Pisgah National Forest
National Forests in North Carolina
Transportation System Analysis Process (TAP) Report

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Pisgah National Forest
Unit Scale Transportation System Analysis Process (TAP) Report

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Executive Summary

Objectives of Forest-Wide Transportation System Analysis Process (TAP)

The objectives of Forest-Wide TAP conducted over the past year were to:

- identify key issues related to the Pisgah National Forest*'s* transportation system
- identify benefits, problems and risks related to the Pisgah National Forest*'s* transportation system;
- identify management opportunities related to the existing transportation system to suggest for future consideration as National Environmental Policy Act (NEPA) decisions (examples included items such as road decommissioning within priority watersheds and needed aquatic passage improvement projects);
- create a map to inform the identification of the future Minimum Road System (MRS);
- indicate the location of unneeded roads and possible new road needs.

(Note: Forest Service regulations at 36 CFR 212.5(b)(1) require the Forest Service to identify the minimum road system needed for safe and efficient travel and for administration, utilization, and protection of National Forest System (NFS) lands.)

Analysis Participants

The TAP was conducted by an interdisciplinary team with extensive internal participation, and limited participation by partners and the general public. The primary participants were:

Josh Martin	Team Lead	Cleve Fox	FMO
		Greg Philipp	FMO
Tina Tilley	District Ranger	Patrick Scott	FMO
John Crockett	District Ranger		
Derek Ibarguen	District Ranger	Cliff Northrop	Civil Engineer
		Chris Williams	Biologist
Lynn Hicks	Eng. HER	Dave Danley	Botanist
Brady Dodd	Soil & Water Specialist	Scott Ashcraft	Archeologist
David McFee	Operations Forester	Amber Vanderwolf	GIS
Ted Oprean	Silviculturist		
Matt Keyes	TMA		
Lorie Stroup	Wildlife & Fisheries Specialist		

Overview of the Pisgah National Forest's Road System

The Pisgah National Forest's road system currently comprises some 885 miles, providing access to approximately 512,670 net acres of national forest, as well as to interspersed private tracts and nearby local communities. The system supports both recreation and resource management. It is comprised of a combination of old "public" roads, roads constructed to access timber sales and subsequent silvicultural activities, roads constructed to access recreation areas, and a variety of other routes. These range from double lane paved roads to single lane gravel or native surface roads that may be useable by passenger cars, to high clearance routes, to travel ways that are closed for periods of time greater than one year. Funding for the construction or reconstruction of all types was generally provided either by congressional appropriations, or authorized as a component of a timber sale. Maintenance funding is primarily by congressional appropriations, although timber sales generally funds any maintenance required during the life of a particular sale operation.

Key Issues, Benefits, Problems and Risks, and Management Opportunities Identified

- Current appropriations and supplemental revenue sources are not sufficient to adequately maintain the Pisgah National Forest's 885 mile Road System as currently configured. Without changes, the existing road system would require an annual expenditure of approximately $3.4 million to maintain the system to Forest Service Standards. Only about $426,300 dollars are currently available, (FY12 road maintenance budget), resulting in a shortfall of about $3 million, or 88% of the total dollars needed.
- There is substantial system mileage which primarily serves either as access to private inholdings, or as general access to adjacent communities (approximately 240.25 miles, or 27% of the total). As opportunities allow, jurisdiction and maintenance costs should be considered for transfer to the most appropriate entity in order to allow the limited maintenance funding to be applied most effectively to the system roads of the Pisgah National Forest.
- Certain roads, particularly those located relatively low in the watersheds, may be causing undue stress to water quality and associated aquatic organisms, especially if they cannot be regularly and properly maintained. This is particularly the case in watersheds that are classified as "impaired." There are zero miles of forest roads located on impaired watersheds on the Pisgah National Forest. In some cases there appear to be opportunities to decrease the total system maintenance costs, while at the same time better protecting water quality by decommissioning those roads with the highest risk and least benefit. Approximately 64 miles have been identified by the TAP to be considered for decommissioning or long term storage.
- There are a number of roads that will most likely be needed at some time in the future, but which do not appear to be needed for actions currently being proposed. Storage of these roads (closure for at least a year, with only custodial maintenance

provided) should be strongly considered. The TAP analysis suggests that about 90.32 miles should be considered for conversion to storage and custodial maintenance only until needed.

- In order to meet budgetary limitations some roads currently opened year round will need to be identified to be considered for seasonal closure (50.24 miles); and some roads currently maintained for passenger car use will need to be identified to be considered for conversion to high clearance use only (29.28 miles).
- Relatively high road densities may be impacting some sensitive wildlife species in a few specific areas of the forest. Overall, however, road densities do not exceed those allowed by the forest plan. As configured the overall road density, exclusive of non-FS jurisdiction roads, is 1.11 miles/square mile, and the open road density is .53 miles per square mile.
- Several roads or portions of roads may have to be closed due to insufficient bridge replacement funding. There are 86 bridges and major culverts on the Forest, of which 53 appear to be load restricted or otherwise deficient
- Opportunities should be sought to increase road maintenance revenues where possible through the use of stewardship contracts and partnerships, including volunteer groups, such as hunters, equestrian organizations, ATV user groups and others.

Comparison of Existing System to Minimum Road System as Proposed by the TAP

Refer to Appendix F for a summary of proposed changes to the existing road system suggested by the TAP, as information available to frame future NEPA analysis and decisions.

Next Steps

- TAP recommendations will be used to inform NEPA decisions, many of which will eventually be implemented in conjunction with various restoration projects on the Forest.
- Prior to implementing these recommendations, NEPA determinations will be conducted at the appropriate scale, using the TAP to inform issues, particularly cumulative effects and affordability.
- The road system should be revisited with an updated forest-wide TAP, probably on about a 10 year cycle, with the next one due by perhaps the year 2025.

Context

Alignment with National and Regional Objectives

Sub-Part "A" Travel Analysis is required by the 2005 Travel Management Rule (36 CFR 212.5). Forest Service Manual 7712 and Forest Service Handbook 7709.55-Chapter 20 provide specific direction, including the requirement to use a six step interdisciplinary, science-based process to ensure that future decisions are based on an adequate consideration of environmental, social and economic impacts of roads. A letter from the Chief of the Forest Service dated March 29, 2012 was issued to replace a November 10, 2010 letter previously issued on the same topic. It reaffirms agency commitment to completing travel analysis reports for Subpart A of the travel management rule by 2015, and also provides additional national direction related to this work, addressing process, timing and leadership expectations. The letter requires documentation of the analysis by a travel analysis report, which includes a map displaying the existing road system and possible unneeded roads. It is intended to inform future proposed actions related to identifying the minimum road system. The TAP process is designed to work in conjunction with other frameworks and processes, the results of which collectively inform and frame future decisions executed under NEPA. This letter, including a diagram which further illustrates the relationship between NEPA and TAP is included in Appendix G.

The document entitled "Sub-Part "A" Travel Analysis (TAP), Southern Region Expectations, Revised to align with 2012 Chief's Letter" and attached in Appendix G, supplements the national direction for Forest Scale TAPs developed for the Southern Region.

Coordination with Forest Plan

The current Forest Plan for the Pisgah National Forest*'s* was adopted in 1994. It provides specific direction for overall management of the Pisgah National Forest. The Forest-wide TAP tiers to the Pisgah National Forest *s* Forest Plan by informing future NEPA actions that implement the Forest Plan and have transportation components. The TAP has been informed by the Watershed Condition Framework, and likewise, the TAP is intended to inform future forest restoration activities, including watershed restoration.

Budget and Political Realities

The roads located on the Pisgah National Forest are a combination of historic trails that have undergone improvement over the years, roads that were built in the decades of the sixties, seventies and eighties to access timber sales, roads constructed for access to communities, either internal or adjacent to the Forest, roads constructed by recreational users, and roads constructed or otherwise acquired through a variety of means to comprise the current system. As is the case for much of the rest of the infrastructure on the Forest, funding has been inadequate to properly maintain all of the Forest's roads and bridges. In some cases these roads and bridges have become superfluous to our administrative needs, and many no longer meet public needs either.

Changes are becoming inevitable, being driven both by the budget as well as by the need to have the most efficient and effective transportation system on the ground as possible, and no more. The TAP process is an attempt to begin to identify a proposed "minimum road system" (MRS) which will only come into place as NEPA decisions are made and then actual on-the-ground decisions are implemented. The MRS will probably change over time as well, as public needs and financial resources change. Therefore it is expected that new Forest-wide TAP analyses will continue to be needed, probably on about a 10 year cycle.

Anticipated 2012 Transportation Bill Effects (to be supplied later)

Alignment with Watershed Condition Framework (WCF)

Along with the other national forests across the country, Pisgah National Forest recently conducted an analysis of its watersheds, categorized them as to their condition and prioritized them for future efforts at improvement. Three categories were identified: Class 1 – Functioning Properly, Class 2 – Functioning at Risk, and Class 3 – Impaired Function. These classifications were performed on watersheds at the 6th order hydrologic unit classification (HUC) according to standard procedures described in the "Watershed Condition Framework" technical guide, found at http://www.fs.fed.us/publications/watershed/Watershed_Condition_Framework.pdf. It was determined that 2 watersheds on the Pisgah National Forest are Class 1, 28 are Class 2 and zero are Class 3. A map showing the location of these can be found in the Appendices. Armstrong Creek watershed was selected as a priority watershed for focus work in the next five to ten years. The priority watershed may also be found on the map in Appendix I.

The forest-wide TAP analysis was heavily informed by the WCF. For example, roads located near streams within impaired watersheds, and especially priority impaired watersheds, were particularly considered as possible decommissioning candidates. Similarly, continuing watershed improvement work is intended to be informed in the future by the TAP.

Overview of the Pisgah National Forest and the supporting Transportation System

General Description of the Pisgah National Forest Land Ownership Patterns, Land Use and Historic Travel Routes

The Pisgah National Forest is comprised of 512,670 acres, occupying almost 48% of the proclamation boundary. Almost all is forested, with about 152,580 acres (or 30 %) being Wilderness or otherwise classified as Roadless, and 360,090 acres (or 70 %) being available for active forest management. Interspersed within the proclamation boundary, and adjacent to the National Forest are several large tracts managed as TIMOs (Timber Investment Management Organizations) or REITs (Real Estate Investment Trusts) as well as some scattered large forest industry tracts, some small farms and a variety of other ownership types. There are a few small communities within the proclamation boundary as well, the larger ones being Hot Springs,

Bakersville, Elk Park and Roseboro. When the land came under the ownership of the Pisgah National Forest it was riddled with a legacy of historic travel routes that were primarily located low in the watersheds, alongside stream channels, presumably as these were the simplest locations on which to construct primitive travel ways. Over the past few decades the Pisgah National Forest has been slowly working towards relocating many of these roads up the slopes and away from the streams.

The lands of the Pisgah National Forest are administered by three ranger districts, Appalachian, Grandfather, and Pisgah Ranger Districts.

Table 1: Acres Administered by District

District	Acres	Portion that is Roadless
Appalachian	161,511	28,635
Grandfather	192,540	50,066
Pisgah	158,619	20,654
Totals	512,670	83,628

Table 2: Developed recreation areas on the Forest

Appalachian Ranger District	Grandfather Ranger District	Pisgah Ranger District
Black Mountain Campground	Boone Fork Campground	Davidson River Recreation Area
Carolina Hemlocks Campground	Curtis Creek Campground	Lake Powhatan Recreation Area
Harmon Den Horse Camp	Mortimer Campground	North Mills River
Rocky Bluff Campground		Sunburst Campground
Briar Bottom Group Camp		Cove Creek Campground
Silvermine Group Camp		Kuykendall Campground
Roan Mountain Recreation Area		Wash Creek
Murray Branch Picnic Area		White Pines
		Cradle of Forestry
		Sliding Rock

Dispersed recreation is allowed throughout the Pisgah National Forest with only limited exceptions. Also there are 944 miles of trails (APP 264, GRF 300, PIS 380), supporting a variety of uses, including OHVs, equestrian, biking, pedestrian, and mixed use. Motor vehicles are restricted to those roads shown on the official Motor Vehicle Use Map (MVUM) included in Section H, Appendix C.

