

3.3 Cove Creek HUC 060101030302

Covering just under 30 square miles, Cove Creek is a mix of forest, agriculture and rural development. Cove Creek has the highest number of acres dedicated to agricultural use, and the second highest number of developed acres when compared to other watersheds in the basin. It is also the second most densely populated watershed in the basin with Sugar Grove located right along the banks of Cove Creek, and Vilas located on the banks of Brushy Fork. US highways 321 and 421 cut through the watershed and act as major thoroughfares for the entire basin. Cove Creek High School, Ben Farthing Farm and the Ward Family House are all listed on the National Register of Historic Places and several private easements are held by the Blue Ridge Conservancy (BRC) and protected for their natural beauty. Several natural areas are recognized by the NC Natural Heritage Program (NHP) and include portions of Potato Hill Bog and Seeps, Rich Mountain Bald and Harmon Knob. A portion of the Tater Hill Plant Conservation Preserve is also located in the watershed. It is managed by the NC Department of Agriculture & Consumer Services (NCDA&CS).



Table 3.17: Land Use and Estimated Population – Cove Creek Watershed

Land Use Type	Acres	Square Miles	Percent
Open Water	0.0	0.0	0.0%
Developed	1,757.0	2.7	9.2%
Bare Earth	11.2	0.0	0.1%
Forest	13,552.2	21.2	70.8%
Grassland	502.9	0.8	2.6%
Agriculture	3,320.5	5.2	17.3%
Wetland	1.4	0.0	0.0%
Total Area	19,145.3	29.9	100%

(NCLD, 2011)

Calendar Year	Population and Projections*
2000	4,400
2010	5,089
2020*	-
2030*	-

*Methodology has not been developed to predict population projections on the HUC 12 scale.

(OSBM, 2014)

Overall, water quality in the Cove Creek watershed is good, but the entire watershed continues to be impacted by historic and existing land use. Long lengths of the creek and its tributaries lack a canopy, portions are deeply entrenched with very little aquatic habitat, and forested riparian areas are non-existent in many areas. Cove Creek was sampled on the basinwide monitoring schedule but was also chosen for a special study in 2004 to assess the impacts from several hurricanes that swept through the area. Three other special studies were conducted in 2008, 2009 and 2011. Six benthic and two fish sites were sampled during cycle 4 (2004-2009). Two benthic and three fish sites were sampled during cycle 5 (2009-2014). Two of the fish sites were Not Rated because criteria and metrics have not been developed by the Biological Assessment Branch (BAB) for Southern Appalachian trout streams. The remaining sites were meeting criteria for aquatic life – benthic and fish.

Three NPDES wastewater discharge permits (Table 3.18) and one non-discharger permit (Table 3.19) are located in the Cove Creek watershed. No stormwater permits were identified. Cove Creek has been targeted by the local Soil and Water Conservation District (SWCD) and NC Cooperative Extension Service

(NCCES) for educational workshops related to keeping and maintaining riparian areas. Initial work has already started in identifying areas of concern and where streambanks are heavily eroded.

Table 3.18: NPDES Wastewater Permits in HUC 060101030302

Permit Number	Facility Name	Receiving Stream	Permitted Flow (MGD)
NC0032182	Sunset Apartments	Brushy Fork	0.003
NC0036242	Woodland Hills Apartments WWTP	Brushy Fork	0.007
NC0067008	Old Cove Creek School	Cove Creek	0.010
Permit Type: Minor – Discharging 100% Domestic < 1MGD			

Table 3.19: Non-Discharge Permits in HUC 06010101030302

Permit Number	Facility Name	Permit Type
WQ0034774	Appalachian Residences	Wastewater Irrigation

3.3.1 Stream Assessments

3.3.1.1 Cove Creek AU 8-15

Located approximately one mile above the confluence with the Watauga River, Cove Creek continues to support a Good benthic (LB5) and a Good-Fair fish community (LF1).

In December 2004, a special study was conducted to assess the biological impacts of severe, widespread flooding due to remnants of several hurricanes that swept through the area. Two sites were selected for sampling – Cove Creek and the

Sampling Year	Benthic Rating (LB5)	Benthic Rating (LB51)	Fish Rating (LF1)	Fish Rating (LF11)
2004	Good		Good-Fair	-
2004*	Good-Fair		Not Rated	-
2007**	-	Good	-	-
2008	Good			Fair
2009***	-	Good-Fair		Good-Fair
2013	Good			Good-Fair
* Special Study (post-hurricane, December 2004)				
** Small Streams Study (DWQ, May 2007)				
*** Special Study (March 2009; no formal document published)				

Watauga River near Sugar Grove. Benthic and fish samples were collected. Samples collected post-hurricane showed very few physical or water quality differences in Cove Creek when compared to previous sampling. Flows were much higher post-hurricane (December 2004) when compared to flows that were seen during normal basinwide monitoring (August 2004), and conductivity was much lower (91 µmhos/cm). Differences in habitat scores pre- and post-hurricane were slight. The benthic bioclassification (LB5) dropped from Good to Good-Fair. The fish bioclassification (LF1) was Not Rated.

