

Chapter 2. Forestwide Desired Conditions

Introduction

The desired condition sets forth the desired attributes and goals of the Prescott NF. In some cases, a desired condition matches the current condition; so our goal is to retain existing characteristics. In other cases, the desired condition is not identical to the current condition, and future management is expected to help Prescott NF trend toward the desired condition. Desired conditions are timeless in that they have no specific date by which they are to be completed. Desired conditions are the focus of the Plan and are the basis for developing objectives and other plan components. A project or activity must be consistent with or help trend towards desired conditions. The glossary in appendix B provides more detailed definitions of terms.

Forestwide desired conditions apply across the plan area. Desired conditions are described at multiple, nested scales. Descriptions at various scales are designed to provide detail and guidance for the design of future projects and activities that help achieve the desired conditions over time.

Descriptions at the landscape scale provide the “big picture” desired conditions for terrestrial-based resources across the larger land area and may be composed of variable elevations, slopes, landforms, and soils. Descriptions at the mid-scale level represent areas of 100 to 1,000 acres and become more specific about characteristics such as species composition and habitat features. Descriptions at the fine scale relate to areas less than 100 acres in size and provide even more detailed information, such as desired vegetation patterns like groups of trees or clumps of vegetation. For instance, in descriptions for mixed conifer forest, landscape scale descriptions identify trees separated by open area. However in the fine scale description, some of the groups of trees between the open areas are described as tight clumps with interlocking tree crowns. A combination of fine scale units add up to the mid-scale and a combination of mid-scale units add up to the landscape scale.

Desired conditions for aquatic resources and watershed integrity are described using watershed scales to help provide their relative importance or niche. Conditions for larger land areas are described under 4th to 5th level hydrologic unit codes (HUC)¹ watershed scale. More detailed descriptions for site-specific conditions are described at the 6th level HUC watershed scale. Not all resources (e.g., scenery, heritage, recreation facilities) require a description at more than one scale.

Desired condition descriptions are divided into three sections:

Physical, Biological, and Social/Economic Factors.

¹ US Geological Service created hydrologic unit codes (HUC) to describe the hierarchy of watersheds within the country. As the unit code increases, the size of the watershed referenced decreases e.g., several 6th HUC watersheds can be combined to make up a 5th HUC watershed.

Physical Factors

Physical factors include ecosystem components such as climate, airsheds, watersheds, landforms, and soil conditions.

Climate

Background and Existing Conditions for Climate

The climate of the southwestern United States is often referred to as dry and hot; however, it is very complex. While low deserts of the Southwest experience heat and drying winds in the early summer, forested mountain areas and plateaus may experience cold and drifting snow during winter. Climate variability is the norm within this region, as temperature and precipitation fluctuate on time scales ranging from seasons to decades. Monsoon thunderstorms in July and August are often accompanied by flash flooding, while from fall to spring, the weather can be warm with clear skies. The Southwest also experiences periods of short- and long-term drought. Precipitation patterns are characterized by two peaks each year; winter precipitation is produced primarily from large frontal systems moving over the region, whereas summer precipitation results largely from thunderstorms within the North American monsoon circulation.

Climate scientists agree that average air temperatures across the globe are rising (IPCC 2007), and it is expected that continued warming will accentuate or exacerbate interactions among ecosystem components. For example, observed temperature increases across the western U.S. have been linked to: increases in fire season length and severity, increases in total area burned, decreases in air quality, and the creation of new fire regimes (Forest Service, August 2009).

Looking forward, there is general agreement among climate modelers that by the end of the 21st century, the Southwest is likely to experience (Forest Service, 2010):

- Temperature increases of five to eight degrees Fahrenheit (or about 0.5°F/decade on average)
- An increase in the number of hot days, with summer heat waves lasting two weeks or longer
- Warmer winters and reduced snowpack, and a later monsoonal season
- A five percent drop in precipitation in most of Arizona and New Mexico
- An increase in extreme flood events following an overall increase in tropical storms

Changes in water distribution, timing of precipitation, availability, storage, watershed management, and human water uses, may present some of the most important challenges of climate change and national forest management in the Southwest. Terrestrial and aquatic ecosystems and all human socioeconomic systems in the Southwest depend on water. The prospect of future droughts becoming more severe because of global warming is also a significant concern.

Climate may influence the distribution and abundance of plant and animal species through changes in resource availability, species productivity, and survivorship. The potential ecological implications of climate change trends in the Southwest indicate:

- More extreme disturbance events, including wildfires, intense rain, flash floods, and wind events (Swetnam, et al., 1999).
- Greater vulnerability to invasive species, including insects, plants, fungi, and vertebrates (Joyce, et al., 2007).

- Long-term shifts in vegetation patterns (Westerling, et al., 2006, and Millar, et al., 2007).
- Cold-tolerant vegetation moving upslope, or disappearing in some areas. Migration of some tree species to the more northern portions of their existing range (Clark, 1998).
- Potential decreases in overall forest productivity, due to reduced precipitation (U.S. Forest Service, 2005).
- Shifts in the timing of snowmelt (already observed) in the American West, which, along with increases in summer temperatures, have serious implications for the survival of fish species, and may challenge efforts to reintroduce species into their historic range (Joyce, et al., 2007, and Millar, et al., 2007).
- Effects on biodiversity, pressure on wildlife populations, distribution, viability, and migration patterns, because of increasing temperatures, water shortages, and changing ecological conditions..

The following conditions are desired to assist with building ecosystem resilience and capacity for plant and animal communities to accommodate expected changes imposed by future climate trends for the Southwest.

Desired Conditions for Ecosystem Resilience to Climate Change

Landscape Scale (10,000 acres or greater)

<p>DC-Ecosystem Resilience-1</p>	<ul style="list-style-type: none"> • Ecosystems retain all of their components, processes, and functions under changing and uncertain future environmental conditions. These resilient ecosystems provide a wide range of ecosystem services² for local and regional needs. • Prescott NF landscapes retain capacity to survive natural disturbances and threats to sustainability such as those driven by climate change and an increasing human population. • Ecosystem functions (such as nutrient cycling, water infiltration, carbon sequestration, etc.) are sustained as forests, woodlands, grasslands, and desert communities adapt to warmer, drier conditions. • Ecosystems are resilient to changing natural disturbance regimes (e.g., drought, wind, fire, insects, and pathogens), allowing for shifting of plant communities, structure, and ages across the landscape. • Ecological conditions for habitat quality, distribution, and abundance contribute to self-sustaining populations of terrestrial and aquatic plant and animals. Conditions provide for the life-history, distribution, and natural population fluctuations of the species within the capability of the ecosystem. • Contiguous blocks of habitat are interconnected, support a wide array of native species, and allow for genetic and behavioral interactions. Ecological processes allow connectivity of predator-prey relationships, metapopulations, and interactive wildlife species throughout the landscape. • Habitat quality distribution and abundance exist to support recovery and/or stabilization of federally listed and other species.
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² Ecosystem services are benefits that people obtain from ecosystems. The Prescott NF provides clean water and air, productive soil, riparian and aquatic resources, diverse wildlife habitats, educational and cultural values, scenery, recreation, timber, forage, and forest products.

Airsheds

Background and Existing Conditions for Airsheds

In addition to establishing standards for national ambient air quality for airsheds within the United States, the Clean Air Act (CAA) established special goals for visibility in many national parks, wilderness areas, and international parks. Through the 1977 amendments to the CAA, Congress set a national goal for visibility as “the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas³ which impairment results from manmade air pollution.” The amendments required EPA to issue regulations to assure “reasonable progress” toward meeting the national goal.

Through the 1999 Regional Haze Rule, the EPA directed States to establish goals for each affected Class I area to 1) improve visibility on the haziest days and 2) ensure no degradation occurs on the clearest days over the period of each implementation plan.

Two mandatory Class 1 Federal areas occur within or adjacent to the Prescott NF: Sycamore Canyon Wilderness (47,757 acres) and Pine Mountain Wilderness (20,061 acres). Baseline visibility data collected for these two areas (2001-2004) indicate increasing visibility and a trend towards the desired goal of 6.68-6.96 deciviews by the year 2064.

Fire management activities have the potential to impact airsheds of the Prescott NF. State air pollution agencies recognize that fire of all kinds (i.e. wildfire, prescribed fire) contributes to regional haze, and there is a complex relationship between what is considered a natural source of emissions versus a human-caused source of emissions. For example, the increased use of prescribed fire in some areas may lead to particulate emissions levels lower than those that would be expected from an uncharacteristically severe wildfire. Given that in many instances the purpose of prescribed fires is to restore natural fire patterns across the landscape, State air pollution agencies work with Federal land managers to support the development of enhanced smoke management plans to minimize the effects of emissions on public health and welfare.

