Chapter 5
Agriculture and Water Quality

The French Broad River basin has several types of agricultural activities, including: animal husbandry; row crop vegetable farms; apple orchards; and ornamental tree farms. DWQ works with land owners and other DENR agencies such as the Division of Soil and Water Conservation, to decrease the impact of agriculture on water quality while maintaining a prosperous agricultural industry.

Animal Operations

In 1992, the Environmental Management Commission (EMC) adopted rules (15A NCAC 2H.0217) establishing procedures for managing and reusing animal wastes from intensive livestock operations. The rule applies to new, expanding or existing feedlots with animal waste management systems designed to serve animal populations of at least the following size: 100 head of cattle; 75 horses; 250 swine; 1,000 sheep; or 30,000 birds (chickens and turkeys) with a liquid waste system.

Table 5-1 summarizes, by subbasin, the animal operations present as of July 2010. These numbers reflect only operations required by law to be permitted, and therefore, do not represent the total number of animals in each subbasin. All animal operation permits in the French Broad River basin are for cattle.

Table 5-1: Confined Animal Operation Permits in the French Broad River Basin

8 Digit HUC	Number of Facilities	Number of Animals	Steady State Live Weight in Pounds
06010105	8	1,640	2,176,000
06010106	8	1,495	2,093,000
06010108	0	0	0
Total	16		4,269,000

Christmas Tree Production

North Carolina is a leading producer of Christmas tress in the United States. Christmas tree production activities are deemed to be an agricultural-horticultural practice, and therefore come under the oversight of the N.C. Department of Agriculture and Consumer Services and N.C. Division of Soil & Water Conservation, with its recommended agriculture BMPs applying to these activities. The N.C. Cooperative Extension Service has developed extensive guidelines and recommendations for Christmas tree farming operations, available online on the ***N.C. Cooperative Extension Service's Christmas tree production webpage***.

Aquaculture

There are 11 permitted trout farms in the French Broad River Basin. This number excludes farms not meeting permit coverage requirements related to annual fish production and feed usage. Cold-water fish farms are required to obtain an NPDES general fish farm permit if they harvest over 20,000 pounds of fish per year, feed more than 5,000 pounds per month, and discharge more than 30 days per year. (See ***NPDES General Permit NCG530000*** for more information.) Macroinvertebrate and chemical sampling data collected in streams utilized by farms indicate negative impacts to water quality standards. Additional data need to be collected and

analyzed. In an effort to support the industry in the region and improve and protect water quality, a collaborative approach has been undertaken which includes trout farmers, NC Department of Agriculture and Consumer Services, NC Cooperative Extension and DWQ. The collaborative work outcomes should be a better understanding of farm operations, BPMs, water resource/quality protection and regulatory needs for all parties. The NCG530000 permit will be renewed in July 2012. Any necessary permit modifications to fully protect surface waters utilized by trout farm operations will be considered and discussed by DWQ and stakeholders during the renewal period.

During this process, DWQ encourages trout farms to contact their local extension service and/or research institutions to use management measures such as those recommended/developed by DWQ in Collaborative Assessment for Watershed and Streams (CAWS) Project (funded by an EPA 104(b)(3) grant):

- Use hand feeding as much as possible to reduce the amount of food that enters the raceways and stream;
- Use high quality feed, which results in less manure production;
- Clean raceways regularly and land apply the manure as fertilizer; and
- Consider reducing the amount of fish being raised if the assimilative capacity has been exceeded.

Impacted Streams in Agricultural Areas

Impacts to streams from agricultural activities can include excessive nutrient loading, pesticide and herbicide contamination, bacterial contamination, and sedimentation. In several watersheds, water quality data are indicating toxicity impacts to the aquatic biological community attributable to the use of pesticides on specialty operations such a tomato, pepper, apple orchards, and ornamental tree farms. Table 5-2 lists streams potential impacted by agricultural activities. The stressors listed may have multiple sources, some non-agricultural.

