

United States
Department of
Agriculture



Forest
Service

Southwestern
Region

April 2009



Coronado National Forest

Comprehensive

Evaluation Report

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Chapter 1: Introduction

The National Forest Management Act (NFMA) of 1976 requires each unit within the National Forest System to develop a Land and Resource Management Plan, typically referred to as a Forest Plan. Regulations finalized in 1982 directed Forests to conduct prescriptive, comprehensive planning processes to guide Forests for a 15-20 year period. The Coronado National Forest's (NF) existing Forest Plan was completed under these regulations and approved in 1986. In March of 2008, a new planning regulation was approved (36 CFR 219). This new regulation reflects the 28 years of comprehensive planning experience gained by the Forest Service since 1982. Currently, the Coronado NF is undergoing a revision of its Forest Plan, following the requirements of the 2008 regulation.

Purpose of the Comprehensive Evaluation Report

This Comprehensive Evaluation Report documents the results of the first major phase of the Forest Plan revision process. This phase includes three main areas of inquiry: an analysis of the ecological components and processes represented on the Coronado NF, an analysis of the social and economic environment that exists in and around the Coronado NF, and a public involvement process to determine public desires and areas of public concern related to the management of the Coronado NF. The primary purpose of the evaluation is to determine if there is a need to change existing Forest Plan components. The evaluation describes the area of analysis and contains available information on the Forest's social, economic, and ecological conditions and trends. An examination of conditions and trends illuminates existing and projected circumstances that may be at odds with the sustainability of all or parts of those systems. In some cases, conditions are responsive to, or a result of, management of National Forest lands. These conditions are further considered in the context of existing Forest Plan management direction.

Analyses of social and ecological environments are complicated endeavors. The information presented in this report is the distillation of a series of more detailed analyses. In 2005, the University of Arizona was contracted to develop a report of the social and economic conditions surrounding the Coronado NF (University of Arizona 2005). This information was then updated and refined in the Social and Economic Sustainability Report (USFS 2009a), which is summarized in Chapter 2. The basic information for the analysis of the ecological environment was developed through a cost-share agreement between the Forest Service and The Nature Conservancy (Schussman and Smith 2006, Vander Lee et al. 2006). Information from this report forms the basis for the Ecological Sustainability Report (USFS 2009b), which is summarized in Chapter 3. Finally, detailed descriptions of the public involvement process are found in a number of documents (Russell and Adams-Russell 2005, Russell 2006, Russell 2007). Information derived from the public is reflected throughout this document.

In summary, the purpose of this report is (1) to briefly describe the social, economic and ecological conditions and trends in and around the Coronado NF, and (2) to identify where the current Forest Plan needs to change because it does not provide adequate guidance for present and future management that would lead to the sustainability of the social, economic and ecological systems that are dependent on lands within the Coronado NF.

Area of Analysis

The Coronado NF is located in southeastern Arizona and southwestern New Mexico (see Figure 1). There are twelve distinct mountain ranges, or “sky islands”, within the Coronado NF that offer a wide array of vegetation types and climates. Each range is home to plant and animal communities described as among the most biologically diverse found on Earth (Mittermeier et al. 2004).

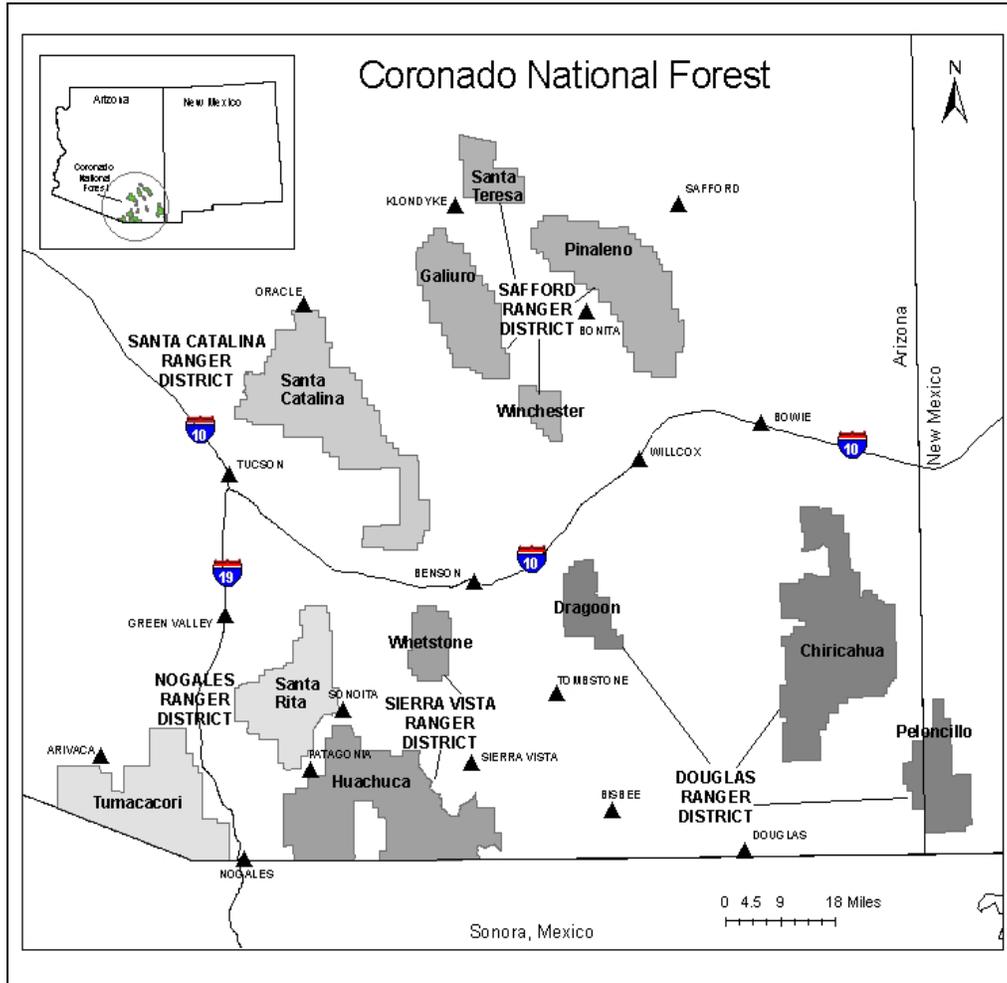


Figure 1. Coronado National Forest Proximity Map

The Coronado NF is an administrative unit of the National Forest System and manages approximately 1.7 million acres, which include general National Forest lands, the Sabino Canyon Recreation Area, eight Wilderness Areas, three Wilderness Study Areas, six Research Natural Areas, and other special management areas. The Forest is organized into five ranger districts and a Forest Supervisor’s Office. Each ranger district administers several sky island mountain ranges, while the Supervisor’s Office in Tucson, Arizona provides oversight for all functions on the Coronado NF.

While management direction is limited to Forest administrative boundaries, broader scales are also considered when planning for social, economic and ecological sustainability. Influential counties include those that contain the Coronado NF (Pinal, Pima, Santa Cruz, Cochise, and

Graham Counties in the State of Arizona, and Hidalgo County in the State of New Mexico), as well as outlying counties such as Maricopa County to the north. There are 12 federally recognized tribes with a potential interest in the natural, historical, cultural, and other resources of the Coronado NF. These tribes include Ak-Chin Indian Community, Fort McDowell Mohave-Apache Indian Community, Fort Sill Chiricahua-Warm Springs Apache Tribe, Gila River Indian Community, Hopi Tribe, Mescalero Apache Tribe, Pascua Yaqui Tribe, Salt River Pima-Maricopa Indian Community, San Carlos Apache Tribe, Tohono O'odham Nation, White Mountain Apache Tribe, Yavapai-Apache Nation, and the Pueblo of Zuni. The southernmost portion of the Coronado NF shares a contiguous international border with the Republic of Mexico. The broader scale of interest described above was considered in the development of this evaluation.

Historical Context and Ecological Attributes

The present day Coronado NF had its origins in 1902, when the Santa Rita, Santa Catalina, Mount Graham and Chiricahua Forest Reserves were established to protect timber and watershed resources. Over the years, Forest units were combined, expanded, and reduced to result in the current configuration, which was established in 1953. Today, the scattered holdings of the Coronado NF cover around 2,700 square miles of land ranging in elevation from 3,000 to over 10,000 feet (atop Mount Graham) in southeastern Arizona and southwestern New Mexico. The area is rich in vegetation zones, including oak woodlands, desert grasslands, mixed conifer forests, and saguaro-covered desert. These zones harbor a diversity of wildlife, including numerous bird species, reptiles, mammals, and large predators such as mountain lions, bears, and even the occasional jaguar. Long stretches of grassland have supported historical grazing, and the variety of elevations allows for year-round recreational use.

Public Participation in Forest Plan Revision

Participatory public collaboration is an essential component of Forest Plan revision and enhances the effectiveness of a Forest Plan in meeting its stated objectives. A region-wide (Arizona and New Mexico) effort began in 2005 to collect information about values, attitudes, and beliefs toward National Forest System lands. Focus group sessions were conducted across the Coronado NF and resulted in a report addressing public beliefs and values as well as community-agency priorities and relationships (Russell and Adams-Russell 2005). In addition to providing the basis for a comprehensive public survey, this process served to identify potential needs for change in the Forest Plan and reaffirmed existing agency goals.

In the fall of 2005, Coronado NF planning staff developed an adaptive collaboration strategy through consultation with local stakeholders, Forest Service personnel, collaboration specialists, and a review of existing scientific literature. The collaboration strategy emphasizes using the dispersed geography and diversity of communities and interest groups to gather place-based input about topics for revision, desired conditions, and other Forest Plan revision elements.

Additionally, the strategy includes a social systems approach to structure engagements with interested parties to ensure productive interaction between the collaborating parties. The elements of this social approach include the following:

1. Apply known principles for collaboration (Mattessich et al. 2001; Weldon et al. 2004; Wondolleck and Yaffee 2000) to establish a science-based approach to achieve practical outcomes.
2. Identify and assess appropriate forums or settings for collaboration activities.
3. Identify the roles, responsibilities, structure, process, and conditions for interaction between publics and the Forest Service for collaborative work. Activities are structured to build a

foundation for interactions between diverse parties with different views to achieve useful outcomes that contribute to Forest Plan revision.

4. Foster building capacity for the Forest Service and interested publics to produce results from collaboration that contribute to Forest Plan revision (Burns and Cheng 2005). In practice, this entails making information available to collaboration participants and providing consultation about the collaborative process.

Using this approach, Coronado NF planning staff structured facilitated forums using small groups to discuss topics for Forest Plan revision and desired conditions. These forums were held in district-based locations plus a “Forest-wide” meeting to offer the opportunity for input about issues and concerns that apply across all districts.