Description of the Pisgah National Forest's Transportation System

Interstate Highways 40 and 26, several Federal and State highways, including the Blue Ridge Parkway, State Highways 267, 64, 19E, 19W, 321, and 25/70, and quite a number of roads under state jurisdiction traverse various parts of the Pisgah National Forest. Some of these roads comprise a portion of the 247.26 miles of Forest Highway, which provides access to relatively large tracts of the Forest. Forest Highways are roads maintained under another agency's jurisdiction, which on occasion receive reconstruction project funding through the Highway Trust Fund.

There are 885 total miles of National Forest system road under the jurisdiction of the Pisgah National Forest. This mileage is comprised of 345 miles suitable for passenger car use, 215 miles are open to the public all year and 76 miles are seasonally open, and 54 miles are closed to public use. 519 miles of road are only suitable for high clearance vehicular traffic, of which 19 miles are opened to the public all year and 23 miles are seasonally closed with 477 miles closed to public use. There are 64 miles on the system inventory that are closed for periods of time greater than one year, being in "storage" for future use when needed.

The Forest Service catalogs its roads in the official inventory, I-Web, by Maintenance Levels, loosely defined as follows:

- Maintenance Level 5 – Single or Double Lane Paved Roads w/ high degree of user comfort
- Maintenance Level 4 – Moderate User Comfort; primarily double lane aggregate roads with ditches
- Maintenance Level 3 – Lowest level maintained to accommodate passenger car traffic
- Maintenance Level 2 – Maintained primarily only to accommodate use by high clearance vehicles
- Maintenance Level 1 – Closed to all traffic for periods greater than one year.

Table 3 below shows the current break down of the Pisgah National Forest*'s* road system by maintenance level:

Table 3. Pisgah National Forest's road system mileage by Objective Maintenance Level.

	ML 5	ML 4	ML 3	ML 2	ML 1
Appalachian	6.9	8.3	8.1	181.6	7.4
Grandfather	19.4	8.9	92.9	171.0	9.2
Pisgah	21.0	25.1	62.8	168.6	3.8
Forest Totals	47.3	42.3	253.8	521.2	20.4

Private and Coop Roads

Certain roads located on the Pisgah National Forest are needed to provide access to private tracts of land, or by municipalities or large private landowners in cooperation with the Forest. The maintenance responsibility for and jurisdiction of these roads are identified in the official inventory. Generally costs for maintaining these roads are pro-rated to the appropriate benefitting entity, as specified in the enabling agreements.

Unauthorized Roads

At any given time there may be roads found to be in existence on the landscape that are not shown in the inventory or on an official map. These roads are considered to be unauthorized roads, unneeded for use by the Pisgah National Forest. They are subject to decommissioning at any time funding becomes available for that purpose.

Road Maintenance Funding

The Pisgah National Forest maintains its road system primarily with funding provided through the annual Interior and Related Agency's budget, specifically the CMRD line item. The Pisgah National Forest received $423,000 of this funding in fiscal year 2012. Roads that support forest management operations may be maintained with timber sale or stewardship dollars during the life of the operation, but that is not typically a long term solution. Finally, partners and user groups may provide some road maintenance support. In 2012 the Pisgah National Forest received $ 11,300 worth of partner and user support, either in cash or in on-the-ground value, related to the road system.

Cost of Operating and Maintaining the Pisgah National Forest's Roads and Bridges

Operations Costs

As indicated in the previous section, there is on an annual basis a total of approximately $426,300 available with which to operate and maintain the Pisgah National Forest*'s* road system. Of this, approximately 289,100, or 68% is required in order to cover fixed costs, including management salaries, rent, fleet, travel and training and cost pool contributions. This amount also covers items such as data management, contract preparation and administration and upward reporting. Regardless of the size of the road system being managed this base amount is required. This leaves only about $137,000 to go on the ground for actual maintenance of the road system, and it must cover replacement of deficient bridges as well.

Road Maintenance Costs

The primary components of road maintenance on the Pisgah National Forest include (in addition to inspections) 1) blading and ditching, 2) surfacing (repaving in the case of ML 5), 3)

signs and markings, 4) drainage structures, and 5) mowing and brushing. Table 4 displays typical unit costs for these items on the Pisgah National Forest*'s* road system by maintenance level:

Table 4. Typical Unit Costs (annual) for Road Maintenance components on the Pisgah National Forest.

	ML 5	ML 4	ML 3	ML 2	ML 1
Blading	$ 436	$ 641	$ 255	$ 24	N/A
Ditching	$ 156	$ 153	$ 137	$ 17	N/A
Culvert Cleaning	$ 1,000	$ 500	$ 446	N/A	N/A
Culvert Replacement	$ 531	$ 531	$ 531	$ 531	N/A
Gate Repair/Signs	$28	$ 4	$ 7	$20	$ 25
Gate Replacement	$ 119	$ 15	$ 30	$ 82	$ 102
Surfacing	$ 8,435	$ 5,000	$ 2,408	$ 55	N/A
Signs and Markings	$ 936	$ 534	$ 330	$ 165	N/A
Minor Damage Repairs	$ 194	$ 211	$ 276	N/A	N/A
Mowing and Brushing	$ 500	$ 500	$ 451	$ 333	$ 22
Totals	$ 12,500	$ 8,100	$ 4,900	$ 1,200	$ 150

Bridge Maintenance and Reconstruction Costs

The Pisgah National Forest has 86 bridges and major culverts. These have to be inspected every other year, at an average cost of about $ 500 per Bridge. At the present time 53 are either known or suspected to be load limited and need to be replaced because they are on roads intended to be left open to traffic. (Load limited bridges will be rated and posted in the interim until funding for replacement can be obtained). Typical bridge replacement costs for the Pisgah National Forest are about $ 6,000 per linear foot for a typical single lane bridge. These costs need to be added to the total road maintenance costs above to get a true picture of the total road and bridge maintenance costs for the next 10 years on the Pisgah National Forest.

Total Cost of Operating and Maintaining the Pisgah National Forest's Roads and Bridges to Standard

Combining the information from the previous sections results in the following table which shows the total annual cost to maintain the Pisgah National Forest's roads and bridges to standard as the system currently exists

Table 5: Cost to Maintain Roads and Bridges

Item	Number	Unit Cost	Total Cost
Fixed Cost to Operate	1 LS	$ 289,100	$ 289,100
Maintenance of Level 1 Roads	20.4 mi	$ 150	$ 3,000
Maintenance of Level 2 Roads	521.2 mi	$ 1,200	$ 625,500
Maintenance of Level 3 Roads	253.8 mi	$ 4,900	$ 1,243,500
Maintenance of Level 4 Roads	42.3 mi	$ 8,100	$ 342,500
Maintenance of Level 5 Roads	47.3 mi	$ 12,500	$ 591,000
Inspection of ½ of Bridges each Year	43 ea	$ 500	$ 21,500
Replacement of Deficient Bridges	1 LS	$ 223,500	$ 223,500
Total Annual Cost			$ 3,400,000

Note: Compare current available budget of 426,300 to the needed amount of $ 3.4 million.

Note: Appendix E in shows the cost of maintaining the "suggested" Optimum Road System" which balances costs and revenue.

Assessment of Issues, Benefits and Risks

Financial

The primary financial issues relate to the inability to adequately maintain the existing road system with current funding sources. As indicated previously, there is on an annual basis a total of only about $426,300 available with which to operate and maintain the system, whereas the needed funding for the system as currently configured is about $3.4 million. As a result, deferred maintenance continually accrues on the system, but more importantly, it is not possible to maintain Best Management Practices (BMPs) required to adequately protect water quality and associated aquatic life. Meanwhile, roads and bridges are becoming unsafe and are having to be closed, and as a result, the system is failing to meet the needs of both the recreating and

travelling public, and to provide for adequate resource access for forest management activities, including prescribed fire and fire suppression.

Environmental and Social

The primary issues in the environmental arena relate to 1) erosion of the roadbed, cut slopes, fill slopes and ditches, with the resulting sediment discharge affecting water quality and associated aquatic resources; 2) in some cases, road density effects on certain wildlife species, such as bear; and 3) the roads serving as a conduit for invasive species. In the social arena, the effects are primarily the demand for adequate access, sometimes offset by the need for providing solitude. Additionally, law enforcement faces challenges due to the high demand. Access is needed by a wide variety of forest users, including hikers, hunters, fishermen and other recreationists, as well as for forest management activities, such as restoration projects and fire suppression. Also, roads require surveillance, as they can easily become sites for crime, illegal dumping and similar activities.

Safety and Function

The primary issues related to safety and function of the Pisgah National Forest*'s* road system include 1) maintenance of a clear and smooth travel way, 2) access in the proximity of the use, 3) steep road grades, 4) functioning of the drainage features, 5) width and stability of the road bed, 6) proper signs and markings, 7) and structurally and functionally sufficient bridges.

Measurement and Rating

Benefits and Risks of the overall system were tabulated and appear in Appendix D. The standard list of questions in the Forest Service Handbook was used as a guide to further assist in identifying the benefits and risks. The degree of risk was rated subjectively as being high, medium or low for the system by appropriate specialists. Then, after considering the entire system, each road was also considered. Those with particular issues, benefits and/or risks different from those of the entire system were identified on the spreadsheet. As related projects become identified at some time in the future, this list may be referenced to inform projects or proposed changes in the Minimum Road System. Risk/Benefit Ratings decision matrix is shown below.

Table 6: Risk/Benefit Matrix

Risk / Benefit Ratings Decision Matrix				
	BENEFITS			
RISKS	**Scores**	**Low**	**Medium**	**High**
	High	(HL) Decommission, Mitigate 4th Priority	(HM) Admin Use Only Mitigate 3rd Priority	(HH) Maintain* and Mitigate - Highest Priority
	Medium	(ML) Close, Decommission Mitigate 7th Priority	(MM) Maintain* Mitigate 5th Priority	(MH) Mitigate and Maintain* - 2nd Priority
	Low	(LL) Close, Decommission, Admin Use Only	(LM) Maintain* Mitigate 8th Priority	(LH) Maintain* Mitigate 6th Priority

Recommendations and Proposed Mitigation Measures

Rationale Used to Arrive at Proposed Minimum Road System

The Chief's March 29, 2012 letter reaffirms that "the Agency expects to maintain an appropriately sized and environmentally sustainable road system that is responsive to ecological, economic, and social concerns. The national forest road system of the future must continue to provide needed access for recreation and resource management, as well as support watershed restoration and resource protection to sustain healthy ecosystems." Budget realities being what they are, roads which are not really needed cannot be supported in the future. Roads that primarily provide access to the public or to a local community need to be considered for transfer of maintenance responsibility, as appropriate. 27.3 Miles were identified that need to be considered in this category. Roads that appear to be unneeded, or which appear to have little benefit yet which are high risk to various environmental or social values were flagged for consideration as decommissioning or long term storage candidates. There are 64 miles in this category. Roads that did not appear to be currently needed for project access during the next decade, and which appear currently to be receiving extremely low use by the public or which appear to not be otherwise needed for management purposes such as fire suppression access were flagged to be considered for storage; there are 22.1 miles in this category. Some roads which are primarily needed only for administrative use, or by hunters and which are currently useable by passenger vehicles were recommended to be considered for conversion to the high clearance. About 29.28 miles were identified that should be considered in this category. Roads which are receiving the highest amount of use, especially by the motoring public, or which access major developed recreation areas, should probably not be downgraded in general.

Inclement weather has a particularly costly impact on native and gravel surfaced roads. Therefore, to the extent possible, roads should be identified for seasonal closure. The TAP recommends that a minimum of 90.32 miles that are currently opened year-round be identified and converted to seasonally closure.

Miles by ML Proposed as Unneeded, by Watershed Condition Class

There are no miles in the Armstrong Creek Watershed that are recommended for decommissioning.

Suggested Conversion of Existing Road System to Minimum Road System

Appendices F lists the existing road system miles by maintenance level, and then proposes changes which respond to the rationale above to comprise the future minimum road system. Although some roads have been suggested to comprise these changes, there are others which have not yet been identified. During the next decade the suggested changes in overall road system makeup should inform projects, and additional individual road change proposals will be identified, with the goal of achieving the proposed minimum road system, and associated financial sustainability as quickly as is practical.

