

Social and Economic Analysis Draft Specialist Report
Draft

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INTRODUCTION

Motorized uses on the Santa Fe National Forest influence a large variety of subtle and more direct economic and social elements important to forest users and resources. As motorized use, and especially OHV use has increased so that nearly 1 in 4 Americans age 16 and older participate in OHV recreation (Cordell 2004), more research has come to focus on the consequences and effects of motorized uses in public lands. This upsurge in research intensity has illustrated a complex relationship between motorized uses, environmental factors, and social and economic values.

Affected Environment

Analysis Area

The analysis area for this project includes six of the seven counties within which Santa Fe National Forest is located, which includes Los Alamos County, Mora County, Rio Arriba County, San Miguel County, Sandoval County, and Santa Fe County. Taos County is not included in this analysis since only 7,000 acres of Taos County is located in the Santa Fe National Forest and all of this is in the Pecos Wilderness, which is inaccessible by vehicular travel. Including demographic information about Taos County might be misleading since such a small portion of the county is in the Forest, and this area does not allow any motorized use. Furthermore, the land base of Taos County is primarily made up of the Carson National Forest and assuming management of the Santa Fe National Forest are shaping economic conditions in Taos County would be misleading.

In addition to the counties discussed above, the analysis area will also include Bernalillo County; as visitor surveys show that a very high number of visitors to the Santa Fe National Forest come from the Albuquerque metro area (Kocis et al. 2004, pg. 8), which is located primarily in Bernalillo County.

Economics and Growth - Population

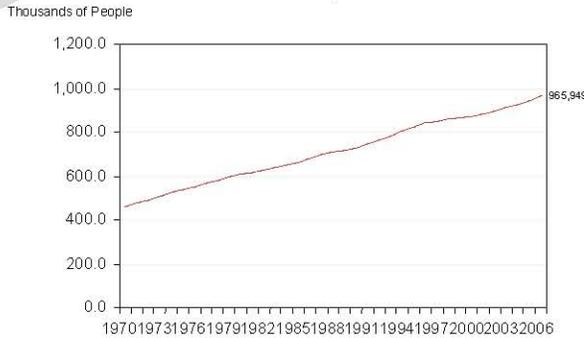


Figure XXX. Population in the analysis area since 1970 (Headwaters Economics 2009)

Population data are of key importance for understanding observed economic and social trends. Furthermore, it can help provide a good idea on the changes in demands for goods and services provided by National Forest System lands. Overall, the analysis area includes almost 1 million people, which is about 60% of the

population of New Mexico. Additionally, slightly over 60% of the population of the analysis area is located in Bernalillo County, which is home to the State's largest city – Albuquerque.

Throughout the analysis area, the population has been growing at an average annual rate at 2.1% between 1970 and 2006, outpacing both the average population growth of the state and nation (Headwaters Economics 2009). Of the seven counties, Sandoval County has had a substantially high average annual population growth rate of 5.3%, which is higher than any other county between 1970 and 2006 (Headwaters Economics 2009f). This is likely the result of the emergence of Rio Rancho as a major population center in the state. Mora County's growth rate has been the slowest at an annualized rate of 0.2% for this same time period (Headwaters Economics 2009b). The population throughout the analysis area is expected to grow by about 36% over the next 20 years, much as a result of retirees (65 and older) attracted by recreational and quality-of-life amenities who have been relocating around mountain communities in the assessment area (Ulibarri 2001).

The population within the analysis area is dominated by middle-aged age classes (35 to 54 years old); with trend data showing that the median age of residents is increasing. The largest single age category is 40 to 44 years old, which makes up 8.2% of the population. The age group that has grown the fastest as a share of the total population has been 50 to 54 years old, while many younger age categories are showing a decreasing trend as a percentage of the population total (Headwaters Economics 2009). These trends observed over the 7-county population area are well represented at each of the individual county levels as well, although some counties such as Mora and Rio Arriba County show the largest age category to be in age groups under 20 years of age (Headwaters Economics 2009b, Headwaters Economics 2009c). Overall, demographic trends in all of the individual counties are illustrating an aging population, which is gaining in individuals that make up the 50+ age classes and is decreasing in individuals less than 30 years old as a percentage of the total population (Headwaters Economics 2009).

The population in the analysis area is generally split evenly between males and females. Additionally, as the population grows it is also becoming more diverse, which doesn't mean different or more races are occurring in the population, but that there is a general trend of populations of different races and ethnicities becoming more even in number in each county and in the analysis area as a whole (Ulibarri 2001). These shifting demographics will likely have long-term impacts on Forest visitation and affect interactions between the Santa Fe National Forest and the surrounding communities.

Income, Employment, and Economic Make-up

Information on income, employment, and the economic make-up of a county can help foster an understanding of the economic and social setting that can affect or may be affected by motorized vehicle use on the Santa Fe National Forest. For example, counties that are made up of many small businesses may be more affected by the economic impacts of restricting motorized vehicle use than a county which includes a population of people employed primarily by local, state, or federal governments.

Within the analysis area, the economic data from the past several years illustrated four trends are strongly present. The first is that per capita income has steadily increased over the past several decades, usually at the same rate or slightly higher than the national average. This trend mirrors

other communities throughout the western Rocky Mountain States, which have been experiencing rapid population and economic diversification over the last 30 years (Hunter et al. 2005). The second trend most evident in the analysis area is that service-oriented industries are supplying most of the economic growth in the economy despite recent growth in construction from the housing boom from 2004-2006. Another trend is that non-labor income is the strongest contributor to new income over the past several decades within the analysis area, contributing over a third of all income in 2006. Both of these latter trends are most likely tied to the observed trend of an aging population, which compared to younger populations contributes more to the economy in areas such as medical and legal services while receiving non-labor payments from Medicaid, retirement accounts, and other sources.

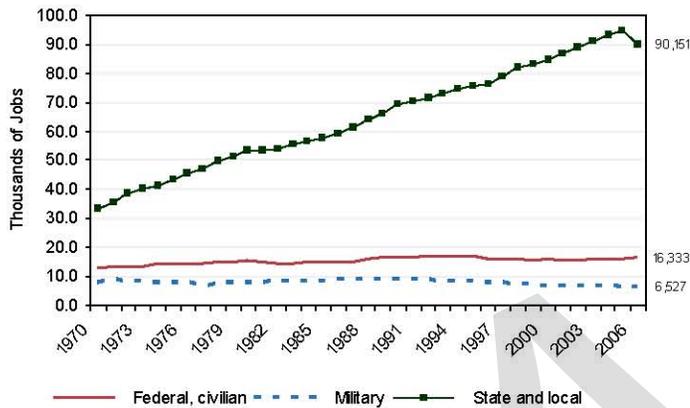


Figure XXX. Amount and type of government jobs in the analysis area (Headwaters Economics 2009)

Lastly, the analysis area as a whole has a very high percentage of government employment compared to the rest of the state and the rest of the nation. This is likely a result of the high amount of federally managed lands and Indian reservations in northern New Mexico. The Los Alamos and Sandia National Laboratories also play a large role in high amounts of government employment in this analysis area. Yet, even counties such as San Miguel County show government employment levels over twice the national average, most of which is shown resulting from state and local government jobs (Headwaters Economics 2009d). This characteristic of the analysis area would likely limit the economic impacts of changes in forest management since government jobs are not very dependent on changes in OHV use or management.

Though the above trends seem to broadly apply to all counties within the 7 county analysis area, there are some important differences at the finer individual county scale. Even though these counties may be experiencing similar trends in economic growth the economic characteristics of the counties vary greatly. For example, the difference in average per capita income between Mora and Los Alamos counties represents one of the greatest disparities in average per capita income in the nation within a single region. Furthermore, Los Alamos County has an exceedingly high rate of government employment, whereas Mora County has much higher rate of non-labor income than any other County (Headwaters Economics 2009e, Headwaters Economics 2009b).

There are also more subtle patterns within the 7-county area. Most of the employment and income growth throughout the analysis area came from Sandoval, Bernalillo, and Rio Arriba Counties. Other counties also experienced employment and income growth, but at lesser rates. All

counties show a strong trend of growth in the services industry, yet some counties such as San Miguel and Mora County show equally or almost as much growth in retail industries (Headwaters Economics 2009b, Headwaters Economics 2009d).

Lastly, all counties have shown a small trend of increasing unemployment as a result of the recent economic downturn; however, this trend has been very different than unemployment rate changes among the counties over the past ten years. From 1998-2008 the most sparsely populated counties including Rio Arriba, Mora, and San Miguel counties enjoyed steady job growth and dropping unemployment rates. In these counties, the employment growth over the past ten years is very pronounced compared to increased unemployment from the current economic slump. Other counties show mixed results over the past ten years, but all counties seem to be generally equally affected by the current economic downturn (US Bureau of Labor Statistics 2009). This is likely a result of the recent economic diversification of northern New Mexico and an aging population that is more dependent on non-labor income.

Table XXX. Unemployment rate trends in the 7-county area from 1998-2008 (% unemployed)

Area	1998	2008	2007	% change 1998-2008	% change 2007-2008
Bernalillo County	4.5	4.1	3.4	-0.4	0.7
Los Alamos County	1.9	2.8	2.1	0.9	0.7
Mora County	19.6	8.2	7.5	-11.4	0.7
Rio Arriba County	9.1	5.1	4.4	-4.0	0.7
Sandoval County	5.1	4.9	4.1	-0.2	0.8
San Miguel County	8.4	4.6	4.0	-3.8	0.6
Santa Fe County	3.6	3.5	2.8	-0.1	0.7
7-county area	7.4	4.7	4.0	-2.7	0.7

US Bureau of Labor Statistics, 2009

Availability of Motorized Recreation Opportunities in Northern New Mexico (Supply)

Much of the experience of a Forest user depends strongly on the availability of areas for their use, the extent of those areas, and how those areas are used by other people. For example, the Rubicon Trail in Northern California is possibly one of the most popular off-road trails in the world possibly because of its close proximity to major population centers such as Sacramento, which includes a population about equal to the whole of New Mexico.

The Santa Fe National Forest is located within a much less populated landscape, but one dominated by publicly-owned land. Partially as a result of this, there are numerous motorized opportunities open to the general public within the seven county area and surrounding areas, including many privately-owned businesses that cater to OHV use. Some of those areas within a few hours drive from the Santa Fe National Forest that promote or allow motorized vehicle use are included below:

Table XXX. Areas with motorized recreation opportunities near the Santa Fe National Forest (State of New Mexico 2009)

Motorized Vehicle Opportunity	Area Type	Land Ownership	Approximate Distance from SFNF
Mescalero Sands North Dune Off-Highway Vehicle Area	General OHV use and OHV events	BLM – Roswell Field Office	5 hrs
Gordy’s Hill Special Management Area	General OHV use and OHV events	BLM – Rio Puerco Field Office	2 hrs 20 min
Quebradas Backcountry Byway	High-clearance vehicles and OHVs	BLM – Rio Puerco Field Office	2 hrs 20 min
Glade Run Recreation Area	General OHV use and events	BLM – Farmington Field Office	2 hrs 10 min
Dunes Vehicle Recreation Area	General OHV use and OHV events	BLM – Farmington Field Office	2 hrs
Moriarty Motocross	General OHV use and OHV events with camping	Private – Moriarty, NM	1 hr 30 min
Mountainair Ranger District	OHV use allowed on existing roads/trails	Forest Service; Cibola NF	1 hr 30 min
NVRP Motocross	Motocross racing, grand prix, and mud bogging	Private – Socorro, NM	1 hr 30 min
Sandia Ranger District	Various – by designation	Forest Service; Cibola NF	1 hr
Mount Taylor Ranger District	OHV use allowed on existing roads/trails	Forest Service; Cibola NF	1 hr
Various BLM lands	OHV use allowed on existing roads/trails	BLM – Rio Puerco Field Office	1 hr
Sandia Motocross Park	Motocross racing and enduro motorcycle use	Private – Albuquerque, NM	1 hr
Montessa Park	OHV use, cross-country	Albuquerque Open Space	45 min
‘Rio Puerco Area’	General OHV use	Private – Rio Rancho, NM	35 min
J-Five Motocross	General OHV use	Private – San Ysidro, NM	15 min
San Ysidro Trials Bike Area	Trials bikes	BLM – Rio Puerco Field Office	10 min
Carson National Forest	OHV use allowed on existing roads/trails	Forest Service	Adjacent to SFNF boundary

Each of these areas are generally designed or designated for specific OHV opportunities. Areas such as the Dunes Vehicle Recreation Area, Montessa Park, Rio Puerco Area, Glade Run Recreation Area, Mescalero Sands, and Gordy’s Hill Special Management Area are designed for steep-slope ATV use, extreme rock crawling and/or rough terrain jeep riding. These sites range from highly signed and managed recreation sites, to fenced areas where motorized use has displaced other potential uses and some vegetation. These sites also allow for ATV use, enduro (long-distance) bikes or trials bikes use where riders find them desirable. In general, they are the most accommodating to all OHV uses. Other areas such as the San Ysidro Trials Bike area are

specifically designed for one type of OHV use, but also allow non-motorized uses such as horseback riding or mountain biking. The privately-owned NVRP Motocross, Sandia Motocross, J-five Motocross and Moriarty Motocross are meant for motocross racing by enduro motorcycles, but several of these also cater to other uses such as grand prix racing and mud bogging competitions. There are little or no other uses of these areas, as they are designed for these purposes as a financial enterprise. Lastly, and most commonly, are areas including the Cibola National Forest, Carson National Forest, BLM lands surrounding the Santa Fe National Forest, and the Quebradas Backcountry Byway. These areas allow all types of motorized use on defined trails or roads in a multiple use setting.

More information about these and other OHV opportunities on private and public lands throughout northern and central New Mexico is available in a report entitled Off-Road Vehicle Recreation in New Mexico, Appendix H: ORV Parks and Recreation Areas: Supporting Materials, located online at <http://www.emnrd.state.nm.us/main/sjm40/SJM40report-01-07-09.pdf>.

Motor vehicle use on the Santa Fe National Forest (Demand)

General Recreation Trends

Over the last several decades the number of people participating in outdoor activities has been increasing. Between 2000 - 2007 the number of people participating in outdoor activities

Table XXX. Participation and change in participation in outdoor recreation activities, 200-2007 (Cordell 2008b)

Activity	Total participants (millions), 2007	Percentage change in participants, 2000–2007
Viewing or photographing flowers and trees	118.4	25.8
Viewing or photographing natural scenery	145.5	14.1
Driving off-road	44.2	18.6
Viewing or photographing other wildlife	114.8	21.3
Viewing or photographing birds	81.1	19.3
Kayaking	12.5	63.1
Visiting water (other than ocean beach)	55.5	1.6
Backpacking	22.1	-0.6
Snowboarding	11.3	7.3
Rock climbing	8.7	-5.5
Visiting nature centers, etc.	127.4	5.0
Big-game hunting	20.2	12.8
Mountain climbing	11.8	-12.5
Visiting ocean beach	96.0	10.5
Sightseeing	113.2	4.1
Visiting wilderness	70.6	3.0

throughout the nation increased by 4.4 % (Cordell 2008b). The trend of visitor use of nature-based public lands, however, is less clear. Inconsistent count methods across time, at different scales, and not accounting for a large increase in visitors entering from adjoining private or other public lands are among some of the reasons that different studies may illustrate differing results.

Though there is a clear pattern of growth in nature-based recreation and the use of public lands after World War II, things become less clear in the last 3 decades. There was a long-term growth trend in use of public lands between the 1960s and 1980s. Beginning in the 1990s, most data show this growth slowed or leveled out in the 1990s, with peak visitation to nature-based public areas being estimated as occurring in 2000, and then decreasing through 2006 (Cordell et al. 2008c). Data from 2007 show that reported visits increased yet again up to levels observed in 2001 (Cordell et al. 2008c).

Where the science is the least clear is in the area of how *nature-based* recreation has changed in the last 10 years. Nature-based recreation is a subsector of non-motorized recreation, which includes viewing wildlife and birds, primitive camping, backpacking, and visiting Wilderness and primitive areas (Cordell 2008c). These types of activities are the least compatible with motorized recreational activities. The National Survey on Recreation and the Environment (NSRE) found that nature-based recreation activities have increased since 1994 (Cordell et al. 2008c). Other studies show that while total visitation for nature-based recreation may have been even or slightly increased overall over the last two decades, per capita nature-based recreation actually declined since 1987 (Pergams 2007). Thus, though nature-based recreation may have the same or an increased total number of people involved, the total percentage of people participating in nature-based recreation may have decreased by as much as 25% between 1981-2007 (Pergams 2007). These two studies appear to have contradictory conclusions about trends in nature-based recreation in the last decade. It is important to realize, however, that the studies include different research methods (the NSRE is based on survey data and the Pergams study uses National Park Service visitation data) and both express their results differently (total number of persons versus per capita numbers).

Overall the data on recreation trends tell us that the total amount of outdoor recreation has increased through 2007, but that *nature-based* recreational activities may have actually decreased when looking at a per capita basis. This data illustrates two distinct, yet opposite trends that are occurring at the national scale. There is no comparable data source to determine whether or not these trends are occurring at the local scale of the Santa Fe National Forest or if they are not.

While the statistics may present seemingly contradictory conclusions, it is clear that public lands visitation is continuing to increase, but the activities people are choosing to participate in on public lands is changing from what was observed in past decades. In particular viewing, studying, and photographing nature, and in particular wildlife, have grown strongly since 1994 (Cordell et al. 2008c). Other activities such as walking, family gathering outdoors, gathering mushrooms and berries, kayaking, snowboarding, or visiting water also increased in the total number of people participating between 2000-2007 (Cordell et al. 2009). Driving off-road has also grown during the 2000-2007 period. According to various survey-based studies, the growth in off-road driving is only behind the growth in photographing nature and kayaking in magnitude. Total participation in other activities has clearly decreased, such as mountain climbing and rock climbing. Mountain biking, backpacking, visiting historic sites, and downhill skiing has decreased in the percentage of participants as well (Cordell et al. 2009).

From 1982 to 2000-2001, driving motor vehicles 'off-road' became one of the fastest growing categories of outdoor activity in the country (Cordell et al. 2009). The percentage of people age

16 and older who said they participated in OHV recreation increased from 17.5% in 1999-2000 to a peak of 23.2% in fall 2002 through summer 2003 (Cordell et al. 2008). After this peak, the percentage of the population participating in OHV recreation decreased somewhat to 19.2% in 2005-2007. The gain in annual OHV days from 2001 to 2007 represents a 42% increase overall. While the national OHV participation rate appears to have peaked in 2003, the amount of OHV activity per participant has continued to increase, slightly overwhelming the trend of decreasing participants (Cordell et al. 2008).

