

Appendix 2B

Biological Assessment Macroinvertebrate and Fish Site Sample Results

Fishing Creek Subbasin HUC 03020102

The full report is available on the DWQ Environmental Sciences Section website:

<http://portal.ncdenr.org/web/wq/ess/reports>.

BENTHIC MACROINVERTEBRATE SAMPLE

Waterbody	Location	Station ID	Date	Bioclassification
FISHING CR	SR 1600	OB100	07/03/07	Good-Fair

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
WARREN	4	3020102	362128	780844	28-79-(1)	Northern Outer Piedmont

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Stream Depth (m)
C, NSW	54.5	230	6	0.3

Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	100	0	0	0

Upstream NPDES Dischargers (>1MGD or <1MGD and within 1 mile)	NPDES Number	Volume (MGD)
Town of Warrenton WWTP	NC0020834	2.0

Water Quality Parameters

Temperature (°C)	22
Dissolved Oxygen (mg/L)	7.1
Specific Conductance (µS/cm)	116
pH (s.u.)	7.1
Water Clarity	slightly turbid

Site Photograph



Habitat Assessment Scores (max)

Channel Modification (5)	5
Instream Habitat (20)	11
Bottom Substrate (15)	3
Pool Variety (10)	10
Riffle Habitat (16)	7
Left Bank Stability (7)	6
Right Bank Stability (7)	6
Light Penetration (10)	10
Left Riparian Score (5)	5
Right Riparian Score (5)	3
Total Habitat Score (100)	66

Substrate	trace of rubble, 10% gravel, 50% sand, 40% silt
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Sample Date	Sample ID	ST	EPT	BI	EPT BI	Bioclassification
07/03/07	10230	19	19	4.5	4.5	Good-Fair
08/18/97	7448	22	22	4.0	4.0	Good
07/28/92	5944	18	18	4.2	4.2	Good-Fair

Taxonomic Analysis

EPT taxa collected in 1992 and 1997 samples were found in 2007 with the exception of the stonefly *Paragnetina fumosa* and the caddisfly *Pycnopsyche*. *Paragnetina fumosa* was abundant in 1992 and 1997 and *Pycnopsyche* was common. Lower water levels in 2007, that exposed root mats and snags, could be one reason why *Pycnopsyche* was not found as they favor these edge habitats. Both taxa are sensitive to water pollution.

Data Analysis

Fishing Creek at SR 1600 declined from Good in 1997 to Good-Fair in 2007. Since only three sampling events have occurred at this location, the differences in the number of EPT collected among the three samples may reflect natural fluxes. A lack of flow in 2002 prevented this site from being sampled. Of future importance to lotic conditions in the Fishing Creek watershed is evidence of beaver activity. One dam was observed in a Fishing Creek tributary near the sampling location.

FISH COMMUNITY SAMPLE

Waterbody	Location	Date	Station ID	Bioclassification
FISHING CR	SR 1600	05/07/07	OF15	Excellent

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
WARREN	4	03020102	36.35722222	-78.1425	28-79-(1)	Northern Outer Piedmont

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Average Depth (m)	Reference Site
C;NSW	58.4	250	12	0.4	No

Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	100	0	0	0

Upstream NPDES Dischargers (>1MGD or <1MGD and within 1 mile)	NPDES Number	Volume (MGD)
Town of Warrenton's WWTP	NC0020834	2.0

Water Quality Parameters

Temperature (°C)	14.6
Dissolved Oxygen (mg/L)	8.2
Specific Conductance (µS/cm)	95
pH (s.u.)	6.4

Water Clarity	Slightly turbid
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Habitat Assessment Scores (max)

Channel Modification (5)	5
Instream Habitat (20)	18
Bottom Substrate (15)	3
Pool Variety (10)	7
Riffle Habitat (16)	5
Left Bank Stability (7)	6
Right Bank Stability (7)	6
Light Penetration (10)	10
Left Riparian Score (5)	5
Right Riparian Score (5)	5
Total Habitat Score (100)	70

Site Photograph



Substrate	Sand and clay
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Sample Date	Sample ID	Species Total	NCIBI	Bioclassification
05/07/07	2007-39	21	58	Excellent
05/24/99	99-36	24	54	Excellent
04/16/97	97-28	24	60	Excellent
02/04/93	93-04	26	48	Good

Most Abundant Species	White Shiner	Exotic Species	Green Sunfish
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Species Change Since Last Cycle

Losses -- Rosyside Dace, Bull Chub, Blacktip Jumprock, Redfin Pickerel (only young-of-year), Pumpkinseed Sunfish, and Bluegill. **Gains** -- Creek Chub, Northern Hog Sucker, Yellow Bullhead, and Green Sunfish.

Data Analysis

Watershed -- large tributary to the Tar River; drains north central Vance and central Warren counties; small municipalities include the Towns of Norlina and Warrenton. **Habitat** -- runs, deadfalls, logs, and sticks in the current creating snags and riffles; good undercuts and roots. **2007** -- 4 species of darters and 3 intolerant species collected; first time an exotic species had been collected. **1993 - 2007** -- primarily Piedmont species; very diverse, 33 species known from the site, including 5 species of suckers and 4 intolerant species; dominant species include Tessellated Darter, Pinewoods Shiner, and White Shiner; has rated Excellent since 1997; may qualify as High Quality Waters if so petitioned.

BENTHIC MACROINVERTEBRATE SAMPLE

Waterbody	Location	Station ID	Date	Bioclassification
FISHING CR	US 301	OB101	06/28/07	Excellent

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
EDGECOMBE	4	03020102	360903	774135	28-79-(29)	Southeastern Floodplains and Low Terraces

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Stream Depth (m)
WS-IV, NSW, CA	529.6	83	10	0.3

Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	100	0	0	0

Upstream NPDES Dischargers (>1MGD or <1MGD and within 1 mile)	NPDES Number	Volume (MGD)
Town of Warrenton WWTP	NC0020834	2.0
Town of Enfield WTP	NC0084034	not limited

Water Quality Parameters

Temperature (°C)	28
Dissolved Oxygen (mg/L)	4.9
Specific Conductance (µS/cm)	106
pH (s.u.)	6.8
Water Clarity	slightly turbid

Site Photograph



Habitat Assessment Scores (max)

Channel Modification (5)	15
Instream Habitat (20)	15
Bottom Substrate (15)	13
Pool Variety (10)	9
Riffle Habitat (16)	0
Left Bank Stability (7)	9
Right Bank Stability (7)	10
Light Penetration (10)	2
Left Riparian Score (5)	5
Right Riparian Score (5)	5
Total Habitat Score (100)	83

