

Appendix 3B

Biological Assessment Macroinvertebrate and Fish Site Sample Results

Tar River Subbasin
HUC 03020103

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
TAR R	US 64 BUS	OB90	06/27/07	Good

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
EDGECOMBE	3	03020103	355338	773200	28-(80)	Southeastern Floodplains and Low Terraces

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Stream Depth (m)
WS-IV, NSW, CA	2207.9	10	30	0.75

Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	50	0	0	50

Upstream NPDES Dischargers (>1MGD or <1MGD and within 1 mile)	NPDES Number	Volume (MGD)
Franklin County WWTP	NC0069311	3.0
Oxford WWTP	NC0025054	3.5
Tar River WRF (Louisburg)	NC0020231	1.4
Tar River Regional WWTP (Rocky Mount)	NC0030317	21.0

Water Quality Parameters

Temperature (°C)	30.2
Dissolved Oxygen (mg/L)	3.4
Specific Conductance (µS/cm)	132
pH (s.u.)	7.4
Water Clarity	clear/tannic

Site Photograph



Habitat Assessment Scores (max)

Channel Modification (15)	15
Instream Habitat (20)	8
Bottom Substrate (15)	7
Pool Variety (10)	6
Left Bank Stability (10)	9
Right Bank Stability (10)	9
Light Penetration (10)	2
Left Riparian Score (5)	2
Right Riparian Score (5)	4
Total Habitat Score (100)	62

Substrate	70% sand, 30% silt
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Sample Date	Sample ID	ST	EPT	BI	EPT BI	Bioclassification
06/27/07	10224	92	27	5.8	4.7	Good
06/28/05	9658	79	29	4.9	4.1	Excellent
08/06/02	8900	77	27	5.9	4.7	Good
08/19/97	7453	79	28	5.4	4.6	Excellent
07/20/92	5899	81	29	5.8	4.8	Good
07/12/90	5358	69	28	5.4	4.6	Excellent
07/11/88	4592	80	21	5.6	4.7	Good
07/06/87	4142	81	23	5.8	4.9	Good
07/11/86	3790	92	27	6.1	4.9	Good
05/12/86	3757	92	27	6.0	5.0	Good
07/24/85	3622	73	23	5.8	5.1	Good
07/25/83	3100	78	27	5.8	4.5	Good

Taxonomic Analysis

A diverse macroinvertebrate community was found in the Tar River at this location (92 Total Taxa). The 27 EPT taxa collected in 2007 are very close to the average EPT found here across all samples since 1983. Mayflies characteristic of this site include *Tricorythodes*, *Isonychia*, *Caenis*, *Mesochertium exiguum*, *M. integrum*, *M. modestum* and *Stenonema internumetatum*. One stonefly, *Acroneuria abnormis*, occurred in each collection.

maccaffertium exiguum, *m. integrum*, *m. modestum* and *Stenacron interpunctatum*. One stonefly, *Acroneuria abnormis*, occurred in each collection taken here. Caddisflies found most often include *Brachycentrus numerosus*, *Hydropsyche incommoda*, *H. rossi*, *Nectopsyche exquisita* and *Cheumatopsyche*. The riffle beetle, *Stenelmis*, was diverse and included the following species recorded: *S. antennalis*, *S. fuscata*, *S. lignicola* and *S. xylonastis*. Rare taxa collected here in 2007 include the mayfly *Leptohyphes dolani*, (found at only one other site in the Tar basin in 2007) and the dragonfly *Didymops transversa* (only 2007 Tar basin record).

Data Analysis

This site has been sampled 12 times since 1983. The macroinvertebrate community residing here has remained diverse and pollution intolerant. Since 1990, in years of lower flows (but not extreme drought as in 2002 and 2007), Excellent bioclassifications have resulted, likely due to less pollutant runoff from urban areas of Tarboro (and possibly Rocky Mount, approximately 15 miles upstream). Considerable amounts of effluent are discharged into the Tar River upstream of US 64 Bus. The high water quality tributaries of Swift and Fishing Creeks, that enter the Tar River above this sampling location, help to dilute upstream point sources.

BENTHIC MACROINVERTEBRATE SAMPLE

Waterbody	Location	Station ID	Date	Bioclassification
TAR R	NC 42	OB89	06/27/07	Excellent

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
EDGECOMBE	3	03020103	354725	773305	28-(80)	Southeastern Floodplains and Low Terraces

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Stream Depth (m)
WS-IV, NSW, CA	2435.4	5	30	0.6

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)
Franklin County WWTP	NC0069311	3.0
Oxford WWTP	NC0025054	3.5
Tar River WRF (Louisburg)	NC0020231	1.4
Tar River Regional WWTP (Rocky Mount)	NC0030317	21.0
Tarborro WWTP	NC0020605	5.0

Water Quality Parameters

Temperature (°C)	28.8
Dissolved Oxygen (mg/L)	2.2
Specific Conductance (µS/cm)	142
pH (s.u.)	7.3
Water Clarity	clear

Site Photograph



Habitat Assessment Scores (max)

Channel Modification (15)	15
Instream Habitat (20)	13
Bottom Substrate (15)	7
Pool Variety (10)	6
Left Bank Stability (10)	9
Right Bank Stability (10)	9
Light Penetration (10)	2
Left Riparian Score (5)	5
Right Riparian Score (5)	3
Total Habitat Score (100)	69

Substrate	80% sand, 20% silt
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Sample Date	Sample ID	ST	EPT	BI	EPT BI	Bioclassification
06/28/07	10204	68	26	5.1	4.5	Excellent
06/27/07	10223	27	27	4.4	4.4	Excellent
06/28/05	9659	80	30	4.9	4.2	Excellent
08/06/02	8919	24	24	4.5	4.5	Excellent
08/19/97	7455	26	26	4.6	4.6	Excellent
07/20/92	5898	26	26	4.2	4.2	Excellent

Taxonomic Analysis

A large number of EPT taxa are regularly collected here (24-30). Characteristic of this site are mayflies, such as: *Baetis intercalaris*, *Pseudocloeon ephippiatum*, *Isonychia*, *Maccaffertium exiguum*, *M. integrum*, *M. modestum* and *Tricorythodes*; the stoneflies: *Acroneuria abnormis*, *Neoperla* and *Pteronarcys dorsata*; and the caddisflies: *Brachycentrus numerosus*, *Cheumatopsyche*, *Chimarra*, *H. incommoda*, *H. venularis*, *Oecetis persimilis*, and *Nectopsyche exquisita*. This site had the only occurrence of the midge *Robackia claviger* in 2007 in the Tar basin. The unusual mayfly *Homoeoneuria* was collected here for the first time in 2007. The next closest *Homoeoneuria* population to NC 42 is located 200 miles west in Rowan County. The rarely collected snail, *Gillia altilis* was found here in 2007 (only one other database record of this species-from the Neuse River watershed).

Data Analysis

A diverse, stable and pollution intolerant aquatic population resides in this section of the Tar River. EPT BI ranges from 4.2-4.6 in the samples 1992 to 2007.

2007, suggesting that no downstream degradation of water quality exists from either the urban areas of Tarboro or its WWTP, located approximately six miles upstream. The second sample in 2007 was collected for part of a quality control procedure.

BENTHIC MACROINVERTEBRATE SAMPLE

Waterbody	Location	Station ID	Date	Bioclassification
TAR R	SR 1565	OB119	06/26/07	Good-Fair

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
PITT	5	03020103	353409	770858	28-(99.5)	Mid Atlantic Floodplains and low Terraces

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Stream Depth (m)
B, NSW	2875.8	sea level	25	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)
Franklin County WWTP	NC0069311	3.0
Oxford WWTP	NC0025054	3.5
Tar River WRF (Louisburg)	NC0020231	1.4
Tar River Regional WWTP (Rocky Mount)	NC0030317	21.0
Tarborro WWTP	NC0020605	5.0
Greenville WWTP	NC 0023931	17.5

Water Quality Parameters

Temperature (°C)	27.7
Dissolved Oxygen (mg/L)	4.5
Specific Conductance (µS/cm)	134
pH (s.u.)	6.6
Water Clarity	slightly turbid

Site Photograph



Habitat Assessment Scores (max)

Channel Modification (15)	15
Instream Habitat (20)	13
Bottom Substrate (15)	7
Pool Variety (10)	10
Left Bank Stability (10)	9
Right Bank Stability (10)	10
Light Penetration (10)	2
Left Riparian Score (5)	4
Right Riparian Score (5)	4
Total Habitat Score (100)	74

Substrate	70% sand, 20% silt, 10% detritus
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Sample Date	Sample ID	ST	EPT	BI	EPT BI	Bioclassification
06/26/07	10220	55	8	7.6	6.5	Good-Fair
08/08/02	8921	43	9	7.9	7.1	Not Rated
08/21/97	7460	67	13	7.4	5.4	Not Rated
06/22/92	5865	57	10	7.4	6.3	Good
07/12/89	4990	66	16	6.9	5.9	Good-Fair
07/10/86	3788	70	8	7.8	6.9	Good-Fair
11/19/85	3704	53	10	7.5	5.9	Good-Fair
07/23/84	3262	74	15	7.1	6.0	Fair

Taxonomic Analysis

A long data record exists for this site (1984-2007). EPT numbers are low here, compared with upstream sites along the main stem Tar River. The pollution tolerant mayfly, *Callibaetis*, was only collected here, among main stem Tar River sites. The chironomid *Cricotopus sylvestris* (tolerance value = 10) was very abundant here but not collected at upstream sites suggesting some degradation in water quality. The estuarine crustaceans (*Cassinidea lunifrons*, *Cyathura polita*) and the phantom midge (*Chaoborus punctipennis*), a lentic species, were only collected here. Oligochaetes and leeches were more abundant here than upstream.

