



File Code: 1950-1

Date: June 12, 2006

Dear Interested Members of the Public and Forest Users:

Enclosed is an environmental assessment (EA) for the Davidson River Channel Stabilization Project, on the Pisgah Ranger District, Pisgah National Forest. Pursuant to 36 CFR 215.5, as District Ranger for the Pisgah Ranger District of the National Forests in North Carolina, I request your written or oral comments on the environmental assessment for the proposed project listed above.

Flooding from the storm events after the hurricanes of 2004 damaged river banks, rearranged gravel bars and moved large trees into the Davidson River. This project involves damage at two locations: 1) Just upstream of the Scyamore Flats Picnic Area and 2) The Exercise Trail about 300 feet downstream of the English Chapel. The damage to the river banks at these locations have become sources of sediment creating problems with water quality and aquatic habitat. The damage has also created problems with recreational opportunities on the river and potential damage to heritage sites. Two alternatives have been developed and analyzed, Alternative A – No Action and Alternative B – Proposed Action. I have identified Alternative B as my preferred alternative. This alternative involves repairing and protecting the river banks through construction of four rock/log vanes, relocation of channel gravel to form a point bar, and relocation of downed trees to stabilize the river banks. These activities are proposed in Transylvania County, North Carolina.

Although a preferred alternative has been identified, my final decision on which alternative to implement has not been made. You can help me in making this decision by providing written review comments on the EA. I encourage your participation during this 30-day comment period for the EA. Please note that I am requesting your comments under 36 CFR 215. Following this 30-day period, I will be publishing a decision. Pursuant to 36 CFR 215.11(a) and 215.15(a), my decision will initiate a 45-day appeal period or pursuant to 36 CFR 215.12 (e) this action will not be subject to appeal.

Only those who submit timely comments will be accepted as appellants. If you would like to comment, it would be helpful if the comments were as specific as possible. You must provide the following information: 1) Your name and address; 2) Title of the Proposed Action; 3) Specific comments on the proposed action, along with supporting reasons that the Responsible Official should consider in reaching a decision; and 4) Your signature or other means of identification verification. For organizations, a signature or other means of identification verification must be provided for the individual authorized to represent your organization.

In accordance with 36 CFR 215.6(a)(2&4), comments must be postmarked or received within 30 days beginning the day after publication of this notice in *The Asheville Citizen-Times*. Oral or hand-delivered comments must be received within our normal business hours of 8:00 a.m. to 4:30 p.m. Comments may be mailed electronically, in a common digital format, to: comments-southern-north-carolina-pisgah-pisgah@fs.fed.us. The subject line must contain the name of the project for which you are submitting comments and the sender should normally receive an automated electronic



acknowledgement from the agency as confirmation of receipt. If the sender does not receive an automated acknowledgement of the receipt of comments, it is the sender's responsibility to ensure timely receipt by other means. Comments may be sent by regular mail to: Pisgah Ranger District, Attn: Randall Burgess, Responsible Official/District Ranger, 1001 Pisgah Highway, Pisgah Forest, N.C. 28768. Or, you may fax your comments to (828) 884-7527.

If you have questions regarding this proposal, you may contact me, at (828) 877-3265. Thank you for your continued interest in management of your National Forest.

Sincerely,

/s/ Randall Burgess

RANDALL BURGESS
District Ranger
Pisgah Ranger District
Enclosure



United States
Department of
Agriculture

Forest Service

June 2006



Davidson River Channel Stabilization Project Environmental Assessment

Pisgah Ranger District, Pisgah National Forest
Transylvania County, North Carolina



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|-------------------------------------|---|
| Project: | Davidson River Channel Stabilization Project Environmental Assessment (EA) |
| Location of Action: | Pisgah Ranger District, Pisgah National Forest Transylvania County, North Carolina |
| Lead Agency: | USDA Forest Service |
| Responsible Official: | Randall Burgess, District Ranger 1001 Pisgah Highway Pisgah Forest, NC 28768 |
| For More Information: | Brady Dodd, Forest Hydrologist, Project Leader (828) 257-4214 (828) 259-0584 (fax) |
| Send Electronic Comments to: | comments-southern-north-carolina-pisgah- pisgah@fs.fed.us |

SUMMARY

In September of 2004, the remnants of three hurricanes hit North Carolina damaging areas throughout the state including sites on the Davidson River. The Pisgah Ranger District proposes to take action to stabilize river banks by redirecting the flow of the Davidson River away from eroding river banks damaged by storm flooding. This is intended to protect aquatic habitat by reducing river sedimentation, to protect the Sycamore Flats picnic area from erosion and flooding and to protect from erosion the Exercise Trail and nearby archaeological resources.

In this environmental assessment (EA), the Pisgah Ranger District is proposing the following action alternative which will bring this area closer to the desired condition outlined in the Nantahala and Pisgah National Forests Land and Resource Management Plan, as amended.

To stabilize banks along the Davidson River, the Pisgah National Forest proposes work at two locations; one near the Sycamore Flats Recreation Area and the other near English Chapel.

Near Sycamore Flats Recreation Area, this project (UID #2322) proposes to:

- construct two log and rock J-hook vanes,
- relocate the channel substrate to form a point bar on the right downstream bank,
- build up the river bank at inlet of the side channel adjacent to the recreation area,
- install a log sill at the inlet of the side channel to control inlet elevation, and
- relocate down trees with root wads in the side channel.

Additionally, approximately one hundred yards downstream of the English Chapel Bridge is the Exercise Trail site (UID #1851), items the National Forest proposes to:

- slope back the vertical river bank,
- place erosion control matting on the river bank, and
- construct two rock vanes in the river.

The project proposal calls for planting the river banks with native trees and shrubs at both locations and reseeding areas impacted by heavy equipment with annual native grasses. In addition to the action alternative (Alternative B), the Forest Service also evaluated a no-action alternative (Alternative A). The no-action alternative would not take any action to improve the stream bank condition in the Davidson River corridor.

In 2004, the Pisgah Ranger District (District) completed the Sycamore Flats Environmental Assessment to add stream structures to a segment of Davidson River adjacent to the Sycamore Flats Recreation Area and within this project area. The Pisgah District Ranger signed the decision notice (DN) for that project in July 2004. The District plans to implement the Sycamore Flats project in summer/spring, 2006. Where appropriate, this EA tiers to the analysis in the Sycamore Flats Project EA and decision notice (DN).

Under the no-action alternative, current management plans would continue to guide management of the project area. However, river bank stabilization would not be implemented, which will result in continued short and long-term sedimentation and damage to recreation and archeological sites. Additionally, this alternative would not contribute to the goals and objectives of the Nantahala and Pisgah National Forest Lane and Resource Management Plan, as amended. Alternative B, the action alternative, would address the project objective by stabilizing the river banks and, thus, protect aquatic habitat and recreational and archeological resources. Short-term input of sediment and disruption of recreation activities through implementation of this project would be mitigated by project design criteria, including use of Best Management Practices (BMPs). The long-term benefits of implementing the project would outweigh the short-term impacts.

Based on the effects of the alternatives, the responsible official will decide to select the no-action alternative, the action alternative, or a modification of the action alternative.

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Chapter 1 – Purpose and Need

1.1 Document Structure

The Forest Service has prepared this Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. All action alternatives will meet the standards and guidelines in the Nantahala and Pisgah National Forests Land and Resource Management Plan, as amended (Forest Plan).

This EA discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into four chapters and appendices:

Chapter 1 – Purpose and Need: This section includes information on the history of the project proposal, the purpose of and need for the project, and the agency’s proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.

Chapter 2 – Alternatives: This section provides a more detailed description of the agency’s proposed action as well as alternative methods for achieving the stated purpose and need. These alternatives were developed based on key issues raised internally, by the public and other agencies. This section also provides a summary table of the alternatives.

Chapter 3 – Environmental Consequences: This section describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by key issues. Within each section, the affected environment is described first, followed by the effects of the No Action Alternative that provide a baseline for evaluation and comparison of the other alternatives that follow.

Chapter 4 – Preparers and Public Involvement: This section provides a list of preparers and members of the public consulted during the development of the environmental assessment.

1.1.1 Project Record

This EA incorporates by reference the project record (40 CFR 1502.21). The project record contains specialist reports and other technical documentation used to support the analysis and conclusions in this EA.

Relying on specialist reports and the project record helps implement the CEQ Regulations’ provision that agencies should reduce NEPA paperwork (40 CFR 1500.4) and that NEPA documents be analytic rather than encyclopedic and kept concise and no longer than absolutely necessary (40 CFR 1502.2). The objective is to furnish enough site-specific information to demonstrate a reasoned consideration of the environmental impacts of the alternatives and how these impacts can be mitigated, without repeating detailed analysis and background information available elsewhere. The project record is located at the Pisgah Ranger District Office in Pisgah Forest, North Carolina.

1.2 Background

During September of 2004, hurricane events (Frances, Ivan and Jeanne) hit the southeastern portion of the United States. Heavy precipitation associated with the remnants of these hurricanes caused 50 and 25-year flood events with high flows that scoured and damaged streams and, in some cases, undercut roads and trails adjacent to these streams. Areas along the Davidson River were damaged during these events. On the Pisgah Ranger District, Forest Service staff identified two sites that require improvements to unstable stream banks and channels along the Davidson River. The damaged areas are undercutting stream banks, which threatens fish habitat, heritage sites, and recreation areas. The erosion will continue until the stream reaches equilibrium at some point in the distant future or until bank stabilization occurs.

The proposed action is located in and immediately adjacent to the Davidson River along Highway 276 (Figures 1 and 9). Management of this area has to meet the guidelines for each of the following classifications:

- The Davidson River Recreation Area and the Sycamore Flats Recreation Area are located within Management Area (MA) 12 (developed recreation areas – Forest Plan Amendment 5, pp. III-140 – III-143).
- The Davidson River is located within MA 2C (visually pleasing scenery – Forest Plan Amendment 5, pp. III-63 – III-70) and MA 18 (riparian areas – Forest Plan Amendment 5, pp. III-179 – III-189).
- MA 18 is within and immediately adjacent to the river so it is embedded within other MAs. The Davidson River is also identified as eligible for classification as a “Recreation” Wild and Scenic River (Forest Plan Amendment 5, pp. III-11 and III-14 – III-19).
- The North Carolina Department of Environment, Health and Natural Resources classified the Davidson River as High Quality Waters (Forest Plan Amendment 5 p. B-6).

The project analysis area consists of two areas located approximately one mile apart on the Davidson River. The analysis area is the geographic range that cumulative effects can reasonably be analyzed, may vary by resource, and unless stated otherwise in this document, is downstream of the analysis area to the Forest boundary. The analysis area is larger than the project area.

1.3 Purpose and Need for Action

The purpose and need (objective) of this proposal is to repair the damage to the Davidson River’s banks and channel, to protect recreation resources at Sycamore Flats picnic area and the Exercise Trail, and to protect heritage resources. The desired condition is to have high quality riparian areas that maintain hydrologic function, enhance stream stability, minimize erosion (Forest Plan Amendment 5, page III-179), protect recreation facilities from erosion (Forest Plan Amendment 5, page III-140), maintain the attributes which qualify Davidson River as an eligible Wild and Scenic River (Forest Plan Amendment 5, page III-18), and protect heritage resources from erosion (Forest Plan Amendment 5 page III-9). The proposed

action is needed at this time, at these locations, because taking no action would lead to further erosion and sedimentation which, in turn, would cause further damage to aquatic habitat, heritage and recreation sites.

This EA incorporates the Forest Plan and all relevant laws, acts, and executive orders. The proposed action addresses the following goals outlined in the Forest Plan (pages III-1 and III-2) and summarized here:

- Blend the needs of people and environmental values in such a way that the Nantahala and Pisgah National Forests sustain ecosystems that are diverse, productive, and resilient to short-term stress and long-term change through principles of multiple-use and sustained-yield.
- Improve the quality of life for citizens of western North Carolina by helping to meet the basic needs of people and communities who depend on National Forest resources for water, food, fuel, shelter, livelihood, recreation, and spiritual renewal.
- Maintain and, where possible, enhance the diversity of plant and animal communities of the southern Appalachians. Maintain viable populations of existing native wildlife, fish, and plants.
- Protect the beauty of the Forests through special attention to visually sensitive areas and the careful application of resource management activities.
- Provide different environmental and social settings for outdoor recreation opportunities that range from primitive to developed.

This action also helps move the project area toward specific desired conditions outlined in the Forest Plan's Forest-wide Management Requirements (pages III-9, III-18, III-24, III-25, and III-40) that help meet the forest-wide goals, desired future conditions and objectives.

These are:

- Protect heritage resources.
- Manage Davidson River to retain values, which qualify it as a Wild and Scenic River.
- Provide structural habitat improvements. Give priority to the use of native materials and mimic naturally occurring structures.
- Maintain and improve aquatic species diversity.
- Protect and improve fisheries habitat.
- Emphasize the protection of all developed stream channels. Protect the integrity of intermittent and ephemeral stream channels, including their banks and beds.

The Forests are administered through a combination of management areas, each of which has unique goals, management direction and standards. These management areas represent different physical and biological characteristics that lend themselves to such management. Both sites in this project are located in riparian areas (Management Area 18) and this action also helps move the project area toward the desired conditions as described for this management area (Forest Plan pages III-179 to III-189). Direction for management of this area that is pertinent to the proposed action is highlighted here:

- Manage area so that management activities are not generally a dominant feature of the landscape.

- Maintain appropriate stream temperatures and stream environment and protect stream banks.
- Maintain the natural hydraulic and hydrologic functioning of the stream channel and protect the integrity of the stream system including channel, banks and stream bottom.

Both sites in this project are located in developed recreation areas (Management Area 12) and this action helps move the project area toward the desired conditions as described for this management area (Forest Plan pages III-140 to III-143). Direction for management of this area that is pertinent to the proposed action is highlighted here:

- Manage, maintain and develop sites to enhance activities associated with a forest environment to provide a safe, aesthetically pleasing, non-urban atmosphere and to support dispersed recreation opportunities.
- Rehabilitate and stabilize eroding areas.

Both sites in this project are located in the Mountain Heritage Scenic Byway corridor (Management Area 2C). This action helps move the project area toward the desired conditions as described for MA 2C (Forest Plan pages III-63 to III-70). Direction for management of this area that is pertinent to the proposed action is to:

- Manage to emphasize visual quality in all activities.

The Davidson River is also identified as eligible for classification as a “Recreation” Wild and Scenic River (Forest Plan Amendment 5, pp. III-11 and III-14 – III-19). Direction for management of this area that is pertinent to the proposed action is highlighted here:

- Provide interim protection for eligible rivers, which are recommended for further study by precluding management activities whose effects could foreclose the potential classification.
- Maintain all eligible rivers in a free flowing condition.
- Allow construction of new minor fish habitat structures such as log deflectors and random boulder placement.

The North Carolina Department of Environment, Health and Natural Resources classified the Davidson River as High Quality Waters (Forest Plan Amendment 5 p. B-6). Direction for management of this area that is pertinent to the proposed action is highlighted here:

- The area will be actively managed to protect and enhance, where possible, the distinctive resource values and characteristics dependent on or associated with these systems.
- Manage activities to meet water resource objectives and attain the goals of the Clean Water Act.

All work done in the river will require a 404 permit issued by the U.S. Army Corps of Engineers and a 401 permit issued by the North Carolina Division of Water Quality.

The proposal falls within the existing framework of the Forest Plan and thus will not require a plan amendment be done.

1.4 Proposed Action

The U.S. Forest Service proposes to improve watershed conditions within the Davidson River watershed by repairing damage to the River's banks and channels. The Proposed Action was developed by the Forest Service to meet the Purpose and Need of this project. A more detailed discussion on the Proposed Action is located in Chapter 2 Alternatives. Project implementation is expected to be completed before October 15, 2006. If the project cannot be completed before this date, then it should be implemented between April 15 and October 15, 2007. The following actions are proposed for this project:

Davidson River Side-Channel Stabilization near Sycamore Flats Picnic Area (Figures 1 to 8)
UID #2322

- Relocate the channel substrate to form a point bar on the right downstream bank,
- Construct two log and rock J-hook vanes upstream of the picnic area,
- Build up bank at inlet of side channel,
- Install log sill at the inlet of the side channel to control inlet elevation,
- Relocate down trees with root wads in the side channel to stabilize banks, and
- Plant the riverbank with native trees and shrubs (e.g. sycamore, mountain doghobble, and rhododendron) and reseed areas impacted by heavy equipment with native grasses.

Davidson River Channel Stabilization adjacent to Exercise Trail downstream of English Chapel (Figures 9 to 13) UID #1851

- Slope back vertical bank to within one foot from trail,
- Place erosion control matting on banks,
- Construct two rock vanes,
- Seed all disturbed areas with native grasses,
- Plant riverbank with native trees and shrubs (e.g. sycamore, mountain doghobble, and rhododendron),
- Reseed areas impacted by heavy equipment with native grasses, and
- Obliterate equipment access route.

1.5 Decision Framework

Based on the analysis disclosed in this EA, the responsible official will make a decision and document it in a decision notice (DN) and finding of no significant impact (FONSI). The Responsible Official can:

- Select the action alternative (Alternative B) that has been considered in detail, or
- Select a modified action alternative, or
- Select the no-action alternative (Alternative A).

1.6 Public Involvement

The portion of this proposal near Sycamore Flats was listed in the July 2005 Schedule of Proposed Actions (SOPA) under Sycamore Flats Bank Stabilization and Riparian Restoration EA and in the April 2005 SOPA under Pisgah RD Tropical Storm Rehabilitation Projects EA. Additionally, this document, the Davidson River Project EA, will serve as both a request for scoping and comment (40 CFR 1501.8).

