



Fish

Resource Brief

Importance

Fish and aquatic communities are excellent indicators of watershed health and water quality. They are sensitive to many factors including pollution, stream physical habitat, and diseases and invasive organisms.

Fish are also a vital part of ecosystems, consuming plankton, crustaceans, insects, and other organisms and in turn providing food for birds of prey, river otters, raccoons, and other creatures.

Monitoring

Fish 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 fish monitoring at thirty-seven park sites throughout the NCRN began in 2008 and follows a set, six-year rotation. Each summer 5-8 sites are 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). Fish monitoring is co-located with macroinvertebrate monitoring and stream physical habitat analysis.

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,
- detect invasions of non-native fish

Streams monitored are small (first- to third-order) and non-tidal. At each site, monitoring teams electrofish two passes along a designated 75-meter stream segment. Electrofishing uses a mild electric current to stun fish to the water surface where they are netted. Captured fish are counted, identified to species, weighed in aggregate, and released. Any gamefish (trout, bass, walleye, northern pike, chain pickerel, and striped bass) are measured for total length. Symptoms of illness or anomalies in fish are noted and described.



Pumpkinseed (*Lepomis gibbosus*)

Photo: <http://cnre.vt.edu/efish>, Bob Jenkins & Noel Burkhead

FIBI Scores

The species and number of fish present in a stream segment is used to calculate a Fish Index of Biotic Integrity (FIBI) score for each stream. Scoring also takes into account factors such as the abundance of fish that are disturbance tolerant, dominant, insectivorous, omnivorous, or benthic (occupying the lowest level of a body of water). Additionally, scoring takes into account the location of all streams within the Coastal Plain FIBI region. FIBI scores range from 1 to 5, with four possible ratings: very poor (1-1.99), poor (2-2.99), fair (3-3.99), and good (4-4.99).

Results

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 FIBI scores indicate healthy conditions for fish in all streams.

One Maryland threatened species, the pearl dace, was found in Henson Creek. The invasive red swamp crawfish (*Procambarus clarkii*) and virile crayfish (*Orconectes virilis*) but not rusty crayfish (*Orconectes rusticus*), were detected in several streams during 2013.



Accokeek Creek (ACCO-214-N-2013)

2013 FIBI = 4.33 (good)

Species found:

- 5 American eel (*Anguilla rostrata*)
- 3 bluegill (*Lepomis macrochirus*)
- 5 creek chub (*Semotilus atromaculatus*)
- 9 creek chubsucker (*Erimyzon oblongus*)
- 19 eastern mosquitofish (*Gambusia holbrooki*)
- 10 eastern mudminnow (*Umbra pygmaea*)
- 8 green sunfish (*Lepomis cyanellus*)
- 14 pumpkinseed (*Lepomis gibbosus*)
- 9 tessellated darter (*Etheostoma olmstedi*)
- 17 white sucker (*Catostomus commersonnii*)
- 1 yellow bullhead (*Ameiurus natalis*)

Game fish: none

Invasive crayfish: red swamp crawfish (*Procambarus clarkii*)

Accokeek Creek (ACCO-214-N-2004)

2004 FIBI = 4.33 (good)

Species found:

- 4 American eel (*Anguilla rostrata*)
- 88 banded killifish (*Fundulus diaphanus*)
- 4 blacknose dace (*Rhinichthys atratulus*)
- 13 bluegill (*Lepomis macrochirus*)
- 82 brown bullhead (*Ameiurus nebulosus*)
- 49 creek chub (*Semotilus atromaculatus*)
- 56 creek chubsucker (*Erimyzon oblongus*)
- 25 eastern mudminnow (*Umbra pygmaea*)
- 1 golden shiner (*Notemigonus crysoleucas*)
- 20 green sunfish (*Lepomis cyanellus*)
- 1 least brook lamprey (*Lampetra aepyptera*)
- 510 mosquito fish (*Gambusia holbrooki*)
- 17 pumpkinseed (*Lepomis gibbosus*)
- 7 sea lamprey (*Petromyzus marinus*)
- 41 tessellated darter (*Etheostoma olmstedi*)
- 1 white sucker (*Catostomus commersonnii*)
- 3 yellow bullhead (*Ameiurus natalis*)

Game fish: none

Invasive crayfish: none

Henson Creek (PRUT-201-N-2013)

