

# Chapter 2. Forestwide Management

## Introduction

This chapter sets forth plan decisions and other content that apply forestwide. See Chapter 1 for descriptions of plan decisions and other content. In the event of conflicts with other sections of this plan, the more restrictive plan decision always applies. However, a project or activity-level evaluation may be required to resolve the conflict.

## Landscape Character Zones

The following landscape character zones provide a thematic and geographical context for forest management by highlighting unique geographic, geological, ecological, and cultural elements of different parts of the Forest. Landscape character zones not only provide the reference condition for scenery, but they also help identify unique resource values associated with different areas of the Forest that should be retained or enhanced by activities and developments. Scenery, but helps identify particular resource values associated with different areas of the Forest that should be retained or enhanced by activities and developments. These landscape character zones are intended to be used in conjunction with other plan direction that would be applicable to any given area of the Forest.

The desired landscape character for these zones may be very similar to the existing landscape. The edges of these zones are not always distinct on the ground and may vary over time with changes from natural disturbance and climate change. Map XX provides a general understanding of their location but areas around the boundaries may exhibit or blend with the character of the adjacent zone. On-the-ground interpretation of these zones is acceptable based on site-specific knowledge.

### Ponderosa Pine Landscape Character Zone

#### General Description and Background for Ponderosa Pine Landscape Character Zone

The Ponderosa Pine Landscape Character Zone is the largest on the Forest and extends from the northern Forest boundary to the northern boundary of the East Clear Creek Watershed (add the watershed in HUC level format to be consistent with other parts of the plan). Western edge of the character zone is defined by the Mogollon Rim and features of this character zone may extend down its slope and into adjacent character zones. On the eastern boundary is Anderson Mesa Landscape Character Zone. The transition between these two character zones is defined by the presence of piñon-juniper and Great Basin grasslands. The transition is gradual, and there may be areas that have a mixed character. This character zone is a portion of the largest ponderosa pine landscape in Arizona.

This character zone overlaps with the Long Valley, Walnut Canyon, and the Flagstaff Neighborwoods Management Areas.

#### Desired Conditions for Ponderosa Pine Landscape Character Zone

The Ponderosa Pine Landscape Character Zone itself is flat to gently sloping with scattered, steeper landforms including Mormon Mountain, lands around Kendrick Peak, the West Clear Creek drainage, Walnut Canyon, Pumphouse Wash, Fry Canyon, Saddle Mountain, a number of prominent hills and mountains in the northern portion of the character zone and various escarpments throughout. On the northern end, evidence of volcanic geology is more common.

This area is valued for its continuous stands of ponderosa pine, old-growth “yellow-belly” ponderosa pine stands, and beautiful lakes for boating and fishing. This character zone is comprised of ponderosa pine forest and piñon-juniper woodland vegetation types which cluster around broad expanses of grassy openings and picturesque lakes. Ponderosa pine is all-aged and has large trees with open, well-formed crowns. The Forest is a generally open and park-like with a diverse understory of grasses and shrubs. Denser tree conditions exist in places across the landscape including north facing slopes and canyon bottoms. The distribution and class of trees across the landscape corresponds with the ecological desired conditions for this vegetation type. Old growth ponderosa pine in groups or individual provides a valued landscape feature that adds to the sense of diversity and discovery in this zone. Snags, top-killed trees, down logs, and other evidence of fire and wind disturbance occur individually and in patches of varying sizes. They provide an intriguing feature that moves throughout the landscape with time. Standing dead trees provide character and wildlife habitat and they are retained (See ponderosa pine Vegetation Type Desired Conditions for details).

Small natural and artificial lakes and wetlands are scattered throughout this character zone. They are highly valued for their recreation opportunities, especially boating and fishing, and scenic attributes. Lakes provide a viewing platform for mountains and hillsides in the vicinity and the some provide views of the San Francisco Peaks. The presence of water provides for ecological diversity and wildlife viewing in these areas, and it is a highly valued scenic attribute.

Gambel oak and aspen provide contrast to the evergreen pine in fall. In winter, this character zone provides a refuge from noise for motorized and non-motorized recreationists in a white, snow-covered landscape that contrasts with evergreen trees. In the summer, it provides cool shady areas for a variety of recreation activities. Arizona walnut trees in Walnut Canyon are another valued feature in this character zone. It contributes an interesting bark and texture against the winter sky and yellow fall color.

Clear, dark night skies are valued for stargazing and as a professional astronomical astronomy resource. Astronomical facilities are present and visible in defined areas.

## **San Francisco Peaks Landscape Character Zone**

### **General Description and Background for San Francisco Peaks Landscape Character Zone**

The San Francisco Peaks Landscape Character Zone is located within the White Mountains-San Francisco Peaks-Mogollon Rim Ecological Section on the Coconino NF. This character zone is characterized by distinctive mountains with steep slopes and alpine peaks, including the highest point in Arizona, Mount Humphreys. The Arizona National Scenic Trail crosses this character zone.

The San Francisco Peaks, including the Kachina Peaks Wilderness, are sacred to many American Indian tribes as a significant religious landmark and traditional cultural place that contains many shrines and sacred places. For the Hopi, the Peaks are the single-most important place that is central to their religious beliefs. It is an icon that gives them their identity as a people. The San Francisco Peaks are one of several mountains that demarcate the boundaries of the traditional and sacred heartland of the Hopi, Navajo, Zuni, Acoma, Apache, Havasupai, and Hualapai. Many tribes continue to conduct centuries-old religious observances on the San Francisco Peaks that are central to their culture and religion.

This character zone overlaps with the Fort Valley-Mount Elden and the Flagstaff Neighborwoods Management Areas.

## **Desired Conditions for San Francisco Peaks Landscape Character Zone**

The San Francisco Peaks are a distinctive volcanic mountain with several alpine peaks and steep slopes. It is a focal point of background views from adjacent zones up to 80 miles away including the Grand Canyon National Park and the Verde Valley. The middleground of views from the Peaks is dominated by sky, air and clouds with background views of dry steep canyons and expansive forests.

Vegetation varies along the elevation gradient from open ponderosa pine stands with views of the surrounding landscape to sun-dappled shade of spruce-fir and mixed conifer to rocky and sparsely-vegetated alpine communities. Within these vegetation types, steep, cool drainages and fire disturbance create microclimates with a surprising diversity of landscape features such as high elevation mountain meadows, communities of bristlecone pine, and aspen that contrast to dark evergreen surroundings. Aspen and grasslands, in particular create openings that provide a sense of the surrounding landscape. The lower slopes of the zone gradually flatten and blend into the surrounding plateau.

The San Francisco Peaks are highly valued for their scenic character year-round. In autumn, aspen lights up the mountains with beautiful yellow, gold, and orange colors contrasted against dark conifer forests. Wildflowers provide dramatic splashes of color in mountain meadows in the spring and late summer. In winter, the snow-covered peaks can be viewed from great distances and the area is a destination for snowplay.

The San Francisco Peaks are sacred to many American Indian tribes and is a significant religious and traditional place. There are individual shrines and sacred places that are valued for their cultural setting on the mountain. The area is valued for its heritage resources and cultural importance, spectacular scenery and high scenic integrity, cool climate escape from desert heat, a diverse range of year-round recreation opportunities, and its distinctive landscape features.

## **Volcanic Woodlands Landscape Character Zone**

### **General Description and Background for Volcanic Woodlands Landscape Character Zone**

The Volcanic Woodlands Landscape Character Zone is part of the White Mountains-San Francisco Peaks-Mogollon Rim Ecological Section and the Painted Desert Ecological Section on the Coconino NF. It is largely defined by the north and northeast extents of the San Francisco Peaks volcanic field associated with more recent volcanic activity.

A number of cinder cones and mountains in this character zone are important cultural and religious places for several tribes. They are the sources spiritual force with shrines that are the focal point for prayers of several religious societies.

This character zone overlaps with the Flagstaff Neighborwoods Management Area.

### **Desired Conditions for Volcanic Woodlands Landscape Character Zone**

This character zone is characterized by gently rolling topography with sudden inclusions of black, red, and gray cinder cones; volcanic craters; and rugged lava flows. Areas with these volcanic features have open growing ponderosa pines which may have unique forms and shapes due to the growing conditions. The forest understory is often sparse with patches of native grass or shrubs. Lava flow areas are distinctive and generally devoid of vegetation being dominated by the unique rock forms. Most of the character zone is characterized by piñon-juniper woodlands interspersed with grasslands on gently rolling

to flat topography. Water is scarce throughout this character zone. Located in this character zone are Sunset Crater National Monument, Cinder Hills OHV recreation area, and Painted Desert Vista. Outside of the Cinder Hills OHV area, cinder cones are generally undisturbed by human activity. The area is valued for its volcanic scenery, motorized recreation opportunities, and distinctive features such as Red Mountain (a designated Geological Area), Cochrane Hill, and other cinder cones and lava flows. The southwestern boundary of this character zone blends gradually into the ponderosa pine characteristics of adjacent character zones.

## **Anderson Mesa Landscape Character Zone**

### **General Description and Background for Anderson Mesa Landscape Character Zone**

Anderson Mesa Landscape Character Zone is located within the White Mountain-San Francisco Peaks-Mogollon rim Ecological Section. The major vegetation types are piñon –juniper and Great Basin grassland. The western and southern parts of this character zone transition gradually to ponderosa pine. This area provides a background to Winona and areas east of the Forest. The Arizona Trail also crosses this character zone.

Anderson Mesa is the location of six large pueblos that are the last archaeological expression of the prehistoric Sinagua culture as it transforms into the nascent Hopi and Zuni cultures in the 1400's. It is also the location of early 20th century homesteads of several families that continue to practice traditional cattle ranching in the region today.

This zone does not overlap any management areas.

### **Desired Conditions for Anderson Mesa Landscape Character Zone**

The Anderson Mesa Landscape Character Zone has mostly gently sloping to flat topography. Steep escarpments form the sides of the mesa. Steep canyons are interspersed along the eastern Forest boundary with Padre Canyon, Jacks Canyon, and East Clear Creek Canyon—distinctive inclusions in this character zone which is otherwise dominated by grasslands and piñon-juniper woodland. The Great Basin grasslands of the mesa provide large open landscapes with individual trees surrounded by piñon juniper and ponderosa pine forests. Grasslands are a valued component of the landscape character where they naturally occur. Anderson Mesa is a destination for hunting and wildlife viewing because of its outstanding wildlife habitat. Other distinctive features in this character zone are wetlands such as Marshall Lake, and lakes, such as Ashurst Lake, Hay Lake, and Long Lake, that contribute to recreation settings and wildlife habitat (See Aquatic Resources for more details).

Clear, dark night skies are valued for stargazing and as a professional astronomical resource. Astronomical facilities are present and visible in defined areas. In spring and late summer, blankets of yellow wildflowers may dominate the grasslands.

The presence of large prehistoric pueblos and historic ranches that are still operating contribute to the sense of history and place that Anderson Mesa provides to the families of several Hopi and Zuni clans as well as Euroamerican ranching families today.

## **East Clear Creek Landscape Character Zone**

### **General Description and Background for East Clear Creek Landscape Character Zone**

The East Clear Creek Landscape Character Zone is located within the White Mountains-San Francisco Peaks-Mogollon Rim Ecological Section on the Coconino NF.

The Mogollon Rim makes up the southern boundary of the Forest and the southern limit of the Colorado Plateau, draining north into East Clear Creek. It is part of the traditional homeland of the Western Tonto Apache, the scene of numerous skirmishes during the Apache Wars of the 1860's to 1880's, and a passageway for many pioneering families who settled central Arizona in the latter part of the 19th and early 20th centuries.

This zone overlaps with the Long Valley Management Area.

### **Desired Conditions for East Clear Creek Landscape Character Zone**

This character zone is characterized by the Mogollon Rim, a rugged escarpment with steep, rocky drainages and narrow canyons and ridges alternating from east to west. This canyon setting provides opportunities for quiet and solitude. Vegetation is composed mostly of ponderosa pine and mixed conifer forests with inclusions of maples, aspen and other deciduous trees offering variety year-round. In autumn, magnificent yellows, golds, and reds contrast against a dark conifer forest background. Distinctive features in this character zone include: C.C. Craigen Reservoir; Knoll Lake; Potato Lake; and scenic drainages including East Clear Creek, Barbershop Canyon, Dane Canyon, and Leonard Canyon, to name a few. Leonard Creek and East Clear Creek have perennial flowing water in a steep canyon setting.

The Apache wars and prehistoric/historic settlement are recognized as culturally significant features related to the General Crook National Recreation Trail which partly follows the —Platkwabi Trail”, an ancient travel route from the Hopi Mesas to the Verde Valley that was used by the Spanish, the American military, and early settlers.”. The Arizona National Scenic Trail provides long distance hiking, biking, and equestrian riding opportunities. Forest Road 300 along the Mogollon Rim provides views into adjacent forest lands and communities below. Past wildfires created views to distant vistas. The Apache-Sitgreaves National Forests to the east are similar in character to this character zone. North of East Clear Creek, the terrain starts to become more gradual and blends in to the Ponderosa Pine Landscape Character Zone.

## **Red Rock Landscape Character Zone**

### **General Description and Background for Red Rock Landscape Character Zone**

The Red Rock Landscape Character Zone makes up about four percent of the White Mountains-San Francisco Peaks-Mogollon Rim Ecological Section on the Coconino NF. However, most of this character zone is located in the Tonto Transition Ecological Section. To the north and northeast is the Ponderosa Pine Landscape Character Zone, which is sharply divided from the Red Rock Landscape Character Zone by the Mogollon Rim. To the south in the Verde Valley, there is gradual transition away from red rock formations to a semi-desert and desert community dominated landscape.

This zone overlaps with the Sedona-Oak Creek (including the Oak Creek Canyon Management Area) and Sedona Neighborhoods Management Areas.

## Desired Conditions for Red Rock Landscape Character Zone

The Red Rock Landscape Character Zone is a truly distinct landscape where monumental buttes, soaring multi-hued cliffs, fantastic towering spires, and rugged canyons bombard the eye and the senses and vast sweeps of greenery refresh and inspire the spirit and fill the viewer with expectation. Unified by Oak Creek, the vital riparian link between the Mogollon Rim and the Verde Valley, the landscape is a museum of life, a living crossroads connecting people in time and space. There is no other region on earth exactly like it. This landscape has long been celebrated nationally and internationally as a year-round destination. This character zone is valued for its world renowned scenery, high and very high scenic integrity, lush riparian areas and perennial streams, historic and prehistoric resources, and primitive and developed recreation experiences. The landscape is defined by bright and vibrant variations in color and form such as blue water and skies juxtaposed with red rocks and dark green trees. The rolling terrain in the piñon-juniper forest provides a variety of visual experiences and panoramic views of the rock formations. The contrast created between the red rocks and soil and the gray-green piñon-juniper forest enhances the visual character of the landscape in terms of color, texture, and form. Scenic views from primary viewing areas such as highways, recreation sites, trails, and residential areas are maintained.

From an aerial perspective, the landscape is coarse-textured and has a vegetation pattern that varies from sparse to dense areas of trees and shrubs that range from dark evergreen to gray-green. The light red and reddish brown soil colors contrasts with the vegetation and rock outcrops to create a mottled appearance to the land surface. The large sandstone formations have a smooth appearance, with vegetation dotting the surface of the rocks in an irregular pattern.

With its intriguing human history and remarkable natural environment rich with plants and wildlife, red rock country offers individuals and families the gifts of discovery, inspiration, and solitude. When wandering the character zone, the visitor is free to imagine, explore, and reconnect with the land. Clear, dark night skies are valued.

Some red rock formations are particularly distinctive such as Bell Rock, Cathedral Rock, and Courthouse Butte. Certain locations, such as Crescent Moon Ranch/Red Rock Crossing, Airport Mesa/Airport Saddle, West Fork of Oak Creek, Call of the Canyon and Oak Creek Vista provide exceptional views of the red rock formations and are particularly valued by photographers, artists, and visitors. The area is rich in prehistoric and historic cultural landscapes, including ranches, orchards, cliff dwelling, and rock art and sacred sites. Along the escarpment, that divides the Red Rock –Secret Mountain Wilderness from the lower country, there are several notable cliff dwellings of high scenic and interpretive value such as Palatki and Honanki.

Riparian areas are a destination for fall color viewing. In summer, they offer a respite from heat along shady banks. In winter, snow-covered red rock is a strong feature. During the monsoon season in late summer rainbows are common across the red rock sky.

Riparian areas, in particular Oak Creek, provide a lush dark green environment with perennial water, which begins in a narrow rich canyon and opens into piñon juniper and semi-desert communities. Interior chaparral vegetation adds to the diversity and interest in the area.

Evidence of fire disturbance generally does not detract from visitor experiences.

Visitors are drawn to the Chapel of the Holy Cross for its distinctive architecture and for the panoramic vistas of the surrounding red rock landscape. From the adjoining Chapel of the Holy Cross plaza, one can see several prominent rock formations including Eagle Head Rock, the Two Nuns, and the Madonna and

Child. To the Yavapai and Tonto Apache people, the Red Rock formations and canyons are recognized as the locations of legendary events that relate to their origins in the Verde Valley/Red Rocks Country. The unique geology and local rock formations of the Red Rock Country make it a multi-cultural landscape that has been recognized for centuries. The unique geology and local rock formations of the Red Rock Country, combined with the distinctive architecture and historic significance of the Chapel of the Holy Cross, make it and the surrounding area a cultural landscape.

## **Verde Valley Landscape Character Zone**

### **General Description and Background for Verde Valley Landscape Character Zone**

The Verde Valley Landscape Character Zone is located within the Tonto Transition Ecological Section. The vegetation is predominantly semi-desert grasslands, desert communities, and riparian. The Verde Valley has a continuous history of human occupation, beginning with Clovis Paleo-Indian mammoth hunters of 12,000 years ago. The Verde Valley comprised the southern Sinagua culture area until A.D. 1400, as highlighted by Montezuma Castle, Montezuma Well, and Tuzigoot National Monuments and the Clear Creek Ruins, Red Tank Draw, Sacred Mountain, and V-V Rock Art Heritage Sites of the Coconino NF. About A.D. 1250, the northeastern Yavapai entered the Verde Valley, and later, the Tonto Apache. Both groups continue to live in the Verde Valley as the Yavapai-Apache Nation. Euroamerican miners, farmers, and ranchers spread into the Verde Valley starting in the 1860's, and several of those pioneering families still work in the Camp Verde and Sedona areas. Fort Verde State Park; the towns of Camp Verde, Cottonwood, and Clarkdale; the General George Crook Road; 13 Mile Rock; and scattered ranches represent the historic period growth of the Verde Valley. The Verde Valley has a long history of prehistoric and historic settlement as highlighted by national monuments and historic trails within the Forest's administrative boundary.

This zone overlaps with the House Mountain-Lowlands Management Area.

### **Desired Conditions for Verde Valley Landscape Character Zone**

This character zone is defined by the large Verde River Valley and semi-desert grasslands and desert communities. Broad valleys with lonely rounded hills are common in the north and western portion of the zone and steep drainages characterize the eastern portion. The Verde River, designated as a Wild and Scenic River, separates the Prescott and Coconino National Forests on the southwest. The Wild and Scenic Verde River runs along the southern end of the Forest. Oak Creek, Sycamore Creek, West Clear Creek, Wet Beaver Creek and the Wild and Scenic Fossil Creek emerge from deep cottonwood and mixed broadleaf lined canyons which cut into the Mogollon Rim and continue as ribbons of riparian vegetation across the piñon juniper and semi-desert grasslands before merging with the Verde River. Canyons along the Mogollon Rim show evidence of past flooding and are periodically flooded. Cool shady pools of water in and along the rivers provide an ideal setting for water-based recreation activities and a refuge from the dry hot landscape that surrounds them. Escarpments, rocky outcrops, and mesas provide a diversity of landforms and leads to unexpected changes in vegetation. Some snow may occur but the transition is mild and gradual. Deciduous trees along riparian areas in the late fall provide some scenic benefits. Some of these riparian areas also have Arizona walnut, which contributes an interesting bark and texture against the winter sky and yellow fall color.

## **Painted Desert Landscape Character Zone**

### **General Description and Background for Painted Desert Landscape Character Zone**

The Painted Desert Landscape Character Zone is predominantly a transition zone between ponderosa pine and piñon juniper woodlands and the Painted Desert. Views of the Painted Desert are in the background from this area, but it lacks some of the characteristic features of the Ecological Section in the foreground.

This zone does not overlap any management areas.

### **Desired Conditions for Painted Desert Landscape Character Zone**

Topography is relatively flat with the exception of Deadman Wash and lands around Doney Picnic Area. Vegetation is comprised of grasslands and piñon juniper woodlands opening onto a vast, largely-undeveloped, desert landscape in the background. Cultural features and evidence of prehistoric habitation are the most predominant scenic attractions in this character zone. Panoramic views of volcanic fields and the characteristic Painted Desert land formations are visible from this character zone.

## **Air Resources**

### **Air Quality**

#### **General Description and Background for Air Quality**

Smoke occurs during wildfires and where fire is used to reduce fuels and restore fire-adapted ecosystems. Management activities that use fire are likely to increase atmospheric particulates.

The Environmental Protection Agency, as required by the Clean Air Act (1990) as amended, has established National Ambient Air Quality Standards (NAAQS) for six pollutants to protect human health, as well as to protect against decreased visibility, damage to animals, crops, vegetation, and buildings. These standards apply to the two airsheds (Little Colorado River Airshed and Verde River Airshed) that overlap the Forest. In addition the EPA established the Regional Haze Rule (40 CFR Part 51) (U.S. EPA 1999) for improved visibility in national parks and wilderness areas. Coconino NF overlaps a portion of the Sycamore Canyon wilderness which is a Class 1 area.

Management activities on the Forest are coordinated with the Arizona Department of Environmental Quality, as well as with adjacent agencies, to maintain and protect the air quality in the two airsheds and the Class 1 area.

#### **Desired Conditions for Air Quality**

Management activities do not exceed State or Federal emissions standards. Air quality on the Coconino NF meets state air quality standards including visibility and public health. Air quality related values, including high quality visual conditions, are maintained within the Class I Airshed over the Sycamore Wilderness.

#### **Guidelines for Air Quality**

Project design for prescribed burns and strategies for wildfires should incorporate as many Emission Reduction Techniques listed in Arizona Revised Statute (ARS) 18-2-15 as are feasible to reduce negative

impacts to air quality, subject to economic constraints, technical feasibility, safety criteria, and land management objectives.

Decision documents for wildfires and prescribed burns should identify smoke sensitive areas<sup>1</sup> and include objectives and courses of action to mitigate impacts to those areas.

The public should be notified through methods, such as smoke warning signs along roads when visibility may be reduced due to wildland fire.

## **Management Approaches for Air Quality**

Coordinate with Arizona Department of Environmental Quality (ADEQ) during prescribed burns to comply with State and Federal regulatory requirements for emissions and impacts to Class I and II airsheds.

Coordinate with ADEQ during wildfire to ensure ADEQ is aware of potential smoke impacts to receptors.

## **Aquatic Resources**

### **Introduction to Aquatic Resources**

The different types of aquatic resources described below are:

- watershed management, water quality and quantity,
- stream ecosystems,
- wetlands and reservoirs
- springs, and
- constructed waters (such as earthen stock tanks or artificial drinkers).

Desired conditions for some aquatic resources are described using watershed scales to help provide their relative importance or niche. Conditions for larger land areas are described under the 4th to 5th level HUC watershed scale. More detailed descriptions for site-specific conditions are described at the 6th level HUC watershed scale. Not all aquatic resources require a description at each scale.

## **Watershed Management, Water Quality and Quantity**

### **Desired Conditions for Watershed Management**

Watersheds exhibit high geomorphic, hydrologic, and biotic integrity relative to their potential natural condition. The natural hydrologic, hydraulic, and geomorphic processes function at a level that allows retention of their unique physical and biological properties. They are resilient and recover rapidly from natural and human disturbances. They exhibit a high degree of connectivity along the stream, laterally across the floodplain and valley bottom, and vertically between surface and subsurface flows. They provide important ecosystem services such as high quality water, recharge of

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<sup>1</sup> Smoke sensitive areas are areas in which smoke from outside sources is intolerable, for reasons such as heavy population, existing air pollution, or intensive recreation or tourist use (from <http://www.nwccg.gov/pms/pubs/glossary/index.htm>)

streams and aquifers, the maintenance of riparian communities, and moderation of climate variability and change. They maintain long-term soil productivity. They provide habitat that supports adaptive animal and plant communities that reflect natural processes.

## **Water Quantity and Quality**

### **Desired Conditions for Water Quantity and Quality**

Adequate quantity and timing of water flows are maintained to retain or enhance ecological functions, including aquatic species and riparian vegetation consistent with existing water rights and claims.

