

Upper Neuse Watershed Evaluation Tool (WET) Task Group
March 15, 2005 Meeting Summary

Prepared March 15, 2005

The Upper Neuse Watershed Evaluation Tool (WET) Task Group met on Tuesday, March 15, 2005 in the USGS Library. The objective of the meeting was to:

- Review progress on the WET;
- Hear an overview of current water-quality monitoring in the Upper Neuse;
- Begin developing a watershed monitoring program.

Meeting attendees introduced themselves and stated which organization they represented. Attendees are listed below.

Name	Organization	E-mail address or phone
Mary Giorgino	US Geological Survey	giorgino@usgs.gov
Silvia Terziotti	US Geological Survey	seterzio@usgs.org
Sarah Bruce	UNRBA	sbruce@tjcog.org
Shelby Powell	Kerr-Tar COG	spowell@kerrtarcog.org
Nancy Newell	City of Durham	Nancy.Newell@durhamnc.gov
Kenny Keel	Town of Hillsborough	kenny.keel@hillsboroughnc.org
Amy Moran	City of Raleigh	amy.moran@ci.raleigh.nc.us
Larry McMillan	City of Raleigh	larry.mcmillan@ci.raleigh.nc.us
Katie Ertmer	Franklin County	kertmer@co.franklin.nc.us
Barry Baker	Granville County	planning@granvillecounty.org
Tom Hill	Wake County	thill@co.wake.nc.us
Wright Lowery	Wake County	Wlowery@co.wake.nc.us
Cam McNutt	NC DWQ	cam.mcnutt@ncmail.net
George Hunt	NC DWQ	george.hunt@ncmail.net
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Greg Melia	NC Ecosystem Enhancement Program	gregory.melia@ncmail.net
Steve Roberts	NC Ecosystem Enhancement Program	steven.roberts@ncmail.net
Sherry Macqueen	NC Public Water Supply	sherry.macqueen@ncmail.net

Status of the WET

Mary Giorgino reported to the task group that USGS is completing the draft WET. USGS anticipates the WET to be complete in November of 2005. A training session to test the tool and train potential trainers is to be held May 3.

Current Water Quality Monitoring Locations

Mary Giorgino gave a comprehensive overview of water quality monitoring sites located in the Upper Neuse. She provided two handouts: a table that summarized programs and a document with her more detailed notes. Mary went through the table program by program and highlighted some of the interesting features of each. Meeting attendees contributed some details of the programs about which they had knowledge (e.g., parameters monitored, sample frequency, which sites were inactive, etc.).

Monitoring programs are listed below. Details are included in the Table Mary passed out at the meeting, which should accompany this meeting summary and will also be posted at www.unrba.org under Project WET.

Division of Water Quality (DWQ) Monitoring Programs

- Ambient Monitoring System (stream sampling)
- Ambient Lakes Monitoring (reservoir sampling)
- Benthic Macroinvertebrate Monitoring
- Fish Community Monitoring
- Fish Tissue Monitoring

NPDES Discharge In-stream Monitoring

Public Water Supply Monitoring, with details for:

- Hillsborough Water Plant (Lake Ben Johnston)
- Durham Water Supply and Treatment (Lake Michie and Little River Reservoir)
- Raleigh Public Utilities (Falls Lake)

Raleigh Stormwater Benthic Macroinvertebrate Monitoring

Durham Stormwater Ambient Monitoring

Durham Stormwater Benthic Macroinvertebrate Monitoring

USGS Real-Time Streamflow Network

USGS Water-Quality Monitoring

An attendee asked whether there was a way for the WET to designate whether a site was active or inactive. Cam McNutt of NC DWQ answered that there is a field for whether the site is monitored as part of the 5-year basinwide planning cycle. The group noted that the spatial coverage of maps of monitoring stations was misleading because so many of the sites were not monitored with any regularity or were no longer monitored at all.

An attendee noted that it would be difficult for the occasional user of the WET to get a feel for monitoring results in such a situation.

An attendee questioned the lack of water quality data in the WET itself. Mary stated that the data would become outdated too quickly, and that the considerations for working with such data are too numerous to feasibly include in a geodatabase. The WET does include links and contact information for each of the water quality monitoring programs to facilitate with data gathering.

An attendee noted a need to obtain an updated coverage for Durham's municipal boundaries due to the annexation of Treyburn.

