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Service

Southwestern
Region



Analysis of the Management Situation

Prescott National Forest



December 2009

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Cover Photo – Verde River at Duff Springs.
PNF photo

Analysis of the Management Situation

Prescott National Forest
Coconino and Yavapai Counties

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Introduction

The Prescott National Forest (PNF) is managed by the Forest Service, an agency of the U.S. Department of Agriculture. The mission of the Forest Service is to sustain the health, diversity, and productivity of the Nation's forests and grasslands to meet the needs of present and future generations.

The primary challenges of administering National Forest System lands for the citizens of the United States include identifying, managing, and monitoring the health and status of the physical resources (e.g. soil, water, air) that create the environment in which the vegetation and animals live and interact, while balancing the many human uses of the forests (e.g. camping, livestock grazing, firewood gathering, logging, quest for solitude).

The forest plan is the principal document that guides forest managers' decisions about management of the land and resources. The current PNF forest plan was originally approved in 1987. Since then, the forest plan has been amended 17 times to adjust for situations in specific projects or to reflect changes in social, economic, or ecological conditions. The 1987 forest plan was written following the guidance in the 1982 forest planning regulations. The PNF will revise the current plan using the provisions of the 1982 planning rule as outlined in transition language of the 2000 planning rule as amended or clarified in each year from 2001 to 2004.

In preparation for plan revision, the PNF has identified what current guidance is working, what new conditions need to be addressed, and what ongoing challenges could be better addressed. Benchmarks from the 1987 PNF forest plan were also reviewed to determine their applicability as outside limits of possible responses to such changes. The Analysis of the Management Situation documents this work.

What is the Analysis of the Management Situation (AMS)?

The AMS highlights the social, economic, and ecological conditions and trends in and around the PNF, as detailed in the PNF's Ecological Sustainability Report (ESR)(Forest Service 2009), and the Economic and Social Sustainability Assessment (ESSA) (Forest Service 2008a). Both of these documents were developed prior to enjoinder of the 2008 planning rule. Concepts or language specific to the enjoined 2008 rule, such as Species of Concern or Species of Interest will not be carried forward into plan development or the environmental analysis of the proposed plan. However, concepts that still apply under the 1982 rule provisions, such as coarse filter/fine filter analyses will be carried forward.

The AMS summarizes the above findings and uses them, along with public input (see Appendix A), to identify where the current forest plan needs to change due to inadequate or, in some cases, unnecessary guidance for the present and future.

Even though the needs for change identified in this report are expected to be the primary drivers of the development of a revised forest plan, they do not represent a comprehensive list of needed changes. Some areas of the current forest plan are still adequate and timely; that direction will be carried forward into the revised forest plan. Many components of the current forest plan will be modified or removed, for reasons including:

- They describe a purely administrative or procedural function, such as budgeting, rather than the management of land and resources.

- They duplicate direction that can be found in existing law, regulation, or Forest Service policy.
- They are based on outdated policies, science, or information.

This AMS is organized as follows:

Chapter 1 summarizes ecological conditions and trends for ecosystems that encompass the PNF, describing the relationship between physical and biotic factors, and the contribution the PNF provides toward sustaining plant and animal diversity. Key ecological concerns are listed that may require change in policy in the PNF revised forest plan.

Chapter 2 summarizes social and economic conditions and trends within the analysis area of Yavapai County, describing the relationship between the PNF and surrounding communities and the contribution of the PNF to social and economic sustainability. Projections of demand for recreation, grazing, minerals and timber are summarized using secondary data from federal, state, and forest-specific sources that provide a qualitative description of possible future resource demands (More detail can be found in Appendix C). Finally, key social and economic concerns are listed that may require change in policy in the PNF revised forest plan.

Chapter 3 explains that in addition to the integrated list described in Chapter 4, there are required procedures that must be included during the forest plan revision process. It lists each topic area, summarizes the procedure that is on-going or will be completed, and references how results may be included in the PNF revised forest plan.

Chapter 4 describes the steps taken to analyze interactions between key ecological, social, and economic needs for change and create a list of integrated possible needs for change that could be used to focus plan revision efforts.

Chapter 5 summarizes adjustments needed to the current forest plan that may not be part of the integrated needs for change, but are part of the general clean-up of the current forest plan. It defines plan components, references re-wording or reformatting needed, and identifies that redundant or outdated information needs removal.

Chapter 6 provides a brief description of each identified need for change and a rationale for each of the needs for change recommended for focus of the PNF plan revision effort.

Appendix A documents the public participation process and input received related to the forest plan revision process.

Appendix B displays a list of topics that are not expected to be addressed in detail during development of the revised forest plan.

Appendix C provides the November 18, 2009 documentation of analysis of demand for recreation, grazing, minerals and timber.

Area of Analysis

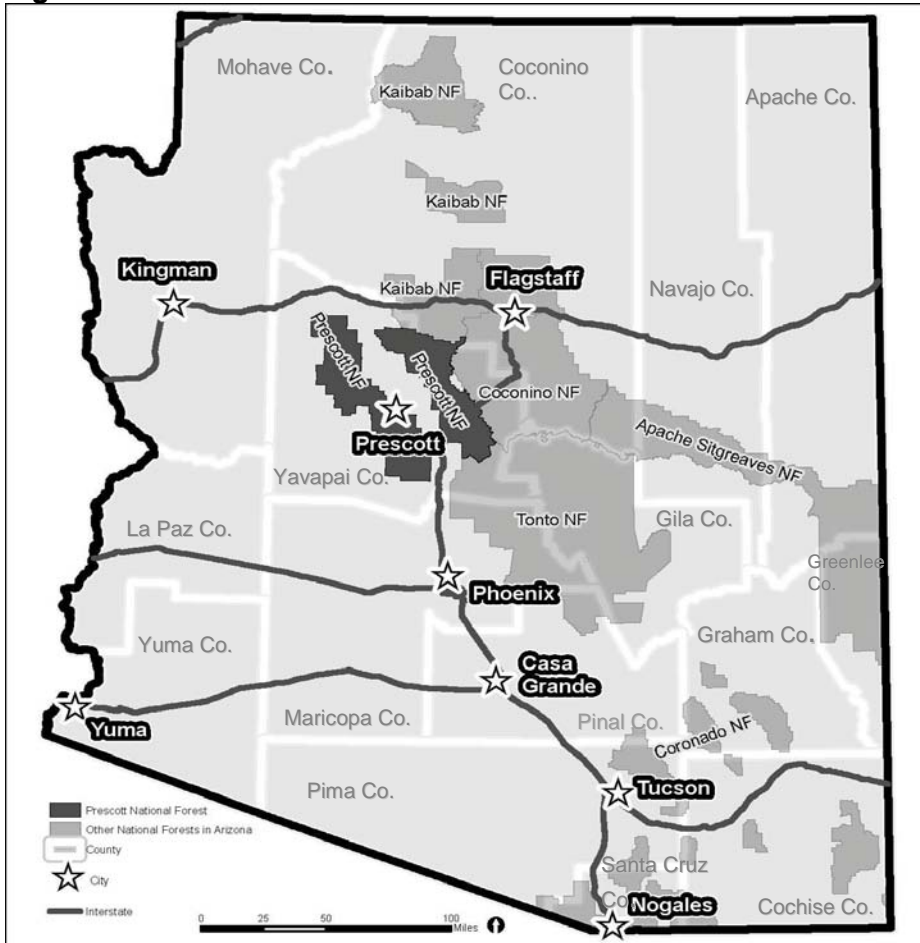
The PNF is one of six National Forests in Arizona, occupying 1.25 million acres within Yavapai and Coconino counties as shown in figure 1. Even though the PNF resides in both Yavapai and Coconino Counties, nearly 97% of the PNF is within Yavapai County. The PNF has little influence on social or economic factors in Coconino County, and recreation use or economic impact on the PNF from those in Coconino County is very limited. Therefore the analysis area for economic and social concerns was limited to

Yavapai County. The PNF borders three other National Forests: Coconino, Kaibab, and Tonto.

The PNF is located in a comparatively mountainous section of central Arizona between the forested plateaus to the north and the arid desert region to the south. Elevations range between 3,000 feet above sea level along the lower Verde Valley to more than 7,900 feet at the top of Mount Union, the highest natural feature found on the PNF.

Roughly half of the PNF lies west of the city of Prescott, Arizona, in the Juniper, Santa Maria, Sierra Prieta, and Bradshaw Mountains. The other half of the PNF lies east of Prescott and takes in the terrain of Mingus Mountains, the Black Hills, and Black Mesa.

Figure 1. The Prescott National Forest is located in central Arizona



Watersheds

The hierarchy of hydrologic units places the PNF within the Lower Colorado River region and within 3 subregions; it includes portions of 3 basins, 8 subbasins, and 22 watersheds. Within this area are important continuously or seasonally flowing stream courses. Table 1 displays names of basins, subbasins and watersheds that overlap the PNF to some degree.

Table 1. Hierarchy of hydrologic units on the PNF and PNF areal contribution to subbasins.

Basin	Subbasin	Percent of subbasin area that overlaps the PNF	Watershed
Bill Williams River	Santa Maria River	16%	Kirkland Creek
			Sycamore Creek
	Burro Creek	4%	Boulder Creek
			Upper Burro Creek
	Big Sandy River	1%	Muddy Creek
The Verde River	Big Chino Wash	16%	Lower Partridge Creek
			Middle Big Chino Wash
			Williamson Valley Wash
			Lower Big Chino
	Upper Verde River	22%	Granite Creek
			Hell Canyon
			Grindstone Wash
			Sycamore Creek
			Cherry Creek
	Lower Verde River	3%	Fossil Creek
Lower Gila/Aqua Fria Rivers	Aqua Fria River	19%	Ash Creek and Sycamore Creek
			Big Bug Creek
			Black Canyon Creek
			Bishop Creek
			Aqua Fria River-Lake Pleasant
	Hassayampa River	13%	Upper Hassayampa River
			Middle Hassayampa River

Note that in the table, basins cover the largest amount of area and are divided into subbasins, which are in turn divided into watersheds. The names listed are titles that reference a geographic area, not just a river corridor. For instance, the portion of the Verde River from the city of Clarkdale west to its headwaters is commonly called the Upper Verde River. However, portions of that stream segment flow through Granite Creek, Grindstone Wash and Cherry Creek watersheds.

Climate

Climate is variable due to the uneven topography and resulting wide range in elevation. Temperatures vary widely during the year depending on elevation and time of year. At lower elevations (3,300') the average low temperature is 45 and average high is 78 degrees F. At 7,000 feet of elevation the average low temperature is 34 degrees and average high is 66 degrees F. Precipitation is also highly variable with average annual precipitation of 12 inches in Chino Valley, 20 inches in Prescott and 27 inches at Crown King.

Vegetation

The vegetation on the PNF is complex and diverse. South of the Bradshaw Mountains there is true Sonoran Desert dominated by saguaro cacti and paloverde trees. Less than 10 miles upslope from the desert, there are cool mountain forests where conifer and aspen trees grow. In between, there are a variety of plant and animal habitats including grasslands, chaparral, pinyon-juniper woodlands, and ponderosa pine forests.

The PNF supports 13 Potential Natural Vegetation Types (PNVTs). PNVTs are groups of land that share similar aspect, elevation, vegetation, soil parent material, and historic disturbances such as fire. Four PNVTs cover 83% of the PNF, including Interior Chaparral, Pinyon-Juniper Evergreen Shrub, Pinyon-Juniper Grassland, and Semi-Desert Grassland. Only about 106,000 acres of Ponderosa Pine are found on the PNF at higher elevations. Table 2 displays PNVTs on the PNF and percent contribution of each to the total area of the PNF.

Table 2. Potential natural vegetation types and their extent on the PNF

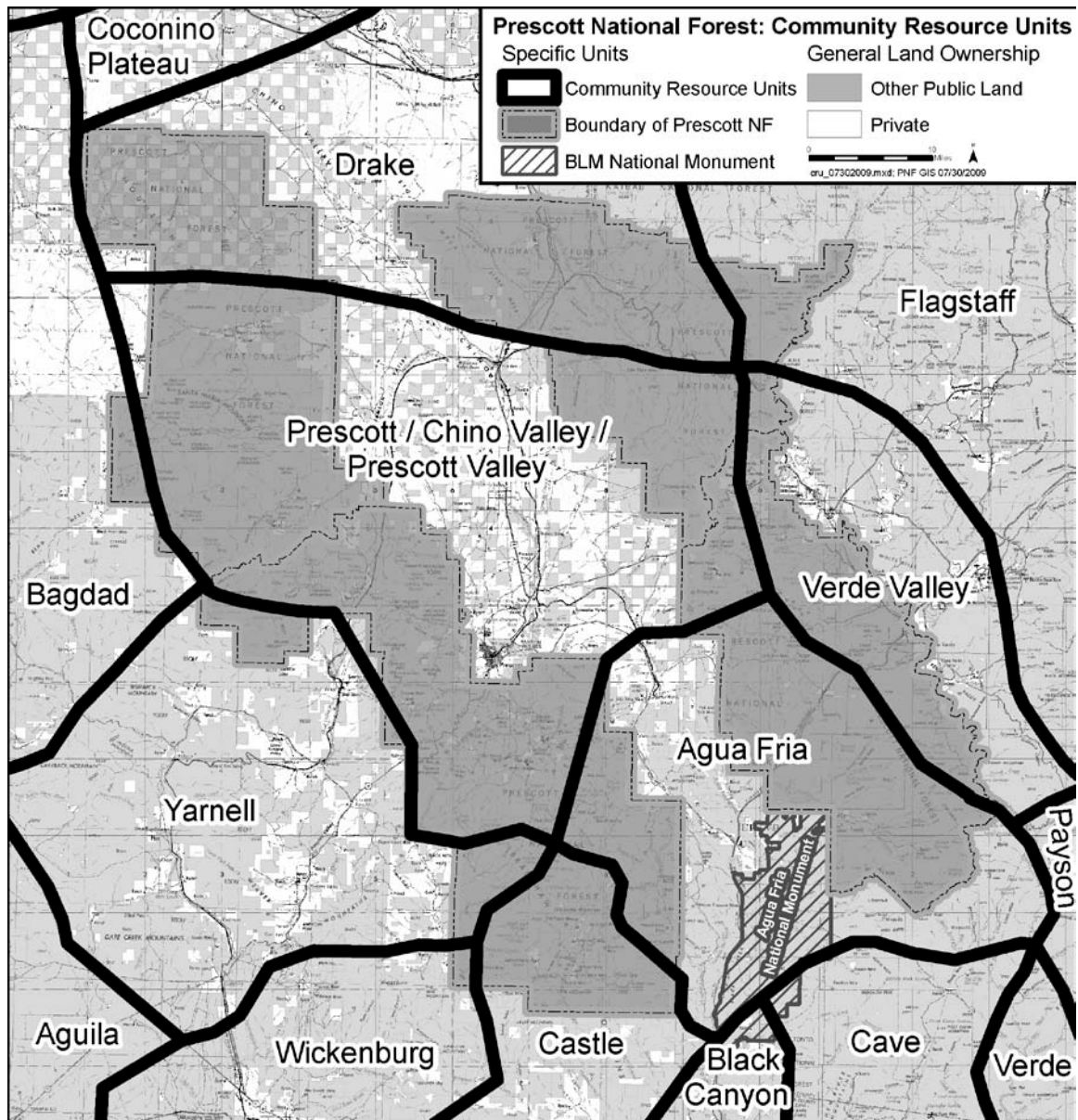
PNVT Name	Prescott National Forest	
	Acres	Percent
Interior Chaparral	315,620	25
Pinyon-Juniper Evergreen Shrub	460,660	37
Pinyon-Juniper Woodland	39,580	3
Pinyon-Juniper Grassland	137,450	11
Semi-Desert Grassland	125,760	10
Colorado Plateau Grassland	38,470	3
Ponderosa Pine-Evergreen Oak	63,540	5
Ponderosa Pine Forest	42,440	3
Mixed-Conifer Forest with Frequent Fire	6,670	<1
Mixed Conifer with Aspen	80	<1
Desert Communities	5,920	<1
Madrean Encinal Woodland	5,580	<1
Riparian Forest	12,400	1
Total	1,254,170	100

Source: (Forest Service 2009)

People

The PNF overlaps 9 Community Resource Units (CRU), defined as community zones of influence based largely on settlement patterns and geographic features (Kent 2007). This is the area to which residents of each community feel connected. Figure 2 shows the community resource units that make up the majority of PNF area include those named Prescott/Chino Valley/Prescott Valley, Agua Fria, and Verde Valley. Several communities completed vision statements that are expected to be a basis for development of desired conditions in the proposed revised plan. Vision statements from 11 communities can be found in Appendix A.

Figure 2. Community Resource Units on the PNF



(Confab 2007)

Recreation

The mild climate of the PNF encourages year round recreational activity. Trail and day use are primary types of activity including off highway vehicle riding, hiking and biking. Most visitors live in Yavapai County. Maricopa County residents are the next most abundant with portions of the PNF located less than 90 miles from the Phoenix metropolitan area.

There are 18 developed sites on the PNF; those with highest use include Thumb Butte, Lynx Lake Recreation Area, and Granite Basin Recreation Area. The area surrounding the city of Prescott—the Prescott Basin—has the highest concentration of recreational activity on the PNF and limits primitive camping to designated sites.

Eight designated wilderness areas comprise more than 116,000 acres entirely or partially within the PNF.

Forest Recreation Niche Statement:

Prescott National Forest – Where the Desert Meets the Cool Pines

The Prescott's unique mix of climate zones provide for "cool zone" heat relief from the Arizona sun in the summer and a "warm zone" in the winter. The Forest offers short duration day use recreation on trails supported by development that provides staging areas and resource protection. Adventure activities are strategically managed to be compatible with one another to preserve the natural setting and the ecosystems of the forest.

Commodity/Consumptive Uses

Fifty-four permittees were issued 60 permits to graze cattle on the PNF in 2008. Permitted grazing areas generally are contiguous with privately-owned ranchland, and ranch owners or managers depend on the PNF for grazing to provide ranch income. Communities historically were sustained by ranching and mining and vestiges of those activities remain in the current culture. Current mining activities include flagstone quarries, gold placer mining, and one permitted limestone operation. Timber production is not a major influence on the Yavapai County economy at present, but is used primarily as a tool for fuel reduction and ecosystem restoration.

Chapter 1. Summary of Ecological Conditions and Trends

The PNF Ecological Sustainability Report (ESR) was prepared as a summary of the historic and current conditions of the ecosystems that encompass the PNF. The report describes relationships between the physical environment and surrounding biotic communities and the contribution of the PNF towards sustaining plant and animal diversity. The ecosystems within and near the PNF have undergone substantial change over the last 100+ years that have affected and will continue to affect the management of the Prescott National Forest.

This evaluation considers ecological information at various scales including: within the boundaries of the PNF; the surrounding ecoregion sections and subsections ¹; and the watersheds that overlap the PNF. The following is based on the PNF Ecological Sustainability Report, unless otherwise indicated, and summarizes key conditions and trends.

Status of the Physical Environment

The physical environment includes the air, climate, soils, water and watersheds of the PNF. They provide life-sustaining elements to the plants and animals that live there.

Air

Air quality over the PNF is considered to be good. Forest management actions, such as prescribed burning and dust from unsurfaced roads, contribute to air pollution, but are of limited duration and/or intensity. The presence of smoke can prompt concerns from local citizens and visitors.

Two Class I airsheds occur within or adjacent to the PNF: Sycamore Canyon Wilderness (47,757 ac) and Pine Mountain Wilderness (20,061 ac). Class I airsheds are one of three classes provided for in the Clean Air Act and are the “cleanest” of the classes receiving special visibility protection. Visibility impairment has been documented in all Class I areas in Arizona, generally due to regional haze. If recently adopted state and federal regulations related to air quality are met, visibility is expected to steadily improve over the next several decades.

Airsheds over the PNF outside of Class I areas currently meet national standards for clean air as measured by six criteria pollutants (carbon monoxide, lead, nitrogen dioxide, sulfur oxides, ozone, and particulate matter).

Climate Change

Climate scientists agree that human activities have led to elevated atmospheric concentrations of carbon dioxide (CO₂) and other greenhouse gases that cause global warming, and observed concentrations are projected to increase. Climate change may

¹ Ecoregion sections and subsections are units in the National Hierarchy of Ecological Units ranging in size from 34 million acres (section) down to 300,000 acres (subsection) that describe areas of similar environmental and biological features. The PNF is located within three ecoregion sections: Tonto Transition 92%; White Mountain-San Francisco Peaks-Mogollon Rim 5%, and Mohave Desert 3%.

intensify the risk of ecosystem change for terrestrial and aquatic systems, affecting ecosystem structure, function, and productivity.

The potential ecological implication of climate change trends in the Southwest include: increasing temperatures; more extreme disturbance events, including wildfires, intense rain and floods, wind events, and drought; reduced precipitation; and shifts in the timing of snowmelt. The consequences of climate change are unknown but may affect resources such as water, vegetation, and animals.

Soils

Almost 50 percent of the soils on the PNF are in satisfactory condition. These soils are functioning properly and normally and are primarily those associated with conifer forests, oak woodlands, and chaparral vegetation.

