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Draft Revised Land Management Plan for the Sequoia National Forest

Fresno, Kern and Tulare Counties, California



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Service

Pacific Southwest
Region

Sequoia National
Forest

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Cover: Image of the upper slope of Coyote Creek drainage.

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Fresno, Kern and Tulare Counties, California

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Chapter 1. Introduction

Location

The Sequoia National Forest, one of eighteen national forests in California, is located at the southernmost end of the Sierra Nevada (Figure 1). It encompasses approximately 1.1 million acres, within Tulare (62%), Kern (26%), and Fresno Counties (12%). There are about 46,000 acres of private, state, county and other land ownerships embedded within the boundaries of the Sequoia National Forest. Other land managers in the region include the National Park Service, Bureau of Land Management, Army Corps of Engineers, and the Tule River Tribe.

It is bordered by the Sierra National Forest to the north, the Inyo National Forest to the east, and the Tule River Indian Reservation to the west. The forest has two major sections divided by the Sequoia and Kings Canyon National Parks. Much of the Giant Sequoia National Monument is managed by and within the boundaries of Sequoia National Forest and is covered under a management plan approved in 2012.

The forest is divided into three ranger districts: the Hume Lake Ranger District on the north end, the Western Divide Ranger District just east of Springville, and the Kern River Ranger District at the southern end near Lake Isabella. The Sequoia National Forest supervisor's office is located in Porterville, California.

Distinctive Roles and Contributions of the Plan Area

The Sequoia National Forest is described as the gateway to the southern Sierras, characterized by soaring granite monoliths, glacier-carved canyons, limestone caves, roaring world-class whitewater, scenic lakes and reservoirs, and towering conifers. The Sequoia National Forest is named for the world's largest trees, giant sequoias, and contains the greatest concentration of giant sequoia groves in the world. Thirty-three groves and the areas around them are protected within the Giant Sequoia National Monument (Figure 1).

Elevations range from 790 feet in the Lower Kern River Valley to 11,873 feet in the Golden Trout Wilderness. The elevation span, combined with the variability in aspect and slope created by deep river canyons, a variety of geology and soils, and precipitation that comes primarily as rain at low elevations and snow at high elevations, creates high diversity of ecosystems across the forest. The Sequoia National Forest has a particularly diverse assemblage of plant communities and a high diversity of rare and endemic plants because the forest is situated at the crossroads of five different geographic and floristic provinces: Sierra Nevada, San Joaquin Valley Grassland, Great Basin Desert, Mojave Desert, and Tehachapi Mountains.

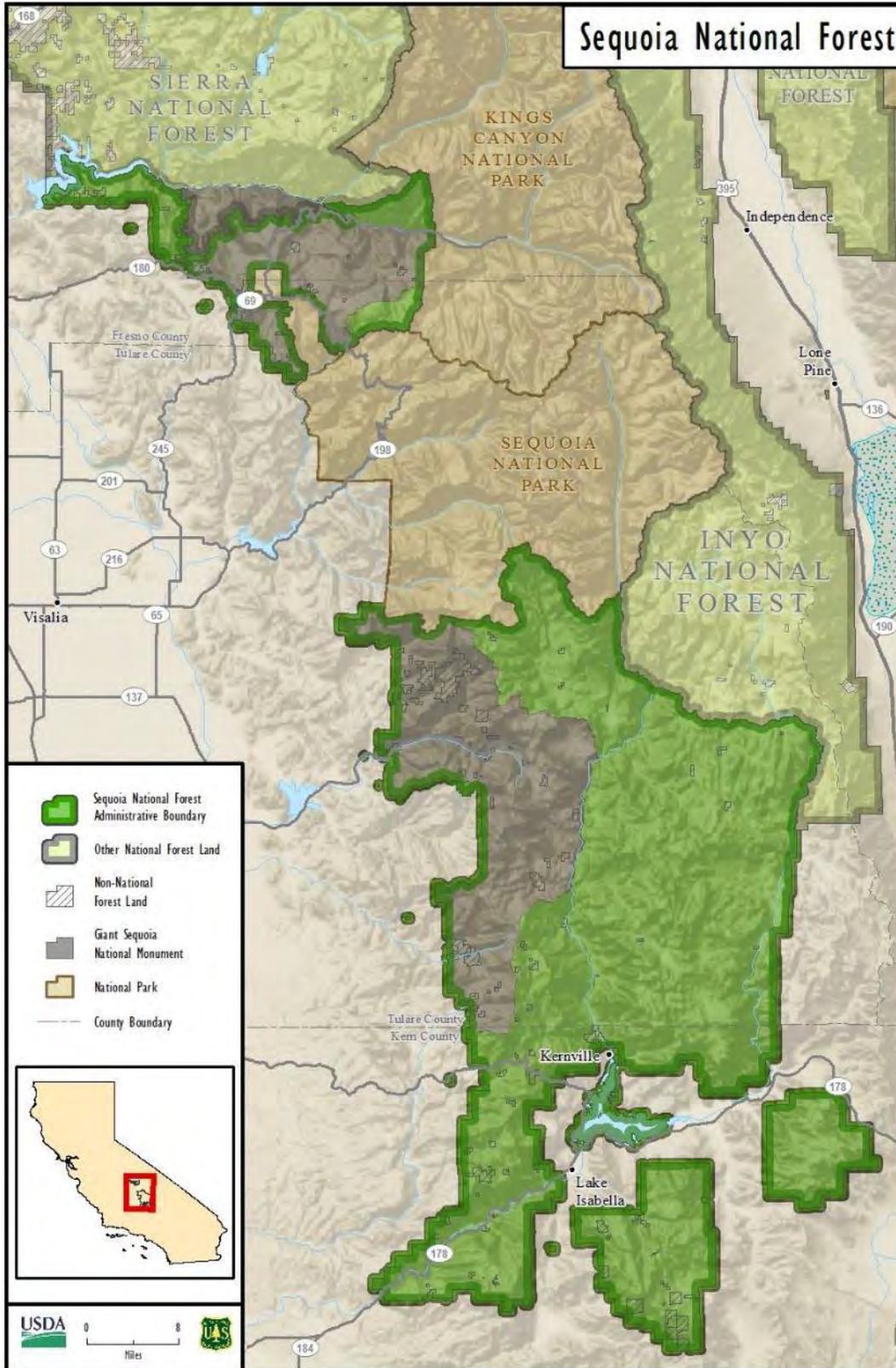


Figure 1. Vicinity map of the Sequoia National Forest

The Sequoia National Forest is inhabited by over 2,000 plant species, and approximately 304 species of terrestrial wildlife: 194 bird species, 85 mammal species, 13 amphibian species, 25 reptile species, and nine native fish species. The iconic California golden trout and its cousin, the threatened Little Kern golden trout, are found in Kern River tributaries. The southern Sierra Nevada, including the Sequoia National Forest, is one of three native sites in California and Oregon for the Pacific fisher, a federal candidate species, whose original range included much of the western United States and Canada. The forest's terrestrial and aquatic plant and animal species, and the resulting biodiversity, are critical for resilient and healthy forest ecosystems upon which all social and economic contributions depend.

This varied landscape is also treasured by people. These lands and people are connected and have a strong influence on each other. Native Americans have inhabited these areas for thousands of years and their diversity, longevity, and importance in the region result in deep cultural ties to the forest and surrounding lands. The forest lies in the traditional territories of seven federally recognized tribes, as well as 13 unacknowledged tribes, tribal groups, and tribal organizations. Tribal communities are contacted and consulted, and are important partners in forest management activities.

The Sequoia lies between the Los Angeles Basin and the San Francisco Bay population centers, making recreational uses on the forest extremely important, both socially and economically, and recreational users develop deep affinities for particular places and experiences. Outdoor recreation also creates economic benefits by serving as a draw for businesses and high-skill workers.

The Sequoia National Forest features a diverse range of settings and special places for people to enjoy, from the dramatic Kings Canyon, through the ancient giant sequoias, down to the mighty Kern River, the Lake Isabella Reservoir, and on to the forested Kern Plateau and desert-like Piute and Scodie Mountains. Opportunities are plentiful for viewing scenery, driving for pleasure, hiking, fishing, horseback riding, mountain biking, paddling, climbing, cross country skiing, snowshoeing, over snow vehicle use, and off-highway vehicle use.

The majority of visitors to the Sequoia National Forest originate from California's Central Valley and the extensive urban areas of southern California. For these visitors, the higher elevations and bodies of water offer a cool retreat from hot summer temperatures, and a reprieve from the stress of urban living. National and international visitors are drawn to iconic natural features such as the giant sequoia groves in the Giant Sequoia National Monument, 60 miles of world class white water opportunities on the Kern River, and climbing destinations on granite monoliths such as the Needles. Most visitors to the Sequoia National Forest spend at least one night; therefore, overnight accommodations are an important element of most recreation experiences.

The Sequoia National Forest is within a four hour drive of nearly half of the 37 million people who make their homes in the State of California. This pool of potential visitors is one of the most ethnically diverse in the world, challenging the Sequoia to look at nontraditional methods of providing services.

Forest facilities offer experiences that range from highly developed campgrounds and picnic areas, to minimally developed overnight and day use areas that serve primarily as access points to trails, creeks, rivers and general forest areas for people who prefer to the forest without the amenities that developed sites provide. Key developed recreation areas include campgrounds and day use sites at Lake Isabella, along the Kern River, and on the Kern Plateau. The Greenhorn Mountains and Piute Mountains provide valued dispersed recreation opportunities. The resulting

tourism from recreational opportunities in the forest contributes to the economic stability of some local communities. Visitor spending supports jobs, creates revenue for local businesses, and generates county sales tax revenues used to provide local public services.

The Sequoia National Forest has six areas designated as wilderness and one area proposed for wilderness (within the Giant Sequoia National Monument), adding up to 314,310 acres, or 27 percent of the forest. These areas offer solitude and vast open spaces as part of one of the largest contiguous blocks of wilderness in the continental United States.

The Sequoia National Forest provides opportunities for nature-based education to a wide variety of local and area residents. Programs like the youth conservation corps and wild places provide opportunities to students from communities in and around the San Joaquin Valley to learn about natural resources, and to contribute to stewardship.

The San Joaquin Valley, located to the west, is mostly rural and agricultural in character and has historic economic and cultural ties to the commodities that are produced on the forest. In addition, the valley is home to urban centers with a growing and increasingly diverse racial and ethnic population that is seeking new and evolving recreational opportunities. Within this ecological, social, and economic landscape, the Sequoia National Forest contributes a vast array of benefits.

Cultural opportunities are also an important contribution of forest lands. Tribal communities benefit socioeconomically through the use of cultural resources for artisan and craft materials, medicinal purposes, fuel, and traditional foods, and by supporting heritage tourism and recreation. Cultural resources on the Sequoia National Forest also enhance the sustainability of tribal communities by providing opportunities for traditional ceremonies and religious practices that strengthen the community's sense of place and self. Gathering activities on the forest play an important role in contributing to social, economic, familial and religious benefits. Native American areas for gathering and distributing wealth and resources on the Sequoia National Forest include sedge beds, sour berry patches, meadows, elderberry patches and black oak groves. The young fronds of bracken fern are used in several types of Asian cuisine by residents of the Central Valley.

While many visitors enjoy the opportunities the Sequoia National Forest provides, there are many people that call the forest their home. Most private property is concentrated around small residential communities that have grown within or adjacent to the Sequoia over time. There are also isolated private properties scattered throughout the forest that support ranching interests, isolated residences, and second homes. Reducing fire hazards to adjacent lands and communities is a key contribution of the Sequoia National Forest to local communities. Wildfires are actively suppressed on national forests when needed to protect key resources and to prevent intrusion of dangerous fires into communities. Tools used to reduce hazardous fuels and maintain fuel conditions that support fires that are characteristic of complex ecosystems include: wildfires managed to meet resource objectives; prescribed burning; and mechanical treatments.

Watersheds in the Sequoia drain into the Tulare Buena Vista Lakes Hydrologic Province and contribute to municipal water supplies, agricultural uses, recreation, warm and cold freshwater habitat, groundwater recharge and freshwater replacement. Most of the runoff from the northern Sequoia National Forest is carried by the Kings River to Pine Flat Lake and Dam. In the southern section of the forest, the Kern River flows into Isabella Lake and then down into the southern end of the Central Valley. Three reservoirs on or adjacent to the Sequoia National Forest have an historic average of approximately 1,360 thousand acre feet of water and ultimately supply water to the populations and agricultural industries of the southern San Joaquin Valley. Six

hydroelectric projects are located on the forest, four on the Kern River, and two on the Tule River. These contributions of the forest are absolutely critical in supporting the economic and social sustainability of jobs, rural culture and quality of life in the San Joaquin Valley. There are also benefits to people living outside of the Valley who value the commodities obtained from continued agricultural production in the area, one of the most diverse and fertile agricultural areas in the world.

The forest is also a source for timber with approximately 124,000 acres of productive forest land available and a rolling average timber volume sold of 3,800 thousand board feet between 2008 and 2012. This timber production helps to support three sawmills in the small communities of Terra Bella, Chinese Camp, and Standard. This contribution is important socially and economically as the mill in Terra Bella is the last remaining mill in California south of Yosemite National Park.

The rangelands of the Sequoia National Forest have been grazed by livestock since the late 1800s. Grazing contributes to the economic and social wellbeing of people by providing economic diversity and by promoting stability for families that depend upon range resources for their livelihood.

The benefits from all forest contributions provide tremendous ecological, social and economic value. Some of these benefits of the forest are more easily appreciated than other benefits. For example, forest recreation, cultural opportunities and a clean water supply are enjoyed directly by people and communities as a whole. Other vital forest ecosystem services provide benefits like biodiversity that are less apparent in our daily lives but are important because they support and regulate the ecosystems and social environments in which we live. The term “value“ is used here to represent something more inclusive than a monetary value and captures the idea that all contributions of the Sequoia National Forest, even when they are not directly related to dollars that are spent or received, still contribute to improving the quality of our lives.

Purpose of the Forest Plan

Every national forest managed by the Forest Service is required to have a land management plan (forest plan) that is consistent with the National Forest Management Act of 1976 (16 U.S.C. 1604) and other laws. The National Forest Management Act directs that these plans be amended as necessary and revised within 15 years. Forest plans are one of three levels of planning and decision-making that guide how we manage National Forest System lands.

The first and broadest level of planning occurs at the national level through the United States Department of Agriculture Forest Service Strategic Plan, a 5-year plan that allows public transparency of the agencies goals, objectives and accomplishments. The second level of planning occurs at the level of National Forest System administrative units through forest plans. The third level of planning includes development of on-the-ground projects and activities, which are designed to achieve the desired conditions and objectives of the forest plan. Projects and activities must be consistent with the forest plan.

Forest plans are intended to be strategic, meaning they identify long-term or overall desired conditions and provide general direction for achieving those desired conditions. Forest plans focus on outcomes, and are flexible to allow management to adapt to local conditions. Generally, forest plans are not tactical and do not specify particular methods that must always be used and do not require resources to be allocated. Forest plans emphasize strategic decisions: “why” and “what,” and to a lesser extent, “when” and “where.” The “how” decision is generally made at the

tactical or project planning level, and includes a set of site specific details of time, place and circumstances of a particular project proposal.

Forest plans themselves do not compel any action, authorize projects or activities, or guarantee specific results. A project might be needed because of a discrepancy between current conditions and desired conditions. Projects may be proposed in response to demands by the public or to respond to forest plan objectives. When a project is proposed, it is first checked against the suitability of areas. If the project is an appropriate use, then relevant design criteria, standards and guidelines are used. The proposed action for the project is then analyzed using appropriate National Environmental Policy Act procedures. If the project is not consistent with the forest plan, the project may be redesigned or rejected, or a forest plan amendment may be considered. After the project is completed, it is evaluated against plan desired conditions and objectives.

A forest plan guides and constrains Forest Service personnel, not the public. Any constraint on the public needs to be imposed by law, regulation, or through the issuance of an order by the Responsible Official under 36 CFR part 261, Subpart B. In addition to forest plans, management of National Forest System lands is also guided and constrained by laws; regulations; and policies, practices, and procedures that are in the Forest Service Directive System. These are generally not repeated in forest plans.

Adaptive Planning

Forest planning is a continuous process that includes; assessment; plan development, amendment, revision; and monitoring. The intent of this forest planning framework is to create an integrated approach to the management of resources and uses, incorporate the landscape-scale context for management, allow the Forest Service to adapt to changing conditions and improve management based on monitoring and new information.

An adaptive forest plan recognizes that there is always uncertainty about the future of natural systems and the timing and type of disturbances. Social conditions and human values regarding the management of national forests are also likely to change. Given that the setting for forest plan implementation will be changing over time, the forest plan incorporates an effective monitoring program, capable of detecting change, with an adaptive flexibility to respond to those detected changes. The forest plan monitoring program recognizes key management questions and identifies measurable indicators that can inform the questions. When conditions change beyond what was anticipated in the forest plan, a responsive process using narrow amendments can be used to adjust plans between revisions.

The planning framework creates a structure within which land managers and partners work together to understand what is happening on the land. It is intended to establish a flexible forest plan that allows the forest to adapt management to changing conditions and improve management based on new information and monitoring.

Plan Structure

In Chapter 1 we have introduced the Sequoia National Forest plan area, distinctive roles and contributions, and described the purpose and structure of a forest plan. Chapters 2, 3 and 4 provide the framework for integrated resource management and for guiding project and activity decision-making. Chapter 2 is the vision section that provides the foundation of the plan, the desired conditions. Desired conditions describe the aspirations or visions of what the plan area (or portions thereof) should look like in the future, and drive the development of the other plan

components. Desired conditions essentially set forth the desired landscape of the future and the other plan components give guidance on how to get there.

Chapter 3 is the management strategy section that builds upon the foundation of chapter 2 and guides subsequent tactical planning. This chapter first describes the expected and measurable outcomes and potential management approaches that apply to specific parcels of land, which can include management areas, geographic areas, designated areas, recommended designated areas, and priority watersheds. Chapter 3 also identifies the following: suitability of lands, which describes areas generally suitable or not suitable for various uses or activities; plan objectives, which describes objectives or intermediate outcomes, that lead toward achievement of desired conditions; goals, which are used to describe outcomes that are not at the sole control of a national forest, such as the result of a partnership; and potential management approaches, which the Forest is inclined to use in order to be responsive to desired conditions and objectives.

Chapter 4, termed the design criteria section, supports the vision and management strategy and is designed to provide sideboards for projects or activities. It includes standards and guidelines that influence the design of projects and activities developed under this forest plan.

Chapter 5 describes the plan monitoring program that forms the basis for continuous improvement and provides information for adaptive management of the plan area. The purpose of monitoring in an adaptive management framework is to facilitate learning to support decisions on necessary changes to the plan. The plan monitoring program consists of a set of monitoring questions and associated indicators to evaluate whether plan components are effective and appropriate and whether management is effective in maintaining or achieving progress toward desired conditions and objectives for the plan area.

The appendix section includes the following sections: maps (appendix A), proposed and possible actions (appendix B), a plan for a renewed partnership focus for the Inyo National Forest (appendix C), management strategies for resolving recreation resource conflicts (appendix D), and timber suitability (appendix E).

Plan Components

An integrated plan means that all plan components work together toward achieving or maintaining desired conditions and are internally consistent. The plan components work together as a whole to meet the requirements of the 2012 Planning Rule (36 CFR 219.8 through 219.11), but this does not mean that all uses must be provided for on all lands.

This plan includes five plan components that guide future project and activity decision making: desired conditions, objectives, standards, guidelines, and suitability of lands. These five plan components, along with other plan content, are organized according to the chapters 2, 3 and 4 as described above. The five components are described as:

A desired condition is a description of specific social, economic, and/or ecological characteristics of the plan area, or a portion of the plan area, toward which management of the land and resources should be directed. A desired condition description is specific enough to allow progress toward achievement to be determined but does not include a completion date.

An **objective** is a concise, measurable, and time-specific statement of a desired rate of progress toward a desired condition or conditions. Objectives are based on reasonable foreseeable budgets.

The **suitability of lands** is determined for specific lands within the plan area. The lands are identified as suitable or not suitable for various uses or activities based on desired conditions applicable to those lands. The suitability of lands is not identified for every use or activity. If certain lands are identified as not suitable for a use, then that use or activity may not be authorized. Appendix E identifies lands that are not suitable for timber production.

A **standard** is a mandatory constraint on project and activity decision making, established to help achieve or maintain the desired condition or conditions, to avoid or mitigate undesirable effects, or to meet applicable legal requirements.

A **guideline** is a constraint on project and activity decision making that allows for departure from its terms, so long as the purpose of the guideline is met. Guidelines are established to help achieve or maintain the desired condition or conditions, to avoid or mitigate undesirable effects, or to meet applicable legal requirements.

Plan components that apply forestwide or to land of specific character (e.g., vegetation types) are spread throughout the chapters of this document, especially in the vision (desired conditions), management strategy (suitability of lands and plan objectives), and design criteria (standards and guidelines) chapters. Plan components that apply to specific parcels of land, such as management areas, geographic areas, and designated areas, are consolidated under the respective areas they apply to in the management strategy chapter.

The forest plan uses a unique coding system to identify plan components and where they apply using the following pattern: AAA-BBB-CCC. The series of letters before the first dash references either a resource area (e.g., WTR for watershed conditions) or a type of spatial area (e.g., MA for management areas). The middle series of letters reference where the plan components apply (e.g., FW for forestwide), land of specific character (e.g., RFIR for the red fir vegetation type), or mapped parcels of land (e.g., CWPZ for the community wildfire protection zone). The third series of letters references the type of plan components (e.g., DC for desired conditions). So the unique coding for air resources (AIR) forestwide (FW) desired conditions (DC) begins with AIR-FW-DC, followed by the specific code number; and the codes for the management area (MA) wildfire restoration zone (WRZ) guidelines (GDL) begins with MA-WRZ-GDL.

Chapter 2. Vision

Introduction

The visions or aspirations of what the plan area, or portions thereof, should look like in the future are expressed in terms of desired conditions. Desired conditions are developed within the context of the forest's distinctive roles and contributions, and include specific cultural, ecological, social, and economic characteristics of the plan area. Desired conditions essentially set forth the desired landscape of the future while the other plan components give guidance on how to get there.

Desired conditions are developed according to the geographic scale where they apply. The conditions that apply forestwide or to land of specific character (e.g., vegetation types) are presented here in chapter 2. Desired conditions and other plan components that apply to specific parcels of land, such as management areas and designated areas, can be found in chapter 3, the management strategy section of this document.

Desired Conditions

Air

Desired conditions and other plan components for air quality apply forestwide or to Class I airsheds, which have the highest standard of air quality. Class I airshed status applies to designated wilderness areas which were larger than 5,000 acres and in existence in 1977. On the Sequoia National Forest, the Domelands Wilderness is a Class I area.

Forestwide (AIR-FW-DC)

- 01 The air quality value of visibility in Class I airsheds is maintained or improved to the natural background condition specified in the California Regional Haze State Implementation Plan.
- 02 Wildland fuel loadings resemble natural range of variation conditions, reducing the potential for harmful effects on air quality from high intensity wildfires.

Watershed Conditions

Plan components found in the watershed conditions (WTR) sections of this plan cover the broad area of soils and water throughout the Sequoia National Forest at the watershed scale. Watersheds include riparian conservation areas (RCAs) and the riparian and aquatic environments contained within them, such as rivers, streams, meadows, springs and seeps. Figure 2 shows the relationship among watersheds, riparian conservation areas, and riparian and aquatic environments. Critical aquatic refuges (CARs) are subwatersheds selected by a national forest to provide a refuge for at-risk species and have plan components similar to those of riparian conservation areas. The management area section of chapter 3 presents plan components specific to riparian conservation areas and critical aquatic refuges.

The Forest Service's national Watershed Condition Framework (WCF) is used to identify priority watersheds for restoration. Priority watersheds are where plan objectives for restoration would concentrate on maintaining or improving watershed condition. Under the framework, the Forest

Supervisor is responsible for identifying priority watersheds using an interdisciplinary team process.

The list of priority watersheds can be changed administratively without a forest plan amendment. Watershed Condition Framework priority watersheds are mapped online at the USDA Forest Service Watershed Condition and Prioritization Interactive [map](#).

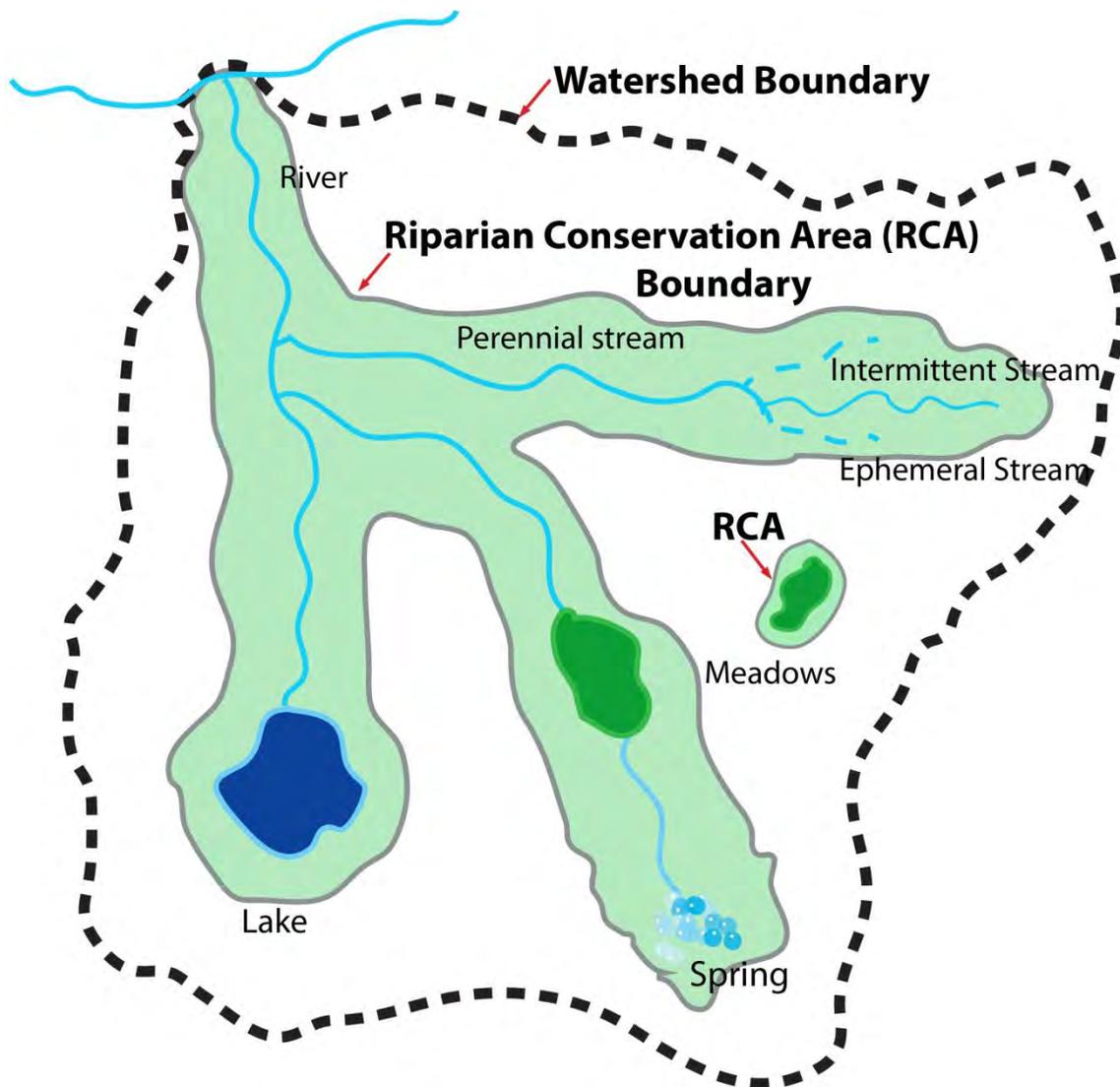


Figure 2. A schematic of the relationship of watersheds, riparian conservation areas, and riparian and aquatic environments

Forestwide (WTR-FW-DC)

- 01 Adequate quantity and timing of water flows support ecological structure and functions, including aquatic species diversity and native riparian vegetation. Watershed resilience to higher air temperatures, reduced snowpack, erratic runoff timing and other effects of climate change is maintained or restored.
- 02 Water quality is sustained at a level that retains the biological, physical and chemical integrity of aquatic systems and benefits the survival, growth, reproduction and migration of native aquatic and riparian species.
- 03 Watersheds have the following conditions: fully functioning or trending toward fully functioning and resilient; recover from natural and human disturbances at a rate appropriate with the capability of the site; have a high degree of hydrologic connectivity laterally across the floodplain and valley bottom, and vertically between surface and subsurface flows. Physical (geomorphic, hydrologic) connectivity and associated processes (i.e., runoff, flooding, in-stream flow regime, erosion and sedimentation) are maintained and restored. Watersheds provide important ecosystem services: high quality water; recharge of streams and shallow groundwater; maintenance of riparian communities; and moderation of climate change and atmospheric deposition. Watersheds maintain long term soil productivity.
- 04 Soil and vegetation function in upland and riparian areas are sustained and resilient. Healthy soils provide the base for resilient landscapes and nutritive forage for browsing and grazing animals, and support timber production. Healthy upland and riparian areas support healthy fish and wildlife populations, enhance recreation opportunities and maintain water quality.
- 05 Water quality meets the needs of water users, providing suitable water for cold and warm water species, swimming, irrigation, groundwater recharge and drinking after normal treatment.
- 06 Identified beneficial uses for a water body are adequately protected.

Terrestrial Ecosystems

Terrestrial (land-based) ecosystems are diverse across the Sequoia National Forest, changing with elevation and topographic features like slope and aspect (Figure 3). These are described in the following paragraphs in terms of ecological zones named the foothill zone, montane zone, upper montane zone, and the subalpine and alpine zones. The ecological zones were mapped broadly using elevation breaks, but vary on the ground in location with respect to aspect and other topographic or soil factors. Each zone has different dominant plants, seasonal weather and wildlife habitat. Because of these distinctions, each ecological zone has desired conditions described for the dominant vegetation types or subtypes. For the more wide-spread forest types in the mixed conifer zone, there are separate desired conditions for the drier versus wetter parts of the landscape. The nature of each vegetation type may vary by location but the desired conditions are designed to be broad enough to allow individual, site specific adjustments at the project level to adjust for these differences.

At the lowest elevations, rising above the valley floor is the foothill zone. The foothill zone is a mosaic of blue oak woodland savannahs and chaparral-live oak plant communities. At the upper

reaches of the foothill zone, ponderosa pine and black oak forests intermingle with the blue oak and chaparral communities.

The foothill zone reaches up into the coniferous forest-dominated montane zone, which is dominated by ponderosa pine and mixed conifer forests on the western slopes of the Sierra Nevada. White fir, sugar pine, incense cedar and occasionally Douglas-fir are intermixed throughout the montane zone. Ponderosa pine is dominant at the lower elevations and drier portions of this zone; at the higher reaches of the zone Red fir is present. The dry mixed conifer type occurs on the south and west aspects, ridges and upper slopes and is distinguished by typical dry site understory indicator plants such as buckwheat and iris. It has been altered greatly by fire suppression and past management actions. Formerly dominated by fire and drought resilient ponderosa pine and black oak, there is now a heavy ingrowth of white fir.

Moist mixed conifer forests are found in the montane zone where soil moisture is higher, such as lower slopes, drainages, north and east aspects or where water tables are close to the surface. Understory plants here include trailplant, false solomon's seal, starflower, fairy bells, hazel or Pacific dogwood. These areas have also been altered greatly by fire suppression and past management actions. Formerly co-dominated by ponderosa and sugar pine, it is now heavily dominated by white fir. Forests are more uniform, where formerly they were highly irregular and patchy.

Next the upper montane zone occurs at higher elevations and receives a high percentage of precipitation that falls as snow. This zone is primarily comprised of red fir forests, open Jeffrey pine woodlands, wet and dry lodgepole pine forests, meadows and riparian areas, and montane chaparral. Red fir is replaced by white fir in the Piute, Scodie, and Breckenridge mountains in the south. These vegetation types occur in a patchy mosaic across the upper montane landscape, depending on changes in elevation, topography, soils, climate and prior disturbance history. Fire is an especially important ecological process in the upper montane zone, influencing forest structure and composition patterns, such as intermingled patches of trees and open areas. As with lower montane forests, decades of fire exclusion, past timber harvest, and patterns of increasing high severity fire have resulted in increasing degrees of structural homogenization in upper montane forests at a landscape scale.

At the highest elevations, the sparsely vegetated subalpine and alpine zones occur. The subalpine zone has stands of high elevation conifers, including limber pine, western white pine, and lodgepole pine. Foxtail pine is also a component of the subalpine zone in the Golden Trout Wilderness. The alpine zone is generally referred to as "above timberline" but may have stunted trees, often referred to as *krummholz*. It supports a rich understory flora of over 600 species, 200 of which are limited to that zone.

In addition to the forested areas on the west side of the Sierra Nevada described above, the Sequoia National Forest has eastern and southeastern areas bordering the Mojave Desert and Great Basin. Here, small portions of the desert and pinyon-juniper ecological zones are found. Massive areas of rock outcrops occur throughout all of these vegetation types.

Desired conditions are described at different spatial scales, or extent of area. First, are landscape scale desired conditions, applying to areas greater than 10,000 acres. The intent is to provide conditions that cover multiple small or medium sized vegetation management projects or single very large (greater than 100,000 acre) sized projects. These are applied over multiple years, on a forest-wide basis. Ecological zones are broad and not exact—for monitoring at forest-wide and multi-forest scale.

Second, are the mid-scale desired conditions, applying to areas in the hundreds to thousands of acres. These desired conditions are applicable to smaller areas, such as a large single patch of vegetation or mosaic of patches in an area or sub-watershed. Third are the fine-scale desired conditions, applying to the variation on the ground of smaller vegetation elements, such as understory shrubs, gaps or small openings, and litter cover.

Patches are areas where there is similar dominant species and vegetation structure. They are similar to the term forest stand but encompass a broader range of ecological aspects. Patches may not be uniform but they are different from the surrounding areas. One may have a “salt and pepper” look from above of tree clumps and gaps and another may be a uniform sea of forest canopy. Some desired conditions include the term “within-patch”. This refers to changes at the fine-scale, like patches of shrubs or clumps of trees within patches.

Terrestrial ecosystem plan components do not apply to administrative or developed recreation sites. Areas covered by special use permits are subject to guidance in their operating plans.

Forestwide (TERR-FW-DC)

- 01 Each vegetation type contains a mosaic of vegetation conditions, densities and structures. This mosaic occurs at a variety of scales across landscapes and watersheds and reflects conditions that provide for ecosystem integrity and ecosystem diversity.
- 02 Vegetation conditions, particularly structure and composition, are resilient to climate change and to the frequency, extent and severity of ecological processes. These include fire in fire-adapted systems, drought, and flooding in riparian systems. Functioning ecosystems retain their essential components, processes and functions. Native insect and disease populations are generally at endemic levels with occasional outbreaks. Vegetation structural diversity usually restricts the scale of insect and disease outbreaks to local levels.
- 03 Ecological conditions contribute to the recovery of threatened and endangered species, conserve proposed and candidate species and support the persistence of species of conservation concern.
- 04 The landscape contains a mosaic of vegetation types and structures that provide habitat, movement and connectivity for a variety of species: wide-ranging generalists such as bear, mountain lion, and deer; more localized, semi-specialists such as ground-nesting, shrub- and cavity-nesting birds, and various bats; and specialists such as old forest and sagebrush associated species.
- 05 The carbon carrying capacity for a given ecosystem is stable or improving, given trends in climate change, fire and drought.
- 06 Fire occurs as a key ecological process in fire-adapted ecosystems where it does not pose an unacceptable risk to life and property. Fire occurs within an ecological appropriate regime of frequency, extent, and severity, and enhances ecosystem heterogeneity and habitat and species diversity.
- 07 Composition, density, structure and condition of vegetation help reduce the threat of undesirable wildfires to local communities, ecosystems and scenic character.

- 08 Landscape sustainably provides a variety of benefits that improve peoples' economic, social and physical wellbeing: clean water; forest products; livestock forage; carbon sequestration and storage stability; energy generation; recreational opportunities; landscapes with scenic character and scenic integrity; cultural uses; and biodiversity. Vegetation provides sustainable amounts of forest products that include wood fiber; biomass; forage; firewood; edible and medicinal plants; and boughs, bark, berries and cones for commercial, tribal, personal, educational and scientific uses. These products are provided while sustaining soil and water quality and productivity. Vegetation conditions support the long-term sustainability of these benefits to people by reducing the risk of undesirable fire effects, disease and mortality.
- 09 Vegetation types and vegetation conditions support continued use by tribes for traditional, ceremonial and medicinal purposes. Plants known to be used by tribes that traditionally use the forest are thriving.
- 10 Ecological conditions in relatively pristine landscapes (e.g., wilderness and recommended wilderness areas) are primarily the result of natural ecological processes, which occur with little direct human influence across the larger landscape.

Blue-Oak Interior Live Oak Woodland (TERR-BLU-DC)

- 01 Blue oak-Interior oak woodlands occur in a highly variable and complex landscape pattern. Blue oak dominates the overstory in patches but is co-dominant with interior live oak or foothill pine. Blue oak woodlands are a mosaic of varying age and size classes with mature oaks that provide acorns from older trees. There are occasional pulses of blue oak regeneration to successfully replace mortality in older trees.
- 02 Fires occur periodically to maintain lower levels of dead grass and litter levels so that they do not fuel intense fire. Fires typically burn with low to moderate vegetation burn severity.
- 03 In annual grasslands, native plant abundance is maintained or improved and provides enough residual plant matter at the end of the growing season to maintain germination potential, site productivity and to protect soils.

Chaparral-Live Oak (TERR-CHAP-DC)

- 01 Chaparral comprises native shrub and understory species that reflect the natural range of variation for the site. The chaparral vegetation type is composed of varying age classes and densities that protect against accelerated erosion, with two to 20 percent of the type in early seral grass and herbaceous cover, 5 to 20 percent in native herbaceous plants and shrubs, and 70 to 95 percent in dense shrubs.
- 02 Chaparral is in a constant state of transition from young to older stages and back again, with fire as the primary disturbance. High severity fires that kill most aboveground stems occur on average every 35 to 100 years. Fire-return intervals allow the buildup of native shrub and plant seeds in the soil seed bank and for the accumulation of fuels necessary to support fire-induced regeneration. Invasive non-native plants do not dominate between fires.

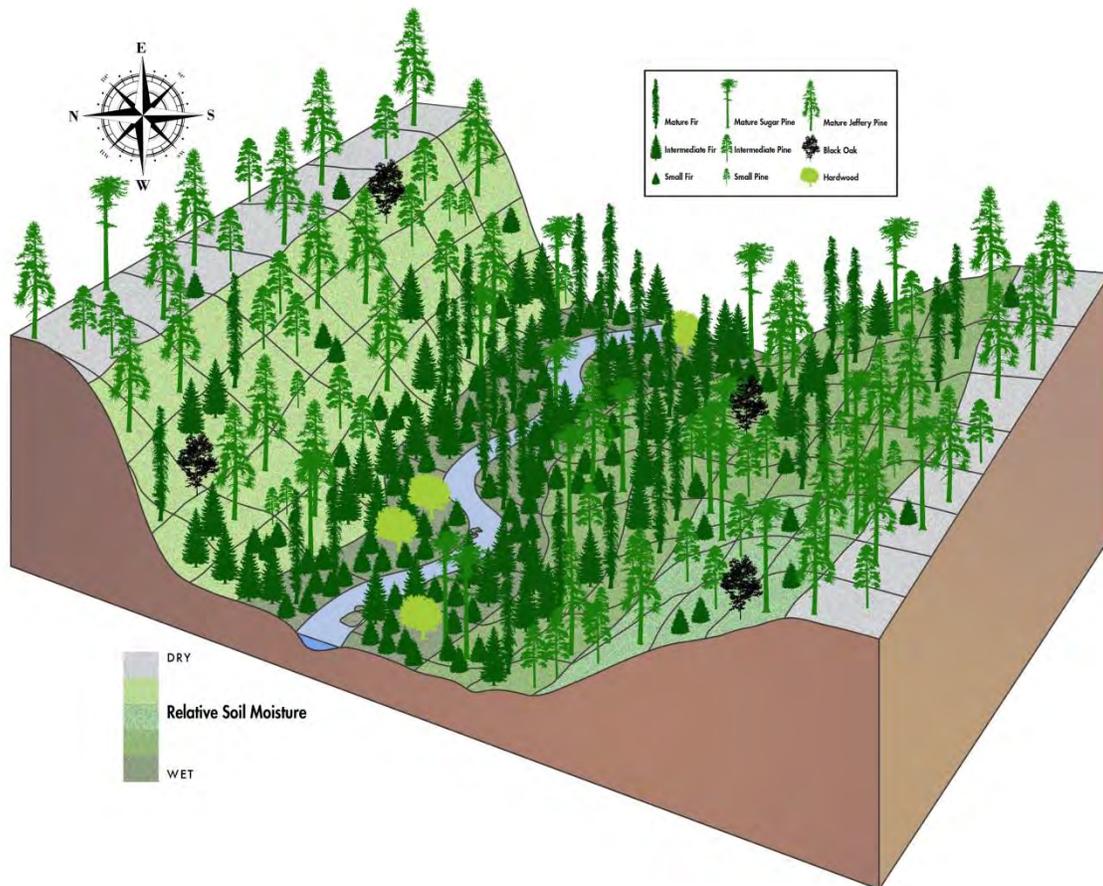


Figure 3. Variation in dominant trees and tree density¹

¹ North, M., P.A. Stine, K.L. O'Hara, W.J. Zielinski, and S.L. Stephens. 2009. An ecosystems management strategy for Sierra mixed-conifer forests, with addendum. General technical report PSW-GTR-220. U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station, Albany, California, USA. This diagram illustrates how tree species, size and tree density varies across the topography of a watershed. The cross-section of a watershed is shown with a river or stream in the middle and slopes rising to a ridge top on either side. Individual trees are shown with lighter colors depicting sun-dependent pine trees and darker green colors depicting shade-tolerant fir trees. The slope on the left is south facing and thus warmer and drier. It has widely spaced pine trees and scattered fir trees. In the valley bottom, fir and hardwood trees dominate in a clumpy distribution. The north-facing slope is more shaded and thus often cooler and moister. It has a moderate density of trees that become more widely spaced as they approach the warmer and drier ridge top.

Table 1. Percent of seral stage patches (>10 acre) by vegetation type at the landscape scale (tens of thousands of acres)

Vegetation Type/Zone	Early Seral ¹	Small Tree ²	Open Mature Forest ³	Intermediate Mature Forest ⁴	Dense Mature Forest ⁵
Black Oak/ Ponderosa pine	10–20%	1–10%	20–40%	40–60%	0–20%
Ponderosa Pine	10–20%	1–10%	60–90%	10–20%	<10%
Dry Mixed Conifer	10–20%	1–10%	60–90%	20–40%	0–20%
Moist Mixed Conifer	10–20%	2–15%	10–40%	30–60%	40–60%

¹ Shrub, grass/herb, tree seedling/sapling.

² California Wildlife Habitat Relationship system (CWHR)² tree size classes 2 & 3.

³ CWHR 4 & 5; 10–40% tree cover.

⁴ CWHR 4 & 5; 40–60% tree cover.

⁵ CWHR 4, 5, & 6, >60% tree cover.

All Montane Vegetation Types (TERR-MONT-DC)

- 01 At the landscape scale, montane vegetation occurs in a complex mosaic of different forest densities, sizes, and species mix across large landscapes (Figure 3 and Table 1), that vary with topography, soils and precipitation. The composition, structure, and function of vegetation make them resilient to fire, drought, insects, pathogens and climate change. The mix of seral stage patches, and open versus closed canopied areas, varies by forest type. Interspersed across all seral stages, large and old trees are common in most of the landscape in varying densities, as described in the old forest section below.
- 02 At the landscape scale, montane vegetation provides ecological connectivity for a wide range of species, including old forest-associated species and habitat generalists. At least 30 percent of the landscape provides greater than 40 percent tree or shrub cover for connectivity of wide-ranging forest-associated species that travel on the ground. Between 10 to 40 percent of the landscape has closed canopied, multi-storied forests with greater than 50 percent overstory tree cover for species that travel in the canopies. Most of these multi-storied forests occur on moist sites, on lower slope positions, and north or east-facing slopes.
- 03 At the landscape scale, ponderosa, Jeffrey and sugar pine are common and dominant or co-dominant on drier sites. Large areas of black oak are present both in large patches, and intermixed throughout montane forests where it historically occurred. Sugar pine is reproducing, growing successfully, and is resistant to blister rust and insects. Shrub

² [Mayer, K.E. and W.F. Laudenslayer. 1988. A Guide to Wildlife Habitats of California. California Department of Fish and Game.](#)

patches, as well as irregular openings within forests, provide diverse habitat for a wide variety of wildlife and plant species.

- 04 At the landscape scale, fire occurs as a key ecological process to create and maintain heterogeneity, invigorate and restore fire-adapted understory plants and shrubs, reduce and maintain lower fuel loads, and promote the retention and maintenance of legacy oak trees and the recruitment of young oaks.
- 05 At the landscape scale, fires burn with low, moderate or mixed severity with minimal patches of very high severity (greater than 90 percent basal area mortality) that is rarely greater than 200 acres in size. The proportion of area burned at very high severity within a fire is generally less than 10 to 15 percent. Due to existing high levels of fuels and weather variability, greater proportions of areas burned at high severity (up to 40 percent, with some patches of high severity up to 1,000 acres), may be unavoidable during large landscape prescribed fires or wildfires managed to meet resource objectives.
- 06 At the mid-scale, a complex mosaic of groups of trees, shrubs, and herbaceous plants provide diverse habitat for a wide variety of wildlife species, including old forest-associated species. Within forest patches, trees are highly irregular in spacing and size. Individual trees, small clumps, and groups of trees are interspersed with grass, herbaceous plants, and shrubs, in variably sized openings that vary by forest type (Figure 4). A mosaic of moderate to dense shrubs, tree litter, down wood and bare ground occurs between groups of trees. Vigorous understories of heterogeneous, patchy, and diverse native shrubs, herbs, and grass species support small mammal, bird, insect, and fungal communities, as well as providing pollinator and herbivore forage.
- 07 At the mid-scale, shrub, grass and young trees grow in patches of high tree mortality with abundant snags and large logs, providing complex early seral habitat.

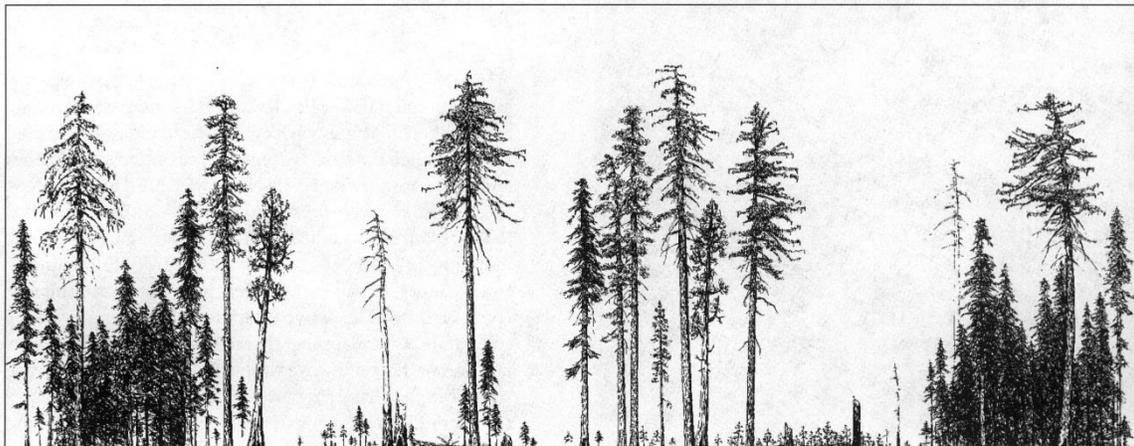


Figure 4. The diagram of a cross-section in a forest patch that illustrates the heterogeneity, or complex mosaic of different tree densities, sizes, and species mix¹. From left to right, there are large and likely old, overstory trees above a widely varying and clumpy understory. On the left, three large trees tower above a dense clump of mid and small fir trees. In the middle, encompassing two-thirds of the cross-section, several individual large trees and small clumps tower above a sparse understory, and there are scattered seedlings and clumps of shrubs. To the right, a similar dense patch as the one on the far left occurs, with a large snag and some mid-sized trees.

