Travel Analysis Process Report

for

The Stearns Ranger District

2016

Approved By: __________________________
Timothy O. Reed
District Ranger

Reviewed By: __________________________
Dan Olsen
Acting Forest Supervisor
BACKGROUND

In August 1999, the Washington Office of the USDA Forest Service published Miscellaneous Report FS-643 titled Roads Analysis: Informing Decisions about Managing the National Forest Transportation System. The objective of roads analysis is to provide decision makers 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.

In January 2001, the agency published the Transportation Final Rule and Administrative Policy authorizing units to use, as appropriate, the road analysis procedure embodied in FS-643 to assist land managers making major road management decisions.

The Federal Register Notice (73 FR 74689) for the final travel management directives was published on December 9, 2008. The directives become effective January 8, 2009 (Forest Service Manual (FSM) 7700 – Travel Management). FSM 7703.25 changes the term “roads analysis” to “travel analysis”. Consequently, the terms are changed in this document to reflect the current direction unless there are references from previous documents using the term “roads analysis.”

These directives require that a travel analysis is conducted to inform decisions related to:

a. Identification of the minimum road system needed for safe and efficient travel and for administration, utilization, and protection of National Forest System (NFS) lands per 36 CFR 212.5(b)(1).

b. Designation of roads, trails and areas for motor vehicle use per 36 CFR 212.51.

PROCESS

This travel analysis is a six-step process. The steps are designed to be sequential with the understanding the process may require feedback among steps over time as an analysis matures. The amount of time and effort spent on each step differs by project, based on specific situations and available information. The process provides a set of possible issues and analysis questions for which the answers can inform choices about the transportation system management. Decision makers and analysts determine the relevance of each question, incorporating public participation as deemed necessary.

- Step 1. Setting up the Analysis
- Step 2. Describing the Situation
- Step 3. Identifying Issues
- Step 4. Assessing Benefits, Problems and Risks
- Step 5. Describing Opportunities and Setting Priorities
- Step 6. Reporting
The analysis is an integrated ecological, social, and economical approach to transportation planning that addresses both existing and future transportation system (USFS, 1999a). This analysis follows the process outlined in the document “Roads Analysis: Informing Decisions About Managing The National Forest Transportation System,” (USFS, 1999a). This is not a NEPA document, but rather a site specific NFMA analysis for the Stearns Ranger District. This area encompasses approximately 171,185 acres of National Forest ownership. This NFMA analysis defines the existing and desired conditions of the transportation system, and opportunities are identified to move towards the desired condition.

This analysis provides a framework to identify travel related concerns and management opportunities that can be incorporated into subsequent projects to be evaluated through the NEPA process. This analysis will assist in the decisions involving transportation systems on the Stearns Ranger District.

**PRODUCTS**

The product of an analysis is a report for decision makers and the public that documents the information and analyses used to identify opportunities and set priorities for future national forest transportation systems. Included in the report is a map displaying the known road system for the analysis area and a table listing the existing objective and operational maintenance level for each road, or segment of road. This report will:

- Identify needed and unneeded roads;
- Identify travel-associated environmental and public safety risks;
- Identify site-specific priorities and opportunities for travel-related improvements and decommissioning;
- Identify areas of special sensitivity or any unique resource values.

**THIS REPORT**

This report documents the travel analysis procedure used for the Stearns Ranger District (wherever analysis area is referenced in this document, it corresponds to the Stearns Ranger District boundary). This report is a “living” document and reflects the conditions of the analysis area at the time of writing. The document can be updated as the need arises and conditions warrant. Any future updates will be reflected in the title (e.g., version 2.0).
STEP 1  SETTING UP THE ANALYSIS

PURPOSE AND PRODUCTS

The purposes of this step are to:

- Identify the geographic scale or scales for the analysis,
- Develop a process plan for conducting the analysis, and
- Clarify the roles of technical specialists and line officers in the team.

The products of this step are:

- A statement of the objectives of the analysis,
- A list of interdisciplinary team members and participants,
- A list of information needs, and
- A plan for the analysis.

OBJECTIVES OF THE ANALYSIS

This travel analysis is specific to the district scale; it is being completed for the Stearns Ranger District. Unless otherwise stated, the boundary for this roads analysis will match the Stearns Ranger District boundary. (See maps in Appendix A.)

This report analyzes existing Forest Service system roads in the District. It will describe opportunities and set priorities; and some of these opportunities may be considered in future NEPA decisions.
**CORE INTERDISCIPLINARY TEAM MEMBERS**

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Role for Travel Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laurie Smith</td>
<td>Supervisory Forester</td>
<td>Planning Team/Leader/Recreation/Special Uses/Minerals</td>
</tr>
<tr>
<td>Lin Vaughan</td>
<td>Forest Engineer</td>
<td>Engineering/Transportation Management</td>
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<tr>
<td>Joe Metzmeier</td>
<td>Wildlife Biologist</td>
<td>Wildlife</td>
</tr>
<tr>
<td>Jon Walker</td>
<td>Forest Hydrologist</td>
<td>Hydrology</td>
</tr>
<tr>
<td>Alison Coons</td>
<td>South Zone FMO</td>
<td>Fuels/Fire Management</td>
</tr>
<tr>
<td>Mike Lick</td>
<td>Silviculturist</td>
<td>Vegetation Management</td>
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**EXTENDED INTERDISCIPLINARY TEAM MEMBERS**

<table>
<thead>
<tr>
<th>Name</th>
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<th>Role for Travel Analysis</th>
</tr>
</thead>
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<tr>
<td>Matt Wingard</td>
<td>GIS Specialist</td>
<td>GIS Support</td>
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<tr>
<td>Claudia Cotton</td>
<td>Soils Scientist</td>
<td>Soils</td>
</tr>
<tr>
<td>Ricky Wilson</td>
<td>Survey Technician</td>
<td>Lands/Access</td>
</tr>
<tr>
<td>Randy Boedy</td>
<td>South Zone Archeologist</td>
<td>Cultural Resources</td>
</tr>
<tr>
<td>Tim Grooms</td>
<td>Law Enforcement Officer</td>
<td>Safety/Enforcement Issues</td>
</tr>
</tbody>
</table>

Individuals from this Interdisciplinary team were utilized for the Travel analysis as needed. At critical points, Line Officers established sideboards, identified issues, and summarized management recommendations.

The Land and Resource Management Plan for the Daniel Boone National Forest 2004 (Forest Plan) and amendments provide the management objectives, baseline information, and standards and guidelines to meet legal requirements. Additional information was obtained through field surveys, knowledge of forest personnel, and database queries. The analysis incorporates the best available scientific information as summarized in the document “Forest Service roads: a synthesis of scientific information” (USFS, 2001). This information was the foundation for determining impacts to different resources and identifying recommended management actions.

A Forest Wide Roads Analysis was completed in April 2003 (DBNF RAP 2002). This analysis will tier to that document.

**INFORMATION NEEDS**

The data currently housed in the geographic information system (GIS) will be the information used for this analysis. Updates may be made as new information becomes available.
ANALYSIS PLAN

Review of the document will occur on the Daniel Boone NF (Forest Service specialists); and, the report will be available for other Forests as well. Once finalized, the document will be available to the public if requested. The Stearns Ranger District TAP Team conducted the analysis using GIS data, field data, and public involvement. The interdisciplinary (ID) team developed issues related to road management and reviewed all the questions in Step 4 to determine which were applicable to the analysis area. In Step 5 the team brought together all the resource information and made recommendations.

Public Involvement and NEPA (National Environmental Protection Act) Requirements.
Unit scale TAPs are not NEPA decisions; they are analyses intended to inform future projects regarding affordability and cumulative effects. These projects, depending upon the specific impacts, will generally require NEPA decisions prior to implementation. The public will need to be provided opportunities for comment on TAP recommendations near to the time that the actual projects are being proposed. This would be expected to include a broad spectrum of participation by citizens, other agencies, and tribal governments as appropriate.

On August 19, 2015, the district had an open, collaborative meeting with partners who work with us on the transportation system. The meeting was open to anyone that desired to attend. The partners in attendance included McCreary and Pulaski County officials, Kentucky Department of Fish and Wildlife Resources managers, and National Park Service managers. We reviewed and discussed the team’s recommendations. There were no additional recommendations that came from the meeting and everyone indicated general agreement with the analysis. However, everyone realized that there would be further opportunity to align maintenance responsibilities in future cooperative road agreements as well as opportunities for comment in future NEPA decisions. A list of individuals that participated in this meeting is included in Appendix F.
STEP 2 DESCRIBING THE SITUATION

PURPOSE AND PRODUCTS

The purpose of this step is to:

- Describe the existing transportation system in relation to current Forest Plan direction.

The products of this step are:

- A map or other descriptions of the existing transportation system defined by the current Forest Plan or transportation plan, and
- Basic data needed to address travel management issues and questions.
- A description of the status of current data, including sources, availability, and methods of obtaining information.

EXISTING TRANSPORTATION SYSTEM DESCRIPTION

Most of the study area is on National Forest System land. The roads assessed in and near the boundary of this study area are mostly National Forest System Roads (NFSRs) under the jurisdiction and maintenance of the Forest Service. There are approximately 362 miles of Forest Service jurisdiction roads within the analysis area. Approximately 139 miles of the Forest Service roads are closed to motor vehicle use. These roads are gated and vegetated throughout the year. The remaining approximately 223 miles of roads are open to public and/or administrative motor vehicle use. Most of the NFSRs are in fair condition and receive periodic maintenance as needed. Deferred maintenance needs exist for most of the roads.

Table 1– System Summary for Stearns Ranger District

<table>
<thead>
<tr>
<th>Maintenance Level</th>
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<th>Objective</th>
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<tr>
<td>5</td>
<td>2.2</td>
<td>3.6</td>
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<tr>
<td>4</td>
<td>11.4</td>
<td>10.7</td>
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<tr>
<td>3</td>
<td>110.2</td>
<td>111.5</td>
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<tr>
<td>2</td>
<td>101.2</td>
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<tr>
<td>1</td>
<td>137.1</td>
<td>138.8</td>
</tr>
<tr>
<td>Total</td>
<td>362.1</td>
<td>362.1</td>
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</tbody>
</table>

LAND AND RESOURCE MANAGEMENT PLAN EMPHASIS

The DBNF is divided into four Management Areas (MA) based on the Forest’s four main river basins. These are the Licking River MA, the Middle Kentucky River MA, the Upper Kentucky River MA, and the Upper Cumberland River MA. The Stearns Ranger District Assessment Area which covers approximately 171,185 total acres is located in the Upper Cumberland River MA.
The Upper Cumberland River MA includes seven landtype associations (LTAs) in two ecological sections, and three ecological subsections. Physiographically, these LTAs range from areas of shallowly dissected rolling plateau without escarpment, to areas of deeply dissected plateau, some with and some without escarpment. Karst features are abundant in some areas along the western edge of the MA. River bottoms are generally narrow and with limited flood plain. Soils range from shallow to deep sandy loams and silt loams on uplands to generally deep silty clay loams on slopes. Most river bottom soils are clay loams. Prior to southern pine beetle epidemic of the late 1990s, southern yellow pine dominated much of the vegetation on the rolling plateau and upper edge of the escarpment. Much of the vegetation below the escarpment and in the deeply dissected plateau is dominated by mixed mesophytic forest. River bottom forests are primarily narrow bands of river front forest. The Forest’s highest concentration of PETS species occurs in this MA. About 50 percent of the PETS and Conservation plant species benefit from periodic fire and are usually associated with open southern yellow pine or southern yellow pine-oak forest. The aquatic fauna of this MA is among the richest in the nation, and includes a higher proportion of federally listed mussels and fish than any other MA on the forest. Approximately 50 percent of the lands managed by the DBNF are within the Upper Cumberland River MA.