Hispanic participation in OHV use grew at the fastest rate compared to all other racial or ethnicity groups (more than 160%) and American Indians had a higher participation rate (27%) than any other racial or ethnic group between 1999 - 2007. This is important information for the analysis of recreation in this analysis as Hispanic and Native American populations are represented at a much higher percentage in northern New Mexico than in other parts of the country. In addition, out of all regions in the country, the West had the highest OHV participation rate (28%). This was especially true for young people under the age of 30, females, and Hispanics all of which showed much higher OHV participation rates in the West than in other regions of the country (Cordell et al. 2008).

Recreation demand on the Santa Fe National Forest

For most Forest visitors the use of a motor vehicle is an integral part of their time spent on the Santa Fe National Forest. Access to and within the Forest will likely largely define the location, experience, and opportunities for those who visit the Forest. Almost all activities one could pursue on a National Forest involve driving on Forest roads. Whether it is to access a trailhead or ski area, collect fuelwood, or for the pleasure of driving in and of itself, motor vehicle use generally has a major influence on where and how the public uses public land. Different uses, however, vary in their dependence on forest roads and differ in the type of route being used. For example, OHV use depends not only on major roads to access trailheads, but also can include the use of many unmaintained routes, trails, and often open country where there is no established route. In fact, studies show that common OHV users preferences include less-populated routes with challenging terrain (Albritton and Stein 2007; Snyder et al. 2008), which also means that these routes are the less maintained level 2 and level 1 roads or unauthorized trails.

As a result of the different types of uses on the National Forest, demand for motor vehicle use can be categorized between those uses that almost entirely depend on main Forest routes and those activities that are more likely to depend on back-country (less maintained level 2 and level 1 routes). For the purposes of this analysis it is assumed that activities including fishing, camping, hiking, viewing natural features or historic and prehistoric sites, and other common recreational activities would primarily depend on major Forest roads for access to trailheads, fishing access sites, campgrounds, campsites, and other developed and undeveloped recreational opportunities. It is assumed that OHV use primarily depends on less maintained roads and unofficial and official trails, but also uses main Forest roads to access these areas. Activities such as driving for pleasure, relaxing, hunting, fuelwood collection, and others are not as easy to categorize as they are highly dependent on an individual's preferences and are assumed to generally use both main Forest routes and back-country routes.

According to the 2004 National Visitor Use Monitoring (NVUM) Report for the Santa Fe National Forest, less than 1% of those who come to the Santa Fe National Forest do so for the primary purpose of OHV use. Another 3% come to the Santa Fe National Forest for driving for pleasure as their main activity. This is compared to 34% of people who come to the Forest for hiking as their primary activity and 17% who come to the Forest for relaxing - the two activities that have the highest reported use as the primary activity. An additional 3.5% of respondents said

that they participate in OHV riding and 21% said they participate in driving for pleasure, though these were not cited as their primary activities.

More recent data from a 2006 report focusing on the attitudes, beliefs, and values (ABV) of Forest users and nearby residents found different results for reported activities by Forest users. In general, this survey found a higher percentage of Forest users or residents participate in OHV activity or driving for pleasure, but found that hiking was still generally one of the main activities of visitors to the Santa Fe National Forest. Also different from the NVUM dataset, the ABV survey showed a very high number of participants who participated in viewing historic or prehistoric sites or viewing natural features.

Since the ABV survey collected information from Forest users and residents throughout the region, this information can be portrayed at different scales including the 7-county analysis area, respondents from residents within the boundaries of the Santa Fe National Forest, and from those who identified the Santa Fe National Forest as a primary Forest of interest to them.

Table XXX. Percentages of those who reported participating in Forest activities, at different survey scales (ABV data).

Activity	Residents living within Forest boundaries	Residents in the 7-county area	Those identifying Santa Fe National Forest as their preferred forest
Backpacking	23.64%	15.13%	21.11%
OHV Use	27.27%	15.91%	23.55%
Driving for Pleasure	67.27%	59.22%	66.98%
Snowmobiling	3.64%	0.00%	2.84%
Other Non-motorized	21.82%	11.88%	15.16%
Hiking / Walking	72.73%	56.49%	69.96%
Horseback Riding	18.18%	7.86%	10.69%
Bicycling	20.00%	15.91%	18.81%
Cross-country Skiing	25.45%	8.31%	12.86%
Fishing	40.00%	32.92%	45.20%
Hunting	16.36%	12.08%	15.83%
Viewing Wildlife	58.18%	42.86%	53.45%

Motorized Water Activities	7.27%	11.10%	16.51%
Non-motorized Water	20.00%	8.77%	14.75%
Downhill Skiing	32.73%	14.03%	19.08%
Developed Camping	36.36%	36.75%	52.64%
Primitive Camping	32.73%	25.65%	37.21%

Results of the survey show that residents located within the Santa Fe National Forest tend to participate more in motorized recreational activities and more non-motorized recreational activities than those from the 7-county area or those who identified the Forest as one of their primary forests. The exceptions to this are activities that include motorized water play or camping. This makes sense, since those living within the Santa Fe National Forest have the most opportunity to recreate on its lands, and generally choose not to camp since they live there. Those who responded in the 7-county area responded as participating in lower numbers in almost all activities than the other two groups, and did report lower participation in all activities when compared to those who identified that Forest as their preferred forest. This also seems reasonable as those who identified the Santa Fe National Forest as their preferred forest are more likely to recreate there, whereas those within the 7-county area may be less likely to recreate on the Santa Fe National Forest or on public lands.

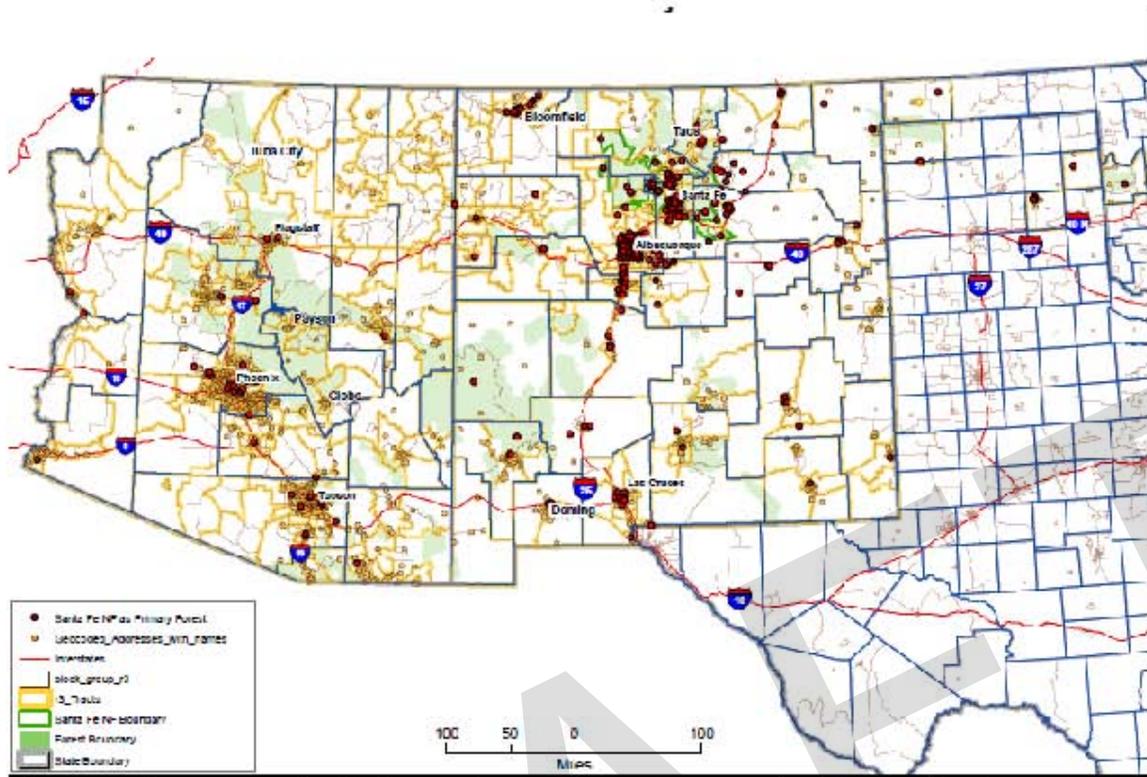


Figure xxx. Locations of the 739 respondents to the ABV survey that identified the Santa Fe National Forest as one of their primary forests

Table XXX. Percentages of survey respondents that participate in the stated Forest activity on the Santa Fe National Forest

Activity	7-county area	Residents	Priority Forest
Driving for pleasure	59	67	67
OHV use	16	27	24
Hiking or waling trails	57	73	70
Viewing nature or historic or prehistoric sites*	48	60	60

* Since the survey included several categories of viewing historic sites, prehistoric, sites, nature trails, natural features, etc. only the highest percentage for a 'viewing' category was included in this table.

The NVUM and ABV data result in very different conclusions for motor vehicle use estimates on the Santa Fe National Forest. The primary objective of the NVUM program is to develop statistically reliable estimates of national forest recreation visitation (English et al. 2002). The NVUM dataset is a reliable and helpful source of visitor information, but as with all survey data the methodology can strongly influence results. The NVUM program uses a sampling protocol that includes both traffic counts and visitor surveys conducted at specific locations and days within the national forest. The locations and days for NVUM sampling are selected via a stratified random sample where potential interview locations are stratified by site type and potential interview days are stratified by expected level of exiting recreation traffic. On NVUM sample

days, national forest recreation visitors are selected at random to complete onsite visitor questionnaires (English et al. 2002).

The ABV dataset used in this analysis is from un-weighted data from the general population survey "Managing National Forests and Grasslands in the Southwest: What Do You Think?". The survey was conducted during a four month period in 2007 (July to October) and achieved a response rate of 21.5%, based on an initial mailing of 37,804 surveys. The study area was the Region 3 of the US Forest Service, which includes Arizona, New Mexico and parts of Oklahoma and Texas (McCullum et al. 2008).

Generally, the ABV data show higher percentages for almost all activities compared to the NVUM data. Also, the ABV dataset lacks the specificity of NVUM which provides information on primary activity versus other activities a Forest user may participate in. Thus, only the latter category can be compared between both data sources. The results may differ so drastically with regard to OHV use for several reasons attributed to their differing methodologies.

Since the NVUM dataset was collected on-site near or in the Forest and in-person rather than a mailed survey, the NVUM dataset presents results from all Forest visitors, not just those within the sampled region (AZ, NM, TX, OK) used by ABV. Additionally, the NVUM dataset is more likely to accurately capture those activities that Forest users actually participate in rather than activities that they *might* choose to participate in at some time in the future.

Overall, the ABV dataset likely overestimates OHV use as an estimate of the true percentage of all Forest visitors participating in this activity. The main reasons for this is that the ABV dataset only focuses on those located near the Forest (AZ, NM, OK, TX), which are more likely to participate in activities that require hauling an OHV, or providing other equipment. Those from other parts of the nation that visit the Santa Fe National Forest are less likely to bring their OHVs. Since the survey didn't include states outside of the southwest their non-participation in this activity was not included. Also, the ABV sample over-represents higher income households, under-represents lower income households, over-represents males (68%) and under-represents females (32%) (Begay 2009). Here again, the ABV survey included a higher number of the general population more likely to choose OHV use as an activity they would participate in (Cordell et al. 2008), thus likely resulting in an overestimate in OHV use on the Santa Fe National Forest.

The site-specific data collection methodology used for NVUM also has its drawbacks. The NVUM methodology often depends on locating data collection points at major access points to the Forest such as main intersections or developed recreational facilities (English et al. 2002). This means that the survey may be more likely to collect data from Forest visitors who use these sites more often or visitors that do not have or know of less used access points. For example, the NVUM dataset is very unlikely to include information from local landowners or local residents who access the Forest from their private lands or from lesser known or accessible access points. Also, since local residents are more likely to participate in a wider variety of recreational and other activities based on their familiarity and knowledge of the Forest, the NVUM method is likely to show a lesser amount of use in general for most if not all activities. Since Forest visitors from outside the local area are more likely to use developed sites and choose certain activities requiring less knowledge of the Forest, it makes sense that the NVUM data may show higher percentages of users who depend on developed sites or enjoy hiking as their primary activity versus showing high percentages of activities such as ATV use or fuel wood collection which requires knowledge of unmarked unadvertised routes or requires transportation of heavy materials.

Using both of the data sources to establish a range of potential Forest use estimates, one can conclude that from 4% to slightly more than 25% of Forest users use OHVs on Santa Fe National Forest lands, and that somewhere between 20% - 67% of Forest users choose to drive on Forest roads for recreational purposes. These ranges to estimate motor vehicle recreation use on the Santa Fe National Forest are likely accurate because they reflect similar numbers estimated through different methods on surrounding public lands. For example, the estimated amount visitors to Bureau of Land Management lands in New Mexico found that approximately 22% of visitors to BLM managed lands in New Mexico participated in motorized recreation (State of New Mexico 2008).

Data showing that between 4% – 25% of Santa Fe National Forest visitors use OHVs tell us that it is an activity participated in by a minority of Forest users. Using data available at larger and smaller scales we can infer that generally the OHV use on the Forest is generally practiced by a minority of OHV users who regularly participate in this activity. Furthermore we can conclude that the Santa Fe National Forest is clearly not known or used as an OHV destination other than by locals familiar with the area. The NVUM and ABV numbers point to the fact that the Santa Fe National Forest provides an important role as a place to relax and “get away to nature” for most Forest visitors, including some of those that may use motor vehicles or OHVs. Other information available through the NVUM report shows that there is little or no demand for additional OHV opportunities on the Forest. This is likely because under current conditions the entire Forest is open to OHV use except for closure areas and designated wilderness areas.

Another example illustrating that the Santa Fe National Forest is generally not known or used as a major OHV destination is that there is a general lack of businesses tied to OHV use on the Forest. For example, between 2008-2009 a company set-up to provide dirt bike rentals and tours on the Santa Fe National Forest was unable to survive, because despite all efforts to attract business there was no more demand than approximately 15 customers for the entire year (Jaramillo 2009).

Data collected from the western United States on ATV and motorbike registrations show that New Mexico has one of the fewest amounts of registered OHV users than any other state in the West (New York Times 2007); however, survey data illustrate the state has an average amount of residents who reported participating in motorized recreation compared to other mountain west states and the highest percentage in the southwest region (Cordell et al. 2008). According to data from 2006, states such as California and Utah have approximately 52 and 21 times the amount of registered ATVs and motorbikes compared to New Mexico, respectively (New York Times 2007). Yet, the number of New Mexican residents 16 and older reporting they participate in motorized recreation is approximately 27.3%, which is only slightly lower than the average of all the mountain states in the West and is the highest amount of all of the southwestern states of Arizona, Texas, and Oklahoma (Cordell et al. 2008).

At the smaller scale, data from infrared trail counters clearly show that current use is regular, but at a relatively low level. Samples of OHV use in the Cochiti Mesa area of the Jemez Mountains in May 2009 show that some of the most commented on motorized trails receive an average daily use of below 2 riders during weekdays and an average of between 3-7 riders on weekends, with a maximum measured value of 16 riders recorded in a day (USDA 2009, USDA 2009b). Though this number illustrates some level of regular use, it is nowhere near the average 164 riders per day that is observed on a nationally known OHV trail such as the Paiute Trail in Utah.

Based on this data from a variety of sources measured at different scales, it appears that New Mexico generally has an equal or slightly higher percent of the population aged 16 and older that

participates in motorized recreation compared to other areas in the West. Additionally, motorized recreation on the forest tends to occur at a low frequency, but this use is regular. Lastly, the large majority of OHV use on the Forest is a result of local use by regular OHV users that are very familiar with existing trails and riding areas. This inference from the data is also supported by the comments received during the scoping process for the Santa Fe National Forest Travel Management Project.

Concerns, Measures, and Methodology

Concern 1: The designation of routes and trails could decrease the amount of motorized recreation on the Forest, resulting in negative economic impacts.

Measure: Number of jobs and labor income resulting from motorized recreation to the six county study area (excluding Bernalillo County).

Rationale: There was concern expressed during scoping that changes in motor vehicle access could adversely affect local businesses, thus impacting local communities. More or less motorized use can be estimated based on the miles of routes designated in each alternative. This estimated change in motorized use can then be used as an input in an economic model to determine how it effects economic contributions from vehicular uses on the Santa Fe National Forest. In this analysis, the IMPact Analysis for PLANning Professional Version 2.0 (IMPLAN) model is used in conjunction with Travel Management Economic Contribution Application (TMECA) to determine the economic impacts of route designations in each alternative. This model can provide information on direct, indirect, and induced economic impacts.

Assumptions:

- For the purposes of this analysis it is assumed that more miles of motorized designations will mean more motorized use. Since the economic analysis model used depends on the amount of Forest visitors by activity type, it is necessary to assume that visitation would change by each alternative to estimate how those changes may affect the surrounding economy of local communities. This assumption comes from the fact that the more motorized opportunities there are via the designation of more miles of routes and trails, the more likely it will be for a motor vehicle user to use a motor vehicle on the Santa Fe National Forest as the primary activity of their visit. The opposite assumption is also used – the fewer roads and trails designated for motor vehicle use, the fewer people will come to the Santa Fe National Forest for motor vehicle use as their primary activity. These assumptions are supported in a 2008 study from Utah State University, which estimated that in some instance land use restrictions or management changes on OHV recreation could decrease the number of trips by over 20% or increase the number of trips by over 40% (Jakus et al. 2008).
 - For Alternative 1, it is assumed that levels motorized recreation and non-motorized recreation do not change as there would be no change in current management.
 - For Alternative 2, which reduces motorized roads and trails by 53%, it is assumed that levels of motorized recreation could decrease by 10% - 25% and levels of non-motorized recreation would stay approximately the same. The reason that it is assumed motorized recreation would not decrease at the same level as route availability is that those routes that are designated for motorized use in this alternative are designated in such a way as to maintain

- a motorized system of connecting routes. Many of those routes not designated were redundant or unnecessary for a connected motorized system.
- For Alternative 3, which reduces motorized roads and trails by almost 66% it is assumed that motorized recreation could decrease by 10% - 50% and levels of non-motorized recreation would stay approximately the same. The reason that motorized recreation could decrease to such an extent in this alternative is because although the total amount of routes decreases by only 13% more than Alternative 2, it decreases the amount of motorized trails by approximately 80%. As a result there are few connected motorized trail systems ('loops') of adequate length for a preferred motorized recreational experience.
 - For Alternative 4, which reduces the amount of motorized routes by approximately 45%, it is assumed that motorized recreation could decrease 0-10%, but non-motorized recreation could decrease as well by 0% - 5% of current estimates. The reason for this is that even though the total amount of motorized routes is decreasing by 45% under this alternative, the total amount of motorized trails is actually increasing by 36%. Additionally, many of the motorized trails under this alternative would be in previously non-motorized areas primarily used for hiking or horseback riding, such as the Medio Dia Trail (Forest Trail 424). As a result, there could be a negative effect on non-motorized users in these areas, while at the same time a decrease in motorized use across the Forest as well.
 - For Alternative 5, which decreases the amount of motorized routes by approximately 54% it is assumed that non-motorized recreation would stay approximately the same, but motorized use would decrease up to 25%. Though it is possible that motorized use may not decrease at all, or could decrease a small amount; assuming a range of decrease in motorized use between 0% - 25% would provide the most conservative assumption for assessing potential economic impacts. The reason this alternative is expected to have a smaller impact on motorized use than other alternatives is that though there is a large decrease in the number of roads available for motorized use, the number of motorized trails in this alternative is decreased by less than 10%. More importantly, this alternative separates motorized and non-motorized uses by concentrating motorized roads and trails in specific areas away from non-motorized areas. As a result, though there may be an overall decrease in the number of available routes for motorized use, those routes designated in this alternative would be more accessible and have greater connectivity.

