

Content

Chapter 1—Introduction	3
How the Rule Works.....	4
Chapter 2—Step 1: Setting Up the Analysis	6
Geographic Information system and Our Engineering Database.....	6
Chapter 3—Step 2: Describing the Situation.....	8
Our Current Road System.....	8
Existing Direction	9
Existing Condition	10
Road Maintenance Levels.....	12
Trails	13
Chapter 4—Step 3: Identifying the Issues.....	14
Kick-off Meetings.....	14
Phase I Meetings.....	14
Phase II Meetings.....	14
Phase III Meetings	14
What the Public Wants.....	15
Recent Funding	16
Chapter 5—Step 4: Assessing Benefits, Problems and Risks of the Existing Road System.....	19
Specialist Reports	20
Fire Suppression and Fuels Treatment	21
Heritage Resources.....	21
Lands and Realty.....	23
Minerals.....	23
Range.....	24
Recreation.....	25
Forest Recreation Use Statistics.....	26
Soils	28
Water Resources	29
Wildlife	30
Terrestrial Habitat and Species	30
Aquatic Habitat and Species	31
Evaluation	32
Current Road Status	33
Chapter 6—Step 5: Describing the Opportunities and Setting Priorities	34
Unneeded Roads	35
Wilderness Area Roads.....	37
Appendix Content.....	38

Chapter 1 — Introduction

In late 2005, the U.S. Forest Service adopted the Travel Management Rule. The rule changes the way that the Forest Service regulates motor vehicles on National Forests and Grasslands. On the Santa Fe National Forest, motor vehicle travel will be restricted to designated roads, trails, and areas—cross-country motor vehicle travel will no longer be allowed unless designated.

This report is a Travel Analysis Process report for the Santa Fe National Forest. Before we adopted the Travel Management Rule, we used the Roads Analysis Process described in the Forest Service Manual (7712.1) and publication FS 643, Roads Analysis: Informing Decisions About Managing the Transportation System. As required by Federal regulations (36 CFR §212), the Travel Analysis Process revises and updates the Roads Analysis Process, adding motorized trails into the analysis process. The Forest Service Manual, supplemented by FS 643, requires that we produce this report as one of the steps in implementing the Travel Management Rule.

The purpose of this report is to explain our comprehensive examination of the roads network on the Santa Fe National Forest before we begin the environmental analysis process to designate the routes according to the Travel Management Rule.

The Travel Analysis process is adopted from FS-643, whose steps are as follows:

- Step One: Setting up the analysis
- Step Two: Describing the situation
- Step Three: Identifying the issues
- Step Four: Assessing benefits, problems, and concerns
- Step Five: Describing the opportunities and setting priorities
- Step Six: Reporting

We have included maps showing existing condition and direction and showing routes recommended for designation for motorized use on a CD that is an appendix to this report.

This report includes lists of all the roads on the Forest and information about these roads. If we printed these lists, they would be over 100 pages long. We included this list on the CD along with the maps.

This report is about motor vehicle transportation on the Santa Fe National Forest. We will discuss both roads and trails and use route as the collective term for both. Both may be designated for motor vehicle use.

Travel Analysis is an iterative, not a one-time, process. When conditions change, additional analysis may point to the need for revisions in the recommendations. In fact, the Travel Management designation process that will follow this process will likely result in additional information and, perhaps, decisions that will then be reflected in changes to the recommendations in this report.

The Travel Analysis Process is not a decision process. Travel Analysis provides the analytical framework from which to make recommendations that may be examined in the National

Environmental Policy Act process that provides the basis, including formal public involvement, for making decisions.

Damage from unmanaged recreation, especially from off-highway vehicles, is one of the main reasons for adopting the Travel Management Rule. When people drive motor vehicles off the road system, they can cause damage without realizing it. The small depressions that their tires leave are visible. Other people may travel the same route and eventually the small depressions can, if the conditions are right, begin to cause erosion. This damage is not limited to typical off-highway vehicles. Any motor vehicle driving off-road can cause this damage. Erosion is just one of the problems that off-road travel can cause. An archaeological site may not be visible, but one trip off the road could cause irreparable damage to the site. All types of motor vehicles can cause damage to wildlife, soils, and vegetation.

Unfortunately, even travel on established routes can damage resources. Many Forest Service routes were built to a low standard with a minimum of improvements and were meant for short-term use. Many stream crossings do not have culvert pipes to carry the water under the road, and driving through a stream damages the stream. We are not able to maintain most roads, and as traffic increases, soil erosion can increase.

How the rule works

The Travel Management Rule requires that the Santa Fe National Forest identify the minimum road system and designate roads, trails, and areas for motor vehicle use. This means that after the designation process is complete, you can operate motor vehicles only on roads, trails, and areas that have been designated. Cross-country motor vehicle travel will not be allowed unless in a designated area. The designations will not only list what roads and trails can be used, but also what types of vehicles can be used on the roads and trails, and what time of year they can be used.

There are, of course, a number of exceptions to these designations. Emergency vehicles—fire and police—will be able to operate anywhere on the Forest to carry out their duties. Many people have special use permits or grazing permits. These permits will list the routes that the permittees can use in their operations. Permittees may be allowed to use specific routes that are not open to the public. The Santa Fe National Forest has inholdings, parcels of privately-owned land surrounded by Forest land. Federal law guarantees that people who own land inside national forests be allowed reasonable access to their property, and the property owner must accept reasonable regulation from the Forest Service. Under certain circumstances, private property owners may be allowed access to their property on routes that are not open to the public.

The Travel Management Rule requires that we coordinate our activities with other Forests and other agencies, Federal, state, and local. The Santa Fe National Forest borders the Carson National Forest and several Indian reservations. In many cases, Santa Fe National Forest routes are accessed by state and county roads. We need to make sure continuous travel routes exist in adjacent areas.

The Santa Fe National Forest will comply with the National Environmental Policy Act. We will prepare and publish an appropriate environmental analysis for the changes to travel on the Forest. This will happen over the next two years.

The object of the rule is not to limit access to the Forest, but to protect the Forest from unmanaged use. Recreational use has increased tremendously in the past forty years, but the

Forest is still the same size, and people tend to congregate in popular areas. The Forest Service must strike a balance in managing all types of recreational activities. To this end, we believe that a designated system of roads, trails, and areas for motor vehicle use, established with public involvement, will enhance public enjoyment of the National Forests while maintaining other important values and uses on National Forest System lands. The Travel Management Rule works to manage current use so future generations can have the same advantages that we all have now: access to some of the most wonderful land in the world.

The first part of the travel management regulations (36 CFR Part 212, Subpart A) requires that the Forest Service “identify the minimum road system needed for safe and efficient travel and for administration, utilization, and protection of National Forest System lands”; and to identify the roads that “are no longer needed to meet resource management objectives and that, therefore, should be decommissioned or considered for other uses, such as for trails.” The second part of the regulations (36 CFR Part 212, Subpart B) requires that the Santa Fe National Forest designate roads, trails, and areas for motor vehicle use. We need to decide what type of vehicle can be used and the season of use on each route. After we have made these decisions, we need to publish a map that shows all the routes, the types of vehicles and season of use on each route.

When we identified a recommended minimum road system, we considered issues for resource protection and use. We considered:

- provision of recreational opportunities,
- access needs for adjacent property owners,
- conflicts among uses of National Forest System lands,
- natural and cultural resources, and
- maintenance and administration of roads.

During our many public meetings, the public provided information on these issues, particularly on recreational opportunities on the Forest. The public also gave us information about the other issues and asked questions that helped us focus our internal evaluations. With all this information, our staff specialists and experts evaluated the routes for these issues.

Chapter 2 — Step 1: Setting Up the Analysis

Table 1 lists the travel management team members and their specialties.

Table 1. Travel Management Team Members

Specialty	Name
Planning	Robert Potts, Ph.D., Public Involvement Coordinator Jennifer Cramer, Ph.D.
Recreation	Diane Taliaferro
Heritage	Jeremy Kulischek, Ph. D.
Engineering	Kiernan Holliday, P.E.
Mapping	Julie Luetzelschwab
Hydrology	Carol Van Dorn
Wildlife	Charles Gobar
Forestry	David Cummings
Lands	Roger Norton
Landscape Architect	Joan Hellen
Public Affairs	Dolores Maese

Geographic Information System and Our Engineering Database

Every National Forest in the country has an extensive route system. These routes came into existence for different reasons. Some were built to provide transportation between two places. Some routes were built for timber sales or to allow for mining. Some were built as part of a campground or a picnic area. Others were built to provide access trailheads for hiking. Some of the routes were created by people driving wherever they wanted. After a while, more and more people drove on the same places and the two-track roads gradually became routes.

We have to manage all of these routes, and we have two tools to help us. We use a geographic information system and our engineering roads database. Each of these computer-based tools helps us with slightly different information. The database stores engineering information about the roads and the geographic information system gives us a picture of the Forest and the routes on it.

