Cherokee National Forest
USDA Forest Service
Southern Region

Roads Analysis Report

Middle Upper Citico Creek Assessment

March 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 Middle Upper Citico Creek Assessment area is approximately 33,700 acres including Citico Creek Wilderness and 13,500 acres excluding wilderness. Approximately 95% of the area is National Forest System land. The majority of the assessment area (10,250 ac) is in Management Prescription (MP) 9.H of the Cherokee National Forest Revised Land and Resource Management Plan. Other MPs represented include: 4.F (240 ac), 5.A (16 ac), 5.B (27 ac), 7.A (2,260 ac), 7.B (1,140 ac), and 7.D (400 ac). Figure 1 displays the location of the analysis area within the Ocoee/Hiwassee Ranger District of the Cherokee National Forest.

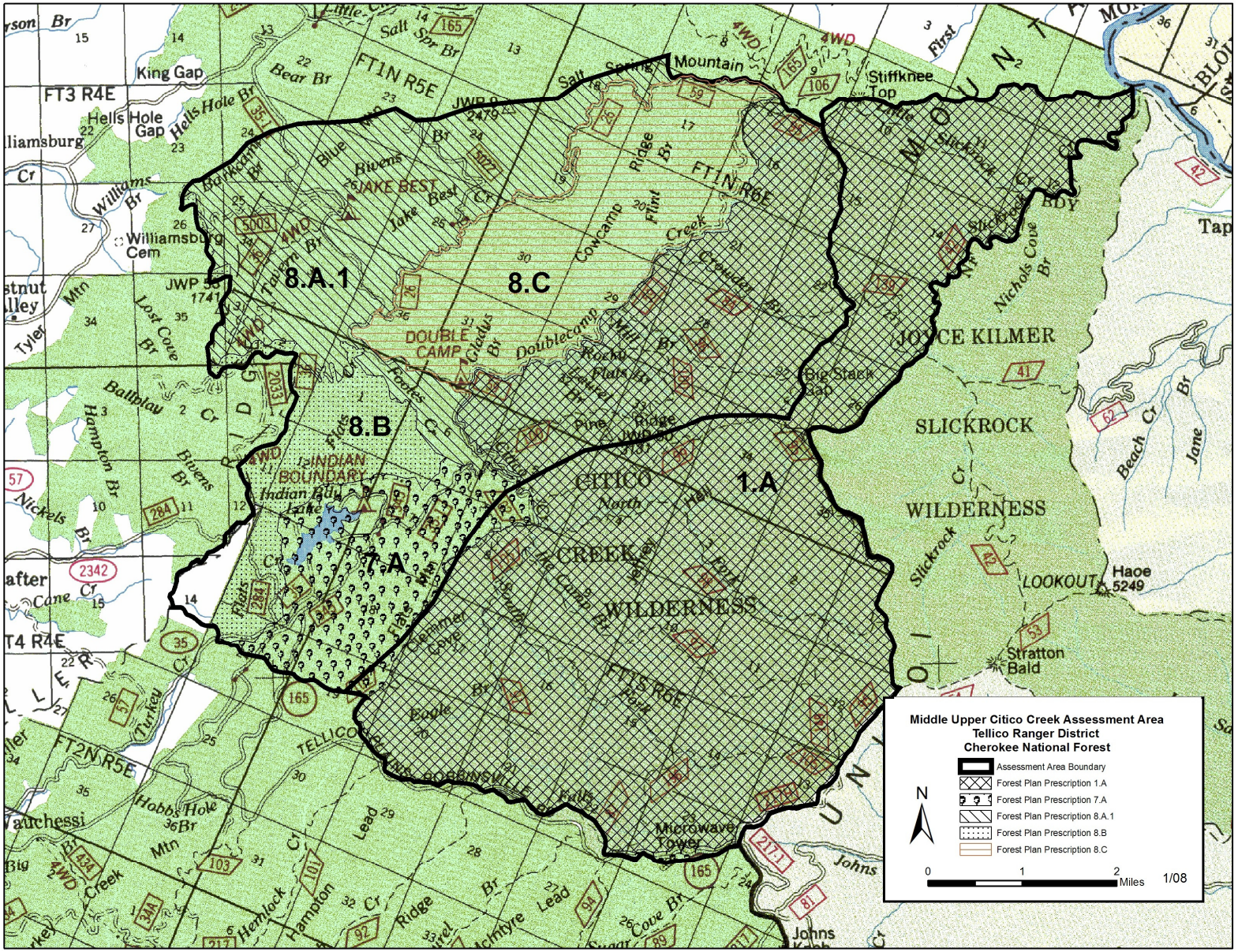
OBJECTIVES

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 SYSTEM ROAD CONDITIONS

Most of the study area is on National Forest System land, and of the roads assessed in and near the boundary of this study area, most are National Forest System Roads (NFSRs) under the jurisdiction and maintenance of the Forest Service. There are approximately 60 miles of Forest Service jurisdiction roads within the analysis area. Many of the Forest Service roads (approximately 26 miles) are gated, vegetated, and closed seasonally or throughout the year. Most of the NFSRs are in fair to good condition, but all could use more maintenance. Deferred maintenance needs exist for just about all roads.


Middle Upper Citico Creek Assessment Area
Tellico Ranger District
Cherokee National Forest
Assessment Area Boundary
Forest Plan Prescription 1.A
Forest Plan Prescription 7.A
Forest Plan Prescription 8.A.1
Forest Plan Prescription 8.B
Forest Plan Prescription 8.C
N
0
1
2
Miles
1/08
8.A.1
8.C
8.B
7.A
1.A
JOYCE KILMER
SLICKROCK
WILDERNESS
CITICO
CREEK
WILDERNESS
LOOKOUT
Haoe
5249
Stratton
Bald
Big Stack
Gap
Stiffknee
Top
King Gap
Hells Hole
Gap
Williamsburg
Cem
DOUBLE
CAMP
INDIAN
BOUNDARY
Indian Lake
Microwave
Tower
FT3 R4E
FT1N R5E
FT1N R6E
FT2N R5E
FT1S R6E
T4 R4E

See the "Middle Upper Citico Creek Road Listing" (Attachment 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.
- Decrease sedimentation.

ANALYSIS QUESTIONS

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. Question	Relevant to this analysis area?	Specific to this analysis area?	Addressed in this Analysis?
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**	**Y**	**N**	**Y**

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spills, oils, deicing salts, or herbicides, to enter surface waters?			
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**	**N**	**Y**
AQ (8): **How and where does the road system affect wetlands?**	**Y**	**N**	**Y**
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**	**N**	**Y**
AQ (11): **How does the road system affect shading, litterfall, and riparian plant communities?**	**Y**	**N**	**Y**
AQ (12): **How and where does the road system contribute to fishing, poaching, or direct habitat loss for at-risk aquatic species?**	**Y**	**N**	**Y**
AQ (13): **How and where does the road system facilitate the introduction of non-native aquatic species?**	**Y**	**N**	**Y**
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?**	**Y**	**N**	**Y**
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**	**Y**	**N**	**N**

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and illegal human activities (including trapping, hunting, poaching, harassment, road kill, or illegal kill levels)? What are the effects on wildlife species?			
TW (4): **How does the road system directly affect unique communities or special features in the area?**	**Y**	**N**	**N**
EF (1): **What ecological attributes, particularly those unique to the region, would be affected by roading of currently unroaded areas?**	**Y**	**N**	**N**
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**	**N**	**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**	**N**	**Y**
EC (3): **How does the road system affect the distribution of benefits and costs among affected people?**	**Y**	**N**	**Y**
TM (1): **How does the road spacing and location affect logging system feasibility?**	**Y**	**N**	**Y**
TM (2) and TM (3): **How does the road system affect managing the suitable timber base? How does the road system affect access to timber**	**Y**	**N**	**Y**

