

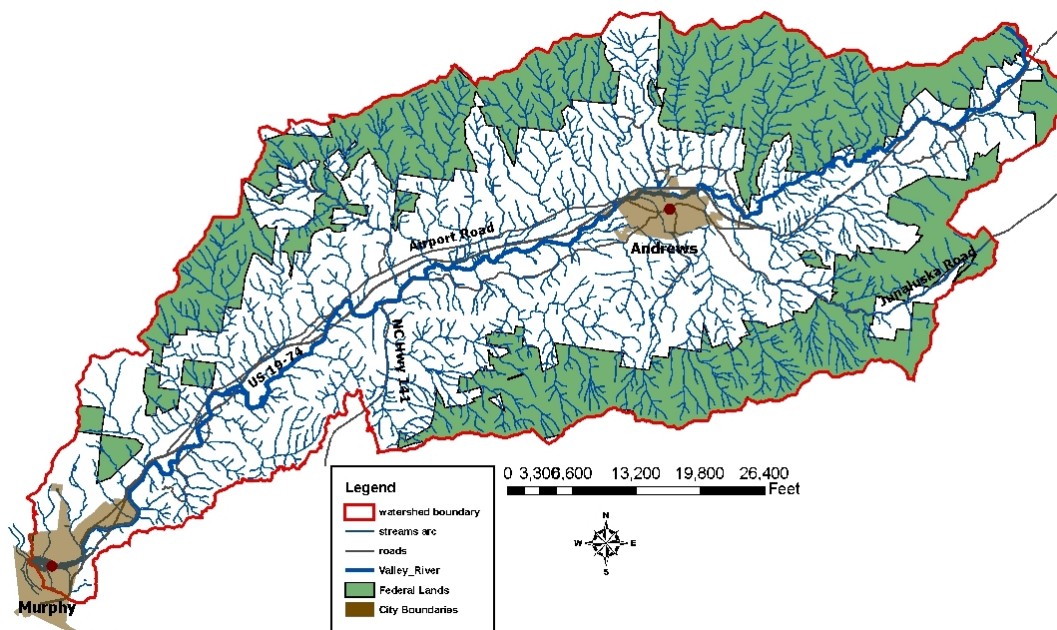
Valley River Watershed Action Plan

DRAFT

Executive Summary

Overview of the Valley River Watershed

The Valley River is a large, fast-flowing mountain river and is a major tributary to the Hiwassee River in Western North Carolina. It begins its journey near the community of Tipton, NC near the Cherokee County line and flows southwestwardly past the Town of Andrews and the communities of Marble and Tomotla before merging with the Hiwassee River at Murphy, NC. Its 120-square mile watershed is formed by the steep slopes of the Snowbird and Valley River Mountains and lies entirely within the boundaries of Cherokee County.



The Valley is one of the largest tributaries in the Hiwassee River basin and directly influences the water quality of Hiwassee Lake immediately downstream. The Valley River is considered an aquatic significant natural heritage area by the NC Natural Heritage Program due to the overall diversity of species, as well as the occurrence of several rare aquatic and wetland-dwelling animal species it contains. Additionally, the river and many of its tributaries contain all 10 “priority aquatic species” in the fish category that are listed in the North Carolina’s *Wildlife Action Plan* as most important for project support in the Hiwassee River basin. One such fish is the sicklefin redhorse, a sucker species that was only recently discovered and is being intensively studied by fisheries biologists.

The river’s broad valley is rich in Native American history. An 1805 map shows the area as the Cherokee settlement Toonatla. It was later listed on a map of the Cherokee Nation as Gunahita. By the time of the

removal of the Cherokee Indians in 1838, it was known as Konehetee, or valley. One of the most infamous periods in history, the removal of the Cherokee and the Trail of Tears, heavily impacted the valley.

The largest town in the watershed is Andrews. In the early 1800s, when most white settlers began arriving, the area was known as Jamesville, after James Whitaker. An Indian Trading Post was established in 1837 and soon after the community was known as Valley Town. The present town was established like many other southern towns, through a land auction.

