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FOR IMMEDIATE RELEASE

Roads Analysis Now Available for Allegheny NF

The completed Roads Analysis for the Allegheny National Forest is now available from the website at www.fs.fed.us/r9/allegheny. The Roads Analysis details the process used to identify the conditions of the roads on the forest and potential changes to roads to increase benefits or reduce risks.

The Roads Analysis was completed to provide information to assist forest decision-makers in making future road management decisions. The Roads Analysis is not a decision-making document.

This technical Roads Analysis focused primarily on Forest Service roads designed for passenger car travel, and was based on the best scientific information available for road management and effects. The objective of this Roads Analysis was to assist in development or maintenance of road systems that are:

- Safe and responsive to public needs and desires,
- Affordable and efficiently managed,
- Have minimal negative ecological effects on the land, and
- Are in balance with available funding for needed management actions.

The completed Roads Analysis will be available in Compact Disc format at public libraries in Warren, Tidioute, Bradford and Ridgway, and at The Pennsylvania State University at State College, Clarion State University at Clarion, and University of Pittsburgh at Pittsburgh. An Executive Summary of the Roads Analysis is also available for people that do not want to download the large, technical report. The Executive Summary may also be viewed at the website listed above or people may request a hard copy of the Executive Summary by contacting Dan Salm, Allegheny National Forest, PO Box 847, Warren, PA 16365, 814/723-5150.

End

Executive Summary

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, affordable and efficiently managed, have minimal negative ecological effects on the land, and are in balance with available funding for needed management actions. Roads analysis is not a decision process nor does it constitute a Federal action requiring National Environmental Policy Act procedures. It serves to guide future project-scale analyses by identifying conditions, changes, and effects relevant to implementing the forest plan.

Roads analysis at the forest-wide scale provides a strategy for road management in the broader framework of managing all forest resources within the Allegheny National Forest (ANF). Every National Forest System administrative unit must complete a forest-scale roads analysis (FSM 7712.15.2). ***This report documents the Forest-wide Roads Analysis (FWRAP) for the Allegheny National Forest (ANF).*** This report focuses primarily on Forest Service roads that are designed for ***passenger car*** travel (Maintenance Levels 3, 4, and 5). Included in the analysis are discussions that examine the environmental, social, and ecological issues identified at the forest-wide scale as related to road management on the ANF. The report provides the general context for informing road management decisions at the site specific project level scale (Maintenance Levels 1 and 2).

This analysis was completed by an Interdisciplinary (ID) team comprised of resource specialists from the Allegheny National Forest in March, 2003. Fourteen issues were generated from public and internal discussion during this process. Those issues centered around five primary topics.

Recommendations from the Forest-Wide Roads Analysis

The following are the major recommendations for the key issues identified during Forest Wide Roads Analysis:

1.) Benefit Risk Analysis: Process used to integrate multiple resource issues.

The Forest-wide roads analysis documented the benefits and potential risks of the road system by use of a benefit / risk matix shown below. Use of this matrix allowed for assigning recommendations and priorities for each road segment based on their relative benefit and risk. Benefits and risks were developed based on questions in Roads Analysis: Informing Decisions about Managing the National Forest Transportation System (USDA-FS 1999).

Figure 1. Benefit/Risk Analysis Final Outcome Matrix, Forest Service Maintenance Level (ML) 3, 4 and 5 roads, Forest-wide Roads Analysis, ANF, 2003.

<table>
<tr><td rowspan="5">RISKS</td><td colspan="4">BENEFITS</td></tr>
<tr><td>Scores</td><td>Low
2-14[1]</td><td>Medium
15-29</td><td>High
30-52</td></tr>
<tr><td>Low
10-20[1]</td><td>Box 9
Monitor – Leave alone
(10.2)[2]</td><td>Box 8
Maintain - low priority
(7.8)</td><td>Box 7
Maintain – low priority
(0)</td></tr>
<tr><td>Medium
21-31</td><td>Box 6
Restrict or Close
(34.8)</td><td>Box 5
Mitigate – Maintain
(99.5)</td><td>Box 4
Maintain - high priority
(83.2)</td></tr>
<tr><td>High
32-61</td><td>Box 3
Decommission Mitigate, realign
(14.9)</td><td>Box 2
Restrict or close
(128.9)</td><td>Box 1
Mitigate - Maintain
(210.1)</td></tr>
</table>

1 – Values represent the range of total benefit or risk scores assigned to each category.

2 – Values represent the number of road miles assigned to each box in the matrix out of a total of 590 miles for ML 3, 4, and 5 roads, open for passenger vehicle use.

2.) Funding Sources

Within the limits of this analysis, the expected funding for road management and maintenance is apparently sufficient to cover the expected costs of management and maintenance of the road system. The estimated cost for annual maintenance is $3,900,000 and the estimated annual budget for maintenance is $3,500,000.

Deferred maintenance needs have accrued over the past 20 years, and has recently been estimated at the amount of $16,300,000 for the entire ANF road system. Reasons for the backlog of deferred maintenance include:

1. Cooperative Work Forest Service (CWFS) fund maintenance rates were updated in 2001 for the first time since 1984. Collection rates in the past did not keep up with road maintenance cost over this period, contributing to development of the deferred maintenance backlog.
2. A portion of the funding for road management and maintenance also comes from the timber sale program, approximately $1,500,000 annually, based on an annual timber sale harvest of 30 million-board-feet. Some of this funding is included within a timber sale

contract as required work to be completed on the road system. A portion of this funding is based on 10% of the gross receipts from timber sales. Over the past several years, the timber program has fluctuated for various reasons, resulting in a reduction in both work completed thru the timber sales and gross receipts. The reduction of timber sale related road management work and gross receipts has contributed to the backlog of road management and maintenance.

3. The 10% Roads and Trails fund (TRTR) (funds collected from 10% of gross receipts to the ANF) is a new source of funding for road management and maintenance used to further address the ANF's deferred maintenance needs. This funding source first became available in 1998.
4. Road reconstruction costs are greater due to changes in road standards and guidelines developed to increase resource protection, (Fisheries Plan Amendment #6).

3.) Right's Of Way

The following Rights of Way concerns were identified during this analysis that will be addressed through future work with other jurisdictional agencies and landowners on a willing seller/buyer basis:

- *Mayburg Bridge*
- *Westline, Forest Road 122*
- *Mudlick, Forest Road 141*
- *Warrpenn (near Morrison Run), Forest Road 156*
- *Libby Road, Forest Road 455*
- *Tollgate (at Sheffield), FR 620*

4.) Public Forest Service Roads

Public Forest Service Road (PFSR) is a new designation given to important National Forest System arterial and collector roads that meet specified criteria. These are roads that serve as principal public access routes to the Forest. The intent of the PFSR program is to provide funding for reconstruction/restoration projects needed to adequately provide safe and environmentally sound access for public use. Funding for the program is expected to come from future Intermodal Surface Transportation Efficiency Act (ISTEA) funding.

The goals of the Public Forest Service Road network are to:

1. Provide safe and efficient access to destinations in the National Forests and Grasslands;
2. Provide a seamless transportation link between State and other local government highway systems and the attractions of the National Forests and Grasslands;
3. Encourage/improve economic development of rural communities through quality recreation and tourism experiences; and
4. Reduce erosion and improve water and air quality.

The following roads have been identified as the priorities for implementing the Public Forest Service Road program on the ANF. Project analysis for the top priorities has recently been initiated.

1. *Recreation Trailhead / Vista / Pulloffs*

2. *FR 437 Adams Run*
3. *FR 126 Kealor*
4. *FR 191 Twin Lakes*
5. *FR 123 Dahoga*
6. *FR 116 Dunham Siding*
7. *FR 133 Ludlow JoJo*
8. *FR 173 Marshwillow*
9. *FR 176 Bucklick*
10. *FR 160 Hook Run*

5.) Unroaded Areas

Through this assessment, 31 unroaded areas (URA) were identified on Allegheny National Forest administered land. These areas are defined as being more than ¼ mile from an existing classified road and of a size greater than 500 acres. The 31 areas total 34,077 acres. None of these unroaded areas are Inventoried Roadless Areas.

Inventoried Roadless Areas and the 31 unroaded areas were evaluated against several criteria for three resources – recreation, wildlife and aquatics. An index was developed as a indicator of how well a particular area provides unroaded values associated with each resource. This information will be used in future project specific analyses, to determine the appropriate level of management activities in the unroaded areas.

Identification of Key Issues for Project Level Roads Analysis

Based on this Forest-wide analysis, the following are the key road related issues to be analyzed for access and/or resource impacts in future project level roads analysis. The relevance of these issues may vary depending on the specific analysis area conditions:

- *Aquatics*
- *Oil, Gas, and Minerals*
- *Recreation*
- *Road management*
- *Road surfacing*
- *Safety*
- *Unroaded Areas*
- *Vegetation Management*
- *Wildlife*

This Forest-wide analysis, reviewed the questions in Roads Analysis: Informing Decisions about Managing the National Forest Transportation System (USDA-FS 1999) and determined the appropriate scale for response to the specific questions. Future project-level Roads Analyses will address 25 questions and may address 26 optional questions (dependent on specific analysis area conditions), and reference this document for broader-scale questions.

Conclusion

The Forest Wide Roads Analysis is an extensive assessment of the Allegheny National Forest road system and it's value in providing public and administrative access to the forest. Development of the analysis has documented our understanding of the resource tradeoffs associated with maintenance and management of the Forest road system.
Analysis techniques developed (benefit/risk, road density) will guide more efficient and effective future project scale roads analysis efforts. Information developed from this report will also be useful in our ongoing efforts to revise the Allegheny National Forest Land and Resource Management Plan (Forest Plan).

Roads Analysis Report

Forest-Wide Analysis Area – 2003
Version 1.0

This document is available in large print.

Contact the Supervisor's Officer 1-814-723-5150

Printed/photocopied on Recycled Paper

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INTRODUCTION

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 (USDA-FS 1999). 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, affordable and efficiently managed, have minimal negative ecological effects on the land, and are in balance with available funding for needed management actions. Roads analysis is not a decision process nor does it constitute a Federal action. It will serve to guide future project-scale analyses by identifying conditions, changes, and effects relevant to implementing forest plans.

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 in making major road management decisions (Federal Register 2001a & b).

PROCESS

Roads analysis is an integrated ecological, social, and economic approach to transportation planning, addressing both existing and future roads. Roads analysis is a six-step process. The steps are designed to be sequential with the understanding that the process may require feedback among steps, over time, and as the 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 road system management. Decision makers and analysts determine the relevance of each question. The roads analysis process (RAP) does not require that all questions are answered; however, rationale for why a question is not relevant to the RAP will be provided. An interdisciplinary team conducts the analysis with line officer guidance and direction incorporating public participation as deemed necessary.

The six steps are:

- 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

Additional information on the roads analysis process is available at:

http://www.fs.fed.us/news/roads/01titlemain.pdf

What Triggers a Roads Analysis

A roads analysis is triggered, 'when proposed road management activities (road construction, reconstruction, and decommissioning) would result in changes in access, such as changes in current use, traffic patterns, and road standards, or where there may be adverse effects on soil and water resources, ecological processes, or biological communities, those decisions must be informed by roads analysis' (FSM 7712.1). There are three scales of roads analysis; roads analysis for large-scale assessments (FSM 7712.13a), roads analysis at the forest or area scale (FSM 7712.13b), and roads analysis at the site specific project scale (FSM 7712.13c).

Roads Analysis for Large-Scale Assessment (7712.13a)

Roads analysis for large-scale assessments is conducted where multi-forest or eco-region analysis is required. At this scale, broad-scale issues such as habitat connectivity and sources of clean water are analyzed over an area larger than a single National Forest. At present, the ANF is not involved in any roads analysis for large-scale assessments.

Roads Analysis at the Forest or Area Scale (7712.13b)

Roads analysis at the forest-wide scale provides a strategy for road management in the broader framework of managing all forest resources within a National Forest. Every National Forest System administrative unit must complete a forest-scale roads analysis (FSM 7712.15.2). ***This report is the Forest-wide Roads Analysis (FWRAP) for the Allegheny National Forest (ANF).*** This report focuses primarily on all roads that are designed for ***passenger car*** travel within the entire ANF. Included in the analysis are discussions that examine the environmental, social, and biological issues identified at the forest-wide scale as related to road management on the ANF. The report will generally provide the context for informing road management decisions at the site specific project level scale.

Roads Analysis at the Watershed or Project Scale (7712.13c)

Roads analysis below the forest-scale is not automatically required, but may be undertaken at the discretion of the Responsible Official. When the Responsible Official determines that additional analysis is not needed for a project, the Responsible Official must document the basis for that conclusion. Examples where roads analysis may not be necessary include: temporary roads for short term access; or a minor extension of a campground road.

When needed, the outcomes of roads analysis at watershed or project scale would result, at a minimum, in the following:

1. Identification of needed and unneeded roads.
2. Identification of road associated environmental and public safety risks.
3. Identification of site-specific priorities and opportunities for road improvements and decommissioning.
4. Identification of areas of special sensitivity, unique resource values, or both.
5. Any other site specific information that may be needed to support project-level decisions.

Scale of this Analysis

This report is the Forest-wide Roads Analysis (FWRAP) for the Allegheny National Forest (ANF)

Figure 1. This report documents the roads analysis process used for the Allegheny National Forest (ANF) analysis area delineated by the ANF proclamation boundary. The ANF lies within Elk, Forest, McKean, and Warren counties of northwestern Pennsylvania and encompasses 513,257 acres of Forest Service administered land, and 225,984 acres of private and other public ownership (Appendix A - Map 1). This analysis will examine:

- Environmental issues potentially affected by road management proposals, such as soil and water resources, ecological processes, invasive species spread, and biological communities.
- Social issues potentially affected by road management proposals such as socio-economic impacts, public access, and accessibility for handicapped persons.
- An evaluation of the transportation rights-of-way acquisition needs.
- The interrelationship of State, County, Township, Tribal, and other Federal agency transportation facility effects on land and resource management plans and resource management programs.
- Transportation investments necessary for meeting resource management plans and programs.
- Current and likely funding levels available to support road construction, maintenance, and decommissioning.

This report is a "living" document and reflects the conditions of the ANF 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).

Figure 1. Vicinity Map of the Allegheny National Forest Road Analysis Area, 2003.

PRODUCTS

The product of a roads 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 road systems. Included in the report are maps displaying the known road system for the analysis area, and the risks, needs, and opportunities for each road or segment of road. This report will: (FSM 7712.13b)

- Inventory and map all classified roads, and display how these roads are intended to be managed.
- Provide guidelines for addressing road management issues and priorities related to construction, reconstruction, maintenance, and decommissioning.
- Identify significant social and environmental issues, concerns, and opportunities to be addressed in project level decisions.
- Document coordination efforts with other government agencies and jurisdictions.

A complete list of all maps developed from this analysis is included in Appendix A. Hardcopies of maps were not included in this report due to their size and voluminous nature. Electronic copies are available at the ANF web site, or are available for viewing electronically at the Forest Supervisor's office in Warren. A CD-ROM and a hard copy are available for viewing at public libraries in Bradford, Kane, Marienville, Tidioute, Tionesta, and Warren. A CD-ROM and a hard copy will be sent to University libraries in Clarion, State College and Pitt Bradford. Appendix B contains large data tables. Appendix C contains photos and large charts.

STEP 1 SETTING UP THE ANALYSIS

PURPOSE AND PRODUCTS

The purposes of this step are to:

- Establish the level and type of subsquent decision making that the analysis will inform: for example, projects, forest planning, plan implementation, or program of work;
- Identify the geographic scale or scales for the analysis;
- Develop a process plan for conducting the analysis;
- 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;
- A plan for the analysis.

OBJECTIVES OF THE ANALYSIS

The objective of this roads analysis is to complete a forest-wide scientific and quantitative review of the Allegheny National Forest road system. This analysis will support the current Land and Resource Management Plan, Allegheny National Forest (USDA FS 1986), Forest Plan Revision, future Forest Plan Amendments, transportation planning, and project level roads analyses. This information will support the decision-making process in defining optimum land stewardship needs and management objectives.

IDENTIFY SCALE/ ANALYSIS AREA

The Analysis will:

- Be at the forest scale for the Allegheny National Forest (513,257 acres FS administered land and 225,984 acres of private and other public ownership) in Northwestern Pennsylvania, Region 9 of the National Forest System;
- Concentrate on maintenance level 3, 4, and 5 roads, though levels 1 and 2 may be used for some specific resource analysis;
- Be spatial or Geographic Information System (GIS)-based whenever possible;
- Use only existing information;
- Demonstrate how well existing and planned roads or road systems meet their intended purposes and the degree to which they can effect ecological, social, and economic conditions;
- Provide information that allows integration of ecological, social, and economic concerns into future decisions about roaded and unroaded areas;
- Describe how the information developed and opportunities identified affect or are affected by adjacent units (i.e. adjacent National Forests, counties, private ownerships) and other agencies and jurisdictions;
- Describe how the information developed and opportunities identified affect or are affected by the scale above and the scale below the selected analysis scale.

THIS ANALYSIS DOES NOT

- This analysis does not make site-specific decisions about which roads should be closed. Those decisions are made at the project scale with public input on site-specific situations. However, the analysis does identify issues, provides guidance, and makes recommendations that will be carried forward to site-specific project analyses under the National Environmental Policy Act.
- This analysis is not a decision document. Recommendations and findings will only be used to inform decisions at higher or lower scales. Recommendations and findings are subject to change as new or better information becomes available.

INTERDISCIPLINARY TEAM MEMBERS AND PARTICIPANTS

The interdisciplinary team (IDT) consisted of team members and support members (Table 1). Team members attended most meetings, contributed data for analysis and participated in the analysis, recommendation, and prioritization process. Support members were individuals who were consulted throughout the process when their expertise was needed for particular questions.

Table 1. Interdisciplinary team and support members for the ANF Forest-wide roads analysis, 2003.

Name	Position	Role
Dan Salm	Civil Engineer	Forest Roads Analysis Leader/Transportation Planner
Mike Antalosky	Forest Planner	Team Leader
April Moore	Ecologist	Team Member
Brad Nelson	Wildlife Biologist	Team Member
Brady Dodd	Hydrologist	Team Member
Brent Pence	Fisheries Biologist	Team Member
Gary Kell	Recreation Planner (retired)	Team Member
Lois DeMarco	NEPA , Appeals and Litigation Coordinator	Team Member
Tedd Huffman	Soil Scientist	Team Member
Alan Wetzel	Wildlife Biologist	Support Member
Arnie Irvine	Realty Specialist	Support Member
Bernie Marocco	Civil Engineer Technician	Support Member
Brenda Adams-Weyant	Recreation Planner	Support Member
Dale Dunshie	Technical Services Staff Officer	Support Member
Don Scronek	Assistant Fire Management Officer	Support Member
Donna McDonald	Planning Assistant	Support Member
Janet Stubbe	Landscape Architect	Support Member
Jason Randolph	Wildlife Biologist	Support Member
Jeanne Hickey	Geographic Information System Specialist	Support Member
Jim Apgar	Bradford Planning & Design Team Leader	Support Member
John Schultz	Bradford District Ranger	Line Officer/Support Member
John Weyant	Natural Resource Specialist (NEPA)	Support Member
Julie Moyer	Recreation Planner	Support Member
Kathe Frank	Budget & Accounting Officer	Support Member
Kevin Treese	Forester	Support Member
Lauren Miles	Forester	Support Member
Leon Blashock	Marienville District Ranger	Line Officer/Support Member
Linda Houston	Geologist – OGM Program Leader	Support Member
Michael Hampton	EM /Planning Staff Officer	Support Member
Pamela Thurston	Wildlife Biologist	Support Member
Rick Fox	Program Analyst	Support Member
Rick Hiemenz	Civil Engineer	Support Member
Rick Kandare	Archaeologist	Support Member
Scott Reitz	Wildlife Biologist	Support Member
September Wilhelm	Wildlife Biologist	Support Member
Steve Burd	Law Enforcement Officer	Support Member
Steve Miller	Public Affairs Staff Officer	Support Member
Terry Steffan	Wildlife Biologist	Support Member

INFORMATION NEEDS

The ID Team identified the following information sources to use for the analysis:

- Infra Travel Routes Database;
- Potential Public Forest Service Road (PFSR) project submittals;
- GIS layers for :
    a. Roads
    b. Trails
    c. Timber
    d. Streams
    e. Mass Wasting Areas
    f. Wildlife
    g. Federally Threatened and Endangered Species
    h. Ecological Land Types (ELT)
    i. Soils
    j. Cultural Resources
    k. Watersheds
    l. Management Areas
    m. Surface Ownership
    n. Waterbodies
    o. National Wetlands Inventory
    p. Gates and Barricades
    q. Oil, Gas, and Minerals
    r. Subsurface Ownership
    s. Gravel Pit Locations
    t. Recreation Sites

ANALYSIS PLAN

Allegheny National Forest team members completed this document. Outside support members, Forest Service and non-Forest Service, were consulted as needed. ANF staff specialists reviewed the document and the report is available for other National Forests as well.

The ANF interdisciplinary (ID) team conducted the analysis using data from field surveys, GIS, and public involvement. An open house was held in the Spring of 2002 to obtain input from the public. The team developed issues related to roads and reviewed all the questions in Step 4 to determine which were applicable to the analysis area, which questions may need to be addressed in future project level roads analysis, and which questions would not need to be discussed in future project level roads analysis based on information at this time. In Step 5, the team brought together all the resource information and used a scientific benefit/risk analysis to make recommendations and set priorities, and report key findings of the analysis. This report was reviewed internally by ANF Forest Service employees and Regional Office employees in Milwaukee, Wisconsin. In addition, an open house was held on February 22, 2003 to provide preliminary results to the public.

A complete list of all maps developed from this analysis is included in Appendix A. Hardcopies of maps were not included in this report due to their size and voluminous nature. Electronic copies are available at the ANF web site, or are available for viewing electronically at the Forest Supervisor's office in Warren. A CD-ROM and a hard copy are available for viewing at public libraries in Bradford, Kane, Marienville, Tidioute, Tionesta, and Warren. A CD-ROM and a hard copy will be sent to University libraries in Clarion, State College and Pitt Bradford. Appendix B contains large data tables. Appendix C contains photos and large charts.

This report is a "living" document and reflects the conditions of the ANF at the time of writing. The document will be updated as the need arises and conditions warrant. Any future updates will be reflected in the title (e.g., version 2.0).

STEP 2 DESCRIBING THE SITUATION

PURPOSE AND PRODUCTS

The purpose of this step is to:

- Describe the existing road system in relation to current forest plan direction.

The products of this step are:

- A map or other descriptions of the existing road and access system defined by the current forest plan or transportation plan;
- Basic data needed to address roads analysis issues and questions.

LOCATION

The ANF forest-wide analysis area is delineated by the ANF proclamation boundary. The ANF, located in northwest Pennsylvania, is the only National Forest in the state and represents 11% of the public land base. It was established in 1923 by Presidential Proclamation, under the authority of the 1911 Weeks Act (USDA-FS 1986). The ANF lies within Elk, Forest, McKean, and Warren counties and encompasses 740,642 acres within the proclamation boundary 513,257 acres of Forest Service administered land, and 225,984 acres of private and other public ownership (Appendix A - Map 1). The Forest is proximate to several large metropolitan areas including Erie to the northwest, Buffalo to the north, Pittsburgh to the south, and the Youngstown-Akron-Cleveland area to the west.

Area Description

Physical Description

The ANF is part of the Northern Unglaciated Allegheny Plateau, Section 212G. The following is a description of the ecological attributes that distinguish the Northern Unglaciated Allegheny Plateau from other regions adapted from McNab and Avers (1994).

Geomorphology, Lithology, and Soil Taxa

Part of the Appalachian Plateau Geomorphic Province, this region is characterized by its maturely dissected plateau with sharper ridge tops and narrower valleys than glaciated portions of the province. Soils consist of a veneer of unconsolidated materials overlaying bedrock. Residuum on flat and gently sloped uplands, colluvium on steep hillsides, and alluvium in narrow valley bottoms is characteristic. Bedrock is composed of sandstone, siltstone, shale, conglomerate and occasionally limestone or coal. Primary geomorphic processes operating include mass wasting, fluvial erosion, transport and deposition. Dominant soil orders include Alfisols, Entisols, Inceptisols, and Ultisols. Parent materials are residuum from sandstone, siltstone and shale. Elevation ranges from 1,000 to 2,000 feet.

Surface Water Characteristics and Climate

The northern Unglaciated Allegheny plateau has a prominently incised, dendritic drainage pattern. A high frequency of rapidly moving streams and rivers flow into the Allegheny and Susquehanna Rivers. Channels are bedrock controlled. Wetlands are formed on alluvial areas, benches, heads of drainages, and in depressions, with seeps and springs being numerous. Annual precipitation ranges from 40 to 50 inches, evenly distributed throughout the year, while annual snowfall averages from 50 to 100 inches. The ANF, located within this plateau, drains entirely into the Allegheny River.

The temperature regime ranges from frigid at the summit of the plateau to mesic in the valleys. Mean annual temperature ranges from 46 to 48 degrees. The growing season lasts from 120 to 150 days.

Disturbance Regimes

The primary natural ecological disturbance regimes on the ANF include wind, lightning, insects and diseases, mass wasting, and ice damage. Tornadoes and windstorms commonly cause catastrophic disturbances on sites ranging from ten to thousands of acres. Lightning is another important cause of individual tree mortality. Periodic outbreaks of insects (e.g., gypsy moth, elm span worm, and cherry scallop shell moth) and diseases (e.g., beech bark disease and maple decline) may cause significant tree defoliation and mortality. Mass wasting is a general term for a variety of processes by which large masses of earth material are moved by gravity from one place to another. Ice storms have caused wide-spread tree crown dieback.

Biological Description

Potential Natural Vegetation

Potential natural vegetation types in Section 212G include northern hardwood forests and Appalachian oak forests. Eastern hemlock and American beech-hemlock forests are common on moist sites while American beech-sugar maple forests are common on better-drained areas. Common associates include red maple, sweet birch, black cherry, white ash, yellow birch, eastern white pine, yellow poplar and cucumber-tree. Intensive human use of the land, including logging and oil/gas development, has altered the landscape for more than 100 years. Moderate to high deer populations over the last 70 years have caused significant changes in plant composition and structure of the forests.

Fauna

Large herbivores and carnivores on the plateau include the abundant white-tailed deer and the common black bear. Small mammals include the snowshoe hare, cottontail rabbit, bobcat, beaver, red and gray fox, raccoon, skunk, coyote, gray and red squirrel, mink, muskrat and re-introduced species, the fisher and river otter. A variety of birds such as the wild turkey, ruffed grouse, woodcock, wood duck, and other waterfowl are hunted. Woodland warblers (such as the chestnut-sided warbler, ovenbird, and black-throated green warbler), and woodland raptors (saw-whet owl, barred owl, northern goshawk and red-shouldered hawk) are found on the plateau. Common salamanders include the red-back, spotted, and northern dusky. Timber rattlesnake, northern green frog, wood turtle and American toad inhabit this section. Threatened and endangered species found within or near the ANF include the bald eagle, Indiana bat, small whorled pogonia, northern riffleshell and clubshell mussels.

Aquatic species include a number of game and non-game species across the ANF. The smaller headwater streams provide cold-water habitat for species such as brook trout, mottled sculpin, blacknose dace, creek chub, johnny darter, and crayfish. Other aquatic species inhabiting streams include white sucker, brown trout, rainbow darter, greenside darter, lampreys, johnny darter, among others. Large stream and lake fish include walleye, small-mouth bass, muskellunge, northern pike, a variety of sucker species, numerous darters, several panfish, and a host of others. In all, there are over 70 species of fish found within forest waters.

Cultural Description

The cultural ecology of the plateau has changed throughout time. During the Paleo-Indian period, humans entered the area around 12,000-8,000 B.C. when the climate was cooler and the vegetation was dominated by spruce. During the Archaic Period (8,000 to 1,000 B.C.), humans had to adapt to a warmer climate that supported oak-hemlock forests and a plethora of fauna (e.g., deer, elk, turkey and passenger pigeon). The transitional and Woodland Periods (1,000 to 1,600 A.D.) found Native Americans living in fortified villages. After the Revolutionary War, Euro-Americans displaced many of the native inhabitants and cut the virgin white pine for markets.

Industrialization and a growing nation facilitated the extinction of some animals (e.g., passenger pigeon) and the extirpation of others (e.g. the wolf). Oil emerged as an important industry and access increased to reach these fields. From 1890 to 1930, facilitated by the use of narrow-gauge railroads and additional roads, the extensive and intensive logging practices of the chemical wood industry created conditions for the growth of the present forest (McNab and Avers 1994). Recreation is a major activity on the ANF and may occur over a wide range of settings from semi-primitive to those that are motorized and highly developed. Day use by local residents includes road-related activities such as hunting, fishing, driving, and firewood gathering.

Economic Description

Jobs and income in Warren, Forest, Elk, and McKean Counties are affected by activities on the ANF through direct employment as well as products and services that are generated from activities on National Forest System lands. Priced commodities (revenues) from the ANF are timber sale receipts. Three of four counties receive payments in lieu of taxes based on 25% of revenues, the fourth county receives a guaranteed payment under the Secure Rural School and Community Self Determination Act of 2002. These payments are to be used to support roads and schools and amount to approximately four million dollars annually. The majority of oil and gas development revenues within the ANF are through private employment as 93% of the mineral rights under the ANF are privately owned. The ANF has 20 campgrounds (665 family sites and 9 group campsites), 6 boat launches, 6 canoe access sites, 1 marina, 8 facilities with some universally accessible amenities, 11 picnic areas, 4 beaches, 3 scenic overlooks, 171 miles of hiking trails, 50 miles of cross country ski trails, 16 miles of interpretive trails, 108 miles of All Terrain Vehicle (ATV) trails, and 360 miles of snowmobile trails. The main non-priced services include dispersed recreation opportunities such as hunting, fishing, hiking, and wildlife viewing with millions of people visiting the ANF annually.

Political Description

The Forest is located in the 65th, 67th and 75th State House Districts and in the 21st and 25th State Senatorial Districts. Virtually the entire Forest is situated within the 5th Congressional District, with Congressman John Peterson as the current Representative. A small area of the Forest is located within the 3rd Congressional District, principally in the Brokenstraw watershed of Warren County where Congressman Phil English is the current Representative. The county commissioners, who run for office every four years in Warren, McKean, Forest and Elk counties are very aware of forest management issues in their respective counties.

The Forest Service enjoys exceptional political support for multiple use management of the ANF from local, state and federal elected officials. This political support is driven by the high level of dependence of local and regional economies and constituents on the commodity and amenity resources produced from the Forest. The ANF since its establishment in 1923, contributes significantly to the quality of the rural way of life in Northwest Pennsylvania. Due to recent controversies and litigation over multiple use management decisions on the Forest that have reduced commodity resource production and annual payments in lieu of taxes from the 25% Fund, there is building opposition to the Forest Service acquiring land from the private sector for additions to the Forest land base.

EXISTING ROAD AND ACCESS SYSTEM DESCRIPTION

Primary access into and out of the ANF for recreation, administration, private rights, and commodity production is provided by State Highways. There are 677 miles of State Highways and Township roads within the proclamation boundary (Table 2). The Allegheny National Forest is a common destination for recreationists from major cities such as: Buffalo, NY, Erie, PA, Cleveland, OH, Columbus, OH, and Pittsburg, PA. There are many smaller cities within about 50 miles of the ANF such as Corry, Meadville, Oil City, Franklin, Clarion, Dubois, and Clearfield – all in PA, and Jamestown and Olean in NY. Primary access to the ANF area occurs from the:

- Southwest by way of I-80, then either US 62 through Oil City or SR 66 through Clarion.
- South by way of SR 66 through Clarion..
- Southeast by way of I-80, then US 219 through Ridgway.
- East by way of US 6 through Kane.
- Northeast by way of US 59 through Smethport or I-86 then US 219 through Bradford.
- North by way of I-86 then US 62 through Warren.
- Northwest by way of US 6 through Warren.
- West by way of US 27 through Youngsville or US 36 through Tionesta.

Table 2. Total road and trail miles within the ANF proclamation boundary, 2003.

Ownership	Miles within Proclamation Boundary	Miles On NFS Administered Land
Forest Service ML* 1&2	677	670
Forest Service ML 3, 4, & 5	590	561
State/Township	677	281
Private & Other Agencies	2,527	1,236
Total – Road only	4,471	2,748
Forest Trails (Motorized and Non-motorized- includes trails on roads)	672	635
Forest Trails (Motorized and Non-motorized – trails not on roads	354	354

*** ML = Maintenance Level**

Connected to State Highways and Township roads are a system of Forest Service administered roads. There are 677 miles of Forest Service Maintenance Level (ML) 1 & 2 roads and 590 miles of ML 3, 4, 5 roads within the ANF proclamation boundary (Table 2)(Appendix A – Map 2). Forest Service roads are managed for public traffic. Guidance for determining how specific roads should be managed is found in the ANF Land and Resource Management Plan, and varies by management area. General management area direction and road guidelines information is summarized in (Table 4). Land allocation by management area is shown in (Table 3). Forest Service road management on the ANF can be divided into three broad categories:

Open – road is typically open for public traffic.

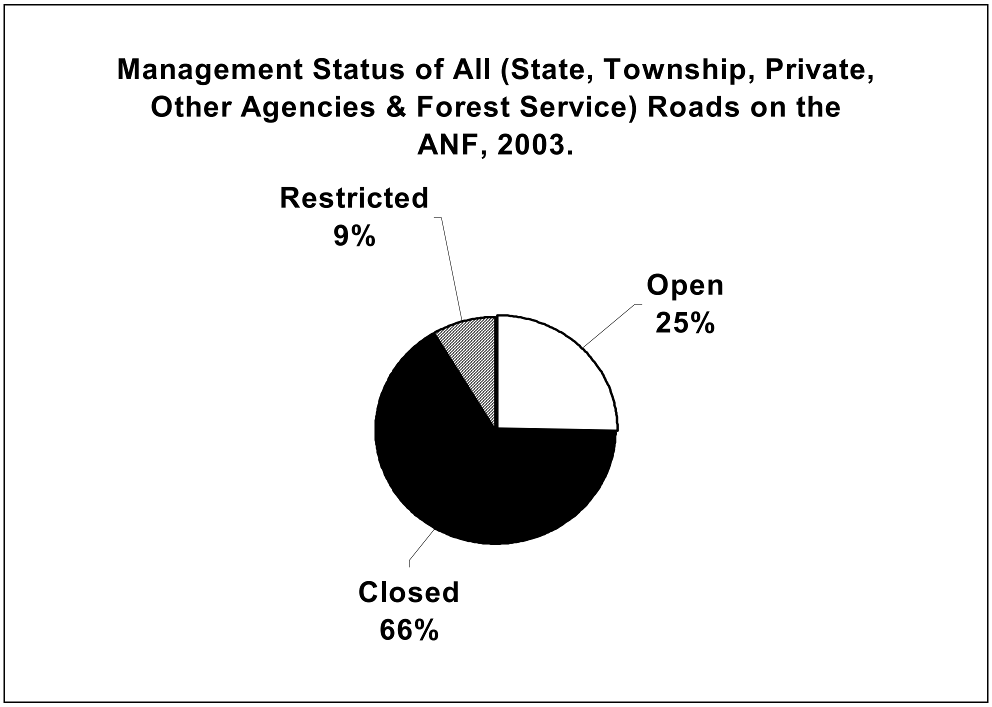
Closed – road is typically closed for public traffic.

Restricted – road may be open or closed to public traffic or types of public traffic depending on the time of year and resource needs.

Figure 2 and Appendix A – Map 3 indicates the current status of road management on the ANF for all roads, maintenance levels 1-5, and maintenance levels 3, 4, & 5 only.

Figure 2. Road management as (a) percent (%) of all roads (b) Forest Service (ML 1-5) roads and (c) Forest Service (ML 3, 4, & 5) on the ANF, 2003.

a.)



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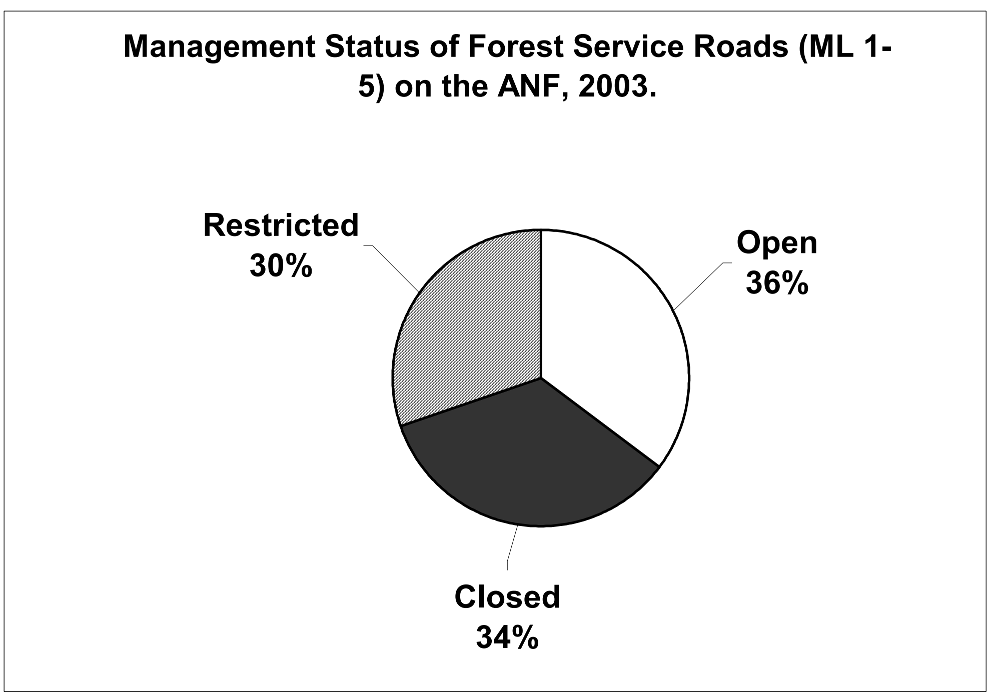

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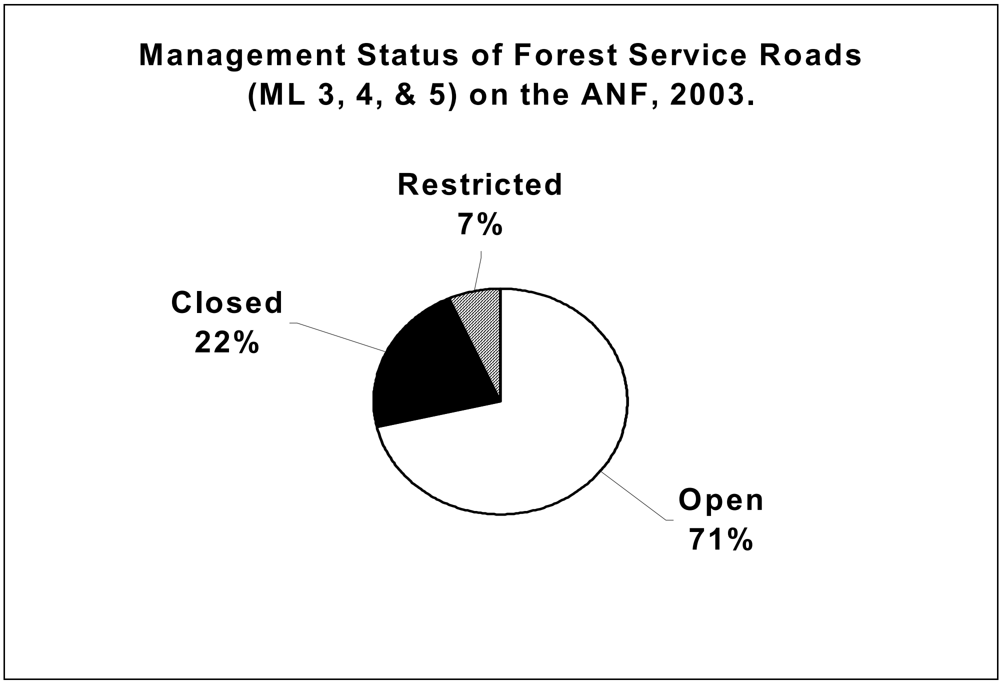


The ANF is unique in that there is a system of oil and gas roads in addition to the State, Township and Forest Service roads. There are an estimated 1,200 miles of OGM roads on the ANF. This number is our best estimate, as of March 15, 2003. The oil and gas roads are not open for public use; however, many OGM operators do not gate their roads. Although Forest Service roads are usually marked at the entrance with a road number, it is often difficult for the public to determine the difference between a Forest Service road and an OGM road.

Pennsylvania contains 45,333 square miles (Encyclopedia Brittanica 1985). The total mileage of improved highways in Pennsylvania is 119,986 miles (PennDot 2001) with an additional 28,000 unpaved dirt and gravel roads (Hassinger 2000). This equates to 2.63 miles per square mile of improved highways and 0.62 miles of unpaved dirt and gravel roads, for a total of 3.25 miles per square mile. By Penndot's definition, improved highways include only State, Township, Forest Service, State Forest, State Game Lands roads. It does not include private roads such as OGM roads. It is believed that OGM roads would fit within Hassinger's unpaved dirt and gravel roads.

Within the proclamation boundary and using the same types of roads (State, Township, Forest Service) for calculating road density, there are 1.7 miles of improved highways per square mile. Using only Forest Service administered land and the same types of roads, there are 1.9 miles of improved highways per square mile. On Forest Service administered land and within the proclamation boundary, the road density is less than the statewide average when comparing State, Township, Forest Service and other Agencies roads.

Within the proclamation boundary and using the same types of roads (unpaved dirt and gravel roads) for calculating road density, there are 2.2 miles of unpaved dirt and gravel roads per square mile. Using only Forest Service administered land and the same types of roads, there are 1.5 miles of unpaved dirt and gravel road per square mile. On Forest Service administered land and within the proclamation boundary, the road density is higher than the statewide average when comparing unpaved dirt and gravel roads.

From this, it can be seen that the total roads in either type will exceed the state averages, due to the unpaved dirt and gravel roads.

Road density for Forest Service system roads within the ANF are shown in Table 3. These road densities are well within Forest Plan Standards and Guides (USDA-FS 1986a). These road densities were calculated by taking the miles of road and dividing by the square miles in the management area. This results in one average (discrete) value for the entire area. This has been the standard method used for calculating road densities cited in the literature including the 1986 Forest Plan and monitoring reports.

Table 3: Forest Service Road Density by Management Area, ANF, 2003

Management Area	Acres (% of Total ANF Acres)	Current Forest Service Road Density miles/square mile	Forest Plan Road Density Guidelines
1.0	7,804 (2.0 %)	0.8	1-3
2.0	3,582 (<1%)	1.5	2-4
3.0	307,099 (60%)	1.7	2-4
5.0	9,001 (2%)	0.0	0
6.1	127,551 (25%)	1.1	1-3
6.2	21,194 (4%)	1.1	1.5-4
6.3	1,127 (<1%)	3.6	N/A*
6.4	21,233 (4%)	0.1	N/A
7.0	686 (<1%)	7.2	N/A
8.0	6,165 (1%)	0.5	N/A
9.1	1,049 (<1%)	0.9	N/A
Average		**1.4**	

*** N/A – Road Density guidelines do not apply.**

In the Forest-wide Roads Analysis, road density variation was calculated on a more site specific basis using a new methodology. Using GIS, the forest was divided into 30 meter by 30 meter pixels (approximately 100 feet by 100 feet). Each pixel was assigned a value based on whether a road was present in the pixel or not. The computer then took each of those pixels, one at a time, and summed the number of pixels that had a road present within a one mile block centered on each pixel. Thus, each 30 meter by 30 meter pixel, had a road density assigned to it. This methodology produces a map that displays road density variation across an area.

Using this method, total road density variation (i.e., all roads - including private, OGM, and Forest Service) within the ANF area ranges from 0 to 18.6 miles/square mile (Appendix A-Map 4a), with the highest road densities occurring in the Cities of Warren and Bradford. The highest concentrations on Forest Service administered land occurred within the Sackett and Lewis Run oil and gas fields. Only 28% of the roads contributing to the total road density are Forest Service administered roads. Forest

Service system road density variation ranges from 0 to 8.9 miles/square mile. The highest Forest system road densities occur within our developed recreation areas, such as Dewdrop and Kiasutha (Appendix A-Map 4f).

Based on the older averaging method, road densities for Forest Service system roads meet Forest Plan direction for all management areas within the roads analysis area. Based on the newer site specific method using GIS, road density variation would appear to exceed Forest Plan direction in some areas within the ANF analysis area. However, because two different methods were used to calculate road density, their numerical values cannot be directly compared. The road density variation values should not be used to determine consistency with management area direction because they are calculated using a different methodology. The newer method is useful to identify or highlight areas where road density or the effects of high road density may be a concern.

Table 4. Forest Plan direction for Management Areas (USDA-FS 1986a).

Management Area	Purpose
Forest Wide	**Road Management** • Arterial and collector roads will be managed as Traffic Service Level (TSL) "A" to "C" roads, open to the public with only limited restrictions on use due to structural deficiencies. Forest Service administered local roads will be managed in accordance with the objectives of the management area served. • Roads under the jurisdiction of an oil and gas operator are not open to public traffic, unless a formal written agreement is reached between the OGM operator and the Forest Service for this use. The only uses allowed on oil and gas roads, without the agreement specified above, are administrative traffic by the oil and gas operator and the Forest Service.
1.0	**Overall** • Emphasize habitat management for ruffed grouse and other wildlife species associated with early successional stages of forest habitat. • Provide a high quality of wood fiber production. • Provide a roaded natural setting for all types of dispersed recreation opportunities. **Wildlife coordination** • Local roads (TSL C) will be closed for the following reasons: • Roads impacting important brood habitat areas will be closed during the brood rearing season (May 1 to September 1), except for two years following sales. They may be left open to permit firewood collection. • Roads will be closed during fall turkey and bear hunting seasons if population levels are below desired levels. • Roads will be closed as necessary during the antlerless deer season to direct hunting pressure into other areas. • Local roads (TSL D) may be opened during the antlerless deer season to provide hunter access if necessary to regulate the deer herd and if road conditions are suitable.

Management Area	Purpose
	Road Management • Forest Service road density will range from one to three miles per square mile. • Local roads will be either TSL "C" or "D". TSL "D" roads will be closed to all public traffic, except as specifically allowed to meet resource objectives. TSL "C" roads will be open to public traffic, except for certain seasonal restrictions to achieve wildlife objectives.
2.0	**Overall** • Provide a continuous, forested scene through practicing uneven-aged management which will promote tolerant species and produce quality sawtimber. • Feature wildlife species associated with shade tolerant vegetation, primarily songbirds and cavity-nesting birds and mammals. • Provide the opportunity for a variety of developed and dispersed motorized recreation opportunities in a Roaded Natural setting. **Wildlife coordination** • Local roads may be closed for the bear and fall turkey hunting seasons when necessary to meet the management objectives for those species. **Road Management** • Forest Service road density will range from two to four miles per square mile. • Local roads will be either TSL "C". These local roads will normally be open to public traffic. Some seasonal closures may be imposed to meet specific wildlife management. objectives.
3.0	**Overall** • Provide a sustained yield of high-quality Allegheny hardwood and oak saw timber through even-aged management. • Provide a variety of age or size class habitat diversity from seedling to mature saw timber in a variety of timber types. • Emphasize deer and turkey in all timber types and squirrel in the oak type. • Provide a roaded natural setting for all types of developed and dispersed recreation opportunities, with an emphasis on motorized recreation activities. **Wildlife coordination** • Roads and trails should be located to avoid turkey brood habitat and wintering areas for both turkey and deer. • Road construction should be scheduled to avoid a conflict during the turkey nesting season, April 15 to June 15, to the extent practicable. • Local roads will be closed for the following reasons: • Those impacting turkey brood habitat areas will be closed during the period of May 1 to September 1, except for two years following sales they may be left open for firewood collection. • During the fall turkey and bear hunting seasons if necessary to meet the management objectives for these species.

Management Area	Purpose
	• During the deer season to direct hunting pressure into other areas where over browsing by deer is occurring. • To meet the Pennsylvania Fish Commission guideline for Wilderness Trout Streams management i.e., stream must not be accessible to motorized vehicles at more than one point every two miles. • Road Management • Forest Service road density will range from two to four miles per square mile. • Local roads will be either TSL "C" or "D". TSL "D" roads will be closed to all public traffic, except as specifically allowed to meet resource objectives. TSL "C" roads will be open to public traffic except for certain seasonal restrictions to achieve wildlife objectives.
5.0	**Overall** • Preserve natural ecosystems. • Protect the Wilderness character for future generations. • Provide a Wilderness experience in a natural appearing, unmodified environment within a semi-primitive non-motorized recreation setting. **Road Management** • All roads will be eliminated from designated Wilderness areas, excepting those necessary for oil and gas recovery on outstanding rights or on private property.
6.1	**Overall:** • Maintain or enhance scenic quality. • Emphasize a variety of dispersed recreation activities in a semi-primitive motorized setting. • Emphasize wildlife species that require mature or over mature hardwood forests, such as turkey, bear, cavity-nesting birds, and mammals. **Wildlife coordination** • Roads should be located to avoid turkey brood habitat as well as turkey and deer wintering areas. • Road construction, reconstruction, and other resource management activities that would disturb turkeys during the nesting season, April 15 to June 15, should be scheduled to avoid a conflict to the extent practicable. • Local roads may be open to hunters during the antlerless deer season, flintlock muzzleloader, and late archery seasons if overbrowsing is occurring and the road conditions are suitable. • Local roads will be closed to meet the Pennsylvania Fish Commission guideline for Wilderness Trout Streams management i.e., stream must not be accessible to motorized vehicles at more than one point every two miles or can be limited to at most one point every two miles. • Roads and trails should be located in a manner to avoid turkey brood habitat and both turkey and deer wintering areas.