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stands needing silvicultural treatment?			
MM (1): **How does the road system affect access to locatable, leasable, and salable minerals?**	**Y**	**N**	**N**
RM (1): **How does the road system affect access to range allotments?**	**N**	**N**	**N**
WP (1): **How does the road system affect access, constructing, maintaining, monitoring, and operating water diversions, impoundments, and distribution canals or pipes?**	**Y**	**Y**	**Y**
WP (2): **How does road development and use affect water quality in municipal watersheds?**	**N**	**N**	**Y**
WP (3): **How does the road system affect access to hydroelectric power generation?**	**Y**	**N**	**Y**
SP (1): **How does the road system affect access for collecting special forest products?**	**Y**	**N**	**N**
SU (1): **How does the road system affect managing special-use permit sites (concessionaires, communications sites, utility corridors, and so on)?**	**Y**	**N**	**Y**
GT (1): **How does the road system connect to public roads and provide primary access to communities?**	**Y**	**N**	**Y**
GT (2): **How does the road system connect large blocks of land in other ownership to public roads (ad-hoc communities, subdivisions, in holdings, and so on)?**	**Y**	**N**	**Y**
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)?**	**Y**	**N**	**Y**
GT (4): **How does the road system address the safety of road users?**	**Y**	**N**	**Y**
AU (1): **How does the road system affect access needed for research activities, inventory, and monitoring?**	**Y**	**N**	**N**
AU (2): **How does the road system affect investigative or enforcement activities?**	**Y**	**N**	**N**
PT (1): **How does the road system affect fuels management?**	**Y**	**N**	**N**

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PT (2): **How does the road system affect the capacity of the Forest Service and cooperators to suppress wildfires?**	**Y**	**N**	**N**
PT (3): **How does the road system affect risk to fire fighters and to public safety?**	**Y**	**N**	**N**
PT (4): **How does the road system contribute to airborne dust emissions resulting in reduced visibility and human health concerns?**	**Y**	**N**	**N**
UR (1): **Is there now or will there be in the future excess supply or excess demand for unroaded* recreation opportunities?**	**Y**	**N**	**N**
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?**	**Y**	**Y**	**Y**
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?**	**Y**	**Y**	**Y**
UR (4): **Who participates in unroaded recreation in the areas affected by building, maintaining, and decommissioning roads?**	**Y**	**Y**	**Y**
UR (5): **What are these participants' attachments to the area, how strong are their feelings, and are alternative opportunities and locations available?**	**Y**	**Y**	**Y**
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.**	**Y**	**Y**	**Y**
RR (1): **Is there now or will there be in the future excess supply or excess demand for road-related* recreation opportunities?**	**Y**	**N**	**N**
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**	**Y**	**Y**	**Y**

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type of road-related recreation opportunities?			
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?**	**Y**	**N**	**N**
RR (4): **Who participates in road-related recreation in the areas affected by road building, changes in road maintenance, or road decommissioning?**	**Y**	**Y**	**Y**
RR (5): **What are these participants attachments to the area, how strong are their feelings, and are alternative opportunities and locations available?**	**Y**	**Y**	**Y**
RR (6)**: How does the road system affect the Scenic Integrity Objective, SIO?**	**Y**	**Y**	**Y**
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)?**	**Y**	**N**	**N**
PV (2): **Do areas planned for road building, closure, or decommissioning have unique cultural, traditional, symbolic, sacred, spiritual, or religious significance?**	**Y**	**N**	**N**
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?**	**Y**	**N**	**N**
PV (4): **Will building, closing, or decommissioning roads substantially affect passive-use value?**	**Y**	**N**	**N**
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?**	**Y**	**N**	**N**
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?**	**Y**	**N**	**N**
SI (3): **How does the road system affect access to**	**Y**	**N**	**N**

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paleontological, archaeological, and historical sites?			
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?**	**Y**	**N**	**N**
SI (5): **How are roads that constitute historic sites affected by road management?**	**Y**	**N**	**N**
SI (6): **How are community, social, and economic health affected by road management (for example, lifestyles, businesses, tourism industry, infrastructure maintenance)?**	**Y**	**Y**	**Y**
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?**	**Y**	**N**	**N**
SI(8): **How does road management affect wilderness attributes, including natural integrity, natural appearance, opportunities for solitude, and opportunities for primitive recreation?**	**Y**	**Y**	**Y**
SI (9): **What are traditional uses of animal and plant species in the area of analysis?**	**Y**	**N**	**N**
SI (10): **How does road management affect people's sense of place?**	**Y**	**Y**	**Y**
CR (1): **How does the road system, or its management, affect certain groups of people (minority, ethnic, cultural, racial, disabled, and low-income groups)?**	**Y**	**N**	**N**

Questions from the table above that are both relevant and specific to the roads in this analysis area will be 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 Middle Upper Citico Creek Watershed; the Citico Creek Wilderness is not included in the analysis. This is a tributary stream of the Little Tennessee River.

In general, precipitation is intercepted by the road surface and cutbanks. Surface and subsurface flows are also intercepted by the road when water is 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 on the landscape. As a result, water infiltration decreases, 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, gradient of road, and its location in the watershed. There are approximately 63 miles of Forest Service jurisdiction roads within the analysis area. This represents a road density of 2.85 miles of Forest Service road per square mile of watershed within the analysis area. Approximately one half of the Forest Service Roads (26 miles) are gated, vegetated, and/or closed seasonally or throughout the year. Within this analysis area, Forest Roads (FR) 35-1, and 2659 are most significant in terms of their length, proximity to stream, and potential influence on surface and subsurface hydrology. FR 35-1 is located adjacent to Citico Creek over much of its length. FR 2659 is located adjacent or in close proximity to Double Camp Creek and Jake Best Creek for much of its length. FR 2659 also crosses 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 surface type, road gradient, road prism, the spacing and effectiveness of drainage structures, traffic use, and maintenance activity. The extent of surface erosion occurring on road cutbanks depends on the steepness, slope length, soil type, and vegetative cover. Road ditches concentrate water flow which generates surface erosion and also increase sediment delivery to streams from road surfaces and road cutbanks. Ditches and culverts that are blocked create surface erosion issues by diverting water flow onto road surfaces. Approximately fifty 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.

There is evidence of minor surface erosion occurring on all the roads that were visited. Evidence of erosion was found on road cutbanks, in ditches, and in stream channels. A blocked Culvert on FR 36.1 is diverting water onto the road surface. The diverted water flow is down cutting into the soil and causing surface erosion.

Recommendations-Unblock culvert and repair damages to road to prevent further erosion on FR 36.1. Then decommission 3.02 miles of FR 36.1.

AQ (3): How and where does the road system affect mass wasting?
Mass wasting is generally not a problem in the analysis area. In the past slides have occurred on the road cutbank adjacent to FR 35-1. There were no active mass wasting sites observed within the analysis area.

Small slides and slumps are possible below culvert outfalls, along fill slopes where road drainage is concentrated, and on road cutbanks. Inadequate sized culverts or plugged culverts may blowout during high flow periods and initiate soil slides. Proper sizing and location of drainage culverts can reduce this potential, as well as, armoring the outfall areas associated with drainage structures, as needed. Road cutbanks propose a problem in steep areas where soils are coarse in texture, shallow, and where unstable colluvium material occurs.