Ephemeral, intermittent, and perennial water courses slow water down, have access to the flood plain, transport bedload, and maintain longer sustained base flows on the landscape, rather than a flush of peak flows. This will reduce flood potential.

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.

Water quality meets or exceeds Arizona water quality standards and supports identified designated beneficial uses and native aquatic species.

Instream water rights are maintained or procured so that a minimum sufficient amount of water is guaranteed over time to ensure that long-term habitat is provided as well as provide for other needs on the Forest.

Water tables are high or elevated so minimal channel downcutting occurs.

### **Guidelines for Watershed Management, Water Quantity and Quality**

Use of felt-soled waders should not be used in aquatic habitats. Cleaned lug-soled waders should be used instead to prevent the spread of aquatic invasive exotic species and diseases.

Approved Total Maximum Daily Load (TMDL) recommendations that maintain or improve water quality to meet or exceed Arizona water quality standards and support identified designated beneficial uses should be implemented. Because watershed loading can potentially be reduced through management of sedimentation and vegetative stability, implementation of this TMDL should include a review of upland and drainage stability to identify areas needing soil stabilization and channel improvements.

Treatments should be focused where protection of people, structures, and community infra-structure (e.g., roads, bridges, and power corridors) in and associated with the wildland-urban interface (WUI) are at risk.

High value, 6<sup>th</sup> level HUC priority watersheds should be restored and maintained in a properly functioning condition which includes ecosystem processes, resilient vegetation conditions, and natural disturbance regimes. These watersheds are identified using the Watershed Condition Assessment Tracking Tool in the Natural Resource Information System, and they are prioritized following the watershed condition framework.

Use of water quantity appropriated within existing water rights should be utilized to let excess water flow freely back into existing channel and riparian habitat.

Consistent with existing water rights and claims, existing diversion structures should be modified to ensure that native fish cannot be diverted from the natural stream system, and that in-channel movement is not hindered.

All equipment should be cleaned, inspected, and dried before leaving any water body to remove plants, fish or animals so organisms are not transported among water bodies.

Aquatic species should not be transferred through management activities from one 6<sup>th</sup> level HUC watershed to another to prevent degradation of native species habitat and the incidental or accidental introduction of disease or non-native species.

Surface-derived pollutants (e.g., oils, radiator fluids from cars) that originate from hardened surfaces such as asphalt or solidified soils should be intercepted before entering streams. Techniques such as settlement basins, overflow basins, or dry wells could be used.

At least 80percent of total stream bank linear distance should be maintained in a stable condition.

Instream flow water rights for fish, other wildlife, and recreation beneficial uses should be procured for those streams without current perfected water rights.

### **Objectives for Watershed Management**

The Forest completes steps 1 and 2 of the 6<sup>th</sup> level HUC watershed condition framework including classification and prioritization within XX years following plan approval.

The Forest completes steps 3 and 4 of the 6<sup>th</sup> level HUC watershed condition framework including development and implementation of watershed condition action plans for identified priority 6<sup>th</sup> level HUC watersheds within 10 years following plan approval.

The Forest completes steps 5 and 6 of the 6<sup>th</sup> level HUC watershed condition framework including tracking costs and reporting accomplishments of implemented treatments and monitoring the effectiveness of treatments to assess if condition class was actually improved within 10 years following plan approval.

All Class 1 watersheds (functioning properly) are maintained as Class 1 watersheds in both 5<sup>th</sup> and 6<sup>th</sup> level HUCs during the 10 years following plan approval.

Class 2 (functioning at risk) and Class 3 (impaired) 6<sup>th</sup> level HUC watersheds are trending towards Class 1 watersheds in XX percent of identified, high priority 6<sup>th</sup> level HUC watersheds within 10 years following plan approval.

Projects in watersheds that contain recharge areas for designated and eligible Wild and Scenic River segments should consider the project's effect on water recharge to those segments.

### **Management Approaches for Water Quantity and Quality**

File for water rights on appropriable waters following State procedures. Complete all documentation required for the adjudication process in the Little Colorado and Gila River (Verde watershed) specified by the courts.

Participate in State water rights adjudications and settlement discussions for negotiating water rights settlements outside of extended adjudication.

Secure water rights through purchase or severance and transfer when additional sources are needed.

Maintain and update annually an inventory of all water used on the Forest.

Implement the TMDL plan to achieve necessary load reductions, including from nonpoint sources of pollutants that may originate in the lake areas, to maintain water quality standards.

Utilize public education and coordination with landowners and stakeholders to prevent the introduction and spread of nonnative aquatic and riparian species.

Coordinate with County and State governments, landowners, and stakeholders to protect public health and safety with respect to water quality, specifically, the threat of fertilizers to downstream resources on the Coconino NF.

Coordinate with landowners and stakeholders on water rights issues that can be utilized to maintain or improve riparian attributes.

Maintain the native-fish-only status of Fossil Creek through public education, signage, and law enforcement.

### **Related Plan Content for Water Quantity and Quality**

- See the following sections: Riparian Types, Streams, Springs, and Wetlands, Wild and Scenic Rivers, Monitoring Plan

### **Constructed Waters**

#### **Desired Conditions for Constructed Waters**

Constructed waters provide water consistent with existing water rights and claims.

#### **Guidelines for Constructed Waters**

New water developments, including stock tanks, should not be constructed in ephemeral or intermittent stream courses so they do not alter stream course hydrology.

Water sources should be managed to reduce harm to wildlife.

### **Related Plan Content for Constructed Waters**

- See the following sections: Range and Livestock Grazing

### **Stream Ecosystems**

#### **General Description and Background for Stream Ecosystems**

Stream ecosystems have flowing water and include rivers, creeks, and streams and their associated riparian vegetation zones. Water flow is in one direction along a water course. There are microhabitats,

such as riffles, pools, and backwaters. Plants, animals and micro-organisms are specialized to live in and around flowing water.

Stream ecosystems collect and transport water, sediment, and organic material from upslope and upstream and moderate flood events.

Riparian vegetation zone is the interface between the terrestrial uplands and water. It includes water dependent plants near the water and often a combination of upland and riparian species as distance from water increases. Riparian areas are more productive per acre in biomass of plants and animals than other vegetation types and provide large amounts of edge between adjoining vegetation types which adds significantly to ecosystem diversity.

Healthy riparian areas slow water which raises the water table and saturation zone and recharges aquifers. Riparian zones protect streams from excessive sedimentation, erosion, and pollution, and thus play a role in water quality. They provide shelter and food for aquatic animals and shade that is important for water temperature regulation. They dissipate stream energy which can result in a reduction in flood damage. They provide wildlife habitat, increased biodiversity, and wildlife corridors, enabling aquatic and riparian organisms to move along river systems and thus avoiding isolated communities. They can provide forage. Soils within riparian zones play a key role in nutrient and water storage and distribution.

Natural disturbances in stream ecosystems are animals such as beavers, flooding, and changing climatic conditions, such as extended drought. The seasonality and quantity of water in floods are key factors in the germination and establishment of riparian vegetation. Fire is an infrequent disturbance and is dependent on the fire regime in adjacent vegetation types.

Stream ecosystems provide water, forage, shelter, and habitat for nesting, roosting, and bedding and are among the most important habitats for wildlife on the Coconino NF. Species that require water for part of their life cycle (aquatic and semi-aquatic species) on the Forest are entirely dependent on these limited and scattered water sources. Ninety-three percent (14 out of 15) of the native fish species on the Forest are considered special status species. All three native leopard frogs on the Forest are either federally listed or considered sensitive. Riparian areas make up less than one percent of the Forest yet are one of the most biologically diverse ecosystems. Two of the four most imperiled species in the Southwestern Region, Little Colorado spinedace and spikedace, occur in stream ecosystems on the Forest. Additional special status species are supported by stream ecosystems, such as the southwestern willow flycatcher and Northern Mexican and narrow-headed garter snakes. Riparian areas provide migration corridors important for birds and bats.

On the Coconino NF, there are three types of water courses: ephemeral, intermittent, and perennial. They differ in the timing and duration of water flow and corresponding vegetation. Ephemeral water courses flow short-term in response to storm events. Intermittent water courses flow seasonally usually in response to snowmelt and may contain perennial pools. Perennial stream courses flow year-round, and some of their flows may be below the surface. Water courses include their associated drainages and floodplains.

Three main types of riparian vegetation associated with intermittent and perennial systems on the Coconino NF are cottonwood willow riparian forest (cottonwood willow), mixed broadleaf deciduous riparian forest (mixed broadleaf), and montane willow riparian forest (montane willow). These are described in the vegetation section. The vegetation in ephemeral drainages is not as diverse as perennial systems but supports different vegetative species than in the adjacent uplands.

## **Desired Conditions for Stream Ecosystems**

Riparian corridors and associated stream courses are resilient to natural disturbances and changing climate conditions and are functioning across the landscape. They are in properly functioning condition as determined by on-site assessment by Forest interdisciplinary teams.

Streams maintain their natural sinuosity, and associated floodplains are intact. Channel depths allow for floodplains to be wetted during flood events. Watercourses and the riparian zone have access to their flood plains so that when floods do occur, energy can be dissipated without causing damage to the streambanks of the channel.

Water courses, associated flood plains, and riparian zones are capable of filtering sediment, capturing and/or transporting bedload, aiding floodplain development, improving flood-water retention, improving or maintaining water quality and providing ground water recharge within their natural potential. Stream ecosystems are not fragmented by infrastructure or development, consistent with existing water rights and claims. Physical barriers or habitat alterations like temperature changes or loss of stream flow do not exclude native fish or other aquatic species from their historic habitat.

Flooding is the primary disturbance. Streams and rivers maintain a natural hydrograph, or water flow over time, including periodic flooding, which promotes natural movement of water, sediment, nutrients, and woody debris. It creates a mix of stream substrates for fish habitat, including clean gravels for fish spawning and sites for germination and establishment of riparian vegetation.

Native fish and other native aquatic species are present, and habitat conditions are capable of supporting self-sustaining populations. Fish habitat is provided by overhanging banks where possible. Woody and herbaceous overstory and understory regulates stream temperatures.

Native fish and other native aquatic species are present within the 6<sup>th</sup> level HUC watersheds where they historically occurred. Federally listed native fish and other aquatic species are trending towards recovery. All native fish and other native aquatic species are stable or trending towards recovery and are being re-established in historic habitat where suitable conditions exist. Habitat and ecological conditions are capable of providing self-sustaining populations of native species. Fish habitat is provided by natural stream hydrographs and unaltered stream channels. Aquatic species habitat conditions provide the resiliency and redundancy necessary to maintain native fish and other aquatic species diversity. To maintain a raised the water table, beavers are present and building dams where woody vegetation will support them. Dams, in turn, hold water year-round, supporting wetland vegetation and a higher diversity of water dependent and terrestrial plants and animals than surrounding areas.

Native species are free or minimally impacted by nonnative predation and diseases. Habitat and ecological conditions are capable of providing self-sustaining populations of native, riparian-dependent plant and animal species. Links between aquatic and upland components are maintained, providing access to food, water, cover, nesting areas, and protected pathways for aquatic and upland species. Native fish and other aquatic organisms have unobstructed passage upstream and downstream at all bridge, culvert, and diversion structures, unless there is a specific need to provide a passage barrier such as to physically separate native and non-native fish.

## **Related Plan Content for Streams**

- See the following sections: Riparian Types, Springs

## Wetlands and Reservoir/Lake

### General Description and Background for Wetlands and Reservoir/Lake

This classification includes wetlands such as Mormon Lake and Stoneman Lake, or reservoir/lakes such as CC Craigen Reservoir, Knoll Lake, Upper Lake Mary and Lower Lake Mary.

On the Coconino NF, the term wetland means those areas that are inundated by water with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands on the Coconino NF are generally disconnected from groundwater and perched above regional groundwater tables, and thus they are completely reliant on precipitation for water input. Therefore, standing water and vegetation in wetlands can fluctuate wildly from basically non-existent in dry periods to highly productive wetlands in wet periods. Other key processes include the development and presence of hydric soils, decomposition, and nutrient cycling, as well as the geomorphic setting. The combination of these processes result in unique vegetative components. All of these processes combined result in a functioning wetland.

Natural disturbances are drought and flooding. Disturbance mechanisms controlled by management activities are grazing by livestock, stock tank construction, roads, and off road vehicle and other recreation use. Indirect disturbance mechanisms include increasing tree canopy cover that reduces ground cover in the upland soils and that results in erosion and sedimentation of wetlands. Fire is an infrequent disturbance, entering from adjacent vegetation types during drought conditions.

Wetland types differ from each other by water permanency, wetland vegetation, and size. These types are semi-permanent, seasonal, temporary or ephemeral wetlands, and reservoirs.

**Table XX. Flooding Conditions by Wetland Type**

Wetland Type	Flooding Regime	Plant Species Occupying Deepest Zone	Flooding Frequency
Reservoir/lakes, open water	Permanent water	submergent vegetation; bare soil	every year
Semi-permanent	6-12 months	Hardstem bulrush, Cattail; submerged aquatics	>7 of 10 years
Seasonal	3-6 months	Manna grass, spikerush, sedges.	<7 of 10 years
Temporary	1-2 months	Alpine timothy, Foxtail barley	3 of 10 years
Ephemeral	2-6 weeks	Bare soil, dock, western wheat grass, deergrass	3-10 years

Wetlands provide water storage, wildlife habitat, recreation, and fisheries, livestock watering.

On the Coconino NF, wetlands primarily occur at elevations ranging from 6,200 to 7,200 feet and cover about 10,000 acres. Most of them are on Anderson Mesa which is on the east central side of the Forest. They range in size from Mormon Lake at about 5,500 acres to less than 10 acres in size. XX percent of the plants known to be used by tribes that traditionally use the Forest occur here.

### **Desired Conditions for Wetlands and Reservoirs**

Within the capability of individual wetland types and consistent with the hydrologic cycle, wetland vegetation has diverse age classes, a diverse composition of native species, and includes species that indicate maintenance of riparian soil moisture characteristics (i.e., plants that occupy deep zones in table above). This provides abundant food, cover, nesting, and spawning habitat.

Aquatic and riparian habitats are free of or minimally impacted by invasive exotic plant and animal species. Desirable non-native species, where they exist, are not having negative impacts on native species.

Wetland types provide habitats that are consistent with their flood regime and flood potential.

All wetlands except reservoirs are maintaining or trending towards properly functioning condition, at a minimum.

Soil is in satisfactory condition on most acres. Localized areas may have unsatisfactory or impaired conditions where there are exceptions such as access lanes for livestock and high wildlife use.

Soil function is sustained (i.e., ability to infiltrate water, recycle nutrients, and resist erosion).

Wetlands are resilient to changing climate conditions.

Wetlands and reservoirs are managed consistent with designated beneficial uses associated with existing claimed or certified water rights<sup>2</sup>.

Water quality is maintained or improved so it fully supports identified beneficial designated special uses by Arizona Department of Environmental Quality or State water quality standards.

Plants known to be used by tribes that traditionally use the Forest are thriving.

### **Objectives for Wetlands and Reservoirs**

Wetlands are trending towards proper functioning condition (or soil condition is being sustained and trending towards or functioning properly and normally) in between XX to XX percent (XX wetlands) of the number of wetlands identified as functional-at-risk within 10 years following plan approval. Soils are trending towards satisfactory.

### **Guidelines for Wetlands and Reservoirs**

Where native frogs and toads occur, established protocols (currently the Arizona Game and Fish Department protocol) should be followed to prevent the introduction and spread of a chytrid fungus (*Batrachochytrium dendrobatidis*) that kills amphibians.

Limited and localized soil compaction and trampling of vegetation is an acceptable effect of wildlife and human uses, including permitted livestock use; however, the scale and magnitude of these uses should not

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<sup>2</sup> Certified water rights are legally recognized water rights that document how much water can be used, for what beneficial use and by whom. Claimed water rights are water right claims for use recognized by the Arizona Department of Water Resources pending adjudication by the court that will decree how much water can be used, for what beneficial use, and by whom.

be such that permanent damage to perennial plants occurs (e.g. loss of plants species expected to be there,).

Recommendations in the Arizona Department of Environmental Quality's Total Maximum Daily Load (TMDL) plan should be considered and followed for Long Lake, Soldier Lake, Soldier Annex, Upper Lake Mary and Lower Lake Mary.

### **Management Approaches for Wetlands and Reservoirs**

Collaborate with the Arizona Game and Fish Department and U.S. Fish and Wildlife Service on the management of sport and native fishes.

### **Related Plan Content for Wetlands and Reservoirs**

- See the following sections: Riparian Types, Springs, Streams, Watershed Management, Water Quantity and Water Quality

## **Springs**

### **General Description and Background for Springs**

There are multiple types of springs within the Coconino NF that vary based on landform and geology. Examples include seeps and hanging gardens. Some springs have unique chemistry that depend on the underlying geology, such as the springs that feed Fossil Creek—producing the unique turquoise color and resulting in travertine formations.

Many springs are used as water sources for domestic use, livestock, or wildlife use. Springs and wetlands are centers of biological diversity. Springs provide habitat or biological refugia for some species, particularly narrow endemics.

Springs are also important to tribes who have traditionally used lands within Coconino NF.

### **Desired Conditions for Springs**

Springs and associated streams and wetlands have the necessary soil, water, and vegetation attributes to be healthy and functioning at or near potential. Water flow patterns, recharge rates, and geochemistry are similar to historic levels and persist over time.

Water quality and quantity maintain native aquatic and riparian habitat and water for wildlife and designated beneficial uses, consistent with water rights and site capability.

Water rights are maintained or procured to protect in situ (on site) water quantity necessary for riparian vegetation needs, fish and wildlife, domestic, agricultural, and livestock grazing use.

Native vegetation around springs exhibit diverse age classes, diverse composition of native species, and include species that indicate maintenance of riparian soil moisture characteristics (e.g., sedges, rushes, willows and other riparian vegetation), consistent with the type of spring. Vegetation association with springs is variable depending on spring type and can include aquatic plants (e.g., diatoms and algae), submergent and floating vegetation, emergent vegetation, grasses, forbs, sedges, shrubs and deciduous trees.

Plant cover protects the banks, edges, and shorelines of springs. Plant distribution and occurrence are resilient to natural disturbances.

Soil condition is in satisfactory condition on most acres with only minor components in unsatisfactory or impaired conditions. Soil function (i.e., the ability of soil to infiltrate water, recycle nutrients, and resist erosion) is sustained.

Spring riparian zones are capable of filtering sediment, capturing and/or transporting bedload, improving or maintaining water quality and providing ground water recharge within their natural potential.

Springs are resilient to natural disturbances and changing climate conditions and are functioning across the landscape within their type and capability. They are in properly functioning condition as determined by on-site assessment by Forest interdisciplinary teams.

Stream and spring ecosystems are not fragmented by infrastructure or development, consistent with existing water rights and claims. Springs are undeveloped and unaltered by man-made structures such as head boxes, cisterns, and pipelines, consistent with existing water rights and claims.

The physical and biological components provide habitat for a diverse community of plant and wildlife species including cover, forage, available water, microclimate, and nesting/breeding habitat. Riparian dependent plant and animal (including invertebrates) species are abundant and diverse consistent with site capability and water rights. Aquatic and riparian habitats and native species are free of or minimally impacted by invasive exotic plant and animal species.

### **Guidelines for Springs**

Where native frogs and toads occur, established protocols (currently the Arizona Game and Fish Department protocol) should be followed to prevent the introduction and spread of a chytrid fungus (*Batrachochytrium dendrobatidis*) that kills amphibians.

Access to springs should be limited to trails or entry points that minimize erosion, trampling, compaction, and inadvertent introduction of non-native and undesirable plants, animals, and disease.

Fences constructed around springs should not cause harm to wildlife.

Structures that divert or alter spring flows should be minimized and/or modified to allow some flow from the spring's source and still maintain established water rights.

Open vegetative conditions in the watersheds surrounding springs should be maintained where feasible to raise the water table.

### **Management Approaches for Springs**

Continue working with partners and stakeholders, including tribes, to inventory, classify, and prioritize springs for restoration. Include consideration of rare and endemic species when evaluating springs for restoration.

Work with partners and stakeholders to develop strategies for restoration of upland watersheds to improve spring flows.

Secure water rights for springs where there are no existing water rights or claims.

## Related Plan Content for Springs

- See the following sections: Riparian Types, Vegetation,

## Biophysical Features

### Caves, Cliffs, Sinkholes, Lava Tubes, Fissures, and Talus Slopes

#### General Description and Background for Caves, Cliffs, Sinkholes, Lava Tubes, Fissures, and Talus Slopes

Biophysical features are geological features such as cliffs, talus slopes (rock slides) and caves (which includes, sinkholes, lava tubes, and fissures (large cracks). Caves include any naturally occurring void, cavity, recess or system of interconnected passages beneath the surface of the earth or within a cliff or ledge and which is large enough to permit a person to enter, whether the entrance is excavated or naturally formed. This definition includes any natural pit, sinkhole, or other opening which is an extension of a cave entrance or which is an integral part of the cave.

Cave resources include any material or substance occurring naturally in caves such as animal life, plant life, paleontological deposits, sediments, minerals, cave formations and cave relief features. Most cave resources are not replaceable and not renewable.

In some instances, cave resources are threatened due to improper use, high recreation use, vandalism, improper disposal of human waste, activities and uses that alter temperature, humidity and moisture regimes, and urban spread. The Forest contains [significant](#)<sup>3</sup> solution and volcanic cave resources including Lava River Cave, a designated recreational cave. Caves often contain archaeological materials and are often of traditional importance to various Indian groups. Some caves on or near the Forest are known as traditional cultural places, identified as the abodes of deities or forces of nature where ceremonial offerings are still made. Proper temperature and humidity levels are critical to the suitability of caves for bat roosting. Bats are particularly sensitive to disturbance when they are raising their young or in winter roosts. An emerging threat for some bats species is a fatal fungal disease called White-nose syndrome which may be spread by humans.

Cliffs provide habitat for mammals and birds, such as Mexican spotted owls, and peregrine falcons; roosting habitat for bats; and habitat for rare plants such as Cliff fleabane. Cliffs offer challenges for rock climbers. Several popular rock climbing areas on the Forest are nationally and internationally known.

Talus slopes provide habitat for rare plants such as the San Francisco Peaks groundsel and for talus snails, which are a type of land snail.

#### Desired Conditions for Caves, Cliffs, Sinkholes, Lava Tubes, Fissures, and Talus Slopes

Caves provide habitat for species that require specialized conditions for roosting and overwintering, such as bats. In this revised Plan, the term cave also includes sinkholes, fissures, and lava tubes. Caves maintain moisture and temperature levels consistent with historic conditions. Archaeological, geological, and biological features of caves are not disturbed by visitors. Cave formations and relief features continue to develop or erode under natural conditions. Caves known to be important for species of conservation concern are intact or provide adequate habitat for these species. Water flowing into, from, or within the

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<sup>3</sup> As defined by the National Cave Resources Management and Protection Act. See Glossary for definition.

cave system is not altered or diverted in its flow, contains normally fluctuating background levels of sediment, organic matter and dissolved minerals, and is not polluted. Bat diseases occur within natural levels. Some caves provide a range of recreational and educational opportunities.

Cliffs and rock outcrops continue to support nesting, roosting and feeding habitats of birds of prey, desert bighorn, bats, and other species. They provide habitat for rare plants such as Cliff fleabane and Senator Mine alumroot. Rock climbing and related recreational activities do not diminish the quantity or quality of specialized vegetation, such as mosses, lichens, and rare plants such as Cliff fleabanes. nor do these activities disrupt life processes of rare or threatened species.

Talus slopes are natural, undisturbed features that provide habitat for lizards, snakes, land snails, and listed plants. They maintain near-historic levels of moisture, and are free from excessive sedimentation. In areas where there are species of conservation concern, there is a near-historic level of high-quality rocky habitat.

### **Standards for Caves, Cliffs, Sinkholes, Lave Tubes, Fissures, and Talus Slopes**

Manage caves that have been designated as ‘significant’ by the Forest Supervisor to perpetuate those features, characteristics, values, or opportunities for which they were designated. Do not use caves for dumping.

### **Guidelines for Caves, Cliffs, Sinkholes, Lave Tubes, Fissures, and Talus Slopes**

Moisture levels should be maintained in talus slopes that contain talus snails to maintain their habitat.

Bat maternity roosts and hibernacula (where bats hibernate) should not be disturbed.

Active bald eagle nests and peregrine falcon nests should not be disturbed.

Policies should be implemented to prevent the introduction or spread of diseases in caves.

Environments in caves, cliffs, and talus slopes should not be altered, unless it can be shown that there would be no deleterious effects to the biophysical feature’s significance or to the plants and animals that rely on those features.

Heavy machinery, blasting, controlled source seismic surveys requiring explosives or other disruptive techniques should not be conducted over, or close enough to, known biophysical features to damage the feature.

