

Arizona National Forest Socio-Economic Assessments Manager's Summary Report

Prepared for the Southwest Region
USDA Forest Service



The University of Arizona
School of Natural Resources

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Socioeconomic Assessment of the National Forests in Arizona

Manager's Summary Report

Prepared for:

USDA Forest Service Region 3
Southwestern Region
333 Broadway SE
Albuquerque, NM 87102

Submitted by:

Arizona National Forests Socioeconomic Assessment Team
The University of Arizona
School of Natural Resources
312 BioSciences East
P.O. Box 210043
Tucson, AZ 85721-0043

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The cover photo, also featured in "Stone Chisel and Yucca Brush: Colorado Plateau Rock Art" by Ekkehart Malotki and Donald E. Weaver, Jr., represents ancient Native American rock art from an area north of Sitgreaves N.F. The exact location is not specified in order to protect the art. Photo courtesy of Prof. Ekkehart Malotki of Flagstaff, AZ.

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1. Introduction

Statement of Purpose

The purpose of this *Manager's Summary Report* is to present a synopsis of key findings and recommendations based on a synthesis of data and information gathered through the socioeconomic assessment of each of Arizona's six national forests. Like the individual assessments, this report characterizes the social and economic environment surrounding the forests by showing the relationship and linkages between National Forest System lands and their neighboring communities. The information contained in the assessment is intended to help the Forest Service and the public to do the following:

- Better understand the relationship between public lands and communities,
- Aid in identifying specific elements of the current forest plans that may need to be changed, and
- Assemble information needed to evaluate trade-offs between options for future forest management.

National Forests in Arizona

There are six national forests in the state of Arizona. Each is within Region 3 (Southwestern Region) of the USDA Forest Service. They are the Apache-Sitgreaves National Forests, the Coconino National Forest, the Coronado National Forest, the Kaibab National Forest, the Prescott National Forest, and the Tonto National Forest.

Assessment Methodology & Topics

These assessments of the social and economic environment surrounding the Arizona's national forests are based entirely on the analysis of secondary research. Secondary demographic, economic, and social data have been drawn from readily available sources, including the U.S. Census Bureau, the USFS Natural Resource Information System (NRIS), and the Minnesota IMPLAN Group (MIG). Specific lines of inquiry were identified in the initial Project Work Plan agreed to by the University of Arizona and Region 3 of the USFS in Albuquerque, New Mexico. That document prescribes the methods of assessment of socioeconomic trends for each of Arizona's six national forests. In addition to individual information elements for each assessment topic, it identifies the desired geographic and temporal scales of analysis as well as potential sources of information.

Counties served as the primary unit of analysis for social and economic data. For each of the national forests in Arizona, the area of assessment consists of all counties adjacent to particular forest boundaries. For the six national forests this included seventeen counties, two of which are in southern Utah and two of which are in eastern New Mexico. Comparable socioeconomic data for the state of Sonora, Mexico, were also included in the assessment for the Coronado National Forest. Where applicable, social and economic trends for the area of assessment are compared to those for the states of Arizona, New Mexico and Utah. It should be noted, however, that statewide trends for Arizona are significantly influenced by Maricopa County, which was home to nearly 60% of the state's population as of 2000.

In addition to analyzing information at the county and regional levels, this assessment includes data on individual communities of interest to the national forests. The Work Plan defines communities of interest as those that are proximate to forest boundaries, those which share a stake in the management of the forest, and those communities of access and egress. During the collection of demographic and economic data, the decision was made to collect information on selected Census Designated Places (CDPs) as well as the more commonly used Minor Civil Divisions (MCDs). Inclusion of CDPs provides data for settled

population concentrations that are identifiable by name but are not legally incorporated under the laws of the state in which they are located.¹

Report organization

This report utilizes a condensed version of each of the individual assessments. Following this introductory section, a synthesis of collected socioeconomic data is provided for each of seven assessment topics. Sections 2 and 3 provide information on demographic trends and economic characteristics of counties and selected cities adjacent to forest boundaries. Section 4 discusses access and travel patterns, and Section 5 examines land use patterns and policies. Section 6 uses available secondary data to discuss trends for current forest users and uses. Section 7 discusses areas and known special places in Arizona's national forests and discusses their importance to forest management. Section 8 assesses relationships between the national forests and various communities at the local and regional levels. Section 9 offers a brief analysis of several key management topics that were identified by forest planners at the commencement of this assessment. The final section summarizes major trends within each topical area and discusses their combined relevance to Forest Plan revision. Works cited are included in footnotes throughout this summary and can be cross-referenced in a separate, fully annotated bibliography which will be presented to the Regional Office and individual forests alongside the assessments.

2. Demographic Patterns and Trends

Total population

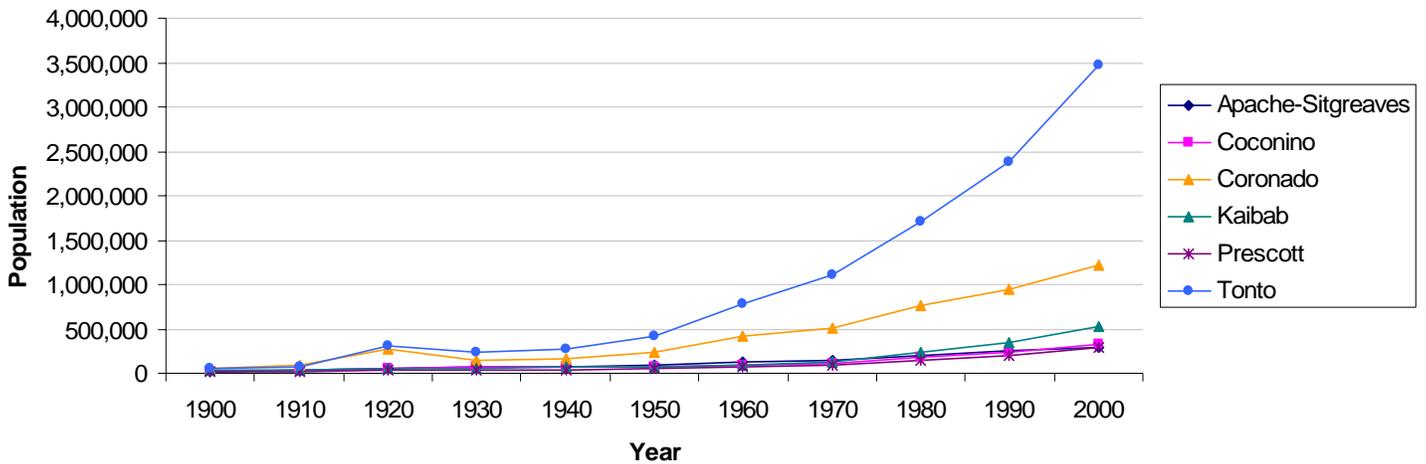
Table 1 shows that total population growth was greatest for the area surrounding the Tonto National Forest, which increased by 1,765,533 individuals over the twenty-year period. The vast majority of this growth was seen in Maricopa County, far and away the most populous county in the Southwestern Region of the Forest Service. Nonetheless, the *rate* of population growth was greater for the area surrounding the Kaibab National Forest, fueled by dramatic growth in both Washington and Yavapai Counties. Among individual counties, population growth between 1980 and 2000 ranged from a high of 246.65% in Washington County to a low of -25.07 % in Greenlee County. Fifteen of the seventeen counties assessed reported rates of population growth that were higher than that for the United States over the same period (24.22%). The lone exceptions were Greenlee County and Hidalgo County, both of which reported net population losses. Chandler, Oro Valley, Prescott Valley, St. George, and Camp Verde were among the fastest growing cities over the twenty-year period. Figure 1 shows the long-term population growth of the areas surrounding Arizona's National Forests.

