

## Chapter 15 Natural Resources

### 15.1 Ecological Significance of the French Broad River Basin

The French Broad River basin once had one of the most diverse aquatic faunas in the state; now it is one of the most heavily altered basins in western North Carolina. Flat, low elevation areas such as floodplains and other wetlands have been especially affected. Because of these impacts, many aquatic animals are no longer found in the basin, including several freshwater mussels, such as the oyster mussel, Cumberland mocassinshell, and purple lilliput. Fish likely to be absent from the basin include longhead darter, wounded darter, and spotfin chub. In addition to fish thought to be extirpated, many species of fish have not been seen in more than 20 years, including river carpsucker, lake sturgeon, blueside darter, longear sunfish, mountain madtom, and dusky darter. Despite these impacts, many of the aquatic and wetland communities of the French Broad River basin are nationally significant and a number of significant remnants persist.

### 15.2 Rare Aquatic and Wetland-Dwelling Animal Species

For information on any of the species listed in Table 26, visit the NC Natural Heritage Program website at [www.ncnhp.org](http://www.ncnhp.org).

Table 26 List of Rare Animals Associated with Aquatic and Wetland Habitats in the French Broad River Basin (September 2003)

Scientific Name	Common Name	Major Group	State Status	Federal Status
<i>Cryptobranchus alleganiensis</i>	Hellbender	Amphibian	SC	FSC
<i>Necturus maculosus</i>	Common mudpuppy	Amphibian	SC	
<i>Stygobromus carolinensis</i>	Yancey sideswimmer	Crustacean	SR	FSC
<i>Percina macrocephala</i>	Longhead darter	Fish	SC	FSC
<i>Aplodinotus grunniens</i>	Freshwater drum	Fish	T	
<i>Hiodon tergisus</i>	Mooneye	Fish	SC	
<i>Carpionodes carpio</i>	River carpsucker	Fish	SC	
<i>Percina burtoni</i>	Blotchside darter	Fish	E	
<i>Noturus flavus</i>	Stonecat	Fish	E	
<i>Erimystax insignis</i>	Blotched chub	Fish	SR	FSC
<i>Etheostoma vulneratum</i>	Wounded darter	Fish	SC	
<i>Percina caprodes</i>	Logperch	Fish	T	
<i>Cottus carolinae</i>	Banded sculpin	Fish	T	
<i>Polyodon spathula</i>	Paddlefish	Fish	E	FSC
<i>Acipenser fulvescens</i>	Lake sturgeon	Fish	SC	FSC
<i>Cyprinella monacha</i>	Spotfin chub	Fish	T	T
<i>Etheostoma jessiae</i>	Blueside darter	Fish	SC	
<i>Ichthyomyzon bdellium</i>	Ohio lamprey	Fish	SR	

<i>Lepomis megalotis</i>	Longear sunfish	Fish	SR	
<i>Stizostedion canadense</i>	Sauger	Fish	SR	
<i>Noturus eleutherus</i>	Mountain madtom	Fish	SC	
<i>Luxilus chrysocephalus</i>	Striped shiner	Fish	T	
<i>Percina sciera</i>	Dusky darter	Fish	E	
<i>Percina squamata</i>	Olive darter	Fish	SC	FSC
<i>Etheostoma acuticeps</i>	Sharphead darter	Fish	T	
<i>Lampetra appendix</i>	American brook lamprey	Fish	T	
<i>Matrioptila jeanae</i>	A caddisfly	Insect	SR	
<i>Ephemera berneri</i>	A mayfly	Insect	SR	
<i>Barbaetis benfieldi</i>	Benfield's bearded small minnow mayfly	Insect	SR	
<i>Attaneuria ruralis</i>	A stonefly	Insect	SR	
<i>Macdunnoa brunnea</i>	A mayfly	Insect	SR	
<i>Isoperla frisoni</i>	A stonefly	Insect	SR	
<i>Bolotoperla rossi</i>	A stonefly	Insect	SR	
<i>Micrasema burksi</i>	A caddisfly	Insect	SR	
<i>Drunella longicornis</i>	A mayfly	Insect	SR	
<i>Heterocloeon petersi</i>	A mayfly	Insect	SR	
<i>Micrasema sprulesi</i>	A caddisfly	Insect	SR	
<i>Macromia margarita</i>	Mountain river cruiser	Insect	SR	FSC
<i>Rhyacophila mainensis</i>	A caddisfly	Insect	SR	
<i>Fusconaia subrotunda</i>	Long-solid	Mollusk	SR	
<i>Alasmidonta viridis</i>	Slippershell mussel	Mollusk	E	
<i>Lasmigona holstonia</i>	Tennessee heelsplitter	Mollusk	E	FSC
<i>Lampsilis fasciola</i>	Wavy-rayed lampmussel	Mollusk	SC	
<i>Pleurobema oviforme</i>	Tennessee clubshell	Mollusk	E	FSC
<i>Alasmidonta raveneliana</i>	Appalachian elktoe	Mollusk	E	E
<i>Epioblasma capsaeformis</i>	Oyster mussel	Mollusk	EX	E
<i>Medionidus conradicus</i>	Cumberland mocassinshell	Mollusk	EX	
<i>Toxolasma lividus</i>	Purple lilliput	Mollusk	EX	FSC
<i>Villosa iris</i>	Rainbow	Mollusk	SC	
<i>Hemidactylum scutatum</i>	Four-toed salamander	Amphibian	SC	
<i>Eurycea longicauda</i>	Longtail salamander	Amphibian	SC	
<i>Ambystoma talpoideum</i>	Mole salamander	Amphibian	SC	
<i>Glyptemys (Clemmys) muhlenbergii</i>	Bog turtle	Reptile	T	T(S/A)