The first set of meetings was held in June of 2006. Coronado NF planning staff identified meeting goals as building relationships and gathering information regarding the public’s desires and concerns. Data generated by the 39 work groups were categorized into overarching topics, specific threads, and interrelating themes (Russell 2006). The second set of meetings, held in September 2006, utilized the information collected in June to prioritize public concerns (i.e., topics, threads and themes). In a third set of meetings held in October and November of 2007, vision statements, also known as desired condition statements, were developed for the topics of highest public concern (Russell 2007). Information from the public meetings was incorporated into Coronado NF planning priorities to develop the primary needs for change for the Forest Plan. Public collaboration will continue as the Coronado NF proceeds with development of desired conditions and other proposed Forest Plan components.

Focus on Sustainability

Contributing to sustaining ecosystems, and therefore the communities they support, is the keystone for managing National Forest System lands. The lands within the Coronado NF provide a significant contribution to sustaining the lifestyles and traditions of the surrounding communities. Forest Plans contribute to sustainability by providing a framework to guide on-the-ground management of projects and activities. The revised Forest Plan will provide strategic guidance that clearly contributes to sustaining the social, economic, and ecologic systems in the planning area; it will be organized in a way that clearly identifies how management will contribute to sustainability.

In the following chapters, this Comprehensive Evaluation Report summarizes the social, economic, and ecological conditions and trends in and around the Coronado NF, as described in the Social and Economic Sustainability Report (USFS 2009a) and the Ecological Sustainability Report (USFS 2009b). It then identifies areas where the current Forest Plan needs to change because it does not provide adequate guidance for sustaining the ecological, social and economic environments of the Coronado NF.

Chapter 2: Social and Economic Conditions, Trends and Management Challenges

This section is a summary of the Coronado NF Social and Economic Sustainability Report (USFS 2009a). It presents an assessment of the social and economic conditions within and around the Coronado NF as a basis for understanding needs for changes in the current Forest Plan.

The boundaries of the Coronado NF abut the State of Sonora, Mexico, and extend into five Arizona counties and one New Mexico county. This evaluation considers social and economic information from an area that includes Pima, Graham, Pinal, Cochise, and Santa Cruz Counties in Arizona, and Hidalgo County in New Mexico. This section discusses information relevant to providing a basis for assessing the interaction of the Coronado NF with surrounding communities, as well as for understanding needs for changes in the current Forest Plan.

Demographic Patterns and Trends

The recent demographic history of the area surrounding the Coronado NF, and the region as a whole, represents one of sustained and rapid growth. Following a period of population loss in Cochise and Santa Cruz counties between 1920 and 1950, the Arizona counties into which the Coronado NF boundaries extend have grown steadily from 240,000 residents to over 1.2 million (Forstall 1995, U.S. Census Bureau 2005).

The average age in the State has been steadily increasing: 31 percent of the State's population was under 15 in 1950, but only 22.4 percent fall in the under-15 bracket today. The shift in the average age can be attributed to Arizona's amenable climate, relatively affordable property values, and the continued importance of area military bases, all features considered attractive to retired people. Long-term population increases are also supported by seasonal visitors wishing to permanently relocate to areas with increased outdoor opportunities (McHugh and Mings 1996).

Racial diversification has been limited in both Arizona and New Mexico over the past 50 or 60 years. The Hispanic population in Arizona is 25.2 percent of the population (a 4.8 percent increase since 1940) and in New Mexico is 43.6 percent of the population (a 6.6 percent increase since 1940). In Arizona the African-American population has remained static at 3.1 percent of the population in 2000, compared to 3.0 percent in 1940. The Native American population in Arizona is 4.7 percent of the population (a 6.3 percent decrease since 1940) and in New Mexico is 9.6 percent of the population (a 3.1 percent increase since 1940). Although the percentage of Native Americans in the Arizona population has decreased, the absolute number is now greater than six times the 1940 figure. What makes the percentage appear to decrease is the fact that Arizona's total population has grown from 499,261 in 1940 to an estimate of more than 6,000,000, in 2006. New Mexico's Native American population has grown at a similar rate, while the overall population increased from 531,818 in 1940 to 1,887,200 in 2005 (Combined US Census 1940 through 2000, and American Communities Survey for 2005 figures)¹.

The past 50 years of increased growth is considered to be a marked pattern for the region, and this trend is expected to continue for the foreseeable future. As local populations increase, additional pressure for space continually affects the borders, integrity, and biodiversity of the Coronado NF. As communities grow, more homes abut National Forest System land, often affecting wildlife

¹ <http://www.census.gov/>

habitat and restricting the ability to use ecosystem management strategies such as prescribed fire. As higher concentrations of visitors travel to favored national forest destinations, opportunities for dispersed, quiet recreation become more limited.

Economic Characteristics and Vitality

The economy of the State of Arizona has undergone a relatively rapid transformation over the past century. During the first half of the 20th century, mining, agricultural, and ranching industries dominated the economy. In the second half, economic dominance shifted to a mix of urban and rural industries that cover nearly every sector. Industrial diversity increased from the 1970s until it peaked in the mid-1980s and has now fallen well below other states to 0.45 on the Industrial Diversity Index² (Arizona Department of Commerce 2002).

Mining represented 3 percent of the State's per capita income in the late 1960s, but was a fraction of a percent by 2002. Agriculture also represents less than 1 percent. Manufacturing and trade/utilities have either remained static or dropped slightly in the second half of the past century. The service industry, however, jumped from 13 percent in 1969 to more than 20 percent in 2002. This trend is due largely to the increasing urbanization of the State, with 88.2 percent of the population living in urban areas according to the 2000 Census. The concentration of economic activity in metropolitan areas is reflected in a per capita personal income of \$27,285 compared to \$18,992 in non-metropolitan areas, a 30.4 percent differential, up from 23.3 percent in 1970.

Per capita personal income in Arizona has generally followed national trends, although it has shown greater fluctuation in the short term. Labor force growth has slowed since the 1970s when it peaked at an annual rate of 2.7 percent, slowing to 1.7 percent in the 1980s and to 1.2 percent in the 1990s. The impact of education on economic standing has increased along with the wages. Wages for college-educated workers has increased dramatically since 1975 to more than 50 percent above high school-educated workers. Poverty rates have remained relatively stable over the last three to four decades, remaining between 14 and 16 percent (Sheridan 1995, Canamex Corridor Coalition 2001, Arizona Department of Commerce 2002).

Many of the counties surrounding the Coronado NF are among the poorest in the Arizona. The 2002 per capita personal income in the six U.S. counties abutting the Forest was \$19,687, or 26.2 percent less than the State average for Arizona. However, this number is very close to the 2002 per capita personal income of \$19,230 for New Mexico. Workers in these counties earn only 63.9 percent of the Arizona average per capita income. The 30-year average rate of income growth in this region was 8.4 percent, well below the Arizona state average of 10.2 percent.

Coronado NF activities are estimated to be responsible for 0.3 percent of jobs and labor income for all sectors combined within the regional economy. Accommodations and food services is the sector that is most dependent on the contributions of the national forest, which accounts for 1.2 percent of the jobs in this sector and 1.3 percent of the labor income. Contributions to all other sectors are less than 1 percent.

Natural and Cultural Resource Dependent Economic Activity

Tourism is the largest economic activity associated with natural settings in the planning area. Cochise, Graham, and Pima Counties, Arizona reported the greatest increases in tourism employment between 1990 and 2000. The natural, cultural, and historic resources of the Coronado NF play a large role in attracting visitors to the area. In Pima County, Sabino Canyon

² An index of 1.0 represents a state of industrial diversity that is equal to the United States as a whole. Although Arizona's economy is no longer limited to agricultural and mining interests, it is still restricted in its industrial array. By contrast, states like Texas and Illinois have indexes near 0.8, suggesting a much broader industrial foundation.

was the second most-visited tourist attraction in 2006. Attractions include not only natural beauty and opportunities to experience nature, but also visitation of cultural and historic sites. Although recreational use has increased steadily since the establishment of the Coronado NF, the increase in recreation over the past few decades has been particularly dramatic. According to National Visitor Use monitoring data (USFS 2008), the Coronado National Forest received over 2.8 million visits during fiscal year 2007, the majority of which were by white males between the ages of 31 and 70.

Land in the planning area is highly mineralized, and mining activity mirrors market prices for mineral commodities. After a period of low market prices in the late 1990s, metals began to show some strength in 2005. By 2006 the prices for many mineral commodities were breaking historic records. These increases are reflected in the increased level of both mineral exploration and proposed mine development activity on Coronado NF lands³. Although metal prices are cyclic and prices may fall back below these historic highs, metal prices are expected to remain high relative to production costs for several years to come. This means that the Coronado NF can expect increased interest in mineral-related activity over the next several years.

Range livestock production is an extensive economic land use in the assessment area, and approximately 90 percent of the Coronado NF lies within 186 identified grazing allotments. This is a long-term land use that predates the establishment of the Coronado NF. The economic return from ranching is difficult to assess because of foregone opportunity costs, the interactions of livestock production activities with other economic sectors, and non-economic values tied to ranching as a way of life. Still, in the assessment area, ranching is considered a noteworthy economic contributor, especially in counties with smaller and less diverse economies such as Cochise, Graham, Santa Cruz Counties in Arizona and Hidalgo County in New Mexico (Harp et al. 2000). Many area ranchers depend on grazing permits issued by the Coronado NF in order to have viable livestock operations (Sheridan 2001, Talbert 2007).

Land Ownership

As a whole, land ownership in the area surrounding the Coronado NF differs from overall ownership patterns for Arizona in that it involves relatively large amounts of private acreage and State Trust land⁴, both of which are likely to have a considerable impact on future development patterns throughout the region. Hidalgo County in New Mexico and Cochise and Santa Cruz Counties in Arizona reported the greatest amounts of private land as of 2005, while Pima and Graham Counties in Arizona had the least. The percentage of State Trust land was greatest in Pinal and Cochise Counties, Arizona. Santa Cruz County, Arizona has far and away the greatest amount of National Forest System land, and Graham and Pima Counties, Arizona reported the highest percentage of land owned by Native American tribes.

Land ownership patterns within and along the boundaries of the Coronado NF present unique challenges to management. The sky island, non-contiguous nature of the Forest results in a large proportional amount of boundary interface when compared to other national forests in Arizona. In addition, the Coronado NF shares 60 miles of international boundary with the Republic of Mexico. There are also an estimated 73,000 acres of private and other non-federal lands within the Coronado NF's proclaimed boundaries. Most of these lands are either patented mining claims or lands settled under homesteading laws that are now part of ranching operations.

³ The number of legitimate commercial mining operation on the Coronado NF increased from 1 in 2001 to 12 in 2007.

⁴ State lands in Arizona are available for disposal, and there is a constitutional requirement that the highest value possible be derived from these lands for the benefit the State education system.