Mary made several general observations regarding current water-quality monitoring in the Upper Neuse basin. First, the geographic distribution of chemical monitoring is uneven, with a majority of the sampling being conducted in Durham County, the Hillsborough area, and lower Falls Lake. Second, DWQ biological sampling covers a wide geographic area, but sampling frequency is low—typically, active sites are visited once every 5 years in conjunction with basinwide assessment schedules. Third, in-stream monitoring data from NPDES dischargers and public water suppliers are archived in the Central Files of the DWQ and Public Water Supply Branch, respectively, but generally are not available electronically. Monitoring programs

conducted by local governments target their specific needs; however, there is the potential for future coordination and data sharing.

Areas where multiple monitoring programs overlap include sites in the Eno River, Flat River (including Lake Michie), Ellerbe Creek, Little River (including Little River Reservoir), and Falls Lake downstream from Highway 50. Monitoring gaps that were noted include:

- Water-quality and hydrologic characteristics of “healthy”, or unimpacted streams
- Smaller tributaries to Falls Lake, including Knap of Reeds, Ledge, Beaverdam, Horse, Upper and Lower Barton Creeks
- Inconsistent monitoring of water-supply reservoirs
- Chemistry of upper Flat River and Little River sub-watersheds to supplement biological assessments

Mary noted a conundrum that confronts us: we need a monitoring plan to seek funds for the monitoring program, but we also information on projected funds before designing the program to know how many stations, parameters, frequencies, etc. the program can afford.

Mary also noted that periodic analyses should be performed in sync with the DWQ basinwide planning process.

Another potential area of coordination would be the development of land use/land cover data by different jurisdictions. Mary noted that situations exist where GIS specialists communicate well, such as the GIS users’ forum, and that these successes can be built upon to help coordinate coverage creation for the Upper Neuse.

Information Priorities

Mary noted that the attendance at this meeting was somewhat different from the WET task group that met last year. She went over the priorities drafted by the previous group in last April. These fell into two major categories:

Adequate water supply

- How much do we have?
- Is water quality adequate?
- Meteorological data to plan for drought
- How much water are people using?
- What are we using water for?

Land use change and water quality

- Better knowledge of effectiveness of approaches that protect water quality
- Higher resolution information about stream health
- Stream and reservoir responses to stress/change
- Baseline information for healthy streams
- Better understanding of new approaches for post-development storm water management

Mary then asked for feedback from this group on what their priorities for a monitoring program might be. Responses, grouped by subject, included:

1. Support watershed planning
 - **modeling (managing and allocating loads, unmonitored reaches)**
 - **baseline and trend analysis (reference reaches)**
 - **target more intensive monitoring**
2. Support evaluation of various management approaches
 - **pollution trading**
 - **restoration projects**
 - **BMPs**

Potential Monitoring Strategies

Mary Giorgino presented three categories of potential monitoring strategies for the Upper Neuse Basin: water supply, ecological integrity, and representative streams.

Water Supply Strategy

- More uniform and inclusive monitoring of water-supply source waters to document how they respond to both natural oscillations and human activities
- Track conditions, loads, and trends in the water body (early warning)
- Include nutrients, chlorophyll, DBP precursors
- Include hydrology at representative sites
- Incorporate withdrawal/usage records

Ecological Integrity Strategy

- Biological & habitat network
- Suitable for a many-sites, synoptic-event approach
- Annual sampling to supplement DWQ rotation
- Established protocols and bioclassifications
- Understandable by public
- Relatively low cost
- Opportunity for education & information

Representative Streams Strategy

- Consolidate fixed-station monitoring by coordinating methods, timing, and data management/sharing among existing and new partners
- Consider a water-quality index for the public
- Target reaches where data are needed
- Allocate sites among drainages & partners
- Include healthy/less impacted sites for a benchmark
- Provides consistent data to support basin-scale and sub-watershed evaluations

Mary also presented several “keys to success” for an effective monitoring program:

- Plan for data management
 - Quality assurance
 - Long-term storage & retrieval capability
 - Schedule and plan for distributing data
- Anticipate who will use the data, how, and why

- Anticipate needing funds for periodic analysis and interpretation
- Establish feedback loops to ensure adaptability
- Coordinate GIS work

Discussion

Several attendees felt that elected bodies will soon be asking agencies that work to protect water quality to demonstrate the improvements brought about by public expenditures. These attendees felt that one of the most important functions a water quality monitoring program could perform would be to help document the improvements made or damages avoided in water quality. Such documentation would also be helpful when seeking additional funding for projects and programs.