The database includes detailed information about the roads, including a road number, road length, beginning and ending locations, ownership, ranger district, road surface, and other information. The database also includes features along the road, things like culvert pipes, signs, cattle guards,

and gates. The engineering roads database includes maintenance information. The geographic information system, or GIS, is a computer system that uses maps, photos, and other information to give us maps of the Forest road system. These are not like typical maps that you would see in a road atlas; our GIS maps are dynamic. Using GIS, we can produce maps that show roads, streams, wildlife areas, land ownership, and a host of other information. We used GIS to produce all the maps in the appendix for this report. The computer database lists all the roads on the Forest and includes information about the roads. The roads database is included in the appendix, labeled Road Table.xls.

The engineering roads database is a working tool to help us maintain our roads. Over the years we have refined the database by deleting roads that don't exist and adding roads we have found. We have changed roads from open to closed when we have found that it would be impossible to drive on them or, for example, when trees have grown up in the road. As we find problems and mistakes in the database we correct them.

The Forest Service has not always kept such detailed records of roads and trails. In 1992, the Forest Service began to inventory all existing roads and assign each a road number. On the Santa Fe National Forest, we used aerial photographs as an initial step in this inventory process, and everything that looked like a road on the photo was identified as a road. We intended to follow up with verification on the ground to eliminate those roads that were in fact fence lines and other features that appeared to be roads on aerial photographs. That follow-up process was never completed, however, and in many places across the Forest, features that are not roads are still identified in our inventory as roads with formal road numbers. Some of these are fence lines and other non-road features; others are unauthorized, or user-created, routes that were never intended as long-term Forest Service road or trail assets to be kept on our system.

When implementation of the Travel Management Rule began, the Forest Service directed that we should not make wholesale changes to our road and trail inventory because it would appear to be broad scale changes in designation outside the formal specified process. As a result, we are aware that some roads on our existing condition maps are not roads at all or are user created roads that may not be needed.

Chapter 3 — Step 2: Describing the Situation

Our current road system

Every National Forest has a land and resource management plan that we call our forest plan. Our forest plan is a plan of operations for the next 10 to 15 years. The plan establishes management areas in the Forest, areas that have common characteristics, like water resources, soils, timber, or cultural divisions. The plan sets out standards and guides for each management area and has information about many aspects of operations, from wilderness areas to mineral development, from motorized travel to campsites.

Current forest plan direction relating to motorized travel can be summarized as follows. The acres reflect National Forest System land within the proclaimed Forest boundary and exclude private land inclusions.

- Non-motorized—484,305 acres
- Travel on existing roads only—246,225 acres
- Cross-country travel OK—821,664 acres

Approximately 53% of the Forest is under management direction that allows cross-country travel with no restrictions

We classify many different road characteristics in our roads database, for example, the type of surface the road has, who maintains the road, and what ranger district the road is on. Four road classifications are particularly important to the Travel Management Rule. These classifications tell us what roads we currently manage for motor vehicle use. The database can be found in the appendix, labeled Road Table.xls.

- Route Status
- Jurisdiction
- System
- Maintenance Level

Route Status tells us whether the road exists or has been decommissioned. Over 90 percent of the roads in our database are existing roads. A road that we have decommissioned is a road that has been removed from service. It is no longer a road—we keep track of it only for recordkeeping purposes.

States, counties, and other Federal agencies may control roads that cross Forest land, and we keep track of this by classifying the road according to jurisdiction. Over 80 percent of the roads on the Forest are Forest Service jurisdiction. New Mexico Highway 126 is an example of a road that crosses Forest land. New Mexico has jurisdiction over the road and has an easement to operate and maintain the road on Forest land.

Any road is part of a system of roads. Interstate 25 is part of the Interstate highway system and New Mexico Highway 4 is part of the state highway system. A road may be part of a county or city road system and may go through part of the Forest. In our database, roads that are part of the system of roads on the Santa Fe National Forest are listed as National Forest System Roads.

When a road meets all the following classifications, the Santa Fe National Forest manages that road for motor vehicle use:

- Route Status—existing
- Jurisdiction— Forest Service
- System— National Forest System Road
- Maintenance Level—Suitable for high-clearance vehicles or passenger cars

Many roads or sections of roads do not meet all of these criteria. Some roads are decommissioned and we keep in the database for information. Some roads may be under control of other Federal agencies or, perhaps, private ownership.

Existing Direction

Table 2 lists the number of miles of roads that meet all the above criteria. We call these roads our *existing direction*. Any road or section of a road that does not meet all the criteria is not included. So existing direction means the system of roads managed as open for public use. Maps of existing direction can be found in the appendix, labeled Existing Direction Eastside.pdf, Existing Direction Westside.pdf. Maps of existing condition can be found in the appendix, labeled Existing Condition Eastside.pdf and Existing Condition Westside.pdf.

Even though we use our engineering roads database to keep track of the roads on the Forest, for this report we used our geographic information system data for the analysis. We believe that using GIS is a more efficient way to analyze the data in this report and in the environmental analysis because GIS contains data on roads, wildlife, soils, water resources, and a host of other items. To answer questions about specific roads or sections of the Forest where we need information, GIS can be used to combine the appropriate layers to get the information. Miles in the engineering database are not exactly the same as miles for the same road segments in GIS, though across the Forest as a whole, the differences are slight.

In this type of analysis, we find that graphic data interpretation is simpler and easier to understand. Our staff can create maps on their computer screens and perform their analyses with minimum effort. Using tabular data from our engineering roads database would make the analysis difficult and complicated. A road location, for example, is only generally described in the database and it is not shown in relation to other features. Our GIS data show individual roads and how they relate to other features. The GIS data are also linked to the engineering roads database; roads information is instantly accessible if a specialist needs it for the analysis.

Table 2: Existing Direction--Roads Managed for Public Motor Vehicle Use

Road Classification	Miles
Suitable for high-clearance vehicles	4,481
Suitable for passenger cars	443
Total	4,924

Existing Condition

While we manage 4,924 miles of roads for public motor vehicle use, we know that there are other roads that people use on the Forest. We also know that some of the roads listed in our database don't exist. Even though we don't have perfect inventory data about what is actually being used, it is important to describe it as well as we can.

The Forest Service has a program to ensure the quality of our roads information. Each year the engineering staff looks for a random sample of roads that are listed in our database to verify the existence and condition of the roads. Based on information from the last several years, it is estimated that between 10 percent and 20 percent of the roads in our database do not exist. The same random sample investigations show that between 10 percent and 20 percent of the closed roads are regularly used.

The roads that we manage for motor vehicle use are not the only roads that people use on the Forest. People regularly use some roads that we consider closed, and there are a number of user-created routes on the Forest. All of the roads on the Forest that people use are part of what we call the *existing condition*. The existing condition is our best estimate of where people are driving now.

Table 3 shows the miles of roads in our existing condition.

Table 3: Existing Condition

Road Category	Miles
Closed	200
High-clearance vehicle	3,809
Passenger car	443
User created	25
Total	4,477

We have included 15 percent of the closed roads in the existing condition, because that is the approximate miles of closed roads that the public uses based on sampling. Our annual random samples that show that not all the roads exist, therefore we have reduced the miles of closed roads and high-clearance vehicle roads by 15 percent. Our information on passenger car roads is more accurate; we have not reduced that number. The user-created roads included above were those routes provided by four-wheel drive user groups that were not on open or closed system roads. There are also user-created routes on the Forest that we don't know about and haven't inventoried. Based on this information, we believe that Table 3 is our best estimate at this time of the number of miles of road in each category for the existing condition. Finally, there are 1136 miles of closed roads that are not in use and table 3 does not include these miles. During the upcoming environmental analysis process, however, our analyses may consider these roads because the roads have some impact on Forest resources.

The Santa Fe National Forest plan specifies objective open road densities for different management areas on the Forest. Table 4 below lists the objective open road density for each management area on the Forest. These upper limits define the maximum miles of roads that are open to public use per square mile for each management area.

Table 4: Forest Plan Road Density Standards

Management Area	Open Road Density (Miles/SqMile)
A	1.0 - 2.5
B	0.3 - 1.5
C	1.0 - 2.5
D	1.0 - 2.5
E	1.0 - 2.5
F	Not specified
G	0.3 - 1.5
H	Non-motorized
I	Not specified
J	Not specified
K	0 - 1.0
L	Non-motorized
M	Not specified
N	Not specified
O	Not specified
P	1.0 - 2.5
Q	1.0 - 2.5
R	0.3 - 1.5
S	0.3 - 1.5
X	Not specified

We measure road density in miles of road per square mile of land. The miles of road part is relatively simple, but there are several options that might be used for determining the appropriate area to use. For example, we could add up all the acres of a given management area across the entire and divide by the total miles of roads in that area. Or we could choose to measure road density by each contiguous polygon of each management area. For this report, we calculate road density for each contiguous management area, except in Management Area K. In this management area, the Plan requires that we use a Forest-wide average. Road density standards in the forest plan were set in the context of gross management area acres, including private land inclusions. Because private land inclusions are not evenly distributed across the Forest and across management area polygons, using the standards in a polygon by polygon analysis may result in some questionable conclusions which will need further consideration.

We have identified some management area polygons where open road densities of the minimum road system exceed forest plan standards. In those cases where there is a compelling reason to keep all the roads in the minimum system, like legally required access to private land, a forest plan amendment will be required.

Road Maintenance Levels

The Forest Service uses maintenance levels to help us allocate maintenance resources and funding, and to help with transportation planning. Broadly speaking, maintenance levels can be grouped as follows:

1. Closed roads, called Maintenance Level 1,
2. Roads suitable for high-clearance vehicles only called Maintenance Level 2, and
3. Roads suitable for passenger cars, called Maintenance Levels 3, 4 and 5.