The official "Town of Murphy" was founded in 1835. On this date the first post office was opened under the name of Huntington, with Col. H.R.S. Hunter the first Postmaster. Huntington later became Murphy, named after Archibald D. Murphey, father of the North Carolina Public School System. In 1839, Cherokee County was formed from a portion of neighboring Macon County. In 1851, Murphy was incorporated as the county seat of Cherokee County.

In 1922, the first paved road opened from Murphy to the Georgia line. In 1935 the Tennessee Valley Authority (TVA) authorized the construction of the Hiwassee Dam, which began later that year and was completed in 1940. The dam created a body of water covering nearly 6,090 acres, and was the highest overspill type dam in the world at the time. The ever-changing level of Hiwassee Reservoir due to operations at Hiwassee Dam influences the character of the lower end of the Valley River, even though the confluence of the two rivers is several miles upstream of the dam.

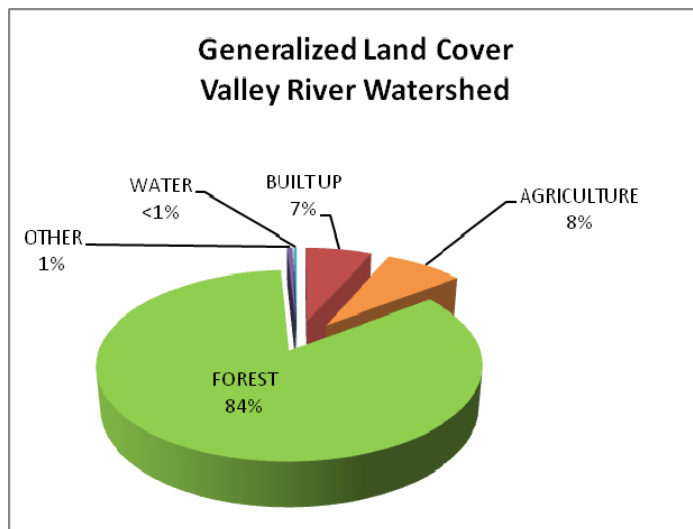
Today, an estimated 26,568 people live in Cherokee County, NC. The county, and parts of the Valley River watershed, experienced a rapid 17% growth rate between 1990 and 2000. Between 2000 and 2008 Cherokee County population expanded at 9.4% compared to the statewide average of 14.6% and an explosive 18.4% in neighboring Clay County. The 4-lane US Highway 74/19/129 is the major transportation route through the watershed and closely parallels the river itself. Most commercial, residential, and agricultural development is concentrated within 2 miles of this highway. Several other roads are 2-lane asphalt corridors, but there are also more than 160 miles of unpaved rural roads.



South of the Town of Andrews (pictured top), 4-lane US 74/19/129 parallels the wooded Valley River corridor (pictured to the right of the highway).

Physical Characteristics of the River & Watershed

The Valley River watershed falls within the Broad Basins (characterized by lower elevations, less relief, less precipitation, and less forested cover) and the Southern Meta-sedimentary Mountains (characterized by steeper relief, more precipitation, and more forested area) physiographic regions. The community of Topton, at the northeast boundary of the watershed lies at an elevation of 2,638 feet above sea level (ASL). Twenty miles downstream at the confluence of the Valley and Hiwassee Rivers, the Town of Murphy sits at 1,604 feet ASL.



Forest covers nearly 100 square miles of the watershed. Almost half of this forestland lies within the boundaries of the Nantahala National Forest and is thus considered protected. Roughly 6,000 acres (9 mi²) are devoted to agricultural uses. Although most of this is pastureland, roughly 800 acres are devoted to row crops in the valley, mostly corn and soybeans. Another 5,000 acres (8 mi²) have been developed for commercial, industrial, or residential uses.

There are 631 miles of intermittent (365 mi.) and perennial (266 mi.) streams in the

Valley River watershed. Perennial streams flow constantly except in periods of extreme drought. Intermittent streams have a clearly defined channel, but often stop flowing during dry spells. This averages out to about 40 feet of stream collecting runoff from every acre in the watershed, and illustrates how human activities on each piece of land are directly connected to water quality in the Valley River itself.

