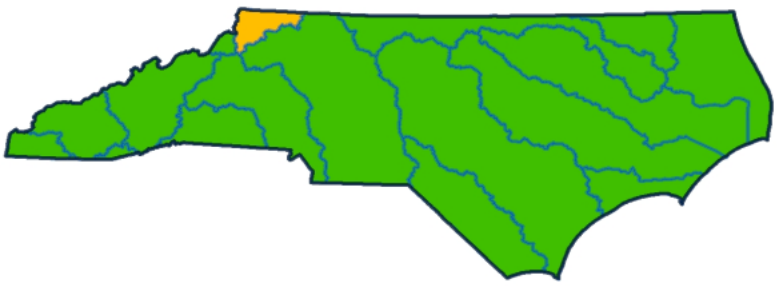
# New River Basin
# Restoration Priorities 2009

Ecosystem Enhancement
PROGRAM



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This document was updated by
Hal Bryson, EEP Western Watershed Planner,
March 2009.

**Cover Photo:** South Fork New River, Ashe County

## Introduction

This River Basin Restoration Priorities (RBRP) document, prepared by the North Carolina Ecosystem Enhancement Program (EEP), presents a description of updated Targeted Local Watersheds (TLWs) within the New River Basin in North Carolina. This RBRP represents an update of the original document developed in 2005 by EEP, *New River Basin Restoration Priorities*. The 2005 RBRP identified six local watersheds to be targeted for stream, wetland and riparian buffer restoration and protection efforts in the New River Basin. This document adds two additional Targeted Local Watersheds, giving an updated total of eight TLWs in the New River Basin.

This updated RBRP draws information from various sources, including the *New River Basinwide Water Quality Plan* (DWQ, 2005). EEP RBRPs do not provide the level of detail found in the DWQ Basinwide Plans. Rather, they provide an overview of EEP, the criteria EEP uses to select Targeted Local Watersheds, an overview of the river basin and its major restoration goals, and then describe the newly selected Targeted Local Watersheds.

In EEP watershed planning documents, the regional sub-basins that make up river basins are defined by the USGS 8-digit cataloging units (CUs) and the Targeted Local Watersheds are defined by the USGS 14-digit hydrologic units (HUs). In the case of the New River Basin in North Carolina, the basin is comprised of a single 8-digit CU: 05050001.

## What is a River Basin Restoration Priority?

*North Carolina General Statute 143-214.10* charges EEP to pursue wetland and riparian restoration activities in the context of basin restoration plans, one for each of the 17 major river basins in the State, with the goal of protecting and enhancing water quality, fisheries, wildlife habitat, recreational opportunities and preventing floods.

EEP develops River Basin Restoration Priorities (RBRPs) to guide its mitigation activities within each of the major river basins. The RBRPs identify specific local watersheds within the basin's 8-digit CUs that exhibit a need for restoration and protection of wetlands, streams and riparian buffers. These priority watersheds, or Targeted Local Watersheds (TLWs), are 14-digit hydrologic units which receive priority for EEP planning and project funds. The designation may also benefit stakeholders writing watershed improvement grants (e.g., Section 319 or Clean Water Management Trust Fund) by giving added weight to their proposals.

## Criteria for selecting Targeted Local Watersheds

EEP evaluates a variety of GIS data and resource and planning documents on water quality and habitat conditions in each river basin to select TLWs. Public comment and the professional judgment of local resource agency staff also play a critical role in targeting local watersheds. TLWs are chosen based on an evaluation of three factors—*problems*, *assets*, and *opportunities*. *Problems* reflect the need for restoration, *assets* reflect the ability for a watershed to recover from degradation and the need for land conservation, and *opportunity* indicates the potential for local partnerships in restoration and conservation work.

**Problems:** EEP evaluates DWQ use support ratings, the presence of impaired /303(d)-listed streams, and DWQ basinwide documents (*Basinwide Water Quality Plans* and *Basinswide Assessment Reports*) to identify streams with known problems. EEP also assesses the potential for degradation by evaluating land cover data, riparian buffer condition, impervious cover, and population statistics. For local watersheds in rural areas, the percentage of agricultural land cover and the number of animal farming operations represent additional indicators of potential watershed problems or stressors.

**Assets:** In order to gauge the natural resource value of each watershed, EEP considers various factors, including the amount of forested land, land in public or private conservation, riparian buffer condition, high quality resource waters, and natural heritage elements (rare/endangered species and unique habitat types).

**Opportunity:** EEP reviews restoration and protection projects that are already on the ground in the local watersheds, such as Clean Water Management Trust Fund (CWMTF) projects, US Clean Water Act Section 319 projects, and projects undertaken by local/regional land trusts. EEP also considers the potential for partnership opportunities by consulting with local, state, and federal resource agencies and conservation organizations, identifying their priority areas for habitat protection or watershed restoration.

**Local Resource Professional Comments/Recommendations:** The comments and recommendations of local resource agency professionals, including staff with county Soil & Water Conservation Districts (SWCD), the Natural Resources Conservation Service (NRCS), county and municipal planning staff, NCDENR regional staff (e.g., Wildlife Resources Commission), and local/regional land trusts and watershed organizations are considered heavily in the selection of Targeted Local Watersheds. Local resource professionals often have specific and up-to-date information regarding the condition of local streams and wetlands. Furthermore, local resource professionals may be involved in local water resource protection initiatives that provide good partnership opportunities for EEP restoration and preservation projects and Local Watershed Planning (LWP) initiatives.

## New River Basin Overview

The total area of the New River basin amounts to 753 square miles and includes 21 fourteen-digit Hydrologic Units (HUs). The New River originates at the confluence of the South and North Fork New Rivers along the Ashe-Alleghany county line in extreme northwestern North Carolina. The New River flows north-northeastward into Virginia and West Virginia, where it joins the Gauley River to form the Kanawha River.

The North Carolina portion of the New River is located in the Blue Ridge physiographic province (and ecoregion) of the southern Appalachian Mountains. Within North Carolina, the North Fork New River, South Fork New River and Little River all drain portions of the New River Plateau as they flow to the New River.

The basin encompasses all or portions of three North Carolina counties (Watauga, Ashe and Alleghany) and six municipalities, including the towns of Boone, Blowing Rock, Jefferson and Sparta. The estimated total population in the basin in the year 2000 was 50,000, with over 25 percent of this total living in the Town of Boone (DWQ, 2005; citing NC Office of State Planning). Data provided by the NC Office of State Budget and Management (OSBM) indicate 20-year population increases (from 2000 to 2020) for the three counties comprising the New River Basin to range from 10 to 17 percent. Applying an area-weighted average to the data (by percent of county land area in the river basin) yields a total predicted basin population of approximately 57,000 by the year 2020. Predicted county population densities (persons per square mile) in the basin for the year 2020 range from approximately 50 (Alleghany County) to 150 (Watauga County), as compared to a statewide average of 225 persons/square mile.

Overall land cover in the North Carolina portion of the New River Basin is approximately 70 percent forested (including wetlands), 24 percent agricultural and six percent developed (Homer et al, 2004). Developed land (and associated impervious cover) is concentrated primarily along major transportation corridors in the basin and within six municipalities -- the towns of Blowing Rock and Boone in Watauga County; Lansing, Jefferson and West Jefferson in Ashe County; and Sparta in Alleghany County. An ever-increasing number of residential subdivisions and vacation homes will inevitably increase the amount of impervious cover (and associated water quality impacts) across the basin.

