Wayne National Forest
Forest-Scale Roads Analysis - 2002

Athens, Hocking, Perry, Vinton, Washington, Monroe, Scioto, Jackson, Lawrence, and Gallia Counties, Ohio

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Abstract: Roads analysis is an integrated ecological, social, and economic science based approach to transportation planning that addresses existing and future road management options. This roads analysis reviews the existing condition of the road system on the Wayne National Forest. This analysis pertains to all federal, state, county, and local roads in maintenance levels 3, 4, or 5. Resource issues, budget concerns, and other local management problems were addressed in this analysis to determine a variety of possible opportunities to improve the road system on the Forest.

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Purpose

The U.S. Forest Service has modified its existing road development policy to one that allows the agency to balance scientific information, public needs, safety and environmental protection, and funding levels when determining the size, purpose, and extent of the future Forest Roads System and any specific road reconstruction or construction activities. This new policy, which has initiated the Roads Analysis Process (RAP), would provide the Forest Road System to best serve the current and anticipated management objectives and public uses of National Forest System lands.

Process

In assembling the RAP, the Wayne National Forest (WNF) worked with an internal Interdisciplinary Team (ID Team) of Forest staff throughout the process. The staff followed the guidelines set forth in Roads Analysis: Informing Decisions About Managing the National Forest Transportation System, Miscellaneous Report FS-643, Washington, D.C., 1999. Six main steps were outlined in the report:

Step 1: Background/Inventory

Step 2: Identification of Road Management Objectives

Step 3: Identifying Issues

Step 4: Assessing Benefits, Problems, and Risks

Step 5: Prioritizing Opportunities

Step 6: Final Report

Scope

The Roads Analysis Process discussed in this document is based on a Forest-wide geographic scope. Only those roads that function as arterials and collectors (level 3, 4 and 5) are being assessed at this scope. While the USFS recognizes that the Forest Service only has jurisdiction to manage its own roads, roads of all jurisdictions were at least minimally assessed during this process.

Overview

Overviews of the socio-economic and transportation contexts were developed for the RAP. These sections helped the ID Team to develop an assessment of each issue that fully addresses the unique circumstances of the Wayne National Forest. Extensive data collection was involved in each of these sections in order to ensure that the most up-to-date information was utilized.

Issue Assessment

Environmental, economic and social road issues were identified through discussions with other road authorities around the Forest, and the ID Team. Utilizing the framework of the Roads Analysis handbook provided by the US Forest Service, the ID Team chose nearly 70 questions that covered nearly all of the identified road-related issues on the Wayne National Forest. The questions were categorized into the functional areas with the number of questions in each category listed below:

Ecosystem Functions and Processes (EF) 5
Aquatic, Riparian Zone, and Water Quality(AQ) 14
Terrestrial Wildlife (TW) 4
Economics (EC) 3
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Minerals Management (MM) 1
Range Management (RM) 1
Water Production (WP) 2
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Special-Use Permits (SU) 1
General Public Transportation (GT) 4
Administrative Use (AU) 2
Protection (PT) 4
Un-Roaded Recreation (UR) 5
Road-Related Recreation (RR) 5
Passive Use Value (PV) 4
Social Issue (SI) 10
Civil Rights and Environmental Justice (CR) 1

ID Team members developed each assessment, with conclusions and opportunities, through an extensive, iterative process.

Integration Into Other Forest Service Projects

After completing this Forest-Scale Roads Analysis Process, the ID team is able to provide recommendations designed to help Forest Service engineering and planning staff with future roads projects and collaborations with other roads authorities. These recommendations are based on observations made during the RAP and through experience working with roads authorities throughout southeastern Ohio.

Further watershed and project level Roads Analysis Processes will be completed in the future as a part of the Environmental Assessment process. The process, conclusions and road management framework resulting from this RAP will provide the lower-level analysis with a streamlined, well informed approach to completing the lower-level RAP effectively and efficiently.

Key analysis results and findings

Since this analysis is a broad, forest-scale analysis, specific portions of roads or units were not analyzed. The road system as a whole was reviewed and site-specific improvements will be identified at a smaller scale. In general, the transportation system on the Wayne National Forest is currently meeting the strategic intent of the guidance in the *Forest Plan*. However, as with most road systems there is always room for improvement. The main issues are budget related. Improvements to road jurisdiction across the forest as well as providing financial assistance to county, state, and other Federal agencies could be implemented with increased budgets. Improving road conditions would in turn improve resource concerns, such as reducing sediment delivery into waterways. Specific results and findings are:

- On average, the Eastern Region of the USDA Forest Service allocated $133,000 (this includes special one-time funding) to the Wayne National Forest for road maintenance and construction/reconstruction during the years 2000-2003. The most efficient annual budget level for the Forest is estimated at $516,177. The Wayne National Forest cannot meet maintenance requirements of the existing road system with current budgets.
- Only 18% of the roads on the Wayne National Forest land are Forest Service system roads; 82% are county right-of-ways, state right-of-ways, private right-of-ways, non-system roads, and other Federal jurisdiction roads that are all maintained by others.
- Most roads that cause unacceptable risk to ecosystem sustainability on the Wayne National Forest are non-Forest Service roads, which are natural soil surfaced material. Many of these roads are special use or unclassified – roads that were associated with mineral extraction activities over the past 130 years.

- The Wayne National Forest is currently following the strategic intent of the *Forest Plan*. Management decisions at the project, watershed, and forest-scale meet guidance in the *Forest Plan*, as per the 7700 section and the individual management areas.
- An extensive transportation network serves the Wayne National Forest. The existing road system is meeting current access needs. Every year the special use staff processes several applications for special use road permits. Special use roads are permitted for many reasons. However, oil and gas well access roads are for the majority of the special use permits.
- Closure of unneeded roads is a controversial issue, because local residents oppose road closures and urban residents promote road closures. Road closures become a political issue when counties and local governments are involved. They become involved if an existing road is classified as a "public road", meaning township, county, and state roads.
- Many non-F.S. road right-of-ways (ROW) exist on the National Forest because the facility had not received needed maintenance in many years and was not prepared for long term closure prior to the cessation of maintenance.
- Continued work with the 12 counties within the National Forest boundary is needed to come up with a more efficient transportation system for all level of roads, not just levels 3, 4 and 5.
- Several roads should be changed from level 1 or 2 to 3, 4, and 5 as shown in Attached Tables A & B. The Forest's multi-use lands must be constantly managed and maintained to better serve the needs of the public and the Forest.
- Several existing FS roads should be brought to Public Forest Service Roads (PFSR) standards to improve safety and to increase the road standard since they are being used by the public for access into the National Forest. Also, it would make the FS transportation system more seamless with the other government agencies within the Forest boundary. The list is available in Attached Table C, "Current and Potential PFSR roads on WNF."

Recommendations/Opportunities

Specific opportunities identified in this analysis are:

- Conduct Forest-wide culvert crossing inventory and prioritize the replacement and relocation of these culverts.
- Assist counties in maintenance or redesign of road system through cost-share agreements.
- Assist counties to install proper drainage structures including ditches and ditch lead out structures in order to meet drainage need and fish/wildlife passage concerns.
- Relocate segments of roads that do not have adequate buffer strips or that constantly wash out.
- Encourage counties to stop using ditch clean out material or other inappropriate materials in order to protect road fills that share a bank with an adjacent stream.
- Encourage counties to harden roads that cannot be economically relocated and that are consistently delivering sediment and gravel to streams.
- Ensure that road related activities that eventually flow into adjacent streams are administered by the National Forest and that the F.S. is in compliance with the dredge and fill activities regulated by Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act as administered by the US Army Corps of Engineers, and by the Ohio Environmental Protection Agency.
- Upgrade Forest Service roads that are causing degradation of the ecosystem.
- Encourage the local and state governments to vacate roads that are no longer serving their needs.
- Obtain National Forest System (NFS) funds to assist counties in road maintenance and reconstruction.
- Seek other funding sources such as Capital Improvement or Road and Trail Deposit Fund (10% funds), or Public Forest Service Roads funds.
- Close Forest jurisdiction roads to meet current maintenance budget.
- Close unneeded Forest jurisdiction roads per *Forest Plan* guidance.

- Review existing special use permit roads to see that road construction and maintenance requirements protect soil and water resources, at the time of permit renewal.
- Ensure that the engineering staff reviews the road locations and make recommendations on specific road standards before permit approval by the District Ranger or Forest Supervisor.
- Inventory and evaluate road signs and install signage that meets Forest Service or highway standards.
- Add the Potential PFSR Roads listed on Attached Table C.

This entire RAP document with maps and attachments can be found posted on our Forest website at: www.fs.fed.us/r9/wnf. Additional information concerning Roads Analysis can be obtained from the Forest Service national website: www.fs.fed.us/eng/road_mgt/policy.html

Introduction

Scope of the analysis

Roads analysis is an integrated ecological, social, and economic approach to transportation planning. It addresses both existing and future roads. Roads analysis neither makes decisions nor allocates lands for specific purposes. Roads analysis provides information for decision making by examining important issues. Roads analysis helps implement *Forest Plan*s by identifying management opportunities that can lead to site-specific projects. The process can also help identify needed changes in *Forest Plan*s to be addressed in amendments or revisions.

The roads analysis comprises six steps aimed at producing needed information (USDA 1999). The process provides a set of possible road-related issues and analysis questions. The interdisciplinary team (ID team) also utilized information from Forest Service Manual (FSM) 7712.13b. Information required from the FSM will be addressed in the key analysis results and findings section of this document found on page 4.

This forest-scale analysis looks at our public road system including federal, state, county and township roads. A public road on National Forest System (NFS) lands refers to roads assigned to maintenance level 3, 4, and 5 [Forest Service Handbook (FSH) 7709.58 section 12.3 (USDA 1995)]. Roads maintained to level 3, 4, or 5 are maintained for travel in a standard passenger car. Level 3 roads are low speed, single lane with turnouts and spot surfacing. Level 4 roads are mostly double lane and aggregate surfaced. Level 5 roads are normally double lane; many of these are paved.

This *Fores- Scale Roads Analysis* has been completed to help identify opportunities for potential management actions that may be considered in subsequent environmental analysis for proposed projects. This analysis will also be utilized during the Wayne National Forest Land and Resource Management Plan (*Forest Plan*) to help complete a roadless and unroaded area analysis. It will also identify long term roads management opportunities.

The goal of the roads analysis was to evaluate the existing condition of the road system on the Wayne National Forest and to identify opportunities to improve existing roads, develop criteria for construction, determine internal and external issues from a social, ecological, and economic perspective, and develop a Forest Transportation Atlas. This analysis was prepared based on the current budget, existing road system, and existing *Forest Plan* land allocations.

Analysis Area

The Wayne National Forest is located in southeastern Ohio and contains approximately 233,638 acres. It was established by proclamation in 1935, and became a National Forest in 1954. The land ownership is located in two distinct units: Athens and Ironton. Within each of these units is a mix of public lands and private lands. Land is still being acquired and with each purchase the transportation system will need to be adjusted to allow access to manage the new acres.

The Forest comprises a large portion of the public lands in the state of Ohio. The Forest is within a few hours drive of several major metropolitan areas; including: Columbus, Toledo, Detroit, Huntington, W. Va., Cleveland, and Cincinnati. Principal access routes to the Wayne National Forest are Ohio State Route 13, 93, 7, 550, 56 and 140 and United States Route 33, 50, and 32, and Interstate 77.

Rural southeastern Ohio is characterized by hardwood-covered rolling hills interspersed with some small farms and pasture land. Spring and fall color is often spectacular. Much of the Forest has seen heavy mining and oil extraction activities in the past. Many iron furnaces and strip mines once operated on what

is now the National Forest. Much of this land is in need of restoration, and that restoration process will utilize the road system for access to individual work sites.

Area included in the Roads Analysis

The Roads Analysis ID team was responsible for identifying what issues and what scale of analysis to include for the Forest-Scale Roads Analysis. The team considered using boundaries set by watersheds, but decided that due to time, people, money, and information constraints, it was not feasible for the forest-wide analysis. More detailed analyses can be completed later at the watershed or project level. As individual watershed assessments are completed, all levels of roads within the watershed will be studied. This includes the level 3, 4, and 5 roads that are being studied in this report. The roads found in the watersheds will be studied on an individual basis and not by the blanket analysis that this report provides.

The team set the following geographic boundary for the analysis:

- A road that touches or passes through NFS land.
- A road that provides access to NFS land.
- Otherwise, roads within the Forest proclamation boundaries.

The Wayne National Forest contains 233,638 acres as of June 30, 2002. The proclamation boundary of the Forest contains 833,990 acres. The remaining acreage is private, state, or other Federal property.

Description of Existing Situation

Nearly all arterial and collector roads are already in place. Most of them originated 80 to 100 years ago, or before Federal acquisition of the land. These collector and arterial roads are under state, county or township jurisdiction, and are open to public motorized traffic at all times.

The vast majority of the local roads under Forest Service (FS) jurisdiction are dead-end roads, terminating on NFS land and gated or otherwise closed to public motorized vehicles. The FS may develop some additional all-weather, aggregate surfaced roads and parking lots. These roads and parking lots would be used for improving public access to inaccessible tracts of forest and for providing minimum facilities for off-road parking or primitive camping. We expect that all-weather (levels 3, 4, and 5) local roads constructed or reconstructed on the National Forest lands will not exceed the annual amounts listed in the *Forest Plan*, and likely will be less than the amounts listed due to funding levels. Although there have been no specific corridors selected or specific plans developed at present, the FS may cooperate with local counties or the State of Ohio to reconstruct existing collector or arterial roads as opportunities arise. Currently, the State of Ohio Department of Transportation is working on a bypass of the city of Nelsonville that will cross National Forest land to some degree depending on the route chosen.

One of the purposes of the *Forest Plan* is to maintain and enhance biological diversity. The Forest has a very scattered land ownership pattern amidst many intermingled private landowners. As other intermingled landowners modify the Forest ecosystems by land-disturbing activities the role the National Forest plays in providing for biological diversity on a local and regional basis will become increasingly important.

The *Forest Plan* provides a blend of different management objectives in management areas across the Forest. The *Forest Plan* emphasizes native plant and animal communities, provides for large, undisturbed forest ecosystems. It also provides for biological diversity on both local and regional scales, from specific management areas to southeastern Ohio as a whole, and protects riparian habitat.

The intent of the *Forest Plan* is to provide areas of the Forest with different recreational opportunities. In order to accomplish this task, different levels of roads and motorized public access roads must be provided into the interior of the different management areas of the FS lands. Management areas 2.3, 3.1,

and 3.2 will have better all-weather and improved roads than they did in 1986. Management areas 2.1, 2.2, and 3.3 will have fewer roads than it did in 1986. Management areas 6.1, 6.2, and 6.3 will provide access only to the perimeter of the areas, except where existing collectors and arterial roads cross the areas as they are a part of the base transportation system of the Forest and other local governments with jurisdiction in the National Forest boundary. The process of changing the transportation system from the one in 1986 to the one outlined in the existing *Forest Plan* is going to be a long one. It is estimated to take 50-100 years (estimate made in 1986). A majority of the changes will require work from the county and township governments, work to vacate the right of ways, change jurisdiction, and to upgrade the FS, township, state, and county roads in order to allow the same level of access into areas with fewer, but better roads.

Forest Plan goals, allocations, and guidance protect important ecological attributes of the Wayne National Forest. The plan protects many unique ecosystems by the allocation of MA 8.2 where unique natural areas are to be preserved and studied. Any need for road construction or closure within special areas is determined during site-specific special area management plans. The *Forest Plan* on page 4-153 refers to the transportation system in these areas.

Recreation Opportunity Spectrum

Nationally the FS uses a system called the Recreation Opportunity Spectrum (ROS) to inventory NFS lands. ROS classifies the range of recreational experiences, opportunities, and settings available on a given area of land. Classifications include: primitive, semi-primitive motorized, semi-primitive non-motorized, roaded, natural, rural, and urban.

The Wayne NF has 32,423 ** acres in semi-primitive non-motorized and the semi-primitive motorized ROS classifications.

Table 1. Present Recreation Opportunities by ROS Class

ROS Classification	Recreation Opportunities, Acres (Approximate numbers)	Percentage of entire Forest
Primitive	0	0
Semi-primitive non-motorized	32,423 **	14%
Semi-primitive motorized	87,587 **	37%
Roaded natural, rural, & urban	115,222 **	49%

* Using the *Forest Plan* direction as the % of the whole Forest adjusted to 2003 acreage
** Figures based on GIS data where the geometric curvature of the earth is accounted for as of 1/7/2003.

The Wayne National Forest presently provides few semi-primitive recreation opportunities and no primitive ROS opportunities. Major reasons for this lack of remote recreation opportunities include:

- Scattered ownership pattern on the Wayne National Forest where consolidated tracts of 5,000 acres or more needed to provide remote recreation opportunities simply do not exist.
- High density of public roads, resulting from occupation of the land for farming, which are still needed for access to private holdings and cemeteries. Lands are part of the local transportation system. Though, some tracts do have the potential if existing roads were vacated and reclaimed. Impacts to the transportation system would have to be evaluated on a project scale analysis. Current level 3, 4, and 5 roads are the backbone of our system and little change is expected, except for local upgrades to protect resources or to improve safety. Reroutes would be minor and road closures are unlikely. Level 1 and 2 roads would be the most likely roads identified for closure and removal.

- Private landowners are scattered throughout the Forest. These landowners have property adjacent to and within Forest ownership that requires access, services, and roads. The large number of neighbors limits the opportunities to provide large blocks of forest for people desiring primitive recreation. The current *Forest Plan* direction is to concentrate land purchases in order to consolidate FS land ownership. The Forest intends to continue actively acquiring lands, and therefore primitive recreation could become an issue. However, it will be studied at that time.

Description of lifestyles and the role of access on those lifestyles

Lifestyles of the residents vary across the region in close proximity to the Forest. We classified three major groupings:

- Urban (Marietta, Athens, Ironton)
- Small town (Nelsonville, Shawnee, Corning, Woodsfield)
- Rural.

Urban

Marietta and Athens, Ohio are the closest urban communities near the Wayne National Forest. The make-up of Ironton would be similar to Athens except for the university/college-related residents. Unlike the small town and rural areas, there are common clusters of white and blue collar families, college town singles, renters and young families.

Small-Town

The small town communities have common clusters of white-collared families, young middle-class families, blue-collar families, rural blue-collar workers and families, farm families, and older families.

Rural

The rural areas have several common clusters of lifestyles: remote rural/town families, rural blue-collar workers and families, farm-town ranch families, farm owners and tenants, and lower-income, older, rural couples.

Across the southeastern Ohio region, road access to public lands is important to lifestyles. These lifestyle activities include: boating, camping, fishing, horseback riding, and hunting.