Travel through this area is along the broad, flat plateau tops and the narrow to wider (up to a half mile) bottoms. The landscape changes from scattered homes and businesses in and out of forests in the narrower valleys and ridge-tops to a pastoral setting found in the wider valleys and plateau. The effects of clearing, building, and timber harvesting can be significant to the form line and texture of the surrounding area or blend easily with the existing activities in the area depending on the location within this section.

The following are the Forest Plan Prescription Areas that are located in the analysis area for the Stearns Ranger District.

1.C. CLIFFLINE COMMUNITY
A cliffline community is the area between 100-feet slope-distance from the top and 200-feet slope distance from the dripline of a cliffline. A cliffline is a naturally occurring, exposed and nearly vertical rock structure at least 10 feet tall and 100 feet long. A cliffline is continuous if segments are separated by no more than 300 feet. Wherever the described conditions are found, those sites will be included in this Prescription Area. This Prescription Area is classified as Unsuitable for Timber Production – Tree cutting, tree removal, or timber harvest may occur on an unscheduled basis to attain Desired Future Conditions.

1.E RIPARIAN CORRIDOR
The Riparian Corridor Prescription Area encompasses riparian areas, as well as adjacent associated upland components. A riparian area is functionally defined as a three-dimensional ecotone of interaction that includes both terrestrial and aquatic ecosystems. It is identified on the ground as one of the following: a perennial stream or other perennial water body (with the exception of artificial upland ponds and the Large Reservoirs Prescription Area), or intermittent stream, as well as the associated soils, vegetation and hydrology. It extends down into the ground water, up above the canopy, outward across the flood plain, up the near-slopes that drain into the water, laterally into the terrestrial ecosystem, and along the watercourse at a variable width (Ilhardt et al. 2000). Wetlands, springs and seeps may also be covered under the 1.G. Rare Community Prescription Area.
1.G RARE COMMUNITY
Rare communities usually occur as small (a few hundred square feet to a few acres) areas of distinguishing vegetation, often with related surface and ground water conditions, and soil and bedrock characteristics. They generally occur as small islands in the context of a larger forest community. They are disturbance sensitive, but often disturbance dependent, communities of plants and animals. Most of these communities provide specific habitat for rare or uncommon plants and animals. Prior to 1700, many of these rare communities were more abundant than they are today (Owen 2002, Trani-Griep 2002). Many are likely to disappear over time without direct manipulation of vegetation. Management zones have been established around the most sensitive of these communities. In this document, the rare community itself is referred to as the “rare community site,” and the surrounding management zone is referred to as the “rare community management zone”. Rare community management zones occur only around wetland communities.

1.I. DESIGNATED OLD-GROWTH
Designated Old-Growth refers only to this Prescription Area, and encompasses areas that will be managed specifically to promote, enhance, and maintain the old-growth community. Examination of Future Old-Growth on the forest determined that the dry-mesic oak and mixed mesophytic hardwood (including American beech) were under-represented, with less than 8 percent by old-growth type (Forestwide Objective 1.4.B.). Areas (9) identified for designation contain a high representation of these types, oldest in age structure, and that would add to the network distribution across the forest. Old-growth stands may exist outside this Prescription Area. Old-growth does not imply first-growth forest, nor does it imply wilderness.

1.J. SIGNIFICANT BAT CAVES
The Significant Bat Caves Prescription Area includes significant bat caves and a ¼-mile radius around each opening. A significant bat caves contains a minimum of 50 Indiana bats (hibernacula) or 5 Virginia or Rafinesque’s big-eared bats (maternity site or hibernacula). Such sites are found in a naturally occurring cavity or system of interconnected passages, or a tunnel or mine, located beneath the surface or within a cliff, ledge, or rockshelter. These sites occur in both limestone and sandstone. This Prescription Area is classified as Unsuitable for Timber Production – Tree cutting, tree removal, or timber harvest may occur on an unscheduled basis to attain Desired Future Conditions.

1.K HABITAT DIVERSITY EMPHASIS
This matrix of diverse habitat unites the Forest landscape. Unless allocated to another Prescription Area, National Forest System land is allocated to the Habitat Diversity Emphasis Prescription Area. It may consist of small to large parcels that may be adjacent to, or possibly surrounded by, other Prescription Areas. Most forest and woodland in this Prescription Area is classified as Suitable for Timber Production (Scheduled Harvest) – Non-timber emphasis. All wooded grassland/shrubland and certain steep or inaccessible areas are classified as Unsuitable for Timber Production – Tree cutting, tree removal, or timber harvest may occur on an unscheduled basis to attain Desired Future Conditions.

2.B BEAVER CREEK WILDERNESS
This Prescription Area, which is congressionally designated under the authority of the Eastern Wilderness Act of 1975, consists of approximately 5,000 acres within the Cumberland River
Management Area. This Prescription Area is Unsuitable for Timber Production – Timber harvest not allowed. This is a primitive place where natural ecological succession is allowed to operate freely to the extent feasible. Little evidence of human activity can be detected. Congress has designated this area as a place where humans influence nature as little as possible.

3.A. DEVELOPED RECREATION AREAS
This Prescription Area, found in all Management Areas, is estimated at approximately 3,700 acres across the DBNF. This Prescription Area is Unsuitable for Timber Production – Tree cutting, tree removal, or timber harvest may occur on an unscheduled basis to attain Desired Future Conditions.

3.B. LARGE RESERVOIRS
This Prescription Area consists of the water surface at summer pool, and a 300-foot wide zone inland from the water’s edge at summer pool, of the entire National Forest shoreline of Cave Run Lake, Laurel River Lake and Lake Cumberland. This Prescription area consists of 30,600 acres in the Cumberland River and Licking River Management Areas. This Prescription Area is Unsuitable for Timber Production – Tree cutting, tree removal, or timber harvest may occur on an unscheduled basis to attain Desired Future Conditions.

3.C.2. PROPOSED WILD AND SCENIC RIVER: MARSH CREEK WILD RIVER SEGMENT
This Prescription Area consists of seven miles of river and 1,240 acres in the Cumberland River Management Area. This river segment has been proposed by the Forest as suitable for federal designation as a Wild and Scenic River. Final action on this designation is pending. This Prescription Area is Unsuitable for Timber Production – Timber harvest not allowed.

3.C.4. PROPOSED WILD AND SCENIC RIVERS: CUMBERLAND RIVER SEGMENT, WAR FORK CREEK SEGMENT, ROCKCASTLE RIVER SEGMENT – SCENIC RIVERS
This Prescription Area contains 35.3 miles of river and approximately 5,600 acres of corridors. It is located in the Cumberland River Management Area, except for War Fork Creek, which is in the Middle Kentucky River Management Area. These river segments have been proposed by the Forest as suitable for Federal designation as Wild and Scenic Rivers. Final action on this designation is pending. The Cumberland and Rockcastle River segments are designated as Kentucky Wild Rivers by the state. This Prescription Area is Unsuitable for Timber Production – Tree cutting, tree removal, or timber harvest may occur on an unscheduled basis to attain Desired Future Conditions.

3.C.5. PROPOSED WILD AND SCENIC RIVERS: ROCK CREEK SEGMENT AND MARSH CREEK SEGMENT – RECREATION RIVERS
This Prescription Area contains 25.5 miles of river and approximately 6,180 acres of corridors. It is located in the Cumberland River Management Area. These river segments have been proposed by the Forest as suitable for Federal designation as Wild and Scenic Rivers. Final action on this designation is pending. The Commonwealth of Kentucky also designates Rock Creek as a Kentucky Wild River. This Prescription Area is Unsuitable for Timber Production – Tree
cutting, tree removal, or timber harvest may occur on an unscheduled basis to attain Desired Future Conditions.

3.F. NATURAL ARCH SCENIC AREA
This Prescription Area contains approximately 1,065 acres and is located in the Cumberland River Management Area. The Secretary of Agriculture under Regulation U-3 designated this area. This Prescription Area is Unsuitable for Timber Production – Tree cutting, tree removal, or timber harvest may occur on an unscheduled basis to attain Desired Future Conditions. Natural ecological processes and conditions dominate, but some human influence, primarily dispersed recreation, commonly occurs. Unique geological features including rock arches, rock bridges, rockshelters, and “rockhouses” are common in this area.

3.H.1. RUFFED GROUSE EMPHASIS
This Prescription Area consists of one location in the Cumberland River Management Area and another in the Licking River Management Area totaling 10,500 acres. This Prescription Area is Suitable for Timber Production (Scheduled Harvest) – Non-timber emphasis. These areas are managed to favor species that use young-age forest conditions with an emphasis on providing high-quality ruffed grouse habitat. They are cooperatively managed with the Kentucky Department of Fish and Wildlife Resources (KDFWR) to provide sport hunting and viewing opportunities.

5.A. COMMUNICATIONS SITES
These are non-forest, small cleared sites containing a communication tower. There is a commercial tower located at Wiborg. It is currently leased to South Kentucky Rural Electric Cooperative. There are administrative towers located at Big Swag Helibase, Stearns District office and on land owned by the McCreary County Water District near Skullbones.

5.C. SOURCE WATER PROTECTION
This Prescription Area -- Zones 1 and 2 -- protects municipal drinking water sources and was developed in close cooperation with the Kentucky Division of Water (KDOM). Similar to the approach taken by the KDOM, each source water protection area is divided into zones:

Zone 1 – Begins one-quarter mile below the water intake site and extends five miles upstream (one mile up-channel in lakes) of the intake along any stream that is 3rd order or larger (on 1:24,000 scale topographic map). This zone includes the surface water and extends one-quarter mile from the shores of these streams or lakes (or nearest watershed boundary if within one-quarter mile).

Zone 2 – Extends the protection area to 10 miles (5 miles up-channel in lakes) above the water intake along the source stream and any tributaries that are 3rd order or larger (on 1:24,000 scale topographic map). It includes Zone 1 and increases the total width to one-half mile from each side of these streams or lakes (or nearest watershed boundary if it is within one-half mile).

Zone 3 – Extends 25 miles (10 miles up-channel in lakes) above the water intake along the source stream and any tributaries that are 3rd order or larger (on 1:24,000 scale topographic map). It includes the area of any 6th level hydrologic unit adjacent to these streams. Zone 3 is not part of this Prescription Area and is governed by Forestwide management direction. The portion of Zone 1 within 300 feet of a water body is Unsuitable for Timber Production – Tree cutting, tree removal, or timber harvest may occur on an unscheduled basis to attain Desired Future Conditions.
The following table displays the acres and percentage of each prescription area in the analysis area (Stearns RD). Some prescription areas overlap, therefore the acres will exceed the total district acres and percentages will exceed 100 percent.

Table 2 – Stearns Acres by Prescription Area

<table>
<thead>
<tr>
<th>Prescription Area</th>
<th>Stearns NFS Acres</th>
<th>Percentage of District Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.C Cliffline Community</td>
<td>28,589</td>
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<tr>
<td>1.E Riparian Corridor</td>
<td>38,886</td>
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<td>1.G Rare Community</td>
<td>25,040</td>
<td>14.6</td>
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<tr>
<td>1.I Designated Old-growth</td>
<td>3,452</td>
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<tr>
<td>1.J Significant Bat Caves</td>
<td>1,241</td>
<td>0.7</td>
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<tr>
<td>1.K Habitat Diversity Emphasis</td>
<td>86,928</td>
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<td>2.B Beaver Creek Wilderness</td>
<td>4,839</td>
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<tr>
<td>3.A Developed Recreation Areas</td>
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<td>3.B Large Reservoirs</td>
<td>1,600</td>
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<tr>
<td>3.C.2 Proposed Wild and Scenic River: Marsh Creek Wild River Segment</td>
<td>1,244</td>
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<tr>
<td>3.C.4 Proposed Wild and Scenic Rivers: Cumberland River Segment, War Fork Creek Segment, Rockcastle River Segment – Scenic Rivers</td>
<td>906</td>
<td>0.5</td>
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<tr>
<td>3.C.5 Proposed Wild and Scenic Rivers: Rock Creek Segment and Marsh Creek Segment – Recreation Rivers</td>
<td>990</td>
<td>0.6</td>
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<tr>
<td>3.F Natural Arch Scenic Area</td>
<td>1,065</td>
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<td>3.H.1 Ruffed Grouse Emphasis</td>
<td>5,845</td>
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<td>5.A Communications Sites</td>
<td>4</td>
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<tr>
<td>5.C Source Water Protection</td>
<td>13,487</td>
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**DEFINITIONS (36 CFR 212.1)**

The Federal Register published the Final Rule and Administrative Policy which established new definitions for road management on the National Forests. Listed below are some of the new definitions related to travel management and analysis.