While we call Maintenance Level 1 roads closed, they are not always physically closed on the ground. In many cases, physical barriers were installed to prohibit entry; in some cases, users have driven around or through those barriers. A classification decision of Maintenance Level 1 and installation of a physical barrier does not provide an enforceable closure unless it is also accompanied by a formal closure order. On much of the Forest, cross-country motor vehicle travel is allowed. In these areas, it would be illogical to restrict travel on a road that is listed in our database as closed, but allow motor vehicles on the meadow next to the road. We know that some of these roads are regularly used. At the same time, there are many closed roads and high-clearance vehicle roads that have not been driven on in decades. In some cases it is difficult to find the original road trace and in other cases trees have grown up in the roads.

Maintenance Level 1 roads are roads we don't need right now, but may be needed later on. For example, after a timber sale, we may close the roads that we used to cut and haul the logs. We occasionally review these roads to decide if we need to decommission them.

Maintenance Level 2 roads are suitable only for high clearance vehicles. Most of these roads are open to the public; anyone can drive on them, but they are not suitable for passenger cars. There are some Maintenance Level 2 administrative use roads that are not open to the public but available for Forest Service use or for use by people who hold Forest Service special use permits or road-use permits.

Maintenance Level 2 roads are used for many activities including mineral extraction, camping, hunting, and by people out for a drive. Generally, we do not maintain these roads or we maintain

them to minimum standards. Many are rutted and eroded and are difficult to drive, even in a high clearance vehicle. Some roads that were built for passenger cars have deteriorated, because of lack of maintenance, into roads that are suitable only for high clearance vehicles.

Maintenance Level 3, 4, and 5 roads are those suitable for passenger cars. Some of these roads are dirt, some are gravel, and some are paved. For dirt and gravel roads, the main distinguishing characteristic is the maintenance effort that we put into the roads. It is impossible to generalize about how often we maintain these roads; some roads require more maintenance than others. For example, a dirt road that is suitable for passenger cars and has a lot of traffic may require more maintenance than a gravel road with less traffic.

The Santa Fe National Forest has no Level 5 roads. Most level 4 roads on the Santa Fe National Forest are paved. Most Level 3 roads on the Santa Fe National Forest are gravel, although some Level 3 roads are dirt.

Trails

The Santa Fe National Forest manages 937 miles of trails. Some of these trails came into existence to access mining claims, for range allotments, hunting, recreation, and other historical uses. We have 5 classes of trails. Class 1 trails are typically primitive and undeveloped, and Class 5 trails are fully developed and often paved. Most of the trails are Class 2 and Class 3 trails and are designed for pack and saddle stock or hiking. We have two trails designed for motor vehicle use.

We have 637 miles of trails in non-motorized areas on the Forest. These areas include wilderness areas and other areas with special closures due to fire, wildlife or other resource concerns. The other trails on the Forest are in areas where motor vehicles are allowed. Most are designed for horses or hikers, however, motor vehicles use these trails.

We have 5 miles of trails that are designed and managed for motorized use. There has also been some motorized use occurring in areas of the Forest that are to be managed for non motorized opportunities, including in wilderness areas. The travel planning process will clarify and designate exactly where motorcycles and all-terrain vehicles can travel. We have a number of user-created routes that we don't have accurate inventory data about. Users provided location data for 291 miles of trails that are not on system trail or road locations. There are, no doubt, other user-created trails which we do not have in our inventory. Some of these may be considered in the travel planning process.

We keep track of system trails in a computer database, similar to our roads database. The database includes detailed information about each trail such as number, length, designed use, class, and beginning location and terminuses. This also includes any features a trail may have such as waterbars, culverts, retaining walls or signs.

The GIS dataset of trails originated from trails that were shown on U.S. Geological Survey quadrangle maps. In the late 1980s the Forest took over the production of these maps and the trail alignments were available in digital format. When the maps were updated every 8 to 12 years the Forest was able to update trail alignments by drawing them on draft maps and they were then digitized. In the late 1990s we verified the locations of the trails using the satellite navigation system.

Chapter 4 — Step 3: Identifying the Issues

One component of issue identification has been informing the public about the designation process, describing the current road system and learning how the public uses the road system. During the public involvement phase of this process we held 50 public meetings. Approximately 1,000 people attended the meetings.

Kick-off meetings

We conducted informational public meetings at the beginning of the process to explain to the public what the Travel Management Rule was all about. We explained why the Travel Management Rule came about, the potential threat of unrestrained motor vehicle use on the Forest, and our need to protect resources. We explained the minimum road system. We also explained that motor vehicle use is essential to forest operations, and that recreational off-highway vehicle use is a legitimate and rapidly-growing use of forest land.

We explained the travel management process. We told the public what we needed to do to arrive at a minimum road system, a designated route system, and a motor vehicle use map. We asked for information about how the Forest is used. We asked for information related to user-created routes so that we would have complete information on how people use the Forest

Phase I Meetings

During the Phase I meetings, we tried to identify use patterns on the Forest. We looked for information about camping, travel, hiking, recreational use, or anything else that might be related to motor vehicle use on the Forest. We asked what people liked to do on the Forest and how these different uses might conflict with each other. We asked again for information about user-created routes, roads and trails on the Forest that are not on our maps, but are used by the public.

Phase II Meetings

After we received and collated comments from the Phase I meetings, we held another round of public meetings. During these meetings, we showed the maps that included public comments from previous meetings.

Of course, we received more comments and made corrections to the maps. Again, we asked the public to mark up the maps that we brought to the meetings.

Phase III Meetings

During the Phase III meetings we introduced the screening criteria that we would use during our science-based analysis that we describe later in this report. We described these criteria as filters that we used to determine what uses would be appropriate in different areas of the Forest. If, for example, the public wanted to use a road or trail through an area with archaeological resources, we would filter this use request to arrive at a recommended condition.

What the public wants

We received around 1000 letters and around an equal number of signatures on petitions during the travel analysis process. We received comments from the following groups:

- American Endurance Riders Association
- Audubon Society
- Backcountry Horsemen
- Blackfeather Motorcycle Club
- Center for Biological Diversity
- Forest Guardians
- Glorieta Mesa.org
- National OHV Alliance
- New Mexico 4 Wheelers
- New Mexico Wilderness Alliance
- Northern New Mexico Trail riders Association
- Save La Cueva.org
- Sierra Club
- Watershed Watch
- Wild Watershed

We did not answer these comments and suggestions in this report. In many cases we answered comments and suggestions with personal phone calls or personal letters from the Supervisor or district rangers. We answered comments and suggestions at the public meetings and workshops. In some cases we met with individuals and groups for field trips where we had discussions and answered questions. Answers to common comments were posted on the Santa Fe National Forest website.

The list below is a summary of public comments.

- Better road maintenance
- More funding for implementation
- More restrictions for OHVs
- Safety of users
- Access to forest products
- Big game retrieval from ATVs
- More motorized trails
- Handicapped access
- More single-track trails for motorcycles
- Smaller route system
- Access to the Forest
- Dispersed camping access
- Recreation without OHVs
- Access to inholdings
- Good economic benefits
- More signs
- No ATVs used for hunting

- No ATVs in wilderness areas
- No increased motorized activity
- More trails for motorcycles
- No more trails for motorcycles
- No motorized recreation near residences
- Less noise
- No OHVs in certain communities
- No public access across private land
- No resource damage
- No routes in riparian areas
- No increased traffic in nearby communities
- More law enforcement

The number of comments and suggestions reflects the passion the public has for the Santa Fe National Forest, its resources and recreation opportunities. The comments and suggestions also highlight the difficulty that we face in the designation process. Some of the comments and suggestions are inconsistent or ask for completely opposite things. Some people, for example, suggested that we need to provide a network of single-track loops. Someone else suggested that we already have too many loops for motorcycles.

All transportation planning has to deal with conflicting issues. Some people want more OHV access to the Forest and other want no OHVs on the Forest. Even the regulations that require us to designate roads, trails, and areas require that we consider competing interests. In our analysis and proposal we have to consider all competing interests. The next section describes the science-based analysis that we used to develop our proposals.

Recent funding

Roads are necessary for almost any activity on the Santa Fe National Forest. Timber harvesting, mining, and cattle grazing all require roads. Even activities that we normally don't associate with roads, such as hiking and horseback riding, still require roads to access trailheads. All the roads that people use on the Santa Fe National Forest need maintenance, and we don't have enough money to maintain all the roads to an ideal standard. This section explains funding for road maintenance on the Forest. It explains how we use our road maintenance money, and briefly describes options for optimizing available budget on the most important maintenance tasks.

Table 5 shows the annual miles of road maintenance by road type on the Santa Fe National Forest from 2004 through 2007. The information is from accomplishment reports.

