Watauga
River Basin Restoration Priorities
2009

Ecosystem Enhancement
PROGRAM

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This document was updated by
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Cover Photo: Beaverdam Creek, Watauga 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 Watauga River Basin. This RBRP represents an update of the original document developed in 2002 by EEP's precursor program, the NC Wetlands Restoration Program: *Watershed Restoration Plan for the Watauga River Basin*. The 2002 plan selected only one local watershed to be targeted for stream, wetland and riparian buffer restoration and protection efforts in the Watauga River Basin. This document adds two new Targeted Local Watersheds, giving an updated total of three TLWs in the Watauga River Basin in North Carolina.

This updated RBRP draws information from various sources, including the *Watauga River Basinwide Water Quality Plan* (DWQ, 2007). EEP RBRPs do not provide the same level of detail found in the DWQ Basinwide Plans. Rather, they provide an overview of EEP and 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 Watauga River Basin in North Carolina, the basin is comprised of a single 8-digit CU: 06010103.

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.

Watauga River Basin Overview

The total area of the Watauga River basin in North Carolina (the second smallest river basin in the state) amounts to 205 square miles and includes six fourteen-digit Hydrologic Units (HUs). The Watauga River and its major tributary, the Elk River, flow northwestward into Tennessee, where they both enter the Watauga Lake Reservoir. The Watauga and Elk River headwaters begin along the flanks of Sugar Mountain and Grandfather Mountain in southwestern Watauga and eastern Avery counties, a few miles southeast of Banner Elk. The North Carolina portion of the Watauga River Basin is located within the Blue Ridge physiographic province of the southern Appalachian Mountains ecoregion.

Watauga River at Bethel Road, Watauga County

The basin encompasses portions of two counties (Watauga and Avery) and includes six municipalities (Banner Elk, Beech Mountain, Boone, Elk Park, Seven Devils and Sugar Mountain). It also contains several unincorporated communities, including Foscoe, Valle Crucis, Vilas, Sugar Grove and Zionville. The estimated total population in the basin in 2000 was 23,675, with approximately 115 persons per square mile (DWQ, 2007). Data provided by the NC Office of State Budget and Management (OSBM) indicate 20-year population increases (from 2000 to 2020) for the two counties comprising the Watauga River Basin to range from 10 to 12 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 26,425 by the year 2020. This represents a basinwide population density of approximately 130 persons per square mile, as compared to a statewide average of 225 persons/square mile.

Overall land cover in the North Carolina portion of the Watauga River Basin is approximately 78 percent forested (including wetlands), 14 percent agricultural and eight percent developed (Homer et al, 2004). Developed land (and associated impervious cover) is concentrated primarily along major transportation corridors in the basin and within and surrounding the six municipalities -- the towns of Boone, Beech Mountain and Seven Devils in Watauga County; and Banner Elk, Elk Park and Sugar Mountain in Avery County. An ever-increasing number of residential subdivisions and vacation homes will inevitably increase the amount of impervious cover (and associated water quality threats) across the basin.

Major water quality and aquatic habitat stressors identified across the Watauga River Basin include habitat degradation, nutrient and sediment inputs, and elevated water temperature (DWQ, 2007). The sources of these watershed stressors are associated with particular land uses and land-disturbing activities, including agriculture (row crops; pasture/grazing; Christmas tree farming), impervious surfaces, stormwater outfalls, road construction, 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 Watauga 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 potential 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.

