



## Fish Community status at Effigy Mounds National Monument, 2008 & 2014

Many native fish populations in the Midwest are declining in abundance throughout their ranges, largely because of land use changes contributing to habitat and water quality degradation. Fishes in cool water streams, such as Dousman Creek at Effigy Mounds National Monument (EFMO), are particularly susceptible to increased water temperature as a result of reduced riparian canopy cover and increased run-off of warmer surface water.

Shifts in stream habitat availability and complexity and changes in water quality (including temperature) can alter the biotic communities. Many fish species are sensitive to habitat and water quality alterations and serve as an important indicator of environmental conditions within a stream. The objective of our long-term fish monitoring program is to determine the status and trend in fish diversity and abundance and determine the relationship between habitat conditions and fish communities at EFMO.

Through interpretation of long-term fish monitoring data, park managers are equipped with science-based understanding to make informed decisions in protecting the entire aquatic community. By protecting portions of publicly owned streams, like Dousman Creek, the park may offer refuges for native cool water fish species.

### Methods:

For specific details on methods of site selection, fish sampling, habitat and water quality data collection, and data analysis please see Dodd et al. (2008).

- The Heartland Inventory and Monitoring Network sampled fish, habitat, and water quality at Dousman Creek in 2008 and 2014.
- Fish were collected using a backpack electrofishing unit at a representative reach with the stream. Fish were identified to species, measured and inspected for diseases or abnormalities.
- Stream habitat related to channel morphology and fish cover as well as riparian/bank habitat were also collected for the sampled reach. Hourly water quality data (temperature, dissolved oxygen, pH, specific conductance, and turbidity) were collected for 24 hours.
- Biological metrics that reflect community diversity, abundance, and overall stream integrity (Index of Biotic Integrity) were calculated.

### Summary of Findings:

- Fourteen species were collected in Dousman Creek. Ten species were found in 2008 and 11 species in 2014 (Figure 1). New species in 2014 included: Fathead Minnow, Grass Pickerel, Fantail Darter and Johnny Darter. Species not collected in 2014 included: Green Sunfish, Burbot, and Brown Trout (Figure 2).

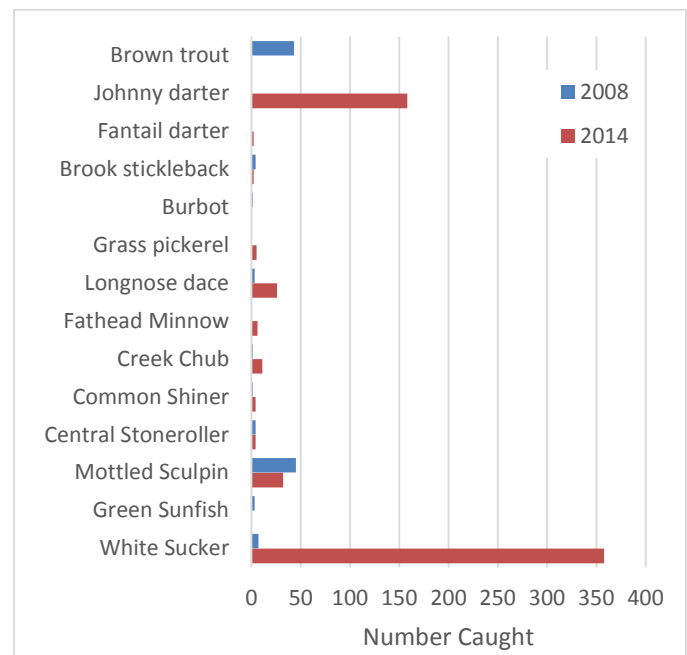


Figure 1. Fish species collected in Dousman Creek in 2008 (blue) and 2014 (red).

- Community diversity, which ranges from 0 to 1, was higher in 2008 (0.69) than in 2014 (0.58). The change in diversity was primarily due to dominance of White Sucker and Johnny Darter in 2014, which comprised 85% of the fish caught.
- Based on the Index of Biotic Integrity which ranges from 0 to 100, overall stream health was rated as fair in 2008 (40) and poor in 2014 (10). This decline was due to an increased abundance of species tolerant to poor habitat/water quality conditions and a decreased abundance of cold/coolwater species and top carnivores.

- The streambed consisted of coarse gravel (8-11 mm) in 2008 (Figure 2A). In summer 2014, the Dousman Creek watershed received a substantial amount of precipitation resulting in eroded banks and deposition of finer sediments (Figure 2B). Average streambed substrate consisted of fine gravel (2-4 mm) in 2014, which likely impacted the fish community diversity and stream integrity.
- Water quality parameters measured at Dousman's Creek were within the water quality standards for cold and cool water streams in Iowa (IAC 2014).

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Figure 2. Dousman Creek in 2008 (A) and 2014 (B).



### Citations:

Dodd, H. R., D. G. Peitz, G. A. Rowell, D. E. Bowles, and L. M. Morrison. 2008. Protocol for monitoring fish communities in small streams in the Heartland Inventory and Monitoring Network. Natural Resource Report NPS/HTLN/NRR—2008/052. National Park Service, Fort Collins, Colorado.

Iowa Administrative Code (IAC). 2012. Chapter 61: water quality standards. Des Moines, IA.  
<http://www.iowadnr.gov/InsideDNR/RegulatoryWater/WaterQualityStandards/Rules.aspx>. Accessed January 10, 2014.