**Rare Species Listing Criteria**

- E = Endangered (those species in danger of becoming extinct)  
T = Threatened (considered likely to become endangered within the foreseeable future)  
SR = Significantly Rare (those whose numbers are small and whose populations need monitoring)  
SC = Species of Special Concern  
FSC = Federal Species of Concern (those under consideration for listing under the Federal Endangered Species Act)  
T(S/A) = Threatened due to similarity of appearance  
EX = Extirpated

### 15.3 Significant Natural Heritage Areas in the French Broad River Basin

The North Carolina Natural Heritage Program (NHP) of the Office of Conservation and Community Affairs compiles a list of Significant Natural Heritage Areas as required by the Nature Preserves Act. The list is based on the program's inventory of natural diversity in the state. Natural areas are evaluated based on the number and quality occurrences of rare plant and animal species, rare or high quality natural communities, and special animal habitats. The global and statewide rarity of these elements and their quality at a site is compared with other occurrences to determine a site's significance. Sites included on this list are the best representatives of the natural diversity of the state, and therefore, have priority for protection. Inclusion on the list does not imply that any protection or public access to the site exists.

Sites that directly contribute to the maintenance of water quality in the French Broad River basin are highlighted on the map and in the following text. The NHP has identified more than 180 individual natural areas in the French Broad River basin. Some of the more important sites are discussed below, and the locations of several are shown in Figure 16.

#### *Black and Craggy Mountains*

This extensive region of high mountains includes Mount Mitchell and several other peaks over 6,000 feet. It is one of the largest NHP areas in the basin and contains many rare plant and animal species associated with high elevations. Much of the site is in public ownership, and many of the identified natural areas are contiguous and of high quality. The Craggy Mountains, in particular, include large stands of old-growth forest.

#### *Roan Mountain Massif*

The Roan Mountain Massif is one of the biologically richest areas in the southern Appalachians. The eastern part of the site contains a series of grassy balds that is collectively the largest and best example remaining in the Southern Appalachians. Numerous rare plant and animal species are found in the balds and associated communities, such as high elevation seeps. The western part of the site contains one of the few large remnants of southern Appalachian spruce-fir forest. Also present are numerous high elevation rocky summits, which supports a large number of rare plants. High quality northern hardwood forests, boulderfield forests, beech gaps, and other forest communities are present lower on the slopes.

#### *Nolichucky/Toe/Cane Rivers*

The Nolichucky and its three main tributaries are home to many rare aquatic animals. For example, the wavy-rayed lamp mussel is only found in the Nolichucky and Little Tennessee River watersheds. The Cane River contains several rare animals, most notably, almost the entire North Carolina population of sharphead darter. The South Toe River supports the only extant North Carolina population of the blotchside darter. Several nearby bogs and marshes in the Celina area contain rare plants. The lower stretches of the North Toe and Nolichucky Rivers provide habitat for the olive darter, logperch, and tangerine darter, as well as the federally endangered Appalachian elktoe mussel.

### Great Balsam Mountains/Pisgah Ridge

This area includes sites in the higher parts of the Great Balsam Mountains and Pisgah Ridge. Many high quality, though common, natural communities are found in the area, as well as rarer communities such as bogs and granitic domes. A large number of regional endemic and northern disjunct species are present, along with several globally rare species.

