

BASINWIDE ASSESSMENT REPORT LITTLE TENNESSEE RIVER BASIN



NORTH CAROLINA
DEPARTMENT OF ENVIRONMENT
AND NATURAL RESOURCES
Division of Water Quality
Environmental Sciences Section



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INTRODUCTION TO PROGRAM METHODS

The Division of Water Quality uses a basinwide approach to water quality management. Activities within the Division, including permitting, monitoring, modeling, nonpoint source assessments, and planning are coordinated and integrated for each of the 17 major river basins within the state. All basins are reassessed every five years. The Little Tennessee River basin has been sampled by the Environmental Sciences Section (ESS) four times for basinwide monitoring: 1994, 1999, 2004, and 2009-2010.

The Environmental Sciences Section collects a variety of biological, chemical, and physical data that can be used in many ways to assist the basinwide planning program. This report addresses the results of benthic macroinvertebrate and fish community monitoring in the Little Tennessee River for the period 2000-2010. Details of biological sampling methods (including habitat evaluation) and rating criteria can be found in the appendices of this report. Technical terms are defined in the glossary.

This document is structured with physical, geographical, and biological data discussions presented in hydrologic units (HUs). General water quality conditions are given in an upstream to downstream format. Lakes data, ambient chemistry data and aquatic toxicity data, with summaries, are presented in separate reports

LITTLE TENNESSEE (LTN) RIVER BASIN DESCRIPTION

The Little Tennessee River basin is located within the Blue Ridge Province of the Appalachian Mountains of western North Carolina and is part of the Tennessee/Ohio/Mississippi River system. It encompasses about 1,800 square miles in Swain, Macon, Clay, Graham, Cherokee, and Jackson counties, and is divided into three eight-digit hydrologic units or HUCs (Figure 1). Much of the land in the basin lies within the U.S. Forest Service's Nantahala National Forest (including the Joyce Kilmer/Slick Rock Wilderness Area) or the Great Smoky Mountains National Park (GSMNP). Although the majority of the basin is forested, many of the lower sections of mainstem and tributary catchments are farmed or developed, resulting in the increased potential for nonpoint source problems. Principal tributaries to the Little Tennessee River in the middle watershed area are the Tuckasegee River (largest tributary to the Little Tennessee River in NC), Oconaluftee River, Hazel Creek, and Deep Creek. Robbinsville is the only urban area in this lower watershed.

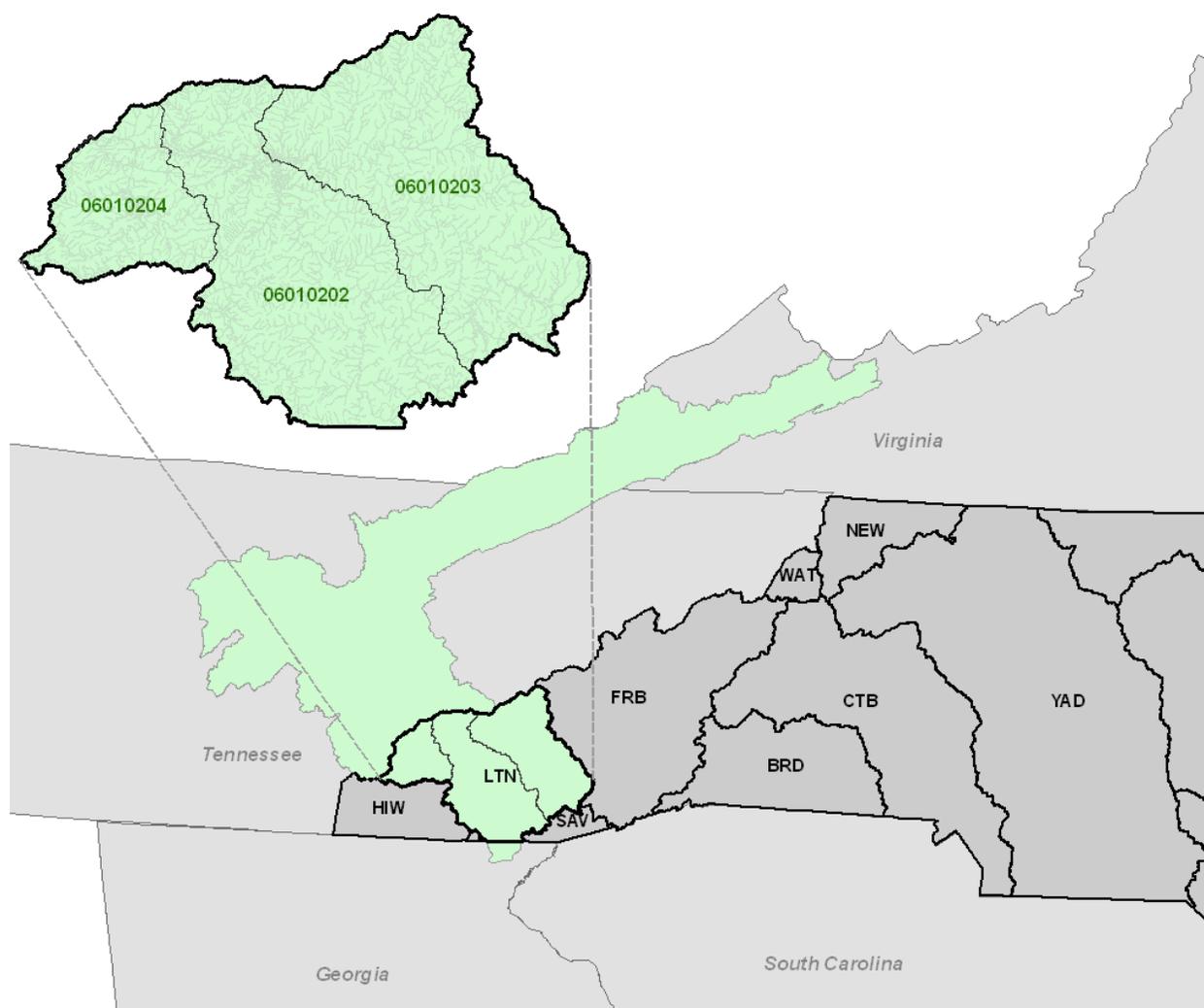


Figure 1. Geographical Relationships and eight digit hydrologic units of the Little Tennessee River Basin.

HUC 06010202—LITTLE TENNESSEE RIVER

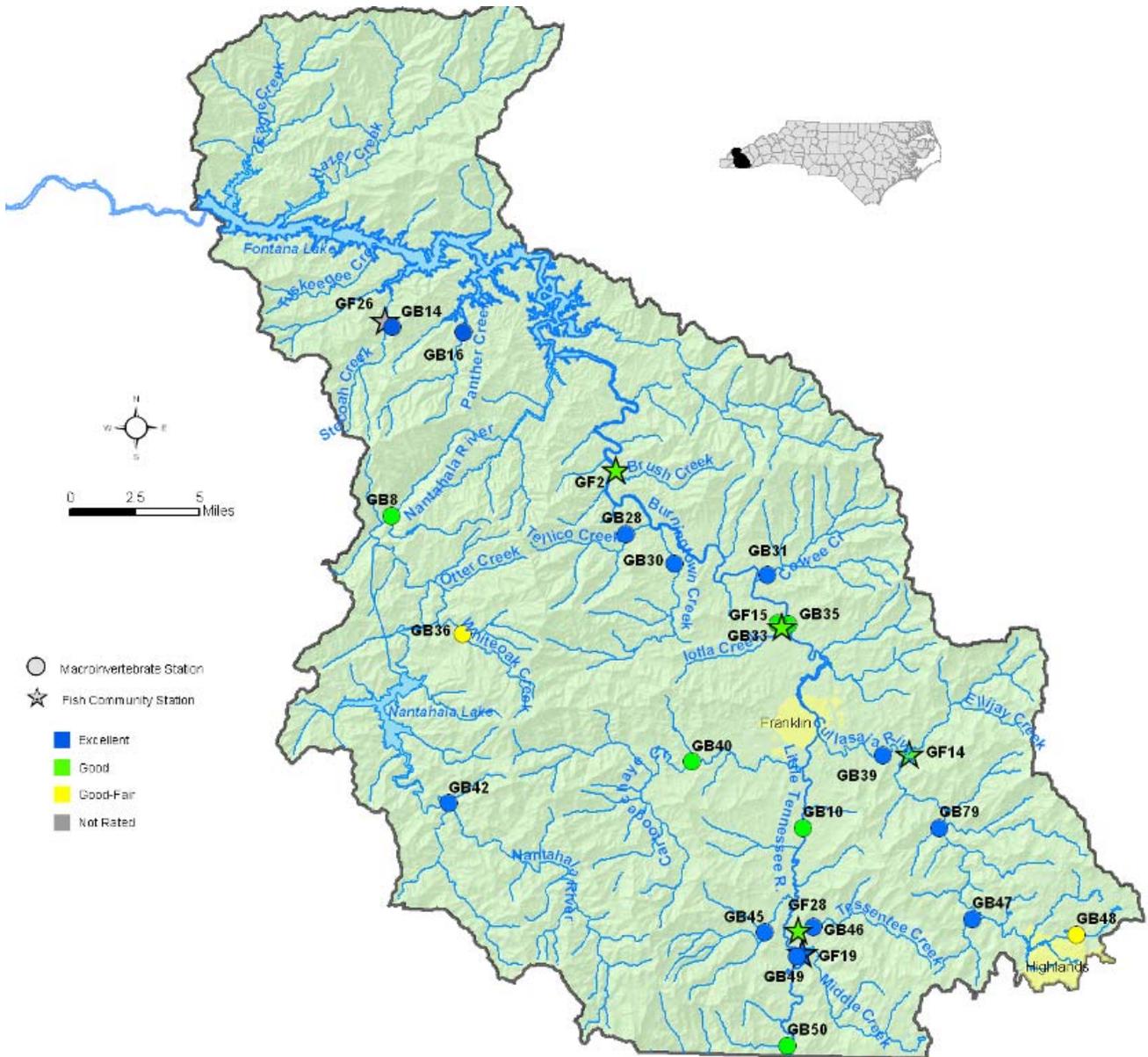


Figure 2. Biological sampling sites in HUC 06010202 in the Little Tennessee River Basin. Monitoring sites are listed in Table 1.

River and Stream Assessment

Twenty benthic macroinvertebrate sites and six fish community sites were evaluated in 2009 representing twenty-four distinct localities (Table 1; Figure 2). Among the six fish community sites, two improved from 2004 while the remaining sites maintained the same bioclassification in 2009 from that observed in 2004. Among the benthos sites, four sites improved from 2004 while the remainder retained the same bioclassification in 2009-2010 as that observed in 2004.

Specific site summaries and data interpretation of each of the benthic macroinvertebrate and fish community samples represented in Table 1 may be found in the additional Station Summaries.

Table 1. Waterbodies monitored in HUC 06010202 in the Little Tennessee River basin for basinwide assessment, 2004 and 2009-2010.

| SiteID ¹ | Waterbody | County | Location | 2004 | 2009-2010 |
|---------------------|------------------|--------|-------------|-----------|-----------|
| GB50 | L Tennessee R | Macon | off SR 1629 | Good-Fair | Good |
| GB10 | L Tennessee R | Macon | SR 1651 | Good | Good |
| GB35 | L Tennessee R | Macon | NC 28 | Good-Fair | Good |
| GB49 | Middle Cr | Macon | SR 1635 | Excellent | Excellent |
| GB46 | Tessentee Cr | Macon | SR 1684 | Excellent | Excellent |
| GB45 | Coweeta Cr | Macon | SR 1114 | Excellent | Excellent |
| GB40 | Cartoogechaye Cr | Macon | SR 1146 | Good | Good |
| GB48 | Cullasaja R | Macon | US 64 | Fair | Good-Fair |
| GB79 | Cullasaja R | Macon | SR 1678 | Excellent | Excellent |
| GB39 | Cullasaja R | Macon | SR 1668 | Good | Excellent |
| GB47 | Turtle Pond Cr | Macon | SR 1620 | Excellent | Excellent |
| GB33 | Iotta Cr | Macon | SR 1372 | Good | Good |
| GB31 | Cowee Cr | Macon | NC 28 | Excellent | Excellent |
| GB30 | Burningtown Cr | Macon | SR 1371 | Excellent | Excellent |
| GB28 | Tellico Cr | Macon | SR 1367 | Excellent | Excellent |
| GB42 | Nantahala R | Macon | US FSR 437 | Excellent | Excellent |
| GB8 | Nantahala R | Swain | US 19/74 | Good | Good |
| GB17 | Alarka Cr | Swain | SR 1185 | Excellent | Excellent |
| GB36 | Whiteoak Cr | Macon | SR 1397 | Good-Fair | Good-Fair |
| GB16 | Panther Cr | Graham | SR 1233 | Good | Excellent |
| GB 14 | Stecoah | Graham | SR 1237 | Good | Excellent |
| GF19 | Middle Cr | Macon | SR 1635 | Good | Excellent |
| GF28 | Tessentee Cr | Macon | SR 1636 | Good | Good |
| GF14 | Ellijay Cr | Macon | SR 1524 | Good | Good |
| GF15 | Iotta Cr | Macon | off SR 1378 | Good-Fair | Good |
| GF2 | Brush Cr | Swain | off SR 1129 | Good | Good |
| GF26 | Stecoah Cr | Graham | SR 1237 | Not Rated | Not Rated |

¹B = benthic macroinvertebrate monitoring sites; F = fish community monitoring sites.

Special Studies

Wildlife Resources Commission Requested Sampling in the Little Tennessee River Associated with Appalachian Elktoe Mussel Die Off

This special study (BAU Memorandum B-20070829) was conducted primarily in HUC 06010202 but included one stream (UT Tuckasegee River) from HUC 06010203. Please see the Special Study section in the HUC 06010202 – Upper Little Tennessee River for more information.

Little Tennessee Basin Local Watershed Plan (LWP)

This special study (BAU Memorandum B-20081023) was an Ecosystems Enhancement Program (EEP) study and was primarily focused on identifying opportunities for watershed protection, restoration, and future mitigation in support of the LWP. The sites sampled as part of this study were conducted in HUC 06010202 and HUC 06010203.

Little Tennessee Basin Local Watershed Plan (LWP):

This BAU Memo (B-20090408) included several samples that were conducted in an effort to 1) determine if pesticides associated with a tomato farm was having an adverse impact on Rabbit and Cat Creek, 2) to

gather pre-construction conditions for an EEP stream restoration project on Cat Creek, and 3) determine the possible effects from residential development on Dalton Creek (a tributary to Cat Creek). The results suggested that the tomato farm was causing adverse impacts to receiving waters.

Asheville Regional Office Requests: Development Patterns, Sedimentation, and Fish Kills

This special study (BAU memorandum B-20050218) was conducted to investigate the effects associated with development and sedimentation as well as to determine the condition of receiving waters where fish kills had been reported. Nine sites were sampled spanning two HUCS: 06010202 and HUC 06010204.

HUC 06010203—TUCKASEGEE RIVER

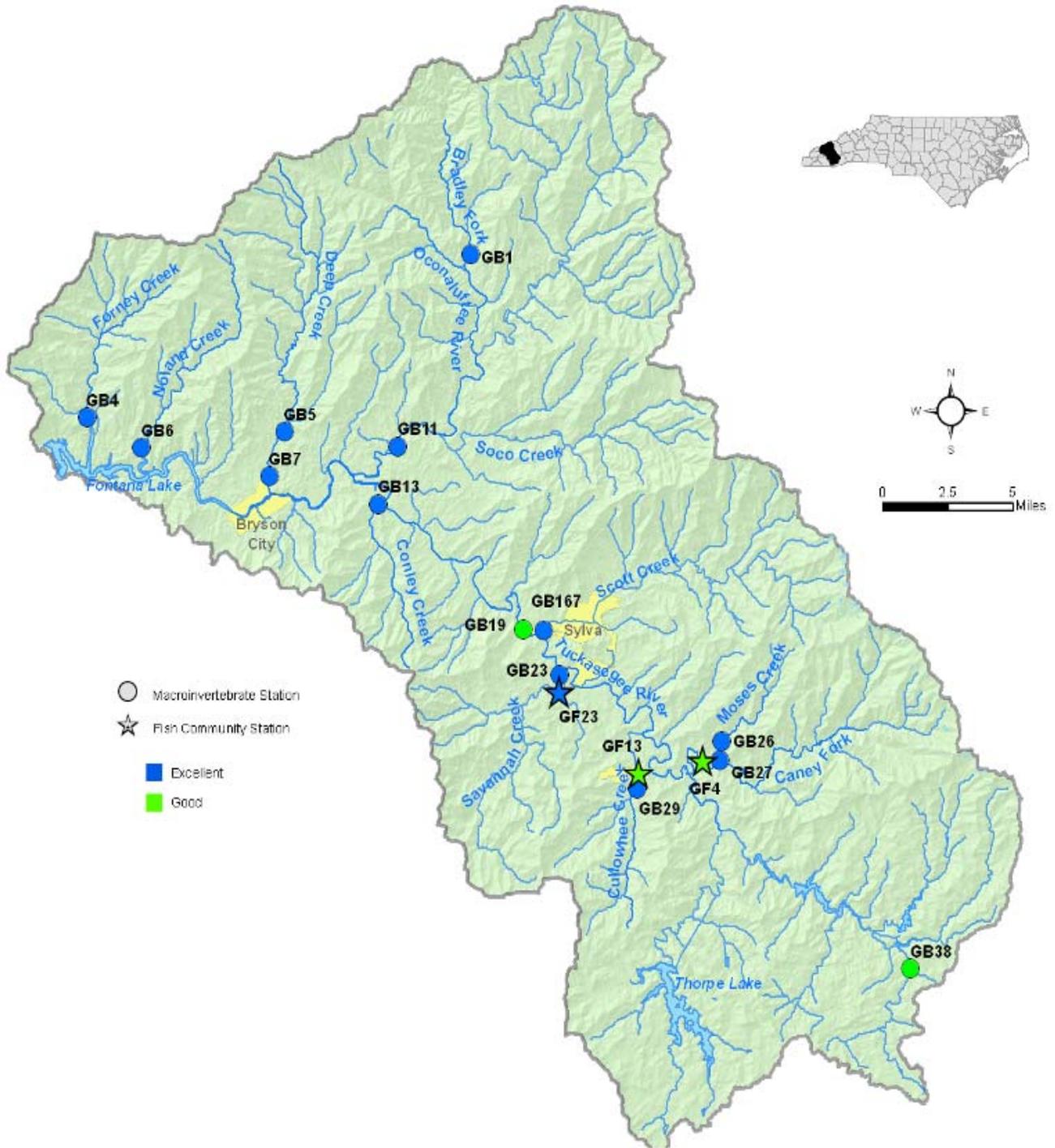


Figure 3. Biological sampling sites in HUC 06010203 in the Little Tennessee River Basin. Monitoring sites are listed in Table 2.

River and Stream Assessment

Fourteen benthic macroinvertebrate sites and three fish community sites were evaluated in 2009 representing seventeen distinct localities (Table 2; Figure 3). Two of the fish community sites improved in bioclassification from 2004 to 2009-2010 while one remained unchanged. Among the benthic macroinvertebrate sites, four sites improved in bioclassification from the previous cycle, two declined, and the remainder was unchanged between cycles.

Specific site summaries and data interpretation of the benthic macroinvertebrate and fish community samples represented in Table 2 may be found in the additional Station Summaries.

Table 2. Waterbodies monitored in HUC 06010203 in the Little Tennessee River basin for basinwide assessment, 2004 and 2009.

| SiteID ¹ | Waterbody | County | Location | 2004 | 2009-2010 |
|---------------------|-------------------------|---------|----------------------|-----------|-----------|
| GB38 | Tuckasegee R | Jackson | SR 1140 | Excellent | Good |
| GB27 | Caney Fk | Jackson | SR 1740 | Excellent | Excellent |
| GB26 | Moses Cr | Jackson | SR 1739 | Excellent | Excellent |
| GB29 | Cullowhee Cr | Jackson | SR 1001 | Excellent | Excellent |
| GB23 | Savannah Cr | Jackson | SR 1367 | Good | Excellent |
| GB19 | Tuckasegee R | Jackson | SR1378 (off SR 1377) | Excellent | Good |
| GB167 | Scott Cr | Jackson | SR 1556 | Good | Excellent |
| GB13 | Connelly Cr (Conley Cr) | Swain | SR 1177 | Good | Excellent |
| GB1 | Bradley Fk | Swain | Off US 441 | Excellent | Excellent |
| GB11 | Oconaluftee R | Swain | SR 1359 | Excellent | Excellent |
| GB5 | Deep Cr | Swain | W Deep Cr Rd (park) | Excellent | Excellent |
| GB7 | Deep Cr | Swain | SR 1340 | Excellent | Excellent |
| GB6 | Noland Cr | Swain | Near mouth | Good | Excellent |
| GB4 | Forney Cr | Swain | Near mouth | Excellent | Excellent |
| GF4 | Caney Fk | Jackson | SR 1738 | Good | Good |
| GF13 | Cullowhee Cr | Jackson | SR 1545 | Good-Fair | Good |
| GF23 | Savannah Cr | Jackson | NC 116 | Good | Excellent |

¹B = benthic macroinvertebrate monitoring sites; F = fish community monitoring sites.

Special Studies

ORW/HQW Survey for Lake Fontana North Shore Tributaries

This special study (BAU memorandum B-20050817) was conducted primarily in HUC 06010202 but included one stream (Grey Wolf Creek) from HUC 06010203. Please see the Special Study section in the HUC 06010202 – Upper Little Tennessee River for more information.

Wildlife Resources Commission Requested Sampling in the Little Tennessee River Associated with Appalachian Elktoe Mussel Die Off

This special study (BAU memorandum B-20070829) was conducted primarily in HUC 06010202 but included one stream (UT Tuckasegee River) from HUC 06010203. Please see the Special Study section in the HUC 06010202 – Upper Little Tennessee River for more information.

Balsam Mountain Preserve Dam Failure

A small pond dam failure in the Balsam Mountain Preserve development occurred on June 7, 2007. The resultant sediment and debris slide entered Sugarloaf Creek and finally the lower segments of Scott Creek. A total of three streams were sampled in this study. Two of the streams sampled (Sugarloaf Creek and Scott Creek) were directly affected by the sediment. The third stream, Licklog Branch, was sampled as a comparative reference site to Sugarloaf Creek and was similar in both landuse and drainage area. Results of the study indicate that the dam failure did affect the macroinvertebrate community in Sugarloaf Creek as it had a “Fair” bioclassification while the reference site was “Good”. The downstream reaches of Scott Creek received an “Excellent” bioclassification.

Little Tennessee Basin Local Watershed Plan (LWP)

This special study (BAU Memorandum B-20081023) was an Ecosystems Enhancement Program study and was primarily focused on identifying opportunities for watershed protection, restoration, and future mitigation in support of the LWP. The sites sampled as part of this study were conducted in HUC 06010202 and HUC 06010203.

Tuskegee Creek Trout (Tr) Reclassification Study

BAU Memorandum (F-20071113) examined the potential for reclassification of several streams in this watershed from Class C to Class C Trout (Tr). Based on this study, nine stream segments were eligible for reclassification from Class C to Class C Trout (Tr).

