IVY RIVER WATERSHED
SOURCE WATER PROTECTION PLAN

Madison and Buncombe Counties, North Carolina

Prepared by:

Mountain Valleys Resource Conservation and Development Council
&
Madison County Soil and Water Conservation District

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TITLE PAGE

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ACKNOWLEDGEMENTS

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- Madison County Soil and Water Conservation District

SUPPORT FROM:

- Buncombe County Health Department, Environmental Health Division
- Buncombe County Soil and Water Conservation District
- Concerned local citizens
- Environmental Quality Institute
- Madison Cooperative Extension Service
- Madison County Department of Emergency Management
- Madison County Health Department, Environmental Health Division
- Mars Hill College
- North Carolina Department of Environment and Natural Resources
- Pigeon River Fund
- Town of Mars Hill
- Town of Weaverville
- US Forest Service

EXECUTIVE SUMMARY

The Ivy River Watershed is located in Madison and Buncombe Counties and borders Yancey County to the east, in extreme western North Carolina. It serves as a municipal water supply for the Town of Weaverville North Carolina. It covers 112 square miles and is a tributary to the French Broad River at mile 127.7 on the river.

There are three major highways, Future I-26, US 19, and NC 197, running through the watershed. Over the last 10+ years, major construction on I-26 and major widening on US 19 have had major sediment delivery impacts in the Little Ivy portion of the watershed. Long term impacts of increased stormwater runoff and non-point source pollutants from these highways have to be recognized in future water supply planning.

Just below the confluence of the Little Ivy Creek flowing in from Madison County and the Big Ivy Creek from Buncombe County, the town of Weaverville, NC has installed its municipal water supply intake. The river, especially the Little Ivy portion, has a history of water quality impairment issues. Those Little Ivy impairment issues such as high fecal coliform, sediment, and nutrients have been linked to mostly beef cattle farming operations and domestic septic discharge (straight piping). The Madison County Health Department and Soil and Water Conservation District (SWCD) have both made progress on these two issues using various funding sources including grants and agricultural cost share programs. But, monitoring results from North Carolina Department of Environment and Natural Resources (NCDENR), Mars Hill College, Environmental Quality Institute, Stream Monitoring Information Exchange (SMIE) volunteers, with financial support from the Pigeon River Fund, continue to show water quality impairment in the Little Ivy (Madison) and better water quality in Big Ivy (Buncombe).

Historically being on the 303(d) list for impaired/impacted streams, the Little Ivy was removed from the 303(d) list in 2006 for improvement in benthic integrity. There is some expectation that it will go back on the 303(d) list in 2013 due to high fecal coliform counts.

Guided by North Carolina regulations, in the late 1990s, both Buncombe and Madison Counties developed and enacted watershed protection ordinances controlling land use development and related issues in the watershed area. Those are referenced in this plan with a recommendation that regular reviews could be helpful for long range watershed protection.

The North Carolina Division of Water Resources, Public Water Supply (PWS) Section completed in 2010 a Source Water Assessment Report for the Town of Weaverville Community Water System. The assessment results indicated an Inherent Vulnerability Rating of Higher due to physical characteristics (landscape, geology, soils, etc.) of the watershed. The assessment summary also showed a Susceptibility Rating of Higher. As noted in the assessment, THE SUSCEPTIBILITY RATING OF HIGHER DOES NOT IMPLY POOR WATER QUALITY. Susceptibility is an indication of a water supply's potential to become contaminated by the identified potential contaminate sources within the watershed.

The Pigeon River Fund approved a grant in late 2011, for the Mountain Valleys Resource Conservation and Development (RC&D) Council and the Madison SWCD to development a Source Water Protection Plan for the Ivy River Watershed. This plan discusses the background and history of using the Ivy River as a water supply source, and the efforts to reduce impacts on water quality.

This plan further identifies and locates potential contaminant sources, delineates a wide assortment of strategies to protect and improve water quality in the Ivy River, and briefly discusses an emergency contingency plan (largely contained in the Weaverville Water Shortage Response Plan).

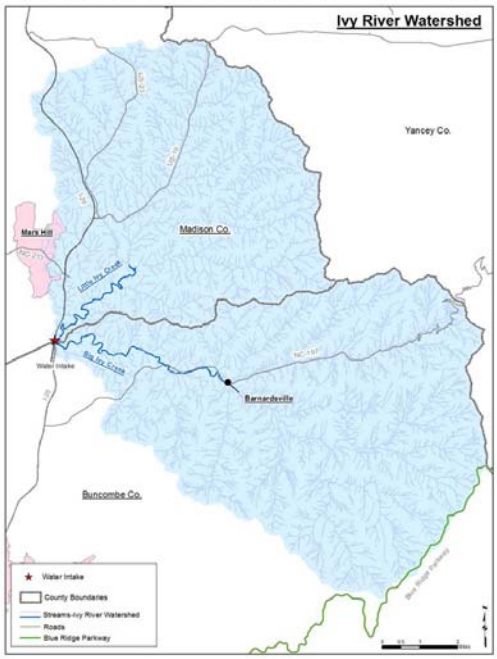
The potential contaminant sources are located by GPS. It is anticipated that this information will be used as a starting point for locating and working with various landowners to improve land use conditions affecting water quality of streams in the watershed. Various grants, two already approved and discussed further in this document, and cost share programs for best management practices (BMPs) have been and are being used to improve water quality.

The following is a partial listing of 30 suggested strategies (fully explained in the narrative) for carrying out this plan:

- The Towns of Weaverville and Mars Hill and the Madison and Buncombe County Soil and Soil and Water Conservation Districts (SWCDs) should consider developing, and keeping up to date, a "Cooperative Agreement" for working together on the watershed.
- "State of the Watershed" biannual meetings need to be held.
- Development needs to continue on organizing an active, on-going "Watershed Stakeholder Group".
- Two grants helpful to the Ivy River Watershed effort and approved for funding in early 2013, one from the Pigeon River Fund and one from the NC Clean Water Management Trust Fund (explained in the narrative), need to be fully implemented.
- Additional funding sources for installing BMPs, for educating the general public and individual land users in the watershed, and for other water quality initiatives need to be continually pursued.
- The Towns of Weaverville and Mars Hill need to provide "seed money" for grants, cost share programs, extension specialists for livestock farmer education, etc.

INTRODUCTION/BACKGROUND

Figure 1: Ivy River Watershed Boundary Map



The Little Ivy is a 112 square mile watershed located in Madison and Buncombe counties in North Carolina. Water flows into the Little Ivy Creek in Madison County from Paint Fork Creek, Middle Fork Creek, and California Creek. On the Northern side of Buncombe County, water from the Big Ivy Creek joins the Little Ivy Creek becoming the Ivy River before heading into the Town of Weaverville water supply intake (see **FIGURE 1-**Watershed Boundary Map in **APPENDIX**).

In 1995, the Town of Weaverville, NC began investigating the Ivy River as a source of municipal water. NC Department of Environment and Natural Resources (NCDENR) studies showed the Big Ivy, flowing in from Buncombe County, had relatively good water quality. The Little Ivy from Madison County showed impaired water quality. While the Big Ivy originated in the Pisgah National Forest, the Little Ivy's origin is in the most agricultural rich area of Madison County. Two major US highways in the watershed of Little Ivy along with prime residential development around the Town of Mars Hill added to the potential impairment of water quality. The waters of Little Ivy were listed as impaired due to lack of benthic integrity. It was believed that the lack of benthic integrity was related to fecal coliform, nutrients, and sediment loads.

Since 1995, very few significant land use changes affecting water quality have occurred in the Big Ivy (Buncombe) portion of the Ivy River Watershed. There are now fewer acres of row crops (tobacco, corn) produced. Beef cattle numbers have remained fairly constant during that period of time.

But since that time in the Little Ivy (Madison), several land use changes have taken place within the watershed, which have negatively impacted water quality. Construction of future Interstate 26 and widening of US highway 19 has had long and short term negative impacts on water quality with increased sediment loads and increased stormwater runoff. This construction has also increased the risk of hazardous material spills from increased traffic. Moderate amounts of residential and commercial construction have also taken place. This construction has increased the potential for non-point source pollution and increased the amount of impermeable surfaces in the watershed.

During the same period, several positive actions have taken place to try to decrease non-point source pollutants such as fecal coliform, sediment, and nutrients. In 1999, a grant from the NC Clean Water Management Trust Fund (CWMTF) was used to address some of the human related fecal issues by targeting some of the straight piping and failing septic systems in the watershed. Also, since that time the two counties and NCDENR have effectively used the Wastewater Discharge Elimination Program (WADE) to address the same issues. Around the same time, the Madison County SWCD received grants from US Environmental Protection Agency (EPA) Section 319 and the NC CWMTF to cost share with land owners for installing agricultural BMPs to reduce sedimentation and fecal coliform in the watershed. Since then, over 2 million dollars of those and similar funds have been used in Madison County to reduce pollutants entering the Ivy. To date, approximately 30+ livestock farmers have installed significant numbers of BMPs.

A Source Water Assessment Program Report for the Town of Weaverville Community Water System was completed by NCDNER in 2010. This is a qualitative evaluation of the potential of a drinking water source to become contaminated by the identified potential contaminant sources (PCS) within the water source area (see **FIGURE 4b** in **APPENDIX**). This table shows a "Higher" inherent vulnerability rating for the watershed. This rating is based on the facts that the water intake location is directly in the stream and that the raw water quality, based on water plant data, quite often shows higher levels of pollutants needing treatment.

Water quality monitoring activities have been constant and ongoing, with several local and state partners, such as The Town of Weaverville, Mars Hill College, Environmental Quality Institute, SMIE volunteers, Pigeon River Fund, and NCDENR being involved. Data is continuing to show water quality impairment in the Little Ivy (Madison) and better water quality in the Big Ivy (Buncombe).

Since 1992 Madison County SWCD, Mars Hill College, and the Environmental Quality Institute (formally Volunteer Water Information Network (VWIN)) have partnered to create an on-going database for local water quality in streams. Communities use this data to help make decisions about stream management needs. Through this county-wide project the Little Ivy Watershed has been targeted as a watershed needing extra attention. Historically it was on the 303(d) list for impaired/impacted streams due to lack of benthic integrity, but water monitoring results also showed extremely high fecal coliform, conductivity, nitrogen, and total suspended solids (TSS) numbers. In 2006, the watershed was removed from the 303(d) list for improvement in benthic integrity. It is expected to go back on the 303(d) list in 2014 for high fecal coliform counts.

WATERSHED STAKEHOLDERS GROUP

A loosely formed watershed stakeholders group of folks from interested local agencies and organizations has met. The group includes the Mars Hill Town Manager, the Public Works Director for the Town of Weaverville, the Directors and staff from Buncombe and Madison Counties' Soil and Water Conservation Districts, NCDENR staff, The Pigeon River Fund, Madison County Health Department, the Madison County Extension Office, USDA-NRCS, USDA-Pisgah National Forest, Mars Hill College, Beech Glen Community Center and Mountain Valleys Resource Conservation & Development. Different members from this group have met to discuss the Ivy River Source Water Protection Plan. Members of this group have met approximately fifteen times to discuss this project and they are committed to the concept of creating a Source Water Protection Plan and improving water quality in the Ivy Watershed. The history of water quality monitoring results and municipal water needs were reviewed and issues to address in doing this initial source water protection plan were also discussed; along with the projected limited scope of the plan with the limited planning funds available. The following issues were identified as areas to investigate: fecal coliform, nutrients, and sediment load still testing high on the Little Ivy (Madison side) at the confluence of Big and Little Ivy; large highway construction projects have impacted the Little Ivy waters and will do so into the long term future; progress to date on installing septic systems; progress to date in installing BMPs on farms and the many remaining needs for additional BMPs in this area; water monitoring results from NCDENR and Mars Hill College; land use changes; recent 2010 NCDENR source water assessment report; potential emergency spills; and community education and involvement needs in the watershed.