Glade Creek, Alleghany County

Major water quality and aquatic habitat stressors identified across the New River Basin (DWQ, 2005) include habitat degradation, nutrient and sediment inputs, toxic impacts, low pH (acidified waters) and fecal coliform bacteria. The sources of these watershed stressors are associated with particular land uses and land-disturbing activities, including agriculture (row crops; pasture/grazing; animal feeding operations; Christmas tree farming), impervious surfaces, road construction, mining and quarry operations, and land clearing for new commercial and

residential development. Four especially significant sources of aquatic habitat degradation and water quality impairment within the New River Basin are (1) livestock grazing with unlimited access to stream banks and stream channels; (2) the clearing of native riparian vegetation from streamside buffer zones; (3) clearing of land (natural vegetation and topsoil) for new roads and buildings, especially in areas of steep slopes; and (4) urban stormwater runoff. Additional sources of water quality, habitat and hydrologic impacts include timber harvesting; failing septic systems and straight pipe discharges; hydrologic modifications (e.g., channelization, streambank armoring, building in floodplains); and wastewater treatment plant discharges.

Various techniques and structures known as Best Management Practices (BMPs) can be applied in order to control many of the watershed stressors/sources noted above. These include agricultural BMPs designed to control sediment and nutrient inputs to streams (e.g., fencing of livestock from streams, pesticide/herbicide management) and urban stormwater BMPs designed to reduce hydrologic stresses in stream channels and to capture and treat specific pollutants in runoff from impervious surfaces.

## New River Basin Restoration Goals

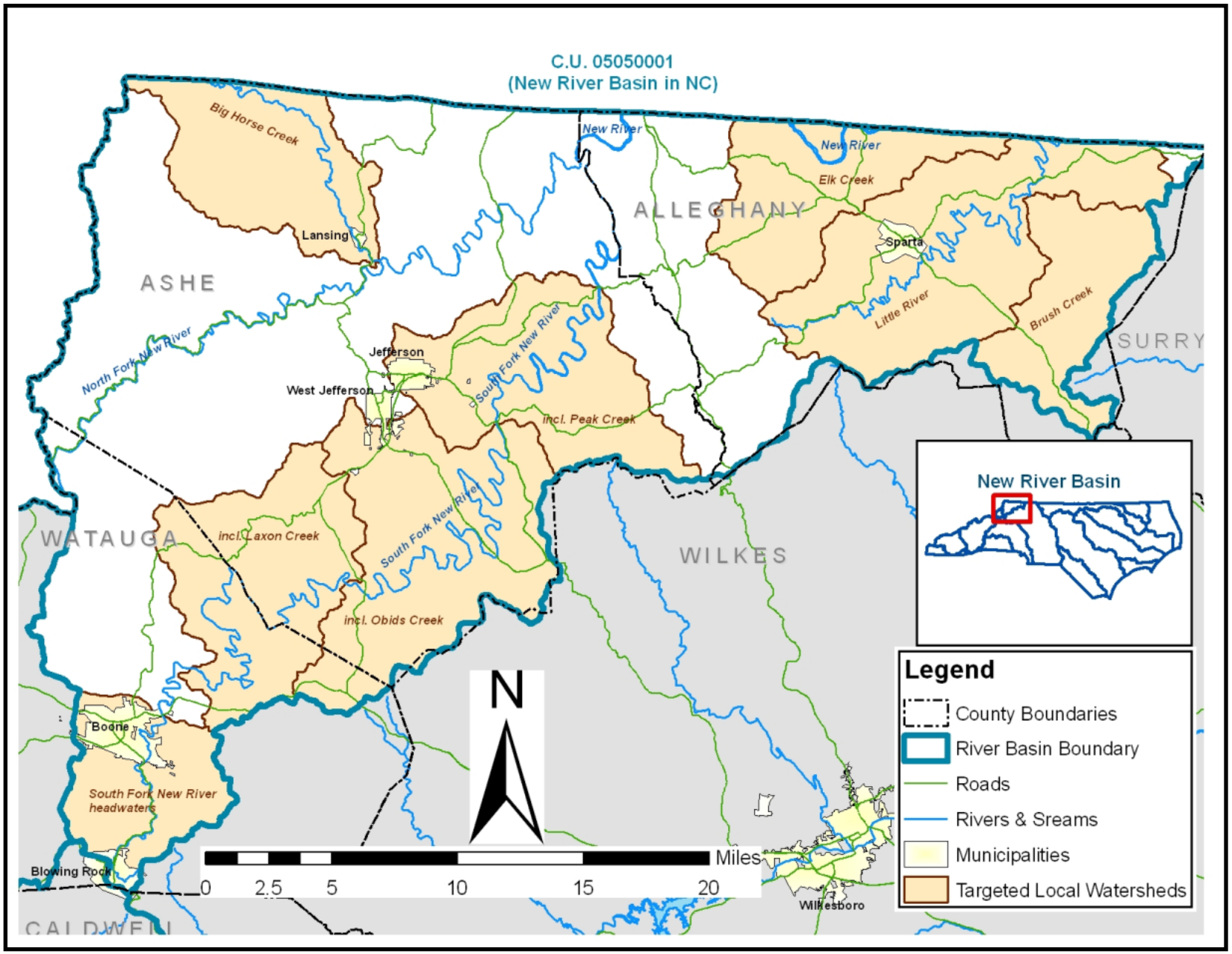
Photo: Dennis Herman, NC DOT.

Based on an assessment of existing watershed characteristics and resource information, EEP has developed several restoration goals for the New River Basin. Pursuing these goals within Targeted Local Watersheds should achieve maximum restoration, enhancement and protection benefits within the basin. The goals reflect EEP's focus on working cooperatively to restore critical wetland and stream functions, such as maintaining and enhancing water quality, restoring hydrology, and protecting fish and wildlife habitat.

- Restoration of DWQ-identified impaired waters through the continued implementation of strategically located stream, buffer and wetland restoration/enhancement projects.
- Implementation of the multi-agency site remediation and aquatic restoration plans for Ore Knob Branch (where acid mine drainage is impairing Peak and Little Peak Creeks).
- Protection of high-quality in-stream and riparian habitat through the preservation of headwater areas (via permanent conservation easement agreements with willing landowners).
- Implementation of multi-agency cooperative efforts (WRC, NHP, NC DOT, county SWCD/NRCS, Land Trusts, CWMTF and private landowners) to more effectively protect and manage parcels that include rare mountain bogs, fens and seeps (bog turtle habitat).
- Increased implementation of agricultural BMPs within rural sub-watersheds.
- Improved stormwater management within urban and suburban sub-watersheds, including the implementation of stormwater BMPs in and around the municipalities of Boone, Blowing Rock, Jefferson-West Jefferson and Sparta.

In 2005, EEP initiated a Local Watershed Planning (LWP) effort in the 111-square mile Little River and Brush Creek watersheds in Alleghany County. This LWP culminated in 2007 with the development of a *Project Atlas* identifying stream and wetlands restoration and preservation sites within priority sub-watersheds and a detailed *Watershed Management Plan* for the Bledsoe Creek focus area. This work included the development of specific stormwater management recommendations for the Town of Sparta and the identification and modeling of stormwater BMP project sites. EEP is currently working with local resource professionals and landowners to implement stream and wetland restoration/enhancement and preservation projects in the two LWP watersheds. For more information on this LWP initiative, go to http://www.nceep.net/services/lwps/Little_River/Little_River.pdf.