¹ United States Census Bureau. 2005. United States Census, 2000. U.S. Dept. of Commerce. <http://www.census.gov/>

Table 1. Total Population by Forest Assessment Area, 1980-2000 and % Change

National Forest Assessment Area	Total Population		% Change
	1980	2000	
Apache-Sitgreaves	208,871	295,303	41.38%
Coconino	180,233	335,172	85.97%
Coronado	757,417	1,219,030	60.95%
Kaibab	229,107	535,269	133.63%
Prescott	143,153	283,837	98.28%
Tonto	1,705,195	3,470,728	103.54%

Source: NRIS - Human Dimensions

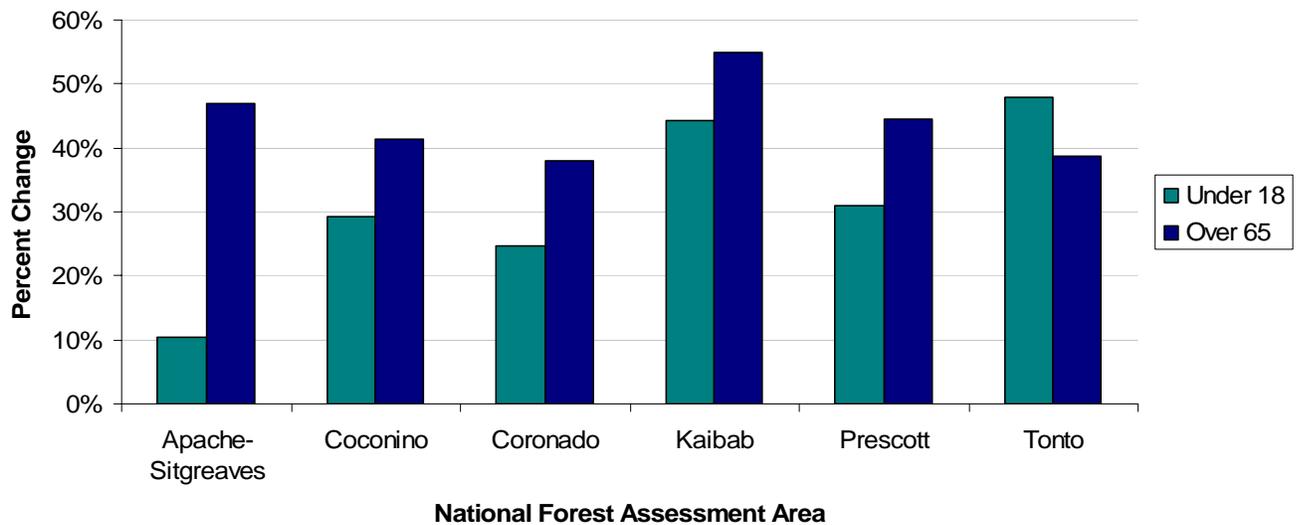


Source: U.S. Bureau of the Census, Census of Population

Figure 1. Population Growth by National Forest Assessment Area, 1900-2000

Population age

Five of the six areas of assessment reported increases in the population of individuals age 65 and over that were greater than those for individuals under 18. The lone exception was that of the Tonto National Forest, the most urban area of assessment for Arizona’s national forests. Between 1990 and 2000, the greatest increase in individuals age 65 and over was within the area surrounding the Kaibab National Forest (54.85%). This was due in part to the substantial growth in the retirement-age population of Washington, Mohave, and Yavapai Counties. The greatest disparities between the growth of the 65-and-over and under-18 populations were reported for the area surrounding the Apache-Sitgreaves National Forests. Significant increases in individuals age 65 and over were reported within the cities of Catalina, Oro Valley, Chandler, Prescott Valley, St. George, Apache Junction, Payson, and Lake Havasu City. Figure 2 shows the percent increase in individuals under age 18 and individuals age 65 and over between 1990 and 2000 for the assessment areas of each national forest in Arizona.



Source: NRIS - Human Dimensions

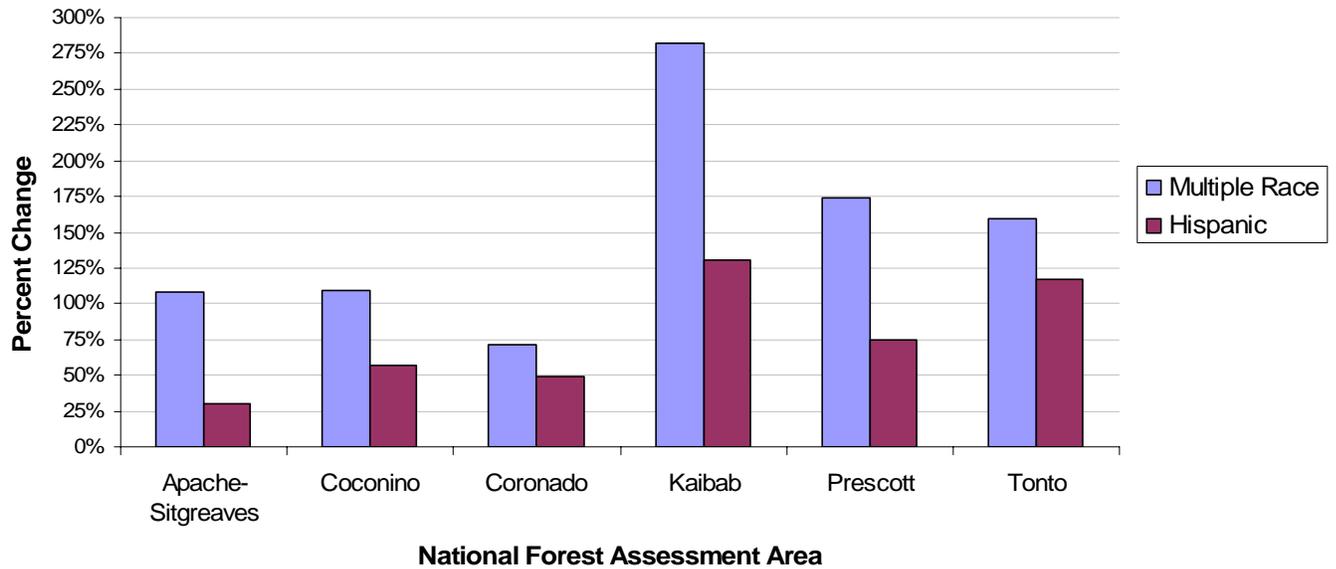
Figure 2. Percent Change in Under-18 and 65+ Populations by Forest Assessment Area, 1990-2000