An attendee noted that NC EEP is moving toward attempting to design monitoring networks to evaluate effectiveness of BMPs and restorations at multiple scales. Watershed scales are too large and site scales are too small to separate the effects of projects on water quality from background conditions.

An attendee noted that proposals are better if they include partnerships and demonstrate that additional funds can be leveraged from the project.

An attendee noted that effectiveness monitoring might make a good pilot/model program.

An attendee noted a need to select or develop data management protocols because changing protocols is so problematic. Mary Giorgino stated that the stream mapping initiative developed because the legislature mandated consistency and a baseline data quality.

Sherry MacQueen discussed the Source Water Protection program's initiative to develop guidance for local, volunteer groups to use the newly developed Source Water Assessment Program (SWAP) report data (assessing drinking water source inherent vulnerability, contaminant rating and susceptibility to contaminants) to develop an approvable, local Source Water Protection Plan. She said that one of the components of the guidance she is developing will include a watershed monitoring protocol. Because the guidance is intended to be used by locals to develop their own plans, it will likely call for a case study to illustrate the protocol in action. The WET group or its future equivalent could have a role in this process.

Next Steps

The next meeting will be a "Train the Trainers" training session using a draft version of the WET on May 3, 2005 at the USGS office in Raleigh. Trainees will be encouraged to provide feedback on the draft WET and expected to train co-workers at their respective agencies and departments.

Once the draft tool is up and running, USGS will use it to analyze the current monitoring network to help identify gaps in watershed monitoring and propose locations for additional stations.

Also, potential funding levels for the monitoring program will be discussed.

CURRENT MONITORING IN THE UPPER NEUSE BASIN

Program and Contact Info.	Purpose of Monitoring	No. Sites	Frequency	Description	Data Availability
<p>DWQ Ambient Monitoring System</p> <p>Andrea Thomas NCDENR-DWQ 1621 Mail Service Center Raleigh, NC 27699-1621 919-733-9960</p> <p>andrea.thomas@ncmail.net</p>	<p>Site--specific, long-term information on significant rivers and streams. Data are evaluated relative to State WQ standards and action levels, and support several DWQ programs, including basinwide planning, 305(b) and 303(d) reporting to EPA, TMDL development, and NPDES permitting.</p>	<p>7</p>	<p>Monthly (biweekly during 2005-2006); Metals & residue quarterly</p>	<p>Typically measure temperature, specific conductance, turbidity, total suspended residue, DO, metals (As, Cd, Cr, Cu, Fe, Pb, Ni, Zn, Al, Hg), fecal coliform, and weather conditions. Additional indicators may be included depending on site-specific concerns. Examples include salinity, Secchi depth, flow, nutrients (NH₃, NO₂+NO₃, TKN, TP), fluoride, sulfate, manganese, color, oil and grease, chlorophyll <i>a</i>.</p> <p>Ambient Monitoring System home page (http://h2o.enr.state.nc.us/esb/ams.html) contains a link to a guidance document for downloading data from STORET.</p>	<p>EPA STORET database: www.epa.gov/storet/, or go directly to the Data Warehouse: http://www.epa.gov/storet/dw_home.html</p> <p>DWQ Basin Assessment Reports (may be up to 5 years out of date): http://www.esb.enr.state.nc.us/bar.html</p>
<p>DWQ Ambient Lakes Monitoring</p> <p>Debra Owen or Dianne Reid NCDENR-DWQ 1621 Mail Service Center Raleigh, NC 27699-1621 919-733-6510</p> <p>debra.owen@ncmail.net dianne.reid@ncmail.net</p>	<p>To collect and analyze data from significant lakes in North Carolina to determine water quality conditions and trends in support of EPA's Clean Lakes Program and Clean Water Initiative; for 305(b) reporting and 303(d) determinations and for other DWQ needs.</p>	<p>23 sites on 8 lakes</p> <p>Rogers Butner/Holt Michie Orange Corporation Ben Johnston Little R Res Falls</p>	<p>Neuse basin is sampled once every 5 years. Each lake is sampled 3 times during the summer (Jun-Aug). Special studies are conducted as needed.</p>	<p>PRIMARY: Temperature, pH, DO, conductance, secchi, TSS, TDS, turbidity, chlorophyll <i>a</i>, total P, ammonia, nitrite+nitrate, TKN, phytoplankton, macrophytes</p> <p>SECONDARY: Metals, chloride, fluoride, calculated total hardness, fecal coliform bacteria, BOD₅, pesticides, volatile organics, and water samples for EPA Algal Growth Potential Tests (AGPT); inclusion based on lake classification, known or suspected problems, or DWQ management needs</p> <p>Trophic State Index is computed.</p>	<p>These data are maintained in-house and are used in the DWQ basin assessment reports and in the biennial 305(b) reports to EPA, but not uploaded to STORET. Basin Assessment Reports (may be up to 5 years out of date): http://www.esb.enr.state.nc.us/bar.html or on request to DWQ.</p>