Camp Creek Trout (Tr) Reclassification Study

BAU Memorandum (F-20071113) examined the potential for reclassification of several streams in this watershed from Class C to Class C Trout (Tr). Based on this study, nine stream segments were eligible to reclassification to Class C (Tr).

HUC 06010204—LOWER LITTLE TENNESSEE RIVER

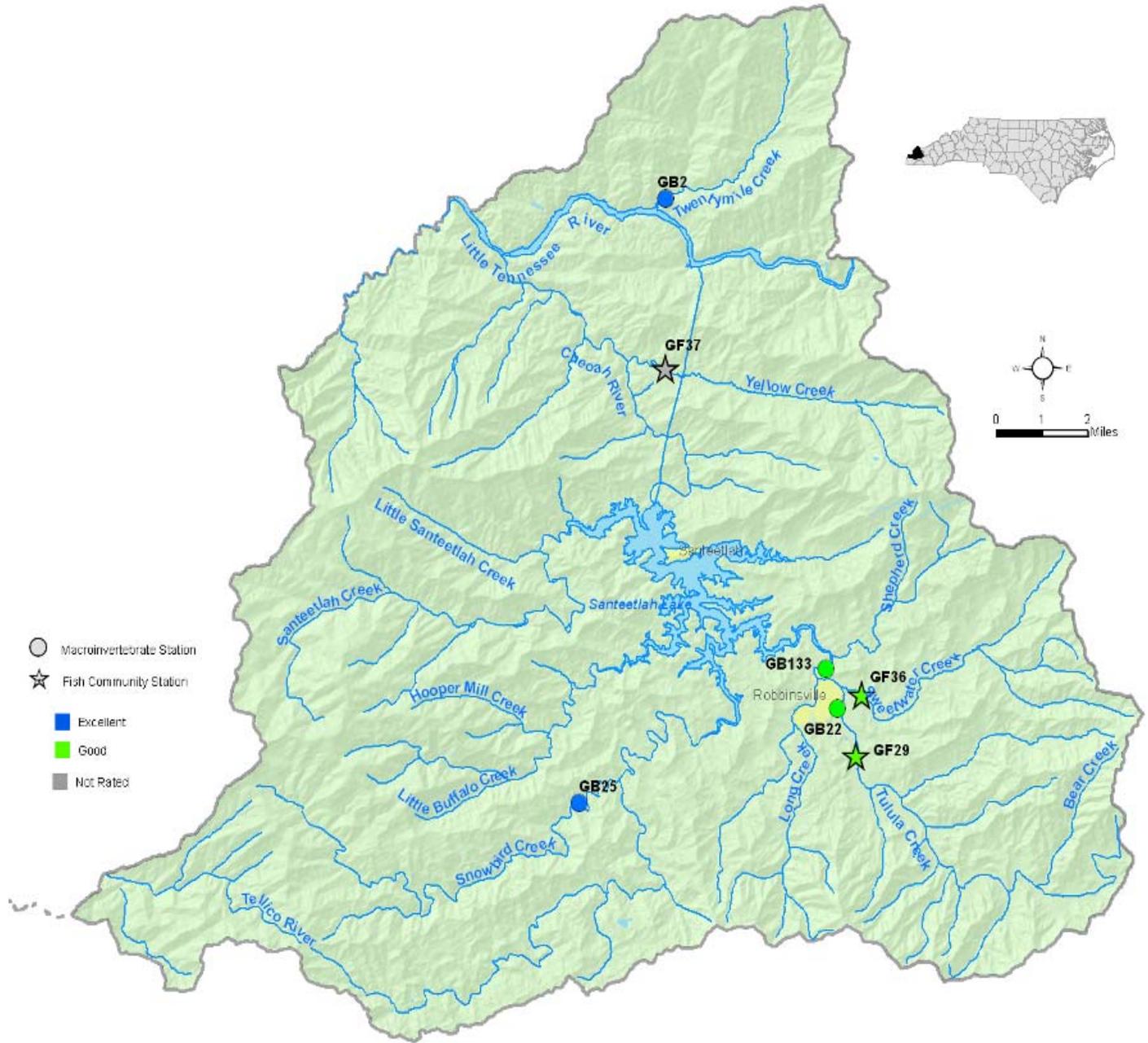


Figure 4. Biological sampling sites in HUC 06010204 in the Little Tennessee River Basin. Monitoring sites are listed in Table 3.

River and Stream Assessment

Four benthic macroinvertebrate sites and three fish community sites were evaluated in 2009-2010 all of which were distinct localities (Table 3; Figure 4). One of the benthic macroinvertebrate samples improved in bioclassification and the remainder were unchanged from 2004. One of the fish community sites improved in bioclassification from 2004 and the other two represented new samples.

Specific site summaries of the benthic macroinvertebrate and fish community samples (Table 3) may be found in the additional Station Summaries.

Table 3. Waterbodies monitored in HUC 06010204 in the Little Tennessee River basin for basinwide assessment, 2004 and 2009.

| SiteID ¹ | Waterbody | County | Location | 2004 | 2009-2010 |
|---------------------|---------------|--------|-------------|-----------|-----------|
| GB133 | Cheoah R | Graham | Off SR 1138 | Good | Good |
| GB22 | Tulula Cr | Graham | SR 1275 | Good | Good |
| GB25 | Snowbird Cr | Graham | SR 1120 | Excellent | Excellent |
| GB2 | Twentymile Cr | Swain | NC 28 | Good | Excellent |
| GF29 | Tulula Cr | Graham | SR 1260 | Good-Fair | Good |
| GF36 | Sweetwater Cr | Graham | SR 1214 | --- | Good |
| GF37 | Yellow Cr | Graham | SR 1242 | --- | Not Rated |

¹B = benthic macroinvertebrate monitoring sites; F = fish community monitoring sites.

Special Studies

Asheville Regional Office Request: Cheoah River Rewatering Study

This special study (BAU memorandum B-20080730) was conducted to investigate the effects of Alcoa Power Generating Inc.'s plan to reintroduce water into the dewatered section of the Cheoah River below the dam. Samples taken during the dewatered phase were obtained in 2004 and resulted in a Fair bioclassification. The 2008 samples were taken after water was reintroduced and resulted in a Good bioclassification.

Asheville Regional Office Requests: Development Patterns, Sedimentation, and Fish Kills

This special study (BAU memorandum B-20050218) was conducted to investigate the effects associated with development and sedimentation as well as to determine the condition of receiving waters where fish kills had been reported. Nine sites were sampled spanning two HUCS: 06010202 and HUC 06010204.

Upper Tellico Off-Highway (OHV) Sediment Study

This study was initiated at the request of the U.S. Forest Service in an effort to assess the potential impacts to the benthic macroinvertebrate communities in the Tellico River and its tributaries as a result of sedimentation associated with extensive off-road use. BAU Memorandum B-20090817 demonstrated sub lethal impacts to the benthic macroinvertebrate communities at sites downstream of OHV trails relative to reference locations.

GLOSSARY

| | |
|-------------------|--|
| 7Q ₁₀ | A value which represents the lowest average flow for a seven day period that will recur on a ten year frequency. This value is applicable at any point on a stream. 7Q ₁₀ flow (in cfs) is used to allocate the discharge of toxic substances to streams. |
| Bioclassification | Criteria have been developed to assign bioclassifications ranging from Poor to Excellent to each benthic sample based on the number of taxa present in the intolerant groups (EPT) and the Biotic Index value. |
| cfs | Cubic feet per second, generally the unit in which stream flow is measured. |
| CHL <i>a</i> | Chlorophyll <i>a</i> . |
| Class C Waters | Freshwaters protected for secondary recreation, fishing, and aquatic life including propagation and survival, and wildlife. All freshwaters shall be classified to protect these uses at a minimum. |
| Conductivity | In this report, synonymous with specific conductance and reported in the units of $\mu\text{mhos/cm}$ at 25 °C. Conductivity is a measure of the resistance of a solution to electrical flow. Resistance is reduced with increasing content of ionized salts. |
| Division | The North Carolina Division of Water Quality. |
| D.O. | Dissolved Oxygen. |
| Ecoregion | An area of relatively homogeneous environmental conditions, usually defined by elevation, geology, vegetation, and soil type. Examples include Mountains, Piedmont, Coastal Plain, Sand Hills, and Carolina Slate Belt. |
| EPT | The insect orders (Ephemeroptera, Plecoptera, Trichoptera); as a whole, the most intolerant insects present in the benthic community. |
| EPT N | The abundance of Ephemeroptera, Plecoptera, Trichoptera insects present, using values of 1 for Rare, 3 for Common and 10 for Abundant. |
| EPT S | Taxa richness of the insect orders Ephemeroptera, Plecoptera and Trichoptera. Higher taxa richness values are associated with better water quality. |
| HQW | High Quality Waters. Waters which are rated Excellent based on biological and physical/chemical characteristics through Division monitoring or special studies, primary nursery areas designated by the Marine Fisheries Commission, and all Class SA waters. |
| Major Discharger | Greater than or equal to one million gallons per day discharge (≥ 1 MGD) |
| MGD | Million Gallons per Day, generally the unit in which effluent discharge flow is measured. |
| Minor Discharger | Less than one million gallons per day discharge (< 1 MGD). |
| NPDES | National Pollutant Discharge Elimination System. |

| | |
|----------------|--|
| NCBI (EPT BI) | North Carolina Biotic Index, EPT Biotic Index. A summary measure of the tolerance values of organisms found in the sample, relative to their abundance. Sometimes noted as the NCBI or EPT BI. |
| NCIBI | North Carolina Index of Biotic Integrity (NCIBI); a summary measure of the effects of factors influencing the fish community. |
| NSW | Nutrient Sensitive Waters. Waters subject to growths of microscopic or macroscopic vegetation requiring limitations on nutrient inputs. |
| ORW | Outstanding Resource Waters. Unique and special waters of exceptional state or national recreational or ecological significance which require special protection to maintain existing uses. |
| SOC | A consent order between an NPDES permittee and the Environmental Management Commission that specifically modifies compliance responsibility of the permittee, requiring that specified actions are taken to resolve non-compliance with permit limits. |
| Total S (or S) | The number of different taxa present in a benthic macroinvertebrate sample. |
| UT | Unnamed tributary. |
| WWTP | Wastewater treatment plant |

Appendix B-1. Summary of Benthic Macroinvertebrate Data, Methods, and Criteria.

Considering the two most recent basin cycles (2004-2009/2010), the most substantial change includes an increase in the number of Excellent bioclassifications. Considering all four cycles, there has been a clear trend of improved water quality bioassessments with increasing Excellent bioclassifications and reduced Fair and Good-Fair bioclassifications (Figure 5).

Figure 5. Bioclassification Trends in the Little Tennessee River Basin: 1994-2010.

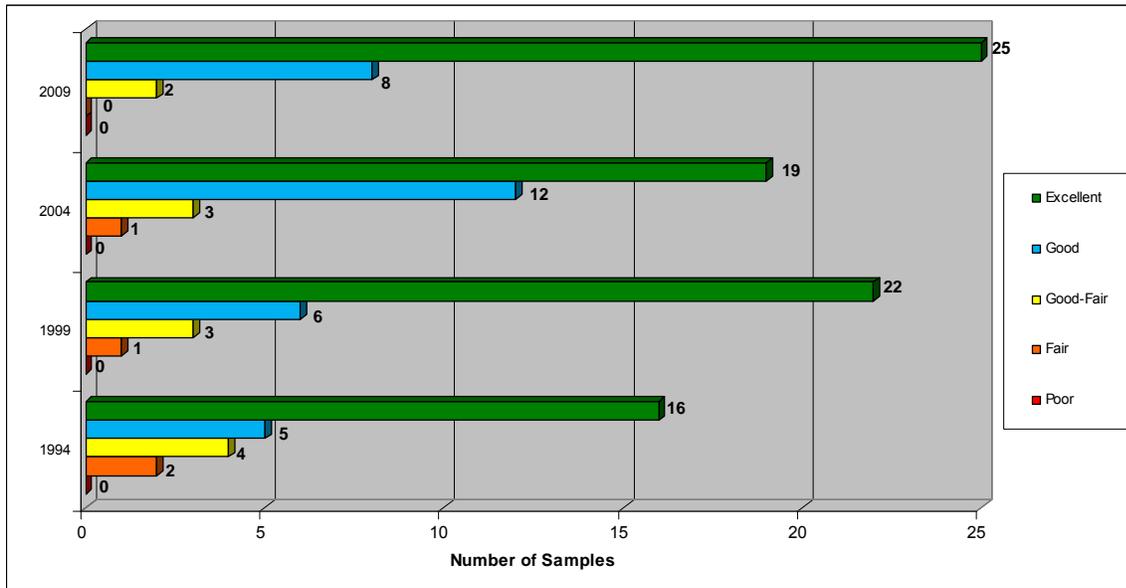


Table 4. Rare Taxa Collected in the Little Tennessee River Basin (Rare Taxa are Defined as Those Taxa Which Occur Less Than or Equal to 0.5% of Approximately 6,500 NCDWQ Benthic Collections).

| Collection Number | Date | Waterbody | Location | County | Scientific Name |
|-------------------|--------|----------------|--------------|--------|-------------------------|
| 11093 | 8/6/10 | DEEP CR | W DEEP CR RD | SWAIN | GLOSSOSOMA NIGRIOR |
| 11094 | 8/6/10 | DEEP CR | SR 1340 | SWAIN | AGNETINA CAPITATA |
| 11093 | 8/6/10 | DEEP CR | W DEEP CR RD | SWAIN | AGNETINA CAPITATA |
| 11094 | 8/6/10 | DEEP CR | SR 1340 | SWAIN | GLOSSOSOMA NIGRIOR |
| 11090 | 8/5/10 | L TENNESSEE R | SR 1113 | SWAIN | OPTIOSERVUS TRIVITTATUS |
| 11091 | 8/5/10 | TWENTY MILE CR | NC 28 | SWAIN | GLOSSOSOMA NIGRIOR |
| 11090 | 8/5/10 | L TENNESSEE R | SR 1113 | SWAIN | CARDIOCLADIUS OBSCURUS |
| 11012 | 8/3/10 | CULLASAJA R | SR 1678 | MACON | TANYTARSUS SP M |
| 11010 | 8/3/10 | CULLASAJA R | US 64 | MACON | DJALMABATISTA PULCHRA |
| 11010 | 8/3/10 | CULLASAJA R | US 64 | MACON | PLANORBELLA TRIVOLVIS |
| 11010 | 8/3/10 | CULLASAJA R | US 64 | MACON | TANYTARSUS SP S |
| 11010 | 8/3/10 | CULLASAJA R | US 64 | MACON | OULIMNIUS NITIDULUS |
| 11011 | 8/3/10 | CULLASAJA R | SR 1668 | MACON | LIPINIELLA SPP |
| 11011 | 8/3/10 | CULLASAJA R | SR 1668 | MACON | STYLURUS SPP |
| 11011 | 8/3/10 | CULLASAJA R | SR 1668 | MACON | ALOTANYPUS SPP |
| 11010 | 8/3/10 | CULLASAJA R | US 64 | MACON | OXYETHIRA SPP |
| 11012 | 8/3/10 | CULLASAJA R | SR 1678 | MACON | MICROPSECTRA SP A |

Table 4 (Continued).

| Collection Number | Date | Waterbody | Location | County | Scientific Name |
|-------------------|---------|----------------|---------------------------|---------|------------------------------|
| 11088 | 8/2/10 | CANEY FK | SR 1740 | JACKSON | ORTHOCLADIUS CARLATUS |
| 11088 | 8/2/10 | CANEY FK | SR 1740 | JACKSON | RHEPELOPIA ACRA GR |
| 11088 | 8/2/10 | CANEY FK | SR 1740 | JACKSON | MACCAFFERTIUM SPP |
| 11088 | 8/2/10 | CANEY FK | SR 1740 | JACKSON | CERACLEA FLAVA |
| 11089 | 8/2/10 | MOSES CR | SR 1739 | JACKSON | GLOSSOSOMA NIGRIOR |
| 11088 | 8/2/10 | CANEY FK | SR 1740 | JACKSON | STYLURUS SPP |
| 11092 | 7/28/10 | NOLAND CR | NR MOUTH | SWAIN | EPEORUS SUBPALLIDUS |
| 11092 | 7/28/10 | NOLAND CR | NR MOUTH | SWAIN | GLOSSOSOMA NIGRIOR |
| 10964 | 5/20/10 | CRAWFORD BR | E MAIN ST | MACON | STENELMIS N SP |
| 10966 | 5/20/10 | DALTON CR | OFF DALTON CR DR | Macon | STENELMIS N SP |
| 10965 | 5/20/10 | CRAWFORD BR | FRANKLIN MEM PK | MACON | STENELMIS N SP |
| 10863 | 9/17/09 | POSSUM BR | SR 1636 | Macon | MICROPSECTRA SP A |
| 10863 | 9/17/09 | POSSUM BR | SR 1636 | Macon | PARATANYTARSUS LONGISTYLUS |
| 10863 | 9/17/09 | POSSUM BR | SR 1636 | Macon | OPTIOSERVUS IMMUNIS |
| 10863 | 9/17/09 | POSSUM BR | SR 1636 | Macon | OULIMNIUS NITIDULUS |
| 10863 | 9/17/09 | POSSUM BR | SR 1636 | Macon | STENELMIS SANDERSONI |
| 10864 | 9/17/09 | WHITEROCK CR | HICKORY GAP ROAD | Macon | MOLOPHILUS SPP |
| 10862 | 9/15/09 | CADON BR | OFF SR 1636 | Macon | OPTIOSERVUS IMMUNIS |
| 10858 | 9/15/09 | BUCKEYE BR | SR 1636 | Macon | STEMPELLINA SPP |
| 10862 | 9/15/09 | CADON BR | OFF SR 1636 | Macon | RHYACOPHILA APPALACHIA |
| 10861 | 9/15/09 | NICHOLS BR | OFF SR 1636 | Macon | RHYACOPHILA AMICIS |
| 10858 | 9/15/09 | BUCKEYE BR | SR 1636 | Macon | PARATANYTARSUS LONGISTYLUS |
| 10858 | 9/15/09 | BUCKEYE BR | SR 1636 | Macon | OULIMNIUS NITIDULUS |
| 10857 | 9/14/09 | EVANS BR | OFF SR 1639 | Macon | OPTIOSERVUS IMMUNIS |
| 10857 | 9/14/09 | EVANS BR | OFF SR 1639 | Macon | OULIMNIUS NITIDULUS |
| 10827 | 8/20/09 | TURTLE POND CR | SR 1620 | MACON | MICRASEMA SPRULESI |
| 10791 | 8/5/09 | L TENNESSEE R | NC 28 | MACON | TRICORYTHODES ROBACKI |
| 10791 | 8/5/09 | L TENNESSEE R | NC 28 | MACON | THIENEMANNIELLA SIMILIS |
| 10790 | 8/4/09 | IOTLA CR | SR 1372 | MACON | GERRIDAE |
| 10782 | 8/4/09 | NANTHALA R | OFF US 19-74 BE QUEENS CR | SWAIN | ORTHOCLADIUS CARLATUS |
| 10782 | 8/4/09 | NANTHALA R | OFF US 19-74 BE QUEENS CR | SWAIN | ORTHOCLADIUS RIVICOLA |
| 10782 | 8/4/09 | NANTHALA R | OFF US 19-74 BE QUEENS CR | SWAIN | MICROPSECTRA POLITA |
| 10782 | 8/4/09 | NANTHALA R | OFF US 19-74 BE QUEENS CR | SWAIN | ORTHOCLADIUS VAILLANTI |
| 10771 | 7/30/09 | SCOTT CR | UPS SR 1556 | JACKSON | OPTIOSERVUS IMMUNIS |
| 10788 | 7/30/09 | TESSENTEE CR | SR 1684 | MACON | AGNETINA FLAVESCENS |
| 10773 | 7/30/09 | CULLOWHEE CR | SR 1001 | JACKSON | EPEORUS SUBPALLIDUS |
| 10772 | 7/30/09 | SAVANNAH CR | SR 1367 | JACKSON | NAIS BEHNINGI |
| 10772 | 7/30/09 | SAVANNAH CR | SR 1367 | JACKSON | RHEPELOPIA ACRA GR |
| 10772 | 7/30/09 | SAVANNAH CR | SR 1367 | JACKSON | ORTHOCLADIUS CARLATUS |
| 10772 | 7/30/09 | SAVANNAH CR | SR 1367 | JACKSON | DEMICYPTOCHIRONOMUS SP C |
| 10771 | 7/30/09 | SCOTT CR | UPS SR 1556 | JACKSON | NANOCLADIUS BRANCHICOLUS |
| 10770 | 7/30/09 | TUCKASEGEE R | SR 1378 | JACKSON | DEMICYPTOCHIRONOMUS CUNEATUS |
| 10772 | 7/30/09 | SAVANNAH CR | SR 1367 | JACKSON | PARATANYTARSUS LONGISTYLUS |
| 10701 | 7/29/09 | PANTHER CR | SR 1233 | GRAHAM | SERRATELLA SPICULOSA |
| 10694 | 7/29/09 | BRADLEY FK | US 441 | SWAIN | AGNETINA CAPITATA |

Table 4 (Continued).