Table 5: Annual Miles of Road Maintenance by Road Type

Year	Passenger Car Roads	High-clearance Roads	Closed Roads	Total
2007	420	88	0	508
2006	371	49	0	420
2005	339	241	100	734
2004	393	193	117	703

In 2007, we maintained 420 miles of passenger car roads. Differences in reporting requirements account for the discrepancy of the numbers between Tables 3 and 5. Because of legal requirements in the Highway Safety Act, we must maintain the passenger car roads. The maintenance we do on the roads is mostly using a grader to blade the roads. The operator smooths the road surface, pulls gravel from the ditches, and fills and compacts potholes. We occasionally repair sections of a road by applying additional quantities of gravel. While this maintenance is important—it would be difficult to drive a passenger car down the road without it—it is still inadequate. We need to regularly replace the gravel on all gravel-surfaced roads.

Gravel is not a permanent surface on a road. Constant vehicle traffic and regular maintenance erode the surface. The fine material can blow away and the larger material gets pushed off the road and eventually lost. Each maintenance cycle recovers less and less of the gravel, and eventually the road becomes a dirt road again. Without regular gravel replacement, the passenger car road will eventually become one that is suitable only for high clearance vehicles.

A gravel surface usually lasts 10 to 15 years. If we assume a generous 15-year life, we would need to replace gravel on approximately 6.5 percent of the gravel roads each year, approximately 22 miles. Based on current costs, a 20-foot average road width, and a six-inch layer of gravel, regular gravel replacement would cost \$1.3 million per year. We are currently able to allocate approximately \$100,000 per year for gravel replacement. As you can see, our gravel replacement rate is less than 8 percent of what it should be to maintain the road surface.

Most roads on the Santa Fe National Forest are suitable only for high-clearance vehicles. Comparing Tables 3 and 5 shows that we maintain a tiny percentage of these roads. While we wouldn't necessarily put gravel on these roads, high-clearance vehicle roads require maintenance. The most important maintenance item on high-clearance vehicle roads is drainage. Rutted roads are certainly difficult to drive on, but rutted roads also cause road and natural resource damage. Rains and spring snowmelt cause water to run down the roads, erosion increases, the road is damaged, and the erosion also damages the surrounding forest. Any road that is not maintained deteriorates at a faster rate. Asphalt roads become cracked and filled with potholes. The surface erodes from gravel roads. Dirt roads become rutted and impassable.

As Table 6 shows, we estimate that the Santa Fe National Forest needs over \$4 million per year for adequate maintenance for all of our roads, using recommended maintenance frequencies and costs.

Table 6: Annual Maintenance Needs

Road Type	Annual Maintenance Needs
Closed Roads	\$111,173
High-clearance Vehicle Roads	\$1,534,260
Passenger Car Roads	\$2,967,273
Total	\$4,612,706

It is unlikely that we will ever have that much money, so we must prioritize the maintenance we do. We currently prioritize maintaining passenger car roads. The difficulty with our limited budget, however, is that our inadequate gravel replacement means that the passenger car roads will eventually be downgraded to high-clearance vehicle roads.

Converting passenger car roads to high-clearance vehicle roads—or allowing them to convert themselves—is certainly one approach to solving the maintenance dilemma. Without the rigid requirements of the Highway Safety Act, we would be able to cover at least drainage issues on far more of our road system. Another partial resolution will be to reduce the miles of the designated road system. This analysis will recommend a minimum road system; the rest of the roads currently on our system will be identified as unneeded.

We know that downgrading all our passenger car roads to high-clearance vehicle status and closing all our roads except those that can be maintained to an ideal standard is not a tenable solution. On the other hand, we need to maintain our open road system to at least minimally meet Highway Safety Act requirements for passenger car roads and to a standard that acceptably protects resources. Finding an acceptable solution to this dilemma will be resolved in the Travel Management designation analysis that will follow this process.

Chapter 5 — Step 4: Assessing Benefits, Problems and Risks of the Existing Road System

One of the more complex parts of the travel analysis process is to complete a science-based analysis of the existing routes—our existing condition—and determine what routes should be open, what routes should be closed and what routes are unneeded. This process necessarily requires that we look at a large number of variables. We have to consider, for example, wildlife, soils, archaeology, water resources, recreation, forestry, and fire fighting. In addition, we need to consider access for permit holders, private property owners, and our own administrative needs.

The Motor Vehicle Route and Area Designation Guide produced by the National OHV Implementation Team explains the screening criteria that we need to consider during the route designation process. Generally, we need to consider:

- National Forest System natural and cultural resources
- Public safety
- Provision of recreation opportunities
- Access needs
- Conflicts among uses of National Forest System lands
- Need for maintenance and administration of roads, trails, and areas that would arise if the used under consideration are designated and the availability of resources for that maintenance and administration

For trails and areas we must consider the following specific criteria:

- Damage to soil, watershed, vegetation and other forest resources
- Harassment of wildlife and significant disruption of wildlife habitats
- Conflicts between motor vehicle use and existing or proposed recreational uses of National Forest System lands or neighboring Federal lands
- Conflicts among different classes of motor vehicle uses of National Forest System lands or neighboring Federal lands
- Compatibility of motor vehicle use with existing conditions in populated areas, taking into account sound, emissions, and other factors

For roads we must consider the following specific criteria:

- Speed, volume, composition, and distribution of traffic on roads
- Compatibility of vehicle class with road geometry and road surfacing
- Finally, for rights of access to private property we must consider:
- Valid existing rights
- The rights of use of National Forest System roads and trails under 36 CFR §212.6(b)

Our analysis was a science-based, rational, iterative process. Through the iterative process we gradually refined our data. Our analysis is based not only on what most people would call science, but on other available information. People who use the Forest regularly are familiar with

the places they visit. In many cases, they have witnessed changes and variations—some natural, some human caused—over the years and they can provide insight into causes and effects. People who hold range grazing permits are another source of information. In some cases, generations of ranchers have grazed livestock on the Forest. Their knowledge of conditions and of causes and effects is invaluable for our decisions. Native American pueblo people have lived in the area of the Santa Fe National Forest since before recorded history. Their knowledge and experience can give us information that can help us through complex and difficult decisions.

We have engaged and consulted with staff who have science-based expertise through this process. We have foresters, wildlife biologists, soil scientists, archaeologists, social scientists, and others. All are familiar with scientific technique and regularly use established science methods in their work. They gather and analyze data using standard methods and then make their recommendations. They monitor programs and review consequences.

While many of our staff are scientists, they have special knowledge that some scientists may not have. Our staff regularly visit the Forest, and they are familiar with local conditions. They are familiar with wildlife, water resources, soils, and archaeological sites. When they work on the Forest, they report conditions to each other, and they all update their records. Our staff specialists are experts. Their use of science and their local knowledge is a valuable resource that our management team needs when making decisions.

In this part of the report, we describe the process that we used to involve our staff experts in the travel management process.

First, we asked the district staff to verify the current status of the route system on their districts. Second, we asked them to document the recommended condition for the route system. In this phase, the staff experts evaluated the current condition and the recommended condition based on specific local knowledge.

We depended heavily on maps that our GIS staff produced. Our GIS staff made maps of roads for the Forest and the districts and sent the maps to the districts for evaluation. The district staff met, reviewed the maps, and answered specific questions about information on the maps. They marked up the maps with changes and updates, and returned the maps to the GIS staff. The GIS staff then incorporated the changes and updates onto master maps that could be sent back to the districts for approval. At no time did the GIS staff make judgment calls regarding what roads should be open or closed or any other information on the maps. For example, if the district staff indicated that a main road should not be open, but the side roads were listed as open, the GIS staff would ask for clarification. The GIS staff looked to resolve apparent inconsistencies in the information that the districts provided.

Specialist Reports

Our staff specialists have written the following short sections describing in more detail how they assessed the benefits, problems and risks of the existing road system. These considerations shaped the preliminary recommendations about:

Identifying the minimum road system needed for safe and efficient travel, and for administration, utilization and protection of National Forest System lands; and

Identification of unneeded roads that are no longer needed to meet forest resource management objectives and that, therefore, should be decommissioned or considered for other uses, such as for trails.

Fire Suppression and Fuels Treatment

Road access to areas on the Forest for purposes of fire suppression was considered in relation to recommendations for the minimum road system. From that perspective, the benefit of a smaller designated road system for public use is reduced probability of human caused fires.

The risk of a smaller road system would be that some fires will get larger because of a longer response time. Assuming a continuation of helicopter initial attack resources in the most severe part of fire season, this response time would not necessarily be longer as long as the number of fires detected does not overwhelm the combined engine and helicopter resources.

Emergency response for fire suppression is not subject to the prohibition of administrative use on Maintenance Level 1 roads, so those which are still drivable would be available. Even user-created roads and others we recommend as unneeded and subject to consideration for decommissioning will not be actually decommissioned and made impassable to vehicular traffic in the immediate future because of limitations in funding. Those unneeded roads that are creating resource damage currently will be the priority for decommissioning treatments, and we would not want to keep those for fire access because of their liabilities.

Roads to access needed fuel treatment may be provided as part of the minimum road system. Access needed in the short term would be provided on open roads. Longer-term needs may be provided by closed roads that would be opened to administrative use when needed.

