United States
Department of
Agriculture

Forest
Service

**Southwestern
Region**

Apache-Sitgreaves National Forests

Economic and Social Sustainability Assessment

January 15, 2009

This version is the same as the June 30, 2008 version except for the addition of Appendix B.

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Introduction

The purpose of this report is to document the Apache-Sitgreaves National Forests (ASNFs) contribution to economic and social sustainability within the assessment area. The Forest Service contributes sustainable social and economic flows of land uses, benefits, products, services, and visitor opportunities through management of National Forest System lands. Ecosystems provide natural resources that encompass a variety of goods and services ranging from consumptive to recreational and spiritual. In doing so, ASNFs lands contribute to the social and economic sustainability of communities, regions, and the nation (figure 1).

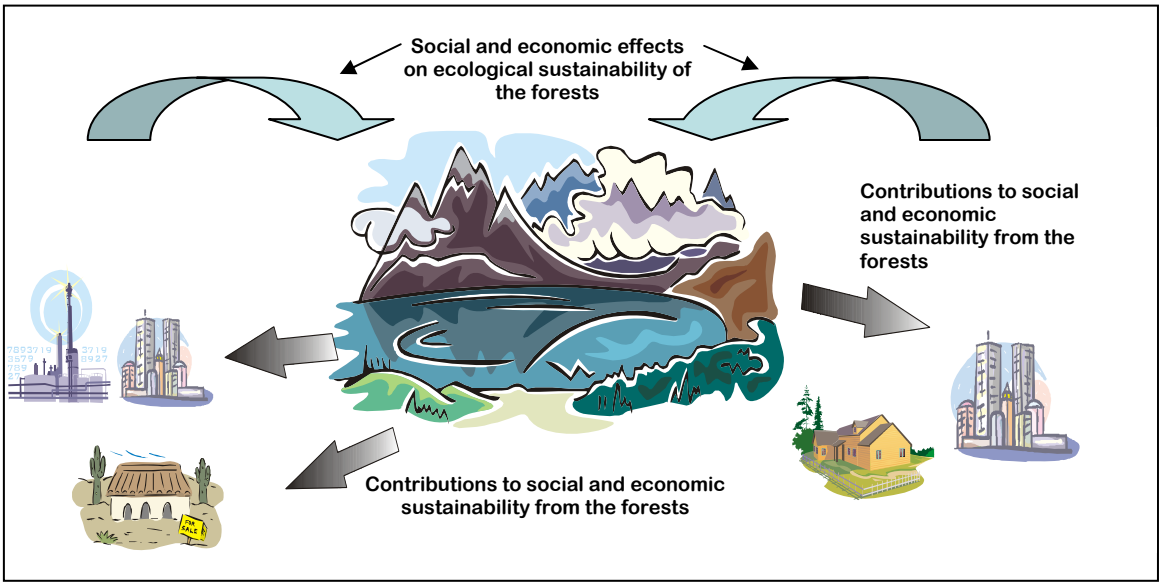

Figure 1. Two-way Flow of Social and Economic Contributions to Sustainability

Forest ecosystems may contribute to the social and economic sustainability of local communities by providing a place to recreate. However, increasing numbers of people hiking and camping within an area of limited size and resources may affect the ability of forest ecosystems to sustain such experiences at the desired level. Industries, such as timber harvesting or livestock grazing, may affect short-term ecological structure and function by changing soil and water quality, which in turn affect the sustainability of future social and economic endeavors. Changing social attitudes, beliefs, and values about how the ASNFs are managed can affect ecological as well an economic sustainability by influencing how forest resources are managed.

There are several different configurations of the ASNFs assessment area. The Economic Conditions, Trends, and Sustainability section uses three assessment areas: (1) The Income and Employment analyses use all of Apache, Navajo, Coconino, and Greenlee Counties in Arizona and Catron and Grant Counties in New Mexico (figure 2), (2) The Payments in Lieu of Taxes analysis uses all of Apache, Navajo, Coconino, and Greenlee Counties in Arizona and Catron County in New Mexico, and (3) The IMpact analysis for PLANing, Minnesota IMPLAN Group, Inc. (IMPLAN)[1] analysis uses an area defined by the ASNFs forest plan revision team using U.S.

[1] A regional economic impact analysis system, that uses county-level, input-output data to determine the extent to which these activities (such as livestock grazing) contribute to the local economy. Input-output analysis is an economist's tool that traces linkages among the structural parts of an economy and calculates the employment, income, and output effects resulting from a direct impact on the economy.

Census Tracts (figure 3). This was done to better reflect the economic "space" for the forests and to better understand the forests' contribution to that economy. Because of the physical distances, economic activities in northern Apache and Navajo Counties generally do not influence the ASNFs' management and, conversely, management of the ASNFs does not affect those areas. Similarly, the portion of Coconino County in the ASNFs is physically separated from the remainder of that county. Access to this area is through southern Navajo County. The remainder of Coconino County (including Flagstaff and Page) does not affect forest management and is not affected by ASNFs' management. Furthermore, less than 1 percent of ASNFs' Arizona visitors are from Coconino County. Western Catron County was included because county residents contribute to Apache County through the purchase of goods and services. Western Grant County was included because it is adjacent to the ASNFs and some grazing permittees operate on both the ASNFs and the Gila National Forest. The Social Conditions, Trends, and Sustainability section considers all of Apache, Navajo, Coconino, and Greenlee Counties in Arizona and Catron County in New Mexico. Grant County is not considered, because it was not included in the University of Arizona study.

Figure 2. County Assessment Area

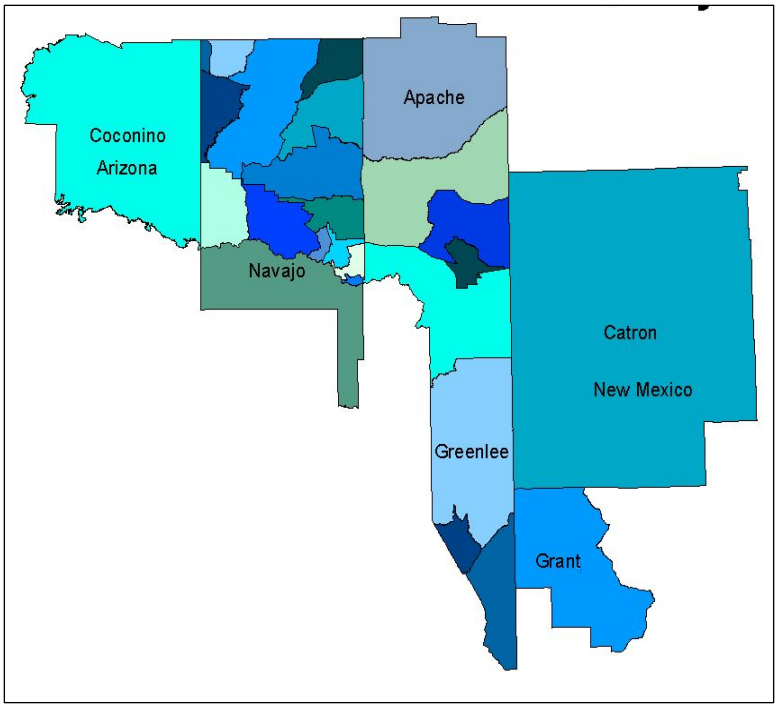

Figure 3. IMPLAN Economic Assessment Area

The sources of information used in this assessment help to document changing conditions and trends and provide the economic and social context for forest plan revision. These assessments highlight the ASNFs' unique socioeconomic position and clarify the ASNFs' role in contributing to the sustainability of local economies. This document uses the following sources:

1. **Socio-Economic Assessment for the Apache-Sitgreaves National Forest** (University of Arizona 2005)**.** This assessment is based on existing secondary data[2]. The secondary data sources consist of county and state economic data, U.S. Census data, and a wide range of data from Forest Service databases.
2. **Values, Attitudes, and Beliefs toward National Forest System Lands: Apache-Sitgreaves National Forest** (United States Department of Agriculture-Forest Service (USDA-FS) 2006d). This focus group study provides information about attitudes, beliefs, and values related to forest management and resources.
3. **An IMPLAN economic contribution analysis for the Apache-Sitgreaves National Forests** (Ott 2007)**.** The Forest Service contribution data (UDSA-FS 2005b) is provided in a separate report for the ASNFs, as a supplement to the University of Arizona socioeconomic assessment.
4. **Data about "Special Circumstances" available at the forests level that may not have been included in the Socio-Economic Assessment.** For example, the ASNFs administer the White Mountain Stewardship Project (WMSP) contract, the first, large-scale, forest restoration project in the nation. This contract facilitates the development of a wood products industry better suited to utilize small-diameter timber.

[2] Books, reports, articles, and data compiled and available on the web, in which other researchers report the results of their research based on primary data or sources. Primary sources, on the other hand, are new data, compiled for the first time through new research, such as direct interviews, focus groups, or new surveys.

Organization

The goal of this evaluation is to describe the economic and social systems sustainability from the ground up. The idea is to describe the economic context in which the ASNFs reside and then to describe the ASNFs' economic contribution to that context. The social conditions and trends are described, again as part of the overall context of the ASNFs. The goal is to describe the contributions of the ASNFs to economic and social sustainability, which finally leads to changing trends and/or potential risks to that sustainability.

This social and economic sustainability assessment is organized into four separate sections describing the economic and social conditions and trends. Each section builds on the previous one. This concept is reflected in the assessment's organization, as follows:

1. The **Executive Summary** briefly describes the conditions, trends, and sustainability likely to affect the need for change assessment.
2. The **Historical Context** sets the stage, describing in broad, general terms how the current social and economic system developed and presenting the land use history of the assessment area as a background. This section includes both social and economic historical background contexts.
3. **Economic Conditions, Trends, and Sustainability** are summarized, beginning with a current economic conditions summary, followed by a description of the ASNFs' direct, indirect, and induced economic effects to the local economic systems. This section also describes any special circumstances, such as stewardship projects or other economically important effects to sustainability.
4. **Social Conditions, Trends, and Sustainability** are described with the categories of demographics, land uses and users, access and travel conditions, and community relationships that may affect how the ASNFs are managed.
5. The **Sustainability Assessment** describes the key economic and social trends, risks and contributions to sustainability, and effects to forest management, as indicated in the previous sections.

Throughout the document are shaded side bars. The information in these boxes is from city, county, and tribal representatives who attended a meeting on March 12, 2007, to gather feedback on a draft version of this document.

Executive Summary

The purpose of this report is to document the economic and social conditions and trends on the Apache-Sitgreaves National Forests (ANSFs) and to identify the how those trends may affect social and economic sustainability. The information sources include the Socio-Economic Assessment for the Apache-Sitgreaves National Forest (University of Arizona 2005) and the focus group study report on Values, Attitudes, and Beliefs toward National Forest System Lands: The Apache-Sitgreaves National Forest (USDA-FS 2006d), as well as the sources listed in the references section.

Economic Conditions, Trends, and Sustainability

Employment

Conditions:

- Federal, state, county, city, and tribal governments are major employers in the assessment area. The government sector provided the largest portion of regional employment (29 percent), followed by the services (27 percent) and retail trade (19 percent) sectors. The manufacturing sector represented 3 percent of the employment; farming and ranching 1 percent; agricultural services, forestry, and fishing 0.5 percent; and mining 0.1 percent.
- Unemployment rates in the assessment area are higher than the state averages. The average unemployment rates from 1980 through 2004 ranged from a high of 15 percent in Apache County to a low of 7 percent in Coconino County. The average unemployment rate for Arizona was 5 percent.

Trends:

- The economy is shifting from extractive industries to service, recreation, and construction. There has been, and will likely continue to be, a transition from employment based on extractive industries to one based on service, recreation, and construction.
- The greatest growth has occurred in the finance, insurance, and real estate sector.
- Employment growth in the assessment area is slow. Employment growth in the six counties surrounding the ASNFs has been below that of their respective states (Arizona and New Mexico).
- Unemployment continues to be higher than the state averages.

Sustainability:

- The relative expansion of information- and service-based industries has led to a more diverse and, perhaps, more sustainable economy. There have been some negative effects to some segments of the more traditional local economy sectors. Natural resource-related jobs may continue to decline. Both low- and high-paying service jobs are increasing.
- Increases in housing developments may lead to more wildland urban interface (WUI) areas. Higher-income service workers (such as medical and legal professionals) may demand more amenities on Forest Service lands.
- Higher numbers of people are unemployed.

Income

Conditions:

- The assessment area per capita income is far below the national average. The 2002 per capita personal income of the four Arizona counties abutting the ASNFs was $19,333. This represents only 63 percent of the national average (approximately $31,000). Relative increases in per capita and median family incomes were greater in each county than in either state from 1990 to 2000. Despite these increases, per capita and median family incomes in all counties except Grant (New Mexico) remained substantially lower than the 2000 state averages.
- Assessment area poverty levels are above the state averages. Approximately 26 percent of the population in the counties had incomes below the poverty level in 1999, well above the average for Arizona (14 percent) and New Mexico (18 percent). The poverty level is highest in the Native American population (42 percent).

Trends:

- Assessment area poverty levels are declining, but are still higher that the state averages. Relative rates of decline in the poverty in all counties were greater than were reflected at the state level. Nonetheless, the percentages of individual and family poverty in all counties except Greenlee were higher than their respective states. Greenlee County has lower poverty levels because of the high mining-related employment and salaries.
- Income not tied to local employment (retirement age residents and seasonal homeowners) is growing. Demographic trends show an influx of retirement-age residents and seasonal homeowners. Several researchers (Booth 2002, Rasker 2000) have noted that while labor income is growing in the rural Mountain West, it is growing more slowly than transfer (social security, pensions, and retirement) and dividend income. In other words, growth of rural communities is being fueled, at least in part, by income that is not tied to local employment.

Sustainability:

- Jobs may not be taken in the assessment area because of low wages.

Payments to States

Conditions and Trends:

- Payments to states generally vary from year to year because of Congressional allocations or revenues from forest activities.
- Counties receive Payment in Lieu of Taxes (PILT) to replace tax revenue lost because of the public nature of lands administered by federal agencies (Payments in Lieu of Taxes Act of 1976). These payments are based on acreage of federal lands within a county. In 2005, $1.8 million was distributed to Apache, Coconino, Greenlee, Navajo, and Catron Counties for ASNFs lands. Although Grant County is affected by ASNFs' management activities, no ASNFs lands are located within the county so Grant County does not receive PILT funds associated with the ASNFs.
- In addition to PILT payments, the five counties have received a portion of the revenues generated on National Forest System lands (the "25 Percent Fund"). These payments returned 25 percent of all revenues generated from forest activities, with the exception of certain mineral programs, and were paid based on the acreage of National Forest System

lands within each county. These funds were used for the maintenance of public schools and roads. In the past, timber sale proceeds constituted the majority of the 25 Percent Fund payments, but these have declined substantially since the late 1980s.

- In 2000 Congress enacted the Secure Rural Schools and Community Self-Determination Act (SRSCS) in response to declining 25 Percent Fund payments. This Act was designed to stabilize annual payments to states and counties for 6 years, beginning in 2001. SRSCS payments were adjusted annually for inflation. In 2005, $2.4 million was distributed to Apache, Coconino, Greenlee, Navajo, and Catron Counties.
- SRSCS expired at the end of 2006, but was extended for 1 year. If SRSCS is not further extended or no other legislation enacted, payments would again be made under the 25 Percent Fund.
- PILT and SRSCS payments are not major portions of each county's overall budget, but may account for substantial portions of local school budgets.

Sustainability:

- Fluctuation of Payments in Lieu of Taxes (PILT) may increase or decrease county and community budgets. Counties may reduce road maintenance assistance to the forests. Forest plan decisions would not affect PILT.
- The 25 Percent Fund payments are the only payments to counties that could be affected directly by the forest plan. The emphasis of the revised plan could contribute to an increase or decrease in forest receipts and, in turn, could affect the amount the counties receive from the 25 Percent Fund.
- Elimination or decrease of the SRSCS payments may reduce county and community payments. Counties may reduce road maintenance assistance to the forests. Forest plan decisions would not affect SRSCS payments.

ASNFs' Economic Contribution

Conditions and Trends:

- Over 95 percent of the economic activity associated with the ASNFs represents new money introduced from outside the local area. The Forest Service programs that generate the greatest economic stimulus are recreation and wildlife. The recreation and wildlife contribution areas represent approximately 69 percent of the jobs and 68 percent of the labor income. The next largest economic contribution area is timber, with approximately 15 percent of the forests' contribution to labor income and 17 percent of the jobs.
- The local industry sectors most dependent on ASNFs management activities and forest uses are agriculture; arts, entertainment, and recreation; and accommodations and food services. Associated labor income and jobs would be most closely connected to the timber management, grazing, recreation, and fish and wildlife economic contribution areas.
- ASNFs management activities during 2005 contributed approximately 7 percent of jobs and 5 percent of labor income within the assessment area. The majority of these jobs were in the government sector and in the accommodations and food service sector.
- The White Mountain Stewardship Project (WMSP) contract accounts for approximately 5 percent of the ASNFs' total economic contribution.

Sustainability:

- WMSP contract has assisted the development of a more sustainable, local forest products industry.
- The ASNFs' recreation and fish/wildlife programs contribute the most to the assessment area economy. Recreation service industry jobs are generally moderate- to low-paying.
- The management activities of the ASNFs contribute a small percentage of the labor income and jobs (5 and 7 percent, respectively) within the assessment area and are not a major contributor to the sustainability of the economic system.
- Within individual counties and communities, dependency on natural resource industries may be greater. Small changes in forest activities have the potential to cause more noticeable localized effects.

Social Conditions, Trends, and Sustainability

Demographic Conditions and Trends

Population

- Population growth in the assessment area has been well below the state average. Each county, except Greenlee and Catron, experienced population growth between 1990 and 2000. Greenlee and Catron Counties saw declines in their relatively small populations between 1980 and 1990. The growth rate for each county over the past 2 decades has remained well below the growth rates for Arizona and New Mexico.
- Arizona grew from 120,000 residents in 1900 to well over five million in 2000.
- Population density is low. Catron County has the lowest population density with one individual for every 2 square miles. In contrast, Navajo County is the most densely populated with almost ten people per square mile.
- Apache and Navajo Counties have experienced strong growth with individuals migrating to the area from other states, as well as from different counties in Arizona. There has been limited in-migration in the other counties.

Race and Ethnicity

- Populations have moderate racial and ethnic diversification. The past 50 to 60 years have seen only moderate racial diversification in Arizona. The Hispanic presence has increased from 20 percent to 25 percent of the total population since 1940, while African American population increased only 0.1 percent. The Native American population has grown from 44,076 to 275,321 over the past 6 decades. However, as a percentage of Arizona's population, it has declined from 11 percent in 1940 to 5 percent in 2000 (U.S. Census Bureau 2005).

Age

- The retirement age population is growing faster than the under-18 population. Growth rates for the under-18 population were considerably lower than overall population growth within the five counties between 1990 and 2000. Conversely, the 65-and-over population for each county grew at a higher rate than average for their respective states and considerably faster than county populations.

Educational Attainment

- Populations have moderate levels of education. Both Coconino and Greenlee Counties exceed the overall state percentage of high school graduates, while Apache and Navajo Counties fall well short. While the percentage of individuals with a Bachelor's degree or higher is greater for Coconino County than the state as a whole, Apache, Navajo, and Greenlee Counties all fall below the statewide percentage in this category.

Housing

- There have been substantial increases in seasonal housing, especially in the Pinetop-Lakeside area. Total housing units in 2000 ranged from a high of 53,443 in Coconino County to a low of 2,548 in Catron County. Housing density and median home value within Greenlee and Apache Counties are substantially lower than neighboring counties and Arizona. There has been a notable increase in seasonal housing units for both Apache and Navajo Counties between 1990 and 2000, most dramatically in Snowflake and Pinetop-Lakeside, both of which saw increases of over 1,000 percent. Within the assessment area, median home values increased the most in Pinetop-Lakeside.

Demographic Sustainability:

- Population increases bring increased demands for goods and services which may enhance the economic vitality of rural areas through greater employment opportunities and expanding tax bases. Increasing populations can also challenge the capacity of rural communities and public land managers to provide a wide array of services.
- Demographic changes could result in a variety of interests in natural resources. In-migration generally brings in values that stress the quality of life and deemphasize natural resource extraction, in contrast to the existing values that favor natural resource extraction. Changing, and diverging, resource values bring new sets of challenges.
- The ASNFs may not be prepared for the needs of the increasing ethnic and 65-and-over populations.
- Increasing seasonal populations and housing may result in community infrastructures being overstressed during the summer, but underutilized in the off-season. Seasonal recreation needs may increase.
- Increasing population and housing increase the wildland urban interface (WUI).

Forest Uses and Users

Conditions and Trends:

- In Arizona the amount of public domain land stood at 76 percent in 1891, decreased to 66 percent in 1945, and by 1977 had increased to over 71 percent (including Native American trust lands). Today, the National Forest System accounts for about 15 percent of the Arizona's land. This small segment of the state's land includes a substantial portion of Arizona's natural resources, including 40 percent of the watersheds and nearly 60 percent of the timber.
- Little private land is available for town expansion or development. Twenty-three percent of the assessment area is national forest, 44 percent is Native American reservations, and 9 percent is state-owned. Only 15.6 percent is in private ownership.
- Over the past 20 years, the sale of forest products from the ASNFs has varied widely. The highest sale volumes were in the late 1980s and early 1990s and the lowest in 1996 and

2003. Changing social values and attitudes, as reflected nationally in law, policy, and regulation changes, reduced timber harvesting dramatically in the mid-1990s. Since 2003, Rodeo-Chediski salvage and the WMSP contract have accounted for most of the forest product sales.

- Livestock grazing on the ASNFs has declined since the late 1980s. These changes were based on a soil capability assessment and on balancing permitted livestock numbers with the allotment capacity. A continuing drought and large fires have also affected the numbers of permitted livestock. The ASNFs administered nearly 2 million acres of grazing allotments during 2005. National forest users have raised concerns because livestock number reductions are sometimes needed to meet resource management obligations on grazing allotments.
- There is a trend away from extractive use towards more recreation use and a focus on forest restoration. While extractive uses like grazing and timber harvesting have been declining, recreation use on the ASNFs has increased. The majority of recreation visitors come from the Phoenix and Tucson metropolitan areas. According to National Visitor Use Monitoring (NVUM) data, the ASNFs received nearly two million visits during fiscal year 2001; 70 percent of those visitors came from Maricopa (Phoenix) and Pima (Tucson) Counties. Access to public lands is considered a major contributor to the quality of life by many Arizonans. Many parks and forests are experiencing very high recreational use while urban expansion is decreasing the amount of available open space.
- According to NVUM data, 73 percent of the ASNFs' visitors participated in wildlife viewing, 50 percent fished, and only 3 percent hunted.
- The ASNFs contain three designated wilderness areas; the nation's only remaining primitive area; and 322,000 acres of inventoried roadless areas. Roughly 45,000 designated wilderness visits were made during fiscal year 2001.
- On public lands throughout the country, off-highway vehicle (OHV) use has increased dramatically. In 2005 the Forest Service implemented the Travel Management Rule to help manage OHV recreation in the national forests. Under the rule, forests will designate a system of roads, trails, and areas for motor vehicle use and will prohibit motor vehicle use that is off the designated system or inconsistent with the designations. This is a substantial administrative change from the current ASNFs policy, which allows motorized use except where posted closed or where use leads to resource damage.
- The ASNFs issue a variety of special use permits for different forest uses by the public. These include permits for recreation residences and privately managed facilities, including organizational camps, marinas, and a golf course, as well as one-time recreation events (varying from dog trials to historic reenactments to family reunions). Special permits can also be purchased for a number of gathering activities, including firewood and Christmas tree cutting.
- Tribal uses of ASNFs lands will continue. Ten federally recognized Native American tribes are affiliated with the ASNFs. Tribes' use of Forest Service land includes gathering boughs and basket materials for ceremonial purposes as well as the purchase of products such as saw-timber. In addition, the ASNFs contain sites and traditional cultural properties important to tribal members.
- The ASNFs work closely with the two adjoining tribes, the White Mountain and San Carlos Apaches, on a variety of issues including forest restoration, smoke management, and wildfire protection.

Sustainability:

- Trends show declines in extractive uses of national forests concurrent with increases in recreational use. Challenges include road maintenance, vegetation management, recreation facility maintenance, and user conflict management.
- FOREST PRODUCTS - Skilled workers in this employment sector may either leave the area or change to different professions.
- FOREST PRODUCTS - Infrastructure developing to use small-diameter timber. Long-term sustainability uncertain.
- LIVESTOCK GRAZING - The number of ranches may decline and the ranching lifestyle may dwindle.
- NATIVE AMERICAN TRIBES - Cooperative management of cross-boundary ecosystems enhances sustainability.
- NATIVE AMERICAN TRIBES - Not enough information is reaching the local native communities on how to obtain a forest products permit.
- RECREATION - Increased demand may not be met due to limited recreation opportunities. These include facilities, developed campground, trails, and dispersed camping opportunities.
- RECREATION - Unmanaged recreation could cause resource damage and user conflicts. Certain types of dispersed recreation activities, such as OHV use and geocaching, have greatly increased or are relatively new and currently have little management.
- OHV USE - Unmanaged OHV use causes resource damage and creates safety concerns.
- WILDLIFE USERS - Wildlife viewing activities are generally sustainable because they do not affect wildlife and their habitats. However, unmanaged or unlimited access could affect wildlife and habitats.
- WILDLIFE USERS - Limited water resources could result in overcrowding and requests for additional stocking of fish.
- WILDLIFE USERS - Increasing huntable wildlife populations may lead to ecological changes if population numbers are not controlled.
- WILDERNESS - More pressure may be but on the wilderness areas to provide recreation opportunities but key wilderness values, opportunities for solitude or primitive and unconfined recreation, may be lost.
- WILDERNESS - Blue Range Primitive Area wilderness values could be lost. Management of the area is not funded because it is not a Wilderness.
- OPEN SPACE - With increasing development there could be a loss of community open space areas.
- WATER AND WATERSHEDS - With increasing populations there will be greater demands for limited water resources. Limited water availability will eventually limit development growth.
- WATER AND WATERSHEDS - The ASNFs manage a large proportion of the watersheds and riparian areas in the northern part of Arizona.

Access and Travel

Conditions and Trends:

- County and state road networks will require change to meet long-term growth needs. County and state transportation networks have been developed as needs have arisen and may be inadequate for accommodating projected long-term growth.
- Road improvements are planned in the proximity of the ASNFs. The Arizona Department of Transportation currently has plans for a number of road widening and resurfacing projects in and around the ASNFs over the next 5 years. Similarly, county governments throughout the assessment area envision improvements to arterial road networks to accommodate expected population growth.
- Peak traffic flow on state highways occurs during the months of June, July, and August, while traffic is lowest from November to February.
- OHV travel is increasing. Travel by motorized vehicle is the dominant mode of travel throughout Arizona and to and from the ASNFs; a trend that is likely to continue. Mechanical innovations, industry developments, and less-demanding physical activity required to access federal lands have all led to a dramatic increase in OHV ownership and use in Arizona.

Sustainability:

- The Travel Management Rule could reduce motorized access within the forest, but would reduce effects to natural resources.
- Road maintenance could be reduced as a result of constrained county and federal transportation budgets.
- Better highway access, and reduced driving times, could further increase use from the major population centers. There could be an increase in day-use visitation as travel times decrease.

Community Relationships

Conditions and Trends:

- The communities surrounding the ASNFs have a history of involvement with the national forests and with natural resource issues in general. Arizona has long been dependent upon natural resources for commodity production, tourism, and aesthetic enjoyment. As a result, the public has frequently expressed intense interest in the use and management of these resources.
- The ASNFs strive to work with community groups and forest partners, as well as address the needs and desires of local communities. The ASNFs take into account the interests of a growing number of community groups and forest partners. Organizations and individuals influencing forest planning and management represent government agencies, Native American tribes, special advocacy groups, business interests, educational institutions, and the media. The Forest Service is making a concerted effort to address the needs and desires of historically underserved communities, given the rates of demographic change in the region.
- Examples of organizations and partners that work collaboratively with the ASNFs are Eastern Arizona Counties Organization, Environmental Economic Counties

Organization, Southwest Sustainable Forest Partnership, and the Natural Resources Working Group.

- The ASNFs continue to work with communities through projects such as the White Mountain Stewardship Project and the implementation of Community Wildfire Protection Plans.
- The ASNFs work closely with the two adjoining tribes, the White Mountain and San Carlos Apaches, on a variety of issues including forest restoration, smoke management, and wildfire protection.

Sustainability:

- Communities' economic and social relationships with natural resources are shifting.
- Decreased forest funding or staffing could decrease public involvement with the communities.
- Increased communication with neighboring tribes on resource management issues has improved coordination, cooperation, and trust.
- FIRE/WUI - Increasing development is putting more human improvements at risk. The accumulating live and dead fuels are increasing the risk of property damage from wildland fire.
- FIRE/WUI - Allocation of fuels management resources would be mostly around the WUIs, while other areas would not be treated.

Apache-Sitgreaves National Forests Historical Context

The earliest inhabitants of the area comprising the present-day Apache-Sitgreaves National Forests and surrounding lands trod lightly upon the land at least 13,000 years ago. They followed the migrating mammoth and later the buffalo, leaving only spear points to mark their presence. As early as 2,000 years ago, the Ancestral Puebloans arrived and shared the White Mountains with the Mogollon people already there. By the time the Apache, Navajo, and Yavapai arrived in the 1400s, the Puebloans were gone. After the mid-1500s the Spanish continued a modest forest use, although they used the forests for fuel, structures, and fence posts more than the Native Americans did.

From 1821 to 1848, the Mogollon Rim forests were part of the Republic of Mexico. When the United States acquired the territory from Mexico, those lands became a part of the "public domain" if they were not owned by private individuals, including earlier Spanish and Mexican land grants. The land was opened under various laws to settlement, purchase, and use. Only after the American Civil War and the completion of the railroads did a great change in public land use begin in Arizona. Domestic enterprises like cutting timber, mining, and raising cattle were to become corporate enterprises with national and international markets.

The territory of Arizona urged the sale of all of the territorial timberlands at public auction in 1879 and in 1880 Congress authorized the citizens of Arizona to "fell and remove timber from the public domain for mining and domestic purposes." Timber production in Arizona and New Mexico, estimated at 8 million board feet in 1879, rose to 22 million in 1889 and 67 million in 1900. Cattle grazed on the forests' open ranges in ever greater numbers, increasing from 172,000 head in 1880 to 1.5 million by 1890. In 1891, Congress authorized the President to designate particular areas of forested public domain as "reserves," to be set aside for future use. The reserves were, by law, completely closed to public use and there was no management or supervision of the land. Congress restricted the President's authority in 1897, authorizing him to establish reserves only to preserve timber, protect watersheds, and provide lumber for local use.

On August 17, 1898 Black Mesa Reserve (North and South) was established. By 1900, once-lush grasslands could no longer support large numbers of livestock. It was becoming painfully clear to Southwesterners that the renewable and nonrenewable resources of the Southwest were being depleted. The Secretary of Agriculture announced in 1905 the transfer of the Forest Reserves to the Department of Agriculture, as authorized by Congress. Some 21 million acres of public lands, almost one-eighth of the land area of Arizona and New Mexico, were now to be administered by a regional subdivision of the Forest Service. The Forest Service was charged to maintain the permanence of national forest resources, while providing for their use. In 1907, Black Mesa Reserve was made a national forest with its headquarters in Show Low, Arizona. In 1908, Theodore Roosevelt established the Sitgreaves National Forest from parts of the Black Mesa North Reserve and Tonto National Forest. The Apache National Forest was established the same year from portions of the Black Mesa South Reserve and other neighboring forest reserves.

Arizona's population increased dramatically following World War II, but little changed in the rural communities surrounding the Apache and Sitgreaves National Forests. Logging, grazing, and mining were important economic factors in the local communities and the forests provided employment where few jobs were available. In 1974, the Apache National Forest was combined administratively with the Sitgreaves National Forest and became the Apache-Sitgreaves National Forests.

Economic Conditions, Trends, and Sustainability

Introduction

This section provides an economic context for the ASNFs and identifies current economic conditions, trends, and risks to sustainability. The first part of this section describes the local economic conditions, including (1) Existing economic conditions as described in the data sets listed in the document introduction and (2) Existing and projected economic trends identified in the Socio-Economic Assessment (University of Arizona 2005). The second part of this section documents the ASNFs' economic contribution to the surrounding economies, using data from the IMPLAN analysis.

The Economic Conditions, Trends, and Sustainability section uses three assessment areas: (1) The Income and Employment analyses uses all of Apache, Navajo, Coconino, and Greenlee Counties in Arizona and Catron and Grant Counties in New Mexico (figure 2), (2) The Payments in Lieu of Taxes analysis uses all of Apache, Navajo, Coconino, and Greenlee Counties in Arizona and Catron County in New Mexico, and (3) The IMPLAN analysis uses an area defined by the ASNFs forest plan revision team using U.S. Census Tracts (figure 3).

Employment

The ways in which people in the ASNFs assessment area earn a living tells us a great deal about the stability of the economy and its dependence on the forests. Key information includes wage and salary employment, farm/ranch proprietors, income from investments, retirement income, and income from government programs. An economy that is based primarily on investment and retirement income likely has more wage and labor jobs that are not related to manufacturing. In such an economy, wage and salary jobs are probably in the service-related sectors, which may include basic food and delivery services and professional services in health care and legal services. Service-related jobs range from basic food and maintenance jobs to more professional services, such as those in the health, education, banking and real estate, and legal fields. This type of economy may contrast sharply with an economy dominated by wage and salary jobs in a major industry, such as logging or manufacturing. Therefore, employment data provides a cross section of the local economy as a whole, as well as prevalent social patterns and trends.

