Missouri Department of Natural Resources

Total Maximum Daily Load Information Sheet

Vandalia Lake

(aka Vandalia City Reservoir, Weldon H. "Pete" Steiner Reservoir)

Water Body Segment at a Glance:


State map showing location of watershed

County: Pike
Nearby Cities: Vandalia
Area of impairment: 37 surface acres
Pollutant: Atrazine
Source: Corn, Sorghum production
Water Body Identification (WBID): 7032

Note: **This lake was removed from Missouri's 303(d) List (as of the 2004/2006 list) because water quality data revealed that it was no longer impaired by atrazine.**

Description of the Problem

Designated Beneficial Uses of Vandalia City Reservoir

- Livestock and wildlife watering
- Protection of aquatic life (Limited warm-water fishery)
- Human health protection (Fish consumption)
- Secondary contact recreation
- Drinking water supply

Use that was impaired

- Drinking Water Supply

The "drinking water supply" use is defined in 10 CSR 20-7.031(1)(C)10 as:

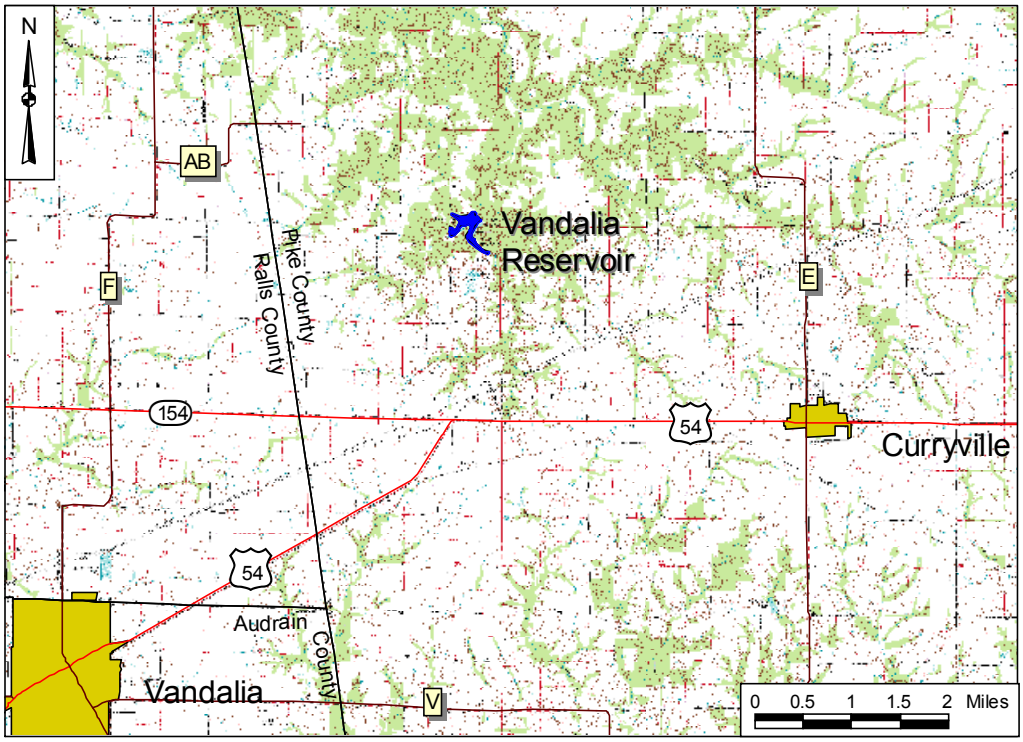
> "Maintenance of a raw water supply which will yield potable water after treatment by public water treatment facilities."*

Standards that apply

- Missouri's Water Quality Standards10 CSR 20-7.031, Table A., allows a maximum of 3 micrograms per liter (µg/L) atrazine. Because this number is based on health risk associated with a 70-year exposure period, the 3 µg/L is interpreted as a long-term average.

Background information
Vandalia City Reservoir (also referred to as Vandalia Lake or Weldon H. "Pete" Steiner Reservoir) is located in Pike County, north of State Highway 54 between Vandalia and Curryville (See map). It was created by damming a tributary of South Spencer Creek. It is a drinking water source for the town of Vandalia (in Audrain County) and surrounding dwellings. The reservoir was renamed Weldon H. "Pete" Steiner Reservoir on January 9, 1979, after a respected former editor of the local newspaper, *The Vandalia Leader* (Vandalia Watershed Management Committee, 1999). However, the name has yet to be officially changed with the U.S. Geological Survey (USGS).