Black Oak/Canyon Live Oak (TERR-BLCK-DC)

- 01 Oak trees in varied ages are present, with wide spacing providing full sunlight around large old oak trees, enhancing their ability to produce abundant acorn crops. Black oak is reproducing successfully. Sufficient numbers of mid-age black oaks have enough canopy space to form full crowns to replace old oaks that eventually die.
- 02 Black oak snags greater than 20 inches in diameter, and live oak trees with dead limbs, hollow boles and cavities provide shelter, resting and nesting habitat for wildlife.
- 03 Acorns and other important plants in this vegetation type are plentiful and available for tribal uses. There are a diversity of sizes, ages, and locations of black oaks, ensuring sustainable tribal uses over time.

Ponderosa Pine (TERR-POND-DC)

- 01 At the landscape scale, the ponderosa pine vegetation type consists of open forests with a mosaic of varied tree sizes, densities and understory vegetation. They are dominated by ponderosa pine trees and, where black oak is common, co-dominated by black oak. Understory shrubs and plants are common. These areas are highly resilient to fire.
- 02 At the landscape scale, areas dominated by open-canopied forests of medium and large diameter trees comprise more than 60 percent of the landscape (Table 1). Overstory tree canopy cover is generally 30 percent, ranging widely from 10 to 80 percent at a fine-scale. When black oak dominates the overstory, because of their wide crowns, canopy cover can be greater than 50 percent. Trees are denser in some locations such as north-facing slopes and canyon bottoms, but in small patches. Large and old trees are common in most of the landscape in varying densities (see old forest section below). Trees greater than 30 to 40 inch diameter are common, especially pine and black oak.
- 03 At the mid- to fine-scale, vegetation within patches is highly variable (Table 2 and Figure 5). Trees of different sizes and ages, variably spaced, comprise an irregular, uneven-aged forest. Individual trees are variably spaced with some denser groups. Groups mostly vary from 2 to 10 trees. Tree stocking (basal area) is highly variable, ranging from 20 to 200 square feet per acre, with most areas having fewer than 150 square feet per acre. Irregularly shaped openings with less than 10 percent tree cover make up from 10 to 50 percent of the area. The opening sizes are varied, mostly ranging from 0.05 to 0.12 acres in size, occasionally greater than 0.12 acres, and contain a mix of grasses, herbaceous plants, and shrubs, and young trees. Vigorous shrubs cover 10 to 60 percent of the area. Less than 30 percent of shrubs are decadent with many dead branches. Numbers of seedlings and saplings are sufficient to replace old trees over time, but since ponderosa pine is shade-intolerant, they are very patchy in distribution with regeneration occurring when gaps and openings of sufficient size are created.
- 04 At the mid- to fine- scale, litter and surface fuel is patchy with fewer than 5 to 10 tons per acre in fuel loading on average over 30 to 70 percent of the area. There are some small areas of up to 30 tons per acre and others with fewer than 5 tons per acre.
- 05 At the mid- to fine- scale, snags greater than 20 inches in diameter are patchily distributed and highly irregular in spacing with 2 to 40 snags (median of 10) per 10 acres (Table 3) providing for future downed logs. Coarse woody debris, including large downed logs in

varying states of decay is patchily distributed and ranges from 1 to 10 tons per acre (Table 3).

- 06 Fire occurs as a key ecological process in fire-adapted ecosystems where it does not pose an unacceptable risk to life and property. Fire as an ecological process creates, restores, and maintains ecosystem resilience and increases understory plant vigor, heterogeneity, and habitat diversity.



Figure 5. Ponderosa pine patch

Table 2. Structure within forested patches (10s to 100s of acre areas with similar forest)

Vegetation Type/Zone	Tree Density Basal Area (square feet per acre)	Tree Canopy Cover (percent cover overhead)	Shrubs
Black oak/Ponderosa Pine	20–200; mostly < 150	10–80; median 30; highly variable	10–60% cover; highly variable; mixed ages
Ponderosa Pine Dry Mixed Conifer	20–200; mostly < 150	10–60; median 30; highly variable	10–60% cover; highly variable; mixed ages
Moist Mixed Conifer	50–300; mostly < 200	20–90; median 60; highly variable	10–60% cover; highly variable; mixed ages

Table 3. Snags and large logs at landscape scale in low to moderate severity burn patches

Vegetation Type/Zone	Snags >20" diameter (per 10 acres)	Logs >15" diameter and >8 feet long (tons per acre)	Litter and Understory Dead Wood (tons per acre)
Black Oak/Ponderosa Pine Ponderosa Pine Dry Mixed Conifer	2–40; median 10	1–10; all decay classes	3–10; patchy
Moist Mixed Conifer	5–60; median of 20	1–10; all decay classes	3–15; patchy

Dry Mixed Conifer (TERR-DMC-DC)

- 01 At the landscape scale, the dry mixed conifer vegetation type has a mosaic of patches of trees of varied sizes and ages. It is dominated by ponderosa pine and Jeffrey pine trees, with varying amounts of white fir, red fir, incense cedar or sugar pine. Sun-loving and fire-adapted native shrubs and plants are common.
- 02 Fire occurs as a key ecological process in fire-adapted ecosystems where it does not pose an unacceptable risk to life and property. Fire as an ecological process creates, restores, and maintains ecosystem resilience and increases understory plant vigor, heterogeneity, and habitat diversity.
- 03 At the landscape scale, areas dominated by medium and large diameter trees comprise more than 60 percent of the landscape. Overstory tree canopy cover is generally 30 percent but ranges widely from 10 to 60 percent at a fine-scale. When black oak dominates the overstory, because of their wide crowns, canopy cover can be greater than 50 percent. Trees are denser in some locations, such as north-facing slopes and canyon bottoms, but in small patches, in limited areas (less than 30 percent of the area). Large and old trees are common in much of the landscape in varying densities (see old forest section below) in all seral stages. Trees greater than 30 and 40 inches in diameter are common, especially pine and black oak. Some trees exceeding 50 inches in diameter occur on more productive sites. These areas are highly resilient to fire (see TERR-MONT-DC-05).
- 04 At the mid- to fine- scale, vegetation within patches is highly variable (Table 2 and Figure 6). Trees of different sizes and ages, variably spaced, comprise an irregular, uneven-aged forest. Individual trees are variably spaced with some denser groups. Tree stocking (basal area) is highly variable, ranging from 20 to 200 square feet per acre, with most areas having fewer than 150 square feet per acre. Numbers of seedlings and saplings are sufficient to replace old trees over time, but since ponderosa pine is shade-intolerant, they are very patchy in distribution with regeneration occurring when gaps and openings of sufficient size are created.
- 05 At the mid- to fine- scale, small irregularly shaped openings with less than 10 percent tree cover make up from 10 to 50 percent of the area, and contain a mix of grasses, herbaceous plants and shrubs. Vigorous shrubs cover 10 to 60 percent of the area. Less than 30 percent of shrubs are decadent with many dead branches.
- 06 At the mid- to fine-scale, large snags greater than 20 inches in diameter are at densities of 2 to 40 snags per 10 acres (Table 3), and are well distributed, but highly irregular in

spacing providing for future downed logs. Coarse woody debris, including large downed logs in varying states of decay, is irregularly distributed and ranges from 1 to 10 tons per acre. Litter and surface fuel is patchy with fewer than 5 to 10 tons per acre in fuel loading on average over 30 to 70 percent of the area. There are some small areas of up to 30 tons per acre and others with fewer than 5 tons per acre.



Figure 6. Dry mixed conifer forest

Moist Mixed Conifer (TERR-MMC-DC)

- 01 At the landscape scale, varying mixtures of Jeffrey or ponderosa pine, white fir, red fir, incense cedar and sugar pine trees occur. Native shrubs and plants are common in the understory.
- 02 At the landscape scale, the moist mixed conifer type has a mosaic of patches of trees of varied sizes and ages, with more small patches of moderate and high canopy cover than in drier parts of the landscape. Areas dominated by medium and large diameter trees comprise more than 50 percent of the landscape. Overstory tree canopy cover is highly variable, ranging from 20 to 90 percent, with a median of 60 percent.
- 03 At the landscape scale, closed-canopied patches are resilient to high intensity fire when they are embedded in larger areas dominated by highly resilient, open forests. These close-canopied patches are comprised of a combination of mid-story and understory tree and shrub density, and patchy, light to moderate surface fuels. Early seral vegetation, shrubs, grasses, herbs, tree seedlings or saplings mostly occur in very small areas, intermixed within forest stands or patches. Large and old trees are common in much of the landscape in varying densities (see old forest section below) in all seral stages. Trees

greater than 30 and 40 inch diameter are common. Some trees exceeding 50 inches in diameter occur on more productive sites.

- 04 At the mid- to fine- scale, moist mixed conifer patches are diverse, with high variation in density and spacing. Trees of different sizes and ages, variably spaced, comprise an irregular, uneven-aged forest with all seral stages present, including old forest. Individual trees are variably spaced with some tight groups. Tree stocking (basal area) is highly variable, ranging from 50 to 300 square feet per acre (Table 2) with most areas having fewer than 200 square feet per acre. Seedlings and saplings are sufficient to replace old trees over time, but are not uniformly distributed in stands. These areas are moderately to highly resilient to fire, when surrounded by large areas of highly resilient forests.
- 05 At the mid- to fine- scale, large snags greater than 20 inches in diameter are patchily distributed, averaging 5 to 60 snags per 10 acres (Table 3) providing for future downed logs. Coarse woody debris, including large downed logs in varying states of decay, is patchily distributed and averages fewer than 5 tons per acre. In patches centered on areas of past tree mortality, coarse woody debris can be up to 10 tons per acre. Litter and surface fuel is patchy, with fewer than 5 to 15 tons per acre in fuel loading on average over 30 to 70 percent of the area.
- 06 At the fine-scale, irregularly-shaped groups of trees and widely-spaced trees are variably spaced with some tight clumps. Vigorous shrub cover varies from 10 to 90 percent of the area. Openings with less than 10 percent tree cover are in various shapes and intermixed with groups of trees. These openings make up 10-30 percent of the area, are typically less 0.75 acres in size, and contain a mix of grasses, forbs, and shrubs.
- 07 Fire occurs as a key ecological process in fire-adapted ecosystems where it does not pose an unacceptable risk to life and property. Fire as an ecological process creates, restores, and maintains ecosystem resilience and increases understory plant vigor, heterogeneity, and habitat diversity.

All Upper Montane Vegetation Types (TERR-UPPR-DC)

- 01 At the landscape scale, the upper montane landscape is a heterogeneous mosaic of patches of red fir forests, lodgepole pine patches, Jeffrey pine woodlands, meadows and montane chaparral. Upper montane vegetation occurs in a complex mosaic of different densities, sizes, and species mixes across large landscapes that vary with topography, soils and snow accumulation. The composition, structure, and functions of vegetation make them resilient to fire, drought, insects and pathogens, and climate change. The mix of seral stage patches, and open versus closed canopied areas, varies by forest type as described in Table 4. Large and old trees are common in most seral stages throughout the landscape and in varying densities (see old forest section below).
- 02 At the landscape scale, fire is a key ecological process, restoring and maintaining patchy fuel loads and increasing heterogeneity and understory plant vigor. Fires occur irregularly, generally every 15 to 100 years, averaging about 40 years. Fires in this vegetation type burn with low, moderate or mixed severity, with minimal patches of very high severity (greater than 90 percent basal area mortality), rarely greater than 300 acres in size. The proportion of areas burned at high severity within a fire is generally less than 10 to 15 percent. Due to existing high fuel levels and weather variability, greater proportions of areas of high severity burn (up to 50 percent) may be unavoidable during

large landscape prescribed fires or wildfires managed to meet resource objectives. Some patches of high severity burn reach 1,000 acres in size.

- 03 At the landscape scale, white pines (sugar pine, western white pine, whitebark pine and foxtail pine) are healthy and vigorous with a low incidence of white pine blister rust. Individual trees and the stands they occur in are resilient to moisture stress, drought and bark beetles. White pine blister rust-resistant trees are regenerating and populations are sustained.

Table 4. Amount of seral stage patches (>10 acre) by vegetation type at the landscape scale (tens of thousands of acres)

Vegetation Type or Zone	Early Seral ¹	Small Tree ²	Open mature forest ³	Intermediate mature forest ⁴	Dense mature forest ⁵
Jeffrey Pine	5–20%	1–10%	60–90%	10–20%	<10%
Red Fir	5–20%	2–15%	20–70%	20–70%	10–40%
Wet Lodgepole Pine	5–20%	2–15%	5–20%	20–70%	20–70%
Dry Lodgepole Pine	5–20%	2–15%	50–80%	10–30%	0–30%

¹Shrub, grass/herb, tree seedling/sapling.

²California Wildlife Habitat Relationship system (CWHR) tree size classes 2 & 3.

³CWHR 4 & 5; 10–40% tree cover.

⁴CWHR 4 & 5; 40–60% tree cover.

⁵CWHR 4, 5, & 6, >60% tree cover.

Table 5. Structure within forested patches (10s to 100s of acre areas with similar forest)

Vegetation Type/Zone	Basal Area (square feet per acre)	Tree Canopy Cover (percent cover overhead)	Shrubs
Jeffrey Pine	20–200; mostly <150	10–40; may exceed 40% in small patches	0–70% cover; variable, mixed ages
Red Fir	50–300; mostly < 200	20–75, median 40; highly variable	0–70% cover, variable, mixed ages
Wet Lodgepole pine	100–280 mostly <200	20–70; generally 40–60%	0–70% cover, variable, mixed ages
Dry Lodgepole pine	20–200; mostly around 120	10–40; may exceed 40% in small patches	0–70% cover, variable, mixed ages

Red Fir (TERR-RFIR-DC)

- 01 At the landscape scale, the red fir forest type is part of a heterogeneous mosaic of tree species and vegetation structures (e.g., tree density, size, age and shrub cover) (Figure 7), with patches of Jeffrey pine, meadows and montane chaparral. It is dominated by red fir trees, with varying amounts of white fir, Jeffrey pine, western white pine, sugar pine, lodgepole pine and mountain hemlock.
- 02 Fire occurs as a key ecological process in fire-adapted ecosystems where it does not pose an unacceptable risk to life and property. Fire as an ecological process creates, restores, and maintains ecosystem resilience and increases understory plant vigor, heterogeneity, and habitat diversity.
- 03 At the landscape scale, areas dominated by medium and large diameter trees and moderate canopy cover (between 50 to 80 percent) comprise most of the landscape (Table 4). Trees are denser in some locations such as north-facing slopes and canyon bottoms, near meadows or where snow accumulates. Areas with closed canopy cover exceeding 60 percent occur on 20 percent of the landscape, but can range from 10 to 40 percent depending on the distribution of deeper soils and available soil water. Early seral vegetation, shrubs, grasses, herbaceous plants, tree seedlings or saplings, mostly occur in very small areas, intermixed within forest stands or patches.
- 04 At the landscape scale, shrubs, grasses and young trees grow in patches of high tree mortality with abundant snags and large logs, providing complex early seral habitat.
- 05 At the mid- to fine-scale, trees of different sizes and ages, variably spaced, comprise an irregular, uneven-aged forest. Individual trees are variably spaced with some tight groups. Tree stocking (basal area) is highly variable, ranging from 50 to 300 square feet per acre with most areas having fewer than 200 square feet per acre (Table 5). Numbers of seedlings and saplings are sufficient to replace old trees as they die, but are very patchy in distribution.
- 06 At the mid- to fine-scale, small openings are intermixed within stands of trees. They make up 5 to 20 percent of the area within tree stands, have less than 10 percent tree cover, are irregularly shaped, and often contain herbaceous plants, shrubs, and tree seedlings and saplings. Vigorous shrub cover is highly variable (Table 5), covering 5 to 70 percent of the area, though some soil types do not support shrubs. Some openings and the understory of some red fir patches have little to no understory plants but instead have a high diversity of mushrooms and other fungi.
- 07 At the mid- to fine-scale, snags greater than 20 inches in diameter are patchily distributed. An average of 5 to 40 snags per 10 acres provide for future downed logs (Table 6). Coarse woody debris, including large downed logs in varying states of decay, is patchily distributed and ranges from 1 to 10 tons per acre. Litter and surface fuel is patchy with fewer than 5 to 20 tons per acre in fuel loading on average. There may be areas with no fuels and pockets of high fuel accumulation scattered irregularly.

Table 6. Snags and large logs at landscape scale in low to moderate severity burn patches

Vegetation Type/Zone	Snags > 20 inches diameter per 10 acres	Snags > 30 inches diameter per 10 acres	Logs (>15" diameter and >8 feet long) tons per acre	Litter and Understory dead wood (tons per acre)
Jeffrey Pine	2–40	--	1–10, all decay classes	3–10; patchy
Red Fir	5–40	1–10	1–10; all decay classes	5–20, patchy
Wet Lodgepole Pine	5–40	--	1–20; all decay classes	5–30, patchy
Dry Lodgepole Pine	2–25	--	1–10; all decay classes	2–10; patchy



Figure 7. Three photos display red fir forest heterogeneity

Lodgepole Pine (TERR-LDGP-DC)

This vegetation type is further divided into dry versus wet lodgepole pine. Dry lodgepole pine dominates on upper montane dry sites generally above 8,500 feet elevation, often located on benches, upper topographic positions, and moderate slopes. Stands are typically in broken terrain and shallow, drier, and nutrient-poor soils. Western white pine may be present, but mesic tree

species (e.g., red fir, mountain hemlock) are generally absent or infrequent. Understory herbaceous plant cover is generally less than 30 percent and bare ground and rock cover is generally more than 30 percent. Either wet or dry lodgepole may border some meadow ecosystems, depending upon the ecological setting.

Wet lodgepole pine dominates on upper montane wet sites generally above 7,500 feet elevation, often located on gently rolling lower slopes and drainage bottoms. Stands are located on relatively productive, moister, and deeper soils in the upper montane zone. Red fir or mountain hemlock may be present in wet lodgepole pine stands. Understory herbaceous plant cover is generally more than 30 percent and bare ground and rock cover is generally less than 30 percent. Either wet or dry lodgepole may border some meadow ecosystems, depending upon the ecological setting.

- 01 Lodgepole pine forests are highly variable throughout the landscape, occurring as both open forests on dry sites at higher elevations, and as denser stands in pockets around meadows, lakes or where cold air accumulates. The lodgepole pine type is part of a heterogeneous mosaic of tree species with diverse structural conditions. It is dominated by lodgepole pine, with varying amounts of red fir, white fir, aspen and sometimes white pines.
- 02 Shrubs, grasses, forbs and young trees grow in patches of high tree mortality where the site potential supports those growth forms, and with sufficient snags and large logs, providing complex early seral habitat.
- 03 Fire occurs as a key ecological process in fire-adapted ecosystems where it does not pose an unacceptable risk to life and property. Fire as an ecological process creates, restores, and maintains ecosystem resilience and increases understory plant vigor, heterogeneity, and habitat diversity.
- 04 The distribution and structure of wet lodgepole pine forests are variable, ranging from small patches of even-aged trees, with both closed and open canopies, to uneven-aged, irregular patches. Size and age class diversity is high within wet lodgepole pine stands. Individual trees are variably spaced with some tight groups. Irregularly shaped groups of large and intermediate trees are variably sized, with some overlapping tree crowns. Smaller trees are randomly distributed.
- 05 In wet lodgepole pine forests, areas dominated by medium and large diameter trees comprise more than 45 percent of the landscape (Table 4). Tree stocking (basal area) is highly variable, ranging from 100 to 280 square feet per acre, but most stands average less than 200 square feet per acre (Table 5). Canopy cover ranges from 20 to 70 percent but is generally 40-60 percent (Table 5). Small openings with less than 10 percent tree cover are irregular in shape and make up from 5 to 20 percent of the area and contain a mix of grasses, herbaceous plants and shrubs. On wet sites next to meadows, lakes, streams or springs, shrub, grass and herbaceous plant cover may exceed 80 percent. Sufficient tree regeneration in openings provides for stand replacement.
- 06 In wet lodgepole pine forests, large snag densities are between 5 and 40 snags per 10 acres (Table 6), and are well distributed, but highly irregular in spacing, providing for future downed logs. Coarse woody debris, including large downed logs in varying states of decay, is well distributed but irregular in spacing, ranging from 1 to 20 tons per acre. Surface fuel loads are highly variable; most are between 5 to 15 tons per acre and patchy,

covering 30 to 70 percent of the area. Some small areas contain very high fuel loading of up to 30 tons per acre and others have fewer than 5 tons per acre (Table 6).

- 07 The distribution and structure of dry lodgepole pine forests are variable but typically open with irregular patches of trees of variable ages, and generally few overlapping tree crowns. Smaller trees are randomly distributed. Tree groups may contain other tree species such as western white pine. Sufficient tree regeneration in suitable but irregularly distributed sites provides for stand replacement.
- 08 In dry lodgepole pine forests, areas dominated by medium and large diameter trees comprise more than 60 percent of the landscape (Table 4). Canopy cover is generally 10 to 40 percent but may exceed 40 percent in small patches and moist microsites (Table 5).
- 09 Within dry lodgepole pine patches, individual trees are variably but often widely spaced. Tree stocking (basal area) is highly variable with most stands having around 120 square feet per acre but ranging from 20 to 200 square feet per acre. Small openings with less than 10 percent tree cover are irregular in shape and make up from 10 to 50 percent of the area and contain a mix of bare ground, rock, grasses, herbaceous plants and shrubs.
- 10 The understory of dry lodgepole pine stands is highly variable. Most areas contain between zero and 40 percent shrub cover; on very dry, cold, rocky sites there may be no shrubs.
- 11 In dry lodgepole pine forests, large snag densities are between 2 and 25 snags per 10 acres (Table 6), and are well distributed, but highly irregular in spacing and providing for future downed logs. Coarse woody debris, including large downed logs in varying states of decay, is well distributed but highly irregular in spacing and ranges from 1 to 10 tons per acre. Surface fuel loads are highly variable and patchy. Nearly all are between 2 to 10 tons per acre and are very patchy, covering 20 to 70 percent of the area. Some small areas contain higher fuel loading of up to 15 tons per acre and most areas have fewer than 8 tons per acre.

Upper Montane Jeffrey Pine (TERR-UMJF-DC)

- 01 At the landscape-scale, forests are dominated by Jeffrey pine trees, with scattered western white pine, red fir, lodgepole pine and white fir in some areas. Forests are generally very open with less than 30 percent canopy cover. Trees are denser in some areas, limited to small pockets with deeper soils. Open canopies allow tree regeneration of shade-intolerant Jeffrey pine. These areas are highly resilient to fire.
- 02 At the landscape scale, fire is a key ecological process, creating a diversity of vegetation types, maintaining understory plant diversity and lowering surface fuels. Fires occur frequently, with mostly low and moderate vegetation burn severity.
- 03 At the landscape scale, areas dominated by medium and large diameter trees comprise more than 60 percent of the landscape (Table 6). Early-seral vegetation, shrubs, grasses, herbs, and tree seedlings or saplings mostly occur in very small areas, intermixed within forest stands or patches. Large and old trees are common throughout all seral stages (see old forest section below).
- 04 At the landscape scale, shrub, grass and young trees grow in small patches of high tree mortality with abundant snags and large logs, providing complex early seral habitat.

- 05 At the mid- to fine-scale, vegetation within patches is highly variable (Figure 8). Trees of different sizes and ages, variably spaced, comprise an irregular, uneven-aged forest. Individual trees are variably spaced with some denser groups. Tree density is typically less than 100 trees per acre but ranging from 20 to 150 trees per acre. Tree stocking (basal area) is highly variable with most areas containing fewer than 80 square feet per acre but ranging from 20 to 150 square feet per acre. Numbers of seedlings and saplings are sufficient to replace old trees over time. These areas are highly resilient to fire.
- 06 At the mid- to fine-scale, openings of various shapes are intermixed with trees. More openings occur on shallow soils or when rock outcrops are interspersed with trees. They make up 10 to 70 percent of the area, are irregular in shape and vary widely in size. They contain herbaceous plants, shrubs and tree seedlings and saplings. Shrub cover is highly variable and Jeffrey pine stands or woodlands often occur in a mosaic with patches of montane chaparral. Shrub cover varies from two to 70 percent of the area. At least half of the shrubs are vigorously growing, with few dead branches.
- 07 At the mid- to fine-scale, snags greater than 20 inches in diameter are at densities between 1 to 20 snags per 10 acres, and are well distributed, but highly irregular in spacing, providing for future downed logs. Coarse woody debris, including large downed logs in varying states of decay, is irregularly distributed and ranges from 1 to 5 tons per acre and highly variable density. Surface fuel loads are fewer than 5 to 7 tons per acre and are patchy, covering 30 to 70 percent of the area.



Figure 8. Jeffrey pine patch

Montane Chaparral (TERR-MCHP-DC)

- 01 Chaparral is comprised of native shrub and understory species that reflect the natural range of variation for the site. The chaparral vegetation type is composed of varying age classes and densities that protect against accelerated erosion, with two to 20 percent of the type in early seral grass and herbaceous cover, 5 to 20 percent in native herbs and shrubs, and 70 to 95 percent in dense shrubs.
- 02 Chaparral is in a constant state of transition from young to older stages and back again, with fire as the primary disturbance. High severity fires that kill most aboveground stems occur on average every 35 to 100 years. The fire return interval is long enough to allow the soil seed bank of uniquely adapted plants that follow fire to be maintained over the short and long term. Fuels are able to accumulate sufficiently in areas to carry fire in the areas of fire adapted plants. Invasive non-native plants do not dominate between fires.

Subalpine and Alpine (TERR-ALPN-DC)

- 01 Subalpine woodlands are highly variable in structure and composition. Diverse patch types vary from open woodlands with scattered trees to small, dense groves.
- 02 Fires occur infrequently, are mostly very small and with mixed severity. Fire intensity is highly variable, but crown fires are usually limited in size.
- 03 Subalpine woodlands and alpine ecosystems are resilient to insects, diseases, fire, wind and climate change. High-elevation white pines (e.g., whitebark pine and foxtail pine) are healthy and vigorous, with a low incidence of white pine blister rust, and resilient to moisture stress and drought. White pine blister rust-resistant trees are regenerating and populations of high elevation white pines have the potential to expand above the tree line.
- 04 Mature cone-bearing whitebark pine trees are spatially well distributed to produce and protect natural regeneration and conserve genetic diversity.

Sagebrush (TERR-SAGE-DC)

- 01 The sagebrush type has a diversity of age classes, stand structure, cover classes and understory composition.
- 02 Sagebrush ecosystems are resilient to fire, disturbances (e.g., grazing, recreation), invasive species (including cheatgrass) and climate change.
- 03 Grazed areas have or are trending toward satisfactory soils condition, functional hydrology and biotic integrity. Sagebrush ecosystems contain all key elements and conditions, including sagebrush regeneration and recruitment, ecosystem productivity, perennial grass cover, biological soil crusts and symbiotic fungal associations.

Pinyon-Juniper (TERR-PINY-DC)

- 01 Pinyon-juniper types have a mosaic of trees and open areas that provide wildlife habitat, contribute to functional soils, and are resilient to disturbances such as fire, invasive species and climate change.
- 02 Fire frequency and severity is within the natural range of variation.
- 03 Plant litter and coarse woody debris are present in sufficient quantity to resist accelerated soil erosion and promote nutrient cycling, water retention and the microclimate conditions necessary for pinyon seed germination. Biological soil crusts are present to improve nutrient cycling and stabilize soils, especially in sandier soils.
- 04 Pinyon pine regeneration and recruitment ensures persistence of this vegetation type.
- 05 Mature pinyon pines provide opportunities for traditional collecting of pinyon nuts.

Xeric Shrub/Blackbrush (TERR-XER-DC)

- 01 Desert vegetation is a mosaic of diverse ecological types with native shrubs and grasses, commonly blackbrush, sagebrush, saltbush, goldenbush and horsebrush in various age classes and patch sizes.
- 02 Vegetation conditions are resilient to natural and human disturbances, such as grazing, flooding, fire, invasive species and climate change.
- 03 Fires are within the natural range of variation and very rare.
- 04 Flooding event frequency and severity is within the natural range of variation, resulting in a mosaic of soil erosion and deposition that supports diverse native plant species and biological soil crusts.

Old Forest (TERR-OLD-DC)

Old forests are characterized by the presence of large and old trees for the given species and site productivity. Old forests vary widely based on forest type, soil condition, topography, and fire history. For ponderosa pine or mixed conifer forests, trees greater than 20, 30 or 40 inches in diameter contribute to old forest structure (Table 7). In contrast, at the highest reaches of trees near the Sierra Nevada crest, whitebark pine trees that are 10 inches in diameter may be several centuries or older. Very large trees that are greater than 50 inches in diameter are also part of the desired condition, their densities are not included in Table 7 because they were heavily harvested in the late 1800s and the earlier 1900s and information is lacking on their historic densities. Desired densities of trees greater than 20 inches in diameter are included for oaks and upper montane forests. These trees are often old and at the high end of their potential size. The old forest management direction below focuses on old forests in the montane and upper montane ecological zones where most vegetation management has occurred in the past and continues to occur.

Old forests often contain large snags and logs in addition to large live trees. The density of these old forest components vary widely. Old forests within montane mixed conifer and pine vegetation types are currently more uniformly dense than they were in the past, resulting in increased rates of old growth tree mortality from competition with younger trees, climate change, insect-related mortality and increased high intensity fire. At the same time, the denser forests with old growth trees are favored habitat of the California spotted owl, Pacific fisher and Sierra marten.

- 01 The composition, structure and functions of old forests and surrounding landscapes are resilient to fire, drought, insects, pathogens and climate change. Fire occurs as a key ecological process in forest types that are adapted to fire, creating, restoring and maintaining ecosystem resilience and fire-related composition and structure.
- 02 The landscape contains a mosaic of vegetation types and structures that provide foraging and breeding habitat, and movement and connectivity for a variety of old forest-associated species.
- 03 Between 40 and 80 percent of the forested landscape contains old forest areas. Old forest areas are clumps and patches of old forest components such as old trees, snags and large downed logs. These areas are irregularly distributed across the landscape and interspersed with stands of younger trees, shrubs, meadows, other herbaceous vegetation and non-vegetated patches.

- 04 The number and density of old trees vary by topographic position and soil moisture. In general, more large and old trees are found on moister sites, on lower slopes, bottoms, and north and east aspects, especially where soils are deeper. Large trees are well distributed but are often clumpy. The densities vary by forest type as shown in Table 7. Trees greater than 40 inches in diameter, generally over 150 years old, represent the oldest trees, and comprise a significant proportion of large and old trees. In many areas of high soil productivity, trees grow to large sizes (e.g., around 30 inches in diameter) in fewer than 100 years. On low and very low soil productivity sites, the oldest trees may be smaller in diameter. Sufficient numbers of younger trees are present to provide for recruitment of old trees over time.
- 05 Old forests are composed of both vigorous trees and decadent trees. Decadent trees with broken tops, multiple tops, cavities and deformities provide wildlife nesting and denning habitat and contribute to the future production of snags, downed logs and other coarse woody debris. Older trees with larger branches and those showing signs of decadence provide the best potential to create cavities. Clumps of large trees, snags, large logs and decadent older trees are maintained on the landscape in sufficient numbers to benefit wildlife and are distributed throughout the planning area pre and post-disturbance.
- 06 Large snags are scattered across the landscape, generally occurring in clumps rather than uniformly and evenly distributed, meeting the needs of species that use snags and providing for future downed logs. The desired number and distribution of snags varies by major vegetation type, but old forests tend to have higher numbers of large snags than younger forests and can vary from single large snags to clusters of up to 20 snags per 10 acres in some areas.
- 07 Coarse woody debris, including large downed logs in varying states of decay, provides important wildlife habitat and can occur as single large down logs, or in clusters, depending on the source of tree mortality. Coarse wood debris is patchily distributed and the density of large downed logs varies by vegetation type. Surface dead wood levels are sufficient to provide for legacy soil microbial populations.

Table 7. Large/old trees at landscape scale, except where high severity fires have occurred (>90 percent basal area mortality)

Vegetation Type/Zone	>20" diameter trees per acre	>30" diameter trees per acre	>40" diameter trees per acre	Proportion of the landscape with large and/or old trees
Dry Mixed Conifer	4–32	5–20 (median of 12)	2–7 (median of 4)	40–80%
Moist Mixed Conifer	4–40	10–22 (median of 16)	4–12 (median of 6)	40–80%
Jeffrey Pine	2–16	1–8	1–4	40–80%
Red Fir	4–40	4–20	4–12	40–80%
Wet Lodgepole Pine	4–12	4–12	--	40–80%
Dry Lodgepole Pine	2–6	2–6	--	40–80%

Complex Early Seral Habitats (TERR-CES-DC)

Complex early seral habitat is the stage of forest development that follows a significant tree mortality event in a mature forest, where the loss is greater than 75 percent of the basal area. Major disturbance events include high intensity fire and wide-scale insect outbreaks. The death of overstory trees creates openings that allow other plants and tree seedlings to reoccupy the site. The complex early seral habitat is often characterized by high densities of snags, the development of shrub cover and other native vegetation, downed wood and natural conifer regeneration.

- 01 Complex early seral habitat created as a result of a disturbance event contains dense patches of snags and regenerating shrub cover and other habitat elements characteristic of natural succession that are important to early seral forest-associated species. Large areas of shrubs are managed in locations where they represent the potential natural vegetation, considering fire risks over time to adjacent vegetation and resources. Aspen and oak sprouts are well distributed in areas where they occur.
- 02 Snags, logs and live trees are widely distributed in large patches (greater than 100 acres when available) of very high vegetation burn severity (greater than 90 percent mortality) to provide habitat while also considering the need for other resource objectives such as hazard and other tree removal (e.g., salvage); reforestation to contribute to future forested conditions and carbon carrying capacity; and strategic fuel treatments, including management of fuels in and adjacent to the community wildfire protection zone.
- 03 Snags that support cavity nesting birds and mammals are sufficiently abundant and well distributed, especially large diameter snags.

Aspen (TERR-ASPN-DC)

- 01 The structure, function and distribution of aspen are within the natural range of variation; there is a wide age and size distribution and aspen is contributing to habitat and biodiversity. Aspen is successfully regenerating and growing into larger trees.
- 02 Fire or other silvicultural activity reduces conifer encroachment and competition. Aspen stands are periodically regenerated through stand-replacing events such as wildfires, allowing for potential expansion.
- 03 Aspen groves contribute to social and economic sustainability by supporting recreational, cultural and economic opportunities. Aspen groves add visual interest, variety and contrasts in the landscape, providing spiritual respite and enjoyment.

Special Habitats (TERR-SH-DC)

Special habitats are generally small scale habitat or vegetation types that may support unique assemblages of plants and animals, especially at-risk species. Special habitats typically include uncommon rock types, harsh soils or rock outcrops. Examples include dry sandy and gravelly soils, limestone or serpentine soils, alkali or acidic soils, metamorphic, volcanic or granitic rocky soils or rock outcrops, caves, and alpine talus or fell fields. Many at-risk plant and animal species are found in rocky or gravelly habitats; the plan area has an abundance of exposed granitic rock, but only some of which is habitat for at-risk species. Aquatic and riparian special habitat examples include fens, seeps and springs. Given the localized nature of these special habitats, they are challenging to address comprehensively at the forest scale since they may be uniquely affected by different activities or trends in ecological conditions. For example, restoring the

composition and structure of a red fir forest where outcrops are present would not automatically restore desired ecological conditions on the outcrops.

- 01 The integrity of special habitats is maintained or improved. Composition, diversity and structure are maintained in all areas, including those with multiple use activities.
- 02 Microclimate or smaller scale habitat elements provide habitat and refugia for species with a specific geographic or other restricted distribution.

Animal and Plant Species

This and subsequent sections under this heading include plan direction designed to maintain the diversity of plant and animal communities and support the persistence of native species within the plan area, subject to the extent of Forest Service authority and the inherent capability of the plan area. This includes plan components that address the needs of at-risk species within the plan area. At-risk species include (1) federally listed threatened, endangered, proposed, or candidate species under the federal Endangered Species Act, and (2) species of conservation concern (SCC)³. This section also includes direction that provides for the sustainable use and enjoyment of fish, wildlife, and plants.

For each species or group of species, the forest plan considers the extent that plan components provide for ecosystem integrity and diversity to meet ecological conditions necessary for those species within their range. Species-specific plan components are added as needed. Additional direction is provided for special habitats under the “Terrestrial Ecosystems” section to address unique habitats of some at-risk species.

Desired conditions are either forestwide or specific to the habitat of the species in question. For the California spotted owl and Pacific fisher, desired conditions are developed based on their respective conservation assessment and science synthesis, and the broad array of science concerning the species and the risks they face. Some desired conditions are more focused on the short-term risks identified in the fisher Conservation Strategy and the California spotted owl Assessment, while others, particularly those in the focus landscapes, are more dedicated to the long term sustainability of the species and their habitat.

Forestwide (SPEC-FW-DC)

- 01 Sustainable populations of native plant and animal species are supported by healthy ecosystems, essential ecological processes and land stewardship activities, and reflect the diversity, quantity, quality and capability of natural habitats on the forest. These ecosystems are also resilient to uncharacteristic fire, climate change, and other stressors in order to support the long-term sustainability of plant and animal communities.
- 02 Habitats for at-risk species support self-sustaining populations within the inherent capabilities of the plan area. Ecological conditions provide habitat conditions that: contribute to the survival, recovery, and delisting of species under the Endangered Species Act; preclude the need for listing new species; improve conditions for species of conservation concern; and sustain both common and uncommon native species.

³ The Regional Forester’s species of conservation list is dynamic and may be periodically updated. The current Regional Forester’s species of conservation concern list for the Sequoia National Forest can be found on the Pacific Southwest Region’s [website](#).

- 03 The structure and function of the vegetation, aquatic and riparian system, and associated microclimate and smaller scale elements (e.g., special features such as carbonate rock outcrops, fens, or pumice flats) exist in adequate quantities within the capability of the plan area to provide habitat and refugia for at-risk species with restricted distributions.
- 04 The forest provides for high quality hunting and fishing opportunities. Habitat for non-native fish and game species is managed in locations and ways that do not pose substantial risk to native species, while still contributing to economies of local communities.
- 05 Residents and visitors have ample opportunities to experience, appreciate and learn about the forest's wildlife, fish and plant resources.

California Spotted Owl, Pacific Fisher and Sierra Marten (SPEC-CSO-PF-SM-DC)

- 01 Risk of large high intensity fire is reduced, especially in fisher linkage areas (Figure 9), fisher target habitat (Figure 10), California spotted owl protected activity centers and home range core areas, and marten core habitat areas.
- 02 Within the fisher strategy area (Figure 9), spotted owl home range core areas, and marten core habitat areas, vegetation is trending toward desired conditions for terrestrial and riparian vegetation.

California Spotted Owl (SPEC-CSO-DC)

- 01 California spotted owl habitat is well distributed throughout the California spotted owl's range, providing for nesting, roosting, and foraging habitat and movement across large landscapes.
- 02 California spotted owl protected activity centers encompass the best available 300 acres of habitat in as compact a unit as possible. Best available habitat includes: two or more tree canopy layers; trees in the dominant and co-dominant crown classes averaging 24 inches diameter or greater; at least 60 percent tree canopy cover, including hardwoods; and in descending order of priority, California Wildlife Habitat Relationships (CWHR) classes 6, 5D, 5M, 4D, and 4M and other stands with at least 50 percent canopy cover, including hardwoods. Protected activity centers also contain some very large snags, greater than 45 inches diameter, and snag and down woody material levels that are higher than average. Where possible, heterogeneity is incorporated as described in the terrestrial vegetation desired conditions appropriate for the protected activity center location (e.g., red fir, mixed conifer, and blue oak woodland). In general, the moist mixed conifer desired conditions are most applicable.
- 03 Where the majority of a California spotted owl protected activity center contains dry vegetation types, the vegetation type is resilient towards fire, drought, insects and pathogens, and is trending towards terrestrial ecosystem desired conditions.
- 04 California spotted owl home range core areas include additional best available California spotted owl habitat as described in desired conditions for protected activity centers, as well as a range of conditions that promote resiliency and heterogeneity. Home range core areas consist of fine-scale gaps and patches of 0.03 to 2.0 acres (median of 0.1 acres) associated with shrubs, meadows, or low tree and canopy densities consistent with

vegetation desired conditions. Clumps or groups of large trees, some with dense tree cover, are well distributed in an irregular pattern. Forest cover varies with the vegetation desired conditions and corresponding vegetation types.

Pacific Fisher (SPEC-PF-DC)

- 01 Pacific fisher habitat is well distributed throughout the fisher's range, providing for foraging, denning and resting habitat and movement across large landscapes.
- 02 Outside of community buffers (see community wildfire protection zone guidelines MA-CWPZ-GDL in chapter 3), essential fisher habitat elements are common and well distributed throughout the fisher's range, including large living and dead trees, especially pines and oaks where feasible; and structures used by fishers for resting and denning, such as cavities and deformities.
- 03 Outside of community buffers, snags occur in all size classes throughout the fisher's range. Many snags are 35 inches in diameter or larger, depending on site conditions. Snag levels correspond with terrestrial vegetation desired conditions.
- 04 Black oaks are well-distributed within mixed-conifer and conifer-hardwood stands throughout the fisher's range. The majority of trees are in good condition and the number of large oaks is increasing.
- 05 Outside of community buffers and focus landscapes, at least 60 percent of each fisher target cell (Figure 10), on average, is in CWHR classes 5M, 4D, 5D, and 6 in a heterogeneous pattern. This proportion may vary according to the landscape conditions within each cell. Canopy cover greater than 60 percent occurs in patches, especially in more mesic sites like canyons and swales and on north and east slopes. The patches may be separated by more open stands, especially on drier slopes and ridges, with up to 25 percent of the target cell in open canopy cover (less than 40 percent) and the balance in moderate canopy cover (40 to 60 percent). Dense stands are also punctuated at fine resolution with gaps of 0.03 to 2.0 acres (median of 0.1 acres).
- 06 Where fisher target cells (Figure 10) overlap with community buffers, manage toward desired conditions for dry vegetation types, except in the black oak/ponderosa pine vegetation type, which should be managed toward black oak/ponderosa pine desired conditions. Large logs and snags are limited to minimize the likelihood of spotting or ember ignitions, support high fireline production rates, and reduce firefighter safety hazards. Preferentially retain large live trees.
- 07 Within focus landscapes, forest cover varies based on vegetation type and corresponding vegetation desired conditions. Areas of higher tree or shrub cover provide movement habitat between adjacent fisher target cells and provide heterogeneity at the landscape and patch scales that is ecologically resilient to climate, drought and fire. There are fine-scale gaps and patches of 0.03 to 2.0 acres (median of 0.1 acres) associated with shrubs, meadows, or low tree and canopy densities. Clumps or groups of large trees, some with dense tree cover, are well distributed in an irregular pattern.
- 08 Fisher linkage areas maintain connectivity between fisher habitat core areas (Figure 9).

- 09 Fisher linkage areas support patchy vegetation with some moderate to dense tree canopy cover where site conditions allow, such as along riparian corridors, or shrub cover where forest cover is inadequate.
- 10 Fisher linkage areas have minimal impediments or barriers to fisher movement, allowing fishers to disperse and maintain genetic diversity within and among subpopulations.

Sierra Marten (SPEC-SM-DC)

- 01 Sierra marten habitat is well distributed throughout the marten's range, providing for foraging, denning and resting habitat, and movement across large landscapes.

Great Gray Owl (SPEC-GGO-DC)

- 01 Meadow vegetation in great gray owl protected activity centers supports a sufficiently large prey species population to provide a food source for great gray owls through the reproductive period.

Invasive Species

Desired conditions and other plan components under this heading address reducing populations of invasive species and minimizing their impacts on native species and ecosystems. Invasive species on the Sequoia National Forest comprise all life forms including plants, animals, invertebrates and fungi.

Forestwide (INV-FW-DC)

- 01 Terrestrial and aquatic invasive species are controlled, or eradicated when possible, and establishment of new populations is prevented.
- 02 The area affected by invasive species and introduction of new invasive species is minimized.

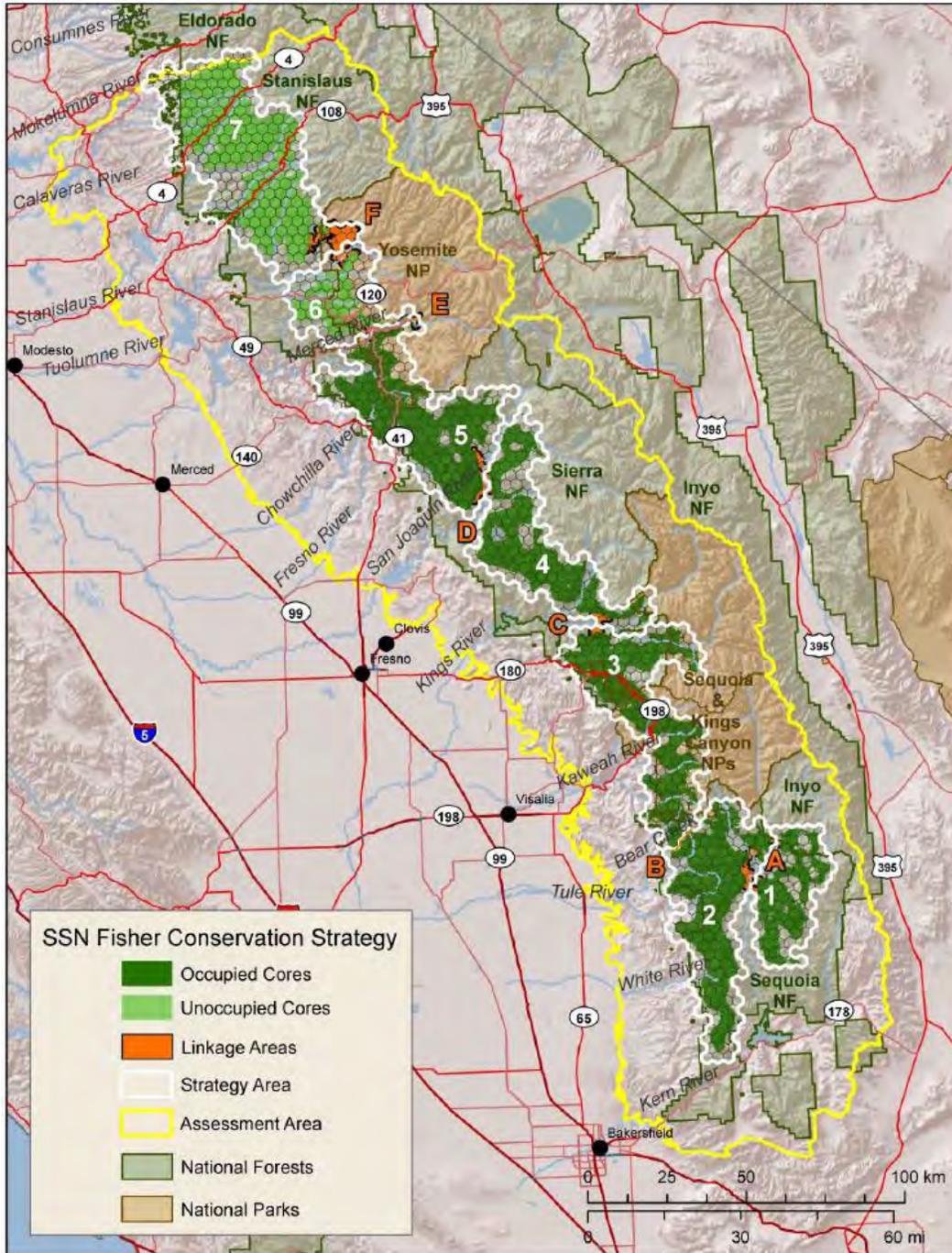


Figure 9. The Southern Sierra Nevada fisher conservation strategy area (white boundary) encompasses modeled fisher habitat core areas and linkage areas based on a grid of female breeding territory-sized (10-km², 4-mi²) hexagon cells⁴. Individual habitat core areas are numbered and linkage areas are lettered.

