



# Strategic Master Plan for the French Broad River Blueway

*Transylvania County, North Carolina  
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Jennings  
Environmental

# Executive Summary

The French Broad River (French Broad) flows for approximately 34 miles within Transylvania County, from its origin at the confluence of the North and West Forks of the French Broad River to the Henderson County line. This portion of the river, as well as nearby lands, are well-known as outdoor recreation destinations. This report builds on previous studies to serve as a strategic master plan for further development of the French Broad River Blueway within Transylvania County. The French Broad Blueway Strategic Master Plan was funded by the Transylvania County Tourism Development Authority.

In collaboration with Transylvania County, Conserving Carolina, and other partners and stakeholders, the following tasks have been completed, and are documented herein:

- Inventory and assess all existing river access sites
- Investigate and record opportunities for improvements and additions at existing river access sites
- Investigate and record opportunities for additional river access sites and parks
- Improve and create additional mapping resources for users and managers
- Organize and document all work and results in a report; including maps, data, photographs, and commentary
- Coordinate with regional non-profit organizations, government agencies, local businesses, planning contractors, and the community

# Recommendations

The recommendations included in this report represent a combination of prior planning efforts, community and partner input, and professional judgment of the project team. Below are lists of priority recommended actions that are described within this report. These lists are not intended to be exhaustive, but represent the highest-priority actions that can be taken to further develop the French Broad River Blueway in Transylvania County. Successful implementation of these recommendations will require coordinated planning and management under the direction of a designated leader and/or task force with input from stakeholders.



### ***Recommended Short-term Actions***

- Develop a branding and marketing plan, including an official Blueway name, logo, and printed/online materials.
- Design and install consistent signs along the river, within access areas, and along roads near access areas. Work with NCDOT to install signs on highway bridges.
- At all seven public access sites on the French Broad, evaluate sign and kiosk content for accuracy, readability, and consistency with other printed/online materials.
- Add all access sites and parks to online mapping programs (e.g., Google Maps).
- Work with NCDOT to ensure that the upcoming Wilson Road construction project includes a re-designed river access site with an expanded parking lot and updated boat ramp and fishing pier. As part of this redesign, construct a greenway path from the Wilson Road access to Pisgah Forest, where it would connect to the Ecusta Trail and Brevard Greenway.
- Evaluate the current lease at the Island Ford access. Investigate the potential to purchase the existing site plus additional property to allow for proposed improvements.

### ***Recommended Medium-term Actions***

- Develop a new river access site at property acquired by Conserving Carolina midway between Island Ford and Hap Simpson Park.
- Install covered kiosks at Lyons Mountain, Wilson Road, and Blantyre.
- At all seven public access sites on the French Broad, install bike/boat racks, additional picnic tables, and trash receptacles.
- As needed, stabilize eroding streambanks at all French Broad access sites with native vegetation.
- Create a new print map (with a PDF version available online) that displays Transylvania County's sections of the French Broad River and tributaries.
- Create and promote a central location (e.g., website, social media, phone app) for reporting and viewing of river blockages.
- Aggregate river flow information on a website, social media, and/or phone app and post suggested river levels for each river section to aid in trip planning.

### ***Recommended Long-term Actions***

- Develop a new river access site in the vicinity of the Everett Road bridge near Pisgah Forest.
- Install restroom facilities at Champion Park, Island Ford, Hap Simpson Park, Penrose, and Blantyre.
- Expand parking areas at Lyons Mountain and Island Ford to allow for additional parking capacity and improved access for boat trailers.
- Install new boat access (e.g., concrete ramp, floating dock, hardened stairs) at Lyons Mountain, Island Ford, Hap Simpson Park, and Blantyre.
- Install covered pavilions at Island Ford and Hap Simpson Park.
- Work with NCDOT to re-design pull-off parking areas along NC Highway 215 and East Fork Road to promote safety and increase parking capacity.
- At Champion Park, connect the upper parking lot with the river access area to increase parking capacity.
- At Champion Park, daylight and restore the small stream within the access area.
- Implement priority recommendations for riverbank stabilization/restoration projects from the upcoming Upper French Broad Watershed Restoration Plan (conducted by Conserving Carolina).

### ***Recommended Ongoing Actions***

- Identify an entity (public or private) to coordinate the planning and management of the Blueway, including debris removal, access site maintenance, and proposed improvements.
- Continue to maintain existing river access sites with regard to security, sediment/debris removal, and trash removal.
- Continue/increase funding to those organizations that identify and remove river debris.
- Update funding and maintenance plans as additional amenities and access sites are developed.
- Pursue grant opportunities, as appropriate, for upcoming planning, design, and construction work.

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## I. Introduction

The French Broad River (French Broad) flows for approximately 34 miles within Transylvania County, from its origin at the confluence of the North and West Forks of the French Broad River to the Henderson County line. This portion of the river, as well as nearby lands, are well-known as outdoor recreation destinations. Previous studies regarding the French Broad River have provided preliminary analyses of the assets, opportunities, and challenges associated with increased recreational development of the French Broad River. Additionally, these studies made recommendations regarding projects that could improve and enhance usage of the French Broad River in Transylvania County.

Transylvania County and Conserving Carolina contracted with Jennings Environmental, PLLC to build on the existing studies and produce a strategic master plan for the French Broad River Blueway within Transylvania County (Blueway Plan). The Blueway Plan, presented herein, provides a detailed, action-oriented document that can guide Transylvania County, Conserving Carolina, and partners in taking priority steps to improve river access and user recreational experiences. The project team worked in collaboration with the clients, partner organizations, and other stakeholders to inventory and assess existing river access sites and document opportunities for improvements. Specific tasks that have been completed include:

- Inventory and assess all existing river access sites
- Investigate and record opportunities for improvements and additions at existing river access sites
- Investigate and record opportunities for additional river access sites and parks
- Improve and create additional mapping resources for users and managers
- Organize and document all work and results in a report; including maps, data, photographs, and commentary
- Coordinate with regional non-profit organizations, government agencies, local businesses, planning contractors, and the community

Previous studies are documented in two reports, from 2011 and 2019. These reports, summarized below, contain extensive resources that remain relevant. This Blueway Plan does not attempt to replicate information contained in those reports; however, they can serve as reference materials for infrastructure improvements, wayfinding, branding/marketing, and other topics.

#### ***French Broad River Paddle Trail Report (2011)***

The 2011 report, titled “French Broad River Paddle Trail,” was produced by Scott Ogletree, a graduate student in the Master of Landscape Architecture program at Clemson University. The report summarizes river characteristics and access areas from Transylvania County downstream to the Tennessee state line. Example conceptual design information is provided for two access sites in Buncombe County.

#### ***French Broad River Access Study (2019)***

In 2019, NCGrowth (a division of the Kenan-Flagler Business School at the University of North Carolina) produced a report titled “French Broad River Access Study.” This report focuses on the French Broad River within Transylvania County, and offers general guidance related to a number of topics, including access improvements, marketing, and funding. An extensive list of resources and case studies of other paddle trails are included.



## II. River Access Site Inventory

The project team visited all known access areas along the French Broad River in Transylvania County, as well as along potentially navigable tributaries (i.e., Davidson River plus the North, West, and East Forks of the French Broad River). While the scope of this study does focus on the mainstem of the French Broad River, from Rosman to Blantyre, these tributaries are included for a more complete representation of paddling resources in Transylvania County. All sites were inventoried for the presence/absence of amenities such as parking, boat ramps, restrooms, picnic areas, and signs. Appendix A (Sheets A1 through A6) contains maps that show the locations of these access areas. Additionally, an online map was created with similar information, and can be updated as a living document as future improvements are made. The online map is available for viewing at:

<https://riverlink.maps.arcgis.com/apps/mapviewer/index.html?webmap=ae5c481b-c6f84516bb8f5083fe9f740f>

## A. FRENCH BROAD RIVER TRIBUTARIES

The East Fork French Broad River (East Fork) flows from near the South Carolina state line to its confluence with the French Broad River downstream of Rosman. The river flows through forested and agricultural areas, with little to no federal or state-protected lands along the river. East Fork Road generally parallels the river for much of its course, and provides the two known river access sites (summarized in Table 1). Both access sites are small gravel pull-offs and predominantly used for fishing access, with little to no paddling occurring in this tributary.

Table 1. East Fork French Broad River Access Sites

Name	Access Type	Parking Type/Capacity	Primary Uses
East Fork Road Access #1	Carry-in, narrow path	Gravel pull-off, 8-10 cars	Fishing
East Fork Road Access #2	Carry-in, narrow path	Gravel pull-off, 4-6 cars	Fishing

The West Fork French Broad River (West Fork) flows through a generally forested corridor, and meets the North Fork French Broad River at Headwaters Outfitters to form the mainstem of the French Broad River. Three known access sites exist (summarized in Table 2): two adjacent sites along Silversteen Road, which parallels much of the river, and one at Woodruff Road near US Highway 64. The upper two access sites, both small gravel pull-offs, are primarily used for access for fishing and whitewater paddling. The lower site, a small, privately-owned gravel lot, is generally used as a whitewater paddling take-out, but could also serve as a put-in for a paddling trip onto the mainstem of the French Broad River.

Table 2. West Fork French Broad River Access Sites

Name	Access Type	Parking Type/Capacity	Primary Uses
Silversteen Road (roadside)	Carry-in, steep path	Gravel pull-off, 4-5 cars	Fishing
Silversteen Road (bridge)	Carry-in, steep path	Gravel pull-off, 3-4 cars	Fishing, Whitewater paddling (put-in only)
Woodruff Road	Carry-in, path	Gravel lot, 4-5 cars	Paddling



The North Fork French Broad River (North Fork) flows through Pisgah National Forest, and contains sections that are popular with whitewater paddlers. The river generally parallels NC Highway 215, which has four small gravel access sites located along it (summarized in Table 3). All four are primarily used for whitewater paddling access, though the lowest (Alligator Rock) sees additional recreational use for fishing and swimming.

Table 3. North Fork French Broad River Access Sites

Name	Access Type	Parking Type/Capacity	Primary Uses
Old Wagon Road/ Macedonia Church Road	Carry-in, overgrown path	Gravel lot, 6-8 cars	Paddling (put-in only)
NC Highway 215 Paddlers' Put-In Trail	Carry-in, steep trail	Gravel pull-off, 3-4 cars	Whitewater paddling (put-in only)
NC Highway 215 Submarine Trail	Carry-in, steep path	Gravel pull-off, 6-8 cars	Whitewater paddling
NC Highway 215 Alligator Rock	Carry-in, short path	Gravel pull-off, 4-8 cars	Swimming, Fishing, Paddling

Like the North Fork, the Davidson River flows through the protected lands of Pisgah National Forest. The Davidson River meets the mainstem of the French Broad River in Pisgah Forest (and just downstream of the Wilson Road access site for the French Broad River). The Davidson River parallels US Highway 276 and Fish Hatchery Road, which allows for five access sites (summarized in Table 4), generally with large parking areas at established recreation locations. All sites are used for fishing and swimming access; the upper two provide access for whitewater paddling, while the lower three provide access for tubing.

Table 4. Davidson River Access Sites

Name	Access Type	Parking Type/Capacity	Primary Uses
Whale's Back Fall	Carry-in, short trail	Paved lot, 4-6 cars, gravel pull-off nearby	Swimming, Fishing, Paddling (put-in only)
Pisgah Center for Wildlife Education	Carry-in, short trails with stairs	Paved lot, 40 cars	Fishing, Whitewater paddling
Coontree Picnic Area	Carry-in, paved trail	Paved lot, 5-10 cars	Swimming, Fishing, Tubing
Art Loeb Trailhead	Carry-in, short trails with stairs	Paved lot, 10-15 cars	Fishing, Tubing
Sycamore Flats Recreation Area	Carry-in with wood/stone steps	Several small areas, 5-10 cars each	Swimming, Fishing, Tubing

## B. FRENCH BROAD RIVER MAINSTEM

The French Broad River within Transylvania County flows from Headwaters Outfitters (mile 0.0) to the Henderson County line at the Blantyre access (mile 34.0). This reach includes eight established access points. (Note: The Blantyre access is located just inside Henderson County, but is included in this report since it commonly serves as a take-out for paddling trips that originate in Transylvania County.) The eight sites are not equally spaced: the first three are approximately 1 mile apart, followed by two sections of approximately 9 miles, then three sections that are generally 3-5 miles apart. All sites are publically-owned, with the exception of the access at Headwaters Outfitters. The public entities that own and manage the sites include: North Carolina Department of Transportation, Town of Rosman, City of Brevard, Transylvania County Parks and Recreation Department, North Carolina Wildlife Resources Commission, and the Henderson County Parks and Recreation Department. Table 5 summarizes features of these eight sites, with additional information provided on the maps in Appendix A (Sheets A7 through A14).



Table 5. French Broad River Access Sites

Name	River Mile	Access Type	Parking Type/ Capacity	Other Amenities
Headwaters Outfitters	0.0	Carry-in, rock steps (private property)	Paved and gravel lots, 20-25 cars	Restrooms, signs, picnic tables
Champion Park	1.2	Carry-in, grassed area	Paved lot, 10-15 cars, more lots nearby	Restrooms, signs, picnic tables, covered pavilions
Lyons Mountain	2.2	Carry-in, dirt path and steps	Gravel pull-off, 4-8 cars	None
Island Ford	11.0	Carry-in, concrete steps	Gravel lot, 25-30 cars	Signs
Hap Simpson Park	20.5	Concrete ramp, vehicle accessible	Paved lot, 20-25 cars	Signs, paved footpaths, picnic areas, fishing pier
Wilson Road	25.4	Concrete ramp, vehicle accessible,	Gravel lot, 10 cars	Signs
Penrose	30.8	Concrete ramp, vehicle accessible, floating dock	Gravel lot, 20-25 cars	Signs
Blantyre	34.0	Carry-in, boat slide	Gravel lot, 15 cars	Signs

## C. CAMPING

Three paddle-in campsites, summarized below, are located along the French Broad River in Transylvania County. Two of these (Riverbend and Little River) are part of a larger network of campsites branded as the “French Broad River Paddle Trail.” The Paddle Trail sites are co-administered by the non-profit organizations MountainTrue and RiverLink.

- Headwaters Outfitters Campsite (mile 8.8) is privately owned, and can be reserved through Headwaters Outfitters. The campsite contains six group campsites, picnic tables, fire rings, and a port-a-john.
- Riverbend Campsite (mile 24.5) contains multiple campsites, picnic tables, a fire ring, a composting toilet, and stairs to access the river. Reservations can be made through [www.frenchbroadpaddle.com](http://www.frenchbroadpaddle.com), and require a fee of \$10 per person.
- Little River Campsite (mile 30.3) is located at the confluence of the Little River and French Broad River. The site includes a large group campsite, a picnic table, fire ring, port-a-john, and rock steps for river access. Reservations can be made through [www.frenchbroadpaddle.com](http://www.frenchbroadpaddle.com), and require a fee of \$10 per person.





### III. Recommended Actions

## A. GENERAL RECOMMENDATIONS

### *Branding and Marketing*

An overarching branding endeavor for the recreational opportunities along the French Broad River and its tributaries within Transylvania County should be considered, to form one comprehensive Blueway system. A name should be developed that highlights the French Broad River and its context within the region. Consistent marketing materials including the name, a logo, and relevant information should be developed. Resources and templates for this do exist, and are included within Section V and Appendix B of this report, as well as the previous French Broad River Blueway reports.

For Transylvania County's Blueway to stand out from existing branding of the French Broad River, the term "paddle trail" may need to be avoided, as there is already a "French Broad Paddle Trail," managed by MountainTrue and RiverLink. This existing paddle trail covers the French Broad River from Rosman to Douglas Lake in Tennessee, and includes information on river sections, access sites, paddle-in campsites, and other amenities.

An opportunity exists to amplify and showcase the Transylvania County section of the river under marketing/branding hosted by Transylvania County Tourism's Explore Brevard brand. There could be a website or sub-section of the Explore Brevard website devoted to the Blueway itself, with branding matching that of other outreach information, while still independent enough to be recognized separately. This website could have the Blueway name, logo, narrative information, interactive maps, and information about river access sites. Additionally, the full range of recreational opportunities on or near the river could be highlighted, including: kayaking, canoeing, stand-up paddle boarding, tubing, fishing, hiking, and cycling. The website could also provide information on services and contacts for local and regional outfitters.

### *Signs and Wayfinding*

Users would benefit from a comprehensive effort to install consistent signs along the river, within access areas, and along roads near access areas. All signs could include some amount of branding, such as the name and logo of the Blueway. Templates and examples of such signs do exist, as aforementioned for the branding and marketing resources.

Signs on the upstream-facing side of each bridge and in advance of each access area would be very helpful for wayfinding while paddling. These signs should be prominent, simple, and could include the name of the road, name of the corresponding access area (if applicable), distance to next access area, and notification of any upcoming hazards (if applicable). Installation of these signs would likely require collaboration with the North Carolina Department of Transportation. Additionally, many partners have suggested in-river signs posted every mile to denote the river mile at those locations. While this is a viable idea, consideration would need to be given to sign maintenance, landowner preferences, and compatibility with the natural resource.

Within access areas, information posted at kiosks should be evaluated for accuracy, readability, and consistency with other printed/online materials. While this could be done piecemeal, it would ideally require a comprehensive effort to re-design most of the existing signs.

Wayfinding efforts along nearby roads and within nearby communities could help direct pedestrians, cyclists, and drivers to the parks and river access areas. Additionally, as people leave river access areas, new signs could help direct them toward community amenities (e.g., local businesses, restaurants, breweries, etc.).

### *Maps and Technology*

Both users and managers would benefit from new and improved mapping and online resources. The following have been suggested as potential improvements:

- Add all access sites and parks to online mapping programs (e.g., Google Maps), which will ensure that visitors are aware of their existence, and can navigate to them.
- Aggregate river flow information on a website, social media, and/or phone app and post suggested river levels for each river section to aid in trip planning.
- Allow for real-time incident and blockage reporting and viewing on a website, social media, and/or phone app.
- Create a new print map (with a PDF version available online) that displays Transylvania County's sections of the French Broad River and tributaries. The map could provide details on access areas, nearby trails/greenways, cycling routes, outfitters, etc. A folded version of this map could be offered at area businesses and outfitters, while a flat print could replace the existing maps at access site kiosks. While similar maps have been produced by RiverLink and MountainTrue, a new map could specifically focus on Transylvania County and highlight local recreational and commercial activities.

## A. GENERAL RECOMMENDATIONS, CONTINUED

### *Maintenance*

With multiple municipal and state agencies owning and managing the river access sites, communication about maintenance is very important. Common maintenance concerns include debris removal after flood events (including sediment removal from boat ramps and access stairs), trash removal, and site security. Maintenance plans should be updated as additional amenities (e.g., restroom facilities, additional trash receptacles) are introduced to the access sites.

Additionally, removal of in-river garbage and debris jams/blockages is a major concern of many partners/stakeholders. A successful blueway will include protocols and procedures to remove these, while understanding the important ecological and habitat functions that are provided by woody material within a river. Specific suggestions related to debris removal include:

- Continue/increase funding to those organizations that identify and remove river debris.
- As needed, address potential liability concerns for landowners and organizations that remove debris.
- Adopt a standardized set of protocols for woody debris identification, reporting, and removal. The “Clean and Open” method, used on many rivers in Michigan, is an example of a procedure to remove woody debris.  
[www.hrwc.org/wp-content/uploads/2013/03/Clean-and-Open-Method.pdf](http://www.hrwc.org/wp-content/uploads/2013/03/Clean-and-Open-Method.pdf)
- Create a central location (e.g., website, social media, and/or phone app) for reporting and viewing of river blockages.

### *Riverbank Erosion and Water Quality*

Agricultural uses cover much of the land near or adjacent to the French Broad River and its tributaries in Transylvania County. Common water pollution sources in these areas include soil erosion from fields and livestock in or adjacent to stream channels, which result in increased sediment, nutrients, and bacteria in receiving water bodies. These types of pollution can directly affect the ecology of the French Broad River, as well as its desirability for recreational uses. For these reasons, an overview of opportunities for riverbank stabilization/restoration are included in this Blueway Plan. Appendix D contains photos of representative riverbank erosion locations throughout Transylvania County, as well as a map identifying priority parcels for riverbank stabilization/restoration. Appendix E contains design details for typical riverbank stabilization/restoration practices. A parallel water quality improvement study for the Upper French Broad River watershed (conducted by Conserving Carolina) will result in the prioritization and preliminary design of selected stabilization and restoration projects in Transylvania and Henderson Counties.

### *Connectivity*

Many users and partners/stakeholders realize the great potential for connectivity between the French Broad River access sites and other recreational activities within Transylvania County. Specifically, this includes connectivity to existing cycling routes and trails such as the Brevard Greenway and future Ecusta Trail. Opportunities for these connections exist at the Wilson Road access, a future Everett Road access, Hap Simpson, Penrose, and Blantyre. General recommendations include ensuring that improvements to river access sites include parking and amenities for multiple types of recreational users (as appropriate) and considering road and trail connectivity between river access sites and pedestrian/biking trails.



## B. ACCESS SITE RECOMMENDATIONS

The project team has identified opportunities for improvements and additions that would increase safety, enhance user experiences, and expand access in ways that would economically benefit Transylvania County and its communities. Many of these potential opportunities have originated from previous reports and input from partners/stakeholders. Recommended actions for the eight French Broad River access sites are listed below and on the maps within Appendix A (sheets A7 through A14). Conceptual designs for selected improvements are under development by the National Park Service – Rivers, Trails & Conservation Assistance Program.

Most of the sites used to access the French Broad River tributaries are not in need of improvements. However, some of the existing pull-off parking areas could be re-designed for improved safety and parking capacity. These include the two pull-offs along East Fork Road (to access the East Fork) and the three pull-offs along NC Highway 215 (to access the North Fork). Improvements to these parking areas would require collaboration with the North Carolina Department of Transportation.

### ***Headwaters Outfitters (Private)***

This site is private property, with permission needed for access and parking. As such, no improvements are recommended for this river access.

