ARCADIS

City of Raleigh 2007 Sampling and Monitoring Program Report

Appendix D

City of Raleigh Fish Monitoring Surveys in the Neuse River Basin, The Catena Group, April 2008

City of Raleigh Fish Monitoring Surveys in the Neuse River Basin

Wake and Johnston Counties, North Carolina

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Executive Summary

In an effort to address increasing demands on the water supply, the City of Raleigh (City) is developing the Dempsey E. Benton Water Treatment Plant (WTP) Project, a reactivation of Lake Wheeler and Lake Benson on Swift Creek as water supply sources, as well as proposing a new water supply reservoir on the Little River. As a result of these and other projects, the City has agreed to expand its Public Utilities Department Sampling and Monitoring Program. Data obtained from the program will be used to monitor changes in water quality over time and identify problems potentially caused by these projects. The Catena Group (TCG) was retained by Arcadis G&M of North Carolina, Inc. to conduct Fish Community surveys at selected locations in the Neuse River Basin as part of this initiative.

The objectives of this study were to provide a Baseline of the fish fauna at several sites in the Neuse River Basin. The purpose of applying the NCIBI methodology is not solely to compare scores generated at each of the monitoring sites with other streams in the reference ecoregion, but also to compare scores generated at the monitoring sites overtime to monitor changes in fish community composition in response to natural or human-induced factors. Thus, the scores generated during the Baseline monitoring surveys will be compared to scores generated using the same methodologies under similar conditions (time of year, water levels, etc) during the Year-5 sampling.

The Study Area generally falls within the transition zone between the Piedmont and Coastal Plain physiographic provinces in eastern Wake and western Johnston Counties. Four locations (1-4) were sampled using the NCIBI methodologies, and three (5-7) were sampled using qualitative methodologies:

1. Middle Creek at NC 210 (Johnston County)
2. Swift Creek at NC 210 (Johnston County)
3. Neuse River at NC 42 (Johnston County)
4. Buffalo Creek at SR 1718 (Johnston County)
5. Little River at NC 96 (Wake County)
6. Little River at SR 2224 (Wake County
7. Little River at NC 97 (Wake County)

The Little River at SR 2333 (Wake County) was originally selected to be sampled using the NCIBI methodologies; however, the river in the majority of the Study Area consists of a series of beaver (*Castor canadensis*) dams throughout the channel and adjacent floodplain, creating a large braided-channel, wetland complex, thus wade-able sections of sufficient length to complete the NCIBI methodology are not present. In lieu of this, three smaller sections of the Little River (Sites 5-7) were selected and sampled using qualitative methodologies.

The NCIBI surveys were conducted on May 29 and 30, 2007, by TCG personnel Shay Garriock, John Lancaster, Jennifer Callahan, Jessie Taylor and Joshua Jones, along with Fred C. Rohde Ph.D, who was hired by TCG to assist with the field crew. A standard

600 linear feet of stream at each of the survey sites depicted in Figure 1 (except the three Little River Sites) was sampled for fish community parameters using a 4-person survey team, with two backpack electroshocker units, and dipnets. Survey methodology, data analysis, and interpretation (scoring) essentially follow procedures outlined in Standard Operating Procedures Biological Monitoring Stream Fish Community Assessment (NCDENR 2001). Qualitative surveys were conducted at the three sites in the Little River on March 11, 2008, by TCG personnel Tom Dickinson and Jennifer Callahan. Short wade-able sections of the river were sampled using one backpack unit with two pass depletion.

A total of 37 species were recorded during the survey efforts, more than 1/3 of the number of fish species known from the Neuse River Basin (98). The survey results and habitat descriptions are shown for each of the respective survey reaches below. NCIBI scoring is provided for sites 1-4 only, since the three surveys (sites 5-7) in the Little River were qualitative only, as previously noted.

It is acknowledged that a more comprehensive survey effort conducted at various times throughout the year is needed, particularly in the deeper habitats, to obtain a complete list of all fish species occurring in the Little River. However, the methods used and the data collected is adequate for establishing a "target" fish fauna and to monitor changes in community composition over time.