Currently, there is a plugged culvert located at the first stream crossing on FR 36.1. This road is located adjacent to Tavern Branch. The plugged culvert is causing water to divert down and over FR 36.1. This creates a potential slide initiation point which could result in high sediment loading into Tavern Branch.

Recommendation – Repair damages from blocked culvert on FR 36.1. Then decommission 3.02 miles of FR 36.1.

AQ (4): How and where do road-stream crossings influence local stream channels and water quality?
Road-stream crossings 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. In most cases culverts have more of an influence on stream channels and water quality than do bridges or bottomless culverts. Culverts concentrate and accelerate water flow causing soil displacement to occur at the outfalls and cause stream banks to undercut. Over time the stream channel adjusts to the change in flow by becoming deeper and/or wider for a short distance below the culvert. Piping occurring under or around culverts is usually a minor

source of sediment; however, high sediment loading can occur from a culvert blowout due to piping. Blowouts can also occur from plugged culverts. Road surfacing, eroded materials, and pollutants are usually deposited into steams by ditches that empty directly into streams at road-stream crossings.

There are an unestimated number of ephemeral and intermittent drainage crossings within the analysis area. During field surveys there were 41 perennial stream crossings observed along the road system in this project area; 6 are bridges, and 35 are culverts; there are no fords. There are approximately 10 crossing where ditch lines empty directly into streams. 3 crossings on FR 35, 1 crossing on Indain Camp Gound Loop Roads, 1 crossing on FR 345, 1 crossing on FR 35-1, and 4 crossings on FR 2659. There are about 8 culverts where piping is occurring 3 crossing on FR 345, 1 crossing on FR 35-1, 2 crossings on FR 2659, 1 crossing on FR 5022, and 1 crossing on FR 5003. 2 blocked culverts were observed; 1 culvert at a small tributary crossing on FR 35, and 1 culvert on FR 36.1.

Recommendations- Create ditch turnouts so that ditchlines do not empty directly into stream channel, repair or replace culverts that are not functioning properly.

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. FR 35-1 and 2659 are located near or adjacent to stream channels. These roads are open to public travel. Roads in the Indain Boundary Camp Gound could possibly be a source for pollutants. Roads within the campground are close to water sources and drainages. This is a high use area and campers tend to carry oil, fuel, and a variety of chemicals. Due to there impervious nature paved roads have the potential to deliver more pollutants such as oils and deicing salts. 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. State Highway 165 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. Generally, the hydrologic connection is made where ditchlines empty into streams or drainages. Road surfacing and other eroded materials are usually deposited into steams by ditches that empty directly into streams. Without proper ditch turnouts, surface runoff enters the stream channel carrying eroded materials and pollutants. If this water moves directly to stream channels, peakflows and hydrograph timing can be somewhat altered from the condition associated with an unroaded watershed. The majority of road mileage within this analysis area is located along ridge-tops or

upper/middle side-slopes. However, stream crossings can also be problematic with these roads. Hydrologic connectivity is generally reduced when roads are properly located.

See AQ(4) about crossing where ditch lines empty directly into streams.

Recommendations- - Create ditch turnouts so that ditchlines do not empty directly into stream channel. Determine roads where ditchlines may be eliminated and other types of water control structures such as coweeta dips may be use.

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 recreation, the support of fish and aquatic life. The use classification for Citico Creek is "Fish and Aquatic Life", "Recreation" and "Trout Stream". Downstream, the use classification of the Little Tennessee 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?

Road systems may affect wetland hydrology by altering surface and subsurface drainage patterns. This change has the potential to modify the wetland moisture regime. Roads crossing at wetlands may restrict natural water flow quantity, timing, and routing. There is a low water crossing at FR 284 and Flats Creek. This is a wetland area that has developed because of beavers. The low water crossing is made of 6 culverts and concrete. This structure is functioning properly but it restricts the natural stream flow.

Recommendations- Replace low water crossing with a structure that does not restrict water flow.

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. FR 35-1 and 2659 has several segments that are close to or adjacent to Citico Creek, Jakes Best Creek, and Double Camp Creek. 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. Armored stream banks along Citico Creek could prevent channel migration. One section of concrete armoring is currently being undercut by the stream.

Recommendation – Determine road crossings where culverts could be replaced by bridges or bottomless culverts.

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 41 perennial stream crossings along the road system in this project area; 6 are bridges, and 35 are culverts; there are no fords. Nineteen of the culverts are potential barriers to fish, amphibians, or macroinvertebrates; all are administered by the Forest.

Twenty-six of fifty-five stream reaches capable of supporting fish in the analysis area have been surveyed. The unsurveyed stream reaches are unlikely to support any new or rare species.

Thirty-one species of fish have been documented in these streams including: one sensitive and one locally rare fish.

The nineteen culverts administered by the Forest Service are not migration barriers for the sensitive or locally rare species because neither of these species normally occurs in small, steep gradient, headwater streams. The culverts could pose migration barriers to rainbow trout, creek chubs, and western blacknose dace. These are the three most common fish species on this forest and do not warrant the cost of culvert replacement to expand their ranges a few hundred feet.

Recommendation – None.

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

Of the 59.6 miles of roads in this project area, 16.5 (28%) are within the riparian corridor; all of which are administered by the Forest Service. Shading, litterfall and riparian plant communities are minimally impacted by these roads because the canopy remains closed. One exception is FSR 36.1 (Tavern Branch 3.02 miles) where the road is so close to the stream bank that sediment runs directly into the channel. Slides and blocked culverts aggravate the existing condition. Three other road segments:

No.	Name	Miles
40251	Miller Ridge Spur	1.21
284F	Old Rafter	0.27
35C	Old Citico	0.36

contribute sediment to the watershed and are of no apparent use.

Recommendation – Decommission 3.02 miles of FSR 36.1 (Tavern Branch North); 1.21 miles of FSR 40251 (Miller Ridge Spur); 0.27 miles of FSR 284F (Old Rafter); and 0.36 miles of 35C (Old Citico).

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 smallmouth and rock bass, rainbow and brown trout, green sunfish, redear sunfish, and bluegill 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.

Recommendation – Protect the riparian corridor.

AQ(13): How and where does the road system facilitate the introduction of non-native aquatic species?
Not relevant to this analysis area – see Forest Wide discussion

Recommendation – None

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?
Citico Creek (Reaches 3 and 4) and Jake Best Creek support exceptionally high aquatic diversity (20, 19 and 15 fish species, respectively) and are in close proximity to roads. Only one Sensitive species (wounded darter) occurs where FSR 35.1 parallels reaches 3 and 4 of Citico Creek. The close proximity of this road to Citico Creek constantly contributes sediment to the creek and could pose a threat from an accidental chemical spill.

Recommendation – Pave all of FSR 35.1 to protect Citico Creek and diminish sediment transport from FSR 2659 and FSR 5022 into Jake Best Creek.