Additionally, in 2004 public comments for another EA, the Sycamore Flats Project EA, were received and have also been considered relevant for this project because of the similarity of the work proposed and the fact that it is in the same area. This 2004 EA proposed adding three rock vanes in the river on the south side of Sycamore Flats Recreation Area to redirect the river's flow away from stream banks where it was causing down cutting and erosion. Since these two projects are similar and in the same area, this project EA tiers to the 2004 Sycamore Flats EA, which helped to develop the issues and alternatives for this analysis.

1.7 Issues

Issues are defined as a point of discussion, debate, or dispute about environmental effects. Issues are used to develop alternatives, mitigation measures, or analyze environmental effects. The Forest Service separated issues into two groups: key and non-key issues.

The Council on Environmental Quality (CEQ) regulations specifies that environmental analysis focus on significant (key) issues. Issues determined not to be significant (non-key) shall be discussed only briefly and eliminated from detailed study [40 CFR 1500.1(b), 1500.2(b), 1500.4(c), 1501.7(3), and 1502.2(b)]. The key issues will be analyzed in Chapter 3 of this EA and will also help form the decision. The non-key issues will be disclosed here in Chapter 1 but not analyzed in Chapter 3. They will not be used to form the decision.

1.7.1 Key Issues

1.7.1.1 Key Issue #1: Scenic Resources

Design and placement of rock vanes, moving trees, building a log sill, and building a point bar may adversely affect scenic resources.

Indicators

- Methods of stream bank stabilization-how natural will the stream look after implementation

1.7.1.2 Key Issue #2: Aquatic Habitats

Placing rock vanes, relocating channel substrate to form a point bar, and moving downed trees may adversely affect aquatic habitats.

Indicators

- Number and location of rock vanes
- Timing of project implementation

1.7.1.3 Key Issue #3: Hydraulics/Water Quality

Placing rock vanes, relocating channel substrate to form a point bar, and moving downed trees may both alter the hydraulics of the Davidson River and increase potential for sediment delivery.

Indicators

- Number and location of rock vanes

1.7.1.4 Key Issue #4: Recreation

Failure to redirect channel flow may result in increased likelihood of flooding in the Sycamore Flats Recreation area and may result in undermining of the Exercise Trail near English Chapel. Placing rock vanes may negatively impact recreational users, especially inner tube floaters.

Indicators

- Number and location of rock vanes
- Ability of recreationists to use the river after construction, particularly tubers

1.7.2 Non-Key Issues**1.7.2.1 Non-key Issue A – Heritage Resources:**

Constructing stream structures may impact heritage resources.

- Non-key Issue due to field review of the project area and avoidance of identified heritage sites.

1.7.2.2 Non-key Issue B – Soils:

Constructing stream structures may impact soils

- Non-key Issue due to implementation of Forest Plan standards and guidelines and Best Management Practices (BMPs).

1.7.2.3 Non-key Issue C – Threatened, Endangered, Sensitive and Forest Concern Species:

Constructing stream structures may impact federally threatened, endangered, or Forest sensitive botanical resources.

- Non-key Issue due to site-specific field verification. There will be no effect to federally listed threatened, endangered, or regionally sensitive (TES) botanical species, or Forest Concern botanical species. There are none of these species present in the project area, suitable habitat in the project area is very marginal, and/or the proposal is so small in scale it would have little effect on potential populations of any species.

Constructing stream structures may impact federally threatened, endangered, or Forest sensitive wildlife species and their habitat.

- Non-key Issue due to site-specific field verification. There is only one threatened, endangered, or Forest sensitive (TES) wildlife species that could be affected by the proposal (bog turtle, *Clemmys muhlenbergii*, a threatened species), but it is not likely to occur in the project or analysis area. As a result, there would be no effect to TES wildlife species or their habitat by the proposal.

1.7.2.4 Non-key Issue D – Safety of Rock Vanes:

The use and placement of rock vanes may decrease safety to some recreation users.

- Non-key Issue because rock vanes would not increase flow velocity passing the structures during flows to levels where a person could not wade in the area. Based on the general USGS safety standard (depth x velocity <6), the summer average flows would be safe for wading up to four feet of water depth (see also Sections 3.3.3.1 and 3.3.4.1, Chapter 3). Additionally, where needed, the surface of logs will be smoothed by removing all limbs and limb stubs on the tree boles used in vane construction. This will help prevent injuries to recreationists.

1.7.2.5 Non-key Issue E – Invasive Plant Species:

Constructing stream structures may increase the presence of invasive plant species.

- Non-key Issue because invasive plant species are already present and will increase in areas of disturbed stream banks. The project will stabilize stream banks, including planting with native species, reducing the amount of exposed soil available for invasive plant species to become established.

Chapter 2 – Alternatives

This chapter describes and compares the alternatives considered for the Davidson River project. It includes a description and map of each alternative considered. This section presents the alternatives in comparative form, defining the differences between each alternative and providing a clear basis for choice among options by the Responsible Official, the Pisgah District Ranger, and the public.

2.1 Range of Alternatives

The range of alternatives developed and analyzed by the interdisciplinary team (IDT) was driven by the purpose and need underlying the proposed action, and by the key issues responding to the proposed action. An alternative to the proposed action must (1) reasonably respond to the purpose and need and (2) address one or more key issues. The only exception is the No-action Alternative, which is required under 40 CFR 1502.14(d).

The IDT considered three alternatives. Following internal review, two alternatives were developed in detail and one was eliminated from detailed study.

2.2 Alternatives Considered in Detail

2.2.1 Alternative A – No Action

Under the No Action Alternative, current plans would continue to guide management of the project area.

2.2.2 Alternative B – Proposed Action

2.2.2.1 Davidson River at Sycamore Flats- UID #2322 (Figure 1)

This reach was blocked by large woody debris, during high flows in September 2004. Due to the location and arrangement of the woody debris in the main channel, the stream flow is directed into the side channel, causing stream bank erosion and an increased risk of damage to the Sycamore Flats Recreation Area facilities. In addition, recreational enthusiasts (tubers) cannot float down this reach of Davidson River without portaging around the debris. It is a safety concern, since someone may not be able to get out of the river in time and may become caught in the large woody debris.

The Davidson River at Sycamore Flats site includes the following actions which would be done by hand, tracked excavator and/or dump truck. Disturbed areas will be seeded with native grasses and/or planted with native trees and shrubs (e.g. sycamore, mountain doghobble, sweet pepperbush and rhododendron) (Figures 3 to 9):

Site A:

Construct log and rock J-hook type vane

Site B:

Relocate channel substrate to form a point bar on the right downstream bank

Site C:

Build bank at the inlet of side channel

Construct a second log and rock J-hook type vane, in combination with a log sill, at the inlet of the side channel to control inlet elevation

Site D:

Relocate large wood in the side channel to enhance stability of banks

2.2.2.2 Davidson River Bank Stabilization near English Chapel- UID #1851 (Figure 10)

This reach of the Davidson River appears to be down cut due to past land management; therefore, the risk of bank erosion during flood events is high. Furthermore, a road/trail parallels the channel within 25 feet of the right downstream bank, thus, limiting stream bank vegetation.

Approximately 112 feet of the right bank eroded into the Davidson River during the 2004 hurricane events. Currently, this section of bank is oversteepened, unvegetated, and prone to further erosion.

The following actions would be taken to stabilize the scoured stream bank (Figures 10 to 13):

- Slope back eroded, vertical bank to within 1 foot from trail,
- Place erosion control matting on eroded bank,
- Construct two rock vanes,
- Seed all disturbed area with native grass,
- Plant disturbed bank with native trees and shrubs (e.g. sycamore, mountain doghobble, sweet pepperbush, and rhododendron), and
- Obliterate and plant the 12 feet wide temporary equipment access route from US 276.

2.2.2.3 Vane Design:

Vane structures can be made entirely out of rocks or in combination with logs.

- Rock vanes are constructed by excavating the river bottom and stacking large boulders three courses high.
- Each course is horizontally offset upstream $\frac{1}{2}$ the width of the underlying course. The line of boulders begins at the near bank and angles upstream at 20-30-degrees; at mid-channel, the line curves downstream forming a “J” and terminates in the far bank.
- Planned vanes are 100 to 150 feet long and about 6 feet wide.
- Each vane slopes 2%-3% over its length.
- At the near bank, vanes are approximately 4 feet above the river bottom and visible during typical flows.
- The vanes gradually slope down into the water.

- From mid-channel to the far bank, the top course of boulders is at the same level as the natural streambed and typically covered by water. (This will allow tubers, swimmers, and anglers to continue to recreate in the project area.)
- At normal flows, the visible portion of each vane extends from the near bank out 60 to 80 feet into the river channel or at most half way across the river.
- The visible top course of each vane is “natural weathered” rock with rounded edges (where practicable), lower courses may be quarry-rock with a rectangular shape and angular edges.
- Each vane is back-filled on the upstream side and pools naturally form on the downstream side. Water flow is redirected to center channel and somewhat concentrated at the vertex of each vane.
- Vanes may increase water velocity over existing velocities at the same location. However, water velocities through these vanes might be comparable to narrower segments of the river, which exist in the vicinity. This design should not affect recreationists.
- Where logs are used in combination with rocks, they normally have their root systems intact and secured against or up on the banks. Logs are limb free for public safety and to keep debris from catching in them.

