

**Cherokee National Forest
USDA Forest Service
Southern Region**

Roads Analysis Process

Spring Creek Watershed Analysis

April 2008

BACKGROUND

On January 12, 2001, the National Forest System Road Management rule was published in the Federal Register. The adoption of the final rule revised the regulations concerning the management, use, and maintenance of the National Forest Transportation System.

The purpose of this road analysis is to provide line officers with critical information to develop road systems that are safe and responsive to public needs and desires, are affordable and efficiently managed, have minimal negative ecological effects on the land, and are in balance with available funding for needed management actions.

SCOPE

The National Forest System ownership in the Spring Creek Watershed Analysis area is approximately 14,331 acres. The majority of the assessment area (8,222 acres) is in Management Prescription 9H of the Cherokee National Forest Revised Land and Resource Management Plan. Other MPs represented include: 8B (2,868 acres), 7B (338 acres), and 9F (100 acres). Included within each of these Management Prescriptions are acres (2,803) assigned to Riparian Prescription.

OBJECTIVES

The main objectives of this road analysis are to:

- Identify the need for change by comparing the current road system to the desired condition.
- Inform the line officer of important ecological, social, and economic issues related to roads within the analysis area.

EXISTING ROAD SYSTEM CONDITIONS

The roads assessed in and near the boundary of this study area are under the jurisdiction of the state of Tennessee (1 road and 15.0 miles), McMinn, Monroe or Polk County (11 roads and 15.6 miles), or the National Forest System. Road maintenance is provided by the appropriate entity with some reciprocal agreements. Altogether, there are approximately 100 miles of road with about 55 miles open to public traffic.

See the “Spring Creek Road Listing” (Appendix A) for basic road data that describes in more detail each road situation.

DESIRED ROAD SYSTEM CONDITIONS

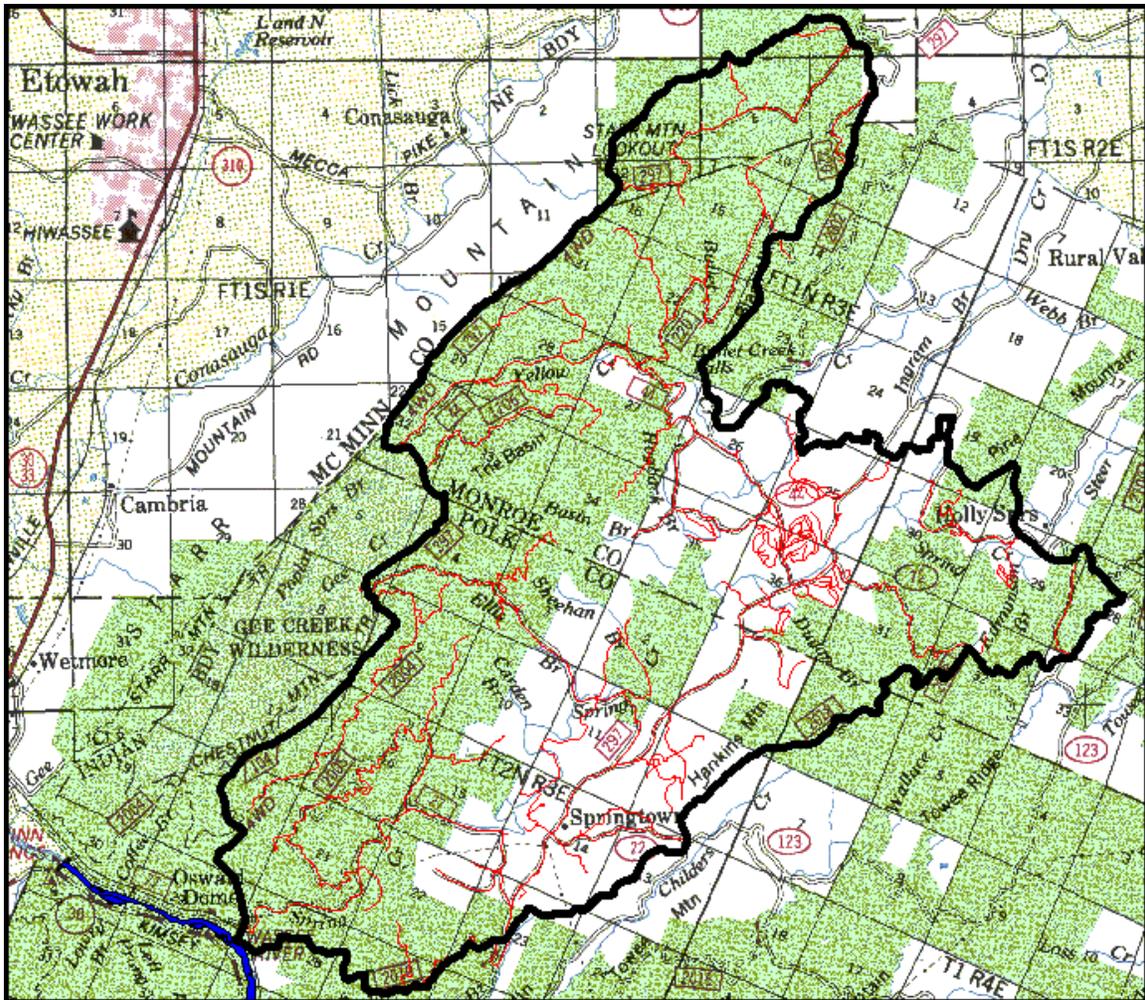
The desired condition is to provide a road system that is safe, responsive to public needs, meets the needs for forest management, is affordable, and has minimal ecological effects.

KEY ISSUES

The key issues related to road construction, relocation, decommissioning, closures, and other road management actions are:

- Keep system road construction to a minimum.
- Protect riparian corridor.

Spring Creek Analysis Area with Roads Highlighted



ANALYSIS QUESTIONS

<p>Pages 25-30 of FS-643, Roads Analysis: Informing Decisions About Managing the National Forest Transportation System (FS-643) lists 72 questions to be used as a checklist to identify potential benefits, problems, or risks. Some of these questions may not be addressed, because they are irrelevant or are appropriate only if there are extraordinary circumstances specific to the analysis area (some questions would be answered the same for any road or road system around the forest and are therefore beyond the scope of this analysis). This analysis will only address those questions that are both relevant and specific to the roads within the analysis area.</p> <p>Question</p>	<p>Relevant to this analysis area?</p>	<p>Specific to this analysis area?</p>	<p>Addressed in this Analysis?</p>
AQ (1): How and where does the road system modify the surface and subsurface hydrology of the area?	Y	N	Y
AQ (2): How and where does the road system generate surface erosion?	Y	N	Y
AQ (3): How and where does the road system affect mass wasting?	Y	N	Y
AQ (4): How and where do road-stream crossings influence local stream channels and water quality?	Y	N	Y
AQ (5): How and where does the road system create potential for pollutants, such as chemical spills, oils, deicing salts, or herbicides, to enter surface waters?	Y	N	Y
AQ (6): How and where is the road system "hydrologically connected" to the stream system? How do the connections affect water quality and quantity?	Y	N	Y
AQ (7): What downstream beneficial uses of water exist in the area? What changes in uses and demand are expected over time? How are they affected or put at risk by road-derived pollutants?	Y	Y	Y
AQ (8): How and where does the road system affect wetlands?	Y	N	N
AQ (9): How does the road system alter physical channel dynamics, including isolation of floodplains, constraints on channel migration, and the movement of large wood, fine organic matter, and sediment?	Y	N	Y
AQ (10): How and where does the road system restrict the migration and movement of aquatic organisms? What aquatic species (i.e., fish and amphibians) are affected and to what extent?	Y	Y	Y
AQ (11): How does the road system affect shading, litterfall, and riparian plant communities?	Y	Y	Y
AQ (12): How and where does the road system contribute to fishing, poaching, or direct habitat loss for at-risk aquatic species?	Y	Y	Y
AQ (13): How and where does the road system facilitate the introduction of non-native aquatic species?	Y	N	N
AQ (14): To what extent does the road system overlap with areas of exceptionally high aquatic	Y	Y	Y

