Missouri Department of Natural Resources
Total Maximum Daily Load Information Sheet

Grand River

Water Body Segment at a Glance:

County: Livingston to Chariton
Nearby Cities: Utica and Brunswick
Length of impaired
        segment: 60 miles
Pollutant: Bacteria
Source: Rural NPS
Water Body ID: 0593

State Map Showing Location of Watershed

Scheduled for TMDL development: 2013

Description of the Problem

Beneficial uses of Grand River

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life
- Protection of Human Health (Fish Consumption)
- Whole Body Contact Recreation – Category A
- Secondary Contact Recreation
- Public Drinking Water Supply
- Irrigation

Use that is impaired

- Whole Body Contact Recreation – Category A

Standards that apply

- Missouri's Water Quality Standards at 10 CSR 20-7.031(4)(C) state that the *E. coli* bacteria count shall not exceed 126 colonies per 100 milliliters of water (126 col/100 mL) for Category A and 206 col/100 mL for Category B waters. This count is the geometric mean during the recreational season (April 1- October 31) in waters designated for whole body contact recreation.

Background information and Water Quality Data

The Grand River is a tributary to the Missouri that has its headwaters in Iowa. It is designated as Category A for the whole body contact recreation use, which means it has swimming areas which are open to and fully accessible by the public. The bacteria impairment is based on water quality data gathered by the U.S. Geological Survey in 2002-08. The listing methodology states that, to be considered not impaired, a water body must meet the water quality criterion in each of the last three

years of available data and that the geometric mean must consist of at least five data points within the recreational season. Recreation season data from 2006, 2007 and 2008 had a geometric means that exceeded the water quality criterion of 126 col/100 mL for Category A waters.

Excessive amounts of fecal bacteria in surface water used for recreation are an indication of an increased risk of pathogen-induced illness to humans. Infections due to pathogen-contaminated waters include gastrointestinal, respiratory, eye, ear, nose, throat and skin diseases. *E. coli*, are bacteria found in the intestines of warm blooded animals and are used as indicators of the risk of waterborne disease from pathogenic (disease causing) bacteria or viruses. Most *E. coli* strains are harmless, but some can cause serious illness in humans and are occasionally responsible for product recalls. The harmless strains are part of the normal flora of the intestines, and can benefit their hosts by preventing the establishment of pathogenic bacteria within the intestine[1,2]. Missouri's bacteria criteria are based on specific levels of risk of acute gastrointestinal illness. The levels of risk correlating to these criteria are no more than eight illnesses per 1,000 swimmers in fresh water.

People can protect themselves from waterborne illness by avoiding contact with contaminated water. However, when swimming anywhere, it is wise to take common sense precautions. These include washing hands before eating, showering after swimming and avoiding exposure to questionable water if you have open cuts or wounds.

E. coli Data for Grand River from the 2002 - 2008 Recrational Seasons

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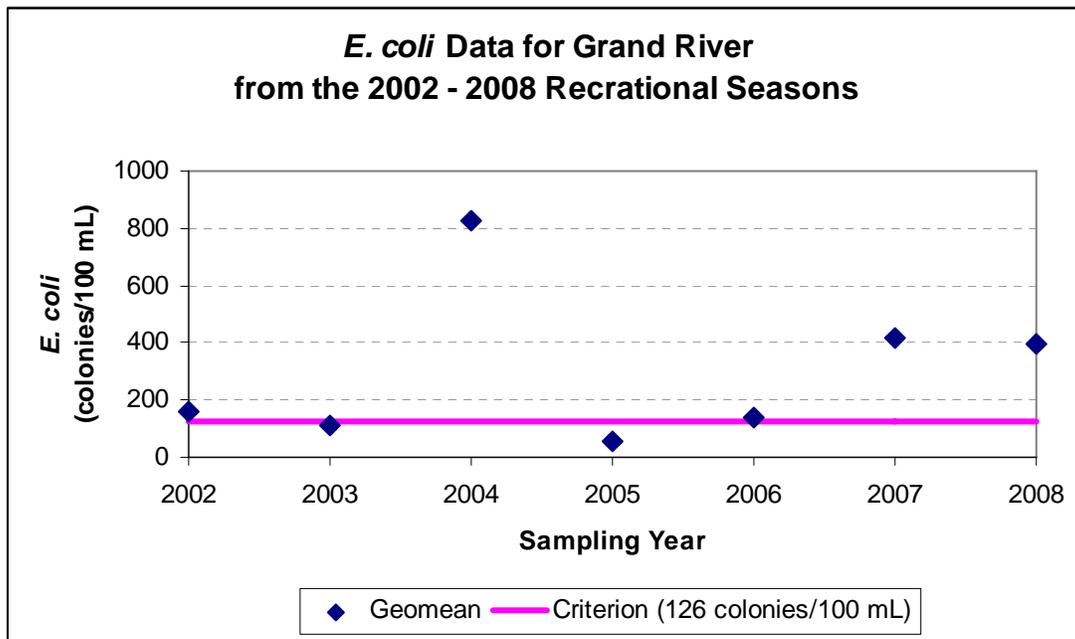
[1] Hudault S, Guignot J, Servin AL (July 2001). "*Escherichia coli* strains colonising the gastrointestinal tract protect germfree mice against *Salmonella typhimurium* infection". *Gut* **49** (1): 47–55

[2] Reid G, Howard J, Gan BS (September 2001). "Can bacterial interference prevent infection?". *Trends Microbiol.* **9** (9): 424–8.