For the Prescott NF, air quality resulting from fire is monitored by Arizona Department of Environmental Quality (ADEQ) Air Quality Division for potential human health impacts using data recorders usually located in local communities including Prescott, Prescott Valley, Cottonwood, and Camp Verde.

To minimize air pollution and smoke impacts, the Prescott NF works with ADEQ Air Quality Division and follows Arizona’s Forest and Rangeland Management Burn Rule (A.R.S. 18-15-1500). The Prescott NF also employs emission reduction techniques to avert smoke impacts to mandatory Class 1 areas.

Under warmer and dryer climate conditions, airsheds are susceptible to increased levels of pollutants (particulates and aerosols) resulting from longer, more severe fire seasons, increased occurrence of warmer air masses that can suspend higher concentrations of pollutants, and frequent or intense wind storms that can transport pollutants short and long distances.

³ The CAA defines mandatory Class I Federal areas as certain national parks (over 6000 acres), wilderness areas (over 5000 acres), national memorial parks (over 5000 acres) and international parks that were in existence as of August 1977.

Desired Conditions for Airsheds

Landscape Scale (10,000 acres or greater)

DC-Airshed-1	<ul style="list-style-type: none"> • Fire as a natural disturbance process occurs across the landscape. • Smoke or dust levels meet national ambient air quality standards (NAAQS). Conflicts between smoke aversion and improvement of ecosystems using fire are minimized and smoke impacts to communities are minimized. Citizens are aware of timing, ignition sources, and benefits of fires and their resulting smoke. • Forest Service management activities do not contribute to diminished visibility or increased atmospheric deposition of pollutants within the Sycamore Canyon Wilderness and Pine Mountain Wilderness.
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Watersheds

Background and Existing Conditions for Watersheds (Watershed Integrity)

Watershed condition is defined as the state of a watershed based on physical and biological characteristics and processes affecting hydrologic and soil functions (Forest Service Manual). Watershed condition integrity, for the purposes of this Plan, 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. In addition, vegetation structure and composition, disturbance regimes, and recreation activities can all affect watershed integrity.

The hierarchy of hydrologic units places the Prescott NF within the Lower Colorado River region and within three subregions. The U.S. Geological Survey has created a hierarchical method of mapping and identifying watersheds. The method uses hydrologic unit codes (HUC), where, as the unit code increases, the size of the watershed decreases. Therefore, within the Prescott NF, 22 fifth level HUC watersheds help to make up 8 fourth level HUC watersheds that overlap the forest to some degree (see maps **XX** in appendix A).

At a fine scale, the Prescott NF overlaps with portions of 127 6th level HUC watersheds. The 127 6th level HUC watersheds vary from about 7,000 to 39,000 acres in size, although in many cases, only a portion of a watershed covers the Prescott NF.

While the updated National Hydrologic Database identifies 79.4 perennial or perennial intermittent⁴ stream miles on the Prescott NF, there is only one major perennial stream with continuous flow from headwaters to mouth—the Verde River.

Current natural disturbances of droughts and floods continue to be within the range of historic variation in all 4th level HUC watersheds. Water yield varies by 4th level HUC watershed. In general, the watersheds associated with the Bradshaw Mountains receive proportionately more precipitation per acre than areas at lower elevations. Instream flow, critical to maintenance of aquatic ecosystems, has been impacted to varying degrees by diversions and groundwater withdrawals. Water quality has been influenced by past mining activities. For example, about 19.7

⁴ Streams where flow is discontinuous; perennial flowing segments are separated by reaches that have intermittent flow.

miles of Turkey Creek was classified as Category 5 impaired waters due to copper and lead levels. Remediation was completed in 2007.

For the most part, acreage of riparian and wetland areas on the Prescott NF is proportional or exceeds that found within each of the eight sub-basins that partially overlap the forest. The exception is the Santa Maria 4th level HUC watershed, where the majority of watershed area occurs off of the Prescott NF.

Under warmer and dryer climate conditions, watersheds are susceptible to changes in the frequency, intensity, timing, and spatial extent of extreme weather events (e.g., droughts, flash flooding, landslides, wind storms, and ice storms). These events, coupled with increased ambient air and soil temperatures, can create corresponding shifts in plant evapotranspiration rates, water infiltration, overland flow, erosion, sediment delivery, and loss of organic ground cover.

Desired Conditions for Watershed Integrity

4th to 5th Level HUC Watershed Scale

DC- Watershed-1	<ul style="list-style-type: none"> • Adequate quantity and timing of water flows are maintained in streams, seeps, springs, and wetlands to retain or enhance ecological functions. • Water quality is sustained at a level that retains the biological, physical, and chemical integrity of the aquatic systems and benefits survival, growth, reproduction, and migration of native and desired non-native aquatic and riparian species. Characteristics include: <ul style="list-style-type: none"> o Water quality meets Arizona water quality standards and supports designated beneficial uses and native and desired non-native aquatic species. o Short-term exceedance of water quality standards, (temporary period of declining water quality), due to management activity occurs only in the anticipation of long-term improvement of watershed condition and water quality. • Soil and vegetation functions in upland and riparian settings are retained or enhanced. Resilient landscapes provide forage for browsing and grazing animals, timber production, and recreation opportunities, without negatively impacting soil and water productivity.
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<p>DC- Watershed-2</p>	<ul style="list-style-type: none"> • Riparian corridors are intact and functioning across the landscape. • Depending on natural flow regimes and associated landforms, stream channels and associated floodplains are sustained. • Herbaceous vegetation and other ground cover are present in sufficient quantity to filter sediments, stabilize streambanks, mitigate effects of flooding, and provide for groundwater recharge within their natural potential. • In the floodplains and channels of deciduous forest dominated riparian corridors, large woody debris is found in sufficient quantities to provide instream transitory pool-like habitat; shading from intense solar radiation; and organic particles for use as food by fish and aquatic invertebrates. • Links between aquatic and upland components are maintained, providing access to food, water, cover, nesting areas, and protected pathways for aquatic and upland species.
<p>DC- Watershed-3</p>	<ul style="list-style-type: none"> • Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport. Erosion and sediment regimes are within the natural range of variability consistent with current technical guides for soil. • At a landscape scale, soil productivity, function, and inherent physical, chemical, and biological processes remain intact or are enhanced. • Elements necessary to sustain soil productivity and function include: <ul style="list-style-type: none"> o Logs and other woody material are distributed across the soil surface to maintain soil productivity within the limitations of vegetation types. o Soil loss does not exceed soil formation rates. Limited soil compaction does not affect ecological and hydrological functions. o Relatively undisturbed biological soil crusts (consisting of cyanobacteria, lichens, mosses, and algae organisms) occur in the interspaces of vascular plants, providing stability and fertility to desert soils. o Soil productivity is not inhibited by proliferation of non-native invasive plant species. o Vegetative ground cover is distributed across the soil surface in sufficient proportions to meet or trend toward “natural” conditions listed for each map unit in the Terrestrial Ecosystem Survey. o Soils are stable within their natural capability. o Soil condition rating is at or trending toward ‘satisfactory’⁵
<p>DC- Watershed-4</p>	<ul style="list-style-type: none"> • The watersheds contributing to the Verde River municipal supply watershed⁶ provide vegetation and soil conditions that lead to desired water quality and quantity for the municipality of Phoenix .

⁵ See Terrestrial Ecosystem Survey of the Prescott NF, p.76

⁶ For this plan, municipal supply watersheds are generally those where agreements have been approved between the Forest Service and the municipality.

6th Level HUC Watershed Scale

DC- Watershed 5	<ul style="list-style-type: none"> The municipal watershed surrounding Goldwater Lakes provides a supply of clean water for the city of Prescott (from Granite Creek and Groom Creek) based on a 1924 agreement, should the need arise. (Agreement covers portions of Upper Granite Creek-Watson Lake and Groom Creek-Upper Hassayampa 6th level HUC watersheds.)
DC- Watershed-6	<ul style="list-style-type: none"> Wetlands, seeps, springs, wet meadows, and associated wetlands or riparian systems develop and support stable herbaceous and woody vegetative communities with root masses that stabilize streambanks, floodplains, shoreline, and soil surfaces. The natural hydrologic, and geomorphic processes inherent to these groundwater dependent ecosystems function at a level that allows retention of their unique physical and biological properties.

Biological Factors

Biological factors relate to living, growing things, such as wildlife, fish, invertebrates, or vegetation.

Vegetation

Background and Existing Conditions for All Vegetation Types

At least eleven vegetation types occur across the Prescott NF landscape. They include a variety of forms from cactus and shrub communities to grasslands, woodlands, and forest. The vegetation patterns found on the Prescott NF are responsive not only to natural and human disturbances, but also to the local abiotic features of the landscape (e.g., topography, aspect, slope, soil texture, and water infiltration rates).

The desired conditions in this section pertain to all eleven major vegetation types found on the Prescott NF. Conditions for vegetation communities that are dependent on groundwater or surface flows (e.g., riparian areas, seeps, and springs) are addressed in the Watershed section of this chapter.