Methods:

The IMpact Analysis for PLANning Professional Version 2.0 (IMPLAN) input-output modeling system and 2002 IMPLAN data (the most recent data available) were used to develop the input-output model for this analysis (IMPLAN Professional 2004). IMPLAN translates changes in final demand for goods and services into resulting changes in economic effects, such as labor income and employment of the affected area's economy. For the economic impact area, employment and labor income estimates that were attributable to current motorized and non-motorized activities for the Santa Fe National Forest were generated.

The IMPLAN model is valuable because it captures the direct, indirect, and induced effects resulting from a change in demand. IMPLAN is an input-output model, which depends on the

inputs of spending profiles and industry sector data. It then outputs a ‘response coefficient’, which captures the employment response from the effect of a specified demand for goods or services. For example, in the case of this analysis, more trails and roads is assumed to result in slightly more motorized use. More motorized use on the Forest could then lead to direct effects such as more hotel stays, indirect effects such as more jobs to clean hotel rooms, and induced effects such as more spending in local restaurants and hardware stores because of more local employment. In this case the response coefficient would represent the employment response for every 1,000 trips for motorized use on the Forest.

Since IMPLAN is an input-output model, it is very important to discuss the inputs used in the model. There are two inputs of key importance:

- The ‘demand’, or in this case, the amount of Forest visitors participating in a specific activity (e.g. motorized use or hiking)

This input has the most uncertainty associated with it. Generally, the amount of Forest visitors participating in a specific activity is based on National Visitor Use Monitoring (NVUM) data and Attitude, Belief, Value survey (ABV) data. The model was run several times with different inputs relative to the range of data from both the ABV and NVUM data.

If the ABV dataset is used based on all of the respondents who identified the Santa Fe as a primary forest, the results are different than the NVUM data. It was deemed most appropriate to use ABV data provided by those survey respondents who identified the Santa Fe National Forest as their preferred forest because this scale represented a higher amount of recreation activity and included a large amount of non-resident, non-local recreationists, which have the greatest impact on local economies (White and Stynes 2008). Generally, the ABV dataset shows much higher amounts of all activities by Forest users, and results in more than 5 times the total employment and labor income from forest visitation. One reason for this is that the NVUM economic impact analysis is based on primary activity, which means that only one activity can be identified per respondent, whereas the ABV dataset identifies all activities each respondent reports to have participated or any activity in which the respondent may participate. As a result, the economic impact for a user that identified more than one activity would result in higher employment and labor income because in essence, each activity is being counted as a separate trip to the Forest. More information on use of the ABV data with the TMECA model is included in the project record (see project record).

These inconsistencies in the NVUM and ABV datasets mean that the IMPLAN/TMECA models are not directly comparable for number of jobs or amount of labor income. It is not useful to use absolute numbers for the employment and labor income for the ABV data; however, the percentage of the total employment and labor income resulting from all of these activities on the Forest can be useful to determine how each activity may impact employment and labor compared to the other activities. The percentages can also be used to normalize the data so that they can be compared as numbers on the same scale. Using this information in addition to the results of the IMPLAN/TMECA model runs can help provide a range of potential economic impacts of each activity.

Also of importance is that NVUM data collection procedures were specifically designed to link forest visits by trip-type and recreation activity to economic impacts by collecting information specific to all of these attributes, whereas the ABV data collection procedures were not. Estimates of the spending of national forest recreation visitors

provide the basis for estimating the economic contributions of forest recreation to local economies. While the NVUM dataset provides a robust statistical framework for developing an estimate of the average spending for each trip-type (day use or overnight) and recreation activity (OHV use, hiking, skiing, etc.), the ABV dataset was not designed with this intent.

Though the ABV dataset does include information on recreation activity, it does not include information on primary recreation activity or trip-type. This is important because analysis of spending averages illustrates that parties on overnight trips spend about four times as much as parties on day trips (White and Stynes 2008). Though data show that those who live closer to the National Forest are less likely to participate in overnight trips and the ABV dataset does include responses from only those within the region, for the purposes of this analysis it is necessary to assume that trip-type is the same for respondents to the NVUM and ABV surveys.

To analyze the effects of each alternative, an assumption must first be made on how each alternative would affect Forest visitation for each activity. Unfortunately, there is currently no valid process or information on how to accurately assess how a decision to designate roads and trails would change how many visitors participate in various Forest activities (Winter 2008). Thus, a range of potential estimates of change of motorized use was run through several IMPLAN/TMECA model runs to determine the range of potential economic impacts resulting from different potential results of a travel management decision.

- Industry sector data

Information on the businesses throughout the study area is determined through data available from the Bureau of the Census based on 2002 Economic Census Subject Series and Geographic Area Series reports. This dataset includes information from 509 sectors on industry and product shipments, total employment, number of production workers, and capital expenditures, and import and export data derived from the merchandise trade statistics.

This is considered the best available industry sector data available, yet as with all large-scale data collection this dataset has its inherent limitations and potential inaccuracies. There could be errors attributed to many sources: inability to identify all cases in the actual universe; definition and classification difficulties; differences in the interpretation of questions; errors in recording or coding the data obtained; and other errors of collection, response, coverage, processing, and estimation for missing or misreported data. One important point is that businesses self report what sector they are in. This is another type of definition and classification error that can often affect businesses that perform more than one function and have to choose one sector for reporting purposes. In addition to the potential errors above, data from the Construction sector are subject to sampling errors, since these data originate from a survey that included all large employers and a sample of the smaller ones. Also, it should be noted that the industry dataset only includes information for established businesses and does not include information on self-employed individuals with no employees.

In this analysis, the Travel Management Economic Contribution Application (TMECA) is used in addition to the IMPLAN model to interpret the results of the model so they can be more readily understood. The TMECA application incorporates spending profile data from

NVUM to illustrate the impact of one activity on the entire local economy. TMECA helps interpret visitor use of the Forest into labor income and number of jobs in the local economy.

The results of TMECA can be delineated between three categories according to activity data collected via the NVUM and ABV surveys: motorized recreation, non-motorized recreation, and other recreation; to determine how each of these recreation types contributes to economic impacts. The latter category may or may not include the use of a motor vehicle, but is not dependent on it. Each category of recreation is made up of several specific recreation activities as illustrated in the table below:

Table xxx. Activities included in each recreation category

Activity Category	Activity
Motorized Recreation	OHV use
	Driving for pleasure
Non-motorized Recreation	Hiking/walking
	Backpacking
	Horseback riding
	Bicycling
	Cross-country skiing
	Other non-motorized
Other Recreation	Developed camping
	Primitive camping
	Picnicking
	Visiting historic sites
	Relaxing
	Non-motorized water
	Downhill skiing
	Gathering forest products
No activity reported	

The expenditure and use information collected by the NVUM survey are crucial elements in the economic analysis. As reported earlier, the NVUM survey collects use and expenditure information for various activity types. The expenditure information is collected by eight spending categories (Stynes and White 2008). The reported spending for each of the spending categories is allocated to the appropriate industry within the IMPLAN model.

One very important limitation resulting from the use of the NVUM expenditure profile data is that the survey relies heavily on differences between local and non-local spending to illustrate how different Forest users spend money while participating in different activities. The survey collected data using a definition of 'local' to mean survey participants living in an area with a zip code within 50 miles of the data collection point. The 50 miles is measured from the center point of the areas defined by the zip code. As a result, information collected from participants from Bernalillo County is not considered 'local' in the expenditure profiles. Since the IMPLAN/TMECA model is meant to provide information on impacts to the 'local' economy, Bernalillo County was excluded from the affected area of analyzed by these models.

The facility of using both local and non-local spending profile information also brings up another issue, which is that 'local' spending is already money coming from the local

economy and is being analyzed as money contributing to the local economy. Some may argue that since the money is already in the local economy, it can't be construed as resulting in an impact on the local economy when the model determines it was spent there. Although local spending may not actually augment the local economy, it is an important part of the economy as this money can always be spent in other outside areas resulting in less money to the local economy. Additionally, the use of local spending in the impact analysis helps measure the impact of recreation choices of local residents. Without it, only the recreation choices of non-local residents would be considered despite the fact local residents are more likely to use the Forest more regularly and extensively. As a result, this analysis includes local spending in the impact analysis.

Another important limitation of the IMPLAN/TMECA modeling exercise to determine economic impacts is that these models only account for economic impacts that can be quantified in the existing market economy. These models do not account for non-market benefits resulting from non-recreational Forest resources such as clean water, clean air, wildlife, or other resources that benefit society directly or indirectly. This is a crucial point, because there is clear evidence that motorized recreation and even nature-based recreation can cause impacts to Forest resources (Cole 1986; Ouren et al. 2007) that may decrease non-market benefits, or ecological services, that are not accounted for in the market economy by number of jobs or amount of labor income. Non-market valuation is an evolving field. Though there have been extensive studies to translate non-market values into a dollar amount for a specific resource or ecosystem function, these studies are not transferable and cannot be used to help value the non-market benefits of other items. As a result, non-market valuation is not included in this analysis.

Lastly, the IMPLAN and TMECA models do not account for the displacement of or potential increase of non-motorized recreation that could result from expanding or restricting motorized use on the Forest. The large majority of research on the social impacts of OHV use shows that the impacts between OHV users and other recreationists (including other motorized uses) are asymmetric; meaning that OHV users affect other recreationists more than they are affected by other recreationists and often this leads to displacement of non-motorized recreationists (Stokowski and LaPointe 2000; McCay and Moeller 1976). There is no information on the size of this displacement effect. Also, since it is unclear whether displaced recreationists stop participating in the non-motorized activity altogether, move to another area outside of the Santa Fe National Forest, or move to another area within the Santa Fe National Forest this displacement effect is not accounted for in the economic impact modeling.

Concern 2: The designation of routes for motorized use in the Santa Fe National Forest could result in undesirable noise, affecting those who visit the National Forest and surrounding areas.

Measure: Noise will be discussed qualitatively by frequency, duration, magnitude, and appropriateness.

Rationale: Noise was identified several times in comments received as a factor in detracting from non-motorized experiences. Executive Order 11644, signed in 1972, states that off-road vehicle areas and trails should be designated in such a manner, "...taking into account noise and other factors."

Assumptions:

- Routes designated as OHV trails or designated for all vehicles would be louder than routes designated for highway legal vehicles only. Motorcycles and ATVs, which drive on trails or roads designated for all vehicles, are louder than passenger cars and trucks (Harrison et al. 1980).
- OHV trails would produce the same amount of noise as routes designated for all vehicles since OHVs may ride on routes designated for all vehicles.

Methods: Noise is defined as any unwanted sound. For this reason, much of what may be defined as noise depends on one's perception – both the perception to discern the sound as well as the perception of the sound's discordance with the environment. As a result of the many potential dimensions of both sound propagation and perception noise is addressed by considering the following characteristics of sound:

- Frequency – How often a sound is perceived
- Duration – length of time for which a sound is perceived
- Magnitude – the level at which a sound is perceived; usually described in A-weighted decibels (dBA)
- Appropriateness – the acceptability of a sound given the setting

Noise is assessed by discussing each of the characteristics of a sound or sounds, including: frequency, duration, magnitude, and appropriateness. Frequency is assessed by discussing traffic counts as measured by traffic counters on various routes on the Santa Fe National Forest. Duration is estimated based on travel time, and the associated sound resulting from this motorized travel. Magnitude is estimated using the SPreAD-GIS Model.

The SPreAD (System for the Prediction of Acoustic Detectability)-GIS Model is one method used to determine sound levels resulting from motorized use. This model is specifically designed to assess noise impacts in a wildland setting by using a series of calculations to account for environmental factors affecting sound in a spatially explicit setting. Though the original SPreAD model was developed in 1980 by the Forest Service to estimate sound levels at a particular point from a specific source, the SPreAD-GIS model is currently in development and despite several attempts model runs (Dechter 2009) do not match those described in the user's manual (Reed et al. 2009). Thus, the model results are used in this analysis to discuss magnitude of sound from a source by informing how noise may propagate across a landscape.

The SPreAD-GIS model assumes noise propagates from one or several point sources and runs a series of calculations. Each set of calculations, or module, is progressive; meaning it depends on the outputs from the previous steps. These modules calculate the spread of sound based on distance, atmospheric absorption (as based on air temperature, humidity, and elevation), absorption by vegetation, wind, terrain, and difference between introduced noise and ambient levels.

The output of the SPreAD-GIS model is a spatial pattern of potential noise disturbances around the source of the sound for a single snapshot in time. Since factors such as wind, temperature, humidity, and even vegetation may vary the results of the model are limited to estimating sound impacts only under the conditions defined in the model. Thus, though the model cannot be used to give a clear and definitive statement about sound from a source such as OHV use, it can be used to estimate impacts based on sound by illustrating where potential sound levels would be greatest from motorized use and at what levels they could occur.

The model can be used with sound sources identified as point on the landscape or a series of points on the landscape to approximate a route. For this analysis, a series of points, representing a travel route was used to model sound sources such as OHV trails or roads included in one or more alternatives. Due to the thousands of miles of roads present on the Forest, representative routes from across the forest were chosen to model noise levels. Routes were chosen based on comments received during the scoping process and to illustrate the differences in how sound propagates across different terrain types found across the Forest. Default characteristics were used to define the sound sources such as A-weighted decibel (dBA) levels for automobiles, ATVs, and motorcycles. Existing corporate GIS data layers were used for vegetation cover and terrain. Weather conditions were based on a clear, calm summer day: 85 degrees, 15-20% humidity, 8 mph southwest prevailing winds.

Another important point is that this model includes a series of complex calculations to identify sound levels on the landscape and compares them to ambient sound levels at that location to identify sound impacts, but it does not identify the ‘effects of noise’ resulting from sounds in the environment. The effects of noise depend on the physiological characteristics of the listener, how well they can hear, as well as what they think constitutes a disturbance.

More information on how the model works or how to use this model is available from the SPreAD-GIS model handbook and information on the model runs available in the project record (Reed et al. 2009).

The last characteristic of noise, appropriateness, is analyzed by assessing how sound sources from motorized vehicles may occur in different identified classes of the Recreation Opportunity Spectrum. The Santa Fe National Forest Plan specifically addresses the issue of sound through the Recreation Opportunity Spectrum (ROS).

Discussion:

On the Santa Fe National Forest increasing numbers of people are seeking outdoor recreation. As a result, Forest users are all becoming more conscious of impacts of recreation and other uses on various resources, including the value that people place on noise or the lack thereof. Substantial disagreement clearly exists as to what constitutes unacceptable impacts, since definitions of acceptability depend upon the values and desires of the person making the judgment (Kariel 1990).

Based on information collected about vehicular and OHV use and modeling tools it is generally possible to discuss the ‘soundscape’ of the Forest based on sound frequency, duration, magnitude, and appropriateness.

Frequency and duration

Sounds from motor vehicle use are generally of short duration (5 to 30 seconds) as a vehicle of any sort tends to be in motion while producing noise. The frequency of this noise, however; may differ according to location. Locations with major transportation corridors likely receive a high frequency of motor vehicle noise as compared to more isolated areas of the Forest where there are fewer roads and only secondary or tertiary forest routes. For example, data collected on a major transportation corridor such as Forest Road 376, which is measured to receive the highest amount of traffic on the Forest, is estimated to have an average daily amount of 150 vehicles per day north of the Gilman Tunnels. This translated to slightly more than 8 vehicles per hour in an 18-hour period. On non-system routes used primarily for motorized recreation, such as Forest Trail 113 and the Crosstown Trail, motorized vehicle use is measured to occur at an average daily amount of almost 3 vehicles

per day with a maximum of 10 vehicles in a day, which was the maximum measurement observed over a weekend day. As a result, the frequency of vehicular use on the Forest may vary greatly, but outside of major transportation corridors motorized vehicle use is considered regular, but infrequent.

Magnitude

The magnitude of sounds from motor vehicles on the Santa Fe National Forest may also vary greatly depending on the vehicle, but also depending on a number of other factors. The magnitude of vehicular noise is estimated to range from between 75 dBA from automobiles to 83 dBA from motorcycles as measured at a distance of 50 feet (Harrison et al. 1980). The magnitude of noise from a vehicle can vary greatly depending on distance from noise source, atmospheric conditions, weather and wind conditions, vegetation, topography, and ambient noise levels. As a result of the large number of factors that can affect noise magnitude, it is very difficult to characterize or manage sound levels at any particular point on the landscape. Results from modeling of noise using the SPreAD-GIS model; however, have illustrated that there are some generalities that can be made to discuss how the magnitude of sound will occur on certain landscapes. For example, sparsely vegetated landscapes that are flat and are dry and hot are the most likely to have the least amount of barriers to sound. As a result it is in these areas where sound may carry the farthest at the highest magnitudes.

For example, an area such as the Caja del Rio would be more likely to carry sounds than an area such as Cochiti Mesa. The reason for this is that the Caja del Rio is a sparsely vegetated hot and dry mesa top, whereas the Cochiti Mesa area is a densely vegetated, higher elevation area with a series of mesas and ridges cut by steep canyons. In an area such as the Caja del Rio sound can be expected to travel farther at a higher magnitude, whereas in the Cochiti Mesa area, sound from an automobile or motorcycle would be much more nuanced due to vegetation and land forms that may absorb or deflect the noise. In other words, sound from a motorcycle might be heard on the mesa where it is occurring or even may be heard at a lesser magnitude on a ridge top a mile away, but may not be heard in a canyon within 200 yards away. This example is supported by modeling results, which show that the topography of an area has a strong impact on the magnitude of sound from a motor vehicle.

Appropriateness

To determine whether or not route designations or existing routes will result in inappropriate noise throughout the Forest, the number of miles of routes in or within ¼ mile of areas designated in ROS as Primitive or Semi-primitive Non-motorized are assessed.

The ROS addresses the appropriateness and frequency/duration of sound within the Forest by speaking to the probability or prevalence of sound in discretely defined settings. The Magnitude of a sound can be used to determine whether or not it can be perceived from a particular point, but it is not specifically addressed by the ROS guidelines. The ROS divides the Forest into the following areas:

Primitive (P) – Characterized by an essentially unmodified environment, where trails may be present but structures are rare, and where the probability of isolation from the sights and sounds of people is high.

Semi-Primitive Non-Motorized (SPNM) – Characterized by few and/or subtle modifications by people, and with a high probability of isolation from the sights and sounds of people.