Mineral extraction activities should be avoided within a ¼ mile or other suitable buffer from biophysical features with high resource values or identified as “significant”. Buffers should consider infeasible drainages and surface areas immediately over cave passages.

If previously undiscovered caves are encountered above the zone of saturation for the regional water aquifer during drilling operations, precautions should be taken to protect the cave, including sealing the casing above and below the cave to prevent air flow and water leakage.

The list of “significant” caves on the Forest should be updated periodically.

When closing caves to public entry, wildlife-friendly gates that meet Bat Conservation International (BCI) recommendations will be installed where these species are present unless public safety concerns warrant closure by a different method.

## **Management Approaches for Caves, Cliffs, Sinkholes, Lava Tubes, Fissures, and Talus Slopes**

Foster cooperation and exchange of information between governmental agencies and those who utilize biophysical features for scientific, educational, cultural, or recreational purposes are fostered.

Encourage partnerships with caving organizations, scientists and outdoor recreationists to secure, preserve and protect Forest biophysical features and their resources.. Enlist partners to help educate the public about the unique ecological and aesthetic value of geophysical features.

Consult with State and Federal agencies to both manage and monitor bat roosts to determine population dynamics at least once every three years.

Monitor significant caves or other biophysical features to determine visitor impacts and the conditions of key resources To protect long-term ecology of the feature or resource..

Foster collaboration with the U.S. Fish and Wildlife Service, Bat Conservation International and the Arizona Game and Fish Department and other stakeholders to address conservation, interpretation and education management for bat species.

## **Paleontological Resources**

### **General Description and Background for Paleontological Resources**

Paleontological resources are any fossilized remains, traces, or imprints of organisms, preserved in or on the earth's crust, that are of paleontological interest and that provide information about the history of life on earth.

### **Desired Conditions for Paleontological Resources**

Using scientific principles and expertise, Forest paleontological resources are retained, generally with little or no negative impact from management activities. The scientific value of paleontological sites is preserved and sites are generally free from adverse impacts. Sites retain integrity and stability , especially on sites susceptible to imminent risks or threats, or where the values are rare or unique. Visitor impacts to sites are minimal, and significance and integrity are maintained through conservation and preservation efforts. Vandalism, theft, and human-caused damage to paleontological resources are rare. Vertebrate fossils (commonly bones, bone fragments, teeth and/or tracks) remain on the Forest, unless collected by permit. Allow for the casual collecting of reasonable amounts of common invertebrate and plant paleontological resources for non-commercial personal use and with negligible surface disturbance. Paleontological resources and copies of associated records are preserved for the public in an approved repository, to be made available for scientific research and public education.

## **Guidelines for Paleontological Resources**

Known locations of key paleontological resources (Classes 3, 4, and 5 of the Fossil Potential Classification<sup>4</sup>) should be protected.

Disturbance to paleontological resources should not occur from fossil collecting activities in wilderness, botanical or geological special areas, and research natural areas, consistent with the intent for which those areas were identified and/or designated.

Locality information of paleontological resources should be protected to preserve cultural integrity and value. Specific locality data should not be released by the permittee or the repository without written permission from ??.

## **Management Approaches for Paleontological Resources**

Emphasize interagency coordination and collaborative efforts, where possible, with the scientific community, non-Federal partners, and the general public.

Prior to ground-disturbing activities, conduct paleontological surveys in areas where there is high potential to encounter these resources. If paleontological resources are discovered during ground disturbing activities, the Forest will facilitate evaluation of the discovery and development of appropriate mitigation measures.

Develop a prioritized list of localities that need stabilization activities in order to be preserved. Monitoring of localities is prioritized in high visitation areas such as roads, campgrounds and trails.

Retain records at Forest Services offices when they need to be accessed regularly for research purposes. Maintain electronic records, including an index of documents of historic research value.

Work with partners such as the Museum of Northern Arizona and Northern Arizona University to protect and monitor localities.

Promote educational programs, interpretive presentations, or publications to increase public awareness of Forest paleontological resources and their significance.

## **Soils**

### **Desired conditions for Soils**

Soil productivity and function is sustained and functions normally and properly so water infiltrates and disperses properly, withstands accelerated erosion, and recycles nutrients. Herbaceous vegetative cover is maintained at levels that contribute to suitable hydrologic function, soil stability, and nutrient cycling. Compaction and erosion is minimized due to a diversity of grass and forb species and presence of plant litter and grass, forb, shrub and tree basal area surface cover.

Biological soil crusts<sup>5</sup> are present and functioning on coarse textured and sandy soils.

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<sup>4</sup> Definition for Fossil Potential Classification Classes 3, 4, and 5

<sup>5</sup> Crusts of soil particles formed by living organisms (algae, mosses, lichens) in arid areas. They hold soil in place, help retain moisture, and improve soil nutrients by fixing atmospheric nitrogen.

## **Guidelines for Soil Resources**

Soil productivity and functions including the ability of the soil to resist erosion, infiltrate water and recycle nutrients should be sustained so terrestrial and riparian ecosystems are more resilient and better adapted to climate change.

The Forest should implement and monitor best management practices (BMPs) for all ground disturbance activities in accordance with the Intergovernmental Agreement between the Arizona Department of Environmental Quality and USDA SW Region to control and manage nonpoint source pollution.

The Forest should implement resource improvement projects that are beneficial for maintaining and improving soil condition and productivity, water quality and quantity. Priority should be given to activities with the least ground disturbance.

Consider using the published Terrestrial Ecosystem Survey (TES) for broad resource and forestwide assessments, land management and project planning at Regional, Forest and District levels. Use TES information as the basis for determining project goals & objectives and desired ecological conditions and predicting effects and impacts of the different management prescriptions and activities upon each terrestrial ecosystem. Use TES information for the initial selection of areas identified for implementation of proposed projects.

Consider conducting on-site soil investigations and refine mapping for soil disturbing projects which require site specific, precise, highly detailed soil information which is beyond the scope of the Level 3 TES. Analyze or collect site specific TES information as needed to accurately determine limitations, suitabilities and productivity potentials of the different terrestrial ecosystems that occur.

Disturbance should be minimized in areas where the percentage of biological soil crusts exceeds 50 percent.

## **Objectives for Soil Resources**

Maintain or improve all soils currently in satisfactory soil conditions in satisfactory condition within 10 years following plan approval.

Impaired and unsatisfactory soils are treated and trending towards satisfactory condition in high priority, watersheds (identified in the watershed action plan) in 5<sup>th</sup> or 6<sup>th</sup> level HUC watersheds within 10 years following plan approval.

Other impaired and unsatisfactory soils that are not identified as high priority watersheds are trending towards satisfactory soil condition where treated within 10 years following plan approval.

## **Wildlife, Fish, and Botanical Resources**

### **Desired Conditions for Wildlife, Fish, and Botanical Resources**

Ecological conditions provide habitat for federally-listed and other special status species. Habitat conditions contribute to the survival and recovery of listed species, contribute to the de-listing of species under the Endangered Species Act, preclude the need for listing new species, and improve conditions for Forest Service Southwestern Region Sensitive Species.

Follow existing recovery plans for federally listed species.

Genetic diversity exists within native plant and animal populations, thus assisting species to adapt to changing environmental conditions.

Improved habitats for Proposed or Candidate species help preclude species listings as Threatened or Endangered under the Endangered Species Act.

#### *Wildlife and Fish*

Wildlife and fish are able to move freely across the Forest, or within the stream course (for aquatic or semi-aquatic species), and across the Forest boundaries to access adjoining habitat, disperse, migrate, in order maintain genetic diversity, and meet their needs within the capability of Forest resources.

Direction for species listed as threatened and endangered species takes precedence over direction for species not listed by U.S. Fish and Wildlife Service.

#### *Botanical Resources*

Collection of those plant species recognized as rare, limited in distribution, threatened, endangered or Southwestern Region sensitive during the plan revision process is discouraged (except for scientific and cultural purposes).

Forest recognizes and complies with regulations for State and federally listed species and considers these regulations before issuing collecting permits for special forest products or scientific research permits. Forest permits may be issued for these species if the requirements of the other entities are met.

Habitats throughout the Forest in general include the microclimate or smaller scale elements needed for rare plants within each PNVT. The structure and function of the PNVTs and associated microclimate or smaller scale elements such as special features, rock piles, specific soil types, and wet areas exist in adequate quantities to provide habitat and refugia for narrow endemics, species with restricted distributions, and Southwestern Region Sensitive species.

### **Standards for Wildlife, Fish, and Botanical Resources**

Follow recovery plans for listed species.

Comply with species conservation agreements.

#### *Plants*

Collection of Southwestern Region Sensitive plants shall occur only for research or scientific purposes or in support of traditional cultural practices.

Storage of fuels and other toxicants shall be located away from known locations of Southwestern Region Sensitive plant and animal species.

When treating invasive exotic weeds to protect endangered, threatened, proposed, and candidate wildlife and plant species and their habitats, design features in Appendix B of FEIS for Integrated Treatment of Noxious or Invasive Weeds (2004) or more current direction must be followed.

Herbicides with Material Safety Data Sheet instructions against application where contact or runoff to water may occur shall not be used in riparian areas.

## **Guidelines for Wildlife, Fish, and Botanical Resources**

All equipment should be cleaned, inspected, and dried before leaving any water body to remove plants, fish or animals so organisms are not transported among water bodies.

Minimal impact fire suppression techniques should be used in Mexican spotted owls protected activity centers (PACs).

Aircraft activity should not occur within 900 meters of bald eagle nesting areas to avoid disturbance to adult and newly fledged bald eagles.

To minimize restriction of antelope movement, fences should be located one eighth mile from roads if road right-of-way fencing is required.

### *Plants*

When conditions are highly disturbed within the vicinity of occupied Southwestern Region Sensitive Plant Species habitat, vegetation should be re-established to avoid establishment of invasive exotic plant species.

Native, weed-free plant material should be selected to restore natural species composition and ecosystem function to the disturbed area.

Vegetation re-establishment may include seeding one mixture of species soon after disturbance, monitoring, and adding other species over time.

When available and not cost-prohibitive, seed and plants used for revegetation should originate from genetically local sources. Seed should be collected in accordance with seed zones or breeding zones. Consideration should be given to using long-term storage facilities for collected seeds such as the seed banks with the Colorado Plateau Native Plant Initiative.

In cases where plant collection permits are issued, collecting seeds or cuttings should be encouraged, while digging or physically removing whole plants should be discouraged.

For projects or activities that included application of insecticides, herbicides, fungicides, or rodenticides, potential adverse impacts on Southwestern Region Sensitive plants and animals, as well as plants and animals of cultural and ceremonial importance, should be minimized.

Conservation and recovery of plant species with high risks should be emphasized where quantity and quality of habitat needed to support them is a concern. Through discussions with Indian tribes who collect plants for traditional cultural and ceremonial purposes, growth and regeneration of culturally important plants should be encouraged during Forest restoration projects.

Introduction of invasive exotic species due to management activities should not occur and new populations as well as their spread should be detected and treated at an early stage. Applicable design features in Appendix B of the FEIS for integrated Treatment of Noxious or Invasive Weeds (2004) should be followed in treating invasive exotic plant species.

Measures to avoid weed establishment and spread should be included with proposed management actions near Southwestern Region Sensitive Plant species locations.

Where needed, project design should incorporate protective measures to provide for these species where they occur.

Disturbance to Western yellow-billed cuckoos (*Coccyzus americanus occidentalis*) during the breeding season should be reduced. Its habitat consists of riparian areas that have a multi-layered canopy of deciduous trees and mesquite bosques in the uplands. This species is a candidate for listing as threatened or endangered by the U.S. Fish and Wildlife Service.

### **Management Approaches for Wildlife, Fish, and Botanical Resources**

Coordinate with Arizona Game and Fish Department regarding hunt recommendations to reduce soil disturbance and improve soil function particularly in montane meadows, wetlands, and riparian vegetation types.

Refer to the plan implementation guidebook for plants and plan implementation guidebook for invertebrates for project level guidance. These two guidebooks are intended to be living documents that are periodically updated with new information.

Coordinate with the Arizona Game and Fish Department and the U.S. Fish and Wildlife Service regarding threatened and endangered species, including re-introductions of listed species, such as Gila trout, into suitable habitat. Also, coordinate on the reintroduction and maintenance of native plant and wildlife species.

Coordinate with Arizona Game and Fish Department, U.S. Fish and Wildlife Service, sportsman groups, and other stakeholders about information and education regarding wildlife, fish, and botanical resources.

Coordinate with Arizona Game and Fish Department, U.S. Fish and Wildlife Service, the scientific community and others stakeholders regarding research especially as it relates to gaps in our knowledge needed for management or to understand habitat requirements.

Maintain the native-fish-only status of Fossil Creek and streams free of non-natives through public education, signage, and law enforcement.

### **Related Plan Content for Wildlife, Fish, and Botanical Resources**

- See the Following Section: Tribal Relations and Uses

## **Vegetation**

### **All Vegetation Types**

#### **General Description and Background for All Vegetation Types**

##### *Scale*

The ecological desired conditions for terrestrial ecosystems are grouped by potential natural vegetation types (PNVTs) and described at multiple, nested scales (definitions of each scale are found in the glossary under “scale”) and may only be achievable over a long time frame (several hundred years). Descriptions at various scales are developed to provide detail and guidance for the design of future projects and activities that help achieve the desired conditions over time. Descriptions under the landscape scale provide the “big picture” desired conditions for terrestrial resources across the larger land area.

Descriptions at the mid-scale and fine scale provide further details necessary for guiding future site-specific projects and activities. 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.

The landscape scale is an assemblage of mid-scale units, typically composed of variable elevations, slopes, aspects, soils, plant associations, and disturbance processes. An area at this scale is comprised of multiple mid-scale units, most often 10 or more.

For our purposes, the mid-scale is a unit of 100 to 1,000 acres and is composed of assemblages of fine scale units which have similar biophysical conditions.

The fine scale is a 10 acre area or less at which finer scale items are described such as the distribution of individual trees (e.g., single, grouped, or aggregates of groups).

### Desired Conditions for All Vegetation Types: Landscape Scale

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, such as fire in fire-adapted systems and flooding in riparian systems, and climate variability. Coconino NF landscapes are functioning ecosystems that retain all of their components, processes, and functions. Natural and human disturbances provide desired overall plant density, structure, species composition, coarse woody debris, and nutrient cycling. Desired disturbance regimes are restored where practical, including fire (table XX).

**Table XX. Fire regime groups and descriptions<sup>6</sup>**

Fire regime	Fire return interval	Severity	Severity description
1	0-35 years	Low/mixed	Generally low severity fires replacing < 25percent of the dominant overstory vegetation; can include mixed severity fires that replace up to 75percent of the overstory
2	0-35 years	Replacement	High severity fires replacing > 75percent of the dominant overstory vegetation
3	35-200 years	Mixed/low	Generally mixed severity fires; can also include low severity fires
4	35-200 years	Replacement	High severity fires
5	200+	Replacement/any severity	Generally replacement severity; can include any severity type in

<sup>6</sup> A natural fire regime is the general classification of the role fire would play across the landscape in the absence of modern human mechanical intervention. These classifications include fire return interval and fire severity.

			this frequency range.
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Native plant communities dominate the landscape while invasive exotic species are non-existent or in low abundance and do not occur at levels that disrupt ecological functioning. Establishment of invasive exotic plant species new to the Coconino NF is prevented. Existing invasive exotic plant species are prioritized for eradication, containment, or control.

Vegetative and stream connectivity provides for upland and aquatic species movements and genetic exchange consistent with landforms and topography.

Vegetation conditions allow for transition zones or ecotones between riparian areas, forests, woodlands, shrublands, and grasslands. Transition zones shift in time and space due to factors affecting site conditions (e.g. fire, climate).

Native insect and disease populations are generally at endemic levels with occasional outbreaks. A variety of vegetation structures usually restrict the scale of localized insect and disease outbreaks.

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 activities contribute to aspects of the social, economic, and cultural structure and stability of rural communities.

Ecosystem contributions (e.g., nutrient cycling, water infiltration, wildlife habitat, etc) are sustained as vegetation on the Forest adapts to a changing climate.

Plants known to be used by tribes that traditionally use the Forest are thriving.

Rare and culturally important plant species are valued. Their habitat is enhanced and protected.

### **Desired Conditions for All Vegetation Types: Mid-Scale**

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 such as cavities and loose bark, etc.

Potentially suitable habitat for Southwestern Region Sensitive plant species helps retain functional stability of the species.

### **Desired Conditions for All Vegetation Types: Fine Scale**

Endemic rare plant communities are intact and functioning.

Unique plant community habitats (e.g. limestone cliffs, margins of 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.

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.

## **Guidelines for All Vegetation Types**

Forest and woodland vegetation within the wildland urban interface may be composed of conditions at the lower end of desired conditions for the respective vegetation type such as younger age classes, and the lower end of coarse woody debris and snags.

## **Management Approaches for All Vegetation Types**

Foster partnerships with local research institutions to study topics of management interest.

## **Riparian Types**

### **All Riparian Forest Types**

#### **Desired Conditions for All Riparian Forest Types**

Riparian zones filter sediments and contaminants, build and stabilize banks, reduce the effects of flooding, store and release water, recharge the aquifer, support a diverse composition of riparian vegetation which regulates water temperature, and support a high diversity of native aquatic and riparian obligate fauna. Native riparian vegetation is diverse and provides the structure and composition to function within their natural potential and provide food and cover for wildlife.

Diverse native vegetative communities, comprised of deep-rooted and hydrophytic (water-loving) herbaceous vegetation, are present in sufficient quantity to filter sediments and provide clean water. These species include native aquatic plants, aquatic macrophytes, aquatic emergents, grasses and sedges, forbs, shrubs and deciduous trees. The diversity of riparian vegetation in all age classes provides for structural diversity important to fauna. Structural diversity includes aquatic vegetation, leaf litter, ground cover and understory, mid-story, over-story, dead and live trees, and dead and down woody material. This woody material provides prey base habitat, aquatic nutrient cycling, and soil retention, consistent with public safety.

[Mesquite bosques](#) are open, park-like stands mesquite trees which are adjacent to cottonwood willow or mixed broadleaf riparian vegetation. The water table is high enough so that mesquite bosques persist on upland terraces. The combination of cottonwood willow riparian forest with mesquite bosques creates a unique vegetation community favored by bird species such as the yellow-billed cuckoo and Bell's vireo.

In bosques, a variety of age classes are present and old trees are prominent. The understory is comprised of native grasses and forbs that support the natural fire regime. Vegetative ground cover in mesquite bosques is comprised of about 15percent litter and 10percent plant basal area. Non-vegetative ground cover consists of sandy soils and rock fragments of gravel, cobble and rock outcrops.

Riparian areas also provide abiotic structure such as silt, sand, gravel, cobble, boulders, and bedrock; all of which are important for a variety of aquatic and terrestrial fauna. Multiple seral stages and age classes of native vegetation are represented. Enough seedlings and saplings are present to allow for adequate replacement and succession. The associated water table supports riparian vegetation and restricts non-riparian vegetation. Riparian vegetation prevents ash flows from entering perennial streams.

Soils are not compacted by management activities and are protected by leaf litter cover.

Soil function is sustained so it infiltrates and disperses water properly, withstands accelerated erosion, and cycles nutrients. Upland vegetation is maintained or improved to prevent excessive erosion of or sedimentation into downstream aquatic habitat.

Soil in wet and headwater meadows has a spongy moist nature, generally as a result of a shallow water table, and functions to filter water. These soils also store and release water over an extended period of time and release it so it is distributed through the associated meadows and downstream.

Flooding is the primary disturbance. Fire rarely burns through these vegetation types, and fire in the surrounding watersheds periodically provides slight increases in sediment, nutrients, and water that cause minimal channel modifications.

### Objectives for All Riparian Forest Types

At least **XX** percent of non-functional and functional-at-risk riparian areas move towards satisfactory condition within 10 years following plan approval with a focus on priority 6<sup>th</sup> level HUC watersheds. Some examples of activities are road obliteration, improved grazing strategies, removal of dispersed campsites, and installation of elk exclosures.

### Guidelines for All Riparian Types

In riparian areas, recreation activities, permitted uses, and management activities should occur with minimal impact to soil function and water quality.

A vegetated streamside management zone should be identified and maintained using guidance from the current plan or recent peer-reviewed publications. This zone generally follows the shape of the water course or riparian areas and consists of vegetation and vegetative litter. The purpose is to buffer against detrimental changes in the temperature regime of the water body, provide bank stability filter excessive sediments such as ash flows, and nutrients, and to provide shade for fisheries habitat. The intent is to minimize, not necessarily exclude, soil and vegetation disturbance from management activities in this zone. The ability of the stream management zone to trap and filter sediments is a function of the amount and type of material on the ground, and width and slope of zone. The table below is intended to be a general starting point for determining the width of the stream management zone, based on average cover conditions and erosion hazard<sup>7</sup>. Other considerations for the size and shape of a stream management zone include soil type<sup>8</sup>, orientation of stream or river to the sun, connection of stream to impaired waters, presence of threatened or endangered species, and condition of the riparian area.

**Table XX. General starting point for width of stream management zones in riparian and non-riparian stream courses by erosion hazard**

Erosion hazard	Width of zone in non-riparian stream courses	Width of zone in riparian stream courses
Severe	100 feet each side of streamcourse	120 feet each side of streamcourse
Moderate	70 feet each side of	100 feet each side of

<sup>7</sup> Erosion hazard is defined as the risk of erosion and sedimentation that is based on slope, soil type, and the amount and type of material on the ground that is able to trap eroded material.

<sup>8</sup> Soil type or hydrologic soil group

	streamcourse	streamcourse
Slight	35 feet each side of streamcourse	70 feet each side of streamcourse

Generally, riparian areas are not accessible to livestock. When they are accessible, livestock use is restricted to when vegetation is dormant. Livestock utilization should not exceed 20 percent on woody vegetation (e.g., trees and shrubs such as cottonwood and willow). Within riparian areas, maintain an adequate height of herbaceous water-loving vegetation needed to protect stream banks.

Within the capability of the area, mesquite bosques should be contiguous and not fragmented by development and infrastructure.

To assure vegetative diversity, manage towards three or more riparian species where potential exists in a variety of age classes including seedling, sapling, mature, and overmature.

In order to achieve bank stability and soil and riparian function, maintain effective (80 percent of natural herbaceous levels) vegetative cover within floodplains, terraces, and riparian areas. This is determined by Terrestrial Ecosystem Survey or a Forest interdisciplinary team.

## **Cottonwood Willow Riparian Forest**

### **General Description and Background for Cottonwood Willow Riparian Forest**

Cottonwood willow currently covers about 2,000 acres of the Forest. It is patchily distributed along the lower elevation (2,800 and 3,600 feet) and low gradient reaches of perennial streams including the Verde River, Oak Creek, West Clear Creek, Wet Beaver Creek, Dry Beaver Creek, and Fossil Creek as well as other perennial and intermittent streams and tributaries. Dominant vegetation includes Fremont cottonwood, willow, ash, box elder, alder and others. Various grasses and forbs are usually present. Riparian vegetation generally occurs along the stream channel.

Cottonwood willow is adjacent to the main communities of Cottonwood, Camp Verde, and Cornville, and other communities in the broader valley floodplains along the Verde and the confluences of the major tributaries. Much of this type along the Verde River, lower Oak Creek and lower Wet Beaver Creek is privately owned or managed by Arizona State Parks. Water diversions and increasing human development in the watersheds have affected quantity and seasonality of historical flood regimes.

XX percent of the plants known to be used by tribes that traditionally use the Forest occur in this ecosystem.

### **Desired Conditions for Cottonwood Willow Riparian Forest**

Associated higher stream terraces support a mix of riparian and upland vegetation, including mesquite and desert willow.

Soil productivity is inherently low on terraces and high on floodplains due to available soil and water. Floodplains tend to have higher surface litter and diversity of species, more protective ground cover, and greater vegetative productivity (biomass) than terraces. Consequently, floodplains have greater ability to resist erosion and recycle nutrients.

Flooding is the primary disturbance. Bends in the stream channel and low gradient help disperse stream energy. Fire is an infrequent disturbance within the system, but it is a disturbance from incursions from adjacent systems and is dependent on the fire regime in adjacent vegetation types.

### **Mixed Broadleaf Riparian Forest**

#### **General Description and Background for Mixed Broadleaf Riparian Forest**

This riparian type covers about 2,560 acres of the Forest. Found between 3,600 and 5,800 feet in elevation, it is patchily distributed across the Forest and includes Sycamore Canyon, mid- elevation portions of West Clear Creek, Oak Creek, Beaver Creek and Fossil Creek, and associated tributaries. It consists of a vegetation mix of riparian woodlands and shrublands with various dominant species, depending on site specific characteristics. Vegetation can include Arizona sycamore, thin leaf alder, willow, Arizona cypress, conifers, box elder, narrow leaf or Fremont cottonwoods, velvet ash, Arizona walnut, and often contains oaks and conifers, including Arizona cypress, from adjacent uplands.