These surveys provide a baseline of the fish community (water quality indicator) for Swift Creek, Middle Creek, Buffalo Creek and the Neuse River. One metric that was consistently lower than expected at all four sites is the total number of fish collected. Water turbidity was moderate to turbid during the surveys, which could have accounted for the lower numbers. However, the sites still scored within the NCIBI Good-Fair classification, which is consistent with scores calculated by DWQ at other locations within the respective waterbodies (http://h2o.enr.state.nc.us/esb/IBIrate.htm). The results of this report will allow for quantitative comparison of the fish community overtime in response to changes (natural or anthropogenic) in water quality.

The habitat conditions in the Little River within the study area do not allow for application of the NCIBI methodology. However, the qualitative surveys indicate that fairly diverse fish fauna, representing multiple trophic levels, occur within the study area. Qualitative comparisons can be made with future survey efforts, and inferences can be made regarding trends with regard to species composition.

In 2006, TCG conducted NCIBI surveys at multiple sites in the Little River in Johnston County, as part of the monitoring protocol for the removal of the Lowell Mill Dam carried out by Restoration Systems LLC (RS). This section of the Little River was not evaluated as part of this study because changes in NCIBI scores over time will likely be more influenced by habitat changes resulting from the dam removal project, than by water quality conditions within the City of Raleigh influence. The results of the dam removal monitoring surveys were presented in the Lowell Dam Removal Year-1 Monitoring Report (TCG 2006). These sites will be monitored in future years to track the

response over time of the fish community following dam removal. These surveys, along with the qualitative surveys performed for this study demonstrate the diversity of the fish fauna within the Little River.

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1.0 INTRODUCTION

In an effort to address increasing demands on the water supply, the City of Raleigh (City) is developing the Dempsey E. Benton Water Treatment Plant (WTP) Project, a reactivation of Lake Wheeler and Lake Benson on Swift Creek as water supply sources, as well as proposing a new water supply reservoir on the Little River. As a result of these and other projects, the City has agreed to expand its Public Utilities Department Sampling and Monitoring Program. Data obtained from the program will be used to monitor changes in water quality over time and identify problems potentially caused by these projects. The Catena Group (TCG) was retained by Arcadis G&M of North Carolina, Inc. to conduct Fish Community surveys at selected locations in the Neuse River Basin as part of this initiative.

1.1 Background and Objectives

The freshwater fish populations in the Neuse River Basin have been sampled extensively over the years and 98 species have been recorded (Rhode et al. 1994, Menhenick 1991). The health and diversity of the fish fauna is reflective of the water quality of a particular water body and monitoring of the fish fauna is a useful tool in tracking and understanding water quality trends over time.

The North Carolina Division of Water Quality (DWQ) has developed a method of assessing water quality by establishing an Index of Biotic Integrity rating, which is based upon the evaluation of the fish community of a particular water body. The evaluation results in a numerical score, which is called the North Carolina Index of Biotic Integrity (NCIBI). The NCIBI score is a useful tool to monitor changes in water quality over time. The NCIBI evaluates 12 metrics (parameters) pertaining to species richness and composition, trophic composition, and fish abundance and condition. Each metric value is converted into a score of 1, 3, or 5, with 5 representing conditions expected for a relatively undisturbed reference stream in the specific river basin or ecoregion (NCDENR 2001).

The study area is within the Outer Piedmont of the Neuse River Basin ecoregion for which NCIBI reference indices have been established, which is required in order to sample using NCIBI protocol. In addition, protocol collection methodology and data analysis must be strictly followed.

The objectives of this study were to provide a Baseline of the fish fauna at several sites in the Neuse River Basin. The purpose of applying the NCIBI methodology is not solely to compare scores generated at each of the monitoring sites with other streams in the reference ecoregion, but also to compare scores generated at the monitoring sites overtime to monitor changes in fish community composition in response to natural or human-induced factors. Thus, the scores generated during the Baseline monitoring surveys will be compared to scores generated using the same methodologies under similar conditions (time of year, water levels, etc) during the Year-5 sampling.