Management Area	Purpose
	Road Management • Forest Service road density will range from one to three miles per square mile. • Local roads will be TSL "D". These local roads will be closed to public traffic. • New road construction in this management area will be restricted to TSL "D". Existing roads may be reconstructed, but to no higher a standard than TSL "D". • ORV use will not be designated on existing roads within Minister Valley (Management Area 6.1 north of State Route 666) or Clarion River (Management Area 6.1 east of powerline near Portland Mills and south of Township Road 307 and LR24002 areas. No new road construction will occur in these areas either.
6.2	**Overall** • Provide a sustained yield of Allegheny hardwood and oak sawtimber using even-aged management. • Emphasize turkey and bear in all timber types. • Provide a semi-primitive non-motorized setting with opportunity for a variety of dispersed non-motorized recreation experiences. • Forest Service local roads, Traffic Service Level "C", will be open to all public traffic during the 10-year intensive management period with certain restrictions for wildlife. Forest Service local roads, TSL "D", will be closed to all public traffic, except for certain exceptions. During the 30-year extensive period, all Forest Service administered roads will be revegetated with no traffic allowed on them (public or administrative). **Wildlife coordination** • Roads and trails should be located to avoid turkey brood habitat areas, as well as turkey and deer wintering areas. • Local roads will be closed for the bear and fall turkey hunting seasons when necessary to meet the management objectives for these species. • Road construction and resource management activities that would disturb turkeys during the nesting season (April 15 to June 15) should be scheduled to avoid conflicts to the extent possible. **Road Management** • Forest Service road density will range from one and one half to four miles per square mile in this management area. • Local roads will be either Traffic Service Level "C" or "D". This decision will be tied to the specific area and resources being accessed. Traffic Service Level "D" roads will be closed to all public traffic, except as specifically allowed for within the project Environmental Analysis (EA) for the area. Traffic Service Level "C" roads will be open to public traffic, with restrictions as indicated in the Standards and Guidelines for resource areas. • During the 30 year extensive management period, all local roads will be revegetated and closed to all traffic (public and administrative), except as needed for private oil and gas administration and development.

<table>
<tr><th>Management Area</th><th>Purpose</th></tr>
<tr><td>6.3 (Buzzard Swamp)</td><td>Overall
Intensively manage for wildlife species which require riparian habitat, including waterfowl, furbearers, and warm-water fish.
Emphasize dispersed recreation activities particularly hunting, fishing, and wildlife observation in a semi-primitive motorized recreation setting.
Road Management
Local roads will be TSL “D”. These local roads will be closed to public traffic.</td></tr>
<tr><td>6.4</td><td>Overall
Preserve and protect the natural scenic, scientific, historic, archaeological, ecological, educational, watershed, and wildlife values.
Provide for enhancement of dispersed semi-primitive motorized and non-motorized recreation opportunities.
State, township, and Forest Service administered arterial and collector roads may form, or be adjacent to, but not within, the boundary of this management area. All other roads will be closed except for roads serving developed recreation sites.
Some abandoned roads and facilities are still evident from early oil and gas and logging production i.e., old roads, railroad grades, pipelines, oil well sites, power houses, rodlines, and cleared rights-of-way. The area will continue to slowly revert to a natural Forest Condition.
Road Management
State, Township, and Forest Service administered arterial and collector roads may form, or be adjacent to, but not within, the boundary of these areas, except for those needed to satisfy private legal rights.
Existing local roads will be managed as Traffic Service Level “D”. These local roads will be closed to public traffic with the following exception: Roads leading to and within developed recreation areas will be designed and managed to a Traffic Service Level applicable to the site.</td></tr>
<tr><td>7.0</td><td>Overall
Provide high-density, self-contained forest recreation developments in a rural setting.
Road Management
The local road standards applicable to this management prescription will be developed during the site design process.
Forest Service Local roads will be Traffic Service Level (TSL) “A to C” and will be open to all public traffic except for certain seasonal restrictions for recreation purposes.</td></tr>
<tr><td>8.0</td><td>Overall: Hearts Content and Tionesta Scenic Area
Protect the unique areas of national significance and provide dispersed recreation opportunities that emphasize the area’s uniqueness.
Preserve the unique ecosystems for scientific purposes</td></tr>
</table>

Management Area	Purpose
	Road Management: Hearts Content and Tionesta Scenic Areas • Local roads will be Traffic Service Level "D". These local roads will be closed to public traffic with the following exception: FR133E and FR193.2 will be TSL "C" roads open to the public during the normal use season. **Overall: Tionesta Research Natural Area** • Preserve the unique ecosystem for scientific purposes. **Overall: Kane Experimental Forest** • Provide an area where we will conduct research to improve the benefits of forests. **Road Management: Tionesta Natural Area and Kane Experimental Forest** • Local roads will be Traffic Service Level "D". These local roads will be closed to public traffic.
9.1	**Overall** • Emphasize minimal management and investment in the surface resources. • Protect the life, health, and safety of incidental forest users. • Prevent significant loss of existing resources or productivity on the site or on adjoining land areas. **Road Management** • Local roads not needed for access to other management areas and needed to develop oil and gas may have their jurisdiction transferred to the oil and gas operator. • Local roads that lie completely within this area will be closed and revegetated. • Local roads that pass through this area and provide access to other management areas will be designed and maintained to the standard for the management area served.

The type of road surfacing varies across the ANF. Surfacing material has been shown to be an indicator of the potential for erosion and sedimentation for a road. Bituminous (paved) roads have the least potential for erosion and sedimentation while roads constructed with a native surface have the most potential for erosion and sedimentation concerns. Pit run material has typically been used to mitigate the effects of road-caused erosion and sedimentation. Most of the roads (78%) in the ANF have pit run surfacing Table 5 Appendix A-Map 5). Limestone surfacing has been used in recent years to mitigate the potential for erosion and sedimentation on some roads. Its high cost in relation to pit run surfacing prohibits its use on a wide scale (USDA-FS 1990, unpublished data). Table B-1-3 in Appendix B shows the current standard and management of all roads in the ANF.

Table 5. Road surfacing type for all roads and Forest Service roads within ANF Proclamation Boundary, 2003.

Road Surface Type	All Roads (miles)(%)	FS Roads (miles)(%)
Bituminous	404 (9%)	43 (3%)
Limestone	72 (2%)	72 (6%)
Native	513 (12%)	0
Pit Run	3,469 (78%)	1,152 (91%)
Total Miles	4,470	1,267

Key Road Definitions (36 CFR 212.1)

As previously noted, the Federal Register published the Final Rule and Administrative Policy, January 12, 2001, which established new definitions for road management on the national forests. Listed below are the new definitions for key items discussed throughout this document (Federal Register Jan 12, 2001, p. 3229-3231). Additional terminology can be found in the glossary. Figure 3 depicts the relationship of road terminology.

Classified Road – Roads wholly or partially within or adjacent to National Forest System lands that are determined to be needed for long-term motor vehicle access, including State roads, county roads, privately owned roads, National Forest System roads, and other roads authorized by the Forest Service.

Temporary Roads – Roads authorized by contract, permit, lease, other written authorization, or emergency operation, not intended to be a part of the forest transportation system and not necessary for long-term resource management.

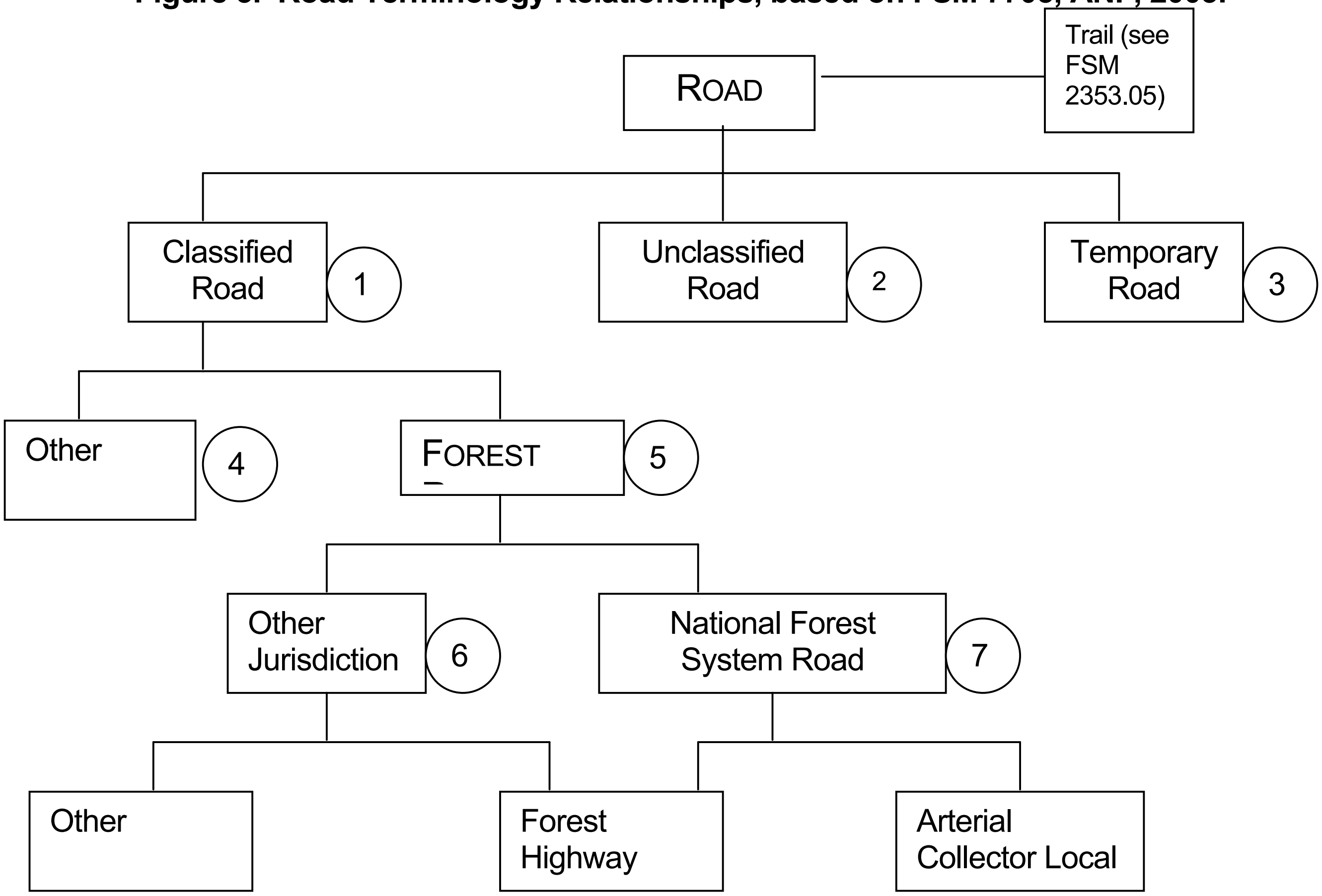
Unclassified Roads – Roads on National Forest System lands that are not managed as part of the forest transportation system, such as unplanned roads, abandoned travelways, and off-road vehicle tracks that have not been designated and managed as a trail, and those roads that were once under permit or other authorization and were not decommissioned upon the termination of the authorization.

Road Decommissioning – Activities that result in the stabilization and restoration of unneeded roads to a more natural state. A road can be decommissioned by applying one or more of the following treatments: 1) Reestablishing former drainage patterns, stabilizing slopes, and restoring vegetation; 2) Blocking the entrance to a road or installing water bars; 3) Removing culverts, reestablishing drainage-ways, removing unstable fills, pulling back road shoulders, and scattering slash on the roadbed; 4) Completely eliminating the roadbed by restoring natural contours and slopes; or 5) Other methods designed to meet the specific conditions associated with the unneeded roads.

Road Reconstruction – Activity that results in improvement or realignment of an existing classified road as defined below:

- Road Improvement – Activity that results in an increase of an existing road's traffic service level, expansion of its capacity, or a change in its original design function;
- Road Realignment – Activity that results in a new location of an existing road or portions of an existing road and treatment of the old roadway.

Figure 3. Road Terminology Relationships, based on FSM 7705, ANF, 2003.



1 Federal, State, Tribal, County, local, private

2 Not managed or intended as part of the transportation system

3 Authorized by permit, lease, contract, etc. and not necessary for long-term resource Management

4 Not relevant to Forest Service Administration

5 Relevant to Forest Service administration, protection, utilization, access, and management

6 State, Tribal, County, local, private

7 Under Forest Service jurisdiction

OTHER KEY DEFINITIONS

Inventoried Roadless Areas (IRA) – Are specific areas on the forest that met the minimum criteria for wilderness consideration under the Wilderness Act and that were inventoried during the Forest Service's Roadless Area Review and Evaluation (RARE II) process completed in 1979, and subsequent assessments. The ANF has seven IRAs consisting of approximately 25,000 acres which include: Tracy Ridge, Allegheny Front, Clarion River, Cornplanter, Minister Valley, Hearts Content, and Verbeck Island.

National Recreation Area (NRA) – The ANF has one congressionally designated NRA encompassing approximately 23,000 acres, which contains portions of the Cornplanter, Tracy Ridge, and Allegheny Front Areas of the forest. All Forest Service roads are closed within the NRA except those classified roads serving developed recreation areas.

Public Road – Any road or street under the jurisdiction of and maintained by a public authority and open to public travel.

Public Forest Service Road (PFSR) – is a designated public road under Forest Service jurisdiction that meets the definition of 23 U.S.C. Section 101. "Designation" means identification, and inclusion in a network, of those Forest Service roads meeting the criteria of a PFSR and recorded officially in the Forest Service Infra database.

Unroaded Area - Any area without the presence of a classified road that is of a size and configuration sufficient to protect the inherent characteristics associated with its roadless condition. Unroaded areas are distinct from and do not overlap with inventoried roadless areas.

Wilderness – A designated area defined in the Wilderness Act of 1964 in the following way: A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which – (a) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (b) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (c) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in unimpaired condition; and (d) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value. There are two congressionally designated wilderness areas on the forest totaling approximately 8,938 acres, Hickory Creek Wilderness and the Allegheny Islands Wilderness. By definition, there are no classified roads in wilderness areas.

Roadway Terms –Figure 4 is a schematic of roadway terms (USDA Forest Service 2000) used throughout this document.

Figure 4: Roadway Terms schematic, ANF, 2003.

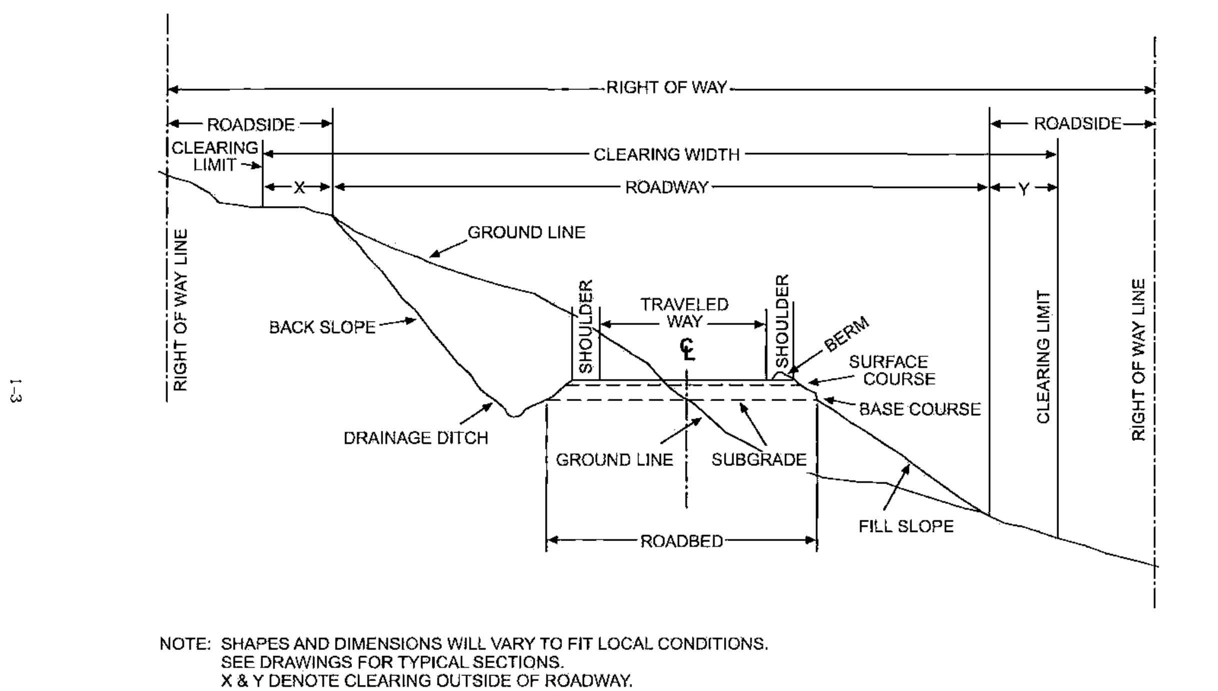


Figure 1-1. *Illustration of road structure terms*

PUBLIC FOREST SERVICE ROADS (PFSR)

Public Forest Service Road is a new designation given to important National Forest System arterial and collector roads that meet specified criteria. These are roads that serve as principal public access routes to the Forest. The intent of the PFSR program is to provide funding for reconstruction/restoration projects needed to adequately provide safe and environmentally sound access for public use. Funding for the program is proposed to come from future Intermodal Surface Transportation Efficiency Act (ISTEA) funding.

The goals of the Public Forest Service Road network are to:

1. Provide safe and efficient access to destinations in the National Forests and Grasslands;
2. Provide a seamless transportation link between State and other local government highway systems and the attractions of the National Forests and Grasslands;
3. Encourage/improve economic development of rural communities through quality recreation and tourism experiences; and
4. Reduce erosion and improve water and air quality.

The Allegheny National Forest has recommended approximately 80 roads for PFSR designation. The program was limited to those roads with an objective maintenance level of 3-5. This correlated to the need for public access by passenger car so the minimum maintenance level would be a level 3, suitable for passenger car.

The criteria for PFSR designation are those roads that:

- Are under Forest Service jurisdiction;
- Provide unrestricted access (other than seasonal snow closures, emergency closures, or scheduled closures for wildlife);
- Serve a compelling public need;
- Primarily serve Forest Service resource needs such as access to lakes, wilderness areas, or developed campgrounds;
- Typically *do not* provide local community needs such as school bus routes, access to cabins and summer homes.

UNROADED AREAS

Unroaded areas (URA) are one of the required elements to be examined in this roads analysis. Unroaded areas have been defined as:

- "areas that do not contain classified roads"(USDA-FS 1999, p. 11).
- "any area without the presence of a classified road, that is of a size and configuration sufficient to protect the inherent characteristics associated with its roadless condition. Unroaded areas are distinct from and do not overlap with inventoried roadless areas" (Federal Register Jan 12, 2001, p. 3229, FSM. 1920.5).

For clarification, an inventoried roadless area (IRA) is a specific area on the forest that met the minimum criteria for wilderness consideration under the Wilderness Act and was inventoried during the Forest Service's Roadless Area Review and Evaluation (RARE II) process completed in 1979 and subsequent assessments. The ANF has seven IRAs consisting of approximately 25,000 acres which include: Tracy Ridge, Allegheny Front, Clarion River, Cornplanter, Minister Valley, Hearts Content, and Verbeck Island.

While unroaded areas are identified through a different process, they may serve many of the ecological functions and possess the same social values as those associated with IRA's. Social values may include one or more of the following:

- *Provide a unique opportunity for dispersed recreation;*
- *Provide sources of clean drinking water;*
- *Provide a large, undisturbed landscape that offers privacy and seclusion;*
- *Provide an opportunity for study, research and education.*

Ecological functions that an unroaded area may possess:

- *Support a diversity of habitat for native plants and animals;*

- *Conserve an area's biodiversity by:*
  - a. *Providing large, relatively undisturbed blocks of habitat;*
  - b. *Functioning as biological strongholds and refuges for a number of species.*

Unroaded areas were identified through GIS analysis by placing a ¼ mile buffer adjacent to all classified roads on the ANF. Land areas that fall outside this buffer are considered to be unroaded. The ¼ mile buffer was used because:

- *Recreation use patterns change as distance from a road increases;*
- *Road noise is not generally heard beyond ¼ mile;*
- *Skidding activities associated with timber harvest generally occur within ¼ mile of a classified road; and*
- *Disturbance to wildlife (edge/noise) is greatly reduced beyond the ¼ mile buffer.*

There were 651 areas totalling 89,254 acres ranging from less than 1 acre to 8,150 acres in size that were delineated using the ¼ mile buffer. Six of the seven areas classified as IRA's (totalling 27,119 acres) are included in this list. There are 31 URA's (totalling 34,077 acres) larger than 500 acres in size located on Forest Service administered land (Table 6, Appendix A – Map 6). Five hundred acres was used as a cutoff for defining an unroaded area based on the definition, 'that a URA is of a size and configuration sufficient to protect the inherent characteristics associated with its roadless condition'. This definition does not specify an exact size, but, based on local topography and landform characteristics 500 acres would be of sufficient size to protect its inherent characteristics. Areas smaller than 500 acres will not be considered as unroaded areas. URA 14 includes an area that has a road approved in the Eastside EIS, but has not been constructed.

Each IRA and URA was evaluated against several criteria in each of three resource areas – recreation, wildlife and aquatics – for the purpose of assigning an index. The index can be used as a indicator of how well a particular area provides for values associated with each resource. A more thorough discussion of the criteria and ranking is found in Step 4, questions EF1 and UR2. The area surrounding each URA was examined to determine if there were additional acres/blocks that could be added with the decommissioning of a classified road.

Table 6: Inventoried Roadless Areas and Unroaded Areas on the ANF, 2003.

Area #	Area Name	Acres	Recreation Index	Wildlife Index	Aquatic Index	Total	Expansion Potential
Inventoried Roadless Areas (alphabetical)							
3	Allegheny Front NRA	4675	26	28	9	63	
5	Clarion River	3341	26	30	5	61	
7	Cornplanter	2279	26	28	9	63	
2	Hickory Creek Wilderness	6596	26	28	14	68	
9	Minister Valley	2078	24	22	8	54	
1	Tracy Ridge NRA	8150	30	30	9	69	

Area #	Area Name	Acres	Recreation Index	Wildlife Index	Aquatic Index	Total	Expansion Potential
	Total Acres	**27,119**					
	Unroaded Areas Greater than 500 acres (largest to smallest)						
4	Morrison Run	3684	30	28	9	67	yes
6	Indian Run	2474	18	27	5	50	
8	Little Drummer	2192	20	24	5	49	yes
11	Laurel Mill	1820	16	22	9	47	yes
12	Steck Run	1807	14	26	5	45	
13	East Fork Run	1538	20	19	17	56	
14	Gilfoyle Run	1391	14	18	5	37	
16	McCray Run	1261	18	25	6	49	
22	Gurgling Run	1144	16	25	5	46	
24	Penoke Run	1107	22	20	6	48	
25	Lick Run	1098	18	20	6	44	yes
27	Upper Arnot	1084	20	20	11	51	
29	Rocky Run	1005	12	18	9	39	
30	Kinzua Dam	993	14	24	4	42	yes
33	Dewdrop Run	923	18	20	5	43	
36	Muddy Fork	875	16	22	6	44	
37	Gregg Hill	864	8	16	5	29	
39	Hunter Creek	801	16	18	6	40	
40	Pine Run	780	18	20	7	45	
44	SB Kinzua W	718	18	20	15	53	yes
48	Tom's Run	663	22	7	5	34	
50	Pell Run	633	16	16	4	36	
51	Deer Lick	622	14	18	7	39	
53	Two Mile Run	610	20	14	11	45	
55	WB Millstone	601	14	18	11	43	
56	Bloody Run	599	12	19	5	36	
59	Rock Spring Run	567	8	18	5	31	
60	Lamentation Run	565	20	22	4	46	
62	Twin Lick	556	8	20	5	33	
63	SB Kinzua E	555	16	18	15	49	
65	Bobbs Creek	547	18	16	5	39	
	Total Acres	**34,077**					

MOTORIZED TRAILS

Motorized Off-Highway Vehicle (OHV) trails are provided for all-terrain vehicles (ATV), trailbikes, and snowmobiles. Portions of each of these trails are located on classified roads that are part of the ANF road system (Appendix A - Map 7). In some cases, the classified road may be open for public vehicle traffic as well as OHV use. In others, the road may be closed to public travel, but may be used for administrative purposes in addition to the OHV use.

ATV/Trail Bike Trails

There are four main ATV trail systems: Timberline ATV, Marienville ATV/Bike, Rocky Gap, and Willow Creek.

Approximately 7.2% of the ATV trail system, and 2% of the bike trail system are located on classified roads (Table 7). Roads can provide an enjoyable riding experience for beginner and intermediate riders. Typically, these roads are not open to public vehicle travel, but may be used for administrative use, including hauling for timber products or access for oil and gas operations. There is an increased risk for accidents on joint-use roads. The long-term goal is to locate trails off roads where feasible. Pit run surface material breaks down rapidly due to the constant scrubbing action created by ATV tires loosening the fines that bind the surface material together. New stabilization products and techniques are being tested to better stabilize the road surface and reduce long-term maintenance needs and costs.

Table 7. Miles of trails on roads by trail type in the ANF, 2003.

Trail Name or Type	Total Trail Miles	Miles (%) of Trail on Roads
ATV	24.3	7.2 (30%)
Bank Fishing	0.5	0.0 (0%)
Bike	18.5	2.0 (11%)
Full Time ATV/Snowmobile	57.8	21.2 (37%)
Full Time Snowmobile	61.5	22.9 (37%)
Dual Use Snowmobile	242.8	242.8 (100%)
Ski	14.0	5.4 (39%)
Hiking	254.2	22.5 (9%)
Total	673.6	324 (48%)

Snowmobile Trails

There are approximately 360 miles of developed snowmobile trail on the ANF. The majority of this trail system (286.9 miles / 80%) is co-located on classified roads. While the direct impact from snowmobiles to the road or to other resources is minimal, there can be conflicts in the joint-use of roads for recreation and other administrative purposes.

The joint-use roads for recreation and administrative purposes may increase the potential for accidents. The most common conflict occurs when timber and oil/gas operators plow snow from roads designated for snowmobile use. The goal is to minimize user conflicts and to provide a high quality recreation experience while accommodating road use needs. Timber and oil/gas operators are asked to make every reasonable effort to maintain a snow covered running surface.

On average, there are less than 28 days during the winter season when there is sufficient snow for winter recreation activities. When adequate snow cover is present, trail use is high on weekends with moderate use during the week. Illegal use is prevalent across the forest. Many users prefer to ride right from their camp or home and not trailer their snowmobile to a trailhead.

The ANF has developed and implemented a grooming and maintenance contract for snowmobile trails and connectors. The contract is reviewed by the contracting officer annually and reissued for bid every five years. Funding for these activities are made possible through Pennsylvania snowmobile registration receipts, which are administered by the Pennsylvania Department of Conservation and Natural Resources (DCNR). Large-scale trail improvement projects are funded through appropriated dollars and ISTEA (Intermodal Surface Transportation Efficiency Act of 1991) grant monies. Costs for administering and maintaining snowmobile trails are relatively low in comparison to the costs associated with maintaining an ATV trail system.

BASIC DATA NEEDS

Basic data needed to adequately address the issues for the ANF Forest-wide Roads Analysis are listed below. Some of the data are included in this report, while other data used to help answer questions in Step 4 are located on file at the Forest Supervisor's Office in Warren.

- GIS layer of existing road network
- Road logs and non-system road survey
- GIS layer of wildlife cover types
- GIS coverage and mapping of critical, unique or sensitive wildlife habitats
- GIS map of unroaded areas (classified roads buffered ¼ mile)
- Classification of all roads by type and level of use, season of use and maintenance needs
- Identification of illegal OHV use and garbage dumping sites within the analysis area
- Mapping of wetlands, landforms, and ecological land types within the analysis area
- Identification of wildlife species whose viability is a concern and are most at risk from roads
- On-forest wildlife monitoring data
- Identification of wildlife habitat management needs facilitated by the existing road system
- Estimates of deer density and an assessment of road management strategies that affect hunter access
- Identification of existing monitoring/inventory sites and the required roads necessary for access
- The location or roads relative to riparian boundaries and the intersections that influence riparian vegetative communities
- The location of roads relative to known wetland areas
- Vegetation inventory data
- Recreation facilities, designated trails, and areas of concentrated dispersed recreation use

STEP 3 IDENTIFYING ISSUES

PURPOSE AND PRODUCTS

The purpose of this step is to:

- Identify the key questions and issues affecting road-related management.
- Describe the origin of the issues.

The products of this step are:

- A summary of key road-related issues, including their origin and basis, presented by general categories of environmental, socio-cultural, and economic.
- A description of the status of current data including sources, availability, and methods of obtaining information.

PUBLIC INVOLVEMENT

A public open house was held at the Sheffield Volunteer Fire Department hall on May 13, 2002. Maps displaying the current transportation system, videos of the roads analysis process, and a power-point demonstration of PFSR roads were displayed. A total of twenty people offered comments either at the open house, by mail or email. An individual response to comments are not provided. They are addressed in the overall answers to the questions in Step 4.

Letters were mailed to the townships about this meeting. Several of the responses and people attending were representing their Township.

A meeting was held with the North Central Pennsylvania Regional Planning and Development Committee to inform them of the Forest-Wide Roads Analysis project.

A public open house was held February 22, 2003 at the Warren Public Library, where the major findings of the ANF Forest-wide Roads Analysis were presented.

ISSUE SUMMARY

Road-related issues were generated from Forest Service employees and from public input. Public comments were received through a public open house May 13, 2002, letters, and via the ANF website. The issues include environmental, social, and economic components. Vegetation management and commodity production were originally going to be addressed as separate issues, however, they were combined for a more succinct discussion. Fourteen issues are discussed in step 3.

ENVIRONMENTAL ISSUES

Issue 1 – Hydrology/Aquatic Biology

Sedimentation and Hydrologic Regime Changes

Roads are a major source of ground disturbance that greatly increase the potential for erosion and hydrologic change. Change in water flow occurs as a result of compacted road surfaces that generate overland flow. As water enters the stream channel network, localized increases in peak flow can occur. Localized peak flows are also increased where roads divert flow from one drainage to another or where roadcuts intercept subsurface flows. The increased energy that results can promote channel instability and sedimentation through in-stream erosion. While altered peak flow is most detectable in smaller channels, the cumulative effects can cause erosion in channels downstream.

Fine sediments on compacted road surfaces are easily transported via overland flow. Relief culverts draining road ditches can create a pathway for sediment transport to the existing channel downslope. Where drainages discharge water onto road fills and side slopes, the risk of soil saturation and associated mass wasting increases, particularly on steep slopes. Such events can result in abundant sedimentation to downslope stream channels, where it can have adverse impacts on the aquatic ecosystem.

In step 4, this isue will be discussed in more detail under questions: AQ1, AQ2, AQ3, AQ4, and AQ6.

Road Location

Hydrologic impact is generally less when roads are located on plateau-tops because natural flow-lines are not modified. These roads usually have less erosional impact than mid-slope roads that often cut across the most unstable part of the hillslope. This is particularly true for colluvial soils. Valley-bottom roads are generally stable, unless they are located in steep and narrow valley bottoms. However, eroded sediment from their surfaces typically has a more direct route to stream channels.

Road location and road design can mitigate many erosional and hydrologic problems caused by altered drainage. On roads determined to have a high risk of impacting protected water uses, road re-alignment is considered during project development. Roads are often re-located out of riparian areas when possible to eliminate or lessen the effects from runoff. In other cases, roads are recommended for decommissioning if their location is a continued concern to the health of a stream or other waterbody, and the road has no future intended use.

Additionally, road related erosion and sedimentation problems often vary with the age of the road. Roads built within the last 10 – 20 years tend to be located on better sites and are better designed than those built decades ago, and thus have fewer drainage related problems.

In step 4, this issue will be discussed in more detail under questions: AQ1, AQ2, AQ3, AQ6, and AQ9.

Road surfacing (pit run/limestone/pavement)

Choice of road surfacing material can also contribute towards erosion and hydrologic problems. Generally, the harder the running surface, the less likely it is to erode. While paved road surfaces would result in the least erosion due to running surface, there are other kinds of pollutants such as thermal or chemical pollution that could occur. Paved roads are extremely expensive and generally are not economically feasible in most forest settings.

Most Forest Service system roads (91%) are surfaced with pit run material obtained from borrow pits located on the ANF. These roads are resurfaced approximately every 12 years. The native sandstone material has a tendancy to break down relatively quickly into fine particles that are subject to creating dust during dry weather and sediment during wet weather and spring runoff. Pit run material is less costly than other surfacing materials.

In 1997, the ANF Forest Plan was amended to address road related concerns (among others) in riparian areas. Design criteria were summarized that address guidelines for road design in proximity to streams. Since 1997, 72 miles of limestone surfacing has been applied, generally on road segments that are within 300 feet of a stream and at stream crossings. Limestone is preferred to sandstone because it is more resistant to physical breakdown, and therefore reduces erosion and potential sedimentation. Limestone is a more costly alternative to pit run material since the source of this type of rock is not locally found. While the use of limestone may be limited due to economic constraints, expanded consideration for its use outside of streamside zones has been made on Public Forest Service Roads.

In step 4, this issue will be discussed in more detail under questions: AQ2 and AQ4.

Aquatic Biology

Potential impacts from roads to water quality, physical habitat, and aquatic biota occur from surface erosion, stream crossings, undersized culverts, and other culvert problems. Sedimentation can affect habitat for a variety of aquatic species, including trout that depend on clean gravels to spawn and carry out various life history requirements. Many of the smaller game and non-game fish species depend on clean gravel and larger substrate for cover and feeding as well. In addition to fish, streams on the ANF contain a wide diversity of aquatic invertebrates that are also dependant on clean substrate. The effect to aquatic species comes from excessive sedimentation that can cover spawning gravels, can fill all or parts of pools that larger fish and other aquatic species utilize, and embed gravels in riffle areas that are important habitat for aquatic insects.

In step 4, this issue will be discussed in more detail under questions: AQ4, AQ5, AQ7, AQ11, and AQ13.

Stream crossings can affect the movement of fish and other aquatic species, sometimes preventing them from moving upstream to spawn, disperse, feed, or fulfill other life history requirements. Pipe culverts are a kind of stream crossing that can create a barrier when they are perched above the water surface, the water velocity inside the culvert is too great to swim against, the water level is too low in the culvert, or the slope of the culvert is too great to swim up. Some culverts that have been identified as a barrier to the movement of aquatic species are proposed for correction or replacement with another type of crossing. Some crossings on the forest have already been replaced with bottomless arch culverts, which maintain the natural stream substrate.

In step 4, this issue will be discussed in more detail under questions: AQ8, AQ10, AQ13, and AQ14.

Fishing Access

Roads in close proximity to streams provide access for anglers who are seeking waters to fish. Roads that are open to the public and parallel or cross streams provide the greatest amount of access for anglers. These roads are primarily pit run and gravel roads. Roads are also used to access several of the small impoundments located around the forest. In addition, the Allegheny Reservoir has six developed and 2 undeveloped (unimproved) boat launches, some more suitable for smaller watercraft (i.e. Sugar Bay, Dunkle Corners, and Roper Hollow) but most can handle larger watercraft. Sugar Bay boat launch and access road, Dunkle Corners (except parking lot), and Roper Hollow access road (Forest Service segment) are limestone surfaced. The other ANF administered launches around the reservoir are accessible by paved roads.

In step 4, this issue will be discussed in more detail under questions: AQ12 and AQ15.

Oil and Gas Management

On the ANF, the Commonwealth of Pennsylvania, Department of Environmental Protection (DEP), Bureau of Water Quality is the regulatory agency when it comes to correcting problems associated with private oil and gas roads that are causing soil erosion and/or sedimentation. The Forest Service works with the DEP and the mineral owner to correct problems associated with private oil and gas roads.

Issue 2 – Wildlife

Road Effects

Habitat Connectivity (fragmentation, edge effect)

The effects of habitat fragmentation on terrestrial wildlife habitat can vary depending on the width of the road, road length, level of construction (related to the ease with which a species can cross a road), the distribution of forested habitat, and the sensitivity of a particular species to roads. Dissecting a forest with roads may diminish its value as wildlife habitat, and there is evidence that roads may exacerbate the problem of habitat fragmentation. This effect varies by the type of road (maintenance level). One of the primary effects of forest habitat fragmentation by roads is the disturbance to wildlife by seeing traffic movement, in addition to the noise generated by passing vehicles. Roads that are built to higher standards and are open to the public (Maintenance Level 3, 4, and 5 roads) have a greater potential to produce these effects.

In step 4, this issue will be discussed in more detail under questions: TW1 and TW4.

Direct mortality (road kills)

Many wildlife species are vulnerable to collisions with vehicles. For many species, road kills increase with an increase in the number of vehicles and the speed at which the vehicles travel. Direct mortality from collisions with vehicles is well documented and few terrestrial species of animals are not at risk. In general, mortality increases on roads with higher traffic volume and speed (i.e., paved roads). All species are at risk and some species may be attracted to roadside vegetation, insects, and dense cover established along the roadside. Some wildlife may be attracted to the road surface itself to collect seeds or gravel. Small mammals, birds, salmanders and snakes aggregate on or near warm roads, increasing their risk of being hit by vehicles.

Seasonal restrictions on the ANF are primarily directed at maintaining the road surface and reducing rutting and soil erosion during spring break-up. Wildlife may indirectly benefit from these seasonal restrictions. Road use restrictions that occur in response to a wildlife objective are generally made to reduce disturbance to wildlife rather than reduce direct mortality. These restrictions are primarily utilized on maintenance level 1 and 2 roads. An exception to this is when restrictions are made to protect the timber rattlesnake, where restricting use on some roads may reduce mortality.

Sensitivity to human activity

Increased human use facilitated by roads, may result in diverse and persistent ecological effects. The primary activities facilitated by the existing road system include dispersed recreation, firewood gathering, motorized recreation, illegal OHV use, and trash dumping.. Effects on wildlife habitat that occur as a result of these activities include: disturbance to wildlife, loss of standing and downed woody debris due to firewood gathering, increased sedimentation due to road use and maintenance, sedimentation and damage to vegetation resulting from illegal OHV use; and, point source pollution from trash dumping. Road management includes closing or restricting roads to minimize impacts to certain species. Closing and restricting roads is an effective means of reducing impacts to wildlife. On the ANF, these measures are primarily applied to ML 1 and 2 roads. Examples of wildlife impacts that are reduced by closing or restricting roads include impacts to nesting turkeys, waterfowl, raptors, and herons; and wintering areas for deer and turkeys.

In step 4, this issue will be discussed in more detail under questions: EF5 and TW2.

Road Density

Some wildlife species are "area sensitive". They prefer large areas of forest without edges of early successional habitat created by roads. Other species may be sensitive to human disturbance and prefer areas where noise and human activity are low. Still other species may benefit from areas of low disturbance (forest corridors) for moving between patches of forest habitats. Forested corridors with minimal roads may facilitate the movement of some species from one area to another.

Road Benefits

Hunter Access

Deer herbivory has caused major alteration in the vegetative composition and structure of understories of forested stands for the past 50 years (Marquis and Brenneman 1981). Access for hunters is determined to a large extent by the road management policies that are followed, and thus has a significant influence on deer herd management. Roads allow easier access whether by walking or driving into an area if the road is open. Most roads in the restricted management category are opened for deer hunting season. The restricted road list is reviewed each year as a deer herd management tool. Some hunters prefer easy access that requires less walking and less effort to remove a harvested deer from the woods. Other hunters enjoy a remote hunting experience where encounters with other hunters are minimal and roads and trails are less common. Some hunters prefer access during deer season while limiting access during spring gobbler season when minimal noise is essential to calling turkeys.

In step 4, this issue will be discussed in more detail under question: TW3.

Access for habitat management

Some areas managed to provide wildlife habitat may need road access. Examples include permanent wildlife openings that need to be mowed or burned periodically or impoundments where water levels are manipulated.

Issue 3 – Invasive Plants

Non-native Invasive Species pose an increasing threat to all ecosystems (USDA-FS 1998b). The definition of non-native invasive species is a plant or animal, including its seeds, eggs, spores, or other biological material that is non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm (Executive Order 13112).

Many factors may influence the ability of a particular species to become established into new areas and the extent to which a particular species becomes established. Biological barriers, physical barriers, and environmental barriers effect plant invasions. Biological barriers of invading species may include low seed production or viability, or dispersal limitations. Physical barriers may include distance traveled, topography, or habitat type and structure. Environmental barriers may include available light conditions, soil, and moisture regimes (Parendes and Jones 2000). Invasive plant species have varying effects on native plant and animal species and ecosystem function depending on native species vulnerability, ecosystem vulnerability, and the ecology of the invasive plant.

Generally, roads are the primary means of invasive plant introduction into an area. The presence of roads may increase the introduction and spread of invasive plants through the direct effect of vehicles or other human activities, wind and water. Roads provide a homogenous corridor along which, once established, invasive plant species may readily move (Gucinski *et al.* 2000). Whether the road is open, restricted, or closed plays a role in the probability of the introduction of non-native invasive species along road corridors. Road management activities such as construction, reconstruction, and maintenance have varying levels of disturbance and also play a role in the probability of the introduction and spread of non-native invasive species along road corridors.

In step 4, this issue will be discussed in more detail under question: EF2.

COMMODITY PRODUCTION ISSUES

Issue 4 – Vegetation Management /Commodity Production

Access for Vegetation Management

The Forest Plan provides programmatic direction for the kinds of activities and the levels of resource outputs anticipated to be produced across the ANF. An efficient transportation system is needed in order to achieve management objectives related to vegetation management and timber harvest. The number of road miles, road density and standard of design are important factors that contribute to the efficiency of the transportation system. While this transportation system is critical to achieving resource management objectives, the pattern and placement of the system on the landscape can result in resource conflicts.

Vegetation management objectives vary by management area (MA), thus the transportation system needed to support resource activities varies by management area. In MA's where vegetation management activities are more intensive and more frequent (MA's 1, 2 and 3), access is needed to a greater percentage of the land area than in other MA's. In MA's where vegetation management activities are less intensive such as MA 6.1, other resource objectives would determine the primary need for access. Considerations on the cost-effectiveness of road design (what traffic service level to construct), road density (are roads more cost-effective than long skids) and multiple road use needs (timber, OGM, recreation, etc.) all contribute to road management decisions.

Long term access is needed for the successful completion of stand regeneration processes, whether even-aged or uneven-aged systems are used. Ground-based heavy machinery may be used for timber harvest, application of herbicides and/or fertilizer, and fence construction. Access to an individual stand may be needed for up to 10 years to bring the process to completion. The intensity of landscape level management in MA's 1, 2 and 3 (the repeated entry from one decade to the next) often results in the almost continual use of the road system, with needed periodic road maintenance being substantially funded by timber sale receipts.

On-going and proposed vegetative treatments exist within the ANF. The current road system, along with oil and gas (OGM) roads, can access a large majority of the ANF; however, there may be a need in the future to access stands for silvicultural treatments that currently do not have adequate access. Future Environmental Assessments (EA's) and Environmental Impact Statements (EIS's) will evaluate various alternatives with different road access needs. New roads could be proposed if adequate access for vegetation management does not currently exist. When considering access for vegetation management, the Forest Service analyzes all existing roads in the area to minimize any new road construction (e.g., looks at potential for using existing Forest Service and OGM management roads).

In step 4, this issue will be discussed in more detail under questions: TM1, TM2, and TM3.

Issue 5 – Borrow Pits

Source and Quality of Material

Local sandstone has traditionally been used as a source of surfacing material for the majority of roads on the ANF. This material, referred to as 'pit run', fractures easily, and breaks down rapidly from exposure to the environment, and from the weight of vehicle traffic.

Pit run is excavated by developing a 'borrow pit'. Surface topsoil is first removed and stockpiled, and the pit run is then removed by excavator, front-end loader, or similar mechanized equipment.

There are 335 active and 216 closed borrow pits, of which 33 have been rehabiliated on the ANF (Appendix A – Map 8). There are an estimated 1,100 acres of land occupied by borrow pits.

There is concern that the quality, quantity, and access to pit run material is decreasing. Alternative road surfacing materials are being investigated for use.

In step 4, this issue will be discussed in more detail under question: MM3.

Changes in Land Use as a Result of Borrow Pit Development

The removal of stone from a borrow pit constitutes an irreversible, irretrievable commitment of resources. The best sites for stone pits generally support stands of high quality forest vegetation. The development of the pit results in a long-term change in land use from commercial forest land to borrow pit, and eventually to a rehabilitated vegetated opening. It would likely take several decades for the site of a borrow pit to return to forested vegetation.

Issue 6 – Oil and Gas Management

Oil and Gas on the Allegheny

The lands making up the ANF are "acquired lands," which means they were privately owned when the Federal Government purchased them. On roughly half of the ANF, a third party (someone other than the sellers of the land) owned the subsurface mineral rights when the surface was sold to the Federal Government. These are referred to as Outstanding Rights, since the subsurface rights were "outstanding" to a third party. On the remainder of ANF where the Federal Government does not own the sub-surface mineral rights, the sellers of the land retained the subsurface mineral rights when they sold the surface to the Federal Government. These are known as Reserved Rights, and are subject to a list of deed restrictions imposed by the Secretary of Agriculture known as "Rules and Regulations." These restrictions deal with prohibiting hydraulic mining and the need to participate in forest wildfire suppression. Owners of Outstanding or Reserved mineral rights have the right to access their private mineral estates for development, which includes building and maintaining access roads to drill and service their oil and gas wells.

Roads constructed by oil and gas companies to access wells and facilities, such as tank batteries, pipelines, and compressors, are "private" roads. These roads represent a significant investment by the oil and gas company, and the owner has the right to prohibit use that interferes with their mineral operation. As the surface landowner, the Forest Service may use the road for management of the National Forest; however, the Forest Service cannot extend use of these private roads to the general public against the wishes of the mineral owner. The mineral owner, while legally able to exclude public vehicles from its road system, cannot exclude the public from accessing National Forest System lands on foot.

On the ANF, the Commonwealth of Pennsylvania, Department of Environmental Protection, Bureau of Water Quality is the regulatory agency when it comes to correcting problems associated with private oil and gas roads that are causing soil erosion and/or sedimentation. The Department of Environmental Protection (DEP) has been given primacy by the Federal Government for carrying out the provisions of the Federal Water Quality Act of 1965 via the Pennsylvania's Clean Streams Law (PA Clean Streams Law of 1937, as amended). The Forest Service works with the DEP and the mineral owner to correct problems associated with private oil and gas roads.

The Forest Service usually does not expend monies on oil and gas access roads that are not part of the Forest Service road system. The Forest Service may take remedial action when a responsible party cannot be found or reasonably made to correct deficiencies on roads. Many oil and gas roads have been recognized as valuable corridors for the management of the National Forest, and have been added to the Forest Service road system.

Oil and gas developments usually have a typical progression of road use. In the beginning, there is a period of very intensive use when access roads are being built and well drilling and hydro-fracturing are occurring. For oil wells, there is usually an initial flush of production that can last anywhere from a month to a year when oil hauling can be significant. Following this initial flush, road-use tapers off to a daily pick-up truck or ATV visit by the well tender, a monthly visit by a tanker truck to pick up oil (if the oil is not pipelined out), and the occasional 1 to 5 year visit by a service rig (a medium to full-sized truck with a mast capable of "pulling" the well to replace tubing, etc.). After being brought into production, gas wells usually require less visits by the well tender, and the gas is pipelined out, which results in less road use. Every month or so, a tanker truck may visit the gas well to pick up brine water. Over time, many oil and gas access roads "grass in," becoming stable corridors that generate little to no sediment; however, some older or poorly designed developments can be plagued with road sediment problems.

The oil and gas industry is characterized by long periods of apparent nonuse, only to have a jump in oil or gas prices revitalize old holdings. The State of Pennsylvania has a criterion for "inactive wells." The Forest Service must respect the right for inactive wells to be put back into working order, and not rule-out the possibility that this can occur. Nonetheless, there are abandoned and orphaned wells on the ANF. An abandoned well is "any well that has not been used to produce, extract or inject gas, petroleum or other liquid within the 12 preceding months, or any well from which the equipment necessary for production, extraction or injection has been removed, or any well, considered dry, not equipped for production within 60 days after drilling, re-drilling or deepening, except that it shall not include any well granted inactive status" (PA Oil & Gas Act 1985). An orphan well is "any well abandoned prior to the effective date of Pennsylvania's Oil and Gas Act (April 18, 1985) that has not been affected or operated by the present owner or operator, and from which the present owner, operator, or lessee has received no economic benefit, except as a landowner or recipient of a royalty interest from the well" (PA Oil & Gas Act 1985). The PA Oil and Gas Act requires all abandoned wells to be plugged, and the State has well plugging programs in place to plug orphan wells based on safety concerns and potential harm to the environment. The Forest Service has also contracted services to plug orphan wells that are a safety concern or doing harm to the environment. After a well is plugged, access roads are decommissioned if they are not needed for current or future management of the National Forest.