Need for Valley River Restoration Plan

Section 303(d) of the Clean Water Act (CWA) requires the North Carolina Division of Water Quality (DWQ) to develop a list of waters not meeting water quality standards or which have impaired uses. Listed waters must be prioritized, and a management strategy or total maximum daily load (TMDL) must subsequently be developed for all listed waters. The Valley River appears on the list because of turbidity violations; however, a TMDL has not yet been developed by DWQ. Resource constraints and statewide priorities may slow DWQ's development of a TMDL. HRWC is developed this watershed action plan so that known sources of excess sediment can be addressed and water quality improvement can proceed in a timely manner.

In 2001, the Hiwassee River Watershed Coalition, Inc. (HRWC) began an intensive, holistic assessment of the watershed in preparation for restoration work. Very little current biological and habitat data was available for the watershed at that time. HRWC brought together a partnership between themselves, DWQ, and TVA to reassess the condition of the watershed. The results of this study were published in

2004 and revealed chronic water quality and habitat impacts resulting from a lack of riparian vegetation, streambank erosion, livestock access, stream alterations, and runoff from highways and unpaved roads.

Several long-term monitoring sites were sampled by DWQ in 2004 and a revised version of the *Hiwassee River Basinwide Water Quality Plan* was published. The plan discusses habitat degradation and turbidity violations in the Valley River. It also reports an increase in the in-stream temperature of the river due largely to a lack of adequate riparian vegetation along streams in the watershed. The Valley River Watershed Action Plan outlines a course of action to remediate these problems.

Causes & Sources of Degradation

There are many causes and literally hundreds of site specific sources of degradation in the Valley River watershed. A cumulative web of environmental torments cause the chronic habitat degradation and turbidity violations observed in the watershed. The parking lot at the grocery store, the trees and shrubs cleared away from the stream, and the cattle standing on the riverbank in a nearby pasture are all making small contributions to the problem. For example, stormwater runs off parking lots and other impervious surfaces much faster than it would off a forest floor. This fast moving water has a lot of energy and when it reaches a stream weakened by livestock access and without stable vegetation along the banks, the water goes to work eroding the streambanks. The eroded soil from the streambanks then settles out as the water slows downstream and smothers fish spawning beds. In addition to habitat loss, severe erosion problems can lead to actual loss of property and threaten buildings with collapse.

Most water quality and habitat degradation can be traced back to land use decisions made some distance, even miles away from the stream itself. Rainwater carries debris and pollutants from every type of surface it falls on whether that be a rooftop or rugged mountain slope. The volume of stormwater and the speed at which it flows over the land also impacts water quality and habitat conditions. In an undisturbed environment, stormwater washes into streams gradually. Streams are able to absorb the water's energy and resist erosion. These are stable streams. Streams become increasingly unstable as natural forest cover is replaced by hard, impervious surfaces like parking lots, roads, and rooftops. Water runs off these surfaces much faster and erodes streambanks and channels. The eroded soil then smothers downstream aquatic habitat.

Turbidity is one metric used to measure how severe erosion problems are. The State of North Carolina has established turbidity standards to protect aquatic life. The standards define the highest allowable levels of turbidity and are expressed in NTUs, or Nephelometric Turbidity Units. Turbidity may not exceed the state standard in more than 10% of measurements. The standard for most streams across the state is 50 NTU, however it is only 10 NTU for classified trout waters. The stricter standard recognizes the extreme sensitivity of cold water aquatic communities like those found in the Valley River and many of its tributaries to excess sediment and other impurities.