Ranges of values presented in desired conditions account for natural variation in the composition, structure, and disturbance patterns within a vegetation type. Desired conditions may differ within a vegetation type due to spatial variability in soils, elevation, aspect, or varying multiple-use needs. Site-specific areas may be managed for different aspects of desired conditions because of particular resource and species needs.

Desired conditions for vegetation reflect our best understanding of the ecological interactions (physical and biological) resulting from warmer and drier climate conditions.

Desired Conditions for All Vegetation Types

Landscape Scale (10,000 acres or greater)

DC-Veg-1	<ul style="list-style-type: none"> • Each vegetation type contains a mosaic of vegetative conditions, densities, and structures. This mosaic occurs at a variety of scales across landscapes and watersheds. The distribution of physical and biological conditions is appropriate to the natural disturbance regimes affecting the area. • Vegetative conditions are resilient to the frequency, extent, and severity of disturbances, especially fire. Natural and human disturbances (e.g., planned and unplanned fire, and mechanical vegetation treatments) provide desired overall plant density, structure, species composition, coarse woody debris, and nutrient cycling. Desired disturbance regimes are restored where practical. • Native plant communities dominate the landscape, while invasive species are non-existent or in low abundance. Establishment of invasive plant species new to the Prescott NF is prevented. Existing invasive plant species are prioritized for eradication, containment, or control. • Vegetation, including appropriate densities, provides favorable conditions for water flow and quality. • The composition, abundance, and mosaic of organic ground cover and herbaceous vegetation protects soil provides moisture infiltration, and contributes to plant and animal diversity and ecosystem function. • Diverse vegetation structure, species composition, and densities, provide quality habitat for native and desirable non-native plant and animal species throughout their lifecycle and at multiple spatial scales. Landscapes provide for the full range of ecosystem diversity at multiple scales, including habitats for those species associated with old growth conditions.
DC-Veg-2	<ul style="list-style-type: none"> • Vegetation provides sustainable amounts of products, such as wood fiber or forage, for local and regional needs. • Herbivory (the act of feeding on plants) aids in sustaining or improving native vegetation cover and composition. Livestock grazing and wood fiber harvest activity contribute to aspects of the social, economic, and cultural structure and stability of rural communities.
DC-Veg-3	<ul style="list-style-type: none"> • Vegetation conditions for federally listed species are consistent with existing recovery plans. • Southwestern Region Sensitive Species⁷ and species identified as culturally important⁸ are valued and therefore enhanced and protected. • Ecological conditions provide habitat for associated federally-listed species. Habitat conditions generally contribute to survival and recovery, and contribute to the de-listing of species under the <i>Endangered Species Act</i> (ESA).

⁷ Southwestern Region Sensitive species are those plant and animal species identified by a regional forester for which population viability is a concern as evidenced by: a) significant current or predicted downward trends in population numbers or density, or b) significant current or predicted downward trends in habitat capability that would reduce a specie's existing distribution (FSM 2670.5 Definitions)

⁸ Rare or culturally important plant species are those that either have specific requirements for survival and are found in few locations, or are those that have importance to Native American tribes, communities, and nations.

Mid Scale (1,000 acres or greater)

DC-Veg-4	<ul style="list-style-type: none"> • The composition, density, structure, and mosaic of vegetative conditions reduce the threat of uncharacteristic wildfire hazard to local communities and ecosystems. • Snags are present in adequate numbers to provide habitat features including cavities, loose bark, etc. • Improved habitats for Proposed or Candidate species help preclude species listings as Threatened or Endangered under the <i>Endangered Species Act</i> (ESA). • Potentially suitable habitat for sensitive plant species helps retain functional stability of the species.
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Fine Scale (less than 100 acres)

DC-Veg-5	<ul style="list-style-type: none"> • Locally endemic⁹ plant communities are intact and functioning. • Unique plant community habitats (e.g., limestone cliffs, margins of seeps and springs, Verde Valley Formation, basalt-lava flows/cinders, calcareous soil/alkaline clay, canyons/cliffs and ledges, granitic soils/igneous rocks, sandstone rocks/soils and riparian forest) are present to maintain well-distributed populations of associated native plant species. • Native plants provide nectar, floral diversity, and pollen throughout the seasons that pollinator species are active. Desired habitat conditions promote pollinator success and survival.
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Desired Conditions by Potential Natural Vegetation Type

Vegetation conditions are described as a whole in the previous section and by Potential Natural Vegetation Type (PNVT) in this section. PNVTs are coarse-scale groupings of non-contiguous land that share similar aspect, elevation, vegetation, soil parent material, and natural disturbances such as fire or drought cycles. Identification of PNVTs is based on the Terrestrial Ecological Unit Inventory¹⁰. It is possible that vegetation characteristics currently found in a PNVT are not the same as those described in the desired condition. The expectation is that future site-specific projects could produce a trend toward the desired conditions that are described. Wildlife and plant species are often associated with a PNVT. As conditions trend toward those that are desired, we intend that habitat for associated species will improve as well.

⁹ Endemic refers to a population that has unique genetic characteristics and likely exists in a very limited geographic area.

¹⁰ The Terrestrial Ecosystems Unit Inventory (also called Terrestrial Ecosystem Survey) identifies ecological units for the Prescott NF that are distinct from each other in terms of their soil, vegetation, and climate components. The ecological units (TEUI or TES units) are mapped at the scale of 1:24,000. There are 147 TES units mapped for the Prescott NF. TES units were aggregated into 11 PNVTs for the purposes of assessing vegetation and soil characteristics across the Prescott NF.

Background for Juniper Grasslands, Piñon-Juniper Evergreen Shrub, and Piñon-Juniper Woodlands

At roughly 636,800 acres, piñon-juniper communities cover a majority of the Prescott NF landscape and represent one of the most extensive vegetation types in the Southwest. These cold-adapted evergreen woodlands are characterized by piñon and/or juniper species at elevations ranging from 4,500 to 7,500 feet. The piñon component includes Colorado and single leaf species. The juniper component is a variable mix of alligator, oneseed, Utah, and Rocky Mountain. Annual and perennial grasses, forbs, and shrubs can be found beneath the woodland overstory. Species composition, stand structure, and density vary by location primarily due to precipitation, elevation, temperature, and soil type. On erosive soil types within these communities, shrub, tree, and herbaceous ground cover help to lessen raindrop intensity and soil movement.

Under warmer and dryer climate conditions, piñon-juniper communities are expected to be susceptible to decreases in plant productivity from water limitations and increased heat; increases in insect attacks; colonization of invasive species; longer and more severe fire season; and altered frequency, intensity, timing, and spatial extent of disturbance events (e.g., droughts, flash flooding, landslides, wind storms, and ice storms). It is possible that there may be some shifts in aerial coverage between the three piñon-juniper PNVTs depending on amount and timing of precipitation and site specific conditions such as terrain and soils. In addition, piñon trees may decrease in number due to possible increased insect attack and lack of moisture.

The piñon-juniper vegetation communities on the Prescott NF have been subdivided into three distinct vegetation types: juniper grassland, evergreen shrub, and woodland. Each are described in more detail in the following sections.

Existing Conditions for Juniper Grasslands

The juniper grassland type, with a grass and forb-dominated understory and scattered overstory trees, generally occurs on flats, basins, gentle sloping foothills, and transitional valleys at generally lower elevations. The soils associated with juniper grasslands are generally deep and productive. Juniper grasslands cover about 137,300 acres of the Prescott NF.

Current conditions within juniper grasslands are moderately departed from that expected based on estimates of historic conditions. Fire has been excluded from this type for most of the last century, allowing for increases in the age, density, and canopy cover of trees and shrubs, and a reduction in fire-stimulated re-growth and germination of perennial grasses and forbs.

Desired Conditions for Juniper Grasslands

Landscape Scale

DC-Veg 6	<ul style="list-style-type: none"> • The juniper grasslands are generally uneven-aged and open in appearance. Trees occur as individuals or in smaller groups and range from young to old. Juniper species are always present while piñon species are usually absent. Tree canopy cover may range from a low of 5-10 percent to as high as 30 percent. A continuous herbaceous understory, including native grasses and forbs, are present, with incidental occurrence of shrubs that support a natural fire regime. • Snags (dead standing trees) are scattered across the landscape. Coarse woody
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	<p>debris occurrence, including logs, generally averages 1 to 2 tons per acre.</p> <ul style="list-style-type: none"> • Fires occur every 1 to 35 years with high severity favoring regrowth and germination of native grasses and forbs.
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Existing Conditions for Piñon-Juniper Evergreen Shrub

The evergreen shrub type, with an understory dominated by a mix of shrub species, generally occurs on elevated and lowland plains, hills, and lower-mountain slopes. The soils associated with the evergreen shrub type are variable and include those derived from granite, limestone, basalt, sandstone, and alluvium. Covering more than 463,000 acres, this is the most common piñon-juniper type on the Prescott NF.