Approximately 35 percent of the soils on the PNF have impaired conditions indicating that the ability of the soil to function properly has been reduced and/or there exists an increased vulnerability to degradation. Impaired conditions occur across all vegetation types but are proportionally highest in the riparian forests (affecting 9,450 ac) and semi-desert grasslands, affecting about 114,860 acres.

At least 15 percent of the soils on the PNF, primarily those associated with grasslands and woodlands, are considered to be in unsatisfactory condition resulting in ecosystem degradation and habitat conversion (including loss of grasslands). The pinyon-juniper grasslands have the highest level of unsatisfactory soil condition at 62 percent.

Unsatisfactory soil conditions signify an unnatural level of erosion is occurring which, in turn, can impact streams and rivers and the species dependent on them as well as the vegetation that grows on them. Some soils in unsatisfactory condition in the grassland and woodland vegetation types may be irreversibly disturbed and may not be able to return to their historic productivity.

The PNF has experienced several years of drought (since about 1997) resulting in reduced upland vegetative growth and ineffective vegetative ground cover increasing the risk of accelerated erosion and sediment delivery to streams during storm events.

Water and Watersheds

The PNF land base falls within portions of eight subbasins. The Verde River is the only perennial stream with continuous flow in the planning area. Streams in the Agua Fria and Hassayampa river subbasins are perennial interrupted (i.e. discontinuous flows) systems. The PNF contributes only 11 percent of the total perennial or perennial interrupted stream miles that occur within the eight subbasins (79 of 739 stream miles). The highest proportion is within the Hassayampa subbasin where the PNF provides 42 percent or 13 miles. There are approximately 52 miles of the Verde River within or forming the boundary of the PNF.

Overall, the PNF water quality is considered to be good to excellent. However, there are stream segments within the Aqua Fria River, Hassayampa River, and Upper and Lower Verde River subbasins that currently do not meet state and national water quality standards and are classified as impaired. Trends in water quality are considered to be upward or improving.

Watershed integrity (or wholeness) is a function of natural geomorphology (landform), and the soil and vegetation conditions found in the uplands. Upland conditions affect the water quality, quantity, and timing of delivery downstream that are important to the

sustainability of riparian and aquatic habitats. The uplands within the Big Chino Wash, Big Sandy River, Burro Creek, and Upper Verde River subbasins have reduced watershed condition integrity due to departed soil and/or vegetation conditions.

The highest precipitation in central Arizona occurs on forest lands and contributes substantially to surface flows, groundwater recharge, and maintenance of groundwater dependent seeps and springs. These areas provide drinking water sources for wildlife as well as municipalities downstream. Within several watersheds of the Aqua Fria River, Hassayampa River, and Santa Maria River subbasins the PNF lands provide a high water yield potential relative to the overall subbasin area.

Riparian areas, wetlands, seeps and springs tend to be a focal point for use by humans, wildlife, and livestock. PNF lands provide the majority share of these hydrologic features within several subbasins (Aqua Fria River, Big Chino Wash, and Hassayampa River). The abundance and distribution of these hydrologic features across the landscape increases the probability that these subbasins will continue to function in a way that contributes to ecosystem resiliency and diversity over time.

Status of the Biota

The biota includes all of the plants and animals that live on the PNF. We identified 13 major vegetation types or groupings. We evaluated more than 380 vertebrate species including 36 fish, 10 amphibian, 22 reptile, 222 bird, and 98 mammal species. In addition, we evaluated 124 invertebrate species (such as insects or snails) and 303 plant species associated with the PNF.

Vegetation

Interior chaparral and pinyon-juniper evergreen shrub are the most abundant vegetation types on the PNF (25 and 37 percent, respectively). These vegetation types along with pinyon-juniper woodlands have only minor differences from historic conditions in terms of structure, composition, and disturbance patterns (figure 3). In the future, these vegetation types are expected to remain near their historic conditions and function in a way that contributes to plant and animal diversity over time.

Ponderosa pine and mixed conifer forests, that typically experience frequent fire, are the most departed from their historic conditions. Historically, these forests had an open appearance with a variety of ages and sizes of trees and were maintained by frequent, surface wildfires. Today, these forest types are mostly dense groups of mid-aged smaller diameter trees that are prone to stand-replacing crown fires. Continuing with the current management under the existing land management plan direction is insufficient to improve ecological conditions for the future (figure 3).

The grassland types in general and semi-desert grasslands in particular, have incurred conspicuous vegetation changes from historic conditions. These changes include the encroachment of trees and shrubs, loss of perennial grass cover, and spread of non-native species. Some grassland areas are now considered non-restorable because site characteristics have changed (e.g. loss of topsoil). More importantly, models indicate that PNF grassland conditions could continue along this trend if current management levels related to fire frequency are continued into the future (figure 3).

Riparian areas are unique habitats that occur near the banks of rivers and streams and are important because of the rarity of water in the Southwest. Although they comprise less than 2 percent of the planning area, over 15 percent of this habitat within the larger

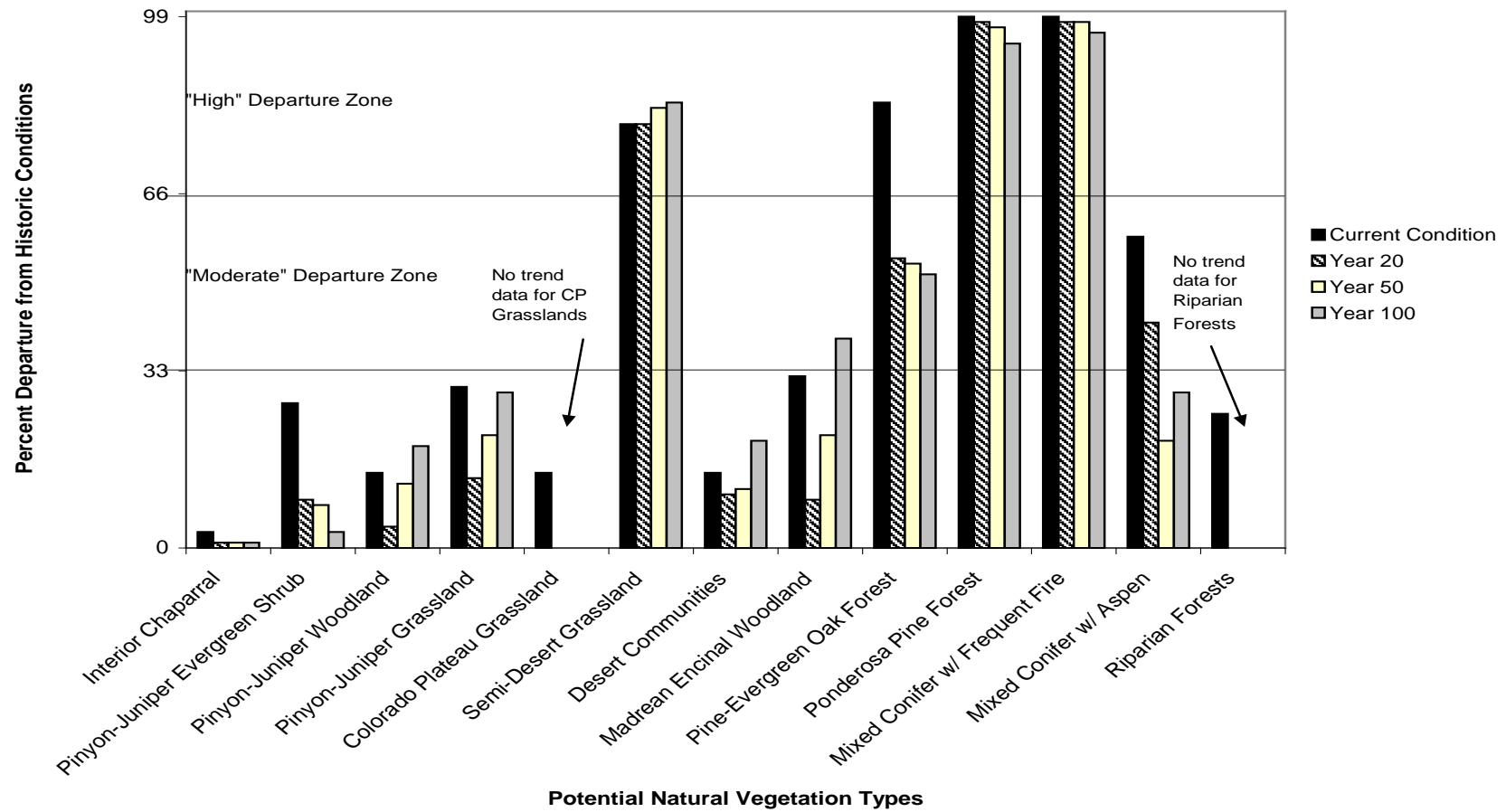
analysis area² occurs on the PNF. Therefore, PNF management is very influential and makes a major contribution to the sustainability of these habitats within central Arizona.

Fire is a natural component and plays a role in sustaining many Southwestern ecosystems, yet 9 of the 13 vegetation communities are out of sync with historic natural fire patterns (for most PNVTs fires are not frequent enough, but for riparian and desert communities fires are too frequent). Dramatic changes in fire size, frequency, intensity, severity or landscape pattern are a result, as evidenced by the 2005 Cave Creek Fire, which burned more than 243,000 acres across the Prescott and Tonto National Forests.

Greater numbers of non-native invasive plants are found on the PNF each year; currently there are over 15,000 acres infested. These infestations can grow and spread at rapid rates and place native plants at risk by aggressively replacing them. There are many negative ecological impacts associated with non-native invasive weeds including changes in species composition, natural fire regime, and habitat for native wildlife species. Riparian areas and semi-desert grasslands on the PNF have been more susceptible to invasion than other vegetation types.

² The 7.5 million acre ecoregion section, Tonto Transition, includes 92 percent of the Prescott National Forest and other lands.

Figure 3. Current and predicted divergence from historic condition of the vegetation types found on the PNF³



³ Trend data for the Colorado Plateau Grassland and Riparian Forest PNVs are not shown because at the time of analysis there was no model available to forecast structure and composition trends through time.

Species Diversity

At the time the 1987 forest plan was approved, there were seven species identified as threatened or endangered on the PNF: two birds (American peregrine falcon and bald eagle) and five fish (Colorado pikeminnow, spinedace, Gila topminnow, Gila trout, and woundfin). Since that time, the American peregrine falcon has been removed from the federal list, while the Mexican spotted owl and Southwestern willow flycatcher have been added. Three fish species (Gila topminnow, Gila trout, and woundfin) suffered introduction failures, however potential habitat persists for Gila topminnow and Gila trout. Three others have since been listed (Gila chub, razorback sucker and loach minnow) but only potential habitat exists for the loach minnow. At present, there are seven federally threatened or endangered animal species thought to be present on the PNF (bald eagle, Mexican spotted owl, Southwestern willow flycatcher, Colorado pikeminnow, spinedace, Gila chub, razorback sucker) with potential habitat for three species (Gila topminnow, Gila trout, loach minnow).

A comprehensive list of species having habitat or population concerns has been evaluated. This list is composed of:

- Threatened and Endangered (T&E) - species listed under the Endangered Species Act
- Species at risk or of special emphasis - those species that may require management action to prevent listing under the Endangered Species Act or that may require management action to achieve ecological or other multiple use management objectives

Using this comprehensive list of species as a starting point, evaluation was conducted looking at several factors:

- whether there are known occurrences or suitable habitat for the species on the PNF
- how management of the PNF may affect the species, including occasional and accidental species
- whether there is enough information known about the species in order to formulate management direction
- consideration of species' habitat requirements, abundance, and threats

The majority of species depend on one or more of the vegetation types presented in figure 3 for their habitat. As mentioned earlier, some vegetation types vary substantially from historic conditions. Altered habitat conditions elevate the risks to species diversity throughout the planning area. Identified threats to the vegetation types also threaten the species associated with these types.

Some species depend on specific ecological characteristics such as cliffs, caves, tree cavities, specific soils, or rock formations. Threats to these features threaten the species dependent on them.



Mexican Spotted Owls are associated with Ponderosa Pine and Mixed Conifer Forests. MSOs are also associated with habitat features including riparian areas and tree cavities. Photo by Brian Wooldridge, USFWS photo

Some species have additional threats not related to the vegetation or habitat features with which they are associated. An example includes threats associated with human disturbance during sensitive life stages (e.g. breeding or hibernation). It is estimated that as many as 29 species may need to be addressed more specifically during development of the revised forest plan, because adjustments made related to ecosystem character might not provide for their sustainability.

Occurrence of fifteen native fish species has been recorded in the aquatic habitats of the PNF, either historically or currently. Currently, only 9 of the 15 native fish species occur within the PNF.

The Verde River watersheds have the highest native fish species diversity in the planning area. However, original populations of the Colorado pikeminnow, razorback sucker, Gila topminnow, Gila trout, and loach minnow were extirpated in the past. The Colorado



PNF and The Nature Conservancy staff performing fish monitoring and habitat assessment work on the Upper Verde River. PNF photo

pikeminnow and razorback sucker are currently being introduced into the lower Verde River but with limited success. The Gila topminnow, loach minnow, and spinedace were recently introduced into Fossil Creek on the Coconino National Forest (Lower Verde River subbasin) in restoration efforts.

Native fish populations within Arizona (Lower Colorado region) have experienced declines in their distribution because of loss or modification of habitat and from competition and predation by introduced nonnative fish and wildlife. Seven of the nine native fish species known on the PNF have undergone declines in distribution across the region. In contrast, the majority of nonnative fish that have been introduced have shown substantial increases in their distribution over time.

Key Ecological Concerns

The following is a list of the ecological concerns identified from the information described previously that may require change in policy in the PNF revised forest plan.

- Climate change may intensify the risk of ecosystem change for terrestrial and aquatic systems, affecting ecosystem composition, structure, and function. The PNF needs to address the emerging issue of climate change by incorporating adaptive management strategies and describing ecological conditions that are resilient to potential shifts in temperature and precipitation patterns.
- Approximately one-half of the soils are estimated to have reduced soil function or increased level of erosion. Recent drought has contributed to reduced vegetative growth and ineffective ground cover. To maintain or improve watershed integrity, the PNF can examine opportunities to increase organic matter levels where practical, thus reducing soil loss and improving soil function on affected PNVTs including: PJ Evergreen Shrub, PJ Woodland, PJ Grassland, Colorado Plateau Grassland, Semi-Desert Grassland, Desert Communities, Madrean Encinal Woodland, and Riparian Forest.
- The integrity (or wholeness) of PNF watersheds is a function of natural geomorphology (landform), and the soil and vegetation conditions found in their uplands. Upland conditions affect water quality, quantity, and timing of delivery downstream that are important to the sustainability of riparian and aquatic habitats. The PNF can protect watershed integrity by ensuring that desired upland conditions are maintained and that natural stream morphology is not compromised in the Upper Verde River, Aqua Fria River, and Big Chino Wash watersheds.
- There is concern that off-PNF withdrawals from both surface water streams and connected groundwater aquifers may affect streamflow and associated riparian and aquatic habitats. Off-PNF groundwater pumping may exceed the inflow of water now or in the future for five of the eight subbasins associated with the PNF. The PNF can explore ways to ensure continued existing levels of surface water yield and ground water potential on the PNF.
- Overall water quality is considered to be good to excellent. However, there are some streams on the PNF that currently fall short of meeting state and federal water quality standards. The PNF needs to identify and protect drinking water sources; protect municipal watersheds; and ensure the highest water quality possible.
- The vegetation structure and composition of several PNVTs on the PNF are moderately or highly departed or are trending away from their historic range of conditions (i.e. PJ Grassland, Colorado Plateau Grassland, Semi-Desert Grassland, Madrean Encinal Woodland, Ponderosa Pine-Evergreen Oak Woodland, Ponderosa Pine Forest, and Mixed Conifer with Frequent Fire). Because these PNVTs are out of sync with their natural fire regimes, restoration efforts need to include modifying the frequency and severity of fire patterns in addition to structure and composition.
- Because the vegetation of Riparian Forests and Desert Communities are not adapted to fire, individual plants are easily damaged or killed from fire. Native plant communities require long periods of time to recover post-fire. These PNVTs require protection from uncharacteristic wildfire occurrence which includes human-caused fires.
- There is a threat to PNVT sustainability from non-native plant invasions. The PNF needs to focus on preventing future introductions of non-native plant species, conducting early treatment of new infestations, and controlling established infestations, especially in the Semi-desert Grassland and Riparian Forest PNVTs.

- Native fish and other aquatic species are in decline within several watersheds. Non-native invasive animals, such as non-native fish, crayfish and bullfrogs, are a growing threat to native species. Habitat improvement and treatment of non-native predators and competitors may help to change the trend.
- There are some plant and animal species that need further consideration in the planning process. Though the majority of these species should be provided for if there are improved ecological conditions in the vegetation communities, there are species that are dependent on changes in specific ecological characteristics (e.g. logs, tree cavities) or non-habitat related conditions (e.g. human disturbance). Opportunities exist to address needs of plant and animal species as they relate to ecosystems and, more specifically, address habitat features or other threats as needed to ensure maintenance of species diversity and viability.

Chapter 2. Summary of Social and Economic Conditions and Trends

The PNF Economic and Social Sustainability Assessment (ESSA) was prepared to provide a profile of the social and economic environment encompassing the PNF. It describes the relationship between the PNF and surrounding communities and the contribution of the PNF to social and economic sustainability. Communities within and near the PNF (within Yavapai County) have undergone substantial social and economic changes over the last 20 years that have affected and will continue to affect the management of the PNF. The following is based on the PNF Economic and Social Sustainability Assessment, unless otherwise indicated, and summarizes key conditions and trends.

Demographics

Population growth in Yavapai County far exceeded the rate of increase in overall state population from 1980 to 2000 (146% versus 89% respectively). The median age of 45 (2000 Census) has increased from 42 in the 1990 Census, and is significantly higher than the state's median age of 34 in 2000. The county's 65 and older population at 22% is substantially higher than the state of Arizona at 13%. Of the increase of 167,517 residents in Yavapai County between 1990 and 2000, 32% moved into Yavapai County from another place.

Housing

Housing units have increased and, based on approvals for future subdivisions within the county, are expected to continue to increase. With increases in housing, it is likely that more development will take place near PNF boundaries and add to the risk of wildfire effects on structures such as homes.

Visitors

Total estimated PNF visitation was up 63% in 2007 compared to 2002. Most visitors come from Yavapai County (62%); the second highest source location of visitors to the PNF (27%) is Maricopa County (Forest Service 2008b)⁴.

Recreation Use

Visitor numbers at PNF developed recreation sites have remained stable or increased slightly over time. Between 2002 and 2007, information on numbers of users paying fees at developed sites ranged from 204,900 (2005) to 219,300 (2004).⁵

⁴ The National Visitor Use Monitoring (NVUM) effort took place on the PNF in 2002 and 2007 and was most recently reported in 2008. The 2007 information was not available for the October, 2008 PNF Economic and Social Sustainability Report but has been used in this document to describe trends.

⁵ Taken from information on fees paid.

The PNF mix of climate zones allows for year-round recreation leading to a high interest in trail-based recreation. The majority of visitors to the PNF use forest trails



Facilities at Lynx Lake Day Use Area. PNF photo

(approximately 70% in 2007); there is high demand for desired experiences on a finite resource. Monitoring information from Fiscal Year 2007 reported that use of motorized trails in 2007 included 4.2% of survey respondents while 2002 results showed 3.0%. This represents a 39% increase from 2002 to 2007. Number of visitors who participated in hiking or walking increased by 31% (from 52% to 68%) between 2002 and 2007 (Forest Service 2008b).

Eight wilderness areas comprise 116,000 acres. Visitors to designated wilderness were estimated at 15,800 in Fiscal Year 2002 and 40,400 in Fiscal Year 2007 (Forest Service 2008b).

Demand for outdoor recreation is expected to grow indefinitely. As long as populations are increasing, so will the demand for recreation on the PNF. Non-consumptive wildlife and developed recreation will grow the most, exceeding the Forests' ability to supply. Capacity of general forest areas and designated wilderness is expected to experience slower demand growth during the next planning cycle.

Land Use and Land Ownership

Ownership within Yavapai County includes 38% Forest Service administered lands. With 37% other publicly owned or tribal lands, only 25% of land is privately owned. A higher than average rate of population growth combined with limited lands for development sensitizes residents to land development, land exchange, and land uses. Uses include mining and ranching in rural areas and commercial uses near urban centers.

Open Space

Policies aimed at preserving open space have been mentioned in the Yavapai County General Plan and the Verde Valley Regional Land Use Plan. The PNF faces challenges in managing land parcels that are not contiguous with the majority of the PNF. Illegal uses such as unauthorized OHV use and trash dumping make meeting responsibilities for managing such parcels for "Wildland" character difficult and expensive. Land exchanges or acquisitions may be used as a tool by the PNF to retain or increase land in "open" condition, however, management concerns would need to be addressed. Demand is also likely to increase for potential land exchanges for development or for associated utilities and access.