<p>Pages 25-30 of FS-643, Roads Analysis: Informing Decisions About Managing the National Forest Transportation System (FS-643) lists 72 questions to be used as a checklist to identify potential benefits, problems, or risks. Some of these questions may not be addressed, because they are irrelevant or are appropriate only if there are extraordinary circumstances specific to the analysis area (some questions would be answered the same for any road or road system around the forest and are therefore beyond the scope of this analysis). This analysis will only address those questions that are both relevant and specific to the roads within the analysis area.</p> <p style="text-align: center;">Question</p>	<p style="text-align: center;">Relevant to this analysis area?</p>	<p style="text-align: center;">Specific to this analysis area?</p>	<p style="text-align: center;">Addressed in this Analysis?</p>
diversity or productivity or areas containing rare or unique aquatic species or species of interest?			
TW (1): What are direct effects of the road system on terrestrial species habitat?	Y	N	N
TW (2): How does the road system facilitate human activities that affect habitat?	Y	N	N
TW (3): How does the road system affect legal and illegal human activities (including trapping, hunting, poaching, harassment, road kill, or illegal kill levels)? What are the effects on wildlife species?	Y	N	N
TW (4): How does the road system directly affect unique communities or special features in the area?	Y	Y	Y
EF (1): What ecological attributes, particularly those unique to the region, would be affected by roading of currently unroaded areas?	Y	Y	Y
EF (2): To what degree does the presence, type, and location of roads increase the introduction and spread of exotic plant and animal species, insects, diseases, and parasites? What are the potential effects of such introductions to plant and animal species and ecosystem function in the area?	Y	N	N
EF (3): To what degree does the presence, type, and location of roads contribute to the control of insects, diseases, and parasites?	Y	N	N
EF (4): How does the road system affect ecological disturbance regimes in the area?	Y	N	N
EF (5): What are the adverse effects of noise caused by developing, using, and maintaining roads?	Y	N	N
EC (1): How does the road system affect the Agency's direct costs and direct revenues used in assessing financial efficiency?	Y	Y	Y
EC (2): How does the road system affect the priced and non-priced consequences included in economic efficiency analysis used to assess net benefits to society?	Y	Y	Y
EC (3): How does the road system affect the distribution of benefits and costs among affected people?	Y	Y	Y
TM (1): How does the road spacing and location affect logging system feasibility?	Y	N	N
TM (2) and TM (3): How does the road system affect managing the suitable timber base? How	Y	N	Y

<p>Pages 25-30 of FS-643, Roads Analysis: Informing Decisions About Managing the National Forest Transportation System (FS-643) lists 72 questions to be used as a checklist to identify potential benefits, problems, or risks. Some of these questions may not be addressed, because they are irrelevant or are appropriate only if there are extraordinary circumstances specific to the analysis area (some questions would be answered the same for any road or road system around the forest and are therefore beyond the scope of this analysis). This analysis will only address those questions that are both relevant and specific to the roads within the analysis area.</p> <p style="text-align: center;">Question</p>	<p style="text-align: center;">Relevant to this analysis area?</p>	<p style="text-align: center;">Specific to this analysis area?</p>	<p style="text-align: center;">Addressed in this Analysis?</p>
<p>does the road system affect access to timber stands needing silvicultural treatment?</p>			
<p>MM (1): How does the road system affect access to locatable, leasable, and salable minerals?</p>	N	N	N
<p>RM (1): How does the road system affect access to range allotments?</p>	N	N	N
<p>WP (1): How does the road system affect access, constructing, maintaining, monitoring, and operating water diversions, impoundments, and distribution canals or pipes?</p>	Y	N	Y
<p>WP (2): How does road development and use affect water quality in municipal watersheds?</p>	N	N	N
<p>WP (3): How does the road system affect access to hydroelectric power generation?</p>	Y	N	Y
<p>SP (1): How does the road system affect access for collecting special forest products?</p>	Y	N	N
<p>SU (1): How does the road system affect managing special-use permit sites (concessionaires, communications sites, utility corridors, and so on)?</p>	Y	Y	Y
<p>GT (1): How does the road system connect to public roads and provide primary access to communities?</p>	Y	N	Y
<p>GT (2): How does the road system connect large blocks of land in other ownership to public roads (ad-hoc communities, subdivisions, inholdings, and so on)?</p>	Y	N	Y
<p>GT (3): How does the road system affect managing roads with shared ownership or with limited jurisdiction? (RS 2477, cost-share, prescriptive rights, FLPMA easements, FRTA easements, COT easements)?</p>	Y	N	Y
<p>GT (4): How does the road system address the safety of road users?</p>	Y	N	Y
<p>AU (1): How does the road system affect access needed for research activities, inventory, and monitoring?</p>	Y	N	N
<p>AU (2): How does the road system affect investigative or enforcement activities?</p>	Y	N	N
<p>PT (1): How does the road system affect fuels management?</p>	Y	N	N
<p>PT (2): How does the road system affect the capacity of the Forest Service and cooperators to</p>	Y	N	N

<p>Pages 25-30 of FS-643, Roads Analysis: Informing Decisions About Managing the National Forest Transportation System (FS-643) lists 72 questions to be used as a checklist to identify potential benefits, problems, or risks. Some of these questions may not be addressed, because they are irrelevant or are appropriate only if there are extraordinary circumstances specific to the analysis area (some questions would be answered the same for any road or road system around the forest and are therefore beyond the scope of this analysis). This analysis will only address those questions that are both relevant and specific to the roads within the analysis area.</p> <p style="text-align: center;">Question</p>	<p style="text-align: center;">Relevant to this analysis area?</p>	<p style="text-align: center;">Specific to this analysis area?</p>	<p style="text-align: center;">Addressed in this Analysis?</p>
<p>suppress wildfires?</p>			
<p>PT (3): How does the road system affect risk to fire fighters and to public safety?</p>	Y	N	N
<p>PT (4): How does the road system contribute to airborne dust emissions resulting in reduced visibility and human health concerns?</p>	Y	N	N
<p>UR (1): Is there now or will there be in the future excess supply or excess demand for unroaded* recreation opportunities?</p>	Y	Y	Y
<p>UR (2): Is developing new roads into unroaded areas, decommissioning of existing roads, or changing the maintenance of existing roads causing substantial changes in the quantity, quality, or type of unroaded recreation opportunities?</p>	Y	Y	Y
<p>UR (3): What are the adverse effects of noise and other disturbance caused by developing, using, and maintaining roads, on the quantity, quality, and type of unroaded recreation opportunities?</p>	Y	Y	Y
<p>UR (4): Who participates in unroaded recreation in the areas affected by building, maintaining, and decommissioning roads?</p>	Y	Y	Y
<p>UR (5): What are these participants' attachments to the area, how strong are their feelings, and are alternative opportunities and locations available?</p>	Y	Y	Y
<p>UR(6): How is developing new roads into unroaded areas affecting the Scenic Integrity Objective, SIO(s)? Note: Some forests are still using the Visual Management System (VMS). If that is the case, substitute VQO for SIO.</p>	Y	Y	Y
<p>RR (1): Is there now or will there be in the future excess supply or excess demand for road-related* recreation opportunities?</p>	Y	N	N
<p>RR (2): Is developing new roads into unroaded areas, decommissioning of existing roads, or changing maintenance of existing roads causing substantial changes in the quantity, quality, or type of road-related recreation opportunities?</p>	Y	N	N
<p>RR (3): What are the adverse effects of noise and other disturbances caused by building, using, and maintaining roads on the quantity, quality, or type of roaded recreation opportunities?</p>	Y	Y	Y
<p>RR (4): Who participates in road-related recreation</p>	Y	Y	Y

<p>Pages 25-30 of FS-643, Roads Analysis: Informing Decisions About Managing the National Forest Transportation System (FS-643) lists 72 questions to be used as a checklist to identify potential benefits, problems, or risks. Some of these questions may not be addressed, because they are irrelevant or are appropriate only if there are extraordinary circumstances specific to the analysis area (some questions would be answered the same for any road or road system around the forest and are therefore beyond the scope of this analysis). This analysis will only address those questions that are both relevant and specific to the roads within the analysis area.</p> <p style="text-align: center;">Question</p>	<p style="text-align: center;">Relevant to this analysis area?</p>	<p style="text-align: center;">Specific to this analysis area?</p>	<p style="text-align: center;">Addressed in this Analysis?</p>
<p>in the areas affected by road building, changes in road maintenance, or road decommissioning?</p>			
<p>RR (5): What are these participants attachments to the area, how strong are their feelings, and are alternative opportunities and locations available?</p>	Y	Y	Y
<p>RR(6): How does the road system affect the Scenic Integrity Objective, SIO?</p>	Y	Y	Y
<p>PV (1): Do areas planned for road building, closure, or decommissioning have unique physical or biological characteristics, such as unique natural features and threatened or endangered species (see TW4)?</p>	Y	N	N
<p>PV (2): Do areas planned for road building, closure, or decommissioning have unique cultural, traditional, symbolic, sacred, spiritual, or religious significance?</p>	Y	N	N
<p>PV (3): What, if any, groups of people (ethnic groups, subcultures, and so on) hold cultural, symbolic, spiritual, sacred, traditional, or religious values for areas planned for road entry or road closure?</p>	Y	N	N
<p>PV (4): Will building, closing, or decommissioning roads substantially affect passive-use value?</p>	Y	Y	Y
<p>SI (1): What are people's perceived needs and values for roads? How does road management affect people's dependence on, need for, and desire for roads?</p>	Y	Y	Y
<p>SI (2): What are people's perceived needs and values for access? How does road management affect people's dependence on, need for, and desire for access?</p>	Y	Y	Y
<p>SI(3): How does the road system affect access to paleontological, archaeological, and historical sites?</p>	Y	N	N
<p>SI(4): How does the road system affect cultural and traditional uses (such as plant gathering, and access to traditional and cultural sites) and American Indian treaty rights?</p>	Y	N	N
<p>SI(5): How are roads that constitute historic sites affected by road management?</p>	Y	N	N
<p>SI(6): How are community, social, and economic health affected by road management (for example, lifestyles, businesses, tourism industry, infrastructure</p>	Y	N	N

