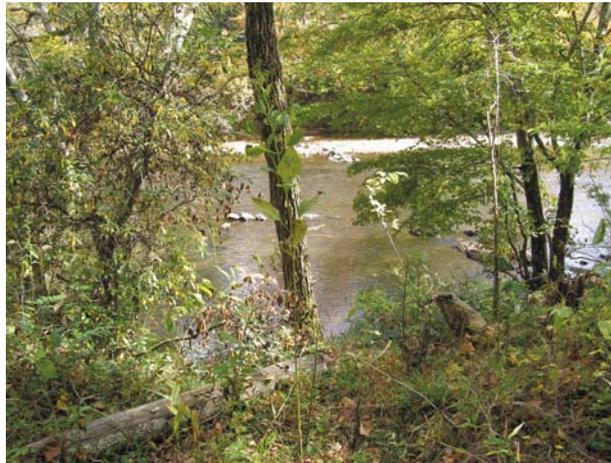


TUCKASEEGEE RIVER GREENWAY

PRELIMINARY MASTER PLAN JACKSON COUNTY, NORTH CAROLINA

"A Landmark Greenway"



JANUARY 2009

Prepared for:
Jackson County Recreation & Parks Department
Presented by:
Equinox Environmental Consultation & Design, Inc.

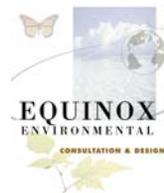


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PROJECT OVERVIEW

In October 2008, Equinox Environmental Consultation & Design, Inc. (Equinox) was contracted by Jackson County to perform a Feasibility Study and a master plan to determine the potential viability of approximately 3.8 miles of greenway corridor along the Tuckaseegee River (See Appendix 1: Greenway Context Map). The research and information uncovered in this preliminary master plan includes information gathered in the feasibility study and schematic design steps in the planning process.

This corridor was initially identified by Jackson County to utilize land that is already encumbered by Tuckaseegee Water & Sewer Authority (TWSA) sewer line and accompanying sewer easement and the river. This initial corridor also generates a visible greenway corridor for the citizens of Jackson County and the faculty and students of Western Carolina University. The preliminary master plan includes locations for the greenway trail alignment, trailheads/access points, parking areas, potential bridge locations, interpretative signage, river access areas, and other design recommendations.

The boundary for this greenway corridor begins at the intersection of Painter Road and Monteith Road and parallels the Tuckaseegee River as it flows northwest and extends to the Bridge along NC 107 (near the intersection of NC107 and Locust Creek Road). This is a portion of the larger greenway system that will ultimately connect to Webster and Sylva to the northwest and south to Western Carolina University and the Millennial campus hiking trail and Cullowhee Recreation Center. Ultimately, this system may provide the opportunity for residences of these populated areas to connect with the surrounding National Forest.



View of the vegetation surrounding the proposed Tuckaseegee River Greenway

GENERAL SITE CONDITIONS

On November 14, 2008, Equinox Environmental's staff biologist, Landscape Architect & land planner performed a general site assessment for the proposed Tuckaseege River Greenway corridor to assess general site conditions. During this assessment, Equinox found that general conditions were favorable to support a greenway. With direction from Emily Elders of Jackson County Recreation & Parks Department, Equinox also identified key lands critical for the greenway and opportunities and constraints within the corridor. Currently, the sewer easement that approximately delineates the potential location for a trail is being used for recreational purposes, including fishing and hiking. Evidence of off-highway vehicles (OHV) was occasionally documented along the sewer easement.

An environmental assessment of the site was performed and documented (See Appendix 2: Environmental Analysis). The site is primarily composed of Montane Alluvial Forest which is largely characterized by rocky bar and shore habitats adjacent to rivers and streams. This community is naturally uncommon in the Southern Blue Ridge. Well-developed examples are rare due to clearing for agriculture and development. In addition, the large edge-to-interior ratio and considerable disturbance, primarily anthropogenic, have resulted in large and extensive infestations of several invasive exotic species. Nevertheless, several large, monotypic stands of native River Cane ("canebrakes") do occur within the floodplain of the Tuckaseege River. Canebrakes support a diversity of wildlife and were historically used by the Cherokee and other southeastern Native American tribes for weaving baskets, building structures, and constructing weapons.



View of the Tuckaseege River from the proposed greenway



View of possible "pinch point" section of greenway along an approximately 100 linear foot section



Existing conditions near proposed Heights River Access

According to U.S. Fish and Wildlife Service National Wetland Inventory (NWI) Program data, there are no wetlands along the proposed Tuckaseegee River Greenway. Jackson County soils data, however, indicate approximately 112 acres of hydric soils along the Tuckaseegee River in the project area. This includes Biltmore sand, Cullowhee fine sandy loam, and Rosman fine sandy loam soils series. Although NWI records do not indicate the presence of wetlands within the project area, there is, a one-acre Freshwater Forested/Shrub Wetland approximately 1/10th mile from the proposed greenway up Cane Creek, a tributary to the Tuckaseegee River. This saturated, broad-leaved deciduous, scrub/shrub wetland is dominated by woody vegetation—mostly shrubs and trees that are small or stunted because of environmentally limiting conditions. Other wetlands most likely occur within the corridor and wetland determinations and delineations may be needed.

A review of North Carolina Natural Heritage element occurrence database indicates the presence of several rare species in the general vicinity of the project area (See Appendix 2: Environmental Analysis). Most occur within a Significant Natural Heritage Area (SNHA). SNHA’s are recognized as sites where land and water resources have been identified as critical reservoirs of biological diversity and provide important habitat for rare, threatened, or endangered species. The Tuckaseegee River is designated as a nationally significant aquatic habitat that supports a suite of federal and state listed animal species.

All waters in the general vicinity of the project area are in the Tennessee River Basin. Streams within the easement area are classified as Tr waters by the North Carolina Division of Water Quality (NCDWQ 2007). “Tr” indicates waters that can

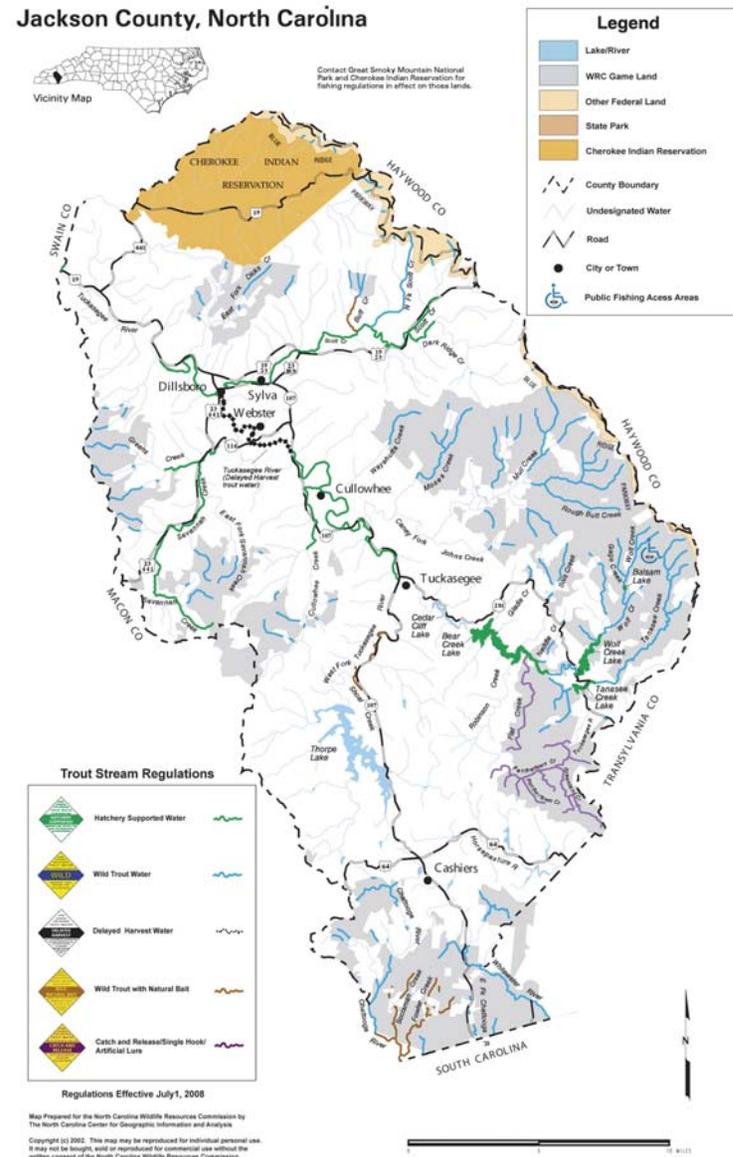


Figure 1. Trout Waters Map for Jackson County (NCDWQ 2007)

support native brook trout or stocked trout. This designation is not the same as the NC Wildlife Resources Commission’s “Designated Public Mountain Trout Waters” classification (See Figure 1). Although these waters are hatchery supported and offer recreation fishing.



View of the Tuckaseegee River along the corridor

LAND OWNERSHIP

The approximate 3.8 mile section of greenway includes land owned by Jackson County, the North Carolina Department of Transportation (NC DOT), North Carolina State, and several individual private landowners. There are approximately eighteen parcels within this corridor that will require easements to allow for a greenway (See Appendix 3: Land Owner Map). This will require negotiating for the acquisition of portions of fifteen parcels, excluding the property Jackson County currently owns. Of these fifteen properties, it appears that ten parcels are held by only three different owners and the remaining parcels are each held individually. This means that while there are a total of fifteen parcels, landowner outreach may only need to take place with a total of ten different landowners.

Acquiring land for greenway easements or through fee-simple acquisition can be one of the most challenging aspects in the greenway planning, design, and development process. Therefore landowner outreach must be conducted with a strategic approach that includes: research and educational materials, coordination with County leadership (including the parks and recreation department) and negotiations with the goal of securing landowner participation and land for the greenway. This also tends to be one of the most time consuming aspects of the greenway process as landowner negotiations can take significant time and effort. However, having a potential 3.8 mile greenway and having only ten different landowners from which to acquire land is a promising ratio.

For the purposes of this plan, and to serve as a baseline measurement, Equinox assigned a 100 foot section from the

river's edge inland which is recommended for fee simple acquisition or easements for the greenway corridor. This is needed as an existing bench for the potential trail and the sewer easement typically falls within this 100 foot section. This will also increase the riparian buffer area along the Trout Waters of the Tuckaseegee River. This will have positive environmental benefits further providing bank stabilization and habitat, in addition to filtering pollutants from run-off before entering the river. Since, the sewer easement is held by (TWSA), it will be important to work with them to allow the greenway trail to "piggy back" within the existing' sewer easement as often as possible. As well, NC DOT owns land within this corridor of which approximately 4,035 linear feet would be needed for an easement for the greenway.

Finally, it is recommended that parcels 4, 9, and 17 be purchased in their entirety and additional areas of parcels 6 and 13 (beyond the 100 section) should be included in any fee simple acquisition (See Appendix 4: Landowner Information). These parcels provide opportunities for parking, trailheads, points of access, and/or pocket parks and are priority parcels for this project. Also, parcels 10-12 need additional area beyond the 100' buffer to include an existing trail/old roadbed within the proposed greenway corridor.

SCHEMATIC PLAN

The Schematic Plan identifies options for a possible greenway along the Tuckaseegee River (See Appendix 5: Schematic Plan). This initial design process map identifies the following points of interest along the Tuckaseegee River, including: public access points, areas of interest, potential trailheads, parking areas, potential river access, potential bridge locations, recommended trail alignment, 25' trout buffers, slope stabilization and areas identified for improvements. The Schematic Plan was a key element used during the Technical Advisory workshop to visualize the proposed greenway corridor. Information from this stage of the planning process was used to further develop the preliminary master plan (See Appendix 6: Technical Advisory Workshop).

Public input is a critical component to greenway planning. A workshop conducted with the Technical Advisory Committee was critical in the collection of key data and helping to focus the vision for the project. A similar workshop to gather community wide support is also recommended during future design phases of this greenway project. As such, some revisions to the preliminary master plan may occur.

PRELIMINARY MASTER PLAN

Design Concepts

The primary design concepts for the preliminary master plan include:

- **Accessibility:** Provide several opportunities for greenway access via trailheads and parking areas.
- **Recreation:** Offer recreational opportunities for a wide diversity of users including walkers, boaters, bicyclists, birdwatchers, fishermen, and other outdoor enthusiasts.
- **Education:** Serve as an important educational role in the community, including: ecology, history, cultural and wellness education.
- **Connections:** Connect to existing and future corridors in the area, including the proposed greenways near Sylva and Western Carolina University (WCU).