Transportation, Forest Access, and Utility Corridors

County and State transportation plans emphasize the need for improved planning through regional approaches linking transportation and desired land use. Utility corridors are also increasing in number to meet the demand of increasing population. Recent utility routes that cross PNF are the Transwestern Pipeline and the 69 KV Copper Canyon power line.

Informal permission is often granted by private land owners for access to the PNF for management or recreational access. As these lands become developed or change ownership, the PNF may lose access and rights-of-ways may need to be acquired.

Commodity/Consumptive Uses

Recent trends on the PNF show grazing permits remaining relatively stable. In 1986, the PNF issued 57 grazing permits; in 2008, 54 permittees were issued a total of 60 permits.

The share of total demand for grazing within the market area (as measured by cattle inventory) that could be supported by actual use on the PNF has ranged from a high of approximately 4.5 percent of the market area cattle inventory in 2004 and a low of 2.7 percent in 2001.

While the share of total demand provided by the Prescott is small, it may be

more important for smaller areas within the market area. However, the actual Head Month use numbers must be used with caution as the supply of grazing is limited, and factors other than demand may limit grazing use on the forest. In addition, this trend is uncertain given the wide degree of variation in actual use over the relatively short period examined (See Figure 3B, Appendix C). Despite these limitations, actual use trends on the Forest indicate a possible trend of increasing demand for PNF forage relative to cattle inventory within the market area.

From 1986 to 2002, timber sale contracts issued ranged from zero to two per year totaling 11 contracts. During the period from 2003 through March of 2008, 22 timber sale contracts for 39,021 hundred cubic feet (ccf) were sold in response to mortality caused by insect infestation. Expectations are that current levels will stabilize at about 3,600 ccf per year. From 2001 through the second quarter of 2008, the PNF issued 7,428 firewood permits. Each permit allows collection of a maximum of 8 ccf (10 cords) of dead and down wood. This use is trending upward with issuance of 679 permits in 2001 and 1,207 issued in 2008.

Our comparison of inventory and demand assumes that all supplies of timber in Arizona national forests are available for commercial timber harvest and ignores such factors as



Livestock grazing on the PNF in Pinyon-Juniper shrubland
PNVT. PNF Photo

harvest economics, steep terrain, and resource quality. Under this baseline estimate, current annual demand represents only 0.05 to 0.15 percent of inventory in the state. Consequently, there appears to be sufficient timber inventory to sustain current consumption rates indefinitely assuming moderate rates of growth. Given the lack of available information on net annual growth for the PNF, a baseline comparison of inventory and demand cannot be made. Similarly, a lack of information on total timber demanded from primary wood processing facilities is unavailable given a lack of information on current consumption from these facilities. However, recent estimates of capacity suggest that area facilities have the capacity to accommodate existing removal. The change in forest service management focusing on removal of smaller size classes does not mean demand for these materials will follow. These materials may increase in demand with favorable market conditions, changes in energy markets and continued programs that incentivize industry development.

The PNF has abundant deposits of metallic minerals; existing activity includes five mineral material contracts for removal of flagstone, one contract for schist removal, and one contract for removal of decomposed granite. One limestone operation exists with approved commercial plan of operations. Gold mining is limited to placer and/or lode mining. Placer operations would involve mining from alluvial deposits such as panning. Lode operations, also known as hard rock mining, consist of mining a vein bearing gold or a rock in-place valuable mineral deposit. Most placer mining is recreational use or small commercial operators; the Gold Basin Project has the only approved plan of operations.

Mining interests are most abundant for gold and copper, and exploration for both commodities is highly influenced by market conditions. Productive copper mines could be located on various parts of the forest, and future development proposals are possible. It is likely that demand for both copper and gold will increase in the future.

Extraction of construction related materials (cinders, crushed stone, dimension stone, and landscape rock) has occurred to a varying degree in recent years. Demand for construction materials is influenced by local industrial activities and economic conditions. As current markets rebound, PNF managers may face an increase in the demand for these types of minerals. Overall, the Forest's capacity is expected to allow for sustainable mining operations and additional proposals are likely to appear during the next planning cycle.

Economy

Service-related industries currently employ the highest number of people in the county, followed by retail trade. These industries are most likely to be impacted (though indirectly) by recreation activities on the PNF, and the recreation program contributes the most economic stimulus of PNF programs.

Even though the total contribution of the PNF to labor income is only 1% of Yavapai County's economy, that contribution is estimated to be about 31 million dollars. Local industries most dependent on PNF programs are agriculture; mining; and arts, entertainment and recreation. In particular, 10% of the PNF contribution to the local economy is attributed to labor income in the Agricultural sector. Ranching and forest product industries fall within that category.

Community Engagement and the Wildland Urban Interface

The PNF has a history of building relationships with those who live in and near the Forest. Consultation with tribal groups, partnerships with local, state, and federal agencies, and project accomplishment through cooperation with interest groups are examples. Use of volunteers is increasing, and with the number of retirees in the local population, there may be those who would like to be involved but have not yet found the opportunity.

A major partner with the PNF is the Prescott Area Wildland Urban Interface Commission which facilitates cooperation between the PNF, local fire departments, other agencies, and homeowner's associations to raise awareness of the risks involved in living in the interface between wildland and developed areas. With housing increases, many structures are located within this interface. Controlled burns are often the most cost-effective means of decreasing fuel build-ups near the interface, thus decreasing wildfire risk. However, residents often find smoke emissions from controlled burns to be a nuisance or possible health risk.

Key Social and Economic Concerns

The following is a list of areas identified as a result of information described previously that may require change in policy in the PNF revised forest plan.

- Utility and large road corridors are being proposed to respond to population increases, and the PNF may be considered as part of proposed routes. The PNF needs to develop strategies in anticipation of these proposals.
- Access to the PNF may be affected by changes in landownership and related lapse of informal agreements to cross non-PNF land for fire protection, administration, and recreational activity. The PNF needs to obtain rights-of-ways for roads that cross non-PNF lands and are needed to gain adequate access to the PNF.
- The PNF, local governments and individuals have interest in retaining lands as open space in areas surrounding communities to retain views and avoid development. With population increases and related increases in housing, many local people perceive that open space is decreasing and have concerns about development of former PNF lands as a result of possible Forest Service land exchanges.
- Population growth in the assessment area has caused a high demand for PNF recreation resources. If not properly managed, overcrowding and resource damage could occur. The PNF needs to provide sustainable and diverse recreation experiences that consider population demographics, avoid overcrowding, minimize resource damage, and provide desired recreation experiences.
- The PNF has a direct effect on the economy within the agricultural sector. Sustainable contribution to the ranching and forest products industries needs to be maintained.
- Population growth and increased development within the wildland urban interface indicate that issues related to smoke management and fuel treatment in that area will persist. The PNF needs to develop a strategy for fuel treatment and identify mitigation measures for smoke emissions that flow into communities due to controlled burns.

Chapter 3. Summary of Required Topics to be Addressed or Evaluated during Forest Plan Revision

In addition to needs for change based on ecological, social, or economic conditions and trends, there are several topics that will be evaluated as part of the Plan Revision process because law or policy requires us to do so. These topics include: addressing diversity and viability of plant and animal communities; identification of management indicator species; inventory and evaluation of potential wilderness areas; review and update of the existing Wild and Scenic Rivers eligibility report; analysis of the PNF for areas that should be recommended for Research Natural Area status; identification of response to Climate Change; analysis of suitability of lands for regulated timber harvest or grazing; and analysis of benchmarks to provide a threshold of feasibility for alternatives developed. A short explanation of each topic follows.

Diversity of Plant and Animal Communities

Ecological sustainability includes providing for the diversity and viability of plant and animal communities. The Ecological Sustainability Report (ESR) addressed plant and animal diversity and viability by describing ecosystem conditions and trends that could impact species diversity and describing species needs that may not be associated with ecosystems. A list of species considered at risk or special emphasis was developed to understand and address species diversity and viability on the PNF; the process is recorded in the ESR. Most species on the list were associated with a Potential Natural Vegetation Type or with a watershed. Threats to those species were assumed to be the same as those identified for the relevant ecosystem or watershed. In other cases, species were associated with a habitat feature, such as cliffs or tree cavities that could be found in several ecosystems. In that case, threats to the indicated habitat features could be addressed to improve or maintain species diversity. Finally, there were threats to some species that were not linked to habitat features or ecosystems, such as disturbance during nesting periods. In all three cases, responding to a possible threat is assumed to improve conditions for species diversity and viability and will be addressed during development of the proposed revised forest plan. Additional analysis related to species population interactions is expected to be done to more completely address species viability, depending on availability of population data.

Management Indicator Species (MIS)

Management Indicator Species (MIS) are species selected during the forest planning process because their population changes are believed to indicate the effects of management activities. MIS are also selected to allow evaluation of the differences between alternatives in the revised plan's Environmental Impact Statement (EIS). There may be a need to change the MIS identified in the current plan to reflect changes in management direction made during plan revision during the evaluation of alternatives and, ultimately, within the revised Forest Plan. MIS selected for the final revised plan will be based on the proposed management in the selected alternative.

Inventory and Evaluation of Potential Wilderness

The National Forest Management Act requires National Forests to re-analyze National Forest lands during forest plan revision to determine if there are areas that should be recommended for study as potential wilderness. A process for carrying this out is

provided in the Forest Service Handbook 1909.12, Chapter 70, Wilderness Evaluation. Inventory of potential areas includes those that 1) do not contain Forest System roads, and 2) are 5,000 acres or larger or are contiguous to an existing designated wilderness. Evaluation includes consideration of factors such as a) meets statutory definition of wilderness, b) is capable of providing wilderness experience; c) is available for recommendation and has no other value that provides higher benefit; and d) meets a need or demand for wilderness within the region and nation. The evaluation is used by the Forest Supervisor to determine whether area(s) should be recommended to the Chief of the Forest Service as potential wilderness.

Review of Existing Wild and Scenic Rivers Eligibility Report

In response to Congressional direction (P.L. 95-625), a study and environmental impact statement were submitted in 1982 for Wild/Scenic River eligibility and possible designation of the Verde River from the PNF boundary near the community of Paulden to Table Mountain on the Tonto NF (with some exceptions where private land ownership predominated). The river study area was found to be eligible for designation, however, only the southern portion of the river from Beasley Flats to the confluence of Red Creek on the Tonto NF was designated by Congress.

In January of 1993, all National Forests in Region 3 completed inventories of rivers having characteristics that could meet the criteria of the Wild and Scenic Rivers Act. The PNF looked at the Verde River, the Santa Maria River, and the Hassayampa Rivers. In addition to the designated southern extent of the Verde River, the upper portion of the Verde River (PNF boundary near Paulden to Clarkdale), was considered to meet the criteria. A further report was released in September of 1993 (ruled in 2005 a Region 3 eligibility report) that identified the Upper Verde River as eligible for Wild/Scenic Rivers designation.

Forest Service Handbook direction states that additional assessment and study at the time of land management plan revision need only be done if changed circumstances warrant additional review of eligibility (FSH 1909.2 sec 81.2). Known changes since 1993 include reductions in the amount of private land along the Upper Verde River, construction of the Transwestern pipeline under the Verde River, and road decommissioning and closures. Therefore, an update to the 1993 eligibility report is being drafted. While eligibility is unlikely to change, river classifications (Wild, Scenic or Recreation) that affect management may be adjusted. The next step toward recommendation for designation would be preparation of a study that evaluates suitability of the river for designation. The Regional Forester may choose to evaluate suitability for the river in the plan revision process or may elect to carry this out as a separate process.

Inventory and Evaluation of Potential RNAs

A Research Natural Area (RNA) is a specially designated area in as near a natural condition as possible, that exemplifies typical or unique vegetation, soils, geology, biota, and aquatic characteristics. An RNA would fit the definition of the plan revision component called Special Area; a Forest Supervisor can administratively recommend designation of an area as an RNA to the Regional Forester. There currently are 18 designated RNAs in the Southwestern Region. None are located on the PNF.

A region-wide coarse-filter assessment of RNA ecological representation was conducted to help identify ecosystems and vegetation types that are underrepresented among the Region's currently established RNAs. The objective of the effort was to help support an

ecological distribution of RNAs across major climate gradients, biophysical settings (Potential Natural Vegetation Types) and to some extent, across important vegetation types within life zones.⁶

We will compare the ecosystems that occur on the PNF to those identified as having a moderate or high need for representation in an RNA. We will then compare possible areas on the PNF to a set of conditions that show their appropriateness for recommendation as an RNA. These conditions include but are not limited to contribution to genetic diversity, serving as a control area for comparing results from manipulative research, serving as a baseline for the study of long-term ecological processes, and being large enough to provide essentially unmodified conditions within its interior. The analysis will be documented and used by the Forest Supervisor to determine whether administrative recommendation of an RNA to the Regional Forester is warranted.

Response to Potential Climate Change Impacts

The Forest Service has been developing a framework and strategy to respond to climate change since 2008. The PNF needs to be aware of available information to provide mitigation and adaptive management in response to unavoidable climate change.

The state of knowledge needed to address climate change in the Southwest is still evolving. We lack detailed information at the planning unit scale (PNF) to assess what ecosystem characteristics have declined, are at risk, or are otherwise inherently vulnerable to change due to effects of past, current, or future climate change.

However, at the regional level, potential ecological implications of climate change trends include⁷:

- More extreme disturbance events, wildfires, intense rain and wind events, etc.
- Greater vulnerability to invasive species
- Long-term shifts in vegetation patterns
- Climate models suggest that reduced precipitation will act as a limiting factor to overall forest productivity
- Increasing temperatures, water shortages, and changing ecological conditions will likely affect biodiversity, and put pressure on wildlife population, distribution, and migration patterns

Based on these implications, climate change may intensify the risk of ecosystem change for terrestrial and aquatic systems on the PNF. As plan components are developed for ecosystem composition, structure, and function, description of ecological conditions that are resilient to anticipated shifts in temperature and precipitation patterns will be needed. In addition, an ongoing strategy of adaptability to changing conditions should be employed.

Timber Suitability

The National Forest Management Act requires that National Forest System lands be classified as to their suitability with regard to timber harvest and timber production. National Forest Service lands were reserved with the intent of providing goods and

⁶ The process for identification of representativeness as well as the R3 process for identifying new RNAs is found in "Research Natural Area Process for Forest Plan Revision," Southwestern Region RNA Work Group, April 3, 2009.

⁷ See the April, 2009 Prescott National Forest Ecological Sustainability Report for more information.

services to satisfy public needs over the long term. One of those goods is the production of a sustainable supply of timber and related forest products. Not all forested lands are suitable for timber production due to biophysical, socio-economic, or legal constraints.

Determination of lands **not** suitable for timber production is based on the following criteria:

- Lands do not support forests.
- Harvest activities may create irretrievable resource damage
- Satisfactory regeneration of harvested stands is not feasible
- Timber harvest is legally prohibited by statute or policy

Lands that do not fall within the criteria listed above are considered tentatively suitable for timber management. As alternatives are developed while preparing the environmental Impact statement, further analysis will be done to determine which lands may be inappropriate for timber production based on the following:

- The land is proposed for resource uses that preclude timber production
- Other management objectives limit timber production activities
- Lands are not cost efficient over the planning horizon to carry out timber production.

Therefore, addressing timber suitability in the forest plan revision process is expected to result in lands that are classified in one of three areas:

1. A set of lands where resource management objectives will be achieved, in part, by sustained periodic timber harvest and forest regeneration.
2. A set of lands that is not appropriate for timber production due to low cost efficiency or other uses and goals.
3. A set of lands not available for any kind of timber harvest activity due to legal or biophysical constraints.

Those lands that are described by the first classification above will be identified as suitable for regulated timber production. Those in categories 2 and 3 above will be identified as unsuitable for regulated timber harvest.



Commercial timber sale near Groom Creek on the PNF in 2007. PNF photo

Livestock Grazing Suitability

Procedures of the 1982 planning rule state that suitability and potential capability of National Forest System lands to produce forage for grazing animals and to provide habitat for management indicator species shall be determined. Capable lands include those that have the potential for being grazed. This could include lands that produce adequate forage, are accessible to livestock, and where slope is such that livestock are able to use the area.

A landscape scale analysis of capable lands was done about 1986 to determine suitability of lands for livestock grazing. It considered the appropriateness of applying grazing to PNF areas related to economic consequences, ecological consequences, and alternative uses foregone. The PNF will review that analysis to determine whether it needs to be updated.

Benchmark Analysis

Benchmark analyses are one of the required provisions of the 1982 Planning Rule pertaining to the Analysis of Management Situation. Benchmark analyses define the range within which alternatives in an environmental impact statement may be developed. Selection of benchmarks depends primarily on the revision topics to be addressed during plan revision.

All Forests in the Southwestern Region developed benchmarks during development of their original plans. Benchmarks were established for timber resources, as well as for other resource areas such as livestock grazing, recreation, wildlife, wilderness, and other key resources. They were evaluated for their physical and biological production potential, and monetary benchmarks were run for those resources having an established market value.

During the need for change evaluation for revising the current forest plan, all benchmarks previously developed⁸ were reviewed, validated, and found to still be appropriate and reasonable. The range of expected alternatives developed during revision should fall within the maximums and minimums established by the original benchmarks. No adjustments to existing benchmarks and no new benchmarks are needed at this time. If, in the process of alternative development, it is discovered that an alternative falls outside the range of an existing benchmark, then the affected benchmark will need to be re-evaluated and re-established as necessary.

⁸ See Prescott National Forest existing plan: Forest Service 1986. Environmental Impact Statement for the Prescott National Forest Plan pp. 258-281.

Chapter 4. Integrated Management Need for Change

Potential needs for change were developed by integrating the key needs for change from the ecological concerns with the key needs from economic and social sustainability report concerns. This integration considered the PNF recreation niche; the PNF contribution to social, economic and ecological sustainability; Forest Service mission; input from public meetings and informal conversations; and community visions (See appendix A for more details).

Process

First, specific needs were identified from the ESR, the ESSA, and discussion with PNF employees. Tables were prepared that listed needs based on terrestrial and aquatic conditions and trends; diversity of plant and animal communities; social or economic conditions and trends; and specific concerns raised by PNF specialists during review of the 1987 Forest Plan. The tables provided a graphic summary connecting the identified needs, condition and trend information, activities that may act as threats, and possible responses to needs. These tables may be obtained by contacting the Forest Planner; contact information can be found at the front of this document.

The needs were then compared to the existing forest plan and regional and national policy to see if they were already being adequately addressed.

Once an initial list of needs that was not currently being addressed was prepared, the needs were combined in ways that integrated ecological, social, and economic interactions. The resulting integrated list of possible needs for change took advantage of combining needs that could lead to increased benefit by being considered together. In some cases, the integrated list also combined competing needs to provide possible mitigation of a social or economic need while addressing an ecological need or vice versa. In some cases the need was not combined with others and decision on relative importance of benefit provided was left to the Management Review.

Integration of Ecological, Social, and Economic Needs

An initial list of needs in a revised PNF forest plan is displayed in table 3. Column 1 provides the list of needs. Columns 2 and 3 are used to display either concurrence or divergence of benefit of addressing the topic. Each need listed in column 1 is compared to other needs by inserting the number or letter of other needs in the columns indicating direct or inverse relationship between needs.

Table 3. Initial list of needs and interaction of needs with each other

<p>Initial List of Needs</p> <p>Numbered needs are from ecological concerns or from employee review of current plan.</p> <p>Lettered needs are from economic or social concerns and public comment.</p>	<p>Relationship is direct: If one need benefits, the other(s), listed by letter or number below, will also.</p>	<p>Relationship is inverse: If one need benefits, may decrease the benefit to other(s) listed by letter or number below.</p>
1. Ensure trend toward natural stream geomorphology.	2,6,H	
2. Protect municipal watersheds.	1,3,6,7,H	
3. Identify and protect drinking water sources.	2,6,H	
4. Limit occurrence of non-native aquatic fauna.	5	A
5. Improve habitat for native fish.	13	A
6. Ensure highest water quality possible.	1,2,3,H	
7. Ensure continued existing levels of surface water yield and ground water potentials.	2,8,9,H	
8. Trend toward increasing organic matter thus reducing soil loss on appropriate Potential Natural Vegetation Types (PNVT).	9,10,11,H	A,G
9. Identify desired vegetative structure and proportions in PNVT's identified as departed or trending away from historic range of variability.	8,10,11,12,13,G,H	F
10. Define desired fire regime characteristics.	9,13,D,G	E,G
11. Minimize uncharacteristic fire.	9,12,13	
12. Control non-native invasive plants.	9,10,11,13	A
13. Protect habitat features associated with species of interest and concern.	5,9,10,11,12,H	A
A. Provide sustainable and diverse recreation experiences that meet needs of demographic characteristics and desires of communities.	C	4,5,8,12,13,H,
B. Maximize value of PNF as open space by defining desired visual character.	9,11,C	F
C. Address need for access to the PNF across non-PNF lands for administrative, recreational, and protection purposes.	A,D	

D. Define wildland urban interface and describe desires for that area.	9,10,11	E
E. Respond to concerns about smoke emissions, from controlled burns, which flow into communities.	11	D,10
F. Address the increasing demand for utility and transportation corridors as well as requests for energy generation or production.		9,B
G. Maintain sustainable contribution to the ranching and forest products industries due to direct impact of PNF on Agricultural sector.	9	8,10
H Identify characteristics of watershed integrity to which the PNF could aspire ⁹ .	1,2,3,5,6,7,8,9,13	A

A summary of key interactions displayed in the table 3 follows:

- There are several overlapping needs related to watershed characteristics that could be combined into one need for watershed integrity. These include maintaining natural stream geomorphology, protecting municipal watersheds, protecting drinking water sources, improving habitat for native fish, ensuring good water quality, providing existing surface water yield and ground water potentials, and improving vegetation and soil characteristics. Discussions with attendees at public meetings in both Prescott and Camp Verde indicated that they preferred combining those concerns into one need to achieve watershed health and integrity.
- Needs for improved vegetation structure and proportions are positively related to achieving desired fire characteristics, since fire is a primary source of natural disturbance in the southwest. The expectation is that given desired type, timing, and intensity of disturbance, vegetation structure and proportions will improve.
- Conversely, the need for restoration of desired fire characteristics conflicts with concerns about smoke emission as a nuisance or possible health risk. Restoration of fire could also be in conflict with sustainability of the agriculture sector of the economy if burning were done to the extent that forage for grazing was reduced for periods of time. In the long term, restoring desired characteristics of fire could expand grasslands and be a positive benefit for both ecological health and the agricultural economy.
- Working with others to limit non-native fish and improve conditions for native fish could conflict with recreational opportunities since many non-natives are game fish, such as bass or sunfish, and are prized by the fishing public.
- The need to provide sustainable and diverse recreation experiences is displayed in table 3 as conflicting with many ecological needs. This indicates that, while providing recreation experiences is important from a social and economic viewpoint, recreational activities may have to be controlled or mitigated to avoid spread of non-native invasive plant species, impacts to wildlife species and habitats, and impacts to riparian or other sensitive areas.

