05 | 206.88 | 79.4 | 1.515 | 0.049 | 0.312 | 0.01 |
| LP1LMB06 | 198.44 | 79.3 | 2.377 | 0.048 | 0.492 | 0.01 |
| LP1WB03 | 171.33 | 78 | 2.141 | 0.045 | 0.471 | 0.01 |
| LP2CC01 | 180.45 | 71.9 | 0.246 | 0.036 | 0.069 | 0.01 |
| LP2CC02 | 131.98 | 73.4 | 0.301 | 0.038 | 0.08 | 0.01 |
| LP2CC03 | 146.42 | 77.5 | 0.533 | 0.044 | 0.12 | 0.01 |
| LP2CC04 | 153.62 | 75.1 | 0.205 | 0.04 | 0.051 | 0.01 |
| LP2CC06 | 104.87 | 77.2 | 0.171 | 0.044 | 0.039 | 0.01 |
| LP3CC01 | 79.61 | 78.8 | 0.283 | 0.047 | 0.06 | 0.01 |
| LP3CC02 | 99.74 | 80 | 0.33 | 0.05 | 0.066 | 0.01 |
| LP3CC03 | 125.68 | 78 | 0.273 | 0.045 | 0.06 | 0.01 |
| LP3CC04 | 89.97 | 80.1 | 0.296 | 0.05 | 0.059 | 0.01 |
| LP3CC05 | 65.16 | 79.3 | 0.343 | 0.048 | 0.048 | 0.01 |

d.l. = detection limit.

TABLE XXXIA. RESULTS FOR METALS ANALYSIS OF MUSCLE TISSUE FROM FISH COLLECTED AT CADDO LAKE (WET WEIGHT).

| SAMPLE | S9C1 | S10BH1 | S11C1 |
|---|---|---|---|
| SAMPLE WT. (g) | 53 | 61 | 148 |
| % MOISTURE | 82.28 | 83.71 | 79.39 |
| Al (mg/kg wet wt.) | 2.440 | 3.6327 | 1.3236 |
| d.l. (mg/kg) | 0.897 | 0.8194 | 1.0264 |
| As (mg/kg wet wt.) | bdl | bdl | bdl |
| d.l. (mg/kg) | 0.0891 | 0.0821 | 0.1031 |
| B (mg/kg wet wt.) | 0.2679 | bdl | bdl |
| d.l. (mg/kg) | 0.0897 | 0.0819 | 0.1026 |
| Ba (mg/kg wet wt.) | 0.314 | 0.2975 | 0.1222 |
| d.l. (mg/kg) | 0.0897 | 0.0819 | 0.1026 |
| Be (mg/kg wet wt.) | bdl | bdl | bdl |
| d.l. (mg/kg) | 0.0179 | 0.0164 | 0.0205 |
| Cd (mg/kg wet wt.) | bdl | bdl | bdl |
| d.l. (mg/kg) | 0.0179 | 0.0164 | 0.0205 |
| Cr (mg/kg wet wt.) | 0.4359 | 0.2755 | 0.3683 |
| d.l. (mg/kg) | 0.0897 | 0.0819 | 0.1026 |
| Cu (mg/kg wet wt.) | 1.4204 | 3.8754 | 0.2378 |
| d.l. (mg/kg) | 0.0897 | 0.0819 | 0.1026 |
| Fe (mg/kg wet wt.) | 13.7171 | 13.89 | 9.021 |
| d.l. (mg/kg) | 1.7935 | 1.6388 | 2.0528 |
| Hg (mg/kg wet wt.) | 0.0897 | 0.068 | 0.3673 |
| d.l. (mg/kg) | 0.0178 | 0.0164 | 0.0206 |
| Mg (mg/kg wet wt.) | 241.878 | 211.184 | 256.182 |
| d.l. (mg/kg) | 1.7935 | 1.6388 | 2.0528 |
| Mn (mg/kg wet wt.) | 0.5063 | 0.8407 | 1.196 |
| d.l. (mg/kg) | 0.0717 | 0.0656 | 0.0821 |
| Mo (mg/kg wet wt.) | bdl | bdl | bdl |
| d.l. (mg/kg) | 0.0897 | 0.0819 | 0.1026 |
| Ni (mg/kg wet wt.) | bdl | bdl | bdl |
| d.l. (mg/kg) | 0.0897 | 0.0819 | 0.1026 |
| Pb (mg/kg wet wt.) | bdl | bdl | bdl |
| d.l. (mg/kg) | 0.0897 | 0.0819 | 0.1026 |
| Se (mg/kg wet wt.) | bdl | bdl | 0.2329 |
| d.l. (mg/kg) | 0.0891 | 0.0821 | 0.1031 |
| Sr (mg/kg wet wt.) | 0.3705 | 0.6795 | 0.5942 |
| d.l. (mg/kg) | 0.0359 | 0.0328 | 0.0411 |
| V (mg/kg wet wt.) | bdl | bdl | bdl |
| d.l. (mg/kg) | 0.0897 | 0.0819 | 0.1026 |
| Zn (mg/kg wet wt.) | 6.1187 | 5.6754 | 7.9864 |
| d.l. (mg/kg) | 0.1793 | 0.1639 | 0.2053 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXXIB. RESULTS FOR METALS ANALYSIS OF MUSCLE TISSUE FROM FISH COLLECTED AT CADDO LAKE (DRY WEIGHT).