Figure 1 - Davidson River at Sycamore Flats Vicinity Map

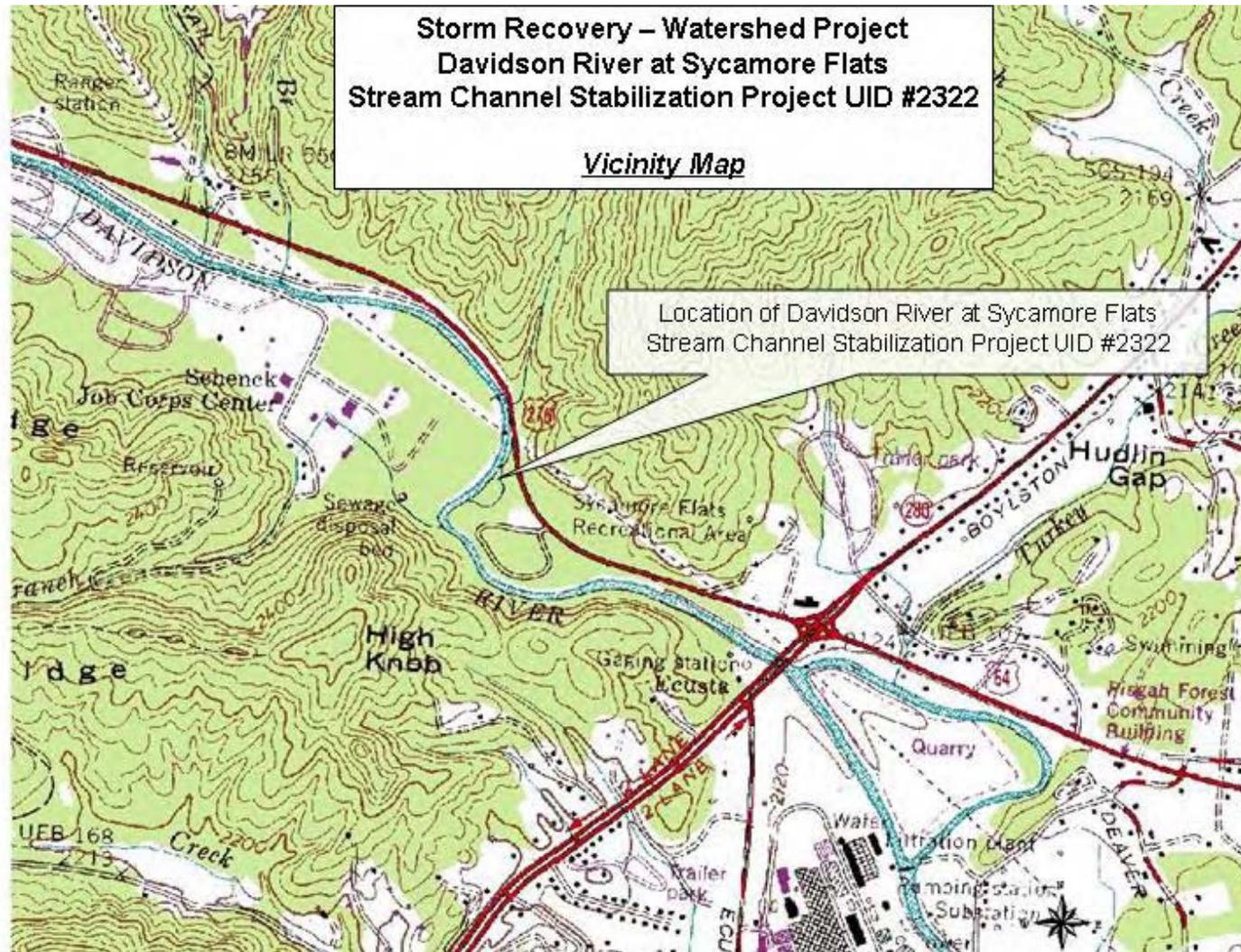


Figure 2 - Davidson River at Sycamore Flats – Sketch of Current Condition

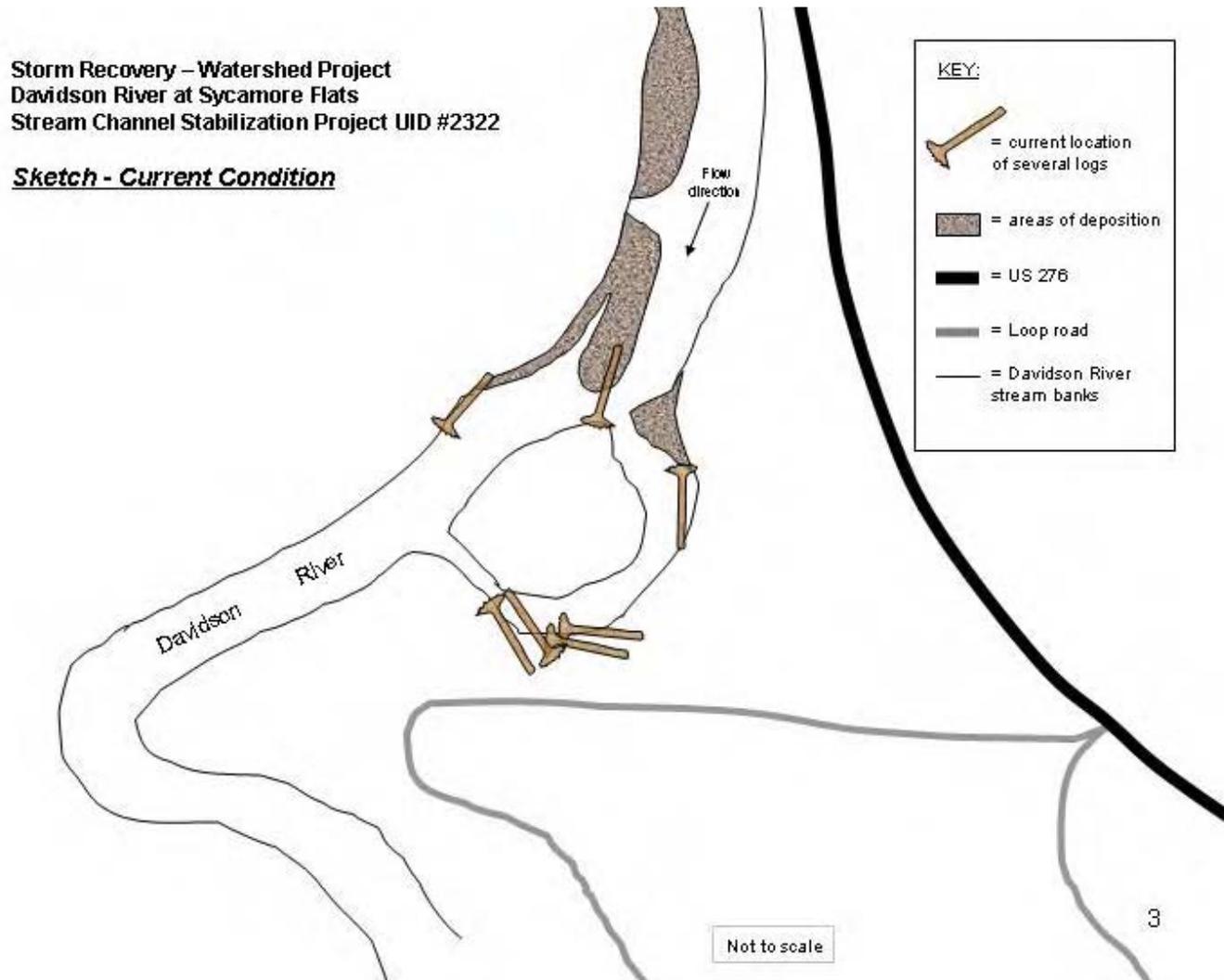


Figure 3 - Davidson River at Sycamore Flats – Proposed Action

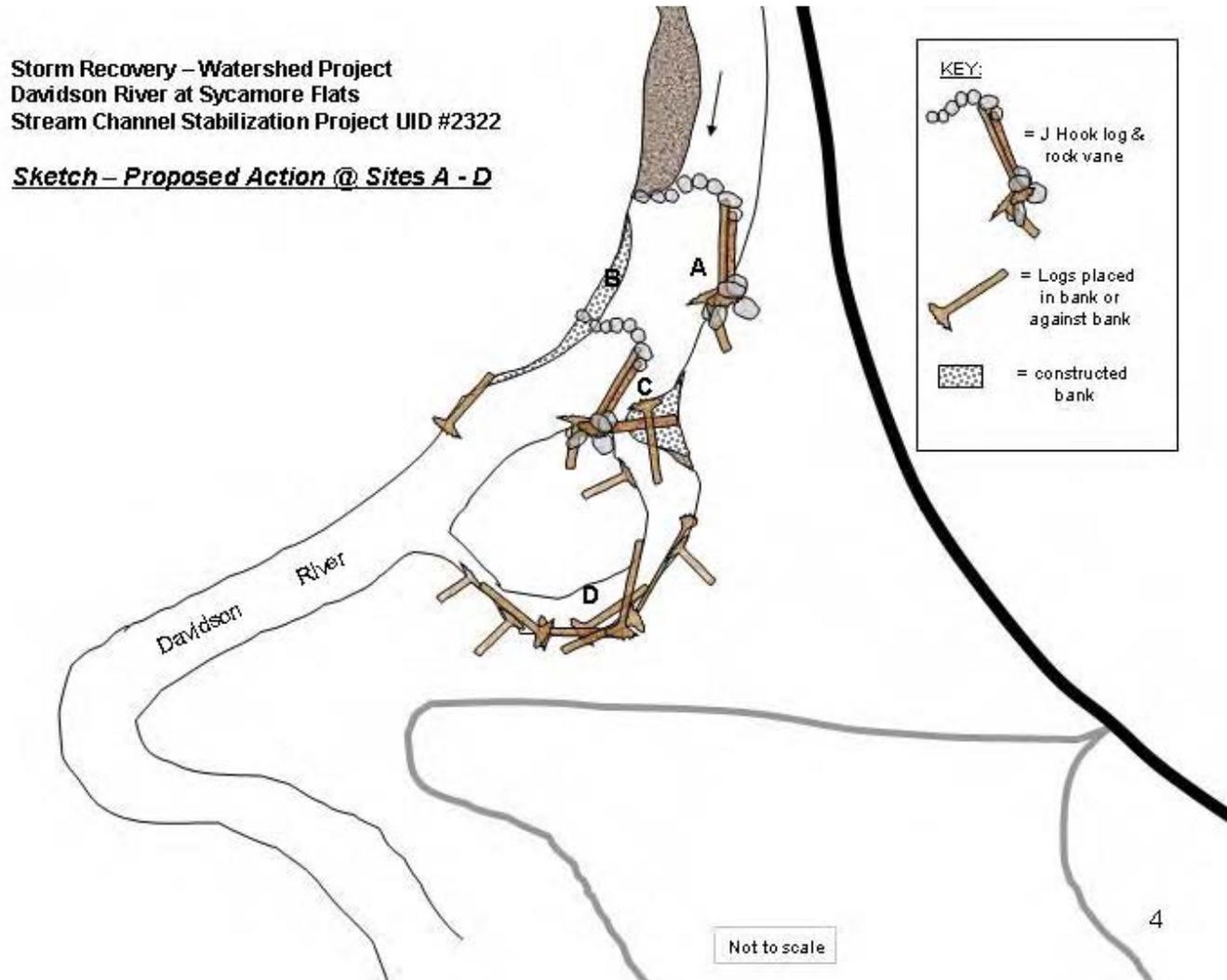


Figure 4 - Typical J-Hook Type Rock Vane

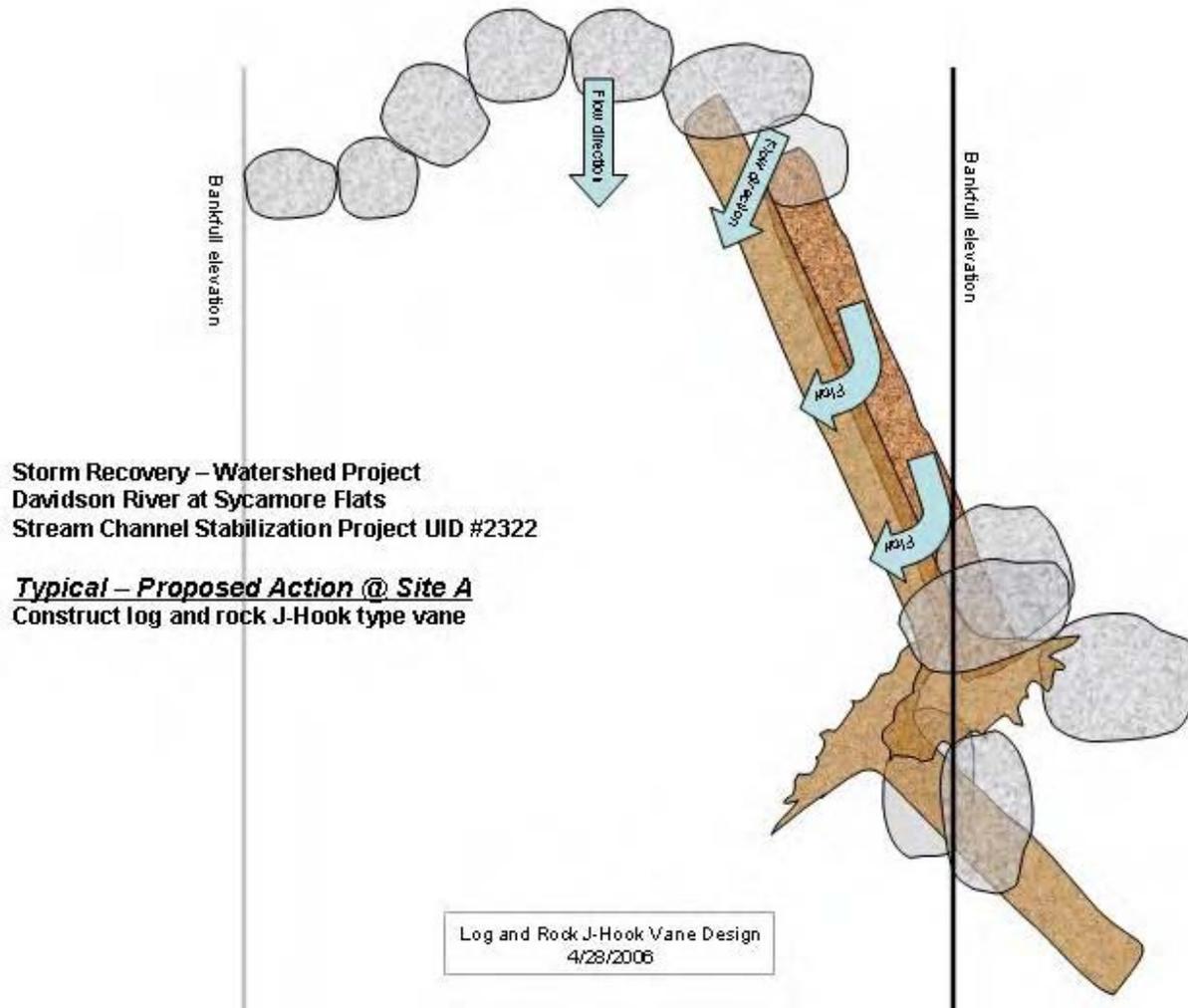


Figure 5 - Davidson River at Sycamore Flats Proposed Sites B and C

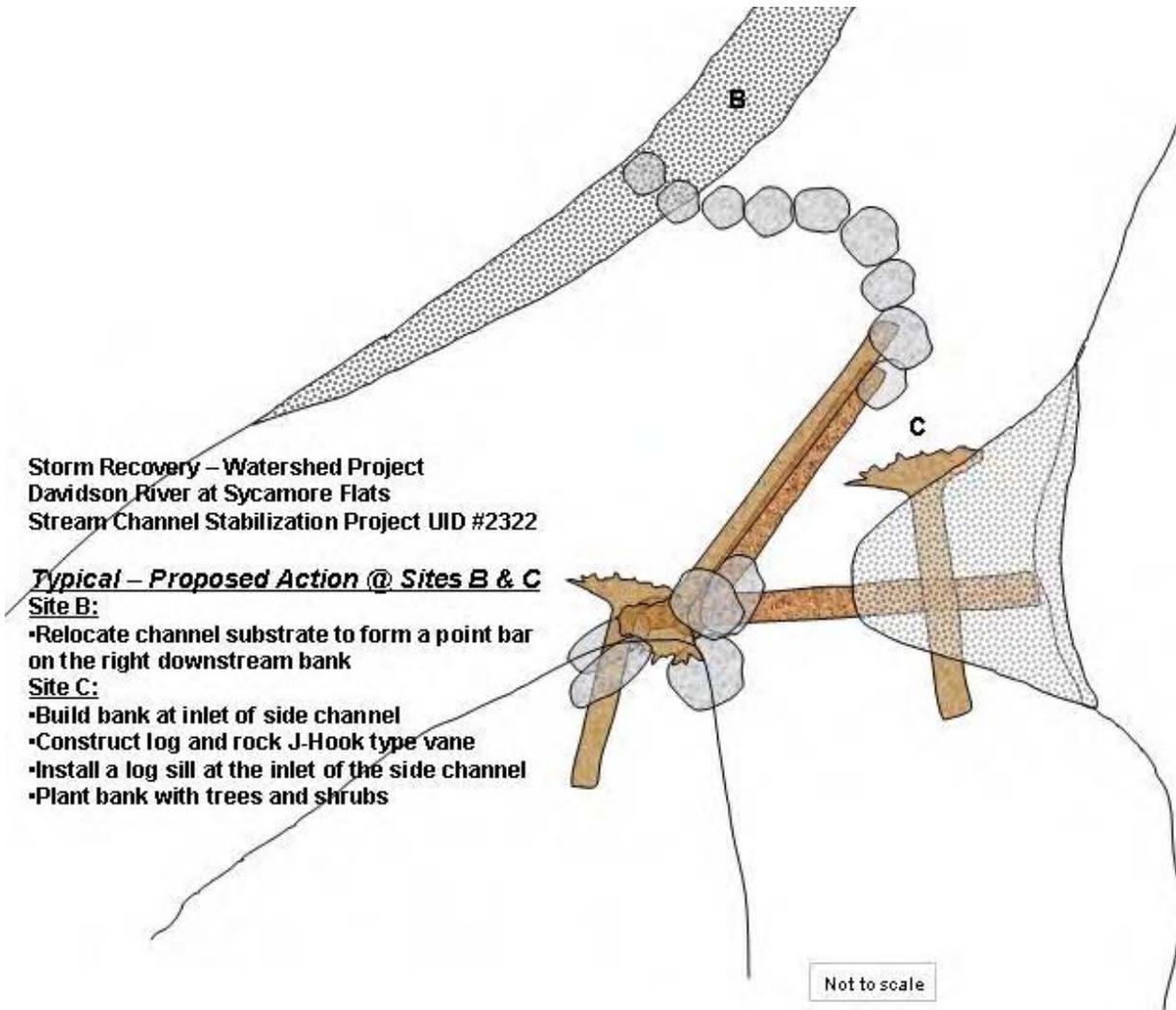


Figure 6 - Davidson River at Sycamore Flats Proposed Action at Site D

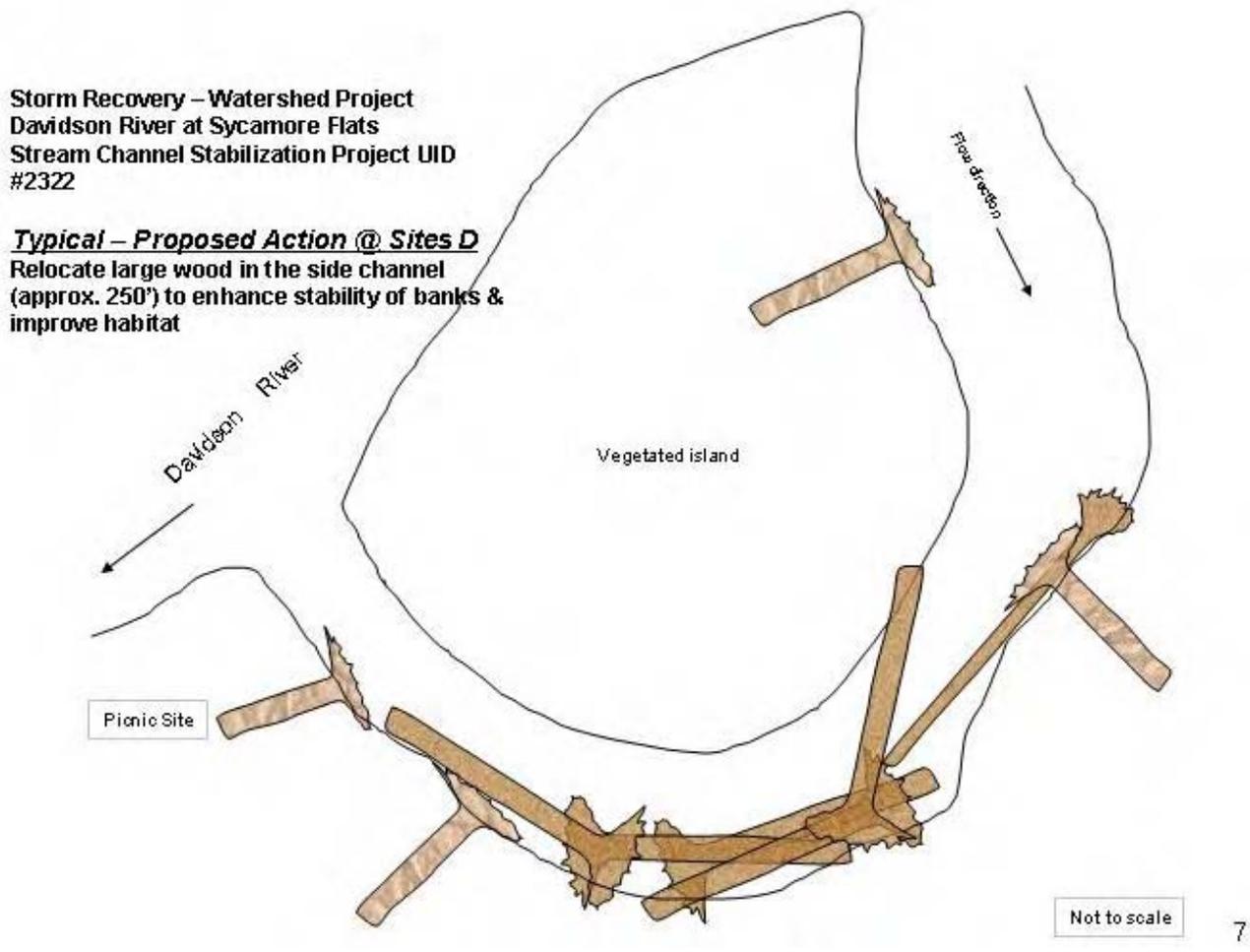


Figure 7 - Typical Log and Rock Vane Design Showing Proposed Change in Thalweg Location