Substrate	30% gravel, 45% sand, 25% silt, trace of rubble and bedrock
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Sample Date	Sample ID	ST	EPT	BI	EPT BI	Bioclassification
06/28/07	10226	86	30	5.4	4.4	Excellent
08/05/02	8898	63	15	5.8	4.4	Good-Fair
08/18/97	7451	86	25	5.7	4.3	Good
07/22/92	5910	92	26	5.7	4.5	Good
07/13/88	4598	75	21	6.0	4.7	Good
07/24/85	3621	88	26	5.4	4.4	Good
07/25/83	2981	71	27	5.6	4.5	Good

Taxonomic Analysis

Eighty-six taxa were collected here, many of which are sensitive to aquatic pollution. Abundant mayflies included, *Maccaffertium modestum* and *Baetis intercalaris*. Four stonefly taxa were collected: *Acroneuria abnormis*, *Paragnetina fumosa*, *Pteronarcys dorsata* and *Perlesta*. There were 14 caddisfly taxa with *Cheumatopsyche*, *Chimarra*, *Hydropsyche venularis* and *Oecetis persimilis* being abundant. The rock-case caddisfly *Neophylax fuscus*, common here, was found at two other sites in the Tar River watershed in 2007 (both were upstream Piedmont sites). Its presence here highlights some of the Piedmont features (gravel, rubble) of this waterbody not seen at downstream sites. This site also contained the only 2007 record of the uncommonly collected damselfly, *Hetaerina*.

Data Analysis

Seven samples have been collected here since 1983 with ratings from Good-Fair to Excellent. A greater than average number of EPT taxa were found here in 2007, possibly the result of an earlier summer sampling effort (June) compared with past years (July and August). Active discharging from a pipe next to the US 301 bridge was observed presumably associated with the Enfield WTP.

BENTHIC MACROINVERTEBRATE SAMPLE

Waterbody	Location	Station ID	Date	Bioclassification
FISHING CR	SR 1500	OB99	06/28/07	Excellent

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
EDGECOMBE	4	03020102	355827	773225	28-79-(30.5)	Southeastern Floodplains and Low Terraces

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Stream Depth (m)
C, NSW	784	9	14	1

Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	100	0	0	0

Upstream NPDES Dischargers (>1MGD or <1MGD and within 1 mile)	NPDES Number	Volume (MGD)
none	n/a	n/a

Water Quality Parameters

Temperature (°C)	27.2
Dissolved Oxygen (mg/L)	5
Specific Conductance (µS/cm)	109
pH (s.u.)	6.9
Water Clarity	clear

Site Photograph



Habitat Assessment Scores (max)

Channel Modification (15)	15
Instream Habitat (20)	13
Bottom Substrate (15)	13
Pool Variety (10)	6
Left Bank Stability (10)	9
Right Bank Stability (10)	9
Light Penetration (8)	7
Left Riparian Score (5)	3
Right Riparian Score (5)	4
Total Habitat Score (100)	79

Substrate	10% gravel, 70% sand, 20% silt
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Sample Date	Sample ID	ST	EPT	BI	EPT BI	Bioclassification
06/28/07	10225	102	31	5.2	3.9	Excellent
08/06/02	8901	21	21	4.5	4.5	Good
08/18/97	7452	56	28	4.7	3.9	Excellent
07/22/92	5911	23	23	3.8	3.8	Good

Taxonomic Analysis

Over 100 taxa were collected here, many of which are sensitive to aquatic pollution. A total of 11 taxa of snails, bivalves and other gastropods were found in this reach. Of these *Elimia* and *Elliptio* were abundant. Abundant mayflies included *Tricorythodes*, *Maccaffertium modestum*, *Proclleon*, *Isonychia*, *Heptagenia* and *Baetis intercalaris*. Four stonefly taxa were collected: *Acroneria abnormis*, *Neoperla*, *Pteronarcys dorsata* and *Perlesta*. There were 14 caddisfly taxa with *Brachycentrus numerosus*, *Cheumatopsyche*, *Chimarra*, *Hydropsyche rossi*, *Nectopsyche exquisita*, *Oecetis morsei* and *O. persimilis* being abundant. Seven riffle beetle taxa were recorded here including *Stenelmis antennalis*, *S. fuscata*, *S. lignicola* and *S. xylonastis*.

Data Analysis

Fishing Cr at SR 1500 rated Excellent in 2007. This site rated Good in 2002. A diverse and pollution sensitive benthic community resides here. The highest number of EPT (31) and Total Taxa (102) were collected in 2007. The four samples collected here since 1992 employed two methods (EPT and Full Scale). Minor differences existed in the number of EPT taxa between Full Scale samples (28 and 31) and between EPT samples (21 and 23), thus suggesting a stable benthic community over the 15-year data record.

BENTHIC MACROINVERTEBRATE SAMPLE

Waterbody	Location	Station ID	Date	Bioclassification
SHOCCO CR	SR 1613	OB105	07/03/07	Not Rated

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
WARREN	4	03020102	361725	781109	28-79-22	Northern Outer Piedmont

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Stream Depth (m)
C, NSW	23.4	250	4	0.3

Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	100	0	0	0

Upstream NPDES Dischargers (>1MGD or <1MGD and within 1 mile)	NPDES Number	Volume (MGD)
None	---	---

Water Quality Parameters

Temperature (°C)	22
Dissolved Oxygen (mg/L)	5.1
Specific Conductance (µS/cm)	106
pH (s.u.)	6.4
Water Clarity	turbid

Site Photograph



Habitat Assessment Scores (max)

Channel Modification (5)	5
Instream Habitat (20)	11
Bottom Substrate (15)	3
Pool Variety (10)	10
Riffle Habitat (16)	10
Left Bank Stability (7)	6
Right Bank Stability (7)	6
Light Penetration (10)	8
Left Riparian Score (5)	5
Right Riparian Score (5)	5
Total Habitat Score (100)	69

Substrate	50% sand, 50% silt
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Sample Date	Sample ID	ST	EPT	BI	EPT BI	Bioclassification
07/03/07	10229	12	12	5.3	5.3	Not Rated
08/18/97	7447	16	16	4.6	4.6	Good-Fair
07/28/92	5947	15	15	4.3	4.3	Good-Fair

Taxonomic Analysis

Stoneflies were absent in 2007, whereas in 1997 and 1992 three and four taxa, respectively, were collected. Only half the number of mayfly taxa collected in 1997 (6) were found in 2007 (3). Caddisflies found in 2007 were similar to previous years with one exception, *Trienodes marginatus*. This uncommon taxon (n=34 records) appears to favor more lentic conditions. This was only the second record of this taxon for the Tar River basin and the only one found in 2007.