### ***Champion Park (Town of Rosman, Transylvania County Parks and Recreation)***

- Connect upper parking lot with the river access area to increase parking capacity
- Daylight and restore the small stream within access area
- Install restroom facilities
- Install bike/boat racks, picnic tables (near river), and trash receptacles
- Evaluate kiosk content for accuracy, readability, and consistency with other printed/online materials
- As needed, stabilize eroding streambanks with native riparian vegetation

### ***Lyons Mountain (NCDOT)***

- Expand access area in current location and/or at NCDOT-owned property across the river
- Install wide, hardened stairs and/or concrete boat ramp and floating dock for enhanced boat and trailer access
- Install bike/boat racks, picnic tables, and trash receptacles
- Install covered kiosk and evaluate content for accuracy, readability, and consistency with other printed/online materials
- As needed, stabilize eroding streambanks with native riparian vegetation

### ***Island Ford (Transylvania County Parks and Recreation)***

- Evaluate the current lease at the Island Ford access. Investigate the potential to purchase the existing site plus additional property to allow for proposed improvements.
- Expand access area to allow for more parking, trailers, and increased amenities
- Install concrete boat ramp and floating dock for enhanced boat and trailer access
- Install restroom facilities
- Install bike/boat racks, picnic tables, trash receptacles, and small covered pavilion
- Evaluate kiosk content for accuracy, readability, and consistency with other printed/online materials
- As needed, stabilize eroding streambanks with native riparian vegetation

### ***Hap Simpson Park (City of Brevard)***

- Install floating dock with ADA accessibility
- Install restroom facilities and large covered pavilion
- Install bike/boat racks, additional picnic tables, and trash receptacles
- Evaluate kiosk content for accuracy, readability, and consistency with other printed/online materials
- As needed, stabilize eroding streambanks with native riparian vegetation

## B. ACCESS SITE RECOMMENDATIONS, CONTINUED

### ***Wilson Road (City of Brevard, Transylvania County Parks and Recreation, NCDOT)***

Wilson Road is scheduled to be realigned, with a new bridge to be constructed. River access improvements should be part of the road construction project, and could include:

- Expanded parking lot
- Improved and updated boat ramp and fishing pier
- Covered kiosk with content evaluated for accuracy, readability, and consistency with other printed/online materials
- Overhead lighting, bike/boat racks, picnic tables, and trash receptacles
- As needed, stabilize eroding streambanks with native riparian vegetation

### ***Penrose (North Carolina Wildlife Resources Commission)***

- Add parking/staging area for cyclists, with cycling amenities and paved path extending out of parking lot
- Install restroom facilities
- Install bike/boat racks, additional picnic tables, and trash receptacles
- Evaluate kiosk content for accuracy, readability, and consistency with other printed/online materials
- As needed, stabilize eroding streambanks with native riparian vegetation

### ***Blantyre (Henderson County Parks and Recreation, North Carolina Wildlife Resources Commission)***

- Replace boat slide with concrete boat ramp for trailer access
- Install floating dock for canoe/kayak and fishing access
- Install restroom facilities
- Install bike/boat racks, additional picnic tables, and trash receptacles
- Replace sign with covered kiosk
- Evaluate kiosk content for accuracy, readability, and consistency with other printed/online materials
- As needed, stabilize eroding streambanks with native riparian vegetation

## C. POTENTIAL FUTURE ACCESS SITES

Distances between river access points were evaluated with respect to possibilities of creating additional river access points in areas of need. The spacing of existing access sites within Transylvania County is conducive to a variety of paddling trip lengths, including many options for trips between 1 and 6 miles. However, larger gaps do exist between Lyons Mountain and Island Ford (8.8 miles) and Island Ford and Hap Simpson Park (9.5 miles). The first gap includes the Headwater Outfitters campsite, so no additional access is recommended in that area. However, the latter section could benefit from an additional access site. Conserving Carolina is in the process of acquiring a new access site, approximately midway between Island Ford and Hap Simpson Park. Additionally, a new access site is recommended in the vicinity of the Everett Road bridge near Pisgah Forest. The timing and scope of this access site should take into account any improvement plans at the nearby Wilson Road access. The planning process for any new sites should include consideration of funding, ownership, and maintenance of the sites.







## IV. Community and Stakeholder Input

## SURVEYS

The previous French Broad Paddle Trail reports do not appear to include survey results specific to the French Broad River. However, the 2019 report does reference the 2008 North Carolina Paddle Trail Study ([www.yumpu.com/en/document/view/50027477/2008-paddle-tourism-study-north-carolina-state-parks](http://www.yumpu.com/en/document/view/50027477/2008-paddle-tourism-study-north-carolina-state-parks)), which was performed by the Department of Parks, Recreation, and Tourism at North Carolina State University for the North Carolina State Trails Program. The report includes results of a 26 question survey that was completed by over 2,000 respondents. Key results that are relevant to this Blueway Plan include:

- Of 14 potential concerns while on a paddling trip, the top three were:
  - o “Quality and safety of access sites” (73% of respondents often concerned)
  - o “Adequate water level” (71% of respondents often concerned)
  - o “Safety of my personal vehicle” (53% of respondents often concerned)
- Of 20 potential enjoyable elements of a paddling trip, the top three were:
  - o “Want to see wildlife” (91% of respondents often enjoy)
  - o “Like being away from the city” (87% of respondents often enjoy)
  - o “Want to see birds” (82% of respondents often enjoy)
- The top three recreational activities enjoyed by paddlers (other than paddling) were: hiking (82%), camping (73%), and walking/running (71%). Fishing was chosen by 47% of respondents.
- The average economic impact of local paddling trips (i.e., less than 50 miles from home) was \$144 per party; the average economic impact of non-local paddling trips (i.e., greater than 50 miles from home) was \$504 per party. For both groups, the largest expenditures were travel and food. Other expenses included lodging, gear, guide fees, shopping, and entertainment.

Additionally, a 2012 survey was conducted of private landowners along the French Broad River in Transylvania County. Results from the 90 responses include:

- Approximately half of respondents use the French Broad for fishing and/or paddling, with 80% agreeing that the river is important or very important for both agriculture and tourism.
- 94% agreed that pro-active management of log/debris jams would save money and soil. Over 80% of respondents believed that governments and/or camps/recreation businesses should share responsibility for removing jams.

As a part of this Blueway Plan, an effort was made to better understand use of the river by local residents. Attendees at the 2021 Rosman Riverfest were asked to complete a five question survey, with 38 people responding. Results are summarized in Figures 1 through 5, as well as within Appendix C.

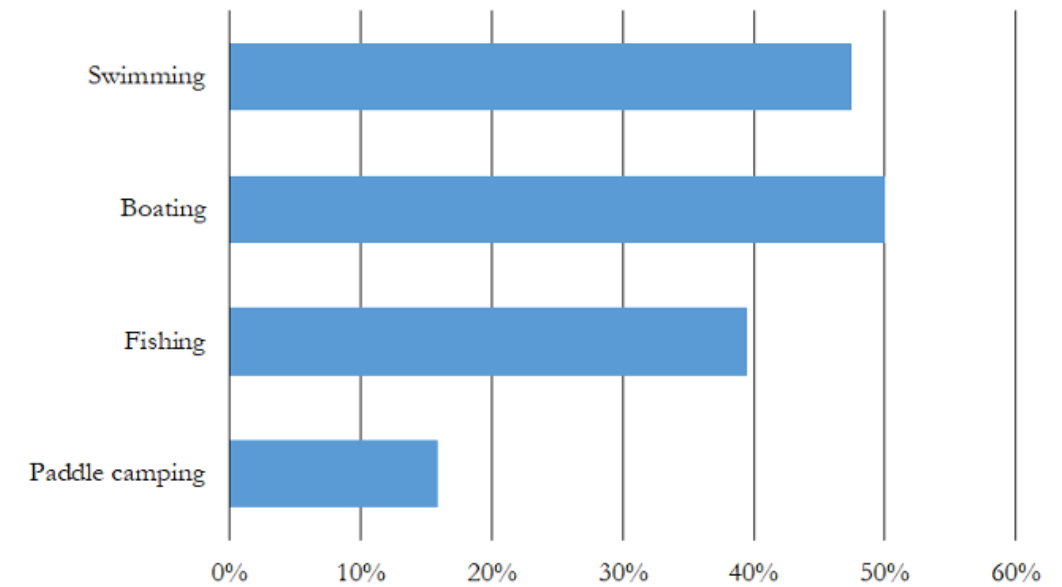


Figure 1. Community Survey Results: What river activity(s) do you participate in? (Notes: Respondents could choose multiple answers; Write-in answers include wildlife/bird watching, picnicking/tubing, and snorkeling.)

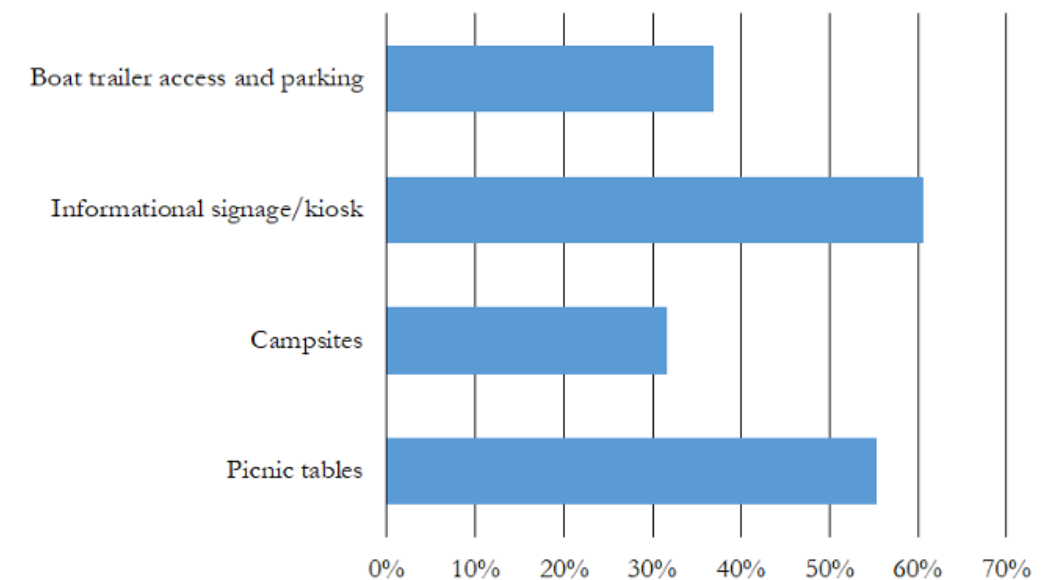


Figure 2. Community Survey Results: What would be important for you to have at a river access site? (Notes: Respondents could choose multiple answers; Write-in answers include trash cans, bathrooms/changing areas, rentals, parking, bike/boat racks, more trees.)

## SURVEYS, CONTINUED

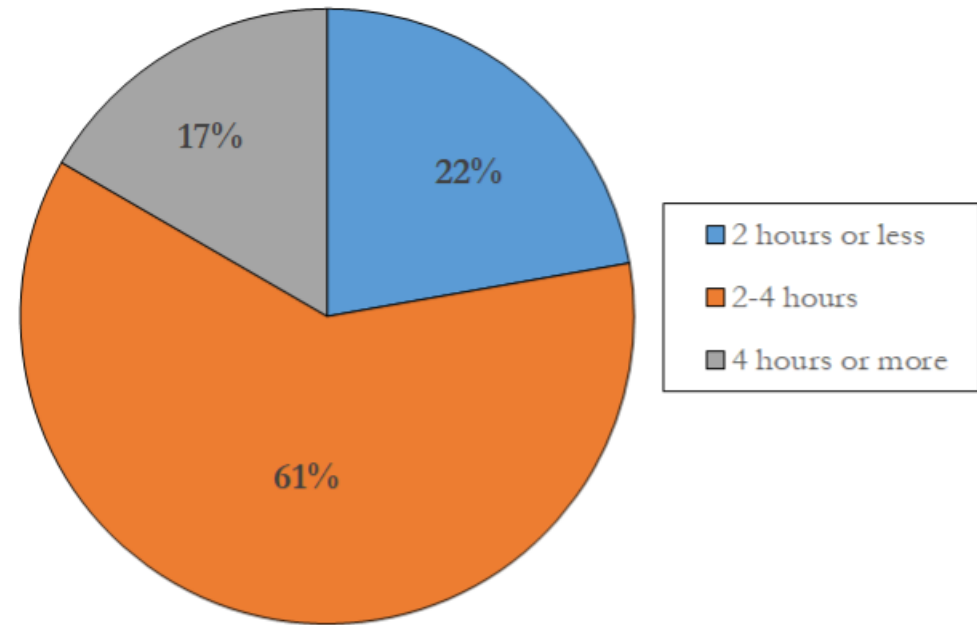


Figure 3. Community Survey Results: What is your ideal time to spend on a river trip?

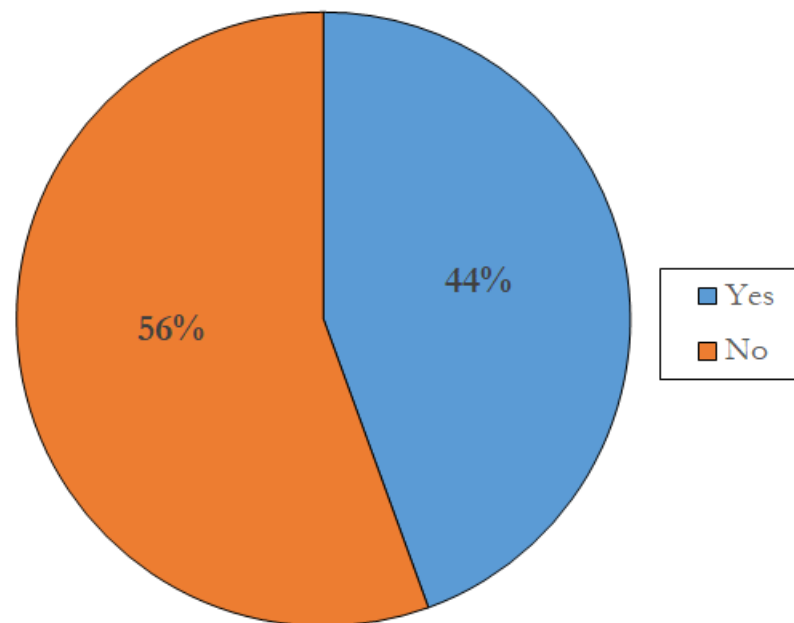


Figure 4. Community Survey Results: Do you find it difficult to get up to date information about river conditions (hazards, water levels, points of interest, etc.)?

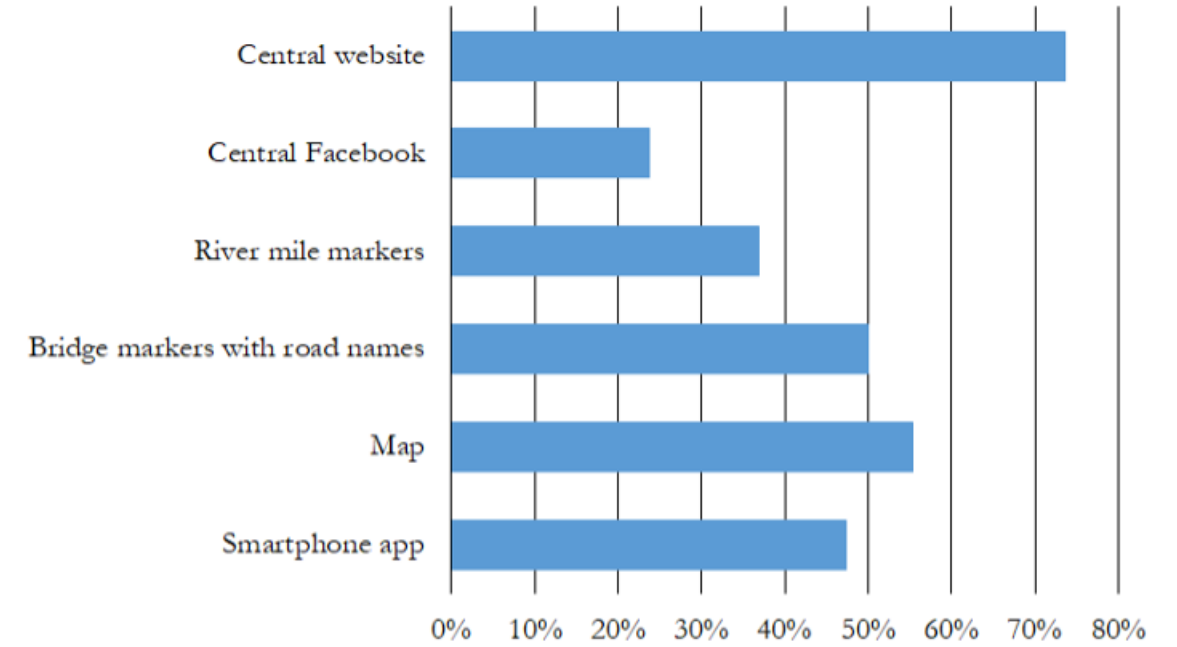


Figure 5. Community Survey Results: What information source would be important to you for paddle trip planning and while on the river? (Notes: Respondents could choose multiple answers; Write-in answers include listing the average times for sections.)



## PARTNERS AND STAKEHOLDERS

The French Broad River in Transylvania County benefits from a robust collection of organizations (e.g., municipal/government, business, non-profit) that recognize the recreational, cultural, and economic impact of the river, including the following list of potential partners and stakeholders. Many of these organizations were contacted during this study, and given the opportunity to review online maps and offer comments and recommendations. The written answers that were received are included within Appendix C. Suggestions that were relevant to the French Broad River Blueway have been incorporated into the recommendations included in this report.

### ***Municipal and Government Organizations***

- National Park Service - Rivers, Trails & Conservation Assistance Program
- North Carolina State Parks
- North Carolina Wildlife Resources Commission
- Town of Rosman
- Transylvania County EMS
- Transylvania County Natural Resources Council
- Transylvania County Parks & Recreation Department
- Transylvania County Rescue Squad
- U.S. Fish & Wildlife Service

### ***Non-Profit Organizations***

- American Canoe Association
- American Whitewater
- Conserving Carolina
- Friends of Ecusta Trail
- MountainTrue
- North Carolina Muskie Club
- The Pisgah Conservancy
- River Management Society
- RiverLink
- Southern Environmental Law Center
- Transylvania French Broad River Stewards
- Trout Unlimited - Land of Sky Chapter
- Trout Unlimited - Pisgah Chapter

### ***Businesses***

- Davidson River Outfitters
- Headwaters Outfitters
- Lazy Otter Outfitters
- Oxbow River Snorkeling
- White Squirrel Paddle Boards

### ***Schools and Camps***

- Brevard College - Wilderness Leadership & Experiential Education
- Camp Rockbrook
- Gwynn Valley Camp
- The Outdoor Academy





## V. Resources and Funding Sources

Many planning, technical, and funding resources exist for the creation of paddle trails and blueways. The following list contain a summary of resources that are relevant to the French Broad River in Transylvania County; however they are not meant to be exhaustive.

French Broad River Paddle Trail Report (2011)  
<http://www.americantrails.org/files/pdf/French-Broad-Paddle-Trail-Ogletree2011.pdf>

French Broad River Access Study (2019)  
<https://ncgrowth.unc.edu/wp-content/uploads/2019/10/French-Broad-River-Access-Study-web.pdf>

2008 North Carolina Paddle Trail Study  
[www.yumpu.com/en/document/view/50027477/2008-paddle-tourism-study-north-carolina-state-parks](http://www.yumpu.com/en/document/view/50027477/2008-paddle-tourism-study-north-carolina-state-parks)

NCGrowth's Field Guide to Blueways (2021)  
<https://ncgrowth.unc.edu/index.php/blueway-guide-launch>

Neuse River Blueway Plan (2021)  
<https://raleighnc.gov/projects/neuse-river-blueway-plan>

French Broad River Paddle Trail  
<https://frenchbroadpaddle.com>

United States Geological Survey, Rosman Gage  
[https://waterdata.usgs.gov/nwis/uv?site\\_no=03439000](https://waterdata.usgs.gov/nwis/uv?site_no=03439000)

United States Geological Survey, Blantyre Gage  
[https://waterdata.usgs.gov/nwis/uv?site\\_no=03443000](https://waterdata.usgs.gov/nwis/uv?site_no=03443000)

### **Map Examples**

Tuckasegee River Blue Trail  
<https://www.discoverjacksonnc.com/wp-content/uploads/2019/01/Tuckasegee-River-Blue-Trail-Map-by-American-Rivers.pdf>

Hiwassee Blueway  
<https://www.hiwasseeblueway.com/wp-content/uploads/2018/05/Hiwassee-River-Map-TVA-2018.pdf>

Harpeth River State Park  
<https://tnstateparks.com/assets/pdf/additional-content/park-maps/36-harpeth-river-sm.jpg>

Chattooga Wild & Scenic River  
<https://www.pisgahmapcompany.com/shop-trail-guides/chattooga-river>

Lower Potomac Water Trail  
<https://dnr.maryland.gov/boating/Documents/lowerpotomacwatertrail.pdf>

Turkey River Water Trail  
<https://turkeyriver.org/wp-content/uploads/turkeyRiverWaterTrailGuide.pdf>

Minnesota River Water Trail  
<https://www.yumpu.com/en/document/read/2076146/a-state-water-trail-guide-to-the-minnesota-river>

Mississippi River Canoe Route  
[https://files.dnr.state.mn.us/maps/canoe\\_routes/mississippi3.pdf](https://files.dnr.state.mn.us/maps/canoe_routes/mississippi3.pdf)

### **Funding Opportunities**

As the French Broad River Blueway continues to be developed in Transylvania County, funding and staffing needs will likely require support from local governments, non-profits, landowners, and businesses. Maintenance and stewardship of access sites, as well as woody debris removal, should be considered during budgeting processes. Many potential funding opportunities are cited in the previous French Broad River reports and NCGrowth's Field Guide to Blueways, with highlights listed below (taken from the 2019 French Broad River Access Study).

USEPA Grants for Recreation Economy for Rural Communities (assistance program to help rural communities revitalize Main Streets through outdoor recreation)  
<https://www.epa.gov/smartgrowth/recreation-economy-rural-communities>

North Carolina Trails Grant (grant opportunities related to trail construction, maintenance, land acquisition, planning, and education)  
<https://trails.nc.gov/trail-grants>

Parks and Recreation Trust Fund (grant opportunities related to land acquisition and park development)  
<https://www.ncparks.gov/more-about-us/parks-recreation-trust-fund/parks-and-recreation-trust-fund>

National Park Service – Rivers, Trails, and Conservation Assistance Program  
[www.nps.gov/orgs/rtca/index.htm](http://www.nps.gov/orgs/rtca/index.htm)

Additionally, several funding sources exist for water quality improvements through riverbank stabilization and stream restoration. Common funding sources for such projects in North Carolina include the following grant programs.

North Carolina Land and Water Fund  
<https://nclwf.nc.gov/>

North Carolina Water Resources Development Grant Program  
<https://deq.nc.gov/about/divisions/water-resources/water-resources-grants/financial-assistance>

Transylvania County Tourism Grant Program  
<https://explorebrevard.com/tourism-grant-program/>



## VI. Summary of Recommendations

The recommendations included in this report represent a combination of prior planning efforts, community and partner input, and professional judgment of the project team. The lists below summarize priority recommended actions previously mentioned in this report. These lists are not intended to be exhaustive, but represent the highest-priority actions that can be taken to further develop the French Broad River Blueway. Along with other information in this report, these items can serve as an action plan for future Blueway improvement efforts.

#### ***Recommended Short-term Actions***

- Develop a branding and marketing plan, including an official Blueway name, logo, and printed/online materials.
- Design and install consistent signs along the river, within access areas, and along roads near access areas. Work with NCDOT to install signs on highway bridges.
- At all seven public access sites on the French Broad, evaluate sign and kiosk content for accuracy, readability, and consistency with other printed/online materials.
- Add all access sites and parks to online mapping programs (e.g., Google Maps).
- Work with NCDOT to ensure that the upcoming Wilson Road construction project includes a re-designed river access site with an expanded parking lot and updated boat ramp and fishing pier. As part of this redesign, construct a greenway path from the Wilson Road access to Pisgah Forest, where it would connect to the Ecusta Trail and Brevard Greenway.
- Evaluate the current lease at the Island Ford access. Investigate the potential to purchase the existing site plus additional property to allow for proposed improvements.

#### ***Recommended Medium-term Actions***

- Develop a new river access site at property acquired by Conserving Carolina midway between Island Ford and Hap Simpson Park.
- Install covered kiosks at Lyons Mountain, Wilson Road, and Blantyre.
- At all seven public access sites on the French Broad, install bike/boat racks, additional picnic tables, and trash receptacles.
- As needed, stabilize eroding streambanks at all French Broad access sites with native vegetation.
- Create a new print map (with a PDF version available online) that displays Transylvania County's sections of the French Broad River and tributaries.
- Create and promote a central location (e.g., website, social media, phone app) for reporting and viewing of river blockages.

- Aggregate river flow information on a website, social media, and/or phone app and post suggested river levels for each river section to aid in trip planning.