CURRENT MONITORING IN THE UPPER NEUSE BASIN

Program and Contact Info.	Purpose of Monitoring	No. Sites	Frequency	Description	Data Availability
<p>DWQ Benthic Macroinvertebrate Monitoring</p> <p>Eric Fleek or Trish MacPherson NCDENR-DWQ 1621 Mail Service Center Raleigh, NC 27699-1621 919-733-6946</p> <p>eric.fleek@ncmail.net trish.macpherson@ncmail.net</p>	<p>To collect and analyze data from over 1000 sites in North Carolina to assess biological water-quality conditions. Data are used for 305(b) reporting and 303(d) determinations, basinwide assessment summaries, and other DWQ programs.</p>	<p>42 (not all active)</p>	<p>Sites in the Neuse basin are sampled once every 5 years during the summer (Jun-Aug), and next will be sampled in 2005. Special studies are conducted as needed, such as for TMDLs or EEP targeted watersheds.</p>	<p>Sample collection began in 1978. Protocols for sampling different stream types and management purposes are in SOP document at: http://h2o.enr.state.nc.us/esb/BAUwww/benthossop.pdf.</p> <p>Streams are assigned bioclassification ratings of Excellent, Good, Good/Fair, Fair, or Poor based on taxa richness and pollution tolerance values (http://h2o.enr.state.nc.us/esb/BAU.html). Results are used to assess the impacts of point and non-point sources of pollution as part of the basinwide monitoring program; to define High Quality or Outstanding Resource Waters; to support enforcement of stream standards; and to measure improvements associated with management actions.</p> <p>Temperature, conductivity, pH, DO), and habitat characteristics (since 1999) also are measured during benthic sampling.</p>	<p>DWQ keeps records in-house. Data are incorporated in the DWQ basin assessment reports and in the biennial 305(b) reports to EPA, but not uploaded to STORET.</p> <p>Benthos data are available online in the DWQ Basin Assessment Reports: http://www.esb.enr.state.nc.us/bar.html or on request to the DWQ.</p>

CURRENT MONITORING IN THE UPPER NEUSE BASIN

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<p>DWQ Fish Community Monitoring</p> <p>Bryn Tracy or Trish MacPherson NCDENR-DWQ 1621 Mail Service Center Raleigh, NC 27699-1621 919-733-6946</p> <p>bryn.tracy@ncmail.net † trish.macpherson@ncmail.net</p>	<p>To assess the ecological integrity of streams and rivers by evaluating fish communities. Data are used for 305(b) reporting and 303(d) determinations, basinwide assessment summaries, and other DWQ programs.</p>	<p>8 active; 5 inactive</p>	<p>Active sites are sampled once every 5 years during April, and next will be sampled in 2005. Special studies also are conducted as needed.</p>	<p>At each stream site, fish within a 200-meter reach are collected with the aid of backpack electrofishing equipment. Standard Operating Procedures are followed: http://h2o.enr.state.nc.us/esb/BAUwww/IB1%20Methods%202001.pdf.</p> <p>Fish community metrics are computed and compiled into an Index of Biotic Integrity (IBI) score. Metrics include measures of species richness, community and trophic composition, abundance, and health/condition.</p>	<p>DWQ keeps records in-house. Data are incorporated in the DWQ basin assessment reports and in the biennial 305(b) reports to EPA, but not uploaded to STORET.</p> <p>Data are available online in the DWQ Basin Assessment Reports: http://www.esb.enr.state.nc.us/bar.html or on request to the ESB.</p>
<p>DWQ Fish Tissue Monitoring</p> <p>Mark Hale or Trish MacPherson NCDENR-DWQ 1621 Mail Service Center Raleigh, NC 27699-1621 919-733-6946</p> <p>mark.hale@ncmail.net † trish.macpherson@ncmail.net</p>	<p>To assess levels of selected contaminants in fish tissue. Data are used for 305(b) reporting and 303(d) determinations, basinwide assessment summaries, other DWQ programs, and by the Department of Health to set fish-consumption advisories.</p>	<p>6</p>	<p>Each of the sites has been sampled once. More than one species may have been collected at each site.</p>	<p>Metals--mercury, arsenic, chromium, copper, nickel, lead, zinc; Organics--dioxin, pesticides, and PCBs.</p> <p>Standard Operating Procedures are followed: http://h2o.enr.state.nc.us/esb/BAUwww/IB1%20Methods%202001.pdf. Analytical results are compared to FDA action levels, EPA screening values, or criteria set by the NC Health Director.</p>	<p>Results can be viewed at: http://h2o.enr.state.nc.us/esb/fish_tissue_results.html.</p> <p>Current fish-consumption advisories in North Carolina are posted at: http://www.epi.state.nc.us/epi/fish/.</p> <p>Data are incorporated in the Basin Assessment Reports: http://www.esb.enr.state.nc.us/bar.html.</p>