The Forest Service may acquire lands through exchange, purchase, donation, or condemnation. Of these, land exchange has been, and will continue to be, the primary method of acquisition. It should be noted, though, that land exchanges are invariably controversial and complex. Since 1986, the Coronado NF has completed 24 land exchanges. Within the Coronado NF proclaimed boundary approximately 16,600 acres of land valuable for public access or protection of resources were acquired. Approximately 5,500 acres of National Forest System lands, those found to be more valuable for purposes other than national forest, were exchanged to other ownerships.

Access and Travel Patterns

The Arizona Department of Transportation currently has plans for a number of road improvements in proximity to the Coronado National Forest over the next five years, most of which entail road widening and resurfacing. Similarly, county governments throughout the area of assessment envision improvements to arterial road networks to accommodate expected population growth. These improvements are expected to make travel to the Coronado NF easier for automobiles, although only if they occur on routes with established access.

The rapid growth of Arizona's and New Mexico's population has led to a much greater need for public access to National Forest System (NFS) lands. At the same time, growth has led to increased development to interior and adjacent private lands, resulting in more restricted public and administrative access. The sky islands nature of the Coronado NF also contributes greatly to the Forest's access problem. Public roads (County and State highways) generally pass between the twelve (12) separate forest mountain range units located in 6 counties [Cochise, Graham, Hidalgo (NM), Pima, Pinal, and Santa Cruz] and two states (Arizona and New Mexico). Private and State Trust lands are located between public roads and the NFS lands, most often leaving the national forest mountain range units without permanent public legal access.

The most common barrier to accessing the Coronado NF is the passage of forest roads and trails through private property. Only 100 of 300 existing access points have legal rights-of-way established. Private landowners have increasingly sought to limit passage through their property for the purpose of accessing public lands for a variety of reasons, including concerns about impacts from off-highway vehicle use and illegal immigration, litter and vandalism, privacy issues, liability issues, and in some cases, a desire for exclusive access to adjoining public lands.

The Coronado NF is currently analyzing the internal road network through a Travel Analysis Process. This process will lead to proposals for any closures or additions to the network. In addition, the Forest will be implementing the Travel Management Rule over the next few years. This will result in designation of the official motorized travel routes, as well as class of vehicles and season of use allowed on those routes.

Exurban Development

Hansen et al. (2005) report that low-density rural home (exurban) development is the fastest growing form of land use in the United States, and has been since 1950. This trend is mirrored in the analysis area and has serious implications for the management of the Coronado NF. Development along the boundaries has the potential to result in further restrictions in the ability of the public to gain access to the Coronado NF. It has also been shown that exurban development has significant negative impacts on native species (Maestas et al. 2003, Blaire and Johnson 2008, USDA NRCS 2008), and that these impacts may manifest over several decades (Hansen et al. 2005) and can extend several hundred meters beyond the developed area (Lenth et al. 2006). Development of any kind severely restricts the ability of the Forest Service to use fire for ecosystem restoration purposes. Given the large amount of private and State Trust land in the analysis area, management strategies for the Coronado NF that encourage land uses compatible

with open space values will be needed in order to protect native species populations. Also, integration of landownership considerations with transportation planning will help to identify rights-of-way needs and opportunities (USFS 2009a).

Long-Range Land Use Plans and Local Policy Environment

County land use within the area of assessment ranges from traditional uses such as farming and 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. The debate over preservation of open space has gained increased attention throughout the region as elements such as the Sonoran Desert Conservation Plan in Pima County and the Malpai Borderlands Group in Cochise County, Arizona and Hidalgo County, New Mexico draw support from diverse stakeholders. The continued availability of ranchlands as working landscapes is the keystone of both of these open space conservation efforts. The Coronado NF plays a major role in maintaining viable ranching operations by providing a forage base for permitted livestock.

The provision of adequate, affordable infrastructure and sufficient water supplies is also a growing concern for planners, residents, and land managers throughout the region. The Coronado NF manages virtually all of the headwaters and a significant portion of the watershed acreage in the area. There is one municipal watershed within the Forest boundary, and a number of small communities depend on springs located on National Forest System lands for their water supplies. Increasing infrastructure to support local communities, if located on National Forest System lands, has the potential to affect scenery and other resources.

International Border

The international border with the Republic of Mexico is an important social and cultural feature, as it influences a range of Coronado NF resources and uses, management issues, and interactions with other land management and law enforcement agencies. There are a significant number of Mexican citizens that regularly come to the Coronado NF to recreate. The cross-border sharing of resource management knowledge and experience, especially in the fields of fire ecology, wildlife studies and range management, has been facilitated by the International Forestry program since the early 1990s. More recently, coordination of management with the Department of Homeland Security has become a high priority for the Coronado NF, for law enforcement issues as well as fire fighting and road maintenance. A major challenge is balancing the need for law enforcement activities with the need to limit ground-disturbing activities (for example, off road travel of law enforcement vehicles). Also, infrastructure needed for law enforcement activities (such as observation towers) will likely affect the scenic resources of the Forest.

Illegal Uses

There is no question that illegal activity along the border has had a significant impact on National Forest lands. The region has seen a gradual increase in the migration of undocumented immigrants since 1994, with particularly large numbers of crossings and apprehensions in the Nogales, Sierra Vista, and Douglas Ranger Districts. Drug smuggling also occurs on a large scale in these areas. The primary impacts to the Coronado NF are the large amount of garbage and human waste left on the Forest and serious safety concerns for employees and visitors as the level of violence associated with illegal immigration and drug smuggling increases. A significant number of wildfires in the border ranger districts are caused by people engaged in illegal activities. Forest Service firefighting efforts are greatly complicated by the very real possibility of

encounters with armed and violent groups or individuals in these areas. In response to the situation, the Forest Service recently approved up to 10 law enforcement K-9 units to work along the border, in addition to current law enforcement staff.

The Forest Service has identified the significant increase in illegal off-highway vehicle activity as a major component of unmanaged recreational use. Implementation of the Travel Management Rule should help with law enforcement efforts to manage this use. Vandalism to natural and cultural resources continues to be a problem with users that are either unaware of, or uncaring about, the effects of their actions. Public comments in the Coronado NF Forest Plan revision process indicate a desire for increased attention to public safety and rule violations by a combination of user education efforts and increased law enforcement.

Specially Designated Areas

There are currently 21 officially designated special areas, including six Research Natural Areas (RNA), three proposed RNAs, one area managed with an emphasis on manipulative research, eight Wilderness Areas, three Wilderness Study Areas (WSA), and two Zoological Botanical Areas. There are also 16 segments of stream courses that have been identified as eligible for consideration for Wild and Scenic River designation. Recommendations reflected in the current Forest Plan (circa 1986) are that one of the three Wilderness Study Areas (Mt. Graham WSA) should be formally designated as a Wilderness, and that two of the three (Bunk Robinson WSA and Whitmire Canyon WSA) should not be formally designated as Wildernesses, and therefore should be un-designate WSAs. These recommendations were never taken through the legislative processes required to establish the Mt. Graham Wilderness Area, or to un-designate the Bunk Robinson and Whitmire Canyon WSAs; therefore, all three areas are still WSAs. Many other areas and places have some form of designation, and a complete list is presented in the Social and Economic Sustainability Report, Appendix B (USFS 2009a).

Community Relationships

The communities surrounding the Coronado NF have long been dependent upon natural resources for commodity production, tourism, and aesthetic enjoyment. A review of state and local newspapers reveals a continued local interest in the use and management of these resources and particularly intense concern surrounding fire control and prevention, illegal activity along the international U.S.-Mexico border, and management of wildlife and regional water supplies.

The management activities of the Coronado NF 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, and educational institutions. 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 Coronado National Forest given the rates of demographic change in the region.

Indian tribes have a unique status in their relationship to the natural resources managed by the Federal Government. In recognition of this unique status, consultation with tribes in the land management planning process is required under Section 106 of the National Historic Preservation Act. The Coronado National Forest has initiated this consultation. A forum convened with tribes in 2004 indicated desires for more accommodation of traditional uses and cultural uses in decision making and planning; clarification of the role of cultural and other non-economic values in decision making about such issues as astro-physical site development on Mount Graham; the incorporation of traditional knowledge in management and planning; attention to site protection

and privacy issues in the management of cultural resources; and a desire for cooperative management of resources of mutual interest to tribes and the Forest Service.

In recent years, a new conservation movement has emerged, known as collaborative conservation (Brick et al. 2001). Reflecting this nationwide trend, the Coronado NF is emphasizing the use of collaborative processes to help guide management decisions. There is also a trend toward working across ownerships and jurisdictions to achieve common goals.

Collaboration goes beyond guidance for decisions, as funding for projects is increasingly provided by sources outside the Forest Service. For example, a group of citizens recently raised \$800,000 for repairs to roads and facilities in Sabino Canyon that had been damaged by flooding in 2006. A large percentage of funding for Coronado NF recreation facilities, watershed restoration, wildlife habitat, and range improvements comes in the form of grants administered by other groups and agencies.

Management Challenges: Social and Economic Sustainability

This section provides a summary of the challenges identified in the social and economic environment that influence, or are influenced by, management of the Coronado NF. Management challenges are coded here for tracking purposes in Chapter 4. The codes for this section are SE1-*n*, to represent Management Challenges, Social and Economic, numbers 1 – *n*.

SE1: The population growth trend is expected to continue for the foreseeable future. The current Forest Plan identifies population growth and development as management issues, but does not present cohesive strategies for sustaining forest lands and experiences in the face of these pressures.

SE2: While it is clear that the communities in and around the Coronado NF are not directly relying on National Forest System lands and products for economic sustainability, it is equally clear that the National Forest System lands provide the context for sustaining the lifestyles and traditions of these communities. Some sectors are more dependent on National Forest System lands than others. Specifically, many area ranchers are dependent on Forest Service grazing permits, as are many who provide tourism services such as outfitting and guiding. Current Forest Plan direction supports these uses but does not reflect possible mutual benefits, such as open space and ecological services provided by ranchers or education and services provided by outfitter guides.

SE3: Mining activity has increased significantly in the past five years, and has the potential to impact the visual and natural resources of the Coronado NF. While mining activity is largely governed by the Mining Act of 1872, the Forest Plan also provides guidance for allowing mining and leasing within the framework of existing laws and regulations. Recent proposals for mining operations in some areas (such as the Rosemont Copper Project in Pima County) have met with a high level of public opposition, reflecting a general passion in the surrounding communities for preserving the natural landscapes of the Coronado NF. While recognizing the statutory rights that exist for mineral development, the direction in the current Forest Plan emphasizes the laws and regulations designed to mitigate the impacts of mining, and the use of operating plans and bonds for rehabilitation.