⁹ This need was added as a result of comments and discussion at public meetings.

Integrated List of Possible Needs for Change

The following is a list of possible integrated needs for change that could be addressed in the revised forest plan for the PNF. Each need is followed by a brief description of the need. Each need has not been adequately addressed in the current forest plan.

1. Restore vegetation structure, composition, and desired characteristics of fire to selected ecosystems while using adaptive management to respond to citizen concerns related to smoke emissions.

In order to improve ecological sustainability within several plant communities, vegetation structure and composition need to be modified to more closely resemble the range of conditions that historically occurred. Most modifications needed are related to changes in fire as a disturbance. There are three scenarios: 1) Current disturbance patterns in grassland systems are much less frequent than those identified historically and undesired tree and brush encroachment is taking place; 2) Vegetation changes, especially in dry conifer and oak systems (e.g. ponderosa pine, mixed conifer, Madrean encinal), are needed to lower the risk of high severity, uncharacteristic wildland fires and their impacts on ecosystems as well as health and human safety; 3) Non-native invasive vegetation can impact biodiversity and change the fire frequency within an ecosystem. An example is the spread of brome grasses that increases the risk of frequent fire disturbance within desert communities and riparian forests, resulting in higher vegetation mortality, and requiring long recovery periods.

While currently, the PNF must meet ADEQ air quality requirements when planning controlled burns, the PNF needs to respond to social concerns related to nuisance and possible health concerns of smoke in and near communities. An example is for the PNF to adaptively use techniques or timing, while monitoring air quality in key locations to work toward decreasing the amount or frequency of smoke flow from controlled burns into communities.

2. Maintain/Improve watershed integrity on the PNF to provide desired water quality, quantity and timing of delivery.

Watershed condition is defined as the state of a watershed based upon physical and biological characteristics and processes affecting hydrologic and soil functions (FSM 2521.05). Watershed condition integrity, for purposes of this document, is a wholeness or completeness of the watershed function in providing water quality, quantity, and timing of delivery. It is influenced by soil function, biological function, and geomorphology. Vegetative structure and composition, disturbance regimes, and recreation activities all can affect watershed integrity. PNF-wide strategies could be developed, however, subbasins on which to concentrate attention include: Upper Verde River, Agua Fria River, and Big Chino Wash (Table 13 of ESR).

3. Provide sustainable and diverse recreation experiences that consider population demographic characteristics reflect desires of local communities, avoid overcrowding and user conflicts, and minimize resource damage.

Numbers of users on the PNF have increased in recent years, both from increases in local population and from users from the Phoenix metropolitan area. This has increased potential for creating conflicts among all PNF users and leads to unmet recreational experience expectations. The increase in recreation use also interacts with ecosystems such as causing changes in habitat, wearing away vegetation, and acting as a vector for non-native plant species.

4. Improve habitat for native fish species.

Native fish and other aquatic species are in decline within several watersheds. While direct threats to native species in these watersheds are non-native species such as green sunfish, bullfrog, crayfish, and game fish, indirect threats include recreational activity, fire as a disturbance, changes in riparian condition, as well as changes in water flow due to off-Forest water utilization (i.e. groundwater pumping and water diversions).

5. Enhance the value of PNF-provided Open Space by defining visual character within areas near or viewed by those in local communities.

The high rate of population growth within Yavapai County combined with limited lands for development (25% of County lands) sensitizes residents to land development, land exchange, and land use issues. Defining the value of PNF open space and its visual character will help determine benefit of PNF lands, should exchange be proposed.

6. Address Organic Matter/Soil Loss in Applicable PNVTs.

Changes in vegetative ground cover can lead to changes in organic matter and related soil movement. Potential causes for these changes vary including recreational wear and tear, vegetation structure that is trending away from HRV, non-native annuals that shift composition away from native perennials, and natural changes in vegetative states where organic matter is tied up in woody shrubs, trees and leaves. PNVTs where this situation applies are PJ Evergreen Shrub, PJ Woodland, PJ Grassland, Semi-Desert Grassland, Colorado Plateau Grassland, Desert Communities, Madrean Encinal Woodland, and Riparian.

7. Acquire rights-of-ways to access the PNF across lands under other ownership.

In some locations, informal agreements allow employees to access the PNF for administrative or protection purposes. With increased land value, lands often change ownership and informal access agreements may not be honored.

8. Respond to increased requests for Utility/Transportation corridors as well as energy production and generation on the PNF while avoiding interference with wildlife habitat or other concerns.

There have been increased numbers of requests for large scale transportation systems and utility corridors to respond to population increases. In addition, other neighboring agencies, such as the Bureau of Land Management have received increased numbers of requests for permits to use public lands for alternative energy production, implying that the PNF may also be affected. Advanced planning would be appropriate in consideration of these activities.

Chapter 5. Current Forest Plan Adjustments Needed

Forest plans provide an adaptive framework to guide on-the-ground management of projects and activities. The findings in table 3 show how potential management actions addressing social, economic, and ecological issues are interrelated. These relationships are important to consider when determining which of the ecological, social, and economic needs will be emphasized in the development of the revised forest plan.

Forest Plan Organization

The procedures of the 1982 planning rule call for a summary of the analysis of the management situation, goals and objectives that include a description of desired conditions as well as goods and services expected to be produced, prescriptions and standards and guidelines for management areas, and monitoring and evaluation requirements. The following provides more detail on major components of a Forest Plan.

- **Goals/Desired Conditions** - The social, economic, and ecological attributes toward which management of the land and resources is to be directed. Goals/Desired conditions are aspirations and are not commitments or final decisions approving projects and activities, and may be achievable only over a long period of time. Desired condition statements are an essential part of land management plans and serve as a guide for the development of the forest plan monitoring program and future actions or activities that are designed to achieve the conditions over time. Goals/Desired conditions should clearly articulate management intent over the life of the Plan.
- **Objectives** – The concise projections of measurable, time-specific intended activities that make progress toward desired conditions. Like desired conditions, objectives are not commitments or final decisions but do set priorities for the life of the plan.
- **Guidelines or Standards** – Information and guidance for project and activity decision-making to help achieve goals/desired conditions or mitigate activities. A forest plan should have guidelines and may include standards. The primary difference between these tools is that guidelines allow for some flexibility in how closely they are followed in project design, as long as the intent is met and the rationale is documented in the project-specific decision document. Standards require strict adherence to the letter of the standard or a plan amendment would be required.
- **Suitability of Areas** – Identification of the suitability of lands for particular uses that are compatible with the goals/desired conditions and objectives for that area. This includes identification of characteristics of lands where timber, range, and various types of recreation opportunities are suitable.
- **Special Areas** – Areas that are designated because of their unique or special characteristics, such as botanical or geologic areas. The Record of Decision for the forest plan may also recommend designation of other special areas that can only be designated by statute, such as Wilderness or Wild and Scenic Rivers.
- **Monitoring** – A list of questions that, when answered, indicate whether areas are trending toward desired conditions and other desired outcomes. Frequency of monitoring and evaluation, and the precision needed is also included. A subsequent detailed monitoring plan prepared outside of the Forest Planning process will be developed that includes specific methods and measures.

Current Prescott National Forest Plan

The current forest plan was approved in 1987 and has been amended seventeen times since. The current Plan addresses uses and resources separately without recognition of interrelationships. As a result, management direction is lacking when guidance is needed to deal with more complex situations. For example, appropriate management responses following uncharacteristic fires need to consider the interactions between soils, vegetation structure, coarse woody debris, cultural resources, economics, and work capacity. In some cases, management under the current Plan is appropriate, but the rate of implementation is too low to alter the direction of trends currently moving away from desired conditions.

The revised Forest Plan is expected to be more integrated and include additional direction where it is lacking or gaps exist. Because this forest plan revision is based on the need for change in the current forest plan, rather than starting over, the current forest plan was reviewed to determine adequacy of addressing today's conditions and trends.

This process illuminated many gaps in the existing plan, pointing to potential needs for change in the existing forest plan:

Goals/Desired Conditions

- are either missing or inadequate to guide projects in many of the Forest's PNVTs, which allows for projects to move forward that do not make progress towards desired conditions
- are missing for invasive species presence or influence
- do not integrate desired disturbance processes
- are sometimes written as standards and/or guidelines, rather than desirable conditions to move toward

Objectives

- are focused primarily on outputs, rather than progress toward desired conditions, goals and objectives.
- are sometimes expressed as guidelines

Standards and/or Guidelines

- are often unnecessarily prescriptive about how to accomplish a project, instead of focusing on the project outcome
- do not support attaining desired conditions or accomplishing objectives
- are duplicative or conflict with direction already found in Forest Service handbooks and manuals, existing laws and regulations, or recovery plans and strategies for federally listed species
- are based on outdated policy, science, or information
- sometimes describe purely administrative functions, such as budgeting, rather than Plan components and can be confused with Plan direction
- Include out of date terminology such as wildland fire use

Monitoring

- Focuses on outputs, rather than on progress toward attainment of goals/desired conditions.

Chapter 6. PNF Leadership Team Review Results

An internal review of the integrated management needs for change (chapter 4) was conducted to determine which of the possible needs for change would be recommended to be carried forward into plan revision. Required analyses and adjustments to the current plan were described previously (chapter 3) and are not included in this list.

After discussions about the integrated needs for change, and the capacity of the Prescott National Forest, the PNF leadership team identified three priority areas that were recommended to focus the scope of this plan revision. A list of the priority focus areas with brief rationale for selection of each is listed below.

Priority Needs for Change and Rationale for Recommendation

Restore vegetation structure, composition, and desired characteristics of fire to selected ecosystems while using adaptive management to respond to citizen concerns related to smoke emissions.

Defining desired vegetative characteristics addresses the following: a) Risk of severe wildland fire that could damage soils, cause uncharacteristic changes in vegetation communities, and impact human health and safety, especially within the wildland urban interface; b) Changes in ecosystems that could affect diversity of plant and animal species, such as spread of invasive plant species or changes in vegetation structure; c) Identification of desired characteristics of fire as a disturbance, including frequency, severity, intensity, size, and seasonality, for ecosystems that are sustained by fire. Mitigation of smoke that flows into communities primarily due to controlled burns is a connected social concern.

Maintain/Improve watershed Integrity to provide desired water quality, quantity and timing of delivery.

Addressing this need would provide improved water quality for human health and safety, would move toward maintaining water quantity for both municipal watersheds and maintenance of aquatic and riparian species habitat, and would provide timing of delivery that is commensurate with healthy soil and biological function and natural geomorphology.

Provide sustainable, diverse recreation experiences that consider population demographic characteristics, reflect desires of local communities, avoid overcrowding and user conflicts and minimize resource damage.

Providing sustainable recreation opportunities was the number one concern at public meetings in both the Verde Valley and Prescott. With increasing population and numbers of visitors to the PNF, conflicts between various types of activities, over-crowding, and over-use leading to resource impacts need to be addressed.

Other Needs for Change and Rationale for Recommendation

The executive leadership team considered and discussed several other plan needs for change. There was recognition that the following topics need to be addressed with plan components, but these were not recommended as priority needs for change topics. The two topics selected and underlying reasons for their selection are listed below.

Provide desired habitat for native fish species.

Native fish and other aquatic species are in decline in some watersheds. Five such watersheds historically supported native aquatic species that are no longer known to be present. The most pressing threat to native species continues to be impacts such as predation, from non-native species. Removal of non-native species is under the authority of the State of Arizona (AZ Game and Fish Dept.); the state is responsible for managing species. The Forest Service manages habitat. In order to assist in responding to the decline in native fish species, the PNF can provide habitat and watershed characteristics that will support native fish species. It could also partner with the State of Arizona in addressing control of non-native species.

Enhance the value of PNF-provided open space by defining visual character within areas near or viewed by those in local communities.

Retention of open space—undeveloped land near or within sight of local communities—is highly valued by citizens for its scenic value and contribution to low population density. The PNF has a unique opportunity to enhance value and identify desired visual character on its lands as population density may increase on other ownership.

Needs for Change that are Deferred

The following topics were considered as needs for change during the management review but were recommended for deferral as topics for revision. They are expected to be considered further during the evaluation of the revised forest plan after the first 5 years of its use, or possibly sooner. A complete list of deferred needs for change is included in appendix B.

Address organic matter/soil loss in applicable PNV's.

This topic is expected to be addressed indirectly within priority focus areas related to restoring vegetation structure, composition, desired characteristics of fire and improving watershed integrity. We also lack definitive information on the proportion of degraded soil conditions that are due to historic (circa late 1880s) grazing impacts.

Acquire rights-of-ways to access the PNF across lands under other ownership.

This topic does need to be addressed; however, the current plan includes an objective for acquiring rights-of-ways that is expected to be carried into the Revised Plan. In addition, current economic characteristics have temporarily slowed development and the expectation is that deferral of this area may be acceptable.

Respond to increased requests for utility/transportation corridors as well as energy production and generation on the PNF while avoiding interference with wildlife habitat or other concerns.

With the recent slowing of in-migration, development, and population growth this topic may be postponed.

References

Adams-Russell Consulting. 2006. Focus Group Study Report of Values, Attitudes, and Beliefs toward National Forest System Lands: Prescott National Forest.

Confab. 2007. Public Participation Strategy for the Prescott National Forest Plan Revision. Parts I, II and III. June 28, 2007. Hamilton, MT. <http://www.confabmt.net>

Forest Service 1986. Environmental Impact Statement for the Prescott National Forest Plan, November, 1986.

Forest Service 2008. National Forest System Lands Management Planning. 36 CFR 219. Federal Register, Vol 73, No 77, April 21, 2008.

Forest Service 2008a. Prescott National Forest Economic and Social Sustainability Assessment (ESSA)

Forest Service 2008b. Natural Resource Information System: National Visitor Use Monitoring (NVUM). 2008.

Forest Service 2009. Prescott National Forest Ecological Sustainability Report (ESR)

Kent 2007. General Planning Map with HRU, SRU, CRU.

P.L. 95-625. National Parks and Recreation Act of 1982.

References are available at the Supervisor's Office of the Prescott National Forest 500 U.S. Highway 89 North, Building 70, Prescott, AZ 86313.

Appendix A. Public Participation

The Prescott National Forest (PNF) took a more informal collaborative approach in preparation for Forest Plan Revision. Rather than sponsoring several public meetings focused on Forest Plan Revision, the intent was to engage citizens in planning, implementation and ongoing stewardship of the forest. This meant not only asking for input but inviting citizens to share their desires for the future and invent new ways to support and sustain stewardship.

Methods used included those that were informal like human geographic mapping, gaining understanding of informal community networks, and reaching out to informal community leaders. More formal methods were also used, including public meetings, use of web page feedback forms, and input received on documents. Information gathered from members of the public, as well as that from PNF personnel contributed to the Economic and Social Sustainability Assessment and to the Ecological Sustainability Report. Many of the needs for change outlined in this document reflect the issues and interests obtained from both the public and PNF employees.

Identification of Citizen Issues

Region 3 utilized a wide-scale assessment of public values, attitudes and beliefs toward National Forest System Lands (Adams-Russell Consulting. 2006). This report documents a focus group study, which provides information about attitudes, beliefs, and values related to forest management and resources.

PNF contracted with Confab to develop a strategy for public participation in the upcoming Forest Plan revision process. The resulting report (Confab 2007):

- Provides knowledge of informal networks active in communities
- Identifies citizen issues and issue holders/carriers
- Defines the natural boundaries of communities throughout the planning area (Human Geographic Mapping – See Figure A-1)
- Identifies realistic opportunities that are practical to build capacity and relationships These projects “resolve as you go” so that Forest Leadership can build a constituency for the plan revision process and beyond
- Develops communication strategies for each human geographic area
- Includes a strategy for integrating the informal community process with formal public meetings, and future comment and objection/resolution processes

Community Visioning

PNF chose to approach communities using the Community Resource Units (See CRUs—figure 2) originally identified by Confab (2007). Using informal citizen networks and community leaders, PNF was invited to a variety of community meetings (not PNF sponsored). Citizens were invited to share their vision for the future of their community and the PNF. Many of the visioning meetings were facilitated by Southwest Decision Resources (SDR), professional 3rd party neutrals obtained via Interagency Agreement from the U.S. Institute for Environmental Conflict Resolution. A diverse group of citizens shared their ideas, discussed differences, learned from one another and discovered many common interests. Numerous citizen issues surfaced during the dialogue. To date ten communities have completed draft or final community vision statements; these statements are found at the end of this appendix.

In April of 2008 citizens expressed a desire to hold a cross-community meeting (with representatives from all the CRUs) to share their interests regarding PNF and to look for common issues and interests. The Upper Agua Fria Watershed Partnership hosted the meeting in Arcosanti, AZ, on April 15, 2008.

"Your Forest Vision and the Way Forward", an open house to share the draft community vision that was developed for Prescott, Prescott Valley, and Chino Valley, was held April 17, 2008 at the Highlands Center. The open-house was co-hosted by the Arizona Trail Riders, Arizona Off Highway Vehicle Coalition, Arizona Wilderness Coalition, Back Country Horsemen, City of Prescott Parks and Recreation Department, Hyde Mt. Vista Group, Open Space Alliance of Central Yavapai County, Prescott Area Wildland/Urban Interface Commission, Prescott Cycling Club, Prescott National Forest, Prescott Open Trails Association, and Yavapai Cattle Growers Association. Facilitated by SDR, approximately 30 interested publics attended the open house. The vision was presented by representatives of co-hosting sponsors, and there was general agreement on the Final Vision. Attendees also discussed next steps for achieving the vision and talked about ideas such as a "stewardship" group that could form to continue working on Forest Planning issues as well as look for ways to increase capacity of the Forest Service. Two new groups, Highlands Center for Natural History and Yavapai County Trails Committee asked to be included in future discussions.

The PNF used known community bulletin boards to post notices of the community visioning meetings, visioning feedback, and public meetings. The motto PNF *"If you invite us, we will come"* resulted in numerous and often repeated invitations to attend community meetings where information was shared and gathered relative to the Forest Plan Revision. Groups contacted during this informal engagement are listed below:

Federal

U.S. Army Corps of Engineers	Coconino National Forest
Bureau of Land Management - Phoenix District	Kaibab National Forest
Fish and Wildlife Service - Ecological Services	Tonto National Forest
National Park Service - Montezuma Castle and Tuzigoot National Monument	Region 3 - Albuquerque
	USDA Natural Resources Conservation Service

State

Arizona Department of State Lands	Arizona State Parks; Deadhorse Ranch State Park
Arizona Department of Transportation	University of Arizona, Cooperative Extension, Yavapai County
Arizona Game and Fish Department; Regions 2, 3, 6	

County

Verde Valley Regional Economic Development Organization	Yavapai County Sheriffs Department
Verde Valley Regional Planner's Group	Yavapai County Supervisors
	Yavapai County Water Advisory Committee

Municipal

Black Canyon City

Black Canyon City Chamber of
Commerce

Camp Verde Trails and Pathways
Commission

Chino Valley Area Chamber of
Commerce

City of Prescott

City of Prescott Parks and Recreation
Dept.