**Area.** A discrete, specifically delineated space that is smaller, and in most cases much smaller, than a ranger district (36 CFR 212.1).

**Designated Road, Trail, or Area.** An NFS road, an NFS trail, or an area on NFS lands that is designated for motor vehicle use pursuant to 36 CFR 212.51 on an MVUM (36 CFR 212.1).
Forest Road or Trail. A road or trail wholly or partly within or adjacent to and serving the NFS that the Forest Service determines is necessary for the protection, administration, and utilization of the NFS and the use and development of its resources (36 CFR 212.1).

Forest Transportation Atlas. A display of the system of roads, trails, and airfields of an administrative unit (36 CFR 212.1).

Forest Transportation Facility. A forest road or trail or an airfield that is displayed in a forest transportation atlas, including bridges, culverts, parking lots, marine access facilities, safety devices, and other improvements appurtenant to the forest transportation system (36 CFR 212.1).

Forest Transportation System. The system of NFS roads, NFS trails, and airfields on NFS lands (36 CFR 212.1).

Forest Transportation System Management. Travel planning, analysis, designation of roads, trails and areas for motor vehicle use, recordkeeping, scheduling, construction, reconstruction, maintenance, decommissioning, and other operations undertaken to achieve environmentally sound, safe, and cost-effective access for the use, enjoyment, protection, administration, and management of NFS lands.

Highway-Legal Vehicle. Any motor vehicle that is licensed or certified under state law for general operation on all public roads in the state. Operators of highway-legal vehicles are subject to state traffic law, including requirements for operator licensing.

Jurisdiction Over a Forest Transportation Facility. The legal right to control or regulate use of a forest transportation facility derived from title, an easement, an agreement, or other similar source.

Motor Vehicle. Any vehicle which is self-propelled, other than:

a. A vehicle operated on rails; and

b. Any wheelchair or mobility device, including one that is battery-powered, that is designed solely for use by a mobility-impaired person for locomotion and that is suitable for use in an indoor pedestrian area (36 CFR 212.1).

Motor Vehicle Use Map (MVUM). A map reflecting designated roads, trails, and areas on an administrative unit or a ranger district of the NFS (36 CFR 212.1).

National Forest System Road. A forest road other than a road which has been authorized by a legally documented right-of-way held by a state, county, or local public road authority (36 CFR 212.1).

National Forest System Trail. A forest trail other than a trail which has been authorized by a legally documented right-of-way held by a state, county, or local public road authority (36 CFR 212.1).
Non-Highway-Legal Vehicle. Any motor vehicle that is not licensed or certified under state law for general operation on all public roads within the state. Operators of non-highway-legal vehicles are subject to state requirements, if any, for licensing and operation of the vehicle in question.

Private Road. A road under private ownership authorized by an easement granted to a private party or a road that provides access pursuant to a reserved or outstanding right.

Public Road. A road under the jurisdiction of and maintained by a public road authority and open to public travel (23 U.S.C. 101(a)).

Road. A motor vehicle route over 50 inches wide, unless identified and managed as a trail (36 CFR 212.1).

Road Construction or Reconstruction. Supervising, inspecting, actual building, and incurrence of all costs incidental to the construction or reconstruction of a road (36 CFR 212.1).

Road Decommissioning. Activities that result in restoration of unneeded roads to a more natural state (FSM 7734).

Road Maintenance. Ongoing upkeep of a road necessary to maintain or restore the road in accordance with its road management objectives (FSM 7714).

Road Subject to the Highway Safety Act. An NFS road that is open to public use in a standard passenger car, including a road with access restricted on a seasonal basis and a road closed during extreme weather conditions or for emergencies, but which is otherwise open to public travel.

Route. A road or trail.

Temporary Road or Trail. A road or trail necessary for emergency operations or authorized by contract, permit, lease, or other written authorization that is not a forest road or a forest trail and that is not included in a forest transportation atlas (36 CFR 212.1).

Trail. A route 50 inches or less in width or a route over 50 inches wide that is identified and managed as a trail (36 CFR 212.1).

**BASIC DATA NEEDS**

Basic data needs are listed below for the Stearns Ranger District Travel Analysis; these were data needed to adequately address the issues. Some of the data are displayed in this report, and other data was used to help answer questions in Step 4, but are located on file at the Stearns Ranger District or in the GIS corporate database.

- GIS layer of existing transportation system.
- Road logs.
- GIS coverage of designated critical habitats.
• GIS shapefile of potential unroaded areas (roads buffered ¼ mile).
• Classification of all roads by type and level of use, season of use and maintenance needs.
• Identification of wildlife habitat management needs facilitated by the existing road system.
• Identification of existing monitoring/inventory sites and the required roads necessary for access.
• An assessment of the degree of encroachment and proximity of roads to wetland areas, and the potential impacts is needed.
• The location or roads relative to riparian area
• Vegetation inventory data.
• Identification of system roads which have easements or special uses to access private property or utility lines
• Culvert inventory
• Watershed framework
• Historic wildfire ignition points

STATUS OF CURRENT DATA

The roads in the analysis area are in the GIS system, and their condition/status is current as of September 8, 2015. The road number, name, length, and other data are detailed in Appendix B, Tables 1-3.

STEP 3 IDENTIFYING ISSUES

PURPOSE AND PRODUCTS

The purpose of this step is to:
• Identify the key questions and issues affecting travel management, and
• Describe the origin of the issues.

The products of this step are:
• A summary of key travel-related issues, including their origin and basis, presented by general categories of environmental, socio-cultural and economic, and

ISSUE SUMMARY

The following issues were identified by the interdisciplinary team for this travel analysis.

Issue 1 – Private Property/Special Use Access

Private property access and special use permit access are issues in this analysis. They are factors in deciding the management of roads in Prescription areas on the Stearns Ranger District. Roads that are needed for access are retained on the road system.
Issue 2 – Use of roads for wildfire suppression and prescribed burning.

Much of the Stearns Ranger District is considered wildland urban interface due to proximity to adjacent towns, private in-holdings and small communities within the proclamation boundary. Public safety and control of wildfires is important to protect our neighbors.

Existing system roads serve an important role in safe and efficient wildfire suppression operations. Timely access for suppression personnel and equipment is dependent upon an adequate road system.

Existing roads often serve as the primary control lines. This allows for suppression with minimal ground disturbance and minimal exposure of personnel to hazards. In addition to wildfire suppression, system roads serve as the primary containment sources for the District’s Hazardous Fuels Reduction Program.

Issue 3 – Access for Vegetation Management

Roads provide access for managing forest vegetation through prescribed burning, timber stand improvement and commercial timber sales. They are needed to manage forest stands and suppress insect and disease outbreaks (i.e. southern pine beetle, oak decline, hemlock wooly adelgid, etc.). Roads provide access for salvage of damaged and fire killed timber and other natural disasters such as fire, wind and ice events. Access is generally good, but small amounts of new roads may be needed for future management.

Issue 4 – Access/Use for Wildlife Management

The current road system provides access for wildlife management on the Stearns Ranger District. The presence of roads, especially roads open to public traffic, can have adverse effects on wildlife. Many adverse impacts are the result of disturbance, illegal harvest, and habitat alterations caused by roads. Controlling access, by gating roads, is an important tool for mitigating adverse impacts. Gated roads also provide benefits for wildlife when these areas are managed as linear wildlife openings or provide access to spot openings. Roads also facilitate and provide access for hunting and wildlife viewing opportunities. Maintaining un-roaded areas is helpful in order to provide wildlife with large contiguous blocks of un-fragmented habitat with low levels of disturbance. Controlling access, providing wildlife openings, and maintaining un-roaded areas were identified as important road issues for wildlife on the Stearns Ranger District.

Issue 5 – Recreation

Roads are an important factor from a recreational standpoint for numerous reasons. They serve as the primary conduit for ingress/egress to the National Forest, recreation areas and trails. Recreation activities on the Stearns Ranger District include: hiking, mountain biking, horseback riding, OHV riding, fishing, camping, swimming, hunting, bird watching, scenic driving, and many others. All of these recreational activities require a road system to access the recreation areas and trails. Additionally from an administrative standpoint, roads are a necessity for emergency response and maintenance of recreation areas and trails.
**Issue 6 – Potential Impacts to Water Quality**

Unmaintained or under-maintained roads could contribute to erosion and sedimentation problems, impacting water quality in streams, which in turn could impact aquatic T&E species. Also, McCreary County’s water sources are the Big South Fork and Laurel Creek Reservoir; these are protected through Prescription Area 5.C Source Water Protection.

**Issue 7 – Mineral Management**

Roads are needed to access outstanding, reserved, and federal mineral operations. They are also needed for rehabilitation of abandoned mineral operations.

### STEP 4 ASSESSING BENEFITS, PROBLEMS, AND RISK

#### PURPOSE AND PRODUCTS

The purpose of this step is to:

- Assess the various benefits, problems, and risks of the current transportation system and whether the objectives of Forest Service policy and forest plans are being met.

The products of this step are:

- A synthesis of the benefits, problems, and risks of the current transportation system,
- An assessment of the risks and benefits of entering any unroded areas, and
- An assessment of the ability of the transportation system to meet management objectives.

#### ROAD RELATED ISSUES

**Access for Special Use permits:** There are currently 46 long term road Special Use Permits in the Stearns Ranger District that are used for access easements. There are additional roads which access powerlines, telephone lines, and communication towers in the project area. A list of these permits can be found in Appendix C, Table 1.

Access to National Forest: The district has numerous areas that lack easements needed for resource management as well as public access. A list of 27 areas and/or roads that need an easement can be found in Appendix C, Table 2.

#### CURRENT ROAD SYSTEM BENEFITS, PROBLEMS, AND RISKS

The following section is a series of questions and answers that assess benefits, problems, and risks of the current transportation system and its ability to meet the objectives stated in the Forest Land Management Plan. The questions are from Forest Service publication FS-643, *Road Analysis: Informing Decisions About Managing the National Forest Transportation System*. 
Although the questions specifically address the road system, in answering the questions, the transportation system was considered. Table 3 provides documentation for this section of the travel analysis process.

Table 3. Documentation for the Stearns Ranger District Travel Analysis Process Step 4.

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### Ecosystem Functions and Processes (EF)

**EF (1): What ecological attributes, particularly those unique to the region, would be affected by roading of currently unroaded areas?**

No additional roads are planned in roadless areas. Beaver Creek Wilderness area provides the largest unroaded area on the district.

**EF (2): To what degree do 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?**

Roads are known vectors for the spread of exotic plant species. The road system may facilitate treatment in some cases but in other cases the road system is a main contributor to the establishment and spread of these plants. Some species are brought in with fill material, planted for erosion control, or brought in with forest visitors using the roads. Other species are spread with the movement of forest visitors from one location to another and by road maintenance operations such as grading and mowing. Once established, some species are persistent and spread rapidly out into the surrounding landscape and replace native plants and associated insects. On the other hand, the presence of road systems allow for the early detection of NNIS and disease on the forest and contribute in the effective trapping, treatment and monitoring of exotics and disease.
A widely held thought about biological invasion is that it is promoted by disturbance. Building roads into a forest’s interior and subsequently maintaining them (including ditch clearing, road grading, and vegetation clearing) includes disturbances that creates and maintains new edge habitat. A suite of exotic species can invade these roadside habitats. Roads may be the first point of entry for exotic species into a new landscape, and the road can serve as a corridor along which the plants move farther into the landscape. Some exotic plants may then be able to move away from the roadside into adjacent patches of suitable habitat. Invasion by exotic plants may have significant biological and ecological effects if the species are able to disrupt the structure or function of an ecosystem. Invasion may also be of concern to land managers if the exotic species disrupt management goals and present costly eradication problems.