| SAMPLE | S9C1 | S10BH1 | S11C1 |
|---|---|---|---|
| SAMPLE WT. (g) | 53 | 61 | 148 |
| % MOISTURE | 82.28 | 83.71 | 79.39 |
| Al (mg/kg dry wt.) | 13.77 | 22.3 | 6.422 |
| d.l. (mg/kg) | 5.061 | 5.03 | 4.98 |
| As (mg/kg dry wt.) | bdl | bdl | bdl |
| d.l. (mg/kg) | 0.503 | 0.504 | 0.5 |
| B (mg/kg dry wt.) | 1.512 | bdl | bdl |
| d.l. (mg/kg) | 0.506 | 0.503 | 0.498 |
| Ba (mg/kg dry wt.) | 1.772 | 1.826 | 0.592 |
| d.l. (mg/kg) | 0.506 | 0.503 | 0.498 |
| Be (mg/kg dry wt.) | bdl | bdl | bdl |
| d.l. (mg/kg) | 0.101 | 0.101 | 0.0996 |
| Cd (mg/kg dry wt.) | bdl | bdl | bdl |
| d.l. (mg/kg) | 0.101 | 0.101 | 0.0996 |
| Cr (mg/kg dry wt.) | 2.46 | 1.691 | 1.787 |
| d.l. (mg/kg) | 0.506 | 0.503 | 0.498 |
| Cu (mg/kg dry wt.) | 8.016 | 23.79 | 1.154 |
| d.l. (mg/kg) | 0.506 | 0.503 | 0.498 |
| Fe (mg/kg dry wt.) | 77.41 | 85.27 | 43.77 |
| d.l. (mg/kg) | 10.122 | 10.06 | 9.96 |
| Hg (mg/kg dry wt.) | 0.506 | 0.418 | 1.782 |
| d.l. (mg/kg) | 0.101 | 0.101 | 0.1 |
| Mg (mg/kg dry wt.) | 1365.0 | 1296.0 | 1243.0 |
| d.l. (mg/kg) | 10.122 | 10.06 | 9.96 |
| Mn (mg/kg dry wt.) | 2.857 | 5.161 | 5.803 |
| d.l. (mg/kg) | 0.405 | 0.402 | 0.398 |
| Mo (mg/kg dry wt.) | bdl | bdl | bdl |
| d.l. (mg/kg) | 0.506 | 0.503 | 0.498 |
| Ni (mg/kg dry wt.) | bdl | bdl | bdl |
| d.l. (mg/kg) | 0.506 | 0.503 | 0.498 |
| Pb (mg/kg dry wt.) | bdl | bdl | bdl |
| d.l. (mg/kg) | 0.506 | 0.503 | 0.498 |
| Se (mg/kg dry wt.) | bdl | bdl | 1.13 |
| d.l. (mg/kg) | 0.503 | 0.504 | 0.5 |
| Sr (mg/kg dry wt.) | 2.091 | 4.171 | 2.883 |
| d.l. (mg/kg) | 0.202 | 0.201 | 0.199 |
| V (mg/kg dry wt.) | bdl | bdl | bdl |
| d.l. (mg/kg) | 0.506 | 0.503 | 0.498 |
| Zn (mg/kg dry wt.) | 34.53 | 34.84 | 38.75 |
| d.l. (mg/kg) | 1.012 | 1.006 | 0.996 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXXIIA. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF MACROINVERTEBRATES COLLECTED FROM CADDO LAKE (WET WEIGHT).

| SAMPLE: | S2IM1 | S2IM2 | S5IM1 | S6IM1 | S6IM2 | S7IM1 | S7IM2 | S9IM1 | S9IM2 |
|---|---|---|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 5.64 | 6.96 | 7.73 | 8.11 | 6.9 | 8.3 | 8.98 | 12.4 | 7.88 |
| % MOISTURE: | 86.7 | 85.7 | 83.5 | 83.1 | 85.7 | 82.9 | 81.5 | 85.2 | 83.8 |
| Al (mg/kg wet wt.): | 5.89 | 17.0 | 1.33 | 1.56 | 3.37 | 4.57 | 4.76 | 5.59 | 4.41 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| As (mg/kg wet wt.): | 0.03 | 0.1 | 0.87 | 0.76 | 0.56 | 0.43 | 1.75 | 0.32 | 0.7 |
| d.l. (mg/kg): | 0.03 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| B (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.68 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| Ba (mg/kg wet wt.): | 14.5 | 19.2 | 22.1 | 25.4 | 22.2 | 25.7 | 30.1 | 17.5 | 18.7 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Be (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.03 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |
| Cd (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.1 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 |
| Cr (mg/kg wet wt.): | 0.27 | 0.18 | 0.2 | 0.22 | 0.21 | 0.2 | 0.2 | 0.17 | 0.16 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Cu (mg/kg wet wt.): | 6.05 | 10.5 | 9.09 | 17.3 | 12.5 | 13.8 | 10.6 | 10.9 | 10.3 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Fe (mg/kg wet wt.): | 49.6 | 49.3 | 32.1 | 14.2 | 28.1 | 34.6 | 49.4 | 87.7 | 81.7 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Hg (mg/kg wet wt.): | 0.039 | 0.063 | 0.03 | 0.066 | 0.06 | 0.084 | 0.098 | 0.025 | 0.018 |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| Mg (mg/kg wet wt.): | 124.0 | 182.0 | 184.0 | 231.0 | 207.0 | 241.0 | 239.0 | 207.0 | 221.0 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Mn (mg/kg wet wt.): | 23.4 | 24.3 | 37.7 | 55.9 | 77.5 | 58.0 | 75.5 | 23.5 | 25.8 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Mo (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.68 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| Ni (mg/kg wet wt.): | bdl | 0.2 | 0.16 | 0.17 | bdl | 0.12 | bdl | 0.17 | 0.15 |
| d.l. (mg/kg): | 0.2 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 |
| Pb (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.85 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Se (mg/kg wet wt.): | bdl | bdl | 0.27 | 0.33 | 0.45 | 0.26 | 0.29 | 0.48 | 0.27 |
| d.l. (mg/kg): | 0.34 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Sr (mg/kg wet wt.): | 12.0 | 15.8 | 23.1 | 23.7 | 19.9 | 22.3 | 24.1 | 13.2 | 14.2 |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| V (mg/kg wet wt.): | bdl | 0.05 | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.08 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| Zn (mg/kg wet wt.): | 7.45 | 11.3 | 13.5 | 13.9 | 12.0 | 13.2 | 13.6 | 13.5 | 14.5 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXXIIB. RESULTS OF METALS ANALYSIS FOR WHOLE BODY COMPOSITES OF MACROINVERTEBRATES COLLECTED FROM CADDO LAKE (DRY WEIGHT).