| Collection Number | Date | Waterbody | Location | County | Scientific Name |
|-------------------|---------|---------------|--------------------------------------|--------|------------------------------|
| 10694 | 7/29/09 | BRADLEY FK | US 441 | SWAIN | PARATRICHOCLADIUS SPP |
| 10694 | 7/29/09 | BRADLEY FK | US 441 | SWAIN | ORTHOCLADIUS CARLATUS |
| 10694 | 7/29/09 | BRADLEY FK | US 441 | SWAIN | CORDULEGASTER MACULATA |
| 10694 | 7/29/09 | BRADLEY FK | US 441 | SWAIN | EPEORUS SUBPALLIDUS |
| 10694 | 7/29/09 | BRADLEY FK | US 441 | SWAIN | RHEOPELOPIA ACRA GR |
| 10694 | 7/29/09 | BRADLEY FK | US 441 | SWAIN | SERRATELLA SPICULOSA |
| 10694 | 7/29/09 | BRADLEY FK | US 441 | SWAIN | CERACLEA FLAVA |
| 10785 | 7/29/09 | TELLICO CR | SR 1367 | MACON | TANYTARSUS SP G |
| 10769 | 7/29/09 | ALARKA CR | SR 1185 | SWAIN | NAIS BEHNINGI |
| 10769 | 7/29/09 | ALARKA CR | SR 1185 | SWAIN | RHEOPELOPIA ACRA GR |
| 10769 | 7/29/09 | ALARKA CR | SR 1185 | SWAIN | PROBEZZIA SPP |
| 10785 | 7/29/09 | TELLICO CR | SR 1367 | MACON | TANYTARSUS SP M |
| 10785 | 7/29/09 | TELLICO CR | SR 1367 | MACON | CHAETOCLADIUS SPP |
| 10696 | 7/28/09 | HAZEL CR | NR MOUTH | SWAIN | OPTIOSERVUS TRIVITTATUS |
| 10696 | 7/28/09 | HAZEL CR | NR MOUTH | SWAIN | EPEORUS SUBPALLIDUS |
| 10697 | 7/28/09 | FORNEY CR | NR MOUTH | SWAIN | AGNETINA CAPITATA |
| 10696 | 7/28/09 | HAZEL CR | NR MOUTH | SWAIN | RHEOPELOPIA SP 3 |
| 10696 | 7/28/09 | HAZEL CR | NR MOUTH | SWAIN | OULIMNIUS NITIDULUS |
| 10696 | 7/28/09 | HAZEL CR | NR MOUTH | SWAIN | MICROPSECTRA SP A |
| 10697 | 7/28/09 | FORNEY CR | NR MOUTH | SWAIN | CORDULEGASTER MACULATA |
| 10697 | 7/28/09 | FORNEY CR | NR MOUTH | SWAIN | EPEORUS SUBPALLIDUS |
| 10696 | 7/28/09 | HAZEL CR | NR MOUTH | SWAIN | PROBEZZIA SPP |
| 10697 | 7/28/09 | FORNEY CR | NR MOUTH | SWAIN | RHEOPELOPIA ACRA GR |
| 10697 | 7/28/09 | FORNEY CR | NR MOUTH | SWAIN | MICROPSECTRA SP A |
| 10697 | 7/28/09 | FORNEY CR | NR MOUTH | SWAIN | CERACLEA FLAVA |
| 10781 | 7/28/09 | SNOWBIRD CR | SR 1120 | GRAHAM | AGNETINA FLAVESCENS |
| 10781 | 7/28/09 | SNOWBIRD CR | SR 1120 | GRAHAM | EPHEMERELLA CREMULA |
| 10783 | 7/28/09 | WHITEOAK CR | SR 1397 | MACON | HETEROTRISSOCLADIUS MARCIDUS |
| 10783 | 7/28/09 | WHITEOAK CR | SR 1397 | MACON | MICROPSECTRA SP A |
| 10780 | 7/28/09 | TULULA CR | SR 1275 | GRAHAM | EPHEMERELLA CREMULA |
| 10695 | 7/27/09 | OCONALUFTEE R | SR 1359 | SWAIN | RHEOPELOPIA ACRA GR |
| 10695 | 7/27/09 | OCONALUFTEE R | SR 1359 | SWAIN | BRILLIA SERA |
| 10892 | 7/14/09 | CAT CR | OFF SR 1504 | Macon | MICROPSECTRA SP A |
| 10893 | 6/4/09 | RABBIT CR | SR 1504 | Macon | MICROPSECTRA SP A |
| 10891 | 6/4/09 | CAT CR | OFF PRESERVE DR ABOVE TOMATO FARM | Macon | MICROPSECTRA SP A |
| 10891 | 6/4/09 | CAT CR | OFF PRESERVE DR ABOVE TOMATO FARM | Macon | PARACHIRONOMUS PECTINATELLAE |
| 10658 | 4/23/09 | SYCAMORE CR | OFF FSR 420 | MONROE | MICROPSECTRA SP A |
| 10658 | 4/23/09 | SYCAMORE CR | OFF FSR 420 | MONROE | YUGUS ARINUS |
| 10657 | 4/23/09 | MANGAN BR | OFF SYCAMORE CR. TRAIL | MONROE | MICROPSECTRA SP A |
| 10658 | 4/23/09 | SYCAMORE CR | OFF FSR 420 | MONROE | HETEROTRISSOCLADIUS MARCIDUS |
| 10658 | 4/23/09 | SYCAMORE CR | OFF FSR 420 | MONROE | ALOTANYPUS SPP |
| 10658 | 4/23/09 | SYCAMORE CR | OFF FSR 420 | MONROE | DEMICYPTOCHIRONOMUS SP A |
| 10658 | 4/23/09 | SYCAMORE CR | OFF FSR 420 | MONROE | DRUNELLA LONGICORNIS |
| 10658 | 4/23/09 | SYCAMORE CR | OFF FSR 420 | MONROE | MOLOPHILUS SPP |

Table 4 (Continued).

| Collection Number | Date | Waterbody | Location | County | Scientific Name |
|-------------------|---------|----------------|------------------------------------|----------|----------------------------|
| 10658 | 4/23/09 | SYCAMORE CR | OFF FSR 420 | MONROE | CRICOTOPUS INFUSCATUS |
| 10658 | 4/23/09 | SYCAMORE CR | OFF FSR 420 | MONROE | RHEOCRICOTOPUS UNIDENTATUS |
| 10657 | 4/23/09 | MANGAN BR | OFF SYCAMORE CR. TRAIL | MONROE | PROBEZZIA SPP |
| 10658 | 4/23/09 | SYCAMORE CR | OFF FSR 420 | MONROE | TANYTARSUS SP M |
| 10655 | 4/22/09 | TIPTON CR | OFF FSR 420 | Cherokee | CHAETOCLADIUS SPP |
| 10653 | 4/22/09 | TIPTON CR | OFF FSR 420 NEAR MOUTH | Cherokee | EUKIEFFERIELLA TIROLENSIS |
| 10656 | 4/22/09 | TIPTON CREEK | FSR 420 | Cherokee | NANOCLADIUS SP D |
| 10653 | 4/22/09 | TIPTON CR | OFF FSR 420 NEAR MOUTH | Cherokee | MOLOPHILUS SPP |
| 10656 | 4/22/09 | TIPTON CREEK | FSR 420 | Cherokee | RHITHROGENA AMICA |
| 10656 | 4/22/09 | TIPTON CREEK | FSR 420 | Cherokee | PARATANYTARSUS LONGISTYLUS |
| 10656 | 4/22/09 | TIPTON CREEK | FSR 420 | Cherokee | MICROPSECTRA SP A |
| 10655 | 4/22/09 | TIPTON CR | OFF FSR 420 | Cherokee | CRICOTOPUS INFUSCATUS |
| 10655 | 4/22/09 | TIPTON CR | OFF FSR 420 | Cherokee | MOLOPHILUS SPP |
| 10656 | 4/22/09 | TIPTON CREEK | FSR 420 | Cherokee | ISOPERLA LATA |
| 10655 | 4/22/09 | TIPTON CR | OFF FSR 420 | Cherokee | ALOTANYPUS SPP |
| 10654 | 4/22/09 | TELLICO R | OFF FSR 420 ABOVE TIPTON CR | Cherokee | CORDULEGASTER MACULATA |
| 10655 | 4/22/09 | TIPTON CR | OFF FSR 420 | Cherokee | TANYTARSUS SP M |
| 10654 | 4/22/09 | TELLICO R | OFF FSR 420 ABOVE TIPTON CR | Cherokee | EUKIEFFERIELLA TIROLENSIS |
| 10654 | 4/22/09 | TELLICO R | OFF FSR 420 ABOVE TIPTON CR | Cherokee | LIMNOPHILA SPP |
| 10654 | 4/22/09 | TELLICO R | OFF FSR 420 ABOVE TIPTON CR | Cherokee | RHITHROGENA AMICA |
| 10654 | 4/22/09 | TELLICO R | OFF FSR 420 ABOVE TIPTON CR | Cherokee | CHAETOCLADIUS SPP |
| 10654 | 4/22/09 | TELLICO R | OFF FSR 420 ABOVE TIPTON CR | Cherokee | MICROPSECTRA SP A |
| 10655 | 4/22/09 | TIPTON CR | OFF FSR 420 | Cherokee | MICROPSECTRA SP A |
| 10653 | 4/22/09 | TIPTON CR | OFF FSR 420 NEAR MOUTH | Cherokee | ORTHOCLADIUS VAILLANTI |
| 10654 | 4/22/09 | TELLICO R | OFF FSR 420 ABOVE TIPTON CR | Cherokee | GERRIDAE |
| 10653 | 4/22/09 | TIPTON CR | OFF FSR 420 NEAR MOUTH | Cherokee | MICROPSECTRA SP A |
| 10654 | 4/22/09 | TELLICO R | OFF FSR 420 ABOVE TIPTON CR | Cherokee | YUGUS ARINUS |
| 10653 | 4/22/09 | TIPTON CR | OFF FSR 420 NEAR MOUTH | Cherokee | NANOCLADIUS BRANCHICOLUS |
| 10653 | 4/22/09 | TIPTON CR | OFF FSR 420 NEAR MOUTH | Cherokee | CORDULEGASTER ERRONEA |
| 10629 | 4/21/09 | ROUGH RIDGE CR | OFF FSR 420 | MONROE | BRILLIA SERA |
| 10652 | 4/21/09 | JENKS BR | OFF FSR 420 | Cherokee | EPHEMERELLA CF HISPIDA |
| 10651 | 4/21/09 | TELLICO R | OFF FSR 420 ABOVE PECKERWOOD CR | Cherokee | CHAETOCLADIUS SPP |
| 10651 | 4/21/09 | TELLICO R | OFF FSR 420 ABOVE PECKERWOOD CR | Cherokee | YUGUS ARINUS |

Table 4 (Continued).

| Collection Number | Date | Waterbody | Location | County | Scientific Name |
|-------------------|---------|----------------|---------------------------------|----------|----------------------------|
| 10630 | 4/21/09 | PECKERWOOD CR | OFF FSR 420 NEAR MOUTH | Cherokee | MICROPSECTRA SP A |
| 10651 | 4/21/09 | TELLICO R | OFF FSR 420 ABOVE PECKERWOOD CR | Cherokee | CORDULEGASTER ERRONEA |
| 10630 | 4/21/09 | PECKERWOOD CR | OFF FSR 420 NEAR MOUTH | Cherokee | PARAPHAENOCLADIUS SPP |
| 10651 | 4/21/09 | TELLICO R | OFF FSR 420 ABOVE PECKERWOOD CR | Cherokee | RHEOCRICOTOPUS EMINELLOBUS |
| 10630 | 4/21/09 | PECKERWOOD CR | OFF FSR 420 NEAR MOUTH | Cherokee | RASVENA TERNA |
| 10629 | 4/21/09 | ROUGH RIDGE CR | OFF FSR 420 | MONROE | YUGUS ARINUS |
| 10629 | 4/21/09 | ROUGH RIDGE CR | OFF FSR 420 | MONROE | MICROPSECTRA SP A |
| 10629 | 4/21/09 | ROUGH RIDGE CR | OFF FSR 420 | MONROE | LIMNOPHILA SPP |
| 10629 | 4/21/09 | ROUGH RIDGE CR | OFF FSR 420 | MONROE | RHITHROGENA AMICA |
| 10652 | 4/21/09 | JENKS BR | OFF FSR 420 | Cherokee | PEDICIA SPP |
| 10652 | 4/21/09 | JENKS BR | OFF FSR 420 | Cherokee | EUKIEFFERIELLA TIROLENSIS |
| 10652 | 4/21/09 | JENKS BR | OFF FSR 420 | Cherokee | MICROPSECTRA SP A |
| 10652 | 4/21/09 | JENKS BR | OFF FSR 420 | Cherokee | MOLOPHILUS SPP |
| 10651 | 4/21/09 | TELLICO R | OFF FSR 420 ABOVE PECKERWOOD CR | Cherokee | EUKIEFFERIELLA TIROLENSIS |
| 10651 | 4/21/09 | TELLICO R | OFF FSR 420 ABOVE PECKERWOOD CR | Cherokee | RHITHROGENA AMICA |
| 10651 | 4/21/09 | TELLICO R | OFF FSR 420 ABOVE PECKERWOOD CR | Cherokee | MICROPSECTRA SP A |
| 10630 | 4/21/09 | PECKERWOOD CR | OFF FSR 420 NEAR MOUTH | Cherokee | MOLOPHILUS SPP |
| 10651 | 4/21/09 | TELLICO R | OFF FSR 420 ABOVE PECKERWOOD CR | Cherokee | MOLOPHILUS SPP |
| 10651 | 4/21/09 | TELLICO R | OFF FSR 420 ABOVE PECKERWOOD CR | Cherokee | PROBEZZIA SPP |
| 10629 | 4/21/09 | ROUGH RIDGE CR | OFF FSR 420 | MONROE | MOLOPHILUS SPP |
| 10651 | 4/21/09 | TELLICO R | OFF FSR 420 ABOVE PECKERWOOD CR | Cherokee | LIMNOPHILA SPP |
| 10629 | 4/21/09 | ROUGH RIDGE CR | OFF FSR 420 | MONROE | CORDULEGASTER ERRONEA |
| 10629 | 4/21/09 | ROUGH RIDGE CR | OFF FSR 420 | MONROE | ORTHOCLADIUS SPP |
| 10651 | 4/21/09 | TELLICO R | OFF FSR 420 ABOVE PECKERWOOD CR | Cherokee | ACERPENNA MACDUNNOUGH |
| 10628 | 4/20/09 | TELLICO R | FSR 420 | Cherokee | PLATYSMITTIA FIMBRIATA |
| 10628 | 4/20/09 | TELLICO R | FSR 420 | Cherokee | MICROPSECTRA SP A |
| 10628 | 4/20/09 | TELLICO R | FSR 420 | Cherokee | NANOCLADIUS BRANCHICOLUS |
| 10628 | 4/20/09 | TELLICO R | FSR 420 | Cherokee | TANYTARSUS SP M |
| 10628 | 4/20/09 | TELLICO R | FSR 420 | Cherokee | CHAETOCLADIUS SPP |
| 10628 | 4/20/09 | TELLICO R | FSR 420 | Cherokee | EPHEMERELLA CF HISPIDA |
| 10628 | 4/20/09 | TELLICO R | FSR 420 | Cherokee | CRICOTOPUS INFUSCATUS |
| 10628 | 4/20/09 | TELLICO R | FSR 420 | Cherokee | MOLOPHILUS SPP |
| 10628 | 4/20/09 | TELLICO R | FSR 420 | Cherokee | RASVENA TERNA |

BENTHIC MACROINVERTEBRATE SAMPLING METHODS

Standard Qualitative (Full Scale) Method

Benthic macroinvertebrates can be collected from wadeable, freshwater, flowing waters using three sampling procedures. The Biological Assessment Unit's standard qualitative (Full Scale) sampling procedure includes 10 composite samples: two kick-net samples, three bank sweeps, two rock or log washes, one sand sample, one leafpack sample, and three visual collections from large rocks and logs (<http://www.esb.enr.state.nc.us/BAUwww/benthossop.pdf>). The samples are picked on-site. The purpose of these collections is to inventory the aquatic fauna and produce an indication of relative abundance for each taxon. Organisms are classified as Rare (1 - 2 specimens), Common (3 - 9 specimens), or Abundant (≥ 10 specimens).

EPT Method

Benthic macroinvertebrates can also be collected using the EPT sampling procedure. Four rather than 10 composite qualitative samples are taken at each site: 1 kick, 1 sweep, 1 leafpack and three visual collections (<http://www.esb.enr.state.nc.us/BAUwww/benthossop.pdf>). Only EPT taxa (i.e., Mayflies, Stoneflies and Caddisflies) are collected and identified and only EPT criteria are used to assign a bioclassification.

Habitat Evaluation

An assessment form has been developed by the Biological Assessment Unit to better evaluate the physical habitat of a stream. The habitat score, which ranges between 1 and 100, is based on the evaluation of channel modification, amount of instream habitat, and type of bottom substrate, pool variety, bank stability, light penetration, and riparian zone width. Higher numbers suggest better habitat quality, but no criteria have been developed to assign impairment ratings based on habitat scores.

Data Analysis

Bioclassification criteria for standard qualitative samples in the mountain ecoregion are provided in NCDWQ 2006b and tolerance values for individual species and biotic index values have a range of 0 - 10, with higher numbers indicating more tolerant species or more polluted conditions. Water quality scores (5 = Excellent, 4 = Good, 3 = Good-Fair, 2 = Fair and 1 = Poor) assigned with the biotic index numbers are averaged with EPT taxa richness scores to produce a final bioclassification. Criteria bioclassifications for the EPT sample method is based on the total number of these taxa present in the sample and bioclassification thresholds for this method can be found in <http://www.esb.enr.state.nc.us/BAUwww/benthossop.pdf>.

EPT abundance and Total taxa richness calculations also are used to help examine between-site differences in water quality.

EPT taxa richness (EPT S) and Biotic Index (BI) values can be affected by seasonal changes. DWQ criteria for assigning bioclassification are based on summer sampling: June - September. For samples collected outside summer, EPT S can be adjusted by subtracting out winter/spring Plecoptera or other adjustment based on resampling of summer site. The BI values also are seasonally adjusted for samples outside the summer season.

Table 5. Benthic Community Data Collected from the Little Tennessee River Basin: 1983-2010. Current basinwide sites are in bold font.

| HUC/Waterbody | Location | County | SiteID | Date | ST | EPT | BI | EPTBI | Bioclass |
|-------------------------|----------------------------------|--------------|-------------|------------------|------------|-----------|-------------|-------------|------------------|
| 06010202 | | | | | | | | | |
| ALARKA CR | SR 1140 | SWAIN | GB54 | 11/7/1988 | 59 | 37 | 2.30 | 1.81 | Excellent |
| ALARKA CR | SR 1185 | SWAIN | GB17 | 7/11/1994 | 91 | 48 | 3.46 | 2.66 | Excellent |
| ALARKA CR | SR 1185 | SWAIN | GB17 | 8/9/1999 | 86 | 51 | 3.08 | 2.54 | Excellent |
| ALARKA CR | SR 1185 | SWAIN | GB17 | 8/2/2004 | 101 | 46 | 3.64 | 2.35 | Excellent |
| ALARKA CR | SR 1185 | SWAIN | GB17 | 7/29/2009 | 110 | 53 | 2.95 | 2.16 | Excellent |
| AMMONS BR | NR SPRUCE LN | MACON | GB55 | 7/25/2001 | 47 | 20 | 2.98 | 1.59 | Not Impaired |
| BEARMEAT BR | SR 1140 | SWAIN | GB64 | 11/7/1988 | 24 | 24 | 1.72 | 1.72 | Good |
| BIG CHOGA CR | FS RD 440 | MACON | GB67 | 9/6/1995 | 30 | 30 | 1.53 | 1.53 | Excellent |
| BIG CR | SR 1538 | MACON | GB51 | 8/29/2000 | 103 | 41 | 3.51 | 2.39 | Excellent |
| BIG CR | SR 1538 | MACON | GB51 | 7/25/2001 | 49 | 29 | 2.72 | 2.15 | Good |
| BIG CR | SR 1548 | MACON | GB56 | 6/22/1999 | 41 | 41 | 1.84 | 1.84 | Excellent |
| BIG CR | SR 1548 | MACON | GB56 | 9/11/2000 | 30 | 30 | 2.71 | 2.71 | Good |
| BRADLEY CR | OFF NC 28 | MACON | GB148 | 5/6/2008 | 58 | 30 | 3.53 | 2.20 | Good-Fair |
| BRUSH CR | NR MOUTH | MACON | GB68 | 6/22/1999 | 47 | 47 | 1.74 | 1.74 | Excellent |
| BRYSON BR | FS RD 437 | MACON | GB69 | 9/5/1995 | 59 | 33 | 2.32 | 1.74 | Excellent |
| BRYSON BR | FS RD 437 | MACON | GB69 | 10/6/1998 | 47 | 27 | 2.37 | 1.83 | Good |
| BUCK CR | NC 28 | MACON | GB70 | 6/22/1999 | 38 | 38 | 1.62 | 1.62 | Excellent |
| BUCKEYE BR | SR 1636 | MACON | GB187 | 9/15/2009 | 68 | 29 | 3.61 | 2.61 | Excellent |
| BURNINGTOWN CR | SR 1371 | MACON | GB30 | 7/26/1994 | 30 | 30 | 2.62 | 2.62 | Good |
| BURNINGTOWN CR | SR 1371 | MACON | GB30 | 8/10/1999 | 39 | 39 | 2.71 | 2.71 | Excellent |
| BURNINGTOWN CR | SR 1371 | MACON | GB30 | 8/3/2004 | 43 | 43 | 2.66 | 2.66 | Excellent |
| BURNINGTOWN CR | SR 1371 | MACON | GB30 | 8/4/2009 | 37 | 37 | 2.99 | 2.99 | Excellent |
| BURNINGTOWN CR | SR 1392 | MACON | GB34 | 8/3/2004 | 68 | 34 | 2.82 | 2.23 | Good |
| BURNINGTOWN CR | SR 1392 | MACON | GB34 | 5/24/2007 | 44 | 44 | 1.54 | 1.54 | Excellent |
| BURNINGTOWN CR | TELLICO RD | MACON | GB147 | 5/6/2008 | 107 | 60 | 3.43 | 2.61 | Excellent |
| CADON BR | OFF SR 1636 | MACON | GB193 | 9/15/2009 | 42 | 25 | 2.33 | 1.71 | Excellent |
| CALER FK | OFF RUBY MINE RD | MACON | GB154 | 5/7/2008 | 43 | 43 | 2.70 | 2.70 | Good |
| CARTOOGECHAYE CR | SR 1152 | MACON | GB71 | 8/9/1988 | 62 | 16 | 5.31 | 4.38 | Fair |
| CARTOOGECHAYE CR | SR 1303 | MACON | GB41 | 7/21/2004 | 38 | 38 | 2.52 | 2.52 | Excellent |
| CARTOOGECHAYE CR | SR 1307 | MACON | GB72 | 6/3/1996 | 84 | 45 | 2.93 | 2.35 | Excellent |
| CARTOOGECHAYE CR | SR 1307 | MACON | GB72 | 6/3/1996 | 77 | 36 | 3.56 | 2.42 | Good |
| CARTOOGECHAYE CR | SR 1146 | MACON | GB40 | 7/27/1994 | 30 | 30 | 2.91 | 2.91 | Good |
| CARTOOGECHAYE CR | SR 1146 | MACON | GB40 | 8/24/1999 | 41 | 41 | 2.81 | 2.81 | Excellent |
| CARTOOGECHAYE CR | SR 1146 | MACON | GB40 | 7/21/2004 | 31 | 31 | 3.03 | 3.03 | Good |
| CARTOOGECHAYE CR | SR 1146 | MACON | GB40 | 7/28/2009 | 30 | 30 | 3.24 | 3.24 | Good |
| CAT CR | OFF SR 1520 AT SEAGLE FARM | MACON | GB173 | 10/28/2008 | 39 | 20 | 4.21 | 3.75 | Not Impaired |
| CAT CR | OFF SR 1504 AT WOLDROOP PROPERTY | MACON | GB170 | 10/27/2008 | 47 | 20 | 4.17 | 3.17 | Not Impaired |

Table 5 (Continued).