<p>Pages 25-30 of FS-643, Roads Analysis: Informing Decisions About Managing the National Forest Transportation System (FS-643) lists 72 questions to be used as a checklist to identify potential benefits, problems, or risks. Some of these questions may not be addressed, because they are irrelevant or are appropriate only if there are extraordinary circumstances specific to the analysis area (some questions would be answered the same for any road or road system around the forest and are therefore beyond the scope of this analysis). This analysis will only address those questions that are both relevant and specific to the roads within the analysis area.</p> <p style="text-align: center;">Question</p>	<p style="text-align: center;">Relevant to this analysis area?</p>	<p style="text-align: center;">Specific to this analysis area?</p>	<p style="text-align: center;">Addressed in this Analysis?</p>
maintenance)?			
<p>SI(7): What is the perceived social and economic dependency of a community on an unroaded area versus the value of that unroaded area for its intrinsic existence and symbolic values?</p>	Y	N	N
<p>SI(8): How does road management affect wilderness attributes, including natural integrity, natural appearance, opportunities for solitude, and opportunities for primitive recreation?</p>	Y	Y	Y
<p>SI(9): What are traditional uses of animal and plant species in the area of analysis?</p>	Y	N	N
<p>SI(10): How does road management affect people's sense of place?</p>	Y	Y	Y
<p>CR(1): How does the road system, or its management, affect certain groups of people (minority, ethnic, cultural, racial, disabled, and low-income groups)?</p>	Y	N	N

Questions from the table above that are both relevant and specific to the roads in this analysis area are discussed below:

AQ (1): How and where does the road system modify the surface and subsurface hydrology of the area?

This analysis area includes the Spring Creek watershed. This is a tributary stream of the Hiwassee River.

In general, roads intercept precipitation on the road surface, cutbanks and from subsurface water moving down adjacent hillslopes. Water can be concentrated either on the road surface or in adjacent ditches, and in places, is rerouted from pathways it would otherwise take if the road were not present. By intercepting surface and subsurface water flow, and diverting it into ditches and channels, roads effectively increase the density of streams in the landscape. As a result, the timing of flood flows is quickened and the peak of flood flows is increased. The magnitude of this effect is dependent on the density of roads in the watershed. There are approximately 71 miles of Forest Service jurisdiction roads within the analysis area. This represents a road density of 2.2 miles of Forest Service road per square mile of watershed within the analysis area. Many of the Forest Service roads (approximately 42 miles) are gated, vegetated, and closed seasonally or throughout the year. Within this analysis area, Forest Roads 44, 27, 297, 2005, and

11191 are most significant in terms of their length and potential influence on surface hydrology. Forest Road 27 is located adjacent or in close proximity to Spring Creek over much of its length. Forest Road 44 is located adjacent or in close proximity to Yellow Creek and Ellis Branch for much of its length. Forest Road 11191 is located adjacent or in close proximity to Sheehan Branch for much of its length. Forest Roads 297 and 2005 are on mid-slope locations, but cross several perennial and intermittent streams. Other roads within the analysis area are basically ridge-top/upper side-slope road locations with reduced connectivity to surface and subsurface water. Most of these roads are outsloped with dips and culverts providing drainage or insloped with ditches and cross drains providing water drainage.

Recommendation – Surface drainage can be improved by additional aggregate surfacing, additional drainage dips, cross drain culverts, berms and outsloping. These mitigation measures can reduce the impacts associated with the roads, including effects to surface and subsurface hydrology and erosion/sediment rates.

AQ (2): How and where does the road system generate surface erosion?

By their nature, all native and aggregate surfaced roads will generate some surface erosion. The amount depends on factors such as soil type, road gradient, the spacing and effectiveness of drainage structures, traffic use and maintenance activity. Sixty percent of the Forest Service road mileage within this analysis area is closed to all but administrative traffic. These roads are generally vegetated with a grass-wildlife mixture and serve as linear wildlife openings. As a result, surface erosion is minimized from these roads. Roads open to public use provide a continual opportunity for surface erosion, but effective mitigation described in AQ1 will limit surface erosion. Any road opened and used for commercial use (such as logging traffic), would result in an increased potential for surface erosion, but reconstruction or maintenance activities associated with this kind of use would mitigate erosion during use and result in a road with less erosion potential after its use. Surface erosion would also be a concern on any newly constructed permanent or temporary road until the road is closed and re-vegetated or otherwise stabilized with mitigation measures. Location and grade will be important factors in limiting surface erosion during use.

AQ (3): How and where does the road system affect mass wasting?

Mass wasting is generally not a problem in the analysis area. Slide events have occurred in the past, however. The Chestnut Mountain area is one location that has experienced slides in the recent past. Loose, granular, sandy textured soils exist in this portion of the analysis area.

Small slides and slumps are possible below culvert outfalls and along fill slopes where road drainage is concentrated. Proper sizing and location of drainage culverts can reduce this potential, as well as, armoring the outfall areas associated with drainage structures, as needed.

AQ (4): How and where do road-stream crossings influence local stream channels and water quality?

There is an estimated 50 stream crossings (mostly culverts) of perennial and intermittent streams on Forest Service lands within the analysis area. This estimation is not based on field survey, but rather on interpretation of topographic maps. There are an unestimated number of crossings of ephemeral drainages within the analysis area (by culvert). These crossings represent direct interaction of roads and streams and serve as a primary conduit for road-related erosion and storm drainage to reach streams. Accelerated sediment delivery to affected streams occurs at these points, and can affect water quality and substrate condition.

AQ (5): How and where does the road system create potential for pollutants, such as chemical spills, oils, deicing salts, or herbicides, to enter surface waters?

Due to the nature and location of the roads within this analysis area, there is little potential for chemical pollution of streams related to Forest Service roads. If roads were used to transport chemicals such as herbicide, the greatest potential for spills affecting aquatic resources would be at stream crossings or road segments located adjacent to streams. Segments of Forest Service Roads 44 and 27 are located near or adjacent to stream channels. These roads are open to public travel. Most of the roads in this analysis area (90 % +) are located on ridgetop or upper/middle sideslope locations. Where these roads cross streams, there would be some potential for chemical pollution should a chemical spill occur. Overall, State Highway 315 offers the greatest potential for chemical spills and deicing salts to enter waterways in this analysis area.

AQ (6): How and where is the road system "hydrologically connected" to the stream system? How do the connections affect water quality and quantity?

The road system in the analysis area is connected to streams primarily at stream crossings. There is occasional roadside ditch drainage that empties directly into streams and road surface (Forest Road 44 and 27) that lies adjacent to streams directing runoff and sediment from roadbed/fill surfaces to streams. The vast majority of road mileage within this analysis area is located along ridge-tops or upper/middle side-slopes although stream crossings can be problematic even with these roads. Hydrologic connectivity is generally reduced due to road location, however. Road crossings serve as an input point for road-related soil erosion to reach stream channels. Surface and subsurface water can be captured by roadbeds and cut slopes. If this water moves directly to stream channels, peakflows and hydrograph timing can be somewhat altered from the condition associated with an unroaded watershed.

AQ (7): What downstream beneficial uses of water exist in the area? What changes in uses and demand are expected over time? How are they affected or put at risk by road-derived pollutants?

The primary use classification for waters within the analysis area is the support of fish and aquatic life. The use classification for Spring Creek is "Fish and Aquatic Life" and "Recreation". The use classification for Yellow Creek is "Trout Stream". Downstream, the use classification of the Hiwassee River is "industrial water supply" and "domestic water supply". Little change in use and demand within the analysis area is expected in the near future. Excessive sediment delivery from roads would have the potential to

adversely affect fish and other aquatic organisms by reducing the quality of habitat. Fish or other aquatic organism passage is discussed in AQ10.

AQ (8): How and where does the road system affect wetlands?

There are no known locations where the road system is directly affecting wetland condition or function. Segments of Forest Road 44, 27 and 11191 encroach into the floodplain/riparian area of Yellow Creek, Ellis Branch, Spring Creek and Sheehan Branch but there is no direct affect to wetlands. Forest Road 297 is upstream from the Bowers Spring wetland area, but there are no known effects to this area from the road.

AQ (9): How does the road system alter physical channel dynamics, including isolation of floodplains, constraints on channel migration, and the movement of large wood, fine organic matter, and sediment?

The road system can alter physical channel dynamics by increasing runoff and sediment delivery to affected streams. Sediment entering streams can reduce pool depths and contribute to changes in channel substrate (i.e. embededness). Stream crossings can retard or prohibit the movement of large woody debris, fine organic matter and sediment. As previously noted there are an estimated 50 stream crossings within the affected area. Forest Roads 27, 44 and 11191 have several segments that are close to or adjacent to several streams within the analysis area. In general, floodplain isolation and channel migration impediment resulting from road location is not a concern within this analysis area although there are specific locations where this could be a problem.

Recommendation – Determine if there is opportunity to re-locate segments of Forest Roads 44 and 27 outside of the floodplain/riparian area of Yellow Creek, Ellis Branch or Spring Creek.

AQ (10): How and where does the road system restrict the migration and movement of aquatic organisms? What aquatic species (i.e. fish and amphibians) are affected and to what extent?

Restrictions to migration for aquatic species primarily occur at stream crossings. There are 54 perennial stream crossings along the road system in this project area; 7 are bridges, 41 are culverts, and 6 are fords. Thirteen of the culverts are potential barriers to fish, amphibians, or macroinvertebrates; six are administered by the Forest Service; two by the state of Tennessee; and five by counties. Correcting the flow through these barriers might increase habitat availability for Tennessee dace, a sensitive species that is typically found in the smallest headwaters of streams.