Current conditions within the piñon-juniper evergreen shrub type are somewhat departed from that expected based on estimates of historic conditions. For example, within-group tree and shrub density is higher than expected, and shrub canopy cover lacks variability. Current fire frequency and severity are similar to historic conditions.

Desired Conditions for Piñon-Juniper Evergreen Shrub

Landscape Scale

DC- Veg-7	<ul style="list-style-type: none"> • The piñon-juniper evergreen shrub type is a mix of trees and shrubs and herbaceous vegetation occurring on the landscape as discrete groups. Trees occur as individuals or in smaller groups ranging from young to old. Juniper species are always present while piñon trees are occasionally absent. Typically, there is a mosaic of groups of trees that are even-aged in structure with all ages represented across the landscape. • The understory is dominated by low to moderate density shrubs. Shrub canopy cover is variable (10 to 65 percent). The shrub component consists of one or a mix of evergreen shrubs including oak, manzanita, mountain mahogany, cliffrose, and other shrub species, which are well-distributed. Native perennial grasses and annual and perennial forbs are present in the interspaces. • Snags (dead standing trees) and old trees with dead limbs/tops are scattered across the landscape. Coarse woody debris is present. • Fires are typically of mixed severity while some evergreen shrub types exhibit occasional high severity fires. Regardless of the level of severity, fires occur with an average frequency of 35 to 100 years.
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Mid-Scale

DC-Veg-8	<ul style="list-style-type: none"> • To reduce wildfire behavior and hazards to life and property: <ul style="list-style-type: none"> o Vegetation conditions within the wildland urban interface (WUI) may be composed of younger and more widely-spaced shrub patches and tree groups. o The frequency of disturbance (e.g., prescribed fire, vegetation treatments) within the wildland urban interface (WUI) may be more often than for the
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	same vegetation types located outside of WUI areas.
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Existing Conditions for Piñon-Juniper Woodlands

Covering about 36,000 acres of the Prescott NF, the woodland type has a persistent tree overstory and a sparse discontinuous understory of some grasses and/or shrubs. It generally occurs on flats, ridge tops, rugged uplands, and steep slopes at various elevations and on soils that are shallow and rocky.

Current vegetative conditions and fire regimes within the piñon-juniper woodlands are similar to historic conditions. Fire in this vegetation type is less frequent than in the juniper grassland and evergreen shrub types and variable due to differences in ground cover.

Desired Conditions for Piñon-Juniper Woodlands

Landscape Scale

DC-Veg-9	<ul style="list-style-type: none"> • The piñon-juniper woodland is a mosaic of even-aged patches of juniper and variable amounts of pinion that are persistent across the landscape. Piñon trees are occasionally absent, but one or more juniper species is always present. Old growth is dynamic in nature and occurs as patches on the landscape that shift across the landscape over time. Very old trees (> 300 years old) are present. • Tree density is variable and mid-to-old age groups of trees have greater than 40 percent canopy cover, shrubs are sparse, and herbaceous cover is low and discontinuous. • Snags and older trees with dead limbs and/or tops are scattered across the landscape. Coarse woody debris generally averages two to five tons per acre. • Fire in this vegetation type is less frequent than in the juniper grassland and evergreen shrub types and variable due to differences in ground cover. The fires that do occur have mixed to high severity effects and return intervals that range from 35 to 200+ years.
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Mid-Scale

DC-Veg-10	<ul style="list-style-type: none"> • To reduce wildfire behavior and hazards to life and property: <ul style="list-style-type: none"> o Vegetation conditions within the wildland urban interface (WUI) may be composed of younger and more widely-spaced shrub patches and tree groups. o The frequency of disturbance (e.g., prescribed fire, vegetation treatments) within the wildland urban interface (WUI) may be more often than for the same vegetation types located outside of WUI areas.
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Background and Existing Conditions for Interior Chaparral

Interior chaparral extends over 315,600 acres, and represents the second-largest vegetation type on the Prescott NF. Interior chaparral occurs at mid-elevations (3,400 to 6,600 ft) on foothills and lower mountain slopes. It is bordered by ponderosa pine or piñon-juniper woodlands at the upper elevations, and semi-desert grasslands at the lower elevations. Interior chaparral has a uniform

dense structure dominated by shrubs with thick, stiff, waxy evergreen leaves. Mixed shrub associations include: shrub live oak, manzanita, desert ceanothus, mountain mahogany, silktassles, Stansbury cliffrose, evergreen oaks, sumacs, and various cacti. Grasses are a minor component in chaparral and may include grama, threawn, and muttongrass species.

Current interior chaparral composition, structure, and fire regime are similar to reference conditions; however, some non-native invasive species, such as yellow star thistle and Dalmatian toadflax, are infesting portions of the chaparral type.

Under warmer and dryer climate conditions, interior chaparral ecosystems are susceptible to decreases in plant productivity from water limitations and increased heat; increases in insect attacks; colonization of invasive species; longer and more severe fire seasons; and altered frequency, intensity, timing, and spatial extent of disturbance events (e.g., droughts, flash flooding, landslides, wind storms, and ice storms).

Desired Conditions for Interior Chaparral

Landscape Scale

DC-Veg-11	<ul style="list-style-type: none"> • During young stages, chaparral contains a grass and forb component in the understory. The mid-to-late development stages are dense, nearly impenetrable thickets with considerable shrub litter. Standing dead material may accumulate in areas that have not burned for several decades. Ground cover consists primarily of shrub litter (e.g., small stems, leaves). Greater than 70 percent of chaparral is closed canopy with some openings of grasses and forbs. • Chaparral is in a constant state of transition from young to older stages and back again, with fire being the major disturbance factor. High severity fires occur with a frequency of once every 35 to 100 years.
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Mid-Scale

DC-Veg-12	<ul style="list-style-type: none"> • To reduce wildfire behavior and hazards to life and property: <ul style="list-style-type: none"> o Vegetation conditions within the wildland urban interface (WUI) may be composed of younger and more widely-spaced shrub patches and tree groups. o The frequency of disturbance (e.g., prescribed fire, vegetation treatments) within the wildland urban interface (WUI) may be more often than for the same vegetation types located outside of WUI areas.
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Background and Existing Conditions for Ponderosa Pine-Evergreen Oak Forest

Ponderosa Pine - Evergreen Oak forests cover more than 63,500 acres of the Prescott NF at elevations ranging from approximately 6,000 to 7,500 feet. It is dominated by ponderosa pine and can be distinguished from the Ponderosa Pine-Gambel Oak PNVF by one or more well-represented evergreen oak species (e.g., Emory oak and Arizona white oak), juniper species, piñon pine species, and Arizona cypress in some locations. This forest type on the Prescott NF has an understory of primarily evergreen shrubs including manzanita, turbinella oak, sumac species, and mountain mahogany species.

This forest type is currently severely departed from reference conditions. It has too many young and mid-aged trees and shrubs growing closely together. There are not enough old trees. The natural fire regime is severely departed from historic conditions. Historically, fire burned relatively frequently (every 6 to 12 years) and at low intensities maintaining an open pine forest with a mix of young evergreen oaks and shrubs underneath. Approximately two thirds of this PNVF occurs within the wildland urban interface¹¹.

Under warmer and dryer climate conditions, ponderosa pine-evergreen oak ecosystems are susceptible to decreases in plant productivity from water limitations and increased heat; increases in insect attacks, colonization of invasive species; longer and more severe fire seasons; and altered frequency, intensity, timing, and spatial extent of disturbance events (e.g., droughts, flash flooding, landslides, wind storms, and ice storms). High risk occurrences could include uncharacteristically intense wildfire, increased rate of insect or disease attack due to warming temperatures, and increasing challenges to regeneration of ponderosa pine, especially on warmer, dryer areas such as south facing slopes.

Desired Conditions for Ponderosa Pine – Evergreen Oak Forest

Landscape Scale

DC-Veg-13	<ul style="list-style-type: none"> • At the landscape scale, the ponderosa pine-evergreen oak forest is a mosaic of structural stages ranging from young to old trees. Forest structure is variable but generally uneven-aged and open in appearance. The forest arrangement consists of small clumps and groups of trees interspersed within variably-sized openings of moderate to high density shrubs and limited grass cover. The size, shape, and number of trees per group and the number of groups per area vary across the landscape. Tree density may be greater in some locations, such as north-facing slopes and canyon bottoms. • Vegetation composition resembles historic situations including ponderosa pine overstory. Evergreen oaks are well represented and juniper, piñon pine and Arizona cypress can be found in the lower tree canopy. Understory species consist of evergreen shrubs (manzanita, turbinella oak, sumac species, mountain mahogany species) and grass as scattered ground cover. • Old growth occurs as groups of old trees mixed with groups of younger trees or occasionally as a patch composed mostly of old trees. Some large contiguous patches (100-300 acres) of old growth, with all its components¹² (snags, logs, and dense canopies), are present. Old growth is dynamic in nature and the location of these patches tends to shift across the landscape over time. • The ponderosa pine-evergreen oak forest is composed predominantly of vigorous trees and shrubs, but declining, top-killed, lightning-scarred, and
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¹¹ The wildland urban interface includes those areas of resident populations at imminent risk from wildfire, as well as human developments having special significance. These areas encompass not only the sites themselves, but also the continuous slopes and fuels that lead directly to the sites regardless of the distance involved.