Semi-Primitive Motorized (SPM) – Characterized by moderately dominant alterations by people, with strong evidence of primitive roads or trails.

Roaded Natural (RN) – Characterized by a predominantly natural environment with evidence of moderate permanent resource use. Evidence of sights and sounds of people is moderate, but in harmony with the natural environment. Opportunity exists for both social interaction and moderate isolation from sights and sounds of people.

Rural (R) – Characterized by an area in which the sights and sounds of people are prevalent and the landscape has been considerably altered by the works of people.

Urban (U) – Characterized by a natural setting dominated by people-made structures and the sights and sounds of people predominate.

This analysis does not look at the appropriateness of noise outside of the Santa Fe National Forest boundaries where there is no clear management objectives as to the appropriateness of the sights and sounds of motorized use. As a result, this analysis may not fully capture impacts where sound from motorized use on Forest land is impacting surrounding areas where the sound of motorized vehicles may result in a negative impact. Lands adjacent to the Santa Fe National Forest where this may be an issue include Bandelier National Monument, Kasha Katuwe (Tent Rocks) National Monument, Valles Caldera National Preserve, and several Indian reservations.

Most of these lands do not identify management goals directed toward minimizing sounds from motorized vehicles in the areas where they are adjacent to Santa Fe National Forest boundaries. One exception is Bandelier National Monument, which includes the Bandelier Wilderness, which has established management goals to be managed for its primitive character in which the sights and sounds of motorized use would be considered inappropriate. In this situation, the Monument shares approximately 25 miles of border with the Santa Fe National Forest, approximately half of which includes a Primitive or SPNM designation on the Santa Fe National Forest side of the border.

Concern 3: The designation of routes for motorized use in the Santa Fe National Forest could affect property values for lands adjacent to the Forest.

Measure: Qualitative

Rationale: Property values were identified as a concern in a small number of comment letters in specific areas such as Cochiti Mesa and Glorieta Mesa where OHV use is perceived as a growing problem.

Methods: Review of relevant scientific peer-reviewed literature.

Many homeowners derive aesthetic and ecological amenities such as scenic views, clean water, fresh air, and recreational opportunities from neighboring public lands. Thus it is no surprise that there have been several studies showing that the presence of natural protected areas within close proximity to private property affects the value of the property in a positive manner (Kim and Johnson 2002). Yet, it is also clear that changes in forest management that impact valued characteristics of natural areas, such as clear cuts that substantially reduce tree cover and thus affect scenery, have been associated with a decrease in existing property values of adjacent

properties (Kim and Johnson 2002). For other management activities which may include both perceived positive and negative results; however, the market signal is not so clear.

The designation of roads and trails in the Santa Fe National Forest could result in both perceived positive and negative impacts to adjacent private properties. For example, a decision that decreases the amount of potential access surrounding an area with private lands can be perceived as decreasing access to recreational opportunities. At the same time, this same decision could be perceived as increasing scenic views and water quality by the reduction of unnecessary roads and trails, thus potentially increasing property values.

Comments received during the travel management process have identified noise and air pollution from motorized vehicle use as an important issue to adjacent landowners with respect to potential impacts to property values as well. Though there are no studies showing a clear relationship between route designation on public lands and impacts to nearby property values, there have been several studies in urban environments showing a relationship between noise and air pollution sources (e.g. highways and airports) and impacts to property values. Generally, these studies have used a wide variety of methods to determine the impact on property values of building a highway or airport adjacent to a home or community, and they have generally found that introducing new noise sources can clearly decrease property values (Bateman et al. 2001, 104-112 p.). On the other hand, other studies or even many of these same studies have shown that the impacts on private property of these new developments are not all negative and in some cases they can be positive (e.g. from improved accessibility) thus compensating for or overwhelming the negative impacts of noise (Bateman et al. 2001).

The basis of valuation of the economic effects of environmental amenities (or disamenities) is that the benefits or damages resulting from these will be incorporated by market forces into the price of a house or property. Environmental economics research looks at one or two environmental amenities that may affect property prices and identify correlations. For example, a valuation study found that ranchettes in Arizona sold for higher prices where greater views were present, but the property wasn't too distant from a city center or major road. This study illustrates that for property values of ranchettes in Arizona there is a threshold at which point distance from roads and population centers turns from a positive impact on property values to a negative impact. This study identifies a correlation between remoteness, scenery, and property values; but it falls short of identifying a causal relationship (Sengupta and Osgood 2003).

This means the current capacity to determine the impact to property values from proposed vehicular access management changes that may affect a number of characteristics (e.g. noise levels, air quality, scenery, water quality, recreation opportunities, wildlife abundance or patterns, etc.) in opposing and potentially unforeseen ways does not exist. Though relationships between negative characteristics (e.g. freeway noise) and property prices have been well documented, these correlations are generally resulting from large transportation and infrastructure *construction* projects such as highways and airports that are much greater in magnitude and intensity than any potential management changes being considered in this analysis.

Based on this information it is possible that route designation could have an impact on private property values, however, research in this area is far from conclusive at establishing a causal relationship. Furthermore, even if economic impacts to property values could be tied to route designation it is unclear if the overall impact would be discernable at all, and if so if the economic impact would be positive or negative. This is because the impacts of route designation on each property would likely differ depending upon preferences of those interested in buying homes in the area as well as several other factors including distance from other routes, route density,

impacts of the route(s) on viewshed, sound, and water quality. As a result of this uncertainty and complexity, it is thought that the comparison of alternatives on potential changes in property values is too speculative and therefore is not analyzed in this report.

Concern 4: The designation of routes for motorized use in the Santa Fe National Forest could impact the cultural practices and traditions by limiting opportunity for traditional activities on the Forest.

Measure:

- Impact on piñon picking – number of roads designated for all vehicles or highway legal in P/J habitat type.
- Impact on mushroom and herb-gathering – number of roads designated for all vehicles or highway legal vehicles in aspen, mixed-conifer, or cottonwood bosque vegetation types based on studies showing the greatest
- Qualitative – gathering of other Forest products.

Rationale: The loss of opportunities to use the National Forest for gathering or harvest of forest-related products due to a decrease in vehicular access was discussed as a concern in several comment letters.

Assumptions:

- Piñon picking occurs primarily on forest roads and not trails.

Methods:

- Quantification of designated roads in habitat types with piñon trees by alternative

Discussion:

In small rural communities, the national forests can be particularly critical for subsistence activities, like hunting and gathering herbs, as well as providing a source of cash income such as from the sale of piñon, firewood or Christmas trees (Ulibarrí 2007b). In northern New Mexico and in communities surrounding the Santa Fe National Forest, the historical background of the region has resulted in cultural lifeways rooted and developed from the subsistence practices of the past.

In northern New Mexico, several Forest Reserves were established in the early 1900s which later became the Carson, Santa Fe, and Cibola national forests. These forests encompass all or portions of various former land grants that were lost or taken from the original grantees. As their access to former land grants decreased and Anglo-American influence increased in the region since the Great Depression, small Hispanic communities and many Native American communities have suffered from continued land loss, economic decline, and poverty. Economic need has forced people from the land and out of the villages, mostly to nearby cities. Those who stay often commute to wage work in a nearby city. For those who remain in these small communities, Forest resources remain an essential economic support mechanism and traditional practice to maintain social cohesion and the current quality of life (Raish 1995).

In recent surveys on the Attitudes, Values, and Beliefs of those who use or live near a national Forest in northern New Mexico, traditional uses of the forests were regularly discussed as having a cultural meaning as well as economic importance for Hispano and other traditional users. Participants believe these types of uses should be respected in forest

management decisions and planning. An example of one of these comments illustrates the importance of the national forest as the resource base for local communities,

I grew up here and local people, people who have lived here for a long time, tend to complain because of closure. They can no longer go into the forest the way they used to. Places you once could drive into were restricted to walking into and then finally you couldn't even walk into them. People were angered because they have always accessed those areas for traditional uses.

Traditional uses comes from the fact that forest lands were part of land grants and those lands were open for use by everybody. So, people depended on going up there for their firewood, latillas for building houses, for rock for around their houses, grazing for livestock. So, those are among the traditional uses and it was all done at a small scale, it was done for cultural purposes (Russel and Adams-Russel 2006).

Other comments; however, illustrate that traditional uses and access associated to areas used for traditional uses can also result in user-conflict as they are a resource that can be impacted by a variety of other Forest uses and users,

The other day I passed a big rig going into (place) and I know they were the only ones back there because I am in that area all the time. When I came through there again a couple of days later, there was this big pile of sewage they had just dumped from their rig. They just dumped their tanks and never thought about it. Things like that just break your heart. My Dad taught me respect for this country and I don't understand it when people come here and do things like that. I am teaching my kids the same way my Dad taught me when we went out riding and getting firewood (Russel and Adams-Russel 2006).

Small communities located within or adjacent to the Santa Fe National Forest continue to practice a number of Forest-dependent activities that are essential to maintaining their cultural identity and economic well-being. These forest-dependent activities include the following:

- Livestock grazing
- Fuelwood collection
- Collection of posts and other timber products
- Piñon picking
- Collection of non-woody forest materials (e.g. rocks, edible and decorative plants)
- Christmas tree collection
- Hunting
- Irrigation
- Other special uses (e.g. drinking water pipelines, communication facilities, permitted educational or management facilities, etc.)

Though the availability of motorized travel available on the Forest influences access and use patterns of all forest users, many of the above activities are not expected to be impacted by the implementation of the Travel Management Rule through any of the alternatives included in this analysis. The Travel Management Rule specifically authorizes uses of a motor vehicle on roads and trails not designated on a Motor Vehicle Use Map for "Motor vehicle use that is specifically

authorized under a written authorization issued under Federal law or regulations¹.” As a result, activities that currently require a permit may still continue as currently practiced under the Travel Management Rule. These include:

- Livestock grazing
- Fuelwood collection
- Collection of posts and timber products
- Collection of non-woody forest materials (e.g. rocks)
- Christmas tree collection
- Irrigation
- Other special uses

Activities such as piñon picking, non-commercial gathering of plants, herbs and mushrooms, and hunting would be most affected; because currently piñon gathering and retrieval of big game doesn't require permits and the TMR will require collectors/hunters to stay on designated roads. The issue of piñon picking and non-commercial gathering of herbs and mushrooms will be reviewed by reviewing the amount of roads by habitat type designated in each alternative. The impact of the establishment of a designated motorized road and trail system on hunting will be reviewed in the Recreation analysis report.

To determine the impact of each alternative on piñon picking, the number of designated roads in habitat types including piñon trees as a major component will be analyzed. To determine the impact of each alternative on the non-commercial gathering of mushrooms, plants, and herbs the number of designated roads in mixed-conifer, aspen, and cottonwood vegetation types will be analyzed as this is where the majority of herb gathering, mushroom collecting, and traditional plant collecting is known to occur (Balice et al. 1997, Anschuetz 2007).

Concern 5: The designation of routes for motorized use in the Santa Fe National Forest could result in a disproportionately high and adverse human health or environmental effect on minority populations and low-income populations.

Measure: Quantification of minority and low-income populations in the study area and comparison to the economic impacts as measured by number of jobs and labor income.

Rationale: Executive Order (EO 12898) requires all Federal agencies to analyze and if necessary address high and adverse human health or environmental effects of their actions and policies.

Assumptions:

- Any population with 50% minority population or under the State's should be considered under the EO (CEQ guidance)
- Minority populations and low-income groups are identified at the County level (1 level below the analysis area).

Methods:

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, and Departmental Regulation 5600-2 direct federal agencies to integrate environmental justice considerations into federal programs and activities.

¹ See 36 CFR 212.51 (a)(8) and 36 CFR 261.13(h)

Environmental justice means that, to the greatest extent practicable and permitted by law, all populations are provided the opportunity to comment before decisions are rendered on, are allowed to share in the benefits of, are not excluded from, and are not affected in a disproportionately high and adverse manner by, government programs and activities affecting human health or the environment.

Content:

The Santa Fe National Forest occupies an area comprised of a complex ethnic and racial landscape. To determine the presence of minority populations within the project area, 2000 census data were reviewed at the state, 7-county aggregate, and individual county area. Tribal entities were included in and contributed to county population estimates. White-only non-Hispanic is the only group that cannot be identified as a minority population based on the majority level of this group at the national level. The purpose of this analysis is to identify population centers of minority and racial groups at the aforementioned scales, which are not present in other areas throughout the nation.

A population is considered a minority population if the population level is greater than 50% of the county level or if the population level at the County level is at a greater percentage than the state level. Below is a summary table of the populations of various ethnicities and races at three different scales relevant to the Santa Fe National Forest – the individual county level, the 7-county aggregate level, and the state.

Table XXX. Race and Ethnicity by County and within the State (Headwaters Economics 2009)

Area	Ethnicity		Race		
	Hispanic	Non-Hispanic	Native American	White	All other races
New Mexico	42.1%	57.9%	10%	67%	23%
7-county area	44.0%	56.0%	5.5%	69.7%	24.8%
Bernalillo county	42.0%	58.0%	4.2%	70.7%	25.1%
Los Alamos county	11.7%	88.3%	0.6%	90.3%	9.1%
Mora county	81.6%	18.4%	1.1%	58.9%	40.0%
Rio Arriba county	72.9%	27.1%	13.9%	56.6%	29.5%
Sandoval county	29.4%	70.6%	16.3%	65.1%	18.6%
Santa Fe county	49.0%	51.0%	3.1%	73.5%	23.4%
San Miguel county	78.0%	22.0%	1.8%	56.2%	42%

Based on the information above there are several distinct racial and ethnic minority populations within the assessment area for this analysis. These include:

- The Hispanic population within the 7-county aggregate area
- The Hispanic population in Mora County
- The Hispanic population in Rio Arriba County
- The Hispanic population in Santa Fe County
- The Hispanic population in San Miguel County
- The Native American population in Sandoval County

- The Native American population in Rio Arriba County

These results reflect the historical context of the northern New Mexico region, which was originally inhabited by Native American tribes and later populated by settlers from the Spanish conquest.

In addition to minority populations, Executive Order 12898 also includes requirements to consider potential impacts of management decisions to low-income populations. Low-income is defined as individuals or mean households that are below the federal poverty level. Data collected by the Census Bureau include this information as a percentage of the total population at different scales, which can be seen below for the state and county level.

Table XXX. Percent of Population below the Federal poverty level, 2007 (Headwaters Economics 2009)

Area	Percent of population in poverty - 2007	90% Confidence interval	Percent change since 1997 estimates
New Mexico	17.9	17.4 – 18.3	- 1.4
Bernalillo county	14.9	13.7 – 16.2	+ 0.3
Los Alamos county	3.1	2.4 – 3.9	+ 0.4
Mora county	22.4	17.3 – 27.6	- 7.5
Rio Arriba county	21.2	17.5 – 24.8	- 1.3
Sandoval county	10.3	8.5 – 12.1	- 2.6
Santa Fe county	15.0	13.1 – 16.9	+ 3.1
San Miguel county	24.5	19.9 – 29.0	- 4.8

Trend data from the past ten years show that in general, the percent of population in poverty has decreased over the past ten years, especially in the counties with the greatest percentage of their populations in poverty. Other counties such as Santa Fe, Bernalillo, and Los Alamos showed small increases in the amount of the population below poverty level, but despite these increases these counties were still below the state average of the percentage of population below the Federal poverty level. Those counties that show a greater percentage of population below poverty than the state level are considered low-income populations, and are the focus of analysis in this report.

Based on the 2007 Census data shown above there are several low-income populations within the assessment area for this analysis. These include:

- The low-income population for Mora County
- The low-income population for Rio Arriba County
- The low-income population for San Miguel County

Legal Consistency

Multiple statutes, regulations and executive orders identify the general requirement for the application of economic and social evaluation in support of Forest Service planning and decision making. These include, but are not limited to, the Multiple-Use Sustained Yield Act of 1960 (74 Stat. 215; 16 USC 528-531), National Environmental Policy Act of 1969 (83 Stat. 852; 42 USC 4321, 4331-4335, 4341-4347), and the National Forest Management Act of 1976 (16 U.S.C. 1600).

- The Multiple-Use Sustained Yield Act of 1960 (74 Stat. 215; 16 USC 528-531) requires that economic impacts are considered when establishing management plans or decision that may effect the management of renewable forest and rangeland resources. This report meets the requirements of this law by specifically considering the economic impacts of the implementation of the Travel Management Rule to local communities.
- National Environmental Policy Act (NEPA) of 1969 (83 Stat. 852; 42 USC 4321, 4331-4335, 43414347) requires that economic and social impacts of Federal actions be considered through environmental analysis. This specialist report includes analysis on social and economic issues identified during the scoping process to meet the terms of the NEPA and regulations.
- National Forest Management Act (NFMA) of 1976 (16 U.S.C. 1600) and regulations require that the economic impacts of decisions or plans affecting the management of renewable resources be analyzed and that economic stability of communities whose economies are dependent on materials from national forest lands are considered. This analysis meets the requirements of the NFMA by specifically considering the economic impacts of the implementation of the Travel Management Rule and its impacts on local communities and minority populations.

In addition, the following guidance also applies:

Executive Order 11644 (February 8, 1972), “Use of Off-road Vehicles on Public Lands,” as amended by Executive Order 11989 (May 24, 1977). These executive orders direct Federal agencies to ensure that the use of off-road vehicles on public lands will be controlled and directed to protect the resources of those lands, to protect the safety of all users on those lands, and to minimize conflict among the various uses of those lands. The Travel Management Rule implements these executive orders and as a result this analysis is in full compliance with them.

Also of importance is Executive Order 12898, issued in 1994 orders federal agencies to identify and address any adverse human health and environmental effects of agency programs that disproportionately impact minority and low-income populations. This report specifically identifies and considers impacts to minority and low-income populations through an environmental justice analysis. The Order also directs agencies to consider patterns of subsistence hunting and fishing when an agency action may affect fish or wildlife (refer to the Recreation Specialist Report).

Additionally, the Forest Service includes internal guidance relevant to economic and social evaluation for Travel Management Planning; FSH 7709.55 – Travel Planning Handbook, Chapter 12 – Requires information about use patterns, user demand, and social and economic interactions to make informed travel management decisions. This report specifically includes analysis of social and economic data to inform a decision on Travel Management planning.

The Santa Fe National Forest Plan also includes the following forest wide management direction relevant to social and economic issues:

Section of Forest Plan	Language in Forest Plan	Compliance
Forestwide Management Direction - Page 22	Manage Forest activities and programs within the capability of the land while recognizing the value of maintaining the traditional cultures of northern New Mexico.	This report specifically discusses the potential impacts of implementing the Travel Management Rule on elements such as jobs and labor income, piñon and other forest product collection, noise and property

		values; all of which are important to maintaining the traditional cultures of northern New Mexico.
Forestwide Management Direction - Page 82	Recognize that people In rural communities rely on the land for a social, economic, and religious base and that their way of life Is directly affected by the management activities of the National Forests.	This report recognizes the reliance of rural communities on the lands within and adjacent to the Santa Fe National Forest by specifically discussing the potential impacts of implementing the Travel Management Rule on elements such as jobs and labor income, piñon and other forest product collection, noise and property values.

