Wolf Trap National Park for the Performing Arts

National Park Service
U.S. Department of the Interior

Stream Physical Habitat *Resource Brief*

Importance

The physical habitat and water quality of a stream are the template upon which aquatic communities of fish and macroinvertebrates must live.

An aquatic macroinvertebrate is any water-dwelling animal without a backbone that is large enough to be seen by the naked eye. They need spots to cling and burrow, and organic material to consume. Fish require places to hide, feed, and lay eggs.

Together, water quality, aquatic communities, and stream physical habitat indicate a great deal about the condition of a stream and its watershed.

Monitoring

Stream physical habitat monitoring is part of a broader effort by the National Capital Region Network (NCRN) Inventory & Monitoring (I&M) program to assess the condition of streams and watersheds.

Long-term stream physical habitat monitoring at thirty-seven park sites throughout the NCRN began in 2008 and follows a set, six-year rotation. Each spring 5-8 sites are visited. At Wolf Trap National Park for the Performing Arts (WOTR), monitoring is done on Courthouse Creek and Wolftrap Creek. The objectives of this combined monitoring are to:

- determine current conditions and track long-term trends in stream condition,
- determine trends in species composition and functional groups of fish and benthic invertebrates

Observations of stream physical habitat are gathered at the same location and time as fish monitoring in late summer and macroinvertebrate monitoring in spring. Monitoring is conducted on non-tidal wadeable streams and rivers.



Wolf Trap Creek NPS/Watts

PHI Scoring

To calculate a stream's Physical Habitat Index (PHI) score, streams are sorted by physiographic province and then compared against high quality reference streams in the same physiographic class. Wolf Trap streams fall into the Coastal Plain stream class. Coastal Plain streams are evaluated on the following characteristics:

- stream bank stability (the extent, height, and severity of bank erosion)
- quantity of woody debris and root wads in the stream
- instream habitat available for aquatic creatures
- quality of materials on the stream bed surface (epifaunal substrate)
- shading
- distance from nearest road (remoteness)

PHI scores range from 0-100 with four possible ratings:

(81-100) minimally degraded,
(66-80) partially degraded,
(51-65) degraded, and
(0-50) severely degraded.

Glossary

Benthic- Referring to the bottom of a body of water.

Embeddedness- The amount of space around large stream bottom particles (gravel, cobble, etc). When smaller particles (sand, silt, mud) surround larger particles, embeddedness rises and habitat for small fish, macroinvertebrates, and other creatures is reduced.

Epifaunal Substrate- hard, stable materials that stream biota can live on (such as large woody debris, rootwads, cobble, gravel, etc).

Riffle- Section of stream with faster flow and more turbulence. Provides shelter, is a food source, and adds oxygen to water.

Root wads- A mass of plant roots (a type of woody debris).

Shading- Amount and duration of shade cast over a stream. Helps lower water temperatures.

Woody Debris- large branches, logs, and tree material. Provides shelter.

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Results & Discussion

Courthouse Creek and Wolf Trap Creek were monitored in 2012.

Courthouse Creek (DIFF-202-N)

2012 PHI = 70 (partially degraded)

In 2012 Courthouse Creek earned a partially degraded PHI score. The stream characteristics that most influenced this score included moderate levels of streambank erosion across part of the streambank, good instream habitat for fish, good epifaunal substrate for macroinvertebrates, and good levels of stream shading.

Wolftrap Creek (DIFF-201-N)

2012 PHI = 65 (degraded)

Wolftrap Creek earned a degraded PHI score in 2012, missing by one point the partially degraded score category. This score resulted from characteristics including close proximity to a roadway and severe and extensive streambank erosion. Positive stream characteristics included high levels of instream wood and good instream habitat for fish.



Sites in Wolf Trap monitored for fish, macroinvertebrates, and stream physical habitat condition.

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