XX percent of the plants known to be used by tribes that traditionally use the Forest occur in this ecosystem.

#### **Desired Conditions for Mixed Broadleaf Riparian Forest**

Soil productivity is inherently low on terraces and higher along floodplains. Generally, both have high amounts of protective litter and plant cover and are not compacted. Consequently, terraces and floodplains are able to resist erosion and recycle nutrients.

Flooding is the primary disturbance. Fire is an infrequent disturbance within the system, but it is a disturbance from incursions from adjacent systems and is dependent on the fire regime in adjacent vegetation types.

### **Montane Willow Riparian Forest**

#### **General Description and Background for Montane Willow Riparian Forest**

Montane willow riparian is located mainly from 5,500 to 8,400 feet in elevation. It is scattered along perennial streams such as East Clear Creek and its tributaries, seasonally intermittent streams, wet meadows, and isolated springs at higher elevations. It covers about XX acres. Trees include Bebb's willow, narrowleaf cottonwood, velvet ash, cherry, box elder, Arizona walnut, and Arizona alder. Dominant shrubs include red osier dogwood, willows, and woods rose. The understory consists of a variety of grass and grass like species, including sedge, Baltic rush, spikerush, and deergrass. Outlying populations of this community type may have unique genetic components.

XX percent of the plants known to be used by tribes that traditionally use the Forest occur in this ecosystem.

#### **Desired Conditions for Montane Willow Riparian Forest**

Soils have high amounts of litter and plant cover, and a spongy moist surface in terraces and wet meadows. Soil productivity is moderate to high on terraces and higher along floodplains. Generally, both have high amounts of protective litter and plant cover and are not compacted. Consequently, terraces and floodplains are able to resist erosion and recycle nutrients. Fire is an infrequent disturbance within the

system, but is a disturbance from incursions originating in adjacent systems and is dependent on the fire regime in adjacent vegetation types.

## Desert Communities

### General Description and Background for Desert Communities

Desert communities (also known as desert scrub) are located on the Red Rock Ranger District and generally occur at elevations ranging from approximately XX to XX feet. They cover about XX percent of the Coconino NF, contain numerous roads and private land parcels, and adjoin the main communities of Cottonwood, Camp Verde, Cornville, and Page Springs. Desert communities are comprised of two vegetation sub-types that vary in composition and structure: creosote bush-dominated sites and crucifixion thorn-dominated sites.

Some soils in this community contain significant quantities of calcium carbonate and a pH of 8 or more is common. There is severe erosion hazard on slopes greater than 35percent. The hot arid climate and calcareous soils significantly limit potential for re-vegetation. This is not a fire-adapted community. It supports a unique community of endemic plants adapted to these calcium-rich soils. It also contains the Verde Valley Botanical Area.

XX percent of the plants known to be used by tribes that traditionally use the Forest occur in this ecosystem.

### Desired Conditions for Desert Communities: Landscape Scale

Predominant plant species are native shrubs, forbs, and grasses in various age classes. There is sparse vegetation cover over most of the area that includes native perennials and varying amounts of native annual species. Cover of these can be high after exceptionally wet winter or summer seasons, but is of short duration and do not lead to changes in the natural fire regime. There is successful regeneration and establishment of native endemic plant species.

In all subtypes, erosion occurs at natural rates. There is little sign of compaction or accelerated erosion. Arroyos are stabilizing and recovering. Soils are friable and biologically diverse so plants form beneficial relationships with soil microbes. Roots are covered with soil and there is little evidence of plants perched above the soil with exposed roots (pedestalling). Fires are rare with mean fire return intervals estimated between 75-200+ years (fire regime condition class 4).

### Desired Conditions for Desert Communities: Mid-Scale

The table below shows differences in perennial plant canopy cover, basal area, litter and ground cover among the three subtypes.

**Table XX. Comparison of vegetation characteristics between desert community subtypes**

Sub-type	Canopy cover	Predominant species	Ground cover	Perennial plant basal area	Litter
Creosote bush	At 15percent for creosote bush,	grass, shrubs	gravel, cobble	10 percent	10 percent

	25percent all shrubs				
Crucifixion thorn	percent<10 to 15percent of Crucifixion thorn, 20 percent all shrubs	grass, shrubs	gravel, cobble, rock outcrops	10 percent	10 percent

Habitat for Arizona cliffrose (a federally endangered species) and endemic plants is connected and preserved. Population numbers for Arizona cliffrose remain static or increase. Habitat for Arizona cliffrose and other endemic plants remains suitable.

**Desired Conditions for Desert Communities: Fine Scale**

Biological soil crusts are present to improve nutrient cycling and stabilize soils, especially in sandier soils.

**Guidelines for Desert Communities**

Excessive<sup>9</sup> ground disturbance should be avoided to limit accelerated erosion and to minimize bringing more calcareous soil to the surface. Bringing calcareous soil to the surface will limit soil plant nutrient availability.

**Semi-Desert Grasslands**

**General Description and Background for Semi-Desert Grasslands**

These low elevation semi-arid grasslands occur on the Red Rocks Ranger District and are bounded by Desert Communities at lower elevations and piñon-juniper evergreen shrub at higher elevations. They cover about 8 percent of the Coconino NF and contain numerous roads and private land parcels. They adjoin the main communities including Camp Verde, Cottonwood, and Cornville. Soils in this PNVT are generally not suited for intensive disturbance because they are shallow, clayey, have high amounts of surface rock, and have low bearing strength which is the inability to support a load without soil movement. Agaves provide food for birds, javelina and other wildlife.

XX percent of the plants known to be used by tribes that traditionally use the Forest occur in this ecosystem.

**Desired Conditions for Semi-Desert Grasslands: Landscape Scale**

Semi-desert grassland communities are open and connected grasslands punctuated by groves of trees and shrubs. Predominant species are perennial native grasses. The moderate to dense native herbaceous cover includes annual and perennial desert grasses and forbs, succulent species, shrubs, and some herbaceous cover of annuals. Cool and warm season species are present at varying heights. Although the presence of

<sup>9</sup> Excessive ground disturbance results in the extent of exposed soil greater than expected for the site; active erosion features with soil being carried off site in most areas, not just in localized patches; live plants and litter not protecting most of the area; obvious flow patterns and fan deposits; abundant deep rills; and deep gullies with sharp edges.

annuals may be of short duration, they do not cause changes to the natural fire regime. Tree cover is less than 10 percent; shrub cover is less than 10 percent. Tree and shrub species include turbinella oak, catclaw mimosa, crucifixion thorn, Utah, redberry, and one seed juniper. All age classes are present. Plant basal area ranges from 5 to 20 percent and plant litter occupies 10 to 15 percent of the soil surface depending on soil type.

Herbaceous vegetative cover is maintained at levels that contribute to suitable hydrologic function, soil stability, and nutrient cycling. Compaction and erosion is minimized due to a diversity of grass and forb species and presence of plant litter. Diversity of grass and forb species is at or nearing potential. Plant basal area ranges from 5 to 20 percent and plant litter occupies 10 to 15 percent of the soil surface depending on soil type.

Arroyos are stabilizing and recovering. Suitable upland conditions of herbaceous cover, leaf litter, and uncompacted soils capable of infiltration reduce instances of overland flows during precipitation events. Improved infiltration reduces arroyos from forming and head cuts from forming in drainages.

Fire plays a natural role. Grasses or understory species carry fire and maintain the natural fire regime (greater than 75 percent overstory mortality or herbaceous top kill).

#### **Desired Conditions for Semi-Desert Grasslands: Mid-Scale**

Multiple seral stages of native vegetation are present.

#### **Desired Conditions for Semi-Desert Grasslands: Fine Scale**

In the Schoolhouse area, remnant populations of big sacaton grass are reproducing and are established in suitable soil types.

Biological soil crusts are present to improve nutrient cycling and stabilize soils, especially in sandier soils.

#### **Objectives for Semi-Desert Grasslands**

Allow or introduce XX acres of wildland fire over 10 years following plan approval to increase and maintain the area occupied by grasses and forbs while decreasing the area occupied by shrubs and trees.

Treat XX to XX acres to reduce the density of trees and shrubs and increase the grassland acres to move towards the desired condition of less than 10 percent canopy cover of trees and shrubs.

#### **Guidelines for Semi-Desert Grasslands**

Ground disturbing activities should occur when soils that have low bearing strength and high clay are dry to minimize soil compaction, displacement, and trafficability problems.

### **Interior Chaparral**

#### **General Description and Background for Interior Chaparral**

The fire-dependent interior chaparral varies from widely scattered pockets within grasslands and woodlands to more extensive areas on steep slopes. Species composition and dominance varies across the

broad range of soils and topography but are dominated by shrubs. Soil productivity is naturally low and most soils are inherently unstable due to the steep slopes.

XX percent of the plants known to be used by tribes that traditionally use the Forest occur in this ecosystem.

### **Desired Conditions for Interior Chaparral: Landscape Scale**

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 (e.g., small stems, leaves) (about 35 to 45 percent of soil surface). Standing dead material may accumulate in areas that have not burned for several decades. Greater than 70 percent of chaparral is middle to late development closed canopy with some openings of grasses and forbs. Canopy ranges from 40 percent at dry sites to 80 percent at wetter sites.

Chaparral is in a constant state of transition from young to older stages and back again, with fire being the major disturbance factor. Natural high severity fires (75+ percent mortality or top kill) occur with a frequency of once every 35 to 100 years. Long fire return intervals allow for re-establishment of seed bank and development of fuel loads and spatial continuity of fuels necessary for fire.

Although soil productivity is generally low and most soils are inherently unstable on steep slopes, there is sufficient vegetation and litter cover to protect soil from accelerated erosion.

### **Desired Conditions for Interior Chaparral: Mid-Scale**

Fire hazard and severity is reduced in the Wildland Urban Interface (WUI) and human life and property is protected. Vegetation conditions within the wildland urban interface are composed of younger and more widely-spaced shrub patches and tree groups.

The frequency of disturbance (e.g., fire, vegetation treatments) within the WUI may be higher than the natural disturbance regime.

### **Desired Conditions for Interior Chaparral: Fine-Scale**

There is 35 to 45 percent of total ground cover by litter and plant basal area and exhibit few signs of soil compaction or accelerated erosion. This indicates that soil function is being sustained and soil is functioning properly and normally.

Biological soil crusts are present to improve nutrient cycling and stabilize soils, especially in sandier soils.

### **Objectives for Interior Chaparral**

### **Guidelines for Interior Chaparral**

Fire treatments within the Interior Chaparral PNVT should provide diversity of burn intensity within burn units. At the landscape scale, burn unit locations should be rotated to provide varying seral stages and habitat diversity.

## Management Approaches for Interior Chaparral

Emphasize coordination with local partners and stakeholders to reduce the risk of catastrophic fire in the wildland urban interface on Forest Service, and adjacent non-Forest Service, lands.

## Piñon and Juniper

### General Description and Background for Piñon and Juniper

The piñon-juniper (PJ) woodland vegetation community is collectively composed of:

- juniper grassland and piñon-juniper grassland
- piñon-juniper evergreen shrub,
- piñon-juniper woodland (also called persistent piñon-juniper)

These generally occur at elevations between approximately 4,500 and 7,500 feet. They are dominated by one or more species of piñon pine and/or juniper and can occur with a grass and forb dominated understory (PJ grassland), a shrub dominated understory (PJ evergreen shrub), or a sparse discontinuous understory of some grasses and/or shrubs (persistent PJ woodland). Two-needle, single-leaf, Mexican, and border piñon pine are common; as well as one-seed, Utah, redberry, Rocky Mountain, and alligator junipers, and a lesser abundance of oaks. Species composition and stand structure vary by location primarily due to precipitation, elevation, temperature, and soil type. In some locations, grassland soil types are interspersed with piñon-juniper soil types. Historically, persistent piñon-juniper did not develop an understory that could carry fire because they are generally located in rocky areas and on rocky outcrops.

XX percent of the plants known to be used by tribes that traditionally use the Forest occur in this ecosystem.

### Desired Conditions for All Piñon and Juniper Types

A shifting mosaic of continuous canopy is interspersed with openings across the landscape. There is connectivity of openings between trees that provide for sufficient sighting distance to facilitate pronghorn movement. Large snags and old trees with dead limbs and tops are persistent and scattered across the landscape. The composition, structure, and function of vegetative conditions are resilient to the frequency, extent and severity of disturbances (e.g. insects, diseases, and fire), and climate variability.

Plant litter (e.g., leaves, needles, etc.) and coarse woody debris is present in sufficient quantity to resist accelerated soil erosion and promote nutrient cycling, water retention, and the microclimate conditions necessary for piñon seed germination. Large coarse woody debris is present.

There are sufficient “nurse trees” to provide microclimate condition in the understory that have improved nutrient and soil properties, higher soil moisture, and lower temperatures, and light levels which increase piñon seedling survival under harsh conditions.

There are opportunities for collecting forest products (e.g., firewood, piñon nuts, post and pole etc.) consistent with other desired conditions.

Pine stringers, noncontiguous narrow communities of predominantly ponderosa pine, extend below the normal elevation distribution of ponderosa pine, often into piñon and juniper, and they persist where they naturally occur.

Biological soil crusts are present to improve nutrient cycling and stabilize soils, especially in sandier soils.

#### *Piñon Juniper Grasslands/Juniper Grasslands*

Piñon-juniper grassland and juniper grassland are generally uneven aged and open in appearance. Trees occur as individuals and small groups and range from young to old. Basal area ranges from 10 to 30 basal area or square foot per acre. Scattered shrubs and a herbaceous understory relative to site capability, including native grasses, forbs and annuals, are present to support frequent surface fires and provide food and cover for wildlife. Shrubs, grasses, and vegetative ground cover (e.g., forbs, litter, and coarse woody material) are present and sufficient to maintain soil stability and soil productivity. Snags and older trees with dead limbs are scattered across the landscape. Fires typically occur every 1 to 35 years with low-severity and patches of mixed severity (Fire Regime 1) favoring re-growth and germination of native grasses and forbs. Piñon Juniper Evergreen Shrub

Piñon-juniper evergreen shrub is a mix of trees and shrubs that occurs as a series of vegetation states that move from herbaceous-dominated to shrub-dominated to tree-dominated over time. Trees occur as individuals or in smaller groups ranging from young to old. Basal area ranges from 10 to 40 square foot per acre to maintain soil stability. Piñon trees are occasionally absent but one or more juniper species is always present. Arizona cypress and live oak are scattered across the landscape. Typically groups are even-aged in structure with all ages represented across the landscape for an overall uneven-aged grouped appearance. The understory is dominated by low to moderate density shrubs depending on successional stage. The shrub component consists of one or a mix of evergreen shrub, oak, manzanita, mountain mahogany, sumac and other shrub species, which are well-distributed. A variety of low to high growing native perennial and annual grasses and forbs are present in the interspaces and maintain soil stability and soil productivity. Fires are typically mixed severity (25-75 percent mortality or top kill with a moderate frequency—Fire Regime III) while some evergreen shrub types exhibit occasional high severity fires (greater than 75 percent mortality—Fire Regime IV).

Vegetation conditions within the wildland urban interface may be composed of younger and more widely-spaced shrub patches and tree groups so fires can be suppressed more easily when needed.

#### *Piñon Juniper Woodland*

Piñon-juniper woodland (persistent) is characterized by even-aged patches of piñons and junipers that at the landscape level form multi-aged woodlands. Very old trees (greater than 300 years old) are present. Old growth occurs as patches on the landscape as individual old trees and patches of old trees. Tree density is high and where interlocking crowns shade the ground over extensive areas, shrubs are sparse to moderate, and herbaceous cover is low and discontinuous. The composition, structure, and function of vegetative conditions are resilient to the frequency, extent and severity of disturbances (e.g. insects, diseases, and fire), and climate variability. Insects and disease occur at endemic levels. Fire as a disturbance is less frequent and variable due to differences in ground cover. The fires that do occur are mixed to high severity (Fire Regimes III, IV, and V).

## **Guidelines for All Piñon and Juniper Types**

On grassland soil types, previous vegetation treatments (pushes) of piñon-juniper grasslands, juniper grasslands, or piñon-juniper evergreen shrub should continue to be treated to maintain seral grasslands.

On non-grassland soil types, pushes in piñon-juniper grasslands, juniper grasslands, or piñon-juniper evergreen shrub should trend towards desired condition for the particular woodland type.

Tree encroached grassland soil types (also called mollisol soils) within the piñon-juniper types should be restored to grassland **desired conditions**.

In areas where there is little understory and treatments are proposed, slash treatments (e.g., lop and scatter and mastication) should be used that improve herbaceous vegetation growth, soil and watershed condition, and soil productivity. The intent is to thin to encourage response by herbaceous vegetation and allow smaller debris to decompose in place on the ground.

If needed to support restoration and if available, seeding with native species appropriate for the ecological unit (or similar in elevation, soil type, and eco regions) should be used.

## **Objectives for All Piñon and Juniper Types**

Treat between **XX** acres of piñon-juniper vegetation types within 10 years following plan approval to move towards desired conditions. Treatment priorities should move forest priority 6<sup>th</sup> level HUC watersheds towards satisfactory conditions.

## **Ponderosa Pine**

### **General Description and Background for Ponderosa Pine**

The ponderosa pine forest vegetation community generally occurs at elevations ranging from approximately 5,000 to 9,000 feet and covers about 44 percent of the Forest. It is adjacent to Flagstaff and numerous other communities. It is dominated by ponderosa pine and commonly includes other species such as oak, juniper, and piñon. More infrequently species such as aspen, Douglas-fir, white fir, and blue spruce may be present in small groups or individual trees. There typically is an understory of grasses and forbs and sometimes shrubs.

The ponderosa pine forest vegetation community includes two sub-types: ponderosa pine bunchgrass and ponderosa pine Gambel oak. The Gambel oak sub-type is particularly important to many wildlife species, including Mexican spotted owls. Higher species richness has been correlated with higher densities of Gambel oak. This sub-type provides important nesting and foraging habitat for wildlife. The desired conditions below apply to both sub-types. This community also contains unique features such as pine stringers. Pine stringers are noncontiguous, narrow communities of predominantly ponderosa pine that extend into the piñon-juniper woodland below the normal elevation distribution of ponderosa pine. They provide connectivity between two vegetation types as well as a unique microclimate in lower elevation environments.

**XX** percent of the plants known to be used by tribes that traditionally use the Forest occur in this ecosystem.

### **Desired Conditions for Ponderosa Pine: Landscape Scale**

At the landscape scale, the ponderosa pine forest vegetation community is a mosaic of tree species and forest conditions composed of trees from young to old. Old growth is well distributed in the landscape and occurs as groups of old trees mixed with groups of younger trees or occasionally as a group comprised mostly of old trees. Forest appearance is variable but generally uneven-aged and open; occasional areas of even-aged structure are present. The forest arrangement is in individual trees, small clumps, and groups of trees interspersed within variably-sized openings of grass/forb/shrub vegetation associations similar to historic patterns. Size, shape, number of trees per group and number of groups per area are variable across the landscape. Denser tree conditions exist in some locations such as north facing slopes and canyon bottoms. Aspen is present as an early seral component of a diverse pine ecosystem and occurs in appropriate microsites such as northern aspects and canyons.

In the Gambel oak sub-type, all sizes, structure (shrub or tree forms depending on site capability), and all ages of oak trees are present. It is reproducing and maintaining its presence on suitable sites across the landscape. Large to moderate sized oak snags are scattered across the landscape, as are moderate to large live oak trees with dead limbs, hollow boles, and cavities. These provide shelter and nesting habitat for a variety of wildlife species, including owls and bats.

The ponderosa pine forest vegetation community is composed predominantly of vigorous trees, but declining trees in a variety of stages of decline are a component and provide snags; trees affected by top-kill, lightning, and fire-scars; and coarse woody debris (greater than 3 inch diameter); these are all well-distributed throughout the landscape. Ponderosa pine snags are typically 18 inches or greater at diameter at breast height (DBH) and average 1 to 2 snags per acre. This can vary in space and time. There are varying sizes greater than 18 inches at DBH. In the Gambel oak subtype, large oak snags (greater than 10 inches) are a well-distributed component.

Downed logs (greater than 12 inch diameter at mid-point and greater than 8 feet long) average 3 logs per acre within the forested area of the landscape. Coarse woody debris, including downed logs, is sufficient to maintain or improve long-term soil productivity, provide important wildlife habitat, and are generally well distributed and averages 3 to 10 tons per acre.

The composition, structure, and function of vegetative conditions are resilient to the frequency, extent, and severity of disturbances and climate variability. The landscape is a functioning ecosystem that contains all its components, processes, and conditions that result from endemic levels of disturbances (e.g. insects, dwarf-mistletoe or pathogens, diseases, drought, fire, and wind), including snags, downed logs, and old trees. Grasses, forbs, shrubs, leaves, and needle cast (fine fuels), and small trees maintain the natural fire regime. Organic ground cover and native herbaceous vegetation provide protection from accelerated soil erosion; promote water infiltration, and nutrient cycling function in order to contribute to plant and animal diversity and to ecosystem function. Frequent, low severity fires (Fire Regime I) are characteristic in this type. Natural and anthropogenic disturbances are sufficient to maintain desired overall tree density, structure, species composition, coarse woody debris, and nutrient cycling.

### **Desired Conditions for Ponderosa Pine: Mid-Scale**

At the mid-scale the ponderosa pine forest vegetation community is characterized by variation in the size, density, and number of tree groups depending on elevation, soil type, aspect, and site productivity. The more biologically productive sites contain more trees per group and more groups per area, resulting in less space between groups. Openings typically range from 10 percent in more productive forested sites to

70 percent in the less productive forested sites. Tree density within forested areas generally ranges from 20 to 80 square foot basal area per acre.

Understory species (e.g., grasses, forbs, and shrubs) diversity is consistent with site potential and provides for infiltration of water and reduction of accelerated erosion. The understory has a variety of heights of cool and warm season vegetation and produces seedheads and all age classes of vegetation for food and cover for wildlife. A mosaic of dense cover, high amounts of litter and bare ground, provide habitat for small mammals.

The mosaic of tree groups generally comprises an uneven-aged forest with all age classes present. Infrequently patches of even-aged forest structure are present. Disturbances sustain the overall age and structural distribution.

Fires burn primarily on the forest floor at low intensity and do not spread between tree groups as crown fire. Single tree torching and isolated group torching, however, is not uncommon, resulting in a mosaic across the landscape.

Forest conditions in goshawk post-fledging family areas (PFAs) are similar to general forest conditions except these forests contain 10 to 20 percent higher basal area in mid-aged to old tree groups than in goshawk foraging areas and the general forest. Goshawk nest areas have forest conditions that are multi-aged but are dominated by large trees with relatively dense canopies.

In order to reduce fire intensity and resistance to control in the wildland urban interface (WUI), forest structure may be at the lower end of the range of desired conditions for levels of snags, logs, coarse woody debris, tree density, as well as groups of trees that are more widely spaced, or have fewer trees per group (but still within desired condition) than in the non-WUI areas.

### **Desired Conditions for Ponderosa Pine: Fine Scale**

Trees typically occur in irregularly shaped groups and are variably-spaced with some tight clumps. Crowns of trees within the mid-aged to old groups are interlocking or nearly interlocking. Openings surrounding tree groups are variably-shaped and comprised of a grass/forb/shrub mix. Some openings contain individual trees. Trees within groups are of similar or variable ages and may contain species other than ponderosa pine. Size of tree groups is typically less than 1 acre, and averages 0.5 acres. Groups at the mid-aged to old stages consist of approximately 2 to 40 trees per group.

Isolated infestations of dwarf mistletoe may occur, but the severity and amount of mortality varies among the infected trees. Witches brooms may form on infected trees, providing habitat for wildlife species.

Gambel oak acorns provide food for wildlife species.

### **Objectives for Ponderosa Pine**

To move towards desired conditions in ponderosa pine communities: Thin **XX** to **XX** acres and prescribe burn **XX** to **XX** acres within 10 years following plan approval.

### **Guidelines for Ponderosa Pine**

Snags and downed logs should be emphasized along edges of openings and within groups/clumps in PFAs to provide for prey habitat and roosts for tree-dwelling bats.

To provide for goshawk nesting, a minimum of 6 nest areas (known or replacement) should be located per territory. Goshawk nest and replacement nest areas should generally be located in drainages, at the base of slopes, and on northerly (NW to NE) aspects. Nest areas should generally be 25 to 30 acres in size. In order to provide habitat while young goshawks are maturing, goshawk PFAs of approximately 420 acres in size should be designated surrounding the nest sites.