| SAMPLE: | S2IM1 | S2IM2 | S5IM1 | S6IM1 | S6IM2 | S7IM1 | S7IM2 | S9IM1 | S9IM2 |
|---|---|---|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 5.64 | 6.96 | 7.73 | 8.11 | 6.9 | 8.3 | 8.98 | 12.4 | 7.88 |
| % MOISTURE: | 86.7 | 85.7 | 83.5 | 83.1 | 85.7 | 82.9 | 81.5 | 85.2 | 83.8 |
| Al (mg/kg dry wt.): | 44.29 | 118.88 | 8.06 | 9.23 | 23.57 | 26.73 | 25.73 | 35.77 | 27.22 |
| d.l. (mg/kg): | 7.52 | 6.99 | 6.06 | 5.92 | 6.99 | 5.85 | 5.41 | 6.76 | 6.17 |
| As (mg/kg dry wt.): | 0.23 | 0.7 | 5.27 | 4.5 | 3.92 | 2.51 | 9.46 | 2.16 | 4.32 |
| d.l. (mg/kg): | 0.23 | 0.7 | 0.61 | 0.59 | 0.7 | 0.58 | 0.54 | 0.68 | 0.62 |
| B (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 5.09 | 2.8 | 2.42 | 2.37 | 2.8 | 2.34 | 2.16 | 2.7 | 2.47 |
| Ba (mg/kg dry wt.): | 109.02 | 133.57 | 133.94 | 150.3 | 155.24 | 150.29 | 162.7 | 118.24 | 115.43 |
| d.l. (mg/kg): | 1.5 | 1.4 | 1.21 | 1.18 | 1.4 | 1.17 | 1.08 | 1.35 | 1.23 |
| Be (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.26 | 0.14 | 0.12 | 0.12 | 0.14 | 0.12 | 0.11 | 0.14 | 0.12 |
| Cd (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.77 | 0.42 | 0.36 | 0.36 | 0.42 | 0.35 | 0.32 | 0.41 | 0.37 |
| Cr (mg/kg dry wt.): | 2.02 | 1.22 | 1.24 | 1.28 | 1.43 | 1.18 | 1.08 | 1.14 | 1.01 |
| d.l. (mg/kg): | 0.75 | 0.7 | 0.61 | 0.59 | 0.7 | 0.58 | 0.54 | 0.68 | 0.62 |
| Cu (mg/kg dry wt.): | 45.49 | 73.43 | 55.09 | 102.37 | 87.41 | 80.7 | 57.3 | 73.65 | 63.58 |
| d.l. (mg/kg): | 0.75 | 0.7 | 0.61 | 0.59 | 0.7 | 0.58 | 0.54 | 0.68 | 0.62 |
| Fe (mg/kg dry wt.): | 372.93 | 344.76 | 194.55 | 84.02 | 196.5 | 202.34 | 267.03 | 592.57 | 504.32 |
| d.l. (mg/kg): | 7.52 | 6.99 | 6.06 | 5.92 | 6.99 | 5.85 | 5.41 | 6.76 | 6.17 |
| Hg (mg/kg dry wt.): | 0.293 | 0.441 | 0.182 | 0.391 | 0.42 | 0.491 | 0.53 | 0.169 | 0.111 |
| d.l. (mg/kg): | 0.075 | 0.07 | 0.061 | 0.059 | 0.07 | 0.058 | 0.054 | 0.068 | 0.062 |
| Mg (mg/kg dry wt.): | 932.33 | 1272.73 | 1115.15 | 1366.86 | 1447.55 | 1409.36 | 1291.89 | 1398.65 | 1364.2 |
| d.l. (mg/kg): | 7.52 | 6.99 | 6.06 | 5.92 | 6.99 | 5.85 | 5.41 | 6.76 | 6.17 |
| Mn (mg/kg dry wt.): | 175.94 | 169.93 | 228.48 | 330.77 | 541.96 | 339.18 | 408.11 | 158.78 | 159.26 |
| d.l. (mg/kg): | 0.75 | 0.7 | 0.61 | 0.59 | 0.7 | 0.58 | 0.54 | 0.68 | 0.62 |
| Mo (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 5.09 | 2.8 | 2.42 | 2.37 | 2.8 | 2.34 | 2.16 | 2.7 | 2.47 |
| Ni (mg/kg dry wt.): | bdl | 1.37 | 0.96 | 1.02 | bdl | 0.73 | bdl | 1.17 | 0.93 |
| d.l. (mg/kg): | 1.53 | 0.84 | 0.73 | 0.71 | 0.84 | 0.7 | 0.65 | 0.81 | 0.74 |
| Pb (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 6.36 | 3.5 | 3.03 | 2.96 | 3.5 | 2.92 | 2.7 | 3.38 | 3.09 |
| Se (mg/kg dry wt.): | bdl | bdl | 1.62 | 1.93 | 3.17 | 1.53 | 1.59 | 3.25 | 1.67 |
| d.l. (mg/kg): | 2.54 | 1.37 | 0.61 | 0.59 | 0.7 | 0.58 | 0.54 | 0.68 | 0.62 |
| Sr (mg/kg dry wt.): | 90.23 | 110.49 | 140 | 140.24 | 139.16 | 130.41 | 130.27 | 89.19 | 87.65 |
| d.l. (mg/kg): | 0.38 | 0.35 | 0.3 | 0.3 | 0.35 | 0.29 | 0.27 | 0.34 | 0.31 |
| V (mg/kg dry wt.): | bdl | 0.36 | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.64 | 0.35 | 0.3 | 0.3 | 0.35 | 0.29 | 0.27 | 0.34 | 0.31 |
| Zn (mg/kg dry wt.): | 56.02 | 79.02 | 81.82 | 82.25 | 83.92 | 77.19 | 73.51 | 91.22 | 89.51 |
| d.l. (mg/kg): | 1.5 | 1.4 | 1.21 | 1.18 | 1.4 | 1.17 | 1.08 | 1.35 | 1.23 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXXIII. RESULTS FOR MERCURY ANALYSIS OF WHOLE BODY COMPOSITES FROM MACROINVERTEBRATES COLLECTED AT CADDO LAKE.

| SAMPLE | SAMPLE WT. (g) | % MOISTURE | Hg (mg/kg dry wt.) | d.l. | Hg (mg/kg wet wt.) | d.l. |
|---|---|---|---|---|---|---|
| S4IM1 | 5.39 | 80.4 | 0.194 | 0.051 | 0.038 | 0.01 |
| S5IM2 | 5.9 | 79.6 | 0.201 | 0.049 | 0.041 | 0.01 |
| S10IM1 | 5.78 | 80.9 | 0.508 | 0.052 | 0.097 | 0.01 |
| S10IM2 | 5.56 | 69.1 | 0.343 | 0.032 | 0.106 | 0.01 |

d.l. = detection limit.