2.0 STUDY AREA

The Study Area generally falls within the transition zone between the Piedmont and Coastal Plain physiographic provinces in eastern Wake and western Johnston Counties. Four locations (1-4) were sampled using the NCIBI methodologies, and three (5-7) were sampled using qualitative methodologies:

1. Middle Creek at NC 210 (Johnston County)
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6. Little River at SR 2224 (Wake County
7. Little River at NC 97 (Wake County)

The Little River at SR 2333 (Wake County) was originally selected to be sampled using the NCIBI methodologies; however, the river in the majority of the Study Area consists of a series of beaver (*Castor canadensis*) dams throughout the channel and adjacent floodplain, creating a large braided-channel, wetland complex, thus wade-able sections of sufficient length to complete the NCIBI methodology are not present. In lieu of this, three smaller sections of the Little River (Sites 5-7) were selected and sampled using qualitative methodologies.

3.0 METHODS

The NCIBI surveys were conducted on May 29 and 30, 2007, by TCG personnel Shay Garriock, John Lancaster, Jennifer Callahan, Jessie Taylor and Joshua Jones, along with Fred C. Rohde Ph.D, who was hired by TCG to assist with the field crew. A standard 600 linear feet of stream at each of the survey sites depicted in Figure 1 (except the three Little River Sites) was sampled for fish community parameters using a 4-person survey team, with two backpack electroshocker units, and dipnets. Survey methodology, data analysis, and interpretation (scoring) essentially follow procedures outlined in Standard Operating Procedures Biological Monitoring Stream Fish Community Assessment (NCDENR 2001). Qualitative surveys were conducted at the three sites in the Little River on March 11, 2008, by TCG personnel Tom Dickinson and Jennifer Callahan. Short wade-able sections of the river were sampled using one backpack unit with two pass depletion.

4.0 RESULTS

A total of 37 species were recorded during the survey efforts, more than 1/3 of the number of fish species known from the Neuse River Basin (98). The survey results and habitat descriptions are shown for each of the respective survey reaches below. NCIBI scoring is provided for sites 1-4 only, since the three surveys (sites 5-7) in the Little River were qualitative only, as previously noted.

4.1 Swift Creek at NC 210

Habitat consists of a shallow run/glide with a sandy/gravel substrate. Channel width is approximately 33-feet with streambanks 6-feet high and fairly stable. A total of 3,765 seconds of electro-shocking time was used.