Table 5-2: Streams Potentially Impacted by Agriculture

Assessment Unit #	Stream Name	County	Stressor	Potential Source
Upper French Broad River Subbasin				
6-2-(0.5)b	W. F. French Broad River	Transylvania	Nutrients, BOD; Solids	Trout farm
6-54-3-(17.5)	South Fork Mills River	Henderson	Pesticides	Tomato, pepper; corn fields
6-55-11-6	Lewis Creek	Henderson	Habitat Degradation	Orchards; turf farms
6-55-11-(5)a 6-55-11-(1)c	Clear Creek	Henderson	Habitat Degradation	Orchards; row crops
6-55b	Mud Creek	Henderson	Habitat Degradation	Row crops
6-55-8-2	Devils Fork	Henderson	Habitat Degradation	Orchards
6-57-(9)a	Cane Creek	Buncombe	Habitat Degradation	Row crops
6-84a 6-84b 6-84c 6-84d	Newfound Creek	Buncombe	Habitat Degradation, Pathogens	Livestock
Pigeon River Subbasin				
5-16-14	Raccoon Creek	Haywood	Habitat Degradation	Row crops, livestock; orchards
5-26-(7)	Jonathans Creek	Haywood	Sediment, Pathogens	Livestock
Nolichucky River Subbasin				
7-3-22	Bald Creek	Yancey	Habitat Degradation	Livestock
7-2-63	Jacks Creek	Yancey	Habitat Degradation	Livestock
7-2-59	Cane Creek	Mitchell	Habitat Degradation	Tree Farm

Agriculture Cost Share Funding Program

Impacts to streams from agricultural activities can include excessive nutrient loading, pesticide and herbicide contamination, bacterial contamination, and sedimentation. Fortunately, there are several programs available to assist farmers minimize or eliminate the impacts of their farms on water quality.

The NC Agricultural Cost Share Program (NCACSP) was established in 1984 to help reduce agricultural nonpoint runoff into the state's waters. The program helps owners and operators of established agricultural operations improve their on-farm management by using BMPs. As the program name states, it is a cost share program, with the State providing 75% of the cost of BMP implementation and the landowner/operator providing the remaining 25% match. These BMPs include vegetative, engineering, or management systems that can improve the efficiency of farming operations while reducing the potential for surface and groundwater pollution. The NCACSP is implemented by the DSWC. The Division categorizes the BMPs into five main purposes or categories based upon the type of nutrient or chemical loading reduction effects these practices have on water quality. They are as follows:

• Sediment/Nutrient Delivery Reduction from Fields - Sediment/nutrient management measures include planned systems that prevent sediment and nutrient runoff from fields into streams. Practices include: field borders; filter strips; grassed waterways; nutrient management strategies; riparian buffers; water control structures; streambank stabilization; and road repair/stabilization.

• Erosion Reduction/Nutrient Loss Reduction in Fields - Erosion/nutrient management measures include planned systems for reducing soil erosion and nutrient runoff from cropland into streams. Practices include: critical area planting; cropland conversion; water diversion; long-term no-till; pasture land conversion; sod-based rotation; strip cropping; terraces; and Christmas tree conservation cover.

• Stream Protection from Animals - Stream protection management measures are planned systems for protecting streams and streambanks. Such measures eliminate livestock access to streams by providing an alternate watering source away from the stream itself. Other benefits include reduced soil erosion and sedimentation; pathogen contamination and pollution from dissolved, particulate, and sediment-attached substances. Practices include: heavy-use area protection; livestock exclusion (i.e., fencing); spring development; stream crossings; trough or watering tanks; wells; and livestock feeding areas.

• Proper Animal Waste Management - A waste management system is a planned system in which all necessary components are installed for managed liquid and solid waste to prevent or minimize degradation of soil and water resources. Practices include: animal waste lagoon closures, constructed wetlands, controlled livestock lounging area, dry manure stacks, heavy use area protection, insect and odor control, stormwater management, waste storage ponds/lagoons, compost, and waste application system.