Data Analysis

This stretch of the Tar River is nine miles below the Greenville WWTP and 11 miles below Greenville. The Biotic Index has been as low as 6.9 (1989) and as high as 7.9 (1986, 2002), averaging 7.5 and suggesting that a tolerant benthic community resides in this stretch of the Tar River. The combination of the natural, physical changes in the lower Tar River, a moderate urban influence from the City of Greenville and the impacts of the Greenville WWTP, result in a decline of over 70% of the EPT fauna at the point where the Tar River flows under SR 1565, when compared with upstream sites.

BENTHIC MACROINVERTEBRATE SAMPLE

Waterbody	Location	Station ID	Date	Bioclassification
TOWN CR	SR 1601	OB91	06/27/07	Good

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
EDGEcombe	3	03020103	354730	773330	28-83	Southeastern Floodplains and Low Terraces

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Stream Depth (m)
C, NSW	193.7	5	4	0.2

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)	25.5
Dissolved Oxygen (mg/L)	3.3
Specific Conductance (µS/cm)	111
pH (s.u.)	6.3
Water Clarity	clear/tannic

Site Photograph



Habitat Assessment Scores (max)

Channel Modification (15)	15
Instream Habitat (20)	15
Bottom Substrate (15)	7
Pool Variety (10)	10
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)	85

Substrate	90% sand, 10% silt, clay along banks
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Sample Date	Sample ID	ST	EPT	BI	EPT BI	Bioclassification
06/27/07	10222	82	24	5.9	4.8	Good
08/19/97	7454	84	24	6.0	4.8	Good
07/20/92	5905	64	14	6.1	5.7	Not Rated

Taxonomic Analysis

The macroinvertebrate community in Town Creek at SR 1601 differs little among the three samples collected here. Mayfly and caddisfly taxa found in multiple years include *Acerpenna pygmaea*, *Maccaffertium modestum*, *M. exiguum*, *Stenacron interpunctatum*, *Triaenodes ignitus*, *Nectopsyche exquisita*, *Chimarra*, *Cheumatopsyche* and *Brachycentrus numerosus*. Stoneflies had not been collected here until 2007 when *Perlesta* and *Neoperla* were found in low numbers. This is likely the result of sampling earlier in the year.

Data Analysis

Town Creek at SR 1601 contains a diverse and relatively pollution sensitive macroinvertebrate community. This stream rated Good in 2007 and in 1997. The site was not sampled in 2002 likely due to the drought. In June 2007, water levels were low, but sampling was still possible. By July or August 2007, it is reasonable to assume that flows would not have permitted sampling here. A stable, diverse and pollution intolerant macroinvertebrate community resides in this lower section of Town Creek.

FISH COMMUNITY SAMPLE

Waterbody	Location	Date	Station ID	Bioclassification
COKEY SWP	SR 1135	05/09/07	OF10	Not Rated

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
EDGEcombe	3	03020103	35.89000	-77.7575	28-83-3a	Rolling Coastal Plain

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Average Depth (m)	Reference Site
C;NSW	14.2	50	3	0.3	No

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

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

Water Quality Parameters

Temperature (°C)	18.9
Dissolved Oxygen (mg/L)	4.8
Specific Conductance (µS/cm)	105
pH (s.u.)	6.1

Water Clarity	Slightly turbid, became very turbid
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Habitat Assessment Scores (max)

Channel Modification (15)	15
Instream Habitat (20)	18
Bottom Substrate (15)	4
Pool Variety (10)	6
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)	83

Site Photograph



Substrate	Soft muck, silt, and sand
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Sample Date	Sample ID	Species Total	NCIBI	Bioclassification
05/09/07	2007-50	20	---	Not Rated
04/02/97	97-08	15	---	Not Rated

Most Abundant Species	Eastern Mosquitofish	Exotic Species	Green Sunfish and Redear Sunfish
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Species Change Since Last Cycle	Losses -- Redbreast Sunfish and Largemouth Bass. Gains -- Yellow Bullhead, Tadpole Madtom, Mud Sunfish, Bluespotted Sunfish, Green Sunfish, Redear Sunfish, and Swamp Darter.
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Data Analysis

Watershed -- tributary to Town Creek; drains eastern Nash and western Edgecombe counties including a portion of the southern area of the City of Rocky Mount; site is just upstream of the NC Natural Heritage Program's Cokey Swamp Significant Natural Heritage Area. **Habitat** -- natural channel with very good floodplain forest; narrow flow within the channel, some macrophytes; coarse woody debris; low dissolved oxygen and percent saturation; very low flow. **2007** -- a diverse coastal plain community, including 7 species of sunfish and 3 species of darters; Eastern Mosquitofish constituted 40% of the fauna. **1997 & 2007** -- 22 species known from the site, including 9 species of sunfish and 3 species of darters; dominant species in 1997 was Bluegill (38%), Eastern Mosquitofish constituted only 3% of the fauna then; no Bluespotted Sunfish collected in 1997, but was abundant in 2007. This site is not rated because the appropriate NCIBI metrics and criteria have yet to be developed for coastal plain streams.

BENTHIC MACROINVERTEBRATE SAMPLE

Waterbody	Location	Station ID	Date	Bioclassification
COKEY SWP	NC 43	OB71	02/08/07	Moderate

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
EDGECOMBE	3	3020103	355344	774427	28-83-3	Rolling Coastal Plain

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Stream Depth (m)
C; NSW	26.3	50	10	0.5

Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	50	0	50	0

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

Water Quality Parameters

Temperature (°C)	4.2
Dissolved Oxygen (mg/L)	15.8
Specific Conductance (µS/cm)	73
pH (s.u.)	6.5
Water Clarity	clear

Site Photograph



Habitat Assessment Scores (max)

Channel Modification (5)	5
Instream Habitat (20)	13
Bottom Substrate (15)	7
Pool Variety (10)	6
Left Bank Stability (7)	9
Right Bank Stability (7)	9
Light Penetration (10)	10
Left Riparian Score (5)	4
Right Riparian Score (5)	1
Total Habitat Score (100)	64

Substrate Mostly sand with a small amount of silt

Sample Date	Sample ID	ST	EPT	BI	EPT BI	Bioclassification
02/08/07	10141	62	7	7.1	5.7	Moderate
02/12/02	8674	41	3	7.6	6.4	Severe

Taxonomic Analysis

Four more EPT taxa, which had not been previously collected, were collected in 2007 than in 2002. Those four included *Eurylophella doris*, *Maccaffertium modestum*, *Isoperla transmarina* and *Ptilostomis*. Abundant taxa included the stonefly, *Isoperla transmarina*; the caddisfly, *Cheumatopsyche*; the beetle, *Peltodytes*; and the midges, *Orthocladius oliveri* and *Tribelos jucundum*.

Data Analysis

Cokey Swamp drains agricultural areas as well as urban areas near the towns of Sharpsburg and Rocky Mount. However, slightly better conditions were noted in 2007. There was an increase in EPT taxa richness from three in 2002 to seven in 2007 and a decrease in EPT Biotic Index from 6.40 in 2002 to 5.68 in 2007.

BENTHIC MACROINVERTEBRATE SAMPLE

Waterbody	Location	Station ID	Date	Bioclassification
BYNUMS MILL CR	SR 1120	OB70	02/07/07	Moderate

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
EDGECOMBE	3	03020103	354600	773829	28-83-4	Rolling Coastal Plain

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Stream Depth (m)
C, NSW	15.3	15	8	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)	5.6
Dissolved Oxygen (mg/L)	15.6
Specific Conductance (µS/cm)	77
pH (s.u.)	5.6

Water Clarity	clear
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Site Photograph



Habitat Assessment Scores (max)

Channel Modification (15)	15
Instream Habitat (20)	20
Bottom Substrate (15)	7
Pool Variety (10)	10
Left Bank Stability (10)	10
Right Bank Stability (10)	10
Light Penetration (8)	8
Left Riparian Score (5)	5
Right Riparian Score (5)	5
Total Habitat Score (100)	90

Substrate	50% sand, 50% silt
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Sample Date	Sample ID	ST	EPT	BI	EPT BI	Bioclassification
02/07/07	10139	58	6	8.2	7.3	Moderate
02/11/02	8671	36	2	8.1	7.5	Severe
08/16/93	6324	29	2	8.5	7.6	Not Rated
05/05/93	6169	49	2	8.0	7.9	Not Rated
02/19/93	6105	51	3	7.9	8.5	Not Rated
08/12/92	5975	31	2	8.7	8.0	Not Rated
05/06/92	5484	44	1	8.0	4.7	Not Rated
02/19/92	5785	49	4	7.9	7.2	Not Rated

Taxonomic Analysis

Bynums Mill Creek contained very low numbers of EPT taxa in 2007 (only 13 individual EPT specimens). All of these taxa were rare (one or two specimens) with the exception of the caddisfly *Ironoquia punctatissima* (eight individuals). Chironomids were the dominant macroinvertebrates here totaling 21 taxa. Abundant chironomids included species known to be very tolerant of aquatic pollution such as *Chironomus*, *Kiefferiulus* and *Polypedilum illinoense*.

