Prince William Forest 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.



Tesselated darter (*Etheostoma olmstedi*)

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

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. At Prince William monitoring is done on Carters Run, Mary Bird Branch, Mawavi Run, Middle Branch of Chopawamsic Creek, North Branch of Chopawamsic Creek, North Fork Quantico Creek, Orenda Run, and Taylor Run. 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 wadeable 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.

FIBI Scores

The number and species of fish at a site is used to calculate a Fish Index of Biotic Integrity (FIBI) score. Sites are sorted by physiographic province. Prince William's monitored streams are all categorized as Eastern Piedmont streams except for Mary Bird Branch and Carters Run which are Coastal Plain streams. Eastern Piedmont streams are scored on:

- Abundance of fish for stream size
- Number of benthic fish species (darters, sculpin, madtom, or lamprey)
- Percent disturbance tolerant fish
- Percent generalists, omnivores, and invertivores
- Biomass per square meter
- Percent of lithophilic spawners (fish that broadcast eggs over silt-free rocky substrates)

Coastal Plain streams are scored on the same first four criteria above and two additional criteria:

- Percent non-tolerant suckers (all suckers except white sucker)
- Percent abundance of dominant species (the species that occurs the most often)

(See "2011 FIBI Scores & Rating Criteria" on next page.)

FIBI scores range from 1 to 5, with four possible ratings:

(4-5) good

(3-3.99) fair

(2-2.99) poor

(1-1.99) very poor

Results

All Prince William streams were monitored in 2011. The North Branch of Chopawamsik Creek was also monitored in 2006 and 2004 and the Middle Branch Chopawamsik Creek during 2004. Most sites scored in the fair range (except for Carters Run, Mawavi Run, and Orenda Run which scored lower). Monitoring found no rare, threatened, or endangered fish species in any streams and only a few game fish.

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Carters Run (QUAN-104-N)

2011 FIBI = 1 (very poor)

Carters Run scored poorly on all criteria.

Species found:

- 8 blacknose dace (*Rhinichthys atratulus*)
- 1 creek chub (*Semotilus atromaculatus*)

Mary Bird Branch (QUAN-206-N)

2011 FIBI = 3 (fair)

Mary Bird Branch scored well for abundance and presence of benthic species; and poor for generalists and non-tolerant suckers.

Species found:

- 2 American eel (*Anguilla rostrata*)
- 50 blacknose dace (*Rhinichthys atratulus*)
- 28 creek chub (*Semotilus atromaculatus*)
- 1 cutlips minnow (*Exoglossum maxillingua*)
- 5 fallfish (*Semotilus corporalis*)
- 2 margined madtom (*Noturus insignis*)
- 1 redbreast sunfish (*Lepomis auritus*)
- 14 rosyside dace (*Clinostomus funduloides*)
- 2 white sucker (*Catostomus commersonnii*)

Mawavi Run (QUAN-101-N)

2011 FIBI = 1.33 (very poor)

Mawavi Run earned a score of "very poor" in part for moderate abundance levels and poor ratings for all other criteria.

Species found:

- 40 blacknose dace (*Rhinichthys atratulus*)

Middle Branch of Chopawamsic Creek (CHOP-103-N)

2011 FIBI = 3.67 (fair)

Middle Branch of Chopawamsic Creek earned a score of "fair" in 2011. Criteria influencing this score were good ratings for benthic and disturbance-tolerant species; moderate for abundance and lithophilic spawners; and poor for generalist and biomass scores.