Environmental Effects

Concern 1: Direct and Indirect Effects

Alternative 1 – No action

Given no changes to existing management, then it is assumed that motor vehicle use would generally stay the same for the purposes of this analysis. Given that there are two sources of Forest visitor use-by-activity through the NVUM and ABV surveys, both were used to show a range of potential economic impacts.

Table XXX. Percent of total employment and labor income effects by activity type using NVUM data

		Employment Effects (full and part time jobs)		Labor Income (2008 dollars)	
		Direct	Total Secondary	Direct	Total Secondary
Non-Motorized Use					
Backpacking	Local	0.3%	0.3%	0.3%	0.4%
	NonLocal	0.2%	0.2%	0.2%	0.2%
Hiking / Walking	Local	9.2%	9.1%	8.7%	9.4%
	NonLocal	13.9%	13.2%	12.7%	13.6%
Horsback Riding	Local	0.1%	0.1%	0.1%	0.1%
	NonLocal	0.2%	0.2%	0.2%	0.2%
Bicycling	Local	0.4%	0.4%	0.4%	0.5%
	NonLocal	0.7%	0.6%	0.6%	0.7%
Cross-country Skiing	Local	0.6%	0.5%	0.5%	0.6%
	NonLocal	1.6%	1.6%	1.4%	1.7%
Othgr Non-motorized	Local	0.0%	0.0%	0.0%	0.0%
	NonLocal	0.1%	0.1%	0.1%	0.1%
Total Non-Motorized Use		28%	27%	26%	28%
Motorized Use					
OHV Use	Local	0.2%	0.2%	0.2%	0.2%
	NonLocal	0.2%	0.2%	0.2%	0.2%
Driving for Pleasure	Local	0.9%	0.8%	0.8%	0.8%
	NonLocal	0.5%	0.5%	0.5%	0.5%
Total Motorized Use		2%	2%	2%	2%
All other Activities					
All Other Activities	Local	30.3%	33.0%	35.9%	31.1%
	NonLocal	38.5%	36.7%	34.9%	37.8%
Total All Other Use		70%	71%	72%	70%
Grand Total: All Categories		317	98	8,122,551	2,925,937

- Local use is defined as 50 miles from the center of each zip code in the analysis area

According to primary purpose visitor use estimates derived from NVUM survey data for the Santa Fe National Forest, OHV use throughout the Forest from local and non-local users results in a combined total of 1.5 jobs (derived by summing the multiplied percentage of both local and non-local economic contribution to the total amount of jobs for both direct and secondary economic effect), which takes into account both the direct and secondary economic effects of this use. This is less than 1% of the total of all employment and labor income resulting from recreation on the Santa Fe National Forest. Driving for pleasure contributes an additional 5.9 jobs, or almost 2% of all of the employment and labor income resulting from reported recreational use on the Santa Fe National Forest. Combined, motorized uses result in a total of 7.4 jobs, or almost 3% of all employment and labor income contributed to the local economy by all recreational activities on the Forest.

If the ABV dataset is used to estimate Forest visitor recreation use levels by activity instead of the NVUM dataset, there are some differences. Motorized use is estimated to result in approximately 8% of labor income and local employment, or approximately 53 jobs in the local economy if normalized to the same scale as the NVUM data. Since the ABV dataset likely overestimates motorized use, 53 jobs is the maximum possible number of jobs resulting from motorized use on the Forest. Nevertheless this amount is approximately half of the amount of labor income and local employment contributed to the local economy as non-motorized recreation. As with the NVUM data, other recreational activities are still the greatest contributors to the local economy resulting in approximately 78% of all local employment and jobs from recreation uses on the Santa Fe National Forest.

Non-motorized uses appear to contribute to local employment and labor income to a much greater degree than those activities classified as motorized uses. For example, hiking contributes approximately 3.3% to all employment and local income created from recreational activities on the Forest, which is more than any other single recreation use. Other non-motorized uses individually contribute less than OHV use. Combined, all activities classified as non-motorized uses contribute almost twice as much as motorized uses.

Table XXX. Percent of total employment and labor income effects by activity type using ABV data

		Employment Effects (full and part time jobs)		Labor Income (2008 dollars)	
		Direct	Total Secondary	Direct	Total Secondary
Non-Motorized Use					
Backpacking	Local	0.8%	0.8%	0.8%	0.9%
	NonLocal	0.6%	0.6%	0.6%	0.6%
Hiking / Walking	Local	2.6%	2.6%	2.4%	2.6%
	NonLocal	3.9%	3.7%	3.5%	3.8%
Horsgback Riding	Local	0.4%	0.4%	0.4%	0.4%
	NonLocal	0.6%	0.6%	0.5%	0.6%
Bicycling	Local	0.7%	0.7%	0.7%	0.7%
	NonLocal	1.1%	1.0%	1.0%	1.0%
Cross-country Skiing	Local	0.6%	0.6%	0.5%	0.6%
	NonLocal	1.7%	1.7%	1.5%	1.8%
Othgr Non-motorized	Local	0.6%	0.6%	0.5%	0.6%
	NonLocal	0.9%	0.8%	0.8%	0.8%
Total Non-Motorized Use		15%	14%	13%	15%
Motorized Use					
OHV Use	Local	1.4%	1.4%	1.4%	1.5%
	NonLocal	1.3%	1.3%	1.2%	1.3%
Driving for Pleasure	Local	2.6%	2.4%	2.5%	2.4%
	NonLocal	1.6%	1.5%	1.4%	1.6%
Total Motorized Use		8%	7%	7%	8%
All other Activities					
All Other Activities	Local	35.1%	38.1%	41.1%	36.0%
	NonLocal	40.4%	38.2%	36.0%	39.7%
Total All Other Use		78%	78%	79%	78%
Grand Total: All Categories		686	182	15,244,070	5,427,524

Motorized recreation contributes in the range of 7.4 jobs (using NVUM data) - 53 jobs (using ABV data) and within the range of \$187,823 (NVUM) - \$1,367,728 (ABV) dollars of labor income to the local economy. Using 2008 county employment estimates, this represents approximately 0.03% of all jobs and 0.02% of all labor income in the 6-county analysis area. In other words, the amount of jobs for motorized recreation on the Santa Fe National Forest is very small (less than one half of one tenth of one percent) when compared to the entire local economy. This impact would be even smaller if Bernalillo County is considered as this county has almost twice as much employment as the other 6 counties combined.

Table XXX. Percent of total employment and labor income effects by activity type using ABV-derived estimates

		(full and part time jobs)	(2008 dollars)
Total Motorized Use	Local	0.017%	0.010%
	NonLocal	0.012%	0.007%
Total All Other Use	Local	0.139%	0.100%
	NonLocal	0.154%	0.091%
Total Use		0.387%	0.250%
Total for Area		198,291	8,434,049,000

Cumulative Effects

Since this alternative would not include management changes, it is unlikely that there would be any changes to recreational activities of any magnitude which would affect the local economy.

Legal Consistency

This alternative is fully consistent with all legal requirements; however, it does not meet the regulatory requirements for designation of a road and trail system as required by the 2005 Travel Management Rule.

Forest Plan Consistency

This alternative is fully consistent with the guidance and direction in the Forest Plan relating to economic impacts. The explicit analyses of the potential economic impacts of this alternative illustrate the Forest's recognition of the economic importance of road and trail use for recreational and other activities. The information included in this analysis was created to inform management decision on how each alternative may affect economic inputs to local communities, which can affect their current ways of life.

Irreversible/Irretrievable Resources

Since this alternative would not result in any management changes, it is unlikely that any irreversible or irretrievable economic resources would result.

Concern 1: Alternative 2

Given Alternative 2 decreases the amount of motorized roads and trails by approximately 53% from the existing condition, it is assumed that this would decrease the amount of visitation for the purpose of motorized use by approximately 10% - 25% across the Forest. For the purposes of this analysis, it is assumed that there would not be any other changes in recreational uses in non-motorized recreation or other recreation. Many comments received during the travel management scoping period contended that simply the act of designating routes would sharply increase their use; however, there is no evidence of this either in the body of scientific research focusing on this subject neither from less formal site-specific studies of motorized use on public lands (Christensen and Watson 2006).

Using NVUM measures of recreation use on the Santa Fe National Forest, a 10% - 25% decrease in motorized recreation would result in a loss of approximately 0.8 – 1.9 jobs in the local economy, which would be a 0.0004% - 0.00095% increase in unemployment. Labor income to the local economy would be decreased by approximately \$16,820 - \$45,320.

According to ABV estimates of recreation visitor use of the Santa Fe National Forest, a 10% - 25% decrease in motorized recreation would result in a potential maximum loss of approximately 5 - 13 jobs in the local economy, which would be a 0.0025% - 0.0065% increase in unemployment. Labor income to the local economy would potentially decrease by a maximum of approximately \$136,800 - \$341,930.

These numbers are stated as potential maximum decreases, because the jobs and labor incomes would be lost to the local economy only if all motorized users stop this activity not only on Santa Fe National Forest lands, but also on all other public lands in the 6-county economic analysis area. More realistically, motorized recreationists would shift their use to other private or public areas. In other words, there would be a number of users and thus jobs and labor income displaced by this travel management decision, but at least some of these users would shift their use to other nearby areas, which may or may not result in a displacement or loss of jobs and labor income.

Even using the potential maximum loss, the impact is almost imperceptible considering the scale of the economy. Furthermore, northern New Mexico is dominated by service industry sectors and government employment, the effects of such a comparatively small number of jobs to the less developed industry sectors would further lessen the effect. Considering the economy of Bernalillo County is almost twice that of all of the other 6 counties combined, this change of economic output contributed by motorized recreation on the Santa Fe National Forest would be even less of an impact.

Cumulative Effects

The loss of 0.8 - 13 jobs (or \$16,820 - \$341,930 in labor income) in the six county area would generally be imperceptible at the scale of the local economy. Despite increasing unemployment due to the recent economic downturn and ongoing management changes for motorized recreation on nearby public lands, the economic change resulting from reducing motorized use across the Forest by decreasing the amount of routes to be used would be so small as to be overshadowed by larger economic trends. Furthermore, a change in management that would slightly reduce motorized use on the Santa Fe National Forest may have positive economic impacts in a number of other areas:

- Increased non-motorized recreation in areas previously used for motorized recreation
- Increase in use of private businesses that cater to motorized recreation experiences less available on public lands
- Increase in use of other public lands to substitute for motorized recreation experiences less available on the Santa Fe National Forest
- Increased non-market values to surrounding areas from resource benefits (e.g. clean water, increased wildlife populations, etc.) resulting from decreased motorized recreation on the Santa Fe National Forest

Effects of Plan Amendments

The plan amendments would be required to keep this alternative in conformance with the Forest Plan. Those forestwide alternatives to modify the language in the Plan, to close the entire Forest (except designated routes and areas) to cross-country travel, and to remove the lower bounds of road density, would have no additional effects on the number of jobs, labor income, or other parts

of the economy above what was analyzed in the direct and indirect effects of the alternative. Amendments for this alternative to allow designated motorized routes would not result in a change to what is occurring in the existing condition as these routes are already being driven on regularly. This alternative would still result in a decrease in the number of routes available to motorized use. As a result the proposed Forest Plan amendments would have no additional effects on the number of jobs, labor income, or other parts of the economy.

Forest Plan Consistency

This alternative is fully consistent with the guidance and direction in the Forest Plan relating to economic impacts. The explicit analyses of the potential economic impacts of this alternative illustrate the Forest's recognition of the economic importance of road and trail use for recreational and other activities. The information included in this analysis was created to inform management decision on how each alternative may affect economic inputs to local communities, which can affect their current ways of life.

Irreversible/Irretrievable Resources

According to the analysis, this alternative would not result in any changes resulting in irreversible or irretrievable resources.

Concern 1: Alternative 3

This alternative would decrease the number of roads and trails open to motorized use by approximately 66%. As a result this alternative would include designation of primarily main roads and motorized trails, with few side roads and trails. Since the main transportation arteries and routes leading to many of the most visited sites on the Forest (e.g. campgrounds, fishing areas, picnic areas, heavily used dispersed camping areas) would be designated under this alternative it is estimated that motorized use would not decrease by the same proportion as the number of routes, but by a lower amount. It is assumed that motorized recreation would decrease between 10% - 50%. This range includes the worst case scenario for economic impacts resulting from decreased motorized use as a result of travel management.

For the purposes of this analysis, it is assumed that there would not be any other changes in recreational uses in non-motorized recreation or other recreation.

Using NVUM measures of recreation use on the Santa Fe National Forest, a 10% - 50% decrease in motorized recreation would result in a loss of approximately 0.8 – 3.7 jobs in the local economy, which would be a 0.0004% - 0.0019% increase in unemployment. Labor income to the local economy would be decreased by approximately \$16,820 - \$90,640.

According to ABV estimates of recreation visitor use of the Santa Fe National Forest, a 10% - 50% decrease in motorized recreation would result in a loss of approximately 5 – 26.5 jobs in the local economy, which would be a 0.0025% - 0.013% increase in unemployment. Labor income to the local economy would be decreased by approximately \$136,800 - \$683,864. This estimate is a worst case scenario of jobs and labor income lost from decreased the amounts of routes available to motorized travel on the Santa Fe National Forest. Regardless this impact is very small considering the scale of the entire economy. Considering the economy of Bernalillo County is almost twice that of all of the other 6 counties combined, this change of economic output contributed by motorized recreation on the Santa Fe National Forest would be even less of an impact.

Cumulative Effects

The loss of 0.8 - 26.5 jobs (or \$16,820 - \$683,864 in labor income) in the six county area would generally be small at the scale of the local economy. Despite increasing unemployment due to the recent economic downturn and ongoing management changes for motorized recreation on nearby public lands, the economic change resulting from reducing motorized use across the Forest by decreasing the amount of routes to be used would be so small as to be overshadowed by larger economic trends. Furthermore, a change in management that would slightly reduce motorized use on the Santa Fe National Forest may have positive economic impacts in a number of other areas:

- Increased non-motorized recreation in areas previously used for motorized recreation
- Increase in use of private businesses that cater to motorized recreation experiences less available on public lands
- Increase in use of other public lands to substitute for motorized recreation experiences less available on the Santa Fe National Forest
- Increased non-market values to surrounding areas from resource benefits (e.g. clean water, increased wildlife populations, etc.) resulting from decreased motorized recreation on the Santa Fe National Forest

Many of these potential changes would result in cumulative impacts that would likely offset the small negative economic impacts resulting from decreased motorized use on the Santa Fe National Forest.

Effects of Plan Amendments

The plan amendments would be required to keep this alternative in conformance with the Forest Plan. Those forestwide alternatives to modify the language in the Plan, to close the entire Forest (except designated routes and areas) to cross-country travel, and to remove the lower bounds of road density, would have no additional effects on the number of jobs, labor income, or other parts of the economy above what was analyzed in the direct and indirect effects of the alternative. Amendments for this alternative to allow designated motorized routes would not result in a change to what is occurring in the existing condition as these routes are already being driven on regularly. This alternative would still result in a decrease in the number of routes available to motorized use. As a result the proposed Forest Plan amendments would have no additional effects on the number of jobs, labor income, or other parts of the economy.

Forest Plan Consistency

This alternative is fully consistent with the guidance and direction in the Forest Plan relating to economic impacts. The explicit analyses of the potential economic impacts of this alternative illustrate the Forest's recognition of the economic importance of road and trail use for recreational and other activities. The information included in this analysis was created to inform management decision on how each alternative may affect economic inputs to local communities, which can affect their current ways of life.

Irreversible/Irretrievable Resources

According to the analysis, this alternative would not result in any changes resulting in irreversible or irretrievable resources.

Concern 1: Alternative 4

This alternative decreases the amount of motorized roads by approximately 45% from the existing condition, but increases the amount of motorized trail by approximately 36% across the Forest. As a result it is assumed that OHV use would decrease from the existing condition somewhere between 0% – 10%, but non-motorized activities such as hiking and horseback riding would also decrease by 0% – 5%. It is assumed that hiking and horseback riding would decrease

less because the designated motorized trails would still be open to hiking and horseback riding, although they may be less desirable. Furthermore designating a system of motorized trail would help non-motorized users as well by limiting motorized uses in other areas that could be used for non-motorized purposes.

Using NVUM measures of recreation use on the Santa Fe National Forest, a 0% - 10% decrease in motorized recreation would result in a loss of approximately 0 - 0.8 jobs in the local economy. Labor income to the local economy would be decreased by approximately \$0 - \$16,820. A 0% - 5% decrease in hiking/walking and horseback riding would result in a loss of approximately 0 - 5 jobs in the local economy. Labor income from a decrease in these activities would be between \$0 - \$123,554. The combined job loss from this alternative would result in up to a 0.003% increase in the unemployment rate for the local economy.

According to ABV estimates of recreation visitor use of the Santa Fe National Forest, a 0% - 10% decrease in motorized recreation would result in a loss of approximately 0 - 5 jobs in the local economy. Labor income to the local economy would be decreased by approximately \$0 - \$136,800. A 0% - 5% decrease in hiking/walking and horseback riding would result in a loss of approximately 0 - 4 jobs in the local economy. Labor income from a decrease in these activities would be between \$0 - \$73,413. The combined job loss from this alternative would result in up to a 0.005% increase in the unemployment rate for the local economy. This impact is almost imperceptible considering the scale of the economy. Considering the economy of Bernalillo County is almost twice that of all of the other 6 counties combined, this change of economic output contributed by motorized recreation on the Santa Fe National Forest would be even less of an impact.

Cumulative Effects

The loss of 0 - 10 jobs (or up to \$210,213 in labor income) in the 6-county area would nearly be imperceptible at the scale of the local economy. Despite increasing unemployment due to the recent economic downturn and ongoing management changes for motorized recreation on nearby public lands, the economic change resulting from reducing motorized use across the Forest by decreasing the amount of routes to be used would be so small as to be overshadowed by larger economic trends. Furthermore, a change in management that would slightly reduce motorized use and horseback riding and hiking on the Santa Fe National Forest may have positive economic impacts in a number of other areas:

- Increased non-motorized recreation in areas previously used for motorized recreation
- Increase in use of private businesses that cater to motorized recreation experiences less available on public lands
- Increase in use of other public lands to substitute for motorized recreation experiences less available on the Santa Fe National Forest
- Increased non-market values to surrounding areas from resource benefits (e.g. clean water, increased wildlife populations, etc.) resulting from decreased motorized recreation and other recreation on the Santa Fe National Forest

Effects of Plan Amendments

The plan amendments would be required to keep this alternative in conformance with the Forest Plan. Those forestwide alternatives to modify the language in the Plan, to close the entire Forest (except designated routes and areas) to cross-country travel, and to remove the lower bounds of road density, would have no additional effects on the number of jobs, labor income, or other parts of the economy above what was analyzed in the direct and indirect effects of the alternative. In

some instances, amendments for this alternative to allow designated motorized routes in currently closed areas would result in a change to what is occurring in the existing condition as these routes are not currently being driven on. This change, however, is considered in the analysis of the direct and indirect effects of this alternative by analyzing a possible decrease in non-motorized recreation. This alternative would still result in a decrease in the number of routes available to motorized use. As a result the proposed Forest Plan amendments would have no additional effects on the number of jobs, labor income, or other parts of the economy.