Best Management Practices (BMPs) Applicable to the Pisgah National Forest

When maintaining the forest roads located on the Pisgah National Forest the following Best Management Practices should be adhered to as a minimum:

- National Best Management Practices for Water Quality Management on Forest System Lands

- Applicable State Best Management Practices

- Best Management Practices listed in the current Forest Plan.

- Completed Watershed Action Plans

Appendices

A. Map of Existing Road System
B. Map of Proposed Unneeded Roads
C. Motor Vehicle Use Map(s) MVUMs
D. Tabular Summary of Existing Road System Showing Benefits and Risks
E. Spreadsheets of Existing Road System and Suggested MRS showing Maintenance Costs
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G. Chief's Letter of Direction
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Appendix A – Map of the Existing Road System. This is an oversized document, therefore only the link is provided:

http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5443004.pdf

Appendix B – Map of the Unneeded Roads. This is also an oversized document, therefore only the link is provided:

Appendix C – Motor Vehicle Use Maps. This is also an oversized document, therefore only the link is provided:

http://www.fs.usda.gov/main/nfsnc/maps-pubs

Appendix D – Existing Road System Benefits and Risks

Recreation Benefit	
Information on the amount and types of recreation uses was developed at meetings with district personnel, other public agency representatives, members of the public, and from LRMP management area designation.	**HIGH (2):** Road accesses major developed recreation complex and/or a wide variety of high use dispersed recreation opportunities.
	MEDIUM (1): Road accesses minor developed recreation area(s) and/or a variety of moderately used dispersed recreation opportunities.
	LOW (0): Road accesses only minor dispersed recreation opportunities and/or non-motorized use is emphasized (MA 3, MA 4, or other special area MA), or the road's close proximity to Wilderness or other area with special characteristics is producing negative impacts.

Social Benefit	
Information on the amount and types of social uses was developed at meetings with district personnel, members of the public, and Eastern Band of Cherokee.	**HIGH (2):** There are long-standing traditional uses accessed by the road and/or the road is an important through road for local users.
	MEDIUM (1): There may be some traditional uses accessed by the road or the road offers some convenience to local travelers.
	LOW (0): There are few if any traditional uses accessed by the road and/or non-motorized use is emphasized (MA3, MA4, or other special area MA).

Resource Management Benefits	
To assign a value for resource management, an analysis was performed to establish how much access a road provides to resource management areas. The amount of access is not only that directly provided by the open road in question, but also from closed system roads that adjoin the open road in question. Roads were rated accordingly:	**HIGH (2):** More than 2.0 miles of road accesses land for resource management
	MEDIUM (1): More than 0.5 mile and less than 2.0 miles of road accesses land for resource management
	LOW (0): Less than 0.5 mile of road is accesses land for resource management

Fire Management Benefit
The two primary functions affected within Fire Management are Fuels Management and Fire Suppression. Values are assigned based on the topography, fire history and the relationship of that particular road or area to the area as a whole. The Fire Management Benefit score is the sum of Fuels Management Benefit and Fire Suppression Benefit scores, below, and ranges from 0 to 3.

Fuels Management Benefit	
Fuels Management consists of actively mitigating potential fire behavior by manipulating the fuels amount and arrangement in a given area.	**HIGH (2):** Due to other constraints the roadbed is the only access to areas planned for future treatment, or for accomplishment of treatments currently ongoing in the area.
	MEDIUM (1): Roadbed is necessary to provide cost effective access for fuels treatment projects, or provides a necessary addition to otherwise occurring human-caused or naturally occurring fuel breaks or barriers in decreasing fuel continuity.
	LOW (0): Road is not deemed necessary for the current fuels treatments planned or being considered. Fuel arrangement and/or availability are mitigated through other permanent human-caused or natural fuel breaks or barriers.

Fire Suppression Benefit	
Positive need for a road is established by the degree to which the road may allow for more safe and/or efficient fire suppression efforts within the area. Factors to consider include strategic location, navigable terrain, and having vistas of the surrounding environment.	**HIGH (2):** The road provides for a significant firebreak in areas requiring a permanent fuel break such as between forested areas and residential areas, or the road lessens the risk for firefighters and the public by providing necessary access and/or egress to areas having a high fire occurrence risk.
	MEDIUM (1): The road, in conjunction with time-of-need improvements or other local topographical features provides for a useable fire line or fire break, or provides some degree of usable access to otherwise inaccessible areas.
	LOW (0): Fire suppression activities are not directed or affected by the presence of the road. Equally the roads may or may not be used for suppression forces or tactics

Traffic Volume Benefit	
Traffic volume brings both value and risk to a road. On the risk side, high traffic volumes are associated with more risk to public safety and wildlife. On the value side, traffic volume is considered as a surrogate for need. A road with high traffic volume is a road that serves some purpose in the lives of many people. However, even a low volume road may provide a critical need for certain individuals.	**HIGH (2):**
	MEDIUM (1):
	LOW (0):

Other Unique Benefits
This category considers other unique benefits provided by the road, which are not described by other categories. This score can range from 0 to 2. Most roads should have a zero in this category.

Aquatic Biota Vulnerability Risk	
Aquatic biota vulnerability is a indicator that factors are associated with this road that mandate extra care be used when considering road-related actions such as maintenance, reconstruction, or changing the level or type of use. In determining the vulnerability rating, the following factors were used: percent of road paralleling stream; number of stream crossings; presence of trout (management indicator species); presence of brook trout.	**HIGH (2):**
	MEDIUM (1):
	LOW (0):

Risk to Rare Species and Habitats	
A GIS analysis was performed to determine roads within 200 feet of any element occurrence of a threatened, endangered, or sensitive species; within 200 feet of a special habitat such as bogs and rock outcrops; or within 200 feet of designated old growth.	**HIGH (2):** More than one element occurrence of a T&E species, or one T&E element occurrence and at least one other factor
	MEDIUM (1): One element occurrence of a threatened or endangered (T&E) species or one or more other factors are present.
	LOW (0): None of the above factors occurs within 200 feet of the road

Risk to Wildlife	
The factors used to assign wildlife-associated risks to roads included: extremely excessive open road density in a management area "4;" poaching is known to have occurred; proximity to bear sanctuary; and high traffic volume.	**HIGH (2):** More than two of the above risk factors are present.
	MEDIUM (1): One or two of the above risk factors is present.
	LOW (0): None of the above risk factors is present.

Wildfire Suppression Risk	
The risks are associated with providing a road that is an apparent tool, which upon further inspection increases the overall hazards of the suppression efforts. A road would be valued negatively overall if it seemingly provides access only to effectively draw a crew into an entrapment	**HIGH (2):** The roadbed is not maintained to support larger, heavier equipment. The road dead-ends with limited or no options to turn equipment around. Limited sight distance. Switchbacks are sharp, steep or routinely rutted/rained out. The roadbed follows along or crosses into the bottom of a drainage. The road ownership patterns make it hard to predict obstacles or hazards

situation. The current use of crews from out of the local area and the availability of aircraft for both reconnaissance and suppression were factors in determining the risk rating of some of the roads.	**MEDIUM (1):** The road doesn't enhance the safety of firefighters or the public. The roadbed and or the surrounding fuels are not situated or maintained to provide a safety zone more effectively than naturally occurring openings in the area. The road has limited access/egress opportunities.
	LOW (0): The road and turnouts are adequate for controlled moderate to heavy traffic and the roadbed including switchbacks are maintained to provide safe passage of larger or heavier fire suppression equipment. Sight distances are adequate. The road has multiple access points.

Heritage Resources Risk	
A GIS analysis was performed to determine roads within 200 feet of any known archeological sites or areas. In addition, the Forest archeologist and Eastern Band of Cherokee Indians provided additional information	**HIGH (2):** Four or more sites per mile of road
	MEDIUM (1): Two or three sites per mile of road
	LOW (0): Less than two known sites per mile of road

Risk to Public Safety	
Public safety is a critical factor in managing the transportation system. The following factors were considered in assigning a public safety risk to each road: presence of pedestrian traffic; amount of vehicular traffic; amount of year road is open; condition of road; excessive speed identified as issue; other identified law enforcement issue; other identified safety issue.	**VERY HIGH (3):**
	HIGH (2):
	MEDIUM (1):
	LOW (0):

Maintenance Cost Risk	
The shortfall in maintenance dollars is one reason the Roads Analysis Process regulations were passed. Because funding is not adequate for identified needs, those roads with higher total road maintenance needs, including annual and deferred, are a higher risk for health and safety and resource damage. A risk factor is assigned to each road based on the total cost of maintenance per mile. Table V-12 displays a summary of the results.	**VERY HIGH (3):** > $50,000 per mile
	HIGH (2): $25,000 - $49,999 per mile
	MEDIUM (1): $7,500 - $24,999 per mile
	LOW (0): <$7,500 per mile

Appendix E – Spreadsheets of Existing Road System and Suggested MRS showing Maintenance Costs

Annual Cost of Maintaining the Pisgah National Forest's Roads and Bridges*

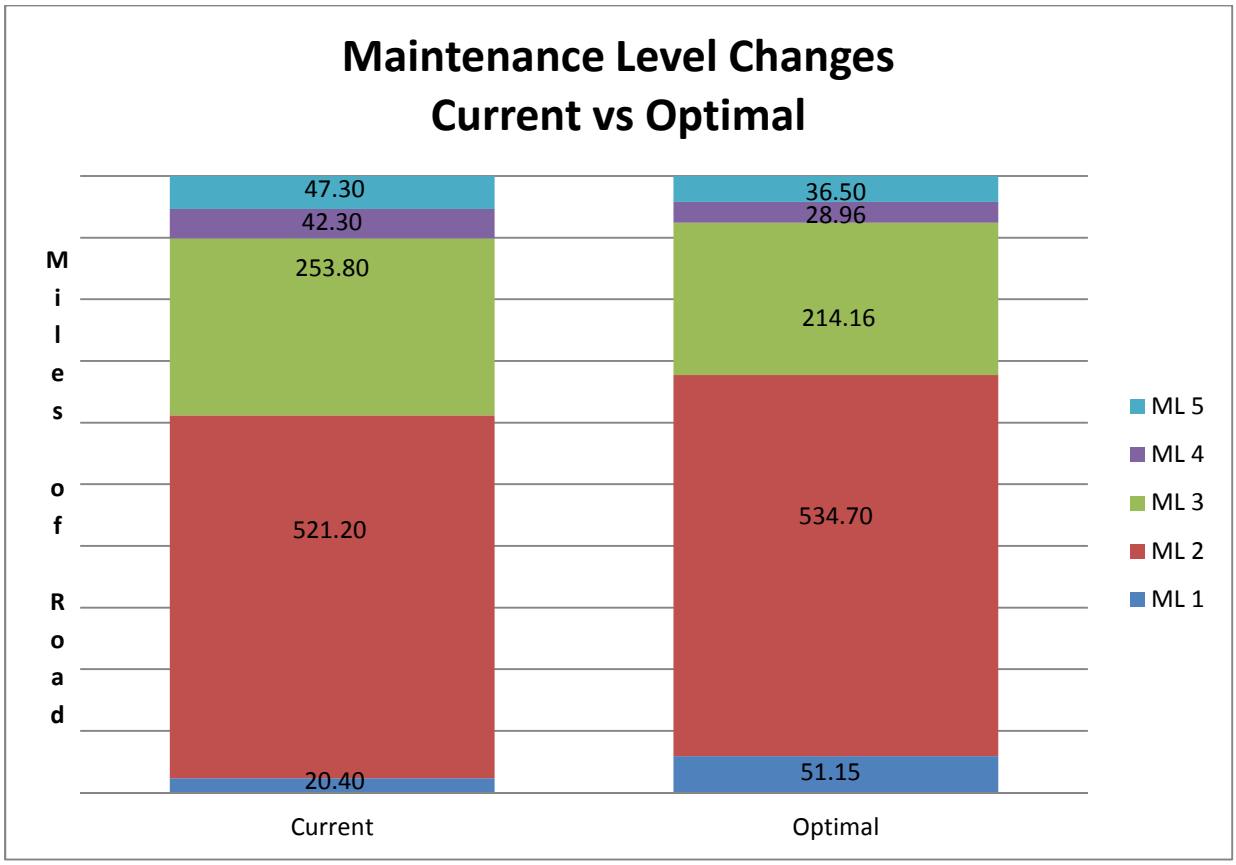
Item/Objective Maintenance Level	Number/Miles by Objective Maintenance Level	Unit Maintenance Cost	Total Annual Road Maintenance Cost
Fixed Cost to Operate	1 LS	$ 289,100	$ 289,100
Maintenance of Level 1 Roads	20.4 mi	$ 150	$ 3,000
Maintenance of Level 2 Roads	521.2 mi	$ 1,200	$ 625,500
Maintenance of Level 3 Roads	253.8 mi	$ 4,900	$ 1,243,500
Maintenance of Level 4 Roads	42.3 mi	$ 8,100	$ 342,500
Maintenance of Level 5 Roads	47.3 mi	$ 12,500	$ 591,000
Inspection of ½ of Bridges each Year	43 ea	$ 500	$ 21,500
Replacement of Deficient Bridges	1 LS	$ 223,500	$ 223,500
Total Annual Cost			$ 3,400,000