Current Conditions

Total employment in the six counties surrounding the ASNFs was 152,497 in 2000. Wage and salary employment accounted for 80 percent (table 1). Farm proprietor (self-employment as opposed to corporate farms) employment was 1 percent of all jobs. The sector providing the largest portion of employment (including wage and salary employment) was government, followed by services and retail trade. Services and retail trade contain the industries most likely to be affected by recreation activities on the forests. The manufacturing sector and the agricultural services, forestry, fishing, and other sectors represented 3 and 0.5 percent of total employment respectively. Mining represented 0.1 percent of total employment (primarily in Greenlee County) and is the area most likely affected by minerals-related activities on the ASNFs (University of Arizona 2005).

- Pinetop-Lakeside. Encouraging the shift from extractive to retail and technology-based economy.
- Pinetop-Lakeside. Professional services/technology-based professionals locate there due to proximity of the forests.
- Greenlee County. Economy still primarily extractive with plentiful mining employment opportunities.

The average unemployment rates by county from 1980 through 2004 ranged from a high of 15 percent in Apache County to a low of 7 percent in Coconino County. The average in all counties was higher than the state averages of just over 5 percent in Arizona and 6 percent in New Mexico. Navajo County's rate of 12 percent is substantially affected by high employment rates in Whiteriver (average of 22 percent) (University of Arizona 2005).

Trends

Employment growth in each of the six counties surrounding the ASNFs, between 1990 and 2000, was below that of their respective states. Employment growth for Navajo and Apache Counties (27 and 39 percent, respectively) was less than the 48 percent increase for Arizona. Wage and salary employment was below the Arizona average in all but Greenlee County, but non-farm proprietor employment increased substantially, particularly in Apache County. All counties experienced decreases in farm proprietor employment (University of Arizona 2005).

Table 1. Total Employment and Employment by Type, 1990 to 2000, with Percent Change (University of Arizona 2005)

Location	Total Employment			Wage and Salary Employment			Farm Proprietor Employment			Non-Farm Proprietor Employment		
	1990	2000	Percent change	1990	2000	Percent change	1990	2000	Percent change	1990	2000	Percent change
Apache County, AZ	17,876	24,786	38.66	15,476	20,114	29.97	351	327	-6.84	2,049	4,345	112.05
Coconino County, AZ	48,977	70,286	43.51	41,079	55,639	35.44	276	204	-26.09	7,622	14,443	89.49
Greenlee County, AZ	3,607	5,216	44.61	3,096	4,645	50.03	136	134	-1.47	375	437	16.53
Navajo County, AZ	26,878	34,033	26.62	22,377	27,429	22.58	404	357	-11.63	4,097	6,247	52.48
Catron County, NM	1,246	1,456	16.85	709	689	-2.82	226	221	-2.21	311	546	75.56
Grant County, NM	12,046	14,720	22.20	9,887	11,460	15.91	290	329	13.45	1,869	2,931	56.82
Assessment Area	112,620	152,497	35.41	94,614	121,976	28.92	3673	3572	-2.75	18,313	30,949	69.00
Arizona	1,909,879	2,819,302	47.62	1,607,628	2,355,299	46.51	8,027	7,572	-5.67	294,224	456,431	55.13
New Mexico	767,139	972,954	26.83	635,725	789,690	24.22	13,600	14,985	10.18	117,814	168,279	42.83

Figure 4 displays the change in industry sector employment from 1990 to 2000 in each county and state. If data was suppressed to avoid the disclosure of confidential information in either year for a given sector, no estimate of the rate of change is provided. Farm employment grew only in Greenlee, Navajo, and Grant Counties, mirroring the trend in both states. Conversely, employment in the financial services/real estate sector increased considerably in Apache,

Coconino, Navajo, and Grant Counties. The construction sector showed very strong growth in Greenlee County, growing at a rate of nearly 253 percent (University of Arizona 2005).

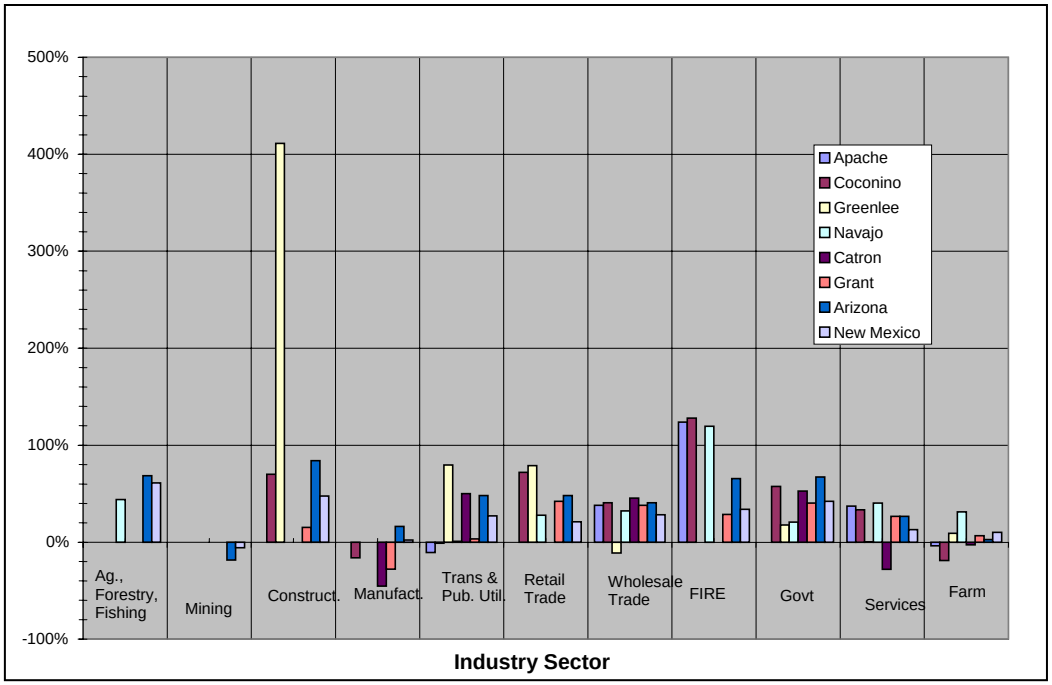

Figure 4. Percentage Change in Industry Sector Employment by County, 1990 to 2000

Figure 5 shows that the mining, manufacturing, transportation, and farm sectors within the assessment area are declining and represent a smaller share of the total economy than is reflected for either state. At 29 percent, the government sector represents a larger portion of employment within the assessment area than is reflected in either state; 23 percent in Arizona and 21 percent in New Mexico (University of Arizona 2005).

Overall, employment growth within the six counties surrounding the ASNFs averaged 34 percent from 1990 to 2000, compared to 48 percent in Arizona and 27 percent in New Mexico. Figure 6 illustrates employment growth across the assessment area. The greatest growth overall was in the finance, insurance, and real estate sector at 110 percent. This was followed by the agriculture services, forestry, and fishing sector, which grew at a rate of 89 percent. Employment in the services sector increased by approximately 69 percent, while employment in the mining sector decreased by approximately 94 percent during the decade. However, the "unclassified" sector is composed of employment not assigned to an individual sector to avoid the disclosure of confidential information[3]. A relatively large number of jobs fell into this category in both years (8 percent in 1990 and 7 percent in 2000) resulting in understating the actual employment in some sectors and distorting actual rates of change across the assessment area (University of Arizona 2005).

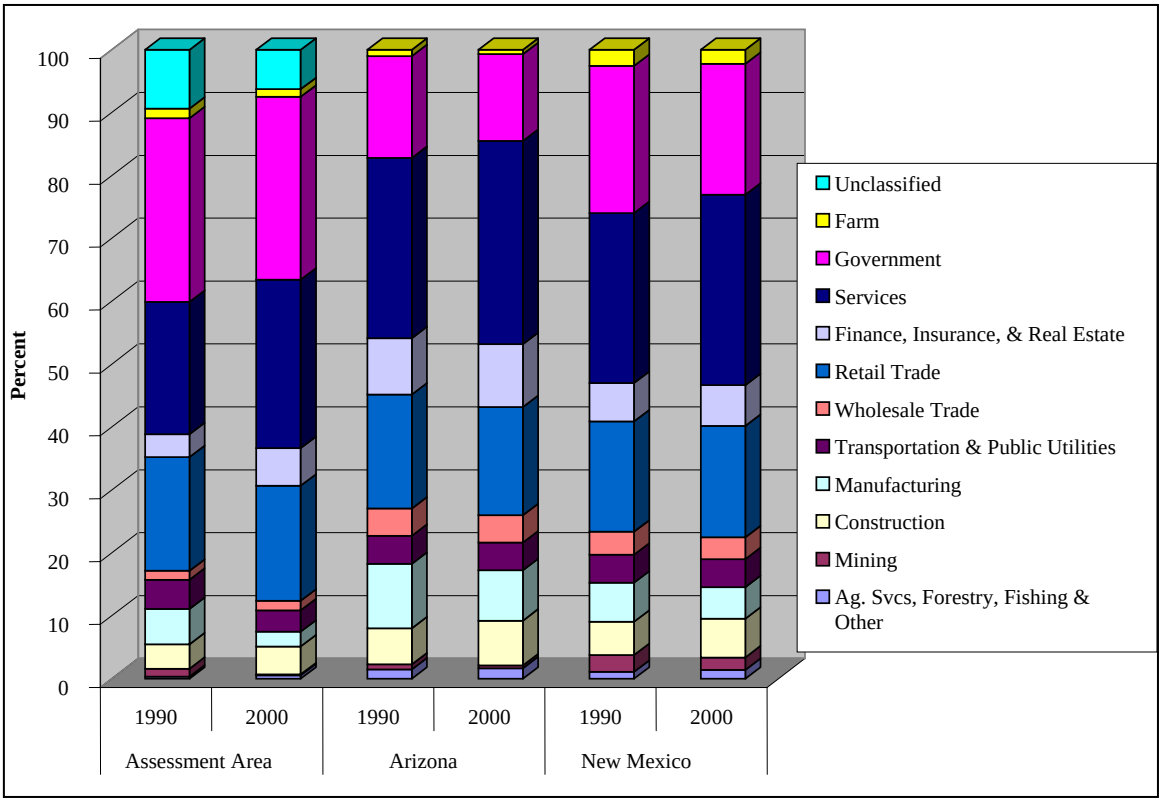

Figure 5. Assessment Area, Arizona, and New Mexico Industry Sector Distribution, 1990 and 2000

Sustainability

In the early stages of the ASNFs' and Arizona's development, extractive industries such as mining, ranching, farming, and timber harvesting were the mainstays of local economies because these resources were needed by a growing population. For decades, these sectors provided the

[3] State "disclosure restrictions" refers to information that has been suppressed by the U.S. Department of Commerce to avoid disclosure of confidential information. Generally, the smaller the geographic level of analysis and the smaller the population of the county, the higher the chances are that industry-specific information will be suppressed and disclosure restricted.

foundation for employment upon which the area's predominantly rural economy was based (Case and Alward 1997, Rasker 2000). In recent decades, however, the counties surrounding the ASNFs, and Arizona in general, have joined neighboring western states in experiencing a major decline in extractive industries because of national social changes that have been reflected in laws, policies, and regulations. Industry declines have been accompanied by declines in employment and income traditionally provided by these sectors (Baden and Snow 1997, Booth 2002). There has been, and will likely continue to be, a marked transition from employment based on extractive industries to one based on services, recreation, and construction.

While these changes have undoubtedly negatively effected some segments of the more traditional local economy sectors, the relative expansion of information- and service-based industries has led to a more diverse, and perhaps more sustainable, economy (Baden and Snow 1997, Booth 2002). The economic data gathered for the ASNFs assessment area illustrate this trend, showing substantial growth in the finance, insurance, real estate and construction sectors, as well as the retail trade sector. When matched with a simultaneous decline in extractive and productive industries, these changes have made the area's rural economy similar to Arizona's urban areas and the entire state (Booth 2002, Case and Alward 1997).

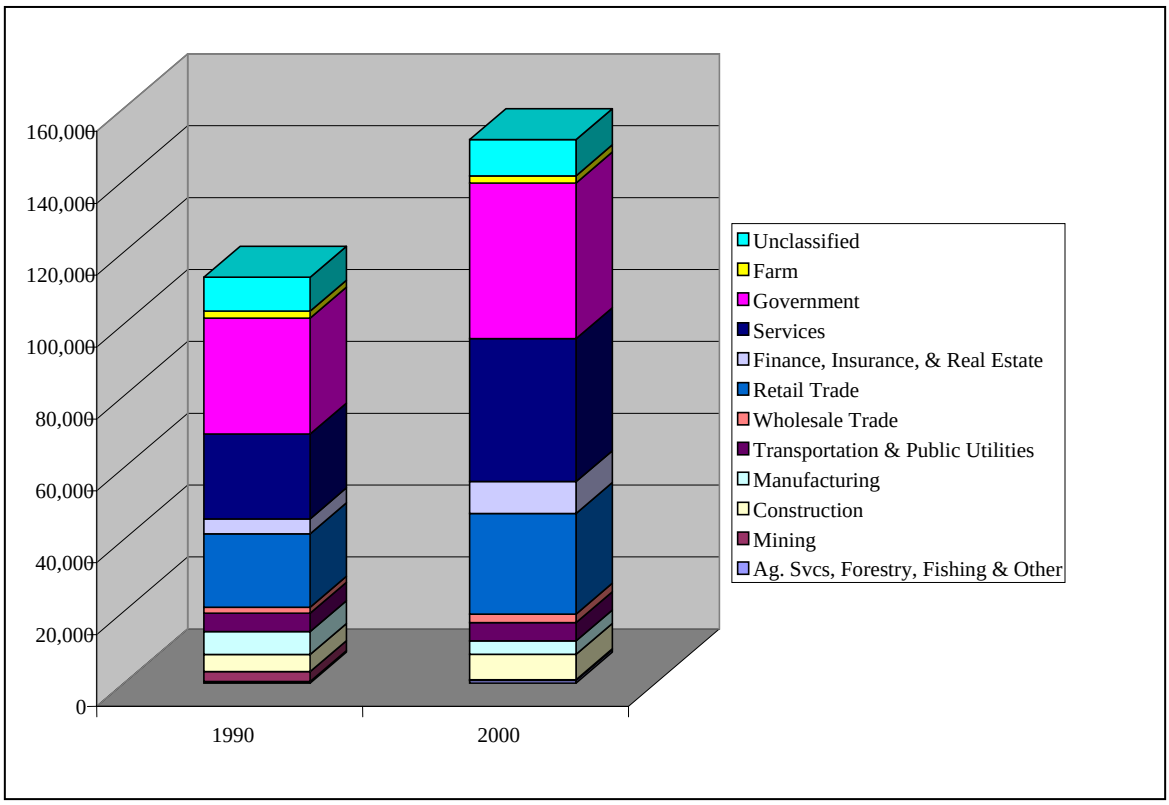

Figure 6. Assessment Area Employment by Industry Sector, 1990 and 2000
(University of Arizona 2005)

The changes occurring in the ASNFs area are emblematic of those seen in recent decades throughout the Mountain West and signal important demographic and economic trends that are likely to shape the region's future development. The area surrounding the ASNFs is experiencing expanding population and increasing service and construction industries. In particular, retirement-aged population increases, high recreation use from large population centers, and an increase in

seasonal housing units located in or near national forest boundaries, provide opportunities, as well as challenges, for ASNFs management. The ASNFs act as a stimulus for the industries that support new areas of employment. Retirees, second-home owners, and the local and non-local recreating public create increasing needs for goods, services, and local knowledge used to enjoy the ASNFs.

The ability to maintain forest health and manage natural resources will present a greater challenge as the capital necessary for management will need to come from Washington rather than from the sale of the forests' resources.

Income

- Pinetop-Lakeside. Some retirees may be unable to afford the cost of living there.

Income patterns and trends provide an idea of economic health for the ASNFs assessment area. Employment figures show that the local economy is continuing to transition from being dependent on traditional, extractive industries into one more dominated by services and recreation-related jobs. High-paying service jobs, such as health care and legal services, as well as construction and financial services, cater to affluent members of the public. However, many service sector jobs are low-paying. As labor income from farm and ranch jobs decreases, specialized labor in the service industries appears to be increasing.

Current Conditions

The 2002 per capita personal income of the four Arizona counties abutting the ASNFs was $19,333, only 63 percent of the national average (approximately $31,000). The average rate of income growth in the assessment area over the past 3 decades has been just under 8 percent (University of Arizona 2005).

Approximately 26 percent of the assessment area population had incomes below poverty level in 1999, well above the averages for Arizona (14 percent) and New Mexico (18 percent). Table 2 displays the percentage of the population below poverty level by race in 1999. The poverty level is highest in the Native American population. Overall, Apache County has the highest population percentage with incomes below poverty level (38 percent).

Table 2. Poverty Levels by Race/Ethnicity, 1999 (U.S. Census Bureau 2000a)

Location	White	Black or African American	Am. Indian & Alaska Native	Asian	Native Hawaiian & Other Pacific Islander	Some Other Race	Two or More Races	Hispanic or Latino
United States	9.1%	24.9%	25.7%	12.6%	17.7%	24.4%	18.2%	22.6%
Arizona	10.3%	19.9%	37.3%	12.3%	16.1%	25.3%	18.5%	24.5%
New Mexico	14.0%	23.0%	36.2%	13.5%	11.9%	25.2%	20.3%	23.7%
Apache Co., AZ	12.4%	56.8%	44.5%	25.5%	5.2%	28.6%	31.5%	29.0%
Coconino Co., AZ	11.7%	19.0%	32.1%	15.2%	12.9%	20.4%	22.3%	20.4%
Greenlee Co., AZ	9.5%	4.1%	5.0%	0.0%	0.0%	12.4%	8.8%	11.6%
Navajo Co., AZ	12.2%	25.3%	46.0%	24.2%	13.0%	31.1%	26.7%	26.0%
Catron Co., NM	23.4%	0.0%	67.3%	0.0%	0.0%	19.0%	27.8%	19.5%
Grant Co., NM	16.4%	18.5%	16.9%	35.5%	39.4%	26.6%	23.8%	23.7%
Assessment Area	12.7%	21.6%	41.9%	18.7%	13.7%	24.2%	24.6%	22.3%

Figure 7 illustrates the distribution of household incomes within the assessment area. Incomes within Apache and Catron Counties are most limited, with approximately 52 percent of households in both counties below poverty level and only 7 percent of households earning $75,000 or more. A high percentage of households in Navajo County (44 percent) also fall below poverty level. Income distribution in Coconino, Greenlee, and Grant Counties more closely resembles the distribution for the states (U.S. Census Bureau 2000f).

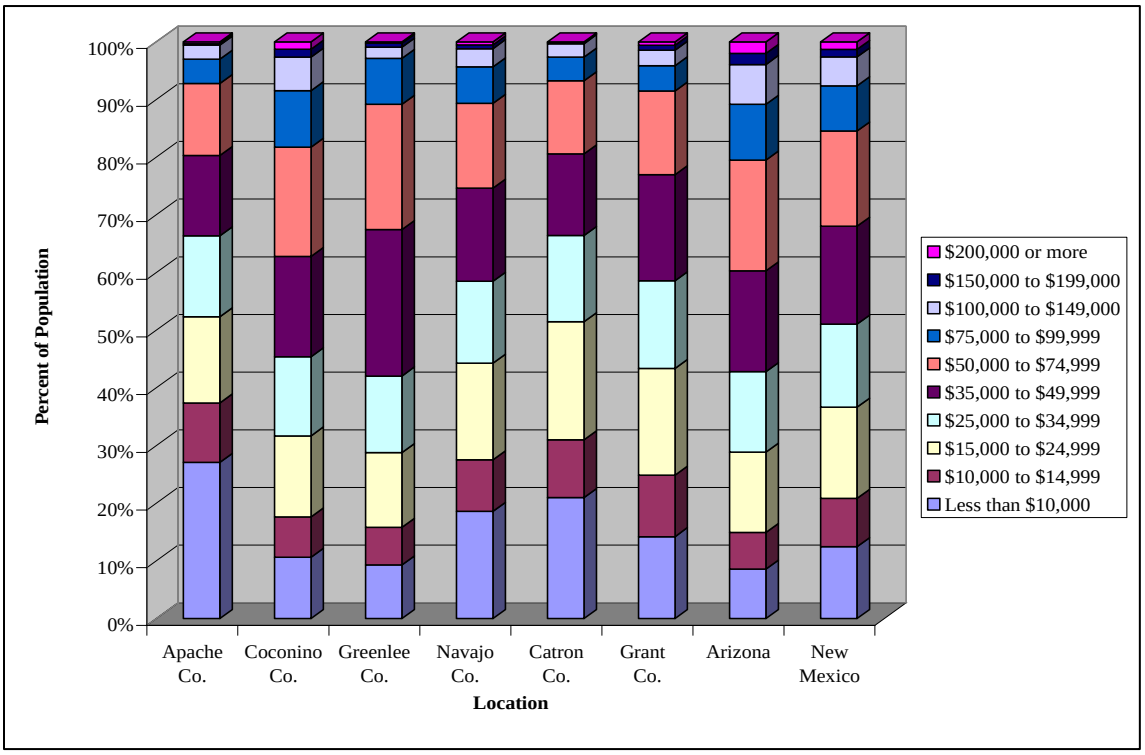

Figure 7. Household Income Distribution, 1999

Trends

The 2002 per capita personal income of the four Arizona counties abutting the ASNFs has dropped 2 percent since 1969. The county per capita personal income has declined nearly 6 percent over the past 30 years, when compared to the national average (Bureau of Economic Analysis 2002). The average income growth rate in the assessment area over the past 3 decades is just under 8 percent, slightly below the 8 percent New Mexico growth rate and well below the 10 percent Arizona average. This suggests that the assessment area lags behind the region in individual economic status, in contrast to Arizona's strong, continuing growth.

Figure 8 displays the per capita personal income and median family income for each county in the assessment area and for the states. Relative increases in per capita and median family incomes were greater in each county than in either state from 1990 to 2000. Despite these increases, per capita and median family incomes in all counties remained substantially lower than the 2000 state averages. A similar trend is evident in individual and family poverty between 1990 and 2000 (figure 9). Relative rates of decline in the poverty rates in all counties were greater than are reflected at the state level. Nonetheless, the percentage of individual and family poverty in all counties was higher than the states. Apache County appears to be the most economically challenged of the assessment area counties (University of Arizona 2005).

Transfer and dividend income in the assessment area continues to grow. In 2005 transfer and dividend income accounted for 46 percent of the total assessment area income, up from 22 percent in 1970 and 42 percent in 1995. Transfer income increases account for the most of the growth (Economic Profile System 2007).

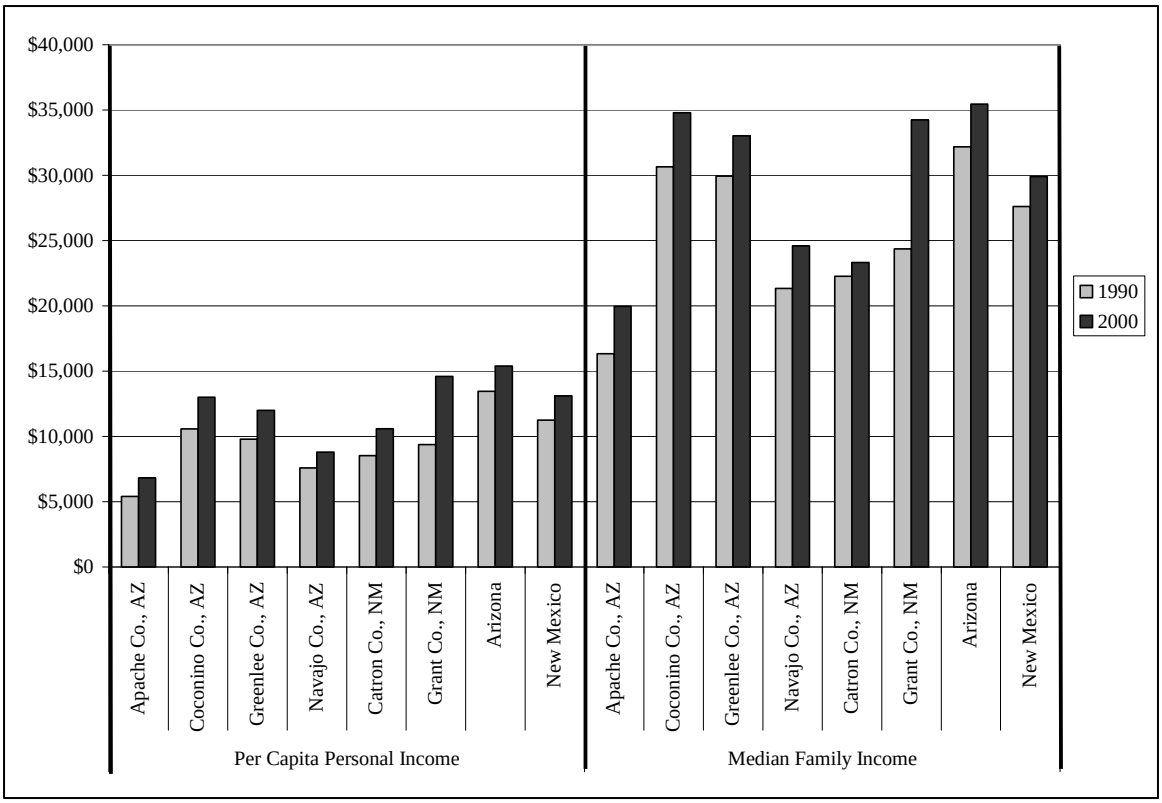

Figure 8. Per Capita Personal Income and Median Family Income, 1990 and 2000

Sustainability

Although the per capita and median household income in the region grew somewhat between 1990 and 2000, overall income levels remain below the state averages for most assessment area counties. This trend takes on increasing relevance when combined with observed demographic trends showing an influx of retirement-age residents and seasonal homeowners. Several researchers have noted that while labor income is growing in the rural Mountain West, it is growing more slowly than transfer (social security, pensions, and retirement) and dividend income. In other words, rural community growth is being fueled, at least in part, by income that is not tied to local employment. This pattern indicates that local economies will become less dependent on extractive industries, but will be making a new set of demands on the national forests (Booth 2002, Rasker 2000).

Communities with increased tourism may often see an earnings decline because of a rise in seasonal (part-time) workers. Additionally, earnings will decline if job growth is primarily from low-wage service industries. Jobs may not be filled in the assessment area because of low wages. Many service jobs pay less than the old jobs in declining extractive industries. This is seen in the 6 percent decrease in per capita income during the past 30 years. Income and employment are transitioning to a greater diversity of jobs, many of them low-paying service jobs. While non-

labor income increases with the influx of retirees and second-home owners, the demand for skilled and construction-related labor is likely do go up as long as retirees and others continue to relocate to the area. The need for skilled labor may actually stimulate higher wages under such conditions. The ASNFs act as a stimulus of employment and income growth. Higher wages for some service workers will likely mean more disposable income, which in turn, will result in higher demands for recreation on the forests' lands. To summarize, income increases and an influx of non-labor income into the assessment area will likely result in greater demands for recreation opportunities and other forest resources.

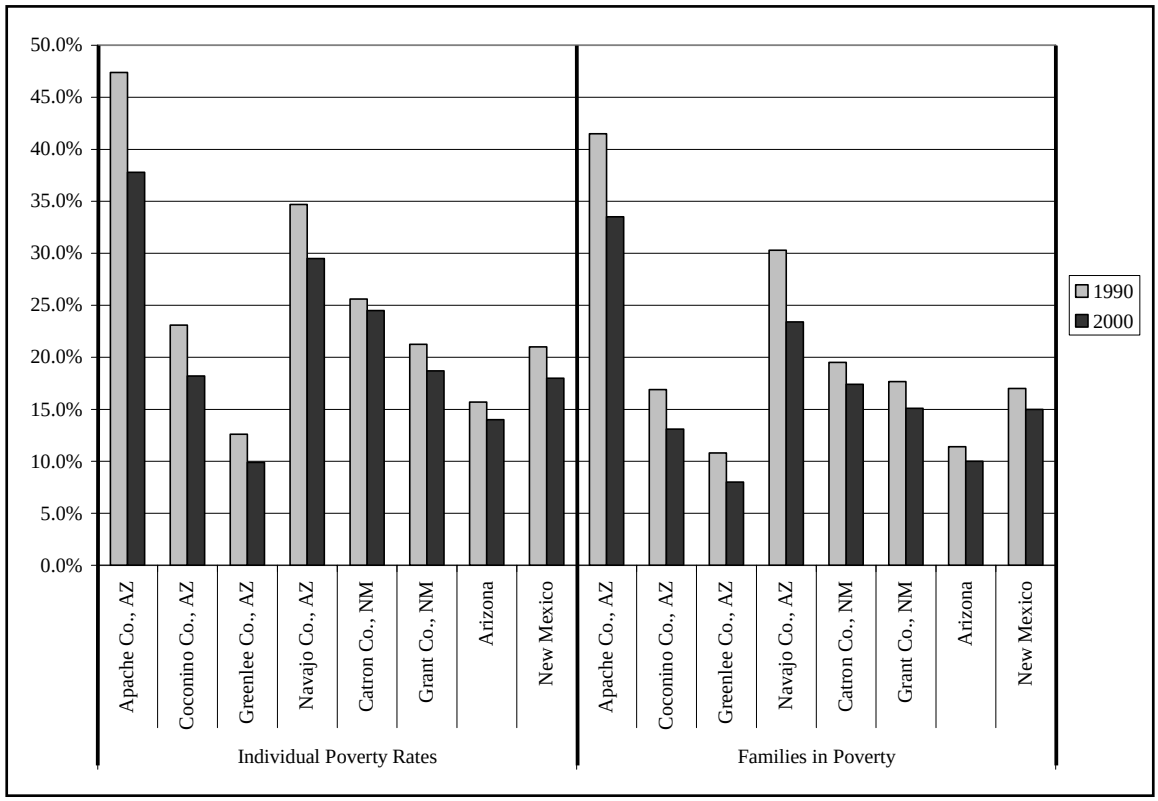

Figure 9. Individual Poverty Rates and Families in Poverty, 1990 and 2000

Payments to States

Current Conditions

Counties receive Payment in Lieu of Taxes (PILT) to replace tax revenue lost because of the public lands administered by federal agencies (1976 Payments in Lieu of Taxes Act). The amount is based on the acreage administered by certain federal agencies, population, a schedule of payments, the Consumer Price Index, other federal payments made in the prior year, and the level of funding Congress allocates. These payments are not affected by changes in the forest plan.

In addition to PILT, counties receive a portion of the revenues generated on National Forest System lands. Historically, counties have received "25 Percent Fund" payments. These payments returned 25 percent of all revenues generated from forest activities, with the exception of certain mineral programs, and were paid based on the acreage of National Forest System lands within

each county. Timber sale proceeds constituted a majority of the 25 Percent Fund payments, but these revenues have declined substantially since the late 1980s. These funds are used for the upkeep and maintenance of public schools and roads. These payments can be affected by changes in resource output levels as a result of direction provided in the forest plan.

- Change away from extractive uses, decreases 25 Percent Fund, and could affect area's schools and roads.
- Stewardship does not contribute to the 25 Percent Fund payments. Any receipts from WMSP are used to offset costs.
- Greenlee County. Road and bridge conditions declining on forest and in county.
- Navajo County. SRSCS/25 Percent Fund payments affect school districts more than county road maintenance.
- Greenlee County. Payments are 5 percent of county budget, but two rural schools are completely dependent on payments.

In 2000 Congress enacted the Secure Rural Schools and Community Self-Determination (SRSCS) Act in response to declining 25 Percent Fund payments. This Act was designed to stabilize annual payments to states and counties for 6 years beginning in 2001. The formula for computing annual payments is based on averaging a state's three highest 25 Percent Fund payments between 1986 through 1999 to arrive at a compensation allotment or "full payment amount." The Act also creates citizen advisory committees and gives local communities the choice to fund restoration projects on federal lands or in counties. The SRSCS requires a county that elects to receive its share of the full payment amount to spend no less than 80 percent and no more than 85 percent of the funds in the same manner as the 25 Percent Fund payments are expended. The balance of the payment must be reserved for special projects on federal lands or for county projects, or the reserved fund must be returned to the General Treasury. If a county's share of the full payment amount is less than $100,000, all of the funds may be spent in the same manner as the 25 Percent Fund payments. Changes in the forest plan would not affect these payments.

Counties could choose to continue to receive payments under the 25 Percent Fund or to receive the county's proportionate share of the state's full payment amount under SRSCS. All counties within the assessment area elected to receive their proportionate share of the state's full payment amount.

Trends

Table 3 displays the PILT and SRSCS payments to each county from 2002 through 2005 that were associated only with the Apache-Sitgreaves National Forests. There are no ASNFs lands within Grant County, so Grant County is no shown in table 3. The payments Coconino County received that are associated with the Coconino and Kaibab National Forests are not included in the table 3 figures. Payments under PILT have tended to fluctuate more from year to year as these payments are dependent on annual Congressional allocations. Payments under SRSCS were adjusted annually for inflation.

For comparison purposes, table 3 also shows the county school budgets for the 2005-2006 school year. PILT and SRSCS payments may not be a large proportion of the county school budgets, but some school districts are very heavily dependent on these payments.

Sustainability

SRSCS was scheduled to expire at the end of 2006. Although SRSCS has been included in the President's budget, Congress has yet to take action to extend the Act. If Congress extends

SRSCS, county payments could continue as detailed above. If the SRSCS is not extended, payments would again be made under the 25 Percent Fund. The 10-year average for receipts from 1990 through 1999 are displayed by county in table 4, along with the resulting estimated payment that each county would be expected to receive if payments under the 25 Percent Fund were to resume. Receipts estimated in table 4 are total national forest receipts and include receipts from forest units other than the ASNFs.