#### ***Recommended Long-term Actions***

- Develop a new river access site in the vicinity of the Everett Road bridge near Pisgah Forest.
- Install restroom facilities at Champion Park, Island Ford, Hap Simpson Park, Penrose, and Blantyre.
- Expand parking areas at Lyons Mountain and Island Ford to allow for additional parking capacity and improved access for boat trailers.
- Install new boat access (e.g., concrete ramp, floating dock, hardened stairs) at Lyons Mountain, Island Ford, Hap Simpson Park, and Blantyre.
- Install covered pavilions at Island Ford and Hap Simpson Park.
- Work with NCDOT to re-design pull-off parking areas along NC Highway 215 and East Fork Road to promote safety and increase parking capacity.
- At Champion Park, connect the upper parking lot with the river access area to increase parking capacity.
- At Champion Park, daylight and restore the small stream within the access area.
- Implement priority recommendations for riverbank stabilization/restoration projects from the upcoming Upper French Broad Watershed Restoration Plan (conducted by Conserving Carolina).

#### ***Recommended Ongoing Actions***

- Identify an entity (public or private) to coordinate the planning and management of the Blueway, including debris removal, access site maintenance, and proposed improvements.
- Continue to maintain existing river access sites with regard to security, sediment/debris removal, and trash removal.
- Continue/increase funding to those organizations that identify and remove river debris.
- Update funding and maintenance plans as additional amenities and access sites are developed.
- Pursue grant opportunities, as appropriate, for upcoming planning, design, and construction work.





# Appendices

## APPENDIX A: RIVER ACCESS SITE MAPS

Sheet A1. Access Site Overview

Sheet A2. Access Sites: East Fork French Broad River

Sheet A3. Access Sites: West Fork French Broad River

Sheet A4. Access Sites: North Fork French Broad River

Sheet A5. Access Sites: Davidson River

Sheet A6. Access Sites: French Broad River

Sheet A7. Headwaters Outfitters (Mile 0.0)

Sheet A8. Champion Park (Mile 1.2)

Sheet A9. Lyons Mountain (Mile 2.2)

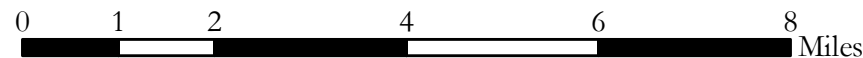
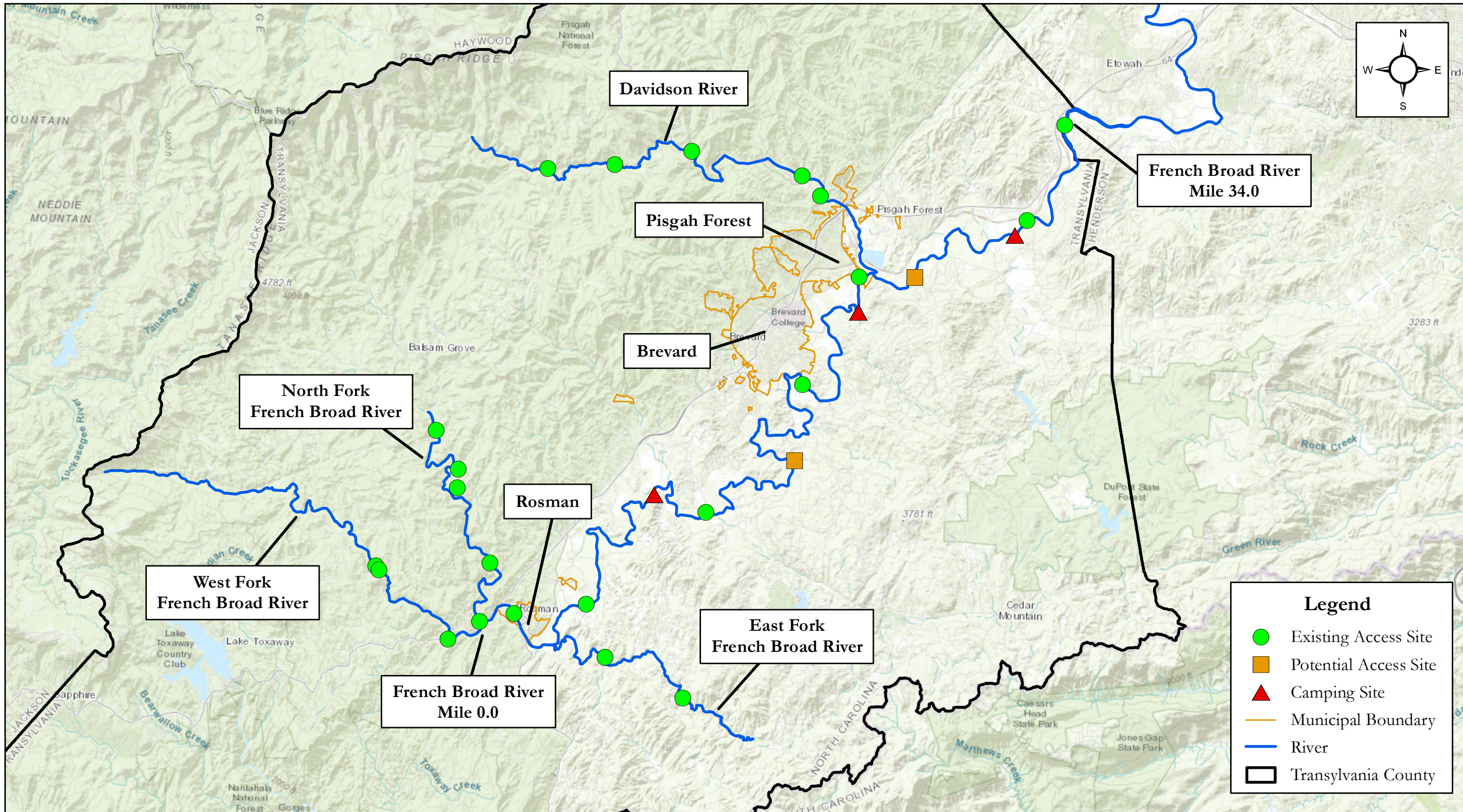
Sheet A10. Island Ford (Mile 11.0)

Sheet A11. Hap Simpson Park (Mile 20.5)

Sheet A12. Pisgah Forest (Mile 25.4)

Sheet A13. Penrose (Mile 30.8)

Sheet A14. Blantyre (Mile 34.0)





**Rosman**

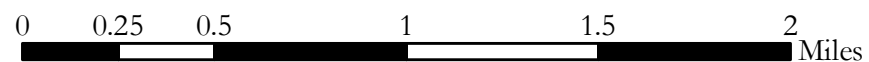
**Confluence with  
French Broad River**

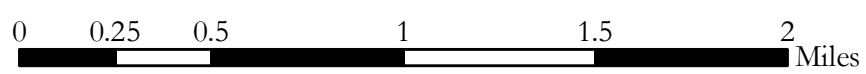
**East Fork Road  
Access #2**

**East Fork Road  
Access #1**

**Legend**

- Existing Access Site
- Potential Access Site
- ▲ Camping Site
- Municipal Boundary
- River
- Transylvania County







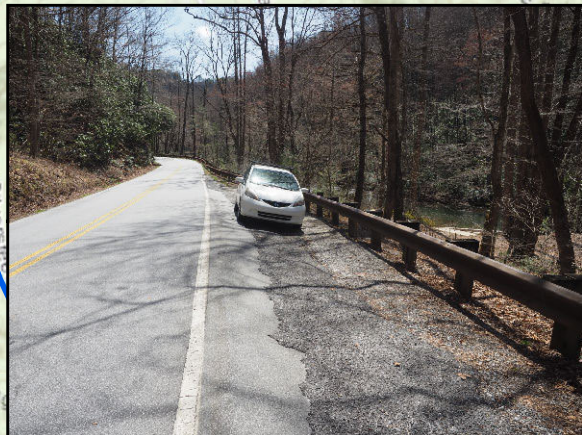
**Old Wagon Road/  
Macedonia Church Road**



**NC Highway 215  
Paddlers' Put-In Trail**



**NC Highway 215  
Submarine Trail**



**NC Highway 215  
Alligator Rock**

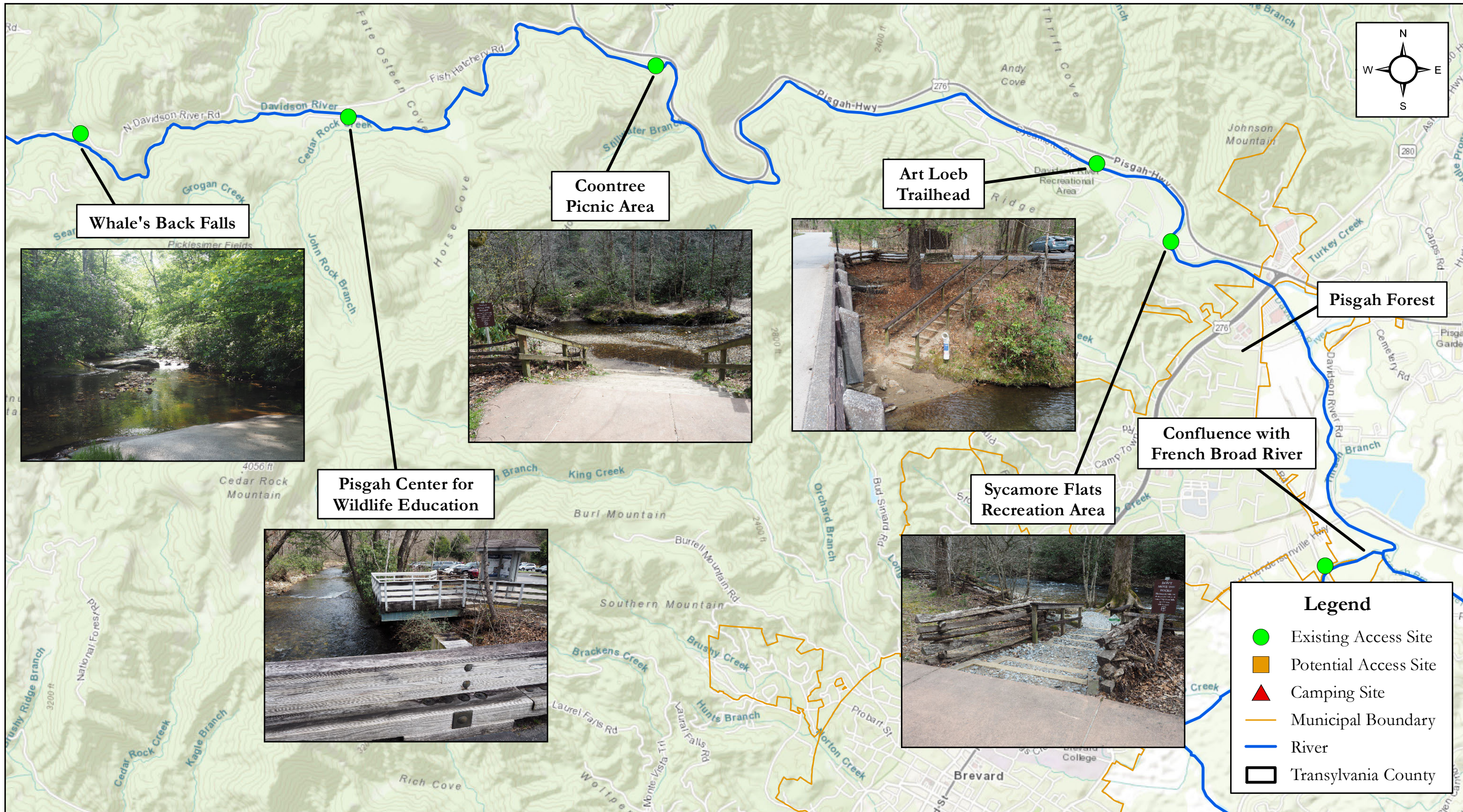


**Confluence with  
West Fork French Broad River**

**Rosman**

**Legend**

- Existing Access Site
- Potential Access Site
- ▲ Camping Site
- Municipal Boundary
- River
- Transylvania County



**Whale's Back Falls**



**Coontree Picnic Area**



**Art Loeb Trailhead**



**Pisgah Forest**

**Confluence with French Broad River**

**Sycamore Flats Recreation Area**

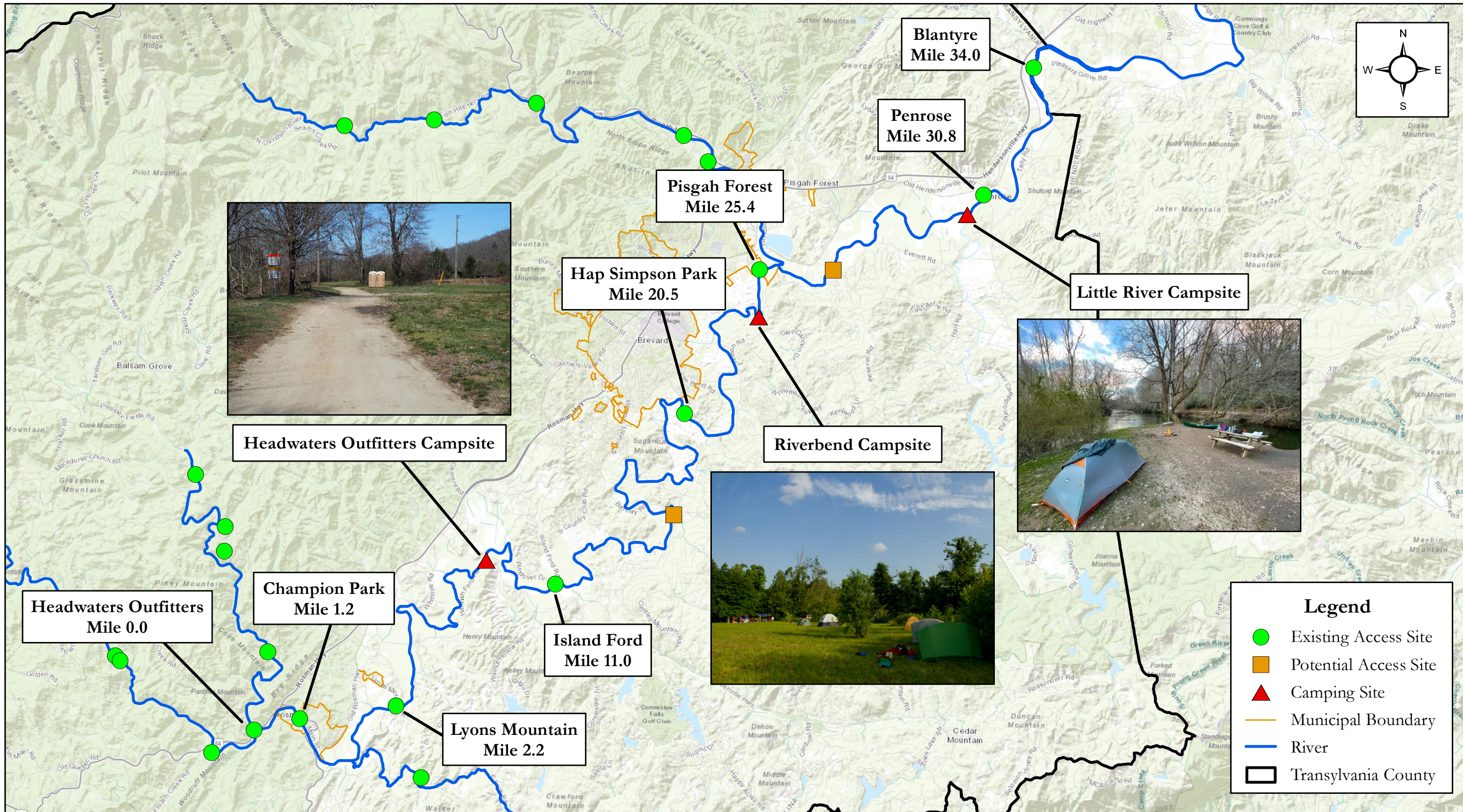


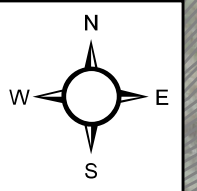
**Pisgah Center for Wildlife Education**



**Legend**

- Existing Access Site
- Potential Access Site
- ▲ Camping Site
- Municipal Boundary
- River
- Transylvania County





NC Highway 215

US Highway 64

North Fork French Broad

West Fork French Broad

Owner/Manager: Headwaters Outfitters  
 Next Upstream Access: n/a  
 Next Downstream Access: Champion Park (1.2 miles)  
 River Access: Rock steps, permission needed  
 Parking: Paved and gravel, 20-25 spots, permission needed  
 Restrooms: Yes  
 Signs: Yes  
 Other: Picnic tables

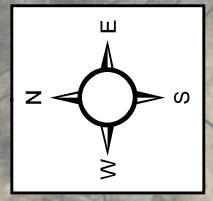
**Note: Headwaters Outfitters is private property, with permission needed for access and parking. As such, no improvements are recommended for this river access.**



**Legend**

- Property Boundary
- Contour (2 foot interval)
- Extent of Regulatory Floodway
- Extent of 1% Annual Chance Flood Hazard
- Extent of 0.2% Annual Chance Flood Hazard





Owner/Manager: Town of Rosman, Transylvania County Parks and Rec  
 Next Upstream Access: Headwaters Outfitters (1.2 miles)  
 Next Downstream Access: Lyons Mountain (1.0 miles)  
 River Access: Carry-in through grass  
 Parking: Paved, 10-15 spots, with many more nearby  
 Restrooms: Yes  
 Signs: Yes  
 Other: Picnic tables, covered pavilions

US Highway 178

Connect upper parking lot with river access area to increase parking capacity

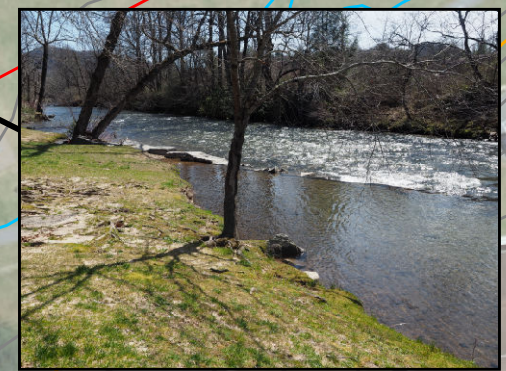
Daylight and restore small stream



Install restroom facilities

Install bike/boat racks, picnic tables (near river), and trash receptacles

Evaluate kiosk content for accuracy, readability and consistency with other printed/online materials

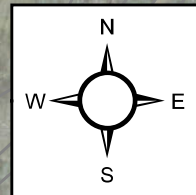


As needed, stabilize eroding streambanks with native riparian vegetation



**Legend**

- Property Boundary
- Contour (2 foot interval)
- Extent of Regulatory Floodway
- Extent of 1% Annual Chance Flood Hazard
- Extent of 0.2% Annual Chance Flood Hazard



Expand access area in current location and/or at DOT-owned property across the river

Install bike/boat racks, picnic tables, and trash receptacles



Install covered kiosk and evaluate content for accuracy, readability, and consistency with other printed/online materials

Owner/Manager: NCDOT  
Next Upstream Access: Champion Park (1.0 miles)  
Next Downstream Access: Island Ford (8.8 miles)  
River Access: Carry-in along dirt path and steps  
Parking: Gravel pull-off, 4-8 spots  
Restrooms: No  
Signs: No

Note: Entire river access area is within regulatory floodway and 1% annual chance flood hazard zone



As needed, stabilize eroding streambanks with native riparian vegetation

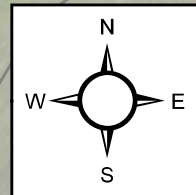


Install wide, hardened stairs and/or concrete boat ramp and floating dock for enhanced boat and trailer access

Lyons Mountain Road

**Legend**

- Property Boundary
- Contour (2 foot interval)
- Extent of Regulatory Floodway
- Extent of 1% Annual Chance Flood Hazard
- Extent of 0.2% Annual Chance Flood Hazard



**Island Ford Road**



**Evaluate kiosk content for accuracy, readability and consistency with other printed/online materials**

Owner/Manager: Transylvania County Parks and Rec  
Next Upstream Access: Lyons Mountain (8.8 miles)  
Next Downstream Access: Hap Simpson Park (9.5 miles)  
River Access: Carry-in with concrete steps  
Parking: Gravel, 25-30 spots  
Restrooms: No  
Signs: Yes

**Expand access area to allow for more parking, trailers, and increased amenities**

**Install restroom facilities**

**Install bike/boat racks, picnic tables, trash receptacles, and small covered pavilion**

**Note: Entire river access area is within regulatory floodway and 1% annual chance flood hazard zone**



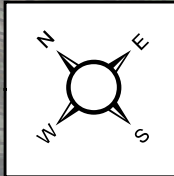
**As needed, stabilize eroding streambanks with native riparian vegetation**



**Install concrete boat ramp and floating dock for enhanced boat and trailer access**

**Legend**

- Property Boundary
- Contour (2 foot interval)
- Extent of Regulatory Floodway
- Extent of 1% Annual Chance Flood Hazard
- Extent of 0.2% Annual Chance Flood Hazard



US Highway 276



Owner/Manager: City of Brevard  
 Next Upstream Access: Island Ford (9.5 miles)  
 Next Downstream Access: Pisgah Forest (4.9 miles)  
 River Access: Concrete ramp, vehicle accessible  
 Parking: Paved, 20-25 spots  
 Restrooms: No  
 Signs: Yes  
 Other: Paved footpaths, picnic areas, ADA accessible fishing pier

Install restroom facilities and large covered pavilion

Evaluate kiosk content for accuracy, readability and consistency with other printed/online materials

Install bike/boat racks, additional picnic tables, and trash receptacles

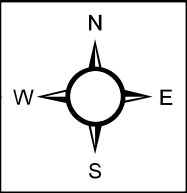


Install floating dock with ADA accessibility

As needed, stabilize eroding streambanks with native riparian vegetation

**Legend**

- Property Boundary
- Contour (2 foot interval)
- Extent of Regulatory Floodway
- Extent of 1% Annual Chance Flood Hazard
- Extent of 0.2% Annual Chance Flood Hazard



Owner/Manager: City of Brevard, Transylvania County Parks and Rec, NCDOT  
Next Upstream Access: Hap Simpson Park (4.9 miles)  
Next Downstream Access: Penrose (5.4 miles)  
River Access: Concrete ramp, vehicle accessible  
Parking: Gravel, 10 spots  
Restrooms: No  
Signs: Yes

**Wilson Road is scheduled to be realigned, with a new bridge to be constructed. River access improvements should be part of the road construction project, and could include:**

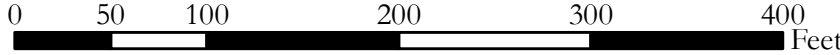
- Expanded parking lot
- Improved and updated boat ramp and fishing pier
- Covered kiosk, with content evaluated for accuracy, readability and consistency with other printed/online materials
- Overhead lighting, bike/boat racks, picnic tables, and trash receptacles
- As needed, stabilization of eroding streambanks with native riparian vegetation

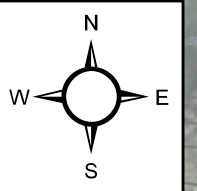
**Legend**

- Property Boundary
- Contour (2 foot interval)
- Extent of Regulatory Floodway
- Extent of 1% Annual Chance Flood Hazard
- Extent of 0.2% Annual Chance Flood Hazard



**Wilson Road**





Add parking/staging area for cyclists, with cycling amenities and paved path extending out of parking lot



Install restroom facilities  
Install bike/boat racks, picnic tables, and trash receptacles

Owner/Manager: NCWRC  
Next Upstream Access: Pisgah Forest (5.4 miles)  
Next Downstream Access: Blantyre (3.2 miles)  
River Access: Concrete ramp, vehicle accessible, floating dock  
Parking: Gravel, 20-25 spots  
Restrooms: No  
Signs: Yes

Note: Entire parcel is within regulatory floodway and 1% annual chance flood hazard zone



Evaluate kiosk content for accuracy, readability and consistency with other printed/online materials

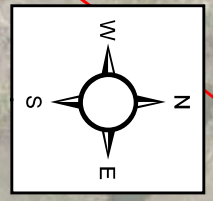
Crab Creek Road



As needed, stabilize eroding streambanks with native riparian vegetation

**Legend**

- Property Boundary
- Contour (2 foot interval)
- Extent of Regulatory Floodway
- Extent of 1% Annual Chance Flood Hazard
- Extent of 0.2% Annual Chance Flood Hazard



Replace boat slide with concrete boat ramp for trailer access



As needed, stabilize eroding streambanks with native riparian vegetation

Owner/Manager: Henderson County Parks and Rec, NCWRC  
Next Upstream Access: Penrose (3.2 miles)  
Next Downstream Access: Horseshoe (6.5 miles)  
River Access: Carry-in with boat slide  
Parking: Gravel, 15 spots  
Restrooms: No  
Signs: Yes

Install floating dock for canoe/kayak and fishing access

Note: Entire parcel is within regulatory floodway and 1% annual chance flood hazard zone

Grove Bridge Road



Replace sign with covered kiosk



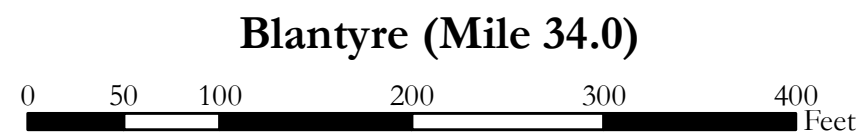
Install restroom facilities

Install bike/boat racks, picnic tables, and trash receptacles

Evaluate kiosk content for accuracy, readability and consistency with other printed/online materials

**Legend**

- Property Boundary
- Contour (2 foot interval)
- Extent of Regulatory Floodway
- Extent of 1% Annual Chance Flood Hazard
- Extent of 0.2% Annual Chance Flood Hazard



French Broad River Blueway  
Transylvania County, North Carolina

Sheet  
A14



APPENDIX B: EXAMPLE WATER TRAIL SIGN PACKAGES



# Example Water Trail Sign Packages

Water trail signage varies greatly by trail as different authorities, organizations, and local communities develop, manage, and maintain the trail. Some sections of a water trail may have different signage based on local requirements or ad hoc signage development. There is no national water trail signage standard, but there are understood best practices.