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Program and Contact Info.	Purpose of Monitoring	No. Sites	Frequency	Description	Data Availability
<p>NPDES Discharge In-stream Monitoring</p> <p>NCDENR-DWQ Central Files Archdale Building 512 N. Salisbury St. Raleigh, NC 27604</p> <p>NCDENR-DWQ Point Source Compliance and Enforcement Unit 1617 Mail Service Center Raleigh, NC 27699-1617 919 733-5083</p> <p>dwqpescu@ncmail.net</p>	<p>Compliance with NPDES permit requirements. Extensive effluent sampling is required. In-stream monitoring of points upstream and downstream from outfalls varies considerably among permittees</p>	<p>16 NPDES wastewater permits</p> <p>14 with in-stream monitoring</p>	<p>Varies among permittees, constituents, and season. Most frequent is 3 times per week; least frequent is monthly</p>	<p>Municipal or domestic wastewater dischargers usually monitor water temperature and dissolved oxygen in receiving waters, both upstream and downstream from their outfalls. Larger dischargers, including the Hillsborough WWTP and North Durham WRF, monitor fecal coliforms and conductance upstream and downstream; North Durham also monitors nutrients and chlorophyll <i>a</i> at a downstream site in Ellerbe Creek.</p> <p>Water treatment plants monitor turbidity weekly or quarterly. Groundwater remediation permittees have no in-stream monitoring requirements.</p>	<p>In-stream monitoring data are not available online or electronically. These data are reported to the DWQ Point Source Compliance and Enforcement Unit via facility daily monitoring reports, and hard copies are stored in Central Files in the Archdale Building, Raleigh.</p> <p>Effluent data are available online via the NC Basinwide Information Management System.</p> <p>Dischargers maintain data files for several years.</p>