In goshawk foraging areas and PFAs, groups of 3 to 5 reserve trees should be retained within management-created openings greater than 1 acre in ponderosa pine and dry mixed conifer, and 6 reserve trees should be retained within management-created openings greater than 0.5 acre in wet mixed conifer and spruce-fir, except where the strong potential for wind-throw prevents the possibility of viable reserve trees, or insect and/or disease prevent the eventual development of regeneration into large trees.

Human presence should be minimized in occupied goshawk nest areas during nesting season of March 1 through September 30.

Ponderosa pine site treatment timing and residual green slash accumulations should be managed to minimize opportunities for Ips beetle populations to increase.

Because the intent of treatments in the WUI are at least partially to reduce fire intensity and resistance to control, forest structure in the WUI may have lesser levels of snags, logs, coarse woody debris, lower tree densities, as well as groups of trees that are more widely spaced, or have fewer trees per group (but still within desired condition) than in the non-WUI areas. Crown base height will be higher.

Slash piles could be retained across the landscape for several years, rather than immediate burning to increase small mammal occupancy in areas where logs are deficient and to provide nesting habitat for turkeys. This should be consistent with scenic integrity objectives and balanced with potential threats from *Ips* beetles.

## **Dry Mixed Conifer**

### **General Description and Background for Dry Mixed Conifer**

Mixed conifer with frequent fire, or dry mixed conifer, covers approximately 79,060 acres on Coconino NF (along with mixed conifer with infrequent fire). This forest type occurs at elevations above ponderosa pine between 5,500 and 9,500 feet on mountain slopes and may also occur in canyons and north facing slopes. These conifer forests are dominated by mainly shade intolerant trees such as: ponderosa pine, southwestern white pine, limber pine, quaking aspen, and Gambel oak, with a lesser presence of New Mexican locust and big toothed maple as well as shade tolerant species such as white fir and blue spruce. Moderately shade tolerant species such as Douglas-fir are common. Aspen may occur as individual trees or small groups.

This forest type typically occurs with an understory of graminoids, forbs, and shrubs. The understory is more similar to ponderosa pine, and it generally has more sedges, mosses, and liverworts. Big toothed maple only occurs on the Mogollon Rim Ranger District.

XX percent of the plants known to be used by tribes that traditionally use the Forest occur in this ecosystem.

Direction regarding Mexican spotted owl (MSO) habitat in this vegetation community is contained in the MSO Recovery Plan.

## Desired Conditions for Dry Mixed Conifer: Landscape Scale

At the landscape scale, the dry mixed conifer vegetation community is a mosaic of forest conditions composed of structural stages ranging from young to old trees. Old growth is well-distributed in the landscape and occurs as groups of old trees, often mixed with groups of younger trees or as individual patches. Forest appearance is variable but generally uneven-aged and open; occasional patches of even-aged structure are present. The forest arrangement is in small clumps and groups of trees interspersed within variably-sized openings consisting of graminoid, forb, and shrub associations similar to historic patterns. Openings typically range from 10 percent in more productive forested sites to 50 percent in the less productive forested sites. Size, shape, number of trees per group, and number of groups per area are variable across the landscape. Where they naturally occur, groups and patches and all structural stages of oak are present. Denser tree conditions exist in some locations such as north facing slopes and canyon bottoms.

The dry mixed conifer forest vegetation community is composed predominantly of vigorous trees, but declining trees are a component and provide for snags, top-killed, lightning- and fire-scarred trees, and coarse woody debris (greater than 3 inch diameter), all well-distributed throughout the landscape. A variety of snag species and coarse woody debris are well distributed throughout the landscape. Snags are typically 18 inches or greater at DBH and average 3 per acre. Downed 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 (greater than 3 inch diameter), including downed logs, ranges from 5 to 15 tons per acre to maintain long-term soil productivity.

The composition, structure, and function of vegetative conditions are resilient to the frequency, extent, severity of disturbances, and to climate variability. The landscape is a functioning ecosystem that contains all its components, processes, and conditions that result from endemic levels of disturbances (e.g. insects, diseases, fire, and wind), including snags, downed logs, and old trees. Graminoids, forbs, shrubs, needle cast (fine fuels), and small trees maintain the natural fire regime.

Organic ground cover and native herbaceous vegetation provide protection of soil, moisture infiltration, and contribute to plant and animal diversity and to ecosystem function. Frequent, low severity fires (Fire Regime I) are characteristic. Natural and human caused disturbances are sufficient to maintain desired overall tree density, structure, species composition, coarse woody debris, and nutrient cycling.

## Desired Conditions for Dry Mixed Conifer: Mid-Scale

At the mid-scale, the dry mixed conifer forest vegetation community is characterized by variation in the size and number of tree groups depending on elevation, soil type, aspect, and site productivity. The more biologically productive forested sites contain more trees per group and more groups per area. Openings typically range from 10 percent in more productive sites to 50 percent in the less productive sites. Tree density within forested areas generally ranges from 30 to 100 square foot basal area per acre. Denser tree conditions exist in some locations such as north facing slopes and canyon bottoms.

The mosaic of tree groups generally comprises an uneven-aged forest with all age classes and structural stages. Occasionally small patches (generally less than 50 acres) of even-aged forest structure are present. Disturbances sustain the overall age and structural distribution.

Frequent low severity fires (generally less than 25 percent mortality or topkill) occurring every 1 to 35 years are characteristic of this forest, including throughout the range of Mexican spotted owls and northern goshawks. Fires burn primarily on the forest floor and do 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.

Forest structure in the wildland urban interface (WUI) is similar to conditions described above or may be composed of smaller and more widely spaced groups of trees.

Basal area per mid-aged to old tree group in northern goshawk PFAs is 10 to 20 percent higher than northern goshawk foraging areas and the general forest. Goshawk nest areas have forest conditions that are multi-aged but are dominated by large trees with relatively dense canopies consistent with current technical guides for northern goshawk in the southwestern U.S.

Where they naturally occur, all age classes of aspen and maple are present in groups or patches and are regenerating and vigorous. A diverse understory comprised of native herbaceous and shrub species is has a variety of seral and age classes and is vigorous and regenerating.

In order to reduce fire intensity and resistance to control in the WUI, forest structure may be at the lower end of the range of desired conditions for levels of snags, logs, coarse woody debris, tree density, as well as groups of trees that are more widely spaced, or have fewer trees per group (but still within desired condition) than in the non-WUI areas.

### **Desired Conditions for Dry Mixed Conifer: Fine Scale**

Trees typically occur in irregularly shaped groups and are variably-spaced with some tight clumps. Crowns of trees within the mid-aged to old groups are interlocking or nearly interlocking. Openings surrounding tree groups are variably-shaped and comprised of a mix of graminoids, forbs and shrubs. Some openings contain individual trees or snags. These provide habitat for rare species such as Colorado blue columbine, Rusby milkvetch, and timberland blue-eye grass.

Trees within groups are of similar or variable ages and one or more species. Size of tree groups typically is less than 1 acre. Groups at the mid-age to old stages consist of approximately 2 to 50 trees per group.

Mistletoe is present in isolated pockets, but the degree of severity and amount of mortality varies among the parasitized trees. Witches brooms may form on infected trees, providing habitat for wildlife species.

Openings and meadows are well distributed throughout the PNVT. These provide habitat for rare species such as Colorado blue columbine (*Aquilegia caerulea var. pinetorum*), Rusby milkvetch (*Astragalus rusbyi*) and timberland blue-eye grass (*Sisyrinchium longipes*). These openings are maintained by natural processes or management activities and exist within the PNVT in quantities and qualities adequate enough to allow for the persistence of these species as members of the native plant community.

Fine scale features such as rock piles and wet areas, which are necessary to support these rare plant species, are well distributed and maintained within the capacity of the PNVT.

### **Guidelines for Dry Mixed Conifer**

A minimum of 3 nest areas and 3 replacement nest areas should be located per territory. Goshawk nest and replacement nest areas should generally be located in drainages, at the base of slopes, and on northerly (NW to NE) aspects. Nest areas should generally be 25 to 30 acres in size.

Goshawk Post-fledging Family Areas (PFAs) of approximately 420 acres in size should be designated surrounding the nest sites.

In goshawk foraging areas and PFAs, groups of 3 to 5 reserve trees should be retained within management-created openings greater than 1 acre in ponderosa pine and dry mixed conifer, and 6 reserve trees should be retained within management-created openings greater than 0.5 acre in wet mixed conifer and spruce-fir, except where the strong potential for wind-throw prevents the possibility of viable reserve trees, or insect and/or disease prevent the eventual development of regeneration into large trees.

Human presence should be minimized in occupied goshawk nest areas during nesting season which is typically March 1 through September 30.

Primary caches (i.e., seed storage sites) for red squirrels should be protected from loss from due to management activities.

## **Wet Mixed Conifer**

### **General Description and Background for Wet Mixed Conifer**

Mixed conifer with infrequent fire, or wet mixed conifer, covers approximately 79,060 acres on Coconino NF (acreage combined with mixed conifer with frequent fire). This forest type occurs at elevations ranging from approximately 5,500 to 10,000 feet **make Coconino NF specific** on mountain slopes such as the San Francisco Peaks and may also occur in canyons and north-facing slopes at lower elevations. Tree species composition varies depending on seral stage, elevation, and moisture availability. It can be composed of early and mid-seral species such as aspen, Douglas fir, New Mexico locust, southwestern white pine and limber pine, and late seral species such as maple, white fir and blue spruce. Ponderosa pine may be present in minor proportions. The absence of Engelmann spruce and/or corkbark fir distinguishes wet mixed conifer from the spruce-fir forest. Aspen may occur as individual trees or small groups.

Disturbances typically occur at two temporal and spatial scales; large scale infrequent disturbances (mostly fire) and small scale frequent disturbances (fire, insect, disease, wind).

This forest has an understory of a wide variety of shrubs grasses, and forbs depending on soil type, aspect, elevation, disturbance, and other factors. It generally has more sedges, mosses, and liverworts than mixed conifer with frequent fire (also called dry mixed conifer). Lichens may occur on the Douglas fir. Vegetation tends to flower more in the spring and compositionally be more similar to vegetation in adjoining spruce-fir type or in canyons. It has more leaf litter than dry mixed conifer because there are more deciduous species. Mixed conifer understory in canyons is older geologically, because the canyons are older than mountains on the Forest. Consequently, mixed conifer vegetation in canyons provides additional biological and genetic diversity.

**XX** percent of the plants known to be used by tribes that traditionally use the forest occur in this ecosystem.

Direction regarding Mexican spotted owl habitat (MSO) in this vegetation community is contained in the MSO Recovery Plan.

### **Desired Conditions for Wet Mixed Conifer: Landscape Scale**

At the landscape scale, this forest type is a mosaic of structural and seral stages ranging from young trees through old. The landscape arrangement is an assemblage of variably-sized and aged groups and patches of trees and other vegetation associations similar to historic patterns. Tree groups and patches are

comprised of variable species composition depending on forest seral stages. An approximate balance of seral stages is present across the landscape, each seral stage characterized by distinct dominant species composition and biophysical conditions. Old growth is well-distributed in the landscape. Canopies are generally more closed than in dry mixed conifer. An understory consisting of native graminoids, forbs, and/or shrubs is present.

The wet mixed conifer community is composed predominantly of vigorous trees, but older declining trees are a component and provide for snags, top-killed, lightning- and fire-scarred trees, and coarse woody debris all well-distributed throughout the landscape. Number of snags and the amount of downed logs (greater than 12 inch diameter at mid-point and greater than 8 feet long) and coarse woody debris (greater than 3 inch diameter) vary by seral stage.

The composition, structure, and function of vegetative conditions are resilient to the frequency, extent, and severity of disturbances and climate variability. The forest landscape is a functioning ecosystem that contains all its components, processes, and conditions that result from endemic levels of disturbances (e.g. insects, diseases, wind, and fire), including snags, downed logs, and old trees. Mixed severity fire (Fire Regime III) is characteristic. High severity fires (Fire Regimes IV and V) rarely occur. Natural and anthropogenic disturbances are sufficient to maintain desired overall tree density, structure, species composition, coarse woody debris, and nutrient cycling.

Organic ground cover and herbaceous vegetation provide protection of soil, moisture infiltration, and contribute to plant and animal diversity and to ecosystem function.

Mosses and lichens are prevalent and function for recycling soil nutrients and for filtering air. These require moisture for part of their life cycle.

### **Desired Conditions for Wet Mixed Conifer: Mid-Scale**

At the mid-scale, the size and number of groups and patches vary depending on disturbance, elevation, soil type, aspect, and site productivity. Patch sizes vary but are frequently in the hundreds of acres, with rare disturbances in the thousands of acres. Groups and patches of tens of acres or less are relatively common. A mosaic of groups and patches of trees, primarily even-aged, but variable in size, species composition, and age is present. Grass, forb, shrub openings created by disturbance, may comprise 10 to 100 percent of the mid-scale area, depending on the disturbances and on amount of time since disturbance. Aspen is occasionally present in large patches.

Tree density ranges from 20 to 180 square foot basal area per acre depending upon time since disturbance and seral stages of groups and patches. Snags 18 inches or greater at DBH average from 1 to 5 snags per acre, with the lower range of snags of this size associated with early seral stages and the upper range associated with late seral stages. Snag density in general (greater than 8 inches DBH) averages 20 per acre. Coarse woody debris, including downed logs, vary by seral stage, with averages ranging from 5 to 20 tons per acre for early-seral stages; 20 to 40 tons per acre for mid-seral stages; and 80 tons per acre or greater for late-seral stages.

Quaking aspen exists as a mosaic within the PNVT, providing habitat for those organisms dependent on it. Organisms present in aspen groves include native plant species such as the Colorado blue columbine and Rusby milkvetch, native animals such as woodpeckers, and a variety of fungi and microorganisms.

Mixed (Fire Regime III) and high (Fire Regime IV) severity fires and other disturbances maintain desired overall tree density, structure, species composition, coarse woody debris, and nutrient cycling. High

severity fires generally do not exceed 1000 acre patches of mortality. Other smaller disturbances occur more frequently.

Forests in the wildland urban interface (WUI) are dominated by early-seral fire-adapted species growing in an overall more open condition than the general forest. These conditions result in fires that burn primarily on the forest floor and rarely spread as crown fire.

Basal area per mid-aged to old tree group in northern goshawk PFAs is 10 to 20 percent higher than northern goshawk foraging areas and the general forest. Nest areas have forest conditions that are multi-aged but are dominated by large trees with relatively dense canopies.

Where they naturally occur, all age classes of aspen and maple are present in groups or patches and are regenerating and vigorous. A diverse understory comprised of native herbaceous and shrub species has a variety of seral and age classes and is vigorous and regenerating.

### **Desired Conditions for Wet Mixed Conifer: Fine Scale**

In mid-aged and older forests, trees are typically variably-spaced with crowns interlocking (grouped and clumped trees) or nearly interlocking. Trees within groups can be of similar or variable species and ages. Small openings (gaps) are present as a result of disturbances.

Openings that support grasses, forbs, and shrubs are periodically created by disturbance to provide habitat for such species as Rusby milkvetch.

Natural openings and meadows are well distributed throughout the PNVT. These provide habitat for rare species such as Colorado blue columbine, Rusby milkvetch, Oregon willow herb and timberland blue-eye grass. These openings are maintained by natural processes and exist within the PNVT in quantities and qualities adequate enough to allow for the persistence of these species as members of the native plant community. Fine scale features such as rock piles and wet areas which are necessary to support these rare plant species, are well distributed within the capacity of the PNVT.

### **Guidelines**

Primary caches (i.e., seed storage sites) for red squirrels should be protected from loss from due to management activities.

## **Montane/Subalpine and Great Basin Grasslands**

### **General Description and Background for Montane/Subalpine and Great Basin Grasslands**

Laying in a patchwork across the Colorado Plateau, the grasslands are meadows varying in size from just a few acres to well over 1,000 acres. A wide variety of species of grasses and forbs characterize the vegetation which varies according to soil type, soil moisture, and temperature.

Grasslands provide vegetative diversity needed by wildlife. They provide breathtaking views and are themselves a highly attractive visual resource.

Prairie dogs are present in a variety of locations. Where they exist, they are a key component in their environment because their burrows provide shelter, and they are prey for a variety of birds and animals.

Grasslands are susceptible to channel erosion and subsequent dropping of the water table, as well as lack of fire as a natural disturbance in some soil types that, in turn, encourages the growth of trees and shrubs.

#### *Subalpine Grasslands*

Subalpine grasslands occur at elevations ranging from 8,000 to 11,000 feet on warmer drier aspects than adjacent soil units that support mixed conifer. A typical location is on the San Francisco Peaks. These productive communities often harbor several plant associations with varying dominant grasses and herbaceous species. Such dominant species may include pine dropseed (*Blepharoneuron tricholepis*), nodding brome (*Bromus anomalus*), various sedges (*Carex spp.*), Arizona fescue (*Festuca arizonica*), mountain junegrass (*Koeleria pyramidata*), mountain muhly (*Muhlenbergia montana*), muttongrass (*Poa fendleriana*), and squirreltail (*Sitanion hystrix*). Trees may occur in trace amounts within these grasslands, and along their periphery. Shrubs may also be present. These meadows are seasonally wet and closely tied to snowmelt. They are maintained by fire.

XX percent of the plants known to be used by tribes that traditionally use the Forest occur in this ecosystem.

#### *Montane Grasslands*

Montane grasslands generally occur at elevations between 6,550 and 8,000 feet. Typical locations include Kendrick Park, Antelope Park, and Mule Park. They are more productive than Great Basin and semi-desert grasslands. Species include, but are not limited to: muttongrass, mountain muhly, spike muhly, Arizona fescue, blue grama, red three-awn, squirreltail, yarrow, and pine dropseed. Non-native Kentucky bluegrass is present. Trees occur along the periphery of montane grasslands. Vegetation in some of the montane grassland soil types are maintained by fire. They are also influenced by weather. Tree canopy is increasing in some areas.

XX percent of the plants known to be used by tribes that traditionally use the Forest occur in this ecosystem.

#### *Great Basin Grasslands*

Great Basin grasslands occur at elevation (insert range) and are more arid than montane or subalpine grasslands. Typical locations are Anderson Mesa and near Wupatki National Monument. They consist mostly of grasses with smaller amounts of forbs and shrubs. Trees can be present in trace amounts depending on soil type; however, tree canopy is increasing in some areas, especially in the northeast part of the Forest around Wupatki National Monument. Species include but are not limited to: western wheatgrass (*Pascopyrum smithii*), black grama (*Bouteloua eriopoda*), blue grama (*Bouteloua gracilis*), galleta grass (*Hilaria jamesii*), hairy grama (*Bouteloua hirsuta*), spike muhly (*Muhlenbergia wrightii*), needle and thread grass (*Hesperostipa comata*). Trees may include sparse one-seeded juniper (*Juniperus monosperma*), alligator juniper (*Juniperus deppeana*), red berry juniper (*Juniperus coahuilensis*), Utah juniper (*Juniperus osteosperma*) and Colorado piñon pine (*Pinus edulis*). Natural disturbances are: weather, natural soil movement (e.g., natural shrink-swell and seasonal surface cracking), and fire (one soil type in this grassland is adapted to fire).

XX percent of the plants known to be used by tribes that traditionally use the Forest occur in this ecosystem.

## Desired Conditions for Montane/Subalpine and Great Basin Grasslands: Landscape Scale

The composition (i.e., mix of species), structure (i.e., form and shape of the species of the composition on the landscape), and distribution (i.e., where it occurs on the landscape) of native vegetation reflects a mix of early, mid, and late seral stages. Early seral stages will typically contain more forbs, and as stages get older, they are dominated by more grasses and fewer forbs. Vegetation height, density, and cover support the historic fire return interval, where fire played a role, while providing food and cover for wildlife species, including pronghorn. Historic fire is thought to be low intensity fire with a 1 to 35 year fire return interval and is generally dependent on the fire regime in adjoining vegetation types.

Tree and shrub canopy cover are each less than 10 percent. There are inclusions and variability within the landscape as well as ecotones on the fringes. There is regeneration, seed head production, and balance of grasses and forb species, including warm and cool season species in most years and within the capability of soil type.

Leafy spurge, an invasive exotic noxious weed, is not present on the landscape. If it is present, it does not compete with rare plant species such as Arizona sneezeweed (*Helenium arizonicum*) and Apache beardtongue (*Penstemon oliganthus*).

Organic ground cover and herbaceous vegetation provide protection from accelerated erosion and promote water infiltration and nutrient cycling function. Soil function is sustained. Soil has the ability to infiltrate water, resist erosion, and recycle nutrients to maintain long-term soil productivity. Soil surface structure is granular or well aggregated to promote water infiltration and reduce runoff.

Grasslands are connected based on the distribution of mollisol soils and not fragmented.

Natural surface drainages and subsurface flow patterns are not altered by man-made or ungulate disturbance, and they are maintained to assure water flow into connected waterbodies or streams returns water quantity expected from an unaltered condition.

## Desired Conditions for Montane/Subalpine and Great Basin Grasslands: Mid-Scale

The table below shows desired ranges of how canopy cover of grass and forbs and plant basal area and litter cover vary among grassland types.

Table XX.

Grassland type	Canopy cover grasses & forbs <sup>10</sup>	Plant basal area and herbaceous litter
Subalpine	> 80 percent	> 90 percent
Montane	65-80 percent	40-90 percent
Great Basin	20-50 percent	25-45 percent

<sup>10</sup> Depends on Terrestrial Ecosystem Unit or soil type

### **Desired Conditions for Montane/Subalpine and Great Basin Grasslands: Fine Scale**

Fine scale features such as rock piles and wet areas, which are necessary to support rare plant species such as grassslope sedge (*Carex oreocharis*), Arizona sneezeweed (*Helenium arizonicum*), are well distributed and maintained within montane grasslands.

Within site capability, a mosaic of vegetation density exists across the landscape ranging from densely vegetated areas that provide cover for ground nesting birds and pronghorn fawns to bare areas that result from natural activities such as freeze thaw action or prairie dog burrowing.

### **Guidelines for Montane/Subalpine and Great Basin Grasslands**

There should be 90 percent potential ground cover to prevent erosion and gully formation.

Minimize disturbance from management activities in key pronghorn fawning areas during fawning season (June 2 to July 15?).

Natural and constructed waters within ¼ mile of fawning habitat should be maintained and available to pronghorn during the fawning season.

New stock tanks and wildlife waters should be placed in locations that reduce concentrations of grazing animals and subsequent vegetation and soil effects in open areas.

### **Management Approaches for Montane/Subalpine and Great Basin Grasslands**

Provide media and public information focused on the unique properties of meadows and appropriate activities within meadows.

Collaborate with partners and stakeholders on grassland restoration, grassland connectivity, and education.

Coordinate with Arizona Game and Fish Department on objectives for wildlife conservation, education, and habitat restoration and improvements particularly regarding pronghorn and prairie dogs.

## **Spruce Fir Forest**

### **General Description and Background for Spruce Fir Forest**

The spruce-fir forest vegetation community generally occurs at elevations ranging from approximately 9,500 to 11,500 feet. It is often dominated by Engelmann spruce but contains other species depending on elevation. The understory commonly includes currants, maples, honeysuckle, common juniper, huckleberry, alpine clover, and sedges. Spruce-fir forests occur within the Kachina Peaks Wilderness and are among the coldest, wettest, and highest elevation sites on the Coconino NF. This forest vegetation community can be subdivided into lower elevation (spruce-fir mix) and upper elevation (subalpine spruce-fir) sub-types with differing fire regimes and sub-dominant species composition. The lower spruce-fir sub-type typically occurs between 9,500 and 10,500 feet in elevation, while the upper spruce-fir sub-type typically occurs between 10,500 and about 11,500 feet in elevation and is bounded by the alpine tundra vegetation above 11,500 feet.

The lower elevation spruce-fir sub-type resembles mixed conifer (with infrequent fire) except with a different composition of tree species, due to colder and wetter conditions, and it is a transition zone

between wet mixed conifer and the upper elevation spruce-fir forest sub-type. In the lower sub-type, the common tree species are aspen, Douglas-fir, white fir, and Southwestern white/limber pine. The climax forest is dominated by Engelmann spruce, white fir and occasionally blue spruce. Subdominant species may include corkbark/subalpine fir, white fir, and bristlecone pine. In the upper sub-type, the dominant tree species are Engelmann spruce and corkbark fir (subalpine fir). Patches of aspen are occasionally present but are usually absent. Disturbances in these types typically occur at two temporal and spatial scales; large-scale infrequent disturbances (mostly fire) and small-scale frequent disturbances (fire, insect, disease, wind).

**XX** percent of the plants known to be used by tribes that traditionally use the Forest occur in this ecosystem.

### **Desired Conditions for Spruce Fir Forest: Landscape Scale**

The spruce-fir forest is a functioning ecosystem that contains all its components, processes, and conditions that result from endemic levels of disturbances (e.g. insects, diseases, fire, avalanches, and wind), including old trees, downed logs, and snags.