In general, the existence of roads appears to have had little effect on forest tree diseases, but there are some examples where building or using roads caused significant local effects such as damage to lower portions of roadside trees. Nearly always, the negative effects can be improved through simple modifications in how roads are built and used. The one benefit of roads related to tree diseases is to provide access for silvicultural activities that protect a variety of resources, such as to inoculate decay fungi into trees to create wildlife habitat. One negative effect includes the movement of people on the roads, roads, which increases the opportunity to introduce pest species. Road building may also set the stage for an insect attack that further stresses the trees and sets the stage for a disease outbreak that kills them. Roads provide a means by which exotic species can spread more rapidly into non-infested areas. Through the movement of people, their belongings, forest products and other material, exotic species may be moved great distances in a short period of time. This can lead to the establishment of populations well removed from the generally infested areas.

**Forest Specific:** Use and maintenance of roads and trails on the Forest are the largest contributors to the continuance and spread of Nepal Browntop/Japanese Grass (*Microstegium vimineum*), False Skullcap (*Mosla dianthera*), and Crown Vetch (*Coronilla varia*). The first two species fair best in disturbed, somewhat open, moist ground. The last species is usually found in open, drier sites. Woods, roads, and trails are ideal habitat for the species. Use of these corridors carries mud-encrusted seed further into forested areas. Shaded roadways and ditches also provide habitat for the species. Ditch and shoulder maintenance on Forest roads are the single largest factor contributing to the maintenance and spread of Nepal Browntop, and to a lesser extent, false skullcap, along roads and into other habitats. Seeds in the soil and mud are carried along the road from one place to another as the ditch is cleared and reshaped. At stream crossings, the accumulated soil is pushed to the side to create a water diversion wing. Water passing along this seed-laden soil picks up seeds, which are then carried to the stream corridor. Suitable habitat for Nepal Browntop is also present in the stream corridor. Once a population is established, flowing water carries the seed downstream to additional sites. The DBNF has forest types very susceptible to exotic pests that have been found or have become established in other parts of the country; gypsy moth, hemlock woolly adelgid, beech bark disease, and Asian long-horned beetle, to name a few.

**Discussion:** Although few habitats are immune to at least some invasion by exotic or other aggressive plants, predicting which species will become pests is usually difficult. Assessing the scale of a biological invasion problem is complicated by the typical lag between when an exotic or aggressive native is introduced and when it begins to expand its distribution and population
size in a new area. Cowbirds, for example, can be introduced into forest environments by roads and subsequently affect populations of Neotropical migratory birds through nest parasitism. The spread of pathogens where roads act as vector is described in the Forest Diseases section. Few environmentally benign approaches to exotic plant control or eradication have been tested. Roads of any sort in the very limited geographic range of the primary host provide a way to move soil, along with the fungus, from infected to uninfected areas. Spread of the fungus can be checked by careful planning to reduce entry to uninfected areas, road closures, partial road closures during wet weather, attention to road surfaces and drainage of possibly contaminated water to streams, wash stations to remove soil from vehicles before entry to uninfected areas, and sanitation strips to remove host plants from near roadsides. Building and maintaining roads may exacerbate root diseases. Wounded trees and conifer stumps created and not removed during road building provide infection courts for annosus root disease; the disease may then spread through root contacts to kill a patch of trees. Trees damaged or stressed by road building become susceptible to a variety of tree diseases through direct wounding of stems and roots, covering roots with side castings, or by compacting soil over roots. Armillaria root disease is benign in deciduous stands where only injured trees are attacked but more serious in conifer stands where pockets of disease are initiated. Oak decline is associated with poor sites, older stands, and road building or other disturbance. Roads indirectly contribute to disease spread by giving people access to remote forests and ways to transport material long distances. New pockets of both oak wilt and beech bark disease may have resulted from moving firewood from the forest to a home site.

Forest-Specific considerations: Because control and eradication of exotic species is difficult and usually expensive, and may also create unwanted side effects, prevention is the best measure. The Region has produced a series of timber sale contract clauses specifically allowing the cleaning of equipment before operating in an area free of invasive weeds. Use of these clauses for timber sales and other projects will help the Forest contain infestations of many exotic weed plants and keep some areas

EF (3): To what degree do the presence, type, and location of roads contribute to the control of insects, diseases, and parasites?
Roads allow equipment used in control of insects, diseases and parasites to reach infested locations that might otherwise not be reached. Roads in some circumstances may also provide a perimeter from which eradication or control can be effectively launched. Roads may hinder control as they can serve as access points for new infestations from sources such as gypsy moths carried in on vehicles into a clean area.

Monitoring measures for insects, diseases and parasites is similar to that for noxious weeds. Building and maintaining a database of specified insects, diseases, and parasites would improve prevention and eradication efficiency. Surveys would require considerable time and money to complete.

EF (4): How does the road system affect ecological disturbance regimes in the area?
Roads within cliffline zones, particularly those above clifflines, have a great potential of disturbing the existing hydrologic regimes of these sensitive habitats. Reducing the water flow into the cliffline system would have the potential to enact changes that are different from background levels. Habitat parameters would change benefiting some species and hurting others.
Roads contribute to increased levels of stream sedimentation, especially during storm events. The existence of roads in and/or near riparian areas provides direct conduits for silt-laden runoff into forest streams thereby increasing the level of impact upon aquatic organisms. While storm events naturally increase sediment loads in forest streams, the presence of roads clearly exacerbates the situation.

**EF (5): What are the adverse effects of noise caused by developing, using, and maintaining roads?**

Forest System Roads are relatively less used when compared to the county, state or federal highways. Thus, noise associated with all aspects of these roads is limited in duration and volume. While noise can limit the utilization of habitats adjacent to heavily traveled roads, this result would not be expected to occur in most instances on Forest System Roads. Some unoccupied, suitable habitat may occur as a result of developing, using and maintaining roads, but the size of this area should be relatively small and its impact on populations to be of little consequence.

**Aquatic, Riparian Zone, and Water Quality (AQ)**

A first approximation of roads that were significant with regard to soil and water concerns was based on a GIS analysis. Using the forest roads layer, five criteria were mapped:

1. Roads within 100' of perennial streams
2. Roads on slopes that exceeded 40%
3. Roads that crossed perennial streams
4. Roads that have culverts that have been identified as having aquatic passage problems
5. Roads that occur within source water protection zones

Each individual road listed on the Travel Analysis Plan was analyzed for all the listed criteria. Roads of concern were either validated or removed with the input of local knowledge from district personnel.

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

Surface and subsurface flows are intercepted by the road when water is moving down adjacent hill slopes. 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. These changes in routing can result in increase in peak flows by both a volumetric increase in quick flow and changes in the timing of storm runoff to streams (Wemple et al. 1996). The magnitude of this effect is dependent on the density of roads, gradient of road, and its location in the watershed. These effects are particularly pronounced in association with roads located along drainages or with multiple stream crossings.

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

Surface erosion occurs on most roads because their surface, cut-slopes, fill-slopes, and associated drainage structures are usually composed of erodible material and are exposed to rainfall and concentrated surface runoff. Surface erosion differs greatly depending on many factors, the most influential of which are usually the erodibility of the exposed surface; the slope of the exposed
surface; and the area of the exposed surface that generates and concentrates the runoff. Surface erosion and associated sedimentation are highly sensitive to road maintenance practices. Small changes in road drainage configuration can result in large changes in erosion and the routing of eroded sediments. (USDA Forest Service 2000a and 2000b)

Most of the roads within and under control of the DBNF are composed of erodible material. Others like federal, state, and county roads are mostly hard surface roads. These latter roads would contribute erosion more through their cut-slopes, fill-slopes and associated drainage structures than through their surface runoff.

AQ (3): How and where does the road system affect mass wasting?
Many Forest roads, especially those on steeper slopes, are subject to failure through mass wasting processes. The mechanisms of road-related mass wasting failures include removing slope support in road cuts, increasing the weight on fill-slopes, groundwater saturation of the road prism, intercepting subsurface flows, hill-slope drainage rerouting, and initiating debris flows at failed stream crossings. Some mass wasting road failures extend long distances downhill from the failure site. If the failure tract extends to a stream channel, the initial failure and subsequent chronic surface erosion of the slide will deliver sediment directly to the channel. These types of failures are typical where unstable road or landing fill is placed on steep slopes. Road construction on unstable slopes can increase the frequency of mass wasting failures. Debris flows and debris torrents often severely affect road/stream-crossing fills and transport fills and channel materials to higher order channels. The factors that may influence the potential for road-related mass wasting failures are hillside slope gradient, slope position, soil type, bedrock geology, geologic structure, type of road construction, road drainage, and groundwater characteristics. Many roads appear relatively stable under normal climactic and geologic conditions but may fail during high intensity precipitation events or in major earthquakes.

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 streams by ditches that empty directly at road-stream crossings.

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?
Roads may create potential pollutants in several ways. Chemicals such as surfacing oils, de-icing salts, herbicides, and fertilizers may be applied to roads for maintenance, safety, or other improvements. Roads may also become contaminated by material from vehicles, including accumulation of small spills, such as crankcase oil, brake pad lining, and hydraulic fluid or from
accidental spills of hazardous or harmful materials being transported over roads. Applied or spilled materials may have access to water bodies, depending on road drainage systems and runoff patterns. The severity of damage depends on what organisms might be exposed, their susceptibility to the material, and the degree, duration, and timing of their exposure. The greatest threat on the Forest is from major roads, where the majority of traffic and transport of hazardous and harmful material occurs. These major roads also contribute to the majority of the deicing salts. There are several of these major state and county roads in the 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 (such as the delivery of sediments and chemicals, thermal increases, elevated peak flows)?
The road system in the analysis area is connected to streams primarily at stream crossings and where the roads are located close to stream channels. Generally, the hydrologic connection is made where ditchlines and runoff empty into streams. Road surfacing and other eroded materials are usually deposited into streams by ditches that empty directly into streams. Without proper ditch turnouts and filter strips, 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.

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?
Beneficial uses of water on the Stearns Ranger District are: providing drinking water for much of the area; recreational fishing, swimming, and boating opportunities; critical habitat for Proposed, Endangered, Threatened, & Candidate (PETC) species of fish and mussels. Numerous threatened & endangered mussel beds are present on the district and many are in close proximity to existing roads, bridges, and low water crossings. Many of the streams are also critical habitat for several Threatened fish species. Our high water quality streams are important to conservation efforts to preserve and increase the populations of many PETC aquatic species.

Poorly maintained and/or located roads have the potential to significantly increase sediment loads in district streams to the point that it could negatively affect all of the above beneficial uses.

AQ (8): How and where does the road system affect wetlands?
Roads can affect wetlands by direct encroachment through changes in hydrology. Roads can modify both surface and subsurface drainage in wetlands, causing changes in wetland moisture regimes. Where roads cross or are near wetlands, the effect on wetland form, process, and function is evaluated by examining the degree to which the local hydrology is modified, in terms of flow quantity, timing, routing, and water quality. Sedimentation rates are also directly affected by changes in hydrology. These in turn can further change wetland hydrology. Roads may also provide a conduit for de-icing salts and chemicals from spills to reach wetlands. Where roads cross the streams, weed seeds have a high likelihood of reaching wetlands where establishment can be detrimental to the system.