Elimination of these funds may represent a decrease in county and community budgets. Infrastructure maintenance or educational funding might decline. Some school districts may face substantial reductions in their budgets. Pressure may be put on locally administered federal agencies, such as the ASNFs, to help make up for such short falls through new revenues from either timber sales or other receipts. Although it is almost impossible to estimate possible outcomes if SRSCS is eliminated by Congress, the reduced funding has the potential to create tension between the ASNFs and local governments.

Table 3. Apache-Sitgreaves National Forests Associated PILT and SRSCS Payments by County, 2002 to 2005 (USDA-FS 2002, USDA-FS 2003, USDA-FS 2004, USDA-FS 2006a, USDI-BLM 2006, Arizona Department of Education 2007)

	2002	2003	2004	2005
Apache County, AZ				
PILT	$575,863	$670,423	$687,626	$702,939
SRSCS	$370,263	$374,706	$379,577	$456,832
Total	$946,126	$1,045,129	$1,067,203	$1,159,771
County Schools Budget				$146,221,325
Coconino County, AZ				
PILT	$80,519	$51,949	$54,183	$56,531
SRSCS	$336,170	$340,204	$344,627	$352,436
Total	$416,689	$392,153	$398,810	$408,967
County Schools Budget				$151,244,810
Greenlee County, AZ				
PILT	$443,908	$286,074	$292,972	$304,431
SRSCS	$531,178	$537,552	$544,541	$655,371
Total	$975,086	$823,626	$837,513	$959,802
County Schools Budget				$11,046,200
Navajo County, AZ				
PILT	$567,901	$650,096	$667,240	$682,147
SRSCS	$609,814	$617,131	$635,154	$752,391
Total	$1,177,715	$1,267,227	$1,302,394	$1,434,538
County Schools Budget				$168,625,451
Catron County, NM				
PILT	$62,738	$71,581	$73,591	$72,829
SRSCS	$162,956	$194,014	$196,536	$201,056
Total	$225,694	$265,595	$270,127	$273,885
County Schools Budget				N/A

Table 4. Ten-Year Average Forest Receipts by County and Estimated 25 Percent Fund Payments (University of Arizona 2005)

County	Average Forest Receipts 1990 to 1999 (2006 Dollars)	Estimated Payment Under 25 Percent Fund (2006 Dollars)
Apache County, AZ	$258,746	$64,687
Coconino County, AZ	$2,340,424	$585,106
Greenlee County, AZ	$364,937	$91,234
Navajo County, AZ	$460,165	$115,041
Catron County, NM	$451,875	$112,969

Apache-Sitgreaves National Forests Economic Contribution Analysis

Analysis Methodology

Estimates of the forest programs and activities economic contribution were developed through IMPLAN, using data for 2003. IMPLAN is an economic modeling program originally developed by the Forest Service in cooperation with the Federal Emergency Management Agency and the Bureau of Land Management. IMPLAN has since been privatized and is now provided by Minnesota IMPLAN Group (MIG). IMPLAN uses a basic economic statistics database that MIG constructed. Information for this database was obtained from major government sources such as the Bureau of Economic Analysis (2002), County Business Patterns, Regional Economic Information System, Bureau of Labor Statistics, U.S. Census, and other data sources and converted to a consistent format using widely accepted methodologies (Minnesota IMPLAN Group 1999).

The IMPLAN database breaks the economy down into 509 industrial sectors[4] based the North American Industrial Classification System (NAICS)[5]. The 509 IMPLAN sectors were aggregated in order to summarize the data. The aggregation scheme grouped sectors by the first two NAICS code digits. This initial aggregation was further refined to better identify areas of particular interest relative to Forest Service management activities. The result was 16 aggregated sectors. The sectors that relate to Forest Service activities are wood products and processing, grazing, mining, and tourism. For this assessment, the portion of labor income and employment associated with tourism were estimated based on percentages derived from the Travel Industry Association of America Tourism Economic Impact Model and used in the Arizona Office of Tourism's Arizona Tourism Statistical Report issued by the Arizona Office of Tourism as cited in the Socio-Economic Assessment for the Apache-Sitgreaves National Forest (University of Arizona 2005). Data for the assessment area, as a whole, are summarized below. Data for each county and the assessment area within each county are presented in appendix A.

[4] Industrial sectors represent the various goods-producing and service-producing economic activities.
[5] A classification system developed jointly by the U.S., Canada, and Mexico to provide improved comparability in industrial statistics across North America. NAICS divides the economy into 20 broad sectors. This classification system is helpful for giving detailed breakdowns of the fastest growth areas in a nation's economy.

To estimate job and labor income impacts of current Forest Service activities, an IMPLAN model was used to estimate "response coefficients" or rates of economic activity for the following forest-related activities:

- Recreation: Local economic activity generated per million dollars of visitor expenditures while visiting the ASNFs.
- Wildlife and Fish: Local economic activity generated per million dollars of visitor expenditures for hunting, fishing, and wildlife viewing while visiting the ASNFs.
- Grazing: Economic activity per million dollars of value added to the sales price of cattle grazed on Forest Service allotments.
- Timber: Economic activity per thousand cubic feet of stumpage flowing through logging companies, sawmills, post and pole operations, and firewood sales.
- Minerals: Economic activity per ton of mineral products such as sand and gravel; cinders, and crushed stone that are extracted from National Forest System lands administered by the ASNFs.
- Payments to States: Returns to counties under the "Secure Rural Schools Act" can foster significant economic activity at the local level. This response coefficient is a prediction of the local economic activity per million dollars returned to the counties.
- Forest Service salary and non-salary expenditures: Economic activity per million dollars of wages (disposable income spent locally by Forest Service employees) and economic activity per million dollars spent locally on materials, contracts, and services by the Forest Service.

These response coefficients, as well as baseline economic data, were exported from IMPLAN models and read into the Forest Economic Analysis Spreadsheet Tool (FEAST) (UDSA-FS 2006b); a spreadsheet designed to pair IMPLAN response coefficients with resource data to generate an economic contribution report.

The following data was used in FEAST to generate an estimate of the ASNFs' economic contribution to the local economy.

- Recreation and Wildlife and Fish:
  - Annual local and non-local visitor use numbers came from the 2001 National Visitor Use Monitoring (NVUM) survey for the ASNFs (USDA-FS 2006c).
  - Expenditure profiles for different types of recreation and wildlife visitor activities were also derived from the 2001 NVUM survey and processed for use with IMPLAN (Stynes and White 2005).
  - A spreadsheet was used to process visitor numbers into numbers compatible with the IMPLAN expenditure profiles.
- Range:
  - Inventory, marketing, and income data came from the Arizona Agricultural Statistics Bulletin.
  - National forest permitted Animal Unit Months (AUM) came from a spreadsheet provided by the Southwestern Region (USDA-FS 2006e).
  - Conversion from AUMs to head months came from the rangeland management website.

- Timber:
  - Volume (hundred cubic feet) cut information was obtained from the Southwestern Region Cut and Sold Report for the ASNFs.
  - Direct effects response coefficients came from Timber Mill Survey from Chuck Keegan at the University of Montana (direct jobs and income per thousand cubic feet of stumpage harvested) (Gebert et al. 2002).
  - Indirect and induced employment and income effects come from the IMPLAN model.
- Minerals:
  - Minerals production information was obtained from the USDA Forest Service Mineral Materials Production Report.
  - Minerals price data was obtained from the U.S. Geological Survey, Mineral Commodity Summaries, January 2006.
  - Direct, indirect, and induced employment and income impacts come from the IMPLAN model.
- Forest Service salary and non-salary expenditures:
  - Budget expenditure data were obtained from the USDA National Finance Center (USDA-FS 2006f).
  - The data were split into salary and non-salary expenditures.
    - Non-salary information was bridged to IMPLAN economic sectors.
    - Salary expenditures were converted to disposable income.
    - Employment levels were obtained from Southwestern Region personnel data.
- Restoration and Stewardship projects:
  - The budget expenditure data contain expenditures for contracting services, i.e. thinning operations, and for force account expenditures related to these projects.
  - FEAST models the economic impact of these expenditures in the local economy.
  - Budget data for Fiscal Year 2005 was used as it reflects the increasing emphasis (expenditure) on restoration and stewardship projects.

Current Conditions

In 2004, the Forest Service awarded the White Mountain Stewardship Project (WMSP) contract to Future Forest, LLC. The contract was the first large-scale, 10-year stewardship contract in the nation. The contract emphasizes large-scale forest restoration activities that should result in healthier forests, enhanced rural development, and the utilization of previously unmarketable small diameter trees. The contract provides for the treatment of an estimated 5,000 to 25,000 acres per year over the term of the contract. It facilitates the development of a wood products industry better suited to utilize the excessive number of small diameter and some larger trees on the ASNFs. This small diameter material is used for various products such as power generation, lumber, and the manufacture of wood pellets. The *2005 WMSP Economic Assessment Conducted for the White Mountain Stewardship Contract Multi-party Monitoring Board* estimated that within the White Mountain Region nearly one-third of the employment in existing forest industries, or approximately 104 direct and indirect full-time equivalent jobs, could be attributed to Future Forest, LLC as a result of the WMSP contract (Gibson 2006).

The economic contribution analysis (economic contribution of the ASNFs to the surrounding economic system) of current forest activities to the assessment area economy utilizes 2003 IMPLAN data, the most current available, to develop response coefficients to estimate the economic impact of forest activities. However, these response coefficients were applied to forest outputs and budget expenditures from 2005 in order to include the effects of WMSP in the ASNFs' overall contribution to the local economy.

The following pie charts display the relative size of the natural resource related sectors[6] in the IMPLAN assessment area economy. Figure 10 displays labor income and figure 11 displays employment. Labor income from natural resource related sectors represents 13 percent of the IMPLAN assessment area total and approximately 12 percent of employment. It should be remembered that the ASNFs' contributions represent only a portion of the economic activity reflected in the natural resource related sectors.

The information below reflects only the direct effects of a given sector. Direct impacts are the response of an industry to demand for the goods or services it produces. The employment and labor income that result from the production of output to meet demand are direct effects. However, direct effects are only a part of the picture. The dynamics of a regional economy can be more fully understood by looking at the complex linkages and interdependencies among businesses, consumers, and the natural resources on which economic activity depends. IMPLAN modeling allows a more complete examination of these complex linkages. In addition to direct effects, each sector also has indirect and induced effects. Indirect effects are produced when a sector must purchase supplies and services from other industries in order to produce output sufficient to meet demand. The employment and labor income generated in other industries as a result are referred to as indirect effects. Induced effects represent the employment and labor income stimulated throughout the local economy as a result of the expenditure of new household income generated by direct and indirect employment. In the following two tables, indirect and induced impacts are referred to as "secondary" impacts.

[6] "Natural Resource Related" refers to ASNFs-related activities, while "Ag, Forestry, Fish & Hunting" represents private industry.

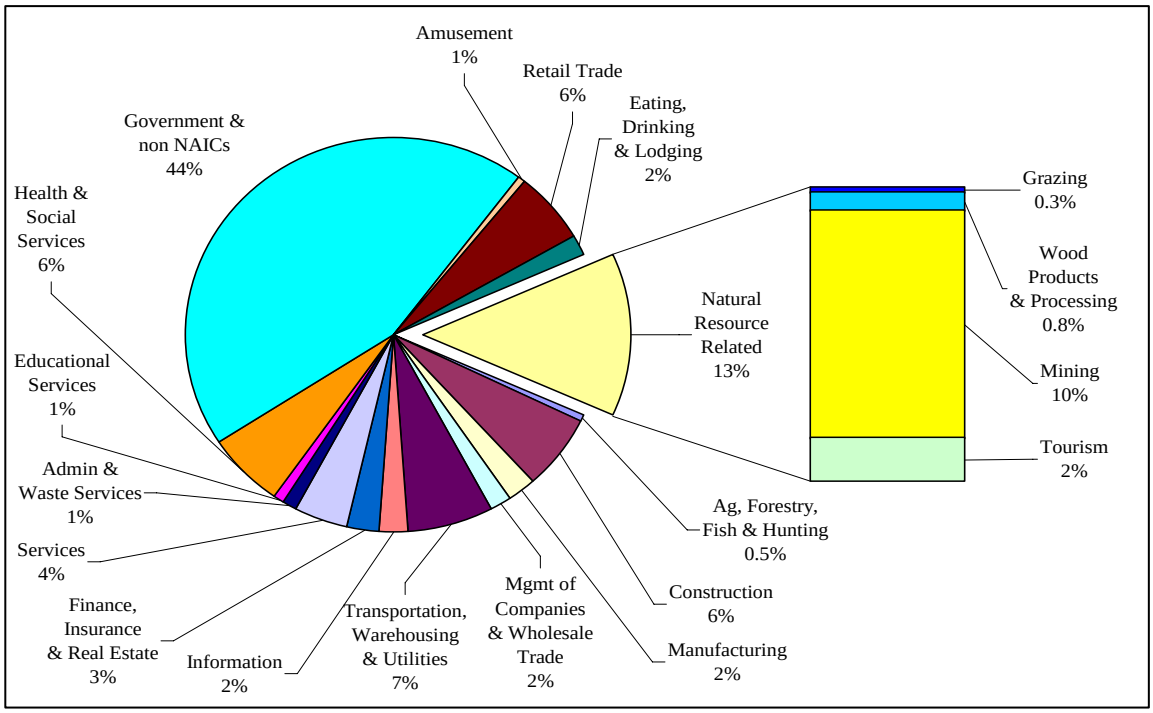

Figure 10. Assessment Area Labor Income Distribution by Industry Sector, 2003 (IMPLAN)

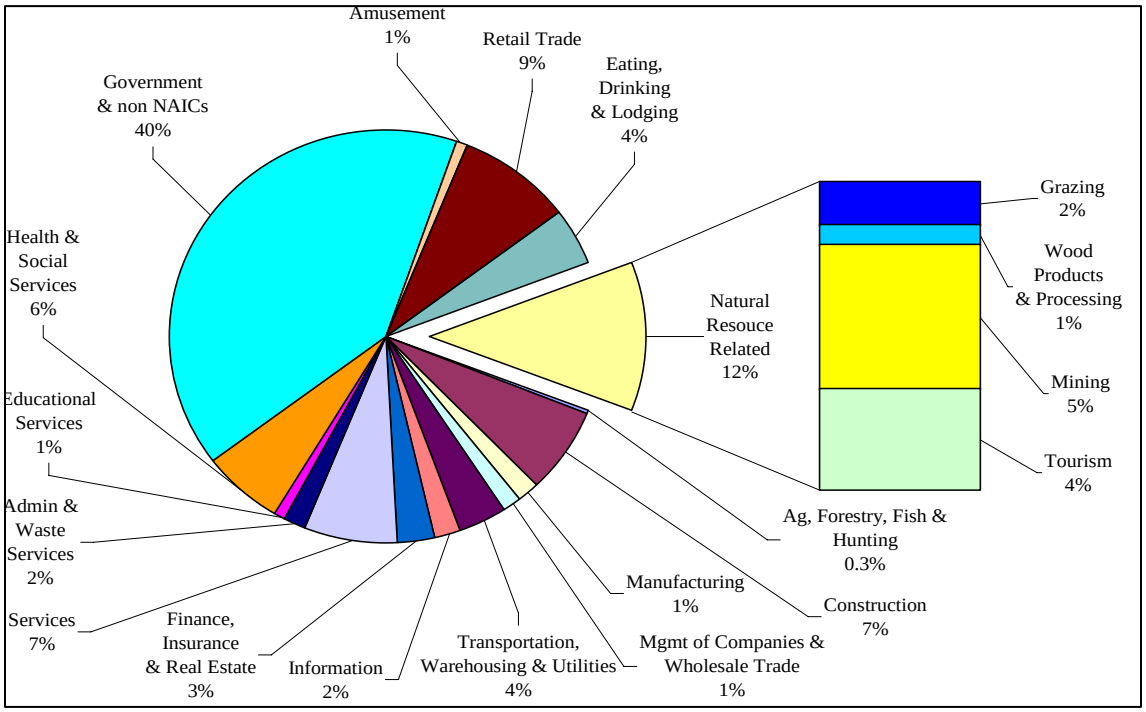

Figure 11. Assessment Area Employment by Industry Sector, 2003 (IMPLAN)

Another factor considered when estimating economic impacts is commonly referred to as "leakage." Part of the monies spent by businesses and individuals is spent within the local economy, while a portion of those monies is exported or spent outside of the local economy. The money expended outside the local economy is referred to as leakage. By the same token,

economic activity is introduced or imported when those from outside the area purchase goods and services within the local area, thereby introducing new money into the local economy.

IMPLAN attempts to estimate these complex economic relationships in order to approximate the effect of each sector on the economy as a whole. Multipliers are developed as a means to estimate the change in direct, indirect, and induced effects as a result of an adjustment in the final demand level for the goods or services provided by a given economy sector. These multipliers also take into account the effects of leakage and imports. Some sectors may have a large multiplier, while others may have a very small one. The size of a sector's multiplier is not a direct indicator of the significance of its economic impact.

Tables 5 and 6 display the total estimated direct and "secondary" labor income and employment contributions of current management activities on the ASNFs. The ASNFs contribute over $83 million and over 3,100 jobs directly and indirectly to the local economy. These contributions represent a stimulus to economic growth and employment.

The employment estimated in table 6 is defined as any part-time, seasonal or full-time job. The recreation economic contribution area stimulates the greatest levels of employment and labor income in the forests' economic contribution areas. However, 3 percent of the estimated employment and 6 percent of the estimated labor income are attributed to the recreation activities of local residents. While providing recreation opportunities to local residents is an important contribution, the recreation expenditures of locals do not represent new money introduced into the economy. If national forest-related opportunities were not present, it is likely residents would participate in other locally-based recreation activities and this money would still be retained in the local economy.

Approximately 97 percent of the jobs and 94 percent of the labor income are generated from expenditures by non-local visitors bringing new money into the area. The Forest Service timber economic contribution area is the second largest generator of jobs and labor income.

The labor income estimate generated by industry sectors is displayed in table 7. The largest amount of labor income is generated in the government sector, followed by the accommodations and food services sector.

Table 5. Apache-Sitgreaves National Forests Estimated Labor Income Contribution

Economic Conribution Area	Thousands of 2006 Dollars Contributed		
	Total Contribution	Contribution from Recreation Activities of Local Residents[7]	New Money Contribution
Recreation	$43,866	$3,882	$39,983
Wildlife	$12,733	$1,028	$11,705
Grazing	$586	$0	$586
Timber	$12,140	$0	$12,140
Minerals	$857	$0	$857
Payments to States/Counties	$1,353	$0	$1,353
Forest Service Expenditures	$11,766	$0	$11,766
Total Forest Management	$83,301	$4,910	$78,391
Percent of Total Labor Income Contributed	100%	6%	94%

Table 6. Apache-Sitgreaves National Forests Estimated Employment Contribution

Economic Contribution Area	Number of Jobs Contributed		
	Total Contribution	Contribution from Recreation Activities of Local Residents	New Money Contribution
Recreation	1,678	140	1,538
Wildlife	483	39	444
Grazing	45	0	45
Timber	527	0	527
Minerals	23	0	23
Payments to States/Counties	44	0	44
Forest Service Expenditures	319	0	319
Total Forest Management	3,119	179	2,940
Percent of Total Employment Contributed	100%	3%	97%

[7] Expenditures by local residents for recreation on the national forests do not introduce "new" money into the economy. If local residents could not recreate on the national forests, they would likely find other forms of recreation in the area and would continue to spend their recreation dollars in the local economy. Therefore, this portion of labor income is not necessarily dependent on the existence of the national forests or the opportunities it provides.

Table 7. Apache-Sitgreaves National Forests Estimated Labor Income Contribution by Industry Sector

Industry Sector	Thousands of 2006 Dollars Contributed		
	Total Contribution	Contribution from Recreation Activities of Local Residents	New Money Contribution
Agriculture	$6,482.7	$79.3	$6,403.4
Mining	$602.2	$1.7	$600.5
Utilities	$661.6	$27.0	$634.7
Construction	$763.8	$29.6	$734.2
Manufacturing	$3,725.8	$30.6	$3,695.2
Wholesale Trade	$4,813.1	$512.5	$4,300.6
Transportation & Warehousing	$2,034.1	$133.8	$1,900.3
Retail Trade	$7,571.7	$745.1	$6,826.6
Information	$1,112.1	$83.5	$1,028.6
Finance & Insurance	$963.7	$43.8	$919.9
Real Estate & Rental & Leasing	$1,342.9	$73.9	$1,269.0
Prof., Scientific, & Tech. Services	$1,295.2	$94.0	$1,201.2
Mgmt.of Companies	$542.4	$33.4	$509.1
Admin., Waste Mgmt., & Rem. Services	$744.5	$47.7	$696.8
Educational Services	$167.0	$11.0	$156.1
Health Care & Social Assistance	$2,574.3	$143.5	$2,430.8
Arts, Entertainment, and Recreation	$3,055.8	$239.2	$2,816.6
Accommodations & Food Services	$14,573.3	$912.32	$13,661.0
Other Services	$1,766.1	$78.2	$1,687.9
Government	$28,509.3	$1,590.3	$26,919.0
Total Forest Management	$83,301.8	$4,910.5	$78,391.4
Percent of Total	100%	6%	94%

Table 8 shows the ASNFs' contribution to employment by sector. Forest Service activities generated the most jobs in the accommodations and food services sector. The large number of jobs relative to labor income generated reflects lower paying service industry jobs. These numbers are consistent with national forest lands that are primarily used for recreation and wildlife viewing. Timber and grazing activities are most closely associated with jobs generated in the agriculture and manufacturing sectors.

Table 8. Apache-Sitgreaves National Forests Estimated Employment Contribution by Industry Sector

Industry Sector	Total Number of Jobs Contributed		
	Total Contribution	Contribution from Recreation Activities of Local Residents	New Money Contribution
Agriculture	344	3	341
Mining	16	0	16
Utilities	10	1	9
Construction	22	1	21
Manufacturing	158	1	157
Wholesale Trade	126	13	113
Transportation & Warehousing	68	5	63
Retail Trade	317	32	285
Information	28	2	26
Finance & Insurance	27	1	26
Real Estate & Rental & Leasing	39	2	37
Prof., Scientific, & Tech. Services	43	3	40
Mgmt.of Companies	11	1	10
Admin., Waste Mgmt., & Rem. Services	35	2	33
Educational Services	10	1	9
Health Care & Social Assistance	69	4	65
Arts, Entertainment, and Recreation	123	10	114
Accommodation & Food Services	995	64	931
Other Services	89	4	85
Government	588	29	560
Total Forest Management	3,119	179	2,940
Percent of Total	100%	3%	97%

Table 9 shows the estimated employment and labor income generated by activities on the ASNFs relative to the regional economy as a whole. In terms of labor income, the largest single industry sector is government, which includes public education and civil servants. This is followed by the retail trade, construction, and health care and social assistance sectors. The largest employment sector is also government, followed by the retail trade, accommodations and food services, and construction sectors. The agriculture sector produces a higher proportion of labor income relative to employment, indicating higher paying jobs.

ASNFs' activities are estimated to be responsible for approximately 7 percent of jobs and 5 percent of labor income within the regional economy. The agriculture sector is most dependent on the ASNFs' contributions, which account for approximately 36 percent of the jobs and 50 percent of the labor income. The wholesale trade, accommodations and food services, and arts, entertainment, and recreation sectors also benefit from ASNFs' contributions to a greater extent than other sectors.

Table 9. Current Role of Apache-Sitgreaves National Forests Contributions to Local Economy by Industry Sector

Industry Sector	Employment (Jobs)			Labor Income (Thousands of 2006 Dollars)		
	Area Totals	ASNFs Related	Percent of Total	Area Totals	ASNFs Related	Percent of Total
Agriculture	950	344	36.2	$13,060.2	$6,482.7	49.6
Mining	2,524	16	0.6	$172,047.9	$602.2	0.4
Utilities	376	10	2.7	$24,739.3	$661.6	2.7
Construction	3,082	22	0.7	$105,371.9	$763.8	0.7
Manufacturing	979	158	16.1	$50,615.6	$3,725.8	7.4
Wholesale Trade	475	126	26.5	$18,082.1	$4,813.1	26.6
Transportation & Warehousing	1,360	68	5.0	$84,663.7	$2,034.1	2.4
Retail Trade	4,444	317	7.1	$113,333.6	$7,571.7	6.7
Information	922	28	3.0	$37,131.2	$1,112.1	3.0
Finance & Insurance	649	27	4.2	$23,695.8	$963.7	4.1
Real Estate & Rental & Leasing	679	39	5.7	$21,700.7	$1,342.9	6.2
Prof., Scientific, & Tech. Services	718	43	6.0	$25,704.9	$1,295.2	5.0
Mgmt.of Companies	185	11	5.9	$9,050.9	$542.4	6.0
Admin., Waste Mgmt., & Rem. Services	795	35	4.4	$18,672.4	$744.5	4.0
Educational Services	454	10	2.2	$13,125.7	$167.0	1.3
Health Care & Social Assistance	2,777	69	2.5	$103,732.0	$2,574.3	2.5
Arts, Entertainment, and Recreation	323	123	38.1	$7,274.0	$3,055.8	42.0
Accommodations & Food Services	3,211	995	31.0	$45,012.2	$14,573.3	32.4
Other Services	2,464	89	3.6	$45,052.1	$1,766.1	3.9
Government	18,608	588	3.2	$742,836.5	$28,509.3	3.8
Total	45,974	3,119	6.8%	$1,674,902.6	$83,301.8	5.0%

Within individual counties and communities, dependency on natural resource industries may be greater. Small changes in forest activities have the potential to result in more noticeable localized effects. Because forest outputs could not be attributed to each county or community, it is not possible to analyze the jobs and labor income to individual counties or communities. However, to provide some insight as to the importance of forest-related industries in the smaller communities, the economies of each assessment area county are described in appendix A.

The contribution of the White Mountain Stewardship Project (WMSP) contract is included in the above analysis. In order to assess this contract's annual contribution, it was also assessed separately. Tables 10 and 11 display the estimated 2005 job and labor income contributions from the WMSP contract.

Table 10. Estimated 2005 Job and Labor Income Contributions from the White Mountain Stewardship Project Contract

Economic Contribution Area	Jobs	Labor Income (Thousands of 2006 Dollars)
Contract-Related Harvest Activities	126	$2,906
Payments to States/Counties	1	$18
FS Contract-Related Expenditures	7	$1,318
Total Contract-Related Contribution	**134**	**$4,242**
Percent of Forests' Total Contribution	4.7%	5.4%
Percent of Assessment Area Economy	0.3%	0.3%

- Stewardship does not contribute to payments to counties. Any receipts from WMSP are used to offset costs and do not contribute to the 25 Percent Fund.
- WMSP does not contribute economically to Pinetop-Lakeside.

The WMSP contract's estimated economic contribution during 2005 represented approximately 5 percent of the ASNFs' total contribution and approximately 0.3 percent each of the total estimated assessment area jobs and labor income. However, as displayed in table 11, the impact within some sectors is more noticeable. The economic activity stimulated in the agriculture sector as a result of the contract represents approximately 21 percent of the jobs and 22 percent of the labor income contribution by the forests and approximately 8 and 11 percent of all jobs and labor income, respectively, in the assessment area agriculture sector. Within the manufacturing sector, jobs and labor income stimulated as a result of the stewardship contract each represent an estimated 18 percent of the ASNFs' total contribution. Within the assessment area, the WMSP contract contributes approximately 3 percent of jobs and 1 percent of labor income in the manufacturing sector. The results of a 2005 study of WMSP's economic effects (Gibson 2006) in the White Mountains region are similar to the modeled effects.

Sustainability

- Forest visitors play a major role in the Pinetop-Lakeside economy.

Natural resource-related industries constitute a sizeable portion of the assessment area economy, providing approximately 12 and 13 percent of employment and labor income, respectively. In total, ASNFs management activities during 2003 stimulated approximately 7 percent of jobs and 5 percent of labor income within the assessment area. However, some industry sectors appear to have a much higher degree of dependence on the ASNFs' contributions. The local industry sectors most dependent on the management activities and forest uses are agriculture; arts, entertainment, and recreation; and accommodations and food services. It is estimated that the ASNFs' contribution represented approximately 36 percent of jobs and 50 percent of labor income in the agriculture sector. These contributions would be most closely connected to activities associated with the timber and grazing economic contribution areas. The ASNFs contribute an estimated 38 and 42 percent of jobs and labor income, respectively, in the arts, entertainment, and recreation sector; and 31 and 32 percent of jobs and labor income in the accommodations and food services sector. Economic contributions to these industry sectors are most closely associated with the recreation and the fish and wildlife economic contribution areas.

Table 11. Estimated 2005 Job and Labor Income Contributions from the White Mountain Stewardship Project Contract by Industry Sector

Industry Sector	Jobs	Percent of Forests' Contrib.	Percent of Assessment Area Total	Labor Income (Thousands of 2006 Dollars)	Percent of Forests' Contrib.	Percent of Assessment Area Total
Agriculture	73	21.4	7.68	$1,443.2	22.4	11.05
Mining	0	0.0	0.00	$1.8	0.3	0.00
Utilities	0	0.0	0.00	$30.9	6.7	0.12
Construction	0	0.0	0.00	$15.3	2.3	0.01
Manufacturing	29	18.5	2.96	$671.3	18.2	1.33
Wholesale Trade	2	1.8	0.42	$81.4	1.9	0.45
Transportation & Warehousing	3	4.8	0.22	$101.5	5.5	0.12
Retail Trade	4	1.4	0.09	$125.0	1.8	0.11
Information	1	4.0	0.11	$29.0	3.0	0.08
Finance & Insurance	1	4.0	0.15	$52.2	5.8	0.22
Real Estate & Rental & Leasing	1	2.9	0.15	$41.4	3.4	0.19
Prof., Scientific, & Tech. Services	1	2.7	0.14	$40.9	3.6	0.16
Mgmt.of Companies	1	10.0	0.54	$38.1	7.8	0.42
Admin., Waste Mgmt., & Rem. Services	1	3.3	0.13	$25.2	3.9	0.13
Educational Services	0	0.0	0.00	$7.4	4.8	0.06
Health Care & Social Assistance	4	6.3	0.14	$144.6	6.0	0.14
Arts, Entertainment, and Recreation	0	0.0	0.00	$11.0	0.4	0.15
Accommodations & Food Services	4	0.5	0.12	$63.4	0.5	0.14
Other Services	6	7.3	0.24	$139.9	8.5	0.31
Government	1	0.2	0.01	$1,178.4	4.0	0.16
Total Contract Contribution	134	4.7%	0.29%	$4,241.9	5.4%	0.25%

Over 95 percent of the economic activity associated with the ASNFs represents new money introduced into the economy. The forests' economic contribution areas that generated the greatest amount of economic stimulus are recreation and those activities associated with wildlife and fish. These two economic contribution areas represent approximately 69 percent of the jobs and 68 percent of the labor income. The next largest supplier is the timber economic contribution area which provides approximately 15 percent of the ASNFs' contribution to labor income and 17 percent of jobs.

The WMSP contract provided about 5 percent of the ASNFs' total economic contribution during 2005. Its impact has been strongest in the agriculture sector, contributing an estimated 8 percent of all jobs and 11 percent of the total labor income of the assessment area economy. The contract has also favorably impacted the manufacturing sector, contributing an estimated 3 percent of the all assessment area jobs.

Social Conditions, Trends, and Sustainability

Identifying Relevant Categories of Social Data

This portion of the sustainability assessment focuses on broad-scale, strategic issues that may be directly linked to desired conditions and sustainability. The categories used to identify and understand sustainability at the forest level address issues that are relevant to Southwestern Region national forests. These categories' indicators are relevant for the identifying historical and existing conditions, trends, and need for change.

The **information categories** used correspond to Socio-Economic Assessment (University of Arizona 2005) chapters as well as information in beliefs, attitudes, and values focus group study (USDA-FS 2006b) and include:

- Demographics
- Land Use and Land Users
- Forest Access and Travel Patterns
- Community Relationships

The figures in this section are derived from the ASNFs' social and demographic information provided in the University of Arizona Socio-Economic Assessment. This section considers the all of Apache, Navajo, Coconino, and Greenlee Counties in Arizona and Catron County in New Mexico. It does not include Grant County, New Mexico, because it was not included in the University of Arizona study.

Demographics

Historical and Current Conditions

The demographic history of the area surrounding the ASNFs, and the region as a whole, represents one of sustained and rapid growth. Since 1930, the Mountain West has more than doubled its share of the U.S. population, from 3 percent to 7 percent. This growth increased dramatically in the 1950s and then slowed in the 1960s. The pattern of alternating decades of intense growth followed by decades of slower growth was repeated for the next 40 years (Otterstrom and Shumway 2003). The three most populous counties surrounding the ASNFs have grown steadily over the past 90 years; by contrast, Greenlee County has seen precipitous drops over the past 30 years. Apache County has seen heavy growth, especially between 1970 and 1980, when the county population nearly doubled from 32,000 to 52,000. Coconino County has grown at an average of just above 3 percent per year over the past 50 years. Over the past century, the counties which are home to the ASNFs have grown from 22,600 residents to nearly 300,000 (U.S. Census Bureau 2005, Forstall 1995, Morton 2003). Arizona has grown from 120,000 residents to well over five million (U.S. Census Bureau 2005). Seasonal visitors wishing to relocate permanently to environs with increased outdoor opportunities (McHugh and Mings 1996) also support long-term population increases.