2013 FIBI = 4.33 (good)

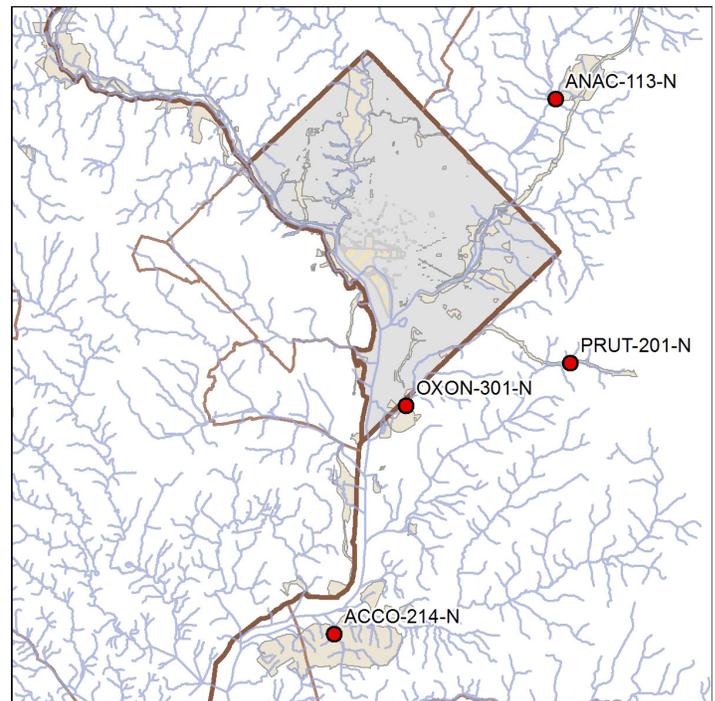
Species found:

- 6 American eel (*Anguilla rostrata*)
- 391 blacknose dace (*Rhinichthys atratulus*)
- 6 bluegill (*Lepomis macrochirus*)
- 229 central stoneroller (*Campostoma anomalum*)
- 107 creek chub (*Semotilus atromaculatus*)
- 2 green sunfish (*Lepomis cyanellus*)
- 90 longnose dace (*Rhinichthys cataractae*)
- 11 mummichog (*Fundulus heteroclitus*)
- 6 pearl dace (*Margariscus margarita*)*
- 77 redbreast sunfish (*Lepomis auritus*)
- 2 rosyside dace (*Clinostomus funduloides*)
- 36 satinfin shiner (*Cyprinella analostana*)
- 191 swallowtail shiner (*Notropis procne*)
- 101 tessellated darter (*Etheostoma olmstedi*)
- 7 white sucker (*Catostomus commersonnii*)

*A Maryland "Threatened" species

Game fish: none

Invasive crayfish: red swamp crawfish (*Procambarus clarkii*)
and virile crayfish (*Orconectes virilis*)



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



Oxon Run (OXON-301-N-2013)

2013 FIBI = 4 (good)

Species found:

- 66 American eel (*Anguilla rostrata*)
- 169 banded killifish (*Fundulus diaphanus*)
- 23 bluegill (*Lepomis macrochirus*)
- 6 bluntnose minnow (*Pimephales notatus*)
- 2 brown bullhead (*Ameiurus nebulosus*)
- 1 central stoneroller (*Camptostoma anomalum*)
- 52 eastern mosquitofish (*Gambusia holbrooki*)
- 1462 eastern silvery minnow (*Hybognathus regius*)
- 5 greenside darter (*Etheostoma blennioides*)
- 8 largemouth bass (*Micropterus salmoides*)
- 10 longear sunfish (*Lepomis megalotis*)
- 378 mummichog (*Fundulus heteroclitus*)
- 73 pumpkinseed (*Lepomis gibbosus*)
- 46 redbreast sunfish (*Lepomis auritus*)
- 29 spottail shiner (*Notropis hudsonius*)
- 45 tessellated darter (*Etheostoma olmstedii*)
- 1 white sucker (*Catostomus commersonnii*)

Game fish: 8 largemouth bass, ranging from 98-195 mm.

Average size: 148 mm.

Invasive crayfish: red swamp crawfish (*Procambarus clarkii*)

Oxon Run (OXON-301-N-2006)

2006 FIBI = 1.33 (very poor)

Species found:

- 239 blacknose dace (*Rhinichthys atratulus*)

Game fish: none

Invasive crayfish: none

Still Creek (ANAC-113-N-2013)

2013 FIBI = 4.33 (good)

Species found:

- 68 American eel (*Anguilla rostrata*)
- 19 banded killifish (*Fundulus diaphanus*)
- 93 blacknose dace (*Rhinichthys atratulus*)
- 26 bluegill (*Lepomis macrochirus*)
- 58 creek chub (*Semotilus atromaculatus*)
- 1 creek chubsucker (*Erimyzon oblongus*)
- 26 eastern mosquitofish (*Gambusia holbrooki*)