Road No.	Road Name	Juris.	Length	Perennial Stream Crossings/Barriers			Length in Riparian Corridor
				Bridges	Culverts	Fords	
State							
TN165	Cherohala Skyway	TN	3.28	0	3/3	0	0
Total State roads			**3.28**	**0**	**3/3**	**0**	**0**
Private							
440903	Lula Gap	PVT	0.27	0	0	0	0
442402	Miller Ridge South	PVT	0.01	0	0	0	0
Total Private roads			**0.28**	**0**	**0**	**0**	**0**
Forest Service							
2033	Miller Ridge	FS	0.52	0	0	0	0
2659	Doublecamp-Jake Best	FS	14.63	0	13/8	0	6.4
284	Rafter	FS	1.89	0	1/0	0	0.6
284F	Old Rafter	FS	0.27	0	0	0	0

Road No.	Road Name	Juris.	Length	Perennial Stream Crossings/Barriers			Length in Riparian Corridor
				Bridges	Culverts	Fords	
29	South Fork Citico	FS	0.12	0	1/0	0	0.12
336	Doublecamp Rec. Area	FS	0.01	0	0	0	0
345	Indian Boundary (IB)	FS	2.49	0	4/3	0	0
345-1	IB Loop Entrance	FS	0.14	0	0	0	0
345A	IB Loop A	FS	0.35	0	0	0	0
345B	IB Loop B	FS	0.34	0	0	0	0
345C	IB Loop C	FS	0.49	0	0	0	0
345C-1	IB Loop C Crossover	FS	0.08	0	0	0	0
345D	IB Boat Ramp	FS	0.28	0	0	0	0
345D-1	IB Boat Ramp Spur	FS	0.15	0	0	0	0
345E	IB Day Use North	FS	0.18	0	0	0	0
345F	IB Overflow	FS	0.26	0	0	0	0
345G	IB Day Use South	FS	0.36	0	1/0	0	0
345G-1	IB Trailer Dump	FS	0.04	0	0	0	0
35	Citico Cr. South	FS	1.32	0	2/0	0	0
35A	Jake Best Campground	FS	0.08	0	0	0	0
35C	Old Citico	FS	0.36	0	0	0	0
35-1	Citico Cr. North	FS	9.30	5	5/3	0	7.0
440903	Lula Gap	FS	0.13	0	0	0	0
442402	Miller Ridge South	FS	0.12	0	0	0	0
Total FS open roads			**33.91**	**5**	**27/14**	**0**	**14.12**
Forest Service							
2033	Miller Ridge	FS	0.10	0	0	0	0
217F	Microwave Tower	FS	0.13	0	0	0	0
2604	Gold Cabin Br.	FS	2.95	0	2/0	0	0
284F	Old Rafter	FS	0.32	0	0	0	0
345H	IB Service Road	FS	0.17	0	0	0	0
345H1	Ft Loudon Electric Access Rd	FS	0.15	0	0	0	0
345J	IB Administrative	FS	0.08	0	0	0	0
35B	Citico Slide	FS	0.13	0	0	0	0.13
36	Tavern Br. South	FS	1.99	0	0	0	0
36-1	Tavern Br. North	FS	3.42	0	0	0	2.2
402301	Cowcamp	FS	1.61	0	0	0	0
402302	Cowcamp Spur	FS	0.57	0	0	0	0
402303	Gladys Br.	FS	0.57	0	0	0	0
40251	Miller Ridge Spur	FS	1.21	0	0	0	0
40252	Burnt Station	FS	0.66	0	0	0	0
403101	Footes Cr.	FS	1.22	0	0	0	0
40321	East Miller Ridge	FS	0.97	0	0	0	0
40401	Debety Gap	FS	0.66	0	0	0	0
40403	BSA Camp	FS	0.10	0	0	0	0
40410	Flats Mt	FS	0.26	0	0	0	0

Road No.	Road Name	Juris.	Length	Perennial Stream Crossings/Barriers			Length in Riparian Corridor
				Bridges	Culverts	Fords	
404201	Flats Cr.	FS	1.07	0	0	0	0
440601	Blue Mt.	FS	0.31	0	0	0	0
442801	Lost Cove Br.	FS	0.41	0	0	0	0
44291	Upper Bivens	FS	0.02	0	0	0	0
5003	Barkcamp	FS	3.48	0	2/2	0	0
5022	Bivens Br.	FS	2.46	1	1/0	0	0
5022A	Bivens Br. Spur A	FS	0.25	0	0	0	0
5022B	Bivens Br. Spur B	FS	0.13	0	0	0	0
59A	Doublecamp Spur	FS	0.15	0	0	0	0
59B	Cold Springs Spur	FS	0.18	0	0	0	0
Total FS closed roads			**25.73**	**1**	**5/2**	**0**	**2.33**
Roads Recently Decommissioned							
40402	Borrow Pit	FS	0.15				
40480	Old Warden Station	FS	0.25				

Summary				
	Perennial Stream Crossings			
Length	Bridges	Culverts	Fords	Length in Riparian Corridor
59.63	**6**	**35/19**	**0**	**16.45**

Roads recommended for decommissioning:

36.1	Tavern Branch North	3.02 miles	Redundant with 5003; mostly in riparian; poor condition; leave open from 40251 running out ridge (~0.4 miles)
40251	Miller Ridge Spur	1.21 miles	Redundant from 36.1 to 36; leave open from 40522 to 36.1 (~0.4 miles)
284F	Old Rafter	0.27 miles	Unnecessary
35C	Old Citico	0.36 miles	Unnecessary
	Total	**5.26 miles**	

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 & Deferred Maintenance Needs & Expenditures for Roads in Middle Upper Citico Cr. Ecosystem Assessment Area

NOTES

1. All known FS system roads are listed.
2. Average expenditures from CMRD budget line item for FY06-07 & FY08 (projected). Costs for ML 1 & 2 roads based on random sample.
3. 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	Length (mi.)	Objective Maint. Level	MAINTENANCE NEEDS		AVERAGE MAINTENANCE EXPENDITURES		Comments
				ANNUAL	DEFERRED	ANNUAL	DEFERRED	
2033	Miller Ridge	0.52	3	$4,463	$6,598	$864	$0	
2659	Doublecamp-Jake Best	14.63	3	$125,569	$185,625	$24,300	$0	Thru road; 3 major culverts (bottomless arches) on Doublecamp side; 2 pipe arches on Jake Best side; road is on area bdy; total length: 15.16
284	Rafter	1.89	3	$16,222	$23,980	$3,139	$0	Thru road; accesses Pvt Prop.; vented concrete ford at Flats Cr.
284F	Old Rafter	0.27	2	$51	$1,188	$0	$0	
29	South Fork Citico	0.12	2	$23	$528	$0	$0	low water bridge at Citico Cr.; accesses trails #99, #100, & #105
336	Doublecamp Rec. Area	0.01	3	$86	$127	$0	$0	
345	Indian Boundary	2.49	5	$48,553	$166,830	$0	$0	opened seasonally
345-1	Indian Boundary Loop Entrance	0.14	5	$2,730	$9,380	$0	$0	opened seasonally
345A	Indian Boundary Loop A	0.35	5	$6,825	$23,450	$0	$0	opened seasonally
345B	Indian Boundary Loop B	0.34	5	$6,630	$22,780	$0	$0	opened seasonally
345C	Indian Boundary Loop C	0.49	5	$9,555	$32,830	$0	$0	opened seasonally
345C-1	Indian Boundary Loop C Crossover	0.08	5	$1,560	$5,360	$0	$0	opened seasonally