| HUC/Waterbody | Location | County | SiteID | Date | ST | EPT | BI | EPTBI | Bioclass |
|--------------------|---|--------------|-------------|-------------------|------------|-----------|-------------|-------------|------------------|
| CAT CR | OFF PRESERVE DR ABOVE TOMATO FARM | MACON | GB171 | 10/27/2008 | 47 | 22 | 4.63 | 4.33 | Good-Fair |
| CAT CR | OFF PRESERVE DR ABOVE TOMATO FARM | MACON | GB171 | 6/4/2009 | 59 | 25 | 4.21 | 3.41 | Good-Fair |
| CAT CR | OFF SR 1504 | MACON | GB159 | 5/8/2008 | 29 | 29 | 3.75 | 3.75 | Good-Fair |
| CAT CR | OFF SR 1504 | MACON | GB159 | 10/27/2008 | 26 | 7 | 5.60 | 4.51 | Poor |
| CAT CR | OFF SR 1504 | MACON | GB159 | 7/14/2009 | 51 | 23 | 4.49 | 3.52 | Good-Fair |
| CHAMBERS CR | @ MOUTH | SWAIN | GB74 | 8/2/2005 | 37 | 37 | 1.60 | 1.60 | Excellent |
| COLD SPRINGS BR | FSR 711 | MACON | GB75 | 1/22/1990 | 41 | 41 | 1.79 | 1.79 | Good |
| COON CR | US23/441 | MACON | GB160 | 5/9/2008 | 60 | 34 | 3.72 | 2.47 | Good-Fair |
| COWEE CR | LEATHERMAN GAP RD | MACON | GB156 | 5/8/2008 | 117 | 59 | 3.03 | 2.13 | Excellent |
| COWEE CR | NC 28 | MACON | GB31 | 7/26/1994 | 24 | 24 | 3.31 | 3.31 | Good-Fair |
| COWEE CR | NC 28 | MACON | GB31 | 8/10/1999 | 35 | 35 | 2.37 | 2.37 | Good |
| COWEE CR | NC 28 | MACON | GB31 | 7/22/2004 | 38 | 38 | 2.82 | 2.82 | Excellent |
| COWEE CR | NC 28 | MACON | GB31 | 5/23/2007 | 43 | 43 | 2.81 | 2.81 | Excellent |
| COWEE CR | NC 28 | MACON | GB31 | 7/29/2009 | 40 | 40 | 2.94 | 2.94 | Excellent |
| COWEETA CR | SR 1114 | MACON | GB45 | 7/27/1994 | 39 | 39 | 2.21 | 2.21 | Excellent |
| COWEETA CR | SR 1114 | MACON | GB45 | 8/21/1999 | 39 | 39 | 2.42 | 2.42 | Excellent |
| COWEETA CR | SR 1114 | MACON | GB45 | 7/22/2004 | 45 | 45 | 2.37 | 2.37 | Excellent |
| COWEETA CR | SR 1114 | MACON | GB45 | 7/29/2009 | 41 | 41 | 2.16 | 2.16 | Excellent |
| CRAWFORD BR | E MAIN ST | MACON | GB76 | 6/21/1999 | 33 | 7 | 7.51 | 4.29 | Not Rated |
| CRAWFORD BR | E MAIN ST | MACON | GB76 | 5/20/2010 | 23 | 5 | 5.76 | 4.45 | Good-Fair |
| CRAWFORD BR | FRANKLIN MEM PK | MACON | GB77 | 6/21/1999 | 24 | 24 | 3.04 | 3.04 | Not Impaired |
| CRAWFORD BR | FRANKLIN MEM PK | MACON | GB77 | 5/20/2010 | 41 | 18 | 3.65 | 2.78 | Excellent |
| CULLASAJA R | AB BRUSH CR | MACON | GB80 | 6/22/1999 | 49 | 49 | 2.18 | 2.18 | Excellent |
| CULLASAJA R | BE BRIDAL VEIL FALLS | MACON | GB57 | 12/11/1990 | 30 | 30 | 3.64 | 3.64 | Good-Fair |
| CULLASAJA R | BE BRIDAL VEIL FALLS | MACON | GB57 | 10/16/1991 | 20 | 20 | 4.24 | 4.24 | Good-Fair |
| CULLASAJA R | BE BRIDAL VEIL FALLS | MACON | GB57 | 7/26/1994 | 70 | 27 | 4.79 | 3.63 | Good-Fair |
| CULLASAJA R | BE BRIDAL VEIL FALLS | MACON | GB57 | 10/14/1996 | 20 | 20 | 4.21 | 4.21 | Good-Fair |
| CULLASAJA R | BE BRIDAL VEIL FALLS | MACON | GB57 | 8/11/2000 | 20 | 20 | 3.82 | 3.82 | Good-Fair |
| CULLASAJA R | NR GOLD MINE | MACON | GB44 | 8/5/2004 | 78 | 36 | 3.79 | 3.09 | Good |
| CULLASAJA R | NR SR 1524 | MACON | GB78 | 12/12/1990 | 28 | 28 | 3.44 | 3.44 | Good-Fair |
| CULLASAJA R | NR SR 1524 | MACON | GB78 | 10/15/1991 | 35 | 35 | 3.41 | 3.41 | Good |
| CULLASAJA R | NR SR 1524 | MACON | GB78 | 10/14/1996 | 37 | 37 | 2.67 | 2.67 | Good |
| CULLASAJA R | RIVER CT RD | MACON | GB53 | 5/16/2000 | 61 | 25 | 4.68 | 3.47 | Not Impaired |
| CULLASAJA R | RIVER CT RD | MACON | GB53 | 7/26/2001 | 56 | 16 | 5.57 | 3.98 | Not Rated |
| CULLASAJA R | SR 1668 | MACON | GB39 | 8/10/1999 | 99 | 51 | 3.74 | 3.09 | Excellent |
| CULLASAJA R | SR 1668 | MACON | GB39 | 8/5/2004 | 86 | 42 | 4.27 | 3.42 | Good |
| CULLASAJA R | SR 1668 | MACON | GB39 | 8/3/2010 | 116 | 50 | 4.30 | 3.08 | Excellent |
| CULLASAJA R | SR 1678 | MACON | GB79 | 12/11/1990 | 37 | 37 | 2.59 | 2.59 | Good |
| CULLASAJA R | SR 1678 | MACON | GB79 | 10/15/1991 | 95 | 48 | 3.67 | 2.90 | Excellent |

Table 5 (Continued).

| HUC/Waterbody | Location | County | SiteID | Date | ST | EPT | BI | EPTBI | Bioclass |
|---------------|-----------------------------------|-----------|--------|------------|-----|-----|------|-------|--------------|
| CULLASAJA R | SR 1678 | MACON | GB79 | 7/26/1994 | 85 | 42 | 3.60 | 2.73 | Excellent |
| CULLASAJA R | SR 1678 | MACON | GB79 | 10/15/1996 | 86 | 45 | 3.31 | 2.36 | Excellent |
| CULLASAJA R | SR 1678 | MACON | GB79 | 6/22/1999 | 90 | 50 | 3.36 | 2.29 | Excellent |
| CULLASAJA R | SR 1678 | MACON | GB79 | 8/3/2010 | 103 | 51 | 3.26 | 2.35 | Excellent |
| CULLASAJA R | US 64 | MACON | GB48 | 12/11/1990 | 14 | 14 | 5.17 | 5.17 | Fair |
| CULLASAJA R | US 64 | MACON | GB48 | 10/16/1991 | 9 | 9 | 5.78 | 5.78 | Poor |
| CULLASAJA R | US 64 | MACON | GB48 | 10/14/1996 | 18 | 18 | 4.85 | 4.85 | Fair |
| CULLASAJA R | US 64 | MACON | GB48 | 6/23/1999 | 47 | 14 | 5.63 | 4.88 | Fair |
| CULLASAJA R | US 64 | MACON | GB48 | 8/28/2000 | 65 | 18 | 6.25 | 5.27 | Fair |
| CULLASAJA R | US 64 | MACON | GB48 | 7/25/2001 | 41 | 10 | 6.67 | 6.04 | Fair |
| CULLASAJA R | US 64 | MACON | GB48 | 7/21/2004 | 58 | 14 | 5.67 | 4.73 | Fair |
| CULLASAJA R | US 64 | MACON | GB48 | 8/3/2010 | 91 | 29 | 5.15 | 3.83 | Good-Fair |
| DALTON CR | OFF DALTON CR DR | MACON | GB172 | 10/28/2008 | 40 | 24 | 3.71 | 2.97 | Not Impaired |
| DALTON CR | OFF DALTON CR DR | MACON | GB172 | 5/20/2010 | 53 | 35 | 2.05 | 1.88 | Excellent |
| DICKS CR | NR SR 1401 | MACON | GB9 | 11/16/1993 | 26 | 26 | 2.81 | 2.81 | Good-Fair |
| DICKS CR | NR SR 1401 | MACON | GB9 | 8/13/1999 | 34 | 34 | 1.57 | 1.57 | Good |
| DICKS CR | NR SR 1401 | MACON | GB9 | 7/21/2004 | 27 | 27 | 1.28 | 1.28 | Good-Fair |
| EAGLE CR | @ MOUTH | SWAIN | GB81 | 8/3/2005 | 113 | 62 | 2.49 | 1.56 | Excellent |
| ELLIJAY CR | SR 1524 | MACON | GB82 | 6/21/1999 | 40 | 40 | 2.57 | 2.57 | Excellent |
| EVANS BR | OFF SR 1639 | MACON | GB186 | 9/14/2009 | 71 | 38 | 2.83 | 2.17 | Excellent |
| HAZEL CR | NR MOUTH | SWAIN | GB3 | 7/12/1994 | 95 | 47 | 2.49 | 1.61 | Excellent |
| HAZEL CR | NR MOUTH | SWAIN | GB3 | 8/11/1999 | 106 | 56 | 2.65 | 1.60 | Excellent |
| HAZEL CR | NR MOUTH | SWAIN | GB3 | 8/3/2004 | 96 | 46 | 3.07 | 1.87 | Excellent |
| HAZEL CR | NR MOUTH | SWAIN | GB3 | 8/3/2005 | 108 | 60 | 2.73 | 1.90 | Excellent |
| HAZEL CR | NR MOUTH | SWAIN | GB3 | 7/28/2009 | 118 | 61 | 2.48 | 1.77 | Excellent |
| HOUSTON BR | SIMON SPEED RD | MACON | GB52 | 8/29/2000 | 47 | 25 | 2.48 | 1.86 | Not Impaired |
| IOTLA BR | SR 1387 | MACON | GB152 | 5/7/2008 | 47 | 16 | 5.21 | 4.40 | Fair |
| IOTLA CR | SR 1485 | MACON | GB37 | 7/22/2004 | 47 | 34 | 3.78 | 3.47 | Not Impaired |
| IOTLA CR | SR 1385 | MACON | GB162 | 5/7/2008 | 60 | 34 | 3.38 | 2.85 | Good |
| IOTLA CR | SR 1378 | MACON | GB153 | 5/7/2008 | 88 | 40 | 4.34 | 3.50 | Good |
| IOTLA CR | SR 1372 | MACON | GB33 | 7/27/1994 | 21 | 21 | 4.28 | 4.28 | Good-Fair |
| IOTLA CR | SR 1372 | MACON | GB33 | 8/10/1999 | 35 | 35 | 3.50 | 3.50 | Good |
| IOTLA CR | SR 1372 | MACON | GB33 | 7/22/2004 | 73 | 32 | 4.66 | 3.86 | Good |
| IOTLA CR | SR 1372 | MACON | GB33 | 5/24/2007 | 31 | 31 | 3.62 | 3.62 | Good |
| IOTLA CR | SR 1372 | MACON | GB33 | 8/4/2009 | 83 | 32 | 4.63 | 3.92 | Good |
| JARRETT CR | FS RD 437 | MACON | GB89 | 9/6/1995 | 35 | 35 | 1.62 | 1.62 | Good |
| L TENNESSEE R | OFF US 23-441, NEAR STATE LINE | RABUN, GA | GB134 | 8/31/1994 | 69 | 27 | 4.95 | 4.08 | Good-Fair |
| L TENNESSEE R | OFF US 23-441, NEAR STATE LINE | RABUN, GA | GB134 | 8/12/1999 | 60 | 14 | 6.20 | 4.68 | Fair |
| L TENNESSEE R | OFF US 23-441, NEAR STATE LINE | RABUN, GA | GB134 | 7/21/2004 | 70 | 22 | 5.53 | 3.48 | Good-Fair |
| L TENNESSEE R | NC 28 | MACON | GB35 | 8/16/1983 | 72 | 29 | 5.07 | 3.92 | Good-Fair |

Table 5 (Continued).

| HUC/Waterbody | Location | County | SiteID | Date | ST | EPT | BI | EPTBI | Bioclass |
|-----------------|---|--------|--------|------------|-----|-----|------|-------|--------------|
| L TENNESSEE R | NC 28 | MACON | GB35 | 8/22/1984 | 64 | 28 | 4.75 | 3.92 | Good-Fair |
| L TENNESSEE R | NC 28 | MACON | GB35 | 8/6/1985 | 64 | 26 | 5.00 | 4.13 | Good-Fair |
| L TENNESSEE R | NC 28 | MACON | GB35 | 6/23/1986 | 72 | 26 | 5.60 | 4.40 | Good-Fair |
| L TENNESSEE R | NC 28 | MACON | GB35 | 8/6/1987 | 75 | 28 | 5.37 | 4.29 | Good-Fair |
| L TENNESSEE R | NC 28 | MACON | GB35 | 7/26/1994 | 57 | 27 | 4.88 | 4.07 | Good-Fair |
| L TENNESSEE R | NC 28 | MACON | GB35 | 8/24/1999 | 86 | 32 | 5.27 | 3.65 | Good-Fair |
| L TENNESSEE R | NC 28 | MACON | GB35 | 7/22/2004 | 72 | 33 | 5.11 | 4.19 | Good-Fair |
| L TENNESSEE R | NC 28 | MACON | GB35 | 8/5/2009 | 84 | 36 | 4.65 | 3.54 | Good |
| L TENNESSEE R | OFF SR 1629 BE COMMISSIONER CR | MACON | GB50 | 9/11/2000 | 67 | 15 | 6.35 | 4.08 | Fair |
| L TENNESSEE R | OFF SR 1629 BE COMMISSIONER CR | MACON | GB50 | 8/4/2010 | 72 | 24 | 5.72 | 4.61 | Good-Fair |
| L TENNESSEE R | SR 1113 | SWAIN | GB24 | 6/23/1994 | 79 | 32 | 4.42 | 3.75 | Good |
| L TENNESSEE R | SR 1113 | SWAIN | GB24 | 7/13/1994 | 82 | 39 | 4.46 | 3.81 | Good |
| L TENNESSEE R | SR 1113 | SWAIN | GB24 | 8/9/1999 | 75 | 31 | 4.59 | 3.44 | Good |
| L TENNESSEE R | SR 1113 | SWAIN | GB24 | 8/5/2004 | 95 | 42 | 4.04 | 3.03 | Good |
| L TENNESSEE R | SR 1113 | SWAIN | GB24 | 5/23/2007 | 40 | 40 | 3.11 | 3.11 | Excellent |
| L TENNESSEE R | SR 1113 | SWAIN | GB24 | 8/5/2010 | 89 | 39 | 4.19 | 3.36 | Good |
| L TENNESSEE R | SR 1651 | MACON | GB10 | 8/16/1983 | 66 | 21 | 5.95 | 4.57 | Fair |
| L TENNESSEE R | SR 1651 | MACON | GB10 | 8/6/1985 | 52 | 18 | 5.48 | 4.66 | Fair |
| L TENNESSEE R | SR 1651 | MACON | GB10 | 8/5/1987 | 64 | 20 | 5.59 | 4.73 | Good-Fair |
| L TENNESSEE R | SR 1651 | MACON | GB10 | 10/20/1999 | 62 | 29 | 4.16 | 3.27 | Good-Fair |
| L TENNESSEE R | SR 1651 | MACON | GB10 | 7/22/2004 | 93 | 37 | 5.30 | 3.62 | Good |
| L TENNESSEE R | SR 1651 | MACON | GB10 | 8/4/2010 | 93 | 35 | 5.03 | 4.12 | Good |
| LAKEY CR | OFF NC 28 | MACON | GB149 | 5/6/2008 | 100 | 44 | 3.48 | 2.75 | Good |
| MATLOCK CR | MATLOCK CREEK RD | MACON | GB155 | 5/8/2008 | 32 | 32 | 2.44 | 2.44 | Good-Fair |
| MIDDLE CR | SR 1635 | MACON | GB49 | 8/24/1999 | 25 | 25 | 3.94 | 3.94 | Good-Fair |
| MIDDLE CR | SR 1635 | MACON | GB49 | 7/22/2004 | 43 | 43 | 2.37 | 2.37 | Excellent |
| MIDDLE CR | SR 1635 | MACON | GB49 | 8/3/2010 | 38 | 38 | 2.77 | 2.77 | Excellent |
| MILL CR | NR MILL CR RD | MACON | GB92 | 12/12/1990 | 15 | 15 | 4.34 | 4.34 | Fair |
| MILL CR | NR MILL CR RD | MACON | GB92 | 10/16/1991 | 36 | 12 | 5.39 | 4.33 | Fair |
| MILL CR | NR OAK LN | MACON | GB62 | 8/28/2000 | 47 | 17 | 5.47 | 4.51 | Not Rated |
| MILL CR | NR RAOUL RD | MACON | GB61 | 12/12/1990 | 17 | 17 | 3.62 | 3.62 | Fair |
| MILL CR | NR RAOUL RD | MACON | GB61 | 10/16/1991 | 50 | 12 | 5.57 | 4.09 | Fair |
| MILL CR | NR RAOUL RD | MACON | GB61 | 6/22/1999 | 44 | 15 | 4.36 | 3.25 | Good-Fair |
| MILL CR | NR RAOUL RD | MACON | GB61 | 5/17/2000 | 37 | 13 | 5.47 | 4.64 | Not Rated |
| MILL CR | NR RAOUL RD | MACON | GB61 | 8/29/2000 | 41 | 11 | 6.12 | 5.55 | Not Rated |
| N PR ELLIJAY CR | SR 1001 | MACON | GB97 | 6/21/1999 | 39 | 39 | 1.74 | 1.74 | Excellent |
| N SKITTY CR | GOVERNMENT RD | MACON | GB98 | 8/29/2000 | 45 | 28 | 2.24 | 1.59 | Not Impaired |
| NANTAHALA R | OFF FSR 308 | MACON | GB128 | 11/16/1993 | 71 | 37 | 3.64 | 3.17 | Good |
| NANTAHALA R | OFF US 19-74 DNS TALC MOUNTAIN BR | SWAIN | GB137 | 11/15/1993 | 53 | 23 | 3.99 | 2.69 | Good-Fair |

Table 5 (Continued).

| HUC/Waterbody | Location | County | SiteID | Date | ST | EPT | BI | EPTBI | Bioclass |
|----------------|------------------------------|--------|--------|------------|-----|-----|------|-------|--------------|
| NANTAHALA R | FSR 437 | MACON | GB42 | 8/22/1984 | 106 | 45 | 3.56 | 1.91 | Excellent |
| NANTAHALA R | FSR 437 | MACON | GB42 | 7/22/1986 | 106 | 48 | 3.50 | 2.32 | Excellent |
| NANTAHALA R | FSR 437 | MACON | GB42 | 8/9/1988 | 98 | 49 | 3.21 | 2.36 | Excellent |
| NANTAHALA R | FSR 437 | MACON | GB42 | 8/8/1990 | 98 | 53 | 2.71 | 1.94 | Excellent |
| NANTAHALA R | FSR 437 | MACON | GB42 | 7/10/1991 | 94 | 54 | 2.34 | 1.48 | Excellent |
| NANTAHALA R | FSR 437 | MACON | GB42 | 11/17/1993 | 80 | 46 | 3.05 | 2.41 | Excellent |
| NANTAHALA R | FSR 437 | MACON | GB42 | 7/26/1994 | 77 | 48 | 2.40 | 1.95 | Excellent |
| NANTAHALA R | FSR 437 | MACON | GB42 | 8/24/1999 | 100 | 49 | 3.11 | 2.02 | Excellent |
| NANTAHALA R | FSR 437 | MACON | GB42 | 7/21/2004 | 92 | 49 | 2.90 | 1.60 | Excellent |
| NANTAHALA R | FSR 437 | MACON | GB42 | 8/4/2010 | 108 | 56 | 3.01 | 1.93 | Excellent |
| NANTAHALA R | NR SR 1401 | MACON | GB100 | 11/17/1993 | 33 | 33 | 3.26 | 3.26 | Good |
| NANTAHALA R | OFF US 19-74 BE QUEENS CR | SWAIN | GB8 | 8/21/1984 | 60 | 22 | 5.40 | 2.67 | Good-Fair |
| NANTAHALA R | OFF US 19-74 BE QUEENS CR | SWAIN | GB8 | 7/23/1986 | 68 | 27 | 4.47 | 2.49 | Good-Fair |
| NANTAHALA R | OFF US 19-74 BE QUEENS CR | SWAIN | GB8 | 11/15/1993 | 65 | 32 | 3.94 | 2.37 | Good |
| NANTAHALA R | OFF US 19-74 BE QUEENS CR | SWAIN | GB8 | 7/26/1994 | 71 | 36 | 3.44 | 1.91 | Good |
| NANTAHALA R | OFF US 19-74 BE QUEENS CR | SWAIN | GB8 | 8/23/1999 | 35 | 35 | 1.87 | 1.87 | Good |
| NANTAHALA R | OFF US 19-74 BE QUEENS CR | SWAIN | GB8 | 7/20/2004 | 83 | 35 | 3.97 | 1.95 | Good |
| NANTAHALA R | OFF US 19-74 BE QUEENS CR | SWAIN | GB8 | 8/4/2009 | 93 | 37 | 3.74 | 1.99 | Good |
| NANTAHALA R | SR 1310 | MACON | GB99 | 11/16/1993 | 64 | 39 | 3.87 | 3.24 | Good |
| NANTAHALA R | SR 1310 | MACON | GB101 | 8/23/1999 | 41 | 41 | 2.15 | 2.15 | Excellent |
| NICHOLS BR | OFF SR 1636 | MACON | GB192 | 9/15/2009 | 38 | 23 | 2.21 | 1.72 | Good |
| PANTHER CR | SR 1233 | GRAHAM | GB16 | 7/13/1994 | 37 | 37 | 1.88 | 1.88 | Excellent |
| PANTHER CR | SR 1233 | GRAHAM | GB16 | 8/10/1999 | 39 | 39 | 1.85 | 1.85 | Excellent |
| PANTHER CR | SR 1233 | GRAHAM | GB16 | 8/4/2004 | 35 | 35 | 1.91 | 1.91 | Good |
| PANTHER CR | SR 1233 | GRAHAM | GB16 | 7/29/2009 | 45 | 45 | 1.93 | 1.93 | Excellent |
| PAYNE BR | @ MOUTH | SWAIN | GB104 | 8/3/2005 | 31 | 31 | 1.23 | 1.23 | Excellent |
| PILKEY CR | @ MOUTH | SWAIN | GB105 | 8/3/2005 | 30 | 30 | 1.84 | 1.84 | Excellent |
| POSSUM BR | SR 1636 | MACON | GB190 | 9/17/2009 | 64 | 33 | 2.81 | 2.07 | Excellent |
| QUEENS CR | SR 1412 | MACON | GB107 | 11/16/1993 | 27 | 27 | 1.72 | 1.72 | Excellent |
| QUEENS CR | SR 1412 | MACON | GB107 | 8/13/1999 | 29 | 29 | 1.32 | 1.32 | Excellent |
| RABBIT CR | OFF SR 1504 | MACON | GB158 | 5/8/2008 | 31 | 31 | 3.53 | 3.53 | Good-Fair |
| RABBIT CR | SR 1504 | MACON | GB157 | 10/27/2008 | 17 | 3 | 6.21 | 4.44 | Poor |
| RABBIT CR | SR 1504 | MACON | GB157 | 5/8/2008 | 98 | 42 | 4.55 | 3.52 | Good |
| RABBIT CR | SR 1504 | MACON | GB157 | 6/4/2009 | 44 | 21 | 4.29 | 3.12 | Good-Fair |
| RATTLESNAKE CR | BIG DOG RD | SWAIN | GB165 | 5/24/2007 | 61 | 38 | 2.21 | 1.64 | Not Impaired |
| ROARING FK | FSR 437 | MACON | GB111 | 9/5/1995 | 57 | 31 | 2.25 | 1.72 | Excellent |
| ROARING FK | FSR 437 | MACON | GB111 | 10/6/1998 | 41 | 27 | 2.03 | 1.80 | Good |
| SALT ROCK BR | FALLS DR | MACON | GB59 | 7/26/2001 | 43 | 5 | 6.53 | 5.39 | Not Rated |
| SHEHAN CR | @ MOUTH | SWAIN | GB112 | 8/3/2005 | 39 | 39 | 1.77 | 1.77 | Excellent |
| SILVERMINE CR | NC 28 | SWAIN | GB113 | 11/16/1993 | 22 | 22 | 2.99 | 2.99 | Good-Fair |