Data Analysis

The decline in the number of taxa here from 1992 and 1997 to 2007 can be attributed to the presence of a large beaver impoundment (see photo). The new hydrologic regime in this waterbody, though still favorable to caddisflies, has discouraged stoneflies and some mayflies, which were present in prior years, from residing in this reach. This site was not sampled in 2002 due to low flows in July and August of that year

FISH COMMUNITY SAMPLE

Waterbody	Location	Date	Station ID	Bioclassification
SHOCCO CR	SR 1613	04/11/07	OF39	Good-Fair

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
WARREN	4	03020102	36.28722222	-78.18583333	28-79-22	Northern Outer Piedmont

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Average Depth (m)	Reference Site
C;NSW	25.3	265	6.5	0.5	No

Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	100	0	0	0

Upstream NPDES Dischargers (>1MGD or <1MGD and within 1 mile)	NPDES Number	Volume (MGD)
None	---	---

Water Quality Parameters

Temperature (°C)	11.1
Dissolved Oxygen (mg/L)	9.8
Specific Conductance (µS/cm)	73
pH (s.u.)	6.6

Water Clarity	Slightly tannin stained
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Habitat Assessment Scores (max)

Channel Modification (5)	4
Instream Habitat (20)	13
Bottom Substrate (15)	3
Pool Variety (10)	10
Riffle Habitat (16)	4
Left Bank Stability (7)	6
Right Bank Stability (7)	6
Light Penetration (10)	10
Left Riparian Score (5)	5
Right Riparian Score (5)	5
Total Habitat Score (100)	66

Site Photograph



Substrate	sand, silt, clay
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Sample Date	Sample ID	Species Total	NCIBI	Bioclassification
04/11/07	2007-15	20	---	Not Rated
04/09/02	2002-07	18	54	Excellent
04/16/97	97-27	17	50	Good
06/18/92	92-21	18	48	Good

Most Abundant Species	Highfin Shiner	Exotic Species	Green Sunfish
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Species Change Since Last Cycle	Gains -- Yellow Bullhead, Flier, Rosyside Dace, Eastern Mosquitofish, Green Sunfish, Warmouth, and Largemouth Bass. Losses -- American Eel, Glassy Darter, Least Brook Lamprey (a state Threatened species), Redear Sunfish, and Chainback Darter.
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Data Analysis

Watershed -- a tributary to Fishing Creek; drains part of the southwest corner of Warren County. **Habitat** -- primarily runs with abundant woody debris, clay bank shelves, and some undercut; a large beaver dam near the top of the sample reach had flooded the surrounding wetlands, causing water to cascade over the banks down into the stream channel (see photo). **2007** -- a diverse fish assemblage was collected at this site including 4 new species of sunfish and bass. However, the altered hydrology in this section of the stream has caused a shift in the trophic function of the fish community, the loss of two darter species (intolerant Chainback Darter and Glassy Darter), and a decline in reproductive function of the fish population. If rated, the altered hydrology would cause an inappropriate decline to Good-Fair. Therefore this site is Not Rated and should be resampled during normal hydrologic conditions. **1992 - 2007** -- overall, 27 species are known from this site including 2 species of suckers, 7 species of sunfish, 6 species of minnows, and 4 species of darters. Despite being Not Rated, this watershed maintains good water quality.

FISH COMMUNITY SAMPLE

Waterbody	Location	Date	Station ID	Bioclassification
CROOKED SWP	SR 1501	04/11/07	OF66	Not Rated

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
NASH	4	03020102	36.1331	-77.88094	28-79-24	Rolling Coastal Plain

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Average Depth (m)	Reference Site
C; NSW	6	147	6	0.4	No

Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	95	5 (rural residential)	0	0

Upstream NPDES Dischargers (>1MGD or <1MGD and within 1 mile)	NPDES Number	Volume (MGD)
None	---	---

Water Quality Parameters

Temperature (°C)	11.5
Dissolved Oxygen (mg/L)	8.6
Specific Conductance (µS/cm)	89
pH (s.u.)	6.6

Water Clarity	Slightly tannin stained
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Habitat Assessment Scores (max)

Channel Modification (15)	15
Instream Habitat (20)	18
Bottom Substrate (15)	10
Pool Variety (10)	10
Left Bank Stability (10)	9
Right Bank Stability (10)	9
Light Penetration (10)	9
Left Riparian Score (5)	5
Right Riparian Score (5)	4
Total Habitat Score (100)	89

Site Photograph



Substrate	sand, gravel, clay
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Sample Date	Sample ID	Species Total	NCIBI	Bioclassification
04/11/07	2007-14	20	--	Not Rated

Most Abundant Species	Pinewoods Shiner	Exotic Species	Green Sunfish
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Species Change Since Last Cycle	N/A
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Data Analysis

Watershed -- a small tributary to Fishing Creek located about one mile above its confluence; drains part of rural north central Nash County above the Town of Red Oak. **Habitat** -- primarily runs with undercuts, side snags, pools, good roots, and a few gravel riffles. **2007** -- a diverse mixed assemblage of coastal plain and piedmont fish species, including 6 sunfish species, 6 minnow species, 2 sucker species, and 2 darter species; the number of species far exceeds what is typically found in a coastal plain stream. This watershed is located very close to, but not within the Northern Outer Piedmont level IV ecoregion. If this site were located within the Northern Outer Piedmont ecoregion and therefore ratable with the NCIBI, the fish community would receive an NCIBI score of 54 and bioclass of Excellent. Currently, coastal plain streams are Not Rated with the NCIBI because the appropriate metrics have yet to be developed.

FISH COMMUNITY SAMPLE

Waterbody	Location	Date	Station ID	Bioclassification
LITTLE FISHING CR	SR 1509	04/12/07	OF26	Excellent

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
WARREN	4	03020102	36.36583333	-77.94333333	28-79-25	Northern Outer Piedmont

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Average Depth (m)	Reference Site
C;NSW	28.5	250	10	0.6	No

Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	100	0	0	0

Upstream NPDES Dischargers (>1MGD or <1MGD and within 1 mile)	NPDES Number	Volume (MGD)
None	---	---

Water Quality Parameters

Temperature (°C)	13.9
Dissolved Oxygen (mg/L)	10.0
Specific Conductance (µS/cm)	74
pH (s.u.)	6.6

Water Clarity	Turbid
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Habitat Assessment Scores (max)

Channel Modification (5)	5
Instream Habitat (20)	16
Bottom Substrate (15)	5
Pool Variety (10)	9
Riffle Habitat (16)	12
Left Bank Stability (7)	4
Right Bank Stability (7)	4
Light Penetration (10)	10
Left Riparian Score (5)	5
Right Riparian Score (5)	5
Total Habitat Score (100)	75

Site Photograph



Substrate	clay, sand, silt, cobble
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Sample Date	Sample ID	Species Total	NCIBI	Bioclassification
04/12/07	2007-17	23	54	Excellent
04/11/02	2002-11	23	52	Good
04/16/97	97-29	19	50	Good
02/03/93	93-02	20	54	Excellent

Most Abundant Species	Tessellated Darter	Exotic Species	Green Sunfish
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Species Change Since Last Cycle

Gains -- Yellow Bullhead, White Sucker, Satinfish, Redfin Pickerel, Pinewoods Shiner, Blacktip Jumprock, Creek Chub, and Eastern Mudminnow. **Losses** -- Rosyside Dace, Bluespotted Sunfish, Warmouth, Notchlip Redhorse, Sicklefin Redhorse, V-lip Redhorse, Golden Shiner, and Swallowtail Shiner.