Forty percent (13,961 acres) of the total USA-owned mineral acreage is not available for exploration and/or development and 60 percent (21,012 acres) is available (Table 8). The "available" acreage represents only four percent of the Forest's total land base of 513,257 acres. The subsurface oil/gas rights on the remaining 478,283 acres are reserved or outstanding.

While there are currently three USA-owned mineral leases on the Allegheny, they are not producing oil or gas at this time.

Table 8 – Mineral Ownership and Status on the ANF, 2003.

Status	Acres	Ownership/ Acres
USA-OWNED MINERALS		34,973
- Withdrawn (Hickory Creek/River Islands Wilderness and National Recreation Areas	13,960.57	
- Mineral ownership only	4,297.00	
- Leased (3 current leases)	1,026.27	
- Available for lease	15,689.12	
OUTSTANDING AND RESERVED OWNERSHIP		478,283
TOTAL ACRES (rounded to nearest whole acre)		**513,257**

Access to privately owned minerals

The mineral estate owner has the right to access his minerals. Operators build their roads in accordance with standards set forth by the Pennsylvania Bureau of Oil and Gas Management, of the Pennsylvania Department of Environmental Protection (DEP). When it comes to soil erosion, sedimentation and water quality issues, DEP is the regulatory authority, not the U.S. Forest Service. DEP road standards are protective of the environment (e.g., preventing sedimentation), but do not reflect the same standards as for a Forest Service system road. Oil and gas operators also utilize system roads. It is therefore important to consider this use prior to closing Forest Service system roads. There have been 3,282 wells drilled on the ANF since 1986.

In step 4, this issue will be discussed in more detail under questions: MM1 and MM2.

Issue 7 – Scenery Management

Scenic Integrity

One of the top five recreational activities on the ANF is scenic driving that ranks high along with hiking/walking, hunting, fishing, and viewing wildlife (USDA-FS 2002).

Viewing scenery on National Forest administered lands is very important to visitors and residents alike. People who live near or recreate in the ANF enjoy the natural appearing landscape character that is expected in a forested setting. It provides a backdrop for the experiences that people enjoy. These settings are important to people and one way to measure them is to look at Scenic Integrity or the intactness of the Landscape Character.

Scenic Integrity measures the "degree of intactness and wholeness of the landscape character" (USDA-FS, 1995). When deviations to landscape integrity occur, they may be viewed with concern and occassional comment from the public. Often these concerns not only relate to scenic integrity, or visual quality objective, but to the ecologic integrity as well.

Roads and road management may create a deviation or an element of discord to the Landscape Character, and a naturally appearing landscape, typical of the ANF, may be impacted. Under the Visual Management System (VMS) existing roads are assigned sensitivity (or concern levels) based on use and concern from the public for scenery, while the landscape itself is characterized by its distinctiveness, or uniqueness of a given landscape (scenic attractiveness). Visual Quality Objective (VQO) elements within the VMS provide a framework for making management decisions in a multiple use environment with competing demands and designing projects to protect scenic values. The current landscape model used by the ANF, the Visual Management System, will be replaced in the future by the newer Scenery Management System model.

The impact of road development is relevant to all maintenance levels and scales of analyses. However, roads with higher design standards and intensive maintenance activities such as MLs 3, 4, and 5 have the greatest potential to create long-term visual impacts.

In step 4, this issue will be discussed in more detail under questions: RR7 and UR6.

Issue 8 – Transportation Systems

Road Management

The Forest Plan provides direction regarding whether a road should be managed as open (open for administrative and public vehicle access, year round), restricted (open for administrative use year round, and seasonally open for public vehicle access), or closed (open for adminstrative use year round, closed year round to public vehicle access). The Forest –wide standard is for roads to be managed as 20% open, 20% restricted and 60% closed. This standard is the goal to be reached by the fifth decade of Forest Plan implementation. There are two items that could potentially impact meeting this objective.

First, one of the underlying assumptions in this ratio is that by the fifth decade, there will be over 1,600 miles of road on the Forest Service system (USDA-FS 1986). It was predicted that the majority of the roads constructed during the first five decades of the plan would be closed to public traffic, thus increasing the percentage of closed roads. The current rate of new construction, coupled with the decommissioning of existing Forest Service system roads, would indicate that a road system of 1,600 miles may not be realistic. The result of this is that the percentages of open/closed/restricted may need to be adjusted.

Second, in order to reduce the deer herd, more roads are being opened for hunting season (restricted) than were predicted. Reducing the deer herd to acceptable levels may result in not meeting the guideline for open/closed/restricted.

Opinion is divided on what our road management policy should be, and where or how it should be exercised. There are many people who would like to see more roads open for public use. There are many people who have a strongly contrasting desire to see more roads closed to public vehicle travel or to have roads decommissioned and obliterated.

In step 4, this issue will be discussed in more detail under questions: AU1, CR1, and GT4.

Road Density

Currently, road density guidelines in the Forest Plan pertain only to Forest Service system roads. Some people suggest that density guidelines should be revised to reflect State/Township, and/or private roads, as well. The guidelines in the Forest Plan need to be reviewed in light of current literature.

Access to private land

Many Forest Service roads on the ANF provide access to State lands or private land (Appendix A – Map 9).

In step 4, this issue will be discussed in more detail under question: GT1.

Public Forest Service Roads

There are many roads on the forest that provide access for a variety of resource objectives, and some that are known to provide access for public enjoyment. In 2000, the Forest Service was declared to be a

Public Road Agency which makes more formal acknowledgement of agency objectives for public road access. In 2001, the preliminary identification of approximately 80 potential Public Forest Service Roads (PFSR) was made. This list was reviewed and revised as a result of comments made for this FWRAP process. See Step 4, question GT 1 for a list of Potential PFSR roads and Appendix A Map10).

The goals of the Public Forest Service Road network are to:

1. Provide safe and efficient access to destinations in the national forests and grasslands;
2. Provide a seamless transportation link between State and other local government highway systems and the attractions of the national forests and grasslands;
3. Encourage/improve economic development of rural communities through quality recreation and tourism experiences; and,
4. Reduce erosion and improve water and air quality.

While funding for the maintenance of system roads has decreased, public use has increased. It is expected that demand for use of the national forests will continue to increase. The benefits of establishing a PFSR Program are to:

1. Ensure reliable and continuous access to NFS administered lands.
2. Provide safe public access ensuring pleasurable recreational and tourism experiences.
3. Strengthen links in the planned seamless transportation system of roadways from the National Highway System to the local rural routes of States, counties, towns and Federal agencies.
4. Increase local employment and rural economic development.
5. Continue and improve contributions to the Nation's total income and receipts to the Treasury.
6. Complement and extend safe public access of the Federal Highway System.
7. Reduce erosion, improve water and air quality, and more rapidly implement the Clean Water Act.

Rights-of-Way (ROW)

Several ROW and jurisdictional concerns related to road management were raised during the analysis (Appendix A – Map 11). Most of these concerns are historical in nature. They are difficult to resolve due to their complexity, cost and jurisdictional negotiation needs. Historically, the ANF has choosen not to exercise it's right to condemn ROW's. Resolution of these ROW's will be on a willing seller, willing buyer basis.

These include:

***Mayburg Bridge*:** This is a Forest Service owned, single lane bridge located near the community of Mayburg along State Highway 666. The bridge crosses over to the south side of Tionesta Creek and accesses private land and residences. The bridge does not access National Forest administered land. There are liability and condition concerns associated with this bridge. Local townships have been contacted in regard to bridge ownership conveyance; however, the townships expressed no interest in acquiring a single lane bridge. The estimated cost of replacing the bridge with a two lane structure is estimated to be $2-3,000,000.

***Westline, Forest Road 122*:** Lafayette Township is agreeable to working out an arrangement to rebuild this road and have it become a township road. The estimated cost to rebuild this 2-lane road and apply limestone surfacing is $200,000.

***Mudlick, Forest Road 141*:** Hamilton Township had been contacted in the past and was not receptive to acquiring ownership of this single lane road. The estimated cost to build a 2-lane, limestone surfaced road is $100,000.

***Warrpenn (near Morrison Run), Forest Road 156*:** This road, located directly adjacent to a stream, receives heavy OGM and recreation traffic. There are liability concerns associated with this road because it serves a dual purpose as a designated part of the ANF snowmobile trail system. There are also concerns regarding a railroad overpass near the junction with US Route 6. Pleasant Township has not yet been approached to negotiate conveying ownership to the township. The estimated cost to rebuild this 2-lane road, limestone surfaced road is $3-4,000,000.

***Libby Road, Forest Road 455*:** Lafayette Township has been contacted and is agreeable to working out an arrangement to rebuild this road and have it conveyed to the township. The estimated cost for this 2-lane, limestone surfaced road is $100,000.

***Tollgate (at Sheffield), FR 620*:** It was recently discovered that approximately 1,000 foot section of this road does not have an acquired right-of-way. This road is under the jurisdiction of Sheffield Township from its intersection with U.S. Route 6 for a short distance, then the next 1,000 feet of road does not have an acquired ROW by either Sheffield Township or the ANF. The road then returns to Forest Service jurisdiction. The Forest Service will work with Sheffield Township and adjacent private landowners to remedy this issue.

In step 4, this issue will be discussed in more detail under questions: GT2 and GT3.

Issue 9 – Recreation

Access

The Allegheny National Forest provides a wide diversity of dispersed recreation opportunities in a natural setting that is supported by an extensive public road system. More and better road access is desired for a variety of recreation activities. Historically, many users have requested the current road system be open to provide motorized access for hunting, fishing, berry picking, firewood gathering, wildlife viewing, photography, driving for pleasure, visiting historic sites, and dispersed camping. Gated Forest Service roads have historically generated many comments by forest users. Gates are frequently vandalized and/or circumvented to gain illegal access of Forest Service roads. Gates implement the Forest Plan road management standards and guidelines as being open, closed, or restricted. The public has voiced concern over closed roads being open seasonally and that they would like to see the roads either as open or decommissioned. Seasonal changes in road management achieve particular management objectives (e.g. hunter access) or closed to protect a particular resource (e.g. wildlife).

Seasonal residence, destination camping, and reservoir/river boating users, especially those pulling trailers and driving recreation vehicles, sometime encounter narrow, rough road conditions. They desire a safer road design, higher Traffic Service Levels (TSL) and Maintenance Levels (ML). Narrow roadways and soft shoulders makes passing difficult and dangerous. Potholes, rocks, washboarding, and loose gravel create more safety issues and are hard on the towed vehicles.

Issues are primarily relative to ML 3, 4, and 5 roads as these are the roads open to public use by passenger vehicles. However, the access issue revolves around identifying gated ML 2 roads that may be desired for an upgrade in TSL or ML to allow public access to specific areas of the ANF. Issues related to additional access for high clearance recreation vehicles or changing the closure status of a road for recreation access purposes should be analyzed at the project level.

In step 4, this issue will be discussed in more detail under questions: RR1and RR4.

Unroaded areas

Fewer open roads and more unroaded areas are desired for a variety of recreation activities. Public comments received stated that, "unroaded areas greater than 500 acres should be identified and given immediate protection so that they may be considered for designation as natural areas, wilderness areas, recreation areas, and scenic areas during revision of the Allegheny National Forest management plan". There are 31 unroaded areas and 6 Inventoried Roadless Areas over 500 acres in the ANF, with a total of 61,196 acres (Appendix A – Map 6). These areas were assessed for recreation, wildlife, and aquatic values and are discussed in more detail in Step 4.

Many people seek areas that have little or no motorized traffic and/or evidence of roads to enjoy a variety of recreation activities. Roads imply additional noise from motorized traffic and a visual intrusion into a natural appearing landscape. However, some want to use the closed or gated road as a trail or as access to a campsite. Others prefer experiences within unroaded areas where any evidence of roads is absent.

In 1972, the Forest Service initiated a review of NFS roadless areas larger than 5,000 acres to determine their suitability for inclusion in the National Wilderness Preservation System. The second and final review process, known as Roadless Area Review and Evaluation II (RARE II), resulted in a nationwide inventory of roadless areas. As recently as November 2000, the issue of conserving Inventoried Roadless Areas (IRAs) reached national attention. As part of a national Environmental Impact Statement, the ANF identified 24,000 acres of IRAs that do not allow road construction or reconstruction. These parcels included large areas along the Clarion and Allegheny Wild and Scenic Rivers and the Allegheny National Recreation Area bordering the Kinzua Reservoir.

In step 4, this issue will be discussed in more detail under questions: RR2, RR3, UR1, UR3, UR4 and UR 5.

Joint use roads

OHV enthusiasts have requested that all roads be open to their use for the purpose of extending trail-riding opportunities, to reduce cost, and to reduce environmental impacts of separate trails. About 80% of the snowmobile trails through the ANF are located on roads. About 29% of the ATV trails on the ANF are located on gated roads that timber and OGM operators use infrequently.

When snow conditions are favorable (most years have 1-2 weeks of favorable snow, once every 8-10 years the favorable snow lasts all winter season) snowmobile use is high on designated trails. It is also not uncommon to encounter snowmobiles off designated trails. Although other recreation use on roads is minimal in the winter, many people (loggers, OGM operators and home owners) use forest roads in the winter. The need to provide safe access for vehicular use, and the need to provide an enjoyable snowmobile trail experience is often contradictory. Joint use roads increase the potential for accidents. As compared to trails, the road's wider width tends to encourage higher speeds. Snowmobile trail users ask for tighter control over plowing on the trail system, or want a separate trail system. Vehicular road users are often concerned about colliding with snowmobiles, and slippery road surfaces from snowmobile use. Given the unpredictable nature of our snow season and an insufficient budget to properly manage trails, few opportunities to correct this situation are available.

Allowing ATV use on open public roads has been minimized because of concerns for safety on mixed traffic roads. ATV use is one of the fastest growing trail uses and one of the most popular on the ANF. The extended sight distance, wider width and smoother surface of roads tends to encourage higher speeds. ATV use is especially high in the summer, roads encourage high speeds, and vehicular use on roads is frequent. New ATV trails are being built off roads to reduce maintenance costs and slow trail users down. Additionally, native road surface material breaks down rapidly due to the constant scrubbing action created by ATV tires loosening the fines that bind the surface material together. This creates a cobbled surface that is unpleasant to drive on and difficult to maintain.

In step 4, this issue will be discussed in more detail under questions: GT4, SI5.

OGM

In the last few years, the number of new oil and gas wells being built on an annual basis has been increasing. On average, 188 new wells have been drilled per year since 1986 on Forest Service adminstered land. This expansion can occur as individual wells, or as an intensive field where wells are spaced at 600-1000 foot intervals. If an entire oil field could be planned at one time, steps could be taken to reduce the amount of road built and impacts to other resources. However, it is difficult to predict if an oil or gas reserve will be hit when drilling a new well, so each new well helps geologists determine where the oil field lies and where the next wells should be drilled.

Mineral rights are privately held on 93 percent of the ANF. The owner of the mineral estate has an easement to the surface as far as it is necessary for the recovery of minerals. The right of ingress and egress is implied when it is not expressly provided for in the grant or reservation of minerals. In essence, the Forest Service has limited control over the development of the mineral estate.

The value of the land to provide recreation opportunities is diminished in intensively developed oil fields. The land area is crisscrossed with roads, which are confusing to navigate and usually not open to public travel. The sounds of vehicles, pump engines and heavy equipment are common and pervasive. Trail systems that traverse these fields are interrupted by frequent road crossings. Some trails may be converted to roads when the trail is located in an appropriate location for road building. Mineral owners may continue to expand the oil field to the extent of its geologic limit. Some of the developed oil fields cover thousands of acres. The inherent character of the landscape is converted to an industrial atmosphere in the midst of the forest.

Issue 10 – Air Quality

Dust abatement on unsurfaced roads

The amount of dust generated from forest roads surfaced with pit run material causes considerable concern for forest residents, and can create safety hazards during extremely dry periods. Passenger car and industrial truck traffic can stir up enough dust to limit visibility on forest roads. Requests for dust abatement are received on a fairly regular basis. While road dust can cause safety problems, generally it is not considered to create an adverse health hazard. Forest Service policy is to not use brine for dust abatement.

In step 4, this issue will be discussed in more detail under question: PT4.

Issue 11 – Law Enforcement

There are law enforcement issues associated with roads and road management. Principal among these issues are illegal ATV/ORV use, illegal trash dumping, joint-use road conflicts, unauthorized road use, OGM road management, and patrolling designated snowmobile trails. The occurrence, and degree to which these activities occur, varies across the ANF.

Illegal ATV/ORV use

Legal use of ATV's is restricted to the approximately 108 miles of designated ATV trails on the ANF.

However, the majority of illegal use is centered on roads surrounding small communities and camps. ATV use is evident on closed roads by the presence of wheel paths. On open roads, the use is more difficult to distinguish, and usually is detected by catching the illegal rider outright, tracing back illegal use from another area, or citizens reporting illegal ATV activity directly to Law Enforcement Officers. The major concern of illegal ATV use on closed roads is environmental – continued use creates wheel tracks, which create wheel ruts that eventually lead to erosion and sedimentation resource problems. On open roads, the major concern is safety – mixing unregistered vehicles with passenger cars and trucks.

Illegal trash dumping

Illegal dumping of household trash and other unwanted items such as sofas, chairs and appliances have always been a problem along roadways. National and local campaigns to curtail, or reduce, the negative impacts of this problem are the "Pack it in, pack it out", "Give a hoot, don't pollute", and "Leave No Trace" initiatives. Success results have varied. There are several known historic dumping areas on the ANF, some of which cover nearly an acre of land. These sites have been closed and the land reclaimed. However, there are many smaller dumping areas on the forest. Most of these sites appear to be from random events where individuals were intent on disposing of unwanted materials such as shingles and other home construction debris. Where this problem occurs on a habitual basis, the ANF has closed roads to reduce access to these sites and employed "targeted enforcement activities" which has resulted in a reduction of this type of dumping.

Littering is the most widespread type of dumping on the ANF. Nearly all roads and trails show some signs of littering.

Joint-use road conflicts

This law enforcement issue often centers on snowmobile use. There are approximately 360 miles of designated snowmobile trail on the ANF, most of which are coincident with existing Forest Service roads. User conflicts, as well as law enforcement concerns, heighten during the winter months when some snow covered roads, co-designated as snowmobile trails, are plowed by loggers and/or OGM operators to access their work sites. Snowmobile users and operators seeking rightful access to their work sites often have verbal disagreements and tempers flare. In order to avoid these situations, some snowmobile users travel illegally 'cross-country' and away from designated trails.

Unauthorized road use

Commercial use of Forest Service roads is by permit only. Commercial uses include timber hauling, traffic associated with OGM operations, and trash hauling. Occasional illegal commercial road use occurs from OGM operators and timber haulers transporting logs harvested from private lands across National Forest administered land. This illegal use often occurs during spring breakup when roads are most susceptible to damage.

OGM road management

Roads constructed by OGM operators to access their drilling sites are 'closed roads', meaning that all public motor vehicle traffic not associated with an OGM operator is illegal. Most of these roads have signs posted stating "Road closed to all public motor vehicle traffic" near the entrance to the road. Gates are often left open by operators, and forest visitors often ignore the posted signs and travel on the closed road, thereby committing an illegal act.

Patrolling designated snowmobile trails

Snowmobile use on designated trails increases significantly during winters with adequate snow pack. Associated with increased use are increased complaints related to excessive speeding, driving under the influence, and compliance with other Pennsylvania snowmobile and operator laws and regulations. Some snowmobile users want to see speed limits posted on trails and a more visible Forest Service law enforcement presence on the trail system, especially during periods of heavy use.

In step 4, this issue will be discussed in more detail under question: AU2.

Issue 12 – Road Design and Maintenance

Cost to maintain the system

From INFRA data, (Table 13) the current estimate of the cost to maintain our road system on an annual basis is $3,900,000. In addition, we have identified $16,300,000 of deferred maintenance needs. Within the limits of this analysis, the anticipated funding for road management and maintenance is sufficient to cover expected costs. Cost to maintain the system is described in depth in Step 4, economic question EC

Road standards

Historically, many people have been concerned that Forest Service roads are constructed to to high a standard. At the same time, there is a national proposal that would increase the standard of many roads. On the ground, and by the specifications, it is virtually impossible to tell the difference between a Traffic Service Level (TSL) "C" and "D" on the ANF. Appendix A – Map 12 shows Forest Service roads by TSL.

OGM

The current standard for Forest Service roads includes many items for soil and water protection, such as limestone surfacing, that are not included within the standards for OGM developed roads. In addition, the level of maintenance on many OGM roads is lacking. Annual maintenance of OGM roads and updating of the Best Management Practices for OGM road construction is a concern.

Issue 13 – Unroaded Areas

The issue of unroaded areas was identified in Miscellaneous Report FS-643, Roads Analysis: Informing Decisions About Managing the National Forest Transportation System (1999) as an issue requiring detailed analysis during this roads analysis. The majority of public comments received concerning this roads analysis also indicated the need to address the unroaded issue in detail.

Unroaded areas are defined as "areas that do not contain classified roads" (Miscellaneous Report FS-643, p.11). Forest Service Road Management Policy further defined unroaded areas as "Any area, without the presence of a classified road, of a size and configuration sufficient to protect the inherent characteristic associated with its roadless condition. Unroaded areas are distinct from and do not overlap inventoried roadless areas" (Federal Register/Vol. 66, No.9/January 12, 2001/page 3229).

The issue was examined in terms of unroaded recreation opportunities, wildlife and aquatic resources on the ANF. A team of resource specialists, made up of recreation, wildlife, and aquatic specialists defined the minimum size an unroaded area should be to protect the inherent characteristics associated with its roadless condition that would enhance unroaded recreation opportunities, as well as be of benefit to wildlife and aquatic resources. The minimum size unroaded area requiring analysis was determined to be 500 acres. There are 31 such areas on the Forest, totaling 34,077 acres (Appendix A – Map 6).

This report does not make recommendations concerning disposition of unroaded areas. The report provides information to forest managers who will conduct site specific project analyses utilizing the NFMA/NEPA planning process when future proposed resource projects are proposed within or adjacent to unroaded areas.

In step 4, this issue will be discussed in more detail under questions: EF1, UR1, UR2, and UR3.

Issue 14 - Wilderness

There are two congressionally designated wilderness areas on the ANF, Hickory Creek and Allegheny Islands Wilderness areas. Totaling 8,938 acres, these wilderness areas were established in 1984.

The Forest-wide Roads Analysis assesses the extent and current condition of the road system in the context of other public and private road systems and land ownership patterns. This analysis does not make land management decisions nor allocate land for specific purposes because both require NFMA (National Forest Management Act) and NEPA (National Environmental Policy Act) based Forest and project planning.

Utilizing the NFMA and NEPA planning processes, the ANF will begin revision of its Land and Resource Management Plan in the spring of 2003. Public involvement is an integral part of this process and input will be solicited concerning all natural resource areas, including wilderness, at that time. The wilderness issue will be examined during the process. A final decision is scheduled for Spring, 2006, which may or may not include recommendations for additional wilderness. If additional wilderness is recommended, the final decision to designate wilderness areas is made by Congress.

STATUS OF CURRENT DATA

The inventory of the roads in the analysis area are located in the GIS system for the map portion, and in INFRA, a computerized database for the tabular information. Step 2 described the existing conditions of Forest Service system roads in the ANF. The road number, name, length, and other data are detailed in Step 2 and shown in Appendix B – Table B-1-3.

- The ANF has mapped all the State, Township, and National Forest System roads. The lengths of these facilities are accurate to within 1-2%. Data associated with these roads varies in quality by jurisdiction of the road and items. In general, the most reliable data is associataed with Forest Service system roads.
- The ANF has mapped over 1,236 miles of privately owned or other roads authorized by the Forest Service on Forest Service administered land. We estimate that this is between 85 and 90 percent of these roads. Data associated with these roads varies in quality by item, but in general, is less than for State and Township roads. In preparation for project level roads analysis, areas will continue to be analyzed for other private and other authorized roads.

KEY ISSUES

Based on the issues described in this section, the key issues for the Forest-Wide Roads Analysis are:

- Benefit Risk Analysis
- Funding Expectations
- ROW's
- Public Forest Service Roads
- Unroaded Areas

Based on this Forest-wide analysis, the following are the key road related issues to be analyzed for access and/or resource impacts in future project level roads analysis. The relevance of these issues may vary depending on the specific analysis area conditions:

- Aquatics
- Oil, Gas and Minerals
- Recreation
- Road management
- Road surfacing
- Safety
- Unroaded Areas
- Vegetation Management
- Wildlife

STEP 4 ASSESSMENT BENEFITS, PROBLEMS & RISKS

PURPOSE AND PRODUCTS

The purpose of this step is to:

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

The products of this step are:

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

Step 4 from the original 'Roads Analysis: Informing Decisions About Managing the National Forest Transportation System' document included 71 social, economic, and ecological questions. As teams around the country began working on their forest-wide roads analysis, several common concerns were raised about the understanding and clarity of the social and economic questions. The original Roads Analysis document contained three economic, four passive use value, ten social, and one civil rights/environmental justice question. These questions have been replaced by five social questions, three economic questions, three cultural and heritage questions, one additional recreation question, and one civil rights/environmental justice question. These new questions were incorporated into the ANF Forest-wide roads analysis and will be incorporated into future project level roads analyses. Seven additional questions pertinent to the ANF were also formulated and included in the forest-wide roads analysis for a total of 73 questions addressed in the ANF Forest-wide roads analysis. Answers to the following questions have been developed by considering the comments received from the public, the issues presented in Step 3, and resource specialist input. Individual responses to comments are not provided. They are addressed in the overall responses to questions.

CURRENT ROAD SYSTEM BENEFITS, PROBLEMS, AND RISKS

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?

Because of its inherent complexity, this question will be answered by: (1) defining the unique ecological attributes of this region, (2) identifying the existing unroaded areas on the ANF (a baseline, forest perspective), (3) defining criteria used to identify unroaded areas, and (4) describing the effects of roading current unroaded areas.

The ANF within a Regional Context

In 1997 the Environmental Protection Agency (EPA) completed an ecological assessment of the Mid-Atlantic Region (Jones *et al*. 1997). Pennsylvania, Maryland, West Virginia, Virginia and Delaware were included in this assessment which provides a regional context for environmental conditions on the ANF.

Within the Mid-Atlantic Region, the watersheds that comprise the ANF proclamation boundary have more than 84.6% forest and agriculture cover along streams. Forest land cover for the ANF is greater than 82.4 percent and Forest edge habitat is less than 7.8 percent. The proportion of the ANF with suitable interior forest habitat at the 600 hectare (about 1,500 acres) scale is more than 42.4 percent. These data are summarized in Table 9 below.

Table 9. Ecological Conditions in Watersheds Containing the Allegheny National Forest in Relation to the Mid-Atlantic Region (PA, MD, WV, VA, DE).

Ecological Measure	Watershed area	Relationship to Mid-Atlantic
Forest & Agriculture Cover along Streams	>84.6%	Highest 2 out of 5 categories
Forest Land Cover	>82.4%	Highest of 5 categories
Forest Edge Habitat	<7.8%	Lowest of 5 categories
Proportion of Forest with Suitable interior habitat at the 600 ha. Scale*	>42.4%	Highest of 5 categories

***Interior habitat was assessed at 3 scales in the mid-Atlantic assessment. The 600 ha scale was the largest scale indicating suitability for the species with the largest interior habitat requirements.**

Generally, the Allegheny National Forest offers a highly forested landscape, with low amounts of forest edge habitat and a high proportion of suitable interior habitat when compared to the total mid-Atlantic region. However, within this relatively unfragmented forested landscape, there are areas of intensive human disturbance and degraded habitats.

Pennsylvania contains 45,333 square miles and about 17 million acres of forested land. The total mileage of improved highways in Pennsylvania is 119,986 miles (PennDot, 2001) with an additional 28,000 unpaved dirt and gravel roads (Hassinger, 2000). Additional access corridors contributing to forest edges and reducing interior habitat size in Pennsylvania include 6,000 miles of active and 6,000 miles of abandon railroad track, 7,857 miles of transmission lines greater than 115 kilovolt, and 23,078 miles of transmission lines maintained by rural electric cooperatives (Hassinger, 2000).

Evaluation of Unroaded Areas

Each IRA and URA was evaluated against the following six criteria to determine an index for the wildlife values associated with each area (Table 10). The maximum number of points for an individual criteria is 5 points, with the highest possible score for all 6 criteria being 30. The higher the score, the higher the wildlife values associated with the unroaded area. A description of the criteria follows:

Size: In general, larger areas provide more habitat features to meet the needs of wildlife for feeding, nesting, denning, and seeking shelter without experiencing disturbances from human activities. 5 points – areas > 2,500 acres, 4 points – areas between 2,000 and 2,500 acres, 3 points areas between 1,000 and 2,000 acres, 1 point, areas less than 1,000 acres.

The core area of at least 1,000 acres in size fulfill the habitat needs for most species. Many species can inhabit much smaller areas and survive and reproduce but 1,000 acres represents an ideal size for providing potential high quality habitat for species sensitive to human disturbance. Smaller areas of 500 to 1,000 acres may still provide some valuable habitat components for many species particularly if unique habitats, within stand features, or diverse vegetation structure are present. Areas below this threshold are too small to provide isolation or remoteness characteristics.

Configuration - The perimeter to area ratio captures the amount of edge. Areas with fingers and long narrow shapes have larger ratios and are less likely to provide the isolation from human activity that some species need. Area should not have fingers and/or narrow corridors less than ½ mile wide. Eliminate the narrow fingers and determine if remaining core area is less than 1,000 acres. 5 points = 0-29 Perimeter to Area Ratio (feet/acre), (Good geometric shape, minor number of fingers); 3 points = 30-45 Perimeter to Area Ratio (Moderately good shape, some fingers or narrow segments); and 1 point = > 45 Perimeter to Area Ratio (Poor shape, many fingers, narrow).

Development: Percent of area disturbed by human development provides a measure of the probability that the evidence of human activity may be experienced. Evidence of development should be low and naturalness high. Less than 20% of forested area in the 0-20 year age class. Overhead power lines and wide transmission corridors should not dominate the landscape character. Limited presence of ROW's, trails (motorized or non-motorized), or unclassified roads. 5 = <5% development, 3 = 6 – 20% development, 1 = > 20% development.

Unique Habitat: Complex vertical structure and diverse vegetative composition in combination with unique habitat increases the potential for wildlife use and increases habitat quality. Unique habitats such as raptor nesting areas, rattlesnake denning sites, high value wetlands, bear denning areas, turkey and deer wintering areas and heron rookeries increase the diversity value of these areas for wildlife. 5 = unique vegetation composition &/or structure + presence of many within stand features and unique habitat components; 3 = Unique vegetation &/or structure with few within stand features or unique habitat components; 1 = low or no unique vegetation &/or structure with no within stand features.

Presence of Federally Endangered or Threatened, and Forest Sensitive species sensitive to human disturbance: 5 = Documented use (occupied habitat) by PETS species that are known to be sensitive to human disturbance; 3 = High potential habitat for PETS species sensitive to human disturbance; 1 = Low potential for use by PETS species sensitive to human disturbance or no suitable habitat.

Landscape connectiveness of similar habitats **-** Habitat connectivity across the landscape is important for facilitating movement of less mobile species and promoting genetic interchange between metapopulations. Landscape connectivity may prove beneficial to species during periods of global climatic change. Potential for connectiveness of similar habitats across the landscape increases an unroaded area's value for allowing movement and dispersal of wildlife species. 5 = provides connectivity between similar undisturbed habitats; 4 = borderline 5, 3 = area provides connectivity at the watershed scale; 2 = borderline 3; 1 = area is isolated and provides low or no connectivity at any scale.

Table 10. Evaluation of Wildlife Criteria for Inventoried Roadless Areas and Unroaded Areas on the ANF, 2003.

Area #	Area Name	Criteria						Wildlife index
		Size	Config.	Dev.	Unique habitats	E, T, S species	Connect.	
Inventoried Roadless Areas (alphabetical)								
3	Allegheny Front NRA	5	5	5	5	3	5	28
5	Clarion River	5	5	5	5	5	5	30
7	Cornplanter	3	5	5	5	5	5	28
2	Hickory Creek Wilderness	5	5	5	5	3	5	28
9	Minister Valley	3	1	5	5	5	3	22
1	Tracy Ridge	5	5	5	5	5	5	30
Unroaded Areas (largest to smallest)								
4	Morrison Run	5	3	5	5	5	5	28
6	Indian Run	4	5	5	5	3	5	27
8	Little Drummer	3	3	3	5	5	5	24
11	Laurel Mill	3	5	3	3	3	5	22
12	Steck Run	3	3	5	5	5	5	26
13	East Fork Run	3	1	3	5	5	2	19
14	Gilfoyle Run	3	1	3	5	1	5	18
16	McCray Run	3	1	5	5	5	4	23
22	Gurgling Run	3	5	5	5	5	2	25
24	Penoke Run	3	1	5	5	3	3	20
25	Lick Run	3	3	5	3	3	3	20
27	Upper Arnot	3	3	5	5	3	1	20
29	Rocky Run	3	3	1	5	3	3	18
30	Kinzua Dam	3	1	5	5	5	5	24
33	Dewdrop Run	1	1	5	3	5	5	20
36	Muddy Fork	1	3	5	5	5	3	22
37	Gregg Hill	1	1	1	5	3	5	16
39	Hunter Creek	1	1	5	5	3	3	18
40	Pine Run	1	1	5	5	5	3	20
44	SB Kinzua W	1	1	5	5	5	3	20
48	Tom's Run	1	1	5	5	3	5	20
50	Pell Run	1	1	3	5	5	1	16
51	Deer Lick	1	1	5	5	5	1	18
53	Two Mile Run	1	1	1	3	3	5	14
55	WB Millstone	1	1	5	3	5	3	18
56	Bloody Run	1	1	5	5	5	2	19
59	Rock Spring Run	1	3	3	4	3	4	18
60	Lamentation Run	1	1	5	5	5	5	22
62	Twin Lick	1	3	3	5	5	3	20
63	SB Kinzua E	1	1	5	5	3	3	18
65	Bobbs Creek	1	1	5	3	3	3	16

Effects of Roading Areas that are Currently Unroaded

Although roading a currently unroaded area would result in diminished wildlife values identified in the table above some benefits to some wildlife species could be realized. Roading would result in both positive and negative impacts to willdife. To demonstrate these wildlife impacts Tracy Ridge unroaded area is used as an example. Tracy Ridge may be one of the largest unroaded areas in Pennsylvania. Habitat quality remains high for species that require isolation or species that are negatively impacted by human disturbance. For example timber rattlesnake habitat is exceptionally high in quality. Large boulder areas used for denning and the surrounding foraging areas remain intact with minimal potential for human-rattlesnake interactions (both pedestrian and vehicular). Raptors and herons can find secure nesting sites where contact with humans is minimal and human induced habitat alterations are virtually non-existent. Black bears can find winter dens where the likelihood of being disturbed by humans is low. Salamanders can migrate from winter shelter to spring breeding pools without the potential of being run over by a truck or ATV. This lack of contact with humans and lack of human induced habitat alteration creates a high quality habitat where reproduction is expected to be high for these species.

Other species that thrive in disturbed habitats or early successional habitats would benefit from roads that would result in more active forest management. Deer, woodcock, and ruffed grouse are examples of species that would do well if roads were added followed by active forest management.

To determine if wildlife impacts associated with roading an unroaded area are acceptable, the amount of unroaded habitat provided at a broader landscape scale needs to be assessed and the likelihood of unroaded areas remaining unroaded should be evaluated. The wildlife criterion in the table that assesses the value of each unroaded area in providing connectiveness across the landscape is a first step in determining the importance of an unroaded area at the landscape scale.

Determining the amount and distribution of unroaded habitat in the watershed and at the Forestwide level is a logical second step. The relationship between the 31 unroaded areas and the 11 fifth level watersheds is displayed on Appendix A – Map13. As described in Step 3, the 31 unroaded areas comprize a total of 34,077 acres or 7 percent of the ANF.

It seems prudent in most cases to manage for early successional species in areas already roaded and management for late-successional species, interior species, and species sensitive to human disturbance in existing un-roaded areas.

Finally, one should assess the likelihood that the area will remain unroaded. Although oil and gas development could occur on privately owned minerals at any time, looking at the current amount and extent of OGM activity in the surrounding area may provide some indication of potential roading associated with future mineral extraction. Likewise, insect and disease outbreaks that cause substantial tree mortality may require roading to ensure that forested habitats are sustained.

In summary, Table 10 displays the wildlife values associated with each unroaded area. This should give decisionmakers and future project interdisciplinary teams an idea of the relative value of each unroaded area to wildlife. When determining if an unroaded area should remain unroaded, a logical process is to determine the amount and distribution of unroaded areas in the fifth level watershed and the forestwide level, and assess the likelihood that the area will remain unroaded by examing adjacent OGM activities and insect and disease impacts.

Aquatic Unroaded Area Assessment

Each IRA and URA was evaluated against the following eight criteria to determine an index for the aquatic values associated with each area (Table 11). The maximum number of points that could be assigned to an area is 30. The higher the score, the higher the aquatic values associated with the unroaded area. A description of the criteria follows:

Stream Density: stream density is the length of stream within a given unroaded area and is measured as miles of stream/square mile. It was used in the unroaded analysis to rank the potential for road related impacts if roads where to be placed on the landscape. The assumption is that the greater the stream density the greater the likelihood of having impacts from a road network since the potential for connectivity increases. 4 points = >3 mile/sq mi; 3 points = >2-3 miles/sq mi; 2 points = >1-2 miles/sq mi; and 1 point = 0-1 mile/sq mi.

DEP Classification: streams are classified across the state to define the level of protection of designated water uses. Criteria used in this unroaded analysis are specific to cold water fishes and the current condition of water quality. The rationale for including the criteria is that the maintenance or propagation of cold water habitat requires special consideration for protection, and unroaded areas would eliminate the risk of water quality degradation often associated with the presence of roads on the landscape. Warm water fishery = 1, Cold water fishery = 2, High Quality = 3, Exceptional Value = 4.

TES Present: the presence of aquatic TES species highlights the importance of the area for habitat of a particular species. The rationale for including the criteria is that TES habitat requires special consideration for protection, and unroaded areas would eliminate the risk of water quality degradation often associated with the presence of roads on the landscape. 0 = No, 4 = Yes

Within 13% Area: this area of the forest was emphasized in the Biological Opinion (USDI-FWS 1999) when the two federally endangered mussels were being assessed in the TES Amendment. The rationale for designating this area was that this area of the forest drains directly into the Allegheny River where the mussels are located. The concern is with sedimentation and water quality issues, and their potential affect on the mussels. The rationale for including the criteria is that unroaded areas would prevent sedimentation and water quality effects from road building activities, thus lessening the potential effect to the mussels in the river. 0 = No, 4 = Yes

State Wilderness Trout Stream: these streams (or sections thereof), and the area around them (normally subwatersheds), are designated by the state when certain criteria are met. To qualify, the stream must be at least 2 miles in length, and have no more than one public access point every 2 miles by vehicle. Nor can an open road parallel a stream within a ¼ mile. Designating an unroaded area would help provide for or preserve these conditions where they exist. 0 = No, 4 = Yes

Municipal Watersheds: the presence of municipal watersheds highlights the importance of the area for water quality. These watersheds were included in the criteria since roads have a potential to degrade water quality where connectivity exists between the road and the stream networks, therefore special consideration for protection is required. Since the risk of contamination entering a stream decreases with the reduction in road/stream interaction, unroaded areas can be important for maintaining high quality municipal drinking water. 0 = No, 4 = Yes

Research/Natural Area: the natural area portion currently provides an unroaded setting in an old growth forest. This area is very important to various research topics, including aquatics and aquatic habitat. The absence of land disturbing activities in this area is important to understanding the natural processes that occur, and is a unique feature on the forest. 0 = No, 3 = Yes

Forest Service Remote Trout Stream: these streams were designated in the Fisheries Amendment (USDA-FS, 1997). They closely mimic the State Wilderness Trout Stream criteria, but because of their smaller size could not be designated by the state. Maintaining an unroaded characteristic would continue to help meet the criteria outlined in the Forest Plan. 0 = No, 3 = Yes

Table 11. Evaluation of Aquatic Criteria for Inventoried Roadless Areas and Unroaded Areas on the ANF, 2003.

Area Number	Area Name	Criteria: Stream Density in Area	DEP Classification of Stream	TES Present	Within 13% Area	State Wilderness Trout Stream	Municipal Watershed	Research / Natural Area	FS Remote Trout Stream	Aquatic index
Inventoried Roadless Areas (Alphabetical Order)										
3	Allegheny Front NRA	2	3	0	4	0	0	0	0	9
5	Clarion River	2	3	0	0	0	0	0	0	5
7	Cornplanter	2	3	4	0	0	0	0	0	9
2	Hickory Creek Wilderness	2	4	0	4	4	0	0	0	14
9	Minister Valley	4	4	0	0	0	0	0	0	8
1	Tracy Ridge NRA	3	3	0	0	0	0	0	3	9
Unroaded Areas (Largest to Smallest)										
4	Morrison Run	3	3	0	0	0	0	0	3	9
6	Indian Run	2	3	0	0	0	0	0	0	5
8	Little Drummer	2	3	0	0	0	0	0	0	5
11	Laurel Mill	2	3	0	0	0	4	0	0	9
12	Steck Run	2	3	0	0	0	0	0	0	5
13	East Fork Run	3	4	0	0	4	0	3	3	17
14	Gilfoyle Run	2	3	0	0	0	0	0	0	5
16	McCray Run	3	3	0	0	0	0	0	0	6
22	Gurgling Run	2	3	0	0	0	0	0	0	5
24	Penoke Run	3	3	0	0	0	0	0	0	6
25	Lick Run	3	3	0	0	0	0	0	0	6
27	Upper Arnot	3	4	0	0	4	0	0	0	11
29	Rocky Run	2	3	0	0	0	4	0	0	9

Area Number	Area Name	Stream Density in Area	DEP Classification of Stream	TES Present	Within 13% Area	State Wilderness Trout Stream	Municipal Watershed	Research / Natural Area	FS Remote Trout Stream	Aquatic index
		Criteria								
Unroaded Areas (Largest to Smallest) continued										
30	Kinzua Dam	1	3	0	0	0	0	0	0	4
33	Dewdrop Run	2	3	0	0	0	0	0	0	5
36	Muddy Fork	3	3	0	0	0	0	0	0	6
37	Gregg Hill	2	3	0	0	0	0	0	0	5
39	Hunter Creek	3	3	0	0	0	0	0	0	6
40	Pine Run	4	3	0	0	0	0	0	0	7
44	SB Kinzua W	4	3	4	0	4	0	0	0	15
48	Tom's Run	2	3	0	0	0	0	0	0	5
50	Pell Run	2	2	0	0	0	0	0	0	4
51	Deer Lick	1	3	0	0	0	0	0	3	7
53	Two Mile Run	3	4	0	0	4	0	0	0	11
55	W Br. Millstone	4	3	4	0	0	0	0	0	11
56	Bloody Run	2	3	0	0	0	0	0	0	5
59	Rock Spring Run	2	3	0	0	0	0	0	0	5
60	Lamentation Run	2	2	0	0	0	0	0	0	4
62	Twin Lick	2	3	0	0	0	0	0	0	5
63	S Br Kinzua E	4	3	4	0	4	0	0	0	15
65	Bobbs Creek	2	3	0	0	0	0	0	0	5

Effects of Roading Areas that are Currently Unroaded

The effects of roading on water and aquatic resources are normally associated with increased runoff as a result of the alteration of normal flow paths. Where a stream and road become hydrologically connected, runoff containing sediment, and potentially other pollutants, will enter a stream. In addition, the amount and timing of the runoff delivered to a stream is altered, which can lead to changes in the physical characteristics of the stream channel. These potential effects can result in habitat degradation for a variety of aquatic species, including fish and invertebrates, as well as cause stream water to become more turbid as a result of runoff from roads. These potential effects need to be taken into consideration on a larger scale than just the unroaded area when assessing the value of these unroaded areas.

The other aspect of creating roads in an unroaded area is that access is increased for the angler. This would provide an increased opportunity to the angler whom is primarily seeking native trout. Not all unroaded areas provide the same level of streams that support fishable populations of trout, so this aspect needs to be considered in any evaluation of an unroaded area. These generally smaller brook trout streams cannot withstand a lot of fishing pressure where those anglers harvest their fish. In addition, several of the unroaded areas are within state designated wilderness trout stream and Forest Service remote trout stream drainages (see Table 11 and Appendix A - Map 14) . An important criteria for these designations is limited motorized accessability to the streams within them to provide for that remote character.

In summary, Table 11 displays the aquatic and water resource values associated with each unroaded area. This should give the decisionmakers and future project interdisciplinary teams an idea of the relative value of each unroaded area to aquatic and water resources. When determining if an unroaded area should remain unroaded, a logical process is to determine the amount and distribution of unroaded areas in the fifth level watershed and at the forestwide level, and assess the likelihood that the area will remain unroaded by examing adjacent OGM activities.

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?

Introduction

The degree to which roads increase the introduction and spread of exotic plant and animal species, insects, diseases and parasites depends, in part, on the type and location of the road. Whether the road is open, restricted, or closed plays a role in the probability of the introduction and spread of an exotic. The road location determines whether the exotic can be introduced into an acceptable habitat where it can become established. Examples are seed and insect (hemlock woolly adelgid or gypsy moth egg masses) or diseases transported by vehicles. Forest roads provide for the dispersal of exotic species by altering habitat conditions preferred by native species, making invasion more likely by stressing or removing native species, and by allowing easier movement by wind or human vectors.

Plants

A widely cited generalization about biological invasion (plants) 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) represent disturbances that create and maintain new edge habitat. These roadside habitats can be invaded by a suite of exotic (non-native) plant species, which may be dispersed by "natural" agents such as wind and water as well as by vehicles and other agents related to human activity. 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 (Gucinski *et al.* 2000). Although few habitats are immune to at least some invasion by exotic 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 is introduced and when it begins to expand its distribution and population size in a new area (Gucinski *et al.* 2000). Observations in different settings suggest that the exotic species that successfully invade and the scale of invasion problems differ regionally. Some exotic species can be significant pests, while others remain fairly benign. A less than ideal science base exists for identifying which exotic species pose the greatest threat and what preventive measures are appropriate (Gucinski *et al.* 2000).

Because non-native invasive plant species pose an increasing threat to all ecosystems (USDA-FS 1998) the Allegheny National Forest is in the process of developing a comprehensive noxious weed and invasive plant management (NWIPM) program. The NWIPM program will encompass collaborative efforts in planning, education, prevention, inventory, mapping, control, monitoring, and research. Historically, most noxious weeds and invasive plant species were introduced to North America from Europe or Asia both accidentally and intentionally. Examples of accidental introduction include the transport of seeds or plants as stowaways when people and products are transported by air, water, rail, or road. Examples of intentional introductions include plants used for medicine, dyes, forage, erosion control and ornamental plants (NISPC 2001).

Many factors may influence the ability of a particular species to become established into new areas and the extent to which a particular species becomes established. Biological barriers, physical barriers, and environmental barriers effect plant invasions. Biological barriers of invading species may include low seed production, viability or dispersal limitations. Physical barriers may include distance traveled, topography, or habitat type and structure. Environmental barriers may include available light conditions, soil, and moisture regimes (Parendes and Jones 2000). Of the approximately 1,200 plants species listed for the Allegheny National Forest 251 are introduced species (Hays, personal communication 2002, adapted from Rhoads and Klein 1993). While many of these species may never occur in prominence, others may invade sensitive habitats. Region 9 Eastern Region Forests, compiled a list of invasive plants found in the Eastern Region and ranked them by their degree of invasiveness based on information from States in the Eastern Region.

Plants were placed into five categories:

Category 1: Highly Invasive, these are all non-native, highly invasive plants which invade natural habitats and replace native species.

Category 2: Moderately Invasive, these are less invasive than Category 1. If these species are significantly replacing native species, then they are doing so only in local areas.

Category 3: Widespread non-natives, these are often restricted to disturbed ground, and are not especially invasive in undisturbed natural habitats. Most of these species are found throughout much of the Eastern Region.

Category 4: Local concern and monitoring, these are non-native species that occur only locally in the Eastern Region. They are not currently known to be especially invasive, but should be monitored in the future, many of these plants are cultivated species which occasionally escape.

Category 5: Native Invasives, these are native to North America and have been reported as being invasive in the Eastern Region, or parts thereof. Some of these plants are regionally exotic, having moved in from another part of North America.

The NWIPM program is in the process of assessing the 251 introduced species by comparing the Region's rank of invasiveness, any new local information, and the magnitude of known infestations, to prioritize species that will be the focus of inventories, control and monitoring. Limitations of resources, personnel, and time warrant looking at the species that may pose the greatest threat to native plant populations, ecosystem integrity, and human health. Current assessment and inventory efforts are focused on species known or believed to occur on the Allegheny National Forest from Category 1 species and plants listed on the Pennsylvania State Noxious Weed List, and two plants of local concern, for a total of 22 species (refer to project file). Here after referred to as the Noxious Weed and Invasive Plant (NWIP) Species of Concern.