DWQ takes monthly turbidity measurements in the Valley River at the US74/19/129 Bridge near Tomotla. A 5-year average is calculated from these measurements to determine if the standard is being met. The last such average was calculated in 2005 using data from 1999-2004. At that time, 12.2% of

the readings taken from the Valley River exceeded the state turbidity standards. Therefore, 7.7 miles of the Valley River from Vengeance Creek to Marble Creek is Listed on the State's 303(d) list of Impaired Waters. **Turbidity is the official cause of impairment.**

Summary of Causes & Sources Linked with Plan Goal

The primary goal of the Valley River Watershed Action Plan and ongoing restoration work in the watershed is to reverse the water quality impairment due to turbidity violations and permanently remove the river from the NC 303(d) List of Impaired Waters. This will be achieved by addressing the sources mentioned above and achieving a set of supporting goals including streambank restoration, reducing stormwater impacts, strengthening community partnerships, and community education.

The sources described above are broad categories that contribute to degradation in the Valley River. These general sources often produce the same symptoms of degradation within the stream. For example, excessive stormwater runoff and livestock access both cause stream bank erosion. To clarify needed actions, very specific stream degradation causes are linked with the sources described above and the management goals needed to eliminate them. This work is presented in Table A.

Target Reductions & Watershed Prioritization

Turbidity violations are caused by excess sediment and erosion originating from a broad spectrum of land use activities including unstable streambanks, unstable soils, eroding roads, impervious surfaces, etc. While turbidity and excess erosion are tightly linked, they are not the same. Therefore a method must be used to translate the quantity of land-based erosion to in-stream turbidity measurements so that target reduction can be set.

In 2004, HRWC invested in the Valley River IPSI Pollutant Loading Model (PLM) to provide immediate support for its ongoing restoration project. It is a desktop computer model that uses the data generated by the GIS-based IPSI inventory to estimate pollutant loadings from selected watershed features like roads, streambanks, and pasture. The model, designed to run using Microsoft Excel software, allows HRWC to estimate pollutant loadings by watershed and source at varying delivery rates.

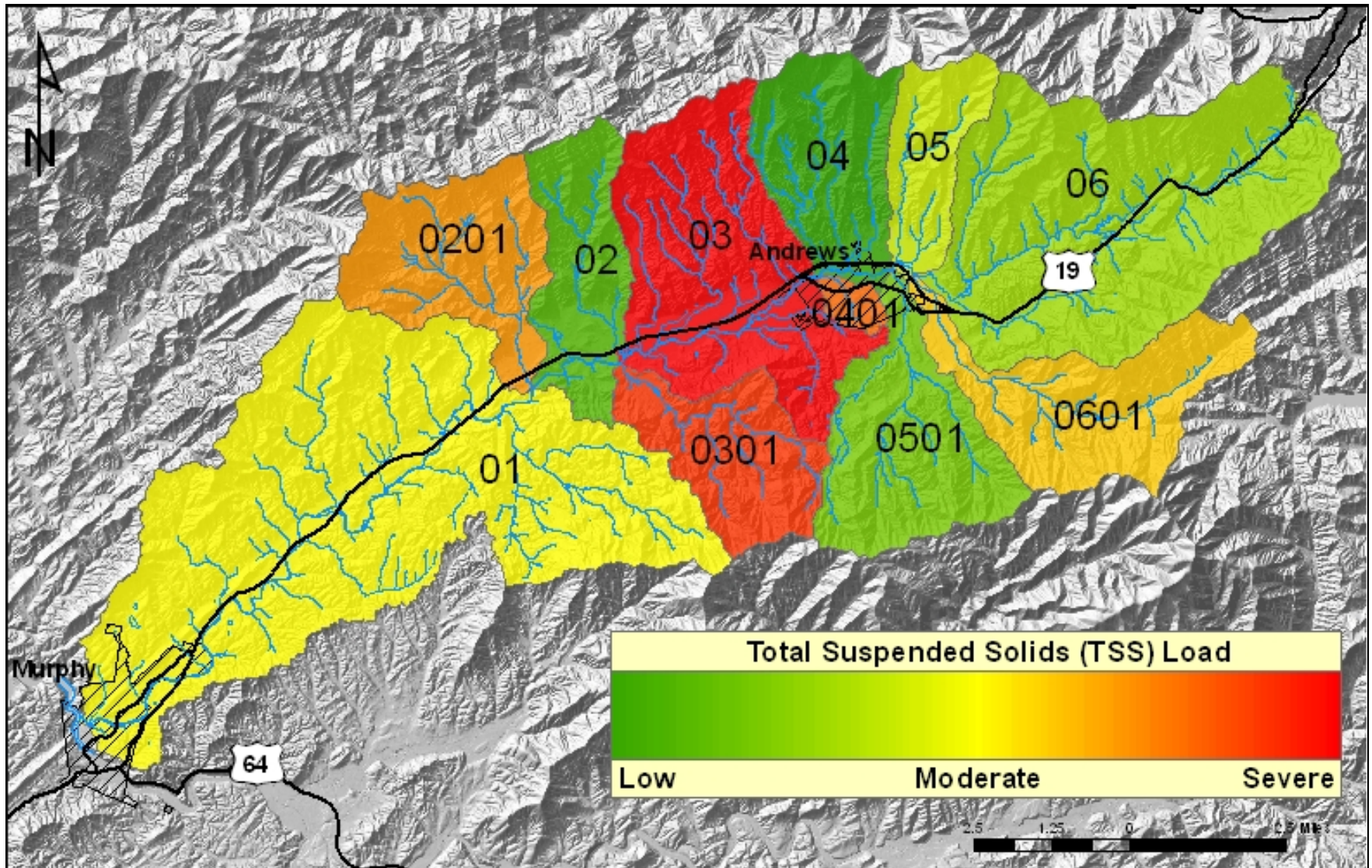
HRWC used the PLM to develop a tenable link between the turbidity violations and the total suspended solid (TSS) load from the Valley River watershed. TSS is a weight measurement of loose soil and debris washed into streams. The baseline scenario assumes that the current estimated TSS load caused the turbidity violations and led to impairment. In DWQ's analysis, 12.2% of its measurements violated the turbidity standard. To reverse the impairment, turbidity violations must be brought below 10%. The baseline PLM estimates the TSS load in the Valley River watershed is 21,713.2 tons/year. In order to drop turbidity violations to 10%, the **TSS load must be reduced to 17797.7 tons/year, or 22%.**