During basinwide monitoring in 2008, the benthic community (LB5) received a Good bioclassification and the fish community (LF11) received a Fair bioclassification. Biologists noted a shift in the taxa distribution in the benthic community with more pollution tolerant species being identified. The shift may have been the result of an increase of instream waste concentration (effluent discharge) which was magnified by drought induced low-flow conditions. The fish community site was moved approximately one mile downstream to a location immediately above the confluence with the Watauga River. The location corresponds with DWR’s Random Ambient Water Quality Monitoring Station (RAMS) that was sampled

between 2007 and 2008. Biologists noted that the watershed was supporting a fairly diverse fish community, but there was an open canopy and much of the watershed is influenced by agricultural practices.

A second special study was conducted in Cove Creek in March 2009 to reassess the fish community (LF11). Biologists saw a slight increase in number of species collected and gave the site a Good-Fair bioclassification. The benthic community also received a Good-Fair bioclassification.

In 2013, the benthic community (LB5) received a Good bioclassification and the fish community (LF11) received a Good-Fair bioclassification. Biologists noted that the benthic species richness has remained stable since sampling began in 2004, and more intolerant species were identified in 2013 when compared to previous samples. The presence of more intolerant species is likely due to lower effluent concentrations and lower specific conductance, both of which can be influenced by precipitation and nonpoint source runoff. Biologists noted a balanced fish structure with the dominant species being the herbivorous Central Stoneroller. Central Stonerollers are commonly found in streams with an open canopy, abundant periphyton growth and nutrient enrichment. Biologists also noted that a naturally reproducing Brown Trout population has not been documented in Cove Creek since 2008. Cove Creek does not carry the supplemental Trout designation.

3.3.1.2 Special Studies

Three special studies were conducted in the Cove Creek watershed. One stream – Brushy Fork – was sampled as part of a special study to assess potential degradation from new construction activities in the catchment. Two streams – George Branch and George Gap Branch – were sampled as part of a small streams study, and two streams – North Fork Cove Creek and Sharp Creek – were sampled as part of a special study requested by the North Carolina Chapter of the American Fisheries Society (AFS).

Impacts to Stream – Brushy Fork AU 8-15-10

Almost the entire length of Brushy Fork runs along US highway 321. It was sampled as part of a special study in June 2008 to assess impacts from new construction activities in the catchment. The sample site is located 0.5 miles upstream from the confluence with Cove Creek and two minor wastewater facilities (Sunset Apartments WWTP Permit NC0032182 and Woodland Hills Apartments WWTP Permit NC0036242) are found upstream.

Sampling Year	Benthic Rating (LB43)
2008*	Good
*Special Study (DWQ, 2008)	

Even though habitat lacked frequent pools and riffles, had poor riparian zones and unstable streambanks, the benthic community (LB43) received a Good bioclassification. Restoring the riparian zones would help to improve streambank stability, increase shade at the site and reduce the amount of sand and silt entering the creek from the adjacent landscape. Specific conductance was high (185 mhos/cm) when compared to surrounding mountain streams which could be a result of the upstream dischargers and development activities. No historic data was available for the site and conclusions regarding degradation over time could not be made.

Small Streams Study – George Branch AU 8-15-10-2

George Gap Branch AU 8-15-9

Between 2005 and 2007, a total of 122 small streams in 25 counties in eight river basins were sampled to establish a five-tiered bioclassification hierarchy for streams with drainage areas less than or equal to 3.0 mi² in mountain

Sampling Year	Benthic Rating (LB48)	Benthic Rating (LB49)
2007*	Not Rated	Not Impaired
*Special Study (DWQ, 2009)		

and piedmont ecoregions. George Branch is a small tributary to Brushy Fork and was included as a reference site for watersheds that are mixed use with an intermediate watershed impacts from the surrounding landscape. The benthic community in George Branch (LB48) was Not Rated. George Gap Branch is a tributary to Cove Creek and was included as a reference site for forested landscapes. The benthic community (LB49) was Not Impaired. More information about the small streams study can be found on the Water Sciences Section (WSS) Biological Assessment Branch (BAB) [publications page](#).

