

# Chapter 2. Forest-wide Desired Conditions

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. They 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 as described in the Consistency with Plan Components in Appendix C of this Plan. The glossary in Appendix B provides more detailed definitions of terms.

**Forestwide desired conditions** apply across the plan area. **Management area desired conditions** are specific to a portion of the plan area to allow for a focus on circumstances that are unique to that geographic location. They do not substitute for or repeat forestwide desired conditions, may be more restrictive than Forestwide guidance, and are found in Chapter 4.

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 get 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 including groups of trees or clumps of vegetation. 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)<sup>1</sup> 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, etc.) require a description at each scale.

Desired Condition descriptions are divided into three sections: Physical, Biological, and Social/Economic Factors.

## Physical Factors

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

### Climate

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<sup>1</sup> 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 6<sup>th</sup> HUC watersheds can be combined to make up a 5<sup>th</sup> HUC watershed.

## 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.

There is unequivocal agreement 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 21<sup>st</sup> 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, flashfloods, 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 (USDA 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)*

DC-Ecosystem Resilience-1	<ul style="list-style-type: none"> <li>• 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 services<sup>2</sup> for local and regional needs.</li> <li>• Prescott National Forest landscapes retain capacity to survive natural disturbances and threats to sustainability such as those driven by climate change and an increasing human population.</li> <li>• 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.</li> <li>• 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.</li> <li>• 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.</li> <li>• 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.</li> <li>• Habitat quality distribution and abundance exist to support recovery and/or stabilization of Federally listed and other species.</li> </ul>
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<sup>2</sup> 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

*The Clean Air Act* and its subsequent amendments assign federal land managers with the responsibility to protect Air Quality Related Values in Class 1 areas and to protect human health and basic resource values in all areas.

Two Class 1 attainment areas occur within or adjacent to the Prescott NF: Sycamore Canyon Wilderness (47,757 acres) and Pine Mountain Wilderness (20,061 acres). In these wilderness areas, little to no deterioration of air quality is allowed and current trends in visibility are moving towards desired conditions. All other areas on the Prescott NF are Class 2 airsheds, where only moderate deterioration of air quality is allowed. There are no air quality non-attainment areas within the Prescott NF.

Of the various Prescott NF programs, fire management has the most notable activities (wildfire and prescribed fire) that involve air quality.

Air quality resulting from fire is monitored by Arizona Department of Environmental Quality (ADEQ) for potential human health impacts using data recorders usually located in local communities including Prescott, Prescott Valley, Cottonwood, and Camp Verde. Notification of prescribed burns is done at least one day prior to ignition to those in affected communities including smoke-sensitive groups.

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 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.

### Desired Conditions for Airsheds

*Landscape Scale (10,000 acres or greater)*

DC-Airshed-1	<ul style="list-style-type: none"><li>• Fire as a natural disturbance process occurs across the landscape.</li><li>• Smoke or dust levels meet national ambient air quality standards. Conflicts between smoke aversion and restoration of ecosystems using fire are minimized or resolved, and smoke impact to communities is minimized. Citizens are aware of timing, ignition sources and benefits of fires and their resulting smoke.</li><li>• Air quality characteristics within the Sycamore Canyon and Pine Mountain Wilderness areas do not diminish visibility or contribute to increased atmospheric deposition of pollutants.</li></ul>
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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 Forest 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 3 subregions. The U.S. Geological Service 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 HUC watersheds help to make up 8 fourth HUC watersheds that overlap the Forest to some degree.

At a fine scale, the Prescott NF overlaps with portions of 127, sixth HUC watersheds. The 127 sixth 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 intermittently perennial stream miles on the Forest, 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 4<sup>th</sup> HUC watersheds. Water yield varies by 4<sup>th</sup> 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. About 19.7 miles of Turkey Creek has been 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 subbasins that partially overlap the Forest. The exception is the Santa Maria 4<sup>th</sup> 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, flashflooding, 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