Based on prelimary inventories on the ANF, most NWIP species of concern seem to be limited to road corridors. Inventory efforts will continue to evaluate the extent of NWIP species of concern across the ANF.

Diseases and Insects

The spread of insect pests can be facilitated by increased road density and traffic volume. Forest pests such as the elm spanworm and gypsy moth have been accidentally transported into, throughout, and out of the forest to other parts of the state and nation, on recreation vehicles as well as vehicles used to transport forest products.

The construction of forest roads may have a direct influence on the spread of forest diseases. Tree roots within or adjacent to new road corridors may be exposed or injured during road construction. Individual tree decline or mortality may occur, however the frequency of such occurrence does not appear to be widespread across the forest.

Wildlife

The cowbird, common grackle, and European starling are considered introduced pests that can have adverse impacts on wildlife. Roads can facilitate the introduction of the cowbird into a region, especially when roads facilitate the fragmentation and isolation of forest tracts, usually through development and agricultural systems. The effects of cowbirds in the analysis area are discussed under Section TW (1).

Mammals such as opossums, skunks, raccoons and porcupines utilize roads to move through the forest. These mammals often prey on birds nests located along the forest edge.

See AQ (13) for aquatic species.

EF (3) To what degree do the presence, type, and location of roads contribute to the control of insects, diseases, and parasites?

The pattern of disturbance related to insect, disease and parasites is somewhat sporadic and difficult to predict, both in terms of timing and locale. Response to these kinds of disturbances often needs to be immediate. Roads provide access for the recognition, sampling, monitoring, and treatment of insect and disease problems. In areas where there is no access, there would likely be a delay in identification of an outbreak, and increase in time and cost for sampling, monitoring and treatment of an insect or disease infestation, unless aerial detection and treatment were used. Even when aerial methods are used, ground survey validation and ground based support for treatment application is often needed. A transportation framework that provides reasonable access to most areas of the forest is needed in order for quick response to be able to be made. The physical presence of roads generally would not create a barrier that would affect (either delay or prevent) the spread of insect or disease outbreaks.

EF (4) How does the road system affect ecological disturbance regimes in the area?

The primary natural ecological disturbance regimes on the ANF include wind, insects and disease, and to a lesser extent mass wasting, fire and ice damage. Wind events occur most frequently and cause wide variation in the extent and intensity of change. High winds result in the blowdown of individual and small groups of trees on about 1% of the ANF annually (Runkle 1982). Tornadoes blew over large acreages of trees in 1808, 1870 and in 1985 (Bjorkbom and Larson 1977, Peterson and Pickett 1991). The road system would not be expected to affect disturbances from insect and diseases or ice damage. The road system would not affect winds from tornados or severe straight-line winds, but blowdown from straight-line winds could have some concentrated localized effects, particularly when adjacent to new road corridors cut through standing timber. Trees along these new corridors have possibly received damage to root systems during construction causing them to be susceptible to blowdown. Trees have developed a lack of wind firmness due to the support of surrounding trees, and after new road construction will have some compensating root development to do over time to increase wind firmness. The presence or absence of roads likely has no effect on the disturbance due to wind or ice glaze.

Road management policy has a significant influence on deer herd management. Road density allows easier entrance for hunters whether walking or by vehicle if the road is opened. Most roads in the restricted management category are opened for deer hunting season. The restricted road list is reviewed each year as a deer herd management tool. Thus, the road system helps reduce deer herbivory on the ANF.

The road system can increase the occurrences of mass wasting and rare erosion events, such as gullies, by changing “natural” soil, landform, and hydrological conditions (Dunne and Leopold 1978). Mass wasting is more prevalent in steeper terrain with high annual precipitation but it can still, and has, occurred on the Allegheny plateau (Pomeroy 1981; Pomeroy 1986). Road impacts on mass wasting and rare erosion events are further discussed in questions AQ2 and AQ3.

Fire, which plays a smaller role in disturbance regimes, would be affected by the presence of roads that could serve as a fire break, thus limiting the spread of disturbance across larger acreages. Wildfire has a low occurrence on the forest and prescribed fire is limited by the narrow window of time when suitable conditions are present, as a result less than 25 acres per year have been disturbed by wildfire over the past 5 years on the ANF. The road system increases access for both vehicular and pedestrian travel. With the increased access comes the increase in the possibility of wildfire due to carelessness with campfires or cigarettes. The road system does allow for increased or improved access to contain, extinguish and minimize the damage of wildfires.

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

General Perspective

Road construction can have a substantial effect on the environment, while later, the maintenance of roads may be minor. The use of forest roads depends on many factors, specifically on: the original purpose and need for the road, the ever-changing public need for access on any given day or season, current interest in an activity or destination, and condition of the road including the running surface and restrictions placed on access, meaning Forest Service administrative decisions to restrict with signs or gates. Consequently, the level of noise expected from a particular road is dependent on its use at any given period of time.

Roads, as part of developed recreation areas, tend to concentrate people, vehicles, and activities that increase noise levels near sites and may displace some wildlife species such as wild turkey during the breeding season (USDA-FS 1986b, pg. 4-10). Roads provide access to dispersed recreation areas such as trailheads for OHVs, overlooks, visitor information services, and parking areas for activities such as hunting and fishing (USDA-FS 1986b, pg. 4-12). Increased noise levels result from many dispersed recreation activities such as OHV use that may displace some wildlife species.

Road construction for a timber sale project typically involves the clearing of trees and soil disturbance with heavy equipment. Noise from jackhammers, chain saws, log skidders, bulldozers, graders and heavy truck traffic occurs in the initial stages of a 3 to 5-year sale contract. This noise is generally of short duration, usually one construction season or less. Wildlife desiring a quiet environment will be displaced during this period. After construction, if the road is open to traffic, noise is generated by vehicular use on the road (USDA-FS 1986b, pg. 4-35). Roads that remain open (and the traffic noise generated) can negatively affect wildlife due to easy access provided to the public (USDA-FS 1986b, pg. 4-36).

Road maintenance with heavy equipment occurs periodically throughout a sale contract as roads receive heavy equipment use or are brought up to specifications before the contract is complete. Noise levels may vary slightly by the size of equipment used and the number of machines running at any one time. Whether road construction or maintenance, the noise is local and short term but may displace some wildlife species (USDA-FS 1986b, pg. 4-21).

The effects of road construction and use on oil/gas leases are similar to that of timber sales with several exceptions. The noise produced on an oil lease is often increased during construction periods as road construction in water flood developments build roads that are often only 500 feet apart. Roads in oil leases facilitate the operation of drilling rigs and hydro-fracturing equipment which produce high intensity, high volume noise for a short duration. Generally, noise produced by well jacks on an oil lease is low intensity and intermittent but of long duration (USDA-FS 1986b, pg. 4-51). When production is peaking, road traffic and associated vehicle noise on water flood lease roads by company employees can equal or surpass public use levels on open forest roads.

On the ANF, pit development is an associated activity of road construction. Concentrated truck traffic, excavation, blasting and crushing create high intensity noise in the local area of a rock pit. This noise is typically intermittent, but of a long duration at sites scattered across the forest. Sites change as old pits are closed and new ones are opened. Wildlife requiring a quiet environment will be displaced.

Road construction during the breeding season is particularly disturbing to avian species. Nest abandonment during incubation or when young are in the nest occurs when construction activities and associated noise are near the nest (USDA-FS 1986b, pg. 4-53). Raptors, great blue herons, and wild turkeys are examples of avian nesting species affected by noise. Hibernating species such as black bears and bats can be adversely affected by noise. Disruption of hibernation can cause increase body metabolism and depletion of fat reserves (Belwood 1998, Pelton 1982). In severe cases, disruptions during hibernation have resulted in fetal absorption and death.

Noise associated with road construction, maintenance, and use may modify an animal's behavior, causing altered movement patterns. Adverse effects on wildlife varies with the intensity and duration of the disturbance and can range from short term avoidance of the area during construction and maintenance activities, to long term impacts such as shifts in home range and altered reproductive success. Long-term impacts are more likely to be associated with new road construction in relatively unroaded areas or along highways with heavy traffic. Noise produced by road improvement work, maintenance activities, or increases in traffic volume may have a greater adverse effect on wildlife on roads that are normally closed or gated. Many wildlife species have or are able to adapt and tolerate predictable noise along open forest roads and major highways.

The greatest increase in levels of road-related noise will occur where new roads are constructed, where the traffic service level of a road is improved and will facilitate the use of heavy equipment related to the proposed timber sale, where the amount and distribution of road improvement and maintenance is greatest, where the improved road conditions will facilitate a timber sale project of the greatest amount, distribution and duration (sale period) than other alternatives, additional maintenance will be required if traffic service levels increase, and where specific OGM management requires high density road systems for daily use. Even with no activities proposed in the project the potential for road-related noise exists because of the possibility of OGM lease expansion, including road construction and maintenance, by mineral owners. Road decommissioning, gating, and signs restricting access temporarily or permanently will have a long-term effect by reducing road-related noise.

Aquatic, Riparian Zone, and Water Quality (AQ)

Please note that the milages quoted in the AQ section are based on the Benefit /Risk analysis. These milages are based on a road segment basis, not the length that transcends a specific item. This means that they include additional milage that are not at risk. Thus a very conservative analysis was completed that overstates the risks of the road system for this section. Refer to Appendix A – Map19 for an example of how much this risk is overstated.

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

"Roads can affect the routing of water through a watershed by intercepting, concentrating, and diverting flows from their natural pathways. These changes in water routing can result in increases in peak flows by both a volumetric increase in quickflow and changes in the timing of runoff to streams (Wemple et al 1996)". (USDA Forest Service 1999)

It is likely that all roads on the Forest modify surface hydrology to some degree due to the nature of the road prism on the landscape. The loss of vegetation, compaction of the soil, and modification of the slope all contribute to changes in surface hydrology. These affects are mitigated to various degrees by the design of the road and condition of the road surface. For example, an insloped road would divert surface runoff to the inside of the road where it is concentrated for a given distance until it is diverted off the road prism, where an outsloped road would shed water off the road surface along its length. Condition of the road surface is notable as well since a well-vegetated road surface will typically shed water at a slower rate than a road without a vegetative cover due to increased roughness associated with vegetation.

Surface hydrology can also be modified where stream channels and swales are intercepted by the road system. In cases where culverts are not present to convey water down its original flow path, water is often diverted laterally in a road ditch and discharged in another location. Even where culverts do exist to pass flow, the hydrology of the drainage may be altered. For example, in instances where a grassy swale is drained through a culvert, flow is concentrated at the outlet and a channel is often cut where a swale once was.

Modification of subsurface flow, because of the road system, is largely dependent on road cut depth relative to the depth of permeable soil down to any restrictive rock or soil layer that promotes perched water tables or lateral movement of groundwater. Where the road cut does come in contact with a flow-restricting layer, subsurface flow can be intercepted by the road prism thus becoming surface runoff. At sites where road ditches are present, flow is concentrated and diverted from its natural subsurface pathway. The diverted water may percolate back into the soil in a new location, concentrate to form a new stream channel, or discharge into a neighboring drainage. In the latter case, the response of the receiving stream channel to the increase in flow is largely dependent on present stability and resiliency of the stream channel to erosion.

Soil permeability is an important factor to consider when determining the potential influence of a road system on surface and subsurface hydrology. Three soil groups have been identified on the ANF based on soil drainage characteristics. Soil groups II and III are of particular importance in identifying potential affects of groundwater interception since these soils are moderately and poorly drained, respectively, with layers restricting vertical water movement. These soils occur predominantly within draws and depressions, and on flat ridge tops. The roads analysis matrix estimates that almost 838 miles of road on the ANF have a "high" risk of modifying subsurface hydrology because these segments go through group III soils. Of these, 109 miles of road are maintained as ML 3, 4, and 5 roads. The distribution of these road segments over the Forest is variable, but with the greatest miles of road occurring in the Upper and Lower Clarion River Administrative Watersheds . Since the majority of roads that pose a "high" risk of modifying surface and subsurface hydrology are roads other than ML 3, 4, and 5 roads, it is important that roads analysis at the project level address the degree of road interaction with surface and subsurface hydrology on these roads.

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

Surface erosion can be generated from the roadbed, from the back or fill slope, and the area adjacent to the back and fill slopes. Accelerated erosion from the roadbed is typical; the prevalence of the erosion is dependent on the road surfacing, road grade, traffic volume, maintenance scheduling, and effectiveness and spacing of drainage structures (Gucinski *et al.* 2000).

Native surfaced roads often referred to as unsurfaced roads, generally have the most roadbed erosion because there is no surface to protect the soil particles from rain impact. Pit run, a crushed, partially weathered sandstone found near the surface on the ANF, is the second most erosive because the sandstone is easily broken down through vehicle traffic and natural weathering. Commercial gravel surfacing provides a good level of protection to the road surface from rain impact and moderate vehicle traffic. Harder limestone gravel surfacing provides even more protection from rain impact and heavy vehicle traffic. Generally, the addition of gravel, both commercial and limestone, increases the porosity and increases the hydraulic conductivity of the road, which decreases the runoff and associated erosion (Flerchinger and Watts 1987). Gravel also reduces the formation of ruts and reduces water flow path within the roadbed (Foltz and Truebe 1995). Overall properly sized and applied gravel has been shown to result in reductions in erosion of 79 to 97 percent over unprotected, unsurfaced roadbeds (Swift 1984; Burroughs *et al.* 1985; Kochenderfer and Helvey 1987). Paved roads rarely experience any erosion of the roadbed, but often direct high amounts of water off the road so that there is more erosion adjacent to the road. The type of surfacing on roads within the ANF proclaimation boundary is included in Table 5.

The more erodable a soil is the more the roadbed will benefit from gravel for reducing erosion. The level of erosion reduction from gravel, commercial or limestone, also depends on the size applied, the amount applied, and the erodability of the soil or other material the road is built on. Larger average size of gravel applied to the road will generally result in lower erosion rates, as will greater depths of gravel applied (Swift 1984). It is important to note that while helping to further reduce erosion, larger gravel is more expensive and can cause safety hazards for drivers.

Roadbed erosion primarily occurs through rainsplash movement and sheet erosion just as on exposed soils. Roadbeds erode more readily than typical exposed soils because they have lost soil structure due to extreme compaction (Froelich 1975). Rilling and gullying are also common erosion processes on roadbeds (Novotny and Olem 1994). Traffic volume on a given road, especially those with native, pit run, and gravel surfacing, can increase the erosion from the roadbed (Reid and Dunne 1984; Sullivan and Duncan 1981). Often heavy traffic volume is an indication to increase the durability of the road surface to limestone or pavement. Another solution to the issue of high traffic volume is to restrict traffic by closing or restricting travel on the road. The times for restriction are typically in the spring, but to provide for maximum benefit these roads are often gated throughout the year and only opened to the public during the fall hunting season to provide for improved hunter access. During the rest of the year Forest Service employees or land and mineral right owners are the only people allowed to use these roads in an effort to reduce vehicle traffic and associated increased erosion and rutting.

The steeper the road the greater the erosion potential from the roadbed (Elliot and Tysdal 1999). The steeper the slope perpendicular to the road the greater the fill slope erosion potential and potential erosion of adjacent areas from excess water draining off the road (Burroughs and King 1989; Soil Survey Staff 1999). Erosion of the fill slope can create unstable conditions in the roadbed or even gullies that extend into the roadbed. Back slope erosion is also greater on steeper slopes perpendicular to the road as runoff from land above the road or from subsurface flow intercepted by the road cut increases velocity on the often-exposed back slope soil. Runoff in the drainage ditch can also cause accelerated erosion if it is allowed to concentrate for great lengths (Burroughs and King 1989). Typically this erosion will occur in the drainage ditch itself, but it may extend into the roadbed or onto the fill slope and land down slope where the drainage ditch runoff is deposited (King 1979; Burroughs and King 1989).

Back and fill slopes often have exposed soil, the degree to which is dependent on the slope, soil type, amount of soil removed, and time since disturbance. Excessively steep road cuts, such as those along Highway 59 south of the Allegheny reservoir, may never revegetate and continue to erode at high rates. The exposed soil is easier to erode than vegetated soil or soil that has other ground cover that is effective in dissipating the rainsplash energy and reducing the velocity of sheet flow movement (Novotny and Olem 1994).

Road maintenance involving ditching and crowning of the road can cause short-term increases in roadbed and drainage ditch erosion as the armored, and sometimes vegetated, surface is displaced. A vegetated drainage ditch has been observed to produce only about 10-20 percent as much sediment as a freshly graded drainage ditch (Luce and Black 1999). Road construction produces the same high increase in short-term erosion as road maintenance, but also adds new long-term chronic increased levels of erosion (Megahan and Kidd 1972). The wider a newly constructed or maintained road is the more effect it will have on potential soil erosion.

Even though road maintenance can cause short-term increases in erosion and sedimentation it will typically reduce erosion in the long-term. Road maintenance can range from simple grading to ditching and crowning to adding gravel surface to improving road drainage to stabilizing back and fill slopes. Grading, while bringing up highly erodable fine soil material, can remove ruts, which if left alone would create long flow paths for carrying water that could erode and transport sediment for long distances (Elliot 2000). Ditching and crowning is a form of grading that also pulls sediment out of the drainage ditch along with any vegetation or armoring and incorporates it back into the roadbed. Adding gravel will also reduce rutting and reduce rainsplash erosion of the roadbed (Foltz and Truebe 1995). Gravel also allows a road to hold up better under heavy traffic volumes with less maintenance. Improved drainage will help to avoid concentrated water creating gullies on steep slopes (Weaver *et al.* 1995; Wemple *et al.* 1996) and place water in proper locations to avoid increasing the hazard of mass wasting (see AQ3). Drainage of the road can also help to deposit sediment-laden runoff onto low gradient, well-vegetated areas where the sediment can settle out before reaching the stream. Back and fill slopes stabilized with rip-rap, slash windrows, geotextiles, erosion mats, straw, etc. are more resistant to erosion and mass wasting (Burroughs and King 1989).

The beneficial effects of road maintenance discussed above are based on the assumption that the road is receiving some level of use. If a road is completely closed off to use it will usually stabilize on its own over time, but it can continue to be a chronic source of increased sediment (Elliot *et al.* 1996). Often stabilization of sediment inputs can take several decades so decommissioning, which will cause a short-term increase in erosion, is preferred. Decommissioning also has other benefits such as improved hydrological function, restored landform, improved slope stability, and reduced compaction. The decision to allow a closed road to stabilize over time or to decommission it must be site specific as a closed road can be a chronic source of sediment if left alone but sometimes decommissioning a road can create more erosion and sedimentation than it will save (Elliot *et al.* 1996; Elliot 2000).

There are 130,760 acres (17.7 % of the land area within the ANF proclaimation boundary) of soil in the Allegheny National Forest that have severe erosion potential (Cerutti 1985; Churchill 1987; Kopas 1993) (Appendix A – Map 15). Overall roads located on soils with high erosion potential pose an increased risk for surface erosion. There are 205 miles (30.3 %) of ML 1 and 2 road, 169 miles (28.8 %) of ML 3, 4, and 5 road, and 999 miles (31.3 %) of Private, other agency, State, and Township roads on high erosion potential soils wihtin the proclaimation boundary of the ANF. The percentage of road miles on severe erosion potential soils is higher than the percentage of land area with this designation. This is likely the case because most roads are built mid-slope in river valleys and this coincides with most areas of high erosion potential of the Forest. This does indicate that many roads are being constructed on steep slopes and the risk for erosion from the roadbed and fill slope is very high.

Erosion from a site can have localized detrimental effects to soil productivity, but if the eroded sediment reaches the stream it can have far reaching detrimental impacts to the stream system and the aquatic biota. Sediment in the streams can have additional detrimental impacts when a stream contains high quality fish habitat or serves as a drinking water source for a community. Important factors that influence the probability of eroded sediment getting into streams include proximity of the road to a stream and road crossings of a stream (see AQ4 and AQ6).

The primary opportunities to reduce road related surface erosion identified in a subforest scale roads analysis include:

- Increasing the number and effectiveness of drainage structures;
- Armoring drainage structure outlets;
- Improving the road surface by adding gravel, limestone, or paving it;
- Installing waterbars or broad-based drivable dips to divert water that could cause road erosion;
- Locate new roads and relocate current roads to reduce the road grade and slope perpendicular to the road
- Install erosion mitigations, such as mulch and windrowed slash, on exposed back and fill slopes.

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

The road system can increase the occurrences of landslides and mass wasting by changing "natural" soil and hillslope conditions in many ways (Dyrness 1967; Dunne and Leopold 1978).

- First, the road cut can intercept water moving laterally through the soil down the hillside.

Surface runoff and subsurface flow can be intercepted onto the road and drainage ditch under any soil/road configuration, but it is more likely to occur where a road goes through a wet soil (Dunne and Leopold 1978)(Appendix A – Map 16). These conditions may be occurring on 31 miles (4.6 %) of ML 1 and 2 road and 39 miles (6.6 %) of ML 3, 4, and 5 road, and 272 miles (8.6 %) of Private, other agency, State, and Township road that are through poorly drained (Cerutti 1985; Churchill 1987; Kopas 1993), group 3, soils. Interception of surface runoff and subsurface flow is of somewhat lower probability on 312 miles (46.1 %) of ML 1 and 2 road, 311 miles (52.6 %) of ML 3, 4, and 5 road, and 1641 miles (51.4 %) of Private, other agency, State, and Township road that are through moderately well drained, group 2 soils. This intercepted water along with other water draining from the road can add weight to the downhill soil and reduce friction holding the soil on the hillside (Dunne and Leopold 1978).

- Second, the added weight of the fill, and water within the fill, that is cast down slope from the creation of the road can also add weight to the soil and create conditions that could induce a landslide or slow soil creep (Dunne and Leopold 1978). Mass wasting caused by the weight of fill material is particularly common in this area of Pennsylvania due to steep slopes, weak geological layers, abundance of colluvial soil, and abundant spring seeps (Shultz 1999).
- Third, the road cut can be through soil and geological layers that are weaker, such as Devonian shale, and conditions similar to those found in a snow avalanche can be created where the hillside above the road cut fails causing a landslide or other form of slope movement (Robinson *et al*. 1972).
- Fourth, the road cut can create a very steep back slope on relatively unstable geological layers. While the cause is similar to landslides created by loss of a toe slope the effect is a rockfall from the back slope (Dunne and Leopold 1978; e.g. SR 59 near the Kinzua Dam). Rockfalls on SR 59 are relatively frequent and usually are deposited in the road or on the roadside. All four of the above-described effects of a road on mass wasting are amplified when a road is made wider as a wider road can intercept more water, adds more fill down slope, and creates a deeper and steeper back slope.

Access provided by roads for timber management, may result in higher soil moistures due to the lack of vegetation to take up water. The extra water adds weight to the soil and creates conditions for mass wasting. Also, the roots of the cut trees will begin to rot in several years during the period new trees begin to establish root systems. There is a "window of vulnerability" in which the old roots are partially decomposed and the new roots are not yet big and strong enough to hold the slope in place (Dunne and Leopold 1978). Access roads to timber harvest units can exacerbate the situation by creating any of the four situations for increasing risk to mass wasting described above.

There are 135,854 acres (18.4 % of the land area within the ANF proclaimation boundary) of soil in the Allegheny National Forest that have a high potential for mass wasting (USDA-FS 1986) (Appendix A – Map 17). High mass wasting potential is determined by overlaying soil map units that represent colluvial soils on top of surface geology with a shale component (Cerutti 1985; Churchill 1987; Kopas 1993). Every geological layer within the Allegheny National Forest has a high potential of having shale at the surface (Linda Houston, ANF Physical Science Program Manager, pers. comm., 01/28/03), so mass wasting risk will be determined using only colluvial soils. Mass wasting is common on colluvium throughout Pennsylvania (Shultz 1999). Overall, roads located on soils with high mass wasting potential pose an increased risk for landslides and other forms of mass wasting (Dunne and Leopold 1978). However, landslides and other forms of mass wasting are very rare on the ANF and are primarily caused by large rain events, such as Hurricane Agnes (Eschner and Patric 1982) There are 213 miles (31.5 %)

of ML 1 and 2 road, 256 miles (43.3 %) of ML 3, 4, and 5 road, and 1378 miles (43.2 %) of Private, other agency, State, and Township road on colluvial soils on top of shale in the Allegheny National Forest. These soils are highly prone to mass wasting due to low cohesion between soils and geology and low cohesion within the geological layers. Pomeroy (1986) mapped other areas around the Allegheny reservoir and river that had moderate to severe susceptibility to mass wasting. Steep slopes, consisting of much of the lower one-fourth to one-third part of the slopes in the Warren area, surrounding the reservoir and river are typically what was identified as susceptible to mass wasting and overlaps somewhat with colluvial soils contacting shale.

While not as dramatic, destructive, or frequent as landslides of the Pacific Northwest there are many areas of recent and past mass wasting evident in and around the forest. The majority of these areas are located around the reservoir or along the rivers. Researchers have not agreed on the cause of recent mass wasting. Some state that road construction and maintenance in this area has caused most recent soil movements (Pomeroy 1986). Others state that most recent landslides are caused or accelerated by rare precipitation events (Schultz 1999). Mapping of historic landslides throughout the Allegheny National Forest indicates that mass wasting can and has occured throughout the landscape.

There are 36 miles (5.3 %) of ML 1 and 2 road, 51 miles (8.6 %) of ML 3, 4, and 5 road, and 242 miles (7.6 %) of Private, other agency, State, and Township road on historic landslide areas (Appendix A – Map 18) identified by the USGS (Pomeroy 1981) and updated for the Allegheny National Forest (William Moriarity, retired ANF Terrestrial Ecologist, pers. comm., 01/07/2003). These areas are also prone to mass wasting as is evidenced by past events. Some of the larger known areas of mass wasting on, and around, the Forest are: adjacent to SR 62 from Buckaloons to Tionesta; many areas along FR 262, also known as Longhouse Scenic Byway including Dew Drop campground and Dutchman Run; slumping along FR 492 to Jakes Rocks; sloughing along FR 202; areas along to FR 122 from Red Bridge to Forest boundary; both above and below SR 59 on the south side of the Allegheny reservoir; and above and below SR 6, Dorcon Road, just south of Warren.

Mass wasting can cause detrimental increases in sedimentation to streams if the bottom end of a slump or landslide ends up in a stream or associated erosion of the material can easily enter the stream. The factors that influence sedimentation from mass wasting are similar to those stated in AQ2 and are expanded upon in AQ4 and AQ6. A mass-wasting event that deposits directly into a stream could decimate a population of fish by blocking access to habitat or even burying fish and/or their eggs.

The primary opportunities to reduce road-related mass wasting in a subforest scale roads analysis include:

- Build and relocate roads off of steep colluvial soils and historic landslides;
- Avoid cutting through weak geological, or soil, formations when building or maintaining a road;
- Build and relocate roads so that back and fill slopes will be minimized;
- Design proper road drainage to avoid too much excess water in a given area;

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

Roads can act as conduits for delivery of more water and sediment to the channel than it has naturally received and formed under, and thus can influence channel formation and water quality. Road-stream crossings are an important point of connection between the road and the natural drainage on the landscape.

A culvert can modify flow energy as streamflow moves from the channel to the pipe and into the channel again. Streamflow at a culvert that is too small to effectively pass flow produced by a runoff event or that becomes plugged by debris or sediment can exceed the culverts inlet capacity and result in overtopping of the inlet and thus a rise in water level on the fillslope. When doing so, the risk of fillslope failure and flow diversion out of the channel increases, as does the potential for erosion and sedimentation. When road crossings overtop and the crossing does not allow water to pass over the road fill and back into the channel below the crossing, flow can be diverted away from the crossing and down the road ditch or running surface. Thus, erosion can occur on the road prism and/or downslope of the road as it leaves the road. If this diverted flow were to travel down to a neighboring stream crossing then additional adverse impacts could occur at the crossing and in the receiving stream channel.

The Forest Service is required to size our culverts to pass flows of a 50 to 100-year return period in large stream, and flows of 25 to 50-year return periods for smaller streams (USFS 1994). On the ANF, all road/stream crossings are sized to pass at least a 50-year event without water backing up at the inlet (headwater depth to culvert diameter ratio of one). Other parameters considered in the design of a stream crossing are; matching channel width at bankfull, reducing diversion potential, and providing aquatic passage.

The greatest potential impact that roads have on water quality on the ANF is the production and delivery of sediment to the channel. The major source of sediment is derived from the running surface, since other portions of the road prism (cutslopes, fillslopes, and road ditches) are typically well vegetated and on stable slopes. Therefore, the type of road surfacing is important to reduce surface erosion and, where streams are near, sedimentation. The best type of surfacing would be one of dense vegetation that is not disturbed by vehicle traffic. These conditions do occur on the forest where roads are closed to public use.

Where roads are open and used by the public, a harder running surface is required to minimize water resource effects. On the ANF, roads are surfaced with native materials (considered unsurfaced), pit-run stone (a locally derived sandstone), commercial stone other than limestone, and limestone aggregate. Limestone surfacing and to a lesser extent the commercial stone, form a more durable and erosion resistant running surface than the native and pit-run types. The use of limestone for surfacing roads has been found to reduce sedimentation on the ANF (Trieu 1999).

The majority of the road crossings on the ANF are surfaced with pit-run type surfacing. Therefore, it is likely that sedimentation to stream channels on the Forest is occurring at moderate to high rates. Placing limestone at road-stream crossings alone could reduce sediment loads by 45 percent at each site (based on Trieu 1999). During project work, roads within 300 feet of a stream channel are typically being upgraded with limestone surfacing.

The sediment derived from the sandstone parent material does not have an impact on the acidity of the receiving waters, since this material is not acidic in nature. The relatively acidic conditions in the streams on the ANF are largely a result of relatively acidic precipitation falling on a landscape having a low buffering or neutralizing capacity.

The roads analysis matrix estimates that about 1,636 miles of road on the ANF have a “high” risk of influencing local stream channels and water quality due to pit-run type surfacing and the road’s proximity to a stream channel. Of these, 212 miles of road are maintained as ML 3, 4, and 5 roads. The highest concentration of these roads occurs within the Kinzua Creek Administrative Watershed with 22 percent of the total miles. Since the majority of roads that pose a “high” risk of influencing local stream channels and water quality due to pit-run type surfacing and the road’s proximity to a stream channel are roads other than ML 3, 4, and 5 roads, it is important that roads analysis at the project level address these roads.

Other concerns relative to water quality are in regard to the pollutants of chemicals, oil, and de-icing salts. Since the Maintenance Level 3, 4, and 5 roads are maintained annually and receive relatively high levels of traffic; the potential for these pollutants to enter the stream at the road/stream crossing is high relative to other roads. The potential impact of these pollutants on the aquatic environment is discussed in more detail in the AQ (5) question.

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

Roads on the ANF may create potential pollutants in several ways. Chemicals such as de-icing salts, surfacing oils, fertilizers, and herbicides are applied to roads for maintenance and safety. Roads also become contaminated by material from vehicles, including accumulation of small spills or from accidental spills of hazardous or harmful materials being transported over roads. Applied or spilled materials may have access to waterbodies, depending on road proximity to the waterbody. 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 (USDA-FS 1999).

Maintenance Level (ML) 3, 4, and 5 roads commonly occur in valley bottoms in many of the major stream channels on the Forest (along with State and Township roads), and therefore have a relatively high risk of contributing pollutants to the stream. In addition, these roads are the major collector roads on the Forest, and receive a higher level of traffic. Where these roads provide access to oil and gas operations, the risk of contamination to local waters increases. Many ML 3, 4, and 5 roads are also maintained in a drivable condition during the winter, but without the use of de-icing salts, thus contamination from de-icing salts is not a concern from Forest Service roads.

Based on Forest monitoring of road/stream connectivity, it is assumed that ML 3, 4, and 5 roads with the greatest risk of contributing pollutants to the stream channel are those within 300 feet of a watercourse (Appendix A – Map 19). Where the roads provide access to oil and gas developments the risk of contamination is considered to increase. The roads analysis matrix estimates that about 961 miles of road across the Forest have a “high” risk of stream contamination due to specifically, oil and gas operations and the road’s proximity to a stream channel. Of these, about 165 miles of road are maintained as ML 3, 4, and 5 roads. Several of these roads are within watersheds that contain streams classified by the State of Pennsylvania as high-quality coldwater fisheries and streams within municipal watersheds, thereby increasing the importance of reducing the risk of contamination. The highest concentration of “high” risk roads occurs within the Kinzua Creek and Upper Clarion River Administrative Watersheds with 23 and 14 percent of the total miles, respectively. Within the Big Mill Creek municipal watershed, Forest Roads 135, 143, and 170 are considered “high” risk roads, and require special attention to reduce the risk of contamination.

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 delivery of sediments, thermal increases, elevated peak flows)?

“Roads frequently generate Horton overland flow resulting from relatively impermeable running surfaces and cut-slopes. In addition, interception of interflow at cut-slopes can generate runoff by converting subsurface flows to surface flows. Where these surface flows are continuous between roads and streams, such as where inboard ditches convey road runoff to stream channels, the road generating or receiving the runoff is considered hydrologically connected to the stream network. Wherever a hydrologic connection exists, rapid runoff, sediments, and road-associated chemicals (for example, spills, oil) generated on the road surface and cut-slopes are provided an efficient route into the natural channel network.” (USDA Forest Service 1999)

Therefore, most roads alter natural drainage patterns to some degree. Whether or not the runoff pattern has an impact on water quality and quantity is a function of hydrologic connectivity or the connection between the road and the stream. The degree of hydrologic connectivity between roads and streams is estimated in this analysis by determining where roads and streams are close enough to interact. Interaction is assumed to occur and therefore the risk of hydrologic connectivity is considered "high" where road segments cross any stream channel either perennial or intermittent.

The roads analysis matrix estimates that about 762 miles of road across the Forest have a "high" risk of being "hydrologically connected" to the stream system due the road's proximity to a stream channel. Of these, about 138 miles of road are maintained as ML 3, 4, and 5 roads. The highest concentration of "high" risk roads occurs within the Kinzua Creek and Lower Tionesta Creek Administrative Watersheds with 27 and 15 percent of the total miles, respectively. Within the Lower Tionesta Creek watershed, the majority of these roads occur within the Salmon Creek drainage. Since a majority of roads that pose a "high" risk of being "hydrologically connected" to the stream system due the road's proximity to a stream channel are roads other than ML 3, 4, and 5 roads, it is important that roads analysis consider hydrologic connectivity at the project level where these roads would be addressed.

Where these "high" risk roads do occur, it is recommended that the connection between road and stream be evaluated at the project scale to reduce or eliminate connectivity where possible. By doing so, the potential for adverse impacts to the nearby stream channel and water quality would be reduced.

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?

"Water and waterbodies have a great many potential uses and benefits, and the distribution, value, and sensitivity of the beneficial uses often differs greatly from area to area. Identifying what values can be affected and making an assessment of the degree to which they are affected by roads is crucial to maintain or improve these uses." (USDA Forest Service 1999)

Beneficial uses are termed "Protected water uses" by Pennsylvania Department of Environmental Protection. Protected water uses were designated by Pennsylvania Department of Environmental Protection (PDEP, 2001) in 2001 for all state waters, including those on the ANF, are inclusive of the following: aquatic life; water supply for potable, industrial, livestock, wildlife, and irrigation uses; and the recreational uses of boating, fishing, water contact sports, and esthetics. In addition to these statewide protected water uses, water quality is to be maintained and protected at a higher standard that promotes an "exceptional value" or a " high quality" cold-water fishes in many of the streams on the ANF In these drainages, the watershed should be managed in a way that maintains and/or propagates fish species, as well as flora and fauna, which are indigenous to a cold-water habitat. There are no streams within the boundary of the Allegheny N. F. that are listed by the Pennsylvania Department of Environmental Protection as "water quality limited" as of the latest 303(d) (PDEP 1998) listing of stream channels impaired from meeting state water quality standards. The DEP has recently begun validation monitoring of many streams in the Upper Allegheny Subbasin, but until this information is made public, it is assumed that all protected water uses are currently supported.

Furthermore, within the Marilla Brook and West Branch Tunungwant Creek Subwatersheds (both in the Tunungwant Creek Watershed), and the Big Mill Creek Subwatershed (in the Upper Clarion River Watershed), water quality is to be maintained and protected to support municipal watersheds for the towns of Bradford, Pa. and Ridgway, Pa., respectively in addition to high quality cold-water fisheries. Other areas exist on the Forest where water from spring sources is used for human consumption under special use permits. These sites are scattered throughout the Forest and include small towns and individual houses.

Within the foreseeable future, there is not an expected change in the protected water uses within the Allegheny National Forest. It is assumed that the landscape will remain in its predominantly forested condition, where resource management will continue while maintaining or improving aquatic and riparian ecosystems. The demand on the existing water uses may change over time in the municipal watersheds as the demand for high quality drinking water change in the respective towns of Bradford and Ridgway. Additional changes may occur with an increase in pressure from recreational activities within the stream corridor, e.g. dispersed camping and fishing.

The potential for adverse affects on protected water uses from the road system may increase across the Forest as oil and gas development increases. This results from construction of low standard roads and the increase in road use associated with oil and gas operations. It is likely that new sources of chronic sediment would be created as well as a heightened risk of water contamination from an increase in these activities. Specifically at risk is the protected use of aquatic life and drinking water. Roads of particular concern are those that parallel streams and receive heavy use and roads with numerous stream crossings. Other activities such as road construction, timber haul, ATV use, deteriorating road conditions, and restoration work, may also create an increased risk to aquatic life to varying degrees where connectivity exists between the road and the stream channel. These activities can create new sources of road derived sediment that could affect the "maintenance and propagation of fish species including the family Salmonidae and additional flora and fauna which are indigenous to a cold-water habitat", as defined by the cold-water fishery designation in Pennsylvania Code, Chapter 93.

The roads analysis matrix estimates that 19 miles of road on the ANF have a "high" risk of impacting protected uses because these road segments are within 300 feet of a stream channel classified as an exceptional value (EV) fishery stream. Of these roads, about six miles of road are maintained as Maintenance Level 3, 4, and 5. These road segments occur only within the Tionesta Creek drainage, specifically within the West Branch Tionesta Creek (FR241), South Branch Tionesta Creek (FR264 and 133), and the Lower Tionesta Creek (FR127 and 145) Administrative Watersheds. Roads posing a "high" risk to drinking water include Forest Roads 135, 143, and 170 in the Big Mill Creek municipal watershed as discussed in AQ(5).

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

The road system can affect wetlands in two primary ways:

- Direct loss through filling and heavy sedimentation;
- Alteration of wetland type through changes in water levels and flow rates.

Depending on the location and type of wetland and road, a road can have many varying effects on a wetland and it's function. A road through or near a wetland can increase direct sedimentation, impede hydrologic function, fill in part of the wetland, cause a change to a non-wetland landtype due to changes in both hydrology and plant composition, and more. Sometimes a road can create a wet area, though not technically a wetland, by changing the hydrology and drainage of an area. Roads can also impact wildlife that depends on wetlands for habitat through fragmentation of habitat, increased mortality rates from vehicle collisions, and alteration of behavior and movement of wildlife. A road can also influence the spread of non-native species into a wetland.

There are 18,771 acres (2.5 % of the land area within the ANF proclaimation boundary) of inventoried wetland within the Allegheny National Forest (USDI-FWS 1977, 1983) (Appendix A – Map 20), which includes open water areas such as the Allegheny reservoir. There are 34 miles (5.0 %) of ML 1 and 2 road, 83 miles (14.0 %) of MLs 3, 4, and 5 road, and 407 miles (12.8 %) of OGM, State, and Township road that cross, or come within 300 feet, of the inventoried wetlands. Of these there are 7 miles (1.0 %) of ML 1 and 2 road, 6 miles (1.0 %) of ML 3, 4, and 5 road, and 77 miles (2.4 %) of Private, other agency, State, and Township road that cross an inventoried wetland. The percentage of road miles through an inventoried wetland is less than the land area in wetlands for all maintenance levels of Forest Service road, but is greater for non-Forest Service roads. On-the-ground layout of non-Forest Service roads is needed to help avoid wetlands. The US Fish and Wildlife Service (FWS) inventoried the wetlands as part of the National Wetland Inventory (NWI) using aerial photos. It is expected that, while the areas identified as wetlands in this inventory are truly wetlands or standing water, there are potentially many more acres of forested wetlands that exist. Wetland plant surveys were conducted in 1989, 2001, and are ongoing in Elk County.

There are 33,724 acres (4.6 % of the land area within the ANF proclaimation boundary) of hydric soils on the Forest (Cerutti 1985; Churchill 1987; Kopas 1993; Soil Survey Staff 1999) (Appendix A – Map 21). There are 38 miles (5.6 %) of ML 1 and 2 road, 62 miles (10.5 %) of ML 3, 4, and 5 road, and 412 miles (12.9 %) of OGM, State, and Township road within hydric soil map units. As with inventoried wetlands on the ground layout is important, especially within hydric soil map units to avoid negatively impacting wetlands. There is a high potential for wetlands within these soil map units. As such there is a potential for roads to impact wetlands within these soil map units.

When found, wetlands are avoided in road construction unless there is no "practicable alternative" (USDA-FS 1986; Carter 1977). Due to the complexity of a wetland, mitigation of road impacts is very costly and has varying degrees of effectiveness. Recommended alterations to road construction near and through a wetland include vegetated buffers between the road and the wetland, water flow structures under and through the road, elevating the road, incorporating wildlife tunnels and associated drift fencing to aid in movement and migration, and restricting road use and speed of travel during the breeding season (may be fall or spring).

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, and provide physical structure and diverse aquatic habitat to the stream 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, constrict channel migration, and simplify riparian and aquatic habitat. In some places, road encroachment can divert streamflow to the opposite bank, thereby destabilizing the hillslope and resulting in increased landsliding." (USDA Forest Service 1999)

Road encroachment on stream channels and their adjacent floodplains is considered likely where roads are located on "floodplain" ecological landtypes (ELT). Of all the roads on the ANF (including State and Township), about 302 miles are located on the floodplain landtype. Of these roads, 34 miles of road are maintained as Maintenance Level (ML) 3, 4, and 5 roads. The distribution of these road segments over the Forest is variable, but with the greatest miles of road occurring in the West Branch Clarion River and Lower Clarion River Administrative Watersheds.

Road-stream crossings are locations where the movement of large wood, fine organic matter, and sediment are often modified. Fills within the floodplain typically characterize road-stream crossings and culverts that can constrict flood flows. During flood events when flows inundate the floodplain, a road crossing typically creates a "bottle neck" condition and a temporary impoundment as the water funnels through the culvert or bridge opening. During these situations, streamflow is slowed upstream of the crossing and the potential for deposition of entrained material increases, thereby reducing the likelihood of downstream transport. As a result, channel-forming processes can be altered. Sites of particular concern include those road crossings on the larger stream channels since these streams have greater flows, greater amounts of entrained material, and more floodplain area. On streams where multiple road crossings occur over a relatively short distance the likelihood of channel modification because of road crossings increases.

The ML 3, 4, and 5 road network near Hoffman Run, within the West Branch Clarion River administrative watershed, crosses through the floodplain landtype and across the channel up to eight times (Table 12). It is recommended that the road network within the Hoffman Run drainage be considered for relocation to reduce the number of road stream crossings that inhibit floodplain function. Also, since a majority of roads that pose a "high" risk of altering physical channel dynamics are roads other than ML 3, 4, and 5 roads, it is important that roads analysis consider these other roads at the project level.

Table 12. Maintenance Levels 3, 4, and 5 roads that cross the floodplain landtypes on the Allegheny National Forest by Administrative Watersheds, 2003.

Administrative Watersheds & HUC *	# of road/flood-plain landtype crossings	Forest Road number & stream(s) crossed
Brokenstraw Creek (5010001280)	0	
Kinzua Cr. (5010001215)	5	122 (Whiting Run), 321 (Meade Run), 150 (Kinzua Creek), 457 (Meade Run), & 313 (Trib. to Kinzua Cr.)
Lower Clarion R. (5010005065)	6	228 (Gurgling Run & E. Branch Millstone Creek), 131 (Muddy Fork, Lick Run, Trib. to E. Br. Millstone Cr., & Log Run)
Lower Tionesta Cr. (5010003045)	3	145 (Trib. to Salmon Creek, Fourmile Run, & Little Salmon Creek)
N. Allegheny Front (5010001225)	1	156 (Morrison Run)
Reservoir (5010001220)	1	602 (Willow Creek)
S. Allegheny Front (upper) (5010003010)	0	
S. Allegheny Front (lower) (5010003015)	3	119 (E. Hickory Creek), 209 (Piney Run), & 680 (Queen Creek)
S. Br. Tionesta Cr. (5010003020)	4	126 (E. Branch Tionesta Creek), 133 (E. Branch Tionesta Creek), 148 (S. Branch Tionesta Creek), & 152 (Coon Run)
Spring Cr. (5010005050)	5	108 (Wolf Run), 124 (Spring Creek), 130 (Spring Creek & Steep Run), & 661 (Hunter Creek)
Tunungwant Cr (5010001140)	0	
Upper Clarion R. (5010005060)	4	135 (Bear Creek & Big Mill Creek), 143 (Red Mill Run), & 339 (Bear Creek)
Upper Tionesta Cr. (5010003040)	1	116 (Trib. to Bobb's Creek)
W. Br. Clarion R.	8	123, 191, 290, & 332 (all in Hoffman Run or tributaries to

Administrative Watersheds & HUC *	# of road/flood-plain landtype crossings	Forest Road number & stream(s) crossed
(5010005020)		Hoffman Run)
W. Br. Tionesta Cr. (5010003030)	2	244 & 154 (Farnsworth Branch)

* HUC – Hydrologic Unit Code

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

Road systems can restrict the movement of aquatic organisms in streams on the ANF. Where a road crosses a stream, the most common crossing method is with a round corrugated culvert. This is because these are the least expensive and are the easiest to install. Other pipes that can restrict movement are squashed pipes and box culverts.

How: Several things can restrict the movement of a variety of species. First, and the most common, is the pipe is elevated above the channel at the outlet end making it difficult or impossible for all or some species to move upstream. Secondly, a round pipe concentrates flow in a long narrow flowpath without velocity breaks, thus becoming a velocity barrier during higher runoff events. Third, inadequate water depth can prevent the movement through a pipe during low flow periods. This is more prone to happen with a squashed pipe or a box culvert. And last, the length and slope of the pipe can prevent upstream movement during all flow periods.

Where: This part of the question will be answered more thoroughly during project analysis and site-specific surveys of crossings. The ANF will also be conducting a forest-scale inventory of stream crossings beginning in 2003 to assess migrational conditions imposed by the type of crossing being surveyed.

What: A variety of aquatic species can be affected by an impassable crossing. Trout receive the highest amount of attention because of their life history requirements. On the ANF, trout seek out habitat for spawning, rearing, feeding, and cover in headwater streams. Because of their size and location, these headwater streams are typically crossed by a road with a culvert. Adult trout, because of their ability to jump, can sometimes navigate through an elevated pipe. However, many non-game fishes do not have this ability and would have their upstream movement restricted.

The effects to aquatic insects are not so well known because of the lack of information in this area. According to Vaughan (2002) in his review of literature and discussions with experts in the field of aquatic insects, the effects of culverts on the upstream passage of stream insect populations would be localized. Most upstream movement of nymphs and larvae occurs over relatively short distances (<300 m). If upstream movement is restricted by an elevated pipe, upstream reaches will likely be colonized by aerially dispersing adults.

Crayfish are a common inhabitant to streams on the ANF, including headwater streams. Many species of crayfish migrate upstream or across land to colonize new habitat. However, for obligate stream species that are typically found in high-gradient, well-oxygenated streams (like that found on the ANF), elevated culverts are likely to obstruct movement upstream (Cooper in Vaughn 2002). Several experts note that many crayfish species are capable of traveling across land, over roads (Cooper and Braswell in Vaughn 2002), or up and over the sides of dams (Cooper, Hobbs, Schofield in Vaughn 2002).

Figure 5. Illustrates an open bottom arch culvert that maintains the natural substrate, and allows for passage of all aquatic species.

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

Road systems can affect shading, litterfall, and riparian plant communities along streams. The effects from roads are dependent on slope, aspect, and proximity to a stream. Most roads on the forest that parallel a stream have forested vegetation growing between the two, thus providing shade and litterfall to the stream. The road system however could affect riparian communities by providing a conduit for the introduction of invasive species. The road system can also affect riparian vegetation by altering flowpaths of springs and underground water sources.

This question will be more thoroughly addressed during project analysis with site-specific data collection.

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

At-risk aquatic species include seven fish, nine Odonates (Dragonflies and Damselflies), and three species of mussels. The fish species include five darters, one chub, and a lamprey.

How: The road system does not contribute to the fishing or poaching of these fish because they are non-game fish and are not sought after. However, anglers who catch their own bait-fish could mistakenly collect one or more of these fish. The same is true for the Odonates. They are not sought after except they may be mistakenly collected for fish bait. As for the mussels, these species mostly inhabit the larger streams and rivers. As is the case with the fish and Odonates, mussels are usually not sought after.