[Classification Study – North Fork Cove Creek AU 8-15-2](#)

[Sharp Creek AU 8-15-6](#)

A special study requested by the AFS to determine if several streams throughout the Watauga River basin are eligible for the supplemental classification of Trout (Tr). Supporting documentation was provided by the North Carolina Wildlife Resources Commission (WRC), and the fish communities were sampled by DWR in 2009. For streams that did not carry the supplemental classification of High Quality Waters (HQW), benthic macroinvertebrates were also sampled in 2011. WSS published a report in 2012 detailing the findings of the biological sampling.

Fish communities were evaluated in North Fork Cove Creek and Sharp Creek but ratings were not applied to the sites because criteria and metrics have not been developed by BAB for Southern Appalachian trout streams. Benthic samples were not collected in North Cove Creek, and Sharp Creek received a Good bioclassification.

Based on data submitted by WRC and because data collected by the Biological Assessment Branch (BAB) showed evidence of multiple age classes and trout species, North Fork Cove Creek and Sharp Creek as well as all named and unnamed tributaries are eligible for the supplemental classification of Tr. Additional information related to land use changes in the watershed may be necessary to pursue the supplemental classification for these streams.

[North Fork Cove Creek AU 8-15-2](#)

North Fork Cove Creek is a tributary to Cove Creek. Multiple sizes and at least three age classes of Wild Brown Trout were collected in North Fork Cove Creek (LF18). Six other fish species were also collected and included one intolerant species and three cool-warm water species.

Sampling Year	Fish Rating (LF18)
2009*	Not Rated
*Special Study (DWQ, 2012)	

Instream habitat consisted of cobble and boulder riffles, gravel runs and plunge pools but the habitat score was low due to the secondary road that runs parallel to the creek. During the assessment, the creek became very turbid, and the benthic community could not be sampled. The turbidity was documented and believed to be from an illegal discharge from an upstream landowner's property.

[Sharp Creek AU 8-15-6](#)

Sharp Creek is also a tributary to Cove Creek. Samples for fish and benthic macroinvertebrates were collected approximately 400 feet upstream of the confluence to Cove Creek. Brown Trout was the most abundant species collected in 2009 and represented multiple sizes and at

Sampling Year	Benthic Rating (LB57)	Fish Rating (LF21)
2009*	-	Not Rated
2011*	Good	-
*Special Study (DWQ, 2012)		

least three age classes. The habitat consisted of cobble and gravel riffles and runs with narrow riparian zones and shrubs. CWMTF supported a 1,050-foot restoration project on Sharp Creek in 2002. No measurable improvements to the trout populations were noted, but the project reduced undercut bank erosion and included a permanent conservation easement.

In 2011, the benthic community (LB57) was sampled to determine if Sharp Creek is also eligible for the supplemental classification of HQW. The benthic community received a Good bioclassification. The stream must be rated Excellent in order to be eligible for the HQW classification. Sharp Creek was the only stream in the special study that did not receive an Excellent bioclassification.

3.3.2 Water Use

There are 12 Public Water Supply (PWS) Systems located in the Cove Creek watershed (Table 3.20). None are identified as community systems indicating that the residents living in the watershed rely on private groundwater wells for drinking water. No entities or facilities are registered as a water withdrawer in the Water Withdraw and Transfer Registration (WWATR) database.

Table 3.20: Public Water Supply Systems in HUC 060101030302

PWS Name	PWS ID	PWS Type	Population Served
VANDERPOOL CAMPGROUND INC.	01-95-161	Transient Non-Community	80
PLEASANT GROVE BAPTIST CHURCH	01-95-454	Transient Non-Community	25
ZIONVILLE BAPTIST CHURCH	01-95-480	Transient Non-Community	50
HENSON CHAPEL UMC	01-95-488	Transient Non-Community	25
BRUSHY FORK BAPTIST CHURCH	01-95-505	Transient Non-Community	25
VALLEY RESTAURANT & STORE	01-95-555	Transient Non-Community	30
SKATE WORLD	30-95-001	Transient Non-Community	25
WESTERN WATAUGA COMMUNITY CENTER	30-95-023	Transient Non-Community	70
APPALCART TRANSIT FACILITY	30-95-022	Non-Transient Non-Community	80
COVE CREEK ELEMENTARY SCHOOL	01-95-530	Non-Transient Non-Community	306
COVE CREEK PRESERVATION & DEV	01-95-424	Non-Transient Non-Community	55
MABEL ELEM SCHOOL	01-95-521	Non-Transient Non-Community	215

3.3.3 Classifications and Management Strategies

Ellison Branch in the headwaters of the Cove Creek watershed is the only tributary with the supplemental classification of Trout (Tr). Special management strategies are in place to protect the water quality. A small portion of the watershed also falls under management strategies for HQW. The entire length of the Watauga River is classified B and HQW. The section where Cove Creek enters the river also has the supplement classification of Trout. Waters with a B classification are managed for primary recreation, including frequent or organized swimming, and must meet water quality standards for fecal coliform bacteria. To protect the HQW designation, ordinances are in place for erosion control at the county level and available online.