Table 5 (Continued).

| HUC/Waterbody | Location | County | SiteID | Date | ST | EPT | BI | EPTBI | Bioclass |
|----------------|--------------------------------------|--------|--------|------------|-----|-----|------|-------|--------------|
| STECOAH CR | SR 1226 | GRAHAM | GB166 | 10/12/2007 | 31 | 31 | 1.60 | 1.60 | Excellent |
| STECOAH CR | SR 1237 | GRAHAM | GB14 | 7/13/1994 | 29 | 29 | 3.20 | 3.20 | Good |
| STECOAH CR | SR 1237 | GRAHAM | GB14 | 8/11/1999 | 39 | 39 | 2.57 | 2.57 | Excellent |
| STECOAH CR | SR 1237 | GRAHAM | GB14 | 8/4/2004 | 30 | 30 | 2.34 | 2.34 | Good |
| STECOAH CR | SR 1237 | GRAHAM | GB14 | 7/29/2009 | 41 | 41 | 2.62 | 2.62 | Excellent |
| STILLHOUSE BR | SR 1636 | MACON | GB189 | 9/15/2009 | 27 | 17 | 2.79 | 1.97 | Good-Fair |
| TELLICO CR | off SR 1369 90m dns Sugar Cove Cr | MACON | GB188 | 8/16/2010 | 32 | 32 | 1.65 | 1.65 | Good |
| TELLICO CR | SR 1369 | MACON | GB187 | 8/5/2010 | 18 | 18 | 3.33 | 3.33 | Fair |
| TELLICO CR | SR 1367 | MACON | GB28 | 7/14/1994 | 84 | 43 | 3.24 | 2.37 | Excellent |
| TELLICO CR | SR 1367 | MACON | GB28 | 8/9/1999 | 108 | 54 | 3.30 | 2.24 | Excellent |
| TELLICO CR | SR 1367 | MACON | GB28 | 8/3/2004 | 93 | 44 | 3.29 | 2.33 | Excellent |
| TELLICO CR | SR 1367 | MACON | GB28 | 7/29/2009 | 93 | 40 | 3.07 | 2.35 | Excellent |
| TESSENTEE CR | SR 1684 | MACON | GB46 | 7/22/2004 | 47 | 47 | 2.36 | 2.36 | Excellent |
| TESSENTEE CR | SR 1684 | MACON | GB46 | 7/30/2009 | 52 | 52 | 2.70 | 2.70 | Excellent |
| TURTLE POND CR | SR 1620 | MACON | GB47 | 6/22/1999 | 42 | 42 | 1.71 | 1.71 | Excellent |
| TURTLE POND CR | SR 1620 | MACON | GB47 | 7/23/2004 | 49 | 49 | 1.82 | 1.82 | Excellent |
| TURTLE POND CR | SR 1620 | MACON | GB47 | 8/20/2009 | 46 | 46 | 1.92 | 1.92 | Excellent |
| UT CULLASAJA | US 64 | MACON | GB58 | 7/25/2001 | 46 | 23 | 3.23 | 2.32 | Not Impaired |
| WALNUT CR | SR 1533 | MACON | GB43 | 6/21/1999 | 34 | 34 | 1.60 | 1.60 | Good |
| WALNUT CR | SR 1533 | MACON | GB43 | 8/6/2004 | 68 | 38 | 2.33 | 1.74 | Excellent |
| WATAUGA CR | JIM BERRY RD | MACON | GB161 | 5/9/2008 | 39 | 39 | 2.75 | 2.75 | Good |
| WHEATFIELD BR | SR 1636 | MACON | GB188 | 9/15/2009 | 56 | 31 | 3.06 | 2.09 | Excellent |
| WHITEOAK CR | NR FSR 711 | MACON | GB123 | 11/8/1988 | 59 | 35 | 2.02 | 1.68 | Excellent |
| WHITEOAK CR | NR FSR 711 | MACON | GB123 | 1/23/1990 | 78 | 46 | 2.07 | 1.54 | Excellent |
| WHITEOAK CR | NR FSR 711 | MACON | GB123 | 5/15/1990 | 83 | 48 | 2.40 | 1.57 | Excellent |
| WHITEOAK CR | NR FSR 711 | MACON | GB123 | 8/10/1990 | 84 | 47 | 2.30 | 1.75 | Excellent |
| WHITEOAK CR | SR 1310 | MACON | GB32 | 11/8/1988 | 33 | 33 | 2.63 | 2.63 | Good |
| WHITEOAK CR | SR 1310 | MACON | GB32 | 5/15/1990 | 96 | 44 | 2.95 | 1.73 | Good |
| WHITEOAK CR | SR 1310 | MACON | GB32 | 8/9/1990 | 78 | 26 | 3.82 | 1.73 | Good |
| WHITEOAK CR | SR 1310 | MACON | GB32 | 11/16/1993 | 33 | 33 | 2.48 | 2.48 | Good |
| WHITEOAK CR | SR 1310 | MACON | GB32 | 8/13/1999 | 31 | 31 | 1.80 | 1.80 | Good |
| WHITEOAK CR | SR 1310 | MACON | GB32 | 7/20/2004 | 78 | 34 | 3.09 | 1.17 | Excellent |
| WHITEOAK CR | SR 1397 | MACON | GB36 | 11/8/1988 | 41 | 10 | 5.97 | 1.69 | Fair |
| WHITEOAK CR | SR 1397 | MACON | GB36 | 1/23/1990 | 83 | 39 | 3.74 | 2.34 | Good-Fair |
| WHITEOAK CR | SR 1397 | MACON | GB36 | 5/15/1990 | 79 | 35 | 4.06 | 1.95 | Good-Fair |
| WHITEOAK CR | SR 1397 | MACON | GB36 | 8/9/1990 | 60 | 20 | 5.78 | 2.27 | Fair |
| WHITEOAK CR | SR 1397 | MACON | GB36 | 7/21/2004 | 63 | 26 | 4.00 | 1.73 | Good-Fair |
| WHITEOAK CR | SR 1397 | MACON | GB36 | 7/28/2009 | 57 | 21 | 4.10 | 1.52 | Good-Fair |
| WHITEOAK CR | SR 1423 | MACON | GB124 | 1/23/1990 | 77 | 37 | 3.47 | 2.31 | Good-Fair |
| WHITEOAK CR | SR 1423 | MACON | GB124 | 5/15/1990 | 104 | 46 | 3.11 | 1.76 | Good |
| WHITEOAK CR | SR 1423 | MACON | GB124 | 8/9/1990 | 94 | 31 | 4.09 | 2.01 | Good |

Table 5 (Continued).

| HUC/Waterbody | Location | County | SiteID | Date | ST | EPT | BI | EPTBI | Bioclass |
|-----------------|--------------------------|---------|--------|------------|-----|-----|------|-------|-----------|
| WHITEROCK CR | HICKORY GAP ROAD | MACON | GB191 | 9/17/2009 | 41 | 23 | 3.19 | 2.16 | Good |
| WINE SPRING CR | SR 1310 | MACON | GB126 | 9/6/1995 | 21 | 21 | 1.48 | 1.48 | Good-Fair |
| YOUNCE CR | SMITH RD | MACON | GB151 | 5/7/2008 | 53 | 35 | 1.71 | 1.38 | Good |
| YOUNCE CR | YOUNCE CREEK RD | MACON | GB150 | 5/6/2008 | 39 | 39 | 1.63 | 1.63 | Good |
| 06010203 | | | | | | | | | |
| BEAR CR | NR MOUTH | SWAIN | GB60 | 7/12/1994 | 71 | 44 | 1.96 | 1.43 | Excellent |
| BEECH FLATS PR | AB KEPHART PR | SWAIN | GB66 | 10/11/1995 | 69 | 41 | 1.85 | 1.34 | Excellent |
| BEECH FLATS PR | AB US 441 | SWAIN | GB65 | 10/11/1995 | 39 | 26 | 1.34 | 1.04 | Excellent |
| BEECH FLATS PR | BE US 441 | SWAIN | GB136 | 10/11/1995 | 16 | 7 | 2.79 | 1.32 | Fair |
| BEECH FLATS PR | US 441 BE MINNIE BALL BR | SWAIN | GB135 | 9/1/1994 | 22 | 22 | 1.56 | 1.56 | Good-Fair |
| BRADLEY FK | US 441 | SWAIN | GB1 | 3/27/1989 | 45 | 45 | 1.81 | 1.81 | Excellent |
| BRADLEY FK | US 441 | SWAIN | GB1 | 9/1/1994 | 31 | 31 | 1.29 | 1.29 | Good |
| BRADLEY FK | US 441 | SWAIN | GB1 | 10/12/1995 | 69 | 42 | 1.99 | 1.63 | Excellent |
| BRADLEY FK | US 441 | SWAIN | GB1 | 7/22/1999 | 67 | 39 | 2.20 | 1.41 | Excellent |
| BRADLEY FK | US 441 | SWAIN | GB1 | 8/3/2004 | 79 | 47 | 2.17 | 1.67 | Excellent |
| BRADLEY FK | US 441 | SWAIN | GB1 | 7/29/2009 | 86 | 48 | 1.98 | 1.42 | Excellent |
| CANEY FK | SR 1740 | JACKSON | GB27 | 7/15/1994 | 93 | 56 | 3.01 | 2.38 | Excellent |
| CANEY FK | SR 1740 | JACKSON | GB27 | 7/20/1999 | 97 | 53 | 3.26 | 2.50 | Excellent |
| CANEY FK | SR 1740 | JACKSON | GB27 | 8/2/2004 | 107 | 54 | 3.39 | 2.33 | Excellent |
| CANEY FK | SR 1740 | JACKSON | GB27 | 8/2/2010 | 107 | 52 | 3.13 | 2.20 | Excellent |
| CEDAR CR | SR 1120 | JACKSON | GB73 | 9/12/1989 | 89 | 40 | 4.19 | 2.89 | Good |
| CONNELLY CR | SR 1177 | SWAIN | GB13 | 7/14/1994 | 94 | 42 | 3.33 | 2.81 | Excellent |
| CONNELLY CR | SR 1177 | SWAIN | GB13 | 7/21/1999 | 44 | 44 | 2.61 | 2.61 | Excellent |
| CONNELLY CR | SR 1177 | SWAIN | GB13 | 8/3/2004 | 34 | 34 | 2.27 | 2.27 | Good |
| CONNELLY CR | SR 1177 | SWAIN | GB13 | 7/29/2009 | 44 | 44 | 2.09 | 2.09 | Excellent |
| CULLOWHEE CR | SR 1001 | JACKSON | GB29 | 8/31/1994 | 32 | 32 | 2.32 | 2.32 | Good |
| CULLOWHEE CR | SR 1001 | JACKSON | GB29 | 7/20/1999 | 43 | 43 | 2.23 | 2.23 | Excellent |
| CULLOWHEE CR | SR 1001 | JACKSON | GB29 | 8/4/2004 | 47 | 47 | 2.21 | 2.21 | Excellent |
| CULLOWHEE CR | SR 1001 | JACKSON | GB29 | 7/30/2009 | 52 | 52 | 2.52 | 2.52 | Excellent |
| DEEP CR | W DEEP CR RD | SWAIN | GB5 | 7/11/1994 | 41 | 41 | 1.93 | 1.93 | Excellent |
| DEEP CR | W DEEP CR RD | SWAIN | GB5 | 8/9/1999 | 47 | 47 | 2.09 | 2.09 | Excellent |
| DEEP CR | W DEEP CR RD | SWAIN | GB5 | 8/2/2004 | 43 | 43 | 1.79 | 1.79 | Excellent |
| DEEP CR | W DEEP CR RD | SWAIN | GB5 | 8/6/2010 | 45 | 45 | 2.33 | 2.33 | Excellent |
| DEEP CR | SR 1340 | SWAIN | GB7 | 7/11/1994 | 88 | 50 | 2.82 | 2.11 | Excellent |
| DEEP CR | SR 1340 | SWAIN | GB7 | 8/9/1999 | 45 | 45 | 2.36 | 2.36 | Excellent |
| DEEP CR | SR 1340 | SWAIN | GB7 | 8/2/2004 | 38 | 38 | 1.73 | 1.73 | Excellent |
| DEEP CR | SR 1340 | SWAIN | GB7 | 8/6/2010 | 49 | 49 | 2.26 | 2.26 | Excellent |
| FISHER CR | SR 1447 BE UT | JACKSON | GB138 | 4/9/1987 | 24 | 24 | 2.54 | 2.54 | Good |
| FISHER CR | SR 1447 AB UT | JACKSON | GB83 | 4/9/1987 | 24 | 24 | 2.54 | 2.54 | Good |
| FORNEY CR | NR MOUTH | SWAIN | GB4 | 7/12/1994 | 79 | 46 | 2.33 | 1.44 | Excellent |

Table 5 (Continued).

| HUC/Waterbody | Location | County | SiteID | Date | ST | EPT | BI | EPTBI | Bioclass |
|----------------------|--------------------------------------|----------------|-------------|------------------|------------|-----------|-------------|-------------|------------------|
| FORNEY CR | NR MOUTH | SWAIN | GB4 | 8/11/1999 | 81 | 46 | 2.49 | 1.49 | Excellent |
| FORNEY CR | NR MOUTH | SWAIN | GB4 | 8/3/2004 | 78 | 44 | 2.29 | 1.57 | Excellent |
| FORNEY CR | NR MOUTH | SWAIN | GB4 | 7/28/2009 | 81 | 52 | 2.13 | 1.51 | Excellent |
| GRASSY CAMP CR | HEADWATERS | JACKSON | GB85 | 8/22/1984 | 52 | 21 | 4.09 | 2.38 | Good-Fair |
| GRASSY CAMP CR | SR 1145 | JACKSON | GB84 | 9/14/1989 | 27 | 27 | 2.20 | 2.20 | Good-Fair |
| GREY WOLF CR | @ MOUTH | SWAIN | GB86 | 8/2/2005 | 30 | 30 | 1.58 | 1.58 | Excellent |
| HURRICANE CR | SR 1145 | JACKSON | GB88 | 9/14/1989 | 39 | 39 | 2.14 | 2.14 | Excellent |
| HURRICANE CR | SR 1145 | JACKSON | GB88 | 12/10/1991 | 45 | 45 | 1.82 | 1.82 | Excellent |
| KEPHART PR | NR US 441 | SWAIN | GB90 | 10/11/1995 | 63 | 42 | 1.84 | 1.43 | Excellent |
| LICKLOG BR | SR 1706 | JACKSON | GB169 | 8/9/2007 | 34 | 34 | 1.32 | 1.32 | Good |
| MILL CR | SR 1145 | JACKSON | GB93 | 9/14/1989 | 28 | 28 | 2.15 | 2.15 | Good |
| MINGUS CR | US 441 | SWAIN | GB94 | 3/3/1989 | 41 | 41 | 2.07 | 2.07 | Excellent |
| MOSES CR | SR 1739 | JACKSON | GB26 | 7/20/1999 | 37 | 37 | 1.57 | 1.57 | Excellent |
| MOSES CR | SR 1739 | JACKSON | GB26 | 8/2/2004 | 46 | 46 | 1.38 | 1.38 | Excellent |
| MOSES CR | SR 1739 | JACKSON | GB26 | 8/2/2010 | 42 | 42 | 1.64 | 1.64 | Excellent |
| MOSES CR | SR 1740 | JACKSON | GB95 | 7/15/1994 | 33 | 33 | 2.13 | 2.13 | Good |
| MULL CR | SR 1737 | JACKSON | GB96 | 9/1/1994 | 29 | 29 | 1.50 | 1.50 | Good |
| NOLAND CR | NR MOUTH | SWAIN | GB6 | 8/11/1999 | 40 | 40 | 1.63 | 1.63 | Excellent |
| NOLAND CR | NR MOUTH | SWAIN | GB6 | 8/3/2004 | 35 | 35 | 1.57 | 1.57 | Good |
| NOLAND CR | NR MOUTH | SWAIN | GB6 | 7/28/2010 | 45 | 45 | 1.31 | 1.31 | Excellent |
| OCONALUFTEE R | OFF US 441 UPS BLUE RIDGE PKWY | SWAIN | GB129 | 3/29/1989 | 42 | 42 | 2.36 | 2.36 | Excellent |
| OCONALUFTEE R | OFF US 441 DNS BRADLEY FK | SWAIN | GB102 | 3/27/1989 | 86 | 48 | 2.25 | 1.71 | Excellent |
| OCONALUFTEE R | SR 1359 | SWAIN | GB11 | 8/9/1985 | 93 | 41 | 3.98 | 2.73 | Good |
| OCONALUFTEE R | SR 1359 | SWAIN | GB11 | 8/7/1987 | 102 | 44 | 4.02 | 2.74 | Excellent |
| OCONALUFTEE R | SR 1359 | SWAIN | GB11 | 3/29/1989 | 93 | 50 | 3.59 | 2.71 | Excellent |
| OCONALUFTEE R | SR 1359 | SWAIN | GB11 | 7/26/1989 | 88 | 47 | 3.90 | 2.84 | Excellent |
| OCONALUFTEE R | SR 1359 | SWAIN | GB11 | 7/14/1994 | 86 | 46 | 3.77 | 2.65 | Excellent |
| OCONALUFTEE R | SR 1359 | SWAIN | GB11 | 7/22/1999 | 104 | 53 | 3.62 | 2.85 | Excellent |
| OCONALUFTEE R | SR 1359 | SWAIN | GB11 | 8/5/2004 | 106 | 51 | 3.78 | 2.85 | Excellent |
| OCONALUFTEE R | SR 1359 | SWAIN | GB11 | 7/27/2009 | 98 | 47 | 3.69 | 2.90 | Excellent |
| PANTHER TOWN CR | nr SR 1301 | JACKSON | GB103 | 6/24/1999 | 28 | 28 | 1.65 | 1.65 | Good |
| PINE CR | SR 1145 | JACKSON | GB106 | 9/14/1989 | 87 | 36 | 4.29 | 3.04 | Good |
| RAVEN FK | OFF FSR 1410 DNS ACE CR | SWAIN | GB130 | 3/28/1989 | 43 | 43 | 1.50 | 1.50 | Excellent |
| RAVEN FK | BE STRIAIGHT FK | SWAIN | GB109 | 3/28/1989 | 43 | 43 | 2.53 | 2.53 | Excellent |
| RAVEN FK | NR STONY MTN RIDGE | SWAIN | GB110 | 3/28/1989 | 41 | 41 | 2.45 | 2.45 | Good |
| RAVEN FK | OFF FSR 1410 UPS STRAIGHT FK | SWAIN | GB108 | 3/28/1989 | 43 | 43 | 2.40 | 2.40 | Excellent |
| SAVANNAH CR | SR 1367 | JACKSON | GB23 | 7/26/1994 | 77 | 40 | 3.64 | 2.96 | Excellent |
| SAVANNAH CR | SR 1367 | JACKSON | GB23 | 7/21/1999 | 53 | 32 | 3.25 | 2.77 | Good |
| SAVANNAH CR | SR 1367 | JACKSON | GB23 | 8/4/2004 | 91 | 40 | 3.76 | 2.76 | Good |
| SAVANNAH CR | SR 1367 | JACKSON | GB23 | 7/30/2009 | 82 | 44 | 3.08 | 2.55 | Excellent |

Table 5 (Continued).