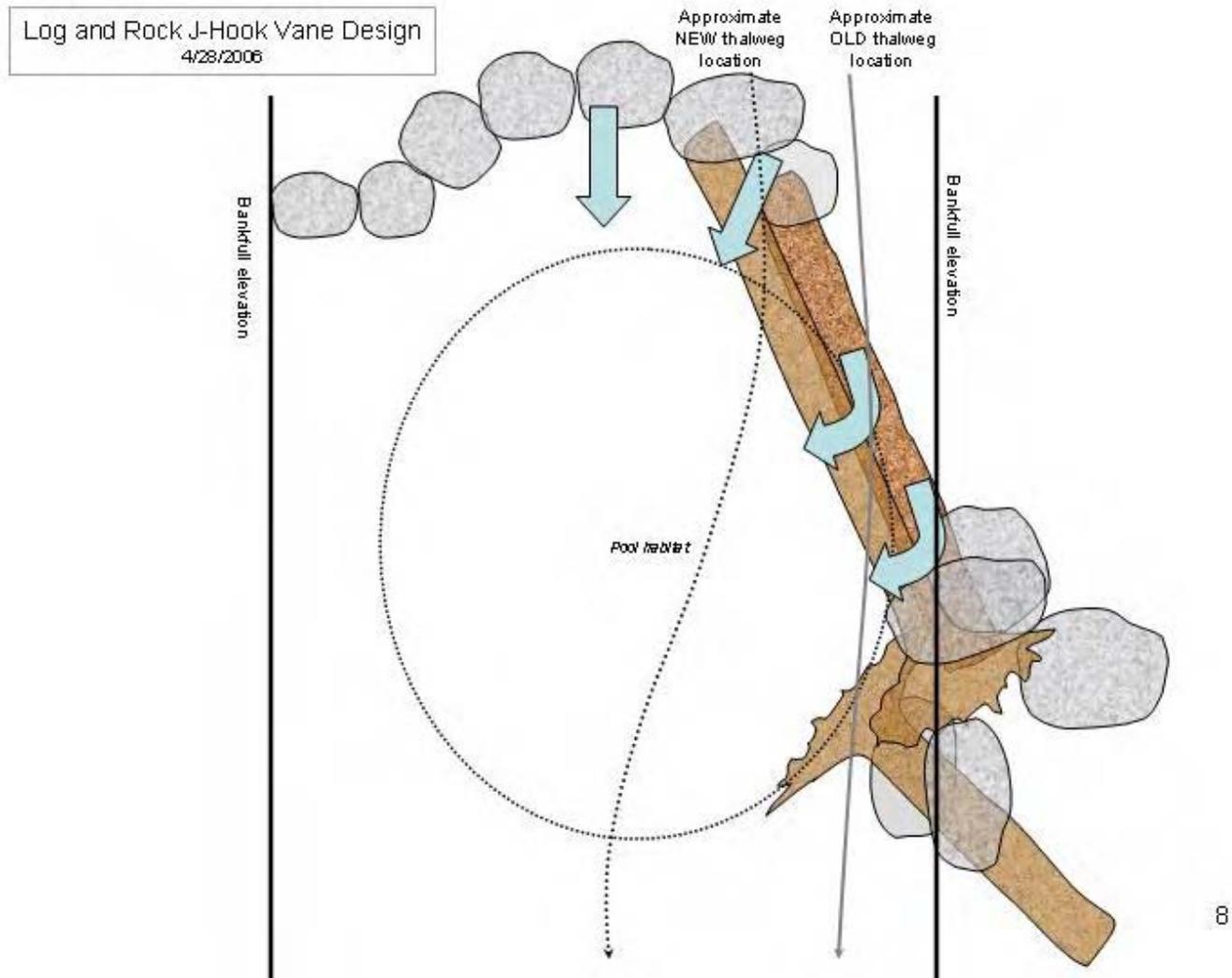


Figure 8 - Typical Log and Rock J-Hook Vane Design with Fill

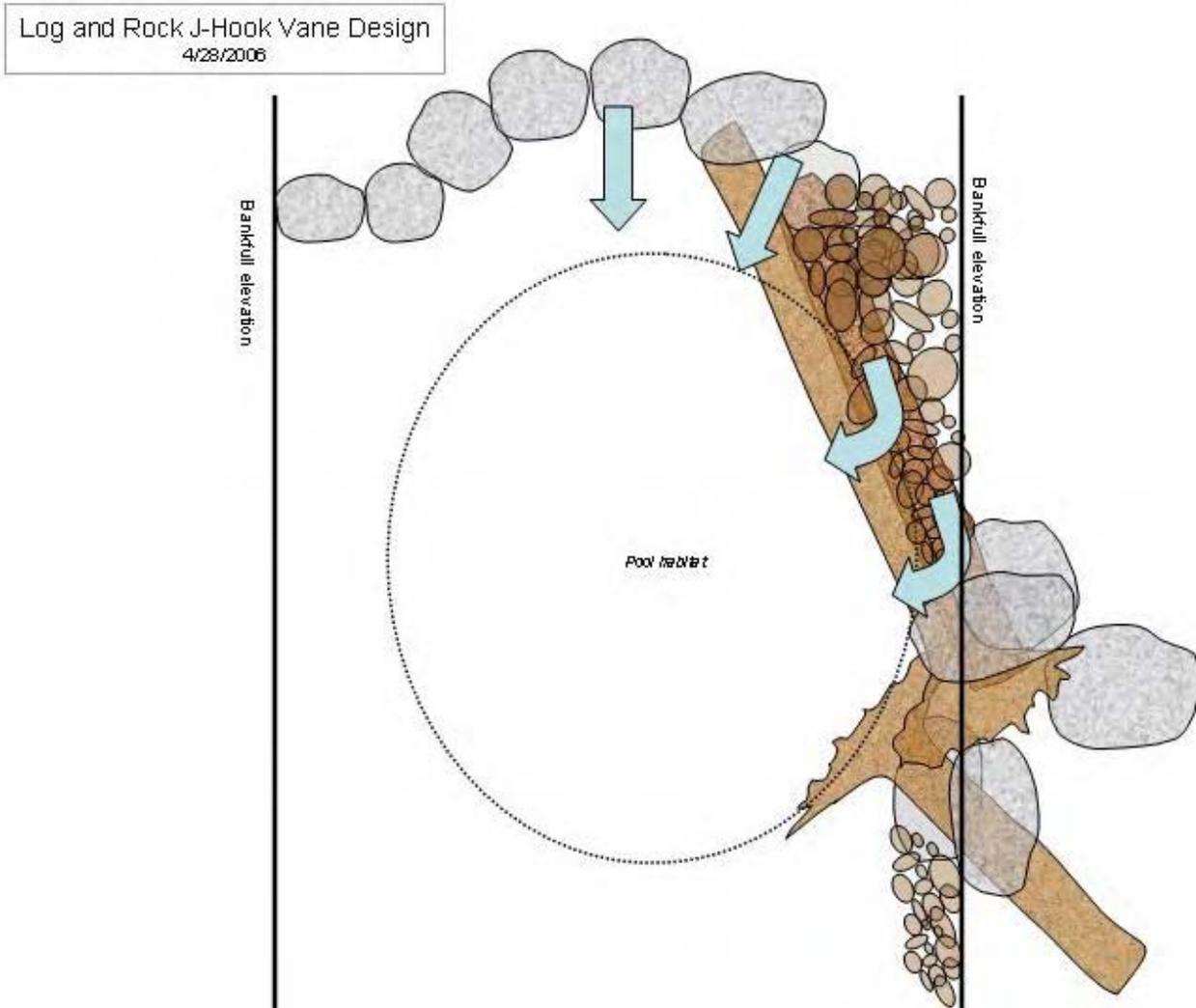


Figure 10 - Photos of Davidson River Streambank - Exercise Trail Near English Chapel



**Davidson River Bank
Stabilization Near English Chapel**
(Slide from Trail to Davidson River UID #1851)

Photos – Current Condition



Figure 11 - Current Condition of Davidson River Exercise Trail Near English Chapel

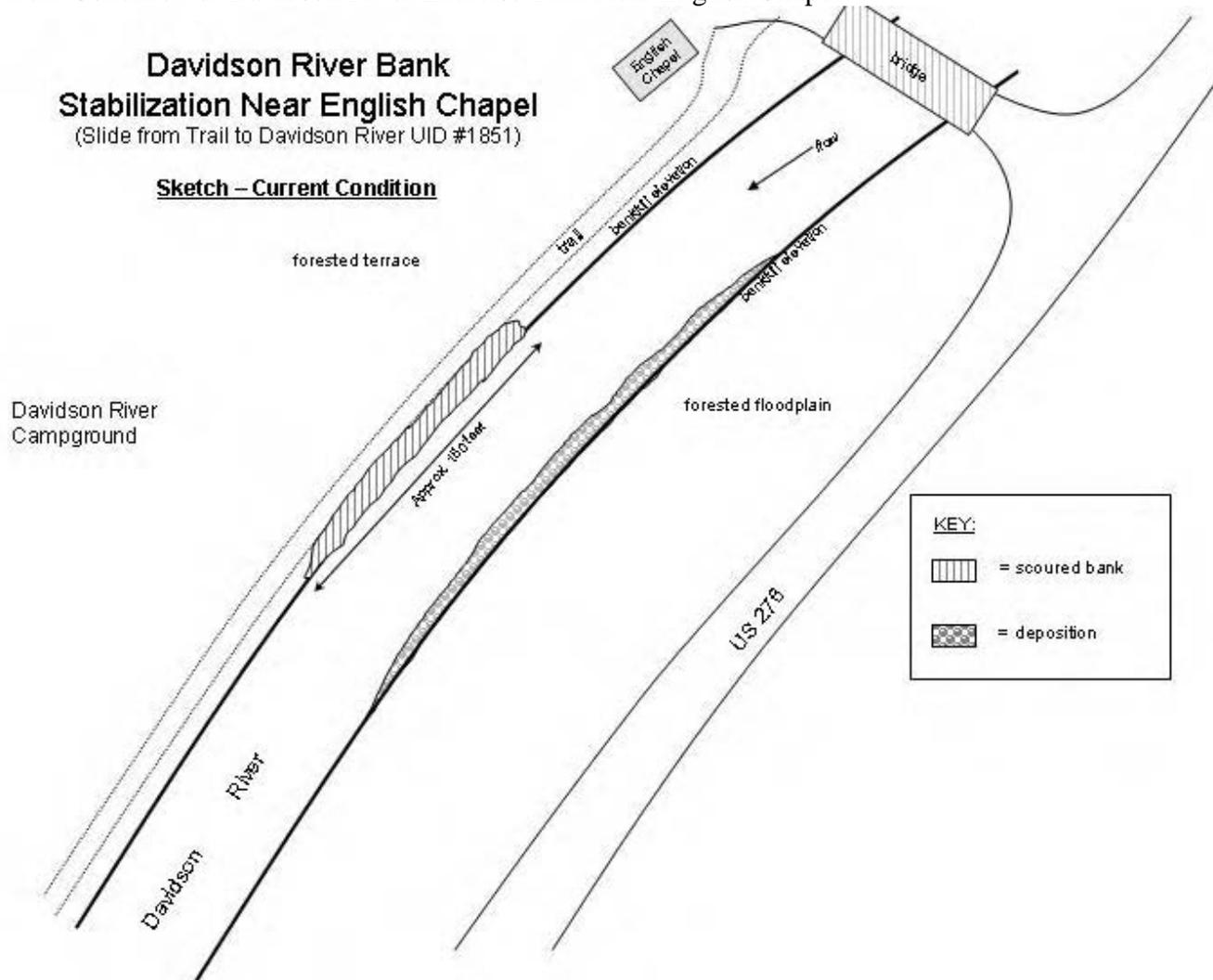


Figure 12 - Proposed Action for Davidson River Exercise Trail Near English Chapel

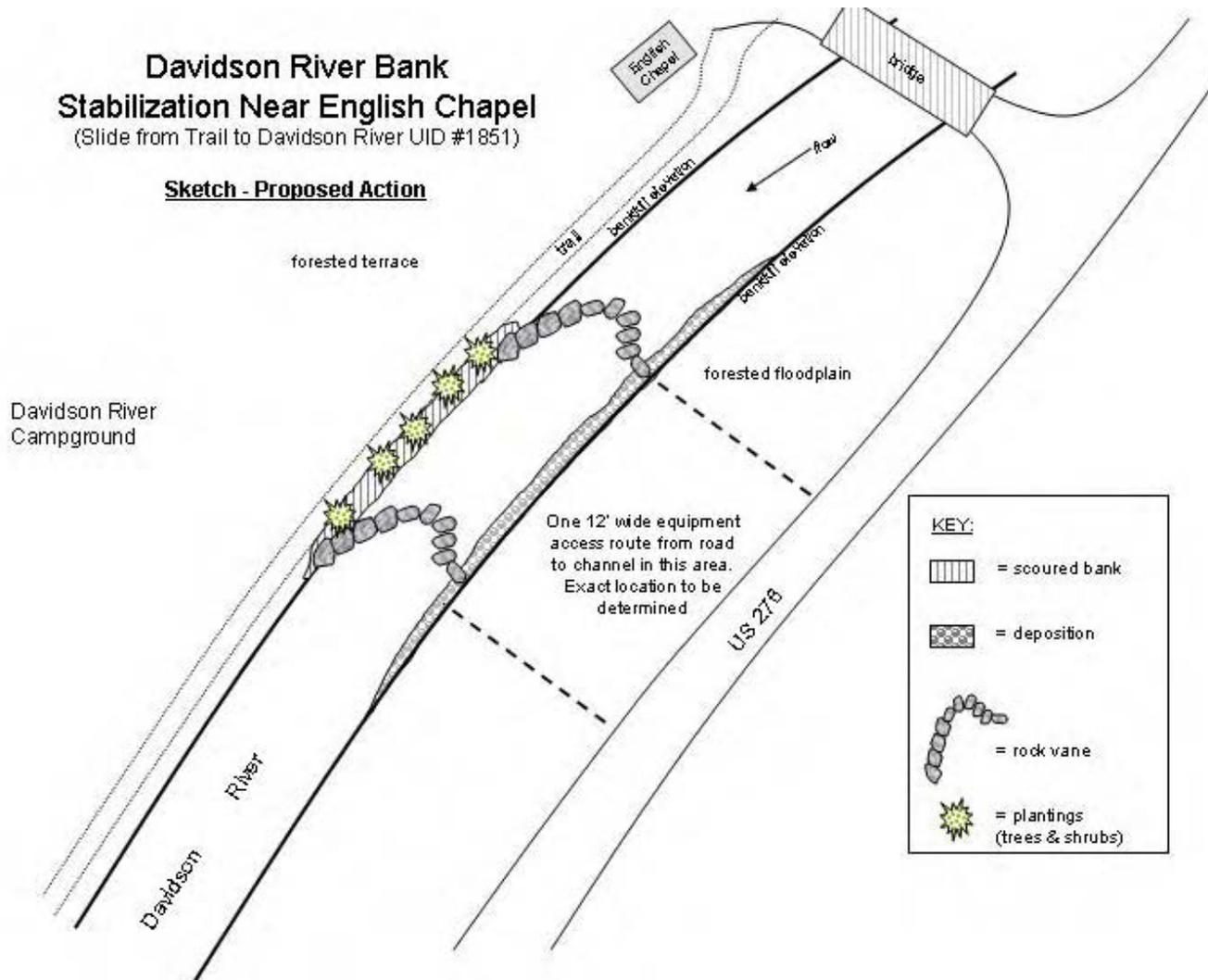
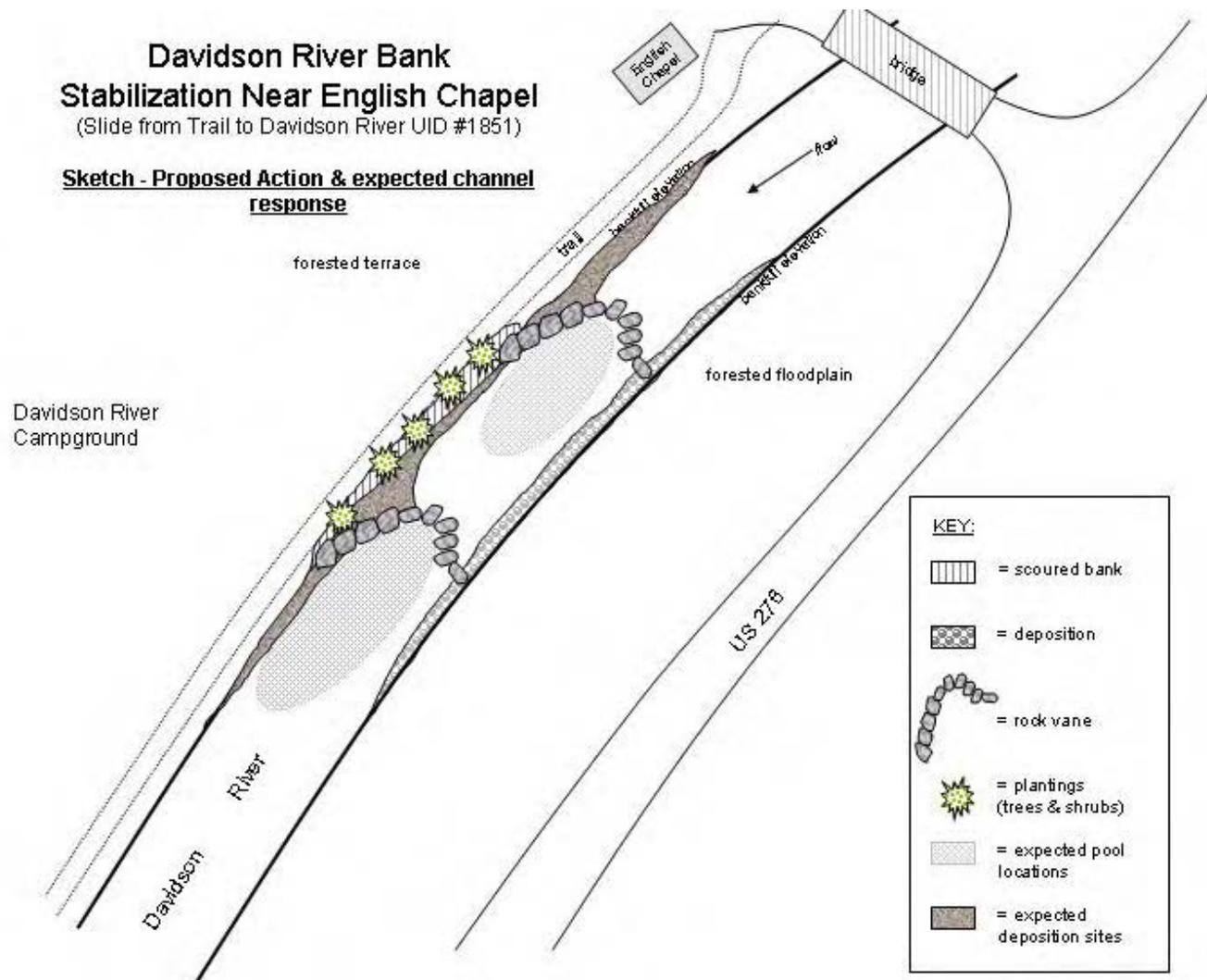


Figure 13 - Davidson River Exercise Trail Near English Chapel Expected Channel Response to Proposed Action



2.3 Alternatives Considered But Eliminated From Detailed Study

One alternative was considered but eliminated from detailed study.

Alternative C:

In the original plan for the English Chapel/Exercise Trail portion of the project, it was proposed to cut back the bank at a shallower degree of incline, and to armor the bank with rocks. This would protect the bank at the site from undercutting and erosion but would negatively affect downstream bank stability and cultural resources found in the area. It would also require re-routing the Exercise Trail. Placement of rock vanes would achieve the desired outcome by encouraging deposition of sediments on the riverbank without negatively affecting cultural resources or requiring a re-route of the Exercise Trail.

On the Sycamore Flats portion of the project, the original proposal was to use only large woody debris placement to minimize bank erosion. Based on additional design analysis, it was concluded that this action would be temporary compared to the vanes and would be less effective at meeting the desired condition.

2.4 Design Criteria

The following design criteria will be incorporated in all action alternatives:

- Implementation of any alternative will follow best management practices (BMPs) for in stream work as determined by the North Carolina Department of Natural Resources;
- The action alternative will meet all Forest Plan standards and guidelines; An Army Corps of Engineers 404 permit, NC Dept. of Water Quality 401 certification, and a Trout Buffer Waiver would be obtained prior to implementation;
- Hellbenders will be collected from the site and relocated immediately prior to project implementation;
- To ensure adherence to Forest Plan standards for scenery, a Forest Service Landscape Architect will be consulted in the final design and construction phases of the rock vanes to meet all visual quality objectives and;
- A safety plan for recreationists incorporating such methods as public notification, riverside signing, lookouts and alternative take out points and portage routes for tubers and others will be developed.

2.4.1 Monitoring

All required Forest Plan monitoring will be accomplished. In addition, a heritage resource specialist will periodically monitor the sites to determine if erosion is threatening known sites.

2.5 Comparison of Alternatives

The following tables compare the issues based on each alternative at each proposed stream bank stabilization site.