# New River Basin and Targeted Local Watershed Map



# Targeted Local Watershed Summary Table for the New River Basin

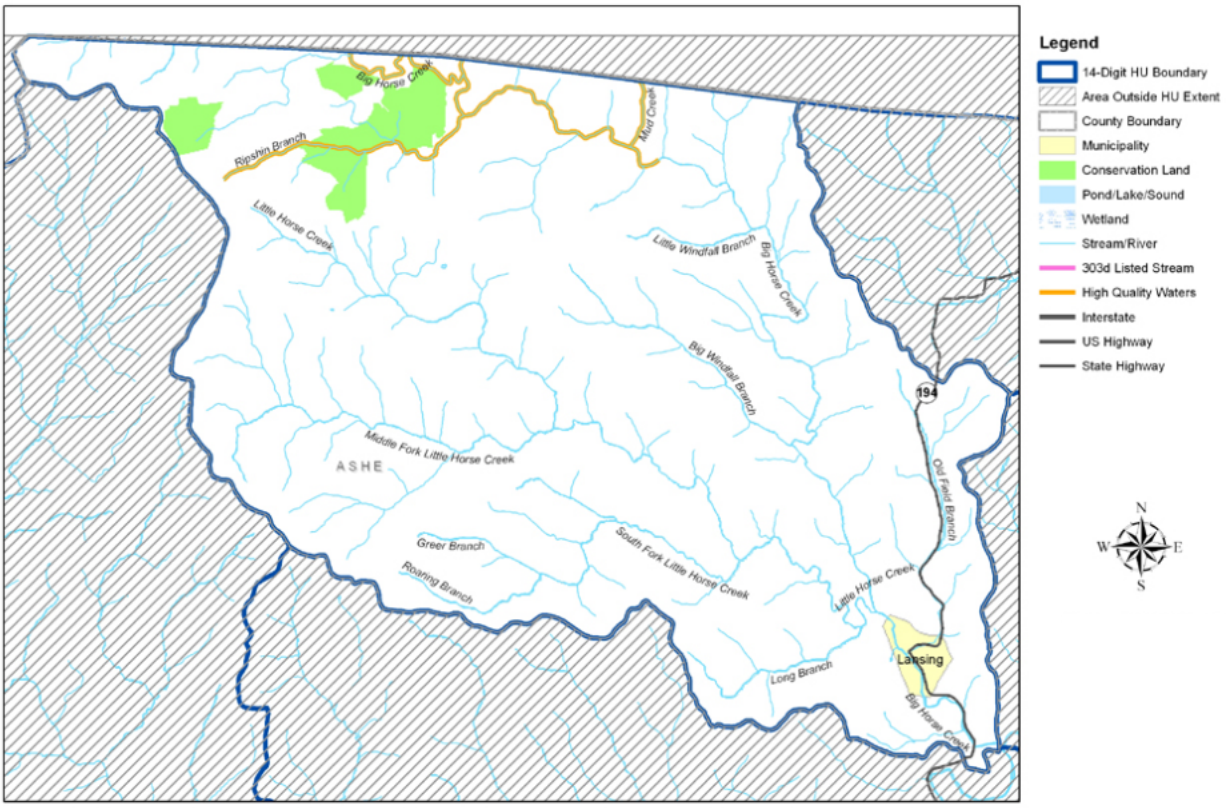
| 14-digit HU Code | Major Streams | Area (sq. mi.s) | % Imperv. | % Develop-ed Area | % Agric. Area | % 303D Miles (2006) | % Non-forest Buffer | # Animal Ops | % Forest-Wetland Area | % HQW-ORW Miles | % Tr Miles | % WSW Miles | % SNHA | # NHEOs | % Land in Conserv. | WRC Prior-ity? | # non-EEP Proj.s | # EEP Proj.s (jan'09) | 2005 TLW ? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| New | | | | | | | | | | | | | | | | | | | |
| 05050001010050 | Big Horse Creek & Little Horse Creek | 44.9 | 0.2 | 3.9 | 14.8 | 0.0 | 29.1 | 9 | 81.3 | 18.8 | 79.5 | 0.0 | 0.0 | 8 | 2.9 | | 0? | 1 | Y |
| 05050001020010 | South Fork New River headwaters (East Fork, Middle Fork, Winkler Creek, Kraut Creek) | 34.9 | 4.7 | 25.8 | 12.4 | 0.0 | 47.5 | 6 | 61.4 | 0.0 | 70.5 | 73.7 | 2.1 | 17 | 16.8 | | 8 | | no |
| 05050001020030 | South Fork New River & tributaries (incl. Laxon Crk) | 57.3 | 0.3 | 6.2 | 21.6 | 0.0 | 34.5 | 10 | 72.0 | 26.3 | 48.1 | 0.0 | 4.6 | 25 | 1.5 | yes | 7 | 2 | no |
| 05050001020040 | South Fork New River & tributaries (incl. Obids Crk) | 75.8 | 0.5 | 7.4 | 25.1 | 5.1 | 40.5 | 13 | 67.2 | 41.7 | 60.7 | 6.8 | 2.6 | 77 | 4.4 | yes | 0 | 2 | Y |
| 05050001020050 | South Fork New River & tributaries (incl. Peak Crk) | 56.9 | 0.6 | 7.6 | 30.2 | 4.6 | 43.8 | 23 | 61.9 | 22.1 | 68.5 | 8.8 | 3.9 | 76 | 8.3 | yes | 16 | 2 | Y |
| 05050001030015 | Elk Creek | 40.2 | 0.3 | 5.3 | 41.8 | 0.0 | 48.1 | 10 | 52.2 | 32.5 | 9.5 | 0.0 | 0.9 | 25 | 0.8 | yes | 0 | | Y |
| 05050001030020 | Little River & trib.s (incl. Bledsoe Crk.) | 77.4 | 0.8 | 7.6 | 40.6 | 0.0 | 41.1 | 27 | 51.6 | 4.9 | 72.0 | 0.0 | 1.6 | 59 | 4.2 | yes | 5 | 4 | Y |
| 05050001030030 | Brush Crk & trib.s (incl. Glade Crk.) | 34.6 | 0.7 | 10.9 | 37.0 | 0.0 | 41.2 | 14 | 51.7 | 0.0 | 100.0 | 0.0 | 5.1 | 40 | 8.1 | yes | 1 | 2 | Y |

**Abbreviations**: Imperv. = percent impervious cover. Animal Operations = NC Dept. of Agriculture-identified animal farms (cows; pigs; poultry), 2007. DWQ classifications: HQW = high quality waters; ORW = outstanding resource waters; Tr = trout streams; WSW = water supply watersheds. Natural Heritage Program (NHP) designations: % SNHA = percent of land area that is NHP-designated significant natural heritage area(s); NHEO = natural heritage element occurrence. Non-EEP projects = funded by 319, Clean Water Management Trust Fund (CWMTF) and local/regional Land Trusts. WRC = NC Wildlife Resources Commission. WRC Priority = includes areas identified as priorities for freshwater conservation in the 2005 *Wildlife Action Plan*. EEP = NC Ecosystem Enhancement Program. LWP = EEP local watershed plan. TLW = EEP targeted local watershed. See also the **Definitions** section at the end of this document..