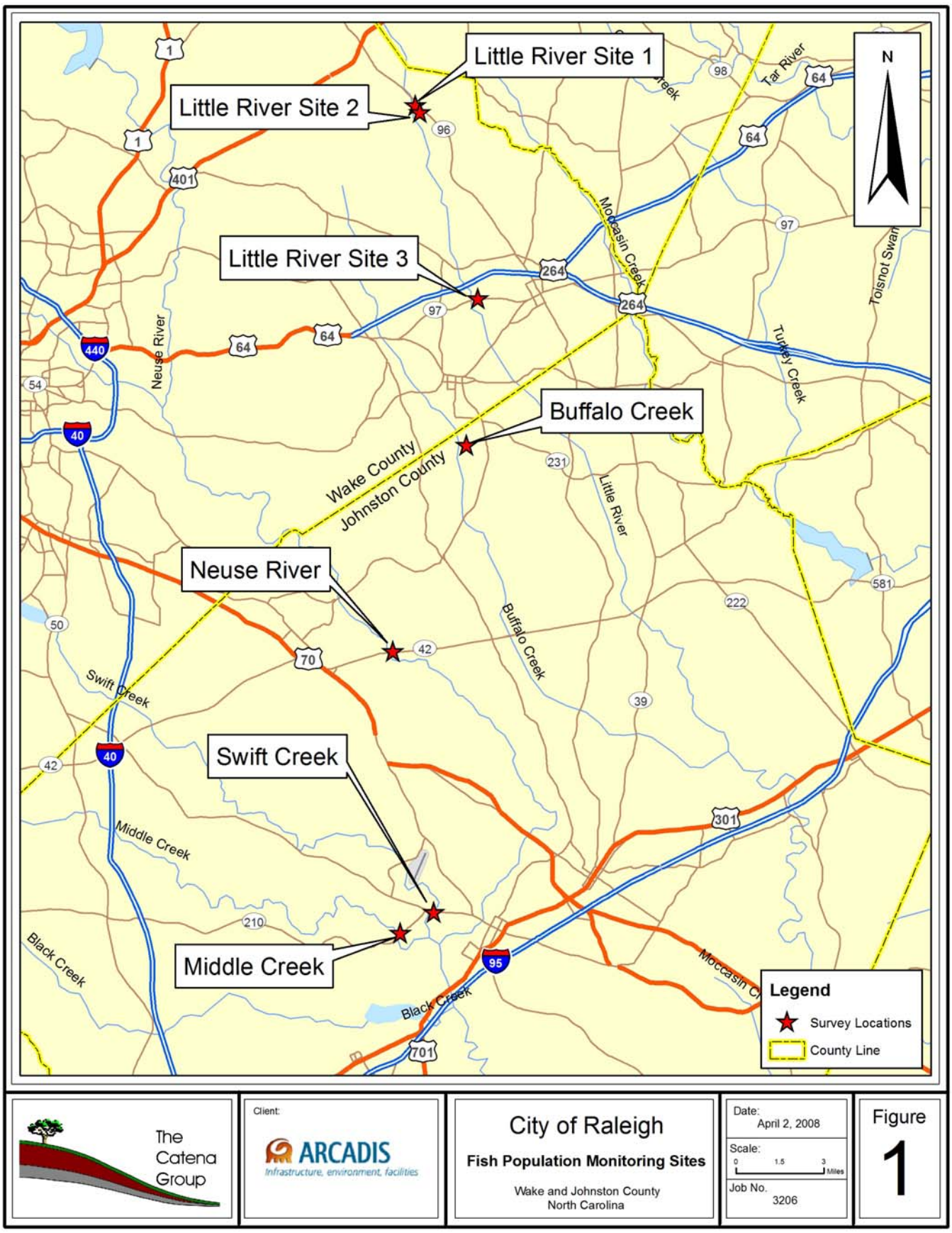
Little River Site 1
Little River Site 2
Little River Site 3
Buffalo Creek
Neuse River
Swift Creek
Middle Creek
N
Wake County
Johnston County
Neuse River
Tar River
Moccasin Creek
Turkey Creek
Tolsnot Swamp
Little River
Buffalo Creek
Swift Creek
Middle Creek
Black Creek
Moccasin Cr
Legend
Survey Locations
County Line
The Catena Group
Client:
ARCADIS
Infrastructure, environment, facilities
City of Raleigh
Fish Population Monitoring Sites
Wake and Johnston County
North Carolina
Date:
April 2, 2008
Scale:
0 1.5 3 Miles
Job No.
3206
Figure
1

Table 1. Swift Creek at NC 210: Fish Species Found

Scientific Name	Common Name	Tolerance Rating	Trophic Guild	#	# of size classes
Micropterus salmoides	Largemouth bass	Intermediate	Piscivore	2	2
Ictalurus punctatus	Channel catfish	Intermediate	Omnivore	2	2
Lepisosteus osseus	Longnose gar	Tolerant	Piscivore	1	1
Lepomis auritus	Redbreast sunfish	Tolerant	Insectivore	19	3
Lepomis machochirus	Bluegill	Intermediate	Insectivore	13	3
Enneacanthus chaetodon	Bluespotted sunfish	Intermediate	Insectivore	1	1
Hypentelium nigricans	Northern hogsucker	Intermediate	Insectivore	1	1
Notropis procne	Swallowtail shiner	Intermediate	Insectivore	43	6
Cyprinella analostana	Satinfin shiner	Tolerant	Insectivore	42	11
Notropis amoenus	Comely shiner	Intermediate	Insectivore	9	7
Notropis hudsonius	Spottail shiner	Intermediate	Omnivore	4	2
Etheostoma vitrium	Glassy darter	Intermediate	Insectivore	15	4
Etheostoma olmstedi	Tessellated darter	Intermediate	Insectivore	10	3
Etheostoma roanoka	Roanoke darter	Intolerant	Insectivore	9	3
Etheostoma nevisense	Chainback darter	Intolerant	Insectivore	3	1
Gambusia holbrooki	Eastern mosquitofish	Tolerant	Insectivore	2	2
Anguilla rostrata	American eel	Intermediate	Piscivore	4	3
Moxastoma collapsum	Notchlip redhorse	Intermediate	Insectivore	3	2
Nocomis raineyi	Bull chub	Intermediate	Omnivore	1	1
Umbra pygmaea	Eastern mudminnow	Intermediate	Insectivore	1	1

