



Missouri Department of Natural Resources

## Total Maximum Daily Load Information Sheet

### Indian Creek, South, North and Middle Indian Creeks

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#### Water Body Segment at a Glance:

<b>Counties:</b>	Newton/McDonald
<b>Nearby Cities:</b>	Neosho, Fairview and Wheaton
<b>Length of impaired segments:</b>	
Indian Creek:	26 miles
South Indian Creek:	9 miles
North Indian Creek:	5 miles
Middle Indian Creek:	2.5 miles
<b>Pollutant:</b>	Bacteria
<b>Source:</b>	Rural Nonpoint Sources
<b>Water Body IDs:</b>	
Indian Creek	3256
South Indian Creek	3259
North Indian Creek	3260
Middle Indian Creek	3263



State Map Showing Location of Watershed

**Scheduled for TMDL development: 2013**

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#### Description of the Problem

##### Beneficial uses of the Indian Creeks

- Livestock and Wildlife Watering
- Protection of Aquatic Life: Cool Water Fishery
- Protection of Human Health (Fish Consumption)
- Whole Body Contact Recreation
- Secondary Contact Recreation (Indian Creek only)
- Irrigation (Indian Creek only)
- Cold Water Fishery (S. Indian Creek only)

##### Use that is impaired

- Whole Body Contact Recreation – Category A (Indian Creek)
- Whole Body Contact Recreation – Category B (S., N. and M. Indian Creeks)

##### 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 (geomean)

during the recreational season (April 1- October 31) in waters designated for whole body contact recreation.

### **Background Information and Water Quality Data**

Indian Creek joins with Big Sugar Creek to form the Elk River in far southwest Missouri. South, North and Middle Indian creeks form the headwaters of Indian Creek. Evidence of the bacteria impairment is based on data gathered by the Newton County Health Department from 2005-2007 and by the U.S. Geological Survey from 2005-2008. Although this segment of Indian Creek is 26 miles long, only 5 miles are judged to be impaired by bacteria.

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 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.