PUBLIC INFORMATION SESSION

A walk-in public information session was held on Tuesday, November 20, 2012 at the Beech Glen Community Center in the middle of the watershed. At this session, information about water quality issues in the Ivy River watershed were shared with interested members of the public. Twelve individuals attended and all stayed for an extended period of time showing significant interest. Results of the recently completed potential contaminant source inventory were

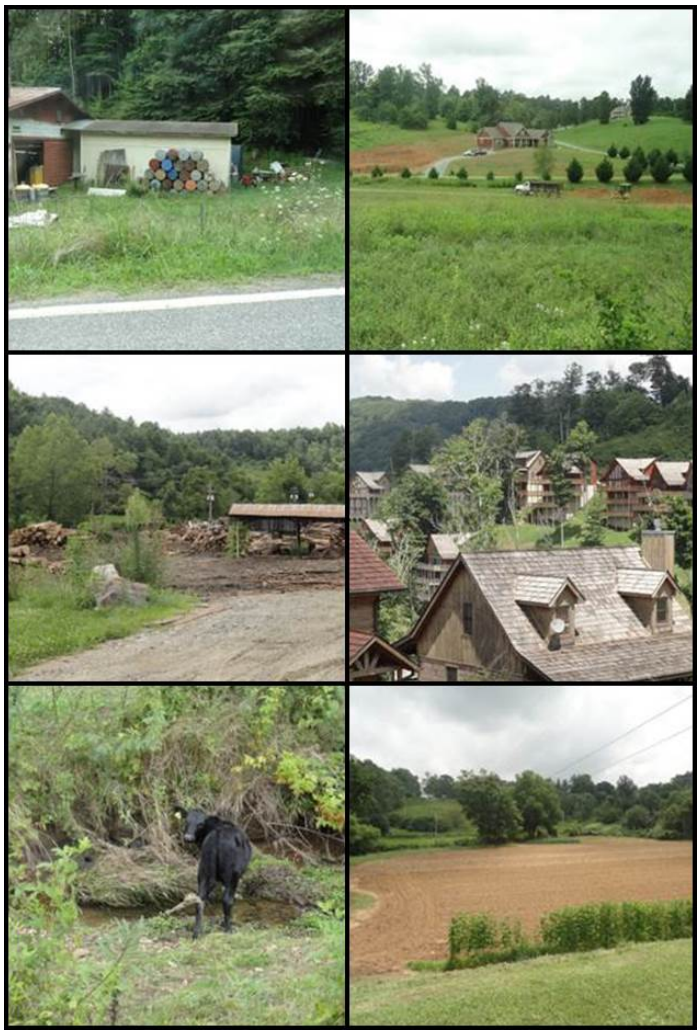
displayed along with historical water quality monitoring results and trends. Ideas for future strategies to maintain and improve water quality conditions are incorporated into this plan document.

It is expected that perhaps some of these attendees and other local citizens will continue their interest and join local agencies and organizations working on the watershed stakeholders group.

POTENTIAL CONTAMINANT SOURCE INVENTORY- 2012

The multi-year and ongoing Madison County SWCD water monitoring activities have identified various individual tributaries in the Little Ivy that show distinct water quality issues—turbidity, total suspended solids (TSS), fecal coliform counts, and indicator species from macro-invertebrate monitoring all help point the way as to which sub-watersheds may need extra attention.

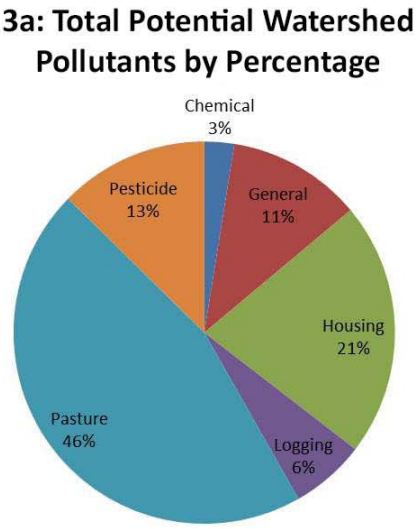
The principal investigators conducted an updated potential stream contaminant source inventory from mid-June through mid-September 2012. This particular survey season was very good because of better than normal rainfall patterns. Well managed pastures and other cropped areas had good vegetative growth. Poorly managed and overgrazed pastures were easily detected during the survey process. The survey was conducted using the latest available aerial photography, GPS, and visual on-the-ground observations (public roads in the watershed were traveled while locating potential surface contaminants as seen from these roads). General categories of potential pollutant sources identified are described as follows: (See **FIGURE 2** in **APPENDIX** for location of described sites, 77 in total)

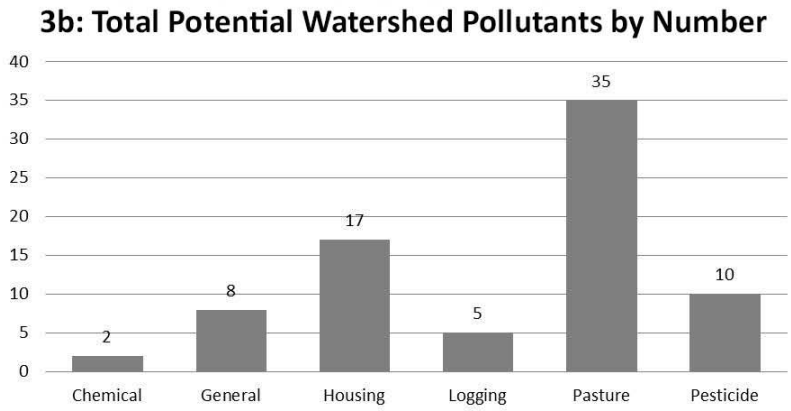


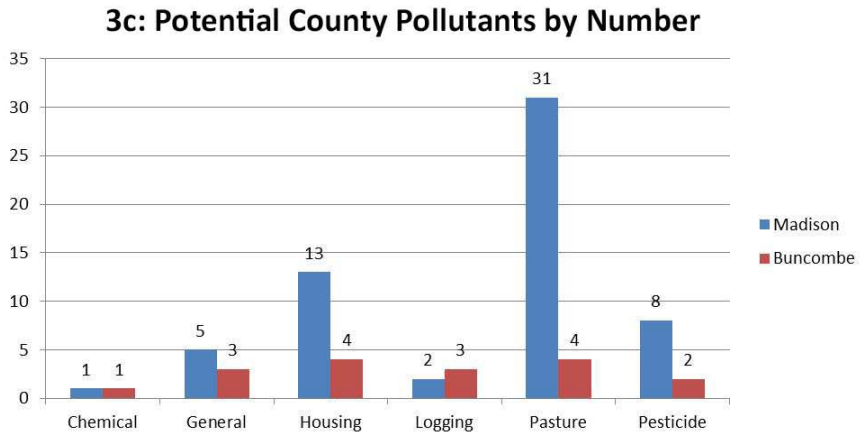
- Chemical (2 sites)- sites near streams that have holding tanks, barrels and other containers that may contain materials detrimental to water quality if leakage occurs.
- General (8 sites) – sites near streams having various land disturbance activities such as new construction that could be contributing added sediment loads to the stream.
- Housing (17 sites) – residences found located in very close proximity to streams with no obvious, logical way for having functioning septic filter fields and residential developments adding overall non-point source pollution loads to the stream system. One subdivision on Holcombe Branch Road in Madison County has had a history of poorly functioning septic filter fields due to inherent soil conditions. A long range solution will need to eventually be developed in this situation.
- Logging (5 sites) – observed logging operations adding a temporary increase in sediment, oil and other pollutants into the stream system.
- Pasture (35 sites) – overgrazed pasture fields both on very steep slopes or on moderately steep to flat

slopes near and adjacent to streams. These sites usually had obvious areas of animal concentrations near and in streams resulting in eroding stream banks and direct deposit of animal wastes into streams.

- Pesticide (10 sites) – sites with cropped fields and home gardens immediately adjacent to streams (no buffers) providing the opportunity for applied chemicals to easily enter streams.







(**FIGURES 3a, 3b & 3c**) show summaries of potential contaminant sources field data collection, described above.

When looking at the relative locations of the inventoried potential contaminant sites (see Figure 2- Appendix), they show that a majority of sites are in Madison County. And, within Madison County, the inventoried sites are fairly evenly distributed between the three main tributaries of Little Ivy River, those being California, Middle Fork, and Paint Fork Creeks. Over the years, water sampling results for indicator pollutants support this same conclusion, that of even distribution of pollutants in those same three streams.

The following paragraph summarizes general observations made during the inventory process about highways, road crossings, and impervious surfaces in the watershed. Storm water runoff and potential waste spills from highways, secondary roads, driveways, and parking lots all have the potential for negatively affecting downstream water quality. The Ivy River Watershed has approximately 10 miles of Future I-26, 6 miles of US 19, and 8 miles of NC 197 within its boundaries. Future I-26 and US 19 are recently constructed or widened, heavily traveled four lane highways. NC 197 is a heavily traveled 2 lane highway. There are also numerous miles of paved and unpaved public roads and private paved and unpaved roads and driveways within the watershed. The ditches and eroding banks along these roads carry heavy

loads of sediment and attached nutrients into receiving streams. Parking lots in built-up areas (estimated at 30+ acres) send various non-point source pollutants (petroleum products, salts, general debris) downstream.

ADDITIONAL INFORMATION ABOUT WATERSHED CONDITIONS

- **NCDENR Source Water Assessment Report- 2010**

  This NCDENR report contains a multitude of information about natural and man-made features within the watershed ranging from geology and groundwater data to various known commercial/industrial potential contaminant sources. It also provides vulnerability ratings for water quality impairment as described earlier in this document.

  *(***FIGURE 4a- APPENDIX**) from the "2010 NCDENR Source Water Assessment Report-Map 2" locates 24 potential contaminant sources. (**FIGURE 4b- APPENDIX**) from the "2010 NCDNER Source Water Assessment Report-Table 4" lists Potential Contaminant Source Attributes. These sites will require ongoing monitoring by state and local officials to insure water quality safety limits are met.

- **Historic Water Quality Data**

  Former DENR Division of Water Quality (DWQ) Benthic Macroinvertebrate data *(***FIGURE 5- APPENDIX Ivy Creek DWQ monitoring site map**)

Figure 6: DWQ Monitoring Data

Creek Name	Date Sampled	Rating	Code
Paint Fork[1]	5/30/2002	Not Impaired	EB214
	5/30/2002	Not Impaired	EB215
Crooked Creek	7/30/2007	Good	EB352
Middle Fork Ivy Creek[2]	5/30/2002	Not Impaired	EB208
	5/29/2002	Not Rated	EB209
California Creek[3]	1/22/1997	Good	EB187
	1/22/1997	Good-Fair	EB188
	5/28/2002	Not Impaired	EB186
	5/28/2002	Not Rated	EB188
Little Ivy Creek[4]	7/22/1992	Good	n/a
	8/31/1993	Good-Fair	n/a
	1/21/1997	Good-Fair	n/a
	7/7/1997	Fair	n/a
	5/29/2002	Fair	n/a
	5/29/2002	Good-Fair	n/a
	8/6/2007	Good-Fair	n/a
Ivy Creek	7/22/1992	Excellent	EB200
	7/22/1992	Good	EB201
	8/31/1993	Good	EB199
	8/31/1993	Good	EB202
	9/2/1993	Good	EB201
	7/7/1997	Good-Fair	EB200
	7/7/1997	Good-Fair	EB201
	6/26/2002	Good-Fair	EB201
	7/9/2002	Good	EB200
	8/6/2007	Excellent	EB200
	8/6/2007	Good	EB201

[1,2]These sites were sampled using a collection method where biocriteria were never developed. The Qual-5 method used on these sites was an experimental collection methodology that was abandoned for the Qual-4. [3]Historical DWQ benthos data for California Creek is inconclusive. The site at SR 1541 was sampled prior to the development of the small streams criteria for watersheds less than an area of 3 square miles, and is therefore not rated. Recent SMIE benthos data show that the stream exhibits poor water quality. Based on this SMIE finding and more recent chemical and physical data, the DWQ biologists will be sampling the California Creek watershed in the spring/summer of 2013. [4]Little Ivy Creek has shown some improvements in benthos integrity from 1997 to 2007. This may be due to restoration work and agricultural BMP implementation that occurred in the watershed.