¹² Old Growth is usually described as groups of trees that show signs of aging such as large diameters, dead standing trees (snags), fallen trees (logs) or those with broken tops, and large tree tops (canopies) that interlace with each other (dense canopies).

	<p>fire-scarred trees provide snags and coarse woody debris (greater than 3 inch diameter). A variety of snag species and coarse woody debris are well-distributed throughout the landscape. Snags are typically 18 inches or greater diameter at breast height (DBH) and average 1 to 2 per acre. Logs (greater than 12 inch diameter at mid-point and greater than 8 feet long) average 3 per acre within the forested area of the landscape. Coarse woody debris, including logs, ranges from 3 to 10 tons per acre.</p> <ul style="list-style-type: none"> • Where it naturally occurs, Emory oak and Arizona white oak are present with all age classes represented. Old trees occur as dominant individuals or small groups in openings. • Limited grasses, forbs, and a moderate density of shrubs, and needle cast (fine fuels), support the natural fire regime. • Fires of low severity and occasionally mixed severity, occurring every 6 to 12 years, are characteristic of this PNVT including throughout the range of northern goshawks.
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Mid Scale

<p>DC-Veg-14</p>	<ul style="list-style-type: none"> • Ponderosa pine-evergreen oak forest is characterized by variation in the size and number of tree groups depending on elevation, soil type, aspect, and site productivity. The more productive¹³ sites contain more trees per group and more groups per area. Desired tree density within forested areas generally ranges from 40 to 80 square feet basal area¹⁴ per acre. In occasional marginal sites, basal area could be as low as 20 square feet basal area per acre. Openings surrounding tree groups are variably shaped and comprised of shrub, grass, forb mixture. Openings typically range from 10 percent in more productive sites to 70 percent in the less productive sites. Occasionally, patches of even-aged forest structure are present. • Fires burn primarily on the forest floor, with some spread between tree groups as crown fire. Crown fires occur in small patches. • Basal area per mature tree group in northern goshawk post-fledging family areas (PFAs) is 10 to 20 percent higher than northern goshawk foraging areas and the general forest. Northern goshawk nest areas have multi-aged forest structure, dominated by large trees with relatively dense canopies consistent with current technical guides for northern goshawk in the southwestern U.S.
<p>DC-Veg-15</p>	<ul style="list-style-type: none"> • To reduce wildfire behavior and hazards to life and property: <ul style="list-style-type: none"> o Vegetation conditions within the wildland urban interface (WUI) may be composed of younger and more widely-spaced shrub patches and tree groups.

¹³ Productive sites are those that provide needed nutrients, light, and moisture that allow for vigorous growth of trees.

¹⁴ Basal Area is an indicator of density of trees with spacing dependent on diameter of trees. The larger the diameter, the more widely spaced the trees. At 80 square feet of basal area, if all trees were 16 inches in diameter, spacing would be approximately 25 -30 feet between trees. At the same basal area, if all trees were 12 inches in diameter approximate spacing would be 15 to 20 feet between trees.

	<ul style="list-style-type: none"> o The frequency of disturbance (e.g., prescribed fire, vegetation treatments) within the wildland urban interface (WUI) may be more often than for the same vegetation types located outside of WUI areas
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Fine Scale

DC-Veg-16	<ul style="list-style-type: none"> • Trees typically occur in irregularly-shaped groups and are variably-spaced with some tight clumps. Openings surrounding tree groups are composed of shrubs and limited grass cover. Some openings contain a high density of shrubs and/or individual trees. • Trees within groups are of similar or variable ages and may contain species other than ponderosa pine. Tree groups are typically less than 1 acre, and at the mature and old stages, consist of approximately 2 to 40 trees.
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Background and Existing Conditions for Ponderosa Pine-Gambel Oak Forest

Ponderosa pine-Gambel oak is a minor vegetation type on the Prescott NF, covering approximately 49,000 acres. This forest type generally occurs at elevations ranging from 5,500 to 9,000 feet on hills, mountain slopes, and some elevated plains. It is dominated by ponderosa pine and Gambel oak and commonly includes other species such as New Mexico locust, juniper, and piñon. Occasionally, species such as aspen, Douglas-fir, white fir, and blue spruce may be present, especially in relatively moist or shady areas. There is typically an understory of grasses and forbs with occasional shrubs.

This forest type is currently severely departed from historic conditions. It has too many young and mid-aged trees and not enough old trees. The natural fire regime is severely departed from historic conditions. Historically, fire burned relatively frequently (every 1 to 15 years) and at low intensities that kept the forest open with abundant herbaceous cover.

Under warmer and dryer climate conditions, ponderosa pine-Gambel oak forest ecosystems are susceptible to decreases in plant productivity from water limitations and increased heat; increases in insect attacks; colonization of invasive species; longer and more severe fire seasons; and altered frequency, intensity, timing, and spatial extent of disturbance events (e.g., droughts, flash flooding, landslides, wind storms, and ice storms). Similar to the ponderosa pine-evergreen oak PNVT, high risk occurrences could include uncharacteristically intense wildfire due to less moisture, increased rate of insect or disease attack due to warming temperatures, and increasing challenges to regeneration of ponderosa pine following disturbance, especially on warmer dryer areas such as south facing slopes.

Desired Conditions for Ponderosa Pine-Gambel Oak Forest

Landscape Scale

DC-Veg-17	<ul style="list-style-type: none"> • At the landscape scale, the ponderosa pine-Gambel oak forest is a mosaic of structural stages ranging from young to old trees. Forest structure is variable but generally uneven-aged and open in appearance. • The forest arrangement consists of small clumps and groups of trees interspersed within variably-sized openings of grasses, forbs, and shrubs. The size, shape, and number of trees per group and the number of groups per area vary across the landscape. Tree density may be greater in some locations, such
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	<p>as north-facing slopes and steep-sided valleys at higher elevation.</p> <ul style="list-style-type: none"> • Vegetation composition resembles historic situations including ponderosa pine overstory with Gambel oak occupying the lower tree canopy. Aspen or Gambel oak patches occur. There is typically an understory of grasses and forbs with occasional shrubs. Where it naturally occurs, Gambel oak is present with all age classes represented. It is reproducing to maintain or expand its presence on suitable sites across the landscape. • Old growth occurs as groups of old trees mixed with groups of younger trees or occasionally as a patch composed of mostly of old trees. Some large contiguous patches (100-300 acres) of old growth, with all its components (snags, logs, and dense canopies), are present. Old growth is dynamic in nature and the location of these patches tends to shift across the landscape over time. • The ponderosa pine-Gambel oak forest is composed predominantly of vigorous trees, but declining, top-killed, lightning-scarred, and fire-scarred trees provide snags and coarse woody debris (greater than 3-inch diameter). A variety of snag species and coarse woody debris are well-distributed throughout the landscape. Snags are typically 18 inches or greater DBH and average 1 to 2 per acre. Logs (greater than 12-inch diameter at mid-point and greater than 8 feet long) average 3 per acre within the forested area of the landscape. Coarse woody debris, including logs, ranges from 3 to 10 tons per acre. • Grasses, forbs, shrubs, needle cast (fine fuels), and small trees support the natural fire regime. The greater proportion of ground cover is composed of grasses and forbs as opposed to needle cast. • Frequent, low severity fires, occurring every 1 to 15 years, are characteristic of this forest including throughout the range of northern goshawks and Mexican spotted owls.
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Mid Scale

<p>DC-Veg-18</p>	<ul style="list-style-type: none"> • Ponderosa pine-Gambel oak forest is characterized by variation in the size and number of tree groups depending on elevation, soil type, aspect, and site productivity. The more productive sites contain more trees per group and more groups per area. Tree density within forested areas generally ranges from 20 to 80 square feet basal area per acre. The openings surrounding tree groups, containing grass, forb, and shrub vegetation, are variably-shaped and typically range from 10 to 70 percent of the mid-scale area. Patches of even-aged forest structure are present. • Fires burn primarily on the forest floor and do not spread between tree groups as crown fire. • Basal area per mature tree group in northern goshawk post-fledging family areas (PFAs) is 10 to 20 percent higher than northern goshawk foraging areas and the general forest. Northern goshawk nest areas have multi-aged forest structure, dominated by large trees with relatively dense canopies consistent with current technical guides for northern goshawk in the southwestern U.S.
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DC-Veg-19	<p>To reduce wildfire behavior and hazards to life and property:</p> <ul style="list-style-type: none"> • Vegetation conditions within the wildland urban interface (WUI) may be composed of younger and more widely-spaced shrub patches and tree groups. • The frequency of disturbance (e.g., prescribed fire, vegetation treatments) within the wildland urban interface (WUI) may be more often than for the same vegetation types located outside of WUI areas
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Fine Scale

DC-Veg-20	<ul style="list-style-type: none"> • Trees typically occur in irregularly-shaped groups and are variably-spaced with some tight clumps. Crowns in the mid- to old-aged stages are interlocking or nearly interlocking. Openings surrounding tree groups are composed of a grass, forb, and shrub mix. Some openings contain individual trees. Trees within groups are of similar or variable ages and may contain species other than ponderosa pine. Tree groups are typically less than 1 acre, and at the mature and old stages consist of approximately 2 to 45 trees.
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Background and Existing Conditions for Grasslands

There are two types of grasslands found on the Prescott NF: Semi-desert and Great Basin. Grasslands are characterized by less than 10 percent tree cover.