⁴Spencer, W.D., S.C. Sawyer, H.L. Romsos, W.J. Zielinski, C.M. Thompson, and S.A. Britting. 2016. Southern Sierra Nevada fisher conservation strategy. Unpublished report produced by Conservation Biology Institute.

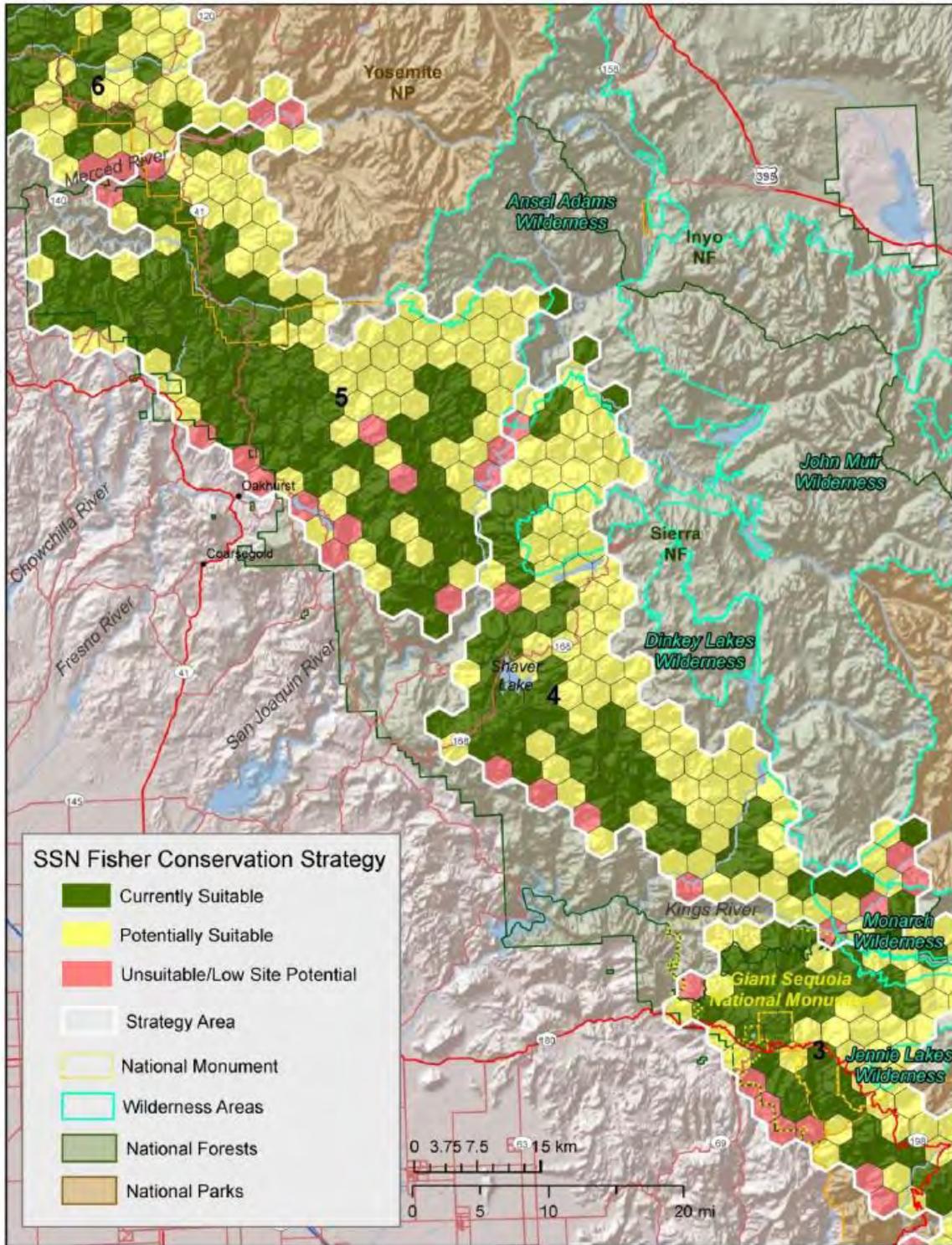


Figure 10. Currently suitable, future potential suitable and low potential to ever be suitable grid cells in the middle portion of the southern Sierra Nevada Fisher Conservation Strategy area⁴. Cell suitability in this map does not reflect potential impacts of the 2013 Aspen and 2014 French Fires. Fisher target habitat is dynamic in nature and made up of target cells that generally include most of the currently suitable cells, as well as some that are potentially suitable. Additional considerations, such as habitat resilience and sustainability goals, are also used to determine the exact locations of target cells. See the definition of fisher target habitat in the glossary for more information.

Fire

Desired conditions and other plan components under this heading apply to forestwide fire management, including reducing damages and enhancing benefits from wildland fire. Other plan direction related to fire management is in chapter 3, under management areas, subsection strategic fire management zones.

Forestwide (FIRE-FW-DC)

- 01 Fire management activities minimize the risk of loss of life and damage to property or ecosystem function. Firefighter and public safety is the first priority in every fire management activity.
- 02 Fire management activities reduce fuel buildup, help maintain and protect habitat for a variety of species, reduce smoke from larger fires, provide added protection for communities, and restore fire on the landscape. These actions are also an integral part of achieving sustainable recreation, particularly in maintaining scenic attractiveness, integrity and character.
- 03 Wildland fires burn with a range of intensity, severity and frequency that allows ecosystems to function in a healthy and sustainable manner. Wildland fire is a necessary process, integral to the sustainability of fire-adapted ecosystems.
- 04 Fire management uses an all lands risk-based approach in planning and decision making, responsive to the latest fire and social sciences, and adaptable to rapidly changing conditions, including climate change. Wildfire management is coordinated with relevant state agencies and adjacent federal agencies. The net gains to the public are an important component of the decision-making process.
- 05 The forest contributes to increased awareness and understanding about wildfire risk among community leaders, service providers, homeowners, permittees and tribes who are invested in or adjacent to the forest. This includes an understanding about the need to adapt communities, properties and structures to wildfire, while also recognizing that wildland fire is a needed ecological process.
- 06 Wildfire threat is reduced through management actions in areas where fuel conditions currently pose the highest threat to communities and community assets, such as power lines, communication towers and developed recreation sites.
- 07 Education and enforcement have reduced the likelihood of human ignited wildfire.

Local Communities

Desired conditions and other plan components under this heading include forest management and communication with local communities and other organizations interested in the management of the plan area and forest resources.

Forestwide (LOC-FW-DC)

- 01 Forest personnel communicate with interested local agency leadership, business owners, non-profit organizations, community members, and other local organizations on a regular basis to develop mutual understanding regarding forest management.

- 02 The Sequoia manages the land in a spirit of shared stewardship with local people. Local knowledge and input is an important part of the process when developing and implementing projects.
- 03 Forest uses such as recreation, forest products, mining and grazing are provided in an ecologically sustainable way that also contributes to economic and social sustainability in local communities.
- 04 Ecological restoration supports the long-term sustainability of forest resource use and appreciation by communities by reducing the risk of high intensity fires, drought, insects and disease, which may impact forest use opportunities.
- 05 The Sequoia provides interpretation and education opportunities related to culture, history and land stewardship, and provides ample opportunities to connect people, including youth, with nature.
- 06 Management of the Sequoia supports community needs by providing employment and training opportunities.

Volunteers, Interpretation, Partnerships and Stewardship

Desired conditions and other plan components for interacting and partnering to work together on shared interests with people, organizations, agencies (e.g., local, state, and federal), non-profits, businesses and communities are included under this heading.

Forestwide (VIPS-FW-DC)

- 01 The Sequoia has a network of dependable partners and volunteers who provide additional capacity to effectively and efficiently meet plan desired conditions and deliver services to the public.
- 02 The Sequoia uses partnerships to build local capacity for providing information and content using the best available methods, including advances in technology.
- 03 Interpretation and conservation education materials and activities convey up-to-date and clear messages about natural and cultural resources, climate change, land stewardship, responsible recreation use and etiquette, and Native American heritage and culture.
- 04 The diverse backgrounds and needs of visitors are considered in the design of communication and interpretive messages.
- 05 Forest Service projects and management actions, as well as the importance of ecosystem services, are communicated to the public in an understandable fashion to increase public awareness of nature and ecosystems.
- 06 There is little human litter as a result of effective interpretation and education, enforcement, patrols and use of refuse and recycling facilities.
- 07 Nationally registered historic sites and culturally important properties retain their historic and cultural significance when public use and education opportunities are provided.

Timber

Desired conditions and other plan components under this heading cover timber management. Forest management on the Sequoia National Forest consists of restoration and fuels reduction treatments designed to achieve desired conditions for the associated terrestrial vegetation type on suitable timber lands (appendix E). The 1.1 million acres of the Sequoia National Forest includes approximately 125,379 acres that are suitable for timber production (Table 18). Land determined to be suitable is land where timber production is the primary or secondary management objective. On lands not suited for timber production, timber harvest may occur to protect multiple use values other than timber production, and for salvage, sanitation, or public health.

Forestwide (TIMB-FW-DC)

- 01 Predictable and sustainable forest product yields contribute to maintaining and improving local and regional industry infrastructure and are sufficient to meet the needs of the desired pace and scale of ecological restoration over the next several decades.
- 02 Production of timber contributes to ecological, social and economic sustainability and associated desired conditions. A sustainable mix of forest products (including both sawtimber and non-sawtimber) is offered under a variety of harvest and contract methods in response to market demand and restoration needs.
- 03 Salvage of dead and dying trees captures as much of the economic value and carbon storage capacity of the wood as possible while retaining key features in quantities that provide for wildlife habitat, soil productivity and ecosystem functions.

Range

Desired conditions and other plan components under this heading apply to rangeland management, which includes the authorized use and management of National Forest System lands for the purpose of livestock production and utilization of forage resources by livestock.

Forestwide (RANG-FW-DC)

- 01 Rangelands, along with grazable forestlands and woodlands, provide large areas of contiguous space supporting native vegetation that has the potential to be grazed. These ranges sustain biological diversity and ecological processes and help to preserve the rural landscape and cultural heritage of the central, southern and eastern Sierra Nevada.
- 02 Domestic livestock grazing maintains the desired vegetation represented by diverse plant functional groups, species richness and diversity, and structure and condition of plant communities.
- 03 Forage, browse, and cover meet the needs of wildlife and authorized livestock are managed in balance with available forage. Areas that are grazed have or are trending toward having satisfactory soils, functional hydrology and biotic integrity.
- 04 The forest contributes to the stability of the ranching community and recognizes its value as part of our heritage, contribution of food and fiber, and maintenance of open space.
- 05 The productivity of all forest rangelands is maintained or improved through adequate protection of the soil, water and vegetative resources.

- 06 Rangelands provide a wide variety of benefits, including forage for livestock and wildlife, a diversity of plant and animal communities, and high quality water yield.

Sustainable Recreation

The Sequoia National Forest receives over X million annual visits by local and state residents as well as people from all over the world. The Sequoia National Forest seeks to provide a quality, sustainable recreation program by assessing recreation settings, opportunities, access and scenic character (addressed in the next section). The Forest uses various tools to describe and assess these categories.

A niche statement is what the Forest uses to describe what it has to offer in terms of special places, opportunities and potential experiences, overlapped with what people desire and expect in terms of outdoor recreation from public lands. The Sequoia's niche is described as follows:

The Sequoia National Forest, named for the world's largest trees, celebrates the greatest concentration of giant sequoia groves in the world. The Sequoia's landscape is as spectacular as its trees. Soaring granite monoliths, glacier-carved canyons, caves, roaring world-class whitewater, and scenic lakes and reservoirs await your discovery at the Sierra Nevada's southern reach. Elevations range from 1,000 feet in the lower canyons to peaks over 12,000 feet on the crest of the Sierra, providing visitors with spectacular views in a dramatic range of settings. These mountains stand in contrast to California's San Joaquin Valley, providing cool relief for families from the scorching heat of summer and welcome blue skies and sun during the cold fog of winter. These spectacular features provide an attractive overnight destination for visitors from far and near.

The Sequoia manages for outdoor recreation activities that are consistent with these recreation settings and opportunities using the recreation opportunity spectrum classification; a framework used to define and categorize recreation settings into six distinct opportunity classes: primitive, semi-primitive non-motorized, semi-primitive motorized, roaded natural, rural and urban. A map of the Sequoia's recreation opportunity spectrum classes is provided in Figure 19, in appendix A.

Desired conditions and other plan components under this heading apply to the Sequoia National Forest's recreation settings and accompanying recreation opportunities. The Sequoia National Forest has place-based management areas that provide a contiguous backdrop for particular opportunities and activities. Plan components specific to these place-based areas are in chapter 3, under management areas, subsection recreation places.

Forestwide (REC-FW-DC)

- 01 The diverse landscapes of the forest offer a variety of year-round recreation settings for a broad range of nature-based recreation opportunities derived from assigned recreation opportunity spectrum (ROS) classes and recreation places management areas. Management focuses on settings that enhance the forest recreation program niche.
- 02 The condition and function of recreation facilities reflect the diversity of cultures and activities in our community.
- 03 Recreation opportunities on land, water and in the air provide a high level of visitor satisfaction and safety. Recreation activities are ecologically, socially and economically sustainable. Agency resources focus on supporting the forest recreation program niche.

- 04 Visitors can connect with nature, culture and history through a full range of inclusive and sustainable outdoor recreation opportunities.
- 05 Conflicts between different recreation uses are infrequent.
- 06 National Forest access is ecologically, socially and economically sustainable and properly sized to provide public enjoyment focusing on the forest recreation program niche. National Forest System roads and trails provide recreation opportunities and access to recreation settings and places the public highly values. The management and operation of facilities and capacity is place based, integrated, and responsive to changes that might limit or alter access. The agency provides access to the distinctive landscapes of the forest in a manner that supports the safety of forest staff and the public.
- 07 Trail opportunities are available in a variety of settings that provide differing levels of challenge and types of experiences.
- 08 Developed recreation sites and infrastructure provide for the planned use, are managed for public safety, and are maintained for ecological, social and economic sustainability.
- 09 New developed recreation infrastructure is located in resilient landscapes and designed to respond to future impacts of climate change, while being financially sustainable and sensitive to changing public demand.
- 10 Dispersed recreation occurs in areas outside of high visitation, developed facilities or communities, and does not impact natural or cultural resources.
- 11 Permitted recreation uses, such as recreation special events or guided activities, are consistent with recreation settings, protect natural and cultural resources, and support community goals.
- 12 Developed recreation facilities sites are in areas resilient to large, high-intensity wildfires.
- 13 Forest recreation information is up-to-date, connecting people to the forest through various means including social media, radio ads, public information bulletins, and print media sources, to reach diverse communities near and far.
- 14 Recreation settings provide a range of opportunities as described by the recreation opportunity spectrum. The desired distribution of recreation opportunity spectrum settings are listed in Table 8, and displayed in Figure 19, appendix A.
- 15 The trail system provides a variety of motorized and non-motorized recreational opportunities during summer and winter and distributed across the forest. Trails access destinations provide for loop opportunities that also connect to a larger trail system, provide linkage from local communities to the forest, and are compatible with other resources.
- 16 Forest system trails are sustainably designed and managed to provide a variety of high quality motorized and non-motorized summer and winter access that connects people to nature. Trails are maintained in accordance with trail management objectives.

Table 8. Desired recreation opportunity spectrum classes

Class	Acres	Percentage
Primitive	329,034	30
Semi-primitive non-motorized	57,085	5
Semi-primitive motorized	250,541	22
Roaded Natural	453,379	41
Rural	24,711	2
Urban	0	0

Scenery

Desired conditions and other plan components under this heading apply to the Sequoia’s management of scenery. Ecosystems provide the environmental context for a scenery management system, a framework that considers scenic character and aesthetic values, geologic features and viewsheds. Scenic character is a combination of the physical, biological, and cultural images that gives an area its scenic identity and contributes to its sense of place. Scenic character provides a frame of reference from which to determine scenic attractiveness and to measure scenic integrity.

In some situations, preferred scenic conditions such as absence of downed woody debris from timber harvest may run counter to the need for woody debris to provide wildlife food and cover, nutrient recycling, etc. Providing a high level of scenic integrity may have to be achieved through establishing an ‘ecological aesthetic’ over time through knowledge and appreciation of how a healthy ecosystem functions.

Forestwide (SCEN-FW-DC)

- 01 The forest provides a variety of ecologically sound, resilient and visually appealing forest landscapes that sustain scenic character, supporting the forest recreation program niche in ways that contribute to visitors’ sense of place and connection with nature.
- 02 Scenic character is maintained and/or adapted to changing conditions to support ecological, social and economic sustainability on the forest and in surrounding communities.
- 03 Scenic integrity is maintained in places people visit and view.
- 04 The Forest’s scenic resources compliment the recreation settings and experiences, as described by the range of scenery integrity objectives, while reflecting healthy and sustainable ecosystem conditions. The desired distribution of scenic integrity objectives is displayed in Figure 20, appendix A.

Tribal Relations and Uses

Desired conditions and other plan components under this heading apply to the Sequoia National Forest's recognition that lands and people surrounding the forest have an important influence on forest management. The forest lies in the traditional territories of seven federally recognized Native American tribes, as well as thirteen unacknowledged tribes, tribal groups and organizations. Tribal communities are contacted and consulted, and are important partners in forest management activities.

Forestwide (TRIB-FW-DC)

- 01 The forest recognizes Native American needs and viewpoints and fosters a robust relationship with federally and non-federally recognized tribes and related groups with which it consults. Forest personnel, including but not limited to line officers, departmental staff, archaeologists, historians, and tribal liaisons, consult and communicate with tribal leadership, tribal historic preservation officers, traditional religious practitioners, traditional gatherers, tribal members and other tribal organizations.
- 02 The forest coordinates with tribes in managing traditional cultural properties, resources and sacred sites where historic preservation laws alone may not adequately protect the resources or values.
- 03 Native Americans have access to areas that provide them an opportunity to practice traditional, cultural and religious lifeways, such as plant gathering, fishing, hunting and ceremonial activities that are essential in maintaining their cultural identity and the continuity of their culture.
- 04 Traditional ecological knowledge is a valued part of the process when developing and implementing restoration projects and other forest programs.
- 05 The forest provides a setting for the education of tribal youth in culture, history and land stewardship and for the exchange of information between tribal elders and youth.

Cultural Resources

The cultural and historic resources on the forest are a vast array of distinct resources that enrich communities, both large and small, through their use, preservation and interpretation. Programmatic management strategies allow selective use of various cultural resource types, for the greatest public benefit, while minimizing overall impacts and leaving a rich cultural heritage for the future. A myriad of federal laws, regulations, and policies direct the documentation and management of cultural resources.

Cultural resources include prehistoric and historic archaeological sites and districts; historic buildings and structures; ethnographic landscapes; traditional cultural properties; and Native American contemporary use areas. Contemporary use areas include places where traditional forest products are harvested. Products harvested annually include but are not limited to teas, medicines, basketry materials, cedar bark, and foods such as acorns, mushrooms, berries, roots, etc. Most contemporary use areas are rooted in past cultural traditions that may have shifted location due to environmental change and forest development.

Cultural resources also include a substantial record of oral histories, photographs, maps, reports, and archaeological artifacts. The documentary record of the people and historic landscapes that

are illustrated in these old stories, maps and photographs contribute greatly to the understanding of cultural resources in the forest.

All cultural resources are not amendable to all potential uses, and vary individually and collectively on what they can offer. Preservation and interpretation of these fragile non-renewable resources educate people of all ages, races, and walks of life about the cultural connections between people and the forest. The realization of the eons of time and generations of people that have passed among the giant sequoia trees can be awe inspiring, humbling even religious.

Forestwide (CULT-FW-DC)

- 01 Cultural resources (buildings, sites, districts, structures and objects) having scientific, cultural or social values are preserved and protected for their cultural importance. 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. Priority heritage assets are stable and their significant values protected; vandalism, looting, theft and human-caused damage to heritage resources are rare. Site significance and integrity are maintained through conservation and preservation efforts.
- 02 Cultural resources, traditional cultural properties and sacred sites are protected through project design and consultation with Indian tribes, tribal cultural leaders and consulting parties.
- 03 Cultural resources provide educational opportunities that connect people to the land and its history. Through interpretive sites, historic standing structures and other materials, the public the forest provides opportunities for an appreciation for the region's history and an awareness of preservation efforts. In some cases, historic routes (e.g., railroad grades) are used for recreation trails with interpretation of their history and historic features. Heritage-based recreation opportunities are connected, where practical, with other recreation opportunities such as trails.
- 04 Public enjoyment is enhanced by opportunities to visit interpretive cultural resource sites. Archaeological site etiquette information is readily available to national forest visitors. Interpretation of the human history of the forest promotes greater public understanding of the communities that have depended on this landscape for their livelihood, recreation and spiritual wellbeing.
- 05 Opportunities exist for volunteers to participate in cultural resource conservation activities such as research, site stabilization, protection, conservation and interpretation. Cultural resource programs, interpretive presentations or publications are available to provide the public with opportunities to learn about, understand and experience the forest's past.
- 06 Practical opportunities for the rehabilitation and reuse of historic structures to enhance recreation experiences are promoted).

Geology and Minerals

Uses on National Forest System lands include the extraction and potential development of mineral resources, which are managed in a manner that protects natural resources, public health and safety, and are consistent with National Forest System land and resource management plans. Mineral extraction and development is limited on the forest, although historically mining played

an important role in the area. Geothermal development is limited on the forest; facilities are present in the area. All authorized uses to occupy and use National Forest System lands are evaluated and determined to be in the public interest. Determinations include consultation with other interested parties including federal, state, and county agencies and non-governmental interests.

Forestwide (GEO-FW-DC)

- 01 Mineral resources on National Forest System lands provide for public benefit, while minimizing adverse environmental effects on other forest resources from mineral exploration, development, and extraction.

Energy

Uses on National Forest System lands include the extraction and potential development of geothermal and other energy sources, which are managed in a manner that protects natural resources, public health and safety, and are consistent with National Forest System land and resource management plans. Wind and solar development is limited on the forest; geothermal facilities are located on the forest and serve local communities. All authorized uses to occupy and use National Forest System lands are evaluated and determined to be in the public interest. Determinations include consultation with other interested parties including federal, state, and county agencies and non-governmental interests.

Forestwide (NRG-FW-DC)

- 01 Energy resources of National Forest System lands provide for the maximum public benefit that is compatible with protecting ecosystem integrity.

Infrastructure

Infrastructure on National Forest System lands includes the built property created to support the Forest's use and mission. The five major categories of infrastructure are transportation, recreation facilities, administrative facilities, public utilities and private uses. Other infrastructure includes range related facilities, and historic facilities.

Transportation refers to the vehicular movement of goods and services for the use of the national forest. Roads managed by public road agencies such as states, counties and municipalities that help provide access to National Forest System lands, are also part of the transportation system. A recreation facility is a discrete area on a forest that provides recreation opportunities, receives recreational use, and requires a management investment to operate and maintain to standard. Administrative facilities are typically buildings and their appurtenances necessary to support the employees, equipment and activities necessary for management of national forests. Public utility infrastructure is associated with Federal Energy Commission licensed hydroelectric systems, but also includes cable TV, telephone and internet service, and municipal sewer service. Private infrastructure refers to facilities developed in private ownership used in conjunction with special use authorizations. Such facilities include buildings and other kinds of structures and improvements representing a broad range of permitted recreation and land use activities. These activities can serve single purpose use by individuals or families, as well as offer benefits to the public.

Management direction for infrastructure is to provide safe, energy-efficient, accessible, functional, efficient, aesthetically pleasing, and cost effective administrative buildings and related facilities, while reducing fixed cost through: consolidation and decommissioning of obsolete or

underutilized buildings; construction of new facilities where and when required; and by conducting proper routine maintenance of existing facilities.

Forestwide (INFR-FW-DC)

- 01 An efficient forest transportation system, administrative sites, and other infrastructure and facilities are in place and maintained at least to the minimum standards appropriate for planned uses and the protection of resources.
- 02 Management operations on the Sequoia National Forest are energy-efficient.

Lands

Uses on National Forest System lands include land acquisition and disposal, and special uses. Statutory authorities govern any land acquisition and disposal, and the authorization and administration of special uses. Special uses are managed in a manner which protects natural resources, public health and safety and are consistent with National Forest System land and resource management plans. Special uses are administered based on sound resource management objectives and sound business principles. All authorized uses to occupy and use National Forest System lands are evaluated and determined to be in the public interest. Determinations include consultation with other interested parties including federal, state, and county agencies and non-governmental interests.

Forestwide (LAND-FW-DC)

- 01 Land ownership and access management support authorized activities and uses on National Forest System lands. Lands exchanges promote improved management of National Forest System lands.
- 02 Coordination of land and resource planning efforts with other federal, state, tribal, county and local governments, and adjacent private landowners, promotes compatible relationships between activities and uses on National Forest System lands and adjacent non-federal lands.
- 03 Isolated or scattered parcels of Federal land identified for disposal through exchange provide for a range of objectives and outputs with limited investments.

Chapter 3. Management Strategy

Management Areas

Strategic Fire Management Zones

Strategic fire management zones were developed based on a southern Sierra Nevada wildfire risk assessment, which used a wildfire risk assessment framework for land and resource management to spatially model and assess contemporary wildfire risk⁵. The purpose of assigning strategic fire management zones is to support decision makers before an ignition occurs, by pre-assessing areas for wildland fire (i.e., wildfire and prescribed fire) risk and benefits. Four strategic fire management zones were developed: 1) community wildfire protection zone, 2) general wildfire protection zone, 3) wildfire restoration zone, and 4) wildfire maintenance zone. The Sequoia National Forest's fire management specialists finalized the mapping of each zone (Figure 11, appendix A). Forest plan guidance organized into these zones aid wildland fire management decisions to meet the full range of forest plan objectives. Active management through thinning and prescribed fire within all the zones reduces fuels and associated fire hazard and mitigates safety hazards for firefighters working close to structures.

Community Wildfire Protection Zone

The community wildfire protection zone encompasses locations where hazardous fuel conditions currently put communities, community assets and private land at a very high risk of damage from wildfire. Wildfires that start in this zone contribute more to potential loss to community assets than any other strategic fire management zone. Under most conditions, wildfire mitigation, fuel reduction treatments and fire protection is needed in the community wildfire protection zone to prevent direct threats to life or property. Wildfire is suppressed under most conditions due to the very significant risk, potential economic loss and public safety concerns posed by a wildfire occurring within this zone.

Within this zone, community buffer areas are identified and used to strategically mitigate vegetation directly adjacent to structures and allow for safer conditions for firefighters. Although some wildfires that burn in this zone can potentially benefit natural resources and help decrease fuels and threats from future wildfires, these potential benefits are less likely under most weather, fuel moisture, and other environmental conditions due to the very high risk to community assets during the fire season. The long term focus is to create fire-adapted communities that are less reliant on aggressive wildfire protection.

Desired Conditions (MA-CWPZ-DC)

- 01 Areas adjacent to communities with current high fire risk have low fuel loadings, designed to result in less intense fire behavior and to facilitate safe wildland fire operations.

⁵ Scott, Joe H.; Thompson, Matthew P.; Calkin, David E. 2013. A wildfire risk assessment framework for land and resource management. Gen. Tech. Rep. RMRS-GTR-315. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 83 p.

- 02 Over time, risk to communities is reduced sufficiently in the community wildfire protection zone (CWPZ) to allow some areas to be placed in a lower risk zone including the general wildfire protection or wildfire restoration zones.

Guidelines (MA-CWPZ-GDL)

- 01 When planning and implementing projects around communities, manage vegetation in community buffers to meet the following conditions:
 - a. Community buffers are measured from the structures in the community. Maximum width is based on potential fire behavior in adjacent areas under extreme fire weather conditions (i.e., 97th percentile weather, probable average momentary wind gusts). The maximum width is sufficient to provide low radiant heat from areas of untreated fuels (i.e., four times the potential maximum flame length in adjacent areas on slopes less than 40 percent and six times the potential maximum flame length in adjacent areas on slopes greater than 40 percent).
 - b. Within the community buffer, treated areas have a modeled average potential flame length of four feet or less, and where possible meet terrestrial ecosystem desired conditions.
 - c. Snags and logs are absent or their densities are very low to minimize the likelihood of spotting or ember ignitions, maximize fireline production rates, and reduce firefighter safety hazards.
 - i. No snags should exist within two and a half tree lengths of structures. In the rest of the community buffer, snag density should be less than 1 snag per 10 acres.
 - ii. Less than 1 large log per acre should exist within two and a half tree lengths of structures. In the rest of the community buffer, log density should be less than 2 large logs per acre.
 - d. In riparian areas within community buffers, native hardwood shrubs and trees should be retained over conifers where fuel reduction is necessary to meet fire behavior objectives. These treatments take precedent over general riparian conservation area guidelines. On a site specific basis, higher levels of large logs may be retained in some areas.
- 02 Locate restoration treatments along ridges, roads, or other natural or man-made features and in areas that pose the greatest fire threat to communities so that there are more tactical opportunities to manage wildfires and reduce the spread rate and intensity of wildfires. Treatments should conform to the terrestrial ecosystem desired conditions.

Goal (MA-CWPZ-GOAL)

- 01 Protect communities (life and property) from the negative impacts of wildfire.
- 02 Reduce the impacts of wildfire by creating fire-adapted communities through fuel reduction treatments, prescribed fire and managing wildfires that can benefit natural resources while reducing risk.

General Wildfire Protection Zone

The general wildfire protection zone identifies where conditions currently put some natural resource values at high risk of damage from wildfire; wildfires that start in the general wildfire protection zone contribute to the high fire risk in the community wildfire protection zone. Managing wildfires to meet resource objectives in this zone is often considerably constrained due to fuel conditions, the high risk of loss of natural resources and the potential adverse impacts to communities threatened by wildfires starting in this zone. Although some wildfires that burn in this zone can potentially benefit some natural resources, high negative impacts to many natural resources are more likely under most weather, fuel moisture, and other environmental conditions during the fire season. Targeted ecological restoration and hazardous fuel reduction are needed in the general wildfire protection zone to safeguard communities and resources.

Desired Conditions (MA-GWPZ-DC)

- 01 The threat to communities from wildfires starting in this zone is minimal due to vegetation conditions reaching a balance of reduced excessive fuel loading while maintaining terrestrial ecosystem desired conditions.
- 02 The landscape is resilient and can tolerate varying effects of wildfires. Over time, risk to values is reduced sufficiently in the general wildfire protection zone to allow some areas to be placed in a lower risk zone including the wildfire restoration and wildfire maintenance zones.

Guidelines (MA- GWPZ-GDL)

- 01 Restoration treatments to reduce the spread rate and intensity of wildfires are located in more tactical opportunity areas like along ridges, roads, other natural or man-made features and in areas that pose the greatest fire threat to communities. Treatments should conform to the terrestrial ecosystem desired conditions.

Goal (MA-GWPZ-GOAL)

- 01 Protect natural resources from the negative impacts of wildfire and prevent direct threats to life or property in nearby communities.
- 02 Reduce the threat of wildfire spreading to communities through fuel reduction treatments, prescribed fire and wildfires managed to meet resource objectives, while also reducing risk to natural resources.

Wildfire Restoration Zone

The wildfire restoration zone identifies where conditions currently put some natural resource values at moderate risk of damage from wildfire. In general, wildfires that start in this zone pose a low to moderate threat to communities in average fire season conditions. Wildfires that burn in this zone can potentially benefit natural resources, but only under limited environmental conditions. Managing wildfires to meet resource objectives in this zone can be constrained due to fuel conditions and moderate risk to natural resources from wildfire. This zone is where some ecological restoration may be needed before using wildland fire under a wider range of weather, fuel moisture, and other environmental conditions.

Desired Conditions (MA-WRZ-DC)

- 01 The landscape is resilient to a range of fire effects, and wildland fire has a predominately positive benefit to ecosystems and resources.

- 02 Wildfire is managed to meet resource objectives under a wide range of environmental conditions.
- 03 The landscape is resilient to the impacts of wildfire. Over time, risk to natural resources is reduced sufficiently in the wildfire restoration zone to allow some areas to be categorized in the wildfire maintenance zone.

Standards (MA-WRZ-STD)

- 01 Use natural barriers and features like creeks, old fire scars, ridges and human-made features (e.g., roads and trails) when managing wildfires to meet resource objectives or managing unwanted wildfires that have surpassed the initial attack phase, unless unsafe or impractical. Variation from this standard will be the exception and will be documented by the responsible line officer in the current fire decision support system.

Goal (MA-WRZ-GOAL)

- 01 Create fire resilient landscapes that can be restored and maintained by managing wildfire to meet resource objectives, prescribed fire and fuel reduction treatments.

Potential Management Approaches

Fuel treatments include prescribed fire, mechanical treatments, and managing wildfire to meet resource objectives.

Areas that historically supported more frequent fire, like ponderosa pine and Jeffrey pine-dominated forests, and areas with high existing levels of understory fuels are prioritized for treatment.

Wildfire Maintenance Zone

The wildfire maintenance zone poses a low threat to communities in average fire season conditions, and where conditions allow natural resources to benefit from wildland fire. Managing wildfire to meet resource objectives in this zone is the least constrained, and implementing prescribed fire for ecological restoration is favorable. Ecological maintenance can be carried out by the management of wildland fire under a wide range of weather, fuel moisture, and other environmental conditions. Using prescribed fire to meet resource objectives is also appropriate.

Desired Conditions (MA-WMZ-DC)

- 01 Ecosystems are resilient to the impacts of wildfire and wildland fire has predominantly positive benefits to ecosystems and resources.
- 02 Lands within this zone are maintained in a predominately low risk with high potential benefit condition relative to wildland fire.

Standards (MA-WMZ-STD)

- 01 Following current wildland fire policy, manage wildfires to meet resource objectives and restore and maintain fire as an ecological process. The responsible line officer must use the current decision support system for wildfire management to document cases when naturally caused wildfires are promptly suppressed.
- 02 Use natural barriers and features, such as creeks, old fire scars, ridges, and human-made features (e.g., roads and trails) when managing wildfires to meet resource objectives or

unwanted wildfires that have surpassed the initial attack phase, unless unsafe or impractical. Variation from this standard will be the exception and will be documented by the responsible line officer using the current fire decision support system.

Goal (MA-WMZ-GOAL)

- 01 Maintain fire resilient landscapes by managing wildfire to meet resource objectives, and using prescribed fire and fuel reduction treatments.

Wilderness

The wilderness management area on the Sequoia National Forest includes all existing wilderness areas that have been designated by Congress (Figure 12, appendix A) that occur outside the Giant Sequoia National Monument (for wilderness areas in the Giant Sequoia National Monument, see designated areas section in this chapter below). In addition to plan components that apply to all designated wilderness areas, the South Sierra Wilderness has additional desired conditions that are specific to four different opportunity classes that occur across this wilderness (Figure 12, appendix A). In addition to the strategic level guidance provided in this land management plan, specific wilderness plans for the Golden Trout, South Sierra, and Domeland Wildernesses provide area specific guidance.

All Designated Wilderness

Desired Conditions (MA-WILD-DC)

- 01 The wilderness character of each wilderness, including the qualities of untrammeled, natural, undeveloped, opportunities for solitude or primitive recreation, and other features of value (ecological, geological or other features of scientific, educational, scenic, cultural or historical value unique to each specific wilderness area) are preserved and, when possible, enhanced.
- 02 Watersheds are functioning properly and exhibit high geomorphic, hydrologic, and biotic integrity relative to their natural and current potential condition.
- 03 Fire is restored as an ecosystem process and natural disturbance agent in wilderness where possible.
- 04 The undeveloped character of wilderness is enhanced compared to the time of designation.
- 05 Each wilderness area accommodates levels of recreation use that are ecologically sustainable.
- 06 Overall recreation use is maintained at a level that protects opportunities for solitude and wilderness character.
- 07 Forest visitors find opportunities for primitive recreation and solitude across the wilderness.
- 08 Forest system trails that access wilderness are part of a high-quality wilderness experience for visitors. Forest system trails meet national quality standards, with minimal deferred maintenance and adhere to the national trail classification system. Trails in

wilderness are located in resilient areas, and do not cause impacts to at-risk species, water quality, soils, hydrologic connectivity, or cultural resources.

- 09 Concentrated use areas and associated resource impacts are not expanding into nearby areas.
- 10 Resource impacts of user-created trails are reduced.
- 11 If a wilderness permit system is in place, the permit system provides equity in access for all authorized and legitimate uses.

Guidelines (MA-WILD-GDL)

- 01 An invasive species should meet the following criteria before the Sequoia National Forest uses herbicide or biocides in wilderness: the invasive species would likely expand to the landscape scale, and the invasive species has the capability to displace native species or alter ecosystem processes.
- 02 Vegetation management projects on non-wilderness lands should include measures to minimize the risk of introducing non-native invasive species into wilderness
- 03 Campsites that adversely affect water quality or exceed established density standards should receive treatments that promote passive restoration to natural conditions.
- 04 Limit party size and number of stock per party to a level that protects social and natural resource values. The level may vary within or between wildernesses.

Suitability (MA-WILD-SUIT)

- 01 Developed recreation sites are not suitable.
- 02 Motorized use on forest system roads and trails is not suitable, except as provided for in the Wilderness Act or Forest Service Manual.
- 03 Over snow vehicle travel is not suitable.
- 04 Mechanized transport is not suitable.
- 05 Ski areas are not suitable.
- 06 Permanent improvements are not suitable.
- 07 Road construction or reconstruction is not suitable, except as provided for in the Wilderness Act.
- 08 Commercial enterprise sites and major utility corridors are not suitable, except as provided for in the Wilderness Act.
- 09 Disposal of National Forest System land is not suitable.
- 10 Commercial harvesting of non-timber forest products is not suitable.

South Sierra Wilderness

Wilderness Opportunity Class 1

Desired Conditions (MA-OC1-DC)

- 01 Opportunities for solitude and isolation are high. There is little evidence of human activities. Encounters with other users are infrequent. Contact with other parties is rare to non-existent while traveling and are very low at campsites. Many opportunities for cross-country travel exist. This environment offers a high degree of challenge, self-reliance and risk.
- 02 A highly unmodified natural environment generally characterizes the area. Ecological processes are largely unaffected by direct human actions. Environmental impacts are minimal and are usually restricted to areas along travel corridors. Most impacts recover on an annual basis and are not apparent to most visitors.
- 03 Management strongly emphasizes sustaining and enhancing the natural ecosystem. Communication about rules and regulations occurs outside the area. Indirect methods of accomplishing management objectives predominate, but when needed management actions can be direct. Site-specific regulations may be in place in unusual cases where resources require higher levels of protection. Maintained trails, signs, or facilities exist only for resource protection. Abandoned OHV routes may be present in some areas and native vegetation is recovering naturally.

Wilderness Opportunity Class 2

Desired Conditions (MA-OC2-DC)

- 01 Many opportunities for exploration and isolation exist. There is some evidence of human activities, and the probability of encountering other users is low on trails, but other parties may be encountered at campsites. This environment offers a high degree of challenge, self-reliance and risk.
- 02 An unmodified natural environment generally characterizes the area, except within trail corridors (50 feet on each side of a trail). Ecological processes are minimally affected by direct human actions. Environmental impacts are low and usually restricted to areas along travel routes and near campsites. Many impacts recover on an annual basis and are not apparent to most visitors.
- 03 Management emphasizes sustaining and enhancing the natural ecosystem. Communication about rules and regulations occurs outside the area. Direct on-site management of visitors is infrequent but occurs more frequently than in Opportunity Class 1. Routes are maintained for resource protection and user safety. Signs provide directions at trail junctions or at geographical passes. Abandoned OHV routes may be present in some locations and native vegetation is recovering naturally.

Wild and Scenic Rivers 1

Desired Conditions (MA-WSR1-DC)

- 01 Outstanding opportunities for solitude and isolation are high. Encounters with other users are infrequent. This environment offers a high degree of challenge, self-reliance and risk.

- 02 An unmodified natural environment generally characterizes the area. The ecosystem is stable and natural processes generally operate free of human induced-controls. Visitor impacts are minor and typically consist of temporary disturbances of soil and vegetation in camps and along popular hiking trails. Most impacts recover on an annual basis and are not apparent to most visitors.
- 03 Management emphasizes maintaining natural conditions and primitive recreation opportunities. Indirect methods of accomplishing management objectives predominate. Direct on-site management of visitors is rare.

Wild and Scenic Rivers 2

Desired Conditions (MA-WSR2-DC)

- 01 Some outstanding opportunities for solitude and isolation exist. Encounters with other users occur during the primary use season. Some off-trail opportunities exist to use primitive outdoor skills and experience challenge, self-reliance and risk.
- 02 A primitive environment generally characterizes the area. The environment is generally unmodified with slight human-caused modifications evident in localized areas. The ecosystem is stable with some human-induced controls. Visitor impacts are minor and typically consist of temporary disturbances of soil and vegetation in camps, along river banks, and along popular trails. Disturbances may be visually noticeable along trails and around camps.
- 03 Management emphasizes maintaining natural conditions and primitive recreation opportunities. Indirect methods of accomplishing management objectives predominate. Direct on-site management is occasional and occurs more than in other opportunity classes.

Wild and Scenic Rivers

The wild and scenic river management areas on the Sequoia National Forest include all existing wild and scenic rivers that have been designated by Congress (Figure 13, appendix A).

Designated Wild and Scenic Rivers

Desired Conditions (MA-WSR-DC)

- 01 The free flowing condition, water quality and specific outstandingly remarkable values of designated wild and scenic rivers are protected or enhanced. Any development is consistent with the river's classification, and management is consistent with a current comprehensive river management plan.
- 02 Public recreation and resource uses are provided that do not adversely impact or degrade the values for which the river was designated.

Standards (MA-WSR-STD)

- 01 Road and motorized trail access to rivers must be consistent with river classification, travel management direction and the recreation opportunity spectrum classification.
- 02 When evaluating a federally assisted water resources project under the Wild and Scenic Rivers Act Section 7(a) and where a comprehensive river management plan has not yet

been completed, use the documented baseline conditions at date of designation for free flow, water quality and outstanding remarkable values to evaluate effects of the project. The river's classification is not a factor in the evaluation.

Guidelines (MA-WSR-GDL)

- 01 Uses of facilities in existence at the date of designation that do not conform to the river's classification should be allowed so long as the river's free-flowing condition, water quality, and outstanding remarkable values are protected.
- 02 Consider closing and restoring dispersed campsites to natural conditions that are adversely affecting water quality.
- 03 If new recreation facilities are needed, they should be consistent with river classification, recreation opportunity spectrum classification, scenic integrity objectives, and located to protect outstanding remarkable values.

Eligible or Recommended Wild and Scenic Rivers

Desired Conditions (MA-EWSR-DC)

- 01 Eligible or recommended wild and scenic rivers retain their free-flowing condition, water quality and specific outstandingly remarkable values. Recommended preliminary classifications remain intact until further study is conducted or until designation by Congress.

Standards (MA-EWSR-STD)

- 01 For interim management of Forest Service-identified eligible or recommended suitable rivers, use interim protection measures identified in FSH 1909.12 – 84.3.

Riparian Conservation Areas

Riparian conservation area widths are defined by type: 1) perennial streams, 300 feet on each side of the stream, measured from the bank full edge of the stream; 2) seasonally flowing streams (includes intermittent and ephemeral streams), 150 feet on each side of the stream, measured from the bank full edge of the stream; 3) streams in inner gorge (defined by stream adjacent slopes greater than 70 percent gradient), top of inner gorge; 4) special aquatic features (e.g., lakes, wet meadows, bogs, fens, wetlands, vernal pools, and springs) or perennial streams with riparian conditions extending more than 150 feet from edge of streambank, or seasonally flowing streams with riparian conditions extending more than 50 feet from edge of streambank, 300 feet from edge of feature or riparian vegetation, whichever width is greater; and 5) other hydrological or topographic depressions without a defined channel, riparian conservation area width and protection measures is determined through project level analysis. Riparian conservation area widths may be adjusted at the project level if interdisciplinary analysis demonstrates a need for different widths to meet or improve riparian conservation area desired conditions. Locations of riparian conservation areas for the Sequoia National Forest are shown in Figure 14 (appendix A).

Riparian conservation area plan components apply to the entire riparian conservation area, as well as the specific riparian and aquatic environments contained within them, such as rivers, streams, meadows, springs and seeps. Riparian and aquatic environments also have additional direction specific to each environment. The relationship among watersheds, riparian conservation areas, and riparian and aquatic environments is displayed in Figure 2, chapter 2.

Desired Conditions

RCA-wide (MA-RCA-DC)

- 01 Habitat supports persistent populations of native and desired non-native plant, invertebrate, and vertebrate riparian and aquatic-dependent species. New introductions of invasive species are prevented. Where invasive species are adversely affecting the persistence of native species, the appropriate state and federal wildlife agencies work to reduce impacts of invasive species to native populations.
- 02 Species composition and structural diversity of plant and animal communities in riparian areas, wetlands, and meadows provide desired habitat conditions and ecological functions.
- 03 The distribution and health of biotic communities in special aquatic habitats perpetuates their unique functions and biological diversity.
- 04 Spatial and temporal connectivity for riparian and aquatic-dependent species and nutrient cycling is maintained within and between watersheds. Connectivity provides physically, chemically and biologically unobstructed movement for species survival, migration and reproduction.
- 05 The connections of floodplains, channels, and water tables distribute flood flows and sustain diverse habitats.
- 06 Soils with favorable infiltration characteristics and diverse vegetative cover absorb and filter precipitation and sustain favorable conditions of stream flows.
- 07 In-stream flows are sufficient to sustain desired conditions of riparian, aquatic, wetland, and meadow habitats and keep sediment regimes as close as possible to those with which aquatic and riparian biota evolved.
- 08 The physical structure and condition of stream banks and shorelines minimizes erosion and sustains desired habitat diversity.
- 09 Flooding is the primary disturbance. Streams and rivers maintain seasonal water flow over time, including periodic flooding, which promotes natural movement of water, sediment, nutrients and woody debris. Flooding creates a mix of stream substrates for fish habitat, including clean gravels for fish spawning, large wood structures and sites for germination and establishment of riparian vegetation.
- 10 Native fish, amphibians and other native aquatic species are present within their historic distribution, adjusted for climate change, and habitat conditions support self-sustaining populations. Streams and rivers provide a variety of habitats for aquatic species, including deep pools and overhanging banks, structure provided by large wood, off channel areas and cover. Woody and herbaceous overstory and understory regulate stream temperatures. Aquatic and upland components are linked, providing access to food, water, cover, nesting areas and protected pathways for aquatic, riparian and upland species.
- 11 Native riparian vegetation is diverse, structurally complex and provides food and cover to sustain fish and wildlife populations.