Design Focal Elements

The Preliminary Master Plan is divided into four main sections based along the greenway corridor's main access points. The plan is further divided into categories pertaining to the following:

- Northern Cullowhee Trailhead (North Access)
- Monteith Gap Trailhead (Central Access)
- Heights River Access (Central, Neighborhood Access)
- Painter Creek Nature Park (South Access)
- Future Proposed Parks

Northern Cullowhee Trailhead

The primary northern access point is proposed along NC 107 which will serve as the northern terminus for this section of the greenway. This northern access point to the greenway occurs just northeast of the existing NC 107 bridge crossing the Tuckaseegee River (See Preliminary Master Plan). This access includes a trailhead, parking area (30 spaces), kiosk, drinking fountain and a picnic area. Currently, this location is heavily used for temporary parking. Formalizing this parking along with key amenities provides opportunities for visibility and education. Even if people use the parking without intent of accessing the greenway, it suggests use, and may serve to draw the interest of motorists traveling along highway 107 to the greenway. Local history interpretation is suggested at this site to inform locals and tourists of the history of the area, greenway system, and recreational opportunities along the Tuckaseegee River.

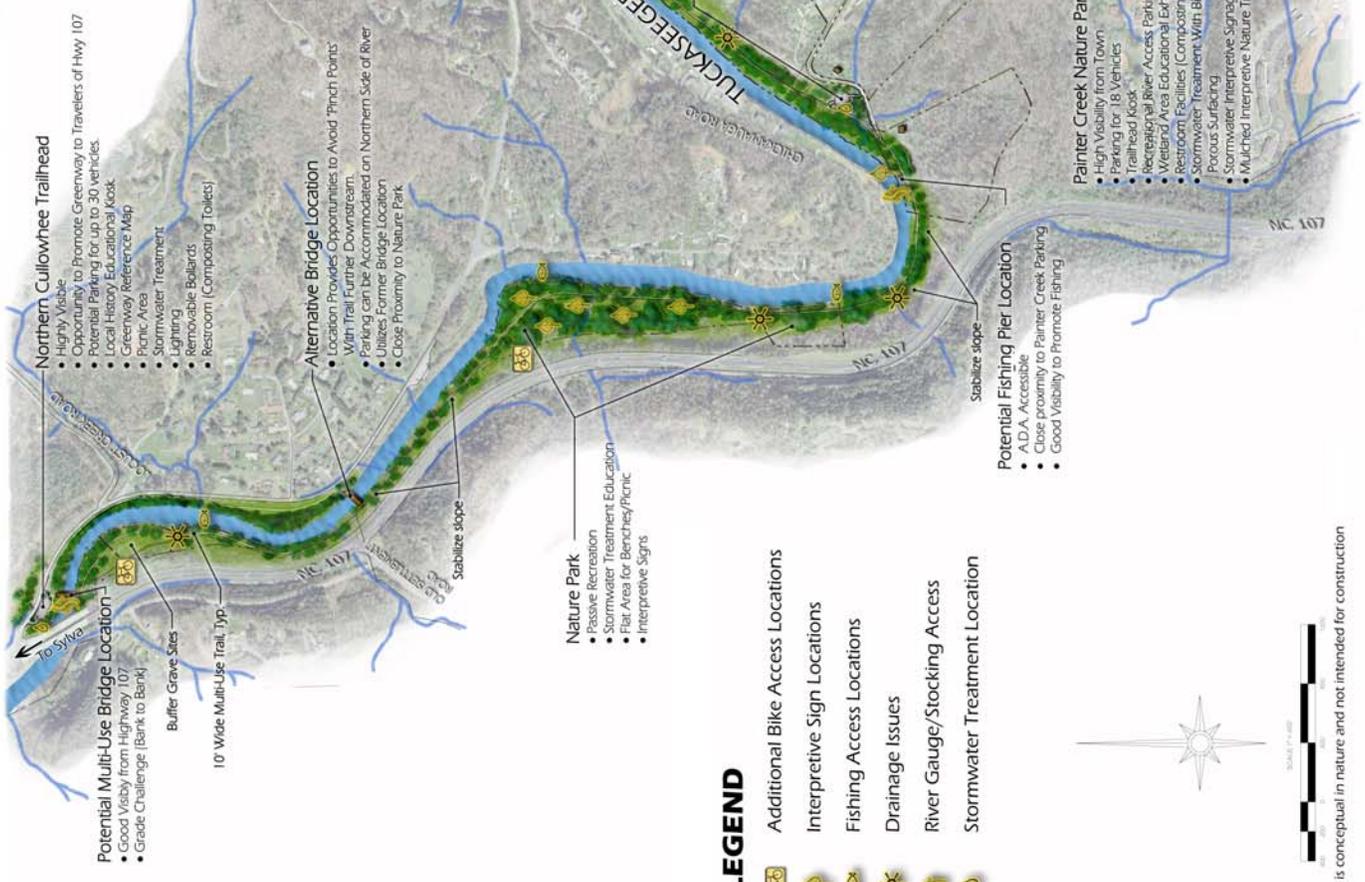
This access serves as a midway connection point to the larger greenway system, assuming proposed greenways are built in the future, that would connect the trail to the north to Sylva,

Tuckasegee Greenway

Preliminary Master Plan

'A Landmark Greenway'

February 2009



- Northern Cullowhee Trailhead**
- Highly Visible
 - Opportunity to Promote Greenway to Travelers of Hwy 107
 - Potential Parking for up to 30 vehicles
 - Local History Educational Kiosk
 - Greenway Reference Map
 - Picnic Area
 - Stormwater Treatment
 - Removable Bollards
 - Restroom (Composting Toilets)

- Alternative Bridge Location**
- Location Provides Opportunities to Avoid Pinch Points
 - With Trail Funnel Downstream
 - Parking can be Accommodated on Northern Side of River
 - Close Proximity to Nature Park

- Monteith Gap Trailhead**
- Parking for up to 15 vehicles
 - River Access for Boats/Tubing
 - Recreational River Access
 - Environmental Educational Kiosk
 - Water-level and Dam Release Information (Reference Gauge in-stream nearby)
 - Greenway Reference Map
 - Picnic Area
 - Stormwater Treatment
 - Removable Bollards

- Painter Creek Nature Park**
- High Visibility from Town
 - Parking for 18 Vehicles
 - Trailhead Kiosk
 - Recreational River Access Parking
 - Wetland Area Educational Exhibits
 - Restroom Facilities (Composting Toilet)
 - Stormwater Treatment With Bio-Retention
 - Porous Surfacing
 - Stormwater Interpretive Signage
 - Mulched Interpretive Nature Trail

- Stabilize slope**
- Potential Fishing Pier Location
 - ADA Accessible
 - Close proximity to Painter Creek Parking
 - Good Visibility to Promote Fishing

- Potential Fishing Pier Location**
- ADA Accessible
 - Close proximity to Painter Creek Parking
 - Good Visibility to Promote Fishing

- Proposed Buffers**
- Ensures Privacy of Residence
 - Maintain Access Points For Residences
 - Bollards and Fencing at Access Points to Ensure Intended Use
 - Fishing Access

- Potential Fishing Pier Location**
- ADA Accessible
 - Close proximity to Painter Creek Parking
 - Good Visibility to Promote Fishing
 - Picnic Tables
 - Existing Trees for Shade

- Tuckasegee River Access**
- Unloading Area for Boats/Tubing
 - Fishing Access
 - Water Gauge
 - River Interpretive Kiosk (Turbidity, Water Levels, Dam Release Info, Etc.)

- Potential Multi-Use Bridge Location**
- Good Visibility from Highway 107
 - Grade Challenge (Bank to Bank)

- 10' Wide Multi-Use Trail, Typ.**
- Buffer Grave Sites

- Nature Park**
- Passive Recreation
 - Stormwater Treatment, Education
 - Flat Area for Benches/Picnic
 - Interpretive Signs

- Additional Bike Access Locations**

- Interpretive Sign Locations**

- Fishing Access Locations**

- Drainage Issues**

- River Gauge/Stocking Access**

- Stormwater Treatment Location**

LEGEND



This Plan is conceptual in nature and not intended for construction

and connect to the proposed WCU greenway and hiking trails to the south.

The location of the alignment along the southern side of the river creates the need for a river crossing in order to make future connections to the Sylva greenway. Two bridge locations have been identified during the planning process. Either bridge location provides the opportunity for a multi-use crossing. Further studies into the physical constraints for a bridge will be needed. Ideally, all efforts should be made to build a multi-use bridge.



Example of an educational kiosk

The bridge location near the Northern Cullowhee Trailhead will require negotiation of potential challenging property issues (private grave site locations) and grade challenges from the southern and northern banks. However, this location may serve as a visual beacon for the greenway system due to its potential visibility from the NC 107 bridge. The alternative bridge site is placed at an old bridge location. This location may allow access to the Northern Cullowhee Trailhead via alternative access located on the northern banks of the river. Physical constraints are not as prominent along this alternate trail alignment; however, this access may require additional easements. Only one additional landowner and additional land properties owned by NCDOT



Example of signage proposed along NC 107 at Painter Creek Nature Park

may be needed. Although visibility to this alternative location does not appear to be as prominent, it was observed during the site assessment that by select thinning of vegetation along NC 107, visibility could be provided. The visibility of such an amenity would not only serve as a major landmark for Cullowhee, it would also serve as a major draw for users of the greenway.



Example of a multi-use bridge proposed on the greenway north of Old Settlement Road

In addition to serving as a highly visible amenity, a multi-use bridge is also proposed to reduce pedestrian and cyclist use along the busy NC 107 bridge. This would provide an ideal connection and safer alternative to the existing bike lane which connects cyclists from Sylva along NC 107. The proposed multi-use bridge will also serve as a safe crossing to potential users along Old Cullowhee Road, just north of the river. A suspension bridge is another less expensive option that could be explored however they typically do not allow for a diversity of uses, such as handicap accessibility, bicycling, roller blading, etc.

A “no-rise” certification may be required if the footing for the bridge is located within the floodway. Prior to issuing



Example of a suspension bridge

any permits involving activities in a regulatory floodway, the county must obtain an engineering certification stating the proposed development will not impact the pre-existing base flood elevations. Besides permitting, studies would need to be conducted to ensure that the bridge is located outside the floodplain which could make the approaches to any bridge a challenge.

Monteith Gap Trailhead

The central access point along the proposed greenway is located off of Monteith Road (See Figure 2). This centrally located trailhead also includes river access, a proposed ADA accessible fishing pier, parking (15 spaces), picnic areas, open space, drinking fountain, information kiosk and access to the greenway. This pocket park along the river is also a proposed access point for boaters. Depending on the river section that will be run, this can serve as a take-out or put-in location. Water level gauges and turbidity gauges will be installed in the river at these locations providing information to anglers and other users. An informational kiosk explaining how to interpret these gauges will also be located at this site providing river gauge descriptions, as well as educational opportunities regarding water quality. The trailhead serves as a main access point due to its proximity along the greenway corridor. If Monteith Road is improved for pedestrian and bicycle accessibility and use, a 3-mile loop could be created connecting the trailhead and greenway with Monteith Road and Painter Creek Nature Park. The trailhead off Monteith Road, (parcel 6 as identified on the Land Owner Map) will need to include a wetland delineation as hydric soils are present, prior to final design for the trailhead.