Fifteen of nineteen stream reaches capable of supporting fish in the analysis area have been surveyed. The four unsurveyed reaches are small channels that could support Tennessee dace.

Forty-three species of fish have been documented in these streams including one sensitive fish. The six barriers administered by the Forest Service could constitute migration barriers for Tennessee dace because it normally occurs in very small, headwater streams. Tennessee dace are known from 36 populations on this Forest. They are stable;

expansion into new areas is not essential to their viability and replacement of the culverts causing barriers is not necessary at this time.

Recommendation – When FSR 220 is upgraded, a bottomless arch culvert should be installed over Bullet Creek to allow fish passage.

AQ (11): How does the road system affect shading, litterfall, and riparian plant communities?

Of the 83.49 miles of roads in this project area, 9.3 (11%) are within the riparian corridor. Shading, litterfall and riparian plant communities are not significantly impacted by most of these roads because the canopy remains closed and the amount of permanently altered habitat is minor.

AQ (12): How and where does the road system contribute to fishing, poaching, or direct habitat loss for at-risk species?

Fishing and poaching could occur for the brown trout, rainbow trout, bluegill, green sunfish, largemouth bass, longear sunfish, redbreast sunfish, redear sunfish, rock bass, smallmouth bass, and spotted bass in this analysis area. The “at-risk” species (TESLR) are not subject to fishing or poaching. Direct habitat loss from the road system is unlikely because the riparian corridor will be protected.

AQ (14): To what extent does the road system overlap with areas of exceptionally high aquatic diversity or productivity or areas containing rare or unique aquatic species or species of interest?

Spring Creek is a very diverse aquatic community supporting all 43 species of fish found in this watershed. All of the other streams support from three to six species of fish. Sediment, from roads is impacting Spring Creek.

Recommendations – Stabilize problem roads (FSR 27 and 44). Decommission roads used only as trails (FSR 2004 and 297). Decommission roads not used or improperly located (FSR 2004A, FSR 2005A, and last 0.5 mile of FSR 220D)

TW4 – How does the road system directly affect unique communities or special features in the area?

Forest Service Road #297 represents the northern boundary of the 216 acre Bullet Creek Botanical Area as delineated in the Cherokee National Forest Revised Land and Resource Management Plan (RLRMP). The Bullet Creek Botanical Area supports a large Cumberland Forested Acid Seep community that is recognized as a rare community in the RLRMP. As currently mapped, this wetland community occupies the southern two thirds of the mapped area, with fingers of upland ridges and drains extending from the road (FSR 297), south into the wetland area. Currently there are no immediate, direct, negative effects occurring to this unique community from the existing road system, however the hydrology of the bog could be potentially altered if changes occur along FSR 297, especially to drainage ditches and culverts. The road is also a potential vector for the introduction of invasive plant species.

EF1 – What ecological attributes, particularly those unique to the region, would be affected by roading of currently unroaded areas?

The Bullet Creek Botanical Area is unique within the region as it supports the world's largest known population of white fringeless orchid (*Platanthera integrilabia*) which is currently a candidate for federal listing. The Cumberland Forested Acid Seep community that supports the orchid population could be negatively impacted if any new roads were constructed in areas that could alter the hydrology of the site.

Recommendation – Do not build any roads into the Bullet Creek Botanical Area.

EC (1): How does the road system affect the agency's direct costs and revenues? What, if any, changes in the road system will increase net revenue to the agency by reducing cost, increasing revenue, or both?

COSTS/REVENUES

Direct costs to the agency include road maintenance costs due to motor vehicle use and any needed restoration or protection costs to stabilize roads near resources such as streams.

Road maintenance costs fit into two categories:

- **Annual Maintenance.** Work performed to maintain serviceability, or repair failures during the year in which they occur. Includes preventive and/or cyclic maintenance performed in the year in which it is scheduled to occur. Unscheduled or catastrophic failures of components or assets may need to be repaired as a part of annual maintenance.

This amount will vary depending on the road's operational maintenance level which is the maintenance level currently assigned to a road considering today's needs, road condition, budget constraints, and environmental concerns. It defines the level to which the road is currently being maintained.

- **Deferred Maintenance.** Maintenance that was not performed when it should have been or when it was scheduled and which, therefore, was put off or delayed for a future period. When allowed to accumulate without limits or consideration of useful life, deferred maintenance leads to deterioration of performance, increased costs to repair, and decrease in asset value. Deferred maintenance needs may be categorized as critical or noncritical at any point in time. Continued deferral of noncritical maintenance will normally result in an increase in critical deferred maintenance.

A critical need is a requirement that addresses a serious threat to public health or safety, a natural resource, or the ability to carry out the mission of the organization.

The objective maintenance level is the maintenance level to be assigned at a future date considering future road management objectives, traffic needs, budget constraints, and environmental concerns. The objective maintenance level may be the same as, or higher or lower than, the operational maintenance level.

The operational maintenance level is the maintenance level currently assigned to a road considering today's needs, road condition, budget constraints, and environmental concerns. It defines the level to which the road is currently being maintained.

The following table shows the amount of funding needed for annual and deferred maintenance to maintain the roads to their objective maintenance levels and the actual annual and deferred maintenance expenditures (CMRD) in the study area.

Annual and Deferred Maintenance Needs and Expenditures for Roads in Spring Creek Watershed

NOTES

1. Roads that are shown in shaded cells are open to the public.
2. Average expenditures for FY06-07 & FY08 (projected). Costs for ML 1 & 2 roads based on random sample.
3. Roads are within Stewardship Area with termini in the area or at appropriate junctions close to the area boundary.

Road No.	Road Name	Length (mi.)	Objective Maint. Level	MAINTENANCE NEEDS		AVERAGE MAINTENANCE EXPENDITURES		Comments
				ANNUAL	DEFERRED	ANNUAL	DEFERRED	
27A	Cliffs @ Spring Cr	0.20	3	\$1,717	\$2,538	\$332	\$0	
27B	Spring Cr Swim. Hole	0.05	3	\$429	\$634	\$83	\$0	
27C	Spring Cr Shoot. Range	0.04	3	\$343	\$508	\$66	\$0	
44	Bullet Cr.	9.78	3	\$83,942	\$124,089	\$16,245	\$0	Provides access to Pvt prop.
220	White Cliff	5.72	3	\$49,095	\$72,575	\$9,501	\$0	Provides access to Pvt prop.
27	Spring Cr.	3.05	3	\$26,178	\$38,698	\$5,066	\$0	Provides access to Pvt prop.
2005	Tinker Br.	0.68	3	\$5,836	\$8,628	\$1,129	\$0	Provides access to Pvt prop.
2005B	Rocky Top	0.67	3	\$5,751	\$8,501	\$1,113	\$0	Provides access to Pvt prop.
297	Starr Mt	4.15	2	\$1,577	\$33,200	\$1,245	\$0	Provides access to Pvt prop.
2005	Tinker Br.	4.83	2	\$913	\$21,252	\$0	\$0	
297	Starr Mt	3.17	1	\$599	\$13,948	\$0	\$0	Managed as a trail #120 (Starr Mt Horse)
2005A	Tinker Br. Spur	0.31	1	\$59	\$1,364	\$0	\$0	
110201	Horse Camp	0.10	1	\$19	\$440	\$0	\$0	
110202	Wet Hollow	0.10	1	\$19	\$440	\$0	\$0	
110203	Davis Mill	0.13	2	\$25	\$572	\$0	\$0	
110402	Yellow Root	0.10	1	\$19	\$440	\$0	\$0	
110403	Bowers Spring w/field	0.10	1	\$19	\$440	\$0	\$0	
11041	Cochran Easement	0.68	2	\$129	\$2,992	\$0	\$0	Provides access to Pvt prop.
110501	Lookout	0.04	1	\$8	\$176	\$0	\$0	
110502	Sawmill	0.20	2	\$38	\$880	\$0	\$0	
110503	Bullet Hump	0.20	1	\$38	\$880	\$0	\$0	