The spruce-fir forest vegetation community is a mosaic of structural and seral stages ranging from young trees through old and is composed of multiple species. The landscape arrangement is an assemblage of variably-sized and aged groups and patches of trees and other vegetation similar to historic patterns. —Old growth” is well-distributed in the landscape. Tree canopies are generally more closed than in mixed conifer. An understory consisting of native grass, forbs, and/or shrubs is present.

The spruce-fir forest vegetation community is composed predominantly of vigorous trees, but older declining trees are a component and provide for snags, top-killed, lightning- and fire-scarred trees, and coarse woody debris, all well-distributed throughout the landscape. The number of snags and amount of downed logs (greater than 12 inch diameter at mid-point and greater than 8 feet long) and coarse woody debris (greater than 3 inch diameter) vary by seral stage.

The composition, structure, and function of vegetative conditions are resilient to the frequency, extent, and severity of disturbances and climate variability. The forest landscape is a functioning ecosystem that contains all its components, processes, and conditions that result from endemic levels of disturbances (e.g. insects, diseases, fire, avalanches, and wind), including old trees, downed logs, and snags. Organic ground cover and herbaceous vegetation provide protection of soil, moisture infiltration, and contribute to plant and animal diversity and to ecosystem function. In the lower spruce-fir sub-type, mixed severity fires (Fire Regime III) infrequently occur. In the upper spruce-fir type, high severity fires (Fire Regime IV and V) occur very infrequently. Natural and human-caused disturbances are sufficient to maintain desired overall tree density, structure, species composition, coarse woody debris, and nutrient cycling.

The tundra and upper mixed conifer and spruce-fir slopes within the Kachina Peaks Wilderness are closed to grazing and are not part of any grazing allotment.

### **Desired Conditions for Spruce Fir Forest: Mid-Scale**

At the mid-scale, the size and number of groups and patches vary depending on disturbance, elevation, soil type, aspect, and site productivity. Patch sizes vary but are mostly in the hundreds of acres, with rare disturbances in the thousands of acres. There may be frequent small disturbances resulting in groups and patches of tens of acres or less. A mosaic of groups and patches of trees, primarily even-aged, that are variable in size, species composition, and age is present. Grass, forb, and shrub openings created by

disturbance may comprise 10 to 100 percent of the mid-scale area following major disturbance and depending on time since disturbance. Aspen is occasionally present in large patches.

Tree density ranges from 20 to 250 square foot basal area per acre, depending upon disturbance and seral stages of the groups and patches. Snags 18 inches or greater at DBH range from 1 to 3 snags per acre, with the lower range of snags this size associated with early seral stages and the upper range associated with late seral stages. Snags density in general (greater than 8 inches DBH) averages 20 per acre with a range of 13 to 30. Coarse woody debris, including downed logs, averages vary by seral stage, ranging from 5 to 20 tons per acre for early-seral stages; 20 to 40 tons per acre for mid-seral stages; and 80 tons per acre or greater for late-seral stages.

Quaking aspen exists as a mosaic within the PNVT, providing habitat for those organisms dependent on it. Organisms present in aspen groves include native plant species such as the Colorado blue columbine and Rusby milkvetch native animals such as woodpeckers, and a variety of fungi and microorganisms.

Mixed (Fire Regime III) and high (Fire Regimes IV and V) severity fires and other disturbances maintain desired overall tree density, structure, species composition, coarse woody debris, and nutrient cycling. Localized, accelerated soil erosion occurs following high severity fires but not to the extent it risks long-term impairment to connected waters downstream or causes loss of soil productivity over major portions of the 5<sup>th</sup> or 6<sup>th</sup> level HUC watershed.

The wildland urban interface (WUI) is comprised primarily of grass/forb/shrub vegetation. Structures in the WUI are surrounded by grassy openings with very few or no trees. These conditions result in ground fires.

Forest conditions in goshawk post-fledging family areas (PFAs) are similar to general forest conditions except PFAs contain 10 to 20 percent greater tree density (basal area) than goshawk foraging areas and the general forest. Nest areas have forest conditions that are multi-aged but are dominated by large trees with relatively dense canopies.

Soil and vegetation disturbance from management activities occur in confined, localized areas where impacts to long-term soil and vegetative condition are minimal.

### **Desired Conditions for Spruce Fir Forest: Fine Scale**

Mid-aged to old trees grow tightly together with interlocking crowns. Trees are generally of the same height and age in early group/patch development but may be multilayered in late development. Small openings (gaps) are present as a result of disturbances. Invasive exotic species are absent or present at minimum levels.

Natural openings and meadows are well distributed throughout the PNVT. These provide habitat for rare species such as Colorado blue columbine, graceful buttercup, spider saxifrage, and timberland blue-eye grass. Openings are maintained by natural processes and exist within the PNVT in quantities and qualities adequate enough to allow for the persistence of these species as members of the native plant community. Fine scale features such as rock piles and wet areas, which are necessary to support these rare plant species, are well distributed within the PNVT.

## **Guidelines for Spruce Fir Forest**

Soil and vegetation disturbance from management activities should occur in confined, localized areas where impacts to soil condition and vegetation is minimized to maintain long-term soil productivity and continue moving the majority of the 6<sup>th</sup> level HUC watershed towards a functioning Class 1 watershed.

## **Alpine Tundra**

### **General Description and Background for Alpine Tundra**

On the Coconino NF, about 941 acres of alpine tundra occur in the Kachina Peaks Wilderness, beginning around 10,600 feet elevation continuing to the top of Humphrey's Peak, the highest point in Arizona. This is the only alpine tundra and area of bristlecone pine, on Forest Service land in Arizona and is one of the southernmost extents of alpine tundra in the Continental United States.

Alpine tundra consists of three main habitat associations: boulder fields, talus slopes, and meadows. Krummholz (areas of dwarfed, wind twisted trees) occurs near tree line where trees transition to alpine tundra vegetation. It is typically barren with sparse vegetation including grasses, forbs, lichens and low shrubs. It supports a federally threatened plant, San Francisco Peaks groundsel (*Packera franciscanus*) that is only found here, as well as other endemic species.

Vegetation is controlled by presence of soil, wind, snow accumulation, slope, and aspect. Episodic weather related factors are the major natural disturbance processes and include extreme temperatures, solar radiation, winds, avalanches, and moisture. Wildland fires and invasive exotic or noxious weeds have had little to no effect on this habitat however off-trail recreation can trample plants and damage habitat.

Major human disturbances are developed recreation from the adjacent ski area and year-round dispersed recreation, mainly outside of winter. There is a popular trail leading to Mount Humphrey's peak.

The alpine tundra vegetation zone is probably the most significant cultural area on the Coconino National Forest. It contains shrines that are the focal points of prayers for many tribes in the Southwest. XX percent of the plants known to be used by tribes that traditionally use the Forest occur in this ecosystem.

### **Desired Conditions for Alpine Tundra**

The ecosystem diversity of alpine tundra is maintained. It maintains the ecological attributes and processes that allow it to provide watershed values, habitat for native biota, panoramic vistas, and/or solitude. The mountain maintains attributes that provide historic and cultural values. It displays a diverse composition of native species and vegetation communities (including boulder fields, talus slopes, and meadows). Invasive exotic species are absent. Recreation use, ecological attributes, and tribal values maintain the uniqueness of the vegetation.

The alpine ecosystem provides habitat for San Francisco Peaks groundsel; is able to support and sustain rare or endemic species and continues to be resilient to natural and human-caused impacts.

### **Standards for Alpine Tundra**

Recreation activities including new route construction shall avoid important habitat for the San Francisco Peaks groundsel and result in few additional areas of disturbance to its habitat.

## **Invasive Exotic Species Management**

### **Community Forest Interface**

#### **Fire Management**

##### **General Description and Background for Fire Management**

Wildland fire is any non-structure fire that occurs in the wildlands. That includes either unplanned human fires, naturally caused fires, or prescribed fires (planned ignitions).

Most of the vegetation on the Forest is adapted to recurrent wildland fires started by lightning from spring and summer thunderstorms. Frequent, low-intensity fire plays a vital role in maintaining ecosystem health. Fire, both prescribed and wildfire, if properly managed, is a tool for restoring the forest's fire-adapted ecosystems.

##### **Desired Conditions for Fire Management**

Wildland fires move ecosystems toward their desired conditions and burn within the range of intensity and frequency of the historic fire regime of the vegetation communities affected. Uncharacteristic high severity fires rarely occur and do not burn at the landscape scale, except where this is part of the historical fire regime.

Wildland-urban interface includes those areas of resident populations at imminent risk from wildfire and human developments having special significance. These areas may include critical communications sites, municipal watersheds, high voltage transmission lines, observatories, church camps, scout camps, research facilities, and other structures that if destroyed by fire, would result in hardship to communities. 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.

Wildland fires in the Wildland-urban interface (WUI) are low intensity surface fires. Residents living within and adjacent to the Forest are knowledgeable about wildfire protection of their homes and property, including providing for defensible space. Wildland fires in the WUI do not result in the loss of life, property or ecosystem function.

People understand that wildland fire is a necessary natural disturbance process integral to the sustainability of the Forest's fire adapted vegetation communities.

Wildfires are safely managed across most of the landscape for the resource benefits they provide.

##### **Standards for Fire Management**

Public and firefighter safety are the highest priority in managing fire.

##### **Guidelines for Fire Management**

Areas around private land and development should be a high priority for fuels reduction and maintenance.

## **Management Approaches for Fire Management**

Where possible, manage wildland fires for multiple resource management objectives.

Integrate fire with other management tools to treat and restore fire adapted ecosystems.

Coordinate with other jurisdictions such as communities, service providers (infrastructure), and county, federal, tribal, state and local entities regarding prevention, preparedness, planned activities and responses to wildland fires. Notify the above regarding the upcoming and, ongoing fire season and any prescribed fire activity.

Work with homeowner associations and homeowners in the Neighborwoods Management Areas to plan and implement measures to reduce wildfire threats to life and property such as:

- Providing reasonable road ingress and egress for emergency evacuation of personnel.
- Providing reasonable road access suitable for use by fire engines including places to turn engines around.

Access for initial attack and suppression activities should be provided in order to reduce response times and address public and firefighter safety.

Encourage the development and implementation of Community Wildfire Protection Plans to promote public safety and to reduce the risk of wildfire on non-Forest Service lands.

## **Heritage Resources**

### **General Description for Heritage Resources**

The Coconino NF has some of the highest archaeological site densities in the Southwest that represent 13 prehistoric and historic cultural traditions, but only about 30 percent of the Forest has been archaeological inventoried. About 10,000 sites have been recorded by those surveys. Of the approximately 10,000 archaeological sites recorded on the Forest when this plan was approved, about 2,700 have been determined to meet the criteria of eligibility for the National Register of Historic Place, meaning they: are considered significant because they are associated with important events or important people, are an outstanding example of a type of site or architecture, or have the potential to contribute important information to history or prehistory.

Four hundred and sixty-two sites have been determined ineligible for the National Register. For those sites that are of particular significance, they are formally nominated to be listed on the National Register, either as individual sites, a district, or as one of a number of significant examples of a class of sites. One hundred and fifty-nine sites have been listed on the National Register, either individually or as part of six National Register Districts.

The highest honor that can be paid to a site is to be considered a National Historic Landmark. These must be approved by an Act of Congress. There are two National Historic Landmarks within the Coconino NF that contain ten additional sites: the C. Hart Merriam Base Camp and Winona Village. Merriam's significant Life Zones concept was conceived in 1889 while he studied the different vegetation zones on the San Francisco Peaks. Winona Village is a complex of sites that were partially excavated in the 1930's and were the basis for many of the archaeological concepts for the prehistory of the Flagstaff area..

Several tribes, particularly the Hopi and Zuni, recognize many of the sites on the Forest as ancestral villages, where many of the ceremonies and traditions of their cultures originated. Pilgrimages to some of these sites are still made, with offerings of prayers and other items.

The recreational, educational, cultural, and scientific values of the archaeological sites on the Forest have been recognized as a recreational and scientific niche that the Forest can provide to the public. Promoting and developing that niche, while respecting those cultural and scientific values through research and conservation, is a goal of the heritage program of the Coconino NF.

## **Heritage Site Conservation and Evaluation**

### **Desired Conditions for Heritage Site Conservation and Evaluation**

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 or minimized through consultation with those tribes who are descendants of the prehistoric people or who have occupied the area in historic times. Site integrity and stability is protected and maintained on sites that are susceptible to imminent risks or threats, or where the values are rare or unique. All of the priority heritage assets are stable and their significant values are protected. Vandalism, looting, theft and human caused damage to heritage resources are rare. Site significance and integrity are maintained through conservation and preservation efforts and receive minimal impact from visitors. Cultural and scientific values are continually enhanced through research and partnerships with tribes, universities, and museums. Through interpretation and public involvement in archaeological activities, appreciation and respect of cultural values and a sense of stewardship for our common heritage is increased.

### **Objectives for Heritage Site Conservation and Evaluation**

Complete analysis of ~~XX~~ property classes" every ~~XX~~ to ~~XX~~ years to determine their rarity or ubiquity, significance, and information gaps about them that will lead to better understanding of those site classes and more cost-effective project clearances.

Nominate ~~XX~~ to ~~XX~~ sites for inclusion on the National Register of Historic Places within 10 years of plan approval.

### **Management Approaches for Heritage Site Conservation and Evaluation**

Develop a prioritized list of sites that need stabilization or documentation in order to be preserved to maintain their information potential and significant values. Focus on sites at risk from threats from vandals, natural conditions, and structural stability. Monitoring of sites is prioritized in high visitation areas such as near roads, campgrounds, and trails. Also prioritize sites for their ability to contribute to significant research issues at local, national, and international levels.

Work with partners such as the Arizona Site Stewards program, the Arizona Archaeological Society, and the Museum of Northern Arizona to study, protect and monitor sites.

Cultural and biological resources in the vicinity of Hartwell Canyon are protected through partnerships and collaboration with organizations, such as The Nature Conservancy and The Archaeological Conservancy.

Achieve a balance between National Historic Preservation Act (NHPA) Section 106 activities (ensuring projects are in compliance with legal requirements to evaluate and protect archaeological sites) and NHPA Section 110 activities (actions focused on the cultural resources themselves). Studying, documenting, and preserving sites as well as conducting a program of “public archaeology” to educate people about heritage through site interpretation and hands-on involvement in the archaeological process.)

Within three years of plan approval, divide the Forest into archaeological study units (geographic areas that are meaningful units of analysis with which to examine and interpret the prehistory of that area) and identify historic property classes (types of sites such as field houses, flaked stone scatters, small pueblos, large pueblos, pit house clusters, and rock art that have cohesiveness and can be studied as individual classes and can be compared between archaeological study units). In property class surveys, give priority for identification and documentation to certain site types, such as wooden structures and rock art that may be more sensitive to impacts due to fire activities and wildland fire.

### **Related Plan Content for Heritage Site Conservation and Evaluation**

- See the following sections: Facilities

### **Heritage Collections**

#### **Desired Conditions for Heritage Collections**

Primary archaeological site and survey records that are maintained and updated on the Forest. Associated records (36 CFR 79.4) may be shared and maintained at institutions that meet professional standards (e.g. 36 CFR 79, American Museums Association) and have research interests on the Coconino NF. Archaeological collections and associated records are maintained and stored in facilities that meet professional standards. Collections and associated records are curated at museums, organizations, and other institutions that meet professional standards for the purpose of scientific research, public education, and interpretation.

#### **Management Approaches for Heritage Collections**

Develop agreements with Forest Service approved repositories to curate records and artifacts. Periodically inspect collections and repository facilities to ensure they continue to meet professional standards. Projects resulting in the collection of artifacts should address funding for curation of those artifacts .

Records will be retained at Forest Services offices when they need to be accessed regularly for management and research purposes. Maintain electronic records, including an index of primary documents of historic research value.

### **Heritage Enhancement and Interpretation**

#### **Desired Conditions for Heritage Enhancement and Interpretation**

Heritage resources provide educational opportunities that connect people, past and present, to the land and its history. Through positive heritage experiences provided by interpretive sites, historic standing structures, and other materials, the public develops an appreciation for the region’s history and develops an awareness of preservation efforts. In some cases, historic routes (e.g., railroad grades, General Crook Road, Beale Road) are used for recreation trails with proper interpretation. Heritage-based recreation opportunities are connected, where practical with other recreation opportunities, such as trails.

Public enjoyment is enhanced by opportunities to visit interpreted heritage resource sites. Archaeological site etiquette information is readily available to national forest visitors. Interpretation of the human history of the Coconino NF promotes greater public understanding of the communities that have depended on this landscape for their livelihood, recreation, and spiritual well-being and provides connections between prehistoric, historic, and modern people.

Opportunities exist for volunteers to participate in heritage resource conservation activities such as research site stabilization, conservation, and interpretation. Cooperation with local museums, schools, organizations, and other governmental agencies provide for heritage tourism that enhances the overall experience of visitors to the Forest, results in preservation and protection of those resources, and is consistent with tribal interests and desires.

Heritage programs, interpretive presentations, or publications are available to provide the public with opportunities to learn about, understand and experience the Coconino NF's prehistory and history.

### **Objectives for Enhancement and Interpretation**

Update the Cultural Resources Overview and tie it to the existing class of properties within XX years of the plan approval.

### **Guidelines for Enhancement and Interpretation**

Commercial use of heritage-based interpretive sites should be limited to activities that enhance the public's understanding of the resource, protect and preserve the resource, and are consistent with tribal interests.

### **Management Approach for Enhancement and Interpretation**

Partnerships are encouraged with American Indians, commercial ventures, volunteers, and universities for documenting, preserving, interpreting, and managing sites, and to evaluate and develop creative management opportunities.

## **Tribal Relations and Uses**

### **General Description and Background for Tribal Relations and Uses**

The Forest Service and federally recognized American Indian tribes have a special and unique government-to-government relationship of one sovereign nation to another, based on the U.S. Constitution, statutes, and court decisions. The Coconino NF is about six miles from the Navajo Nation reservation boundary and adjacent to the Yavapai Apache near Camp Verde. The Forest regularly consults with 13 tribes. American Indian tribes have lived on the land that is now the Coconino NF for centuries. Some consider the prehistoric sites to be the homes of their ancestors. Other tribes recognize some sites and places to be of historical, cultural, and religious significance.

### **Desired Conditions for Tribal Relations and Uses**

Tribes have access to areas that provide them an opportunity to practice traditional activities, such as plant gathering, and ceremonial activities that are essential in maintaining their cultural identity and the continuity of their culture with reasonable limitations, consistent with public safety and multiple uses by other Forest users. Forest products used by American Indian nations, tribes, and communities with

ancestral or historic ties to the Coconino NF continue to be available for traditional practices. Collection of culturally important plants by American Indian tribes does not negatively affect the existence and distribution of the species on the Forest.

## **Management Approaches for Tribal Relations and Uses**

Work with the Kaibab National Forest to consult with tribes to develop a consistent tribal fuelwood program for both adjacent Forests.

Partner with American Indian Tribes and the Forest Service are partners in management of cultural sites. Cultural resources are preserved and interpreted for the enjoyment of all visitors.

Meet with American Indian tribes to better understand their needs and viewpoints. The Forest develops a better relationship and recognition of American Indian tribal needs and viewpoints. Consider developing agreements, such as the Coconino and Kaibab National Forests Memoranda of Agreements with the Hopi Tribe, may be developed with other tribes for the purpose of detailing the Forests' government-to-government relationship with the tribe or for managing recurring activities such as native plant gathering.

Consult Indian tribes during plant, fish (water), and botanical to determine if there are any impacts to traditional cultural values or opportunities to improve plant and animal populations of traditional cultural importance.

## **Infrastructure**

### **Facilities**

#### **General Description for Facilities**

In progress

#### **Desired Conditions for Facilities**

Recreation sites, administrative 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.

Forest facilities that are eligible for the National Register of Historic Places continue to be available for Forest administration, public recreation and interpretation, tribal events and other uses, as appropriate. These sites retain their importance in American history through historic preservation and adaptive re-use and continue to contribute to the historical significance of the community.

#### **Objectives for Facilities**

#### **Guidelines**

The Forest Service's Built Environment Image Guide (BEIG) or subsequent guides for facility design should be used for public and private facilities across the Forest in order to provide for consistency in design of facilities.

## **Management Approach**

Design narratives provide criteria to determine the appropriate location, capacity, and type of facility required to meet user needs in the context of the Forest setting.

## **Roads**

### **General Description for Roads**

The Coconino NF has a substantial number of roads with a particularly dense road network in the northwest and southeast areas. Two major interstates meet near the center of the Coconino NF (Interstate 17 and Interstate 40). Most of the major roadways follow a north-south orientation, the lone exception being Interstate 40, which is oriented east-west.

### **Desired Conditions for Roads**

A sustainable, and economical transportation system (roads) 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 minimizes impact to rare plants, fisheries, and wildlife habitat and movement. Bridges and culverts allow for safe aquatic passage. Travel restrictions are clearly understood by Forest visitors. Roads to private property provide reasonable access but do not necessarily provide for comfort or all-weather access. Roads that are under easement or special use permit are maintained to Forest Service standards by the permittee or easement holder.

Unneeded roads are closed and rehabilitated to reduce human disturbance to wildlife and to reduce soil erosion. Some closed roads have been converted to non-motorized trails for recreational use by hikers, mountain bikers, and horseback riders.

Deadman Wash provides large tracts of un-roaded landscape for disturbance-sensitive species and remote recreation experiences.

### **Guidelines for Roads**

Frequent and low-intensity maintenance should be used on roads that are in areas that may impact wildlife, areas with sensitive soils, and roads that affect water resources to prevent the need for larger scale reconstruction and the associated disturbance.

Roads open on the Motor Vehicle Use Map should be signed.

Bridges and culverts should comply with current guidelines regarding wildlife use of bridges and culverts, such as the AZGFD Bridge and Culvert Guidelines.

### **Management Approaches for Roads**

Consider wildlife habitat needs should be considered early in the transportation and development planning process.

Work closely with the AZGFD, the Arizona Wildlife Linkages Working Group and ADOT to identify potential barriers to wildlife movement, and to mediate such threats during new projects by designing effective wildlife crossings and travel mitigation areas.

Encourage private land owners who use Forest roads to take maintenance responsibility for roads that serve primarily private uses.

Collaboration efforts with local and regional governments and transportation agencies to meet future local and regional transportation needs, as well as NF objectives and plans, such as the design and location of roadway improvements and routes and alternative modes of transportation.

## **Lands**

### **Land Adjustments**

#### **General Description for Land Adjustments**

Land adjustments are the real estate transactions on the Forest including sales, purchases, exchanges, conveyance, and rights-of-way. Land exchange and land purchase have been, and will continue to be, the means by which the Coconino NF acquires key wildland resources and open space areas.

#### **Desired Conditions for Land Adjustments**

The Coconino NF has a mostly contiguous land base that provides for biologically diverse public lands with minimal impacts from adjacent land uses. Most of the Forest has a natural-appearing landscape that has not lost its wildland character. Open-space values including those related to naturally appearing landscapes, wildlife habitat, recreational opportunity, riparian/wetland character and community needs are retained.

Priority parcels in the Sedona/Oak Creek Management Area<sup>11</sup> are acquired from willing sellers, through methods other than land exchanges, when possible.

#### *Rights of Way*

Easement rights of way help provide adequate access to the Forest. Appropriate trail access through private lands is identified and managed or acquired through the private land development process, in cooperation with local governments. Reasonable access is provided to private inholdings.

#### **Standards for Land Adjustments**

Land exchanges that dispose of national forest land in the Sedona/Oak Creek Management Area will occur only if they result in acquisition of national forest lands in the Sedona/Oak Creek Management Area.

Land exchanges that dispose of national forest land in The Dells area will occur only if they result in acquisition of high-priority private parcels elsewhere in the Sedona/Oak Creek Management Area. High priority private parcels total approximately 95 acres (see map XX). High-priority land acquisition parcels include: Lincoln Canyon (25 acres) and Hancock Ranch (70.3) acres.

Base-for-exchange lands are national forest lands located at:

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<sup>11</sup> Priority parcels are those listed in the standards and guidelines.

- Chapel of the Holy Cross area (approximately 11 acres, Sedona Neighborwoods Management Area), Slide Rock area (approximately 13 acres, Oak Creek Management Area), Village of Oak Creek Golf Course area (approximately 5 acres, Sedona Neighborwoods Management Area) and The Dells area (up to 300 acres, Sedona-Oak Creek and House Mountain-Lowlands Management Areas).
- In the Walnut Canyon Management Area, national forest jurisdiction will be maintained for all lands in the Walnut Canyon Management Area. No land exchanges will occur unless the purpose is to acquire land within this Management Area through exchange of national forest lands elsewhere.