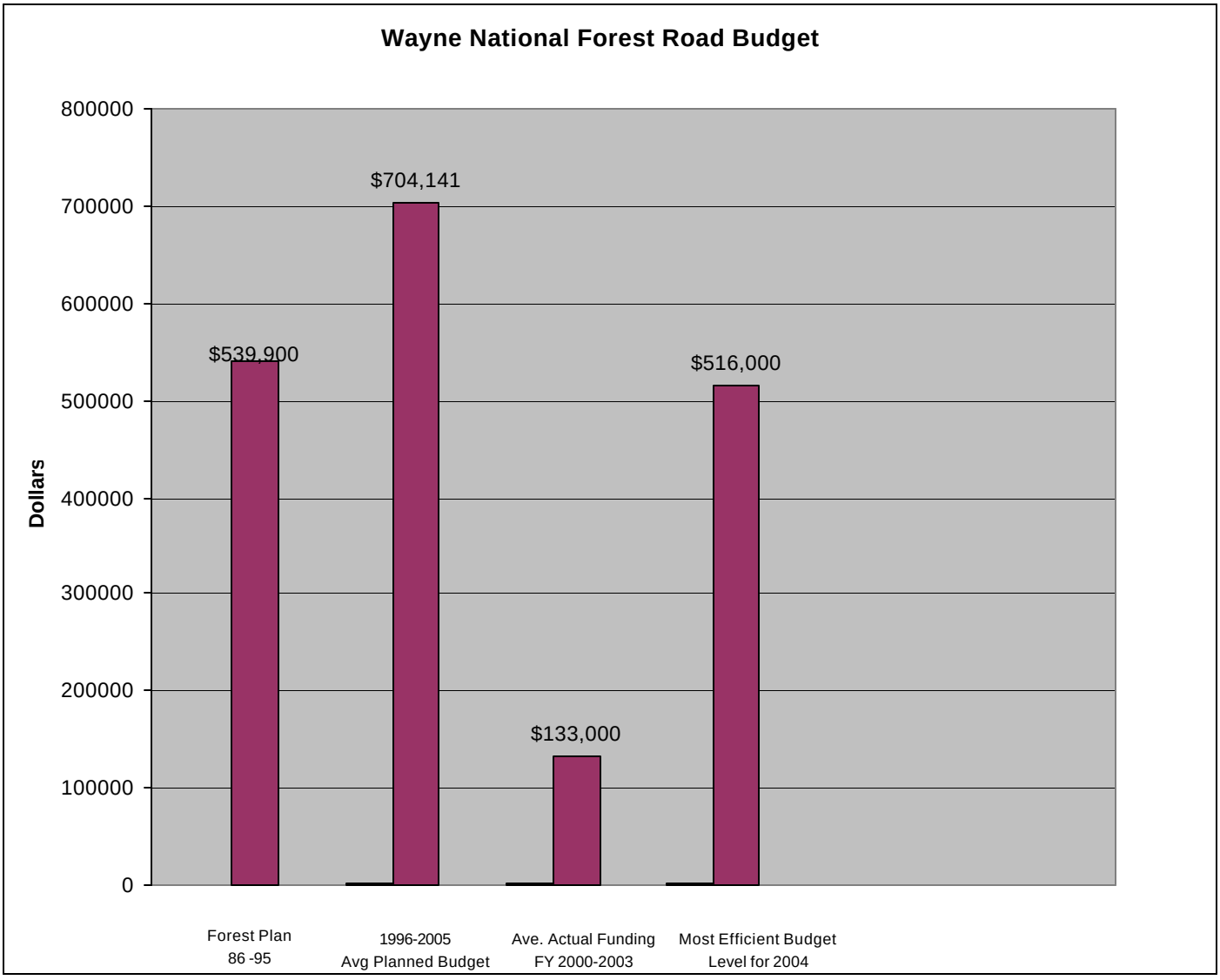
All 12 of the counties on the WNF is in the part of Appalachia Ohio and are less economically advantaged than the rest of the state. The average income in all 12 counties is below the state average.

Budget

The primary 392.0 (approximately) miles of the transportation system is in place. During the last 9 years (1991-1999), the WNF reconstructed an estimated 5 miles of road. One key new program that could provide needed funding to correct deferred maintenance backlog is the PFSR. In this program the Forest would become public road agencies and tax dollars from the Transportation Trust fund could be used to reconstruct and upgrade existing FS roads. The PFSR Program is further discussed later on in the document.

The following figure shows recent road budgets compared with the *Forest Plan* estimates in calendar year 2002 dollars. Road budgets below include both road maintenance and road construction funds.

Figure 1: Wayne National Forest Roads Budget



As shown in the above bar chart, road budgets are below *Forest Plan* expectations. During the *Forest Plan* analysis, the planning team assumed that funding would be available to reconstruct many of the public roads accessing NFS developed campgrounds. This has not happened. We are deferring reconstruction and heavy maintenance until funding becomes available.

The following table labeled *Road Budget Needed to Accommodate Forest Plan Direction vs. Actual Budget* displays estimated road costs from the *Forest Plan* analysis.

Table 2: Road Budget Needed to Accommodate *Forest Plan* Direction vs. Actual Budget

	Budget Items	Unit of Measure	1986-1995 Planned	1996-2005 Planned	2006-2015 Planned	Most Efficient Budget Level (2004- and beyond)	Actual budgeted dollars available based on four year history of WNF funding and corresponding amount that could be done at 2002 unit costs. (FY 2000-2003)
1	Permanent Road Construction	Miles	2.2	1.8	1.3	1.0	0.1 ***
	$42.5K/mile	Dollars	$93,500	$122,760	$109,043	$72,353	$7,885
	(Base year 1986, 3% values inflated to 2002, 2011, and 2004 respectively)						
2	Permanent Road Construction	Miles	6.6	5.2	3.9	3.5	0.3 ***
	$30K/MILE (Existing ROW)		$198,000	$250,333	$230,914	$178,755	$16,476
	(Base year 1986, 3% values inflated to 2002, 2011, and 2004 respectively)						
3	Annual Road Maintenance Level 3,4,5 Roads Only	Miles	38.0*	43.0	45.0	45.0	2.8 ***
	$1.5K/mile		$57,000	$101,096	$133,219	$114,914	$6,792
	(Base year 1986, 3% values inflated to 2002, 2011, and 2004 respectively)						
4	Temporary Road Construction	Miles	1.6	2.0	2.3	2.0	0.1***
	$12K/mile		$19,200	$38,513	$54,472	$40,858	$2,589
	(Base year 1986, 3% values inflated to 2002, 2011, and 2004 respectively)						
5	Temporary Road Reconstruction	Miles	4.8	6.0	6.9	4.8	0.4 ***
	$8K/mile		$38,400	$77,026	$108,944	0	$5,178
	(Base year 1986, 3% values inflated to 2002, 2011, and 2004 respectively)						
6	Road Closures	Miles	78.8	13.9	14.4	10.0	2.2 ***
	$1K/mile		$78,800	$22,305	$28,420	$17,024	$3,465
	(Base year 1986, 3% values inflated to 2002, 2011, and 2004 respectively)						
7	Parking for N.F.	Parking	20.0 *	40.0	60.0	10.0	2.8 ***

	visitors (dispersed) (estimated, from planned density)	Stalls					
	$120/space		$2,400 *	$7,703	$14,210	$2,043	$543
	(Base year 1986, 3% values inflated to 2002, 2011, and 2004 respectively)						
	Total Direct Costs to meet *Forest Plan* Objectives		**$487,300**	**$619,735**	**$679,222**	**$425,947**	**$42,928**
8	Salary and Overhead for Roads Program (not including RO special Projects)	Annual Salary and Overhead	$52,599	$84,406	$103,735	$90,230	$84,406
	(Base year 2002, with 3% deflation to 1986, and 3% inflation to 2011 and 2004 respectively)						
	Total Needed Dollars for Program to meet *Forest Plan* Direction		**$539,899**	**$704,141**	**$782,956**	**$516,177**	

This chart represents the dollars anticipated to pay counties, townships, and other government agencies for road use agreements. The values for this are included in the costs of each line item where it is applicable. Construction of bridges, culverts, and other features is also included in the line items.

* Estimated

*** This amount is not going to reflect exactly the mileage that can be accomplished, due to economy of scale, and base cost for mobilization of construction equipment. Accomplishments annually will be in only one or two line items as dollars allow.

After a review of the recent historic road budgets, the above *Forest Plan* budget estimates, and maps of the minimum road system, the Forest Engineer (Steve Marchi) developed the following estimate of road budget need: The estimated annual budget level is $516,000. (See Table 2) This is the most efficient level that was allowed for the Forest to correct the worst deferred maintenance problem over a 2-5 year period and correct most of the other problems over a 10 year period of time. At this level, we would prevent most deferred maintenance from accumulating.

There are no revenues associated with road management. We know of no changes in the road system that would increase net revenue to the agency by reducing cost, increasing revenue, or both. On the whole, there are avenues the Wayne is going to investigate with the current special use roads. As the agreement lapses however, the Wayne will evaluate included collections for surface replacement on road use agreements. In some cases, existing special use roads should become level 1 or 2 FS roads when the type of mineral rights allow it and when it is logical according to the transportation management plan.

In the future, if the FS proposes a site-specific road construction or reconstruction project, a project-level financial efficiency analysis will be done that will include all road costs (including maintenance), associated costs, and associated revenues, as part of project level RAPs.

Forest Roads Analysis

Description of the Process

Roads analysis comprises six steps aimed at producing needed information and maps. The process provides a set of possible road-related issues and analysis questions, the answers to which will inform the choices made about future road systems

Step 1 — Setting up the analysis. The analysis is designed to produce an overview of the road system. Line officers established appropriate ID teams, and identified the proper analytic scales, developed a process plan for conducting the analysis. The output from this step includes assignment of ID team members, a list of information needs, and a plan for the analysis.

Step 2 — Describing the situation Products from this step include a map of the existing road system, descriptions of access needs, and information about physical, biological, social, cultural, economic, and political conditions associated with the road system.

Step 3 — Identifying issues. The output from this step includes a summary of key road-related issues, a list of screening questions to evaluate them, a description of status of relevant available data, and additional data needed to conduct the analysis.

Step 4 — Assessing benefits, problems, and risks. The output from this step is a synthesis of the benefits, problems, and risks of the current road system and the risks and benefits of building roads into unroaded areas, and discussion of level 3, 4, and 5 road needs in areas underserved.

Step 5 — Describing opportunities and setting priorities. The output from this step includes a map and descriptive ranking of management options and technical recommendations to the transportation system.

Step 6 — Reporting. The output for this step includes a report and maps portraying management opportunities and supporting information important for making decisions about the future characteristics of the road system. This information sets the context for developing proposed actions to improve the road system and for future amendments and revisions of *Forest Plan*s.

Forest Service Manual Requirements

The following information is required for a forest-scale roads analysis and is identified in FSM 7712.13b. Roads analysis at the forest-scale is critically important; as it provides a context for road management in the broader framework of managing all forest resources.

1. Consider the following at this scale:
    a. Environmental.
    b. Social Issues.
    c. An evaluation of transportation rights-of-way acquisition needs(broad view)
    d. The interrelationship of State, county, Tribal, and other Federal agency transportation facility effects.
    e. Transportation investments.
    f. Current and likely finding levels.
    g. Public involvement on the transportation system

h. Future needs

2. Prepare a report with accompanying map(s) that documents the information and analysis methods used to identify access and environmental priorities, issues, and guidelines for future road management and the key findings. At a minimum, the report will:
    a. Inventory and map all classified roads, and display how these roads are intended to be managed. The records will be maintained in INFRA. INFRA is a nationwide database that contains information related to the roads system with specific data on each road. It lists how roads should be maintained, the features on the roads (including culverts, signs, etc.), up to date listing on maintenance, and the needs for both deferred and annual maintenance.
    b. Provide guidelines for addressing road management issues and priorities related to construction, reconstruction, maintenance, and decommissioning.
    c. Identify significant social and environmental issues, concerns, and opportunities to be addressed in project level decisions. All decisions the Forest makes must now be accompanied by project level roads analysis.
    d. Document coordination efforts with other government agencies and jurisdictions such as the townships and county governments.
    e. Take public comments from this scoping into consideration in the analysis.

The ID team addressed all of the requirements in FSM 7712.13b. Many of the items in section one were specifically addressed during step 4 and step 5 of this roads analysis process. A couple of the requirements in Section 2 were also addressed in the responses to the 71 questions. However, all the requirements of FSM 7712.13b were completed as a result of this analysis. During step 4, the ID team utilized other Forest staff specialists to respond to the 71 questions. For specific responses to the 71 questions, please refer to the Step 4 section. Many of the questions and comments from the specialists will hold true on all of the RAPS (project and watershed) from this point on, and will not need to be revisited in the future. It can be referenced from this document. Issues that will need further work at the project or watershed level will be covered at the project level.

1(a) Environmental. This was addressed during step 4 and step 5. Most of the questions in Step 4 respond to environmental effects. Please refer to step 4 and question 1 in step 5.

1(b) Social Issues. This was addressed during step 4. Please refer to questions SI 1- SI 10 and CR 1.

1(c) An evaluation of the transportation rights-of-way acquisition needs and potential abandonment (vacation) of existing ROW by other agencies. This was addressed during step 4. Please refer to questions GT 1 – GT 4.

1(d) The interrelationship of state, county, and other Federal agency transportation facility effects. This was addressed during step 4. Please refer to questions GT 1 – GT 4 and AQ 1 – AQ 14.

1(e) Transportation investments. This was addressed during step 4 and step 5. Please refer to questions EC 1 – EC 3 and question 2 in step 5.

1(f) Current and likely finding levels. This was addressed during step 4 and step 5. Please refer to questions EC 1 – EC 3 and question 2 in step 5.

2(a) Inventory and map all classified roads, and display how these roads are intended to be managed. We inventoried and mapped all classified roads. The INFRA database displays how all these roads are intended to be managed (INFRA is an integrated inventory of and financial data for its constructed features, including buildings, dams, bridges, water systems, roads, trails, developed recreation, range improvements, administrative sites, heritage sites, general forest areas, and others). The engineering staff maintains the maps and INFRA database.

2(b) Provide guidelines for addressing road management issues and priorities related to construction, reconstruction, maintenance, and decommissioning. It was determined that the guidelines in the *Forest Plan* for reconstruction, maintenance, and decommissioning properly display accurate needs and priorities. As part of the analysis process, construction guidelines were developed. These guidelines can be found in Appendix A.

2(c) Identify significant social and environmental issues, concerns, and opportunities to be addressed in project level decisions. This was addressed during the 71 questions. Questions were identified that were outside of the scope of this analysis and would be more appropriate for a smaller scale analysis.

2(d) Document coordination efforts with other government agencies and jurisdictions. When this analysis is completed, a letter and the executive summary will be sent to other agencies and jurisdictions. A list of agencies who will receive this and responses will be available in the project file.

Step 1-Setting Up the Analysis

The members of the ID team who carried out this analysis are:

- Steve Marchi - Team Leader, Forest Engineer*
- Mary Reddan – Forest Supervisor
- Bob Gianniny – Forest Planner
- Carleen Yocum – Operations Group Leader
- Chad Wilberger – Recreation Program Manager*
- Marvin Brown - Civil Engineer Technician on the Athens Ranger District
- Cindy Henderson – Civil Engineer Technician on the Ironton Ranger District
- Bob Kerber – Civil Engineer*
- Lynda Andrews – Wildlife Biologist*
- Becky Ewing – Forest Biologist*
- Erin Larson – Forest Botanist*
- Aaron Burk - GIS Coordinator*
- Sean Lowery – Information Tech Specialist*
- Pam Stachler – Forest Hydrologist
- Phil Perry – Forest Silviculturist
- Ann Cramer – Forest Archaeologist*
- Ahmed Mohsen – Special Uses Program Manager
- Max Norris – Special Uses on the Athens Ranger District
- Tom Eaches – Fire Tech on the Ironton Ranger District
- Kevan Moore – Forest Fire Management Officer

* core team member

Info Needs:

Only existing information was to be used for the analysis, unless it could not be completed without additional information.

Info Needs: 1. List of 3, 4, 5's
2. Identify issues (broad view)
3. GIS coverage with slope, crossings of streams, etc.
4. Public input for step 4
5. Process to generally follow direction in "Roads Analysis" in forming

decisions about managing the NF Transportation System
6. TES input
7. County and state input on their roads system
8. Internal scoping for issues

Step 2 –Describing the Situation

There are approximately 43 miles of FS roads in maintenance levels 3, 4, and 5. County, state, and Federal roads need to be incorporated. They are approximately 1,392 miles of other jurisdiction roads on FS land within the boundary.

The team considered using boundaries set by watersheds, but decided that due to time, personnel, budget and information constraints, it was not feasible for the forest-wide analysis. Also, level 3, 4, and 5 roads were all viewed at once. No watershed boundaries used. More detailed analyses can be completed later at the watershed or project level.

The team set the following geographic boundary for the analysis:

- A road that touches NFS land.
- A road that provides access to NFS land.
- Otherwise, roads within the unit boundaries.

During the fall and winter of 2001, both districts and all SO employees were contacted and a set of maps (recorded and available at the Supervisor's Office in Nelsonville, OH) were made available for all the disciplines and for all of the management to review. All roads that were needed on our system were identified. The changes were noted and recorded. Due to the nature of FS lands on the Wayne, many of the roads providing access are on local government jurisdiction. The FS has only 44.0 miles of level 3, 4, and 5 roads on the ground. Currently, 51.1 miles of Level 2,3,4 or 5 roads have been identified as opportunities to improve the existing roads to Level 3, 4 or 5. (*These roads are listed at the end of this report as Attached Tables A and B*). These upgrades will take the Maintenance level of the roads in question up to the Objective Maintenance Level as listed in the INFRA data base.

During this process, there was not enough time to go to all 12 courthouses across the Forest to verify the different jurisdiction issues. Also, this is an ongoing process with records dating back to the early 1800's. As time allows, this process will continue and at each project level analysis.

The only roads retained on the system are those roads accessing existing National Forest Service Lands where activities for wildlife monitoring, mine reclamation, monitoring, fire-control or vegetation management and other such activities are taking place or will take place. Roads with the primary purpose of accessing private homes, private tracts of land, or those roads under the jurisdiction of local governments were avoided, since the F.S. is not intending to provide this type of service. In some cases, ROW. have been purchased on private land to provide access to the National Forest. These routes are identified and maintained on the system.

Step 3-Identifying Issues

To identify the most important roads-related issues, the ID team developed a list of some of the roads-related issues key issues on the Wayne National Forest. The Forest Leadership Team was informed at Forest Leadership meetings of the progress along the way.

Key Issues:

- *Forest Plan* Direction
- Maintenance ability, costs and current budget
- Location of old roads (poor location, environmental impacts from roads)
- Access to management activities
- Recreation
- Special use roads
- Legal authority or jurisdiction
- Sediment production or sediment travel paths
- Reinstate master road use agreements with counties
- Cemetery access (outside wilderness)
- Access to private land (private property rights)
- Dump sites
- Road closures
- Wildlife

Other issues were discussed, such as unroaded areas, roadless areas, and road/trail classification. However, it was determined that these were not issues related to the roads analysis process. These issues would be addressed during *Forest Plan* revision utilizing information obtained during the roads analysis process.

Based on the discussion about the characteristics of the Forest and the road system, the team developed a list of issues, which were framed as questions to be answered. These were grouped into three broad categories of **Social, Economic and Ecological**. The roads analysis will focus primarily on these top priority questions.

