



Missouri Department of Natural Resources

## Total Maximum Daily Load Information Sheet

### Hickory Creek

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#### Water Body Segment at a Glance:

**County:** Newton  
**Nearby Cities:** Neosho  
**Length of impaired segment:** 4.5 miles  
**Pollutant:** Bacteria  
**Source:** Unknown  
**Water Body ID:** 3226



State Map Showing Location of Watershed

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**Scheduled for TMDL development:** 2013

#### Description of the Problem

##### Beneficial uses of Hickory Creek

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

##### 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

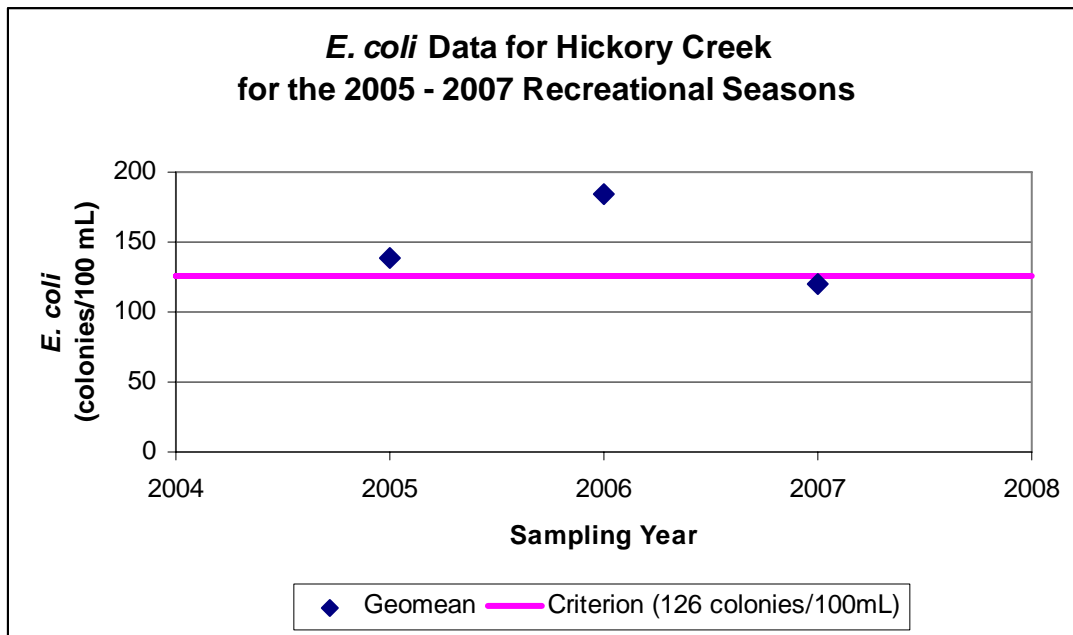
Hickory Creek, which is a small tributary to Shoal Creek, drains the east side of Neosho in Newton County, Missouri. It is designated as Category A for the whole body contact recreation use, which means it has swimming areas which are open to and fully accessible by the public.

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<sup>1,2</sup>. 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.

Evidence for the impairment comes from monitoring for *E. coli* conducted by the Newton County Health Department on Capps Creek in 2005-2007. The Listing Methodology for bacteria states that if the annual average (geometric mean) for at least one of the last three years of available data exceeds the criteria, the stream is judged to be impaired. In 2005 and 2006, the recreational season data showed the geometric mean exceeded the water quality criteria of 126 col/100 mL for Category A waters. It is unknown what exactly is causing the high levels of bacteria. Possible bacteria sources, both rural and municipal, are leaking sewer systems and manure from pets, livestock and wild animals.

