



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 followed a six-year rotation. Each spring 5-8 sites were visited. At Harpers Ferry National Historical Park (HAFE), monitoring is done in Flowing Springs Run. 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.

PHI Scoring

To calculate a stream's Physical Habitat Index (PHI) score, streams are sorted by region and compared against high quality reference streams in the same region. Harpers Ferry falls into the Highlands PHI stream class. As a result, the following characteristics are evaluated:

1. distance from nearest road (remoteness)
2. shading



Photo: NPS/Watts

Flowing Springs Run with a small dam of woody debris present.

3. suitability of stream bed surface materials for macroinvertebrates (epibenthic substrate)
4. average width of riparian buffer
5. stream bank stability (the extent, height, and severity of bank erosion)

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.

Results & Discussion

Flowing Springs Run, which flows into the Shenandoah River near the southern end of Schoolhouse Ridge, was monitored in 2013. It was also sampled in 2004 along with two sites

More Information

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on Elks Run while monitoring protocols were under development. Elks Run flows into the Potomac River through Schoolhouse Ridge North near Bakerton Road.

While Elks Run earned partially degraded PHI scores at 2 sites in 2004, Flowing Springs declined from minimally degraded to partially degraded from 2004 to 2013.

Elks Run (HARP-301-N-2004)

2004 PHI = 73.5 (partially degraded)

In 2004, two monitoring sites on Elks Run, earned nearly identical partially degraded PHI scores. Both sites were moderately distant from a roadway, had good levels of shading, moderate macroinvertebrate habitat, excellent riparian buffer width, and good streambank stability.

Elks Run (HARP-302-N-2004)

2004 PHI = 72.6 (partially degraded)

In 2004, two monitoring sites on Elks Run, earned nearly identical partially degraded PHI scores. See assessment above.

Flowing Springs Run (SHEN-110-N-2013)

2013 PHI = 76.3 (partially degraded)

In 2013, Flowing Springs Run earned a partially degraded PHI score. Factors influencing this score include moderate distance to a roadway, good shading, moderate macroinvertebrate habitat, excellent riparian buffer width, and good streambank stability.

Flowing Springs Run (SHEN-110-N-2004)

2004 PHI = 81.3 (minimally degraded)

In 2004, Flowing Springs earned a slightly higher PHI score than it did in 2013. While distance to roadway, shading, and riparian buffer width ratings were similar, macroinvertebrate habitat and bank stabilization were in better condition than 2013.

References

Inventory & Monitoring at Harpers Ferry webpage. <http://science.nature.nps.gov/im/units/ncrn/parks/hafe.cfm>.

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