TABLE XXXIV. RESULTS FOR MERCURY ANALYSIS OF FEATHERS FROM GREAT BLUE HERONS COLLECTED AT CADDO LAKE.

| SAMPLE | SAMPLE WT. (g) | % MOISTURE | Hg (mg/kg dry wt.) | d.l. |
|---|---|---|---|---|
| CLMSF01 | 4.9 | 0.0 | 1.38 | 0.01 |
| CLMSF02 | 4.47 | 0.0 | 1.27 | 0.01 |
| CLMSF03 | 2.05 | 0.0 | 1.23 | 0.01 |
| CLMSF04 | 2.51 | 0.0 | 2.77 | 0.01 |
| CLMSF05 | 4.02 | 0.0 | 14.5 | 0.01 |
| CLMSF06 | 7.58 | 0.0 | 1.62 | 0.01 |
| CLMSF07 | 10.63 | 0.0 | 1.57 | 0.01 |

d.l. = detection limit.

TABLE XXXV. RESULTS FOR MERCURY ANALYSIS OF KIDNEYS FROM GREAT BLUE HERONS COLLECTED AT CADDO LAKE.

| SAMPLE | SAMPLE WT. (g) | % MOISTURE | Hg (mg/kg dry wt.) | d.l. |
|---|---|---|---|---|
| CLMSK01 | 2.0 | 0.0 | 0.597 | 0.01 |
| CLMSK02 | 0.8 | 0.0 | 0.513 | 0.01 |
| CLMSK03 | 1.6 | 0.0 | 0.863 | 0.01 |
| CLMSK04 | 2.2 | 0.0 | 0.553 | 0.01 |
| CLMSK05 | 2.2 | 0.0 | 2.37 | 0.01 |
| CLMSK06 | 2.1 | 0.0 | 0.628 | 0.01 |
| CLMSK07 | 2.8 | 0.0 | 0.657 | 0.01 |

d.l. = detection limit.

TABLE XXXVIA. RESULTS OF METALS ANALYSIS FOR LIVERS OF GREAT BLUE HERONS COLLECTED FROM CADDO LAKE (WET WEIGHT).

| SAMPLE: | CLMSL01 | CLMSL02 | CLMSL03 | CLMSL04 | CLMSL05 | CLMSL06 | CLMSL07 |
|---|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 19.77 | 18.1 | 3.25 | 33.52 | 21.04 | 6.69 | 14.02 |
| % MOISTURE: | 63.5 | 65.7 | 0.00 | 66.4 | 67.9 | 62.0 | 70.4 |
| Al (mg/kg wet wt.): | bdl | bdl | 1.48 | bdl | 1.3 | 1.61 | 1.17 |
| d.l. (mg/kg): | 0.98 | 0.98 | 1.0 | 0.99 | 1.0 | 1.0 | 1.0 |
| As (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 |
| B (mg/kg wet wt.): | 0.51 | 0.44 | 6.64 | 0.4 | 0.5 | 7.4 | 5.9 |
| d.l. (mg/kg): | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| Ba (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Be (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |
| Cd (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 |
| Cr (mg/kg wet wt.): | 0.32 | 0.98 | 0.29 | 0.31 | 0.57 | 0.13 | 0.42 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Cu (mg/kg wet wt.): | 32.6 | 27.0 | 24.0 | 14.9 | 20.3 | 10.1 | 10.8 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Fe (mg/kg wet wt.): | 118.0 | 131.0 | 167.0 | 277.0 | 983.0 | 106.0 | 206.0 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Hg (mg/kg wet wt.): | 0.387 | 0.467 | 0.632 | 0.721 | 19.9 | 0.566 | 0.5 |
| d.l. (mg/kg): | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| Mg (mg/kg wet wt.): | 159.0 | 179.0 | 103.0 | 200.0 | 170.0 | 134.0 | 193.0 |
| d.l. (mg/kg): | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Mn (mg/kg wet wt.): | 3.27 | 3.78 | 1.86 | 3.42 | 3.81 | 1.99 | 3.23 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Mo (mg/kg wet wt.): | 0.41 | 0.42 | 0.43 | 0.5 | 1.45 | 0.44 | 0.61 |
| d.l. (mg/kg): | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| Ni (mg/kg wet wt.): | 0.21 | 0.86 | 0.28 | 0.27 | 0.61 | bdl | 0.43 |
| d.l. (mg/kg): | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 |
| Pb (mg/kg wet wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.49 | 0.49 | 0.5 | 0.5 | 0.49 | 0.5 | 0.5 |
| Se (mg/kg wet wt.): | 1.39 | 0.4 | bdl | 1.07 | 9.38 | 1.26 | 1.18 |
| d.l. (mg/kg): | 0.1 | 0.1 | 0.14 | 0.1 | 0.1 | 0.1 | 0.1 |
| Sr (mg/kg wet wt.): | 0.14 | 0.15 | 0.08 | 0.1 | 0.09 | 0.24 | 0.12 |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| V (mg/kg wet wt.): | bdl | bdl | bdl | 0.05 | 0.26 | bdl | bdl |
| d.l. (mg/kg): | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| Zn (mg/kg wet wt.): | 47.2 | 39.0 | 46.5 | 24.0 | 58.1 | 33.8 | 36.8 |
| d.l. (mg/kg): | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |

d.l. = detection limit.
bdl = below detection limit.

TABLE XXXVIB. RESULTS OF METALS ANALYSIS FOR LIVERS OF GREAT BLUE HERONS COLLECTED FROM CADDO LAKE (DRY WEIGHT).