Furthermore, there is a balance when it comes to signs. Too many signs and the natural aesthetic is taken away and replaced by a more authoritative feeling. Not enough signs and orientation, safety, and regulations aren't communicated with the potential for severe consequences.

The following gives a brief overview of water trail signage examples that have been developed for the Hiwassee Blueway in Tennessee, Delaware River Water Trail, Schuylkill River National & State Heritage Area in Pennsylvania, and the Cahaba Blueway in Alabama. These examples can be used for the French Broad River Paddling Trail (FBRPT) to illustrate signage that best incorporates safety, functionality, and local aesthetic.

The Hiwassee Blueway Design Guide (HBDG) provides an initial overview of the variety of signs one will encounter on the Hiwassee River as well as examples of wayfinding and implementation. Given the Hiwassee River's geography in southeast Tennessee, the HBDG is an excellent regional example that the FBRPT could adapt its own signage plan from. The guide was prepared by Kaizen Collaborative, LLC in 2015.

The Delaware River Water Trail Signage Plan (DRWT) features more detailed signage characteristics. Shape, style, content, and color were examined closely and comes with a sidebar narrative that discusses each sign in depth. The DRWT was prepared by the landscape architecture firm Simone Collins in 2010.

The Schuylkill River National & State Heritage Area Design Guide Manual (SGM) gives a perspective from a national and state partnership for sign standards in the Heritage Area in Pennsylvania. The SGM's templates give partners within the Heritage Area guidelines for their signs while also allowing flexibility for each individual site along the river.

Located in Alabama, the Cahaba Blueway Wayfinding and Branding Guide (CBG) is another example in the Southeast United States and was guided previously by the National Park Service Rivers, Trails, and Conservations Assistance Program (RTCA) along with other partners. It features similar signage examples with special attention dedicated to interpretive signage that offers additional perspectives for the FBRPT.



## SIGN STANDARDS & TYPES:

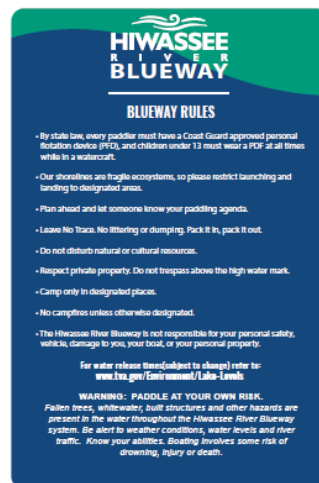
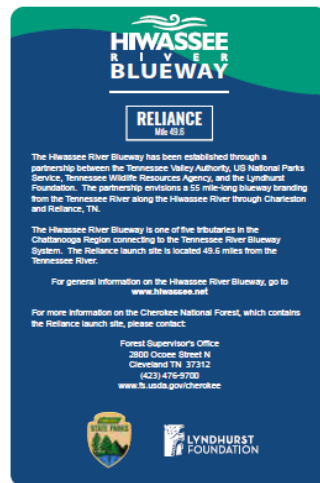
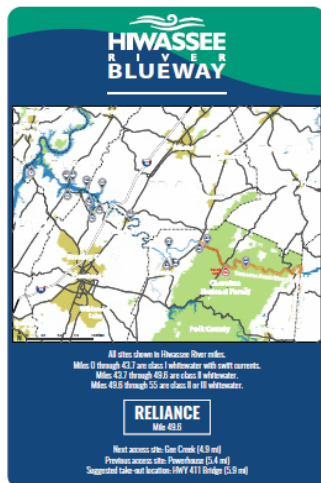
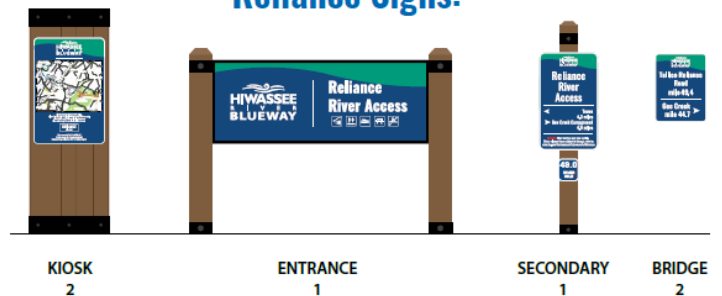
There are several varieties of signs that accomplish different objectives throughout the water trail. Kiosk signs give information related to wayfinding, safety, local amenities, etc. while entrance and wayfinding signs orient people to specific sites and amenities. Signs on bridges that feature the name of the bridge and the mileage of the water trail provide further orientation, especially for sections of the trail that often flood limiting sign options.

# IMPLEMENTATION

## Reliance - Sign Panels

The demonstration route will begin in Reliance, with the sign panels shown to be featured on the kiosk sign. Bridge markers will be placed on either side of the bridges, and the secondary sign will be placed along the river bank at the access point to insure it is visible from the river. The entrance sign will be placed perpendicular to Ellis Creek Road as a two-sided sign.

### Reliance Signs:



### Kiosk Panels 24"x36"



Sign Design Alternative **A**  
On River - Landing

Delaware River Water Trail Signage Plan

**Description:**

The sign is double sided fabricated from aluminum sheet mounted with adhesive vinyl. Each sign should be mounted to aluminum poles that are removable from a buried sleeve.

Because of constant changes in technology, materials and finishes, the final selection of sign options will need to be reexamined at the time of ordering.

**Content:**

This sign is designed to let the paddler know the location with the river mile number.

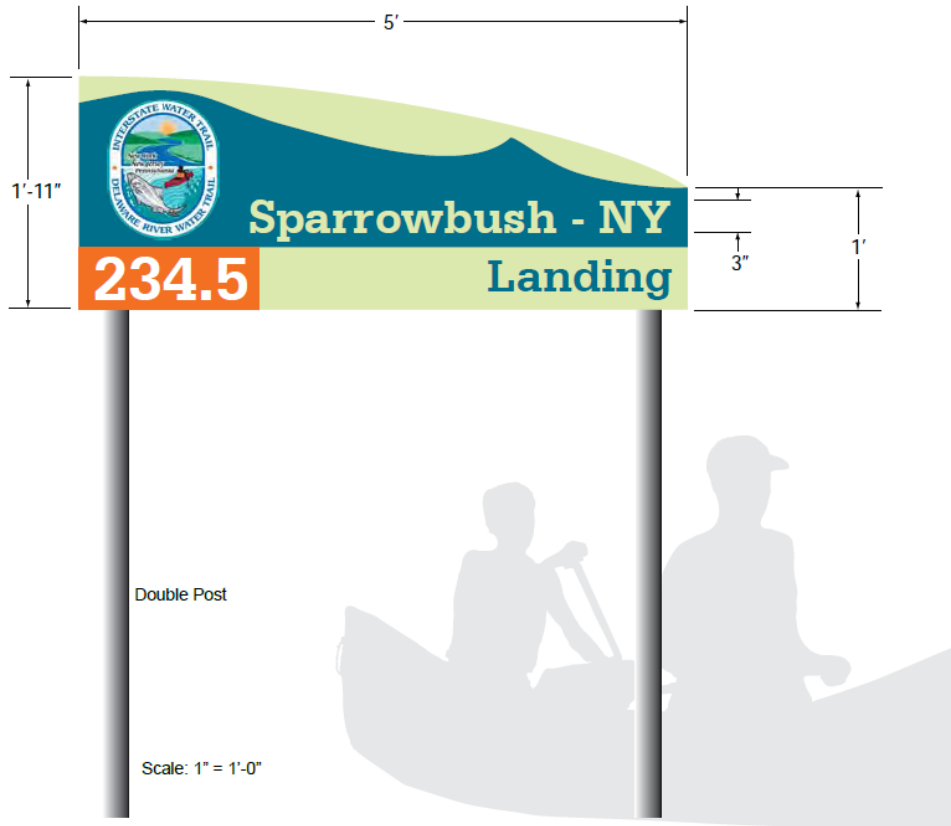
Each sign should contain:

- Name of the landing
- Town / location
- State
- Water Trail logo
- River mile

**Placement:**

This sign should be mounted on the upstream side adjacent to the landing from a paddler's perspective. Clear obstructing vegetation to achieve maximum site distance for both upstream and downstream views.

Each site should be evaluated to determine what the ideal height should be, but a minimum 7' clearance will act as a general guideline.



**Sign Design Alternative A**  
**Off River - Kiosk**

Delaware River Water Trail Signage Plan

**Description:**  
 The sign is made of a double sided graphic panel, fabricated from high pressure laminate. Mounted on prefabricated aluminum poles and mounts offered by most manufacturers.

Because of constant changes in technology, materials and finishes, the final selection of sign options will need to be reexamined at the time of ordering.

**Content:**  
 This sign is designed to be an information station. One panel should be a context map and local map, the other panel will be safety and regulations.

Each sign side should contain:  
 • Water Trail logo  
 • Landing Name  
 • Maps  
 • Partner logos  
 • River mile  
 • Safety regulations

**Placement:**  
 This sign should be placed adjacent to the landing, but out of the floodway where possible, and constructed so that staff will be able to efficiently remove it.

**Eshback Access**

3'-6"

Scale: 1" = 1'-0"

**Eshback Access**

234.5

DCNR

Flat, 2-Post, 2-sided

4'

34 2010

**Sign Design Alternative B**  
**Off River - Kiosk**

Delaware River Water Trail Signage Plan

**Description:**  
 The sign is made of three, single-sided graphic panels, fabricated from high pressure laminate. Mounted on prefabricated aluminum poles and mounts offered by most manufacturers.

Because of constant changes in technology, materials and finishes, the final selection of sign options will need to be reexamined at the time of ordering.

**Content:**  
 This sign is designed to be an informational station. One panel should be a context map, the other panel will be a local map, the last panel will be safety and regulations.

Each sign side should contain:  
 • Water Trail logo  
 • Landing Name  
 • Maps  
 • Partner logos  
 • River mile  
 • Safety Regulations

**Placement:**  
 This sign should be placed adjacent to the landing, but out of the floodway where possible, and constructed so that staff will be able to efficiently remove it.

**SPARROWBUSH**  
 Location, NY

4'-11"

2'

Scale: 1" = 1'-0"

**SPARROWBUSH**  
 Location, NY

234.5

DCNR

**SPARROWBUSH**  
 Location, NY

234.5

DCNR

**SPARROWBUSH**  
 Location, NY

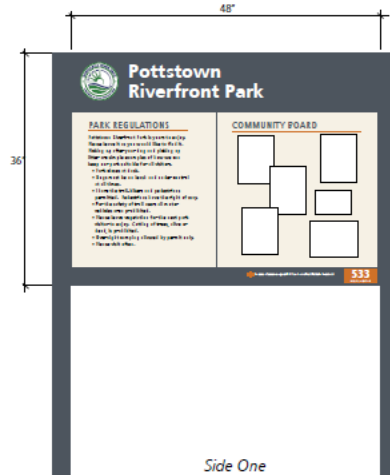
234.5

DCNR

Triangular, 3-Post, 3-sided

2010 35

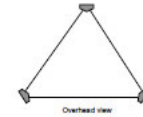




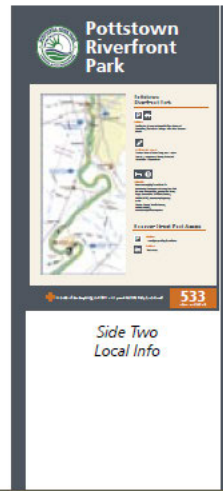
Side One  
Rules & Regulations/  
Community Postings



Side Two  
Heritage Area Info./  
Local Info



Side One  
Heritage Area Info



Side Two  
Local Info



Side Three  
Rules and Regulations



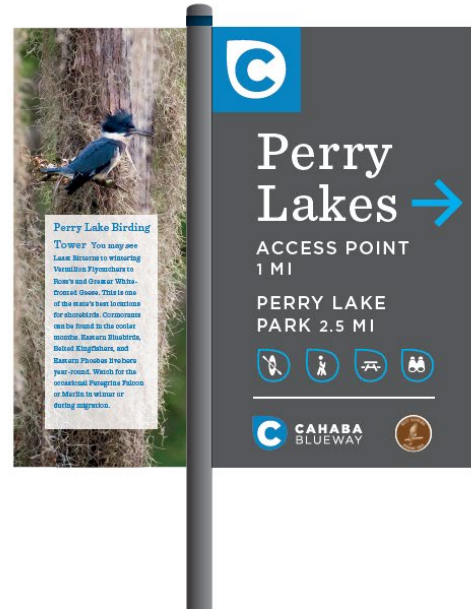
## Flora/Fauna signs // Examples

Flora and Fauna signage content can be presented in a number of different signage. Below are several examples of how content might be set-up for the reader. The information can also be presented on a singular pedestal or cantilever sign.

Example: graphic/photography



Example: Photography



## SIGN CONTENT:

The non-profit American Rivers states trailhead signs (kiosks, displays, and bulletin boards) located near a boat ramp or landing site are a great place for information since they are places people spend the most time getting in and out of the river. Consider displaying the following information on these signs (American Rivers):

- Safety: Give warning to any hazards including dangerous currents, water levels, dams, mandatory portages, and boat traffic.
- Leave No Trace: Include site specific information when possible regarding what to do with human waste and trash.
- Parking: For those expecting to be on the trail overnight it helps to include information on where they can safely park.
- Interpretation: Describe the natural, cultural, and historical uniqueness of the area.
- Amenities: Provide information on lodging, outfitters, local business, and nearby trail networks. Such signs can be a great way to elicit support from local businesses, your chamber of commerce, and other partners.

## SIGN MATERIALS:



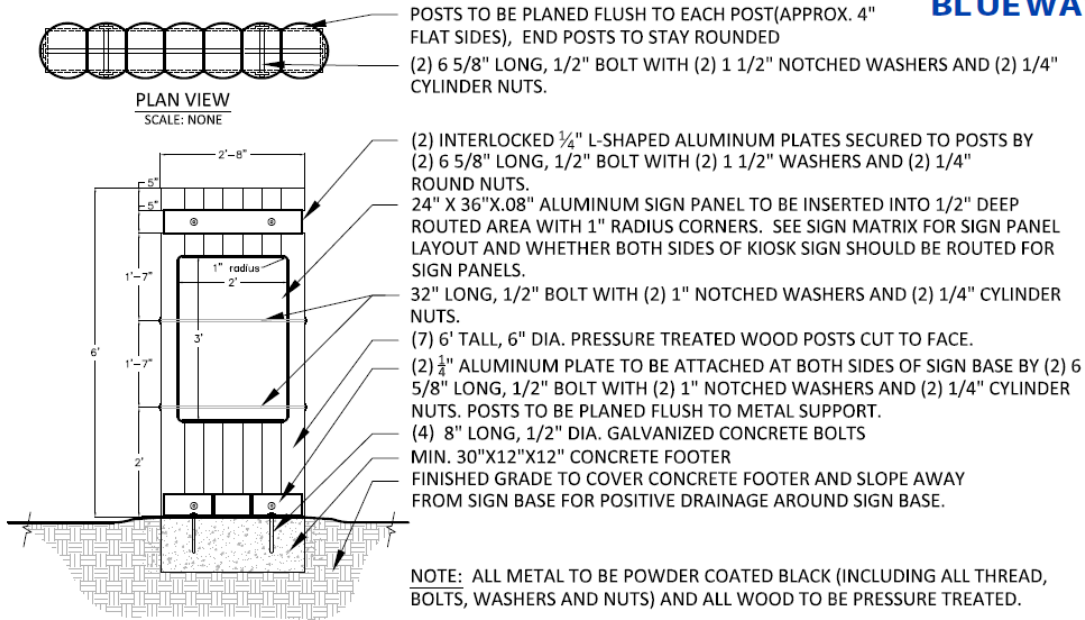
American Rivers provides an excellent overview of the types of materials to be used and their respective pro/cons:

Issues to consider besides environmental sensitivity are cost, durability, vandalism or theft, and ability to mount signs in ice and snow, swamp, forest, and other conditions. Consider using recycled materials or locally and sustainably produced materials in the signs. The longer a sign will last, the more expensive it will likely be. Materials to consider include:

- Wood signs may be more environmentally friendly and aesthetically pleasing, but may require more frequent replacement and maintenance than other types of signs. Avoid pressure treated wood preserved with chromated copper arsenate because of the potential for leaching harmful chemicals into the river and surrounding area.
- Metal signs can be used to identify a permanent launch site. Aluminum is durable, but it is also expensive and can be stolen or subject to target practice. Steel is durable, but more susceptible to rusting in a marine environment.
- Fiberglass can be used for durable, inexpensive signs that might require a high level of detail, such as interpretative signs or maps.

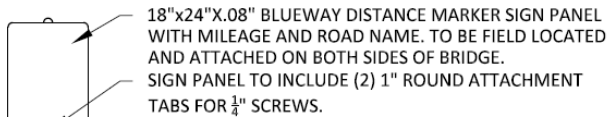
The HBDG opted for stained wood with black metal brackets to “capture the natural elements of the river corridor and coexist with other sign standards in the area” for their sign supports. For the signs themselves, aluminum was chosen for its durability despite its cost:



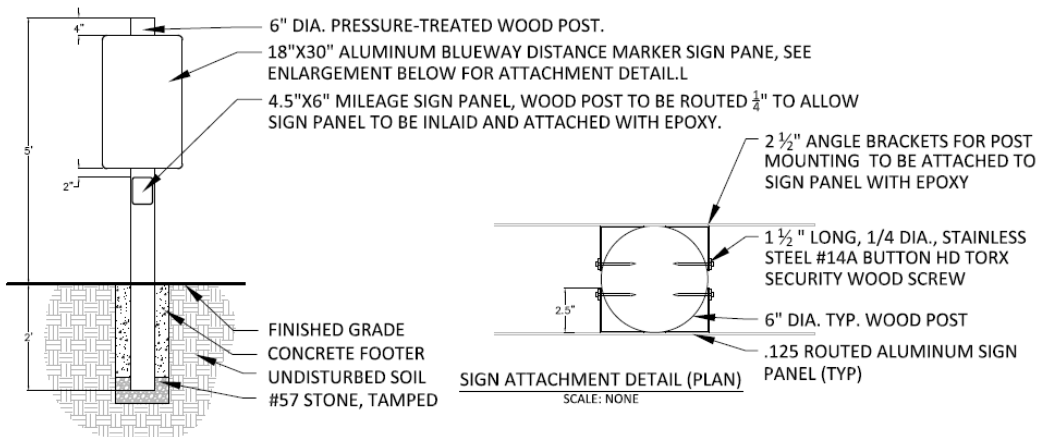


## HIWASSEE BLUEWAY KIOSK SIGN

SCALE: NONE



**BRIDGE DISTANCE MARKER SIGN PANEL**  
SCALE: NONE



NOTE: ALL METAL TO BE POWDER COATED BLACK (INCLUDING ALL THREAD, BOLTS, WASHERS AND NUTS) AND ALL WOOD TO BE PRESSURE TREATED.

## HIWASSEE BLUEWAY DISTANCE MARKER

SCALE: NONE





## WAYFINDING:

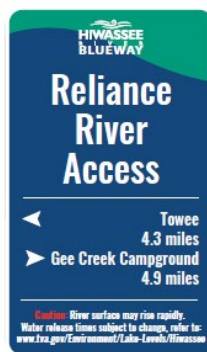
Wayfinding signs are used to direct people to river amenities and access points as well as to provide locations for paddlers on the rivers. It is important for wayfinding signs to have a standardized format throughout the river so river users can quickly identify directional and location signs in case of emergency.

Bridge signs, like the examples below, allow for both locals and visitors to quickly identify where they are on the river. They are especially useful for situations where other wayfinding signs are not practical such as when the banks of the river are privately owned, are prone to flooding, or are heavily vegetated.

Trailblades allow for simple, yet effective communication regarding amenities, mileage, trailheads, nearby communities, and points of interest. The trail logo always sits at the top of the sign.



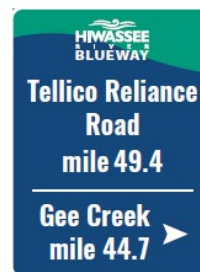
**Entrance Sign**  
72"x24"



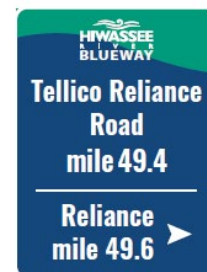
**Secondary Identification Sign**  
18"x30"



4.5"x6"



Downstream



Upstream

**Bridge Distance Marker Signs**  
18"x24"



**Sign Design Alternative A**  
**On River - Bridge**

Delaware River Water Trail Signage Plan

**Description:**  
 The sign is single sided, fabricated from aluminum sheet mounted with adhesive vinyl. Installation will vary due to the difference in bridge owners, construction, and materials.  
 Because of constant changes in technology, materials and finishes, the final selection of sign options will need to be reexamined at the time of ordering.  
 Partnerships will be required with bridge owners.

**Content:**  
 This sign is designed to let the person on the river know the location by the name of the bridge/road.  
 Each sign should contain:  
 • Name of the bridge  
 • Town / location  
 • Corresponding states  
 • River mile

**Placement:**  
 These signs should be mounted facing upstream and downstream on the most visible point from an on-river perspective.

Scale: 1" = 1'-0"

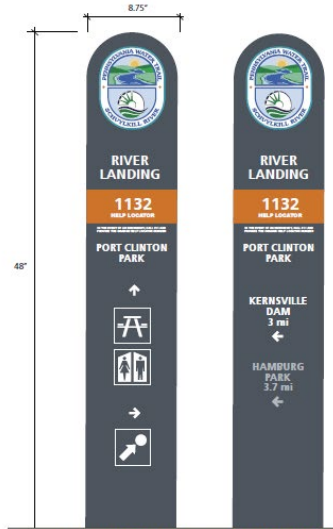
The diagram shows a sign with a width of 8'-0" and a height of 6". The sign is divided into three sections: a green section on the left with "NY", a blue section in the middle with "234.1" in white, and a dark blue section on the right with "PA". Below these sections, the text "Bridge Street" is written in white, and "County Road 54" is written in green. A silhouette of a person is shown behind the sign for scale. The sign is mounted on a light green background.