SE4: Like population growth, access is also identified in the current Forest Plan as a management issue. The scope of the problem has only increased with continued development along the Forest boundary. New strategies will need to be developed to ensure that the public has access to national forest lands.

SE5: An issue closely related to population growth, increased development, and loss of access is the need to preserve open space. In the past, Forest Service policy and management strategies

have focused only on lands within the boundaries of the national forest. In recent years there has been a realization that in order to sustain the ecological integrity of the landscape, various ownership entities will need to work together. Management approaches will need to be developed to facilitate the concept of working across ownership boundaries to sustain ecosystems and therefore the communities that depend on them.

SE6: Special area designations are a component of the Forest Plan, and will be revisited during the Forest Plan revision process. A proposal for a new Wilderness Area has been introduced in Congress. As part of the revision process, the entire Forest will be evaluated for potential new Wilderness Areas. Also, there are additional proposals from the public for other special area designations. These proposals are generally put forth with the objective of protecting areas that have unique or fragile ecological or cultural resources.

SE7: Safety issues have changed substantially over the years for both visitors and Forest employees. The current Forest Plan needs to be updated to better address a social environment that includes illegal activity not anticipated in 1986.

SE8: 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 grows, so does the need for forest managers and planners to understand the dynamic linkages between the Forest and surrounding communities. Management direction to facilitate these relationships is lacking. Although the concept of community relations is a relatively new component of forest planning, frameworks exist to help the Forest Service develop a comprehensive strategy for monitoring and enhancing these relationships.

SE9: The Coronado NF is increasingly relying on funding provided by partners for accomplishing work on the ground. In general, the results of decisions informed by collaborative processes and supported by multi-party funding are better in that these results reflect shared goals. However, there is some concern that there is not sufficient guidance to align outside influence and funding with Coronado NF management priorities.

Chapter 3: Ecological Conditions, Trends and Management Challenges

This section is a summary of the Coronado NF Ecological Sustainability Report (USFS 2009b). It presents an assessment of the conditions of the ecosystems within the Coronado NF, as a basis for understanding needs for changes in the current Forest Plan.

Ecological Diversity

The Coronado NF is one of the most ecologically diverse forests in the National Forest System. Several ecological regions and vegetation communities merge within the vicinity of the Coronado NF: To the west is the Sonoran Desert; to the southeast is the Chihuahuan Desert; to the north are the Central Arizona Mountains, and to the south are the Madrean “Sky Island” Mountains, a northern extension of Mexico’s Sierra Madre Occidental. The mountains and valleys are typified by a largely Mexican flora and fauna. Elevations range from about 3,000 feet to nearly 11,000 feet above sea level. Along this elevational gradient, vegetation communities range from deserts to subalpine forests; however, most of the Coronado NF is comprised of Madrean encinal woodlands and semi-desert grasslands. Ecological diversity is further enhanced by a long growing season, a dual rainy season, and the evolutionary consequences of isolation of the sky island mountain ranges.

The number of native species inhabiting the Coronado NF and adjoining lands is not precisely known (and new species are periodically described), but conservative estimates include about 2,100 species of plants (McLaughlin 1995), 469 species of birds, 108 species of mammals, 91 species of reptiles, 19 species of amphibians, 18 species of fishes (L. L. C. Jones, personal communication), over 240 species of butterflies (Bailowitz and Brock 1991), and nearly 200 species of mollusks (Jones 2005).

Vegetation

Nine major vegetation communities are identified on the Coronado NF. Table 1 displays the relative percentage of these vegetation communities.

Table 1. Coronado NF Vegetation Communities

Vegetation Community	Percent of Coronado NF
Desert communities	9%
Semi-desert grasslands	26%
Interior chaparral	9%
Madrean encinal woodland	42%
Madrean pine/oak woodland	8%
Ponderosa pine	3%
Mixed conifer forest	2%
Spruce/fir	<1%
Riparian communities	<1%

Desert communities include both the Sonoran and Chihuahuan Deserts. The semi-desert grassland category includes some other, less-common grassland community types. The term “encinal” refers to oak communities. Riparian communities range across all elevation gradients from deserts to sub-alpine forests, thereby including a variety of vegetation communities. Some other uncommon vegetation communities (e.g., montane meadows) are not included here, but are considered in the discussion of wildlife habitat. For a more complete description of vegetation communities, including plant species composition, associated wildlife, context within the broader planning area, disturbances, current and reference conditions, projected future trends and an assessment of risks to sustainability, see the Ecological Sustainability Report, Appendix A (USFS 2009b).

In order to make an assessment of the sustainability of various vegetation communities within the Coronado NF, current vegetation conditions are compared to a historic range of variation (HRV) of conditions, as determined by a review of published scientific literature (Schussman and Smith 2006). The HRV characterizes a range of reference conditions, reflecting natural disturbance regimes. The reference conditions are, for the most part, based on conditions that existed between the years 1000 to 1880, before major human-caused disturbances affected the landscape.

In the nine major vegetation communities represented on the Coronado NF (with the exceptions of the Madrean encinal woodlands and the interior chaparral), conditions differ, sometimes substantially, from reference conditions as described in the HRV. Reference conditions provide an inference of ecological sustainability; however, disturbance and climate regimes may be different than those that existed under reference conditions. Climate variability may have affected vegetation mortality and reproduction. Homebuilding and road development have fragmented the landscape. Invasive species are changing vegetation dynamics. Past overgrazing and fire management policies and practices have altered vegetation structure and composition in many areas. All of these changes have effects that are predicted to continue, and in some cases to increase, in the foreseeable future.

The following descriptions of vegetation condition are arranged according to the general elevational gradient along which they occur, from lowest to highest. Riparian areas, which occur at all elevations, are described last. This section provides a summary of current vegetation conditions, trends and risks to sustainability.

Desert Communities

The Coronado NF manages only a tiny fraction of desert plant communities, compared to the surrounding land-ownership entities. Desert plant communities within the HRV are typically sparsely vegetated, with few grasses in the understory. They evolved without fire as an ecological process, and most of the plants that characterize the community, including the iconic saguaro cactus, cannot survive fire. On the Coronado NF and on other land-ownerships, this plant community is currently at risk from non-native, invasive grasses which provide fuel for wildfires. The biggest threat is buffelgrass (*Pennisetum ciliare*). The risk to the Sonoran desert from non-native, invasive grasses goes beyond wildfire. Buffelgrass grows densely and crowds out native plants of similar size. Competition for water can weaken and kill larger desert plants. Dense roots and ground shading prevent germination of seeds. It appears that buffelgrass can kill most native plants by these means alone (Arizona-Sonora Desert Museum 2008). Populations of invasive, non-native grasses are increasing in desert communities in spite of concerted efforts to restrict them. Most sources of and vectors for invasive species are beyond the control of the Coronado NF. This combination of factors indicates that the risk to the sustainability of desert communities is high (USFS 2009b).

Semi-Desert Grasslands

Semi-desert grasslands within the HRV are typically open with low shrub canopy cover. The semi-desert grasslands of southeastern Arizona have been shown to be trending from open grasslands with low shrub canopy cover towards higher shrub canopy cover. Factors such as precipitation patterns, grazing history, soil, and fire all interact to influence non-uniform changes in grassland composition and structure across the region (Gori and Enquist 2003). On private lands surrounding the Coronado NF, ex-urban development has led to loss and fragmentation of grasslands and the disruption of processes (primarily fire) that played a role in maintaining them. Semi-desert grasslands make up 26 percent of the Coronado NF. Around 27 percent of these lands are currently in an open, native condition, similar to the reference condition. Another 42 percent have been invaded by shrubs, but have the potential to be restored to an open, native condition through appropriate management actions. An additional 21 percent are open, non-native grassland (primarily dominated by Lehmann lovegrass), and just over 10 percent of former grasslands are considered by experts to no longer have the potential for restoration to grassland (Schussman and Gori 2004). In summary, 52 percent of semi-desert grasslands are shrub invaded; of these, 42 percent are considered restorable. Projected trends are toward increased shrub cover unless restoration treatment efforts are increased. Given this trend, and because of identified threats beyond agency control, the risk to sustainability of semi-desert grasslands is moderate to high (USFS 2009b).

Interior Chaparral

The interior chaparral vegetation community (9 percent of the Coronado NF) differs from historic condition in that higher percentages have a more open canopy and higher percentages have been recently burned. There are indications that, within the Coronado NF, fires are occurring more frequently in this vegetation community than they did historically. This trend toward recently burned and open canopy structure is expected to continue. Even so, the overall structure of chaparral as shrub land has been stable over the historical record, although changes at the species level may be occurring with more frequent fire (Schussman and Smith 2006). An assessment of Fire Regime Condition Class⁵ (FRCC) indicates that around half of the interior chaparral vegetation community has a high probability of uncharacteristic fire behavior, and the other half has an elevated probability of uncharacteristic fire behavior. Projected trends are toward more fires and more open canopy cover. However, the interior chaparral is a fire-adapted ecosystem, and the basic structure as a shrub-dominated type is not expected to change. There are no identified threats beyond agency control. Given these factors, the risk to sustainability of the interior chaparral is low (USFS 2009b).

Madrean Encinal Woodland

The Madrean encinal (oak) woodland makes up 42 percent of the total acreage of the Coronado NF. The reference condition is characterized by open stands of oaks with denser stands on north facing slopes and in drainages. An understory of perennial grasses provides fuel for surface fires. Current conditions are not substantially different from reference conditions, although the trend over the last 150 years has been toward higher canopy cover and higher abundances of mesquite and juniper trees (Schussman and Smith 2006). Projected trends indicate that current management practices, if continued, will lead to a structure similar to reference conditions, with a more open canopy and higher percentage of younger trees than currently exists. In summary, the Madrean encinal woodland is the most extensive vegetation community on the Coronado NF. Projected trends are toward reference conditions. There are identified threats beyond agency control, but

⁵ Fire Regime Condition Class (FRCC) is a measure of the departure of current vegetation composition and structure from the historical reference condition (USDA Forest Service 2007).

they are primarily limited to areas along the Forest boundary. Given these factors, the risk to sustainability of the Madrean encinal woodland is low.

Madrean Pine-Oak Woodland

The Madrean pine-oak woodland (8 percent of the Coronado NF) exhibits a large departure from the HRV, with increased closed canopy structure and higher fuel loads compared to reference conditions. This vegetation community was recently added to a list of global conservation “hotspots” by Conservation International (Mittermeier et al. 2004); it remains intact within less than 20 percent of the area of its historical range, which lies mostly in Mexico. Studies indicate that prior to 1880 these communities were characterized by widely spaced pines and oaks, with pines dominating the overstory and an understory dominated by perennial grasses. These conditions were maintained by low-intensity, frequent fire. Changes that have occurred, thought to be the result of fire suppression, include an increase in the dominance of oak and other sprouting species. Also, the bunch grass understory has decreased with increased litter and canopy cover, both consequences of fire suppression (Schussman and Smith 2006). As measured by FRCC, there is a high proportion of the Madrean pine oak woodlands type (99 percent) with an elevated or high probability of uncharacteristic fire behavior. This probability, coupled with the high percentage deviating from reference conditions, projected trends away from reference conditions, and identified threats beyond agency control, all indicate a high risk to the sustainability of the Coronado NF Madrean pine oak woodland (USFS 2009b).