Table 3.21: Stream Names and Classifications

AU Number	Stream Name	Description	Classification
8-15-1	Ellison Branch	From source to Cove Creek	C; Tr
8-(1)	Watauga River	From source to US Hwy 321 bridge	B; Tr; HQW

3.3.4 Protecting Water Resources in the Cove Creek Watershed

Several agencies and organizations are actively working throughout the basin to protect water resources. Agencies or organizations that have identified specific priorities, concerns or restoration projects in the Cove Creek watershed are included here.

3.3.4.1 NCDEQ Division of Mitigation Services (DMS)

The Cove Creek watershed is one of three targeted local watersheds (TLWs) identified by the Division of Mitigation Services (DMS) for priority planning and restoration project funds. The [2009 River Basin Restoration Priority \(RBRP\) Plan](#) identifies preservation and restoration of riparian buffers and streams through the implementation of agricultural BMPs as a priority to protect aquatic habitat in the watershed. Preservation of undisturbed tracts of land in the headwaters would also contribute to overall watershed protection.

3.3.4.2 NC Wildlife Resources Commission (WRC)

The Wildlife Resources Commission (WRC) identifies four species of greatest conservation need (SGCN) in the Watauga River basin. SGCN identified in the 2015 Wildlife Action Plan (WAP) include one crayfish species, two freshwater fish and one freshwater mussel. WRC identifies erosion and sedimentation from nonpoint sources as well as narrow riparian corridors or lack thereof as the primary problems impacting habitats and affecting aquatic species in the basin.

Table 3.22: SGNC Identified in the Watauga River Basin

Taxa Group	Scientific Name	Common Name	Federal/State Status*
Crayfish	<i>Cambarus eeseehensis</i>	Grandfather Mountain Crayfish	FSC / -
Fish	<i>Cottus carolinae</i>	Banded Sculpin	-
Fish	<i>Salvelinus fontinalis</i>	Brook Trout (native)	-
Mussel	<i>Lasmigona subviridis</i>	Green Floater	FSC / E

*FSC – Federal Species of Concern
E – Endangered (State)

The Cove Creek watershed along with the Watauga River headwaters, Dutch Creek and the Beech Creek watersheds have been identified as Tier 2 conservation priority areas by the WRC. Tier 1 are considered highest priority and Tier 2 are high priority areas. WRC recommends surveys to identify species distribution in the watersheds. Long-term monitoring is also needed to assess species and ecosystem health over time. Monitoring will also assist with understanding species resiliency to changing water quality conditions. WRC also recommends research to investigate aquatic community responses to restoration activities as well as water withdraws. Research is also needed to investigate the potential for species reintroduction of native mussels to the basin. Education and management measures are recommended to prevent the introduction or spread of invasive nonnative species, and WRC supports stream and riparian area conservation and restoration initiatives throughout the basin to protect, improve or enhance existing conditions. More information about can be found in Section 4.5.18 of the [2015 Wildlife Action Plan \(WAP\)](#).

3.3.4.3 NCDA&CS DSWC Agriculture Cost Share Program (ACSP)

Cove Creek has been targeted by the local Soil and Water Conservation District (SWCD) and NC Cooperative Extension Service (NCCES) for educational workshops related to keeping and maintaining riparian areas. Initial work has already started in identifying areas of concern and where streambanks are heavily eroded. In addition, several BMPs have already been installed in the watershed. BMPs include

measures to reduce sediment, nutrient and erosion and exclude livestock from streams. Additional information about the ACSP and the total number of BMPs installed, total cost as well as the benefits (soil saved and nutrient reduction) can be found in the chapter titled Nonpoint Source Pollution and Programs to Protect Water Resources.

3.3.5 References

North Carolina Department of Agriculture & Consumer Services (NCDA&CS) Division of Soil and Water Conservation (DSWC). March 2017. Agriculture Cost Share Program (ACSP) BMP Manual.

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