# Antietam National Battlefield

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.

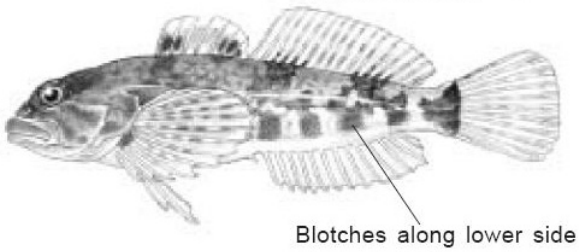



Image: Maryland Department of Natural Resources

Checkered sculpin (*Cottus* n. sp.), a bottom-dwelling fish of limestone-influenced waters whose range is restricted to the Potomac River system, was found in large numbers in Sharpsburg Creek.

## Inventory and 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 followed a six-year rotation. Each summer 5-8 sites were visited. At Antietam National Battlefield (ANTI) monitoring is done in Sharpsburg Creek. 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 factors such as the abundance of fish that are disturbance tolerant, insectivorous, omnivorous, or benthic (occupying the lowest level of a body of water). Scoring also takes into account a Antietam's location in the warmwater highlands 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

Sharpsburg Creek was monitored in 2013. It was also sampled in 2006 and 2004 while monitoring protocols were under development. Newcomer Creek and Mumma Creek were sampled during protocol development in 2004 but no fish were found in either stream.

No rare, threatened, or endangered fish species were found during monitoring. The invasive rusty crayfish (*Orconectes rusticus*) was found along Sharpsburg Creek in 2006 but not subsequently. The invasive virile crayfish (*Orconectes virilis*) and red swamp crawfish (*Procambarus clarkii*) were not detected.

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

**2013 FIBI** = 3.67 (fair)

Species found:

37 blacknose dace (*Rhinichthys atratulus*)
342 checkered sculpin (*Cottus* n. sp.)

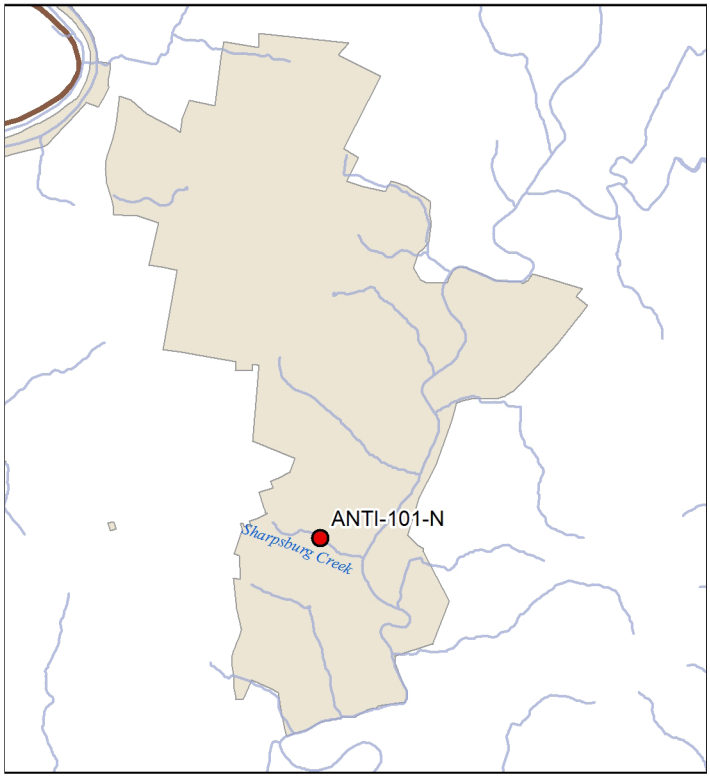
Game fish: none
Invasive crayfish: none

**2006 FIBI** = 4 (good)

3 blacknose dace (*Rhinichthys atratulus*)

239 checkered sculpin (*Cottus* n. sp.)
1 rainbow trout (*Oncorhynchus mykiss*)
3 white sucker (*Catostomus commersonnii*)
Game fish: 1 rainbow trout, no measurement.
Invasive crayfish: Rusty crayfish (*Oroconectes virilis*)