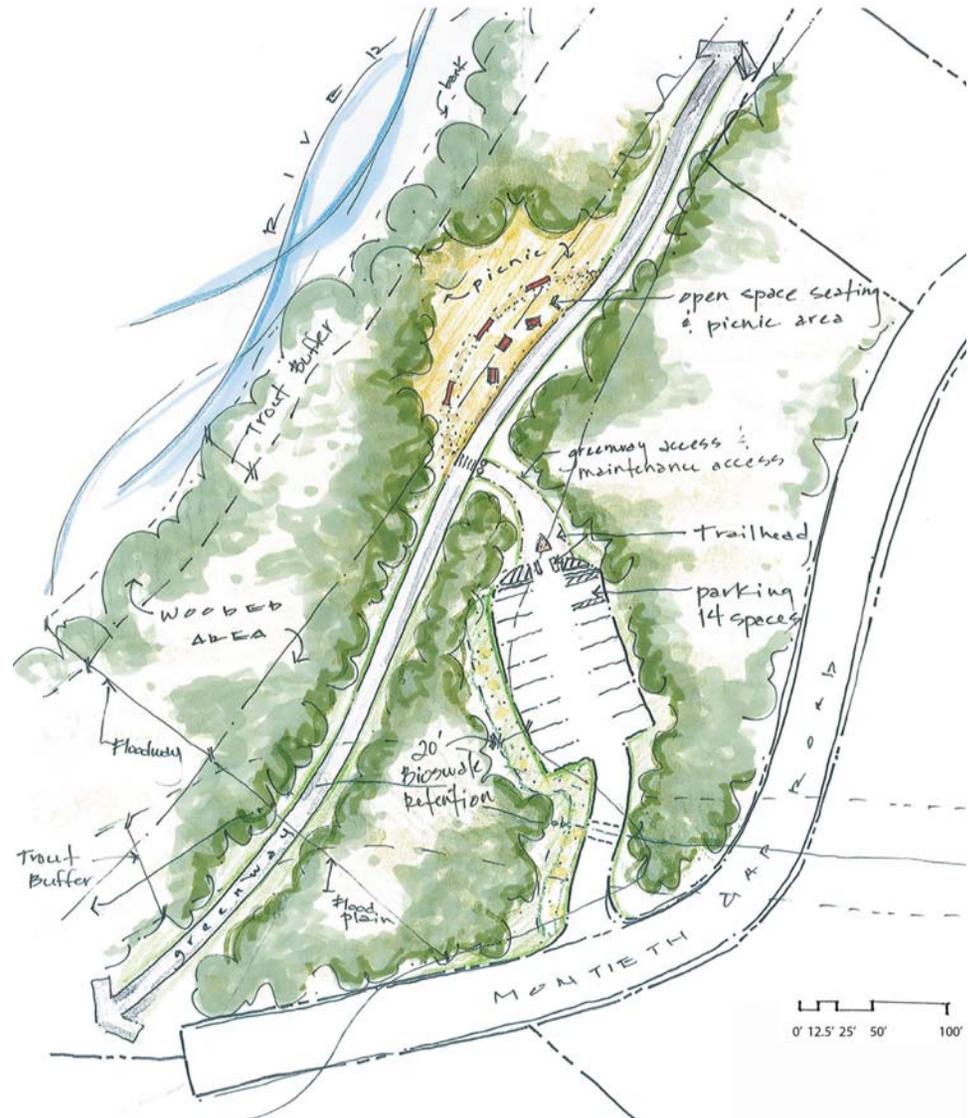


Figure 2. Monteith Gap Trailhead Conceptual Plan

Heights River Access

An additional access point further along the greenway corridor, is a more intimate, neighborhood access off University Heights Road (See Figure 3). The Heights River Access consists of a

small parking area (8 spaces), a trailhead, river access, picnic space and seating/resting areas with benches for greenway users, and a water fountain. This access area is characterized as a more

Figure 3. Heights River Access Conceptual Plan



serene, local gathering or greenway access area, surrounded by lush and mature vegetation. Great care should be taken during the detailed design phase to maintain the current character of the neighborhood. A balance of buffering and visibility into this area from adjacent landowners should be maintained.

Painter Creek Nature Park

The southern-most access area along the greenway corridor is highlighted by the Painter Creek Nature Park (See Figure 4). The location of this site was chosen based on several factors including visibility from downtown/Old Cullowhee Road,

Figure 4. Painter Creek Nature Park Conceptual Plan



and its flexibility to serve as a hub for access to WCU and potential future connections into and beyond downtown along the Tuckaseegee River. The park consists of a parking area (18 spaces and additional expansion for up to 25 vehicles based upon use), educational kiosk, an interpretive trail, an observation deck, picnic areas and direct access to the greenway. Across from the park along the greenway, this river access area is the primary “put-in” point along this section for boaters. From the trailhead at the intersection of Painters Road and Monteith Road, there is limited space for a pathway due to the proximity of the road to the river (See Figure 6 and 7).



Example of a observation deck at a nature park

This area’s wetland like characteristics of rich soils and water absorbing capabilities serve as not only valuable wildlife habitat, but also as an educational opportunity, along this riparian corridor. Wetland plantings are also proposed to help restore or enhance this area which is currently inundated with invasive plant species. A system of bio-filtration swales is proposed along the parking areas to filter and trap any surface run-off and pollutants. A proposed loop trail combines a wood mulched trail surface with an elevated boardwalk system, if needed, to reduce impacts to the area. The



Example of a seating area off a precedent greenway

loop trail and observation deck provide a serene environment for wildlife viewing while educational signage and information along the trail educate the user on the natural ecology of the area, as well as stormwater BMPs used on site. This location (parcel 17 as identified on the Land Owner Map) should include a wetland delineation as hydric soils are present. This will be needed to determine the most suitable design for the park.

Future Proposed Parks

In addition to the four above trailheads and access points, two public park locations are proposed, which include a portion of parcel 13 and all of parcel 4. Parcel 13 includes an open field and can possibly be accessed near the intersection of Ledbetter Road and University Heights Road. Feasibility of this access will need to be further studied to determine the suitability for the site to serve as a trailhead with a few parking spaces. Regardless, this open space should be used as a pocket park as a destination along the greenway trail. Parcel 4 is completely land locked but has some flat terrain that would serve as a suitable “nature park” with opportunities for bird watching, interpretive signage, nature trails, and stormwater BMPs. This park would be accessed by the greenway via the Monteith Gap Trailhead. Since parcel 4 is land locked and visibility is limited, it is recommended that this park be developed after this section of the greenway has sufficient activity or “eyes on the trail” from users and/or nearby development to protect public safety. Another option would be to patrol the greenway corridor and the park on a regular basis if this park is constructed earlier in the implementation phase.

DESIGN RECOMMENDATIONS

Trail Design

The proposed greenway follows along the existing sewer easement for over 95% of the approximately 3.8 mile corridor, greatly reducing the need for grading or vegetation removal. The greenway is to be a multi-use trail, with a width of 10 feet to accommodate multiple users and maintenance vehicles. A proposed maintenance zone around the greenway is shown below (See Figure 5). Two modifications of the greenway design are proposed where “pinch points” occur, as specified on the preliminary master plan (See Figure 6 and 7).

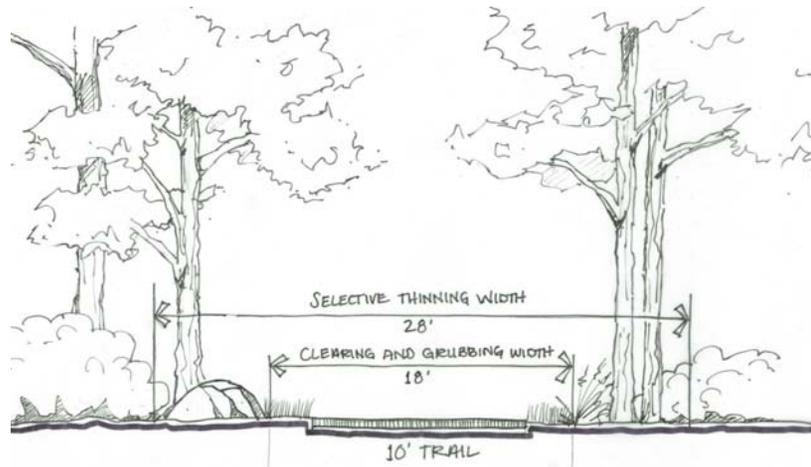


Figure 5. Typical Trail Section

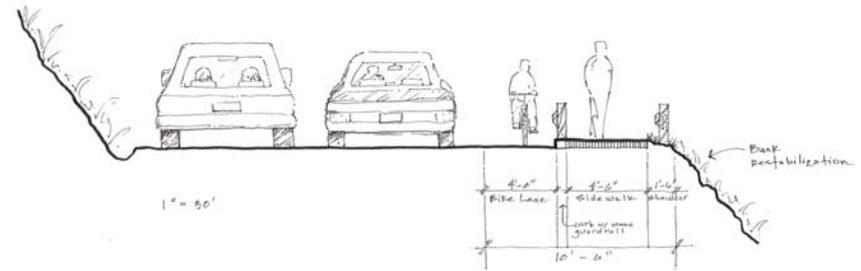


Figure 6. Modified Trail Section A at Ledbetter Road

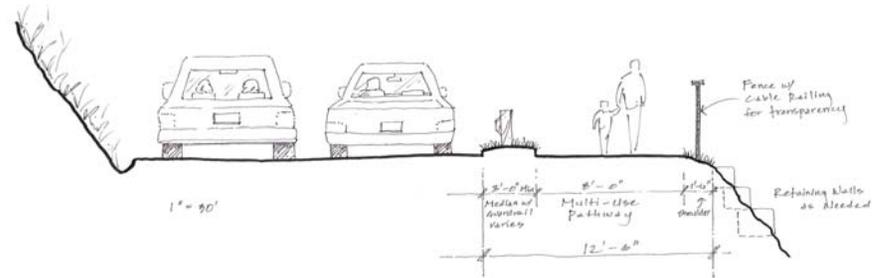


Figure 7. Modified Trail Section B at Ledbetter Road

The greenway study compares several trail surface types. The primary greenway trail is designed to be a 10-foot wide multiple-use path, preferably asphalt or Rubberized Asphalt Concrete (RAC). These two surfaces were selected based on total cost, maintenance, durability, and desirability to multiple user groups (See Appendix 7: Greenway Trail Surfaces). In some areas, the 10-foot wide trail may need to be reduced in order to successfully fit among tight areas due to the location of roads and the trout buffer in relation to the river’s edge as discussed above. The primary greenway trail is designed to be ADA accessible

for the entire 3.8 mile stretch. Several seating and picnic areas are designed along the corridor to offer resting possibilities for users at convenient intervals. Other trail types are associated with the nature park, which include a mulched surface for the loop trail and also a potential wooden boardwalk, if soil conditions warrant them.



Rubberized Asphalt Concrete (RAC) trail surface

Along the route of the greenway trail there are several locations in which the manholes are elevated. The concrete bases of the elevated manholes are exposed and it is recommended that these exposed surfaces be faced with native fieldstone. This minor detail will improve the trail users experience since they are located immediately adjacent to the trail.

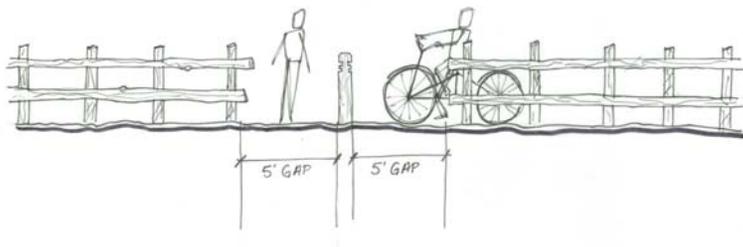


Figure 8. Greenway Access Trail Section

Other Amenities

The following additional amenities are proposed along the greenway corridor, in addition to the greenway trail, including:

- Three ADA accessible fishing piers
- Public restrooms (composting toilets) at the Northern Cullowhee Trailhead and at the Painter Creek Nature Park
- Educational kiosks and signage
- Trailhead signs
- Benches
- Picnic tables
- Water Fountains

Parking

Small parking areas are designed in several locations along the greenway corridor. Parking (including ADA accessible) is located at four locations along the corridor for easy access and to minimize the impacts of a larger, centrally located parking area. A total of up to 71 parking spaces are provided for users. The parking area surfaces are proposed to be either chip-seal or an open-grid permeable, such as a plastic or concrete grid, filled with gravel.



A bio-swale with educational signage is proposed at parking areas

Safety

Proper trail design can minimize trail user conflicts. Signage can be used at intersections and at areas with potential safety hazards, locations which are labeled on the Preliminary Master Plan. Vegetation should be cleared in the area immediately adjacent to and above the trail for good visibility and to minimize obstructions. Areas with current ATV and motorcycle use, noted during the workshop, are also potential hazards. Fencing near and around these access points are proposed to eliminate undesirable uses on the greenway in addition to signage that prohibits motorized vehicle use.



Example of a safe greenway crossing

Other safety precautions include “pedestrian refuge islands” or crossing islands for greenway users where road crossing is likely to occur, such as near Painter Creek Nature Park. As proposed in the workshop, potential call stations could be placed at intervals along the greenway to increase safety along the trail. Lighting is also a significant safety feature. Lighting along the trail is not recommended as it promotes evening use which can lead to safety concerns. It may, however, be located at the trailheads potentially with timers that turn lighting off at a pre-determined time at these locations. Lighting should be low glare and in accordance with the Night Sky Initiative to promote prevention of light pollution. During construction of the greenway, conduit should be buried for future needs, so if at a later date in time lighting is desired along the greenway trail it will not be problematic.

This corridor inherently provides visibility from adjacent land owners and existing neighborhoods. This combined with frequent trailheads, EMS access, and a well used greenway should provide a safe environment for greenway users.