- 1 green sunfish (*Lepomis cyanellus*)
- 11 longnose dace (*Rhinichthys cataractae*)
- 7 redbreast sunfish (*Lepomis auritus*)
- 3 silverjaw minnow (*Notropis buccatus*)
- 29 spotfin shiner (*Cyprinella spiloptera*)
- 55 swallowtail shiner (*Notropis procne*)
- 91 tessellated darter (*Etheostoma olmstedii*)
- 3 white sucker (*Catostomus commersonnii*)
- 6 yellow bullhead (*Ameiurus natalis*)

Game fish: none

Invasive crayfish: virile crayfish (*Orconectes virilis*)

Still Creek (ANAC-113-N-2004)

2004 FIBI = 3.33 (fair)

Species found:

- 8 American eel (*Anguilla rostrata*)
- 120 blacknose dace (*Rhinichthys atratulus*)
- 3 bluegill (*Lepomis macrochirus*)
- 19 creek chub (*Semotilus atromaculatus*)
- 2 cutlips minnow (*Exoglossum maxillingua*)
- 3 gold fish (*Carassius auratus*)
- 1 largemouth bass (*Micropterus salmoides*)
- 10 longnose dace (*Rhinichthys cataractae*)
- 32 mummichog (*Fundulus heteroclitus*)
- 9 pumpkinseed (*Lepomis gibbosus*)
- 1 redbreast sunfish (*Lepomis auritus*)
- 1 rosyside dace (*Clinostomus funduloides*)
- 19 swallowtail shiner (*Notropis procne*)
- 38 tessellated darter (*Etheostoma olmstedii*)
- 17 white sucker (*Catostomus commersonnii*)

Game fish: 1 largemouth bass, 83 mm.

Invasive crayfish: none

Discussion

Accokeek Creek. In 2013, Accokeek Creek earned a good FIBI score because of the high number of benthic fish species present; low numbers of pollution tolerant species; a good mix of omnivores, invertivores, and generalists; high numbers of sensitive sucker species; and a well diversified population. Overall, 11 taxa were detected.

Sampling on Accokeek Creek in 2004 also earned a good score. Seventeen taxa were detected, including 2 types of



lamprey (benthic species that indicate good stream health). The score fell short of perfect, in part because the most abundant fish (mosquito fish) outnumbered all other taxa combined.

Henson Creek. In 2013, 6 pearl dace (*Margariscus margarita*) were found in Henson Creek, a species considered threatened in the state of Maryland. Pearl dace has a relict distribution, with small, isolated populations occurring in colder, spring-fed streams in the southern portion of their range (Raesly 2004). Including the pearl dace, 15 taxa were found in Henson Creek. Sampling also found good levels of benthic fish species, low levels of pollution tolerant fish, a good distribution of generalists and specialists, and a population not dominated by a single species. A low number of sensitive sucker species dropped the overall score slightly.

Oxon Run. In 2013, 17 taxa were found in Oxon Run and the stream rated high for fish abundance. There were few sensitive sucker species, but good numbers of benthic fish species, low numbers of pollution-tolerant species, and a good distribution of generalists and specialists. The fish sampled were moderately dominated by a single species.

The good 2013 FIBI score for Oxon Run is in contrast with a poor score in 2006. In 2006, only one species, the pollution-tolerant blacknose dace was detected.

Still Creek. Still Creek earned a good rating in 2013, improving upon the fair rating it received in 2004. A total of 16 taxa were detected, and the creek had a good abundance of species, good numbers of benthic fish, good numbers of pollution-tolerant species, and moderate distribution of generalists and specialists. Moderate numbers of round-bodied suckers were present and the fish sampled were not dominated by a single species.

The 2004 FIBI score for Still Creek was fair based on a good abundance of species, and good numbers of benthic fish. Distribution of generalists and specialists and numbers of pollution-tolerant species were moderate. Low numbers of round-bodied suckers were present and the fish sampled were not dominated by a single species. Overall 15 taxa were detected.

References:

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- NCRN Biological Stream Survey – Data Analysis Standard Operation Procedure #20, Version 1.1 (June 2009) [includes instructions for calculating FIBI scores]
- NCRN Monitoring Information for Water Quality, Physical Habitat, and Aquatic Macroinvertebrates. http://science.nature.nps.gov/im/units/ncrn/monitor/stream_survey/index.cfm
- Raesly, R.L, et al. 2004. Inventory and Biological Monitoring of Fishes in National Parks of the National Capital Region. TIC #: NCRO D-54. https://irma.nps.gov/App/Reference/DownloadDigitalFile?code=456458&file=ncrn_fish_inv_report.pdf