Data Analysis

Watershed -- a tributary to Fishing Creek; drains part of east central Warren County. **Habitat** -- fast riffles, deep clay lined runs and pools with submerged deadfalls and side snags. **2007** -- very diverse fish community including 6 species of minnows, 3 species of suckers, and 3 species of darters were collected; almost identical NCIBI metric scores as in 2002; the bioclass improvement in 2007 can be attributed to a slightly higher reproductive function of the fish community. **1993 - 2007** -- this watershed has maintained good water quality and a diverse assemblage of fish fauna over a 14 year period, with a total of 34 known species. This site has the potential to qualify for HQW or ORW status if petitioned.

BENTHIC MACROINVERTEBRATE SAMPLE

Waterbody	Location	Station ID	Date	Bioclassification
L FISHING CR	SR 1343	OB103	06/29/07	GOOD

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
HALIFAX	4	03020102	360914	775305	28-79-25	Rolling Coastal Plain

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Stream Depth (m)
C, NSW	187.1	110	9	0.3

Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	100	0	0	0

Upstream NPDES Dischargers (>1MGD or <1MGD and within 1 mile)	NPDES Number	Volume (MGD)
None	---	---

Water Quality Parameters

Temperature (°C)	25
Dissolved Oxygen (mg/L)	53
Specific Conductance (µS/cm)	99
pH (s.u.)	6.8
Water Clarity	slightly turbid

Site Photograph



Habitat Assessment Scores (max)

Channel Modification (15)	15
Instream Habitat (20)	15
Bottom Substrate (15)	13
Pool Variety (10)	8
Left Bank Stability (10)	9
Right Bank Stability (10)	9
Light Penetration (10)	7
Left Riparian Score (5)	5
Right Riparian Score (5)	5
Total Habitat Score (100)	86

Substrate	10% Boulder, 10% rubble, 20% Gravel, 50% sand, 10% silt
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Sample Date	Sample ID	ST	EPT	BI	EPT BI	Bioclassification
06/29/07	10228	95	27	5.2	4.0	Good
08/05/02	8899	86	23	5.6	4.2	Good
8/15/1997*	7449	85	23	5.3	4.1	Good
9/10/1992*	5948	64	18	5.6	4.8	Good-Fair
7/14/1988*	4599	89	24	5.3	3.8	Good

Taxonomic Analysis

A diverse and healthy benthic community resides in this lower reach of Little Fishing Creek. Pollution intolerant taxa dominate the taxa list for this site and include: the mayflies *Serratella serratooides*, *Leucocuta*, and *Stenacron pallidum*; the caddisfly *Trienodes perna/helo*; and the stoneflies *Pteronarcys dorsata* and *Paragnetina fumosa*. Ten Mollusk taxa were reported from this site in 2007 including the rare *Lioplax subcarinata*. Another rare taxon collected here in 2007 was the water beetle, *Lioporeus pilatei*. This taxon was also collected here in 2002. The hemipteran, *Hydrometra*, that has only been found at 13 locations in North Carolina, was collected here in 2007.

Data Analysis

Water quality in the lower reaches of Little Fishing Creek has remained stable since sampling began in 1988. Though this site lies just inside the Coastal Plain, its watershed is Piedmont, indicated by species such as the rock case caddisfly *Neophylax fuscus*. This species is found in this upper region of the Tar River watershed but not downstream in more Coastal A waters. Medoc Mountain State Park lies upstream of this location and likely contributes to the high water quality at SR 1343.

*Note: prior to 2002, Little Fishing Creek was sampled at SR 1338, approximately 3 miles upstream of SR 1343.

FISH COMMUNITY SAMPLE

Waterbody	Location	Date	Station ID	Bioclassification
REEDY CR	SR 1511	04/12/07	OF34	Good

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
WARREN	4	03020102	36.35	-78.01833333	28-79-25.5	Northern Outer Piedmont

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Average Depth (m)	Reference Site
C;NSW	19.7	270	12	0.4	Yes

Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	100	0	0	0

Upstream NPDES Dischargers (>1MGD or <1MGD and within 1 mile)	NPDES Number	Volume (MGD)
None	---	---

Water Quality Parameters

Temperature (°C)	13.1
Dissolved Oxygen (mg/L)	9.3
Specific Conductance (µS/cm)	63
pH (s.u.)	6.5

Water Clarity	Slightly turbid
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Habitat Assessment Scores (max)

Channel Modification (5)	5
Instream Habitat (20)	18
Bottom Substrate (15)	6
Pool Variety (10)	9
Riffle Habitat (16)	3
Left Bank Stability (7)	6
Right Bank Stability (7)	6
Light Penetration (10)	10
Left Riparian Score (5)	5
Right Riparian Score (5)	5
Total Habitat Score (100)	73

Site Photograph



Substrate	gravel, sand
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Sample Date	Sample ID	Species Total	NCIBI	Bioclassification
04/12/07	2007-16	16	48	Good
04/11/02	2002-12	17	52	Good

Most Abundant Species	Bluehead Chub	Exotic Species	Green Sunfish
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Species Change Since Last Cycle	Gains -- Creek Chubsucker, Redfin Pickerel, Green Sunfish, Bluegill, and Swallowtail Shiner. Losses -- Yellow Bullhead, Pumpkinseed, Golden Shiner, Roanoke Darter, Blacktip Jumprock, and Creek Chub.
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Data Analysis

Watershed -- a tributary to Little Fishing Creek located about 8 miles above its confluence; drains part of central Warren County. **Habitat** -- primarily runs with side snags, good roots, and coarse woody debris; good riparian forest. **2007** -- a fairly diverse fish community in 2007, with relatively stable metric scores, notwithstanding a slightly lower total abundance and the loss of the intolerant Roanoke Darter. **2002 - 2007** -- there are 22 fish species that are known from this site including 2 species of suckers, 8 species of minnows, and 3 species of darters. Water quality in this catchment remains good with no apparent issues.