Road No.	Road Name	Length (mi.)	Objective Maint. Level	MAINTENANCE NEEDS		AVERAGE MAINTENANCE EXPENDITURES		Comments
110504	Switchback	0.07	2	\$13	\$308	\$0	\$0	
110505	Pot	0.06	2	\$11	\$264	\$0	\$0	
110506	Bridge	0.06	1	\$11	\$264	\$0	\$0	Managed as a trail #121 (Bullet Cr Horse)
1106	Hogback Ridge	2.11	2	\$399	\$9,284	\$0	\$0	Managed as a trail #126 (Hogback Horse)
110601	Ivens	0.10	1	\$19	\$440	\$0	\$0	Managed as a trail #127 (Hogback Spur Horse) Provides access to Pvt prop.
11061	Gardner SU	0.21	2	\$40	\$924	\$0	\$0	Provides access to Pvt prop.
11178	Holly Springs	0.70	2	\$132	\$3,080	\$0	\$0	
11191	Spring Cr.-Sheehan Br	1.40	2	\$265	\$6,160	\$0	\$0	Provides access to Pvt prop. Natural ford
11192	Sheehan Br	0.30	2	\$57	\$1,320	\$0	\$0	
11213	N. Hogback Ridge	1.88	2	\$355	\$8,272	\$0	\$0	Managed as a trail #126 (Hogback Horse)
11215	Round Mt	1.72	2	\$325	\$7,568	\$0	\$0	Managed as a trail #126 (Yellow Cr Horse)
112201	Ellis Flats	0.05	2	\$9	\$220	\$0	\$0	
11272	Tinker-Carden	1.21	2	\$229	\$5,324	\$0	\$0	
11273	Pick Easement	0.11	2	\$21	\$484	\$0	\$0	Provides access to Pvt prop.
114601	Big Bottom	0.64	2	\$121	\$2,816	\$0	\$0	Natural ford
114801	Spring Cr. Spur	0.10	2	\$19	\$440	\$0	\$0	
2004	Chestnut Mt.	7.72	2	\$1,459	\$33,968	\$0	\$0	Managed as a trail #105 (Coffee Br. Horse)
2004A	Chestnut Mt. Spur A	0.50	1	\$95	\$2,200	\$0	\$0	
2009	Bullet Cr Access	0.25	2	\$47	\$1,100	\$0	\$0	Provides access to Pvt prop.
2010	Ruckers Br	2.94	2	\$556	\$12,936	\$0	\$0	
2010B	Ruckers Br Spur Rt	0.87	2	\$164	\$3,828	\$0	\$0	
2018	Hicks Br	2.99	2	\$565	\$13,156	\$0	\$0	
220D	N. Black Mt	0.35	2	\$66	\$1,540	\$0	\$0	
220D	N. Black Mt	0.10	1	\$19	\$440	\$0	\$0	
110502	Sawmill	0.20	2	\$38	\$880	\$0	\$0	
220H	White Cliff Spur H	0.07	2	\$13	\$308	\$0	\$0	
220K	White Cliff Spur K	1.20	2	\$227	\$5,280	\$0	\$0	

Road No.	Road Name	Length (mi.)	Objective Maint. Level	MAINTENANCE NEEDS		AVERAGE MAINTENANCE EXPENDITURES		Comments
2372	Hogback Br. Basin Cr	1.14	2	\$215	\$5,016	\$0	\$0	
2372-1	Hogback Br. Basin Cr	1.47	2	\$278	\$6,468	\$0	\$0	
297A	Starr Mt Extension	0.90	2	\$170	\$3,960	\$0	\$0	
297F	Starr Mt Lookout S.U.	0.50	2	\$95	\$2,200	\$125	\$0	Used by TN Dept Of Forestry to access lookout tower
44A	Vaughn Easement	0.12	2	\$23	\$528	\$0	\$0	Provides access to Pvt prop.
44B	Ellis Br. Spur	0.37	2	\$70	\$1,628	\$0	\$0	

Total miles maintained by
FS

66.51

\$182,838

\$474,919

\$34,906

\$0

COSTS BY MAINTENANCE LEVEL

ML1	\$922	\$21,472	\$0	\$0
ML2	\$8,625	\$197,276	\$1,370	\$0
ML3	\$173,291	\$256,171	\$33,536	\$0
ML4	\$0	\$0	\$0	\$0
ML5	\$0	\$0	\$0	\$0
Totals	\$182,838	\$474,919	\$34,906	\$0

Expenditures have decreased due to decreased funding. It is hard to predict future funding, but the trend in recent years is a decrease in road maintenance funding.

The need to provide forest visitors with safe and environmentally friendly roads seems to have become an important issue to many legislators. This concern may reverse the recent downward trend.

When funding is below the amount needed, priorities are set concerning which roads will have which maintenance activities (grading, brushing, gravel, etc.) performed.

All the maintenance level 3 roads in the area are graded twice a year and mowed once every two years.

Consideration is given to changing the objective maintenance level if a reduction in funds continues, e.g. maintenance level 3 (suitable for passenger car) is changed to maintenance level 2 (high clearance vehicles). Also, funds other than those specifically designated for road maintenance (CMRD) are often available for road maintenance. These include K-V Trust Fund - Special Legislation (CWK2), 10% Roads and Trails for States Fund (TRTR), Vegetation Management (NFVW), Wildlife Management (NFWF), Recreation Fee Revenue Program (FDFD), road maintenance deposits from timber purchasers, road permits that require the user to perform maintenance, and road legacy funds.

The road system provides for potential revenues to the agency in the following ways:

- Timber sales
- Recreation use fees
- Fees for special use and road use permits:
 - Access to timber on private land

Presently, direct costs exceed direct revenues, but many resource management targets could not be met or would cost more to accomplish without the current road system, so reducing the number of roads and/or reducing the amount of maintenance on roads could result in a net decrease in revenue. For example, roads that provide access to areas for prescribed burns which are needed to reduce hazardous fuels.

CHANGES

Changes to the road system that could increase net revenue:

- Manage the suitable timber base that can be accessed by existing roads and/or new roads that are low cost and would not harm resources. Any new classified roads would likely have an objective maintenance level of 1 or 2 which reduce the long-term funding needs. New roads would be built to reduce annual maintenance costs. This would be done by the construction features including broad-based dips and the stabilization of the roadbed with gravel or vegetation. Some of the costs associated with this include planning, design, and contract administration. The forest would collect road maintenance deposits from the purchasers and/or the purchaser would perform the necessary maintenance on roads not open the public.

It could also provide an opportunity to perform deferred maintenance work on roads open to the public if the work is also needed to accommodate log trucks. Such work would be done so that long-term impacts of a road to adjacent resources are reduced.

- Close roads to motor vehicle use by the public. This could require the following costs: planning, enforcement, and mitigating unacceptable environmental effects such as sedimentation from roads adjacent to streams. Possible consequences of closure: decreases in revenues from commodities such as timber (if road is no longer used to access timber), recreation fees, and other services such as special-use permits. Reduced maintenance costs and reductions in costs to mitigate unacceptable environmental effects would likely increase in net revenues. Some roads were built prior to FS ownership and were considered “public” access with an established historical use. Changes that prevent the public from using roads they feel they have a “right” to use could increase costs to the agency due to the need for enforcement of the closure and an increase in the amount of time spent responding to complaints.
- Decommissioning is the demolition, dismantling, removal, obliteration and/or disposal of a deteriorated or otherwise unneeded road, including necessary cleanup work. Decommissioning would be done so that the road no longer needs maintenance. Costs include planning, monitoring, repairing or mitigating any unacceptable impacts to resources, and the actual decommissioning work. Possible consequences include decreases in revenues from commodities such as timber, recreation fees, and other services such as special-use permits. This work would reduce maintenance costs and reduce costs to mitigate any unacceptable impacts to resources. This work could make some areas harder to access for resource management which could increase costs.
- Encourage individuals who use Forest Service roads to access private land to form homeowner associations and/or to approach the county road department to maintain those roads. This would reduce the agency’s road maintenance costs. Except for one or two rare situations in other areas of the forest, the Polk County road department has indicated that it is not interested in maintaining any roads that are currently being maintained by the Forest Service.

EC (2) How does the road system affect priced and non-priced consequences included in economic efficiency analysis used to assess net benefits to society?

The management of the road system involves decisions to build new roads, reconstruct roads, perform maintenance on some roads and not others, decommission roads, or temporarily close them if they are no longer needed or are causing resource damage.

Construction of new roads, although improving access to the area (a benefit to some), may diminish the desired natural and remote character associated with the area and would reduce its passive use value to some visitors.

Passive use values include features society values simply because they exist without actually using them or they expect them to be preserved for others to use and enjoy (a

scenic landscape, wilderness, or an endangered plant or animal). They are also features valued for preservation (cultural resources and historic sites).

Decommissioning and/or closing roads may be necessary to meet budget and funding constraints or to prevent resource damage, but may diminish access to areas that are important to certain users of forest resources. People with a strong attachment to a place, activity, or road may consider it a loss in value unless they are willing and able to find, and adapt, to substitute experiences.

The road users that contribute the most significant economic benefits are those who visit the area for recreation-related activities such as:

Driving for pleasure

Roads #297, #220, #44, and #27 are part of a network of roads that is very popular with sightseers.

Camping

Roads #297, #44 and #27 provide access to numerous dispersed camping sites.

Hunting

The open roads provide access and closed roads make game retrieval easier.

Fishing

Road #27 provides access to Spring Cr.
Road #44 provides access to Spring Cr. and Yellow Cr.

Hiking/ Horseback riding

Roads #44, #297, & #220 provide access to trails, #104, #105, #119, #121, #122, #123, #124, #126, & #127, and foot travel is permitted on many roads closed to motor vehicle use.
Roads #297, #44, & #220 provide access to Bullet Cr Falls (access is across private land) and White Cliff (on private property) which are popular hiking destinations.

Wildlife viewing

The open roads are used by visitors for this activity.

Hiking in wilderness areas

Road #44 provides access to trails in the Gee Creek Wilderness.

Visiting historical sites/areas

Road #297 provides access to the site of the White Cliffs Springs Hotel (on private property)

Other

Road #27 provides access to the Spring Cr. Shooting Range

Roads that provide access for other uses can also be considered as benefits:

Roads #297 and #297F provide access to communication towers and the TN Department of Forestry lookout tower on Starr Mt

Roads #297, #44, #220, #27, #2005, #2005B, #44A, #11061, #2009, #11191, #11273, and #11041 provide access to private property.