| HUC/Waterbody | Location | County | SiteID | Date | ST | EPT | BI | EPTBI | Bioclass |
|-------------------|-----------------------------|---------|--------|------------|-----|-----|------|-------|--------------|
| SCOTT CR | DNS SR 1556 | JACKSON | GB20 | 7/14/1994 | 68 | 28 | 4.87 | 2.87 | Good-Fair |
| SCOTT CR | DNS SR 1556 | JACKSON | GB20 | 7/21/1999 | 70 | 36 | 3.67 | 2.68 | Good |
| SCOTT CR | UPS SR 1556 | JACKSON | GB167 | 8/4/2004 | 74 | 35 | 3.57 | 2.71 | Good |
| SCOTT CR | UPS SR 1556 | JACKSON | GB167 | 8/9/2007 | 37 | 37 | 2.58 | 2.58 | Excellent |
| SCOTT CR | UPS SR 1556 | JACKSON | GB167 | 7/30/2009 | 98 | 46 | 3.61 | 2.74 | Excellent |
| SOCO CR | US 441 | JACKSON | GB115 | 3/28/1989 | 83 | 41 | 3.24 | 2.61 | Excellent |
| STRAIGHT FK | FSR 403 | SWAIN | GB116 | 3/28/1989 | 47 | 47 | 1.96 | 1.96 | Excellent |
| SUGARLOAF CR | OFF SR 1708 | JACKSON | GB163 | 8/9/2007 | 14 | 14 | 1.46 | 1.46 | Fair |
| TUCKASEGEE R | BE GREENLAND CR | JACKSON | GB118 | 6/8/1988 | 99 | 51 | 3.73 | 2.91 | Excellent |
| TUCKASEGEE R | SR 1377 | JACKSON | GB117 | 8/23/1984 | 65 | 25 | 4.66 | 3.46 | Good-Fair |
| TUCKASEGEE R | SR 1377 | JACKSON | GB117 | 7/23/1986 | 67 | 32 | 4.51 | 3.11 | Good |
| TUCKASEGEE R | SR 1377 | JACKSON | GB117 | 8/12/1988 | 83 | 39 | 4.27 | 2.96 | Good |
| TUCKASEGEE R | SR 1377 | JACKSON | GB117 | 8/10/1990 | 86 | 43 | 3.96 | 3.01 | Good |
| TUCKASEGEE R | SR 1377 | JACKSON | GB117 | 7/14/1994 | 100 | 47 | 4.25 | 3.14 | Excellent |
| TUCKASEGEE R | SR 1140 | JACKSON | GB38 | 9/13/1989 | 101 | 47 | 3.38 | 1.82 | Excellent |
| TUCKASEGEE R | SR 1140 | JACKSON | GB38 | 9/1/1994 | 39 | 39 | 2.12 | 2.12 | Excellent |
| TUCKASEGEE R | SR 1140 | JACKSON | GB38 | 7/19/1999 | 46 | 46 | 1.61 | 1.61 | Excellent |
| TUCKASEGEE R | SR 1140 | JACKSON | GB38 | 8/2/2004 | 36 | 36 | 1.72 | 1.72 | Excellent |
| TUCKASEGEE R | SR 1140 | JACKSON | GB38 | 8/17/2009 | 35 | 35 | 2.24 | 2.24 | Good |
| TUCKASEGEE R | SR 1378 | JACKSON | GB19 | 7/21/1999 | 75 | 40 | 4.14 | 3.47 | Good |
| TUCKASEGEE R | SR 1378 | JACKSON | GB19 | 8/4/2004 | 84 | 44 | 3.71 | 3.04 | Excellent |
| TUCKASEGEE R | SR 1378 | JACKSON | GB19 | 7/30/2009 | 75 | 43 | 3.87 | 3.11 | Good |
| UT PANTHERTOWN CR | AB PANTHERTOWN CR | JACKSON | GB119 | 6/24/1999 | 26 | 26 | 1.25 | 1.25 | Not Impaired |
| UT SHORTOFF CR | SR 1150 | JACKSON | GB120 | 8/22/1984 | 54 | 27 | 2.43 | 1.59 | Excellent |
| UT TUCKASEGEE R | SR 1172 | JACKSON | GB164 | 5/23/2007 | 55 | 32 | 1.51 | 1.28 | Not Impaired |
| W FK TUCKASEGEE R | SR 1133 | JACKSON | GB122 | 7/21/1999 | 35 | 35 | 2.28 | 2.28 | Good |
| WHITEROCK CR | NR FSR | JACKSON | GB125 | 12/11/1991 | 31 | 31 | 1.77 | 1.77 | Excellent |
| 06010204 | | | | | | | | | |
| BEAR CR | SR 1201 | GRAHAM | GB63 | 7/25/1994 | 62 | 32 | 3.13 | 2.55 | Excellent |
| CHEOAH R | OFF SR 1138 UPS MOUNTAIN CR | GRAHAM | GB133 | 8/12/1999 | 89 | 48 | 3.04 | 2.32 | Excellent |
| CHEOAH R | OFF SR 1138 UPS MOUNTAIN CR | GRAHAM | GB133 | 7/19/2004 | 84 | 38 | 3.60 | 2.82 | Good |
| CHEOAH R | OFF SR 1138 UPS MOUNTAIN CR | GRAHAM | GB133 | 7/27/2009 | 93 | 40 | 3.72 | 2.65 | Good |
| CHEOAH R | OFF US 129 BE LONG CR | GRAHAM | GB131 | 7/25/1994 | 73 | 32 | 3.82 | 3.06 | Good |
| CHEOAH R | SR 1147 | GRAHAM | GB15 | 7/20/2004 | 54 | 19 | 5.61 | 4.05 | Fair |
| CHEOAH R | SR 1147 | GRAHAM | GB15 | 5/5/2008 | 89 | 45 | 4.16 | 3.10 | Good |
| CHEOAH R | SR 1138 AB LONG CR | GRAHAM | GB21 | 8/15/1983 | 81 | 32 | 4.15 | 2.80 | Good |
| CHEOAH R | SR 1138 AB LONG CR | GRAHAM | GB21 | 8/8/1985 | 74 | 34 | 4.32 | 2.98 | Good |
| CHEOAH R | SR 1138 AB LONG CR | GRAHAM | GB21 | 8/6/1987 | 97 | 40 | 4.50 | 3.01 | Good |
| CHEOAH R | SR 1138 AB LONG CR | GRAHAM | GB21 | 7/26/1989 | 80 | 39 | 3.55 | 2.71 | Excellent |

Table 5 (Continued).

| HUC/Waterbody | Location | County | SiteID | Date | ST | EPT | BI | EPTBI | Bioclass |
|-----------------------|---------------------------------|---------------|-------------|------------------|-----------|-----------|-------------|-------------|------------------|
| CHEOAH R | SR 1138 AB LONG CR | GRAHAM | GB21 | 7/26/1989 | 38 | 38 | 3.02 | 3.02 | Excellent |
| CHEOAH R | OFF US 129 AB BARKER CR | GRAHAM | GB12 | 8/4/2004 | 42 | 42 | 2.76 | 2.76 | Excellent |
| HOOVER MILL CR | SR 1123 | GRAHAM | GB87 | 6/19/1990 | 85 | 49 | 1.94 | 1.56 | Excellent |
| JENKS BR | OFF FSR 420 | Cherokee | GB185 | 4/21/2009 | 76 | 40 | 1.87 | 1.24 | Excellent |
| L SANTEETLAH CR | NR SR 1127 | GRAHAM | GB18 | 7/20/2004 | 60 | 32 | 2.53 | 1.38 | Good |
| L SNOWBIRD CR | SR 1115 | GRAHAM | GB91 | 8/12/1999 | 39 | 39 | 1.26 | 1.26 | Excellent |
| MANGAN BR | OFF SYCAMORE CR. TRAIL | MONROE | GB175 | 4/23/2009 | 80 | 49 | 1.70 | 1.16 | Excellent |
| PECKERWOOD CR | OFF FSR 420 NEAR MOUTH | CHEROKEE | GB180 | 4/21/2009 | 66 | 47 | 1.79 | 1.33 | Excellent |
| ROUGH RIDGE CR | OFF FSR 420 | MONROE | GB184 | 4/21/2009 | 101 | 58 | 2.04 | 1.46 | Excellent |
| SNOWBIRD CR | SR 1119 | GRAHAM | GB114 | 6/19/1990 | 47 | 47 | 1.98 | 1.98 | Excellent |
| SNOWBIRD CR | SR 1119 | GRAHAM | GB114 | 7/26/1994 | 33 | 33 | 2.03 | 2.03 | Good |
| SNOWBIRD CR | SR 1120 | GRAHAM | GB25 | 6/20/1990 | 49 | 49 | 1.70 | 1.70 | Excellent |
| SNOWBIRD CR | SR 1120 | GRAHAM | GB25 | 8/12/1999 | 52 | 52 | 2.36 | 2.36 | Excellent |
| SNOWBIRD CR | SR 1120 | GRAHAM | GB25 | 7/20/2004 | 48 | 48 | 1.82 | 1.82 | Excellent |
| SNOWBIRD CR | SR 1120 | GRAHAM | GB25 | 7/28/2009 | 52 | 52 | 1.76 | 1.76 | Excellent |
| SYCAMORE CR | OFF FSR 420 | MONROE | GB176 | 4/23/2009 | 104 | 57 | 1.97 | 1.34 | Excellent |
| TELLICO R | OFF FSR 420 ABOVE PECKERWOOD CR | CHEROKEE | GB181 | 4/21/2009 | 95 | 54 | 1.98 | 1.43 | Excellent |
| TELLICO R | OFF FSR 420 ABOVE TIPTON CR | CHEROKEE | GB183 | 4/22/2009 | 116 | 69 | 2.16 | 1.51 | Excellent |
| TELLICO R | FSR 420 | CHEROKEE | GB182 | 4/20/2009 | 98 | 61 | 2.01 | 1.60 | Excellent |
| TIPTON CR | OFF FSR 420 | CHEROKEE | GB178 | 4/22/2009 | 87 | 50 | 2.12 | 1.52 | Excellent |
| TIPTON CR | OFF FSR 420 NEAR MOUTH | CHEROKEE | GB179 | 4/22/2009 | 70 | 41 | 1.92 | 1.56 | Excellent |
| TIPTON CREEK | FSR 420 | CHEROKEE | GB177 | 4/22/2009 | 77 | 50 | 1.92 | 1.31 | Excellent |
| TULULA CR | SR 1275 | GRAHAM | GB22 | 7/25/1994 | 78 | 34 | 3.81 | 3.01 | Good |
| TULULA CR | SR 1275 | GRAHAM | GB22 | 8/12/1999 | 85 | 40 | 3.57 | 2.69 | Excellent |
| TULULA CR | SR 1275 | GRAHAM | GB22 | 7/19/2004 | 60 | 31 | 3.23 | 2.73 | Good |
| TULULA CR | SR 1275 | GRAHAM | GB22 | 7/28/2009 | 88 | 39 | 3.77 | 2.70 | Good |
| TWENTY MILE CR | NC 28 | SWAIN | GB2 | 8/4/2004 | 29 | 29 | 1.82 | 1.82 | Good |
| TWENTY MILE CR | NC 28 | SWAIN | GB2 | 8/5/2010 | 41 | 41 | 2.06 | 2.06 | Excellent |
| W BUFFALO CR | SR 1123 DNS CEDAR CR | GRAHAM | GB132 | 6/19/1990 | 43 | 43 | 1.99 | 1.99 | Excellent |
| W BUFFALO CR | SR 1123 DNS CEDAR CR | GRAHAM | GB132 | 8/12/1999 | 39 | 39 | 2.27 | 2.27 | Excellent |
| W BUFFALO CR | OFF SR 1160 AB HOOVER MILL CR | GRAHAM | GB121 | 6/19/1990 | 83 | 40 | 2.69 | 1.60 | Excellent |

Appendix F-1. Fish community sampling methods and criteria.

Sampling Methods

At each sample site, a 600 ft. section of stream was selected and measured. Fish within the delineated stretch of stream were then collected using two backpack electrofishing units and usually, two persons netting the stunned fish. A seine was also used where there were substantial riffles. During the 2009 basinwide assessment BAU staff was assisted by staff from the DENR's Ecosystem Enhancement Program and DWQ's Asheville Regional Office. After collection, all readily identifiable fish were examined for sores, lesions, fin damage, and skeletal anomalies, measured (total length to the nearest 1 mm), and then released. Those fish that were not readily identifiable were preserved and returned to the laboratory for identification, examination, and total length measurement. These fish have been deposited as voucher specimens with the North Carolina State Museum of Natural Sciences in Raleigh. All young-of-year were excluded from the analyses.

North Carolina Index of Biotic Integrity (NCIBI) Analysis, Evaluation, and Scoring Criteria

The NCIBI is a modification of the Index of Biotic Integrity initially proposed by Karr (1981) and Karr, *et al.* (1986). The IBI method was developed for assessing a stream's biological integrity by examining the structure and health of its fish community. The scores derived from this index are a measure of the ecological health of the waterbody and may not directly correlate to water quality. For example, a stream with excellent water quality, but with poor or fair fish habitat, would not be rated excellent with this index. However, in many instances, a stream which rated excellent on the NCIBI should be expected to have excellent water quality.

The Index of Biological Integrity incorporates information about species richness and composition, trophic composition, fish abundance, and fish condition. The NCIBI summarizes the effects of all factors that influence aquatic faunal communities (water quality, energy source, habitat quality, flow regime, and biotic interactions). While change within a fish community can be caused by many factors, certain aspects of the community are generally more responsive to specific influences. Species composition measurements reflect habitat quality effects. Information on trophic composition reflects the effect of biotic interactions and energy supply. Fish abundance and condition information indicate additional water quality effects. It should be noted, however, that these responses may overlap. For example, a change in fish abundance may be due to decreased energy supply or a decline in habitat quality, not necessarily a change in water quality.

For the Little Tennessee River basin, the assessment of biological integrity using the North Carolina Index of Biotic Integrity (NCIBI) is provided by the cumulative assessment of 10 parameters or metrics. The values provided by the metrics are converted into scores on a 1, 3, or 5 scale. A score of 5 represents conditions which would be expected for undisturbed reference streams in the specific river basin or ecoregion, while a score of 1 indicates that the conditions deviate greatly from those expected in undisturbed streams of the region. Each metric is designed to contribute unique information to the overall assessment. The scores for all metrics are then summed to obtain the overall NCIBI score. Finally, the score (an even number between 12 and 60) is then used to determine the ecological integrity class of the stream from which the sample was collected.

The NCIBI has been revised (NCDENR 2006). Currently, the focus of using and applying the NCIBI has been restricted to wadeable streams that can be sampled by a crew of four persons. In 2001, the bioclassifications and criteria were recalibrated against regional reference site data (Biological Assessment Unit Memorandum F-20010922) (Tables 6 – 10). To qualify as a reference site, the site had to satisfy all seven criteria in the order listed in Table 6. Reference sites represented the least impacted or the most minimally impacted streams and the overall biological conditions of the fish communities that could be attained.

Table 6. Reference site selection hierarchy.

| Criterion | Qualification |
|------------------------------|---|
| 1 -- Habitat | Total habitat score ≥ 65 |
| 2 -- NPDES dischargers | No NPDES dischargers ≥ 0.01 MGD above the site or if there are small dischargers (~ 0.01 MGD), the dischargers are more than one mile upstream |
| 3 -- Percent urbanization | $< 10\%$ of the watershed is urban or residential areas |
| 4 -- Percent forested | $\geq 70\%$ of the watershed is forested or in natural vegetation |
| 5 -- Channel incision | At the site, the stream is not incised beyond natural conditions |
| 6 -- Riparian zone integrity | No breaks in the riparian zones or, if there are breaks, the breaks are rare |
| 7 -- Riparian zone width | Mountain streams -- width of the riparian zone along both banks is $\geq 6\text{m}$ |
| Exception 1 | If the site satisfied Criteria 1 - 6, except one of the two riparian widths was less than one unit optimal, then the site still qualified as a reference site |
| Exception 2 | If the site satisfied Criteria 1 - 3 and 5 - 7, but the percentage of the watershed in forest or natural vegetations was $\geq 60\%$ (rather than $\geq 70\%$), then the site still qualified as a reference site. [Note: in the New River Basin this last exception is $\geq 50\%$.] |

Table 7. Regional fish community reference sites in the Little Tennessee River basin.

| Waterbody | Station | County | Level IV Ecoregion |
|------------|-------------|--------|---|
| Walnut Cr | SR 1533 | Macon | Southern Crystalline Ridges & Mountains |
| Brush Cr | off SR 1129 | Swain | Southern Crystalline Ridges & Mountains |
| Panther Cr | SR 1233 | Graham | Southern Crystalline Ridges & Mountains |

Metrics, criteria, and ratings are applicable only to wadeable streams in the Little Tennessee River basin and are the same as those for the French Broad, Hiwassee, New, and Watauga River basins. The NCIBI should not be applied to non-wadeable streams or to small, wadeable Southern Appalachian type trout streams. General characteristics of rout streams include high gradient, certain aspects of the stream and riparian zones (e.g., *Rhododendron*-, *Leucothoe*-, and *Tsuga*-lined), presence of boulder and rock outcrop plunge pools, overall faunal characteristics (naturally low diversity), low specific conductance (often $< 25 \mu\text{S}/\text{cm}$), temperature (often $< 20^\circ\text{C}$), clarity (gin-clear), elevation, and stream order ($1^{\text{st}} - 3^{\text{rd}}$).

Table 8. Scoring criteria for the NCIBI for wadeable streams in the Western and Northern Mountains of the French Broad (including the Pigeon River), Hiwassee, Little Tennessee, New, and Watauga River basins with watersheds ranging between 3.1 and 161 mi^2 .

| No. | Metric | Score | |
|-----|--|---|---|
| 1 | No. of species | | |
| | ≥ 16 species | 5 | |
| | 12-15 species | 3 | |
| | < 12 species | 1 | |
| 2 | No. of fish | | |
| | 320-1,000 fish | 5 | |
| | 205-319 fish | 3 | |
| | < 205 fish | 1 | |
| 3 | No. of species of darters | | |
| | <u>French Broad & Little Tennessee River Basins</u> | <u>New River, Pigeon River, Watauga & Hiwassee River Basins</u> | |
| | ≥ 4 species | ≥ 3 species | 5 |
| | 2 or 3 species | 1 or 2 species | 3 |
| | 0 or 1 species | 0 species | 1 |
| 4 | No. of species of rock bass, smallmouth bass, and trout | | |
| | ≥ 2 species | 5 | |
| | 1 species | 3 | |
| | 0 species | 1 | |
| 5 | No. of species of cyprinids | | |
| | <u>All basins, except Pigeon River Basin</u> | <u>Pigeon River Basin</u> | |
| | ≥ 8 species | ≥ 6 species | 5 |
| | 6 or 7 species | 4 or 5 species | 3 |
| | ≤ 5 species | ≤ 3 | 1 |

| | | | |
|-----------|---|---|------------------------|
| 6 | No. of intolerant species | | |
| | | <u>All basins, except New River Basin</u> | <u>New River Basin</u> |
| | | ≥ 3 species | ≥ 5 species |
| | | 2 species | 3 or 4 species |
| | | 0 or 1 species | 0, 1, or 2 species |
| 7 | Percentage of tolerant individuals | | |
| | ≤ 2% | | 5 |
| | 2-10% | | 3 |
| | > 10% | | 1 |
| 8 | Percentage of omnivorous + herbivorous individuals | | |
| | 10-36% | | 5 |
| | 37-50% | | 3 |
| | > 50% | | 1 |
| | < 10% | | 1 |
| 9 | Percentage of insectivorous individuals | | |
| | 55-85% | | 5 |
| | 40-54% | | 3 |
| | < 40% | | 1 |
| | > 85% | | 1 |
| 12 | Percentage of species with multiple age groups | | |
| | ≥ 65% of all species have multiple age groups | | 5 |
| | 45-64% all species have multiple age groups | | 3 |
| | < 45% all species have multiple age groups | | 1 |

Table 9. Tolerance ratings and adult trophic guild assignments for fish in the Little Tennessee River basin. Species collected in 2009 are highlighted in blue.

| Family/Species | Common Name | Tolerance Rating | Trophic Guild of Adults |
|----------------------------------|---------------------------------|------------------|-------------------------|
| Petromyzontidae | Lampreys | | |
| <i>Ichthyomyzon greeleyi</i> | Mountain Brook Lamprey | Intermediate | Non-feeding |
| Lepisosteidae | Gars | | |
| <i>Lepisosteus osseus</i> | Longnose Gar | Tolerant | Piscivore |
| Clupeidae | Herrings | | |
| <i>Dorosoma cepedianum</i> | Gizzard Shad | Intermediate | Omnivore |
| <i>D. petenense</i> | Threadfin Shad | Intermediate | Omnivore |
| Cyprinidae | Carps and Minnows | | |
| <i>Campostoma anomalum</i> | Stoneroller | Intermediate | Herbivore |
| <i>Carassius auratus</i> | Goldfish | Tolerant | Omnivore |
| <i>Chrosomus oreas</i> | Mountain Redbelly Dace | Intermediate | Herbivore |
| <i>Clinostomus funduloides</i> | Rosyside Dace | Intermediate | Insectivore |
| <i>C. sp. cf. funduloides</i> | "Smoky" Dace | Intermediate | Insectivore |
| <i>Cyprinella galactura</i> | Whitetail Shiner | Intermediate | Insectivore |
| <i>Cyprinus carpio</i> | Common Carp | Tolerant | Omnivore |
| <i>Erimonax monachus</i> | Spotfin Chub | Intolerant | Insectivore |
| <i>Luxilus chrysocephalus</i> | Striped Shiner | Intermediate | Omnivore |
| <i>L. coccogenis</i> | Warpaint Shiner | Intermediate | Insectivore |
| <i>Nocomis leptoccephalus</i> | Bluehead Chub | Intermediate | Omnivore |
| <i>N. micropogon</i> | River Chub | Intermediate | Omnivore |
| <i>Notemigonus crysoleucas</i> | Golden Shiner | Tolerant | Omnivore |
| <i>Notropis leuciodus</i> | Tennessee Shiner | Intermediate | Insectivore |
| <i>N. lutipinnis</i> | Yellowfin Shiner | Intermediate | Insectivore |
| <i>N. photogenis</i> | Silver Shiner | Intolerant | Insectivore |
| <i>N. micropteryx</i> | Highland Shiner | Intolerant | Insectivore |
| <i>N. rubricroceus</i> | Saffron Shiner | Intermediate | Insectivore |
| <i>N. spectrunculus</i> | Mirror Shiner | Intermediate | Insectivore |
| <i>N. telescopus</i> | Telescope Shiner | Intolerant | Insectivore |
| <i>N. volucellus</i> | Mimic Shiner | Intolerant | Insectivore |
| <i>Phenacobius crassilabrum</i> | Fatlips Minnow | Intermediate | Insectivore |
| <i>Rhinichthys cataractae</i> | Longnose Dace | Intermediate | Insectivore |
| <i>R. obtusus</i> | Western Blacknose Dace | Intermediate | Insectivore |
| <i>Semotilus atromaculatus</i> | Creek Chub | Tolerant | Insectivore |
| Catostomidae | Suckers | | |
| <i>Catostomus commersonii</i> | White Sucker | Tolerant | Omnivore |
| <i>Hypentelium nigricans</i> | Northern Hogsucker | Intermediate | Insectivore |
| <i>Moxostoma anisurum</i> | Silver Redhorse | Intermediate | Insectivore |
| <i>M. carinatum</i> | River Redhorse | Intermediate | Insectivore |
| <i>M. duquesnei</i> | Black Redhorse | Intermediate | Insectivore |
| <i>M. erythrum</i> | Golden Redhorse | Intermediate | Insectivore |
| <i>M. macrolepidotum</i> | Shorthead Redhorse | Intermediate | Insectivore |
| <i>M. sp. cf. macrolepidotum</i> | Sicklefin Redhorse | Intermediate | Insectivore |
| <i>M. sp. cf. macrolepidotum</i> | Smallmouth Redhorse | Intermediate | Insectivore |
| Ictaluridae | North American Catfishes | | |
| <i>Ameiurus brunneus</i> | Snail Bullhead | Intermediate | Insectivore |
| <i>A. melas</i> | Black Bullhead | Tolerant | Insectivore |
| <i>A. nebulosus</i> | Brown Bullhead | Tolerant | Omnivore |
| <i>A. platycephalus</i> | Flat Bullhead | Tolerant | Insectivore |
| <i>Ictalurus punctatus</i> | Channel Catfish | Intermediate | Omnivore |
| <i>Noturus flavus</i> | Stonecat | Intermediate | Insectivore |
| <i>Pylodictis olivaris</i> | Flathead Catfish | Intermediate | Piscivore |
| Esocidae | Pikes | | |
| <i>Esox masquinongy</i> | Muskellunge | Intermediate | Piscivore |
| Salmonidae | Trouts and Salmons | | |
| <i>Oncorhynchus mykiss</i> | Rainbow Trout | Intolerant | Insectivore |
| <i>Salmo trutta</i> | Brown Trout | Intermediate | Piscivore |
| <i>Salvelinus fontinalis</i> | Brook Trout | Intolerant | Insectivore |

Table 9 (Continued).

| Family/Species | Common Name | Tolerance Rating | Trophic Guild of Adults |
|-----------------------------------|----------------------------|------------------|-------------------------|
| Cottidae | Sculpins | | |
| <i>Cottus bairdii</i> | Mottled Sculpin | Intermediate | Insectivore |
| Moronidae | Temperate Basses | | |
| <i>Morone chrysops</i> | White Bass | Intermediate | Piscivore |
| Centrarchidae | Sunfishes | | |
| <i>Ambloplites rupestris</i> | Rock Bass | Intolerant | Piscivore |
| <i>Lepomis auritus</i> | Redbreast Sunfish | Tolerant | Insectivore |
| <i>L. cyanellus</i> | Green Sunfish | Tolerant | Insectivore |
| <i>L. gibbosus</i> | Pumpkinseed | Intermediate | Insectivore |
| <i>L. gulosus</i> | Warmouth | Intermediate | Insectivore |
| <i>L. macrochirus</i> | Bluegill | Intermediate | Insectivore |
| <i>L. microlophus</i> | Redear Sunfish | Intermediate | Insectivore |
| <i>Micropterus dolomieu</i> | Smallmouth Bass | Intolerant | Piscivore |
| <i>M. punctulatus</i> | Spotted Bass | Intermediate | Piscivore |
| <i>M. salmoides</i> | Largemouth Bass | Intermediate | Piscivore |
| <i>Pomoxis annularis</i> | White Crappie | Intermediate | Piscivore |
| <i>P. nigromaculatus</i> | Black Crappie | Intermediate | Piscivore |
| Percidae | Darters and Perches | | |
| <i>Etheostoma chlorobranchium</i> | Greenfin Darter | Intolerant | Insectivore |
| <i>E. gitselli</i> | Tuckasegee Darter | Intermediate | Insectivore |
| <i>E. rufilineatum</i> | Redline Darter | Intermediate | Insectivore |
| <i>E. vulneratum</i> | Wounded Darter | Intolerant | Insectivore |
| <i>E. zonale</i> | Banded Darter | Intermediate | Insectivore |
| <i>Perca flavescens</i> | Yellow Perch | Intermediate | Piscivore |
| <i>Percina aurantiaca</i> | Tangerine Darter | Intolerant | Insectivore |
| <i>P. burtoni</i> | Blotchside Logperch | Intolerant | Insectivore |
| <i>P. evides</i> | Gilt Darter | Intolerant | Insectivore |
| <i>P. squamata</i> | Olive Darter | Intolerant | Insectivore |
| <i>Sander vitreus</i> | Walleye | Intermediate | Piscivore |

Table 10. Scores and classes for evaluating the fish community of a wadeable stream using the North Carolina Index of Biotic Integrity in the French Broad, Hiwassee, Little Tennessee, New, and Watauga River basins.

| NCIBI Scores | NCIBI Classes |
|-----------------------|---------------|
| 58 or 60 | Excellent |
| 48, 50, 52, 54, or 56 | Good |
| 40, 42, 44, or 46 | Good-Fair |
| 34, 36, or 38 | Fair |
| ≤ 32 | Poor |

Appendix F-2. Summary of fish community assessment data.