### **Guidelines for Land Adjustments**

Lands that the Forest considers for acquisition have one or more of the following qualities:

- Contains habitat for threatened or endangered species and sensitive species
- Contributes to the continuity of wildlife habitat
- Contains or influences wetlands, riparian areas, or other water-related features
- Contains important cultural resources
- Provide needed access, protect public lands from fire or encroachment, or prevent damage to resources
- Contributes to areas of high scenic integrity
- Improves the ability to manage a designated special area.
- Contains significant sites with cultural, scientific, or recreational values.

Lands that the Forest is willing to exchange or sell have one or more of the following qualities:

- Isolated from other NFS lands
- Without unique cultural or ecological resources
- Managed for a single commercial or other special use, for which it is being exchanged or sold
- Has lost its wildland characteristics
- Lands needed to meet the needs of communities and the public, such as land for a water treatment plant.

Priority parcels in the Sedona/Oak Creek Management Area<sup>12</sup> should be acquired from willing sellers, through methods other than land exchanges, when possible.

National Forest parcels less than or equal to 10 acres in size in the Sedona/Oak Creek Management Area could be disposed of under the Small Tracts Act, Townsite Act or General Exchange Act to resolve encroachment issues or provide lands needed for public purposes.

Base-for-exchange lands at the Chapel of the Holy Cross area is intended for church acquisition only; base-for-exchange at Village of Oak Creek Golf Course is intended for golf course acquisition.

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<sup>12</sup> Priority parcels are those listed in the standards and guidelines.

Slide Rock base-for-exchange land should be available for acquisition by Slide Rock State Park to better facilitate management of the creek and the park.

#### *Rights of Way*

When responding to requests for new access permits or easements, easements should be granted in reciprocity, if appropriate, to ensure administrative and public access to the Forest.

### **Management Approaches for Land Adjustments**

Consult with the local governments about land adjustment proposals the Forest plans to take forward into NEPA. Public input on land exchange begins at the time a site-specific land exchange is proposed.

If acquisition cannot occur, collaborate with private land owners and county governments in the land development process to protect unique resources such as scenery, adjacent Wilderness, archaeological values and threatened and endangered species habitat. Encourage local governments or agencies, private landowners and/or other appropriate entities (e.g. Nature Conservancy, Trust for Public Land, Archeological Conservancy, local land trust) to protect the resources and character of National Forest through methods such as conservation easements, land trust management, deed restrictions, or public acquisition of adjacent, high priority parcels.

Work with land owners and local and regional governments to raise awareness of the roles, values and contributions of NFS lands within the broader landscape. This would include evaluation of existing assessments to understand the condition and trends of natural resources across the region, social/economic indicators in the relevant landscapes, and the management intentions of neighboring landowners. Provide advice to local governments on the possible impacts of new developments on natural resources and open space (especially when they are adjacent to the Forest), participate in community forums concerning open space issues, continue linking city and county trails to Forest Service trails, share public outreach and education tools, and share information about future plans.

#### *Rights of Way*

Work with local and regional governments and road agencies to develop transportation solutions that reduce traffic and vehicle impacts on national forest lands.

## **Range and Livestock Grazing**

### **General Description for Range and Livestock Grazing**

Livestock grazing has occurred on the Coconino NF since it was established. This use has changed dramatically since the 1940's. During World War II and in the years following, there was substantially more livestock permitted to graze on the Forest than there are today, as well as there were many more ranchers with permits on the Forest.

### **Desired Conditions for Range and Livestock Grazing**

Range lands provide large areas of unfragmented open space. These open spaces sustain biological diversity and ecological processes and help to preserve the rural landscape and cultural heritage of central and northern Arizona.

Domestic livestock grazing maintains the desired composition and structure of plant communities. Rangeland ecosystems are diverse, resilient, and functioning within a healthy, sustainable landscape. Grasses and forbs provide adequate forage for wildlife and permitted livestock consistent with other desired conditions. Areas that are grazed have stable soils, functional hydrology and biotic integrity.

Livestock waters allow for safe access by wildlife. Troughs and uncovered storage tanks are designed or modified to avoid wildlife injuries.

### **Standards for Range and Livestock Grazing**

Water developments shall incorporate escape devices to prevent animal entrapments.

### **Guidelines for Range and Livestock Grazing**

The placement of salt, minerals, and/or other supplements for the purposes of livestock management should be located further than ¼ mile from riparian areas or seasonally present water that is not overland flow to protect riparian area function.

New water developments, corrals, and other handling or loading facilities should be located away from known locations of Southwestern Region Sensitive Plant species unless it can be demonstrated these facilities do not adversely affect occupied sensitive plant habitat.

Livestock salting should be located away from known locations of Southwestern Region Sensitive Plant species so plants are not affected by associated trampling and archaeological sites.

Burned or mechanically treated areas should be given sufficient rest, especially during the growing season, to ensure plant recovery and vigor and to ensure that perennial plants would not be permanently damaged by grazing. The range management definition for this condition is range readiness. Range readiness is achieved and plants are ready for grazing when characteristics such as the following are present on a majority of the perennial plants within the treated area: seed heads or flowers, multiple leaves or branches, and/or a root system that does not allow them to be easily pulled from the ground. These characteristics provide evidence of plant recovery, vigor, and reproductive ability.

Nonstructural and structural (fences, troughs, pipelines) range improvements should be used and/or located in a way that does not conflict with riparian functions and archaeological sites or should be relocated or modified when found incompatible.

Intensity, timing, duration, distribution, and frequency of livestock grazing should provide for growth, reproduction, and retention of adequate residual cover of desired plant species.

Fences are constructed to specifications identified in the interagency fence standard book<sup>13</sup>. Project specific wildlife concerns may require modifying the standard specifications on new or existing fences. Construction of additional fences should be minimal. Maintenance of fences should occur as needed and be prioritized in threatened, endangered, and sensitive species habitat. Fences that are no longer needed should be removed.

Cattleguards should be placed where problem gates exist to help achieve desired plant composition and structure.

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<sup>13</sup> Fences. USDI BLM and USDA Forest Service, July 1988, or more current standards.

Establishment of forage reserves should be considered to improve flexibility and balance between restoring fire adapted ecosystems and range management.

### **Management Approaches for Range and Livestock Grazing**

Collaborate with permittees, tribes, educational institutions, other agencies and stakeholders, in achieving and maintaining desired conditions.

Regularly review active Allotment Management Plans.

Leave gates in waterlot fencing open to wildlife except when controlling livestock distribution.

### **Livestock Grazing Suitability**

Suitability is the appropriateness of applying certain resource management practices to a particular area of land in consideration of the relevant social, economic, and ecological factors. The identification of lands suitable for livestock grazing is not a decision to authorize livestock grazing; the final decision to authorize livestock grazing would be made at the project (allotment) level.

**Table XX. Grazing Suitability, areas that are not suitable Coconino National Forest**

Table under development		

### **Livestock Grazing Capability**

Capability is the potential of an area of land to produce resources and supply goods and services. Capable lands are generally the sum of lands classified as full or potential grazing capability for domestic livestock and generally exclude areas classified as no capability. Capability depends upon current conditions and site conditions such as climate, slope, landform, soils, and geology. Livestock grazing capability is determined at the allotment (project) level following Southwestern Region protocol that may be current at the time.

## **Energy and Minerals**

### **General Description for Energy and Minerals**

There are low levels of mineral development currently on the Coconino NF, but the Forest has some potential for geothermal development (a leaseable mineral) on the northern part of the Forest and for mineral materials such as pumice, cinder pits, and gravel. (Definitions for locatable and leaseable minerals and mineral materials are in the glossary.)

### **Desired Conditions for Energy and Minerals**

Opportunities for environmentally sound minerals development are available. Important wildlife habitats, visually sensitive areas, archeological sites and areas with large capital investments are protected through surface occupancy restrictions imposed on mineral activities. Adverse surface resource impacts are minimized through the appropriate administration of mineral laws and regulations. Past and present mine facilities are sufficiently reclaimed to provide for public safety and minimize impacts to cultural and

natural resources. Mineral materials are provided to State, county, and city agencies, where feasible, available, and consistent with other resource values. Mineral material removal does not occur where needed for forest purposes.

### **Guidelines for Energy and Minerals**

The Forest should recommend to the Department of Interior existing mineral withdrawals for retentions, revocations and modifications.

The following areas that should be considered for withdrawal for locatable minerals include:

- Properties with a substantial FS investment in facilities such as administrative sites and campgrounds.
- Traditional Cultural Properties where historic preservation laws alone do not adequately protect the cultural resource.
- Areas of very high archaeological site density and significance
- Oak Creek Canyon
- Established Research Natural Areas not located in Wilderness
- Geological and Botanical Areas

Maintain existing mineral withdrawal<sup>14</sup> on the San Francisco/Mount Elden Recreation Area.

The following areas should be considered for No Surface Occupancy or No Leasing for leaseable minerals in:

- Designated and Eligible Wild and Scenic Rivers
- Research Natural Areas not located in wilderness.
- The Foreground of State and National Scenic byways and National Trails
- Areas of Very High Scenic Integrity
- San Francisco Peaks/Mount Elden Recreation Area Withdrawal
- Areas of very high archaeological site density and significance

Minerals materials operations should be limited in Oak Creek Canyon MA, although some activities may be appropriate for ADOT and Forest Service administration needs if they are minor and consistent with area desired condition and standards and guidelines.

Mitigation measures should be used for threatened, endangered and sensitive species to avoid impacts to populations due to mineral exploration or extraction activity, where feasible and consistent with mining laws and regulation. Management Approaches for Energy and Minerals

For congressionally designated areas that are not specifically withdrawn by the legislation establishing them, consider withdrawal from locatable minerals entry and operations.

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<sup>14</sup> Expires in year 2020.

Projects requiring mineral materials will consider environmental and resource concerns, multiple-use objectives, economic costs and savings. Project-level environmental analysis will consider potential environmental effects of new and existing sources.

Best Management Practices and stipulations from the Geothermal Leasing Programmatic EIS (DOI- BLM Final Programmatic Environmental Impact Statement for Geothermal Leasing in the Western United States published in 2008) may be incorporated into future leases as appropriate to the location.

To achieve the desired conditions for forest products, use operating plans and bonds for rehabilitation to protect and restore surface resources.

Projects requiring mineral materials will consider environmental and resource concerns, multiple-use objectives, economic costs and savings opportunities.

## **Recreation**

### **General Description for Recreation**

Coconino NF provides public access to central Arizona settings that accommodate a wide range of opportunities for outdoor, nature-based recreation. Interstates 40 and 17 connect the Coconino NF with several urban populations including Phoenix, Tucson, Flagstaff, Las Vegas, and Albuquerque. Smaller rural towns and communities utilize parts of the Coconino NF as local recreation areas and tourism attractions. Scenic rivers, creeks and lakes create unique mountain settings for water-based activities such as fishing, swimming and motor boating. Several rivers have sections of whitewater for kayaking, canoeing and rafting. Remote backcountry areas of the Forest accommodate dispersed recreation activities like backpacking, mountain biking, horseback riding, and hunting.

### **Developed Recreation**

#### **General Description for Developed Recreation**

Developed facilities are sites where the Forest Service provides multiple amenities for the purpose of visitor comfort and convenience

#### **Desired Conditions for Developed Recreation**

Developed recreation facilities such as campgrounds and picnic areas are clean, energy efficient, and maintained to standard. Most meet current accessibility guidelines. Developed sites blend with the natural setting, and uses at these areas do not cause damage to ecologically or culturally sensitive areas. Potable water is provided in high-use areas. Developed recreation opportunities are available for both families and groups, with a multitude of recreation experience types.

Developed camping facilities provide a level of amenities appropriate for their Recreation Opportunity Spectrum (ROS) setting (see map XX), while providing climatic relief and escape from urban life. Developed campgrounds are located outside of floodplains and away from areas prone to flash flooding. Most campgrounds are part of a centralized strategy which consolidates developed recreation opportunities and protects resources. Trails in developed sites connect users to a variety of dispersed recreation opportunities.

Developed sites near riparian areas are predominantly day use. Amenities in sites adjacent to water protect water quality and prevent vegetation damage and soil erosion and compaction from fishing, boating, swimming, and other activities. Invasive exotic weeds and aquatic organisms are not established or transported. There is little human litter as a result of effective enforcement, patrols, and use of refuse and recycling facilities

Group sites in a variety of settings are provided across the Forest. Sites may vary in capacity including providing space for groups of more than 75 people<sup>15</sup>. These sites offer users a place to gather near towns and communities and provide adequate sanitation and amenities. Group sites may be co-located with developed campgrounds or day use facilities, such as Elden Pueblo. These sites are strategically located to protect resources and minimize the need for large group gatherings in the dispersed recreation areas.

Information facilities are open to the public on busy days and provide places where visitors can find information and learn about natural and cultural resources on the Coconino NF. They are located in strategic locations to best serve the public.

Where there are high levels of visitor use, most national forest visitor activities occur at developed sites and on trails designed for high levels of use. High levels of developed recreation use occurring along Upper and Lower Lake Mary and in Oak Creek Canyon are accommodated by facilities which balance resources protection with recreation demand. Recreation sites within these corridors also emphasize safety and minimize user conflict along highways. Designated parking spots are provided along these highways to prevent resource damage and erosion into nearby waterbodies. The site-specific combination of recreation facilities, services, public information and enforcement minimize wildlife access to human food and trash.

### **Objectives for Developed Recreation**

Reduce the backlog of recreation deferred maintenance by **XX** percent within **XX** years of plan approval.

### **Guidelines for Developed Recreation**

Use of native plant species should be emphasized during planning activities (design of new or improvements of existing sites). Invasive exotics should be removed or treated on existing sites before they become widespread within recreational sites.

The USFS's Built Environment Image Guide (BEIG) or subsequent guides for facility design should be used for public and private facilities across the Forest in order to provide for consistency in design of recreation facilities.

Snowplay areas should be managed to industry standards.

### **Management Approaches for Developed Recreation**

Patrol areas regularly for such things as public safety, facility/resource protection, and fee compliance checks. Site operation or closure is determined by volume of use by season. Sites are operated to the current standards, such as those outlined in the Forest Service publication "Cleaning Recreation Sites"

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<sup>15</sup> Groups of 75 people or more must apply for a special use permit under the Forest Service's non-commercial group regulations.

Facilities and infrastructure are maintained and replaced as needed using a sustainable mix of federal and other funds and partners. Through a facilities master planning process and appropriate NEPA, some facilities may be closed or decommissioned as the public's needs change.

Design narratives provide criteria to determine the appropriate location, capacity, and type of facility required to meet user needs in the context of the forest setting.

Fee areas and concessionaires may be used, as appropriate, to maintain and manage developed facilities, particularly in high-use areas. **Ensure that FS rules are enforced consistently through contract administration.**

Area-specific Built Environment Image Guides may be developed to manage specific design issues associated with special areas or unusual circumstances.

Consider mitigation of heavy recreation congestion along Highway 180 with future development of developed recreation facilities, particularly for winter recreation, along the Highway 89 corridor (and/or other locations).

Adaptively manage recreation facilities and opportunities as needed to shift limited resources to those opportunities.

## **Dispersed Recreation**

### **General Description for Dispersed Recreation**

Dispersed recreation is activities that take place outside of developed camping or concessionaire-operated facilities. This may include dispersed camping in designated sites or corridors that lack substantial improvements. The growing array of dispersed recreation uses points out the need to supply an adequate spectrum of recreation settings and opportunities. Particularly critical is providing future trail systems that accommodate many types of uses, while reducing user conflicts. If current management direction continues, overuse will eventually occur in more areas. Illegal uses will also continue to escalate as demand outgrows the supply of designated trails and roads, especially for OHV, mountain bike, and horse use. The Forest recognizes and understands that recreation activities are fluid and change over time, with new users being attracted to varying opportunities. The Forest may recognize new activities that occur on Forest lands, while upholding the responsibility to protect the natural environment and the multiple use rights of other visitors.

By the time the plan is in place the Forest expects to have published its first Motor Vehicle Use Map (MVUM) under the 2005 Travel Management Rule (TMR). The part of the plan pertaining to motorized use directs future iterations of the MVUM and TMR decisions.

### **Desired Conditions for Dispersed Recreation**

The diverse landscapes of the Coconino NF offer a variety of settings for a broad range of recreational opportunities in all seasons and a place for visitors to escape into natural, wild places. Landscapes range from primitive settings that provide opportunities for solitude, to more developed, rustic settings that provide opportunities for social interaction and greater human comforts, such as sources of drinking water, trash disposal, and boat docks at lakes. Recreation opportunities exist for people with a variety of abilities. Although development and population in the region continue to grow and new forms of recreation emerge, recreation settings on the Coconino NF are stable, retaining their natural character, and

loss of remote, undeveloped settings does not occur. Recreation activities are balanced with the ability of the land to support them, and create minimal user conflicts. The Coconino NF fulfills a unique and vital role as a place of learning and caring about the environment.

Growing demand for recreation is balanced with other Forest desired conditions, unless increasing capacity results in unacceptable negative effects on natural resources. Managed recreation use stays within this capacity with the exception of holiday weekend use levels that may exceed capacity on a short-term basis but resources can recover from short-term increases in use. Recreation on the Coconino NF enhances the quality of life for residents and provides tourist destinations, which contribute to local economies. Dispersed recreation activities on the Coconino NF include driving, hiking, wildlife viewing, hunting, fishing, horseback riding, camping, and hunting, among others. Activities such as mountain-biking, geo-caching, and rock climbing do not significantly detract from the natural character of the Forest, impact resources such as aesthetics, soils, vegetation, and wildlife, or contribute to user conflicts. Non-recreation activities that take place have minimal effect on recreation activities. For example, thinning projects do not result in slash piles that block trails, and projects that temporarily impact trails are followed up with trail restoration.

#### *Motorized Recreation*

Motor vehicle use is a legitimate use of National Forest System lands. Motorized vehicle use occurs as identified on the Motor Vehicle Use Map (MVUM) , except as authorized by permit or for administrative uses. A motorized trail system provides a variety of trail widths and levels of challenge for a diversity of users. This system offers opportunities to enjoy scenery, wildlife viewing, a variety of terrain and conditions, and dispersed camping. Multi-use trails are more common than those available for only one class of vehicle and may interconnect with roads to make loops. Motorized routes are easily identified on the ground and on the Motor Vehicle Use Map. Single-track trails emphasize solitude from other types of motorized vehicles, to the extent practical, and challenge. Motorized trail opportunities provide long distance connections between motorized recreation hubs.

The boundaries of the Cinder Hills Off-Highway Vehicle (OHV) Area are clearly delineated and prevent off-road driving outside of the designated area. Intrusion on the Sunset Crater National Monument is eliminated. Clear signing and information are provided to off highway vehicle drivers to make clear distinction between driving rules in the Cinder Hills OHV area and rules that apply to the cinder cones outside of the OHV area. Connectors provide access to the motorized trails within this area from a number of nearby access points and adjacent motorized trails.

Adequate signing is provided to advise publics of motorized restrictions. Information kiosks are located at main entryways onto the Forest with pertinent OHV recreation information. Information is provided for OHV recreationists and trail users, including maps and signs that provide road and trail information and explain national forest regulation for such activities as OHV travel and camping and trail opportunities. Orientation information and interpretation is provided at sites that receive high levels of visitation.

Resource damage from unauthorized motorized trails is minimal and existing user-created roads and trails are rehabilitated to prevent future access by the public and to mitigate long-term soil and water impacts. Motorized trails are located with minimal impact to sensitive resources such as cultural sites, highly erodible soils, water, and wildlife and botanical resources. Poorly located trails are redesigned or relocated.

#### *Interpretation and Education*

Forest Service communication and interpretive messages show respect for the diverse backgrounds and needs of visitors. The Forest Service communicates accurately and conveys a land ethic to visitors. Visitors are well-informed and supportive of a sustainable land ethic; not only do they understand how to reduce their impacts on ecosystems, but actively help support the Coconino NF's efforts to protect natural resources and wilderness values. Low impact recreation principles are promoted and widely practiced by the visiting public. There is little human litter as a result of effective enforcement, patrols and use of refuse and recycling facilities. Through a variety of interpretive efforts, people learn about geology, riparian communities, and biodiversity and will be motivated to practice careful stewardship.

Information kiosks minimize visual clutter by concentrating messages and eliminating the need for multiple signs. CNF information boards provide regional recreation maps and information, site-specific interpretation, trip preparedness, ethics, and seasonal information or closures.

Interpretation and communication results in residents adjacent to national forest lands understanding the natural environment and are partners in managing the neighboring forest lands for public use and resource protection.

The national forest educational mission underlies all resources, including vegetation management, rare communities, fire, wildlife/fisheries and heritage resources. Through an increased effort to provide learning-based recreation, the Coconino NF provides strong local and regional support as sustainable nature-based tourism continues to grow into the 21<sup>st</sup> century.

### *Camping*

Forestwide dispersed recreation sites have an appropriate-sized footprint, and evidence of human waste and litter and resource damage is minimal. Where resource damage has occurred in high traffic locations, sites are rehabilitated to discourage expansion of the impacts.

Dispersed camping with recreational vehicles and campers occurs in designated motorized camping corridors or designated spur roads as shown on the Motor Vehicle Use Map (MVUM). There is a range of choices available for dispersed camping. Most motorized dispersed camping areas are not overcrowded, and their naturalness is maintained. In both nonmotorized and motorized dispersed camping areas, trees are intact, and soil erosion, impacts to understory vegetation, and evidence of human waste is minimal. Invasive exotic plants and animals are not introduced or spread by activities.

### *Trails and Trailheads*

A system of well-marked and well-maintained trails provides opportunities for visitors to explore the Forest. Access roads to trailheads are open and maintained, and trailheads provide adequate parking and vehicle turnaround space. Trailheads minimize conflict with private land and avoid impacts to ecological and cultural resources. Trails provide access to scenic and wildlife viewing opportunities. Damage to resources from trailheads and trails is minimal and within the ability of the Forest to mitigate or restore. Trail level of development is appropriate to the site conditions and ROS setting. Trail use remains on the established tread, especially in high-traffic or sensitive areas such as the Verde Valley Botanical Area (see map **XX** for Special Areas).

Meadows and riparian areas are visually appealing and free from evidence of physical, mechanical, or vegetative damage due to recreation and other forest activities. Physical impacts to meadows and riparian areas are confined to specified road crossings, trail crossings, and access points. These structures are designed to minimize damage to meadows and riparian areas. Access to springs is limited to trails or entry

points that minimize erosion, trampling, compaction and inadvertent introduction of invasive exotic plants, animals and disease and allow for wildlife access to the spring.

Historic trails, such as Beale Wagon Road, Chavez Road, and logging railroad grades, are preserved and adapted for contemporary use, where appropriate and feasible. Unplanned social trails are rare and off-trail non-motorized use is discouraged in ecologically-sensitive or high traffic areas. National Forest System trails adjacent to urban areas sometimes connect to urban trail systems to expand recreation opportunity. Trails in areas with resource concerns such as sensitive soils that may result in accelerated erosion and loss of soil productivity, rare plant or riparian impacts, or where high user conflicts occur, are prioritized for closure, rehabilitation, and mitigation. Markers on winter sport trails are visible in winter. Mountain biking occurs on multi-use trails which provide adequate opportunities for a different levels of skills and a variety of settings. Recreation uses, including some mountain biking trails that provide a high level of challenge, are located where their impact to soil and vegetation resources is minimized.

Trailheads are easily accessible and do not interrupt the traffic flow along main roads. Infrastructure at trailheads is durable, sustainable, and appropriate for the setting. Boundaries of trailhead parking areas are clearly defined to prevent parking outside of the trailhead. Trailhead interpretive information is appropriate for the uses of the trail and provides information on low impact trail use. The level of development at trailheads is appropriate for the ROS setting<sup>16</sup>. Trailheads that are needed for multi-season recreation access are designed to accommodate snow removal. Ample access to year-round recreation activities areas is available. Trailheads intended to accommodate horse trailers are wide enough for vehicles with trailers to turn around and have a firm, stable surface to prevent resource damage in wet conditions.

Recreation programs, infrastructure and services are useable by all people to the greatest extent possible without separate or segregated access for people with disabilities. Information on what conditions recreation visitors will encounter on trails is well-advertised at the trailhead. Trails and facilities incorporate principles of universal design.

#### *Water-based Recreation*

Recreation opportunities at waterways and lakes emphasize day-use, nature-based activities such as hiking, picnicking, wildlife viewing, photography, boating, swimming, fishing and interpretation. These activities in and near riparian areas do not contribute to bank erosion, trash, water quality, or sanitation issues. Camping is discouraged, where recreation activities have damaged riparian, shoreline, or aquatic resources. Dispersed camping is provided near but not within 200 feet of riparian, shoreline, or aquatic resources (per Leave No Trace principles) of these areas to provide fishing/camping opportunities. Angling opportunities are available at remote sites, with a semi-primitive or primitive character and in a natural setting.