Data Analysis

A high Biotic Index and low EPT numbers characterize this waterbody. Though it rated Moderate in 2007 than 2002, degraded water quality continues to be a problem here as habitat problems can be ruled out (habitat scored 90 out of 100 in 2007). The 2002 Tar Basinwide report cited the Macclesfield WWTP (located approximately two miles upstream of SR 1120) as the potential source of increased nutrients that encouraged a filamentous algae bloom seen here during sampling in that year. No bloom was witnessed in 2007. Decreased flow was seen here in 2007, as was evidence of beaver activity.

BENTHIC MACROINVERTEBRATE SAMPLE

Waterbody	Location	Station ID	Date	Bioclassification
OTTER CR	SR 1614	OB86	02/07/07	Moderate

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
EDGECOMBE	3	03020103	354336	773549	28-86-(0.3)	Rolling Coastal Plain

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Stream Depth (m)
C, NSW	20.0	11	5	0.4

Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	80	20	0	0

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

Water Quality Parameters

Temperature (°C)	4
Dissolved Oxygen (mg/L)	16.4
Specific Conductance (µS/cm)	84
pH (s.u.)	5.4
Water Clarity	tannin stained

Site Photograph



Habitat Assessment Scores (max)

Channel Modification (15)	15
Instream Habitat (20)	15
Bottom Substrate (15)	7
Pool Variety (10)	6
Left Bank Stability (10)	10
Right Bank Stability (10)	10
Light Penetration (8)	10
Left Riparian Score (5)	5
Right Riparian Score (5)	5
Total Habitat Score (100)	83

Substrate	65% sand, 35% silt
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Sample Date	Sample ID	ST	EPT	BI	EPT BI	Bioclassification
02/07/07	10138	71	9	7.3	6.6	Moderate
02/11/02	8672	44	5	7.5	6.4	Moderate
05/05/93	6168	71	10	7.3	5.7	Not Rated
02/16/93	6106	62	9	7.1	5.6	Not Rated
08/12/92	5974	31	1	8.3	9.8	Not Rated
05/06/92	5847	62	9	7.2	5.4	Not Rated
02/20/92	5788	83	15	6.9	5.4	Not Rated

Taxonomic Analysis

Nine EPT taxa were found in 2007, an increase of four from 2002 and equaling the February 1993 effort. Abundant EPT taxa included the mayfly *Caenis* and the hypsopsychid caddisfly *Cheumatopsyche*. The presence of this caddisfly suggests that this site had some flow in summer and fall 2006, as *Cheumatopsyche* requires nearly year around flow for its life cycle. It was absent in 2002. A large number of mollusks were found including abundant freshwater mussels (*Elliptio* sp). A rarely collected dragonfly, *Ladona deplanata* was captured. It is only the forth record in NC and the first this species has been seen in the Tar River watershed.

Data Analysis

This site has been sampled seven times since 1992. Four of these samples were taken in what is now the swamp stream sampling time frame (February and March). Habitat here scored well, suggesting that the Moderate bioclassification is due more to water quality. The aquatic macroinvertebrate data is representative of a moderately stressed benthic community.

BENTHIC MACROINVERTEBRATE SAMPLE

Waterbody	Location	Station ID	Date	Bioclassification
CONETOE CR	SR 1510	OB75	02/06/07	Moderate

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
EDGECOMBE	3	03020103	355232	772338	28-87-(0.5)b	Mid-Atlantic Flatwoods

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Stream Depth (m)
C; NSW	12	52	5	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)	4
Dissolved Oxygen (mg/L)	14.7
Specific Conductance (µS/cm)	77
pH (s.u.)	5.1
Water Clarity	slightly turbid

Site Photograph



Habitat Assessment Scores (max)

Channel Modification (5)	5
Instream Habitat (20)	8
Bottom Substrate (15)	7
Pool Variety (10)	4
Left Bank Stability (7)	8
Right Bank Stability (7)	5
Light Penetration (10)	9
Left Riparian Score (5)	5
Right Riparian Score (5)	2
Total Habitat Score (100)	53

Substrate	sand with some silt
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Sample Date	Sample ID	ST	EPT	BI	EPT BI	Bioclassification
02/06/07	10134	40	3	7.1	6.4	Moderate
02/22/02	8679	47	2	7.5	7.4	Severe

Taxonomic Analysis

Two Trichoptera taxa were present in both 2002 and 2007: *Cheumatopsyche* and *Isonychia punctatissima*. No mayflies have been collected by BAU from the site. In 2007 a single specimen of *Prostoia* was collected, thereby increasing EPT Richness by one between 2002 and 2007. Chironomidae were the dominant group at the site for the two sampling events, with 43 to 45 percent of the total taxa composed of midge taxa.

Data Analysis

Conetoe Creek is a tributary to Tar River. The site is 8 miles east of downtown Tarboro NC. The better bioclassification in 2007 over 2002 is due to a lower pH measurement (5.1 and 6.3 respectively) and an additional EPT taxon in 2007 over 2002 (see the BAU criteria for information on swamp classifications). Monthly measurements of pH for the period of February 2002 through December 2006 at an ambient monitoring station (O6205000 at SR 1409/Pitt County) 9.3 stream miles downstream of the benthic site indicate that such temporal differences in pH are normal for area sites. The three lowest pH values for the ambient station for that period were recorded in April and May of 2003 and December of 2005 (pH values of 5.0, 5.5, and 5.2 respectively) and the three highest in December 2004 and March and May of 2005 (7.7, 7.9, and 7.6 respectively); no trend is indicated for pH at the ambient station. Therefore, the difference in bioclassifications between 2002 and 2007 are likely due to artifacts (i.e. the presence/absence of a single EPT specimen and pH measurements, both of which include an element of chance) rather than any real change in water quality.

FISH COMMUNITY SAMPLE

Waterbody	Location	Date	Station ID	Bioclassification
CONETOE CR	SR 1510	05/09/07	OF52	Not Rated

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
EDGEcombe	3	03020103	35.875856	-77.393434	28-87-(0.5)b	Mid-Atlantic Flatwoods

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Average Depth (m)	Reference Site
C,NSW	12	45	5	0.2	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)	15.8
Dissolved Oxygen (mg/L)	6.5
Specific Conductance (µS/cm)	82
pH (s.u.)	5.8
Water Clarity	Slightly turbid, stained

Site Photograph



Habitat Assessment Scores (max)

Channel Modification (15)	10
Instream Habitat (20)	13
Bottom Substrate (15)	7
Pool Variety (10)	6
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)	74

Substrate	Sand
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Sample Date	Sample ID	Species Total	NCIBI	Bioclassification
05/09/07	2007-47	18	---	Not Rated

Most Abundant Species	Golden Shiner and Bluespotted Sunfish	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 the Tar River; drains rural southeastern Edgecombe County; site is just upstream of the NC Natural Heritage Program's Conetoe Creek Bottomland Forest Significant Natural Heritage Area. **Habitat** -- channelized a long time ago; straight channel; macrophytes; mature trees providing the canopy, especially along the left shoreline; maintenance road on the right shoreline; wide riparian zones; very little coarse woody debris within the channel (removed during maintenance of channel); specific conductance relatively low. **2007** - coastal plain fauna, but rather sparse (n = 98 fish); 18 species present, including 8 species of sunfish; Pirate Perch and American Eel were also common. This site is not rated because the appropriate NCIBI metrics and criteria have yet to be developed for coastal plain streams.