Social:

Does the FS have legal authority to close, maintain, or conduct any activities on 3, 4, 5 roads?

The Forest only has authority to close, maintain, or conduct activities on roads that are under jurisdiction of the Wayne National Forest. The FS does have the opportunity to work with counties by providing funding to improve roads. The FS will continue to work with the counties to vacate roads, especially roads that "dead-end" on the Forest, and serve only FS ownership. These roads, if vacated, would likely become part of the roads overall system or they would be closed.

What type or level of access should be provided to access cemeteries outside wilderness?

All cemeteries on the Wayne National Forest are only utilized for visitation. Current access to these cemeteries meets *Forest Plan* standards for access.

If the Forest receives a specific request for cemetery access, the request will be reviewed on a site-specific basis to ensure legal rights for family members are in compliance.

What are opportunities to provide access to private land and special use areas?

Public access is primarily on other public agency roads (arterial and collector) as all of the Forest's roads are classified as local. However, the Forest has a growing number of special use roads which access private in holdings. See Special Use questions in Section 4.

The Forest is required to provide an opportunity for access to private property. Special use permits will continue to be issued, but the engineering staff shall review the road locations and make recommendations on specific road standards before permit approval by the District Ranger or Forest Supervisor.

What are management challenges associated with roads (dumps, county road maintenance, dust, etc)?

Dumping trash on NFS lands is a long-term, widespread problem. While incidents of dumping may be more frequent close to communities, we find dumps all over the Forest.

One reason has much to do with the culture and customs of the area. In the days before public landfills and garbage collection, people typically designated a certain place on their property for disposing of items that they could not burn or compost. Often, people used sinkholes and natural drains for this purpose because they could not farm or otherwise use for "productive" purposes.

In addition, the common approach to dealing with waste management in the 19th century was to dispose of it in the stream. People who did not own property would probably take their trash out to an isolated place with a creek and dump it. The population was small enough and the density was low enough that this approach did not seem to pose any problems for the residents.

Over the years, even though the population has grown and our knowledge of the interrelationships of ground water has increased, many people hang on to this attitude of "out of sight, out of mind" and continue to dispose of their trash in isolated areas. The National Forest, with many system and non-system roads, offers an ideal location. Our experience is that most dumping occurs along well-traveled, aggregate-surfaced county roads. Dumpers seem to prefer "dead-end roads" and prefer to throw trash where it will "disappear," for instance over the side of a steep hill or into a deep ravine.

The arterial and collector road system under other public agencies jurisdiction contributes to the majority of the air borne emissions found on the Forest. This is due to some roads having an aggregate surface and to other roads having de-icing materials placed on them. This in conjunction with higher speeds will allow the dust emissions to suspend and move greater distances with the wind. This is usually only an issue in extended dry periods.

What are the public needs for recreation access?

The Wayne National Forest needs to complete a sign inventory and develop a sign plan to review existing signing to recreation areas. The inventory and sign plan will identify if current signing on the Forest is adequate or where improvements can be made.

Making a direct recommendation for potential roaded-recreation and OHV use on the Wayne National Forest is beyond the scope of this analysis. Forest staff specialists will review current policy regarding OHV's and roaded recreation opportunities during *Forest Plan* revision.

For the arterial and collector roads under other public agencies jurisdiction, it is the respective agencies responsibility for safety. The Forest has entered cost share agreements to improve roads not under its' jurisdiction, but benefit from the improved access to forest lands. For those roads under Forest jurisdiction, the *Forest Plan* addresses safety as part of our transportation system in general terms.

Economic:

Given the current and foreseeable budget, what size road system can we maintain?

On average, the Eastern Region of the FS allocated $133,000 annually to the Wayne National Forest for road maintenance and construction/ reconstruction since FY02. Given the current budget, the Wayne National Forest can maintain 5 miles annually at maintenance level 3.

What are budget needs to meet the objectives of the *Forest Plan*?

Our estimate of the most efficient budget levels is $516,177 annually. Other Forest Service funding sources include the Eastern Region capital improvement process (CIP) for projects over $250,000 and the Road and Trail Deposit Fund (10% funds). Both of these funding sources could help reduce our deferred maintenance backlog, thus helping to free up funds for annual road maintenance. In addition the Public Forest Service Roads program is keyed to having the Forest Service made a Public Road Agency like the National Park Service and BIA. This allows the Forest to expend Transportation trust funds dollars directly on Forest Roads and would provide a new funding source to correct deffered maintenance and improve access and safety on the Wayne's system.

Ecological:

What effect does the road system have on sediment delivery?

Roads can affect the routing of water through a watershed by intercepting, concentrating, and diverting flows from their natural flow paths. These changes in routing can result in increases in peak flows by both a volumetric increase in quick flow and changes in the timing of storm runoff to streams.

All road drainage ditches modify the surface hydrology to a degree by creating additional surface flow paths, which significantly increases the effective drainage density. Road cuts and ditches modify or intercept subsurface hydrology. Modification varies by geology and soils in an area. Roads increase erosion and pollution to streams.

Surface erosion is highly dependant on soils, the effectiveness and spacing and frequency of drainage structures, and the adequacy of buffer strips. Historically, county roads are poorly located and are not designed or maintained to divert water from flowing directly into streams. The limestone aggregate used to surface most county roads produces a fine dust during use. During initial rainfall this fine dust is carried by runoff and directly delivered to streams as sediment. Depending on the intensity of the rainstorm and gradient of the road surface and ditch large amounts of aggregate can actually be delivered to the stream along with this fine-grained sediment.

Culverted road-stream intersections can cause large inputs of sediment to streams when culvert hydraulic capacity is exceeded or the culvert inlet is plugged and stream flow overtops the road fill. The result is often erosion of the crossing fill, diversion of stream flow onto the road surface or inboard ditch, or both. An inventory of all the road-stream crossings in a watershed allows:

- assessing the distribution and severity of risks to beneficial uses from this important potential source area
- screening of crossings to determine the most crucial and cost-effective ones to upgrade
- allows estimating the cost of road upgrading or decommissioning, because these costs are very sensitive to the configuration of road-stream crossings
- determine the effect on wildlife and water quality

A complete inventory of all crossings in a watershed for these purposes need not gather detailed and highly accurate data, as might be required for a contract, but can be accomplished quickly and inexpensively if methods are adjusted to the desired analytical objectives.

Step 4-Assessing benefits, problems, and risks

This section assesses the effects of roads on the Wayne National Forest. To complete this assessment, the ID team utilized 71 specific questions from Appendix 1 in "Roads Analysis: informing decisions about managing the National Forest transportation system" (USDA 1999).

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?

Currently, the Wayne National Forest has no unroaded areas.

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 functions in the area?

Roads, as fragmenting agents, increase the amount of forest-edge habitat on the landscape. While a certain amount of edge may be good for species that prefer open-growth habitats, large amounts of artificial edge can cause problems for interior forest species. The "edge effect" results in alterations of the microclimate in these disturbed regions, resulting in 1) changes in radiation, which affect air temperature and light, 2) changes in the wind profile, which can compromise stand structure and alter relative humidity, and 3) changes in the local water regime, which can affect surface and groundwater flow, rainfall interception, soil runoff and deposition, and evapo-transpiration. Such changes, coupled with earth disturbing activities, tend to favor opportunistic, non-native invasive plant species (NNIS). Since exotic species, by definition, have been transplanted outside their original range, they often lack natural controls (e.g., disease, predators, parasites, or climate), which allows them to out compete and eventually replace more sensitive native species. Once NNIS become established, they are extremely difficult to eradicate, and the resulting change in community plant composition can alter ecosystem dynamics and functions over time. Not only do roads create habitat for invasive species, but they also, according to the Federal Interagency Committee for the Management of Noxious and Exotic Weeds (FICMNEW), serve as major corridors for the spread of invasive plants from place to place in the United States through the spread of seed propagules that attach to vehicles and other modes of transportation (Westbrooks 1998).

The Wayne National Forest maintains a list of 42 formidable non-native invasive plant species (Table 1), of which most, if not all, are likely to be found along roadsides.

Table 3. Non-native Invasive Species list for the Wayne National Forest.*

Species	Common Name	Habitat
Ailanthus altissima	Tree of heaven	disturbed soils- all habitats except wetlands
Alliaria petiolata	Garlic mustard	Semi-shade (forests, savannas, yards, roadsides)
Arthraxon hispidus	Small Carpgrass	moist/wet soil (pastures, hayfields, ditches)
Berberis thunbergii	Japanese barberry	roadsides/thickets
Bromus inermis	Smooth brome	roadsides, open fields, woodland edges, riverbanks
Celastrus orbiculatus	Asian bittersweet	Open woods/thickets
Coronilla varia	Crown-vetch	roadsides and waste lands
Cuscuta species	Dodder	fields, fencerows, gardens and waste places.

Dioscorea batatas	Cinnamon vine	
Duchesnea indica	Indian strawberry	moist waste places
Elaeagnus angustifolia	Russian olive	pastures, fields, grasslands, sparse woodlands
Elaeagnus umbellata	Autumn olive	pastures, fields, grasslands, sparse woodlands
Euonymus alatus	Winged burning bush	forests (mature/second growth), pastures, ravines
Euonymus fortunei	Wintercreeper	
Glechoma hederacea	Gill-over-the-ground	moist woods; disturbed areas
Ligustrum vulgare	Common Privet	thickets and roadsides
Lonicera japonica	Japanese honeysuckle	fields, forest edges and openings, floodplains
Lonicera maackii	Amur honeysuckle	under-story of woodlands, marsh edges
Lonicera morrowi	Morrow (Fly) honeysuckle	under-story of woodlands, marsh edges
Lonicera tatarica	Tatarian honeysuckle	under-story of woodlands, marsh edges
Lythrum salicaria	Purple loosestrife	Wetlands
Melilotus alba	White sweet-clover	roadsides/waste places (esp. calcareous soil)
Melilotus officinalis	Yellow sweet-clover	waste places
Microstegium vimineum	Japanese silt grass	disturbed shaded areas
Miscanthus sinensis	Eulalia	old fields
Myriophyllum heterophyllum	Water milfoil	submersed in quiet water or rooting in muddy shores
Myriophyllum spicatum	Eurasian water-milfoil	submersed in quiet water or rooting in muddy shores
Paulownia tomentosa	Princess tree	disturbed natural areas
Phalaris arundinacea	Reed canary grass	wetlands (marshes, wet prairies/meadows, fens)
Phragmites australis	Common reed grass	wetland habitats (marshes, lakeshores, ditches)
Polygonum cuspidatum	Japanese knotweed	roadsides, stream banks, edges, disturbed areas
Polygonum perfoliatum	Mile-a-minute	roadsides, stream banks, edges, disturbed areas
Polygonum sachalinense	Giant knotweed	roadsides, stream banks, edges, disturbed areas
Pueraria lobata	Kudzu	disturbed areas, forest edges, abandoned fields
Rhamnus cathartica	Common buckthorn	
Rhamnus frangula	Glossy buckthorn	wet soil
Rosa multiflora	Multiflora rose	sunny areas w/ well drained soil
Rubus phoenicolasius	Wineberry	fields, edges, disturbed places
Thlaspi arvense	Field penny-cress	waste places
Typha angustifolia	Narrow-leaved cattail	wetland habitats (marshes, lakeshores, ditches)
Vinca minor	Periwinkle or myrtle	roadsides and open woods
Wisteria floribunda	Japanese wisteria	forest edges, roadsides, ditches- full sun or partial shade

*This list is by no means all-inclusive, but rather represents those species thought to contribute the greatest threat to biological diversity and ecosystem integrity on Forest Service lands in southeastern Ohio.

No local studies have been initiated that analyze the varying effects of road type, size, or age on the degree of non-native infestations in our forested areas. However, it is reasonable to assume that all travel corridors, from off-road vehicle trails to oil/gas roads to major highways, contribute significantly to the exotic species problem. During the summer of 2002, the Wayne NF initiated a Forest-wide survey of NNIS infestations on the Forest, beginning on the Athens unit of the Athens Ranger District. Survey efforts were generally focused along roads (mostly Level 3 or below) and trails. Assuming that funding is available, surveys will continue on all three units of the Forest next field season, and will proceed annually thereafter until sufficient data has been collected. The results of the surveys will be converted to a GIS format and entered into a Natural Resource Information System Database to assist in prioritizing and directing Forest management activities and contribute to project-specific risk assessments. The final

product of the mapping project will also help to establish a more quantitative understanding of the relationship between road corridors and non-native invasive species spread.

Opportunities:

- The diffuse framework for land and road ownership and administration makes consistent management of exotics difficult, thus it is imperative to establish a multi-jurisdictional working group to effectively and efficiently control exotic species along road corridors.
- Adopt an integrated vegetative management approach to prevention, education, monitoring, and control of non-natives.
- Maintain and supplement the non-native invasive species database to assist in prioritizing and directing Forest management activities.
- The potential use of the INFRA database in addressing issues concerning the introduction and spread of plant and animal species, insects, diseases and parasites.

Concerns about roads and introduction of non-native aquatic species is further addressed in AQ(13).

EF (3): How does the road system affect ecological disturbance regimes in the area? To what degree does the presence, type, and location of roads contribute to the control of insects, disease, and parasites?

In addition to the fact that the Wayne's forest road system is a means for the spread of insects, disease and parasites, it also allows for the quick detection of insect, parasite and disease build-ups. Early detection is important to locate, monitor, and take action on the particular insect or disease. Having a developed road system is beneficial in the early detection of insect build-ups. Once it is determined that outbreak is occurring, the Forest is able to quickly drive the roads on the Forest to check the extent of the insect build- up. Having access to the information on insect build-ups, we are able to quickly alert both Federal and state agencies.

- The diffuse framework for land and road ownership and administration makes consistent management of exotics difficult, thus it is imperative to establish a multi-jurisdictional working group to effectively and efficiently control exotic species along road corridors.
- Adopt an integrated vegetative management approach to prevention, education, monitoring, and control of non-natives.
- Maintain and supplement the non-native invasive species database to assist in prioritizing and directing Forest management activities.

The existing road system was developed to facilitate timber harvest and provide access into those management areas identified for potential timber harvest through the *Forest Plan.* While some roads are closed to public use, the road prisms are still in place and could be reconstructed to facilitate additional management for control of insects and disease.

The Forest continues to monitor for diseases, insects and parasites by using the forest road system. Pest management is further discussed in the *Forest Plan*. Control of pests will be evaluated using integrated pest management (IPM)-type approach. IPM is a planned and systematic use of detection, evaluation, and monitoring techniques for pest management.

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

Fire is the primary ecological disturbance regime affected by the road system. The Forest has a low frequency/low intensity fire regime. The old woods roads and the current road network allow easy access to the Forest. The intermingled private and public land ownership and the road network allows accidental

and arson fires to occur almost anywhere when fuel conditions are conducive to fire. The road network also creates firebreaks and allows ready access in most of the Forest outside of the wilderness.

Regardless of how roads are managed, all wildland fires will be suppressed because of their timber and recreational values, and the intermingled public-private ownership.

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

The Wayne National Forest provides opportunities for solitude. However, in areas of the Wayne where ATV/OHMs are permitted, noise levels can increase dramatically during periods of high usage. Road construction or maintenance would not directly or permanently impact noise levels because those activities are of short duration. However, road construction and maintenance activities may create unwanted noise for trail riders and hikers seeking solitude if these roads were to be used illegally. In addition, road construction and maintenance projects may temporarily inconvenience visitors enjoying other forms of recreation where high noise levels are undesirable such as hunting, fishing, camping, or wildlife viewing. Closing roads may provide additional areas for all visitors to find solitude in the forest.

There is a diversity of public opinion whether the Wayne should provide more areas for solitude or more access to the forest.

Motorized trail riding is also a highly popular recreation sport that off-highway vehicle (OHV) enthusiasts seek on the Wayne National Forest. Recent recreation use studies and annual ATV/OHM sales have shown national and regional trends for motorized recreation use to be on a steady increase. On the Wayne, annual rises in motorized trail permit sales offer additional evidence of this upward trend. Presently, the Forest has over 100 miles of motorized trails located in three Management Areas – 2.3, 3.1, and 3.2. Noise levels in these areas can be expected to increase in proportion to the increase of ATV/OHM use.

In addition, the scattered ownership pattern on the Wayne may not provide a suitable separation of noise producing activities and activities that are adversely affected by that noise.

Aquatic, Riparian Zone, and Water Quality (AQ)

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 by intercepting, concentrating, and diverting flows. In other words, roads expand the drainage network. These changes can increase peak flows and can change the timing of storm runoff to streams.

The road system modifies the surface and subsurface hydrology by intercepting ground and surface water and routing it more quickly to stream channels through the road ditch system. There is a large network of roads within the Wayne National Forest, in addition to the National Forest System public roads. Few of these roads were designed and constructed to current highway design standards. Many township and county roads have been in place for 150-200 years, and many evolved from trails, wagon roads, and logging and mining roads. Because of the hilly topography, roads are generally located on ridge tops or valley bottoms, however there are roads found on side slopes. The ridge top and side slope roads can reduce or alter overland flow processes by intercepting flows and routing it quickly to streams. Rain events can overwhelm ditch systems and wash out roads because of poor design and topography. When

surface flow escapes the ditch system that is not designed according to Best Management Practice standards or maintained properly, the road is then often left to convey surface flows.

The roads included on the Forest Service road system are surfaced with aggregate, native material , or asphalt. Non-asphalt roads have been graded and re-graded for years, which has affected the road crown, ditches and cross-drains. Loose material has typically been moved to the sides of the road by the grader's blade. This loose material can enter the ditch system and reduce surface flow capacity of the ditches. In some instances, roads have become slightly entrenched by continual grading. Ditches have been lost and surface flows are conveyed on the road itself.

Compaction of soils and road surface materials alters permeability and infiltration. Reduced infiltration contributes to additional surface flow since water does not infiltrate for storage into the sub-soil profile, but instead runs off as overland or surface flow. Storage and movement of water through the soil profile as subsurface flow regulates and sustains base flows in streams. When roads disrupt these processes, more water become available during peak flows and less water is available to sustain base flows.

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

Surface erosion is in relation to forest roads is dependant on soils, road surfacing, road grade, and age of the road, traffic volumes, and the effectiveness and spacing of drainage structures. The Wayne National Forest, in all new construction and re-construction, is meeting or exceeding Best Management Practices and Professional Engineering practices to reduce any effect the road system may have on soil transport. Old roads tend to increase erosion when not designed correctly, or are poorly maintenance.

Roads found on highly erodible soils have the potential to cause surface erosion problems. Erodible soils are found throughout the Wayne National Forest. However, a coarse-scale look at the distribution of erodible soils shows that there are higher percentages of erodible soils in the Athens and Marietta units of the Forest (Ewing and Stachler 2002).

Road surfacing, maintenance and grade play a role in surface erosion. Some roads are surfaced with limestone aggregate or native material. When roads are not located, designed, or maintained properly to divert water from streams, aggregate or native material can move into streams during rainfall events. Movement of material into ditch lines and streams can be increased on roads with steeper grades. Grades of over 12% average slope are avoided unless there are stringent erosion control practices installed.