DWQ Ivy Watershed Fecal Coliform Assessment - 2011

Figure 7: 2011 Ivy Watershed Fecal Coliform Assessment		
Site description	**Date**	**Fecal Coliform**
California Creek at Beech Glen Rd	9/15/2011	3400.0
	9/19/2011	340.0
	9/20/2011	830.0
	9/21/2011	510.0
	10/10/2011	210.0
	Geo Mean	**634.4**
Little Ivy Creek near mouth at SR 1610	9/15/2011	3000.0
	9/19/2011	430.0
	9/20/2011	400.0
	9/21/2011	2700.0
	10/10/2011	140.0
	Geo Mean	**721.2**
Dillingham Creek at Barnardsville	9/15/2011	68.0
	9/19/2011	46.0
	9/20/2011	140.0
	9/21/2011	1400.0
	10/10/2011	96.0
	Geo Mean	**142.5**
Ivy Creek at Forks of Ivy	9/15/2011	150.0
	9/19/2011	120.0
	9/20/2011	240.0
	9/21/2011	3400.0
	10/10/2011	140.0
	Geo Mean	**290.1**
Ivy Creek at water plant	9/15/2011	120.0
	9/19/2011	130.0
	9/20/2011	160.0
	9/21/2011	1700.0
	10/10/2011	100.0
	Geo Mean	**211.6**

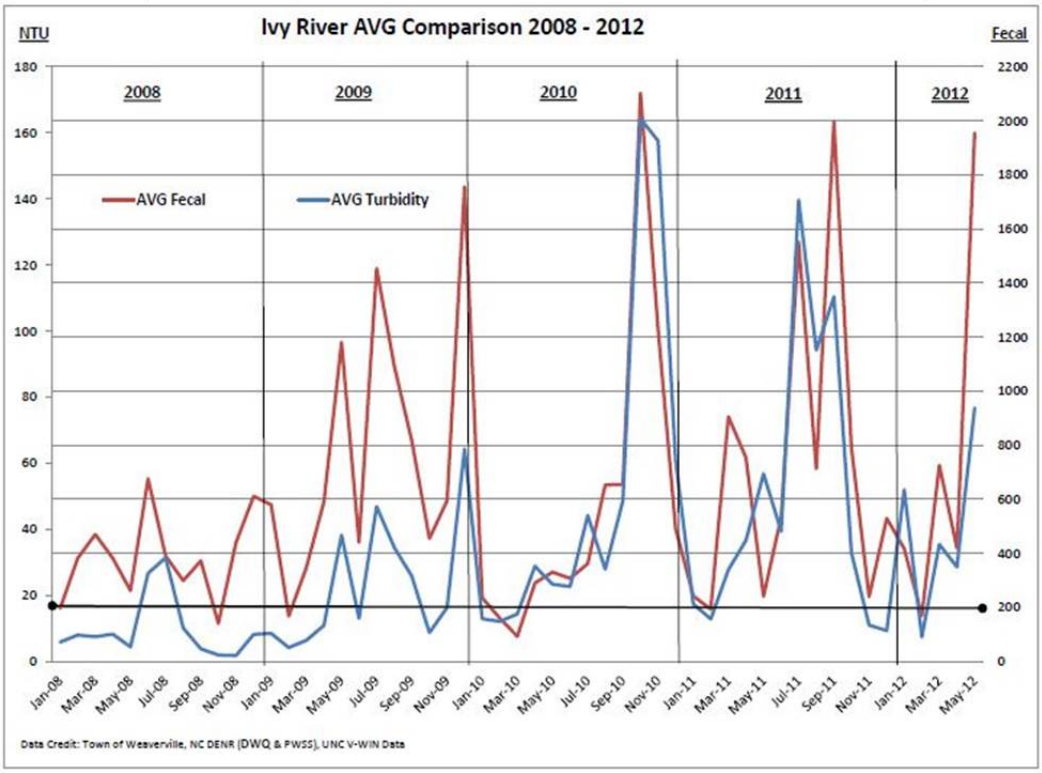
In order to determine if streams were meeting water quality standards for class “C” waters in the Ivy Creek watershed, the DWQ performed an assessment in September and October of 2011.

Administrative Code Section: 15A NCAC 02B .0211 (c) “Organisms of the coliform group” states that fecal coliform shall not exceed a geometric mean of 200/100ml (MF count) based upon at least five consecutive samples during any 30 day period, nor exceed 400/100ml in more than 20 percent of the samples examined during such period.

Of the five sites sampled, only one, Dillingham Creek at Barnardsville, met water quality standards. The other four exceeded standards with a geometric mean above 200/100 ml. California Creek and Little Ivy Creek were the highest with geometric mean values in excess of 600/100ml. The data indicates that the Little Ivy Creek watershed has a higher number of bacteria sources and should be the focus of future efforts to locate and remove these sources.

The failure to meet water quality standards may be the grounds for including Ivy Creek in the 2014 303d list of impaired waters.

Figure 8: Fecal Coliform Levels 2008 – 2012



The above graph based mostly on data collected at the Weaverville water treatment plant, depicts average fecal coliform and turbidity levels from January 2008 until May 2012.

Although stream flow data is not included in this graph, as expected, the turbidity and fecal levels appear to follow the rise and fall of the hydrograph indicating high bacteria and turbidity loads during storm events. This is occurring due to non-point source runoff. Sources of runoff may include land disturbing practices such as agriculture tilling, residential construction, secondary gravel roads, and private driveways. Bacteria levels may be increasing due to runoff from livestock operations, septic system failures, and wildlife and domestic animals.

It is important to note that during non-storm event, normal flow conditions, the fecal coliform levels still exceed the water quality standard level of 200/100ml. This is an indication of a high occurrence of constant fecal sources, ie: sources that enter the stream by means other than storm event runoff. Through extensive bacteria source studies in western NC, it has been found that these constant sources mostly consist of livestock with access to the stream and straight piping of domestic sewage. In some cases, the source may be failing single family septic systems, but all failing septic systems do not short-circuit directly to a stream, so they are the least likely contributor to a constant fecal source.

When assessing and targeting sources to restore fecal impaired waters it is important to prioritize constant fecal sources as they are easier to identify than runoff sources and usually result in direct, measurable reductions in fecal levels in a watershed.

Monitoring in western NC before and after the implementation of agriculture BMPs and straight pipe removal have shown immediate and sometimes drastic reductions in stream fecal coliform levels.

- **Domestic Septic Systems Situation**

The installation and proper functioning of rural domestic septic systems has been recognized for many years as being critical for successful water quality improvement in the Ivy River watershed. There have been several programs used over the last 12+ years to assist residents within the Ivy River Watershed to install and /or improve domestic septic systems.

FIGURE 9a - **APPENDIX** and **FIGURE 9b** - below, give a 2009 update for such efforts in Madison County. Some additional progress has been made since 2009, but there is a remaining need to vigorously continue the effort of installing and/or upgrading these systems in the county.

An update on this issue for Buncombe County, as of 2009, is shown in **FIGURE 10 - APPENDIX**. Significant progress in addressing the issue had been made at that time. It would not appear to be a highly significant issue affecting stream water quality in the Big Ivy portion of the watershed, but there are a few additional sites that still need some improvement.

Madison Survey Project	
Total Visits	882
Completed Survey	698
Violations Found	208
Violation Breakdown	
Greywater (non-toilet plumbing)	70
Blackwater (includes toilet)	55
Failing systems (surface or stream)	73
Others	10
Total	208
Repair Activity	
Total Repairs	87
Repaired with Wade financial assistance	12
Cost of repairs (total)	$31,746.57
High	$5,859
Low	$998
Average cost	$2,645.55

Figure 9b: Madison Survey Project
Madison County Project information is limited to surveys completed prior to the development of the database. The Wade Program assisted with repairs after the "county" grant program ended.

- **US Forest Service Land – Big Ivy**

The following describes the 13,905 acres of U.S. Forest Service land in the upper portion of the Big Ivy Watershed (see **FIGURE 11- APPENDIX**):

- All National Forest System lands are managed to provide for the needs of present generations without impairing the ability of the land to provide for future generations. Essentially this means goods (such as timber) and services (such as recreation) should be provided on a sustainable basis. In the case of timber it can be thought of as spending some of the interest without going into the principle. A brief description of the management areas (kind of like "zones") follows:
- MA 10: Walker Cove Research Natural Area is managed for scientific research and maintained in an undisturbed state as a baseline for comparison with other forest environments.

- MA 2A and 2C: Management Area 2 emphasizes pleasant scenery for people who experience the forest by driving (or boating) through it. It provides open roads through older forests. Timber management is allowed in MA 2A if designed to be compatible with maintaining the scenery.
- MA 3B: Emphasis on sustainable timber production with up to 15% in young forest at any one time, and few open roads, so that wildlife that thrives in this habitat is relatively undisturbed. Recreationists use these areas for hiking, mountain biking, horseback riding, hunting and other activities.
- MA 4C and 4D: Most roads are closed to motor vehicles and a somewhat remote setting of older forests is provided. MA 4C tends to be steep, rugged, often inaccessible terrain that is unsuitable for timber production. MA 4D emphasizes providing high quality wildlife habitat, including a continuous supply of hard mast (such as acorns and hickory nuts). Less timber management, and thus less young forest, occurs than in MA 3B and it is designed to provide wildlife habitat.
- MA 6: This area is a congressionally designated Wilderness Study Area. It is managed to protect wilderness attributes, so there is very little evidence of human influence: no open roads, no timber or wildlife management, etc.

MANAGEMENT STRATEGIES DEVELOPMENT

LOCAL GOVERNMENT LEADERSHIP:

The joint development of a "Cooperative Agreement" between the Towns of Weaverville and Mars Hill and the Buncombe and Madison County SWCDs is now in the process of being adopted. This could form a core base of support for future Ivy Watershed activity. This will be a non-binding document, with no funding commitment, simply agreeing to work together where ever possible for the improvement of water quality in the Ivy River Watershed. This action will greatly facilitate implementing several of the following suggested strategies for watershed improvement.

(NOTE:) The local government entities signing the cooperative agreement will need to be very much involved in carrying out the following strategies, especially the first two areas concerning education and public awareness.

IVY RIVER WATERSHED
COOPERATIVE AGREEMENT
Between the
Towns of
WEAVERVILLE & MARS HILL, N.C.
And the
MADISON & BUNCOMBE COUNTY SOIL & WATER CONSERVATION DISTRICTS

This cooperative agreement is entered into this _____ day of _____, 2013, by and between the Town of Weaverville, NC, and the Town of Mars Hill, NC, hereinafter called the "TOWNs" and the Madison County and Buncombe County Soil and Water Conservation Districts, hereinafter called the "SWCDs".

PURPOSE:

The Ivy River Watershed, hereinafter called the "Watershed", drains lands lying in both Madison and Buncombe Counties. Water from the Ivy River is withdrawn for municipal water use by the Town of Weaverville. The SWCDs, as a subdivision of state government (NC General Statues, Chapter 139) are to provide local leadership in efforts to protect and improve the state's soil and water resources. Thus, the TOWNs and SWCDs have a mutual interest in maintaining and improving the water quality of streams in the Watershed.
This agreement documents the intent of the above parties to work together in areas of common interests by providing mutual support for activities that help achieve the goal of stream quality improvement in the Watershed. The document does not commit specific funds or other resources.

IMPLEMENTATION OF AGREEMENT:

The parties recognize that achieving the common goal of stream water quality improvement requires a unique blend of voluntary conservation initiatives and state and local mandates. The parties agree to jointly

commit, where available and possible, their program authorities and financial and staff resources to implement actions of mutual benefit to the Watershed.

The parties agree to support existing and/or develop new programs and activities to improve water quality in the Watershed. In doing so, the parties also agree to use as broad, general guides the "Source Water Assessment Program Report for the Town of Weaverville Community Water System" completed by NCDENR in 2010 and the "Ivy River Source Water Protection Plan" completed in 2013 using a grant from the Pigeon River Fund.