The past 50 to 60 years have seen only moderate racial diversification in Arizona. While the Hispanic presence has increased from 20 percent to 25 percent of the total population since 1940, African Americans, despite a rapid influx in the 2 decades following WWII and an average population growth rate of 49 percent per decade, remained static at 3.1 percent of the population in 2000, only 0.1 percent above their relative numbers in 1940. The Native American population, as a percentage of Arizona's total population, by contrast, has declined over the past 5 or 6

decades, falling from 11 percent in 1940 to 5 percent in 2000 (U.S. Census Bureau 2005), even though the Native American population has grown [8].

Total Persons and Population Density

Total land area, 2000 population, population density, and percent Forest Service land is shown for each of the five counties in table 12. Coconino County is the most populous county and has the largest total area. Greenlee County has the highest percentage of Forest Service land. Catron County has the smallest population per total land area, resulting in a population density of one individual for every 2 square miles. In contrast, Navajo County is the most densely populated with almost 10 people per square mile. Although Flagstaff is the most populous city within the assessment area, both Phoenix and Tucson provide substantial numbers of visitors, many of whom occupy seasonal housing adjacent to the ASNFs. All other towns throughout the region support much smaller populations, the least of which is Reserve, NM.

Table 12. Total Area, Total Population, Population Density, and Percent Forest Service Land by County (UDSA-FS 2007)

County	Total Area (Sq. Miles)	2000 Population	Population Density per Sq. Mile	Percent FS Land
Apache	11,218.4	69,423	6.2	6.9
Coconino	18,661.2	116,320	6.2	27.4
Greenlee	1,837.1	8,547	4.7	63.9
Navajo	9,959.5	97,470	9.8	7.7
Catron, NM	6,927.8	3,543	0.51	50.1

Population Trends

1. Each county, except Greenlee and Catron, has experienced net population growth. Greenlee and Catron Counties saw declines in their relatively small populations between 1980 and 1990 (figure 12).
2. The rate of growth for each county over the past 2 decades has remained well below the growth rates for Arizona and New Mexico.
3. Population growth within Navajo County between 1990 and 2000 far exceeded that of the previous decade.
4. The Greenlee County population has stabilized following sharp declines in the local labor market as a result of reduced mining activities in the mid-1980s.
5. The influence of changing local economies is also seen in the sharply declining populations of mining towns like Clifton and Morenci (Greenlee County), with the exception of population increases in Whiteriver and Pinetop-Lakeside during the same period (Navajo County).
6. While the population growth rate in Greenlee County appears to have stabilized, it remains the lowest of the four Arizona counties and far below that of Arizona.

[8] The specific numbers for these historical comparisons are found at http://www.census.gov/population/documentation/twps0056/ in the U.S. Census Bureau website (table 17) and are juxtaposed against the Census 2000 findings.

7. As of 1980, Apache and Navajo Counties were predominantly rural, whereas Coconino and Greenlee Counties were largely urban, because the populations are concentrated in areas that the U.S. Census defined as urban.
8. Between 1980 and 2000, Greenlee and Navajo Counties reported relatively strong growth in urban populations.
9. During this same period, Apache and Coconino Counties saw increases in rural population concurrent with seasonal housing increases.
10. Catron County is categorized as entirely rural because of its extremely low population density.

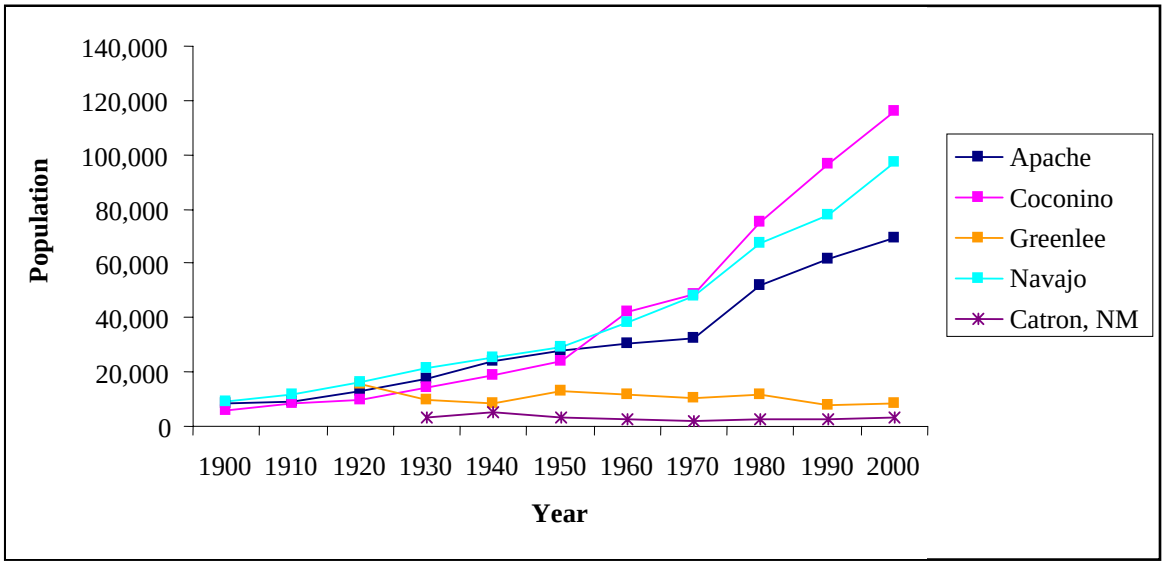

Figure 12. Five-County Assessment Area Population Change, 1900 to 2000 (U.S. Census Bureau 2005)

Migration Trends

Net migration data show that assessment area population growth has been relatively slow with limited in-migration of individuals previously living outside the county. The exceptions to this trend were Apache and Navajo Counties, both of which reported relatively strong growth in individuals migrating to the area from other states as well as from different counties within Arizona. The greatest numbers of individuals moving in from out-of-state came from the West and the Midwest. Both Apache and Navajo Counties reported large increases in the number of individuals migrating from "elsewhere" (different countries) over the period.

People live in and move to the towns and areas within and around the ASNFs because of the forested environment and the ability to pursue their desired lifestyles. The forests provide shade, privacy, and a retreat from the desert heat. Most residents (87 percent) value the White Mountain forest environment more than other aspects of place (social connections, cost, and work) (Collins 2006).

Age Distribution Trends

There is a clear difference in population trends for individuals under 18 and those 65-and-over for each county with the exception of Greenlee County. Greenlee County witnessed declines in both age groups between 1990 and 2000 (figure 13). Perhaps the most dramatic difference can be seen in Apache County, where the under-18 population declined and the 65-and-over population grew considerably in Eagar, St. Johns, and Springerville. The contrast between growth rates in these age groups was also noteworthy in Catron County. In fact, four of the five counties saw relatively small increases in the number of individuals under 18 when compared to Arizona over the same period. Growth rates for the under-18 population were also considerably lower than overall population growth within these same counties between 1990 and 2000. Conversely, the 65-and-over population for each county grew at a higher rate than average for its respective state and considerably higher than county populations. Catron County experienced the highest rate of increase in the 65-and-over population with 71 percent. In sheer numbers, however, Navajo County experienced a more substantial increase in individuals 65-and-over with a 55 percent gain between 1990 and 2000. Among cities, Show Low and Snowflake saw the largest increases in the 65-and-over population with growth rates of 85 and 87 percent, respectively. Again, the exception to this overall trend is Greenlee County, which experienced a 5 percent decrease in the number of individuals 65-and-over between 1990 and 2000.

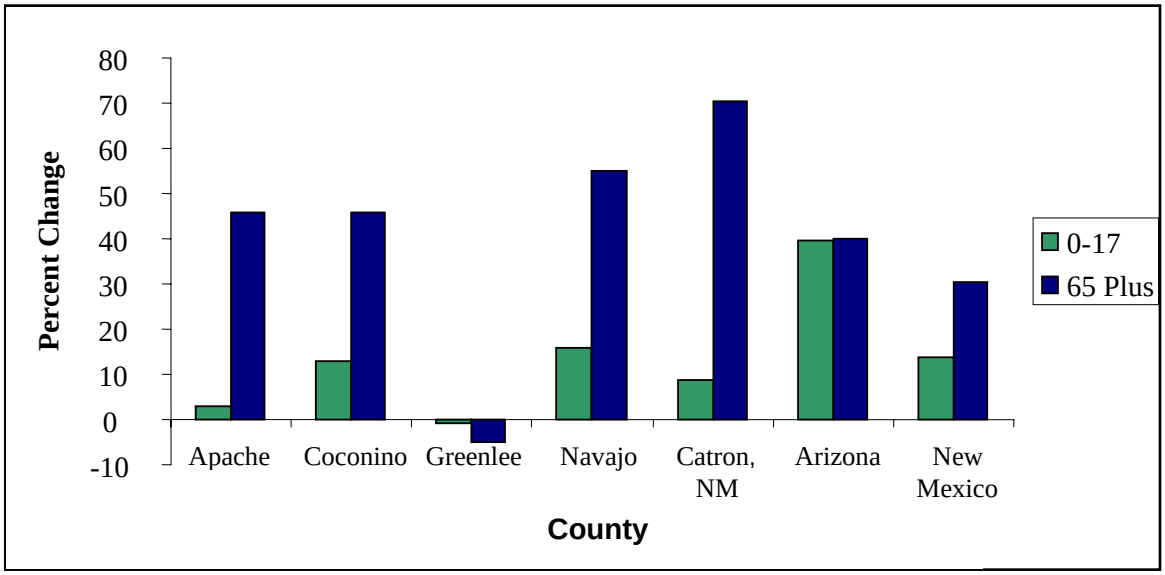

Figure 13. Percent Change in Under-18 and 65+ Populations by County, 1990 to 2000 (USDA-FS 2007)

Race and Ethic Distribution Trends

Despite a slight decrease in proportional representation, Native Americans remain a clear ethnic majority in Apache County. Although Native Americans are no longer the majority ethnic population of Navajo County, they remain the largest group with over 47 percent of the population. The clear exception to regional ethnic diversity is Greenlee County, which more closely resembles the overall ethnic composition of Arizona. The past 60 years have seen only moderate racial diversification in both Arizona and New Mexico. While the Hispanic population in Arizona has increased from 20 percent to 25 percent of the population since 1940, the African American cohort, despite an especially rapid influx during the 2 decades following World War II

and an average population growth of 49 percent per decade, has remained static sitting at 3 percent of the population in 2000.

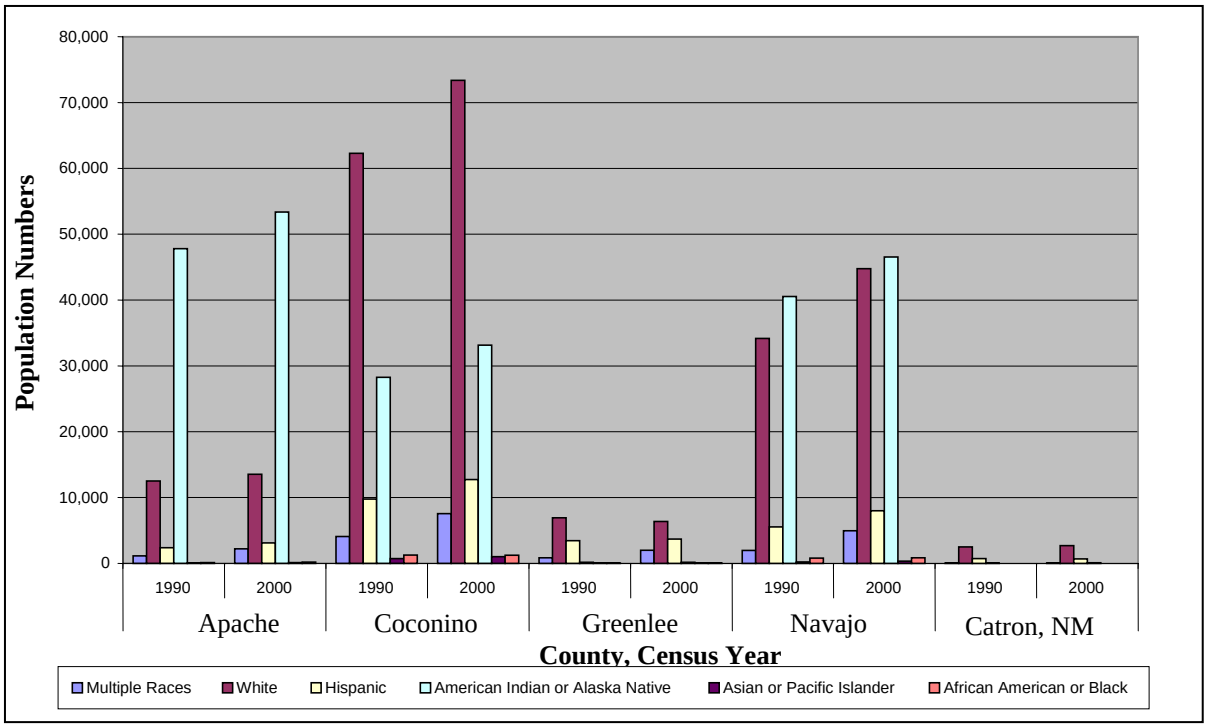

Figure 14. Racial/Ethnic Composition of the Population, 1990 and 2000

In contrast, the Native American population, as a percentage of the total population, has declined substantially over the past 6 decades, falling from 11 percent in 1940 to 5 percent in 2000 (U.S. Census Bureau 2005).[9]

Between 1940 and 2000 the Hispanic population in New Mexico rose from 221,331 to a high of 822,224; growing from 37 percent of the total population in 1940 to 44 percent in 2005. Between 1940 and 2005, the Native American population in Arizona grew from 44,076 in 1940 to 275,321 in 2005. During the same time period, the percentage of Native American, as part of Arizona's total population, declined from 11 percent in 1940 to 8 percent in 2005. In New Mexico, the Native American population was estimated at 34,520 in 1940 and grew to 181,064 by 2005, while the percentage of the total population grew from 6.5 percent in 1940 to 9.6 percent in 2005.

Although the percentage of Native Americans in the Arizona population has decreased, the absolute number is now six times greater than the 1940 figure. What makes the percentage appear to decrease is that Arizona's total population has grown from 499,261 in 1940 to more than 6 million in 2005. New Mexico's Native American population has grown at a similar rate, while the overall population has increased from 531,818 in 1940 to 1,887,200 in 2005 (Combined U.S. Census 1940 through 2000, American Communities Survey for 2005 figures).

[9] The specific numbers for these historical comparisons are found at http://www.census.gov/population/documentation/twps0056/ in the U.S. Census Bureau website and are juxtaposed with the 2000 Census findings.

There is a strong correlation between individuals who identify themselves as being of multiple racial background as well as Hispanic origin. Notably, the decade between 1990 and 2000 saw increases in individuals of multiple races in four of the five counties (figure 14), mirroring the overall trends for Arizona and New Mexico. Similarly, the growth in Hispanic populations exceeded the overall population growth rates within these same counties. The exception was Catron County, which reported a minimal increase in multiple race population and a slight decline in the Hispanic population between 1990 and 2000. Navajo County experienced the largest increases in both multiple race and Hispanic populations with growth rates of 154 and 44 percent, respectively. In spite of marked increases in both multiple race and Hispanic populations for each county, Native American populations constitute a relatively large portion of county populations, particularly when compared to the state. The Native American population, as a proportion of assessment area's population, has declined over the past 6 decades, falling from 11 percent in 1940 to 5 percent in 2000 (U.S. Census Bureau 2005), even though the Native American population has grown.

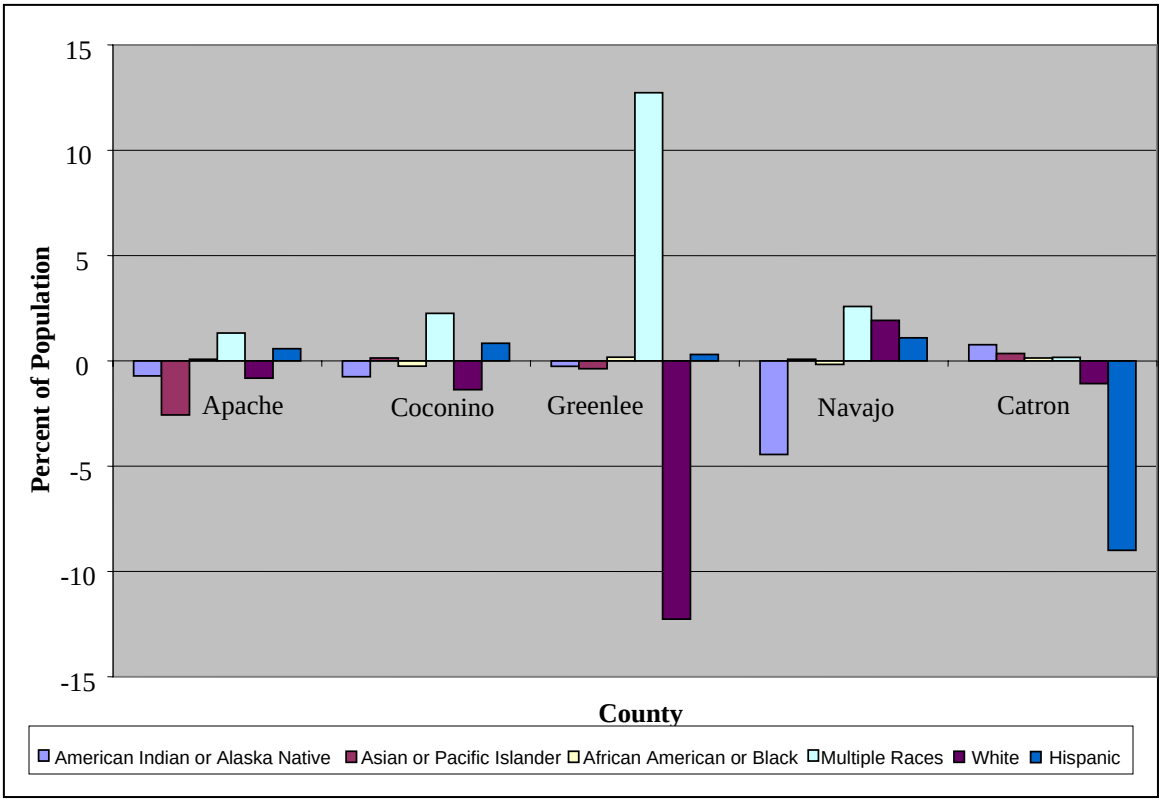

Figure 15. Percent Change in Racial/Ethnic Composition of the Population, 1990 to 2000

Educational Attainment Trends

Educational attainment for the population 25 years-of-age and older is shown for each of the five counties in figure 15. The data show that both Coconino and Greenlee Counties exceed the overall state percentage of high school graduates, while Apache and Navajo Counties fall well short of the statewide average. While the percentage of individuals with a Bachelor's degree or higher is greater in Coconino County than the state, Apache, Navajo, and Greenlee Counties all

fall below the statewide percentage in this category. Figure 15 shows that Apache County is most restricted in educational attainment with 19 percent of the 25-and-over population achieving less than a 9th grade education. Overall the trend of increasing education continues across the nation, as well as Arizona and New Mexico. While Apache, Navaho, and Greenlee Counties have lower percentages of Bachelor's degrees, the numbers of assessment area high school and college graduates continues to rise (U.S. Census, American Communities Survey Data, 2000 and 2005).

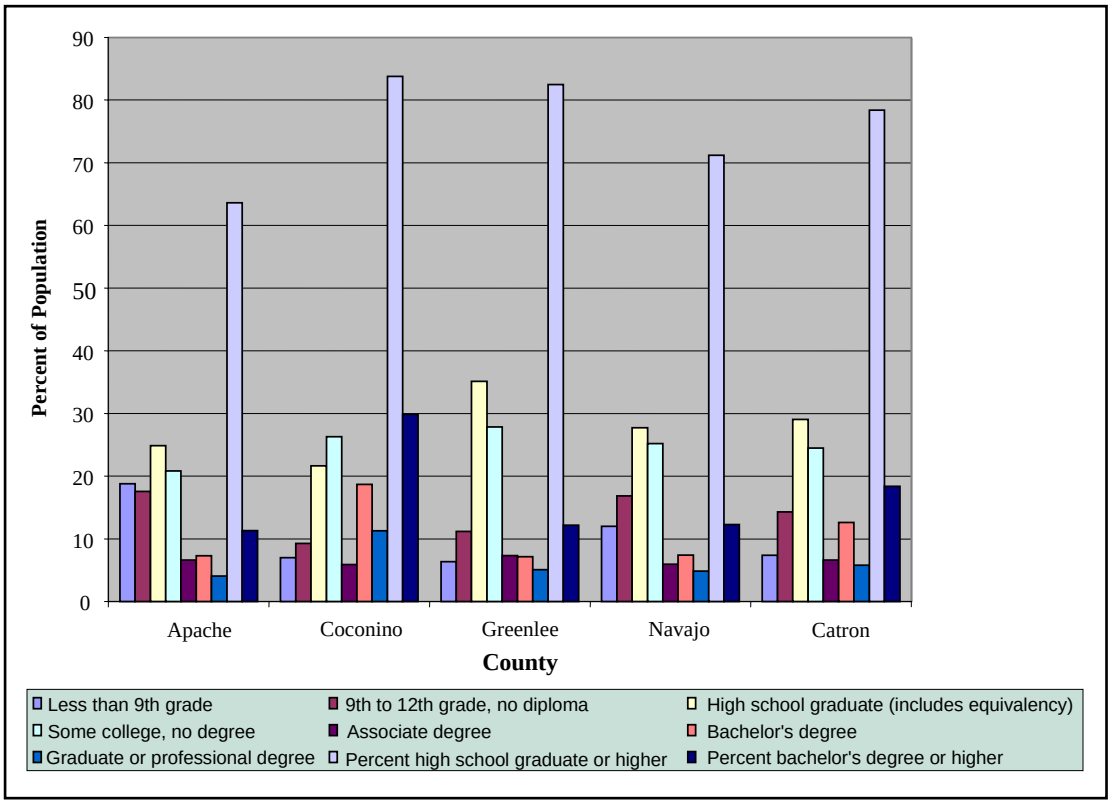

Figure 16. Levels of Education as Percent of Population, by County

Housing Trends

Total housing units in 2000 ranged from a high of 53,443 in Coconino County to a low of 2,548 in Catron County. Housing density and median home value within Greenlee and Apache Counties are lower than neighboring counties and Arizona. As illustrated in figure 17, there have been notable increases in seasonal housing units for both Apache and Navajo Counties between 1990 and 2000. Growth in seasonal housing units was most dramatic in Snowflake and Pinetop-Lakeside, both saw increases of over 1,000 percent. Approximately 90 percent of second home owners in the White Mountains are from Phoenix and Tucson (Bergsman 2004). Median home values increased most dramatically in Pinetop-Lakeside.

- Pinetop-Lakeside. Seasonal residents increase sales tax revenues; but also inflate real estate costs. Seasonal residents want year-round infrastructure, but do not contribute year-round. There is no local property tax. Median home value is $300,000.
- Increasing summer home costs have resulted in new developments in less expensive nearby areas, thereby increasing the wildland urban interface.
- Alpine. Most seasonal resident use in on weekends.
- Show Low. Since 2000, increased numbers of subdivisions aimed at out-of area buyers.
- Greenlee County. Majority of workforce lives in Graham County because of housing shortage and lack of services. Some retirees moving there and buying smaller farms. Land prices are increasing.

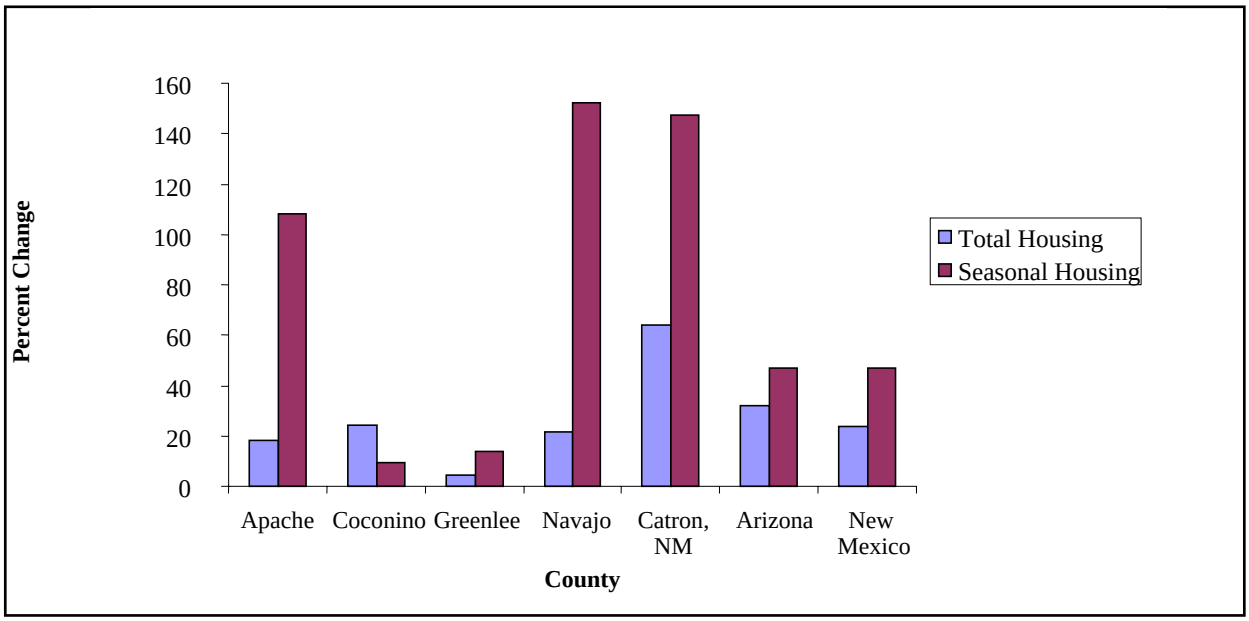

Figure 17. Percent Change in Total and Seasonal Housing Units by County, 1990 to 2000 (USDA-FS 2007)

Table 13 suggests that population growth at the county and state level is expected to continue, although at somewhat lower rates than experienced over the last 2 decades. The population growth for each county is expected to be considerably less than statewide rates. Although the population of Navajo County is expected to grow between 2010 and 2020, growth rates will likely remain well below the state average.

Table 13. County and State Population Projections, 2010 to 2030 and Percent Change (Arizona Department of Commerce 2002)

County/State	Total Pop. 2000	Projected 2010	Percent Change	Projected 2020	Percent Change	Projected 2030	Percent Change
Apache County	69,423	76,645	10.40	85,766	11.90	94,707	10.42
Coconino County	116,320	147,352	26.68	169,343	14.92	189,868	12.12
Greenlee County	8,547	9,605	12.38	10,271	6.93	10,984	6.94
Navajo County	97,470	99,979	2.57	111,946	11.97	123,460	10.29
Catron County, NM	3,543	4,063	14.68	4,459	9.75	4,752	6.57
Arizona	5,130,632	6,145,108	19.77	7,363,604	19.83	8,621,114	17.08
New Mexico	1,819,046	2,112,986	16.16	2,383,116	12.78	2,626,553	10.22

Urban and Rural Residence Trends

As of 1980, populations within Apache and Navajo Counties could be characterized as predominantly rural, whereas those of Coconino and Greenlee Counties were largely urban. Between 1980 and 2000, the assessment area witnessed interesting trends in the urban/rural composition of county populations. The Greenlee County urban population was substantially affected by the previously mentioned labor market changes. Similarly, Apache and Coconino Counties saw increases in rural populations concurrent with an increase in seasonal housing. During the same period, Greenlee and Navajo Counties reported relatively strong growth in urban populations. Further evidence of these divergent patterns is offered by Apache County's net urban population decrease and Greenlee County's comparable loss of rural residents between 1990 and 2000. Given its extremely low population density, the census bureau categorizes Catron County as entirely rural.

Sustainability

The considerable changes in demographic makeup of the ASNFs assessment area are likely to have correspondingly important effects on what the public expects from the these public lands. During the past 2 decades, continued population growth in predominantly rural areas has brought about changes in the dynamic relationships between human communities and publicly-administered lands throughout Arizona. These changes have occurred amid ongoing resource policy debates concerning fire suppression, forest restoration, water allocation, road construction, and other economically and environmentally pressing issues.

Communities transitioned from having lifestyles in which economies, social institutions, and values were consistent, to ones characterized by different economic associations with natural resources and more diversity in social institutions and values. Residents continue to share a strong sense of place about the ASNFs. They continue to value the aesthetics and benefits of open space and ready access to the forests' lands and resources. However, meanings attached to those resources and the relationship of individuals and communities to them is transitioning from relatively shared lifestyles to more diverse lifestyles. In these types of social environments, forums such as the Natural Resources Working Group provide an important means to identify and resolve differences that can result in socially disruptive polarization about natural resource and forest management issues (USDA-FS 2006d).

Although population growth in the communities surrounding the ASNFs has been somewhat slower than in other parts of Arizona, changes in the human populations surrounding the forests are likely to affect not only the quantity of goods and services demanded from public lands but also influence the character or quality of those goods and services. Research shows that areas with an abundance of natural resource-based amenities (forested mountains, rivers, lakes, access to hiking and camping, presence of clean air and water) are increasingly attractive to retirement-age populations, as well as others seeking to take advantage of the quality of life offered by small, rural communities. In particular, migrants are increasingly attracted to smaller communities with relatively affordable housing, low crime rates, and cultural traditions associated with small, rural towns throughout the Mountain West (Booth 2002, McCool and Kruger 2003, Bodio 1997). These demographic shifts are borne out by collected data for ASNFs, which show substantial increases in both the retirement-age population and the number of seasonal housing units throughout the areas characterized by small, rural towns.

Although the potential for population growth can enhance the economic vitality of rural areas through greater employment opportunities and an expanding tax base, it can also challenge the capacity of rural communities and public land managers to provide for the wide array of services. This is particularly true in areas where potential conflicts in value systems between established community interests and recently arrived immigrants can create friction over natural resource management. For example, the growth in populations seeking natural amenities from the forests' lands may pit them against traditional commodity interests. Likewise, the dramatic growth in multiple race and Hispanic populations may force different demands for public services and may interact with natural resources in fundamentally different ways than have been the historic norm for the resident population (McCool and Kruger 2003).

Together, these shifts in the demographic makeup of the communities surrounding the ASNFs carry important implications for the development of good relations between management agencies and their local publics. The opportunities and planning challenges faced by the ASNFs include increasing populations with diverse natural resource interests. While the population becomes more diverse, demand increases on the ASNFs for a greater range of experiences, facilities to accommodate recreation activities, and communication of rules and regulations. Demographic shifts create challenges for the ASNFs, including the maintenance of viable resource-based economic contributions, in an atmosphere of potential conflict given increasing demands for amenities. Similarly, expansion of the wildland urban interface influences issues such as forest access, water quality, habitat fragmentation, and fire management. Finally, demographic changes within the forests' communities may influence not only the management of natural resources, but also the social and political acceptability of processes used to develop management plans. The land management objectives of new property owners or state and municipal governments may lead to demands for change in management of ASNFs administered land (McCool and Kruger 2003, Booth 2002, Wilkinson 1992).

Forest Uses and Users

Land Ownership Conditions

There are over 31 million acres of land in the five-county assessment area. Within this expanse, there are distinct land ownership and use patterns, each carries important implications for current and future forest management. Most importantly, the area is 43 percent Native American land

(figure 17) as compared to 27 percent for Arizona. Also, 23 percent of the five-county area is managed by the Forest Service. Meanwhile, the assessment area contains private and State Trust land percentages that are below those reported for Arizona. Each of these factors influences regional development patterns, as discussed later in this section (Arizona State Land Department 2004).

Navajo, Apache, and Coconino Counties are particularly notable for their substantial amounts of Native American land (66 percent, 66 percent, and 38 percent, respectively). Conversely, Greenlee and Catron County have large percentages of Forest Service land (64 percent and 50 percent, respectively). Meanwhile, four of the five assessment area counties contain State Trust land percentages that are below that for Arizona. The lone exception is Greenlee County with 15 percent of its land managed by the Arizona State Land Department. The percentage of assessment area private land ranges from a high of 24 percent in Catron County to a low of 8 percent in Greenlee County.

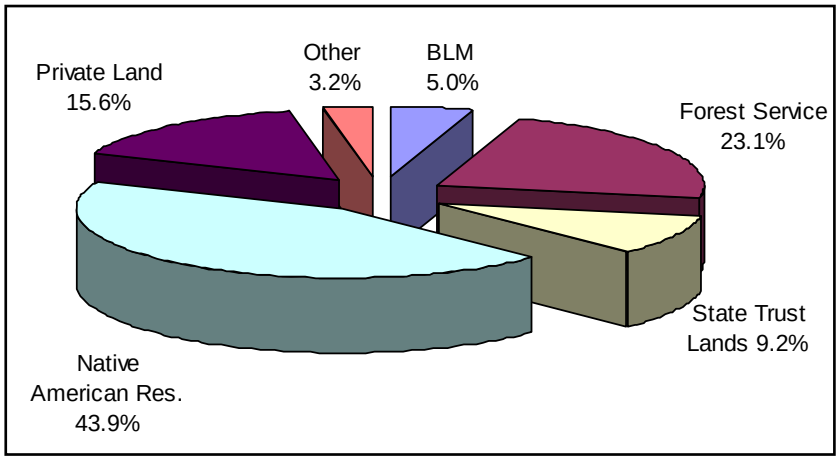

Figure 18. Percent Ownership by Major Land Owners in Five-County Assessment Area[10] (Arizona State Land Department 2005)

Long-Range Land Use Plans and Local Policy Environment

County land use within the assessment area ranges from traditional uses such as ranching in rural areas to denser concentrations of residential, industrial, and commercial uses in and around urban centers. Preservation of open space is a particularly important land use issue given both the public's desire to maintain the "rural character" of county lands and the need to accommodate rapidly growing populations and municipalities. This value is most evident in those areas where local residents and second-home owners live within a designated wildland urban interface (WUI) area adjacent to the ASNFs. Conflicts with land owners and forest management have the potential to grow out of the close proximity of homes. People want to live near the ASNFs with their many qualities. As long as the desired forest qualities persist, the WUI residents are happy. However, conflict may arise when the ASNFs want to thin or use fire to treat such areas as a means of vegetation management or when the forests' lands are conveyed to private ownership through a land exchange. Additionally, the provision of adequate, affordable infrastructure and sufficient water supplies is a growing concern for planners, residents, and land managers throughout the region.