Heritage Resources

Heritage Resources include archaeological sites with prehistoric and historic components including limited-activity sites, habitation sites, linear sites and special use sites. Additional heritage resources include sites with traditional cultural resource values for living communities and are referred to as Traditional Cultural Places. Within the framework of the National Historic Preservation Act these “sites” are referred to as historic properties which may have the potential to be affected by undertakings, in this case, activities associated with management of the transportation system on the Santa Fe National Forest. Miscellaneous Report FS-643, Road Analysis: Informing Decisions About Managing the National Forest Transportation System, offers guidance regarding questions to be asked when evaluating a forest’s transportation system’s impacts on Heritage Resources:

- How does the road system affect access to archaeological and historical sites?
- 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?
- How are roads that are historic sites affected by road management?

In general on the Santa Fe National Forest the existing road system is quite extensive and provides access to many significant heritage resources on the Forest. While the guidance in FS-643 asserts that this may be in keeping with the wishes of the public for access to enjoy and appreciate its resources, it provides a certain management problem in that increased and unmanaged visitation to heritage resources raises the potential for damage to those resources. The existing road system also provides access to cultural and traditional uses on the Forest. The Forest

also has roads that overlie linear historic sites. If a road has been repeatedly maintained in the past, site documentation has shown that historic features have been obliterated by road construction or repeated maintenance. In cases where intact features of historic roads have been documented during inventory, consultation under Section 106 of the National Historic Preservation Act has been completed to address the potential for adverse effects.

The following questions were used during the designation process to guide district staffs in making determinations about what roads, trails or areas would be designated in terms of impacts to Heritage Resources:

- Does a system of roads, trails or areas lead to or occur in an area with multiple historic properties that may be affected by access on those roads, trails or areas, or having those roads, trails or areas cross or directly impact historic properties?
- Does a system of roads, trails or areas lead to or occur in an area where Traditional Cultural Properties may be affected by access on those roads, trails or area or will those roads, trails or areas have an impact on the values that make the Traditional Cultural Properties eligible for the National Register?
- Does the Area of Potential Effects for a proposed road, trail or area have the potential to adversely affect historic properties whether they are archaeological or Traditional Cultural Properties?
- Can a different road, trail or area be used for access that will decrease or eliminate potential impacts to historic properties?
- Are there circumstances when it might be better to recommend placement of a road, trail or area through, within or adjacent to a historic property to limit or deflect access away from significant properties or features?
- If a road, trail or area is currently being used by motorized vehicles and is within, adjacent to or in close proximity to a historic property is it best to continue the use or discontinue it?
- What is the potential for historic properties to be adversely affected by roads, trails and areas in areas that have not been subject to valid inventory?
- Will the road, trail or area be used to interpret or enhance the knowledge and appreciation of heritage resources on the Forest?
- If use is continued on a road, trail or area on, adjacent to or in the vicinity of historic properties, can the Forest provide adequate monitoring of site condition?

Rationale for recommendations involved assigning codes for each road segment. Coding may include impacts to heritage resources as a rationale for not recommending open a road, trail or area, or conversely to recommending open roads, trails or areas important for heritage resource interpretation or protection. In some cases the rationale for designation of a road, trail or area may be the result of several reasons.

Lands and Realty

Federal law requires that the Forest Service provide reasonable access to private inholdings, and the property owner must accept reasonable regulation. (16 U.S.C. 3210, Sec. 1323) In essence, while required to provide a right of access, that right is not unqualified; the kind of access provided an inholder is a discretionary decision based upon individual facts and circumstances.

Where ingress and egress to private land is via an existing Forest System Road, which is open and available for general public use, the private landowner is permitted to use the road without a separate written authorization. However, the private landowner in this situation does not have the right to relocate, construct, reconstruct, or maintain the Forest System Road, and we often find ourselves in a situation where our minimum road maintenance standards do not adequately meet the needs or desires of the private landowner. If ingress or egress to private inholdings across NFS land requires surface disturbance, or the use of a road which is not a Forest System Road, or the landowner does not want open and unrestricted public use, the landowner must apply for and receive a special use authorization or road use permit.

We have hundreds of inholdings within the Santa Fe. These inholdings are often subdivided multiple times, resulting in a large number of different property owners forest-wide. Many of these subdivisions do not provide adequate access to the internal parcels, thereby encouraging the use of multiple roads for access to one inholding. A significant majority of these properties are currently accessed by a network of Forest System Roads. The amount of research required to evaluate each and every inholding is enormous, and we are unable at this time to identify every specific road necessary for private access. In an effort to find some kind of balance between our statutory requirement to provide a reasonable right of access to private inholdings, and our need to meet the goals of the Travel Management Rule, we analyzed our system of roads, using the following factors as guidance:

- Is road primarily for private land access, or does it serve another purpose or need?
- Likely historical use and designation.
- Natural resource concerns.
- Whatever institutional knowledge we may have with the real estate development patterns specific to the parcel and in general with the area.
- The financial cost to private landowners of closing a given System road, and issuing the landowner a special use authorization for their access needs.
- A multi-year backlog of existing special use authorization applications, which would only be exacerbated if we aggressively pursued the closure of access roads.

Minerals

Mineral extraction activities, by their very nature, require disturbance of surface resources. At times, the disturbance may be short-term, such as removal of a small quantity of surface rock for landscaping by an individual; but in some cases, the extraction activity may continue for up to 60 years, as is the case for several of the oil wells on the Forest. In most cases, the exploration and extraction of mineral resources will require road access.

Most mineral extraction activities require frequent access on a year round basis; although seasonal restrictions on construction or major maintenance operations are generally acceptable to the operators.

The Santa Fe has minimal “hobby” mining, such as gold panning or dredging; but does have active oil and gas production, pumice mining, sales of landscaping rock from several dispersed areas, sales of construction and road surfacing aggregate from a few sites, and the potential for uranium and geothermal developments.

The Forest needs to provide adequate access to active or reasonably foreseeable mineral exploration and extraction activities while minimizing damage to natural resources in and around the drainages used for this activity. We need to ensure that mining claimants and operators, oil and gas lease operators, and mineral material operators can continue to access the mineral resources on the Santa Fe National Forest in accordance with Federal law and policy.

There is potential for uranium occurrences in several parts of the Forest, but no significant claim staking has occurred, and no exploration plans have been submitted to the Forest.

There are numerous patented mining claims scattered throughout the Forest, but no minerals production is occurring from any of them. As with any private inholding, the Forest will work with the landowner to assure reasonable access.

The portion of the Santa Fe National Forest with current and foreseeable oil and gas development was analyzed in the Oil-Gas Leasing EIS.

While there is the potential for geothermal development over a significant part of the Forest, no development plans have been submitted to the Forest.

There is a significant, and growing, demand for salable minerals, particularly common variety pumice and construction and road surfacing aggregate in the area. These products are very sensitive to production costs, so are generally located in areas with suitable resources close to the existing road systems. The production sites for these commodities were considered during the roads analysis process.

Range

Livestock grazing on the Santa Fe National Forest is important part of local economies, and livestock grazing is deeply rooted in Northern New Mexico culture. Livestock grazing in New Mexico has existed since the sixteenth century. Managed, permitted livestock grazing on the Forest began in the early twentieth century. Federal law requires that public rangelands were to be “managed ... so that they become as productive as feasible for all rangeland values.” The Santa Fe National Forest has 234 term grazing permits on 74 grazing allotments.

The network of roads on the Forest lands has both positive and negative effects on rangelands and the administration of the grazing program. The vast majority of grazing permittees on the Forest truck their livestock onto their grazing allotments. Livestock trailing still occurs on the Forest but primarily occurs along FS road corridors. Roads have mostly replaced driveways as a means for transporting sheep and cattle to and from mountain allotments. As a result, these driveways have dramatically improved in rangeland health within the allotments where they are located.

Forest roads allow range managers and grazing permittees to access allotments quickly by using vehicles rather than horses. Roads can reduce permittee operating costs by providing motorized access to allotments. However, the same roads can produce conflicts between users of the national forests, such as between livestock grazing and recreation interests. Vandalism to range

facilities such as corrals, water storage tanks and water troughs are common occurrences on some portions of the Forest.

Road corridors are a major contributor to the spread of weeds that adversely effect native grassland communities. The overall trends indicate that the human activity along roads, trails, and recreation areas, along with disturbance at oil and gas well pads and the movement of seed or other vegetative propagules by water along riparian corridors, are the main transportation vectors at this time. However, this human activity can include the hauling of livestock on trailers which could contribute to the spread of weeds if the vehicle comes from an infested area or drives through an infested area.

Roads also contribute to the fragmentation of open grassland communities. User-created roads and trails and the cross country motor vehicle use causes physical disturbance to vegetation and soils which can compromise the ecological integrity of grassland communities by influencing species composition and rangeland hydrology.

Motor vehicle use by grazing permittees is exempt from the Travel Management Rule as long as the permittee complies with the terms of the permit. Some permittees may be allowed to use roads that will not be designated, and these roads will be part of the minimum road system. The district staffs considered permittee needs when they selected roads for the minimum road system.

Recreation

The Forest covers land in the Sangre de Cristo and Jemez mountains and surrounding foothills. Elevations range from 5,300' to 13,103 feet, with the highest ground in the Pecos Wilderness. Vegetation ranges from open grassland and piñon-juniper at the lowest elevations through Ponderosa pine up to mixed conifer at the highest elevations. Recreation resources at the lowest elevations are used most of the year, while motorized uses at the highest elevations are restricted to plowed roads, except for a minor level of snowmobile use. Recreation activities include skiing, hiking, biking, horseback riding, hunting, fishing, camping, scenic driving, four-wheel driving, and motorcycle and ATV riding. Some also consider piñon seed, firewood and landscape rock gathering as recreational activities.