# Discussion of Targeted Local Watersheds in the New River Basin

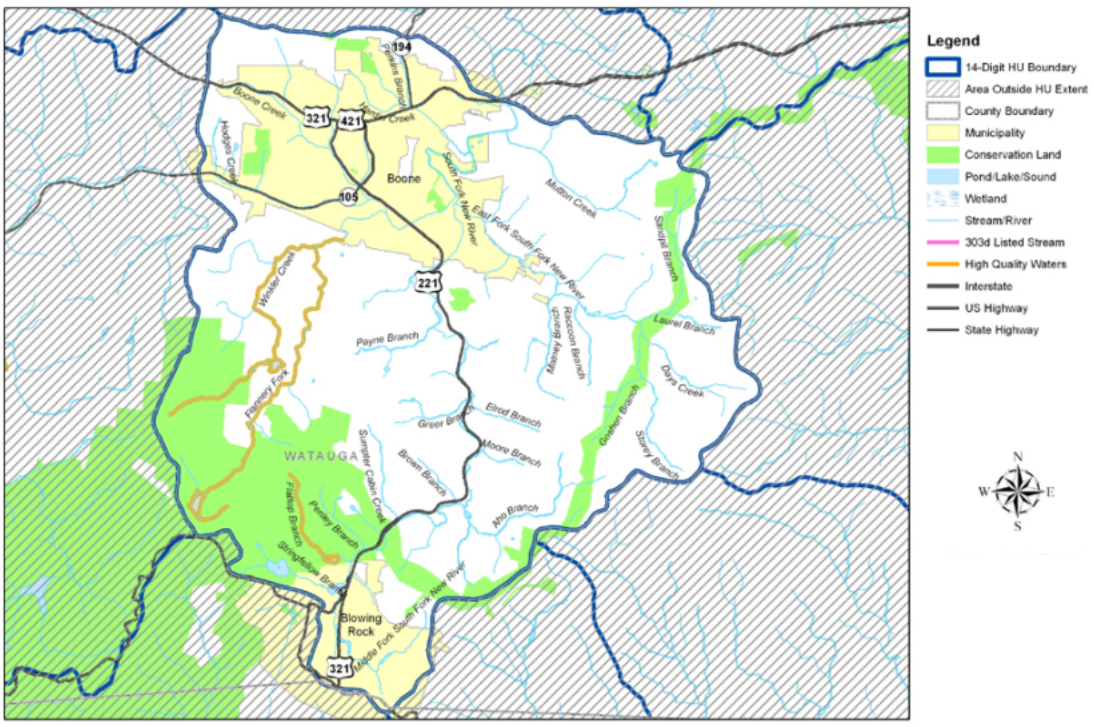
05050001 010050: Big Horse Creek and Little Horse Creek

Big and Little Horse Creeks drain the 45-square mile extreme northwestern corner of Ashe County, flowing southeasterly to the community of Lansing, where Big Horse Creek enters North Fork New River. The watershed is predominantly forested (81 percent of land cover), with 15 percent agricultural land cover and nine animal operations. Nearly 30 percent of its riparian buffers are degraded (non-forested), affording numerous opportunities for stream and buffer enhancement projects. Habitat degradation has been noted by DWQ (2005) as a local stressor of Big and Little Horse Creeks. Approximately three percent of its land area is presently conserved, primarily in the headwaters area of Big Horse Creek and Ripshin Branch (which are both HQW-classified waters and DWQ trout streams). The watershed includes eight Natural Heritage Element Occurrences (NHEOs), which represent Natural Heritage Program (NHP)-documented locations of rare and endangered species and/or unique natural communities. EEP has initiated the design of a large stream restoration and preservation project on Ripshin Branch, a tributary to Big Horse Creek. This project also includes some wetlands enhancement. A primary goal for this watershed is to build upon the existing restoration and conservation efforts in order to provide long-term protection of this area's ecological assets.



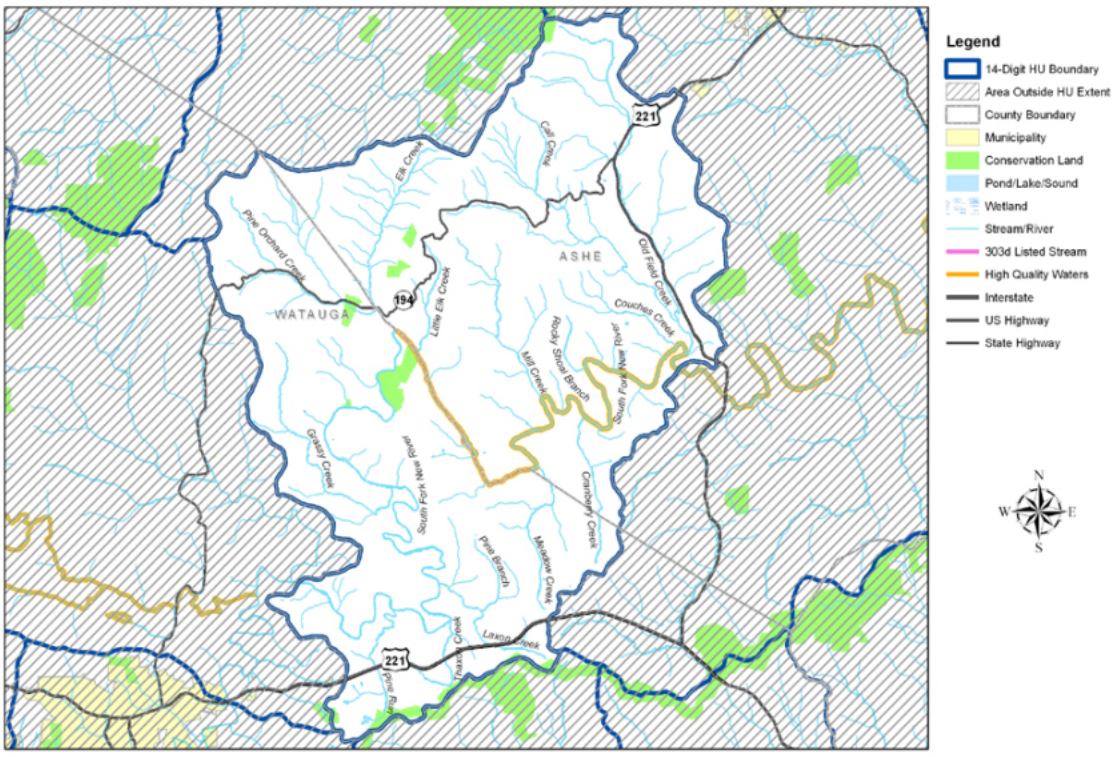
05050001 020010: South Fork New River Headwaters

The South Fork New River mainstem begins at the confluence of three streams on the eastern side of the Town of Boone. Winkler Creek, Middle Fork and East Fork flow from headwater streams originating in the vicinity of the Blue Ridge Parkway as it runs just north of the Town of Blowing Rock. The 35-square mile watershed encompasses a diverse landscape of developed lands (26 percent), forest (61 percent) and agriculture (13 percent) in south-central Watauga County. It includes most of the municipal area of Boone and the northern half of Blowing Rock, so impervious cover is significant (at 4.7 percent of total land cover). Nearly 48 percent of riparian buffers in the watershed are degraded (non-forested). Yet it also includes 17 documented NHEOs, 17 percent conserved lands (including the National Park Service's Blue Ridge Parkway, Moses Cone Memorial Park and municipal parks and greenways), 71 percent trout streams and 74 percent water supply watershed (WSW)-classified waterways. The watershed is home to several Clean Water Management Trust Fund (CWMTF) water quality protection initiatives, including the Kraut Creek (aka Boone Creek) restoration partnership involving the Town of Boone, Appalachian State University, the National Committee for the New River and the Watauga County Cooperative Extension Service. New stormwater management efforts, including stormwater BMP projects, are underway in the Town of Boone to help address some of the aquatic habitat degradation and flooding issues apparent within urban streams in the watershed. The Middle Fork Greenway Association is working to expand conservation easements along the Middle Fork buffer between Blowing Rock and Boone. Continuing efforts to protect water quality, restore degraded riparian buffers and improve management of stormwater runoff from developed catchments should remain a high priority within this watershed. This is one of two newly designated TLWs by EEP within the New River Basin.



