Manassas National Battlefield Park

National Park Service
U.S. Department of the Interior

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.



Photo courtesy of: http://cnre.vt.edu/efish, Bob Jenkins & Noel Burkhead

Green sunfish (*Lepomis cyanellus*)

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.

The NCRN began long-term fish monitoring in 2008. Each summer 5-8 sites are visited, and following a set rotation, the NCRN will visit thirty-seven sites throughout the region every six years. At Manassas monitoring is done on Youngs Branch. 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 game-fish (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.

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 takes into account: the number of fish per stream area, the total biomass of fish captured, which species are most abundant, if most fish are disturbance tolerant or generalist feeders, the number of benthic fish (occupying the stream bottom), and the number of fish who need silt-free rocky stream beds to spawn. Scoring also takes into account a Manassas's location in the Eastern Piedmont physiographic province. 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

Youngs Branch was monitored in 2010 and also in 2004 while monitoring protocols were under development. Monitoring staff found no rare, threatened, or endangered fish species.

Youngs Branch (BULL-018-N)

2010 FIBI = 2.67 (poor)

2010 Species found:

2	banded killifish (*Fundulus diaphanus*)
1	blacknose dace (*Rhinichthys atratulus*)
4	bluegill (*Lepomis macrochirus*)
27	bluntnose minnow (*Pimephales notatus*)
1	creek chub (*Semotilus atromaculatus*)
11	eastern mosquitofish (*Gambusia holbrooki*)
1	fantail darter (*Etheostoma flabellare*)
6	fallfish (*Semotilus corporalis*)
20	green sunfish (*Lepomis cyanellus*)
8	largemouth bass (*Micropterus salmoides*)

11 longnose dace (*Rhinichthys cataractae*)
5 river chub (*Nocomis micropogon*)
3 satinfin shiner (*Cyprinella analostana*)
7 tessellated darter (*Etheostoma olmstedi*)
18 white sucker (*Catostomus commersonnii*)
5 yellow bullhead (*Ameiurus natalis*)

Game fish:

8 largemouth bass, ranging from 68 - 116 mm. Average size: 86 mm

Invasives: virile crayfish (*Orconectes virilis*)

Youngs Branch (BULL-018-N)

2004 FIBI score = 2.67 (poor)

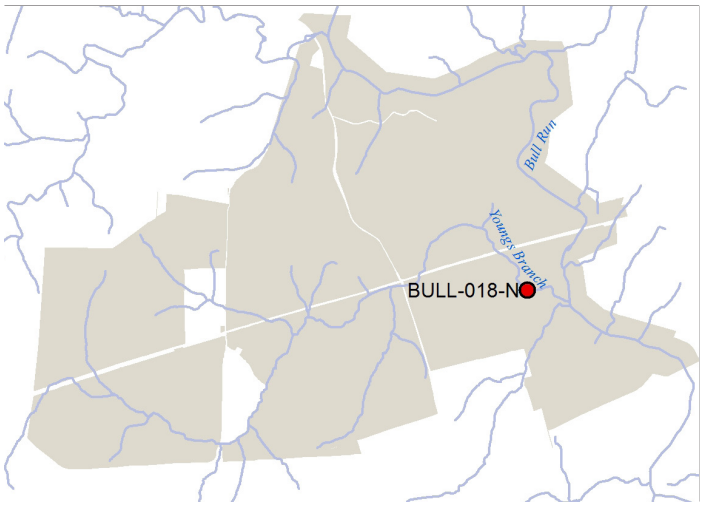
2004 Species found:

3 blacknose dace (*Rhinichthys atratulus*)
46 bluegill (*Lepomis macrochirus*)
55 bluntnose minnow (*Pimephales notatus*)
7 creek chub (*Semotilus atromaculatus*)
28 fallfish (*Semotilus corporalis*)
88 green sunfish (*Lepomis cyanellus*)
19 longnose dace (*Rhinichthys cataractae*)
2 pumpkinseed (*Lepomis gibbosus*)
9 redbreast sunfish (*Lepomis auritus*)
1 satinfin shiner (*Cyprinella analostana*)
4 smallmouth bass (*Micropterus dolomieu*)
1 spottail shiner (*Notropis hudsonius*)
10 swallowtail shiner (*Notropis procne*)
3 white sucker (*Catostomus commersonnii*)
5 yellow bullhead (*Ameiurus natalis*)

Game fish:

4 smallmouth bass, ranging from 42 - 49 mm. Average size: 46 mm

Invasives: Asiatic clam (*Corbicula fluminea*)



Manassas sites monitored for fish, macroinvertebrates, and stream physical habitat.

Discussion

FIBI scores for Youngs Branch in 2004 and 2010 were poor inspite of higher numbers of stream bottom (benthic) dwelling fish like darters, sculpins, madtoms, and lampreys in both years. Both years the number of fish that need silt-free rocky stream bottoms to spawn were low; numbers of generalist fish were moderate; and only a moderate number of fish were present per stream area.

The FIBI score might have improved from 2004 to 2010 since the number of disturbance tolerant species went down in 2010, however the improvement was offset by a lower biomass of fish captured in 2010.

References:

National Capital Region Network Biological Stream Survey Fish Data (2008-2010). Versar, Inc. National Capital Region Inventory and Monitoring Program, Washington, DC. Generic Dataset-2175666. https://irma.nps.gov/App/Reference/Profile/2195810

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/Profile/580767