Ponderosa Pine

Ponderosa pine forests on the Coronado NF are characterized by a shrub understory and occur primarily as an association with silverleaf oak, netleaf oak, mountain muhly or screwleaf muhly. These forests cover approximately three percent of the land area. Historically, these forests experienced a high-frequency, low-intensity surface fire regime. High-severity fire may have occurred in small areas as individual or groups of trees occasionally torched. This fire regime resulted in a larger proportion of older, larger trees and a smaller proportion of smaller, younger trees compared to current conditions. Also, tree canopy cover was much less historically than it is now (Schussman and Smith 2006). Disruption of the natural fire regime with the onset of overgrazing and active fire suppression in the early part of last century has resulted in an accumulation of fuels through litter-fall and development of fuel “ladders” of live and dead trees. The current level of fuel accumulation can result in widespread, destructive crown fires.

The trend toward increasing closed canopy structure is expected to continue, with the notable exception of areas where large fires occur. Since 1994, approximately 42 percent (around 26,600 acres) of the ponderosa pine vegetation type on the Forest has burned in wildfires. An estimated 16 percent (around 10,000 acres) of that was involved in stand-replacing fires. Much of this is in designated Wilderness Areas or steep, inaccessible terrain. On non-Wilderness lands, approximately 322 acres have been identified as currently being deforested. Tree planting is targeted on 147 acres, of which 77 acres have been re-planted to date. The management strategy for much of this type has been to monitor natural regeneration, and some areas have been observed to have natural regeneration occurring at the level expected for these harsh sites. Reforestation needs, accomplishments, and capabilities will be assessed and refined on an on-going basis.

The high proportion of the ponderosa pine type (99 percent) with an elevated or high probability of uncharacteristic fire behavior, the high percentage deviating from reference conditions, projected trends away from reference conditions, and identified threats beyond agency control all indicate a high risk to the sustainability of the Coronado NF ponderosa pine vegetation type (USFS 2009b).

Mixed Conifer Forest

The situation noted for ponderosa pine forests is similar in mixed conifer forests, which make up 2 percent of the Coronado NF. Compared with reference conditions, there is a current overabundance of closed, mid-seral-aged stands. Historically, these forests were less dense, with a larger proportion of older, bigger, trees and fewer small, young trees. There were also fewer fire-sensitive species such as white fir (Schussman and Smith 2006). As with the ponderosa pine forests, these changes are thought to be the result of overgrazing and the onset of active fire suppression in the early 1900s. In the current condition, the mixed conifer vegetation community is at risk from uncharacteristically large insect outbreaks and destruction by unnaturally large and intense wildfires.

The projected trend for this vegetation community indicates there will be an increase in closed canopy structure in the future, again with the notable exception of areas where large fires occur. Since 1994, approximately 45 percent (around 52,000 acres) of the mixed conifer vegetation type on the Forest has burned in wildfires. An estimated 18 percent (around 21,000 acres) of the mixed conifer vegetation type on the Forest was involved in stand-replacing fires. Much of this is in designated Wilderness Areas or steep, inaccessible terrain. On non-Wilderness lands, approximately 660 acres have been identified as currently being deforested. Tree planting was targeted on 312 acres, of which 262 acres have been re-planted to date. The management strategy for much of this type has been to monitor natural regeneration, and some areas have been observed to have natural regeneration occurring at the level expected for these harsh sites. Reforestation needs, accomplishments and capabilities will be assessed and refined on an on-going basis.

The high proportion of the mixed conifer forest (92 percent) with an elevated or high probability of uncharacteristic fire behavior, the high percentage deviating from reference conditions, projected trends away from reference conditions, and identified threats beyond agency control all indicate a high risk to the sustainability of the Coronado NF mixed conifer vegetation type (USFS 2009b).

Spruce-Fir Forest

The spruce-fir forest makes up much less than 1 percent of the total acreage of the Coronado NF, but is disproportionately important because of its unique characteristics and lack of representation elsewhere on the Coronado NF. The spruce-fir forest on top of the Pinaleño Mountains is undergoing a massive die-off of mature trees, primarily due to drought, high density of trees (competition), wildfire and insect outbreaks (Schussman and Smith 2006). The current insect outbreak involves a variety of species including native bark beetles and the spruce aphid, which is an exotic, defoliating insect. The current insect outbreak is thought to have a positive correlation with recent warmer-than-normal winter temperatures (Lynch 2006). Stand replacement wildfire or continued warmer winter temperatures could lead to a loss of this vegetation community altogether.

Since 1998, over 90 percent (around 1,800 acres) of the spruce-fir vegetation type on the forest has suffered mature tree mortality due to insect attack and wildfire. Many of the areas where mortality has occurred are currently regenerating to aspen forest cover. On non-Wilderness lands, approximately 130 acres have been identified as currently being deforested (insufficient spruce or aspen regeneration). Spruce planting was targeted on 130 acres, all of which have been re-planted to date. The management strategy for much of this type has been to monitor natural regeneration, and some areas have been observed to have natural regeneration of spruce occurring. Reforestation needs, accomplishments, and capabilities will be assessed and refined on an on-going basis. The long-term potential for spruce regeneration is unknown, however, due to the presence of the spruce aphid, which may prevent seedlings from growing to maturity.

The very small amount of the spruce-fir vegetation within the Coronado NF, along with identified threats beyond agency control and limited management options to reduce those threats, indicate a high risk to the sustainability of the Coronado NF spruce-fir vegetation type (USFS 2009b).

Riparian Areas

Riparian areas are of primary importance because of the rarity of water in the region. The small areal extent of the sky island riparian areas, coupled with the generally shallow saturated zone beneath them, make them vulnerable to changes in climate and management. Historic overgrazing and poorly located roads are management concerns that have been, or are being, addressed. Changes in climate, including drought and summer floods, have resulted in a loss of mature and sapling trees, and therefore a lower canopy closure. In addition, riparian tree species are not successfully reproducing. During drought conditions, riparian areas are more susceptible to damage from wildfire than under normal conditions. Because of the narrow, linear structure of riparian areas, they take on the risk to sustainability of the surrounding vegetation communities. In addition, there are a number of identified threats to riparian areas that are beyond agency control. Given these considerations, the risk to sustainability of riparian areas ranges from low to high (USFS 2009b).

Soil

Soil conditions across the Coronado NF are mostly satisfactory, ranging from 79 to 100 percent satisfactory condition, with most remaining areas trending toward satisfactory conditions (USFS 2009b). Soil erosion has been a problem in the past, mostly due to an under-designed, un-maintained transportation system coupled with a lack of herbaceous ground cover caused by historic overgrazing. Current management has largely corrected these problems; however, new problems exist in the form of unmanaged recreation and illegal activity along the international border. These problems are caused by vehicle use off of roads, which destroys vegetation and causes soil compaction and erosion (USFS 2009b). Large destructive fires are another current threat because of the increased soil erosion caused by subsequent flooding.

Water Quality

A total of one stream and two lakes on the Coronado NF are impaired. In addition, five streams and two lakes have Total Maximum Daily Load (TMDL) plans⁶ (plans for limiting pollutants) in process.

Water Quantity

In the watersheds that have perennial water, lands within the Coronado NF contain a large share of the miles of perennial streams; the Coronado NF has approximately 21 percent of the land area of its component sub-basins and it has 36 percent of the miles of perennial streams. Exceptions include the Upper San Pedro River Sub-basin, the Animas Valley Sub-basin, and the Whitewater Draw Sub-basin, where there is much less perennial water on the Coronado NF compared with other land ownerships.

⁶ A TMDL plan is a written, quantitative plan and analysis to determine the maximum loading on a pollutant basis that a surface water can assimilate and still attain and maintain a specific water quality standard during all conditions. The TMDL allocates the loading capacity of the surface water to point sources and nonpoint sources identified in the watershed, accounting for natural background levels and seasonal variation, with an allocation set aside as a margin of safety.

Air Quality

The Coronado NF lies within four airsheds. The Gila River and Mexico Drainage airsheds have non-attainment areas for particulates (PM-10) and sulfur dioxide, neither attributed to National Forest activities. The data collected indicate that all air quality attributes are trending up or are static. Visibility is not being monitored on the Class I Wilderness Areas (Galiuro Wilderness and Chiricahua Wilderness), but nearby monitoring indicates the trend is up for the Chiricahua area and static for the Galiuro area. If the Regional Haze Rule and State Implementation Plan conditions are met, visibility conditions will steadily improve through 2064. It is estimated that sulfur dioxide emissions will remain unchanged through 2020.

Riparian Systems

Riparian areas occupy less than 1 percent of the total land area of the sub-basins as a whole. The Coronado NF has even less. Unlike the larger riparian areas downstream, however, the riparian areas found in the sky islands are relatively free of exotic plant species such as salt-cedar. The small areal extent of the sky island riparian areas, coupled with the generally shallow saturated zone beneath them, makes them vulnerable to changes in climate and management.

Little is known about the reference conditions for vegetation and channel characteristics within riparian areas. General observations indicate that the trend for channel bank protection is up; for canopy closure it is down; and for vegetation it is static or down. The trend for width:depth ratio and entrenchment ratio is not known (USFS 2009b). In the past, poorly managed grazing and transportation systems caused damage to many channels in these sub-basins. Management changes have been made, and continue to be made, to address these situations. The general trend of either static or down for vegetation measures can be at least partly explained by the drought that affected the region from 1995-2005. Mature and sapling trees have been lost due to the drought and riparian tree reproduction is not surviving, resulting in lower canopy closure. In addition, major wildfires have resulted in changes to riparian conditions. The general trend of up or not known, but currently within the expected range, for channel characteristics is a result of generally improved range management in riparian areas and careful management of road location and maintenance.

Wildlife, Fish and Rare Plants

The Coronado NF likely has the highest biological diversity of any national forest in the western United States of America. This is due to the fact that it is situated at a convergence zone of ecological regions and vegetation communities. To the west is the Sonoran Desert; to the southeast is the Chihuahuan Desert; to the north are the Central Arizona Mountains; and to the south is Mexico's Sierra Madre Occidental. Elevations range from about 3,000 feet to nearly 11,000 feet above mean sea level. Along this elevational gradient, vegetation communities range from deserts to sub-alpine forests, but most of the Coronado NF is comprised of semi-desert grasslands, Madrean encinal woodlands, and Madrean pine/oak woodlands. Biological diversity is further enhanced by a long growing season, a dual rainy season, and the evolutionary consequences of isolation of the sky island mountain ranges.