- 12 The condition of riparian vegetation including riparian species composition, stand density and fuel loading are consistent with healthy riparian systems and reduce risks due to high-intensity wildfire in the watershed.
- 13 Riparian areas provide a range of substrates to sustain habitat for a variety of aquatic and terrestrial fauna. Soil structure and function is sustained to infiltrate and disperse water properly, withstand erosive forces and cycle nutrients. Associated water tables support riparian vegetation and restrict non-riparian vegetation.
- 14 Riparian areas in frequent fire landscapes (e.g., montane) have low to moderate intensity fire restored as an ecological process. Fire effects occur in a mosaic and support restoration and ecological integrity and function of composition, structure, and ecological resilience.
- 15 Ecological conditions contribute to the recovery of threatened and endangered species, conserve proposed and candidate species, and support the persistence of species of conservation concern.

Meadows (RCA-MEAD-DC)

- 01 Meadows are hydrologically functional. Sites of accelerated erosion, such as gullies and headcuts are stabilized or recovering. Vegetation roots occur throughout the available soil profile. Meadows with perennial and intermittent streams have the following characteristics: (1) stream energy from high flows is dissipated, reducing erosion and improving water quality; (2) streams filter sediment and capture bedload, aiding floodplain development; (3) meadow conditions enhance floodwater retention and groundwater recharge; and (4) root masses stabilize stream banks against cutting action.
- 02 Wetlands and groundwater-dependent ecosystems, including springs, seeps, fens, wet meadows, and associated wetlands or riparian systems, support stable herbaceous and woody vegetative communities that are resilient to drought, climate change and other stressors. Root masses stabilize stream channels, shorelines and soil surfaces. The natural hydrologic, hydraulic and geomorphic processes in these ecosystems sustain their unique functions and biological diversity.
- 03 Meadows are resilient and recover rapidly from natural and human disturbances; they exhibit a high degree of hydrologic connectivity, laterally across the floodplain, and vertically between surface and subsurface flows; they provide important ecosystem services such as high quality water, recharge of streams and aquifers, and moderation of climate variability and change.
- 04 Soil in wet and headwater meadows are influenced by a shallow water table and function to filter water. These soils also store and release water over an extended period of time, which helps to maintain streamflow during dry summer months.
- 05 Meadows are in mid- to late-seral condition, with substantive ground cover and a rich and diverse species composition, especially of grasses and forbs. Meadows have high plant functional diversity with late successional functional types represented. Perennial streams in meadows contain a diversity of age classes of hardwood shrubs along the stream bank, where the potential exists.

- 06 Fen condition is within the natural range of variation. Fens are resilient with continual peat accumulation. The hydrologic regime, and vegetation, soil and water characteristics sustain the fen's ability to support unique physical and biological attributes.
- 07 A complexity of meadow habitat types and successional patterns support native plant and animal communities. Meadow species composition is predominantly native, where graminoid (grass-like) species are well represented and vigorous, and regeneration occurs naturally. Healthy stands of willow, alder, and aspen are present within and adjacent to meadows with suitable physical conditions for these species. Natural disturbances and management activities are sufficient to maintain desired vegetation structure, species diversity, and nutrient cycling.
- 08 Meadows in montane and upper montane areas have low to moderate intensity fire restored as an ecological process, especially on meadow edges, limiting conifer encroachment and enhancing native understory plant composition and cover.

Rivers and Streams (RCA-RIV-DC)

- 01 Stream ecosystems, riparian corridors and associated stream courses sustain ecosystem structure; are resilient to natural disturbances (e.g., flooding) and climate change; promote the natural movement of water, sediment and woody debris; and provide habitat for native aquatic species.
- 02 Stream ecosystems, including ephemeral watercourses, exhibit full connectivity where feasible to maintain aquatic species diversity, except where barriers are maintained in good condition to protect native aquatic species. Ephemeral watercourses provide for dispersal, access to new habitats, and perpetuation of genetic diversity, as well as nesting and foraging for riparian and aquatic species.

Lakes, Pools, Ponds (RCA-LPP-DC)

- 01 Natural lakes and ponds retain necessary attributes, such as adequate vegetation and large woody debris, to function properly and support native biotic communities. Attributes include floodwater retention and groundwater recharge; stabilized islands and shoreline features; and diverse characteristics to provide for amphibian production, waterfowl breeding and biodiversity.

Springs and Seeps (RCA-SPR-DC)

- 01 Springs provide sufficient water to maintain healthy habitats for native riparian and aquatic species.
- 02 Springs are resilient to natural disturbances, groundwater diversions, and changing climate conditions. Springs function across the landscape within their type and water availability.
- 03 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 is similar to historic levels and persists over time, within constraints of climate change.

Standards (MA-RCA-STD)

All standards listed here also apply to Critical Aquatic Refuges (CARs), except as noted.

- 01 Ensure that management activities do not adversely affect water temperatures necessary for local aquatic- and riparian-dependent species assemblages.
- 02 Limit pesticide applications to cases where project level analysis indicates that pesticide applications are consistent with riparian conservation area desired conditions.
- 03 Within 500 feet of known occupied sites for foothill yellow-legged frog and mountain yellow-legged frog, design pesticide applications to avoid adverse effects to individuals and their habitats.
- 04 Within riparian conservation areas only, prohibit storage of fuels and other toxic materials except at designated administrative sites and sites covered by special use authorization. Prohibit refueling within riparian conservation areas except if there are no other alternatives.
- 05 Ensure that culverts or other stream crossings do not create barriers to upstream or downstream passage for aquatic-dependent species, except where desired to protect native species.
- 06 Locate water drafting sites to minimize adverse effects to in stream flows and depletion of pool habitat.
- 07 Prevent disturbance to streambanks and shorelines of natural lakes and ponds caused by resource activities (for example, livestock, off-highway vehicles, and dispersed recreation) from exceeding 20 percent of stream reach, or 20 percent of natural lake and pond shorelines. Disturbance includes bank sloughing, chiseling, trampling, and other means of exposing bare soil or cutting plant roots. This standard does not apply to developed recreation sites; sites authorized under special use permits; and designated off-highway vehicle routes.
- 08 In stream reaches occupied by or identified as “essential habitat” in the conservation assessment for the Little Kern golden trout, limit streambank disturbance from livestock to 10 percent of the occupied or “essential habitat” stream reach. Implement corrective action where streambank disturbance limits have been exceeded.
- 09 Use screening devices for water drafting pumps. (Fire suppression activities are exempt during initial attack.) Use pumps with low entry velocity to minimize removal of aquatic species from aquatic habitats, including juvenile fish, amphibian egg masses and tadpoles.
- 10 During ecological restoration or other activities, use methods and equipment that limit soil disturbance and erosion to achieve riparian conservation area desired conditions.
- 11 Assess the hydrologic function of meadow habitats and other special aquatic features during range management analysis. Ensure that characteristics of special features are, at a

minimum, at proper functioning condition or at functioning at-risk and trending toward proper functioning condition, as defined in the appropriate technical reports^{6,7,8,9}.

- 12 Prohibit or mitigate ground-disturbing activities that adversely affect hydrologic processes that maintain water flow, water quality, or water temperature critical to sustaining fen ecosystems and the plant species that depend on these ecosystems. During project analysis, survey, map, and develop measures to protect fens from activities causing significant degradation, such as trampling by livestock, pack stock, and humans. In all cases, wheeled vehicles should be prohibited from entering fens. The criterion for defining fens is the presence of at least 40 cm of peat (thickness) in the top 80 cm of soil. Complete initial inventories of fens within active grazing allotments prior to re-issuing permits. If more than 10 fens occur on an allotment, ensure 25 percent of all fens are inventoried, and establish a 5-year schedule to complete inventory.
- 13 Locate new facilities for gathering livestock and pack stock outside of meadows and riparian conservation areas.
- 14 Under season-long grazing:
 - 01 For meadows in early seral status: limit livestock utilization of grass and grass-like plants to 30 percent (or minimum 6-inch stubble height).
 - 02 For meadows in late seral status: limit livestock utilization of grass and grass-like plants to a maximum of 40 percent (or minimum 4-inch stubble height).
- 15 If meadow ecological status is determined to be moving in a downward trend, modify or suspend grazing.
- 16 Degraded meadows (like those in early seral statuses with greater than 10 percent of the meadow area in bare soil and active erosion) require total rest from grazing until they have recovered and have moved to mid- or late-seral status.
- 17 Limit browsing to no more than 20 percent of the annual leader growth of mature riparian shrubs and no more than 20 percent of individual seedlings. Remove livestock from any area of an allotment when browsing indicates a change in livestock preference from grazing herbaceous vegetation to browsing woody riparian vegetation.

⁶ Barrett, H., J. Cagney, R. Clark, J. Fogg, K. Gebhardt, P. L. Hansen, B. Mitchell, D. Prichard, D. Tippy. 1993 (Revised 1998). Riparian area management: Process for assessing proper functioning condition TR-1737-9. U.S. Department of the Interior, Bureau of Land Management. 60 pp.

⁷ Prichard, D., J. Anderson, C. Corell, J. Fogg, K. Gebhardt, R. Krapf, S. Leonard, B. Mitchell, and J. Staats. 1998. Riparian Area Management TR-1737-15. A user guide to assessing proper functioning condition and the supporting science for lotic areas. U.S. Department of the Interior, Bureau of Land Management, National Applied Resource Sciences Center. 136 pp.

⁸ Prichard, D., C. Bridges, R. Krapf, S. Leonard, and W. Hagenbuck. 1994. Riparian area management: Process for assessing proper functioning condition for lentic riparian-wetland areas T R-1737-11. US Department of Interior, Bureau of Land Management Service Center. Denver, Colorado. USA. 38p.

⁹ Weixelman, D. and D. J. Cooper. 2009. Assessing Proper Functioning Condition for Fen Areas in the Sierra Nevada and Southern Cascade Ranges, California. A user's guide. Gen. Tech. Rep. R5-TP-028. Vallejo, CA. US Department of Agriculture, Forest Service, Pacific Southwest Region, 52 p.

- 18 Designate equipment exclusion zones within riparian conservation areas when designing projects. The default is half of the riparian conservation area width (150 feet for perennial streams, 75 feet for intermittent streams):
 - a. These widths may be adjusted on a project by project basis based on geomorphology, slope, and/or soil conditions, as long as best management practices and other plan direction are met. Adjustments may be made only after consultation with experts in aquatic ecology, soils, and/or hydrology.
 - b. If further mechanical incursion is warranted, use methods that limit soil disturbance within the riparian conservation area, such as low ground pressure equipment, helicopters, over the snow logging, extra ground cover requirements, or other non-ground disturbing actions to achieve desired conditions consistent with best management practices and other plan direction.
 - c. When vegetation is treated in the near stream area, meet the needs for coarse wood in stream channels where possible.
- 19 Decommissioned landings and non-system roads located within 100 feet of perennial or intermittent streams, meadows or springs must not be reopened and reused if inconsistent with riparian conservation area plan components.

Guidelines (MA-RCA-GDL)

All guidelines listed here also apply to Critical Aquatic Refuges (CARs).

- 01 Prior to activities that could adversely affect streams, determine if relevant stream characteristics are within the range of natural variation. If characteristics are outside the range of natural variation, mitigation measures should be considered.
- 02 Within rivers and streams, ensure proposed management activities maintain the level of coarse large woody debris within the natural range of variation.
- 03 Post-wildfire management activities in riparian conservation areas and critical aquatic refuges should emphasize enhancing native vegetation cover, stabilizing channels, and minimizing adverse effects from the existing road network. Post-wildfire operations shall minimize the exposure of bare soil, to limit erosion.
- 04 Maintain and restore the hydrologic connectivity of streams, meadows, wetlands, and other special aquatic features by identifying roads and trails that intercept, divert, or disrupt natural surface and subsurface water flow paths. Implement corrective actions where necessary to restore connectivity.
- 05 Minimize the construction of new skid trails or roads for access into riparian conservation areas.
- 06 Consider actions in project design to ensure consistency with standards and guidelines and move toward desired conditions for roads, trails, OHV trails and staging areas, developed recreation sites, dispersed campgrounds, special use permits, grazing permits, and day use sites, that have been identified as contributing to degradation of water quality or habitat for aquatic and riparian-dependent species.

- 07 During permit reissuance for livestock, evaluate impacts of facilities on the riparian conservation areas and, consider relocating existing livestock facilities outside of meadows and riparian areas.
- 08 Under intensive grazing systems where meadows are receiving a period of rest (e.g., rest-rotation and deferred rotation), utilization levels can be higher than the levels described above if the meadow is maintained in late seral status and meadow-associated species are not being impacted.

Goals (MA-RCA-Goal)

- 01 Continue to coordinate and collaborate with California Department of Fish and Wildlife to implement and re-new the California Golden Trout Conservation Assessment and Strategy in order to improve riparian and stream resources for the golden trout.

Potential Management Approaches

All management approaches listed here also apply to Critical Aquatic Refuges (CARs), except as noted.

Look for opportunities to use prescribed fire treatments in riparian areas.

For waters designated as “water quality limited” (Clean Water Act Section 303(d)), participate in the development of total maximum daily loads and total maximum daily loads implementation plans. Execute applicable elements of completed total maximum daily loads implementation plans.

At either the landscape or project-scale, determine if the ecological conditions within riparian conservation areas are outside of the natural range of variation for the vegetative community including age class, structural diversity, composition, and cover of riparian vegetation. Include consideration of the ecological role of fire. If conditions are outside the range of natural variation, consider implementing mitigation and/or restoration actions that will result in an upward trend. Actions could include restoration of aspen or other riparian vegetation where conifer encroachment is identified as a problem, using fire, hand or mechanical treatments.

Evaluate required long-term restoration actions and implement them according to their status among other restoration needs.

Ensure that fuel spill plans are reviewed, up-to-date, and determined sufficient to protect soils and aquatic resources.

Determine ecological status on all key areas monitored for grazing use prior to establishing use levels. Use regional ecological scorecards and range plant list in regional range handbooks to determine ecological status. Analyze meadow ecological status every 3 to 5 years. Include ecological status data in a spatially explicit geographical information system database.

Recommend restoration practices in: (1) areas with compaction in excess of soil quality standards; (2) areas that have lowered water tables; or (3) areas that are actively down cutting or that have historic gullies. Identify management practices such as road building, recreational use, grazing and timber harvest that may be contributing to the observed degradation.

Trails will be rerouted away from meadows and springs. On the meadow edge, dispersed recreation sites and user constructed trails will be discouraged. Winter motorized recreation will

be discouraged in riparian conservation areas and eliminated where possible from meadows and within 100 feet of streams.

Critical Aquatic Refuges

Critical aquatic refuges are subwatersheds, generally ranging between 500 to 50,000 acres, on the Sequoia National Forest, that contain either: 1) known locations of at-risk species; 2) highly vulnerable populations of native plant or animal species; or 3) are localized populations of rare native aquatic- or riparian-dependent plant or animal species. Critical aquatic refuges on the forest are shown in Figure 15 (appendix A). The boundaries of CARs may be refined based on the findings from conservation assessments or verification of the presence and condition of habitat for at-risk species.

Desired Conditions (MA-CAR-DC)

- 01 Critical aquatic refuges provide habitat for native fish, amphibian and aquatic invertebrate populations. Remnant plant and animal populations in aquatic communities are maintained and restored.
- 02 Streams in CARs have vegetation and channel bank characteristics that are properly functioning or functioning at-risk with an upward trend. These ratings are made in relation to the current potential of the stream system. If the current potential is different from historic potential, assess what restoration measures are required to attain historic potential and if this is necessary or achievable.
- 03 The ecological integrity of upland vegetation is resilient and maintains soil productivity, water quality, and creates conditions to maintain or improve watershed conditions under the Watershed Condition Framework.

Potential Management Approaches

Consider seeking withdrawal of lands in critical aquatic refuges from location and entry under federal mining laws, subject to valid existing rights.

Pacific Crest National Scenic Trail

The Pacific Crest National Scenic Trail (PCT) management area includes the lands in the visible foreground encompassing resources, qualities, values, associated settings and primary uses (Figure 16, appendix A). The visible foreground is the distance zone, up to a half mile, that is visible from the trail at a height of 5 feet, and using terrain to define the boundaries. The PCT travels through designated wilderness and non-wilderness lands with management direction for both.

Pacific Crest Trail in Designated Wilderness

Desired Conditions (MA-PCTW-DC)

- 01 The Pacific Crest National Scenic Trail's nature and purpose are to provide for outstanding journeys on foot or on horseback amongst the spectacularly wild landscapes of high Pacific mountain ridges. Tranquility and closeness with nature can be found consistently along the trail, evoking a feeling of extended retreat from civilization, even if only venturing out for a day.
- 02 The recreation setting is consistent with or compliments the primitive recreation opportunity spectrum.

- 03 When possible, the Pacific Crest Trail management area provides panoramic views of natural landscapes in a tranquil scenic environment and offers outstanding views along the crest of the Sierra Nevada.

Standards (MA-PCTW-STD)

- 01 Prohibit heavy equipment line construction on the Pacific Crest Trail, unless necessary for emergency protection of property and safety.

Guidelines (MA-PCTW-GDL)

- 01 All management activities should meet or exceed high or very high scenic integrity objectives.

Potential Management Approaches

Reconstruct or relocate existing portions of the PCT as needed to enhance the recreation experience and protect resources. Evaluate proposed trail relocations using the established Pacific Southwest Region process in partnership with adjoining federal agencies, Pacific Crest Trail Association, and other partners.

Key observation points along the trail corridor are used to evaluate the condition of scenery resources.

Implement visitor use management strategies to minimize impacts to desired conditions for natural resources and visitor experiences on the Pacific Crest Trail through education, site management, regulation and enforcement.

Pacific Crest Trail outside Designated Wilderness

Desired Conditions (MA-PCT-DC)

- 01 The Pacific Crest National Scenic Trail's nature and purpose are to provide for outstanding journeys on foot or on horseback amongst the spectacularly wild landscapes of high Pacific mountain ridges. Tranquility and closeness with nature can be found consistently along the trail, evoking a feeling of extended retreat from civilization, even if only venturing out for a day.
- 02 The Pacific Crest National Scenic Trail corridor retains a natural, forested or pastoral landscape character shaped by both natural processes and humans. Management practices are modified to recognize the nationally significant scenic attributes and recreational values of these lands. Vegetation management is appropriate to maintain the long-term goals and stewardship objectives of the PCT management area and provide for ecosystem restoration, public safety, and enhancement of the trail environment.
- 03 The PCT corridor traverses a range of recreation opportunity spectrum classes. The recreation setting of the PCT corridor is consistent with or complements the semi-primitive non-motorized recreation opportunity spectrum class, except in locations where the existing condition is semi-primitive motorized or roaded natural.
- 04 When possible, the Pacific Crest Trail management area provides panoramic views of natural landscapes in a tranquil scenic environment and offers outstanding views along the crest of the Sierra Nevada.

Standards (MA-PCT-STD)

- 01 Hauling or skidding along the Pacific Crest Trail itself or using the Pacific Crest Trail for landings or temporary roads is prohibited.
- 02 Prohibit heavy equipment line construction on the Pacific Crest Trail, unless necessary for emergency protection of property and safety.
- 03 For leasable minerals such as oil, gas and geothermal energy, permits and activities within the management area that are available for leasing must contain a “no surface occupancy” stipulation within the management area.
- 04 New permits for extraction of mineral materials such as sand, gravel, pumice, cinders and other common variety minerals, are prohibited within the PCT management area. When existing permits terminate or expire, new permits will not be issued.
- 05 Project design and mitigation for utility and rights-of-way projects will be sufficient to protect trail values. Require mitigation measures including screening, feathering, and other visual management techniques to mitigate visual and other impacts of new or upgraded utility rights-of-way.
- 06 Outside the national forest’s proclaimed boundary, PCT lands or interests acquired will be managed consistent with deed transfer language and the PCT management area direction.

Guidelines (MA-PCT-GDL)

- 01 All new management activities should meet or exceed high or very high scenic integrity objectives.
- 02 Timber harvest, prescribed burning, wildfire, herbicides, biological controls and grazing may be used to manage vegetation to meet the desired conditions of the management area.
- 03 New recreation events such as foot races or horseback endurance events and fundraising events should be limited to designated crossings only. Existing recreation events may be allowed to continue at current levels.
- 04 Existing roads and trails within the PCT management area that are available for public motorized travel and are designated on the forest motor vehicle use map may remain open for public motor vehicle use. Other federal, state, county or other public roads within the management area available for public motor vehicle use may remain open for motorized travel.
- 05 All new road and trail crossings of the PCT will be evaluated and planned to minimize impacts to the scenic, natural, and experiential values of the trail. New temporary roads and new motorized and mechanized transport trails within the PCT management area should be designed to minimize the visual, aural and resource impacts to the PCT. Exemptions may be allowed if required by law to provide access to private lands or documented as the only prudent and feasible alternative.
- 06 New permanent roads are not permitted within the management area unless required by law to provide access to private lands or documented as the only prudent and feasible alternative.

- 07 New buildings and structures associated with special uses that would be visible from the PCT are designed to blend into the natural landscape and be visually subordinate.
- 08 Locate new public utilities and rights-of-way in areas of this management prescription area where impacts already exist. Limit linear utilities and rights-of-way to a single crossing unless additional crossings are documented as the only prudent and feasible alternative.

Suitability (MA-PCT-SUIT)

- 01 The Pacific Crest National Scenic Trail management area is not suitable for special-use authorizations for new communication sites and wind generation sites.
- 02 On the trail itself, year-round motorized or mechanized transport is not suitable, except at designated crossings and on interim routes.
- 03 Mineral exploration or extraction that causes surface disturbance within the Pacific Crest National Scenic Trail management area is not suitable.

Potential Management Approaches

Place priority on the purchase of lands or interest in lands necessary to protect the PCT experience as delineated in the PCT land acquisition inventory.

Reconstruct or relocate existing portions of the PCT as needed to enhance the recreation experience and protect resources. Evaluate proposed trail relocations using the established Pacific Southwest Region process in partnership with adjoining federal agencies, Pacific Crest Trail Association and other partners.

Key observation points along the trail corridor are used to evaluate the condition of scenery resources.

Implement visitor use management strategies to minimize impacts to desired conditions for natural resources and visitor experiences on the PCT, through education, site management, regulation and enforcement.

Recreation Places

Recreation places (Figure 17, appendix A) and associated desired conditions provide a framework to guide management efforts to sustain scenery and recreation settings, recreation opportunities, and recreation sites and infrastructure. Recreation places help connect the public to relevant and various types of places within the forest.

Recreation places are characterized by their distinctive roles and contributions within the landscape, taking into account the agency mission, unique capabilities and the broader area beyond national forest boundaries. This includes the scenic character of each place. Plan components that guide management of each recreation place are provided within the context of each place's distinctive roles and contributions. In addition, each place on the Sequoia National Forest is categorized as one of the following types:

- **Dispersed Use:** These places have local and regional significance. Visitors are drawn to these places to experience unregimented recreation activities and moments of solitude in undeveloped settings. Infrastructure tends to be rustic or non-existent, with minimal visitor controls.

- **High Country:** These places have local and regional significance. Visitors are drawn to these places to experience challenge and adventure in high-elevation settings and as relief from the warmer lower-elevation climates. Infrastructure tends to be rustic or non-existent, with minimal visitor controls.
- **High-Use Overnight:** These places have local and regional significance. Visitors are drawn to these places to experience a high social exchange among families, friends and other forest visitors in developed recreation settings. More highly developed infrastructure is prevalent; visitor controls are evident.
- **River Recreation:** These places have regional and national significance. Visitors are drawn to these places to experience moderate-to-extreme water-based challenges and relief from the warmer lower-elevation climates. Infrastructure tends to be rustic or non-existent, with minimal visitor controls.
- **Wildlands:** These places have regional, national and international significance. Visitors are drawn to these places to experience extreme challenge and solitude in remote high-elevation settings. Infrastructure and visitor controls are non-existent.

Domeland Wilderness Place

Domeland Wilderness Place is a wildlands type place; a natural-evolving wilderness landscape. The varied and rugged landscape is characterized by granitic domes and rock features. High elevation meadows feed mountain streams that fall through a predominately dry landscape into the South Fork of the Kern Wild and Scenic River (designated “wild” under the Wild and Scenic Rivers Act), which runs north to south through the wilderness. In the north, the Pacific Crest National Scenic Trail follows the river for 9 miles. The remote access and scarcity of water in the Domeland Wilderness Place minimizes visitation, especially during the summer months. The meadowlands are popular in the early summer for stock users and hikers. Day use is limited mostly to the access points along the South Fork. Areas of tribal importance are found in this place. Management is shared with the Bureau of Land Management. This place is valued for primitive recreation opportunities and solitude.

Desired Conditions (MA-DOME-DC)

- 01 The Domeland Wilderness Place is managed to sustain its wilderness character; visitor use is managed consistent with wilderness values.

Golden Trout Wilderness Place

Golden Trout Wilderness is a wildlands type place; a natural-evolving wilderness landscape characterized by high plateaus, expansive meadows, and whitewater rivers. The Golden Trout Wilderness is named after California’s brightly colored state fish, which is endemic to the area. The elevation ranges roughly between 3,000–9,000 feet. Snow pack on high peaks feed meadows, and streams that fall into the North Fork and South Fork of the Kern Wild and Scenic Kern River (designated “wild” under the Wild and Scenic Rivers Act), and the eligible (“wild”) Little Kern River, which all travel north to south through the length of the wilderness. The wilderness extends east beyond the forest boundary and is jointly managed with the Inyo National Forest. The Sequoia Kings Canyon National Parks wilderness aligns on the north boundary. This place is valued for hiking, backpacking, trout fishing and stock use.

Desired Conditions (MA-GNTR-DC)

- 01 The Golden Trout Wilderness is managed to sustain its wilderness character; visitor use is managed consistent with wilderness values.

Isabella Lake Place

Isabella Lake Place is a high-use overnight type place; a reservoir created by the dam at the junction of the North and South Forks of the Kern Wild and Scenic River. Isabella Lake is a popular overnight destination, valued for developed and dispersed recreation opportunities including lakeshore camping, boating, wildlife viewing and fishing opportunities in a high desert environment. Located at 2,500 feet in elevation, Isabella Lake is predominantly a dry scrubland surrounded by rugged hills with abundant rocky outcrops and a dramatic backdrop of mountain ridgelines with conifer forests at the highest elevation. The area is significant ecologically as high desert transition between the Mojave Desert, Central Valley, and Southern Sierra Nevada. Locations of cultural and tribal value are found in this place. There is a moderate density of roads, with OHV opportunities limited to the Cyrus Canyon OHV Park. This place is valued for fishing and provides the only motorized boating opportunities on the forest. The lake is also valued as one of the state's most popular windsurfing areas. The South Fork Wildlife Area is highly valued by birders and wildlife viewing enthusiasts as part of the most extensive riparian forest remaining in California.

Desired Conditions (MA-ISBL-DC)

- 01 The lands around Isabella Lake sustain a variety of day use and overnight recreation opportunities ranging from highly developed to dispersed, with an emphasis on more developed opportunities. Locations of cultural and tribal values are enhanced to sustain landscape resiliency.

Jennie Lakes Wilderness Place

Jennie Lakes Wilderness Place is a wildlands type place; a natural-evolving wilderness landscape adjacent to and accessed from the Kings Canyon and Sequoia National Parks and the popular Big Meadows area of the Giant Sequoia National Monument. Most of the wilderness is above 7,000 feet and is characterized by rugged and rocky mountain peaks towering above meadows and conifer forests. The main attractions in this wilderness are Jennie and Weaver Lakes. This place is valued for primitive recreation opportunities such as hiking, fishing, backpacking and stock use, and providing access to the National Park wilderness to the south and east.

Desired Conditions (MA-JNLK-DC)

- 01 The Jennie Lakes Wilderness Place is managed to sustain its wilderness character; management is coordinated with the National Park Service. Visitor use is managed consistent with wilderness character.

Kern Plateau Place

The Kern Plateau Place is a high country type place; a natural appearing, high country landscape characterized by high elevation conifer forests and meadows transitioning to drier, desert-like woodlands in the east. Views of the Sierra Crest and outstanding granitic features accent the landscape containing the Bald Mountain and Ernest C. Twisselmann Botanical Areas. A little less than half of the Kern Plateau Place falls into inventoried roadless areas. There is an emphasis on dispersed recreation opportunities, both motorized and non-motorized, and these opportunities are supported by a limited number of developed campgrounds. The Jackass and Cannell Meadow

National Recreation Trails occur here. The area provides access with trailheads to three wilderness areas. Trails are groomed for over-snow vehicle use in the winter. The limited number of developed sites and extensive system of trails and roads provide some of the most valued opportunities for remote experiences on the forest. The area is valued for a multitude of remote, dispersed recreation opportunities including hiking, OHV opportunities, horseback riding, fishing and camping.

Desired Conditions (MA-KERN-DC)

- 01 The recreation settings and opportunities of the Kern Plateau Place are sustained as a remote, natural-appearing landscape. Resilient settings provide a variety of trail related dispersed opportunities, both in the winter and in the summer seasons, with supporting overnight facilities in the summer season. Dispersed recreation opportunities, including motorized and non-motorized trails, are managed consistent with the recreation opportunity spectrum.

Kiavah Wilderness Place

Kiavah Wilderness Place is a wildlands type place; a natural-evolving, high desert landscape characterized by the eroded hills, canyons, and alluvial fans of the Scodie Mountains. Management is shared with the Bureau of Land Management. The elevation ranges roughly between 4,000 to 8,000 feet. Water is scarce in many areas minimizing visitation, especially during the peak heat of summer. This place is valued for opportunities for solitude and activities such as hiking, backpacking and stock use. Kiavah Wilderness Place hosts 16 miles of the Pacific Crest National Scenic Trail. This place has cultural and tribal value.

Desired Conditions (MA-KIAV-DC)

- 01 The Kiavah Wilderness Place is managed to sustain its wilderness character and visitor use is managed consistent with wilderness character.

Lower Kern River Place

The Lower Kern River Place is a river recreation type place; a natural-appearing landscape with a mixture of dispersed and developed recreation opportunities. This place is valued highly for the river, which is wild and scenic eligible (classified as “recreation” and scenic” under the Wild and Scenic Rivers Act), beginning at the Isabella Dam at 2,800 feet in elevation to 1,000 feet at the entrance of Kern River Canyon on the Central Valley floor with one hydro-electric plant. This whitewater river carves out a dramatic narrow gorge, strewn with large granite boulders. Breckenridge Mountain rises out of the Kern River Canyon with ridgelines over 8,000 feet at the highest points. Close proximity to a large urban area and easy access to the river along Highway 178 accounts for the local popularity of this place. Day use activities such as fishing and picnicking are popular in both developed and dispersed sites; there are limited overnight opportunities. Visitation at the river is high during summer weekends and holidays, while the mid-elevation coniferous setting on the ridgeline to the east of the river, Breckenridge Mountain, is lightly used. The steep terrain of the river canyon limits the number of roads and this is reflected by approximately two thirds of the area being classified as inventoried roadless areas (Greenhorn Creek and Mill Creek), with a limited number of motorcycle trails and other OHV opportunities crossing through the inventoried roadless areas. This place is valued for river related recreation opportunities with an emphasis on day use. The river in the canyon and the conifer forests on the mountain provide a cool retreat from summer heat. Whitewater opportunities attract tourists from around the world.

Desired Conditions (MA-LWKN-DC)

- 01 Lower Kern River Place is sustained as a natural appearing landscape providing a balance of developed and dispersed river oriented recreation opportunities and settings. The river, which is wild and scenic river status eligible, provides opportunities for the public to enjoy nature-based activities along the Kern River. Outfitter and guide services provide world class whitewater boating opportunities. Areas of high use maintain a quality experience for visitors and promote a stewardship ethic. Utilities are considered if their location will not limit the achievement of the roles, contributions and sense of the place. Management is aligned with the recreation opportunity spectrum and the roles, contributions and sense of the place. Scenic character is sustained by resilient landscapes that support and enhance the scenery setting.

Monarch Wilderness Place

Monarch Wilderness Place is a wildlands type of place; a naturally evolving wilderness landscape characterized by extremely steep, rugged terrain, and the outstanding geologic features of the South Fork and Middle Fork Kings River Gorge. The wilderness is split by the North Fork of Kings Wild and Scenic River (designated “wild” under the Wild and Scenic Rivers Act), Middle Fork of Kings Wild and Scenic River (designated “recreation” under the Wild and Scenic Rivers Act) and the Kings Canyon Scenic Byway (Highway 180). Management is shared by the Sequoia and Sierra National Forests and the eastern boundary connects to the Sequoia Kings Canyon National Park wilderness. The elevation ranges roughly between 2,000 to 12,000 feet. Brush and oak woodlands cover the lower elevations, giving way to pine and red fir, and giant sequoias at the higher elevations. The steep terrain makes travel difficult and minimizes visitation in most areas. The few trails are mostly steep and strenuous. Monarch Wilderness Place is valued for solitude and primitive recreation opportunities including activities such as hiking, backpacking and stock use. Part of the wilderness is in the Giant Sequoia National Monument.

Desired Conditions (MA-MRCH-DC)

- 01 The Monarch Wilderness Place is managed to sustain its wilderness character; visitor use is managed consistent with wilderness character.

Oat Mountain Front Country Place

Oat Mountain Front County Place is a dispersed use type of place; a low-elevation, natural appearing, dispersed use landscape bordering Pine Flat Reservoir and the Kings River. Elevations range between 2,000 to 5,000 feet. There is a minimal road system, no motorized trails, and few non-motorized trails. There are several roads open to all vehicles, including OHVs, along Pine Ridge. Oat Mountain Front County Place offers opportunities for solitude and recreation activities such as hiking, backpacking and stock use. There are developed recreation facilities located along the short stretch of the Kings River, which are rustic in character, mostly supporting whitewater boating enthusiasts and fishermen. This place is valued for the river oriented dispersed and developed recreation opportunities along the northern boundary, including fishing, camping, whitewater boating, OHV use and hiking.

Desired Conditions (MA-OAT-DC)

- 01 Oat Mountain Front Country Place recreation settings and opportunities are sustained as a natural-appearing landscape focused on dispersed recreation opportunities in a non-wilderness setting. Scenic character is sustained by resilient landscapes that support and enhance the scenery setting. The trail system and motorized access is aligned with the

recreation opportunity spectrum. Management emphasis perpetuates this remote setting and facilitates visitor stewardship. The few developed opportunities along the river support tourism around the outstanding whitewater opportunities.

Piutes Place

The Piutes Place is a dispersed use type place; a natural-appearing, remote non-wilderness. With elevations ranging from 4,000 to 8,400 feet, this place is a remote, mountainous landscape that is dry with relatively few streams. Piutes Place contains the Long Canyon Research Natural Area, Inspiration Point Botanical Area, Bodfish Piute Cypress Botanical Area, as well as designated inventoried roadless areas. This place offers extensive dispersed recreation opportunities and is moderately roaded. A portion of the Pacific Crest National Scenic Trail travels across the lower southeastern sections of the place. This place is valued for dispersed use, a sense of remoteness, and limited motorized trails. Rare vegetation communities and heritage sites are also valued.

Desired Conditions (MA-PIUT-DC)

- 01 The Piutes Place is sustained as a natural-appearing landscape. Unique features, heritage resources and tribal values are protected. Dispersed recreation activities occur in a remote setting and support a stewardship ethic.

South Sierra Wilderness Place

South Sierra Wilderness Place is a wildlands place; a natural-evolving wilderness characterized by high plateaus, meadows and streams that feed the South Fork of the Kern Wild and Scenic River. The river is designated “wild” under the Wild and Scenic Rivers Act. California’s brightly colored state fish, the California golden trout, is endemic to the area. The elevation ranges roughly between 3,000 to 9,000 feet. The South Fork of the Kern Wild and Scenic River travels north to south through the length of the wilderness. The wilderness extends east and north beyond the forest boundary and is jointly managed with the Inyo National Forest. Fishing, hiking, backpacking and stock use are popular. This place includes a portion of the Pacific Crest National Scenic Trail. South Sierra Wilderness Place has several sites of cultural and historical value. This place is valued for the California golden trout, solitude and the opportunities for primitive recreation opportunities.

Desired Conditions (MA-SOSR-DC)

- 01 The South Sierra Wilderness Place is managed to sustain its wilderness character; visitor use is managed consistent with wilderness character.

Upper Kern River Place

The Upper Kern River Place is a high-use overnight type of place; a natural appearing landscape with developed and dispersed recreation sites interspersed along the North Fork of the Kern Wild and Scenic River. The river is designated “recreation” under the Wild and Scenic Rivers Act. This place is a world class destination for white water river enthusiasts, due to class III to IV rapids, and fishermen are attracted to the prolific sport fishery. Day and overnight recreation opportunities for water-based recreation activities are valued and in high demand, with especially heavy use on weekends, holidays and during the summer season. Mountain Route 99 follows the river and serves as the southern entry portal to Giant Sequoia National Monument and provides easy access to the river. Granite outcrops and boulders are abundant and distant conifer covered ridgelines form a scenic backdrop. Brush Creek is a tributary to the North Fork and is another highly valued white water opportunity. Two popular motorcycle trails, Rincon and Cannel

Meadow National Recreation Trails, climb and travel ridgelines. Most of the place outside the river canyon floor is inventoried roadless area. This place is valued for its wide range of river-based recreation opportunities that support the local tourism economy.

Desired Conditions (MA-UPKN-DC)

- 01 The Upper Kern River Place recreation setting and opportunities are sustained as a natural-appearing destination landscape that provides world class, whitewater boating, fishing and other water-based recreation opportunities, and overnight camping with high visitor satisfaction. The transportation system is managed to support the recreation opportunity spectrum of the place. Areas of high use are managed to maintain a quality experience for visitors, surrounding communities and the wild and scenic river. Scenic character is sustained by resilient landscapes that support and enhance the scenery setting. Utilities are considered if their location will not limit the achievement of the roles, contributions and sense of the place. Management actions are aligned with the recreation opportunity spectrum and the roles, contributions and sense of the place.

Forks of the Kern River Place

The Forks of the Kern River Place is a river recreation type place; a remote, natural appearing, wildland landscape. The main attraction of this place is the section of the North Fork of the Kern Wild and Scenic River that flows from the confluence of the North Fork and the Little Kern Rivers to the Johnsondale Bridge. This section of the river is a world class whitewater opportunity and a protected native fishery for the Kern River rainbow trout, endemic to the area. The river is designated “wild” under the Wild and Scenic Rivers Act. Dry Meadow Creek is a tributary to the North Fork and another highly valued white water opportunity. Waterfalls, granite outcrops, geologic features and boulders are abundant and distant conifer covered ridgelines form a scenic backdrop. The extremely steep canyon walls prevent any vehicle access except at Johnsondale Bridge, and only a portion of the river is accessible by foot. Although there is no road access to the river, there is one motorized trail, the Rincon Trail that travels the ridgeline above the river to the east. This place is within inventoried roadless areas. This place is valued for primitive recreation opportunities including class IV and V rapids whitewater boating in a remote setting.

Desired Conditions (MA-FRKS-DC)

- 01 The Forks of the Kern River Place is maintained as a natural appearing destination landscape that provides water-based recreation activities and overnight camping opportunities with high visitor satisfaction.

Designated Areas

A designated area is an area or feature identified and managed to maintain its unique special character or purpose. Designated areas are either statutorily or administratively designated, pursuant to statute, regulation, or policy. Examples of statutorily designated areas include wilderness areas, national scenic trails, and wild and scenic rivers. Examples of administratively designated areas are experimental forests, research natural areas, scenic byways, botanical areas, and significant caves. Where multiple designated areas overlap, the designated area with the most restrictive plan components must be followed. A map of all statutorily designated areas can be viewed in Figure 18, appendix A.

Wilderness

Congress has designated six wilderness areas that are either in whole or in part within the Sequoia National Forest's administrative boundary. These wilderness areas comprise about 26 percent of the forest. They include the Domeland Wilderness (shared with the Bureau of Land Management), Golden Trout Wilderness (shared with the Inyo National Forest), Jennie Lakes Wilderness, Kiavah Wilderness (shared with BLM), Monarch Wilderness (shared with the Sierra National Forest), and South Sierra Wilderness (shared with the Inyo). Plan components for wilderness areas are organized under the wilderness management area section above.

Wild and Scenic Rivers

Congress designated two wild and scenic rivers that are either in whole or in part on the Sequoia National Forest: the north and south forks of the Kern Wild and Scenic River (shared with the Inyo National Forest and Sequoia Kings Canyon National Park) and the main stem and south fork of the Kings Wild and Scenic River (shared with the Sierra National Forest and Sequoia Kings Canyon National Park). Plan components for wild and scenic river segments on the Sequoia National Forest are organized under the wild and scenic river management area section above.

Giant Sequoia National Monument

On April 15, 2000, President Bill Clinton proclaimed approximately 328,000 acres of the Sequoia National Forest as the Giant Sequoia National Monument. The management plan for the Giant Sequoia National Monument (monument plan) was approved by the Regional Forester in 2012. The monument plan provides management direction for all lands within the monument. The management direction in this draft land management plan applies to all National Forest System lands within the Sequoia National Forest outside the monument. Other designated areas and recommended designated areas found within the monument, as well as associated management direction, can be found in the monument plan. The 24,290 acres of the Kings River Special Management Area located within the northern portion of the monument are administered and managed by the Sierra National Forest.

Pacific Crest National Scenic Trail

In 1968, Congress designated the Pacific Crest National Scenic Trail. The Pacific Crest Trail is a continuous long distance trail from the Mexican border near Campo, California to the Canadian Border at Boundary Monument 78 near Manning Provincial Park, Canada. The Sequoia National Forest manages 47 miles of the Pacific Crest Trail, 34 miles of which are in wilderness.

The Pacific Crest National Scenic Trail Comprehensive Plan was signed in 1982 by the Chief of the Forest Service; national forests are expected to integrate the direction and guidance provided

by this plan into their land management planning process. Plan components for the Pacific Crest Trail are organized under the Pacific Crest National Scenic Trail management area section above.

To ensure the conservation of the Pacific Crest Trails nationally significant wild, scenic, natural, and heritage resources, and to maximize its intended recreation opportunities, the trail's entire length, together with sufficient land area on both sides to safeguard and preserve its character, should be publically owned, permanently protected, and managed as a single entity across jurisdictions. The investment of citizen stewards offers another critical thread of continuity from Mexico to Canada. The Pacific Crest Trail experience should favor panoramic views of undisturbed landscapes in an uncrowded, non-mechanized, quiet, and predominantly natural environment. It should feature diverse, untrammled ecosystems and historic high country landmarks while avoiding, as much as possible, road crossings, private operations, and other signs of modern development. Trail facilities such as campsites, water sources and other amenities for hiker and pack-and-saddle use should be simple.

Inventoried Roadless Areas

Inventoried roadless areas are designated by the Secretary of Agriculture. About 29 percent of the Sequoia National Forest has been designated as inventoried roadless areas, as governed by the Roadless Area Conservation Rule (36 CFR 294 Subpart B). The Roadless Area Conservation Rule and Forest Service policy guide and restrict management activities within inventoried roadless areas. Subject to the restrictions imposed by the Rule, forestwide plan components apply to inventoried roadless areas.

National Recreation Trails

The Secretary of Agriculture has designated two national recreation trails on the Sequoia National Forest: the Cannell Meadow National Recreation Trail and Jackass National Recreation Trail.

Desired Conditions (DA-NRT-DC)

- 01 National recreation trails meet the intended goals and preserve the values and recreation opportunities for which they were established.
- 02 The trail setting provides a variety of opportunities that complement the existing recreation opportunity spectrum class where the trail segment is located.

Guidelines (DA-NRT-GDL)

- 01 Management activities within the foreground views from the trail should be designed to meet a scenic integrity objective at least as high as shown on the minimum scenic integrity map. Management activities in the middle and background should meet or exceed a scenic integrity objective of at least moderate. As appropriate, include scenery management considerations in special use permits that affect national recreation trails.
- 02 During management activities, maintain safe public access to national recreation trails if practicable.
- 03 National recreation trails should be managed consistent with trail management objectives and the maintenance standards for trail class and managed use.

Research Natural Areas

The regional forester with concurrence of the research station director designates research natural areas. The purpose of research natural areas is to maintain biological diversity and to contribute to a network of representative ecosystems across the nation. Research natural areas are intended to provide ecological baseline data, and to be used for education and research that results in improved management of all National Forest System lands.

The Sequoia National Forest has two established research natural areas outside the Giant Sequoia National Monument: Church Dome and Long Canyon Research Natural Areas. Management of research natural areas is guided by individual management plans and/or by direction provided in the Forest Service Manual (FSM-4063).

Standards and guidelines for constraints on fire management activities within research management areas are included under the components for “Fire”.

Desired Conditions (DA-RNA-DC)

- 01 Research natural areas have excellent examples of the ecological features and values for which they were established. They are generally natural appearing, and ecological processes such as plant succession, fire, and insect and disease activity function with limited human influences. They serve as areas for the study of ecosystems and ecological processes, including succession, and as baseline areas for measuring ecological change due to disturbances or stressors like climate change.

Suitability (DA-RNA-SUIT)

- 01 Developed or dispersed recreation sites are not suitable.
- 02 Over snow vehicle travel is not suitable.
- 03 Timber production or wood gathering is not suitable.
- 04 Developed facilities are not suitable.
- 05 New roads, trails, fences, or signs are not suitable unless they contribute to the objectives or protection of the research natural area.

Special Areas

Special areas are designated by the Regional Forester for areas less than 100,000 acres and the Secretary of Agriculture for areas 100,000 acres or larger. The Sequoia National Forest has five botanical areas and one geological area outside the Giant Sequoia National Monument. These include the Bald Mountain Botanical Area, Ernest C. Twisselmann Botanical Area, Baker Point Botanical Area, Bodfish Piute Cypress Botanical Area, Inspiration Point Botanical Area, and Packsaddle Cave Geological Area. Management of these Special Areas is guided by area specific management plans.

Standards

- 01 The Sirretta Peak trail shall not impact significantly the Twisselmann Botanical Area or adjacent sensitive areas, including areas to the north of Sirretta Pass such as Sirretta Meadows.

Walker Pass National Historic Landmark

The Secretary of Interior designated the Walker Pass National Historic Landmark in 1961. It is shared with the Bureau of Land Management's Caliente and Ridgecrest Resource Areas.

Desired Conditions (DA-NHL-DC)

- 01 The characteristics of the natural landscape and viewsheds that contributed toward the designation of Walker Pass as a National Historic Landmark are maintained.

Plan Objectives

Watershed Conditions

Forestwide (WTR-FW-OBJ)

- 01 Priority watersheds achieve or are moving toward a higher functioning condition class, as defined by the national Watershed Condition Framework within 10 years of plan approval.

Terrestrial Ecosystems

Forestwide (TERR-FW-OBJ)

- 01 Increase forest heterogeneity, reduce forest density and surface fuels, and restore species composition (i.e. increase black oak and pine) on 9,000 to 15,000 acres of the montane, upper montane, and portions of the foothill landscape, using mechanical treatment, often in combination with prescribed fire, within 10 to 15 years following plan approval.
- 02 Restore low and moderate severity fire mosaics of beneficial fire using prescribed fire on 5,000 to 15,000 acres within 10 to 15 years following plan approval.
- 03 Manage wildland fire primarily to meet resource objectives when safe and within resource capability to restore 50 to 90 percent of the area in the Kern River drainage, outside of the monument, in the wildfire restoration and wildfire maintenance zones to move toward desired conditions within 10 years following plan approval.
- 04 Implement restoration or maintenance actions on 3 to 10 areas of tribal importance within 10 years following plan approval.