The parties agree to broadly coordinate the collection and use of natural resource data needed to support water quality improvement in the Watershed. The parties further agree that gathered data be mutually shared and used, as needed, to support beneficial programs in the Watershed.

The parties agree to coordinate with public and private resource agencies and/or groups to share information and resources and to gather their input to help implement water quality programs.

The parties agree to, where possible, use federal, state, and local programs and funding sources in a complimentary fashion to address local priorities and concerns in the Watershed.

The parties agree to conduct a common effort to inform all interested parties about the Watershed's use and its significance to the local area's well-being. This effort could consist of mutually forming a watershed stakeholders group and holding regular state- of- the- watershed type meetings for cooperating agencies' staff and the general public.

SCOPE OF AGREEMENT:

This agreement covers the basic operating understanding between all parties for working in the Watershed. Authority to carry out specific projects or activities, transfer of funds, joint use of staff, or acquisition of services or property, will be established under separate agreements or contracts, if ever needed.

REVIEW/MODIFICATION/TERMINATION:

The agreement can be reviewed, modified, or terminated at any time by mutual consent of all parties or can be terminated by any party by giving 60 days written notice to the other parties.

TOWN OF WEAVERVILLE, NC

By: _____
Mayor

Date: _____

TOWN OF MARS HILL, NC

By: _____
Mayor

Date: _____

BUNCOMBE COUNTY SOIL & WATER CONSERVATION DISTRICT

By: _____
Chairperson

Date: _____

MADISON COUNTY SOIL & WATER CONSERVATION DISTRICT

By: _____
Chairperson

Date: _____

EDUCATION and COMMUNITY INVOLVEMENT:

There is an on-going need for school administrators, teachers, parents, and others to provide environmental course work, labs, field trips, and related activities to help students to understand drinking water sources, watersheds, and their protection and improvement. Regular field trips into the Ivy Watershed and to water treatment plants should be encouraged. "Kids in the Creek" and similar programs need to be funded.

The success of the above efforts will greatly depend on both funding levels and the willingness of public/private partners to cooperate with the schools. School boards, school leaders, parents, local government entities, and local/state/federal environmental agencies such as soil and water conservation districts, DENR, Cooperative Extension Service, USDA, County Health Departments, public utilities, local colleges, and many others will need to seek and/or provide funding and technical staff support to the schools.

Creating a higher sense of awareness in the local adult population of the water quality issues in the Ivy River requires many broad and differing approaches. Educating the general citizenry about watershed boundaries, water quality monitoring and data, land use issues in the watershed, and other issues will require leadership from the local town utilities departments, local colleges, soil and water district boards, county planning departments, and others.

Educating local government leaders about the use of the watershed is critical and needs to be continuous over time. Presentations at regular "board" meetings and field trips for elected officials into the watershed are both needed. These should be led by professional teams from soil and water conservation district offices, the NC Cooperative Extension Service, and others.

Educating individual landowners/homeowners about the proper use, handling, disposal of pesticides, fertilizers, household chemicals, prescription medications, and related materials will need the leadership of the Cooperative Extension Service and others. Educational techniques developed over the years have to be fully funded and utilized. A renewed effort to work with farmers/landowners in the watershed is needed.

PUBLIC AWARENESS, VISUAL MONITORING, WATER SAMPLING and ANALYSIS:

The project participants (Madison SWCD) and (Mountain Valleys RC&D) are working with NCDOT Division of Highways to install additional signs (three signs are present now) on major highways telling vehicle drivers that they are in the Ivy River water supply area and to dial 911 to report accidental hazardous waste spills. More signs along secondary roadways for public awareness efforts could be considered in the future.

Further development of a Watershed Stakeholder Group (friends of the river) type of organization would be helpful in several ways. It provides (with leadership from the previously suggested "Cooperative Agreement" local governments) an organized means for local citizens to address their own resource needs. A start at developing this "group" has begun while writing this protection plan. A partnership of landowners, businesses, students, interested citizens, and others could help promote water quality improvement needs in a positive, non-threatening manner. The group could help keep the issue before local governing boards while providing positive suggestions for continued water quality improvement. Mountain Valleys RC&D, Mars Hill College staff, the Cooperative Extension Service, Beech Glen Community Club, Big Ivy Community Club, the two SWCDs and others may be able to lead this effort. This same group could also become trained and perhaps train others to visually recognize potential water quality impairments on the landscape. Group members could also help in water sampling efforts.

Students, faculty and staff at Mars Hill College and the Environmental Quality Institute (formerly VWIN) have been actively monitoring water quality in the Ivy River watershed since 1992. That expertise is much needed in the future for monitoring and for help in the adult and student educational efforts already discussed.

SEPTIC SYSTEMS IMPROVEMENT NEEDS:

As discussed earlier in this document, significant work to improve septic systems and to document that work has taken place in the watershed (see **FIGURES 9a & 10**). As they show, more work has been completed in Big Ivy (Buncombe) – only a little work left, than in Little Ivy (Madison) – plenty of work to do. There is a definite need for local government entities in Madison to develop an aggressive action plan to install and/or improve residential septic systems. With many limited resource landowners/dwellers, a combination of financial incentives, technical assistance/education and regulation is needed. This approach has been used but still needs continuing, aggressive attention. The record keeping systems started with the WADE program needs to be updated and used in Madison County to show continued progress.

It is suggested that the Madison County Health Department, the Madison County Department of Social Services, the Madison County SWCD, and other local government entities support the full and timely implementation of the recently awarded 2013 Pigeon River Fund grant to the local faith based nonprofit organization "Recreation Experience" for installing and/or repairing failing septic tank systems.

INDUSTRIAL/COMMERCIAL SITES:

The 2010 Source Water Assessment Report prepared by NCDENR located potential contaminant sources (**FIGURE 4a—**map**, FIGURE 4b—**attribute table in **APPENDIX**). DENR's ongoing monitoring and assessments of those sites will be a key component of this long range protection plan. It will be important to continue the close cooperation between DENR staff and local utilities/partners in providing oversight to manage these sites to prevent damage to downstream water quality.

During the potential contaminant source inventory there were two random sites found where metal barrels, tanks, and other possible chemical storage containers have been stored around and /or near floodplains and streams. There may be other such sites. Action is needed, if not already completed, to determine the contents and condition of these containers in relation to potential leakage into nearby streams.

AGRICULTURAL BMP PLANNING and INSTALLATION:

The intensity of agricultural and forestry land use in the watershed leads to the obvious conclusion that these uses greatly impact stream water quality. 65% of the sites found during the 2012 potential contaminant sources inventory were used for pastures, cropland/gardens, or were current logging sites.

Even with the significant work already done in working with farmers/ landowners to install BMPs, much work remains. Education and awareness for those landowners could be greatly enhanced through the use of Cooperative Extension Service Livestock and Forestry Specialists. This educational effort probably should focus on the increased farm profit benefits of improved pasture and cropland management techniques with the side benefits of improved water quality. Funding and coordination to get this help started in the watershed is a much needed strategy.

The Town Councils of Weaverville and Mars Hill should consider providing funding/seed money (on a contract basis) to help develop a detailed educational plan for farmers in the Ivy Watershed. Promoting improved livestock and pasture management techniques using field days, short courses and on-farm visits could help accelerate the installation of water quality BMPs on farms in the watershed.

Accompanying this increased educational effort, there is the ongoing need to install additional BMPs on many farms in the watershed. To do this, funding is needed for both technical assistance from trained soil conservationists and additional cost sharing for landowners to install those BMPs. Best management practices such as livestock watering systems, fencing, stream bank buffers, and others allow landowners to fully implement improved pasture or cropland management systems. Here, the two Town Councils and the two Boards of County Commissioners should support the SWCDs, USDA agencies, and the Cooperative Extension Service in their efforts to find additional funding sources and programs to accelerate BMP installations. This may need to consist of letters of support, seed funding for grants, and other actions.

There have been good efforts underway for years to train and educate farmers and homeowners about proper uses of agricultural chemicals and fertilizers in both counties. Both counties provide collection sites and special disposal days for farm chemical and household hazardous waste containers. With support from watershed residents, perhaps special training events and/or disposal sites could be developed within the watershed. Extra funding would have to be obtained for trainers, personnel, and equipment.

HOUSING, SUBDIVISIONS, AND CONSTRUCTION SITES ISSUES:

The Legislature of the State of North Carolina has, in chapter 153A, Article 6, Section 121, General Ordinance Authority, and in Chapter 143, Article 21, Watershed Protection Rules, delegated the responsibility or directed local government units to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry.

Buncombe and Madison Counties both have ordinances that control land use changes in the Ivy River water supply watershed. For Buncombe County, that ordinance is found in the CODE OF ORDINANCES>>Chapter 78 –

ZONING>>ARTICLE II. - WATERSHED PROTECTION>>DIVISION 3.- SUBDIVISION REGULATIONS. For Madison County, that ordinance is named the "Watershed Protection Ordinance of Madison County". The provisions of the ordinances apply within the areas of the counties designated as a Public Water Supply Watershed by the N. C. Environmental Management Commission.

It is suggested that from time to time (every 5 -10 years) a review of these ordinances be conducted. This would help ensure that the ordinances are addressing current land-use and development pressures in the watershed.

Buncombe County has ordinances that address soil erosion and sediment (E&S) and stormwater runoff control. They are found in the Buncombe County Code of Ordinances>>.CODE of ORDINANCES>>.Chapter 26-ENVIRONMENT>>ARTICLE V.- SOIL EROSION AND SEDIMENT CONTROL and ARTICLE VII.-STORMWATER CONTROL. Although Madison County has no specific soil erosion and sediment control or stormwater runoff control ordinances, the issues are addressed in the approval processes for new subdivisions, general construction, and zoning changes. The county uses close cooperation and support from NCDENR staff in these activities. The Madison County Comprehensive Plan, May, 2010, delineates the Ivy Water Supply Watershed on Map 6. On page 14 of the "Plan", one of 8 major concerns expressed at citizen forums was the need to better understand water capacity availability and consider any new developments impacts on water supply sources. Also on page 54 of the "Plan" the need for the county to consider protecting farmland in public water source areas (a preferred land use for water supply protection) is expressed.

It is suggested Buncombe County officials, when considering any changes or updates in their E&S and stormwater runoff control ordinances, include source water protection watershed needs in their planning process. Madison County officials may, over time, see the need for specific ordinances for E&S and stormwater runoff control in the Ivy River Watershed portion of the county.

HIGHWAYS, ROADS, AND PARKING LOTS:

As mentioned earlier in this report, major highways, roads (paved and unpaved) and parking lots/driveways all produce runoff that is detrimental to water quality downstream. The diligence of local and state government entities in monitoring and minimizing contaminants leaving these surfaces can greatly improve long term water quality.

The North Carolina Department of Transportation, NCDOT, uses their Highway Stormwater Program (HSP) to install stormwater control devices in NCDOT right-of-ways, rest areas, and county maintenance yards as a way to keep stormwater pollution from reaching the state's waterways. In Madison County there are currently (3) stormwater devices located on I-26 in the Little Ivy Creek watershed (**see Figure 12- APPENDIX**). In Buncombe County, there are no devices installed on highways within the Ivy River watershed. The locations of these stormwater devices (along with additional ones, when installed) need to be on record, if not already, with all emergency services responders, and with appropriate officials in the Towns of Weaverville and Mars Hill.

The NCDOT has done a creditable job on soil erosion and stormwater runoff control on recent major construction on highway US 19 from Mars Hill to Burnsville. The streams within the Ivy Watershed did however receive heavier than normal sediment loads (as has to be expected no matter what control efforts took place). This impact is now dissipating (from visual observations), but increased sediment can be expected to move downstream for several years to come just as seen in the prior construction of I-26 in the watershed. Monitoring the movement (location year-to-year) of this sediment load could help the water plant operators anticipate future treatment (sediment removal) needs.