BENTHIC MACROINVERTEBRATE SAMPLE

Waterbody	Location	Station ID	Date	Bioclassification
CONETOE CR	NC 42	OB73	02/06/07	Moderate

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
EDGECOMBE	3	03020103	355006	772449	28-87-(0.5)c	Southeastern Floodplains and Low Terraces

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Stream Depth (m)
C; NSW	27	46	9	0.7

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)	4.6
Dissolved Oxygen (mg/L)	14.4
Specific Conductance (µS/cm)	94
pH (s.u.)	5.2
Water Clarity	slightly turbid

Site Photograph



Habitat Assessment Scores (max)

Channel Modification (5)	5
Instream Habitat (20)	6
Bottom Substrate (15)	7
Pool Variety (10)	4
Left Bank Stability (7)	9
Right Bank Stability (7)	9
Light Penetration (10)	10
Left Riparian Score (5)	5
Right Riparian Score (5)	3
Total Habitat Score (100)	58

Substrate	sand, with some silt
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Sample Date	Sample ID	ST	EPT	BI	EPT BI	Bioclassification
02/06/07	10136	48	4	7.3	6.0	Moderate
02/22/02	8690	53	1	7.2	7.8	Moderate

Taxonomic Analysis

The four EPT taxa collected in 2007 were *Maccaffertium modestum*, *Isoperla transmarina*, *Cheumatopsyche*, and *Ptilostomis*. In 2002 the only EPT taxon collected was *Isonychia punctatissima*. Each of the three EPT taxa collected in 2007 have a lower tolerance value than the *Isonychia* collected in 2002, resulting in a lower EPT BI in 2007. Though abundant in 2002, *Elliptio complanata* was not observed at the site in 2007. Overall, mollusks declined from five taxa in 2002 to a single taxon in 2007 (*Pisidium*, which was common in both years). Chironomids were dominant in both years; 40% and 38% of all taxa were midge taxa in 2002 and 2007 respectively.

Data Analysis

Conetoe Creek is a tributary to Tar River. The site is 8 miles ESE of downtown Tarboro NC. Though EPT richness was higher and the EPT BI was markedly lower in 2007 than in 2002, the NCBI was similar between the two sampling events.

BENTHIC MACROINVERTEBRATE SAMPLE

Waterbody	Location	Station ID	Date	Bioclassification
CRISP CR	SR 1527	OB78	02/06/07	Moderate

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
EDGECOMBE	3	03020103	355019	772254	28-87-1	Mid-Atlantic Flatwoods

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Stream Depth (m)
C; NSW	18	46	5	1.3

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

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

Water Quality Parameters

Temperature (°C)	4.2
Dissolved Oxygen (mg/L)	15.5
Specific Conductance (µS/cm)	106
pH (s.u.)	5.4
Water Clarity	slightly turbid

Site Photograph



Habitat Assessment Scores (max)

Channel Modification (5)	5
Instream Habitat (20)	10
Bottom Substrate (15)	7
Pool Variety (10)	5
Left Bank Stability (7)	8
Right Bank Stability (7)	8
Light Penetration (10)	10
Left Riparian Score (5)	2
Right Riparian Score (5)	5
Total Habitat Score (100)	60

Substrate	sand with a small amount of silt
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Sample Date	Sample ID	ST	EPT	BI	EPT BI	Bioclassification
02/06/07	10135	42	3	7.0	6.2	Moderate
03/01/04	9357	46	4	7.0	6.1	Moderate
02/11/02	8673	36	2	7.7	6.4	Severe

Taxonomic Analysis

The same two Trichoptera taxa have been present at each of the three sampling events in 2002, 2004, and 2007: *Cheumatopsyche* and *Ironoquia punctatissima*. During the most recent two sampling events a rather ubiquitous mayfly, *Maccaffertium modestum*, has been collected. The only stonefly collected at the site, *Taeniopteryx*, was present in only the 2004 sample. Chironomids make up much of the taxa present at the site, though less so for the latest sampling event (44%, 48%, and 29% of the taxa in 2002, 2004, and 2007 respectively). Odonates are also fairly well represented (five, six, and six taxa in 2002, 2004, and 2007 respectively). *Physella* was noted as being abundant for 2002 in the prior basinwide report; the snails were not collected in 2007.

Data Analysis

Crisp Creek is a tributary to Conetoe Creek. The site is about 9 miles ESE of Tarboro NC. A single downed tree that traversed the width of the stream provided a small amount of habitat heterogeneity to the straight sand-bottom channel. The better bioclassification from 2002 to 2004 and 2007 is due to the markedly lower NCBI values and better habitat scores for the latter two sampling events.

FISH COMMUNITY SAMPLE

Waterbody	Location	Date	Station ID	Bioclassification
CRISP CR	SR 1527	05/09/07	OF53	Not Rated

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
EDGEcombe	3	03020103	35.838656	-77.381202	28-87-1	Mid-Atlantic Flatwoods

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Average Depth (m)	Reference Site
C,NSW	17.4	40	6	0.2	No

Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	70	0	15	15 (logged)

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

Water Quality Parameters

Temperature (°C)	16.5
Dissolved Oxygen (mg/L)	5.4
Specific Conductance (µS/cm)	132
pH (s.u.)	6.0

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

Channel Modification (15)	5
Instream Habitat (20)	8
Bottom Substrate (15)	7
Pool Variety (10)	2
Left Bank Stability (10)	8
Right Bank Stability (10)	8
Light Penetration (10)	10
Left Riparian Score (5)	5
Right Riparian Score (5)	4
Total Habitat Score (100)	57

Site Photograph



Substrate	Sand
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Sample Date	Sample ID	Species Total	NCIBI	Bioclassification
05/09/07	2007-48	14	---	Not Rated

Most Abundant Species	Swallowtail Shiner and Tessellated Darter	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 Conetoe Creek; drains rural southeastern Edgecombe and southwestern Martin counties. **Habitat** -- straight channel; channelized, but mature trees providing a canopy; stable banks, but entrenched; very shallow and of uniform depth; sandy runs, several species of macrophytes; little woody debris in the channel; specific conductance slightly elevated; low concentration and saturation of dissolved oxygen; very low flow. **2007** -- coastal plain fauna, but rather sparse (n = 80) and low diversity for a stream of its size; 14 species present, including 4 species of sunfish; American Eel was also common, but 8 of the 14 species were represented by only 1 or 2 fish/species; lowest percentage of tolerant fish of any site in the Tar River basin in 2007; Eastern Mosquitofish absent. This site is not rated because the appropriate NCIBI metrics and criteria have yet to be developed for coastal plain streams.

BENTHIC MACROINVERTEBRATE SAMPLE

Waterbody	Location	Station ID	Date	Bioclassification
BALLAHACK CAN	NC 42	OB68	02/06/07	Severe

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
EDGECOMBE	3	3020103	354903	772714	28-87-1.2	Southeastern Floodplains and Low Terraces

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Stream Depth (m)
C; NSW	8.7	40	5	0.2

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

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

Water Quality Parameters

Temperature (°C)	7.4
Dissolved Oxygen (mg/L)	12.6
Specific Conductance (µS/cm)	179
pH (s.u.)	5.4
Water Clarity	clear

Site Photograph



Habitat Assessment Scores (max)

Channel Modification (5)	5
Instream Habitat (20)	7
Bottom Substrate (15)	7
Pool Variety (10)	2
Left Bank Stability (7)	4
Right Bank Stability (7)	4
Light Penetration (10)	7
Left Riparian Score (5)	3
Right Riparian Score (5)	0
Total Habitat Score (100)	39

Substrate	sand and silt
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Sample Date	Sample ID	ST	EPT	BI	EPT BI	Bioclassification
02/06/07	10137	19	1	8.0	6.2	Severe
02/22/02	8680	27	2	8.3	8.9	Severe

Taxonomic Analysis

Callibaetis was common in 2002 but not collected in 2007, thereby lowering the EPT abundance from two in 2002 to one in 2007. That one EPT taxa was a single individual *Cheumatopsyche*. Midges were the dominant taxa collected and included *Cricotopus bicinctus*, *Conchapelopia*, and *Dicrotendipes neomodestus*.

Data Analysis

Ballahack Canal is a highly channelized tributary of Conetoe Creek. Located in the town of Conetoe, it has rated Severe since 2002. This site had a very low habitat score (39) due to the straight channel, lack of instream habitat, homogenous substrate (sand/silt), lack of pools, eroding banks, open canopy and little riparian buffer zone. In addition to the low habitat score, algal mats were abundant and the conductivity was elevated (179 umhos/cm).