| SAMPLE: | CLMSL01 | CLMSL02 | CLMSL03 | CLMSL04 | CLMSL05 | CLMSL06 | CLMSL07 |
|---|---|---|---|---|---|---|---|
| SAMPLE WT. (g): | 19.77 | 18.1 | 3.25 | 33.52 | 21.04 | 6.69 | 14.02 |
| % MOISTURE: | 63.5 | 65.7 | 0.00 | 66.4 | 67.9 | 62.0 | 70.4 |
| Al (mg/kg dry wt.): | bdl | bdl | 1.48 | bdl | 4.05 | 4.24 | 3.95 |
| d.l. (mg/kg): | 2.68 | 2.87 | 1.0 | 2.96 | 3.12 | 2.63 | 3.38 |
| As (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.19 | 0.2 | 0.07 | 0.21 | 0.22 | 0.18 | 0.24 |
| B (mg/kg dry wt.): | 1.4 | 1.27 | 6.64 | 1.2 | 1.55 | 19.47 | 19.93 |
| d.l. (mg/kg): | 1.1 | 1.17 | 0.4 | 1.19 | 1.25 | 1.05 | 1.35 |
| Ba (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.54 | 0.57 | 0.2 | 0.59 | 0.62 | 0.53 | 0.67 |
| Be (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.05 | 0.06 | 0.02 | 0.06 | 0.06 | 0.05 | 0.07 |
| Cd (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 0.16 | 0.17 | 0.06 | 0.18 | 0.18 | 0.16 | 0.20 |
| Cr (mg/kg dry wt.): | 0.87 | 2.87 | 0.29 | 0.93 | 1.76 | 0.33 | 1.43 |
| d.l. (mg/kg): | 0.27 | 0.29 | 0.1 | 0.3 | 0.31 | 0.26 | 0.34 |
| Cu (mg/kg dry wt.): | 89.32 | 78.72 | 24.0 | 44.35 | 63.24 | 26.58 | 36.49 |
| d.l. (mg/kg): | 0.27 | 0.29 | 0.1 | 0.3 | 0.31 | 0.26 | 0.34 |
| Fe (mg/kg dry wt.): | 323.29 | 381.92 | 167.0 | 824.4 | 3062.3 | 278.95 | 695.95 |
| d.l. (mg/kg): | 2.74 | 2.92 | 1.0 | 2.98 | 3.12 | 2.63 | 3.38 |
| Hg (mg/kg dry wt.): | 1.06 | 1.362 | 0.632 | 2.146 | 61.994 | 1.489 | 1.689 |
| d.l. (mg/kg): | 0.027 | 0.029 | 0.01 | 0.03 | 0.031 | 0.026 | 0.034 |
| Mg (mg/kg dry wt.): | 435.62 | 521.87 | 103.0 | 595.24 | 529.59 | 352.63 | 652.03 |
| d.l. (mg/kg): | 2.74 | 2.92 | 1.0 | 2.98 | 3.12 | 2.63 | 3.38 |
| Mn (mg/kg dry wt.): | 8.96 | 11.02 | 1.86 | 10.18 | 11.87 | 5.24 | 10.91 |
| d.l. (mg/kg): | 0.27 | 0.29 | 0.1 | 0.3 | 0.31 | 0.26 | 0.34 |
| Mo (mg/kg dry wt.): | 1.13 | 1.23 | 0.43 | 1.5 | 4.52 | 1.16 | 2.04 |
| d.l. (mg/kg): | 1.1 | 1.17 | 0.4 | 1.19 | 1.25 | 1.05 | 1.35 |
| Ni (mg/kg dry wt.): | 0.59 | 2.51 | 0.28 | 0.81 | 1.91 | bdl | 1.44 |
| d.l. (mg/kg): | 0.33 | 0.35 | 0.12 | 0.36 | 0.37 | 0.32 | 0.41 |
| Pb (mg/kg dry wt.): | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg): | 1.34 | 1.43 | 0.5 | 1.48 | 1.54 | 1.32 | 1.68 |
| Se (mg/kg dry wt.): | 3.81 | 1.17 | bdl | 3.18 | 29.22 | 3.32 | 3.99 |
| d.l. (mg/kg): | 0.27 | 0.29 | 0.1 | 0.3 | 0.31 | 0.26 | 0.34 |
| Sr (mg/kg dry wt.): | 0.38 | 0.43 | 0.08 | 0.31 | 0.28 | 0.64 | 0.4 |
| d.l. (mg/kg): | 0.14 | 0.15 | 0.05 | 0.15 | 0.16 | 0.13 | 0.17 |
| V (mg/kg dry wt.): | bdl | bdl | bdl | 0.16 | 0.8 | bdl | bdl |
| d.l. (mg/kg): | 0.13 | 0.14 | 0.05 | 0.15 | 0.16 | 0.13 | 0.17 |
| Zn (mg/kg dry wt.): | 129.32 | 113.7 | 46.5 | 71.43 | 181.0 | 88.95 | 124.32 |
| d.l. (mg/kg): | 0.55 | 0.58 | 0.2 | 0.6 | 0.62 | 0.53 | 0.68 |

d.l. = detection limit.
bdl = below detection limit.

# APPENDIX I
# (ANALYTICAL RESULTS OF ORGANOCHLORINES IN FISH)

TABLE XXXVIIA. RESULTS OF ORGANOCHLORINE ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CYPRESS SPRINGS RESERVOIR AND LAKE O'THE PINES (WET WEIGHT).

| SAMPLE | CS1LMB03 | LP1LMB03 |
|---|---|---|
| SAMPLE WEIGHT (grams) | 1760.0 | 2840.0 |
| % MOISTURE | 76.5 | 75.5 |
| % LIPID | 3.52 | 4.45 |
| HCB (mg/kg wet weight) | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 |
| Total PCB (mg/kg wet weight) | bdl | 0.22 |
| d.l. (mg/kg wet weight) | 0.05 | 0.05 |
| "BHC (mg/kg wet weight) | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 |
| "chlordane (mg/kg wet weight) | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 |
| $BHC (mg/kg wet weight) | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 |
| dieldrin (mg/kg wet weight) | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 |
| endrin (mg/kg wet weight) | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 |
| (BHC (mg/kg wet weight) | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 |
| (chlordane (mg/kg wet weight) | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 |
| heptachlor epoxide (mg/kg wet weight) | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 |
| mirex (mg/kg wet weight) | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 |
| o,p'-DDD (mg/kg wet weight) | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 |
| o,p'-DDE (mg/kg wet weight) | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 |
| o,p'-DDT (mg/kg wet weight) | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 |
| oxychlordane (mg/kg wet weight) | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 |
| p,p'-DDD (mg/kg wet weight) | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 |
| p,p'-DDE (mg/kg wet weight) | 0.02 | 0.02 |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 |
| p,p'-DDT (mg/kg wet weight) | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 |
| toxaphene (mg/kg wet weight) | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.05 | 0.05 |
| trans-nonachlor (mg/kg wet weight) | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 |

d.l. = detection limit
bdl = below detection limit

TABLE XXXVIIB. RESULTS OF ORGANOCHLORINE ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CYPRESS SPRINGS RESERVOIR AND LAKE O'THE PINES (DRY WEIGHT).