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?
Stream channels are dynamic. They migrate within historic floodplains, eroding the bed and banks in one place while aggrading the bed and building new banks in other places. Streams also transport and deposit large pieces of woody debris and fine organic matter, providing physical structure and diverse aquatic habitat to the channel. When roads encroach directly on stream channels, these processes can be modified. Wood and sediment can be trapped behind stream crossings, reducing downstream transport and increasing the risk of crossing failure. Road alignment and road fills can isolate floodplains, constrict the channel, constrain channel migration, and simplify riparian and aquatic habitat. In some places, road encroachment can divert stream-flows to the opposite bank, thereby destabilizing the hill-slope and resulting in increased landslides. Changes in flow rates and their maxima and minima created by runoff and altered flow paths can change sedimentation rates, altering floodplain and wetland dynamics, especially along smaller streams.

**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?**

Fish, mussels, reptiles, and amphibians are susceptible to blockage at road crossings. In the southeast, most stream species are adapted to low gradients and moderate currents. Low water fords, bridge aprons, and culvert pipes may include artificial cascades or waterfalls that are beyond the jumping and swimming capabilities of many aquatic species. These drops may block movements primarily during low flows. The shallow laminate flows of aprons or the concentrated flow of culverts can impede aquatic organism movements at either low or high flows.

Road crossings and other artificial barriers may restrict fish access to prime habitat. Smaller stream fishes may not migrate across large distances, however, many species rely on seasonal upstream movements to access more suitable spawning habitat and to replenish populations that have declined due to natural or human caused disturbance. Since mussels rely on fish hosts during their early life history, mussels may also be limited in their distribution due to artificial barriers. Young mussels attach themselves on to fish. In this way, mussel populations can re-populate upstream areas that could otherwise become devoid of mussels over years of downstream drift or periodic floods and drought. Amphibians and reptiles may also be affected by road crossings. Aquatic obligate species such as waterdogs may be blocked from upstream movements. Semi-aquatic species such as turtles and frogs may be forced to travel overland and across roadways where they are susceptible to predation and road kill. Even slow moving snails and salamanders can be affected since they may be attracted to the cobble cover and hardened substrates present at some low water fords. Their concentration at crossings can result in elevated road mortality and deplete local populations.

A comprehensive fish passage assessment has been completed for the Daniel Boone National Forest by the CATT team. When major road repairs are undertaken, aquatic species passage should be accommodated.

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

When roads are constructed adjacent to streams, riparian vegetation is often removed to accommodate the road right-of-way, improve visibility, and reduce the hazard of trees falling on the roadway. This action can reduce shading of the stream, causing increased stream temperatures, reduced potential for recruiting large woody debris in the stream, reduced leaf fall and riparian invertebrates, and loss of habitat for aquatic and riparian species. Flow rate and sedimentation rate changes can drastically alter floodplain and wetland plant communities along streams as the result of changes in the effective water table level along the stream. The miles of roads per watershed, per acre that are located within 100 feet of a stream are documented. This
includes stream crossings. This information should be viewed at the watershed level to accurately identify individual sites of greatest risk. Additional useful information at the watershed level would be: GIS coverage overlaying roads (all types), riparian areas, streams, cover types, critical habitats, and locations of all rare, unique, and/or PETS species, and existing CATT data.

**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 anywhere in this analysis area. No Sensitive or Locally Rare species are subject to fishing or poaching. Direct habitat loss from the road system is unlikely because the riparian corridor will be protected.

**AQ(13): How and where does the road system facilitate the introduction of non-native aquatic species?**
Introduction of non-native sport fishes, whether authorized or unauthorized, have the potential to affect the distribution and abundance of native fishes, amphibians, and other aquatic organisms. Exotic aquatic plants may also be introduced to lakes and streams from boats and boat trailers. Unauthorized releases of aquarium fishes, bait fishes, exotic amphibians and reptiles, and non-native plants to streams and lakes are strongly influenced by road access. On the Forest the introduction of non-native fish is high due to the nearness of the streams and lakes to roads and due to the high fishing nature of the human population in the area. Anywhere in the Forest where a road comes close to a stream there is likely to be someone fishing at any time. Along with fishing come the use of natural bait and the likelihood of bait bucket introductions. Also, rainbow trout are actively stocked in approximately 15 streams within the Forest’s proclamation boundaries. Specifically, trout (several species in various locations) are stocked presently in Rock Creek (of Big South Fork of the Cumberland River) along NFSR 137 and MCC-566.

**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?**
The following streams are either aquatically rich in species diversity and abundance or are known to host some very rare upper Cumberland species: Rock Creek, Marsh Creek, Barren Fork, Indian Creek, Cogur Fork, Kilburn Fork, Laurel Creek, Elisha Branch, Jenny’s Branch, Jellico Creek, Lower Rock Creek and Capuchin Creek. The degree to which these streams are impacted by the existence of road systems can be computed using a WEP model.

**Terrestrial Wildlife (TW)**

**TW (1): What are the direct effects of the road system on terrestrial species habitat?**
Roads have myriad effects on species habitats within the forest; some positive, some negative.

1. Roads provide flight corridors for many species of bats.
2. Road ruts provide drinking opportunities for bats and egg laying habitat for salamanders. Road ruts also provide habitat for a number of uncommon bryophytes, which are found exclusively or nearly so on shaded mud in various degrees of wetness.
3. Roads provide breaks in the forest canopy (edge) that is utilized by less shade tolerant species.
4. Roads can act to fragment habitat for species with small home ranges such as snails.
5. Roads cause direct mortality to individuals of many species unable to avoid motor vehicles.
6. Roads allow a level of human disturbance that some wildlife species will avoid thereby causing.

**TW (2): How does the road system facilitate human activities that affect habitat?**
1. Roads allow Forest Service personnel access to sites for habitat management projects.
2. Roads allow access by arsonists.
3. Roads allow access to cave sites that would otherwise be considered remote. This access potentially increases disturbance of bat hibernation and/or maternity sites, perhaps rendering these sites unsuitable for habitation.
4. Roads can serve to concentrate human use in areas unsuitable for that level of unregulated disturbance.
5. Species, which exist in the disturbance habitat in road corridors, are directly affected by changes to habitat with each passage of person, animal or vehicle.

**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?**
Roads create biological sinks or areas where emigrating or wandering individuals may be destroyed depending on traffic service level or traffic volume. Amphibians and reptiles are drawn to roads at night for the thermal heating provided; birds and bats use road corridors for convenient feeding. All are subjected to be killed by passing vehicles. Scavengers (hawks, vultures, bobcats, etc.) feeding on these road kills may themselves become road kills.

Forest road systems facilitate legal hunting, which is an important wildlife management tool. Subsistence hunters, relatively common in under-served areas of the state, are benefited by road access. Sport hunters are usually benefited by road access; however, management of roads is important to balance the negative potential effects to wildlife populations of disturbance and over-harvest. In addition, road access supports activities such as wildlife viewing and nature photography. Poaching (illegal take of wildlife) is closely associated with roads. Wildlife is often drawn to roadsides to feed on herbaceous plants, which may be limited to roadsides in areas of mature forest. This puts them at risk from poachers illegally shooting from roads. Increases in open road miles diminish the effectiveness of a fixed number of law enforcement officers, and increase poaching opportunities.

Roads allow people access to the Forest for illegal dumping, which can be dangerous to indigenous animals that might ingest it, and it may also attract nuisance wildlife (crows, rats, feral cats and dogs, nuisance bears, etc.).

**TW (4): How does the road system directly affect unique communities or special features in the area?**
Roads provide direct access to otherwise remote areas. Roads also provide access for trucks and trailers that carry OHVs, horses, and trail bikes, thus giving these means of transportation direct access to many additional acres of unique communities or special features. This access sets the stage for several potential adverse effects including increased human trampling, the introduction of exotic weedy species and changes in cliffline hydrology.
Another unique community that has been impacted by roads is the natural ridge-top pond. Historically, many more of these unique features are believed to have been present on the landscape prior to road building activities. In many instances, roads have been built through the pond site. At other locations, roads are built around the pond site, but drastically change the limited watershed hydrology of these small areas. Roads may affect high-quality, often rare or unique communities, in several ways. An immediate threat in many cases is increased potential for invasion of exotic plants and animals that may threaten or eliminate populations of native species in the area. This in turn affects biodiversity at several scales. Roads can affect the hydrology of rare communities, making either wetter or drier. Roads may directly cause the death of populations of rare species where the road crosses migration paths, affecting community structure and stability. Roads also provide immediate access for predators, including humans, which can disrupt community stability.

*Forest Specific:* Several bogs with rare communities have been infested with exotic invasive plants, a direct result of road corridor passage. In at least one, the rare plants are seriously susceptible. In two other cases, runoff, laden with weed seeds from roads above a cliff, has resulted in infestations of exotic invasive plants in rock house habitat below. At least one glade system has been seriously degraded as a result of a noxious weed planted on the road bank for erosion control. The weed moved into the glades and took over. Roads may directly affect special features such as caves, bogs, cliffs, and glades. Roads may change contours on the ground, which in turn can alter water, air and debris flow, affecting the conditions maintaining these features, or possibly directly altering them. Roads may pass through directly or immediately adjacent to the areas seriously harming or destroying the sites.

*Forest Specific:* Several roads have been built through cliffs, a process requiring blasting. This has completely altered and or destroyed sections of cliffs and glades. Roads passing along or above bogs or other wetlands have altered water flow resulting in destruction or degradation of the sites. *Measures:* Using GIS determine how many identified rare or sensitive communities are affected by roads, using existing cliff buffer and predicted locations as threshold for cliffs. For other communities, distance thresholds will need to be established, and locations will need to be mapped.

**Economics (EC)**

*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?*

The road system can directly affect the agency’s revenues and direct costs. Roads provide accessibility to potential sale and use areas. Revenues are generated in the following ways:

- Receipts from Timber Sales
- Fees for Recreation Use Permits
- Fees for Special Use Permits
- Fees for Road Use Permits

Direct costs to the agency include road maintenance costs due to motor vehicle use and costs associated with restoration or protection initiatives to minimize the impact of existing roads on the ecological systems. Presently direct costs exceed revenues. However, many resource
management targets could not be met or would cost more to accomplish without the current road system.

Changes to the road system that could increase revenues and decrease direct costs include;

1. 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 costs. Reducing the maintenance level or closing roads to vehicle traffic would reduce maintenance costs. Utilizing lower maintenance construction features including broad-based dips and the stabilization of the roadbed with gravel or vegetation would contribute to a reduction as well. The district would continue to 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.

2. Improve the collection of fees by more effective management. For example, cost recovery for the use of system roads by commercial users could include a revenue share percentage in addition to the reconstruction and haul maintenance elements.

3. Seasonal closure of 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. Reduced maintenance costs and reductions in costs to mitigate unacceptable environmental effects would likely result in an increase in net revenues. Some roads were built prior to FS ownership and were considered “public” access with an established historical use.

4. 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. Some of these costs could be eliminated by a phased decommissioning process where vehicular traffic is eliminated, natural drainage restored, and the road allowed to naturally re-vegetate. Possible consequences include decreases in revenues from commodities such as timber, recreation fees, and other services such as special-use permits, could be avoided with an inter-discipline road selection approach. 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 and would increase direct project costs for re-entry.

5. 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 cost.
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?

A good road system increases the value of priced and non-priced benefits in the watershed. These benefits include access for timber management, wildlife management, recreation opportunities, and fire protection. The following are general priced and non-priced consequences of roads:

- **Biological:** Some plants and animals are specifically destroyed during road construction, maintenance and use. Runoff from roads and changes in hydrology typically negatively affects aquatic flora and fauna. However, entire populations are seldom significantly affected. Rare communities are protected during road activities on the District. Greater access improves hunting success, changing game population dynamics. Also see TW(1-4)

- **Air Quality/Fire:** Emissions from vehicles using roads negatively affects air quality. The road system positively affects the Forest Service’s ability to control smoke from wild land fire. Greater access increases chance of arson, but also increases our ability to control fires.

- **Water Quality:** Is reduced to some degree, since siltation is increased.

- **Commodity Production:** Is increased.

- **Recreation:** Generally is increased, with the exception of wilderness-like recreation, which is negatively affected.

- **Heritage Resources:** Greater access increases the temptation for vandalism/theft, at the same time increasing enforcement’s opportunity to catch such law-breakers.