FISH COMMUNITY SAMPLE

Waterbody	Location	Date	Station ID	Bioclassification
BEAR SWP	NC 561	05/07/07	OF2	Good

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
HALIFAX	4	03020102	36.2779312	-77.8841524	28-79-25-7	Northern Outer Piedmont

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Average Depth (m)	Reference Site
C;NSW	42.8	200	8	0.4	No

Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	100	0	0	0

Upstream NPDES Dischargers (>1MGD or <1MGD and within 1 mile)	NPDES Number	Volume (MGD)
None	---	---

Water Quality Parameters

Temperature (°C)	15.4
Dissolved Oxygen (mg/L)	7.5
Specific Conductance (µS/cm)	83
pH (s.u.)	6.5

Water Clarity	Clear, tannin stained
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Habitat Assessment Scores (max)

Channel Modification (5)	5
Instream Habitat (20)	18
Bottom Substrate (15)	6
Pool Variety (10)	6
Riffle Habitat (16)	5
Left Bank Stability (7)	6
Right Bank Stability (7)	6
Light Penetration (10)	10
Left Riparian Score (5)	5
Right Riparian Score (5)	5
Total Habitat Score (100)	72

Site Photograph



Substrate	Sand, gravel, cobble, and silt
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Sample Date	Sample ID	Species Total	NCIBI	Bioclassification
05/07/07	2007-40	25	52	Good
04/11/02	2002-10	20	52	Good

Most Abundant Species	Redbreast Sunfish and American Eel	Exotic Species	Green Sunfish
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Species Change Since Last Cycle	Losses -- Golden Shiner, White Sucker, Notchlip Redhorse, and Bluegill. Gains -- Satinfish Shiner, Northern Hog Sucker, V-lip Redhorse, Yellow Bullhead, Redfin Pickerel, Eastern Mosquitofish, Flier, Green Sunfish, and Glassy Darter.
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Data Analysis

Watershed -- tributary to Little Fishing Creek; drains the west-southwest corner of Halifax County; the Town of Littleton is located within the extreme headwaters; borders the Rolling Coastal Plain; one NPDES permitted facility located approximately 11 miles upstream on Butterwood Creek (discharge = 0.28 MGD). **Habitat** -- *Fissidens* and several species of macrophytes; root mats; coarse woody debris and deadfalls in the channel; wide riparian zones. **2007** -- 4 species each of darters and suckers and 3 intolerant species (Pinewoods Shiner, Roanoke Darter, and the Chainback Darter). **2002 & 2007** -- a diverse piedmont and coastal plain fauna, 29 species present including 7 species of minnows, 6 species of suckers, 5 species of sunfish, 4 species of darters, and 3 intolerant species; most abundant species in 2002 was the Highfin Shiner; similar to other streams in the transitional zone between the Piedmont and the Coastal Plain, the trophic structure is skewed with a very low percentage of omnivores+herbivores and a high percentage of piscivores.

BENTHIC MACROINVERTEBRATE SAMPLE

Waterbody	Location	Station ID	Date	Bioclassification
ROCKY SWP	SR 1002	OB104	06/28/07	Good

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
HALIFAX	4	03020102	361335	774835	28-79-28-(0.7)	Northern Outer Piedmont

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Stream Depth (m)
WS-IV	19.6	130	6	0.2

Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	75	0	25	0

Upstream NPDES Dischargers (>1MGD or <1MGD and within 1 mile)	NPDES Number	Volume (MGD)
None	---	---

Water Quality Parameters

Temperature (°C)	24.7
Dissolved Oxygen (mg/L)	4.9
Specific Conductance (µS/cm)	70
pH (s.u.)	6.7
Water Clarity	clear

Site Photograph



Habitat Assessment Scores (max)

Channel Modification (5)	15
Instream Habitat (20)	13
Bottom Substrate (15)	7
Pool Variety (10)	10
Riffle Habitat (16)	0
Left Bank Stability (7)	10
Right Bank Stability (7)	10
Light Penetration (10)	10
Left Riparian Score (5)	4
Right Riparian Score (5)	4
Total Habitat Score (100)	83

Substrate 80% sand, 20% silt, traces of bedrock, boulder rubble and gravel

Sample Date	Sample ID	ST	EPT	BI	EPT BI	Bioclassification
06/28/07	10227	81	20	6.0	5.1	Good
08/18/97	7450	39	13	5.6	4.6	Good-Fair

Taxonomic Analysis

The taxa composition was typical of that found in sandy substrates. The psammophilic midge, *Cryptochironomus*, dominated the chironomid community. The burrowing mayfly, *Hexagenia*, was abundant here, as were *Isonychia*, *Maccaffertium modestum*, and *Caenis*. Abundant caddisflies included *Cheumatopsyche*, *Trienodes ignitus*, and *Oecetis persimilis*. An uncommonly collected beetle, *Helophorus*, was found here. This is only the third collection of this taxon in the Tar River Basin. Like most Tar River sites, gastropod taxa were well represented at Rocky Swamp (seven taxa), however, no live mussels were observed (just their shells). It is unclear why only one chironomid taxa was collected in 1997 whereas 19 were found in 2007. Beetles were well represented in 2007 (10 taxa) but scarce in 1997 (3 taxa).

Data Analysis

Rocky Swamp at SR 1002 appears to be a transitional reach from Piedmont to Coastal A. The majority of the watershed upstream of SR 1002 is Piedmont, however, the previous sampling effort (1997) used CA criteria for assigning a bioclassification. For consistency the same was done in 2007 resulting in a Good bioclassification. Regardless of the methodology used, the 1997 effort would have resulted in a Good-Fair. This site was not sampled in 2002 due to a lack of flow in July and August.

FISH COMMUNITY SAMPLE

Waterbody	Location	Date	Station ID	Bioclassification
ROCKY SWP	SR 1002	05/07/07	OF35	Good

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
HALIFAX	4	03020102	36.22638889	-77.80916667	28-79-28-(0.7)	Northern Outer Piedmont

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Average Depth (m)	Reference Site
WS-IV;NSW	19.5	145	7	0.4	Yes

Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	60	0	35	5 (utility right-of-way)

Upstream NPDES Dischargers (>1MGD or <1MGD and within 1 mile)	NPDES Number	Volume (MGD)
None	---	---

Water Quality Parameters

Temperature (°C)	16.7
Dissolved Oxygen (mg/L)	7.3
Specific Conductance (µS/cm)	97
pH (s.u.)	6.8

Water Clarity	Slightly tannin stained
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Habitat Assessment Scores (max)

Channel Modification (5)	5
Instream Habitat (20)	16
Bottom Substrate (15)	5
Pool Variety (10)	6
Riffle Habitat (16)	2
Left Bank Stability (7)	6
Right Bank Stability (7)	6
Light Penetration (10)	7
Left Riparian Score (5)	5
Right Riparian Score (5)	5
Total Habitat Score (100)	63

Site Photograph



Substrate	Sand, gravel, cobble, bedrock, and boulder
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Sample Date	Sample ID	Species Total	NCIBI	Bioclassification
05/07/07	2007-41	19	48	Good
04/12/02	2002-13	19	50	Good
04/03/97	97-11	14	---	Not Rated
02/03/93	93-01	15	---	Not Rated

Most Abundant Species	White Shiner and Tessellated Darter	Exotic Species	Green Sunfish
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Species Change Since Last Cycle	Losses -- Margined Madtom, Redfin Pickerel (represented only by young-of-year), and Swamp Darter. Gains -- Mud Sunfish, Pumpkinseed, and Bluegill.
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Data Analysis

Watershed -- tributary to Fishing Creek; drains rural north-central Warren County; a transitional area between the Northern Outer Piedmont and the Rolling Coastal Plain. **Habitat** -- sandy runs; good snags, roots, and deadfalls; open canopy at two utility right-of-ways; total habitat score using coastal plain criteria = 82. **2007** -- 7 species of sunfish, most species ever, Bluegill and Mud Sunfish collected for the first time; only 1 species of darter, sucker, and intolerant species collected. **1993 - 2007** -- 28 species known from the site, including 8 species of sunfish and 7 species of minnows; Least Brook Lamprey, Bowfin, Mimic Shiner, and Chainback Darter have not been collected since 1993; similar to other streams in the transitional zone between the Piedmont and the Coastal Plain, the trophic structure is skewed with a very low percentage of omnivores+herbivores and a high percentage of piscivores.