16 2010



**742 LANCASTER AVE.**





Landing Trailblade with river-side Information

Landing Trailblade with park-side Information

### RECONNECTING TO THE RIVER WATER TRAIL SIGNS LANDING TRAILBLADES

The side of the trailblade facing the river identifies the landing name, the help locator number and available amenities, such as restrooms, parking, or picnic facilities.

The side of the trailblade facing land shows the landing name and help locator number, and the next two significant points of interest downriver.

The Pennsylvania Water Trail logo is a unifying element that identifies the landing as part of the Schuylkill River Water Trail system.

The help locator number is unique and assigned by SRHA and coordinated with local 911 services.

### Trailblades // Blueway Signage

Trailblades may be used to mark distance. In the event a partner logo must appear on a trail blade, it will be centered at the bottom.



DISTANCE MARKER



## AMENITIES AND IMPLEMENTATION:

Water trail amenities can include benches, picnic tables, restrooms, trash receptacles, and camping facilities. As seen below, the HBDG matched their picnic tables and benches with their stained wood signage standard to keep the same natural look and feel to each site. Amenities such as these greatly help in defining the trail and marketing it towards different user groups like paddlers, boaters, and floaters. They do, however, come with an added cost and must be maintained regularly, especially trash receptacles to avoid pollution of the site and the river. The HBDG estimated between \$2,000 - \$5,000 per site that includes benches, picnic tables, and trash receptacles. The total estimated signage costs with included labor are given in the table below. It should be noted that the estimated costs are in 2015 dollars and are likely more today due to inflation.

### AMENITY RECOMMENDATIONS

Site amenities such as picnic tables, benches and trash receptacles provide essential support to the Hiwassee River Blueway's branding and should enhance and reflect the architectural theme of the scenic corridor.

#### Picnic Tables and Benches

Picnic tables and benches are dominant features at pull-off areas, campgrounds, interpretive trails and scenic overlooks. Picnic tables and benches within the Hiwassee corridor should include round timber features to complement the Hiwassee River Blueway design standards. Stained wood with black metal accents are recommended as shown in the examples to the right.

#### Trash Receptacles

Trash receptacles should be provided in areas where trash is typically generated and maintenance occurs on a regular schedule such as the picnic pull-off areas or scenic overlooks. Receptacles should be directly located on the main access route and associated with destination amenities such as restrooms or kiosks. Bear resistant cans are required for all developed sites providing trash service and the USFS standards are recommended. Special attention to accessibility is necessary when mounting trash cans. Hard angles can be mitigated with nested stepped posts at each side of the trash can (rounded in Hiwassee and Chilhowee Spur, dimensional in Ocoee).



**Single-Post Contour Park Bench**  
by UltraSites-Playcore

model #975SM-PT6

Description: 6 foot, surface mount, pressure treated wood contoured bench with 8 slates (in-ground option available)



**Recycled Multi-Pedestal Table**  
by UltraSites-Playcore

model #348-BRN6

Description: 6 foot, rectangular table available as inground or surface mount, 4"x4" square all MIG welded frame with zinc plated hardware.



# IMPLEMENTATION COST ESTIMATE SUMMARY

River Access Site Name	Kiosk (\$3,250 each)	Entrance (\$3,250 each)	Secondary (\$1,500 each)	Bridge (\$200 each)	Wayfinding (\$1,500 large, \$500 small)	Cost Estimate	
<b>Lower Hiwassee (Large Wayfinding Sign)</b>						<b>2</b>	<b>\$ 3,000.00</b>
1. Blythe Ferry Boat Ramp	1	1	1	0	2	\$ 9,000.00	
2. Highway 58 Bridge Boat Ramp	1	1	1	2	0	\$ 8,400.00	
3. Agency Creek Campground	0	1	1	0	0	\$ 4,750.00	
4. Sportsman's Hwy. 58 Dock	1	1	1	0	0	\$ 8,000.00	
<b>Central Hiwassee (Large Wayfinding Sign)</b>						<b>2</b>	<b>\$ 3,000.00</b>
5. Price's Creek Boat Ramp	1	1	1	2	1	\$ 8,900.00	
6. Gray's Ferry Ramp	1	1	1	2	0	\$ 8,400.00	
7. Candies Creek	0	1	1	0	0	\$ 4,750.00	
8. Ed's Landing	0	1	1	2	0	\$ 5,150.00	
9. B&B Marina	1	1	1	0	1	\$ 8,500.00	
10. North Mouse Creek	1	1	1	2	0	\$ 8,400.00	
11. Charleston Boat Ramp	2	1	1	6	1	\$ 12,950.00	
12. Calhoun Boat Ramp	0	1	1	0	0	\$ 4,750.00	
<b>Upper Hiwassee (Large Wayfinding Sign)</b>						<b>2</b>	<b>\$ 3,000.00</b>
13. Two Rivers Campground	1	1	1	2	1	\$ 8,900.00	
14. Old Patty Bridge	1	1	1	2	0	\$ 8,400.00	
15. Patty Bridge	1	1	1	2	0	\$ 8,400.00	
16. Highway 411 Bridge Ramp	2	1	1	2	0	\$ 11,650.00	
17. Gee Creek Campground	2	1	1	0	1	\$ 11,750.00	
18. Reliance	2	1	1	4	0	\$ 12,050.00	
19. Towee	2	1	1	0	0	\$ 11,250.00	
20. Powerhouse Boat Ramp	2	1	1	0	1	\$ 11,750.00	
	22	20	20	28	14	<b>\$ 185,100.00</b>	
							<b>Total Implementation Cost</b>

**Notes:**

1. Benches, trash receptacles, and picnic tables are not included in the pricing above. It is suggested to estimate \$2,000.00 - \$5,000.00 per site for amenities.
2. The amounts shown include all material and labor based on 2015 pricing. Coordination, management, and permitting (if required) are not included within the above pricing.

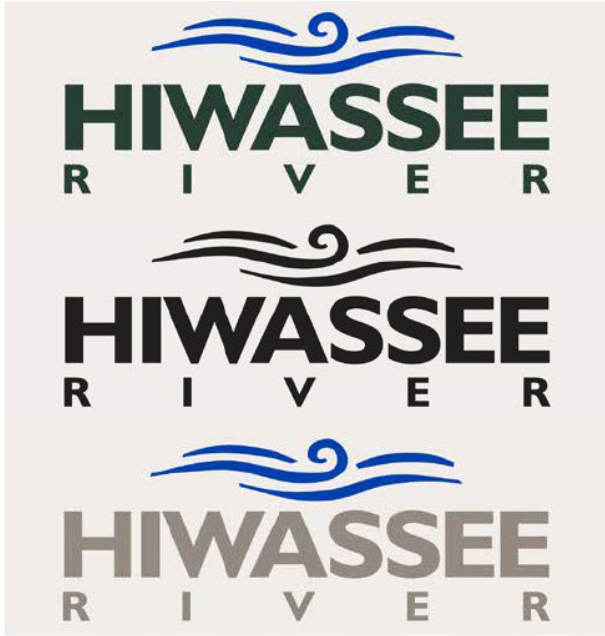
## COLORS:

The below color study examples give an excellent visualization to contrasting colors. American Rivers breaks it down further for size and color considerations:

A sign that users will need to see from a distance, such as a hazard warning, should be large and have contrasting colors. A sign indicating the name of a campsite and reminding users to pack out their garbage can be less visually obtrusive (American Rivers).

Remember that overbearing signs that look out of place with the natural environment can deteriorate the experience for the user. If the interpretive and wayfinding signs are the same colors as the safety signage, then safety messages may be unintentionally ignored.





## RIVER LOGO STANDARD

### Original Logo

The Hiwassee River logo was developed by Derryberry Public Relations and Tommy Stokes Design, Inc. Color options are neutrals mixed with earth and water tones to strengthen the conceptual relationship with the river.

The full palette of suggested colors are shown. The large, bold font is readable in many formats large and small, near or far.

The “wave” element helps tie the logo to the Ocoee River logo (also provided by Derryberry Public Relations) and adds a flowing curvature to an otherwise bold and rectilinear design.

## BLUEWAY LOGO STANDARD

Tommy Stokes Design, Inc. also provided guidelines for a color palette for use in the Hiwassee branding, which is shown below.

The Hiwassee River Blueway Committee decided to primarily use a white-on-blue color scheme, shown on page 8, for most logo applications along the blueway. Some signs incorporating a curved color splice which complements the swirl in the logo.

In addition, a third line of text was added with the word “BLUEWAY,” in the interest of balancing the weights and incorporating the full name of the Blueway system.



**Sign Design Alternative Color Study**

**Delaware River Water Trail Signage Plan**

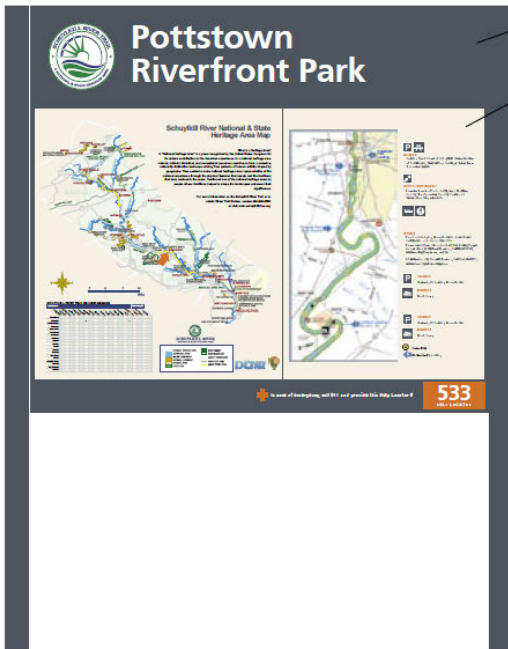
Color studies were looked at early on. Contrasting the message with light on dark, or dark on light schemes was the main intention. Graphically it is important for the text to have contrasting values so that it can be read at a distance.

Color schemes were influenced by existing signage programs. Earth tone and high chroma styles were explored.

New colors not found in corridor signage were explored in Alternative B.

Final color schemes can be modified as needed.





Gray background color definitions:  
 • 23c 2m 0y 77k  
 • PMS432

Cream background color definitions:  
 • 0c 8m 23y 2k  
 • PMS726

**COLORS**

The blue-gray and cream color backgrounds were chosen for their compatibility with other colors.

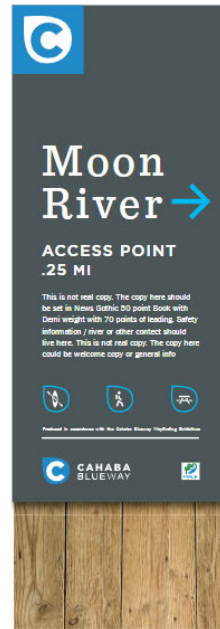
It is important that partners adhere to these colors. The integrity of these base colors provides a visual cue that the viewed sign is part of the Heritage Area wide sign system.

Fonts // Colors // Iconography

PMS 425, the "charcoal" primary color will be used as the sign background. Corten steel custom pole.



Charcoal background  
 pms / 425

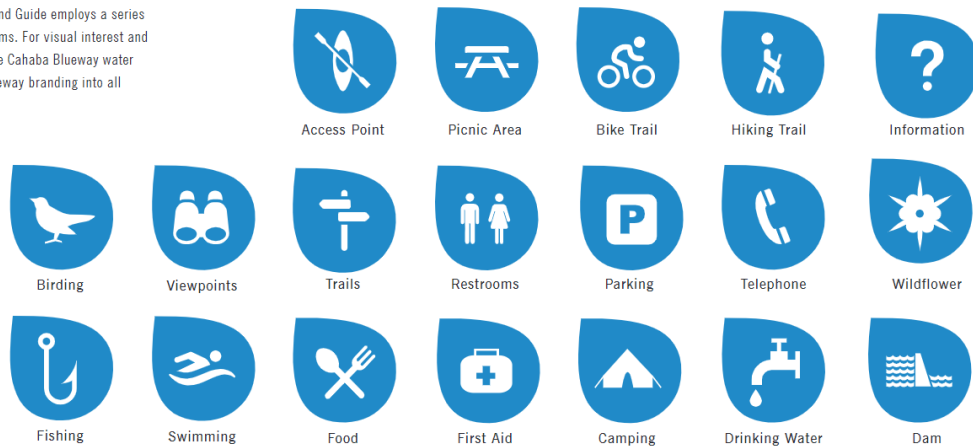


Charcoal background  
 pms / 425



## Fonts // Colors // Iconography

The Cahaba Blueway Wayfinding and Brand Guide employs a series of symbols or icons for the signage systems. For visual interest and brand consistency, the icons appear in the Cahaba Blueway water drop shape, integrating the Cahaba Blueway branding into all aspects of the signage system.



## **CONCLUSION:**

If desired, the next step for Conserving Carolina and the FBRPT would be to create a signage plan with river partners for the entire 140 mile trail that examines existing signage, new signage needs, implementation, and maintenance. Standardization of signage types, colors, and materials throughout the trail will be essential in establishing and maintaining an identity for the FBRPT. It is critical that other partners throughout the river corridor be included in the creation of a plan to ensure adoption of a standardized signage system. Feel free to reach out to the NPS – RTCA team for more information regarding signage plans and next planning steps.







## APPENDIX C: COMMUNITY AND STAKEHOLDER INPUT

Community Survey Results (2021)  
Stakeholder Input (2021)

# Community Survey Results (2021)

## Upper French Broad Blueway Survey, conducted June 19, 2021 at Rosman Riverfest (38 Responses)

1. What river activity(s) do you participate in (list all that apply)?
  - a. Swimming (18) (47%)
  - b. Boating (19) (50%)
  - c. Fishing (15) (39%)
  - d. Paddle camping (6) (16%)
  - e. Other, please list: *Wildlife/ bird watching (2); Picnicking/ tubing (3); Snorkeling (2)*
  
2. What would be important for you to have at a river access site (list all that apply)?
  - a. Boat trailer access and parking (14) (37%)
  - b. Informational signage/kiosk (23) (61%)
  - c. Campsites (12) (32%)
  - d. Picnic tables (21) (55%)
  - e. Other (Please list): *Trash Cans (2); Bathrooms/ changing area; Rentals; Parking; Bike/ boat rack to lock while shuttling; Hiking nearby; More trees*
  
3. What is your ideal time to spend on a paddle trip?
  - a. 2 hours or less (8) (22%)
  - b. 2-4 hours (22) (61%)
  - c. 4 or more hours (6) (17%)
  
4. Do you find it difficult to get up to date information about river conditions (hazards, water levels, points of interest, etc.?)
  - a. Yes (16) (44%)
  - b. No (20) (56%)
  
5. What information source would be important to you for paddle trip planning and while on the river?
  - a. Central website (28) (74%)
  - b. Central Facebook (9) (24%)
  - c. River mile markers (14) (37%)
  - d. Bridge markers listing road name (19) (50%)
  - e. Map (21) (55%)
  - f. Smartphone app (18) (47%)
  - g. Other (list): *List average time for sections*

## Stakeholder Input (2021)

### **Kent Wilcox, Transylvania County Natural Resources Council**

It's no secret that folks have been trying for years to get signage along the French Broad River, but without much success. David Whitmire put up a few signs, but most of his signs have been washed away by floods. The French Broad River Stewards proposed to put signage on overpasses - mile marker and name of road - but ran into issues with the NC DOT about methods and materials. On the last river cleanup, we were told to take out "at the third bridge", but most of us forgot to count bridges.

Chuck McGrady (from Hendersonville) is now on the NC DOT. He is a strong conservationist (big role in getting funds for DuPont State Forest and the Ecusta Trail) and is very pragmatic. He is quite skilled at cutting through bureaucracy and getting the job done. Bridges are pretty stable structures for river signage. This should be an inexpensive and long-lasting step. Getting this done would be concrete evidence (pun intended) that all of this planning is more than just talk.

States with popular recreational rivers often put water level gauges on bridge supports. Recreational boaters love to report river levels when they paddle. Outfitters check water levels to determine risks for clients. So, putting water level gauges on bridges would be informative.

Everyone wants more access sites along the French Broad River. The fact that portions of the Ecusta Trail and the French Broad River are intertwined offers a great opportunity for synergy between a biking trail and a paddling trail. My dream is to use my bike on the Ecusta Trail to shuttle between take-out and put-in sites on the river - the access points near Penrose and Horse Shoe are good examples where this could work.

You mentioned adding racks for securing bikes at access points - much better than chaining a bike to a tree.

### **Ethan Talley, Transylvania County Resident, Paddler, American Canoe Association-certified Paddling Instructor**

Thanks for including me in this email, I hope a meeting can be arranged to further discuss these access points with as many user groups as possible.

The specific areas I would like to comment on are mostly located on the upper forks. While the pull-offs are hazardous and pose risk of auto vs person accidents, the paddling community largely respects the road. The West Fork access points (Specifically the Woodruff Rd access) have been devastated by recent high water events over the past two years. While the parking is not terrible, those rock areas

## Stakeholder Input (2021)

require re-grading and leveling. Some form of storm water mitigation may also need to be considered as there are evident ruts created by runoff. The North Fork pull offs along 215 have historically been bad, I assumed that DOT was over their maintenance. One request I could see working well is to create an entryway (or break) in the guard rail at these pull offs and create a dedicated pathway (This really applies to Alligator Rock and the paddler's put in above the Submarine access point). To me, this would help with some of the erosion created by paddlers and other users hopping over the guard rail wherever seems closest or lowest. The put in 'beach' for NFFB could do with some maintenance, but I am concerned that high water events (that seem to happen more and more) threaten the integrity of whatever might be built. What could be done is a better job of maintaining the trail from the Submarine parking lot to the actual put in (underneath the power lines) which I'm sure either Duke of Haywood EMC might be willing to help with such an effort. The larger amount of use that trail has gotten over the last few years has exposed some pretty glaring problems with how that footpath was carved out, whether intentionally or unintentionally. Otherwise, I think the bulk of effort could be applied at the road versus at the river. I liked the proposed idea for utilizing the larger parking area at the Pisgah sign, I have heard it called the 'Gentleman's Takeout' and have found it to be a nice change when the Alligator pull off becomes too crowded. Some work could be done on river level there, I think, but that's just because it's not really a beach or anything. Also a crosswalk and break in the guard rail could help notify drivers of the need for caution. Also the distance from the road to the actual gravel in that particular parking area is scary. I have seen plenty of vehicles bottom out.

The only other access point I'd like to address is the Lyons Mtn Access. Having utilized that section (Champion to Lyon's) for instruction over the last 6 years, I can attest to the limited parking and space the Lyon's Mtn access has. At one point, DNR had expressed interest in expanding that site, but the land owner (as mentioned) was quite upset with the clearing job that DNR did (hence the barbed wire and signage). I would like to see that area developed because of its popularity. More parking is needed, and I would argue that any access point with such a steep bank should be studied for potentially widening and lessening the slope. That access and the one on Island Ford are quite steep sets of steps that make for difficult entry/exit from the water. This could be studied for erosion, etc. and maybe a more gradual ramp could be constructed (similar to Tuckaseegee access points) that might create easier forms of access. I also think this would go with the intent of creating more trailer access (I am assuming fishing rafts, etc.?) which might appease more user groups and create enthusiasm for development. This river is unique in the steepness of its banks for most of the upper sections, if we want more/better access, we need to think of ways to ease the strain on such steep banks.

I believe that covers my perspective. I (and Kelli) are happy to attend a meeting with the various user groups and hopefully create a dialogue. I think this river is a great example of how various user groups can coexist and work together.

## Stakeholder Input (2021)

**Tim Schubmehl, Pisgah Chapter Trout Unlimited board member, Cold Water Conservation Committee chair**

My name is Tim Schubmehl, your email dated June 21st was forwarded to me by Jim Rumbaugh, the President of the Pisgah Chapter of Trout Unlimited (PCTU).

I am a member of the Chapter Board as well as the Chair of our Cold Water Conservation Committee.

PCTU has a long history of involvement with the Davidson River. It may not be well known, but in April of 2002, PCTU in cooperation with the USFS-PNF, adopted a nine mile section of the Davidson River from Sycamore Flats to the Cove Creek Parking Area.

In looking at the documentation that was attached, I noted that there are some areas on the Davidson River that have been identified. Specifically: Sycamore Flats, Coontree Picnic Area and the Pisgah Wildlife Education Center.

Early on Sycamore Flats was a major focus for us and the USFS. All of the fence, access points and planting were done by PCTU volunteers with the support of the USFS, local organizations and grant monies.

Since then, in other areas, we have installed several thousand feet of split rail fence, constructed hardened access points, bank stabilization projects, and done riparian planting.

Much of what we do is focused on the prevention of sedimentation from entering the Davidson River. In many cases sedimentation was the result of numerous casual trails entering the river.

In addition, macroinvertebrate surveys, and Basin Visual Estimation Technique (BVET) studies have been performed which are part of the process for determining water quality to support wildlife.

Also, we have installed five fishing line recycling containers along the river, for over twenty years we have been doing Adopt-A-Highway roadside cleanup on a three mile stretch of Hwy 276, for five years we have also been doing three miles on Hatchery Road. In 1998 PCTU built and continues to maintain the Kiosk at the Pisgah Wildlife Education Center.

Most recently, working with several partners, we completed the Davidson River Enhancement Project adjacent to the Pisgah Wildlife Education Center with a project cost of over \$30,000.

As you can see, for many years, PCTU has invested a considerable amount of time and funds in this section of the Davidson River.

## Stakeholder Input (2021)

I hope this information will help you with your long term planning and we look forward to being involved with the ongoing dialogue.

### **Ken Kinard, Transylvania County Natural Resources Council**

This is Ken Kinard, I am on the TCNRC, one of the areas that would help tourism would be to identify some more public acceptable fishing areas. The East Fork is so heavily fished because it is along the road. There is a section along East Fork Road that the public could access. Parking is an issue as well as silting in the river. If some stream restoration is done it could provide maybe a half mile of trout habitat. I'd be happy to discuss this with you if you are interested.

### **David Whitmire, Headwaters Outfitters Owner**

*From in-person conversation:*

- Desire for continuance of and/or increase for strainer removal funds.
- Improve/extend trailer parking situation at Lyons Mountain Access.
- Create better layout/flow of traffic at Island Ford Access.
- Improve/add signage to bridge faces, surrounding roads.
- Work with riverside landowners to flag and remove/trim leaning trees before they fall into the river and become strainers/sweepers.

### **Kevin Colburn, American Whitewater National Stewardship Director**

I think the map and content is great. You did a terrific job.

I wonder about the recreation value of the Little River in the reach between the Cascade powerhouse and the French Broad. I've not paddled it. I think the final plan should not have gaps in river reaches like the Davidson or Little. I'll try to explore.

I noticed a dam on the Davidson, we should note any dams/hazards in the plan.