[10] "Other" includes county, AZ Game and Fish, and other Federal lands.

A review of available data on uses and users within the ASNFs is consistent with larger trends surveys at the regional and national levels. These trends show a decline in extractive uses of national forests concurrent with recreational use increases, particularly off-highway vehicle (OHV) use. These and other socioeconomic factors present important challenges for management of the ASNFs.

Extractive Use Trends

Historically, extractive uses have played a major role in public land management throughout the assessment area. National studies show, however, that land uses such as livestock grazing, timber cutting, and mining are being succeeded by non-extractive uses. These national trends are supported by information which suggests similar declines in livestock grazing and mining on the ASNFs. Forest thinning and treatment projects proposed in the wake of the Rodeo-Chediski fire have contributed to an intense public debate over appropriate fire prevention and natural resource and fire management.

Forest Products and Timber Production

Over the past 20 years, the sale of forest products from the ASNFs has varied widely. The highest sale volumes were in the late 1980s and early 1990s and the lowest in 1996 and 2003. Since 2003 Rodeo-Chediski salvage and the WMSP contract have accounted for most of the forest product sales.

Currently, forest products sold by the ASNFs include fuelwood, Christmas trees, wildlings, boughs, and cones. A total of 55,890 hundred cubic feet of salable tree products with a value of $357,054 were removed from the ASNFs in FY 2005. This nearly 50 percent increase from FY 2004 was the result of the WMSP contract. In addition to 2,800 fuelwood permits, 681 Free Use Permits for an estimated 3,000 cords of fuelwood were issued in 2005. This is 20 percent fewer permits than were issued in 2004. 2,100 permits for Christmas trees were issued statewide for harvest on the Black Mesa and Lakeside Districts in 2005; while an additional 3,550 Christmas tree permits were available for the Springerville, Alpine, and Clifton Districts. Another 1,500 permits were issued for wildlings, tree boughs or cones. These numbers are similar to 2004.

The volume of timber sold in 2005 from the ASNFs, in support of habitat improvement, fuels reduction, and ecosystem restoration, was approximately 25,000 hundred cubic feet, an increase of 400 hundred cubic feet from 2003. Timber harvest sites are quickly reforested, soils stabilized, and watersheds protected. Additionally in 2005, trees were planted on 367 acres burned in the Rodeo-Chediski Fire. Another 1,431 acres were reported as naturally regenerated. Pre-commercial thinning of small trees was conducted on 6,634 forested acres. Commercial thinning of larger trees to improve forest health was conducted on 12,648 acres.

Livestock Grazing

Livestock grazing on the ASNFs has declined since the late 1980s. These changes were based on a soil capability assessment and on balancing permitted livestock numbers with the allotment capacity. A continuing drought and large fires have also affected the numbers of permitted livestock.

The ASNFs administered nearly 2 million acres of grazing allotments during 2005. Over the last 7 fiscal years, National Environmental Policy Act (NEPA) allotment management analyses have been completed on 116 grazing allotments, encompassing nearly 1.7 million acres. These NEPA decisions found that additional or changed management is needed to protect watersheds and wildlife habitats. National forest users (primarily grazing permittees) have raised concerns because livestock number reductions will be needed to meet resource management obligations on grazing allotments. Reductions in livestock numbers forestwide indicate that some allotments had very large percentage reductions in allowed stocking, while others had relatively small changes. During FY 2005 at least 20 allotments were in non-use or not stocked status, primarily because of a long-term drought and recovery from severe, large-scale wildfires.

Recreation Trends

- Forest users should or should not pay for their use.
- Consider a tiered system by which locals pay less that non-locals or fees based on type of recreation use (i.e., hiking v. camping).
- Aging population requires more motorized recreation access and more developed recreation sites.
- With increased use, the need for areas of solitude increases (non-motorized solitude).
- Areas of solitude need to be balanced with other use areas and located within a reasonable distance of towns and cities.

Non-extractive uses, particularly recreation, play a major role in forest use and planning. The national forests are mandated to provide outdoor recreation opportunities in natural settings, to maintain and enhance open spaces and public accessibility, and to maintain and enhance "cultural, wilderness, visual, and natural resource values" through a variety of management tasks and activities (Forest Service Handbook 2302). However, unmanaged recreation has also been identified by the Forest Service as one of four "key threats" to the nation's forests and grasslands. As participation in outdoor recreation increases, the Forest Service predicts that recreation pressure on undeveloped areas in most of the Southwestern and Rocky Mountain Regions will be heavy. Much of this pressure can be traced back to population trends throughout the West. OHV use (discussed below) is seen as a major component of unmanaged recreation (USDA-FS 2005c).

Recreation use has increased steadily throughout the history of the national forests. Over the past few decades, the growth in recreation has been truly extraordinary. For example, participation in camping has increased from about 13 million people in 1960 to 19 million people in 1965 to almost 58 million people in 1994/1995 (Cordell et al. 2004). The 2004 Roper Report estimated that 9 in 10 Americans had participated in some sort of outdoor recreation during the previous 12 months (RoperASW 2004). However, the same report showed a decline in recreation participation beginning in 2001. It attributes this trend in part to travel concerns following September 11, 2001, but also to the expansion of indoor recreation opportunities through Internet and television (RoperASW 2004). Cordell and others (2004) also note slight decreases in several categories of outdoor recreation following September 11, 2001. Nationally, there were 209 million national forest visits in 2001; Southwestern Region forests received 19.5 million visits[11] (USDA-FS 2001a).

Arizona, in particular (but also the West and the nation in general), has experienced noteworthy demographic changes in recent years and these demographic trends have likewise influenced recreation trends. In Arizona, where more than 42 percent of the land base is managed by federal agencies for public use, the population has increased about tenfold since 1940 to more than five million people in 2000. The state had the second largest growth rate in the nation in the 1990s

[11] For the latter figure there is a 41.2% margin of error at the 80% confidence level.

(Arizona State Parks 2003). Perhaps even more importantly, the proportion of Arizonans living in urban areas has increased dramatically, so that more than 88 percent of Arizona residents lived in urban settings by the year 2000 (Arizona State Parks 2003). In phone surveys conducted by the Arizona State Parks in 1994 and 1998; nearly 50 percent of Arizonans said that they had visited an Arizona national forest within the previous 12 months (Arizona State Parks 2003). Access to public lands is considered a major contributor to quality of life by many Arizonans and many parks and forests are experiencing very high recreational use, while urban expansion is decreasing the amount of available open space. As a result, increasing pressure on recreational resources can be expected to continue well into the future.

According to National Visitor Use Monitoring (NVUM) data, the ASNFs received nearly two million visits during fiscal year 2001. Ninety-three percent of these visitors were from Arizona. Four percent were from New Mexico, Texas, and California. Less than 1 percent was from a foreign country. The majority of these visitors were male (approximately 73 percent) and were predominately white (an estimated 89 percent). Spanish, Hispanic, or Latino visitors made up approximately 8 percent of total visits, while Native American and Asian users comprised only about 0.8 percent of visits each. About 21 percent of users were under the age of 16, while relatively few visitors were between 16 and 30 or over 70-years old. An estimated 63 percent of visitors were between the ages of 31 and 70 (Kocis et al. 2002). Cordell and others (2004) note a trend of increasing participation by older Americans in a variety of different recreational activities. The most frequently reported zip codes suggest that, while local residents (Lakeside, Alpine, Holbrook, and Show Low) are relatively frequent visitors, they tend to be outnumbered by visitors from the Phoenix and Tucson metropolitan areas (Kocis et al. 2002). Additionally, the NVUM data show that while Maricopa County is not immediately adjacent to the ASNFs, nearly 58 percent of the ASNFs' Arizona visitors come from there (figure 18). Major recreation activities on the forests are "relaxing and escaping the heat", viewing natural features and wildlife, hiking, driving for pleasure, fishing, picnicking and family activities, and camping (Kocis et al. 2002). It is important to note that the ASNFs have one of the highest overnight use rates for all national forests.

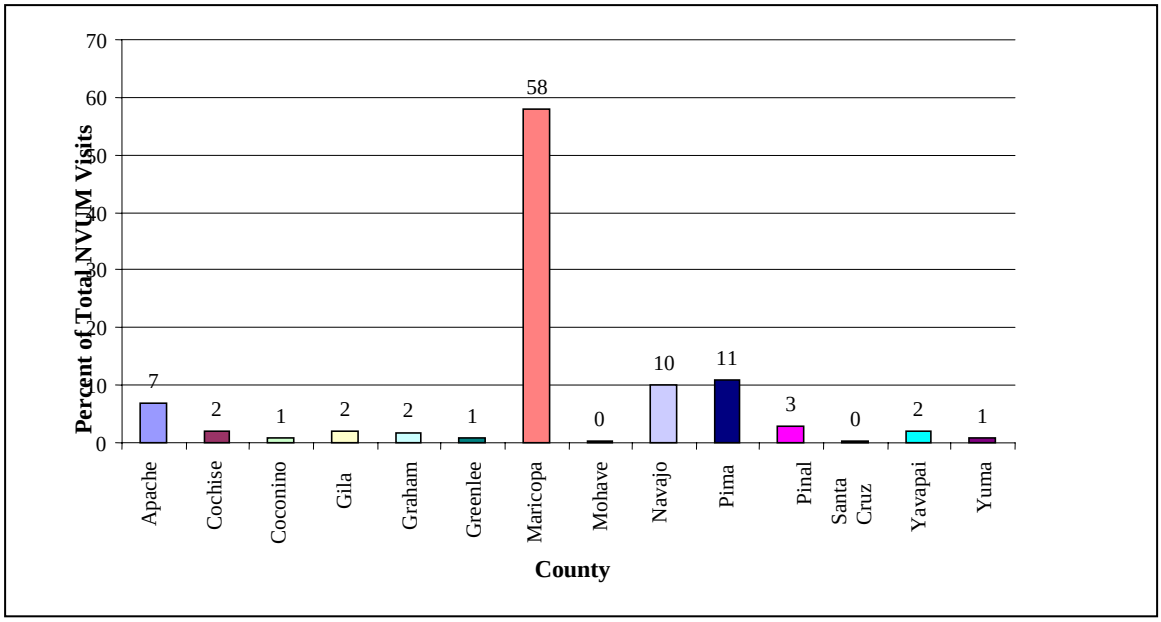

Figure 19. Arizona Counties Percent NVUM Visits to ASNFs

Special User Trends

A number of special user groups were identified for the ASNFs, including Native American tribes, OHV users, wildlife users, and wilderness users. The management and accommodation of these and other special user groups and management of their activities has involved increasing administrative and political implications in recent years. Rule violations and illegal activities are perceived to be emerging problems as the volume and types of uses increase. Themes about these activities include: 1) beliefs that the use of forest resources are a privilege and not a "right;" 2) limited resources for enforcement while there is a growing problem requiring enforcement; 3) Forest Service closures as a response to misuse; 4) and using peer pressure and education as an alternative response to problem behavior (USDA-FS 2006d).

Native American Tribes

Federally recognized Native American tribes occupy about 53.5 million acres (7 percent) of land in the western states. These tribes are legally considered to be sovereign nations, so the relationship between the FS and tribes is at a government-to-government level (Toupal 2003). Tribes that enter into contracts with the federal government do so just as state governments or sovereign nations do (National Forest Foundation and USDA-FS 2005). However, the federal government also holds a special responsibility to consult with tribes over management issues that may affect them. This process is governed by a variety of federal regulations and policies, including the Forest Service Handbook (FSH 1509.13), the National Environmental Policy Act, the National Indian Forest Resources Management Act, the Tribal Forest Protection Act, the Archeological Resources Protection Act, and several presidential executive orders.

Tribes' use of Forest Service land includes the gathering boughs and basket materials for ceremonial purposes as well as the purchase of products such as saw-timber. This use could increase in the future. In 2003, the National Tribal Relations Task Force recommended a legislative proposal that would authorize the Forest Service to allow federally-recognized tribes to use forest products for traditional cultural purposes free of charge. In addition, the ASNFs include traditional cultural places, the locations of which are known only to the tribes.

Ten federally recognized Native American tribes are affiliated with the ASNFs: the Fort McDowell Yavapai Nation, the Hopi Tribe, the Navajo Nation, the Ramah Navajo Chapter, the San Carlos Apache Tribe, the Tonto Apache Tribe, the White Mountain Apache Tribe, the Yavapai-Apache Nation, the Yavapai-Prescott Tribe, and the Pueblo of Zuni. Public Law 95-341, the American Indian Religious Freedom Act (AIRFA), declares that the policies of the United States shall preserve and protect the American Indian's freedom to practice their religion. This includes the right to have access to religious sites, to use and retain sacred objects, and to conduct ceremonials and practice traditional rites on the ASNFs.

Most Native American belief systems exhibit a strong sense of place. Deities have visited many of the sacred places and some are thought to be the homes of these deities. The power of the supernatural is inherent in all of nature including mountains, plants, and animals, all of which are interdependent. Reciprocity regulates the persisting relationships between humans and all other beings. Sacred places may be places of prayer, places to collect material for ceremonies, places to gather medicine or places to carry out other privileged, sensitive, or confidential activities which cannot be shared with the uninitiated. Visual aspects may in themselves be sacred. The responsibility to respect these sacred places is inherent in tribal belief systems. The places are known to the communities that consider them important. They are rooted in the communities'

histories and pre-histories and are important in maintaining the continuing cultural identities of these communities. They are not necessarily regularly visited by tribal members but are known to the communities. Some tribes consider all ancestral archaeological sites as sacred sites and Traditional Cultural Properties (TCPs) as defined by the Department of the Interior.

In the ASNFs, Mount Baldy, Rose Peak, and Escudilla Mountain are but a few of the sacred places. Many mountain tops have shrines but these locations are not divulged in respect for the tribes' need for confidentiality. For the same reason, specific areas which may be the ancestral home of clans are not revealed. Springs, rivers, pictograph and petroglyph panels, and places where sacred objects are found are TCPs to the Puebloan peoples and some other tribes. The White Mountains, in general, and the Little Colorado River are also TCPs to many of the tribes.

In the past, most ethnographic research was conducted by non-Native American contractors. More and more tribes prefer to conduct their own research and many have the needed capability. The process by which the locations of confidential sacred sites and TCPs can be designated without making the locations public has long been a difficult concept upon which the government and the tribes have been unable to agree. This remains a challenge today. The ASNFs rely upon tribal consultation and individual project notifications to fulfill the government's obligation to preserve and protect the Native Americans' freedom to practice their religion.

OHV Users

On public lands throughout the country, OHV use has increased in popularity and is now a major concern to many public land managers. Between 1982 and 2000, OHV users increased by more than 109 percent, nationally (Cordell et al. 2004). In 1995, a Government Accounting Office (GAO) study found OHV use on federal lands to be generally undermanaged. The Forest Service has devoted limited funding and staffing to managing OHV use and forests have relied heavily on state funding (GAO 1995). According to surveys conducted by the Arizona State Parks, most Arizonans consider the provision of OHV recreation opportunities to be a lower priority than other services, such as the preservation of cultural resources and natural areas. However, in a 1998 survey more Arizonans considered management for OHVs to be important than in an earlier survey (Arizona State Parks 2003).

- The White Mountain Apache Tribe prohibits all-terrain vehicle use on tribal lands.

In the 1987 ASNFs plan, OHV recreation was identified as a source of conflict among user groups and a cause of resource damage. At that time, about 84 percent (all but 322,954 acres) of the ASNFs' 2 million acres were open to OHV use, although use in some areas was restricted to existing or designated roads and trails (USDA-FS 1987). In 2001, about 11 percent of the forests' visitors reported participating in OHV travel; however, less than 5 percent used trails developed for motorized vehicles (Kocis et al. 2002).

Wildlife Users

In the ASNFs, wildlife viewing is a more common activity that either fishing or hunting. 2001 NVUM data show that 73 percent of the visitors interviewed participated in some sort of wildlife viewing activity; however, only 1 percent described it as their primary activity. Approximately 50 percent of interviewed visitors fished (with about 19.6 percent describing it as their primary activity) and only 3 percent hunted. Thirty-five percent used a developed fishing site or dock

(Kocis et al. 2002). The heavy angler use reflects the popularity of the forests' water resources, which are rare in Arizona.

Wilderness Users

The ASNFs include three designated wilderness areas, the nation's sole remaining primitive area, and 322,000 acres of inventoried roadless areas (USDA-FS 2001b). Users of designated wilderness areas fit a profile similar to other forests' users: 1) they are predominantly male (81 percent), 2) white (92 percent) or Hispanic/Latino (5 percent), 3) between the ages of 31 and 60, and 4) often travel from the Phoenix and Tucson areas. NVUM data suggest that roughly 45,000 wilderness visits were made during fiscal year 2001 although the error rate on this data is very high (± 56 percent) because of the relatively low number of visitors interviewed (Kocis et al. 2002). There are no use figures specific to the Blue Range Primitive Area or the inventoried roadless areas.

Special Use Permits

- Pinetop-Lakeside. Special use permits are essential for recreation and open space (Woodland Lake Park).

A variety of special use permits for recreation and land uses are issued to the public and other federal, state, and local government agencies. Recreation permits are issued to authorize recreation residences and privately managed facilities and activities, including organizational camps, marinas, outfitter/guide services, and a golf course, as well as one-time recreation events (varying from dog trials to historic reenactments to family reunions). Land use permits include communication sites, roads, utilities, water and wastewater systems, and mineral source pits. Special permits can also be purchased for a number of gathering activities, including cutting firewood and Christmas trees. Some concerns arise when it is not clear to the public as to when a permit is required or how to obtain one.

While research is rarely considered by the public to be a major use of federal lands, the ASNFs are required to issue special use permits for research purposes. Research on flora, fauna, water quality, seismic activity, weather, and wildland fire effects is conducted on the ASNFs by universities, private institutions, and other federal, state, and local agencies.

Sustainability

The ASNFs assessment area contains a relatively high percentage of Native American and Forest Service lands, both of which could affect future forest planning. Additional factors, such as available water supply and the preservation of open space, contribute to a land use policy environment that is increasingly focused on the economic and environmental sustainability of urban development. The proximity of private parcels to the forests has also contributed to a number of important land exchanges involving the ASNFs over the last several years.

The amount of public domain land stood at 76 percent in Arizona in 1891, declined to 66 percent in 1945, and by 1977 had increased to over 71 percent (including Native American trust lands). Today, the National Forest System accounts for about 15 percent of the Arizona's land. This small segment of the state's land represents a substantial portion of Arizona's natural resources, including 40 percent of the watersheds (Brown 1999) and nearly 60 percent of the timber. For this reason, maintaining the integrity of the forests' boundaries by acquiring land to form contiguous borders has historically been an essential Forest Service objective. Recently, trends have reflected

the increasing importance of national forests as a resource for recreational use. “Multiple use” is the primary purpose of national forest land, although certain elements of its subsidiary functions, such as wilderness and maintaining species habitats, can limit this practice (Baker et al. 1988).

Logging remains an integral and controversial element of national forest land use despite the fact that private lands contribute 90 percent of the U.S. timber harvest and private owners control 60 to 70 percent of the timberlands (Haynes 2003, Alig and Butler 2004). Five years ago, Arizona national forests produced 13 million cubic feet of saw-timber, but over the past 2 decades the amount of land devoted to timber uses has declined substantially. Under current management practices, these lower harvest levels are expected to remain stable for at least the next 50 years (Mills and Zhou 2003, Alig and Butler 2004, Johnson 2000).

While logging was once the mainstay of the local economies, recreation now plays a dominant role. This increasing demand may not be met by the ASNFs because of limited recreation opportunities. These include facilities, developed campgrounds, trails and dispersed camping opportunities. Certain types of dispersed recreation activities, such as OHV use and geocaching, have greatly increased or are relatively new and currently have little management. In particular, unmanaged OHV use causes resource damage and creates safety concerns. Wildlife viewing activities are also increasing and are generally sustainable because they do not affect wildlife and their habitats. However, unmanaged or unlimited access could affect wildlife and habitats. Increasing fishing pressure and limited water resources could result in overcrowding and additional requests for fish stocking. Increasing huntable wildlife populations may lead to ecological changes if population numbers are not controlled. Wilderness use in the small, easily-accessible wilderness areas on the ASNFs continues to increase, which may affect key wilderness values. Wilderness values in the Blue Range Primitive Area may also be affected because its management is not funded.

The area surrounding the ASNFs exemplifies many of the trends and controversial issues involving the economic stability and effective management of public lands. Within the assessment area, an abundance of publicly-managed land has led to a vigorous debate between government land agencies and private property owners. Nearly 84 percent of land within the assessment area is controlled by Native American tribes, the Forest Service, the Bureau of Land Management, the Arizona State Land Department, and other public agencies. This pattern of ownership continues to put increasing pressure on existing private property, particularly in light of recent population and housing growth.

At issue is how, and whether, private owners and public land managers can come to an agreement on how to best manage the competing priorities of resource conservation and economic development. As seen in the county comprehensive plans reviewed for this assessment, planners are struggling to cope with growing demands for housing and recreation while ensuring preservation of a shrinking natural resource base that contributes to Arizona’s highly valued “rural character.”

Much of the current controversy involving land management is encapsulated in the debate over open space. Research shows that the rate of conversion of private land parcels from farming, ranching, and forestry to more urban land uses has outpaced population growth over the last several decades (USDA-FS 2005d). This trend has led to increasingly pointed exchanges between ranchers, farmers, urban residents, seasonal residents, conservation interests, and residential developers over the immediate and long-term value of open space. Meanwhile, all sides of the

debate over the management of public lands have become aware of the increasingly important role of Arizona's State Trust lands in conserving natural resources and sustaining urban growth. As such, any reforms of the current State Trust land system are likely to be highly relevant to future ASNFs management plans in light of the amount of State Trust lands within the assessment area.

Finally, all Arizona national forests are likely to find themselves at the center of growing debate over the management of the state's water resources. This is because the forests manage watersheds critical to environmental sustainability as well as residential and industrial growth. Water availability is an important factor in sustainable development and growth. Studies have shown that approximately 40 percent of surface and subsurface water in Arizona originates on Forest Service-administered lands (USDA-FS 1983). The ASNFs' role in protecting the integrity of area watersheds is likely to become increasingly important given the projected growth rates in Apache and Navajo Counties and southern Arizona.

Access and Travel Conditions

The area surrounding ASNFs has a relatively large network of State and Federal Highways and county roads when compared to Arizona's other national forests. Research shows that seasonal traffic flows coincide with weather conditions, which influence accessibility for visitors from outside the region.

In response to the tremendous nationwide increase in OHV use, negative effects to resources, and increased conflicts with non-motorized recreation uses, the Forest Service developed the National Travel Management Rule (TMR) in 2005. The rule directs each national forest to establish a system of roads, trails, and areas designated for motor vehicle use. By 2009, only those designated roads, trails, and areas will be available for motor vehicle use. The designations may impose restrictions as to the type(s) of motor vehicle and to the time(s) of year a road, trail, or area may be used. The rule also prohibits motor vehicle use off the designated system. Public involvement in this process includes issue identification and the submission of proposed routes and areas for designation. NEPA analysis will be done on a proposed action and alternatives. New designations will not take effect until a Motor Vehicle Use Map is published for a forest or district. Until the map is published, current travel management designations and prohibitions (including Forest Orders) will remain in effect. The ASNFs' Travel Management designation process is occurring at the same time as the ASNFs forest plan revision.

Existing Federal and State Road Networks

County and state transportation plans reviewed for this assessment acknowledge that current circulation networks have been developed as needs have arisen and, therefore, are inadequate for accommodating projected long-term growth (Apache County 2003, Coconino County 2003, Navajo County 2004). As such, these plans emphasize the need for improved planning through regional approaches linking transportation and land. According to the Arizona Department of Transportation (ADOT), projected demographic changes throughout Arizona will require "major expansions of roadway capacity and the development of transportation options and alternatives to

- Greenlee County. County assumes costs to maintain roads damaged by forest users. Decline in road and bridge conditions on forest and in county. Bridges on forest need replacing. Access denied when not fixed.
- Road users from out of area not contributing dollars to maintenance.
- Fewer rural recreation opportunities affect ALL users.
- Roads with multiple purposes needed.

provide acceptable levels of service on Arizona's roadways and maintain circulation" (ADOT 2004).

Modes of Travel and Seasonal Patterns

Travel by motorized vehicle is the dominant mode of travel throughout Arizona and to and from the ASNFs; a trend that is likely to continue given development patterns in rural areas as well as the expense of developing infrastructure for alternative transportation modes. Peak traffic flow for the assessment area occurs between June and August, while traffic is lowest from November to February. With respect to internal modes of travel, the greatest increases were reported for OHVs. Mechanical innovations, industry developments, and less-demanding physical activity required to access federal lands have all led to a dramatic increase in OHV ownership and use in Arizona.

Planned Improvements

Over the next 5 years, ADOT has plans for a number of road improvements in proximity to and providing access to the ASNFs, most of which involve road widening or resurfacing. Of particular interest is the widening of State Route 260, from two lanes to four lanes, from Payson to Show Low. This will decrease travel time to and from the Phoenix area and is expected to result in increased day and overnight use on the ASNFs. Similarly, county governments throughout the assessment area envision improvements to arterial road networks to accommodate expected population growth. There are currently no plans to expand the existing internal road network on the ASNFs.

Access

On transportation networks, the greatest barrier to access is poor road maintenance resulting from constrained county and Federal transportation budgets. Current and projected road and trail maintenance budgets cover only a fraction of annual and deferred maintenance costs. Choices and prioritizations balancing safe, high-quality, developed utilization and high-quantity, lower-standard access opportunities will be necessary.

Amid a substantial increase in OHV use, the ASNFs began planning during 2006 in accordance with the national TMR. To address unmanaged motorized recreation, this nationwide rule requires each national forest to designate roads, trails, and areas where motorized use is allowed. This is a major administrative change from the current ASNFs policy, which allows motorized use except where posted closed or where use leads to resource damage.

The TMR raises several important issues involving access and modes of travel. Primary issues include the ability to effectively and efficiently enforce propose travel restrictions as well as the ability of diverse user groups to access recreational sites and resources, such as fuelwood and big game retrieval. This effort to regulate cross-country OHV travel is further complicated by the need to adequately assess existing roads and trails and the logistics of implementing a new motor vehicle management strategy. Such decisions will affect most forest visitors. The Travel Management planning process will attempt to incorporate local individuality in the route/area designation process.

While the ASNFs do enforce seasonal road closures during periods of high fire danger and severe winter weather, valid permit holders are generally allowed access for the purpose of managing their permit operations (grazing, minerals, for example) or accessing private lands. In terms of observed trends in the modes of travel employed by the forests' users, gains have been strongest in recreational OHV use. The demand for mountain bike access has also recently increased while snowmobile use has declined because of poor snow conditions.

Trends and Sustainability

In light of the relatively modest increases in traffic for all roads within the counties, the increases in travel on non-state roads likely points to increases in travel on county, private, and tribal road networks. Navajo County has also experienced a substantial increase in travel on non-state roads over the same period. The largest increase in travel on all roads was reported in Coconino County (42 percent), while Greenlee County actually reported a decrease (17 percent). These distinct trends in travel are likely explained in part by diverging population growth trends in the two counties. Available information suggests that Catron County experienced declines in vehicle miles traveled (VMT) between 1990 and 2000. Although total VMT grew much more quickly in Arizona between 1990 and 2000, increases in travel on interstates and rural arterial routes for New Mexico were nearly identical that for Arizona (New Mexico Department of Transportation 2005).

Under current travel management planning, local public perception of federal management is mixed. TMR could reduce motorized access within the forest, but would reduce effects to natural resources. While many residents and visitors support and encourage active management and OHV use limitations, others strongly support increases in motorized access despite anticipated budgets and national concerns related to unmanaged motorized use of national forests and grasslands. Regardless of local opinions, the implementation of the TMR on the ASNFs will be a major cultural shift in management and use.

Another major trend involves developed access points to the forests. Although responsibly-located access points for visitors are encouraged, proposed parking and trailhead developments are typically controversial with private landowners and neighborhoods. Many users currently access the ASNFs across undeveloped private lands, which results in conflicts when the private lands are built on or developed. As community development continues in the WUIs, motorized use of federal lands adjacent to private property will continue to be an important issue.

Despite a diverse array of transportation planning issues at the county and municipal level, planning agencies throughout Arizona express a common concern for the linkages between transportation and land use planning (Pima Association of Governments 2001, Pinal County 2001, Santa Cruz County 2004). In its current long-range plan, ADOT includes an appendix which analyzes broad transportation trends and issues as well as potentially important implications for future transportation planning. In summary, ADOT identifies five large-scale issues that are most likely to influence transportation planning on Arizona national forests in the coming years. They are:

1. Population growth and demographic change,
2. Economic growth and change,
3. Security concerns,

4. Energy supply and efficiency, and
5. Technological change and opportunities (ADOT 2004).

While the latter three issues are discussed in largely hypothetical terms and are indirectly linked to forest management, the first two issues are immediately relevant and directly pertain to other factors presented in this assessment.

Emergence of new recreation activities, such as OHV use, is a key multiple-use issue. Population growth and population composition changes are increasing the importance of recreation as a use of the ASNFs and other regional national forests. Although there are other forest resource use issues, most participants acknowledge that recreation is among the topics that need focused attention in plan revision because of the increased use, conflicts that disturb user experiences (USDA-FS 2006d), and effects to natural resources.

Community Relationships

Community Involvement with Natural Resources

The communities surrounding the ASNFs have a history of involvement with and dependence upon the national forests and natural resource issues in general. Arizona has long been dependent upon natural resources for commodity production, clean water, tourism, and aesthetic enjoyment. As a result, the public has frequently expressed intense interest in the use and management of these resources.

Information gathered on the nature of the relationships between the ASNFs and surrounding communities reveals a complex network of interests involved in a variety of issues that affect forest management and planning (Davis 2001). In addition to wider public concern for issues such as water provision, wildlife protection, and fire prevention, a growing number of local government organizations and special advocacy groups desire to participate directly with the ASNFs in policy formation. Although a comprehensive analysis of the social network surrounding the ASNFs is beyond the scope of this assessment, this section provides insight into the roles and purposes of key stakeholders and establishes a framework for the development of a comprehensive community-relations strategy. A review of state and local newspapers reveals a general interest in the use and management of forest resources with particular attention paid to the effects of fire and recreational uses, such as hunting and fishing.

The term and concept of “communities” receives a broad interpretation and, hence, designation. In one sense, “communities” refers to the towns and cities located in the counties surrounding the ASNFs. In a broader sense, “communities” refers also to tribes, governments, the media, educational entities, partners, and special advocacy groups.

Communities of Interest and Forest Partnerships

The ASNFs have many communities of interest; that is, entities that share an interest along with the Forest Service in forest management. For the purpose of this assessment, a distinction should be made between communities of interest and forest partners. Communities of interest may include residents of physical communities or members of an interest group, agency, or private organization that are influenced by, and in turn, stand to influence forest planning and

management. Consideration of their stake in forest management is important, but not specifically directed through formal partnership agreements.

Some especially noteworthy communities of interest to the ASNFs are the Native American tribes. The ASNFs work closely with the two adjoining tribes, the White Mountain and San Carlos Apaches, on a variety of issues including forest restoration, smoke management, and wildfire protection.

National forest management is not simply by a USDA chain of command, but by a network, that includes a wide variety of stakeholders. The resource itself forms the “center” of the network and these stakeholders both affect the management of the resource and are in turn affected by its management direction. In a very real sense, non-USDA personnel, such as county officials, media, and citizen groups, participate in forest management.

The ASNFs management activities must take into account the interests of a growing number of community groups and forest partners. Organizations and individuals influencing forest planning and management represent government agencies, Native American tribes, special advocacy groups, business interests, educational institutions, and the media. Meanwhile, the Forest Service is making a concerted effort to address the needs and desires of historically underserved communities, a fact that is increasingly important to the ASNFs given the demographic change rates in the region.

Several forest partners and their relationship to the ASNFs are described below:

Eastern Arizona Counties Organization (EACO) includes Apache, Gila, Graham, Greenlee, and Navajo Counties. Through intergovernmental agreements, the five counties banded together in the 1990s to focus on common concerns with the vast amount of public land within their boundaries. The organization is dedicated to finding environmentally sound means of developing rural economies. One of the group's primary efforts is to find economically viable uses for the small diameter trees that need to be cleared from the forests to improve their health and reduce fire hazards. The organization’s goals are forest restoration, catastrophic fire hazard reduction, and rural economic revitalization. The ASNFs interact with EACO through attendance at meetings, commenting on proposed projects, and providing input on Resource Advisory Committee projects.