• Agricultural Chemical (agrichemical) Pollution Prevention - Agrichemical pollution prevention measures involve a planned system to prevent chemical runoff to streams for water quality improvement. Practices include: agrichemical handling facilities and fertigation/chemigation back flow prevention systems.

As contracts to implement BMPs are developed, staff from DSWC enter in the project site and conservation plan data. This data is tracked in a database administered by the Division. Reports are generated from this database and provided to interested organizations and agencies, generally based on the five BMP benefit categories described above. Nutrient loading (nitrogen and phosphorus) reductions, tons of soil saved, pounds of animal waste managed, acres affected by the implementation of the BMPs, and the tax dollars expended to create these

effects are often provided in a report to various agencies.

From the program's inception in 1984 to the present, over $177 million of BMPs across the state have been implemented with NCACSP funds. The five categories of reductions vary across the state, based effectively by geographic variances. As an example, you will likely find more erosion control/nutrient management practices in the eastern portion of the state, more sediment/nutrient management practices in the piedmont geographic region, and more stream protection measures in the mountain region.

These data for the French Broad River Basin from January 1, 2004 - December 31, 2009 are provided below in tabular form (spreadsheet) along with BMP locations (map). The data are arranged by 10 Digit Hydrologic Unit Code. As a reference, $31.78 million has been expended across the state from NCACSP funds during this same timeframe. $2.78 million (or 8.75%) was expended within the French Broad Basin during these years. The total contract value of the BMPs implemented was $3.71 million dollars (the NCACSP cost shares BMP implementation at a 75% rate, with the landowner/operator providing the 25% match). The French Broad Basin is approximately 4,373 square miles or 8.1% of the State of North Carolina, which is approximately 53,821 square miles. Under this program, the following water quality benefits were realized:

- Over 29,000 acres of crop, pasture, and haylands were affected by the installation of the BMPs;
- Over 7800 tons of soil (equivalent of over 487 tandem dump truck loads), enabled farmlands to remain productive while keeping sediment and nutrients out of streams;
- Nearly 48,000 lbs of nitrogen (amount of nitrogen that would be used to produce over 3,200 acres of corn), remained on the land as opposed to running off into streams or travelling through the soil, potentially contaminating groundwater;
- Over 16,000 pounds of phosphorus (amount equivalent to produce 2,800 acres of corn), were kept out of the French Broad Basin's waterways; and
- Over 275,000 lbs of nitrogen and over 186,000 pounds of phosphorus generated from animal waste was properly managed, utilizing these macro-nutrients as opposed to having them eventually end up, along with potential pathogens, into the watercourses of the French Broad Basin.

Please note that the figures mentioned above, and tabularized below, are only for the NCACSP Program. Currently there are other programs available through the Soil and Water Conservation Districts within the French Broad Basin that address non-point sources of pollution. They include the Community Conservation Assistance Program (CCAP), Clean Water Management Trust Fund (CWMTF) grant, several Division of Water Resources grants, Resource Conservation and Development (RC&D) grants, Environmental Quality Incentives Program (EQIP) projects, EPA 319 grants, and other programs and projects that the districts have utilized to improve water quality in selected watersheds. As these programs are not run through the NCACSP database, the nutrient load reductions are not captured in this report.

Figure 5-1 shows the NCACSP project (management measure) locations in relation to the 10-Digit Hydrologic Unit watersheds. Most of the high quality farmlands are located along major stream and river systems, where the high quality soils are located. Understandably, the majority of management measures installed with NCACSP funds were installed on these productive lands. Further, "Streamside Practices" accounted for 46 percent of the total acres affected by installation of the management measures, 25 percent of the BMPs installed were Erosion/Nutrient Reduction practices, 18 percent were Waste Management practices, and the remaining 11 percent included Agriculture Chemical Pollution Prevention and Sediment/Nutrient Reductions.