| SAMPLE | CS1LMB03 | LP1LMB03 |
|---|---|---|
| SAMPLE WEIGHT (grams) | 1760.0 | 2840.0 |
| % MOISTURE | 76.5 | 75.5 |
| % LIPID | 3.52 | 4.45 |
| HCB (mg/kg dry weight) | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.043 | 0.041 |
| Total PCB (mg/kg dry weight) | bdl | 0.898 |
| d.l. (mg/kg dry weight) | 0.213 | 0.204 |
| "BHC (mg/kg dry weight) | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.043 | 0.041 |
| "chlordane (mg/kg dry weight) | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.043 | 0.041 |
| $BHC (mg/kg dry weight) | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.043 | 0.041 |
| dieldrin (mg/kg dry weight) | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.043 | 0.041 |
| endrin (mg/kg dry weight) | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.043 | 0.041 |
| (BHC (mg/kg dry weight) | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.043 | 0.041 |
| (chlordane (mg/kg dry weight) | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.043 | 0.041 |
| heptachlor epoxide (mg/kg dry weight) | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.043 | 0.041 |
| mirex (mg/kg dry weight) | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.043 | 0.041 |
| o,p'-DDD (mg/kg dry weight) | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.043 | 0.041 |
| o,p'-DDE (mg/kg dry weight) | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.043 | 0.041 |
| o,p'-DDT (mg/kg dry weight) | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.043 | 0.041 |
| oxychlordane (mg/kg dry weight) | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.043 | 0.041 |
| p,p'-DDD (mg/kg dry weight) | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.043 | 0.041 |
| p,p'-DDE (mg/kg dry weight) | 0.085 | 0.082 |
| d.l. (mg/kg dry weight) | 0.043 | 0.041 |
| p,p'-DDT (mg/kg dry weight) | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.043 | 0.041 |
| toxaphene (mg/kg dry weight) | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.213 | 0.204 |
| trans-nonachlor (mg/kg dry weight) | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.043 | 0.041 |

d.l. = detection limit
bdl = below detection limit

TABLE XXXVIIIA. RESULTS OF ORGANOCHLORINE ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE (WET WEIGHT).

| SAMPLE | S2B3 | S2S5 | S4BG1 | S4G3 | S5B3 | S5G3 | S6R1 | S6S1 | S7BG1 |
|---|---|---|---|---|---|---|---|---|---|
| SAMPLE WEIGHT (grams) | 215 | 66 | 424 | 814 | 773 | 1312 | 469 | 787 | 307 |
| % MOISTURE | 73.61 | 76.93 | 72.96 | 64.82 | 71.3 | 66.18 | 71.3 | 71.9 | 72.89 |
| % LIPID | 2.32 | 4.19 | 0.88 | 2.71 | 5.58 | 3.6 | 3.31 | 6.68 | 1.91 |
| HCB (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| Total PCB (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| "BHC (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| "chlordane (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| $BHC (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| dieldrin (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| endrin (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| (BHC (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| (chlordane (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| heptachlor epoxide (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| mirex (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| o,p'-DDD (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| o,p'-DDE (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| o,p'-DDT (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| oxychlordane (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| p,p'-DDD (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| p,p'-DDE (mg/kg wet weight) | bdl | bdl | bdl | 0.038 | 0.02 | 0.039 | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| p,p'-DDT (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| toxaphene (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| trans-nonachlor (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |

d.l. = detection limit
bdl = below detection limit

TABLE XXXVIIIA. RESULTS OF ORGANOCHLORINE ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE (WET WEIGHT) (continued).

| SAMPLE | S7S2 | S8B2 | S8R1 | S9K1 | S10B2 | S10R1 | S11B2 | S11S4 |
|---|---|---|---|---|---|---|---|---|
| SAMPLE WEIGHT (grams) | 1233 | 426 | 350 | 7 | 806 | 346 | 290 | 110 |
| % MOISTURE | 73.94 | 72.25 | 70.36 | 0.0 | 72.34 | 71.78 | 75.08 | 79.08 |
| % LIPID | 3.45 | 3.64 | 3.26 | 2.62 | 5.6 | 2.56 | 4.63 | 3.88 |
| HCB (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.018 | 0.01 | 0.01 | 0.01 | 0.01 |
| Total PCB (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.05 | 0.05 | 0.05 | 0.092 | 0.05 | 0.05 | 0.05 | 0.05 |
| "BHC (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.018 | 0.01 | 0.01 | 0.01 | 0.01 |
| "chlordane (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.018 | 0.01 | 0.01 | 0.01 | 0.01 |
| $BHC (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.018 | 0.01 | 0.01 | 0.01 | 0.01 |
| dieldrin (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.018 | 0.01 | 0.01 | 0.01 | 0.01 |
| endrin (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.018 | 0.01 | 0.01 | 0.01 | 0.01 |
| (BHC (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.018 | 0.01 | 0.01 | 0.01 | 0.01 |
| (chlordane (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.018 | 0.01 | 0.01 | 0.01 | 0.01 |
| heptachlor epoxide (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.018 | 0.01 | 0.01 | 0.01 | 0.01 |
| mirex (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.018 | 0.01 | 0.01 | 0.01 | 0.01 |
| o,p'-DDD (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.018 | 0.01 | 0.01 | 0.01 | 0.01 |
| o,p'-DDE (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.018 | 0.01 | 0.01 | 0.01 | 0.01 |
| o,p'-DDT (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.018 | 0.01 | 0.01 | 0.01 | 0.01 |
| oxychlordane (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.018 | 0.01 | 0.01 | 0.01 | 0.01 |
| p,p'-DDD (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.018 | 0.01 | 0.01 | 0.01 | 0.01 |
| p,p'-DDE (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.018 | 0.01 | 0.01 | 0.01 | 0.01 |
| p,p'-DDT (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.018 | 0.01 | 0.01 | 0.01 | 0.01 |
| toxaphene (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.05 | 0.05 | 0.05 | 0.092 | 0.05 | 0.05 | 0.05 | 0.05 |
| trans-nonachlor (mg/kg wet weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg wet weight) | 0.01 | 0.01 | 0.01 | 0.018 | 0.01 | 0.01 | 0.01 | 0.01 |

d.l. = detection limit
bdl = below detection limit

TABLE XXXVIIIB. RESULTS OF ORGANOCHLORINE ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE (DRY WEIGHT).