Forest Plan Consistency

This alternative is fully consistent with the guidance and direction in the Forest Plan relating to economic impacts. The explicit analyses of the potential economic impacts of this alternative illustrate the Forest's recognition of the economic importance of road and trail use for recreational and other activities. The information included in this analysis was created to inform management decision on how each alternative may affect economic inputs to local communities, which can affect their current ways of life.

Irreversible/Irretrievable Resources

According to the analysis, this alternative would not result in any changes resulting in irreversible or irretrievable resources.

Concern 1: Alternative 5

This alternative reduces the amount of available routes for motorized use by 54%; but it is designed to enhance the recreational experience for both motorized and non-motorized users by separating these uses in such a way as to provide the best user-experience for all users. As a result, though there may be fewer routes designated for motorized use, the designation of these routes would create a more accessible and connected system for motorized users. Non-motorized users, on the other hand, would be able to easily avoid motorized areas thus reducing conflict or displacement of non-motorized uses. Based on this information, it is assumed that both motorized use and non-motorized use on the Forest would not change or motorized recreation would decrease up to 25% as a result of this alternative.

Using NVUM measures of recreation use on the Santa Fe National Forest, a 0% - 25% decrease in motorized recreation would result in a loss of approximately 0 – 1.9 jobs in the local economy, which would be a 0% - 0.00095% increase in unemployment. Labor income to the local economy would be decreased by approximately \$0 - \$45,320.

According to ABV estimates of recreation visitor use of the Santa Fe National Forest, a 0% - 25% decrease in motorized recreation would result in a potential maximum loss of approximately 0 - 13 jobs in the local economy, which would be a 0% - 0.0065% increase in unemployment. Labor income to the local economy would potentially decrease by a maximum of approximately \$0 - \$341,930.

These numbers are stated as potential maximum decreases, because the jobs and labor incomes would be lost to the local economy only if all motorized users stop this activity not only on Santa Fe National Forest lands, but also on all other public lands in the 6-county economic analysis area. More realistically, motorized recreationists would shift their use to other private or public areas. In other words, there would be a number of users and thus jobs and labor income displaced by this travel management decision, but at least some of these users would shift their use to other nearby areas, which may or may not result in a displacement or loss of jobs and labor income to the local economy.

Even using the potential maximum loss, the impact is almost imperceptible considering the scale of the economy. Furthermore, northern New Mexico is dominated by service industry sectors and government employment, the effects of such a comparatively small number of jobs to the less developed industry sectors would further lessen the effect. Considering the economy of Bernalillo County is almost twice that of all of the other 6 counties combined, this change of economic output contributed by motorized recreation on the Santa Fe National Forest would be even less of an impact.

Cumulative Effects

The loss of 0 - 13 jobs (or \$0 - \$341,930 in labor income) in the six county area would generally be imperceptible at the scale of the local economy. Despite increasing unemployment due to the recent economic downturn and ongoing management changes for motorized recreation on nearby public lands, the economic change resulting from reducing motorized use across the Forest by decreasing the amount of routes to be used would be so small as to be overshadowed by larger economic trends. Furthermore, a change in management that would slightly reduce motorized use on the Santa Fe National Forest may have positive economic impacts in a number of other areas:

- Increased non-motorized recreation in areas previously used for motorized recreation
- Increase in use of private businesses that cater to motorized recreation experiences less available on public lands
- Increase in use of other public lands to substitute for motorized recreation experiences less available on the Santa Fe National Forest
- Increased non-market values to surrounding areas from resource benefits (e.g. clean water, increased wildlife populations, etc.) resulting from decreased motorized recreation on the Santa Fe National Forest

Effects of Plan Amendments

The plan amendments would be required to keep this alternative in conformance with the Forest Plan. Those forestwide alternatives to modify the language in the Plan, to close the entire Forest (except designated routes and areas) to cross-country travel, and to remove the lower bounds of road density, would have no additional effects on the number of jobs, labor income, or other parts of the economy above what was analyzed in the direct and indirect effects of the alternative. Amendments for this alternative to allow designated motorized routes would not result in a change to what is occurring in the existing condition as these routes are already being driven on regularly. This alternative would still result in a decrease in the number of routes available to motorized use. As a result the proposed Forest Plan amendments would have no additional effects on the number of jobs, labor income, or other parts of the economy.

Forest Plan Consistency

This alternative is fully consistent with the guidance and direction in the Forest Plan relating to economic impacts. The explicit analyses of the potential economic impacts of this alternative illustrate the Forest's recognition of the economic importance of road and trail use for recreational and other activities. The information included in this analysis was created to inform management decision on how each alternative may affect economic inputs to local communities, which can affect their current ways of life.

Irreversible/Irretrievable Resources

According to the analysis, this alternative would not result in any changes resulting in irreversible or irretrievable resources.

Concern 2: Direct and Indirect Effects

For the purposes of this analysis areas identified in the ROS as either the Primitive and Semi-primitive Non-motorized (SPNM) designation are considered areas where motorized noise is most inappropriate. Those areas designated as Primitive or SPNM in ROS include wilderness areas, roadless areas, and other areas with motor vehicle restrictions in the Forest Plan.

Any designated route within or ¼ mile from the Primitive or SPNM areas is considered to potentially result in audible noise in these areas. The SPreAD-GIS model illustrated that regardless of vegetation, topography and other landscape or climatic features a majority of sound from motor vehicles generally occurs within ¼ mile of the source, although in some instances sound can be heard at farther distances or may be limited to less than this distance.

Concern 2: Alternative 1 – No Action

Under this alternative motorized use would occur over the greatest number of routes and thus would affect the greatest overall area. In addition, this alternative could result in more noise in areas designated to be managed for a recreation experience isolated from the sounds of people.

Based on current known routes, there would be a total of approximately 45.6 miles of roads and motorized trails within Primitive and Semi-primitive Non-motorized (SPNM) designations and an additional 263.1 miles of motorized roads and trails within ¼ mile of these areas. Overall this alternative would result in a total of 308.7 miles of motorized routes within or near areas of the Forest designated as least appropriate for noise from this type of use. This amount is more than any other alternative.

Table XXX. Miles of motorized roads and trails within or adjacent to noise-sensitive ROS designations for Alternative 1.

ROS designation	Roads	Trails
Primitive	9.0	0.2
Semi-primitive Non-motorized	22.4	14.0
Within a quarter mile of either	244.9	18.2
Total	276.3	32.4

Generally, motorized use of many of these roads and trails occurring in the back-country near or in the Primitive and SPNM areas is regular, but of low frequency. Those of greatest magnitude where tolerance of Forest visitors would likely be lowest would be the approximately 14.2 miles of motorized trails located within Primitive and SPNM areas. This portion would likely be the greatest impact because of the greater noise caused by OHVs compared to motor vehicles and their location directly in Primitive and SPNM areas.

In addition to these known routes, this alternative would also contribute to noise from cross-country travel. Though several of the alternatives include some small areas of cross-country travel, this alternative would include a much greater area and much of this area could result in noise infringement on Primitive and SPNM areas. For example, under this alternative there is approximately 66,256.3 acres of areas open to cross-country travel within ½ mile of designated Wilderness. Generally; however, the frequency and duration of this noise from cross-country in these areas travel would continue to be low as based on current estimates.

This alternative would also continue to result in noise to surrounding areas including primitive areas such as the Bandelier Wilderness. Currently there are no system roads immediately adjacent or within ¼ mile of the Bandelier Wilderness, however, there are areas adjacent to the Wilderness

on the Caja del Rio and in the Rabbit Hill area (north of the Dome Wilderness) that receive use by OHVs, likely resulting in motor vehicle noise that can be heard from within the Bandelier Wilderness. Generally; however, the frequency and duration of this noise from cross-country in these areas travel would continue to be low as based on current estimates.

Cumulative Effects

Other activities that result in additional sound within the Santa Fe National Forest could result in cumulatively increased noise impacts. Other activities that could act as sound sources in general Forest areas or those areas designated for a primitive experience include hunting, camping, or wood cutting.

In this alternative where there would be the most amount of routes for use and open cross-country travel across much of the Forest; hunting, camping, or use of chainsaws from woodcutting would result in a cumulative impact. Roads and trails facilitate access to the Forest. Where there is access, there is a greater likelihood for sound-producing activities to occur. As a result, since this alternative includes the greatest amount of routes in Primitive and SPNM areas, it would likely result in the greatest cumulative noise impact to all other Forest users and those who live in or adjacent to the Forest boundary.

Forest Plan Consistency

This alternative would be the least consistent with the guidance in the Forest Plan as it includes the greatest amount of routes in and near Primitive and SPNM areas, which are meant to provide a Forest experience with little or no noise from motor vehicles and other machinery. No amendments are proposed because this alternative cannot be selected due to the Travel Management Rule.

Irreversible/Irretrievable Resources

The sound from motor vehicles is temporary, generally of short duration, and does not have a permanent impact. Since the sound level produced by motor vehicles on the Forest is of short duration and of a magnitude from between 83 decibels (from 50 feet with no sound attenuation from vegetation, etc.) to 0, there is very little or no likelihood of human health effects from motor vehicle noise on the Santa Fe National Forest.

Concern 2: Alternative 2

This alternative reduces the total amount of routes by over half and reduces the amount of roads and motorized trails in or adjacent to areas of the Forest designated to be managed for a recreation experience isolated from the sounds of people by 160.5 miles. This alternative decreases the number of routes in Primitive areas by 62% and decreases 69% of the routes in SPNM areas that currently exist and are being used. Furthermore, this alternative would remove all cross-country travel in Primitive and SPNM areas of the Forest, except for those areas with camping corridors where vehicles would be able to drive up to 300 feet from the road. For example under this alternative the amount of acres within ½ mile of designated Wilderness open to cross-country travel would be reduced by 99.1%.

Table XXX. Miles of motorized roads and trails within or adjacent to noise-sensitive ROS designations in Alternative 2

ROS designation	Roads	Trails
Primitive	3.3	0.2
Semi-primitive Non-motorized	6.8	4.5
Within a quarter mile of either	116.9	16.5

Total	127.0	21.2
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Although this alternative would reduce the amount of sound from motorized vehicle in the more primitive and non-motorized areas of the Forest, it could marginally increase the frequency of noise from motor vehicles resulting from their sounds on designated routes. Since Alternative 2 action decreases the amount of roads and motorized trails available for motorized use 53%, there could be a concentration of use on the designated routes (Snyder et al. 2008). This concentration effect would be of greatest impact on designated motorized trails in or adjacent to Primitive or SPNM areas where existing use occurs regularly, but of low frequency.

Based on data collected in May 2009 on existing backcountry trails in the Cochiti Mesa area used by OHVs, there is an average of 2 – 2.5 OHVs per day with a daily maximum of up to 10 OHVs in one day. Assuming that the concentration effect would increase traffic by up to 10 or 20%, this would result in approximately one or two more OHVs per weekend day or an average increase of 0.2 – 0.3 OHVs per day. This concentration effect would largely be overshadowed by the reduction of motorized noise from cross-country travel and on routes not designated by this alternative, causing an overall reduction in motorized noise in and adjacent to P and SPNM areas.

This alternative would result in an overall reduction in noise from motorized vehicles to surrounding areas including primitive areas such as the Bandelier Wilderness. Currently there are no system roads immediately adjacent or within ¼ mile of the Bandelier Wilderness, however, this alternative would result in a decrease in motorized noise that could be heard from the Bandelier Wilderness by limiting opportunities for motorized cross-country travel on the Caja del Rio and north of the Dome Wilderness. This decrease in motorized noise is estimated to be small as the current frequency and duration of this noise from cross-country OHV use in these areas is estimated to be low.

Many comments received during the scoping period discussed OHV noise as an important concern. Since this alternative does not include additional requirements to limit sound from motorized vehicles, the magnitude of noise from motorized vehicles would not change. Since this alternative decreases the total amount of routes available for all motorized uses, noise from vehicles would be much less prevalent in the Forest, especially in those areas designated for retention of primitive and non-motorized characteristics. Some areas; however, where routes are designated would experience a higher frequency of noise from motor vehicles. One major benefit of moving to a designated system of motorized travel is that the use of motor vehicles across the Forest will become much more predictable and Forest visitors most sensitive or concerned about noise from motor vehicles can more easily avoid these areas.

Cumulative Effects

Generally this alternative curtails the prevalence of motor vehicle noise throughout the Forest. Furthermore it would reduce noise impacts to many forest visitors by establishing a more predictable system of where motorized noise would occur to allow sensitive Forest visitors to avoid these areas.

This alternative would not result in cumulative effects from noise impacts with any other federal actions, trends or projects. This alternative would result in a reduction of motorized noise in those areas designated for retention of primitive and non-motorized characteristics, which would be in contrast to a general increase in motorized noise from the trend of increasing OHV use across the Forest.

Effects of Plan Amendments

Several Forest Plan amendments would be required to keep this alternative in conformance with the Forest Plan. Those amendments to modify the language in the Plan, to close the entire Forest (except designated routes and areas) to cross-country travel, and to remove the lower bounds of road density, would have no additional effects on impacts from noise of motor vehicle use above what was analyzed in the direct and indirect effects of the alternative. Amendments for this alternative to modify various management areas to allow designated motorized routes would not result in the construction of any new routes or motorized use on any route where it is not currently occurring at some level. This alternative would still result in an overall decrease in the number of routes available to motorized use, although it would require site specific amendments to the Forest Plan to change management direction. The proposed Forest Plan amendments would have no additional effects on impacts of noise from motorized use above the direct and indirect effects analysis.

Forest Plan Consistency

This alternative would move conditions toward guidance in the Forest Plan as it results in more than a 75% reduction of routes in Primitive and SPNM areas, which are meant to provide a Forest experience with little or no noise from motor vehicles and other machinery.

Irreversible/Irretrievable Resources

The sound from motor vehicles is temporary, generally of short duration, and does not have a permanent impact. Since the sound level produced by motor vehicles on the Forest is of short duration and of a magnitude from between 83 decibels (from 50 feet with no sound attenuation from vegetation, etc.) to 0, there is very little or no likelihood of human health effects from motor vehicle noise on the Santa Fe National Forest.

Concern 2: Alternative 3

Alternative 3 reduces the total amount of routes by 66% resulting in a reduction in the amount of roads and motorized trails in or adjacent to areas of the Forest designated to be managed for a recreation experience isolated from the sounds of people by almost 210 miles, or 68%. This alternative decreases the mileage of routes in Primitive areas by 91% and the mileage of routes in SPNM areas by 88%. Furthermore, this alternative would remove all cross-country travel in Primitive and SPNM areas of the Forest and would include no dispersed camping or motorized big game retrieval corridors, which would also further decrease noise infringement on Primitive and SPNM areas.

Table XXX. Miles of motorized roads and trails within or adjacent to noise-sensitive ROS designations in Alternative 3

ROS designation	Roads	Trails
Primitive	0.8	0
Semi-primitive Non-motorized	4.3	0
Within a quarter mile of either	93.2	0.6
Total	98.3	0.6

Although this alternative would reduce the amount of sound from motorized vehicle in the more primitive and non-motorized areas of the Forest, it could increase the frequency of noise from motor vehicles resulting from their sounds on designated routes. Since Alternative 3 decreases the amount of roads and motorized trails available for motorized use by over half, there could be a concentration of use on the designated routes (Snyder et al. 2008). This concentration effect would be of greatest impact on designated motorized trails in or adjacent to Primitive or SPNM areas where existing use occurs regularly, but of low frequency.

Based on data collected in May 2009 on existing trails in ROS SPNM areas in the Cochiti Mesa area used by OHVs, there is an average of 2 – 2.5 OHVs per day with a daily maximum of up to 11 OHVs in one day. The trails measured in this study are not designated under this alternative; however, assuming the use of these trails is somewhat similar to those that are included in this alternative and that the concentration effect would increase traffic by up to 10 or 20%; this would result in approximately one or two more OHVs per weekend day or an average increase of 0.2 – 0.3 OHVs per day.

This alternative would result in an overall reduction in noise from motorized vehicles to surrounding areas including primitive areas such as the Bandelier Wilderness. Currently there are no system roads immediately adjacent or within ¼ mile of the Bandelier Wilderness, however, this alternative would remove several routes within a mile of the boundary west of the Bandelier Wilderness. Additionally, this alternative would result in a decrease in motorized noise that could be heard from the Bandelier Wilderness by limiting opportunities for motorized cross-country travel on the Caja del Rio and north of the Dome Wilderness. This decrease in motorized noise is estimated to be small as the current frequency and duration of this noise from cross-country OHV use in these areas is estimated to be low.

Many comments received during the scoping period discussed OHV noise as an important concern. Since this alternative does not include additional requirements to limit sound from motorized vehicles, the magnitude of noise from motorized vehicles would not change. Since this alternative decreases the total amount of routes available for all motorized uses, noise from vehicles would be much less prevalent in the Forest, especially in those areas designated for retention of primitive and non-motorized characteristics. Some areas; however, where routes are designated could experience a higher frequency of noise from motor vehicles. One major benefit of moving to a designated system of motorized travel is that the use of motor vehicles across the Forest will become much more predictable and Forest visitors most sensitive or concerned about noise from motor vehicles can more easily avoid these areas.

Cumulative Effects

Sound resulting from motorized use on the Santa Fe National Forest results in noise within the Forest and adjacent to the Forest boundaries. Thus, the cumulative effects analysis is bounded spatially by the Forest boundary and immediately adjacent areas. This alternative curtails the prevalence of motor vehicle noise throughout the Forest. Furthermore, it would substantially reduce noise impacts to many forest visitors by establishing a more predictable system of where motorized noise would occur to allow sensitive Forest visitors to avoid these areas.

In some areas near designated routes, there could be an increase in the frequency of motorized noise as a result of the potential for concentrated use. Over the past several decades, there has been a trend of increasing motor vehicle use, especially from OHVs, on the Forest resulting in a greater frequency of motorized sound in specific areas. Increasing recreation on the Forest has generally been focused on highly popular areas such as the Jemez National Recreation Area, the Hyde Park area, and Pecos Canyon by the reconstruction of several campgrounds, trailheads, and establishment of several national areas of interest such as the Jemez National Recreation Area, Pecos Wild and Scenic River, and East Fork of the Jemez Wild and Scenic River.