Table 1 - Alternative Comparison Table

| Key Issues | Alternative A No Action | Alternative B Proposed Action |
|--|--|--|
| <i>Davidson River at Sycamore Flats- UID #2322</i> | | |
| Issue 1: Scenic Resources | | |
| Short-term impacts (< 1 year) | Bare river banks will be visually unattractive due to difficulty in plants becoming established on steep, eroding soils. | <p>Timing during summer months with heavy equipment and disturbance will visually impact recreationists until the plants and grass become established. Project implementation will be about one week.</p> <p>In the short term, the area will appear unnatural while the plantings get established.</p> |
| Long-term impacts (>1 year) | There will be continued degradation of channel and banks creating a more visually unattractive area. | <p>There will be less substrate movement because the banks would be stabilized. Down trees (woody debris) would still be present but rearranged.</p> <p>There will be improved visual attractiveness because of natural rock placement and native plant placement. Planted banks would be more visually attractive and over time the appearance will be indistinguishable from naturally established vegetation.</p> |
| Issue 2: Aquatic Habitats | | |
| Short-term impacts (< 1 year) | Woody debris in its current location provides marginal habitat but does not decrease bank erosion. | <p>Placement of rock vanes and point bars would cause short-term turbidity in stream.</p> <p>Woody debris would be moved to locations where it would decrease bank erosion and enhance aquatic habitat quality.</p> |

| Key Issues | Alternative A No Action | Alternative B Proposed Action |
|--|--|--|
| Long-term impacts (>1 year) | The river would continue to shift into the side channel, causing habitat to be lost in the side channel and the main river. Unstable banks will continue to erode causing degradation of aquatic habitats. | Rock vanes and point bars would help direct flows away from stream banks, decreasing erosion and turbidity in stream. Habitat quality would be improved because of the pool habitat formed by the vanes. Bank erosion would also be reduced resulting in less sedimentation. Roots from new plantings will hold soil thus, reducing sediment and improving aquatic habitat. |
| Issue 3: Hydraulics / Water Quality | | |
| Short-term impacts (< 1 year) | Woody debris in its current location would encourage the channel to shift into the side channel, causing an increase in erosion. | Placement of rock vanes and point bars would cause short-term turbidity in stream. |
| Long-term impacts (>1 year) | No rock vanes will be placed, thus the river would continue to shift into the side channel, causing a decrease in water quality due to increased bank erosion. Steep, un-vegetated banks will continue to erode causing degradation of water quality. | Rock vanes will help direct flows away from stream banks, decreasing erosion, sedimentation and turbidity in river. Woody debris would be moved to locations where it will decrease bank erosion and reduce the risk of channel adjustment. New plantings will improve bank stability and reduce bank erosion. |
| Issue 4: Recreation | | |
| Short-term impacts (< 1 year) | Flow will continue to be directed into the back channel which is choked with debris leading to dangerous condition for tubers. Woody debris in its current location is causing a hazard to tubers. | Work will occur during peak recreation season but would only occur for about one week. This would create a safety hazard for recreationists, especially tubers. Precautions will be taken to minimize the hazards through public notification, on-site signing and lookouts. |

| Key Issues | Alternative A No Action | Alternative B Proposed Action |
|--|--|--|
| Long-term impacts (>1 year) | The current arrangement of woody debris and point bar increase the potential for flooding. | Flow will be directed back into main channel leading to safer conditions for tubers. Woody debris will be moved to locations which will help open up the main channel for tubers. |
| <i>Davidson River near English Chapel-UID #1851</i> | | |
| Issue 1: Scenic Resources | | |
| Short-term impacts (< 1 year) | There will be continued degradation of channel and banks continuing a more visually unattractive area. | Implementation during summer months with heavy equipment and disturbance will visually impact the area in short term. The area will appear unnatural while the plantings get established. |
| Long-term impacts (>1 year) | Bare river banks will be visually unattractive due to difficulty in plants becoming established on steep, eroding soils. | There will be improved visual attractiveness because of natural rock placement and native plant placement. Planted banks will be more visually attractive and over time its appearance will be indistinguishable from naturally established vegetation. |
| Issue 2: Aquatic Habitats | | |
| Short-term impacts (< 1 year) | No rock vanes will be placed, thus, no new habitat would be created but some degradation of habitat could occur due to sediment from bank erosion. | Placement of rock vanes will cause short-term turbidity in stream. Implementation between April 15 and October 15 will reduce risk of interference with trout spawning. |
| Long-term impacts (>1 year) | Unstable banks will continue to erode causing degradation of aquatic habitats. | Rock vanes will help direct flows away from stream banks, decreasing turbidity in stream. Habitat quality would be improved because of the pool habitat formed by the vanes. Bank erosion would be reduced as would sedimentation. Roots from new plantings will hold soil thus, reducing sediment and improving aquatic habitat. |

| Key Issues | Alternative A No Action | Alternative B Proposed Action |
|--|---|--|
| Issue 3: Hydraulics / Water Quality | | |
| Short-term impacts (< 1 year) | No rock vanes will be placed, thus the river would continue to erode banks causing a decrease in water quality. | Placement of rock vanes will cause short-term turbidity in stream. Implementation between April 15 and October 15 will reduce risk of interference with trout spawning. |
| Long-term impacts (>1 year) | Unvegetated banks will continue to erode causing degradation of aquatic habitats. | Rock vanes will help direct flows away from stream banks, decreasing turbidity in stream. New plantings will improve bank stability and reduce bank erosion. |
| Issue 4: Recreation | | |
| Short-term impacts (< 1 year) | Failure to stabilize the bank could lead to loss of the Exercise Trail. | Construction of the rock vanes and bank stabilization would create a temporary safety hazard for recreationists, especially tubers. Work will occur during peak recreation season but would only occur for about one week. This will create a safety hazard for recreationists, especially tubers. Precautions will be taken to minimize the hazards through public notification, on-site signing and lookouts. |
| Long-term impacts (>1 year) | Failure to stabilize bank would lead to loss of the Exercise Trail. | The river's flow would be concentrated enhancing the experience for tubers. The risk of undercutting Exercise Trail would be reduced. |

Chapter 3 – Environmental Consequences

This chapter forms the scientific and analytical basis for the comparison of alternatives as required by NEPA. Included in this chapter are disclosures of direct, indirect, and cumulative effects of the alternatives on resources relevant to the key issues. Direct and indirect effects occur at, or near the same time and place as a result of the action [40 CFR 1508.8 (a) and (b)]. The direct and indirect effects are combined in this chapter. Cumulative effects result “...from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such action. Cumulative effects can result from individually minor, but collectively significant, actions taking place over a period of time” (40 CFR 1508.7). A list of past, present, and reasonably foreseeable projects that may have affected stream flow in the project area or may in the future is listed in Table 2.

Table 2 - Past, current, and foreseeable future management activities (anticipated in the next few years) within the analysis area.

| Project | Location | Activity | Implementation Date |
|--|--|--|--|
| Searcy Creek Timber Sale | Davidson River watershed above Coontree Picnic Area | Road construction and reconstruction Timber harvest | 1995-2000 |
| Davidson River Bank Stabilization | Sycamore Flats Recreation Area upstream to Coon Tree Picnic Area | River bank stabilization by laying back river banks and revegetating disturbed areas | 2003 |
| Sycamore Flats Project | Sycamore Flats Recreation Area | Install rock vanes, Construct: picnic shelters, additional parking, accessible fishing pier, replace bathrooms, remove existing wells, and ½ mile of walking path | Started in 2005, still implementing projects |
| Storm Repair to Roads and Trails in Davidson River Watershed | Davidson River Watershed | Road and Trail Repair by replacing culverts, installing new culverts, relocating segments of damaged roads and trails, and repairing slides | 2004 – 2007 |
| Lower Davidson River Multi-Use Trail | Along the Art Loeb Trail and an old railroad grade | Develop an aggregate multi-use trail about six feet wide from the National Forest Boundary to the Davidson River Campground and the Schenck Job Corps Center. | 2006 - 2007 |

Reports from different resource specialists supplied information for portions of the analysis in this chapter. The project area is the location of the proposal, Davidson River near English Chapel and upstream of Sycamore Flats Picnic Area. The analysis area is the anticipated extent of effects by resource and is generally larger than the project area.

Effects analyses are disclosed by key issue in this chapter. The key issues associated with this project were identified through a public participation process, which included input from Forest Service resource specialists, other government agencies, organizations and individuals (Section 1.7.1, Chapter 1) to the 2004 Sycamore Flats EA. The key issues were used to develop the proposed action. Other resources and issues (non-key issues) were discussed in Section 1.7.2, Chapter 1.

3.1 Effects Related to Key Issue #1; Scenic Resources

Issue Statement: Design and placement of vane structures, moving trees, building a log sill and building a point bar may adversely affect scenic resources.

Indicator

- Methods of stream bank stabilization-how natural the stream will look after implementation.

3.1.1 Existing Condition

The project area is located on the Pisgah Ranger District of the Pisgah National Forest and includes two sites on the Davidson River. These sites are accessed by US 276 near the Pisgah National Forest entrance. US 276 is part of the Mountain Heritage Scenic Byway. Management Areas (MAs) in and immediately adjacent to, the project area include 2C, 12, and 18 (see Section 1.2, Chapter 1). Direction for managing the MAs and the forest-wide management direction, including protect heritage resources (Forest Plan page III-9), guide scenic objectives for the project area.

Management Area 2C comprises a corridor along the Mountain Heritage Scenic Byway; this corridor includes parts of the Davidson River. The entire project area has an emphasis on scenic quality and is assigned a Visual Quality Objective (VQO) of Retention (R) for all distance zones; therefore all activities in MA 2C are required to meet the Retention VQO. Retention provides for management activities which are not visually evident. Activities only repeat form, line, color and texture which are frequently found in the characteristic landscape. Changes in size, amount, intensity, direction, pattern, etc., should not be evident.

Management Area 12 includes the developed recreation area at Sycamore Flats and Davidson River Recreation Area. At Sycamore Flats this area extends from the maintained perimeter of the recreation area to the river's edge. This MA has assigned VQOs ranging from Retention to Modification, depending on the characteristics of each site. Sycamore Flats Recreation Area is characterized as a highly developed recreation area, with a paved loop road and parking areas, a picnic shelter and restrooms. All management activities must be in character with existing structures and setting of the developed recreation site. It should be noted that although the English Chapel project site is not immediately adjacent to the maintained perimeter of the Davidson River Recreation Area, another highly developed recreation site, it is very close. The Exercise Trail, adjacent to this project site, is heavily used by campers moving through the campground. Thus, the management activities here have also been managed in character with existing structures and setting in this campground.

Management Area 18 is the riparian zone embedded within other MAs. In the project area, activities within MA 18 should not be generally a dominant feature of the landscape and are required to meet the Retention VQO.

Erosion of the river banks at the two project sites is unsightly but individually do not affect the overall VQOs established for the area since they are small and natural in appearance.

3.1.2 Alternative A – No Action

3.1.2.1 Direct and Indirect Effects

From a scenic standpoint, under this alternative, the Davidson River would continue to maintain its Wild and Scenic River (WSR) eligibility status would not change. Scenery objectives would be met in spite of the lack of repair to the erosion on the river banks and woody debris in the river.

3.1.2.2 Cumulative Effects

As there are no direct or indirect effects with this alternative, there would be no cumulative effects related to Scenery management under the Forest Plan.

3.1.3 Alternative B – Proposed Action

3.1.3.1 Direct and Indirect Effects

Under this alternative, the proposed activities would improve visual attractiveness by mitigating the unsightly erosion and rearranging large woody debris in the channel while meeting all Nantahala and Pisgah National Forests Land and Resource Management Plan (Forest Plan) standards for scenery management. The work and any structures would be of a design and materials, which would be compatible with the assigned VQOs. There will be short term (less than 1 year) negative impacts on scenic quality from stabilization work. However, once vegetation is established the impacts will not be visually evident to the typical viewer.

Management activities in the Davidson River must meet the “Retention” VQO, which means activities cannot be visually evident to the typical viewer, i.e. vanes must be natural appearing. Alternative B meets this objective by mimicking characteristics of the surrounding natural landscape—considering design elements of form, line, color, texture and scale (Section 3.1.1). The top visible layer of each vane would use logs or weathered boulders of varying size and shape, which are similar in appearance to naturally occurring rock in the area. Boulder and log orientation and placement would appear random and natural, avoiding repetitive forms or parallel rows. To insure adherence to these criteria, a Forest Service Landscape Architect will be consulted in the final design and construction phases of this project to prevent the vanes from having an engineered look.

3.1.3.2 Cumulative Effects

If implemented to meet all design considerations, directions, guides, standards and objectives discussed under the effects analysis above, this alternative would have no negative cumulative effects to scenic resources under the Forest Plan.

3.2 Effects Related to Key Issue #2; Aquatic Habitat

Issue Statement: Placing vane structures, relocating channel substrate to form a point bar, and moving down trees may negatively affect aquatic habitats.

Indicators

- Number and location of vanes
- Timing of project implementation

3.2.1 Existing Condition

Aquatic habitat in the project area consists primarily of riffle and run habitat with large cobble as the dominant substrate. Sedimentation from unstable, eroding banks is negatively affecting the substrate quality and quantity for many aquatic species, particularly fish, which need clean, sediment free substrate to live and reproduce. This erosion comes primarily from unstable riverbanks created during the storm events. This problem is exacerbated by large woody debris and point bars during storm events, forcing flow energy into river banks causing further erosion.

In this lower reach of the Davidson River, pool habitat most often forms in association with river meander bends, as the flow energy moves to the outside of a bend and scours the bed. Since the natural meander pattern of the Davidson River has been reduced by straightening of the river from past management on the floodplain (e.g., farming and road building), pools make up a small percentage of aquatic habitat compared to riffle and run types. Over time, during future flooding events, the Davidson River stream channel is likely to increase its length by recreating a meander pattern in reaches that are now relatively straight. Thus, a future of stream bank erosion and new floodplain development is anticipated in the next 50 to 100 years. To fully restore the lower reach of the Davidson River would require a great deal of floodplain excavation and channel relocation, however, this would likely result in the loss of existing facilities and infrastructure, both federal and private.

3.2.2 Alternative A – No Action

3.2.2.1 Direct & Indirect Effects

Under this alternative, channel stabilization actions would not occur. Erosion of the river's stream banks would continue to contribute sediment to the Davidson River, negatively affecting aquatic habitat. Additionally, pool habitat would remain at the current low level or decrease further with continued sedimentation.

3.2.2.2 Cumulative Effects

The No Action Alternative would allow the continued gradual adjustment of the river channel to a more natural meander pattern. However, due to past modifications of the channel, and recreational and other development, unchecked river adjustment would result in extensive erosion and damage to existing roads and other facilities. Since past activities have left a legacy of effects, such as confined channels lacking adequate pool habitat and sedimentation above background levels, future activities have a higher risk of having negative cumulative effects. Since the construction of new roads in the watershed is likely to be minimal within the next decade, additional effects, such as an increase (over current rates) in sediment and water yield, are not expected. In addition, timber management in the watershed is expected to have minimal, short term (≤ 1 year) negative effects on the Davidson River because of the implementation of State and Federal Forestry Management Guidelines.

In 2003, a decision was made that identified about 20 separate National Forest locations for riverbank stabilization from Sycamore Flats upstream to the Coon Tree Picnic Area. The decision authorized placing boulders, log deflectors, and fill material to better ensure the riverbank would be stabilized, reducing annual sediment contribution to the river. To date, 9-12 log deflectors have been anchored (using rebar) along the river near Sycamore Flats, which have improved habitat

conditions. In addition to these positive effects to habitat, two rock vanes will be constructed during the spring of 2006 and trails located in the watershed will be maintained and improved during 2006. The No Action Alternative would not add to the beneficial effects of this work.

3.2.3 Alternative B – Proposed Action

3.2.3.1 Direct & Indirect Effects

In-stream sedimentation beyond background levels reduces habitat quality and quantity for many aquatic species. This is true for all fish species but particularly trout. Adult trout need clean, sediment free, gravel sized substrate for spawning; eggs need this clean substrate for hatching. Without successful spawning, trout populations become unstable and suppressed within as little as two years. This proposal will reduce sedimentation and have a positive effect on trout and on most aquatic species. For further trout protection, in-stream structures would be built outside the North Carolina Wildlife Resources Commission's designated trout spawning moratorium of October 15 through April 15.

Alternative B would have positive impacts on riparian areas and floodplains within the project area. Riparian areas and floodplains are critical for nutrient input (leaf material) and shade for aquatic organisms. Alternative B would address those needs by planting native vegetation along the river and placing in-stream structures that aquatic species could use as habitat. Under Alternative B, vanes would reestablish pools, which are currently lacking within this stretch of river. However, there would be displacement of sediment causing a temporary fluctuation of turbidity during installation. This displacement is expected to last less than a week and long-term benefits of stabilizing stream banks and reducing chronic sediment pulses are expected to more than offset these short impacts. The proposed action would also help stabilize an estimated 1,000 feet of stream channel without notably changing the meander pattern of the river.

3.2.3.2 Cumulative Effects

Alternative B would facilitate the improvement of habitat for aquatic species, since the action would reduce erosion and sedimentation and add to pool habitat. Past activities have left a legacy of effects, such as confined channels lacking adequate pool habitat, future activities have a higher risk of having adverse cumulative effects, which makes the proposed activities even more important.

The construction of new Forest Service roads in the watershed is likely to be minimal within the next decade, so an increase (over current rates) in sediment and water yield is not expected. In addition, timber management in the watershed is expected to have minimal, short term (< 1 year) negative effects on aquatic habitat in the Davidson River because of the implementation of State and Federal Forestry Management Guidelines. The contribution of sediment to the Davidson River would be reduced as a result of the placement of the vanes, improving aquatic habitat downstream. In 2003, a decision was made that identified about 20 separate locations on Forest Service lands for riverbank stabilization from Sycamore Flats upstream to the Coontree Picnic Area. The decision authorized placing boulders, log deflectors, and fill material to stabilize the riverbank and reduce annual sediment contribution to the river. To date, 9-12 log deflectors have been anchored (using rebar) along the river near Sycamore Flats.