The semi-desert grassland encompasses roughly 126,000 acres at elevations ranging from 3,000 to 4,500 feet. They are bounded by desert communities at the lowest elevations and piñon-juniper woodlands or interior chaparral at higher elevations. Species composition and dominance varies based on soils and topography. The more common grass species include black grama, blue grama, hairy grama, tobosa, and giant sacaton. Various shrubs species also inhabit these grasslands including: creosote bush, catclaw acaccia, mimosa, burroweed, broom snakeweed, and mesquite.

The Great Basin grassland encompasses almost 38,500 acres and intermingles with piñon-juniper ecosystems adjacent to the Chino Valley. It is higher in elevation (approximately 4,700 to 7,600 feet) and climatically cooler and moister than semi-desert grasslands. Vegetation consists mostly of grasses and forbs with interspersed shrubs. Grass species may include, but are not limited to, Indian ricegrass, threeawns, blue grama, needle grass, bottlebrush squirreltail, James’ galleta, dropseed, and tobosa grass. Shrub and half-shrub species may include, but are not limited to, saltbush, snakeweed, winterfat, buckwheat, and juniper.

Healthy grasslands are important habitat for a variety of wildlife species and are essential to maintain pronghorn antelope populations. Grasslands of the Prescott NF have undergone dramatic changes over the last 130 years. Changes include encroachment by trees and shrubs, loss of perennial grass cover, loss of cool season plant species, increase in exposed soil surface, and the spread of non-native annual grasses. Fire plays a key role in the maintenance of grasslands. Fire historically occurred every 10 to 30 years in the Great Basin and 2 to 10 years in the semi-desert.

Currently, the Great Basin grasslands show minimal departure from historic conditions in structure and composition; however, without periodic disturbance (such as fire) conditions are expected to trend away from historic conditions. The semi-desert grasslands show severe departure from historic conditions in both structure and fire regime.

Under warmer and dryer climate conditions, grassland ecosystems are susceptible to decreases in plant productivity from water limitations and increased heat; increases in insect attacks; colonization of invasive species; longer and more severe fire seasons; and altered frequency, intensity, timing, and spatial extent of disturbance events (e.g., droughts, flash flooding, landslides, and ice storms). Grasses make use of moisture in the upper soil layers. Intense precipitation events may lead to increased run-off, but decreased effective water infiltration. This could decrease vigor of native plants and lead to increased colonization of non-native invasive plant species.

Desired Conditions for Grasslands

Landscape Scale

DC-Veg-21	<ul style="list-style-type: none"> • Perennial herbaceous species dominate and include native grasses, grass-like plants (sedges and rushes), and forbs and, where appropriate, a diversity of shrubs. Woody (tree and shrub) canopy cover is less than 10 percent. Grass communities are a diverse mix of cool and warm season species. • Composition, structure, and cover provide for the full suite of native animals associated with grasslands. • On average, fine fuels provide for and maintain the desired fire regime. In semi-desert grasslands, the desired fire return interval is approximately every 10 to 15 years. In Great Basin grasslands the desired fire return interval is approximately every 10 to 30 years.
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Background and Existing Conditions for Desert Communities

The Desert Communities vegetation type covers approximately 5,900 acres of the lowest elevations of the Prescott NF. Desert communities most often have the appearance of a scrubland or low woodland of leguminous trees with intervening spaces held by one to several open layers of shrubs, cacti and perennial succulents. This vegetation type is found on slopes, broken ground, and multi-dissected sloping plains.

Current vegetation composition and structure are similar to historic conditions. Non-native grasses have invaded and have provided fuel for uncharacteristic and more frequent fire. The natural disturbance regime has also been altered by the frequent occurrence of human-caused wildfires.

Under warmer and dryer climate conditions, desert communities are susceptible to increases in insect attacks; colonization of invasive species; longer and more severe fire seasons; and altered frequency, intensity, timing, and spatial extent of disturbance events (e.g., droughts, flash flooding, landslides, and wind storms).

In desert communities, warming and drying could enhance the invasion of non-native plant species that are adapted to fire. These species grow quickly in the spring and then dry and cure so that wildfire risks increase. The natural vegetation within this community is not adapted to fire and can require long time periods to reproduce. Fire can greatly change the plant composition and thus change the desert plant communities so that birds and other wildlife species may be affected.

Desired Conditions for Desert Communities

Landscape Scale

DC-Veg-22	<ul style="list-style-type: none"> • Desert communities generally have a sparse to dense vegetation cover of cacti, succulents, trees and shrubs. Grass cover is inherently low. Non-native grass species coverage is controlled. • Dominant plants include giant saguaro, palo verde trees, cholla and prickly pear cacti, ocotillo, velvet mesquite, catclaw acacia, and jojoba. • Natural disturbances are infrequent from drought, frost and wind. Fire is very rare or absent. • Damage to vegetation composition, density, and structure from human-caused fires is minimal. • Saguaros, mesquite trees and other vegetation large enough to sustain cavity nesting birds are present.
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Background and Existing Conditions for Terrestrial Wildlife Species

Species diversity and distribution are important to retaining natural components of ecosystems. A species screening process was described in the Ecological Sustainability Report (Forest Service, 2009) to understand and address species diversity. The list of species that remained after applying the screening process was analyzed to determine which species were associated with PNVTs and which have requirements for a specific habitat feature. If vegetative conditions are trending toward Desired Conditions, habitat conditions for species associated with that community are expected to be improving as well. Where associations to a PNVT cannot be made, where species require structural characteristics common to several habitats, or where protection from disturbance during nesting or winter hibernation are most important, additional guidance or site specific activities were identified to improve habitat where necessary. In addition an analysis of species distribution has been done and additional guidance added, as necessary.

The Prescott NF evaluated 222 bird and 98 mammal species (Forest Service, 2009). Species were not considered further if: a) management activities did not affect the species; b) there was so little information known that management direction could not be identified; or c) species appeared to be secure and well-distributed. Thirty-three birds and 11 mammals were considered further. The majority of those species' habitat requirements could be associated with one or more Potential Natural Vegetation Types. Therefore, desired conditions for PNVTs and for Ecosystem resilience provide for conditions that most species require. For a smaller group of species, additional guidance was developed, including desired conditions, objectives (chapter 3), standards and guidelines (chapter 4), or all three.

Viability analyses were also carried out for terrestrial and aquatic vertebrates, invertebrates, and plant species. The process for viability analysis is documented in 'Viability Procedures for Use in Forest Plan Revision' (Forest Service 2010). It includes identification of species for which there is a viability concern, collection of information on species for which there is a viability concern, identification of species groups, and description of conservation approaches. Plan components were identified to mitigate management actions for those species or species groups where conservation approaches indicated a need.

Desired Conditions for Terrestrial Wildlife Species in addition to those related to Vegetation Desired Conditions

DC-Wildlife-1	<ul style="list-style-type: none"> • Locations of sensitive flora and fauna species are known and secure. Habitats that support these populations are enhanced to facilitate protection of sensitive flora and fauna species. • Wildlife and aquatic movement corridors are maintained, restored, and promoted at the local and regional scales. • Avian and mammal mortality and habitat alteration associated with existing and proposed power lines, corridors, energy development (i.e., wind and solar), and cell towers is minimized. • Terrestrial habitats are free of or minimally impacted by non-native or feral species.
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Background and Existing Conditions for Fisheries and Aquatic Species

In this document, aquatic species include not only fish but reptiles and amphibians (herps), and invertebrate species such as insects or springsnails. Aquatic habitats occur in perennial and perennial intermittent rivers¹⁵ and streams, as well as ground water dependent systems, such as springs and seeps. A similar process as that described above for terrestrial species was applied to determine species that may need guidance in the forest plan. Of 183 species considered, 2 reptiles, 2 amphibians, 12 fish and 3 invertebrates are thought to exist on the Prescott NF and required development of plan guidance. Aquatic species are addressed separately and as part of watershed integrity desired conditions, objectives (chapter 3), and standards and guidelines (chapter 4).