BENTHIC MACROINVERTEBRATE SAMPLE

Waterbody	Location	Station ID	Date	Bioclassification
BEECH SWP	SR 1003	OB94	02/05/07	Moderate

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
HALIFAX	4	03020102	360847	773326	28-79-30	Rolling Coastal Plain

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Stream Depth (m)
C;SW;NSW	151.6	85	10	0.4

Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	100	0	0	0

Upstream NPDES Dischargers (>1MGD or <1MGD and within 1 mile)	NPDES Number	Volume (MGD)
None	---	---

Water Quality Parameters

Temperature (°C)	1.9
Dissolved Oxygen (mg/L)	16.2
Specific Conductance (µS/cm)	63
pH (s.u.)	6.1
Water Clarity	clear

Site Photograph



Habitat Assessment Scores (max)

Channel Modification (15)	15
Instream Habitat (20)	17
Bottom Substrate (15)	7
Pool Variety (10)	10
Left Bank Stability (10)	10
Right Bank Stability (10)	10
Light Penetration (10)	10
Left Riparian Score (5)	5
Right Riparian Score (5)	5
Total Habitat Score (100)	89

Substrate	Nearly all sand
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Sample Date	Sample ID	ST	EPT	BI	EPT BI	Bioclassification
02/05/07	10131	35	3	7.4	6.9	Moderate
02/15/02	8677	37	2	7.2	7.8	Moderate

Taxonomic Analysis

Two new mayfly species were added to the species list for SR 1003 in 2007; these included *Maccaffertium modestum* and *Pseudocloeon frondale*. Overall, the taxa diversity (ST) and the number of EPT remained relatively constant between the 2002 and 2007 sampling events. This study site is dominated by pollution tolerant macroinvertebrate species, and midges and crustaceans were the most abundant and diverse groups.

Data Analysis

There are no upstream NPDES dischargers above this study site. The habitat at this site rated high in 2007 because of the presence of a relatively natural stream channel with good (i.e. suitable for colonization) instream habitat and a healthy and intact riparian zone. The only negative aspect of the habitat at SR 1003 was the homogeneous streambed substrate composed almost entirely of sand. This study location was given a bioclassification of Moderate during both 2002 and 2007 sampling events. This bioclassification implies that there is moderate environmental stress at this study site.

FISH COMMUNITY SAMPLE

Waterbody	Location	Date	Station ID	Bioclassification
MARSH SWP	SR 1210	05/08/07	OF49	Not Rated

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
HALIFAX	4	03020102	36.379309	-77.728805	28-79-30-1	Rolling Coastal Plain

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Average Depth (m)	Reference Site
C,Sw,NSW	6.5	190	5	0.4	Yes

Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	100	0	0	0

Upstream NPDES Dischargers (>1MGD or <1MGD and within 1 mile)	NPDES Number	Volume (MGD)
None	---	---

Water Quality Parameters

Temperature (°C)	16.0
Dissolved Oxygen (mg/L)	6.8
Specific Conductance (µS/cm)	97
pH (s.u.)	6.8

Water Clarity	Blackwater
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Habitat Assessment Scores (max)

Channel Modification (15)	15
Instream Habitat (20)	20
Bottom Substrate (15)	15
Pool Variety (10)	10
Left Bank Stability (10)	10
Right Bank Stability (10)	10
Light Penetration (10)	10
Left Riparian Score (5)	5
Right Riparian Score (5)	5
Total Habitat Score (100)	100

Site Photograph



Substrate	Cobble, boulder, gravel, sticks, and logs
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Sample Date	Sample ID	Species Total	NCIBI	Bioclassification
05/08/07	2007-42	16	---	Not Rated

Most Abundant Species	Redbreast Sunfish, Highfin Shiner, American Eel, Creek Chubsucker, and Redfin Pickerel.	Exotic Species	Green Sunfish
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Species Change Since Last Cycle	N/A
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Data Analysis

This is the first fish community sample collected at this site. **Watershed** -- tributary to Beech Swamp; drains rural northern Halifax County; on the Fall Line, in a transitional area between the Northern Outer Piedmont and the Rolling Coastal Plain. **Habitat** -- a perfect score using coastal plain criteria (95 using Piedmont criteria); natural channel, boulder bluff on the left; boulders in the stream; riffles, runs, deep and shallow pools, undercuts, roots, and snags; low specific conductance for a coastal plain stream. **2007** -- sparse (n = 92 fish), coastal plain fauna and very low productivity, but not low pH; diverse fauna for a small stream, including six species of sunfish and one intolerant species (Sawcheek Darter). This site is not rated because the appropriate NCIBI metrics and criteria have yet to be developed for coastal plain streams.

FISH COMMUNITY SAMPLE

Waterbody	Location	Date	Station ID	Bioclassification
MILL SWP	SR 1615	04/13/07	OF73	Not Rated

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
HALIFAX	4	03020102	36.34398	-77.70671	28-79-30-1-0.5	Rolling Coastal Plain

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Average Depth (m)	Reference Site
C; SW, NSW	11	147	6	0.5	Yes

Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	100	0	0	0

Upstream NPDES Dischargers (>1MGD or <1MGD and within 1 mile)	NPDES Number	Volume (MGD)
None	---	---

Water Quality Parameters

Temperature (°C)	18.0
Dissolved Oxygen (mg/L)	9.0
Specific Conductance (µS/cm)	76
pH (s.u.)	5.8

Water Clarity	Tannin stained
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Habitat Assessment Scores (max)

Channel Modification (15)	15
Instream Habitat (20)	18
Bottom Substrate (15)	13
Pool Variety (10)	10
Left Bank Stability (10)	10
Right Bank Stability (10)	10
Light Penetration (10)	9
Left Riparian Score (5)	5
Right Riparian Score (5)	5
Total Habitat Score (100)	95

Site Photograph



Substrate	sand, gravel, cobble
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Sample Date	Sample ID	Species Total	NCIBI	Bioclassification
04/13/07	2007-21	8	--	Not Rated

Most Abundant Species	Bluegill	Exotic Species	None
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Species Change Since Last Cycle	N/A
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Data Analysis

This is the first fish community sample collected at this site. **Watershed** -- a tributary to Marsh Swamp, Beech Swamp, and ultimately Fishing Creek; drains the western edge of the Rolling Coastal Plain ecoregion in central Halifax County; located to the north of the Beaverdam Swamp and Burnt Coat Swamp watersheds; site is about 1 mile above Bradley Lake. **Habitat** -- a natural meandering channel with good flow; runs with submerged logs, and macrophytes; extensive riparian zone widths; 2nd lowest pH for all Tar basin sites. **2007** -- low abundance (n = 47) and diversity of the fish community (fewest number of species for all Tar sites), typical for a low pH coastal plain stream; fish community is dominated by sunfish; no crayfish collected; this site is not rated because the appropriate NCIBI metrics have yet to be developed for coastal plain streams; although not rateable, there are no apparent water quality issues in this watershed.