Almost all the public recreational uses of the Forest depend on roads for access. In *Forest Roads: A Synthesis of Scientific Information* (June, 2000; San Dimas Technology Development Center), the authors note that the relationship between roads and recreation is complex. They note indirect evidence and admittedly incomplete research to formulate the following insights and hypotheses (p. 61):

“Roads provide corridors of access to a variety of national forest sites, settings and viewing opportunities for widely diverse users. Almost all recreation use on national forests depends to some degree on road access. . . . Less road mileage, maintenance, or both can lead to uneven shifts in recreational opportunities across different user, socioeconomic and ethnic groups who depend differently on roads for access.”

“Roads provide staging access to remote areas and wilderness, but the presence of roads can at the same time reduce opportunities for solitude and perceptions of wilderness.”

“As demand for forest recreational opportunities continues to grow. . .even a stable amount and condition of forest roads will likely result in increased congestion, lowered satisfaction, and user conflicts.”

Forest Recreation Use Statistics

The National Visitor Use Monitoring project was implemented as a response to the need to better understand the use and importance of and satisfaction with National Forest System recreation opportunities. This level of understanding is required by National Forest plans, Executive Order 12862, Setting Customer Service Standards, and implementation of the National Recreation Agenda. The Santa Fe National Forest sampling was conducted in fiscal year 2003, and the report was published in June 2004. The National Visitor Use Monitoring methodology and analysis is explained in detail in the research paper entitled: Forest Service National Visitor Use Monitoring Process: Research Method Documentation; English, Kocis, Zarnoch, and Arnold; Southern Research Station; May 2002 (<http://www.fs.fed.us/recreation/programs/nvum>). Table 7 and Table 8 derived from the National Visitor Use Monitoring report summarize use statistics derived from sample interviews and other proxy data, such as trail counters.

Table 7 shows information about the number of visits per year on the Santa Fe National Forest.

Table 7: Annual Santa Fe National Forest Recreation Use Estimate

Visit Type	Visits
Site Visits	1,522,307
National Forest Visits	1,356,154
Wilderness Area Visits	64,956

Table 8 shows information from the National Visitor Use Monitoring report summarizing use statistics for the Santa Fe National Forest. The percentages do not add to 100 percent because some visitors chose more than one primary activity.

Table 8: Santa Fe National Forest Activity Participation and Primary Activity

Activity	Percent Participating	Percent as Main Activity
Viewing Natural Features	63	8
Hiking or Walking	63	34
Relaxing	53	17
Viewing Wildlife	51	1
Driving for Pleasure	21	3

Activity	Percent Participating	Percent as Main Activity
Downhill Skiing	16	16
Picnicking	14	4
Nature Study	11	Less than ½%
Visiting Historic Sites	11	1
Fishing	9	5
Developed Camping	7	5
Primitive Camping	6	2
Gathering Forest Products	6	2
Nature Center Activities	5	Less than ½%
OHV Use	4	Less than ½%
Backpacking	3	1
Other Non-motorized	3	Less than 1%
Bicycling	2	2
Cross-country Skiing	2	2
Hunting	1	1
Horseback Riding	1	Less than 1%
Resort Use	Less than ½%	0.00
Non-motorized Water	Less than ½%	Less than ½%
Motorized Water Activities	Less than ½%	0.00
Snowmobiling	Less than ½%	0.00
Other Motorized Activity	Less than ½%	0.00

Of the categories cited in Table 8, 24.62% of interviewees cited their participation in one of the categories that specifically refer to motorized use. However, only 3.42% of interviewees reported that motorized use as their principal activity. And, as noted above, almost all national forest based recreation depends on motorized use to at least access the point of beginning. It is also appropriate to point out that, while the National Visitor Use Monitoring sampling is a peer-

reviewed, statistically sound design, it is still a sample. There may be types of use that were under- or over-represented because of the design of the sampling scheme.

On average across the Forest, off-road motorized use is still at relatively low levels. There are exceptions in specific locations. Damage from ATV and four-wheel drive vehicles has occurred in certain locations, and forest supervisor closure orders have been imposed to stop further damage. An example is the Forest area west of the highway near the villages of Medenales and Hernandez.

There is a small area on the Jemez District where off-road motorcycle trials have occurred as a permitted activity over the last several years.

Local residents have complained about abusive riding practices of ATV riders in residential and forest interface areas, especially in the Glorieta Mesa and Cañoncito areas.

Because most of the Forest has been open to cross-country travel, dispersed camping has occurred for many years in numerous locations across the Forest. The Guadalupe Canyon area on the Jemez District is a good example of the long-term dispersed camping practices, with many user-created routes accessing camping sites along the stream. Because of damage to riparian vegetation, this practice has been restricted in the last several years by the installation of buck and pole fences along the road and restricting off-road travel to just a few routes.

Local residents gathering firewood and piñon seeds have created many cross-country routes by driving off the road. These practices have been acceptable under forest-wide permitting systems over the years.

Public access for recreation and traditional forest product gathering is one of the key drivers in the route designation process. As district staff considered designation on all the route segments in their area, the following issues were considered:

- Existing route serves a needed recreational purpose;
- Route provides a quality recreational experience;
- Route assures user safety;
- Unauthorized routes eliminated unless needed to provide appropriate additional recreational opportunities, including loop opportunities;
- Ability of a route to endure and sustain increased motorized vehicle uses;
- Routes are low maintenance, with minimal erosion;
- Biological resources and critical habitat are preserved or minimally impacted; and
- Seek a balance between motorized uses and “quiet recreation” uses and avoid exacerbating user conflicts.

Soils

Roads are compacted soil that is virtually impermeable, with little or no infiltration capacity. Forest roads directly and indirectly affect the soil resource through the loss of site productivity, and act as a major contributor to soil erosion and sediment transport on forest lands.

The most obvious direct effects of forest roads upon the soil resource are on site productivity, where roads occupy formerly productive land. Forest roads can have significant effects on site productivity by removing and displacing topsoil and vegetation, altering soil properties, changing microclimate, and accelerating erosion. Forest roads alter soil physical properties including depth,

density, infiltration capacity, water holding capacity, and gas exchange rate, nutrient cycling, and microclimate. Site productivity for open roads is lost on the road surface tread, or the area occupied by the road, and diminished on cutslopes, road fills, and road treads on closed roads.

Losses of soil productivity associated with road-caused accelerated erosion are variable and depend on the location, road surface, road gradient, road drainage features, hill slope gradient, surface soil texture, and precipitation. Forest roads intercept, collect and concentrate surface and subsurface water flow; they divert, and accelerate surface water runoff from flow paths that it would otherwise take if the road were not present. This can result in indirect effects to the soil resource through erosion, the detachment and transport of sediments from the road surface, ditches, and fill slope material, and can extend downslope of the road. Across the Santa Fe National Forest there are very few mass soil movements in the form of debris slides, rotational slumps, earth flows, and debris flows associated with roads.

Virtually all forest roads contribute to soil erosion and sediment transport. However, closed roads are generally stable, often well vegetated due to the lack of vehicle traffic, and have adequate road drainage structures that minimize erosion and sediment transport. Most often, they are not as much of a problem as most of the open dirt-surfaced roads. High-clearance vehicle roads typically do not receive road maintenance due to funding limitations; therefore, they are often rutted, sometimes having blocked culverts, and often poorly defined road drainage structures, which results in higher levels of erosion and sediment delivery than closed roads. Generally, sediment generated from passenger car roads is less than that from dirt roads because they are graveled or paved, and generally receive most of the maintenance. Traffic and road maintenance have the potential to influence soil erosion and sediment transport from forest roads. Across the Santa Fe National Forest, yearly road maintenance typically occurs only on passenger car roads. Maintenance of these roads through grading and maintaining drainage structures can minimize downslope impacts to soil resources. However, maintenance operations have the potential to increase soil erosion by removing armoring layers on the road surface and removing stabilizing vegetation in ditches.

For this analysis, district staff identified roads that were considered non-essential and would not be recommended for use. Damage to soil was one of the rationales for not recommending a road. The spreadsheet in the appendix shows the roads that were not recommended due to the damage to soil rationale code.

Water Resources

Watershed resources—soil, water, and air quality—are the natural resources most affected by roads within national forest lands. While providing important access to valid use areas, roads can also negatively affect the physical, chemical and biological forest environments, particularly where they are not paved.

Physically, roads intercept and concentrate flow by collecting and transporting water from precipitation and sub-surface flow. Roads redistribute the flow and cause increased evaporation. Roads expose raw soil at cutbanks, fillslopes and all locations where topsoil is removed, and contribute aerial dispersion of dust-size particulates into air and streams. Roads intersect with and damage stream channel geomorphology except where protected by culverts or other engineered structures. Such disturbances can cause channel re-routing and headcuts. Roads can damage the sensitive structure of wet soils, especially where user-created tracks cross wetlands, cause mass soil movement such as landslides and surface erosion as a consequence of some uses.

