



## 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 Antietam (ANTI), monitoring is done in Sharpsburg 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.

### 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. Antietam's streams are all in the Highlands PHI stream class. As a result, the following characteristics are evaluated:

1. distance from nearest road (remoteness)
2. shading
3. suitability of stream bed surface materials for macroinvertebrates (epibenthic substrate)



Sharpsburg Creek

Photo: NPS/Watts

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

Sharpsburg Creek was monitored in 2013. It was also sampled in 2006 and 2004 while monitoring protocols were under development. Newcomer and Mumma Creeks were sampled once only in 2004.

#### Mumma Creek (ANTM-101-N-2004)

2004 PHI = 75.0 (partially degraded)

In 2004, Mumma Creek earned a partially degraded PHI score. Factors influencing the score include the creek's moderate distance to a roadway, good levels of stream shading, little habitat

### More Information

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available for macroinvertebrates, excellent riparian buffer width, and excellent streambank stability.

## **Newcomer Creek** (ANTM-112-N-2004)

2004 PHI = 50.0 (severely degraded)

In 2004, Newcomer Creek earned a severely degraded PHI, just 1 point shy of the next higher PHI category “degraded.” Factors influencing the severely degraded score include Newcomer’s moderate distance from a roadway, moderate stream shading, little macroinvertebrate habitat, very poor riparian buffer width, and excellent stream bank stability.

## **Sharpsburg Creek** (ANTI-101-N-2013)

2013 PHI = 70.0 (partially degraded)

Sharpsburg Creek was monitored in 2013 and earned a degraded PHI score. Factors influencing the score include: Sharpsburg Creek’s moderate distance from nearby roads, good levels of shading, moderate levels of macroinvertebrate habitat, excellent riparian buffer width, and good streambank stability.

## **Sharpsburg Creek** (ANTI-101-N-2006)

2006 PHI = 65.97 (degraded)

In 2006, Sharpsburg Creek earned a degraded PHI score very similar to its 2013 score. Factors influencing this score were largely the same as in 2013.

## **Sharpsburg Creek** (ANTI-101-N-2004)

2004 PHI = 71.8 (partially degraded)

In 2004, Sharpsburg creek earned a partially degraded PHI score. While some criteria influencing the score were similar to 2006 and 2013 monitoring (distance from roadways, stream shading, and riparian buffer width), habitat for macroinvertebrates and stream bank stability scored better in 2004.

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## References

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

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