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

When doing economic distribution analysis, we identify the distribution of benefits and costs in society. Distribution analysis can be either financial or economic. Financial distribution analysis includes only direct cash flows. Examples include job and income gains or losses by different sectors of the economy. Economic distribution analysis adds non-market and external values and costs. Examples of this type of distribution consequences include who incurs the negative effects of air or water pollution and who benefits from enhanced scenic beauty or solitude. The affected people will be recreation-related and timber-related groups. The road system will affect each of these groups in either a positive or negative way, depending on individual viewpoints.

**Commodity Production - Timber management (TM)**

TM (1): How does road spacing and location affect logging system feasibility?

Road spacing and location is adequate for ground based logging systems, the primary logging system utilized on the Stearns RD of the DBNF. The layout and arrangement of roads on ridges would make skyline logging feasible in areas such as the Jellico Mountains. Many maintenance level 1 (closed) roads could provide road templates for future access for vegetation management,
and should not be decommissioned for this reason. The current road system (including maintenance level 1 roads) provides a base from which temporary roads (if needed) can be constructed for access for timber removal and utilization during forest management activities and any unforeseen catastrophic events.

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

The current road system is favorable for managing the suitable timber base and other lands, and provides adequate access to timber stands needing silvicultural treatment. A minority of system roads need reconstruction for managing resources and, generally, system road maintenance is all that’s needed to improve the roads for timber haul. The current road system provides a good base for any temporary roads that need to be constructed to access timber stands in need of silvicultural treatment.

**Commodity Production - Minerals Management (MM)**

**MM (1): How does the road system affect access to locatable, leasable, and salable minerals?**

The Stearns District has no locatable minerals of interest (e.g., gold, silver, gypsum), some salable minerals (e.g., sand, stone, gravel), and widespread leasable minerals (e.g., oil, gas, coal). On the Daniel Boone National Forest and particularly on the Stearns District, private minerals (reserved or outstanding) make up the majority of the minerals ownership and minerals activity. These resources have been made available on NFS lands; however, the extraction of minerals from the forest can impact soil and water, flora and fauna, and ecosystem processes.

Furthermore, across the district there exist hundreds of abandoned coal mine features, oil wells, and gas wells that have come with the acquisition of new property. With these features come the old access roads, which are often closed.

The road system affects minerals on the district in several ways. Since the mineral rights beneath the district are mostly in private ownership, we are obligated to provide reasonable access to those private mineral owners if requested. Roads may be refurbished or created to provide this access. Generally, the existing road system provides adequate access to most of the district. Short “spur” roads may be created to provide operator access.

There are many older or user-developed roads on the district that are not in compliance with Forest Plan standards and guidelines. Mineral operating plans are submitted to the district and forest specialists for review, but operators can choose to ignore road recommendations. This makes road management difficult and creates varying levels of maintenance and disrepair. Closed mineral access routes can also become favored motorized recreation routes. These old access/user-developed routes are often located on erodible soils, steep slopes, and undesirable locations.

Many old access/user-developed routes are unclassified, and therefore receive no NFS maintenance funds. Private mineral operators may interpret this lack of management as approval to use the same roads for their purposes. Negotiating a private minerals project can become difficult when we recommend that a private mineral operator build a costly new access road adjacent to a nearby old access/user-developed/unclassified road that the general public is using.

**Commodity Production - Range Management (RM)**
RM (1): How does the road system affect access to range allotments?  
The district does not have any range allotments.

Commodity Production - Water Production (WP)

WP (1): How does the road system affect access, constructing, maintaining, monitoring, and operating water diversions, impoundments, and distribution canals or pipes?  
There are several acid mine drainage impoundments on the Stearns District, which are currently accessible by classified forest roads. The access roads need periodic maintenance to allow heavy and light equipment in for dredging, repairs, monitoring, and maintenance; however, shrinking budgets often delay or altogether ignore maintenance. Commonly, when we have to access abandoned mine features on the district, which include many portals with acid mine drainage seeps, the first thing we need to order is road maintenance, because most of the access roads are grown over and impassible.

WP (2): How does road development and use affect water quality in municipal watersheds?  
The effects of road development and use on water quality in municipal watersheds are offset by the proper installation and maintenance of road best management practices. Primary effects may include sedimentation buildup and increased filtration costs to the municipality. All forest projects must include the analysis of effects of road issues on municipal water supplies, as well as design features that will minimize these effects. The Stearns District has a total of 93,668 acres of land designated as a municipal source water protection zone.

WP (3): How does the road system affect access to hydroelectric power generation?  
This is not an issue on the Stearns Ranger District of the Daniel Boone National Forest.

Commodity Production - Special Forest Products (SP)

SP (1): How does the road system affect access for collecting special forest products?  
The road system provides adequate access for collecting special forest products. Most of the special forest products on the Stearns RD (roots for example) are located away from the roads and require walking to reach them anyway. There have been few to no complaints from the public that our roads are not adequate for harvesting the special forest products they buy permits for. Most of the local public enjoys getting away from the roads and walking in the woods to harvest the special forest products they’re interested in and see this as part of the experience.

Special-Use Permits (SU)

SU (1): How does this road system affect managing special-use permit sites (concessionaires, communication sites, utility corridors, and so on)?  
The Stearns District has 44 non-road special use permits and growing. These include permits for powerlines, waterline, telephone lines, gas lines, cemeteries, springs, a grazing area, church, communication site, weather station, and marina. Because of the fragmented ownership, the district roads are crucial to providing access for these special use permits and for administering them.
General Public Transportation (GT)

GT (1): How does the road system connect to public roads and provide primary access to communities?
This is not an issue for the FS jurisdiction road system, as all of these roads are classified as local roads by the State. The Daniel Boone Inventory identifies local, arterial and collector roads in the system. These arterial and collector roads link the Forest local roads to other jurisdiction roads at the government property line. The Daniel Boone has 37 miles of arterial, 410 miles collector and 888 miles of local roads. Other public jurisdiction roads provide access to communities.

The Forest has several isolated tracks of land that still do not have any road access to get to them. There is a need to obtain rights-of-way to these tracts to legally access them for inventory, monitoring and management purposes. There are also tracts of land that have portions of the area cut off from the rest by natural barriers such as clifflines or waterways. These isolated areas will require acquisition of rights-of-way to legally access them for inventory, monitoring and management purposes. The specific need for access can best be determined by a watershed or site-specific level of analysis. A list of roads and areas identified by this analysis are shown in Appendix C Table 2.

GT (2): How does the road system connect large blocks of land in other ownership to public roads (ad hoc communities, subdivisions, in holdings)?
Public access is primarily over other public agency roads (arterial and collector). The Forest’s roads provide access to government land. The Forest has a growing number of special use roads that access small private in-holdings. There is private land that is accessed by Forest Service roads in this analysis area.

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)?
This is not an issue as the Forest does not share ownership or have limited jurisdiction on any roads in our system. The Forest cost shares with the local public agencies on maintenance projects, which benefit the Forest, although the Forest does not have jurisdiction over these roads.

GT (4): How does the road system address the safety of road users?
On the arterial and collector roads under another public agency’s jurisdiction, safety is that agency’s responsibility. The Forest has entered cost share agreements to improve roads not under its jurisdiction, but benefit from the improved access to the Daniel Boone National Forest. National Forest System roads that are open to the public for standard passenger cars are subject to the Highway Safety Act and shall apply the selected elements of the Highway Safety Program Standards. (23 CFR Part 1230). Most of the roads within this analysis area are closed to year round public traffic. Only roads open to public traffic have turnouts for safety.

Administrative Uses (AU)

AU (1): How does the road system affect access needed for research, inventory, and monitoring?
The current road system provides adequate access needed for research, inventory, and monitoring, with the exception of the Beaver Creek wilderness. As an example, in the Freeman Fork Oak Woodland Restoration Project, the road system has provided satisfactory access for inventory, monitoring, and studies being conducted on the restoration of woodlands by the University of Tennessee.

**AU (2): How does the road system affect investigative or enforcement activities?**

A principal impact on law enforcement and investigation (LE&I) is the mileage of open roads within the district that require regular patrols. Due to a large number of miles of open public roads and limited number of law enforcement officers, adequate patrol of the open roads cannot occur at the frequency desired. Officers typically focus on the roads that are considered high traffic to provide a high level of service to the greatest number of users. Many open roads on the district are not regularly patrolled and thus are susceptible to illegal activities that can impact resources such as illegal gathering of forest products. Because forest roads are often dead-end roads, it requires that officers travel the same section of roadway twice to patrol the road thus increasing the amount of time required to complete the patrol. Any increase in the mileage of roads on the district would further increase the problem of adequate patrol schedules.

The condition of the roadway can also severely impact LE&I by increasing the risk of accidents by forest users. Poorly maintained roads can increase the probability of accidents occurring. Road shoulders are difficult to distinguish and culvert openings can become hidden. Poor surfacing such as potholes and washboards can contribute to vehicles losing control. This can also accelerate wear and tear on vehicles for both forest users and patrol vehicles. Due to budget restrictions there are roads on the district that are not maintained to the identified maintenance level and pose an increased risk to travel.

In order for visitors to follow transportation regulations they must identify which roads are open to which uses. Per regulation Stearns RD uses the Motor Vehicle Use map (MVUM) to identify which roads are open for motorized vehicles. This system has impacts on LE&I because it is often difficult for the public to interpret the map and LE&I is charged with enforcing the transportation regulations. Officers often find themselves dealing with a public that either has no knowledge of the MVUM or its purpose or doesn’t have the ability to properly interpret the map. Most forest users assume a travel way is open unless physically blocked or signed closed. This process for managing the public interaction on our road system often leads to conflict with our forest users.

LE&I is often impacted by jurisdictional questions that arise with transportation systems. There is often local confusion about which entity is responsible for the road and its management. Clear authority for every passable roadway on the district would help to avoid conflicting information that may lead to unauthorized uses.

**Protection (PT)**

**PT (I): How does the road system affect fuels management?**

The road system in general benefits fuels management. Roads are used when possible as control lines for prescribed burning. Reduction of hand and dozer line benefits the fuels program by providing access for planning, preparation, implementation, and monitoring of burn areas. Use
of roads as control lines reduces potential impacts to soils, unidentified historical sites, and sensitive species. Use of roads reduces workload and exposure to potential unsafe conditions for personnel during the preparation of control lines. Reduction of hand and dozer line construction through use of existing roads also aids in management of illegal off road trails as burn lines are often used by ATV riders.

**PT (2): How does the road system affect the capacity of the Forest Service and cooperators to suppress wildfires?**

Fire is affected both positively and negatively by the current road system. On the positive, it provides rapid access to most fires ignited on the Stearns Ranger District. With over 90% of fires being human caused, fires are frequently ignited either from an existing open road or in close proximity to roads that are officially closed but used as illegal off road vehicle trails. The footprints of the closed roads are often used as control lines with minimal concern over disturbance of sensitive resources due to previous analysis. Frequent use of the closed roads often keeps them clear enough so that fire spread is slowed or halted completely. On the negative side, those same roads provide access to areas where fires occur. Regardless of intent, human caused fires are rarely ignited over 0.25 miles from a road or trail. The use of old roads for recreation with ATV's and high clearance motor vehicles allows access to locations that fire personnel are unable to get to without the use of similar equipment. Potential exists for a reduction in "remote" fires if the access routes being used were made impassable.

**PT (3): How does the road system affect risk to firefighters and to public safety?**

See PT 2

By using roads as control lines, access and egress for incidents remain open and readily available during wildland fires. Use of roads as escape routes increases a firefighter’s ability to follow the route in challenging conditions such as heavy smoke. Availability of roads allows residents to evacuate quickly and provides for rapid response of fire personnel responding from numerous duty stations. By taking advantage of rapid access, exposure time for firefighters can often be reduced and with that overall risk can reduce. Roads often create breaks in homogenous fuel beds that can slow or stop fire progression providing fire fighters opportunities to contain fires with reduced exposure to structures and other features at risk.