**2004 FIBI** = 4 (good)
171 blacknose dace (*Rhinichthys atratulus*)
435 checkered sculpin (*Cottus* n. sp.)
3 largemouth bass (*Micropterus salmoides*)
10 rainbow trout (*Oncorhynchus mykiss*)
Game fish: 3 largemouth bass, ranging from 35-51 mm. Average length = 42 mm.
10 rainbow trout, ranging from 82 to 158 mm. Average length = 128 mm.
Invasive crayfish: none



Site on Sharpsburg Creek in Antietam monitored for fish, macroinvertebrates, and stream physical habitat condition.

## Discussion

For all years that Sharpsburg Creek was sampled, it earned fair or good FIBI scores.

The factors behind these FIBI scores stayed largely the same over the three sampling years. All years earned good scores for high numbers of benthic species, number of fish, and high numbers of disturbance sensitive species. All years also earned poor scores for having low or no insectivorous fish.

Antietam occupies a region known for karst, a geology marked by groundwater that dissolves buried limestone layers. This process not only creates springs, sinkholes, and caves, but stream waters with lower levels of acidity and more dissolved material. These stream water characteristics influence the type of biota that are found in Antietam. Notably, checkered sculpin, a fish of limestone-influenced waters whose range is restricted to the Potomac River system, was found in large numbers in all years.

The degree to which the most numerous fish dominated a year's sample varied. It was moderate in 2004 and 2006 but dropped to poor in 2013. Four taxa were found in Sharpsburg Creek in 2004 and 2006, but only 2 taxa were found in 2013.

While NCRN monitoring in Sharpsburg Creek found only

## References:

National Capital Region Network Biological Stream Survey Fish Data (2008-2012). Versar, Inc. National Capital Region Inventory and Monitoring Program, Washington, DC. Generic Dataset-2195810. 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. https://irma.nps.gov/App/Reference/Profile/580767.

5 species, NCRN's inventory (2002-2004) of fish at seven sample sites in Antietam including Antietam Creek, found 30 species.

## Species List

This list includes all fish found at Antietam during both recent monitoring and earlier inventory efforts by NCRN I&M.
**M=found during monitoring: I=found during inventory.**

I American eel (*Anguilla rostrata*)
MI blacknose dace (*Rhinichthys atratulus*)
I bluegill (*Lepomis macrochirus*)
I Blue Ridge sculpin (*Cottus caeruleomentum*)
I bluntnose minnow (*Pimephales notatus*)
I brown trout (*Salmo trutta*)
I checkered sculpin (*Cottus* n. sp.)
I common shiner (*Luxilus cornutus*)
I creek chub (*Semotilus atromaculatus*)
I cutlip minnow (*Exoglossum maxillingua*)
I greenside darter (*Etheostoma blennioides*)
I green sunfish (*Lepomis cyanellus*)
M largemouth bass (*Micropterus salmoides*)
I longnose dace (*Rhinichthys cataractae*)
I northern hogsucker (*Hypentelium nigricans*)
I Potomac sculpin (*Cottus girardi*)
I rainbow darter (*Etheostoma caeruleum*)
MI rainbow trout (*Oncorhynchus mykiss*)
I redbreast sunfish (*Lepomis auritus*)
I river chub (*Nocomis micropogon*)
I rock bass (*Ambloplites rupestris*)
I rosyface shiner (*Notropis rubellus*)
I satinfin shiner (*Cyprinella analostana*)
I shielded darter (*Percina peltata*)
I shorthead redhorse (*Moxostoma macrolepidotum*)
I smallmouth bass (*Micropterus dolomieu*)
I spotfin shiner (*Cyprinella spiloptera*)
I spottail shiner (*Notropis hudsonius*)
I tessellated darter (*Etheostoma olmstedi*)
MI white sucker (*Catostomus commersonnii*)
I yellow bullhead (*Ameiurus natalis*)