In addition to these positive effects to habitat, two rock vanes will be constructed and trails located in the watershed will be maintained and improved during 2006. These two activities would add to positive cumulative effects on the aquatic habitat of Davidson River. The cumulative effects of this alternative will add to the aquatic habitat beneficial effects in the river system.

3.3 Effects Related to Key Issue #3; Hydraulics/Water Quality

Issue Statement – Placing rock vanes, relocating channel substrate to form a point bar, and moving downed trees may both alter the hydraulics of the Davidson River and increase potential for sediment delivery.

Indicator

- Number and location of vane structures

3.3.1 Existing Condition

The current stream flow regime of the Davidson River is modified by the presence of roads and other compacted areas in the watershed. Such changes to the landscape often result in increased runoff of water and sediment during storm events. Stream flow modifications are likely to increase with storm flow magnitude and result in quicker storm flow peaks.

The reach of Davidson River near the Sycamore Flats Recreation Area is particularly susceptible to channel modification because of past management of the river. The river was dammed just downstream from the Sycamore Flats area until the early 1900's. A lake-type environment was created that encouraged deposition of finer-sized sediments in this area than would occur under natural stream flow conditions. When the dam was removed and the local base-level lowered, the channel responded by cutting down into the deposited sediments in an attempt to form a stable channel. During this period of relatively rapid channel adjustment, rates of channel erosion were probably high.

The Davidson River Exercise Trail English Chapel site is a channel without access to its normal floodplain with a high rate of bank erosion. As a result, flood flows are largely contained in the channel and bank erosion continues due to excessive flow energy. This reach of channel is a transport reach where stream substrate is efficiently transported through the reach. Downstream at the site near Sycamore Flats the channel does have access to much of its floodplain and flow energy is dissipated during floods. In this reach, the transported material from the upstream reach is deposited on the channel bottom, causing erosive pressure on stream banks, resulting in channel adjustment. Over time, this deposition has caused the channel to widen and scour a side channel, and shift to the left. Therefore, much of the reach is wider than normal because of continued bank erosion. Bank erosion at the Sycamore Flats area is increased by heavy public use to access Davidson River. These activities are widespread along the bank, contributing to trampled banks and reduced vegetation.

The sediment eroded from stream banks at Sycamore Flats and the Exercise Trail sites has become incorporated in the river and is deposited within the Davidson River and downstream.

Sedimentation in streams is a natural process and stream channels can efficiently move a range of amounts and sizes of sediment by many factors such as flow and channel morphology. When there is more sediment than the stream can move, as is the case here, sediment will begin to deposit in places that it would not under a lower sediment load. This has caused embedding or covering of larger substrate and filling of pools; thus, resulting in a reduction in aquatic habitat quality.

The State of North Carolina, Department of Environment and Natural Resources designates protected water uses (or best uses) for all state waters, including those in the Davidson River drainage. These include: aquatic life propagation and maintenance of biological integrity, wildlife, primary recreation (swimming on a frequent basis), agriculture, and domestic water supply. In addition to these protected water uses, water quality in the Davidson River should sustain and allow for trout reproduction and survival of stocked trout on a year-round basis.

The Davidson River is not listed as “water quality limited” by the N.C. Department of Environment and Natural Resources, Division of Water Quality (NCDENR 2003a) as of the latest 303(d) listing of stream channels impaired from meeting State water quality standards. All protected water uses are currently identified as “supported” at some level. The Division of Water Quality (NCDENR 2003b) Basinwide Assessment Report for the French Broad River Basin reported an excellent rating for benthic macroinvertebrates in the Davidson River. These classifications only reflect chemical pollutants and do not address sediment. Although the data does not make clear the current condition of the Davidson River relative to sediment impacts, it is apparent that erosion at the proposed project sites does not meet the desired conditions in a riparian area.

3.3.2 Alternative A – No-action

3.3.2.1 Direct & Indirect Effects

Under this alternative, channel stabilization actions would not occur. Erosion of the river’s stream banks would continue to contribute sediment to the Davidson River, negatively affecting water quality. Under Alternative A, the current rate of bank erosion is expected to continue or increase due to unstable bank conditions. A slight increase in the current rate of erosion could occur as the undercut trees on the bank fall over and expose more soil, putting water quality at risk. Archaeological sites along the river could be eroded, causing loss of valuable artifacts. The Sycamore Flats picnic area would be more vulnerable to erosion, ultimately resulting in expensive damage to a heavily used recreation facility. Continued undercutting of the Exercise Trail could cause expensive damage to the trail and disruption of recreational activity.

3.3.2.2 Cumulative Effects

The direct and indirect adverse effects to channel integrity and water quality associated with this alternative would continue to add to cumulative effects within the Davidson River watershed. Since past activities have left a legacy of effects, such as confined channels, future activities have a higher risk of having adverse cumulative effects on water quality due to erosion and sedimentation. However, the construction of new roads in the watershed is likely minimal within the next decade, and an increase (over current rates) in sediment and water yield is not expected from roads. In addition, timber management in the watershed is expected to have minimal short term negative affects on water quality in the Davidson River because of the implementation of State and Federal Forestry Management Guidelines, including streamside buffers.

In 2003, a decision was made that identified about 20 separate National Forest locations for riverbank stabilization from Sycamore Flats upstream to the Coontree Picnic Area. The decision authorized placing boulders, log deflectors, and fill material to ensure the riverbank would be stabilized, reducing annual sediment contribution to the river. To date, 9-12 log deflectors have been anchored (using rebar) along the river near Sycamore Flats and have improved stream bank stabilization. In addition to these positive effects to water quality, two rock vanes will be constructed and trails located in the watershed will be maintained and improved during 2006. These two activities would add to positive cumulative effects on the water quality of Davidson River. The No Action Alternative would not add to the beneficial effects of this work since it would not contribute to reducing sediment loading to the Davidson River or improve channel dimensions.

3.3.3 Alternative B – Proposed Action

3.3.3.1 Direct & Indirect Effects

Alternative B would have direct short-term (≤ 1 year) negative effects on turbidity and fine sediment mobilization, but positive, indirect effects on hydrology and water quality of the Davidson River in the long term.

Under this alternative, constructed structures would redirect river flow away from stream banks, where it is causing erosion, and back into the middle of the channel. Downed trees would be redistributed in the back side channel at the Sycamore Flats site. Two rock vanes would be placed in the river and the bank sloped back to the edge of the trail at the Exercise Trail site near English Chapel. Riverbanks would be sloped back to a stable angle upstream and downstream of each vane where practical. River banks would be seeded, mulched, and planted with native riparian vegetation.

Vane structures would be installed to work with the existing streambed form of the channel. Therefore, location of the vanes would generally coincide with existing riffle and pool habitats. Much of the bed material removed from the channel during construction would be placed on the upstream side of the vanes against the stream bank to enhance the deposition that would naturally occur there. The areas along the bank, both upstream and downstream of the vanes, would fill in after construction as deposition occurs over the years. By doing so, the channel would narrow and generally improve water quality and aquatic habitat. A narrower channel would be deeper and less prone to water temperature warming. Pools and riffles would be well defined and of better quality than currently at the site.

The vanes are not likely to increase peak flow levels or the risk of flooding since they are designed to increase channel efficiency. Following construction of the vanes, the wetted channel width is expected to narrow by approximately 10 feet on average and deepen by about 0.2 feet. As a result, stream flow velocity is expected to increase slightly through the reach. Using flow data from the U.S. Geological Survey Davidson River Gauging Station (#03441000) an estimated average flow velocity in the Davidson River Sycamore Flats reach would be less than 1.5 feet per second during the months of May through October. Based on the general USGS safety standard (depth times velocity less than six) the summertime average flows would be safe for wading in water depths up to four feet. Higher than average flows and velocities are common during the summer due to the natural variability of stream flow; however, the need for public river safety education would not increase with this alternative.

Additionally, the proposed vanes and the associated bank work would help stabilize the Davidson River channel. Stabilizing the bank would reduce the existing chronic source of sediment, improve aquatic habitat, and establish riparian vegetation. A short-term pulse of sediment created from the construction of the vanes is expected but would be outweighed by the long-term benefit of a stable stream channel. Implementation of Forest Plan standards and guidelines requiring erosion control while working in riparian areas would further reduce sediment input (Section 2.4).

3.3.3.2 Cumulative Effects

Since this alternative would have positive direct and indirect effects on hydrology and water quality of Davidson River, it is expected to have beneficial cumulative effects, particularly on the sediment regime. The partial implementation of the 2003 decision to place in-stream structures into the Davidson River from Sycamore Flats upstream to the Coontree Picnic Area has been a beneficial effect to water quality. In addition to these positive effects, two rock vanes will be

constructed and trails located in the watershed will be maintained and improved during 2006. These two activities would add to positive cumulative effects on the water quality of Davidson River.

In 2003, a decision was made that identified about 20 separate National Forest locations for river bank stabilization from Sycamore Flats upstream to the Coontree Picnic Area. The decision authorized placing boulders, log deflectors, and fill material to better ensure the river bank would be stabilized, reducing annual sediment contribution to the river. To date, 9-12 log deflectors have been anchored (using rebar) along the river near Sycamore Flats. The cumulative effects of this alternative combined with implementation of the other watershed improvement projects the 2003 decision, would be beneficial for the river system hydraulics and water quality since sediment loading would be reduced.

Since past activities have left a legacy of effects, such as confined channels, future activities have a higher risk of having adverse cumulative effects on water quality due to erosion and sedimentation. However, the construction of new roads in the watershed is likely minimal within the next decade, and an increase (over current rates) in sediment and water yield is not expected from roads. In addition, timber management in the watershed is expected to have minimal short term negative affects on water quality in the Davidson River because of the implementation of State and Federal Forestry Management Guidelines, including streamside buffers.

3.4 Effects Related to Key Issue #4; Recreation

Issue Statement: Failure to redirect channel flow may result in increased likelihood of riverbank erosion in the Sycamore Flats Recreation Area and may result in undermining the Exercise Trail near English Chapel. Failure to redirect channel flow will negatively impact recreational users, especially inner tube floaters.

Indicators

- Number and location of vane structures
- Ability of recreationists, particularly tubers, to use the river after implementation

3.4.1 Existing Condition

Recreational Use

The Mountain Heritage Scenic Byway corridor and associated parts of the Davidson River are classified as Roded Natural 1 (RN 1) in the Recreation Opportunity Spectrum (ROS). Roded Natural 1 areas have a natural-appearing environment with evidence of the sights and sounds of people and are within ½ mile of improved roads. Opportunities to interact with nature exist but encounters with other users are common. Sycamore Flats Recreation Area and the Exercise Trail have a ROS classification of Rural. These Rural areas are characterized by substantially modified natural environments, which enhance specific recreation activities but maintain vegetative cover. Sights and sounds of humans are readily evident and the interaction between users is often moderate to high.

Recreational uses in the project areas include camping, picnicking, wading, swimming, tubing, fishing, and walking for exercise. Currently, there are campsites, picnic sites, paved roads, trails, shelters and restrooms in the highly developed Sycamore Flats and Davidson River Recreation Areas. These facilities along with the Davidson River attract high public recreation use during the

summer with the river being the place where many of these visitors are attracted and focus their play.

A safe river environment, including access to the river, is important to visitors as they wade, fish, swim, tube or just walk the banks and enjoy the sights and sounds of the river. Since the storm events, the amount of large woody debris projecting in and across the river has created increased safety hazards to the recreating public, especially tubers. This debris has redirected the flow of the river increasing the potential for additional flooding at Sycamore Flats Recreation Area and loss of the Exercise Trail and nearby archeological sites due to erosion.

Wild and Scenic River Status

The Davidson River is very scenic with clear waters, large boulders and outcrops, and cobble dominated substrate. These outstanding values, including its popularity with recreationists, earned the Davidson River consideration as “eligible” for Wild and Scenic River (WSR) designation with a potential classification of “recreation” from its headwaters to the National Forest boundary (Forest Plan Amendment 5, pg. III-18). Forest Plan direction provides interim WSR protection for the Davidson River until designated or formally released from further study (Forest Plan Amendment 5, pg. III-11) to maintain the potential for WSR classification. The river must be maintained in a free-flowing condition, but minor fish habitat structures, such as log deflectors and boulder placement like that proposed in Alternative B, are allowed (Forest Plan Amendment 5, pg. III-15).

3.4.2 Alternative A – No Action

3.4.2.1 Direct & Indirect Effects

Alternative A, would maintain Davidson River as eligibility as a WSR and the qualities that qualify this area as a “Rural” ROS would not be changed. However, some qualities that contribute to its eligibility as a WSR would decline. The safety of the river environment would continue to decline. The large woody debris projecting in and across the river has increased safety hazards to the recreating public, especially tubers. This debris would remain in the river continuing to pose a safety concern and increasing the potential for flooding at Sycamore Flats Recreation Area and loss of the Exercise Trail and nearby archeological sites.

3.4.2.2 Cumulative Effects

Cumulative effects would be similar to the direct and indirect effects.

3.4.3 Alternative B – Proposed Action

3.4.3.1 Direct & Indirect Effects

With Alternative B, the proposed activities would improve site conditions, safety, and user experience while meeting all Nantahala and Pisgah National Forests Land and Resource Management Plan (Forest Plan) standards for recreation management. The Davidson River would maintain, and even slightly enhance, its eligibility as a WSR and the qualities that qualify this area as a “Rural” ROS would not be changed. Proposed naturally appearing vanes allow the river to maintain its “free-flowing” condition but redirect flow to the channel center.

The safety of the river environment would improve (also see Section 3.3.3.1). The large woody debris projecting in and across the river and has created increased safety hazards to the recreating public, especially tubers would be removed. The debris that poses the potential for flooding at Sycamore Flats Recreation Area would be removed. Eroding banks threatening a segment of the Exercise Trail and nearby archeological sites would be stabilized and protected.

Short-term hazards to the public would exist during construction activities. However, this would be less than two weeks per work site and safety precautions are designed into the project (see Section 2.4) to mitigate public safety hazards.

3.4.3.2 Cumulative Effects

Cumulative effects would be similar to the direct and indirect effects.

3.5 Other Resource Concerns

Threatened, Endangered and Sensitive Species

3.5.1 Existing Condition

Aquatic habitat within these stretches of the Davidson River primarily consists of riffles with large cobble as the dominate substrate. The two sites are heavily disturbed as a result of the storm events and recreational use. Portions of the river bank are eroded or have recently failed with very little vegetation stabilizing them.

The proposed activity area near the English Chapel surrounding the Davidson River is dominated by Acidic Cove Forest. Tree canopy dominance within this community consists of a mixed canopy consisting of species such as: Yellow poplar (*Liriodendron tulipifera*), black birch (*Betula lenta*), American beech (*Fagus grandifolia*), Frasier magnolia (*Magnolia fraseri*), eastern hemlock (*Tsuga Canadensis*), northern red oak (*Quercus rubra*), white oak (*Quercus alba*), yellow buckeye (*Aesculus flava*), and red maple (*Acer rubrum*). Midstory trees include white ash (*Fraxinus Americana*), black gum (*Nyssa sylvatica*), ironwood (*Carpinus caroliniana*), dogwood (*Cornus florida*) and *Halesia tetraptera*. In the shrub layer, rhododendron (*Rhododendron maximum*) dominates with *Leucothoe fontansiana* and *Clethra acuminata* more common near streams. Other common shrubs include mountain laurel (*Kalmia latifolia*), *Pyrolaria pubera*, and *Gaylussacia ursina*. Herb species are generally sparse with the dense evergreen shrub layer. Primary species included *Goodyera pubescens*, *Chimaphila maculata*, sedges (*Carex debilis*, *Carex torta* and *Carex aestivalis*), *Viola rotundifolia*, *Hexastylis arifolia*, *Galax urceolata*, *Solidago curtisii*, *Thelypteris noveboracensis*, *Maianthemum racemosum*, *Arisaema triphyllum* and *Polystichum acrostichoides*. *Xanthoriza simplicissima* and *Arundinaria gigantea* dominate along the edge of the Davidson River.

Sycamore Flats Recreation Area occurs within a disturbed Montane Alluvial Forest community. The overstory is dominated by sycamore (*Platanus occidentalis*) and yellow poplar (*Liriodendron tulipifera*) with more scattered occurrences of basswood (*Tilia Americana*), buckeye (*Aesculus flava*), black birch (*Betula lenta*), eastern hemlock (*Tsuga Canadensis*), and black walnut (*Juglans nigra*). The area is heavily disturbed with numerous access trails to the Davidson River. The open understory included *Hydrangea arborescens*, *Viburnum dentatum* and *Lindera benzoin*. Common species within the diverse herbaceous layer included *Brachyelytrum erectum*, *Thalictrum dioicum*, *Viola canadensis*, *Xanthoriza simplicissima*, *Geranium maculatum*, *Trillium erectum*, *Tiarella cordifolia*, *Polygonatum biflorum*, *Deparia acrostichoides*, *Coreopsis major*, *Adiantum pedatum*, *Sanguinaria canadensis*, *Prenanthes altissima*, *Galearis spectabilis*, *Zizia trifoliata*, *Parthenocissus quinquefolia*, *Caulophyllum thalictroides*, *Laportea canadensis*, *Arisaema triphyllum*, *Botrychium virginianum*, *Polystichum acrostichoides*, *Iris cristata*, *Arabis laevigata*, *Asarum canadense*, *Viola rotundifolia*, *Uvularia grandifolia*, *Eupatorium purpureum*, *Carex virescens*, *Dryopteris marginalis*, *Heuchera villosa*, *Eurybia divaricata*, *Galax urceolata*, *Arundinaria gigantea*, *Agrimonia parviflora*, *Viola striata*, *Cardamine diphylla*, *Osmunda*

cinnamomea and *Erigeron pulchellus*. Invasive exotic species noted were *Microstegium vimineum*, *Ligustrum sinense*, *Celastrus orbiculatus*, *Lonicera japonica*, and *Rosa multiflora*.

