Heartland Network

National Park Service
U.S. Department of the Interior

Heartland Network, Inventory and Monitoring

Aquatic Monitoring at George Washington Carver National Monument

Importance: Canary in a coal mine and bugs in a creek

The National Park Service monitors water quality and invertebrates, the insect larvae and nymphs, worms, and other animals without backbones that live in water. Monitoring occurs in prairie streams at several Midwestern parks, including George Washington Carver NM (Monument). Trends in invertebrate abundance and diversity, particularly for three insect orders that are intolerant of stream disturbance, can indicate trends in water quality within streams. Coupling invertebrate community data with measurements of physical characteristics of the creek tells Monument managers about stream conditions. The Monument has three creeks of concern: Carver Creek (the main branch), Williams Branch and pond and Harkins Branch.

Carver Creek
HTLN files

Long Term Monitoring: Using indices to determine conditions [1]

The Heartland Network Inventory and Monitoring Program revitalized water quality monitoring at the Monument in 2005. The objectives of monitoring are to: (1) determine the status and trends of invertebrate diversity and abundance and related community indices of condition, and (2) relate the invertebrate community conditions to overall water quality and habitat conditions. Summary results for invertebrate community indices include EPT (orders of Ephemeroptera, Plecoptera, Trichoptera) Richness (Figure 1). The EPT Richness tells Monument managers about species diversity for orders that are intolerant of habitat disturbance. Generally the greater the EPT Richness value, the less pollution and perturbation occurring in the stream.

Status and Trends: Concerns for the future

Water quality, habitat and invertebrate community measures show consistency among sampling years and the creeks sampled. The scientists need more data to establish trends in stream conditions, but stream conditions appear to be generally good. They saw indications of potential decline in certain conditions attributable to activities in the watersheds outside the Monument boundaries. Additionally, scientists found that

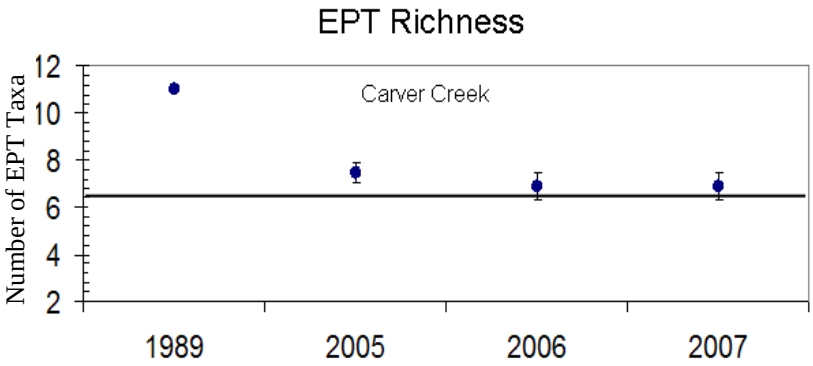

Figure 1: Control chart for EPT richness for Carver Creek. Points are means for a given sampling date, and the vertical bars are standard errors. The horizontal line represents a warning threshold for management action.

1. Conditions have not degraded since the beginning of water quality monitoring (1996 sampling period);

2. The Missouri Stream Condition Index, a biotic index of water quality conditions, indicated a possible mild impairment of the creeks. This warns managers that they should remain vigilant of the potential for future degradation of the creeks.

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

. . . protecting the habitat of our heritage

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Natural Resource Monitoring

[1] Bowles, D. E. 2009. Aquatic invertebrate monitoring at George Washington Carver National Monument, 2005-2007 Report. Natural Resource Technical Report NPS/HTLN/NRTR—2009/243. National Park Service, Fort Collins, Colorado.