#### *Snow-based Recreation*

Snowplay activities occur where conflict between motorized and non-motorized activities is mitigated through signing and design considerations. Dispersed downhill snowplay activities, such as sledding, are discouraged within a quarter mile of paved roads and along the Interstate 17 corridor unless the site-

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<sup>16</sup> For example, an area that is providing access into a SPNM or Primitive setting uses natural materials for the parking area and has signing that is minimal but provides adequate information for the recreation experience. Trailheads in more developed settings may have constructed fencing, gravel or pavement and other developed features more consistent with developed campgrounds and picnic areas as appropriate under the ROS objectives for that level.

specific conditions, such as the slope of hill in the direction away from the road, do not pose a serious hazard.

### *Hunting*

The Coconino NF provides for a diverse range of hunting opportunities. Blinds, stands, cameras and other structures brought in by the public are temporary and portable and do not have long-term effects on vegetation and wildlife. Quiet areas<sup>17</sup> provide opportunities for non-motorized hunting experiences with minimal disturbance of wildlife.

### **Objectives for Dispersed Recreation**

Within **XX** years of plan approval, develop a system of designated bike trails, equestrian trails, and motorized trails to adequately provide for these user groups and reducing conflicts between user groups.

Develop an Interpretive Services Master Plan with 10 years of plan approval.

Naturalize **XX** to **XX** miles of unauthorized routes every **XX** years until evidence of these routes is minimized forestwide.

Designate **XX** additional systems of motorized trails on the Coconino NF within 10 years of plan approval.

### **Standards for Dispersed Recreation**

Prohibit motor vehicle use beyond the designated system of roads, trails, and areas, as defined on Motor Vehicle Use Maps (MVUMs), except for those uses authorized by law, permits, and orders in connection with resource management and public safety.

Motorized vehicle use shall be restricted in the following areas<sup>18</sup> during the specified seasons of the year<sup>19</sup>:

- Nordic Ski Center Seasonal Closure – closed to motor vehicle use from December 1 to March 31.
- Wing Mountain Cross Country Ski Area Seasonal Closure – closed to motor vehicle use from December 1 to March 31.
- Pine Grove Seasonal Closure – closed to motor vehicle use from August 15 to December 31. Roads within the area are closed, but the roads along the perimeter are open to motorized travel. The purpose of the closure is to provide opportunities for recreation in areas undisturbed by vehicles.

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<sup>17</sup> Quiet areas are areas designated by the Forest Service and AZ Game and Fish Department jointly, that are closed to motor vehicle traffic seasonally to provide for a non motorized hunting experience. These area have existed since the pervious plan was instated. (See Standards for closure periods)

<sup>18</sup> These seasonal closures were carried forward from the 1986 plan (revised May 1991), and they are identified on map **XX** in appendix **XX**.

<sup>19</sup> These closures should be reflects on the MVUM and in associated closure orders.

- Rattlesnake Seasonal Closure – closed to motor vehicle use from August 15 to December 31. Roads within the area are closed, but the roads along the perimeter are open to motorized travel. The purpose of the closure is to provide opportunities for recreation in areas undisturbed by vehicles.
- Woods Seasonal Closure – closed to motor vehicle use from December 15 to April 1. Roads within the area are closed, but the roads along the perimeter is open to motorized travel. Schnebly Hill Road and Forest Road 153 are not affected by this closure. The purpose of the closure is to minimize disturbance to big game winter habitat.
- Cottonwood Basin Seasonal Closure – closed to motor vehicle use from December 1 to June 15. The purpose of the closure is to provide for wildlife habitat.]

### **Guidelines for Dispersed Recreation**

Motorized vehicles should not be permitted to cross riparian areas, streams, and rivers and adjacent filter strips except at hardened crossings, bridges, or crossing with existing culverts.

Trails should be built, rerouted, or maintained utilizing current best practices to promote tread stability and desired user experience.

New designated motorized dispersed camping access routes should be located away from floodplains and environmentally sensitive areas.

Interpretation should follow the themes established in a Forest Interpretive Strategy with district priorities for implementation.

Where necessary, national forest visitor activities should be restricted from soil and plant restoration sites.

Dispersed sites should be closed, rehabilitated, or otherwise mitigated when:

- campsite condition reaches Frissell class 4 (heavy) or 5 (severe),
- site occupancy exceeds the adopted scenery management objective,
- there are social use conflicts, or
- unacceptable environmental damage is occurring.

Where forage is limited, require overnight campers with recreational livestock to carry cubed, pelleted, or rolled feed. Feeds shall be free of viable noxious-weed seeds.

### **Management Approaches for Dispersed Recreation**

Establish long-term partnerships with motorized recreation organizations to help the Forest establish, construct, and maintain motorized trails and foster a low-impact conservation ethic.

Develop a management plan for the Cinder Hills OHV Areas. Within the Cinder Hills OHV area, work with and establish interpretive messages and programs with the adjacent national monument and volunteers from OHV users, including improved signing, information kiosks, and interpretive message. Provide signing and information aimed at the following objectives: to prevent lost riders, to show opportunities of where to ride, and to identify dangerous and/or closed areas.

Work with partners such as AZGFD, Arizona State Parks, and user groups to provide information and education to foster a low-impact land ethic among OHV riders.

When developing motorized trails consider their suitability as multiple user trails for non-motorized recreation.

Work with other Forests and AZGFD to adopt a noise emission standard for OHVs to manage noise impacts.

Work with the Great Western Trail Association and associated groups to maintain the long –distance trail opportunity it provides.

Develop and implement a motorcycle-trials recreation area within 5 years of plan approval in cooperation with trials groups. This area will provide for both individual riders and special-use permitted competitive events.

Provide leadership to coordinate recreation, visitor information, and trail planning among major recreation providers, such as the National Park Service, State Parks, the Arizona Game and Fish Department, concessionaires, chambers of commerce, city and county governments, volunteers and non-profits.

Update the Memorandum of Understanding (MOU) between the National Park Service and the Coconino National Forest. The MOU sets up: 1) how the agencies communicate when management concerns arise and 2) what criteria will be used to make decisions together. For the Flagstaff area national monuments, some considerations should be included for: American Indian access for traditional uses, law enforcement cooperation, personal use plant gathering, outfitter/guide parameters, commercial filming parameters, boundary management, fire management, location and management of NPS facilities on Coconino NF lands, National Historic Preservations Act (Section 106), National Environmental Policy Act and Endangered Species Act compliance coordination, shared services for monitoring, and cooperative efforts in managing interpretation and visitor services.

Consider single use trails (as opposed to multi-user trail designs) to accommodate varying user experiences where trail design features cannot be provided to mitigate user conflicts or provide for a sustainable recreation setting. Lands and Recreation staffs provide input to the design requirement of new developments (especially when they are adjacent to National Forest), share public outreach and education tools, and share information about future plans.

Include discussions and input from county trails coordinators and local groups, as well as local citizens when conducting trail planning. Consider needs for non-motorized and motorized trails and provide opportunities for both. Coordinate trailhead parking with future development on adjacent lands so as to be proactive in designing trails and trailheads to maintain access to public lands and protect resources.

Cooperate with local governments to provide for snow removal and safe conditions for travel to and from winter outdoor activities.

Coordinate with the Arizona Game and Fish Department and other stakeholders to provide a network of wildlife viewing opportunities.

Adopt design standards and best management practices for emerging recreation activities as they become available. Adopting management policies for new forms of recreation may be considered

as time allows and in accordance with the desired interest these new forms attract in relation to other known recreation uses

For trail-system analyses and decisions, include consideration of universal design for all new construction or rehabilitation proposals.

Provide visitor information and guidelines to members of the public inquiring about dispersed recreation opportunities. Coordinate with city, county, and State law enforcement agencies to assist with the enforcement of Federal laws at known Forest dispersed recreation areas on holiday weekends.

## **Scenic Resources**

### **All Scenic Resources**

#### **General Description for All Scenic Resources**

The Forest is divided into a three levels of desired Scenic Integrity: Very High, High, and Moderate. These levels set objectives for the amount of variation from the desired landscape character that is permissible within the scenic integrity level, according to Agriculture Handbook Number 701 Landscape Aesthetics: A Handbook for Scenery Management. Some areas of the Forest may require restoration in order to move toward the conditions described in the desired landscape character.

#### **Desired Conditions for All Scenic Resources**

The scenic values of the Coconino NF are conserved and enhanced. Vegetation treatments contribute to the scenic integrity of the valued landscape character (see character zones), especially in highly sensitive areas. Visitors see that the Forest is being actively managed through visual cues, such as seeding fuel breaks with native wildflowers, grasses, and forbs and thinning trees to frame views from trails. Slash and root wads along Concern Level 1 and 2 travel routes are arranged to minimize their visual disturbance in the Immediate Foreground (300 feet). Slash piles are not evident once they are burned or scattered. Openings and stand boundaries are naturally shaped and are oriented to contours and existing vegetation patterns to blend with existing landscape characteristics, except where other natural resource concerns require minimal treatment along powerline corridors.. Constructed features, facilities, and management activities closely follow the form, line, color, texture, and pattern common to the valued landscape character to remain visually subordinate to the surrounding landscape. Long-term soil and plant productivity, properly functioning ecosystems and clean water are considered important components of scenic quality. Gravel pits, borrow areas, open pit mines, and restored gullies are not seen in the area of visually sensitive travelways and viewing points to the extent possible. Cultural and historic features are recognized for their inherent scenic values. Native plant rehabilitation is carried out in disturbed areas to speed scenic quality recovery. Natural land forms and vegetation are used, to the extent possible, to screen facilities from important viewing locations such as scenic trails and byways.

#### **Guidelines for All Scenic Resources**

Management activities that are inconsistent with the scenic integrity objective and whose effects last more than 5 years should not occur unless a decision is made to change the scenic integrity objective.

In areas with Very High and High Scenic Integrity Objectives, only minimal<sup>20</sup> alterations<sup>21</sup> from the landscape character goals described in the desired conditions should be allowed in the long-term.

In areas with Moderate Scenic Integrity Objectives, only slight alterations should be allowed, which ensure that deviations remain visually subordinate to the landscape character in the long-term.

In areas of High Scenic Integrity, new infrastructure should, when safety and logistical constraints allow:

- Use of natural contours to minimize the appearance of structures;
- Use of neutral, non-reflective colors to blend structures into their surroundings;
- Make use of existing infrastructure to camouflage new structures that are not part of the valued landscape

Where using rocks from the surrounding landscape is not desirable or feasible, fencing should use rough-hewn stacked timbers in highly visible areas within the Ponderosa Pine and Anderson Mesa Landscape Character Zones, except where barbed wire is needed for range, wildlife, or other specific management.

Visually attractive trees and understory shrubs<sup>22</sup> should be favored when leaving vegetation in the Foreground (1/2 mile or less)<sup>23</sup> of Concern Level 1 and 2 travel routes.

Stems should be flush cut if possible and at a maximum cut to within 6 inches of the ground in the Immediate Foreground (300 feet or less)<sup>24</sup> of Concern Level 1 travel routes.

When possible, new log landings, roads, and designated skid trails should be located out of view to avoid observation of bare mineral soil from Concern Level 1 and 2 travel routes.

Straight lines and geometric shapes should be avoided at the edges of openings and stand boundaries.

Where fire management activities occur, brown needles and other evidence of fire activities should be permissible for up to 3 years after burning in areas of High Scenic Integrity and 5 year in Moderate Scenic Integrity.

## Management Approach for All Scenic Resources

A decision to change the scenic integrity objectives will be documented in a project-level NEPA decision document and in the Plan Desired Scenic Integrity Objective map.

Priorities for rehabilitation of sites and facilities that do not meet scenic integrity objectives may consider the following:

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<sup>20</sup> Descriptions of the terms “minimal”, “slight” and “moderate” can be found in Agricultural Handbook Number 701: Landscape Aesthetics. In general, “minimal” means deviations are not evident because they closely follow the form, line, color texture and pattern common to the landscape character, “slight” means that noticeable deviations are subordinate to the landscape character being viewed, and “moderate” means deviations may begin to dominate the landscape but borrow from the characteristics of the valued landscape character.

<sup>21</sup> Alterations are long-term alterations to the landscape and not intended to restrict short-term impacts to scenery from construction, fire management, drilling rigs or other short-term activities.

<sup>22</sup> Visually attractive trees are those that are pointed out for particular scenic value in the landscape character zone desired conditions.

<sup>23</sup> The Foreground may be less than 1/2 mile as determined by site-specific visibility modeling.

<sup>24</sup> The Immediate Foreground may be less than 300 feet as determined by site-specific visibility modeling.

- relative importance of the area and the amount of deviation from the scenic condition objectives; "foreground" of high public-use areas has highest priority
- length of time it will take natural processes to reduce the visual impacts so that they meet the scenic condition objective
- length of time it will take rehabilitation measures to meet the scenic condition objectives
- benefits to other resource-management objectives to accomplish rehabilitation.

The Forest Service may cooperate with other entities, such as AZDOT, local governments, and commercial and private entities to protect scenic integrity on and adjacent to the national forest.

## **Special Uses**

### **Land Special Uses**

#### **General Description for Land Special Uses**

Special uses permits authorize a large variety of activities on the national forest. Land special uses are not related to recreation and may include activities such as utility lines, road use, communication sites, research, and wind energy development.

#### **Desired Conditions for Land Special Uses**

Infrastructure on national forest lands associated with private land needs (e.g., utilities, waterlines, roads and bridges) meets scenic goals, particularly as viewed from the highways, concern level 1 travelways, and recreation sites. New utility construction and reconstruction of existing utility lines uses existing rights-of-ways to the extent practical to provide utility access and services to private land and communities. Utility lines, such as pipelines, power lines, fiber optic lines, and telephone lines are buried unless there are overriding environmental or technical concerns that would prevent burial. The location of new, large linear infrastructure such as power lines has minimal effects to wildlife and minimizes habitat fragmentation.

Existing communication sites and utility corridors are used to their maximum capacity with compatible utilities where additions are environmentally and visually acceptable before considering new routes and sites. New corridors will avoid research natural areas, geological and botanical areas, and environmental study areas. New communication sites are rare and occur only when a broad public need is demonstrated. Powerlines and towers are built (construction or reconstruction) to specifications compatible with raptor use.

Information about the screening process for special use permits is available and understandable to the public.

The Forest supports alternative energy production and facilitates its development while mitigating impacts to resources and public values. Alternative energy developments, such as wind energy, are designed to minimize impacts to other uses and resources, in particular wildlife and scenic integrity.

Commercial filming using aircraft is limited in all management areas except the House Mountain-Lowlands Management Area

Research permitted on the national forest is focused on improving the general scientific understanding of natural and social systems. Research projects conducted under special use permits: helps realize and understand the scientific potential of the abundant cultural and natural resources found on the Coconino National Forest

- are clearly related to the mission of the Forest Service
- do not interfere with recreation opportunities for the general public
- do not introduce new invasive exotic plants or animals
- do not negatively impact long-term vegetation structure and composition or vegetation management objectives for the vegetation type.
- provide needed data for future forest management
- are co-located with other research activities, when possible
- expand the knowledge of rare species on the Forest

### **Guidelines for Lands Special Uses**

Utility rights-of-ways should be located and maintained to conform with natural-appearing patterns of native vegetation to the extent possible.

New overhead utility lines and support towers should be located to minimize adverse environmental and scenic impacts and screened, where possible.

Structures, such as communication sites, should have finishes that reduce contrast with the desired landscape character.

Expansion of existing communication sites and utility corridors with equipment of a comparable scale should be allowed before creating new sites or corridors.

Where environmental or technical concerns prevent the burial of utility lines, scenic integrity objectives should be maintained to the extent feasible.

Aircraft activities related to commercial filming should be restricted to protect threatened, endangered, and sensitive species from noise disturbance.

Special use permits for diversion ditches across NFS lands should be maintained in a way that minimizes disturbance of vegetation and hydrological conditions.

Commercial filming at cultural sites should generally be prohibited.

### **Management Approaches for Land Special Uses**

Work to ensure that all communication sites have a Communication Site Plan in place.

Look at Landscape Character Zone desired conditions, when considering whether or not a permit would be consistent with the scenic integrity objectives. For instance, astronomical facilities in the Ponderosa Pine and Anderson Mesa LCZ's.

**Coordinate with the research community to identify and manage long-term research locations.**

## Recreation Special Uses

### General Description for Recreation Special Uses

Special use permits authorize services that support the Forest Service mission and meet the needs of the public. These permits are a partnership between the Forest Service and private businesses and individuals to provide services and facilities, such as outfitter-guide services, skiing, and special events.

### Desired Conditions for Recreation Special Uses

Special use activities blend into the landscape and do not draw attention to the activity or equipment. Commercial tours are focused on main roadways and vistas as well as selected recreation locations. They support the Forest Service mission by providing high-quality outdoor recreational and educational and interpretive opportunities. If the need can be demonstrated, commercial tours are allowed to provide opportunities for scenic viewing, natural history education, wildlife viewing, and other activities that are compatible with resource protection, user experiences, and Forest direction.

Commercial and recreational activities occur during times and in locations that are consistent with the needs of national forest users and area residents. These activities are consistent with other direction for the location including ROS objectives, resource protection and community goals. Commercial use travel is limited to roads and trails on the Motor Vehicle Use Map, or to sites designated in an operating plan for such use. Exceptions include activities that require very limited access over a short period of time, such as hot air balloon retrieval and similar activities, where this access is specified in the permit. Livestock used in special use activities does not negatively impact areas where forage is limited.

Outfitter/guide permits or permit use does not cause a significant change for the ROS social or managerial setting, such as allowing airboats or seaplanes on the lakes that are at a less developed ROS setting. Generally, motor vehicle use for outfitter-guide activities occurs on roads and trails displayed on the Motor Vehicle Use Map. Commercial uses are encouraged to use non-National Forest System lands for their activities when their proposed use is not consistent with national forest goals and can be accommodated on non-National Forest System lands.

Large group gatherings and recreation events are discouraged outside of areas that have already been analyzed for resource issues or suitably developed sites. These sites provide a range of opportunities from a natural, "outdoor" experience to commercial amenities for visitor comfort. Applicants are encouraged to use non-National Forest System land for staging when possible. Pre-approved sites are generally areas that are compatible with use by the general public and are identified based on their ability to support large group activities with minimal resource impacts. They do not have long-term evidence of erosion or invasive exotic species as a result of special use activities. In general, events occur where they will disrupt the general public's use of the land.

Recreation residences and commercial facilities on the Forest meet State and county health and safety standards. Their footprints are stable with some exceptions to accommodate improvements that address health safety and environmental issues. Organization camps managed under special use permits are focused on natural resource values, conservation education, and emphasize non-motorized recreation opportunities.

## **Objectives for Recreation Special Uses**

Replace through permit administration all outhouses (outbuildings with one or more seats and a pit serving as a toilet) at recreation residences within XX years of plan approval with facilities that meet sanitation requirements.

Identify and approve XX sites for recreation events and large group gatherings within XX years of plan approval.

## **Standards for Recreation Special Uses**

Prohibit motorized aircraft landings and takeoffs associated with outfitter-guide activities on National Forest System lands and waters, except for emergencies and rare administrative support activities.

Require permit holders to rehabilitate non-NFS trails and other sites created by activities authorized under special use permits.

## **Guidelines for Recreation Special Uses**

Outfitter-guide motor vehicle use and camping activities should be excluded from areas with a high density of archeological sites, sensitive wildlife areas, including riparian areas or areas with sensitive or rare plants, and adjacent to urban areas.

Special use permits should not be given for activities proposed to occur within 200 feet of perennial streams, springs, or sensitive waters. Exceptions will be for hardened or slickrock sites, for activities in support of approved research, to improve safety, or to provide for site rehabilitation.

Commercial tours at high interest archeological sites such as Honanki, should be consistent with site protection and visitor experience objectives.

Air tour companies and rock climbing activities should not disturb occupied eyries between March 1 to August 31, to protect the area during the peregrine falcon breeding season and to protect other raptor species.

Outfitter/guide activities or group activities should not generally occur in Deadman Wash, Dry Lake Hills, Walnut Canyon from Fisher Point east, and Pumphouse Wash.

Special use events should occur on the Snowbowl Road infrequently and should not interfere with use of the area by the general public or permittees near the Snowbowl Ski area.

Where forage is limited, require overnight campers with recreational livestock to carry cubed, pelleted, or rolled feed. Feeds shall be free of viable noxious-weed seeds.

Sites pre-approved for special use activities should be rated/designed to accommodate a specific number of people.

## **Management Approaches for Recreation Special Uses**

Priority is given to permit applications received in response to a prospectus issues by the Forest Service. Unsolicited proposals will be evaluated on a case-by-case basis as workload allows.

Before permitting outfitter/guides adjacent to national monuments, contact the National Park Service for coordination. Outfitter guiding might also help meet the mission of the National Park Service in the national monuments or on adjacent national forest lands. Work cooperatively with NPS for special uses requests that occur on both Forest Service and NPS lands.

Coordinate wildlife viewing permits with the Arizona Game and Fish Department.

## **Forest Products**

### **General Description for Forest Products**

National forest lands were reserved with the intent of providing goods and services to satisfy public needs over the long-term. Among these goods is the production of a sustainable supply of forest products. The focus of the Forest Service has broadened over time, and the desired conditions for this plan are focused on outcomes rather than outputs.

Forest products fall into three categories: timber, special forest products, and forest botanical products.

Timber products include, but are not limited to, firewood, wood pellets for home and industrial heating, structural panels, animal bedding, wood molding, pallets, structural lumber, posts and poles, sawtimber, pulpwood, non-sawlog materials removed in log form, cull logs, small roundwood, house logs, and biomass to electricity. Timber products can be measured in cubic or board feet of solid wood.

Special forest products include, but are not limited to, bark, berries, boughs, bryophytes, bulbs, burls, cactus, Christmas trees, cones, ferns, firewood, forbs, fungi (to include mushrooms), grasses, mosses, nuts (to include piñon nuts), pine straw, roots, sedges, seeds, transplants, tree sap, wildflowers, fence material, mine props, posts and poles, shingle and shake bolts, and rails. Special forest products do not include minerals, animals, animal parts, insects, worms, soil, and water.

Forest botanical products are naturally occurring special forest products, including, but not limited to, bark, berries, boughs, bryophytes, bulbs, burls, cactus, cones, ferns, fungi (to include mushrooms), forbs, grasses, mosses, nuts (to include piñon nuts), pine straw, roots, sedges, seeds, shrubs, transplants, tree sap, and wildflowers. Forest botanical products are not rocks, minerals, animals, animal parts, insects, worms, soil, or water.

Special forest products and forest botanical products do not have a common standard conversion to cubic or board feet of solid wood.

### **Desired Conditions for Forest Products**

The Forest provides a sustainable supply of forest products within the capacity of the land to produce these goods and within applicable laws and regulations.

Silvicultural treatments reflect natural disturbance regimes and contribute to ecosystem sustainability. On forested lands suitable for thinning, timber management activities are designed to integrate considerations for socio-economic values, water quality, soils, wildlife habitat, recreation opportunities, visual quality, and other values, while providing opportunity for a sustainable and appropriately scaled industry.

Timber products are available to businesses and individuals in a manner that is consistent with other desired conditions and that is on a sustainable basis within the capacity of the land. Timber products are available to local American Indian tribes for subsistence and traditional purposes, such as kiva beams.

Forest botanical products remain on the Forest unless collection is authorized by permit and occurs in a manner that ensures the products collected persist on the Forest.

Traditional tribal uses for forest botanical products, such as the collection of medicinal plants, wild plant foods, basketry materials, and fire wood, are facilitated. Boughs and herbaceous plant parts used for American Indian traditional and ceremonial purposes are available under conditions and procedures that minimize restrictions, and are consistent with laws, regulations, and agreements with tribes.

### **Management Approaches for Forest Products**

When forest products are available as a result of forest management activities, work with agencies, private organizations, and individuals to promote forest product use.

Encourage use of forest products in lieu of onsite burning or chipping.

Ensure the continued sustainability of special forest products through observation of commercial sales and personal-use permit harvest levels.

Recognize the rights of members of tribes whose aboriginal territories include the land now administered by the Coconino NF to collect forest materials for traditional, ceremonial, and subsistence purposes.

Collaborate with tribal governments through nation-to-nation agreements, annual project consultations, formal and informal meetings, and other methods on the management of species important to maintaining the social and cultural well-being of tribes.

Provide training to Forest employees about the trust responsibilities Federal agencies have for tribes, and the specific ways in which the Coconino NF honors and implements those responsibilities.

Encourage tribal members to engage in traditional activities relating to forest botanical products, such as the collection of medicinal plants, wild plant foods, basketry materials, and fuel wood for traditional and cultural purposes..