Once a total TSS load reduction value was reached, HRWC then used the PLM to determine which sub-watersheds contribute the most TSS from human activities. By dividing TSS load by watershed acreage, HRWC determined which watersheds have the most concentrated impact. The results are presented in Figure A. Moderate to severely ranked watersheds are in most desperate need of restoration resources.

Table A. Summary of Management Objectives Identified for the Valley River Watershed

Causes	Sources	Management Objectives
Excess Sediment (Turbidity) & Decreased Aquatic Habitat	<ul style="list-style-type: none"> • Lack of adequate erosion control practices implemented and/or maintained during construction • Poor private access road construction • Past and present damage to river banks and small stream channels by unrestricted livestock access and lack of adequate riparian buffers • Overgrazing of pasture lands • Erosion of stream banks associated with stormwater impacts and natural events (e.g. storms, floods) 	<ol style="list-style-type: none"> 1) Improve implementation of erosion/sediment control BMPs on construction sites within the watershed. 2) Provide seminars to educate people about proper erosion/sediment control BMPs for construction 3) Employ and equip personnel for adequate enforcement existing laws and rules pertaining to water quality protection at the local level. 4) Provide seminars to educate people about proper construction and maintenance of private access roads in the mountain landscape 5) Restrict livestock access to streams by constructing fencing and providing alternative watering sources 6) Repair damage to eroding stream banks and unstable channels using bioengineering and natural channel design techniques 7) Rotate livestock and implement BMPs for winter feeding as needed to prevent loss of vegetation and overgrazing. 8) Reduce impervious surfaces to minimize impacts of storm events 9) Install post-construction stormwater BMPs to help retain and filter stormwater runoff
Increased Temperature	<ul style="list-style-type: none"> • Lack of adequate riparian buffers • Damage to vegetation by livestock • Runoff from large amounts of impervious surfaces 	<ol style="list-style-type: none"> 10) Restore and protect wooded riparian buffers. 11) Prevent damage to riparian vegetation by livestock. 12) Limit imperviousness in the watershed.
Excess nutrients	<ul style="list-style-type: none"> • Failing septic systems • Agricultural runoff from field and pasture • Aging sewer system infrastructure & lack of nutrient removal at wastewater treatment plants 	<ol style="list-style-type: none"> 13) Identify and repair failing systems 14) Install agricultural BMPs 15) Proactively repair sewer system infrastructure to minimize I&I problems and add nutrient removal systems when WWTPs are renovated or expanded

Figure A. Loading of Total Suspended Solids by sub-watershed.