Chemically, roads expose raw mineral soil to weathering at disturbed areas, particularly where moist. Roads deliver sediment into unprotected stream channels, which impairs water quality. When this occurs, water quality is impaired with turbidity as dissolved solids, or solids that are not dissolved but entrained in the flow or add to the substrate. New Mexico Surface Water Quality Bureau monitors water quality, and Forest staff evaluated their 303(d) list.

Biologically, roads deliver sediment to topographic lows, which is where streams are located in forested land. Fine particulates especially can diminish dissolved oxygen needed by aquatic life forms. Roads damage wetland vegetation which helps stabilize soils.

For our analysis, we considered:

- Proper gradient for safety and drainage.
- Proper drainage strategies, including crowning, bar ditches, and culvert size and placement.
- Proper road density as in location strategy for roads,
- Proper location strategies whether in valley-bottoms, mid-slope or ridge-top placement.
- Depending upon multiple resource concerns, it may or may not be optimum to place roads away from streams, and minimize stream crossings.
- Use of armoring and appropriate culvert strategies at stream crossings.
- Seasonal or permanent closure.

On the Forest, in addition to the above factors, our science-based analysis included the number of road-stream crossings on roads with operational maintenance levels 1 to 3. Currently there are 198 perennial stream crossings, 1,726 intermittent or ephemeral crossings and 16 areas where roads intersect floodplains along streams.

Wildlife

Terrestrial Habitat and Species

Terrestrial vertebrates are negatively affected by a wide variety of factors associated with roads. These factors include habitat loss, fragmentation, negative edge effects, reduced densities of snags and logs, poaching, disturbance, collisions, movement barriers, displacement or avoidance, and human interactions.

Habitat is lost during road construction when an area is converted from habitat to non-habitat. Roads and their adjacent environment qualify as a distinct habitat and have various species, populations, and landscape-scale effects. Roads create habitat edge; increased edge changes habitat in favor of species that use edges, and to the detriment of species that avoid edges or experience increased mortality near or along edges. For example, surveys of songbirds in two national forests of northern Minnesota found 24 species of birds more abundant along roads than away from them. Close to half of these species were associated with edges, including birds like crows and blue jays that use road as corridors to find food. The continuity of the road system also creates a corridor for edge-dwelling species of birds and animals to penetrate environments of continuous forest cover.

Roads also facilitate biological invasion where disturbed roadside habitats are invaded by non-native plants and animal species; dispersed by wind, water, vehicles, and other human activities.

Roads may be the first point of entry for non-native species into a new landscape, and the road can serve as a corridor for plants and animals moving farther into the landscape. Some exotic plants may then be able to move away from the roadside into adjacent patches of suitable habitat. For example cowbirds can be introduced into forested environments by roads and subsequently affect population of neo-tropical migratory birds through nest parasitism.

Because most forest roads are not designed for high-speed travel, and the speed of the traffic is directly related to the rate of mortality, direct mortality on forest roads is not usually an important consideration for large mammals. Road-avoidance behavior is characteristic of elk and other large mammals. Avoidance distances of 200 meters are common. Road usage by people and their vehicles has a significant role in determining animal road avoidance. For example in a telemetry study of black bear movements, bears crossed roads with little traffic more frequently than those with high traffic volumes. Another example is elk avoidance of large areas near roads open to traffic, with elk avoidance increasing with increasing rate of traffic.

Natural populations of terrestrial species are affected by habitat fragmentation caused by the presence of roads. Roads fragment habitat by changing landscape structure, dissecting vegetation patches, increasing the amount of edge, and decreasing interior area. Populations can be fragmented into smaller subpopulations causing instability, inbreeding, loss of genetic variability, and local population extinctions.

Forest roads pose a greater hazard to small, slow moving, migratory animals, such as amphibians and small mammals making them highly vulnerable as they cross even narrow forest roads. Reptiles seek roads for thermal cooling and heating, and in doing so these species are more vulnerable to mortality from motorized vehicles. Roads often restrict the movements of small mammals. Consequently, roads can function as barrier to population dispersal and movement of some species of small mammals.

Many species are sensitive to harassment of human presence, which are often facilitated by road access: potential reduction in productivity or displacement in population distribution or habitat use can occur. For example road associated effects would include human disturbance of nests and dens. In addition, roads facilitate poaching of large mammals such as elk and deer.

Road density is a useful index of the effect of roads on wildlife populations. For example some studies have shown that a few large areas of low road density, even in a landscape of high average road density, may be the best indicator of suitable habitat for large vertebrates. In general, in landscapes with high densities of roads, habitats are generally underused by many species that are negatively affected by roads.

Aquatic Habitat and Species

The effects of roads on aquatic habitat are documented through mechanistic effects, such as fine sediment, changes in water temperature, migration barriers, and increased fishing pressure.

Increased sediment production and fine sediment in stream gravel associated with roads have been linked to decreased fry emergence, decreased juvenile densities, loss of winter carrying capacity, and increased predation of fishes. Pools that lose volume from sediment support fewer fish and fish that reside in them may suffer higher mortality. Increased sediment reduces populations of benthic organisms by reducing interstitial spaces and flow used by many species and by reducing alga production, the primary food source of many invertebrates. Changes in

water temperature are generally associated with removing the riparian canopy. Negative effects include increased stream temperatures beyond the range of preferred rearing, increased disease susceptibility, and reduced metabolic efficiency. Culvert placement at road-stream crossings can reduce or eliminate fish passage, and road crossings are common barriers to fish. Barriers can be an advantage or disadvantage, depending on the fish species and habitat condition above and below the barrier. Roads may also increase access to streams increasing fishing pressures in some locations.

Evaluation

The process used to evaluate the impact of the current road system on terrestrial and aquatic species and their habitats focused on reducing threats to threatened, endangered, sensitive, and management indicator species or their habitats, and reducing open road density, as identified in the Forest plan. This included reducing impacts on:

- Mexican spotted owl protected activity centers
- Northern goshawk post-family fledging areas
- Jemez Mountain salamander essential habitat
- peregrine falcon areas
- Rio Grande cutthroat trout core areas
- elk crucial winter range
- elk calving areas.

Habitat maps were overlaid on the route system to evaluate the potential effect of the route on wildlife and fish resources. As a result of this assessment, routes were recommended open, not open, or seasonally closed to reduce traffic and human disturbance in the area. For example on the Cuba Ranger District FR 530E/D and 539E are not recommended open because it goes through Mexican spotted owl protected activity area and FR 117 has a seasonal closure through an elk calving area. However, some routes occur in protected activity areas, post-fledging and family areas or “essential” habitat, because they are part of the long-established system, avoid direct effects to the species, or they provide access to private inholdings. For example FR 144 has been long-established on the Jemez Ranger District and goes through a Northern goshawk post-fledging and family area and a peregrine falcon area.

Based on this assessment, routes were not recommended open or were recommended for seasonal closure because of potential impacts to terrestrial species and their habitats. These routes were considered to be “harassing” or “disrupting” threatened, endangered, sensitive, and management indicator species or their habitats. Not leaving these routes in use will directly reduce negative impacts to terrestrial species and their habitat. All of the unneeded routes will ultimately reduce habitat fragmentation, edge effects, poaching, disturbance, collisions, movement barriers, displacement or avoidance, and human interactions on the Forest as they are decommissioned and restored.

In addition, routes were not recommended for open designation because of potential effects to the riparian resources and watershed or water quality. These routes are directly and indirectly related to reducing impacts to aquatic species and their habitat. All these unneeded routes will ultimately lead to reductions in fine sediment, changes in water temperature, migration barriers, and fishing pressure on the Forest as routes are decommissioned and restored.

Open road densities were calculated for each Management area in the Forest plan. As a result many routes were not recommended open because they were not needed, duplicated or not recommended open for other resource reasons. For example, prior to this assessment Rowe Mesa on the Pecos-Las Vegas Ranger District had a road density that exceeded the Forest plan standard; as a result of this assessment the recommended open road system on Rowe Mesa meets the Forest standard. Based on this assessment all but a few management areas meet the Forest plan standard for road density. Those management areas that do not meet the standard will be address in the Proposed Action for Managing Motorized Travel on the Santa Fe. With the overall reduction of open road density on the Forest habitats will eventually become more suitable for species negatively affected by higher road densities as roads become closed and decommissioned.

Current Road Status

We further refined the existing condition defined earlier in the analysis. We wanted to determine what roads are being used and when they are being used.

We needed current information from the district staffs about what areas were closed to motorized travel, and when they were closed. We gave the district staffs the closure orders that we had at the Supervisor's Office to find if our information was complete and to have the districts supplement the information and make it current. The following questions were considered:

- What is the basis for each area listed as non-motorized and non-cross country travel in the Plan?
- Review existing closure orders dealing with motorized use. Are the closure orders correct? Are there other closure orders?
- Are there seasonal closure orders?
- Are there any other areas missing from our lists?

The district staffs answered the questions by marking up the maps.

Based on this information, we determined the current status of motorized use on the Forest. The existing condition included areas that are closed to all motorized travel, areas where cross-country travel is not allowed, areas with seasonal travel restrictions, and areas that are open to all travel. The two maps labeled Existing Condition in the appendix DVD show the existing condition of our forest with respect to motorized travel, including closed, decommissioned, and the unauthorized routes we know about. The two maps labeled Existing Direction show forest plan direction, including amendments to the Plan.