*Bridge replacement costs included as annualized amount

Annual Cost of Maintaining the Pisgah National Forest's Roads and Bridges suggested future road system

Item/Objective Maintenance Level	Number/Miles by Objective Maintenance Level	Unit Maintenance Cost	Total Annual Road Maintenance Cost
Fixed Cost to Operate	1 LS	$ 289,100	$ 289,100
Maintenance of Level 1 Roads	20.4 mi	$ 150	$ 3,000
Maintenance of Level 2 Roads	521.2 mi	$ 1,200	$ 625,500
Maintenance of Level 3 Roads	253.8 mi	$ 4,900	$ 1,243,500
Maintenance of Level 4 Roads	42.3 mi	$ 8,100	$ 342,500
Maintenance of Level 5 Roads	26 mi	$ 12,500	$ 591,000
Inspection of ½ of Bridges each Year	43 ea	$ 500	$ 21,500
Replacement of Deficient Bridges	1 LS	$ 223,500	$ 223,500
Total Annual Cost			$ 3,400,000

Appendix F – Comparison of Existing and Suggested Optimal Road System Miles by Maintenance Level



Maintenance Level	Current	Optimal
Maintenance Level 1	20.40	51.15
Maintenance Level 2	521.20	534.70
Maintenance Level 3	253.80	214.16
Maintenance Level 4	42.30	28.96
Maintenance Level 5	47.30	36.50
	885.00	865.47

Appendix G – Chief's Letter of Direction

File Code: 2300/2500/7700 **Date:** March 29, 2012
Route To:

Subject: Travel Management, Implementation of 36 CFR, Part 202, Subpart A (36 CFR 212.5(b))

To: Regional Foresters, Station Directors, Area Director, IITF Director, Deputy Chiefs and WO Directors

This letter is to reaffirm agency commitment to completing a travel analysis report for Subpart A of the travel management rule by 2015 and update and clarify Agency guidance. This letter replaces the November 10, 2010, letter on the same topic.

The Agency expects to maintain an appropriately sized and environmentally sustainable road system that is responsive to ecological, economic, and social concerns. The national forest road system of the future must continue to provide needed access for recreation and resource management, as well as support watershed restoration and resource protection to sustain healthy ecosystems.

Forest Service regulations at 36 CFR 212.5(b)(1) require the Forest Service to identify the minimum road system needed for safe and efficient travel and for administration, utilization, and protection of National Forest System (NFS) lands. In determining the minimum road system, the responsible official must incorporate a science-based roads analysis at the appropriate scale. Forest Service regulations at 36 CFR 212.5(b)(2) require the Forest Service to identify NFS roads that are no longer needed to meet forest resource management objectives.

Process

Travel analysis requires a process that is dynamic, interdisciplinary, and integrated with all resource areas. With this letter, I am directing the use of the travel analysis process (TAP) described in Forest Service Manual 7712 and Forest Service Handbook (FSH) 7709.55, Chapter 20. The TAP is a science-based process that will inform future travel management decisions. Travel analysis serves as the basis for developing proposed actions, but does not result in decisions. Therefore, travel analysis does not trigger the National Environmental Policy Act (NEPA). The completion of the TAP is an important first step towards the development of the future minimum road system (MRS). All NFS roads, maintenance levels 1-5, must be included in the analysis.

For units that have previously conducted their travel or roads analysis process (RAP), the appropriate line officer should review the prior report to assess the adequacy and the relevance of their analysis as it complies with Subpart A. This analysis will help determine the appropriate scope and scale for any new analysis and can build on previous work. A RAP completed in accordance with publication FS-643, "Roads Analysis: Informing Decisions about Managing the National Forest Transportation System," will also satisfy the roads analysis requirement of Subpart A.

Results from the TAP must be documented in a **travel analysis report**, which shall include:

- A map displaying the roads that can be used to inform the proposed action for identifying the MRS and unneeded roads.
- Information about the analysis as it relates to the criteria found in 36 CFR 212.5(b)(1).

Units should seek to integrate the steps contained in the Watershed Condition Framework (WCF) with the six TAP steps contained in FSH 7709.55, Chapter 20, to eliminate redundancy and ensure an iterative and adaptive approach for both processes. We expect the WCF process and the TAP will complement each other. The intent is for each process to inform the other so that they can be integrated and updated with new information or where conditions change. The travel analysis report described above must be completed by the end of FY 2015.

The next step in identification of the MRS is to use the travel analysis report to develop proposed actions to identify the MRS. These proposed actions generally should be developed at the scale of a 6th code sub watershed or larger. Proposed actions and alternatives are subject to environmental analysis under NEPA. Travel analysis should be used to inform the environmental analysis.

The administrative unit must analyze the proposed action and alternatives in terms of whether, per 36 CFR 212.5(b)(1), the resulting road system is needed to:

- Meet resource and other management objectives adopted in the relevant land and resource management plan;
- Meet applicable statutory and regulatory requirements;
- Reflect long-term funding expectations;
- Ensure that the identified system minimizes adverse environmental impacts associated with road construction, reconstruction, decommissioning, and maintenance.

The resulting decision identifies the MRS and unneeded roads for each sub watershed or larger scale. The NEPA analysis for each sub watershed must consider adjacent sub watersheds for connected actions and cumulative effects. The MRS for the administrative unit is complete when the MRS for each sub watershed has been identified, thus satisfying Subpart A. To the extent that the sub watershed NEPA analysis covers specific road decisions, no further NEPA analysis will be needed. To the extent that further smaller-scale, project-specific decisions are needed, more NEPA analysis may be required.

A flowchart displaying the process for identification of the MRS is enclosed with this letter.

Timing

The travel analysis report **must be completed by the end of FY 2015**. Beyond FY 2015, no Capital Improvement and Maintenance (CMCM) funds may be expended on NFS roads (maintenance levels 1-5) that have not been included in a TAP or RAP.

Leadership

The Washington Office lead for Subpart A is Anne Zimmermann, Director of Watershed, Fish, Wildlife, Air and Rare Plants. Working with her on the Washington Office Steering Team are Jim Bedwell, Director of Recreation, Heritage, and Volunteer Resources, and Emilee Blount, Director of Engineering. I expect the Regions to continue with the similar leadership structures which have been established.

Your leadership and commitment to this component of the travel management rule is important. Together, we will move towards an ecologic, economic, and socially sustainable and responsible national road system of the future.

/s/ James M. Pena (for):
LESLIE A. C. WELDON

Deputy Chief, National Forest System

Appendix H: Southern Region Expectations

Southern Region Expectations
Revised to align with 2012 Chief's Letter

A. Background. During the period 2005 - 2010 the National Forests of the Southern Region successfully completed Sub-Part "B" (Designation of Roads, Trails and Areas for Motor Vehicle Use) Travel Analysis. The result was a set of Motor Vehicle Use Maps (MVUMs) which prescribe the Forest Service roads that allow traffic; and in doing so it also prohibited cross-country travel by off-highway vehicles (OHVs). Forests are now beginning work on Sub-Part "A" (Administration of the Forest Transportation System) Travel Analysis to identify the minimum road system needed for safe and efficient travel and for the protection, management and use of NFS lands; and also to identify roads no longer needed to meet forest resource management objectives.

TAP analysis identifies risks and benefits of individual roads in the system, but especially cumulative effects and affordability of the entire system. Consideration is given to the access needed to support existing Forest Plans, and for informing future Forest Plans and resulting projects. TAP is intended to identify opportunities to assist managers in addressing the unique ecological, economic and social conditions on the national forests and grasslands.
B. Agency Direction. Sub-Part "A" Travel Analysis is required by the 2005 Travel Management Rule (36 CFR 212.5). Forest Service Manual 7712 and Forest Service Handbook 7709.55 Chapter 20 provides specific direction, including the requirement to use a six step interdisciplinary, science-based process to ensure that future decisions are based on an adequate consideration of environmental, social and economic impacts of roads. A letter from the Chief of the Forest Service dated March 29, 2012 was issued to replace a November 10, 2010 letter previously issued on the same topic. It reaffirms agency commitment to completing travel analysis reports for Subpart A of the travel management rule by 2015, and also provides additional national direction related to this work, addressing process, timing and leadership expectations. The letter requires documentation of the analysis by a travel analysis report, which includes a map displaying the existing road system and possible unneeded roads. It is intended to inform future proposed actions related to identifying the minimum road system. The TAP process is designed to work in conjunction with other frameworks and processes, the results of which collectively inform and frame future decisions executed under NEPA. These other analyses and procedures include Watershed Analysis Framework and mapping; Recreational Framework planning and analyses; and forest-wide planning under the new Planning Rule. This document (Southern Region Expectations) supplements the national direction for Sub-Part "A" TAPs developed for the Southern Region.

C. Geographic Scale. Like smaller scale road analyses (RAPS) that have been underway at the project level, TAPs consider economic, environmental and social effects of roads. Analysis at the smaller project scale, however, does not adequately address cumulative effects and affordability. The Chief's letter requires that proposed NEPA actions be informed by work at the 6th order HUC watershed as a minimum. Southern Region Expectations are for a Unit TAP at the District level or equivalent; and since budgets are generally allocated to the Forest level, District analyses are not considered complete until all other Districts on the same Forest are also complete and

have been integrated to create a Forest Scale TAP. As projects which involve travel (road) decisions are subsequently proposed on a unit, additional project level analysis will be required in advance of associated NEPA decisions only if the proposal varies substantially from the Unit Scale TAP covered by it. The purpose would be to show any additional impact on cumulative effects and affordability.

D. Process, Review and Approval. Forests Interdisciplinary Teams (IDTs) are expected to conduct analyses, with guidance and review by the Regional Office TAP Review Team (members listed below). Standard boilerplate, spreadsheets and Executive Summary format will be developed by the Review team for incorporation into the TAP reports. Final review will be by the Forest Supervisor, indicating that the analyses comply with national and regional direction. Upon completion of the last District TAP on a Forest, the Forest Supervisor needs to submit a forest-wide Executive Summary and verify that the cumulative results meet the expectations defined in this guidance.

The Regional TAP Review Team consists of Team Leader Paul Morgan (Engineering), Emanuel Hudson (Biological and Physical Resources), Mary Hughes Frye (Recreation), Paul Arndt (Planning) and various other ad hoc members as needed. They will submit their review comments to the TAP Steering Team prior to officially conveying them to the Forest. The Steering Team will be responsible for overall direction and oversight of the process. This team consists of Randy Warbington, TAP Steering Team Lead and Director of Engineering, Dave Schmid, Director of Biological and Physical Resources, Chris Liggett, Director of Planning, and Ann Christensen, Director of Recreation as well as George Bain, Forest Supervisor on the Chattahoochee Oconee NF's and Steve Bekkerus, Regional Legislative Affairs Specialist.
E. Information Systems. Analysis will be based upon field-verified spatial data (GIS, or Geographic Information System road and trail layers), and official tabular data (from I-Web, the corporate Forest Service data base) as applicable. ARC Map products will be included as a part of all completed Unit Scale TAPs, and will be provided to the Regional Office TAP review team as a part of the final TAP report.