There are counties and townships within the Forest boundary that maintain ditches and place the ditch spoil material along the edges of the roadside during maintenance operations. Erosion control methods (i.e., seeding and mulching, silt fencing) are often not employed. This material, while usually placed in the upland areas, has the potential to erode into ephemeral channels.

Sediment delivery to streams may be higher during and just after construction, but raw ditch lines and road surfaces with little binder can also remain chronic sources of sediment. High volumes of traffic on roads with aggregate and native material have a greater affect on the integrity of the road and surfacing than it does on asphalt-surfaced roads. Roads with average grades of over 12% are to be avoided unless extensive erosion control features are incorporated in the design.

Proper design and placement of drainage structures are critical to minimizing the amount of surface flow and surface erosion.

Road-stream crossings can accelerate inputs of sediment. Use of native materials or aggregate that contain sand or materials smaller than ½ inch in size for road surfaces can degrade channels by filling in pools downstream of crossings. This generally occurs where the road slope approaching the channel is steep. Surface erosion can occur on roads that are located in the floodplain of streams, specifically with

roads surfaced with native materials or aggregate. Floodwaters can wash over the road surface and carry material into the stream.

At the Forest-scale it is not feasible to determine expected erosion rates from road features. This is more appropriately done at the project-level or subwatershed-scale (6^{th} level watershed or smaller).

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

Road-related mass wasting results from improper placement and construction of road fills and stream crossings; inadequate culvert sizes to accommodate peak flows, sediment loads with woody debris; roads located on soils prone to mass wasting; and water diversion onto unstable hill slopes.

This issue should be dealt with at the project-level.

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

Road-stream crossings have the potential to directly and indirectly affect stream channels and water quality. Road-stream crossings on the Forest Road System generally consist of bridges or culverts, but they occur on ephemeral, intermittent and perennial streams. If not properly designed, crossings can alter the channel geometry upstream and downstream of the crossing. Depending on how much the crossing alters the amount of water or sediment the stream can carry, channel adjustments may include changes in bed form, bed armor, width, pattern, and profile (Furniss et al. 1991).

There are a total of 17 road-perennial stream and numerous road-ephemeral/intermittent intersections on the level 3, 4, and 5 Forest Road System as queried by GIS at the perennial stream layer. Each of these sites represents a point where pollutants can be introduced into the streams. These pollutants can include salt or deicing materials, trash, petroleum products, and pesticides.

Many more road-stream crossings occur. For example, an analysis of road crossings (township, county and state roads) showed as many as 323 crossings in one 5^{th} level watershed (Ewing and Stachler 2002). However, this number of road crossings was generated only for perennial streams. There are many more miles of intermittent and ephemeral streams than perennial streams, thereby indicating a higher amount of road crossings occuring in our watersheds than estimated. Road-stream crossings that pose the highest risk for affecting stream channels and water quality should be identified through watershed-scale and project-level analysis. At this time the WNF is preparing to begin a forest-wide culvert inventory which will be used when performing smaller scale RAPs.

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

Road-stream crossings provide the greatest potential for pollutants to enter stream systems. Roads that parallel streams also represent a potential route for contaminants to enter surface waters. Cross-drained ditches may transport spilled pollutants to standing or flowing water bodies.

The Forest Road System is not generally used for transport of bulk materials of potential pollutants like petroleum products. The vehicles using the roads do carry sufficient fuel and oil to cause localized water quality problems should an accident occur but do not necessarily pose a significant threat to the Wayne's waterways.

Oil and Gas exploration and development activities are surface-disturbing in nature and requires excavation and removal of surface vegetation and soils for drilling operations. Road and drill pad

construction may disturb up to 2 acres per well. *(See Appendix for map showing location of oil well and proximity to level 3,4,&5 system roads.)*

The effects to existing roads would differ between hot-mixed paved highways and gravel or other rock-based material roads. Heavy vehicles may cause paved roads to crack, or deteriorate, especially along the edges of the narrower roadways. Gravel and dirt roads may be subject to the formation of ruts, potholes, and washboard effects. The level of impact is dependent upon the amount of activity, weather conditions during the activity and the level of road maintenance by the governing agency. Direct effects would occur during the drilling and plugging phases of oil and gas operations which usually require the use of heavy vehicles and equipment. A total of 8,384 oil and gas wells were drilled in Wayne National Forest counties for 10 year period 1980-1989, or 838 per year. The present condition of the road systems is partly a consequence of this oil and gas activity. The road system remains in place and continues to be used for travel and access. The counties included in the Wayne National Forest have local frost laws which restrict use of the roads by heavy vehicles when the roads would be most easily damaged during days of freeze and thaw. Vehicle operators are also subject to county road use and bridge weight requirements.

Effects to traffic patterns on the road system within the Forest will vary depending on the location(s) of the proposed well(s) and the time of day the equipment uses these roads.

The potential direct effects to surface water include:

? sediment loading of stream channels due to the earthwork associated with site construction;
? introduction of pollutants via spills and releases to surface water from:
- oil/produced water treatment, storage tanks and handling facilities,
- sanitary facilities; and
- oil/produced water transportation facilities (trucks, pipelines);

The potential indirect effects to surface water include:

? Water consumption during the early development of a field could have a short-term adverse effect on local stream flow; and
? secondary effects on downstream water use due to changes in water quantity or quality described above.

The potential direct effects to ground water include:

? transfer of drilling fluids and saline production water to fresh water aquifers if wells are not properly constructed;
? introduction of pollutants from spills and releases via exposed ground surfaces to subsurface aquifers from:
-oil/produced water treatment, storage tanks and handling facilities,
-sanitary facilities, and
-oil/produced water transportation facilities (trucks, pipelines);

The potential indirect effects to ground water include:

? water consumption for road watering and drilling fluids during the early development of a field could have a short term adverse effect on local groundwater levels; and
? secondary adverse effects of each of the above on seeps and springs.

Deicing salts (or equivalents) may be used by other agencies or organizations to some degree on the Forest Road system, specifically only on the county and State roads. There is currently no pesticide use on the Wayne road system outside of administrative sites such as offices and campgrounds. The types of equipment normally used in applying the deicing agent on the roadway cannot keep the agent from getting onto surrounding lands and waters.

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

The road system is hydrologically connected to the stream system at road-stream crossings, in areas where roads parallel streams that have an insufficient buffer strip between the road and stream, and by ditch systems that drain directly into streams.

An extended channel network can increase peak flows, as described in AQ(1). Water quality can be degraded where poorly designed and maintained roads connect with streams as described in AQ(1), AQ(2), and AQ(4).

Condition of hydrologic connections between roads and streams can be identified best through project-level and subwatershed (6^{th} level watershed and smaller) scale analysis.

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 water bodies 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 the Forest Service road system is crucial. Some potential beneficial uses include, but are not limited to, fish habitat, municipal water supplies, recreational use, visual values, use by wildlife associated with riparian and aquatic habitats, etc.

Downstream beneficial uses of water in southeastern Ohio exist in the form of surface waters and reservoirs used by wildlife and recreation. There are no municipal water supply sources directly on the Wayne National Forest but water supply sources do exist within the Forest's Proclamation Limits and several could be considered hydrologically connected (i.e. subsurface) to Forest Service surface and subsurface water resources. Changes in land use and population may or may not affect water quality and quantity. However, downstream beneficial uses of water can be affected as described in AQ(2), AQ(4),and AQ(6).

At the Forest-scale it is not feasible to determine expected water quality and quantity effectment from road features. This is more appropriately done at the project-level or subwatershed-scale (6^{th} level watershed or smaller).

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

Wetlands are those areas that are inundated by surface or ground water with a frequency sufficient to support, under normal circumstances, a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction (R9 Supplement 2520-98-1 for FSM 2527.05). Roads can affect wetlands directly by encroachment or indirectly by altering surface and subsurface flows. Encroachment results in a loss of wetland area directly proportional to the area disturbed by the road. Alteration of hydrology can affect wetland function with the effects extending beyond the area directly affected by the road.

Many of the naturally occurring wetlands in southeastern Ohio have been drained or modified as a result of agriculture, mining, or urban development. The majority of naturally occurring wetlands in southeastern Ohio are riverine in nature. In other words, the wetlands are hydrologically tied to the streams and floodplains. On Wayne National Forest lands these wetlands generally occur as wooded swamps, buttonbush dominated shrub-scrub wetlands, or as seasonally flooded bottomland hardwood vernal pools or sedge meadows. In some cases due to construction activities of road embankments and/or

subsequent beaver activity, wetlands have been formed and should be kept. The Forest Service has restored floodplain wetlands in a few selected areas and will continue to restore wetland habitat as opportunities become available.

Coordination with other local government agencies on maintenance of roads on their jurisdiction should take place and will affect stream wetlands outside of the right of way on Forest Service ownership. There is a potential for cost-sharing with these agencies on maintenance activities to protect the resources where the work is more costly than the standard procedure.

Most of the level 3, 4, and 5 roads included in this analysis are not located near wetland habitat. However, Lyra Trailhead, Wolcott Trailhead, Carter Abel Trailhead, and Symmes Creek Trailhead are located adjacent to seasonally flooded areas that possess vernal pools and/or sedge meadow habitats. Effects to specific wetland habitats from maintenance of roads and drainage structures, or from construction of new roads, can best be determined through watershed and project-level analysis.

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 naturally migrate within floodplains, eroding the bed and banks in one place, while depositing material in other places. Streams also transport and deposit woody debris and organic matter from the floodplain into and through the aquatic system. Woody debris and organic matter such as leaves, twigs, and needles, provides energy, nutrients, and structure for aquatic organisms. Floodplains also play an important role in the dissipation of excess energy during high water events.

Roads in bottomlands can directly affect physical channel dynamics when they encroach on floodplains. Roads within a floodplain reduce the amount of permeable surface area for storage of floodwaters and groundwater recharge. This can increase peak flows, making more water available for in-channel erosion. A change in erosion rates effects stream stability. When roads eliminate or reduce floodplain access by the stream, the movement of sediment and organic matter can be affected. Wood and sediment can be trapped behind bridges or culverts, which increases the risk of road-stream crossing failure.

Roads built in floodplains can restrict channel migration. If a stream loses its ability to migrate laterally on the floodplain, it will attempt to maintain stability by adjusting other aspects of its pattern, dimension and profile. This in turn affects how the stream will transport wood, organic matter, and sediment. In some cases, streams have been channelized in an attempt to protect roads. However, channelization of streams increases the stream energy available for channel erosion, which results in increased channel instability.

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?

Migration and movement of aquatic organisms are primarily restricted at road-stream crossings by culverts. This results from hanging culverts, high flow velocities in culverts, or inadequate depths for movement of aquatic organisms. Fish and some invertebrates move up and down streams in seasonal patterns to access spawning areas, food, and various habitat types. In our region, headwater assemblages of fish use high water events to re-colonize pools in upper reaches of intermittent stream systems on the Forest. Therefore, culverts and stream crossing on perennial and non-perennial streams are of equal importance to migration and movement of warm water stream organisms.

AQ(4) discusses locations of stream crossings on the level 3, 4, and 5 roads. These crossings represent only a portion of the crossings present in our watersheds. An analysis of stream-road crossings by 5th level watershed showed that there is a range of 139-323 stream crossings per 5th level watershed (Ewing

and Stachler 2002). These represent crossings, generated by GIS, on RF3 streams (i.e., perennial streams). Because the miles of intermittent and ephemeral streams far exceeds perennial stream miles in our area, the number of stream crossings is much higher than those figures.

Condition of culverts and road-streams crossings can be identified best through project-level and subwatershed (6^{th} level watershed and smaller) scale analysis. It is the intent of the Wayne National Forest to record and list culverts to be replaced with suitable crossings to accommodate the aquatic system.

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

Forested riparian areas play a role in trapping and filtering sediment and pollutants, serve as a corridor for plant and animal migration, maintain optimal water temperatures for aquatic organisms, reduce peak flows, and supply nutrients to the aquatic ecosystem. Roads constructed, or maintained, in riparian and floodplain areas reduce forest or vegetative cover that provide shade and nutrients to the aquatic system. Changes in the amount of shade can alter water temperature, both of which can cause changes in the biotic community. Reduction in vegetative cover can reduce recruitment of large woody debris to the system, which results in loss of habitat for aquatic species and the structural integrity of the stream channel. A few of the roads included in this Forest-scale roads analysis occur wholly or partially within riparian areas.

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

The road system provides fishing access to National Forest ponds, lakes, and streams. Specifically, the level 3, 4, and 5 roads access the following fishing areas on the Wayne National Forest: Hanging Rock Area ponds and lakes, Lake Vesuvius, Pumpkintown Lake, Lewis Lake, Timbre Ridge Lake, Lamping Homestead Pond, the Little Muskingum River (at the Ring Mill and Lane Farm Canoe Access sites), and the Ohio River at the Leith Run Recreation Area. Because many of these fishing areas are remote, there is always the potential for illegal harvest of fish to occur. The road system affords Ohio Division of Wildlife and Forest Service Law Enforcement Officers access to these areas for wildlife law enforcement, however they cannot patrol all remote areas as frequently as they would like. Access to aquatic resources by level 1 and 2 roads is possible; these roads may encourage potential poaching because of their remote nature. However, that scale of analysis is best conducted through project level or sub-watershed level (6^{th} level) roads analysis.

Recreational use of aquatic resources, if improperly managed, can contribute significantly to declines in rare or unique native vertebrate populations or do damage to important habitats. The presence of a road system facilitates access to streams, lakes, and wetlands where at-risk species occur. For example, there have been instances where the Forest's fisheries biologist has noted all-terrain vehicle or 4 wheel drive vehicle tire tracks on gravel bars and in stream beds in streams such as the Little Muskingum River, Symmes Creek and Storms Creek. This illegal activity indirectly affects aquatic organisms by contributing to sedimentation of habitat. There are also potential direct threats to freshwater mussels and mussel beds (i.e., crushing) by such illegal activity. None of the level 3, 4, and 5 system roads appear to be located in a way to encourage such illegal access to in-stream habitat.

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

The introduction of non-native species is of great concern to the Forest Service and the Ohio Division of Wildlife. Non-native species can out compete native aquatic species for food and habitat, and at time

even displace the native species. The road system provides access to National Forest aquatic resources, and therefore increases the potential for introduction of non-native aquatic species. Education is the most effective control of this activity.

By far the most common way non-native aquatic species are introduced into waters is via bait bucket release. Anglers, at the completion of their trip, have been known to release their bait into the water where they have been fishing. This is an illegal activity. AQ(12) describes all of the National Forest fishing areas that are accessed by level 3, 4, and 5 roads.

Release of unwanted aquarium species is also a method by which non-native species are illegally introduced into National Forest waters. One example occurred at Sand Run Lake, accessed by a level 3 road. Local students released an extremely large Amazon pacu (i.e., a piranha-like fish) into Sand Run. The lake was easy to access because of the road, and made for the perfect place to illegally stock a non-native fish. This activity was discovered when an angler captured the large, toothy fish.

The zebra mussel is a non-native mussel introduced into the Great Lakes by foreign ships. The species has spread throughout the Great Lakes and into the large river systems in the eastern United States. It is easily transported to uninfected waters by boaters who have been recreating in infected waters. The zebra mussel now occurs in the Ohio River, and is known to be established along the Leith Run shoreline. Boaters using the Ohio River could introduce the zebra mussel into National Forest waters such as Lake Vesuvius and Timbre Ridge Lake, both accessed by the Forest Public Road system. Consequently, the Forest Service entered into a partnership with the U. S. Fish and Wildlife Service and Ohio River Fisheries Management Team to print and distribute boater educational signing at boat ramps of concern.

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 of interest?

The Forest Service considers the Little Muskingum River, Symmes Creek, Pine Creek, Ohio River, and Hocking River as being important aquatic areas. These systems contain rare aquatic species, including fish, mussels, and/or insects. By far, the Little Muskingum River has the highest number of aquatic species-at-risk, and the highest diversity of fish and mussel species of all streams flowing through the Forest. The Little Muskingum River is accessed at two points by level 3, 4, or 5 roads. The level 3, 4, and 5 roads cross a couple tributaries to Symmes and Pine Creek.

Terrestrial Wildlife (TW)

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

In general, road construction tends to have a negative impact on terrestrial plant species by 1) resulting in direct habitat and/or population loss, 2) creating "edge" (see question EF2), 3) providing means for dispersal for non-natives, and 4) increasing herbivory by providing corridors to grazing wildlife (e.g., deer). However, certain native plant species, some of which are rare, can grow and even thrive in disturbed, open edge habitats along roadsides. For example, the Federally endangered running buffalo clover (*Trifolium stoloniferum*) is a disturbance-dependent species that is known to grow along trails and old jeep roads. And, two Regional Forester Sensitive species, yellow gentian (*Gentiana alba*) and yellow-fringed orchid (*Platanthera ciliaris*), have known populations along roadsides on the Athens and Marietta Units, respectively. However, while both of these species use roadsides as habitat, both populations are at risk due to untimely and extensive maintenance of the roadside right-of-ways: the gentian is being mowed in late September during its flowering period, and the orchid may have been permanently eradicated by deep bank scalping. In short, closing or decommissioning roads could have a negative effect on certain plant species if the roadside habitat is allowed to grow over, yet, misdirected

maintenance of these roads could be equally detrimental. Effects to individual plant populations will have to be determined on a project-by-project basis.

Trombulak et al (2000) states that roads of all types affect terrestrial wildlife species and habitat in seven general ways: 1) mortality from road construction, 2) mortality from collision with vehicles, 3) modification of animal behavior, 4) alteration of the physical environment, 5) alteration of the chemical environment, 6) spread of exotic species and 7) increased alteration and use of habitats by humans. The direct effect of a road alters soil density, temperature, soil water content, light, dust, surface-water flow, pattern of run-off and sedimentation. Roads create edge habitat which can have serious consequences to species such as nesting birds. The long-term use of a road leads to greater soil compaction. The heat stored on a road can be released at night creating heat islands, which attracts some species of wildlife to them which increases the chances of mortality. Road traffic on gravel roads can spread dust onto adjacent plants thus interfering with photosynthesis, respiration and transpiration which are essential processes for growing plants. Elimination of some plants could alter the terrestrial habitat community structure. The effects of chemical pollution to surrounding plant life and animal species, such as heavy metals from gasoline additives or pollution from exhaust, is dependant on the amount of vehicle traffic on the roadway. Roads have also been implicated as being a barrier to species movement such as small mammals (Oxley et al 1974), which in turn affects the gene flow among populations. Roadside vegetation provides increased habitat for some species, such as rodents. This will provide a food source for their predators, such as hawks and owls.

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

The road system provides access to and through the Wayne National Forest. Roads bisecting the Forest cause the Forest to become fragmented into smaller parcels which can become unattractive to those wildlife species that prefer large, undisturbed , interior areas of forest habitat. Roads allow for the increase in the amount of edge or early successional habitat through a forested area.