### 4<sup>th</sup> to 5<sup>th</sup> Level HUC Watershed Scale

DC-Watershed-1	<ul style="list-style-type: none"> <li>• Adequate quantity and timing of water flows are maintained in streams, lakes, groundwater dependent ecosystems, and wetlands to retain or enhance ecological functions. In particular, the Prescott NF portion of the Verde watershed provides clean water for those along the river with water rights, as well as the municipality of Phoenix.</li> <li>• 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 and riparian species. Characteristics include:             <ul style="list-style-type: none"> <li>○ Water quality meets Arizona water quality standards and supports designated beneficial uses and native aquatic species.</li> <li>○ 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.</li> </ul> </li> <li>• 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.</li> </ul>
DC-Watershed-2	<ul style="list-style-type: none"> <li>• Riparian corridors and their associated stream courses are intact and functioning across the landscape.             <ul style="list-style-type: none"> <li>○ Stream channels and associated floodplains are sustained, given natural flow regimes and associated landforms.</li> <li>○ Vegetative communities comprised of deep-rooted and hydrophytic herbaceous vegetation are present in sufficient quantity to filter sediments, stabilize streambanks, reduce flooding, and provide for groundwater recharge within their natural potential.</li> <li>○ Effective ground cover within riparian areas occurs at a level that is at least 80 percent of potential.</li> <li>○ Large woody debris at least eight inches in diameter and eight feet or more in length is found in the floodplain and channel of riparian corridors within coniferous forest ecosystems and in cottonwood/willow and mixed broadleaf riparian systems.</li> <li>○ Links between aquatic and upland components are maintained, providing access to food, water, cover, nesting areas, and protected pathways for aquatic and upland species.</li> </ul> </li> </ul>

DC- Watershed-3	<ul style="list-style-type: none"> <li>• 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.</li> <li>• At a landscape scale, soil productivity and its inherent physical, chemical, and biological processes and functions remain intact or are enhanced.</li> <li>• Elements necessary to sustain soil productivity include: <ul style="list-style-type: none"> <li>○ Logs and other woody material are distributed across the soil surface to maintain soil productivity within the limitations of vegetation types.</li> <li>○ Soil loss does not exceed soil formation rates within natural potential. Limited soil compaction does not affect ecological and hydrological functions.</li> <li>○ Biological soil crusts (mosses, lichens, algae, liverworts) are present, where there is potential.</li> <li>○ Soil productivity is not inhibited by proliferation of non-native plant species.</li> <li>○ Vegetative ground cover (including litter, organic material, and basal vegetation) is well-distributed across the soil surface, given potential of vegetation types.</li> <li>○ Soils are stable within their natural capability.</li> <li>○ Soil condition rating is at or trending toward ‘satisfactory’ (See Terrestrial Ecosystem Survey of the Prescott NF, p. 76)</li> </ul> </li> </ul>
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*6th Level HUC Watershed Scale*

DC- Watershed 4	<ul style="list-style-type: none"> <li>• The municipal watershed surrounding Goldwater Lakes provides a supply of clean water for the city of Prescott, should the need arise.</li> </ul>
DC- Watershed-5	<ul style="list-style-type: none"> <li>• Wetlands and groundwater dependent ecosystems, including springs, seeps, 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.</li> <li>• The natural hydrologic, hydraulic, and geomorphic processes inherent to these groundwater dependent ecosystems function at a level that allows retention of their unique physical and biological properties.</li> </ul>

## 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

Ten vegetation types comprise more than 97 percent of 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).

This section pertains to all vegetation types found on the Prescott NF including two minor types (mixed-conifer with aspen and madrean oak woodland) that are not further described because they occur as small inclusions within one or more of the major vegetation types. Vegetation types that are dependent on groundwater or surface flows (e.g., riparian areas, seeps and springs) are addressed in the “watershed integrity” section of this Plan.

All of the upland vegetation types vary, to some degree, in structure, composition, function, densities, and natural disturbance processes from what they were historically, with the exception of the interior chaparral. Except for the desert communities, fire is the most important natural disturbance that shaped these vegetation communities.

Ranges of values presented in desired conditions account for natural variation in the composition and structure 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"> <li>• 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.</li> <li>• Vegetative conditions are resilient to the frequency, extent, and severity of disturbances, especially fire. Natural and human disturbances (e.g., planned and unplanned fire, mechanical vegetation treatments) provide desired overall plant density, structure, species composition, coarse woody debris, and nutrient cycling. Desired disturbance regimes are restored where practical.</li> <li>• 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.</li> <li>• Vegetation, including appropriate densities, provides favorable conditions for water flow and quality.</li> <li>• 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.</li> <li>• 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.</li> </ul>
DC-Veg-2	<ul style="list-style-type: none"> <li>• Vegetation provides sustainable amounts of products, such as wood fiber or forage, for local and regional needs.</li> <li>• 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.</li> </ul>
DC-Veg-3	<ul style="list-style-type: none"> <li>• Vegetation conditions for federally listed species are consistent with existing recovery plans.</li> <li>• Rare and culturally important plant species are valued and therefore enhanced and protected.</li> <li>• 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).</li> </ul>