Roads generally do not cause a direct habitat loss, but instead may affect habitat indirectly from sediment-laden runoff and increased flows. Another indirect affect may come from an impassible culvert to an area above the pipe that was depopulated from an event such as the channel drying up.

Where: Forest roads located in the Tionesta Creek watershed provide access to longhead darter, longsolid mussel, and several odonate populations. However, Tionesta Creek is primarily accessed by State Rt. 666 that parallels much of its length, as well as some private roads. Most of the fish and mussel species inhabit the Allegheny River, where access is primarily by roads other than the Forest Service.

The Regional Forester Sensitive Species (RFSS) odonates are widely spread across the forest. Forest system roads access watersheds or subwatersheds where at least one of the nine odonates has been documented. These include Tionesta Creek, S. Br. Tionesta Cr., W. Br. Tionesta Cr., E. Br. Tionesta Cr., Salmon Creek, Minister Creek, Kinzua Creek, S. Br. Kinzua Cr., Sugar Run, and E. Hickory Cr.

This portion of the question will be answered more thoroughly at the project level with more site-specific information.

AQ (13) How and where does the road system facilitate the introduction of non-native aquatic species?

How: Road systems that are open to public traffic and lead to a body of water or stream provide an avenue for the potential introduction of non-native species. The introduction could occur from boats that have previously been in infested waters, and then launching into a body of water on the ANF. Also, roads leading to streams or rivers provide the avenue for anglers using live bait (which may include invasive species) to release any unused bait into these waters.

Where: For waterbodies, the main concern is with the Allegheny Reservoir where thousands of boats are launched each season. Many boats come from waters infested with non-natives such as zebra mussels, quagga mussel, round goby, spiny water flea, rusty crayfish, Eurasian watermilfoil, hydrilla, purple loosestrife, and others.

Many of the cold-water headwater streams, do not provide the required habitat and water quality conditions for the survival of these species. The larger streams and rivers, do. These include Tionesta Creek, Allegheny River, and the Clarion River. Most of the access along these waterways is by roads other than Forest Service.

This portion of the question will be answered more thoroughly at the project level with more site-specific information.

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?

For fish, the Pennsyvania Fish and Boat Commission (PFBC) classifies streams based on biomass (productivity). Class A is the highest classification given to trout streams. On the ANF, two streams have this designation. They are Lewis Run and Fourmile Run (tributary to W. Br. Tionesta Cr.). Forest roads are present in the Fourmile Run watersheds, with FR 259 crossing the headwaters and FR 365 leading to a section of the stream. Lewis Run, on the other hand, has few Forest Service roads, but has numerous oil and gas roads. Other streams meet the criteria for Class A, but first have to be verified by the PFBC. These are streams that were surveyed by others, and not PFBC.

Several RFSS are found in Tionesta Creek. These include several species of Odonates, the longsolid mussel, and the longhead darter. The primary overlap by roads is by State Rt. 666 that parallels it for much of its length. Numerous Forest Service roads lead off State Rt. 666.

The odonates on the RFSS list are widely spread across the forest. Forest system roads access watersheds or subwatersheds where at least one of the nine odonates has been documented. These include Tionesta Creek, S. Br. Tionesta Cr., W. Br. Tionesta Cr., E. Br. Tionesta Cr., Salmon Creek, Minister Creek, Kinzua Creek, S. Br. Kinzua Cr., Sugar Run, and E. Hickory Cr.

Mussels in the Allegheny River are not overlapped by Forest Service roads. The river is paralleled and crossed by state roads along much of its length. Some Forest Service roads do lead off from these state routes.

This question will be answered more thoroughly at the project level with more site-specific information.

AQ (15) Where do roads provide access to fishable waters? What are the benefits and risks associated with these roads? (Question added by ANF)

This question will be answered more thoroughly at the project level, where more site-specific information can be collected and analyzed. Opportunities for improvement of the existing road or the possible decommissioning of roads will be evaluated at that time. In general though, roads that are open to the public and parallel or cross a stream provide access. In addition, the Allegheny Reservoir has numerous boat launches, some more suitable for smaller watercraft (i.e. Sugar Run, Dunkle Corner, and even Roper Hollow because of access) and some that can handle larger watercraft. Many of the risks have been answered in the above questions in a general way, but the benefits of the road as well as any more site-specific risks will be evaluated at the project level.

Terrestrial Wildlife (TW)

TW (1) What are the direct effects of the road system on terrestrial species habitat?

General

Roads directly affect terrestrial species habitat by altering physical habitat conditions (habitat fragmentation), by increasing contamination of pollutants (sediment, salt etc.), and by facilitating the spread of exotic species. Effects from exotics and possible contamination by pollutants are discussed under EF(2) and AQ (2). Roads built to higher standards and open to the public have a greater potential to produce these effects than roads built to accommodate a specific function, generally built to a lesser standard, and closed or restricted to the public.

Establishment of a roadbed during new road construction can directly affect wildlife by converting existing forested habitat to non-forest conditions, or through the establishment of an herbaceous ROW, which can fragment a forested environment and potentially alter wildlife species composition and diversity. The effects of resulting habitat fragmentation on wildlife depends on the size and type of road and ROW, the distribution of forested habitat, the sensitivity of a particular species to roads, and the ease with which a species can cross the road. Species whose habitat is most directly affected by habitat fragmentation from roads include interior wildlife species, and less mobile species with small home ranges that are bisected by roads.

Due to different intensities of oil and gas development, road density varies considerably across the National Forest. Because road density varies, potential effects to wildlife habitat also vary.

Eight physical characteristics of the environment are altered by roads; soil density, temperature, soil moisture, light, dust, surface water flow, pattern of runoff, and sedimentation.

Long-term road use leads to soil compaction that can persist for decades even after use is discontinued. With water vapor transport reduced on a road with a hard surface, compared to bare soil, temperature increases occur. Heat stored on the road surface is released at night, creating heat islands around roads. Moisture content of soils under roads declines in response to changes in soil porosity. Roads increase the amount of light reaching the forest floor. The amount of light depends on how much of the original canopy and lower strata remain as well as the road width. The result is a change in forested habitat conditions along a linear area. Species that prefer mid to late successional forested habitat with deep soils may be adversely impacted. Early-succession, disturbance adapted, higher light level preferring species may take advantage of these conditions (Trombulak and Frissell 2000, pg. 21).

Road traffic mobilizes and spreads dust that can block photosynthesis, respiration, transpiration and cause physical injuries to plants. Dust can serve as a source of fine sediments, nutrients and contaminants to aquatic ecosystems. Roads and bridges can alter the development of shorelines, stream channels, floodplains, and wetlands. Roads on floodplains can redirect water, sediment and nutrients between streams and wetlands and their riparian ecosystems. Along rivers with forested floodplains roads can impair natural habitat development and woody debris dynamics (Trombulak and Frissell 2000, pg. 22).

Road related sedimentation affecting wildlife habitat is more likely to occur on non-system roads. Many of these roads are currently in use, occur on steep slopes, or are in close proximity of streams. These roads were often established before state standards and require monitoring. Restricting access to lower standard (lease) roads helps to curb sedimentation but additional investments must be considered to maintain or improve these roads to ultimately reduce the potential of long-term sediment loading. The consequences of sediment delivery are often a long lasting and cumulative adverse impact to habitat quality.

By altering surface flows, roads can create or damage wetlands (Trombulak and Frissell 2000, pg. 22). Results of research by Findlay and Bourdages, as part of a presentation by J. Hassinger (Hassinger 2000), PGC, at the 2000 PA Wildlife Society meeting, provides evidence that the full effects of road construction on wetland bio-diversity may be unpredictable in some taxa for decades. Such a lag in response to changes has important implications in land-use planning and environmental assessment.

Effect to songbirds

Interior songbirds are the group of species considered at risk from fragmentation directly associated with roads. Considering this, the ANF set up four breeding bird monitoring transects in areas that had been intensively developed for oil and gas. These sites were characterized by higher road densities, had a greater density of openings and are considered some of the most fragmented areas on the Forest. Since 1993, breeding bird data has been collected at these sites, as well as 49 other sites across the forest that are in close proximity to roads (within ¼ mile).

Although these intensively roaded areas are fragmented by many narrow road corridors, breeding bird diversity in these areas does not appear to be significantly affected. This is due primarily to the predominantly forested nature of these areas, which helps reduce edge related effects and allows for the continued availability of interior bird habitat. For example nest parasitism by the brown-headed cowbird, which invades fragmented forests from adjacent farmland or other non-forested habitat, is a well documented effect of fragmentation associated with roads. However out of over 8000 breeding bird observations on the Forest since 1993, fewer than 15 cowbirds have been documented (Dave DeCalesta, personal communication). This is supported by other research in the Northeast (Giocomo and Brittingham 1998), which indicates that effects of fragmentation such as brood parasitism and nest predation may not occur or may be reduced in forested areas, when compared to landscapes that are not predominantly forested.

In summary, due to the small size of most road corridors, the predominantly forested nature of the landscape, the availability of interior bird habitat, and based on Forest-wide monitoring of breeding birds from similarly roaded areas, the existing road system is not expected to significantly affect breeding bird habitat. Some highly roaded areas (usually associated with high oil and gas development) may degrade habitat quality for some songbirds.

Chemical effects of roads on wildlife habitat

Maintenance and use of roads can contribute at least five chemical groups to the environment including: heavy metals, salt, organic molecules, ozone and nutrients. Heavy metals are derived from gasoline additives. Heavy metal contaminations in forest environments are directly related to the amount of traffic. The heaviest concentrations of heavy metals occur in soils, plants, and animals closest to the road. Heavy metal accumulations are usually localized in the soil, although concentrations in soils have declined over time with the reduction of leaded gasoline and runoff has transported metals away. Also, metals can accumulate in the tissues of plants. Deicing salts contribute ions to the soil, altering pH and the soil composition. Organic pollutants such as dioxins and polychlorinated biphenyls are present in higher concentrations along roads. Vehicles produce ozone, concentrated particularly in areas where exhaust accumulates. Water moving on and along roadsides can be charged with high levels of dissolved nitrogen, and sediment carries a phosphorus subsidy when it reaches surface waters. Deicing salts are an additional source of phosphorus. Alteration in the chemical environment along roads results in; changes in the chemical composition of some woody plants in response to pollution, organisms possibly will be killed or displaced by a chemical exposure, growth and health of plants possibly being depressed often resulting in decreased resistance to pathogens, plants could accumulate toxins that pose a threat to consuming organisms, and increased concentrations of some pollutants, such as salt, often attract mammals, putting them more at risk of being killed by vehicles (Trombulak and Frissell 2000, pg. 23 and 24). These impacts usually occur on the highest maintenance level roads.

Replacement/alteration of habitat

Roads directly affect terrestrial species habitat by replacing the existing physical habitat with a linear, non-forest condition. Road construction kills any sessile or slow moving animals in the path and often immediate to the path of the road (Trombulak and Frissell 2000, pg. 19). New construction removes wooded habitat and native ground vegetation, fragments present forest canopy, and creates edge habitat. Lost forested habitat can result in the loss of mast producing trees and shrubs, conifer cover important for summer and winter thermal and hiding cover, brood habitat, den trees, and snags – a general decline in forest habitat quality.

Positive effects can occur for species that utilize the herbaceous vegetation created along the ROW, or in the case of low-standard re-vegetated roads, on the roadbed itself,. Due to the scarcity of openings in much of the ANF, low standard roads that are closed or receive little use are frequently used for brood habitat by turkey, as well as other forested wildlife species that require or prefer a small non-forested habitat component. Road management is an important factor when considering potential benefits of roads to species such as turkey. For example turkey hens in North Carolina nested near closed and gated logging roads and used them extensively in all stages of brood development (Davis 1992 *in* Roads: Science Synthesis 2000).

Effects of roads on wildlife movements

Movements of some wildlife may be restricted by roads. Salamanders are a group of species whose movements can be altered by roads, particularly if a road cuts through a traditional migratory pathway between wintering habitat and spring breeding ponds. Small mammals such as mice and chipmunks may alter their feeding movements because of roads. During the first year of an experimental fisher release on the ANF, 4 fishers were killed on paved highways while moving to establish home ranges and breeding territories. However, most existing roads on the ANF are relatively narrow, have low traffic levles, and do not isolate critical or unique wildlife habitats. As a result, effects to wildlife movements are mostly minor and localized.

However direct effects to wildlife movements can be reduced, by seasonally restricting road use and/or by allowing vegetation to become established on the roadbed in some areas.

Beneficial wildlife uses of road surfaces and materials

Sources of moisture and minerals provided by the surface of forest roads meets the needs of many organisms, including insects such as the red spotted purple, tiger swallowtail and spring azure. These sites also serve as areas of species interaction. Song sparrows and robins use the wet and dry areas of forest roads for grooming, i.e., bathing and dusting. Roads not only provide habitat for bugging (collecting food), but road material, such as grit, aid some species like the ruffed grouse and wild turkey in digestion. As previously mentioned, roads are often sources of salts and minerals desired by mammals such as white-tailed deer and porcupine.

Beneficial uses of forest roads by wildlife

Forest roads play important roles in the life cycles of many organisms. Ruffed grouse have been observed using forest roads to establish territorial boundaries. Porcupine and red fox use roads to escape from danger or provide easy movement throughout their territory. The ditches and catch basins of roads provide reproductive habitat for amphibians such as the green frog, wood frog and red-spotted newt. Materials, such as topsoil, stumps, and other large woody debris cleared during road construction, are utilized by ground nesting birds like the dark-eyed junco and by another common terrestrial species, the redback salamander. Running surfaces of forest roads provide the foraging habitat of insects, like the tiger beetle, band-winged grasshopper, and antlions. Heat from road surfaces become attractive basking areas for the eastern garter snake and wood turtle. Black bear often use the cool, moist, herbaceous vegetation growing on forest roads as resting sites, but are able to remain alert to danger by taking advantage of breezes funneled through road corridors. Limestone gravel forest roads near ANF waterfowl impoundments have been successfully used as nesting habitat by killdeer.

Wildlife food sources provided by roads

Scavenger species, like the raven, crow and turkey vulture have adapted to and become dependent on road corridors for sources of food. With their abundance of perching sites, raptors such as the broad-winged hawk use road corridors as foraging areas. Forest edge habitat created by forest roads provides habitat for the insect prey sought after by song sparrows, indigo buntings and a variety of bats including the Indiana bat and northern long-eared bat.

Wildlife structures provided by roads

Bridges and other structures commonly associated with roads provide roosting cover and nesting habitat for bats and swallows. At least 2 large bat roosting sites are known to occur under brdges on the ANF. Culvert pipes provide escape routes for mammals like the woodchuck and raccoon. Beaver frequently create wetland habitat by plugging road drainage structures.

TW (2) How does the road system facilitate human activities that affect habitat?

Increased human use, facilitated by roads, may result in diverse and persistent ecological effects. Historically roads have opened the way to settlement and the conversion of forests to agricultural lands

(Hunter 1990, p. 257-258). New roads increase the ease of human access into formerly remote areas. As a result, roads increase the efficiency with which natural resources can be exported and may increase changes in the use of land and water. Roads built into remote areas have promoted logging, agriculture, mining and the development of homes, industry, or commercial projects. Such changes in wildlife habitat can have major and persistent adverse effects on native flora and fauna of terrestrial systems and freshwater ecosystems. Studies across the US have correlated the declines in wetland species diversity to increasing road densities and their cumulative effects. It appears roads can serve as an indicator of the magntude of land-use changes (Trombulak and Frissell 2000, pg. 24-25).

The primary activities facilitated by the existing road system include oil and gas development and maintenance, dispersed recreation in the form of hunting, fishing, camping, and collection of firewood, illegal OHV use and vegetation manipulation. Effects on wildlife habitat that occur as a result of these activities include; changes in wildlife habitat conditions resulting vegetation manipulation; direct habitat loss from oil and gas activity; loss of standing and downed woody debris due to firewood collection; increased sedimentation due to road use and maintenance, sedimentation and damage to vegetation resulting from illegal OHV use; and, point source pollution from trash dumping.

Due to the number of acres treated, timber harvest has a high potential to alter wildlife habitat conditions, both positively and negatively. However since 1986, timber harvest has been driven by Forest Plan (USDA-FS 1986) direction. Objectives and Desired Future Conditions identified in the Plan include providing a mix of habitat conditions designed to meet wildlife needs, as well as guidelines to protect or enhance unique and sensitive wildlife habitat. Additionally, vegetative manipulation is used to meet Forest Plan, as well as site specific wildlife objectives and as a result, timber harvest is used to enhance wildlife habitat conditions that otherwise would be unavailable or scarce. Other activities that promote or improve wildlife habitat and utilize portions of the existing road system include opening maintenance, wildlife habitat improvement work and wildlife and vegetation monitoring.

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?

In addition to effects on wildlife habitat described under TW (1 & 2), many road-related activities also have direct effects on wildlife. Direct mortality from collisions with vehicles is well documented. In general, mortality increases with traffic volume and impacts will be greatest from paved roads. However, all species are at risk and some species may be attracted to lower standard roads due to the desirable vegetative cover established in a ROW or will be attracted to the roadbed itself to bask or collect gravel or seeds. Amphibians may be especially vulnerable to road kill because their life histories often involve migration between wetland and upland habitats and because individuals are inconspicuous and slow moving. While there is some mortality associated with non-system and open system roads, due to the low level of daily use, road related mortality is considered minor.

The presence of a road may also modify an animal's behavior either positively or negatively. This can occur through shifts in home range, altered movement patterns and altered reproductive success. The effects will vary depending on road density, the road location, the level and season of use, the types of habitats traversed, the species involved and the status of populations in the surrounding area. Effects will be greatest from roads that traverse or isolate critical or specialized habitats, where the level of activity is high enough to displace species sensitive to disturbance, and from roads that alter an animal's behavior to the extent that reproductive success is affected. Roads can also contribute toward fragmentation of populations where modification of behavior makes the animals less likely to cross roads.

When evaluating behavior related effects to wildlife, the size and type of road, as well as the level and season of use are considerations. For example, in a telemetry study of black bear movements, bears almost never crossed interstate highways, and they crossed roads with little traffic more frequently than those with high traffic volume (Brody and Pelton 1989 *in* Roads: Science Synthesis 2000). Due to the small size and infrequent daily use, behavioral effects to large predators from most forest roads are expected to be insignificant and both bear and bobcat have been observed crossing Forest and non-Forest system roads with young-of-the-year, indicating these types of roads are not significantly restricting their movement.

The Forest Plan recognized that road related disturbance could potentially have adverse effects on wildlife and includes standards and guidelines to reduce effects to select wildlife. Species most at risk from disturbance associated with roads include several Forest Species of Special Concern (Great Blue Heron, Red-Shouldered Hawk, Goshawk, Coopers Hawk), Management Emphasis Species (turkey and bear) and some Management Indicator Species (Red-Shouldered Hawk, Rattlesnake). Habitat for the above species, as well as effectiveness of Forest Plan Standards and Guidelines to protect their habitat has been monitored on the Forest since 1990. Based on this monitoring data, Forest Plan standards and guidelines have been effective at reducing road related impacts. Forestwide, the viability of these species remains intact although road densities in some areas may have impacted the habitat suitability for goshawks and timber rattlesnakes because of the increased traffic levels and human activity (USDA-FS 2000b).

A road system can also facilitate activities such as poaching, trapping and hunting, which result in direct mortality to wildlife. In terms of access, the open road system on the ANF has not changed significantly within the last two decades. Additionally, populations of furbearers such as beaver, fox and bobcat appear to be stable or increasing. As a result, direct mortality to wildlife resulting from poaching and trapping is considered insignificant.

While over-hunting can have impacts on game populations, on the ANF hunting is considered the most important management tool available for controlling deer populations. Decades of over-browsing by deer have greatly impacted vegetation and associated wildlife communities. As a result, maintaining a road system that increases deer hunter access is essential to reducing and maintaining deer populations at a level that will allow establishment of understory vegetation and minimize short and long-term vegetative and wildlife impacts. Although harvest levels of other high interest game species such as turkey and bear fluctuate from year to year, populations of these species have remained relatively unchanged and there are no significant adverse effects from hunting anticipated.

The Forest Plan calls for 20 percent of the Forest Service road system to be open for public vehicle use; 60 percent closed; and another 20 percent with restricted use. Currently, 36 percent of the roads are open, 30 percent are restricted, and 34 percent are closed.

TW (4) How does the road system directly affect unique communities or special features in the area?

In addition to direct effects on wildlife species, roads many have both direct and indirect effects on rare communities and special habitat features. Uncommon or unique habitats and the associated wildlife communities include wetlands (described under AQ (8)), riparian communities, key wildlife winter range, and breeding habitat. Special features include rock outcroppings or caves, vernal or seasonal ponds, spring seeps, and raptor nest sites.

Streamside habitat and the adjacent riparian zone add greatly to the wildlife habitat diversity found on the Allegheny NF. Riparian and streamside habitat, as well as the ground vegetation associated with wetlands, are particularly important and provide habitat for a variety of wildlife species. Additionally, although lands with special features or unique communities only make up a small portion of the ANF, areas with these features or habitats often receive a disproportionate amount of wildlife use and help to meet the specialized habitat needs of many wildlife species. As a result, protection of these areas is important in order to maintain viability of all wildlife.

The Forest Plan and its amendments recognized the importance of unique wildlife communities and features and many areas such as wetlands, riparian zones and floodplains are given preferential consideration to other resources (USDA-FS 1986a, p 4-19-20). Additionally, the Forest Plan includes standards and guidelines that allows for the protection of special features and habitats (brood and winter range) important to wildlife (USDA-FS 1986a, p 4-31, 4-38-4-40, 4-93).. As a result, the existing Forest Road system is not adversely affecting unique wildlife communities or features. However as described under TW(1) and AQ(8), some existing wetlands and riparian areas are affected by non-system roads.

Economics (EC)

This section was reviewed and rewritten based on comments and discusion that occurred during the FWRAP open house. During this review, several inconsistencies in the basic data were discovered and eliminated. Due to this, the figures shown in this section do not agree with the figures presented at the open house.

EC (1) What are the monetary costs associated with the current road system? How do these costs compare to the budgets for management and maintenance of the road system? (Question modified by WO)

This question will be addressed in three sections:

- Overview – summary of the costs and budgets for managing and maintaining the road sytem.
- Costs – discussion on how the costs for managing and maintaining the road system were developed.
- Funding Sources – discussion on how the estimated budget for managing and maintaining the road system were developed.

Overview

Within the limits of this analysis, the expected funding for road management and maintenance is apparently sufficient to cover the expected costs of management and maintenance of the road system. The estimated cost for annual maintenance is $3,900,000 and the estimated annual budget for maintenance is $3,500,000. Due to the variability in the data these values are based on, these values are felt to be in balance. Based on this analysis, project NEPA analysis could identify additional roads that could be constructed and added to the system.

This question will be addressed in lower level analysis only enough to describe the expected annual and deferred maintenance costs for each Forest Service road within the project area.

Deferred maintenance needs have accrued over the past 20 years, and has recently been estimated at the amount of $16,300,000 for the entire ANF road system. Reasons for the backlog of deferred maintenance include:

1. Cooperative Work Forest Service (CWFS) fund maintenance rates were updated in 2001 for the first time since 1984. Collection rates in the past did not keep up with road maintenance cost over this period, contributing to development of the deferred maintenance backlog.

2. A portion of the funding for road management and maintenance also comes from the timber sale program. Nearly $1,500,000 of the annual budget can be tied directly or indirectly to the timber

sale program. Over the past several years, the timber program has fluctuated for various reasons. The reduction of timber sale related road management work has contributed to the backlog.

3. TRTR funding (from 10% of gross receipts to the ANF) is a new source of income for road management and maintenance and is a funding source to address the backlog. This funding source first became available in 1998. Road reconstruction and restoration projects using these funds to address the deferred maintenance backlog have only been available for the past 5 years. This fund can be used on either roads or trails. The forest made a decision when this funding became available to fund trail projects as a priority over funding road projects.

4. Changes in road standards and guidelines to increase resource protection, i.e. higher current cost for reconstruction. Increased emphasis has been placed on protection of water resources in the past decade. This is evidenced by: the fisheries amendment, ecosystem management and roads analysis. Many of these changes in standards and guidelines come with a cost to roads. Changing the surfacing material from pit run to limestone increases the cost of the surfacing per mile from $15,000 to $35,000. Additional culverts are being installed to reduce the collection of water and separate ditchwater from streams. Each additional culvert costs an average of $1,000. Implementing these changes takes time.

Costs

Background

The Forest Service divides road maintenance into two categories: annual and deferred. Annual maintenance includes items such as grading, opening/closing gates, and minor spot surfacing. These costs include the cost of completing the work as well as overhead, survey, design, contracting, etc. Annual and deferred maintenance costs were projected from road maintenance surveys and standardized cost guides included within INFRA (a Forest Service database).

Within INFRA, annual maintenance also includes costs for periodic replacement of facilities. An example of this would be culverts require periodic cleaning and replacement, about every 10 and 20 years, respectively. Table 13 shows the frequency of major work items included within annual maintenance and their approximate percentage of total annual costs. These frequencies are based on empirical data. No formal studies have been conducted to establish these values. Variations in the frequency have the potential to cause significant changes in expected annual costs. For instance, if the frequency of replacing surfacing material were to be 10 years rather than 12 years, the annual maintenance costs would increase by $300,000 per year. On the other hand, if the frequency were 15 years, the annual maintenance costs would decrease by $300,000 per year.

INFRA includes an annual cost equal to 1/10th the cost to clean a culvert as an annual cost. INFRA includes an annual cost equal to 1/20th the cost to replace a culvert as an annual cost. Thus, the annual costs for a culvert include an annual maintenance cost to clean and a periodic cost to replace.

Should a culvert need to be replaced now, it's cost would be included as a deferred maintenance cost as well as the annual costs. Deferred maintenance includes items that need to be done now, but are not done on an annual basis such as culvert replacement, surfacing replacement, gate repairs, and brush removal. Table 13 indicates that over 85% of the costs included as annual maintenance costs in INFRA are actually costs to reflect periodic maintenance needs based on a frequency of more than 10 years.

Table 13: INFRA Annual Maintenance items and costs for the ANF, 2003.

Frequency	Items	% of INFRA Costs
1 - annually	Grading maintenance level 3 and 4 roads	8
.33 – every 3 years	Deferred maintenance surveys, clean lead off ditches, grading maintenance level 2 roads, repair of signs	3
.2 - every 5 years	Crack sealing of paved roads, gate maintenance	2
.1 – every 10 years	Culvert cleaning, brushing, sign replacement	9
.083 – every 12 years	Replace surfacing material on roads	60
.05 – every 20 years	Replace culverts	18

INFRA Cost Estimates

Based solely on INFRA reports, the total estimated annual road maintenance needs for Forest Service roads is $3,900,000 and the total estimated deferred road maintenance needs for Forest Service roads is $17,300,000. Table 14 indicates the results of running the same summary report on the INFRA database at three times. This data indicates wide flucuations in results.

Table 14: Variation in INFRA data over time, ANF, 2003.

Date of Report	Annual maint cost	Deferred maint cost
Oct 1, 2001	$3,600,000	$10,700,000
Sept 1, 2002	$4,600,000	$18,700,000
Oct 1, 2002	$3,900,000	$17,300,000

Deferred maintenance surveys have been completed on all maintenance level 3,4 and 5 roads. Deferred maintenance surveys have been completed on about 50% of maintenance level 1 and 2 roads. Data on the remaining maintenance level 1 and 2 roads was extrapolated based on per mile data obtained from surveyed maintenance level 1 and 2 roads.

To obtain a better value for the annual and deferred maintenance needs, the basic data in INFRA was exported to a spreadsheet. Average costs per mile for each road were then calculated. This data was then sorted by maintenance level, and an average value for annual and deferred maintenance by maintenance level was calculated. These values were then used to extrapolate the annual and deferred maintenance costs for any roads on the system without any deferred maintenance survey data. Results of this analysis are summarized in Table 15.

These numbers are our best estimate of the annual and deferred maintenance needs for the Forest Service road system at this time, and will be used as the annual and deferred maintenance costs. The estimated annual maintenance budget needed to manage and maintain the Forest Service road system is

$3,900,000,000. The accuracy of this number is +/- $500,000. The estimated deferred maintenance backlog is $16,300,000. The accuracy of this number is +/- $5,000,000.

Table 15 : Final Annual and Deferred Maintenance Costs for the Forest-Wide Roads Analysis, ANF, 2003.

Maintenance Level	Miles	Annual/ mile	Total annual	Deferred / mile	Total deferred
1	50.07	$2,300	$100,000	$8,000	$400,000
2	572.94	$2,800	$1,600,000	$11,000	$6,600,000
3	361.51	$2,800	$1,000,000	$11,000	$4,000,000
4	116.49	$4,300	$500,000	$25,000	$3,000,000
5	33.98	$10,900	$400,000	$16,000	$500,000
Split	136.2	$2,400	$300,000	$13,000	$1,800,000
Total	1271.2		$3,900,000		$16,300,000

The ANF is considerably below the National average for deferred maintenance needs of it's road system. The quoted $8,000,000,000 backlog of deferred maintenance needs, and a total Forest Service road system of 383,000 miles, equates to an average of about $21,000 per mile in deferred maintenance needs. For the ANF Forest Service road system of 1267 miles, this would equate to a need of $26,000,000. Our current estimate of deferred maintenance need is $10,000,000 below this.

Table 15 shows the average per mile costs for annual and deferred maintenance, and the total estimated annual and maintenance costs by maintenance level. Figure 6 also shows the per mile costs for annual and deferred maintenance in graph form. The data for annual cost/mile for maintenance level 1 and 2 roads appear higher than would be expected. This data would indicate that the cost of maintaining level 1 and 2 roads on an annual basis would be nearly equal to the cost of maintaining a maintenance level 3 road. It would be expected that the annual maintenance costs for level 1 and 2 would be less than maintenance level 3. Analysis of the data has not revealed an explanation of this anomoly. Further analysis will be necessary to determine the reason for this anomoly.

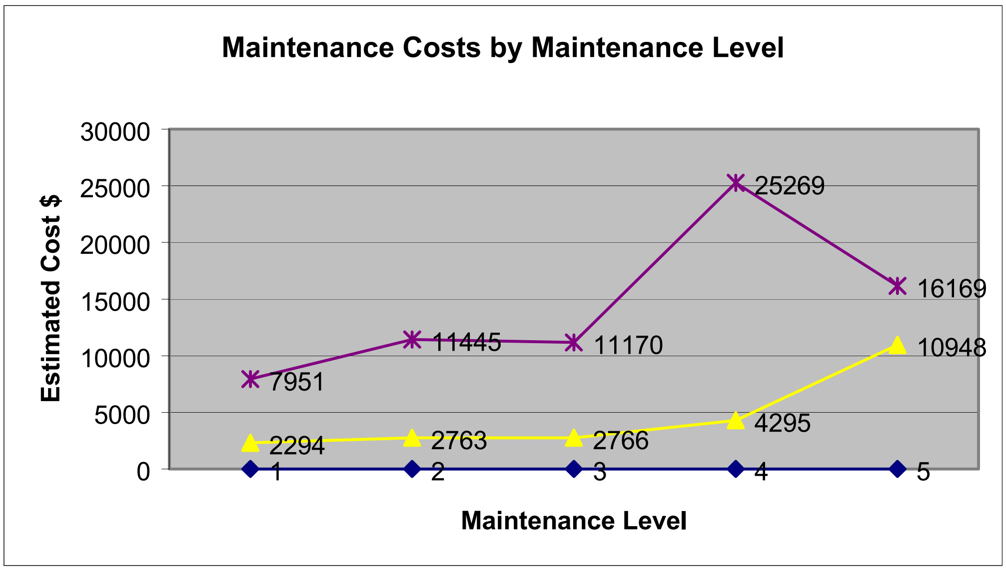
The deferred maintenance costs for maintenance level 2 would appear high at first examination. However, this figure is believed accurate because emphasis has been placed on performing deferred maintenance on level 3 and 4 roads for the past 5 years. The funding source for deferred maintenance on level 2 roads is typically from timber sales. Deferred maintenance on these roads is typically deferred until a timber sale is offered needing these roads. Thus, the backlog on maintenance level 2 roads would be expected to be higher. Additionally, this backlog has increased due to the reduction in the timber sale program. The relatively low deferred maintenance backlog on maintenance level 5 roads is primarily due to funding of the recreation road fund.

Appendix A-Maps 22 and 23 indicate the annual and deferred maintenance costs per mile by road in a map format. Appendix B - Table B-8 displays the estimated costs associated with maintaining the Forest Service road system by road on the ANF. Road cost estimates based on extrapolated data are identified in Appendix B - Table B-8 by the note "extrapolated" in the source column.

The road system increases the Forest Services direct costs. Quantifiying the affect on direct revenues is beyond the scope of this analysis. Generally, the cost of maintaining roads to the Forest Plan Standards and Guidelines translates into higher product values for timber sold. Better road conditions reduce hauling time and extend the available time for logging operations in an area. OGM and special use traffic are intended to pay commensurate maintenance costs for their use.

Closing and/or decommissioning roads will reduce the direct costs. In step 5 of this analysis, recommendations will be made to examine specific roads for closing or decommissioning. This examination will occur during project level analysis.

Figure 6: Maintenance Costs by Maintenance Level, Forest-Wide Roads Analysis, ANF, 2003



FUNDING SOURCES

The budget for management and maintenance of the road system comes from a variety of sources. These include: direct appropriations from Congress, timber sale road reconstruction, purchaser engineering deposits, 10% fund, and cooperative work on Forest Service Roads. The average annual amount for each of these items is shown in Table 16 and are discussed below.

Table 16. Anticipated Funding Sources for Road Management on the ANF, 2003.

Funding Source	Type	Estimated Annual $
Appropriations from Congress	Road Construction/ Maintenanace Fund	$1,300,000
	10% Fund	$700,000
	Recreation Road Fund	$400,000
Timber Sale	Road Reconstruction	$600,000
	Engineering Deposits	$100,000
Cooperative Work – Forest Service	Deposits	$200,000
	Work in lieu of deposits	$200,000

Total		$3,500,000

Appropriations from Congress

Annually, Congress appropriates money to the Forest Service to accomplish certain work. For roads, Congress has three broad areas of funding: road construction and maintenance, recreation roads, and 10% funding. Road construction and maintenance is the general fund for completing most road maintenace. Recreation roads funds typically fund specific recreation projects.

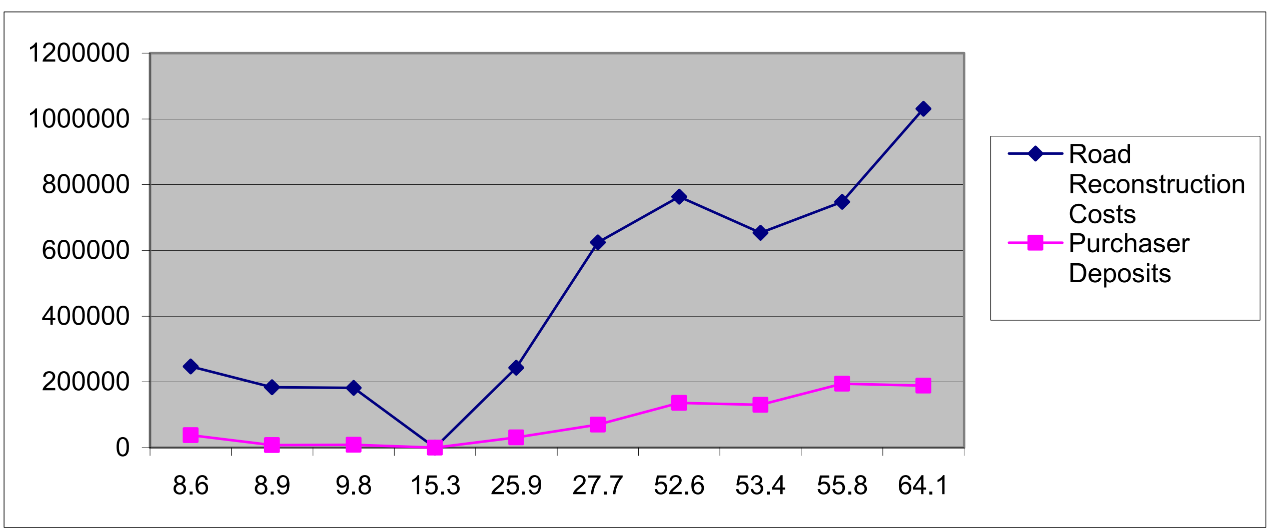
10% funds are appropriated based on 10% of the gross revenues from the National Forest System from the previous year. Legislation requires that these funds be returned to the Forest Service Region they were generated from, but not the specific forest. National direction is that these funds are to be used to reduce the impact of roads and trails on soil and water. The numbers shown in Table 16 are the portion obligated to roads. The Allegheny National Forest recieves an average of an additional $140,000 per year in 10% funds that are obligated to trail work (ATV/Bike, Snowmobile, and pedestrian trails). Each year the forest decides which projects are the highest priority for funding for 10% funding. Since the inception of this funding source, the forest has placed a priority on funding trail projects over road projects.

The ANF expects each of these funds to continue over the next several years at about the average figures stated. There will be some variation year to year in these funds, but no trend is evident from examining past appropriations.

Timber Sale

The Forest Service can include construction, reconstruction and maintenance of roads within the timber sale contract as a requirement of the timber sale. Table 17 indicates the timber volume, miles of construction, miles of reconstruction, value of construction, and value of reconstruction by year since 1994.

Figure 7: Purchaser Road Work and Engineering Deposits by Timber Offer Volume, FWRAP, ANF, 2003.



The projected budget for timber sales for the next few years is expected to be sufficient to allow for a timber offer of 30mmbf per year. Based on this and the data as shown in Table 17, it is predicted that the average annual value of road reconstruciton from timber sales will be $600,000 and that engineering deposits from timber sales will be $100,000. It should be noted that on average, the timber sale program reconstructs 1.8 miles of township roads at a value of $85,000.

Table 17: Timber Sale Road Program since 1994, ANF, 2003.

FY	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003 (for year to date)
Volume offered (MMBF)	64.1	55.8	53.4	52.6	8.6	15.3	9.8	25.9	27.7	8.9
Miles Road Construction	8.9	8.1	1.9	4.2	0.4	0	0	0.4	3.2	0
Value ($)	$292,222	$242,132	$65,060	$166,191	$14,039	0	0	$18,083	$151,021	0
Miles Road Reconstruction	82.7	67.3	50.8	75.2	20.6	0	7.5	29.6	41.7	15.3
Value ($)	$1,031,264	$748,043	$653,355	$763,178	$246,805	0	$181,733	$243,347	$624,227	$183,482
Engineering Deposits ($)	$189,069	$194,890	$130,616	$136,021	$38,400		$9,200	$30,884	$69,970	$7,500
Township Roads Reconstructed	1.9	4.3	9.1	0.5	0.1	0	0	1.7		
Value ($)	$99,970	$289,606	$355,823	$8,000	$3,435	0	0	$82,868		

Cooperative work on Forest Service Roads

The Forest Service requires commercial users of it's roads to maintain those roads commensurate with their use. Commercial use includes activites such as timber sales from private land, OGM well development and hauling oil. Depending on the specific situation, this maintenance can take one of two forms. Either the commercial user performs the maintenance (in lieu of), or the commercial user pays the Forest Service to perform the maintenance (deposits). The former works satisfactorily when the commercial user is the only user of a road, typically maintenance level 1 or 2 roads. The later works best where there are several users of the road. This would typically be maintenance level 3, 4 and 5 roads.

Maintenance rates for deposits were revised in 2001. They went from $1.00/mbf ($20/well) to $2.09/mbf ($28.63/well). Based on deposits from the past 5 years, an estimated $200,000 per year would be expected. While in lieu of maintenance is tracked on a road by road basis, no attempt has ever been made to establish a yearly annual value for this maintenance work. Discussions with personnel responsible for monitoring commercial use indicate that the miles of roads maintained in lieu of is usually equal to or greater than the miles of road that deposits are collected on. Therefore, the same value was used for estimating the value of in lieu of maintenance.

EC (2) What are the indirect economic contributions of roads including market and non-market costs and benefits associated with road system design, management, and operations? (Question modified by WO)

Roads provide access (benefit) for a variety of reasons: resource management by Forest Service personnel, resource extraction (mostly likely for timber sales or oil & gas), or other non commercial access such as recreation (including dispersed camping, wildlife viewing, hunting, photography etc). A good road system increases the value of both priced and non-priced commodities, because in general without access these items have less value. The most notable exceptions to this are commodities that are intrinsically valuable simply because they have less access, such as wilderness, roadless or unroaded areas which are only accessible by individuals who can walk long distances with supplies.

Non-market costs include: reduction in fish and animal habitat, decrease in visual quality, decrease in water quality or quantity and reductions in air quality.

The benefit /risk analysis discussed in Step 5 documents the indirect market and non-market costs and benefits associated with road segments on the ANF. This information may be used during Forest Planning as part of an economic efficiency analysis.

This question will not be addressed specifically at lower scale analysis on the ANF. The benefit / risk analysis will be used at lower scales to document the effect of the road system on market and non-market costs and benefits.

EC (3) What are the direct economic impacts of the current road system and its management upon communities around the forest? (Question modified by WO)

The focus of this question is economic impact analysis of jobs and income from National Forest management. This question may be addressed during Forest Plan revision. The road system allows for resources to be accessed, providing for the creation of jobs and income. This analysis provides data on which roads are being used for commodity production, estimates of need based on current use and the environmental concerns of the current road system.

Closed roads limit or eliminate access to individuals who are unable or unwilling to walk long distances and/or to resource extraction, which generally needs motorized equipment for hauling. In turn, this could have economic repercussions for the local communities, which may depend on having access for employment opportunities. To date, it has been demonstrated that there is limited interest in the Allegheny area for commercial backpacking or backcountry guiding experiences. The largest recreation demand is for motorized access, such as "driving for pleasure", and one of the fastest growing recreational pursuits is ATV riding.

COMMODITY PRODUCTION

Timber management (TM)

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

The effect of road and landing spacing on logging system feasibility was first described in Matthews "Cost Control in the Logging Industry" 1942. More recently, Penn Peters described the effects of various factors on the economics of road and landing spacing in "Road and Landing Spacing". This model was adapted for use on the ANF in an unpublished report "Road and Landing Spacing on the ANF" completed in 1990. This report made recommendations about road spacing based on local conditions and costs.

Ground-based logging systems are used most frequently in timber harvest operations on the ANF. Local experience and analysis has shown that road access is needed to within ½ mile (¼ mile average skidding distance) of all harvest units. Therefore a fairly dense system of roads is needed in areas where intensive ground-based timber harvest is expected to occur. Low standard system roads are adequate in most areas for hauling timber products. Higher standard roads are designed when access is needed for multiple resource purposes.

Less conventional logging systems such as skyline cable or helicopter logging require fewer roads, but need more careful placement of the road system on the landscape.

TM (2) How does the road system affect managing the suitable timber base and other lands?

Management area designation and management area objectives play an important role in determining the need for road access within different sections of the forest. While large areas of the forest are included in the suited land base, ultimately, the MA objectives determine the need for treatment, the frequency of treatment, and therefore, the need for road access. Project level analyses are the basis for determining the timing and frequency of these treatments.

Presently, there are 31 unroaded areas (areas in excess of 500 acres), totaling over 34,000 acres. Of these, 29 occur within MA's where timber harvest could potentially occur. If management decisions are made that timber harvest should occur in these areas that are currently unroaded, then additional roads could be needed. An analysis that assesses the value of these areas should be completed before decisions to construct roads in these areas are made.

The existing transportation system provides access to most areas of the forest (outside of the unroaded areas mentioned above). As individual project level analyses are completed, additional road construction, reconstruction and maintenance needs may be identified. Project analyses may also identify the opportunity for road decommissioning.

TM (3) How does the road system affect access to timber stands needing silvicultural treatment?

Management area designation and management area objectives play an important role in determining the need for road access within different sections of the forest. While large areas of the forest are included in the suited land base, ultimately, the MA objectives determine the need for treatment, the frequency of treatment, and therefore, the need for road access. Project level analyses are the basis for determining the timing and frequency of these treatments.

Stand regeneration processes may take from 5-10 years to complete, in both even-aged and uneven-aged silvicultural systems. The efficiency and cost-effectiveness of treatments is dependent, somewhat, on the presence of roads. Road access is needed for reforestation treatments that utilize heavy equipment, such as fertilization, fencing and herbicide application. Treatments such as release or planting are easier to complete when road access is available.

Natural disturbance from wind or insect infestations can cause catastrophic damage to forested stands that requires silvicultural treatment in order to meet long term management objectives. When road access is available, timely and cost effective treatments can be implemented.

Minerals management (MM)

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

Locatable minerals, generally referred to as “hardrock” minerals, are intrinsically valuable deposits, such as an ore deposit or precious mineral resource. There are no locatable minerals underlying the Allegheny National Forest.

A leasable mineral is one that is owned by the Federal government and leased by a private individual or organization through the Bureau of Land Management (BLM) lease process. The BLM oversees all Federal mineral leases. Currently, there are three Federal oil and gas leases on the ANF totaling 1,026.27 acres. An additional 15,689.12 acres are currently unleased and available for leasing. Total federal mineral ownership is 34,973 acres, or about seven percent of the forest land-base.

Presently, none of the leasable minerals on the ANF have been developed. When the lease holder decides to produce his lease, the BLM/FS will determine road locations.

A salable or “common variety” mineral is one with no intrinsic material value, such as sand, stone, or gravel. The ANF owns all of the common variety minerals on the forest, and is currently only utilizing pit run stone for road surfacing. All existing stone pits have access roads. Additional roads may be needed to access new stone sources (see MM (3)).

Access to privately held mineral rights: Ninety-three percent of the subsurface mineral rights on the ANF are privately held. The forest contains numerous wells, pipelines, and associated roads. The oil and gas operators build and maintain roads to access their existing and new developments in accordance with guidelines published by the Pennsylvania Department of Environmental Protection (PA-DEP). Roads are built to a standard to accommodate the intended use, but may not always be built to the standards of Forest Service system roads. The Forest Service works with operators to identify and correct problems associated with their roads, but the regulatory authority rests with the PA-DEP. There is no certain way to predict the amount of oil and gas wells that will be developed in the future; however, on average, 188 new wells are drilled on the ANF each year. Before closing any Forest Service system roads, consideration must be given to whether the road will be needed for future oil and gas operations (drilling or plugging wells, removing equipment) in order to lessen or prevent future soil disturbance or road building by oil and gas companies.

MM (2) How does the road system affect access to private minerals? (Question added by ANF)

Roads are needed to access private mineral estates, and whenever feasible, existing roads are utilized. However, new wells and facilities usually require additional local access roads, which are constructed by the mineral operators. The Forest Service works with the mineral owner/operator in determining the location of new oil and gas access roads on the ANF. The location of access roads is negotiated during the development phase of new projects. The maintenance of oil and gas access roads is the responsibility of the mineral owner/operator.

The current road system allows mineral owners/operators to operate and maintain their existing developments. Appendix A – Map 24 shows the roads used to access OGM developments.

MM (3) How does the road system affect the availability and management of pits? (Question added by ANF)

The principal material used to surface low volume roads on the ANF is pit run sandstone. This material is a "common variety mineral" found close to the earth's surface, and is generally excavated with a front-loader or other similar mechanized equipment. There are currently 335 open pits and 216 closed pits on the ANF (Appendix A – Map 8). Of the closed pit sites 33 have been rehabilitated.

To reduce the cost of roads and road maintenance, many small pits have been developed on the ANF. Potential pits are areas where, based on previous experience with pit development, there is potential for a pit source to be developed. Experience has shown that many potential pit sits will not result in actual pit development due to the material not being suitable for road surfacing. The quality, quantity, and ease of obtaining pit material is decreasing. For these reasons alternative surfacing materials such as limestone are being used or investigated.

Limestone deposits do not exist on the ANF, thus the material is hauled to the forest from outside sources. Some advantages of limestone over pit run sandstone include: limestone is a more durable material, it breaks down much slower than sandstone, it contains fewer fines thereby reducing potential sedimentation, and it provides a less slippery running surface than sandstone.

Range management (RM)

RM (1) How does the road system affect access to range allotments?

There are no range allotments on the Allegheny National Forest. This question will not be addressed in future project level roads analyses as it is not pertinent on the ANF.

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?

General Perspective

Between 1932 and 1966 there were 5 large reservoirs constructed on the Allegheny National Forest. These include:

1. Ridgway Reservoir – 90 acres constructed in 1932 as a water supply and operated by the Ridgway Borough Water Works.
2. Tionesta Reservoir – 3,330 acres constructed in 1941 by the U.S. Army Corps of Engineers for flood control.
3. Twin Lakes Reservoir - 7 acres constructed by the Forest Service in 1936 for recreation.
4. Beaver Meadows – 47 acres constructed in 1936 by the Forest Service as a waterfowl refuge.
5. Allegheny Reservoir - 11,400 acres constructed by the U.S. Army Corps of Engineers in 1966 primarily for flood control.