The number of native species inhabiting the Coronado NF and adjoining lands is not precisely known and new species are periodically described; conservative estimates include about 2,100 species of plants (McLaughlin 1995), 469 species of birds, 108 species of mammals, 91 species of reptiles, 19 species of amphibians, 18 species of fishes (L. L. C. Jones, personal communication), over 240 species of butterflies (Bailowitz and Brock 1991), and nearly 200 species of mollusks (Jones 2005).

The majority of species inhabiting the Coronado NF are considered secure from a conservation standpoint. The management strategy for those species is to manage for sustainable habitats. Species that are not provided for by sustaining habitats will need additional management direction in the Forest Plan. These species are considered to be at a greater risk from natural or man-made causes than common, adaptable species.

Three categories of species will be considered for additional management direction in the revised Forest Plan (FSH 1909.12). The process and criteria for identifying these species is described in USFS 2009b. The categories include federally designated Threatened and Endangered (T&E) species, Species-of-Concern (SOC), and Species-of-Interest (SOI). Table 2 summarizes the number of plant and animal species and subspecies on these lists by taxonomic group.

Table 2. Taxonomic groups of plants and animals of the Coronado NF considered for the Forest Plan revision process. Numbers in parentheses indicate those species for which there is sufficient scientific information available to support the development of management strategies. Thirty of the SOI are non-native invasive species.

Taxonomic Group	Threatened and Endangered	Species-of-Concern	Species-of-Interest	TOTAL
Amphibian	2 (2)	2 (2)	5 (5)	9 (9)
Bird	6 (4)	4 (3)	9 (9)	19 (16)
Fish	7 (7)	2 (2)	10 (10)	19 (19)
Arthropod	0	78 (31)	1 (1)	79 (32)
Lichen	0	7 (3)	0	7 (3)
Mammal	6 (5)	4 (4)	17 (17)	27 (26)
Non-Vascular Plant	0	6 (2)	0	6 (2)
Vascular Plant	3 (3)	175 (123)	42 (41)	220 (167)
Reptile	1 (1)	3 (2)	11 (11)	15 (14)
Mollusk	0	60 (16)	0	60 (16)
TOTAL	25 (22)	341 (188)	95 (94)	461 (304)

There are a total of 461 species on the lists: 25 T&E, 341 SOC, and 95 SOI. Of these, 304 taxa will be carried forward into the plan revision process. The remaining 157 species will not be further analyzed at this point because their distribution and natural history are too poorly understood to effectively manage for them, or because of other reasons described in the criteria for screening species in the planning rule directives (FSH 1909.12).

Most terrestrial species at risk are found in the most extensive habitats that the Coronado NF manages: Semi-desert grasslands, Madrean encinal woodlands, and Madrean pine/oak woodlands. This emphasizes the need to sustain and restore, if needed and where possible, these habitats. The primary goal of management for species diversity is to ensure that habitats for native species are maintained across the lands managed by the Coronado NF. Vegetation communities need to be managed for resiliency. Past vegetation management practices could generally be characterized as insufficient to bring about the needed changes. For example, very few acres across the managed

lands have actually been treated to reduce high densities of shrubs and trees, although there has been recent progress.

The species at greatest risk are associated with aquatic environments or some other specialized habitat features such as caves and rocks. There has been a nearly categorical decline across aquatic species. Before 1986, many fishes, ranid frogs, garter snakes, and some insects were far more abundant and well distributed than they are today. The Ramsey Canyon leopard frogs nearly disappeared, but are now on a slow increase as a result of conservation efforts. Since 1986, Chiricahua leopard frogs have been in a steep decline. Once documented in over 120 locations, Chiricahua leopard frogs now only occur in a handful of localities. This species has been apparently lost from its type locality, the Chiricahua Mountains, and possibly the Santa Rita Mountains. They are known in two localities in the Dragoon Mountains. Lowland leopard frogs are also declining and are now rare on the Coronado NF. Tarahumara frogs were re-introduced onto a single site on the Coronado NF, but currently the prognosis for becoming re-established is not good. Gila topminnows, Gila chub, and some other fishes have been steadily declining, having been extirpated from much of their historic range. Work is currently being done by the Arizona Department of Game and Fish to restore these populations. Mexican garter snake populations have plummeted, and they will likely be extirpated from the Coronado NF soon, if they are not already. The Sabino dancer, an aquatic-associated damselfly, was nearly extirpated from the Catalina Mountains following the flooding and debris flow after the Aspen Fire. The Stephan's heterelmis beetle is now only known from Bog Springs in the Santa Rita Mountains.

The threats facing aquatic ecosystems include, but are not limited to, a lack of water; water diversions; poor water quality (including temperature, pH, sulfuric and nitrogenous wastes, and heavy metals); excessive sedimentation, as from post-fire runoff; non-native invasive species, such as bullfrogs, warm water fishes, and crayfishes; exotic diseases, such as chytrid fungus; and lack of structure, such as emergent vegetation, coarse woody debris, and overhangs. These threats are not identified in the "Water Quality" and "Water Quantity" sections because those sections were limited to perennial lakes and streams. Cienegas, springs, wet meadows, ephemeral waters, and stock ponds are considered here, anywhere there are aquatic-associated species.

In addition to and related to the threats to ecosystems and species mentioned above are external factors, often beyond the scope of forest management decisions. Climate change, urban sprawl, exotic plants and diseases, and the continued need for infrastructure to serve growing populations are all examples of external pressures on ecosystem sustainability. For example, the presence of structures on a landscape in areas along the Forest boundary will alter the ability to use wildfire as a natural agent of change and ecosystem restoration.

Another example is that despite eradication efforts to date, the buffelgrass population continues to expand into desert vegetation communities. In other words, the rate and magnitude of treatments needs to increase. Habitat restoration ideally would mean achieving resiliency and homeostasis (i.e., where the environment is capable of "managing" itself through natural processes). In most vegetation communities, this would be a point where a near-natural fire regime is met.

Each species will need to be evaluated as to the status and habitat requirements that will allow them to persist, as well as their threats. The number of federally listed and declining species is growing and more are on the horizon, pointing to a need to reverse this trend. If the requirements of T&E species, SOC, and SOI populations cannot be met through habitat management (usually via vegetation manipulation), there will need to be specific management strategies identified to address the species themselves.

Finally, the effort to sustain species diversity, as with the effort to sustain ecosystem diversity, will require working across jurisdictional boundaries. All agencies and non-governmental organizations that manage wildlife, fish, rare plants, and their habitats need to work together as

complete partners, rather than relying on an individual group or agency to bear the burdens of management and conservation.

Management Challenges: Ecological Sustainability

As with the management challenges for social and economic sustainability, management challenges for ecological sustainability in this section are coded here for tracking purposes in Chapter 4 (E1-*n*, standing for Management Challenges, Ecological Sustainability, 1 – *n*).

E1: The primary risk to desert communities is the spread of invasive non-native grasses (USFS 2009b). These grasses increase the risk of wildfire, which destroys native desert plant communities. For the Coronado NF, preventing fires in desert plant communities will be an important strategy for reducing the spread of these grasses. Also, a concerted effort must be made to remove or control buffelgrass if desert plant communities are to be sustained. Long-term commitments to monitoring the spread of invasive non-native grasses will be necessary in order to get ahead of future threats.

E2: There are many factors that affect the sustainability of semi-desert grasslands. Domestic livestock grazing is an extensive use of Coronado NF grasslands, and is currently managed at levels that do not degrade ecosystem components and processes. Increases in non-native grasses, shrub invasion due to fire suppression, and land fragmentation due to ex-urban development are the primary current threats to native grasslands. These three disturbances interact to make grassland restoration activities by the Coronado NF more difficult. The use of fire as a restorative process is complicated by possible resulting increases in non-native grasses and the need to protect the developments that are increasing along Coronado NF boundaries. There will be a continuing need to work with neighboring communities and land owners to maintain, where possible, open and un-fragmented landscapes

E3: In mixed conifer, ponderosa pine forests, and Madrean pine/oak woodland, reducing the threat of large, stand-replacing wildfires will be necessary if these communities are to be sustained. At the same time, frequent low-intensity fires, and occasional low frequency, high-intensity fires will need to be part of the restorative process because they play an important role in maintaining healthy forest ecosystems. Current conditions are likely the result of past fire management policies and practices. While fire suppression will continue to be an appropriate management response, especially when there are risks to life or property or to protect non-fire adapted ecosystems, the Coronado NF recognizes the importance of fire as a natural process which is beneficial to fire-adapted ecosystems.

E4: Ninety percent of the spruce-fir vegetation type on the Forest has suffered mature tree mortality due to insect attack and wildfire. The long-term potential for spruce regeneration is unknown due to the presence of the spruce aphid, which may prevent seedlings from growing to maturity.

E5: Sustaining vegetation communities means recognizing that their component processes function at broad scales. The mosaic of seral and structural stages descriptive of reference conditions was historically distributed widely across the landscape. Widespread fire suppression, drought, and die-off due to disease create whole landscapes at risk of destruction by wildfire because of continuous fuel loading. Treatments will need to be considered to create large areas within landscapes that have a lower risk of destructive fire (Betancourt et al. 2004). Areas within recently burned landscapes provide practical opportunities for this approach (Millar et al. 2007).

E6: Much of what is known about managing vegetation is based on assumptions about climate and disturbance regimes that may no longer be valid. Future success in sustaining vegetation communities will require an adaptive management strategy. This means systematic observation

(monitoring) and analysis of treatment results, and adaptation of treatment methods based on those results.

E7: Current management has largely corrected historic soil erosion problems; however, there are new problems associated with unmanaged recreation and illegal activity on the border. Reducing the risk of large, destructive fires will be key to sustaining the soil resources within the Coronado NF in the future.

E8: Two recent large fires resulted in eutrophic⁷ conditions in one lake, and could be a risk for the few other lakes within the Coronado NF. In general, water quality is being maintained or improved under current management. However, water quality degradation as a result of flooding following large fires will continue to be a risk.

E9: In terms of managing for sustaining water quantity within the Coronado NF, the key will be to protect soils and vegetation, and therefore provide for natural runoff when precipitation occurs.

E10: Drought and large, severe wildfires continue to be risks for riparian systems within the Coronado NF. Also, unmanaged recreation, particularly the illegal use of off-highway vehicles, is negatively impacting a number of Coronado NF riparian areas.

E11: Most terrestrial species at risk are found in the most extensive habitats that the Coronado NF manages: Semi-desert grasslands, Madrean encinal woodlands, and Madrean pine/oak woodlands. This emphasizes the need to sustain and restore, if needed and where possible, these habitats.