Racial/ethnic composition

The decade between 1990 and 2000 saw a significant increase in individuals of multiple race and Hispanic origin in the areas surrounding each of the national forests, mirroring statewide trends for Arizona, New Mexico, and Utah. As a point of clarification, race and ethnicity are defined as separate concepts by the federal government. People of a specific race may be of any ethnic origin, and people of a specific ethnic origin may be of any race. Race in this section covers the following five groups: White, Black or African American, American Indian and Alaska Native, Asian and Pacific Islander, and Multiple Races. The population of Hispanic origin is defined for federal statistical purposes as another group and may be of any race². Despite substantial increases in individuals of multiple-race and Hispanic ethnicity, whites remain the predominant racial group in fifteen of the seventeen counties for which racial and ethnic data were collected. The exceptions were Apache and Navajo Counties, both of which reported Native Americans as the dominant racial group as of 2000. Figure 3 shows the percentage increase in individuals of multiple race and Hispanic origin for each of the Forest assessment areas.

² Hobbs, F., and N. Stoops. 2002. Demographic trends in the 20th Century. U.S. Census Bureau. Census 2000 Special Reports, 228p.

Leefers, L., K. Potter-Witter, and M. McDonough. 2003. Social and economic assessment of the Michigan National Forests. Department of Forestry, Michigan State University. 254p.

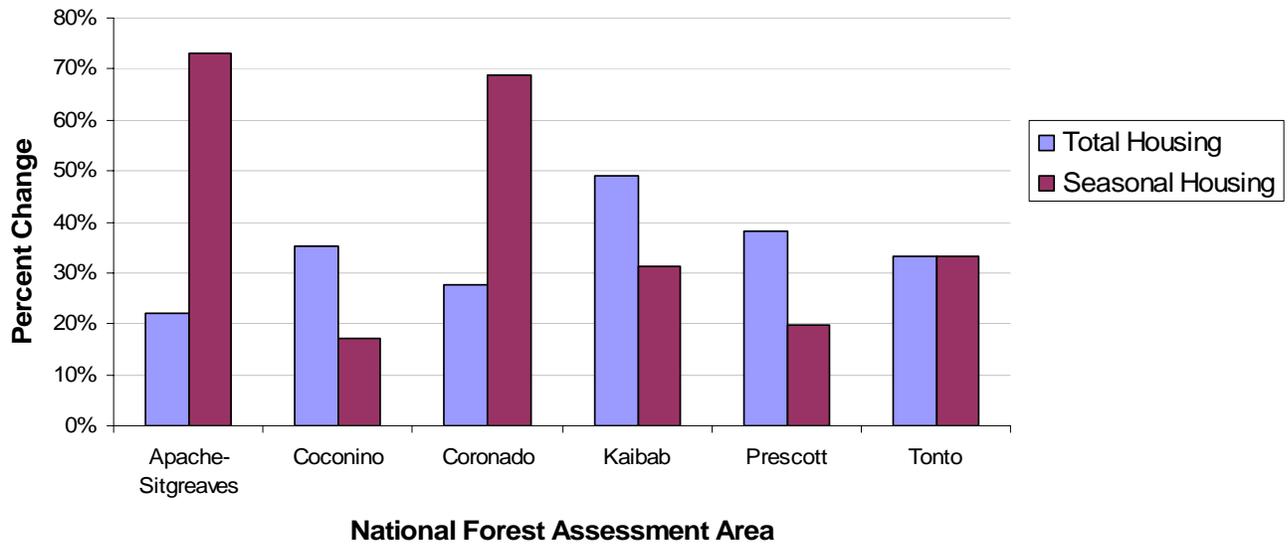


Source: NRIS - Human Dimensions

Figure 3. Percent Change in Individuals of Multiple Race and Hispanic Origin by Forest Assessment Area, 1990-2000

Housing

Mirroring increases in total population, the areas surrounding Arizona's national forests reported substantial increases in total and seasonal housing between 1990 and 2000. Increases in total housing ranged from 49.14% for the area surrounding the Kaibab National Forest to 22.0% within the area surrounding the Apache-Sitgreaves National Forests. Increases in seasonal housing between 1990 and 2000 were greatest for the areas surrounding the Apache-Sitgreaves and the Coronado National Forests (73.03% and 68.88% respectively). Among individual cities, total housing increases were greatest in Chandler, Prescott Valley, Oro Valley, Apache Junction, St. George, and Lake Havasu City. The largest increases in seasonal housing were reported for Pinetop-Lakeside, Catalina, Benson, Chino Valley, Casa Grande, Lake Havasu City, and Camp Verde.



Source: NRIS - Human Dimensions

Figure 4. Percent Change in Total and Seasonal Housing by Forest Assessment Area, 1990-2000

Table 2. Total and Seasonal Housing by Forest Assessment Area, 1990-2000 and % Change

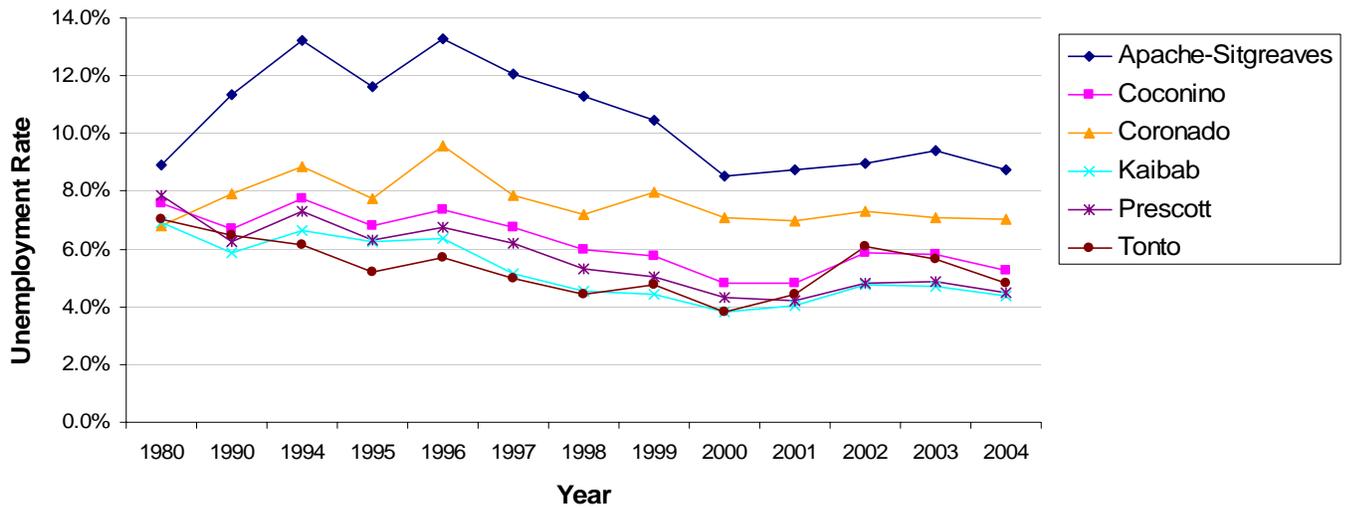
National Forest Assessment Area	Total Housing			Seasonal Housing		
	1990	2000	% Change	1990	2000	% Change
Apache-Sitgreaves	113,746	138,769	22.00%	17,022	29,454	73.03%
Coconino	120,680	163,362	35.37%	17,854	20,928	17.22%
Coronado	412,297	526,331	27.66%	14,816	25,022	68.88%
Kaibab	171,301	255,480	49.14%	23,438	30,779	31.32%
Prescott	97,719	135,173	38.33%	12,686	15,203	19.84%
Tonto	1,082,539	1,441,304	33.14%	54,890	73,121	33.21%