F. **Access.** As prescribed by 16USC532 the Forest Roads and Trails Act TAPs should identify an adequate system of roads and trails to provide for intensive use, protection, development, and management of National Forest System lands. As such, they should address user safety and environmental impacts, and provide for an optimum balance of access needs and cost. Roads, trails and bridges that are unsafe and where unacceptable risks cannot be eliminated or mitigated due to a lack of funding should be identified for closure or possible decommissioning. Unneeded, temporary and unauthorized routes should be identified for possible decommissioning. TAPs should support current Forest Plan direction and anticipate future Forest Plan analysis needs, as well as Recreational Framework planning and analyses. As unit scale TAPs are completed, associated MVUMs must be reviewed. After appropriate NEPA decisions are made to implement TAP recommendations, future MVUM revisions need to be revised to assure that they are in agreement with those decisions.

G. **Environmental.** One major analysis component of the TAPs is impact of the road system on water quality. In those cases where high road densities on National Forest lands are a major factor in causing watersheds to be at risk or impaired, some roads should be identified for

decommissioning in order to reduce the impacts and change the classification. Also, it should be recognized that some existing roads are poorly located and should be eliminated, while some new roads might be needed to replace them and provide essentially equivalent access in better locations, generally farther away from live streams or wetlands. The Watershed Condition Framework should inform each unit's travel analysis. An overriding objective for all roads should be compliance with provisions cited in National Best Management Practices for Water Quality Management on National Forest System Lands, April 2012. While a reduction in maintenance levels may be a desired option for cost reduction, it is not an appropriate strategy when it results in more environmental impacts. Similarly, changes in recreational use should be considered, especially for roads that cannot be maintained to standard and which may begin to attract challenge-oriented four-wheelers that create even further impacts on the environment and on the road.

H. **Financial.** Units should consider all expected sources of funding available to maintain the road system to appropriate standards (based upon 3 year history and current trends), and include all costs that are required to comply with applicable Best Management Practices (BMPs) for their maintenance. Include associated bridge maintenance as well, and replacement costs for those routes which include bridges that are deficient or expected to need major work in the next ten year period. Identify and account for fixed costs (program management, fleet, etc.) when analyzing financial feasibility. Ultimately units must balance the costs of maintaining the identified system such that the recommendation will not result in accrual of deferred maintenance on roads and bridges once the TAP is implemented (i.e. there should be a zero balance between anticipated maintenance revenue and anticipated maintenance cost on an annual basis).

The focus of this analysis should not be primarily on disinvestment, i.e. just reducing passenger car roads to high clearance roads in order to meet funding constraints. Roads receiving minimal maintenance have the high likelihood, at least those roads located relatively low in the watershed, of creating additional siltation impacts. They can also have unintended consequences for recreation management. Therefore a better strategy might be to identify roads not required for current operations but which might be needed at some time in the future for seasonal or intermittent closure, or "storage". Other strategies might include scheduling maintenance over a two to three year cycle on less used roads, adding seasonal restrictions, identifying roads to transfer to state or local jurisdiction, and identifying unneeded roads for possible decommissioning. Total mileage of high clearance roads should not generally increase over the amount in the current system unless it is determined that there has been substantial maintenance level "creep" over the years and therefore a substantial increase in high clearance roads is warranted. However it is expected that the number of roads identified to be placed in storage will generally increase from the current level. Finally it should be noted that similar to the road system, the trail system is also over-committed to be managed within its maintenance budget. Therefore, unless maintenance funding is verified to be available over the long-term, it is not acceptable to identify roads for conversion to trails; the more appropriate options would be storage or decommissioning, depending upon future need.

I. Public Involvement and NEPA (National Environmental Protection Act) Requirements. Unit scale TAPs are not NEPA decisions; they are analyses intended to inform future projects

regarding affordability and cumulative effects. These projects, depending upon the specific impacts, will generally require NEPA decisions prior to implementation. The public will need to be provided opportunities for comment on TAP recommendations near to the time that those actual projects are being proposed. This would be expected to include a broad spectrum of participation by citizens, other agencies, and tribal governments as appropriate.

J. Products. All final products to be posted on an internal website or on the "O" drive available for access by other Forests and the Regional Office. The final product should consist of the following items:

1) A Travel Analysis Report summarizing the process the results of all analyses conducted.

2) A map showing the entire Road System, ML 1-5, and delineating potential unneeded roads.

3) A list of roads that are proposed for transfer to another jurisdiction and whether acceptance by that jurisdiction is likely within the next three years.

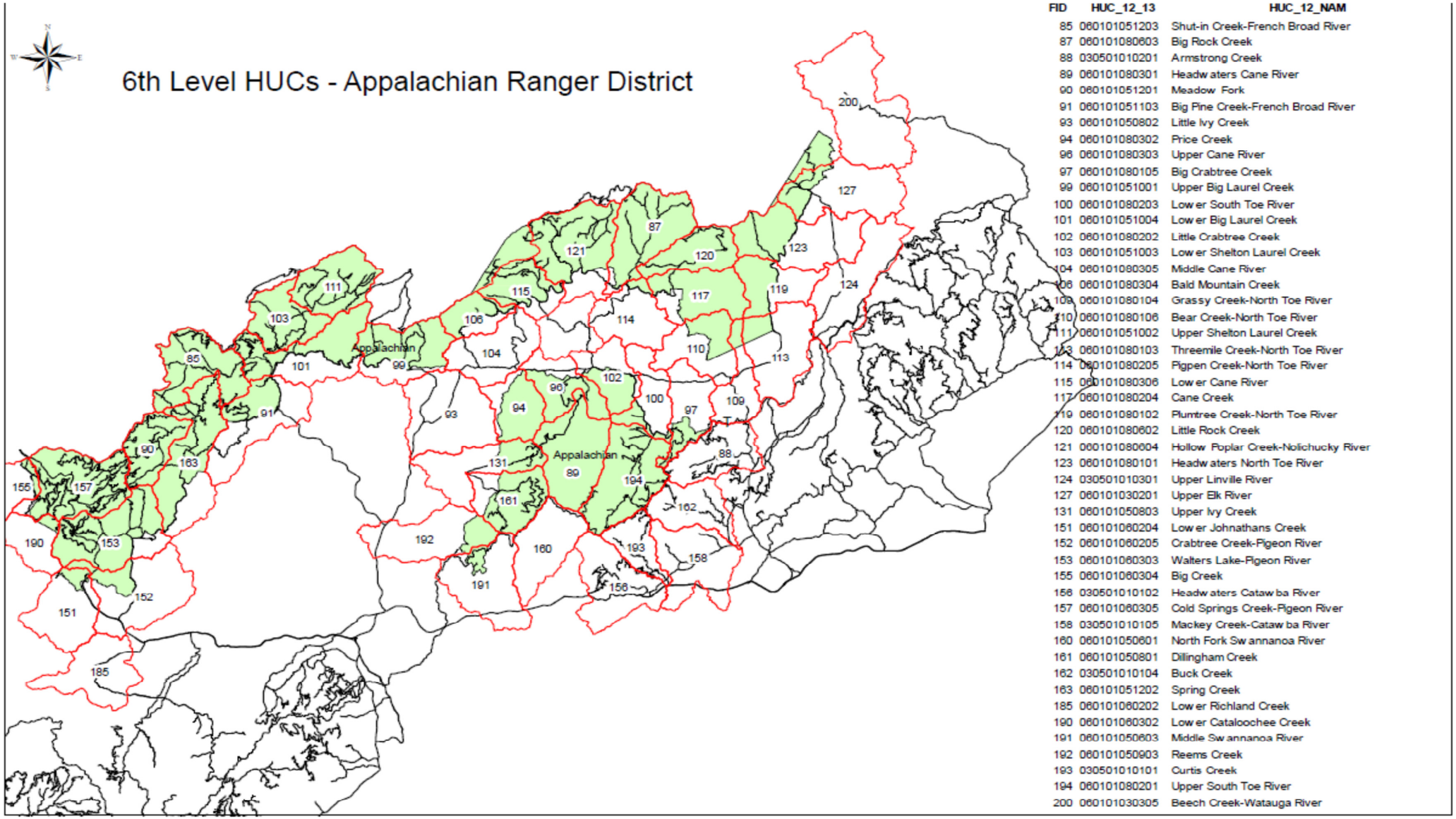
4) A tabular summary of issues, benefits and risks for each road in the system. (Although not included in this write-up an example format is available and will be provided to each unit as they begin work on their TAP.)

5) A spreadsheet identifying available maintenance funding and expected costs for applying affordable operational maintenance levels and associated BMPs (best management practices) to the road system to result in a financial strategy that balances funding and costs such that no deferred maintenance will accrue if fully implemented.

6) Signature sheets with dates, indicating preparation and review officials, and Review by the Forest Supervisor.

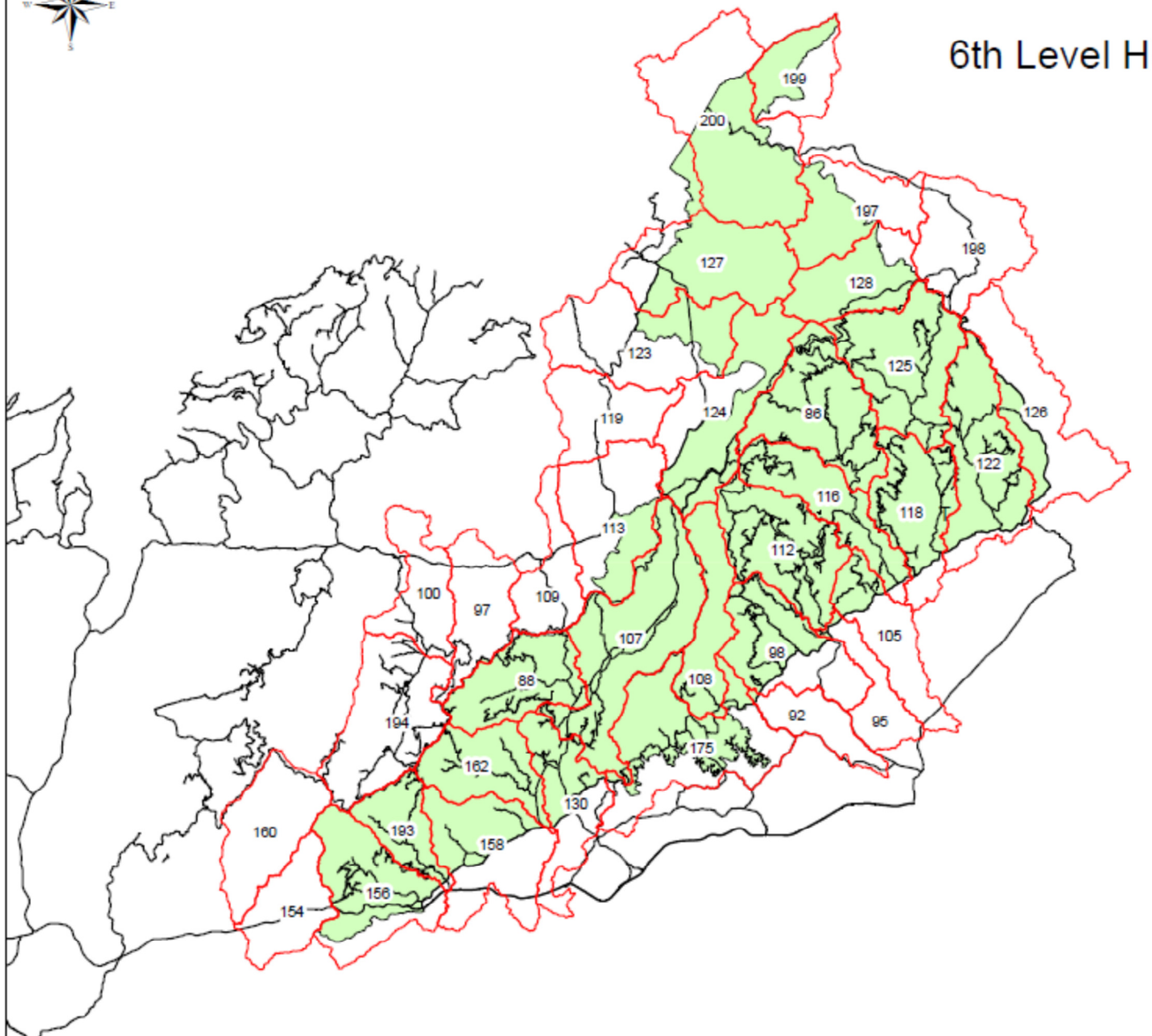
K. Schedule and Completion Date.
The chief's letter directs that all units be covered by a TAP by the end of FY 2015. The proposed schedule is as follows:
Croatan NF, NFs in North Carolina – FY11
Pisgah NF in NC – FY12
Nantahala NF in NC – FY13
Uwharrie RD, NFs in NC – FY14