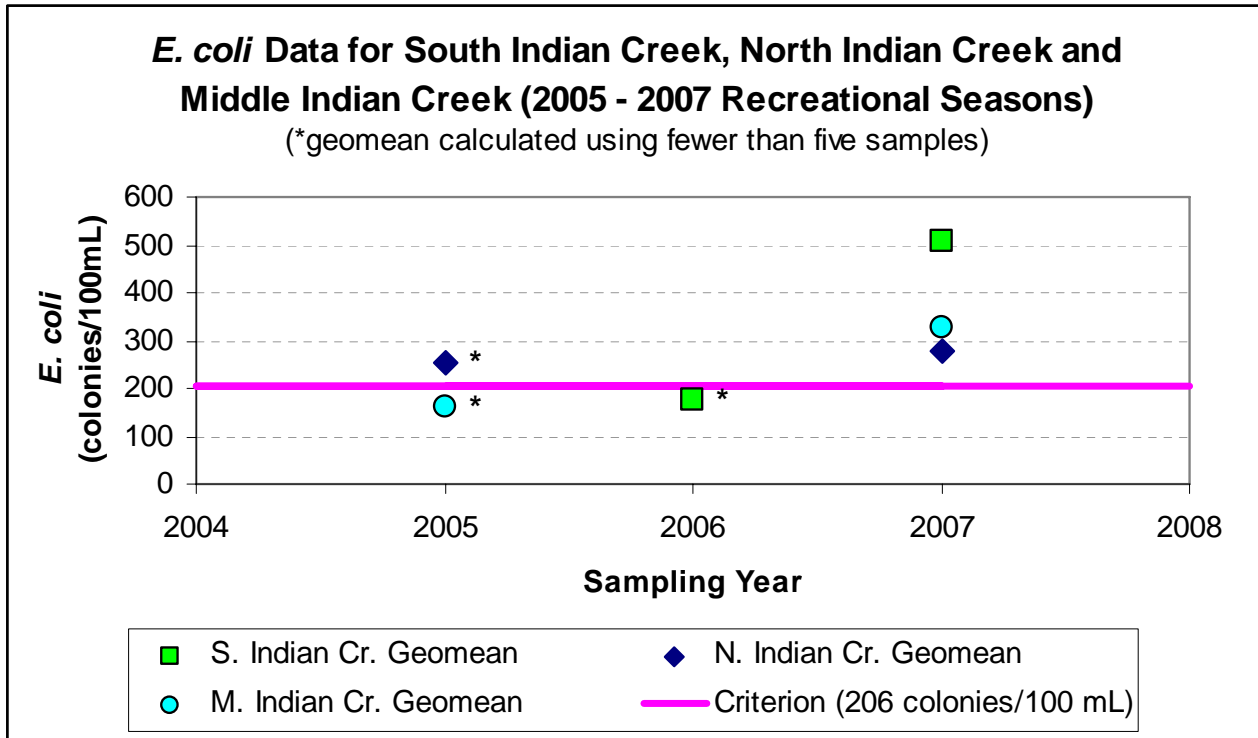
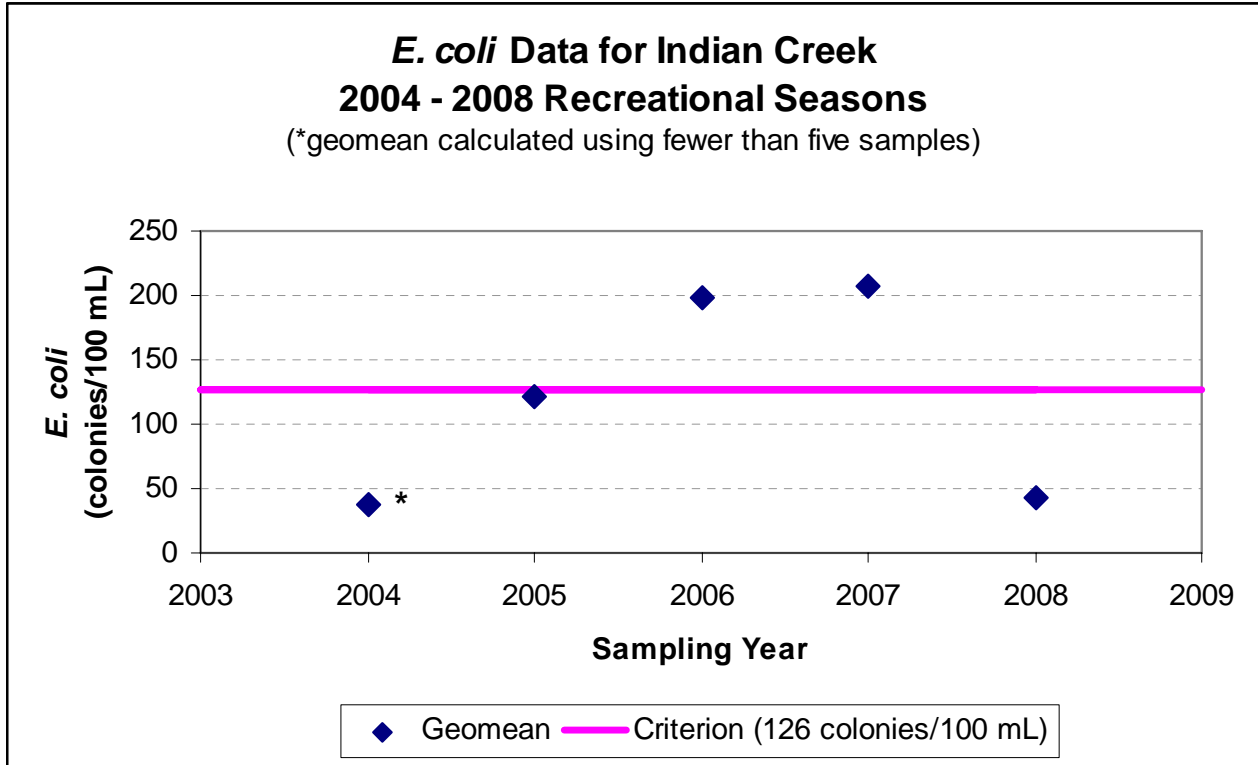
For whole body contact recreation waters, Category A means there are swimming areas which are open to and fully accessible by the public. Category B waters have places deep enough for total immersion (i.e., swimming), but they may be on private lands or inaccessible to the public. The Listing Methodology 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 Indian Creek, the recreational season geometric mean exceeded the *E. coli* criteria of 126 col/100 mL) for Category A waters in two of the last three years of data. The Newton County Health Department monitored South, North and Middle Indian creeks in 2007 and the recreational season data for that year exceeded the *E. coli* criteria of 206 col/100 mL for Category B waters in each creek..