In addition, 14 small impoundments were constructed on the Allegheny National Forest in the 1950s in cooperation with the Pennsylvania Game Commission primarily for wildlife purposes. These small impoundments range in size from 2 acres to 14 acres and include such well known areas as Buzzard Swamp and the Mead Run Duck ponds. In 1998 the ANF entered into partnership agreements with Ducks Unlimited and PA Game Commission to maintain the water control structures on these small impoundments including the installation of Clemson beaver excluders. These details are brought forth because roads are an important part of providing public access to these reservoirs and impoundments, and roads are needed to safely maintain and monitor these structures. Although maintenance of these small impoundments can usually be done on an annual basis using a four-wheel drive pick-up truck, maintenance of the water control structures and breast work of the dam requires the use of heavy equipment about every decade.

Other water systems on the ANF include wells, ponds, drinking water systems and water transmission lines. Private citizens, companies , or local authorities (i.e. townships and boroughs) own many of these facilities. Private water rights exist on some portions of the ANF, and should they choose, these holders may develop these resources within certain parameters.

Based on Forest Plan Standards and Guidelines (7500 Water Storage and Transmission), impoundments on the ANF will be designed, constructed, and maintained to meet laws and regulations established by federal, state, and local agencies. Impoundment designs will include water control features. On a smaller scale, consider utilization of road projects to develop shallow water areas. Under Section 7400 Public Health and Pollution Control Facilities, Water Supply, Management Areas 1.0, 2.0, 3.0, 6.1, 6.3, 6.4, 7.0 and 8.0 on the ANF, drinking water may be provided. If provided, it must meet Federal and State regulations and be protected to ensure its continued quality. Water systems may include springs, hand pumps and electric pumps. Electric pumps are excluded in 6.1, 6.2, 6.3 and 6.4. In Management Areas 5.0 and 9.1, drinking water supplies will not be developed. Carry-in/carry-out method of disposal will be emphasized and promoted and no dam construction will occur in Management Area 5.0 (USDA-FS 1986a, pg. 4-32, 33, 52, 68, 80, 95, 109, 23, 36, 146, 160, 167, 174, & 185).

In nearly all cases, water resource facilities on the ANF have been constructed using the latest technology, including the use of heavy equipment. Roads were constructed to provide safe and environmentally sound access to the facilities. The operation of these roads requires regular maintenance and monitoring as well as upgrades or major reconstruction to meet the intended purpose. At times maintenance requires nothing more than small mowing equipment while major repairs often mean heavy equipment must be brought back on site.

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

The West Branch Tunungwant Creek Subwatershed (on the northeastern edge of the Forest) and the Big Mill Creek Subwatershed (on the southeastern edge of the Forest) are municipal watersheds for the town of Bradford, Pa and Ridgway, Pa, respectively. Within the West Branch Tunungwant Creek Subwatershed the ANF occupies a portion of the land in the headwaters. The current Forest Service road network within that drainage is near the ridge top and not within 300 feet of a stream channel, and therefore is not likely to have an adverse impact on water quality.

Several Forest Service roads, maintained at a level 3, 4, and 5, occur within the Big Mill Creek Subwatershed. Of these, 6.6 miles of road are within 300 feet of a stream channel, and thus are likely to have the greatest risk of affecting water quality as discussed in AQ (5). These roads include sections of Forest Roads 135, 143, 297, 854, and 860.

FR 135 – this road goes from Ridgway to Owls Nest. It crosses Big Mill Creek and parallels a tributary to Big Mill Creek. Approximately 0.7 miles of FR 135 are within 300 feet of Big Mill Creek or a tributary of Big Mill Creek. A project was completed in 2000 on the sections of this road within the Big Mill Creek Watershed. The sections within 300 feet of Big Mill Creek and any tributaries of Big Mill Creek have been surfaced with limestone to reduce the effects of this road on water quality. Drainage was reviewed and brought into compliance with Forest Plan Standards and guidelines during this project.

FR 143 – this road is located on an old railroad grade that basically parallels Big Mill Creek between SR 948 and FR 135. Approximately 5.1 miles of this road are within 300 feet of Big Mill Creek or it's tributaries. As early as 1984 the Forest Service considered surfacing this road with limestone or relocating the road away from Big Mill Creek. At that time, public opinion wanted the road in it's present location, primarily for fishing and recreation access. Over the past 15 years, the Forest Service has coopertated with the Pennsylvania Fish Commission to place limestone sand in Big Mill Creek to reduce the acidity of the stream. In 1998 and 2000, two projects were completed to limestone and improve the drainage on this road.

FR 297 – this road connects FR 143 and FR 237. Approximately 0.7 miles of this road are within 300 feet of Pine Run, a tributary of Big Mill Creek. No projects have been completed on this road in the past 10 years.

FR 854 – this is a short spur off FR 135 on the east side of Big Mill Creek. It was constructed in the mid 1990's as a parking area for fishing access. Nearly all of it's 0.07 mile length are within 300 feet of Big Mill Creek.

FR 860 – these are the access roads in the area known as Red Mill dispersed camping area. All of it's 0.05 miles are within 300 feet of Big Mill Creek or it's tributaries. After several decades of trying to eliminate this dispersed recreation area, a decision was made in the id 1990's to rebuild this area to an acceptable level. A project was completed in the mid 1990's to resurface these roads with limestone and improve the drainage. Work was also completed to restrict access to the stream, raise the level of Red Mill Pond, and stabilize the streambank. Since then, a sweet smelling toilet (SST) was installed at this site.

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

The Seneca pump storage reservoir is a water storage structure used for hydro-electric power generation and operated by the U.S Army Corps of Engineers. Simply stated, water is pumped up to the storage reservoir from the Allegheny Reservoir. When electric demand is high, water is released from the storage reservoir back into the reservoir or river. As the water is released and descends down slope it turns large turbines and generates electricity. This system requires daily monitoring and maintenance by the Corps and is accessed primarily from FR 160.

WP (4) How does road development and use affect the water quality of domestic watersheds? (Question added by ANF)

On the Allegheny National Forest, water from spring sources are used for human consumption under special use permits. These sites are scattered throughout the Forest and include small towns and individual houses. The road system does access some of these sites, while more typically roads do not provide access. Where roads do access these sites, the source is protected and no negative affects on the source occur.

Special forest products (SP)

SP (1) How does the road system affect access for collecting special forest products?

Special Forest Products are defined in the U.S.D.A. Forest Service's, National Strategy for Special Forest Products, 2001, as 'products derived from biological resources collected in forest, grasslands, and prairies for personal, educational, commercial, and scientific use. Special forest products exclude sawtimber, pulpwood, cull logs, small roundwood, house logs, utility poles, minerals, animals, animals parts, rocks, water, and soil.' Use of special forest products is diverse, but generally falls under five general areas: foods, herbs, medicinals, decoratives (floral greenery and dyes), and specialty items (aromatic oils and certain value-added wood products) (USDA-FFS 2001).

Past management activity and oil and gas development have established a road system that provides access to much of the ANF. Many of these roads are closed to public traffic, thus access is provided by foot traffic, with the roads providing a corridor. This access allows ample opportunity for people to collect special forest products such as leeks, blackberries, blueberries, ground-pine, and mushrooms. Minor changes in the road system will not have a significant effect on these opportunities.

Special - Use Permits (SU)

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

There are many special use permit sites within the ANF. Most of these sites are utility corridors or related to mineral developments. The current road system allows for access to operate and maintain these sites (Appendix A-Map 25).

General Public Transportation (GT)

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

Primary access into and out of the ANF for recreation, administration, private rights, and commodity production is provided by State Highways. The Allegheny National Forest is a common destination for recreationists from major cities such as Buffalo,NY, Erie,PA, Cleveland, OH, Columbus, OH, and Pittsburg. PA. There are many smaller cities within about 50 miles of the forest such as Corry, Meadville, Oil City, Franklin, Clarion, Dubois, and Clearfield in PA, and Jamestown and Olean, in NY. Primary access to the ANF area occurs from the:

- Southwest by way of I-80, then either US 62 through Oil City or SR 66 through Clarion.
- South by way of SR 66 through Clarion.
- Southeast by way of I-80, then US 219 through Ridgway.
- East by way of US 6 through Kane.
- Northeast by way of US 59 through Smethport or I-86 then US 219 through Bradford.
- North by way of I-86 then US 62 through Warren.
- Northwest by way of US 6 through Warren.
- West by way of US 27 through Youngsville or SR 36 through Tionesta.

There are many communities within or near the Forest. These communities vary in size from under ten thousand residents to only a few permanent residents. A network of State and Township roads provides primary access between these communities. There are 677 miles of State and Township roads within the proclamation boundary (Table 2). Few Forest Service roads serve as the primary through-routes that connect communities. Primary communities and the roads providing access to them and the roads providing access to the forest are shown in the Table 18 below.

These roads and others are important to and used by smaller communities within the Forest. Many people in these communities rely on access to the Forest for their livelihood as well as for recreation.

Table 18. Primary Communities and Access roads, 2003.

Community	Primarily Access between Communities	Access to National Forest System
Warren	US 6, US 62, SR 59	LR 1013, LR 3005, FR 156 FR 160, LR 2006
Youngsville	US 6, SR 27	
Tidioute	US 62, LR 127	FR 119, LR 3005
Tionesta	US 62, SR 36	LR 4002, LR 4004, T 337
Marienville	SR 66, SR 899	T358, T327, LR 2005, T356, SR 3004
Ridgway	US 219, SR 120, SR 948, SR 949	T307, LR 3002, FR 135, FR 143, T548
Kane	SR 321, SR 66, US 6	T457, FR 133, T359, T 326, FR 186, T311, T301
Bradford	US 219, SR 770, SR 346	SR 346, SR 770
Sheffield	US 6, SR 666, SR 948	LR 2002, US 6, SR 666, SR 948
Westline	US 219, LR	FR 122, FR 321, FR 188, FR 322

Public Forest Service Roads (PFSR)

Public Forest Service Road is a new designation given to important National Forest System arterial and collector roads that meet specified criteria. These are roads that serve as principal public access routes to the Forest. The intent of the PFSR program is to provide funding for reconstruction/restoration projects needed to adequately provide safe and environmentally sound access for public use. Funding for the program is proposed to come from future Intermodal Surface Transportation Efficiency Act (ISTEA) funding.

The goals of the Public Forest Service Road network are to:

1. Provide safe and efficient access to destinations in the National Forests and Grasslands;
2. Provide a seamless transportation link between State and other local government highway systems and the attractions of the National Forests and Grasslands;
3. Encourage/improve economic development of rural communities through quality recreation and tourism experiences; and
4. Reduce erosion and improve water and air quality.

The Allegheny National Forest has recommended approximately 80 roads for PFSR designation. The program was limited to those roads with an objective maintenance level of 3-5. This correlated to the need for public access by passenger car so the minimum maintenance level would be a level 3, suitable for passenger car. Designation is also limited to existing roads. This program currently does not include any new construction.

The criteria for PFSR designation are those roads that:

- Are under Forest Service jurisdiction;
- Provide unrestricted access (other than seasonal snow closures, emergency closures, or scheduled closures for wildlife);
- Serve a compelling public need;
- Primarily serve Forest Service resource needs such as access to lakes, wilderness areas, or developed campgrounds;
- Typically *do not* provide local community needs such as school bus routes, access to cabins and summer homes.

The Forest Service has been developing the Public Forest Service Road program since 2000. A preliminary system and priorities were established in 2001. Also, in 2001, the ANF was funded to complete a demonstration project of PFSR. The demonstration project was the Wolf Run Marina, FR 596. This was completed in 2002.

Based on the results of the Forest-Wide Roads Analysis, the potential PFSR system and the priorities are being adjusted. The following Forest Service roads have been identified as having the potential to become PFSR's. Please note that only sections of the road may have the characteristics to be included in the PFSR program, and that no road will be designated as a PFSR until it is constructed to the standard appropriate for the intended traffic.

100, 116, 119, 120, 123, 124, 126, 127, 130, 133, 135, 136, 137, 143, 145, 148, 148A, 150, 152, 155, 156, 157, 160, 165, 173, 179, 180, 182, 185, 186, 187, 188, 191, 193.2, 195, 202, 209, 212, 215, 216, 223, 225, 227, 232, 237, 258, 259, 262, 267, 271, 279, 287, 291, 297, 321, 339, 395, 403, 435, 437, 446, 449, 454, 455, 456, 457, 468, 492, 492A, 504, 508, 515, 521, 536, 596, 604, 608, 615, 685B, 701, 848, 850, 851, 852.

These roads are shown on Appendix A – Map 10. Based on the analysis of PFSR, the priorities for PFSR implementation are shown in Table 19. These roads are highlighted on Appendix A – Map 26.

Table 19: Public Forest Service Road implementation priorities, Forest-Wide Roads Analysis, ANF, 2003.

Priority	Current Proposal	NEPA	Proposed Standard
1	Recreation Trailhead / Vista / Pulloffs	EA	Varies
2	FR 437 Adams Run	EA	Double lane – limestone surfacing
3	FR 126 Kealor	completed	Single lane – limestone surfacing
4	FR 191 Twin Lakes	EA	Double lane – paved surfacing
5	FR 123 Dahoga	EA	Single lane – limestone surfacing
6	FR 116 Dunham Siding	EA	Single lane – limestone surfacing
7	FR 133 Ludlow JoJo	EA	Single lane – limestone surfacing
8	FR 173 Marshwillow	EA	Double lane – limestone surfacing
9	FR 176 Bucklick	EA	Double lane – limestone surfacing
10	FR 160 Hook Run	EA	Double lane – limestone surfacing

Coordination with State, Township and other Agencies

The ANF has coordinated efforts on providing an efficient road system with Penndot, Townships, and other agencies. Annually, the ANF meets with Penndot representatives and Federal Highway Administration officials to discuss the Forest Highway Program. At this meeting, any additional topics of interest are discussed. This would include discussion of any Public Lands Highway projects, any current State or Forest Service projects that might impact the other agencies activities and any future projects that might impact the other agencies activities. These discussions might include items such as right of way needs, brushing and clearing projects along State Highways, use of herbicides, and waste areas. Additional meetings are scheduled for project implementation as needed.

The Allegheny National Forest has entered into cooperative road agreements with all the Townships that have roads within the Forest Proclamation boundary. Many of these agreements were originally signed in the 1970's, but one was finally signed in 1995. Within these agreements, the Townships and the Forest Service document the roads under the jurisdiction of each party that are important to the other party, and agree to work together to maintain and improve the road system. As the Townships and the Forest Service see maintenance or improvement that needs to be done on those roads included within the agreement, project agreements can be developed that allow the other party to perform that maintenance or improvement. Thus, if the Forest Service has a need to haul timber on a Township road that has a bridge that has a weight restriction, the Forest Service and the Township can enter into a project agreement to replace that bridge. Thru the Timber Sale program, the Forest Service has been reconstructing an average of 1.8 miles of Township roads at a cost of $85,000 per year.

The Forest Service works with DEP on OGM developments. The Forest Service was instrumental in developing the current BMP's for OGM road development. The Forest Service continues to be involved with DEP in improving the BMP's for OGM road development and maintenance.

The Forest Service consults with the Seneca Nations of Indians on any road construction or reconstruction project. This is done as part of the NEPA process.

When applicable, the Forest Service works with State Game Lands managers on road projects of mutual interest. As an example, we are currently working on a NEPA project called Spring Creek Watershed which includes a State Game Land. The Forest Service is discussing with the State Game Land managers about road ROW's and standards for roads in that area.

When applicable, the Forest Service works with large landowners on ROW's, road standards, and developing road systems that serve each others needs.

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

All of the land within the Allegheny National Forest was originally owned by private landowners. Since formation of the ANF in the 1920's, parcels have been purchased by the USA. Today, approximately two thirds of the land within the proclamation boundary are owned by the USA, and approximately one third of the land within the proclamation boundary are in private or other agency ownership. The size and dispersion of these inholdings vary across the forest. Because purchase by the USA has been on a willing seller, willing buyer basis, there is no pattern to land ownership on the ANF. Many roads go in and out of private and Forest Service administered land. Some of the larger parcels are managed by the State as State Game Lands. The larger parcels in private ownership are owned and managed as industrial forest. These landowners include companies such as Collins Pine, Kane Forest Products and Beuhler Lumber Company. The size of these inholdings vary from tens of thousands of acres down to tenths of an acre. Most of these inholdings are accessed by State Highways or township roads. Some of these inholdings are accessed from Forest Service roads. Some access to inholdings are provided by roads operated under special use permits. Appendix A - Map 9 shows the roads that are used to access inholdings.

Conversely, the Forest Service has ROW's on about 35 miles of private land to provide access to National Forest administered land. There are approximately 1.5 miles of road on private land that are needed for access to National Forest administered land that currently do not have valid ROW's. These are discussed in greater detail in GT3.

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

OGM Roads

The ANF has many oil and gas roads. These are roads built and maintained by a mineral owner to access their privately held oil and gas rights (see MM(2)). The roads needed for access to oil and gas rights are shown in Appendix A-Map 24. This map includes roads that were constructed by the OGM operators to access their mineral estate as well as State, Township, and Forest Service roads. To reduce the roading impacts between oil and gas users and Forest Service resource management, a long standing policy and objective in route planning is to share road use by the Forest Service and other ownership whenever feasible. Roads that require maintenance/improvement prior to use for timber haul or other resource management activities are added to the FS system as OGM jurisdiction, after consultation with the OGM operator. The OGM operator maintains as much right to use his road as before the Forest Service putting their road on our system. There are presently an estimated 75 miles of road that were originally constructed by the OGM operator and are now on our system. The Office of General Council (OGC) has advised that any OGM roads that can be used in their existing condition, without reconstruction or improvement can be used for resource management activities after obtaining agreement from the OGM operator that our use will not interfere with their operation.

ROW concerns:

Mayburg Bridge**:** This is a Forest Service owned, single lane bridge located near the community of Mayburg along State Highway 666. The bridge crosses over to the south side of Tionesta Creek and accesses private land and residences. The bridge does not access National Forest administered land. There are liability and condition concerns associated with this bridge. Local townships have been contacted in regard to bridge ownership conveyance; however, the townships expressed no interest in acquiring a single lane bridge. The estimated cost of replacing the bridge with a two lane structure is estimated to be $2-3,000,000.

Westline, Forest Road 122**:** Lafayette Township is agreeable to working out an arrangement to rebuild this road and have it become a township road. The estimated cost to rebuild this 2-lane road and apply limestone surfacing is $200,000.

Mudlick, Forest Road 141**:** Hamilton Township had been contacted in the past and was not receptive to acquiring ownership of this single lane road. Several landowners along the road are not receptive to giving a right of way. The estimated cost to build a 2-lane, limestone surfaced road is $100,000.

Warrpenn (near Morrison Run), Forest Road 156**:** This road, located directly adjacent to a stream, receives heavy OGM and recreation traffic. There are liability concerns associated with this road because it serves a dual purpose as a designated part of the ANF snowmobile trail system. There are also concerns regarding a railroad overpass near the junction with US Route 6. The Forest Service does not have rights of way across many of the sections of this road across private ownership. Pleasant Township has not yet been approached to negotiate conveying ownership to the township. The estimated cost to rebuild this to a 2-lane limestone surfaced road is $3-4,000,000.

Libby Road, Forest Road 455**:** Lafayette Township has been contacted and is agreeable to working out an arrangement to rebuild this road and have it conveyed to the township. Several of the landowners along this road are not receptive to giving a right of way. The estimated cost for this 2-lane, limestone surfaced road is $100,000.

Tollgate (at Sheffield), FR 620: It was recently discovered that an approximately 1,000 foot section of this road does not have an acquired right-of-way. This road is under the jurisdiction of Sheffield Township from its intersection with U.S. Route 6 for a short distance, then the next 1,000 feet of road does not have an acquired ROW by either Sheffield Township or the ANF. The road then returns to Forest Service jurisdiction. The Forest Service will work with Sheffield Township and adjacent private landowners to remedy this issue.

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

Safety of the road users is one of the primary considerations of maintenance level 3, 4 and 5 roads. The Highway Safety Act established a national highway safety program to improve safety for road users. In 1975, the Forest Service entered into a Memorandum of Understanding with the Federal Highway Administration requiring the Forest Service to apply the requirements of the national highway safety program to all roads open to public travel. In 1982, this agreement was modified to define “open to public travel” as “those roads passable by four-wheeled standard passenger cars and open to general public use without restrictive gates, prohibitive signs.. “. Most roads maintained at level 3, 4 or 5 meet this definition. Design, maintenance, and traffic control on these roads emphasizes user safety and economic efficiency, based on the roads traffic service level (ANF Forest Plan, p4-52). Traffic control signing on these roads follows standards set forth in the Manual of Uniform Traffic Control Devices (MUTCD). These are the same standards used on State and Township roads. This provides consistency in signing for the road users, thus providing increased safety to road users.

When accidents occur on Forest roads, often the Forest Service is not immediately informed unless an employee is involved. Accidents involving only public motorists are reported to the local or state police, if at all. When the Forest does become aware of an accident on a Forest Service road, an investigation is initiated to attempt to identify the cause. The ANF maintains an accident investigation team to investigate accidents that occur on Forest Service roads. The Highway Safety Act requires that procedures are implemented to identify and monitor locations having high accident rates.

Forest Service roads are managed and signed in accordance with their maintenance and traffic service design levels (Appendix A, Map 12) and are considered adequate under normal operating conditions. Any management activity that increases use or considerably alters normal traffic patterns would be mitigated with appropriate warning and precautionary signs. Additional road maintenance or reconstruction to restore or improve standards may be required to safely accommodate heavier traffic volumes.

GT (5) How does the road system address the safety of road users on joint use roads (e.g. snowmobile trails on roads)? (Question added by ANF)

Over 80% of the snowmobile trails through the ANF are located on roads (open, gated, FS and municipal) (Appendix A-Map 7). These roads are designated as either "full time snowmobile" or "joint use". Roads that are designated as full time snowmobile trails have a restriction limiting wheeled vehicle use during the snowmobile season. Joint use roads are roads that are designated for use by both wheeled vehicles and snowmobiles. The Forest Service has the obligation to accommodate joint use as efficiently and safely as possible. Many people work in the forest (OGM and timber operators) as well as live and recreate, so it is not uncommon for there to be vehicular traffic on roads in the winter. Joint use roads increase the potential for accidents. As compared to trails, the road's wider width tends to encourage higher speeds. Most snowmobile accidents are speed related. However, the most common conflict occurs when timber and oil/gas operators plow snow off roads designated for snowmobile use. Many of these roads are plowed in the winter when OGM, timber, or local residents need safe access. The goal is to minimize user conflicts and to provide a high quality recreation experience while accommodating road use needs. Timber and oil/gas operators are asked to make every reasonable effort to maintain a snow covered running surface in joint use locations.

Permitting ATV/bike use on open, public roads has been minimized because of concerns for safety on mixed traffic roads. About 29% of the ATV trails on the ANF are located on gated roads that timber and OGM operators use infrequently. These joint use roads may increase the potential for accidents and the long-term goal is to locate the ATV/bike trail off roads where feasible and practical. Native and pit run road surface material breaks down rapidly due to the constant scrubbing action created by ATV tires loosening the fines that bind the surface material together. New stabilization products and techniques are being tested to better stabilize the road surface and reduce long-term maintenance needs and costs. ATV/bike users tend to increase speed on sections of trails that are on roads. This increase in speed is due to several reasons: longer straightaways allowing vehicles to gain speed, operators wanting to flex their machines muscles, boredom of users – their desire to get to the next trail section. This increased speed is a concern when the vehicle has low pressure tires. With low pressure tires, there is an increased likelihood of lossing control due to bouncing at high speeds.

Administrative Uses (AU)

AU (1) How does the road system affect access needed for research, inventory, and monitoring?

The transportation framework provides access for research, inventory and monitoring of the vegetation resource. The Kane Experimental Forest headquarters are located off FR 138. Researchers with the Northeast Forest Experiment Station are actively working on over 40 research studies located at sites found throughout the ANF that are accessed by system roads.

Periodic, landscape level vegetative inventories are conducted across the ANF, generally on a ten-year cycle. In addition, annual or biennial surveys are conducted in individual stands that are widely dispersed throughout the ANF. Various other vegetative surveys are conducted as part of our overall monitoring program. Existing access makes these inventory and monitoring efforts affordable and efficient. The Tionesta Scenic and Research Natural Area (TSRNA) has about a dozen research projects in progress at any one time. Except for access to the scenic vistors loop, access within the TSRNA is restricted. Access to the perimeter is provided by FR 133, FR 148, FR 443, and FR 264.

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

The forest-wide road system within the proclamation boundary of the forest is jurisdictionally complex and consists of state highways, township roads, federal roads (Forest Service and Corps of Engineers), private roads (includes OGM development roads), State Game Land roads, State Park roads (Chapman State Park), borough and city roads, and some county owned bridges.

All roads provide access to the forest for a variety of purposes. Unfortunately, roads also provide opportunities for unlawful activities. Unlawful use of closed roads, unauthorized collecting of forest products, road hunting, and trash dumping along roads are some of these activities. However, the same open and closed roads that provide access for unlawful activities are the roads utilized by law enforcement to investigate these activities. The current forest-wide road system is adequate for investigative and enforcement activities (Bodenhorn 2003 personal communication; Burd 2003 personal communication).

Protection (PT)

PT (1) How does the road system affect fuels management?

Our developing fuels program utilizes the existing road system as pre-established treatment area boundaries. This diminishes preparation costs for treatment areas and greatly reduces escape risks while minimizing holding complexity (containment) and mop-up efforts (securing).

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

Fire behavior on the ANF is characteristically low-moderate intensity and of short duration. The primary carrier of fire is forest ground litter. The road network provides effective access and egress to wildland fire incidents. Suppression strategy, relative to the road system, is to utilize the roads as natural barriers/control lines and anchor points. The execution of suppression tactics is augmented by the road system. The Forest has a limited Initial Attack (IA) capability; the roads permit response to be effective with minimal resources allowing effective confinement to support direct and indirect suppression strategies. These litter-type fires if undetected reach moisture-point of extinction due to the fuel break/discontinuous fuels the roads provide.

The Forest has a fuel configuration where mountain laurel (similar to Fire Behavior Fuel Model 6 in vertical configuration and loading) is the predominant component, which has a volatile combustion potential. Fire behavior in this fuel type is high intensity, fast moving and very resistant to control. With the limited IA capability, resources can take suppression action utilizing backfiring tactics (indirect) from existing roads, which minimize risk exposure and avail an effective egress should the tactic prove ineffective.

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

The road system provides effective access and egress in the event of wildland fire. Incident management is facilitated by the roads permitting areas to be isolated for incident response and contributing to the development of strategic and tactical alternatives.

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

The Clean Air Act of 1977 (CAA) and amendments created the National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The NAAQS specify allowable concentrations and exposure limits for various pollutants. The Environmental Protection Agency (EPA) is charged with developing criteria for attaining and maintaining the NAAQS. NAAQS have been established for six principal pollutants, which are called "criteria" pollutants. They are listed below in Table 20. Units of measure for the standards are parts per million (ppm) by volume, milligrams per cubic meter of air (mg/m^3), and micrograms per cubic meter of air at 25° C ($\mu g/m^3$).

Table 20. National Ambient Air Quality Standards.

POLLUTANT	STANDARD VALUE		STANDARD TYPE
Carbon Monoxide (CO)			
8-hour Average	9 ppm	($10\ mg/m^3$)**	Primary
1-hour Average	35 ppm	($40\ mg/m^3$)**	Primary
Nitrogen Dioxide (NO_2)			
Annual Arithmetic Mean	0.053 ppm	($100\ \mu g/m^3$)**	Primary & Secondary
Ozone (O_3)			
1-hour Average*	0.12 ppm	($235\ \mu g/m^3$)**	Primary & Secondary
8-hour Average	0.08 ppm	($157\ \mu g/m^3$)**	Primary & Secondary
Lead (Pb)			
Quarterly Average		$1.5\ \mu g/m^3$	Primary & Secondary
Particulate < 10 micrometers (PM-10)			
Annual Arithmetic Mean		$50\ \mu g/m^3$	Primary & Secondary
24-hour Average		$150\ \mu g/m^3$	Primary & Secondary
Particulate < 2.5 micrometers (PM-2.5)			
Annual Arithmetic Mean		$15\ \mu g/m^3$	Primary & Secondary
24-hour Average		$65\ \mu g/m^3$	Primary & Secondary
Sulfur Dioxide (SO_2)			
Annual Arithmetic Mean	0.03 ppm	($80\ \mu g/m^3$)**	Primary
24-hour Average	0.14 ppm	($365\ \mu g/m^3$)**	Primary
3-hour Average	0.50 ppm	($1300\ \mu g/m^3$)**	Secondary

*** The ozone one-hour standard applies only to areas that were designated on-attainment when the ozone eight-hour standard ws adopted in July 1997.**

**** Parenthetical value is an approximately equivalent concentration.**

The region is listed as a Class II airshed in accordance with the CAA. This category allows a moderate deterioration of air quality not to exceed the NAAQS. The Allegheny National Forest is within a part of Western Pennsylvania classified by the EPA as exceeding standards for Ozone. Warren County is in non-attainment for Sulfur Dioxide. The U.S. Forest Service has established no separate air quality targets for Class II airsheds.

Haze obscures the clarity, color, texture, and form of what we see. Some haze-causing pollutants (mostly fine particles) are directly emitted to the atmosphere by a number of activities such as electric power generation, various industrial and manufacturing processes, truck and auto emissions, burning related to forestry and agriculture, and construction activities. Other haze-causing pollutants are formed when gases emitted to the air form particles as they are carried downwind. Examples include sulfates, formed from sulfur dioxide, and nitrates, formed from nitrogen oxides.

Fine particles tend to be relatively uniform over very large regions. Episodes of heavy fine particle pollution tend to clear out after a front passes through and brings in a clean air mass, rather than being affected by local changes in wind speed or direction. High humidity will cause sulfate particles (which are the primary particles in eastern U.S. fine particle pollution) to swell up and become more visible, creating hazy conditions.

Fine particulate matter ($PM_{2.5}$) is generated by chemical reactions between pollutant gases and particles in the atmosphere. Un-paved roads are not considered to be a significant cause of this type of pollution.

Large particulate matter (PM_{10}) emissions from transportation sources primarily result from on-road dust (fugitive dust) from both paved and unpaved roads, unpaved road shoulders, and “track-out” from construction/development projects. In addition to fugitive dust emissions, there are specific transportation related pollutants from tailpipe emissions, tire wear particulate that remains on the road surface, and other re-entrained dust particles (e.g., sand and gravel). Fugitive dust emissions are related to vehicle miles traveled, and the amount of dust abatement for road travel and construction operations.

Road activities generate large particles with short atmospheric residence times. This dust is comprised mainly of large diameter inert silicates that are chemically non-reactive, and are further filtered out by human breathing passages. These fugitive dust particles are therefore more of a potential soiling nuisance as they settle out rather than an adverse health hazard. Even with mitigation, dust-soiling effects may occur out to 25 meters, with the potential for significant increases in PM_{10} concentrations out to 10 meters.

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?

The supply and demand for recreation opportunities is based in personal observations, public requests and visitor use monitoring data. Most unroaded areas are experiencing only low to moderate use on the ANF, hence there appears to be an excess supply. That is, when considering the spread between high, medium and low recreation activity levels, Table 21, there are 8 areas with a rating of high, 11 areas with a rating of medium, and 12 areas with a rating of low. Some of the unroaded areas with low recreation use have similar attributes to areas with high use, indicating that there is an excess supply of unroaded recreation opportunities. It has been found that most recreation occurs within a mile of roads.

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 31 unroaded areas were evaluated for their unroaded recreation potential(Appendix A – Map 6). The URA's were evaluated based on 6 criteria: size, configuration, development, scenic variety, recreation features and recreation activities. Each area was rated on a scale from 1-5 (5 was optimum) on its attributes in each category. The highest possible score for a given area is 30. Three areas received an unroaded recreation value between 21-30; twenty-five unroaded areas received an unroaded recreation value between 11-20; and three areas a value of less than ten.

Size – Ideally an unroaded area should be 2,500 acres or greater which makes it consistent with the Recreation Opportunity Spectrum (ROS) size criteria for ROS classes featuring some solitude or remoteness (i.e. Semi-Primitive Motorized (SPM), Semi-Primitive Non-Moptorized (SPNM), and Primitive (P)), however core areas of at least 1,000 acres allows for enough area to meet the requirement for a days outing for traditional non-motorized activities and the potential to satisfy some users remoteness and solitude expectations. Smaller areas to 500 acres will be reviewed for other unique factors. Areas below this threshold are too small to provide any isolation or remoteness characteristics. 5 points = > 2,500 acres; 3 points = 1,000-2,500 acres; 1 point = < 1,000 acres.

Configuration – area must not have fingers and/or narrow corridors less than ½ mile wide. Eliminate the narrow fingers and determine if remaining core area is less than 1,000 acres. The ratio of perimeter to area for each unit will be used to rank areas according to configuration. The higher the ratio, the greater the amount of edge and the more fingers and/or long narrow shapes that exist. 5 points = 0-29 Perimeter to Area Ratio (feet/acre), (Good geometric shape, minor number of fingers); 3 points = 30-45 Perimeter to Area Ratio (Moderately good shape, some fingers or narrow segments); and 1 point = > 45 Perimeter to Area Ratio (Poor shape, many fingers, narrow).

Development - Percent of area disturbed by human development provides a measure of the probability that the evidence of human activity may be experienced. Evidence of development should be low and naturalness high. Less than 20% of forested area in the 0-20 year age class. Overhead power lines and wide transmission corridors should not dominate the landscape character. Limited presence of ROW's, trails or unclassified roads. 5 = <5% development, 3 = 6 – 20% development, 1 = > 20% development.

Scenic Variety – Landscape variety and natural appearing landscapes can be evaluated using the Forest Service Visual Management system layer for Variety Class. The higher the variety, the more valuable it is for unroaded recreation opportunities. 5 points – Variety Class A (distinctive landscapes, high variety); 3 points – Variety Class B (typical landscapes – common variety); 1 point – Variety Class C (indistinctive landscapes, homogeneous/monotonous).

Recreation Features – area should possess recreation features that draw people in to use the area. Features include streams, lakes, rock fields, boulders, historic/cultural sites, vistas, unique vegetation, flowering vegetation, forest products (i.e. berries), wildlife viewing opportunity, or geomorphologic feature (slope changes, cliff, sinks, basins, stream bottoms). This evaluation was made by using the GIS stream layer, the GIS Ecological Land Unit Layer and specialists observations and familiarity with the unroaded areas. 5 points = many common features and one or more unique feature; 3 points = 2 -3 common features or one unique feature; 1 point – one or two common features.

Recreation Activities/Uses - evidence of use should be compatible with traditional non-motorized unroaded recreation activities. Compatible recreation uses such as hunting, fishing, hiking, dispersed camping, backpacking, rock climbing or scrambling, wildlife viewing, photography, bird watching, wildflower identification etc., are evident and or opportunity available. 5 points = more than two primary activities/uses; 3 points = 1 or 2 primary activitis/uses; 1 point = activity limited primarily to hunting.

The higher the unroaded recreation value, the more scrutiny needs to be applied to road activities in unroaded areas. The appeal of these areas is their unroaded character, scenic variety and recreational features. Maintenance of existing roads would have a short-term effect on unroaded areas, mainly from the noise of machinery. Decommissioning may increase the size of the unroaded areas, however, there would be machinery noise until the activity was completed. Building new roads into unroaded areas would introduce different recreationists, which may not value the same attributes. In some cases, some recreationists may choose to leave if their needs are no longer being met in this area. It would be desirable to identify the long-term goals for each of these unroaded areas, so that they would be managed with their attributes in mind.

Table 21. Evaluation of Recreation Criteria for Inventoried Roadless Areas and Unroaded Areas on the ANF, 2003.

Area #	Area Name	Criteria						Rec. Index
		Size	Config.	Dev.	Scenic	Features	Activity	
Inventoried Roadless Areas								
3	Allegheny Front NRA	5	5	5	3	5	3	26
5	Clarion River	5	5	5	1	5	5	26
7	Cornplanter	3	5	5	5	3	5	26
2	Hickory Creek Wilderness	5	5	5	3	3	5	26
9	Minister Valley	3	1	5	5	5	5	24
1	Tracy Ridge NRA	5	5	5	5	5	5	30
Unroaded Areas								
4	Morrison Run	5	5	5	5	5	5	30
6	Indian Run	3	5	5	3	1	1	18
8	Little Drummer	3	3	1	5	3	5	20
11	Laurel Mill	3	5	1	1	1	5	16
12	Steck Run	3	3	5	1	1	1	14
13	East Fork Run	3	1	3	5	5	3	20
14	Gilfoyle Run	3	1	1	3	3	3	14
16	McCray Run	3	1	5	5	3	1	18
22	Gurgling Run	3	5	5	1	1	1	16
24	Penoke Run	3	1	3	5	5	5	22
25	Lick Run	3	3	5	3	3	1	18
27	Upper Arnot	3	3	5	3	3	3	20
29	Rocky Run	3	3	1	1	3	1	12
30	Kinzua Dam	1	1	5	3	3	1	14
33	Dewdrop Run	1	1	5	3	5	3	18
36	Muddy Fork	1	3	5	3	3	1	16
37	Gregg Hill	1	1	1	1	3	1	8
39	Hunter Creek	1	1	5	3	3	3	16
40	Pine Run	1	1	5	5	3	3	18
44	SB Kinzua W	1	3	5	3	3	3	18

Area #	Area Name	Criteria						Rec. Index
		Size	Config.	Dev.	Scenic	Features	Activity	
Unroaded Areas (continued)								
48	Tom's Run	1	3	5	3	5	5	22
50	Pell Run	1	1	5	3	3	3	16
51	Deer Lick	1	1	1	3	3	5	14
53	Two Mile Run	1	1	5	3	5	5	20
55	WB Millstone	1	1	3	3	3	3	14
56	Bloody Run	1	1	3	5	1	1	12
59	Rock Spring Run	1	3	1	1	1	1	8
60	Lamentation Run	1	1	5	3	5	5	20
62	Twin Lick	1	3	1	1	1	1	8
63	SB Kinzua E	1	1	5	3	3	3	16
65	Bobbs Creek	1	1	5	3	5	3	18

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

The Recreation Opportunity Spectrum (ROS) is used to classify the range of experiences and settings available on a given piece of land. The ROS classes are: primitive, semi-primitive non-motorized, semi-primitive motorized, roaded natural, rural, and urban. On the Allegheny National Forest, ROS classes range from semi-primitive non-motorized to rural. ROS classes are assigned at the management area level. Seven setting indicators have been established to distinguish and evaluate a given piece of land. These setting indicators are: access, remoteness, visual characteristics, site management visitor management, social encounters, and visitor impacts. On the primitive end of the spectrum, opportunities and experiences are oriented toward solitude, risk taking and self-reliance. On the urban end of the spectrum, security, comfort and socializing are emphasized.

Road building in unroaded areas affects the access, remoteness and social encounters setting indicators. 64% of the ANF is classified as roaded natural or rural where remoteness is of little importance. 30% is semi-primitive motorized where visitors have a moderate probability to experience solitude and remoteness. 6% is semi-primitive non-motorized where visitors have a high probability to experience solitude and remoteness.

The noise from constructing new roads would carry into the forest and could affect a recreationist’s sense of remoteness. However, construction activities are short in duration. The sound from road maintenance activities could carry into the forest, but are also of short duration. Road use from standard vehicles does not carry far into the forest because of the low speeds involved, whereas off-road vehicle use does carry far across the landscape and could affect a sense of remoteness. The distance that sound is carried is also affected by the time of year, typography, and type/density of the forest.

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

The primary users of unroaded areas are hikers, equestrians, hunters and anglers.

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

There are six Inventoried Roadless Areas and 31 Unroaded Areas over 500 acres on the ANF, with a total of 61,196 acres. The six IRA's and 3 of the URA's were given an "unroaded recreation value" of 21 or higher (maximum value of 30). The higher rating indicates that there are higher amounts of recreation features and activities that draw visitors (hikers, equestrians, hunters and anglers). Some of these areas, like Tracy Ridge, Morrison Run, Hickory Creek and Minister Creek, are well known for good hiking, scenery and camping opportunities. It is expected that the higher the unroaded recreation value, the greater attachment visitors would feel for an area.

Seven unroaded areas have a recreation index of high, 12 areas with a rating of medium, and 12 areas with a rating of low. More than half of the unroaded areas fall into the middle range of scenic variety (typical landscape). Some of the more unique opportunities in these unroaded areas may not be available elsewhere on the ANF. For most activities, there are comparable unroaded areas if a recreationist is displaced from their preferred unroaded area. Most unroaded areas show a low to moderate amount of use.

UR (6) - How is developing new roads into unroaded areas affecting the Scenery Management System (SMS)? (Question added by ANF)

The potential area to develop new roads is found in 31 unroaded blocks (Appendix A – Map 6). The forested areas in these blocks are generally over 50 years old and are relatively undisturbed and natural appearing. At this time, these areas appear unaltered, and meet a High Scenic Integrity Objective Level. New roads in these areas could disturb the existing landscape character, resulting in a reduced scenic integrity. Mitigation measures may include roadway design and vegetative treatments that reduce the visual impacts and meet the Scenic Integrity Objectives.

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?

Nationally, as well as forest wide, there appears to be an excess supply of roaded recreation opportunities and low to moderate demand. On the ANF, thousands of acres accessible from hundreds of miles of open public roads receive little recreation use on a daily basis (Appendix A – Map 27). A majority of recreation use on the ANF is road oriented (easy access, sightseeing, motorized vehicle use, developed recreation) (Appendix A – Map 28). Evidence of recreation use bears this out. In general, the highest use occurs on summer weekends, opening day of trout season, fall color season, and the opening day of deer rifle season. Summer weekday use is much less, and almost nonexistent in the winter and early spring. In most places on the ANF, there is an excess demand for camping sites along roads near streams and the ATV trails. For most forms of recreation, there are alternate opportunities and a variety of locations for similar experiences across the entire Allegheny National Forest.

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

More than 60 percent of the ANF is currently managed as roaded natural ROS class, which emphasizes roaded recreation. Another 30% of the ANF is managed as semi-primitive motorized, which permits motorized use although at a lesser degree of development. Given the abundance of roaded recreation opportunities in the ANF, building roads into currently unroaded areas, road maintenance and road decommissioning, except on a large scale, would have a small effect on the quality or quantity of roaded recreation opportunities.

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

The Recreation Opportunity Spectrum (ROS) is used to classify the range of experiences and settings available on a given piece of land. The ROS classes are: primitive, semi-primitive non-motorized, semi-primitive motorized, roaded natural, rural, and urban. On the Allegheny National Forest, ROS classes range from semi-primitive non-motorized to rural. ROS classes are assigned at the management area level. Seven setting indicators have been established to distinguish and evaluate a given piece of land. These setting indicators are: access, remoteness, visual characteristics, site management visitor management, social encounters, and visitor impacts. On the primitive end of the spectrum, opportunities and experiences are oriented toward solitude, risk taking and self-reliance. On the urban end of the spectrum, security, comfort and socializing are emphasized.

Road building in unroaded areas affects the access, remoteness and social encounters setting indicators. 64% of the ANF is classified as roaded natural or rural where remoteness is of little importance. 30% is semi-primitive motorized where visitors have a moderate probability to experience solitude and remoteness. 6% is semi-primitive non-motorized where visitors have a high probability to experience solitude and remoteness.

The construction, rehabilitation, or maintenance of roads will displace some recreationists while that road activity is occurring. This disturbance is temporary and users will return when the road activity is completed. Some roads in the ANF are open to ATV, trailbikes and snowmobile (OHV) use. The noise from these machines is loud and can carry some distance through the forest and may affect other recreationists in the vicinity. Some OHV riders will leave the designated trails to travel to a residence or scenic feature, which could affect recreationists who do not expect to hear OHV's. Many recreationists have told us they would like to see more roads open to vehicles. Sightseeing and wildlife viewing from a vehicle are popular activities. In general, most recreation in the ANF seems road or vehicle-based and recreationists seem accustomed to hearing and seeing vehicle traffic when they recreate.

RR (4) Who participates in roaded recreation in the areas affected by road constructing, maintaining, or decommissioning?

The primary users of roaded areas are ATV trail riders, hikers, equestrians, snowmobile riders, boaters, developed and dispersed campers, sightseers, hunters and anglers.

Construction and reconstruction of roads may affect ATV and snowmobile trail riders since parts of these trail systems are located on roads. The extensive road system on the ANF provides improved access for motor vehicles and pedestrians looking to access the forest. Decommissioning roads will make it harder for some recreationists to access the forest. This question is discussed in more detail under RR(5).

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

Within the Allegheny National Forest Region, there are some aspects and experiences of the outdoor recreation market that the ANF itself is especially known for. The ANF has developed a "recreation strategy" to help define these niches and provide some management direction. The following opportunities and experiences were identified as the ANF niche:

Nationally Designated Trails, Rivers and Areas – The ANF has a number of specially designated areas with national significance that attract visitors. Some of these unique settings include that Allegheny Islands Wilderness, Hickory Creek Wilderness, Allegheny Wild & Scenic River, Clarion Wild & Scenic River, Hearts Content Scenic Area, Tionesta Research and Natural Area, Allegheny National Recreation

Area, and The North Country National Scenic Trail.

***Allegheny Reservoir* –** Within the tri-state market area, the Allegheny Reservoir is the largest, most renowned man-made reservoir with over 12,000 acres of water nestled between steep forested hillsides. A body of water this size, surrounded by an undeveloped shoreline all in public or tribal ownership is a unique feature in the northeastern United States.

***Road Based Recreation* –** The ANF provides a wide diversity of dispersed recreation opportunities in a natural setting that is supported by an extensive public road system. Easy access to an extensive natural forested setting is what attracts recreationists to this area. Scenic stream valleys, rock outcrops, vibrant fall colors and rolling forested hillsides provide a backdrop to whatever recreational activity you pursue.

***ATV Trail Riding* –** The ANF provides a premier trail bike and ATV trail riding opportunity in a natural setting. Demand for off-highway vehicle trails is at an all time high across the United States. There are few riding areas in the east even though demand for such opportunities is high.

***Heritage Sites and Stories* –** The ANF provides unique heritage sites and stories surrounding native peoples and the development of the ANF with an emphasis on natural resource changes over time. Prehistoric sites, birthplace of the oil industry, logging era boomtowns, catastrophic fires and Civilian Conservation Corps are some of the heritage stories in the ANF Region.

If recreational use grew to the point of reaching capacity within these niche areas, it may be difficult for visitors to find comparable opportunities nearby.. It is expected that participant's attachments to these areas are strong because they are unique. At this time, the only niche that is close to capacity is ATV Trail Riding. Demand exceeds supply, and it has been difficult to get through the planning process to approve additional trail miles. However, there are additional areas appropriate to this use that have not been developed with ATV trails. For recreational pursuits outside of these niches, opportunities for comparable experiences are available in the ANF and surrounding areas.

RR (6) - How does road management affect wilderness attributes, including natural integrity, natural appearance, opportunities for solitude, and opportunities for primitive recreation? (Question modified by WO)

- Phrases in **bold type** in parentheses are direct quotes from the Wilderness Act (P.L. 88-577, 1964).
- Phrases in *italic type* in parentheses are direct quotes from the Eastern Wilderness Areas Act (P.L. 93-622, 1975).