Human activities can have a direct impact to habitat such as trampling of vegetation or the unplanned introduction of fire by anthropogenic means (Noss 2002). However, roads may also become barriers to the movement of fire. Roads on the Wayne can also provide humans a well hidden place to dump household garbage and litter and more recently illicit drug lab refuse. Additionally, Forest land located adjacent to Level 3, 4, and 5 roads is sometimes viewed, by the public, as prime potential land exchange sites that may promote job development in an area. Road frontage of this nature can increase the value of a tract or parcel of real estate. Habitat loss could then be assumed permanent.

Road access allows for greater access for lawful hunting. More roads will spread out hunters into a larger land area. A reduced hunter density should make for safer hunting. More roads can provide increased access, which will increase the harvest of some numerous species with no natural predators, such as deer and coyote, and help keep their population in balance with the habitat.

TW (3): How does the road system affect legal and illegal human activities? What are the effects on wildlife species?

Roads facilitate the access of areas for legal hunting and trapping activities. For managed game species this would be considered a positive effect on wildlife populations. Road ways however are also used for illegal poaching activity which would have a negative effect on wildlife populations. The net effect to managed wildlife populations, such as white-tailed deer, is not clearly known but might be considered negligible due to the ever-increasing deer herd in the state. Roadways do have the opportunity to disrupt the hunters experience on the Wayne due to the noise associated with the traffic, which may disperse game from an area. Seibert and Conover (1991) found, in a road-kill study on a dual lane road adjacent to

National Forest land and the Hocking River, that over a period of a year that 188 vertebrate species and 1,162 invertebrate species were identified as road-kill within a one-mile stretch of U.S. Highway 33. Similar studies elsewhere show that the type of habitat adjacent to the roadway, time of year, amount of traffic, type of road, and weather patterns all play a role in the magnitude and types of wildlife species that are killed on roadways.

Unlawful marijuana plots are a problem on Forest Service land. Unlike many western forests where growers are driven to the more remote reaches of the Forest to maintain extensive irrigation systems needed to sustain the plots, growers using the Wayne NF tend to focus their activity near roads and trails, or areas accessible from them (Hall 2002). Constructing new roads could contribute to such clandestine activities, yet also make law enforcement easier. Conversely, closing roads could discourage the use of more remote areas for marijuana plots, but at the same time, hinder law enforcement. Specific effects will have to be determined on a project-by-project basis.

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

According to the Natural Heritage Database (2000) maintained by the Ohio Division of Natural Areas and Preserves, the Wayne NF contains at least 40 distinct patches/representatives of 10 unique community types or features:

- Mixed mesophytic forest
- Appalachian oak forest
- Floodplain forest
- Hemlock-hardwood forest
- Beech-sugar maple forest
- Oak-maple forest
- Oak-hickory forest
- Oak-maple-tulip tree forest
- Maple-ash-oak swamp
- Natural bridge or arch

Approximately 100 miles of road (classified and unclassified) come within one half mile of these communities/features, of which ~ 12 miles are Class 3, 4, or 5 (6.7 of which are Forest system roads). The close proximity of these unique areas to major road corridors renders them vulnerable to the effects of road reconstruction or decommissioning, as well as to road usage issues (e.g., increase access, clandestine activities, and ecological impacts).

Other distinct communities and features known to occur on the Forest include buttonbush swamps, beaver-created wetlands, floodplain wetlands (e.g., sedge meadows), vernal pools, and abandoned mine shafts. For general effects of the road system on all of the above terrestrial and aquatic habitats that occur on the Wayne, see the questions in sections EF, TW, and AQ. The specific effects of the road system on these areas will be determined on a project-by-project basis.

Economics (EC)

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

The forest road system affects costs to the Wayne by placing demands on the budget for road repair projects, maintenance expenses and administrative overhead associated with the entire road system, and when need arises for new construction of roads.

The forest road system brings revenue into the Wayne's budget through timber sales, oil and gas and other minerals leasing, user fees for recreational activities such as camping, ATV/OHM use, bicycle and horse-back riding. Some of the revenue returns directly to the Wayne's budget and some revenue returns indirectly, after having been examined and sorted at the Washington Office, as well as taxes from gas receipts that are returned to the Federal Highway program for our cooperators. Changes to the road system cannot be expected to significantly increase net revenue to the agency by reducing cost, increasing revenue, or both.

In the future, if we propose a site-specific road construction/ reconstruction project, we will do a project-level financial efficiency analysis that will include all road costs (including maintenance), associated costs, and associated revenues (if any), in addition to the Project Level RAP.

Direct Costs: Roads, although directly costing capital to maintain, do also reduce the cost of implementing other management activities by allowing less expensive access. For example, when roads are unavailable for access to complete trail maintenance, the cost of transporting materials to the trails is drastically increased, and in many cases, "trailing" stone surfacing over one half mile is very costly due to lack of efficiency. Other programs, such as fire, wildlife, timber and recreation benefit from ease of access due to roads.

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

Economic efficiency goes beyond financial efficiency. Economic efficiency analysis measures net economic benefit to society in aggregate, including non-marketed and external costs and benefits, without regard for who gains and who loses. The economic efficiency question asks whether a specific investment produces more aggregate economic value than it costs at the scale in question. Economic efficiency analysis may include consequences that we cannot express in dollars.

Examples of benefits included in economic efficiency analysis are the value of recreation experiences provided free-of-charge and passive-use values. Examples of costs include decreased quality and value of water flowing from the National Forests, sedimentation of fish habitat, and fragmentation of species habitat resulting from management activities. Economic distribution effects such as employment, income, who benefits, and who pays are not included. They are the focus of distribution analysis as covered under EC (3).

Although passive-use value is a component of economic efficiency analysis, we address it after the recreation section below. This added emphasis is due to the potential long-term loss of unique unroaded values in areas planned for road entry. Passive-use value, however, in areas currently roaded can be lost with planned road decommissioning. At the time of the last *Forest Plan* the Wayne did not have any tracts meeting unroaded classification.

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

When doing economic distribution analysis, we identify the distribution of benefits and costs in society. Distribution analysis can be either financial or economic. Financial distribution analysis includes only direct cash flows. Examples include job and income gains or losses by different sectors of the economy. Economic distribution analysis adds non-market and external values and costs. Examples of this type of

distribution consequences include who incurs the negative effects of air or water pollution and who benefits from enhanced scenic beauty or solitude and those gaining from the ease of access to the public's lands.

The public road system managed by FS benefits rural and urban people of both sexes and people of varying ages, education levels, and incomes. It is likely that more males than females use the roads to access fishing, hunting, ORV, and other outdoor recreational activities, while both sexes use roads to gain access to campgrounds and picnicking areas. This information is not scientifically based, but is observed by those dealing with the public at our offices.

Seasonal closures of roads during the winter and spring seasons can reduce maintenance costs. A regular maintenance program will keep roads in good condition and is less expensive than major maintenance after the road has deteriorated, beyond normal maintenance.

Also related to this question are Social Issue impacts related to the existing road system. See the Social Issues (SI) set of questions for more information.

Timber Management (TM)

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

In the Wayne *Forest Plan* 71 % of the Forest is shown as suitable for timber production (p. 4-7). Currently in the Combined Data System (CDS) data base, 79 % of the Forest is shown as suitable for timber production (LSC 500). The CDS is a timber stand database that keeps track of the timber base on the Forest. In CDS, suitable acreage is designated by stand. In most stands there will be some portion that will not be suitable for timber production because of heritage resources, T & E species, soil conditions, etc. Therefore, the acreage of suitable land in CDS is higher than it actually is.

The collector road system is in place for the Forest and is composed of state, county, township, and a small amount of FS open system roads. Past timber sales have provide for road coverage into suitable areas for timber production. Construction of minor local roads or spur roads will be required to access the remaining areas. These roads will be usually ½ mile or less in length.
The forest-scale RAP is only dealing with Level 3, 4 or 5 roads and at this time new construction of those higher level roads for timber management is not likely.

The spacing of forest roads allows for a variety of uses, making entry for Timber Management more cost effective. As for tractor ground acceptable for skidder operation the normal range of skidding efficiency is a distance of less than one-quarter mile. This is variable depending on the value of the logs and the species and slope of the terrain. In all cases other logging systems such as cable, horse or even helicopter logging (although no helicopter logging has taken place on the Wayne) must utilize roads, and the closer the logging unit is located to the landing or staging area the more economically viable the sale is.

This will be evaluated in an economic analysis of the transportation system during subsequent Project Scale RAPs.

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

The current road system allows for suitable access for monitoring, managing, and treatment on most of the Wayne National Forest suitable timber base and other lands. There are areas of the Forest where no

access is available due to private lands that need ROW or roads that are located on excessive slopes. ROW will be ddressed on a project basis in project-level RAPS.

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

The current road system allows for suitable access for monitoring, managing, and treatment on most of the Wayne National Forest suitable timber base which is in need of silvicultural treatment. The same issues on isolated tracts exist as stated in TM (2) above where ROW and terrain prevent access.

Minerals Management (MM)

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

On the average a well and associated drill pad may cause up to 2 acres of surface disturbance. The location of existing roads (all jurisdictions) will dictate the distance of the access roads construction for access to the drill pad. The closer the pad is to an existing road, the shorter the distance of the new construction. Drill rigs and associated equipment on the roads is a concern, as heavy equipment does most of the damage to a road. The American Association of State Highway and Transportation Officials (AASHTO) estimate that up to 91% of road damage is due to heavy over-the-road equipment. The majority of the damage done to road surfaces are not caused by passenger vehicles or light trucks. This is a concern on FS roads and seasonal closures to this type of activity may be needed in some areas. This will be part of all project level RAPS for oil well construction and special use in the future. The heavy concentrations of roads (non system and special use) are primary a result of mineral exploration and extraction for the past 160 years. Many of these roads are now in need of removal or upgrade if use is to continue on the roads into the future. At the time of renewal of special use agreements for wells where access to the wells is over FDR's, the need for a road use agreement will be evaluated. The agreement would allow the FS to reclaim expenses associated with the use of our roads by the permitee's heavy equipment through surface replacement dollars where applicable.

Currently the Forest has 3 types of mineral rights on the Forest:

1. Reserve Rights: Private mineral rights under Federally owned land.
2. Outstanding Rights:
3. Federal Rights: FS owned rights to minerals and surface rights.

On reserved and outstanding rights and on leased rights the FS must provide access unless it can be easily obtained from private or other public roads and ROWs. On reserve and outstanding rights, the FS authority is somewhat limited.

At this time the Forest does not have any locatable mineral claims that are active. In addition, there are no active saleable mineral permits for common minerals such as aggregates or limestone on the Forest.

Range Management (RM)

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

Currently the range program on WNF is not very large, it has ranged from up to 10 allotments and down to 5 allotments. The existing 3, 4 & 5 roads provide access to all needed sites and no

changes are expected. They currently meet the needs of the limited Range Allotment Program to date.

Water Production (WP)

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

There are several water improvements on the Forest. All have access for routine maintenance on the roads system. While most are small with little risk to residents in the event of failure, several owned by the FS are classed by the state as high hazard dams where the possibility of a loss of life due to catastrophic failure during a maximum design flow would be likely.

Forest Road 604, also known as Timbre Ridge Lake road, should also be upgraded to meet the state's requirements for high hazard dams. The State of Ohio currently stipulates that a second (alternate) route exist to access a high hazard dam during an event of maximum design flow. Currently this is not the case, as route 604 is not travelable with the type of equipment that would be needed in the case of a potential dam failure or dam emergency for repairing the structure.

Upgrading this road would also serve the public by providing access to a popular recreation site. This road is currently listed as an objective level 5 on the system, but due to funding is now closed. This is a candidate for the PFSR program. It should be reconstructed and this decision will be made at the project level RAPs.

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

There are no municipal water supply sources directly on the Wayne National Forest but water supply sources do exist within the Forest's Proclamation Limits and several could be considered hydrologically connected (i.e. subsurface) to Forest Service surface and subsurface water resources. Changes in land use and population may or may not affect water quality and quantity. However, potential effects on municipal water systems are possible from activities such as land disturbing activities, oil & gas road development, mass wasting, chemical spills, or herbicide application and other activities described in AQ(2), AQ(4),and AQ(6).

At the Forest-scale it is not feasible to determine expected water quality and quantity for municipal watersheds effectment from road features. This is more appropriately done at the project-level or sub watershed-scale (6^{th} level watershed or smaller).

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

The Wayne National Forest has no hydroelectric power generation facilities within its boundaries.

Special Forest Products (SP)

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

The Wayne National Forest sells collection permits for firewood and plant roots, like ginseng (*Panax quinquefolius*), goldenseal (*Hydrastis canadensis*), blue cohosh (*Caulophyllum thalictroides*), black cohosh (*Cimicifuga racemosa*), bloodroot (*Sanguinaria canadensis*), and wild ginger (*Asarum canadense*). Ginseng harvesting is restricted to a particular season (August 15- December 31), and

specific conditions are set for harvesting technique (e.g., berries must be replanted, and plants must be at least 5-years old and 3-pronged). One-hundred and sixty-six plant permits and 115 firewood permits were sold in FY02.

Other popular forest products collected on Forest Service land include: mushrooms, fruits, nuts, pinecones, and moss. Collection of any forest product is prohibited from all Research Natural Areas and Special Areas (candidate and designated).

The Forest has a high density of roads (4 mi/square mile for the watersheds in which the Wayne NF owns land), making access to special forest products easy. The construction of additional roads could open more remote areas to collection, and at the same time, increase pressure on the resource being collected. This could prove especially detrimental to some of the roots sought for medicinal purposes, like ginseng, which is thought to be declining in many states in the Region due to over-collection pressures. Road closure, on the other hand, could make collection of forest products more difficult, thus relieving some of the stress on the more popular resource products.

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Special Use Permits (SU)

SU (1): How does the road system affect managing special use permit sites (concessionaires, communication sites, utility corridors, etc)?

There are a variety of roads on the Wayne National Forest that are under special use permit. Some of these special use permit roads are system roads that were built years ago for timber sales but have not been maintained. Some system roads have been used to access private land and then were closed by gate to be used later by the permittee for a timber sale in the future. Many of these roads are access to private in-holdings and others are access to communications assets such as cellular telephone towers.

The important factor with special use permit sites is to ensure the roads are constructed and maintained to FS road standards. Many existing special use permit roads that are on the Wayne National Forest are not built to standard and cause sedimentation. The other problem with special use permit roads is proper decommissioning of the road when the special use permit is no longer needed. Proper rehabilitation of these roads will help minimize sedimentation and allow the vegetation to return.

To determine specific issues regarding special use roads, this question is more appropriate at the project level. Future special use roads will be built to the standards listed in Appendix A.

General Public Transportation (GT)

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

This is not an issue for the FS jurisdiction road system, as all of these roads are classified as local roads, which provide access to the Forest. However, the other public jurisdiction road systems (arterial and collector roads) that will be part of the backbone of our system shall be our primary access to communities.

Some roads such as Telegraph Road (FR 127) are connectors from county road to county road and provide access to large parcels of Forest Service land, and is a prime candidates to be a Public Forest Service Road (PFSR).

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

Public access is primarily over other public agency roads (arterial and collector) as all of the Forest's roads are classified as local. However, the Forest has a growing number of special use roads that access private in-holdings. The Forest is playing a roll in providing the counties and the state with money from the Forest Highway Program. This program collects and allocates money from the Transportation Trust fund through the collection of tax revenues from sales of road fuels used on forest roads. Currently, we found an average of $200,000 per year in road reconstruction and improvements on roads of county and state jurisdiction within or leading to the National Forest. This is a cooperative venture with the Federal Highway Administration, Forest Service, and local governments. Maps of all existing Forest highway designated roads is available in Appendix E: Forest Highways In Ohio. Additional roads are pending in several of the counties of the Forest, and the maps will be updated when those are added to the system by agreement of the Regional Forester and the Director of the Eastern Federal Highways in the next few months.

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

Jurisdiction is an issue on the Forest, as the Forest is a conglomerate of purchased parcels acquired since the 1930's. The base transportation system was in place before the Forest and the 12 counties have records back to the very early 1800's on ROW for roads crossing the Forest. In addition, as we buy more land there is even more ROW issues, as easements are granted and historic easements come with those tracts as well. The Forest has taken the stance that as we work on roads we will do a thorough background check on the road and it's jurisdiction during the NEPA process. At that time ROW issues will be settled.

Currently, the Forest has master road use agreements with 8 of the 12 counties in the boundary. Some are old agreements and are being renewed. Under these agreements the Forest and counties agree to cooperate on road maintenance and reconstruction when it is beneficial to both parties. Under the master agreement there is a schedule "A", which is an agreement that lists specific roads that we have agreed to cooperate on as funds or projects allow. Over the next two years, the Forest plans on having all those agreements back in place and updated as further coordination with the counties and townships that are located in the Forest. While this does not change jurisdiction, it does allow the FS and counties to spend their money on each others roads. This is not legal without the agreements.

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

The forest road system is not currently a public transportation system. All the roads we build and maintain are for administrative use.

The land manager (ranger) for the District has the authority to close or keep open the roads on their district to public and administrative use. All FS system roads are designed per Forest Service manual direction. When the roads are put in for administrative use, they must meet the standards and guidelines of the FSH 7700. The design speed unless otherwise stated is 5 mph.

Safety is a key component of the design. Clearing, alignment (vertical and horizontal) grades, surfacing and drainage control, sight distance and turnout spacing (for one lane roads) are all taken into consideration. Professional engineering practices are to be used on all system roads constructed by the Forest. When the Forest reconstructs roads to "Public Forest Service Standards", we will use the guidance of the AASHTO Guidelines for Geometric Design of Very Low-Volume Local Roads (ADT<400, 2001). This sets forward geometric design standards the engineering staff has to meet for all aspects of the roads. The design speed will be set and the facility will be designed to support that speed, which is generally 35 mph.

Administrative Use (AU)

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

The road system benefits the FS by the collection of data, the transportation of personnel and people (administrative use), and to collect monitoring data. This is discussed in EC(1). Please refer to that section for explanations of the transportation system. The road system is adequate for this activity.

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

The road system provides access to the forest for a variety of purposes. As long as there is access to the forest, illegal activities will occur. Unlawful activities are often centered around road issues. Illegal use of closed roads, unauthorized collecting of forest products, and trash dumping along roads are just a few of these activities.

Roads facilitate the access of areas for legal hunting and trapping activities. For managed game species this would be considered a positive effect on wildlife populations. Road ways however are also used for illegal poaching activity which would have a negative effect on wildlife populations.

Unlawful marijuana plots are a problem on Forest Service land. Unlike in many western forests, where growers are driven to the more remote reaches of the forest to maintain extensive irrigation systems needed to sustain the plots, growers using the Wayne NF tend to focus their activity near roads and trails, or areas accessible from them (Hall 2002). Constructing new roads could contribute to such clandestine activities, yet also make law enforcement easier. Conversely, closing roads could discourage the use of more remote areas for marijuana plots, but at the same time, hinder law enforcement.

Specific roads and how they affect law enforcement activities are more appropriate at the project level.

Protection (PT)

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

Roads are an important tool in fuels management. The road system provides control lines for prescribed burns as well as providing access for equipment to perform mechanical treatment of hazardous fuels.

Roads serve as an integral part of hazardous fuels management planning as it provides access to the area, serves as control lines and most importantly serve as a safety zone and escape route during prescribed burning operations.