Example of a bio-swale adjacent to a greenway

Environment

Since the Tuckaseegee is designated Trout Waters, a 25 foot buffer measured from the top of bank is required to remain intact and undisturbed. The greenway can impact a maximum of ten percent of the total length of the buffer zone with no more than 100 linear feet of disturbance in each 1,000 linear feet of buffer zone allowed. Efforts have been made to prevent encroachment into the Trout Buffer; however, there are “pinch points” along the greenway. At these locations there should be at least a 15 foot buffer, and the trail should be designed to direct stormwater away from the river into a swale or other stormwater best management practice (BMP). Providing shade and keeping sediment out of the stream is one of the major objectives of this buffer requirement. The Trout Buffers are regulated through the NC Department of Environment and Natural Resources, the Division of



A multi-use greenway

Land Resources (DLR). If infringement occurs beyond what is allowed by DLR, waivers for greenways may be obtained from the NC State Sediment Specialist.

There are also locations along the greenway corridor in which additional fill slope stabilization would be required. Due to the fill slopes from the construction of NC 107, large boulders are at the toe of the bank in a few locations and fencing and signage are recommended to keep children from playing in these locations for safety reasons. These areas will need to be further examined to determine stability by a geotechnical engineer. Stabilization techniques such as small retaining walls or wire meshes may be used. As well, there are a few locations where drainage is causing some relatively minor erosion. These areas should be addressed during the detailed design phase of the project and should include stabilization efforts and stormwater BMPs. As well, several culverts will need to be replaced and energy

dissipaters to deal with stormwater runoff from NC 107 may be needed.

Education

Environmental education is a significant part of the greenway design. Educational kiosks and signs are displayed at potential, high-use areas to increase visibility as well as focus attention on the surrounding natural systems. The portion of greenway between the southern and central access points is denoted as



Educational interpretive signage

an interpretive trail, with information stations along the trail pertaining to the native vegetation, rare species, hydrology and other significant ecological opportunities that occur along the trail. The section of the greenway dedicated to interpretation is called the Tuckaseegee Environmental Educational Corridor or TEEC. Signage is placed strategically along this section of the trail to divert views of development across the bank and to create emphasis on the surrounding natural communities, creating a richer educational experience for the user.

Other educational opportunities include bio-swales and other stormwater BMPs near parking areas and trailheads. Signage will coincide with the actual practices in place to reinforce the importance of water quality and expand on opportunities for watershed education.

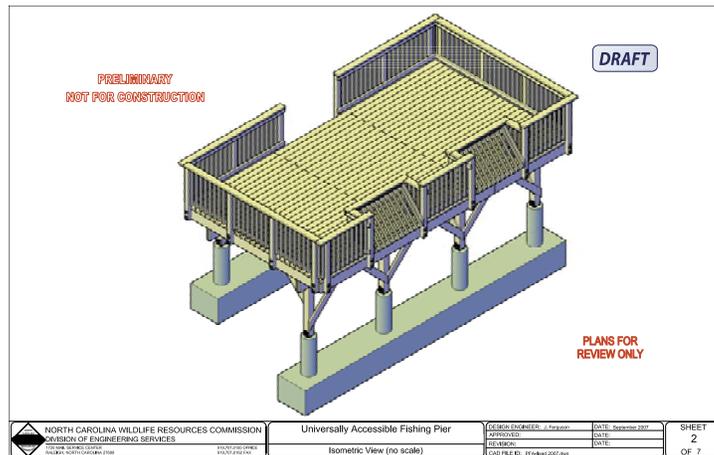


Figure 9. Example design of a proposed fishing pier

Recreation

This greenway and potential blueway can offer recreational opportunities for a wide diversity of users including walkers, boaters, bicyclists, birdwatchers, fishermen and other outdoor enthusiasts. Fishing is a major draw in the region and a partnership with the NC Wildlife Resources Commission has been created as they may offer assistance with construction of fishing piers and river access points (See Figure 9). The NC Wildlife Resources Commission also stocks this section of the river with trout in two locations and is very interested in providing additional opportunities for fishing access. As a result of the many recreational opportunities of this corridor, the greenway also has the potential to be widely used due to the scenic qualities of the Tuckaseegee River, the proximity to WNC Campus, the length of the greenway corridor, and the potential for a loop connection.



Recreational use of a river access point



ADA accessible greenway



Recreational opportunity along the Tuckaseegee River

COSTS

Construction costs differ for every greenway project and are based on factors such as the terrain of the corridor, the amount of landscape architectural and engineering services needed to complete the project, the type of trail (width, use, surfacing) and the desired amount of amenities. Due to the varying degree of these factors Equinox has found that a mile of greenway can cost between \$250,000 and \$800,000. This range does not include land acquisition costs (See Appendix 4) or bridge crossings. For example, on the low end of the range a 10' wide multi-use paved greenway trail, constructed to NCDOT standards on relatively flat terrain with limited grading, no amenities and no landscape architecture and engineering fees would cost roughly \$235,000 per mile. While a good portion of the proposed greenway corridor is on flat land with an existing roadbed, several site amenities should be considered for this greenway and landscape architecture and engineering will be needed. Greenway amenities could include stormwater BMPs, landscaping, benches, signage, trash receptacles, kiosks and more. The following are estimated costs based on the preliminary master plan (See Figure 10).

Figure 10. Tuckaseege Greenway Probable Cost Estimate

| | Units | Quantity | Cost Per Unit | Costs |
|---|-------|----------|----------------|-----------------------|
| Demolition | | | | \$21,750.00 |
| Power Pole/Utility Relocation* | EA | 3 | \$1,250.00 | \$3,750.00 |
| Clearing and Grubbing* | LS | | \$10,000.00 | \$10,000.00 |
| Grading* | LS | | \$8,000.00 | \$8,000.00 |
| Land Acquisition | | | | \$1,363,537.22 |
| Fee-Simple Acquisition** | LS | | \$1,348,537.22 | \$1,348,537.22 |
| Landowner Outreach | LS | | \$15,000.00 | \$15,000.00 |
| Planning, Design & Engineering | | | | \$110,000.00 |
| Environmental Permitting | LS | | \$10,000.00 | \$10,000.00 |
| Design & Engineering | LS | | \$52,000.00 | \$52,000.00 |
| Engineering for Bridge | LS | | \$10,000.00 | \$10,000.00 |
| Wetland Delineation | EA | 4 | \$4,500.00 | \$18,000.00 |
| No-Rise Certification | LS | | \$20,000.00 | \$20,000.00 |
| Hardscape Paving Elements | | | | \$1,566,920.00 |
| 10' Asphalt Trail | SF | 196900 | \$7.50 | \$1,476,750.00 |
| Trailhead Parking Space | EA | 71 | \$1,200.00 | \$85,200.00 |
| Recycled Curbstops | EA | 71 | \$70.00 | \$4,970.00 |
| Trailhead Amenities | | | | \$96,000.00 |
| Kiosks | EA | 4 | \$7,500.00 | \$30,000.00 |
| Put-in/Take-Out | EA | 3 | \$3,000.00 | \$9,000.00 |
| Restrooms* | LS | 2 | \$8,500.00 | \$17,000.00 |
| Water Fountain | EA | 4 | \$950.00 | \$3,800.00 |
| Signage | EA | 4 | \$2,500.00 | \$10,000.00 |
| Trash Receptacles | EA | 8 | \$400.00 | \$3,200.00 |
| Pedestrian Refuge | EA | 1 | \$5,000.00 | \$5,000.00 |
| Area Light | EA | 6 | \$1,000.00 | \$6,000.00 |
| Stone Columns | EA | 15 | \$800.00 | \$12,000.00 |
| Trail Amenities | | | | \$1,045,200.00 |
| Fence | LF | 4000 | \$4.50 | \$18,000.00 |
| Multi-Use Bridge*** | LS | | \$925,000.00 | \$925,000.00 |
| Culverts | EA | 5 | \$2,750.00 | \$13,750.00 |
| Removable Bollards | EA | 20 | \$275.00 | \$5,500.00 |
| Boulder Retaining Wall* | FF | 900 | \$25.00 | \$22,500.00 |
| Benches | EA | 10 | \$800.00 | \$8,000.00 |
| Picnic Tables | EA | 13 | \$1,150.00 | \$14,950.00 |
| Warning & Directional Signage | EA | 20 | \$300.00 | \$6,000.00 |
| Educational Signage & Stands | EA | 7 | \$4,500.00 | \$31,500.00 |
| Site Improvements | | | | \$275,000.00 |
| Bank Stabilization* | LS | | \$25,000.00 | \$25,000.00 |
| Landscape/Plantings Enhancements* | LS | | \$150,000.00 | \$150,000.00 |
| Stormwater BMPs* | EA | 10 | \$10,000.00 | \$100,000.00 |

| | |
|-----------------------|------------------------|
| \$4,478,407.22 | SUBTOTAL |
| \$447,840.72 | 10% Contingency |
| \$4,926,247.94 | TOTAL |

* Difficult to quantify at this time.

** Does not include survey fees or transactional costs such as attorney costs.

*** Pedestrian only suspension bridge would be significantly less.

PHASING

A four phased approach is recommended. This recommendation is based on visibility of the greenway and connectivity with future greenway plans.

Phase 1:

The first phase of this project should include:

- The trailhead and parking areas at the intersection of Painter Road and Monteith Road (parcel 17).
- An on-road section may be needed to connect to the mobile home park, (parcel 15) through parcel 16 along Ledbetter Road.
- The section that includes parcels 6-13.
- A potential park for a portion of parcel 13 and the trailhead at parcel 10 off of University Heights Road.
- Trailhead and parking at parcel 6 located at the end of Monteith Road.

Phase 2:

The second phase of the project will extend the greenway northwest to parcel 4 and will also include:

- The northern terminus of Monteith Road northwest through parcels 5 and NC DOT 2.
- The development of a neighborhood park at parcel 4. The park could serve as a destination and terminus.

Phase 3:

The third phase of the project will extend the greenway northwest to the bridge along NC 107 and include:

- NC DOT 1 and parcels 1, 2, and 3.
- Pedestrian bridge crossing Tuckaseegee River.
- Landowner outreach and acquisition on north side of river after bridge crossing (along Old Cullowhee Road).
- The trail along Old Cullowhee Road.
- Trailhead improvements at intersection of Old Cullowhee Road and NC 107.

Phase 4:

Connectivity is a major benefit of a greenway corridor and future phases should include connections to the WCU campus and to Sylva and Dillsboro. The fourth and final section of this greenway corridor should be an on-road connection along Monteith Road. This will provide a loop for bicyclists and provide additional connectivity for residents along Monteith Road to access the greenway without depending on an automobile. An alternate off road trail connection could also be explored in this phase between Painter Road and parcel 5.

CONCLUSIONS

The greenway preliminary master plan was designed with a focus towards environmental design addressing such elements as fishing piers, access down to the river's edge, riparian restoration and educational opportunities, landscape improvements that include native plants to increase biodiversity, stormwater BMPs, and sustainable/durable materials for the surfacing of the trail, just to name a few.