Vandalia City Reservoir in Pike County, Missouri



Atrazine is a systemic herbicide that blocks photosynthesis. It has been a major herbicide used for corn production since its introduction in 1958. Atrazine is the most heavily used herbicide in corn and grain sorghum production in Missouri where it provides selective broadleaf control and grass suppression at a lower cost than many other herbicides. Watershed vulnerability to agrichemical contamination is based on the chemistry of the contaminant, hydrology of a region and land-use. Streams draining watersheds with runoff-prone soils, such as those existing in the Vandalia City Reservoir watershed, may periodically contain high herbicide levels.

Atrazine was thought to be a Group C carcinogen (i.e., possibly caused cancer in humans) when the department first placed Vandalia City Reservoir on the 1998, and subsequently the 2002, 303(d) list of impaired waters. It was listed for atrazine contamination. However, the U.S. Environmental Protection Agency (EPA) stated in the October 2003 *Interim Reregistration*

Eligibility Decision (IRED) that it had no clear indication that atrazine caused cancer in humans. Various studies have also been conducted to assess the effects of atrazine on amphibians, especially focusing on whether or not it was associated with endocrine disruption and thus reproduction. In the October 2003 IRED, EPA stated that the data available at that time was insufficient to make a determination as to the potential for atrazine to impact reproduction in amphibians. EPA continues to review new studies on both issues as they become available.

In 1997, the Vandalia Watershed Management Committee formed to address the concerns about atrazine levels in the City Reservoir. City officials, community residents, farmers and livestock producers, and University of Missouri Outreach and Extension, Soil and Water Conservation District, and various other agency personnel created an atrazine reduction plan, which was published in 1999 as the *Vandalia City Reservoir Water Resources Plan*. Committee goals were, and are, as follows:

- Reduce contaminant levels in the public water supply;
- Write a management plan that educates and improves communication, volunteerism and cooperation;
- Create stewardship opportunities;
- Ensure acceptable water treatment costs;
- Monitor water quality; and
- Maintain water supply below MCL limits.

In the spring of 2004, EPA and the registrants of pesticide products containing atrazine (e.g. Syngenta[1]) signed into effect a Memorandum of Agreement (MOA). The goal of the MOA, in relation to this and other selected surface water bodies, was to reduce loading of atrazine and its chloro-metabolites to total chlorotriazine levels below the newly developed drinking water criteria on which EPA and the technical registrants agreed. If the drinking water standards are not met, the use of atrazine may be excluded within the applicable watersheds.

As part of the MOA, the registrants have initiated a monitoring program on surface water for selected community water systems. The MOA provides details regarding conditions under which atrazine may continue to be used as a contingency to EPA approving the re-licensing registration of these products. It constitutes an incentive for atrazine manufacturers, distributors, and users to cooperate in order to protect the Vandalia City Reservoir's designated use as a drinking water supply lake. Syngenta, in cooperation with the Missouri Corn Growers Association and other entities, continues to work with producers in exploring employment of Best Management Practices (BMPs) that could have a positive impact on water quality in the lake.

The implementation of the Water Resources Management Plan, and subsequent adoption of BMPs resulted in a dramatic reduction of atrazine levels in raw water. The adoption of voluntary BMPs is achieving successful results using economically and socially acceptable practices and is clearly a model for other atrazine-contaminated lakes in the state.

[1] Syngenta is a large global agribusiness company which notably markets seeds and pesticides.

The department submitted a draft TMDL on Vandalia City Reservoir to EPA Region 7 on August 21, 2006. Subsequent to that submittal, available water quality data from the lake was analyzed according to the department's 303(d) Listing Methodology document. Based on a review of those data, the lake was no longer considered impaired by atrazine. EPA agreed with the department's assessment in their Sept. 27, 2007 letter providing partial approval of Missouri's 2004/2006 303(d) List, and the lake was removed from the list (final EPA approval of the 2004/2006 303(d) List was on Jan. 16, 2009). As a result of the delisting, a TMDL is no longer required and the submitted draft TMDL was neither approved nor denied.

For more information call or write:

Missouri Department of Natural Resources
Water Protection Program
P.O. Box 176, Jefferson City, MO 65102-0176
Telephone: 1-800-361-4827 or 573-751-1300 office
Facsimile: 573-522-9920
Program Home Page: http://www.dnr.mo.gov/env/wpp/index.html