Source: NRIS - Human Dimensions

3. Economic Characteristics and Vitality

Employment

Economic growth between 1990 and 2000 varied among the areas surrounding each of Arizona’s National Forests. Four of the six areas of assessment reported increases in total full- and part-time employment that exceeded gains at the state level over the same period. The exceptions were the areas surrounding the Apache-Sitgreaves and Coronado National Forests, which reported employment increases of approximately 38% and 34% respectively. Each of the areas of assessment reported average rates of unemployment that met or exceeded those for the state of Arizona between 1980 and 2004. Average unemployment rates ranged from a high of 10.5% for the area surrounding the Apache-Sitgreaves National Forest to a low of 5.2% for the area surrounding the Kaibab National Forest. The relatively strong employment statistics for the area surrounding the Kaibab National Forest are due primarily to strong economic growth in Yavapai and Washington Counties. Figure 5 shows the average unemployment rate between 1980 and 2004 for each of the areas surrounding Arizona’s six national forests.



Sources: Arizona Department of Commerce, Arizona Workforce Informer
U.S. Bureau of Labor Statistics

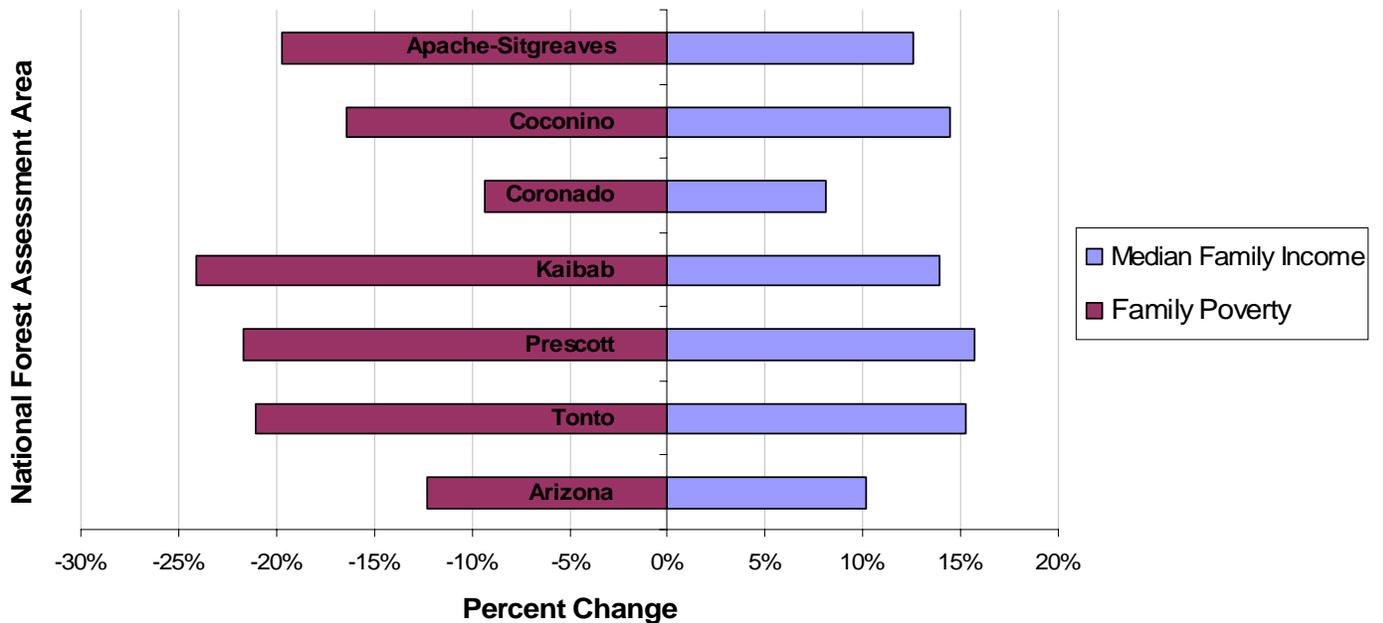
Figure 5. Average Unemployment Rate by Forest Assessment Area, 1980-2004

Occupational structure

As of 2000, eight of the seventeen counties surrounding Arizona’s national forests maintained occupational structures that closely resembled those of the states of Arizona, New Mexico, and Utah overall. For these areas, the management, professional, and related occupations grouping is the dominant occupational category followed by sales and office occupations; service occupations; construction, extraction, and maintenance occupations; and, finally, production, transportation and material moving occupations. Among the nine counties that reported slightly different occupational structures, sales and construction were more common.

Income

Despite significant increases, each of the areas of assessment maintained levels of median family income that were lower than average for Arizona. This state average is significantly influenced by Maricopa County, which reported the highest median family income of the seventeen counties included in the assessment. The largest increase in median family income between 1990 and 2000 was reported for the area surrounding the Prescott National Forest (15.75%), and the smallest increase was for the area surrounding the Coronado National Forest (8.12%)³. Similarly, despite substantial cuts over the ten-year period, five assessment areas reported rates of family poverty that were greater than average for the state of Arizona as of 2000. The area surrounding the Kaibab National Forest experienced the greatest decline in family poverty and subsequently reported the lowest rate of family poverty as of 2000 (8.8%). The highest rate of poverty was for the area surrounding the Apache-Sitgreaves National Forests (19.1%). Average rates of family poverty were also high among the counties in the Coronado National Forest assessment area as of 2000 (16.5%). Among individual counties, median family income was greatest in Maricopa County at \$51,826 and poverty was highest in Apache County at 33.5 % as of 2000.