The Beech Glen Community Center Stream Restoration Project is nearing full completion. This project involved stabilizing severely eroding stream banks at the community center, thus reducing sediment loads downstream. A multitude of factors, including heavy highway construction up stream, as described above, contributed to the stream bank issues at this site. Ongoing maintenance and monitoring at this site by community center members and SWCD personnel will be needed for the next few years, to ensure complete stream bank recovery. This site needs to be used as a tour stop in educational/training activities over the next several years.

The Stormwater Low Impact Development (LID) BMPs and Demonstration Project, financed by the "Pigeon River Fund", and in cooperation with the Town of Mars Hill (on the Town Hall property), the Madison County SWCD and Mountain Valleys RC&D has been installed. It is now being used by Mars Hill College and other entities for monitoring, education, and public demonstration purposes. It contains a variety of storm water control BMPs that will reduce negative runoff impacts on downstream water quality from buildings and parking lots. The educational effort at this site needs to be funded and used for schools students, the general public, local government officials, and many others for the foreseeable future.

From observing littered roadsides in the watershed during the potential contaminant source inventory process in 2012, it is recommended that an Ivy River citizens' awareness campaign, led by the "Watershed Stakeholders Group" to increase support for the "Madison County Ten-Year Solid Waste Management Plan" be started. It is suggested that locating a waste disposal "Convenience Center" in the Madison county portion of the Ivy Watershed could be helpful in carrying out the Ten-Year Plan. The NCDOT "Adopt a Highway" program could also be useful in addressing the issue. Interested local groups, churches, community clubs, fire departments and others would have to lead the effort. Buncombe County residents of the watershed have private hauler services available for a fee. The County needs to continue seeking more convenient means for waste disposal for those residents who cannot afford or choose not to use private haulers.

FORESTLAND ISSUES:

Lands within the Pisgah National Forest occupy about 13,905 acres of land area in the Big Ivy Creek watershed in Buncombe County. It is suggested that local officials responsible for using water from the watershed maintain an open line of communication with US Forest Service managers concerning land management plans that effect land cover and thus water quality downstream.

With five logging sites observed during the potential contaminant source survey in 2012, and assuming others were not seen, there is an ongoing need to support North Carolina Forest Service (NCFS) initiatives in working with loggers and landowners. Local funds and/or grants are needed to support NCFS workshops and other efforts to continue teaching forestry operators the Forestry Practices Guidelines to Protect Water Quality. Such workshops could also benefit landowners with needs for pre-harvest planning and expected quality harvesting techniques to protect water quality.

'STATE OF THE WATERSHED' BI-ANNUAL MEETINGS:

A final and much needed suggestion is for local government entities, with vested interest in the Ivy River Watershed, lead and conduct bi-annual "State of the Watershed" meetings. These meetings, one for interested agencies and organizations and a follow up meeting for the general public, should be used to update everyone on available programs, actions, grants, coordination needs, monitoring results, land use changes, and any other items of interest. Following any updates, discussion should follow on future proposed activities, any needed support and help from others in the group, and new ideas for water quality improvement and protection. These meetings could help develop a common sense of concern for the watershed. The local "vested interest" government entities would need to decide how to lead and organize such an on-going event. The suggestion here is for the Towns of Weaverville and Mars Hill and the Madison and Buncombe County Soil and Water Conservation Districts jointly plan and conduct such meetings.

EMERGENCY CONTIGENCY PLAN UPDATE:

It is beyond the scope/financial resources of this planning effort to develop a detailed contingency plan beyond the Weaverville Water Shortage Response Plan of 2008 presently in use. The Weaverville Response plan is used to handle situations ranging from drought to hazardous spills.

The town of Weaverville public utilities director has established very effective lines of communication with county emergency management directors and other emergency responders concerning hazardous spills and many other water safety issues. The Town of Weaverville has reciprocal agreements in effect with the Towns of Mars Hill and Woodfin for sharing water under emergency conditions. But, safety/ security needs of public water supplies are continually changing, thus, both short and long term planning is an on-going need.

Local emergency management directors are presently waiting for state level grant funding approval for completing a new region- wide emergency management plan. This plan is anticipated to be inclusive of water supply safety issues.

It is suggested that the Towns of Weaverville and Mars Hill fully participate the upcoming regional planning effort, and that they incorporate details from it into an updated plan for the Ivy River Watershed.

SUMMARY OF SUGGESTED STRATEGIES:

Local Government Entities Leadership:

- Develop a "Cooperative Agreement" between the Towns of Weaverville and Mars Hill and the Madison and Buncombe SWCDs.

Education and Community Involvement:

- Emphasize environmental education programs (Envirothon, Kids in the Creek, others) in schools including field trips to the Ivy watershed and the Weaverville Water Treatment Plant.
- Expand public/private partners cooperation with schools for environmental education concerning water supply watersheds.
- Create a higher sense of awareness in the adult population of the water quality issues in the Ivy Watershed.
- Educate local government leaders about the Ivy Watershed and land/water issues in the watershed.
- Educate individual land/homeowners about proper use and handling of pesticides, fertilizers, household chemicals and related materials in the watershed.

Public Awareness, Visual Monitoring, Water Sampling and Analysis:

- Install additional highway public water supply watershed signs at entrances to and within the Ivy Watershed.
- Develop a "Watershed Stakeholder Group" type organization – a partnership of landowners, businesses, students, interested citizens, government agencies, and others to visually monitor conditions in the watershed and suggest and coordinate programs/efforts in the watershed.
- Continue or expand the water quality monitoring and educational expertise of Mars Hill College staff and students and the Environmental Quality Institute staff for help in the watershed.

Septic Systems Improvement Needs:

- An aggressive action plan needs to be developed in Madison County to install and/or improve residential septic systems in the Ivy River Watershed. In doing so, all avenues need to be explored to find additional sources of revenue to aid low and limited resource residents to install/improve systems.
- It is suggested that Madison County local government entities support the 2013 pigeon River Grant awarded to "Recreation Experience" to install septic systems.

Industrial/Commercial Sites:

- Continue close cooperation with NCDNER staff and local public utilities/partners staff in monitoring potential contaminant sources located in the 2010 Source Water Assessment report of the Ivy Watershed.
- Investigate and mitigate, if needed, two or possibly more random storage tank/barrel sites located during the 2012 inventory process.

Agricultural Best Management Practices Planning and Installation:

- A detailed education plan for farmers in the watershed is needed. The two towns could provide seed money to work with Cooperative Extension, SWCDs, and the USDA to begin this concerted effort.
- The towns of Weaverville and Mars Hill could consider funding/coordinating with the NC Cooperative Extension Service to have livestock specialists work with cattle farmers in the Ivy watershed on improved pasture and herd management techniques.
- Mountain Valleys RC&D will fully implement a Clean Water Management Trust Fund (CWMTF) grant received on 2/13 to prioritize 10 specific sites or projects identified by the watershed stakeholder group and develop detailed plans with cost estimates to solve water quality impacts from these sites. This effort to protect and restore surface drinking water focuses on specific problem areas. Examples are a subdivision with failing septic systems that could be connected with the Mars Hill sewage treatment system, a stream repair that would reduce sediment loads entering the little Ivy, a sawmill with no buffer between a high use area and the adjacent stream, a trailer park with failing septic systems and agricultural BMPs.
- The watershed stakeholder group needs to seek funding and technical staff assistance from all possible sources to install many more BMPs on farms in the watershed, especially the Little Ivy Creek portion.
- The watershed stakeholder group could lead in organizing and holding special training days for properly using fertilizers/farm chemicals in the watershed.

Housing, Subdivisions, and Construction Site Issues:

- The watershed stakeholder group needs to ask that the planning boards in Buncombe and Madison Counties review their respective county watershed ordinances from time to time (every 5-10) years for any needed improvements.
- Buncombe County officials, whenever changes are considered in their E&S and stormwater control ordinances, should be encouraged to always, as they have in the past, include source water watersheds in their planning process.
- Madison County officials may need to consider E&S and stormwater controls specifically for the Little Ivy in any future planning processes.

Highways, Roads, and Parking Lots:

- Local government entities need to coordinate closely with NCDOT in using and updating their Highway Stormwater Program and its database within the Ivy River Watershed area.
- Monitoring the extra sediment load (from recent I-26 and US 19 construction) as it moves downstream over the next several years may help anticipate extra water treatment needs for sediment removal.
- An organized watershed stakeholders group needs to use the Pigeon River Fund Stream Restoration project at the Beech Glen Community Center as an educational tour stop for the foreseeable future.
- The watershed stakeholders need to also use the Pigeon River Fund stormwater control BMP demonstration site at the Mars Hill Town Hall as an educational tour stop.
- The watershed stakeholders need to aggressively support the “Madison County Ten-Year Solid Waste Management Plan” implementation, and find funding for and support locating a waste disposal “Convenience Center” in the Ivy Watershed.
- The watershed stakeholders need to work with Buncombe County officials to find more convenient means for waste disposal for residents who cannot afford or choose not to use

private haulers.
Forestland Issues:
o Local government entities need to maintain close coordination with the US Forest Service on forest management plans in the Big Ivy portion of the watershed. o The watershed stakeholders need to seek local funds and grants to support NCFS workshops and other efforts to teach forest landowners and forest operators the Forestry Practices Guidelines to protect water quality.
'State-of-the-Watershed' Bi-Annual Meetings:
o It is suggested that the towns of Weaverville and Mars Hill along with the Madison and Buncombe County SWCD Boards jointly lead, plan for, and conduct such meetings.
Emergency Contingency Plan Update:
o It is suggested that the Towns of Weaverville and Mars Hill participate fully in the new region wide emergency plan development process concerning water supply safety issues

ACTION PLAN

The recommendations listed above outline strategies to reduce nonpoint pollution. Implementing these strategies will require an Action Plan that requires staff and funding. There will be a continued need to provide financial and technical assistance in the Ivy River Watershed for correcting sources of non-point solution and creating public awareness programs. By identifying water quality programs and pursuing grant funding the following Action Plan can begin to accomplish the strategies that have been identified. If items in the plan have been accomplished or improved methods are identified the Action Plan will be amended.

Long-Term Goal:	Supporting Inititive:	Schedule:	Coordinator:	Partners:
Education	Kids in the Creek	Fall		SWCDs, Madison County Schools
	Enviroscape Presentations	During School Year	Sara Nichols (Madison County SWCD)	SWCDs, Madison County Schools
	Conservation Field Days	Fall	Sara Nichols (Madison County SWCD)	Conservation Groups, SWCDs, Madison County Schools
Public Awareness	Organize "Watershed Stakeholder Group"	Bi-Annual		County Health Departments, NCDENR, local government entities, Beech Glen Community Center, SWCDs

	Adopt-a Stream	Spring		
	Agricultural BMPs tour	Summer		Madison and Buncombe County Extension Offices
	Newspaper articles	Bi-Annual		News Record & Sentinel
	Display at County Fair	Fall		Madison County Fair Committee
	Watershed Website	Ongoing		Watershed Stakeholder Group
	Watershed Newsletters	Bi-Annual		Watershed Stakeholder Group
Improve Water Quality	Water quality monitoring stations	Ongoing	Madison SWCD has secured funding for three sites in the watershed on a year-to-year basis	SWCD, Mars Hill College, Environmental Quality Institute, Pigeon River Fund
	BMPs installations	Ongoing	John Ottinger	USDA-NRCS, landowners, CWMTF
	Septic repairs	Ongoing	ReCreation Experience	County Health Departments, Pigeon River Fund

CONCLUSION STATEMENT

The Ivy River Watershed serves as a municipal water source for the Town of Weaverville. The watershed drainage is divided into the Big Ivy watershed in Buncombe County and the Little Ivy watershed in Madison County. Historic land uses in these two watersheds are significantly different. Water quality sampling results reflect these land use differences, with those sampling results historically showing the Little Ivy as a watershed in need of extra attention for water pollution control efforts. That need remains today.

This document identifies programs that have historically been used to make stream water quality improvements in the watershed. The use and findings of a potential contaminant sources inventory are displayed and explained. The document contains materials and references to several assessments and data sources that can be helpful in managing water quality issues in the watershed.