*Mid Scale (1,000 acres or greater)*

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

DC-Veg-5	<ul style="list-style-type: none"><li>• Endemic rare plant communities are intact and functioning.</li><li>• 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, and sandstone rocks/soils) are present to maintain well distributed populations of associated native plant species.</li><li>• Native plants, including rare plant species, provide nectar, floral diversity, and pollen throughout the seasons that pollinator species are active. Desired habitat conditions promote pollinator success and survival.</li></ul>
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**Desired Conditions By Potential Natural Vegetation Type**

Vegetation is 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 Inventory<sup>3</sup>. It is possible that vegetation currently found in a PNVT is not that described in the desired condition. The expectation is that future site-specific projects could produce a trend toward desired conditions 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.

***Background and Existing Conditions for Juniper Grasslands, Piñon-Juniper Evergreen Shrub, and Piñon-Juniper Woodland***

At roughly 638,000 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 singleleaf species.

<sup>3</sup> The Terrestrial Ecological Unit Inventory 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 13 PNVTs for the purposes of assessing vegetation and soil characteristics across the Prescott NF.

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.

The piñon-juniper vegetation communities can be subdivided into three distinct vegetation types: juniper grassland, evergreen shrub, and persistent woodland. 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. 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. 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 conditions within the piñon-juniper communities are slightly departed from that expected based on estimates of historic conditions. In the evergreen shrub and juniper grassland PNVT's; there are too many medium to very large trees that are so close together that their crowns touch and overlap, and there is a lack of area with small to medium size trees that are widely spaced. The current fire regimes are similar to historic conditions for the evergreen shrub and piñon-juniper woodland PNVTs. Fire has been excluded within the juniper grassland PNVT over the last 60 years to the degree that the current fire frequency is now outside of its naturally-adapted range. Current insect outbreaks have been episodic and drought-synchronous.

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, flashflooding, 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 landform and soils. In addition, piñon trees may decrease in number due to possible increased insect attack and lack of moisture.

***Desired Conditions for Piñon-Juniper Grasslands***

*Landscape Scale*

DC-Veg 6	<ul style="list-style-type: none"> <li>• 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. 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.</li> <li>• Snags (dead standing trees) are scattered across the landscape. Coarse woody debris occurrence, including logs, generally averages 1 to 2 tons per acre.</li> <li>• Fires occur every 1 to 35 years with high severity (&gt;75 percent top kill) favoring regrowth and germination of native grasses and forbs.</li> </ul>
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## ***Desired Conditions for Piñon-Juniper Evergreen Shrub***

### *Landscape Scale*

DC-Veg-7	<ul style="list-style-type: none"><li>• 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.</li><li>• 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.</li><li>• Snags (dead standing trees) and old trees with dead limbs/tops are scattered across the landscape. Coarse woody debris is present.</li><li>• Fires are typically of mixed severity (25-75 percent mortality or top kill) while some evergreen shrub types exhibit occasional high severity fires (&gt;75 percent mortality). Regardless of the level of severity, fires occur with an average frequency of 35 to 100 years.</li><li>• Vegetation conditions within the wildland urban interface (WUI) may be composed of younger and more widely-spaced shrub patches and tree groups.</li><li>• The frequency of disturbance (e.g., fire, vegetation treatments) within the wildland urban interface (WUI) may be higher than the natural disturbance regime.</li></ul>
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## ***Desired Conditions for Piñon-Juniper Woodlands***

### *Landscape Scale*

DC-Veg-8	<ul style="list-style-type: none"><li>• The piñon-juniper woodland is a mosaic of even-aged patches of juniper and variable amounts of piñon 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 (&gt; 300 years old) are present.</li><li>• 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.</li><li>• 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.</li><li>• 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 are mixed to high severity (25-75+ percent mortality or top kill) and return intervals range from 35 to 200+ years.</li><li>• Vegetation conditions within the wildland urban interface (WUI) may be composed of younger and more widely-spaced shrub patches and tree groups.</li><li>• The frequency of disturbance (e.g., fire, vegetation treatments) within the WUI may be higher than the natural disturbance regime.</li></ul>
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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, threeawn, and muttongrass species.