Species found:

- 7 blacknose dace (*Rhinichthys atratulus*)
- 34 common shiner (*Luxilus cornutus*)
- 13 creek chubsucker (*Erimyzon oblongus*)
- 2 cutlips minnow (*Exoglossum maxillingua*)
- 20 fallfish (*Semotilus corporalis*)
- 20 margined madtom (*Noturus insignis*)
- 2 pumpkinseed (*Lepomis gibbosus*)
- 24 redbreast sunfish (*Lepomis auritus*)
- 20 rosyside dace (*Clinostomus funduloides*)
- 5 tessellated darter (*Etheostoma olmstedi*)
- 8 white sucker (*Catostomus commersonnii*)

2004 FIBI = 3.33 (fair)

Species found:

- 1 American eel (*Anguilla rostrata*)
- 10 blacknose dace (*Rhinichthys atratulus*)
- 3 chain pickerel (*Esox niger*)
- 11 creek chubsucker (*Erimyzon oblongus*)
- 1 cutlips minnow (*Exoglossum maxillingua*)
- 1 fallfish (*Semotilus corporalis*)
- 18 margined madtom (*Noturus insignis*)

2011 FIBI Scores and Rating Criteria

	FIBI Score	Abundance fish/stream size	# Benthic species	% Disturbance tolerant	% Generalists, omnivores, & invertivores	Biomass/ m^2	% Lithophilic spawners	Total # taxa	Round-bodied suckers	Abundance dominant taxa
Carters Run	1	1	1	1	1	n/a	n/a	2	1	1
Mary Bird Branch	3	5	5	3	1	n/a	n/a	9	1	3
Mawavi Run	1.33	3	1	1	1	1	1	1	n/a	n/a
Middle Branch Chopawamsic Creek	3.67	3	5	5	1	5	3	10	n/a	n/a
North Branch Chopawamsic Creek	3.67	3	5	5	1	5	3	11	n/a	n/a
North Fork Quantico Creek	2.67	1	5	5	1	1	3	8	n/a	n/a
Orenda Run	1.67	5	1	1	1	1	1	1	n/a	n/a
Taylor Run	4	5	5	3	1	5	5	10	n/a	n/a

24 redbreast sunfish (*Lepomis auritus*)
5 tessellated darter (*Etheostoma olmstedi*)

Game fish:

3 chain pickerel, ranging from 165 - 196 mm. Average size: 180 mm

North Branch of Chopawamsic Creek (CHOP-102-N)

2011 FIBI = 3.67 (fair)

In 2011, North Branch of Chopawamsic Creek earned a "fair" FIBI score. It was rated good for benthic species and disturbance tolerant species; moderate for abundance and lithophilic spawners; and poor for generalists and biomass.

In 2006 and 2004, sites very close but not identical to the 2011 site, were rated good for benthic species; moderate for tolerance; and poor for lithophilic spawners and biomass.

Species found:

37 blacknose dace (*Rhinichthys atratulus*)
73 common shiner (*Luxilus cornutus*)
33 creek chubsucker (*Erimyzon oblongus*)
4 cutlips minnow (*Exoglossum maxillingua*)
25 fallfish (*Semotilus corporalis*)
13 margined madtom (*Noturus insignis*)
17 redbreast sunfish (*Lepomis auritus*)
19 rosyside dace (*Clinostomus funduloides*)
4 swallowtail shiner (*Notropis procne*)
10 tessellated darter (*Etheostoma olmstedi*)
44 white sucker (*Catostomus commersonnii*)