Road No.	Road Name	Length (mi.)	Objective Maint. Level	MAINTENANCE NEEDS		AVERAGE MAINTENANCE EXPENDITURES		Comments
				ANNUAL	DEFERRED	ANNUAL	DEFERRED	
345D	Indian Boundary Boat Ramp	0.28	4	$2,100	$4,200	$168	$0	
345D-1	Indian Boundary Boat Ramp Spur	0.15	4	$1,125	$2,250	$90	$0	
345E	Indian Boundary Day Use North	0.18	4	$1,350	$2,700	$108	$0	opened seasonally
345F	Indian Boundary Overflow	0.26	4	$1,950	$3,900	$156	$0	opened seasonally
345G	Indian Boundary Day Use South	0.36	4	$2,700	$5,400	$216	$0	
345G-1	Indian Boundary Trailer Dump	0.04	4	$300	$600	$0	$0	
35	Citico Cr. South	1.32	3	$11,330	$16,748	$1,320	$0	Thru road; accesses Pvt Prop.
35A	Jake Best Campground	0.08	3	$687	$1,015	$0	$0	opened seasonally
35C	Old Citico	0.36	2	$68	$1,592	$0	$0	Provides access to trail #129
35-1	Citico Cr. North	9.30	3	$79,785	$117,943	$15,440	$0	Thru road; 5 bridges & 2 large culverts
440903	Lula Gap	0.13	3	$1,116	$1,649	$0	$0	accesses Pvt Prop.; road is on area bdy; total length: 0.72 (FS + PVT)
442402	Miller Ridge South	0.12	2	$23	$528	$0	$0	accesses Pvt Prop.; road is on area bdy; total length: 0.44 (FS)
		33.91						
2033	Miller Ridge	0.10	2	$19	$440	$0	$0	accesses wildlife field(s)
217F	Microwave Tower	0.13	2	$25	$572	$0	$0	
2604	Gold Cabin Br.	2.95	2	$558	$12,980	$0	$0	All or portion managed as wildlife field
284F	Old Rafter	0.32	2	$60	$1,408	$0	$0	
345H	Indian Boundary Service Road	0.17	2	$32	$748	$0	$0	
345H1	Ft Loudon Electric Access Rd	0.15	2	$28	$660	$0	$0	
345J	Indian Boundary Administrative	0.08	3	$15	$352	$0	$0	
35B	Citico Slide	0.13	2	$25	$572	$0	$0	
36	Tavern Br. South	1.99	2	$376	$8,756	$0	$0	opened seasonally; road is on area bdy; total length: 3.21; accesses wildlife field

Road No.	Road Name	Length (mi.)	Objective Maint. Level	MAINTENANCE NEEDS		AVERAGE MAINTENANCE EXPENDITURES		Comments
				ANNUAL	DEFERRED	ANNUAL	DEFERRED	
36-1	Tavern Br. North	3.42	2	$646	$15,048	$0	$0	opened seasonally
402301	Cowcamp	1.61	2	$304	$7,084	$0	$0	
402302	Cowcamp Spur	0.57	2	$108	$2,508	$0	$0	
402303	Gladys Br.	0.57	2	$108	$2,508	$0	$0	
40251	Miller Ridge Spur	1.21	2	$229	$5,324	$0	$0	opened seasonally
40252	Burnt Station	0.66	2	$125	$2,904	$0	$0	road is on area bdy; total length: 1.14; accesses wildlife field(s)
403101	Footes Cr.	1.22	2	$231	$5,368	$0	$0	All or portion managed as wildlife field
40321	East Miller Ridge	0.97	2	$183	$4,268	$0	$0	All or portion managed as wildlife field
40401	Debety Gap	0.66	2	$125	$2,904	$0	$0	All or portion managed as wildlife field
40403	BSA Camp	0.10	2	$19	$440	$0	$0	
40410	Flats Mt	0.26	2	$49	$1,144	$0	$0	All or portion managed as wildlife field
404201	Flats Cr.	1.07	2	$202	$4,708	$0	$0	All or portion managed as wildlife field
440601	Blue Mt.	0.31	2	$59	$1,364	$0	$0	road is on w.s. bdy; total length: 0.83; portion of road used as trail #165-4
442801	Lost Cove Br.	0.41	2	$77	$1,804	$0	$0	opened seasonally; road is on area bdy; total length: 2.96; accesses wildlife field(s)
44291	Upper Bivens	0.02	2	$4	$88	$0	$0	All or portion managed as wildlife field
5003	Barkcamp	3.48	2	$658	$15,312	$0	$0	opened seasonally; road is on area bdy; total length: 2.9; accesses wildlife field(s)
5022	Bivens Br.	2.46	2	$465	$10,824	$0	$0	opened seasonally; bridge at Jake Best Cr.; accesses wildlife field(s); portion of road used as trail #165-3 near w.s. bdy
5022A	Bivens Br. Spur A	0.25	2	$47	$1,087	$0	$0	
5022B	Bivens Br. Spur B	0.13	2	$24	$553	$0	$0	All or portion managed as wildlife field; used as trail #165-3

Road No.	Road Name	Length (mi.)	Objective Maint. Level	MAINTENANCE NEEDS		AVERAGE MAINTENANCE EXPENDITURES		Comments
				ANNUAL	DEFERRED	ANNUAL	DEFERRED	
59A	Doublecamp Spur	0.15	2	$28	$660	$0	$0	portion managed as wildlife field
59B	Cold Springs Spur	0.18	2	$34	$792	$0	$0	accesses communication tower & special use site

TOTALS BY MAINTENANCE LEVEL

ML2	**26.59**	**$5,026**	**$117,016**	**$0**	**$0**
ML3	**27.88**	**$239,257**	**$353,686**	**$45,064**	**$0**
ML4	**1.27**	**$9,525**	**$19,050**	**$738**	**$0**
ML5	**3.89**	**$75,851**	**$260,630**	**$0**	**$0**
TOTALS:	**59.63**	**$329,659**	**$750,382**	**$45,802**	**$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 and the graveled level 4 and 5 roads are graded twice a year and these roads receive small amounts of gravel spot surfacing. The level 3 roads are mowed once every two or three years and the level 4 and 5 roads are mowed every year.

Consideration is given to changing the objective maintenance level if a reduction in funds continues, e.g. maintenance levels 3, 4, and 5 (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

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 that have 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. Decommissiong 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 plat 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 #35-1, #345, and #2659 are part of a network of roads that is very popular with sightseers.

Camping

-Roads #345, #345-1, and #345F and their spurs provide access to the Indian Boundary Recreation Area.
-Roads #345 and #35-1 provide access to Jake Best Campground.
-Roads #284, 35-1, and #2659 provide access to numerous dispersed camping sites.

Hunting

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

Fishing

-Road #345 provides access to Indian Boundary Lake.
-Roads #345 and #35-1 provide access to Citico Creek.
-Roads #345, #35-1, and #2659 provide access to Doublecamp Creek.

Hiking/ Mountain Biking/Horseback riding

-Roads #345, #35-1, and #2659 provide access to trails #165-1, #165-2, #165-3, #84, #91, #95, #96, #97, #98, #99, #100, #102, #105, #129, and foot travel is permitted on many roads closed to motor vehicle use.
-Roads #35-1, #2659, #284, #2033, #36, and #5003 are used by bicyclists.

Wildlife viewing

The open roads are used by visitors for this activity.

Hiking in wilderness areas

Roads #345, #35-1, and #2659 provide access to trails in the Citico Creek Wilderness.

Other

-Roads #345 and #35-1 provide kayakers access to Citico Creek.

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

Roads #345 and #35-1 provide access to Lower Citico Creek which is

habitat for duskytail darter, smoky madtom, and yellowfin madtom and are monitored by U.S. Forest Service and U.S. Fish & Wildlife Service scientists.

Roads #345, #35-1, #2659 and #59B provide access to Forest Service communication tower and to a special use site for USGS.

Roads #284, #35, #440903, #442402 provide access to private property.

Portions of roads #35-1, #2659 and #36 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?