Invasive Species

Forestwide (INV-FW-OBJ)

- 01 Within 10 years of plan approval, take action to eliminate non-native invasive plant species on 300 acres

Riparian Conservation Areas

RCA-wide (MA-RCA-OBJ)

- 01 Restore the structure and composition of 500 to 1000 acres in riparian areas within ten years following plan approval, emphasizing riparian areas that face the most risk from large-scale high intensity fire, past fire exclusion or accelerated flooding events associated with climate change.

Meadows (RCA-MEAD-OBJ)

- 01 Take action to maintain, enhance, or improve conditions on 5 to 10 meadows of any size, within ten years following plan approval.

Rivers and Streams (RCA-RIV-OBJ)

- 01 Take action to maintain or restore structure, composition, or function of habitat for fisheries and other aquatic species along 5 to 10 stream miles over a 10 year period.
- 02 Eliminate or mitigate one high priority barrier to aquatic organism passage or ecological connectivity within ten years following plan approval

Timber

Forestwide (TIMB-FW-OBJ)

- 01 Provide approximately 8 to 16 MMCF (40 to 80 MMBF) per decade to contribute to the local forest products infrastructure.

Sustainable Recreation

Forestwide (REC-FW-OBJ)

- 01 Within 10 years of plan approval, complete fuel treatment restoration activities on 200 acres at recreation sites that are in areas with a high risk of large, high intensity wildfire.
- 02 Within 10 years of plan approval, convert 10 percent of existing recreation sites to group sites.
- 03 Within 10 years of plan approval, 400 to 650 miles of trails (40 to 60% of total miles) are meeting standard.

Scenery

Forestwide (SCEN-FW-OBJ)

- 01 Within 10 years of plan approval, improve scenic stability by treating 2000 acres of vegetation in areas with a high likelihood of large, high intensity wildfire, that depart from the natural range of variation.

Cultural Resources

Forestwide (CULT-FW-OBJ)

- 01 Within 10 years of plan approval, generate 5 to 10 cultural resource products such as: significant interpretation; National Register of Historic Places nominations; thematic contexts; site management plans; 500 acres or more non-project surveys; development and testing of predictive models; establishment of formal cultural resource partnerships; and cultural site restoration, stabilization or adaptive reuse.

Goals

Air

Forestwide (AIR-FW-GOAL)

- 01 Continue the visibility monitoring program and determine sensitive indicators for each air quality-related value in Class I areas of the national forests. Protect air quality-related values by reviewing all projects and management activities that may affect those values. Review external prevention of significant deterioration source applications and make recommendations to permitting authorities.
- 02 Participate in and support interagency collaborative smoke management, including real time smoke monitoring and public messaging to maximize efficiency and relevance of monitoring results.
- 03 Provide early notification to the public about potential smoke from fire activities to promote awareness and protect human health and safety.
- 04 Support post-fire analysis of smoke impacts as they relate to emissions when they can inform refinement of smoke dispersion and transport modeling. Include analytical tradeoff and impact information, as appropriate, in public messaging to show smoke tradeoffs from large landscape scale fuels treatment projects.

Watershed Conditions

Forestwide (WTR-FW-GOAL)

- 01 Take a landscape- or watershed-scale approach to restoring aquatic and riparian ecosystems, integrating with recreation, fuels, and vegetation management in order to efficiently use limited resources, including partnerships, and to effectively address climate change.

Terrestrial Ecosystems

Forestwide (TERR-FW-GOAL)

- 01 Develop a regional whitebark pine conservation and restoration strategy in collaboration with other federal agencies, research organizations, and other partners.

Animal and Plant Species

Forestwide (SPEC-FW-GOAL)

- 01 Cooperate with private landowners to encourage resource protection on private lands.
- 02 Collaborate with California Department of Fish and Wildlife to assess potential disturbance factors to deer during the planning phase of vegetation management projects.
- 03 Develop and implement a consistent, systematic, biologically sound program for plant species of conservation concern and their habitat so that federal listing does not occur.

- 04 For wildlife species that overlap in range and require areas of high canopy cover (e.g. California spotted owl, fisher and marten), target maintenance of high canopy cover conditions in areas that can meet the needs of multiple species in the same location, thereby increasing potential for more heterogeneous and resilient conditions outside of high canopy cover patches.

Pacific Fisher (SPEC-PF-GOAL)

- 01 Fisher mortality from human causes is reduced substantially. Fisher exposure to poisonous substances and pesticides is rare. Vehicle collisions are rare. Fisher mortality from human structures is eliminated.
- 02 Predation on fishers occurs at natural rates with natural seasonal patterns and does not prevent fisher population growth.

Fire

Forestwide (FIRE-FW-GOAL)

- 01 Restore ecosystems to a more fire resilient condition and lessen the threat of wildfire to communities.
- 02 Coordinate with other jurisdictions such as communities, tribes, service providers, and federal, state, county and local entities regarding prevention, preparedness, planned activities and responses to wildland fires. Notify those agencies about upcoming and ongoing fire season and any prescribed fire activity.
- 03 Help communities become more fire adapted, improving their ability to withstand a fire without loss of life and property.
- 04 Where feasible and suitable, use grazing, mechanical treatment, prescribed fire and/or wildfires managed to meet resource objectives to reduce vegetation build-up to lower the risk of unwanted wildfire.
- 05 Provide defensible space as defined by the California Public Resource Code 4291- Defensible space around structures on administrative sites and structures authorized by permit.
- 06 Use wildfires forest-wide to meet multiple resource management objectives, where and when conditions permit and risk is within acceptable limits.

Local Communities

Forestwide (LOC-FW-GOAL)

- 01 Develop memoranda of agreements or other protocols between the forest and local governments as appropriate to guide coordination processes and reflect local perspectives and interests.
- 02 Identify important socioeconomic locations and activities on the forest with interested local agencies to promote a common understanding of these important contributions, to help identify potential projects that may enhance community benefits, and help identify mitigation measures that may address adverse impacts to these resources.

- 03 Work with local governments, businesses, and organizations to collect economic data to track changes for businesses in sectors dependent on forest activities.

Volunteers, Interpretation, Partnerships and Stewardship

Forestwide (VIPS-FW-GOAL)

- 01 Work with neighboring communities, organizations, state and local agencies, tribes, and other federal agencies to sustain forest benefits to people across the broader landscape.
- 02 Regularly report potential projects suitable for partnership and volunteer opportunities to the public.
- 03 Maintain and expand contracting and partnering opportunities with local governments, businesses, and organizations. Develop partnerships that leverage different sources of funding to support opportunities to contribute to the economic and social sustainability of local communities.
- 04 Work with partners and volunteers to provide recreation opportunities, maintain and enhance recreation settings, collect and manage data on recreation use and demand, and contribute to socioeconomic benefits associated with recreation and tourism.
- 05 Work with skilled stewardship organizations in managing wilderness, wild and scenic rivers, national trails, and other designated areas.
- 06 Work with partners and volunteers in the coordination, development, and delivery of educational and community outreach programs. Actively engage urban populations, youth and underserved communities in programs.
- 07 Work with partners and volunteers to prioritize and complete deferred maintenance and to engage in resource stewardship and restoration.
- 08 Work with site stewards, volunteers, tribal governments, local governments, state and federal agencies, schools and universities and non-profit groups to protect, rehabilitate and restore cultural resource sites and facilitate development of research, educational and interpretive opportunities.
- 09 Develop heritage tourism opportunities with tribal governments, local organizations, and businesses to provide an economic benefit to the community, while fostering long-term sustainability of cultural resources.

Timber

Forestwide (TIMB-FW-GOAL)

- 01 After disturbances occur on lands identified as suitable for timber production, and when funding is available, adequately restock these areas within 5 years of salvage harvest, if applicable, or, when salvage harvest is not used, within 5 years of site preparation.

Sustainable Recreation

Forestwide (REC-FW-GOAL)

- 01 Link a broad variety of transportation systems, including bikeways, to connect people to nature, improve personal health, and increase access for underserved communities, minorities and urban youth.
- 02 To the extent practical, harmonize recreation direction for forest visitors to minimize confusion when crossing administrative boundaries.
- 03 Review and participate in the preparation of state recreation plans.
- 04 Continue coordination with the National Park Service to manage visitor use to protect natural resources and improve the recreation experience (e.g., permit issuance for park backcountry users where access begins on the National Forest).

Scenery

Forestwide (SCEN-FW-GOAL)

- 01 The Forest Service works with other agencies and adjacent landowners to maintain shared vistas.

Tribal Relations and Uses

Forestwide (TRIB-FW-GOAL)

- 01 Manage the land in a spirit of shared stewardship with tribes, supporting tribal rights and recognizing the mutual benefits of restoration.
- 02 Partner with tribes to contribute to the socioeconomic sustainability of tribal communities.
- 03 Develop memoranda of agreements or other protocols between the forests and Native American tribes as appropriate to guide consultation processes, reflect tribes' particular perspectives and interests, and protect sacred sites.
- 04 Meet regularly with tribes to better understand their needs and viewpoints. Promote the use of forest-hosted tribal forums and events, as well as attendance at tribally-hosted meetings and events, as a method to ensure consistent contact, consultation and collaboration.

Potential Management Approaches

Management approaches describe the principal strategies and program priorities the Sequoia National Forest intends to employ to carry out projects and activities under the land management plan. Management approaches may discuss potential processes such as analysis, assessment, inventory, project planning or monitoring.

Air

Include smoke tradeoff evaluation in project level planning comparing local (e.g., prescribed fire) and regional (e.g., wildfire) scales. Use existing scientific information on large wildfire emissions. Consider downwind communities at the local and regional scale.

Watershed Conditions

Cooperate with federal, tribal, state and local governments to secure in-stream flows needed to maintain, recover, and restore riparian resources, channel conditions, and aquatic habitat during all basic Federal Energy Regulatory Commission (FERC), state and other authorized water use planning, water rights, and relicensing on the national forests. Coordinate relicensing projects with the appropriate state and federal agencies. Provide written and timely license conditions to the Federal Energy Regulatory Commission.

Maintain and restore soils with favorable infiltration characteristics and diverse vegetative cover to absorb and filter precipitation and to sustain favorable conditions of stream flows.

Restore the watershed, through thinning, restoration of floodplain connectivity, and shallow groundwater storage to enhance instream flows.

Educate recreation users to properly dispose of waste and potential pollutants.

Look for opportunities to restore watersheds that are in need of thinning, fuels reduction, meadow restoration and restoration of hydrologic and ecological connectivity.

Terrestrial Ecosystems

Emphasize vegetation treatments in focus landscapes (10,000 to 80,000 acres in size) to move terrestrial ecosystems toward desired conditions and increase resilience of old forest habitat, while limiting impacts to California spotted owl, Pacific fisher and Sierra marten.

To protect old forest components from uncharacteristic fire, prioritize restoration in key old forest areas. Methods of protecting existing old forest components on the landscape may include thinning, selective harvest, prescribed fire and wildfires managed to meet resource objectives.

To perpetuate old forest components, encourage the development of old forest conditions in areas where old forest is lacking. Restore patchiness within stands and sustain large black oak trees, pine tree regeneration and snags, over time.

During post-fire restoration projects, consider the availability of complex early-seral forests across the forest and region to provide for ecological conditions needed by complex early seral wildlife species. This includes retaining areas of dense and connected patches of snags across a range of snag sizes; naturally regenerating vegetation, and adjacent or intermixed burned and unburned areas or areas with moderate to high tree survival.

Promote native vegetation (e.g., conifers, hardwoods, shrubs) in complex early-seral habitat that supports long term ecosystem integrity considering climate change, drought, insects, disease and fire.

Animal and Plant Species

Give high priority to restoration of meadows, streams, and riparian areas when funding fish and wildlife habitat improvement projects through timber sales, thinning projects or in cooperation with partners including other agencies.

Focus on high priority habitats for restoration when funding habitat improvement projects from sources other than timber sales.

California Spotted Owl

Prioritize ecological restoration of protected activity centers that have departed furthest from protected activity center and/or vegetation desired conditions, and that promote the greatest ecological resilience of the protected activity center. Also consider prioritizing protected activity centers with the highest wildfire risk in the community buffers, such as on upper slopes or ridge tops or in canyons with large areas of chaparral below. Consider the risk of large high intensity wildfire to clustered protected activity centers, degree of departure from desired condition, and whether some should be managed to reduce wildfire risk and increase overall resilience of protected activity centers and vegetation in an area.

Within protected activity centers, locate restoration treatments to minimize impacts to the protected activity center while considering opportunities to increase the resilience of the overall network of protected activity centers. Prioritize areas where dry vegetation is most departed from desired conditions and where treatments would provide for the most resilient conditions for the entire protected activity center.

Pacific Fisher

Prioritize ecological restoration in landscapes around key linkage areas and areas with suitable habitat at highest fire risk.

Plan prescribed fire under weather and fuel conditions that promote habitat resilience and fisher habitat values, including burn prescriptions that promote mosaic fire effects within the natural range of variation.

Maintain or increase understory heterogeneity in fisher denning habitat to promote “escape cover” such as shrub patches, coarse woody debris, and slash piles following vegetation treatments. Design projects to have non-linear edges.

Reduce human-caused mortalities associated with illegal marijuana growing and rodenticide use, road-related mortalities, and mortalities associated with water pipes and tanks.

Avoid or remediate habitat modifications that unnaturally increase fisher susceptibility to predation.

Sierra Marten

Maintain or increase understory heterogeneity in marten denning habitat to promote “hiding cover” such as shrub patches, coarse woody debris, and slash piles following vegetation treatments. Design projects to have non-linear edges.

Reduce human-caused mortalities associated with illegal marijuana growing and rodenticide use, road-related mortalities, and mortalities associated with water pipes and tanks.

Avoid or remediate habitat modifications that unnaturally increase marten susceptibility to predation.

Great Gray Owl

Conduct additional surveys using established protocols to follow up reliable sightings of great gray owls.

Invasive Species

Work with tribes to determine priority areas for weed prevention and control, especially focused on traditional gathering areas that are threatened by weed infestations. Consult with tribes before using pesticides or herbicides that may affect traditional gathering.

Coordinate with research and other organizations to evaluate the potential effects of climate change on the spread of invasive, non-native species.

Fire

Prior to and during the fire season assess conditional thresholds under which desired conditions can be met for the strategic fire management zones (see management areas section in this chapter). Work with tribes and adjacent landowners to identify areas and resources of value considered in the assessments.

Assess human-caused ignitions and implement prevention activities that reduce the likelihood of the most common human-caused ignition sources.

Work with adjacent land management agencies to identify methods to reduce costs and increase effectiveness in restoring fire to the landscape.

Prioritize fuel treatments in areas that pose the greatest threat to communities and highly valued resources.

During ecological restoration treatments, reduce fuels along ridges, roads, or other natural or man-made features to aid in the use of large prescribed fires and in managing wildfire, including wildfires managed primarily for resource objectives.

Integrate terrestrial ecosystem desired conditions into spatial patterns for fuel reduction treatments. Incorporate heterogeneity by increasing variation in tree spacing, enhancing tree clumps, creating canopy gaps, promoting fire resilient tree species, increasing the ratio of large to small trees, and using topographic variation (e.g. slope, aspect, and position) to guide treatment prescriptions.

Volunteers, Interpretation, Partnerships and Stewardship

Assess partnership needs and develop priorities to meet those needs using the strategies and tools described in appendix C.

Develop a partnership and volunteer strategy to define the types of projects suitable for partnership and volunteer opportunities, potential partners and volunteers, and the mechanisms for developing partnerships and volunteer agreements.

Provide visitor information services at major entry points and areas of concentrated use.

Provide and update interpretive signage, wayside exhibits, publications and programs using a variety of media and methods.

Develop bi-lingual communication tools including publications, information boards and radio spots.

Timber

Encourage use of small trees and wood biomass to support a variety of potential uses.

Develop landscape scale projects to increase the pace and scale of ecological restoration, ecosystem resilience and fire resilience, and to protect the carbon carrying capacity of the forest.

Plan vegetation, fuels, and other restoration projects across large landscape areas (e.g., greater than 5,000 to 10,000 acres), when it can increase efficiency in planning and support partnership-based approaches, such as stewardship contracts.

Sustainable Recreation

Use integrated resource planning during projects to respond to changing conditions in recreation settings.

Use management strategies to mitigate recreation use and resource conflicts (appendix D).

Manage vegetation in developed recreation sites to improve the recreation experience. This includes perpetuating existing large trees and planting new trees and shrubs where ecologically appropriate.

Emphasize sustainable alternatives for refuse management that protect the recreation experience in all settings including messages of visitor responsibility and pack-in, pack-out guidance in lightly used developed recreation areas and dispersed recreation areas.

Close and rehabilitate, or otherwise mitigate, dispersed recreation sites when conditions deteriorate to an unacceptable level and cannot be managed to forest service standards. Conditions could include unacceptable environmental damage, visitor conflicts and overcrowding.

Scenery

Use integrated resource planning during projects to respond to changing scenery conditions affecting scenic character and integrity.

Scenic character is sustained by perpetuating and improving scenic attributes through ecological restoration activities that improve scenic stability and integrity.

Minimize visible lines in landscape areas where vegetation is removed for management objectives. Cleared areas will include edges that reflect the visual character of naturally occurring vegetation openings.

In vegetation treatment and fuels reduction projects, consider improving scenery resources, especially in areas that do not meet established scenic integrity objectives.

Tribal Relations and Uses

Provide training to forest employees about federal tribal trust responsibilities and ways in which the forest honors and implements these responsibilities.

Consider employee exchange opportunities between the Forest Service and tribes under Service First agreements or other mechanisms. Provide forest staff with detail opportunities to work with tribes, and provide tribal staff opportunities to work with the agency, to increase reciprocal understanding and promote use of tribal programs and legislation that is mutually beneficial.

Cultural Resources

To protect sites from physical damage and excessive wear and tear, consider user education, restrictions and visitation controls.

Develop a forest-wide historic preservation plan that will programmatically manage cultural resources for long term sustainability.

Develop a forest-wide cultural resource interpretation plan that provides educational information intended to reach a broad spectrum of forest visitors through hands-on field opportunities as well as educational information.

Geology and Minerals

For each common variety materials site, prepare a development and rehabilitation plan prior to development and use.

Lands

Acquire available private land and dispose of public land where needed to reduce administrative costs, foster resource programs, or resolve administrative problems and have favorable benefit-cost ratio.

Chapter 4. Design Criteria

Standards

Air

Forestwide (AIR-FW-STD)

- 01 Coordinate management activities that potentially impact the air quality of adjacent Class I areas with the responsible agency (e.g., Sequoia and Kings Canyon National Parks, Edwards Air Force Base and China Lake Naval Weapons Center).

Watershed Conditions

Forestwide (WTR-FW-STD)

- 01 Use best management practices as described in agency technical guides and handbooks to minimize adverse impacts to soils and water resources during the planning and implementation of forest activities.
- 02 Minimize the effects of stream diversions or other flow modifications on at-risk species, and other beneficial uses, during all basic Federal Energy Regulatory Commission , state and other authorized water use planning, water rights, and relicensing on the national forests. Determine and recommend in-stream flow requirements and habitat conditions that maintain, enhance, or restore all life stages of native aquatic species, and that maintain or restore riparian resources, channel integrity and aquatic passage.
- 03 For exempt hydroelectric facilities on national forest lands, ensure that special use permit language provides adequate in stream flow requirements to maintain, restore, or recover favorable ecological conditions for local riparian- and aquatic-dependent species.
- 04 Restore the watershed, through thinning, restoration of floodplain connectivity and shallow groundwater storage, to enhance instream flows.
- 05 Regulate the discharge and disposal of potential pollutants near all recreation sites. Designate points of discharge where potential impacts to aquatic resources are minimized and educate the dispersed recreation users about the benefits of careful disposal of potential pollutants away from aquatic habitats.

Terrestrial Ecosystems

Forestwide (TERR-FW-STD)

- 01 For mechanical thinning harvests specifically designed to treat fuels, and/or control stand densities, within the wildfire restoration and maintenance zones, retain all live conifer trees 30 inches in diameter or larger, except to meet the needs for equipment operability.

Xeric Shrub/Blackbrush (TERR-XER-STD)

- 01 Restoration projects in desert shrub and blackbrush must include design measures to minimize damage to biological soil crusts, with the purpose of maintaining areas resistant to non-native plant invasions.

Special Habitats (TERR-SH-STD)

- 01 At the project scale, consider special habitats during project design.

Animal and Plant Species

California Spotted Owl (SPEC-CSO-STD)

- 01 Within community buffers and focus landscapes, vegetation treatments in protected activity centers may include mechanical, prescribed fire and hand treatments. Protected activity centers may be re-mapped during project planning to avoid intersections with mechanical treatment areas, provided that the re-mapped protected activity centers contain habitat of equal or better quality and include known nest sites and important roost sites. Treatment-related constraints include the following:
 - a. Limit mechanical treatments to no more than one third of an individual protected activity center per decade.
 - b. Mechanical treatment is not allowed within 250 feet of the known nest site or, where the nest site is not known, the most recent known roost site.
 - c. Retain clumps or groups of large trees, some with dense tree cover, in a well-distributed and irregular pattern.
 - d. Maintain sufficient tree cover within 250 feet of the known nest site or, where the nest site is not known, the most recent known roost site to provide for the life history requirements.
- 02 Within community buffers and focus landscape, where greater than half of the protected activity center habitat is a dry vegetation type, up to one third of the protected activity center may be treated in dry vegetation type areas to improve resilience.
- 03 Outside community buffers and focus landscapes, vegetation treatments in protected activity center may include prescribed fire and hand treatments. Mechanical treatments are prohibited.
- 04 For all treatments within protected activity centers, maintain connectivity between the rest of the protected activity center and habitat around the known nest site or, where the nest site is not known, the most recent known roost site.
- 05 Where prescribed fire is used in protected activated centers, apply mitigation measures as needed to minimize loss of or damage to known nest and roost trees.
- 06 Outside of community buffers, if less than half of a protected activity center burns at very high severity with greater than 90 percent basal area mortality, avoid salvage harvest in the protected activity center. If more than half of the protected activity center burns with greater than 90 percent basal area mortality, follow direction for complex early seral forests.

Pacific Fisher (SPEC-PF-STD)

- 01 Avoid creating openings where woody vegetation cover is less than 30 percent within and directly adjacent to fisher linkage areas that would completely severed; strategically manage vegetation continuity in these areas as necessary to prevent widespread crown fire.
- 02 Within fisher target cells, limit disturbance from mechanical treatment to less than 13 percent of the target cell in any 5-year period, except if target cells are within focus landscapes or contain community buffers. In those areas, mechanical treatment could occur in up to 50 percent of the fisher target cell in any 10-year period, but no more than one third of all suitable target cells (Figure 10) can be treated to this extent within a 10-year period.
- 03 Outside of community buffers and focus landscapes, avoid treatment actions that could fragment the breeding population or degrade dispersal probability between fisher habitat core areas. Do not:
 - a. Treat two or more adjacent target cells in a manner that creates simultaneously unsuitable conditions in each.
 - b. Treat one or more target cells adjacent to recently disturbed cells in a manner that reduces their suitability for more than 5 years.
- 04 Design projects to provide dispersal habitat between adjacent fisher target cells.

Invasive Species

Forestwide (INV-FW-STD)

- 01 When working in water bodies with known aquatic invasive species, clean equipment and vehicles before moving to other water bodies.

Fire

Forestwide (FIRE-FW-STD)

- 01 Fire management actions and any subsequent suppression within research natural areas must be planned and carried out in consultation with the forest research natural area coordinator and the fire resource advisor.

Timber

Forestwide (TIMB-FW-STD)

- 01 Following regulated regeneration harvest (e.g., group selection) on lands identified as suitable for timber production, create and maintain planting environments that favor seedling survival and rapid growth rates, facilitate early and periodic use of fire to reduce future wildfire-related mortality, and provide sufficient tree numbers to meet a variety of ecosystem services, including forest products and carbon storage. A site-specific silvicultural prescription will be designed to ensure that lands are adequately restocked within 5 years of a regeneration harvest (see appendix E for stocking criteria).

- 02 In response to wildfire, windthrow, insects, pathogens, or other disturbance occurring on lands identified as suitable for timber production, create and maintain planting environments that favor seedling survival and rapid growth rates, facilitate early and periodic use of fire to reduce future wildfire-related mortality, and provide sufficient tree numbers to provide a variety of ecosystem services, including forest products and carbon storage.

Range

Forestwide (RANG-FW-STD)

- 01 To protect hardwood regeneration in grazing allotments, allow livestock browsing on no more than 20 percent of annual terminal leader growth of aspen seedlings and advanced regeneration, and no more than 20 percent of annual growth of willows. Modify grazing plans if hardwood regeneration and recruitment needs are not being met.
- 02 Grazing utilization in annual grasslands will maintain a minimum of 60 percent cover. Where grasslands are in satisfactory condition and annual precipitation is greater than 10 inches, manage for 700 pounds residual dry matter per acre; where grasslands are in satisfactory condition and annual precipitation is less than 10 inches, manage for 400 pounds residual dry matter per acre. Where grasslands are in unsatisfactory condition and annual precipitation is greater than 10 inches, manage for 1,000 pounds residual dry matter per acre; where grasslands are in unsatisfactory condition and precipitation is less than 10 inches, manage for 700 pounds residual dry matter per acre. Adjust these standards, as needed, based on grassland condition. This standard and guideline only applies to grazing utilization.
- 03 Where professional judgment and quantifiable measurements find that current practices are maintaining range in good to excellent condition, the grazing utilization standards above may be modified to allow for the Forest Service, in partnership with individual permittees, to rigorously test and evaluate alternative standards.

Guidelines

Air

Forestwide (AIR-FW-GDL)

- 01 Project design for prescribed burns, and strategies for wildfires, should incorporate emission reduction techniques to reduce negative impacts to air quality, subject to economic constraints, technical feasibility, safety criteria and land management objectives.
- 02 Decision documents for wildfires and prescribed burns should identify smoke sensitive areas and include management objectives and courses of action to mitigate impacts to those areas.

Watershed Conditions

Forestwide (WTR-FW-GDL)

- 01 Cooperate with federal, tribal, state and local governments to secure in-stream flows needed to maintain, recover, and restore riparian resources, channel conditions, and aquatic habitat during all basic Federal Energy Regulatory Commission, state and other authorized water use planning, water rights, and relicensing on the national forests. Coordinate relicensing projects with the appropriate state and federal agencies. Provide written and timely license conditions to the Federal Energy Regulatory Commission.

Terrestrial Ecosystems

Forestwide (TERR-FW-GDL)

- 01 Projects should facilitate increasing heterogeneity at all scales, from tree clumps to large landscapes. Several treatment strategies can be employed: using landscape topography (e.g. slope, aspect, slope position) to vary stand densities; promoting tree clumps and gaps within a stand, increasing the proportion of large to small trees; retaining important habitat structures such as large trees, snags and trees with broken tops; and increasing diversity by promoting hardwoods, pines and native plant species.
- 02 Vegetation treatment projects should include a widely distributed but often clumped distribution of snags and downed logs. Some snags and downed logs should be retained along edges of openings and within groups and clumps of large trees to provide habitat and roost sites for wildlife species such as small mammals, cavity-nesting birds and tree-dwelling bats.
- 03 Management activities that generate accumulations of green slash should minimize potential impacts from bark beetles.
- 04 Mechanical vegetation treatments, prescribed fire, and salvage operations should retain all large hardwoods, greater than 12 inches in diameter (8 inches for blue oak), except where they pose a threat to human life or property.
- 05 Design vegetation treatments to provide for edge, corridors of cover, and enhancement of special habitat features such as meadows.

Xeric Shrub/Blackbrush (TERR-XER-GDL)

- 01 Restoration projects in desert shrub and blackbrush should include islands of untreated vegetation in project design to speed native species regeneration.

Chaparral-Live Oak (TERR-CHAP-GDL)

- 01 Treatments using fire within chaparral should be designed to provide a diversity of seral stages at the landscape scale. Where feasible, leave small to medium unburned or lightly burned patches for wildlife within very large burn units.
- 02 When chaparral is the potential natural vegetation type, projects should not include active reforestation with the intent to convert the area to a forested type.

Black Oak/Canyon Live Oak (TERR-BLCK-GDL)

- 01 Where possible and appropriate to enhance forest structural heterogeneity or an underrepresented hardwood component, projects should create crown space around existing mid-aged California black oak and canyon live oak to allow crown development of the oaks. Where replacement age classes are missing, projects should create openings near mature oaks to stimulate natural regeneration.
- 02 Mechanical vegetation treatments, prescribed fire, and salvage operations should retain all large hardwoods, greater than 12 inches in diameter (8 inches for blue oak), except where they pose a threat to human life or property.

Pinyon-Juniper (TERR-PNY-GDL)

- 01 Projects in sagebrush should prioritize restoration treatment to remove trees from wooded shrublands, which include recent expansion areas of pinyon and juniper into sagebrush ecosystems and other adjacent shrublands.
- 02 Include appropriately sized patches of undisturbed vegetation in project designs to minimize non-native species spread and maximize native species regeneration.

Old Forest (TERR-OLD-GDL)

- 01 When large tree densities meet desired condition levels, thinning to increase heterogeneity and resilience should emphasize retention of the oldest and largest trees, especially pines and black oaks. Large trees with deformities, broken tops, large branches and cavities should be retained for wildlife habitat whenever possible.
- 02 During burning, firing patterns should limit mortality of old trees by managing smoldering at the base of large old trees. Limit fire intensity in areas with large old trees where possible.

Complex Early Seral Habitats (TERR-CES-GDL)

- 01 Restoration projects following large stand replacing events (e.g., wildfire and bark beetle infestations) should consider:
 - a. safety to people in the short and long term
 - b. fuel loads over the long term, including the need to restore fire to the recovering or restored landscape
 - c. restoring forested habitat to deforested areas, including restoring connectivity

- d. habitat for local wildlife species that use burned forest habitats
 - e. other ecological restoration actions in the affected area
 - f. opportunities to recover economic value and carbon stored as a harvested wood product from dead and dying trees
- 02 Post-disturbance restoration projects should be designed to reduce potential soil erosion and the loss of soil productivity caused by loss of vegetation and ground cover.
 - 03 Post-disturbance restoration projects should be designed to protect and maintain important wildlife habitat.
 - 04 Post-disturbance restoration projects should be designed to manage the development of fuel profiles over time.
 - 05 Post-disturbance restoration projects should be designed to recover the value of timber killed or severely injured by the disturbance.
 - 06 Large fires with more than 1,000 acres of contiguous blocks of moderate and high vegetation burn severity should retain at least 10 percent of the moderate and high vegetation burn severity area without harvest to provide areas of high snag density for species that use complex early seral habitat.

Aspen (TERR-ASPN-GDL)

- 01 Where pile burning of material from conifer removal is desired, piles should be kept at least 4 to 15 feet away from large aspen trees to limit damage to aspen trunks. Larger piles should be farther from aspen trunks than smaller piles.
- 02 During treatment to manage or restore aspen, aspen trees with historical carvings should be protected, or the record and historical value appropriately captured.
- 03 Near developed or heavily managed areas, conifer removal (mechanical or hand thinning) should be the primary initial restorative treatment for aspen stands. Where cut material cannot be removed from the stand, pile burning is used to manage residual fuel loading.
- 04 Within the community and general wildfire protection zones, the number and size of conifers removed to enhance aspen should meet the following long term objectives: maximize direct and indirect light (this requires treating beyond the existing aspen stand perimeter); allow aspen expansion; reduce conifer seed sources; create fuel loads that reflect functioning aspen stands to allow future prescribed burning; and promote wildlife habitat, plant assemblages, and water yields typically found in functioning aspen communities.
- 05 Browsing pressure should be reduced in aspen stands that receive intensive browsing from either livestock or wildlife, to protect regenerating aspen stands.

Animal and Plant Species

Forestwide (SPEC-FW-GDL)

- 01 Known nest, roost, or den trees used by species of conservation concern, including surrounding trees that provide beneficial thermal or predatory protection, should not be purposefully removed, with the exception of hazard trees.
- 02 In order to reduce the loss of deer breeding and fawning, minimize disturbance associated with vegetation treatments in key summer range areas from May 15 through July 15, and during rutting season in key winter range areas from November 15 through January 1 (refer to California Department of Fish and Wildlife deer range maps). Long-term over short-term benefits should be the deciding factor where conflicts exist.
- 03 Projects should protect at-risk species and their habitat by considering at-risk species early in the environmental planning process.
- 04 Habitat management objectives from approved recovery plans should be considered in the design of projects that will occur within federally-listed species habitat to promote recovery of the species.
- 05 Design features, mitigation, and project timing considerations should be incorporated into ground-disturbing projects that may affect occupied habitat for species of conservation concern.
- 06 Water developments (such as a diversion or well) should be avoided near streams or seeps and springs where there is high risk of dewatering aquatic habitats where species of conservation concern occur.

California Spotted Owl, Pacific Fisher and Sierra Marten (SPEC-CSO-PF-SM-GDL)

- 01 Within the California spotted owl home range core areas, fisher strategy area and marten core habitat areas, retain some overtopping and multi-storied canopy conditions, including some shade-tolerant understory trees such as firs and cedars, especially in drainages, swales and canyon bottoms and on north and east-facing slopes. Retain a patchy mosaic of shrubs and understory vegetation, separated by more open areas, to reduce fuel continuity, increase habitat heterogeneity, support prey and provide hiding cover, with a goal of 10 to 20 percent shrub cover at the home range scale.

California Spotted Owl (SPEC-CSO-GDL)

- 01 As necessary to assess the effects of a project, surveys should be conducted in compliance with survey protocols during the planning process when proposed vegetation treatments are likely to reduce habitat quality in suitable California spotted owl habitat with unknown occupancy. Designate California spotted owl protected activity centers where appropriate based on survey results.
- 02 Maintain protected activity centers regardless of California spotted owl occupancy status, except in the following situations:
 - a. After a stand-replacing event, evaluate habitat conditions within a 1.5-mile radius around the activity center to identify opportunities for remapping the protected

- activity center. If there is insufficient suitable habitat within the 1.5-mile radius, the protected activity center may be removed from the network.
- b. If surveys show no occupancy after five years of survey data.
- 03 To minimize disturbance that may lead to breeding failure, apply a limited operating period prohibiting vegetation treatments during the breeding season (March 1 to August 15, or current regional guidance) within approximately 0.25 miles of the known nest site, or where the nest site is not known, the most recent known roost site, unless surveys confirm that California spotted owls are not nesting. Prior to implementing activities within or adjacent to a California spotted owl protected activity center, and the location of the nest site or known roost site is uncertain, conduct surveys to establish or confirm these locations.
- a. The limited operating period may be waived for vegetation treatments of limited scope and duration, if a biologist determines that such projects are unlikely to result in breeding disturbance considering their intensity, duration, timing and specific location. If a biologist concludes that a nest site would be shielded from planned activities by topographic features that would minimize disturbance, the limited operating period buffer distance may be modified.
 - b. Breeding season limited operating period restrictions may be waived, where necessary, to allow for early season prescribed fire in up to 5 percent of protected activity centers per year on a forest.
- 04 Where protected activity centers overlap with community buffers, community buffer standards should be met first (chapter 3), followed by vegetation desired conditions. Where community buffer standards conflict with vegetation desired conditions, desired conditions for dry vegetation types may be used.
- 05 The following criteria should be used in selecting vegetation treatment areas that intersect with protected activity centers to avoid those that have the highest likely contribution to owl productivity. Current occupancy is based on surveys from the last 3 years prior to project planning. The protected activity center criteria below are listed from lowest contribution to productivity to highest contribution to productivity.
- a. Currently unoccupied and historically occupied by territorial singles only.
 - b. Currently unoccupied and historically occupied by pairs.
 - c. Currently occupied by territorial singles.
 - d. Currently occupied by pairs.
 - e. Currently or historically reproductive.
- 06 Outside of community buffers and focus landscapes, treatments in protected activity centers should not exceed 5 percent per year and 10 percent per decade of total acres of California spotted owl protected activity centers.
- 07 Within community buffers and focus landscapes, mechanical treatments in protected activity centers should not exceed 10 percent per year and 30 percent per decade of total acres of California spotted owl protected activity centers.

Pacific Fisher (SPEC-PF-GDL)

- 01 Within the fisher strategy area, prescribed fires should be designed to leave some unburned patches (up to 25 percent of total area within the burn perimeter) to provide

heterogeneity and refugia for prey species, especially in larger burn units, if environmental conditions allow.

- 02 Avoid creating permanent new linear or otherwise continuous areas of open habitat in or near fisher denning habitat.
- 03 Within key fisher linkage areas, limit large areas of high intensity fire during firing operations. These areas should be uploaded and available ahead of fire season in the current Forest Service decision support system for wildfire management.
- 04 Outside community buffers and focus landscapes, apply the limited operating periods below in occupied fisher habitat cores 1 to 5 to minimize disruptions to fisher reproduction, unless a project-specific evaluation determines a low risk to fishers. In cores 2 to 5, the limited operating period applies to modeled denning habitat buffered by 820 feet (250 meters). In core 1, the limited operating period applies to California wildlife habitat relationship fisher high-value reproductive habitat buffered by 820 feet (250 meters).
 - a. Prohibit mechanical logging or thinning, mastication and construction activities from March 1 to June 30, or current regional guidance.
 - b. Prohibit using prescribed fire from March 1 to May 1, or current regional guidance.

Great Gray Owl (SPEC-GGO-GDL)

- 01 In meadow areas of great gray owl protected activity centers, maintain herbaceous vegetation at a height commensurate with site capability and habitat needs of prey species. Follow regional guidance to determine potential prey species and associated habitat requirements at the project level.
- 02 During vegetation management activities, apply a limited operating period prohibiting vegetation treatments and road construction within 0.25 mile of an active great gray owl nest stand, during the nesting period (typically March 1 to August 15). The limited operating period may be waived for vegetation treatments of limited scope and duration, if a biologist determines that such projects are unlikely to result in breeding disturbance considering their intensity, duration, timing and specific location. If a biologist concludes that a nest site would be shielded from planned activities by topographic features that would minimize disturbance, the limited operating period buffer distance may be reduced.

Bats (SPEC-BAT-GDL)

- 01 To conserve long-term bat species persistence in the plan area, bat gates should be considered at the entrances of caves and mines when known bat hibernacula or maternity colonies may be adversely affected by recreational, management or other activities.

Invasive Species

Forestwide (INV-FW-GDL)

- 01 Use an integrated pest management approach in the planning and implementation of all projects and activities.

- 02 Projects should be designed to minimize invasive species spread by incorporating prevention and control measures into ongoing management or maintenance activities that involve ground disturbance, terrestrial or aquatic habitat alteration, or the possibility of spreading invasive species. When feasible, projects should include measures to provide invasive species-free gravel, fill, topsoil and mulch; include follow-up inspections as needed and specified in regional or national strategies.
- 03 To the extent feasible, hay, straw and mulch used for animal feed or bedding, soil stabilization and land rehabilitation, or other purposes should be certified by California or the North American Invasive Species Management Association as being weed-free to prevent unintentional introduction of invasive species.
- 04 Weed-free plant material should be selected for all seeding and mulching projects to restore natural species composition and ecosystem function to the disturbed area. Plant or seed materials should be used that are appropriate to the site, capable of becoming established, and not invasive.
- 05 Weed prevention measures should be included as necessary when amending or re-issuing permits, including but not limited to livestock grazing, special uses and pack stock operator permits.

Fire

Forestwide (FIRE-FW-GDL)

- 01 When managing wildland fire (i.e., wildfire and prescribed fire), a variety of fire management options and activities should be considered, including hand and aerial ignitions, to achieve a mix of fire effects. When safe and feasible, limit extensive continuous areas of high severity fire effects in old forest habitat and riparian areas.
- 02 Plan restoration and fire management projects for large landscapes (i.e., subwatershed or larger) when and where possible to improve economic feasibility of restoration and effectiveness of changing the negative fire effects from large wildfires.
- 03 When wildfires affect identified areas of tribal importance, communicate and collaborate with tribal leadership during fire incident management to identify and, to the extent practical, protect tribal values and minimize impacts to resources or areas of tribal importance.
- 04 When managing wildland fire, the role of fire in riparian ecosystem function should be considered. Allow fire to burn in riparian ecosystems when fire intensity and continuous crown fire are limited.
- 05 During wildland fire management activities, where possible, locate incident bases, camps, helibases, staging areas, helispots and other centers for incident activities outside of riparian conservation areas or critical aquatic refuges to avoid impacts to aquatic- and riparian-dependent resources.
- 06 During wildfires, avoid fire management activities in special habitats (see Terrestrial section, chapter 2) except when necessary to protect life and property. This includes activities such as line construction, staging areas, safety zones, water drafting and camps.

When conducting fire management activities near special habitats, take extra measures to avoid spread of invasive plants.

- 07 If fire management actions are required within designated wilderness areas, research natural areas, or the Pacific Crest National Scenic Trail management area, apply minimum impact strategies and tactics to manage wildland fire, unless more direct attack is needed to protect people or adjacent property. When possible, allow naturally ignited wildfires to function in their natural role. In cases where fire may damage the ecological values for which a research natural area was established, measures should be taken to exclude fire from the research natural area.
- 08 Wildfire management techniques that minimize ground disturbance impacts should be used in sensitive habitat of at-risk species, while considering the safety of people.
- 09 Consult a resource advisor during wildfires in large areas of old forest patches to identify old forest and wildlife resource values and to suggest opportunities for retaining and protecting large and old trees. When safe and feasible, protect highly valued old, den and nest trees ahead of burn operations using techniques such as targeted burning, removing large fuel from the base of trees, and providing direct protection.
- 10 When determining the appropriate wildfire management strategy, use spatial support tools such as wildfire risk assessments, fire management operating plans, and the current Forest Service decision support system for wildfire management. Locations of special habitats, old forest patches, and key habitat areas for at-risk species should be readily available in the current Forest Service decision support system for wildfire management ahead of fire season.

Timber

Forestwide (TIMB-FW-GDL)

- 01 Retention of snags within and immediately adjacent to areas planned for reforestation should be discouraged to mitigate hazards to workers. High fuel levels should not be retained in plantations that would preclude the use of prescribed burning at appropriate times as the plantation matures.
- 02 Reforestation of suitable lands should be designed to achieve stocking levels, spatial arrangements and species composition to allow for long term resilience of the developing forest, while considering potential future plantation management, carbon carrying capacity, and climate change adaptations. Competing vegetation, fuel levels, and fire risk should be managed to provide for the long term survival and vigor of reestablishing forests as they move toward maturity.
- 03 On lands not suited for timber production, reforestation of deforested lands should be considered when forest cover could contribute to ecological restoration, while providing benefits such as improving scenic character, restoring connectivity for wildlife, increasing carbon storage and improving watershed condition.
- 04 Plant all regeneration areas requiring reforestation except where natural seeding is prescribed. Regeneration by natural seeding should be applied primarily in the true fir type.

Sustainable Recreation

Forestwide (REC-FW-GDL)

- 01 Recreation projects should meet the minimum characteristics for recreation opportunities and settings as classified by the recreation opportunity spectrum (Figure 19, appendix A). Exemptions may occur on a case-by-case basis as documented in site-specific permits.
- 02 Recreation uses should be managed adaptively to prevent impacts to other resources and recreation settings, while considering the recreation places inventory.
- 03 During implementation of projects with the potential to adversely affect recreation activities, implement measures to minimize adverse effects to recreation activities, facilities and visitor safety.
- 04 Redesign, restore, or rehabilitate recreation sites where recreation activities have caused unacceptable natural resource and social resource impacts.
- 05 New developed campgrounds and designated dispersed campsites should be located away from riparian areas, flood plains and other environmentally sensitive areas.
- 06 Within developed campgrounds, vegetation removal should promote visitor safety, scenic values and vegetation health.
- 07 Seasonal road and trail closures, or other management methods, should be used to manage and protect resources and infrastructure.
- 08 To be cost effective, conversion of recreation sites should fall within footprints of existing development unless there is a possibility of partnerships or alternative funding for a new recreation site.

Scenery

Forestwide (SCEN-FW-GDL)

- 01 Built environment and permitted activities should be designed to meet or exceed scenic integrity objectives and contribute to scenic stability.
- 02 Maintain scenic integrity objectives and scenic stability levels for the Pacific Crest Trail corridor, and surrounding National Forest System lands viewsheds, for the retention of panoramic views and landscape connectivity.
- 03 Restoration and salvage activities should achieve scenic integrity objectives in the long-term timeframes established in project analysis.

Cultural Resources

Forestwide (CULT-FW-GDL)

- 01 Cultural artifacts should only be collected for diagnostic dating purposes, answering research questions, or protection of the artifact when special circumstances require collection. Artifact collections should be curated at nearby facilities and accessible to local tribes and researchers.

- 02 Historic property protection provisions should be included in contracts and special use permits as applicable.
- 03 To protect the cultural setting of a site and visitor experiences, commercial use of heritage-based interpretive sites should be limited to activities that enhance the public understanding of the resource, protect and preserve the resource, and are consistent with tribal interests.
- 04 For cultural resources that have been designated as “significant”, manage to perpetuate those features, characteristics, values or opportunities for which they were designated.

Geology and Minerals

Forestwide (GEO-FW-GDL)

- 01 Ensure that plans of operation, reclamation plans, and reclamation bonds address the costs of: (1) removing facilities, equipment, and materials; (2) isolating and neutralizing or removing toxic or potentially toxic materials; (3) salvaging and replacing topsoil; and (4) preparing the seed bed and revegetating to meet the objectives of the land allocation in which the operation is located.
- 02 During mining-related activities, limit the clearing of trees and other vegetation to the minimum necessary. Clearing of vegetation should be pertinent to the approved phase of mineral exploration and development.
- 03 Consider mineral withdrawal subject to existing claims in special areas and wild and scenic river corridors.

Lands

Forestwide (LAND-FW-GDL)

- 01 Acquire lands in the following priority:
 - Priority 1
 - a. Key tracts of non-Federal land (1,000 acres) to enhance management efficiency.
 - b. "Inholding land" to reduce costs related to right-of-way acquisition and landline survey.
 - Priority 2
 - a. Remaining lands classified as desirable for National Forest System land status.
 - Priority 3
 - a. Tracts that will become key tracts in the foreseeable future because of location or character, but immediate actions are not urgent.
 - b. Land intermingled with or adjacent to National Forest System land, and primarily valuable for watershed purposes, timber production, or public recreation and needed to adequately consolidate National Forest System land.
- 02 Grants of right-of-way for roads and utilities should use common corridors where feasible, to limit adverse effects to the environment, safety, and suitable uses.

Chapter 5. Forest Plan Monitoring

Introduction

Monitoring forms the basis for continuous improvement of the forest plan and provides information for adaptive management within the plan area. The forest plan monitoring program enables the responsible official to determine where changes are needed in forest plan components, other plan content, and plan implementation strategies that guide resource management.

The forest plan monitoring program measures management effectiveness and assesses progress toward achieving or maintaining the forest plan desired conditions and objectives through a set of monitoring questions and associated indicators. These are designed to inform management of resources in the plan area, including testing relevant assumptions, tracking relevant changes, and measuring management effectiveness. By using appropriate indicators which can be measured, observed, or described over time, management actions can be evaluated to determine if they are trending conditions toward the anticipated results. Not every plan component will have a corresponding monitoring question or indicator since monitoring in the plan is focused on priority management questions and related core information that are achievable within the means of the national forest.

The plan monitoring program is just one piece of the monitoring that occurs within the forest and region; project and activity monitoring, and resource or species monitoring conducted by other agencies and organizations may inform the plan monitoring program and adaptive management of the plan. To address plan monitoring program questions and associated indicators that can best be answered at a broader geographic scale than one plan area, the Regional Forester shall develop a broader-scale monitoring strategy. The intent of the broader-scale monitoring strategy is to inform decision-making regarding the effectiveness of the forest plan, within the context of an all-lands approach, and realize efficiencies by coordinating similar monitoring across units, integrating agency protocols and leveraging partner and adjacent landowner monitoring work.