Portions of roads #44, #27, #2005 and #11191 are in riparian areas which can be considered a cost to society because of the roads impact on water quality.

Based on the activities that the road system accommodates, the following consequences are realized:

Priced:

- Sale of commodities such as timber (on Forest Service and private land)
- Less cost due to convenient access for research, inventory, and monitoring
- Road development and maintenance
- Liability
- Maintenance of trails and recreation-related sites
- Fire suppression
- Resource management
- Control of invasive species
- Mitigation of resource damage from roads

Non-priced:

- Resource protection such as fire suppression, wildlife and watershed management to preserve the “passive” value that the public assigns to natural resources.
- Access to public land and its resources
- Noise and air pollution
- Water quality
- Fish habitat
- Effect of road density on wildlife
- Litter

Typically, the road system increases the value of both priced and non-priced commodities, because without access these items have less value or cost more to obtain. The most notable exception to this is commodities that have an intrinsic value because they are difficult to access, such as a wilderness or areas with low road densities.

The type of experience society desires in the study area and its associated value depends in large part on whether or not there are roads, their density, their condition, and whether or not they are open to motor vehicle use. The consequence may be a net benefit or a cost depending on what value the public assigns to the type of experience they desire.

Road management activities that benefit some members of society by enhancing their quality of life, may negatively impact resources that other members value for their quality of life. These may include impacts to resources such as soil, water, habitat, scenic beauty,

or a reduction in value that people assign to an area such as limited accessibility or solitude. Public input is needed to provide information to evaluate the tradeoffs being considered and will help assign “value” to non-priced consequences.

EC (3) How does the road system affect the distribution of benefits and cost among affected people?

Accessibility to resources in the study area is important to the local economy. Commerce, associated with forest visitors, also has an economic influence on Polk, Bradley, McMinn, and Monroe Counties and the communities of Etowah, Athens, Tellico Plains, Benton, and Cleveland. Since counties do not collect property taxes on federal land, activities that generate other tax revenue such as sales tax are beneficial to the community.

Forest roads are the primary means of access to forest resources. Changes to the road system and/or in road management can affect long-established access and use patterns, lifestyles, recreation activities, forest resource-related businesses, collection of forest products, fire suppression, and distribution of recreational opportunities available to users. These effects can change the distribution benefits and costs for all users.

Construction, maintenance, or decommissioning of roads in the area is not likely to have a significant long-term impact on the economic benefits derived from recreation activities unless there is a significant reduction in the total mileage of roads that provide access for this use.

The road system distributes the following economic benefits to businesses of various sizes as well as individuals:

- Income from the sale of gas, food, lodging, supplies, and souvenirs.
- Employment under Government contracts for:
 - road maintenance
 - control of invasive species
 - maintenance of wildlife openings
 - vegetation management
 - trail maintenance
 - watershed management
 - fire suppression
 - maintenance of recreation sites

The road system creates different benefits and costs to people who use vehicles for travel within the area than to visitors who travel on foot or by other non-motorized methods. For those who choose non-motorized forms of transportation, the economics of the road system may cost more in terms of aesthetic values, air and noise pollution, and conflicts with motorized vehicle use.

Reduced road mileage and/or maintenance can lead to unbalanced recreation opportunities among users and directly affect the distribution of economic benefits and costs to the region. Closing roads would limit or eliminate access to those who are unable

or unwilling to walk long distances and could increase the cost of resource removal, which usually requires mechanized equipment. This could have economic impacts for the local communities, which may depend on convenient access for employment opportunities.

In contrast, improved road access can increase the efficiency and effectiveness of fire-suppression activities, but can also contribute to an increase in the number of human-caused fires in the area. Closing or restricting roads to minimize traffic could be a benefit by reducing fires and keeping the road in a condition that facilitates use by fire fighting equipment.

State and county roads between communities affect how the benefits and costs associated with use of the area are distributed beyond the immediate communities. Forest Service roads #27, #297, and #44 are part of a road network that includes the state and county road system.

As previously stated in EC (2), the type of experiences and their associated values are dependent upon whether or not there are roads, how the roads are managed, and the desires of the user groups or individual. This may be a benefit or a cost depending on what value the public assigns to the type of experience they desire.

TM (2 and 3): How does the road system affect managing the suitable timber base? How does the road system affect access to timber stands needing silvicultural treatment?

One area of National Forest land, approximately 32 acres, is at a distance of greater than 1/2 mile from an existing road. These 32 acres are within compartment 120. Current road system is generally adequate for silvicultural management and access to timber. Limited amounts of temporary road and system road may be needed.

WP (1): How does the road system affect access, constructing, maintaining, monitoring, and operating water diversions, impoundments, and distribution canals or pipes?

Road access is adequate within this analysis area to build, maintain, operate and monitor any structures associated with present and future water uses. Currently on national forest lands, these structures are not present.

WP (2): How does road development and use affect water quality in municipal watersheds?

There are no streams classified as municipal watersheds within the analysis area. The analysis area is a portion of the Hiwassee River watershed. The Hiwassee River is classified as “Domestic and Industrial Water Supply” by the State of Tennessee. The effects of roads on water quality within the analysis area are considered in Questions **AQ (1) – AQ (9)**.

WP (3): How does the road system affect access to hydroelectric power generation?

No hydroelectric power generation facilities other than a transmission line are located within this analysis area. The road system is adequate to provide access to the transmission line.

SU (1): How does this road system affect managing special-use permit sites (concessionaires, communication sites, utility corridors, and so on)?

One TVA power transmission line crosses this analysis area. This is the Apalachia Powerhouse-East Cleveland #2 line (permit # OCOHIW247). It crosses in a Northeast Southwest direction. Road access to this line is critical to perform periodic maintenance. Necessary access roads are in place and they are adequate.

Fort Loudoun Electric Corporation has power transmission lines on National Forest land along Towee Falls C.H., Ivy Trail C.H., and Maple Springs C.H. to supply electricity to private residences. Necessary access roads are in place and they are adequate.

TDS Telcom has telephone lines on National Forest land along Ivy Trail C.H. and maple Springs C.H. Necessary access roads are in place and they are adequate.

NFSR 297 and 297F are used to access the Starr Mountain Electronic Site in Compartment 101. Necessary access roads are in place and they are adequate.

Volunteer Electric Cooperative has a power transmission line on National Forest land along the Tellico-Reliance road. Necessary access road is in place and it is adequate.

Bell South has telephone lines on National Forest land along the Tellico –Reliance road (Compartment 145) and NFSR 44 at Merrill Cemetery (Compartment 119) Necessary access roads are in place and they are adequate.

Polk County Road Department has a road easement for the bridge over Spring Creek on NFSR 27.

Monroe County Road Department has a road easement on Ivy Trail, CH 640.

Edgar Cochran has a road easement to an inholding. NFSR 11041. This is in Compartment 104.

Gardner and Duggan both have road easements on NFSR 11061 to an inholding. This is in compartment 106.

GT (1): How does the road system connect to public roads and provide primary access to communities?

There are no specific communities accessed solely by Forest Service roads that serve the study area. NFSRs in the study area connect to state and county roads that lead to the Reliance and Springtown communities in Polk County and the Holly Springs and Bullet Creek communities in Monroe County. The collector road system within the study area is mainly State Highways and Polk and Monroe County roads but includes all or parts of the following Forest Service collector roads:

<u>Road No.</u>	<u>Road Name</u>
44	Bullet Creek
220	White Cliff
297	Starr Mt.
27	Spring Creek

GT (2): How does the road system connect large blocks of land in other ownership to public roads (ad hoc communities, subdivisions, inholdings, and so on)?

There are some private land inholdings in the study area that are accessed by roads described in GT (1) plus some additional local roads that provide access through easement or special use permit. In addition to the roads in GT (1), the following roads provide access to private land:

Local roads open to the public that provide access to inholdings:

<u>Road No.</u>	<u>Road Name</u>
2005	Tinker Branch (East end)
2005B	Rocky Top

Local roads not usually open to the public that provide access to inholdings:

<u>Road No.</u>	<u>Road Name</u>
11191	Spring Cr.-Sheehan Br.
11041	Cochran Easement
110601	Ivens
11061	Gardner Special Use
44A	Vaughn Easement
2009	Bullet Creek Access
11273	Pick Easement

GT (3): How does the road system affect managing roads with shared ownership or with limited jurisdiction (RS 2477, cost-share, prescriptive rights, FLPMA easements, FRTA easements, DOT easements)?

There are no shared ownership (cost-share) roads on the Forest. The FS has a co-operative agreement with Polk County for sharing various types of roadwork from planning to maintenance on roads of common interest to the FS and to the county.

The bridge that crosses Bullet Creek on Monroe County Rd #633 has been proposed for replacement through the Forest Highway program.

GT (4): How does the road system address the safety of road users?

There are several open FS roads in the study area that are objective maintenance level 3 (suitable for passenger cars). They are single lane with turnouts, and designed for low volume and low speeds. Since they are subject to the Highway Safety Act, safety of road users is a concern. Because they are designed for low speed and low volume, safety is usually not a major issue, but as private land has been subdivided, the number of land owners has increased and has caused in an increase in traffic. There may be a need to work with the counties to accept responsibility for the maintenance of some roads.