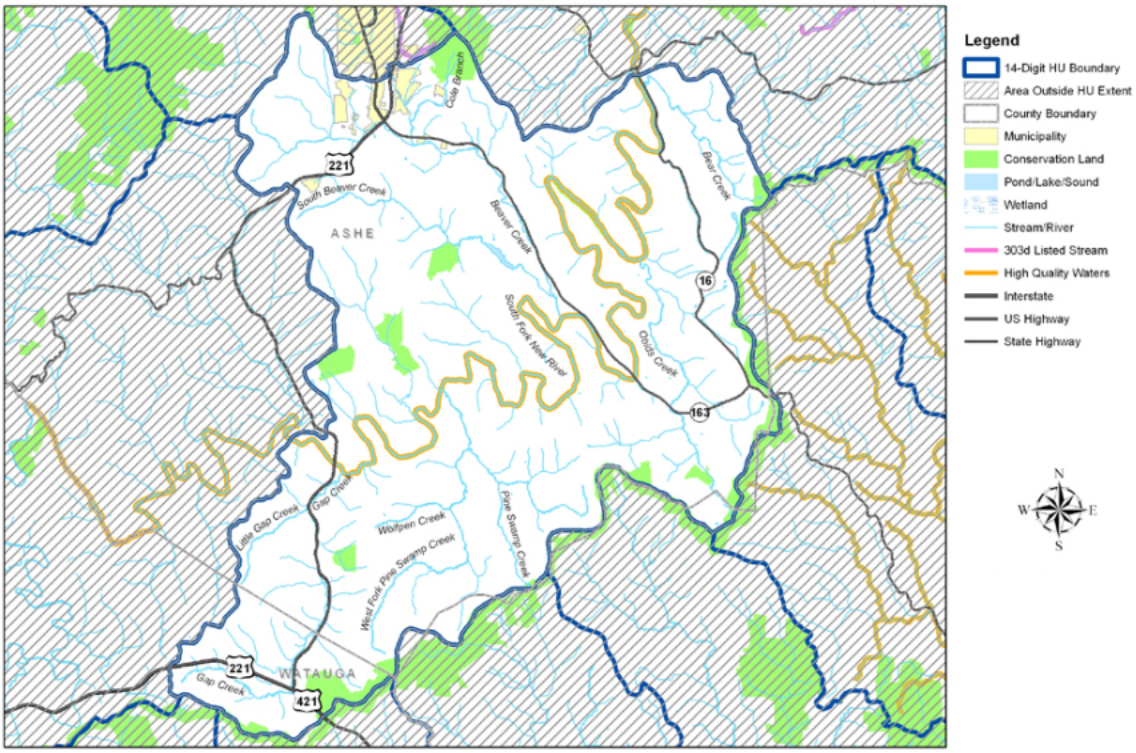
05050001 020030: South Fork New River (including Laxon Creek)

This 57-square mile watershed straddles the Watauga-Ashe county line and is characterized by 72 percent forest cover, 22 percent agricultural cover and six percent developed land. It includes 10 animal operations, 35 percent degraded (non-forested) riparian buffers and only 1.5 percent conserved lands. Nearly five percent of the land area is NHP-designated Significant Natural Heritage Areas (SNHAs) and it contains 25 NHEOs. A large stretch of the South Fork New River in this watershed is classified as high quality waters (HQW) and nearly 50 percent of the stream miles are DWQ trout waters. This watershed includes a WRC priority aquatic habitat (WRC, 2005). This is one of two newly designated TLWs by EEP in the New River Basin. EEP has two completed stream restoration projects within this watershed, on Laxon Creek and a tributary to Laxon Creek in eastern Watauga County. Both projects are now in long-term management. Primary goals for this watershed include additional stream and riparian buffer restoration and preservation to help protect the South Fork New River *Significant Aquatic Habitat* (including a cluster of 16 rare species) that has been identified by the NHP.



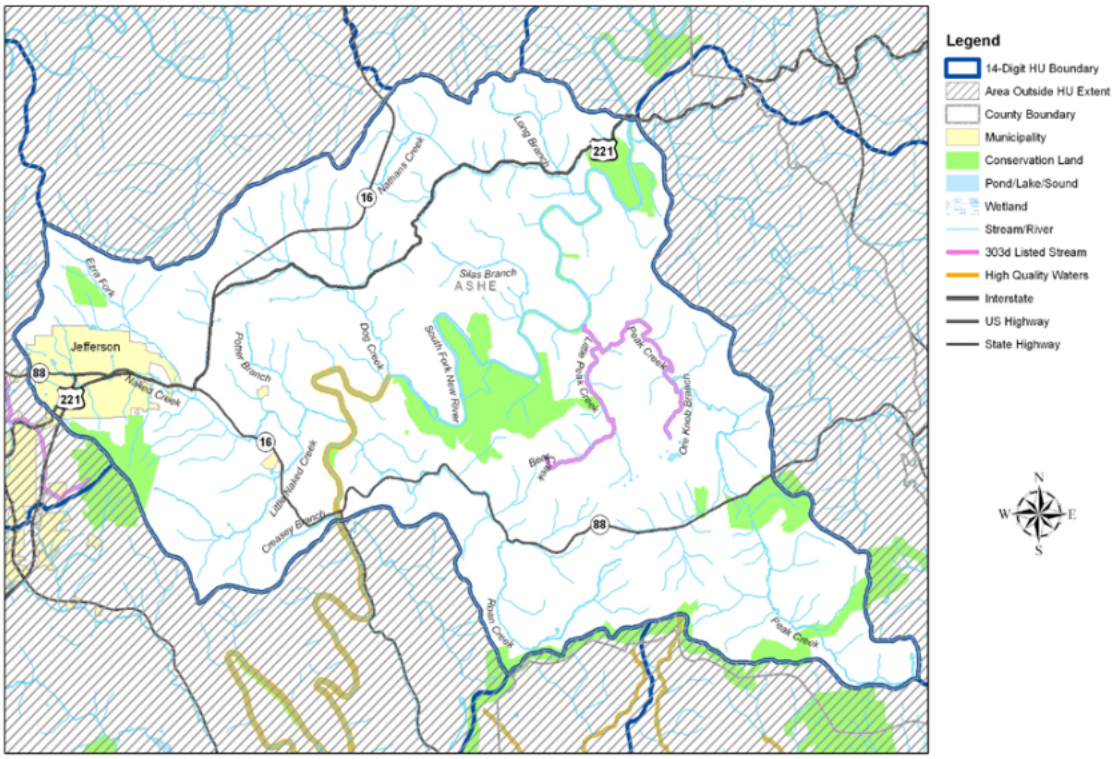
05050001 020040: South Fork New River (including Obids Creek)

The South Fork New River continues downstream through southern Ashe County as an HQW-classified waterway, a WRC priority freshwater habitat, and an NHP-designated *Significant Aquatic Habitat*. This 76-square mile watershed is host to 77 NHEOs, the highest number among any of the TLWs selected within the New River Basin. The watershed land cover is 67 percent forest-wetlands, 25 percent agriculture and eight percent developed, with 41 percent degraded (non-forested) riparian buffer miles and 13 animal operations. There are clear opportunities for stream and buffer restoration/enhancement. A 6.6-mile stretch of the South Fork New River (from Obids Creek to a point 0.6 miles upstream of Roan Creek) is rated as Impaired for aquatic life due to low pH values (source unknown), as shown on the 2006 303(d) list (DWQ, 2007). EEP has two stream projects in this watershed: one is a 3,400-ft stream preservation tract; the other is a 1,800-ft stream restoration project on Obids Creek that is in long-term management. This watershed could benefit from additional stream and buffer restoration and preservation efforts, especially given the high ecological value of the South Fork New River.