Table 2. NCIBI Score Swift Creek at NC 210

Metric/score criteria	Site Metric #	Site Metric Score
No. of species ≥ 16 species = 5 10-15 species = 3 <10 species = 1	20	5
No. of fish ≥ 225 fish = 5 150-224 fish = 3 <150 fish = 1	185	3
No. of species of darters ≥ 3 species = 5 1-2 species = 3 0 species = 1	4	5
No. of species of sunfish ≥ 4 species = 5 3 species = 3 0-2 species = 1	3	3
No. of species of suckers ≥ 3 species = 5 1-2 species = 3 0 species = 1	2	3

Metric/score criteria	Site Metric #	Site Metric Score
No. of intolerant species ≥ 3 species = 5 1-2 species = 3 0 species = 1	2	3
% of tolerant individuals ≤ 35% = 5 36-50% = 3 >50% = 1	35%	5
% of omnivorous and herbivorous individuals 10-35% = 5 36-50% = 3 >50% or <10% = 1	4%	1
% of insectivorous individuals 65-90% = 5 45-64% = 3 <45% or >90% = 1	92%	1
% of piscivorous individuals 1.4-15% = 5 0.4-1.3% = 3 <0.4% or >15% = 1	4%	5
% of diseased fish ≤1.75% = 5 1.76-2.75% = 3 >2.75% = 1	1.85%	3
% of species with multiple age groups ≥50% = 5 35-49% = 3 <35% = 1	75%	5
NCIBI Score		**42 (Good-Fair)**

4.2 Middle Creek at NC 210

Habitat consists of a shallow riffle/run/glide/pool sequence from the bridge upstream through the first bend. Stream width is approximately 30 feet and the slightly eroded stream banks are 7 feet high. Substrate consists of coarse sand with a fairly large amount of accumulated silt. A total of 1,966 seconds of electro-shock time was used.

Table 3. Middle Creek at NC 210: Fish Species Found

Scientific Name	Common Name	Tolerance Rating	Trophic Guild	#	# of size classes
Micropterus salmoides	Largemouth bass	Intermediate	Piscivore	1	1
Lepomis gibbosus	Pumpkinseed	Intermediate	Insectivore	1	1
Lepomis auritus	Redbreast sunfish	Tolerant	Insectivore	4	2
Lepomis machochirus	Bluegill	Intermediate	Insectivore	2	2
Lepomis macrolophus	Redear sunfish	Intermediate	Insectivore	1	1
Enneacanthus chaetodon	Bluespotted sunfish	Intermediate	Insectivore	1	1
Notropis procne	Swallowtail shiner	Intermediate	Insectivore	1	1

Scientific Name	Common Name	Tolerance Rating	Trophic Guild	#	# of size classes
Amia calva	Bowfin	Tolerant	Piscivore	1	1
Etheostoma vitrium	Glassy darter	Intermediate	Insectivore	3	3
Etheostoma olmstedi	Tessellated darter	Intermediate	Insectivore	6	5
Etheostoma roanoka	Roanoke darter	Intolerant	Insectivore	3	3
Anguilla rostrata	American eel	Intermediate	Piscivore	5	3
Moxostoma collapsum	Notchlip redhorse	Intermediate	Insectivore	1	1
Moxostoma papillosum	V-lip redhorse	Intermediate	Insectivore	1	1
Petromyzon marinus	Sea lamprey	Intermediate	Parasitic	1	1