The monitoring program outlined below considers the 2014 science synthesis¹⁰ and 2013 forest plan assessment¹¹. Existing national and regional monitoring programs, like the Forest Inventory and Analysis National Program, the National Visitor Use Monitoring Program, the current forest plan monitoring, and ongoing monitoring with the State contribute to the plan monitoring program. Monitoring is also coordinated with other Forest Service program mission areas (i.e., U.S. Forest Service State & Private Forestry and Research & Development), other federal and state agencies, partners and the public.

Monitoring information will be evaluated every two years, starting no later than two years after the effective date of the forest plan decision. This biennial evaluation includes information gathered through this plan monitoring program and relevant information from the Region 5

¹⁰ Long, Jonathan W.; Quinn-Davidson, Lenya; Skinner, Carl N., eds. 2014. Science synthesis to support socioecological resilience in the Sierra Nevada and southern Cascade Range. Gen. Tech. Rep. PSW-GTR-247. Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station. 723 p.

¹¹ [USDA, Forest Service. 2013. Final Sequoia National Forest assessment. U.S. Department of Agriculture, Forest Service, Pacific Southwest.](#)

broader scale monitoring strategy. A written report of the evaluation will be made available to the public. Where frequency of monitoring is longer than two years, evaluation of that information will be made in the next biennial evaluation.

The monitoring program contains one or more monitoring questions and associated indicators addressing each of the following topics:

- The status of select watershed conditions.
- The status of select ecological conditions including key characteristics of terrestrial and aquatic ecosystems.
- The status of focal species to assess the ecological conditions required under the Code of Federal Regulations, specifically 36 CFR 219.9.
- The status of a select set of the ecological conditions required under 36 CFR 219.9 to contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern.
- The status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives.
- Measurable changes on the plan area related to climate change and other stressors that may be affecting the plan area.
- Progress toward meeting the desired conditions and objectives in the plan, including for providing multiple use opportunities.
- The effects of each management system to determine that they do not substantially and permanently impair the productivity of the land (16 U.S.C. 1604(g)(3)(C)).

Some monitoring questions and indicators may address more than one of these required topics. The entire monitoring program must be within the financial and technical capability of the forest, augmented by broader-scale monitoring by the Pacific Southwest Region and other monitoring with partners.

The monitoring program for the Sequoia National Forest is presented below in a set of tables, each related to one of the eight required topics previously listed. For clarity, monitoring questions for terrestrial ecosystems and aquatic ecosystems are presented in separate tables. In the tables, each row represents a single monitoring question and associated indicators used to respond to a selected desired condition or objective. The desired conditions are generally complex statements that cannot be fully monitored. Therefore, the monitoring questions and indicators focus on some core aspect of the desired condition related to the required monitoring item that we are capable of monitoring. Monitoring questions and indicators that address more than one of the eight required items are repeated for each such item. Details of the plan monitoring program, including monitoring and analysis protocols, will be part of a separate monitoring guide.

Monitoring Program

Watershed Conditions

These monitoring questions and their associated indicators are related to water resources and watershed conditions in the forest plan area. The geographic scale may extend beyond the plan area and may include receiving areas for water that flows off the plan area.

Table 9. Monitoring questions and associated indicators that evaluate watershed conditions

Selected Desired Condition and Objective or Other Plan Component	Monitoring Question	Associated Indicators
WTR-FW-DC-02 Water quality is sustained at a level that retains the biological, physical and chemical integrity of aquatic systems and benefits the survival, growth, reproduction and migration of native aquatic and riparian species.	Do aquatic benthic macroinvertebrate communities indicate stream ecosystem integrity is being maintained? (Same as aquatic ecosystems and focal species below)	Diversity; species composition; other indices of macroinvertebrate response to current conditions (e.g., Rivpacs score [O/E], index of biotic integrity [IBI], Ephemeroptera Plecoptera Trichoptera index [EPT]).
WTR-FW-DC-03 Watersheds have the following conditions: fully functioning or trending toward fully functioning and resilient; recover from natural and human disturbances at a rate appropriate with the capability of the site; have a high degree of hydrologic connectivity laterally across the floodplain and valley bottom, and vertically between surface and subsurface flows. Physical (geomorphic, hydrologic) connectivity and associated processes (i.e., runoff, flooding, in-stream flow regime, erosion and sedimentation) are maintained and restored. Watersheds provide important ecosystem services: high quality water; recharge of streams and shallow groundwater; maintenance of riparian communities; and moderation of climate change and atmospheric deposition. Watersheds maintain long term soil productivity.	Is the condition of watersheds improving?	Watershed condition indicators from the Watershed Condition Framework.

Terrestrial Ecosystems

A select set of ecological conditions is monitored for terrestrial ecosystems. The monitoring questions and indicators are selected to measure the effectiveness of the forest plan to maintain or restore ecological conditions for key ecosystem characteristics associated with composition, structure, function and connectivity.

Table 10. Monitoring questions and associated indicators that evaluate ecological conditions for terrestrial ecosystems

Selected Desired Condition and Objective or Other Plan Component	Monitoring Question	Associated Indicators
<p>TERR-CES-DC-01 Complex early seral habitat created as a result of a disturbance event contains dense patches of snags and regenerating shrub cover and other habitat elements characteristic of natural succession that are important to early seral forest-associated species. Large areas of shrubs are managed in locations where they represent the potential natural vegetation, considering fire risks over time to adjacent vegetation and resources. Aspen and oak sprouts are well distributed in areas where they occur.</p>	<p>What is the amount and distribution of complex early seral habitat across large landscapes?</p>	<p>Patch size; patch density; and patch distribution.</p>
<p>TERR-MONT-DC-01 At the landscape scale, montane vegetation occurs in a complex mosaic of different forest densities, sizes, and species mix across large landscapes, that vary with topography, soils and precipitation. The composition, structure, and function of vegetation make them resilient to fire, drought, insects, pathogens and climate change. The mix of seral stage patches, and open versus closed canopied areas, varies by forest type. Interspersed across all seral stages, large and old trees are common in most of the landscape in varying densities, as described in the old forest section below.</p> <p>TERR-MONT-DC-02 At the landscape scale, montane vegetation provides ecological connectivity for a wide range of species, including old forest-associated species and habitat generalists. At least 30 percent of the landscape provides greater than 40 percent tree or shrub cover for connectivity of wide-ranging forest-associated species that travel on the ground. Between 10 to 40 percent of the landscape has closed canopied, multi-storied forests with greater than 50 percent overstory tree cover for species that travel in the canopies. Most of these multi-storied forests occur on moist sites, on lower slope positions, and north or east-facing slopes.</p>	<p>What are the proportions and spatial distributions of seral stage patches and canopy cover areas for vegetation types across large landscapes?</p>	<p>Percent of seral stage patches by vegetation type at the landscape scale as shown in table 1 (chapter 2): acres; and patch size distribution.</p>
<p>TERR-MONT-DC-03 At the landscape scale, ponderosa, Jeffrey and sugar pine are common and dominant or co-dominant on drier sites. Large areas of black oak are present both in large patches, and intermixed throughout montane forests where it historically occurred. Sugar pine is reproducing, growing successfully, and is resistant to blister rust and insects. Shrub patches, as well</p>	<p>Are pines (i.e., ponderosa, Jeffrey, and sugar) increasing?</p>	<p>Pine relative density; basal area; average diameter at breast height; regeneration density; and health.</p>

Selected Desired Condition and Objective or Other Plan Component	Monitoring Question	Associated Indicators
as irregular openings within forests, provide diverse habitat for a wide variety of wildlife and plant species.		
<p>TERR-MONT-DC-06 At the mid-scale, a complex mosaic of groups of trees, shrubs, and herbaceous plants provide diverse habitat for a wide variety of wildlife species, including old forest-associated species. Within forest patches, trees are highly irregular in spacing and size. Individual trees, small clumps, and groups of trees are interspersed with grass, herbaceous plants, and shrubs, in variably sized openings that vary by forest type (figure 4). A mosaic of moderate to dense shrubs, tree litter, down wood and bare ground occurs between groups of trees. Vigorous understories of heterogeneous, patchy, and diverse native shrubs, herbs, and grass species support small mammal, bird, insect, and fungal communities, as well as providing pollinator and herbivore forage.</p>	Is heterogeneity increasing within forest patches at the mid-scale?	Variation in tree canopy cover; tree sizes; tree spacing; and shrub and understory cover.
<p>TERR-OLD-DC-03 Between 40 and 80 percent of the forested landscape contains old forest areas. Old forest areas are clumps and patches of old forest components such as old trees, snags and large downed logs. These areas are irregularly distributed across the landscape and interspersed with stands of younger trees, shrubs, meadows, other herbaceous vegetation and non-vegetated patches.</p> <p>TERR-OLD-DC-04 The number and density of old trees vary by topographic position and soil moisture. In general, more large and old trees are found on moister sites; on lower slopes, bottoms, and north and east aspects, especially where soils are deeper. Large trees are well distributed but are often clumpy. The densities vary by forest type. Trees greater than 40 inches in diameter, generally over 150 years old, represent the oldest trees, and comprise a significant proportion of large and old trees. In many areas of high soil productivity, trees grow to large sizes (e.g., around 30 inches in diameter) in fewer than 100 years. On low and very low soil productivity sites, the oldest trees may be smaller in diameter. Sufficient numbers of younger trees are present to provide for recruitment of old trees over time.</p>	Is the proportion of the landscape with large trees and the density of large trees increasing?	Proportion of area with large trees; and number of large trees per acre averaged at the landscape scale.
<p>TERR-BLCK-DC-01 Oak trees in varied ages are present, with wide spacing providing full sunlight around large old oak trees, enhancing their ability to produce abundant acorn crops. Black oak is reproducing successfully. Sufficient numbers of mid-age black oaks have enough canopy space to form full crowns to replace old oaks that eventually die.</p>	Are black oak populations stable or increasing?	Oak spatial extent; basal area; density; regeneration; and tree health (e.g., mortality rates, insects, etc.).

Aquatic Ecosystems

A select set of ecological conditions are monitored for riparian and aquatic ecosystems. The monitoring questions and indicators are selected to measure the effectiveness of the plan to maintain or restore ecological conditions and key ecosystem characteristics associated with composition, structure, function and connectivity.

Table 11. Monitoring questions and associated indicators that evaluate ecological conditions for aquatic and riparian ecosystems

Selected Desired Condition and Objective or Other Plan Component	Monitoring Question	Associated Indicators
WTR-FW-DC-02 Water quality is sustained at a level that retains the biological, physical, and chemical integrity of aquatic systems and benefits the survival, growth, reproduction and migration of native aquatic and riparian species.	Do aquatic benthic macroinvertebrate communities indicate stream ecosystem integrity is being maintained? (Same as watershed condition above and focal species below)	Diversity; species composition; and other indices of macroinvertebrate response to current conditions (e.g., Rivpacs score [O/E], index of biotic integrity [IBI], Ephemeroptera Plecoptera Trichoptera index [EPT]).
RCA-MEAD-DC-01 Meadows are hydrologically functional. Sites of accelerated erosion, such as gullies and headcuts are stabilized or recovering. Vegetation roots occur throughout the available soil profile. Meadows with perennial and intermittent streams have the following characteristics: (1) stream energy from high flows is dissipated, reducing erosion and improving water quality; (2) streams filter sediment and capture bedload, aiding floodplain development; (3) meadow conditions enhance floodwater retention and groundwater recharge; and (4) root masses stabilize stream banks against cutting action.	Do meadows have well-functioning streams and floodplains?	Undercut banks; down cut streams; headcuts; number and size of deep pools, glides, riffles; and woody vegetation along streams.
RCA-MEAD-DC-05 Meadows are in mid- to late-seral condition, with substantive ground cover and a rich and diverse species composition, especially of grasses and forbs. Meadows have high plant functional diversity with late successional functional types represented. Perennial streams in meadows contain a diversity of age classes of hardwood shrubs along the stream bank, where the potential exists.	What is the ecological condition of meadows in selected grazed and ungrazed allotments?	Range condition class; species richness; species diversity; and plant functional groups.
RCA-MEAD-DC-05 Meadows are in mid- to late-seral condition, with substantive ground cover and a rich and diverse species composition, especially of grasses and forbs. Meadows have high plant functional diversity with late successional functional types represented. Perennial streams in meadows contain a diversity of age classes of hardwood shrubs along the stream bank, where the potential exists.	What is the status of streambank vegetation in selected grazed and ungrazed meadow perennial streams?	Range greenline monitoring: vegetation community types; presence of woody regeneration; and plant functional groups.

Focal Species

Focal species are a small subset of species whose status permits inference to the integrity of the larger ecological system to which they belong. Focal species monitoring provides information regarding the effectiveness of the plan in providing the ecological conditions necessary to maintain the diversity of plant and animal communities and the persistence of native species in the plan area. They should act as indicators for the attributes of community composition, structure, connectivity or function, or factors that regulate them.

An effective focal species, or assemblage of species, will be sensitive to the ecosystem components or habitat attributes of concern. There are a few key qualities of well-selected focal species: the species is taxonomically well-known and stable; the species is specialized within a narrow habitat; and the species is a permanent resident (migrants are subject to a variety of sources of mortality and stress on their wintering grounds and during migration). A focal species could be a keystone species, an ecological engineer, an umbrella species, a link species, or a species of conservation concern, but need not be any of these species categories. Monitoring questions should relate the species to the ecological condition and reason for its selection, and indicators may include affected attributes of the species, such as presence or occupancy, habitat use, reproductive rate, and population trends. If the focal species' sensitivity to habitat changes cannot be directly attributable to a cause and effect relationship, then the influence of habitat change on the focal species may not be separable from the influence of other factors on the species, such as climate change, predation, disease, or competition.

Focal species, as used by the Forest Service, are not meant to act as surrogates for other species. Focal species monitoring is also not the same as monitoring those species in which we have a particular interest, such as threatened or endangered species, invasive species, or other species for which we deliberately manage the landscape.

Focal species are intended to reduce the cost and effort of ecosystem monitoring and should only be used when direct measurement of resources is not efficient or practical.

Table 12. Monitoring questions and associated indicators that evaluate the status of focal species

Selected Desired Condition and Objective or Other Plan Component	Monitoring Question	Associated Indicators
<p>Focal species is cheatgrass and red brome for the following ecosystems and desired conditions: TERR-SAGE-DC-01 The sagebrush type has a diversity of age classes, stand structure, cover classes and understory composition.</p>	<p>Is the abundance of Cheatgrass and red brome (non-native <i>Bromus</i> spp.) changing over time?</p>	<p>Spatial extent (acres); and cover (%).</p>

Selected Desired Condition and Objective or Other Plan Component	Monitoring Question	Associated Indicators
<p>TERR-SAGE-DC-02 Sagebrush ecosystems are resilient to fire, disturbances (e.g., grazing, recreation), invasive species (including cheatgrass) and climate change.</p> <p>TERR-PINY-DC-01 Pinyon-juniper types have a mosaic of trees and open areas that provide wildlife habitat, contribute to functional soils, and are resilient to disturbances such as fire, invasive species and climate change.</p>		
<p><u>Focal species are benthic macroinvertebrate communities for stream ecosystems and the following desired conditions:</u></p> <p>WTR-FW-DC-02 Water quality is sustained at a level that retains the biological, physical, and chemical integrity of aquatic systems and benefits the survival, growth, reproduction and migration of native aquatic and riparian species.</p> <p>RCA-RIV-DC-01 Stream ecosystems, riparian corridors and associated stream courses sustain ecosystem structure; are resilient to natural disturbances (e.g., flooding) and climate change; promote the natural movement of water, sediment and woody debris; and provide habitat for native aquatic species.</p>	<p>Do aquatic benthic macroinvertebrate communities indicate stream ecosystem integrity is being maintained?</p>	<p>Diversity; species composition; and other indices of macroinvertebrate response to current conditions (e.g., Rivpacs score [O/E], index of biotic integrity [IBI], Ephemeroptera Plecoptera Trichoptera index [EPT]).</p>

Ecological Conditions for At-risk Species

For select at-risk species, a select set of ecological conditions, including habitat, is monitored. The selected ecological conditions are necessary to provide for diversity of plant and animal communities and contribute to the recovery of, conserve, or maintain the viability of at risk species within the plan area. At-risk species include federally recognized threatened, endangered, proposed, and candidate species plus the species of conservation concern identified for the forest. Only a select set of ecological conditions is monitored for select at-risk species and may include characteristics at both the ecosystem and species-specific levels of terrestrial, riparian, or aquatic ecosystems.

Table 13. Monitoring questions and associated indicators that evaluate ecological conditions for select at-risk species

Selected Desired Condition and Objective or Other Plan Component	Monitoring Question	Associated Indicators
TERR-SH-DC-01 The integrity of special habitats is maintained or improved. Composition, diversity and structure are maintained in all areas, including those with multiple use activities.	Is the integrity of special habitats (e.g. pumice flats, limestone or serpentine soils, fens) for at-risk plants being maintained or improved over time?	Special habitat extent (acres) and health (e.g., species composition, and hydrologic function, grazing utilization).
MA-CAR-DC-01 Streams in CARs have vegetation and channel bank characteristics that are properly functioning or functioning at-risk with an upward trend. These ratings are made in relation to the current potential of the stream system. If the current potential is different from historic potential, assess what restoration measures are required to attain historic potential and if this is necessary or achievable.	Do streams in selected grazed and ungrazed meadows and grasslands have vegetation and channel bank conditions within the natural range of variability?	Range greenline monitoring: vegetation community types, and presence of woody regeneration.
SPEC-FW-DC-02 Habitats for at-risk species support self-sustaining populations within the inherent capabilities of the plan area. Ecological conditions provide habitat conditions that: contribute to the survival, recovery, and delisting of species under the Endangered Species Act; preclude the need for listing new species; improve conditions for species of conservation concern; and sustain both common and uncommon native species.	Do stream temperatures support persistence of Little Kern golden trout, California golden trout, Kern River golden trout, and hardhead? (Same as climate change and other stressors below)	Maximum summer stream temperature; average daily stream temperatures; maximum daily average stream temperature during summer and fall for fall spawners; and maximum and minimum winter stream temperatures.
Fisher (<i>Pekania pennanti</i>) SPEC-PF-DC-05 Outside of community buffers and focus landscapes, at least 60 percent of each fisher target cell (figure 10), on average, is in CWHR classes 5M, 4D, 5D, and 6 in a heterogeneous pattern. This proportion may vary according to the landscape conditions within each cell. Canopy cover greater than 60 percent occurs in patches,	What is distribution of fisher target habitat in the fisher target cells?	Acreage and distribution of California Wildlife Habitat Relationships classes 5M, 4D, 5D, 6

Selected Desired Condition and Objective or Other Plan Component	Monitoring Question	Associated Indicators
<p>especially in more mesic sites like canyons and swales and on north and east slopes. The patches may be separated by more open stands, especially on drier slopes and ridges, with up to 25 percent of the target cell in open canopy cover (less than 40 percent) and the balance in moderate canopy cover (40 to 60 percent). Dense stands are also punctuated at fine resolution with gaps of 0.03 to 2.0 acres (median of 0.1 acres).</p>		
<p>Fisher (<i>Pekania pennanti</i>) SPEC-PF-DC-04 Black oaks are well-distributed within mixed-conifer and conifer-hardwood stands throughout the fisher’s range. The majority of trees are in good condition and the number of large oaks is increasing.</p>	<p>Are black oaks stable or increasing? (Same as terrestrial ecosystems above)</p>	<p>Oak spatial extent; canopy cover; density; regeneration; and tree health (e.g., mortality rates, insects, etc.)</p>
<p>California spotted owl (<i>Strix occidentalis occidentalis</i>) SPEC-CSO-DC-02 California spotted owl protected activity centers encompass the best available 300 acres of habitat in as compact a unit as possible. Best available habitat includes: two or more tree canopy layers; trees in the dominant and co-dominant crown classes averaging 24 inches diameter or greater; at least 60 percent tree canopy cover, including hardwoods; and in descending order of priority, California Wildlife Habitat Relationships (CWHR) classes 6, 5D, 5M, 4D, and 4M and other stands with at least 50 percent canopy cover, including hardwoods. Protected activity centers also contain some very large snags, greater than 45 inches diameter, and snag and down woody material levels that are higher than average. Where possible, heterogeneity is incorporated as described in the terrestrial vegetation desired conditions appropriate for the protected activity center location (e.g., red fir, mixed conifer, and blue oak woodland). In general, the moist mixed conifer desired conditions are most applicable.</p>	<p>What are the ecological conditions in protected activity centers (PACs)?</p>	<p>Diameter of crown trees; canopy cover; and California Wildlife Habitat Relationships class.</p>

Visitor Use, Visitor Satisfaction, and Progress toward Meeting Recreation Objectives

The plan monitoring program includes monitoring questions and associated indicators that address the status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives.

Table 14. Monitoring questions and associated indicators that evaluate visitor use, visitor satisfaction, and progress toward meeting recreation objectives

Selected Desired Condition and Objective or Other Plan Component	Monitoring Question	Associated Indicators
<u>Recreation Objective</u> REC-FW-DC-02 Recreation settings are capable of adapting to changing conditions and support social, ecological and economic sustainability on the forest and in surrounding communities.	How much money is spent in a year by non-local visitors within the local area on lodging, restaurant meals, groceries, gas and oil, and activities?	Total spending by non-local visitors (whose home is at least 50 miles from the forest) within the local area (within 50 miles of the forest) on lodging, restaurant meals, groceries, gas and oil, and activities.
<u>Visitor Satisfaction</u> REC-FW-DC-03 Recreation opportunities on land, water and in the air provide a high level of visitor satisfaction and safety. Recreation activities are ecologically, socially and economically sustainable. Agency resources focus on supporting the forest recreation program niche.	What level of satisfaction do visitors express for developed facilities, access, services, and perception of safety?	Percent meets expectations (PME) measure for developed facilities, access, services, and perception of safety.
<u>Visitor Use</u> REC-FW-DC-04 Visitors can connect with nature, culture and history through a full range of inclusive and sustainable outdoor recreation opportunities.	Do visitors engage in selected activities that focus on natural and cultural resources?	Percentage of visitors participating in viewing natural features, hiking or walking, viewing wildlife, visiting historic sites, nature study, and backpacking.
<u>Recreation Objective</u> REC-FW-OBJ-03 Within 10 years of plan approval, 400 to 650 miles of trails (40 to 60% of total miles) are meeting standard.	How many trail miles meet National Trail Quality Standards?	Miles of trail meeting National Trail Quality Standards.
<u>Recreation Objective</u> SCEN-FW-DC-01 The forest provides a variety of ecologically sound, resilient and visually appealing forest landscapes that sustain scenic character, supporting the forest recreation program niche in ways that contribute to visitors' sense of place and connection with nature.	What level of satisfaction do visitors express for scenery associated with day-use developed sites, overnight developed sites, undeveloped areas, and wilderness?	Percent meets expectations (PME) measure for scenery associated with day-use developed sites, overnight developed sites, undeveloped areas, and wilderness.

Climate Change and Other Stressors

The plan monitoring program includes monitoring questions and associated indicators to determine whether there are measurable changes on the plan area resulting from climate change and other stressors.

Table 15. Monitoring questions and associated indicators that measure changes on the plan area resulting from climate change and other stressors

Selected Desired Condition and Objective or Other Plan Component	Monitoring Question	Associated Indicators
<p>TERR-ALPN-DC-03 Subalpine woodlands and alpine ecosystems are resilient to insects, diseases, fire, wind and climate change. High-elevation white pines (e.g., whitebark pine and foxtail pine) are healthy and vigorous, with a low incidence of white pine blister rust, and resilient to moisture stress and drought. White pine blister rust-resistant trees are regenerating and populations of high elevation white pines have the potential to expand above the tree line.</p> <p>TERR-RFIR-DC-01 At the landscape scale, the red fir forest type is part of a heterogeneous mosaic of tree species and vegetation structures (e.g., tree density, size, age and shrub cover), with patches of Jeffrey pine, meadows and montane chaparral. It is dominated by red fir trees, with varying amounts of white fir, Jeffrey pine, western white pine, sugar pine, lodgepole pine and mountain hemlock.</p>	<p>Are high-elevation white pines and red fir being sustained or increasing across the landscape with climate change?</p>	<p>Extent by forest type (acres); tree mortality (%); incidence of insects and pathogens (e.g., white pine blister rust) (%); tree regeneration (no./acre); and extent of tree mortality (acres).</p>
<p>RCA-RIV-DC-01 Stream ecosystems, riparian corridors and associated stream courses sustain ecosystem structure; are resilient to natural disturbances (e.g., flooding) and climate change; promote the natural movement of water, sediment and woody debris; and provide habitat for native aquatic species.</p>	<p>Do stream temperatures support persistence of Little Kern golden trout, golden rout, Kern River golden trout, and hardhead? (Same as at-risk species above)</p>	<p>Maximum summer stream temperature; average daily stream temperatures; maximum daily average stream temperature during summer and fall for fall spawners; and maximum and minimum winter stream temperatures.</p>
<p>FIRE-FW-DC-03 Wildland fires burn with a range of intensity, severity and frequency that allows ecosystems to function in a healthy and sustainable manner. Wildland fire is a necessary process, integral to the sustainability of fire-adapted ecosystems.</p>	<p>Are wildfires managed for resource objectives meeting the desired range of conditions within forested landscapes?</p>	<p>Fire severity; proportion high fire severity; fire severity index; and mean and maximum high severity patch size.</p>
<p>FIRE-FW-DC-03 Wildland fires burn with a range of intensity, severity and frequency that allows ecosystems to function in a healthy and sustainable manner. Wildland fire is a necessary process, integral to the sustainability of fire-adapted ecosystems.</p> <p>TERR-MONT-DC-05 At the landscape scale, fires burn with low, moderate or mixed severity with minimal patches of very high severity</p>	<p>Are natural fire regimes within terrestrial ecosystems becoming less departed from the desired conditions and the natural range of variation?</p>	<p>Fire return interval departure</p>

Selected Desired Condition and Objective or Other Plan Component	Monitoring Question	Associated Indicators
<p>(greater than 90 percent basal area mortality) that is rarely greater than 200 acres in size. The proportion of area burned at very high severity within a fire is generally less than 10 to 15 percent. Due to existing high levels of fuels and weather variability, greater proportions of areas burned at high severity (up to 40 percent, with some patches of high severity up to 1,000 acres), may be unavoidable during large landscape prescribed fires or wildfires managed to meet resource objectives.</p> <p>TERR-UPPR-DC-02 At the landscape scale, fire is a key ecological process, restoring and maintaining patchy fuel loads and increasing heterogeneity and understory plant vigor. Fires occur irregularly, generally every 15 to 100 years, averaging about 40 years. Fires in this vegetation type burn with low, moderate or mixed severity, with minimal patches of very high severity (greater than 90 percent basal area mortality), rarely greater than 300 acres in size. The proportion of areas burned at high severity within a fire is generally less than 10 to 15 percent. Due to existing high fuel levels and weather variability, greater proportions of areas of high severity burn (up to 50 percent) may be unavoidable during large landscape prescribed fires or wildfires managed to meet resource objectives Some patches of high severity burn reach 1,000 acres in size.</p>		
<p>FIRE-FW-DC-03 Wildland fires burn with a range of intensity, severity and frequency that allows ecosystems to function in a healthy and sustainable manner. Wildland fire is a necessary process, integral to the sustainability of fire-adapted ecosystems.</p> <p>TERR-MONT-DC-05 At the landscape scale, fires burn with low, moderate or mixed severity with minimal patches of very high severity (greater than 90 percent basal area mortality) that is rarely greater than 200 acres in size. The proportion of area burned at very high severity within a fire is generally less than 10 to 15 percent. Due to existing high levels of fuels and weather variability, greater proportions of areas burned at high severity (up to 40 percent, with some patches of high severity up to 1,000 acres), may be unavoidable during large landscape prescribed fires or wildfires managed to meet resource objectives.</p> <p>TERR-UPPR-DC-02 At the landscape scale, fire is a key ecological process, restoring and maintaining patchy fuel loads and increasing heterogeneity and understory plant vigor. Fires occur irregularly, generally every 15 to 100 years, averaging about 40 years. Fires in this</p>	<p>Are wildfires becoming larger, more frequent, and more severe with warming climate conditions?</p>	<p>Fire return interval departure; fire severity; proportion high fire severity; fire severity index; mean and maximum high severity patch size; and total fire size.</p>

<p>Selected Desired Condition and Objective or Other Plan Component</p>	<p>Monitoring Question</p>	<p>Associated Indicators</p>
<p>vegetation type burn with low, moderate or mixed severity, with minimal patches of very high severity (greater than 90 percent basal area mortality), rarely greater than 300 acres in size. The proportion of areas burned at high severity within a fire is generally less than 10 to 15 percent. Due to existing high fuel levels and weather variability, greater proportions of areas of high severity burn (up to 50 percent) may be unavoidable during large landscape prescribed fires or wildfires managed to meet resource objectives Some patches of high severity burn reach 1,000 acres in size.</p>		

Desired Conditions, Including Social, Cultural, and Economic Sustainability

Progress toward meeting desired conditions, objectives, or other plan components that do not fall under one of the other eight required items are included in the monitoring program. Specifically, the plan monitoring program must contain one or more questions and associated indicators addressing the plan contributions to communities, social and economic sustainability of communities, multiple use management in the plan area, or progress toward meeting the desired conditions and objectives related to social and economic sustainability.

Table 16. Monitoring questions and associated indicators that evaluate progress toward meeting desired conditions not addressed elsewhere in the monitoring program, particularly those related to social and economic sustainability of communities

Selected Desired Condition and Objective or Other Plan Component	Monitoring Question	Associated Indicators
<p>LOC-FW-DC-03 Forest uses such as recreation, forest products, mining and grazing are provided in an ecologically sustainable way that also contributes to economic and social sustainability in local communities.</p>	<p>What are the economic conditions in local communities that could affect the impact of forest contributions to local economies?</p>	<p><u>Economic health</u>: unemployment (%); household earnings; per-capita income; and source of income (%). <u>Economic diversity</u>: employment diversity index; employment projections by occupation (% change); number of local businesses, employees, and average salaries in forest related sectors. <u>Local fiscal conditions</u>: forest land use receipts; timber yield tax revenue (\$); transient lodging tax revenue (\$); visitor spending contribution to county sales tax; and PILT and FFR/SRS payments to counties (\$).</p>
<p>LOC-FW-DC-03 Forest uses such as recreation, forest products, mining and grazing are provided in an ecologically sustainable way that also contributes to economic and social sustainability in local communities.</p>	<p>What economic contributions are forest-based recreation, forest products, mining and grazing making to local communities?</p>	<p><u>Conditions in forest based sectors</u>: forest-related sector employment (jobs); forest-related sector wages (annual salary); employment and earnings from travel and tourism (by county) <u>Forest contributions</u>: units of commodities provided; value of contributions of commodities to local economies; contributions of USDA FS employees; ratio of annual local contracted value to annual total contracted value.</p>

Productivity of the Land

This monitoring requirement comes from the NFMA requirement that there be research regarding the effects of timber management systems on the productivity of the land, and that such research is to be based on continuous monitoring and assessment in the field. Monitoring is focused on key ecosystem characteristics related to soils and soil productivity.

Table 17. Monitoring questions and associated indicators that evaluate soils and soil productivity

Selected Desired Condition and Objective or Other Plan Component	Monitoring Question	Associated Indicators
<p>WTR-FW-DC-04 Soil and vegetation functions in upland and riparian areas are sustained and resilient. Healthy soils provide the base for resilient landscapes and nutritive forage for browsing and grazing animals, and support timber production. Healthy upland and riparian areas support healthy fish and wildlife populations, enhance recreation opportunities, and maintain water quality.</p> <p>TERR-FW-DC-08 Landscape sustainably provides a variety of benefits that improve peoples' economic, social and physical wellbeing: clean water; forest products; livestock forage; carbon sequestration and storage stability; energy generation; recreational opportunities; landscapes with scenic character and scenic integrity; cultural uses; and biodiversity. Vegetation provides sustainable amounts of forest products that include wood fiber; biomass; forage; firewood; edible and medicinal plants; and boughs, bark, berries and cones for commercial, tribal, personal, educational and scientific uses. These products are provided while sustaining soil and water quality and productivity. Vegetation conditions support the long-term sustainability of these benefits to people by reducing the risk of undesirable fire effects, disease and mortality.</p>	<p>Is soil quality being maintained such that productivity of the land is not substantially or permanently impaired?</p>	<p>Soil stability; surface organic matter; soil organic matter, soil strength, soil structure; and macro-porosity.</p>

