



## Aquatic Community Monitoring at Homestead National Monument of America

### **Importance: Canary in a coal mine and bugs in Cub Creek**

The National Park Service monitors water quality and aquatic invertebrates, the insect larvae and nymphs, worms, and other animals without backbones living in water, in prairie streams at several Midwestern parks. Monitoring began in Cub Creek at Homestead NM of America (Monument) in 1989. Trends in invertebrate abundance and diversity, particularly for three insect orders intolerant of stream disturbance, can indicate trends in water quality within the creek. Coupling invertebrate community data with measurements of physical characteristics of the creek tells Monument managers important information about stream conditions.



### **Long Term Monitoring: Using indices to determine conditions<sup>1</sup>**

The Heartland Network Inventory and Monitoring Program uses established methods to monitor aquatic invertebrate communities and water quality parameters in Cub Creek. The objectives of monitoring are to: (1) determine the status and trends of invertebrate diversity and abundance and related community measurements, and (2) relate the invertebrate community conditions to overall water quality through indices related to richness and abundance, water quality and habitat condition. 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 and abundance 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: Concern for the future**

Cub Creek's invertebrate community conditions suggest that it is in good condition, compared to a typical prairie stream. Human disturbance upstream of the Monument could result in degradation of water quality within the Monument, and so, continued monitoring of the invertebrate community remains important. Additionally, scientists found that:

1. Invertebrate community monitoring shows that community integrity has not diminished since 1989, when monitoring first began, although annual data show substantial variation; and
2. Maintaining good stream habitat and riparian buffer within the Monument may compensate for some of the upstream disturbance occurring outside of the park and may help to maintain Cub Creek's water quality and community integrity.

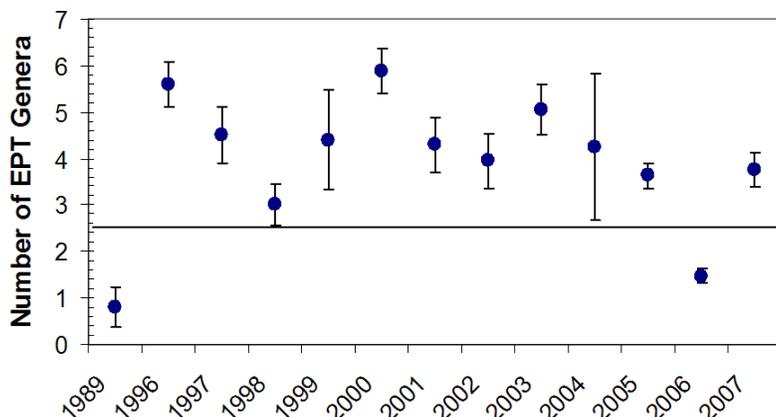


Figure 1: Control chart showing means and standard errors for Ephemeroptera, Plecoptera, Trichoptera richness at Cub Creek. The horizontal line represents a warning threshold for management action.

Heartland Network Inventory and Monitoring Program of the National Park Service. Visit [www.nps.gov/im/units/htln/index.htm](http://www.nps.gov/im/units/htln/index.htm)

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<sup>1</sup> Bowles, D. E. 2009. Aquatic invertebrate monitoring at Homestead National Monument of America: 2005-2007 trend report. Natural Resource Technical Report NPS/HTLN/NRTR-2009/242. National Park Service, Fort Collins, Colorado..