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.



Photo: NPS/Watts

Henson Creek

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. Within the parks that make up National Capital Parks - East (NACE), monitoring is done in Accokeek Creek (Piscataway Park), Henson Creek (Suitland Parkway), Oxon Run (Oxon Cove Farm Park), and Still Creek (Greenbelt Park). Stream physical habitat analysis is co-located with fish and macroinvertebrate monitoring.

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 physiographic province and compared against high quality reference streams in the same province. All NACE streams are in the Coastal Plain PHI stream class. As a result, the following characteristics are evaluated:

1. stream bank stability (the extent, height, and severity of bank erosion)
2. quantity of woody debris and root wads in the stream
3. instream habitat available for fish
4. suitability of stream bed surface materials for macroinvertebrates (epibenthic substrate)
5. shading
6. 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.

Results & Discussion

Accokeek Creek, Henson Creek, Oxon Run, and Still Creek were all monitored in 2013. Oxon Run was also sampled in 2006 and Accokeek and Still Creeks in 2004 while monitoring protocols were under development. Resulting PHI scores cover a range of conditions from partially degraded to severely degraded.

More Information

Megan Nortrup
Email: megan_nortrup@nps.gov
Phone: 202-339-8314

http://science.nature.nps.gov/im/units/ncrn

National Capital Parks - East

National Park Service
U.S. Department of the Interior

Accokeek Creek (ACCO-214-N-2013)

2013 PHI = 55.49 (degraded)

Piscataway Park's Accokeek Creek earned a partially degraded PHI score in 2013. Factors influencing this score were the creek's close proximity to roadways, poor shading, good fish and macroinvertebrate habitat, high woody debris levels, and good streambank stability.

Accokeek Creek (ACCO-214-N-2004)

2004 PHI = 74 (partially degraded)

In 2004, Accokeek Creek earned a slightly higher, yet still partially degraded PHI score. While most factors were rated the same as in 2013, shading levels in 2004 were better as was stream bank stability.

Henson Creek (PRUT-201-N-2013)

2013 PHI = 39.74 (severely degraded)

Henson Creek in the Suitland Parkway earned a severely degraded PHI score in 2013. Factors that influenced this score were the creek's close proximity to the roadway, low levels of woody debris, moderate streambank stability, little shading, and yet good habitat for macroinvertebrates and fish.

Oxon Run (OXON-301-N-2013)

2013 PHI = 32.82 (severely degraded)

In Oxon Cove Farm Park, Oxon Run earned a severely degraded PHI score in 2013. The factors that influenced this score were a location a good distance from roadways, moderate fish and macroinvertebrate habitat, good streambank stability, poor shading, and low levels of woody debris.

Oxon Run (OXON-301-N-2006)

2006 PHI = 51.8 (degraded)

In 2006, Oxon Run had better levels of shading helping it earn a slightly better PHI score than it did in 2013. The stream also had moderate conditions for macroinvertebrate habitat, good streambank stability, poor in stream-habitat for fish, and low levels of woody debris.

Still Creek (ANAC-113-N-2013)

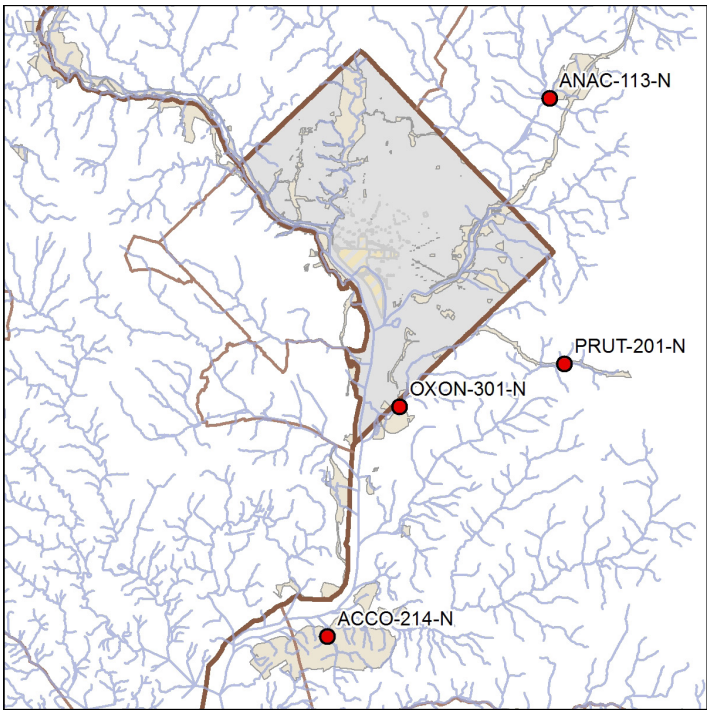
2013 PHI = 45.96 (severely degraded)

Still Creek in Greenbelt Park earned a severely degraded PHI score in 2013. Like Henson Creek it is very close to a roadway and so had a poor level of remoteness. Streambank stability was low, shading was moderate, as was habitat for macroinvertebrates and fish. Woody debris levels were moderate and streambank stability was low.

Still Creek (ANAC-113-N-2013)

2004 PHI = 53 (degraded)

In 2004, Still Creek earned a slightly better PHIscore of degraded, than it did in 2013. Factors influencing this score were the same poor remoteness, better shading, moderate habitat for macroinvertebrates and fish, higher levels of woody debris, and very poor streambank stability.



Sites in NACE monitored for stream physical habitat condition, fish, and macroinvertebrates

References

NCRN Monitoring Information for Water Quality, Physical Habitat, and Aquatic Macroinvertebrates. http://science.nature.nps.gov/im/units/ncrn/monitor/stream_survey/index.cfm.

Norris M.E. and G.M. Sanders. 2009. National Capital Region Network Biological Stream Survey Protocol Version 2.0: Physical Habitat, Fish, and Aquatic Macroinvertebrate Vital Signs. Natural Resource Report. NPS/NCRN/NRR-2009/116. https://irma.nps.gov/App/Reference/Profile/662917/.

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