Watauga River Basin Restoration Goals

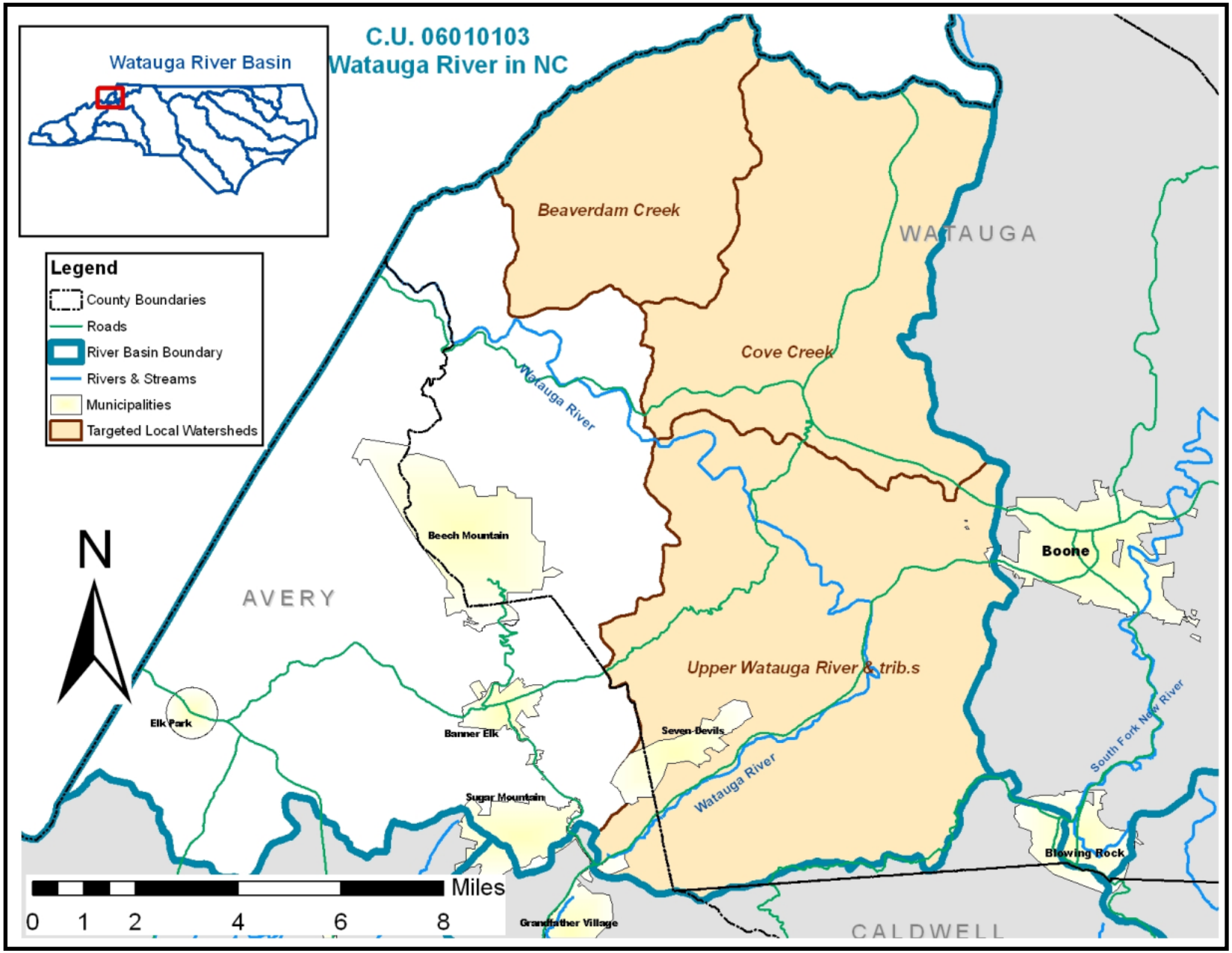
Based on an assessment of existing watershed characteristics and resource information, EEP has developed several restoration goals for the Watauga River Basin. Pursuing these goals within Targeted Local Watersheds should achieve maximum restoration, enhancement and protection benefits within the basin.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

Vander Pool Creek, Watauga County

- Restoration of DWQ-identified impaired waters through the implementation of strategically located stream, buffer and wetland restoration/enhancement projects.
- 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, Land Trusts, CWMTF and private landowners) to protect and manage parcels that include rare mountain bogs and other high-elevation wetlands.
- Increased implementation of agricultural BMPs (e.g., livestock exclusion fencing around riparian buffers) within rural sub-watersheds.
- Continuation of local efforts to improve stormwater management within urban and suburban sub-watersheds, including the implementation of stormwater BMPs in and around the municipalities of Boone, Banner Elk and Elk Park.
- Improved enforcement of state and local sediment/erosion control rules during new residential and commercial construction.

To date, there have been no Local Watershed Planning (LWP) initiatives undertaken by EEP in the Watauga River Basin.

