



## Aquatic Invertebrate Community Monitoring at Herbert Hoover National Historic Site

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

Scientists commonly monitor aquatic invertebrates, the insect larvae and nymphs, worms, isopods and other invertebrates living in the creek bed, to assess water quality. Many invertebrates reside in the creek bed for a year or more, exposing them to water quality conditions throughout that time. Some species tolerate poor water quality, while other species require pristine conditions. Therefore, the aquatic invertebrate community composition is the “canary in the mine” for overall water quality of a creek. Looking at community composition and assessing habitat will evaluate the overall biological integrity of the creek.



HTLN file photo-mayfly nymph

### Long Term Monitoring: *Indices of change*<sup>1</sup>

The Heartland Inventory and Monitoring Network scientists began collecting invertebrate samples on an unnamed stream in Herbert Hoover National Historic Site referred to as Hoover Creek in 2008. The network methodology satisfies two main objectives: 1) determine the status and trends of invertebrate species diversity, abundance, and community conditions, and 2) relate the invertebrate community to overall water quality through calculations for indicators of water and habitat conditions.

Scientists identified invertebrates in the samples and recorded their numbers. They calculated indicators of conditions, including total taxa richness and richness of Ephemeroptera, Plecoptera, Trichoptera (EPT) – three insect orders generally intolerant of poor water quality conditions.

### Status and Trends: *Impaired stream conditions*

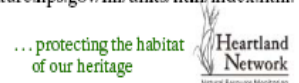
The invertebrate stream community data collected during this initial study suggests that Hoover Creek is impaired. Total taxa richness for Hoover Creek were roughly one-third that expected for regional reference streams. The dominant EPT taxa represent those tolerant of poor water quality conditions. Additionally, scientists found that:



High velocity flash floods impact stream conditions by destabilizing stream banks and causing erosion of banks where no riparian buffer zone exists.

1. Future invertebrate sampling should include methodology compatible with the IOWATER Advanced Benthic Macroinvertebrate Indexing Methods. This would allow park managers to assess long-term trends in invertebrate community structure relative to Iowa reference streams.
2. Although most impacts to the Hoover Creek stream community originate upstream of the park, widening and maintaining riparian buffer zones along this stream within the park and other best practices for stormwater management would aid in protecting aquatic life as well as stream habitat from local chemical runoff, high velocity flash flooding, and excessive sedimentation or erosion.

Heartland Network Inventory and Monitoring Program of the National Park Service. Visit [www1.nature.nps.gov/im/units/htln/index.htm](http://www1.nature.nps.gov/im/units/htln/index.htm).



<sup>1</sup> Bowles D. E., H. R. Dodd, and J. A. Luraas. 2010. Aquatic invertebrate monitoring at Herbert Hoover National Historic Site, 2008. Natural Resource Data Series NPS/HTLN/NRDS—2010/053. National Park Service, Fort Collins, Colorado.