Natural integrity **(Retaining primeval character and influence)**

- *Roads break up the natural flow of water across the surface and, to some extent, subsurface of the land. The change of flow patterns can change the amount of water available to plants and wetlands, create new water run-off channels, and increase erosion in some areas, particularly road banks.*
- *Hardened road surfaces can become water channels during high rain/snow melt events, leading to higher run-off levels and scouring of the road surface. This can increase sediment in streams and lakes. If the surface of the road is gravel, water run-off can dissolve or abrade gravel and change pH of local water sources. If the surface is asphalt or other industrial type, runoff can introduce previously unknown (for the area) chemicals into the water system.*
- *Roads change travel patterns for wildlife, with animals either avoiding the road or using the road. Either way can change the advantages/disadvantages to the critter for finding food or water, and the relationship between predator and prey.*

- *Roads can create "edge effect", increasing fragmentation of interior habitats. This effect can continue until the forest crown closes over the road. If the road is wide enough to prevent crown closure, the effect may become permanent. Even with crown closure, some fragmentation effects to the understory will continue as long as the road is in use.*
- *Roads become easy ingress for invasive species to find new territory.*
- *Air quality could decrease from the effects of increased motorized use of the area and/or wind channeling down the road corridor and carrying increased loads of air-born pollens, spores, and other natural particles as well as industrial pollutants from upwind sources.*

Natural appearance **(generally appears to have been affected primarily by the forces of nature)**

- *Roads create an unnatural visual corridor. They are wide, often straight, and lead to a sense of crowding because straight stretches make visitors more visible to each other.*
- *When viewed from a distance, roads can create a notch in a ridgeline where timber has been cleared, creating an unnatural break.*
- *The hardened surface of the road, and impact areas along the road from car camping and other associated activities decreases the natural appearance of the area.*

Opportunities for solitude **(has outstanding opportunities for solitude…)**

- *Roads decrease the potential for solitude by allowing easy access for greater numbers of people and more noise. This decreases the feeling of solitude by reminding the wilderness visitor that civilization and its higher numbers of people are not very far away.*
- *Road corridors can channel noise, making even distance sounds of civilization seem very close and intrusive.*
- *Roads cut the landscape into smaller sections, making it more and more difficult to find a place where the impacts of civilization do not intrude.*

Opportunities for primitive recreation **(…or a primitive and unconfined type of recreation)**

- *Roads decrease the opportunity for a primitive and unconfined type of recreation by allowing easier access for mechanical transports or motorized vehicles and equipment to intrude into the area. As higher levels of technology intrude, use levels increase due to the ease of ingress. This increases the level of human impacts to the environment and more hardening is necessary to offset these impacts. This decreases the primitive experience of the area.*
- *Roads confine the area, giving it artificial boundaries where the primitive experience automatically decreases when the visitor reaches the road. This decreases the amount of primitive experience area available for an unconfined type of recreation.*

Effects on size of area available **(is of sufficient size as to make practicable its preservation and use in an unimpaired condition)**

- *Roads divide primitive areas, cutting them into increasingly smaller pieces until the area is too small for primitive recreation because the influence of civilization is too readily available.*

- *Smaller areas are more subject to outside influence so that the appearance of naturalness and the free flow of natural processes are impaired.*
- *As areas decrease in size, visitors tend to be more crowded together. Higher numbers of visitors in a smaller area mean increased impacts to both physical and social conditions, making use and preservation of the area in an unimpaired condition virtually impossible.*

Other attributes of Wilderness **(may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value)**

- *Roads have impacts on other attributes that may be in an existing Wilderness area, or affect the designation of potential areas.*
- *Roads can change ecological conditions of an area, changing both the appearance of naturalness and decreasing the natural integrity of the site.*
- *Roads can obliterate or change geological features, decreasing our knowledge base about natural processes and marring scenic beauty or wonder.*
- *They can introduce influences beyond the control of a researcher and make scientific analysis difficult, if not impossible. They can also increase the chance that the project could be altered or disrupted by those unaware of the research.*
- *They can mar scenery and decrease our enjoyment of natural beauty.*
- *They can obliterate features of history, or make historic sites too accessible and therefore easily plundered or altered.*

Mental and physical challenge *(…preserved and managed so as to promote and perpetuate the wilderness character of the land, including its values of…physical and mental challenge…)*

- *Roads decrease the challenge level for Forest visitors. They provide easy access, reassurance, and navigational aids.*
- *Roads decrease the amount of skill necessary to travel in Wilderness or potential wilderness, decreasing opportunities for challenge.*
- *The reassurance of seeing or knowing that roads are close may lead to an unrealistic assessment of risk on the part of the Forest visitor.*

RR (7) - How does the road system affect the Scenery Management System (SMS)? (Question added by ANF)

In general, the road system has a tremendous impact on scenic integrity. Roads permit easier access for resource management and recreationists but higher road densities can have a negative impact on scenic integrity if not designed or managed within the context of the landscape character. Decisions regarding impacts of roads are made at the project level where the SMS is applied. The SMS inventory includes data on Landscape Character, Landscape Visibility, Scenic Attractiveness, and Scenic Integrity. During project site analysis, the Scenery Resource is addressed with other resource issues as well as Management Area guidelines with the goal of maintaining Scenic Integrity Objectives for a given site.

Cultural and Heritage (CH)

CH 1: How does the road system affect access to paleontological, archaeological, and historical sites and the values people hold for these sites? (Question modified by WO)

The road system has had an effect on archaeological and historical sites on the Forest. Present day man finds desirable the same places that prehistoric and historic man found desirable for living, hunting, and recreating in. These areas include: stream margins, floodplains, and first terraces. To access these areas, present day man has constructed roads for access. Many of these roads are State and Township roads, and roads on private land to access homes. Some are Forest Service ML 3, 4 and 5. The construction of roads involves the disturbance of a continuous, relatively narrow, corridor over a long distance creating a linear passage for human travel and activities. Some sites have had direct effects from road construction or from maintenance or modifications. These effects can be avoided or mitigated through proper planning. It is the indirect effect of providing easy access to archaeological and historical sites that creates a difficult-to-control indirect effect. According to the State Plan for Archaeological resources, road construction "tends to affect a great variety of archaeological sites to a greater degree than many other construction activities."

Some types of values that people hold for these sites include: their interpretive value; their contribution to time and space; their research/information value; their value as a rare or typical example; and their sociocultural value. Archaeological and historical sites associated with people, groups, events significant in our past may have potential for public interpretation as exhibits-in-place or sources of information for interpretation elsewhere. Archaeological and historical sites often contribute importantly to a community's, a neighborhood's, or a rural area's sense of time and place. Most archaeological elements as well as elements of the built environment, may have the potential to reveal important information and fill research needs. People also ascribe value to archaeological and historical sites that are rare or unusual, because there may be few examples of its type extant, because there are few with similar historical associations, or because the site or structure exhibits unusual features. On the other hand, a site may be ascribed special value because it exemplifies a type, method of construction, settlement pattern, or economic system. In addition, some archaeological and historical sites may still be used for historical purposes or for related purposes, and therefore may have special social and cultural significance to their users.

CH2: How does the road system and management affect the exercise of American Indian treaty rights? (Question modified by WO)

There are no American Indian treaty rights on the ANF administered land. Therefore, the road system and management on the Allegheny National Forest does not affect the exercise of American Indian treaty rights. As a matter of courtesy, the Forest consults with and values the input obtained from the Seneca Nation of Indians on proposed management activities.

CH3: How does road use and road management affect roads that constitute historic sites? (Question modified by WO)

At the present time there are no roads in the Forest that are on or eligible for inclusion on the National Register of Historic Places.

There are numerous roads in the Forest that easily exceed the 50-year threshold for National Register consideration. Several have been recorded as sites, such as the Old State Road (Route 59; FS Site # 09-19-03-259), the Warren-Ridgway Turnpike (FS Site # 09-19-01-323), the Olean Road (FS Site # 09-19-02-), the Farnsworth Road (FS Site # 09-19-01-). Of these only the latter has been evaluated and it was determined to be ineligible for the National Register. State Route 6 has been designated as Historic

Route 6.

The first "highways" in the area were not on land. They were on the water. For more than a half century after the establishment of counties in northwestern Pennsylvania, the streams navigable by logs, rafts, or scow boats were declared public highways by the Pennsylvania Assembly. Such Acts made it legal for the inhabitants "to remove all natural and artificial obstructions from the bed or channel of streams. Prior to early Euro-American settlement, the waterways were used for thousands of years by Native Americans using shallow draft watercraft such as dugout canoes.

The first land routes in the ANF were Indian trails, which were first widened by the passage of horses, over them. Later, they were somewhat improved and further widened into roads for carts and wagons. Several of these trails such as the "Iroquois Main Road" (now State Road 948) have been used as travel corridors for almost two centuries.

Few roads existed in the area until the introduction of railroads in 1860 and their demise less than a century later. The construction of many miles of track reaching into all of the valleys and up into most of the hollows and along the plateau for logging purposes (and in some cases for the oil industry) superceded most road construction in the area. After many of these railroad lines were abandoned in the first part of the twentieth century, and with the creation of the Allegheny National Forest in 1923, numerous segments of these old railroad grades were adaptively reused and turned into Forest Service roads. Perhaps the best example of this is FR 131. Early maps of the Forest show a number of extant roads running through the Forest. Some, like 666, are "Pinchot Roads." Roads constructed by Governor Pinchot in the 1920's was an attempt to blacktop the many miles of dirt roads in the state. During the Great Depression, the Civilian Conservation Corps (CCC) constructed / reconstructed many miles of road on the ANF (e.g. FR154).

Social Issues (SI)

SI (1) Who are the direct users of the road system and of the surrounding areas? What activities are they directly participating in on the forest? Where are these activities taking place on the forest? (Question modified by WO)

1) Recreationists – This information is based on the National Visitor Use Study that took place in FY 2001 on the ANF (USDA-FS 2002). The percentages represent the number of people who said this was their primary recreation activity. Information on national recreation use was taken from the National Survey on Recreation and the Environment.
   a) Driving for pleasure
      i) ANF participation: 8.9%
      ii) Nationally, sightseeing ranks among the top five in participation, and has seen an increase in participation in the last couple of decades.
      iii) This activity can occur on any open, public roads. This use occurs from spring through fall, with peaks occurring during fall color and big game seasons.
   b) OHV use
      i) ANF participation: 2.6%
      ii) Nationally, snowmobile use ranks in the top thirty in participation, and ATV and trailbike use in the top twenty in participation, and both have seen an increase in participation in the last

couple of decades.

iii) ATV and trailbike use has been the fastest growing recreational use on the Allegheny National Forest. Heaviest use occurs on summer weekends.

iv) 29% of the ATV/trailbike trails are located on roads, and 80% of the snowmobile trails are located on roads.

c) Access to recreation sites

i) ANF participation: 31.9%

ii) Nationally swimming, picnicking and boating are all ranked in the top ten in participation. Camping in a developed area ranks in the top twenty in participation. All of these activities have seen growth in participation in the last couple of decades.

iii) These activities primarily take place or depend on developed recreation sites. Heaviest use occurs on weekends from May through October.

d) Hunters, anglers

i) ANF participation: 21.7%

ii) Nationally, fishing ranks in the top ten in participation, and hunting in the top twenty-five in participation. Both have seen a decline in participation in the last couple of decades.

iii) The opening days of trout seasons and rifle season for deer are periods of highest use.

e) Dispersed recreation (berry picking, nature study, horseback riding, camping, viewing wildlife, etc.)

i) ANF Participation: 30.5%

ii) Nationally, bird watching is one of the fastest growing recreation pursuits; it ranks in the top fifteen in participation. Horseback riding is in the top thirty in participation and has seen decline in participation in the last couple of decades. Camping in primitive areas and backpacking ranks in the top thirty in participation and has seen growth in participation in the last couple of decades.

iii) Most use occurs on weekends from May through October.

2) Residential access – seasonal and permanent

3) Mail and school bus routes

4) Timber and OGM operators.

5) Inholders

SI (2) Why do people value their specific access to national forest and grasslands – what opportunities does access provide? (Question modified by WO)

A person's perceived needs and values for roads are both personal and socio-economic: access for recreation (fishing, hunting, driving, etc.), access for timber sales/firewood cutting for themselves and their local economy, and access for OGM activities. Respondents to the scoping for this project indicate a desire for more open roads for recreation access, and conversely, need to decommission more roads to provide more unroaded or primitive opportunities.

Presently pedestrian uses such as hiking, horse use, and mountain biking are permitted on all open and gated roads. Motorized uses, such as snowmobile and ATV use, are only permitted on designated trails. Commenters also expressed a need for good hunting access to control deer herds and to provide better access for persons with disabilities. Many roads are opened during fall hunting season to provide additional vehicle access. It is assumed that many people desire to have more roads open to them than currently exists. Locks on gates are often cut and illegal OHV use is common. The ANF frequently hears from recreationists that more gates need to be open. In general, many of these recreationists view a gated road as an area closed to them because they cannot access the area by vehicle. The typical recreationist to the ANF prefers easy access. This is based on the observation that evidence of recreation use is heaviest within one mile of roads.

There are also Forest users who desire fewer roads on the ANF in order to protect wildlife, clean water, clear air and recreation, as opposed to commercial logging and oil/gas drilling. They site a need for more low impact, dispersed recreation.

The oil and gas industry is dependent upon roads for accessing and developing their subsurface minerals, and they are permitted to build additional roads if needed to expand their development.

SI (3) What are the broader social and economic benefits and costs of the current forest road system and its management? (Question modified by WO)

The Allegheny National Forest lies within Elk, Forest, McKean and Warren counties in Pennsylvania. The lifestyle of the people and general nature of these counties is very rural in nature. Roaded access to recreational opportunities, seasonal housing, and economic opportunities based on natural resources (such as wood harvesting and oil and gas development) are very important in this area.

The data in Table 22 displays the local employment, income, and housing characteristics in the four counties where there is ANF administered land (Pennsylvania State Data Center 2001).

Table 22. Employment, income, and housing data for townships located in Elk, Forest, McKean and Warren Counties, ANF, 2003.

County	Employ. % Manuf.	Employ. % Service	% Unempl.	Per Capita Income	Persons per square mile	Total Housing Units	Seasonal Housing Units
Elk	44.0	13.3	4.5	18,174	42.4	18,115	3,039
Forest	19.8	16.4	7.1	14,341	11.6	8,701	6,560
McKean	28.4	16.1	6.0	16,777	46.8	21,664	2,234
Warren	26.6	15.0	5.1	17,862	49.6	23,058	4,125
Pennsylvania	16.0	14.8	5.7	20,880	274	5,249,750	148,230

The following data for the four counties is taken from the 2000 census (Pennsylvania State Data Center 2001) and outlines basic social and economic conditions in the ANF:

- *ANF area residents have lower per capita incomes compared to the state averages;*
- *The density of people per square mile in the four-county area is considerably less than the state average;*

- *There are no incorporated towns or urban populations within Forest County;*
- *Nearly 80 percent of the housing units in Forest County are seasonal/recreational residences. Forest County has the highest ratio of seasonal/recreational residences of any county in the State. It ranks fourth in total number of seasonal housing units (6,560) exceeded only by those counties within the Pocono Mountains resort area (10,000 to 15,000 each);*
- *When all four counties are summed, 22 percent of the housing units are seasonal/recreational in nature.*

The features that draw recreational users to the ANF include: the ATV/Trailbike system, the snowmobile trail system, extensive acreage of state and federal land available for dispersed recreation, pedestrian trails, fall leaf colors, hunting, fishing, Allegheny Reservoir…

The public road system provides access to these outdoor recreation opportunities and seasonal dwellings that would not otherwise be possible.

In addition to wood products and oil and gas product industries, other industries include plastics, metals, and light manufacturing, such as light bulbs, home windows, and food products. The main features that support these industries are the woodlands and oil and gas resources that abound in the surrounding ANF, Pennsylvania State Game Lands, and private land holdings. Most of the oil and gas resources are privately held and adequate access to these natural resources is important to these local industries.

The local community economy depends both on the seasonal residents and recreational visitors who depend heavily on the public road system in the ANF. The local service and tourism industry depends heavily on the seasonal residents who in turn need access to their seasonal dwellings. The main recreational activities for local and seasonal residents include ATV riding, hunting, fishing, wildlife viewing, and driving. Public road access is important for users to reach developed recreation sites, trails and the general forest area.

Users have also depended on public road access to fish and game. Many of the seasonal residences were appropriated after WWII primarily for hunting and fishing as well as an escape from the city. The majority of hunters hunt within close proximity to their vehicle and so depend on good access to reach their hunting locations. Many hunters in the seasonal residence communities hunt right from their dwellings. Some of the classified roads and many of the gated and unclassified roads are used for hunting trails as well. There seems to be a great demand to open gated roads for additional vehicle access to good hunting opportunities. Anglers also need and use public roads to access the fishing opportunities in the ANF. The main routes are also used to stock local waters that support this fishing use. This use is primarily in demand during the spring trout season.

SI (4) How does the road system and road management contribute to or affect people's sense of place? (Question modified by WO)

Any change is likely to affect a person's sense of place. Recreationists who prefer roaded recreation activities may have a higher tolerance for change than folks who prefer unroaded recreation activities where solitude and remoteness are important. Places with unique or scenic features are more often considered special by recreationists, and these areas should be treated with extra care when designing roads or other developments. The landscape character should be considered so that new features blend into the landscape rather than contrast with it.

SI (5) What are the current conflicts between users, uses, and values (if any) associated with the road system and road management? Are these conflicts likely to change in the future with changes in local population, community growth, recreational use, resource developments, etc? (Question modified by WO)

In recent years, new OGM developments have increased. Some of these expansions are isolated wells or small developments, while others can be intensive developments with wells every 700 feet. Total federal mineral ownership is 34,973 acres, or about seven percent of the forest land-base.

As the surface owner, the Forest Service cannot deny access to mineral owners. Access roads and wells can be placed within recreation areas and near trails with little consideration given to previous Forest Service investments. Portions of the snowmobile trail system have been affected by mineral development. In some places trails have been converted into roads, trails have been plowed, and there has been an increase in vehicular (non-snowmobile) traffic. OGM use has also affected pedestrian trails. The North Country National Scenic Trail has been relocated in several areas to avoid new oil wells. Oil and gas drilling on the ANF has become much more evident in recent years.

The ANF frequently hears from recreationists that more gates need to be open. In general, many of these recreationists view a gated road as an area closed to them because they cannot access the area by vehicle. There has been demand to open all gates, and to open all roads to ATV and snowmobile use. These requests have not been acted upon out of a need to provide a wide variety of opportunities. Recreational opportunities from the primitive to the developed are provided via the management of the road system.

There are others who desire fewer roads on the ANF in order to protect wildlife, clean water, clear air and recreation, as opposed to commercial logging and oil/gas drilling. They site a need for more low impact, dispersed recreation. There have been proposals to increase the amount of designated Wilderness on the ANF. In every project initiated on the ANF, there are comments to obliterate roads and ban all new construction.

Over 80% of the snowmobile trails through the ANF are located on roads (open, gated, FS and municipal). Many people work in the forest (OGM and timber operators) as well as live and recreate, so it is not uncommon for there to be vehicular traffic on roads in the winter. Joint use roads increase the potential for accidents. As compared to trails, wider road width tends to encourage higher speeds. Most snowmobile accidents are speed related. However, the most common conflict occurs when timber and oil/gas operators plow snow off roads designated for snowmobile use. Many of these roads are plowed and cindered when OGM, timber, or local residents need safe access. Timber and oil/gas operators are asked to make every reasonable effort to maintain a snow covered running surface in joint use locations.

Permitting ATV use on open public roads has been minimized because of concerns for safety on mixed traffic roads. About 29% of the ATV trails on the ANF are located on gated roads that timber and OGM operators use infrequently. Joint use roads may increase the potential for accidents and the long-term goal is to locate trails off roads where feasible and practical.

Native road surface material breaks down rapidly due to the constant scrubbing action created by ATV tires loosening the fines that bind the surface material together. New stabilization products and techniques are being tested to better stabilize the road surface and reduce long-term maintenance needs and costs.

Civil Rights and Environmental Justice (CR)

CR (1) Is the road system used or valued differently by minority, low-income, or disabled populations than by the general population? Would potential changes to the road system or its management have disproportionate negative impacts on minority, low-income, or disabled populations? (Question modified by WO)

To the best of our knowledge, there will be no differential impact on either minority or low-income populations on the ANF. Nor do we have any indication that these populations use or value the road system differently from the general population.

With regard to disabled persons, however, there is evidence that they do value highly the access that the present road system affords. Those who are aged, infirm, or disabled, especially those who are recently disabled because of accidents or circulatory or respiratory impairment, use the road system to extend their limited mobility for hunting, scenic enjoyment, and simple access to nature.

As to disproportionate negative impacts on this group from potential changes, this is difficult to gauge. There is unlikely to be either significant reduction or increase in the net mileage of the road system. However, inappropriately sited roads, such as those which are too steep or in riparian areas, and others abandoned by oil and gas operators long ago, will be decommissioned, re-routed, or turned to other uses. Limited additional road mileage will be added to the system as a result of timber harvests and new oil and gas extraction. The overall impact will be an improved road system, in terms of greater safety and less negative environmental impact, both improvements for the disabled. But, some “favorite spots” for recreation will undoubtedly be closed to those limited to access by motor vehicle.

Several Forest Service roads have been designated for disabled hunter access. These roads are open for vehicular access only to hunters possessing a Disabled Persons Hunting Permit issued by the Pennsylvania Game Commission. For the 2002 hunting season the following roads were designated and signed for disabled hunter access: Forest Service Roads 255, 320, 479, 101, 101B, 101BB, 113, 226, 332A, 458 and 458A.

These roads complement the disabled hunter access program implemented on State Forest lands and State Game lands and appear to be meeting current demand. In project level roads analysis projects, this question should be addressed only in projects where existing disabled hunting roads currently exist, or where the public brings forward a specific disabled hunter access concern.

STEP 5 DESCRIBING OPPORTUNITIES & SETTING PRIORITIES

PURPOSE AND PRODUCTS

The purpose of this step is to:

- *Compare the current road system with what is desirable or acceptable;*
- *Describe options for modifying the road system that would achieve desirable or acceptable conditions.*

The products of this step are:

- *A map and descriptive ranking of the problems and risks posed by the current road system;*

- *Assessment of the potential problems and opportunities of building roads in a currently unroaded area;*
- *A map and list of opportunities, by priority, for addressing important problems and risks;*
- *A prioritized list of specific actions, projects, or forest plan adjustments requiring NEPA analysis;*
- *Project level recommendations, Public Forest Service Roads (PFSR), Public involvement, and Right-of-Ways (ROW).*

PROBLEMS AND RISKS POSED BY THE CURRENT ROAD SYSTEM

Benefit/Risk Priority Analysis

Step 5 of the roads analysis process includes a requirement to prioritize road projects that will address important problems and risks. In the Lewis Run roads analysis, the first one done on the ANF, it was possible to group roads by type or concern in order to prioritize projects because of the relatively smaller size of the analysis area (USDA-FS 2001a). Because the Forest-Wide Roads Analysis area is over 739,000 acres in size and includes over 5,000 road segments (a segment is typically a section of road between two intersections) within the maintenance levels 3, 4 and 5 roads (590 miles) alone, a more systematic and quantitative approach was needed. During the roads analysis of the Spring Creek Watershed Project area (USDA-FS, 2003), a process was developed to analyize the benefits and risks of the road system, make recommendations, and then prioritize those recommendations. This process was further refined during the Forest-Wide Roads Analysis.

Methods

The Benefit/Risk Analysis process works from the premise that each road segment may have certain benefits and risks (or potential for problems) associated with it, and that these benefits and risks can be described using a set of relevant questions that highlight the benefits and risks. In this analysis, the use of the term "risk" encompassed both the risk and problem definitions outlined in the Roads Analysis Guide in that "problems are conditions for certain environmental, social, and economic attributes that managers deem to be unacceptable" and "risks are likely future losses in environmental, social, and economic attributes if the road system remains unchanged" (USFA-FS 1999, p. 25). Risks measure the **potential** for problems, they do not necessarily indicate or define that a problem currently exists. Benefits are assigned based on actual condition or occurence – they are observable and measurable.

With this approach, investments in the road system can be prioritized by addressing concerns on road segments with the greatest benefit and greatest risk first, and making investments in the road system last on those road segments with the least benefit and least risk. By characterizing the benefits and risks on a low, medium, and high scale, a matrix of investment priorities can be conceptualized (Figure 8). The management implications for each of the boxes in the matrix was developed prior to the analysis.

Figure 8. Benefit/Risk Analysis Final Outcome Matrix, Forest-Wide Roads Analysis, 2003.

		BENEFITS		
	Scores	**Low 2-14**[1]	**Medium 15-29**	**High 30-52**
RISKS	**Low 10-20**[1]	Box 9 Monitor – Leave alone (10.2)[2]	Box 8 Maintain - low priority (7.8)	Box 7 Maintain – low priority (0)
	Medium 21-31	Box 6 Restrict or Close (34.8)	Box 5 Mitigate – Maintain (99.5)	Box 4 Maintain - high priority (83.2)
	High 32-61	Box 3 Decommission Mitigate, realign (14.9)	Box 2 Restrict or close (128.9)	Box 1 Mitigate - Maintain (210.1)

1 – Values represent the range of total benefit or risk scores assigned to each category.

2 – Values represent the number of road miles assigned to each box in the matrix out of a total of 590 miles for ML 3, 4, and 5 roads. These numbers changed from the preliminary results.

The analysis questions in the Forest-Wide Roads Analysis were based on the questions in the publication Roads Analysis: Informing Decisions about Managing the National Forest Transportation System (USDA-FS 1999), plus any additional questions pertinent to the Forest Wide analysis area. Early in the roads analysis ID team meetings, it was recognized that some questions in the Roads Analysis Guide lent themselves to modeling the transportation system through quantitative means, while others did not.

The following process was used for the Forest-Wide Roads Analysis:

1. The roads analysis ID team reviewed each question to determine if individual road segments could be rated based on that particular question. Those questions that could be modeled in the transportation system on a road segment by road segment basis were identified as “keep” questions in the analysis, and those that could not be modeled, were not pertinent to the Forest-Wide Roads Analysis, or did not have any information available at this time, were identified as “drop” from further analysis. The results of this stage of the analysis are shown in Table 23. As a result of this step, 46 questions that were pertinent to the Forest-Wide Roads Analysis, could be modeled, and had data available that could be used to evaluate each question as to its relative benefit or risk.
2. Table 23 also highlights the rationale used by the roads analysis ID team for questions that were “dropped”. It should be noted that questions that were dropped from further analysis at this point were analyzed in Step 4 to the extent applicable for the Forest-Wide Roads Analysis. As examples, question “PT1: How does the road system affect fuels management”, is not applicable to the ANF. Fuels management has not been a concern on this forest for the past 20-30 years. The ANF does not manage its road system for fuels management at this time. The question is addressed to the extent necessary in Step 4. Therefore, this question was identified as “drop”. Question “AQ2: How and where does the road system generate surface erosion” is pertinent to the Forest Wide analysis area

and could be modeled by road segment. Therefore, this question was identified as a "keep".

3. Each "keep" question was then categorized as a benefit or risk or both with respect to the transportation system. As examples, for question "AQ2: How and where does the road system generate surface erosion", it was clear that this was a risk associated with the road system. Question "TW2: How does the road system facilitate human activities that affect habitat" had both a benefit and a risk factor. It was a risk in that roads allow for easier human interaction with wildlife habitat, but a benefit in that some road segments allow for management of the wildlife habitat to improve the habitat, i.e. planting shrubs, etc. Of the 46 relevant "keep" questions, 19 evaluated benefits and 27 evaluated risks (Table 23).

Table 23: Keep/Drop reasoning and Benefit/Risk assignments for roads analysis questions in matrix analysis, Forest-wide roads analysis, 2003. (See key at end of table for Section Codes[1])

Keep/ Drop	Benefit/ Risk	Section[1]	Question #	Dropped from Matrix Analysis Rationale
Keep	Risk	AQ	1	
Keep	Risk	AQ	2	
Keep	Risk	AQ	3	
Keep	Risk	AQ	4	
Keep	Risk	AQ	5	
Keep	Risk	AQ	6	
Keep	Risk	AQ	7	
Keep	Risk	AQ	8	
Keep	Risk	AQ	9	
Drop		AQ	10	This question could not be addressed on a road segment basis and was discussed in narrative form only in Step 4.
Drop		AQ	11	This question could not be addressed on a road segment basis and was discussed in narrative form only in Step 4.
Keep	Risk	AQ	12	
Keep	Risk	AQ	13	
Keep	Risk	AQ	14	
Keep	Benefit	AQ	15	
Keep	Benefit	AU	1	
Keep	Benefit	AU	2	
Keep	Risk	AU	2	
Keep	Benefit	CR	1	
Keep	Risk	EC	1A	
Keep	Risk	EC	1D	
Keep	Benefit	EC	1B	
Drop		EC	2	This question could not be addressed on a road segment basis and was discussed in narrative form only in Step 4.
Drop		EC	3	This question could not be addressed on a road segment basis and was discussed in narrative form only in Step 4.

Keep/ Drop	Benefit/ Risk	Section[1]	Question #	Dropped from Matrix Analysis Rationale
Drop		EF	1	This question could not be addressed on a road segment basis and was discussed in narrative form only in Step 4.
Keep	Risk	EF	2	
Keep	Benefit	EF	3	
Drop		EF	4	This question could not be addressed on a road segment basis and was discussed in narrative form only in Step 4.
Keep	Risk	EF	5	
Keep	Benefit	GT	1	
Keep	Benefit	GT	2	
Keep	Risk	GT	3	
Keep	Risk	GT	4	
Keep	Risk	GT	5	
Keep	Benefit	MM	1	
Keep	Benefit	MM	2	
Keep	Benefit	MM	3	
Drop		PT	1	This question could not be addressed on a road segment basis and was discussed in narrative form only in Step 4.
Drop		PT	2	This question could not be addressed on a road segment basis and was discussed in narrative form only in Step 4.
Drop		PT	3	This question could not be addressed on a road segment basis and was discussed in narrative form only in Step 4.
Keep	Risk	PT	4	
Keep	Benefit	REC/RR	developed	
Keep	Benefit	REC/RR	dispersed	
Keep	Benefit	REC/RR	visual	
Keep	Risk	REC/RR	visual	
Drop		RM	1	This question is not applicable to the ANF as there are no range allotments.
Drop		SI	1	This question could not be addressed on a road segment basis and was discussed in narrative form only in Step 4.
Drop		SI	2	This question could not be addressed on a road segment basis and was discussed in narrative form only in Step 4.
Drop		SI	3	This question could not be addressed on a road segment basis and was discussed in narrative form only in Step 4.
Drop		SI	4	This question could not be addressed on a road segment basis and was discussed in narrative form only in Step 4.
Drop		SI	5	This question could not be addressed on a road segment basis and was discussed in narrative form only in Step 4.
Drop		SP	1	This question could not be addressed on a road segment basis and was discussed in narrative form only in Step 4.
Keep	Benefit	SU	1	
Drop		TM	1	This question could not be addressed on a road segment basis and was discussed in narrative form only in Step 4.
Keep	Benefit	TM	2	

Keep/ Drop	Benefit/ Risk	Section[1]	Question #	Dropped from Matrix Analysis Rationale
Keep	Benefit	TM	3	
Keep	Benefit	TW	1	
Keep	Risk	TW	1	
Keep	Benefit	TW	2	
Keep	Risk	TW	2	
Keep	Benefit	TW	3	
Keep	Risk	TW	3	
Keep	Benefit	TW	4	
Keep	Risk	TW	4	
Drop		WP	1	This question could not be addressed on a road segment basis and was discussed in narrative form only in Step 4.
Keep	Risk	WP	2	
Drop		WP	3	This question could not be addressed on a road segment basis and was discussed in narrative form only in Step 4.
Drop		WP	4	This question could not be addressed on a road segment basis and was discussed in narrative form only in Step 4.

1-Question Codes:

AQ - Aquatic, Riparian Zone, and Water Quality
AU - Administrative Uses
CR - Civil Rights and Environmental Justice
EC - Economics
EF - Ecosystem Functions and Processes
GT - General Public Transportation
MM - Minerals Management
PT - Protection
REC/RR - Road-related Recreation
REC/UR - Unroaded Recreation
RM - Range Management
SI - Social Issues
SP - Special Forest Products
SU - Special-Use Permits
TM - Timber Management
TW - Terrestrial Wildlife
WP - Water Production

4. The ID team identified criteria for ranking each road segment for each question, (see Table 24). These criteria were based on the professional judgment of the ID team for how to assign high, medium and low rankings to each road segment. For some questions, criteria for each ranking could be developed. For other questions, it was determined that criteria for some rankings were not applicable (N/A). For example, for question AQ15, it was determined that a medium and low ranking were not appropriate for this question. Either a road segment provides access for fishing, or it doesn't. Any road segment that provides access, obtained a ranking of high. Any road segment that does not provide access for fishing, did not receive a ranking – a zero.

Table 24. Ranking criteria for Benefit/Risk analysis, FWRAP, 2003. *(See key at end of Table 23 for Question Codes)

Question*	Benefit/ Risk	Rank	Criteria for Rank
AQ1	Risk	Low(1)	Any road segment not within group II or III soils.
		Medium(2)	Road segment within group II soils.
		High(3)	Road segment within group III soils.
AQ2	Risk	Low(1)	Any segment not meeting criteria for medium or high.
		Medium(2)	Segments on highly erosive soils or having pit run or native surfacing.
		High(3)	Segments on highly erosive soils and having pit run or native surfacing.
AQ3	Risk	Low(1)	Any segment not meeting criteria for medium or high.
		Medium(2)	Road segments within historic landslide areas or on coluvial soil.
		High(3)	Road segments within historic landslide areas and on coluvial soil.
AQ4	Risk	Low(1)	Any segment not meeting criteria for medium or high.
		Medium(2)	All limestone surfaced roads within 300’ of streams.
		High(3)	All pit run surfaced roads within 300’ of streams.
AQ5	Risk	Low(1)	Restricted FR within 300’ of a stream, not used for OGM.
		Medium(2)	Open road within 300’ of steam without OGM.
		High(3)	All roads with OGM within 300’ of stream.
AQ6	Risk	Low(1)	Road segments not within 300’ of stream.
		Medium(2)	Road segments within 300’ of stream.
		High(3)	Road segments crossing any perennial or intermittent stream.
AQ7	Risk	Low(1)	Road segments within 300’ of cold water fishery.
		Medium(2)	Road segments within 300’ of a high quality cold water fishery.
		High(3)	Road segment within 300’ of a exceptional value fishery.
AQ8	Risk	Low(1)	Any segment not meeting criteria for medium or high.
		Medium(2)	Any road segment crossing hydric soils.
		High(3)	Any road segment within 300’ of an NWI.
AQ9	Risk	Low(1)	Road segments crossing perennial and intermittent steams.

Question*	Benefit/ Risk	Rank	Criteria for Rank
		Medium(2)	Road segments crossing upper bottom ELT's.
		High(3)	Road segments crossing floodplain ELT's.
AQ12	Risk	Low(1)	Open or Restricted limestone surfaced road within 300' of a stream.
		Medium(2)	Restricted Forest Service roads used for fishing access or end of road sites (i.e. OGM well pads) within 300' of a stream course.
		High(3)	Pit run roads within 300' of a stream.
AQ13	Risk	Low(1)	Closed road segments crossing perennial streams.
		Medium(2)	Restricted road segments crossing perennial streams.
		High(3)	Open road segments crossing perennial streams.
AQ14	Risk	Low(1)	Limestone surfaced road within 300' of a stream course, or closed Forest Service within 300' of a stream course.
		Medium(2)	Restricted Forest Service roads within 300' of a stream course; other closed private roads within 300' of a stream course.
		High(3)	Open pit-run roads within 300' of streams, and all OGM roads within 300' of a stream course.
AQ15	Benefit	None (0)	Motorized access for fishing not provided.
		High(3)	Any road segment identified as needed for fishing access.
AU1	Benefit	Low(1)	Road segments needed for research access
		Medium(2)	N/A
		High(3)	Road segments needed for access to research natural areas
AU2	Benefit	Low(1)	N/A
		Medium(2)	N/A
		High(3)	Municipal roads and open FR.
AU2	Risk	Low(1)	Closed roads
		Medium(2)	Restricted or open roads
		High(3)	Open FR with known dumping or illegal ATV activity
CR1	Benefit	Low(1)	Road segments closed to public traffic.
		Medium(2)	Road segments restricted to public traffic.
		High(3)	Road segments open year round to the public and Disabled hunter access roads.

Question*	Benefit/ Risk	Rank	Criteria for Rank
EC1A	Risk	Low(1)	The estimated cost to maintain the road is less than $2,000 per mile per year.
		Medium(2)	The estimated cost to maintain the road is between $2,000 and $4,000 per mile per year.
		High(3)	The estimated cost to maintain the road is more than $4,000 per mile per year.
EC1D	Risk	Low(1)	The estimated cost to complete all identified deferred maintenance items are less than $20,000 per mile.
		Medium(2)	The estimated cost to complete all identified deferred maintenance items is between $20,000 and $40,000 per mile.
		High(3)	The estimated cost to complete all identified deferred maintenance items are more than $40,000 per mile.
EC1B	Benefit	Low(1)	Road segments used for timber now, timber future, or developed recreation access.
		Medium(2)	Road segments used for timber now and timber future access.
		High(3)	Road segments used for timber now and developed recreation access.
EF2	Risk	Low(1)	Road segments restricted to public traffic.
		Medium(2)	Road segments open to public traffic.
		High(3)	Road segments open to public traffic with developed recreation.
EF3	Benefit	Low(1)	N/A
		Medium(2)	N/A
		High(3)	Road segments accessing NAMDP sites.
EF5	Risk	Low(1)	Road use consists of passenger vehicles
		Medium(2)	Road use consists of OGM or timber, but not both, and the road is open or restricted to public traffic.
		High(3)	Road use consists of both OGM and timber, or the road segment has OHV use, or road is a state highway.
GT1	Benefit	Low(1)	Open FS roads with pit run surfacing accessing private land.
		Medium(2)	All other open roads with pit run or limestone surfacing accessing private land, or open FS roads with paved surfacing accessing private land.
		High(3)	All paved State highways or Township roads.
GT2	Benefit	Low(1)	N/A
		Medium(2)	N/A
		High(3)	Road segment used to access private land.

Question*	Benefit/ Risk	Rank	Criteria for Rank
GT3	Risk	Low(1)	N/A
		Medium(2)	N/A
		High(3)	Road segments needing a ROW or having other jurisdictional concerns.
GT4	Risk	Low(1)	Road segments with a Traffic Service Level of "D" and the road is open to public traffic.
		Medium(2)	Road management = restricted and road is used as an ATV or snowmobile trail.
		High(3)	Road management = open, road is used as an ATV or snowmobile trail, and road needs brushing.
GT5	Risk	Low(1)	Road management = closed and road is used as an ATV or snowmobile trail.
		Medium(2)	Road management = restricted and road is used as an ATV or snowmobile trail.
		High(3)	Road management = open and road is used as an ATV or snowmobile trail.
MM1	Benefit	Low(1)	N/A
		Medium(2)	N/A
		High(3)	Road segments accessing areas where the minerals are owned by the USA.
MM2	Benefit	Low(1)	N/A
		Medium(2)	N/A
		High(3)	Roads needed to access OGM developments/wells.
MM3	Benefit	Low(1)	N/A
		Medium(2)	Road segments within ¼ mile of a site tested and found stone.
		High(3)	Road segments provide access to an open pit.
PT4	Risk	Low(1)	All closed and restricted roads with limestone surfacing.
		Medium(2)	Restricted roads with pit run or native surfacing and open roads with limestone surfacing.
		High(3)	Open FS roads with pit run or native surfacing.
RR/DEV	Benefit	Low(1)	Pit run FR used for accessing developed recreation.
		Medium(2)	Limestone surfaced FR used for access to developed recreation.
		High(3)	Any other roads used for access to developed recreation.
RR/Disp	Benefit	Low(1)	Road segments used for hunting or fishing or camping.
		Medium(2)	Roads used for both hunting and camping.
		High(3)	Roads used for hunting, fishing and camping.
RR/VIS	Benefit	Low(1)	Road segments with visual sensitivity of 1.

Question*	Benefit/ Risk	Rank	Criteria for Rank
		Medium(2)	Road segments with a visual sensitivity of 2.
		High(3)	Road segments with a visual sensitivity of 3.
RR/VIS	Risk	Low(1)	Road segments with visual sensitivity of 3.
		Medium(2)	Road segments with visual sensitivity of 2
		High(3)	Road segments with visual sensitivity of 1
SU1	Benefit	Low(1)	N/A
		Medium(2)	N/A
		High(3)	Roads needed to access special-use permit sites.
TM2	Benefit	Low(1)	Road segments within 300' of suitable timber stands.
		Medium(2)	N/A
		High(3)	Road segments within or crossing suitable timber stands.
TM3	Benefit	Low(1)	Roads needed for future timber access
		Medium(2)	Roads needed for timber access now
		High(3)	Roads needed for timber access now and in the future
TW1	Benefit	Low(1)	Road segment is barricaded closed and seeded.
		Medium(2)	Road segment crosses a perennial stream.
		High(3)	Road segment crosses a major perennial stream (2 line stream on map).
	Risk	Low(1)	Road segments not within a ¼ mile buffer of a NWI or road segments not on FP1 ELT.
		Medium(2)	Closed road segments within a ¼ mile buffer of a NWI or closed road segments on FP2 or UB2 ELT.
		High(3)	Open or restricted road segments within a ¼ mile buffer of a NWI or open or restricted road segments on FP3 or UB3 or DS3 ELT, or any road segment within ¼ mile of a sticknest.
TW2	Benefit	Low(1)	Road segments that are closed to public traffic
		Medium(2)	Restricted road segments used for hunting access.
		High(3)	Open road segments used for hunting, or road segments identified by the wildlife biologist as needed for wildlife management access.
	Risk	Low(1)	Road segments not within ¼ mile buffer of NWI and not used for developed recreation.
		Medium(2)	Road segments within ¼ mile buffer of NWI and used for developed recreation.
		High(3)	Road segments within ¼ mile buffer of NWI and used for developed recreation and used for pit access or road segments wildlife biologist has identified as desirable to eliminate for wildlife.

Question*	Benefit/ Risk	Rank	Criteria for Rank
TW3	Benefit	Low(1)	Open road segments with no hunting access.
		Medium(2)	Restricted road segments used for hunting access.
		High(3)	Open road segments used for hunting access.
	Risk	Low(1)	Road segments closed to public traffic with pit run surfacing.
		Medium(2)	Restricted FR with pit run surfacing and non FR that are open with pit run surfacing.
		High(3)	Any other open roads or any road segment within 100 meters of a sticknest
TW4	Benefit	Low(1)	Road segments providing access for wildlife management activities.
		Medium(2)	N/A
		High(3)	Road segments within 100 meters of a waterbody.
	Risk	Low(1)	Road segment within ¼ mile of NWI or within a site identified as a good location for ginseng.
		Medium(2)	Road segment is within ¼ mile of NWI and within a site identified as a good location for ginseng.
		High(3)	Road segment is within a NWI and within a site identified as a good location for ginseng.
WP2	Risk	Low(1)	N/A
		Medium(2)	N/A
		High(3)	Any road segment within a municipal watershed.

5. Each road segment was then classified according to the assigned criteria rank (low, medium, high) in a GIS coverage of the road system. By putting this information into the GIS coverage, we are able to print maps of each question, and complete an analysis of the benefits and risks. Each GIS attribute was reviewed by the specialists to ensure each road segment was attributed correctly.

Results

1. At this point, within GIS, each road segment had been attributed for the 46 questions that were “keepers”. The total benefit and the total risk for each road segment were then calculated by summing the individual risks and benefits for that road segment (Appendix A-Map 29 -benefit score & Appendix A – Map 30-risk score). The GIS was then used to display segments based on their total benefit and risk score, separating them into high, medium and low. This allowed us to assign each road segment to a matrix box.
2. We have assigned relative values (rankings) to the criteria because it is difficult to assess the absolute merit of each ranking. For example, we cannot conclude that question AQ2’s high ranking has the same value as question TM2’s high ranking, even though their assigned rankings are equal (+3). The assigned weights are based on professional judgment and resource management experience and are all uniformly based on the subjective assumptions of the ID Team. Therefore, a ranking of the topics based on their additive weights is valid as a coarse estimate of how the ID

Team judges the relative importance of each. **At the same time, this would indicate that a direct comparison of benefits versus risks would lead to erroneous conclusions. i.e. that the risks of this road are greater than the benefits, therefore this road is bad. Noting that there are more risk questions than benefit questions further compromises a direct comparison of risks and benefits.**

3. It should be noted that the total possible benefit score for any segment was 57 (19 benefit questions times 3-the maximum possible score). The road segment with the highest benefit score had a benefit score of 52. This would indicate that some road segments met nearly every benefit criterion at a high benefit level. On the other hand, the total maximum risk score was 81 (27 questions x 3-maximum possible score), but the road segment with the highest risk score only had a score of 61. This would indicate that the Forest Service road system of maintenance levels 3, 4 and 5 roads, is not a very risky road system in terms of the questions analyzed. Investments have been made over time to systematically reduce the risks of the road system. This was indicated in the Spring Creek Watershed Analysis by a comparison of the present day road system and the road system that existed in 1937 (Forest Wide Watershed Analysis, unpublished data).

4. Based on the relative total risk and benefit of each road segment, each road segment was assigned to a box in the matrix (Appendix A – Map 31). Based on their location in the matrix, a preliminary recommendation was made for each road segment (Figure 8 & Appendix A-Map 32). Each road segment was then reviewed individually to determine if the preliminary recommendation was feasible, e.g., were their "decommission" segments sandwiched between "maintain" segments. Based on this review, no road segments were identified that needed their recommendations revised. Final recommendations are shown in Appendix A-Map 32 and Appendix B-Table B-7.

5. Priorities are based on completing work on road segments with a high total benefit and a high total risk, Matrix Box 1. The road with the highest total risk and the highest total benefit was given a priority of 1. The road with the next highest risk and next highest benefit was given a priority of 2. Where segments existed with the same risk, the highest benefit was prioritized higher. Where both the risk and benefit were the same, the higher maintenance level was given a higher priority. Thus the road segment with the lowest risk and the lowest benefit has the lowest priority. Appendix A – Map 33 shows the road segments with the top 20 priorities, the bottom 20 priorities, and then all other road segments by their matrix box. Each road segment's priority is indicated in Appendix B - Table B-7.

Discussion

1. Caution is advised in evaluating the resulting data and maps from the Benefit/Risk analysis completed in Step 5 for the following reasons:

   a) This analysis is based on the questions provided in <u>Roads Analysis: Informing Decisions about Managing the National Forest Transportation System</u> (USDA-FS 1999), and any additional questions pertinent to the Forest Wide analysis area. Although this list of questions is comprehensive, it is not all-inclusive. Secondly, the final analysis completed in Step 5 of the process only evaluated the relevant "keep" questions in Table 23 and used the criteria in Table 24. While the team was confident in the questions and criteria selected for this analysis, there could potentially be other questions, criteria, and factors identified that could adequately model the benefits and risks of a road system.

   b) While all roads of all ownerships were evaluated based on the above criteria (Table 24), the most complete and accurate data available was for Forest Service System roads. Complete and accurate data was not always available for roads managed by other jurisdictions (i.e. State, Township, State Game Lands, private, OGM). Therefore, the scoring of the benefit and risk factors for these road segments for some questions may not include all the data used for Forest Service System roads For example, road costs, question EC1A and EC1D, were calculated only for Forest Service roads. No attempt was made to determine the costs of maintaining the road system for State, Township, or OGM roads. Therefore, economic considerations as a risk factor are disproportionately weighted against Forest Service roads as compared to roads under other jurisdictions.

c) The benefit/risk analysis was run on all roads within the proclamation boundary. For the reason stated above, and the scope of the Forest-Wide Roads Analysis are Forest Service roads with a maintenance levels of 3, 4 or 5, only those roads will have recommendations and priorities set through the Forest-Wide Roads Analysis. Results of the benefit / risk analysis on all other roads will be used for comparison purposes only.

2. All questions are not of equal importance. There was considerable discussion as to whether all questions should be weighted equally. Ultimately, it was decided that they should be weighted equally. Nonetheless, the analysis is structured to provide ample opportunity to re-evaluate the questions using unequal weights, should the users of this analysis so desire. It is worth noting however, that during the Spring Creek Project analysis (USDA-FS, 2003), weighting of questions was examined, and it was determined that weighting was not changing where road segments fell into the matrix. Please see that roads analysis for further discussion of this topic. It should also be noted that the questions used provide some weighting. As an example, there are 14 risk questions for aquatics. There are 2 benefit questions for timber production.

3. The team reviewed the final list of "keep" questions that were considered relevant to the Forest Wide analysis area and that could be modeled (Table 23). It was noted that some questions, although relevant, were not as important because their elements were captured in other questions and could possibly be grouped with other questions, or they added only minor benefit/risk elements to the overall assessment. The team considered eliminating these to reduce the number of questions in the final modeling process. While eliminating questions from the analysis could gain some efficiency, the team finally agreed to use all of the relevant "keep" questions that could be modeled to produce this model of the road system and to obtain a better understanding of the process.

4. What other benefits are there to completing this analysis? This process and analysis can be used to document the changes in the benefits and risks associated with alternative actions developed in NEPA analysis. This analysis documents the existing condition, and makes recommendations for improving the road system, i.e., reducing the risk and increasing benefits for specific road segments. When taken forward into NEPA, it could show the net change of the benefits and risks of the road system for implementing each alternative.

5. The priorities are based on a scientific-based analysis. This analysis utilizes the science-based process developed for roads analysis (USDA-FS 1999). It should be noted that the Forest-Wide Roads Analysis ID team identified potential road segments for decommissioning prior to initiating this process. The results between the professional judgment and the calculated matrix were similar and are discussed below.

6. Automating the process. Because this process uses GIS, the potential exists to significantly automate the process. Criteria were developed that utilized forest-wide GIS coverages. This allowed the GIS system to perform the majority of the calculations in attributing the road system.

7. Appendix C - Figure C-1 provides a scatter plot of the benefit/risk data for all road segments. This was completed for various groups of road segments, and are shown as Appendix C - Figures C-1 to C-5, for all roads, municipal roads, Forest Service (FS) MLs 3, 4, & 5 roads, FS ML 1 & 2 roads, and all other roads, respectively. From Appendix C - Figure C-1, several general trends can be seen. It appears that as the benefits increase, so do the risks of the road segment. It would seem that in order to obtain those benefits, risks need to be taken or are inherent in acquiring additional benefits, otherwise, there would be road segments with low risks and high benefits. At lower benefits, lower risks are acceptable, but higher risks are not. Therefore, road segments with high risks and low benefits tend not to be constructed.

   It can also be noted that all roads have some risk associated with them. Simply by being there, a road has some potential for risk. Road location, design, and maintenance standards are intended to minimize the realization of risks. Roads are constructed to provide some benefit.

   From Appendix C - Figure C-2, it can be seen that the minimum benefit and risk is higher than for all road segments. It can also be seen that these segments comprise the group of segments that have the higher benefits.

   From Appendix C - Figure C-3, the same general trends noted for Appendix C - Figure C-1 are evident. The minimum benefit is higher than for all road segments, but not as high as for municipal roads.