Watauga River Basin and Targeted Local Watershed Map



Watauga River Basin Restoration Priorities 2009

Targeted Local Watershed Summary Table for the Watauga River Basin

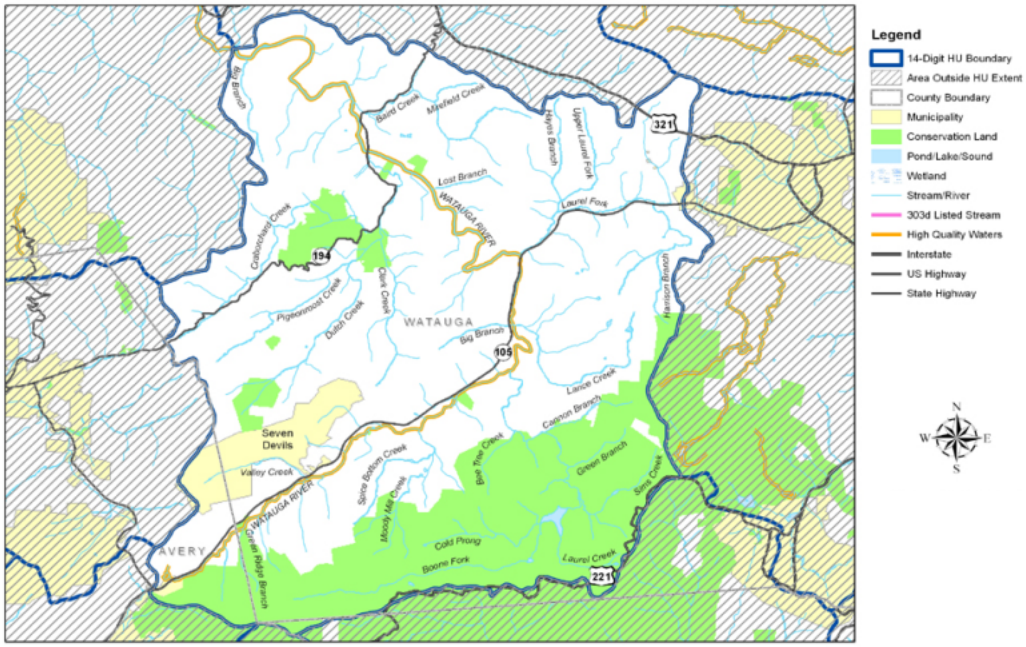
14-digit HU Code	Major Streams	Area (sq. miles)	% Imperv.	% Develop-ed Area	% Agric. Area	% 303D Miles (2006)	% Non-forest Buffer	# Animal Ops	% Forest-Wetland Area	% HQW-ORW Miles	% Tr Miles	% WSW Miles	% SNHA	# NHEOs	% Land in Conserv.	WRC Priority?	# non-EEP Proj.s	# EEP Proj.s (jan'09)	2002 TLW?
Watauga																			
06010103010010	Upper Watauga River (incl. Boone Fork, Dutch Creek, Baird Creek)	56.2	0.8	10.0	9.5	0.0	32.2	2	80.2	52.4	73.3	0.0	11.9	121	23.9	yes	14		**Y**
06010103010020	Cove Creek & tributaries, incl. Vanderpool Creek	34.8	0.7	8.9	19.6	0.0	44.5	11	71.4	4.6	2.2	0.0	5.0	11	1.7	yes	3		**no**
06010103010040	Beaverdam Creek	20.6	0.2	3.7	18.7	0.0	27.5	6	77.4	4.6	59.7	0.0	5.4	4	0.0	yes	0		**no**

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 Watauga River Basin

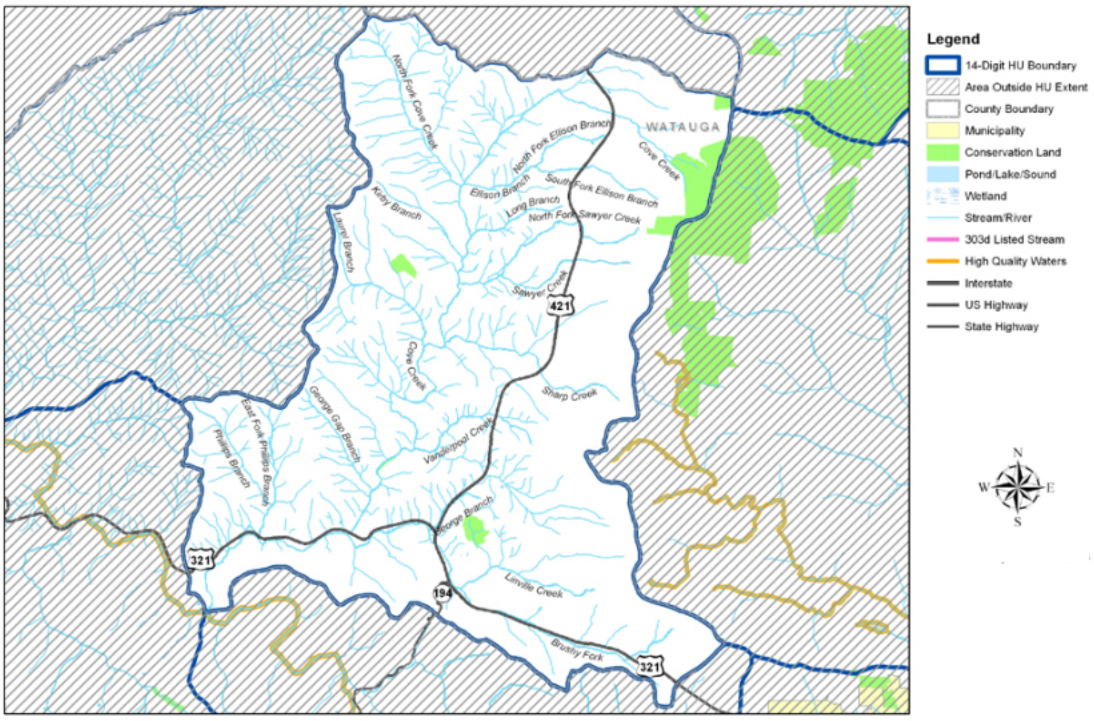
06010103 010010: Upper Watauga River
(including Boone Fork, Dutch Creek, Baird Creek)