Table 4. NCIBI Score Middle Creek at NC 210

Metric/score criteria	Site Metric #	Site Metric Score
No. of species ≥ 16 species = 5 10-15 species = 3 <10 species = 1	15	3
No. of fish ≥ 225 fish = 5 150-224 fish = 3 <150 fish = 1	32	1
No. of species of darters ≥ 3 species = 5 1-2 species = 3 0 species = 1	3	5
No. of species of sunfish ≥ 4 species = 5 3 species = 3 0-2 species = 1	5	5
No. of species of suckers ≥ 3 species = 5 1-2 species = 3 0 species = 1	2	3
No. of intolerant species ≥ 3 species = 5 1-2 species = 3 0 species = 1	1	3
% of tolerant individuals ≤ 35% = 5 36-50% = 3 >50% = 1	16%	5
% of omnivorous and herbivorous individuals 10-35% = 5 36-50% = 3 >50% or <10% = 1	0%	1

Metric/score criteria	Site Metric #	Site Metric Score
% of insectivorous individuals 65-90% = 5 45-64% = 3 <45% or >90% = 1	75%	5
% of piscivorous individuals 1.4-15% = 5 0.4-1.3% = 3 <0.4% or >15% = 1	22%	1
% of diseased fish ≤1.75% = 5 1.76-2.75% = 3 >2.75% = 1	0%	5
% of species with multiple age groups ≥50% = 5 35-49% = 3 <35% = 18	80%	5
NCIBI Score		**42 (Good-Fair)**

4.3 Buffalo Creek at SR 1718

Habitat consists of a shallow riffle/run/pool sequence extending from approximately 500 feet upstream of the bridge to approximately 100 feet downstream. The channel width is approximately 15 feet with 5-foot high banks. The substrate consists of sand and gravel, with cobble in the riffles with a large amount of woody debris. A total of 2,149 seconds of electro-shock time was used.

Table 5. Buffalo Creek at SR 1718: Fish Species Found

Scientific Name	Common Name	Tolerance Rating	Trophic Guild	#	# of size classes
Esox americanus americanus	Redfin pickerel	Intermediate	Piscivore	3	2
Ameriurus natalis	Yellow bullhead	Tolerant	Omnivore	3	2
Aphredoderus sayanus	Pirate perch	Intermediate	Insectivore	4	3
Lepomis auritus	Redbreast sunfish	Tolerant	Insectivore	15	3
Lepomis machochirus	Bluegill	Intermediate	Insectivore	8	2
Lepomis microlophus	Redear sunfish	Intermediate	Insectivore	1	1
Lepomis gulosus	Warmouth	Intermediate	Insectivore	1	1
Enneacanthus gloriosus	Bluspotted sunfish	Intermediate	Insectivore	1	1
Notropis cummingsae	Dusky shiner	Intermediate	Insectivore	50	7
Noturus insignis	Margined madtom	Intermediate	Insectivore	15	7
Notemigonus crysoleucas	Golden shiner	Tolerant	Omnivore	1	1
Etheostoma olmstedi	Tessellated darter	Intermediate	Insectivore	22	5
Gambusia holbrooki	Eastern mosquitofish	Tolerant	Insectivore	33	5
Anguilla rostrata	American eel	Intermediate	Piscivore	3	2
Erimzon oblongus	Creek chubsucker	Intermediate	Omnivore	3	3
Semotilus atromaculatus	Creek chub	Tolerant	Insectivore	2	2

Table 6. NCIBI Score Buffalo Creek at SR 1718

Metric/score criteria	Site Metric #	Site Metric Score
No. of species ≥ 16 species = 5 10-15 species = 3 <10 species = 1	16	5
No. of fish ≥ 225 fish = 5 150-224 fish = 3 <150 fish = 1	165	3
No. of species of darters ≥ 3 species = 5 1-2 species = 3 0 species = 1	1	3
No. of species of sunfish ≥ 4 species = 5 3 species = 3 0-2 species = 1	5	5
No. of species of suckers ≥ 3 species = 5 1-2 species = 3 0 species = 1	1	3
No. of intolerant species ≥ 3 species = 5 1-2 species = 3 0 species = 1	0	1
% of tolerant individuals ≤ 35% = 5 36-50% = 3 >50% = 1	33%	5
% of omnivorous and herbivorous individuals 10-35% = 5 36-50% = 3 >50% or <10% = 1	4%	1
% of insectivorous individuals 65-90% = 5 45-64% = 3 <45% or >90% = 1	92%	1
% of piscivorous individuals 1.4-15% = 5 0.4-1.3% = 3 <0.4% or >15% = 1	4%	5
% of diseased fish ≤1.75% = 5 1.76-2.75% = 3 >2.75% = 1	0%	5

