



# Monitoring Aquatic Macroinvertebrates

## Importance

Aquatic macroinvertebrates, such as insect larvae, snails, and worms, play a vital role in stream ecosystems, both as a food source and as consumers of algae and other organic matter. Because macroinvertebrates are sensitive to environmental change, monitoring them can help us to detect chemical, physical, and biological impacts to aquatic ecosystems. Long-term macroinvertebrate monitoring will complement water quality assessment methods, thus providing a more complete evaluation of overall stream health. Because the four states represented within Southern Colorado Plateau Network (SCPN) parks (AZ, CO, NM, UT), as well as the Navajo Nation, all include macroinvertebrates as part of their water quality monitoring programs, SCPN monitoring efforts will also contribute to a broader regional understanding of aquatic conditions.

## Long-term monitoring

In four SCPN parks, aquatic-macroinvertebrate assemblages are monitored annually along sites on selected streams. Two types of samples are collected from each site: (1) quantitative samples from five riffle habitats; and (2) one pooled qualitative sample from all available habitats at each site. Core water quality data (temperature, pH, specific conductivity, dissolved oxygen, and turbidity) and physical habitat characteristics (e.g., water depth, water velocity, canopy closure, and substrate size) are also collected at each site. Pilot studies were initiated in 2005 and monitoring was implemented in 2007.

## Management applications

Human-caused stream alterations can lead to structural and functional changes to aquatic ecosystems. Land uses can pollute streams or otherwise affect the condition of aquatic resources, and disturbance events may contribute to accelerated erosion and increases in suspended and bedload sediment. Persistent changes in climate can disrupt natural flood regimes and alter natural temperature cycles, affecting the composition, structure, and functioning of aquatic ecosystems. Climate-related changes to aquatic ecosystems may be amplified by interactions with



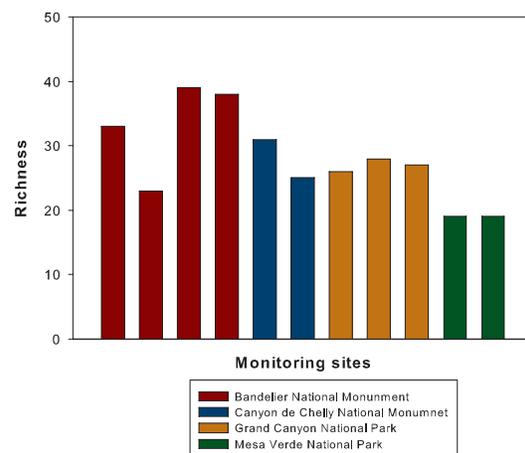
Sampling aquatic macroinvertebrates in Hermit Creek of Grand Canyon N.P. Inset - mayfly on stone.

existing anthropogenic stressors, such as the spread of invasive species like crayfish.

The first few years of monitoring data will be used to document baseline conditions in SCPN streams. Over the long term, macroinvertebrate data will be used to (1) examine responses of aquatic life to changing water quality or physical habitat conditions, (2) follow the recovery of aquatic macroinvertebrate assemblages after disturbance events, such as catastrophic fires and floods, and (3) document changes in macroinvertebrate community structure in response to climate change.

## Contact

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Species richness of aquatic macroinvertebrates for qualitative multihabitat samples of SCPN monitoring sites (2010 data).

## SCPN Park units monitored for aquatic macroinvertebrates

Park	Sites
Bandelier NM	Capulin Creek, Rito de los Frijoles
Canyon de Chelly NM	Tsaile Creek, Black Rock Creek
Grand Canyon NP	Bright Angel Creek, Garden Creek, Hermit Creek
Mesa Verde NP	Mancos River