Monitoring efforts for 2009 can be summarized as:

- Twelve sites were assessed as part of the 2009 basinwide monitoring cycle.
- All of the sites, except Sweetwater and Yellow creeks, had been assessed during the previous basinwide cycle in 2004.
- In 2009, 12 sites were planned to be sampled; of these, 11 were actually sampled. Snowbird Creek off SR 1120/ SR 1115 in Graham County was not sampled because it was too wide and flowing too swiftly to be safely sampled. Sweetwater Creek was sampled as a substitute site.
- None of the streams sampled were on the 303 (d) impaired waters list (NCDENR 2007).
- The most commonly collected species were the Northern Hogsucker, Central Stoneroller, River Chub, and Mottled Sculpin. The most abundant species was the Mottled Sculpin which constituted almost one-third of all the fish collected.
- The federally Endangered Spotfin Chub was found in Iotla and Brush creeks.
- All streams, except and Stecoah Creek, a trout-type stream and Yellow Creek whose fish community is naturally depauperate, were evaluated and rated using the North Carolina Index of Biotic Integrity (NCIBI) (Appendices F-1, and F-3 – F-5). The NCIBI scores ranged from 48 to 58 and the NCIBI ratings were either Good or Excellent (Figure 1).
- Nine sites had been sampled and rated during the previous basinwide monitoring cycle (Figure 5). Of these, 6 sites had no appreciable change in their NCIBI rating and 3 sites had ratings that increased between 2004 and 2009. The improvements in scores and ratings were generally attributable to slight increases in the overall species diversity. No fish communities declined between 2004 and 2009.
- Streams classified as Trout waters (Tr) from which no trout were collected included Middle, Tessentee, Savannah, and Yellow creeks and Caney Fork.
- The instream and riparian habitat scores for the 12 sites ranged from 65 at Middle Creek to 89 at Sweetwater Creek (Appendix F-6). Lower scoring sites generally had narrow riparian zones which were sparsely vegetated with mature trees providing less than optimal shading to the streams and would benefit from bank stabilization and stream restoration techniques.
- All dissolved oxygen concentrations met the state water quality standard of 5 mg/L (Appendix F-7). Eight pH measurements were less than 6.0 s.u., but the water quality meter and measurements may be affected by the low specific conductance of the water. Elevated specific conductance measurements were associated primarily with nonpoint source runoff.

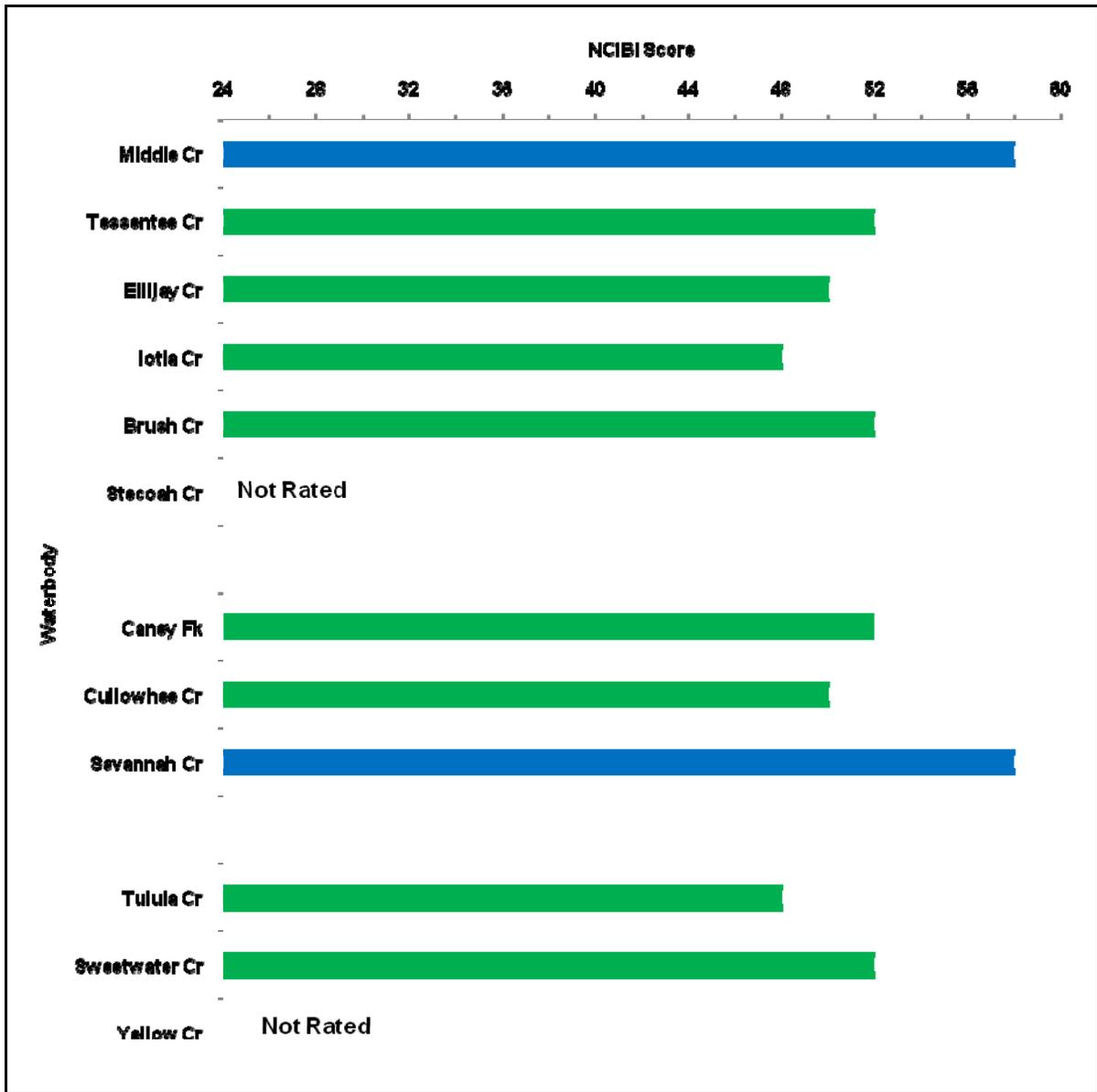


Figure 6. NCIBI scores and ratings of 12 fish community basinwide sites in the Little Tennessee River basin, 2009. Blue = Excellent and Green = Good.

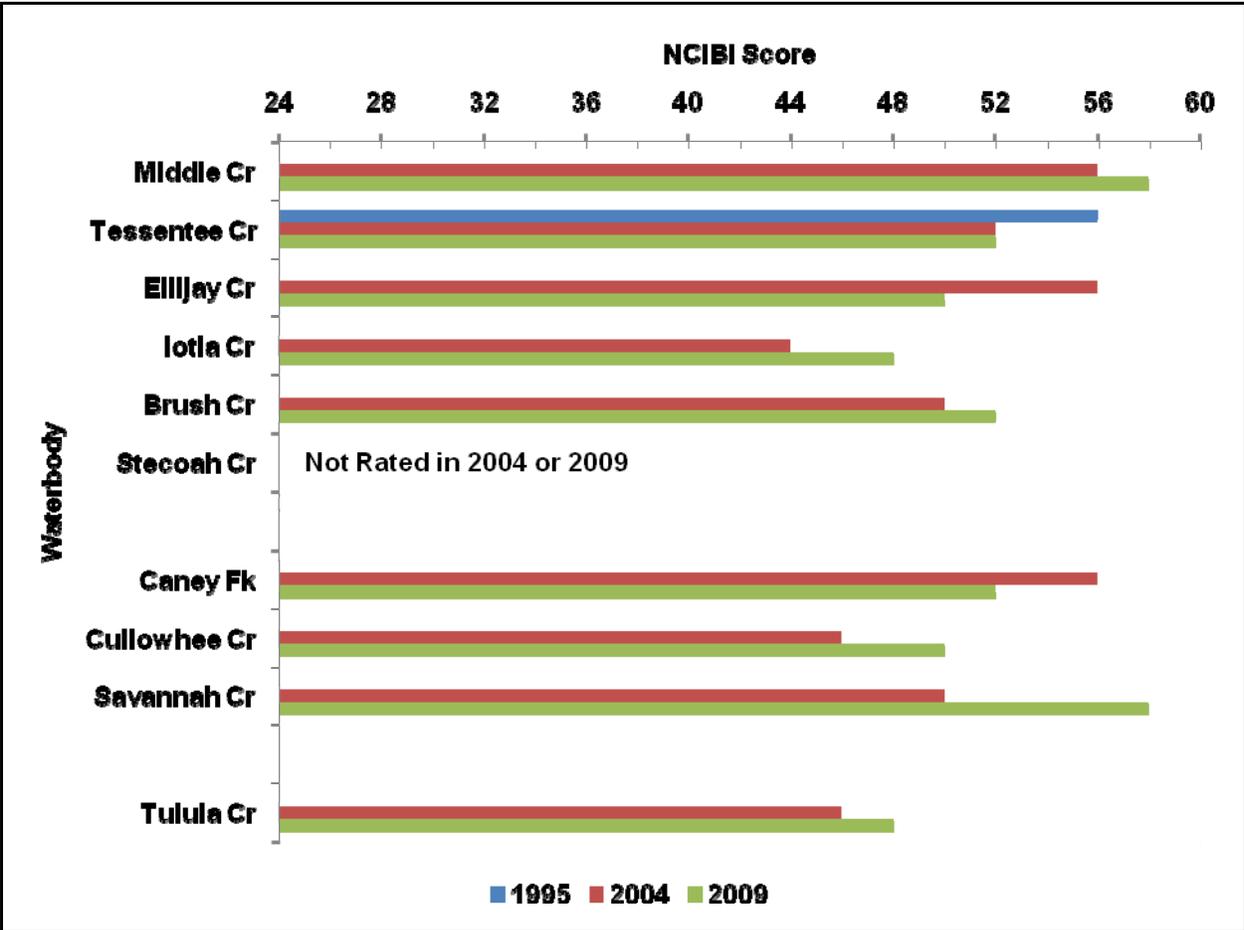


Figure 7. NCIBI scores and ratings of 10 repeat fish community sites in the Little Tennessee River basin, 1995 - 2009.

Appendix F-3.

Fish community data collected from the Little Tennessee River Basin, 1995
– 2009. Basinwide sites are in bold font.

| HUC/Waterbody | Station | County | Site ID | Date | NCIBI Score | NCIBI Rating |
|--|--------------------|----------------|-------------|----------|-------------|--------------|
| 06010202 Little Tennessee River | | | | | | |
| Alarka Cr | SR 1185 | Swain | GF1 | 06/03/04 | 46 | Good-Fair |
| Brush Cr | off SR 1129 | Swain | GF2 | 04/29/09 | 52 | Good |
| | | | | 05/19/04 | 50 | Good |
| Buckeye Br | off 1636/1640 | Macon | GF45 | 09/16/09 | --- | Not Rated |
| Burningtown Cr | SR 1364 | Macon | GF3 | 05/21/04 | 58 | Excellent |
| Cadon Br | off SR 1636 | Macon | GF50 | 09/16/09 | --- | Not Rated |
| Camprock Br | USFS 751 | Macon | GF40 | 10/27/09 | --- | Not Rated |
| Cartoogechaye Cr | SR 1146 | Macon | GF6 | 05/18/04 | 56 | Good |
| Cartoogechaye Cr | SR 1168 | Macon | GF10 | 05/02/95 | 56 | Good |
| Cowee Cr | SR 1340 | Macon | GF8 | 05/19/04 | 56 | Good |
| Coweeta Cr | SR 1119 | Macon | GF9 | 05/20/04 | 56 | Good |
| Coweeta Cr | US 23/441 | Macon | GF16 | 05/01/95 | 44 | Good-Fair |
| Cullasaja R | SR 1653 | Macon | GF11 | 10/20/99 | 46 | Good-Fair |
| | | | | 10/16/96 | 34 | Fair |
| Cullasaja R | SR 1677 | Macon | GF12 | 10/19/99 | 50 | Good |
| | | | | 10/15/96 | 52 | Good |
| Cunningham Cr | off USFS 751 | Macon | GF41 | 10/27/09 | --- | Not Rated |
| Ellijay Cr | SR 1524 | Macon | GF14 | 04/30/09 | 50 | Good |
| | | | | 05/20/04 | 56 | Good |
| Evans Cr | SR 1639 | Macon | GF44 | 09/16/09 | --- | Not Rated |
| Henson Cr | Ball Creek Rd | Macon | GF42 | 10/27/09 | --- | Not Rated |
| Howard Br | SR 1111 | Macon | GF43 | 10/27/09 | --- | Not Rated |
| Iotla Cr | off SR 1378 | Macon | GF15 | 05/01/09 | 48 | Good |
| | | | | 05/19/04 | 44 | Good-Fair |
| Iotla Cr | SR 1372 | Macon | GF18 | 05/03/95 | 22 | Poor |
| Little Tennessee R | off SR 1683 | Macon | GF17 | 05/17/04 | 38 | Fair |
| Middle Cr | SR 1635 | Macon | GF19 | 04/30/09 | 58 | Excellent |
| | | | | 05/17/04 | 56 | Good |
| Middle Cr | SR 1635 | Macon | GF20 | 05/03/95 | 46 | Good-Fair |
| N Fk Coweeta Cr | SR 1114 | Macon | GF38 | 10/27/09 | --- | Not Rated |
| Nantahala R | SR 1401 | Macon | GF25 | 11/15/93 | --- | Not Rated |
| Nichols Br | off SR 1636 | Macon | GF49 | 09/16/09 | --- | Not Rated |
| Panther Cr | SR 1233 | Graham | GF21 | 06/03/04 | --- | Not Rated |
| Pinnacle Cr | USFS 751 | Macon | GF39 | 10/27/09 | --- | Not Rated |
| Possum Br | off SR 1636 | Macon | GF48 | 09/16/09 | --- | Not Rated |
| Rabbit Cr | SR 1504 | Macon | GF22 | 05/20/04 | 44 | Good-Fair |
| Silvermine Cr | SR 1103 | Swain | GF31 | 11/16/93 | --- | Not Rated |
| Stecoah Cr | SR 1237 | Graham | GF26 | 04/28/09 | --- | Not Rated |
| | | | | 06/03/04 | --- | Not Rated |
| Stillhouse Br | SR 1636 | Macon | GF47 | 09/16/09 | --- | Not Rated |
| Tellico Cr | SR 1367 | Macon | GF27 | 05/21/04 | 50 | Good |
| Tessentee Cr | SR 1636 | Macon | GF28 | 04/30/09 | 52 | Good |
| | | | | 05/18/04 | 52 | Good |
| | | | | 05/03/95 | 56 | Good |
| Walnut Cr | SR 1533 | Macon | GF30 | 05/18/04 | --- | Not Rated |
| Wheatfield Br | SR 1636 | Macon | GF46 | 09/16/09 | --- | Not Rated |
| Whiteoak Cr | SR 1310/1404 | Macon | GF32 | 11/15/93 | --- | Not Rated |
| Whiterock Cr | off SR 1638 | Macon | GF51 | 09/17/09 | --- | Not Rated |
| 06010203 Tuckasegee River | | | | | | |
| Beck Br | off US 441 | Jackson | GF5 | 03/23/05 | --- | Not Rated |
| Camp Cr | SR 1405 | Jackson | GF33 | 03/24/05 | --- | Not Rated |
| Camp Cr | SR 1408 | Jackson | GF34 | 03/24/05 | --- | Not Rated |
| Camp Cr | SR 1488 | Jackson | GF35 | 03/23/05 | --- | Not Rated |
| Caney Fk | SR 1738 | Jackson | GF4 | 04/27/09 | 52 | Good |
| | | | | 06/01/04 | 56 | Good |
| Conley Cr | SR 1183 | Swain | GF7 | 06/02/04 | --- | Not Rated |
| Cullowhee Cr | SR 1545 | Jackson | GF13 | 04/27/09 | 50 | Good |
| | | | | 06/02/04 | 46 | Good-Fair |
| Savannah Cr | NC 116 | Jackson | GF23 | 04/28/09 | 58 | Excellent |
| | | | | 06/02/04 | 50 | Good |
| Scott Cr | SR 1527 | Jackson | GF24 | 06/01/04 | --- | Not Rated |

Appendix F-3 (continued).

| HUC/Waterbody | Station | County | Site ID | Date | NCIBI Score | NCIBI Rating |
|--|---------|--------|---------|----------|-------------|--------------|
| 06010204 Lower Little Tennessee River | | | | | | |
| Sweetwater Cr | SR 1214 | Graham | GF36 | 04/29/09 | 52 | Good |
| Tulula Cr | SR 1260 | Graham | GF29 | 04/29/09 | 48 | Good |
| | | | | 06/04/04 | 46 | Good-Fair |
| Yellow Cr | SR 1242 | Graham | GF37 | 04/28/09 | --- | Not Rated |

Appendix F-4. Fish community metric values from 12 wadeable streams in Little Tennessee River basinwide monitoring program, 2009.¹

| HUC/ Waterbody | Location | County | d. a. (mi ²) | Date | No. Species | No. Fish | No. Sp. Darters | No. Sp. RST | No. Sp. Cyprinids | No. Intol. Sp. | % Tolerant | % Omni. +Herb. | % Insect. | % MA |
|--|-------------|---------|-----------------------------|----------|----------------|-------------|--------------------|----------------|----------------------|-------------------|---------------|-------------------|--------------|---------|
| 06010202 Little Tennessee River | | | | | | | | | | | | | | |
| Ellijay Cr | SR 1524 | Macon | 20.0 | 04/30/09 | 19 | 1132 | 1 | 3 | 10 | 4 | 1 | 37 | 61 | 74 |
| Tessentee Cr | SR 1636 | Macon | 14.8 | 04/30/09 | 19 | 1476 | 2 | 1 | 9 | 3 | 1 | 29 | 65 | 68 |
| Middle Cr | SR 1635 | Macon | 12.2 | 04/30/09 | 19 | 823 | 2 | 2 | 11 | 3 | 1 | 24 | 75 | 68 |
| Iotla Cr | off SR 1378 | Macon | 10.0 | 05/01/09 | 22 | 289 | 4 | 3 | 10 | 6 | 3 | 41 | 45 | 50 |
| 06010203 Tuckasegee River | | | | | | | | | | | | | | |
| Caney Fk | SR 1738 | Jackson | 50.2 | 04/27/09 | 15 | 537 | 2 | 1 | 9 | 3 | 0 | 17 | 80 | 87 |
| Cullowhee Cr | SR 1545 | Jackson | 19.5 | 04/27/09 | 17 | 648 | 2 | 3 | 7 | 3 | 2 | 9 | 85 | 82 |
| Stecoah Cr | SR 1237 | Graham | 9.0 | 04/28/09 | 12 | 378 | 0 | 2 | 7 | 2 | 6 | 52 | 48 | 92 |
| Savannah Cr | NC 116 | Jackson | 36.5 | 04/28/09 | 18 | 622 | 2 | 4 | 8 | 4 | 0 | 25 | 74 | 67 |
| Brush Cr | off SR 1129 | Swain | 7.5 | 04/29/09 | 15 | 494 | 2 | 2 | 7 | 6 | 0 | 21 | 74 | 80 |
| 06010204 Lower Little Tennessee River | | | | | | | | | | | | | | |
| Yellow Cr | SR 1242 | Graham | 12.7 | 04/28/09 | 6 | 186 | 0 | 2 | 3 | 1 | 46 | 0 | 99 | 67 |
| Tulula Cr | SR 1260 | Graham | 27.4 | 04/29/09 | 15 | 659 | 2 | 2 | 6 | 3 | 0 | 49 | 50 | 67 |
| Sweetwater Cr | SR 1214 | Graham | 13.6 | 04/29/09 | 13 | 646 | 2 | 2 | 7 | 3 | 1 | 36 | 63 | 77 |

¹Abbreviations are d. a. = drainage area, No. = number, Sp. = species, RST = rockbass, smallmouth bass, and trout, Intol. = intolerants, Omni. + Herb. = omnivores+herbivores, Insect. = insectivores, and MA = species with multiple age groups.

Appendix F-5. Fish distributional records for the Little Tennessee River basin.