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<p>DEH Public Water Supply Monitoring</p> <p>Linda Raynor Public Water Supply Section Div. of Env. Health 1634 Mail Service Center Raleigh, NC 27699-1634 919-715-3225</p> <p>linda.raynor@ncmail.net</p>	<p>Each public water supplier monitors its raw and finished water. The PWS reviews results to assess performance in removing contaminants of concern and to ensure compliance with drinking-water regulations. The PWS also tracks turbidity and bacteria in source water for the Area Wide Optimization Program, whose goal is to produce ultra-low turbidity finished water.</p>	<p>8 surface-water systems;</p> <p>Numerous ground-water systems, which were not included in this study</p>	<p>Influent--once to several times a day for most constituents</p> <p>Ambient Source Water monitoring is extremely variable.</p>	<p>Most raw-water influents are monitored daily for temperature, pH, turbidity, color, carbon dioxide, total alkalinity, total hardness, dissolved oxygen, iron, manganese, fluoride, chloride, total phosphate, total coliform; paired set of TOC at least once per month. Facilities report daily averages to the PWS Compliance Branch via their monthly operating reports.</p> <p>Ambient monitoring of source waterbodies is more variable. Hillsborough samples Lake Ben Johnston daily; Durham samples Lake Michie and Little River Reservoir monthly; Raleigh samples 4 sites in Falls Lake quarterly.</p>	<p>Raw and source-water data are not available online. Raw-water TOC, DOC and UV254 data are electronically tabulated (Martha Fillinger at 919-715-3243). The Compliance Branch tracks source-water turbidity and total coliforms in an electronic database (Brad Cole, 919-715-3221). Recent source-water data reside in paper reports at the PWS Central Files, Parker Lincoln Building, 2728 Capital Blvd, Raleigh, NC, 27604. Files older than 5 years are archived off-site.</p> <p>EPA downloads the PWS database quarterly, which includes raw-water TOC, UV254, DOC (if collected), and all finished-water data.</p> <p>Each treatment plant also keeps copies of monitoring records.</p>
<p>Hillsborough Water Plant</p> <p>Russell Bateman, Superintendent City of Hillsborough PO Box 429 Hillsborough, NC 27278 919-732-3621</p>	<p>Support daily operations; compliance reports to DEH PWS</p>	<p>1 at Lake Ben Johnston Intake</p>	<p>Daily</p>	<p>Temperature, pH, turbidity, total alkalinity, total hardness, iron, manganese, fecal coliform, TOC</p>	<p>Report to DEH Public Water Supply monthly.</p> <p>Keep data on file in Engineering (3 years) and at Water Plant (indefinitely). Data are not available electronically or online.</p>

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<p>Durham Water Supply and Treatment</p> <p>Renee Lawrence, Superintendent Water Supply and Treatment Division Department of Water Management 1600 Mist Lake Drive Durham, NC 27704 919-560-4349</p>	<p>Support daily operations; compliance reports to DEH PWS</p>	<p>1 at Lake Michie intake and 1 at Little River Reservoir intake</p>	<p>Monthly</p>	<p>Monthly at reservoirs—physical parameters, metals, pH, DO, UV254, TOC, DOC.</p> <p>Raw influent is measured daily at the treatment plants for metals & the usual constituents (temperature, pH, turbidity, color, carbon dioxide, total alkalinity, total hardness, dissolved oxygen, iron, manganese, fluoride, chloride, total phosphate, total coliform); weekly for TOC, DOC, and UV254.</p>	<p>Results are reported to PWS monthly. Data are not available online. For general information, see Durham Water Supply and Treatment Division web page: http://www.ci.durham.nc.us/departments/environ/water_supply.cfm. Durham's annual water quality report, <i>Tap Into Quality</i>, presents updates on Durham's drinking water and treatment processes, but no raw-water data.</p>
<p>Raleigh Public Utilities</p> <p>Dale Crisp Public Utilities Dept One Exchange Plaza 219 Fayetteville St. Mall, Suite 620 Raleigh, NC 27601 919-857-4540</p> <p>dale.crisp@ci.raleigh.nc.us</p>	<p>Support daily operations; compliance reports to DEH PWS</p>	<p>4 sites in Falls Lake</p>	<p>Quarterly</p>	<p>Constituents include VOCs, SOCs, nutrient fractions, inorganics, trace metals, TOC, DOC, bromide, chlorophyll a, physical parameters, secchi, alkalinity, turbidity, phytoplankton community, fecal coliform, enterococcus. In addition, Raleigh Public Utilities monitors enterococcus monthly at 4 reservoir sites.</p>	<p>Ambient monitoring data are summarized annually and are for in-house use only. These data are not reported to any other agencies, published, or made available online.</p>
<p>Raleigh Stormwater Management</p> <p>Mac Smith 222 W. Hargett St. P.O. Box 590 Raleigh, NC 27602 919-890-3030</p>	<p>To examine storm water impacts on stream biology at 23 sites in the Raleigh area</p>	<p>1 in the Upper Neuse</p>	<p>Annually</p>	<p>Relative abundance and taxonomic analysis. Site is a Lower Barton Creek.</p>	<p>Could not find data nor access details on the program online. Organizational structure and web pages have changed since 4/2004</p>