Source: NRIS - Human Dimensions

Figure 6. Percent Change in Median Family Income and Family Poverty by Forest Assessment Area, 1990-2000

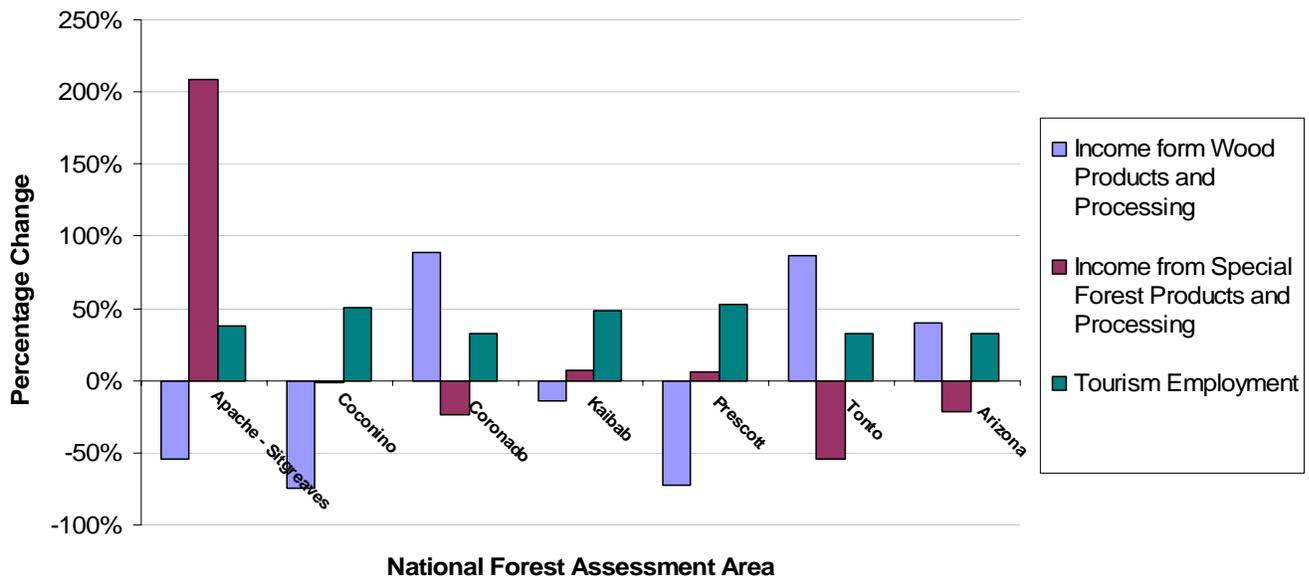
Natural-resource dependent economic activity

Trends in income from natural resources varied significantly among the counties of assessment between 1990 and 2000 (Table 3). The counties surrounding the Coronado and Tonto National Forests reported strong gains in income from wood products and processing between 1990 and 2000. Alternatively, the counties surrounding the Apache-Sitgreaves, Coconino, Kaibab, and Prescott National Forests all reported losses in the same category. The opposite trend was true for income from special forest products and

³ Real rates of change, adjusted by the CPI, reflect 1990 constant dollars by applying Consumer Price Index adjustment.

processing. The Coronado and Tonto assessment counties reported substantial losses in this sector, while the counties surrounding the Kaibab and the Prescott National Forests reported minimal gains in income from these industries over the same period. The counties surrounding the Apache-Sitgreaves National Forests experienced a dramatic increase in income from special forest products and processing between 1990 and 2000 due primarily to substantial gains in this category reported for Navajo and Coconino Counties.

Information on tourism employment for each of the counties within the area of assessment, as well as for the state of Arizona, is also provided in Table 3. Calculating the direct impact of tourism is particularly difficult because a small percentage of business activity in any given industry can be considered the result of tourism. For the purposes of this assessment, tourism employment was assessed based on percentages derived from the Travel Industry Association of America’s Tourism Economic Impact Model (TEIM). Five of the six assessment areas reported increases in tourism-related employment that exceeded gains at the state level between 1990 and 2000. The strongest gains were for the area surrounding the Prescott and the Coconino National Forests (52.84% and 50.51% respectively) and the smallest were for the area surrounding the Tonto National Forest (32.38%).



Source: 1990 and 2000 IMPLAN data

Figure 7. Percent Change in Income from Forest Resources and Tourism Employment by Forest Assessment Area, 1990-2000

Table 3. Labor Income from Forest Resources and Tourism Employment by Forest Assessment Area, 1990-2000 and % Change

National Forest Assessment Area	Income from Wood Products and Processing			Income from Special Forest Products and processing			Tourism Employment		
	1990	2000	% Change	1990	2000	% Change	1990	2000	% Change
Apache - Sitgreaves	\$88,806,077	\$40,404,111	-54.50%	\$2,621,320	\$8,082,452	208.34%	7,292	10,092	38.40%
Coconino	\$38,562,033	\$9,969,637	-74.15%	\$2,674,562	\$2,640,983	-1.26%	8,335	12,545	50.51%
Coronado	\$15,801,746	\$29,792,048	88.54%	\$27,039,350	\$20,692,924	-23.47%	20,893	27,793	33.02%
Kaibab	\$41,980,594	\$36,130,043	-13.94%	\$3,641,704	\$3,906,854	7.28%	12,309	18,338	48.98%
Prescott	\$34,603,166	\$9,434,863	-72.73%	\$2,308,082	\$2,438,203	5.64%	7,614	11,637	52.84%
Tonto	\$151,315,906	\$282,653,302	86.80%	\$80,666,280	\$36,860,520	-54.30%	65,410	86,588	32.38%
Arizona	\$263,558,989	\$369,474,539	40.19%	\$175,994,087	\$137,825,248	-21.69%	97,338	129,081	32.61%

Source: NRIS - Human Dimensions

*2000 Income data adjusted to reflect 1990 constant dollars by applying deflation factor calculated by Consumer Price Index

4. Access and Travel Patterns

Existing federal and state highway conditions

County and state transportation plans emphasize the need for improved planning through regional approaches linking transportation and land use. According to the Arizona Department of Transportation, projected demographic changes throughout the state will require “major expansions of roadway capacity and the development of transportation options and alternatives to provide acceptable levels of service on Arizona’s roadways and maintain circulation.”⁴

Modes of travel and seasonal flows

Travel by motorized vehicle is by far the dominant mode of travel throughout the states of Arizona, New Mexico, and Utah, a trend that is likely to continue given patterns of development in rural areas as well as the expense of developing infrastructure for alternative modes of transportation. Traffic increases were greatest for the area surrounding the Prescott and Coconino National Forests, both of which reported gains of over 60% in vehicle miles traveled (VMT) between 1990 and 2000. Nonetheless, the area surrounding the Tonto National Forest reported far and away the most vehicular traffic of any of Arizona’s six national forests. The smallest increase in VMT was reported for the area surrounding the Coronado National Forest, which saw traffic grow by 29.3% over the same period. Peak traffic flow for each of the area of assessment is determined by climate variations and is therefore largely consistent on either side of the Mogollon Rim. With respect to internal modes of travel, the greatest increases were reported for off-highway vehicles (OHVs).

⁴ Arizona Department of Transportation (ADOT). 2004. MoveAZ Long Range Transportation Plan., Synthesis of Issues Papers. <http://www.moveaz.org/Documents/issuepapersynth.pdf>

Planned improvements

The Arizona Department of Transportation currently has plans for a number of road improvements in the areas surrounding Arizona's national forests. The current ADOT Five-Year Transportation Facilities Construction Program identifies fifty-eight road construction projects near existing forest boundaries. The majority of the projects involve resurfacing, road widening, and design of retaining walls or traffic interchanges. Similarly, county governments throughout the state envision improvements to arterial road networks to accommodate expected population growth. There are currently no plans to expand the existing network of internal roads in the Arizona national forests.