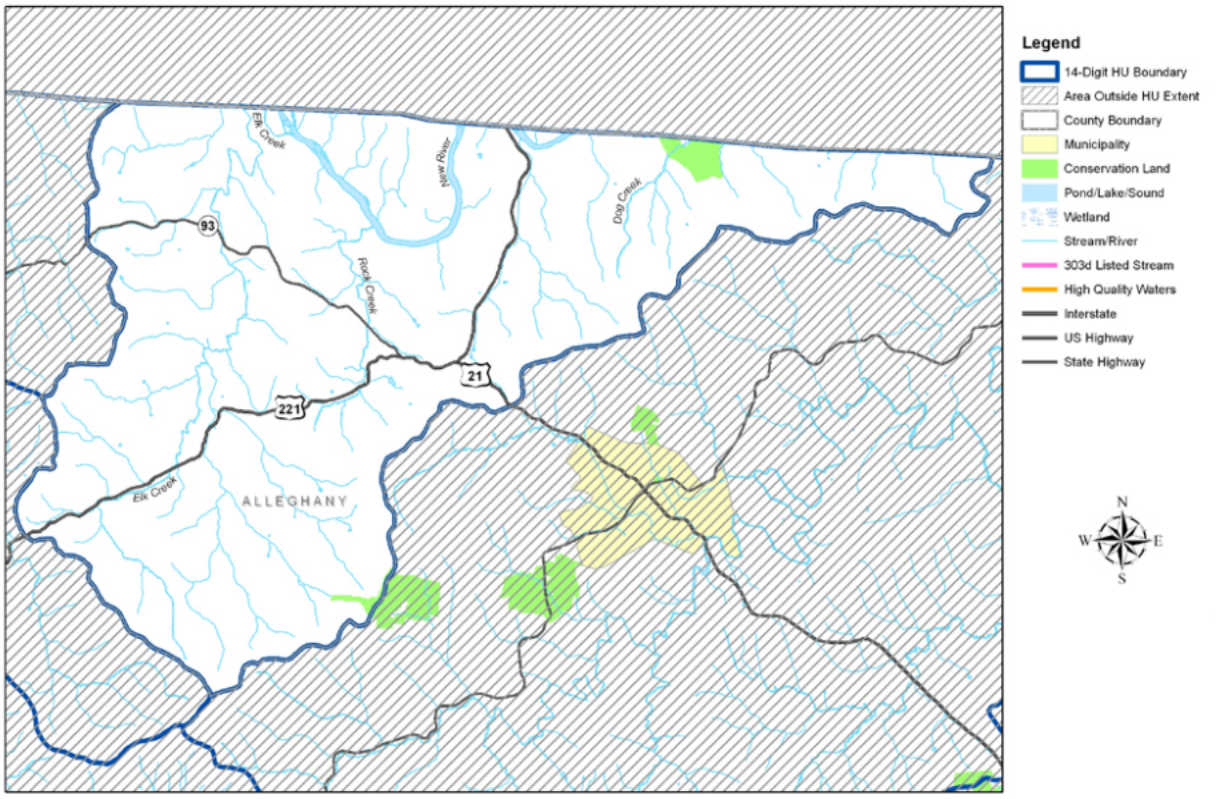
05050001 020050: South Fork New River (including Peak Creek)

This 57-square mile watershed is asset-rich, with 76 NHEOs, four percent NHP-designated SNHAs, 69 percent of stream miles as designated Trout waters and 8.3 percent conserved lands (including New River State Park). However, it also faces several challenges associated with new development and impervious surfaces around the Town of Jefferson, significant agricultural activity (30 percent of land cover; 23 animal farms) and acid drainage from an abandoned mining operation at Ore Knob. Ore Knob Branch, Peak Creek below Ore Knob Branch and Little Peak Creek are all on the 2006 303(d) list of impaired waters due to pH violations, impaired biota and violations of Action Levels for one or more metals (DWQ, 2007). The USEPA, US Army Corps of Engineers (USACE), NC DWQ and NC Division of Waste Management are working together to develop and implement an aquatic restoration plan at the abandoned Ore Knob mine. A recommendation to the USEPA Superfund National Priorities List (NPL) may also be imminent for this site, as of March 2009 (personal communication, NC DWQ). Agricultural BMPs have been installed within the Peak Creek sub-watershed using NC Ag Cost Share Program funding (DWQ, 2005). EEP has completed two stream restoration projects in the watershed, one on Peak Creek and one on an unnamed tributary to Peak Creek. The primary restoration goals for this watershed should be the continuation of ongoing stream restoration and agricultural BMP efforts, coupled with site remediation at the old Ore Knob mine, as well as improved stormwater management in and around the Town of Jefferson.



05050001 030015: Elk Creek

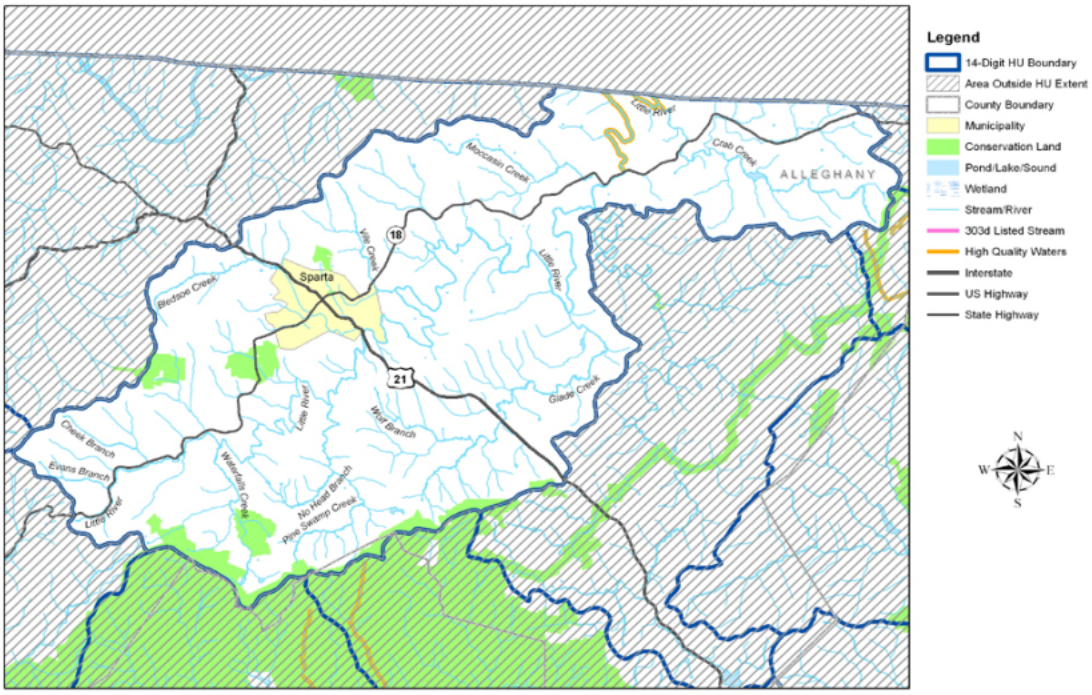
This is a 40-square mile watershed in north-central Alleghany County; its northern boundary is the North Carolina - Virginia state line. It includes 42 percent agricultural land cover (the highest among all eight TLWs in the New River basin), 52 percent forest cover and just six percent developed area. Over 48 percent of its riparian buffers are degraded (non-forested), it is home to 10 animal operations and less than one percent of its land area is in conserved status. There are bound to be numerous stream and buffer restoration/enhancement opportunities within this watershed. The NHP has documented 25 NHEOs within the watershed, most of which are probably associated with the New River *Significant Aquatic Habitat*. Presently, there are no EEP projects under design or construction in the watershed. At least one resource professional in Alleghany County confirmed DWQ reports (DWQ, 2005) that significant stretches of Elk Creek are suffering from riparian buffer and aquatic habitat degradation, with pasture operations noted as the most common source of these impacts. Working with staff of the Alleghany Soil and Water Conservation District (SWCD) and cooperative landowners to implement agricultural BMPs and stream/buffer restoration projects should be a primary objective for this watershed.