Hispanic Chamber of Commerce; Prescott
Valley

Town of Camp Verde

Town of Chino Valley

Town of Clarkdale

Town of Cottonwood

Town of Dewey-Humboldt

Town of Jerome

Town of Prescott Valley

Unincorporated

Arcosanti

Bagdad

Breezy Pines

Cherry

Cordes Lakes

Crown King

Mayer

Paulden

Skull Valley

Spring Valley

Walker

Wilhoit

Tribes

Fort McDowell Yavapai Nation

Hopi Tribe

Hualapai Tribe

Tonto Apache Tribe

Yavapai-Apache Nation

Yavapai-Prescott Tribe

Local Arizona Groups and Organizations

Agua Fria Open Space Alliance, Inc.

Arizona Off Highway Vehicle Coalition

Arizona Trail Riders

Arizona Wilderness Coalition

Back Country Horsemen

Back Country Horsemen of Central
Arizona

Bagdad Volunteer Fire Department

Black Canyon Trail Coalition

Breezy Pines Property Owners

Central Arizona Land Trust

Central Yavapai Fire District

Cherry Volunteer Fire Association

Citizens Water Advisory Group

Community Forest Trust

Cordes Lakes Homeowners Association
Crown King Volunteer Fire Department
Friends of the Agua Fria National Monument
Highland Pines Homeowners Association
Homeowners Presidents Circle
Highlands Center for Natural History
Hyde Mountain Vista Group
Jerome Fire Department
Mingus Springs Camp and Outdoor Learning Center
Open Space Alliance of Central Yavapai County
Paulden Area Community Organization
Ponderosa Park Association
Prescott Area Wildland Urban Interface Commission
Prescott Country Club Property Owners Association
Prescott Cycling Club

Prescott Open Trails Association
Prescott Saddle Club
Prescott Sportsmen's Club
Sierra Club – Arizona Chapter
Skull Valley Volunteer Fire Department
Walker Volunteer Fire Department
Southwest Center for Biological Diversity
Stewards of Public Lands
Upper Agua Fria Watershed Partnership
Verde River Basin Partnership
Verde River Citizens Alliance
Verde Valley 4-Wheelers
Verde Valley Land Preservation Institute
Verde Watershed Association
Wildwood Estates Homeowners Association
Wilhoit Fire Department
Yavapai Cattle Growers Association
Yavapai County Trails Committee
Yavapai Horsemen's Association

Formal Methods

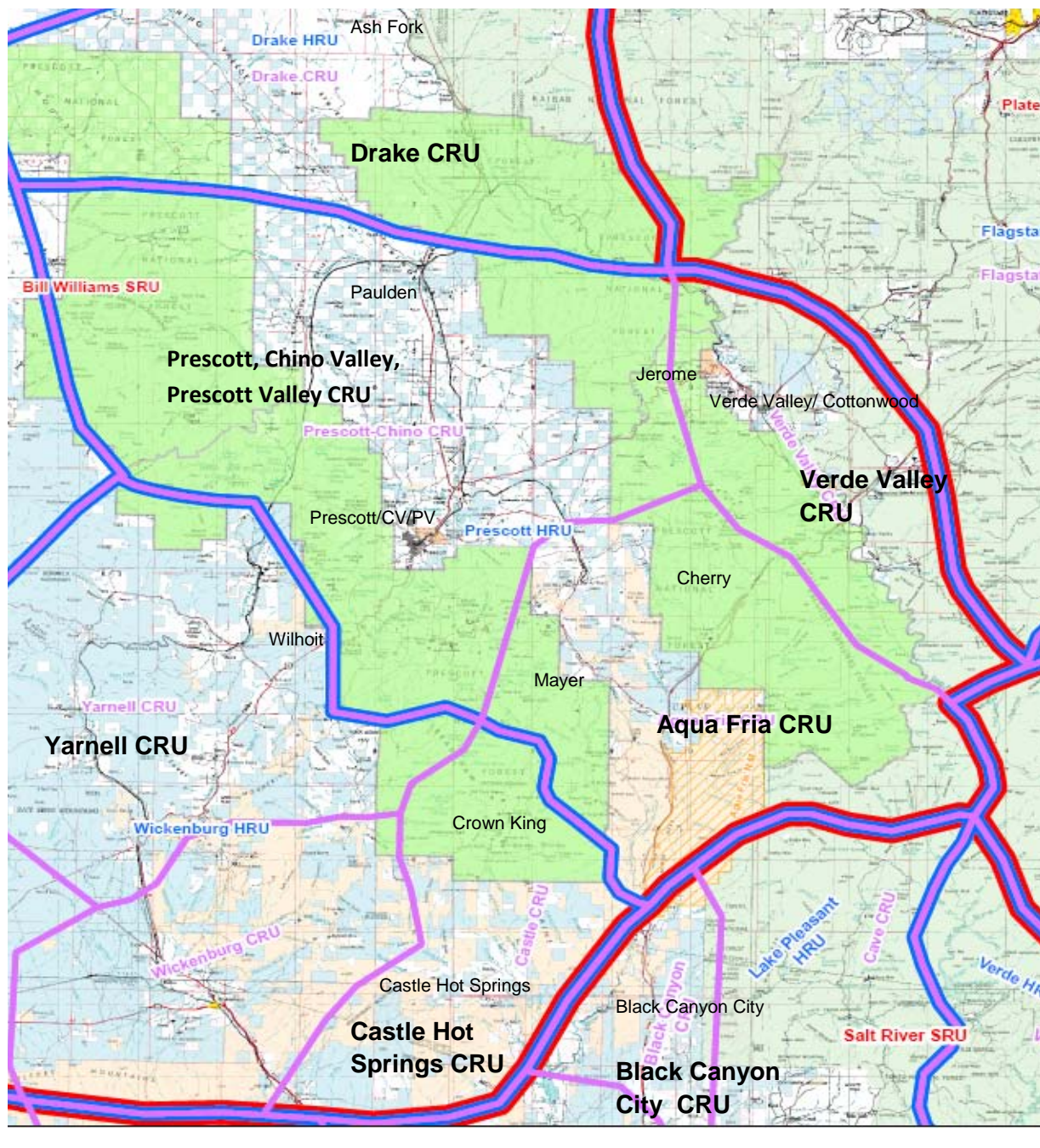
On February 25 and 26, 2009, PNF hosted meetings in Camp Verde and Prescott regarding potential need for change in the Forest Plan. Feedback was used to validate and refine issues gathered through informal methods mentioned above. Attendees at these meetings favored the following topics for PNF forest plan focus: recreation, watershed health, reintroduction of fire as a disturbance, and open space.

PNF released several press releases regarding progress on the Plan with contact information. Two radio interviews regarding forest planning by PNF planning staff occurred in August 2008 and March 2009. Several planning updates were sent during 2008 to over 400 individuals and organizations. The PNF webpage is also a useful tool to disseminate information about the revision process, as well as a location to receive written feedback.

Consultation with tribes consisted of formal letters, phone calls, and visits by PNF staff and leadership to the Yavapai-Prescott and Yavapai-Apache Nation. The Forest Tribal Relations Liaison participated in discussions with and provided briefing papers to the Yavapai Apache Nation, Hopi Tribe, and Yavapai-Prescott Tribe. Offers for meetings were made to all groups with interests in PNF.

Community Visions in the vicinity of the Prescott National Forest

Figure A-1: Locations of communities providing vision statements relative to the Prescott National Forest and Community Resource Units .



Ash Fork *(Final Vision Statement from Ash Fork USDA Forest Service Action Plan II, August 2004)*

Ash Fork has successfully managed change to maintain its small town character while reviving the bustling community of the 1950s.

The Community is still authentic Route 66, a western town where nature's experiences abound. The character has been kept through a strict adherence to a community based set of values and good communication.

We value:

- Cleanliness
- History
- Respect
- Quality education and healthcare
- Safety
- Families
- A place where individuals can still make a difference!

Black Canyon City *(Final Vision Statement from existing BLM plan; validated by community through hard copy feedback received at community meeting.)*

The ultimate desire of the citizens of Black Canyon City is the preservation of the rural nature of our community and the natural beauty of our surroundings. Coincidental to that desire is the retention of open space to be used for designated public recreational activities. The community would like a sufficient amount of BLM lands surrounding the town dedicated to future development of public trails, nature preserves, and riparian areas. A sufficient amount of land would be a minimum depth of five miles from the private property lines around the community. The State Trust Lands within that area would be purchased by BLM for inclusion in the designated open space.

The community would like the viewshed protected from the town to the mountaintops in all directions. Limiting further commercial or residential development will also help protect the limited water supply in our area. In support of these considerations, many residents have expressed an interest in working with BLM and other communities to assure continued protection, cleanliness, access, and enjoyment of the public lands in our area.

Crown King and Southern Bradshaws *(Draft Vision Statement)*

To be known as a community that values the heritage and natural beauty of this region. That encourages and provides equal access to services, amenities and recreational activities. That sustains and provides protection to the sociological, economical, and ecological health of public and private lands, through enforcement of the rules that govern them. To be a community that values cooperation and participates in effective communication with federal, state and local agencies and that will contribute time and resources to enhance the safety and security of residents, property owners and guests of the Crown King area.

We envision for the future of the Crown King and Southern Bradshaws landscape...

- Active forest management through agency / community collaborative efforts to help maintain forest health and reduce danger of catastrophic fires.
- A healthy forest with a natural trash free setting providing clean air and quiet surroundings.

- Adequate public facilities to accommodate the many visitors that frequent Crown King and the surrounding area.
- An increased number of improved campsites, including existing and previously closed campsites.
- Regular maintenance of all roads to provide safe public accessibility and evacuation if needed.
- Availability and maintenance of adequate and clearly designated motorized and non-motorized trails.
- Consistent and timely enforcement of existing laws and rules that govern the use of public and private lands.
- Preservation of the unique history of Crown King and the Southern Bradshaws as an historic mining area.
- Cooperation between the community and the Forest Service to help maintain the ecological, economical and sociological health of Crown King and the surrounding area.

Castle Hot Springs *(Final Vision Statement)*

Our community has a vision to maintain our remote yet reachable lifestyle, yet we also recognize that recreational use will increase and needs to be accommodated. This is not only an enforcement issue for the BLM, Yavapai and Maricopa counties, and the City of Peoria, but also an increasing social issue for our community. With this in mind, our community embraces the following as a means to maintain our way of life, as well as deal with increased outside pressure:

- Existing, historically described roads on BLM land must be mapped, legally described, and dedicated so as to ensure that residents and property owners can continue to access and use their lands into perpetuity.
- We need to seriously consider a recreational-user fee, earmarked for the local community, imposed on non-residents to help fund the substantially increasing costs associated with recreational uses.
- Existing roads (whether public, private, or easement) located in areas subject to occasional inundation will be exempt from permitting requirements for continued maintenance in this area.
- In considering changes in the use of private property in this area, the county or city will not be permitted to consider federal goals and objectives for the surrounding property.
- All federal lands in the Lake Pleasant area are to be treated the same as private property with regard to obtaining new or perfecting existing legal and physical access.
- Mineral rights retained by BLM in this area under private property will be transferred gratis to the surface owners.
- We want a community-based stewardship group to proactively plan and later provide expertise, labor, and cultural wisdom with BLM on all recreational uses, including but not limited to non-motorized and motorized trails.
- Many of the existing water wells are in the "younger alluvium" as currently defined by recent case law.
- Encourage the re-establishment of a northern loop road around Lake Pleasant linking to Table Mesa Road at I-17 for health/safety/welfare purposes.
- Target shooting needs to be encouraged in appropriate and safe areas. Our community is willing, as a stewardship group, to counsel BLM on appropriate areas for target shooting.
- Encourage appropriate discreet cell-site development to provide for better law enforcement telecommunications.

Cherry *(Draft Vision)*

Maintain community outreach programs to foster voluntary community involvement, input and feedback to inform policy development and facilitate implementation.

Utilize communities as on-site resources to monitor both natural and human induced occurrences in the national forest setting.

Recognize that private interests maintain a tangible stake in best outcomes strategic planning.

Whenever desirable and feasible promote partnerships between local communities, municipal, state and federal agencies to formulate and achieve goals.

Maintain the highest standards of ethical conduct as trustees of a national asset.

Identify controversial issues and attempt resolution through public educational campaigns.

It was noted that the National Forest is the backyard and garden of all citizens and most individual operators would not damage their own personal property in the way they do in the national forest setting. A public educational campaign to increase environmental awareness.

Verde Valley/Cottonwood *(Final Vision -West of the Verde River)*

The Verde Valley landscape, west of the Verde River, includes the City of Cottonwood and the Towns of Jerome, Clarkdale and Camp Verde, each with their own identity and community character. Intermingled are unincorporated residential neighborhoods, farms and ranches. All are buffered by PNF lands, which provide natural open spaces and big mountain views. The Black Mountain Range, featuring Mingus Mountain and Woodchute Wilderness on the north and Squaw Peak and Cedar Bench Wilderness to the south, forms a scenic backdrop for the entire Valley.

These wide open spaces and urban interface areas are highly regarded by communities for their natural and cultural resource values, and their social and economic benefits. They are free of litter and illegal uses; and they are protected from wildfire. In addition to providing a panoramic viewscape, the Forest protects the region's watershed by storing ground water and sustaining renewable and non-renewable resources for future generations.

Forest and range vegetation are healthy, providing habitat diversity, forage for grazing animals, and natural corridors for wildlife. The Verde River flows year round through a lush riparian greenway, providing water for agricultural production, habitat for animals, and a large variety of recreational opportunities. All recreationists—including anglers, birders, hunters, hikers, bicyclists, equestrians, gun enthusiasts, river runners, hang gliders and off-highway vehicle drivers—respect and utilize the Forest in harmony with each other and the environment.

A system of non-motorized multi-use trails connects communities, allows access to public lands and encourages people to improve health and vitality by exploring the outdoors. Roads and selected areas are managed for responsible use of off-highway vehicles, while other areas are set aside for protection or managed for non-motorized uses.

Especially important are the geologic, prehistoric and historic attributes of the Verde Valley. People—including the Sinagua, Yavapai-Apache, miners, pioneer settlers and today's residents—have occupied the valley for over 900 years. Visitor centers and educational activities that raise public awareness of cultural values attract locals and tourists alike.

Federal, State and County agencies work cooperatively and effectively with neighboring municipalities, groups and individuals to protect public lands and enforce the rules that govern them.

Jerome *(Draft Vision)*

Jerome residents participated in the Forest Plan Update visioning process on January 23, 2008. The participants responded to the following questions posed by the facilitators from the Forest Service: (1) Why Are You Here? (2) How Would You Like the Landscape and Community to Look in 20-50 years?; and (3)What Role Should PNF Play? During a spirited discussion, several categories of concern were offered, including protection and preservation of resources such as: Open Space, Viewshed and

Watershed, Wildlife Corridors, Riparian Habitat, Cultural and Historic Sites, Low Impact Recreational Trails, Riding Trails, and Clean Air and Quiet Environment. Controlled burns were a big issue for health and watershed reasons. Residents were adamantly against Commercialization and Development, as well as Forest Land Trades for private use. Strict limitation of ATV/OHV and Shooting Activities was recommended. Residents wanted more enforcement of Forest rules, as well as education and outreach to motorized vehicle and gun users. There was an overall sense that the PNF should take a proactive stance to protect and maintain Forest Resources for future generations.

1. When considering the reasons for why we live in Jerome or what role the Prescott National Forests plays, we spoke loud and clear that maintaining the views, protecting the air quality, and preserving open space surrounding Jerome is paramount in our minds as we look ahead 50 years. It is imperative that there are areas adjoining our town where we can go to escape the traffic noise of our busy community; away from all motorized vehicles, recreational shooting, and other negative impacts of a dense urban environment. As a collective community we desire to retain as much of the natural environment as close to our town limits as possible. Thus ensuring that we will have those places of refuge nearby where we can enjoy the outdoors and reflect on the beauty that the PNF provides.

2. As Jerome residents we hold a strong sense that the existing Prescott National Forest boundaries should be kept intact and that management must focus on protection of the natural and cultural resources to ensure that they will be around for our grandchildren to enjoy in 50 years.

3. Regarding management objectives, we want the Forest Service to actively work to minimize unwanted uses that pose threats to wildlife and low-impact recreational use (i.e., hiking). Specifically, we want the Forest Service to enforce existing laws and provide programs to educate and inform those Forest users who engage in reckless use of firearms and all-terrain vehicles.

Mayer/Agua Fria (*Draft Vision*)

1. As stewards of the Upper Agua Fria landscape, which provides beauty, bounty and sustenance, we envision a sustainable future of health and continued abundance through considerate, wise use of its resources.

2. Good water quality and adequate water supply in our watershed directly affects our success and survival. We encourage and support projects to minimize run-off of rainfall and prevent erosion, increasing water retention within our watershed. Along riparian zones, we support projects to preserve topsoil, control invasive plant species and maintain plant and animal diversity. Projects which slow perennial stream flow and control runoff conserve land which would otherwise disappear. Low impact recreational use is to be encouraged in these areas.

3. Healthy forests and rangelands are keys to sustainability. We support least-impact timber management practices and managed grazing to control excess combustible vegetation. We support ranching practices that utilize renewable forage resources in a sustainable fashion, and that develop and maintain range improvements. Ranching and farming allow for preservation of open space, limiting housing and industrial encroachment.

4. We support projects to ensure stable, noninvasive wildlife populations. Maintenance and development of permanent water resources, interagency cooperation on hunting and education, and enforcement of allowable motorized vehicle access provide us with the open space needed to respectfully experience wildlife, especially important in times of drought. We support efforts to control the invasion of feral hogs and request continued research into the effects of the increasing population of elk and its expanding habitat in our watershed. We recognize fire as a management tool and respect its role in the evolution of the forest and a critical component of forest health. We desire continued research in to the potential

positive and negative effects of fire on the land. Recreational opportunities abound on our forest. We support and desire the maintenance of trails and signage, control of trash accumulation and illegal dumping, and designation of motorized vehicles to roads and specific "OHV use areas."

5. The increasing demand on our natural resources compels us to keep abreast of conservation practices that prove to be more efficient, sustainable, nonpolluting and respectful of diversity. As these improved practices become available, we support their timely implementation, with our vision remaining optimistic for the future.

Paulden (*Draft Vision from Paulden Community Plan; draft August 2007, p. 9-10*)

Paulden residents have made a strong statement that the community they desire will be rural in character and lifestyle. But it is in the details of that statement that defines what "rural" and "character" mean. For Paulden, that means low density in all aspect of the community; housing, traffic, commercial uses, etc. They note that it is critical to maintain the historic two acre minimum lot zoning in all future development, planned or not. Commercial and residential development should always be of a small scale, even if that means residents must travel to other parts of the Prescott area for many commercial goods and services. There is no expressed feeling that Paulden needs a "downtown". Although there is a concern for maintenance and reduction of trash and clutter, many citizens also appreciate the dirt roads that are characteristic through much of the area.

Paulden residents have already taken some steps to assure the character of their community. First, by deciding to remain unincorporated, the community will be working with Yavapai County officials, departments and zoning and development codes to guide its growth. Then by requesting a community plan be prepared, they will receive official recognition by county, state and federal agencies of the specifics of how Paulden is to grow.

But beyond density, the sense of openness is critical to the sense of remaining rural. Paulden is fortunate to be surrounded by State and Federal lands. They not only help set the character of the community, but offer close by recreational opportunities. Maintaining these lands and access to them thus is very important to this community. Also, open areas and the feeling of "space" distinguish Paulden from other, more built up communities. Access throughout the area for horseback riding, hiking, taking the dogs out for walks and rides allow residents to take advantage of the openness the community enjoys.

Rural communities come from an agricultural and ranching heritage and Paulden's heritage stretches for more than a century. Paulden feels it is fortunate to have working ranches adjacent to it and has maintained the rural traditions of providing homes for horses and many animals as part of the daily life of residents. Preserving both the ranches and appreciation for animals is a goal almost universally stated by residents.

Finally, Paulden enjoys the benefits of pure environment, bountiful fresh water, clear skies and starry nights. These all contribute to the sense of a rural community and maintaining them is a priority to be met in the plan. Foremost among these is a protection of the community's water supply. Minimizing night lights, protecting the water supply, and avoiding any sources of air pollution are critical to maintaining this environment.

Challenges: In its visioning process, the community recognized there are challenges to be met if it is to achieve its goals in a general plan. Within the community there are areas that will need special attention, notably old platted areas with substandard sized lots, old manufactured homes that need maintenance, potential groundwater pollution and trash and litter. The community recognizes that it will need to partner with County and State agencies to be successful in improving these locations. Whether it is area wide

trash clean up needs or reducing dust on the roads by ATC drivers, the plan must address methods to maintain and improve the environment of Paulden.

Of equal concern is the ability to preserve the underground aquifer that supplies water to residents. Residents are aware of the desirability of using this resource and that there are challenges to ensuring the water supply remains available to residents living in the Big Chino basin. All efforts must be made to partner with groups working to accomplish this.

Finally, the Paulden plan needs to clearly state the unique vision for itself as a rural community and the elements that will maintain that vision. In order to maintain the character that many have found desirable here, residents accept several tradeoffs. The plan must express this balance so that as new residents consider Paulden as a home, they are aware of this character that has been chosen by Paulden residents and can accept it and help to reinforce and maintain it.