Environmental Economic Counties Organization (EECO) was formed in 1998 by the EACO Board of Directors as an outcome of a survey titled “Attitudes Toward Rural Communities and Environmental Values.” EECO’s mission is to “achieve a balance between environmental concerns, the multiple uses of public lands, and local economic and social considerations.” This nonprofit environmental entity is designed to be eligible for public and private funds to collect, commission, and disseminate verifiable scientific research and to offer education opportunities, publications, and forums that address social, economic, policy, and natural science aspects of the multiple uses of public lands. EECO’s goals are producing verifiable, independent scientific data, promoting responsible natural resource stewardship through education, developing short and long-term information dissemination and education strategies, raising funds to maintain a viable organization, and building a strong organizational core in Arizona.

Arizona Sustainable Forest Partnership-Little Colorado Resource Conservation & Development works to create a strong connection between sustainable forests, sustainable communities, and sustainable industries. The Partnership goals are to provide technical transfer

opportunities that promote the science of healthy forest ecosystems and the acceptable practices for reducing hazardous forest fuels, to provide business and marketing expertise opportunities for wood use to build sustainable forest and wood product enterprises, and to promote sustainable, community-based forest and wood product enterprises. The ASNFs support the partnership though presenting updates on stewardship, providing letters of support for grants, and attending workshops on forest thinning and new forest products markets.

In 1997 a cross-section of community members in southeastern Arizona met to find ways to move the natural resource dialogue from contention and conflict in the courtroom to collaboration and restoration on the ground. Their efforts brought about the creation of the **Natural Resources Working Group** (NRWG), comprised of local, state, federal, and private representatives. The group wanted to find a more collaborative way to restore the forests and develop economic opportunities in northern Arizona. The group's goals are to restore forests to diverse and sustainable conditions, to involve interested people, to develop economic opportunities, and to share social and environmental benefits. The group has been successful because it has been able to develop broad-scale plans and because of its long term commitment to the process. Successes include the development of a Community Wildfire Protection Plan for WUI areas in the western portion of the ASNFs and the completion of the Blue Ridge Demonstration Project, a 17,000-acre forest treatment effort designed to test the viability and economics of large-scale thinning projects. The NRWG continues to be involved in WUI issues throughout the ASNFs.

White Mountain Stewardship Project (WMSP) is a 10-year stewardship contract to thin primarily small-diameter ponderosa pine trees in both the WUI and interior forest areas in the ASNFs' portion of Arizona's White Mountains. The stewardship contract is designed to reduce the fire risk to communities, reduce forest thinning costs to taxpayers, support local economies, and encourage new wood product industries and uses for thinned wood. The contract was awarded to a local, private corporation. The stewardship legislation authorizes a multi-party community monitoring board that recommends monitoring activities to the ASNFs to assess the social, ecological, and economic effects of the stewardship contract.

Wildland Urban Interface and White Mountain Stewardship Project

In a cooperative effort, the four counties in Arizona's White Mountains completed a seamless Community Wildfire Protection Plan to address WUI boundaries and priorities for hazardous fuels treatments. Based on WUI boundaries, the ASNFs determined that over 150,000 acres of ponderosa pine forests were overstocked and vulnerable to fire and insect attack. The ASNFs then offered a 10-year stewardship contract to thin at least 50,000 acres. As of October 2006, 15,000 acres had been thinned under the WMSP, with another 25,000 obligated. WMSP activities are monitored for ecological, economic, and social effects. Social monitoring in 2004 and 2005 showed 94 percent of the White Mountains public understand and support the use of prescribed burning and thinning to reduce fuels. The surveys measured public opinion about thinning the forests to reduce the risks of wildfire and assessed their knowledge of forest health and fire issues.

WMSP does not address lands outside of WUIs. Many of these areas need to be thinned, but may not be treated because fuels management resources would be allocated to WUIs.

Community/Forest Interaction

- Land exchanges can benefit area towns and counties. Can also benefit forests. Local governments should be included in land exchanges.
- Pinetop-Lakeside. Forty-six percent of the land within the town boundaries is national forest. This constitutes almost all of the open space in town.
- Pinetop-Lakeside. A land exchange within the city could contribute to undesirable urban sprawl.
- Concern that Forest Service land is becoming “city parks”.
- Forest Service will need to partner with counties, cities, and state on local road systems and travel management.
- Forest Service needs to improve reporting to public.

In recent years, the Forest Service has placed increasing priority on the social relationships between national forests and surrounding communities. As awareness and commitment to these processes grow, so does the need for forest managers and planners to understand the dynamic linkages between the forests and surrounding communities. Although the concept of community relations is a relatively new component of forest planning, frameworks exist to help planners develop a comprehensive strategy for monitoring and enhancing these relationships. These relationships need to be strong enough to continue through any decreases in forest funding or staffing.

Sustainability Assessment

This sustainability assessment summarizes the trends, contributions and risks to sustainability, and the effects to forest management for each of the major topics presented above in the Economic and Social Conditions, Trends, and Sustainability sections. The tables are presented in the same order.

Economic Sustainability

Table 14. Employment Trends, Sustainability, and Effects

TREND	SUSTAINABILITY	EFFECTS AND FS CONTRIBUTION
The economy is shifting away from historical commodity resource industries to services, construction, and retail trade employment.	Natural resource-related jobs may continue to decline. Both low- and high-paying service jobs are increasing. The expansion of information- and service-based industries has led to a more diverse, and perhaps more sustainable, economy.	Changes have undoubtedly had negative effects on some segments of the more traditional local economy sectors.
Over 100 percent increases in finance, insurance, and real estate employment in Apache, Navajo, and Coconino counties.	Increases in housing developments may lead to more wildland urban interface (WUI) areas. Higher income service workers (such as medical and legal professionals) may demand more amenities on Forest Service lands.	Greater responsibilities for the ASNFs in the treatment of more WUI areas. Fire and vegetation management could increase. Under current budget, ASNFs is not able to speed-up or increase WUI treatments. Additional recreation facilities and amenities may be needed, but the ASNFs may not be able to construct and maintain any new facilities.
Employment growth is slow. Unemployment continues to be higher than the state average.	Higher numbers of people are unemployed.	The ASNFs could experience an increase in demand for special use permits for commercial goods and services (for example, commercial firewood), as people try to supplement their incomes.

Table 15. Income Trends, Sustainability, and Effects

TREND	SUSTAINABILITY	EFFECTS AND FS CONTRIBUTION
Per capita income is growing, but remains below the national average.	Jobs may not be taken in the assessment area because of the low wages.	People may not move to the assessment area because of potentially low incomes. Services for assessment area residents may be less than needed or wanted.
Job income is growing, but slower than state averages.		
Job incomes are below state averages.		
Transfer (non-labor) income increasing. Increasing transfer income reflects the growing retiree and second-home owner populations.	Demands for recreation opportunities, water, and amenity-related services could increase, while the public emphasis on commodity-related jobs may decrease.	Existing ASNFs recreation management priorities may not meet the changing public needs.

Table 16. Payments to States Trends, Sustainability, and Effects

TREND	SUSTAINABILITY	EFFECTS AND FS CONTRIBUTION
Payments in Lieu of Taxes (PILT) continue to fluctuate.	Fluctuation of these payments may increase or decrease county and community budgets. Counties may reduce road maintenance assistance.	County budgets may increase or decrease. Congress will continue to determine the amount of funding available for PILT. Decisions made in the forest plan would not affect PILT.
25 Percent Fund payments continue to decrease.	Forest receipts contribute to the amount of these funds. Counties may reduce road maintenance assistance.	Pressure may be put on the ASNFs to help make up for short falls through new revenues from timber sales or from other receipts. The ASNFs may need to increase maintenance on roads that had been maintained by the counties. Decisions made in the forest plan could affect the 25 Percent Fund payments.
Secure Rural Schools and Community Self-Determination Act (SRSCS) payments may decrease or be eliminated in the near future.	Elimination or decrease of these payments may reduce county and community budgets. Counties may reduce road maintenance assistance.	Infrastructure maintenance or educational funding might decline. The ASNFs may need to increase maintenance on roads that had been maintained by the counties. Congress will decide whether or not to continue the SRSCS payments. Decisions made in the forest plan would not affect SRSCS.

Table 17. ASNFs' Economic Contribution Trends, Sustainability, and Effects

TREND	SUSTAINABILITY	EFFECTS AND FS CONTRIBUTION
Labor income and jobs closely connected to natural resource management activities are currently stable to increasing.	Management activities that affect natural resource industries fluctuate. The White Mountain Stewardship Project (WMSP) has assisted the development of a more sustainable, local forest products industry.	Management activities associated with timber, grazing, and forest restoration could affect the labor income and jobs for these industries. This could have a greater effect on some communities in the assessment area more than others depending on a community's reliance on these industries. The ASNFs, through the WMSP, are helping to develop a market for small-diameter trees.
Management activities could fluctuate or decrease (for example, interpretive programs or visitor centers).	The ASNFs' recreation and fish/wildlife programs contribute the most to the assessment area economy. Recreation service industry jobs are generally moderate- to low-paying.	ASNFs management activities associated with recreation could greatly affect the contribution to the economic sustainability of the assessment area. Recreation draws new money into the area. The ASNFs may not be able to meet public and industry demands because of a lack of organizational capacity.
Reduction in workforce and management projects.	Forest Service jobs and income (7 and 5 percent, respectively), although important, are not major contributors to the assessment area economy.	There are fewer FS jobs in the assessment area. Further, smaller budgets have reduced the funding available for projects, contracts, and purchasing. Smaller staffs and less funding could result in fewer goods and services provided to the public from the ASNFs.

Social Sustainability

Table 18. Demographics Trends, Sustainability, and Effects

TREND	SUSTAINABILITY	EFFECTS AND FS CONTRIBUTION
Overall, population in the assessment area is increasing. The greatest increases are in the retirement age and seasonal populations.	Increased population growth has the potential to put higher, and potentially more specialized, demands on forest resources.	With an increasing population there is an anticipated increased demand on forest resources, especially for access, water and recreation. If not properly managed, overcrowding and resource damage could occur in some areas. Displacement of some recreation users could occur. The growing population could also create more WUI.
Diverse natural resources interests are increasing. In-migration generally brings in values stressing the quality of life and deemphasizing natural resource extraction.	Demographic changes could result in a variety of interests in natural resources. Changing resource values brings new sets of challenges.	Potential conflicts in value systems between established community interests and recently arrived residents/visitors may cause friction over natural resource management.
Population diversity is increasing.	Forest Service may not be prepared for their needs, such as communicating rules and regulations or providing facilities to accommodate their recreation activities.	Messages concerning hazards, safety, appropriate behavior, or Forest service management activities may not reach many forest visitors. Facilities may not meet these visitors' needs or expectations.
Seasonal housing is increasing	WUI acreage increasing. Community infrastructure may be at capacity during summer, but underutilized in the off-season. Seasonal recreation needs are also increasing.	Community structure may be altered by seasonal residents who want increased infrastructure, but the community may be unable to sustain. Forest management may be perceived as limiting development, while demands for services may increase.

Table 19. Forest Products and Timber Production Trends, Sustainability, and Effects

TREND	SUSTAINABILITY	EFFECTS AND FS CONTRIBUTION
Decrease in saw timber harvesting.	Skilled workers in this employment sector may either leave the area or change to different professions.	The infrastructure for handling large-diameter timber would be lost. Shift in FS emphasis to small-diameter timber.
Increasing demand for small-diameter timber.	Infrastructure developing to use small-diameter timber. Long-term sustainability uncertain.	Increased utilization of small-diameter forest products. Reduced need to burn thinned timber resulting in less smoke. The ASNFs currently provide funding, expertise, and oversight for the White Mountain Stewardship Project.

Table 20. Livestock Grazing Trend, Sustainability, and Effects

TREND	SUSTAINABILITY	EFFECTS AND FS CONTRIBUTION
Numbers of animals permitted decreasing.	The number of ranches may decline and the ranching lifestyle may dwindle.	Continuing to issue FS grazing permits to ranchers could help sustain livestock grazing, but only in a limited capacity.

Table 21. Native American Tribes Trends, Sustainability, and Effects

TREND	SUSTAINABILITY	EFFECTS AND FS CONTRIBUTION
Increase in the ASNFs working with neighboring tribes.	Cooperative management of cross-boundary ecosystems enhances sustainability.	Similar goals and management strategies increase the effectiveness of WUI vegetation treatments. Communication and coordination with neighboring tribes on resource management issues have increased and improved.
Potential increase in tribal use of forest lands to gather forest products.	Not enough information is reaching the local native communities on how to obtain a permit.	Forest products could be gathered in a manner that affects other natural resources or FS management activities.

Table 22. Recreation Trends, Sustainability, and Effects

TREND	SUSTAINABILITY	EFFECTS AND FS CONTRIBUTION
Increasing demand for recreation opportunities fueled by population growth.	Increased demand may not be met due to limited recreation opportunities. These include facilities, developed campgrounds, trails, and dispersed camping opportunities.	Demand for recreation opportunities may not be met and over crowding could occur. As demand for recreation increases from the public, limited resources are available to provide it. Historically, recreation staffing and funding were greater. Under the current budget, the ASNFs are unable to adequately maintain the existing developed campgrounds and facilities. Therefore, increasing the number of developed campgrounds would not be sustainable.
Unmanaged recreation is increasing, especially in areas adjacent to communities.	Certain types of dispersed recreation activities, such as OHV use and geocaching, have greatly increased or are relatively new and currently have little management.	Unmanaged recreation could cause resource damage. The ASNFs provide a variety of traditional recreation opportunities, but have been slow in responding to new and changing activities. Restrictions on recreation activities could increase, including the designation of use areas.

Table 23. OHV Users Trend, Sustainability, and Effects

TREND	SUSTAINABILITY	EFFECTS AND FS CONTRIBUTION
Increasing OHV use and minimal Forest Service management.	Unmanaged OHV use causes resource damage and creates safety concerns.	Implementation of the Travel Management Rule will designate roads, trails, and areas that are open to motorized use. Designation of routes and areas should help reduce resource damage. The Forest Service has been engaging in public collaboration efforts to help guide what routes and areas could/should be closed or kept open.

Table 24. Wildlife Users Trends, Sustainability, and Effects

TREND	SUSTAINABILITY	EFFECTS AND FS CONTRIBUTION
Increasing numbers of non-consumptive wildlife users.	Wildlife viewing activities are generally sustainable because they do not affect wildlife and their habitats. However, unmanaged or unlimited access could affect wildlife and habitats.	Increasing wildlife viewers would help support the assessment area economies with minimal effects to natural resources. The ASNFs support and implement projects that maintain and improve wildlife habitats, thereby providing recreation opportunities.
Increasing fishing pressure, but stable numbers of hunters.	Limited water resources could result in overcrowding and requests for additional stocking of fish. Increasing huntable wildlife populations may lead to ecological changes if population numbers are not controlled.	Consumptive wildlife-related activities could decline. The ASNFs are only responsible for habitat management; wildlife population management is the responsibility of the state.

Table 25. Wilderness Trends, Sustainability, and Effects

TREND	SUSTAINABILITY	EFFECTS AND FS CONTRIBUTION
Recreation use in small, easily accessible wilderness areas is increasing.	More pressure may be put on the wilderness areas to provide recreation opportunities, but key wilderness values, opportunities for solitude or primitive and unconfined recreation, may be lost.	Wilderness users that are seeking solitude and a primitive experience may be displaced to other management areas. The ASNFs are responsible for managing their wilderness areas so these values are not degraded.
On-the-ground management of Blue Range Primitive Area is decreasing.	Management of Blue Range Primitive Area is not funded because it is not a Wilderness.	Wilderness values could be lost. The ASNFs are required to manage the Blue Range Primitive Area as wilderness.

Table 26. Open Space Trend, Sustainability, and Effects

TREND	SUSTAINABILITY	EFFECTS AND FS CONTRIBUTION
Development in the assessment area is increasing.	With increasing development there could be a loss of community open space areas.	More pressure could be but on the ASNFs to maintain or provide open space for growing towns. This may affect potential land exchanges, public access to the ASNFs, and right-of-ways.

Table 27. Water and Watersheds Trends, Sustainability, and Effects

TREND	SUSTAINABILITY	EFFECTS AND FS CONTRIBUTION
Water availability and resources for development are limited.	With increasing populations there will be greater demands for the limited water resources. Limited water availability will eventually limit development growth.	Approximately 40 percent of surface water and subsurface water in Arizona originates on lands administered by the Forest Service. The ASNFs' role in protecting area watersheds will become increasingly important.
Recreation activities in watersheds and riparian areas are increasing.	The ASNFs manage a large proportion of the riparian areas in the northern part of Arizona.	Watersheds and riparian areas could experience resource damage, leading to a decline in this sensitive resource. The ASNFs may need to increase management and protection of riparian areas and important watersheds.

Table 28. Access and Travel Trends, Sustainability, and Effects

TREND	SUSTAINABILITY	EFFECTS AND FS CONTRIBUTION
Motorized access within the forest is changing.	Travel Management Rule could reduce motorized access within the forest, but would reduce effects to natural resources.	Primary issues include the ability to effectively and efficiently enforce proposed travel restrictions, access to recreation sites, and game retrieval. Although the ASNFs could reduce the number of roads open to motorized vehicle travel, interest groups have been involved to help determine which roads could be closed and which kept open. By closing some roads and keeping open needed roads, there should be little effect to access.
Road maintenance is decreasing.	Road maintenance could be reduced as a result of constrained county and federal transportation budgets.	Reduced road maintenance leads to increased safety risks, potential access reductions, and possible unauthorized use around hazards.
Highway access to the assessment area is improving.	Better highway access, and reduced driving times, could further increase use from the major population centers.	Recreation use on the ASNFs would continue to increase. There could also be a shift towards increasing day-use as travel times decrease.

Table 29. Community Relationships Trends, Sustainability, and Effects

TREND	SUSTAINABILITY	EFFECTS AND FS CONTRIBUTION
Increase in the communities' involvement with forest management	Shift in communities' economic and social relationships with natural resources.	Forums and partnerships provide a way to identify and resolve about natural resource management and forest uses.
	Decreased forest funding or staffing could cause a decrease in public involvement with communities.	Less public involvement could weaken the ASNFs' relationships with the communities and weaken support for management activities.
Increase in tribal communications.	Improved communication and coordination with neighboring tribes on resource management issues.	Maintaining and improving existing tribal relationships and developing new relationships with other tribes results in greater cooperation and trust.

Table 30. Fire/Wildland Urban Interface (WUI) Trends, Sustainability, and Effects

TREND	SUSTAINABILITY	EFFECTS AND FS CONTRIBUTION
Wildfires are becoming more intense.	Increasing development is putting more human improvements at risk. The accumulating live and dead fuels are increasing the risk of property damage from wildland fire.	The ASNFs has no control over the increase in housing developments that expand the WUI. The ASNFs are treating WUI areas to reduce the uncharacteristic wildfire potential and to improve long term-forest health.
Fuels management in WUIs is increasing.	Allocation of fuels management resources would be mostly around the WUIs, while other areas may not be treated.	If the ASNFs focuses all of its fuel management resources on the WUI and does not address other areas that need treatment there could be more uncharacteristic wildfires.

Glossary

All-terrain Vehicle - Any motorized off-highway vehicle designed to travel on four low pressure tires, having a seat designed to be straddled by the operator, and handlebars for steering control.

Commodities - The goods and services produced by industries.

Direct Effects - The set of expenditures applied to the predictive model (i.e., input/output multipliers) for impact analysis.

Farm/Ranch Proprietors - Generally “family farmers,” who are self-employed, in contrast to corporately owned and managed farms or ranches.

Farm Self-Employment - The number of non-corporate farm operators, consisting of sole proprietors and partners. A farm is defined as an establishment that produces, or normally would be expected to produce, at least $1,000 worth of farm products, crops, and livestock in a typical year. Because of the low cutoff point for this definition, the farm self-employment estimates are effectively on a full-time and part-time basis. The estimates are consistent with the job-count basis of the estimates of wage and salary employment because farm proprietors are counted without regard to any other employment.

IMpact analysis for PLANing, Minnesota IMPLAN Group, Inc. (IMPLAN) - A regional economic impact analysis system, that uses county-level, input-output data to determine the extent to which these activities (such as livestock grazing) contribute to the local economy. Input-output analysis is an economist’s tool that traces linkages among the structural parts of an economy and calculates the employment, income, and output effects resulting from a direct impact on the economy.

Indirect Effects - The inter-industry effects of input-output analysis. The impacts above and beyond the direct effects when applied to the Type I multipliers.

Induced Effects - The impacts of household expenditures in input-output analysis.

Industries - The collection of businesses in an economy within a given region that are purchasing goods and services and paying workers.

Input-Output Analysis - An economic model that allows the assessment of change in overall economic activity as a result of some corresponding change in one or several activities.

Institutions - Refer to the type of final demand sector. They are personal consumption expenditures, or purchases made by households, federal, state, and local purchases, investment purchases, and trade.

Labor Force - The labor force includes all people classified in the civilian labor force, plus members of the U.S. Armed Forces (people on active duty with the United States Army, Air Force, Navy, Marine Corps, or Coast Guard).

Labor Income - In general, it represents all forms of employment income. In input-output it is the sum of employee compensation and proprietor income (except for IMPLAN multiplier report 603 which includes only employee compensation).

Non-Farm Proprietors Employment - The number of sole proprietorships and the number of individual business partners not assumed to be limited partners. The non-farm self-employment estimates resemble the wage and salary employment estimates in that both series measure jobs, as opposed to workers, on a full-time and part-time basis. However, because of limitations in source data, two important measurement differences exist between the two sets of estimates. First, the self-employment estimates are largely on a place-of-residence basis rather than on the preferred place-of-work basis. Second, the self-employment estimates reflect the total number of sole proprietorships or partnerships active at any time during the year, as opposed to the annual average measure used for wage and salary employment.

Off-Highway Vehicle - Any motorized vehicle capable of, or designed for, travel on or immediately over land, water or other natural terrain, excluding the following: 1) any nonamphibious registered motorboat; 2) any military, fire, emergency or law enforcement vehicle while being used for emergency purposes; 3) any vehicle whose use is expressly permitted by the authorized officer or otherwise officially approved; 4) vehicles in official use; and 5) any combat or combat support vehicle when used in times of national defense emergencies. OHVs generally include off-highway motorcycles, dune buggies, four-wheel drive vehicles, snowmobiles, and all-terrain vehicles (ATVs).

Partnership - An unincorporated business association of two or more partners.

Per Capita Personal Income - The average obtained by dividing aggregate income by total population of an area.

Poverty Rate - The U.S. Census Bureau uses a set of money income thresholds that vary by family size and composition to detect who is poor. If the total income for a family or unrelated individual falls below the relevant poverty threshold, then the family or unrelated individual is classified as being "below the poverty level."

Predictive Model - The mathematical representation of the input-output multipliers. Mathematically it is: $X = (I - A)-1 * Y$.

Proprietor income - Income of sole proprietorships, partnerships, and tax-exempt cooperatives.

Response Coefficient - Rate of economic activity.

Rural Area - Territory, population, and housing units not classified as urban. Rural classification cuts across other hierarchies and can be in metropolitan or non-metropolitan areas.

Secondary Data Sources - Books, reports, articles, and data compiled and available on the web, in which other researchers report the results of their research based on primary data or sources. Primary sources, on the other hand, are new data, compiled for the first time through new research, such as direct interviews, focus groups, or new surveys.

Tax Exempt Cooperative - A nonprofit organization that is collectively owned by its members.

Type I Multipliers - The total production requirements of all industries within a given region to meet the industry demands triggered by $1 of consumption of the goods/services produced by a specified industry.

Urban Area – The 2000 U.S. Census Bureau use the following definition: All territory, population and housing units in urban areas, which include urbanized areas and urban clusters. An urban area generally consists of a large central place and adjacent densely

settled census blocks that together have a total population of at least 2,500 for urban clusters, or at least 50,000 for urbanized areas. Urban classification cuts across other hierarchies and can be in metropolitan or non-metropolitan areas. The 1990 U.S. Census Bureau used the following definition: "urban" consists of territory, persons, and housing units in: 1) Places of 2,500 or more persons incorporated as cities, villages, boroughs (except in Alaska and New York), and towns (except in the six New England States, New York, and Wisconsin), but excluding the rural portions of "extended cities," 2) Census designated places of 2,500 or more persons, and 3) Other territory, incorporated or unincorporated, included in urbanized areas.

Wage and Salary Employment - Also referred to as wage and salary jobs, measures the average annual number of full-time and part-time jobs in each area by place-of-work. All jobs for which wages and salaries are paid are counted. Full-time and part-time jobs are counted with equal weight.

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Appendix A

The following pages provide a series of charts depicting the economy within each county in the assessment area. This analysis displays the differences between the counties and the relative importance of natural resource industries to each. IMPLAN data was used to examine the overall economic activity, including natural resource dependent economic activities within each county. Also, shown are charts for the IMPLAN assessment area as identified by the forest plan revision team where an area smaller than the entire county was selected. The IMPLAN assessment area more closely represents the economic relationships of the Apache-Sitgreaves National Forests.

Apache County, Arizona

Figure 20 displays the relative size of the labor income produced in the natural resource related sectors to the countywide economy in 2003. Government is the dominant sector in Apache County. Natural resource related sectors represented only 2.1 percent of the labor income. Figure 21 shows that natural resource related employment represented 3.8 percent of county employment. Tourism was the largest natural resource related sector with 2.1 percent of employment and 1.1 percent of labor income.

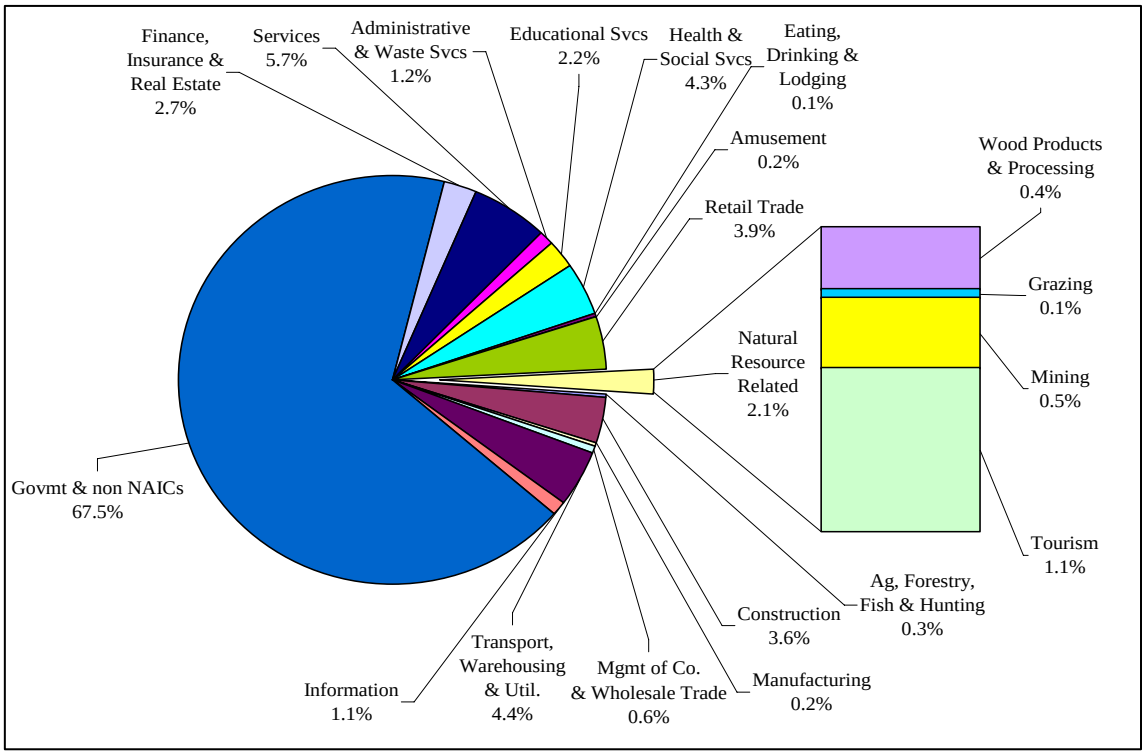

Figure 20. Apache County, Arizona 2003 Labor Income

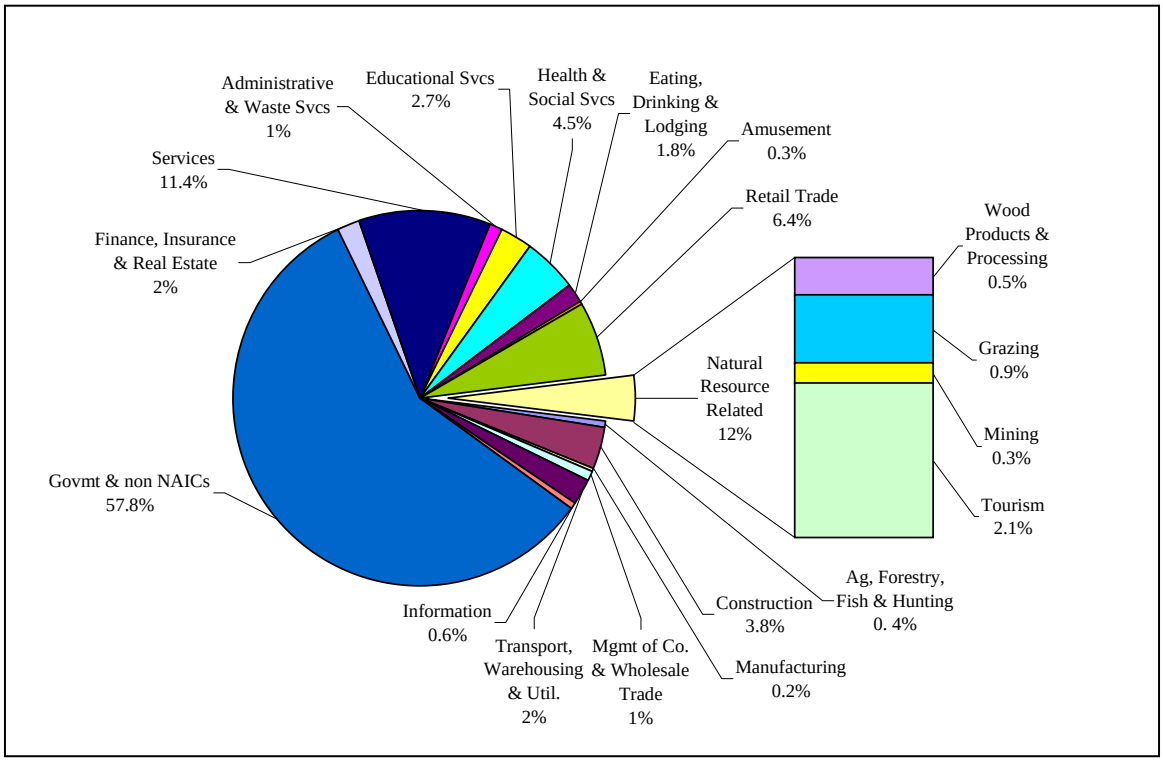

Figure 21. Apache County, Arizona 2003 Employment

Only a portion of Apache County was included in the assessment area (table 14). Total labor income associated with the assessment area is $393.4 million with employment of approximately 11,013 jobs, just over half the whole county totals.

Table 31. Assessment Area Zip Codes for the Apache-Sitgreaves National Forests IMPLAN Economic Conditions

Apache County, Arizona							
85920	85924	85925	85927	85930	85932	85936	85938
85940							
Coconino County, Arizona							
85931	86024						
Greenlee County, Arizona (all of this county was included)							
85533	85534	85540					
Navajo County, Arizona							
85901	85911	85923	85926	85928	85929	85933	85934
85935	85937	85939	85941	85942	86025	86032	86047
Catron County, New Mexico (all of this county was included)							
87820	87821	87824	87827	87829	87830		
Grant County, New Mexico							
88025	88051	88055					

Figures 22 and 23 display labor income and employment associated with the assessment area portion of Apache County. The natural resources related sectors in the assessment area produce only 1 percent of labor income but 3 percent of employment. Tourism again represents the largest portion of the natural resource related sectors.