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

The Forest Service road system is used to deliver firefighters to a wildland fire by vehicles use on those roads. It is the quickest way for area fire departments to respond to fires in the urban interface with fire trucks to suppress fires before damage results to other constructed structures.

The budget system used for fire management by the Forest Service is the National Fire Management Analysis System (NFMAS). This program counts heavily on roads and access along with response times to certain areas and then formulates a budget for the Forest. Reducing roads on a forest would have an impact to the fire budget on any given forest.

Roads serve as control lines on wildland fires, providing a safety zone and escape route, as well as a fire line that is all ready in place.

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

A good road system in an area with scattered land ownership creates a situation of more people with additional housing construction. This will increase the number of fires for firefighters to respond to and more danger when it comes to protecting houses. Homeowners sometimes build narrow roads which larger structure fire engines cannot access.

However, the road system on the Forest can also be a means for arsonists to access remote areas with the intention of creating fires and then using the road as a means to escape detection or capture.

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

The arterial and collector road system under other public agencies jurisdiction contributes to the majority of the air borne emissions found on the forest. This is due to some roads having an aggregate surface and to other roads having deicing materials placed on them. This in conjunction with higher speeds will allow the dust emissions to suspend and move greater distances with the wind.

On the roads under the Forest's jurisdiction, lower speeds help keep the dust emissions low. Plus most of the roads are paved and the Forest does not place deicing materials on them.

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 Wayne National Forest does not have officially designated unroaded areas. Parts of the Forest were considered for wilderness/roadless area study designation during the 1988 *Forest Plan* Revision process. However, none of the proposed areas met the criteria established in the Wilderness Act. Management Areas 6.1, 6.2, and 6.3, which includes Wildcat Hollow and the Lake Vesuvius area, have been designated semi primitive non-motorized recreation areas. Since there are no unroaded areas on the Forest, unroaded recreation opportunities are not affected by decommissioning of existing roads, or changing the maintenance of existing roads.

Closing unneeded roads would add more areas for non-motorized recreation (i.e. walk-in areas and pedestrian trails). The Forest will consider closing an existing road only after it has determined (with public input) that a road is no longer needed or being maintained to standard.

Overall, there is an excess demand for all recreation opportunities in Ohio, including unroaded recreation.

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?

Since there are no unroaded areas on the Forest, unroaded recreation opportunities are not affected by decommissioning of existing roads, or changing the maintenance of existing roads.

However, closing unneeded roads in Management Areas 6.1, 6.2, and 6.3 would add more areas for semi primitive non-motorized recreation (i.e. walk-in areas and pedestrian trails). The Forest will consider closing an existing road only after it has determined (with public input) that a road is no longer needed or being maintained to standard.

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

Since there are no unroaded areas on the Forest, unroaded recreation opportunities are not adversely affected by noise or other disturbance caused from developing, using, and/or maintaining roads.

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

There are no unroaded or designated wilderness areas on the Forest. Visitors who recreate in the Forest's semi primitive non-motorized areas similar to those that recreate in unroaded/wilderness areas. These users include hikers/backpackers, horseback riders, bicyclists, wildlife viewing enthusiasts, hunters, berry pickers, or anyone seeking non-motorized forms of recreation. Most if not all are seeking solitude and to "get away from it all".

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

There are no unroaded or designated wilderness areas on the Forest. Visitors that recreate in the Forest's semi primitive non-motorized areas have similar attachments and feelings, as of those that have unroaded/wilderness areas. These people tend to have a strong connection with the land and highly value areas that provide them a sense of solitude. They also want an area large enough to roam where there is little or no evidence of human disturbance – a place where they can "get away from it all".

Due to the high road densities, fragmented land base, and evidence of human disturbances on the Wayne, there is little or no opportunity for an area to be designated as a roadless or wilderness areas. However, perhaps there are other potential areas on the Forest that may qualify for semi primitive non-motorized designations. Recreation Opportunity Spectrum (ROS) classification of each management area will be reviewed during the *Forest Plan* revision process.

Roaded Recreation (RR)

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

Forest visitors utilize the existing road system to access campgrounds, trailheads, scenic vistas and other dispersed recreation areas. While many roads serve to link the host of recreation areas and opportunities on the forest, some roads have been designated primarily for recreational driving (i.e. Covered Bridge Scenic Byway).

These scenic routes provide opportunities for site seeing and wildlife viewing that some visitors seek after. One such example is the Covered Bridge Scenic Byway, which winds along the Little Muskingum River through the eastern portion of Wayne National Forest in Southeast Ohio. The byway is a self-guided tour of the historic covered bridges that stretched along 35 miles of the picturesque Little Muskingum River. Pleasure driving is especially popular during spring and autumn. Visitors are attracted to the Forest's vibrant springtime blooms and its colorful fall foliage.

Motorized trail riding is also a highly popular recreation sport that off-highway vehicle (OHV) enthusiasts seek after on the Wayne National Forest. Recent recreation use studies and annual ATV/OHM sales have shown national and regional trends for motorized recreation use to be on a steady increase. On the Wayne, annual rises in motorized trail permit sales offer additional evidence of this upward trend. Presently, the Forest has over 100 miles of motorized trails located in three Management Areas – 2.3, 3.1, and 3.2. This trail system is one of a few public places in the state of Ohio and the surrounding region where all-terrain vehicle (ATV) and off-highway motorcycle (OHM) enthusiasts may enjoy their sport. On the Wayne, ATVs and OHMs less than 50" wide are permitted on designated trails. Public roads are off-limits to these types of motorized vehicle (except for dual-sport motorcycles).

The demand for an ATV/OHM trail system relative to the demand for other type of public land uses in some areas of the Forest (i.e. Marietta Unit) may not warrant a motorized trail system. In addition, the scattered ownership pattern on the Wayne may not provide a suitable land base for a viable trail system.

No special roads or trails will be constructed or maintained for large four-wheeled drive vehicles such as sports utility vehicles (Subs), pick-up trucks or similar off-highway vehicles. However, these "street legal" vehicles may use any forest road that is opened to all public vehicles.

Recent *Forest Plan* public scoping efforts have produced comments that ranged from providing more motorized recreation opportunities to reducing or even eliminating certain motorized sports on the Forest.

However, the Forest will continue to provide motorized recreational opportunities as long as it does not adversely impact the natural and social environment. Close monitoring and evaluation will be conducted to limit any potential negative impacts. Construction of additional motorized trails will be reviewed during the *Forest Plan* revision process.

Compared with the 1983 Ohio Statewide Comprehensive Outdoor Recreation Plan (SCARP), the 1993 SCARP reports a moderate increase in the demand for most types of motorized and non-motorized recreation - particularly, ORV riding, bicycling, horseback riding, hunting, and camping.

TABLE 4: Percentage of Change in Participation of Outdoor Recreation Activities between 1983 - 1990

Recreation Activity	Percentage of Participation Change
Backpack and Tent Camping	8.6 % increase
Group Camping	13.0 % increase
Motorized Camping	9.7 % increase
Small Game Hunting	42.4 % increase
Deer/Turkey Hunting	No Data
Waterfowl Hunting	47.7 % increase
Other Hunting	45.3% increase
Wildlife/Nature Observation	No Data
Canoeing	11.8 % decrease
Fishing from Shore	No Data
Fishing from Boat	No Data
Picnicking	11.7 % decrease
Day Hiking	No Data
Bicycling	7.6 % increase
ORV Riding	48.1 % increase
Off-highway Driving	No Data
Snowmobile Riding	No Data
Horseback Riding	4.0 % increase

Source: 1993 State of Ohio SCORP

ORV riding had the highest percentage increase (48.1 %) of participation among the forty outdoor activities listed in the 1993 State of Ohio SCORP. Overall, there is an excess demand for most outdoor recreation activities in Ohio.

RR (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 road-related recreation opportunities?

The Wayne National Forest does not have officially designated unroaded/ roadless/wilderness areas. Parts of the Forest were considered for wilderness/roadless area study designation during the 1988 *Forest Plan* Revision process. However, none of the proposed areas met the criteria established in the Wilderness Act. Since there are no unroaded/roadless areas on the Forest, road-related recreation opportunities are not affected by decommissioning of existing roads, or changing the maintenance of existing roads.

Closing unneeded roads would add areas for non-motorized recreation opportunities. The Forest will consider closing an existing road only after it has determined (with public input) that a road is no longer needed or being maintained to standard.

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

Many people look to the Wayne National Forest to provide opportunities for solitude. Road construction, maintenance, or closure would not directly impact motorized off-road recreation because ATVs/OHMs are limited to designated trails only. However, road construction and maintenance activities may create unwanted noise for trail riders and hikers seeking solitude. In addition, road construction and maintenance projects may temporarily inconvenience visitors enjoying other forms of recreation such as hunting, fishing, camping, wildlife viewing, as well as pleasure driving by rerouting them to other areas of the Forest to recreate. Closing roads may provide additional areas for all visitors to find solitude in the forest.

There is a diversity of public opinions whether the Wayne should provide more areas for solitude or more access to the forest. Providing an acceptable mix of roaded and unroaded recreation opportunities will be addressed during the *Forest Plan* Revision process.

RR (4): Who participates in road-related recreation in the areas affected by building, maintaining, and decommissioning roads?

The primary transportation system for the Wayne National Forest is in place. Currently, there are no plans to build new arterial or collector roads. Some existing roads may be identified for decommissioning. Because of the magnitude and frequency of road maintenance activities, they would have the greatest affect on road-related recreation on the Wayne.

The Forest's road system provides access to a variety of recreationists. Many are not seeking road-related recreation opportunities, but utilize the road system to access sites on the forest. Roads serve as links to developed recreation areas, trailheads, and other dispersed recreation areas. During the fall hunting seasons, hunters utilize the Forest's road systems to access their favorite hunting spot.

Specific road-related participants are difficult to identify at a forest-scale. It will be easier to identify participants to specific areas at the project analysis level.

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

There are a wide variety of areas in Ohio that provide road-related recreation opportunities. People who utilize the road system tend to have strong feelings about their right to access public lands. Many visitors place a high value on public roads for providing unlimited access to the forest's recreation opportunities. Others want to limit new road construction unless it is justified (i.e. provide access to recreation opportunities, timber removal, mineral exploration, etc…) and cost effective. Yet others concerned of

forest fragmentation want no new roads at all or obliterate some existing roads to enhance primitive/semi primitive recreation experiences.

Major roads that access developed recreation areas and trailheads are critical to the Wayne National Forest and will remain accessible. In most cases, the seldom used "back roads" provide the greatest interest and contention from forest users engaged in road-related recreation opportunities. The Wayne intends to provide a road system that provides access for all forest users.

At the forest level, visitors involved in road-related recreation have a wide spectrum of opinions for all type of forest roads. Therefore, it would be easier to identify user attachments to specific roads at the project level analysis.

Passive-Use Value (PV)

PV (1): Do areas planned for road building, closure, or decommissioning have unique physical or biological characteristics, such as unique natural features and threatened or endangered species (see TW4)?

No specific roads or areas are targeted for road construction or closure. However, the possibility of such activities exists across the entire forest and is the basis for this analysis.

Unique Natural Features: The existing Land and Resource Management Plan, as amended, designates 23 natural areas (Management Areas 8.1, 8.2, and 9.2), totaling approximately 6,850 acres, that are unique due to geological, ecological, cultural, or other scientific values. In part, the desired condition of these areas, which have been established primarily for ecosystem preservation and/or research, is minimal evidence of human activities and disturbance. However, all areas, except for the Lick Branch Special Area on the Ironton District, have roads within or adjacent to them at densities ranging from 0.23 to 11.5 mi/ square mile (mean = 3.12). Four of the areas are intersected or bound by Class 1 and 2 roads only. Road construction, reconstruction, or closure could impact these unique areas; however, new road construction is prohibited (M.A. 8.1), or severely restricted (M.A. 8.2 and 9.2), within them unless access is needed to develop outstanding mineral rights, or provide for existing rights (such as to oil/gas wells and private property). Road closure, on the other hand, may be encouraged if it is determined that the motorized vehicles, or walk-in traffic that they carry, pose a significant threat to the unique features in the area.

Threatened and Endangered Plant Species: According to the US Fish and Wildlife Service (2002), The Wayne National Forest comprises part of the potential range of four Federally Threatened or Endangered species (Table 1). While no individuals have been found within the Forest boundary, all four species have been found in Counties containing National Forest lands, and suitable habitat exists on Federal lands for them.

Table 5. Federally Proposed, Endangered and Threatened Species for the Wayne National Forest.

Species	Common Name	Status TNC/FS/S	Habitat
Aconitum noveboracense	Northern wild monkshood	G3S1/T/E	Moist cliffs w/ cold air drainage
Isotria medeoloides	Small whorled pogonia	G3N2N3S1/T/E	Open second growth hardwoods

Spiraea virginiana	Virginia spirea	G2N2S1/T/E	Damp, rocky banks; streambeds
Trifolium stoloniferum	Running buffalo clover	G3N3S2/E/E	Moist, semi-shaded, disturbed woods

Road building and maintenance are referred to directly in the Recovery Plans for the monkshood and spirea as significant threats to the long-term viability of both species (USFWS 1983 and 1992b, respectively). Furthermore, habitat destruction, formation of barriers to seed dispersal, and changes in the light regime to the forest floor (all of which are associated with road building) are cited as threats to the pogonia (USFWS 1992a). While the clover, on the other hand, is a disturbance-dependent species that may favor roadside habitats, it too, may be directly affected by habitat and/or population destruction from road construction and maintenance activities. Project specific Roads Analysis will be performed during the NEPA process.

According to the most recent revision of the Regional Forester Sensitive Species list (USFS 2000), eleven RFSS have been designated for the Wayne National Forest (Table 2), all of which have been found within the Forest boundary.

Table 6: Regional Forester Sensitive Species list for the Wayne National Forest.

Species	Common Name	Status TNC/FS/S	Habitat
Carex juniperorum	Juniper sedge	G2S2S1/SOC/E	dry prairies; openings in oak woods
Dicanthelium bicknellii	Bicknell's panic-grass	GUQS1/SOC/T	dry woods; thickets; openings
Gentiana alba	Yellow gentian	G4S1/SOC/T	moist meadows/prairies; open woods
Gentiana villosa	Striped gentian	G4S1/SOC/E	open woods and pinelands; shady places
Juglans cinerea	Butternut	G3N3/SOC/P	moist woods and fields; riverbanks
Magnolia tripelata	Umbrella magnolia	G5S3/SOC/P	rich woods; mesic ravines and coves
Panicum philadelphicum	Philadelphia panic-grass	G5S2/SOC/T	dry soil and sand fields; dry woods
Phacelia ranunculacea	Blue scorpion-weed	G4S1/SOC/E	dry or moist woods; sandy fields
Platanthera ciliaris	Yellow-fringed orchid	G5S2/SOC/T	wet, sandy bogs & meadows, fields & woods
Scutellaria saxatilis	Rock skullcap	G3N3/SOC/P	moist banks/woods; dry slopes & cliffs
Vitis cinerea	Pigeon grape	G4G5/SOC/P	moist, alluvial soil; low thickets & stream banks

All of these species may be impacted by road construction or closure, either adversely or beneficially, depending on the habit of the particular species. According to the Land and Resource Management Plan for the Wayne National Forest (1988), forest management activities, including road building and decommissioning, "must not result in loss of a species viability or create significant trends toward Federal listing" (4-46). Project-specific analyses will be completed prior to any on-the-ground activities to ensure compliance with this guideline.

Also according to the U. S. Fish and Wildlife Service (2002), five animal species are found on or near the Wayne National Forest. These include the Indiana bat, bald eagle, American burying beetle, fanshell, and pink mucket pearly mussel.

Siltation is a threat and limiting factor to the fanshell and pink mucket pearly mussel across their range. While the two species are not present in the Wayne, nor is their suitable habitat for them inside the proclamation boundaries, there is suitable habitat in several streams for their host fishes. The concerns about roads and sedimentation of aquatic habitats is addressed in AQ(2) and AQ(4).

The American burying beetle has not been documented on the Wayne National Forest, however it has been reintroduced just outside the proclamation boundary in Athens County. The beetle relies on carrion to raise their brood, but it is essential for the beetle's survival to have relatively loose, porous, deep soil in which to bury the carrion (USFWS 2001). Because of that, the U. S. Fish and Wildlife Service (2001) suggested two conservation recommendations in the Wayne's Biological Opinion that addressed road construction, reconstruction and maintenance. These discretionary actions are designed to minimize or avoid adverse effects to listed species and to help implement recovery plans for listed species. The two conservation recommendations pertain to areas within 10 air miles of known occupied beetle habitat, which includes part of the Athens Unit. As for new road construction, the U. S. Fish and Wildlife Service recommends that it "could be planned in such a way as to involve the least amount of ground disturbance, measured in terms of the area compacted to the point it is no longer American burying beetle habitat, and designed with the minimum safe width necessary for planned use of the road". As for reconstruction and maintenance of existing roads, the U. S. Fish and Wildlife recommends "ground disturbance be kept to a minimum" and that the "width of road, ditches, and surface materials could be the minimum necessary to allow safe movement of all permitted vehicular traffic". The U. S. Fish and Wildlife Service reviewed the Forest Service standards for maintenance on road levels 1-5 and agreed that the direction equated to their intent of keeping ground disturbance to a minimum (Ewing 2002). None of the level 3, 4, or 5 roads being addressed in this analysis fall within 10 air miles of the beetle reintroduction site (i.e., known occupied habitat).

There are no bald eagle nests on Wayne National Forest lands at the present time, but eagles are migrating through or wintering near the Forest. The Forest Service conducts three mid-winter surveys, annually, to identify winter roost sites. Human disturbance is a threat to the bald eagle, and roads are the means people use to access areas of the Forest. Currently there are no level 3, 4, or 5 roads in this analysis that are affecting the bald eagle.

The Indiana bat is present within the Wayne National Forest. Roads can affect bat habitat in that removal of trees during road construction, reconstruction, or maintenance may result in loss of roosting or potential roosting habitat. The U. S. Fish and Wildlife Service (2001) issued a Biological Opinion that provided terms and conditions that must be followed when implementing activities that call for the removal of suitable Indiana bat roost trees. For the existing level 3, 4, and 5 roads being addressed in this analysis, the Biological Opinion should be reviewed prior to implementing any road maintenance activities. The bat may also be affected by human disturbance while it is hibernating. Because of this, the U. S. Fish and Wildlife Service also requires a ¼-mile undisturbed buffer around all known hibernacula. This would limit future road construction in such areas. The agency also suggested a discretionary conservation recommendation to protect fall swarming sites. This measure recommends a ¼-mile undisturbed buffer around any known fall swarming sites. Again, this would limit road construction in the buffered area. None of the existing level 3, 4, or 5 roads addressed in this analysis are within ¼-mile of known hibernacula.

Status abbreviations: **TNC** = The Nature Conservancy; **FS** = Forest Service; **S** = State; **SOC** = Forest Service Species of Concern- these species are subject to further review at the Regional level and may be considered potential candidate sensitive species; **E** = State Endangered; **T** = State Threatened; **P** = State Potentially Threatened.