Prescott (*Final Vision Statement Prescott/Prescott Valley/Chino Valley*)

Overall, Forest Health and Fire: The Prescott/Prescott Valley/Chino Valley community values the PNF for the many recreational, economic and ecological services that it provides. The natural beauty and rural character of the surrounding public lands are a vital part of this community. Our vision of those lands 50 years from now is that they remain in the public domain, a resource shared across generations. We envision a forest where...

- Diverse, primarily native vegetation will protect soil from erosion, both in upland and riparian areas. Healthy wildlife populations will play an integral role in these ecosystems.
- The risk of forest fires will be reduced in the urban-wildland interface where the Forest and community partners will actively work to reduce hazardous fuel loads. Ecologically, socially and economically sustainable uses of forest products will support these projects.
- Active forest management, with an emphasis on restoration of natural ecological processes, developed through agency-community collaborative efforts, will help maintain forest health and reduce the risk of stand-replacing wildfires forest wide.
- All of this, in turn, will promote healthy watersheds where storage of water in the soil, stream courses and local aquifers is maximized.
- The healthy forest will contribute to global sustainability and will be a natural, trash-free place with quiet settings.
- The PNF will have sufficient financial resources to meet its management obligations, including adequate law enforcement.

Recreation: Through ongoing dialogue among land managers and communities, a thoughtful balance will be achieved between the need for access and the protection of forest resources and aesthetics. In our vision, a comprehensive recreational travel plan region-wide will protect forest health and promote robust economies in our cities and towns. The PNF will maintain a comprehensive system of meaningful and sustainable trails, trailheads and designated campsites. Low maintenance facilities built collaboratively among citizens and agencies will be valued by all. The PNF, with user participation, will minimize user conflict through enhanced separation between non-motorized and multi-use trails. The trails will be enjoyed by hikers, equestrians, bicyclists, motorized vehicle operators and hunters, with a reasonable amount of access to all user groups. Cross-country* motor vehicle travel will continue to be prohibited

Economic: All economic activities on the forest will be managed to minimize forest damage while promoting healthy ecosystems and public safety. Grazing allotments will be adaptively managed to promote healthy and productive grasslands and watersheds, while supporting ranch families who are good stewards of the land and represent an important part of our local history and culture. The PNF will continue to support a range of activities that directly contribute to local economies.

Community Involvement/Partnerships: Citizens will recognize an ethical obligation to protect the forest for the future; this land ethic will be shared with all newcomers to the area. Vibrant partnerships with emerging or established community groups will enhance the Forest Service's ability to provide services, enabling a large group of citizen volunteers to respond to the needs of the forest, including trail maintenance, user education and fire prevention. This informed, engaged citizenry – through a multi-interest non-profit and/or stewardship group - will actively participate in an ongoing collaborative process of forest planning that ensures the Prescott National Forest will be enjoyed by more generations to come.

*Unauthorized motor vehicle travel off of designated roads, trails and areas.

Wilhoit (*Draft Vision*)

Wilhoit is rural in character with a strong desire to remain that way. We are surrounded by Prescott National Forest and State Trust Lands. Our quiet, private community has few public attractions and amenities. "Low impact" commercial growth might be welcomed on SR89 (Fuel pumps?)

The public areas surrounding our community should allow recreational access for all ages & physical conditions where practical. - Example: Thunderbird Meadows access to FR72

Reasonable fees should be charged for access; the income earmarked for:

- Forest Road Maintenance
- Rules signage - Examples: "OHV allowed trails", "No litter", etc.
- Trails and water source access for horses
- Volunteer program for trail management
- Fire Prevention is paramount and should be on-going.
- Continue prescribed burns and brush thinning around our community for fuel reduction. The North side of our community must be attended to next. Brush removed must be chipped or removed immediately after clearing.
- Manage the public areas to reduce fuel build-up. A clean forest makes for a safer community. Encourage the public to remove deadfalls for firewood after fires.
- Widen Highway 89 shoulder clearing.
- Widen the Forest Road system and trails for fire breaks.
- Enforce building codes to restrict structure density.
- Tougher law enforcement/greater punishments for those who start fires.
- Reforestation efforts should be stepped up.
- Plant seedlings to introduce more favorable varieties.
- Should be done soon after prescribed or involuntary burns.
- Better use of greater financial resources.
- How can we increase budget allotments for our desired community vision?
- More call boxes.
- Water reservoirs for fire fighting.
- Funding for our fire department.
- Inter-agency coordination-
- Federal – State – County (FSC) communication network to feed down to local level
- FSC policy coordination.
- FSC plan parity.

Appendix B. Potential Forest Plan Needs for Change – Bin List

This section of the report contains a list of other potential Forest Plan needs for change that have been raised internally or by the public through the Forest Plan revision process to date. This list contains items that have been deferred and are expected to be reevaluated at a later date. These items, that are either a lower priority or not ripe to be addressed, or are topics over which the PNF has less influence will be retained in this bin list. The bin list will serve as a living document to capture and store potential Forest Plan needs for change that will either be addressed to a lesser degree when the Forest Plan is revised or will be retained until the next CER is prepared.

- **Address Organic Matter/Soil Loss in Applicable PNV's.**
- **Address need to acquire rights-of-ways to access the PNF across lands under other ownership.**
- **Address suitability of areas for utility/transportation corridors and energy production.**
- **Modify Plan direction related to Communication sites.**
- **Collect PNF data regarding cowbird parasitism.**
- **If prairie dogs re-establish on the PNF, consider working with agencies and the public to discourage poisoning, shooting, or other threats to their population viability.**
- **Develop a Forest-wide monitoring strategy for macroinvertebrates.**

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Appendix C

Recreation, Grazing, Minerals and Timber Demand

Analysis of the Management Situation

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TEAMS Planning Enterprise Unit

for:

Prescott National Forest

November 18, 2009



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Recreation

Introduction

This document provides estimates of existing recreation use and capacity on the Prescott National Forest (PNF). Current recreation use and anticipated changes in demand during the next planning period are provided in order to aid in planning for future management of the Forests' resources. Outdoor recreation is of growing popularity across the western states, and National Forests in Arizona and New Mexico provide unique recreational experiences. Demand for these recreational opportunities is directly tied to population levels; therefore population growth provides a proxy for changes in demand. A variety of data sources are utilized throughout this report, including national and state demographic and recreation studies. Visitor use data for the PNF is provided from the National Visitor Use Monitoring Survey (NVUM). NVUM provides current use estimates by activity. Although factors such as population growth, available services and amenities, and substitute activities may be controlled for when projecting demand for forest recreation, there are several issues that are beyond the control of natural resource planners. Weather, future regional economic conditions, state and federal wildlife regulations and other unknown factors can impact the rate at which public stakeholders recreate on public lands. Accounting for such factors is outside the scope of this report. Forest recreation is a dynamic concept in that it changes across time. This report utilizes quantitative data, when available, to predict changes in demand for recreation. However, the quantitative analysis must be paired with a qualitative assessment of socioeconomic factors affecting recreation use for which no data exists.

The goal of this report is to provide a comprehensive analysis of outdoor recreation as it relates to the PNF, and provide projections of demand so that managers may make more informed decisions during the next planning cycle. Part of forest management is to decide the level of recreation supply to introduce to the market. In a balanced recreation economy supply equals demand. However, the equilibrium state is impossible to predict without dynamic supply and demand functions. Such functions do not exist for recreation on the PNF. When possible, quantitative data is used to report recreation supplied and demanded; which is then paired with a qualitative assessment of the market for outdoor recreation. NVUM data is also assumed to report the current quantity of recreation supplied. Since the public good qualities of National Forests prohibit the exclusion of recreators, and the only mechanism of limiting supply is the productivity and sustainability of forest resources. Current use levels are assumed to be the equilibrium state for recreation supply and demand. Exogenous factors provide the basis for the assessment of directional change from that equilibrium.

The PNF receives visitors from all over the western United States. The study area for this analysis is the State of Arizona. State trends in population and outdoor recreation use are relied upon to serve as a proxy to recreation demand. When necessary, the report will discuss regional findings at a smaller scale, however, quantitative data at this level is limited.

Recreation Summary

At the national level, outdoor recreation participation has been steadily increasing for decades. Cordell (2004) explains that "outdoor recreation is not only a deeply entrenched part of Americans' lifestyles but also is a growing part of those lifestyles. National Forests serve as a primary destination for outdoor recreators across the nation. They provide opportunities for many different activities in both developed and primitive environments. Recreational activities on

forests are often an issue of disagreement and contention across user groups. For example, motorized and non-motorized interests groups are often at odds with each other regarding their ideas of the best use of public lands. One of the critical components of forest planning is to develop a mechanism for providing a sustainably diverse set of recreational opportunities meeting the demands of the public. Those demands are constantly evolving and likely to vary across different regions of the US.

Arizona offers a wide range of outdoor recreation opportunities. The supply and demand of recreation on public lands is complex. Arizona consists of approximately 72.6 million acres of land, 33 percent of which is public land and 13 percent state trust land (AZGFD, 2009). The public-private interface complicates the availability and demand for outdoor recreation. More than 6 percent the State's land base is considered landlocked public ground, meaning there is no legal access through public means (AZGFD, 2009). To address this, the Arizona Game and Fish Department (AZGFD) developed the Landowner Relations Program, which includes an access program with the objective of maintaining public access by cooperatively working with private land owners. This improves accessibility to public land across the state.

Overall, tourism in Arizona is on the rise. A total of 35.2 million overnight travelers visited the state in 2007; this represents a 4.4 percent increase from the previous year. This visitation resulted in \$19.3 billion dollars of direct expenditures, and generated 171,500 direct jobs (AOT, 2008). The economic activity specific to outdoor recreation is not reported, however, it is assumed to be a substantial contributor. Arizona's rich natural amenity base, including the Grand Canyon, is a popular draw for many tourists. This includes activities on National Forests. In 2008, the Arizona Office of Tourism (AOT) launched an outdoor adventure campaign in partnership with Arizona State Parks and Arizona Trail Association to showcase the state's outdoor offerings (AOT, 2008). These campaigns should increase Arizona's visibility as an outdoor recreation destination among residents and non-residents, and consequently increase demand.

Outdoor recreation on public lands is concentrated due to the limited acreage available. Managing 1.25 million acres, the PNF is a popular recreation destination for many residents in the southwest. The majority of visitors surveyed during round 2 of NVUM resided in Arizona, Southern California. Overall it was estimated that the PNF received 756,220 visits in 2007. Much of the use is by local residents, 66 percent. Locals were considered those traveling less than 50 miles to site visited. Non-locals accounted for 19 percent of total visits and non-primary accounted for 15 percent. Non-primary visitors are those whose primary purpose of trip was something other than recreation on the Forest. The PNF is located in a remote part of southeastern Arizona, near the City of Tucson. This accounts for the high proportion local visitation.

Demand

The 1986 Forest Plan highlighted that future demand for developed recreation could exceed the Forest's ability to supply under the currently inventoried sites. It is common in the southwest for demand for recreation sites near lakes and streams to outpace supply. Water is a scarce resource there, and many outdoor recreation experiences are enhanced by the presence of water. Outdoor recreators tend to flock to easily accessible, high amenity, areas which could stress the Forests' natural resources. Therefore, consolidated use around the PNF's water resources is expected to reach the maximum output sustainable. The 1986 plan estimates that projected future use will

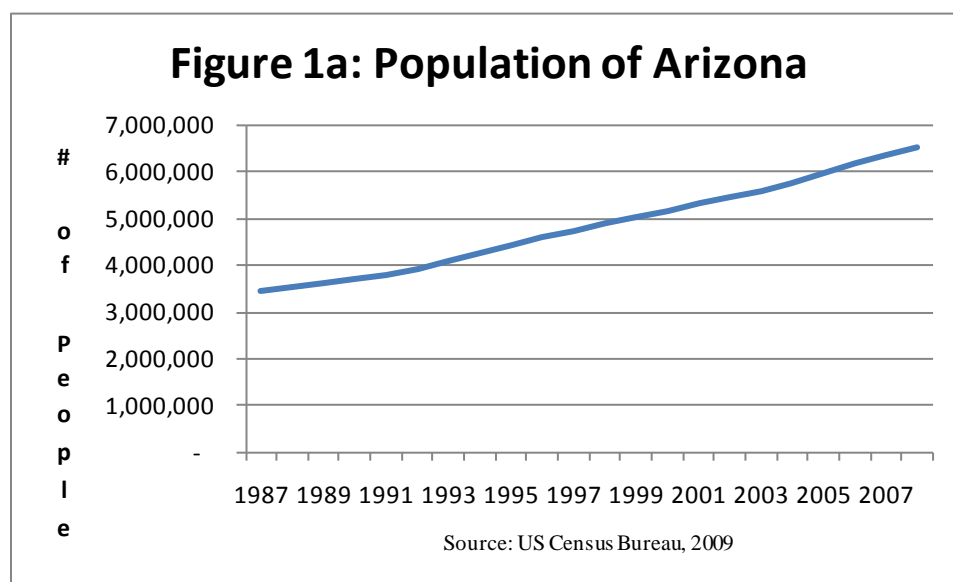
exceed the potential supply for developed recreation, and meet the potential supply of wilderness and dispersed recreation.

Table 1a: Comparison of Recreation Outputs with Projected Future Use and Supply

		Average Annual					
		Proposed Plan		Potential Supply		Projected Future Use	
Resource Output	Unit of Measure ¹	1986-1995	2026-2035	1986-1995	2026-2035	1986-1995	2026-2035
Wilderness Recreation (excluding wildlife)	MRVD	37	74	37	74	37	74
Developed Recreation (including skiing)	MRVD	567	947	573	1,090	582	2,200
Dispersed Recreation (Excluding Highway Use)	MRVD	799	1,314	799	2,500	799	2,500

Source: 1986 PNF Plan

¹: MRVD = Thousands of Recreation Visitor Days



Demand for recreation is closely tied to population levels. Figure 1a reports Arizona's population from 1987 to 2008. Since 1987, the state's population has increased at an average annual growth rate

of 3.1 percent. It is therefore expected that the demand for outdoor recreation among residents should have increased at a similar rate. Population growth serves as a proxy for change in recreation demand; actual change in demand could vary according to changes in other socioeconomic variables. A person's tastes and preferences, household income, mental and physical health, proximity to National Forests, as well as a variety of other variables affect their demand for outdoor recreation. A well researched demand function should control for those variables significantly influencing the population of the study area. However, such functions for recreation on the PNF do not exist, and development of one is beyond the scope of this analysis. Therefore, population growth serves as the best proxy for change in demand.

Table 2a reports the estimated distribution of activities participated in during recreational visits. NVUM measures visitation as National Forest Visits which are different than MRVD's. Thus the methods of reporting recreation use are not directly comparable between the 1986 Forest Plan and current revision efforts. A National Forest Visit is defined as the entry of one person onto a National Forest for the primary purpose of recreation for an unspecified period of time. It is assumed that this data represents current recreation use based on the existing population. The

main activity represents the primary purpose for the trip, and participation represents all activities participated in no matter what the main activity was. Therefore, one visitor could participate in multiple activities during one trip. It is important to consider total activity participation because that identifies the demand for recreational goods and services supplied by the Forests. The most common activities include viewing natural features and wildlife, relaxing, and hiking/walking. There should be continual growth in demand for most forest activities during the next planning cycle.

Table 2a: PNF Activity Participation

Activity	% Participation	% Main Activity
Developed camping	12.4%	5.1%
Primitive camping	0.9%	0.1%
Backpacking	0.2%	0.0%
Resort Use	0.5%	0.0%
Picnicking	8.6%	1.7%
Viewing wildlife	70.3%	1.0%
Viewing natural features	81.9%	18.4%
Visiting historic/prehistoric sites	4.6%	0.5%
Visiting a nature center	5.4%	0.0%
Nature Study	6.4%	0.0%
Relaxing	55.5%	7.1%
Fishing	7.7%	4.8%
Hunting	0.5%	0.4%
OHV use	2.7%	0.4%
Driving for pleasure	24.4%	8.1%
Motorized water travel	0.1%	0.0%
Other motorized activities	0.1%	0.0%
Hiking or walking	68.2%	44.5%
Horseback riding	2.0%	2.1%
Bicycling	4.3%	3.5%
Non-motorized water travel	2.3%	1.8%
Downhill skiing or snowboarding	0.2%	0.2%
Other non-motor activity	1.0%	0.2%
Gathering forest products	3.1%	0.4%
Motorized trail Activity	2.9%	0.8%

Based on a 3.1 percent average annual growth rate, the demand for recreation on the PNF in the year 2025 will be 1,310,099 visits. Table 3a reports the demand for recreation at 5 year intervals during the next planning cycle. These estimates are based on 2007 data reported during round 2 of NVUM and Arizona's average annual population growth rate from 1987 to 2008. The distribution of activity participation is also based off of NVUM round 2 results. The sum of participants is greater than the total National Forest visits because individuals can participate in more than one activity during their visit.

Table 3a: Demand for Recreation on the PNF during the Next Planning Cycle

	2007¹	2010²	2015³	2020³	2025⁵
National Forest Visits	756,220	828,751	965,423	1,124,633	1,310,099
	Number of Participants				
Developed camping	93,771	102,765	119,712	139,454	162,452
Primitive camping	6,806	7,459	8,689	10,122	11,791
Backpacking	1,512	1,658	1,931	2,249	2,620
Resort Use	3,781	4,144	4,827	5,623	6,550

Picnicking	65,035	71,273	83,026	96,718	112,669
Viewing wildlife	531,623	582,612	678,692	790,617	921,000
Viewing natural features	619,344	678,747	790,681	921,074	1,072,971
Visiting historic/prehistoric sites	34,786	38,123	44,409	51,733	60,265
Visiting a nature center	40,836	44,753	52,133	60,730	70,745
Nature Study	48,398	53,040	61,787	71,977	83,846
Relaxing	419,702	459,957	535,810	624,171	727,105
Fishing	58,229	63,814	74,338	86,597	100,878
Hunting	3,781	4,144	4,827	5,623	6,550
OHV use	20,418	22,376	26,066	30,365	35,373
Driving for pleasure	184,518	202,215	235,563	274,410	319,664
Motorized water travel	756	829	965	1,125	1,310
Other motorized activities	756	829	965	1,125	1,310
Hiking or walking	515,742	565,208	658,418	767,000	893,488
Horseback riding	15,124	16,575	19,308	22,493	26,202
Bicycling	32,517	35,636	41,513	48,359	56,334
Non-motorized water travel	17,393	19,061	22,205	25,867	30,132
Downhill skiing or snowboarding	1,512	1,658	1,931	2,249	2,620
Other non-motor activity	7,562	8,288	9,654	11,246	13,101
Gathering forest products	23,443	25,691	29,928	34,864	40,613
Motorized trail Activity	21,930	24,034	27,997	32,614	37,993

¹Estimate from NVUM Round 2

^{2,3,4} and ⁵Projection based on an average annual growth rate of 3.1 percent

It is projected that the PNF will receive steady growth in the demand for all recreation activities during the next planning cycle. Infrastructure must be developed to meet this increase in demand, or regulations must be invoked to limit use. The most growth should occur to the more common activities reported in Table 2a; therefore planning efforts should focus around these user groups. Public collaboration is an important element of gauging demand for recreation throughout the planning cycle. Changes in tastes and preferences could affect participation rates of outdoor activities. Other factors such as aging populations, decreasing leisure times, geographically uneven population growth, immigration, family values and education levels could impact total forest visits and the distribution of activity participation (Cordell et al., 1999). Such evolutions in recreation use should emerge through public comments and in various political arenas. Therefore, the data reported in Table 3a should be considered in conjunction with any information received during scoping periods and incorporate future advancements in the science.

Recreation Trends

Many variables affect trends in participation of outdoor recreation. Geographic location, socioeconomic status, age, and education all influence recreational behavior. However, outdoor recreation has remained largely popular across American communities and groups within society. And although recreational activities evolve overtime, the basic motivation is still having the opportunity to visit, view and live with nature (Cordell et al., 1999). Past trends indicate that casual activities are most in demand. These activities include hiking/walking, family gatherings and viewing sites of interest. Long term and short terms trends also indicate continued growth in outdoor recreation among all segments of the population (Cordell et al., 1999).

As reported above, population growth has been, and is expected to continue to be the primary driver of outdoor recreation participation growth. Projections for winter, water-based, wildlife

related, dispersed land activities, and developed land activities were developed based on data published in *Outdoor Recreation in American Life: A National Assessment of Demand and Supply Trends*, by H. Ken Cordell, et al. (1999). Projections were developed by region and indexed using 1995 as the base year (Cordell et al., 1999). For example, in Table 4a, the value of 1.06 for canoeing means that in the year 2000 total participation in canoeing should be 6 percent greater than it was in 1995; in 2010 it should be 21 percent greater than it was in 1995. For the purposes of this report the pacific region is used as a proxy for recreation trends. Given Arizona's close proximity to the west coast, and similarities in the socioeconomic environments of large population centers in Arizona and Southern California, it is assumed that average recreators have more in common with those in the pacific region than the mountain states. The projected participation trends in this region are reported in Table 4a; winter recreation is not included because it was not a common activity on the PNF.