*Note: the following two 14-digit HUs were the focus of EEP's Little River and Brush Creek Local Watershed Planning (LWP) initiative conducted from late 2005 through the summer of 2007. This effort culminated in production of a Project Atlas of stream and wetlands restoration/enhancement sites within the two watersheds, in addition to a detailed Watershed Management Plan for the Bledsoe Creek sub-watershed. EEP has implemented the design/construction of five stream restoration projects within the two LWP watersheds, and local resource professionals and the Town of Sparta have successfully used the LWP recommendations to leverage funding for the planning and implementation of stormwater BMPs within the Bledsoe Creek sub-watershed.*

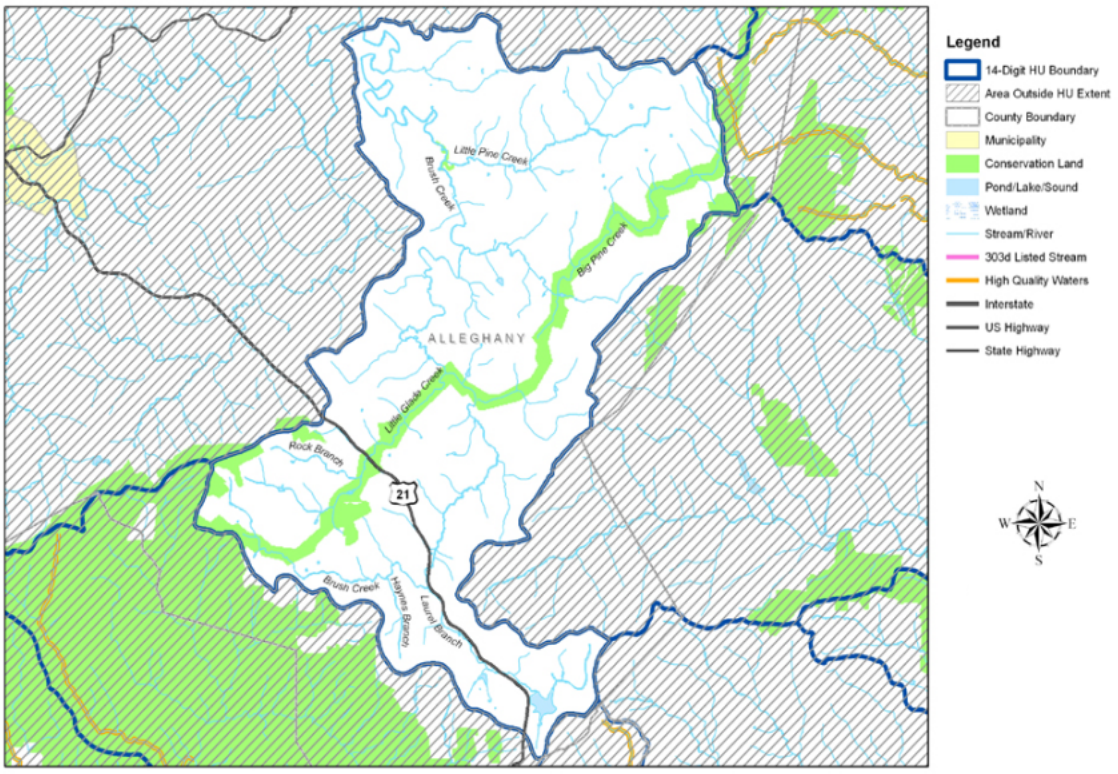
05050001 030020: Little River (including Bledsoe Creek)

At just over 77 square miles, this is the largest of the eight TLWs selected within the New River Basin. Land cover is comprised of 52 percent forest-wetlands, 40 percent agriculture (including many Christmas tree farms) and eight percent developed area (including the Town of Sparta). Twenty-seven animal farms (the highest number among TLWs in the New River basin) occur within the watershed and 41 percent of riparian buffers are degraded (non-forested). Grazing cattle have direct access to several streams (especially on tributaries to Little River) and fecal coliform impacts have been noted (DWQ, 2005). Bledsoe Creek shows clear evidence of degraded habitat and water quality impacts (e.g., sedimentation) associated with stormwater runoff from impervious surfaces in Sparta. Over 70 percent of the stream miles are Trout-classified. The watershed includes 59 NHEOs, a WRC priority aquatic habitat and 4.2 percent conserved lands. Three EEP stream restoration projects (including some wetlands preservation) are under design within this watershed and one large wetlands preservation parcel (Sparta Bog) originally acquired by NC DOT is now being managed/monitored by EEP. The Town of Sparta and the High Country COG have recently received funding from CWMTF to do stormwater planning and BMP implementation in the Sparta vicinity. Agricultural BMPs (e.g., livestock fencing and buffer enhancement) should also be pursued as part of a multi-pronged approach to watershed restoration within this watershed.



05050001 030030: Brush Creek (including Glade Creek)

This is the second of the two 14-digit HUs addressed as part of EEP's LWP initiative in the New River basin. Brush Creek and its tributaries drain a 35-square mile landscape in eastern Alleghany County, characterized by 52 percent forest-wetlands cover, 37 percent agricultural land use and 11 percent developed area. Forty-one percent of riparian buffers are degraded (non-forested) and there are 14 animal farming operations in the watershed. Christmas tree farms, cattle pastures, horse farms and golf courses occur here. Widespread habitat degradation (in-stream and within riparian buffers) associated primarily with pasturing has been noted along several reaches of Brush Creek and some its tributaries. The watershed's streams are 100 percent DWQ trout waters and include WRC priority aquatic habitat; 40 NHEOs occur within the watershed, 5.1 percent of the land area is in SNHAs and 8.1 percent of the lands are conserved. The Blue Ridge Parkway bisects the watershed along a southwest-to-northeast axis. EEP has a stream restoration project in design for an approximately 4,000-ft reach of Little Pine Creek and a second stream restoration/enhancement project currently in monitoring along a section of Brush Creek (and a contiguous portion of Little Pine Creek). Agricultural BMPs, additional stream and buffer restoration efforts, and wetlands enhancement and preservation should all be priorities within this watershed.



## References

Homer et al, 2004. Development of a 2001 National Landcover Database for the United States. *Photogrammetric Engineering and Remote Sensing*, vol. 70, no. 7, July 2004, pp. 829-840. http://www.mrlc.gov/publications.php

NC Division of Water Quality (DWQ), Basinwide Planning Program. October 2005. *New River Basinwide Water Quality Plan.* http://h2o.enr.state.nc.us/basinwide/New.htm

NC Division of Water Quality (DWQ), Planning Section. 2007. *North Carolina Water Quality Assessment and Impaired Waters List* [2006 Integrated 305(b) and 303(d) Report]. Final (approved May 17, 2007).