FISH COMMUNITY SAMPLE

Waterbody	Location	Date	Station ID	Bioclassification
BALLAHACK CANAL	NC 42	05/09/07	OF54	Not Rated

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
EDGECOMBE	3	03020103	35.817232	-77.45367	28-87-1.2	SE Floodplains & Low Terraces

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Average Depth (m)	Reference Site
C,NSW	8.7	35	5	0.4	No

Visible Landuse (%)	Forested/Wetland	Rural Residential	Agriculture	Other (describe)
	25	30	30	15 (Whitehurst Farms - tractor supply)

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

Water Quality Parameters

Temperature (°C)	17.7
Dissolved Oxygen (mg/L)	6.0
Specific Conductance (µS/cm)	215
pH (s.u.)	5.7

Water Clarity	Clear, but with a greenish tinge
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Habitat Assessment Scores (max)

Channel Modification (15)	5
Instream Habitat (20)	8
Bottom Substrate (15)	4
Pool Variety (10)	7
Left Bank Stability (10)	4
Right Bank Stability (10)	4
Light Penetration (10)	6
Left Riparian Score (5)	2
Right Riparian Score (5)	1
Total Habitat Score (100)	41

Site Photograph



Substrate	Sand, silt, and muck
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Sample Date	Sample ID	Species Total	NCIBI	Bioclassification
05/09/07	2007-49	13	---	Not Rated

Most Abundant Species	Bluespotted Sunfish	Exotic Species	Redear 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 Conetoe Creek; drains southeastern Edgecombe County; site is within the community of Conetoe. **Habitat** -- straight, channelized, first 300 ft. were affected by commercial enterprise (stormwater runoff from maintenance yard, rip/rap banks, industrial debris, etc.), poor canopy; second 300 ft. with good canopy; sandy runs; greatest specific conductance of any fish community site in the Tar River basin in 2007. **2007** -- no darters or intolerant species collected; Bluespotted Sunfish found within the snags and rip/rap; Bluespotted Sunfish and the American Eel constituted two-thirds of all the fish; only site from which the Lake Chubsucker was collected. 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
TYSON CR	SR 1255	05/10/07	OF57	Not Rated

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
PITT	5	03020103	35.68693	-77.505072	28-88	Rolling Coastal Plain

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Average Depth (m)	Reference Site
WS-IV,NSW	17.9	45	6	0.3	No

Visible Landuse (%)	Forested/Wetland	Rural Residential	Agriculture	Other (describe)
	99	1	0	0

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

Water Quality Parameters

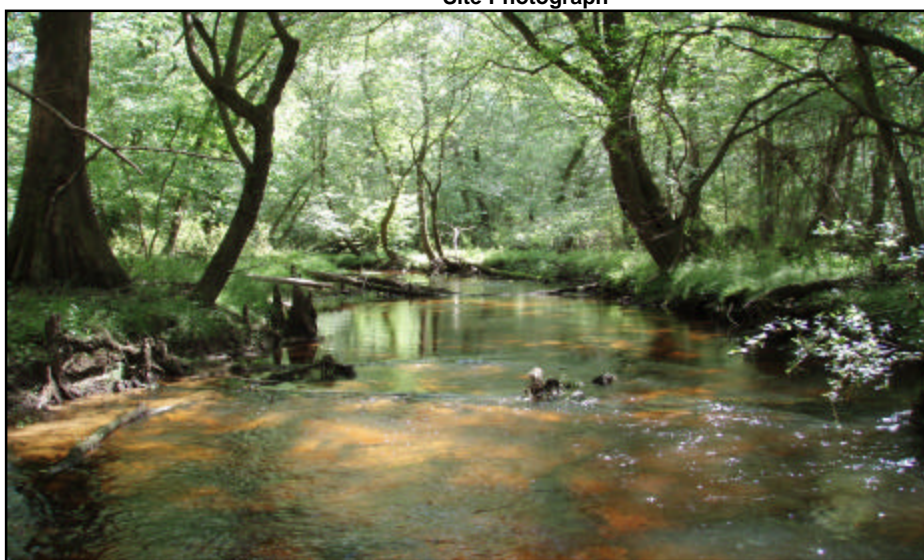
Temperature (°C)	21.8
Dissolved Oxygen (mg/L)	7.4
Specific Conductance (µS/cm)	84
pH (s.u.)	5.8

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

Channel Modification (15)	15
Instream Habitat (20)	17
Bottom Substrate (15)	13
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)	95

Site Photograph



Substrate	Sand and gravel
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Sample Date	Sample ID	Species Total	NCIBI	Bioclassification
05/10/07	2007-54	15	---	Not Rated

Most Abundant Species	American Eel	Exotic Species	Green Sunfish and Redear 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 the Tar River; drains rural southwestern Pitt County. **Habitat** -- natural channel; very good riparian and instream habitats; gravel and log riffles; runs, pools, macrophytes, coarse woody debris; cypress bottomland forest; low specific conductance for a coastal plain stream. **2007** -- a diverse, coastal plain community; the piscivorous American Eel comprised almost 50% of all the fish; one intolerant species (Sawcheek Darter) collected. 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
PARKER CR	NC 33	05/10/07	OF31	Not Rated

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
PITT	5	03020103	35.63388889	-77.36388889	28-95	Mid-Atlantic Floodplains & Low Terraces

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Average Depth (m)	Reference Site
C;NSW	5.9	20	6	0.4	No

Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	25	0	25	50 (turf farm)

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

Water Quality Parameters

Temperature (°C)	20.6
Dissolved Oxygen (mg/L)	9.0
Specific Conductance (µS/cm)	140
pH (s.u.)	6.4

Water Clarity	Clear, not stained
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Habitat Assessment Scores (max)

Channel Modification (15)	7
Instream Habitat (20)	18
Bottom Substrate (15)	7
Pool Variety (10)	4
Left Bank Stability (10)	5
Right Bank Stability (10)	9
Light Penetration (10)	7
Left Riparian Score (5)	2
Right Riparian Score (5)	5
Total Habitat Score (100)	64

Site Photograph



Substrate	Sand
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Sample Date	Sample ID	Species Total	NCIBI	Bioclassification
05/10/07	2007-53	24	----	Not Rated
04/16/02	2002-19	15	----	Not Rated

Most Abundant Species American Eel, Redbreast Sunfish, and Bluegill

Exotic Species Green Sunfish and Redear Sunfish

Species Change Since Last Cycle

Losses -- Satinfish Shiner and Golden Shiner. **Gains** -- White Catfish, Yellow Bullhead, Brown Bullhead, Tadpole Madtom, Chain Pickerel, Eastern Mudminnow, Mud Sunfish, Flier, Green Sunfish, Redear Sunfish, and Black Crappie.

Data Analysis

Watershed -- tributary to the Tar River, drains central Pitt County, including the northern part of the City of Greenville, one small NPDES permitted facility in the watershed and its discharge is unlimited. **Habitat** -- channelized with 50% open canopy; sewer right-of-way along the left riparian zone; runs with several species of macrophytes providing instream structure and habitat; banks more stable and vegetated in 2007 than in 2002; habitat score in 2002 was 39. **2007** -- coastal plain species; very diverse and abundant community for such a small stream; 9 species of sunfish and 4 species of catfish present; large biomass of sunfish, pickerels, and Creek Chubsucker; no intolerant species collected; third highest catch rate (18.0 fish/100 seconds shocking time) of any site in the Tar River basin in 2007. **2002 & 2007** -- 26 species known from the site, including 11 species of sunfish; more species and fish in 2007 than in 2002; species lost and gained between 2002 and 2007 were primarily uncommon species (1-5 fish/species); no intolerant species known from the site. This site is not rated because the appropriate NCIBI metrics and criteria have yet to be developed for coastal plain streams.

BENTHIC MACROINVERTEBRATE SAMPLE

Waterbody	Location	Station ID	Date	Bioclassification
Hardee Cr	NC 33	OB112	02/14/07	Natural

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
Pitt	5	03020103	353541	771923	28-97	Mid-Atlantic Flatwoods

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Stream Depth (m)
C; NSW	9.2	25	4	0.5

Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	20	60	0	20

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

Water Quality Parameters

Temperature (°C)	9
Dissolved Oxygen (mg/L)	9.4
Specific Conductance (µS/cm)	123
pH (s.u.)	6.3
Water Clarity	slightly turbid

Site Photograph



Habitat Assessment Scores (max)

Channel Modification (5)	15
Instream Habitat (20)	15
Bottom Substrate (15)	5
Pool Variety (10)	5
Left Bank Stability (7)	10
Right Bank Stability (7)	10
Light Penetration (10)	9
Left Riparian Score (5)	3
Right Riparian Score (5)	3
Total Habitat Score (100)	75

Substrate	Silt and sand.
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Sample Date	Sample ID	ST	EPT	BI	EPT BI	Bioclassification
02/14/07	10128	59	8	6.5	5.2	Natural
02/19/02	8688	59	7	6.7	5.4	Natural

Taxonomic Analysis

In terms of total taxa richness and EPT taxa richness, the 2007 invertebrate community is essentially unchanged from the 2002 sample. However, the BI and EPTBI both decreased in 2007 and EPT abundance increased (64 in 2007, 49 in 2002). Tolerant taxa present in 2002 but absent in 2007 include the chironomids *Orthocladius robacki*, *Clinotanytus pinguis*, *Micropsectra* sp, and the oligochaetes *Nais* sp., *Slavina appendiculata*, and *Stylaria lacustris*. Indeed, overall oligochaete diversity decreased from five in 2002 to only two in 2007. The reduction of tolerant taxa and decrease in BI, EPTBI and increase in EPT abundance suggest slightly improved physical conditions at this location for 2007.

Data Analysis

Total taxa richness metrics have been unchanged at this location from 2002 to 2007. However, the BI, EPTBI, EPT species richness, and EPT abundance all demonstrated slight improvements in 2007. Landuse upstream of this location is largely suburban with some remnant areas of forest. Typical of catchments where point sources are absent and where nonpoint pollution is the largest potential stressor, reduced runoff usually engenders improvements in water chemistry. 2007 invertebrate community data support this hypothesis and is likely related to the drought.