The accessibility to resources in the study area is important to the local economy, and commerce associated with forest visitors also has an economic influence on Loudon, Blount, McMinn, and Monroe Counties and the communities of Etowah, Athens, Madisonville, Vonore, Sweetwater, and Tellico Plains. 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, the collection of forest products, fire suppression, and the 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 #284, #345, #35, and #35-1 are part of a road network that includes the state and county road system.

As 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 (1): How does the road spacing and location affect logging system feasibility?
The spacing and location of existing roads were chosen to accommodate ground based logging systems and tandem trucks. Much of the road system would need to be improved to accommodate tractor trailers for hauling.

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?
A large portion of the Middle and Upper Citico Watershed Assessment Area (approximately 22,688 acres) is made up management prescriptions 1A, 1B, 12B, 7A and 7D. These areas are not suitable for timber management or road building.

The suitable land base (approximately 11,433 acres) in the assessment area is made up of management prescriptions 8A1, 8B and 8C.

Road access is lacking in parts of the area. Approximately 4,072 acres are at a distance greater than ¼ mile from an existing system road and approximately 708 acres are at a distance of greater than ½ mile of a system road. Additional roading may be needed to gain access to some of the area.

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 NFS lands, these structures are present only within the Chilhowee Recreation Area and the Ocoee Work Center.

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. Greasy Creek and Madden Branch are classified as "Fish and Aquatic Life". Rock Creek, a large tributary stream of Greasy Creek, is classified as "Trout Stream". The analysis area is a portion of the Ocoee River watershed. The Ocoee 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)?
Fort Loudoun Electric Corporation has power transmission lines on National Forest land along NFSR's 284, 284F, and 442402 to supply electricity to Indian Boundary Recreation Area and private residences. Necessary access roads are in place and they are adequate.

TDS Telcom has telephone lines on National Forest land along NFSR's 284 and 442402 to supply telephone services to private residences. Necessary access roads are in place and they are adequate.

Appalachian Adventures, Inc. has a special use permit for a camp store at Indian Boundary Recreation Area. NFSR's 345 and 345-1 are used for access. Necessary access roads are in place and they are adequate.

Smoky Mountain Wheelman has a special use permit for an annual bike ride on the Cherohala Skyway. Necessary access roads are in place and they are adequate

The Tellico Ranger district has issued temporary special use permit to commercial outfitter/guides for backpacking trips in Citico Creek Wilderness area and the Joyce Kilmer/Slick Rock Wilderness area portion in Tennessee. Necessary access roads are in place and they are adequate.

The Tellico Ranger district has issued temporary special use permit for commercial photography at Indian Boundary Recreation Area, Necessary access roads are in place and they are adequate

NFSR's 35-1, 2659, and 59B are used to access the Cold Springs Administrative Site in Compartment 13. Necessary access roads are in place and they are adequate.

NFSR 284 is used to access residences on private land. Necessary access roads are in place and they are adequate

NFSR 440903 is used to access residences on private land. Necessary access roads are in place and they are adequate

NFSR 442402 is a prescriptive right-of-way used to access residences on private land.

GT (1): How does the road system connect to public roads and provide primary access to communities?
There are no specific communities for which Forest Service roads in the study area provide the primary access. NFSRs in the study area do connect to county roads (outside the area) that lead to Rafter, Tellico Plains, and Vonore. The primary access to these communities are state and county roads The collector road system within the study area includes all or parts of the

following Forest Service roads:

Road No.	Road Name
2033	Miller Ridge
2659	Doublecamp-Jake Best
284	Rafter
35	Citico Cr. South
35-1	Citico Cr. North

Other collector roads in the area include State Highway 165 which meanders along the Southern boundary of the area. There are no county roads in the area.

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)?
The study area contains a relatively small amount of private land. 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:

Road No.	Road Name
440903	Lula Gap
442402	Miller Ridge South

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 Monroe County for sharing various types of roadwork from planning to maintenance on roads of common interest to the FS and to the county.

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, 4, or 5 (suitable for passenger cars). The ML 3 roads are single lane with turnouts. The ML 4 and 5 roads are mostly paved two-lane and single lane one-way road (inside the recreation area). These roads are subject to the Highway Safety Act, so safety of road users is a concern, but because they are designed for low speed and low volume, safety is usually not a major issue.

As private land has been subdivided, the number of land owners has increased and has caused in an increase in traffic on the Rafter Road, #284. There may be a need to work with Monroe County to accept responsibility for the maintenance of this road as well as the local roads listed under GT (2).

The objective maintenance level 2 roads are graded and mowed every 2-3 years.

The objective maintenance level 3 and graveled level 4 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.

The maintenance level 5 and some ML 4 roads were recently paved and require relatively little maintenance except for roadside mowing every 1-2 years and sign maintenance.

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.

All or portions of the following roads are normally open year round to the public for motor vehicle use:

Maintenance level 2:

Road No.	Road Name
284F	Old Rafter
29	South Fork Citico
35C	Old Citico
442402	Miller Ridge South

Maintenance level 3:

Road No.	Road Name
2033	Miller Ridge
2659	Doublecamp-Jake Best
284	Rafter
336	Doublecamp Rec. Area
35	Citico Cr. South
35-1	Citico Cr. North
440903	Lula Gap

Maintenance level 4:

Road No.	Road Name
345D	Indian Boundary Boat Ramp
345D-1	Indian Boundary Boat Ramp Spur
345G	Indian Boundary Day Use South
345G-1	Indian Boundary Trailer Dump Station

Maintenance level 5:

Road No.	Road Name
345	Indian Boundary

All or portions of the following roads are open on a seasonal basis to the public for motor vehicle use:

Maintenance level 2:

Road No.	Road Name
2033	Miller Ridge
36	Tavern Br. South
36-1	Tavern Br. North
40251	Miller Ridge Spur
442801	Lost Cove Br.
5003	Barkcamp
5022	Bivens Br.

Maintenance level 3:

Road No.	Road Name
35A	Jake Best Campground

Maintenance level 4:

Road No.	Road Name
345E	Indian Boundary Day Use North
345F	Indian Boundary Overflow

Maintenance level 5:

Road No.	Road Name
345	Indian Boundary
345-1	Indian Boundary Loop Entrance
345A	Indian Boundary Loop A
345B	Indian Boundary Loop B
345C	Indian Boundary Loop C
345C-1	Indian Boundary Loop C Crossover

Recommendations:

1. Determine if the roads that are used as trails should no longer be managed as roads and evaluate the need of Tavern Br. North & Tavern Br. South roads, otherwise continue with the current management of all system roads (same RMOs).

2. In the past, paving NFSR 35-1, Citico Cr. North with asphalt has been considered. This may be desirable to reduce the amount of sediment entering Citico Cr., but such a proposal should take into consideration 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.

3. Evaluate if barriers to aquatic organism passage exist at the following locations:
   NFSR 284 at Flats Cr. (existing vented concrete ford)
   NFSR 2659 at Gold Cabin Br. (existing pipe-arch)
   NFSR 35-1 at various tributaries of Citico Cr. (existing round pipes or pipe-arches)

4. Decommission unclassified roads if illegal access is taking place, and continue to identify other classified and unclassified roads to decommission. There are no known instances of illegal access.

5. Determine if additional roads are needed to provide access to the Bivens Br., Jake Best Cr., Flint Br., and Cowcamp Ridge areas for timber management, fire suppression, etc.

6. 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 NFSR 284.

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

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?
Management decisions affecting the open and closed roads within MUCC will have a direct impact to the quality and type of unroaded recreation opportunities in and around Little Citico Creek and Citico Creek & Joyce Kilmer/Slickrock Wildernesses. At a forest-scale, the Citico Creek Recreation Zone, which encompasses the entire MUCC with the exception of Indian Boundary Recreation Area, is uniquely managed to provide opportunities to experience primitive, backcountry recreation.