Under warmer and dryer climate conditions, aquatic species are susceptible to increased water temperatures, altered seasonal discharge events, increases in drought severity during summer flows, and increased predation pressure. Concerns include decreases in water flow and, possibly, a shorter period of sustained flows in the spring due to reduced winter snowpack. Sustained flows and desired temperatures in the spring are needed for successful spawning. Another concern is the potential for fragmentation of habitat with resulting increases in competition and predation in pools, due to little or no water flow in some stream segments.

¹⁵ Streams other than the Verde River on the Prescott NF are predominantly discontinuous, meaning that there are perennial flowing segments separated by reaches that have intermittent flow; or that they cease to be perennial prior to confluence with a larger stream, with flow sinking into the underlying porous soil or fault/fracture conditions.

Desired Conditions for Fisheries and Aquatic Species

4th Level HUC watershed scale

DC-Aquatic-1	<ul style="list-style-type: none"> • Streams, springs, and wetlands that have potential to support native fish and/or other aquatic species provide quality and quantity of aquatic habitat within the natural range of variability. • Quantity and timing of water flows¹⁶ are maintained in streams, seeps, springs, and wetlands to retain or enhance aquatic habitat and ecological functions. • Water quality is sustained at a level that retains the biological, physical, and chemical integrity of the aquatic systems and benefits survival, growth, reproduction, and migration of native aquatic species. • Riparian vegetative communities within these aquatic habitats are intact and functioning. • Aquatic habitats are free of or minimally impacted by non-native plant and animal species.
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5th Level HUC Watershed scale

DC-Aquatic-2	<ul style="list-style-type: none"> • Desired non-native fish¹⁷ species are present only where recreational fishing opportunities are emphasized.
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Social and Economic Factors

Social factors include various recreational and transportation opportunities; cultural characteristics of communities, such as ranching; as well as, visual beauty and open space. Economic factors include the impact of Prescott NF activities on the economy of the area. The recreation program produces the largest indirect influence on economies by providing features that draw tourists to the area. Tourists then spend money on food and lodging. On the other hand, of all programs on the Prescott NF, the livestock grazing program has the highest direct impact on individuals living within Yavapai County. That is, changes in the program could directly affect jobs or income. Some desired conditions that relate to social or economic factors are also referenced in desired conditions for vegetation. In particular, see [DC-Veg 2](#).

Recreation, Transportation, and Facilities

Background and Existing Conditions for Recreation, Transportation, and Facilities

The mild climate of the Prescott NF encourages year-round recreational activity. Trail and day use are primary types of activity including: off-highway vehicle riding, horseback riding, hiking, biking, hunting, fishing, and wildlife viewing. Most visitors live in Yavapai County. Maricopa

¹⁶ Generally, sustained spring water flows as well as cooler water temperatures are needed by fish for spawning. Therefore the time of year of flows, as well as the stream depth are important.

¹⁷ Non-native fish species include bass, sunfish, certain trout species, and other fish that anglers enjoy. Many of these fish have been planted in streams or lakes, provide a fishing experience, but can act as predators to native fish species. The desired condition indicates that places where recreational fishing opportunities are emphasized should be separated from places where native fish habitat is emphasized.

County residents are the next most abundant with portions of the Prescott NF located less than 90 miles from the Phoenix metropolitan area.

There are 18 developed sites on the Prescott NF; 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 Prescott NF and limits primitive camping to designated sites.

The Prescott NF recreational niche identifies trail and day use as primary uses by visitors; 50 percent of these visitors are from within a 20-mile radius. The Prescott NF had 1,230,500 annual visitors in 2007. Top recreational activities listed as a primary activity by visitors on the Forest include hiking and walking, viewing natural features, and driving for pleasure (Forest Service, 2008).

Under warmer and dryer climate conditions, recreation and transportation facilities are susceptible to increased use for relief from increased temperatures in urban areas and to damage from altered frequency, intensity, timing, and spatial extent of disturbance events (e.g., fire, droughts, flash flooding, landslides, and wind storms).

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.

Desired Conditions for Recreation, Transportation, and Facilities

DC-Rec-1	<ul style="list-style-type: none"> • A wide variety of recreational experiences and benefits exist across the Prescott NF landscape, emphasizing opportunities for those of current and future demographics, as well as all abilities, to discover and enjoy. • The number and location of recreation facilities respond to changing demographics and demand and are strategically located to concentrate use at key locations so that visitors enjoy the cultural and biophysical resources while protecting those resources. • Forest users learn from their experience on the Prescott NF and have a better understanding of the ecology of the area. • Conflicts between different recreational uses are infrequent. • Employees and volunteers present a friendly, knowledgeable, and positive image of the Forest Service. • Recreation sites are safe, clean and sanitary and provide a quality experience. • Recreational facilities and constructed features (trails, trailheads, etc.) minimize resource impacts, especially those related to watershed integrity. Characteristics of trails or facilities that qualify them for inclusion in state or national specialized management designations are generally retained. • Vegetation within developed recreation areas is diverse, healthy, and free from hazards to public safety. Vegetation contributes to scenic, healthy, natural, and sustainable recreation areas and enriches the visitors' experience. • Designated dispersed recreation occurs in areas that can accommodate concentrations of use, while impact to natural and cultural resources of the setting is minimal or absent. • Visitors are aware of and comply with forest regulations.
DC-Rec-2 Trails	<ul style="list-style-type: none"> • Trail opportunities are available in a variety of settings that provide differing levels of challenge and seclusion. • Trail routes include both point-to-point trails that connect communities and interconnected loops of varying lengths. • On designated Maintenance level 2 roads, motorized vehicles and their operators comply with State motor vehicle regulations. • Trails and trailheads meet the needs of the intended recreational use. For example, trailheads to be used by horseback riders provide adequate parking and turning space for vehicles with trailers. • Trail systems meet the needs of a growing population of a variety of recreationists. • Conflicts between various types of trail activities are minimized. • Resource impacts due to trail location and use is minimized. • Signage is accurate, effective, and in appropriate numbers for the desired experience. Information provided matches that found in brochures and other printed material. • Alternate access is available where changes in land ownership or increased development have eliminated historic access to the national forest. • Trails and trailheads are utilized to the extent that they meet the desired recreation experience for the trail or area.

DC-Wild and Scenic-1	<ul style="list-style-type: none"> • The designated wild and scenic portion of the Verde River and its adjacent areas retain their free-flowing character and outstandingly remarkable values and classifications. • For the portion of the Verde River that is eligible for wild and scenic rivers designation: outstandingly remarkable values (archeological, scenic, fishery, wildlife, recreational, and botanical) and recommended classifications remain intact until further study is conducted or designation by Congress.
DC-Wilderness-1	<ul style="list-style-type: none"> • Designated wilderness provides outstanding opportunities for exploration, solitude, risk, and challenge; natural processes with little or no human intervention continually influence ecosystems; and wilderness character is preserved and meets the intent of the designation. • The wilderness characteristics of each recommended wilderness remain intact until further action is initiated by the Forest Service to forward recommended wilderness areas to the Congress for designation. Characteristics include such attributes as scenic beauty, natural conditions, solitude, and identified special features. • Within designated wilderness and on related trails and trailheads, native plant communities dominate the landscape, while invasive species are non-existent or in very low abundance.
DC-Transportation and Facilities-1	<ul style="list-style-type: none"> • A safe, sustainable, and economical transportation system (roads and trails) exists at a level commensurate with use and need, and balances desire for public access with potential for ecological impacts. • A system of sustainable, well-maintained and marked roads and trails provides diverse opportunities to safely explore the forest and does not impede wildlife and fish movement. • Transportation and trail systems and their classifications are clearly understood by forest visitors. • Recreation sites, buildings, dams, and other infrastructure, operate as intended and provide a safe environment for people, while minimizing negative impacts to natural resources. • Energy efficient and economical facilities incorporate emerging technologies and are placed when and where they can be used effectively.
DC-IRA-1	<ul style="list-style-type: none"> • Pending resolution of existing legal disputes, the undeveloped character of Inventoried Roadless Areas identified in the 2001 Roadless Area Conservation Rule is retained by restricting the occurrence of road construction and timber harvest activities within their existing boundaries.

Open Space, Lands, and Scenic Values

Background and Existing Conditions for Open Space, Lands, and Scenic Values

The high rate of population growth within Yavapai County combined with limited lands for development raises awareness of impacts due to land development, land exchange, and land use issues. The Prescott NF provides scenery to those who live in communities near the Forest. In other situations, the Prescott NF provides lands near communities that provide desired undeveloped scenery and wild character to citizens. Scenery management on the Prescott NF

utilizes the Forest Service Scenic Management System, a tool for inventory and management of scenic resources. The Lands program oversees permits for individual uses, such as power line corridors, and responds to opportunity for acquiring or exchanging land within the national forest.