Aquatic Resources

There will be no direct, indirect, or cumulative effects to these species since they do not occur within aquatic biological analysis area. Therefore, these species will not be analyzed further in this document.

All aquatic animal species that might occur on the Pisgah National Forest were initially considered. One federally listed and three sensitive aquatic species have been listed by NC Wildlife Resources Commission (NCWRC), US Fish and Wildlife Service (USFWS), or North Carolina Natural Heritage Program (NCNHP) as occurring or potentially occurring in Transylvania County. These species are included in the aquatic animal portions of the 2001 Nantahala/Pisgah National Forests Federally Listed and Regionally Sensitive Terrestrial Wildlife List. All of these species were eliminated from further analysis based on either analysis area surveys or recent project area surveys conducted by the USFS and/or the NC Wildlife Resources Commission. All five of these species are only currently known from the main stem of the French Broad River within this area of Transylvania County. French Broad crayfish (*Cambarrus recurrans*) was previously located within the main stem of the Davidson River downstream of the Sycamore Flats Recreation Area. However, it has not been relocated for 50 years even though extensive aquatic survey work has been completed within the Davidson River.

Botanical Resources

There will be no direct, indirect, or cumulative effects to any plant species with implementation of this proposed watershed restoration project. Therefore, these species will not be analyzed further in this document.

Seven endangered, seven threatened, and 148 sensitive plant species occur, or could occur within the Pisgah and Nantahala National Forests. All of these plant species were initially considered. Of these 162 plant species, 5 federally threatened or endangered and 48 regional sensitive botanical species have been listed by the US Fish and Wildlife Service or North Carolina Natural Heritage Program (NCNHP) as occurring or potentially occurring in Buncombe County. This list of 53 plant species would have the greatest likelihood of occurrence within the proposed activity areas. These species are included in the botanical portion of the 2001 Nantahala/Pisgah National Forests Federally Listed and Regionally Sensitive Terrestrial Wildlife List, which contains habitat information by individual species.

Previous botanical surveys within this area of the forest have not located any federally listed or sensitive plant species. A field survey during the spring and late summer of 2005 did not locate any populations nor any suitable habitat for the federally listed or sensitive plant species within the analysis area. Many of these species previously documented in other portions of Transylvania County occur in habitats, such as Spruce-Fir Forest, Rich Cove Forest, Granitic Domes, High Elevation Summits or Southern Appalachian Bogs, that will not be affected by project activities.

Wildlife Resources

Three sensitive terrestrial species may occur in the project area. Effects are discussed below.

All 10 federally listed and 33 sensitive terrestrial animal species that might occur on the Pisgah and Nantahala National Forests were initially considered for analysis for the proposed project. All but 2 federally listed and 9 sensitive species were dropped since these were listed by the North Carolina Wildlife Resources Commission (NCWRC), North Carolina Natural Heritage Program (NCNHP), and the US Fish and Wildlife Service (USFWS) as occurring or probably occurring in Transylvania County. Of these 11 species, all but 3 sensitive species were dropped from the list for analysis as a result of the likelihood of occurrence evaluation based on surveys, habitat elements and filed records.

Sycamore Flats and the surrounding area north toward Coontree picnic area may have previously supported bog turtles (*Clemmys muhlenbergii*). This species was previously documented within the general Davidson River floodplain within the early 20th century. Chris Kelly (Sycamore Flats Project Environmental Assessment 2004) indicated the area has a long history of disturbance and probably supported wet agricultural pastures when the species was last documented. However, since that time, either portions of the area have been allowed to grow back into Montane Alluvial Forest or are actively managed as mown lawns. Kelly determined the area no longer supports suitable habitat for bog turtles.

Speyeria diana, a regional sensitive butterfly, has previously been located adjacent to Davidson River road. This butterfly could also occur within or adjacent to the activity area of the stream placement. Southern Appalachian Salamanders (*Plethodon teyahalee*) have recently been located in many locations including Acidic Cove Forest across western North Carolina. This species could occur within the vicinity of the proposed project site. While the possibility of the Rafinesque's Big-eared Bat (*Myotis rafinesquii rafinesquii*) is remote there is a small likelihood it could be found near English Chapel. There are no other rare terrestrial animal records known nor is there any potential suitable habitat within the proposed activity areas.

Table 3 - Known and potential sensitive species evaluated for this project. All the species are terrestrial animals.

| | | | |
|---|-----------|---|-----------|
| Diana fritillary butterfly (<i>Speyeria diana</i>) | Butterfly | Deciduous and pine woodlands | May occur |
| S. Appalachian salamander (<i>Plethodon teyahalee</i>) | Amphibian | Moist forests at all elevations | May occur |
| Rafinesque's Big-eared Bat (<i>Myotis rafinesquii rafinesquii</i>) | Mammal | Roosts in hollow trees near water in summer | May occur |

3.5.2 Alternative A – No Action

3.5.2.1 Direct, Indirect & Cumulative Effects to Wildlife Resources

The no-action alternative will have no affect on any federally listed species since no TE species or their associated habitats occur within the project area based on preferred habitat elements and survey results.

Implementation of the no-action alternative would perpetuate the existing condition within the Davidson River and could impact potential sensitive species habitat. An increase in the current rate of erosion could occur as the undercut trees on the bank fall over and expose more soil, the streams

become more incised, and adverse effects to channel integrity would continue and water quality would be at risk.

Table 4 lists the potential impacts with implementation of the no-action alternative to the three terrestrial wildlife species that may occur within the activity areas. For *Speyeria diana*, there will be no direct impacts to the *Viola* plants that may serve as hosts for the larvae of this species. This vegetation should persist within the area for the foreseeable future. Thus, the lack of implementation of this project should not significantly change suitable habitat for *Speyeria diana*. For *Plethodon teyahalee*, there will be no direct or indirect impacts to individuals or habitat since the riparian vegetation forest will not be modified. There will be no direct or indirect impacts to *Myotis rafinesquii rafinesquii* with lack of implementation of the restoration project. Suitable habitat, under the eastern hemlock trees or in adjacent roost trees will continue to be present within the Acidic Cove Forest.

3.5.3 Alternative B – Proposed Action

3.5.3.1 Direct, Indirect & Cumulative Effects by Wildlife Species

(1) Diana fritillary butterfly (*Speyeria diana*)

Direct and Indirect Effects - There is a site occurrence for the Diana fritillary, *Speyeria diana*, along Davidson Road north of the activity area and on private property south of the activity area. This species utilizes nectar species found along roadsides, streams, and linear grass/forb areas. Diana fritillary occurs in different forest types but seems to prefer roadsides through cove forests. Potential habitat for this butterfly is present within both proposed activity areas. Eggs and larvae are typically found on violets (*Viola* spp.). Violets were located at both sites. If heavy equipment creates an access route to the two river restoration sites during the egg or larval season, individual eggs or larvae may be eliminated by trampling. Project activities could impact individuals through direct crushing although it is more likely the butterflies will flee the activity areas. A small amount of existing stream edge habitat will be negatively impacted following project activities and may no longer provide suitable habitat until riparian vegetation is re-established and ages. Conversely, some potentially suitable edge habitat through an existing forested landscape will be created from the access routes.

Cumulative Effects of Past, Ongoing and Future Projects – Past activities resulted in similar effects to Diana fritillary as the effects described above for the proposed actions. Specifically, some activities could have crushed plants with eggs or caterpillars or over-wintering caterpillars or eggs on the ground could have been run over. Opening up the forest following harvest may have decreased habitat for Diana fritillary. However, constructing road or edge habitat may have also increased habitat for the Diana fritillary. Although watershed restoration and other past and ongoing disturbance activities may directly impact Diana fritillary individuals, the construction/reconstruction of roads and edge has or will increase habitat and mitigate any loss of individuals in the activity areas.

Determination of Effect - This project may impact individuals of this species, but could benefit the habitat (Table 4). The adverse effects to individuals would be minor considering the status and distribution of the habitat on the National Forest. Diana Fritillary has been documented within 15 of the 18 western most counties. Over half of the occurrences, greater than 40, are known to occur within the Nantahala or Pisgah National Forest. As a result of all the recent documentation for this species, the North Carolina Natural Heritage Program no longer formally tracks Diana fritillary. Therefore, this project is not likely to cause a trend to federal listing or a loss of viability across the Forest.

(2) Southern Appalachian salamander (*Plethodon teyahalee*)

Direct and Indirect effects - This species is found in moist forests in the southwestern mountains at all elevations. Several populations have recently been located within the Davidson Creek watershed. One population has been documented within a forest adjacent to Avery Creek less than 0.4 mile from the upper Davidson River activity area. It is conceivable the species could occur under the leaf litter and downed wood debris in the forest adjacent to the activity areas. The heavy equipment (trackhoe, etc.) could crush individuals when accessing the two river sites. Habitat may be temporarily decreased in the road access areas and where trees are removed to access the Davidson River.

Cumulative Effects of Past, Ongoing and Future Projects – Recent and ongoing road projects along the Davidson River have resulted in some habitat loss, primarily within the mesic Montane Alluvial Forest, Acidic Cove Forest, and Rich Cove Forest. Habitat has been lost in the past with the previous timber sale due to road construction activities and regeneration cuts. All the habitat loss is probably of a temporary duration (10 years or less). Some additional habitat loss may result in the future from the ongoing facilities projects at the two recreation sites. The proposed project will add to the cumulative loss of individuals or habitat for southern Appalachian salamanders within the Davidson River watershed.

Determination of Effect - This species is thought to be fairly common across the Forest. Dr. Richard Highton's collection at the Smithsonian lists 1007 records for this species from 10 counties in North Carolina, at elevations from 1160 feet to 6000 feet. This includes 267 records on the National Forest, distributed across the same 10 counties and four ranger districts. Since the species is widely distributed, current management is unlikely to affect the availability of suitable habitat. The species occurs in non specialized mesic sites. Current management practices are unlikely to affect the availability of suitable habitat. This watershed restoration project may impact individuals of this species and cause a loss of short-term loss of habitat (Table 4). The adverse effects to individuals and habitat would be minor considering the status and distribution of this species on the National Forest. Therefore, this project is not likely to cause a trend to federal listing or a loss of viability across the Forest.

(3) Rafinesque's Big-eared Bat (*Myotis rafinesquii rafinesquii*)

This species is thought to roost in hemlock forests, rock crevices, caves, mines, bridges or buildings, usually near water. The species uses other habitats for feeding. Little is known regarding summer nursery sites and summer foraging or roosting habitat. Suitable maternity habitat may be lacking across the Forest, if otherwise appropriate sites are not exposed to the sun. The likelihood that a Rafinesque's big-eared bat exists within the watershed is remote, however not completely dismissible at the site near English Chapel. The last recorded sighting of a Rafinesque's big-eared bat in Transylvania County was near the Pink Beds approximately 100 years ago.

Direct and Indirect effects - If Rafinesque's big-eared bats are roosting in trees during channel stabilization activities, the bats could be disturbed or die as a result of trees being cut or knocked down. No snags will be removed with this project; however, some hollow trees, possible roosting habitat, may be removed in order to access the stream banks. The removal could indirectly affect these bats by eliminating roost trees. Creating small openings in the canopy, particularly with the access road may temporarily improve feeding habitat for forest bats, which are attracted to the insects supported by grassy/brushy habitat areas.

Cumulative Effects of Past, Ongoing and Future Projects - The past timber sale in the Searcy Creek areas may have affected bats by disturbed or killing them by felling trees they are roosting in or possible roost trees would be removed from use. However, these impacts would have been very minimal since this bat occurs within riparian forests and Nantahala and Pisgah Forest land management standards would limit activities within the riparian habitat. The previous timber sale may have created some foraging habitat for the species. However, these acres have matured and are probably no longer desirable feeding habitat. Cumulatively, the past projects, ongoing projects, and the current proposal, could impact local populations of bats that roost in trees. Viability across the forest for this bat species would be unaffected because the total cumulative effect of past actions, proposed actions and activities on private land would only occur in a localized area.

Determination of Effect –Rafinesque’s Big-eared bat may occur within the proposed project area. This species has not been collected often across western North Carolina. The proposed activities will probably not affect snags to access the activity areas or rock outcrops, which are the optimal habitats for this species within the project area. This project may impact individuals of this species but the adverse affects to potential habitat will be very minor considering the habitat present for this species within this watershed and across the Forest (Table 4).

Table 4 - Summary of potential effects of the Davidson River Channel Stabilization Project on sensitive species. No federally listed species will be affected.

| Species | Group | No Action Alternative | Action Alternative |
|---------------------------------------|-----------|-----------------------|---|
| <i>Speyeria diana</i> | Butterfly | No impact | Short term: May impact individuals, Long term: beneficial habitat impacts (indirect) |
| <i>Plethodon teyahalee</i> | Amphibian | No impact | Short term: May impact individuals |
| <i>Myotis rafinesquii rafinesquii</i> | Mammal | No impact | Short term: May impact individuals |

Proposed, Endangered, Threatened, and Sensitive Species Determination of Effects

The Davidson River channel stabilization project will have no effect on any proposed, endangered, and threatened (PET) species. Consultation with the U.S. Fish and Wildlife Service is not required. The project may impact individuals of Diana fritillary butterfly (*Speyeria diana*), southern Appalachian salamander (*Plethodon teyahalee*), and Rafinesque’s Big-eared Bat (*Myotis rafinesquii rafinesquii*) but will not impact their viability across the Forest. This project will not impact any other sensitive species. No cumulative effects on species viability across the Forest will result from this project.

Forest Concern Species

3.5.4 Existing Condition

The Nantahala and Pisgah National Forests list of Forest Concern species includes 262 plants, 56 terrestrial animals, and 87 aquatic animals. These species are either known or could occur on the Forests. All of these species were initially considered for this analysis. The following discussion analyzes each of the three biological resources.

Botanical Resources

Fifty-four Forest Concern plant species have been listed by the North Carolina Natural Heritage Program (NCNHP) as occurring or potentially occurring in Transylvania County. This list of 54 plant species would have the greatest likelihood of occurrence within the proposed activity areas. The field survey did not locate any of these 54 species. Many of these species previously documented in other portions of Transylvania County occur in habitats, such as Spruce-Fir Forest, Spray Cliffs, rock outcrop communities or Southern Appalachian Bogs, that will not be affected by project activities. Previous surveys within this area of the forest by David Danley have not located any rare plant species. There will be no direct, indirect, or cumulative effects to any Forest Concern plant species with implementation of this proposed channel improvement project.

Wildlife Resources

All 40 Forest Concern terrestrial animal species that might occur on the Pisgah and Nantahala National Forests were initially considered for analysis for the proposed project. All but 12 species were dropped since these were listed by the North Carolina Wildlife Resources Commission (NCWRC), North Carolina Natural Heritage Program (NCNHP), and the US Fish and Wildlife Service (USFWS) as occurring or probably occurring in Transylvania County. Most of these 12 species occur within high elevation forests or openings, in Southern Appalachian Bogs, in vernal pools or woodland pools, or in wet rock outcrops. None of these habitats are present within the two proposed activity areas. Previous bird and butterfly surveys by the former wildlife biologist on the Pisgah Ranger District, Chris Kelly, did not locate any rare species. Thus, the proposed river stabilization project will have no direct, indirect, or cumulative effects to any Forest Concern terrestrial wildlife species.

Aquatic Resources

All Forest Concern aquatic animal species that might occur on the Pisgah National Forest were initially considered. Twenty-four species have been listed by NCWRC or NCNHP as occurring or potentially occurring in Transylvania County. A previous evaluation in 2003 for Forest Concern aquatic species within the Davidson River for the Sycamore Flats Recreation Area project only located habitat for hellbenders (*Cryptobranchus alleghaniensis*). Habitat within the Davidson River within the two channel stabilization activity areas is similar. Previous surveys have documented this amphibian species adjacent to the activity area near English Chapel. The proposed activity area upstream of Sycamore Flats Recreation Area could also provide suitable habitat for this amphibian species (L. Stroup, pers. comm.). An aquatic amphibian, mudpuppies (*Necturus maculosus*) was previously located within the main stem of the Davidson River downstream of the Sycamore Flats Recreation Area. However, the species has not been relocated for 90 years even though there have been periodic aquatic species surveys within the Davidson River. Thus, the species is not expected to occur within or downstream of the activity area.

Since habitat for this species was found in the project area, the effects of the project on hellbenders will be analyzed (Table 5).

Table 5 - Habitat for Forest Concern rare species likely to occur within the activity areas affected by the Davidson River channel stabilization project.

| Forest Concern Species | Type | Habitat | Occurrence |
|---|-------------|--------------------------------------|-------------------|
| <i>Cryptobranchus alleganiensis</i> (Hellbender) | Amphibian | Large and clear fast flowing streams | Known to occur |

3.5.4 Alternative A – No Action

3.5.4.1 Direct, Indirect & Cumulative Effects- Hellbender (*Cryptobranchus alleganiensis*)

With the no-action alternative, there will be no activities to stabilize the Davidson River at these two sites. The channel will continue to be unstable and sediment could reach the Davidson River during storm events. If any individual hellbenders are present, they could be indirectly affected by loss of suitable habitat. Suitable habitat for these species will not be increased with the no-action alternative. The chronic long-term affects of sedimentation may lead to localized extirpation of sub-populations. This would not result in a loss of this species within the Davidson River since cumulatively there are other ongoing projects that are improving hellbender habitat on other portions of the Davidson River.

3.5.5 Alternative B – Proposed Action

3.5.5.1 Direct & Indirect Effects- Hellbender (*Cryptobranchus alleganiensis*)

Hellbenders prefer rocky, clear creeks and rivers where there are submerged logs or rock shelters present (Natureserve 2006). This species could be present within both Davidson River activity areas. If individuals of this species are present within the two activity areas, they could be crushed by the heavy equipment necessary to construct the rock vanes and place downed woody debris. In order to diminish any negative impacts to this high quality population within the Davidson River, on the day prior to construction a river survey will be completed in order to collect and move any individuals upstream away from the disturbance. This collection and movement may stress a few individuals and could result in a death, however it is expected the vast majority will survive the relocation.