NC Ecosystem Enhancement Program (EEP). June 2005. *New River Basin Restoration Priorities*. http://www.nceep.net/services/restplans/New_River_Basin_Plan05.pdf

NC Wildlife Resources Commission (WRC). 2005. *North Carolina Wildlife Action Plan*. http://www.ncwildlife.org/fs_index_07_conservation.htm

Watershed Needs Assessment Team. 2003. *Report from the Watershed Needs Assessment Team to the Mitigation Coordination Group*. http://www.nceep.net/news/reports/WNAT%20Mit%20Group%20Final.pdf

## For More Information

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http://www.nceep.net/pages/lwplanning.htm

## Definitions

**303(d) List** – This refers to Section 303(d) of the federal Clean Water Act, under which the U.S. EPA requires states to submit biennially a list of all impaired water bodies. Impaired water bodies are streams and lakes not meeting state water quality standards linked to their designated uses (e.g., water supply, recreation/fishing, propagation of aquatic life). Best professional judgment (in interpreting water quality monitoring data and observations) along with numeric and narrative standards/criteria are considered when evaluating the ability of a water body to serve its uses.

**8-digit Catalog Unit (CU)** – The USGS developed a hydrologic coding system to delineate the country into uniquely identified watersheds that can be commonly referenced and mapped. North Carolina has 54 of these watersheds uniquely defined by an 8-digit number. EEP typically addresses watershed – based planning and restoration in the context of the 17 river basins (each has a unique 6-digit number), 54 catalog units and 1,601 14-digit hydrologic units.

**14–digit Hydrologic Unit (HU)** – In order to address watershed management issues at a smaller scale, the U.S. Natural Resources Conservation Service (NRCS) developed methodology to delineate and uniquely identify watersheds at a scale smaller than the 8-digit catalog unit. A hydrologic unit is a drainage area delineated to nest in a multilevel, hierarchical drainage system. Its boundaries are defined by hydrographic and topographic criteria that delineate an area of land upstream from a specific point on a river, stream or similar surface waters. North Carolina has 1,601 14-digit hydrologic units.

**Animal Operations –** Inventory of animal farms (bovine; swine; poultry) provided by NC Department of Agriculture (NCDA) in December 2007.

**Aquatic Habitat** – the wetlands, streams, lakes, ponds, estuaries, and streamside (riparian) environments where aquatic organisms (e.g., fish, benthic macroinvertebrates) live and reproduce; includes the water, soils, vegetation, and other physical substrate (rocks, sediment) upon and within which the organisms occur.

**Benthic Macroinvertebrates** – organisms living in or on the bottom substrate of aquatic habitats; include insect larvae, worms, snails, crayfish and mussels; can be used as indicators of stream water quality and stream habitat condition.

**BMPs (best management practices)** – any land or stormwater management practice or structure used to mitigate flooding, reduce erosion & sedimentation, or otherwise control water pollution from runoff; includes urban stormwater management BMPs and agriculture/forestry BMPs.

**EEP** – The North Carolina Ecosystem Enhancement combines existing wetlands restoration initiatives (formerly the Wetlands Restoration Program or NCWRP) of the N.C. Department of Environment and Natural Resources with ongoing efforts by the N.C. Department of Transportation (NCDOT) to offset unavoidable environmental impacts from transportation-infrastructure improvements.

**GIS** - A geographic information system integrates hardware, software, and data for capturing, managing, analyzing, and displaying all forms of geographically referenced information.

**High Quality Waters (HQW)** - Supplemental NC DWQ classification intended to protect waters with quality higher than state water quality standards. In general, there are two means by which a water body may be classified as HQW. They may be HQW by definition, or they may qualify for HQW by supplemental designation and then be classified as HQW through the rule-making process.

1) The following are HQW by definition:
• (Water Supply) WS-I, WS-II,
• SA (shellfishing area),
• ORW (outstanding resource water),
• Waters designated as Primary Nursery Areas (PNA) or other functional nursery areas by the Marine Fisheries Commission, or
• Native and special native (wild) trout waters as designated by the Wildlife Resources Commission.

2) The following waters can qualify for supplemental HQW designation:
• Waters for which DWQ has received a petition for reclassification to either WS-I or WS-II, or
• Waters rated as Excellent by DWQ.

II. Classifications by Other State and Federal Agencies.

**NC DWQ** – North Carolina Division of Water Quality.

**NC WRP** – The North Carolina Wetlands Restoration Program was a wetland restoration program under NC DENR and a predecessor of the NCEEP.

**Natural Heritage Element Occurrences (NHEOs) –** NC Natural Heritage Program (NHP) documented locations of rare and endangered species (plant and animal) populations and occurrences of unique or exemplary natural ecosystems and special wildlife habitats (terrestrial and palustrine community types).

**Outstanding Resource Waters (ORW)** - Supplemental NC DWQ classification intended to protect unique and special waters having excellent water quality and being of exceptional state or national ecological or recreational significance. To qualify, waters must be rated Excellent by DWQ and have one of the following outstanding resource values:

- Outstanding fish habitat or fisheries,
- Unusually high level of water-based recreation,
- Some special designation such as NC or National Wild/Scenic/Natural/Recreational River, National Wildlife Refuge, etc.,
- Important component of state or national park or forest, or
- Special ecological or scientific significance (rare or endangered species habitat, research or educational areas).
- No new discharges or expansions of existing discharges shall be permitted.

There are associated development controls enforced by DWQ. ORW areas are HQW by definition.

**Preservation** – the long-term protection of an area with high habitat and/or water quality protection value (e.g., wetland, riparian buffer), generally effected through the purchase or donation of a conservation easement by/to a government agency or non-profit group (e.g., land trust); such areas are generally left in their natural state, with minimal human disturbance or land-management activities.

**RBRP** - The River Basin Restoration Priorities are documents that delineate specific watersheds (Targeted Local Watersheds) within a River Basin that exhibit both the need and opportunity for wetland, stream and riparian buffer restoration.

**Resource Professionals** – staff of state, federal, regional or local (city, county) natural resource agencies –including planners, water resources and storm water engineers, parks & recreation departments, water quality programs, regional councils of government, local/regional land trusts or other non-profit groups with knowledge/expertise and/or interest in local watershed issues and initiatives

**Restoration –** the re-establishment of wetlands or stream hydrology and wetlands vegetation into an area where wetland conditions (or stable streambank and stream channel conditions) have been lost; examples include: stream restoration using natural channel design methods coupled with re-vegetation of the riparian buffer; riparian wetlands restoration through the plugging of ditches, re-connection of adjacent stream channel to the floodplain, and planting of native wetland species; this type of compensatory mitigation project receives the greatest mitigation credit under the 401/404 regulatory framework.

**Riparian –**relating to the strip of land adjacent to streams and rivers, including streambanks and adjoining floodplain area; important streamside zones of natural vegetation that, when disturbed or removed, can have serious negative consequences for water quality and habitat in streams and rivers.

**Significant Natural Heritage Areas (SNHA) –** NC Natural Heritage Program identified areas containing ecologically significant natural communities or rare species. May be on private or public lands, and may or may not be in conserved status.

**TLW -** Targeted Local Watershed, are 14-digit hydrologic units which receive priority for EEP planning and restoration project funds.

**Use Support** –refers to the DWQ system for classifying surface waters based on their designated best use(s); at present, the DWQ primary stream classifications include the following: class C [fishing/boating & aquatic life propagation]; class B [primary recreation/direct contact]; SA [shellfish harvesting]; and WSW [water supply]. Supplemental classifications include High Quality Waters (HQW), Outstanding Resource Waters (ORW), Nutrient Sensitive Waters (NSW), Trout Waters (Tr), and Swamp Waters (Sw). All waters must at least meet the standards for class C waters.

**USGS** – United States Geological Survey.

**Watershed –**all the land area which contributes runoff to a particular point along a stream or river; also known as a "drainage basin", although the term *Basin* usually implies a very large drainage system, as of an entire river and its tributary streams.

**Watershed Restoration Plan** – Older versions of RBRP documents were called Watershed Restoration Plans. In essence, they are the same thing.