E12: Species identified as T&E, SOC, or SOI that are not provided for by sustaining habitats will need additional management direction in the Forest Plan. These species are considered to be at a greater risk from natural or man-made causes than common, adaptable species.

E13: The species at greatest risk are associated with aquatic environments or some other specialized habitat features such as caves and rocks.

E14: In addition to and related to the threats to ecosystems and species mentioned above are external factors, often beyond the scope of forest management decisions. Climate change, urban sprawl, exotic plants and diseases, and the continued need for infrastructure to serve growing populations, are all examples of external pressures on ecosystem sustainability. For example, the presence of structures on a landscape in areas along the Forest boundary will alter the agencies ability to use unplanned natural ignitions for ecosystem restoration.

E15: The effort to sustain species diversity, as with the effort to sustain ecosystem diversity, will require working across jurisdictional boundaries. All agencies and non-governmental organizations that manage wildlife, fish, rare plants, and their habitats need to work together as complete partners, rather than relying on an individual group or agency to bear the burdens of management and conservation.

⁷ A condition in a body of water caused by an increase of dissolved nutrients that stimulate the growth of aquatic plants, resulting in a decrease of dissolved oxygen.

Chapter 4: Need for Change

Revised Forest Plan

The Coronado National Forest Land and Resource Management Plan (Forest Plan) was first published in 1986, and has been amended 12 times. The 1986 Forest Plan has served the Coronado NF well. Much of the direction the Forest Plan is still valid today and those components will be brought forward into the revised Forest Plan. Additionally, there are several new subject areas that will be added to the Forest Plan to reflect changes in conditions or knowledge since 1986, or to address problems that didn't exist or were overlooked at the time. The direction in the Forest Plan that is outdated or redundant with other existing regulations will be removed. Revision will be limited to areas where current direction is insufficient to address management challenges, or where there is new policy, scientific knowledge, or other information that indicates a need for changes in the Forest Plan.

The existing Forest Plan has five parts: Introduction (the purpose and organization of the document); Issues, Concerns, and Management Opportunities; Summary of the Analysis of the Management Situation; Management Direction; and Monitoring Plan. The revised Forest Plan will have a different structure than the existing Forest Plan:

- Issues, Concerns, and Management Opportunities will be incorporated into all components rather than be a stand-alone section. The emphasis will be on desired conditions and objectives that will be based on resource potential.
- The Summary of the Analysis of the Management Situation currently consists of a table displaying productive capacity of the Coronado NF in terms of resource outputs such as thousands of board feet of sawtimber and firewood, animal unit months of permitted livestock, and thousands of acre-feet of water. The revised Forest Plan will emphasize outcomes rather than outputs. Availability of various resource outputs will be based on whether or not such production is consistent with desired conditions.
- The revised Forest Plan will not propose site-specific projects. Project proposals will be driven by desired conditions and objectives that will be part of the revised Forest Plan.
- Monitoring will be an important part of the revised Forest Plan, but not as the schedule it is in the existing Forest Plan. Monitoring will be necessary to implement adaptive management, which will be emphasized in the revised Forest Plan. Monitoring elements will be linked to the achievement of desired conditions.
- The revised Forest Plan will be place-based. Management direction will be developed for specific geographic areas as well as for the Forest as a whole. Place-based planning will guide management to consider the uniqueness of different areas (places). At a minimum, twelve geographic areas corresponding to the twelve mountain ranges within the boundaries will be defined. In the revised Forest Plan, each mountain range will be referred to as a unique Ecosystem Management Area.

The components of the revised Forest Plan will be desired conditions, objectives, guidelines, standards (if needed), a determination of suitable uses, and special area designations:

- **Desired conditions** express resource goals that, in most cases, can be achieved in 10-50 years.
- **Objectives** are specific, measurable, management outcomes that contribute to maintenance or achievement of desired conditions within defined timeframes.

- **Guidelines** are design criteria for management activities based on Best Management Practices. They provide information and guidance for the design of projects and activities to contribute to the achievement of desired conditions and objectives. If strict design criteria are required, allowing no variation, then they may be included as standards.
- **Suitability of areas** is the identification of the general suitability of an area in a national forest unit for a variety of uses that are compatible with desired conditions and objectives for that area. The identification of an area as generally suitable for a use or uses is neither a commitment nor a decision approving activities and uses. Any specific use of an area is authorized through project and activity decision making.
- **Special areas** are areas within the National Forest System recognized for their unique or special characteristics with an official designation. Some examples include Wilderness Areas, Wild and Scenic Rivers, and Research Natural Areas. Some of these areas are designated by statute, while others may be established through Forest Plan amendment or revision. Most require a separate analysis and decision under the National Environmental Policy Act.

Other Plan Content

The revised Forest Plan may also include information other than the plan components, such as management approaches. This information will be distinguished from the plan components if contained within the Forest Plan, or will be a separate section of the Forest Plan.

- Management approaches describe the principal approaches the responsible official is inclined to take during the Forest Plan period. The approaches can come from and respond to the desired conditions and the objectives. Management approaches may describe partnership opportunities and collaboration arrangements that support the achievement of desired conditions and objectives.

Adaptive Management

In addition to the five Forest Plan components described above, there will be an overarching monitoring program. The monitoring program will be a central element of adaptive management planning in the revised Forest Plan, because monitoring is key to discovering how to make project decisions consistent with objectives. Through monitoring, the knowledge base of what to adapt to and how to adapt is developed. This process of monitoring and adapting leads to discovering what ultimately may need to be changed in the revised Forest Plan.

There are three major parts to the adaptive management process:

- (1) This evaluation document, the sustainability reports, and the supporting specialist reports provide an initial comprehensive description of current and desired social, economic, and ecological conditions.
- (2) Annual monitoring and evaluation reports will relate project and activity information to desired conditions and objectives.
- (3) Within a minimum of 5 years, this evaluation and sustainability reports will be reviewed in their entirety, with consideration of the annual reports and supporting specialist reports. At that point, a new evaluation of needs for change will be produced.

Unifying Themes to Guide Change

In recognition of the realities of agency capacity, the forest plan revision effort will be focused on a limited number of changes, with a plan toward other needed changes in the future. In other words, this will not be an effort to fix all that needs to be fixed in one process; rather, it is the first step in a continuous cycle of planning and improvement. Evaluation of the current Forest Plan points to five major themes for revision. These themes were developed by grouping and refining the input resulting from the assessments of social, ecological, and ecological conditions (USFS 2009a, USFS 2009b), as well as the collaborative process to date (Russell and Adams-Russell 2005, Russell 2006, 2007). The themes can be thought of as a framework for organizing ideas, while recognizing that considerable overlap exists between them. Each theme references specific management challenges outlined and coded in Chapters 2 and 3 above. The indicated needs for changes to the Forest Plan are itemized at the end of each theme description.

Ecosystem Restoration (SE3, E1-14)

Many of the terrestrial and aquatic environments on the Coronado NF are significantly altered from reference conditions. In addition, modeled predictions of future conditions show that if current rates of prescribed burning and thinning continue, many vegetation communities within the boundaries of the Coronado NF, from grasslands to montane coniferous forests, will not significantly change, and uncharacteristic fire behavior will continue to be a threat. In deserts, more effective management direction for controlling invasive species is needed. Overall, rates, effectiveness of treatments, and areas of treatments will need to increase if vegetation communities and species diversity are to be sustained. Current management direction generally recognizes and supports the need for species diversity, ecosystem sustainability, and restoration of desired ecosystem characteristics. However, explicit desired condition statements and objectives to achieve those conditions do not exist in the current Forest Plan.

New scientific knowledge will need to be incorporated in the Forest Plan. Current Forest Plan direction regarding vegetation management is based on assumptions about climate and disturbance regimes that may no longer be valid. For example, current Forest Plan standards for riparian areas in the Forest exceed capability along many channels because of long-term drought. Rainfall amounts and patterns, and possibly increased carbon dioxide levels, are thought to be factors in the increased amount of shrub cover in grasslands as well as noxious weed invasions. Recent dry springs and warm winters are factors in the spruce aphid infestation destruction of the spruce-fir forest (USFS 2009b). The concept of climate change is not currently reflected in the Forest Plan.

Current management direction in the Forest Plan is to protect soil resources, improve or maintain water quality, provide favorable water flow quantity, and improve or maintain air quality. Indeed, soil conditions have improved over the past 100 years. There is no need to change the basic management direction for these physical resources. However, the Forest Plan should be changed to reflect new scientific knowledge and updated language. In addition, protecting soil and water quality will mean reducing the negative effects of large fires, so physical and biological Forest Plan components should be integrated to reflect this interrelatedness.

The current Forest Plan does not adequately address the threats to vegetation communities, wildlife, fish, and rare plants posed by invasive non-native species. There is a need for comprehensive, integrated management direction for meeting these threats. The current Forest Plan also does not adequately address threats to aquatic species.

Mining activities on the Coronado NF have the potential for manifest localized impacts. Although these activities are largely governed by the Mining Act of 1872, the revised Forest Plan should

provide better guidance for mitigation and minimization measures and for mineral withdrawal recommendations to the Bureau of Land Management for designated Special Areas.

Finally, each mountain range is different, so management direction should recognize the specific needs of each, its habitats, and its species. For example, the Santa Catalina Mountains have the largest amount of desert communities, so specific management direction should be described for that specific area. Similarly, the Pinaleno Mountains have the only sub-alpine forest type. An analysis by mountain range will add a spatial dimension that was not considered in the current Forest Plan.

Needed changes to plan components:

- Desired condition statements and objectives need to be developed that provide adequate guidance for sustaining and restoring ecosystems.
- Plan components should be changed to reflect new scientific knowledge and updated language.
- The Forest Plan components for ecological attributes should be integrative, where possible, to reflect the interconnectedness between physical and biological resources.
- The Forest Plan needs to be changed to include objectives and guidelines that reflect systematic observation and analysis of treatment results, and adaptation of treatment methods based on those results.
- As Forest Plan components are developed, they will need to reflect the uncertainties associated with changing climate.
- Plan components for reducing the threat of invasive species and for conserving native species will need to be developed
- Plan components will need to be developed for sustaining aquatic habitats that are at risk.
- Place-based geographic area plan components should be developed where it makes sense to do so. This will help to facilitate understanding of the management needs for each mountain range.

Safety and Information (SE1-2, SE6-7, E7, E9)

The social environment surrounding the Coronado NF has changed significantly since 1986. Although the current plan anticipates negative impacts associated with regional population growth and increased urbanization, it does not identify strategies for sustaining the forest resources and experiences in the face of these changes.

Other unanticipated forces have come to bear in the region, notably illegal activity associated with the international border with Mexico. Undocumented immigrants crossing in to the United States through the Coronado NF from Mexico, as well as drug smuggling activity, cause unprecedented resource damage as well as public and employee safety issues.