| SAMPLE | S2B3 | S2S5 | S4BG1 | S4G3 | S5B3 | S5G3 | S6R1 | S6S1 | S7BG1 |
|---|---|---|---|---|---|---|---|---|---|
| SAMPLE WEIGHT (grams) | 215 | 66 | 424 | 814 | 773 | 1312 | 469 | 787 | 307 |
| % MOISTURE | 73.61 | 76.93 | 72.96 | 64.82 | 71.3 | 66.18 | 71.3 | 71.9 | 72.89 |
| % LIPID | 2.32 | 4.19 | 0.88 | 2.71 | 5.58 | 3.6 | 3.31 | 6.68 | 1.91 |
| HCB (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.043 | 0.037 | 0.028 | 0.035 | 0.03 | 0.035 | 0.04 | 0.037 |
| Total PCB (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.189 | 0.217 | 0.185 | 0.142 | 0.174 | 0.148 | 0.174 | 0.18 | 0.184 |
| "BHC (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.043 | 0.037 | 0.028 | 0.035 | 0.03 | 0.035 | 0.04 | 0.037 |
| "chlordane (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.043 | 0.037 | 0.028 | 0.035 | 0.03 | 0.035 | 0.04 | 0.037 |
| $BHC (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.043 | 0.037 | 0.028 | 0.035 | 0.03 | 0.035 | 0.04 | 0.037 |
| dieldrin (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.043 | 0.037 | 0.028 | 0.035 | 0.03 | 0.035 | 0.04 | 0.037 |
| endrin (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.043 | 0.037 | 0.028 | 0.035 | 0.03 | 0.035 | 0.04 | 0.037 |
| (BHC (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.043 | 0.037 | 0.028 | 0.035 | 0.03 | 0.035 | 0.04 | 0.037 |
| (chlordane (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.043 | 0.037 | 0.028 | 0.035 | 0.03 | 0.035 | 0.04 | 0.037 |
| heptachlor epoxide (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.043 | 0.037 | 0.028 | 0.035 | 0.03 | 0.035 | 0.04 | 0.037 |
| mirex (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.043 | 0.037 | 0.028 | 0.035 | 0.03 | 0.035 | 0.04 | 0.037 |
| o,p'-DDD (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.043 | 0.037 | 0.028 | 0.035 | 0.03 | 0.035 | 0.04 | 0.037 |
| o,p'-DDE (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.043 | 0.037 | 0.028 | 0.035 | 0.03 | 0.035 | 0.04 | 0.037 |
| o,p'-DDT (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.043 | 0.037 | 0.028 | 0.035 | 0.03 | 0.035 | 0.04 | 0.037 |
| oxychlordane (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.043 | 0.037 | 0.028 | 0.035 | 0.03 | 0.035 | 0.04 | 0.037 |
| p,p'-DDD (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.043 | 0.037 | 0.028 | 0.035 | 0.03 | 0.035 | 0.04 | 0.037 |
| p,p'-DDE (mg/kg dry weight) | bdl | bdl | bdl | 0.108 | 0.07 | 0.115 | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.043 | 0.037 | 0.028 | 0.035 | 0.03 | 0.035 | 0.04 | 0.037 |
| p,p'-DDT (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.043 | 0.037 | 0.028 | 0.035 | 0.03 | 0.035 | 0.04 | 0.037 |
| toxaphene (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.189 | 0.217 | 0.185 | 0.142 | 0.174 | 0.148 | 0.174 | 0.18 | 0.184 |
| trans-nonachlor (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.043 | 0.037 | 0.028 | 0.035 | 0.03 | 0.035 | 0.04 | 0.037 |

d.l. = detection limit
bdl = below detection limit

TABLE XXXVIIIB. RESULTS OF ORGANOCHLORINE ANALYSIS FOR WHOLE BODY COMPOSITES OF FISH COLLECTED FROM CADDO LAKE (DRY WEIGHT) (continued).

| SAMPLE | S7S2 | S8B2 | S8R1 | S9K1 | S10B2 | S10R1 | S11B2 | S11S4 |
|---|---|---|---|---|---|---|---|---|
| SAMPLE WEIGHT (grams) | 1233 | 426 | 350 | 7 | 806 | 346 | 290 | 110 |
| % MOISTURE | 73.94 | 72.25 | 70.36 | 0.0 | 72.34 | 71.78 | 75.08 | 79.08 |
| % LIPID | 3.45 | 3.64 | 3.26 | 2.62 | 5.6 | 2.56 | 4.63 | 3.88 |
| HCB (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.036 | 0.034 | 0.018 | 0.036 | 0.035 | 0.04 | 0.048 |
| Total PCB (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.192 | 0.18 | 0.169 | 0.092 | 0.181 | 0.177 | 0.201 | 0.239 |
| "BHC (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.036 | 0.034 | 0.018 | 0.036 | 0.035 | 0.04 | 0.048 |
| "chlordane (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.036 | 0.034 | 0.018 | 0.036 | 0.035 | 0.04 | 0.048 |
| $BHC (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.036 | 0.034 | 0.018 | 0.036 | 0.035 | 0.04 | 0.048 |
| dieldrin (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.036 | 0.034 | 0.018 | 0.036 | 0.035 | 0.04 | 0.048 |
| endrin (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.036 | 0.034 | 0.018 | 0.036 | 0.035 | 0.04 | 0.048 |
| (BHC (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.036 | 0.034 | 0.018 | 0.036 | 0.035 | 0.04 | 0.048 |
| (chlordane (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.036 | 0.034 | 0.018 | 0.036 | 0.035 | 0.04 | 0.048 |
| heptachlor epoxide (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.036 | 0.034 | 0.018 | 0.036 | 0.035 | 0.04 | 0.048 |
| mirex (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.036 | 0.034 | 0.018 | 0.036 | 0.035 | 0.04 | 0.048 |
| o,p'-DDD (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.036 | 0.034 | 0.018 | 0.036 | 0.035 | 0.04 | 0.048 |
| o,p'-DDE (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.036 | 0.034 | 0.018 | 0.036 | 0.035 | 0.04 | 0.048 |
| o,p'-DDT (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.036 | 0.034 | 0.018 | 0.036 | 0.035 | 0.04 | 0.048 |
| oxychlordane (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.036 | 0.034 | 0.018 | 0.036 | 0.035 | 0.04 | 0.048 |
| p,p'-DDD (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.036 | 0.034 | 0.018 | 0.036 | 0.035 | 0.04 | 0.048 |
| p,p'-DDE (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.036 | 0.034 | 0.018 | 0.036 | 0.035 | 0.04 | 0.048 |
| p,p'-DDT (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.036 | 0.034 | 0.018 | 0.036 | 0.035 | 0.04 | 0.048 |
| toxaphene (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.192 | 0.18 | 0.169 | 0.092 | 0.181 | 0.177 | 0.201 | 0.239 |
| trans-nonachlor (mg/kg dry weight) | bdl | bdl | bdl | bdl | bdl | bdl | bdl | bdl |
| d.l. (mg/kg dry weight) | 0.038 | 0.036 | 0.034 | 0.018 | 0.036 | 0.035 | 0.04 | 0.048 |

d.l. = detection limit
bdl = below detection limit

**APPENDIX J**
**(SCREENING CRITERIA)**

TABLE XL. SCREENING CRITERIA FOR SEDIMENT, WATER, AND WILDLIFE.

