

Missouri Department of Natural Resources

# Total Maximum Daily Load Information Sheet

## Clear Creek

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### Water Body Segment at a Glance:

**County:** Lawrence/Newton  
**Nearby Cities:** Monett  
**Length of impaired segment:** 9 miles  
**Pollutant:** Bacteria  
**Source:** None Given  
**Water Body ID:** 3238



**Scheduled for TMDL development:** 2013

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### Description of the Problem

#### Beneficial uses of Clear Creek

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

#### Use that is impaired

- Whole Body Contact Recreation – Category B

#### Standards that apply

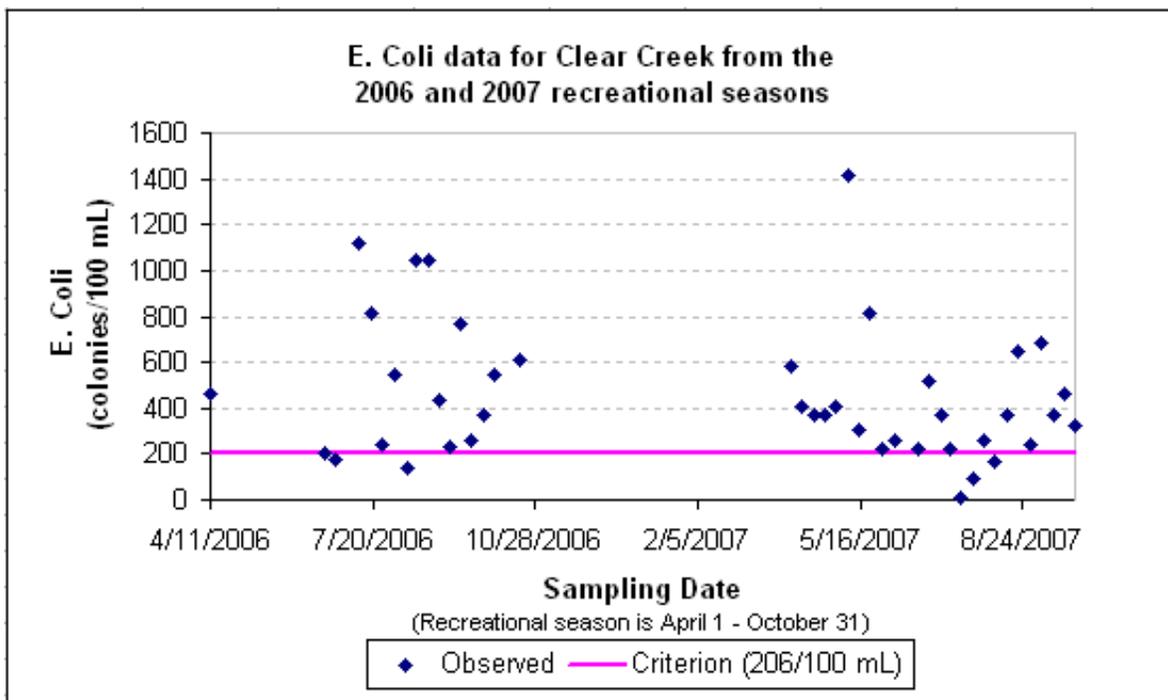
- Missouri's Water Quality Standards at 10 CSR 20-7.031(4)(C) state that the *E.coli* bacteria count shall not exceed 126 colonies per 100 milliliters of water (126 col/100 mL) for Category A and 206 col/100 mL for Category B waters. This count is the geometric mean during the recreational season (April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

#### Background information and water quality data

A TMDL was written and approved for this creek in 1999 relating to problems caused by the Monett Wastewater Treatment Plant in upper Clear Creek. The bacteria impairment has been identified on the lower segment, from Pierce City on down to the creek's mouth at Shoal Creek. The source of the bacteria is unknown. Clear Creek is designated as Category B for the whole body contact recreation use, which means it has places deep enough for total immersion (i.e., swimming), but they may be on private lands or inaccessible to 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. *Escherichia coli*, or *E. coli*, are bacteria found in the intestines of warm blooded animals and 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.

The bacteria impairment in Clear Creek is based on Newton County Health Department sampling in 2006 and 2007. The geometric means for Clear Creek have been calculated as 435 col/100 mL for 2006 and 312 col/100 mL for 2007. These are both greater than the Category B criteria of 206 col/100 mL. The data the NCHD collected are displayed in the graph below. The sample site is shown on the map found on the following page.