2006 FIBI = 2.33 (poor)

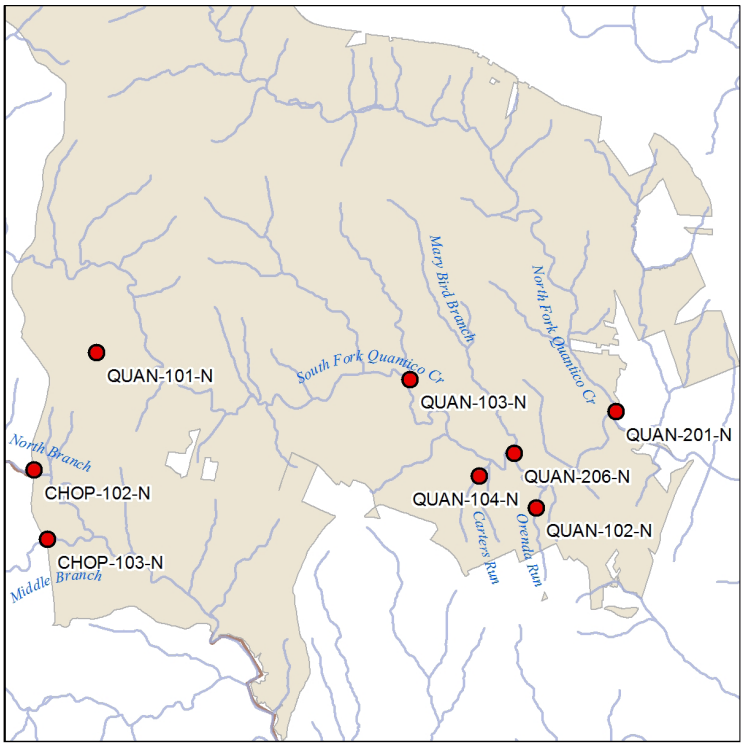
Species found:

38 blacknose dace (*Rhinichthys atratulus*)
13 common shiner (*Luxilus cornutus*)
1 creek chub (*Semotilus atromaculatus*)
5 cutlips minnow (*Exoglossum maxillingua*)
4 fallfish (*Semotilus corporalis*)
14 margined madtom (*Noturus insignis*)
37 redbreast sunfish (*Lepomis auritus*)
3 rosyside dace (*Clinostomus funduloides*)
24 tessellated darter (*Etheostoma olmstedi*)
16 white sucker (*Catostomus commersonnii*)

2004 FIBI = 2.33 (poor)

Species found:

6 blacknose dace (*Rhinichthys atratulus*)
1 bluegill (*Lepomis macrochirus*)



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

References:

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 Fish, 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.

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1 chain pickerel (*Esox niger*)
1 cutlips minnow (*Exoglossum maxillingua*)
14 margined madtom (*Noturus insignis*)
9 redbreast sunfish (*Lepomis auritus*)
31 tessellated darter (*Etheostoma olmstedi*)

Game fish:

1 chain pickerel, 193 mm.

North Fork Quantico Creek (QUAN-201-N)

2011 FIBI = 2.67 (poor)

North Fork Quantico Creek scored "poor" in 2011. While it rated well for benthic and disturbance tolerant species; it rated moderate for lithophilic spawners and poor for abundance, generalists, and biomass.

Species found:

8 American eel (*Anguilla rostrata*)
14 blacknose dace (*Rhinichthys atratulus*)
3 creek chub (*Semotilus atromaculatus*)
8 cutlips minnow (*Exoglossum maxillingua*)
14 fallfish (*Semotilus corporalis*)
2 green sunfish (*Lepomis cyanellus*)
1 margined madtom (*Noturus insignis*)
2 rosyside dace (*Clinostomus funduloides*)

Orenda Run (QUAN-102-N)

2011 FIBI = 1.67 (very poor)

Orenda Run rated well for abundance and poor for all other categories.

Species found:

185 blacknose dace (*Rhinichthys atratulus*)

Taylor Run (QUAN-103-N)

2011 FIBI = 4 (good)

Taylor Run was scored as "good" in 2011. It rated well for abundance, benthic species, and lithophilic spawners; moderate for disturbance tolerance and biomass; and poor for generalist species.

Species found:

1 American eel (*Anguilla rostrata*)
67 blacknose dace (*Rhinichthys atratulus*)
29 common shiner (*Luxilus cornutus*)
42 creek chub (*Semotilus atromaculatus*)
10 cutlips minnow (*Exoglossum maxillingua*)
1 pumpkinseed (*Lepomis gibbosus*)
2 river chub (*Nocomis micropogon*)
55 rosyside dace (*Clinostomus funduloides*)
3 tessellated darter (*Etheostoma olmstedi*)
19 white sucker (*Catostomus commersonnii*)