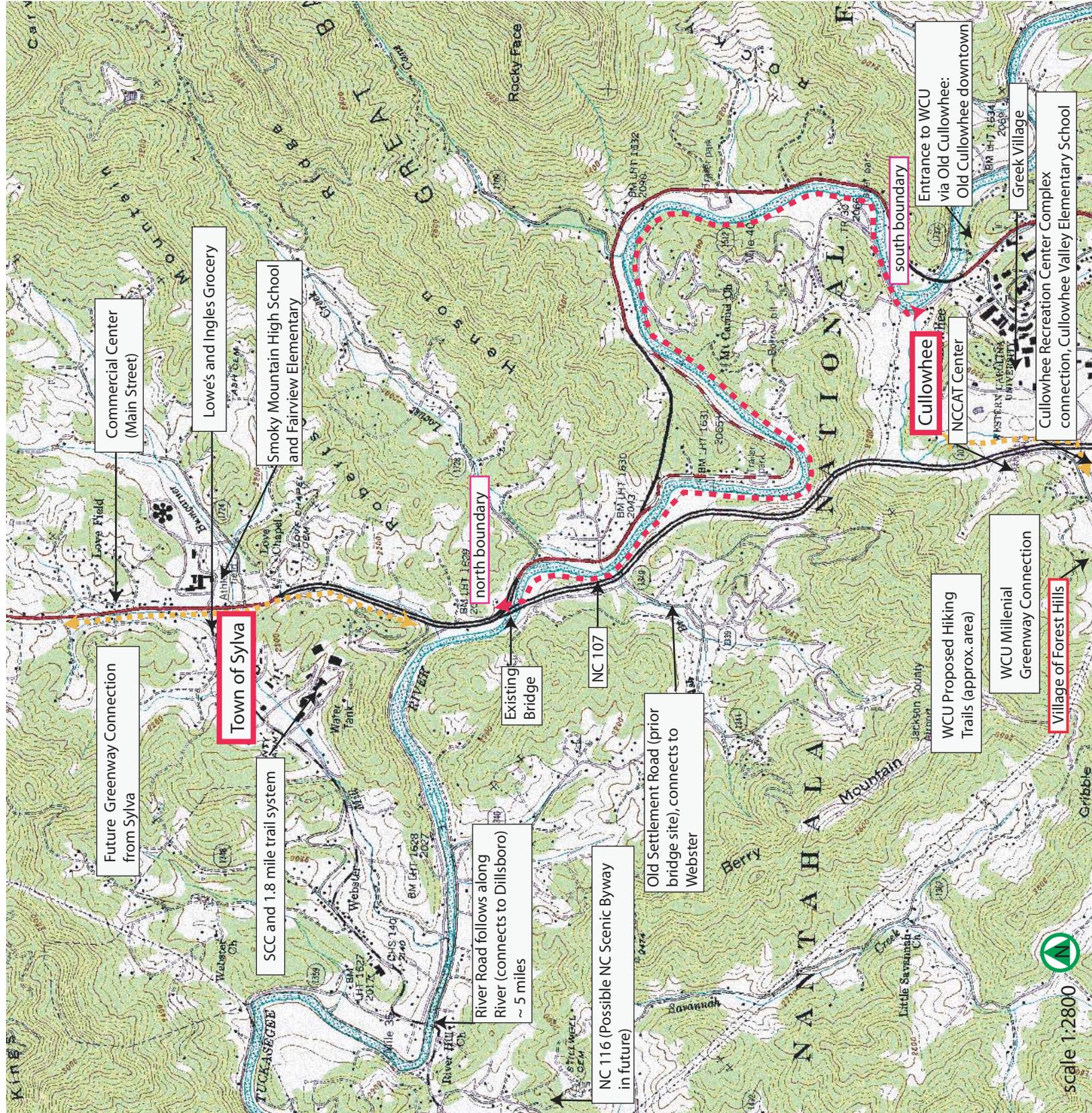
Overall, this corridor offers one of the very best potential greenway corridors in the western part of the region. The success of any greenway depends on use. Visibility, proximity to populated areas, amenities, natural beauty, and overall design of the greenway plays an important role to promote this use. The numerous recreational opportunities for this greenway, access via trailhead parking, along with pocket parks and river/fishing access within this greenway corridor, will provide exceptional opportunities for community members of all ages. This corridor also has the potential to become a major attraction for visitors throughout the state and beyond.

Tuckasegee River Proposed Greenway Contextual Map



LEGEND

- Proposed Tuckasegee River Greenway (Red dashed line with arrowheads)
- Other Proposed Greenway (approx.) (Yellow dashed line with arrowheads)



scale 1:2800

E N V I R O N M E N T A L A N A L Y S I S

Tuckasegee River Greenway
Field Assessment Summary

Purpose

On November 14, 2008, Equinox Environmental performed a site assessment for the proposed Tuckasegee River Greenway located in Jackson County to document general site conditions and natural communities as well as determine the presence of conservation values.

General Site Description

Soils and Wetlands

According to U.S. Fish and Wildlife Service National Wetland Inventory (NWI) Program data, there are no wetlands along the proposed Tuckasegee River Greenway. Jackson County soils data, however, indicate approximately 112 acres of hydric soils along the Tuckasegee River in the project area. This includes Biltmore sand, Cullowhee fine sandy loam, and Rosman fine sandy loam soils series. All series are either frequently or occasionally flooded. Additional soil series primarily consist of fine loamy to stony, well drained, and permeable soils on lower mountain slopes.

Although NWI records do not indicate the presence of wetlands within the project area, there is, a one-acre Freshwater Forested/Shrub Wetland approximately 1/10th mile from the proposed greenway up Cane Creek, a tributary to the Tuckasegee River. This saturated, broad-leaved deciduous, scrub/shrub wetland is dominated by woody vegetation—mostly shrubs and trees that are small or stunted because of environmentally limiting conditions.

Rare Species and Significant Natural Heritage Areas

A review of North Carolina Natural Heritage element occurrence (EO) data indicate the presence of several rare species in the general vicinity of the project area. Most occur within a Significant Natural Heritage Area (SNHA). SNHA's are recognized as sites where land and water resources have been identified as critical reservoirs of biological diversity and provide important habitat for rare, threatened, or endangered species.

The Tuckasegee River is designated a nationally significant aquatic habitat that supports a suite of federal and state listed animal species, which are listed below in Table 1.

Table 1: Tuckasegee River Aquatic Habitat State and Federally Listed Rare Species

| Common Name | Latin Name | State Status | Federal Status |
|---------------------------------|--------------------------------|--------------|----------------|
| Appalachian Elktoe | <i>Alasmidonta raveneliana</i> | E | E |
| Sicklefin Redhorse | <i>Moxostoma</i> sp. 2 | | C |
| Wounded Darter | <i>Etheostoma vulneratum</i> | SC | FSC |
| Olive Darter | <i>Percina squamata</i> | SC | FSC |
| Little Tennessee River Crayfish | <i>Cambarus georgiae</i> | SC | |
| Wavy-rayed Lampmussel | <i>Lampsilis fasciola</i> | SC | |

*SC = Species of Concern; E = Endangered; C = Candidate.

Adjacent to the west side of NC-107, just west of Riverbend Road, is the Tuckasegee River Hornblende Ravine—a locally significant NHA that has a fair quality example of Rich Cove Forest and several Significantly Rare (SR) plants, including Goldenseal (*Hydrastis canadensis*) and Largeleaf Waterleaf (*Hydrophyllum macrophyllum*). Even though these plants are not included on the main list of state Threatened, Endangered, or Candidate species and therefore have no legal protection, they are often significantly reduced in numbers usually as a result of

Tuckasegee River Greenway Field Assessment Summary

habitat destruction. In addition, the Wavy-rayed Lampmussel reportedly occurs east of NC-107 in the Tuckasegee River and an historic record for Fraser's Loosestrife (*Lysimachia fraseri*), a Federal Species of Concern (FSC) and NC State Endangered plant, occurs at the mouth of Cane Creek along the Tuckasegee River.

Water Resources

All waters in the general vicinity of the project area are in the Tennessee River Basin. Streams within the easement area are classified as Tr waters by the North Carolina Division of Water Quality (NCDWQ 2007). "Tr" indicates waters that can support native brook trout or stocked trout. This designation is not the same as the NC Wildlife Resources Commission's "Designated Public Mountain Trout Waters" classification.

Findings

Currently, the sewer easement that approximately delineates the project area is being used for recreational purposes, including fishing and hiking. Evidence of off-highway vehicles (OHV) was occasionally documented along the sewer easement. In addition, the large edge-to-interior ratio and considerable disturbance, primarily anthropogenic, have resulted in large and extensive infestations of several invasive exotic species, including Multiflora Rose (*Rosa multiflora*), Oriental Bittersweet (*Celastrus orbiculatus*), Japanese Honeysuckle (*Lonicera japonica*), Japanese Stiltgrass (*Microstegium vimineum*), Chinese Privet (*Ligustrum sinense*), Kudzu (*Pueraria montana* var. *lobata*), Princesstree (*Paulownia tomentosa*), Golden Bamboo (*Phyllostachys aurea*), and Mimosa (*Albizia julibrissin*). Other weedy species include English Ivy (*Hedera helix*), Periwinkle (*Vinca minor*), and Burning Bush (*Euonymus alata*).

Nevertheless, several large, monotypic stands of native River Cane ("canebrakes") do occur within the floodplain of the Tuckasegee River. Canebrakes support a diversity of wildlife and were historically used by the Cherokee and other southeastern Native American tribes for weaving baskets, building structures, and constructing weapons.

Plant structure and composition indicate that the site, although degraded, is primarily composed of Montane Alluvial Forest. Montane Alluvial forests are primarily characterized by rocky bar and shore habitats adjacent to rivers and streams. This community is naturally uncommon in the Southern Blue Ridge. Well-developed examples are rare due to clearing for agriculture and development. They consist of a canopy dominated by Sycamore, Tulip Poplar, Sweet Birch, Ironwood, and Red Maple. Other canopy trees include Virginia Pine, White Pine, and Eastern Hemlock. The understory frequently consists of Ironwood, Silverbell, Basswood, and Flowering Dogwood. Characteristic shrub species include Tag Alder, Spicebush, Witch Hazel, Winterberry, Wild Hydrangea, Rosebay Rhododendron, and Mountain Doghobble. Vines can be prominent, including Greenbriar, Blackberry, and Grapevine. Herbaceous species composition consists of Christmas Fern, Partridgeberry, and Eastern Waterleaf. In addition, evidence or direct observation of several wildlife species were recorded, including Belted Kingfisher (*Megaceryle alcyon*), Carolina Chickadee (*Poecile carolinensis*), Dark-eyed Junco (*Seiurus aurocapillus*), Kingbird (*Tyrannus tyrannus*), Pileated Woodpecker (*Dryocopus pileatus*), Northern Cardinal (*Cardinalis cardinalis*), Black Bear (*Ursus americanus*), and Coyote (*Canis latrans*).

Tuckasegee River Greenway
Field Assessment Summary

Mountain slopes and ridges adjacent to the Tuckasegee River are primarily composed of Yellow Poplar, White Oak, and several species of Hickory. Typical understory species include Sourwood and Fraser Magnolia. Rosebay Rhododendron, Mountain Laurel, and Mountain Doghobble. Several rock outcroppings occur on more exposed, steep slopes.

Shingle Oak, a NC Plant Watch List species, was documented throughout the project area adjacent to the Tuckasegee River. The Watch List includes plant species which are rare or otherwise threatened with serious decline, but for which current information does not warrant placement on the main list (E, T, C, SR, or SC). Watch List species are considered to be indicators of significant habitats. The status of Shingle Oak is relatively well known in NC and the species appears to be reasonably secure.

In total, 62 species were observed during the field inventory (Table 2). These species should be considered a preliminary and incomplete list of those plants likely to be present on the property. An exhaustive survey is beyond the scope of this assessment, which occurred at a time when most herbaceous species were already dormant. Furthermore, due to difficulty in taxonomy, identification, and collection, non-vascular species were not surveyed. Taxonomic nomenclature follows Weakly (2008)

Table 2. Native Plant Species Documented in the Project Area

| Habit | Latin Name | Common Name |
|-------|--|--------------------------|
| Fern | <i>Botrypus virginianus</i> | Rattlesnake Fern |
| Fern | <i>Polystichum acrostichoides</i> | Christmas Fern |
| Grass | <i>Arundinaria gigantea</i> | River Cane |
| Grass | <i>Dichantherium sp.</i> | Witch Grass |
| Grass | <i>Elymus hystrix var. hystrix</i> | Common Bottlebrush Grass |
| Grass | <i>Tridens flavus</i> | Purpletop |
| Herb | <i>Agrimonia parviflora</i> | Southern Agrimony |
| Herb | <i>Anemone virginiana var. virginiana</i> | Thimbleweed |
| Herb | <i>Anemonella thalictroides</i> | Windflower |
| Herb | <i>Aplectrum hyemale</i> | Puttyroot |
| Herb | <i>Cynoglossum virginianum var. virginianum</i> | Wild Comfrey |
| Herb | <i>Diphasiastrum tristachyum</i> | Running Ground Cedar |
| Herb | <i>Elephantopus carolinianus</i> | Leafy Elephant's-foot |
| Herb | <i>Eurybia divaricata</i> | White Heart-leaved Aster |
| Herb | <i>Galium sp.</i> | Bedstraw |
| Herb | <i>Heuchera americana</i> | American Alumroot |
| Herb | <i>Hydrophyllum virginianum var. virginianum</i> | Eastern Waterleaf |
| Herb | <i>Hylodesmum nudiflorum</i> | Naked tick-trefoil |
| Herb | <i>Mitchella repens</i> | Partridgeberry |
| Rush | <i>Juncus sp.</i> | Rush |
| Rush | <i>Luzula acuminata var. carolinae</i> | Wood-rush |
| Shrub | <i>Alnus serrulata</i> | Tag Alder |
| Shrub | <i>Cercis canadensis</i> | Redbud |
| Shrub | <i>Euonymus americanus</i> | Strawberry-bush |
| Shrub | <i>Hamamelis virginiana</i> | Witch Hazel |
| Shrub | <i>Hydrangea arborescens</i> | Wild Hydrangea |
| Shrub | <i>Ilex verticillata</i> | Winterberry |