| Compound | TNRCC Sediment 85th % Screening Values[g] (mg/kg dry wt.) | NOAA Sediment ER-Ls[h] (mg/kg dry wt.) | Ontario Sediment LELs - SELs[a] (mg/kg dry wt.) | TNRCC Water Quality Stand.[g] (mg/l) | USEPA Water Quality Stand.[c] (mg/l) | TDH Tissues Criteria[g] (mg/kg wet wt.) | USFWS PPL[k ì] (mg/kg wet wt.) | NAS/NAE PPL[j] (mg/kg wet wt.) |
|---|---|---|---|---|---|---|---|---|
| Al | | | | | 0.087 | | 200.0 ì | |
| As | 17.6 | 8.2 | 6.0 - 33.0 | 0.19 | | 1.0 | 30.0 ï | |
| B | | | | | 0.75 | | 30.0 ð | |
| Ba | 287.0 | | | | | | 20.0 ì | |
| Be | | | | | | | | |
| Cd | 2.0 | 1.2 | 0.6 - 10.0 | $e^{(0.7852\ [\ln\ (\text{hardness})]\ -3.49)}$ | | 1.0 | 0.5 k | |
| Cr | 34.0 | | 26.0 - 110.0 | 0.125/0.062 | | 100.0 | 4.0 (dry wt.) ñ | |
| Cu | 33.0 | 34.0 | 16.0 - 110.0 | $e^{(0.8545[\ln\ (\text{hardness})]-1.386)}$ | | 40.0 | 300.0 ì | |
| Fe | | | 20,000 - 40,000 | | 1.0 | | 1000.0 ì | |
| Hg | 0.16 | 0.15 | 0.2 - 2.0 | 0.0013 | | 1.0 | 0.1 - 1.1 ò | |
| Mg | | | | | | | 3000.0 ì | |
| Mn | 1210.0 | | 460.0 - 1100.0 | | | | 2000.0 ì | |
| Mo | | | | | | | 100.0 ì | |
| Ni | 25.0 | 21.0 | 16.0 - 75.0 | $e^{(0.8460[\ln\ (\text{hardness})]+1.1645)}$ | | | 100.0 ì | |
| Pb | 61.5 | 47.0 | 31.0 - 250.0 | $e^{(1.273[\ln\ (\text{hardness})]-4.705)}$ | | 1.25 | 50.0 ì | |
| Se | 1.73 | | | 0.005 | | 1.0 | 0.5 k | |
| Sr | | | | | | | 3,000.0 ì | |
| V | | | | | | | 10.0 ì | |
| Zn | 120.0 | 150.0 | 120.0 - 820.0 | $e^{(0.8473[\ln\ (\text{hardness})]\ +0.7614)}$ | | | | |
| *p,p'*-DDE | | | | | | | | 1.0 |
| PCBs | | 0.023 | 0.07 - 530.0 | | | | | 0.5 |
| PAHs | | 4.0 | 2.0 - 11,000 | | | | | |
| Acenaphthalene | | 0.044 | | | | | | |
| Anthracene | | 0.085 | 0.22 - 370.0 | | | | | |
| Benzo(a)pyrene | | 0.43 | 0.37 - 1,440.0 | | | | | |
| Benzo(k)fluoranthene | | | 0.24 - 1,340.0 | | | | | |
| Benzo(g,h,i)perylene | | | 0.17 - 320.0 | | | | | |
| Chyrsene | | 0.38 | 0.34 - 460.0 | | | | | |
| Dibenzo(a,h)anthracene | | | 0.06 - 130.0 | | | | | |
| Flouranthene | | 0.60 | 0.75 - 1,020.0 | | | | | |
| Indeno(1,2,3-cd)pyrene | | | 0.2 - 320.0 | | | | | |
| 2-methylnaphthalene | | 0.07 | | | | | | |
| Naphthalene | | 0.16 | | | | | | |
| Phenanthrene | | 0.24 | 0.56 - 950.0 | | | | | |
| Pyrene | | 0.67 | 0.49 - 850.0 | | | | | |

g TNRCC, 1996b.
h Long et al., 1995.
a Persaud et al., 1993.
c USEPA, 1986.
ì NRC, 1980.
j Nowell and Resek, 1994.
k Irwin, 1988.
ï Eisler, 1988a.
ð Eisler, 1990.
ñ Eisler, 1986a.
ò Eisler, 1987a.

Note - all water quality standards are for chronic aquatic life protection.

TABLE XLI. METALLIC ELEMENT CONCENTRATIONS IN SOILS OF THE UNITED STATES (Shacklette and Boerngen, 1984).

| Element | Median Concentration (mg/kg dry wt.) | Range (mg/kg dry wt.) |
|---|---|---|
| Al | 47,000.0 | 700.0 - >100,000.0 |
| As | 7.2 | <0.1 - 97.0 |
| B | 33.0 | <20.0 - 300.0 |
| Ba | 580.0 | 10.0 - 5,000.0 |
| Be | 0.63 | <1.0 - 15.0 |
| Cd | 0.05* | 0.01 - 0.70* |
| Cr | 54.0 | 1.0 - 2,000.0 |
| Cu | 25.0 | <1.0 - 700.0 |
| Fe | 26,000.0 | 100.0 - >100,000.0 |
| Hg | 0.06 | <0.01 - 4.6 |
| Mg | 9,000.0 | 50.0 - >100,000.0 |
| Mn | 330.0 | <2.0 - 7,000.0 |
| Mo | 0.97 | <3.0 - 15.0 |
| Ni | 19.0 | <5.0 - 700.0 |
| Pb | 19.0 | <10.0 - 700.0 |
| Se | 0.3 | <0.1 - 4.3 |
| Sr | 120.0 | <5.0 - 3,000.0 |
| V | 80.0 | <7.0 - 500.0 |
| Zn | 48.0 | <5.0 - 2,900.0 |

* Values from USEPA guidance document entitled, Metals In Soils: A Brief Summary (1980).