The document is completed with a listing of 30 strategies that can be helpful for protecting and/or improving stream water quality conditions in the Ivy River watershed. Hopefully, these strategies can serve as a guide and provide an impetus for local leaders to use now and as an impetus to develop future actions for watershed improvement. Key among all of these may be completing the “cooperative agreement” between the local Towns and Soil and Water

Conservation Districts, further developing the “watershed stakeholder group”, and holding regular “state-of-the-watershed” meetings.

APPENDIX

Figure 1: Ivy River Watershed Boundary Map

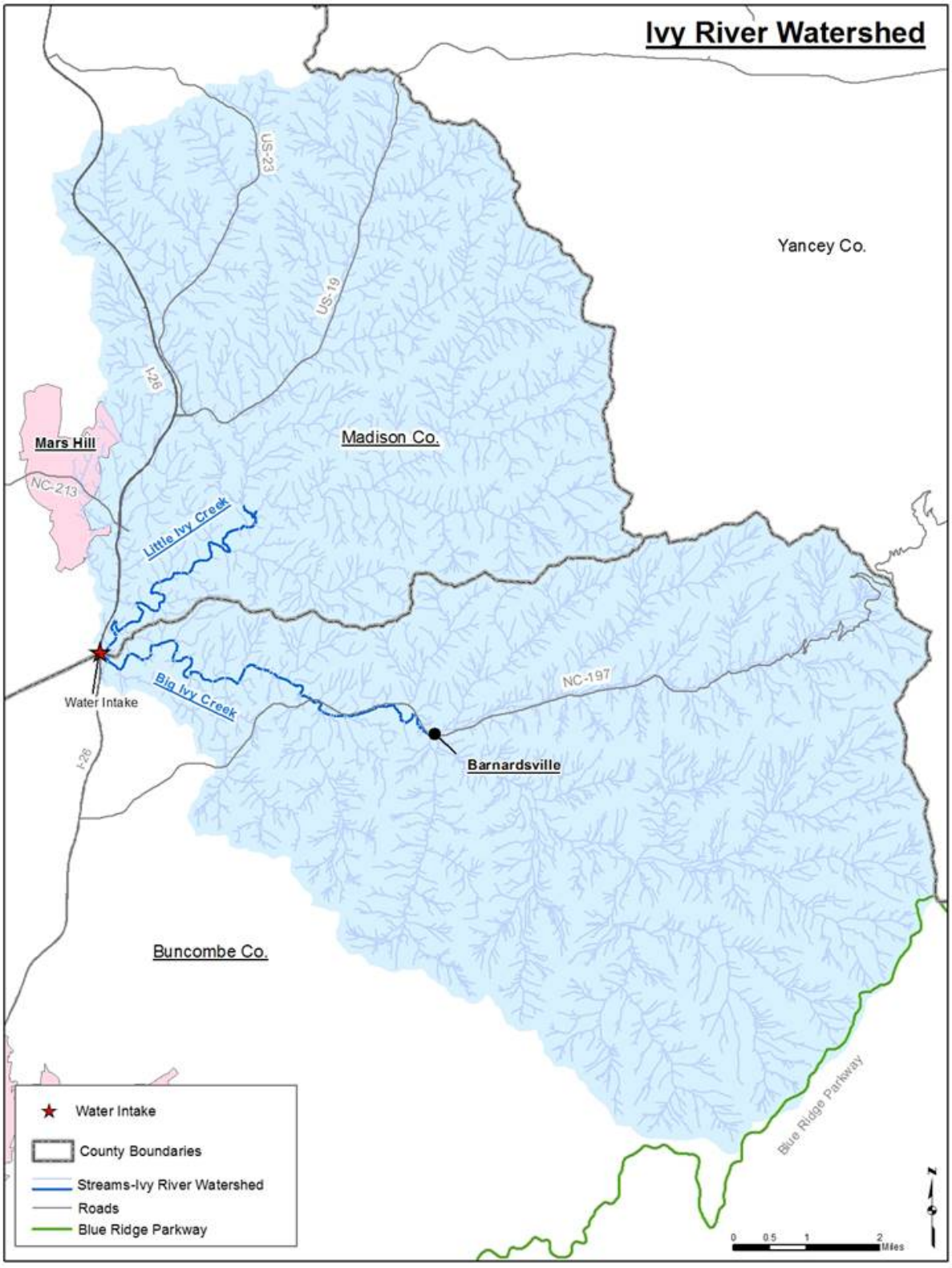
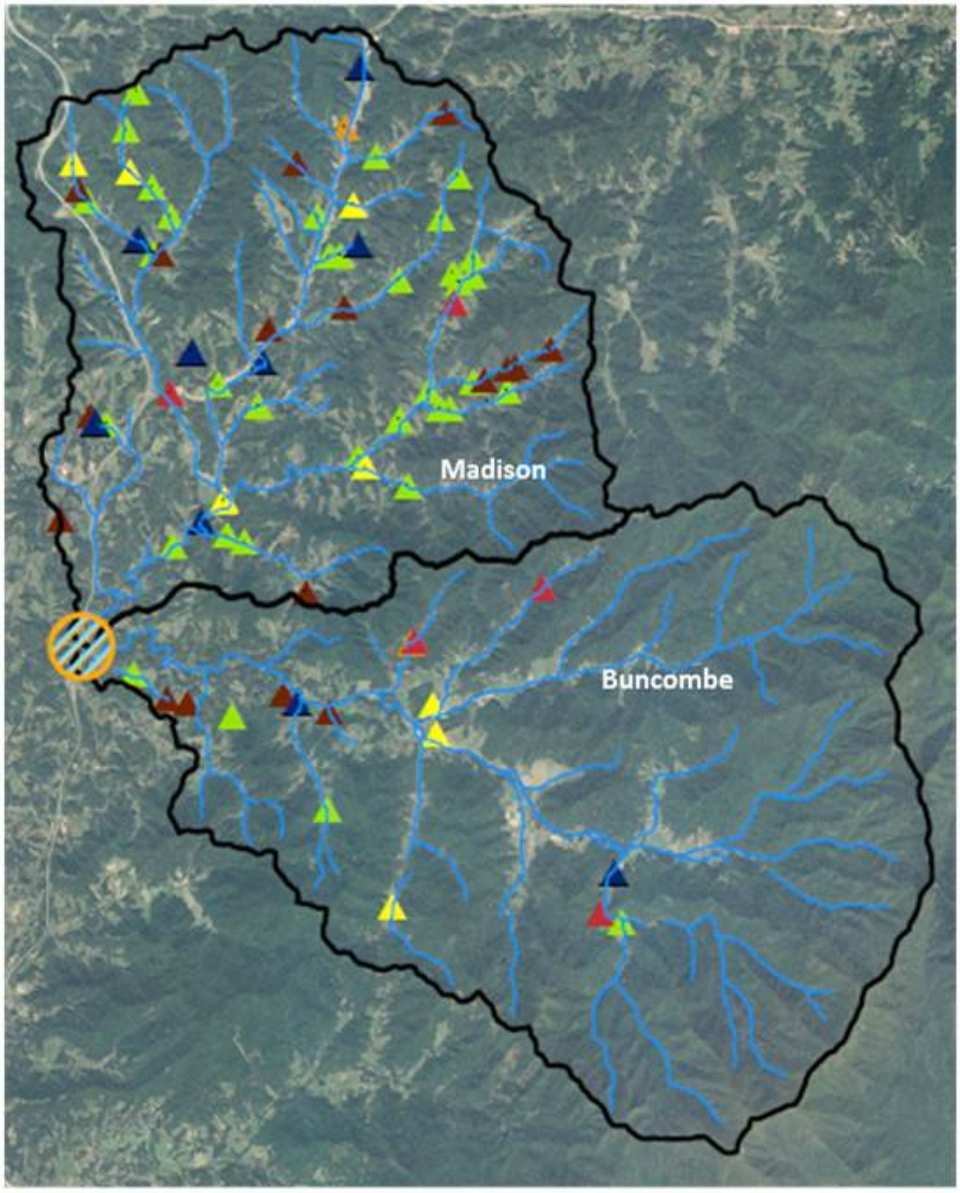


Figure 2: Potential Water Contaminant Source Locations Ivy River Watershed



Legend

- Ivy Intake
- Watershed Boundary

Potential Sources of Water Contaminants

- Chemical
- General
- Housing
- Logging
- Pasture
- Pesticide

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Map produced by the Madison County Soil & Water Conservation District, Mountain Valleys RC&D, and the Pigeon River Fund.

Figure 4a: Delineated Area & PCS Map

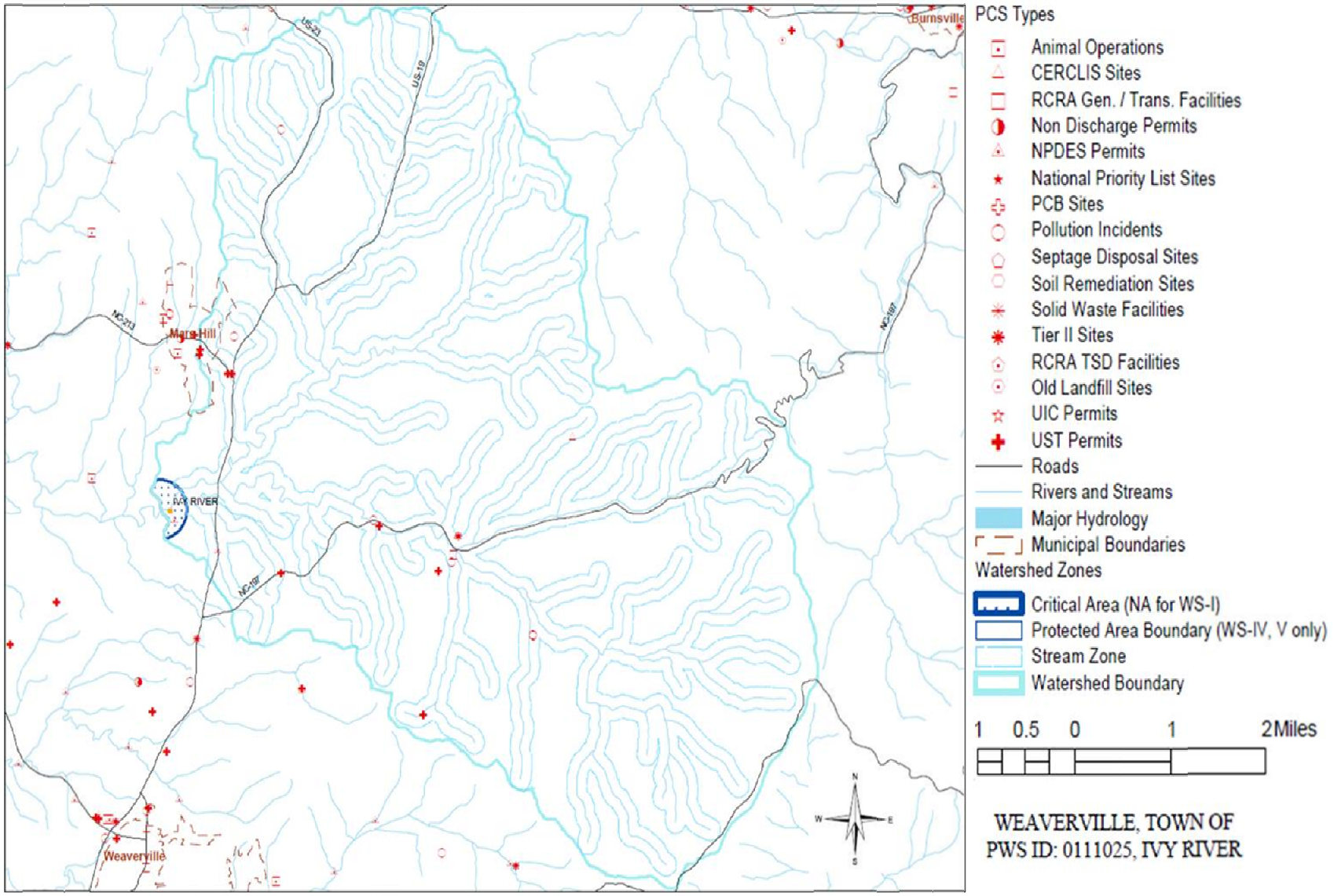


Figure 4b: from the "2010 NCDNER Source Water Assessment Report-Table 4" lists Potential Contaminant Source Attributes. These sites will require ongoing monitoring by state and local officials to insure water quality safety limits are met.