### Southern Appalachian Bogs

This basin contains a number of Southern Appalachian bogs and swamp forest-bog complexes, many of them nationally significant. Examples of these wetlands include: Bat Fork Bog, East Flat Rock Bog Remnant, Franklin Bog, King Creek Bog, McClures Bog, Sevenmile Ridge Swamp Forest-Bog Complex, and Sugar Mountain Natural Area. Before the Hendersonville area was extensively developed, this area was probably the largest expanse of mountain wetlands in North Carolina. Although most of the remaining sites are now just remnants, very significant wetlands still exist at Buck Forest and Pink Beds. Many of the rare, federally listed plants in the French Broad River basin are associated with these wetlands.

### Buck Forest

Much of Buck Forest is protected by DuPont State Forest. Buck Forest includes a large collection of rare natural communities. Significant features include Southern Appalachian bogs, swamp forest-bog complexes, and several swamp pink populations. Many of the rare plants in Buck Forest are associated with the wetland communities.

### Pigeon River Gorge

The Pigeon River Gorge contains a number of rare species. Here, cove forests support a population of the globally imperiled pirate bush and the mock orange and yellowwood. This area was heavily impacted by construction of Interstate 40 through the length of the gorge.

### Hot Springs Window

The French Broad River flows through the Hot Springs Window, a geologic "window" through which two rock types unusual for the state, dolomites and mudstones, are exposed. Associated with the unusual rock types are many plants and natural communities rare in North Carolina.

## **15.4 Significant Aquatic Habitats in French Broad River Basin**

The NHP also collaborates with other agencies and organizations to identify Significant Aquatic Habitats in North Carolina. They are stream segments or other bodies of water that contain significant natural resources, such as a high diversity of rare aquatic animal species. The impact from lands adjacent to and upstream of these reaches determines their water quality and the viability of their aquatic species. The identification of a natural area conveys no protection; these lands are the responsibility of the landowner. The Significant Aquatic Habitats of the French Broad River basin include the following; several of which are shown on Figure 16.