FISH COMMUNITY SAMPLE

Waterbody	Location	Date	Station ID	Bioclassification
CANNON SWP	US 264	05/10/07	OF56	Not Rated

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
PITT	5	03020103	35.625572	-77.276981	28-99-1-1	Mid-Atlantic Floodplains & Low Terraces

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Average Depth (m)	Reference Site
C,NSW	3.6	20	5	0.4	No

Visible Landuse (%)	Forested/Wetland	Rural Residential	Agriculture	Other (describe)
	25	15	60	0

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

Water Quality Parameters

Temperature (°C)	19.0
Dissolved Oxygen (mg/L)	7.9
Specific Conductance (µS/cm)	160
pH (s.u.)	6.2

Water Clarity	Clear, not stained
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Habitat Assessment Scores (max)

Channel Modification (15)	5
Instream Habitat (20)	13
Bottom Substrate (15)	7
Pool Variety (10)	4
Left Bank Stability (10)	2
Right Bank Stability (10)	2
Light Penetration (10)	0
Left Riparian Score (5)	1
Right Riparian Score (5)	1
Total Habitat Score (100)	35

Site Photograph



Substrate	Sand
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Sample Date	Sample ID	Species Total	NCIBI	Bioclassification
05/10/07	2007-52	16	----	Not Rated

Most Abundant Species	Eastern Mosquitofish (n = 650, 78%)	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** -- small tributary to Moyes (Broad) Run (a tributary to the Tar River); drains central Pitt County; rural, agricultural watershed. **Habitat** -- channelized with one 90 degree bend; 100% open canopy; severe bank erosion on right bank at the bend; macrophytes abundant and provided instream habitats; low flow; smallest watershed assessed in 2007. **2007** -- very productive and diverse coastal plain stream; second greatest catch rate (29.7 fish/100 seconds shocking time) of any stream in the Tar River basin in 2007; intolerant species absent; high percentage (82%) of tolerant fish (Eastern Mosquitofish, Redbreast Sunfish, and Yellow Bullhead). This site is not rated because the appropriate NCIBI metrics and criteria have yet to be developed for coastal plain streams.

BENTHIC MACROINVERTEBRATE SAMPLE

Waterbody	Location	Station ID	Date	Bioclassification
GRINDLE CR	US 264	OB111	06/25/07	Good-Fair

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
PITT	5	03020103	353728	771314	28-100b	Mid-Atlantic Flatwoods

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Stream Depth (m)
C, NSW	74.0	5	5	0.2

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

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

Water Quality Parameters

Temperature (°C)	28.7
Dissolved Oxygen (mg/L)	5.6
Specific Conductance (µS/cm)	149
pH (s.u.)	8.8

Water Clarity	clear
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Site Photograph



Habitat Assessment Scores (max)

Channel Modification (15)	5
Instream Habitat (20)	13
Bottom Substrate (15)	7
Pool Variety (10)	0
Left Bank Stability (10)	2
Right Bank Stability (10)	9
Light Penetration (8)	4
Left Riparian Score (5)	0
Right Riparian Score (5)	2
Total Habitat Score (100)	42

Substrate	100% sand, trace of silt
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Sample Date	Sample ID	ST	EPT	BI	EPT BI	Bioclassification
06/25/07	10221	82	17	6.8	5.9	Good-Fair
08/07/02	8920	52	12	6.5	4.9	Good-Fair
08/20/97	7457	67	13	6.7	5.6	Good-Fair
07/21/92	5908	10	10	5.2	5.2	Fair

Taxonomic Analysis

Stoneflies have never been collected from this channelized sandy bottom stream. The number of mayflies and caddisflies increased from 12 in 2002 to 17 in 2007. Many of the more common taxa are found in all four samples collected here from 1992 to 2007. Several taxa that are less frequently encountered in the Tar River watershed occur here. These include: the mayfly *Pseudocloeon frondale*, the caddisflies *Oecetis* sp A, *O.* sp C, *Oxyethira* and the beetles *Hydrochus* and *Tropisternus collaris*.

Data Analysis

The Grindle Creek watershed is highly agricultural. Overall habitat scores are consistently low here, and nutrients entering the stream are high. Abundant filamentous algae and macrophytes clog the channel (see photo). Due to its channelized nature, year-round flow persists, which increases the numbers of aquatic macroinvertebrates. This increase however, is mitigated by higher numbers of pollution tolerant taxa (e.g. many of the 25 chironomid taxa collected in 2007).

BENTHIC MACROINVERTEBRATE SAMPLE

Waterbody	Location	Station ID	Date	Bioclassification
Chicod Cr	SR 1777	OB107	02/14/07	Natural

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
Pitt	5	03020103	353244	771238	28-101	Mid-Atlantic Flatwoods

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Stream Depth (m)
C; NSW	21.6	26	5	0.4

Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	80	0	20	0

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

Water Quality Parameters

Temperature (°C)	9.4
Dissolved Oxygen (mg/L)	7.94
Specific Conductance (µS/cm)	95
pH (s.u.)	5.47
Water Clarity	slightly turbid

Site Photograph



Habitat Assessment Scores (max)

Channel Modification (5)	15
Instream Habitat (20)	14
Bottom Substrate (15)	6
Pool Variety (10)	5
Riffle Habitat (16)	0
Left Bank Stability (7)	10
Right Bank Stability (7)	10
Light Penetration (10)	9
Left Riparian Score (5)	5
Right Riparian Score (5)	5
Total Habitat Score (100)	79

Substrate	Sand and silt
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Sample Date	Sample ID	ST	EPT	BI	EPT BI	Bioclassification
02/14/07	10127	70	9	7.0	5.9	Natural
03/12/02	8701	43	2	7.6	7.5	Severe

Taxonomic Analysis

Relative to the 2002 sample, all metrics drastically improved in 2007 resulting in a Natural bioclassification. In addition to BI, EPTBI, EPT and total taxa richness, EPT abundance also improved from four in 2002 to 47 in 2007. EPT taxa present in 2007 for the first time included the mayflies *Caenis* sp., *Pseudocloeon frondale*, *Mccaffertium modestum*, *Stenacron interpunctatum*, the stonefly *Perlenta* sp., and the caddisflies *Ceraclea resurgens*, and *Cheumatopsyche* sp. Although chironomid taxa increased from 10 in 2002 to 21 in 2007 many of the most pollution tolerant chironomids present in 2002 were absent in 2007 and included *Ablabesmyia peleensis*, *Hydrobaenus* sp., and *Procladius* sp. This fact helped keep the BI suppressed despite the doubling of chironomid diversity.

Data Analysis

The profound improvement in the invertebrate community seen in 2007 is likely the result of lowered inputs of nonpoint pollution due to drought conditions in this agricultural watershed. Indeed, the 2007 pH (5.4) was the lowest ever observed at this location and three previous pH measurements between 1997 and 2002 ranged from 6.7-6.5. This indicates decreased runoff from agricultural sources and supports the large improvement seen in the invertebrate community. In addition to the 2007 and 2002 samples, this site has also been sampled twice in 1997 and twice in 1993 to ascertain summer flows and determine proper collection methodology. None of these samples (including 2002) have ever produced total taxa richness values (previous high was 56), EPT taxa richness values (previous high was five), or EPT abundances (previous high was 32) comparable to levels measured in 2007. These data indicate improved physical and chemical conditions in the segment of Chicod Creek in 2007.

BENTHIC MACROINVERTEBRATE SAMPLE

Waterbody	Location	Station ID	Date	Bioclassification
WHICHARD BR	SR 1521	OB120	02/13/07	Moderate

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
PITT	5	03020103	354202	772034	28-100-2	Mid-Atlantic Flatwoods

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Stream Depth (m)
C; NSW	4.3	38	5	0.2

Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	60	20	20	0

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

Water Quality Parameters

Temperature (°C)	10.5
Dissolved Oxygen (mg/L)	9.6
Specific Conductance (µS/cm)	149
pH (s.u.)	6.3
Water Clarity	Clear

Site Photograph



Habitat Assessment Scores (max)

Channel Modification (5)	5
Instream Habitat (20)	13
Bottom Substrate (15)	7
Pool Variety (10)	2
Left Bank Stability (7)	7
Right Bank Stability (7)	9
Light Penetration (10)	7
Left Riparian Score (5)	2
Right Riparian Score (5)	2
Total Habitat Score (100)	54

Substrate	Sand
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Sample Date	Sample ID	ST	EPT	BI	EPT BI	Bioclassification
02/13/07	10126	61	11	6.7	5.7	Moderate
02/12/02	8675	45	6	7.0	5.8	Moderate
02/08/01	8392	41	7	6.9	5.5	Not Rated

Taxonomic Analysis

The 2007 sample produced a record high EPT taxa richness. EPT present for the first time in 2007 include the mayflies *Caenis* sp., *Pseudocloeon frondale*, and the caddisflies *Hydropsyche betteni* and *Trienodes ignitus*. In addition, the BI set a record low for 2007 as several tolerant taxa collected in 2001 and 2002 were absent in 2007 and included the chironomids *Orthocladius oliveri*, *Tanytarsus* sp. 2, and the low dissolved oxygen-indicating gastrod *Physella* sp.