The new Spring Creek Shooting Range has increased the number of vehicles using NFSR 27, but no problems have occurred or are expected.

The objective maintenance level 3 roads receive routine maintenance which normally consists of blading twice a year and roadside mowing every two years. Other maintenance activities that are done on an as-needed basis include gravel placement, hazard tree removal, slide repair, pothole repair, etc.

Most of the other roads in the area are not usually open to the public and are used only when needed for specific purposes or managed for other uses, such as hunter access, horse trails, or timber sales. Safety is not as much of a concern on those roads since there is generally single use and very little traffic.

Replacing the bridge that crosses Bullet Creek on Monroe County Rd #633 will make this road safer. The new bridge will be wider and on better alignment.

The following roads have objective maintenance level 3:

<u>Road No.</u>	<u>Road Name</u>
44	Bullet Creek
297	Starr Mt
220	White Cliff
27	Spring Creek
27A	Cliffs at Spring Creek
27B	Spring Creek Swimming Hole
27C	Spring Creek Shooting Range
2005	Tinker Branch
2005B	Rocky Top

Recommendations -

1. Determine if the roads that are used as trails should no longer be managed as roads, otherwise keep all system roads as currently managed (same RMOs).
2. Improve and/or maintain roads so that operational maintenance level is the same as the objective maintenance level especially for roads open to the public that have sections in riparian areas:
 - NFSR 27 (adjacent to Spring Cr.)
 - NFSR 2005 (adjacent to Tinker Br.)
 - NFSR 11191 (fords Spring Cr.)
 - NFSR 44 (adjacent to Ellis Br. & Yellow Cr.)
 - NFSR 220 (crosses Bullet Cr.)
3. In the past, paving NFSR 27, Spring Cr. with asphalt has been considered. This may be desirable to reduce the amount of sediment entering Spring Cr., but such a proposal should consider that funds to maintain asphalt surfaced roads have been very difficult to obtain. Emphasis should be placed on obtaining funds to maintain existing asphalt-surfaced roads.
4. Evaluate if barriers to aquatic organism passage exist at the following locations:
 - NFSR 27 at Tinker Br. (existing round pipe)

NFSR 220 at Bullet Cr. (existing vented concrete ford)
CH 27 at Spring Cr. (existing box culverts)

5. Consider improvements to existing natural fords on NFSR 11191, Spring Cr.- Sheehan Br. and NFSR 114601, Big Bottom
6. Decommission unclassified roads where illegal access is taking place, and continue to identify other classified and unclassified roads to decommission.
7. Monitor private development along NFSRs with FS jurisdiction and maintenance and look for opportunities to turn jurisdiction and maintenance over to counties where appropriate. Especially, monitor development along the east end of NFSR 297 (just outside the study area), NFSR 44 (North & South ends), and 2005B.

Continue to maintain and improve high use open roads to meet Goals 47, 48 and 50.

UR (1): Is there now or will there be in the future excess supply or excess demand for unroaded* recreation opportunities?

There are no inventoried roadless areas in the study area. The Gee Creek Wilderness is along the northwestern boundary. The area is managed primarily as a Roaded Natural recreation setting as described in the Forest Plan as, *“developed, but highly roaded settings popular for dispersed recreation activities such as hunting, fishing, camping and horseback riding”* (p. 304). The Starr Mountain Trail System provides unroaded recreation opportunities in the Watershed and helps satisfy a growing demand for equestrian opportunities and settings within the area.

UR (2): Is developing new roads into unroaded areas, decommissioning of existing roads, or changing the maintenance of existing roads causing substantial changes in the quantity, quality, or type of unroaded recreation opportunities?

Developing new system roads that intersect the Starr Mountain Trail system could degrade the experience desired by hikers and equestrian users. Decommissioning existing gated roads or converting their use to trails and/or trailhead parking could improve the quality of the Trails Complex by improving access and providing additional miles of trail opportunities.

UR (3): What are the adverse effects of noise and other disturbance caused by developing, using, and maintaining roads, on the quantity, quality, and type of unroaded recreation opportunities?

Road improvements may invite additional use of the area and decrease the sense of remoteness and solitude. However, the sites and sounds of developing and maintaining roads in the project area would be hardly noticeable to the average user.

UR (4): Who participates in unroaded recreation in the areas affected by building, maintaining, and decommissioning roads?

Activities in the unroaded areas include hunting, fishing, hiking and equestrian opportunities. These activities are enjoyed by visitors on a primarily local but also regional scale.

UR (5): What are these participants' attachments to the area, how strong are their feelings, and are alternative opportunities and locations available?

Hikers, equestrians, hunters and anglers attachments may include strong feelings of ownership from local visitors or those taking part in volunteer work. The developed dispersed campsites and shooting range provide a level of comfort while preserving the desired natural setting.

UR(6): How is developing new roads into unroaded areas affecting the Scenic Integrity Objective, SIO(s)?

Developing roads into unroaded areas has the highest potential to diminish or degrade scenic integrity along the Starr Mountain Trail Complex.

RR (3): What are the adverse effects of noise and other disturbances caused by building, using, and maintaining roads on the quantity, quality, or type of roaded recreation opportunities?

The effects of noise and other disturbances caused by maintaining the roadway is unlikely to affect the overall visitor experience, and any effect is will be temporary in nature. Building additional roads may diminish the overall appeal of the scenery.

RR (4): Who participates in road-related recreation in the areas affected by road building, changes in road maintenance, or road decommissioning?

Visitors to the area utilize roadways in the project area as a venue for hunting, driving for pleasure, viewing scenery, and to access the support facilities and trails in the project area. The Tellico-Reliance Road TN315, is a major route for the small communities in and bordering the project area.

RR (5): What are these participants attachments to the area, how strong are their feelings, and are alternative opportunities and locations available?

Due to close proximity to privately owned land, local visitors may have strong attachments to this area, and alternatives may not be considered adequate.

RR(6): How does the road system affect the Scenic Integrity Objective, SIO?

The road system affects the SIO's by defining the social and physical setting from where the project area is primarily viewed. The higher elevations along Starr Mountain provide long distance vistas to the surrounding forested mountainous backdrop. Additional roads may detract from the desired scenic quality.

PV (4): Will building, closing, or decommissioning roads substantially affect passive-use value?

Driving for pleasure and recreating on FS trails may be considered a passive recreational use. Road management will affect this value in a positive or negative way depending on the user.

SI (1): What are people's perceived needs and values for roads? How does road management affect people's dependence on, need for, and desire for roads?

Limited high quality roadways support driving for pleasure and maintain the desired ROS roaded natural character. Increased numbers of roads may diminish the desired natural and remote character desired by forest visitors. The Tellico-Reliance Road TN315 provides access to local communities.

SI (2): What are people's perceived needs and values for access? How does road management affect people's dependence on, need for, and desire for access?

Access is desired and road management can contribute to the overall visitor experience/visitor expectation.

SI(8): How does road management affect wilderness attributes, including natural integrity, natural appearance, opportunities for solitude, and opportunities for primitive recreation?

The northwest project area is bordered by Gee Creek Wilderness. Road management in the project area may affect the Wilderness attributes above. Increase in road density may be linked to degrading Wilderness attributes. Decommissioning roads may improve those attributes.

SI (10) How does road management affect people's sense of place?

Road management can both contribute to and detract from the unique sense of place drawing visitors to an area. Quality of road surface, mowing schedule, and thoughtful design of support facilities can compliment the inherent qualities of a natural forested setting or detract from the overall aesthetic appeal.

SUMMARY AND RECOMMENDATIONS

Surface drainage can be improved by additional aggregate surfacing, additional drainage dips, cross drain culverts, berms and outsloping. These mitigation measures can reduce the impacts associated with the roads, including effects to surface and subsurface hydrology and erosion/sediment rates.

Determine if there is opportunity to re-locate segments of Forest Roads 44 and 27 outside of the floodplain/riparian area of Yellow Creek, Ellis Branch or Spring Creek or to stabilize road surface in critical sections.

When Forest Roads are upgraded, culverts should be re-installed to allow fish passage.

Decommission or stabilize problem roads.

Do not build any roads into the Bullet Creek Botanical Area.

Determine if the roads that are used as trails should no longer be managed as roads, otherwise keep all system roads as currently managed (same RMOs).

Improve and/or maintain roads so that operational maintenance level is the same as the objective maintenance level especially for roads open to the public that have sections in riparian areas:

- NFSR 27 (adjacent to Spring Cr.)
- NFSR 2005 (adjacent to Tinker Br.)
- NFSR 11191 (fords Spring Cr.)
- NFSR 44 (adjacent to Ellis Br. & Yellow Cr.)
- NFSR 220 (crosses Bullet Cr.)

In the past, paving NFSR 27, Spring Cr. with asphalt has been considered. This may be desirable to reduce the amount of sediment entering Spring Cr., but such a proposal should consider that funds to maintain asphalt surfaced roads have been very difficult to obtain. Emphasis should be placed on obtaining funds to maintain existing asphalt-surfaced roads.