Table 5-3: NC Agriculture Cost Share Program Achievements in the French Broad Basin from January 1, 2004 through December 31, 2009

10 Digit HUC	Watershed Area (Acres)	Area (Acres)	Cost Share Expended	Soil Saved (Tons)	N Saved (Lbs)	P Saved (Lbs)	WasteN Manage (Lbs)	WasteP Manage (Lbs)
0601010302	33,343.9	533.4	$ 110,815	171.5	293	217		
0601010501	83,092.8	2,572.4	$ 293,852	2,980.6	3,842	1,921	6,614	3,067
0601010502	107,219.6	161.2	$ 52,500					
0601010503	72,065.4	5,375.9	$ 258,610	417.7	1	0		
0601010504	84,891.8	770.6	$ 152,113	235.3	4,769	3,125	75,255	49,677
0601010505	66,494.6	548.0	$ 43,890	6.0				
0601010506	84,943.8	271.1	$ 33,731	73.7			384	118
0601010507	98,422.9	30.0	$ 9,088	17.5			2,457	1,507
0601010508	103,074.3	394.0	$ 37,786	28.0				
0601010509	150,891.2	1,269.3	$ 171,349	988.9	59	59	1,309	803
0601010510	84,674.5	3.0	$ 9,871					
0601010511	60,935.4	310.3	$ 41,456	162.7				
0601010601	107,519.3	1,768.5	$ 138,141	880.8	6,924	742	8,375	42
0601010602	116,296.0	3,400.0	$ 373,924	2,390.8	17,780	3,326	38,936	1,606
0601010603	119,092.7	1,507.9	$ 91,257	940.0	8,279	905	11,770	
0601010801	117,172.3	1,749.5	$ 279,570	770.0	2,053	1,899	14	
0601010802	94,190.2	1,663.0	$ 147,262	70.0			120,000	120,000
0601010803	100,998.3	4,963.0	$ 234,323				8,160	4,440
0601010804	1,434.3	834.4	$ 209,930	310.0	3,719	3,829	232	900
0601010806	89,165.9	4,269.3	$ 549,383	586.0	4,140	2,917	8,156	8,105
Totals	1,776,990.5	29,127.7	$ 2,781,684	7,877.3	47,724	16,802	275,048	187,198

Figure 5-1: Location of NC Agriculture Cost Share Projects Installed January 1, 2004 Through December 31, 2009