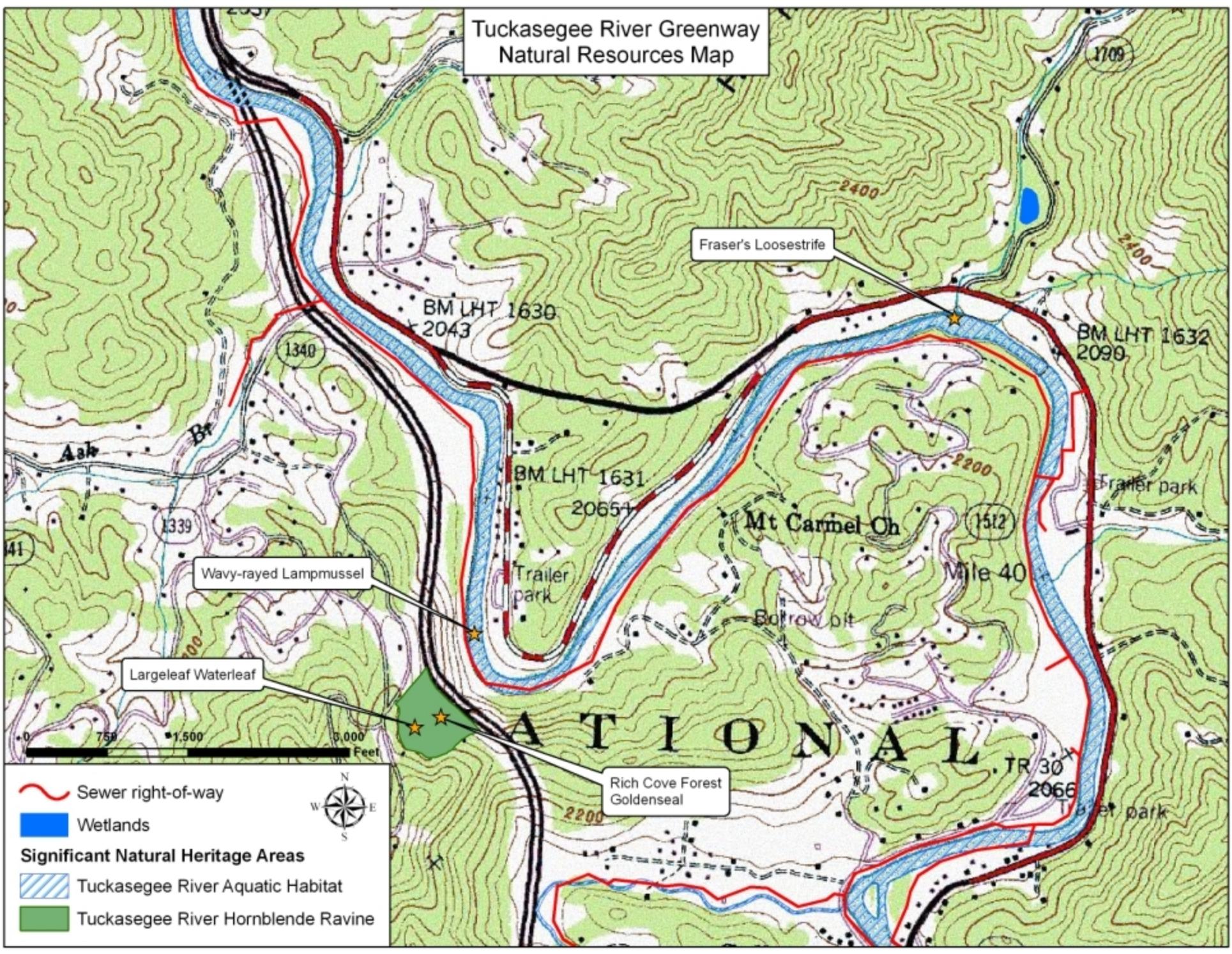
Tuckasegee River Greenway
Field Assessment Summary

| Habit | Latin Name | Common Name |
|-------|--|----------------------|
| Shrub | <i>Kalmia latifolia</i> | Mountain Laurel |
| Shrub | <i>Leucothoe fontanesiana</i> | Mountain Doghobble |
| Shrub | <i>Lindera benzoin</i> var. <i>benzoin</i> | Spicebush |
| Shrub | <i>Rhododendron maximum</i> | Rosebay Rhododendron |
| Shrub | <i>Rhus glabra</i> | Smooth Sumac |
| Shrub | <i>Sambucus canadensis</i> | Common Elderberry |
| Shrub | <i>Xanthorhiza simplicissima</i> | Yellowroot |
| Tree | <i>Acer negundo</i> | Box Elder |
| Tree | <i>Acer rubrum</i> var. <i>rubrum</i> | Eastern Red Maple |
| Tree | <i>Betula lenta</i> var. <i>lenta</i> | Sweet Birch |
| Tree | <i>Carpinus caroliniana</i> | Ironwood |
| Tree | <i>Carya tomentosa</i> | Mockernut Hickory |
| Tree | <i>Cornus florida</i> | Flowering Dogwood |
| Tree | <i>Fagus grandifolia</i> var. <i>caroliniana</i> | American Beech |
| Tree | <i>Halesia tetraptera</i> var. <i>tetraptera</i> | Mountain Silverbell |
| Tree | <i>Ilex opaca</i> var. <i>opaca</i> | American Holly |
| Tree | <i>Juglans nigra</i> | Black Walnut |
| Tree | <i>Juniperus virginiana</i> var. <i>virginiana</i> | Eastern Red Cedar |
| Tree | <i>Liriodendron tulipifera</i> | Tulip Poplar |
| Tree | <i>Oxydendrum arboreum</i> | Sourwood |
| Tree | <i>Pinus strobus</i> | White Pine |
| Tree | <i>Pinus virginiana</i> | Virginia Pine |
| Tree | <i>Plantanus occidentalis</i> var. <i>occidentalis</i> | Sycamore |
| Tree | <i>Quercus alba</i> | White Oak |
| Tree | <i>Quercus coccinea</i> | Scarlet Oak |
| Tree | <i>Quercus falcata</i> | Southern Red Oak |
| Tree | <i>Quercus imbricaria</i> | Shingle Oak |
| Tree | <i>Quercus rubra</i> var. <i>rubra</i> | Red Oak |
| Tree | <i>Quercus velutina</i> | Black Oak |
| Tree | <i>Robinia pseudoacacia</i> | Black Locust |
| Tree | <i>Tilia americana</i> var. <i>heterophylla</i> | Basswood |
| Tree | <i>Tsuga canadensis</i> | Eastern Hemlock |
| Tree | <i>Ulmus rubra</i> | Red Elm |
| Vine | <i>Smilax rotundifolia</i> | Roundleaf Greenbriar |
| Vine | <i>Toxicodendron radicans</i> | Poison Ivy |

References

Weakley, A.S. 2008. Flora of the Carolinas, Virginia, Georgia, northern Florida, and Surrounding Areas. University of North Carolina Herbarium (NCU). University of North Carolina at Chapel Hill. Chapel Hill, NC.

Tuckasegee River Greenway Natural Resources Map



Fraser's Loosestrife

BM LHT 1630
2043

BM LHT 1632
2090

BM LHT 1631
2065

Wavy-rayed Lampmussel

Largeleaf Waterleaf

Mt Carmel Oh

1512

Mile 40

Borrow pit

NATIONAL

Rich Cove Forest
Goldenseal

TR 30
2066

Sewer right-of-way

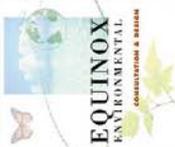
Wetlands

Significant Natural Heritage Areas

Tuckasegee River Aquatic Habitat

Tuckasegee River Hornblende Ravine

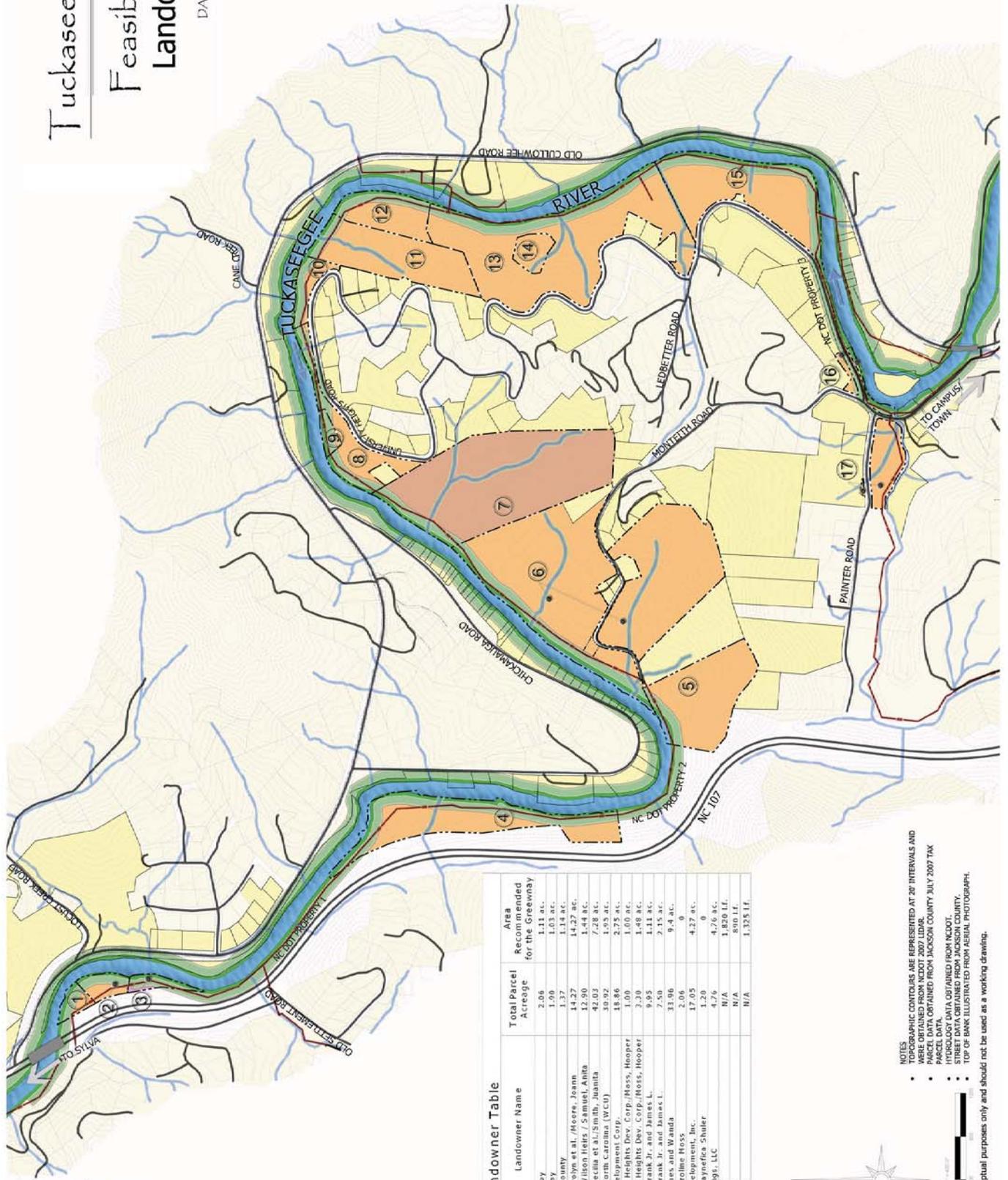
L A N D O W N E R M A P



Tuckaseegee Greenway

Feasibility Study: Landowner Map

DATE: December 2008

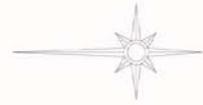


LEGEND

- LANDOWNER LIST PARCEL
- STATE OWNED PARCEL
- COUNTY OWNED PARCEL
- ADJACENT PARCELS
- SEWER LINE
- WATER LINE
- PARCEL OWNER #
- 100' ACQUISITION STREAM/RIVER
- 20' ACQUISITION STREET
- PARCELS (REFERENCE)
- 20' CONTOUR
- DNQ 25' TROUT BUFFER

Landowner Table

| Identification Number | Landowner Name | Total Parcel Acreage | Area Recommended for the Greenway |
|-----------------------|--|----------------------|-----------------------------------|
| 1 | Asher, Leroy | 2.06 | 1.11 ac. |
| 2 | Asher, Leroy | 1.00 | 1.03 ac. |
| 3 | Jackson County | 1.37 | 1.14 ac. |
| 4 | Cable, Cronin et al./Moore, Joann | 14.27 | 14.27 ac. |
| 5 | Koehn, William/Williams, Anita | 42.03 | 7.38 ac. |
| 6 | State of North Carolina (WCU) | 30.92 | 1.95 ac. |
| 7 | Moss Development Corp. | 18.86 | 2.75 ac. |
| 8 | University Heights Dev. Corp./Moss, Hooper | 1.00 | 1.00 ac. |
| 9 | University Heights Dev. Corp./Moss, Hooper | 2.30 | 1.48 ac. |
| 10 | Mahuro, Frank Jr. and James L. | 9.95 | 1.11 ac. |
| 11 | Mahuro, Frank Jr. and James L. | 7.50 | 2.15 ac. |
| 12 | Moss, James and Wanda | 33.96 | 9.4 ac. |
| 13 | Lewis, Catherine Moss | 2.06 | 0 |
| 14 | Devin Development, Inc. | 17.05 | 4.27 ac. |
| 15 | Reece, Waymetica Shuler | 1.20 | 0 |
| 16 | Lap Holdings, LLC | 4.76 | 4.76 ac. |
| 17 | NC DOT 1 | N/A | 1.80 ac. |
| | NC DOT 2 | N/A | 1.80 ac. |
| | NC DOT 3 | N/A | 1.35 ac. |



NOTES:

- PARCELS AND CONTROLS ARE REPRESENTED AT 20' INTERVALS AND WERE OBTAINED FROM NC DOT 2007 LIDAR.
- PARCEL DATA OBTAINED FROM JACKSON COUNTY JULY 2007 TAX PARCEL DATA.
- HYDROLOGY DATA OBTAINED FROM NC DOT.
- TOP OF BANK ILLUSTRATED FROM AERIAL PHOTOGRAPHY.