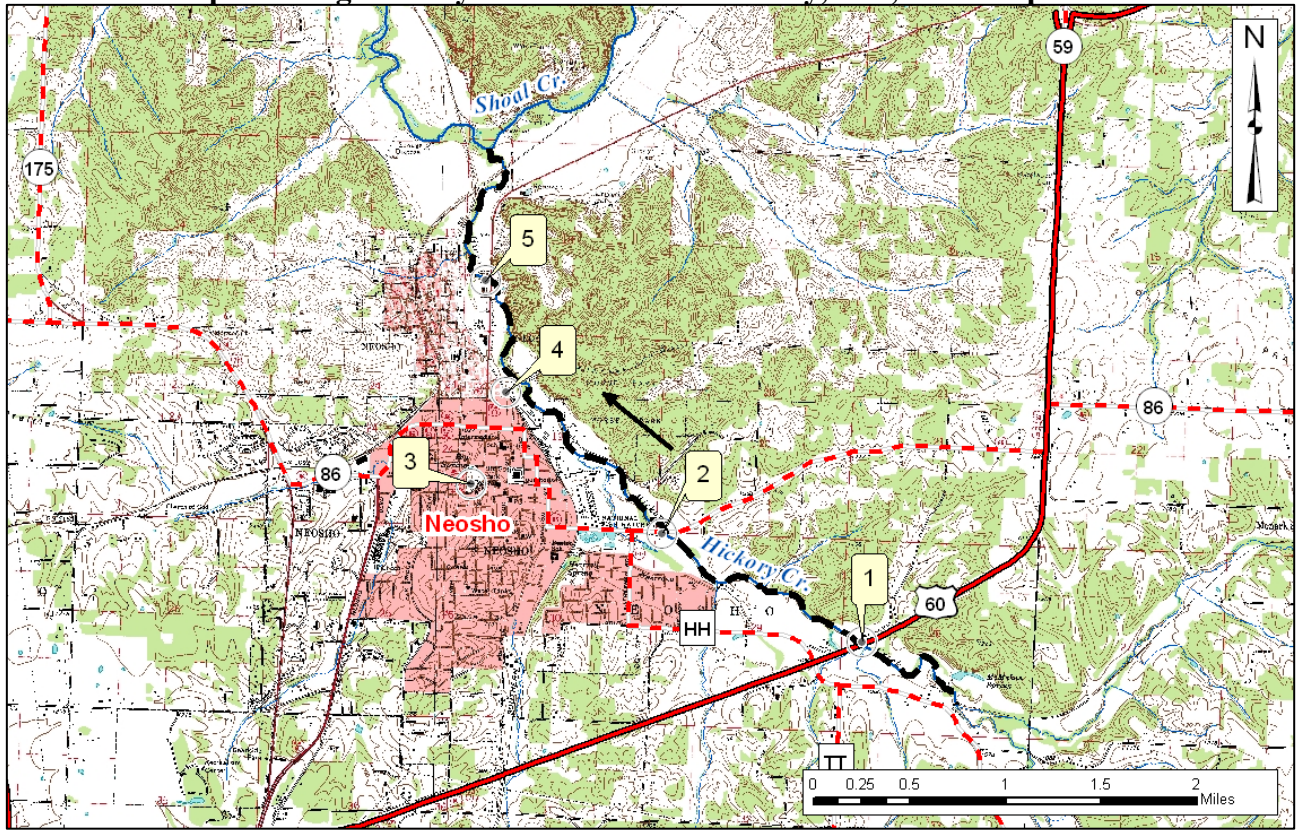
People can protect themselves from waterborne illness by avoiding contact with contaminated water. However, when swimming anywhere, it is wise to take common sense precautions. These include washing hands before eating, showering after swimming and avoiding exposure to questionable water if you have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



<sup>1</sup> 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

<sup>2</sup> Reid G, Howard J, Gan BS (September 2001). "Can bacterial interference prevent infection?". *Trends Microbiol.* **9** (9): 424-8.

**Map Showing Hickory Creek in Newton County, Mo., and Sample Sites**



--- Impaired Segment

→ Direction of flow

**Sample Sites**

- 1 – Hickory Creek at U.S. Highway 60
- 2 – Hickory Creek at State Highway 86
- 3 – Spring to Hickory Creek at cave in Big Spring Park
- 4 – Spring to Hickory Creek north of Big Spring Park
- 5 – Hickory Creek at U.S. Highway 60 Business

**For more information call or write:**

Missouri Department of Natural Resources

Water Protection Program

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