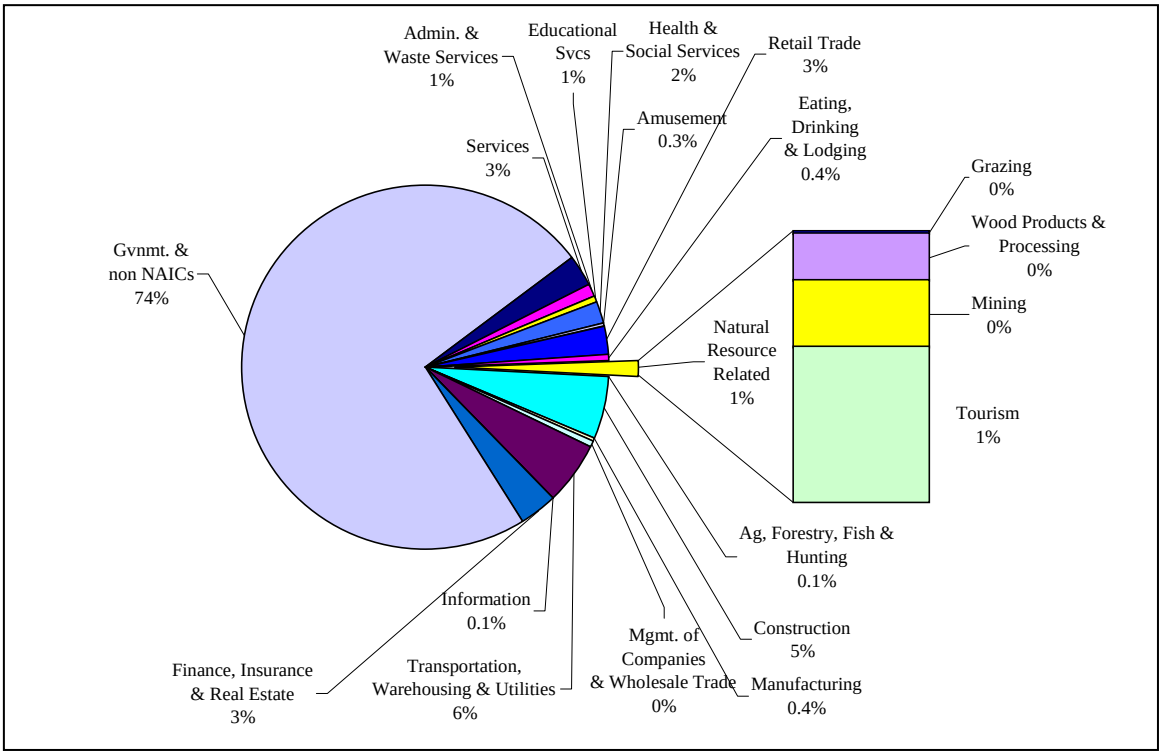

Figure 22. 2003 Labor Income in Assessment Area Portion of Apache County

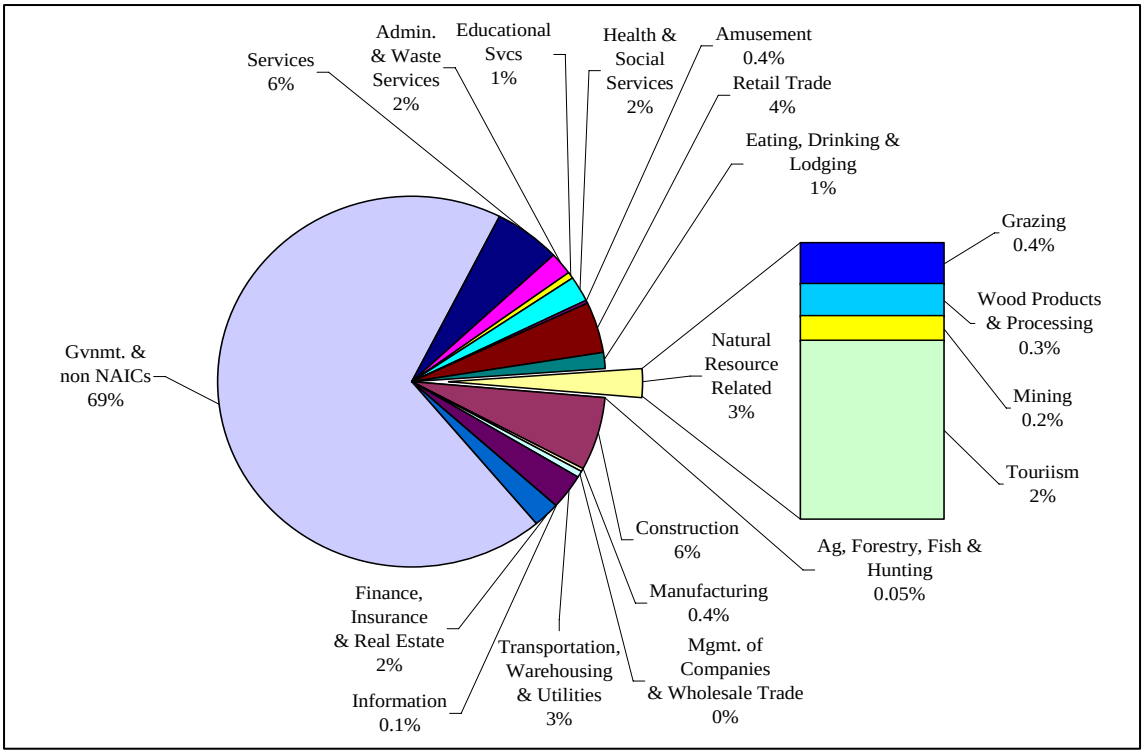

Figure 23. 2003 Employment in Assessment Area Portion of Apache County

Coconino County, Arizona

Figure 24 displays the relative size of the labor income produced in the natural resource related sectors to the countywide economy in 2003. Figure 25 displays the 2003 employment. Forest related sectors represented 4 percent of labor income and 8.6 percent of employment. The largest natural resource related sector was tourism with 3.6 percent of labor income and 7.9 percent of employment.

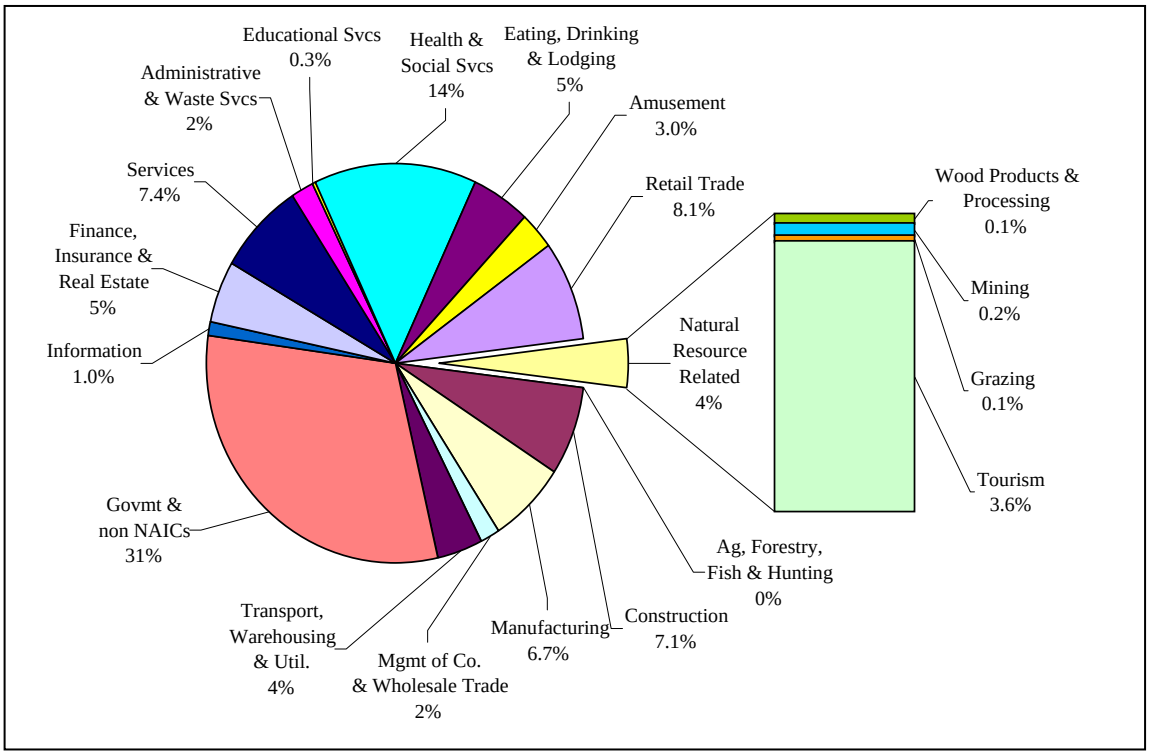

Figure 24. Coconino County, Arizona 2003 Labor Income

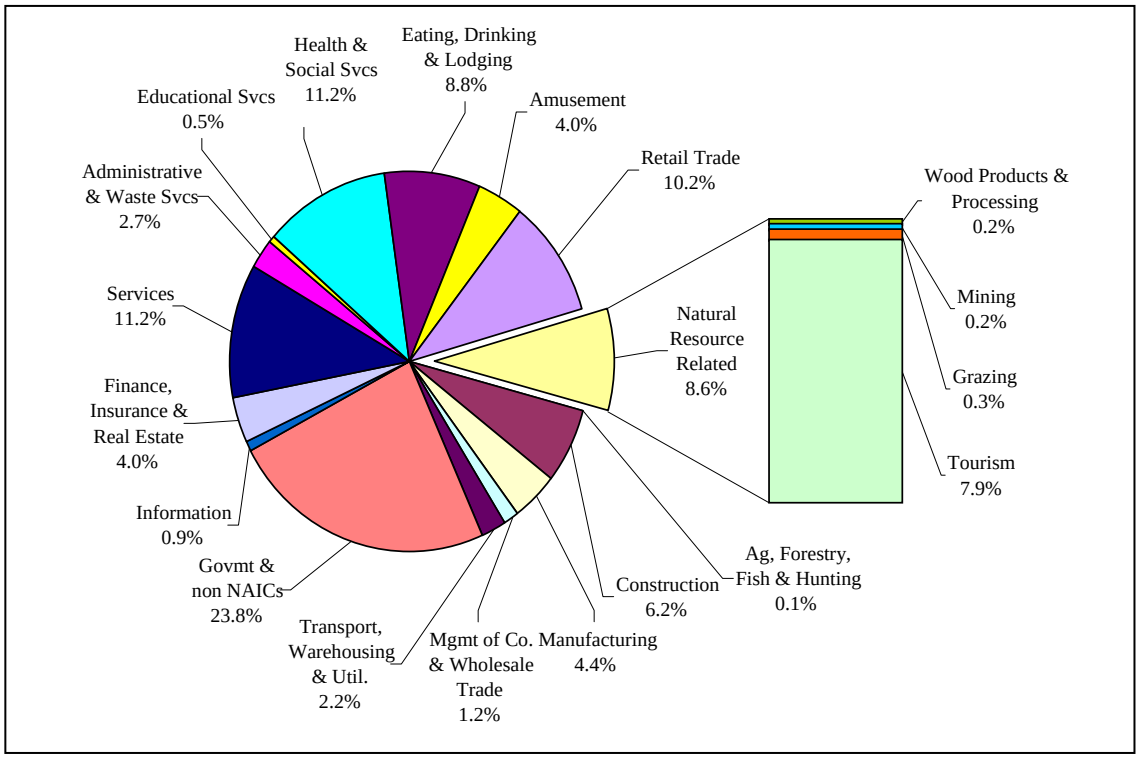

Figure 25. Coconino County, Arizona 2003 Employment

Only a portion of Coconino County was included in the assessment area (table 14). Total labor income associated with the assessment area is $7.7 million (compared to $2.1 billion for the entire county) with employment of approximately 219, 0.3 percent of the county total. Figures 26 and 27 display labor income and employment associated with the assessment area portion of Coconino County. The natural resources related sectors in the assessment area produce 3 percent of labor income and 5 percent of employment. Tourism again represents the largest portion of the natural resource related sector.

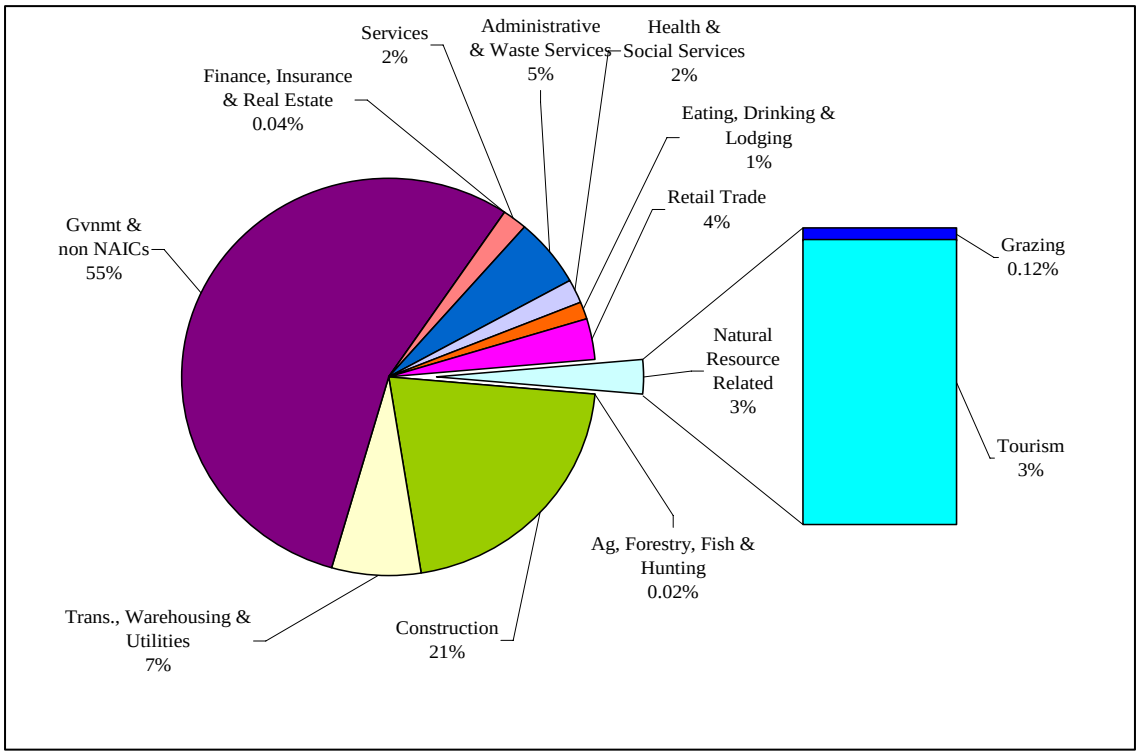

Figure 26. 2003 Labor Income in Assessment Area Portion of Coconino County

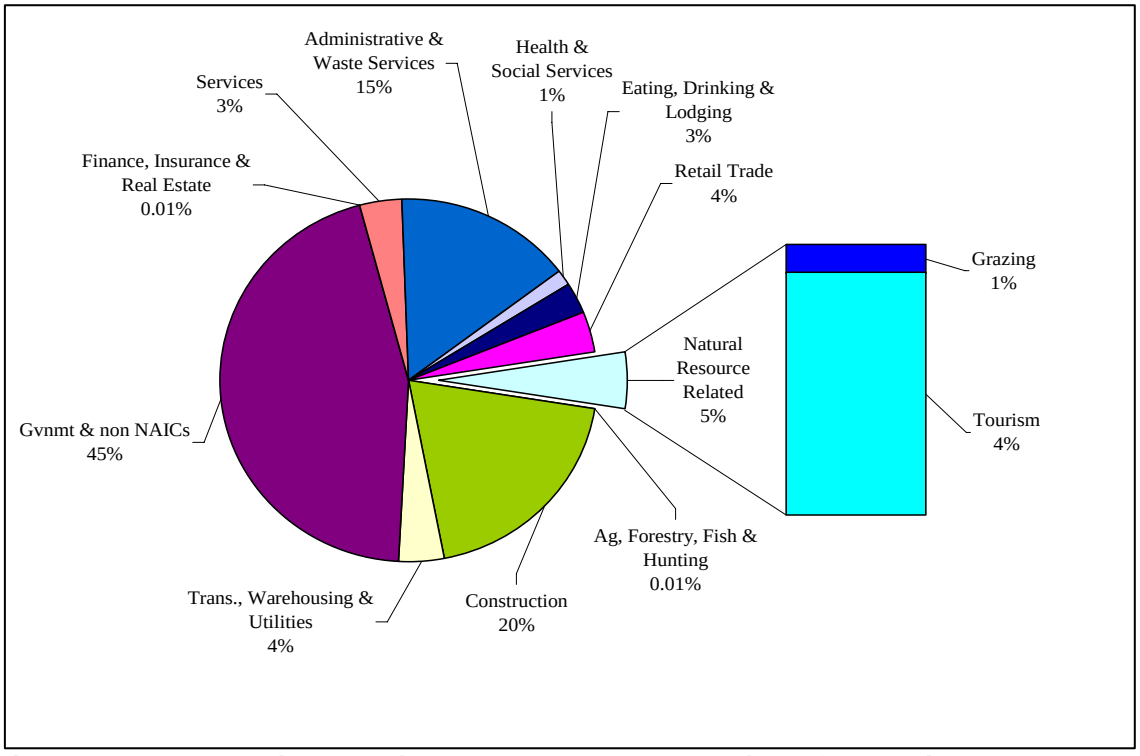

Figure 27. 2003 Employment in Assessment Area Portion of Coconino County

Greenlee County, Arizona

Figure 28 displays the relative size of the labor income produced in the natural resource related sector to the county economy in 2003. The natural resource related sectors dominate the Greenlee County economy with 73.6 percent of labor income and 60.9 percent of employment (figure 29). The largest sector within the natural resource related sectors is mining with 72.8 percent of labor income and 57 percent of employment. The relatively low mining employment relative to the labor income produced suggests the sector provides relatively high paying jobs. The grazing and tourism sectors are very small relative to the overall economy.

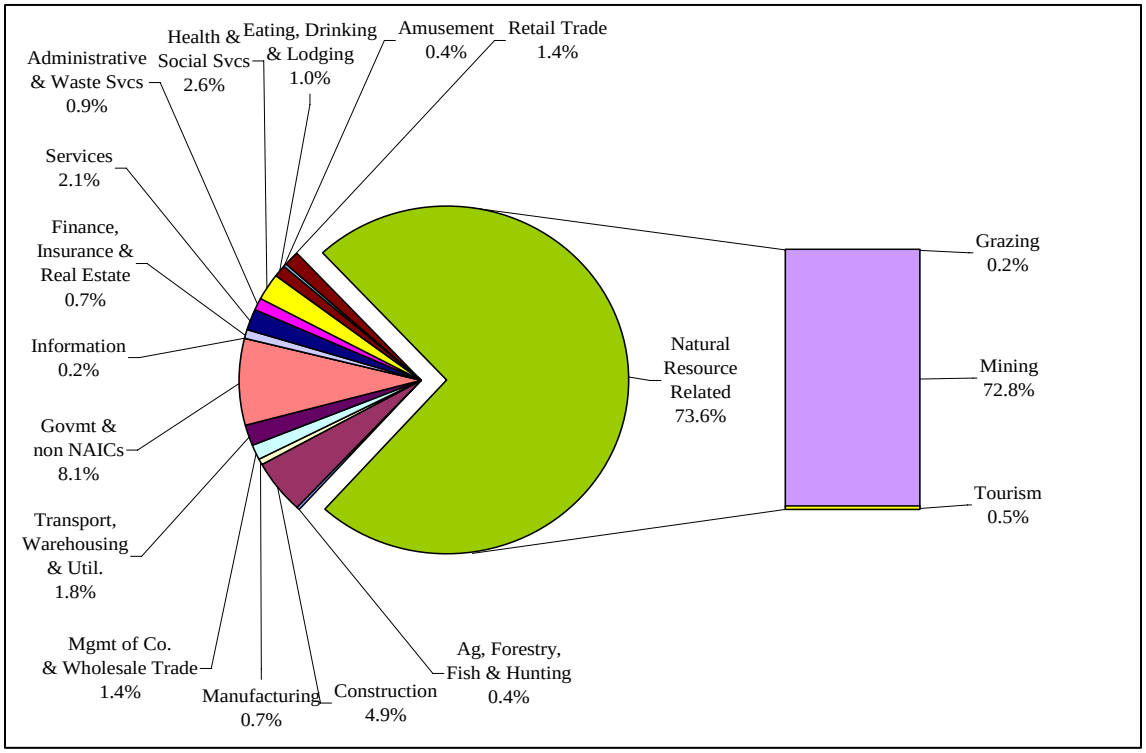

Figure 28. Greenlee County, Arizona 2003 Labor Income

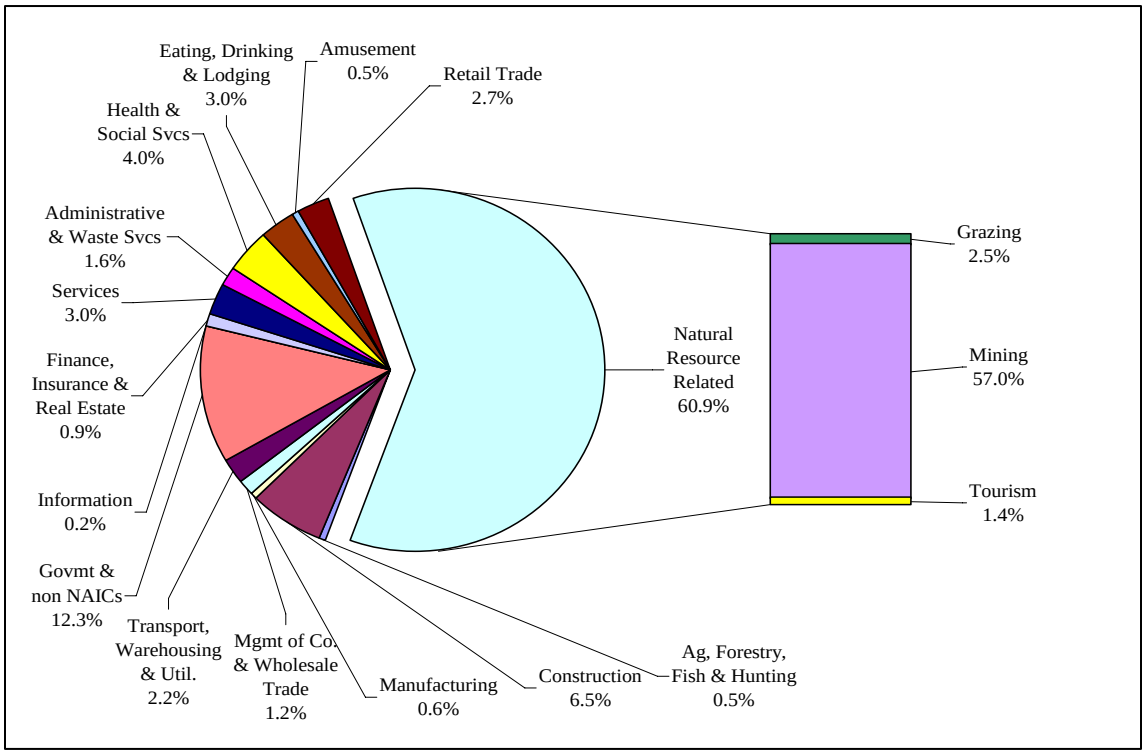

Figure 29. Greenlee County, Arizona 2003 Employment

Navajo County, Arizona

Figures 30 and 31 display the relative size of the labor income and employment produced in the natural resource related sectors as compared to the Navajo County economy. Natural resource related sectors produced 6.6 percent of labor income and provided 8 percent of employment in 2003. One of the largest natural resource related sectors was tourism with 2.7 percent of labor income and 5 percent of employment. The larger proportion of jobs relative to labor income suggests that this sector provides relatively low paying jobs. Mining produced 2.5 percent of labor income and 1 percent of employment.

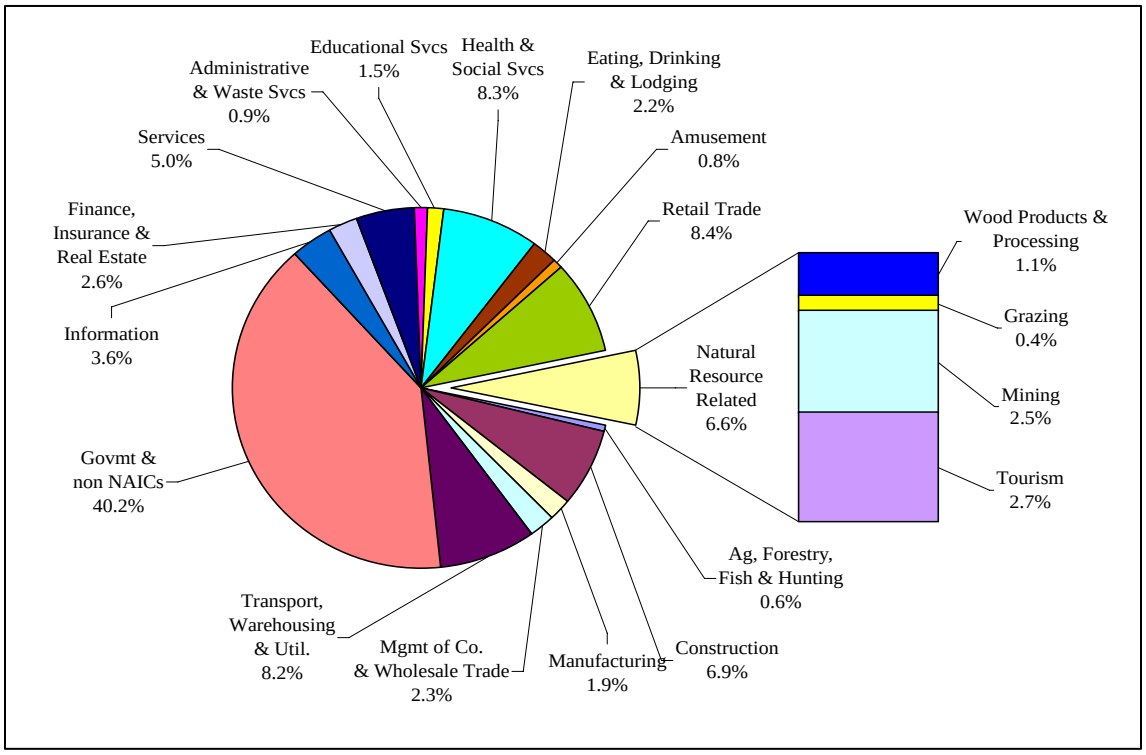

Figure 30. Navajo County, Arizona 2003 Labor Income

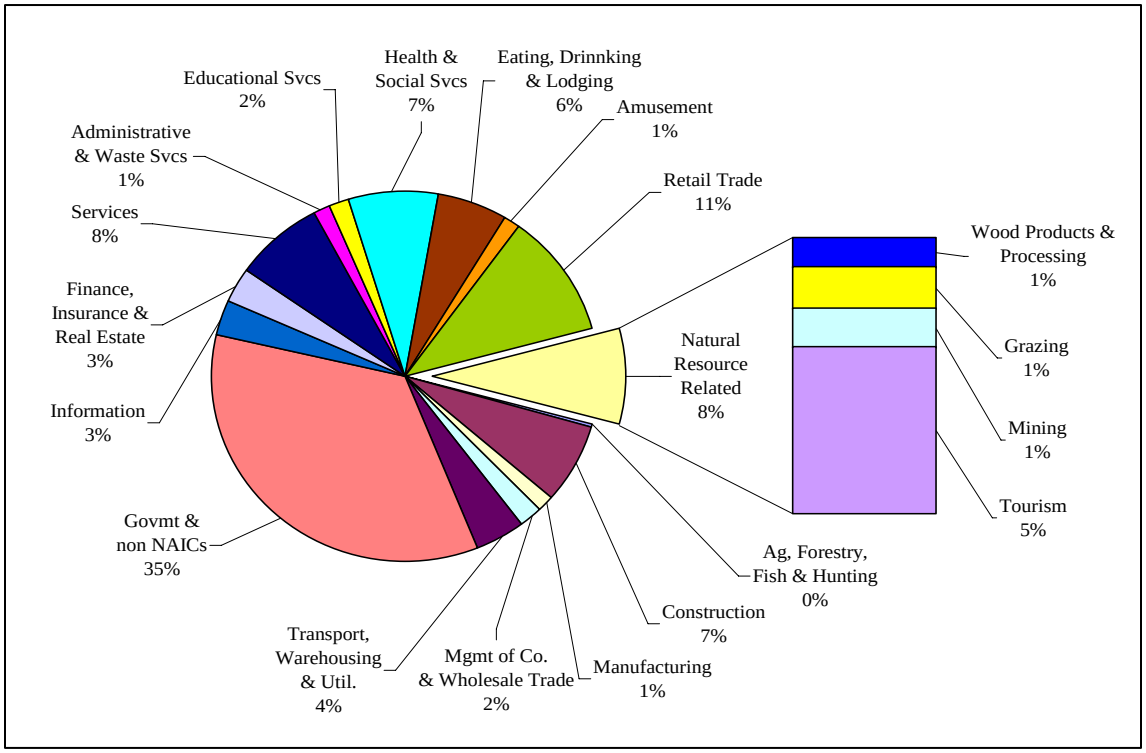

Figure 31. Navajo County, Arizona 2003 Employment

Only a portion of Navajo County was included in the assessment area (table 14). Total labor income associated with the assessment area is $944.6 million, or 91 percent of the county total ($1.02 billion), with employment of approximately 20,866, approximately 66 percent of the county total. Figures 32 and 33 display labor income and employment associated with the assessment area portion of Navajo County. The natural resources related sectors in the assessment area produce 5 percent of labor income and 7 percent of employment. Tourism again represents the largest portion of the natural resource related sectors.

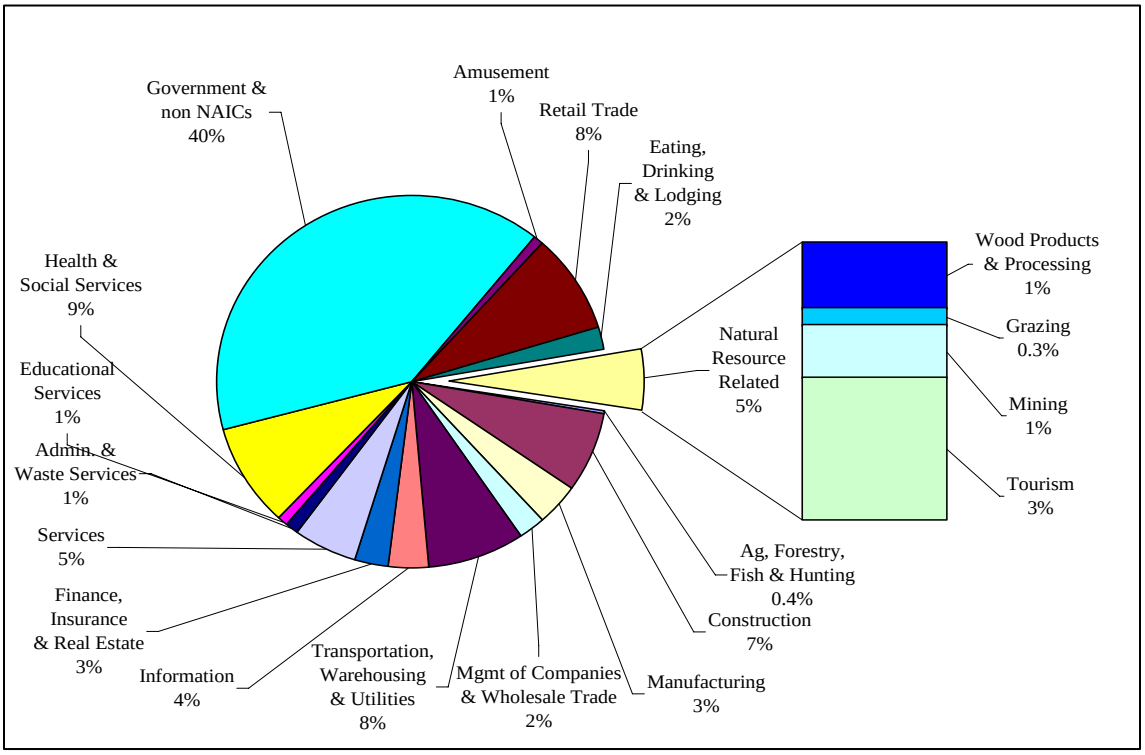

Figure 32. 2003 Labor Income in Assessment Area Portion of Navajo County

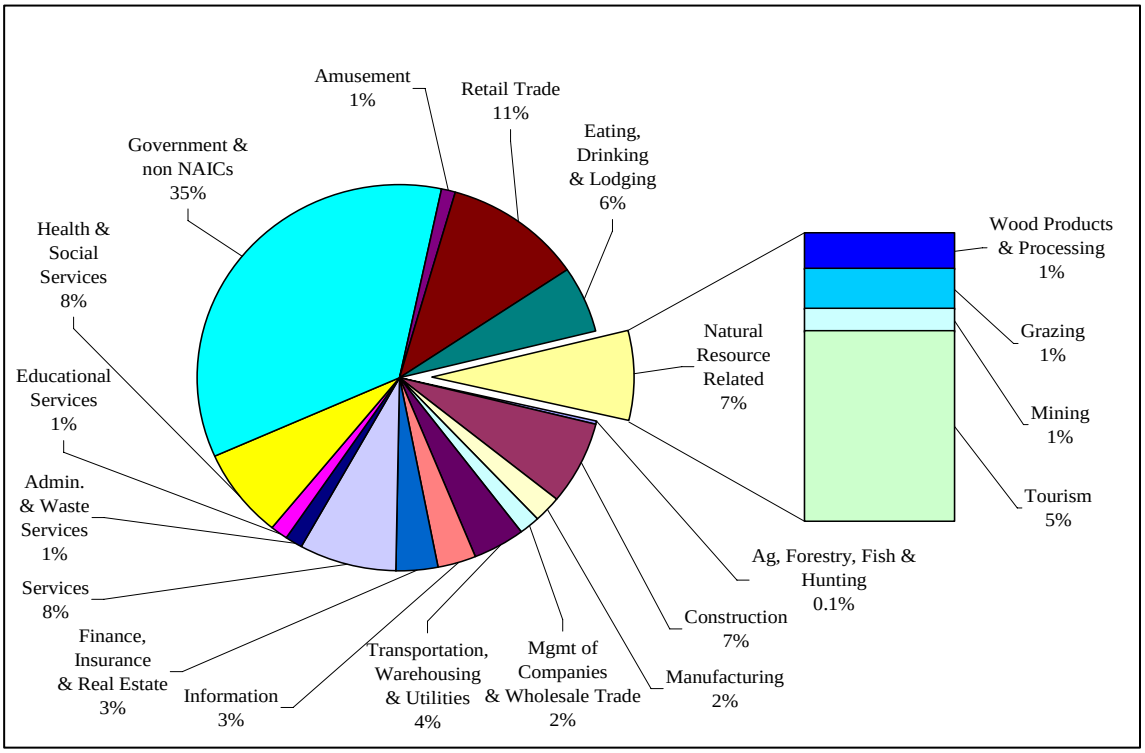

Figure 33. 2003 Employment in Assessment Area Portion of Navajo County

Catron County, New Mexico

Figure 34 illustrates the relative size of the labor income produced in the natural resource related sectors to the countywide economy in 2003. Figure 35 displays the employment in 2003. Government and non-NAICS was the dominant sector. Natural resource related labor income represented only 6 percent of labor income, but provided 29.8 percent of employment. The largest sector within the natural resource related industries was grazing with 3.0 percent of labor income and 22.8 percent of employment, indicating very low incomes for people in these jobs.