Appendices

Appendix A: Maps

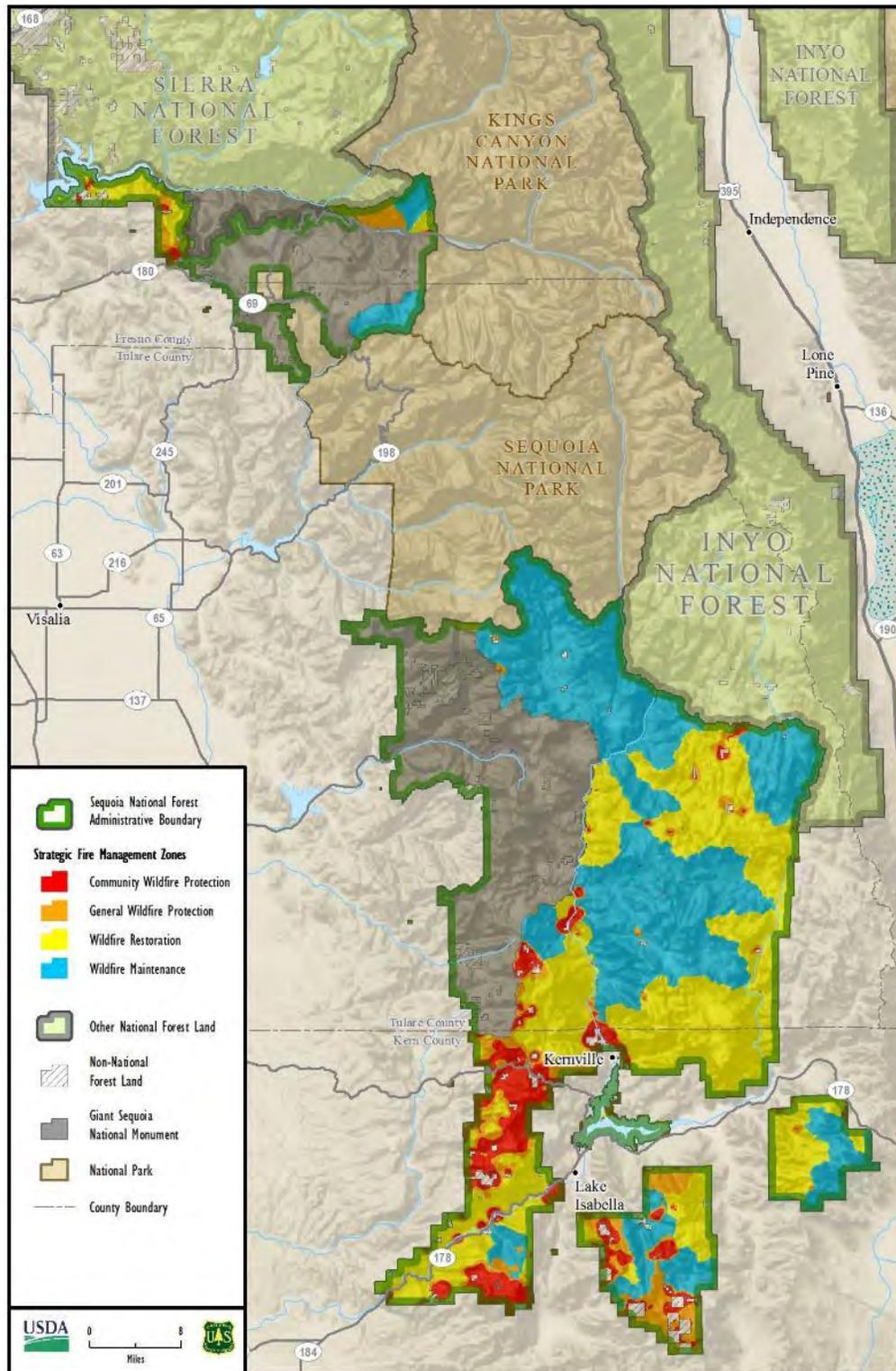


Figure 11. Strategic fire management zones

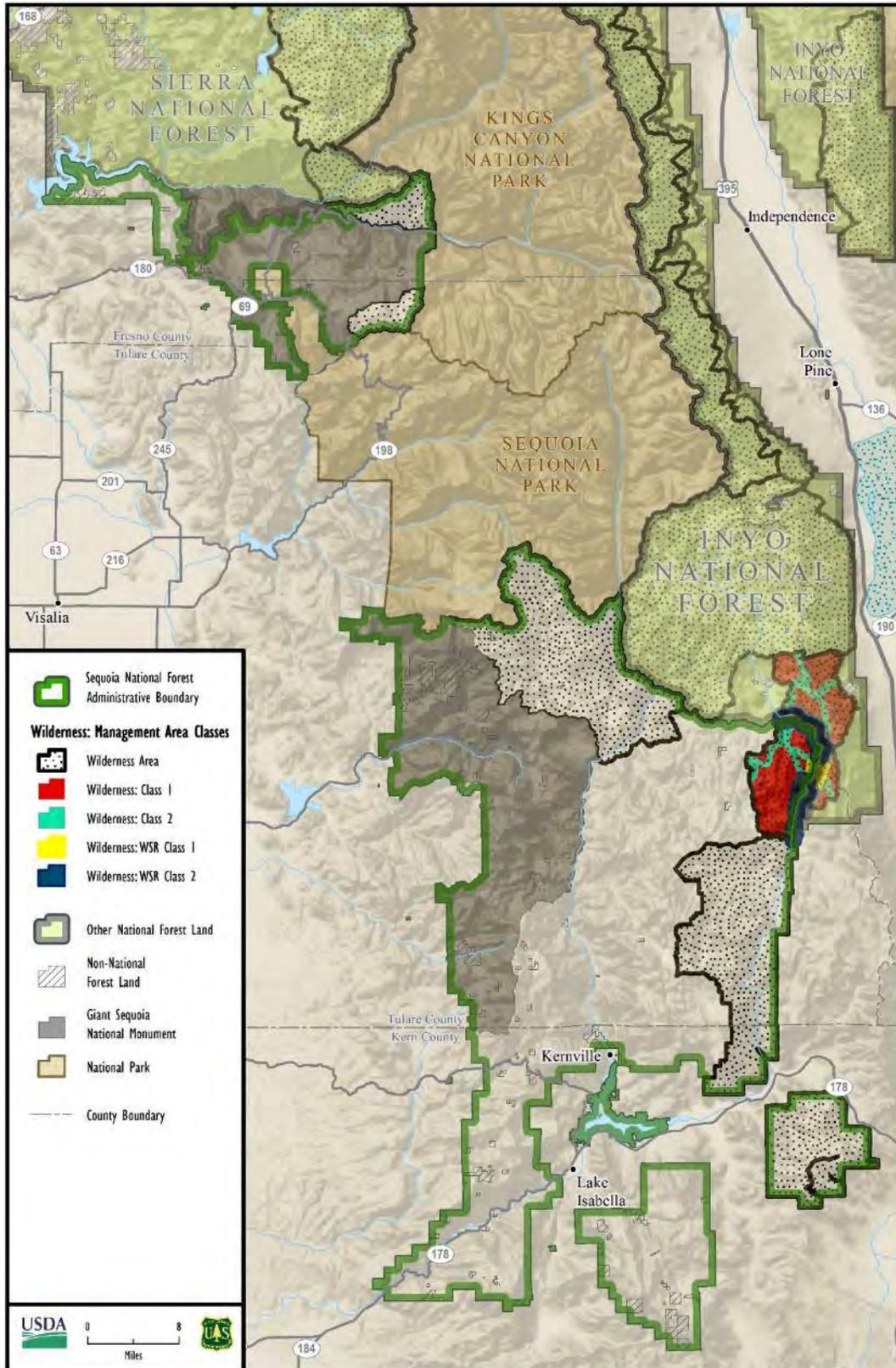


Figure 12. Wilderness management area classes of the Sequoia National Forest

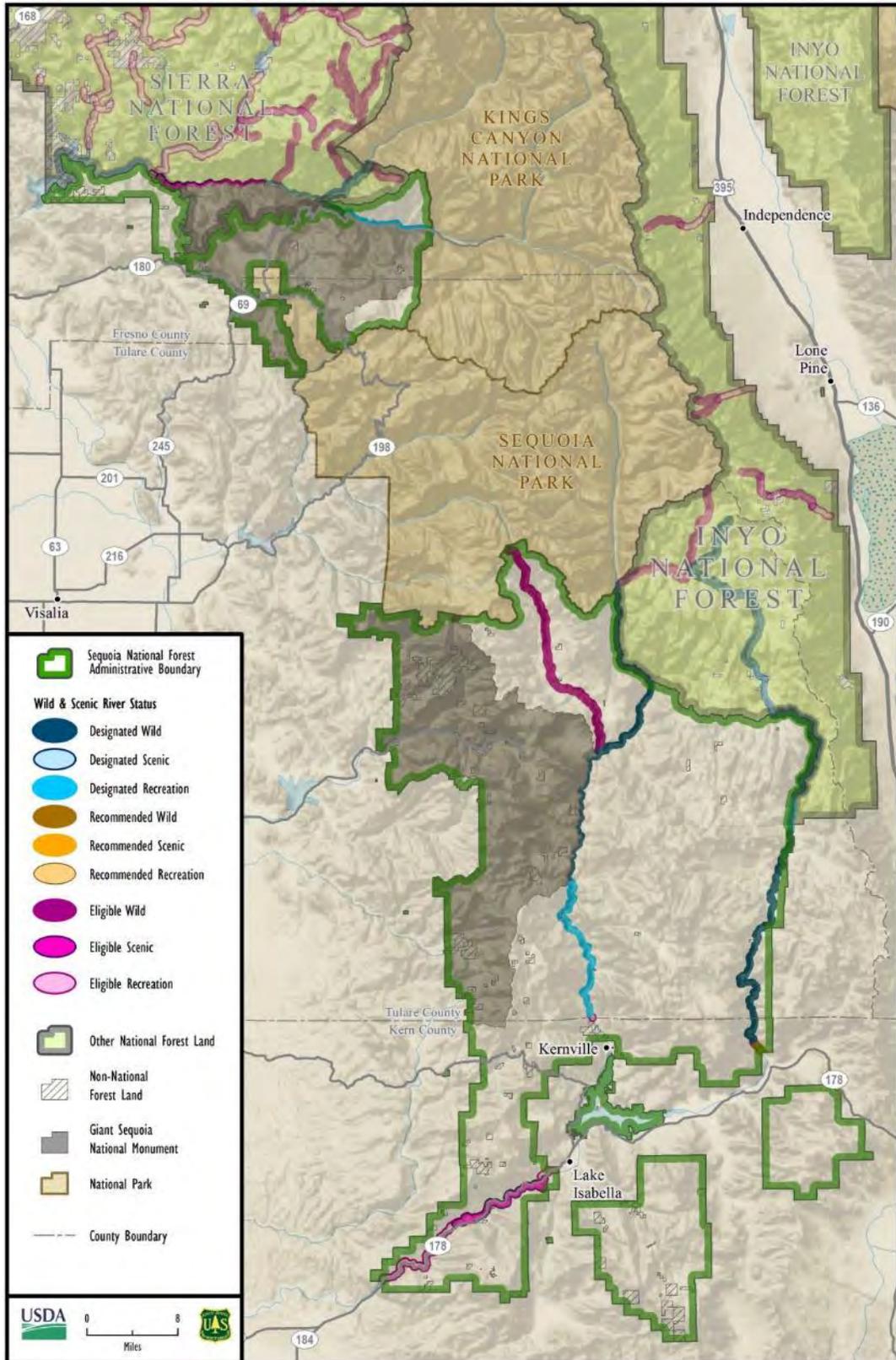


Figure 13. Wild and scenic river status of the Sequoia National Forest

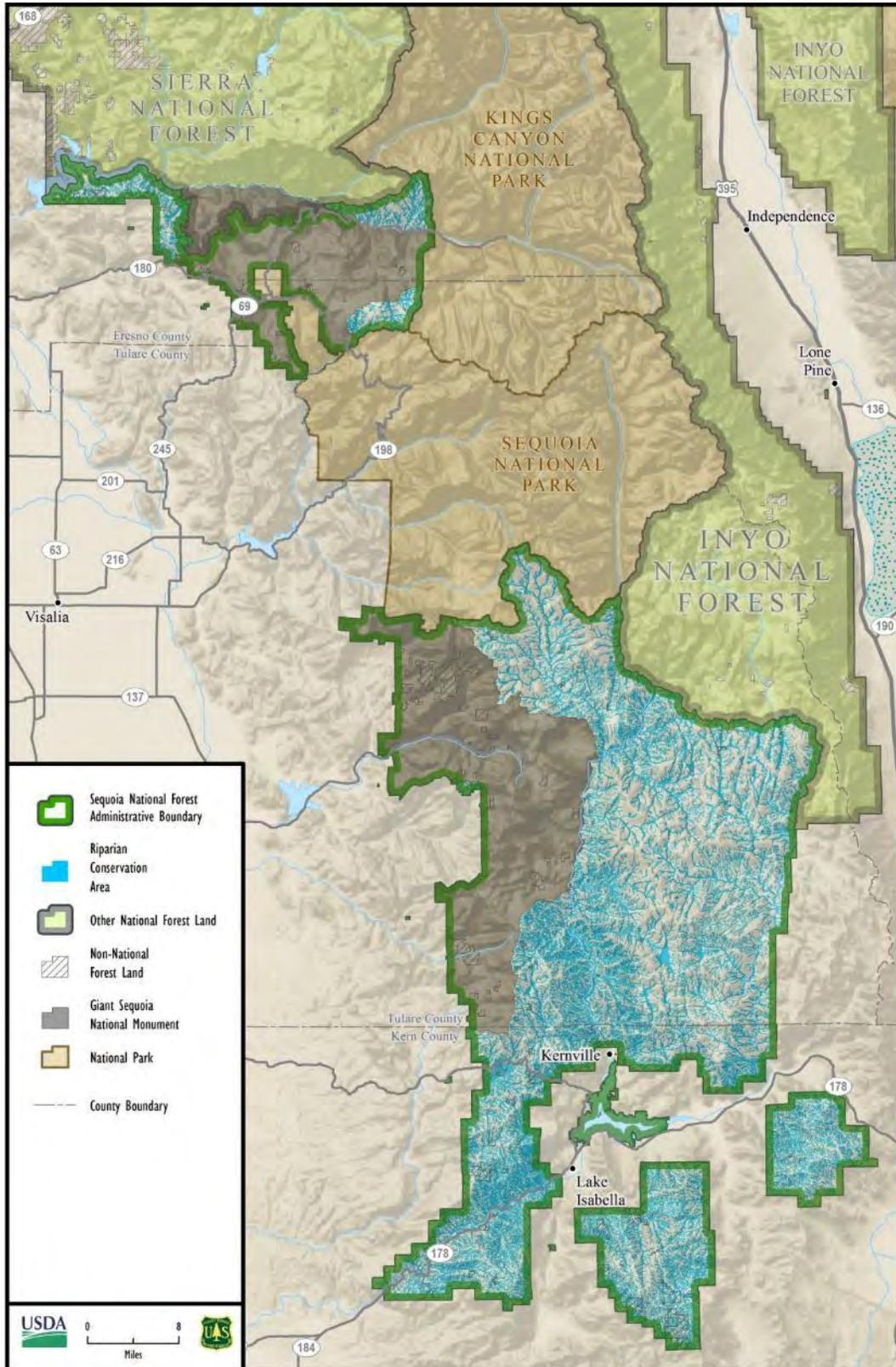


Figure 14. Riparian conservation areas of the Sequoia National Forest

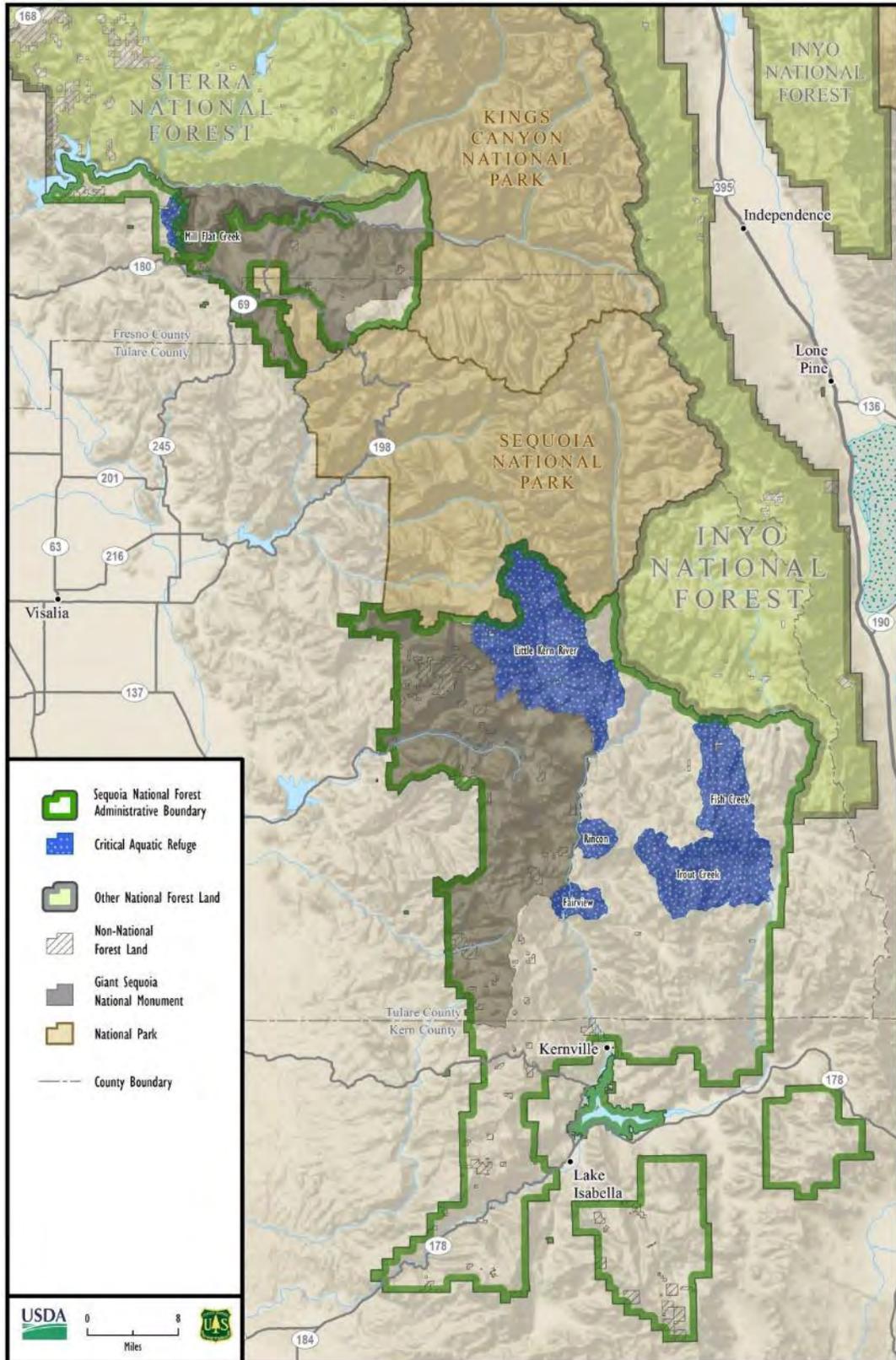


Figure 15. Critical aquatic refuges of the Sequoia National Forest

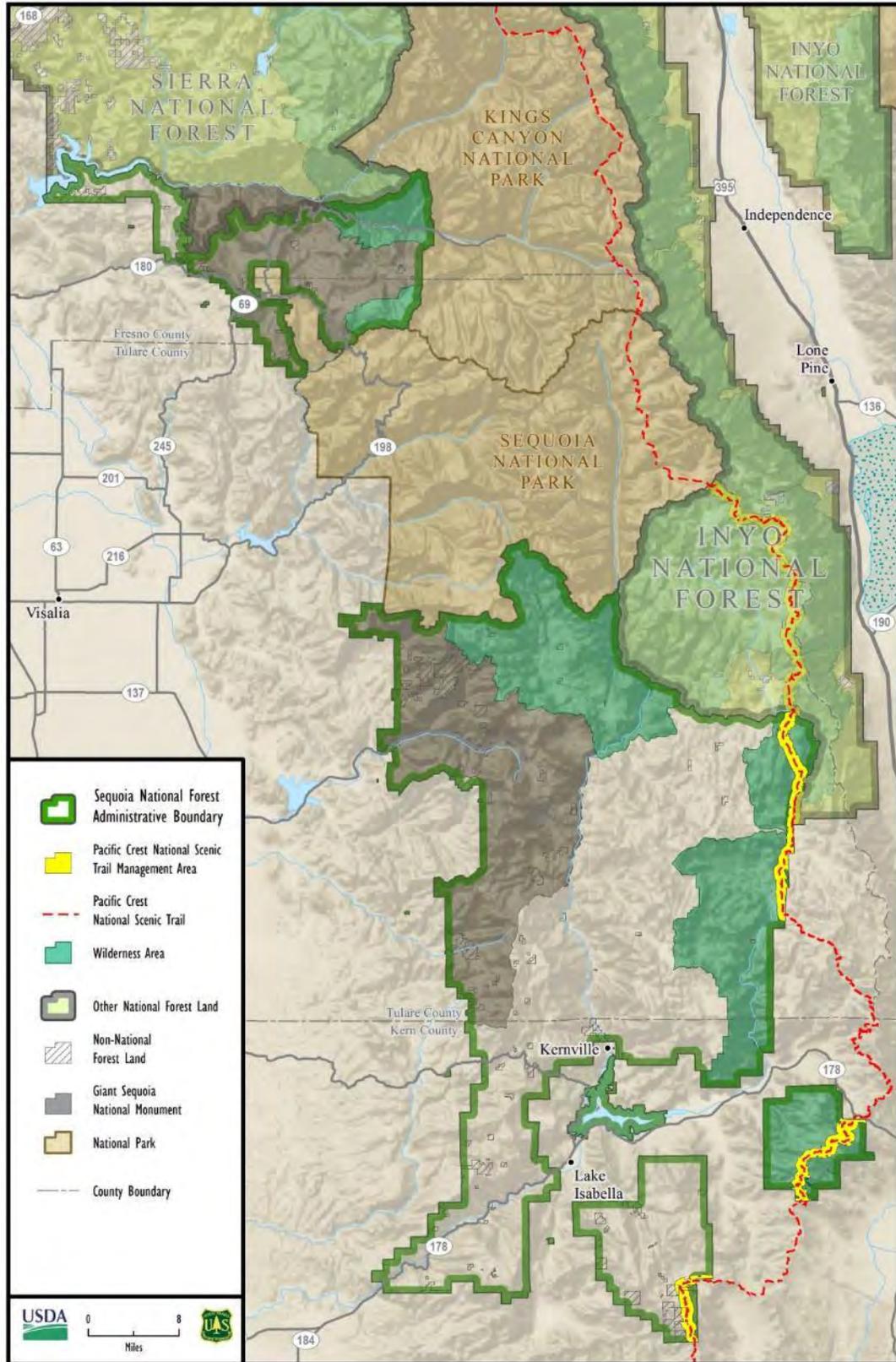


Figure 16. Pacific Crest National Scenic Trail management Area of the Sequoia National Forest

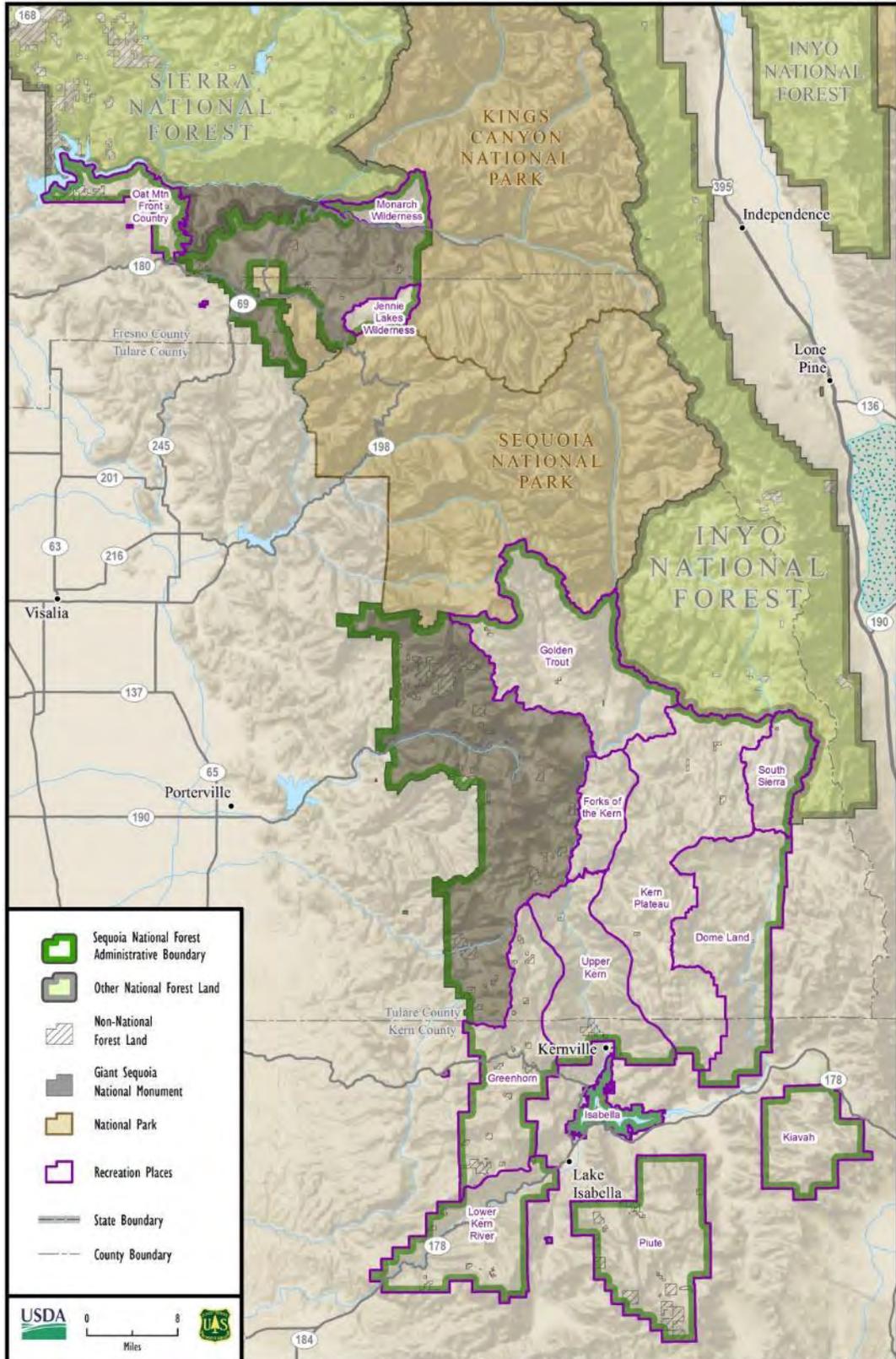


Figure 17. Recreation places map of the Sequoia National Forest

Congressionally Designated Areas

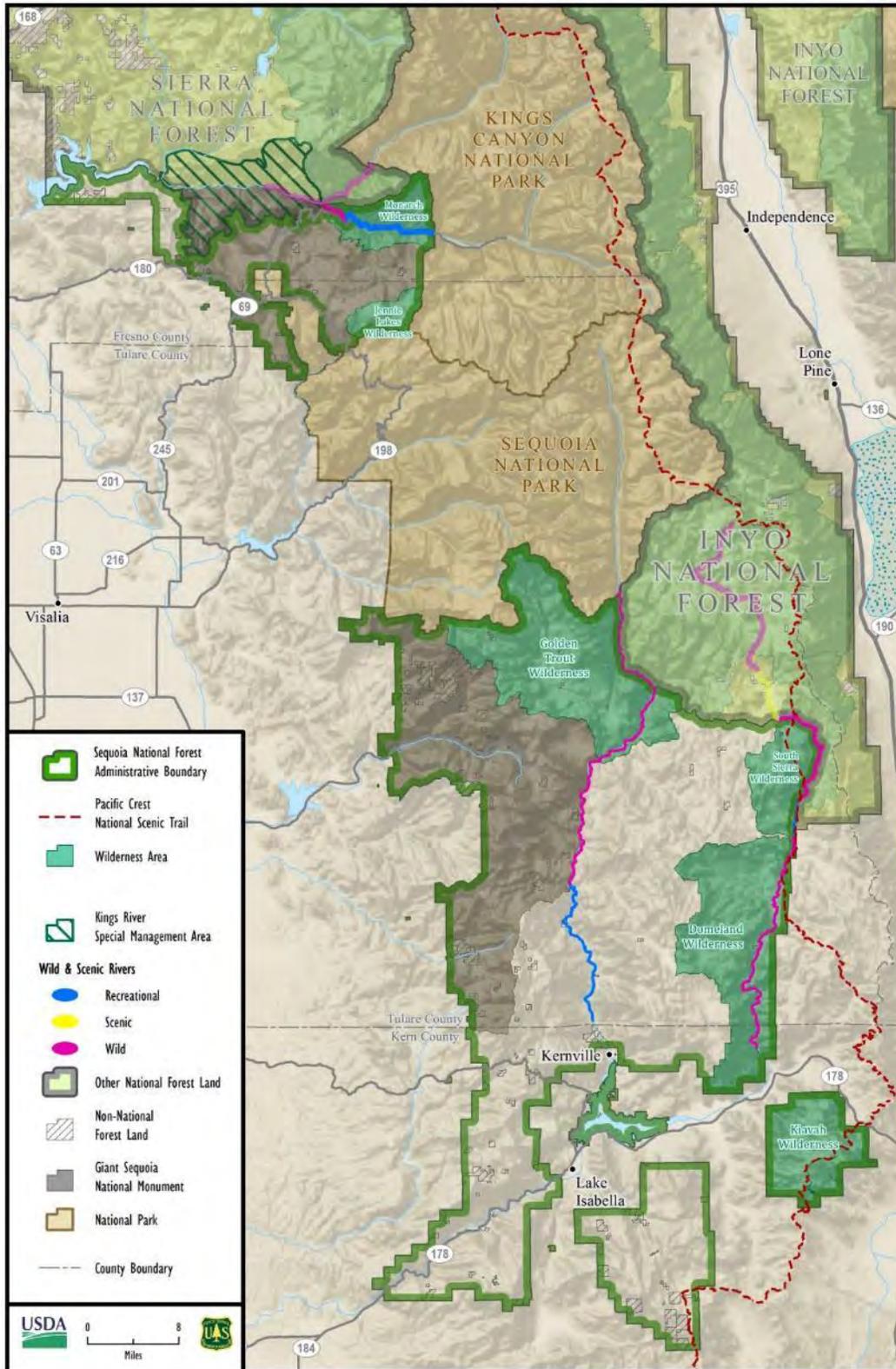


Figure 18. Congressionally designated areas of the Sequoia National Forest

Recreation Opportunity Spectrum

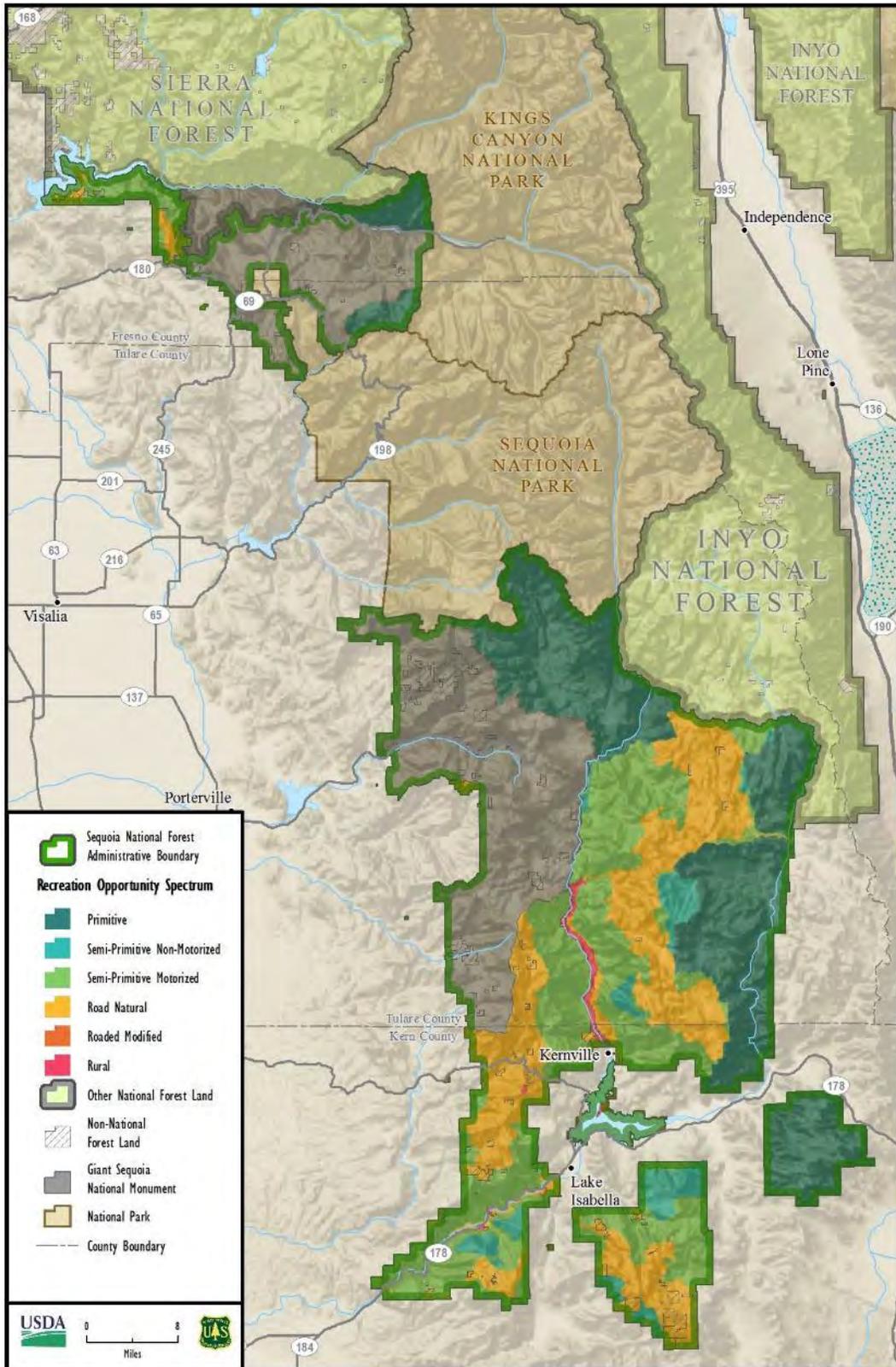


Figure 19. Recreation opportunity spectrum map of the Sequoia National Forest

Scenic Integrity Objectives

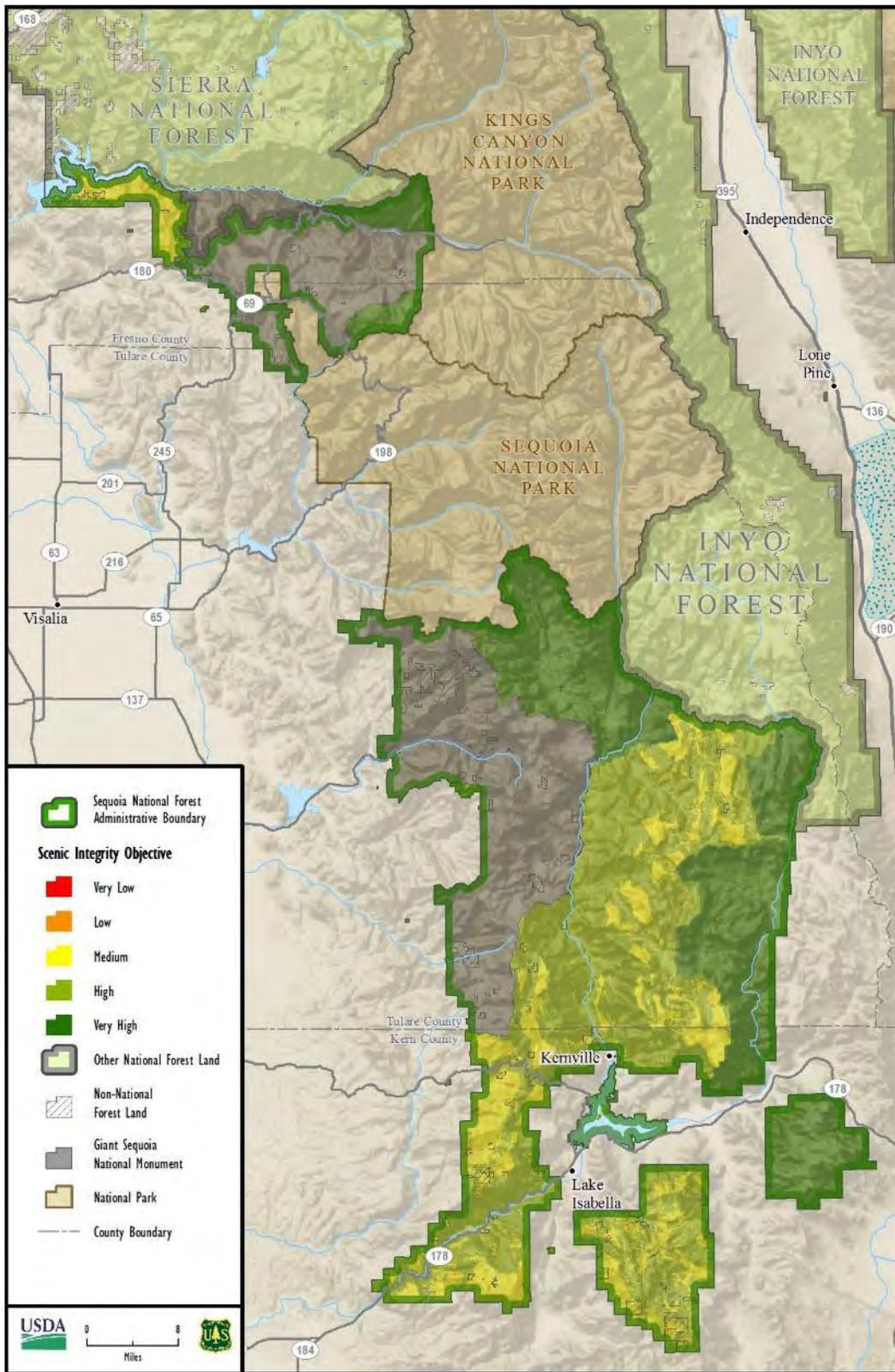


Figure 20. Scenic integrity objectives map of the Sequoia National Forest

Appendix B: Proposed and Possible Actions

Introduction

This appendix describes proposed and probable practices that may take place on the Sequoia National Forest at the project or activity level to help maintain existing conditions or achieve the desired conditions described in the plan. Included are items such as program strategies; inventories, assessments, resource analyses and other planning needs; and ongoing work with partners and cooperating agencies anticipated during the next 3 to 5 years.

The listed proposed and probable management practices are not intended to be all-inclusive, nor are they intended to be decisions, but simply projections of what actions may take place in the future. A plan amendment is not required to change or modify any proposed and possible actions. The list of these actions can be updated at any time through an administrative correction of the plan. More information may be found under plan objectives and management approaches.

Air

- Coordinate with the San Joaquin Valley Air Quality Control Board on smoke impacts from wildfires and prescribed fires.

Water, Soils, and Watershed

- Plan and implement improvement activities in watersheds which are functionally at risk or impaired.
- Secure water rights and participation in water right settlement and adjudication.
- Coordinate and educate with other government agencies to protect water quality and protect aquatic ecosystems from invasive plants and animals.
- Maintain satisfactory soil conditions and improvement of impaired and unsatisfactory soil conditions. Treatments which move forest priority 6th code watersheds toward satisfactory conditions should take precedence.
- Implement resource improvement projects that are beneficial for maintaining and improving soil condition and productivity, and water quality and quantity.
- Complete onsite soil investigations and refinement of maps for soil disturbing projects that require site-specific, precise and highly detailed soil information that is beyond the scale of the terrestrial ecosystem survey.
- Analyze or collect site-specific terrestrial ecosystem survey information, as needed, to accurately determine limitations, suitability and productivity potentials of the different terrestrial ecosystems on the forest.

Terrestrial Ecosystems

- Restore aspen stands.
- Coordinate with local research institutions.
- Complete treatments in pinyon-juniper vegetation types to move toward desired conditions.

- Construct trails and establishment of restrictions to minimize recreation effects to desert communities.
- Collaborate with partners and stakeholders on brush, scrub and grassland habitat restoration, connectivity and education.
- Use hand, mechanical, prescribed fires and naturally-ignited forests fires to move toward desired conditions.

Aquatic and Riparian Ecosystems

- Restore wetlands that are not in proper functioning condition.
- Coordinate with the California Department of Fish and Wildlife and U.S. Fish and Wildlife Service on the management of sport and native fishes.
- Reconstruct or restore riparian function to springs that are identified as not in proper functioning condition.
- Restore nonfunctioning or functioning-at-risk riparian areas so they are in or moving toward proper functioning condition.
- Distribute information to the media and general public focused on the unique properties of meadows and appropriate activities within meadows.
- Collaborate with partners and stakeholders on meadow and riparian restoration, connectivity and education.
- Coordinate with the California Department of Fish and Wildlife on objectives for wildlife conservation, education, and habitat restoration and improvements, particularly regarding Little Kern Golden Trout.

Animal and Plant Species

- Implement actions to benefit at-risk species by contributing to species recovery or supporting trends that avoid listing.
- Restore terrestrial and aquatic wildlife habitat for Little Kern golden trout, golden trout, Kern River rainbow trout, mountain yellow legged frog, butterflies and rare plants.
- Coordinate with the California Department of Fish and Wildlife, U.S. Fish and Wildlife Service, and interested parties on the education, research and activities that promote and enhance habitat conditions and species recovery.
- Maintain the native-fish-only status of Little Kern River and upper North Fork Kern River through remedial actions to remove invasive species, increase public education, provide signage and provide law enforcement.

Invasive Species

- Complete treatments in areas containing invasive species to restore native vegetation.
- Complete treatments in aquatic systems containing invasive species to restore native fish populations.

- Prioritize wilderness areas, research natural areas, botanical areas, wild and scenic areas, and aquatic and riparian areas for control of invasive exotic species, to maintain the integrity of native species populations in these unique and rare habitats.
- Maintain a current inventory of invasive exotic species on forest lands, access roads and trails.
- Coordinate invasive species management activities with internal and external partners and stakeholders to reduce, minimize, or eliminate the potential for the introduction, establishment, spread and impact of invasive species.

Fire

- Complete treatments in areas to reduce fire hazards to communities and the forest.
- Coordinate with other jurisdictions such as communities; service providers (i.e., infrastructure); Kern, Tulare, and Fresno Counties; Sequoia and Kings Canyon National Parks, Bureau of Land Management and Bureau of Indian Affairs; CAL FIRE, Tule River Fire Department; and local entities regarding prevention, preparedness, planned activities and responses to wildland fires. Provide notification of upcoming and ongoing fire season activities and any prescribed fire activities to these jurisdictions.
- Implement initial attack activities and other activities to manage wildfires to meet resource objectives.
- Coordinate access for initial attack and suppression activities with responsible jurisdictions to reduce response times and address public and firefighter safety.
- Participate in the development and implementation of community wildfire protection plans to promote public safety and to reduce the risk of wildfire on non-National Forest System lands.

Timber and Other Forest Products

- Ensure the sustainability of special forest products through commercial sales and personal use permit harvest levels.
- See appendix f for more information on the possible timber sale program and vegetation management practices.

Range

- Review active allotment management plans on a regular basis.
- Maintain and replace fencing, waters and other range improvements.

Sustainable Recreation

- Provide visitors with recreation opportunities in a variety of sustainable recreation settings, from primitive to highly developed areas, focusing agency resources on settings with high niche conformance.
- For all recreation opportunity spectrum inconsistencies, complete the environmental analysis and implement decisions to resolve inconsistencies (e.g., Sirretta Peak Trail and

trails in the semi-primitive non-motorized recreation opportunity spectrum class in the Piutes).

- Improve and protect riparian areas and meadows by establishing effective setbacks for recreation activities that have impacted or have the potential to impact resources.
- Continue to implement new strategies focusing on high use areas to reduce the human impact on recreation settings from recreation use such as reducing litter, soil compaction, erosion and vegetation removal, and improving sanitation.
- Protect and enhance natural resources and natural amenities of recreation settings by engaging the public and recreation user groups in responsible recreation use and natural resource stewardship activities.
- Outreach to youth and underrepresented groups, as well as traditional groups, to help manage the natural amenities of recreation settings and to educate peers and forest visitors about resource stewardship.
- Develop and enhance recreation opportunities that connect people to the land and provide for public enjoyment, focusing on the needs and recreation preferences of under-represented groups.
- Increase the number of overnight and day use sites that serve underrepresented groups and the overall changing recreation demand, such as providing for sites that can accommodate larger social groups and sites with more vehicle parking.
- Balance a wide variety of uses, accommodate use through all seasons, and minimize conflicts among recreational users.
- Implement vegetation management activities in developed recreation sites to remove hazard trees, retain healthy large trees, improve screening, enhance scenery and provide shade where possible.
- Improve facilities sustainability by reducing deferred maintenance and increasing operating efficiency.
- Remove and rehabilitate, or mitigate dispersed camping in concentrated use areas that are experiencing unacceptable resource impacts.
- Establish use fees that contribute to sustainable recreation opportunities, are compatible with cost, and reduce public competition with the private sector.
- Emphasize diverse public access, focusing on connection to place and the forest recreation program niche.
- Maintain and rehabilitate system trails utilizing partnerships with user groups, other agencies, hosted programs and volunteers, giving priority to those trails that may cause resource damage.
- Rehabilitate user created routes focusing first on those created along routes that are being actively maintained. Expand partnerships with user groups and other agencies to include rehabilitation of user created routes and areas that have sustained resource damage from recreation use.

- Complete Subpart C - Use by Over-Snow Vehicles, of the Forest Service Travel Management Rule, providing equitable opportunities for both motorized and quiet winter recreation opportunities.
- Develop trail systems for bikes, equestrians and motorized recreation users.
- Complete updates and changes to the motor vehicle use map to achieve forest plan desired conditions.
- Maintain trails according to development level and managed use.
- Develop a management plan for OHV areas.
- Complete updates to the memorandum of understanding (MOU) between the National Park Service and the Sequoia National Forest.
- Develop interpretive plans.
- Develop education and outreach programs, including signage, to help reduce user conflicts like those between motorized and non-motorized users.
- Implement management actions to discourage illegal activity, including creation of unauthorized routes.
- Implement management strategies to reduce user conflicts and address resource concerns.
- Develop interpretive sites as opportunities become available and in conjunction with partners.
- Maintain interpretive signs and exhibits.
- Distribute visitor information at Forest Service offices, visitor centers and other locations.
- Improve facilities' operating efficiency and sustainability through new construction and repairs. Consider energy efficiency through the implementation of recycled or renewable resources which produce a smaller carbon footprint.
- Complete accessibility assessments on developed recreation sites.
- Complete regular patrols at developed facilities to check for public safety, facility and resource protection, and fee compliance.

Scenery

- In all forest restoration projects, improve long-term scenery resources especially in areas that do not meet established scenic integrity objectives.
- Cooperate with other entities such as Bureau of Land Management, public utility companies, California Department of Transportation, local governments, and commercial and private entities, to protect scenic character and meet scenic integrity objectives on and adjacent to the forest.
- Improve scenic stability through forest restoration projects.

- Rehabilitate areas that do not meet or exceed their desired scenic integrity objective (SIO).

Tribal Relations and Uses

- Continue tribal consultation on projects and needs as they arise.
- Jointly develop and implement memoranda of agreements and memoranda of understandings between the forest and consulting American Indian tribes, to guide consultation processes and reflect the tribes' particular perspectives and interests.
- Participate in regular meetings and tribal forums with tribes to understand their needs, exchange ideas and promote mutually beneficial projects, goals and objectives.
- Maintain consistency on already established special forest products collection policies and tribal firewood programs with local tribes.
- Create volunteer opportunities and promote potential employment or contracting opportunities for tribal communities.

Cultural Resources

- Complete project clearances required under existing law, regulation and policy.
- Complete class of property analysis to better understand site classes and provide more cost-effective clearances.
- Complete non-project related archaeological surveys in areas of moderate or very high site density.
- Stabilize historic structures.
- Participate in partnerships with the National Park Service to study, protect and monitor sites.
- Curate records and artifacts through agreements with Forest Service approved repositories.
- Support offsite educational and enrichment products such as classroom programs, heritage celebrations, publications and field trips.
- Update cultural resources overviews as archaeological study units are defined and existing class of property classes are analyzed.

Geology and Minerals

- Coordinate with the Bureau of Land Management to properly process applications for mineral entry on the forest.
- Request withdrawal of some areas on the forest from mineral entry.
- Rehabilitate mineral operations sites that are no longer in use.
- Coordinate with State and Federal agencies to manage and monitor bat roosts in order to determine population dynamics at least once every 3 years.

- Monitor significant caves or other biophysical features to determine visitor impacts and the conditions of key resources in order to protect the long-term ecology of the feature or resource.
- Participate in public education activities about disease prevention “best practices” for caves.
- Complete periodic updates to the list of significant caves on the forest.
- Coordinate and collaborate, where possible, with the scientific community, non-Federal partners and the general public.
- Develop educational and interpretive programs to increase public awareness of forest caves and paleontological resources.

Infrastructure

- Naturalize or decommission unauthorized roads and system roads to create a more cost-effective road system and to restore natural resources impacted by roads.
- Construct and close new temporary and permanent roads to support ecosystem restoration activities.
- Coordinate with local, State and Federal agencies to mitigate impacts from community, highway, and state road reconstruction and management needs.
- Implement effective wildlife passage improvement projects.
- Issue road use permits to private landowners to take maintenance responsibility for roads that primarily serve private uses.
- Evaluate outdated facilities and sites for current and future needs, potential reuse, and the capacity to update or retrofit them in order to meet the agency’s mission in an economical manner.

Lands

- Consult with local governments regarding land adjustment proposals the Sequoia National Forest plans to carry forward and conduct National Environmental Policy Act analysis.
- Encourage open space designations on private land (located between private development and national forest lands) as a buffer to minimize conflicts between residents and other forest users.
- Coordinate with landowners and local and regional governments to encourage private land uses that are compatible with the forest’s desired conditions.
- Coordinate with local and regional governments and road agencies to develop transportation solutions that reduce traffic and vehicle impacts on National Forest System lands.
- Ensure reasonable road ingress and egress to private property in the forest to allow fire engines mobility and access.

- Acquire right-of-way agreements for the public and Forest Service uses.

Special Uses

- Authorize and administer permits for the many special use activities on the forest such as recreation events, outfitter-guide activities, Native American gatherings, filming, access roads and research.
- Update communication site plans for existing communication sites; develop new communication site plans as needed.
- Rehabilitate existing special use sites that do not meet the scenery guidelines, as they are brought up for reauthorization or determined to be no longer required.
- Issue and supervise forest product or vegetation management permits to lessen abrupt vegetation transition in powerlines rights-of-way, where it is necessary to clear the right-of-way boundary to meet national standards.
- Coordinate with the research community to identify and manage long-term research locations, with the intent of balancing research and management needs.

Interpretation and Education

- In accordance with the Sequoia National Forest’s interpretive plan and the Forest Service conservation education guidance, provide opportunities for interpretation that reflect scientifically-supported scholarship and research data.
 - Convey clear messages regarding natural and cultural resources and multiple use. Use multi-media interpretation and educational programs to develop stewardship of resources, to ensure their present and future protection, and to enhance public enjoyment of this national forest.
 - Promote and integrate awareness of the history of the national forest, appreciation of biological processes, education about past and current human use and education about the distinctive yet interrelated disruptive forces involved with the use and protection of resources.
- Develop bi-lingual communication tools, including publications, information boards, social media, and radio spots.
- Encourage communities of color, focusing on youth, to increase involvement in environmental education programs to develop the citizen steward.
- Continue development of new and old environmental education programs cooperatively with public schools such as “Trout in the Classroom” and Smokey Bear programs.
- Participate in outdoor classrooms for school groups and other partnership opportunities with local schools.

Partnerships

- Develop partnerships to provide a spectrum of sustainable recreation experiences through a variety of providers including the Forest Service, associations, non-government organizations, permit holders, volunteers and other community groups.
- Continue to support and participate in employment and training programs for youth, older Americans and the disadvantaged, in response to national employment and training needs and existing opportunities in forest surroundings.
- Support the efforts of non-profit, public benefit organizations promoting conservation, education, and recreational enjoyment of the national forest, and the surrounding southern Sierra Nevada region.
- Develop and support partnerships to increase interpretive materials and programs that reach larger segments of the general public and to foster stewardship.
- Work with gateway communities and communities within the national forest to help foster economic opportunities.

Designated Areas

Wilderness

- Through partnerships with other agencies, organizations and volunteers increase the presence of wilderness rangers during use seasons.
- Provide information to the public that will increase understanding and appreciation of the wilderness resource and promote leave no trace principles.
- Rehabilitate sites or areas in wilderness that have been impacted by recreation in order to restore wilderness character.
- Implement corrective measures if overuse causes unacceptable resource damage.
- Implement various management actions to prevent bicycle use in wilderness including the following: ranger patrols; placement of bike racks near wilderness boundaries or portals; “wilderness ahead” signs located outside of wilderness; improved trail design; and expanded trail opportunities outside of wilderness.
- Complete regular wilderness ranger patrols in wilderness areas.
- Develop and implement management plans for wilderness areas on the forest.
- Develop and implement management plans for any newly designated wilderness areas within 5 years of designation.
- Establish and implement the national wilderness character monitoring protocol.

Wild and Scenic Rivers

- Through partnerships with other agencies, organizations, and volunteers, help maintain and enhance the outstandingly remarkable values of each designated and eligible wild and scenic river.

- Provide information to the public that will increase understanding and appreciation of designated and eligible wild and scenic rivers and promote citizen stewardship.
- Implement comprehensive river management plans for designated and eligible wild and scenic rivers.

Pacific Crest National Scenic Trail

- Utilizing partners and volunteers, continue to maintain the Pacific Crest Trail to standard.
- Collaborating with the public, develop and implement strategies to reduce potential visitor use conflicts.
- Provide information to the public that will increase understanding and appreciation of the Pacific Crest Trail and promote citizen stewardship of this recreation opportunity.
- Maintain and reroute the trail in coordination with the Pacific Crest Trail Association and adjacent landowners.

National Recreation Trails

- Continue to use partnerships and volunteers to maintain designated trails and perpetuate the values for which they have been designated.

National Scenic Byways

- Coordinate activities and design of byway facilities with the appropriate byway association and byway plan.

Research Natural Areas, Botanical Areas, and Geological Areas

- Prepare establishment reports for geological, botanical, and research natural areas.
- Establish an interpretation and education program for geological areas and caves to prevent and repair graffiti.

Appendix C: A Renewed Partnership Focus for the Sequoia National Forest

Partnerships in land stewardship reflect a growing and important trend, the joining of passion and resources by committed citizens, organizations and government agencies to achieve social, economic and ecological goals. The U.S. Forest Service has worked with partners throughout its more than 100-year history. But the challenges of land management have grown more complex, and the needs of the public more varied. The American people today are voicing their strong desire to volunteer and participate in the stewardship of natural resources and in the decisions that affect their communities. The Forest Service has responded by developing partnership strategies at the [national](#) and [regional](#) levels.

The mission of the Forest Service is to “sustain the health, diversity, and productivity of the Nation’s forests and grasslands to meet the needs of present and future generations.” Partnerships are essential to carrying out that mission today. Fortunately, there are hundreds of organizations in California whose missions overlap with ours in some way, creating the opportunity to work together toward bigger, better outcomes than each can achieve on its own.

The Sequoia National Forest recognizes the value of continuing to develop effective partnerships, wherein we invite public participation, embrace stakeholder proposals, and successfully leverage our resources by working together to achieve the desired conditions set forth in the forest plan.

Creating a Partnership Culture

The forest supervisor on the Sequoia National Forest responds to the needs of a varied public by empowering employees and communities of place, interest, and culture to create and sustain successful partnerships. The forest supervisor and forest staff have established the following partnership goals to accomplish the Forest Service mission, implementing the forest plan, and building a strong and lasting community of stewardship on the forest:

- Through partnership, sustain the health, diversity and productivity of the Sequoia National Forest.
- Build community support for, and understanding of, the Sequoia National Forest.
- Enhance opportunities to connect people to the land, especially in urban areas and of diverse cultures.
- Expand partnerships with other federal, state, and local government agencies, as well as associations, non-government organizations, and other community groups, to leverage information and resources for mutual benefit.
- Foster partnerships dealing with science.
- Create more “citizen stewards” of the Sequoia National Forest through volunteerism.
- Support the ongoing efforts of partner groups.
- Develop new partnerships focused on management of the land (e.g., tree planting).
- Build and enhance partnerships to protect tribal sites and interpret cultural assets.

Accomplishing these goals will require new and innovative methods, as well as the continuation of investment in ongoing successful partnership efforts. The purpose of this strategy is to outline an iterative process for building and sustaining a strong partnership culture for the Forest. The strategy includes the following components: a method for determining the forest capacity for working in partnership; best practices for building and sustaining new partnerships; and steps for ensuring effective outreach to nontraditional partners.

Forest Capacity for Working in Partnership

The National Partnership Office of the U.S. Forest Service has designed a [partnership capacity assessment tool](#) to help Forest Service units assess, sustain, and improve their abilities to work with partners in continuing the Forest Service’s long history of partnership and collaboration in land stewardship.

What is the Partnership Capacity Assessment Tool?

The “partnership capacity assessment tool” is essentially a group exercise to reflect on experiences and attitudes about partnerships and collaboration. The tool asks the group to score itself on a series of questions about partnership opportunities, goals, resources, procedures, incentives, barriers, skills and relationships. The group then uses these scores to chart strengths, analyze positive and negative factors that contribute to partnership capacity, and identify actions to sustain and grow capacity.

Who Should Use the Assessment Tool?

The tool is used by Sequoia National Forest in conjunction with communities of place, interest and culture, who care about the uses and resources within the Sequoia National Forest and whom will benefit from completing the assessment. This tool is designed to generate open dialogue with partners and among staff. It is also a useful starting point for assessing current partnership abilities and discussing how to maintain strengths or address needs.

How Can the Assessment Tool Best Meet the Needs of the Forest?

The assessment tool provides the format for a community forum to assess partnership needs and develop priorities to meet those needs. Use of the assessment tool by Forest Service staff can help identify needed resources and changes to better position the Forest for successful accomplishment of goals through partnerships; including partners in the process can help promote dialogue and improve relationships. However, the tool is not intended to assess the feasibility of or develop plans for specific partnership opportunities. These details will be identified during project-level planning.

How Long and Where Will the Assessment Take Place?

The community forum can expect to complete the assessment in one session lasting 3 to 4 hours. The investment of time will pay off by helping forest staff and potential partners to systematically identify needs and actions to meet those needs. Trained facilitators and recorders can be used to keep the process moving smoothly.

Best Practices for Building New Partnerships

Partnerships can be thought of as a type of alliance, where the complex interaction of business and interpersonal activities are essential to successfully achieving mutually beneficial goals. Key characteristics of successful interpersonal relationships include trust, communication, perspective taking, rapport building, and commitment. Partnerships are known to yield better results under

certain conditions^{12 13}, for example: when each partner recognizes the need to have access to capabilities and competencies it cannot develop internally; or when a gradual and sustained approach is preferable in accessing resources, capabilities and competencies, as opposed to faster and shorter-term mechanisms such as contracting.

Keeping these conditions in mind, the following best practices are provided to assist forest staff in the identification and development of new partners:

1. Identify the need for partnerships within the long-term strategies and desired condition of the forest
2. Define specific objectives of the partnership
3. Choose partners
4. Evaluate what to offer and what to receive in exchange
5. Define and act upon opportunities
6. Evaluate the effect on forest stakeholders
7. Determine each partner's resources and capabilities
8. Plan the integration
9. Create the partnership
10. Take action and achieve objectives
11. Recognize and celebrate successes

Identify the need for partnerships within the long-term strategies and desired condition

Strategic alliances respond to various long-term strategies of the Sequoia National Forest. For example, the interpretive plan for the Sequoia National Forest and Giant Sequoia National Monument established a program strategy featuring the interpretation of natural and cultural objects of interest. Interpretive services are provided on-site or virtually. The specific interpretive products, services and delivery methods are expected to evolve over time, in response to evolving technologies, visitor needs and demands, and available resources. Partnerships are important not only because of the extra resources they provide, but also because they help to enrich a sense of stewardship in both the partners and recipients of interpretive services.

Define specific objectives of the partnership

Three aspects of defining objectives are necessary for the success of the partnership:

1. The objective should be compared with the forest's available resources and capabilities and with those that could be used. The partnership should bridge the gap of existing

¹² Mockler, R.J. 1999. *Multinational Strategic Alliances*. John Wiley & Sons. 266 p.

¹³ [O'Neill, B. \(n.d.\) Brian O'Neill's 21 partnership success factors. San Francisco, CA: Golden Gate National Parks.](#)

resources and capabilities to achieve the objectives. The assessment tool can assist in identifying where gaps occur regarding both the forest's capability to cultivate new partnerships and its resources to accomplish management goals alone.

2. A clear consensus (internally) on why the agency cannot reach particular goals on its own, and why it must seek a partnership with an external organization, rather than internal development or via procurement.
3. Knowing where the partnership generates mutual advantages within the chain of value, and clarifying why each partner cannot develop these advantages internally.

Choose partners

The right partner in an alliance must have three principal features¹⁴:

1. The partner must have the resources and capabilities to help the Forest achieve its strategic goals, bringing to the partnership what is missing and which they are seeking.
2. The partner and forest must share the same long-term goals for the partnership. Failure is inevitable if the goals are divergent.
3. The partner must not use the alliance to gain know-how, relationships with clients or suppliers, or technology without making contributions of equal strategic weight. Alliances are longer lasting and better when they are considered between partners with a reputation for trustworthiness.

Evaluate what to offer and what to receive in exchange

Reciprocity is a key component of building trust. Each partner should evaluate which capabilities are critical to the partnership, and then decide what the forest can offer to the others and what it can expect from them.

Define and act upon opportunities

Knowing the value of the opportunities that can be achieved with the alliance is an essential guide in negotiation, and subsequent management, of the partnership. Beyond the opportunities, it is also important to examine the possible risks.

Evaluate the effect on forest stakeholders

A key question to consider is, "How will stakeholders, including other partners, react to the partnership?"

Determine each partner's resources and capabilities

Understanding a partner's abilities and limitations is an important component in creating a successful partnership. A key question to consider is, "What resources and capabilities can the partners realistically bring to the partnership?"