Evaluate if barriers to aquatic organism passage exist at the following locations:

- NFSR 27 at Tinker Br. (existing round pipe)
- NFSR 220 at Bullet Cr. (existing vented concrete ford)
- CH 27 at Spring Cr. (existing box culverts)

Consider improvements to existing natural fords on NFSR 11191, Spring Cr.-Sheehan Br. and NFSR 114601, Big Bottom

Decommission unclassified roads where illegal access is taking place, and continue to identify other classified and unclassified roads to decommission.

Monitor private development along NFSRs with FS jurisdiction and maintenance and look for opportunities to turn jurisdiction and maintenance over to counties where appropriate. Especially, monitor development along the east end of NFSR 297 (just outside the study area), NFSR 44 (North & South ends), and 2005B.

Continue to maintain and improve high use open roads to meet Goals 47, 48 and 50.

BIBLIOGRAPHY

USDA Forest Service, Washington Office. 1999. FS-643 Roads Analysis: Informing Decisions About Managing the National Forest Transportation System

ROADS ANALYSIS TEAM

Mary Dodson, Wildlife Biologist
Janan Hay, NEPA Coordinator
Jim Herrig, Forest Fisheries Biologist
Gary Hubbard, Civil Engineer
Mike Nicolo, Forest Hydrologist
Bob Lewis, Silviculturist
Mark Pistrang, Forest Botanist/Ecologist
Doug Byerly, Forest Recreation Specialist
Tom Coppinger, Recreation Specialist
Sarah Belcher, Landscape Architect

APPENDIX A

Existing Roads by Jurisdiction TAUs H-1,9,10,11,12,22,26,27,29 (all or part)

NOTES

1. Jurisdiction: F = Forest Service
2. All known FS roads are listed. There are no State, County or Private roads in the Stewardship Area.
3. FS roads that are shown in shaded cells are open to the public.
4. Roads are within Stewardship Area with termini in the area or at appropriate junctions close to the area boundary.

Road No.	Road Name	Juris.	Termini		Length	RMO (see separate documents)	Comments
			Beginning	Ending			
State							
315	Tellico-Reliance	TN	TN 30	TN 39	15.04		
				Total State Roads	15.04		
County							
CH637	Ivy Trail	County	TN 315	CH 640	2.45		
CH653	Bullet Cr	County	TN 315	CH 655 & NFSR 44(North side)	1.88		
CH640	Jones Road(Towee Falls)	County	TN 315	CH 665	2.09		
CH640-1	Steer Cr	County	CH 665	CH 637	1.05		
CH654	Basin Cr	County	CH 655	DE	0.50		
CH652	Dry Cr	County	CH 651	CH 653	0.25		
CH655	Maple Springs	County	TN 315	CH 653	1.91		
CH 656	Shields Br	County	CH655	DE	0.70		
CH27	Spring Cr	County	US 411	TN 315	2.19		East & West sides of NFSR 27
CH44	Ellis Cr	County	TN 315	NFSR 44 (South side)	1.09		
CH22	Towee Pike	County	TN 315	NFSR 22 & NFSR 22B	1.47		
				Total County Roads	15.58		
Private	No Private roads						
				Total Private Roads	0.00		

Road No.	Road Name	Juris.	Termini		Length	RMO (see separate documents)	Comments
			Beginning	Ending			
Forest Service							
297	Starr Mt	FS	NFSR 220	Gate	4.15	D2-HC	
27A	Cliffs @ Spring Cr	FS	NFSR 27	DE	0.20	C3	
27B	Spring Cr Swim. Hole	FS	NFSR 27	DE	0.05	C3	
27C	Spring Cr Shoot. Range	FS	NFSR 27	DE	0.04	C3	
44	Bullet Cr.	FS	CH 653	CH 44	9.78	C3	
220	White Cliff	FS	NFSR 297	NFSR 44	5.72	C3	
27	Spring Cr.	FS	Spring Cr. Study Area	CH 27East side)	3.05	C3	
2005	Tinker Br.	FS	NFSR 2005B	NFSR 27(North side)	0.68	C3	Provides access to Pvt prop.
2005B	Rocky Top	FS	NFSR 2005	NFSR 11273	0.67	C3	Provides access to Pvt prop.
2005	Tinker Br.	FS	NFSR 27(South side)	NFSR 2005B	4.83	D2-FS	In past, has been opened during hunting seasons
297	Starr Mt	FS	Gate	NFSR 44	3.17	D1	Managed as a trail #120 (Starr Mt Horse)
2005A	Tinker Br. Spur	FS	NFSR 2005	DE	0.31	D1	
110201	Horse Camp	FS	NFSR 297	DE @ w/field	0.10	D1	
110202	Wet Hollow	FS	NFSR 220	DE	0.10	D1	
110203	Davis Mill	FS	NFSR 220	DE	0.13	D2-FS	
110402	Yellow Root	FS	NFSR 297	DE	0.10	D1	
110403	Bowers Spring w/field	FS	NFSR 297	DE	0.10	D1	
11041	Cochran Easement	FS	NFSR 297	DE	0.68	D2-FS	
110501	Lookout	FS	NFSR 297	DE	0.04	D1	
110502	Sawmill	FS	NFSR 297	DE	0.20	D2-FS	
110503	Bullet Hump	FS	NFSR 297	DE	0.20	D1	
110504	Switchback	FS	NFSR 220	DE	0.07	D2-FS	
110505	Pot	FS	NFSR 220	DE	0.06	D2-FS	
110506	Bridge	FS	NFSR 220	DE	0.06	D1	Managed as a trail #121 (Bullet Cr Horse)

Road No.	Road Name	Juris.	Termini		Length	RMO (see separate documents)	Comments
			Beginning	Ending			
1106	Hogback Ridge	FS	NFSR 44	DE	2.11	D2-FS	Managed as a trail #126 (Hogback Horse)
110601	Ivens	FS	NFSR 44	DE	0.10	D1	Managed as a trail #127 (Hogback Spur)
11061	Gardner SU	FS	NFSR 44	Pvt land	0.21	D2-FS	
11178	Holly Springs	FS	CH640	DE	0.70	D2-FS	
11191	Spring Cr.-Sheehan Br	FS	NFSR 44	DE	1.40	D2-FS	
11192	Sheehan Br	FS	NFSR 11191	DE @ w/field	0.30	D2-WL	
11213	N. Hogback Ridge	FS	NSFR 44	DE	1.88	D2-FS	Managed as a trail #126 (Hogback Horse)
11215	Round Mt	FS	NFSR 44	DE	1.72	D2-FS	
112201	Ellis Flats	FS	NSFR 44	DE	0.05	D2-FS	
11272	Tinker-Carden	FS	NFSR 2005	DE	1.21	D2-FS	
11273	Pick Easement	FS	NFSR 2005B	Pvt Land	0.11	D2-FS	
114601	Big Bottom	FS	NFSR 27	DE	0.64	D2-FS	
114801	Spring Cr. Spur	FS	NFSR 27	DE	0.10	D2-FS	
2004	Chestnut Mt.	FS	NFSR 27	NFSR 44	7.72	D2-HC	Managed as a trail #105 (Coffee Br.)
2004A	Chestnut Mt. Spur A	FS	NFSR 2004	DE	0.05	D1	
2009	Bullet Cr Access	PVT	NFSR 44	PVT land	0.25	D2-FS	
2010	Ruckers Br	FS	TN 315	DE	2.94	D2-FS	
2010B	Ruckers Br Spur Rt	FS	NFSR 2010	DE	0.87	D2-FS	
2018	Hicks Br	FS	CH 637	DE	2.99	D2-FS	
220D	N. Black Mt	FS	NFSR 220	DE	0.45	D1	
220H	White Cliff Spur H	FS	NFSR 220	DE @ w/field	0.07	D2-WL	
220K	White Cliff Spur K	FS	NFSR 220	DE	1.20	D2-FS	
2372	Hogback Br. Basin Cr	FS	NFSR 44	DE	1.14	D2-FS	
2372-1	Hogback Br. Basin Cr	FS	NFSR 44	DE	1.47	D2-FS	
297A	Starr Mt Extension	FS	NFSR 297	DE	0.90	D2-FS	
297F	Starr Mt Lookout S.U.	FS	NFSR 297	DE	0.50	D2-FS	
44A	Vaughn Easement	FS	NFSR 44	Pvt land	0.12	D2-FS	

Road No.	Road Name	Juris.	Termini		Length	RMO (see separate documents)	Comments
			Beginning	Ending			
44B	Ellis Br. Spur	FS	NFSR 44	DE	0.37	D2-FS	
				Total FS Roads in Area	66.06		
Forest Service Roads that provide access to area							
297	Starr Mt	FS	TN 39-1	NFSR 220	2.39	C3	
27	Spring Cr.	FS	CH 27(West side)	Spring Cr. Study Area	2.00	C3	
			Total FS Roads that provide access to Area		4.39		
Total FS Jurisdiction roads					70.45		
			Maintained by FS				
			Maintained by other				
						Def. Mtce. Unit Cost	Def. Mtce. Total Cost
		Miles by Objective ML	Obj. ML Decommission				
			Obj. ML 1		4.78		
			Obj. ML 2		41.09		
			Obj. ML 3		24.58		
			Obj. ML 4		0.00		
			Obj. ML 5		0.00		
			Total		70.45		