This map is for conceptual purposes only and should not be used as a working drawing.

L A N D O W N E R A C Q U I S I T I O N

Tuckasegee Feasibility Study
Landowner Acquisition Needs

| EE ID | Parcel Number | Name | Street Address | City, State, Zip | Acreage | 2007: Tax Valuation | Cost per/acre | Easement | | Estimated Cost | \$5,000 increase | Total Proposed Cost | Notes |
|---------------|---------------|--|--------------------------|-----------------------|---------|---------------------|---------------|--------------|--|-----------------------|-------------------|-----------------------|-----------------------------|
| | | | | | | | | Acres | | | | | |
| 1 | 7640-83-2769 | Ashe, L | 344 Riverview Drive | Sylva, NC 28779 | 2.06 | \$44,130.00 | \$21,422.33 | 1.11 | | \$23,778.79 | \$5,000.00 | \$28,778.79 | |
| 2 | 7640-83-3594 | Ashe, L | 344 Riverview Drive | Sylva, NC 28779 | 1.90 | \$41,150.00 | \$21,657.90 | 1.03 | | \$22,307.64 | | \$22,307.64 | |
| 3 | 7640-83-4184 | Jackson County | 401 Grindstaff Cove Road | Sylva, NC 28779 | | | | 1.14 | | \$0.00 | | \$0.00 | County Owned |
| 4 | 7640-90-8278 | Cabe, C et al. | 80 Joe Davis Road | Sylva, NC 28779 | 14.27 | \$11,060.00 | \$775.05 | 14.27 | | \$11,060.00 | \$5,000.00 | \$16,060.00 | Entire Parcel |
| 5 | 7559-08-9238 | Lowery, W Heirs | 15 Azalea Street | Asheville, NC 28803 | 12.90 | \$354,070.00 | \$27,487.29 | 1.44 | | \$39,581.70 | | \$39,581.70 | |
| 6 | 7559-19-7471 | Rogers, C et al. | 96 S French Broad Ave | Asheville, NC 28801 | 42.03 | \$1,057,190.00 | \$25,153.22 | 7.28 | | \$183,115.44 | \$5,000.00 | \$188,115.44 | Additional land recommended |
| 7 | 7559-29-8993 | State of NC (WCU) | PO Box 878 | Angier, NC 27501 | | | | 1.95 | | \$0.00 | | \$0.00 | State Owned |
| 8 | 7650-31-6187 | Moss Development Corp. | PO Box 121 | Cullowhee, NC 28723 | 18.86 | \$383,770.00 | \$20,348.36 | 2.75 | | \$55,957.99 | \$5,000.00 | \$60,957.99 | Beyond 100' needed |
| 9 | 7650-31-2558 | UH Dev. Corp./Moss, Hooper | 11317 Vale Road | Oakton, VA 22124 | 1.00 | \$85,000.00 | \$85,000.00 | 1.00 | | \$85,000.00 | \$5,000.00 | \$90,000.00 | Entire Parcel |
| 10 | 7650-41-6739 | UH Dev. Corp./Moss, Hooper | 11317 Vale Road | Oakton, VA 22124 | 3.30 | \$164,340.00 | \$49,800.00 | 1.48 | | \$73,704.00 | \$5,000.00 | \$78,704.00 | Beyond 100' needed |
| 11 | 7650-41-9030 | Maturo, F and J | 3010 NW 9th Place | Gainesville, FL 32605 | 9.95 | \$217,070.00 | \$21,816.08 | 1.11 | | \$24,215.85 | \$5,000.00 | \$29,215.85 | Beyond 100' needed |
| 12 | 7650-51-2005 | Maturo, F and J | 3010 NW 9th Place | Gainesville, FL 32605 | 7.50 | \$188,140.00 | \$25,085.33 | 2.15 | | \$53,933.46 | | \$53,933.46 | Beyond 100' needed |
| 13 | 7559-49-9321 | Moss, J and W | PO Box 121 | Cullowhee, NC 28723 | 33.96 | \$749,800.00 | \$22,078.92 | 9.40 | | \$207,541.85 | \$5,000.00 | \$212,541.85 | Additional land recommended |
| 14 | 7559-49-8749 | Lewis, C Moss | PO Box 1906 | Cullowhee, NC 28723 | 2.06 | \$438,960.00 | \$213,087.38 | | | \$0.00 | | \$0.00 | No easement needed |
| 15 | 7559-57-4840 | Devin Development, Inc. | 281 Brunswick Drive | Waynesville, NC 28786 | 17.05 | \$1,338,900.00 | \$78,527.86 | 4.27 | | \$335,313.96 | | \$335,313.96 | |
| 16 | 7559-36-5862 | Reece, W S | PO Box 253 | Cullowhee, NC 28723 | 1.20 | \$93,980.00 | \$78,316.67 | 0.70 | | \$54,821.67 | \$5,000.00 | \$59,821.67 | Section between ROW & River |
| 17 | 7559-26-9687 | Lap Holdings, LLC | PO Box 373 | Cherry Log, GA 30522 | 4.76 | \$86,820.00 | \$18,239.50 | 4.76 | | \$86,820.02 | \$5,000.00 | \$91,820.02 | Entire Parcel |
| *18 | 7559-47-1148 | Albert's Cullowhee, Inc. | 1547 S. Main Street | Waynesville, NC 28786 | 1.40 | \$146,380.00 | \$104,557.14 | 0.26 | | \$27,184.86 | \$5,000.00 | \$32,184.86 | Section between ROW & River |
| *19 | 7559-47-2396 | Setzer, B and A | PO Box 1257 | Cullowhee, NC 28723 | 1.80 | \$165,600.00 | \$92,000.00 | 0.10 | | \$9,200.00 | | \$9,200.00 | Section between ROW & River |
| | | NC Department of Transportation (NC DOT 1) | | | | | | 4.34 | | | | | 1,325 Linear Feet |
| | | NC Department of Transportation (NC DOT 2) | | | | | | 2.36 | | | | | 890 Linear Feet |
| | | NC Department of Transportation (NC DOT 3) | | | | | | 0.57 | | | | | 1,820 Linear Feet |
| Totals | | | | | | | | 63.47 | | \$1,293,537.22 | \$5,000.00 | \$1,348,537.22 | |

* These parcels are not located on Landowner Map (appendix 4)

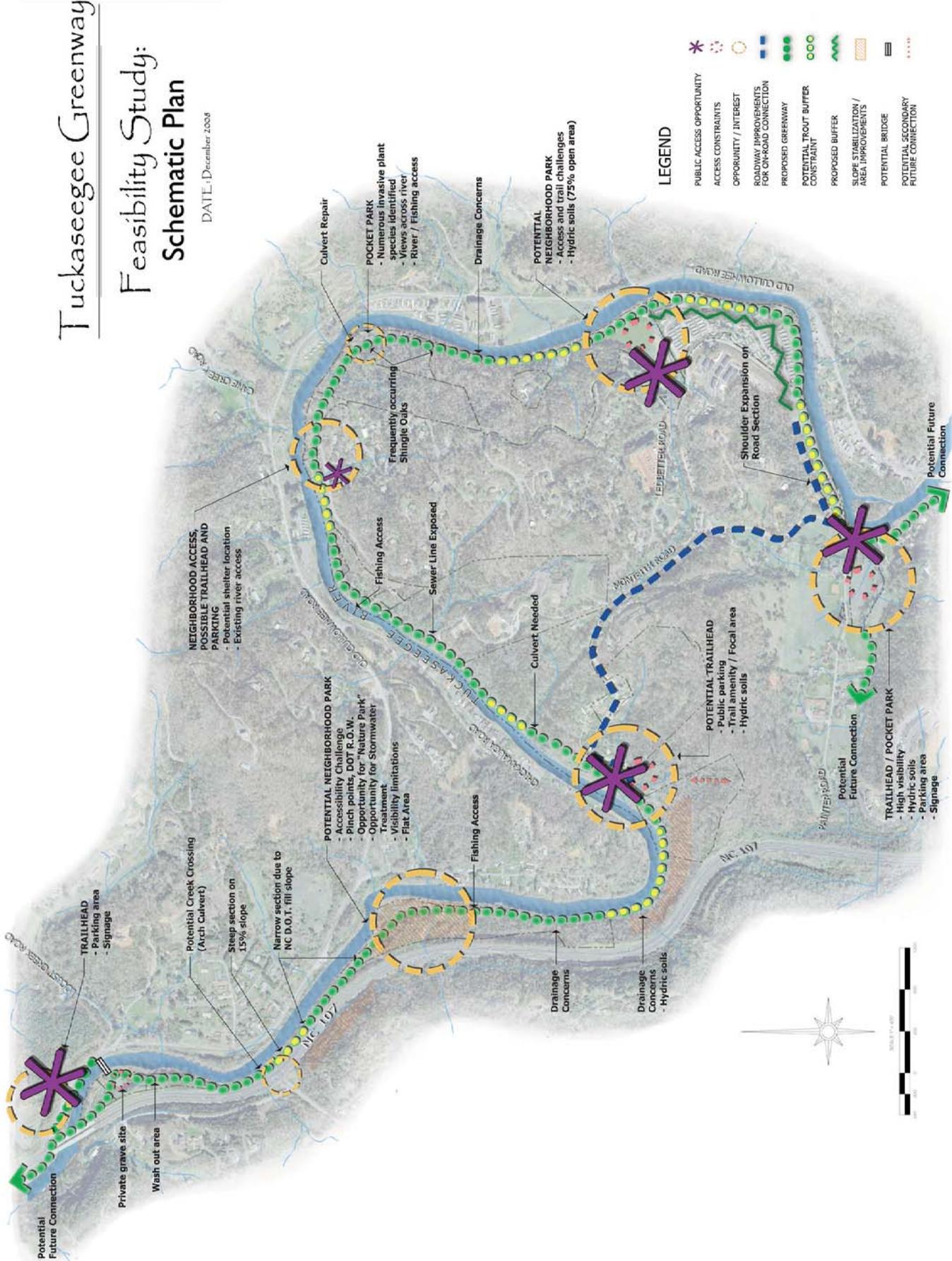
** The optional 5,000 increase is added to 60 percent of parcels (11 out of 19).

S C H E M A T I C P L A N

Tuckasegee Greenway

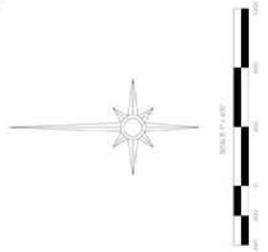
Feasibility Study: Schematic Plan

DATE: December 2008



LEGEND

| | |
|--|---|
| | PUBLIC ACCESS OPPORTUNITY |
| | ACCESS CONSTRAINTS |
| | OPPORTUNITY / INTEREST |
| | ROADWAY IMPROVEMENTS FOR ON-ROAD CONNECTION |
| | PROPOSED GREENWAY |
| | POTENTIAL TROUT BUFFER CONSTRAINT |
| | PROPOSED BUFFER |
| | SLOPE STABILIZATION / AREA IMPROVEMENTS |
| | POTENTIAL BRIDGE |
| | POTENTIAL SECONDARY FUTURE CONNECTION |



View of the bank along the river from the proposed greenway.



View of a low area along the proposed greenway and existing trail.



View of a potential neighborhood access point and existing river access.



View looking up at a large fill slope along the proposed greenway.