Chapter 6 — Step 5: Describing the Opportunities and Setting Priorities

The route system we will designate for public use may be a subset of the minimum road system. There are routes on the Santa Fe that are necessary for forest management, but will not be designated as open to the public. For example, the road to the Tesuque Peak radio site is not open to public vehicle traffic, but the road is necessary for permitted public agencies and private businesses to get to their equipment at the mountaintop. The road, however, is a popular hiking, biking, and cross-country skiing trail. In another case, a road on the Pecos-Las Vegas Ranger District crosses private property to access a site used by the military. The Forest Service's easement across the private property allows only administrative use and therefore it is not open to the public. The road, however, is necessary for forest management and will be part of the minimum road system.

Another example might be a road that an inholder uses for private property access. Federal law requires that Forest Service allow an inholder reasonable access to property and the inholder must accept reasonable regulation from the Forest Service.

We are recommending that all roads believed to be necessary for access to private land remain for now as system roads open to the public. Given the clear statutory direction, we chose to err on the cautious side, not wanting to risk unintended financial consequences for private landowners. We recognize the consequences of this cautious approach include:

- 1) a potentially higher road density in certain areas than is currently called for in our forest plan;
- 2) the undesirable designation of roads that access private lands, which have been historically identified as System roads, but are now recognized as causing natural resource management issues; and
- 3) showing roads open to the public whose only real purpose is to access private land.

This cautious approach does not prevent us from continuing to identify and limit appropriate access to private lands. Roads with less than satisfactory consequences will be targeted for action, with access roads that cause resource damage prioritized for elimination from the designated system, conversion to special use authorization, relocation, and closure.

As you can see, the minimum road system needs to include roads for many different uses. But we also need to consider the available funding. It is obvious from the section on recent funding that we are able to regularly maintain only the passenger car roads and a few of the high-clearance vehicle roads. There is no precise number of miles of road that we can maintain under any given future budget scenario. By law, we must maintain passenger car roads to meet Highway Safety Act requirements; and we need to maintain roads to prevent resource damage like delivering sediment into streams. However, beyond those requirements, there is a range of how well roads must be maintained and, therefore, a range of how many miles we can maintain with any given budget level. However, it is clear that we predict having less budget than would be needed to

maintain our existing system to an acceptable level; and, therefore, we need to reduce the size of our road system to be better able to maintain it.

The minimum road system is what we need to manage the Forest. This includes not only the obvious forest resource management needs like timber harvesting, firewood cutting, mining, or even Christmas tree cutting, but also includes other public uses. Road 103, for example, provides access between Cuba and Coyote. Other forest roads also provide access between communities.

Unneeded Roads

There is no correct minimum road system that is static over time. The recommended minimum road system we develop in this process will represent our best estimate of a current minimum system. Because of the nature of forest operations, the minimum road system can vary from year to year. It is difficult for us to know what routes we may need in the future. If, for example, a grazing permittee needs to use different routes in a few years that are not currently identified as part of the minimum road system, we might choose to adjust the permittee's grazing permit to allow that use and revise the minimum road system.

Federal regulations require that we identify roads that we no longer need to meet forest resource management objectives, and that should be decommissioned or considered for other uses, such as trails. We will identify all the roads that are not part of the minimum road system now as roads that we no longer need. But as the example shows above, the list of roads that we no longer need might very well include roads that will be part of the minimum road system in a few years.

It is apparent to almost everyone that there are many roads on the Forest that we no longer need. For example, our engineering roads database lists almost 4,000 roads that are less than a quarter of a mile long. Only 95 of these roads are passenger car roads. We have over 1,000 roads that are less than one-tenth of a mile long—less than 500 feet long. Approximately 60 of these roads are passenger car roads. The passenger car roads tend to be in campgrounds, picnic areas, or at trailheads, and we need these roads to operate the Forest. Most of the other short roads are closed roads or high-clearance vehicle roads. Many are probably dead end roads or unnecessary connector roads. Some roads may cause resource damage and have little recreation or other value. Some roads may be in areas where the road density is too high. Other roads may have little or no use and continuing to maintain them makes no sense.

We have evaluated roads and recommended a minimum road system. Roads not identified in our minimum road system are not needed. As mentioned above, this list of unneeded roads will likely change over time, including as a result of the route designation process we are now beginning. As our travel analysis process moves forward, we will set priorities for decommissioning roads that remain in the unneeded category and continue with our decommissioning efforts.

As our travel analysis process moves forward, we will set priorities for decommissioning roads that remain in the unneeded category and continue with our decommissioning efforts. Priority will be given to those that are creating resource impacts. Decommissioning involves taking the road off our asset inventory and can involve a range of treatments, depending on what is required to actually cause use of the road to cease. In some cases, extensive treatments are needed to return the area to natural drainage and prevent erosion; in other cases, simply barring entry will allow the road to revegetate on its own without extensive need for treatment. These roads may not be returned to service as roads without further environmental analysis and decision.

The last step in developing a minimum road system and identifying unneeded roads was to integrate the considerations we made in the individual resource by resource analysis described in the previous Step 4, Assessing the Benefits, Problems and Risks of the Existing Road System. District and Forest staff reviewed the entire engineering roads database and GIS layer and made recommendations on each road. The logic for these recommendations proceeded generally as follows:

- is the route necessary to provide private land access;
- does the route create unacceptable resource impacts;
- if resource impacts are acceptable, does the route provide access needed by the public or the Agency or its permittees;
- is the route redundant; and
- will keeping the route open to public use allow compliance with forest plan road density standards?

Additional more specific questions considered include:

- Is the route duplicated within one-half mile?
- Does the route impact wetlands or riparian areas?
- Does the route impact wildlife habitat?
- Could the route encourage encroachment into wilderness?
- Does the route cause soil erosion?
- Does the route contribute to cumulative impacts, such as many stream crossings or high route density?
- Is the route in an inventoried roadless area or forest plan management area that prohibits motorized use?
- Is this a primary access route for recreation?
- Does the route have a unique destination, such as an overlook or campsite?
- Does this route provide a unique recreation opportunity?

The recommendations resulting from this final step of integrating all the considerations can be found in the spreadsheet in the appendix labeled Recommendation Table.xls and shown on two maps labeled: Minimum Road System Eastside.pdf, Minimum Road System Westside.pdf.

There are codes used to denote the reasons for recommending designating or not designating a road available for some form of motorized use. The recommendation is found in Column B, and the codes are found in Columns G, H and I. Definitions of the codes are found at the spreadsheet tab at the bottom called Codes. The logic used by the staff specialists in forming recommendations asked whether there are resource reasons not to designate and whether there will be access or recreational value provided by designating. If there are values provided and no resource reasons not to designate, the route would likely be recommended for designation. If there are resource reasons not to designate that can not be mitigated, then the route would likely not be designated. An exception would be if the route is the only access to private land. There are many redundant routes going to virtually the same place in some locations on the Forest. In some cases, routes were identified as not needed simply because they are redundant.

Table 9 is a summary of our recommendations for different road classifications on the forest.

Table 9: Route Summary

Classification	Miles
Recommended Open Roads	2,309
Recommended Motorized Trails	247
Minimum Road System	3,737
Recommended Closed and Administrative Use Roads	1,428
Unneeded Roads	3,239

The total minimum road system and unneeded roads is 6,976 miles. Note that this is 2,052 miles more than the 4,924 miles shown in Table 2 as existing direction. Existing direction is defined as roads open to the public. The 2,052 additional miles are roads that were not open to the public, including some that have been decommissioned; and roads under other jurisdiction.

Wilderness area roads

Two roads on the Santa Fe National Forest appear on maps to enter designated Wilderness areas. Road 70, a frequently used access road for the San Pedro Parks Wilderness Area, appears on the map to be in the Wilderness for approximately 600 feet of its length. Road 6LE appears to cross a tip of the Wilderness in the Deadman Peak area. Both these roads have been in their current locations since before the creation of the Wilderness areas.

The forest surveyor did field research for both roads; he found neither road to be in the Wilderness. For Road 70, he found the original section line which forms that boundary and determined that the road is not actually in the Wilderness. He also found that Road 6LE does not enter the Wilderness.

We will correct the GIS map layer to show that the roads are not in the Wilderness, but the maps for this report continue to show the roads in the Wilderness areas.

Appendix Content

This is the appendix for the *Travel Analysis Process Report* for the Santa Fe National Forest. The documents are too large to include in the paper report. The maps (files named .pdf) are all in the Maps folder.

Document Name	Description	Size
	Existing	
Road Table.xls	List of all the roads on the Forest with data from our database	2.5MB
Existing Condition Eastside.pdf	Existing condition on the east side of the Forest	4.8 MB
Existing Direction Eastside.pdf	Existing direction on the east side of the Forest	5.8 MB
Existing Condition Westside.pdf	Existing condition on the west side of the Forest	5.8 MB
Existing Direction Westside.pdf	Existing direction on the west side of the Forest	5.7 MB
Existing Road Density.pdf	Existing road density by management area	256 KB
	Recommended	
Recommendation Table.xls	List of the roads and criteria considered	1.8 MB
Minimum Road System Eastside.pdf	Recommended minimum road system for the east side of the Forest	4.7MB
Minimum Road System Westside.pdf	Recommended minimum road system for the west side of the Forest	5.8 MB