Data Analysis

The Whichard Branch watershed is a mix of agriculture, suburban, and forest uses. As would be expected in a watershed where non-point inputs are the largest potential stressor, the record 2007 drought has resulted in reduced pollutant runoff. The improved invertebrate metrics for 2007 invertebrate data support this conclusion as do the water chemistry data. The 2007 conductivity levels were the lowest ever measured at this location (149 µS/cm), while the 2001 and 2002 conductivity levels were 156 µS/cm and 165 µS/cm respectively.

FISH COMMUNITY SAMPLE

Waterbody	Location	Date	Station ID	Bioclassification
WHICHARD BR	SR 1521	05/10/07	OF55	Not Rated

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
PITT	5	03020103	35.700922	-77.342795	28-100-2	Mid-Atlantic Flatwoods

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Average Depth (m)	Reference Site
C	4.4	35	6	0.3	No

Visible Landuse (%)	Forested/Wetland	Rural Residential	Agriculture	Other (describe)
	70	15	15	0

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

Water Quality Parameters

Temperature (°C)	17.9
Dissolved Oxygen (mg/L)	7.5
Specific Conductance (µS/cm)	168
pH (s.u.)	6.2

Water Clarity	Clear, not stained
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Habitat Assessment Scores (max)

Channel Modification (15)	10
Instream Habitat (20)	13
Bottom Substrate (15)	7
Pool Variety (10)	4
Left Bank Stability (10)	7
Right Bank Stability (10)	7
Light Penetration (10)	10
Left Riparian Score (5)	4
Right Riparian Score (5)	5
Total Habitat Score (100)	67

Site Photograph



Substrate	Sand
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Sample Date	Sample ID	Species Total	NCIBI	Bioclassification
05/10/07	2007-51	19	---	Not Rated

Most Abundant Species	Swallowtail Shiner	Exotic Species	Redear 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** -- small tributary to Grindle Creek; drains rural northern Pitt County. **Habitat** -- straight; very old chanellization with a mature tree canopy; deeply entrenched; side snags; very shallow runs; field drain pipes discharging to the creek; low flow; specific conductance elevated. **2007** -- for its size, a diverse and abundant coastal plain community; intolerant species absent; four species of catfish present. This site is not rated because the appropriate NCIBI metrics and criteria have yet to be developed for coastal plain streams.

BENTHIC MACROINVERTEBRATE SAMPLE

Waterbody	Location	Station ID	Date	Bioclassification
Tranters Cr	SR 1552	OB126	02/13/07	Moderate

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
Edgecombe	6	03020103	354340	771030	28-103	Mid Atlantic Flatwoods

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Stream Depth (m)
C; Sw, NSW	111.4	27	100	0.6

Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	80		20	0

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

Water Quality Parameters

Temperature (°C)	6
Dissolved Oxygen (mg/L)	10.7
Specific Conductance (µS/cm)	136
pH (s.u.)	5.6
Water Clarity	Clear

Site Photograph



Habitat Assessment Scores (max)

Channel Modification (5)	15
Instream Habitat (20)	16
Bottom Substrate (15)	6
Pool Variety (10)	5
Left Bank Stability (7)	10
Right Bank Stability (7)	10
Light Penetration (10)	10
Left Riparian Score (5)	5
Right Riparian Score (5)	5
Total Habitat Score (100)	82

Substrate	silt and sand
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Sample Date	Sample ID	ST	EPT	BI	EPT BI	Bioclassification
02/13/07	10124	60	6	7.44	4.48	Moderate
02/12/02	8676	40	3	7.80	9.20	Moderate

Taxonomic Analysis

The 2007 sample had many more overall taxa and twice the number of EPT taxa than did the 2002 sample. The BI actually decreased in 2007 even though the 2007 sample had 24 chironomid taxa versus only six collected in 2002. The additional chironomid taxa were balanced out by the addition of three new EPT taxa and the overall lowering of the BI can be seen by the substantial reduction in the EPTBI. EPT taxa collected here for the first time include the mayflies *Caenis* sp., *Stenacron interpunctatum*, the stonefly *Taeniopteryx* sp., and the caddisflies *Ceraclea resurgens*, and *Ptilostomis* sp.

Data Analysis

The substantial increase in the total taxa and EPT taxa, coupled with a somewhat lowered BI and drastically lessened EPTBI suggests slightly improved conditions in the Tranters Creek watershed in 2007. The Tranters Creek catchment is a combination of agriculture and forest with no dischargers. As a result, non-point pollution is the largest potential stressor here and the 2007 drought may have induced a slight improvement in the invertebrate community as a result of decreased runoff. This hypothesis is supported by the water chemistry data. The 2002 sample had a higher pH (6.3) and higher conductivity (184 µS/cm) than did the 2007 sample which produced a lower pH (5.6) and lower conductivity (136 µS/cm).

BENTHIC MACROINVERTEBRATE SAMPLE

Waterbody	Location	Station ID	Date	Bioclassification
Flat Swp	SR 1157	OB121	02/13/07	Moderate

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
Martin	6	03020103	354654	771525	28-103-2b	Mid-Atlantic Flatwoods

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Stream Depth (m)
C; Sw, NSW	20.3	24	8	0.6

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)
Robersonville	NC0026042001	1.8

Water Quality Parameters

Temperature (°C)	7.5
Dissolved Oxygen (mg/L)	11
Specific Conductance (µS/cm)	161
pH (s.u.)	6.1
Water Clarity	slightly turbid

Site Photograph



Habitat Assessment Scores (max)

Channel Modification (5)	5
Instream Habitat (20)	10
Bottom Substrate (15)	3
Pool Variety (10)	4
Riffle Habitat (16)	3
Left Bank Stability (7)	10
Right Bank Stability (7)	10
Light Penetration (10)	9
Left Riparian Score (5)	5
Right Riparian Score (5)	5
Total Habitat Score (100)	61

Substrate	Silt and sand.
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Sample Date	Sample ID	ST	EPT	BI	EPT BI	Bioclassification
02/13/07	10125	53	2	7.7	6.8	Moderate
03/12/02	8702	49	1	7.9	6.2	Moderate

Taxonomic Analysis

Most community metrics have been remarkably stable at this location between sample events. However, the BI did decrease slightly in 2007 relative to 2002 and was due to a reduction in oligochaete taxa (three in 2002, zero in 2007) as well as a reduction in several tolerant chironomids that were common or abundant in 2002 but absent in 2007 and included *Cricotopus bicinctus*, *Chironomus* sp., *Hydrobaenus* sp. The small increase in EPTBI measured in 2007 was the result of the addition of *Caenis* sp and an increase in abundance of *Cheumatopsyche* sp from Rare in 2002 to Abundant in 2007.

Data Analysis

The reduction in several very tolerant taxa and corresponding decrease in BI suggest slightly improved conditions along this segment of Flat Swamp for 2007. Considering that this location is below the Robersonville WWTP, these results are surprising given that decreased flows due to drought tend to concentrate effluent and therefore usually depress invertebrate community metrics. Analysis of toxicity testing data for the five years prior to the 3/12/2002 sample show that the Robersonville WWTP had seven failing tests including one in February 2002 and one in March 2002 both of which were just prior to sampling. Conversely, from April 2002 to November 2007 there has been only one failing toxicity test. The improvement in toxicity results may explain the slight improvement in the invertebrate community. However, reduced non-point runoff from the large amount of agriculture in this watershed may also be contributing to slightly improved metrics for 2007.

BENTHIC MACROINVERTEBRATE SAMPLE

Waterbody	Location	Station ID	Date	Bioclassification
Horsepen Swamp	SR 1001	OB122	02/13/07	Moderate

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
Beaufort	6	03020103	354035	770934	28-103-10	Mid-Atlantic Flatwoods

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Stream Depth (m)
C; Sw, NSW	10	21	4	0.5

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)	6
Dissolved Oxygen (mg/L)	9.3
Specific Conductance (µS/cm)	75.5
pH (s.u.)	5.7
Water Clarity	Slightly Turbid

Site Photograph



Habitat Assessment Scores (max)

Channel Modification (5)	15
Instream Habitat (20)	14
Bottom Substrate (15)	7
Pool Variety (10)	5
Left Bank Stability (7)	10
Right Bank Stability (7)	7
Light Penetration (10)	7
Left Riparian Score (5)	5
Right Riparian Score (5)	3
Total Habitat Score (100)	73

Substrate	Sand and silt.
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Sample Date	Sample ID	ST	EPT	BI	EPT BI	Bioclassification
02/13/07	10152	58	7	7.1	6.2	Moderate
02/26/02	8681	27	4	6.5	6.1	Moderate

Taxonomic Analysis

Although the EPTBI remains essentially identical from 2002, the 2007 sample did result in a large increase in overall EPT taxa. EPT collected here for the first time in 2007 include five species of mayflies (there were no mayfly taxa collected in 2002) and included *Acerpenna pygmaea*, *Caenis* sp., *Leptophlebia* sp., *Maccaffertium modestum*, and *Stenacron interpunctatum*. The stonefly *Perlesta* sp., and the caddisfly *Cheumatopsyche* sp. were also collected here for the first time in 2007. The caddisflies *Ptilostomis* sp., and *Isonychia punctatissima* were present in 2002 but were absent in 2007 and may be the result of reduced edge habitat due to drought-induced low water levels. The increase in the BI was the result of an increase in chironomid taxa up from only five in 2002 to 22 in 2007.