Current interior chaparral composition, structure, and fire regime are similar to reference conditions; however, 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, flashflooding, landslides, wind storms, and ice storms).

## ***Desired Conditions for Interior Chaparral***

### *Landscape Scale*

DC-Veg-9	<ul style="list-style-type: none"> <li>• 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.</li> <li>• 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 (75+ percent mortality or top kill) occur with a frequency of once every 35 to 100 years.</li> </ul>
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*Mid-Scale*

DC-Veg-10	<ul style="list-style-type: none"> <li>• Vegetation conditions within the wildland urban interface (WUI) may be composed of younger and more widely-spaced shrub patches and tree groups.</li> <li>• The frequency of disturbance (e.g., fire, vegetation treatments) within the wildland urban interface (WUI) may be higher than the natural disturbance regime.</li> </ul>
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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 Forest PNVT 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.

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, flashflooding, 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-	<ul style="list-style-type: none"> <li>• At the landscape scale, the ponderosa pine-evergreen oak forest is a mosaic</li> </ul>
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Veg-10	<p>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.</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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 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.</li> <li>• The ponderosa pine-evergreen oak forest is composed predominantly of vigorous trees and shrubs, 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 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.</li> <li>• 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.</li> <li>• Limited grasses, forbs, and a moderate density of shrubs, and needle cast (fine fuels), support the natural fire regime.</li> <li>• Fires of low severity (&lt; 25 percent mortality or top kill) and occasionally mixed severity (25-75 percent mortality or top kill), occurring every 6 to 12 years, are characteristic of this forest including throughout the range of northern goshawks and Mexican spotted owls.</li> </ul>
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*Mid Scale*

Dc-Veg-11	<ul style="list-style-type: none"> <li>• 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 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. Openings surrounding tree groups are variably shaped and comprised of a grass/forb/mix. 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.</li> <li>• Fires burn primarily on the forest floor, with some spread between tree groups as crown fire. Crown fires occur in small patches.</li> <li>• Forest structure in the wildland-urban interface (WUI) may be composed of smaller, more widely-spaced groups of trees.</li> <li>• 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 US.</li> </ul>
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*Fine Scale*

Dc-Veg-12	<ul style="list-style-type: none"> <li>• 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 shrubs and limited grass cover. Some openings contain a high density of shrubs and/or individual trees.</li> <li>• 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.</li> </ul>
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**Background and Existing Conditions for Ponderosa Pine Forest**

Ponderosa pine is a minor vegetation type on the Prescott NF, covering approximately 42,400 acres. This forest type generally occurs at elevations ranging from 5,500 to 8,500 feet on hills, mountain slopes, and some elevated plains. It is dominated by ponderosa pine and commonly includes other species such as oak, New Mexico locust, juniper, and piñon. Occasionally, species such as aspen, Douglas-fir, white fir, and blue spruce may be present. 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 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, flashflooding, landslides, wind storms, and ice storms). Similar to the ponderosa pine ever green

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 Forest**

*Landscape Scale*

DC-Veg-13	<ul style="list-style-type: none"> <li>• At the landscape scale, the ponderosa pine 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.</li> <li>• 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 as north-facing slopes and canyon bottoms.</li> <li>• Vegetation composition resembles historic situations including ponderosa pine overstory with Gambel oak occupying the lower tree canopy. Aspen or oak patches occur. There is typically an understory of grasses and forbs with occasional shrubs. Where it naturally occurs, oak is present with all age classes represented. It is reproducing to maintain or expand its presence on suitable sites across the landscape.</li> <li>• 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.</li> <li>• The ponderosa pine 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.</li> <li>• Frequent, low severity fires (&lt; 25 percent mortality or top kill), occurring every 1 to 15 years, are characteristic of this forest including throughout the range of northern goshawks and Mexican spotted owls.</li> </ul>
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*Mid Scale*

DC-Veg-14	<ul style="list-style-type: none"> <li>• Ponderosa pine 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.</li> <li>• Fires burn primarily on the forest floor and do not spread between tree groups as crown fire.</li> <li>• Forest structure in the WUI may be composed of smaller, more widely-spaced groups of trees.</li> <li>• 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 US.</li> </ul>
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*Fine Scale*

