# National Capital Region Network

National Park Service
U.S. Department of the Interior

# Fish — *Resource Brief*

## Importance

Fish and aquatic communities are excellent indicators of the condition of a stream and its watershed. They are sensitive to many factors including low-level chemical, physical, and biological disturbances. As a result, fish give us a broad overview of water quality.



**A longnose dace (*Rhinichthys cataractae*).**

Fish are also a vital part of the greater ecosystem in the National Capital Region Network (NCRN). They consume plankton, crustaceans, insects, and other organisms, and in turn are food for birds of prey, river otters, raccoons, and other creatures in NCRN parks.

According to a 2008 report from the US Geological Survey and American Fisheries Society, nearly 40 percent of fish species in North American streams, rivers and lakes are now in jeopardy. The NCRN helps conserve some of these species in the mid-Atlantic by being home to several species of special conservation status, such as pearl dace (*Margariscus margarita*), white catfish (*Ameiurus catus*), brook trout (*Salvelinus fontinalis*), and checkered sculpin (*Cottus* sp. *cf. cognatus*).

## Inventory and Monitoring

The NCRN Inventory & Monitoring (I&M) program conducted an inventory of fish populations from 2002-2003 in six NCRN parks: ANTI,* CHOH, GWMP, HAFE, MONO, and WOTR. The inventory established species distributions that served as a baseline for monitoring efforts.

After working to establish monitoring protocols during 2003-04, NCRN fish monitoring began in 2006. We use Maryland Biological Stream Survey (MBSS) methods that combine fish monitoring with aquatic macroinvertebrate monitoring and stream physical habitat analysis. This combination produces a comprehensive picture of stream health. The objectives of this combined monitoring are to:

1) Determine current conditions and track long-term trends in stream condition,
2) Determine trends in species composition and functional groups of fish and benthic invertebrates,
3) Detect invasions of non-native fish

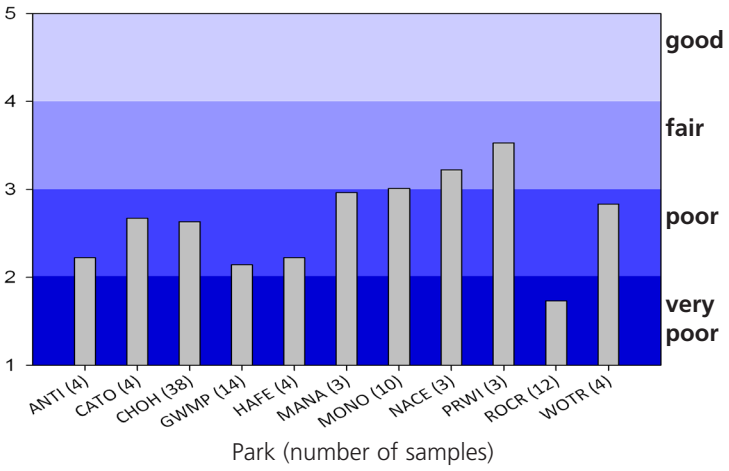
Overall, thirty-six park sites are monitored for fish during July and August—six each year on a six-year rotating basis. Fish monitoring is co-located at water quality monitoring sites on small (first- to third-order), non-tidal streams.

Scientists sample fish by electrofishing along designated 75-meter stream segments. (Electrofishing involves using a mild electric current to stun fish to the surface where they are netted.) The segment is thoroughly fished two times. Captured fish from each pass 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.

## Current Status

NCRN's 2003-04 fish inventory found that more than 90% of fish native to the region (77 in all), have been documented to occur in ANTI, CHOH, GWMP, HAFE, MONO, and WOTR. However, because of the fragmented nature of parks and the potential for environmental impacts from surrounding areas, that diversity is not well-protected.

Fish Index of Biotic Integrity (FIBI)
Average Scores 2003-2010






* full park names and park abbreviations are listed on reverse.

**FIBI Scores**

NCRN monitoring data on the number and species 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, dominant, insectivorous, omnivorous, or benthic and the stream location—in the Coastal Plain, Eastern Piedmont, Warmwater Highlands, or Coldwater Highlands. 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). Based on data gathered between 2003 and 2010, all parks in the NCRN have poor FIBI scores, except one that scored as very poor, and two others that scored as fair.

While most NCRN parks host only short portions of streams whose condition largely reflects upstream (non-park) watershed condition, parks still can, and do, have a positive effect on their streams and fish through mitigation and restoration efforts. NCRN will continue to monitor fish populations and water quality for changes in condition.

## Challenges

Fish populations in the NCRN are threatened by several factors including:

- pollution from industrial, agricultural, and residential land use
- increases in impermeable surfaces such as pavement and buildings in stream watersheds
- displacement by invasive exotic species like the snakehead
- dams and other structures that impede fish migration

## To find out more:


NCRN's 2004 Fish Inventory. http://science.nature.nps.gov/im/units/ncrn/inventories_fish.cfm

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

Jelks, H.L., et al. 2008. Conservation status of imperiled North American freshwater and diadromous fishes. *Fisheries* 33(8):372-407.

NCRN Biological Stream Survey – Data Analysis Standard Operation Procedure #20, Version 1.1 (June 2009) [includes instructions for calculating FIBI scores]

USGS Imperiled Fishes webpage. http://fl.biology.usgs.gov/afs/


*NCRN Park Abberviations*

ANTI- Antietam National Battlefield
CATO- Catoctin Mountain Park
CHOH- Chesapeake and Ohio Canal National Historical Park
GWMP- George Washington Memorial Parkway
HAFE- Harpers Ferry National Historical Park
MANA- Manassas National Battlefield Park
MONO- Monocacy National Battlefield
NACE- National Capital Parks – East
PRWI- Prince William Forest Park
ROCR- Rock Creek Park
WOTR- Wolf Trap National Park for the Performing Arts