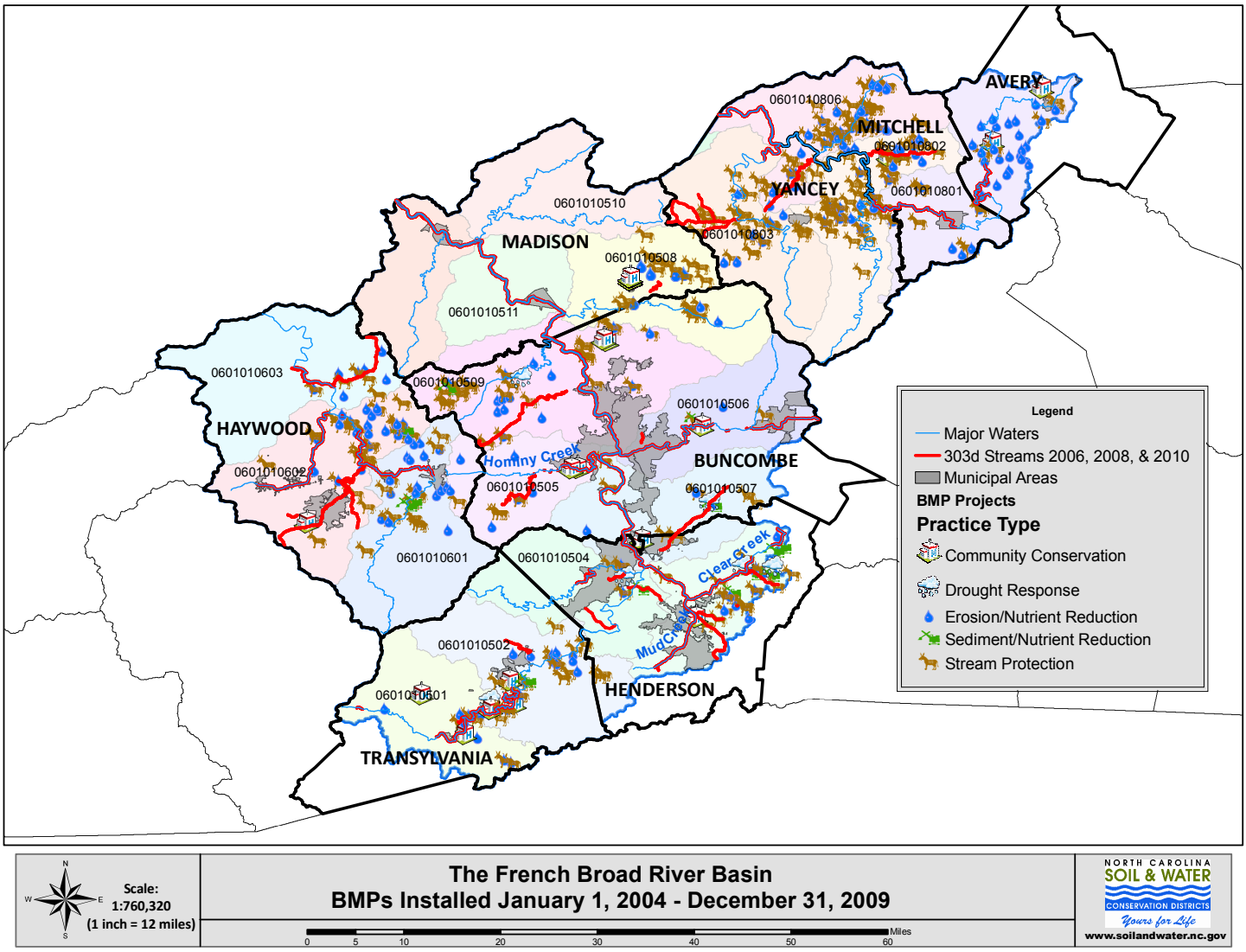
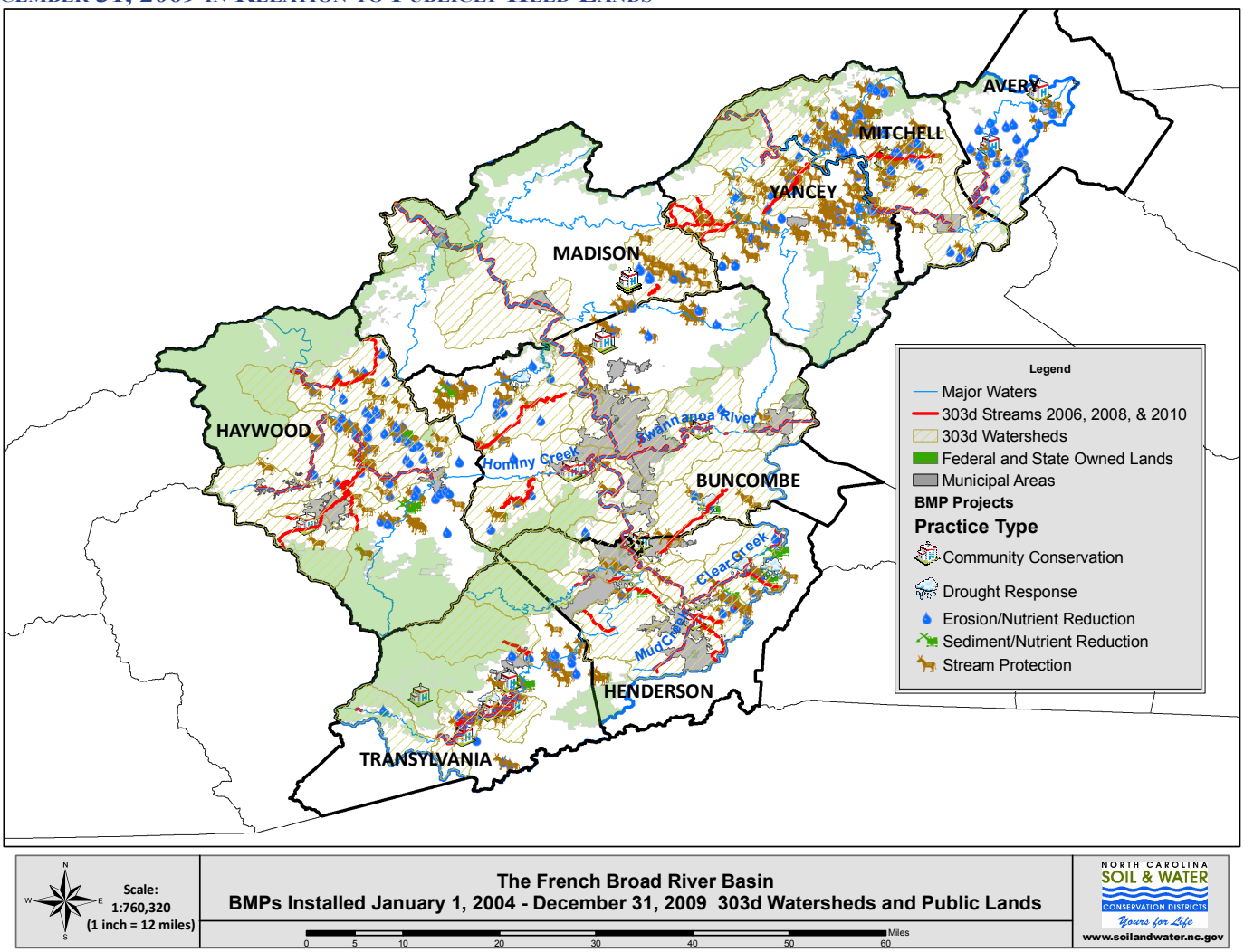