The stabilization of the existing sedimentation problem along the Davidson River will indirectly affect hellbender by improving suitable habitat for this species. The placement of the rocks and woody debris should provide more habitat for egg rearing nests under the flat rocks and submerged logs.

3.5.5.2 Cumulative Effects- Hellbender (*Cryptobranchus alleganiensis*)

The existing condition of the aquatic resource is the result of all past and on-going activities. Roads were constructed and culverts were installed from the past timber sale project within the Searcy Creek area. However, the direct negative impacts of these former projects are temporary (≤ 1 year) in nature and should no longer be affecting individuals or suitable habitat for hellbenders. Various segments of the Davidson River are influenced by recreationists and it is reasonable to assume hellbenders are moving upstream to avoid human contact. Since 2003, a bank stabilization project within the Davidson River has placed log deflectors, boulders and re-vegetated fill slopes from the Sycamore Flats Recreation Area to the Coontree Picnic Area. These activities have improved suitable habitat for hellbenders. Two rock vanes are currently being constructed in the Davidson River adjacent to the Sycamore Flats Recreation Area. On the day prior to construction

of the rock vanes, a survey was completed in the river in order to collect and move any individual hellbenders upstream away from the disturbance. No individuals were located there. This on-going project should improve habitat for hellbenders in this length of the Davidson River. The proposed activities should cumulatively add to the increase in suitable habitat for hellbenders.

Determination of Effect – Hellbenders are known from 17 counties within western North Carolina. This widely distributed species has 14 populations occurring in streams adjacent to USFS lands. Both Transylvania and Graham Counties have the greatest concentration of documented hellbender populations. The population in the Davidson River has been determined to be high quality and perhaps the most stable population on the National Forests in North Carolina (L. Stroup, pers. comm.).

The proposed activities may have minimal impact to individuals since hellbenders will be collected and relocated upstream prior to project implementation. The project will improve suitable habitat for this species within the Davidson River. This project may impact individuals of this species but the negative effects to potential habitat will be very minor considering the habitat present for this species within this watershed and across the Forest (Table 5).

Forest Concern Species Determination of Effects

The Davidson River channel stabilization project may impact individuals of *Cryptobranchus alleghaniensis*, but will not reduce the stability of populations within this area of the Pisgah Ranger District. Any impacts will be greatly reduced since individual hellbenders will be collected and placed upstream prior to project implementation. There will be a cumulative improvement of suitable habitat for this species with implementation of the project. This project will not impact any other Forest Concern species.

3.6 Management Indicator Species

3.6.1 Introduction & Existing Condition

Management Indicator Species (MIS) serve as the system to monitor Forest Plan implementation and effects on diversity and population viability of all native and desirable non-native plants and animals. At the project scale, MIS are used to focus the effects of proposed activities on habitat types. When these effects are evaluated within a forest wide context, it is determined whether or not any trends for MIS would change. An assessment of habitat changes linked to management indicator species (MIS) is documented in this section. The assessment provides an evaluation of project level activities, the change in habitat used by MIS, and the likely contribution to forest wide trends.

The amount of habitat changed by the project is checked for consistency with the Forest Plan and the recent trends in activities. If any inconsistencies are uncovered, then further investigation should be made to determine effects on MIS. However, if the project activities are consistent with recent trends, then effects of habitat changes to MIS should remain constant. Tables 6 and 7 list each MIS species and the biological communities and special habitats they are indicating. For the Davidson River channel stabilization project, five separate species were selected to represent the two habitats that potentially could be impacted. Acadian flycatchers will represent riparian forests. Brook, brown, and rainbow trout and blacknose dace represent the coldwater stream component for the Nantahala and Pisgah National Forest. Within this area of the Davidson River, rainbow trout is the predominant species with lesser amounts of brown trout. Both species have their populations enhanced by hatchery inputs although both are able to reproduce to a limited extent within this length of the Davidson River.

Communities and Special Habitats Effects

Most of the biological communities and special habitats in the project area are not affected by management activities proposed by the preferred alternative. What changes that are anticipated to occur, and discussed above, are consistent with the Nantahala and Pisgah Forest Plan. Most of the projected habitat changes are needed to accomplish the multiple-use goals of the Plan. The cumulative effect of the implementation of this project, along with other similar projects, would change habitats in amounts close to/consistent with forest-wide averages of the recent past. Therefore, population trends of MIS related to habitat changes on the Forest would continue as cited in the most recent update of the MIS assessment.

Coldwater Streams

There are approximately 5100 miles of coldwater stream on the Nantahala and Pisgah National Forests. Implementation of the proposed project will be affecting less than 0.2 mile length of these streams. For cold-water streams, the forest-wide trend is increasing quality, due to improved efforts at erosion control and a reduction in new road construction. The proposed project will add to this trend but will not significantly change the forest-wide trend considering the minor amount of stream reach (<0.01% of the forest-wide streams) the project will affect.

Riparian Forests

Riparian forests are protected by standards in the Pisgah and Nantahala National Forest Land and Resource Management Plan. These forests, approximately 95,000 acres in extent, currently are static, i.e. they are not expanding or being reduced in extent. As a result, there is no reduction in the quantity of habitat and a gradual increase in quality as the forests are aging and developing more characteristics of high-quality riparian forests and only activities that enhance riparian benefits are permitted forest-wide. The current project will negatively impact riparian forest within the access routes. The amount of impact will be less than 0.1 acre and will not significantly modify the gradual increase in quality for riparian forests across the Nantahala and Pisgah National Forest.

Table 6 - Biological communities and associated MIS (using Forest Plan EIS, Table III-8).

| Biological Community | MIS | Analyzed Further/ Evaluation Criteria* |
|--------------------------------------|---|---|
| Fir dominated high elevation forests | Fraser fir | No/1 |
| Northern hardwood forests | Ramps | No/1 |
| Carolina hemlock bluff forests | Carolina hemlock | No/1 |
| Rich Cove forests | Ginseng | No/1 |
| Xeric yellow pine forests | Pine warbler | No/1 |
| Reservoirs | Largemouth bass | No/1 |
| Riparian forests | Acadian flycatcher | Yes |
| Coldwater streams | Brook, brown, and rainbow trout; blacknose dace | Yes |
| Coolwater streams | Smallmouth bass | No/1 |
| Warmwater streams | Smallmouth bass | No/1 |

*1 Biological community and its represented species do not occur in the project area; therefore, this biological community will not be affected. Given no effects to the community, the action alternative will not cause changes to forest-wide trends or changes in population trends of species associated with this community.

Table 7 - Special Habitats and associated MIS (using Forest Plan EIS, Table III-9).

| Habitat Components | MIS | Analyzed Further/ Evaluation Criteria* |
|--|----------------------------------|---|
| Old Forest Communities (100+ years old) | Black bear | No/1 |
| Early successional (0-10 years old) | Rufous-sided (eastern) towhee | No/1 |
| Early successional (11-20) | Ruffed grouse | No/1 |
| Soft mast producing species | Ruffed grouse | No/1 |
| Hard mast-producing species (>40 yrs) | Black bear | No/1 |
| Large contiguous areas with low levels of human disturbance | Black bear | No/1 |
| Large contiguous areas of mature deciduous forest | Ovenbird | No/1 |
| Permanent grass/forb openings | White-tailed deer | No/1 |
| Downed woody debris | Ruffed Grouse | No/1 |
| Snags | Pileated woodpecker | No/1 |

*1 Biological community and its represented species do not occur in the project area; therefore, this biological community will not be affected. Given no effects to the community, the action alternative will not cause changes to forest-wide trends or changes in population trends of species associated with this community.

*2 Special Habitat and its represented species will be protected in accordance with Forest Plan standards and guidelines (open road density will not change, snags and den trees will be retained); therefore, this special habitat will not be affected by any of the alternatives. Given no effects to the habitat, this project will not cause changes to forest-wide trends or changes in population trends of species associated with this habitat.

Table 8 - Biological communities and special habitats, and estimated change in each alternative.

| Biological Community | No Action | Action Alternative |
|---|--|--|
| Fraser fir forests | None affected. | None affected. |
| Northern hardwood forests | None affected. | None affected. |
| Carolina hemlock bluff forests | None affected. | None affected. |
| Rich cove forests | None affected. | None affected. |
| Yellow pine successional communities | None affected. | None affected. |
| Reservoirs | None affected. | None affected. |
| Riparian forests | None affected. | Minor affect, < 0.1 acre |
| Cold water streams | Short and long-term affects, ~ 0.2 stream mile | Short and long-term affects, ~ 0.5 stream mile |
| Warm water streams | None affected. | None affected. |
| Special Habitats | | |
| Old forest communities (100+ years old) | None affected. | None affected. |
| Early successional communities (0-10 yr) | None affected. | None affected. |
| Early successional communities (11-20 yr) | None affected. | None affected. |
| Soft mast-producing species | None affected. | None affected. |
| Hard mast-producing species (>40 yr) | None affected. | None affected. |
| Contiguous areas with low disturbance (< 1 mi. open road / 4 sq. miles) | None affected. | None affected. |
| Large contiguous forest | None affected. | None affected. |
| Permanent grass/forb openings | None affected. | None affected. |
| Snags and dens (>22" dbh) | None affected. | None affected. |
| Down woody material | None affected. | None affected. |

Species Evaluated and Rationale

The proposed project is channel stabilization bank improvement work at two sites on Davidson River. All management indicator species whose habitat is potentially affected by project activities were evaluated (see Tables 6-8). This includes the brook, brown, and rainbow trout, blacknose dace, and Acadian flycatcher. Information about forest-wide MIS habitats and population trends is contained in the Forest MIS report, “**Management Indicator Species Habitat and Population Trends**”, which is available for review by contacting the National Forest Office.

3.6.2 Alternative A – No Action

3.6.2.1 Direct, Indirect & Cumulative Effects by MIS Species

1) Acadian Flycatcher (*Empidonax virescens*)

The no-action alternative will have no direct or indirect impact on Acadian flycatcher since potential habitat for this species within the forest adjacent to the Davidson River will not change. There will be no cumulative effect with implementation of the activities associated with project.

2) Rainbow Trout (*Oncorhynchus mykiss*), Brown Trout (*Salmo trutta*), and Blacknose Dace (*Rhinichthys atratulus*)

With the no-action alternative, there will be no activities to stabilize the existing slide on the river bank downstream of English Chapel and with eroding river banks upstream of the Sycamore Flats Recreation Area. Given the lack of any stream bank restoration, the three aquatic species occurring downstream of the proposed activity areas would continue to be directly impacted by periodic

sedimentation following rain events. The greater turbidity and sediment loading could result in negative affects to all three species by injuring and stressing individuals or smothering eggs and juveniles. Available habitat, including the interstitial space within the substrate used as spawning and rearing areas, may be covered with sediments. Thus, suitable habitat for these species will not be increased with the no-action alternative. The chronic long-term affects of sedimentation may lead to localized extirpation of subpopulations.

3.6.3 Alternative B – Proposed Action

3.6.3.1 Direct, Indirect& Cumulative Effects by MIS Species

1) Acadian Flycatcher (*Empidonax virescens*)

The proposed watershed improvement activity area downstream of English Chapel is dominated by relatively uninterrupted riparian vegetation and Acidic Cove Forest. Direct impacts to any canopy trees will be primarily limited to this area since the adjacent forest within the Sycamore Flats Recreation Area is already heavily disturbed and partially open. It is conceivable Acadian flycatcher individuals may occur within the activity area on or adjacent to the English Chapel site. If eggs are present within the nest, there could be a direct affect on potential recruitment. If the species is nesting within some of the trees that may have to be removed to access the streams, there could be an indirect affect in loss of habitat for the species.

Forest riparian regulations have reduced any negative impacts to Acadian flycatcher from past and on-going projects within the Bent Creek watershed. Habitat has been lost in the past with the previous timber sale due to road construction activities. Disturbance from past storm events during the mid 1990's may have affected scattered riparian canopy trees and indirectly affected this species. Future projects within the watershed should not affect this species on public land. The cumulative negative impact to Acadian flycatcher from the proposed project should be minimal and localized primarily to the activity area. While the project may impact a small amount of habitat for Acadian flycatcher along a small portion of the riparian forests for the Davidson River, this small potential impact in habitat loss will not change the overall static population trend for Acadian flycatcher across the Forest.

2) Rainbow Trout (*Oncorhynchus mykiss*), Brown Trout (*Salmo trutta*), and Blacknose Dace (*Rhinichthys atratulus*)

All three species are known from this segment of the river and could be affected by project activities within the two activity areas. Management most likely to impact suitable habitat for this species would be ground disturbing activities such as the re-contouring of the river banks and construction of the rock vanes.

This disturbance within the stream or on the stream bank could result in direct short term (< 1 year) impacts by smothering fish eggs and/or juveniles result in a short term impact. Adults of all three species should be unaffected by the project since they have the ability to swim away from the disturbance area. Long term benefits of stabilizing the existing erosion problems within the two activity areas should indirectly enhance suitable habitat for all three species within this reach of the Davidson River.

The existing condition of the aquatic resource is the result of all past and on-going activities. Roads were constructed and culverts were installed from the past timber sale project within the Searcy Creek area. However, the direct negative impacts of these former projects are temporary (<1 year) in nature and should no longer be affecting individuals. Various segments of the Davidson River are influenced by recreationists and it is reasonable to assume the two trout species

and blacknose dace are moving upstream to avoid human contact. Since 2003, a bank stabilization project within the Davidson River has placed log deflectors, boulders and re-vegetated fill slopes from the Sycamore Flats Recreation Area to Coontree Picnic Area. These activities have improved suitable habitat for all three aquatic MIS species. Two rock vanes are currently being constructed in the Davidson River adjacent to the Sycamore Flats Recreation Area. The on-going project should improve habitat for all three species in this segment of the Davidson River. The proposed activities should cumulatively add to the increase in suitable habitat for brown trout, rainbow trout, and blacknose dace within the Davidson River. Rainbow trout are the most abundant of the three trout species occurring on the Nantahala and Pisgah National Forests. Even though rainbow trout numbers are higher than brown trout forest-wide, both species have a static population trend. Although blacknose dace populations fluctuate more frequently forest-wide in comparison to the two trout species, the densities of this species have remained relatively stable for the last 17 years. The beneficial impact to habitat within this small area of the Forest probably will increase the local population size of all three species; however, this increase will not dramatically change the overall forest-wide trend for any of these three species.

3.7 Heritage Resources

3.7.1 Existing Condition

The project area has a high probability for heritage sites. The area has a long history of use by prehistoric and historic peoples. There many known sites along the Davidson River area due to the flat terrain and proximity to water. These sites consist of eligible, not eligible, and unevaluated sites. Past management practices have not always evaluated these properties for eligibility to the National Register of Historic Places (NRHP). Historic properties that are unevaluated are managed as if eligible, and mitigations for these properties follow management prescriptions as specified in the next section. Currently, the Heritage Program management attempts to relocate sites, monitor the sites for damage and deterioration, evaluate the sites for NRHP eligibility, and preserve and protect sites.

3.7.2 Alternative A – No Action

3.7.2.1 Direct and Indirect Effects

The project would not be implemented under the No Action Alternative. There would be no direct immediate negative effects to most heritage resources in the project area. However, some heritage sites located adjacent to the project area will continue to be negatively affected, and possibly lost, by increased erosion and sedimentation over time if the No Action Alternative is selected.

3.7.2.2 Cumulative Effects

Under the No Action Alternative, historic properties within the project area would be expected to continue to experience effects from other past, present, and reasonably foreseeable future actions; however, heritage resource sites were found within or adjacent to the project and are being affected by erosion.

3.7.3 Alternative B – Proposed Action

3.7.3.1 Direct and Indirect Effects

Under the National Historic Preservation Act (NHPA), a significant or adverse effect is one which may diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or associations (36 CFR 800.9[b]). The project area was surveyed for cultural resources. Heritage resource sites were found within or adjacent to the project and are being affected by

erosion, which the project proposes to stop. No negative effects to these heritage sites would occur if project design features are applied as specified. Protection of some of these sites will occur under this alternative.

3.7.3.2 Cumulative Effects

If the Proposed Action is implemented, historic properties within the project area would not be negatively impacted by the planned actions. Design features of the proposed action, if followed, would insure that no negative impacts to heritage resources would occur. Some of the heritage resources that have been identified will continue to experience the normal effects from recreation and other ongoing actions while some could be protected.

CHAPTER 4 – PREPARERS AND PUBLIC INVOLVEMENT

The Forest Service consulted the following individuals, Federal, State, and local agencies, tribes and non-Forest Service persons during the development of this environmental assessment:

4.1 ID Team Members

4.1.1 Core IDT:

Bob Wilhelm – Storm Team NEPA Writer-Editor, IDT Leader

Susan Jennings – Storm Team Specialist Coordinator

Tom Heutte – Storm Team NEPA Writer-Editor

Gary Kauffman – Forest Botanist

Brady Dodd – Forest Hydrologist, Project Leader

Melissa Amentt – Storm Team Hydrologist

Megan Best – Storm Team Heritage Strike Team Leader

John Preston – Storm Team Archaeologist

Lorie Stroup – Zone Fisheries Biologist

Fred Marriott- Storm Team NEPA Writer

4.1.2 Other Forest Service Personnel Providing Input:

Rodney Snedecker – Forest Archaeologist

Dave Danley – Zone Botanist

Erik Crews – Forest Landscape Architect

Randy Burgess – Pisgah District Ranger

4.2 Federal, State, and Local Agencies

U.S. Fish and Wildlife Service

Army Corps of Engineers

North Carolina Wildlife Resources Commission

North Carolina Department of Water Quality

North Carolina Deputy State Historic Preservation Officer

4.3 Others

Richard Burns

Harry Hafer – CFAIA

Terrell West – Blue Ridge Community College

Rivers Edge

Davidson River Rafting

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