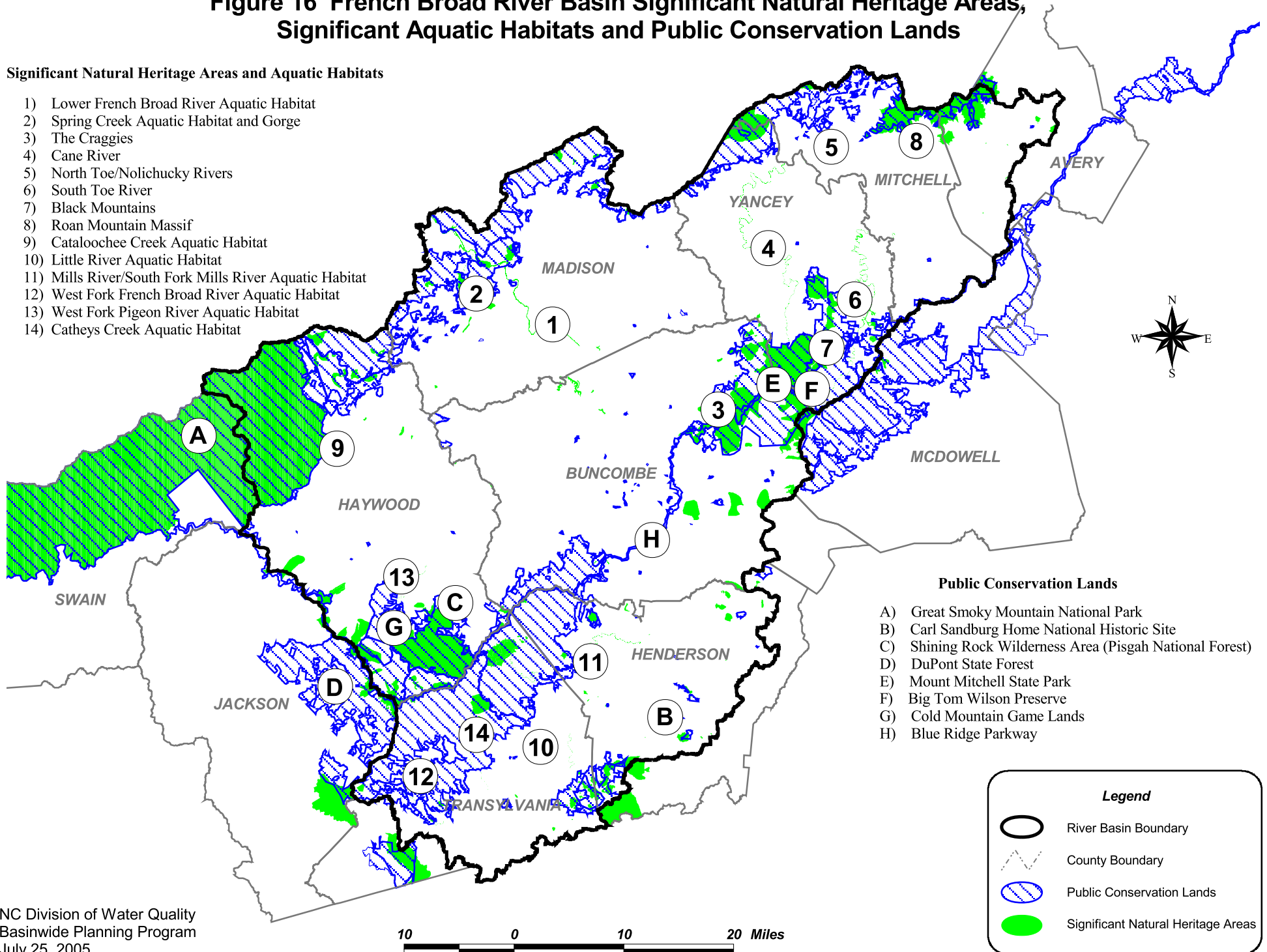
### South Toe River Aquatic Habitat

The state significant South Toe River drains the east slopes of the Black Mountains and west slopes of the Blue Ridge. Rare animals found include: Appalachian elktoe; blotchside darter; olive darter; hellbender; and two caddisflies. This is the location for the only extant blotchside darter population known in North Carolina.

**Figure 16 French Broad River Basin Significant Natural Heritage Areas, Significant Aquatic Habitats and Public Conservation Lands**

**Significant Natural Heritage Areas and Aquatic Habitats**

- 1) Lower French Broad River Aquatic Habitat
- 2) Spring Creek Aquatic Habitat and Gorge
- 3) The Craggies
- 4) Cane River
- 5) North Toe/Nolichucky Rivers
- 6) South Toe River
- 7) Black Mountains
- 8) Roan Mountain Massif
- 9) Cataloochee Creek Aquatic Habitat
- 10) Little River Aquatic Habitat
- 11) Mills River/South Fork Mills River Aquatic Habitat
- 12) West Fork French Broad River Aquatic Habitat
- 13) West Fork Pigeon River Aquatic Habitat
- 14) Catheys Creek Aquatic Habitat



**Public Conservation Lands**

- A) Great Smoky Mountain National Park
- B) Carl Sandburg Home National Historic Site
- C) Shining Rock Wilderness Area (Pisgah National Forest)
- D) DuPont State Forest
- E) Mount Mitchell State Park
- F) Big Tom Wilson Preserve
- G) Cold Mountain Game Lands
- H) Blue Ridge Parkway

**Legend**

- River Basin Boundary
- County Boundary
- Public Conservation Lands
- Significant Natural Heritage Areas

#### North Toe River/Nolichucky River Aquatic Habitat

This segment of the river is nationally significant, providing habitat for several rare fish including: the sharphead darter, olive darter, blotched chub, logperch; and two mussels, the Appalachian elktoe and wavy-rayed lampmussel.

#### Cane River Aquatic Habitat

This state significant river contains several rare fish, most notably essentially the entire North Carolina population of sharphead darter. Other rare fish found here are striped shiner, blotched chub, stonecat, and olive darter. The hellbender has also been found in the Cane River, as well as Appalachian elktoe.

#### Cataloochee Creek Aquatic Habitat and Catheys Creek Aquatic Habitat

These habitat areas are regionally significant waterways, important for their assemblages of rare stream insects. Cataloochee Creek is in the Great Smoky Mountains National Park, while Catheys Creek is in Transylvania County.

#### Little River Aquatic Habitat

Little River Aquatic Habitat in Transylvania County is significant because the area supports a population of the federally endangered Appalachian elktoe mussel. The Little River is also one of only two sites in the state for Tennessee clubshell, which is also federally endangered. The rare mountain river cruiser (a dragonfly species) is also known from this river.