DC-Veg-15	<ul style="list-style-type: none"> <li>• 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 40 trees.</li> </ul>
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**Background and Existing Conditions for Mixed Conifer Forest with Frequent Fire**

Mixed conifer with frequent fire is a minor vegetation type on the Prescott NF, covering approximately 6,600 acres. This forest type occurs at elevations above ponderosa pine and interior chaparral between 6,000 and 9,000 feet on upper mountain slopes. These conifer forests are dominated by mainly shade intolerant trees such as: ponderosa pine, quaking aspen, and Gambel oak, with a lesser presence of shade tolerant species such as white fir and blue spruce. Mid-tolerant species such as Douglas-fir are common. Aspen may occur as individual trees or small groups. This forest vegetation community typically occurs with an understory of grasses, forbs, and shrubs.

This vegetation type is the most departed from historic conditions. The forest composition has shifted toward more shade-tolerant species that are not adapted to fire, such as the true firs. There are also too many closed-canopy young-to-middle aged forest stands and there are not enough open-canopy, old forest stands. The natural fire regime is severely departed from historic conditions. Historically, fire burned relatively frequently (every 5 to 36 years) and at low intensities. This historic regime kept the forest open and maintained fire-resistant species and abundant herbaceous cover.

[Under warmer and dryer climate conditions, mixed conifer 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, flashflooding, landslides, wind storms, and ice storms). Mixed conifer on the Prescott NF occurs within slightly more moist areas at higher elevations. Under warmer, dryer climate conditions, extended drought could lead to increased tree mortality resulting in increasing risk of intense wildfire.

**Desired Conditions for Mixed Conifer Forest with Frequent Fire**

*Landscape-Scale*

DC-Veg-16	<ul style="list-style-type: none"> <li>Mixed conifer forests are a mosaic of conditions composed of structural stages ranging from young-to-old trees. Forest appearance is variable but generally uneven-aged and open. All age classes and structural stages are present. Occasionally, there are small patches (generally less than 50 acres) of even-aged forest present. The forest arrangement consists of small clumps and groups of trees interspersed within variably-sized openings of grass, forb, and shrub vegetation associations similar to historic patterns. Disturbances sustain the overall age and structural distribution.</li> <li>Size, shape, number of trees per group, and number of groups per area are variable across the landscape. Where they naturally occur, groups or patches of aspen are maintained, and all seral stages of oak are present. Tree density may be greater in some locations, such as north-facing slopes and canyon bottoms.</li> <li>Mixed conifer forest is characterized by a variety of 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 ranges from 30 to 100 square feet basal area per acre. Openings with grass, forb, and shrub vegetation surrounding tree groups typically comprise 10 to 50 percent of the area.</li> <li>Old growth occurs as groups of old trees, often mixed with groups of younger trees, or occasionally as a patch composed mostly of old trees. Some large patches (100 to 300 acres) of old growth, with all its components, such as 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.</li> </ul>
DC-Veg-17	<ul style="list-style-type: none"> <li>This mixed conifer 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).</li> <li>A variety of snag species and coarse woody debris are well-distributed throughout the landscape. Snags are typically 18 inches DBH or greater and average 3 per acre. Logs (greater than 12-inch diameter at mid-point, greater than 8 feet long) average 3 per acre within the forested area of the landscape. Coarse woody debris, including logs, ranges from 5 to 15 tons per acre.</li> </ul>

*Mid-Scale*

DC-Veg-18	<ul style="list-style-type: none"> <li>• The mixed conifer 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 DBH or greater and average 3 per acre. Logs (greater than 12 inch diameter at mid-point, greater than 8 feet long) average 3 per acre within the forested area of the landscape. Coarse woody debris, including logs, ranges from 5 to 15 tons per acre.</li> <li>• Frequent, low severity fires (&lt;25 percent mortality or topkill) occurring every 5 to 36 years are characteristic of this forest, including throughout the range of Mexican spotted owls and northern goshawks. Fire burns primarily on the forest floor and does not spread between tree groups as crown fire. Grasses, forbs, shrubs, and needle cast (fine fuels) maintain the natural fire regime with a greater proportion of the ground cover as grasses and forbs as opposed to needle cast.</li> <li>• Forest structure within the wildland urban interface (WUI) is similar to conditions described above or may be composed of smaller and more widely-spaced tree groups.</li> <li>• Basal area per mature tree group in northern goshawk 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.</li> </ul>
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*Fine Scale*

