Missouri Department of Natural Resources

Total Maximum Daily Load Information Sheet

Mark Twain Lake

Waterbody Segment at a Glance:

County: Monroe and Ralls
Nearby Cities: Paris, Monroe City, Stoutsville Palmyra, Hannibal
Area: 18,600 Acres
Pollutant: Atrazine
Source: Corn, Sorghum production

Note: This lake is proposed for deletion from the 2002 303(d) list.

TMDL Priority Ranking: Medium

State map showing location of watershed

Description of the Problem

Beneficial uses of Mark Twain Lake

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life and Human Health associated with Fish Consumption
- Boating and Canoeing
- Whole Body Contact
- Drinking Water Supply

Use that is impaired

- Drinking Water Supply

Standards that apply

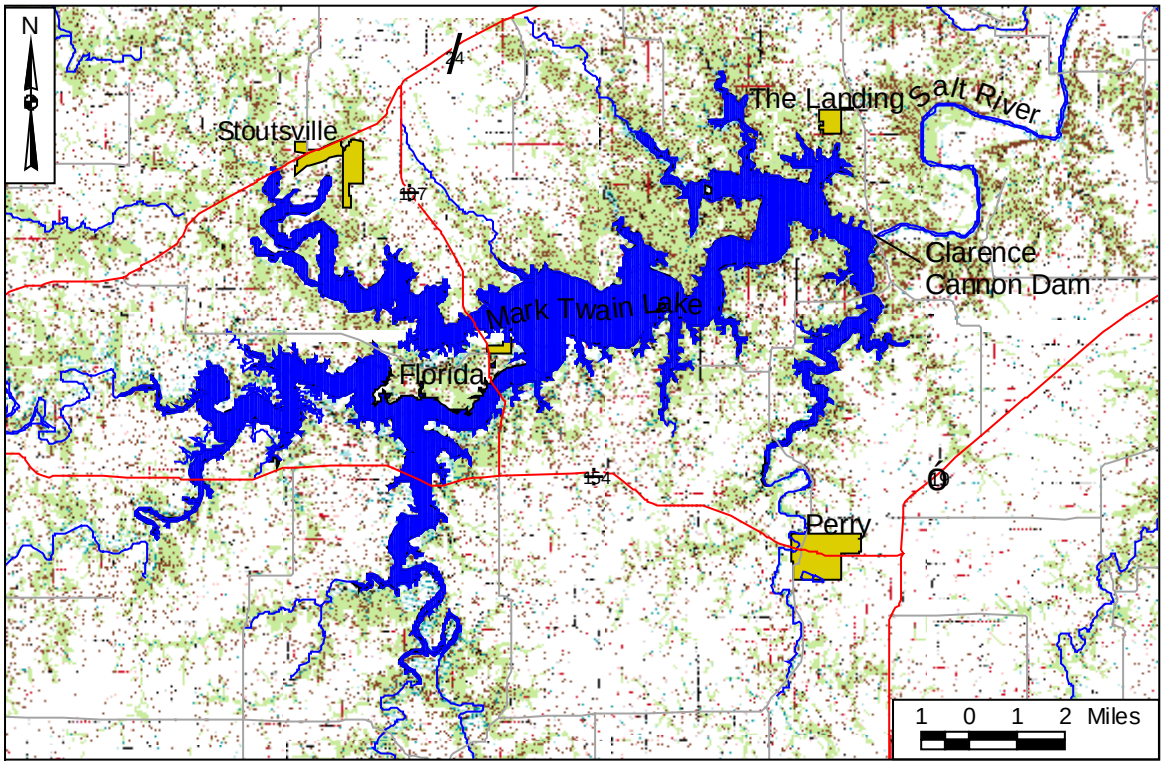
- The impairment of this lake is based on exceedence of the specific criterion of 3 micrograms per liter (µg/L or parts per billion) atrazine, as an average of the period of record, contained in Missouri's Water Quality Standards. 10 CSR 20-7.031 Table A.

First proposed in 1937 to provide flood control on the Salt River, Mark Twain Lake was created during the 1960s with the construction of the Clarence Cannon Dam by the U.S. Army Corps of Engineers. Its drainage area comprises 2300 square miles and the lake surface at normal pool covers 18,600 acres. The lake also serves as a drinking water supply due to the shortage of existing groundwater. The Clarence Cannon Wholesale Water Commission, which provides drinking water for a number of communities in the area, utilizes the lake as its primary supply

source. The drinking water supply has been threatened with accumulation of atrazine in the lake resulting from runoff from surrounding farmland.

Atrazine is a widely used herbicide for control of broadleaf weeds. It is the most heavily used herbicide on corn and grain sorghum in Missouri. Since 1993, its uses have been greatly restricted. Atrazine is considered a possible human carcinogen, so the state standard is set at the very low level of three µg/L. Measured levels in the lake have commonly exceeded the state standard in the past. In the last few years, atrazine levels have been much lower in the lake and the long term average atrazine level is 2.19 µg/L, and the lake is being proposed for deletion from the 303(d) list.

Map of Mark Twain Lake Area



Yearly Atrazine Levels in Mark Twain Lake, 1995-1999
(µg/L)

Year (Months)	Average	Range
1995 (6-12)	2.57	1.6-3.2
1996 (1-11)	4.92	2-13
1997 (1-11)	2.04	0.2-4.3
1998 (1-11)	0.82	0.08-2.8
1999 (1-12)	1.95	0.05-6.7

Source: Novartis Inc.

Monthly Atrazine Levels in Mark Twain Lake, 1995-1999
(µg/L)

Month (Years)	Average	Range
January (1996-1999)	1.21	0.05-2.6
February (1996-1999)	1.06	0.05-2.8
March (1996-1999)	0.61	0.05-2
April (1996-1999)	2.07	0.08-6
May (1996-1999)	6.28	2.6-13
June (1995-1999)	3.70	0.4-4.3
July (1995-1999)	2.66	0.9-6.8
August (1995-1999)	2.52	1.1-4.5
September (1995-1999)	2.52	1.2-4
October (1995-1999)	2.52	0.8-3.5
November (1995-1999)	1.88	0.2-3
December (1995, 1998-1999)	1.25	0.05-3

Source: Novartis Inc.

Atrazine Levels in Mark Twain Lake 1999-2000
(µg/L)

December, 1999	0.99
March, 2000	0
June, 2000	0
September, 2000	0.52

Source: Missouri Dept Natural Resources

For more information call or write:
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