Metric/score criteria	Site Metric #	Site Metric Score
% of species with multiple age groups ≥50% = 5 35-49% = 3 <35% = 1	63%	5
NCIBI Score		**42 (Good-Fair)**

4.4 Neuse River at NC 42

Habitat consists of a long straight run with small riffle habitats created by woody debris. Substrate consists of sand, cobble and gravel with scattered large boulders. Channel width is approximately 45 feet and the fairly stable streambanks are approximately 7 feet high. A total of 3,705 seconds of electro-shock time was used.

Table 7. Neuse River at NC 42: Fish Species Found

Scientific Name	Common Name	Tolerance Rating	Trophic Guild	#	# of size classes
Ictalurus punctatus	Channel catfish	Intermediate	Omnivore	4	1
Lepomis machochirus	Bluegill	Intermediate	Insectivore	3	2
Hypentelium nigricans	Northern hogsucker	Intermediate	Insectivore	2	1
Notropis procne	Swallowtail shiner	Intermediate	Insectivore	15	3
Cyprinella analostana	Satinfin shiner	Tolerant	Insectivore	44	9
Notropis amoenus	Comely shiner	Intermediate	Insectivore	1	1
Notropis hudsonius	Spottail shiner	Intermediate	Omnivore	15	2
Etheostoma vitrium	Glassy darter	Intermediate	Insectivore	12	3
Etheostoma nirgum	Johnny darter	Intermediate	Insectivore	5	2
Etheostoma roanoka	Roanoke darter	Intolerant	Insectivore	7	3
Gambusia holbrooki	Eastern mosquitofish	Tolerant	Insectivore	3	3
Anguilla rostrata	American eel	Intermediate	Piscivore	3	3

Table 8. NCIBI Score Neuse River at NC 42

Metric/score criteria	Site Metric #	Site Metric Score
No. of species ≥ 16 species = 5 10-15 species = 3 <10 species = 1	12	3
No. of fish ≥ 225 fish = 5 150-224 fish = 3 <150 fish = 1	114	1
No. of species of darters ≥ 3 species = 5 1-2 species = 3 0 species = 1	3	5

Metric/score criteria	Site Metric #	Site Metric Score
No. of species of sunfish ≥ 4 species = 5 3 species = 3 0-2 species = 1	1	1
No. of species of suckers ≥ 3 species = 5 1-2 species = 3 0 species = 1	1	3
No. of intolerant species ≥ 3 species = 5 1-2 species = 3 0 species = 1	1	3
% of tolerant individuals ≤ 35% = 5 36-50% = 3 >50% = 1	41%	3
% of omnivorous and herbivorous individuals 10-35% = 5 36-50% = 3 >50% or <10% = 1	17%	5
% of insectivorous individuals 65-90% = 5 45-64% = 3 <45% or >90% = 1	81%	5
% of piscivorous individuals 1.4-15% = 5 0.4-1.3% = 3 <0.4% or >15% = 1	3%	5
% of diseased fish ≤1.75% = 5 1.76-2.75% = 3 >2.75% = 1	0%	5
% of species with multiple age groups ≥50% = 5 35-49% = 3 <35% = 1	60%	5
NCIBI Score		**44 (Good-Fair)**

4.5 Little River at NC 96

Habitat consists of a braided channel system with small riffle/run and slackwater habitats. Substrate consists of sand over bedrock, with scattered boulders. A total of 1,564 seconds of electro-shock time was used.

Table 9. Little River at NC 96: Fish Species Found

Scientific Name	Common Name	Total
Micropterus salmoides	Largemouth bass	6

Scientific Name	Common Name	Total
Ameiurus natalis	Yellow bullhead	3
Noturus insignis	Margined madtom	4
Lepomis auritus	Redbreast sunfish	30
Lepomis machochirus	Bluegill	13
Lepomis gulosus	Warmouth	1
Notropis procne	Swallowtail shiner	16
Notropis amoenus	Comely shiner	1
Etheostoma olmstedi	Tessellated darter	3
Etheostoma nigrum	Johnny darter	2
Aphredoderus sayanus	Pirate Perch	2
Gambusia holbrooki	Eastern mosquitofish	20
Anguilla rostrata	American eel	1
Esox americanus americanus	Redfin pickerel	1
Totals	**14 species**	**103 individuals**

4.6 Little River at SR 2224 (Mitchell Mill Road)

Habitat in this reach consists of a steep gradient riffle/pool habitat over bedrock and rubble. A total of 812 seconds of electro-shock time was used.