This 56-square mile watershed comprises the upper Watauga River and its headwater tributaries in southwestern Watauga County (and a small portion of eastern Avery County near Grandfather Mountain). Nearly 24 percent of its land area is in conservation status, including portions of the Blue Ridge Parkway, Grandfather Mountain and Pisgah National Forest. Eighty percent of the land cover is forested, with only 10 percent each in agricultural and developed areas. Despite the high percentage of forested lands in conservation, over 32 percent of riparian buffers are degraded (non-forested), primarily due to the relatively large amount of commercial and residential development within the watershed (especially along the NC-105 and NC-194 highway corridors). This development also contributes to in-stream habitat degradation associated with increasing impervious cover and land clearing activities in the watershed. In particular, habitat degradation has been noted throughout the Laurel Fork sub-watershed, which receives nonpoint source runoff from urbanized areas of western Boone (DWQ, 2007). Despite these water quality stressors, the overall watershed is rich in natural resource assets, including 121 NHP-designated natural heritage element occurrences (NHEOs), 12 percent of the land area in Significant Natural Heritage Areas (SNHAs), 73 percent of stream miles as DWQ-classified Trout streams and 52 percent high quality waters (HQW). Several non-EEP watershed projects have been funded here, primarily through the NC Clean Water Management Trust Fund (CWMTF) working with local land trusts and private conservation groups. These efforts include some stream restoration/enhancement projects on the main stem of the Watauga River. The primary restoration goal for this watershed should be the continuation of private and public land conservation efforts, especially the preservation and restoration of streams and riparian buffers within the headwaters of Watauga River tributary streams. Additionally, improved stormwater management and sediment/erosion control practices are needed for new construction, especially in areas of steep slopes.



06010103 010020: Cove Creek and tributaries

This watershed encompasses 35 square miles and contains a mix of residential and agricultural land use. With 20 percent agricultural land cover and 10 cow farms, this watershed has the highest level of agricultural activity of all local watersheds (14-digit HUs) within the Watauga River basin in North Carolina. Nearly 45 percent of riparian buffers are degraded (non-forested) and less than two percent of the land area is in conserved status. Historic and current agricultural use (primarily pasturelands for cattle) has created narrow or nonexistent riparian buffer zones, streambank instability and sedimentation. Direct cattle access to streams has been noted along several tributaries to Cove Creek. In-stream habitats are poor (sandy runs, embedded riffles, infrequent pools) and new residential development is occurring, especially in the upper portion of the watershed (DWQ, 2007). Five percent of this watershed's land area is in NHP-identified SNHAs, including the amphibolite bluffs of Snake Mountain and Rich Mountain Bald along the watershed's northeastern divide. Natural heritage element occurrences (NHEOs) have been documented at 11 locations in the watershed. Presently there are no EEP stream or wetland restoration projects planned for the watershed; however, at least three non-EEP (e.g., CWMTF) stream restoration/enhancement projects have been implemented. A primary goal for this watershed is to protect aquatic habitat through the restoration of riparian buffers and streams, and through the implementation of agricultural BMPs (e.g., livestock fencing and provision of alternate watering sources) at key locations. Preservation of undisturbed tracts of land in headwater portions of the watershed would contribute significantly to overall watershed protection.



06010103 010040: Beaverdam Creek and tributaries

This 21-square mile watershed's land cover is 77 percent forested, 19 percent agricultural and only four percent developed. Land use within the watershed includes scattered rural residences, cattle pastures and row crops. Twenty-eight percent of riparian buffers are non-forested. Sixty percent of the stream miles are DWQ trout streams. Just over five percent of the land area is a designated Significant Natural Heritage Area (Stone Mountain, along the watershed's northwestern divide), but none of the watershed is presently in conserved status. The entire length of Beaverdam Creek is rated as Impaired (for aquatic life) due to a Poor fish bioclassification at a site just above its confluence with the Watauga River – in fact, DWQ has recommended that Beaverdam Creek be included on the 2008 303(d) list (DWQ, 2007). Degraded or nonexistent riparian buffers and direct cattle access to streams have been noted on Beaverdam Creek and some of its tributaries. There are presently no EEP projects and no CWMTF-funded water quality projects in the watershed. Working with cooperative landowners through the Watauga County Soil and Water Conservation District (SWCD), the implementation of agricultural BMPs (e.g., livestock fencing, stream buffer restoration) should be a continuing priority for this watershed. Preservation of high-quality riparian buffers (undisturbed; vegetated with native species) and stream channels in headwater reaches of the watershed should also be a goal.

References

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For More Information

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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.