In addition, it is estimated motorized recreation has become more concentrated over the last several decades because of the dozens of Forest motor vehicle closures that have been put in place over the past several decades to protect various Forest resources (for example, the Jemez District has established 25 closure orders since 1984). Over the years, these decisions have

resulted in a cumulative decrease in noise near areas with sensitive water and wildlife resources, but a cumulative increase from concentration of motorized use in preferred areas outside of these closures (Snyder et al. 2008).

Though this alternative could lead to a cumulative increase in the frequency of motorized sound in specific areas from concentrated motorized use, this increase in the frequency of motorized sound near designated routes would not necessarily result in a greater cumulative noise impact on Forest users or adjacent areas. This is because the number of routes in and adjacent to Primitive and SPNM areas would be decreased by approximately 68% and these are the areas in the Forest most sensitive to impacts from the sights and sounds of motorized uses.

Effects of Plan Amendments

Several Forest Plan amendments would be required to keep this alternative in conformance with the Forest Plan. Those amendments to modify the language in the Plan, to close the entire Forest (except designated routes and areas) to cross-country travel, and to remove the lower bounds of road density, would have no additional effects on impacts from noise of motor vehicle use above what was analyzed in the direct and indirect effects of the alternative. Amendments for this alternative to modify various management areas to allow designated motorized routes would not result in the construction of any new routes or motorized use on any route where it is not currently occurring at some level. This alternative would still result in an overall decrease in the number of routes available to motorized use, although it would require site specific amendments to the Forest Plan to change management direction. The proposed Forest Plan amendments would have no additional effects on impacts of noise from motorized use above the direct and indirect effects analysis.

Forest Plan Consistency

This alternative would move conditions toward guidance in the Forest Plan as it results in a reduction of routes in Primitive and SPNM areas by 89%, which are meant to provide a Forest experience with little or no noise from motor vehicles and other machinery.

Irreversible/Irretrievable Resources

The sound from motor vehicles is temporary, generally of short duration, and does not have a permanent impact. Since the sound level produced by motor vehicles on the Forest is of short duration and of a magnitude from between 83 decibels (from 50 feet with no sound attenuation from vegetation, etc.) to 0, there is very little or no likelihood of human health effects from motor vehicle noise on the Santa Fe National Forest.

Concern 2: Alternative 4

Alternative 4 reduces the total amount of routes by 45%, which results in a 46% reduction of 140.6 miles or 46% of the roads and motorized trails in or adjacent to areas of the Forest designated to be managed for a recreation experience isolated from the sounds of people. This alternative decreases the mileage of motorized routes in Primitive areas by 87% and decreases the mileage of routes in SPNM areas that currently exist and are being used by almost 37%. Furthermore, this alternative would remove all cross-country travel in Primitive and SPNM areas of the Forest, except for dispersed camping corridors and game retrieval corridors.

Table XXX. Miles of motorized roads and trails within or adjacent to noise-sensitive ROS designations in Alternative 4

ROS designation	Roads	Trails
Primitive	1.0	0.2
Semi-primitive Non-motorized	14.0	9.2

Within a quarter mile of either	122.0	21.8
Total	137.0	31.2

Although this alternative would reduce the amount of sound from motorized vehicles in the more primitive and non-motorized areas of the Forest, it could increase the frequency of noise from motor vehicles resulting from their sounds on designated routes. Since this alternative decreases the amount of roads and motorized trails available for motorized use by 45%, there could be a concentration of use on the designated routes (Snyder et al. 2008); albeit less of a concentration than the other action alternatives. This concentration effect would be of greatest impact on designated motorized trails in or adjacent to Primitive or SPNM areas where existing use occurs regularly, but of low frequency.

Based on data collected in May 2009 on existing trails in ROS SPNM areas in the Cochiti Mesa area used by OHVs, there is an average of 2 – 2.5 OHVs per day with a daily maximum of up to 11 OHVs in one day. Assuming that the concentration effect would increase traffic by up to 10%; would result in approximately one more per weekend day or an average increase of 0.2 OHVs per day.

This alternative would result in an overall reduction in noise from motorized vehicles to surrounding areas by creating a designated system of roads and trails. Yet this reduction would be very small as infrequent motorized noise would still occur from cross-country travel because of dispersed camping corridors and motorized big game retrieval. In some situations, the designation of roads that are currently closed could increase the noise from motorized vehicles. For example, this alternative would increase the amount of roads within ¼ mile of the Bandelier Wilderness, by designating two roads that are currently closed on the Caja del Rio and Obsidian Ridge.

Many comments received during the scoping period discussed OHV noise as an important concern. Since this alternative does not include additional requirements to limit sound from motorized vehicles, the magnitude of noise from motorized vehicles would not change but the location of the noise and frequency of noise at each location may change. Since this alternative decreases the total amount of routes available for all motorized uses, noise from vehicles would be much less prevalent in the Forest, especially in those areas designated for retention of primitive and non-motorized characteristics.

This alternative; however, would result in more prevalent motor vehicle noise than any other action alternative. This alternative would still result in establishment of a designated system of motorized travel where the use of motor vehicles across the Forest would become more predictable and Forest visitors most sensitive or concerned about noise from motor vehicles can avoid these areas. However, because of dispersed camping corridors and game retrieval corridors, there still may be some audible motor vehicle noise across much of the Forest including in primitive and non-motorized areas, albeit at a very low frequency in areas away from designated routes. For example, it is estimated that motorized big game retrieval corridors would result in 438 trips by motorized vehicles to retrieve downed game. Considering this use would be spread across approximately 1 million acres, it would be very infrequent.

Cumulative Effects

Sound resulting from motorized use on the Santa Fe National Forest results in noise within the Forest and adjacent to the Forest boundaries. Thus, the cumulative effects analysis is bounded spatially by the Forest boundary and immediately adjacent areas. This alternative curtails the prevalence of motor vehicle noise throughout the Forest. Furthermore, it would reduce noise

impacts to many forest visitors by establishing a more predictable system of where motorized noise would occur to allow sensitive Forest visitors to avoid these areas.

In some areas near designated routes, there could be an increase in the frequency of motorized noise as a result of the potential for concentrated use. Over the past several decades, there has been a trend of increasing motor vehicle use, especially from OHVs, on the Forest resulting in a greater frequency of motorized sound in specific areas. Increasing recreation on the Forest has generally been focused on highly popular areas such as the Jemez National Recreation Area, the Hyde Park area, and Pecos Canyon by the reconstruction of several campgrounds, trailheads, and establishment of several national areas of interest such as the Jemez National Recreation Area, Pecos Wild and Scenic River, and East Fork of the Jemez Wild and Scenic River.

In addition, it is estimated motorized recreation has become more concentrated over the last several decades because of the dozens of Forest motor vehicle closures that have been put in place over the past several decades to protect various Forest resources (for example, the Jemez District has established 25 closure orders since 1984). Over the years, these decisions have resulted in a cumulative decrease in noise near areas with sensitive water and wildlife resources, but a cumulative increase from concentration of motorized use in preferred areas outside of these closures (Snyder et al. 2008). This alternative would designate routes in some areas previously closed to motorized use, thus somewhat decreasing the potential for concentrated motorized use.

Though this alternative could lead to a cumulative increase in the frequency of motorized sound in specific areas from concentrated motorized use, this increase in the frequency of motorized sound near designated routes would not necessarily result in a greater cumulative noise impact on Forest users or adjacent areas. This is because the number of routes in and adjacent to Primitive and SPNM areas would be decreased by approximately 46% and these are the areas in the Forest most sensitive to impacts from the sights and sounds of motorized uses.

Effects of Plan Amendments

Several Forest Plan amendments would be required to keep this alternative in conformance with the Forest Plan. Those amendments to modify the language in the Plan, to close the entire Forest (except designated routes and areas) to cross-country travel, and to remove the lower bounds of road density, would have no additional effects on impacts from noise of motor vehicle use above what was analyzed in the direct and indirect effects of the alternative. Amendments for this alternative to modify various management areas to allow designated motorized routes would not result in the construction of any new routes, but would allow motorized use on a small mileage of routes where it is currently prohibited. For example, this alternative would designate Forest Service Trail 424 as a motorized trail, thus allowing motorized use in areas currently closed to motorized use in the Forest Plan. As a result, this alternative would require plan amendments that would increase motorized noise in areas where non-motorized uses currently predominate, potentially resulting in local displacement of some recreational users. This alternative while possibly resulting in motorized noise in areas where it currently does not exist, would still result in an overall decrease in amount of motorized sound in primitive and non-motorized areas as designated by the Forest Plan.

Forest Plan Consistency

This alternative would move conditions toward guidance in the Forest Plan as it results in a reduction of approximately 47% of routes in Primitive and SPNM areas, which are meant to provide a Forest experience with little or no noise from motor vehicles and other machinery.

Irreversible/Irretrievable Resources

The sound from motor vehicles is temporary, generally of short duration, and does not have a permanent impact. Since the sound level produced by motor vehicles on the Forest is of short duration and of a magnitude from between 83 decibels (from 50 feet with no sound attenuation from vegetation, etc.) to 0, there is very little or no likelihood of human health effects from motor vehicle noise on the Santa Fe National Forest.

Concern 2: Alternative 5

Alternative 5 reduces the total amount of routes by 54% and decreases the amount of roads and motorized trails in or adjacent to areas of the Forest designated to be managed for a recreation experience isolated from the sounds of people by 176.9 miles or 57%. This alternative includes decreases the mileage of routes in Primitive areas by 91% decreases the mileage of routes in SPNM areas by 56%. Furthermore, this alternative would reduce noise impacts to many forest visitors by limiting dispersed camping corridors to 294.1 miles of road and motorized big game retrieval areas to 371.4 miles of road, almost all of which is outside of Primitive and SPNM areas. Lastly, this alternative would establish a more predictable system of where motorized noise would occur to allow sensitive Forest visitors to avoid these areas.

Table XXX. Miles of motorized roads and trails within or adjacent to noise-sensitive ROS designations in Alternative 5

ROS designation	Roads	Trails
Primitive	0.6	0.2
Semi-primitive Non-motorized	6.7	9.2
Within a quarter mile of either	98.7	16.4
Total	106.0	25.8

This alternative would reduce the amount of sound from motorized vehicle in the more primitive and non-motorized areas of the Forest, but could increase the frequency of noise from motor vehicles resulting from their sounds on designated routes. This alternative was designed to specifically concentrate motorized use while, reducing motorized routes in all other areas including system trails, private property, wilderness, and sensitive wildlife habitat. This would have the effect of generally moving motorized noise away from most areas of the Forest where the sights and sounds of motorized vehicles is undesirable. Yet, the camping corridors, motorized big game retrieval areas could result in some motorized noise in Primitive and SPNM areas, albeit it is estimated that it would be very infrequent.

This alternative would result in an overall reduction in noise from motorized vehicles to surrounding areas including primitive areas such as the Bandelier Wilderness. Currently there are no system roads immediately adjacent or within ¼ mile of the Bandelier Wilderness, however, this alternative would remove several routes within a mile of the boundary west of the Bandelier Wilderness. Additionally, this alternative would result in a decrease in motorized noise that could be heard from the Bandelier Wilderness by limiting opportunities for motorized cross-country travel on the Caja del Rio and north of the Dome Wilderness. Although this alternative does include dispersed camping corridors and motorized big game retrieval corridors, the nearest corridor is approximately 2 miles from the boundary with the Bandelier Wilderness. This decrease in motorized noise is estimated to be small as the current frequency and duration of this noise from cross-country OHV use in these areas is estimated to be low.

Many comments received during the scoping period discussed OHV noise as an important concern. Since this alternative does not include additional requirements to limit sound from motorized vehicles, the magnitude of noise from motorized vehicles would not change. Since this

alternative decreases the total amount of routes available for all motorized uses and motorized use is concentrated in areas generally away from areas where non-motorized uses dominate, noise from vehicles would have less impact.

Cumulative Effects

Sound resulting from motorized use on the Santa Fe National Forest results in noise within the Forest and adjacent to the Forest boundaries. Thus, the cumulative effects analysis is bounded spatially by the Forest boundary and immediately adjacent areas. This alternative curtails the prevalence of motor vehicle noise throughout the Forest. Furthermore, it would reduce noise impacts to many forest visitors by establishing a more predictable system of where motorized noise would occur to allow sensitive Forest visitors to avoid these areas.

In some areas near designated routes, there could be an increase in the frequency of motorized noise as a result of the potential for concentrated use. Over the past several decades, there has been a trend of increasing motor vehicle use, especially from OHVs, on the Forest resulting in a greater frequency of motorized sound in specific areas. Increasing recreation on the Forest has generally been focused on highly popular areas such as the Jemez National Recreation Area, the Hyde Park area, and Pecos Canyon by the reconstruction of several campgrounds, trailheads, and establishment of several national areas of interest such as the Jemez National Recreation Area, Pecos Wild and Scenic River, and East Fork of the Jemez Wild and Scenic River.

In addition, it is estimated motorized recreation has become more concentrated over the last several decades because of the dozens of Forest motor vehicle closures that have been put in place over the past several decades to protect various Forest resources (for example, the Jemez District has established 25 closure orders since 1984). Over the years, these decisions have resulted in a cumulative decrease in noise near areas with sensitive water and wildlife resources, but a cumulative increase from concentration of motorized use in preferred areas outside of these closures (Snyder et al. 2008). This alternative would further concentrate motorized use, but would result in a decreased noise impact by decreasing the amount of motorized noise in areas designated as Primitive and SPNM.

Though this alternative could lead to a cumulative increase in the frequency of motorized sound in specific areas from concentrated motorized use, this increase in the frequency of motorized sound near designated routes would not necessarily result in a greater cumulative noise impact on Forest users or adjacent areas. This is because the number of routes in and adjacent to Primitive and Semi-primitive Non-motorized areas would be decreased by approximately 63% and these are the areas in the Forest most sensitive to impacts from the sights and sounds of motorized uses.

Effects of Plan Amendments

Several Forest Plan amendments would be required to keep this alternative in conformance with the Forest Plan. Those amendments to modify the language in the Plan, to close the entire Forest (except designated routes and areas) to cross-country travel, and to remove the lower bounds of road density, would have no additional effects on impacts from noise of motor vehicle use above what was analyzed in the direct and indirect effects of the alternative. Amendments for this alternative to modify various management areas to allow designated motorized routes would not result in the construction of any new routes or motorized use on any route where it is not currently occurring at some level. This alternative would still result in an overall decrease in the number of routes available to motorized use, although it would require site specific amendments to the Forest Plan to change management direction. The proposed Forest Plan amendments would have no additional effects on impacts of noise from motorized use above the direct and indirect effects analysis.

Forest Plan Consistency

This alternative would move conditions toward guidance in the Forest Plan as it results in a reduction of approximately 63% of routes in Primitive and SPNM areas, which are meant to provide a Forest experience with little or no noise from motor vehicles and other machinery.

Irreversible/Irretrievable Resources

The sound from motor vehicles is temporary, generally of short duration, and does not have a permanent impact. Since the sound level produced by motor vehicles on the Forest is of short duration and of a magnitude from between 83 decibels (from 50 feet with no sound attenuation from vegetation, etc.) to 0, there is very little or no likelihood of human health effects from motor vehicle noise on the Santa Fe National Forest.

Concern 4: Direct and Indirect Effects

The effects of route designation on traditional activities such as piñon picking and other non-timber forest products such as herbs, plant materials, and mushrooms are the focus of this analysis. There are many other traditional activities and practices regularly occurring by various populations on the Santa Fe National Forest as well. Many of these activities such as fuelwood collection, grazing, and timber-related products are not considered here because they are currently regulated under a permit system, which can allow for exceptions to use of only designated routes if specifically recorded in the permit. Other traditional activities are analyzed in the cultural resources analysis.

Concern 4: Alternative 1 – No Action

Under the existing condition there are approximately 844.6 miles of known roads in habitat types where piñon is a major component. Additionally, much of the area within the Forest covered by piñon vegetation types is open to cross-country travel. For mixed conifer, aspen, and cottonwood vegetation types, there are approximately 1,107 miles of roads. Cross-country travel is allowed in much of this area as well, though likely not as much as for other habitat types as Wilderness and current Forest Closure designations tend to be in drainage bottoms and higher elevations where these vegetation types persist.

Since this alternative would not result in any change to the existing condition, there would be no impacts from restricting cultural activities such as the collecting of piñon nuts, plant materials, herbs, or mushrooms.

Cumulative Effects

This alternative does not change current management and as a result would have no effect on the collecting of piñon nuts, plant materials, herbs, or mushrooms. Since there is no direct or indirect effect, there would be no cumulative effect from this alternative.

Forest Plan Consistency

The Management Direction in the Forest Plan includes language to, “Manage Forest activities and programs within the capability of the land while recognizing the value of maintaining the traditional cultures of northern New Mexico (USDA Forest Service 1987).” This alternative would maintain access necessary for cultural and traditional practices of the Forest as well as maintain currently protected areas across the Forest.

Irreversible/Irretrievable Resources

This alternative would not result in any changes to current management. As a result there would be no resulting impacts to resources that would be irreversible or irretrievable.

Concern 4: Alternative 2

This alternative reduces the miles of roads in habitat types where piñon is a major component by 468.5 miles or 55%. For mixed conifer, aspen, and cottonwood vegetation types, the mileage open for motorized travel would be reduced approximately by 667 miles or 60% of the existing known roads. Additionally, this alternative prohibits cross-country motorized travel across the Forest except for 40.3 acres. This alternative does include cross-country travel for purposes of dispersed camping and motorized big game retrieval; however, these corridors are not expected to facilitate the collecting of piñon nuts, plant materials, herbs, or mushrooms. Activities such as fuelwood collection, grazing, and timber-related products are not expected to be impacted because they are currently regulated under a permit system.

Overall this alternative would decrease access to many areas with potential cultural or traditional uses across the Forest. Though this alternative would not modify access by traditional means of travel by foot or horse, it would make travel to areas farther from designated routes more difficult.

The positive impact of this alternative is that it may reduce conflict caused by increasing recreational use in areas used for cultural or traditional purposes. The reduction in motorized access in these areas is likely to reduce multiple uses in these areas, which has been recorded to cause user conflict in some instances in surveys of users of National Forests in northern New Mexico (Russel and Adams-Russel 2006).

Cumulative Effects

Since the establishment of the Santa Fe National Forest Plan in 1987, there have been a number of laws, regulations, and orders put in place that have generally restricted access with motorized vehicles such as the establishment of the Jemez National Recreation Area, the East Fork of the Jemez Wild and Scenic River, the Pecos Wild and Scenic River, and Kasha Katuwe (Tent Rocks) National Monument; the development of the lower Jemez Corridor and implementation of the Respect the Rio Program, which have limited vehicular access in stream buffer zones; land transactions removing parts of the southeast part of the Jemez Ranger District from public access and the proposed sale of portions of the National Forest System to the San Ildefonso Pueblo and the Pecos National Historic Park; and several administrative closures throughout the Forest. Other adjacent land owners and managers such as the Bureau of Land Management, the Cibola National Forest, and the Carson National Forest, are also going through processes to manage the use of motorized vehicles to designated routes. Overall these changes will also result in a decrease in overall access using motor vehicles. Though there have been some land acquisitions (Gascon Point and Mesita Blanca) and recreation and OHV and motor vehicle technologies have improved to allow for greater access across difficult terrain, the overall result of these changes have been to cumulatively decrease motorized access in public lands across the Northern New Mexico region.