Barriers to access

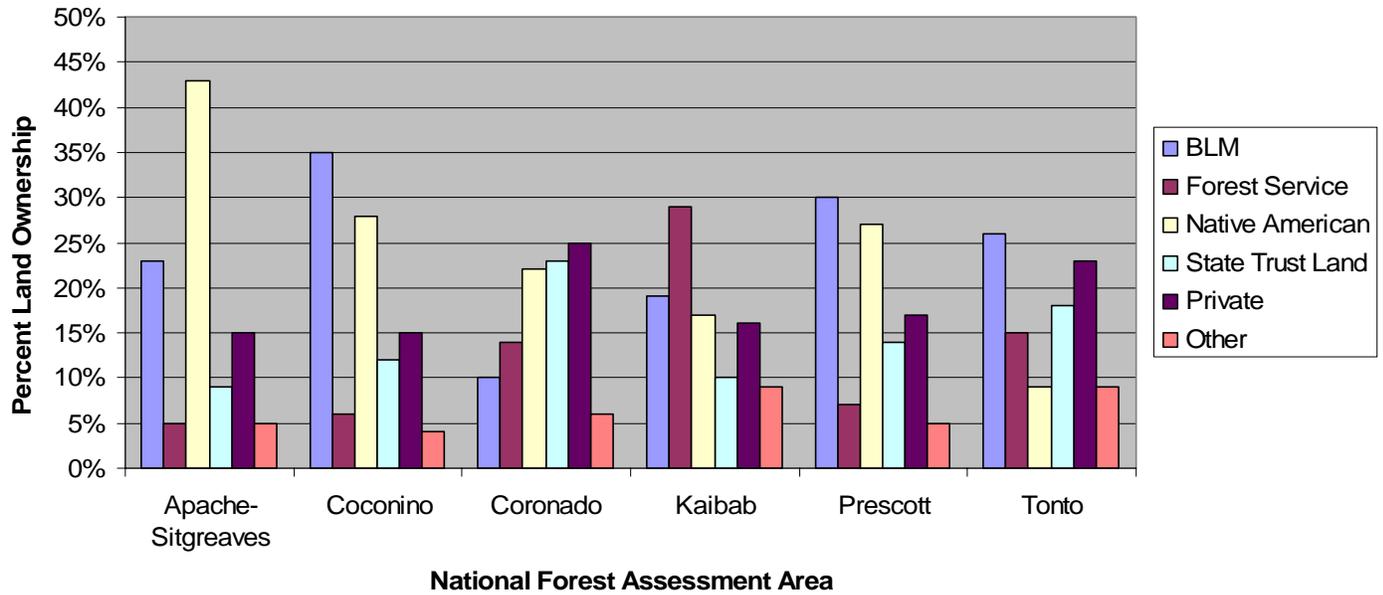
In both internal and external road networks, inadequate road maintenance resulting from constrained transportation budgets is a common barrier to access. Internally, the proximity of private parcels and the increased use of OHVs have also become primary issues affecting access to Arizona's national forests. Forest planners have cited instances of private landowners adjacent to forest boundaries seeking to control access to National Forest lands. Regarding internal modes of travel, the Apache-Sitgreaves, Coconino, Kaibab, Prescott, and Tonto National Forests have joined in drafting the Five-Forest Amendment for OHV Travel. Travel restrictions within the proposed amendment are aimed at limiting erosion and damage to roads, trails, wildlife habitat, and riparian areas as a result of OHV use.⁵ Under revision at the time of this assessment, the Five-Forest DEIS raises several important issues such as the ability to effectively and efficiently enforce proposed travel restrictions as well as the ability of diverse user groups to access recreational sites and resources such as fuelwood and big game. Within the Coronado National Forest, internal access is also significantly affected by security concerns and environmental damage caused by undocumented migrants near the U.S.-Mexico border.

5. Land Use

Land ownership

Patterns of land ownership vary among each of the areas surrounding Arizona's six national forests. For instance, the areas surrounding the Kaibab, Coconino, and Tonto National Forests report relatively large percentages of federally owned land (e.g., Forest Service, Bureau of Land Management, National Park Service, etc.). Alternatively, the areas surrounding the Apache-Sitgreaves, Coconino, and Prescott National Forests contain substantial amounts of Native American Land. Finally, the areas surrounding the Coronado and Tonto National Forests report relatively high percentages of State Trust and private land, both of which exercise a great deal of influence on local and regional development patterns.

⁵ United States Forest Service (USFS). 2003c. Draft environmental impact statement for cross country travel by off-highway vehicles: Apache-Sitgreaves, Coconino, Kaibab, Prescott, and Tonto National Forests, Arizona. U.S. Dept. of Agriculture, Southwestern Region. 201p. <http://www.fs.fed.us/r3/ohv/deis/xcountry-deis.pdf>



Sources: Arizona State Land Department, Hidalgo County Tax Assessors Office, Catron County/ Assessor's Office, Utah Trust Lands Administration

Figure 8. Percent Land Ownership by National Forest Area of Assessment

Land coverage and land use

Evergreen forest constitutes the predominant land cover for the areas surrounding the Apache-Sitgreaves, Coconino, and Prescott National Forests. For the areas surrounding the Coronado, Kaibab, and Tonto National Forests, shrub and brush rangeland was most common. Mixed rangeland is also common throughout each of the assessment areas. The counties surrounding the Tonto National Forest reported by far the most residential land cover (3.38%), due primarily to Maricopa County, which reported 15.58% of its total land area dedicated to residential land cover. Notably, the counties surrounding the Tonto National Forest also reported the most significant amount of crop and pastureland (13.98%).

Long-range land use plans and local policy environment

Throughout much of Arizona and the Southwest, land use patterns have been heavily influenced by traditional uses such as ranching, farming, timber harvesting, and mining. Many of the counties assessed maintain strong cultural and economic ties with these and other rural land uses. Meanwhile, other areas are becoming increasingly urban as concentrations of residential, industrial, and commercial uses accompany rapid population growth. Given both the public's desire to maintain the "rural character" of county lands and the need to accommodate rapidly growing populations and municipalities, the preservation of open space is a particularly important land use issue throughout the state. Additionally, the provision of adequate, affordable infrastructure, and sufficient water supplies is also a growing concern for planners, residents, and land managers throughout the region.

6. Forest Users and Uses

Extractive uses

Historically, extractive uses have played a major role in public land management throughout the region. National studies show, however, that land uses such as livestock grazing, timber cutting, and mining are being slowly succeeded in policy and management by an emphasis on non-extractive uses. These national trends are supported by data that suggest similar declines since 1990 in livestock grazing, timber harvesting, and mining on national forest land throughout Arizona.

Non-extractive uses

Although recreational use has increased steadily since the establishment of the National Forest System, the increase in recreation over the past few decades has been particularly dramatic. According to National Visitor Use Monitoring data, forest visits ranged from a high of 5.7 million for the Tonto National Forest in 2002 to a low of 560,000 visitors to the Kaibab National Forest in 2000. For each of the forests, the majority of visitors were male, white, and between the ages of 31 and 70. A significant increase in the use of OHVs has been identified by the Forest Service as a major component of unmanaged recreational use.