**PT (4): How does the road system contribute to airborne dust emissions resulting in reduced visibility and human health concerns?**

Due to the rural setting of the Stearns Ranger District, little impact on visibility and human health is expected due to dust and vehicle emissions. Few roads have heavy transportation use with the majority of use occurring as recreational. The areas of greatest potential to develop issues are travel routes to campgrounds, hunting locations, and other day use recreation attractions.

**Recreation – Unroaded Recreation (UR)**

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

According to the Forest Plan, types of recreation uses have changed, with faster growth in horseback riding and off-highway vehicle use but slower increases in hiking and backpacking, for example. The Daniel Boone National Forest provides a variety of dispersed and developed recreational opportunities to five million visitors each year. Growth in demand for recreational opportunities is likely to continue and new types of recreation may be introduced. Budget and
resource protection are the key limiting factors to growth. Unroaded recreation opportunities are provided by the existing Beaver Creek Wilderness (4,788 acres). The majority of the Stearns District is classified as roaded natural as evidenced by the following ROS breakdown: Rural-4,950 acres; Roaded Natural- 153,735 acres; Semi-primitive motorized- 6,438 acres; Semi-primitive non-motorized- 5,505 acres and Unclassified- 30 acres.

According to the Forest TAP, over the majority of the Forest there is no excess demand for recreation opportunities in unroaded areas, in fact there is usually an oversupply of unroaded recreation opportunities. However, in certain places, primarily during summer weekends and holidays, there is excess demand for unroaded recreation opportunities. These conclusions are based on the recreation use observations of Forest Service employees and informal public input. It should be pointed out that unroaded recreation opportunities in the semi-primitive ROS do not necessarily mean that the activities must occur in large, unroaded tracts of National Forest land. Except for wilderness areas, good quality, unroaded opportunities for most people who recreate on this Forest mean that they do not see open roads (closed, brushed-in roads are usually acceptable), do not perceive much human activity or do not hear traffic while engaged in their recreational pursuit. In addition, they usually do not desire many encounters with others not in their group during their outing. Such unroaded experiences can be achieved in fairly narrow corridors in semi-primitive ROS settings, even though roads, some past human activity (such as old logging) and other developments might be nearby. Depending on the type of activity these corridors may be less than 1/10 of a mile wide. This is primarily true of trail recreation opportunities.

There are 40,922 acres of unroaded area (¼ mile from a Forest Service system road) on the Stearns District. The smallest area is 0.01 acres. The largest is 3,427 acres, which is in and adjacent to the Beaver Creek Wilderness. The mean size of unroaded area is 123 acres. However, many of these unroaded areas may have old non-system roads through them. Even the Beaver Creek Wilderness has old historic roads that are still apparent.

**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?**

The district doesn’t have any plans to develop new roads into unroaded areas nor do we plan to decommission a large quantity of roads. Over time due to budget constraints, the amount of maintenance on the district roads has been decreasing; however it is not causing substantial changes in unroaded recreation 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?**

During the weekdays and winter there should be little in the way of adverse effects of noise and other disturbances on existing unroaded recreation opportunities in the wilderness and unroaded areas. Noise and other disturbances caused from the use of roads is a negative effect on users feeling of solitude. Any road building in the existing unroaded areas would negatively affect quantity and quality of the unroaded recreation experience. Impacts on the Stearns District should be minimal as there are no open roads in the Beaver Creek Wilderness and the district doesn’t have any plans to develop new roads into unroaded areas. Any impacts would come from roads adjacent to the unroaded areas.
**UR (4):** Who participates in unroaded recreation in the areas affected by building, maintaining, and decommissioning roads?

Wilderness users (hikers, campers, rock climbers), all types of non-wilderness trail users, rock climbers, hunters and non-motorized boaters (sailing, canoeing, kayaking) are all affected by these road activities.

In fiscal year 2012 the Daniel Boone National Forest conducted a National Visitor Use Monitoring (NVUM) Survey. According the NVUM, white males make up 65% of the recreating public and are the majority; followed by 35% white female for both wilderness and non-wilderness. The primary age group is 20-69 years old and for wilderness was 20-49. The NVUM also found that over 93% of visitors are very satisfied with facilities, access, services and safety for developed areas; and over 87% for undeveloped and wilderness areas.

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

Most non-wilderness trail participants have less of an attachment to a particular area than they do for their sport. This may not be as true for people who live very near a forest area where they recreate. Ease of access may be crucial to them but the desire to explore other areas would seem to mitigate a strong attachment if good quality recreation alternatives can be found. In most cases there are probably some potential for alternatives if roading adversely impacts an area. Wilderness uses are necessarily limited to a few, defined areas. Attachments to an area by participants are primarily due to ease of access, closeness to home and familiarity with an area. However area attachments are often strong enough to cause the creation of interest groups that advocate the protection of existing roadless areas and urge for the creation of new roadless areas.

A goal in the Forest Plan is to provide motorized and non-motorized trails to address recreational demand.

Developing new roads in areas currently unroaded will diminish those areas’ intrinsic unroaded characteristics. Decommissioning existing roads could increase the unroaded characteristics. Significantly lowering maintenance levels of existing roads (i.e., into non-motorized trails for horses, bicycles, or hiking) would increase the area’s non-motorized characteristics. Significantly raising maintenance levels of existing roads would diminish the remote character by potentially bringing more people and vehicles more frequently into the backcountry.

Opportunities for unroaded recreation are available in the Beaver Creek Wilderness.

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**Recreation - Road Related Recreation (RR)**

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

According to the Forest Plan, types of recreation uses have changed, with faster growth in horseback riding and off-highway vehicle use but slower increases in hiking and backpacking, for example. The Daniel Boone National Forest provides a variety of dispersed and developed recreational opportunities to five million visitors each year. Growth in demand for recreational opportunities is likely to continue and new types of recreation may be introduced. According to the 2012 NVUM, 30% of the visitors were driving for pleasure, however most of the recreation use required driving to an access point to participate.
Rooded recreation opportunities follow a similar use and supply pattern as unrooded recreation. There is an excess supply for most of our developed recreation sites, especially during the weekdays. However, in the areas along Rock Creek there is excess demand during weekends and holidays from spring to fall. The majority of the Stearns District is classified as rooded natural as evidenced by the following ROS breakdown: Rural-4,950 acres; Roaded Natural- 153,735 acres; Semi-primitive motorized- 6,438 acres; Semi-primitive non-motorized- 5,505 acres and Unclassified- 30 acres.

While there is both an oversupply and excess demand for road-related recreation opportunities there seems to be a balance that is economically reasonable (i.e., we cannot afford to build and maintain facilities to accommodate all the possible weekend use and then have these facilities set almost empty during the weekdays) but we do have opportunities to move some of the demand from the weekends to the weekdays. With this in mind access seems to be adequate and appropriate for these more developed road-related recreation opportunities.

RR (2): Is developing new roads into unrooded areas, decommissioning existing roads, or changing maintenance of existing roads causing significant changes in the quantity, quality, or type of rooded recreation opportunities?
The district doesn’t have any plans to develop new roads into unrooded areas nor do we plan to decommission a large quantity of roads. Over time due to budget constraints, the amount of maintenance on the district roads has been decreasing; however it is not causing substantial changes in rooded 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 rooded recreation opportunities?
Noise and other disturbances caused from the use of roads is a negative effect on the users feeling of solitude. However, road noise and/or disturbance are necessary if one is to enjoy the convenience of roads. Any additional road building near areas that enjoy high recreation use could negatively affect the quality of the recreation experience because of the additional noise and disturbance. Road improvements could significantly improve the quality of the experience for those who prefer well-maintained roads. Road maintenance levels also affect the type of rooded recreation enjoyed. Adding roads to the low maintenance level classification would actually increase the opportunities for high clearance vehicle driving even though this level of road may limit access for many.

RR (4): Who participates in road-related recreation in the areas affected by road building, changes in road maintenance, or road decommissioning?
District specific knowledge about our visitors is limited. The most current information is from the results of the 2012 NVUM surveys. According to the NVUM, about 30% of visitors drive for pleasure. Approximately 65% of the forest users are white males, 35% are white females, and age range is between 20 and 69 years old. Primary uses are typically involved in hiking, hunting, camping, and horseback riding.

RR (5): What are these participants attachments to the area, how strong are their feelings, and are alternative opportunities and locations available?
As with UR (5), the most attachment to an area relates to its ability to provide the participant with the recreation opportunity they desire or its nearness to the participant’s home. The developed areas on the Forest usually tie to a specific natural setting (i.e., lake, cliffline, river,
etc.) which, for this Forest, are not easily duplicated elsewhere. From public input, we can tell that people having strong attachments to these areas use the major recreation facilities.

Roaded recreation attachments are strong enough to cause the creation of interest groups that advocate the protection of their preferred recreation opportunity and urge for the creation of new opportunities. Four-wheelers and horse riders demand additional trails. Mountain bikers are likely to soon organize and demand more opportunities for their sport. Many hunters want every gated road open during hunting season. While the existing road system on the Stearns Ranger District is very extensive, demand for roaded recreation is increasing, just as demand for unroaded recreation is increasing. Recreation activities, such as hunting, horseback riding, and four-wheeling, are all available on private and other federal lands.

**Passive-Use Value (PV)**

*PV (1):* Do areas planned for road entry, closure, or decommissioning have unique physical or biological characteristics, such as unique natural features and threatened or endangered species?  
Site-specific project analysis is the level this should be determined.

*PV (2):* Do areas planned for road construction, closure, or decommissioning have unique cultural, traditional, symbolic, sacred, spiritual, or religious significance?  
Site-specific project analysis is the level this should be determined.

*PV (3):* What, if any, groups of people (ethnic groups, subcultures, and so on) hold cultural, symbolic, spiritual, sacred, traditional, or religious values for unroaded areas planned for road entry or road closure?  
The following passive values are identified: Indian sacred sites, cemetery access for relatives of the deceased; use of traditional dispersed camping, picnicking and visitation spots by family and friends that were raised or had families that owned worked land within the present National Forest; preservation of NFS land by environmental activists; and spiritual renewal values of NFS land by visitors.

*PV (4):* Will road construction, closure, or decommissioning significantly affect passive-use value?  
The term “passive-use value” includes two categories: things people appreciate without actually using them or even intending to use them (like a distant wilderness or an endangered plant or animal); and things people want to remain available for others (such as their descendants) to use and appreciate. Managing the road system can create either positive or negative effects upon passive use values.

**Social Issues (SI)**

*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?  
Roads in the mountains of eastern Kentucky were hard to come by in the past. The Daniel Boone National Forest lies within 21 of the historically poorest counties in Kentucky. Many of the original communities and homes were originally accessed by railroad or horse trail. When the railroads pulled out, the railroad bed was converted to a primitive road. Gradually some of the
horse trails were converted to wagon routes and eventually roads. This is why so many roads are still crooked and winding. They were built from one home to another, usually along property lines. Over a hundred years ago some counties had what was called “Court Days” which was the last day of court in the fall when the roads would still be in good enough shape for the people of the county to get together to do business and conduct court. Improvements were slow due to the subsistence existence of the local population. The lack of a strong tax base is compounded by the high cost of road construction, upgrading and maintenance of roads in eastern Kentucky. The people of eastern Kentucky still place a very high value on even the most primitive of roads.

Many believe that roads and the use of roads or travel ways causes little environmental impact. Many feel that closing or eliminating roads would deny the public full use and enjoyment of public lands. The public’s needs and values for roads are diverse and whether positive or negative depends on individual viewpoints.

**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?*

To be enjoyed and appreciated by visitors, the Forest must be accessible. Many of the state and county roads that provide access to NFS land also provide access for residents to their communities where they work and purchase goods and services. Closure of unneeded roads also provides public service. Closure of unneeded roads would reduce sights and sounds of motor vehicles, improving the experience for people who desire solitude. Public attitudes toward the FS and roads on NFS lands are diverse and often very contentious. In general, local residents oppose road closures; however there are local exceptions.