Figure 4b, pg.1

Table 4. Potential Contaminant Source Attributes
WEAVERVILLE, TOWN OF
PWS ID: 01-11-025, IVY RIVER

Common Attributes

PCS Name	PCS ID	PCS Type	PCS Risk Rating	Street Address	City	Zip	County
MARTINS CREEK ROAD	NCD986166320	CERCLIS Sites	H	MARTIN'S CREEK RD	BARNARDSVILLE	28709	BUNCOMBE
OHIO ELECTRIC MOTORS	NCD097362321	RCRA Gen. / Trans. Facilities	H	30 PAINT FORK RD	BARNARDSVILLE	28709	Buncombe
Ohio Electric Motors WWTP	NC0039152	NPDES Permits	H	30 Paint Fork Rd	Barnardsville	28709	Buncombe
Ivy River WTP	NC0085154	NPDES Permits	H	Sam's Rd NCSR 1769	Weaverville	28787	Buncombe
Ohio Electric Motors WWTP	NCG030140	NPDES Permits	H	30 Paint Fork Rd	Barnardsville	28709	Buncombe
Robinson Claude-Residence	NCG550514	NPDES Permits	H	NCSR 2207	Weaverville	28787	Buncombe
NCDOT-MARS HILL	9715	Pollution Incidents	H	SR 1553	MARS HILL	UNKNOWN	MADISON
CLAUDE CHANDLER PROPERTY	16376	Pollution Incidents	H	P.O. BOX 11	MARS HILL	28754	Madison
D & D GROCERY	7521	Pollution Incidents	H	HWY 197	WEAVERVILLE	28787-	BUNCOMBE

Figure 4b, pg.2

PCS Name	PCS ID	PCS Type	PCS Risk Rating	Street Address	City	Zip	County
BARNARDSVILLE ELEM. TANK #2	28164	Pollution Incidents	H	20 HILLCREST DRIVE	BARNARDSVILLE	28709	BUNCOMBE
CARSON RESIDENCE	18235	Pollution Incidents	H	597 DILLINGHAM ROAD	BARNARDSVILLE	28709-	BUNCOMBE
COMMUNITY CASH & CARRY	12916	Pollution Incidents	H	597 DILLINGHAM RD	BARNARDSVILLE	UNKNOWN	BUNCOMBE
OHIO ELECTRIC MOTORS	44F5FA3E1F7E7FB985256F96005B8A84	Tier II Sites	H	30 PAINT FORK RD	BARNARDSVILLE	28709	BUNCOMBE
BARNARDSVILLE SCHOOL	0-004515	UST Sites	H	20 HILLCREST DRIVE	BARNARDSVILLE	28709	BUNCOMBE
OHIO ELECTRIC MOTORS	0-007898	UST Sites	H	30 PAINT FORK ROAD	BARNARDSVILLE	28709	BUNCOMBE
CONVENIENCE KING 20	0-021217	UST Sites	H	1164 BARNARDSVILLE HIGHWAY	BARNARDSVILLE	28709	BUNCOMBE
ROADRUNNER MARKET 128	0-021866	UST Sites	H	222 CARLELLER RD	MARS HILL	28754	MADISON
PAYLESS BEVERAGE CENTER	0-035981	UST Sites	H	10 STOCKTON ROAD	WEAVERVILLE	28787	BUNCOMBE
MARS HILL BAPTIST CHURCH	0-027165	UST Sites	H	67 N MAIN STREET	MARS HILL	28754	MADISON
UNITED STATES POSTAL SERVICE	0-033496	UST Sites	H	115 SOUTH MAIN STREET	MARS HILL	28754	MADISON
MARS HILL ONE STOP	0-035342	UST Sites	H	844 CARL ELLER ROAD	MARS HILL	28754	MADISON

Figure 4b, pg.3

Table 4. (Cont.) Potential Contaminant Source Attributes
WEAVERVILLE, TOWN OF
PWS ID: 01-11-025, IVY RIVER

Unique Attributes

PCS Name	PCS ID	Attribute	Value
OHIO ELECTRIC MOTORS	NCD097362321	Generator Class	Small Quantity Generator
OHIO ELECTRIC MOTORS	NCD097362321	Transporter	N
Ohio Electric Motors WWTP	NC0039152	Permit Type	Discharging 100% Domestic < 1MGD
Ohio Electric Motors WWTP	NC0039152	Permit Issue Date	2005-09-14
Ohio Electric Motors WWTP	NC0039152	Permit Expiration Date	2010-09-30
Ohio Electric Motors WWTP	NC0039152	Receiving Stream	Paint Fork
Ivy River WTP	NC0085154	Permit Type	Water Plants and Water Conditioning Discharge
Ivy River WTP	NC0085154	Permit Issue Date	2005-10-05
Ivy River WTP	NC0085154	Permit Expiration Date	2010-09-30
Ivy River WTP	NC0085154	Receiving Stream	Ivy Creek (River)
Ohio Electric Motors WWTP	NCG030140	Permit Type	Metal Fabrication Stormwater Discharge COC
Ohio Electric Motors WWTP	NCG030140	Permit Issue Date	2002-09-01
Ohio Electric Motors WWTP	NCG030140	Permit Expiration Date	2007-08-31
Ohio Electric Motors WWTP	NCG030140	Receiving Stream	Paint Fork
Robinson Claude-Residence	NCG550514	Permit Type	Single Family Domestic Wastewater Discharge COC

Figure 4b, pg.4

PCS Name	PCS ID	Attribute	Value
Robinson Claude-Residence	NCG550514	Permit Issue Date	2002-08-01
Robinson Claude-Residence	NCG550514	Permit Expiration Date	2007-07-31
Robinson Claude-Residence	NCG550514	Receiving Stream	(null)
NCDOT-MARS HILL	9715	Contaminant Type	Petroleum
NCDOT-MARS HILL	9715	Risk Site	H
NCDOT-MARS HILL	9715	Site Priority Code	UNKNOWN
CLAUDE CHANDLER PROPERTY	16376	Contaminant Type	Heating Oil/Kerosene
CLAUDE CHANDLER PROPERTY	16376	Risk Site	UNKNOWN
CLAUDE CHANDLER PROPERTY	16376	Site Priority Code	A
D & D GROCERY	7521	Contaminant Type	Petroleum
D & D GROCERY	7521	Risk Site	H
D & D GROCERY	7521	Site Priority Code	UNKNOWN
BARNARDSVILLE ELEM. TANK #2	28164	Contaminant Type	Petroleum
BARNARDSVILLE ELEM. TANK #2	28164	Risk Site	H
BARNARDSVILLE ELEM. TANK #2	28164	Site Priority Code	UNKNOWN
CARSON RESIDENCE	18235	Contaminant Type	Petroleum
CARSON RESIDENCE	18235	Risk Site	H
CARSON RESIDENCE	18235	Site Priority Code	UNKNOWN
COMMUNITY CASH & CARRY	12916	Contaminant Type	Petroleum
COMMUNITY CASH & CARRY	12916	Risk Site	H
COMMUNITY CASH & CARRY	12916	Site Priority Code	UNKNOWN

Figure 5: DWQ Monitoring Site Map

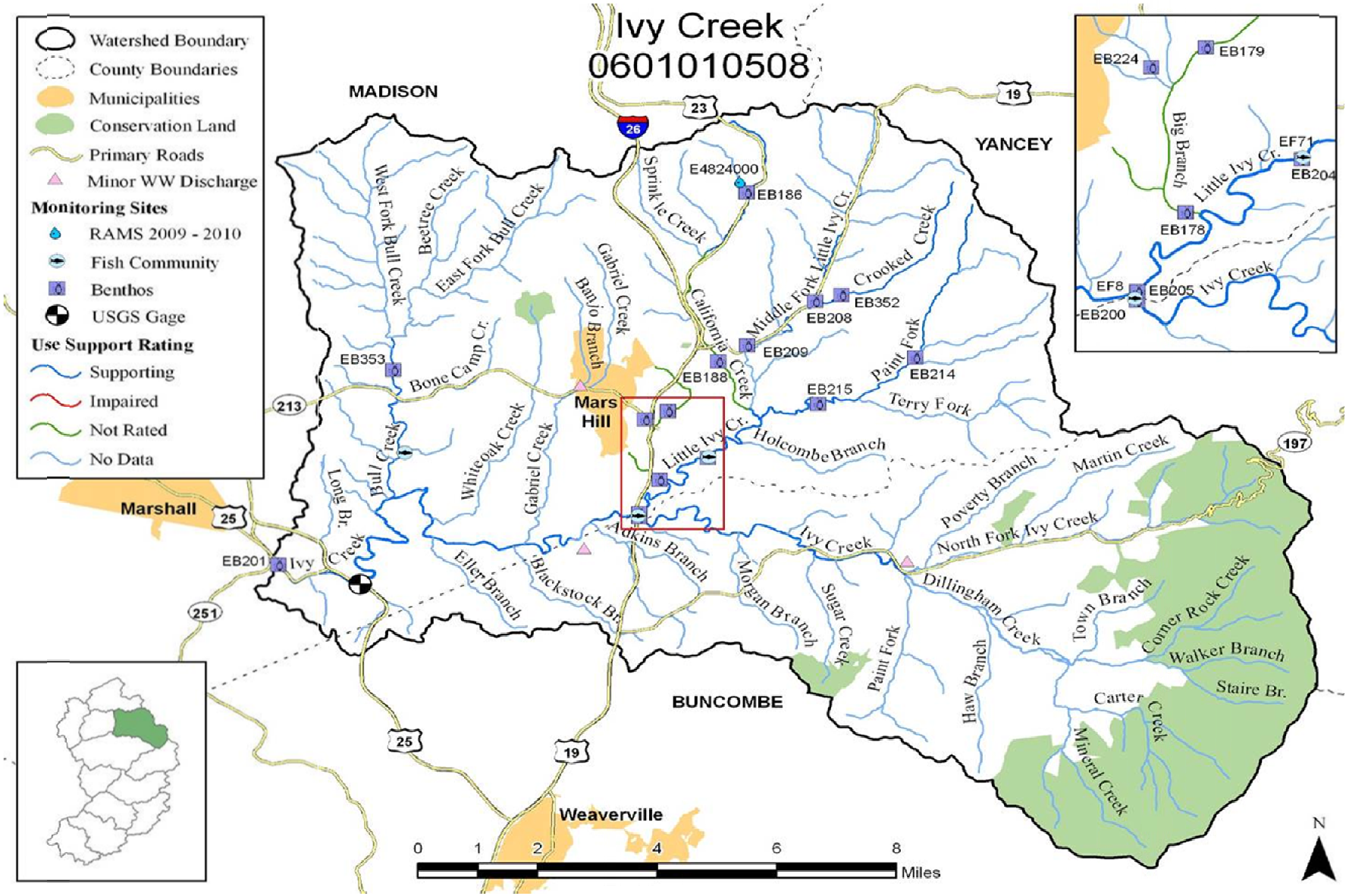


Figure 9a:

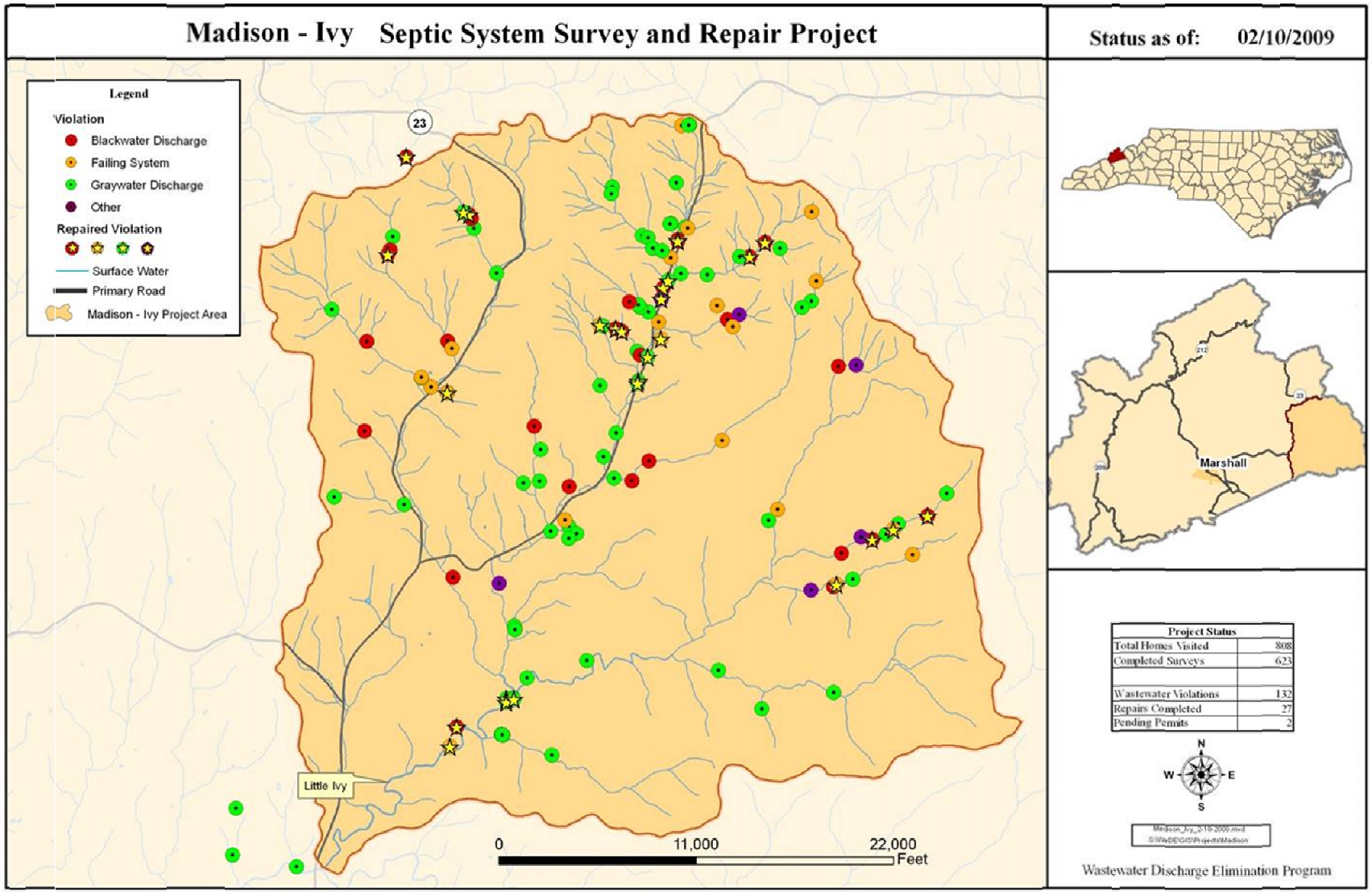
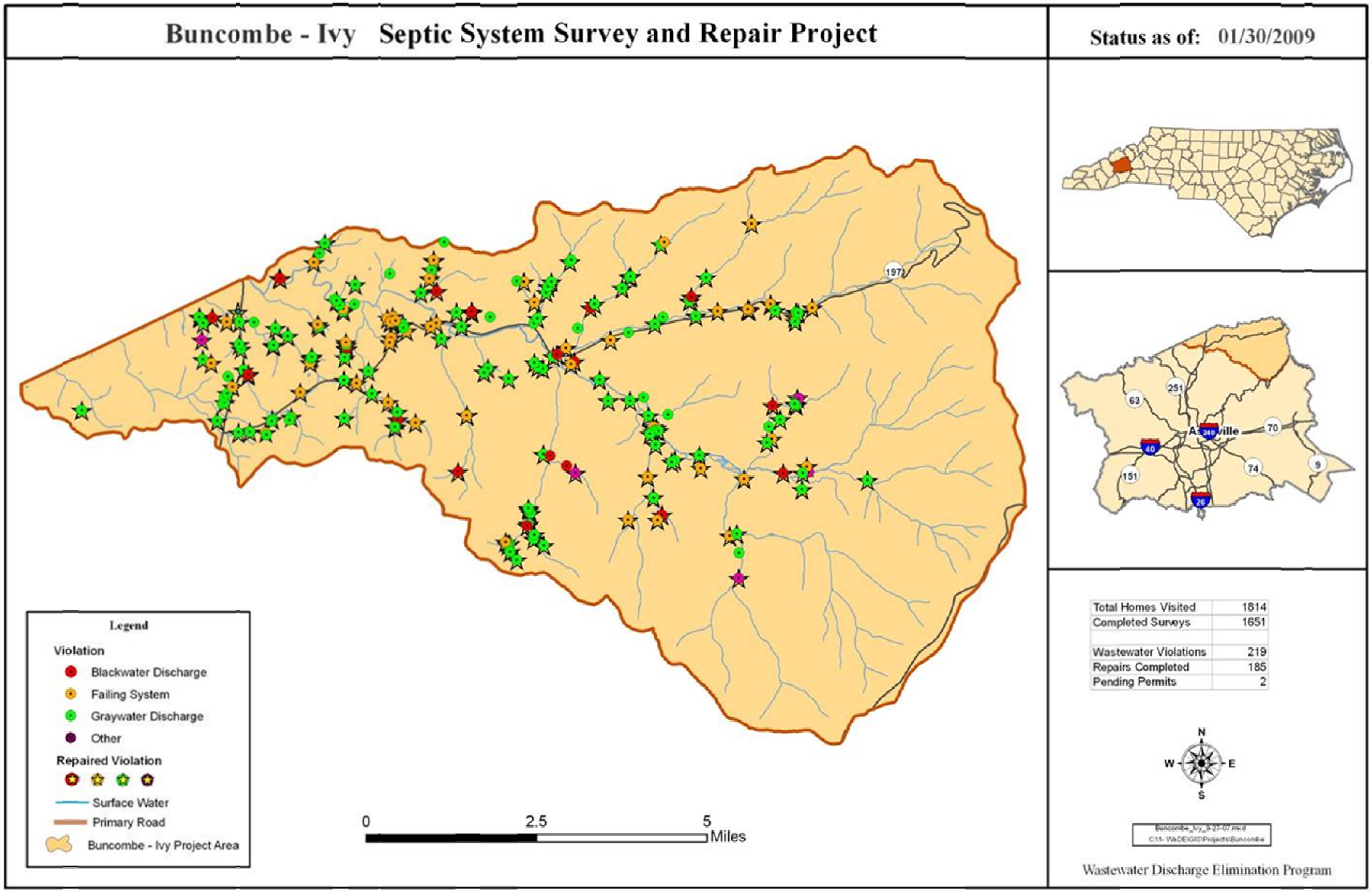
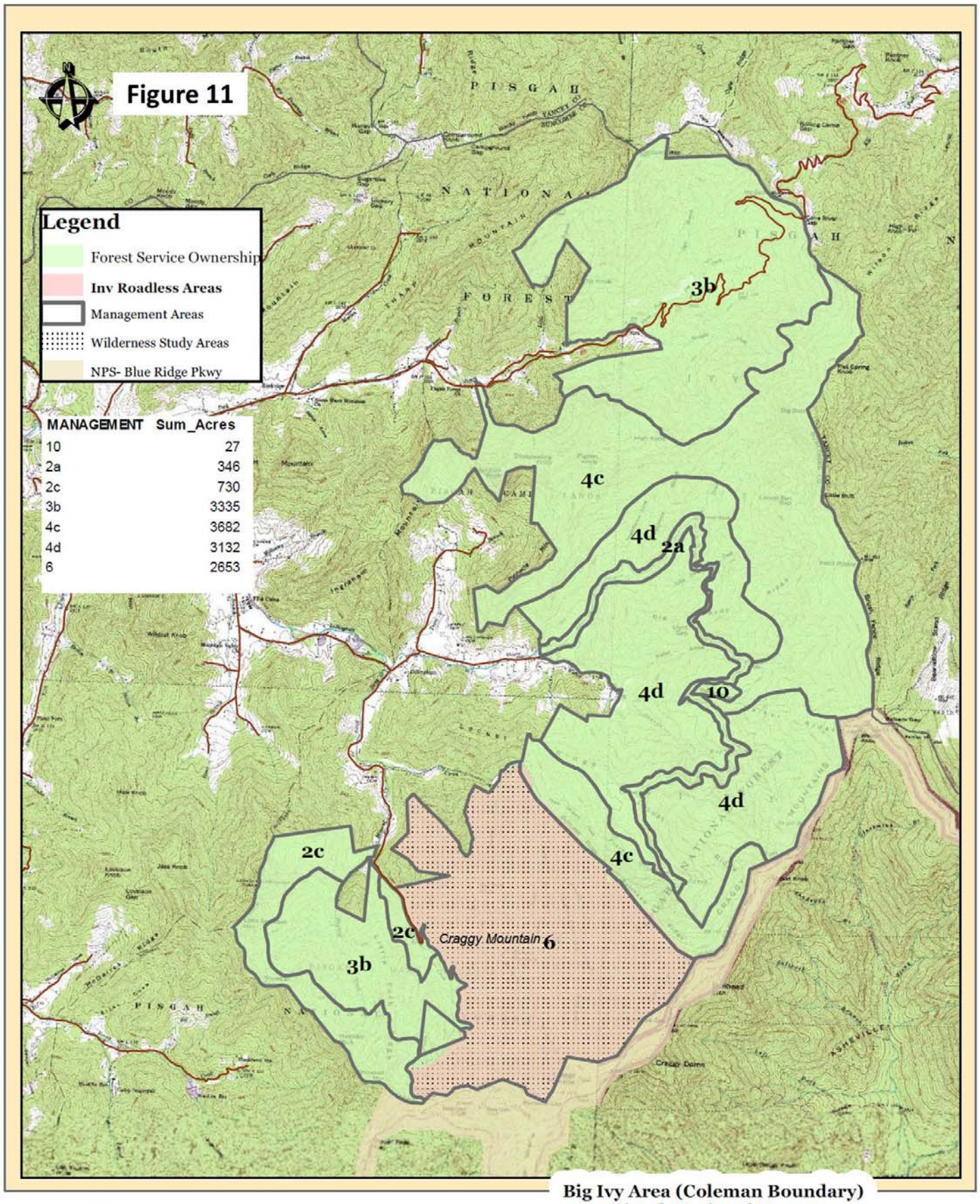

Madison - Ivy Septic System Survey and Repair Project
Status as of: 02/10/2009
Legend
Violation
Blackwater Discharge
Failing System
Graywater Discharge
Other
Repaired Violation
Surface Water
Primary Road
Madison - Ivy Project Area
23
Little Ivy
0
11,000
22,000
Feet
Marshall
Project Status
Total Homes Visited 808
Completed Surveys 623
Wastewater Violations 132
Repairs Completed 27
Pending Permits 2
N
W
E
S
Wastewater Discharge Elimination Program

Figure 10:


Buncombe - Ivy Septic System Survey and Repair Project
Status as of: 01/30/2009
Legend
Violation
Blackwater Discharge
Failing System
Graywater Discharge
Other
Repaired Violation
Surface Water
Primary Road
Buncombe - Ivy Project Area
0
2.5
5
Miles
Total Homes Visited 1814
Completed Surveys 1651
Wastewater Violations 219
Repairs Completed 185
Pending Permits 2
N
W
E
S
Wastewater Discharge Elimination Program



1:65,000

0 0.35 0.7 1.4 Miles

Best available data as of February 2013. Map may have been developed from different sources, accuracies and modeling, and is subject to change without notice

Big Ivy Area (Coleman Boundary)
Pisgah National Forest
Management Areas - 1987 Plan, as Amended
Plus Inventoried Roadless Areas (2001 Roadless Rule)

Figure 12: Ivy River Watershed Sediment Basins