Recommended Actions for Watershed Improvement

Recommended actions are only listed in this section. Please visit the Hiwassee River watershed Coalition's web site for a more detailed discussion of the recommendations: www.hrwc.net or contact the HRWC office if you prefer to be mailed a hard copy.

Federal and State Government

- ◆ Enforce applicable water quality rules and regulations and sediment/erosion control laws
- ◆ Provide increased monitoring stream monitoring, especially on lower elevation streams.
- ◆ Continue to provide basin-wide insight into watershed health on a regular basis
- ◆ Make implementation of this plan a top priority for funding programs.
- ◆ Provide assistance to local governments who are trying to manage growth (technology, training & funding)
- ◆ Provide an awareness of relevant tools as they become available
- ◆ Avoid implementation of "blanket" rules and regulations and include Valley River watershed residents and local governments early in any rule development process.
- ◆ Adopt this action plan in lieu of a TMDL and direct those resources that would have been consumed developing that TMDL towards implementation of this plan.
- ◆ Provide HRWC a reliable liaison from headquarter offices.

Local Government

- ◆ Establish a local sediment/erosion control program
- ◆ Evaluate your own properties for potential BMPs to retain/treat stormwater
- ◆ Provide funding for management measures outlined in this plan
- ◆ Consider adopting a stormwater ordinance
- ◆ Plan for wastewater treatment for new development/increased population
- ◆ Consider conducting a regional planning initiative

Residents

- ◆ Educate yourself & others about the issues
- ◆ Report erosion control problems to the appropriate authorities
- ◆ Restore and/or maintain a woody riparian buffer along streams on your property
- ◆ Evaluate your home site for ways to retain or treat stormwater
- ◆ Minimize water usage and runoff at home
- ◆ Properly maintain your septic tank
- ◆ Encourage businesses that you patronize to implement stormwater BMPs
- ◆ Support your local governments in their efforts to implement water quality protection measures
- ◆ Support HRWC by volunteering or through donations.
- ◆ Assist HRWC in operating a volunteer monitoring program in the Valley River.

Developer/Builders/Grading-Clearing Contractors

- Educate yourself and co-workers/staff about erosion control and stormwater issues
- Design roads to follow natural contours of the land and such that no slopes are greater than 15% grade
- Place home sites in locations that minimize earthwork
- Design developments and home sites with stormwater and water quality in mind (minimize impervious surfaces & protect sensitive areas)
- Avoid creating cut/fill slopes that are greater than 1.5H:1V
- Restore/maintain woody riparian buffers along all waters
- Install and maintain appropriate BMPs during and after construction
- Limit underbrushing and clearing, particularly prior to sale of a property
- If you have the opportunity, educate new residents about these matters

Realtors

- Educate yourself about the value of riparian buffers and conservation-based developments
- Seek to sell responsibly developed properties first
- Limit clearing, underbrushing and grading of property
- Educate buyers/new residents about how to be sensitive to our mountain environment

Commercial Business/Property Owners

- Educate yourself about impervious surfaces and impacts to water quality
- Restore/maintain a woody riparian buffer (if your property borders water)
- Evaluate your property and/or business practices for the potential to retain/treat stormwater runoff
- Implement stormwater BMPs
- Support HRWC

