



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 Manassas, monitoring is done in Youngs Branch.

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 Scores

To calculate a stream's Physical Habitat Index (PHI) score,

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).



Youngs Branch

NPS/Watts

streams are sorted by physiographic province and then compared against high quality reference streams in the same physiographic class. Youngs Branch is in the Eastern Piedmont stream class. As a result, the following 8 characteristics are evaluated:

- 1) riffle quality
- 2) stream bank stability (the extent, height, and severity of bank erosion)
- 3) quantity of woody debris and root wads in the stream
- 4) instream habitat available for fish
- 5) suitability of stream bed surface materials for macroinvertebrates (epifaunal substrate)
- 6) shading
- 7) distance from nearest road (remoteness)
- 8) embeddedness of substrates

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.



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.

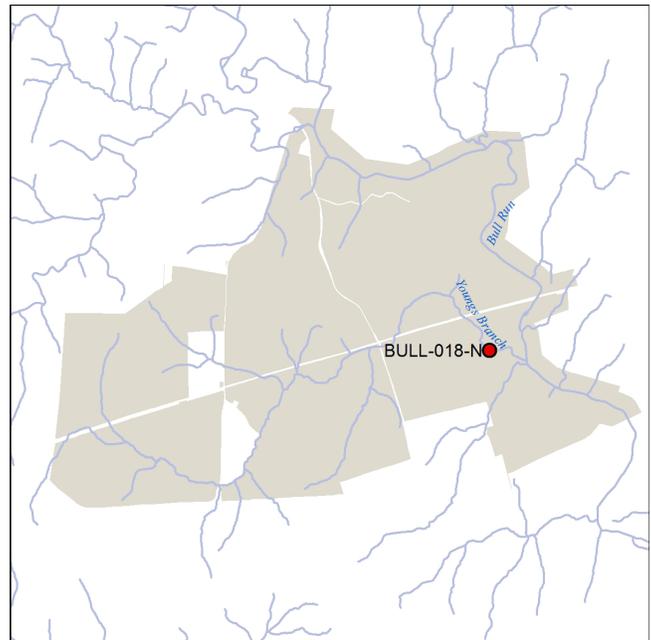
Results & Discussion

Youngs Branch was monitored in 2010. It earned a PHI score of degraded, missing by one point the more favorable “partially degraded” category.

Youngs Branch (BULL-018-N)

2010 PHI = 65 (degraded)

Youngs Branch earned a degraded score in 2010. Positive stream characteristics included good distance from roadways, high levels of instream wood, and moderate shading. Poor stream characteristics included severe stream bank instability and high levels of embeddedness.



Youngs Branch monitoring site in Manassas National Battlefield Park monitored for fish, macroinvertebrates, and stream physical habitat condition.

References:

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