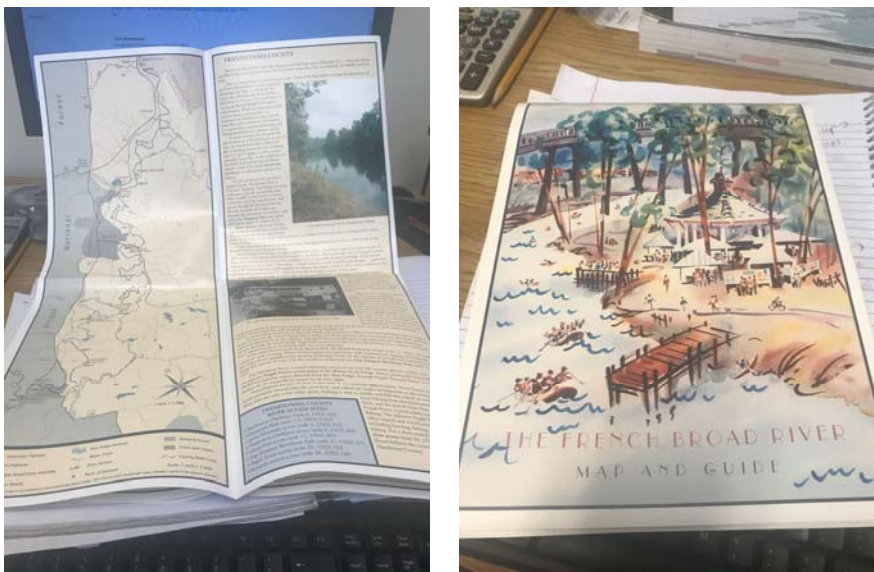
I think we could think bigger about the North Fork. That road is dangerous enough that some intentional off-road parking might be in order or at least as an aspirational goal. Also, the submarine description would benefit from a bit more intel about how folks use it as a put in.

## Stakeholder Input (2021)

I am interested in erosion, BMPs, etc. I know that even discussing this could make people concerned about buffers etc, but I think it may be worth exploring. And point sources. The one thing I hear from people most often about the FB is not about too little access, but the health risk of pollution, bacteria, etc. Recreation will benefit from a clean, healthy river.

### Renee Fortner, RiverLink Watershed Resources Manager

This is great; It looks like you have a lot of information collected already. I am attaching photos of the old map that you may be referring to. I have no idea where that design file would be, but could dig around if it is needed. I see benefits to having a smaller fold-out map like this one, in addition to the spiral bound book that Mountain True maintains.



Anyway, see my thoughts below. Thanks for including RiverLink in the discussion!

- Public restrooms at the formal takeouts would be beneficial. Over the years, numerous people have commented to us on the need for restrooms along the paddle trail. I know this is tricky with the access points being in the floodplain. A feasibility study should be conducted to identify where restrooms could be safely located along the paddle trail corridor.
- Paddle trail mileage signs on bridges so that paddlers can see it from the river. My co-worker RJ Taylor has spoken to NCDOT about this and they are open to the idea.

## Stakeholder Input (2021)

- Funding for updated/replacement signage at takeouts. RiverLink received a grant to develop and install the current paddle trail signage that includes Mountain True and RiverLink's logos. We do not have funding to replace those signs.
- More funding for tree/debris removal to keep the river navigable.

### **Anna Alsobrook, MountainTrue Watershed Outreach Coordinator**

- Strainers and logjams are serious issues down there. I've just recently heard of a woman flipping and swimming through one the other day. They are real safety issues for recreationalists. More money to remove them would be great, but IDEALLY there would be buffer rules in place preventing farmers (and developers/landscapers) from removing riparian vegetation (ie mowing/planting all the way to river's edge) and allowing cows access to the river. There would be a lot less trees falling in the river if the river banks were stable and tree roots had solid ground to hold on to.
- Adequate buffers would also help to filter out sediment and other pollutants from entering the river, allowing it to be cleaner for recreational use.

### **Grant Bullard, Gwynn Valley Camp Director/Owner**

These are exciting times with all that's going on with the river and trail systems. We have a couple of sections of the FB that we use presently. One is the section of the river between Champion Park and Lyons Mtn. Rd takeout. As you may or may not know that access point was quite controversial back in '19. The land owner erected lots of signage (some still there) and put up barbed wire on the property line at the access point. We've used that site a bunch this summer with our beginner paddlers and the barbed wire is a bit much. I'm always concerned that a camper carrying a boat will fall against the wire and get a severe scratch or cut. I would love to see that takeout a bit bigger. The parking has worked itself out and we don't park on the side of the road where the access point is. We always park on the opposite side of the road which has ample parking. We usually pull the van and trailer across the road for loading to keep campers safe as they load boats after the trip. As for Champion Park, it is seeing more use and it would be nice to have some bathrooms there as well as a bigger area to bring in a van with boats and trailers. At one point you could use the bathrooms in the Rosman city hall but covid may have prevented that. This section is great for a short morning or afternoon float and a great intro to moving water for both our kayakers and canoers.

The other section of the river that we use is the access point on Wilson Rd. just near the intersection of old 64 and Wilson just up from the PF Post Office. That access point could be a bit larger especially if you're pulling a trailer with a van. Some days it's hard to get in and turn around to get out. The old



## Stakeholder Input (2021)

takeout we used in 2019 was just before the Patton Rd bridge off of Everett Rd. That piece of land has been purchased by the folks at the Key Falls Inn. They have improved the area and one has to have a permit to park there. They willingly allowed us to use that section several times this summer. This is also a good run for beginners and usually has more water if the Rosman section is too low. The first rapid is great for teaching and could use some work clearing out vegetation. I usually take some pruning shears on the first trip of the summer to take out overhanging tree limbs and such that interfere with paddlers view and navigation. It just needs a little love. The rest of that run is pretty basic and has another great rapid for beginners just before the bridge. Again, the distance for a paddle here is similar to the Rosman section above. Both good for an afternoon or evening paddling experience. The next take out is too far and too much flatwater for teaching. The takeout that Key Falls has purchased is the only access point til you reach the next bridge on Crab Creek Rd.

We mainly use these just for beginners and because they are quick access get in get out. I know a few other camps use these as well to progress to bigger water north and west of Brevard. These are valuable for us and I would hate to lose or lessen access to the points. One other section that we've used in the past is the North Fork from Alligator Rock down to Champion Park. It's mostly a small boat run (kayaks) and is only usable when we have an abundance of water. This year it has been pretty low. The section of the river where the North Fork Flows into the FB needs a little love just downstream also. Vegetation has grown out over the river and made it difficult to navigate some of the man made rapids that were created when they widened 64. It's a good quick run as well and would be used more if it received more attention.

Given the amount of dollars camps bring to the county, it would be nice to see some improvements to the river and its access. I'm sure some of our year round staff would be willing to help with some maintenance and ideas for the future and any projects that you all come up with. Years ago there were slalom gates set up at the park on 276 (Hap Simpson). I think Brevard College provided this. I've always thought that if there were a few river features added there it would be a great place to train young paddlers and provide something for visitors coming to the area. Of course the Corp of Engineers, American Whitewater, American Canoe Assoc. would have to be involved as well as many others. If the old Picklesiemer land turns into a park that may be another possible project that could enhance usage in positive ways. We need a group like the mountain bikers (SORBA) have that take care of rivers.

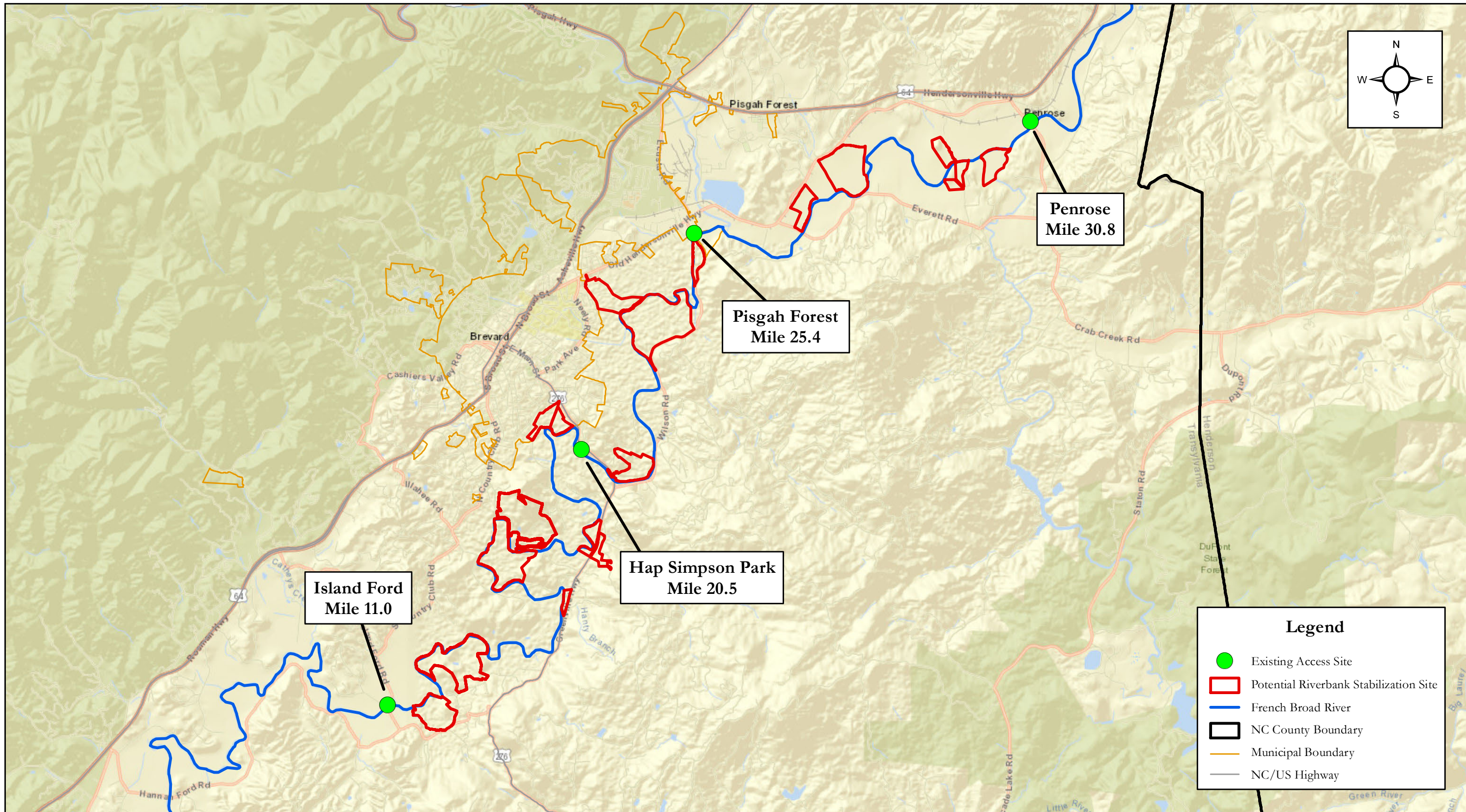


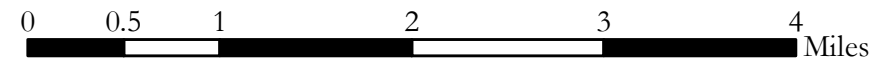
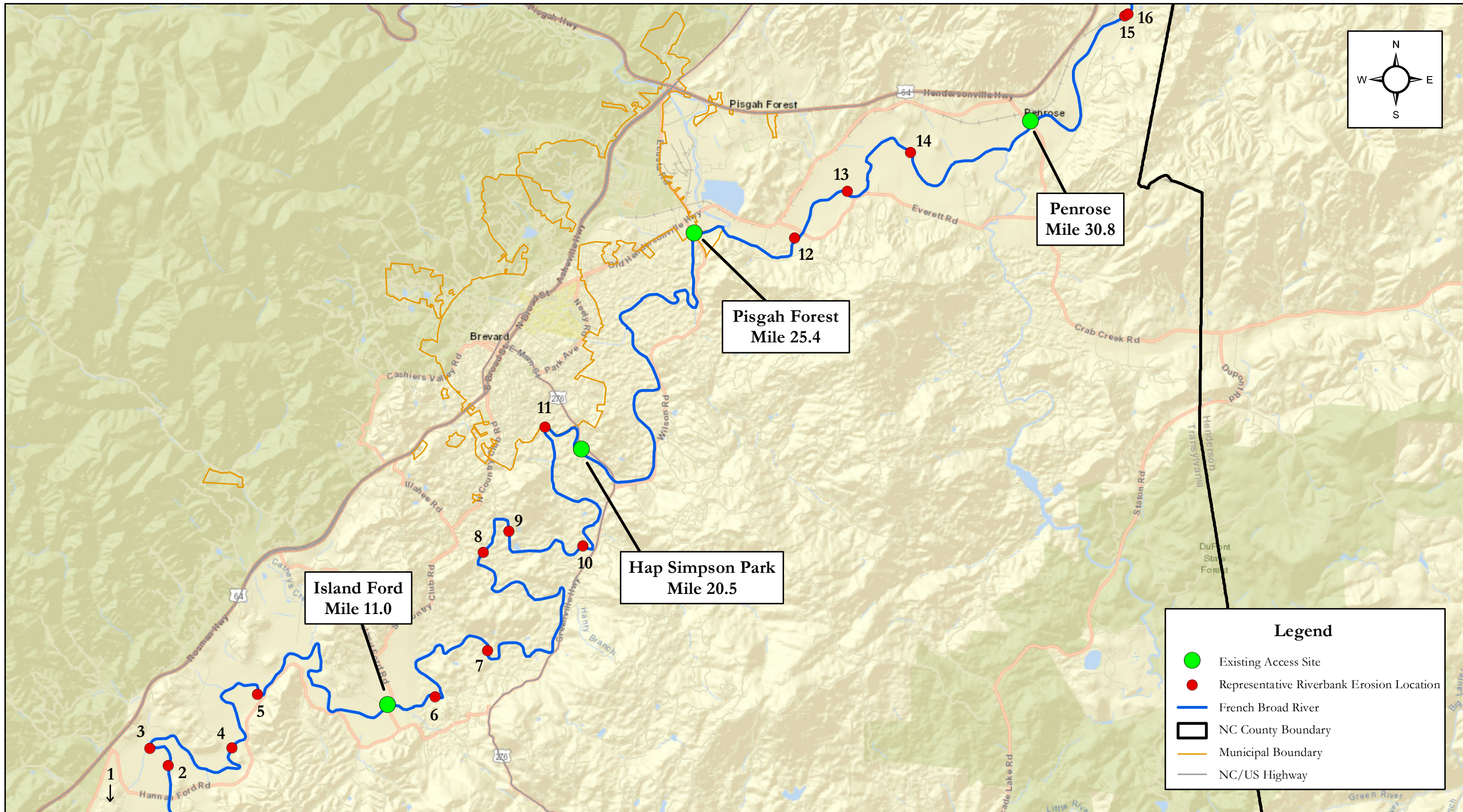
## APPENDIX D: RIVERBANK EROSION INVENTORY

Sheet D1: Potential Riverbank Stabilization Sites

Sheet D2: Representative Riverbank Erosion Locations

Photographs: Representative Riverbank Erosion Locations





## Photographs: Representative Riverbank Erosion Locations



Location 1



Location 2

## Photographs: Representative Riverbank Erosion Locations



Location 3



Location 4

## Photographs: Representative Riverbank Erosion Locations



Location 5



Location 6

## Photographs: Representative Riverbank Erosion Locations



Location 7



Location 8



## Photographs: Representative Riverbank Erosion Locations



Location 9

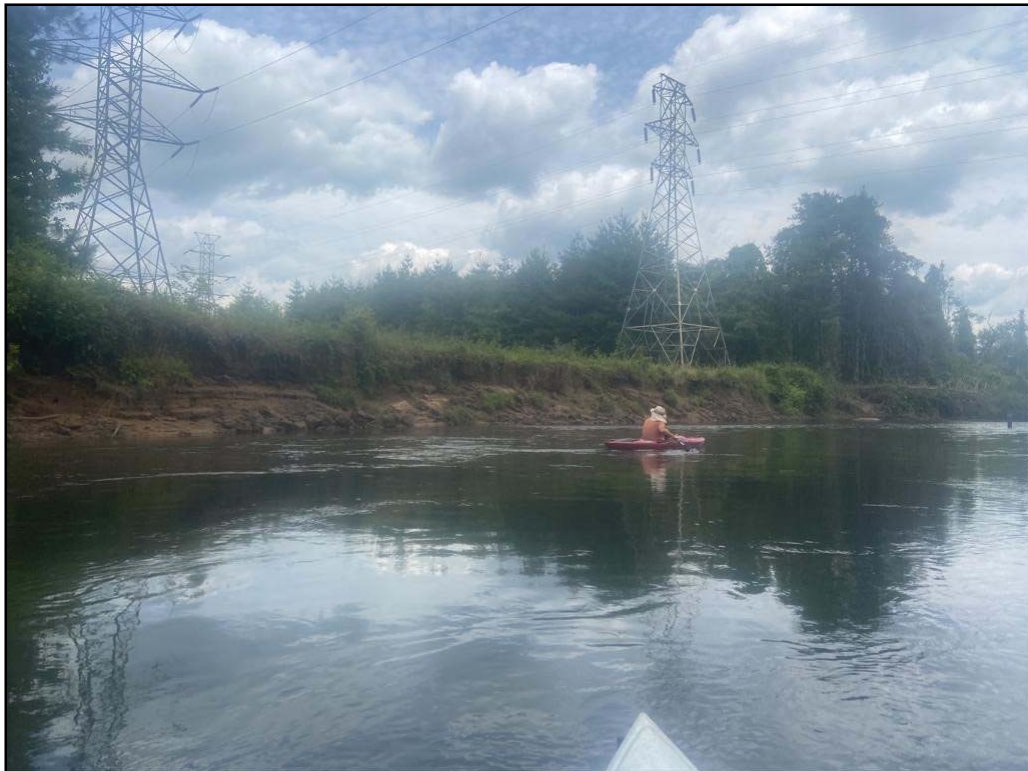


Location 10

## Photographs: Representative Riverbank Erosion Locations



Location 11



Location 12

## Photographs: Representative Riverbank Erosion Locations



Location 13



Location 14

## Photographs: Representative Riverbank Erosion Locations



Location 15

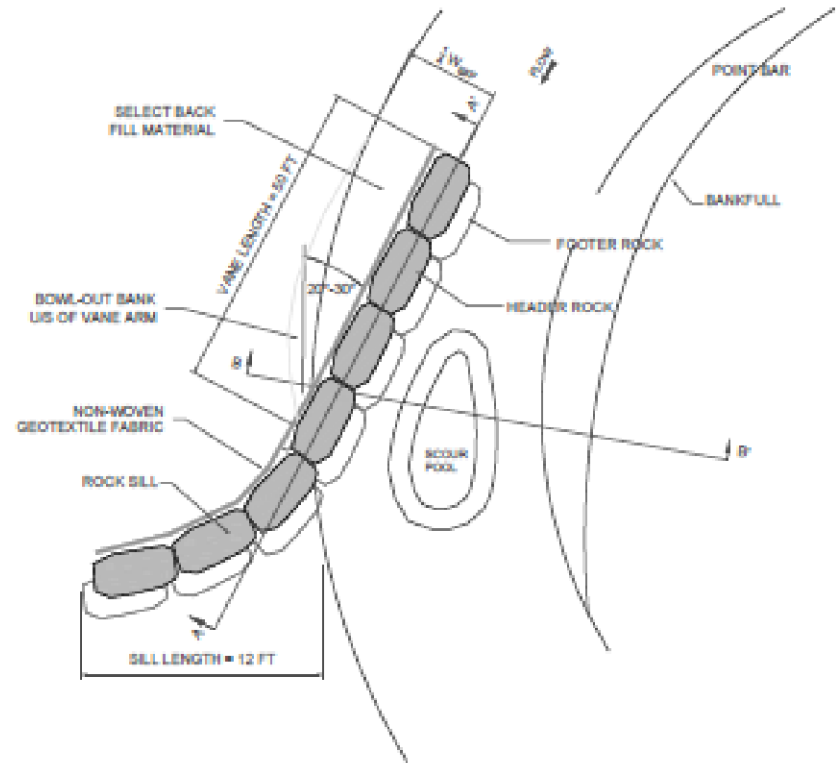


Location 16



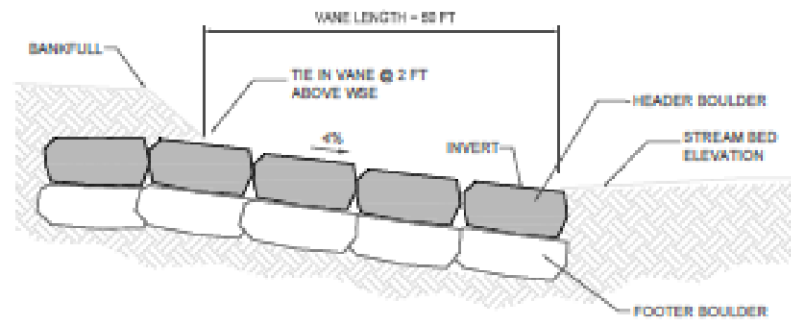
## APPENDIX E: TYPICAL DESIGN DETAILS: RIVERBANK STABILIZATION/RESTORATION

- Sheet E1. Design Detail: Single Arm Boulder Vane
- Sheet E2. Design Detail: Log Vane
- Sheet E3. Design Detail: Boulder Toe
- Sheet E4. Design Detail: Toe Wood Revetment
- Sheet E5. Design Detail: Erosion Control Matting
- Sheet E6. Design Detail: Vegetation



**SINGLE ARM BOULDER VANE  
DETAILED PLAN**

NOT TO SCALE

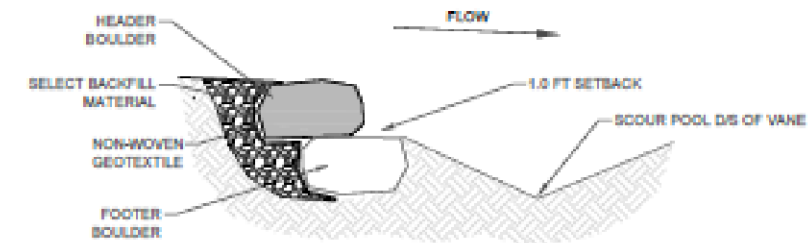


**SINGLE ARM BOULDER VANE  
DETAILED SECTION A - A'**

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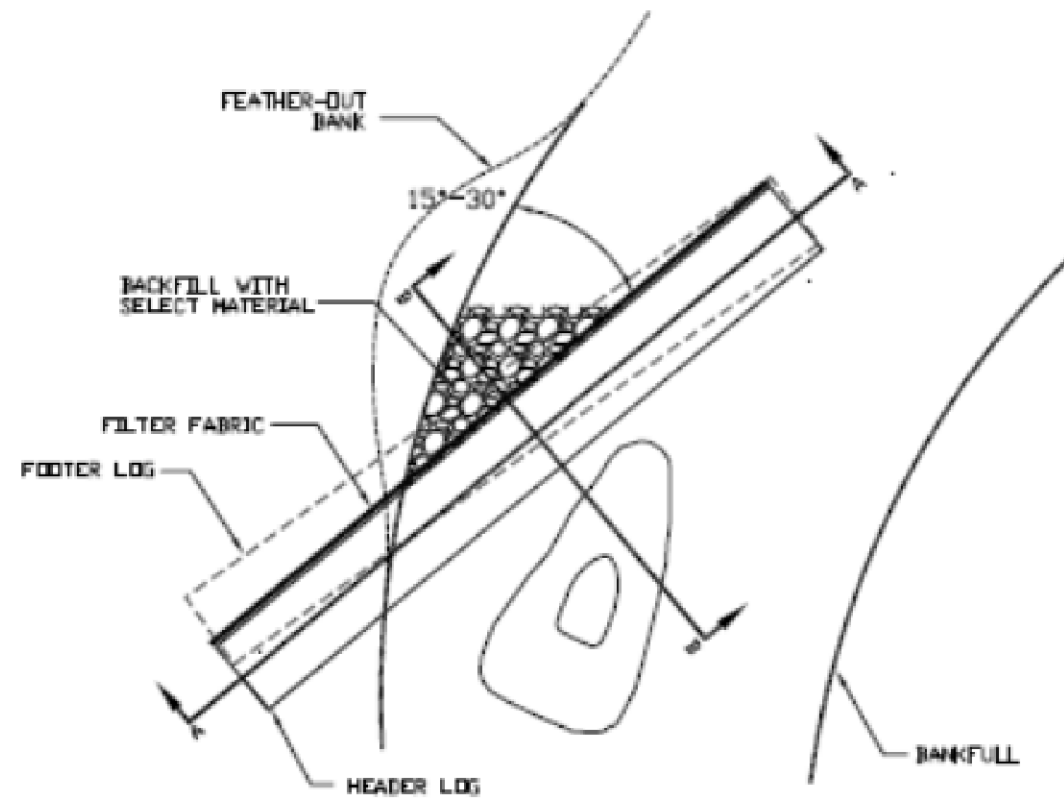
**SINGLE ARM BOULDER VANE  
NOTES**