Paving Citico Creek Road (35-1) would change the existing recreation settings to a higher level of development and introduce recreational uses and demands similar to nearby Tellico River Corridor. Pavement would possibly encourage motorcycle traffic from Cherohala Skyway and discourage equestrian use of the road.

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?
Noise from motorized traffic would diminish the backcountry experience, i.e. traffic on Cherohala Skyway can be heard within Citico Creek Wilderness.

UR (4): Who participates in unroaded recreation in the areas affected by building, maintaining, and decommissioning roads?
Local & non-local equestrian users would be most directly affected by road management decisions in MUCC. Unlike other trail opportunities, open and closed roads are an integral part of providing traditional equestrian opportunities across the national forest. Moreover, local

equestrian enthusiasts take advantage of riding opportunities afforded by non-system routes through the mountains such as abandoned railroad grades, logging roads and skid trails. These routes need to either be legitimized as part of a trail system or actions taken to stop users from maintaining & using them.

Little Citico Horse Trail System is only one of four areas across the national forest identified to provide a multiple day-ride horse trail system with a minimum of 36 miles of equestrian trails (3 different day rides). The intent is to develop a trail system that users will want to use instead of riding the hike only trails, undesignated routes and open roads.

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.
Development of new roads that invite recreational use could increase public concern for the scenery being viewed from these routes. This may unintentionally create an expectation to assign a higher scenic integrity objective to the areas in view. Nearly 20,000 acres of the MUCC is in SIO-Very High, most of which is in wilderness area, where road construction would not be an issue. Almost 5,000 acres are in SIO-High, where new roads may or may not be appropriate, thus scenery standards would need to be followed. Lastly, over 9,000 acres are in SIO-Low and Medium, where road construction may be appropriate with proper mitigation.

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?
Construction of the Cherohala Skyway has greatly expanded the quantity, quality and type of road-related recreation opportunities especially sightseeing. This has created an expectation and need for quality recreation signs along the skyway. Many of the original signs have disappeared or currently provide wrong information or lead visitors to sub-standard recreation opportunities. In FY 2009 funds will be available to improve recreation signs along the skyway that affect recreational use in MUCC.

RR (4): Who participates in road-related recreation in the areas affected by road building, changes in road maintenance, or road decommissioning?
Based on 2003 National Visitor Use Monitoring Results, more than 30% of recreation visitors to Cherokee NF participate in driving for pleasure. Sightseers are taking advantage of the existing paved roads in the MUCC and motorcycle traffic has increased since construction of the Cherohala Skyway. Any new paved roads connected to the Skyway will attract general sightseers that typically do not venture down gravel roads, especially motorcyclists.

RR (5): What are these participants attachments to the area, how strong are their feelings, and are alternative opportunities and locations available?
Attachments to the MUCC are most strongly felt by traditional users of MUCC that disperse camp, fish, hike and ride horses. Weekend gatherings of families and friends can include several generations. Citico Creek itself, the low level of development and non-fee areas are part of the attraction. As unmanaged areas along Citico Creek and Tellico River become developed to manage use and protect resources, recreational use up Double Camp–Jake Best Road will most likely increase as an alternative location for unconfined, unregulated, free recreation.

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

See response to UR (6).

SI (6): How are community, social, and economic health affected by road management (for example, lifestyles, businesses, tourism industry, infrastructure maintenance)?
The Cherohala Skyway is a central part of the area's tourism industry.

SI(8): How does road management affect wilderness attributes, including natural integrity, natural appearance, opportunities for solitude, and opportunities for primitive recreation?
Improved roads ease access to Citico Creek Wilderness inviting additional use which decreases opportunities for solitude and may lead to designated campsites in the backcountry.

SI (10): How does road management affect people's sense of place?
As noted in the response to RR (5), changes to the level of development along Citico Creek would change the setting and attract new recreational visitors. This would affect the sense of place valued by traditional users and those seeking a primitive, backcountry recreation experience.

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.
- Unblock culvert and repair damages to road to prevent further erosion on FR 36.1. Then decommission 3.02 miles of FR 36.1.
- Repair damages from blocked culvert on FR 36.1. Then decommission 3.02 miles of FR 36.1.
- Create ditch turnouts so that ditchlines do not empty directly into stream channel. Determine roads where ditchlines may be eliminated and other types of water control structures such as coweeta dips may be use.
- Replace low water crossing with a structure that does not restrict water flow.
- Determine road crossings where culverts could be replaced by bridges or bottomless culverts.
- Decommission 3.02 miles of FSR 36.1 (Tavern Branch North); 1.21 miles of FSR 40251 (Miller Ridge Spur); 0.27 miles of FSR 284F (Old Rafter); and 0.36 miles of 35C (Old Citico).
- Protect the riparian corridor.
- Pave all of FSR 35.1 to protect Citico Creek and diminish sediment transport from FSR 2659 and FSR 5022 into Jake Best Creek.
- Determine if the roads that are used as trails should no longer be managed as roads and evaluate the need of Tavern Br. North & Tavern Br. South roads, otherwise continue with the current management of all system roads (same RMOs).
- In the past, paving NFSR 35-1, Citico Cr. North with asphalt has been considered. This may be desirable to reduce the amount of sediment entering Citico Cr., but such a proposal should take into consideration 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 284 at Flats Cr. (existing vented concrete ford)
  NFSR 2659 at Gold Cabin Br. (existing pipe-arch)
  NFSR 35-1 at various tributaries of Citico Cr. (existing round pipes or pipe-arches)
- Decommission unclassified roads if illegal access is taking place, and continue to identify other classified and unclassified roads to decommission. There are no known instances of illegal access.
- Determine if additional roads are needed to provide access to the Bivens Br., Jake Best Cr., Flint Br., and Cowcamp Ridge areas for timber management, fire suppression, etc.
- 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 NFSR 284.
- Continue to maintain and improve high use open roads to meet Goals 47, 48 and 50.

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Attachment A

Middle Upper Citico Cr. Ecosystem Assessment Area
Existing Roads by Jurisdiction

TAUs T-2,3,6,8,12,15 (all or part)