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

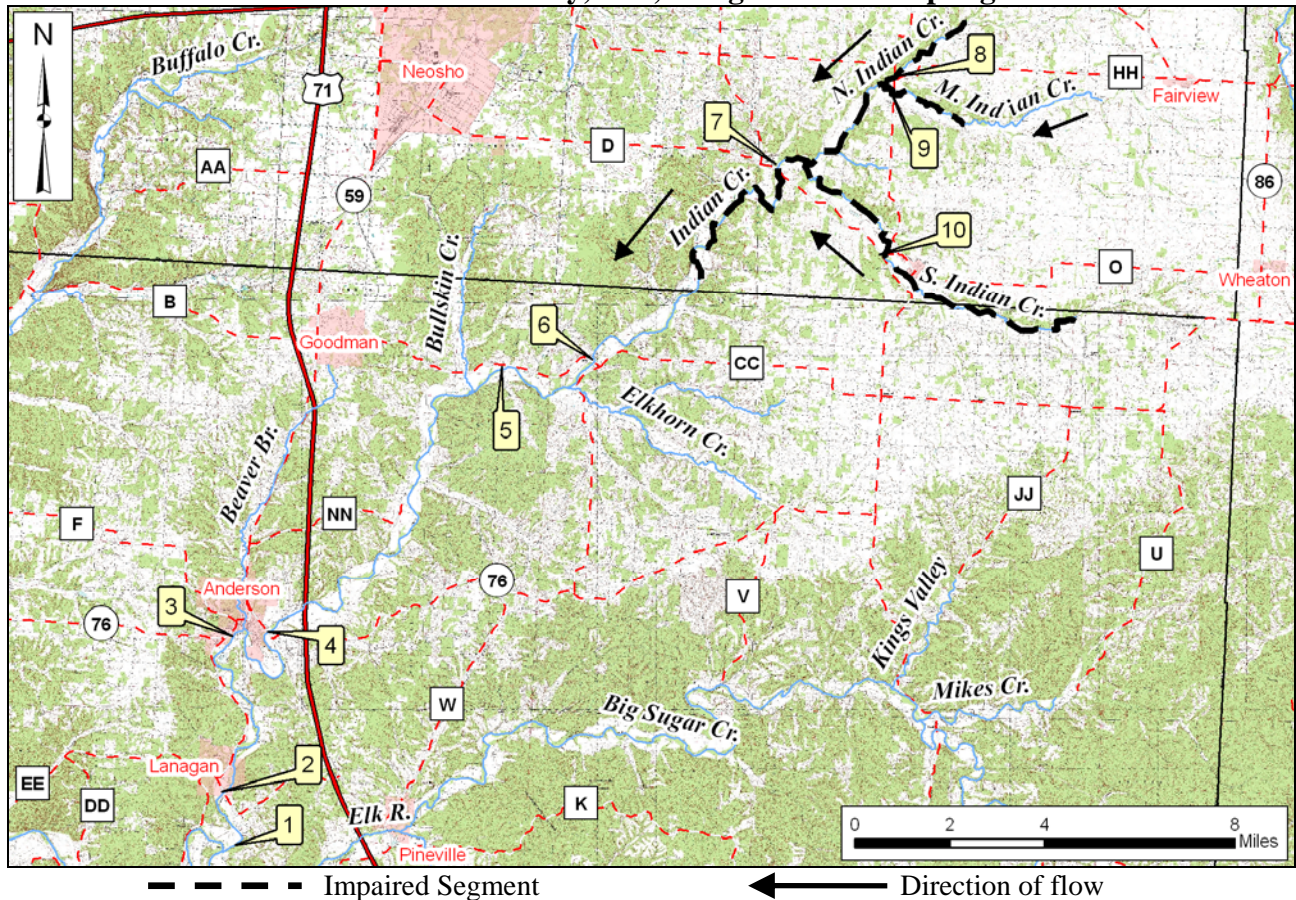
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<sup>1</sup> Hudault S, Guignot J, Servin AL (July 2001). "[Escherichia coli strains colonising the gastrointestinal tract protect germfree mice against Salmonella typhimurium infection](#)". *Gut* **49** (1): 47-55

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



**Map showing the impaired segments of Indian Creek and South, North and Middle Indian creeks in Newton County, Mo., along with the sampling sites**



Sample Sites	
1 – Indian Cr. near mouth	6 – Indian Cr. at McNatt, State Hwy C
2 – Indian Cr. at Lanagan	7 – Indian Cr. at State Hwy D near Boulder City
3 – Indian Cr. at Anderson	8 – N. Indian Cr. just above M. Indian Cr.
4 – Indian Cr. just ab. Anderson	9 – M. Indian Cr. near mouth
5 – Indian Cr. above Bullskin Cr.	10 – S. Indian Cr. at State Hwy A

**For more information call or write:**  
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