1. FOOTER BOULDERS ARE BOULDERS PLACED TO PROVIDE A FOUNDATION AND SCOUR PROTECTION FOR THE HEADER BOULDERS.
2. HEADER BOULDERS SHALL BE UNDERLAIN BY FOOTER BOULDERS WITH A 1 FT SETBACK UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
3. HEADER BOULDERS ARE THE TOP MOST LOGS USED IN EACH LOG STRUCTURE. ALL HEADER BOULDERS CAN BE SEEN PARTIALLY PROTRUDING FROM THE WATER SURFACE DURING EXTREMELY LOW FLOWS.
4. HEADER LOGS SHALL BE OFFSET SLIGHTLY DOWNSTREAM OF THE FOOTING LOGS WHERE SCOUR POOLS ARE ANTICIPATED TO FORM AS SHOWN IN THE DETAIL.
5. SILL BOULDERS SHALL BE PLACED PERPENDICULAR TO THE BANKFULL FLOW DIRECTION.
6. INVERT AND TIE IN ELEVATIONS SHALL BE DETERMINED BY THE ENGINEER ONSITE.
7. ALL GAPS/VOIDS LARGER THAN 1 INCH BETWEEN THE HEADER AND FOOTING BOULDERS SHALL BE CHINKED WITH GRAVEL AND COBBLES.
8. ON THE UPSTREAM SIDE OF THE BOULDERS NON-WOVEN GEOTEXTILE FABRIC SHALL BE PLACED AS SHOWN IN THE GEOTEXTILE PLACEMENT AND SELECT BACKFILL DETAIL FOR THE ENTIRE LENGTH OF THE VANE ARM.
9. BACKFILL STRUCTURE WITH SELECT BACKFILL MATERIAL AS SHOWN AND DEFINED IN THE GEOTEXTILE PLACEMENT AND SELECT BACKFILL DETAIL.
10. SELECT BACKFILL AND SOIL BACKFILL MATERIAL SHALL BE COMPACTED SUCH THAT FUTURE SETTLEMENT OF THE MATERIAL IS KEPT TO A MINIMUM.
11. THE SURFACE OF THIS STRUCTURE SHALL BE FINISHED TO A SMOOTH AND COMPACT SURFACE IN ACCORDANCE WITH THE LINES, GRADES, AND CROSS-SECTIONS OR ELEVATIONS SHOWN ON THE DRAWINGS. THE DEGREE OF FINISH FOR INVERT ELEVATIONS SHALL BE WITHIN 0.1 FT OF THE GRADES AND ELEVATIONS INDICATED.
12. RE-DRESSING OF CHANNEL AND BANKFULL BENCH/FLOODPLAIN WILL LIKELY BE REQUIRED FOLLOWING INSTALLATION OF IN-STREAM STRUCTURES AND SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.
13. NO LIVE STAKES SHALL BE INSTALLED ON THE UPSTREAM SIDE OF THE LOG VANE AT OR BELOW THE TIE-IN ELEVATION OF THE HEADER LOG WITH THE STREAM BANK UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
14. FOOTER DEPTH ON ALL STRUCTURES REQUIRING FOOTERS SHALL BE 6 TIMES GREATER THAN THE DROP BETWEEN THE STRUCTURE AND THE FOOTERED STRUCTURE DIRECTLY UPSTREAM.



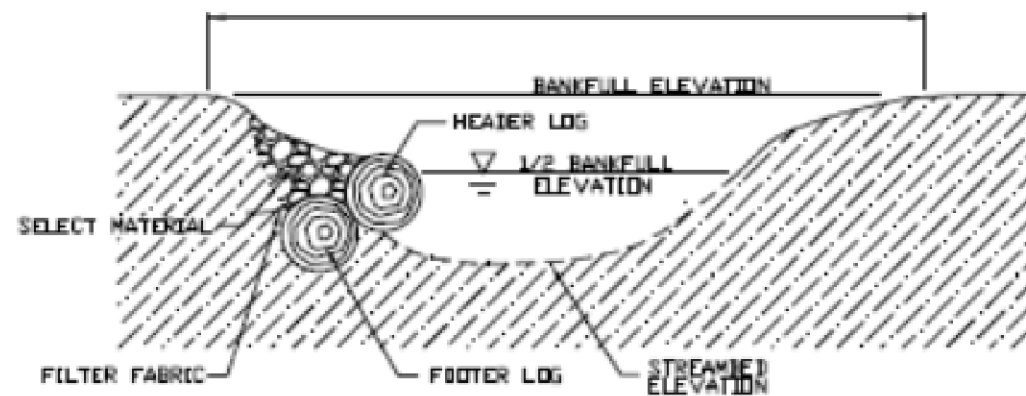
**SINGLE ARM BOULDER VANE  
DETAILED SECTION B - B'**

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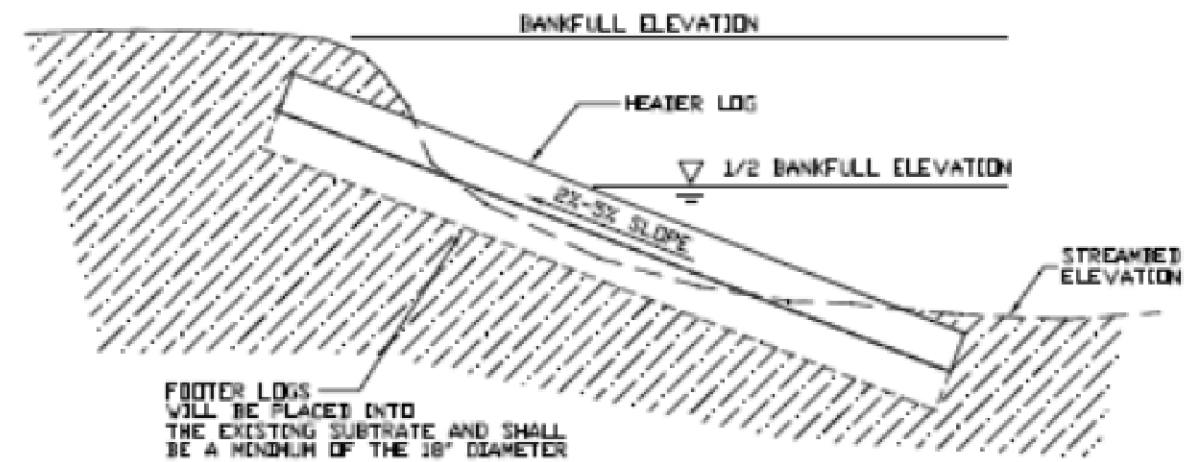


PLAN VIEW

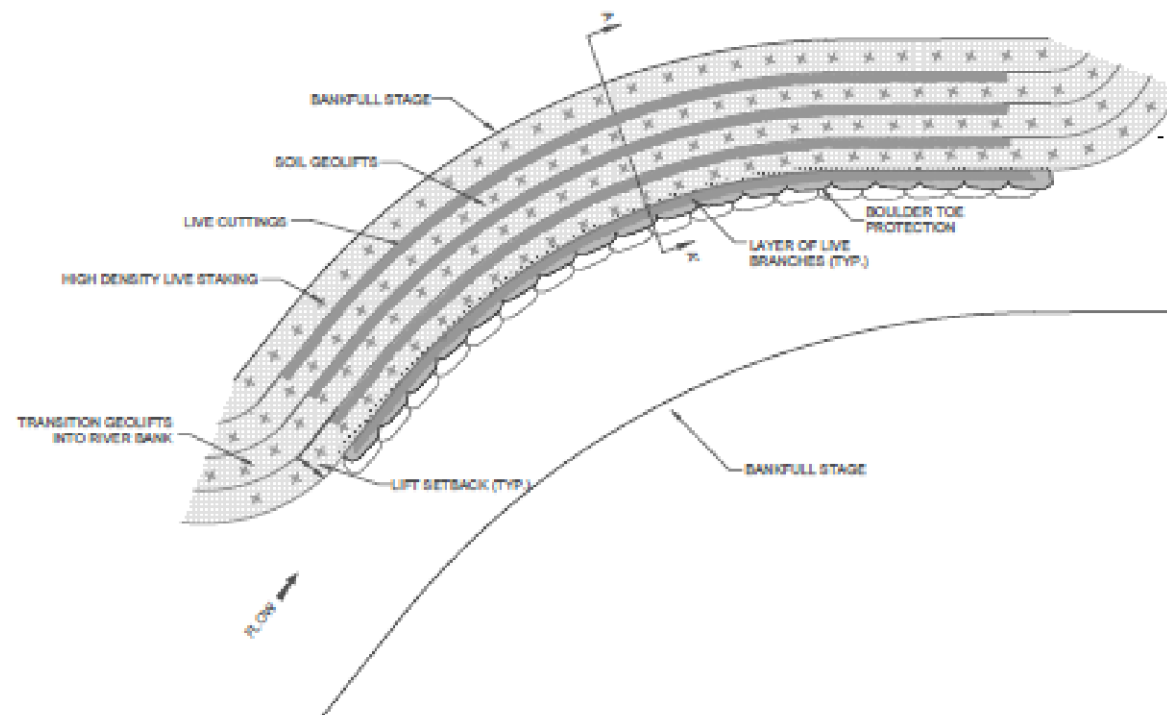
1. FILTER FABRIC SHALL BE PLACED ON THE UPSTREAM SIDE OF THE STRUCTURE 1/4 DIAMETER FROM THE TOP OF THE LOG. THE NAILS SHALL BE ON 12 INCH CENTERS. FILTER FABRIC SHALL BE BURIED IN THE BOTTOM OF THE CHANNEL AND SHALL BE PLACED THE ENTIRE LENGTH OF THE STRUCTURE.
2. A TRENCH SHALL BE DUG IN SUCH A MANNER THAT THE FOOTER BOULDERS AND LOGS A MINIMUM OF 2/3 OF THE HEADER BOULDER IS BURIED BENEATH THE BED SURFACE ELEVATION.
3. LOG IS HARDWOOD AND A MINIMUM DIAMETER OF 24". THE LOG SHALL BE BURIED A MINIMUM OF 5 FT IN THE BANKS.
4. FILTER FABRIC SHALL BE PLACED ON THE UPSTREAM SIDE OF THE VANE STRUCTURE TO PREVENT WASHOUT OF SEDIMENT THROUGH BOULDER GAPS. FILTER FABRIC SHALL EXTEND FROM THE BOTTOM OF THE FOOTER BOULDER TO THE FINISHED GRADE ELEVATION AND SHALL BE PLACED THE ENTIRE LENGTH OF THE STRUCTURE.



SECTION A-A

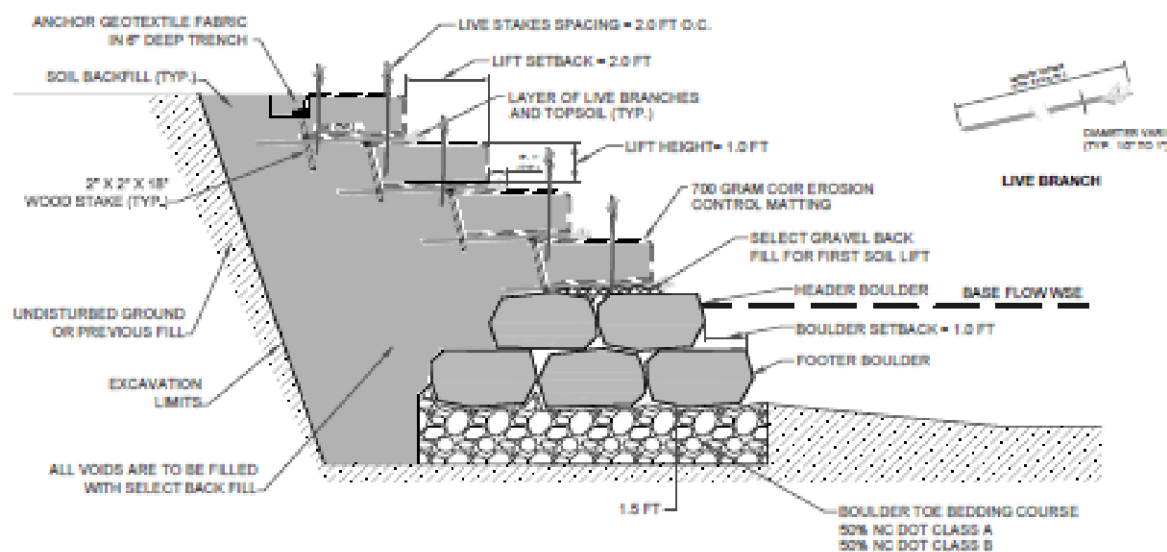


SECTION B-B



**BOULDER TOE PROTECTION WITH SOIL LIFTS  
DETAILED PLAN**

NOT TO SCALE



**BOULDER TOE PROTECTION WITH SOIL LIFTS  
DETAILED CROSS-SECTION A - A'**

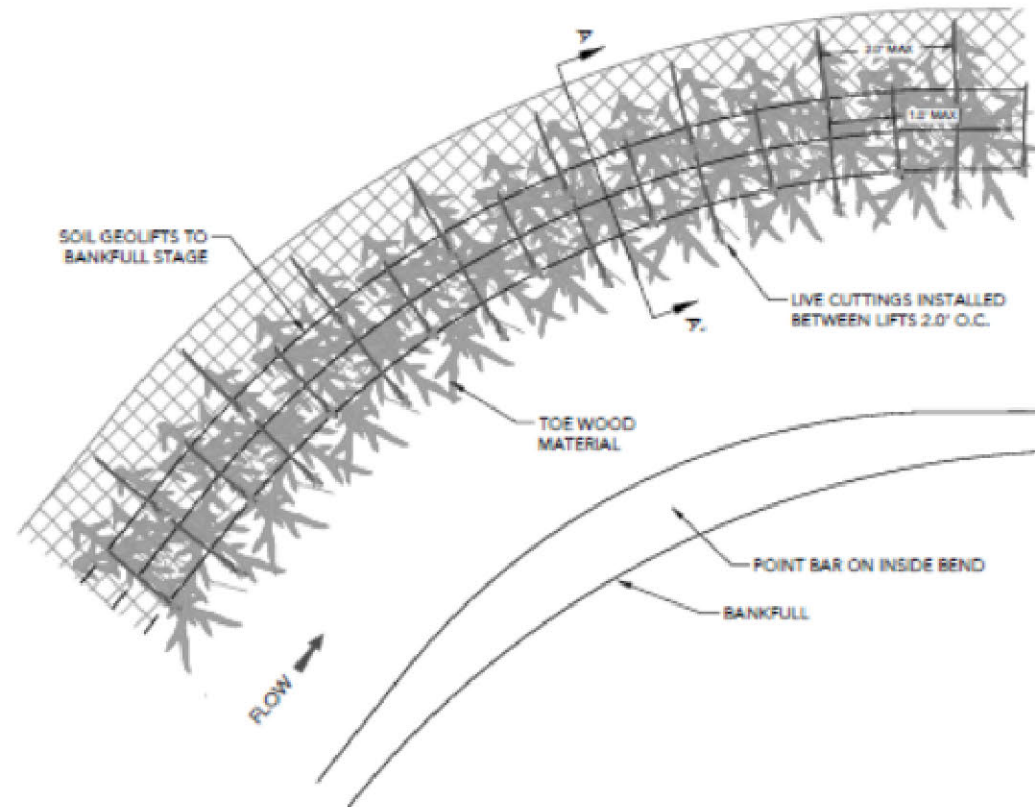
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**BOULDER TOE PROTECTION WITH SOIL GEOLIFTS**

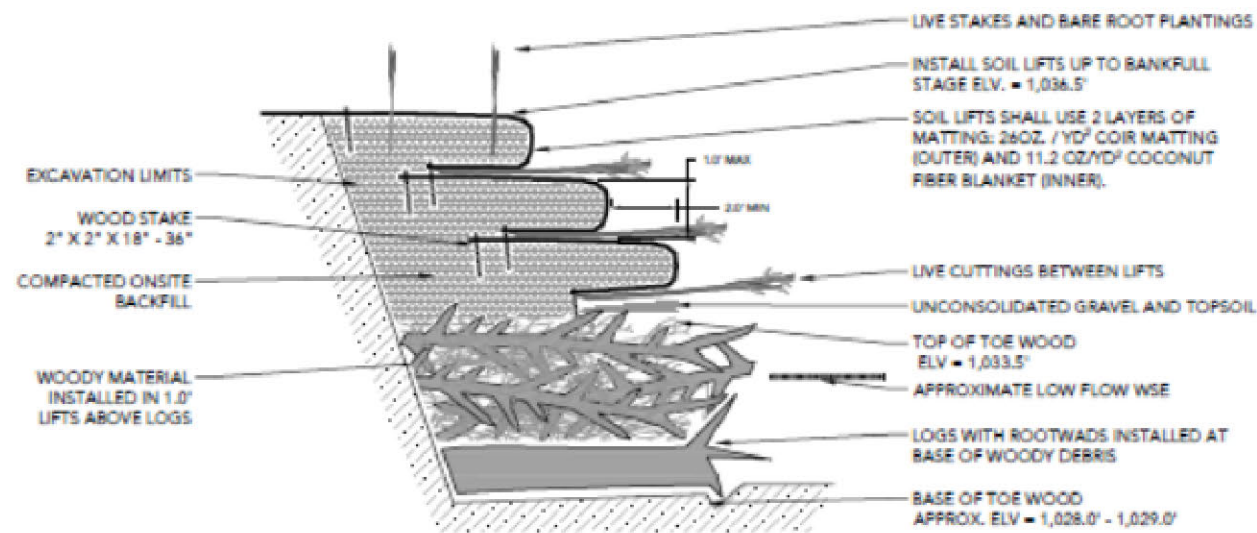
**NOTES**

1. A 1.5 FT THICK BEDDING COURSE CONSISTING OF WELL GRADED 50% NC DOT CLASS A ROCK AND 50% NC DOT CLASS B ROCK SHALL BE INSTALLED BELOW THE BOULDER FOUNDATION UP TO THE ELEVATION OF THE STREAM BED.
2. FOOTER BOULDERS SHALL BE INSTALLED AT THE ELEVATION OF THE EXISTING STREAM BED SUCH THAT A 5 FT - 8 FT WIDTH FOUNDATION IS CREATED. BOULDERS MAY BE MINED AND REUSED ONSITE. FOOTER BOULDERS SHALL BE 3.0' X 3.0' X 5.0' +/- 0.5'.
3. HEADER BOULDERS SHALL BE INSTALLED ATOP THE FOOTER BOULDERS. ALL BOULDERS SHALL FIT TIGHTLY TOGETHER. HEADER BOULDERS SHALL BE INSTALLED WITH A 1.0 FT SETBACK FROM THE FRONT EDGE OF THE FOOTER BOULDERS. BOULDERS MAY BE MINED AND REUSED ONSITE. HEADER BOULDERS SHALL BE 3.0' X 3.0' X 5.0' +/- 0.5'.
4. GRAVEL LEVELING BASE SHALL BE INSTALLED ABOVE THE HIGHEST ELEVATION OF THE FOUNDATION BOULDERS BEFORE THE SOIL LIFTS ARE INSTALLED.
5. THE SOIL BACKFILL USED FOR LIFTS AND TOPSOIL USED FOR LAYERING WITH THE LIVE BRANCHES SHALL BE FREE OF ANY LARGE ROOTS OR WOODY DEBRIS AND SHALL GENERALLY BE FREE FROM ANY GRAVEL OR COBBLE MATERIAL.
6. SOIL BACKFILL SHALL BE COMPACTED SUCH THAT FUTURE SETTLING WILL BE KEPT TO A MINIMUM, YET, NOT SUCH THAT THE UNDERLYING BRUSH IS DISPLACED OR DAMAGED.
7. THE TOP OF THE BACKFILL FOR THE FIRST LIFT SHALL BE SLOPED AT APPROXIMATELY 5% AWAY FROM THE STREAM.
8. PLACE A LAYER OF TOPSOIL AND LIVE BRANCHES ON TOP OF EACH SOIL LIFT SUCH THAT APPROXIMATELY 6 INCHES TO 1 FOOT OF EACH LIVE BRANCH WILL BE EXPOSED AND THE REMAINDER (2' TO 4') OF EACH LIVE BRANCH WILL BE COVERED BY THE NEXT SOIL LIFT.
9. LIVE BRANCHES SHALL BE OF THE SPECIES SPECIFIED FOR LIVE STAKES OR APPROVED BY THE ENGINEER.
10. PLACE A LAYER OF 6.5 FEET WIDE GEOCOIR DEKOWE 700 EROSION CONTROL BLANKET, OR EQUIVALENT, ON TOP OF THE TOPSOIL AND LIVE BRANCHES SUCH THAT 2.5 FEET OF THE BLANKET WILL BE BURIED BELOW THE NEXT SOIL LIFT. ALLOW THE REMAINING 4.5 FEET OF BLANKET TO HANG OVER THE PRECEDING SOIL LIFT OR COIR FIBER LOGS.
11. PLACE A LAYER OF 6.5 FEET WIDE NON-WOVEN COIR MATTING OVER THE EROSION CONTROL BLANKET TO THE SAME LIMITS.
12. SOIL CAN BE COMPACTED BY STACKING A PIECE OF 2 X 6 SAWN LUMBER EDGEWAYS UP TO THE LIFT HEIGHT SPECIFIED IN THE STRUCTURE TABLE AND SECURING WITH WOODEN STAKES TO PROVIDE A RIGID BACKSTOP FOR COMPACTING SOIL LIFT.
13. PLACE SOIL BACKFILL UP TO THE LIFT HEIGHT SPECIFIED OF NO GREATER THAN 1.0 FT BEING CAREFUL NOT TO PUSH/PULL OR TEAR THE FABRIC PREVIOUSLY PLACED.
14. THE TOP OF THE SOIL BACKFILL SHALL BE FLAT WITHIN THE LIFT SETBACK DISTANCE SPECIFIED IN THE STRUCTURE TABLE. BEYOND THE LIFT SETBACK DISTANCE, THE SOIL BACKFILL SHALL BE SLOPED AT AN APPROXIMATE 5% SLOPE AWAY FROM THE STREAM.
15. TOP DRESS THE SOIL LIFT WITH TOPSOIL FROM THE FACE OF THE SOIL LIFT BACK INTO THE FLOODPLAIN AT LEAST 4FT.
16. REMOVE THE SAWN LUMBER AND WOODEN STAKES FROM THE FACE OF THE SOIL LIFT AND WRAP THE FACE AND TOP OF THE SOIL LIFT USING THE WOVEN AND NON-WOVEN COIR MATTING HANGING OVER THE PREVIOUS LIFT/COIR FIBER LOGS.
17. THE EROSION CONTROL FABRIC SHALL BE PULLED AS TIGHT AS POSSIBLE WITHOUT TEARING OR EXCESSIVELY DISTORTING THE FABRIC.
18. SECURE THE EROSION CONTROL AND NON-WOVEN MATTING IN PLACE BY STAKING THE END OF THE EROSION CONTROL FABRIC WITH WOODEN STAKES ON 1.5-FOOT CENTERS.
19. BEGIN CONSTRUCTION OF THE NEXT SOIL LIFT BY REPEATING THE PREVIOUS NOTES STARTING WITH NOTE 11.
20. THE OVERALL SLOPE CREATED BY THE LIVE BRUSH LAYERING SHALL MATCH THE PROPOSED CROSS SECTION SHAPE FOR THE OUTER BANK OF THE TYPICAL POOL CROSS-SECTION FOR EACH REACH.
21. THE COIR BLANKETS AND GEOTEXTILE FABRIC USED FOR THE UPPER MOST SOIL LIFT WILL BE SECURED WITHIN A 6 INCH DEEP TRENCH AS SHOWN IN DETAIL. TRENCH AS SHOWN IN THE DETAIL.
22. THE SURFACE OF THIS STRUCTURE SHALL BE FINISHED TO A SMOOTH AND COMPACT SURFACE IN ACCORDANCE WITH THE LINES, GRADES, AND CROSS-SECTIONS OR ELEVATIONS SHOWN ON THE DRAWINGS. THE DEGREE OF FINISH FOR ELEVATIONS SHALL BE WITHIN 0.1 FT OF THE GRADES AND ELEVATIONS INDICATED OR APPROVED BY THE ENGINEER.
23. RE-DRESSING OF CHANNEL AND BANKFULL BENCH/FLOODPLAIN WILL LIKELY BE REQUIRED FOLLOWING INSTALLATION OF IN-STREAM STRUCTURES AND SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.