NOTES

1. Jurisdiction: FS = Forest Service
2. All known FS roads are listed.
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		Miles (inside watershed)	RMO (see separate documents)	Comments
			Beginning	Ending			
State							
TN165	Cherohala Skyway	TN	Watershed boundary	Watershed boundary	3.28	N.A.	Thru road; road is on w.s. bdy; total length in & adjacent to w.s.: 6.3
				Total State Roads	**3.28**		
County							
							No county roads in the watershed
				Total County Roads	**0.00**		
Private							
440903	Lula Gap	PVT			0.27	N.A.	road is on w.s. boundary
442402	Miller Ridge South	PVT			0.01	N.A.	road is on w.s. boundary, total length: 0.95
				Total Private Roads	**0.28**		
Forest Service							
2033	Miller Ridge	FS	NFSR 284	Gate	0.52	C3	
2659	Doublecamp-Jake Best	FS	NFSR 35-1	NFSR 35-1	14.63	C3	Thru road; 3 major culverts (bottomless arches) on Doublecamp side; 2 pipe arches on Jake Best side; road is on w.s. bdy; total length: 15.16
284	Rafter	FS	TN 165	Watershed boundary	1.89	C3	Thru road; accesses Pvt Prop.; vented concrete ford at Flats Cr.
284F	Old Rafter	FS	NFSR 284	Gate	0.27	D2-HC	
29	South Fork Citico	FS	NFSR 35-1	Dispersed campsites	0.12	D2-HC	low water bridge at Citico Cr.; accesses trails #99, #100, & #105
336	Doublecamp Rec. Area	FS	NFSR 35-1	NFSR 35-1	0.01	C3	
345	Indian Boundary	FS	TN 165	Dead End @ beach pkg	2.49	A5	opened seasonally
345-1	Indian Boundary Loop Entrance	FS	NFSR 345	Loop	0.14	A5	opened seasonally
345A	Indian Boundary Loop A	FS	NFSR 345-1	Loop	0.35	A5	opened seasonally
345B	Indian Boundary Loop B	FS	NFSR 345-1	Loop	0.34	A5	opened seasonally
345C	Indian Boundary Loop C	FS	NFSR 345-1	Loop	0.49	A5	opened seasonally
345C-1	Indian Boundary Loop C Crossover	FS	NFSR 345C	NFSR 345C	0.08	A5	opened seasonally
345D	Indian Boundary Boat Ramp	FS	NFSR 345G	Loop	0.28	B4	
345D-1	Indian Boundary Boat Ramp Spur	FS	NFSR 345D	Loop	0.15	B4	
345E	Indian Boundary Day Use North	FS	NFSR 345	Loop	0.18	B4	opened seasonally
345F	Indian Boundary Overflow	FS	NFSR 345G	Loop	0.26	B4	opened seasonally

Middle Upper Citico Cr. Ecosystem Assessment Area
Existing Roads by Jurisdiction

TAUs T-2,3,6,8,12,15 (all or part)

NOTES

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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		Miles (inside watershed)	RMO (see separate documents)	Comments
			Beginning	Ending			
345G	Indian Boundary Day Use South	FS	NFSR 345	Loop	0.36	B4	
345G-1	Indian Boundary Trailer Dump	FS	NFSR 345G	NFSR 345G	0.04	B4	
35	Citico Cr. South	FS	Watershed boundary	NFSR 345	1.32	C3	Thru road; accesses Pvt Prop.
35A	Jake Best Campground	FS	NFSR 35-1	NFSR 35-1	0.08	C3	opened seasonally
35C	Old Citico	FS	NFSR 35	Dead End at Trail #129	0.36	D2-HC	Provides access to trail #129
35-1	Citico Cr. North	FS	NFSR 345	Watershed boundary	9.30	C3	Thru road; 5 bridges & 2 large culverts
440903	Lula Gap	FS	NFSR 35	Pvt Property	0.13	C3	accesses Pvt Prop.; road is on w.s. bdy; total length: 0.72 (FS + PVT)
442402	Miller Ridge South	FS	NFSR 284	Pvt Property	0.12	D2-HC	accesses Pvt Prop.; road is on w.s. bdy; total length: 0.44 (FS)
				Total open FS roads	**33.91**		
2033	Miller Ridge	FS	Gate	Dead End	0.10	D2-FS	accesses wildlife field(s)
217F	Microwave Tower	FS	TN 165	Dead End	0.13	D2-FS	
2604	Gold Cabin Br.	FS	NFSR 2659	Dead End	2.95	D2-WL	All or portion managed as wildlife field
284F	Old Rafter	FS	Gate	Dead End	0.32	D2-HC	
345H	Indian Boundary Service Road	FS	NFSR 345	Dead End @ dam	0.17	D2-FS	
345H1	Ft Loudon Electric Access Rd	FS	NFSR 345H	powerline	0.15	D2-FS	
345J	Indian Boundary Administrative	FS	NFSR 345	Dead End	0.08	C3	
35B	Citico Slide	FS	NFSR 35-1	Dead End	0.13	D2-FS	
36	Tavern Br. South	FS	NFSR 40321	NFSR 40251	1.99	D2-FS	opened seasonally; road is on w.s. bdy; total length: 3.21; accesses wildlife field
36-1	Tavern Br. North	FS	NFSR 40251	NFSR 35-1	3.42	D2-FS	opened seasonally
402301	Cowcamp	FS	NFSR 2659	NFSR 402302	1.61	D2-FS	
402302	Cowcamp Spur	FS	NFSR 402301	Dead End	0.57	D2-FS	
402303	Gladys Br.	FS	NFSR 2659	Dead End	0.57	D2-FS	
40251	Miller Ridge Spur	FS	NFSR 2033	NSFR 36	1.21	D2-FS	opened seasonally
40252	Burnt Station	FS	NFSR 40251	Dead End	0.66	D2-FS	road is on w.s. bdy; total length: 1.14; accesses wildlife field(s)
403101	Footes Cr.	FS	NFSR 35-1	Dead End	1.22	D2-WL	All or portion managed as wildlife field
40321	East Miller Ridge	FS	NFSR 2033	Dead End	0.97	D2-WL	All or portion managed as wildlife field
40401	Debety Gap	FS	NFSR 35-1	Dead End	0.66	D2-WL	All or portion managed as wildlife field
40403	BSA Camp	FS	NFSR 345	Dead End	0.10	D2-FS	
40410	Flats Mt	FS	TN 165	Dead End	0.26	D2-WL	All or portion managed as wildlife field
404201	Flats Cr.	FS	NFSR 345	Dead End	1.07	D2-WL	All or portion managed as wildlife field
440601	Blue Mt.	FS	NFSR 5022	Dead End	0.31	D2-FS	road is on w.s. bdy; total length: 0.83; portion of road used as trail #165-4
442801	Lost Cove Br.	FS	NFSR 2033	NFSR 5003	0.41	D2-FS	opened seasonally; road is on w.s. bdy; total length: 2.96; accesses wildlife field(s)
44291	Upper Bivens	FS	NFSR 2033	Dead End	0.02	D2-WL	All or portion managed as wildlife field

Middle Upper Citico Cr. Ecosystem Assessment Area
Existing Roads by Jurisdiction

TAUs T-2,3,6,8,12,15 (all or part)

NOTES

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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		Miles (inside watershed)	RMO (see separate documents)	Comments
			Beginning	Ending			
5003	Barkcamp	FS	NFSR 35-1	Watershed boundary	3.48	D2-FS	opened seasonally; road is on w.s. bdy; total length: 2.9; accesses wildlife field(s)
5022	Bivens Br.	FS	NFSR 2659	Watershed boundary	2.46	D2-FS	opened seasonally; bridge at Jake Best Cr.;accesses wildlife field(s); portion of road used as trail #165-3 near w.s. bdy
5022A	Bivens Br. Spur A	FS	NFSR 5022	Dead End	0.25	D2-FS	
5022B	Bivens Br. Spur B	FS	NFSR 5022	Dead End	0.13	D2-WL	All or portion managed as wildlife field;used as trail #165-3
59A	Doublecamp Spur	FS	NFSR 2659	Dead End	0.15	D2-WL	_____portion managed as wildlife field
59B	Cold Springs Spur	FS	NFSR 2659	Dead End	0.18	D2-FS	accesses communication tower & special use site
				Total FS Roads in Area	**59.63**		
Roads Recently Decommissioned							
40402	Borrow Pit	FS			0.15		
40480	Old Warden Station	FS			0.25		

Total FS Jurisdiction roads	
Maintained by FS	**59.63**
Maintained by others	**0.00**

F.S. Miles by Objective Maint. Level	
Obj. ML Decommission	0.40
Obj. ML 1	
Obj. ML 2	26.51
Obj. ML 3	27.96
Obj. ML 4	1.27
Obj. ML 5	3.89
Total	**60.03**

Total mileage in area (all jurisdictions)	**63.19**