Table 10. Little River at SR 2224: Fish Species Found

Scientific Name	Common Name	Total
Lepomis auritus	Redbreast sunfish	13
Lepomis machochirus	Bluegill	9
Lepomis macrolophus	Redear sunfish	1
Notropis amoenus	Comely shiner	8
Notropis procne	Swallowtail shiner	13
Notropis chalybaeus	Ironcolor shiner	6
Ameiurus natalis	Yellow bullhead	6
Ameiurus platycephalus	Flat bullhead	1
Etheostoma olmstedi	Tessellated darter	4
Semotilus atromaculatus	Creek chub	1
Erymizon oblongus	Creek chubsucker	1
Anguilla rostrata	American eel	3
Gambusia holbrooki	Eastern mosquitofish	10
Totals	**13 species**	**76 individuals**

4.7 Little River at NC 97

Habitat in this reach consists of a riffle/run/pool habitat with sand and gravel substrate with occasional boulders. Much of the substrate is covered with emergent aquatic vegetation. A total of 487 seconds of electro-shock time was used.

Table 11. Little River at NC 97: Fish Species Found

Scientific Name	Common Name	Total
Lepomis auritus	Redbreast sunfish	13
Lepomis machochirus	Bluegill	4

Scientific Name	Common Name	Total
Notropis amoenus	Comely shiner	1
Notropis procne	Swallowtail shiner	16
Cyprinella analostana	Satinfin shiner	1
Noturus insignis	Margined madtom	3
Etheostoma olmstedi	Tessellated darter	4
Etheostoma roanoka	Roanoke darter	1
Erymizon oblongus	Creek chubsucker	7
Anguilla rostrata	American eel	6
Total	**10 species**	**56 individuals**

4.8 Survey Summary

It is acknowledged that a more comprehensive survey effort conducted at various times throughout the year is needed, particularly in the deeper habitats, to obtain a complete list of all fish species occurring in the Little River. However, the methods used and the data collected is adequate for establishing a "target" fish fauna and to monitor changes in community composition over time.

5.0 DISCUSSION

These surveys provide a baseline of the fish community (water quality indicator) for Swift Creek, Middle Creek, Buffalo Creek and the Neuse River. One metric that was consistently lower than expected at all four sites is the total number of fish collected. Water turbidity was moderate to turbid during the surveys, which could have accounted for the lower numbers. However, the sites still scored within the NCIBI Good-Fair classification, which is consistent with scores calculated by DWQ at other locations within the respective waterbodies (http://h2o.enr.state.nc.us/esb/IBIrate.htm). The results of this report will allow for quantitative comparison of the fish community overtime in response to changes (natural or anthropogenic) in water quality.

The habitat conditions in the Little River within the study area do not allow for application of the NCIBI methodology. However, the qualitative surveys indicate that fairly diverse fish fauna, representing multiple trophic levels, occur within the study area. Qualitative comparisons can be made with future survey efforts, and inferences can be made regarding trends with regard to species composition.

In 2006, TCG conducted NCIBI surveys at multiple sites in the Little River in Johnston County, as part of the monitoring protocol for the removal of the Lowell Mill Dam carried out by Restoration Systems LLC (RS). This section of the Little River was not evaluated as part of this study because changes in NCIBI scores over time will likely be more influenced by habitat changes resulting from the dam removal project, than by water quality conditions within the City of Raleigh influence. The results of the dam removal monitoring surveys were presented in the Lowell Dam Removal Year-1 Monitoring Report (TCG 2006). These sites will be monitored in future years to track the response over time of the fish community following dam removal. These surveys, along with the qualitative surveys performed for this study demonstrate the diversity of the fish fauna within the Little River.

6.0 LITERATURE CITED

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