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PV (2): Do areas planned for road building, closure, or decommissioning have unique cultural, traditional, symbolic, sacred, spiritual, or religious significance?

There is a fairly low probability that groups of people hold cultural, spiritual, and symbolic value for NFS land in Ohio. However, because there may be instances such as access to a cemetery still in use by family descendants, or use of traditional dispersed camping spots, a project-level analysis to include an assessment of passive values should be conducted at the time of the proposed federal action.

PV (3): What, if any, groups of people (ethnic groups, subcultures, and so on) hold cultural, symbolic, spiritual, sacred, traditional, or religious values for areas planned for road entry or road closure?

The two instances mentioned above (active cemetery access and traditional family camping spots) may be the only circumstances where values exist.

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

Because in some cases such activities may have an adverse effect on historic properties and traditional values, the effects should be assessed on a case-by-case basis since at this time no Level 3, 4 or 5 road is considered for decommissioning. This will have to be examined when project level RAPs are conducted.

Social Issues (SI)

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

The local area in south-eastern Ohio has had a long history of small rural roads intertwining along ridges and down stream bottoms. The system of Federal, State, County and Townships all having jurisdiction over roads is an indication of the perceived needs and the high values placed by the local residents, and for their desire to have road management under their local control. The current road pattern criss-crosses the entire Wayne National Forest. Discussions of road closures is often met with resistance, mainly by local residents or families who were residents. The principle items raised for discussion are access to traditional homestead properties for family gathering.

Sharing of road management has long been done by verbal agreements and a hand-shake between Townships, Counties and throughout south-eastern Ohio. As National Forest land has increased, and Federal and State roads have increased, the process for road management has become more formalized. This has not changed the dependence, need or desire for roads by most local residents.

On the other hand, the more urban users of the Forest in general desire a higher standard of road to replace the twisting narrow roads which dominate the current road system of the area. And at the same time, there are some persons expressing the desire that there is a need for unroaded recreational areas in southeast Ohio and that roads should be closed to create this condition.

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

There has been a perceived need to improve the major access route into and through southeastern Ohio for many years. This has been at the national, State and local levels. The Appalachian Highways program has developed many of the major highways in the area and is continuing to improve these access routes with several projects underway at this time.

There are differences between the perceived access needs for the area by local residents and by the recreating public coming from other areas. In general the local residents express a need to do minor upgrades and improvements to the access, but perceive a very limited need for major changes. Persons coming to the area from other places often express the desire to have straighter and wider roads to access the various locations in the area.

One prime current example of this is the controversy between the Town of Nelsonville and the State Department of Transportation on a bypass around Nelsonville.

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

Access to historic sites that have been restored and interpreted should be retained, and road closures may be appropriate where sites need protection by limiting access (in particular prehistoric burial mounds and rock shelters).

SI(4): How does the road system affect cultural and traditional uses (such as plant gathering, and access to traditional and cultural sites) and American Indian treaty rights?

There are no known American Indian treaty rights on the Wayne National Forest. Cultural and traditional uses of the Forest are unknown at this time.

SI (5): How are roads that constitute historic sites affected by road management?

There are no known historic roads on the Wayne National Forest.

SI (6): How is community social and economic health affected by road management (for example, lifestyles, businesses, tourism industry, infrastructure maintenance?

One of the major justification for the Appalachian Highways initiative was to improve the access and road management as a way to improve the economic and social conditions of the area.

A big factors expressed by persons visiting the area is an appreciation of the small towns and communities and the more relaxed pace of things when compared to life in major cities. The lifestyles and businesses in the area are more tied to the local area than a dependency on regional or national trends. While tourism is an important economic component, the management of the roads (i.e., narrow and winding) does have some negative affect on tourism by limiting the type and size of recreational vehicles that can easily navigate the area.

SI (7): What is the perceived social and economic dependency of a community on unroaded area versus the value of that area for its intrinsic existence and symbolic values?

The Wayne National Forest has no unroaded areas of size or configuration to provide for an unroaded recreation experience. In the work preparing the Forest Plan in the mid-1980's, no area of the Forest was found to have 1,000 acres that was not cut by a road.

In the Forest Planning process from the mid-1980's several areas of the forest were designated to be managed so that sometime in the next 50 to 100 years they would be in an unroaded condition. There is a perception by some members of the public that these areas will be made into unroaded condition much sooner than was discussed and displayed in the forest planning effort.
There is a perception be some members of the public that having an unroaded area would be an economic boon to the local areas through increased recreation spending and jobs created.

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

The closure, presence, or addition of new roads and their management in proximity to wilderness areas can change the natural integrity and opportunities for solitude because of differences in vistas, amounts of noise and dust, and crowding.

At the present time, there are no designated wilderness areas on the Wayne National Forest. The Forest Service has initiated the process to revise the Wayne National Forest Land and Resource Management Plan. As part of that process the Forest Service will investigate whether there are areas on the National Forest that meet requirements for wilderness areas.

SI (9): What are traditional uses of animal and plant species in the area of analysis ?

Traditional uses of these species on the Wayne National Forest are generally unknown at this time.

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

There is a difference in how road management in southeast Ohio affects people's sense of place for people who have lived in the area for a long time and those who come to the area to recreate. The narrow roads, the lack of signing and the intertwining of the roads helps to maintain the existing conditions of the rural area which many long time residents enjoy. This type of management strengthens their sense of place and ties to their heritage.

In general, the recreating public and for many new comers to southeastern Ohio, the narrow roads and lack of signing on all the back roads are things which need to be changed so they can know where they can have a better sense of location.

Civil Rights and Environmental Justice (CR)

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

Many areas of the Forest are accessed by local roads which has very little signing, and the maps of the area do not include many of these smaller local roads. This can be intimidating to people unfamiliar with the local area. Much of the area in southeastern Ohio is rural with low-income households dominating in terms of numbers, and with a very small percentage of these households being in minority categories. The existing road system serves to maintain the status quo of the local areas and can be intimidating to both minority and non-minority persons from outside the local area, but may have a stronger level of intimidation to minority persons.

Step 5 – Describing Opportunities and Setting Priorities

The section below answers six specific questions from "Roads Analysis: Informing Decisions About Managing the National Forest Transportation System (FS-643)". These questions helped capture potential opportunities for the road system on the Wayne National Forest.

1. Question: Does the existing system of roads create an unacceptable risk to ecosystem sustainability?

Roads that cause unacceptable risks to ecosystem sustainability are:

- Roads located with no design criteria considerations for ecological sustainability.
- Roads where entrenchment of the travel way is occurring due to use, erosion, and surface blading.
- Roads with no ditches or ways of removing water from the road surface.
- Roads with ditches that empty directly into a stream.
- Roads with ditches that do not have the proper number or placement of lead out ditches.
- Roads that are located adjacent to the stream with no buffer or with a narrow buffer.
- Roads that are so close to streams that the road fill is the bank of the stream.
- Un-maintained roads that are only occasionally used by four-wheel-drive traffic during wet periods causing ruts that channel water, eroded soil, and gravel to either deposit soil and gravel materials elsewhere on the roadway or deliver sediment to a stream.
- Low maintenance or no maintenance roads that have plugged or washed out culverts that causes bank erosion or additional sediment in the stream.

There are numerous roads in the Forest Service system that create risk to ecosystem sustainability. The existing Forest Service road system as a whole can be said to create a risk to the ecological sustainability of the region but not an unacceptable risk. Whenever NFS funds are involved the Wayne National Forest is working to mitigate the amount of risk by

- assisting counties and townships in maintenance or redesign of proper drainage structures including ditches and ditch lead out structures as funding allows.
- relocating segments of roads that do not have adequate buffer strips or that are constantly washing out.
- encourage counties and townships to not use ditch clean out material or other inappropriate materials to protect road fills that share a bank with an adjacent stream.
- encouraging counties to blacktop roads that cannot be economically relocated and that are consistently delivering sediment and gravel to streams.
- ensure that removal of streambed materials from streams administered by the National Forest are in compliance with dredge and fill activities regulated by Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act as administered by the United States Army Corps of Engineers.

2. Question: Can the maintenance requirements of the existing system be met with current and projected budgets?

We believe that the state, counties and especially the townships cannot meet maintenance requirements of their corresponding existing road system with current budgets. Again, we have not identified any opportunities to reduce the public road system. State, county and township road budgets are unlikely to improve. This is why it would be beneficial to develop cooperative or cost share agreements with counties to improve the transportation system. Due to past and ongoing purchases some existing

township roads are no longer servicing private land and should be vacated. These roads are currently not maintained due to lack of funding the townships receive and in many cases are causing resource damage.

As long as the roads are maintained as township Right Of Way there is no way the Forest can keep the public off of the roads, and some "off-road" vehicle sports events are currently using the roads.

With the emphasis to improve water quality, one of the logical methods would be for road management agencies to pave gravel roads in critical watersheds. This in turn would drive down long-term maintenance costs.

We need to be more aggressive in obtaining funds to assist counties in road maintenance and reconstruction of the county roads that primarily serve customers of the Wayne National Forest. For the first time since FY 1995, the agency is returning to field based budget proposals. The FS is adopting a new system for formulation and execution of its Budget Formulation and Execution System (BFES). The Wayne National Forest entered field-based information about capabilities (dollars and outputs) and management priorities. We hope that under this new approach, we can obtain more road dollars to maintain our road system. However, the Forest is under a constrained budget system. So, if road maintenance dollars increase, funds for other functions would have to decrease. Other FS funding sources include the capital improvement process (CIP) for projects over $250,000 and the Road and Trail Deposit Fund. Both of these funding sources could help reduce our deferred maintenance backlog, thus helping to free up funds for annual road maintenance and would not have an effect on the constrained budget. In addition, the PFSR Program could help out both the Forest and local governments by allowing the FS to build more "seamless" roads on the system.

3. Question: Are some existing roads not needed to meet projected access needs?

Some existing roads can undoubtedly be closed without lessening the Wayne's overall access needs. However, which roads are specifically unneeded will need to be determined by a site-specific or smaller scale analysis.

4. Question: If new access is proposed, what are the expected benefits and risks?

Dam Access Roads:

All weather access road for the operation and maintenance of dams will allow access during high water events when structural problems or threats to human safety may occur. All weather access, upstream of the dam, is also essential to act quickly if there are signs of partial or full failure of the dam or to access valves to prevent failure.

Access roads to dams also provide recreational opportunities for visitors to the National Forest. These new roads would provide safe access to conduct needed dam maintenance that in turn provides for the safety of inhabitants and property downstream of the dam.

Any dam access road would address watershed health and restoration by constructing a well-designed road that protects soil and water resources. These access roads would address recreation by providing a safe, convenient walk in access for fishing, hunting, and other dispersed recreation opportunities.

Special Use Roads:

The ID team recommends that existing permits be reviewed to see that road construction and maintenance requirements protect soil and water. The Forest engineering staff has recently developed road guidance for future roads. In the future, the engineering staff shall review the road locations and make

recommendations on specific road standards before permit approval by the District Ranger or Forest Supervisor.

5. Question: 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?

The *Forest Plan* provides overall guidance for the road system on the Wayne National Forest as well as area specific direction.

Overall Forest Guidance

The *Forest Plan* states the overall strategic intent of the Wayne National Forest road system includes all county and FS jurisdiction roads that are needed for protecting and managing the forest, for providing recreation access to the forest, for transporting forest products or for maintenance of the transportation system. (*Forest Plan*, p. 2-20). The Wayne National Forest road system provides support of goods, services, and uses on NFS lands.

Roads are not located in areas that might jeopardize threatened or endangered specie. Road design should consider any habitat of rare or sensitive species and ensure that making these areas accessible to the public will not adversely effect these populations. Locations and management of new or reconstructed roads are determined only after area-specific project planning and appropriate consideration of public input. Standard protection and mitigation measures for soil and water resources during and after road construction are followed.

Specific Guidance

The Forest Plan divides the Wayne National Forest into twelve separate Management Areas.

Table 7: Management Area Allocation

Management Area	Description	Road Usage	NFS land acreage[1]
2.1	River and stream corridors, wildlife habitat	Recreation activities, stream access, forest product removal, maintenance	8,137
2.2	General Forest Habitat	Recreation activities, forest product removal, maintenance	12,813
2.3	General Forest Habitat	Recreation activities, OHV use, forest product removal, maintenance	21,107
3.1	General Forest Habitat	Recreation activities, forest hardwood removal, maintenance	59,099
3.2	General Forest Habitat	Recreation activities, OHV use, forest hardwood removal, maintenance	23,725
3.3	General Forest Habitat	Recreation activities, forest hardwood removal, maintenance	74,360
6.1	Hardwood Forest Habitat	Recreation activities, forest hardwood removal, maintenance	12,726

[1] Acreage determined by ArcInfo intersect of Management Areas and National Forest System Lands. Updated 2002.

6.2	Old Growth Hardwood Habitat	Limited access for recreation, maintenance	18,466
7.1	Developed Recreational Area	Large volume lakeside access, maintenance	1222
8.1	Research Ecosystem	Restricted access for research and preservation	117
8.2	Research Ecosystem	Restricted access for research and preservation	2993
9.2	Protected Ecosystem	Restricted access	3711
Total			**238,475**

Management Area 2.1
Roads within and on the perimeter of this management area are used for a variety of recreation activities and to haul forest products. In some areas, trails or canoeable streams provide access for non-motorized activities. Viewing scenery, hunting, trapping, fishing, canoeing, and hiking are key recreation activities.

Management Area 2.2
Roads within and on the perimeter of this management area are used to haul forest products to market, provide access for resource management purposes and provide access for recreation activities such as hunting and gathering forest products. Some roads within this area which are not under township, county or State jurisdiction may be closed to public vehicle traffic. Trails for hiking and horse riding will be provided. Hunting, hiking, horse riding, fishing, viewing scenery and wildlife, and gathering forest products are examples of recreation activities which will occur in these areas.

Management Area 2.3
Roads within and on the perimeter of this management area are used to haul forest products to market, provide access for resource management purposes and provide access for recreation activities such as hunting and gathering forest products. In addition to the above, forest roads (particularly Level 2) will be used to provide Off Road Vehicle (OHV) travel for public use. Some roads within this area which are not under township, county or State jurisdiction may be closed to public vehicle traffic. Trails for hiking and horse riding will be provided. Hunting, hiking, horse riding, fishing, viewing scenery and wildlife, and gathering forest products are examples of recreation activities which will occur in these areas.

Management Area 3.1
Roads within and on the perimeter of this management area are used to haul forest products to market, provide access for resource management practices, and provide access for recreational activities such as hunting and gathering forest products. Whenever resource conditions allow, roads will be open to use by the public. Trails for hiking, and horse riding may be provided. Hunting, hiking, horse riding, fishing, viewing scenery and wildlife, and gathering forest products are examples of the recreation activities which will occur in these areas.

Management Area 3.2
Roads within and on the perimeter of this management area are used to haul forest products to market, provide access for resource management purposes and provide access for recreation activities such as hunting and gathering forest products. In addition to the above, forest roads (particularly Level 2) will be used to provide Off Road Vehicle (OHV) travel for public use. Some roads within this area which are not under township, county or State jurisdiction may be closed to public vehicle traffic. Trails for hiking and horse riding will be provided. Hunting, hiking, horse riding, fishing, viewing scenery and wildlife, and gathering forest products are examples of recreation activities which will occur in these areas.

Management Area 3.3
Roads within and on the perimeter of this management area are used to haul forest products to market, provide access for land management and for recreational activities such as hunting and gathering forest products. Roads within this area which are not under township, county, or State jurisdiction will usually be closed to public vehicle traffic. Trails for hiking and horse riding will be provided. Hunting, hiking, horse riding, fishing, viewing scenery and wildlife, and gathering forest products are examples of recreation activities which will occur in these areas.

Management Area 6 .1
Roads within and on the perimeter of this management area are used to provide access for dispersed recreational activities and resource management purposes. Roads within this area which are not under township, county or State jurisdiction will usually be closed to public vehicle traffic. A low density of hiking and horse trails will be provided. Dispersed recreational activities such as hunting, fishing, viewing scenery and wildlife, hiking, and gathering forest products are examples of recreation activities which will occur in these areas.

Management Area 6.2
On some of the area, access to the forest for hiking, viewing wildlife and scenery, fishing and other non-motorized forms of recreation is provided by appropriate trails. There are few roads and all Forest Service roads are closed to public motor vehicles, except for access to cemeteries or similar restrictive uses.

Management Area 7.1
This area provides opportunities for dispersed recreation in lakesides and for camping, swimming, picnicking, group activities, and other intensive recreation opportunities in highly developed sites.

Management Area 8.1
Trails and roads provide access for administrative purposes and research activities. Management of these systems will depend upon the purpose of the area; non-motorized access often being regulated. Evidence of human activities will be controlled to reduce their effect on the area.

Management Area 8.2
Trails and roads provide access for administrative purposes and research activities. Management of these systems will depend upon the purpose of the area; non-motorized access often being regulated. Evidence of human activities will be controlled to reduce their effect on the area.

Management Area 9.2
The primary benefits and use of these areas are scientific values derived from protected examples of unique ecosystems. Other benefits may include hiking, hunting, and nature study. Mineral exploration and extraction may occur with special restrictions. Road access is kept to a minimum.

6. Question: Are additional or improved roads needed to improve access for forest use or protection, or to improve the efficiency of forest use or administration?

This question will be answered in two parts. First, this question will be addressed from the need for additional or improved access for forest use. Second, additional or improved access needs from an administrative perspective for fire, law enforcement, and special use.

An extensive transportation network serves the Wayne National Forest. Compared with many National Forests, the Wayne National Forest is well roaded with a transportation system maintained by federal, state, county or township governments.

There are an estimated 861.3 miles of roads on Forest Service property. Of these 397.2 miles are under the jurisdiction of federal, state, county or township governments and 464.1 are Forest Service roads. Of the FS roads, 239.4 miles of roads are system roads and 224.7 miles are considered non-system roads. Roads that appear in the Transportation Atlas are considered necessary for management of NFS lands. There are only about 47 miles of roads in maintenance levels 3, 4, or 5 under FS jurisdiction.

Concerning the road system on the Wayne National Forest, two issues were raised that would have an affect on additional or improved roads needs for users. These issues are:

- What type or level of access should be provided for Off-Highway-Vehicles (OHV) use?
- What are the public needs for recreation access?

Currently the Wayne allows access to two types of Off-Highway-Vehicles (OHV). They are All-Terrain-Vehicles ATV (e.g., four wheelers) and Off-Highway-Motorcycles (OHM). These vehicles must be fifty (50) inches or less in width. These two types of OHVs are legal on designated trails only in Management Areas 2.3 and 3.2. Whether the current system for OHV use on the forest meets the public's need will be reviewed during the *Forest Plan* revision process. They will also be reviewed whenever a watershed or project scale RAPs is performed. There are no roaded recreation opportunities for four wheel drive vehicles or motorcycles.

Does the existing road system meet current access needs? Yes, but there are requests for additional opportunities for new recreation use needs (which is appropriate for *Forest Plan* revision, but not during an access review). Current access for recreation needs is appropriate.