Based upon Menhinick (1991) and data from DWQ, North Carolina State Museum of Natural Sciences, TVA, and from other researchers, 74 species have been collected from the Little Tennessee River basin in North Carolina. The known species assemblage includes 25 species of cyprinids, 9 species of suckers, 12 species of sunfish and bass, and 11 species of darters. The only new county distributional records recorded in 2009 were the collection of one Mountain Redbelly dace, *Chrosomus oreas*, from Middle Creek at SR 1635, Macon County. This species is indigenous in North Carolina only in the New, Roanoke, Neuse and Tar River basins. Twenty-one of the 74 species (28 percent of the total basin fauna) are nonindigenous (exotic) and were introduced either as sportfish, forage fish, baitfish, or for reasons unknown. In 2009, 7 of the 32 species collected were nonindigenous species and every stream, except Caney Fork, had at least one nonindigenous species present.

Table 11. Nonindigenous species in the Little Tennessee River basin. Species collected in 2009 are highlighted in blue.

| Family/Species | Common Name | Family/Species | Common Name |
|--------------------------------|---------------------------------|----------------------------|----------------------------|
| Clupeidae | Herrings | Salmonidae | Trouts and Salmons |
| <i>Dorosoma petenense</i> | Threadfin Shad | <i>Oncorhynchus mykiss</i> | Rainbow Trout |
| Cyprinidae | Carps and Minnows | <i>Salmo trutta</i> | Brown Trout |
| <i>Carassius auratus</i> | Goldfish | Moronidae | Temperate Basses |
| <i>Chrosomus oreas</i> | Mountain Redbelly Dace | <i>Morone chrysops</i> | White Bass |
| <i>Clinostomus funduloides</i> | Rosyside Dace | Centrarchidae | Sunfishes |
| <i>Cyprinus carpio</i> | Common Carp | <i>Lepomis auritus</i> | Redbreast Sunfish |
| <i>Luxilus chrysocephalus</i> | Striped Shiner | <i>L. cyanellus</i> | Green Sunfish |
| <i>Nocomis leptcephalus</i> | Bluehead Chub | <i>L. gibbosus</i> | Pumpkinseed |
| <i>Notemigonus crysoleucas</i> | Golden Shiner | <i>L. microlophus</i> | Redear Sunfish |
| <i>Notropis lutipinnis</i> | Yellowfin Shiner | Percidae | Darters and Perches |
| <i>N. rubricroceus</i> | Saffron Shiner | <i>Perca flavescens</i> | Yellow Perch |
| Ictaluridae | North American Catfishes | | |
| <i>Ameiurus brunneus</i> | Snail Bullhead | | |
| <i>A. platycephalus</i> | Flat Bullhead | | |
| <i>Ictalurus punctatus</i> | Channel Catfish | | |

In 2009, 32 of the 74 species were collected during NC DWQ's fish community monitoring program. The most commonly collected species were the Northern Hogsucker, collected at all 12 sites, and the Central Stoneroller, River Chub, and Mottled Sculpin which were collected at 11 of the 12 sites. These latter three species were not collected from Yellow Creek whose fish community is naturally depauperate. The most abundant species was the Mottled Sculpin which constituted almost one-third of all the fish collected. It was also the numerically dominant species at 6 of the 12 sites. Seven species were collected only at 1 or 2 sites. Except for the Spotfin Chub and Telescope Shiner, these rarer species were represented by only 1 or 2 fish per species.

Table 12. Narrowly distributed and uncommonly collected species encountered by the wadeable stream fish community assessment program in the Little Tennessee River basin, 2009.

| Species | No. of Sites Collected | No. Specimens Collected |
|------------------------|------------------------|-------------------------|
| Spotfin Chub | 2 | 39 |
| Telescope Shiner | 2 | 28 |
| Mountain Redbelly Dace | 1 | 1 |
| White Sucker | 2 | 2 |
| Snail Bullhead | 1 | 1 |
| Bluegill | 1 | 1 |
| Banded Darter | 1 | 2 |

Special protection status has been given to 7 of the 74 species by the U. S. Department of the Interior, the NC Wildlife Resources Commission, or the NC Natural Heritage Program under the NC State Endangered Species Act (G.S. 113-331 to 113-337) (LeGrand *et al.* 2008; Menhinick and Braswell 1997) (Table 13). In 2009, the Smoky Dace and Spotfin Chub were collected as part of the fish community

monitoring program. The Smoky Dace was collected from Middle, Tessentee, and Ellijay creeks and from Caney Fork; the Spotfin Chub was collected from lotla and Brush creeks.

Table 13. Species of fish listed as endangered, rare, threatened, or of special concern in the Little Tennessee River basin in North Carolina.

| Species | Common Name | State or Federal Status | State Rank¹ |
|--|---------------------|--------------------------------|-------------------------------|
| <i>Clinostomus</i> sp cf. <i>funduloides</i> | Smoky Dace | State - Special Concern | S3 |
| <i>Erimonax monachus</i> | Spotfin Chub | Federal – Threatened | S1 |
| <i>Moxostoma</i> sp. cf. <i>macrolepidotum</i> | Sicklefin Redhorse | State –Threatened) | S1 |
| <i>Noturus flavus</i> | Stonecat | State - Endangered | S1 |
| <i>Etheostoma vulneratum</i> | Wounded Darter | State - Special Concern | S1 |
| <i>Percina burtoni</i> | Blotchside Logperch | State – Endangered | S1 |
| <i>Percina squamata</i> | Olive Darter | State - Special Concern | S2 |

¹S1 = critically imperiled in North Carolina because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation from North Carolina; S2 = imperiled in North Carolina because of rarity or because of some factor(s) making it very vulnerable to extirpation from North Carolina; S3 = rare or uncommon in North Carolina (LeGrand *et al.* 2008).

Appendix F-6. Habitat evaluations and stream and riparian habitats at 12 fish community monitoring sites in the Little Tennessee River basin, 2009.

Habitat Assessments

A method and scoring system has been developed to evaluate the physical habitats of a stream (NCDENR 2006). The narrative descriptions of eight habitat characteristics, including channel modification, amount of instream habitat, type of bottom substrate, pool variety, riffle frequency (not evaluated in Sand Hills and Coastal Plain streams), bank stability, light penetration, and riparian zone width, are converted into numerical scores. The total habitat score ranges between 1 and 100. Higher numbers suggest better habitat quality, but criteria have not been developed to assign ratings. Scores greater than 65 generally represent moderate to high quality habitat site, whereas scores less than 65 generally represent low to poor quality habitat sites (DWQ unpublished data).

In 2009 fish community sampling was conducted at 12 sites (Tables 14 and 15). Habitat scores ranged from 65 at Middle Creek to 89 at Sweetwater Creek. Lower scoring sites generally had narrow riparian zones which were sparsely vegetated with mature trees providing less than optimal shading to the streams. Many of the sites would benefit from bank stabilization and stream restoration techniques. The lower ranking sites also scored low during the 2004 assessment period.

Table 14. Rankings of 12 waterbodies in the Little Tennessee River basin according to the total habitat scores, 2009.

| Waterbody | Location | County | Level IV Ecoregion | Score |
|------------------|-----------------|---------------|---|--------------|
| Sweetwater Cr | SR 1214 | Graham | Southern Metasedimentary Mountains | 89 |
| Brush Cr | off SR 1129 | Swain | Southern Metasedimentary Mountains | 87 |
| Cullowhee Cr | SR 1545 | Jackson | Southern Crystalline Ridges & Mountains | 85 |
| Tulula Cr | SR 1260 | Graham | Southern Metasedimentary Mountains | 85 |
| Stecoah Cr | SR 1237 | Graham | Southern Metasedimentary Mountains | 79 |
| Yellow Cr | SR 1249/1242 | Graham | Southern Metasedimentary Mountains | 79 |
| Caney Fk | SR 1738 | Jackson | Southern Crystalline Ridges & Mountains | 78 |
| Elijay Cr | SR 1524 | Macon | Southern Crystalline Ridges & Mountains | 77 |
| Tessentee Cr | SR 1636 | Macon | Southern Crystalline Ridges & Mountains | 70 |
| Iotta Cr | off SR 1378 | Macon | Broad Basins | 69 |
| Savannah Cr | NC 116 | Jackson | Southern Crystalline Ridges & Mountains | 68 |
| Middle Cr | SR 1635 | Macon | Broad Basins | 65 |

Table 15. Habitat evaluations of 12 basinwide fish community sites in the Little Tennessee River basin, 2009. Red bold denotes less than optimal habitat conditions.

| HUC/ Waterbody | Location | County | Channel | Instream Habitat | Substrate | Pools | Riffles | Erosion | Bank Vegetation | Shade | Riparian Zone-L | Riparian Zone-R | Total Score |
|--|--------------|---------|----------|---------------------|-----------|-----------|-----------|----------|--------------------|-----------|--------------------|--------------------|----------------|
| 06010202 Little Tennessee River | | | | | | | | | | | | | |
| Middle Cr | SR 1635 | Macon | 5 | 16 | 8 | 10 | 7 | 4 | 4 | 7 | 3 | 1 | 65 |
| Tessentee Cr | SR 1636 | Macon | 5 | 18 | 8 | 10 | 10 | 2 | 4 | 7 | 5 | 1 | 70 |
| Elijay Cr | SR 1524 | Macon | 4 | 18 | 10 | 9 | 16 | 7 | 4 | 5 | 2 | 2 | 77 |
| Iotla Cr | off SR 1378 | Macon | 5 | 17 | 6 | 8 | 10 | 4 | 5 | 8 | 4 | 2 | 69 |
| Brush Cr | off SR 1129 | Swain | 5 | 18 | 8 | 8 | 14 | 7 | 7 | 10 | 5 | 5 | 87 |
| Stecoah Cr | SR 1237 | Graham | 5 | 18 | 10 | 10 | 16 | 2 | 4 | 10 | 3 | 1 | 79 |
| 06010203 Tuckasegee River | | | | | | | | | | | | | |
| Caney Fk | SR 1738 | Jackson | 5 | 19 | 13 | 6 | 16 | 7 | 3 | 4 | 3 | 2 | 78 |
| Cullowhee Cr | SR 1545 | Jackson | 5 | 18 | 11 | 10 | 16 | 7 | 5 | 5 | 3 | 5 | 85 |
| Savannah Cr | NC 116 | Jackson | 3 | 18 | 12 | 6 | 15 | 4 | 3 | 4 | 1 | 2 | 68 |
| 06010204 Lower Little Tennessee River | | | | | | | | | | | | | |
| Tulula Cr | SR 1260 | Graham | 5 | 18 | 13 | 8 | 16 | 4 | 6 | 7 | 5 | 3 | 85 |
| Sweetwater Cr | SR 1214 | Graham | 5 | 19 | 10 | 8 | 16 | 7 | 6 | 9 | 5 | 4 | 89 |
| Yellow Cr | SR 1249/1242 | Graham | 5 | 18 | 8 | 6 | 10 | 7 | 6 | 10 | 4 | 5 | 79 |
| Maximum possible score | | | 5 | 20 | 15 | 10 | 16 | 7 | 7 | 10 | 5 | 5 | 10 |

Characteristics of moderate to high quality habitat streams are (Figure 8):

- instream habitats composed of rocks (often covered with *Podostemum*), sticks, leafpacks, snags, logs, undercut banks and root mats;
- a substrate of boulder, cobble, and gravel with low embeddedness;
- frequent pools and riffles of varying depths and widths; and
- stable banks with a good tree canopy and a medium to wide riparian zone with no or rare breaks.



Figure 8. Instream habitats composed of boulder, cobble, and gravel rocks, sticks, leafpacks, snags, logs, and root mats and wide riparian zones offering a good tree canopy, Brush Creek off SR 1129, Swain County (left) Sweetwater Creek at SR 1214, Graham County (right).

Characteristics of lower quality habitat streams are (Figure 9):

- a substrate of primarily sand with instream bar development;
- an absence of riffles; if present, they are usually caused by embedded, coarse woody debris;
- narrow and sparsely vegetated riparian zones; and
- deeply entrenched channel with unstable, vertical, and sparsely vegetated banks.



Figure 9. Riparian zones offering no canopy over the stream or sparsely vegetated riparian no trees, Savannah Creek at NC 116, Jackson County (left) and Tessentee Creek at SR 1636, Macon County (right).

Appendix F-7. Water quality at fish community sites in the Little Tennessee River basin.

Temperature, specific conductance, dissolved oxygen, and pH were collected at every site during fish community assessments in 2009 (Table 16). All measured dissolved oxygen concentrations met the water quality standard of 5 mg/L. Eight pH measurements were less than 6.0 s.u. Specific conductance ranged from 18 $\mu\text{S}/\text{cm}$ at Tessentee Creek to 41 $\mu\text{S}/\text{cm}$ at lotla Creek (Figure 10). Elevated readings were associated primarily with nonpoint source runoff. Over the past two monitoring cycles, the specific conductance has been a very stable indicator of water quality. The lowest values have been recorded at Tessentee Creek and the highest values at lotla and Stecoah creeks (Figure 11). Neither lotla or Stecoah creeks receives municipal point source discharges, therefore the elevated readings are from nonpoint source runoff.

Table 16. Water quality measurements at 12 fish community sites in the Little Tennessee River basin, 2009. Red bold denotes less than the water quality standard.¹

| HUC/ Waterbody | Location | County | Date | Temperature (°C) | Specific conductance ($\mu\text{S}/\text{cm}$) | Dissolved oxygen (mg/L) | pH (s.u.) |
|--|-------------|---------|----------|---------------------|--|-------------------------------|--------------|
| 06010202 Little Tennessee River | | | | | | | |
| Middle Cr | SR 1635 | Macon | 04/30/09 | 13.4 | 23 | 9.1 | 5.8 |
| Tessentee Cr | SR 1636 | Macon | 04/30/09 | 13.5 | 18 | 9.4 | 6.1 |
| Elijay Cr | SR 1524 | Macon | 04/30/09 | 16.2 | 31 | 9.1 | 6.9 |
| lotla Cr | off SR 1378 | Macon | 05/01/09 | 15.3 | 41 | 8.9 | 5.7 |
| Brush Cr | off SR 1129 | Swain | 04/29/09 | 16.7 | 29 | 9.9 | 6.6 |
| Stecoah Cr | SR 1237 | Graham | 04/28/09 | 15.4 | 39 | 10.0 | 5.8 |
| 06010203 Tuckasegee River | | | | | | | |
| Caney Fk | SR 1738 | Jackson | 04/27/09 | 18.8 | 19 | 8.5 | 5.9 |
| Cullowhee Cr | SR 1545 | Jackson | 04/27/09 | 12.1 | 30 | 8.9 | 6.2 |
| Savannah Cr | NC 116 | Jackson | 04/28/09 | 12.1 | 29 | 10.2 | 5.4 |
| 06010204 Lower Little Tennessee River | | | | | | | |
| Tulula Cr | SR 1260 | Graham | 04/29/09 | 14.5 | 25 | 10.1 | 5.6 |
| Sweetwater Cr | SR 1214 | Graham | 04/29/09 | 13.4 | 32 | 10.0 | 5.8 |
| Yellow Cr | SR 1242 | Graham | 04/28/09 | 16.2 | 19 | 9.1 | 5.6 |

¹Note: pH measurements made with the Fisher-Accumet® AP 61 portable pH meter may be affected by the low specific conductance of the water; pH measurement should be interpreted with caution.

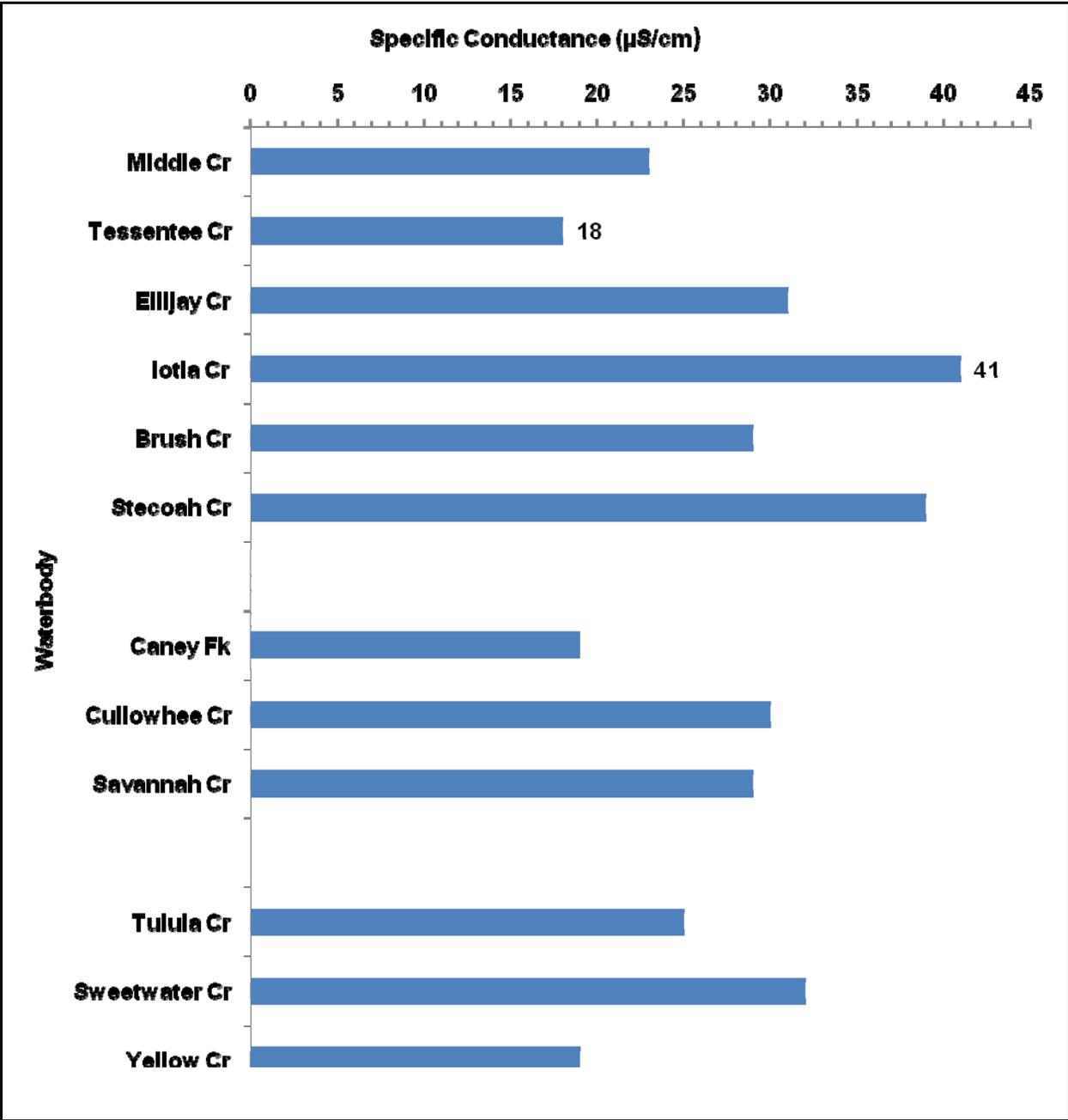


Figure 10. Specific conductance at 12 fish community sites in the Little Tennessee River basin, 2009.

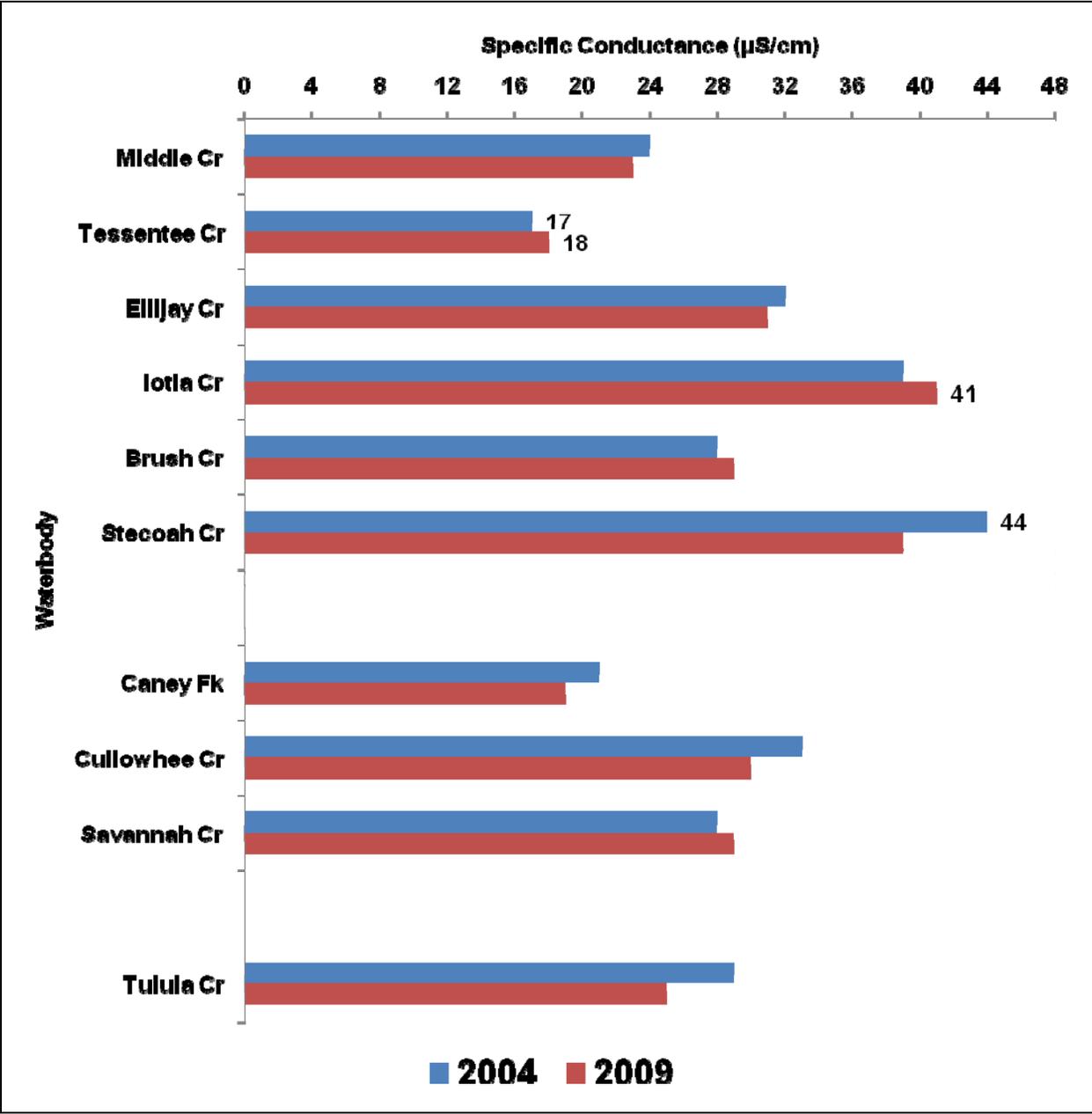


Figure 11. Specific conductance at 10 repeat fish community sites in the Little Tennessee River basin, 2004 & 2009.

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