Special uses

A number of special user groups were identified for each of the national forests. They include Native American tribes, OHV users, wildlife users, and wilderness users. The management and accommodation of these and other special user groups has involved increasing administrative and political implications in recent years.

7. Designated Areas and Special Places

Natural, recreational and interpretive resources

The national forests in Arizona encompass considerable natural, recreational, cultural, and interpretive resources. Collectively, the six forests identified approximately 1,500 designated sites, including campgrounds, picnic areas, scenic areas, administrative and research areas, boating sites, trailheads, and wilderness areas. Additionally, the mountain ranges, canyons, and water sources throughout the state are home to numerous special places for Native Americans, descendants of settlers, recreational users, and wildlife enthusiasts in Arizona.

Issues surrounding identification of cultural resources

Due to the cultural, emotional, and spiritual bonds formed between individuals and specific environments, the identification and management of special places can be rather contentious. Making these tasks more difficult is the fact that the relationships people form with special places often cut across traditional boundaries dividing liberal and conservative political ideologies, extractive and environmentalist interests, and urban and rural user groups. Ultimately, incorporation of “special places” into revised forest plans is best supported by a commitment to primary research and participatory decision-making.

8. Community Relationships

Community involvement with natural resources

The communities surrounding Arizona's national forests have long been dependent upon natural resources for commodity production, tourism, and aesthetic enjoyment. A review of state and local newspapers reveals a general interest in the use and management of forest resources with particular attention paid to recreational uses, the effects of fire, and management of regional water supplies.

Communities of interest and historically underserved communities

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

Community/forest interaction

In recent years the Forest Service has placed a 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 forest 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. Figures 9 and 10 display the interconnectedness and complexity of the forests, their regional partners, and their resources. Such diagrams clearly cannot address the immense subtleties of these networks, but do provide some initial insight into the complicated nature of any large interconnected system.

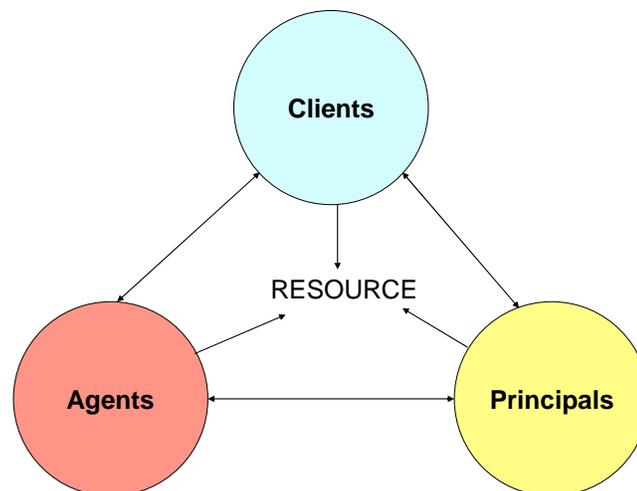


Figure 9. Social Networks in Natural Resource Management

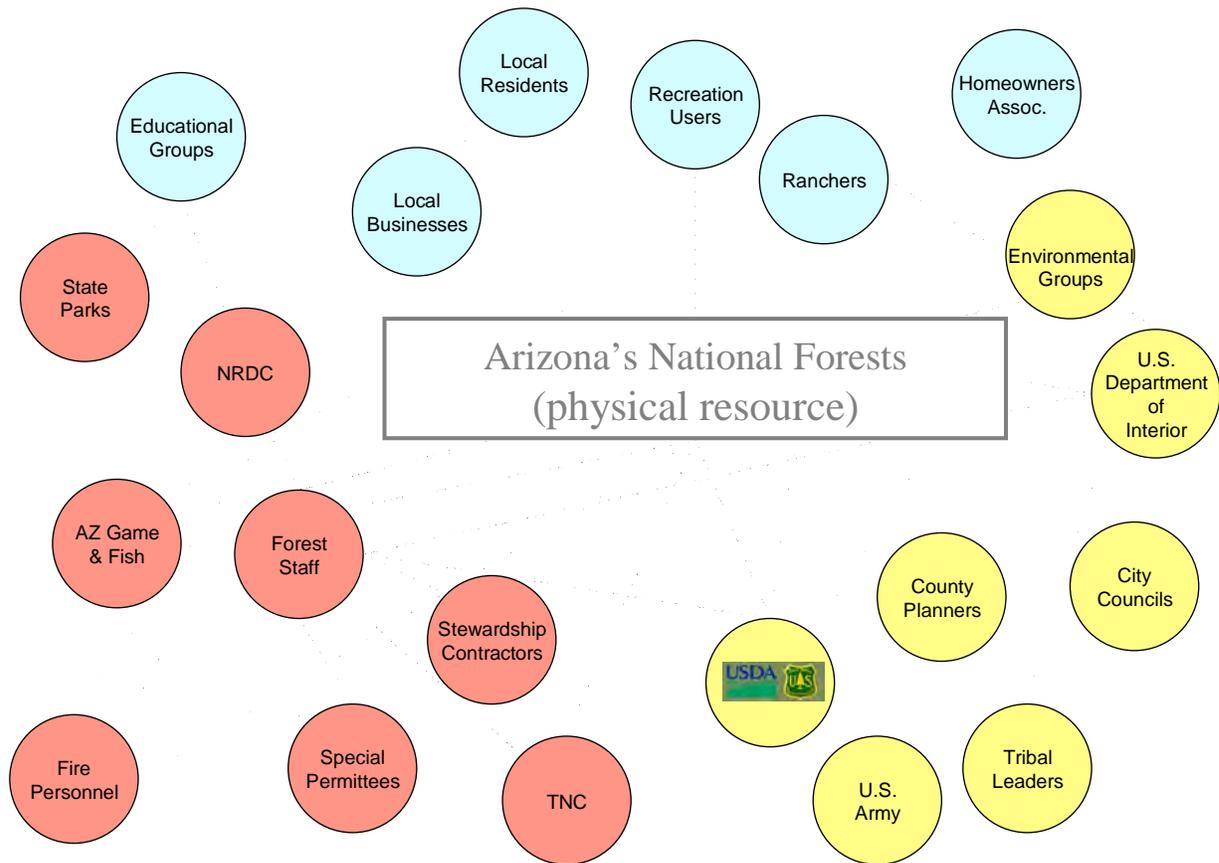


Figure 10. Partial Social Network for the Arizona's National Forests

9. Key Resource Management Topics

In addition to the initial seven topics of socioeconomic assessment, forest planners identified several issues of growing importance to the management of natural resources within Arizona's national forests. Although these issues are identified and addressed throughout the assessments, an additional section in each of the drafts provides greater detail on the status of policy debates as well as potential implications for forest planning and management.

Findings suggest that susceptibility to catastrophic wildfire and invasive species, the environmental and economic sustainability of livestock grazing on public lands, and the effects of human land use on existing open space will likely continue to have a strong impact on future management activities of each of the national forests in Arizona.