Table 4a: Projected Trends in Outdoor Recreation, Indexed to 1995

Variable	2000	2010	2020	2030	2040	2050
Water-Based Activities:						
Canoeing	1.06	1.21	1.30	1.51	1.69	1.89
Motor-boating	1.07	1.22	1.32	1.52	1.69	1.88
Non-pool Swimming	1.06	1.19	1.29	1.43	1.57	1.72
Rafting/Floating	1.05	1.20	1.30	1.52	1.73	1.97
Wildlife-Related Activities:						
Fishing	1.05	1.12	1.20	1.23	1.30	1.38
Hunting	0.94	0.93	0.91	0.89	0.88	0.89
Non-consumptive Wildlife Activities	1.08	1.23	1.37	1.52	1.65	1.77
Dispersed Land Activities:						
Backpacking	1.05	1.12	1.23	1.24	1.34	1.46
Hiking	1.08	1.23	1.34	1.53	1.69	1.85
Horseback Riding	1.05	1.18	1.29	1.46	1.61	1.77
Off-Highway Driving	1.04	1.10	1.20	1.20	1.26	1.33
Primitive Camping	1.05	1.13	1.23	1.27	1.35	1.44
Rock Climbing	1.03	1.06	1.16	1.12	1.21	1.34
Developed Land Activities:						
Biking	1.06	1.19	1.29	1.41	1.53	1.65
Developed Camping	1.06	1.19	1.32	1.45	1.59	1.73
Picnicking	1.07	1.20	1.31	1.44	1.54	1.63
Family Gathering	1.07	1.20	1.30	1.42	1.54	1.65
Sightseeing	1.09	1.26	1.42	1.58	1.74	1.87
Visiting Historical Places	1.08	1.22	1.33	1.46	1.58	1.68
Walking	1.08	1.23	1.34	1.49	1.62	1.73

Source: Cordell et al., 1999

Activities projected to experience the greatest growth are most water based activities, hiking and walking, sightseeing and non-consumptive wildlife activities. The only activity in the pacific region projected to experience a decline in participation is hunting. Hunting and fishing are considered consumptive forms of wildlife activities. Fishing is expected to experience growth, but at rates much slower than other non-consumptive activities. For the most part, it is the more casual activities that are expected to experience the greatest growth. Individuals and families are likely to continue to participate in outdoor activities during their leisure time for recreational and

bonding purposes. Based on these trends, it is safe to say the PNF will experience an increase in demand for most recreational activities during the next planning cycle.

Forest Capacity

Forest capacity refers to the ability of the resources to supply recreation. The PNF has a limited resource base; therefore supply may not grow infinitely. Available forest resources may be considered as a fixed input to production. Other factors such as the development of new technology and investments in infrastructure may increase the supply of recreation to a certain degree, but at some point the available resources will be exhausted and recreation supply will reach a ceiling or possibly experience a decrease. Forest resources must support recreational opportunities well into the future. This section explores the PNF's ability to supply sustainable levels of recreation.

Recreation at developed sites is more subject to capacity restrictions than dispersed recreation. A developed site, such as a campground, typically supports a limited number of recreators.

Infrastructure at the site limits the number of people who may recreate at one time. Parking spots, campsites and picnic tables are all examples of infrastructure that limit the total capacity at developed sites. Table 5a reports the volume and capacity of recreation sites by type.

Campgrounds have the largest capacity of developed sites supporting up to 4,089 recreators at one time. Each site may have a different season of use, which would affect annual capacity. Demand for these sites does not occur evenly throughout the year. For much of the year, during moderate or low demand periods such as mid-week or off-season periods, a significant quantity of developed capacity is unused. Public perceptions of crowding tend to occur during periods of high (i.e. weekends) and peak use (i.e. holidays). Based on recreation trends and projected population growth, it is expected that total demand for outdoor recreation at developed sites will surpass the Forest's ability to supply during high use periods given the current volume and capacity of developed sites. Investment in infrastructure, or adopting regulations to control use, will be needed to align capacity with demand in future years.

Table 5a: Volume and Capacity of Recreation Sites by Type

Site Type	Number of Sites	Total Capacity
Boating	3	125
Campground	12	1,455
Day Use Area	12	310
Fishing Site	5	157
Group Campground	4	316
Group Picnic Site	3	185
Horse Camp	1	260
Interpretive Site (Major)	2	135
Lookout/ Cabin	1	4
Observation Site	2	25
Picnic Site	12	1,201
Specialized Sport Site	5	388
Trailhead	12	657

Source: USDA Forest Service, 2009

Capacity estimates are subject to a certain amount of subjectivity. While the capacity of a campground can be estimated based on the parking available and the number of sites provided; estimates of the capacity of general forest areas are subject to interpretation based on personal or

social preferences. Social capacity is the number of other persons or activities that a visitor can tolerate without feeling that their experience has been compromised. If social capacity is exceeded, a visitor will try to find another location to pursue their chosen activity or abandon that activity in favor of another. Social capacity can vary from one person to another. What one individual is willing to accept, may be unacceptable to another.

Russell and Adams-Russell (2006) explain that the PNF is valued as a recreational resource. In recent years there has been a transition from valuing the more consumptive uses such as mining and grazing to placing greater value on recreational activities. A primary concern is that as demand continues to grow, recreation quality will suffer. Ultimately unmanaged resources will succumb to overuse and supply would decrease due to deteriorating conditions. Collaborating with the public is an important method for addressing forest use and identifying areas where demand may outpace supply.

Grazing

Assessment of Grazing Demand on the Prescott National Forest

While shrublands and grasslands are most commonly associated with grazing, forest lands also support an understory of grasses, shrubs and forbs valuable as a source of forage for domestic livestock grazing. Most allotments on the PNF are grazed year round (45 allotments) while a few are grazed in just the winter (18 allotments). The 1986 PNF Land and Resource Management Plan identified 977,000 acres as being capable and suitable for livestock grazing and this acreage has remained relatively stable. In 1986, the PNF issued 57 grazing permits. In 2008, 54 permittees were issued a total of 60 permits (USDA 2009b).

This assessment of demand considers use of head months on the forest service and does not address the demand for non-economic values tied to ranching as a way of life. These non-economic values can include having a working relationship with the land, owning livestock, commitment to community, land stewardship, continuing a family tradition, and the ability to pass on the operation to future generations (Raish and McSweeney, 2003, Conley et al, 2007).

Demand

The demand for grazing is ultimately dependent on the demand for livestock products. The USDA Economic Research Service provides projections of domestic per capita meat consumption and some explanation of expected trends. They anticipate the production decreases that occurred in 2007 and 2008 in response to high grain and soybean meal prices to continue to ripple through the livestock sector in the first several years of the projections. In addition, they expect that with current demand weakened due to the domestic recession and global economic slowdown that these production changes combine with strengthening meat exports to reduce domestic per capita consumption through 2012 (Figure 1b). Finally they conclude “The result is lower production at higher prices, with improving net returns providing economic incentives for moderate expansion in the sector toward the end of the projection period” (USDA 2009a). Thus, while demand may decrease in the next few years, they anticipate opportunities for producers with returning demand at the end of their project period.

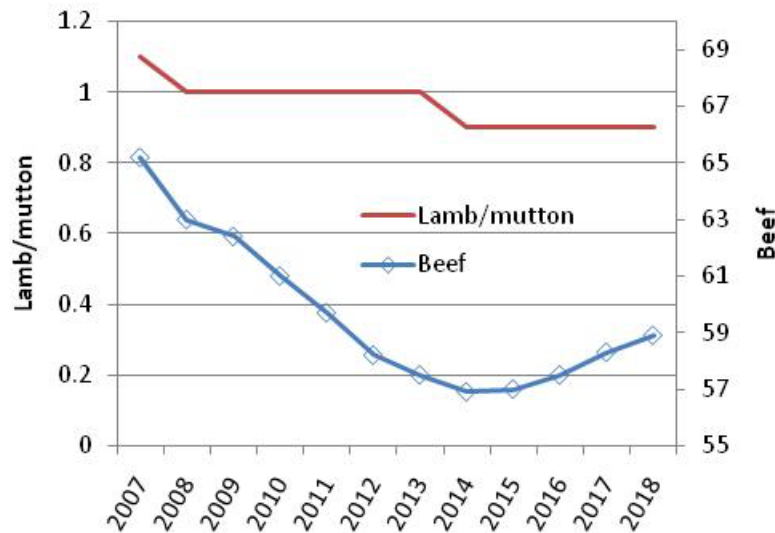


Figure 1b: Per capita meat consumption, retail weight

Examining demand for forage presents some difficulties because only a portion of forage consumed by livestock is leased or sold in an observable market. The vast majority of forage consumed by livestock in the U.S. is produced from pasture owned by the operator and is therefore is not priced in a forage market (USDA 2000). Price information specific to Arizona and provides some indication that demand may be increasing. Data shows that grazing fees, adjusted for inflation, have increased from \$8.12 in 2003 to \$8.50 in 2008 per Animal unit month (AUM) (USDA 2009c). If we assume supply has remained constant, the increase in price suggests demand for forage may be increasing in Arizona. The price for forage on National Forest System and other public lands is set by federal laws and was \$1.35 per AUM in 2008. Forage on public land may not be of the same quality as competitively priced forage and there are often additional costs of operation associated with use of forest service forage.

The best indicator for demand for forage is the number of livestock. Between 1975 and 2009 the numbers of cattle decreased by 13 percent in Arizona (approximately 150,000 animals) (USDA 2009c) (Figure 2b).

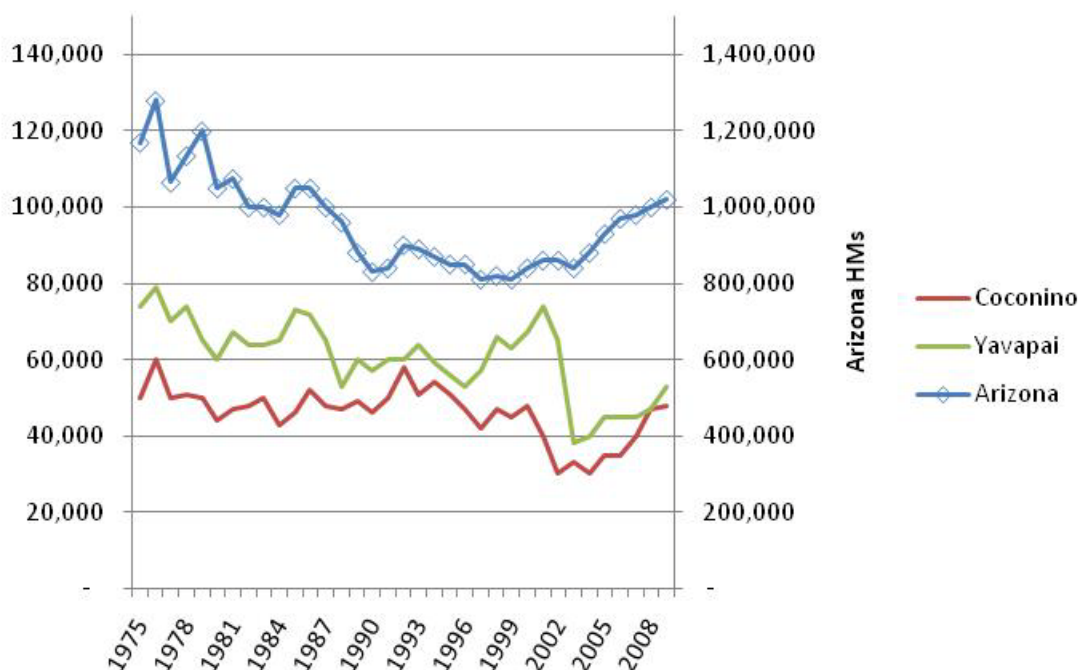


Figure 2b: Cattle inventory in market area counties and the state of Arizona (Source: USDA 2009c)

The geographic area of assessment for the Socio-Economic Assessment for the Prescott National Forest included both Coconino and Yavapai Counties and is thus used as the market area for this analysis (USDA 2009b). Within this market area cattle inventory declined by 40 percent in Coconino County (20,000 head) between 1975 and 2002 and by 48 percent in Yavapai County (36,000 head) between 1975 and 2003 (Figure 2b). Both Coconino and Yavapai have seen a moderate recoveries since their lows in 2002 (30,000 head) and in 2003 (38,000 head) recovering by 36 and 20 percent, respectively.

Between 1997 and 2008 (Figure 3b) actual cattle and horse Head Months (HMs) on the PNF have increased by 139 and 31 percent, respectively. Actual use of HMs on the forest has supported a high of approximately 4.5 percent of the market area cattle inventory in 2004 and a low of 2.7 percent in 2001. While the share of total demand provided by the PNF is small, it may be more important for smaller areas within the market area. In addition, the recently observed decreases in the number of actual HMs and share of inventory support by actual use suggests demand for forage from the forest may be increasing within the market area. However, this trend is uncertain given the wide degree of variation in actual use over the relatively short period examined.

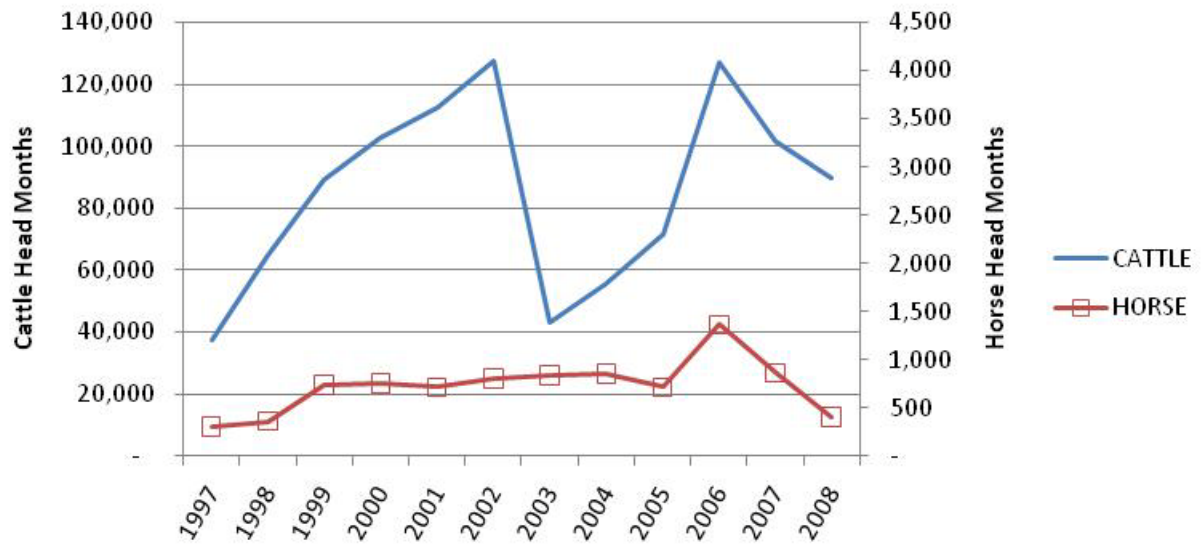


Figure 3b: Actual Head Months on the Prescott National Forest Supply

While livestock grazing is an important and valued use, it is not the only use on the PNF and is limited by other resource considerations. Consequently, these other uses and resource values impact the supply of forage available for livestock grazing. The forest service establishes permitted limit for HMs on allotments. This is the maximum number of HMs that could be offered under ideal forage conditions. These changes have occurred with implementation of grazing practices to protect forage conditions. For example, grazing is excluded along all PNF reaches of the Verde River. About 35 percent of riparian reaches are winter use only, and the rest are managed under PNF Land Management Plan vegetative guidelines (20% on woody species, 35-40% use on herbaceous vegetation, etc.). In addition, all allotments have incorporated rest in the allotment's grazing system varying from yearlong to seasonal deferment.

Between 1998 and 2008 (Figure 4b) permitted cattle and horse grazing has increased by 92 and 296 percent. Given large changes in year to year variation it is difficult to say whether these data are indicative of long term trends however they provide a baseline comparison with trends in actual use on the PNF.

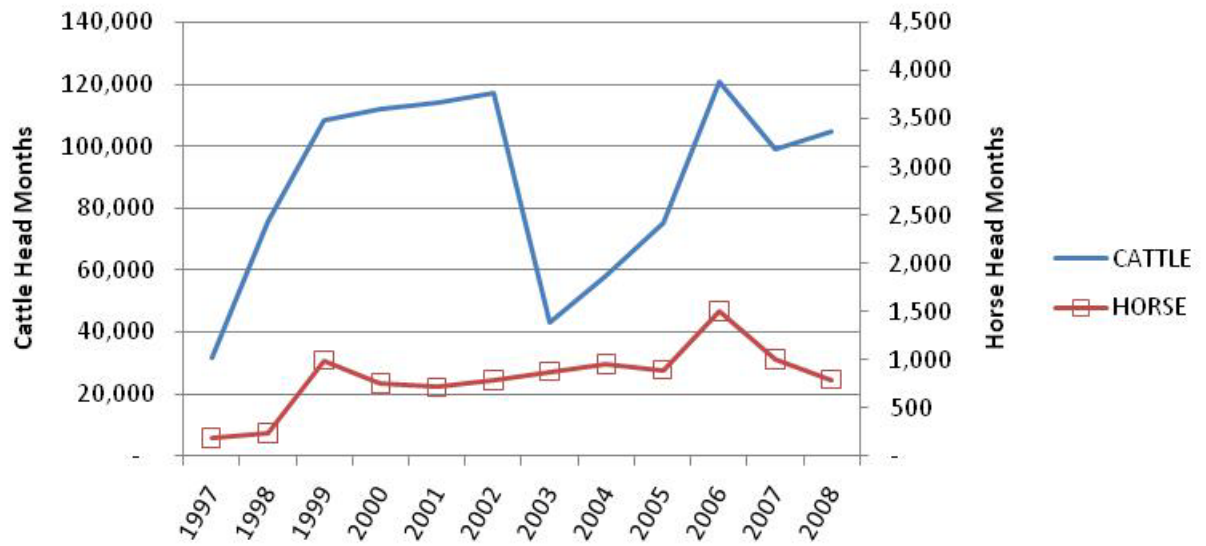


Figure 4b: Permitted Head Months on the Prescott National Forest

Minerals

Introduction

This document assesses the current state and future development of mining activity on the Prescott National Forest (PNF). Minerals of all types are an important resource on National Forests in the southwest. Types of extractable minerals include energy minerals (i.e. oil and gas), metallic minerals (i.e. copper and gold) and construction related materials (i.e. sand and gemstones). The PNF is located in west-central Arizona. Demand for minerals on the Forest is influenced by state trends regarding capacity and extraction. Therefore Arizona serves as the study area for this analysis. Mining is a popular activity both on and off the Forest. Current and projected extraction levels are used to assess demand, however there is less information regarding the supply of available minerals on the PNF. Locatable and extractable minerals depend heavily on the technology available which is influenced by pricing in a global marketplace. This report assesses the supply and demand conditions of minerals using the limited data available as well as a qualitative assessment of indicators lacking reliable data.

Regional Mineral Activity

Mineral production in the area dates back to the late 1600's, with major mining eras occurring in the 1880's, early 1900's to mid 1920's, and 1940's and 1950's. There are very few mining operations left, with the major production occurring for copper (BOI Bureau of Mines, 1994). In 2007 Arizona ranked as the Nation's top producer of non-fuel minerals with a production value of \$7.58 billion. "Arizona leads the Nation in copper and ranks in the top five in molybdenum, sand and gravel, gemstones, perlite, silver, zeolites, and pumice" (ADMMR, 2008). Other extractable minerals include: zinc, lead, beryllium, vanadium, uranium, tungsten, rare earths, manganese, coal, and at least 18 varieties of industrial minerals. Arizona's copper industry alone accounted for 62 percent of National production and had a total impact of \$4.7 billion to the state's economy in 2006 (ADMMR, 2008).

The total value of Arizona's mineral production has increased substantially in recent years (Table 1c). Copper is the most valuable mineral resource under production in the state. Copper deposits are scattered throughout Arizona, are more are likely to be discovered in the future. Strong demand and high prices have driven exploration and development activity to their highest levels in many years (ADMMR, 2008). As with most minerals, exploration activity is driven by the market price for the resource. Market prices are determined by supply and demand, however available supply changes with technology. In many cases new technology has allowed for the production of materials previously considered un-extractable. Therefore if copper prices continue to rise, it is likely that new technology and exploration endeavors will lead to the discovery of additional deposits.

Table 6c: Value of Arizona's Mineral Production (\$)

Commodity	2005 Value	2006 Value	2007 Value
Bentonite	-	1,710,000	1,730,000
Copper	2,640,000,000	4,950,000,000	5,540,000,000
Gemstones	1,370,000	1,560,000	1,580,000
Sand and Gravel	516,000,000	662,000,000	597,000,000
Crushed Stone	69,300,000	102,900,000	116,000,000
Coal	1,120,000,000	1,040,000,000	1,120,000,000

Other	290,000,000	190,000,000	200,000,000
Total	4,640,000,000	6,940,000,000	7,580,000,000

Source: ADMMR, 2008

Uranium is the only fuels mineral in Arizona monitored by the USGS; exploration for which continues at a high rate. Exploration is concentrated in three regions: Colorado Plateau, central Arizona and Date Creek Basin (USGS, 2009). Much of the activity surrounding uranium is prospective; however many companies are well positioned to expand production capabilities if the marketplace permits. The current and expected future interest for uranium mining on the PNF is minimal, and not expected to be a hot topic during the next planning cycle.