Map Showing the Grand River in Northern Missouri, and USGS Sampling Site
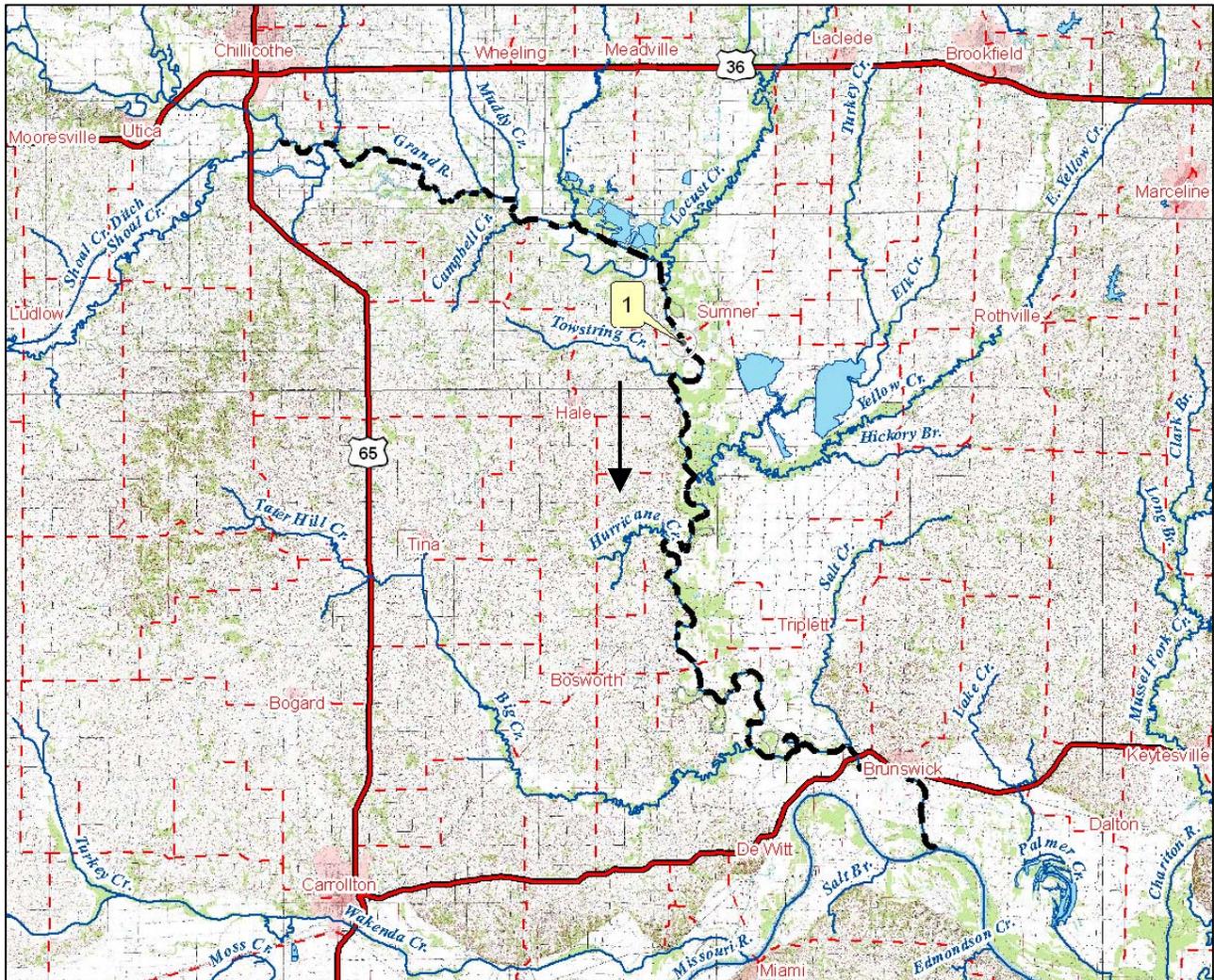
- - - - Impaired Segment   ⟶ Direction of flow

Sample Sites
1 – Grand River at State Highway 139

For more information call or write:
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