



Aquatic Invertebrate Community Monitoring at Homestead National Monument of America

Importance: *The canary in the mine and the bugs in the creek*

Scientists commonly monitor benthic invertebrates, the insect larvae and nymphs, worms, isopods and other invertebrates living in the creek bed, to assess water quality. Many benthic invertebrates reside in the stream substrate for a year or more. They are exposed to water quality conditions throughout that time. Some species tolerate poor water quality and some species require pristine conditions. Therefore, the benthic invertebrate community composition can indicate the overall water quality of a stream. Looking at the community composition and assessing habitat will evaluate the biotic integrity of the stream.



Long Term Monitoring: *Using indices to determine conditions*¹

Heartland Network Inventory and Monitoring Program scientists collected invertebrate samples at two monitoring sites on Cub Creek at Homestead National Monument of America. Each sample consisted of five replicates collected with a special sampler called a Hester-Dendy sampler. Staff collected samples monthly from June through September during nine years. They identified invertebrates in the samples and recorded their numbers. Scientists employed a suite of statistical indices that evaluate invertebrate community composition to process the data. They compared the invertebrate indices across sampling years. The investigative team also began assessing in-stream habitat and riparian conditions, and chemical and physical parameters in the field in 2002-2003.

Status and Trends: *Improvements in a heavily impacted stream*

Water quality of Cub Creek within the monument improved over baseline conditions and remained relatively stable with some variability afterwards. Additionally, scientists observed:

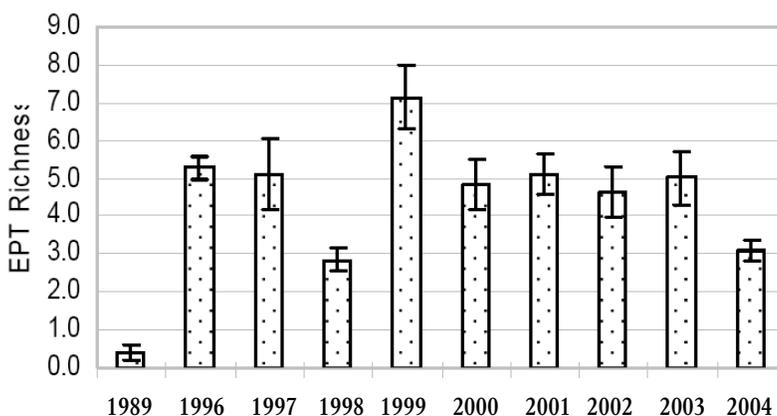


Figure 1: One of the indices that showed water quality improvement from baseline conditions in 1989 and consistency from 1996 through 2004

1. Although conditions have improved, Cub Creek is still a heavily impacted stream. The improvement relates only to prior condition and current condition, and does not compare the water quality with a reference beyond this stream.
2. The project expansion to include habitat and riparian condition provided baseline information that will allow scientists to detect change in the stream integrity or health in the future.

Heartland Network Inventory and Monitoring Program of the National Park Service. Visit www1.nature.nps.gov/im/units/htln/index.htm.

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¹ David G. Peitz and J. Tyler Cribbs. 2005. *Bio-monitoring of Water Quality Using Aquatic Invertebrates and In-stream Habitat and Riparian Condition Assessments: Status Report for Cub Creek, Homestead National Monument of America, Nebraska 1989-2004*. National Park Service, unpublished.