The current road system is utilized by a variety of recreation users to access campgrounds, trailheads, and dispersed areas. In many areas the road system is a link to recreation opportunities on the forest and is not a direct recreation use. However, there are scenic drives throughout the Wayne National Forest. Driving is especially popular during the fall when colors are at their peak.

Signs that show how to access areas and provide safety information are an important topic as well. We need to review our current sign plan for the forest and improve signage where needed. Specifically, signing for developed sites needs to be reviewed.

Fire and Law Enforcement

The current road system on the Wayne National Forest provides adequate coverage for fire suppression and law enforcement efforts. Additional or improved roads are not needed to improve efforts now or in the foreseeable future.

Administrative Access

The ID team identified several roads that need to have improvements made to them to bring them up from level 1 or 2 to level 3, 4 or 5. This is shown on tables A and B

Potential Public Forest Service Roads

In addition to the roads listed in **tables A and B** as needing upgrading, several roads were identified by the ID team and approved by the Land Managers to be recommended to the Public Forest Service Roads program, see **table C**. This program would have these roads listed as eligible for funding under the PFSR program if and when the catagory is accepted in the legislation in the next transportation bill.

Step 6 – Reporting

This final document titled *Wayne National Forest, Forest-Scale Roads Analysis*, dated January 13, 2003 consists of the final report for the roads analysis. This document meets all the requirements listed on page 33 of *Roads Analysis: Informing Decisions About Managing the National Forest Transportation System*, FS-643 (August 1999).

Project files are available at: Forest Supervisor, Wayne National Forest, 13700 US Highway 33, Nelsonville, Ohio 45764. These files contains documentation used throughout the analysis.

This entire RAP document with maps and attachments can be found posted on the Wayne National Forest website at: www.fs.fed.us/r9/wnf. Additional information concerning Roads Analysis can be obtained from the Forest Service national website: www.fs.fed.us/eng/road_mgt/policy.html

Public Comments

Public comments regarding ORV usage and segmentation of forest ground were received.

Segmentation is an issue. From the density of roads as shown in the attached maps, the Wayne Nation Forest is very roaded with over 1600 miles of county, township, private and unclassified system roads. The average road density is approximately 4 miles/square mile. Some areas containing more and some less. This number is high and the Forest Plan director has identified Management Areas with long term goals regarding road density/road quantity. As of now, no Level 3, 4 or 5 roads are targeted to be removed. However, Level 1 & 2 roads as well as unclassified roads will be targeted for obliteration.

As for ORV trails, this is not an issue relevant for the RAP but it will be looked at during Forest Plan Revision and during project level work.

Public comments received also concerned that Forest specialists dealing with oil and gas roads be included in the RAP. This was the case and specific comments as to the Special Use roads, minerals and leases are covered in Question MM(1).

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Appendix A
Wayne National Forest Road Design Guidelines

DESIGN GUIDANCE: The following guidelines should be used when setting design standards in road contracts or road special use permits on National Forest System lands in Ohio. The guidelines were derived from the *Forest Plan* and the *Forest Service* manuals and handbooks.

TYPE OF USE	NUMBER OF LANES	ROAD WIDTH (FEET)	CLEARING WIDTHS (MINIMUM FEET)	DRIVING SURFACE	ROAD GRADES (MAXIMUM* PERCENT)	TRAFFIC SERVICE LEVEL (SEE APPENDIX B)	MAINTENANCE LEVEL (SEE APPENDIX C)	CUT SLOPE RATIOS	FILL SLOPE RATIOS
FS Access Roads (non-gated, long term)	Single	12	22	Aggregate	8	B	3-4	1:1-2:1	1 ½:1
FS Access Roads (gated, long term)	Single	12	22	Native or Aggregate	12	D	1-3	1:1-2:1	1 ½:1
Driveways:									
1-5 Homes	Single	12	22	Aggregate	8	B	3-4	1:1-2:1	1 ½:1
>5 Homes	Single	14	24	Aggregate	8	B	3-4	1:1-2:1	1 ½:1
Recreation Rds:									
Access Roads	Double	20	30	Asphalt or Aggregate	8	A	4-5	1:1-2:1	1 ½:1
Campground Loops	Single	12	22		4	B	4-5	1:1-2:1	1 ½:1
Temporary Roads	Single	10	10	Native or Aggregate	12	D	Obliterate after use	Vertical-2:1	1 ½:1

* Maximum grades are target grades. Due to the steep topography existing in the Wayne National Forest road grades in certain areas can exceed the maximum grade for short stretches of road if the road is designed using Professional Engineering practices and if excessive erosion can be prevent by more stringent control of surface water.

ROAD WIDTH: The widths shown above are the recommended road widths; the actual width should be based on the design vehicle for that particular road.

On single lane roads, turnouts should be constructed for safety purposes. The location of turnouts should reflect the proper blend of road user, safety, visuals, and economics. Normally, turnouts should be located on the outside of cuts; outside of curves; low side of fills or at the run out point between through cuts and fills. Turnout widths should be a minimum of 10 feet wide and 50 feet long with 25-foot tapers.

TURNOUT SPACING (USDA 1994a): The following describes turnout spacing and operational constraints by traffic service level.

Traffic Service Level	Turnout Spacing	Operational Constraints
A	Make turnouts inter-visible unless excessive costs or environmental constraints preclude construction. Closer spacing may contribute to efficiency and convenience. Maximum spacing is 1,000 feet.	Traffic: mixed Capacity: up to 25 vehicles per hour Design Speed: up to 40 mph Delays: 20 seconds/mile or less
B	Inter-visible turnouts are highly desirable but may be precluded by excessive costs or environmental constraints. Maximum spacing is 1,000 feet.	Traffic: mixed Capacity: up to 25 vehicles per hour Design Speed: up to 25 mph Delays: should be 30 seconds/mile or less Use signs to warn non-commercial users of the traffic to be expected. Road segments without inter-visible turnouts should be signed.
C	Maximum spacing is 1,000 feet. When the environmental impact is low and the investment is economically justifiable, additional turnouts may be constructed.	Traffic: small amount of mixed Capacity: up to 20 vehicles per hour Design Speed: up to 20 mph Delays: up to 60 seconds/mile Road should be managed to minimize conflicts between commercial and noncommercial users.
D	Generally, only naturally occurring turnouts, such as additional widths on ridges or other available areas on flat terrain are used.	Traffic: not intended for mixed Capacity: generally 10 vehicles per hour or less Design Speed: 15 mph or less Delays: up to 60 seconds/mile expected Road should be managed to restrict concurrent use by commercial and noncommercial users.
Note: On roads identified as being subject to the Highway Safety Act, inter-visible turnouts or appropriate signing should be provided.		

CLEARING WIDTHS: Clearing limits shall be kept to a minimum on all roads. The minimum clearing limits on all roads, not to be obliterated, are 5 feet from the shoulders of the road. On driveways and non-gated roads clearing limits shall be no greater than 5 feet beyond the top of cut and to the toe of fill. On gated access roads, the clearing shall be to the top of cut and toe of fill. On temporary roads clearing shall be enough to allow equipment to use the road without damage to the vehicle.

SLASH DISPOSAL: Slash generated from construction activities should be disposed of in such a manner that large concentrations are not showing to meet the visual quality objectives of the *Forest Plan.* However, not all of the slash should be removed from a site in order to meet the ecosystem objectives of the *Forest Plan*. There several ways to handle slash, but recommendations will be based on site-specific

analysis. Slash is the tops, limbs, and un-merchantable logs generated by building a road. Possible slash handling recommendations are:

1. Lop and scatter (a): Scatter the slash so that it is generally between two feet and three feet high. The lowest heights would be recommended on Traffic Service Levels A and B roads, with taller heights allowed on Traffic Service Levels C and D roads.
2. Lop and scatter (b): A variation of lop and scatter is to place some of the slash in such a way as to trap sediment and mitigate effects on soil and water, if needed.
3. Chip: The slash could be chipped. The chips could be scattered on the site or could be partially scattered and partially removed.
4. Burn: If the volume of slash is heavy, some of it could be burned to reduce the fuel loading if all USFS and other required permit obligations are met.
5. Bury: Some of the slash and stumps could be buried in the disturbed area if undesired settlement is mitigated through best management practices and the burial is designed using Professional Engineering practices.
6. Remove: Tree stumps could be removed from the site if onsite disposal is unfeasible and hauling distances can be kept to a minimum. Other slash could be partially removed, as listed above.

SURFACING: A minimum of 4 inches of aggregate should be placed on roads to be used year round. This will allow for adequate maintenance of the road surface. On gated roads, native surfacing is acceptable if the road is not to be used during wet times of the year. On temporary roads that are to be used during dry seasons, native surfacing is acceptable. If the road is to be used during wet seasons, the road shall be rocked to accommodate the design vehicle. Temporary roads shall be obliterated after use is terminated.

ROAD GRADES: The desired grade on roads is 8 percent or less except as exempted. (See Maximum Grade Table above.) Safety, State laws, and economic and environmental constraints and concerns govern the selection of the maximum grade, or at least require mitigating measures to lessen the impacts of steep grades. The maximum grade varies with the ability of each material type to resist erosion. Steeper grades normally require additional costs for drainage, surface stabilization, maintenance, and use.

ROADWAY CRITERIA: The following recommendations should also be used as guidelines on new road construction.

Type: The travel way should be constructed to the following type for the grades given:

0-2 percent	Crowned
2-4 percent	Insloped or outsloped
4-8 percent	Insloped or outsloped with drain dips
>8 percent	Insloped with ditch

Insloped, outsloped and crowned travel ways shall have a 3 percent cross slope (Garland 1983). Shoulders are usually not needed. On side slopes greater than 35 percent, full bench excavation for the roadway shall be used. Slopes less than 35 percent cut and fill excavation for the roadway can be used.

Sight distance: Roads should be evaluated for adequate sight distance on vertical and horizontal curves, intersections, and in passing areas. The ability to see ahead is important in the safe and efficient operation of a vehicle on a road.

Sight distance is the length of roadway ahead visible to the driver. The minimum sight distance available on a roadway should be sufficiently long to enable a vehicle traveling at or near the design speed to stop before reaching a stationary object in its path. At road intersections, this is of great importance to allow vehicles time to see and react to a vehicle turning into the path of another vehicle or slowing to make a turn.

Stopping sight distance should be calculated to arrive at a minimum sight distance needed for a vehicle to see an obstruction and slow enough to avoid a collision. To arrive at the minimum required sight distance refer to one of the following: FSH 7709.56 Road Preconstruction Handbook (USDA 1994a); A Policy on Geometric Design of Highways and Streets (American Association of State Highway and Transportation Officials 1994).

Drainage structures: Use drain dips on road grades 4-8%. Use culverts on grades of 8% and greater. Install water bars on temporary roads when not in use.

Culverts and drain dips should be skewed 30 degrees for ditch relief. Culverts shall consist of corrugated aluminum, galvanized or aluminumized steel, or polypropylene. For culverts to be self-cleaning they should have a grade 2% greater than the ditch grade, minimum grade should be 3%. If culverts are used on temporary roads, they shall be removed immediately upon termination of use on the road.

Recommended Maximum Spacing for Culverts & Drain Dips	
Road Grade (%)	**Spacing (feet)**
1	500
2	300
3	233
4	200
5	180
6	167
7	157
8	150
9	144
10	140
11	136
12	133
13	131
14	129
15	127

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Appendix B: Traffic Service Levels

	A	B	C	D
Flow	Free flowing with adequate parking facilities.	Congested during heavy traffic such as during peak logging or recreation activities.	Interrupted by limited passing facilities, or slowed by the road condition.	Flow is slow or may be blocked by an activity. Two way traffic is difficult and may require backing to pass.
Volumes	Uncontrolled; will accommodate the expected traffic volumes.	Occasionally controlled during heavy use periods.	Erratic; frequently controlled as the capacity is reached.	Intermittent and usually controlled. Volume is limited to that associated with the single purpose.
Vehicle Types	Mixed; includes the critical vehicle and all vehicles normally found on public roads.	Mixed; includes the critical vehicle and all vehicles normally found on public roads.	Controlled mix; accommodates all vehicle types including the critical vehicle. Some use may be controlled to vehicle types.	Single use; not designed for mixed traffic. Some vehicles may not be able to negotiate. Concurrent use traffic is restricted.
Critical Vehicle	Clearances are adequate to allow free travel. Overload permits are required.	Traffic controls needed where clearances are marginal. Overload permits are required	Special provisions may be needed. Some vehicles will have difficulty negotiating some segments.	Some vehicles may not be able to negotiate. Loads may have to be off-loaded and walked in.
Safety	Safety features are a part of the design.	High priority in design. Some protection is accomplished by traffic management.	Most protection is provided by management.	The need for protection is minimized by low speeds and strict traffic controls.
Traffic Management	Normally limited to regulatory, warning, and guide signs and permits	Employed to reduce traffic volume and conflicts.	Traffic controls are frequently needed during periods of high use by the dominant resource activity.	Used to discourage or prohibit traffic other than that associated with the single purpose.
User Costs	Minimize; transportation efficiency is important.	Generally higher than "A" because of slower speeds and increased delays.	Not important; efficiency of travel may be traded for lower construction costs.	Not considered.
Alignment	Design speeds is the predominant factor within feasible topographic limitations.	Influenced more strongly by topography than by speed and efficiency.	Generally dictated by topographic features and environmental factors. Design speeds are generally low.	Dictated by topography, environmental factors, and the design and critical vehicle limitations. Speed is not important.

Road Surface	Stable and smooth with little or no dust, considering the normal season of use.	Stable for the predominant traffic for the normal use season. Periodic dust control for heavy use or environmental reasons. Smoothness is commensurate with the design speed.	May not be stable under all traffic or weather conditions during the normal use season. Surface rutting, roughness, and dust may be present, but controlled for environmental or investment protection.	Rough and irregular. Travel with low clearance vehicles is difficult. Stable during dry conditions. Rutting and dusting controlled only for soil and water protection.

Appendix C: General Relationship Between Maintenance Levels

PARAMETERS	MAINTENANCE LEVEL 1	2	3	4	5
Service Life	Intermittent Service-Closed Status	Constant Service or Intermittent Service - Open Status (Some uses may be restricted under 36 CFR 261.50)			
Traffic Type	Open for non-motorized uses. Closed to motorized traffic.	Administrative, permitted, dispersed recreation, specialized, commercial haul.	All National Forest Traffic - General Use, Commercial Haul		
Vehicle Type	Closed-N/A	High clearance, pick-up, 4x4, log trucks, etc.	All types - passenger cars to large commercial vehicles		
Traffic Volume	Closed-N/A	Traffic volume increases with maintenance level			
Typical Surface	All types	None, Native, or Aggregate -- may be dust abated		Aggregate -- usually dust abated; paved	
Travel Speed	Closed-N/A	Travel speed increases with maintenance level			
User Comfort and Convenience	Closed-N/A	Not a consider-ation	Low Priority	Moderate Priority	High Priority
Functional Classification	All Types	Local Collector	Local Collector Arterial	Local Collector Arterial	Local Collector Arterial
Traffic Service Level	Closed-N/A	D	A, B, C -- Traffic service level increases with maintenance level		
Traffic Management Strategy	Prohibit or Eliminate	Discourage or Prohibit cars. Accept or Discourage high clearance vehicles.	Encourage, Accept	Encourage	Encourage

Appendix D: Documentation Table

The table was used during Step 4 of the Roads Analysis Process for the Wayne National Forest, Forest-Scale Roads Analysis. The 71 questions addressed are from the Roads Analysis Guidebook (FS-643), Appendix 1, Ecological, Social, and Economic Considerations. In the table, each set of questions is identified by title and their corresponding page number in the Roads Analysis Guidebook.

Question	Addressed in Analysis? (Yes/No)	FS official addressing question	If not addressed, rationale for not addressing
Ecosystem Functions and Process (EF) – Page 14-17			
EF1	No		N/A at Forest-Scale
EF2	Yes	Larson	
EF3	Yes	Marchi/Perry	
EF4	Yes	Marchi/Perry	
EF5	Yes	Marchi	
Aquatic, Riparian Zone, and Water Quality (AQ) – Page 17-24			
AQ1	Yes	Ewing	
AQ2	Yes	Ewing	
AQ3	No	Ewing	
AQ4	Yes	Ewing	
AQ5	Yes	Ahmed, Ewing	
AQ6	Yes	Ewing	
AQ7	Yes	Stachler	
AQ8	Yes	Ewing	
AQ9	Yes	Ewing	
AQ10	Yes	Ewing	
AQ11	Yes	Ewing	
AQ12	Yes	Ewing	
AQ13	Yes	Ewing/Larson	
AQ14	Yes	Ewing	
Terrestrial Wildlife (TW) – Page 24-26			
TW1	Yes	Larson	
TW2	Yes	Larson	
TW3	Yes	Larson	
TW4	Yes	Larson	
Economics (EC) – Page 26, 27			
EC1	Yes	Marchi	
EC2	Yes	Marchi	
EC3	Yes	Marchi/Perry	
Timber Management (TM) – Page 27-29			
TM1	Yes	Perry	
TM2		Marchi	
TM3		Marchi	
Minerals Management (MM) – Page 29			
MM1	Yes	Moshen	
Range Management (RM) – Page 29			
RM1	Yes	Marchi	

Water Production (WP) – Page 30

WP1	Yes	Marchi	
WP2	Yes	Stachler	
WP3	No		N/A on the Wayne

Special Forest Products (SP) – Page 31

SP1	Yes	Larson/ Marchi	

Special Use Permits (SU) – Page 32

SU1	Yes	Marchi	

General Public Transportation (GT) – Page 32, 33

GT1	Yes	Marchi	
GT2	Yes	Marchi	
GT3	Yes	Marchi	
GT4	Yes	Marchi	

Administrative Use (AU) – Page 33, 34

AU1	Yes	Marchi	
AU2	Yes	Hall/ Marchi	

Protection (PT) – Page 34, 35

PT1	Yes	Marchi	
PT2	Yes	Marchi	
PT3	Yes	Marchi	
PT4	Yes	Marchi	

Unroaded Recreation (UR) – Page 35, 36

UR1	Yes	Wilberger	
UR2	Yes	Wilberger	
UR3	Yes	Wilberger	
UR4	Yes	Wilberger	
UR5	Yes	Wilberger	

Roaded Related Recreation (RR) – Page 36-39

RR1	Yes	Wilberger	
RR2	Yes	Wilberger	
RR3	Yes	Wilberger	
RR4	Yes	Wilberger	
RR5	Yes	Wilberger	

Passive Use Values (PV) – Page 39-42

PV1	Yes	Larson, Ewing	
PV2	Yes	Cramer	
PV3	Yes	Cramer	
PV4	Yes	Marchi/ Cramer	

Social Issues (SI) – Page 42-44

SI1	Yes	Gianniny	
SI2	Yes	Gianniny	
SI3	Yes	Cramer	
SI4	No		N/A on the Wayne
SI5	No		N/A on the Wayne
SI6	Yes	Gianniny	
SI7	Yes	Gianniny	
SI8	Yes	Ewing/Gianniny	
SI9	No		N/A on the Wayne
SI10	Yes	Gianniny	

Civil Rights and Environmental Justice (CR) – Page 44,45

CR1	Yes	Marchi	