Missouri Department of Natural Resources

# Total Maximum Daily Load for Streams with Mercury Impairment

Water Protection Program fact sheet 8/2009

**Waterbody Segment at a Glance:**

| | |
|---|---|
| **Location:** | 15 Streams and 24 Reservoirs Statewide |
| **Pollutant:** | Mercury |
| **Source:** | Atmospheric Deposition |
| **TMDL Priority Ranking:** | Medium |

## Description of the Problem

### Beneficial use that is impaired

• Protection of human health associated with fish consumption.

### Standards that apply

- The impairment of this lake is based on the general criterion contained in Missouri's Water Quality Standards. 10 CSR 20-7.031(3)(D), which states, "Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal or aquatic life."

Mercury occurs in the environment through natural processes and human activity. Naturally occurring mercury is released to the environment by volcanoes, hot springs and the weathering of rock and soil. Substantial amounts of mercury can be released to the environment from human sources. Several industrial processes such as electroplating, coal combustion for production of electricity, pulp and paper manufacturing and the formulation of pesticides use mercury. Improper disposal of such mercury-containing products as thermometers and electrical switches increases the amount of mercury released to the environment. Because it can vaporize, a large amount of mercury enters the atmosphere and is deposited globally in precipitation.

Mercury affects the human central nervous system. It is considered a neurological and developmental toxicant, and it is a possible carcinogen. Mercury can accumulate to unsafe levels in commercially and recreationally important fish. Many chemical contaminants accumulate in bottom-feeding fish. However, unlike many of these other contaminants, mercury is magnified through the food chain. Therefore, predatory fish (bass, walleye and pike) have much higher levels of mercury. Of the mercury that accumulates in predatory fish, 90 to 100 percent is in the methyl mercury form, a form that is very soluble and assimilates easily into flesh. Preparing fish by skinning and trimming does not reduce the amount of mercury because it accumulates in fish muscle tissue (fillets). Cooking or drying fish can concentrate mercury levels to even higher levels.

There is no clear demarcation of safe levels for mercury in fish tissue; however, mercury levels of 0.2 – 0.3 mg/kg or greater should be considered to be a general human health risk. The amount of human health risk depends on the amount of fish eaten and the levels of mercury in the fish being consumed.

Based on analysis of fish fillet samples from throughout Missouri, 40 specific waterbody segments have been added to the Missouri 303(d) List for mercury. Only waterbodies with data suggesting human health risk due to elevated mercury levels in fish were added to the 303(d) list; however, it is important to note that Missouri Department of Natural Resources staff believe the problem is statewide (see table and map below). In addition, the Missouri Department of Health has issued a Fish Consumption Advisory for mercury in largemouth bass throughout the state. This advisory recommends children 12 years of age or younger and women who are or may become pregnant should not eat largemouth bass over 12” in length. At least 10 other states have similar Fish Consumption Advisories. For more information about the Missouri Fish Advisory, consult the following Web Sites:

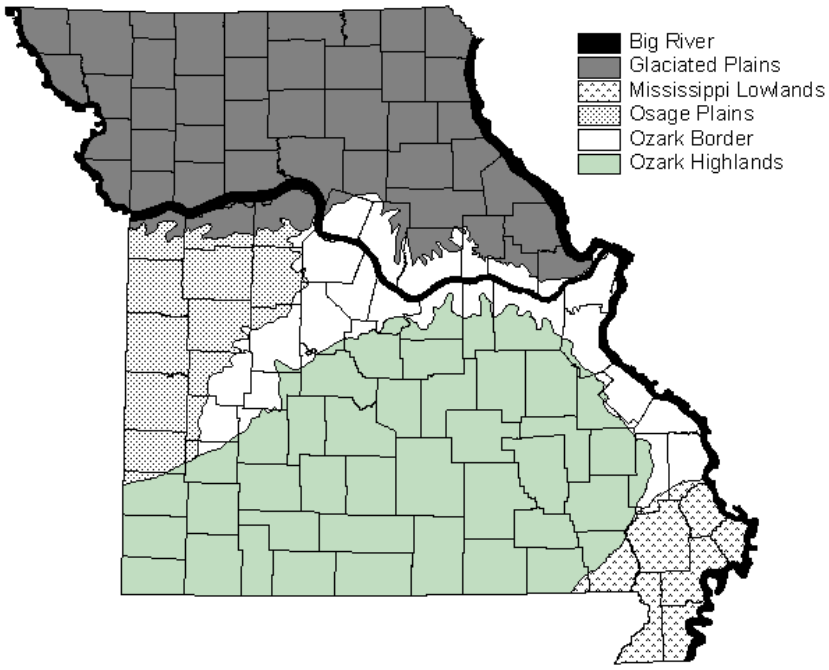
Missouri Department of Conservation: www.mdc.mo.gov/news/2001/fish_consumption/

Missouri Department of Health: www.dhss.mo.gov/fishadvisory/

**Average Mercury Levels in Several Types of Fish in Six Missouri Aquatic Faunal Regions**

| Data Through 2001 | Average Mercury in mg/kg (number of samples) | | | | |
|---|---|---|---|---|---|
| | Largemouth Bass | Carp | Channel Catfish | Sturgeon | Walleye |
| Big River | .337 (6) | .101 (85) | .117 (27) | .116 (13) | |
| Glaciated Plains | .316 (78) | .125 (49) | .067 (42) | | .355 (2) |
| Mississippi Lowlands | .300 (9) | .023(3) | .038 (4) | | |
| Osage Plains | .282 (19) | .055 (4) | .061 (2) | | .132(1) |
| Ozark Border | .257 (81) | .066 (39) | .067 (30) | | .194 (2) |
| Ozarks | .187 (57) | .141 (66) | .120 (19) | | .320 (5) |
| **Statewide** | **.265 (251)** | **.109 (246)** | **.084 (126)** | **.116 (13)** | **.283 (10)** |

**Missouri Aquatic Faunal Regions**



**Waterbodies Listed for Mercury Impairment**

| | |
|---|---|
| Ben Branch Lake | Osage County |
| Bethany Reservoir | Harrison County |
| Black River | Butler County |
| Bluestem Lake | Jackson County |
| Bourbeuse River | Franklin County |
| Clearwater Reservoir | Wayne County |
| Cooley Lake | Clay County |
| Crowder State Park Lake | Grundy County |
| Deer Ridge Community Lake | Lewis County |
| Ditch #1 | Dunklin County |
| Eleven Point River | Oregon County |
| Fellows Lake | Greene County |
| Femme Osage Slough | St. Charles County |
| Foxboro Lake | Franklin County |
| Gasconade River | Gasconade County |
| Grand Glaize Creek | St. Louis County |
| Grindstone Reservoir | DeKalb County |
| Hough Park Lake | Cole County |
| Hunnewell Lake | Shelby County |
| Indian Hills Lake | Crawford County |
| James River | Stone County, two locations |
| Jamesport City Lake | Daviess County |
| Knob Noster State Park Lake | Johnson County |
| Little Blue River | Jackson County |
| LaBelle Lake #2 | Lewis County |
| Lake of the Woods | Boone County |
| Lamine River | Cooper County |
| Long Branch Reservoir | Macon County |
| Longview Reservoir | Jackson County |
| Mark Twain Lake | Ralls County |
| Meramec River | Franklin County |
| Noblett Lake | Douglas County |
| Osage River | Osage County |
| Salt River | Ralls County |
| Schuman Park Lake | Phelps County |
| Smithville Reservoir | Clay County |
| Swift Ditch | New Madrid County |
| Weatherby Lake | Platte County |
| Winnebago Lake | Cass County |

**For More Information**

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