Appendix I: 6th Level HUCs Watershed Condition Classification and Priority Watersheds on the Forest

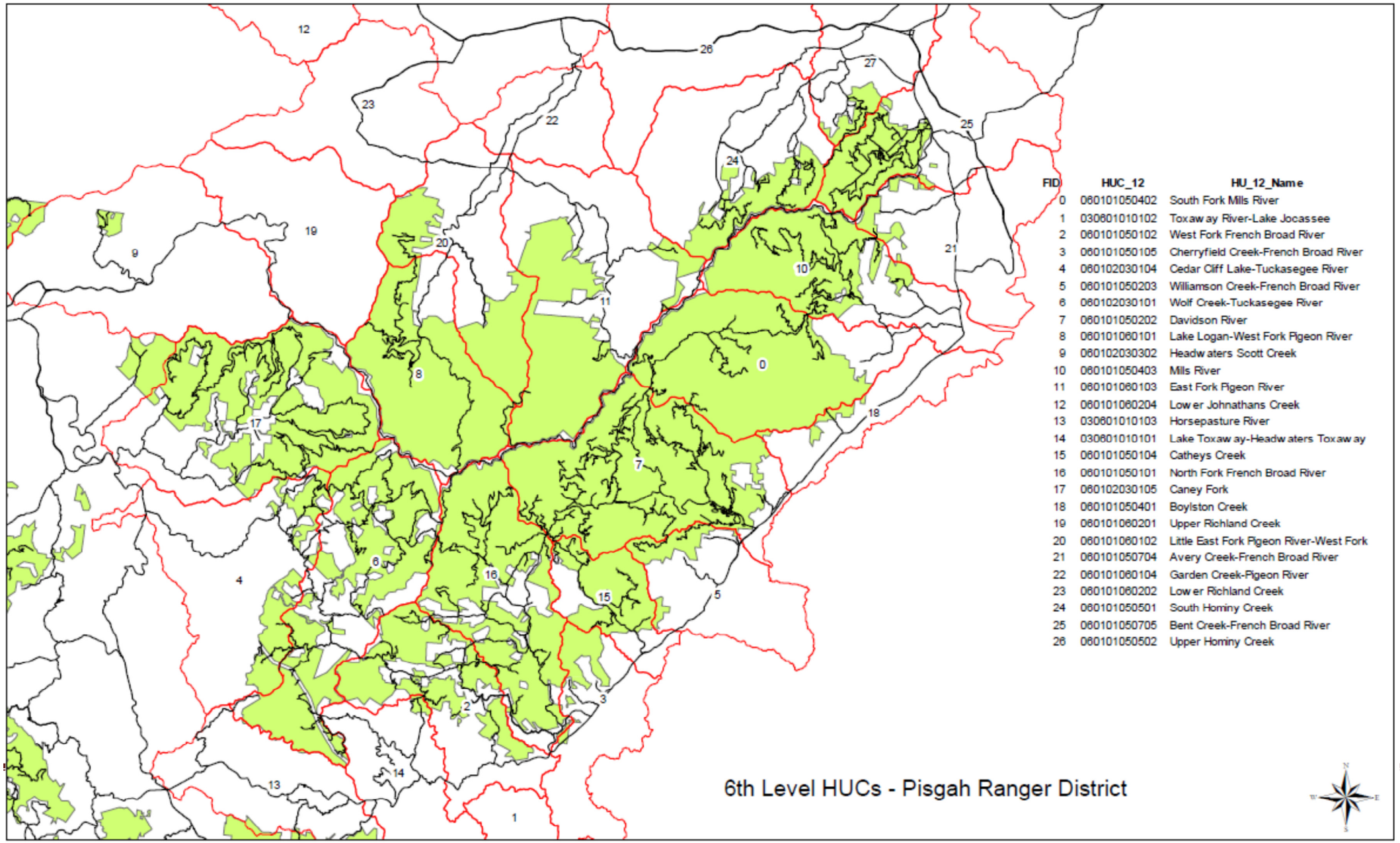


FID	HUC_12_13	HUC_12_NAM
85	060101051203	Shut-in Creek-French Broad River
87	060101080603	Big Rock Creek
88	030501010201	Armstrong Creek
89	060101080301	Headwaters Cane River
90	060101051201	Meadow Fork
91	060101051103	Big Pine Creek-French Broad River
93	060101050802	Little Ivy Creek
94	060101080302	Price Creek
96	060101080303	Upper Cane River
97	060101080105	Big Crabtree Creek
99	060101051001	Upper Big Laurel Creek
100	060101080203	Lower South Toe River
101	060101051004	Lower Big Laurel Creek
102	060101080202	Little Crabtree Creek
103	060101051003	Lower Shelton Laurel Creek
104	060101080305	Middle Cane River
106	060101080304	Bald Mountain Creek
108	060101080104	Grassy Creek-North Toe River
110	060101080106	Bear Creek-North Toe River
111	060101051002	Upper Shelton Laurel Creek
113	060101080103	Threemile Creek-North Toe River
114	060101080205	Pigpen Creek-North Toe River
115	060101080306	Lower Cane River
117	060101080204	Cane Creek
119	060101080102	Plumtree Creek-North Toe River
120	060101080602	Little Rock Creek
121	060101080604	Hollow Poplar Creek-Nolichucky River
123	060101080101	Headwaters North Toe River
124	030501010301	Upper Linville River
127	060101030201	Upper Elk River
131	060101050803	Upper Ivy Creek
151	060101060204	Lower Johnathans Creek
152	060101060205	Crabtree Creek-Pigeon River
153	060101060303	Walters Lake-Pigeon River
155	060101060304	Big Creek
156	030501010102	Headwaters Catawba River
157	060101060305	Cold Springs Creek-Pigeon River
158	030501010105	Mackey Creek-Catawba River
160	060101050601	North Fork Swannanoa River
161	060101050801	Dillingham Creek
162	030501010104	Buck Creek
163	060101051202	Spring Creek
185	060101060202	Lower Richland Creek
190	060101060302	Lower Cataloochee Creek
191	060101050603	Middle Swannanoa River
192	060101050903	Reems Creek
193	030501010101	Curtis Creek
194	060101080201	Upper South Toe River
200	060101030305	Beech Creek-Watauga River

6th Level HUCs - Grandfather Ranger District



FID	HUC_12	HU_12_Name
86	030501010502	Upper Wilson Creek
88	030501010201	Armstrong Creek
92	030501010605	Canoe Creek
95	030501010403	Lower Warrior Fork
97	060101080105	Big Crabtree Creek
98	030501010402	Irish Creek
100	060101080203	Lower South Toe River
105	030501010506	Lower Johns River
107	030501010202	North Fork Catawba River
108	030501010302	Lower Linville River
109	060101080104	Grassy Creek-North Toe River
112	030501010401	Upper Warrior Fork
113	060101080103	Threemile Creek-North Toe River
116	030501010504	Lower Wilson Creek
118	030501010505	Middle Johns River
119	060101080102	Plumtree Creek-North Toe River
122	030501010503	Mulberry Creek
123	060101080101	Headwaters North Toe River
124	030501010301	Upper Linville River
125	030501010501	Upper Johns River
126	030401010102	Headwaters Yadkin River
127	060101030201	Upper Elk River
128	060101030301	Headwaters Watauga River
130	030501010106	Toms Creek-Catawba River
154	060101050602	Upper Swannanoa River
156	030501010102	Headwaters Catawba River
158	030501010105	Mackey Creek-Catawba River
160	060101050601	North Fork Swannanoa River
162	030501010104	Buck Creek
175	030501010303	Lake James-Catawba River
193	030501010101	Curtis Creek
194	060101080201	Upper South Toe River
197	060101030303	Dutch Creek-Watauga River
198	050500010201	Headwaters South Fork New River
199	060101030304	Beaverdam Creek
200	060101030305	Beech Creek-Watauga River



FID	HUC_12	HU_12_Name
0	060101050402	South Fork Mills River
1	030601010102	Toxaway River-Lake Jocassee
2	060101050102	West Fork French Broad River
3	060101050105	Cherryfield Creek-French Broad River
4	060102030104	Cedar Cliff Lake-Tuckasegee River
5	060101050203	Williamson Creek-French Broad River
6	060102030101	Wolf Creek-Tuckasegee River
7	060101050202	Davidson River
8	060101060101	Lake Logan-West Fork Pigeon River
9	060102030302	Headwaters Scott Creek
10	060101050403	Mills River
11	060101060103	East Fork Pigeon River
12	060101060204	Lower Johnathans Creek
13	030601010103	Horsepasture River
14	030601010101	Lake Toxaway-Headwaters Toxaway
15	060101050104	Catheys Creek
16	060101050101	North Fork French Broad River
17	060102030105	Caney Fork
18	060101050401	Boylston Creek
19	060101060201	Upper Richland Creek
20	060101060102	Little East Fork Pigeon River-West Fork
21	060101050704	Avery Creek-French Broad River
22	060101060104	Garden Creek-Pigeon River
23	060101060202	Lower Richland Creek
24	060101050501	South Hominy Creek
25	060101050705	Bent Creek-French Broad River
26	060101050502	Upper Hominy Creek

6th Level HUCs - Pisgah Ranger District

Appendix J: Watershed Action Plan

USDA Forest Service Watershed Condition Framework

FY2011 TRANSITION WATERSHED RESTORATION ACTION PLAN

National Forests in North Carolina

1. Summary

a. Watershed Name and HUC: Armstrong Creek (030501010201)
b. General Location: The Armstrong Creek Watershed is located on the Grandfather Ranger District, Pisgah National Forest of McDowell County, North Carolina.
c. Total Watershed Area: 18,303 acres; NFS area within watershed: 46%.
d. Watershed Characterization:

- General Physiography: The Armstrong Creek Watershed is within the Blue Ridge Mountain Physiographic Province draining in an easterly direction on the Atlantic Slope in the Catawba River Basin. The topography of the area is mountainous with strongly sloping to very steep uplands and narrow floodplains along the streams in FS ownership. Soils are dominated by the Chestnut-Ashe complex (CaF) and Edneyville-Chestnut complex (EcF), both steep with slopes ranging from 25 to 80 percent and stony. These soil types both have "severe" erosion concerns for management because of steep slopes. Average annual precipitation can be as high as 74.5 inches (data from nearby Mt. Mitchell), but more likely slightly lower due to a lower elevation. Stream channels are predominantly stable with an abundance of large rock substrate and banks.
- Land Use: The predominant land use in the Armstrong Creek Watershed is forested with low-volume roads accessing only about half of the area. Forest Plan management areas include MA 4C (emphasis – scenery) and 4D (emphasis – wildlife habitat) in the northwest, MA 3B (emphasis – timber supply) and small areas of 2C (emphasis – timber & scenery) in the northeast, and MA 5 (emphasis – backcountry area) in the southern portion of the watershed. Private lands in the watershed are managed for forestry in the steeper mountains and agriculture, grazing, industry, and homes in the flatter areas.
- General Overview of Concerns: The Armstrong Creek Watershed ranked in a condition class of "Fair" or "Functioning at Risk". Several indicators ranked "Poor" or "Not Properly Functioning" including; Aquatic Habitat – Large Woody Debris (LWD), Aquatic Biota – Native Species, Roads and Trails- Open Road Density, - Road Maintenance, - Proximity to Water, and - Mass Wasting, Soil Contamination, and Fire Condition Class.
- Important Ecological Values: These include State designated High Quality Waters, aquatic habitat for native species, terrestrial wildlife species, and Hudsonia montana on southern ridge tops.
- Current Condition Class: Fair (1.8) Target Condition Class: Good

e. Key Watershed Issues

1) Attributes/Indicators within FS control to affect

ATTRIBUTES /INDICATOR	**REASON FOR RATING**

3.1 Aquatic Habitat Fragmentation	Although rated as Properly Functioning (score of 1.33), the culvert on FSR 469 of Caney Creek is a barrier to aquatic passage.
3.2 Aquatic - Large Woody Debris	Rated as Not Properly Functioning (score of 3.00) due to the lack of LWD incorporated into the stream ecosystem.
5.1 Riparian/Wetland Vegetation Condition	Rated as Properly Functioning (score of 1.00), however with the high hemlock mortality in the streamside areas and the overabundance of a single species (Rhododendron) there is a need to restore these areas to a more diverse vegetative composition.
6.2 Road/Trail Maintenance	Rated as Not Properly Functioning (score of 3.00), the proposed trail work would reduce the need for maintenance on the trail system.
6.3 Road/Trail Proximity to Water	Rated as Not Properly Functioning (score of 3.00), the proposed trail work would reduce the length of trail system in close proximity to the stream course.
7.1 Soil Productivity	Although rated as Properly Functioning (score of 1.00), little is known about soil productivity in the watershed. The proposed inventory would affirm the need for restoration of base cation losses.
8.1 Fire Condition Class	Rated as Not Properly Functioning (score of 3.00), prescribed fire is needed on the landscape to restore fire dependent vegetative communities, and one federally listed fire dependent species, Hudsonia montana.
9.1 Loss Forest Cover	Although rated as Properly Functioning (score of 1.00), Forest Cover would be restored in stream side areas where hemlock mortality is high and the dominance of a single shrub species (Rhododendron) would not allow for a more diverse vegetative composition and may inhibit tree regeneration.
11.1 Terrestrial Invasives	Although rated as Properly Functioning (score of 1.00), there is a need to treat non-native and invasive plant species along the FSR 469 road network prior to vegetation management.
12.1 Forest Health – Insects & Disease	Although rated as Properly Functioning (score of 1.00), there is a need to restore American Chestnut and restore Rich Cove Forest diversity.

2) Attributes/Indicators that require other parties to address

ATTRIBUTES /INDICATOR	**REASON FOR RATING**
None identified at this time	

2. Watershed Characteristics and Conditions

a. General Context/Overview of the Watershed

The Armstrong Creek Watershed is 18,303 acres in size on the Atlantic Slope of the Blue Ridge Mountains in North Carolina. There are 8,462 acres of land managed by the National Forests in North Carolina located largely in the headwaters. Elevations range from 4,078 feet on the Blue Ridge Parkway to approximately 1,300 feet at the mouth into the North Fork Catawba River. The predominant land use in the Armstrong Creek Watershed is forested with low-volume roads accessing mostly the southern portion of the area. Forest Plan management areas emphasize scenery, wildlife habitat, timber supply, and backcountry area in the watershed. Private lands in the watershed are managed for forestry in the steeper mountains and agriculture, grazing, industry, and homes in the flatter areas.

b. Watershed Conditions

The watershed ranked "Fair" in the Watershed Condition Class analysis, but water quality is high with Armstrong Creek and many tributaries are designated by the state of North Carolina as High Quality Waters, supporting trout. These waters provide an important refuge for the propagation of aquatic organisms in the Catawba River Basin.

3. Restoration Goals, Objectives, and Opportunities

a. Goal Identification and Desired Condition

There is a need to treat non-native invasive plant species, improve aquatic passage at road crossings, improve terrestrial plant and wildlife habitats, and restore vegetation diversity in coves and streamside zones, large woody debris amounts to stream channels, and the fire regime. Implementation of these projects in the Armstrong Creek Watershed would shift the Watershed Condition Rating from "Fair" to "Good".

b. Objectives

i. Alignment with National, Regional, or Forest Priorities

This watershed condition work would be consistent with the Chiefs declaration of the general purpose of the Forest Service:

"to make sure that America's forests and grasslands are in the healthiest condition they can be; and to see to it that you have lots of opportunities to use, enjoy, and care for the lands and waters that sustain us all."

The proposed work would meet several aspects of the Regional Strategic Framework including: Aquatic organism passage improved (A.1.1); Watershed condition class is improved (A.1.2); Non-native invasive species controlled (A.2.1); Acres of restored native vegetation (A.2.2); Habitats of rare species are improved (A.3.3); Improve fire condition class strategically (B.1.1); Acres under Stewardship Authority (B.1.2); and Trails are maintained to standard or decommissioned (C.2.1).

Also, the proposed work would meet 2011 Forest Priority number seven - "Ecological Restoration in the Mountains" by increasing treatment of Non-Native Invasive Plant

species and increasing wildlife habitat restoration, and 2012 Forest Priority number two – "Collaboration/Integration/Stewardship" by developing and implementing a consistent process for Integrated Assessments. Direction in the Land and Resource Management Plan would be met as well.

ii. Alignment with State or local goals

The proposed work is in alignment with the state of North Carolina's goal to maintain the aquatic habitat and water quality that supports the designations of "Trout" and "High Quality Water" for Armstrong Creek and its tributaries.

c. Opportunities

i. Partnership Involvement

Discuss the roles partners are expected to have within the priority watershed (overall planning, funding, etc.) Stewardship opportunities are present within the Armstrong Creek Watershed. Potential partners include the National Park Service - Blue Ridge Parkway, The Nature Conservancy, American Chestnut Foundation, Southern Appalachian Forest Coalition, Western North Carolina Alliance, Southern Research Station, US Fish and Wildlife Service, NC Wildlife Resources Commission, the Ruffed Grouse Society, and the National Wild Turkey Federation. Groups such as these are likely to be involved in the planning process through proposal development and implementation by serving as primary and sub-contractors.

ii. Outcomes/Output

a) Performance Measure Accomplishment

The following performance measures are likely to be accomplished if the Essential Projects listed in Section d. are implemented:

1. Acres of hazardous fuels treated outside the wildland/urban interface (WUI) to reduce the risk of catastrophic wildland fire (FP-FUELS-NON-WUI)
2. Acres of forest vegetation improved (FOR-VEG-IMP)
3. Acres of Forest vegetation establishment (FOR-VEG-EST)
4. Miles of stream habitat restored or enhanced (HBT-ENH-STRM)
5. Number of stream crossings constructed or reconstructed to provide for aquatic organism passage (STRM-CROS-MTG-STD)
6. Miles of system trail improved to standard (TL-IMP-STD)
7. Manage noxious weeds and invasive plants (INVPLT-NXWD-FED-AC)
8. Acres of water or soil resources protected, maintained or improved to achieve desired watershed conditions (S&W-RSRC-IMP)
9. Acres of terrestrial habitat restored or enhanced (HBT-ENH-TERR)
10. Acres of forestlands treated using timber sales (TMBR-SALES-TRT-AC)
11. Volume of timber sold (CCF) (TMBR-VOL-SLD)

b) Socioeconomic Considerations

Implementation of the action plan would create jobs since much of the work would occur through contracts and agreements. The work would reinforce FS relationships within the community.

d. Specific Project Activities (Essential Projects)

1. Prescribed Fire

- Attribute/Indicator Addressed: 8.1
- Project Description: Implementation of prescribe burning approximately 1000 acres within the Armstrong Creek Watershed. This will restore and maintain habitat for *Hudsonia montana*, a federally threatened sub shrub that is dependent on periodic fire, in addition to abundant table mountain and pitch pine forests and woodlands. Fuel loads will also be reduced with these activities within the watershed. A moderate to high intense fire will be needed to meet the objectives. A helicopter will be needed to accomplish the prescribe burn due to moderate to steep terrain.
- Partners Involvement: National Park Service - Blue Ridge Parkway and The Nature Conservancy.
- Timeline: Starting in 2012 and continuing for 5 years.
- Associated Budget Line Item(s): CWKV, NFWF, and/or WFHF.
- Estimated costs:

Work Type	Cost
Planning/NEPA	$20,000
Prescribed Burn (@$150 x 1000 ac)	$150,000
Total:	**$170,000**

2. Riparian Habitat Restoration

- Attribute/Indicator Addressed: 3.2, 5.1, 9.1, 11.1
- Project Description: A combined treatment along stream courses in need of LWD inputs where significant high canopy loss resulted from eastern hemlock mortality. Restoration will be concentrated in areas with hemlock mortality and dense rhododendron. The treatment may include: (1) Directional felling (pushing snags using a track-hoe) of hemlock snags into stream channel; (2) Mechanical and chemical treatment of rhododendron to reduce its density; and (3) Planting of riparian hardwood species.
- Partners Involvement: NC Wildlife Resource Commission and NC State Fish Hatchery.
- Timeline: Starting in 2012 and continuing for 5 years.
- Associated Budget Line Item(s): NFVW, CWKV, NFWF, and/or Stewardship funding.
- Estimated costs:

Work Type	Cost
Directional Pushing	$5,000
Rhododendron Treatment	$8,000
Tree Planting	$1,500
NEPA	$8,000
Monitoring stream LWD function & riparian treatment success ($1,000/year for 3 years)	$3,000
Supplies	$4,000
Total:	**$29,500**

3. American Chestnut Restoration

- Attribute/Indicator Addressed: 12.1
- Project Description: Plant A. chestnut hybrid stock in small groups located along the Blue Ridge Parkway.
- Partners Involvement: American Chestnut Foundation and National Park Service.
- Timeline: Starting in 2012 and continuing for 5 years.
- Associated Budget Line Item(s): RTRT, NFVW, and/or Stewardship funding.
- Estimated costs:

Work Type	Cost
Prescription/NEPA	$2,000
Site Prep ($250/ac)	$500
Planting ($500/ac)	$1,000
Interpretation	$2,000
Monitoring	$500
Total:	**$6,000**

4. **Rich Cove Forest Diversity Enhancement**
   - Attribute/Indicator Addressed: 5.1,12.1 (Plus other terrestrial objectives)
   - Project Description: The typical second or third generation rich cove forest is dominated by tulip poplars. Use thinning, regeneration, and planting techniques to increase the species diversity in selected cove forests within Armstrong WS. Desirable species will include but not be restricted to basswood, cucumber tree, white ash, beech, ironwood, black cherry, sugar maple and yellow buckeye.
   - Monitor: Complete a third year sapling check by species.
   - Partners Involvement: Southern Appalachian Forest Coalition, Western North Carolina Alliance, and Southern Research Station.
   - Timeline: Starting in 2012 and continuing for 5 years.
   - Associated Budget Line Item (s): NFTM, NFVW, RTRT, CWKV, NFWF and/or Stewardship funding.
   - Estimated costs:

Work Type	Cost
Prescription/NEPA ($17/ccf and 20ccf/ac over 100 ac)	$34,000
Marking & Layout ($19/ccf)	$38,000
Sell ($0.86/ccf)	$1,700
Monitor ($25/ac Stocking check x 50 ac)	$1,250
Regeneration and TSI ($225/ac x 50 ac)	$11,000
Total:	**$85,950**

5. **Aquatic Organism Passage (AOP)**
   - Attribute/Indicator Addressed: 3.1
   - Project Description: Replace existing FSR 469 culvert on Caney Creek with a structure that would allow passage of aquatic native species, such as Greenhead shiner.
   - Partners Involvement: USFWS, NC Wildlife Resource Commission.
   - Timeline: Starting in 2012 with NEPA & Design and construct within 5 years.
   - Estimated costs and associated Budget Line Item (s): **$60,000** funded by NFWF, HTAP, CMLG, and/or other outside source.