Many citizens feel strongly that they have the right to access the Daniel Boone National Forest as they see fit. This may be particularly true in McCreary Co. KY because such a large percentage of the county is in federal ownership. The National Forest has been the recreational center of the local communities. Family gatherings, many homes, cemeteries, camping, picnicking, hunting and fishing areas are now part of the National Forest or are within the present National Forest boundary. Access is important for revisiting areas that have a very strong sense of place for these people who were born, raised or visited these areas in the past. They wish to bring their family to rekindle the feelings and emotions they have and want to pass this on to their children. Their visit may be for just a couple of hours, a day or a week. They expect the same access or better access when they return to the Forest. The public’s needs and values for access are diverse. Closing roads has a high potential for controversy.

**SI (3): How does the road system affect access to paleontological, archaeological, and historical sites?**

The road system is not known to have an effect on access to paleontological, archaeological, and historic sites. Roads give greater access to these sites and as a result, can provide opportunities for studying, learning about, and enjoying our natural history and cultural heritage. However, this greater access and the probable increased visitation can make sites more susceptible to unintentional physical damage and intentional looting and vandalism.

**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?**

The present road system does not have any known effects on cultural and traditional uses and American Indian treaty rights.
**SI (5): How are roads that are historic sites affected by road management?**
No historic roads or transportation routes will be affected by road management.

**SI (6), SI (7): We combined questions SI (6) and SI (7) to read, “How are community social and economic health affected by road management and management of un-roaded areas (for example, lifestyles, businesses, tourism industry, infrastructure maintenance)?**
A legacy of historical factors, such as the economic depression of the 1930s, partially explains why the Daniel Boone National Forest was established, why it has a scattered ownership, and why socioeconomic and cultural characteristics vary so much across the region. Across the eastern Kentucky region, road access to public lands is important to lifestyles. These lifestyle activities include driving to work, family gatherings, picnicking, driving to special spots, boating, camping, fishing, horseback riding, and hunting.

The economic composition of our regional community depends on a well-maintained road transportation network. Winding curvy roads that require slow speeds to be safe isolate homes and communities. The existing arterial and collector roads are an adequate transportation system to support the present commuting patterns. Improvements in the present network would provide an improved infrastructure that would provide for economic growth and improve the economic stability of the area. Some counties have only one or two industries and if an industry closes, half or more of the people employed in the county are out of a job. Many people must go outside the county for employment. Most hospitals serve a regional or multi-county area. Some county seats provide health and retail services for several adjacent counties.

The trend in outdoor recreation has extended from one or two week vacations to weekends or extended three-day weekends. Tourism and visits to un-roaded areas are limited by the isolation of the un-roaded areas in the District.

**SI (8): How does road management affect wilderness attributes, including natural integrity, natural appearance, opportunities for solitude, and opportunities for primitive recreation?**
The appearance of roads negatively affects the natural appearance and integrity of wilderness attributes. Noise and other disturbances caused from the use and maintenance of roads is a negative effect on users’ feelings of solitude. Opportunities for primitive recreation where people do not perceive much human activity or do not hear traffic are also reduced by road management. Within the District Beaver Creek Wilderness is an un-roaded area consisting of 4,788 acres and provides the largest area on the district for solitude and primitive recreation.

**SI (9): What are the traditional uses of animal and plant species within the area of analysis?**
Plant and animals of the Daniel Boone National Forest continue to be used for food and income in the subsistence economy of eastern Kentucky. The proportion of the population using plants and animals for food and income is decreasing, but such use still remains important to the local community.

**SI (10): How does road management affect people's sense of place?**
This question relates to very specific locations on the Forest. These places are specific to each individual’s experiences and what it is about the specific location that gives the person the attachment. “Sense of place” describes the character of an area and the meaning people attach to
it. It integrates the interpretations of a geographic place, considering the biophysical setting, psychological influences (memory, choice, perception, imagination, emotion), and social and cultural influences. Changes in road management can affect access to these places or change the biophysical setting, affecting what people value.

**Civil Rights and Environmental Justice (CR)**

**CR (1): How does the road system, or its management, affect certain groups of people (minority, ethnic, cultural, racial, disabled, and low-income groups)?**

Usually environmental justice is not an issue unless the percent of minority population or low-income population exceeds twice the state average. The 2010 Census identified the State of Kentucky having a non-white population of 12.2%. In the District, the three counties with the majority of NFS lands have the following populations of non-white: (1) McCreary County 8.6% (2) Pulaski County 3.9% (3) Whitley County 2.6%. The Census identifies the State of Kentucky median household income as $42,610 with 18.6% of the population living below the poverty level. In the District the three counties with the majority of NFS lands have the following median household income and % of population living below the poverty level; (1) McCreary County $21,758 and 30.8% (2) Pulaski County $32,788 and 23.3% (3) Whitley County $29,876 and 26.3%. This demographic information indicates that these counties are not qualified as environmental justice communities. Therefore, we believe the road system has no more or no less effect on certain groups of people than on any other group of people.

The road system is used by all groups of people. Changes in road management will have the same effect on all groups of people with the exception of some people with disabilities. People with disabilities may be impacted by road closures proposed in the project, since motorized access will not be allowed on those portions of roads. However, the remainder of the open roads in the project area will provide substantial motorized access.

**STEP 5 DESCRIBING OPPORTUNITIES AND SETTING PRIORITIES**

**PURPOSE AND PRODUCTS**

The purpose of this step is to compare the current road system with what is desirable or acceptable, and describe options for modifying the road system that would achieve desirable or acceptable conditions. The products of this step are:

- a description of the problems and risks posed by the current road system,
- a list of opportunities for addressing important problems and risks, and
- a map (shown at two different scales) of the roads likely needed for future management activities and roads not likely needed for future management activities.

**PROBLEMS AND RISKS POSED BY THE CURRENT SYSTEM**

**Overall Priorities**
The priorities listed below in the table and in the site-specific descriptions are prioritized by resource area. The Team analyzed the individual resource priorities in order to develop larger, overall priorities for the District. These priorities are:

- Recreation/Heritage Access
- Vegetation Management Access
- Access to Private Land/Special Uses
- Wildlife/Fish Management
- Fire Management.

Road Maintenance Needs

There is on an annual basis a total of approximately $687,631 available with which to operate and maintain the Daniel Boone National Forest’s road system. Of this, approximately $349,655, or 51% is required to cover fixed costs, including management salaries, rent, fleet, travel and training and cost pool contributions. This amount also covers items such as data management, contract preparation and administration and upward reporting. Regardless of the size of the road system being managed this base amount is required. This leaves $337,976 to go on the ground for actual maintenance of the entire Forest road system, and it must cover replacement of deficient bridges as well. The District’s allocation of on the ground actual maintenance is based on a percentage of this budget. For 2015, the percentage was 26.49% resulting in approximately $92,626 spent on the District’s roads.

The primary components of road maintenance on the District include (in addition to inspections) 1) blading and ditching, 2) surfacing (repaving in the case of ML 5), 3) signs and markings, 4) drainage structures, and 5) mowing and brushing. Appendix D, Table 1 displays typical unit costs for these items on the District’s road system by maintenance level per mile.

The District has a few major culverts. These have to be inspected every other year, at a cost of $1,500 per year. At the present time none are either known or suspected to be load limited and need to be replaced.

Combining the information from the previous sections results in the following table which shows the total annual cost to maintain the District’s roads and bridges to standard as the system currently exists:

Table 4 – Typical Maintenance Costs per Maintenance Level

<table>
<thead>
<tr>
<th>Item</th>
<th>Total Cost</th>
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<tbody>
<tr>
<td>Maintenance of Level 1 Roads</td>
<td>$9,640</td>
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<tr>
<td>Maintenance of Level 2 Roads</td>
<td>$95,220</td>
</tr>
<tr>
<td>Maintenance of Level 3 Roads</td>
<td>$125,930</td>
</tr>
<tr>
<td>Maintenance of Level 4 Roads</td>
<td>$13,540</td>
</tr>
<tr>
<td>Maintenance of Level 5 Roads</td>
<td>$4,450</td>
</tr>
</tbody>
</table>
Compare current available budget of $92,626 to the needed amount of $248,780. Appendix D, Table 2 shows the estimated cost to maintain each individual road. The cost difference is $156,154 annually. This is a significant problem for the long term use and management of the transportation system. The transportation system is not sustainable without an increase in funding, a decrease in the number of system miles, or reduction in maintenance levels.

OPPORTUNITIES FOR TRAVEL MANAGEMENT

Analysis
Appendix E, Table 1 summarizes recommendations in response to the issues identified in Step 3 and the questions answered in Step 4. Maps are included in Appendix A to assist in tracking the recommendations. Each specialist identified recommendations based on how the transportation system affected their resource; therefore, conflicting recommendations may exist between resource areas due to differing needs.

Aquatics
Road surfaces and ditches are properly aligned and graded to minimize sediment runoff. As road improvements are made, culverts are replaced to allow aquatic species passage.

Non-native Invasive Plants
Non-native invasive plants are a problem across the forest and are commonly encountered along forest roads. Discreet populations of non-native invasive plants should be reported to the Forest Botanist using the appropriate site documentation forms. All reported sites are input into the NRIS reporting system and catalogued for future treatment. It is important that future road maintenance, construction, or decommissioning projects recognize the existence of these species and provide opportunities to reduce their spread rather than exacerbate the situation.

RECOMMENDATIONS FOR FURTHER CONSIDERATION

Actions to Be Considered
1. Decommission the following system roads: 5121, 5265, 6027A, 6030B, 6032, 6040, 6043, 6058, 6071, 6074, 6084, 6088, 6104, 6138, 6138A, 6189, 6222, 6263, 6296, 6296A, and 832B.
2. Reduce the objective maintenance levels on the following roads: 128, 130, 213, 498, 678, 849, 850, 851, 5008, 5009, 5129, 5230, 5234, 5293, 6080, 6131, 6170, 6239, 6276, 6313, 51C, 5227A, 6279A, and 656A.
3. Increase the objective maintenance levels on the following roads: 137, 684, 721, 724, 725, 6055, 6120, 6133, 6186A, 684A, and 845A.
4. Review with the County or Park Service jurisdiction and maintenance opportunities on the following roads: 564, 651, 660, 845, 5193, 5211. 5267, 6035, 6046, 6140, 6173, 5087A, 593A, 593C, and 839A.
5. Pursue opportunities for acquiring easements in Appendix C, table 2.

<table>
<thead>
<tr>
<th>NEPA ANALYSIS NEEDS</th>
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<tbody>
<tr>
<td>A majority of the opportunities identified in this report will need to further study. Some opportunities identified in this report will be incorporated into the database to correct errors. However, the majority of changes will require a site-specific NEPA analysis in the future when the decision is made to implement them (activities other than maintenance and administrative decisions).</td>
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<tr>
<th>STEP 6 REPORTING</th>
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<tr>
<td>PURPOSE AND PRODUCTS</td>
</tr>
<tr>
<td>The purpose of this step is to report the key findings of the analysis.</td>
</tr>
<tr>
<td>The products of this step are:</td>
</tr>
<tr>
<td>- a report including maps, analyses, and documentation of the travel analysis, and opportunities identified during the analysis.</td>
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<thead>
<tr>
<th>REPORT</th>
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<tbody>
<tr>
<td>This report will be reviewed by the Daniel Boone NF, and shared with other offices in the Forest Service that are also working on roads analysis. This report is available to the public if requested, and will be part of the Stearns District Transportation Analysis Report project file.</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>MAPS</th>
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<tbody>
<tr>
<td>Maps summarizing the results of this analysis are included in Appendix A.</td>
</tr>
</tbody>
</table>
REFERENCES


USDA Forest Service (2015), Daniel Boone NF, GIS Database.

USDA Forest Service (2015), Daniel Boone NF, INFRA Database.