DC-Veg-19	<ul style="list-style-type: none"> <li>• Trees typically occur in irregularly-shaped groups and are variably-spaced with some tight clumps with crowns of mid-to-old-aged trees interlocking (clumped trees) or nearly interlocking. Openings surrounding tree groups are composed of a robust grass, forb, and shrub mix. Some openings contain individual trees or snags. Trees within groups are of similar or variable ages and one or more species.</li> <li>• Tree group sizes typically are less than 5 acres, but often less than 1 acre, and at the mature and old stages consist of approximately 2 to 50 trees.</li> </ul>
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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 acacia, 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, flashflooding, 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-20	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Composition, structure, and cover provide for the full suite of native animals associated with grasslands.</li> <li>• On average, fine fuels provide for and maintain the natural fire regime (&gt;75 percent mortality or top kill). In semi-desert grasslands, the natural fire return interval is approximately every 2 to 10 years. In Great Basin grasslands the natural fire return interval is approximately every 10 to 30 years.</li> </ul>
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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, flashflooding, 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***

*Table X. Landscape Scale*

DC-Veg-21	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Dominant plants include giant saguaro, palo verde trees, cholla and prickly pear cacti, ocotillo, velvet mesquite, catclaw acacia, and jojoba.</li> <li>• Natural disturbances are infrequent from drought, frost and wind. Fire is very rare or absent.</li> <li>• Damage to vegetation composition, density, and structure from human-caused fires is minimal.</li> <li>• Saguaros, mesquite trees and other vegetation large enough to sustain cavity nesting birds are present.</li> </ul>
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***Background and Existing Conditions for Terrestrial Wildlife Species***

Species diversity and distribution is 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. We assume that if vegetative conditions are trending toward Desired Conditions, habitat for associated species is 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 hibernacula were 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 list of species, additional guidance was developed, including desired conditions, objectives (Chapter 3), standards and guidelines (Chapter 4), or all three. This list of species includes 7 bat species, pronghorn antelope, raptors (including American peregrine falcon, Ferruginous hawk, Swainson's hawk, and goshawk), and federally threatened or endangered species.

Under warmer and dryer climate conditions, terrestrial wildlife species are susceptible to habitat loss and fragmentation resulting from more frequent or extreme disturbance events including wildfire, droughts, flashflooding, landslides, and wind storms. Wildlife species are also susceptible to alterations in the timing of plant phenology events (green-up, flowering, fruit ripening, etc.) especially those that influence critical life behaviors (migration, breeding, dispersal, etc).

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

DC-Wildlife-1	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Wildlife and aquatic movement corridors are maintained, restored, and promoted at the local and regional scales.</li> <li>• 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.</li> </ul>
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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 intermittent perennial rivers 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 Forest Plan guidance was developed. 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. A main concern includes 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.

**Desired Conditions for Fisheries and Aquatic Species**

*4<sup>th</sup> Level HUC watershed scale*

DC-Aquatic-1	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Quantity and timing of water flows are maintained in streams, groundwater dependent ecosystems, and wetlands to retain or enhance aquatic habitat and ecological functions.</li> <li>• 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.</li> <li>• Riparian vegetative communities within these aquatic habitats are intact and functioning.</li> <li>• Aquatic habitats are free of or minimally impacted by non-native plant and animal species.</li> <li>• Within the range of natural variability, the following habitat conditions are present in native fish-bearing streams. All of the desired features may not occur in a specific segment of stream within a watershed, but all generally occur at the watershed scale for stream systems of moderate to large size (3rd through 6th order streams).             <ul style="list-style-type: none"> <li>○ Percent fines in spawning gravels: 0 to 60 percent, depending upon stream morphology and geologic characteristics.</li> <li>○ Percent stable streambanks: 75 percent or higher.</li> <li>○ Pool-riffle ratio and sequence and width-depth ratios are within the limits for the particular stream.</li> </ul> </li> </ul>
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*5<sup>th</sup> Level HUC Watershed scale*