6. **Water Chemistry Data Collection – Base Cation Losses**
   - Attribute/Indicator Addressed: 7.1
   - Project Description: The purpose of this project is to obtain water chemistry data. The assessment will identify which portions of the watersheds are likely to need restoration to replace base cation losses. Adequate supplies of base cations (calcium, magnesium, and potassium) in the soils are essential to maintain healthy forests and aquatic ecosystems. Additional inventory work will need to be completed after this project and before a base cation restoration project can be implemented.
   - Partners Involvement: Unknown at this time.
   - Timeline: Samples will be collected during spring base flow in 2012. Associated Budget Line Item: NFVW and/or FERC funding.
   - Estimated costs:

Work Type	Cost
Water Samples - $150 Processing Fee for each of 10 samples	$1,500
Forest Watershed Specialist plans & collects samples @ $430/day for 5 days	$2,150
Enter site locations into NRIS @$430/day for 2 days	$860
Fleet	$450
Supplies	$100
Total:	**$5,060**

7. **Trail Rehabilitation**
   - Attribute/Indicator Addressed: 6.2 & 6.3.
   - Project Description: Change the FS Trail #223 designation from "Horse and Bike" to "Foot Traffic Only", and relocated sections of the same trail away from the stream and improve drainage e.g., by constructing rolling dips.
   - Partners Involvement: Unknown at this time.
   - Timeline: Starting in 2012 and continuing for 5 years.
   - Associated Budget Line Item: CMTL, CMLG, and/or Stewardship funding.
   - Estimated costs:

Work Type	Cost
Design/NEPA (*complete with Timber Assessment*)	$2,500
Construction	$15,000
Total:	**$17,500**

8. **NNIS Treatments**
   - Attribute/Indicator Addressed: 11.1
   - Project Description: Six non-native species; multiflora rose, princess tree, Chinese silvergrass, Japanese honeysuckle, Chinese yam and kudzu, have been documented primarily on the roadsides of the area as well as a few interior locations. In general the percent cover was low in these infested locations, less than 5%. The goal would be to control the infestations prior to any vegetative management project such as a prescribed burn or timber harvest. For most infestations species it will take two chemical

applications. For some species such as Chinese Yam, it may require at least 3 chemical applications.

- Monitoring: Revisit twenty 100 meter transects previously (2003) established along the road corridors recording percent cover of invasive plant species within three established zones (road edge, forest edge, and forest interior). Prior to implementing control establish an additional 20 transects within infestations on firelines, trails, stream courses, etc.
- Partners Involvement: National Park Service - Blue Ridge Parkway.
- Timeline: Starting in 2012 and continuing for 5 years.
- Associated Budget Line Item: NFVW, CWKV, and/or Stewardship funding**.**
- Estimated costs:

Work Type	Cost
Inventory ($20/ac across at-risk acres)	$ 5,000
Herbicide/Adjuvants	$ 500
Control ($300/ac) for 100 acres	$30,000
2nd and 3rd control ($150/ac) for 50 acres	$15,000
Monitor ($2500/year for 3 years)	$ 7,500
Total:	**$58,000**

9. Rehab Drug Growing Site

- Attribute/Indicator Addressed: 9.1
- Project Description: Ensure disturbed site is reforested with native species. Use appropriate shrub species, such as sweet pepperbush, and a grass species, such as Virginia wild rye or deer tongue grass that will reduce erosion impacts while still allowing nearby native species to reinvade the disturbed area.
- Monitor: Establish photo points across the acreage prior to planting, ensure at least 50-75% bare ground is covered with vegetation 1 year after planting and assess for any non-native invasive plant species.
- Partners Involvement: Unknown at this time.
- Timeline: Starting in 2012 and continuing for 5 years.
- Associated Budget Line Item(s): NFVW, RTRT, and/or CWK2.
- Estimated costs:

Work Type	Cost
Prescription/NEPA	$5,000
Plant ($500/ac for 1 acres)	$500
Herb/Grass ($250/ ac for 1 acres)	$250
Monitor photo points	$2,000
Total:	**$7,750**

10. Wildlife Opening Habitat Enhancement

- Attribute/Indicator Addressed: NA
- Project Description: Using silvicultural techniques to enhance habitat condition near wildlife openings through creating non-permanent openings, brushy interface, and savannah/woodland conditions.
- Partners Involvement: NC Wildlife Resource Commission.
- Timeline: Starting in 2012 and continuing for 5 years.
- Associated Budget Line Item(s): NFVW, NFTM, NFWF, and/or Stewardship.

- Estimated costs:

Work Type	Cost
Prescription/NEPA ($17/ccf and 12ccf/ac (22 ac perm openings)	$4,500
Marking & Layout ($19/ccf)	$5,000
Sell ($0.86/ccf)	$2,300
Monitor ($25/ac Stocking check x 50 ac)	$1,250
Regeneration and TSI ($225/ac x 22 ac)	$5,000
Total:	**$18,050**

11. Cerulean Warbler Habitat Enhancement

- Attribute/Indicator Addressed: NA (until terrestrial portion shows up) (12.1 maybe)
- Project Description: Combinations of variable density thinning and regeneration techniques will be used to enhance vertical and horizontal stand diversity within selected stands to enhance late structural conditions and Cerulean Warbler habitat. The resulting habitat will have a diverse woody structure component in both the horizontal and vertical dimensions and contain more vigorous and a more resilient forest system.
- Partners Involvement: Bent Creek (SRS), Partners in Flight, NC Wildlife Resource Commission.
- Timeline: Starting in 2012 and continuing for 5 years.
- Associated Budget Line Item(s): NFVW, NFTM, NFWF, Stewardship, and CWKV (Assuming 12ccf/ac for a thinning/swd treatment average under a WL objective. Possible area of treatment = 150 acres of AMFC thin, 150 acres of RUMFC regen = 3,600 ccf).
- Estimated costs:

Work Type	Cost
Prescription/NEPA ($17/ccf)	$61,000
Marking & Layout ($19/ccf)	$68,000
Sell ($0.86/ccf)	$3,100
Monitor ($25/ac Stocking check x 50 ac)	$1,250
Regeneration and TSI ($225/ac x 75 ac)	$17,000
Total:	**$150,350**

12. *udsonia montana* Habitat Enhancement

- Attribute/Indicator Addressed: NA
- Project Description: Use non-commercial thinning techniques to reduce overstory density and treat competing shrub and herbaceous species to enhance habitat condition for HM. Post signs to reduce visitor impacts to *Hudsonia montana,* educating visitors to stay on the mountain-to-sea trail.
- Monitoring: Complete *Hudsonia montana* census within 4 separate size classes
- Partners Involvement: USFWS
- Timeline: Starting in 2012 and continuing for 5 years.
- Associated Budget Line Item(s): NFVW, RTRT, NFWF, and/or Stewardship.
- Estimated costs:

Work Type	Cost
Prescription/NEPA (federal consultation)	$ 7,250

Slash Treatment ($250/ac over 25 acres)	$ 6,250
Signage	$ 3,500
Monitor twice every third year	$ 3,000
Total:	**$20,000**

e. Costs:

	Planning	Design	Implementation	Project Monitoring
FS Contribution	$169,310	$127,000	$312,100	$19,750
Partner Contribution (both in kind and $)	Unknown at this time	Unknown at this time	Unknown at this time	Unknown at this time
Total	$169,310	$127,000	$312,100	$19,750

Timelines and Project Scheduling

FY*	**Task**		**FS Cost**	**Partner cost**
2011	**Prescribed Fire**	Planning/NEPA	$20,000	Unknown
2012-2013		Prescribed Burn	$150,000	Unknown
2012	**Riparian Habitat Restoration**	NEPA	$8,000	Unknown
2013		Directional Pushing	$5,000	Unknown
2013		Rhododendron Treatment	$8,000	Unknown
2014		Tree Planting	$1,500	Unknown
2012 - 2014		Monitoring stream LWD function & riparian treatment success	$3,000	Unknown
2013		Supplies	$4,000	Unknown
2012	**American Chestnut Restoration**	Prescription/NEPA	$2,000	Unknown
2013		Site Preparation	$500	Unknown
2013		Planting	$1,000	Unknown
2013		Interpretation	$2,000	Unknown
2013+		Monitoring	$500	Unknown
2012	**Rich Cove Forest Diversity Enhancement**	Prescription/NEPA	$34,000	Unknown
2013		Marking & Layout	$38,000	Unknown

2013+		Sell	$1,700	Unknown
2013+		Monitor	$1,250	Unknown
2014+		Regeneration and TSI	$11,000	Unknown
2013	**Aquatic Organism Passage (AOP)**	Design	$3,000	Unknown
2012		NEPA	$7,000	Unknown
2013+		Construction	$50,000	Unknown
2012	**Water Chemistry Data Collection – Base Cation Losses**	Water Samples - $150 Processing Fee for each of 10 samples	$1,500	Unknown
2012		Sample Collection	$2,150	Unknown
2012		Data entry into NRIS	$860	Unknown
2012		Fleet	$450	Unknown
2012		Supplies	$100	Unknown
2012	**Trail Rehabilitation**	Design/NEPA	$2,500	Unknown
2013+		Construction	$15,000	Unknown
2013+	**NNIS Treatments**	Inventory	$5,000	Unknown
2013+		Herbicide/Adjuvants	$500	Unknown
2013+		Control - 100 acres	$30,000	Unknown
2013+		2nd and 3rd control for 50 acres	$15,000	Unknown
2013+		Monitor for 3 years	$7,500	Unknown
2012	**Rehab Drug Growing Site**	Prescription/NEPA	$5,000	Unknown
2012+		Plant	$500	Unknown
2012+		Herb/Grass	$250	Unknown
2012+		Monitor photo points	$2,000	Unknown
2012	**Wildlife Opening Habitat Enhancement**	Prescription/NEPA	$4,500	Unknown
2013+		Marking & Layout	$5,000	Unknown
2013+		Sell	$2,300	Unknown
2013+		Monitor	$1,250	Unknown
2013+		Regeneration and TSI	$5,000	Unknown
2012	**Cerulean Warbler**	Prescription/NEPA	$61,000	Unknown

	Habitat Enhancement			
2013+		Marking & Layout	$68,000	Unknown
2013+		Sell	$3,100	Unknown
2013+		Monitor	$1,250	Unknown
2013+		Regeneration and TSI	$17,000	Unknown
2012	**Hudsonia *montana* Habitat Enhancement**	Prescription/NEPA (federal consultation	$7,250	Unknown
2013+		Slash Treatment over 25 acres	$6,250	Unknown
2013+		Signage	$3,500	Unknown
2013+		Monitor twice every third year	$3,000	Unknown
****FY of work depends on funding and workforce availability.***				

f. Other Partners: We anticipate the proposed work in this document to involve partnerships with the following: U.S. Fish and Wildlife Service, NC Wildlife Resources Commission, NC State Fish Hatchery, National Park Service, The Nature Conservancy, American Chestnut Foundation, Southern Appalachian Forest Coalition, Western North Carolina Alliance, U.S. Southern Research Station (SRS), Bent Creek Experiment Station (SRS), and Partners in Flight.

4. Restoration Project Monitoring and Evaluation

a. The forest will monitor:

Project	**Monitoring**
Riparian Habitat Restoration	Effectiveness monitoring - stream LWD function & riparian treatment success directly following completion of work.
American Chestnut Restoration	Effectiveness monitoring of plantings - complete a 3rd year sapling check.
Rich & Acidic Cove Diversity Enhancement	Effectiveness monitoring – complete a 3rd year sapling check by species.
Aquatic Organism Passage	Assess crossing for passage potential following construction to document passage improvement.
NNIS Treatment	Monitoring: Revisit twenty 100 meter transects previously (2003) established along the road corridors recording percent cover of invasive plant species within three established zones (road edge, forest edge, and forest interior). Prior to implementing control establish an additional 20 transects within infestations on firelines, trails, stream courses, etc.
Rehab Drug Growing Sites	Establish photo points across the acreage prior to planting,

	ensure at least 50-75% bare ground is covered with vegetation 1 year after planting and assess for any non-native invasive plant species.
Hudsonia montana Habitat Enhancement	Complete *Hudsonia montana* census within 4 separate size classes.

b. Monitoring will be done in cooperation with: Unknown at this time.

5. Contributors to this document

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