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Program and Contact Info.	Purpose of Monitoring	No. Sites	Frequency	Description	Data Availability
<p>Durham Stormwater Ambient</p> <p>Chris Outlaw Durham Stormwater Services 101 City Hall Plaza Durham, NC 27701 919-560-1230, ext. 223</p> <p>chris.outlaw@durhamnc.gov</p>	<p>Ambient monitoring of selected physical, chemical and microbiological parameters is conducted at 34 sites on a monthly basis. Data are used to assess trends and to help determine causes of stream impairment.</p>	<p>19 in the Upper Neuse</p>	<p>Monthly sampling beginning in 2004; quarterly prior to 2004 (program began in 1996)</p>	<p>Constituents include water temperature, DO, pH, conductivity, turbidity, BOD, TSS, ammonia, nitrite+nitrate, TKN, TON, total phosphorus, hardness, copper, zinc, fecal coliform bacteria. Samples are analyzed at the South Durham WRF (Farrington Plant).</p> <p>When water-quality problems are observed, the City may follow-up with intensive monitoring (of fecal coliforms) to locate "hotspots" or illicit discharges.</p> <p>They use benthic and chemistry data to compute a water-quality index rating for stream sites. At present, this is used only in-house, but may eventually be posted on the web to inform the general public.</p>	<p>The data are maintained in an electronic database and paper copies but are not available online.</p> <p>Report elements required for NPDES Phase I permit compliance to DWQ.</p>
<p>Durham Stormwater Benthic</p> <p>Robert Louque Durham Stormwater Services 101 City Hall Plaza Durham, NC 27701 919-560-1230, ext. 222</p> <p>robert.louque@durhamnc.gov</p>	<p>The City uses biological assessment of benthic macroinvertebrates at 19 sites in the Durham area to assess stream biological conditions and to compute water-quality index ratings..</p>	<p>10 in the Upper Neuse</p>	<p>Annually, beginning in 2000</p>	<p>Sites are monitored at least annually in the summer, following the DWQ protocol for full-scale benthic sampling. Counts and taxonomic analysis are performed. Biological specimens are archived.</p>	<p>The data are maintained in an electronic database and paper copies but are not available online. The data are not published or reported to another agency at this time.</p>

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Program and Contact Info.	Purpose of Monitoring	No. Sites	Frequency	Description	Data Availability
<p>USGS Real-Time Streamflow</p> <p>Ramona Traynor, Information Officer U.S. Geological Survey 3916 Sunset Ridge Road Raleigh, NC 27607 919-571-4096</p> <p>rtraynor@usgs.gov</p>	<p>Monitor stream stage and discharge for use by multiple agencies</p>	<p>7 (10 were active in 2003)</p> <p>1 site non-RT</p>	<p>Continuous at 15-minute intervals</p>	<p>Stream stage and discharge are measured every 15 minutes. Historical records and statistics also are available. 1 site (Falls Lake) is a stage-only gage.</p> <p>Electronic records are maintained in local and national databases in perpetuity. Paper records are maintained on-site for 10 years, and then are archived at the Federal Records Center in Atlanta, Georgia.</p>	<p>Data are entered into the National Water Information System and can be accessed online at: http://waterdata.usgs.gov/nwis/rt (national data) or http://waterdata.usgs.gov/nc/nwis/current/?type=flow (NC sites only).</p> <p>The Information Officer will provide assistance with data requests.</p>
<p>USGS Water Quality</p> <p>Ramona Traynor, Information Officer U.S. Geological Survey 3916 Sunset Ridge Road Raleigh, NC 27607 919-571-4096</p> <p>rtraynor@usgs.gov</p>	<p>Monitor water quality at selected sites in cooperation with local and state agencies. Data are used for assessment of water-quality conditions and long-term trends and loads, and to assess the effects of large- and small-scale management actions.</p>	<p>9 active</p> <p>3 more discont., but with recent data</p>	<p>Varies from 4 to 9 times per year.</p>	<p>The active sites have been monitored since 1988, as part of the Triangle Area Water Supply Monitoring and the Treyburn projects. The 3 NAWQA sites were sampled only a few times, but for a broad suite of constituents.</p> <p>Physical parameters, nutrients, suspended sediment, major ions, metals, stream stage and discharge are measured. Three sites were sampled for emerging contaminants in 2004.</p> <p>Electronic records are maintained in local and national databases in perpetuity. Paper records are maintained on-site for 10 years, and then are archived at the Federal Records Center in Atlanta, Georgia.</p>	<p>Data are entered into the National Water Information System and can be accessed online at: http://waterdata.usgs.gov/nwis/</p> <p>The Information Officer will provide assistance with data requests.</p> <p>Data are also published in annual data reports and in interpretive project reports.</p>