T E C H N I C A L A D V I S O R Y W O R K S H O P :
E X I S T I N G C O N D I T I O N S

Tuckasegee Greenway Workshop: Existing Conditions Table 01/15/09

| Subject | Comments (Individuals) "" |
|-------------------------------------|---|
| <i>Physical Constraints</i> | Drainage issue off 107 |
| | Width of Area on DOT right of way near Trailer Park |
| | Area restrictions near roadways |
| | Culvert to other side of 107 @ Ashe Settlement intersection |
| <i>Safety</i> | Coyotes-end of Monteith Gap Road |
| | Snakes in summer (rocky/fill parcel across from Ashe settlement) |
| | Safety along Ledbetter Rd. width/accidents/also river (orator) |
| | Closeness to River Road/safety |
| | Security/liability at University Heights, etc. ; security: evidence of some vandalism |
| <i>Connections</i> | Secondary phases: Old Cullowhee connection; Millenial connector (orator) |
| | |
| | To not include the area starting at the dam and going along the river is a missed opportunity |
| | Potential bridge location |
| | WCU is developing a trasil system on the east side of Hwy 107 that would easily tie into this greenway through the ped tunnel Will it tie into existing bike path? |
| <i>Community/Culture/Landowners</i> | Property exchanges; Moss Memorial Park (orator) |
| | Property owners should see a benefit to their property in exchange or partial exchange for an easement |
| | Is there a right way to spell Tuckaseigee, -seegee, -segee? |
| | Excavation-Indiana artifacts |
| | Get WCU involved |
| | Landowners (Landowner By-In) |
| | Private Property holders |
| | Benefits for property owners Sweet talk Jim Moss |

| Subject | Comments (Individuals) "" |
|--------------------|---|
| <i>Environment</i> | Stream flows |
| | Fishing/boating/rec tourism - flows, g/data/education (Duke and WRC) (orator) |
| | Pollution issues |
| | Limited Trout "stocking" available sites |
| | The river becomes chocolate during a big rain |
| | Human waste |
| | 25' buffer on Tuckasegee |
| | Turbidity metering |
| <i>Parcels</i> | Area between #4 and #5 is currently experiencing single-fam home dev. |
| | WCU landfill has possible use as a park (Brown site) |
| | Picnic Area (Parcel 4) (orator) |
| | Grave site on plot number 1 |
| | #4 landlocked parcel |
| <i>Access</i> | Where will visitors park? |
| | Are there particularly "scenic" areas for river overlooks? Break/picnic areas |
| | The grade is flat! Very conducive to a greenway |
| | More stocking points = more possible stocking could possible change or extend delayed harvest! (By Bridge 107) (orator) |
| | No boat ramp |
| | Access points, Multi-purpose |
| | Canoe/kayak/driftboat access at trailheads? |
| | Easy access: usage (Multi-use)- Potential parking |
| | 4x4 and ATV have easy access currently |
| | Lack of stocking access to the river DH/HS |
| | Potential for picnic areas |
| | Lack of access areas for fishing, parking |

T E C H N I C A L A D V I S O R Y W O R K S H O P :
V I S I O N

Tuckaseegee Greenway Workshop Results: Vision Table 01/15/09

| SUBJECT | SUB-CATEGORY | *Number of "Priority" Votes | **Number of "Concerned Votes" |
|---------------------------------|--|-----------------------------|-------------------------------|
| <i>Amenities</i> | Fitness Station | 2 | |
| | Family Biking/Walking Opportunity | 1 | |
| | Restroom Facilities (permanent, central/composting) | | |
| <i>Connections</i> | Connect to Sylva | 4 | |
| | Kids Safe Route to School / CVS Connector (Connect to Rec Park allow kids to bike/walk to school) | 2 | |
| | Stock/Access connection w/ S River Rd intersection | | |
| | A greenway that connects to other trails-WCU,SCC, town, Dillsboro, Rec Center | | |
| <i>Trail</i> | Transportation Facility (surfacing, visibility, safety, speed limits) | 1 | 1 |
| | Emergency Call boxes-1/4 mile or closer intervals-even patrolled | | |
| | Build hard enough trail surface for rollerblades, bicycles, strollers, 150 psi tires | | |
| | Use the "Greenest" surface possible without limiting the ability for a multi-use surface | | |
| | Path surface: flood prone area, stable surface treatment for long term existence | | |
| <i>Education</i> | Enhance Use and Awareness of River | 2 | |
| | Environment and Local History Education (Railroad) | 1 | |
| | Informative Kiosks | 1 | |
| | Greenway to serve as a model for future greenways | 1 | |
| | Environmental education-both the amenities and programs | | |
| | Wetlands area and exhibits | | |
| | Fitness Programs/ Wellness; community gardens | | |
| <i>Environment</i> | Preserve the natural environment including the river | 4 | |
| | Protect natural beauty and provide quite/undeveloped areas | | |
| | Access to Natural Environment (provide connections for peiople with the natural | | |
| <i>Access & General Use</i> | Provide youth-oriented opportunities along the greenway | 4 | |
| | Create a greenway that is safe | 4 | |
| | Boat Launches/Public Access | 2 | |
| | Safety | 2 | |
| | Night Access | 1 | |
| | A greenway that has high-use & is a popular area | | |

| | | | |
|---------------------------|---|---|---|
| | Additional public parks/boat launches, ie, East LaPorte | | |
| | Intentional usage for specific activities | | |
| | Commuting to work | | |
| | Consistent Lighting for Bike Commuters | | |
| | Central access w/ park, picnic and facilities | | |
| | Steps or ramps for river access | | |
| | ADA/Handicap/Child Access to Trail & Recreation | | |
| | Relaxing use, "my activity is meant to be here" | | |
| | Enhanced fishing opportunities for youth (under 16 yrs old). Elderly and Handicap ie.) | | |
| | River access for none driving public | | |
| | Environmental rules (no soap, no picking flowers, etc.) | | |
| <i>Recreation</i> | Multiple use: boat, bike, walk, run, hike | 2 | |
| | Fishing Piers | 1 | |
| | Water Park | 1 | |
| | Skate Park/Skater Access | | |
| | Tube Rental / Economic Develop. Opp. / Regulation | | |
| | Places for passive recreation | | |
| | Create a sliding rock in the river for kids to play in | | |
| <i>Community Partners</i> | Communication/Coordination with NCDOT (new roads) | | 1 |
| | Programs/Partner to involve community so the community takes pride and ownership of the greeway | | |

**Represents something the committee would like to see incorporated within the greenway*

*** Represents something the committee shared concerns*

G R E E N W A Y S U R F A C E S

Greenway Surfaces Table

| Surface Type | Durability | Environmental Considerations | Maintenance | Meets NC DOT Requirements? | Meets ADA Accessibility Guidelines? | Additional Comments | User Groups | Cost (Per mile of 10 ft width, installed) |
|--|--|--|---|----------------------------|-------------------------------------|--|---|--|
| Asphalt | <ul style="list-style-type: none"> Texture: Flexible Hard Slope max: 20% Lifespan: 7-15 years | <ul style="list-style-type: none"> Highest embodied energy Cold or warm mix to reduce emissions | Low | Yes | Yes | <ul style="list-style-type: none"> Can use recycled aggregate (i.e., reclaimed pavement, furnace slag, crushed waste stone, etc) Variety of surface options (See Asphalt Surfaces Table) | All | <ul style="list-style-type: none"> \$200,000 - 300,000 (Flink et al 2001) |
| Concrete | <ul style="list-style-type: none"> Texture: Hard Slope max: 20% Lifespan: 30+ years | <ul style="list-style-type: none"> Use reclaimed or recycled aggregate to reduce embodied energy | Low | Yes | Yes | <ul style="list-style-type: none"> Ideal in flood prone areas Hardest surface and easy to form Supports multiple users Expansion | All | <ul style="list-style-type: none"> \$300,000-500,000 (Rails-to-Trails Conservancy) |
| Porous Asphalt | <ul style="list-style-type: none"> Texture: Flexible Hard Slope max: 9% Lifespan: unknown | <ul style="list-style-type: none"> Cold or warm mix to reduce emissions Use reclaimed or recycled aggregate to reduce embodied energy | Moderate: Must have surface vacuumed or cleaned to maintain porosity | Yes | Yes | <ul style="list-style-type: none"> Silt and sediment can clog pores, reducing porosity | All, however not ideal for strollers (rougher surface reduces speed) | Varies, comparable to asphalt costs, up to 30% more |
| Porous Concrete | <ul style="list-style-type: none"> Texture: Hard Slope max: 7% Lifespan: unknown | <ul style="list-style-type: none"> Use reclaimed or recycled aggregate to reduce embodied energy | Moderate: Must have surface vacuumed or cleaned to maintain porosity | Yes | Yes | <ul style="list-style-type: none"> Silt and sediment can clog pores, reducing porosity | All, however not ideal for strollers (rougher surface reduces speed) | Varies, comparable to concrete costs, up to 50% more |
| Rubber Asphalt Concrete (RAC), Rubberized Composite | <ul style="list-style-type: none"> Texture: Flexible Hard Lifespan: 15+ years | <ul style="list-style-type: none"> Increases life of traditional surfacing due to flexibility Variety of low emission binders Uses recycled materials | Low: Lifespan of RAC is 2x traditional asphalt | Yes | Yes | <ul style="list-style-type: none"> Reuses waste tires Increased traction More common in asphalt applications | All | Varies, comparable to concrete applications |
| Chip-n-Seal | <ul style="list-style-type: none"> Texture: Hard Slope max: 8% Lifespan: 3-7 years | <ul style="list-style-type: none"> Reduces asphalt use if applied directly to aggregate base (low use only) Emulsified application; less energy and lower fumes (Calkins 2008) | Low - Moderate: Must resurface every 3-7 years | Yes | Yes | <ul style="list-style-type: none"> Cape Seal is an alternative that may improve lifespan up to 15 years Rubberized Asphalt Chip Seal available | All, however not ideal for bicyclists | Varies, compare to asphalt applications or slightly lower |
| Boardwalk | <ul style="list-style-type: none"> Texture: Flexible Hard Slope max: varies Lifespan: 10+ years | <ul style="list-style-type: none"> Wood treatments may be harmful to aquatic environment Low impact on the existing landscape | Low | Yes | Yes | <ul style="list-style-type: none"> Ideal for small sections, such as environmentally sensitive areas (wetlands) | All, however speed is reduced | <ul style="list-style-type: none"> \$1.5 - 2 million (Flink et al 2001) |
| Soil Cement | <ul style="list-style-type: none"> Texture: Hard Slope max: 8% Lifespan: 3-7 years | <ul style="list-style-type: none"> Low embodied energy Low transport costs Stabilizer options can increase or decrease impact | Low - Moderate | Yes | Yes | <ul style="list-style-type: none"> Not ideal for heavy use Bicyclists and horseback riders have biggest impact Can erode over time Low cost | All | <ul style="list-style-type: none"> Soil Cement \$60,000 - 100,000 (Flink et al 2001) |
| Crushed Rock, Granular Stone (< 3/8") | <ul style="list-style-type: none"> Texture: Loose - Firm Slope max: 5% Lifespan: 7-10 years | <ul style="list-style-type: none"> Low impact and low embodied energy Can use stone, materials from site | Low - Moderate: Additional stone every 7 - 10 yrs | Varies | Varies | <ul style="list-style-type: none"> Can be compacted with dust as binding agent Tree resin emulsion can also be used for a harder surface | Not ideal for road bicyclists, in-line skating, strollers and wheel chairs (can be washed away) | <ul style="list-style-type: none"> Crushed limestone \$80,000 - 120,000 (Flink et al 2001) |
| Pea Gravel | <ul style="list-style-type: none"> Texture: Loose Lifespan: varies | <ul style="list-style-type: none"> Low impact and reduced impaction | Low - Moderate | No | No | <ul style="list-style-type: none"> Edging and geo-textile layer assist in maintaining trail width | Excludes road bicyclists, in-line skating, wheel chairs, strollers and people with disabilities | Varies |
| Natural Surface | <ul style="list-style-type: none"> Texture: Loose-Firm Lifespan: varies | <ul style="list-style-type: none"> Lowest environmental impact Erosion BMPs needed | High: Remove obstructions from substrate (initial); erosion, vegetation and drainage maintenance (annual) | Varies | Varies | <ul style="list-style-type: none"> Can be installed using volunteers Not an all-weather surface | Excludes road bicyclists, in-line skating, strollers, wheel chairs and could exclude people with disabilities | <ul style="list-style-type: none"> \$50,000 - 70,000 (Flink et al 2001) |
| Wood Chips | <ul style="list-style-type: none"> Texture: Loose Slope max: 5% Lifespan: 1-3 years | <ul style="list-style-type: none"> Low impact | Low - Moderate: Additional woods chips added as needed | Varies | Varies | <ul style="list-style-type: none"> Can be installed using volunteers Edging and geo-textile layer assist in maintaining trail width | Excludes road bicyclists, in-line skating, strollers, wheel chairs and could exclude people with disabilities | <ul style="list-style-type: none"> \$65,000 - 85,000 (Flink et al 2001) |