In addition to a general decrease in motorized access within and in areas adjacent to the Santa Fe National Forest, there has been a major increase in Forest use and especially motorized use over the last 30 years since the establishment of the Santa Fe National Forest Plan. As a result, it is most likely that Forest use and impacts from various Forest uses, including motorized use has been concentrated and increased.

The cumulative impact resulting from all Forest uses on traditional and cultural practices is reduced motorized access to areas used for traditional purposes in the Santa Fe National Forest and surrounding public lands. The magnitude and extent of these traditional practices are generally not known. Restricting vehicular access, however, could make it cumulatively more

difficult for activities such as collecting of piñon nuts, plant materials, herbs, or mushrooms in areas used for these traditional activities in northern New Mexico.

Effects of Plan Amendments

Several Forest Plan amendments would be required to keep this alternative in conformance with the Forest Plan. Those forest wide alternatives to modify the language in the Plan, to close the entire Forest (except designated routes and areas) to cross-country travel, and to remove the lower bounds of road density, would have no additional effects on impacts to traditional and cultural practices above what was analyzed in the direct and indirect effects of the alternative.

Amendments for this alternative to modify various management areas to allow designated motorized routes would not result in the construction of any new routes or motorized use on any route where it is not currently occurring at some level. The proposed Forest Plan amendments would have no additional effects on impacts to traditional and cultural practices above the direct and indirect effects analysis.

Forest Plan Consistency

The Forest Plan direction includes language to, “Manage Forest activities and programs within the capability of the land while recognizing the value of maintaining the traditional cultures of northern New Mexico (USDA Forest Service 1987).” This alternative would maintain access necessary for cultural and traditional practices of the Forest, albeit motorized access would be curtailed by more than half of known use. This alternative would likely increase the capacity of the Forest to provide for forest resources used in traditional and cultural practices by decreasing resource impacts caused by motorized use.

Irreversible/Irretrievable Resources

The negative impact from this alternative would be to limit motor vehicle access that could be used in the pursuit of cultural or traditional activities. This alternative would not limit other forms of access nor would the impacts of this decision be irreversible or irretrievable because route designation could be changed or motorized access could be authorized via a permitted use in special circumstances.

Concern 4: Alternative 3

This alternative reduces the miles of roads in habitat types where piñon is a major component by 551.1 miles or 65%. For mixed conifer, aspen, and cottonwood vegetation types, the mileage open for motorized travel would be reduced approximately by 756 miles or 68% of the existing known roads. Additionally, this alternative prohibits all forms of cross-country motorized travel across the Forest. Activities such as fuelwood collection, grazing, and timber-related products are not expected to be impacted because they are currently regulated under a permit system.

Overall this alternative would decrease access to many areas with potential cultural or traditional uses across the Forest. Though this alternative would not modify access by traditional means of travel by foot or horse, it would make travel to areas farther from designated routes more difficult.

The positive impact of this alternative is that it may reduce conflict caused by increasing recreational use in areas used for cultural or traditional purposes. The reduction in motorized access in these areas is likely to reduce multiple uses in these areas, which has been recorded to cause user conflict in some instances in surveys of users of National Forests in northern New Mexico (Russel and Adams-Russel 2006).

Cumulative Effects

Since the establishment of the Santa Fe National Forest Plan in 1987, there have been a number of laws, regulations, and orders put in place that have generally restricted access with motorized vehicles such as the establishment of the Jemez National Recreation Area, the East Fork of the Jemez Wild and Scenic River, the Pecos Wild and Scenic River, and Kasha Katuwe (Tent Rocks) National Monument; the development of the lower Jemez Corridor and implementation of the Respect the Rio Program, which have limited vehicular access in stream buffer zones; land transactions removing parts of the southeast part of the Jemez Ranger District from public access and the proposed sale of portions of the National Forest System to the San Ildefonso Pueblo and the Pecos National Historic Park; and several administrative closures throughout the Forest. Other adjacent land owners and managers such as the Bureau of Land Management, the Cibola National Forest, and the Carson National Forest, are also going through processes to manage the use of motorized vehicles to designated routes. Overall these changes will also result in a decrease in overall access using motor vehicles. Though there have been some land acquisitions (Gascon Point and Mesita Blanca) and recreation and OHV and motor vehicle technologies have improved to allow for greater access across difficult terrain, the overall result of these changes have been to cumulatively decrease motorized access in public lands across the northern New Mexico region.

In addition to a general decrease in motorized access within and in areas adjacent to the Santa Fe National Forest, there has been a major increase in Forest use and especially motorized use over the last 30 years since the establishment of the Santa Fe National Forest Plan. As a result, it is most likely that Forest use and impacts from various Forest uses, including motorized use has been concentrated and increased.

The cumulative impact resulting from all Forest uses on traditional and cultural practices is reduced motorized access to areas used for traditional purposes in the Santa Fe National Forest and surrounding public lands. The magnitude and extent of these traditional practices are generally not known. Restricting vehicular access, however, could make it cumulatively more difficult for activities such as collecting of piñon nuts, plant materials, herbs, or mushrooms in areas used for these traditional activities in northern New Mexico.

Effects of Plan Amendments

Several Forest Plan amendments would be required to keep this alternative in conformance with the Forest Plan. Those forest wide alternatives to modify the language in the Plan, to close the entire Forest (except designated routes and areas) to cross-country travel, and to remove the lower bounds of road density, would have no additional effects on impacts to traditional and cultural practices above what was analyzed in the direct and indirect effects of the alternative.

Amendments for this alternative to modify various management areas to allow designated motorized routes would not result in the construction of any new routes or motorized use on any route where it is not currently occurring at some level. The proposed Forest Plan amendments would have no additional effects on impacts to traditional and cultural practices above the direct and indirect effects analysis.

Forest Plan Consistency

The Management Direction in the Forest Plan includes language to, “Manage Forest activities and programs within the capability of the land while recognizing the value of maintaining the traditional cultures of northern New Mexico (USDA Forest Service 1987).” This alternative would maintain access necessary for cultural and traditional practices of the Forest, albeit motorized access would be curtailed by more than half of known use. This alternative would likely increase the capacity of the Forest to provide for forest resources used in traditional and cultural practices by decreasing resource impacts caused by motorized use.

Irreversible/Irretrievable Resources

The negative impact from this alternative would be to limit motor vehicle access that could be used in the pursuit of cultural or traditional activities. This alternative would not limit other forms of access nor would the impacts of this decision be irreversible or irretrievable as route designation could be changed or motorized access could be authorized via a permitted use in special circumstances.

Concern 4: Alternative 4

This alternative reduces the miles of roads in habitat types where piñon is a major component by 412.1 miles or 48.8%. For mixed conifer, aspen, and cottonwood vegetation types, the mileage open for motorized travel would be reduced approximately by 568.5 miles or 51% of the existing known roads. Additionally, this alternative prohibits cross-country motorized travel across the Forest except for 48.7 acres. This alternative does include cross-country travel for purposes of dispersed camping and motorized big game retrieval; however, these corridors are not expected to facilitate the collecting of piñon nuts, plant materials, herbs, or mushrooms. Activities such as fuelwood collection, grazing, and timber-related products are not expected to be impacted because they are currently regulated under a permit system.

Overall this alternative would decrease access to many areas with potential cultural or traditional uses across the Forest. Though this alternative would not modify access by traditional means of travel by foot or horse, it would make travel to areas farther from designated routes more difficult.

The positive impact of this alternative is that it may reduce conflict caused by increasing recreational use in areas used for cultural or traditional purposes. The reduction in motorized access in these areas is likely to reduce multiple uses in these areas, which has been recorded to cause user conflict in some instances in surveys of users of National Forests in northern New Mexico (Russel and Adams-Russel 2006).

Cumulative Effects

Since the establishment of the Santa Fe National Forest Plan in 1987, there have been a number of laws, regulations, and orders put in place that have generally restricted access with motorized vehicles such as the establishment of the Jemez National Recreation Area, the East Fork of the Jemez Wild and Scenic River, the Pecos Wild and Scenic River, and Kasha Katuwe (Tent Rocks) National Monument; the development of the lower Jemez Corridor and implementation of the Respect the Rio Program, which have limited vehicular access in stream buffer zones; land transactions removing parts of the southeast part of the Jemez Ranger District from public access and the proposed sale of portions of the National Forest System to the San Ildefonso Pueblo and the Pecos National Historic Park; and several administrative closures throughout the Forest. Other adjacent land owners and managers such as the Bureau of Land Management, the Cibola National Forest, and the Carson National Forest, are also going through processes to manage the use of motorized vehicles to designated routes. Overall these changes will also result in a decrease in overall access using motor vehicles. Though there have been some land acquisitions (Gascon Point and Mesita Blanca) and recreation and OHV and motor vehicle technologies have improved to allow for greater access across difficult terrain, the overall result of these changes have been to cumulatively decrease motorized access in public lands across the Northern New Mexico region.

In addition to a general decrease in motorized access within and in areas adjacent to the Santa Fe National Forest, there has been a major increase in Forest use and especially motorized use over the last 30 years since the establishment of the Santa Fe National Forest Plan. As a result, it is

most likely that Forest use and impacts from various Forest uses, including motorized use has been concentrated and increased.

The cumulative impact resulting from all Forest uses on traditional and cultural practices is reduced motorized access to areas used for traditional purposes in the Santa Fe National Forest and surrounding public lands. The magnitude and extent of these traditional practices are generally not known. Restricting vehicular access, however, could make it cumulatively more difficult for activities such as collecting of piñon nuts, plant materials, herbs, or mushrooms in areas used for these traditional activities in northern New Mexico.

Effects of Plan Amendments

Several Forest Plan amendments would be required to keep this alternative in conformance with the Forest Plan. Those forest wide alternatives to modify the language in the Plan, to close the entire Forest (except designated routes and areas) to cross-country travel, and to remove the lower bounds of road density, would have no additional effects on impacts to traditional and cultural practices above what was analyzed in the direct and indirect effects of the alternative. Amendments for this alternative to modify various management areas to allow designated motorized routes would not result in the construction of any new routes or new motorized use on any route where there are known traditional or cultural practices. The proposed Forest Plan amendments would have no additional effects on impacts to traditional and cultural practices above the direct and indirect effects analysis.

Forest Plan Consistency

The Management Direction in the Forest Plan includes language to, “Manage Forest activities and programs within the capability of the land while recognizing the value of maintaining the traditional cultures of northern New Mexico (USDA Forest Service 1987).” This alternative would maintain access necessary for cultural and traditional practices of the Forest, albeit motorized access would be curtailed by more than half of known use. This alternative would likely increase the capacity of the Forest to provide for forest resources used in traditional and cultural practices by decreasing resource impacts caused by motorized use.

Irreversible/Irretrievable Resources

The negative impact from this alternative would be to limit motor vehicle access that could be used in the pursuit of cultural or traditional activities. This alternative would not limit other forms of access nor would the impacts of this decision be irreversible or irretrievable as route designation could be changed or motorized access could be authorized via a permitted use in special circumstances.

Concern 4: Alternative 5

This alternative reduces the miles of roads in habitat types where piñon is a major component by 456.8 miles or 54%. For mixed conifer, aspen, and cottonwood vegetation types, the mileage open for motorized travel would be reduced approximately by 649.5 miles or 59% of the existing known roads. Additionally, this alternative prohibits cross-country motorized travel across the Forest except for 35.2 acres. This alternative does include cross-country travel for purposes of dispersed camping and motorized big game retrieval; however, these corridors are not expected to facilitate the collecting of piñon nuts, plant materials, herbs, or mushrooms. Activities such as fuelwood collection, grazing, and timber-related products are not expected to be impacted because they are currently regulated under a permit system.

Overall this alternative would decrease access to many areas with potential cultural or traditional uses across the Forest. Though this alternative would not modify access by traditional means of

travel by foot or horse, it would make travel to areas farther from designated routes more difficult.

The positive impact of this alternative is that it may reduce conflict caused by increasing recreational use in areas used for cultural or traditional purposes. The reduction in motorized access in these areas is likely to reduce multiple uses in these areas, which has been recorded to cause user conflict in some instances in surveys of users of National Forests in northern New Mexico (Russel and Adams-Russel 2006).

Cumulative Effects

Since the establishment of the Santa Fe National Forest Plan in 1987, there have been a number of laws, regulations, and orders put in place that have generally restricted access with motorized vehicles such as the establishment of the Jemez National Recreation Area, the East Fork of the Jemez Wild and Scenic River, the Pecos Wild and Scenic River, and Kasha Katuwe (Tent Rocks) National Monument; the development of the lower Jemez Corridor and implementation of the Respect the Rio Program, which have limited vehicular access in stream buffer zones; land transactions removing parts of the southeast part of the Jemez Ranger District from public access and the proposed sale of portions of the National Forest System to the San Ildefonso Pueblo and the Pecos National Historic Park; and several administrative closures throughout the Forest. Other adjacent land owners and managers such as the Bureau of Land Management, the Cibola National Forest, and the Carson National Forest, are also going through processes to manage the use of motorized vehicles to designated routes. Overall these changes will also result in a decrease in overall access using motor vehicles. Though there have been some land acquisitions (Gascon Point and Mesita Blanca) and recreation and OHV and motor vehicle technologies have improved to allow for greater access across difficult terrain, the overall result of these changes have been to cumulatively decrease motorized access in public lands across the Northern New Mexico region.

In addition to a general decrease in motorized access within and in areas adjacent to the Santa Fe National Forest, there has been a major increase in Forest use and especially motorized use over the last 30 years since the establishment of the Santa Fe National Forest Plan. As a result, it is most likely that Forest use and impacts from various Forest uses, including motorized use has been concentrated and increased.

The cumulative impact resulting from all Forest uses on traditional and cultural practices is reduced motorized access to areas used for traditional purposes in the Santa Fe National Forest and surrounding public lands. The magnitude and extent of these traditional practices are generally not known. Restricting vehicular access, however, could make it cumulatively more difficult for activities such as collecting of piñon nuts, plant materials, herbs, or mushrooms in areas used for these traditional activities in northern New Mexico.

Effects of Plan Amendments

Several Forest Plan amendments would be required to keep this alternative in conformance with the Forest Plan. Those forest wide alternatives to modify the language in the Plan, to close the entire Forest (except designated routes and areas) to cross-country travel, and to remove the lower bounds of road density, would have no additional effects on impacts to traditional and cultural practices above what was analyzed in the direct and indirect effects of the alternative.

Amendments for this alternative to modify various management areas to allow designated motorized routes would not result in the construction of any new routes or motorized use on any route where it is not currently occurring at some level. The proposed Forest Plan amendments would have no additional effects on impacts to traditional and cultural practices above the direct and indirect effects analysis.

Forest Plan Consistency

The Management Direction in the Forest Plan includes language to, “Manage Forest activities and programs within the capability of the land while recognizing the value of maintaining the traditional cultures of northern New Mexico (USDA Forest Service 1987).” This alternative would maintain access necessary for cultural and traditional practices of the Forest, albeit motorized access would be curtailed by more than half of known use. This alternative would likely increase the capacity of the Forest to provide for forest resources used in traditional and cultural practices by decreasing resource impacts caused by motorized use.

Irreversible/Irretrievable Resources

The negative impact from this alternative would be to limit motor vehicle access that could be used in the pursuit of cultural or traditional activities. This alternative would not limit other forms of access nor would the impacts of this decision be irreversible or irretrievable as route designation could be changed or motorized access could be authorized via a permitted use in special circumstances.

Concern 5: Direct and Indirect Effects

This analysis focuses on impacts to minority and low-income populations. The Santa Fe National Forest is surrounded by communities with a wide variety of economic situations and is also located within by a unique cultural landscape made up of a number of tribes, traditional Hispanic populations, predominantly Caucasian populations, and several communities with a high diversity of races and ethnic populations. This analysis focuses on the potential for economic or social impacts to those low-income and minority populations identified earlier in this analysis.

Concern 5: Alternative 1 – No Action

This alternative would not result in any changes to access or employment. As a result, there would be no impacts to low-income or minority populations from this alternative.

Concern 5: Alternative 2-5

Native Americans and traditional Hispanics in the area frequently supplement their household income with the use and sale of forest products, in particular piñon nuts. There is potential for a minor effect to this activity because of the more restricted access to some locations in the forest. Alternative 3, which is the most restricted in terms of access, would have the largest effect on this activity. However, for all alternatives most piñon gatherers will still be able to access enough supply on foot or using mechanical support such as a wheelbarrow for household and commercial use.

The cost associated with owning and operating a motor vehicle is considerable. Low income households are unlikely to own a recreation-only motorized vehicle such as an off-road motorcycle or an OHV because they do not have adequate discretionary income to afford to participate in the sport. However, low-income households may use Forest Service roads to acquire firewood and other subsistence products. Access to these products may only partially be provided by any of the action alternatives. However, these potential effects are mitigated because permits could be written to allow explicit access for these purposes, as appropriate where requested. Currently, there are only a few special forest product areas on the District because district-wide firewood access is allowed. In the long-term, the demand for special forest products will continue to be met by increasing the number and dispersal of designated special forest product areas. There are, therefore, no measurable effects to low-income or other minority populations by any of the action alternatives.

Lastly, there is a possibility that each action alternative, by reducing the amount of designated routes for motorized use, could decrease Forest visitation possibly causing a displacement or even loss of one or more jobs. Though this is possible, there is no evidence that the identified low-income or minority populations would be disproportionately affected.

Cumulative Effects

Since there are no effects from any of the action alternatives, no cumulative effects are expected.

Effects of Plan Amendments

Several Forest Plan amendments would be required to keep this alternative in conformance with the Forest Plan. Those forest wide alternatives to modify the language in the Plan, to close the entire Forest (except designated routes and areas) to cross-country travel, and to remove the lower bounds of road density, would have no additional effects on impacts to low-income or minority populations above what was analyzed in the direct and indirect effects of the alternative. Amendments for this alternative to modify various management areas to allow designated motorized routes would not result in the construction of any new routes or motorized use on any route where it is not currently occurring at some level, except Alternative 4, where there is no information to support that new motorized use in a small number of routes currently closed to motorized use would result in impacts to minority or low-income populations. All action alternatives would still result in an overall decrease in the number of routes available to motorized use, although all alternatives would require a number of site specific amendments to the Forest Plan. The proposed Forest Plan amendments would have no additional effects on impacts to minority or low-income populations within or surrounding the Santa Fe National Forest above the direct and indirect effects analysis.

Forest Plan Consistency

The Forest Plan does not include any management direction specific to low-income or minority populations.

Irreversible/Irretrievable Resources

Since none of the action alternatives would have any impacts on minority or low-income populations, there would not be any irreversible or irretrievable impacts to resources.

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