   From Appendix C - Figure C-5, it can be seen that these road segments have significantly fewer benefits compared to all road segments, and that the risks are in a slightly smaller range as compared to all road segments. Again, the minimum benefit is higher than for all road segments, but not as high as for municipal roads.

   From Appendix C - Figure C-5, it can be seen that these road segments have significantly fewer benefits compared to all road segments, lower benefits are acceptable for road segments, and that the maximum risks are less than compared to all road segments.

8. As stated earlier, the GIS system chooses the breaks between high, medium and low. If the risks and benefits had been divided into thirds based on total possible score, (i.e. for risk – low = 0-27, medium = 28-56 and high = 57-81), it can be seen from Figure 8, that very few road segments would fit into the high-risk category. A more conservative division was needed. Therefore, the GIS system chose the thresholds between groups based on default settings and normal breaks.

ASSESSMENT OF THE POTENTIAL PROBLEMS AND OPPORTUNITIES OF BULIDING ROADS IN A CURRENTLY UNROADED AREA

This analysis provides an assessment of the relative importance of the 31 areas larger than 500 acres that are currently unroaded. The wildlife, recreation and aquatic values associated with these areas can be used in subsequent analyses as the basis for future management decisions for these blocks of land. In addition, there is a preliminary assessment of the potential for expanding the size of these unroaded blocks (through the decommissioning of existing road segments in adjacent areas).

A MAP AND LIST OF OPPORTUNITIES, BY PRIORITY, FOR ADDRESSING IMPORTANT PROBLEMS AND RISKS

Within the benefit/risk analysis, each road segment was assigned to a box in the matrix. Based on their location in the matrix, a preliminary recommendation was made for each road segment (Figure 8 & Appendix A - Map 32). Each road segment was then reviewed individually to determine if the preliminary recommendation was feasible, i.e., whether there were “decommission” segments sandwiched between “maintain” segments. Based on this review, no road segments were identified whose recommendations needed revising. Final recommendations are shown in Appendix A - Map 32 and Appendix B-Table B-7.

Priorities are based on first completing work on road segments with a high total benefit and a high total risk, Matrix Box 1. The road with the highest total risk and the higher total benefit was given a priority of 1. The road with the next highest risk and next highest benefit was given a priority of 2. Where segments existed with the same risk, the highest benefit was prioritized higher. Where both the risk and benefit were the same, the higher maintenance level was given a higher priority. All road segments in matrix box 1 were prioritized, then all the road segments in matrix box 2, etc. Thus the road segment with the lowest risk and the lowest benefit in matrix box 9 has the lowest priority. Appendix A - Map 33 shows the road segments with the top 20 priorities, the bottom 20 priorities, and then all other road segments by their matrix box. Each road segment’s priority is indicated in Appendix B - Table B-7.

The roads that were identified during the benefit risk analysis for possible decommissioning/ realignment/mitigation, matrix box 3, are shown below with any known pertinent information and preliminary recommendations based on that information if recommendation is obvious. If the recommendation is not obvious, no recommendation is made whether it should be decommissioned/realigned/mitigated.

- FR 139 – 0.4 miles

  This road is discussed in the County Line Fourmile Roads Analysis and was considered in the County Line Fourmile NEPA analysis for possible decommissioning.

- FR 142 – 1.4 miles

  This road is primarily used for timber access, and some sections are used to access private land. There are several miles of road off the end of this road that were not identified for decommissioning. Mitigation is the likely recommendation for this road.

- FR 144 – 0.4 miles

  This road is used primarily for access to private land. Mitigation is the likely recommendation for this road.

- FR 155 – 1.4 miles

  This is the end of FR 155 near Chapman Dam. This road is used by OGM. This road is closed to public traffic. This road may be analyzed in the Meades Mills Roads Analysis.

- FR 157 – 0.8 miles

  This is the section of FR 157 within the Buzzard Swamp area. This road is used for administrative management of the Buzzard Swamp area. Mitigation is the likely recommendation for this road. This road will be analyzed during the Brush Creek NEPA analysis.

- FR 191 – 0.8 miles

  This road is used primarily for administrative access to the Twin Lakes Recreation Area. The road is used occasionally for public traffic. This road forms the boundary between a management 3.0 and 6.1 area.

- FR 244 – 0.2 miles

  This is the road into the Farnsworth Fish Hatchery and administrative site. This road was resurfaced with limestone and the drainage upgraded in 2000. Mitigation is the likely recommendation for this road.

- Developed Recreation Site Roads – 7.7 miles

  This includes sections of FR 100 – Tidioute Overlook , FR 200 – Buckaloons, FR 284 – Loleta, FR 290 – Twin Lakes, FR 503 – Kiasutha, FR 602 – Willow Bay, FR 610 – Red Bridge, and many spurs to these roads. Mitigation will be the likely recommendation for these roads.

A Prioritized List of Specific Actions, Projects, or Forest Plan Adjustments Requiring NEPA Analysis

See the discussion in Item 3 above.

Programmatic Recommendations

Identification of Key Issues for Project Level Roads Analysis

Based on this assessment, the following are the key road related issues to be analyzed for access and/or impacts in project level roads analysis. The relevance of these issues may vary depending on the specific analysis area conditions:

- Aquatics
- Oil, Gas and Minerals
- Recreation
- Road management
- Road surfacing
- Safety
- Unroaded Areas
- Vegetation Management
- Wildlife

Disposition of FWRAP Questions

The questions addressed in Step 4 were reviewed by the ID Team to determine if the scope of the question was programmatic in nature, or whether it needs to be addressed in a site-specific context during project-level RAP analysis. The ID Team determined that some questions were adequately addressed in the FWRAP and will not need to be addressed in project RAP's, some will need to be addressed in all future RAP's, and others could be addressed if the specific resource situation occurs within the area being considered in the future RAP. Table 25 indicates the disposition of each question (FWRAP = address only in FWRAP; PROJ = address in all project-level RAP's; and PROJ? = evaluate site specific conditions and determine if question needs to be addressed or not)

Table 25. Disposition of the Roads Analysis Questions, 2003 *(See key at end of Table 23 for Question Codes).

Code	ROADS ANALYSIS QUESTIONS	Disposition
AQ 1	How and where does the road system modify the surface and subsurface hydrology of the area?	**PROJ**
AQ 2	How and where does the road system generate surface erosion?	**PROJ**
AQ 3	How and where does the road system affect mass wasting?	**PROJ**
AQ 4	How and where do road-stream crossings influence local stream channels and water quality?	**PROJ**
AQ 5	How and where does the road system create potential for pollutants, such as chemical spills, oils, de-icing salts, or herbicides to enter surface waters?	**PROJ**
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 delivery of sediments and chemicals, thermal increases, elevated peak flows)?	**PROJ**
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?	**PROJ**
AQ 8	How and where does the road system affect wetlands?	**PROJ**
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?	**PROJ**
AQ10	How and where does the road system restrict the migration and movement of aquatic organisms? What aquatic species are affected and to what extent?	**PROJ**
AQ11	How does the road system affect shading, litterfall, and riparian plant communities?	**PROJ?**
AQ12	How and where does the road system contribute to fishing, poaching, or direct habitat loss for at-risk aquatic species?	**PROJ**
AQ13	How and where does the road system facilitate the introduction of non-native aquatic species?	**PROJ**
AQ14	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?	**PROJ**
AQ15	Where do roads provide access to fishable waters? What are the benefits and risks associated with these roads?	**PROJ**
AU1	How does the road system affect access needed for research, inventory, and monitoring?	**FWRAP**
AU2	How does the road system affect investigative or enforcement activities?	**FWRAP**
CH1	How does the road system affect access to paleontological, archaeological, and historical sites and the values people hold for these sites?	**PROJ**
CH2	How does the road system and road management affect the exercise of American Indian treaty rights?	**FWRAP**

Code	ROADS ANALYSIS QUESTIONS	Disposition
CH3	How does road use and road management affect roads that constitute historic sites?	**PROJ?**
CR1	Is the road system used or valued differently by minority, low-income, or disabled populations than by the general population? Would potential changes to the road system or its management have disproportionate negative impacts on minority, low-income, or disabled populations?	**PROJ?**
EC1	What are the monetary costs associated with the current road system? How do these costs compare to the budgets for management and maintenance of the road system?	**FWRAP**
EC2	What are the indirect economic contributions of roads including market and non-market costs and benefits associated with road system design, management and operations?	**FWRAP**
EC3	What are the direct economic impacts of the current road system and its management upon communities around the forest?	**FWRAP**
EF1	What ecological attributes, particularly those unique to the region, would be affected by roading of currently unroaded areas?	**PROJ?**
EF2	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?	**PROJ**
EF3	To what degree do the presence, type, and location of roads contribute to the control of insects, diseases, and parasites?	**FWRAP**
EF4	How does the road system affect ecological disturbance regimes in the area?	**FWRAP**
EF5	What are the adverse effects of noise caused by developing, using, and maintaining roads?	**FWRAP**
GT1	How does the road system connect to public roads and provide primary access to communities?	**FWRAP**
GT2	How does the road system connect large blocks of land in other ownership to public roads (ad hoc communities, subdivisions, inholdings, and so on)?	**PROJ**
GT3	How does the road system affect managing roads with shared ownership or with limited jurisdiction? (RS 2477, cost-share, prescriptive rights, FLPMA easements, FRTA easements, DOT easements)?	**PROJ?**
GT4	How does the road system address the safety of road users?	**PROJ**
GT5	How does the road system address the safety of road users on joint use roads (e.g. snowmobile trails on roads)?	**PROJ?**
MM1	How does the road system affect access to locatable, leasable, and salable minerals?	**PROJ?**
MM2	How does the road system affect access to private minerals?	**PROJ**
MM3	How does the road system affect the availability and management of pits?	**PROJ**
PT1	How does the road system affect fuels management?	**FWRAP**
PT2	How does the road system affect the capacity of the Forest Service and cooperators to suppress wildfires?	**FWRAP**

Code	ROADS ANALYSIS QUESTIONS	Disposition
PT3	How does the road system affect risk to firefighters and to public safety?	**FWRAP**
PT4	How does the road system contribute to airborne dust emissions resulting in reduced visibility and human health concerns?	**PROJ?**
RM1	How does the road system affect access to range allotments?	**FWRAP**
RR1	Is there now or will there be in the future excess supply or excess demand for roaded recreation opportunities?	**FWRAP**
RR2	Is developing new roads into unroaded areas, decommissioning existing roads, or changing maintenance of existing roads causing substantial changes in the quantity, quality, or type of roaded recreation opportunities?	**PROJ?**
RR3	What are the adverse effects of noise and other disturbances caused by constructing, using, and maintaining roads on the quantity, quality, or type of roaded recreation opportunities?	**FWRAP**
RR4	Who participates in roaded recreation in the areas affected by road construction, changes in road maintenance, or road decommissioning?	**PROJ?**
RR5	What are these participants' attachments to the area, how strong are their feelings, and are alternative opportunities and locations available?	**PROJ?**
RR6	How does road management affect wilderness attributes, including natural integrity, natural appearance, opportunities for solitude, and opportunities for primitive recreation?	**PROJ?**
RR7	How does the road system affect the Scenery Management System (SMS)?	**PROJ**
SI1	Who are the direct users of the road system and of the surrounding areas? What activities are they directly participating in on the forest? Where are these activities taking place on the forest?	**PROJ**
SI2	Why do people value their specific access to national forest and grasslands - - what opportunities does access provide?	**FWRAP**
SI3	What are the broader social and economic benefits and costs of the current forest road system and its management?	**FWRAP**
SI4	How does the road system and road management contribute to or affect people's sense of place?	**FWRAP**
SI5	What are the current conflicts between users, uses, and values (if any) associated with the road system and road management? Are these conflicts likely to change in the future with changes in local population, community growth, recreational use, resource developments, etc?	**FWRAP**
SP1	How does the road system affect access for collecting special forest products?	**PROJ?**
SU1	How does the road system affect managing special-use permit sites (concessionaires, communications sites, utility corridors, and so on)?	**PROJ?**
TM1	How does road spacing and location affect logging system feasibility?	**FWRAP**
TM2	How does the road system affect managing the suitable timber base and other lands?	**PROJ?**

Code	ROADS ANALYSIS QUESTIONS	Disposition
TM3	How does the road system affect access to timber stands needing silvicultural treatment?	**PROJ?**
TW1	What are the direct effects of the road system on terrestrial species habitat?	**PROJ**
TW2	How does the road system facilitate human activities that affect habitat?	**PROJ**
TW3	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?	**PROJ**
TW4	How does the road system directly affect unique communities or special features in the area?	**PROJ?**
UR1	Is there now or will there be in the future excess supply or excess demand for unroaded recreation opportunities?	**FWRAP**
UR2	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?	**PROJ?**
UR3	What are the adverse effects of noise and other disturbances caused by developing, using, and maintaining roads on the quantity, quality, and type of unroaded recreation opportunities?	**PROJ?**
UR4	Who participates in unroaded recreation in the areas affected by constructing, maintaining, and decommissioning roads?	**PROJ?**
UR5	What are these participants' attachments to the area, how strong are their feelings, and are alternative opportunities and locations available?	**PROJ?**
UR6	How is developing new roads into unroaded areas affecting the Scenery Management System (SMS)?	**PROJ?**
WP1	How does the road system affect access, constructing, maintaining, monitoring, and operating water diversions, impoundments, and distribution canals or pipes?	**PROJ?**
WP2	How does road development and use affect the water quality in municipal watersheds?	**PROJ?**
WP3	How does the road system affect access to hydroelectric power generation?	**PROJ?**
WP4	How does road development and use affect the water quality of domestic water supplies?	**PROJ?**

Project Level Recommendations By Category

Many of the answers to questions raised in Step 4 provided recommendations that should be considered during project level analysis. Some of these recommendations may appear to be in conflict with one another as the recommendation generally is made in response to an individual resource concern. The appropriate time to resolve these apparent conflicts is when project level decision-making takes place. The consideration of site-specific needs and trade-offs will influence how these recommendations are to be applied. Some of these recommendations could also be considered for addition as standards and guidelines during Forest Plan revision.

Road location:

- Modify the road system where possible to reduce the miles of road located on Group III soils.
- Locate new roads and relocate existing roads to reduce the road grade and slope perpendicular to the road.
- Construct or realign roads off of steep colluvial soils and areas of historic landslides;
- Avoid cutting through weak geological formations when building or maintaining a road;
- Construct and realign roads so that back and fill slopes will be minimized;
- Consider decommissioning or realigning roads located within floodplains.
- Realign roads off upper bottom and DS3 ELT's.
- Realign roads away from National Wetlands Inventory sites.
- Work with OGM to eliminate roads within 300 feet of streams.

Road Design:

- Increase the number and effectiveness of drainage structures.
- Armor drainage structure outlets.
- Consider improveing the road surface by adding gravel, limestone, or paving it
- Consider installation of waterbars or broad-based drivable dips to divert water that could cause road erosion;
- Install erosion mitigations, such as mulch and windrowed slash, on exposed back and fill slopes.
- Design proper road drainage to avoid too much excess water in a given area.
- Apply limestone surfacing to road segments within 300 feet of a stream channel.
- Size culverts and bridges to pass at least a 50-year flood event (with a headwater depth to culvert diameter (HW/D) of 1.0) and match the width of the bankfull channel.
- Design road/stream crossings to convey streamflow over the road and back into the channel downstream rather that down the road if it were overtop (e.g. eliminate diversion potential using a drivable dip).
- Reduce the use of surfacing oils and eliminate chemicals used to control vegetation on road segements within 300 feet of a stream channel and where hydrologically connected, and excluded use from all roads within the Big Mill Creek municipal watershed. Talk with State (DEP & PENNDOT) and Townships about reducing or eliminating the use of these potential contaminants along "riparian" roads that they maintain (e.g. SR 666).
- During project level roads analysis, evaluate the hydrologic connection between the road network and the stream network. Reduce connectivity by placing ditch relief culverts at frequent intervals on crossing approaches and allow adequate filtering potential. Improve filtering where needed by using slash below the outlet and sediment basins where appropriate.
- Minimize the height of road fill at all stream crossings to be overtopped during a flood event thus allowing flow and debris to go over the road and into the channel with minimal disturbance (e.g. high water ford).
- Brush the road when needed.

Road Management:

- Consider closing or restricting roads to minimize adverse impacts to wildlife species that require solitude or mimimal disturbance
- Consider restricting or closing roads over perennial streams.
- Consider opening more roads for fishing access.
- Consider opening more road segments to public traffic or for Disabled hunter access roads.
- Consider closing or restricting roads to public traffic.
- Consider reducing joint-use or joint use of roads open to the public for ATV or snowmobile use by closing trails or constructing trails off of roads.
- Continue inventory efforts to evaluate the extent of noxious weed and invasive plant species of concern across the ANF.
- Incorporate non-native invasive species prevention and control into road management and maintenance
- Treat non-native invasive species accessed by proposed decommissioning and rreclamation project before roads are decommissioned. Reinspect and follow-up based on initial inspection and documentaiton.
- Train road maintenance staff to recognize non-native invasive species and report locations to the forest botanist.

Costs:

- Continue emphasis on protection of water resources.
- 10% funding is a new source of income for road management and maintenance. This funding source was first available in 1998. The forest made a decision when this funding became available to fund trail projects as a priority over funding road projects. This should continue as the priority.
- The funding for road management and maintenance is dependent on the timber sale program. Nearly $1,500,000 of the annual income stated can be tied directly or indirectly to the timber program. Over the past several years, the timber program has fluctuated for various reasons. This has impacted the Forest's ability to maintain many of the roads on the forest. Include road related work in Timber Sales to the extent practacle and prudent.
- Monitor CWFS maintenance rates and adjust as necessary.
- Continue INFRA, adjusting costs and work items as projects are completed or needed.

Specific Projects Identified:

- Sediment reduction projects on FR297 and FR854 in Big Mill Creeek Watershed
- Work with the Townships, landowners, and other interested parties to eliminate the following Rights of Way / Jurisdiction concerns on a willing seller, willing buyer basis:
    - Mayburg Bridge
    - Westline, Forest Road 122
    - Mudlick, Forest Road 141
    - Warrpenn (near Morrison Run), Forest Road 156

    - Libby Road, Forest Road 455
    - Tollgate (at Sheffield), FR 620

- The following are the priority Public Forest Service Road Projects identified:

    - Recreation Trailhead / Vista / Pulloffs
    - FR 437 Adams Run
    - FR 126 Kealor
    - *FR 191 Twin Lakes*
    - *FR 123 Dahoga*
    - *FR 116 Dunham Siding*
    - *FR 133 Ludlow JoJo*
    - *FR 173 Marshwillow*
    - *FR 176 Bucklick*
    - *FR 160 Hook Run*

Unroaded Areas:

Through this assessment, 31 unroaded areas were identified on Allegheny National Forest administered land. These areas are defined as being more than ¼ mile from an existing classified road and having an area greater than 500 acres. These 31 areas total 34,077 acres. These unroaded areas are separate from Inventoried Roadless Areas.

Each Inventoried Roadless Area and unroaded area was evaluated against several criteria in each of three resource areas – recreation, wildlife and aquatics – for the purpose of assigning an index. The index can be used as a indicator of how well a particular area provides for unroaded values associated with each resource. This assessment will provide a framework for project level NEPA analysis to compare unroaded areas within the project to other unroaded areas across the forest.

Public Recommendations

We received numerous comments with suggestions for improvements or changes on specific roads. These suggestions will be summarized here (Table 26) so they may be considered in subsequent project-level analyses as time and scheduling permits.

Table 26: Road Recommendations received from the public, ANF, 2003.

Road Improvement	Open For Hunting	Trash Dumping	Road Closures	Snowmobile Use
FR 116	*FR 245*	*FR 127*	*FR 111*	*FR 114*
FR 122 – 2 Lane	*FR 534*	*FR446A*	*FR 250*	*FR 145*
FR 124 – limestone	*FR 535*	*FR 444*	*FR 251*	*FR 150*
FR 126			*FR 411*	*FR 155*
FR 130			*FR 419*	*FR 160*
FR 137 – 2 Lane			*FR 420*	*FR 250*
FR 150 – 2 Lane			*FR 453*	*FR 252*
FR 271 – 2 Lane			*FR 573*	*FR 253*
FR 321 – 2 Lane			*Tionesta Scenic Area*	
FR 437				
FR 615				

ANF FOREST-WIDE ROADS ANALYSIS CONCLUSIONS

The following six questions from Miscellaneous Report FS-643 titled Roads Analysis: Informing Decisions about Managing the National Forest Transportation System (USDA-FS 1999) were used as a guide to summarize the conclusions from the Forest-wide Roads Analysis.

1) Does the existing system of roads create an unacceptable risk to ecosystem sustainability?

Unacceptable risk is based on legal, social and policy criteria. Based on the responses to the questions in Step 4, the existing road system within the ANF analysis area does not create an unacceptable risk to ecosystem sustainability.

2) Can the maintenance requirements of the existing system be met with current and projected budgets?

Forest Service roads:

Based on the analysis shown in EC1, currently, the road management and maintenance needs can be met with current and projected budgets. Prior to 10% funds, the maintenance budgets had not been adequate to maintain the road system to an adequate level. Some roads were closed or their use restricted to reduce the level of maintenance needed. Additionally, some maintenance has been "deferred" until it could be included within a timber sale. The inception of 10% funds has allowed the forest to match funding with maintenance needs. When/if additional funding sources become available (PFSR), the estimated backlog of deferred maintenance can be reduced.

State/Township roads:

Historically, the Commonwealth of Pennsylvania and the local townships do not have adequate funding to maintain the current road system. This is evidenced by the continual low ratings for Pennsylvania for road conditions. While Pennsylvania has shown a vast improvement in the condition of its roads, it continues to rank near the bottom for road conditions. This scenario is expected to continue into the future. The high cost of maintaining the State highway system can be shown by an example from the area. In Bradford, US 219 needs reconstruction. The estimated cost of this one project is $85 million dollars. This one project dwarfs the entire ANF's deferred maintenance road needs of $16,300,000.

3) Are some existing roads not needed to meet projected access needs?

An analysis was completed to determine the minimum road system needed to meet management objectives. This analysis included a determination of which roads were needed to meet specific resource needs. The resources included within this analysis and shown in Appendix A included:

1. Hunting Access (including Disabled Hunter Access) - Maps 34 & 35
2. Wildlife Management Access - Map 36
3. Timber Access (now) - Map 37
4. Timber Access (future) - Map 38
5. OGM Access - Map 24

6. Special Uses - Map 25
7. Access to Private Land - Map 9
8. Dispersed Recreation Access – Map 27
9. Developed Recreation Access – Map 28
10. Fishing Access - Map 39

Based on this analysis, all the Forest Service maintenance level 3, 4 and 5 roads were needed for access for at least one resource.

As part of the benefit/risk analysis, the high risk/low benefit road segments were examined to determine if they should be candidates for decommissioning. The road segments that the interdisciplinary team determined as being candidates for decommissioning are shown on Map 32 in Appendix A. These road segments are more fully discussed in Step 5 part 3.

4) If new access is proposed, what are the expected benefits and risks?

This assessment does not propose any new roads. Any proposed additions to the transportation system in project level roads analysis will be analyzed through the NEPA process. The benefits and risks of providing new access in a particular area will be evaluated during the NEPA process.

5) What opportunities exist to change the road system to reduce the problems and risks or to be more consistent with forest plan direction and strategic intent of the roads system?

This analysis includes recommendation and priorities on every Forest Service ML 3, 4 and 5 road. Implementing the recommendations shown on Appendix A-Map 32 and Appendix B-Table B-7 will reduce the problems and potential risks of the road system. The priorities for each road segment are indicated on Appendix A-Map 33. These priorities are based on addressing the highest risk road segments first. Implementing the standard mitigation measures of the forest plan and/or the deferred maintenance identified in the deferred maintenance surveys will bring the road system in line with forest plan direction and strategic intent of the road system.

The Forest-Wide Roads Analysis area includes Forest Service administered land assigned to all of the Management Areas. Forest Plan direction for road management in these MAs is summarized in Table 4. Road density for Forest Service system roads within the each management area were calculated and are shown in Table 3. All of these road densities are well within Forest Plan Standards and Guides (USDA-FS 1986a). These road densities were calculated by taking the miles of road and dividing by the square miles in the project area and management area. This results in one average (discrete) value for the entire area. This has been the standard method used for calculating road densities cited in the literature including the 1986 Forest Plan and monitoring reports.

In the Forest-Wide Roads Analysis, road density variation was calculated on a more site specific basis using a new methodology. Using GIS, the forest was divided into 30 meter by 30 meter pixels (approximately 100 feet by 100 feet). Each pixel was assigned a value based on whether a road was present in the pixel or not. The computer then took each of those pixels, one at a time, and summed the number of pixels that had a road present within a one mile block centered around each pixel. Thus, each 30 meter by 30 meter pixel, had a road density assigned to it. This methodology produces a map that displays road density variation across an area.

Using this method, total road density variation (i.e., all roads-including private, OGM, and Forest Service) within the Forest-Wide Roads Analysis project boundary ranges from 0 to 18.7 miles/square mile (Appendix A-Map 4a), with the highest road densities occurring Warren, Bradford and the Sackett oil and gas field. Only 29.7% of the roads contributing to the total road density are Forest Service administered roads.

Forest Service system road density variation ranges from 0 to 8.9 miles/square mile within the ANF proclamation boundary (Appendix A-Map 4f). The highest densities of Forest Service roads are related to developed recreation areas.

Based on the older averaging method, road densities for Forest Service system roads meet Forest Plan direction for all management areas within the roads analysis area. Based on the newer site specific method using GIS, road density variation would appear to exceed Forest Plan direction in some areas within the Forest-Wide Roads Analysis area. However, because two different methods were used to calculate road density, their numerical values cannot be directly compared. The road density variation values should not be used to determine consistency with management area direction because they are calculated using a different methodology. The newer method is useful to identify or highlight areas where road density or the effects of high road density may be a concern.

6) Are additional roads or improved roads needed to improve access for forest use or protection, or to improve the efficiency of forest use or administration?

No additional roads were identified for forest protection or to improve the efficiency of forest use or administration.

Several existing roads were identified for improvement to increase the efficiency of forest use. These roads are identified within the discussion on Public Forest Service Roads.

NEPA Analysis Needs

Any road recommendation requiring road construction, realignment, improvement or changes in road management will require NEPA analysis.

ANF Forest-wide Roads Analysis Comparison with Program Direction

There was specific direction on several items that were to be considered during the Forest-Wide Roads Analysis (FSM 7712.13b). That direction, and a synopsis of the results are shown below.

This analysis will consider:

Environmental issues potentially affected by road management proposals, such as soil and water resources, ecological processes, invasive species spread, and biological communities.

- Issues were developed in Step 3, addressed in Step 4 and recommendations summarized in Step 5.

Social issues potentially affected by road management proposals such as socio-economic impacts, public access, and accessibility for handicapped persons.

- Issues were developed in Step 3, addressed in Step 4 and recommendations summarized in Step 5.

An evaluation of the transportation rights-of-way acquisition needs.

- This was developed as an issue in Step 3, addressed in Step 4, question GT3, with recommendations summarized in Step 5.

The interrelationship of State, County, Township, Tribal, and other Federal agency transportation facility effects on land and resource management plans and resource management programs.

- This is discussed in Step 4, question GT1 and 2.

Transportation investments necessary for meeting resource management plans and programs.

- This is discussed in Step 4, question EC1.

Current and likely funding levels available to support road construction, maintenance, and decommissioning.

- This is discussed in Step 4, questions EC1.

There was specific direction on items that were to be included within the Forest-Wide Roads Analysis Report (FSM 7712.13b). These items and a synopsis of the results are:

Inventory and map all classified roads, and display how these roads are intended to be managed.

- Classified roads include: State, Township, privately owned roads, National Forest System roads, and other roads authorized by the Forest Service.
- The ANF has mapped all the State, Township, National Forest System roads.
- The ANF has mapped over 1,236 miles of privately owned or other roads authorized by the Forest Service on Forest Service administered land. We estimate that this is between 85 and 90 percent of these roads. In preparation for project level roads analysis, areas will continue to be analyzed for other private and other authorized roads.
- The existing road system and it's management are shown on maps included within Appendix A.

Provide guidelines for addressing road management issues and priorities related to construction, reconstruction, maintenance, and decommissioning.

- These guidelines are included within the discussion on the benefit risk matrix analysis.
- The ANF will emphasize addressing road segments with the highest risks first.

Identify significant social and environmental issues, concerns, and opportunities to be addressed in project level decisions.

- These are identified in Step 5 recommendations. Based on this assessment, the following are the key road related issues to be analyzed for access and/or impacts in project level roads analysis. The relevance of these issues may vary depending on the specific analysis area conditions:
    - Aquatics
    - Oil, Gas and Minerals
    - Recreation
    - Road management
    - Road surfacing
    - Safety
    - Unroaded Areas

- Vegetation Management
- Wildlife

Document coordination efforts with other government agencies and jurisdictions.

- This is included within Step 4 question GT1 discussion.

STEP 6 REPORTING

Purpose and Products

The purpose of this step is to:

- Report the key findings of the analysis.

The products of this step are:

- A report including maps, analyses, and text documentation of the roads analysis;
- Maps that show the data and information used in the analysis, and the opportunities identified during the analysis.

Report

This report was reviewed by personnel from the Allegheny National Forest and shared with other offices in the Forest Service that are also working on roads analysis. This report is available to the public upon request.

Maps

A list of all maps used for this report is included in Appendix A. Maps are included as separate documents.

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GLOSSARY

Alfisol - Soils with gray to brown surface horizons, medium to high supply of bases, and B horizons of illuvial clay accumulation. These soils form mostly under forest or savanna vegetation in climates with slight to pronounced seasonal moisture deficit (Brady 1990).

Alluvium - A general term for clay, silt, sand, gravel, or similar unconsolidated detrital material deposited during comparatively recent geologic time by a stream or other body of running water as a sorted or semisorted sediment in the bed of the stream (McNab & Avers 1994).

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

Arterial Road - Provides service to large land areas. Connects arterials to local roads or terminal facilities (USDA-FS 1999).

At-Risk-Species - Those species included on the Regional Forester Sensitive Species list and/or are Federally listed threatened and endangered species.

Bridge - A road or trail structure, including supports, erected over a depression or an obstruction, such as water, a road, a trail, or railway, and having a deck for carrying traffic or other loads.

CFR - Code of Federal Regulations.

Classified Road-Roads wholly or partially within or adjacent to National Forest System lands that are determined to be needed for long-term motor vehicle access, including State roads, county roads, privately owned roads, National Forest System roads, and other roads authorized by the Forest Service (36 CFR 212.1).

Closed Road - A road closed to motorized public traffic (USDA-FS 1986).

Collector Road - Serves smaller land areas than arterial roads. Connects arterials to local roads or terminal facilities (USDA-FS 1999).

Colluvium - A general term applied to any loose, heterogeneous, and incoherent mass of soil material and/or rock fragments deposited by rainwash, sheetwash, or slow continuous downslope creep, usually collecting at the base of gentle slopes or hillsides (McNab & Avers 1994).

Culvert - A conduit or passageway under a road, trail, or other obstruction. A culvert differs from a bridge in that it is usually constructed entirely below the elevation of the traveled way.

Deferred Maintenance - Maintenance that was not performed when it should have been or when it was scheduled and which, therefore, was put off or delayed for a future period. When allowed to accumulate without limits or consideration of useful life, deferred maintenance leads to deterioration of performance, increased costs to repair, and decrease in asset value. Deferred maintenance needs may be categorized as critical or noncritical at any point in time. Continued deferral of noncritical maintenance will normally result in an increase in critical deferred maintenance. Code compliance (e.g. life safety, ADA, OSHA, environmental, etc.), Forest Plan Direction, Best Management Practices, Biological Evaluations other regulatory or Executive Order compliance requirements, or applicable standards not met on schedule are considered deferred maintenance.

DEP - Department of Environmental Protection – state government agency charged with protecting Pennsylvania's environmental and natural resources.

Deposition - The process of leaving material in a new position by transport agents such as water, wind, ice, or gravity.

Design Speed - The speed determined for design and correlation of the physical features of a route that influence vehicle operation. The maximum safe speed that the design vehicle can maintain over a specified segment of a route when conditions are so favorable that the design features of the road, rather than operational limitations of the vehicle, govern. The design speed is the safe speed for the design situation only *(FSH 7709.56, Sec 4.25 - Road Preconstruction Handbook).*

Dispersed Recreation - Lands and waters under Forest Service jurisdiction that are not developed for intensive recreation use. Dispersed areas include general undeveloped areas, roads, trails, and water areas not treated as developed sites (Lewis Run EIS).

Ecological Land Types - An area of land with distinct combination of natural, physical, chemical, and biological properties.

Endangered Species - Any species that is in danger of extinction throughout all or a significant part of its range. Endangered species must be designated in the Federal Register (Lewis Run EIS).

Entisol - Soils have no diagnostic pedogenic horizons. They may be found in virtually any climate on very recent geomorphic surfaces (Brady 1990).

Erosion - The wearing away of the land surface by running water, wind, ice, and other geological agents. The detachment and removal of soil from the land surface by wind, water, or gravity (Lewis Run EIS).

Extirpation - To remove completely from a particular area.

Floodplain - The surface or strip of relatively smooth land adjacent to a river channel, constructed by the present river in its existing regimen and covered with water when the river overflows its banks (McNab & Avers 1994).

Fluvial Erosion - Erosion caused by rivers or streams.

Forest Plan - Allegheny National Forest Land and Resource Management Plan (Forest Plan) – A plan developed and approved in April 1986 to meet the requirements of the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended (95-125, 129, 130). This plan guides all natural resource management activities and establishes management activities, standards, and guidelines for the Allegheny National Forest (Lewis Run EIS).

Forest Road - As defined in Title 23, Section 101 of the United States Code (23 U.S.C. 101), any road wholly or partly within, or adjacent to, and serving the national forest system and which is necessary for the protection, administration, and utilization of the national forest system and the use and development of its resources.

Forest Transportation Atlas - An inventory, description, display, and other associated information for those roads, trails, and airfields that are important to the management and use of National Forest System lands or to the development and use of resources upon which communities within or adjacent to the National Forests depend *(36 CFR 212.1).*

Forest Transportation Facility - A classified road, designated trail, or designated airfield, including bridges, culverts, parking lots, log transfer facilities, safety devices and other transportation network appurtenances under Forest Service jurisdiction that is wholly or partially within or adjacent to National Forest System lands *(36 CFR 212.1, FSM 7705 - Transportation System).*

Forest transportation system management - The planning, inventory, analysis, classification, recordkeeping, scheduling, construction, reconstruction, maintenance, decommissioning, and other operations undertaken to achieve environmentally sound, safe, cost-effective, access for use, protection, administration, and management of national forest system lands.

Geographic Information System (GIS) - Computer software that makes possible the visualization and manipulation of spatial data, and links such data with other information.

Geomorphology - Branch of geology that deals with the nature and origin of surface landforms such as mountains, valleys, plains, and plateaus.

Gullying - The process whereby water accumulates in narrow channels and over short periods, removes the soil from this narrow area to various depths, from about 1 foot to as much as 100 feet.

High Clearance Road - Suitable for standard pick-up truck travel.

High Scenic Integrity Level - A scenic integrity level meaning human activities are not visually evident. In high scenic integrity areas, activities may only repeat attributes of form, line, color, and texture found in the existing landscape character.

Inceptisol - Soils that are usually moist with pedogenic horizons of alteration of parent materials but not of illuviation. Generally, the direction of soil development is not yet evident from the marks left by various soil-forming processes or the marks are too weak to classify in another order.

INFRA Travel Routes Database - A standardized, computerized database of Forest Service road information. This database includes information on the location, standard, management, maintenance, and costs associated with each road.

Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) - Covers the Federal-aid Highway program including highways and bridges, Federal lands highways, and special projects such as Rural and Urban Access, Priority Intermodal and Innovative Projects.

Invasive Species - Are species that have been introduced into an environment in which they did not evolve and thus have no natural enemies to limit their reproduction and spread.

Inventoried Roadless Area (IRA) - Are specific areas on the forest that met the minimum criteria for wilderness consideration under the Wilderness Act and that were inventoried during the Forest Service's Roadless Area Review and Evaluation (RARE II) process and subsequent assessments. The ANF has seven IRAs consisting of approximately 25,000 acres which include: Tracy Ridge, Allegheny Front, Clarion River, Cornplanter, Minister Valley, Hearts Content, and Verbeck Island

Jurisdiction - The legal right to control or regulate use of a transportation facility. Jurisdiction requires authority, but not necessarily ownership. The authority to construct or maintain a road may be derived from fee title, an easement, or some other similar method *(FSM 7705 - Transportation System).*

Landform - Any physical, recognizable form or feature of the earth's surface, having a characteristic shape, and produced by natural causes (FSH 2090.11).

Landscape Character - Particular attributes, qualities, and traits of a landscape that give it an image and make it identifiable or unique.

Landscape Visibility - Accessibility of the landscape to viewers, referring to one's ability to see and perceive landscapes.

Landslide - A form of mass wasting that consists of a mass of soil, rock, or debris that moves rapidly down slope, often associated by water when the material is saturated.

Local Road - Serves smaller land areas than collector roads. Connects to other roads or terminal facilities.

Low Clearance Road - Suitable for passenger car travel.

Maintenance Level - Defines the level of service provided by, and maintenance required for, a specific road, consistent with road management objectives and maintenance criteria *(FSH 7709.58, Sec 12.3 - Transportation System Maintenance Handbook).*

Maintenance Level 1 - Assigned to intermittent service roads during the time they are closed to vehicular traffic. The closure period must exceed 1 year. Basic custodial maintenance is performed to keep damage to adjacent resource to an acceptable level and to perpetuate the road to facilitate future management activities. Emphasis is normally given to maintaining drainage facilities and runoff patterns. Planned road deterioration may occur at this level. Appropriate traffic management strategies are "prohibit" and "eliminate". Roads receiving level 1 maintenance may be of any type, class or construction standard, and may be managed at any other maintenance level during the time they are open for traffic. However, while being maintained at level 1, they are closed to vehicular traffic, but may be open and suitable for non-motorized uses.

Maintenance Level 2 - Assigned to roads open for use by high clearance vehicles. Passenger car traffic is not a consideration. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation, or other specialized uses. Log haul may occur at this level. Appropriate traffic management strategies are either discourage or prohibit passenger cars or accept or discourage high clearance vehicles.

Maintenance Level 3 - Assigned to roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. Roads in this maintenance level are typically low speed, single lane with turnouts and spot surfacing. Some roads may be fully surfaced with either native or processed material. Appropriate traffic management strategies are either "encourage" or "accept." "Discourage" or "prohibit" strategies may be employed for certain classes of vehicles or users.

Maintenance Level 4 - Assigned to roads that provide a moderate degree of user comfort and convenience at moderate travel speeds. Most roads are double lane and aggregate surfaced. However, some roads may be single lane. Some roads may be paved and/or dust abated. The most appropriate traffic management strategy is "encourage." However, the "prohibit" strategy may apply to specific classes of vehicles or users at certain times.

Maintenance Level 5 - Assigned to roads that provide a high degree of user comfort and convenience. Normally, roads are double-lane, paved facilities. Some may be aggregate surfaced and dust abated. The appropriate traffic management strategy is "encourage."

Management Area (MA) - A land area that has a common management direction to achieve a common goal. Examples are:

MA 1.0 – early successional emphasis

MA 3.0 – sustained yield of high-quality hardwood sawtimber; variety of age classes with emphasis on deer and turkey.

MA 6.1 – emphasis on continuous canopy and dispersed recreation.

MA 6.3 – emphasis on intensive wildlife management and dispersed recreation.

Mass Wasting - A general term for a variety of processes by which large masses of earth material are moved by gravity from one place to another. Included are land slips, slides, mud flows, rock falls, talus, dry ravel, and soil creep.

National Environmental Protection Act (NEPA) - Establishes a national policy to encourage productive and enjoyable harmony between humankind and the environment, to promote efforts that will prevent or eliminate damage to the environment and stimulate the health and welfare of humans, to enrich the understanding of the ecological systems and natural resources important to the nation, and to establish a Council on Environmental Quality.

National Forest System Road -A classified forest road under the jurisdiction of the Forest Service. The term "National Forest System roads" is synonymous with the term "forest development roads" as used in 23 U.S.C. 205 *(FSM 7705 - Transportation System).*

National Recreation Area (NRA) - The ANF has one congressionally designated NRA encompassing approximately 23,000 acres, which contains portions of the Cornplanter, Tracy Ridge, and Allegheny Front Areas of the forest. All Forest Service roads are closed within the NRA except those classified roads serving developed recreation areas.

Natural-appearing Landscape Character - Landscape character the has resulted from human activities, yet appear natural, such as historic conversion of native forests into farmlands, pastures, and hedgerows that have reverted back to forests through reforestation activities or natural regeneration.

Noncritical Need - A requirement that addresses potential risk to public or employee safety or health, compliance with codes, standards, regulations etc., or needs that address potential adverse consequences to natural resources or mission accomplishment *(Financial Health - Common Definitions for Maintenance and Construction Terms, July 22, 1998).*

Odonates - Dragonflies and damselflies belonging to the order Odonata.

OGM – Oil, Gas, and Minerals.

Open for Public Travel - The road section is available and passable by four-wheeled standard passenger cars, and open to the general public for use without restrictive gates, prohibitive signs, or regulation other than restrictions based on size, weight or class of registration, except during scheduled periods, extreme weather or emergency conditions *(23 CFR 460.2(c)).*

Potential Natural Vegetation - The vegetation that would exist today if man were removed from the scene and if the plant succession after his removal were telescoped into a single moment. The time compression eliminates the effects of future climatic fluctuations, while the effects of man's earlier activities are permitted to stand (McNab & Avers 1994).

Private Road - A road under private ownership authorized by easement to a private party, or a road which provides access pursuant to a reserved or private right *(FS-643, Roads Analysis; Informing Decisions About Managing the National Forest Transportation System, August 1999).*

Proclamation Boundary – The exterior boundary, designated by Congress, for the ANF in which acquisition of land is authorized.

Public Authority - A Federal, State, county, town or township, Indian tribe, municipal or other local government or instrumentality thereof, with authority to finance, build, operate or maintain toll or toll-free highway facilities *(23 CFR 460.2(b))*.

Public Forest Service Road (PFSR) - Is a designated public road under Forest Service jurisdiction that meets the definition of 23 U.S.C. Section 101. "Designation" means identification, and inclusion in a network, of those Forest Service roads meeting the criteria of a PFSR and recorded officially in the Forest Service Infra database.

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

Rainsplash - The spattering of small soil particles caused by the impact of raindrops on very wet soils. With each splash soil particles are moved and continued rainsplash will cause soil particles to move downhill. The loosened and spattered particles may also be carried in sheet flow.

Regional Forester Sensitive Species (RFSS) - A list of species that include Federally designated threatened and endangered species, and species determined to be at-risk based on their abundance, range, population vulnerability, population trend, and habitat integrity. A valid species is recognized by taxonomic experts and at there is at least one documented occurrence within the proclamation boundary.

Restricted Road - Roads open only for a portion of the year to motorized public traffic (USDA – FS, 1986, p4-85).

Right-of-way (ROW) - A general term denoting: the privilege to pass over land in some particular line (including easement, lease, permit, or license to occupy, use or traverse public or private lands).

Rill Erosion - An erosion process in which numerous small channels of only several centimeters in depth are formed.

Riparian Area - Are composed of aquatic ecosystems, riparian ecosystems and wetlands. They have three dimensions: longitudinal extending up and down streams and along the shores; lateral to the estimated boundary of land with direct land-water interactions; and vertical from below the water table to above the canopy of mature site-potential trees (Verry *et al*. 2000).

Road - A motor vehicle travelway over 50 inches wide, unless designated and managed as a trail. A road may be classified, unclassified, or temporary (36 CFR 212.1).

Road Construction (new) - Activity that results in the addition of forest classified or temporary road miles (36 CFR 212.1).

Road Decommissioning - Activities that result in the stabilization and restoration of unneeded roads to a more natural state (36 CFR 212.1), (FSM 7703). A road can be decommissioned by applying one or more of the following treatments: 1) Reestablishing former drainage patterns, stabilizing slopes, and restoring vegetation; 2) Blocking the entrance to a road; installing water bars; 3) Removing culverts, reestablishing drainage-ways, removing unstable fills, pulling back road shoulders, and scattering slash on the roadbed; 4) Completely eliminating the roadbed by restoring natural contours and slopes; or 5) Other methods designed to meet the specific conditions associated with the unneeded roads.

Road Improvement - An activity that results in an increase of an existing road's traffic service level, expansion of its capacity, or a change in its original design function.

Road Maintenance - The ongoing upkeep of a road necessary to retain or restore the road to the approved road management objective (FSM 7712.3).

Road Realignment - An activity that results in a new location of an existing road or portions of an existing road and treatment of the old roadway.

Road Reconstruction - Activity that results in improvement or realignment of an existing classified road. Including:

a. Road Improvement Activity that results in an increase of an existing road's traffic service level, expands its capacity, or changes its original design function.

b. Road Realignment Activity that results in a new location of an existing road or portions of an existing road and treatment of the old roadway (36 CFR 212.1).

Road Restoration- (term no longer used) - Investment in construction activity required to rebuild a road to its approved traffic service level (FSM 7705).

Roadbed - The graded portion of a road between the intersection of subgrade and side slopes, excluding that portion of the ditch below the subgrade.

Rockfall - Occurs along steep cliffs where material breaks loose and reaches the valley floor by free fall, bounding, and rolling. The movement is very fast and can vary in size from single rocks to millions or cubic yards of material.

Scenic Attractiveness - The scenic importance of a landscape based on human perceptions of the intrinsic beauty of landform, rockform, waterform, and vegetation pattern. Reflects varying visual perception attributes of variety, unity, vividness, intactness, coherence, mystery, uniqueness, harmony, balance, and pattern. It is classified as: A – Distinctive, B – Typical or common, C – Undistinguished.

Scenic Integrity - State of naturalness or, conversely, the state of disturbance created by human activities or alteration. Integrity is stated in degrees of deviation from the existing landscape character in a national forest.

Sedimentation - The process by which materials carried in water are deposited.

Sheet Erosion - The removal of a fairly uniform layer of soil from the land surface by runoff water.

State Wilderness Trout Stream - A surface water designated by the Fish and Boat Commission to protect and promote native trout fisheries and maintain and enhance wilderness esthetics and ecological requirements necessary for the natural reproduction of trout.

Temporary Road - Roads authorized by contract, permit, lease, other written authorization, or emergency operation, not intended to be a part of the forest transportation system and are not necessary for long-term resource management (36 CFR 212.1).

Threatened Species - Any specie which is likely to become endangered within the foreseeable future through all or a significant portion of its range, including species categorized as rare, very rare, or depleted (Lewis Run EIS).

Traffic Service Level (TSL) - Describes the significant characteristics and operating conditions of a road *(FSH 7709.56, Ch 4 - Road Preconstruction Handbook, FSM 7705 - Transportation System).*

TSL A: Free flowing, mixed traffic; stable, smooth surface; provides safe service to all traffic.

TSL B: Congested during heavy traffic, slower speeds and periodic dust; accommodates any legal-size load or vehicle.

TSL C: Interrupted traffic flow, limited passing facilities, may not accommodate some vehicles. Low design speeds. Unstable surface under certain traffic or weather.

TSL D: Traffic flow is slow and may be blocked by management activities. Two-way traffic is difficult, backing may be required. Rough and irregular surface. Accommodates high clearance vehicles. Single purpose facility (USDA-FS 1999).

Ultisol - Soils that are low in bases and have sub-surface horizons of illuvial clay accumulations. They are usually moist, but during the warm season of the year some are dry part of the time (Brady 1990).

Unclassified Road - Roads on National Forest System lands that are not managed as part of the forest transportation system, such as unplanned roads, abandoned travelways, and off-road vehicle tracks that have not been designated and managed as a trail; and those roads that were once under permit or other authorization and were not decommissioned upon termination of the authorization (36 CFR 212.1).

Unroaded Area - Any area without the presence of a classified road, that is of a size and configuration sufficient to protect the inherent characteristics associated with its roadless condition. Unroaded areas are distinct from and do not overlap with inventoried roadless areas.

Waterbar - Berm or ditch and beret combination that cuts across roads (and trails) at an angle so that all surface water running on the road and in the road ditch is intercepted and deposited over the outside edge of the road. These normally allow high clearance vehicles to pass.

Weeks Act - Weeks Act of 1911 (36 Stat. 962), as amended; 16 USC 515, 521) authorized the Secretary of Agriculture to purchase " forested, cut-over, or denuded lands" for the purposes of watershed protection and timber production (ANF LRMP 1986).

Wilderness - A designated area defined in the Wilderness Act of 1964 in the following way: A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which – (a) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (b) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (c) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in unimpaired condition; and (d) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value. There are two congressionally designated wilderness areas on the forest totaling approximately 8,938 acres, Hickory Creek Wilderness and the Allegheny River Islands Wilderness. By definition, there are no classified roads in wilderness areas.

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Map 39 Roads providing access for fishing

APPENDIX B DATA

See separate files for electronic version. Due to length, these are not printed out in the report. If you are interested, please print from separate file.

APPENDIX C FIGURES

See separate files for electronic version. These are included in printed report.