FISH COMMUNITY SAMPLE

Waterbody	Location	Date	Station ID	Bioclassification
BURNT COAT SWP	SR 1216	04/13/07	OF70	Not Rated

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
HALIFAX	4	03020102	36.25521	-77.75957	28-79-30-2	Rolling Coastal Plain

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Average Depth (m)	Reference Site
C: SW, NSW	6.3	147	4	0.4	No

Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	100	0	0	0

Upstream NPDES Dischargers (>1MGD or <1MGD and within 1 mile)	NPDES Number	Volume (MGD)
None	---	---

Water Quality Parameters

Temperature (°C)	11.7
Dissolved Oxygen (mg/L)	8.7
Specific Conductance (µS/cm)	96
pH (s.u.)	6.4

Water Clarity	Slightly tannin stained
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Habitat Assessment Scores (max)

Channel Modification (15)	15
Instream Habitat (20)	15
Bottom Substrate (15)	13
Pool Variety (10)	9
Left Bank Stability (10)	9
Right Bank Stability (10)	9
Light Penetration (10)	10
Left Riparian Score (5)	5
Right Riparian Score (5)	5
Total Habitat Score (100)	90

Site Photograph



Substrate	sand, clay
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Sample Date	Sample ID	Species Total	NCIBI	Bioclassification
04/13/07	2007-18	11	--	Not Rated

Most Abundant Species	Redfin Pickerel	Exotic Species	None
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Species Change Since Last Cycle	N/A
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Data Analysis

This is the first fish community sample collected at this site. **Watershed** -- a small tributary to Beech Swamp; drains a small section of central Halifax County. **Habitat** -- shallow meandering runs with side snags, and coarse woody debris in the channel, creating some "stick riffles"; good flow; natural channel; good riparian zone widths. **2007** -- fairly typical coastal plain fish community present with moderate to low diversity and abundance; includes 1 species of sucker, 2 species of sunfish, 2 species of minnows, and no darters; this site is not rateable because the appropriate NCIBI metrics have yet to be developed for rating coastal plain streams; although not rateable, there are no apparent water quality issues in this watershed.

FISH COMMUNITY SAMPLE

Waterbody	Location	Date	Station ID	Bioclassification
JACKET SWP	SR 1216	04/13/07	OF71	Not Rated

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
HALIFAX	4	03020102	36.2280903	-77.7708477	28-79-30-2-1	Rolling Coastal Plain

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Average Depth (m)	Reference Site
C; SW, NSW	3.3	147	3	0.4	Yes

Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	100	0	0	0

Upstream NPDES Dischargers (>1MGD or <1MGD and within 1 mile)	NPDES Number	Volume (MGD)
None	---	---

Water Quality Parameters

Temperature (°C)	13.6
Dissolved Oxygen (mg/L)	6.8
Specific Conductance (µS/cm)	102
pH (s.u.)	6.7

Water Clarity	Slightly turbid
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Habitat Assessment Scores (max)

Channel Modification (15)	15
Instream Habitat (20)	18
Bottom Substrate (15)	8
Pool Variety (10)	9
Left Bank Stability (10)	9
Right Bank Stability (10)	9
Light Penetration (10)	6
Left Riparian Score (5)	5
Right Riparian Score (5)	5
Total Habitat Score (100)	84

Site Photograph



Substrate	sand, clay
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Sample Date	Sample ID	Species Total	NCIBI	Bioclassification
04/13/07	2007-19	15	--	Not Rated

Most Abundant Species	Bluespotted Sunfish	Exotic Species	None
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Species Change Since Last Cycle	N/A
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Data Analysis

This is the first fish community sample collected at this site. **Watershed** -- a small tributary to (and just south of) Burnt Coat Swamp; drains part of central Halifax County. **Habitat** -- runs with macrophytes, deadfalls, and snags; natural channel; the upper 1/3 of the sample reach is more open and sunlit due to an old logging operation. **2007** -- good diversity and abundance for a coastal plain stream, except that there were no minnows collected; the 2007 sample included 1 species of sucker, 6 species of sunfish, and 2 species of darters; this site is not rated because the appropriate NCIBI metrics have yet to be developed for coastal streams; although not ratable, there are no apparent water quality issues in this watershed.

FISH COMMUNITY SAMPLE

Waterbody	Location	Date	Station ID	Bioclassification
BREECHES SWP	SR 1002	04/13/07	OF72	Not Rated

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
HALIFAX	4	03020102	36.2066781	-77.7300272	28-79-30-2-1-2	Rolling Coastal Plain

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Average Depth (m)	Reference Site
C; SW, NSW	4.2	98	4	0.4	No

Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	100	0	0	0

Upstream NPDES Dischargers (>1MGD or <1MGD and within 1 mile)	NPDES Number	Volume (MGD)
None	---	---

Water Quality Parameters

Temperature (°C)	14.9
Dissolved Oxygen (mg/L)	5.6
Specific Conductance (µS/cm)	90
pH (s.u.)	5.6

Water Clarity	Tannin stained
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Habitat Assessment Scores (max)

Channel Modification (15)	15
Instream Habitat (20)	18
Bottom Substrate (15)	10
Pool Variety (10)	10
Left Bank Stability (10)	10
Right Bank Stability (10)	10
Light Penetration (10)	10
Left Riparian Score (5)	5
Right Riparian Score (5)	5
Total Habitat Score (100)	93

Site Photograph



Substrate	sand, white gravel
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Sample Date	Sample ID	Species Total	NCIBI	Bioclassification
04/13/07	2007-20	8	--	Not Rated

Most Abundant Species	Bluespotted Sunfish and Golden Shiner	Exotic Species	None
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Species Change Since Last Cycle	N/A
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Data Analysis

This is the first fish community sample at this site. **Watershed** -- a small tributary to Jacket Swamp and ultimately Burnt Coat Swamp; drains part of south central Halifax County, immediately south of the Jacket Swamp watershed. **Habitat** -- meandering run through bottomland forest with good flow and a natural channel; lowest pH among all Tar basin sites. **2007** -- low abundance (n = 41, lowest among all Tar basin sites) and diversity of the fish community, typical for a low pH black water coastal plain system; no darters and only one sunfish species collected; this site is not rated because the appropriate NCIBI metrics have yet to be developed for coastal plain streams; although not ratable, there are no apparent water quality issues in this watershed.