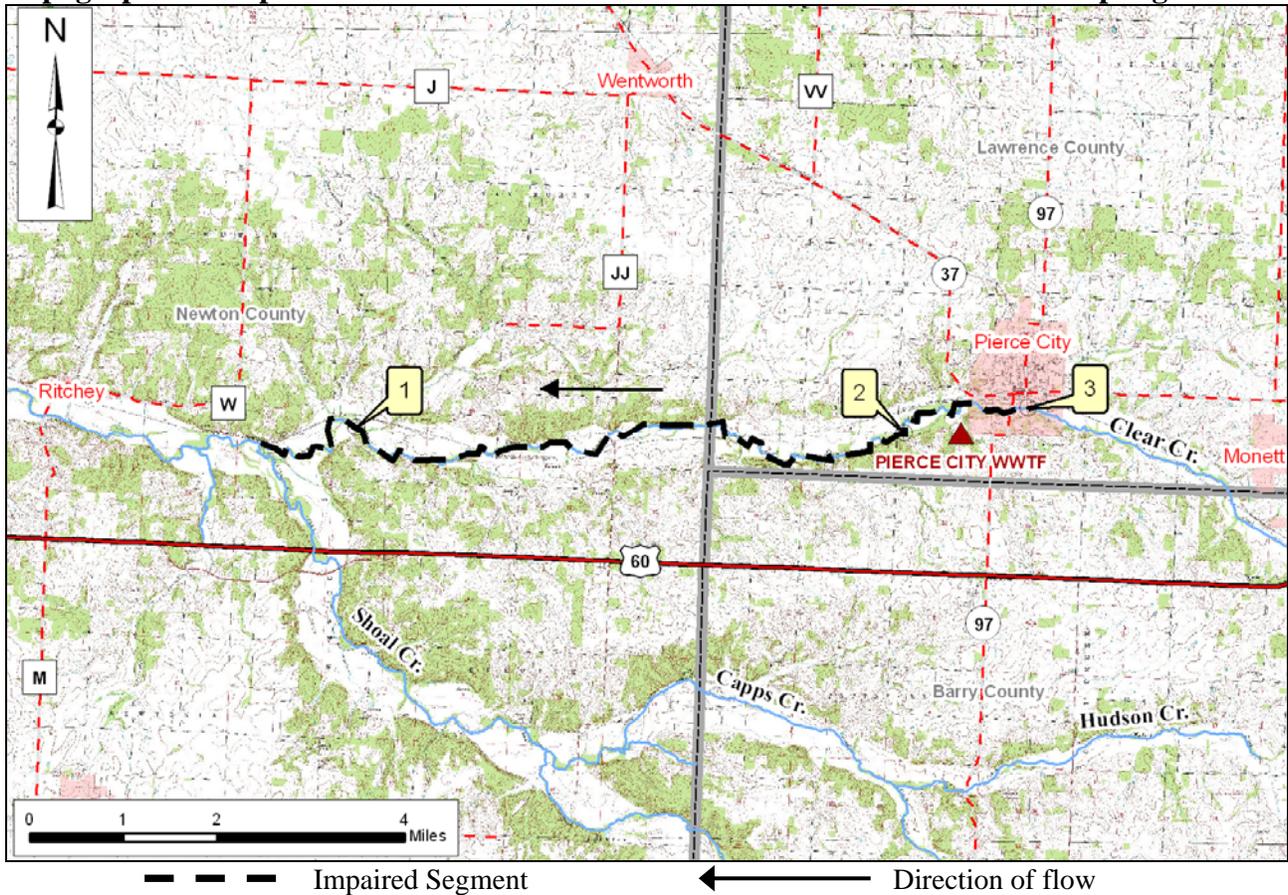
In addition, sampling by the U.S. Geological Survey in 1999 at three other sites found bacteria levels higher than the criteria during the recreational season. These were not needed in assessing

<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.

the impairment<sup>3</sup>, since more recent data are available; however, these data illustrate that the problem is not only at one location.

### Topographical Map of Clear Creek in Lawrence and Newton Counties with Sampling Sites



**Sample Sites**  
1 – Clear Creek at Newton Road  
2 – Clear Creek at County Road 1020  
3 – Clear Creek at Elm Street

**For more information call or write:**

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

<sup>3</sup> Refer to the time requirements outlined in the Listing Methodology Document, the department’s guidelines for when and how to list a water body on the 303(d) list.