DC-Aquatic-2	<ul style="list-style-type: none"> <li>• Desired non-native fish species provide recreational fishing where the opportunity exists.</li> </ul>
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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, the Prescott National Forest livestock grazing program has the highest direct impact on individuals living within Yavapai County. Some desired conditions that relate to social or economic factors are related to 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, hiking, and biking. Most visitors live in Yavapai County. Maricopa 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 771,772 annual visitors in 2002. Primary recreational activities on the Forest include hiking/walking, overall relaxation, non-motorized activities, fishing, and wildlife viewing. Driving for pleasure is a common use on the Prescott NF; NVUM data reported that 20 percent of those surveyed participated in this activity with 5 percent of respondents reporting driving for pleasure as their primary activity (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, flashflooding, 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"><li>• 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.</li><li>• 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.</li><li>• 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.</li><li>• Volunteers present a friendly, knowledgeable, and positive image of the Forest Service.</li><li>• Developed sites are safe, clean and sanitary and provide a quality experience.</li></ul>
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	<ul style="list-style-type: none"> <li>• Recreational facilities and constructed features (trails, trailheads, etc.) minimize resource impacts, especially those related to watershed integrity. 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. Characteristics of trails or facilities that qualify them for inclusion in state or national specialized management designations are generally retained.</li> <li>• 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.</li> <li>• Designated dispersed recreation occurs in areas that can accommodate concentrations of use while impact to natural and cultural resources of the setting is minimal.</li> <li>• Signage is accurate and effective, and information provided matches that found in brochures and other printed material.</li> </ul>
DC-Wild & Scenic 1	<ul style="list-style-type: none"> <li>• For the designated Wild/Scenic portion of the Verde River: river segments as well as their adjacent areas retain their free-flowing character and outstandingly remarkable values and classifications.</li> <li>• For the portion of the Verde River that is eligible for Wild/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.</li> </ul>
DC-Wilderness-1	<ul style="list-style-type: none"> <li>• For designated wilderness: 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.</li> <li>• For recommended wilderness: 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.</li> </ul>
DC Transportation and Facilities-1	<ul style="list-style-type: none"> <li>• A safe, sustainable, and economical transportation system (<i>roads and trails</i>) 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. Restrictions are clearly understood by forest visitors.</li> <li>• 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 are placed where they can be effectively used while making sustainable use of natural resources.</li> </ul>

## 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, often on the mountains that surround the community. 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., flashflooding, 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"> <li>Open-space values including those related to naturally appearing landscapes, wildlife habitat, recreational opportunity, and riparian/wetland character, are retained.</li> </ul>
DC- Lands- 1	<ul style="list-style-type: none"> <li>Rights of way are in place for legal access needs for private land, public access, administrative access needs or to resolve legal status deficiencies 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.</li> <li>Electronic sites help fulfill public and government need for adequate communication. Day to day frequency management is accomplished and road maintenance and snowplowing to sites occur. Electronic sites are co-located where possible to minimize visual impacts</li> <li>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 uses; and are not a source of unacceptable human exposure to radio frequency radiation.</li> <li>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.</li> <li>Existing recreation residences are stable in number and blend into a natural forest setting.</li> </ul>
DC- Lands-	<ul style="list-style-type: none"> <li>The natural visual character, free-flowing water, and habitat for Federally listed and sensitive species<sup>4</sup> along and within the Verde River are retained or enhanced.</li> </ul>

<sup>4</sup> Sensitive species are those plants 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

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DC-Scenic-1	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Occasionally, evidence of fire, such as black char on the bases of trees or evidence of thinning activities such as tree stumps or branches are seen within forested areas, but are generally present for a relatively short duration (less than three years).</li> </ul>

## 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 with an approved plan of operations. 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; the Gold Basin Project has the only approved plan of operations.

### Desired Conditions for Minerals

DC-Minerals-1	<ul style="list-style-type: none"> <li>• Mineral and energy exploration and development has minimal impact on cultural and natural resources.</li> <li>• Past and present mine facilities are sufficiently reclaimed to provide for public safety and minimize impacts to cultural and natural resources.</li> <li>• Mining activity is not found within Recreation Areas such as the Lynx Lake Recreation Area.</li> </ul>
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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.

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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)

### Desired Conditions for Heritage

DC-Heritage-1	<ul style="list-style-type: none"><li>• 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.</li><li>• Opportunities for interpretation, research, stewardship, and enjoyment of our cultural past are available.</li></ul>
DC-Heritage-2	<ul style="list-style-type: none"><li>• Use of forest products by affiliated Native American Indian nations, tribes, and communities continues to be available for traditional practices.</li></ul>

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