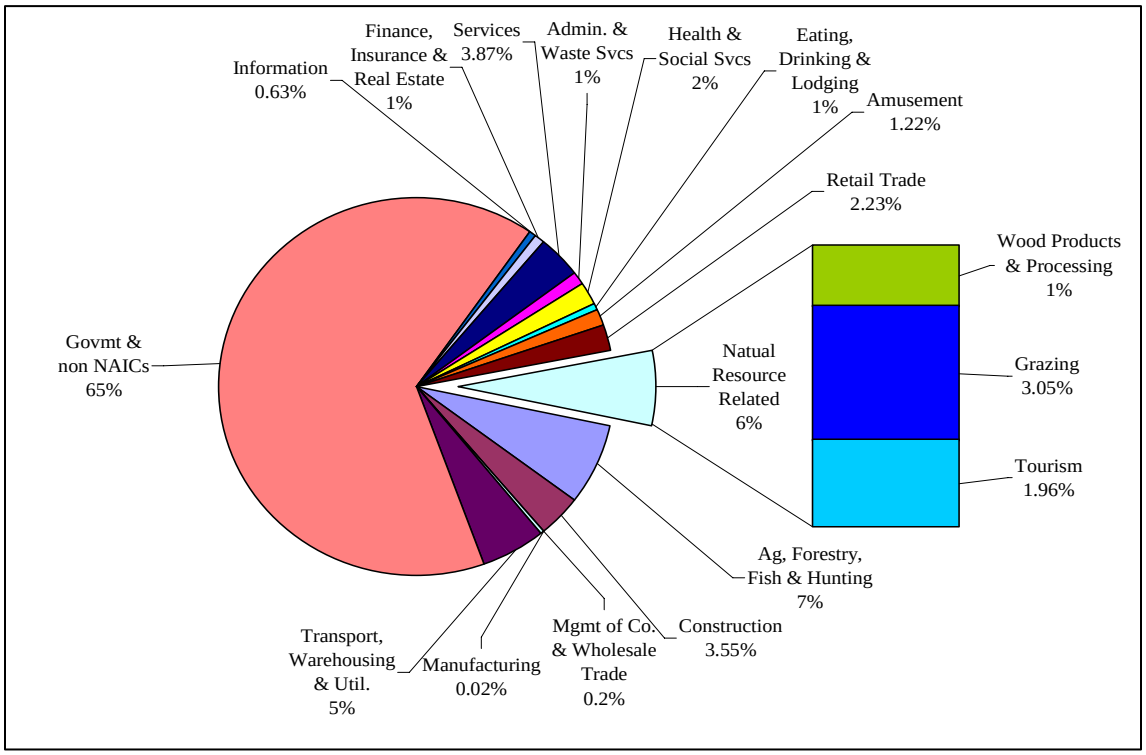

Figure 34. Catron County, New Mexico 2003 Labor Income

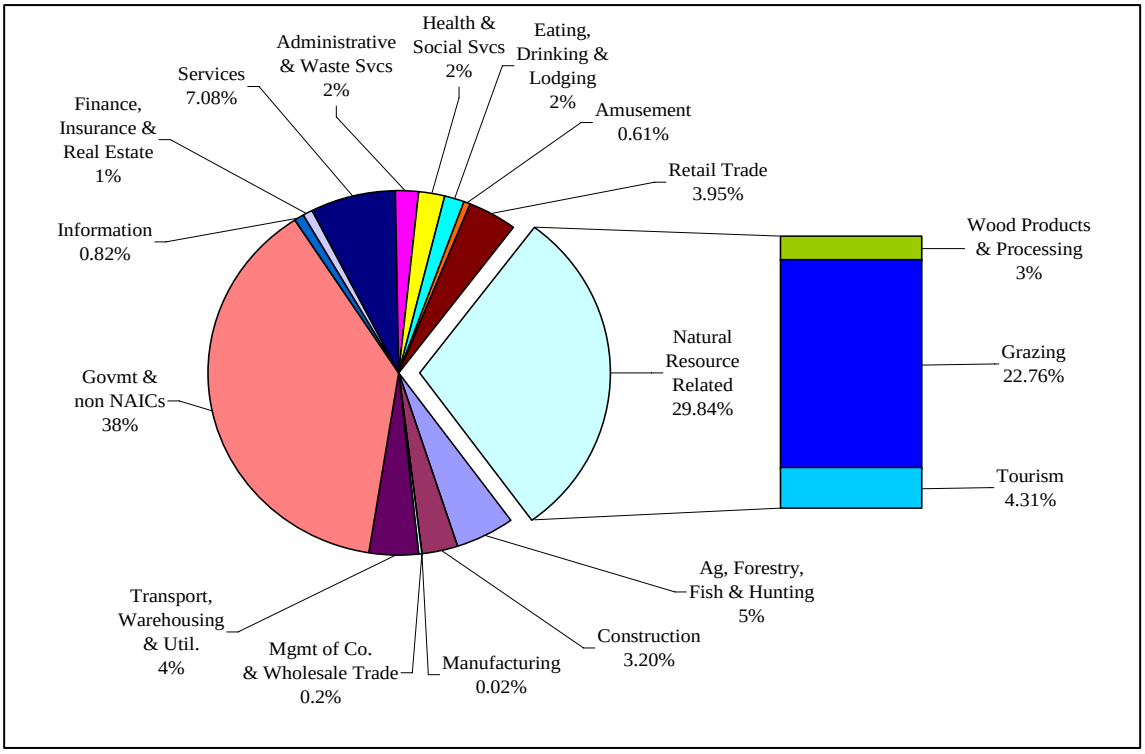

Figure 35. Catron County, New Mexico 2003 Employment

Grant County, New Mexico

Figure 36 illustrates the relative size of the labor income produced in the natural resource related sectors to the countywide economy in 2003. Figure 37 displays the employment in 2003. Government and non-NAICS was the dominant sector. Natural resource related labor income represented 15 percent of labor income and 13 percent of employment. The largest sector within the natural resource related industries was mining with 13 percent of labor income and 6 percent of employment.

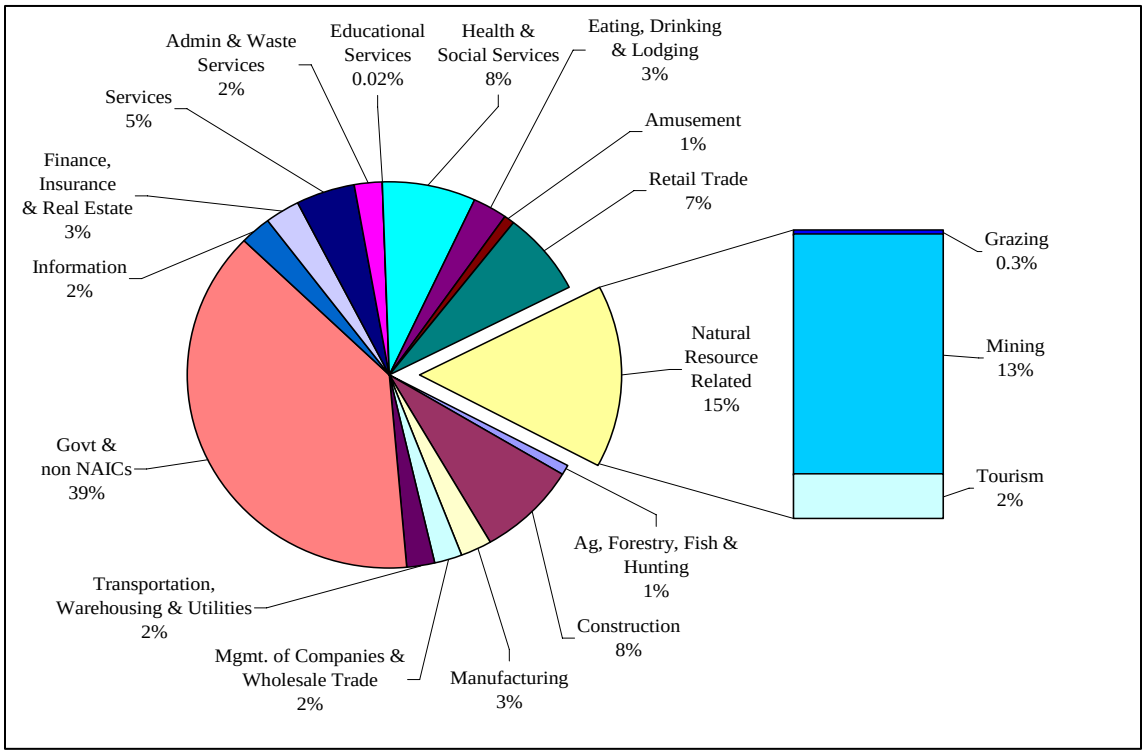

Figure 36. Grant County, New Mexico 2003 Labor Income

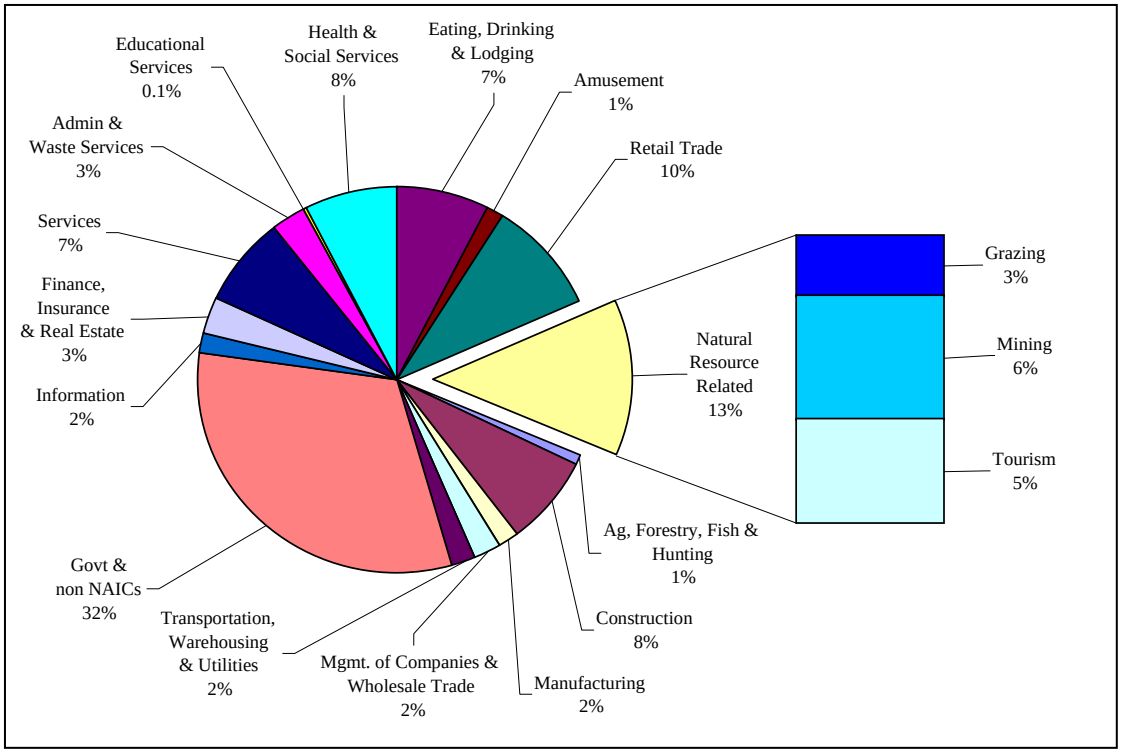

Figure 37. Grant County, New Mexico 2003 Employment

Only a portion of Grant County was included in the assessment area (table 14). Total labor income associated with the assessment area is $15 million, or approximately 4 percent of the county total ($329.6 million), with employment of approximately 752, approximately 7 percent of the county total. Figures 38 and 39 display labor income and employment associated with the assessment area portion of Grant County. The natural resources related sectors in the assessment area represent a smaller portion of labor income with only 7 percent. However, natural resource related industries provide a greater portion of jobs with 21 percent of employment. Tourism again represents the largest portion of labor income, but grazing provides a larger portion of employment. The large share of employment relative to labor income suggests a high proportion of lower paying jobs in this part of Grant County.

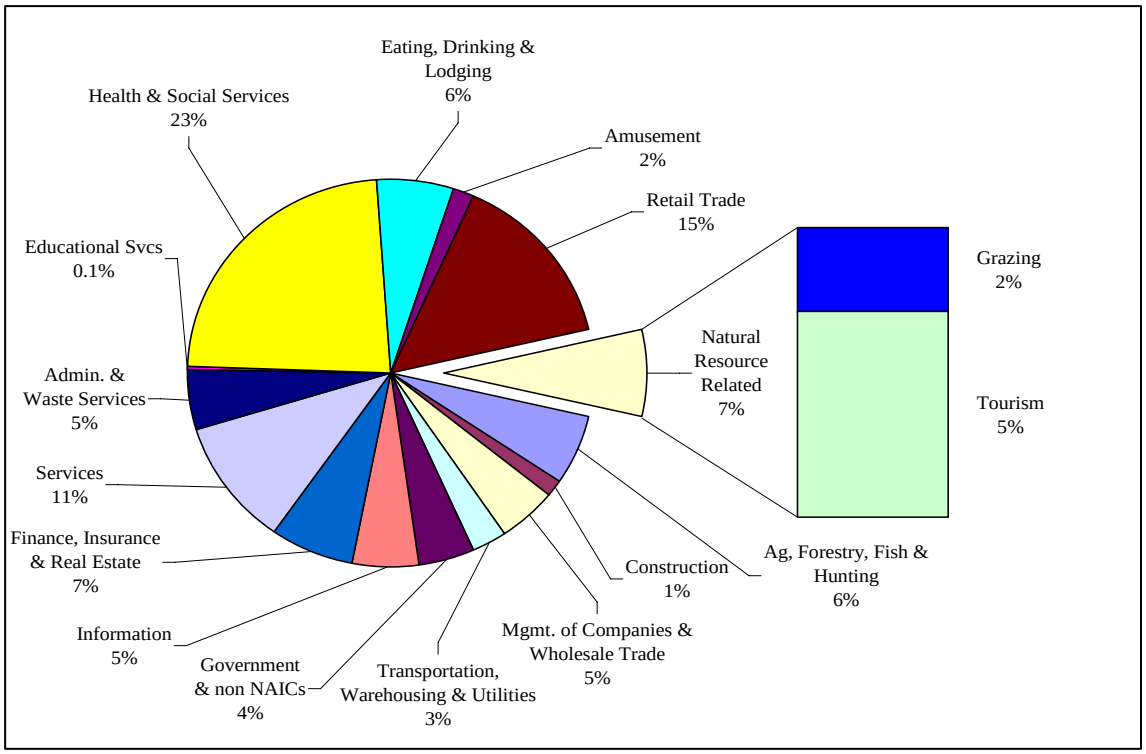

Figure 38. 2003 Labor Income in Assessment Area Portion of Grant County

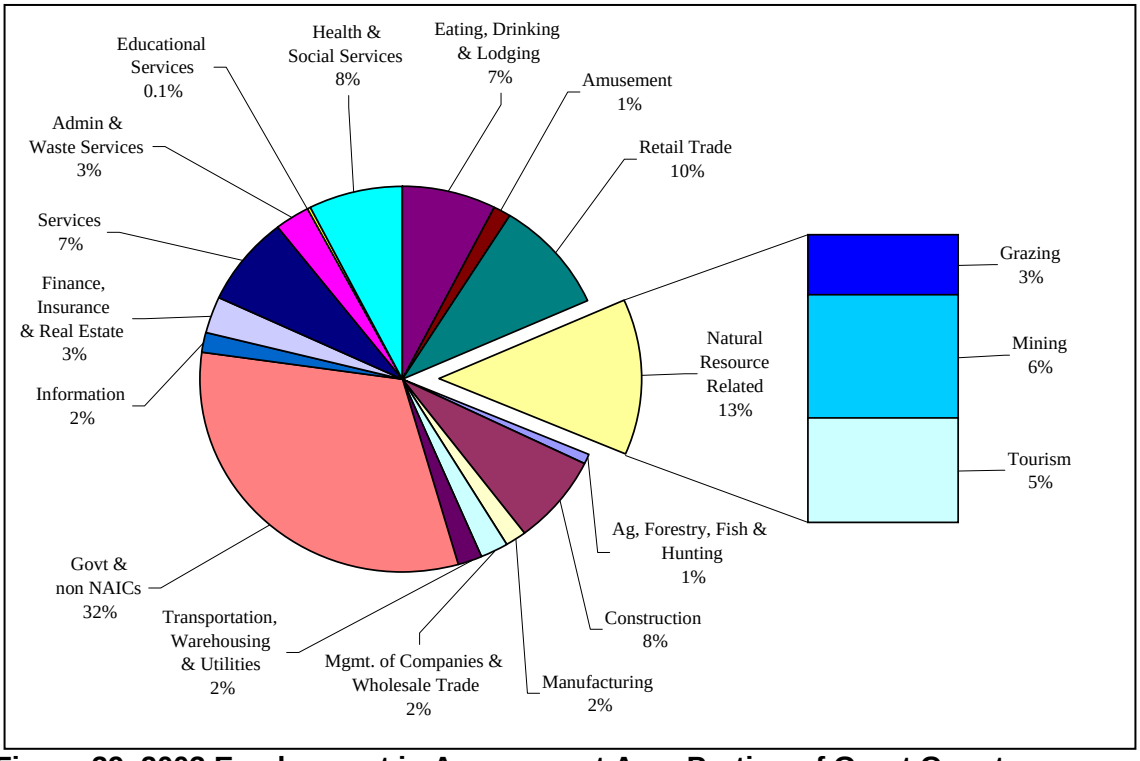

Figure 39. 2003 Employment in Assessment Area Portion of Grant County

Appendix B

Data and Process Used to Develop Apache-Sitgreaves National Forest

Contribution Analysis for Grazing, Recreation, and Wildlife Programs

Recreation and Wildlife:

Data Needs:

- National Forest visitation estimate for year of analysis
    - 1,932,000 National Forest Visits
    - Source: National Visitor Use Monitoring Report for the Apache-Sitgreaves National Forest
- Division of total visitation between wildlife and recreation related activities.
    - Wildlife – 21 percent
    - Recreation – 79 percent
    - Source: *Spending Profiles of National Forest Visitors, NVUM Four Year Report* by Stynes and White, page 42, Table B-6 (Case Weights column)
- Division of visits by visitor use segments
    - Non-local day use: 3 percent
    - Non-local overnight on national forest: 42 percent
    - Non-local overnight off forest: 35 percent
    - Local day use: 8 percent
    - Local overnight on national forest: 4 percent
    - Local overnight off forest: 6 percent
    - Nonprimary (national forest was not reason for presence): 2 percent
    - Source: *Spending Profiles of National Forest Visitors, NVUM Four Year Report* by Stynes and White, page 26, Table A-2.
- Average persons per vehicle surveyed
    - Non-local day use: 2.3 persons
    - Non-local overnight on national forest: 2.5 persons
    - Non-local overnight off forest: 2.7 persons
    - Local day use: 2.1 persons
    - Local overnight on national forest: 2.5 persons
    - Local overnight off forest: 2.5 persons
    - Source: *Spending Profiles of National Forest Visitors, NVUM Four Year Report* by Stynes and White, page 31, National Average.
- Visitor spending profiles ($’s per party)
    - Wildlife Related
        - Non-local day: $40.71

        - Non-local overnight on national forest: $203.78
        - Non-local overnight off forest: $249.95
        - Local day: $44.03
        - Local overnight on national forest: $151.92
        - Local overnight off forest: $116.49
        - Source: *Spending Profiles of National Forest Visitors, NVUM Four Year Report* by Stynes and White, page 40, Table B-3, 2001 dollars.
    - Non-Wildlife Related
        - Non-local day: $53.76
        - Non-local overnight on national forest : $151.33
        - Non-local overnight off forest: $244.46
        - Local day: $30.79
        - Local overnight on national forest: $119.49
        - Local overnight off forest: $116.03
        - Source: *Spending Profiles of National Forest Visitors, NVUM Four Year Report* by Stynes and White, page 40, Table B-4.
- Response Coefficients per $1,000,000 change in final demand (from IMPLAN model)
    - Wildlife Related
        - Non-local day: $326,426.80 of labor income and 13.8 jobs
        - Non-local overnight on national forest: $436,937.50 of labor income and 14.3 jobs
        - Non-local overnight off forest: $362,238.00 of labor income and 17.3 jobs
        - Local day: $320,204.10 of labor income and 12.9 jobs
        - Local overnight on national forest: $382,655.90 of labor income and 12.9 jobs
        - Local overnight off forest: $319,222.30 of labor income and 14.3 jobs
    - Non-Wildlife Related
        - Non-local day: $383,037.90 of labor income and 16.0 jobs
        - Non-local overnight on national forest: $473,007.10 of labor income and 15.3 jobs
        - Non-local overnight off forest: $381,925.80 of labor income and 18.3 jobs
        - Local day: $369,203.30 of labor income and 14.5 jobs
        - Local overnight on national Forest Service: $458,782.80 of labor income and 14.2 jobs
        - Local overnight off forest: $380,221.80 of labor income and 16.3 jobs
    - Source: IMPLAN model, 2003 data
- GDP deflators for 2001, 2003, and 2006
    - 2001 – 1.0940
    - 2003 – 1.1221
    - 2006 – 1.1747

1. Divide total recreation between wildlife and recreation related visits.
    - National Forest Visits * Percent Wildlife related visits = Wildlife related National Forest Visits
    - National Forest Visits * Percent Recreation related visits = Recreation related National Forest Visits
2. Calculate the visits by visitor use segments
    - Wildlife related National Forest Visits * percentage for each visitor use segment = Wildlife related use by visitor use segment
    - Recreation related National Forest Visits * percentage for each visitor use segment = Recreation related use by visitor use segment
3. Convert spending profiles from $'s per party to $'s per visit for each visitor use segment
    - Expenditure per party by visitor use segment * Persons per vehicle by visitor use segment = Expenditure per visit (2001 dollars)
4. Convert from 2001 dollars to 2003 dollars (2003 is the IMPLAN model data year)
    - Expenditure per visit (2001 dollars) * (2003 GDP deflator / 2003 GDP deflator) = Expenditure per visit (2003 dollars)
5. Calculate total estimated expenditures for each visitor use segment
    - Wildlife related use by visitor use segment * Expenditure per visit = Total expenditure per wildlife related visitor use segment
    - Recreation related use by visitor use segment * Expenditure per visit = Total expenditure per recreation related visitor use segment
6. Calculate Labor Income and Employment estimates
    - Response coefficient for each wildlife related visitor use segment * (Total expenditure per wildlife related visitor segment / 1,000,000) = Labor Income or jobs supported.
    - Response coefficient for each recreation related visitor use segment * (Total expenditure per recreation related visitor segment / 1,000,000) = Labor Income or jobs supported.
7. Convert Labor Income estimates from 2003 dollars to 2006 dollars
    - Estimated wildlife related labor income * (2006 GDP deflator / 2003 GDP deflator) – Estimated wildlife related labor income in 2006 dollars.
    - Estimated recreation related labor income * (2006 GDP deflator / 2003 GDP deflator) – Estimated recreation related labor income in 2006 dollars.

The following are the actual calculations of the labor income contributions of Apache-Sitgreaves NF wildlife and recreation related visitor use.

1. Division of National Forest Visit between wildlife and recreation:

- 1,932,000 National Forest Visits * 21% Wildlife Related = 405,720 wildlife related National Forest Visits
- 1,932,000 National Forest Visits * 79% Recreation Related = 1,526,280 recreation related National Forest Visits

2. Calculation of visits by visitor use segments:

Use Segment	Total Visits		*Segment percentage	Recreation visits	Wildlife visits
	Recreation	Wildlife			
Non-Local day	1,526,280	405,720	3%	45,788	12,172
Non-Local overnight on forest			42%	641,038	170,402
Non-Local overnight off forest			35%	534,198	142,002
Local day			8%	122,102	32,458
Local overnight on forest			4%	61,051	16,229
Local overnight off forest			6%	91,577	24,343

*NOTE: percentages do not total to 100% because 2 percent of visitors indicated that the National Forest was not the primary reason for their presence.

3 and 4. Convert spending profiles from $'s per party to $'s per visit and convert to 2003 dollars:

Use Segment	Avg. persons per vehicle	Conversion: 1/Avg. person per vehicle	2003 GDP / 2001 GDP 1.1221 / 1.0940	Expenditure per Party	Expenditure per Visit (Expenditure per Party * Conversion * GDP)
WILDLIFE RELATED					
Non-Local day	2.3	0.434783	1.0257	$40.71	$18.154906
Non-Local overnight on forest	2.5	0.400000		$203.78	$83.606858
Non-Local overnight off forest	2.7	0.370370		$249.95	$94.953133
Local day	2.1	0.476190		$44.03	$21.505488
Local overnight on forest	2.5	0.400000		$151.92	$62.329738
Local overnight off forest	2.5	0.400000		$116.49	$47.793517
RECREATION RELATED					
Non-Local day	2.3	0.434783	1.0257	$53.76	$23.974644
Non-Local overnight on forest	2.5	0.400000		$151.33	$62.087672
Non-Local overnight off forest	2.7	0.370370		$244.46	$92.867545
Local day	2.1	0.476190		$30.79	$15.038701
Local overnight on forest	2.5	0.400000		$119.49	$49.024357
Local overnight off forest	2.5	0.400000		$116.03	$47.604788

5. Calculate total estimated expenditures for each visitor use segment:

Use Segment	Visits	2003 Expenditure per visit	Total Expenditure per Use Segment
WILDLIFE RELATED			
Non-Local day	12,172	$18.1549	$220,978
Non-Local overnight on forest	170,402	$83.6069	$14,246,575
Non-Local overnight off forest	142,002	$94.9531	$13,483,358
Local day	32,458	$21.5055	$698,016
Local overnight on forest	16,229	$62.3297	$1,011,535
Local overnight off forest	24,343	$47.7935	$1,163,421
TOTAL WILDLIFE RELATED			$30,823,883
RECREATION RELATED			
Non-Local day	45,788	$23.9746	$1,097,735
Non-Local overnight on forest	641,038	$62.0877	$39,799,997
Non-Local overnight off forest	534,198	$92.8675	$49,609,008
Local day	122,102	$15.0365	$1,836,231
Local overnight on forest	61,051	$49.0244	$2,992,944
Local overnight off forest	91,577	$47.6048	$4,359,442
TOTAL RECREATION VISITOR EXPENDITURES			$99,695,357
TOTAL WILDLIFE AND RECREATION VISITOR ESTIMATED EXPENDITURES			$130,519,240

6. Calculate Labor Income estimates:

Use Segment	Total Expenditure per Use Segment	Total Expenditure / 1,000,000	Labor Income Response Coeff.	Est. Labor Income (2003 $'s)	Jobs Response Coeff.	Est. Jobs
WILDLIFE RELATED						
Non-Local day	$220,978	0.220978	$326,426.8	$72,133	13.8	3
Non-Local overnight on forest	$14,246,575	14.246575	$436,937.5	$6,224,863	14.3	203
Non-Local overnight off forest	$13,483,358	13.483358	$362,238.0	$4,884,185	17.6	238
Local day	$698,016	0.698016	$320,204.1	$223,508	12.9	9
Local overnight on forest	$1,011,535	1.011535	$382,655.9	$387,070	12.9	13
Local overnight off forest	$1,163,421	1.163421	$319,222.3	$371,390	14.3	17

Use Segment	Total Expenditure per Use Segment	Total Expenditure / 1,000,000	Labor Income Response Coeff.	Est. Labor Income (2003 $'s)	Jobs Response Coeff.	Est. Jobs
Total Wildlife Related Labor Income and Jobs				**$12,163,149**		**483**
RECREATION RELATED						
Non-Local day	$1,097,735	1.097735	$383,037.9	$420,474	16.0	18
Non-Local overnight on forest	$39,799,997	39.799997	$473,007.1	$18,825,681	15.3	610
Non-Local overnight off forest	$49,609,008	49.609008	$381,925.8	$18,946,960	18.3	910
Local day	$1,836,231	1.836231	$369,203.3	$677,943	14.5	27
Local overnight on forest	$2,992,944	2.992944	$458,782.8	$1,373,111	14.2	42
Local overnight off forest	$4,359,442	4.359442	$380,221.8	$1,657,555	16.3	71
Total Recreation Related Labor Income and Jobs				**$41,901,724**		**1,678**
TOTAL LABOR INCOME AND JOBS				**$54,064,873**		**2,161**

7. Convert Labor Income estimates from 2003 dollars to 2006 dollars:

Use Segment	Est. Labor Income (2003 $'s)	2006 GDP / 2003 GDP (1.1747 / 1.1221)	Est. Labor Income (2006 $'s)
WILDLIFE RELATED			
Non-Local day	$72,133	1.046876392	$75,515
Non-Local overnight on forest	$6,224,863		$6,516,662
Non-Local overnight off forest	$4,884,185		$5,113,138
Local day	$223,508		$233,985
Local overnight on forest	$387,070		$405,214
Local overnight off forest	$371,390		$388,799
TOTAL WILDLIFE RELATED LABOR INCOME			$12,733,313
RECREATION RELATED			
Non-Local day	$420,474	1.046876392	$440,184
Non-Local overnight on forest	$18,825,681		$19,708,161
Non-Local overnight off forest	$18,946,960		$19,835,125
Local day	$677,943		$709,722
Local overnight on forest	$1,373,111		$1,437,478
Local overnight off forest	$1,657,555		$1,735,255
TOTAL RECREATION RELATED LABOR INCOME			$43,865,925

GRAZING:

Data Needs:

- Forest Service Actual Head Months of Grazing for the year of IMPLAN data
    - 92,988 HM (2003)
    - Source: Apache-Sitgreaves National Forest Range staff
- Total State cattle inventory
    - 1,706,000 animals (January 1 inventory + Calves + in-shipping)
    - Source: National Agricultural Statistics Service (2003)
- Total cattle inventory for each county in the analysis area
    - Apache County – 12,000
    - Coconino County – 34,000 animals
    - Greenlee County – 10,000 animals
    - Navajo County – 32,000 animals
    - Source: National Agricultural Statistics Service (2003)
- Total state marketings
    - 812,000 animals
    - National Agricultural Statistics Service
- Total state gross income (from sale of cattle), 2002 data
    - $693,891,000
    - Source: National Agricultural Statistics Service (2003)
- Final Demand factor
    - 0.818147
    - Source: IMPLAN Model (reciprocal of type SAM multiplier), 2003 data year
- Response Coefficient (from IMPLAN model)
    - $214,440 of labor income and 17.3 jobs per $1,000,000 change in final demand
    - Source: IMPLAN Model, 2003 data year
- GDP deflation factors for 2003 and 2006
    - 2002 – 1.1080
    - 2003 – 1.1221
    - 2006 – 1.1747

Process for estimating the economic contribution of Forest Service Grazing:

1. Total state marketings / Total state inventory = State Proportion of cattle marketed
2. State gross income * (2003 GDP / 2002 GDP) [to convert state gross income from 2002 dollars to 2003 dollars which is the same as the IMPLAN model data]
3. State gross income / State total marketings = Price per animal

4. FS Head Months grazed / Total HM in Impact area (total of county inventories * 12) = Proportion FS HM.

5. Total of county inventories * State proportion of cattle marketed * Price per animal * Proportion FS HM = Total FS selling price

6. Total FS selling price / FS HM grazed = FS selling price per HM

7. Change in Total Industrial Output (TIO) * Final Demand Factor = Change in Final Demand

    - Change in Total Industrial Out put (TIO) is the HM of FS grazing for year of analysis (in this case we used the same year, 2003, as the IMPLAN data)

    - Final Demand Factor is used to adjust the output to remove intermediate demand (demand of cattle producers from other cattle producers) so that we are left with the change in Final Demand.

8. Change in final demand /1,000,000 * Response Coefficient = Economic Impact

9. Economic Impact * GDP Inflator = Economic impact in today's dollars.

The following are the actual calculations for the economic contribution of Apache-Sitgreaves NF grazing.

1. 812,000 animals / 1,706,000 animal = 0.47596717

2. $693,891 * (1.1221 / 1.1080) = $702,721,201

3. $702,721,201 / 812,000 = $865.4202

4. 92,988 HM / [(12,000 HM + 34,000 HM + 10,000 HM + 32,000 HM) * 12] = 0.08805682

5. (12,000 HM + 34,000 HM + 10,000 HM + 32,000) * 0.47596717 * $865.42 * 0.08805682 = $3,191,903.08

6. $3,191,903.08 / 92,988 HM = $34.33

7. (92,988 HM * $34.33) * 0. 818147 = $2,611,445.93 Total change in Final Demand

8. $2,611,445.93 / 1,000,000 * $214,440 = $559.997.60 Labor Income (2003 dollars)

9. $559.997.60 * (1.1747 / 1.1221) = $586,248 Labor Income (2006 dollars)

Summary: Total estimated contribution to final demand as a result of the grazing authorized on the Apache-Sitgreaves National Forest is $2,611,446. Total Labor income supported is $586,248. The total number of jobs (full-time, part-time, intermittent, and temporary) supported is 45.

NOTE: The calculations above were completed in a Microsoft Excel Workbook referred to as FEAST. If they are recalculated based on the numbers displayed – slightly different answers may be obtained than were displayed in the Apache-Sitgreaves National Forest Economic and Social Sustainability report due to the effects of rounding.