Under warmer and dryer climate conditions, open space and scenery values are susceptible to changes in landscape vegetation patterns from altered frequency, intensity, timing, and spatial extent of wildfire, insect and disease outbreaks, drought-induced vegetation die-off, and extreme weather events (e.g., flash flooding, landslides, wind storms, and ice storms).

Desired Conditions for Open Space, Lands and Scenic Values

DC-Open Space-1	<ul style="list-style-type: none"> Open-space values including those related to naturally appearing landscapes, wildlife habitat, recreational opportunity, riparian/wetland character and community needs are retained.
DC-Lands-1	<ul style="list-style-type: none"> Rights of way are in place for legal access needs for private land, public access, administrative access needs, or to resolve legal status deficiencies¹⁸ at a level that is commensurate with need. Roads that provide access to multiple properties are well maintained. All affected areas are developed to minimize effects to natural and cultural resources, and recreational opportunities. Electronic sites help fulfill public and government need for adequate communication. Day-to-day commercial frequency management is accomplished and road maintenance and snowplowing to sites occur. Electronic sites are co-located where possible to minimize visual, wildlife, recreational and other natural resource impacts. Towers are non-reflective, self supporting, and less than 199 feet in height to reduce visual impacts. They do not interfere with fire detection or cause radio frequency interference with senior uses¹⁹; and are not a source of unacceptable human exposure to radio frequency radiation²⁰. Power lines and pipelines are located and co-located within existing energy corridors when compatible. Distribution lines (less than 69 kV) are generally underground and rights of way for all above-ground lines have low growing plant communities that do not interfere with overhead lines growing within the corridors. Existing recreation residences²¹ are stable in number and blend into a natural forest setting.
DC-	<ul style="list-style-type: none"> The natural visual character, free-flowing water, and habitat for federally listed

¹⁸ An example is gaining a right of way to cross private land on a road or trail that previously was located on public land.

¹⁹ Senior communication uses predate later communication applications. The most senior uses form the basis for the communications site designation.

²⁰ High-powered radio broadcast towers must have radio frequency radiation studies by the Federal Communications Commission or licensed contractor to determine need for mitigation such as fencing and hazard signage around the tower to prevent public exposure.

²¹ The recreation residence program as we know it today began in 1915 with an Act that allowed summer homes to be constructed in certain parts of Forest Service lands with multiyear occupancy permits. The Forest Service retains ownership of the underlying land.

Lands-2	and sensitive species along and within the Verde River are retained or enhanced.
DC-Scenic-1	<ul style="list-style-type: none"> • The visual landscape generally appears natural within the context of native vegetation and landforms. A high degree of scenic integrity occurs where naturally appearing landscapes predominate. • Evidence of prescribed fire, such as black char on the bases of trees, or evidence of thinning activities, such as slash piles, may be visible but are generally present for a relatively short duration.

Minerals

Background and Existing Conditions for Minerals

While mining gold and copper were important historically, current mining activities on the Prescott NF include 5 mineral material contracts for removal of flagstone, 1 contract for schist removal, and 1 contract for removal of decomposed granite. One limestone operation exists. Today, gold mining is limited to placer and/or lode mining. Placer operations 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.

Desired Conditions for Minerals

DC-Minerals-1	<ul style="list-style-type: none"> • Mineral exploration and development has minimal impact on natural and cultural resources. • Past and present mine facilities are sufficiently reclaimed to provide for public safety and minimize impacts to cultural and natural resources. • When closing mines or caves, a pre-closure inspection by qualified individual should be done to determine if bat populations are present. If bats are present, closure methods that allow bat access should be considered. • Mining activity is withdrawn within Recreation Areas such as the Lynx Lake Recreation Area or within administrative sites located within the Prescott National Forest Boundary.
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Heritage

Background and Existing Conditions for Heritage

The Prescott NF Heritage program manages a multitude of known historic and cultural sites, providing protection from human impacts. Federal law provides direction for most archeological and historic survey and protection including survey for sites before any ground disturbing activity may take place. Once sites are discovered, they must be protected until they are evaluated and further management is approved by the State Historic Preservation Officer. That direction is not repeated in this plan.

Desired Conditions for Heritage

DC- Heritage-1	<ul style="list-style-type: none"> • Historic and prehistoric sites, including known American Indian sacred places and traditional cultural properties, are preserved and protected for their cultural importance and are generally free from adverse impacts. • Opportunities for interpretation, research, stewardship, and enjoyment of our cultural past are available. • Site integrity is protected and maintained on sites listed or eligible for listing on the National Register of Historic sites.
DC- Heritage-2	<ul style="list-style-type: none"> • Use of forest products by affiliated Native American Indian nations, tribes, and communities continues to be available for traditional practices.

Timber, Range, and Recreation Suitability

As stated in chapter 1, the provisions of the 1982 planning rule calls for identification of lands that are suitable for timber production²², lands suitable for producing forage for grazing animals, and the characteristics that make land suitable for recreation opportunities. Suitability²³ determinations are one of the decisions made as part of revising the plan.

Timber Suitability

Not all forested lands are suitable for timber production due to biophysical, socio-economic, or legal constraints. Information on the process used to identify acreage of suitable timber lands are found in appendix XX of this Plan. Suitable acreage for timber management for the proposed Forest Plan is XXXX.

Grazing suitability

Provisions 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. The process used to determine range suitability is described in appendix XX of this Plan. Suitable acreage for the proposed Forest Plan is XXXX.

Recreation suitability

A broad spectrum of outdoor recreation opportunities are provided on the Prescott NF. Opportunities provided are to be consistent with needs and demands for all major resources. The following table indicates the suitability of recreational activities within different identified

²² Timber production is defined as the purposeful growing, tending, harvesting, and regeneration of regulated crops of trees to be cut into logs, bolts, or other round sections for industrial or consumer use. This definition does not include production of fuelwood (provisions of the 1982 planning rule, 219.3).

²³ Suitability is the appropriateness of applying certain resource management practices to a particular area of land as determined by an analysis of economic and environmental consequences and the alternative uses foregone. A piece of land may be suitable for a variety of individual or combined management practices(provisions of the 1982 planning rule, 219.3)

settings. Definitions have been provided in appendix **XX** to clarify the meaning and intent of each setting and activity.

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Table 1. Recreation Suitability on the Prescott National Forest

		Activities					
		Developed Recreation	Dispersed Camping	Non-Motorized Dispersed Recreation	Motorized Recreation	Water-based Recreation	Education / Interpretation
<p>Suitable – the area or site is appropriate for the activity, whether the opportunity is available or not.</p> <p>Not Suitable – the area or site is not appropriate for the activity or the activity is not allowed by law or regulation within the area.</p>		<p>– recreation that is dependent upon facilities provided by the Forest Service. Examples include developed camping, picnicking, or group activities.</p>	<p>– camping outside of a developed campground, including designated dispersed camping, dispersed car camping, and back-country camping.</p>	<p>– a wide range of activities which are not dependent upon developed facilities or motorized equipment, including hiking, backpacking, hunting, wildlife viewing, rock climbing, or mountain biking.</p>	<p>– the operation of motorized vehicles such as All Terrain Vehicles, Off-Highway Vehicles, or motorcycles for recreation as opposed to transportation.</p>	<p>– on-water and water adjacent activities such as rafting, tubing, kayaking, swimming, wading, and fishing.</p>	<p>– recreation based on the pursuit of knowledge and understanding. Ranges from formal displays and programs sponsored by the Forest Service, to outdoor classrooms, interpretive field trips, and citizen-scientist projects.</p>
Settings	Developed Recreation Facilities	Suitable	Not Suitable	Not Suitable	Not Suitable	Suitable	Suitable
	Heritage Interpretive Area e.g. Lynx Creek Ruin	Suitable	Not Suitable	Suitable	Not Suitable	Not Suitable	Suitable
	Wilderness	Not Suitable	Suitable	Suitable Non-mechanized only	Not Suitable	Suitable	Suitable
	Wild & Scenic River	Suitable Recreation Classification	Suitable	Suitable	Not Suitable	Suitable	Suitable
	Grapevine Botanical Area	Not Suitable	Not Suitable	Suitable	Not Suitable	Suitable	Suitable

Conditions

	Forest System Trails – Non-motorized	Not Suitable	Suitable	Suitable	Not Suitable	Not Suitable	Suitable
	Forest System Trails – Motorized	Not Suitable	Suitable	Suitable where allowed	Suitable	Not Suitable	Suitable
	Designated OHV Area	Suitable	Not Suitable	Not Suitable	Suitable	Not Suitable	Suitable
	Administrative Facilities	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Suitable

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