Farmers and the Agricultural Community

- Rotate livestock and implement BMPs for winter feeding as needed to prevent loss of vegetation and overgrazing
- Restrict livestock access to waters by installing fencing, stream crossings, and alternative watering sources
- Restore/maintain a woody riparian buffer (if your property borders water)
- Practice good nutrient management by following an NRCS-approved nutrient management plan or recommendations of bi-annual soil analysis
- Reduce soil requirements for nitrogen amendments by sowing nitrogen fixing legumes (e.g. clover) with grasses
- Practice no-till or minimal-till techniques when seeding or planting crops
- Consider converting steeply sloping pasture or cropland to orchard/horticulture or harvestable timber
- Consider restoring prior-converted wetlands

HRWC

- Provide residents, developers, builders, grading-clearing contractors, realtors and commercial businesses with educational opportunities and materials
- Seek funding to assist willing landowners with evaluation of properties and BMP implementation
- Assist local governments in drafting, adopting, and implementing ordinances and in planning
- Serve as a “clearinghouse” for information from state and federal agencies
- Assist with distribution of publications and create public awareness about available programs, funding, educational materials, and other tools available to watershed stakeholders
- Establish a volunteer monitoring program in the Valley River watershed

Monitoring Implementation Progress

HRWC will evaluate progress toward plan implementation by tracking:

- Sites reviewed for possible BMP installation
- Practices planned
- Practices installed (miles and/or acres)
- Reductions anticipated for targeted parameters associated with installed practices

In addition to sites selected for BMP installation through the formal process, HRWC plans to set up a system (hopefully online) whereby anyone can input actions taken (from the list of recommendations) watershed-wide. This way practices will be accounted for down to the smallest backyard buffer planting or rain garden installation; the system would also allow all stakeholders to fully participate in the restoration process! New local ordinances or changes to existing ordinances that positively impact water quality will also be tracked.

Actual water quality data will be a key component of measuring success of the Action Plan. HRWC will pursue funding to maintain a volunteer monitoring program similar to the one that is now five years old in the Lake Chatuge watershed. Once the program is established, major streams flowing into Valley River, particularly in the high priority sub-watersheds can be monitored monthly for (at minimum) turbidity, Total Suspended Solids, temperature and dissolved oxygen. HRWC will rely heavily on continued turbidity monitoring on a monthly basis at DWQ’s ambient chemistry monitoring station as well.

Overall project success will be determined by one or more of the following:

- BMPs are implemented such that targeted Total Suspended Solids reductions are met.
- Aquatic habitat assessment scores improve, particularly along tributary streams.
- Turbidity concentrations do not exceed state water quality standards and the Valley River is removed from NC’s 303(d) List of Impaired Waters.

Funding & Technical Assistance for Plan Implementation

HRWC estimates that approximately \$5,000,000 is needed meet the targeted TSS reduction goals and remove Valley River from the list of impaired waters. Costs include: \$3.6 million for restoration, enhancement, and stabilization activities to correct severe to moderate bank erosion and channel instability problems; \$750,000 for stormwater management planning in the Town of Andrews and installation of retrofit stormwater BMPs for commercial and residential areas; \$350,000 for pastureland improvements and agricultural BMPs; \$100,000 for riparian buffer plantings; \$25,000 for an education program; and \$75,000 for monitoring and evaluation. The estimated cost also includes \$100,000 over the 5-year period (\$20,000/year) for project management to help support a Watershed Restoration Coordinator; HRWC will also provide support for this position.

Project leadership, including acquisition of funds, identification of sites for best management practices, installation oversight, monitoring, and evaluation will be provided by the Hiwassee River Watershed Coalition in cooperation with DWQ, Wildlife Resources Commission, local officials, and community leaders.

Public Involvement

Following the mission statement on many of HRWC's promotional materials is another statement: "HRWC leadership believes that for water resources to truly be protected, citizens within a watershed must understand and participate in protection and restoration efforts." Citizens who live in the Valley River watershed have been engaged in this initiative from the beginning. From direct mailings to newspaper articles and community meetings to individual conversations with landowners, HRWC will continue to insure that the citizens that stand to be impacted, positively or negatively based on action and/or inaction, will be informed and involved. HRWC is committed to "facilitating water quality improvements" in the Valley River and the upper Hiwassee River watershed for the long-term!