BENTHIC MACROINVERTEBRATE SAMPLE

Waterbody	Location	Station ID	Date	Bioclassification
DEEP CR	SR 1100	OB96	02/05/07	Moderate

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
HALIFAX	4	03020102	360426	772625	28-79-32-(0.5)	Rolling Coastal Plain

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Stream Depth (m)
WS-IV;NSW	41.4	49	5	0.8

Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	100	0	0	0

Upstream NPDES Dischargers (>1MGD or <1MGD and within 1 mile)	NPDES Number	Volume (MGD)
None	---	---

Water Quality Parameters

Temperature (°C)	3.1
Dissolved Oxygen (mg/L)	14.7
Specific Conductance (µS/cm)	90
pH (s.u.)	5.6
Water Clarity	clear/tannic

Site Photograph



Habitat Assessment Scores (max)

Channel Modification (15)	15
Instream Habitat (20)	15
Bottom Substrate (15)	4
Pool Variety (10)	8
Left Bank Stability (10)	10
Right Bank Stability (10)	10
Light Penetration (10)	10
Left Riparian Score (5)	5
Right Riparian Score (5)	5
Total Habitat Score (100)	82

Substrate	Nearly all detritus
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Sample Date	Sample ID	ST	EPT	BI	EPT BI	Bioclassification
02/05/07	10132	34	0	7.9	0.0	Moderate
02/15/02	8678	33	2	8.1	8.8	Moderate

Taxonomic Analysis

No mayflies, stoneflies, or caddisflies (EPT taxa) were collected during the current basinwide sampling of SR 1100. However, the absence of these insect groups was only a slight change from the 2002, during which only 2 taxa were collected. The majority (53%) of the invertebrates collected in 2007 were chironomids (midges) and crustaceans, but additional taxa included the Hemipteran *Belostoma* sp.; and the Coleopterans *Dineutus* sp., *Hydrocanthus* sp., *Neoporus* sp., and *Peltodytes* sp..

Data Analysis

There are no registered NPDES dischargers upstream of the study site. The habitat score was high during the current sampling in part because of the presence of a natural channel and a healthy riparian zone. The only two factors substantially detracting from this habitat rating were the lack of substrates conducive to macroinvertebrate colonization and a homogeneous streambed of detritus. This study location has been given a bioclassification of moderate during both the 2002 and 2007 sampling events. This bioclassification implies that there is moderate environmental stress at this study site.

FISH COMMUNITY SAMPLE

Waterbody	Location	Date	Station ID	Bioclassification
DEEP CR	SR 1506	05/11/07	OF58	Not Rated

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
EDGEcombe	4	03020102	35.973719	-77.451783	28-79-32-(1.5)	SE Floodplains & Low Terraces

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Average Depth (m)	Reference Site
WS-IV,NSW	78.5	35	6	0.4	No

Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	90	0	10	0

Upstream NPDES Dischargers (>1MGD or <1MGD and within 1 mile)	NPDES Number	Volume (MGD)
None	---	---

Water Quality Parameters

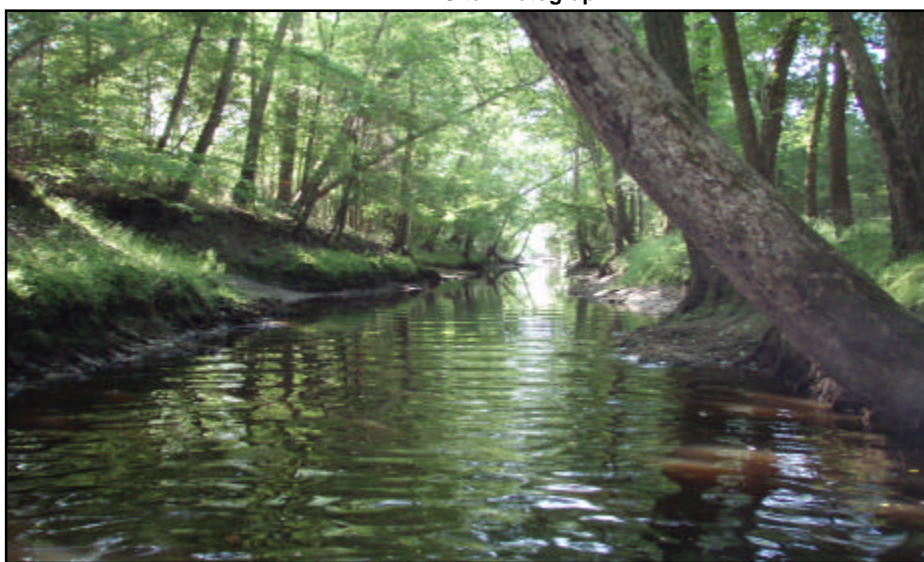
Temperature (°C)	19.3
Dissolved Oxygen (mg/L)	5.1
Specific Conductance (µS/cm)	115
pH (s.u.)	6.4

Water Clarity	Blackwater
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Habitat Assessment Scores (max)

Channel Modification (15)	7
Instream Habitat (20)	11
Bottom Substrate (15)	4
Pool Variety (10)	8
Left Bank Stability (10)	9
Right Bank Stability (10)	9
Light Penetration (10)	10
Left Riparian Score (5)	5
Right Riparian Score (5)	5
Total Habitat Score (100)	68

Site Photograph



Substrate	Hard, slippery clay
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Sample Date	Sample ID	Species Total	NCIBI	Bioclassification
05/11/07	2007-55	19	---	Not Rated

Most Abundant Species	Eastern Mosquitofish	Exotic Species	None
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Species Change Since Last Cycle	N/A
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Data Analysis

This is the first fish community sample collected at this site. **Watershed** -- large tributary to Fishing Creek; drains southeastern Halifax and northeast Edgecombe counties; one small municipality (the Town of Scotland Neck) within the watershed. **Habitat** -- very old channelization with a mature tree canopy; stable banks with wide riparian zones; long run/pool with some side snags; below the bridge, the levee is maintained by the U.S. Army COE; very low flow; second lowest dissolved oxygen measurement and saturation. **2007** -- a diverse coastal plain community, but 10 of the 19 species represented by only 1-3 fish/species; most fish (n = 1,165) and the greatest catch rate (CPUE = 36.2fish/100 seconds shocking time) at any site in 2007; 85 percent (n = 994) of all the fish were Eastern Mosquitofish, a tolerant species; the greatest percentage of tolerant fish at any site in 2007. This site is not rated because the appropriate NCIBI metrics and criteria have yet to be developed for coastal plain streams.