#### Mills River/South Fork Mills River Aquatic Habitat

This state significant site provides habitat for a number of rare aquatic animals, fish, mollusks and insects including: the hellbender; the blotched chub and blueside darter; and the Appalachian elktoe, slippershell mussel, and Tennessee heelsplitter. This site supports the only known population of the Tennessee heelsplitter in the state. An aquatic amphibian, the mudpuppy, was reported in this site in 1950s, but has not been seen recently. Its current status is unknown.

#### West Fork French Broad River Aquatic Habitat

This state significant river segment provides habitat for a number of rare aquatic species including hellbenders, two stoneflies, and two caddisflies.

#### West Fork Pigeon River Aquatic Habitat

This state significant site contains a good population of the federally endangered Appalachian elktoe mussel, as well as hellbenders.

#### Spring Creek Aquatic Habitat

The state significant Spring Creek and its tributaries drain most of western Madison County before emptying into the French Broad River at Hot Springs. A number of rare fish species are known in this creek, including the American brook lamprey, Ohio lamprey, banded sculpin, spotfin chub, wounded darter, logperch, dusky darter, olive darter, and freshwater drum. Several are now extirpated from Spring Creek, and many are found nowhere else in North Carolina.

#### Lower French Broad River Aquatic Habitat

This regionally significant site extends from the confluence of Ivy Creek downstream to the Tennessee border. Historically, it provided habitat for a variety of aquatic animals, including

hellbenders, banded sculpin, lake sturgeon, paddlefish (last observed 1983), mooneye, river carpsucker, mountain madtom, logperch, olive darter, sauger, freshwater drum (last observed 1987), loggerhead musk turtle, and eastern spiny softshell. As part of the Tennessee Valley river system, the French Broad provides habitat for numerous fish species found in no other river systems in North Carolina. Some of these fish have been extirpated (e.g., native muskellunge, longhead darter, lake sturgeon, Tennessee snubnose darter, and mountain madtom).

## **15.5 Public Conservation Lands**

Figure 16 also shows public conservation lands within the French Broad River basin. The basin contains significant public lands, both in terms of area and ecological value. The National Park Service manages Great Smoky Mountains National Park and the Blue Ridge Parkway, both of which have substantial acreage in the French Broad River basin. The Carl Sandburg Home National Historic Site accounts for another 271 acres of National Park Service land in the French Broad River basin. The US Forest Service oversees the Pisgah National Forest, which include the 7,500-acre Middle Prong and 18,600-acre Shining Rock Wilderness Areas.

State-owned lands include the Division of Forest Resources' 10,200-acre DuPont State Forest, an area very popular with naturalists and recreational users. The Division of Parks and Recreation manages the 1,575-acre Mount Mitchell State Park, and the Wildlife Resources Commission manages the 3,307-acre Cold Mountain Game Land. Two other state agencies, the Department of Transportation and the Department of Agriculture, have been working to preserve wetlands in the basin, such as Southern Appalachian bogs. The Department of Agriculture owns portions of Bat Fork Bog and Ochlawaha Bog, while DOT has been working on Franklin Bog, Mud Creek and many other sites. Mountain wetlands are often small, so it is significant that between these two agencies, more than 200 acres have been permanently protected.

Key partners in future protection efforts will be private, nonprofit land trusts, such as the Southern Appalachian Highlands Conservancy, the Carolina Mountain Land Conservancy, and the Nature Conservancy. Although not shown on the map, these organizations have protected significant areas in the French Broad River basin. Using innovative tools such as conservation easements, these organizations work with landowners in a number of ways to protect important natural areas and the "open space" of agricultural lands.

A prime example of the use of conservation easements is the Asheville Watershed Easement, where the Conservation Trust for North Carolina helped the city protect its water supply in perpetuity. Not too long ago, the American Farmland Trust helped protect the Big Tom Wilson Preserve, an area of 8,517 acres encompassing the upper part of the Cane River watershed. Land trusts also purchase and hold land as preserves. The Nature Conservancy owns and manages much of McClure's Bog, and the Carolina Mountain Lands Conservancy owns and manages part of the Ochlawaha Bog. In 2002, the Southern Appalachian Highlands Conservancy, with help from the CWMTF, protected important riparian areas along Rough Creek and other tributary streams that are part of the Canton watershed. The work that these private organizations do is helping to improve quality of life for residents of the French Broad River basin. Conservation organizations will continue to work with landowners in a number of ways to protect important natural areas, as well as the "open space" of the mountains.