Similarly, changing demographic patterns and forest user trends will surely affect the alternatives considered in the process of Forest Plan revision. In particular, a significant increase in recreational forest uses and the ongoing concern surrounding the economic and environmental sustainability of livestock grazing and timber harvesting will continue to be important issues for the forests.

Given rates of population growth and urban expansion in Arizona, New Mexico, and Utah, each of the forests will be affected by ongoing debates regarding the management of public land and regional water supplies. Reforms proposed by lawmakers and the Arizona State Land Department are likely to have an impact on the forest given the amount of State Trust Land within the areas of assessment. Likewise, the role of managing regional watersheds places Arizona's national forests at the center of contentious debates over water provision, particularly in light of the ongoing regional drought.

Finally, specific issues under the heading of forest access and travel will undoubtedly affect the future management activities of the national forests. Recent reinterpretation of the "Roadless Rule" has been particularly controversial, involving extractive business interests, environmental advocacy groups, and the general public at the local and state level. Additionally, the effort on the part of the Forest Service to respond to a dramatic increase in OHV travel promises to raise concerns from various user groups and to affect natural resource management of the forests over the coming years.

10. Summary of Key Findings and Recommendations

Communities throughout the region have undergone substantial social and economic changes over the last twenty years. The purpose of these socio-economic assessments has been to illustrate some of the more dramatic trends in key indicators and discuss their likely implications for future forest planning and management.

Among the most noteworthy trends is a significant increase in population over the past two decades. Data show that overall population within the state of Arizona increased by nearly 90% between 1980 and 2000. This exceeded the rate of total population growth within the United States over the same period by more than 60%. Within this overall increase, growth in the retirement-age population and an upsurge in individuals of multiple race and Hispanic origin were particularly strong. Along with increases in population, the area witnessed a substantial growth in housing, especially homes intended for seasonal use. Together, these trends warrant careful consideration by forest planners. Ultimately, a larger and more diverse population suggests not only an increased number of potential forest users but also a change in the nature of interaction between the national forests and surrounding communities.

The economy of Arizona is also likely to have a substantial impact on future planning and management of the state's national forests. Data suggest that economic growth in the region has been relatively strong over the past several years. This is evidenced in part by increases in total full- and part-time employment as well as per capita and household income. Meanwhile, certain areas throughout the state maintain significant rates of household and individual poverty. Recent indicators of dependence on natural resources have also shown mixed results. Although the areas surrounding the Coronado and Tonto National Forests reported strong gains in income from wood products and processing, all others experienced substantial losses in the same category. These losses were at least partially offset by gains in income from special forest products and tourism employment between 1990 and 2000. Although activities such as mining and ranching continue to play an important role in rural areas, recent years have seen a continued shift away from extractive industries and toward a regional economy that is increasingly dependent on the construction, real estate, and service sectors supporting growing urban populations. When combined with ongoing demographic changes, such factors are likely to have a direct impact on the forest's role within local and state economies.

A review of county comprehensive plans and long-range policies has demonstrated the importance of both travel patterns and land use characteristics surrounding the national forests. Though road conditions have generally improved over the last several decades, research shows that expansion of regional road networks has not kept pace with travel demands arising as a result of population and industry growth. Furthermore, previous transportation planning has not always been implemented in a way that supports

long-range land use plans. Such plans reveal that the preservation of open space, the sustainable use of natural resources, and the use of public lands are of growing importance to regional planning authorities, government agencies, environmental advocates, and community residents. Increasing land values, the cost of infrastructure development, and limited water supplies are among the numerous factors that have made policy formation increasingly contentious in recent decades. National forests throughout the state have an opportunity to play an important role in the resolution of current and future transportation and land use issues by promoting sustainable regional planning policies, informing local stakeholders of the environmental and economic impacts of transportation and land use alternatives, and effectively involving surrounding communities in forest planning and management.

Concurrent with trends in the regional economy, there has been a measurable shift away from extractive uses of the national forests. This trend is supported by national surveys and forest-specific data that show continued declines in timber harvesting, livestock grazing, and mining on national forest lands. These same reports point toward a substantial increase in recreational uses of the national forests in general and Arizona's national forests in particular. Data suggest that a significant increase in the use of OHVs is a primary reason for the Forest Service's growing concern over unmanaged recreation. These trends are consistent with the recent expansion of communities with high levels of natural resource amenities and signal a shift in the perceived role of forestlands. Each of the forests has the opportunity to incorporate these data on changing forest users and uses into future forest plan revisions and management priorities.

Arizona's national forests have designated nearly 1,500 natural, cultural, and recreation sites within forest boundaries. Forest archeologists and recreation staff have also made considerable progress in identifying a number of areas throughout the state that are considered special by Native American tribes, descendants of early settlers, and wilderness enthusiasts. In the future, the national forests should continue to seek input from these and other groups in identifying special places and planning for their protection. At the forest and regional levels, a more comprehensive identification and analysis of "special places" will require a long-term commitment to primary social and cultural research.

Regional trends and Forest Service planning regulations have influenced the relationships between the forests and surrounding communities. In particular, the protection of wildlife, the prevention of forest fire, and the sustainable management of area watersheds have involved a diverse array of stakeholders. In recent years, growing attention has been paid to these issues given the general public's expectation for adequate participation in decisions affecting public land management. Although such relationships are inherently unique and dynamic, specific frameworks for monitoring and improving community-forest interaction may aid future forest management objectives.

Regional, state, and local data suggest that a number of natural resource issues will continue to influence future management alternatives of the national forests in Arizona. The control of invasive species, management of fire and fuels, preservation of open space, and protection of regional biodiversity each carries important implications for future forest plans. Although an exhaustive analysis of these issues is beyond the scope of this assessment, research shows that each will be impacted by ongoing socioeconomic trends.

In addition to identification of the aforementioned trends and their possible implications for forest planning, the assessment process has led to the development of certain recommendations for similar research efforts in the future. Forest planners and social scientists may benefit from periodically using the methods of this assessment to monitor future change in selected indicators. Much of the demographic and economic data obtained for this assessment is updated at multiple geographic scales on a regular basis. Using this assessment as a baseline, forest planners can monitor demographic and economic change and anticipate future management alternatives.

This assessment has made use of the most recent spatial data available. Geographic Information System (GIS) data from multiple sources has been collected for analysis of regional, local, and forest-level land use and transportation patterns. All compiled data and metadata will be distributed for use by GIS

personnel in individual forest and Region 3 offices. In the future, as technology and availability permit, forest managers stand to benefit from periodic analysis of consistent land use data at the county, municipal, and forest level.

Where appropriate, this assessment has incorporated information obtained directly through Forest Service data sources such as the National Visitor Use Monitoring (NVUM) reports, NRIS Human Dimensions, IMPLAN, INFRA, and others. Future assessment efforts could benefit from the coordination of internal and external social research efforts such as these in the aim of informing interested communities and forest planners of the potential effects of changing forest users and uses.

Finally, this assessment can provide a basis for community consultation and effective public involvement in the process of forest planning. By sharing available socioeconomic information with communities of interest, and by incorporating community perspectives and specific, local information, the Forest Service can establish a dialogue that will strengthen community relationships and improve future forest management.