Data Analysis

The Horsepen Swamp watershed is a mix of agriculture and forest and there are no NPDES dischargers present. As such, non-point inputs are likely the greatest potential stressor in this system. However, unlike many swamp sites characterized by non-point sources that were sampled in the lower Tar during the 2007 drought, the biotic index worsened slightly here. The increase in the biotic index was primarily due to a large increase in the diversity and abundance of chironomid taxa. The large increase in chironomid taxa is somewhat contradicted by the increase in EPT taxa. These data suggest that overall there has been little change in water quality at this location through time. This conclusion is supported by the water chemistry data as the 2002 sample had a pH of 6.0 (57 µS/cm in 2007) and a conductivity of 94 (76 µS/cm in 2007).

BENTHIC MACROINVERTEBRATE SAMPLE

Waterbody	Location	Station ID	Date	Bioclassification
Old Ford Swp	US 17	OB124	02/12/07	Moderate

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
Beaufort	6	03020103	353751	770348	28-103-14-1	Mid Atlantic Flatwoods

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Stream Depth (m)
C; SW, NSW	23.6	18	100	0.3

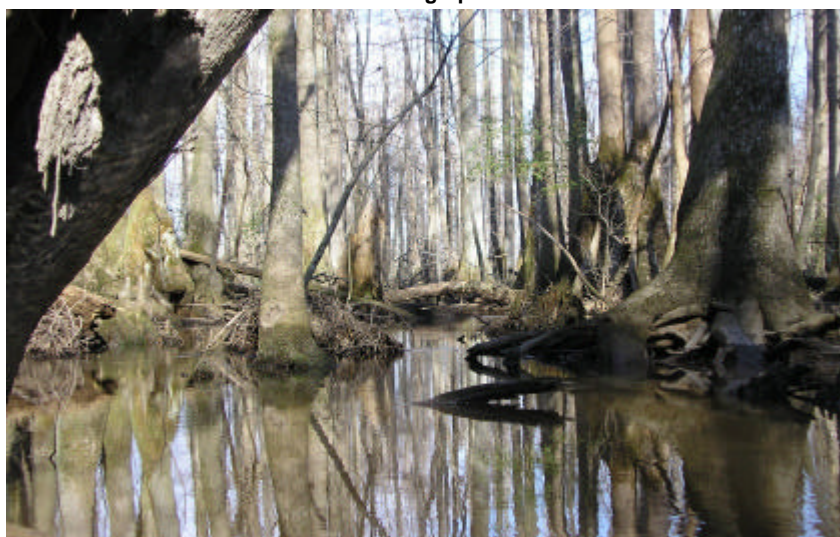
Visible Landuse (%)	Forested/Wetland	Urban	Agriculture	Other (describe)
	90	0	10	0

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

Water Quality Parameters

Temperature (°C)	5.9
Dissolved Oxygen (mg/L)	10.7
Specific Conductance (µS/cm)	59
pH (s.u.)	4.9
Water Clarity	Slightly Turbid

Site Photograph



Habitat Assessment Scores (max)

Channel Modification (5)	15
Instream Habitat (20)	18
Bottom Substrate (15)	3
Pool Variety (10)	2
Left Bank Stability (7)	10
Right Bank Stability (7)	10
Light Penetration (10)	10
Left Riparian Score (5)	5
Right Riparian Score (5)	5
Total Habitat Score (100)	78

Substrate	silt
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Sample Date	Sample ID	ST	EPT	BI	EPT BI	Bioclassification
02/12/07	10150	43	5	7.2	6.8	Moderate
02/19/02	8689	29	4	6.7	6.4	Natural

Taxonomic Analysis

Nearly all of the difference in the invertebrate community between the 2002 and 2007 samples were the result of additional chironomid taxa (16 in 2007, 7 in 2002) and oligochaete taxa (1 in 2002, and 4 in 2007). EPT species richness, EPT abundance (17 in 2002 and 18 in 2007), and EPTBI were essentially the same between years. Pollution tolerant taxa present in the 2007 sample but absent in 2002 include the chironomids *Kiefferulus* sp., *Nanocladius crassicornus*, *Polypedilum illinoense*, *Polypedilum tritum*, *Paratanytarsus dissimilis*, *Paratendipes* sp., *Procladius* sp., *Stictochironomus* sp., and *Tribelos jucundum* and the oligochaetes *Cambarincola* sp. and *Spirosperma nikolskyi*. The addition of these taxa explains the large increase in BI and the lowered bioclassification for

Data Analysis

The large increase in chironomids and oligochaetes seen in 2007 resulted in an increase in the BI. This increase in BI was enough to lower the bioclassification from Natural to Moderate. The addition of several tolerant chironomids and oligochaetes in 2007 but absent in 2002 suggest that some aspect of water chemistry along this segment of Old Ford Swamp has deteriorated since 2002. Although most of this watershed is agriculture (with some forest) and would therefore be expected to improve during a drought due to reduced pollution runoff, it is possible that the reduction in higher pH agricultural runoff and subsequent concentration of low pH swamp water is the reason for the depressed invertebrate community in 2007. Indeed, the 4.9 pH measured in 2007 is much lower than the 5.7 value measured in 2002. Moreover, conductivity was lower in 2007 (59 µS/cm) versus (94 µS/cm) in 2002 further supporting this hypothesis. Values of pH approaching 4.0 have been shown to adversely impact invertebrate communities and this may explain the decline seen in 2007. Indeed, the 4.9 pH was the lowest measured in all of the Tar Basin in 2007.

BENTHIC MACROINVERTEBRATE SAMPLE

Waterbody	Location	Station ID	Date	Bioclassification
Lathams Cr	SR 1410	OB123	02/12/07	Natural

County	Subbasin	8 digit HUC	Latitude	Longitude	AU Number	Level IV Ecoregion
Beaufort	6	3020103	353918	770541	28-103-14-2	Mid Atlantic Flatwoods

Stream Classification	Drainage Area (mi2)	Elevation (ft)	Stream Width (m)	Stream Depth (m)
C; Sw, NSW	6.4	25	4	0.5

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)	6.6
Dissolved Oxygen (mg/L)	11.3
Specific Conductance (µS/cm)	64
pH (s.u.)	5.2
Water Clarity	Clear

Site Photograph



Habitat Assessment Scores (max)

Channel Modification (5)	15
Instream Habitat (20)	16
Bottom Substrate (15)	4
Pool Variety (10)	3
Left Bank Stability (7)	10
Right Bank Stability (7)	10
Light Penetration (10)	10
Left Riparian Score (5)	5
Right Riparian Score (5)	5
Total Habitat Score (100)	78

Substrate	Silt.
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Sample Date	Sample ID	ST	EPT	BI	EPT BI	Bioclassification
02/12/07	10151	59	10	6.8	6.4	Natural
02/26/02	8682	48	7	6.9	6.6	Natural

Taxonomic Analysis

Every community metric evaluated in 2007 improved from 2002 levels. EPT taxa present in 2007 but not collected in 2002 include the mayflies *Leptophlebia bradleyi*, *Pseudocloeon frondale*, and *Stenacron interpunctatum* and the caddisflies *Ceraclea resurgens* and *Cheumatopsyche* sp. Tolerant taxa present in 2002 but absent from 2007 included the chironomids *Cricotopus bicinctus*, *C/O Sp 7*, *Natarsia* sp., and *Polypedilum illinoense*.

Data Analysis

While most of the increase in total taxa richness was due to additional chironomid taxa in 2007 (22 versus 15 in 2002) many of these taxa were rare and many of the most tolerant chironomids that were present in 2002 were absent in 2007. This, combined with the increased in EPT taxa richness helped lower the BI and EPTBI respectively for 2007 and indicates a more intolerant community here in 2007 relative to the 2002 sample. While much of the Lathams Creek watershed is forest, there are some agricultural inputs. The 2007 drought likely reduced the agricultural non-point impacts and therefore helped improved invertebrate community metrics. Water chemistry supports this assertion as conductivity was 64 µS/cm in 2007 and was nearly twice as high (115 µS/cm) in 2002. In addition, the pH in 2007 was much lower (5.2) versus 6.2 measured in 2002 indicating a reduction in higher pH agricultural runoff.