**DETAILED PLAN**  
NOT TO SCALE



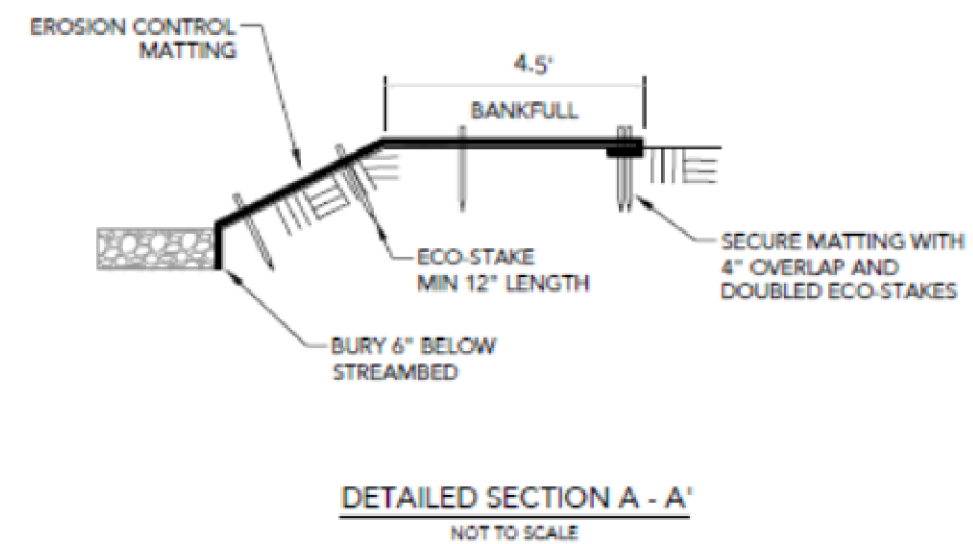
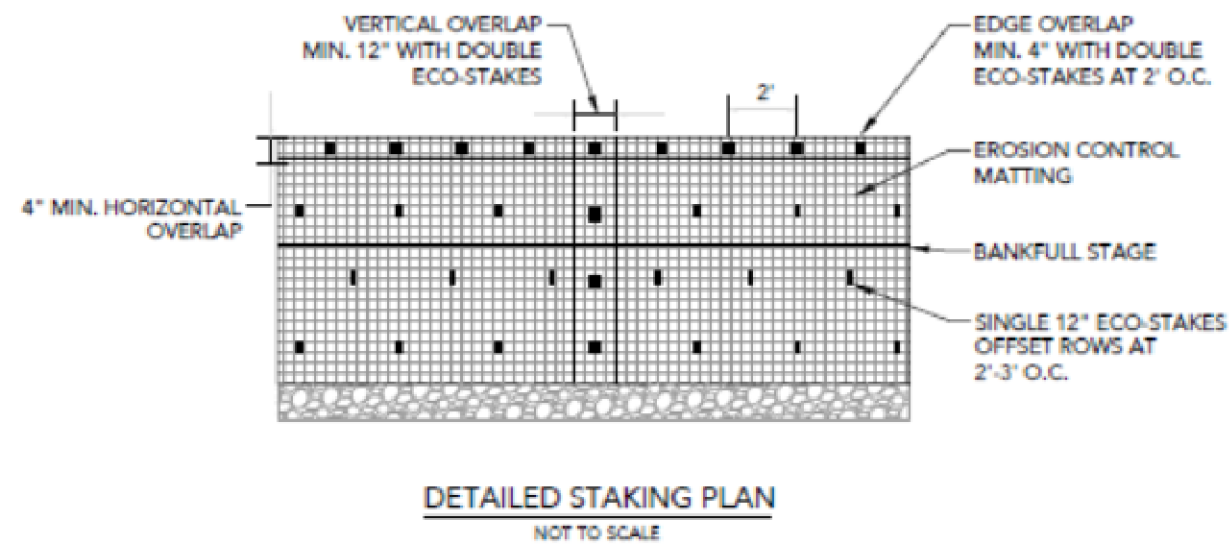
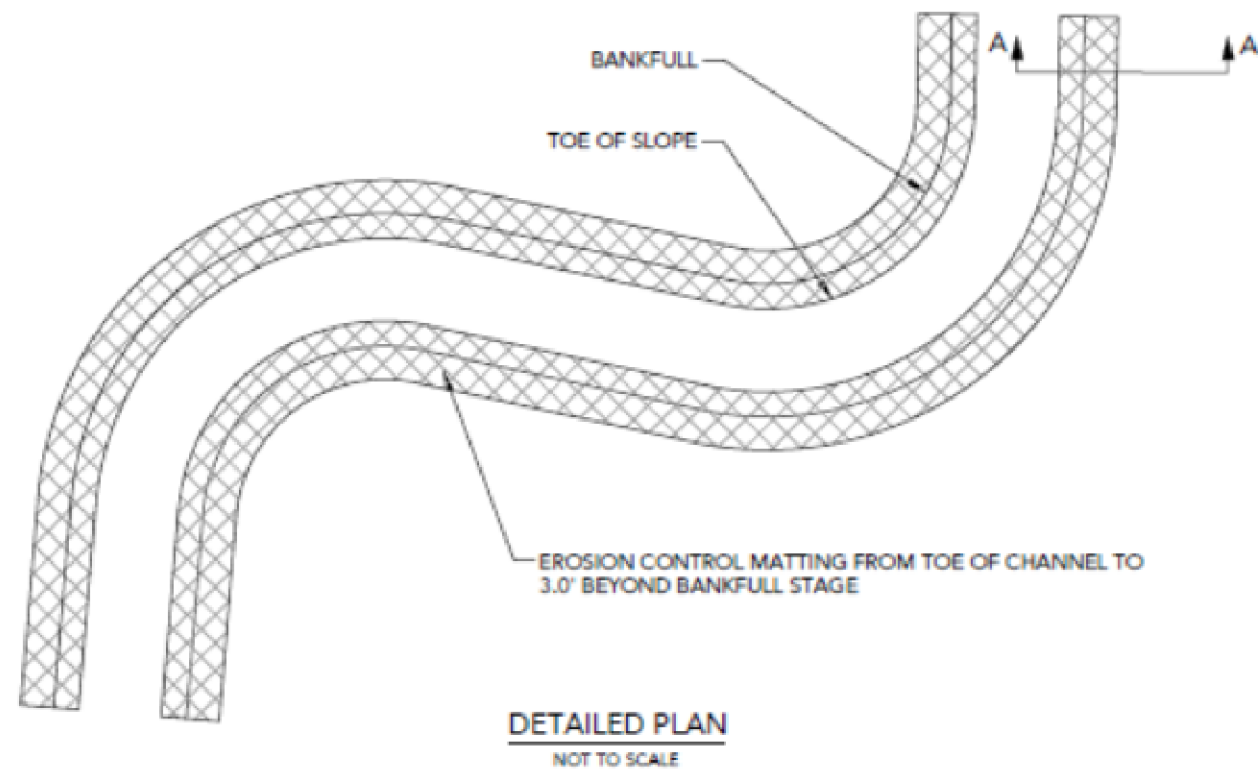
**DETAILED SECTION A - A**  
NOT TO SCALE

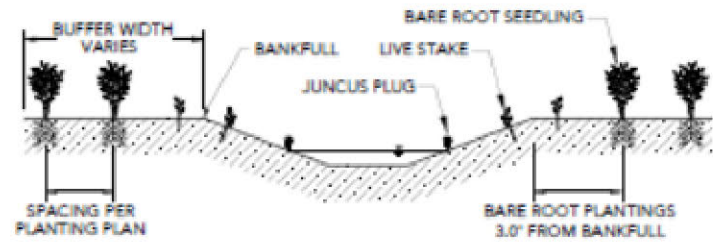
**TOE WOOD NOTES**

1. WOODY MATERIAL USED IN THE TOE WOOD STRUCTURE SHALL CONSIST OF LOGS, LARGE BRANCHES AND WOODY DEBRIS RANGING IN DIAMETER FROM 1" TO 12". LARGE VOIDS SHALL BE FILLED WITH FINE WOODY MATERIAL AND DEBRIS. ALL MATERIALS ARE TO BE APPROVED BY THE ENGINEER. A LAYER OF LOGS WITH ROOT WADS INTACT SHALL BE INSTALLED ALONG THE BASE OF THE STRUCTURE. WOODY MATERIAL SHALL BE INSTALLED IN 1.0' LIFTS. EACH LIFT SHALL BE COMPACTED WITH THE EXCAVATOR BUCKET AND COVERED WITH A LAYER OF ALLUVIUM OR MIXED SOIL AND GRAVEL TO FORM A DENSE LAYER OF WOODY MATERIAL AND ALLUVIAL TO LINES, ELEVATIONS AND GRADES IN THE DRAWINGS.
2. UNCONSOLIDATED GRAVEL AND TOPSOIL SHALL BE INSTALLED ABOVE WOODY MATERIAL BEFORE THE LIVE CUTTINGS AND SOIL LIFTS ARE INSTALLED.
3. PLACE LAYER OF LIVE CUTTINGS (MIN. 4' LENGTH) A 2.0' O.C. ON THE GRAVEL AND TOPSOIL SUCH THAT APPROXIMATELY 6 INCHES TO 1 FOOT OF EACH LIVE BRANCH WILL BE EXPOSED AND THE REMAINDER (2' TO 4') OF EACH LIVE BRANCH WILL BE COVERED BY THE SOIL LIFT. LIVE BRANCHES SHALL BE OF THE SPECIES SPECIFIED FOR LIVE STAKES OR APPROVED BY THE ENGINEER.
4. INSTALL SOIL LIFTS FROM THE LIVE CUTTINGS UP TO THE BANKFULL STAGE. LIFTS SHALL NOT EXCEED 1.0' THICKNESS. LIFTS SHALL INCLUDE ALL SOIL PREPARATION, TEMPORARY AND PERMANENT SEEDING AND MULCH. SOIL LIFTS SHALL USE 2 LAYERS OF MATTING: 26OZ. / YD² COIR MATTING (OUTER) AND 11.2 OZ/YD² COCONUT FIBER BLANKET (INNER). EROSION CONTROL MATTING USED FOR SOIL LIFTS SHALL BE MADE OF 100% NATURAL FIBERS AND MATERIALS AND BE BIODEGRADABLE UNDER NORMAL CLIMATE CONDITIONS. EROSION CONTROL MATTING CONTAINING PLASTICS OR PLASTIC BASED MATERIALS SHALL NOT BE USED.
5. PLACE SOIL BACKFILL UP TO THE LIFT HEIGHT SPECIFIED OF NO GREATER THAN 1.0 FT BEING CAREFUL NOT TO PUSH/PULL OR TEAR THE FABRIC PREVIOUSLY PLACED.
6. REPEAT STEPS #3, #4 AND #5 AS NEEDED TO INSTALL SOIL LIFTS UP TO THE BANKFULL STAGE.
7. THE SURFACE OF THIS STRUCTURE SHALL BE FINISHED TO A SMOOTH AND COMPACT SURFACE IN ACCORDANCE WITH THE LINES, GRADES, AND CROSS-SECTIONS OR ELEVATIONS SHOWN ON THE DRAWINGS. THE DEGREE OF FINISH FOR ELEVATIONS SHALL BE WITHIN 0.1 FT OF THE GRADES AND ELEVATIONS INDICATED OR APPROVED BY THE ENGINEER.
8. RE-DRESSING OF CHANNEL AND BANKFULL BENCH/FLOODPLAIN WILL LIKELY BE REQUIRED FOLLOWING INSTALLATION OF IN-STREAM STRUCTURES AND SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.

### EROSION CONTROL MATTING NOTES

1. EROSION CONTROL MATTING IS USED TO PROTECT RECENTLY CONSTRUCTED STREAMBANKS FROM EROSION. THE MATTING WILL REMAIN INTACT WHILE THE BANK AND RIPARIAN VEGETATION MATURES, PROVIDING CRITICAL BANK PROTECTION.
2. BEFORE INSTALLING EROSION CONTROL MATTING, RAKE SOIL LEVEL, ADD TEMPORARY AND PERMANENT SEED, SOIL PREPARATION AND MULCH.
3. EROSION CONTROL MATTING SHALL BE PLACED ALONG THE LENGTH OF THE NEW CHANNEL FROM THE TOE OF SLOPE OUT TO A MINIMUM OF 4.5' BEYOND THE BANKFULL STAGE.
4. SECURE MATTING IN PLACE BY STAKING AND OVERLAPPING AT THE SEAMS WITH A SHINGLE-TYPE METHOD SUCH THAT THE OVERLAPPING PIECE IS IN THE SAME DIRECTION AND AS THE STREAM FLOW AS SHOWN IN THE DETAIL. ADDITIONAL STAKING SHALL BE APPLIED BY THE CONTRACTOR AT NO ADDITIONAL COST IF THE MATTING SEPARATES FROM THE SOIL MORE THAN ONE INCH UNDER A REASONABLE PULL.
5. EROSION CONTROL MATTING SHALL BE MADE OF 100% NATURAL FIBERS AND MATERIALS AND BE BIODEGRADABLE UNDER NORMAL CLIMATE CONDITIONS. EROSION CONTROL MATTING CONTAINING PLASTICS OR PLASTIC BASED MATERIALS SHALL NOT BE USED.

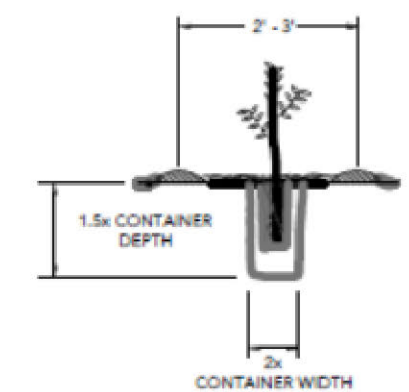




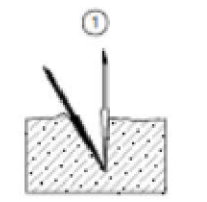
**DIBBLE BAR**  
 PLANTING BAR SHALL HAVE A BLADE WITH A TRIANGULAR CROSS-SECTION, AND SHALL BE 12" LONG, 4" WIDE AND 1" THICK AT THE CENTER.

**ROOT PRUNING**  
 ALL ROOTS SHALL BE PRUNED TO AN APPROPRIATE LENGTH FOR PLANTING TO PREVENT J-ROOTING.

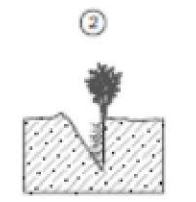
- NOTES**
1. ALL SOILS WITHIN THE BUFFER PLANTING AREA SHALL BE DISKED, AS REQUIRED, PRIOR TO PLANTING.
  2. ALL PLANTS SHALL BE HANDLED PROPERLY PRIOR TO INSTALLATION TO ENSURE SURVIVAL AND VIGOR.



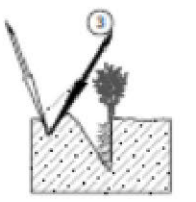
- NOTES**
1. PLANTS SHALL HAVE BEEN GROWN IN A CONTAINER LONG ENOUGH FOR THE ROOT SYSTEM TO HAVE DEVELOPED SUFFICIENTLY TO HOLD ITS SOIL TOGETHER ONCE REMOVED FROM THE CONTAINER.
  2. PLANTS WILL NEED TO BE WATERED REGULARLY AND PLACED IN SHADY CONDITIONS UNTIL PLANTING OCCURS.
  3. THE DIAMETER OF THE PLANTING FITS FOR EACH PLANT SHOULD BE AT LEAST TWO TIMES THE DIAMETER OF THE ROOT MASS. SCARIFY THE PLANTING FIT PRIOR TO EACH PLANT INSTALLATION.
  4. SET PLANTS UPRIGHT IN THE CENTER OF THE FIT. THE BOTTOM OF THE ROOT MASS SHOULD BE RESTING ON UNDISTURBED SOIL.
  5. PLACE BACKFILL AROUND BASE AND SIDES OF ROOT MASS, AND WORK EACH LAYER TO SETTLE BACKFILL AND TO ELIMINATE VOIDS AND AIR POCKETS. WHEN FIT IS APPROXIMATELY 1/4 FULL, WATER THOROUGHLY BEFORE PLACING REMAINDER OF THE BACKFILL. WATER AGAIN AFTER PLACING FINAL LAYER OF BACKFILL.



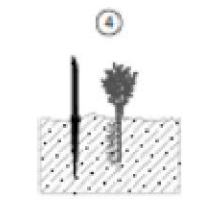
1. INSERT THE DIBBLE STRAIGHT DOWN INTO THE SOIL TO THE FULL DEPTH OF THE BLADE AND PULL BACK ON THE HANDLE TO OPEN THE PLANTING HOLE. DO NOT ROCK THE SHOVEL BACK AND FORTH AS THIS CAUSES THE SOIL IN THE PLANTING HOLE TO BE COMPACTED, INHIBITING ROOT GROWTH.



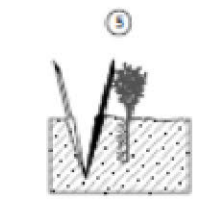
2. REMOVE THE DIBBLE AND PUSH THE SEEDLING ROOTS DEEP INTO THE PLANTING HOLE. PULL THE SEEDLING BACK UP TO THE CORRECT PLANTING DEPTH. THE ROOT COLLAR SHOULD BE 1' - 3' BELOW THE SOIL SURFACE. GENTLY SHAKE THE SEEDLING TO ALLOW THE ROOTS TO STRAIGHTEN OUT. DO NOT TWIST OR SPIN THE SEEDLING OR LEAVE THE ROOTS J-ROOTED.



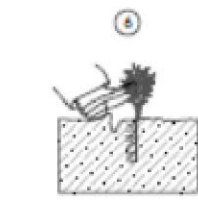
3. INSERT THE DIBBLE SEVERAL INCHES IN FRONT OF THE SEEDLING AND PUSH THE BLADE HALFWAY INTO THE SOIL. TWIST AND PUSH THE HANDLE FORWARD TO CLOSE THE TOP OF THE PLANTING HOLE TO HOLD THE SEEDLING IN PLACE.



4. PUSH THE DIBBLE DOWN TO THE FULL DEPTH OF THE BLADE.

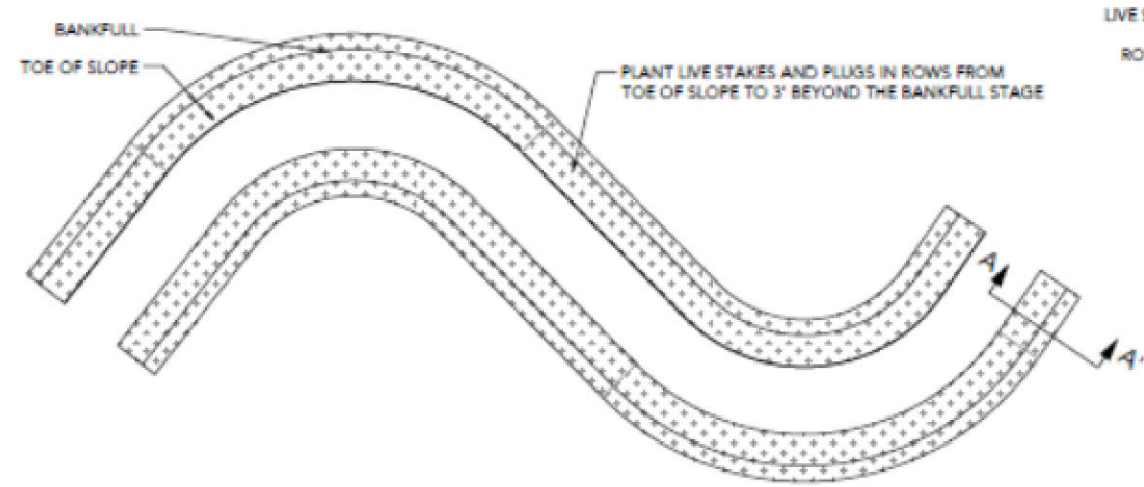


5. PULLBACK ON THE HANDLE TO CLOSE THE BOTTOM OF THE PLANTING HOLE. THEN PUSH FORWARD TO CLOSE THE TOP ELIMINATING AIR POCKETS AROUND THE ROOT.



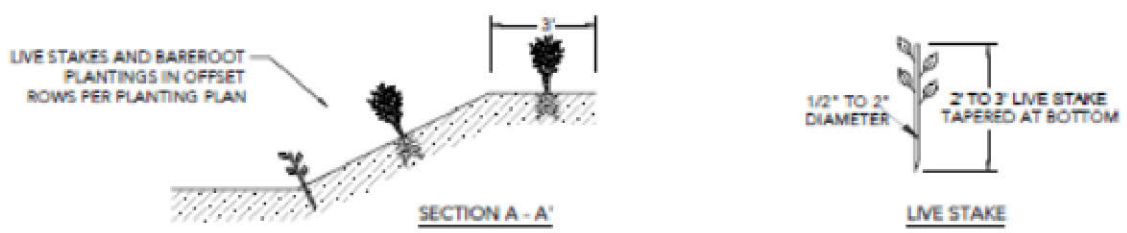
6. REMOVE THE DIBBLE. CLOSE AND FIRM UP THE OPENING WITH YOUR HEEL. BE CAREFUL TO AVOID DAMAGING THE SEEDLING.

**BARE ROOT DETAILS**



3' O.C. LIVE STAKE AND PLUG SPACING / 3' ROW SPACING

**LIVE STAKING DETAILS**



- NOTES**
1. LIVE STAKES MUST BE DORMANT WHEN CUT. KEEP LIVE STAKES MOIST UNTIL PLANTING. THE STAKE SHOULD BE PREPARED WITH THE BUDS POINTED UP, AND THE BOTTOM SHOULD BE CUT AT AN ANGLE FOR INSERTION INTO THE GROUND. AN IRON BAR CAN BE USED TO MAKE A PILOT HOLE TO PREVENT BARK FROM BEING DAMAGED DURING INSTALLATION.
  2. LIVE STAKES SHALL BE 0.5" - 2" IN DIAMETER AND 2' - 3' IN LENGTH.
  3. LIVE STAKES SHOULD BE PLACED WITH 1/3 TO 1/2 OF THE LENGTH OF THE STAKE BELOW GROUND AND ANGLED DOWNSTREAM. ENSURE THE BASE OF THE LIVE STAKE WILL REACH THE WATER TABLE. AFTER INSTALLATION THE TOP OF THE LIVE STAKE SHALL BE PRUNED WITH A SQUARE CUT LEAVING NO LESS THAN 3" AND NO LESS THAN 6" ABOVE THE GROUND.
  4. PLANT LIVE STAKES AND JUNCUS PLUGS IN OFFSET ROWS AND SPACINGS PER PLANTING PLAN.