Table 5-3: Soil and Water Conservation Districts Contact Information

District	Address	Phone Number
Avery	PO Box 190, Newland, NC 28657	
Buncombe	155 Hilliard Avenue, Suite 204 Asheville, NC 28801	(828) 250-4785
Henderson	999 High County Land Hendersonville, NC 28792	(828) 697-4949
Haywood	589 Raccoon Road, Suite 203 Waynesville, NC 28786	(828) 456-5132
Madison	4388 US 25/70, Suite 2 Marshall, NC 28753	(828) 649-3313
Transylvania	203 E Morgan Street Brevard, NC 28712	(828) 884-3230
Mitchell Yancey	217 Spruce Pine Shopping Center B Spruce Pine, NC 28777	(828) 765-4701

Figure 5-2: Location of NC Agriculture Cost Share Projects Installed January 1, 2004 Through December 31, 2009 in Relation to Publicly Held Lands



Other Agriculture Assistance Programs

Districts have utilized other sources of funding to implement management measures within the French Broad Basin. These include EPA 319, Clean Water Management Trust Fund, NC Division of Water Resources, Natural Resources Conservation Service (NRCS) Environmental Quality Incentive Program (EQIP), NRCS Resource Conservation and Development (RC&D), Golden Leaf Foundation, and Community Conservation Assistance Program. Many times these sources of funding are coupled with one another on projects to more efficiently and effectively implement large projects that quite possibly could not be funded through one source alone. Considerable success has been noted with these programs. The Buncombe and Madison Districts have received EPA 319 funds for projects on Cane Creek and Little Ivy Creek. The Transylvania, Mitchell, and Avery Districts have received Division of Water Resources funds for dam removal and stream stabilization projects. The Henderson, Mitchell, Yancey, and Haywood Districts are involved with an ongoing Clean Water Management Trust Fund grant. Golden Leaf funds have been used in Henderson County. RC&D funds have been utilized in Madison, Mitchell, and Yancey Districts. All the districts in the French Broad Basin have used EQIP funds. There are several other programs available to farmers to assist them ensuring their farming practices are protective of water quality. Detailed descriptions of these programs can be found in Chapter 10 of this document.