The topic of off-highway vehicle management is addressed in the current Forest Plan. However, it is still a prominent issue and updated management direction is needed. The collaborative process for Forest Plan revision reflects desires for increased enforcement of rules for off-highway vehicle use and concerns about effects on visitors' experiences and natural resources. The Forest Service has identified the significant increase in illegal off-highway vehicle activity as a major component of unmanaged recreational use. A related concern is the slow loss of opportunities for quiet recreation. The Coronado NF is currently implementing the Travel Management Rule, which is an opportunity to increase control of motorized vehicle use and decrease user conflicts

and resource damage. The Forest Plan needs to be changed to provide the overall desired conditions for motorized use that the Travel Management Rule will reflect, as well as to address the general suitability of motorized uses in different areas of the Forest.

The current Forest Plan is organized around the concept of management areas that are largely based on the capability of an area to produce certain types of vegetation. This was consistent with the resource “output” based plans of the 1980’s. As such, it does not address social uses, such as motorized vehicle use and recreation, in much detail. The revised Forest Plan needs to do a better job of defining social uses, especially those that are being compromised by increasing use; and those that are destructive. One way to address this topic is to define land use zones that are based on social uses rather than vegetation production communities. This is a strategy that will guide managers in focusing resources to address social problems, as well as to take advantage of opportunities to improve safety and protect resources. Place-based plan components will also help to focus management strategies.

Needed changes to plan components:

- The Forest Plan needs to be changed to identify new strategies for sustaining the forest resources and experiences in the face of changes in population, behavior, and increased development.
- Place-based geographic area plan components should be developed where it makes sense to do so.

Public Access and Travel Patterns (SE4, SE8-9)

The need for legal rights-of-way to allow public and administrative access to the Coronado NF is identified as an issue in the current Forest Plan. Although progress has been made toward the goal of obtaining rights-of-ways, the issue has become more complicated and updated management direction is needed. Currently, less than 100 of the approximately 300 access points to the Coronado NF’s ± 1.7 million acres from outside its proclaimed boundaries have permanent legal access.

The rapid growth of Arizona's population has led to a much greater need for public access to National Forest System lands. At the same time, population growth has led to increased development and impacts on interior and adjacent private lands, resulting in more restricted public and administrative access. Many public roads and highways (County, State, and Federal) pass between Forest units (12 units in 6 counties and 2 states), with private or State Trust lands between those public roads and highways and Coronado NF lands. If access across those private lands is denied, the public and the Forest Service are left without legal access (see Management Challenges in the Social and Economic Environment above).

Public access issues are not easily solved, particularly when dealing with differing opinions from multiple users. A range of concerns have been expressed by the public, including rights-of-way issues; damage and liability issues for private landowners; the ability to use forest trails, roads, and facilities; and considerations to restrict vehicular access in some areas. Flexibility as well as a comprehensive, coordinated, and collaborative public access effort is central to resolving many of this Forest’s public access needs.

In order to meet the challenge of providing adequate and appropriate access to the Coronado NF in the future, the Forest Plan needs to be changed to include desired conditions and objectives that emphasize and prioritize Forest-wide public and administrative access needs. These need to be structured around a particular area within or adjacent to the Coronado NF. This is different than the current approach which identifies specific individual access points, roads, or trails. By

assessing needs based on areas rather than specific points, roads, or trails, flexibility and opportunities to resolve public access issues are increased. Land-use zoning as described in the previous section will also help to focus the efforts for providing adequate and appropriate access to the Coronado NF.

Needed changes to plan components:

- The Forest Plan needs to be changed to include desired conditions and objectives that emphasize and prioritize Forest-wide public and administrative access needs.

Needed changes to management approaches:

- Management approaches should be identified that facilitate comprehensive, coordinated and flexible collaborative solutions for resolving public access needs.

Preservation of Open Space (SE2, SE4-5, E2, E11, E15)

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 issue has been identified by the Forest Service as one of the four greatest threats to ecological sustainability (USFS 2005); however, it is not addressed in the current Forest Plan. If ecosystem sustainability is to be realized, management direction for the Coronado NF will need to consider land uses beyond the Forest boundary (USDA NRCS 2006). The concept of preserving open space is widely recognized as a primary tool for sustaining ecosystem components and processes across landscapes.

This theme overlaps with needs for change identified for ecological sustainability in the recognition of ecological services provided by private lands managed as open space, and the need to protect and provide for wildlife corridors between the sky islands of the Coronado NF. It also reflects the increased difficulty in managing planned and unplanned fires due to increased development along and within the boundary of the Coronado NF. In addition, development and subdivision of private land and the resulting loss of open space leaves large tracts of National Forest System lands without legal access and inaccessible to the general public.

The Forest Plan needs to be changed to include desired condition statements that reflect the role of the Coronado NF in preserving open space by providing forage for livestock grazing, a land use that is compatible with preserving open space, and reducing fragmentation by consolidating NFS lands and private lands with high resource values within its boundaries. Desired condition statements could also reflect the role of the Coronado NF as a cooperating stakeholder in local government land-use planning processes, providing information on how growth decisions will affect public land resources and public access, and including local communities in planning for NFS lands to help coordinate local land use with the Forest Plan. Other possible changes could include guidelines, based on the Scenery Management System, to protect scenic natural landscapes.

Needed changes in plan components:

- Desired condition statements should be developed that reflect the role of the Coronado NF in preserving open space.
- Guidelines, based on the Scenery Management System, should be developed to protect scenic natural landscapes.

Needed changes in management approaches:

- Management approaches for the Coronado NF will need to be developed for participating in county and community land use planning efforts.

Collaboration and Partnerships (SE2, SE4-5, SE8-9, E1-2, E14-15)

In recent years the Forest Service has placed increasing priority on the relationships between national forests and surrounding communities, as well as communities of interest. There is a growing realization that the Coronado NF will need to work in partnership with other entities to sustain the natural and social environment within its boundaries. For example, the effort to sustain species diversity, as with the effort to sustain ecosystem diversity, will require working across jurisdictional boundaries. All agencies and non-governmental organizations that manage wildlife, fish, rare plants, and their habitats need to work together as complete partners, rather than relying on an individual group or agency to bear the burdens of management and conservation. The current Forest Plan does not provide guidance for the type of collaborative conservation efforts that will be needed in the future.

Native American tribes have expressed desires for more accommodation of traditional uses and cultural uses in decision-making and planning, clarification of the role of cultural and other non-economic values in decision-making about such issues as Mt Graham located on the Pinaleno Mountain Range, the incorporation of traditional knowledge in management and planning, attention to site protection and privacy issues in the management of cultural resources, and a desire for cooperative management of resources of mutual interest to the Tribes and the Forest Service. The current Forest Plan addresses cultural resources in one section, separate from the others, and provides no real guidance for incorporating traditional knowledge.

Needed changes in plan components:

- The Forest Plan should include desired conditions that reflect, where possible, outcomes that are based on collaborative processes.

Needed changes in management approaches:

- Management approaches that emphasize collaboration should be described.
- The plan needs to be changed to reflect an integrated approach to management of traditional uses and cultural resources.

Next Steps in the Forest Plan Revision Process

Over the following months, the Coronado NF will be working with the public to develop a proposed, revised Forest Plan that responds to the needs for change identified in this report. The revised plan will be structured in three parts, with each part built from the plan components described earlier in this chapter. Below (Figure 2) is a general representation of how the revised Forest Plan will be organized, and how the various plan components (shown in bold) will be incorporated.

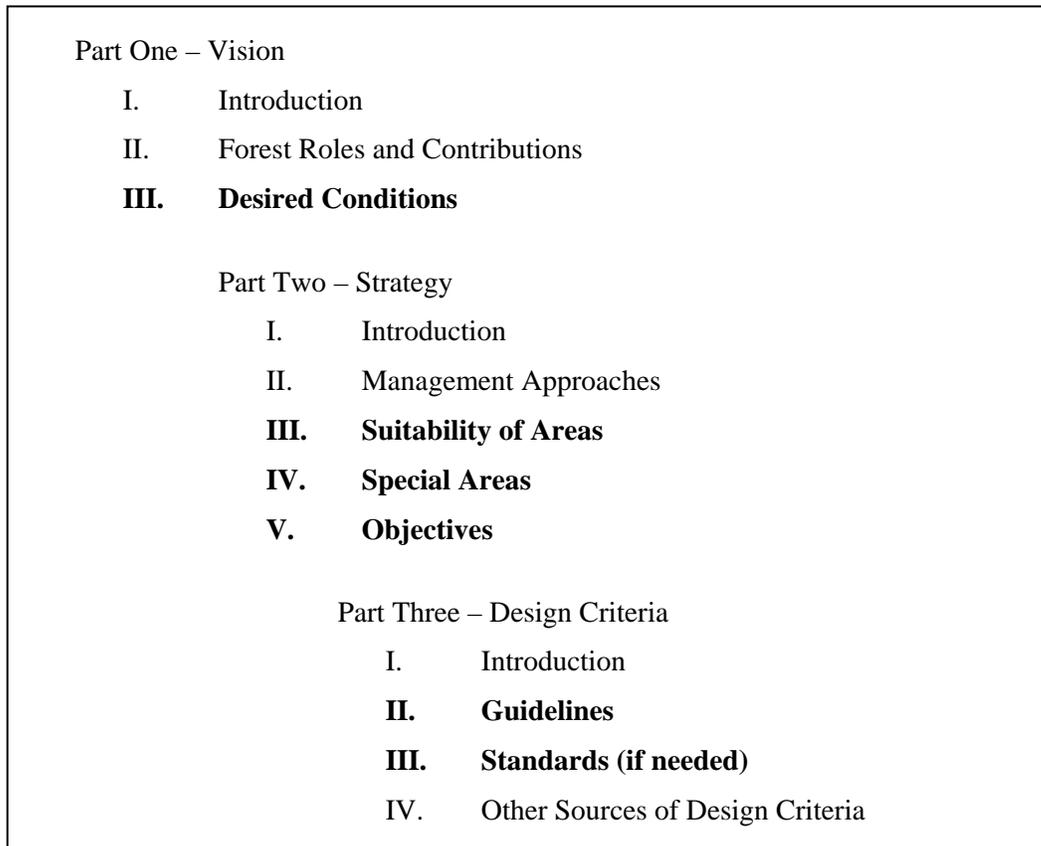


Figure 2. Model of a Forest Plan

As mentioned earlier in this chapter, many elements from the current Forest Plan are still relevant. These elements will be reorganized to fit the new plan model. Elements that are no longer relevant will be removed. New plan components deemed necessary to help sustain the social, economic and ecological systems represented on the Coronado NF will be drafted. The unifying themes to guide change described in this chapter will be the basis for developing the new plan components. Once finalized, the new Forest Plan will be considered as a starting place for a continuous improvement process based on adaptive management.

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