Demand

Minerals are a main resource on National Forests, many of which have national and global importance. Minerals of most importance on Arizona forests are of the metallic variety. In general, there has been a decline in the demand for metallic minerals due to the development of cheaper, non-metal, substitutes. Demand for individual minerals, however, is more volatile; and high demand growth is expected for scarce and costly metals (USDA, 1989). Statutory and regulatory direction separate mineral resources in federal lands into three categories: leasable, locatable, and salable. Forest level data exists for salable minerals because a contract is developed to administer the sale. Demand for leasable and locatable minerals is much more subjective because there is no standardized system of reporting extraction levels.

Mining interests are most abundant for gold and copper. Exploration for both commodities is highly influenced by market conditions. As price increases, mining companies increase exploration and hence increase demand for extraction on public lands. Copper is the most abundant metallic mineral on the PNF. Productive copper mines could be located on various portions of the Forest. It is likely that development proposals will be presented to managers during the next planning cycle. In addition to copper activity, there are several opportunities for placer mining gold operations. These tend to be small operations without big equipment. Currently the Gold Basin Project is the only commercial mine with an approved plan of operations. There is no data regarding the volume of gold extracted. It is apparent that demand exists for copper and gold on the Forest, and it is likely that demand will increase in the future. Copper is likely to be a high demand commodity during the next planning cycle. As deposits on nearby property become depleted, and market conditions remain favorable, companies will invest more resources into exploring other sites.

Placer gold mining is most common in the Bradshaw Mountains. Additionally, recreational and small commercial operators could work when stream flows permit (BOI Bureau of Mines, 1995). Demand for gold is likely to continue at a similar scale during the next planning cycle.

There is currently no demand for energy minerals on the PNF. There is no method for predicting future demand, but current conditions and trends indicate that development interests should remain low.

There is also substantial production of construction related materials. Table 2c reports sale contracts for cinders, crushed stone, dimension stone and landscape rock for 2007 thru 2009. Demand has varied considerably in recent years. The total value of minerals sold in 2009 was \$217,648, which is down from \$329,261 in 2008. Overall this is a small level of demand relative to the rest of the state. It is likely that demand will continue to fluctuate in the future because it is

highly speculative and dependent on private and commercial construction activities in the local area. The recent downturn in the economy has slowed demand growth for construction materials, but as markets recover, demand should rebound. PNF managers will be forced to adapt to varying demand conditions. Demand may be predicted by monitoring future construction activities and investments in public infrastructure in the local area. These activities are usually followed by an increase in population, which would consequently contribute to an increase in demand for construction related materials.

Table 7c: Construction Related Material Sale Contracts

Commodity	2007		2008		2009	
	Sale Contracts (Short tons)	Value (\$)	Sale Contracts (Short tons)	Value (\$)	Sale Contracts (Short tons)	Value (\$)
Cinders	67	60	67	60	-	-
Crushed Stone	-	-	1,481	4,111	-	-
Dimension Stone	2,028	12,168	54,149	324,894	36,255	217,528
Landscape Rock	64	388	32	196	20	120
Forest Total	2,159	12,616	55,729	329,261	36,275	217,648

USDA Forest Service, 2009d

Trends in Mineral Development

Consumption of minerals has varied considerably by resource in recent years. Demand for energy minerals has increased moderately since the early 1980's and the trend is expected to continue in the future. Among the various types of energy minerals, oil consumption is expected to decrease while coal consumption is expected to increase (USDA, 1989). The PNF currently does not produce any energy minerals. The potential for energy development is minimal, and future demand is highly speculative and influenced by global energy markets.

Demand trends for metallic minerals are hard to pinpoint because use patterns are sporadic. In general, demand for these minerals is volatile and effected by substitutes introduced to the marketplace, however it is expected to increase at a modest rate through 2040 (USDA, 1989). High demand growth is expected for copper in the United States. This is likely to increase the interest of mining on the PNF. Currently there is no active mining of copper, but development proposals are likely to appear during the next planning cycle. It is anticipated that most major mineral exploration and development will occur in the Bradshaw Mountains (BOI Bureau of Mines, 1995). Demand for copper will continue to be highly dependent on market price. As prices increase, private industry will invest more in research and development making new areas open for exploration. The supply and demand for copper on National Forests is influenced by available technology. The level of demand stimulates investment in new technology, which in turn increases available supply by locating new deposits and bringing some deposits previous considered un-extractable into development.

Demand for construction related materials has varied considerably in the past. This trend is expected to continue in the future. Table 2c reports the sale of contracts and free use permits for construction related materials extractable on the PNF. Mining activity for these minerals is highly sporadic, and is more influenced by local demand than energy and metallic minerals because they

are more influenced by the global market place. Construction related materials are typically consumed within the local area due transportation costs. Therefore demand is greatly influenced by local construction activities. Decomposed granite has been an important commodity for the growing population of Prescott (BOI Bureau of Mines, 1995). Slowed economic growth has greatly reduced demand in recent years, however it is likely to recover during periods of positive economic and population growth.

Forest Capacity

Forest capacity refers to the ability of the Forest to supply minerals for both commercial and private consumption well into the future. The PNF has a limited resource base; therefore supply may not grow infinitely. Non-renewable resources should be considered as fixed; however certain factors, such as the development of new technology and investments in infrastructure, may increase available supply to a certain degree. Technology may increase the volume of minerals considered extractable, but at some point the available resources will be exhausted. Forest resources must be managed to ensure that mining activities are sustainable well into the future. This section explores the PNF's ability to supply sustainable levels of extractable minerals.

Geologic surveys suggest that locatable mineral deposits exist across the PNF. The highest concentrations of metallic minerals exist in the western parts of the Forest. The US Bureau of Mines conducted a Mineral Land Assessment (MLA) across this region in 1995. Numerous priority areas were identified. Areas with potential for exploration for large tonnage deposits of copper and gold include the Copper Basin, Walker stock in the southeast part of the Groom Creek priority area, the northwest part of the Big Bug Creek priority area, the north part of the Crooks Canyon priority area, the Big Bug stock in the northern part of the Big Bug Creek priority area, the Crown King stock and priority area, the Glen Oaks stock near the north part of the Hassayampa priority area and the Pine Flat stock east of Goodwin. The Bradshaw Mountains could also support recreation and small scale placer operations for gold (BOI Bureau of Mines, 1995). There appears to be ample supply of construction related materials across the Forest. "Because of lower population density and less public use, the area west of Iron Springs is probably best suited for additional large commercial quarries. Smaller quarries used by the county are less socially objectionable, and should be located as close as possible to the end use site" (BOI Bureau of Mines, 1995). With these deposits the Forest may sustain a healthy mining regimen if demand allows. The Forest's capacity to supply mineral resources appears to be greater than what is currently demanded. It is therefore assumed that the PNF has the capacity to support diversified mining operations during the next plan cycle; but caution must be taken when reviewing plans of operations to ensure that production is not confined to areas where resource depletion may occur, and social concerns are mitigated to best extent possible.

Timber

Timber resources within the state of Arizona

In many discussions of sustainability, it is customary to compare harvest and growth as a gauge of “resource sufficiency” (Adams et al. 2006). Description of timber resources within Arizona provides a comparison between timber inventory on national forest lands and demand from those lands. Timber demand and inventory are assessed by examining timber cut and sold reports and timber inventory at the state level given available data. At a smaller scale, specific to the PNF, total timber demanded from all primary wood processing facilities is unavailable given a lack of information on current consumption from these facilities. Similarly standing volume inventory on all national forests within the state are considered since data is unavailable by forest.¹ Regardless of data deficiencies, timber resources and demand from the PNF are discussed qualitatively and when data are available below.

The state of Arizona covers approximately 72.8 million acres of which 5 percent (3.4 million acres) are timberland on all ownerships. Under FIA definitions, timberland is any forested land capable of growing at least 20 cubic feet (cf) of industrial wood per acre per year. The remaining land area is in nonforest land, water, reserved timberland, or other forest land. Within Arizona 72 percent of timberland (2.4 million acres) is managed by the USFS, one percent is managed by other public agencies (27,643 acres) and 28 percent is private forest ownership (939,985) which includes individuals, farmers, and corporations (USDA 2009e).

Estimates of total volume of live trees for Arizona are approximately 6.89 billion cf; 70 percent of this (4.82 billion cf) are managed by the forest service. Growing-stock volume is defined as the cubic-foot volume of sound wood from a 1-foot stump to a 4-inch top for commercial species of trees 5 inches or larger in diameter at breast height (dbh) that are capable of producing sawlogs. Total net annual growth of growing stock (net of mortality) on national forest lands is about 23.7 million cf in Arizona (USDA 2009e).

Timber harvest from Arizona and the Prescott National Forest

In this analysis, total annual consumption of timber from Arizona National Forests is used as a proxy for current timber demand from National Forest land. No attempt was made to measure the demand for fuelwood or specific forest products. Annual consumption of timber from the PNF was obtained from cut and sold reports for region 3. This data represents the most accurate data on timber removal from national forest system lands in the state.

¹ Data on timber inventory was obtained from the most recent Forest Inventory Analysis (FIA) inventories for forest service land. This inventory data was aggregated to summarize major timber resource attributes (timberland area, ownership, stocking, volume, average annual growth, mortality, and removals).

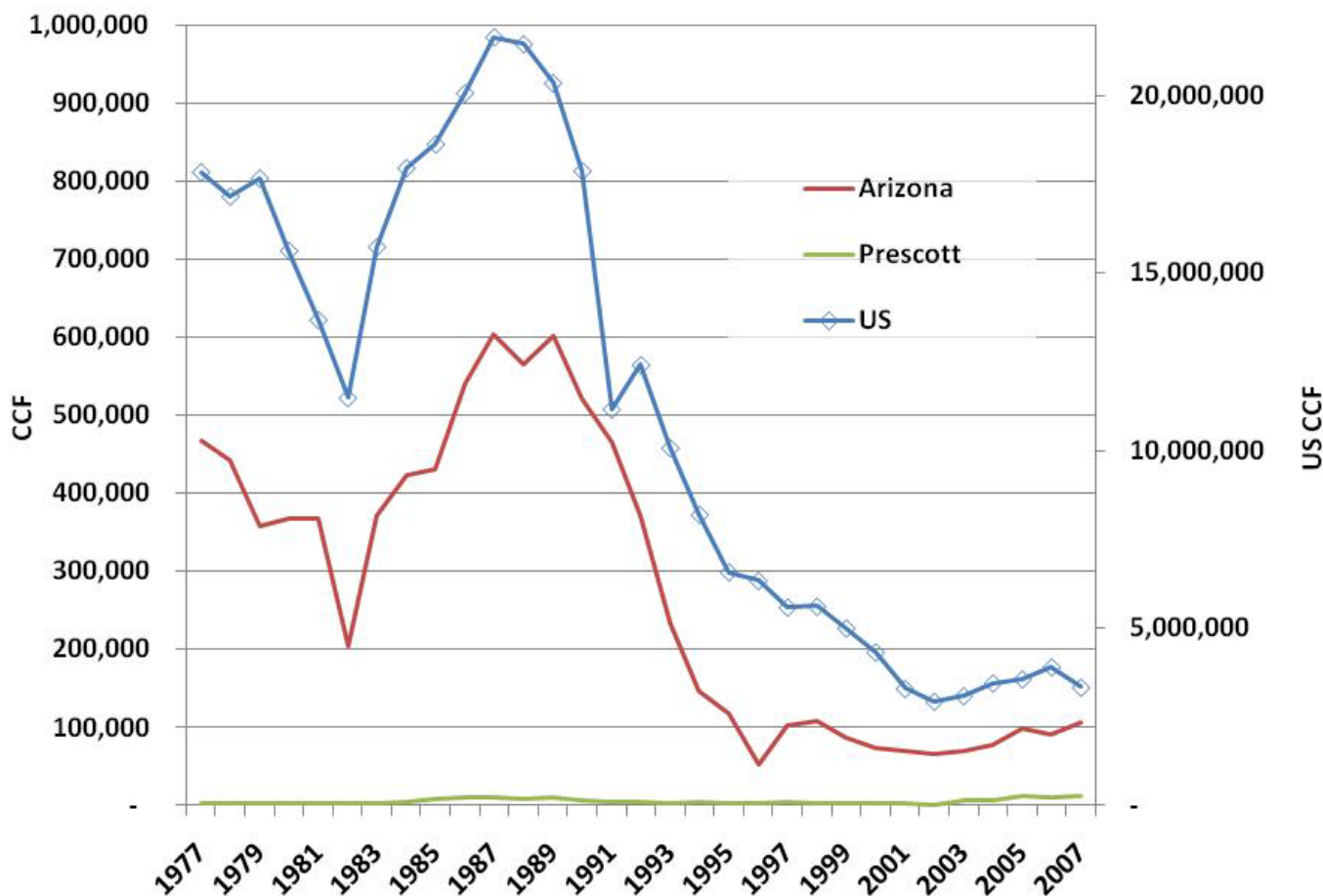


Figure 1d: Annual timber removed from National Forest land in Arizona and the PNF

Timber removal in Arizona and on the PNF has varied over time with changing market and policy conditions (Figure 1d). Timber harvests on national forests have increased by approximately 30 percent between 1905 and 2005 in the entire nation (USDA 2009e). However, timber harvests have decreased since the late 80's on national forests throughout the nation including the PNF (Figure 1d). Litigation against public agencies in the 1980's and 90's suggested the role of public forest land was changing.

Lawsuits in the Pacific Northwest challenged the adequacy of protection of old growth species and fish in federal forest plans. Timber sales on federal land within the Northwest Forest plan region came to a complete halt in April 1989 with a federal court injunction made by Judge Dwyer (Caldwell et al. 1994). The influence of this decision was widespread for national forest lands throughout the nation (Figure 1d).

In May of 1991 Judge Dwyer ruled that the Forest Service had violated the EIS requirement of NEPA and a second timber harvest injunction was enacted (Caldwell et al. 1994). In May of 1992 Dwyer ruled that the Forest Service EIS violated NEPA by "failing to consider new information on the environmental effects of logging on Spotted owl habitat and ... not prescribing measures to protect critical habitat or assess the viability of other species associated with old-growth forests and Northern spotted owl habitat" (Marcot and Thomas, 1997). The Forest Service formed the Scientific Analysis Team (SAT) in response to Judge Dwyer's ruling. SAT's 1993 report

recommended management changes to accommodate 667 species associated with old-growth forests and “was a significant step toward a broader ecological basis for evaluating ecosystems” (Marcot and Thomas, 1997). In 1993 President Clinton assigned the Forest Management Assessment Team with development of the Northwest Forest Plan (NWFP). On December 21st Judge Dwyer ruled that the NWFP was consistent with the viability regulation of the National Forest Management Act. Thus, by 1995 the outcome of national forest policy situation was known and timber harvest on national forests land had decreased by 62 percent throughout the nation from 1987 to 1994 (Figure 1d).

Policy has established a new status quo of timber inventory available for harvest. In order to account for such changes, timber consumption from the PNF has been examined as a minimum, midpoint, and maximum from a range of values over the post 1994 period, following the convention of LeDoux et al. 2003. This range is a reasonable benchmark for current timber demand from national forests in the area.

For Arizona national forests, the maximum consumption was 14.7 million cf while the minimum was 5.4 million cf and the median was 8.9 million cf, over the period from 1994 to 2007 (Table 1d). This material is used for the production of chips, pulp and paper, and sawtimber products, including lumber, veneer, plywood, and other industrial products (posts, rail and fence material, biomass and related products).

Annual removal of sawtimber on the PNF was 1.3 million cf in 2007. Between 1994 and 2007 the maximum, midpoint and minimum consumption were 1.3 million, 372,700 and 187,600 cf, respectively. Given the lack of availability information on net annual growth for the PNF, a baseline comparison of inventory and demand cannot be made. Similarly, as stated above, a lack of information on total timber demanded from primary wood processing facilities is unavailable given a lack of information on current consumption from these facilities. Regardless recent estimates of capacity suggest that area facilities have the capacity to accommodate existing removal.

Baseline timber inventory and demand comparison

A baseline estimate of timber inventory and demand is established by comparing consumption from all national forest in the state and timber from the PNF with estimates of current timber inventories (standing inventory and net annual growth) (Table 1d).

Table 8d: Statewide national forest timber demand as a percentage of national forest timber inventories

	Timber consumption range²	Demand/total inventory³	Demand/net annual growth⁴
Minimum	2.52	0.05%	11%
Midpoint	5.18	0.11%	22%
Maximum	7.43	0.15%	31%

² In million cf per year

³ 4,818 and 5,109 million cf (includes growing stock and all other live trees)

⁴ 23.77 million cf (based on growing-stock volume). Information unavailable for New Mexico from FIA.

Following the convention of LeDoux et al., This comparison assumes that all supplies of timber on Arizona national forests are available for commercial timber harvest and ignores such factors as harvest economics, steep terrain, and resource quality. Consequently this baseline assessment of inventory ignores the effects of physical and market constraints. Under this baseline estimate, current annual demand represents only 0.05 to 0.15 percent of the total inventory in Arizona (Table 1d). On the basis of these numbers, there appears to be sufficient timber inventory in the state to sustain current consumption rates indefinitely (Table 1d). These figures are consistent with FIA estimates of growth and removal for the most recent inventory periods, that is, the calculated net annual growth exceeded removals within the state.

Given available data, these estimates of inventory and demand are limited to growing stock defined by FIA as cubic-foot volume of sound wood from a 1-foot stump to a 4-inch top for commercial species of trees 5 inches or larger in dbh. Thus timber often classified as nontraditional materials are not considered in the estimates above of growing stock and growth. Volume estimates for removals or stocking levels are not available however, the share of live trees less than 5 inches dbh from all live trees on timberland is 57 percent in Arizona (USDA 2009e). Stocking levels of these size classes are well above desired levels as defined by forest desired conditions and as forests manage for desired conditions non-traditional materials will be increasingly available (personal communication with James Youtz on October 29, 2009). Current management within Region 3 focuses on attaining conditions similar to historic ranges of variability by creating open uneven aged forests complimentary of frequent fire regimes. Management within these guidelines could produce regular timber yields (personal communication with James Youtz on October 29, 2009).

The availability of this timber and the change in management focus on removal of these smaller size classes does not mean demand for these materials will follow. These materials may increase in demand with favorable market conditions, changes in energy markets and programs that incentivize industry development.

Summary

Demand for outdoor recreation is expected to grow indefinitely. As long as populations are increasing, so will the demand for recreation on the PNF. Non-consumptive wildlife and developed recreation will grow the most, exceeding the Forests' ability to supply. Capacity of general forest areas and designated wilderness is expected experience slower demand growth during the next planning cycle. The greatest growth will occur for more popular activities requiring easy access and public services.

The share of total demand for grazing within the market area (as measured by cattle inventory) that could be supported by actual use on the ASNF has ranged from a high of approximately 4.5 percent of the market area cattle inventory in 2004 and a low of 2.7 percent in 2001. While the share of total demand provided by the Prescott is small, it may be more important for smaller areas within the market area. However, the actual HM use numbers must be used with caution as the supply of grazing is limited, and factors other than demand may limit grazing use on the forest. In addition, this trend is uncertain given the wide degree of variation in actual use over the relatively short period examined (Figure 3b). Despite these limitations, actual use trends on the Forest indicate a possible trend of increasing demand for PNF forage relative to cattle inventory within the market area.

The PNF has abundant deposits of metallic minerals. The majority of interest is for copper, but no active mining currently exists. Gold mining is limited to recreational and small scale placer operations; the Gold Basin Project is the only approved commercial plan of operations. Extraction of construction related materials has occurred to a varying degree in recent years. Demand for construction materials is influenced by local industrial activities and economic conditions. As markets rebound PNF managers may face an increase in the demand for these types of minerals. Overall, the Forest's capacity is expected to allow for sustainable mining operations and additional proposals are likely to appear during the next planning cycle.

The comparison of inventory and demand presented here assumes that all supplies of timber in Arizona national forests are available for commercial timber harvest and ignores such factors as harvest economics, steep terrain, and resource quality. Under this baseline estimate, current annual demand represents only 0.05 to 0.15 percent of inventory in the state. Consequently, there appears to be sufficient timber inventory to sustain current consumption rates indefinitely assuming moderate rates of growth. Given the lack of availability information on net annual growth for the PNF, a baseline comparison of inventory and demand cannot be made. Similarly, a lack of information on total timber demanded from primary wood processing facilities is unavailable given a lack of information on current consumption from these facilities. However, recent estimates of capacity suggest that area facilities have the capacity to accommodate existing removal. The change in forest service management focusing on removal of smaller size classes does not mean demand for these materials will follow. These materials may increase in demand with favorable market conditions, changes in energy markets and continued programs that incentivize industry development.

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