¹⁴ Hill C., and G. Jones. 2000. Strategic Management: an Integrated Approach, 5th ed. Boston, MA: Houghton Mifflin Company.

Plan the integration

Develop a partnership business plan, which should:

1. Organize activities and functions
2. Define accounting procedures
3. Define procedures to resolve conflicts
4. Define the relationships between the partnership and the forest, including duration and renewal process
5. Define the authorizing instrument for the partnership (e.g., memorandum of understanding) that will be appropriate to formalize the relationship

Create the partnership

Flexibility is integral to sustaining an effective partnership. Whatever the form of the partnership, some principles apply:

1. Each partner has its own goals that dictate the role of the partnership
2. The role of the partnership changes as internal and external conditions evolve
3. The relationship between the partners is quite dynamic
4. Evaluate the partnership for effectiveness in meeting mutual goals

Take action and achieve objectives

For a partnership to last, both parties must find the partnership to be meaningful and to satisfy the established objectives.

Recognize and celebrate successes

Honor the efforts accomplished through the work of partnership. This recognizes the individuals involved and strengthens the relationship between partners.

Steps for Ensuring Effective Outreach and Communication with Nontraditional Partners and the Public

The diversity of people using and valuing the Sequoia National Forest will continue to increase as the American population grows and becomes more diverse, and as international visitation increases. California's youth is more culturally diverse than any previous generation.

Interpretation and outreach methods designed to connect users to the forest need to communicate important resource issues, solicit commitment to conservation, and encourage appropriate behaviors. Use of the forest by nontraditional user groups, especially Hispanics and Asians, is prevalent and growing.

To assure effective outreach occurs within this growing segment of potential forest partners, metrics should be designed to monitor and evaluate success, adapting as necessary to continually broaden the circle of involvement. The following steps may be considered, as appropriate, in developing innovative partnerships:

- Translation of major documents (or summaries thereof), provision of translators at meetings, or other efforts as appropriate to ensure that limited English speakers gain understanding of potential partnership opportunities
- Provision of opportunities for limited English speakers to provide comments and actively engage in partnership opportunities
- Provision of opportunities for public participation through means other than written communication, such as personal interviews or use of audio or video recording devices to capture oral comments
- Use of different meeting sizes or formats, or variation on the type and number of media used, so that communications are tailored to the particular community or population
- Use of locations and facilities that are local, convenient and accessible to disabled individuals, low-income and minority communities, and Native American tribes
- Assistance to hearing-impaired or sight-impaired individuals when needed

Appendix D: Management Strategies for Resolving Recreation Resource Conflicts

Management strategies can be applied to existing or new recreation sites and uses whenever a conflict between recreation uses or sensitive resources is detected. Sensitive resources include at-risk species and habitats, riparian habitats, soil and watersheds, heritage resources, and other resources.

Implementation of these actions would also take into consideration available funding and staffing. The actions and practices include the following:

1. Conservation Education

- Use information networks, including public service announcements, internet sites and links, and visitor guides and newsletters to communicate information regarding sensitive resources.
- Install and maintain appropriate multilingual information boards, interpretive panels and regulatory signs at developed sites and dispersed areas within sites of sensitive resources.
- Develop interpretive and environmental education programs about sensitive resources and habitats for the public, Forest Service personnel, concessionaires, other special-use authorization holders, and volunteers. Engage the services of special-use authorization holders that provide services to the public (e.g., concessionaires, organization camps, and outfitter guides) to assist in the development and delivery of these programs. Provide authorization holders with messages about sensitive resources and management issues so that they can use them to educate people. Ensure that the methods chosen do not result in unacceptable effects to sensitive resources. Coordinate efforts between national forests for maximum results and cost efficiencies. Use existing visitor centers where appropriate.
- De-emphasize the site or area and develop an information strategy to direct visitors to national forest recreation opportunities that do not affect sensitive resources.

2. Perimeter Control

- Modify visitor access to manage use. Install and maintain appropriate fencing or other barriers to protect sensitive resource areas. Limit the number of users at the site or area.
- Install and maintain appropriate multi-lingual informational, interpretive and regulatory signing, in conjunction with perimeter controls, to engage national forest visitors with protection of sensitive resources at recreation sites and areas.

3. Presence

- Provide adequate management presence to ensure protection of sensitive resources. This presence could include Forest Service personnel, peer education, contractors, concessionaires, other permit holders, and volunteer support.

4. Direct Action

- Limit visitor use of recreation sites and areas through diurnal, seasonal or temporary closures during critical life cycle periods for affected at-risk species.

- Where visitor use is allowed, seek opportunities to proactively rehabilitate, design, reconstruct, rehabilitate and harden the site; locate new facilities and areas for redistributing human use away from sensitive resources.
- Where visitor use is restricted, limit or control use at developed recreation sites and areas through permit system (e.g., group campgrounds). When other actions are ineffective, enact and enforce forest orders to protect sensitive resource areas through use of seasonal or temporary closures of developed recreation sites and areas. Seek opportunities to proactively design and locate new facilities and areas for re-distributing human use away from sensitive resources.
- Where visitor use is prohibited when seasonal or temporary closures are ineffective, enact and enforce forest orders to close recreation sites or areas. If monitoring and evaluation indicate that closure is ineffective, take steps to decommission facilities and permanently discontinue visitor use.

Appendix E: Timber Suitability and Management

Determination of Suitability for Timber Production

Timber production is the purposeful growing, tending, harvesting and regeneration of regulated crops of trees to be cut into logs, bolts or other round sections for industrial or consumer use (36 CFR 219.19). Timber production activities can contribute to social, economic and ecological sustainability. Timber production may offset some or all of the costs of silvicultural treatments and other forest management activities that restore ecosystems to desired conditions, lower uncharacteristic fire and insect risk, increase understory plant diversity and abundance, and create employment opportunities.

The National Forest Management Act (NFMA) requires that the Forest Service determine the suitability of National Forest System lands for timber production and has specific requirements for timber suitability analysis in land management plans. Note that there is a distinction between timber harvest as a resource use (i.e., timber production) and timber harvest as a management tool to achieve desired conditions. Timber harvest on lands classified as not suitable for timber production may be used as a tool designed to achieve desired conditions.

Lands that *May be* Suitable for Timber Production

Identification of land that *may be* (tentatively) suitable for timber production is the first step in the process of determining lands that are suited for timber production. This preliminary classification is made prior to the consideration of objectives and desired conditions that are part of the forest plan revision process. It excludes National Forest System lands that are not suitable for timber production based on the following criteria:

- Timber production is prohibited by statute, executive order, regulation or where the Secretary of Agriculture or the Chief of the Forest Service has withdrawn the land from timber production. Examples include designated wilderness areas, designated wild and scenic rivers, research natural areas and other designated areas where timber is specifically prohibited.
- Land that is not forested (nonforest), identified by having less than 10 percent occupation¹⁵ by conifer trees of any size or having a nonforest use like powerline clearings, residential or administrative sites, improved pasture, etc.
- Known environmental factors exist that preclude reasonable assurance that restocking can be achieved within five years of final regeneration harvest¹⁶.
- Technology to harvest timber is not currently available without causing irreversible damage.

Forest lands that remain after this initial screening are termed “lands that *may be* suitable for timber production.” Based on this initial suitability analysis, the Sequoia National Forest has 134,378 acres that *may be* suitable for timber production.

¹⁵ Ten percent occupation was represented utilizing ten percent canopy cover during analysis.

¹⁶ The following Regional Dominance Types (CalVeg Forest Types) are recognized as capable of adequate restocking within 5 years: Giant Sequoia, Pacific Douglas-fir, Douglas-fir-Ponderosa Pine, Eastside Pine, Jeffrey Pine, Mixed Conifer-Giant Sequoia, Incense Cedar, Mixed Conifer-Fir, Mixed Conifer-Pine, Ponderosa Pine, Red Fir, and White Fir. In addition, Order 3 soil survey data was used to inform the likelihood of regeneration success.

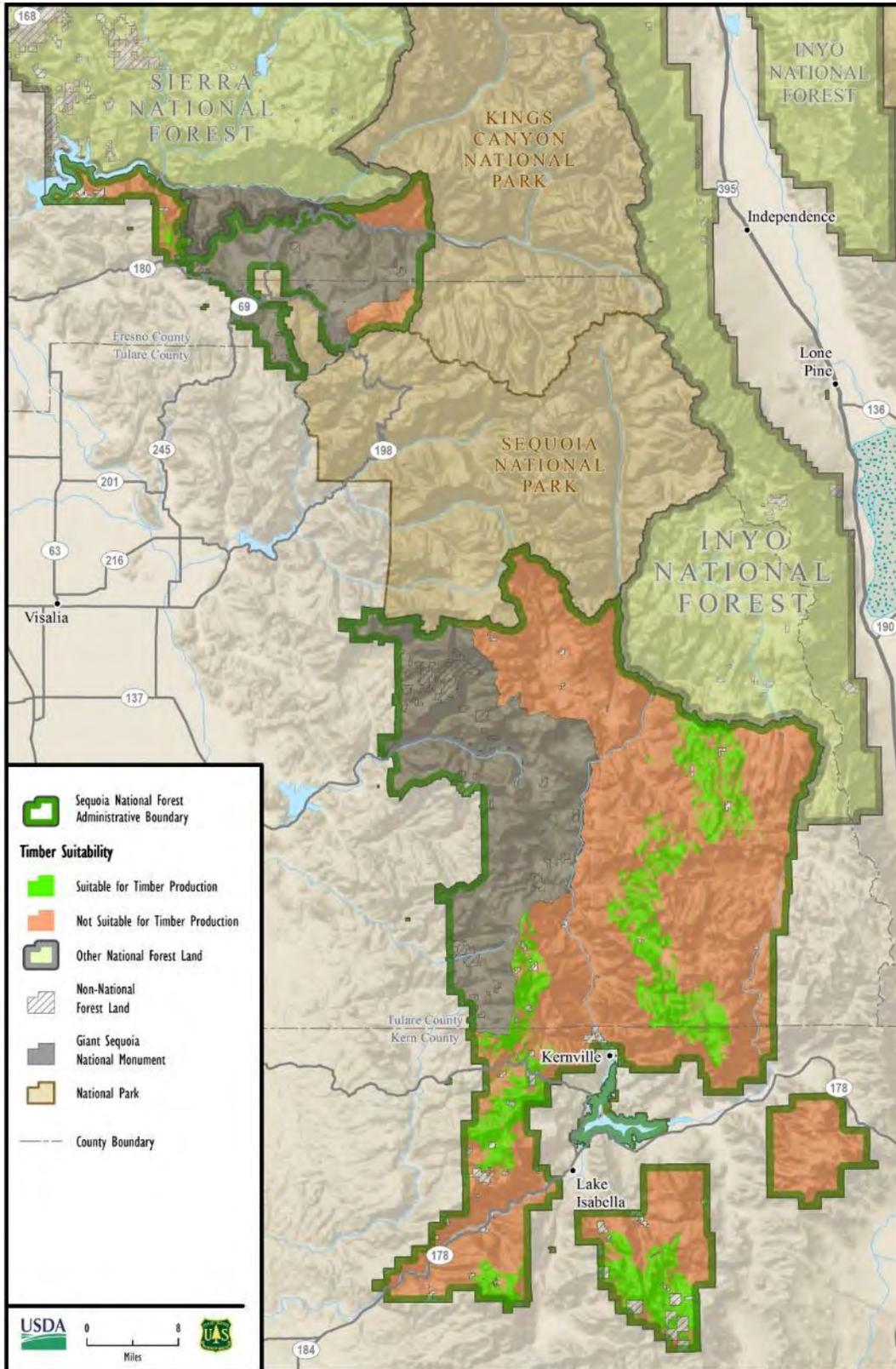


Figure 21. Timber suitability map of the Sequoia National Forest

Lands Suitable for Timber Production

The final step in determining lands suitable for timber production is to determine which of the lands that *may* be suitable for timber production, are suited for timber production, based on compatibility with desired conditions and objectives:

- Timber production is a desired primary or secondary use of the land
- Timber production is anticipated to continue after desired conditions have been achieved
- A flow of timber can be planned and scheduled on a reasonably predictable basis
- Regeneration of the stand is intended
- Timber production is compatible with the desired conditions or objectives for the land

After subtracting the lands that are suited for timber production from the lands that *may* be suitable, the remaining lands are not suited for timber production because timber production is not compatible with the land area's desired conditions and objectives. Categories of lands deemed not suited for timber production include areas recommended for wilderness designation, wild river segments of eligible wild and scenic rivers¹⁷, and California spotted owl protected activity centers.

On lands not suited for timber production, timber harvest may occur to protect multiple use values other than timber production, and for salvage, sanitation, public health or safety. Multiple use values may also include various other restoration activities. For example, meadow restoration may require cutting encroaching trees. These trees may be made available for sale, but the intent is to maintain the meadow.

The Sequoia National Forest includes approximately 125,379 acres that are suitable for timber production (Figure 21). The detailed acres of suitability are shown in Table 18. Suitability indicates timber production is the primary or secondary management objective. Project designs will incorporate actions to meet a variety of objectives, such as riparian area enhancement, habitat maintenance or development, and scenic stability and integrity.

Planned Timber Sale Program

The planned timber sale program represents an estimation of treatment types, planned to achieve the outcomes described by the plan's desired conditions and objectives, and consistent with the other plan components during the plan period (i.e., by decade). The planned practices are based on the projected fiscal capability and organizational capacity of the planning unit, and not a commitment to take an action or to develop a project-specific proposal for such action.

Sustained Yield Limit

The sustained yield limit is the amount of timber meeting applicable utilization standards, "which can be removed from a forest annually in perpetuity on a sustained yield basis" (NFMA at section 11, 16 USC 1611; 36 CFR 219.11(d) (6)). It is the volume that could be produced in perpetuity on lands that *may be suitable* for timber production. The calculation of the sustained yield limit is not limited by land management plan desired condition, other plan components, or the planning unit's fiscal capability and organizational capacity. The sustained yield limit for the lands that *may be* suitable for timber production is 159 millions of cubic feet (MMCF) per decade.

¹⁷ Area includes a corridor incorporating approximately 0.25 miles on either side of eligible Wild and Scenic Rivers.

Table 18. Sequoia National Forest land suitable for timber production

Land Classification Category	Acres
A. Sequoia National Forest System Land	1,114,766
B. Lands non suited for timber production due to legal or technical reasons (1+2+3+4)	980,377
1. Land withdrawn from timber production	869,664
2. Nonforested lands	101,611
3. Lands where adequate stocking is not assured	9,091
4. Lands where irreversible resource damage is likely	0
C. Lands that <i>may</i> be suitable for timber production (A-B)	134,378
D. Lands where management objectives limit timber harvest	8,999
1. Recommended wilderness areas	
2. Eligible wild river segments	
3. California spotted owl protected activity centers	8,999
E. Lands <u>not suitable</u> for timber production (B+D)	989,376
F. Lands suitable for timber production (A-E)	125,379

Projected Wood Sale Quantity and Timber Sale Quantity

The estimated quantity of timber and all other wood products that is expected to be sold from the plan area for the plan period is called the projected wood sale quantity (PWSQ). The PWSQ consists of the projected timber sale quantity as well as other woody material such as fuelwood, firewood, or biomass that is also expected to be available for sale. The PWSQ includes volume from timber harvest for any purpose based on expected harvests that would be consistent with the plan components. The PWSQ is also based on the planning unit's fiscal capability and organizational capacity. PWSQ is neither a target nor a limitation on harvest.

The projected timber sale quantity (PTSQ) is the estimated quantity of timber meeting applicable utilization standards that is expected to be sold during the plan period. As a subset of the PWSQ, the projected timber sale quantity includes volume from timber harvest for any purpose from all lands in the plan area based on expected harvests that would be consistent with the plan components. The PTSQ is also based on the planning unit's fiscal capability and organizational capacity. PTSQ is neither a target nor a limitation on harvest. Average volume outputs for the 1st and 2nd decades for Sequoia National Forest planned timber sale program is displayed in Table 19.

Table 19 Average volume outputs for the 1st and 2nd decades for Sequoia National Forest planned timber sale program¹. The sustained yield limit for the lands that may be suitable for timber production is 159 MMCF² per decade

Land suitability	Product Type	Product Subtype	1 st Decade MMCF	1 st Decade MMBF ³	2 nd Decade MMCF	2 nd Decade MMBF
Suitable ⁴	Timber Product ⁵	A1. Sawtimber	5–10	25–50	5–10	25–50
		A2. Other products	2–4	10–20	2–4	10–20
Not Suitable ⁶	Timber product	B1. Sawtimber	1–2	5–10	1–2	5–10
		B2. Other products				
Both Suitable & Not Suitable	Timber Product Total	C. Projected Timber Sale Quantity (A1+A2+B1+B2)	8–16	40–80	8–16	40–80
Both Suitable & Not Suitable	Other Estimated Wood Products ⁷	D. Fuelwood	3–5	15–25	3–5	15–25
Both Suitable & Not Suitable	All	E. Projected Wood Sale Quantity (PWSQ) (C+D)	11–21	55–105	11–21	55–105

¹ NFMA limits the sale of timber to less the sustained yield limit for each decade of the plan (16 U.S.C. 1611). Providing estimates in the plan of the annual projected wood sale quantity and the annual projected timber sale quantity for each of first two decades aligns with the NFMA decadal periods limiting the sale of timber, and provides estimates to cover a second decade if revision of the plan is delayed beyond the 15-year limit.

² MMCF: Millions of cubic feet.

³ MMBF: Millions of board feet.

⁴ Lands suitable for timber production.

⁵ The timber product categories are for volumes other than for salvage or sanitation, that meet timber product utilization standards.

⁶ Lands not suitable for timber production.

⁷ Other estimated wood products include fuelwood, biomass and others that do not meet timber product utilization standards.

Vegetation Management Practices

Harvest of timber on National Forest System lands occurs for many different reasons, including ecological restoration, community protection in wildland-urban interfaces, habitat restoration, protection of municipal water supplies, and to contribute to economic sustainability through the production of timber, pulp for paper, specialty woods for furniture, and fuel as a renewable energy source. Timber harvest, whether for wood production, restoration, or other reasons can support local businesses and employment.

Forest management on the Sequoia National Forest consists of restoration and fuels reduction treatments designed to achieve desired conditions for the associated terrestrial vegetation type on suitable timber lands. The projected management approach uses an uneven-aged management system. Thinning would be used to increase individual tree vigor, increase horizontal heterogeneity, and reduce fuel hazards. Group selection would be used to regenerate suitable lands, increasing vertical structure heterogeneity and tree species diversity. Table 20 displays estimates of acres of activity implemented by decade and vegetation management type for the Sequoia National Forest.

Forest management in wildfire protection zones and strategic ridge tops will be prioritized for treatment. Forest management on unsuitable lands is primarily responsive to safety concerns or disturbance agents such as wildfire, windthrow, insect and disease, or other restoration objectives.

Table 20. Estimated vegetation management practices on the Sequoia National Forest (acres implemented by decade)

Cover Type	Forest-wide Vegetation Management Practice	1st Decade	2nd Decade
Montane	Thinning (Intermediate harvest)	5,000–7,500	5,000–7,500
Montane	Regeneration (Group Selection)	750–1,100	750–1,100
Montane	Precommercial Thinning	6,000–12,000	6,000–12,000
Upper Montane	Thinning (Intermediate harvest)	1,000–1,500	1,000–1,500
Upper Montane	Regeneration (Group Selection)	<1,000	<1,000
Upper Montane	Precommercial Thinning	<1,000	<1,000

Silvicultural Treatments Used in Timber Management Prescriptions

While uneven-aged management will be the primary management system used to achieve desired conditions and restoration objectives, other silvicultural treatments may be used to better meet specific forest health and restoration objectives for long term sustainability.

Reforestation

Reforestation is the act of renewing forest cover by establishing young trees. This is typically accomplished by planting nursery-grown seedlings, but establishment of seedlings from natural seeding of nearby sexually-mature trees may supplement areas planted with nursery-grown seedlings. In some cases, natural seedlings originating from nearby trees may be used to meet

management objectives. In the case where desired tree species are capable of sprouting new trees from roots (e.g., oaks and aspen), prolific sprouting can provide for effective reestablishment.

Site Preparation

Site preparation treatments are designed to enhance the success of regeneration efforts. A variety of methods may be used to reduce competing vegetation, planting obstacles and fuel levels. Ground-based equipment may be used to reduce tree and shrub levels, providing a more favorable environment for developing seedlings. Selective herbicides may be applied to suppress competing plants, reducing competition for soil moisture and sunlight. Fire may be used to reduce surface fuel or to consume woody material piled by machine or hand.

Seedling Establishment

As discussed under reforestation, new forests may be established by planting nursery-grown seedlings or by germinating seed from nearby mature trees. Seedlings are grown in tree nurseries, from selected seed sources, to meet the expected demands of the future growth environment. Selected species, numbers, and arrangements are designed to provide a variety of options for the future. Seedlings developing from seeding of nearby mature trees vary widely in number and arrangement and commonly establish, in pulses, over time.

In managed environments, planting selected species at designed numbers and arrangements provides advantages over the development of seedlings from nearby mature trees. Seedlings originating from seeding of nearby trees often provide numbers in excess of need and in undesirable arrangement. They may, however, provide for successful establishment of new forests in places regarded as difficult to plant, or where planted seedling mortality levels are unacceptably high. Regardless of origin, both sources benefit from actions taken to provide more favorable growth environments.

Seedling Stocking Criteria

The stocking criteria for lands suitable for timber production are indicated in Table 21. They are designed to provide for the attainment of long-term desired conditions, and provide sufficient stocking to meet the potential forest product yields over time. The values apply after regeneration harvests, and after disturbances, like in areas affected by high severity fire.

Table 21. Stocking criteria for suitable lands by forest type*

Forest Type	Region 5 Site Class	Trees per Acre Minimum
Ponderosa/Jeffrey Pine	0-3	200
Ponderosa/Jeffrey Pine	4-5	150
True Fir	All	300
Douglas-fir	All	225
Mixed Conifer	All	200

* Final density after stand establishment (within 5 years of harvest).

Release

These treatments are designed to free young trees from undesirable competing vegetation. Treatments are aimed at increasing the availability of moisture, sunlight and nutrients to planted seedlings, thus increasing survival and favorable growth rates. Depending on conditions, release can be performed using hand tools, herbicides or mechanically.

Precommercial Thinning

This treatment removes selected trees to reduce stocking and promote the growth and development of desirable trees. The removed trees are typically small and without sufficient value to cover the cost of the treatment.

Timber Harvest

The projected activities associated with scheduled forest management on suitable lands for timber production are geared toward uneven-aged management, a system using a planned sequence of treatments, designed to maintain and regenerate a stand with three or more age classes. The types of treatments used are primarily “thinning” and “group selection”:

- Thinning is commonly applied to lower stand density and improve the health and growth rates of the remaining trees. It may also be designed to alter tree arrangement. Trees of merchantable size are selected for removal; trees of less than merchantable size are selected when the reduction of ladder fuels is an objective. The youngest age classes are typically excluded from thinning.
- Group selection is the most common method used to regenerate an age class. All, or most, of the trees are removed, followed by the establishment of seedlings. The size of the opening is variable, but is designed to provide sufficient site resources for favorable seedling establishment and growth.

In addition to scheduled forest management, management may also occur in response to disturbance events (i.e. wildfire, windthrow, insect, parasite or pathogen-related decline). Other harvest methods will likely apply to these specific conditions and project objectives. For example, after wildfire, and especially on suitable land, salvage harvests may be implemented to recover the economic value of dead and dying trees and to reduce the fuel environment. Other events, such as windthrow and insect and pathogen related infestations, may lead to salvage or sanitation harvests, to recover economic value and improve residual stand health.

Site-specific analysis may also lead to the use of alternative regeneration methods, including those associated with the even-aged management system. For example, project-specific objectives may lead to use of the shelterwood regeneration method to aid in establishment of seedlings.

Safety considerations, although not regarded as a component of a harvest system, will likely lead to the harvest of dead and dying trees, as well as living trees deemed a risk, that may fall along roads and other places where people or property are threatened. This action, commonly referred to as hazard tree removal, or tree risk reduction, may be used extensively along roads and trails within wildfire areas.

Glossary

Adaptive capacity is the ability of ecosystems to respond, cope, or adapt to disturbances and stressors, including environmental change, to maintain options for future generations.

At-risk species are federally recognized threatened, endangered, proposed, and candidate species and species of conservation concern within the plan area.

Best management practices for water quality (BMPs) are methods, measures or practices selected by an agency to meet its nonpoint source control needs. Best management practices for water quality include but are not limited to structural and nonstructural controls and operation and maintenance procedures. Best management practices for water quality can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters (36 CFR 219.19).

Biotic integrity refers to habitat that supports viable populations of native and desired non-native plant, invertebrate, and vertebrate species. Species composition and structural diversity of plant and animal communities provide desired habitat conditions and ecological functions. New introductions of invasive species are prevented. Where invasive species are adversely affecting the viability of native species, the appropriate State and Federal wildlife agencies have reduced impacts to native populations. The distribution and health of biotic communities perpetuates functions and biological diversity.

Broader Landscape is the plan area and the lands surrounding the plan area. The spatial scale of the broader landscape varies depending upon the social, economic, and ecological issues under consideration.

California spotted owl protected activity centers (PACs) are areas delineated surrounding each territorial owl activity center detected on national forest system lands since 1986. Owl activity centers are designated for all territorial owls based on the most recent documented nest site, or the most recent known roost site when a nest location remains unknown. Protected activity centers are delineated to include known and suspected nest stands and to encompass the best available 300 acres of habitat, in as compact a unit as possible. Aerial photography interpretation and field verification are used as needed to delineate protected activity centers. As additional nest location and habitat data become available, boundaries of protected activity centers are reviewed and adjusted as necessary to better include known and suspected nest stands and encompass the best available 300 acres of habitat. When activities are planned adjacent to non-National Forest System lands, available databases are checked for the presence of nearby California spotted owl activity centers on non-national forest system lands. A 300-acre circular area, centered on the activity center, is delineated. Any part of the circular 300-acre area that lies on National Forest System lands is designated and managed as a California spotted owl protected activity center.

Candidate species is a species under the purview of the U.S. Fish and Wildlife Service (USFWS), for which the USFWS possesses sufficient information on vulnerability and threats to support a proposal to list as endangered or threatened, but for which no proposed rule has yet been published by the USFWS. For species under the purview of the National Marine Fisheries Service (NMFS), a candidate species is a species that is the subject of a petition to list as a threatened or endangered species and for which the NMFS has determined that listing may be warranted, pursuant to section 4(b)(3)(A) of the Endangered Species Act (16 U.S.C.

1533(b)(3)(A)), or a species that is not the subject of a petition but for which the NMFS has announced in the Federal Register the initiation of a status review.

Canopy closure is the percentage of the sky hemisphere obscured by vegetation when viewed from a single point.

Canopy cover is the percentage of forest floor covered by the vertical projection of the tree crowns.

Carbon carrying capacity is the amount of carbon that can be stored in a system as a function of prevailing climatic conditions and natural disturbance regimes, and a potential foundation for carbon management plans¹⁸.

Climate change adaptation is an adjustment in natural or human systems in response to actual or expected climatic stimuli, or their effects, which moderates harm or exploits beneficial opportunities. This adaptation includes initiatives and measures to reduce the vulnerability of natural and human systems against actual or expected climate change effects: building resistance to climate-related stressors; increasing ecological resilience by minimizing the severity of climate change impacts, reducing the vulnerability, and increasing the adaptive capacity of ecosystem elements; and facilitating ecological transitions in response to changing environmental conditions.

Collaboration is a structured manner in which a collection of people with diverse interests share knowledge, ideas, and resources, while working together in an inclusive and cooperative manner toward a common purpose.

Community buffers are areas around communities that are adjacent to or surrounded by National Forest System lands that currently have high fire risk and where treatments on National Forest System lands are designed to reduce fire behavior and intensity. Human health and safety are the primary values at risk within these areas. Community buffers are within the community wildfire protection zone (chapter 3).

Complex early seral habitat is a type of early successional forest habitat that contains structural, compositional, or functional elements of ecological complexity or integrity. These post-disturbance elements may include large snags, logs, and isolated live trees or tree clumps, as well as patches of young native shrubs, hardwoods, herbaceous plants or tree regeneration. Spatial heterogeneity in vegetation structure and diversity in vegetation composition during post-disturbance recovery is an important element of complexity in early seral forest habitat.

Connectivity is the ecological conditions that exist at several spatial and temporal scales to provide landscape linkages, including to: permit the exchange of flow, sediments, and nutrients; the daily and seasonal movements of animals within home ranges; the dispersal and genetic interchange between populations; and the long distance range shifts of species, such as in response to climate change.

Conservation is the protection, preservation, management or restoration of natural environments, ecological communities and species

¹⁸ Hurteau, M.D. and M. L. Brooks. 2011. Short- and long-term effects of fire on carbon in US dry temperate forest systems. *BioScience*, 61 (2):139-146.

Critical aquatic refuges (CARs) are subwatersheds, generally ranging between 500 to 50,000 acres, on the Sequoia National Forest, that contain either: 1) known locations of at-risk species; 2) highly vulnerable populations of native plant or animal species; or 3) are localized populations of rare native aquatic- or riparian-dependent plant or animal species.

Critical habitat for a threatened or endangered species is: (1) the specific areas within the geographical area occupied by the species, at the time it is listed and in accordance with the provisions of section 4 of the Endangered Species Act (16 USC 1533), on which are found those physical or biological features (a) essential to the conservation of the species, and (b) which may require special management considerations or protections; and (2) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 4 of the Endangered Species Act (16 USC 1533), upon a determination by the Secretary that such areas are essential for the conservation of the species, ESA, sec. 3 (5)(A), (16 USC 1532 (3)(5)(A)). Critical habitat is designated through rulemaking by the Secretary of the Interior or Commerce, ESA, sec. 4 (a)(3) and (b)(2) (16 USC 1533 (a)(3) and (b)(2)).

Disturbance is any relatively discrete event in time that disrupts ecosystem, watershed, community, or species population structure and/or function, changing resources, substrate availability, or the physical environment.

Ecological conditions are the biological and physical environment that can affect the diversity of plant and animal communities, the persistence of native species, and the productive capacity of ecological systems. Ecological conditions include habitat and other influences on species and the environment. Examples of ecological conditions include the abundance and distribution of aquatic and terrestrial habitats, connectivity, roads and other structural developments, human uses, and invasive species.

Ecological integrity is the quality or condition of an ecosystem when its dominant ecological characteristics (e.g., composition, structure, function, connectivity, and species composition and diversity) occur within the natural range of variation and can withstand and recover from most perturbations imposed by natural environmental dynamics or human influence.

Ecological restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed. Ecological restoration focuses on reestablishing the composition, structure, pattern and ecological processes necessary to facilitate terrestrial and aquatic ecosystem sustainability, resilience, and health under current and future condition.

Ecosystem is a spatially explicit, relatively homogeneous unit of the Earth that includes all interacting organisms and elements of the abiotic environment within its boundaries. An ecosystem is commonly described in terms of its: 1) composition or the biological elements within the different levels of biological organization, from genes and species to communities and ecosystems; 2) structure or the organization and physical arrangement of biological elements such as, snags and down woody debris, vertical and horizontal distribution of vegetation, stream habitat complexity, landscape pattern and connectivity; 3) function or the ecological processes that sustain composition and structure, such as energy flow, nutrient cycling and retention, soil development and retention, predation and herbivory, and natural disturbances such as wind, fire and floods; and 4) connectivity.

Ecosystem services are benefits people obtain from ecosystems: 1) provisioning services, such as clean air and fresh water, energy, food, fuel, forage, wood products or fiber, and minerals; 2) regulating services, such as long-term storage of carbon; climate regulation; water filtration,

purification, and storage; soil stabilization; flood and drought control; and disease regulation; 3) supporting services, such as pollination, seed dispersal, soil formation and nutrient cycling; and 4) cultural services, such as educational, aesthetic, spiritual, and cultural heritage values, recreational experiences, and tourism opportunities.

Endangered Species are any species that the Secretary of the Interior or the Secretary of Commerce has determined is in danger of extinction throughout all or a significant portion of its range. Endangered species are listed at 50 CFR sections 17.11, 17.12, and 224.101.

Ephemeral stream is a stream that flows only in direct response to precipitation in the immediate locality (watershed or catchment basin), and whose channel is at all other times above the zone of saturation.

Even-aged stand refers to a stand of trees composed of a single age class.

Federally recognized Indian Tribe is an Indian Tribe or Alaska Native Corporation, band, nation, pueblo, village or community that the Secretary of the Interior acknowledges to exist as an Indian Tribe under the Federally Recognized Indian Tribe List Act of 1994 (25 U.S.C. 479a).

Final regeneration harvest is the final timber harvest in a sequence of harvests designed to regenerate a timber stand or release a regenerated stand. A final regeneration harvest could be a clearcut, removal cut of a shelterwood or seedtree system, or a selection cut.

Fine-scale refers to areas less than 10 acres in size.

Fisher denning habitat is habitat used by females while raising young.¹⁹

Fisher habitat core areas are large contiguous areas, greater than 15 square miles, of fisher habitat within which fishers can establish home ranges and congregate as a population. Fishers in the southern Sierra Nevada are distributed in a series of subpopulations separated by unsuitable habitat areas²⁰. Fisher habitat in the southern Sierra Nevada is segmented into a series of core habitat areas, which support these subpopulations, separated primarily by major river canyons, across which fishers may occasionally disperse via linkage areas (Figure 9). The “core” habitat areas are contiguous polygons of modeled suitable fisher habitat large enough to support at least 5 adult females. There are seven fisher core areas, which are described in detail in the Southern Sierra Fisher Conservation Assessment¹⁰ and the Southern Sierra Fisher Conservation Strategy¹¹. Cores 1 to 5 (1,621 mi² total area) are occupied currently by breeding fisher populations; Cores 6 and 7 (647 mi² total area) currently are not occupied by breeding fisher populations, although fishers are detected occasionally in core 6.

Fisher linkage area is a delineated polygon of habitats considered likely to facilitate dispersal between fisher habitat core areas, based on least-cost corridor models. Least-cost corridors are intended to represent the least risky areas for fishers to disperse between fisher habitat core areas,

¹⁹ Spencer, W.D., S.C. Sawyer, H.L. Romsos, W.J. Zielinski, R.A. Sweitzer, C.M. Thompson, K.L. Purcell, D.L. Clifford, L. Cline, H.D. Safford, S.A. Britting, and J.M. Tucker. 2014. Southern Sierra Nevada fisher conservation assessment. Unpublished report produced by Conservation Biology Institute.

²⁰ Spencer, W.D., S.C. Sawyer, H.L. Romsos, W.J. Zielinski, C.M. Thompson, and S.A. Britting. 2015. Southern Sierra Nevada fisher conservation strategy. Unpublished report produced by Conservation Biology Institute.

based on expert assumptions about fisher dispersal relative to vegetation, terrain and other factors¹¹.

Fisher strategy area is a mapped area encompassing modeled fisher habitat core and linkage areas based on a grid of female breeding territory-sized (4 mi²) hexagonal cells. It represents the area used in the Southern Sierra Fisher Conservation Strategy¹¹ to apply fisher conservation measures. The fisher strategy area consists of 1,012 hexagonal cells that include all areas considered likely to contribute substantially to sustaining the fisher population over the next 15 to 30 years.

Fisher target cells are hexagonal cells that make up fisher target habitat, where restoring and maintaining female fisher home range habitat is a conservation priority.

Fisher target habitat is the portion of the mapped fisher strategy area where restoring or maintaining female fisher home range habitat is a conservation priority. It is made up of fisher target cells defined as ‘suitable’ and ‘potentially suitable’. The Southern Sierra Fisher Conservation Strategy establishes a desired number of target cells within each fisher habitat core area, representing about 40-45 percent of the fisher strategy area. However, their locations cannot all be mapped until appropriate resiliency targets and maps have been created, so that management can be planned and prioritized to most effectively and efficiently meet both fisher habitat and forest resiliency goals. Mapping and prioritizing of target cells also considers spatial configuration issues, such as proximity to linkage areas and patterns of contiguity or fragmentation of currently suitable habitat cells. Once mapped, locations of target cells may change over time, e.g., following large, severe wildfires. Given the dynamic nature of this system, shifting target habitat over time is acceptable, so long as the numbers of target cells are maintained and fisher habitat core and linkage areas are not significantly fragmented or severed (Spencer et al. 2015).

Focal species refers to a small subset of species whose status permits inference to the integrity of the larger ecological system to which they belong, and provides meaningful information regarding the effectiveness of the forest plan in maintaining or restoring the ecological conditions to maintain the diversity of plant and animal communities in the forest plan area. Focal species are commonly selected on the basis of their functional role in ecosystems. See chapter 5, focal species section for more information.

Focus landscapes are large areas (10,000 to 80,000 acres) managed for old forest habitat for Pacific fisher and California spotted owl, which are resilient to climate change, fire, insects, and disease. They are identified based upon the co-occurrence of some or all of the following conditions: 1) presence of fisher sightings, regional monitoring; 2) more than one-third suitable owl and fisher habitat; 3) high fire risk to habitat, low ecological fire resilience; 4) presence of large areas of old forest (e.g. late succession old growth rank 3, 4, or 5, areas of late successional emphasis²¹); 5) more than one-third of area mechanically unconstrained; 6) little area that has recently burned; 7) contains, or is near, a fisher linkage area; and 8) contains black oak dominated

²¹ Millar, C. I. 1996. Sierra Nevada Ecosystem Project, Final Report to Congress, Vol. I, Assessment Summaries and Management Strategies, Centers for water and Wildland Resources, Report No. 36, University of California, Davis, California. Cooperative report of the PSW Research Station, PSW Region, USDA, for the Sierra Nevada Framework Project, Sacramento, CA.

or co-dominated areas. They can occur in all fire management zones but are mostly found in the general wildfire protection zone and wildfire restoration zone.

Foreground refers to the scenery management system, detailed in Forest Service Handbook 701, with a distance zone consisting of a detailed landscape generally found from the observer to 0.5 mile away.

Forest land is land that is at least 10 percent occupied by forest trees of any size or formerly having had such tree cover and not currently developed for nonforest uses. Land developed for nonforest use includes areas for agricultural crops, improved pasture, residential or administrative areas, roads of any width and adjoining road clearing, and powerline clearing of any width (36 CFR 219.19).

Forest recreation program niche is the specific recreation focus of a forest, incorporating public expectations with unique social and ecological features of the land. It is used to help focus to create the most public value with limited resources.

Fuelwood is wood used for conversion to some form of energy.

Functional hydrology refers to perennial and intermittent streams having the following characteristics: (1) stream energy during high flows is dissipated, reducing erosion and improving water quality; (2) streams filter sediment and capture bedload, aiding floodplain development; (3) meadow conditions enhance floodwater retention and ground water recharge; and (4) root masses stabilize stream banks against cutting action.

Functional restoration refers to restoration of abiotic and biotic processes in degraded ecosystems. Functional restoration focuses on the underlying processes that may be degraded, regardless of the structural condition of the ecosystem. Functionally restored ecosystem may have a different structure and composition than the historical reference condition. As contrasted with ecological restoration that tends to seek historical reference condition, the functional restoration focuses on the dynamic processes that drive structural and compositional patterns. Functional restoration is the manipulation of interactions among process, structure and composition in a degraded ecosystem to improve its operations. Functional restoration aims to restore functions and improve structures with a long-term goal of restoring interactions between function and structure. It may be, however, that a functionally restored system will look quite different than the reference condition in terms of structure and composition and these disparities cannot be easily corrected because some threshold of degradation has been crossed or the environmental drivers, such as climate, that influenced structural and (especially) compositional development have changed.

Geographic area is a spatially contiguous land area identified within the planning area. A geographic area may overlap with a management area.

Great gray owl protected activity centers (PACs) are established and maintained to include the forested area and adjacent meadow around all known great gray owl nest stands. A protected activity center encompasses at least 50 acres of the highest quality nesting habitat (i.e., California wildlife habitat relationship type 6, 5D, and 5M) available in the forested area surrounding the nest. A protected activity center also includes the meadow or meadow complex that supports the prey base for nesting owls.

Greenline is a linear grouping of perennial plants at or near the stream channel.

Groundwater-dependent ecosystem refers to the community of plants, animals, and other organisms whose extent and life processes depend on groundwater. Examples include wetlands, groundwater-fed lakes and streams, cave and karst systems, aquifer systems, springs, and seeps.

Growing stock is all trees growing in a forest or in a specified part of it, usually commercial species, meeting specified standards of size, quality, and vigor, and generally expressed in terms of trees per acre, density, or volume.

Home range core area (HRCa) is established surrounding each territorial California spotted owl activity center detected after 1986. The core area amounts to 20 percent of the area described by the sum of the average breeding pair home range plus one standard error. For the Sequoia National Forest, the home range core area size is 600 acres. Aerial photography is used to delineate the core area. Acreage for the entire core area is identified on national forest lands. Core areas encompass the best available California spotted owl habitat in the closest proximity to the owl activity center. The acreage in the 300-acre protected activity center counts toward the total home range core area. Core areas are delineated within 1.5 miles of the activity center. When activities are planned adjacent to non-national forest lands, 1.5 mile circular core areas are delineated around California spotted owl activity centers on non-national forest lands. Using the best available habitat as described above, any part of the circular core area that lies on national forest lands is designated and managed as a California spotted owl home range core area.

Inherent capability of the plan area is the ecological capacity or ecological potential of an area characterized by the interrelationship of its physical elements, its climatic regime, and natural disturbances.

Integrated resource management refers to multiple use management that recognizes the interdependence of ecological resources and is based on the need for integrated consideration of ecological, social, and economic factors.

Intermittent stream is a stream or reach of stream channel that flows in its natural condition only during certain times of the year, or in several years, and is characterized by interspersed, permanent surface water areas containing aquatic flora and fauna adapted to the relatively harsh environmental conditions found in these types of environments.

Invasive species are alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health; species that causes, or is likely to cause harm and that is exotic to the ecosystem it has infested. Invasive species infest both aquatic and terrestrial areas and can be identified within any of the following four taxonomic categories: plants, vertebrates, invertebrates, and pathogens.

Landscape refers to a defined area, irrespective of ownership or other artificial boundaries, such as a spatial mosaic of terrestrial and aquatic ecosystems, landforms, and plant communities, repeated in similar form throughout such a defined area.

Landscape-scale refers to areas that are greater than 10,000 acres in size.

Line Officer is a Forest Service official who serves in a direct line of command from the Chief.

Maintain in reference to an ecological condition is to keep in existence or continuance of the desired ecological condition in terms of its desired composition, structure and processes. Depending upon the circumstance, ecological conditions may be maintained by active or passive management or both.

Management area is land area identified within the planning area that has the same set of applicable plan components. A management area does not have to be spatially contiguous.

Management intensities are the set and schedule of management practices typically used for certain forest or timber types to achieve desired conditions that may include timber production.

Management practices (vegetation management practices) are silvicultural practices such as reforestation, prescribed fire, thinning to reduce stand density, and other practices designed to facilitate growth and development of trees.

Management system is a timber management system including even-aged management and uneven-aged management.

Marten habitat core areas are large contiguous areas of marten habitat within which martens can establish home ranges and comeingle as a population²².

Mean annual increment of growth is the total increment of increase of volume of a stand (standing crop plus thinning) up to a given age, divided by that age. The **culmination of mean annual increment of growth** is the age in the growth cycle of an even-aged stand at which the average annual rate of increase of volume is at a maximum. In land management plans, the mean annual increment of growth is expressed in cubic measure and is based on the expected growth of stands according to intensities and utilization guidelines in the plan (36 CFR 219.19).

Mid-scale refers to areas that are hundreds to thousands of acres in size.

Mitigate is to avoid, minimize, rectify, reduce or compensate the adverse environmental impacts associated with an action.

Monitoring is a systematic process of collecting information to evaluate effects of actions or changes in conditions or relationships.

Multiple use is the management of all the various renewable surface resources of the National Forest System, so that they are used in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services, over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; that some land will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output, consistent with the Multiple-Use Sustained-Yield Act of 1960 (16 U.S.C. 528–531).

National Forest System includes national forests, national grasslands, and the National Tallgrass Prairie.

Native species is an organism that is, or was historically, present in a particular ecosystem as a result of natural migratory or evolutionary processes and not as a result of an accidental or

²² Spencer, W. and H. Rustigian-Romsos. 2012. Decision-Support Maps and Recommendations for Conserving Rare Carnivores in the Interior Mountains of California. Unpublished report produced by Conservation Biology Institute

deliberate introduction into that ecosystem. An organism's presence and evolution (adaptation) in an area are determined by climate, soil, biotic and abiotic factors.

Natural range of variation (NRV) is the variation of ecological characteristics and processes over scales of time and space that are appropriate for a given management application. In contrast to the generality of historical ecology, the natural range of variation concept focuses on a distilled subset of past ecological knowledge developed for use by resource managers; it represents an explicit effort to incorporate a past perspective into management and conservation decisions. The pre-European influenced reference period considered should be sufficiently long, often several centuries, to include the full range of variation produced by dominant natural disturbance regimes such as fire and flooding, and should also include short-term variation and cycles in climate. The natural range of variation is a tool for assessing the ecological integrity and does not necessarily constitute a management target or desired condition. The natural range of variation can help identify key structural, functional, compositional, and connectivity characteristics, for which plan components may be important for either maintenance or restoration of such ecological conditions.

Nonforest land is land that does not meet the definition of forest land.

Patch refers to a relatively homogeneous area that differs from its surroundings. Patches are the basic unit of the landscape that change and fluctuate. Patches have a definite shape and spatial configuration, and can be described compositionally by internal variables such as number of trees, number of tree species, age of trees, height of trees, or other similar measurements.

Perennial stream is a stream or reach of a channel that flows continuously, or nearly so, throughout the year and whose upper surface is generally lower than the top of the zone of saturation in areas adjacent to the stream.

Persistence is continued existence.

Plan components are the parts of a national forest land management plan that guide future project and activity decision-making. Specific plan components may apply to the entire plan area, to specific management areas or geographic areas, or to other areas as identified in the plan. Every plan must include the following plan components: desired conditions; objectives; standards; guidelines; suitability of lands. A plan may also include goals as an optional component.

Plan monitoring program is an essential part of the land management plan that based on plan components sets out the plan monitoring questions and associated indicators. The plan monitoring program informs management of resources on the plan area and enables the responsible official to determine if a change in plan components or other plan content that guide management of resources on the plan area may be needed.

Productivity is the capacity of National Forest System lands and their ecological systems to provide the various renewable resources in certain amounts in perpetuity. For the purposes of the land management planning, productivity is an ecological term, not an economic term (36 CFR part 219).

Project refers to an organized effort to achieve an outcome on National Forest System lands identified by location, tasks, outputs, effects, times and responsibilities for execution.

Proposed species is any species of fish, wildlife or plant that is proposed by the U. S. Fish and Wildlife Service or the National Marine Fisheries Service in the Federal Register to be listed under Section 4 of the Endangered Species Act.

Reasonable assurance is a judgment made by the responsible official based on best available scientific information and local professional experience; practices that are based on existing technology and knowledge are likely to deliver the intended results. Reasonable assurance applies to average and foreseeable conditions for the area and does not constitute a guarantee to achieve the intended results.

Recovery is a word used with respect to threatened or endangered species to denote the improvement in the status of a listed species to the point at which listing as federally endangered or threatened is no longer appropriate

Recreation opportunity is an opportunity to participate in a specific recreation activity in a particular recreation setting and enjoy desired recreation experiences and other benefits that accrue. Recreation opportunities include primitive, non-motorized, motorized, developed, and dispersed recreation on land, water and in the air.

Recreation setting is the social, managerial and physical attributes of a place that when combined, provide a distinct set of recreation opportunities. The Forest Service uses the recreation opportunity spectrum to define recreation settings and categorize them into six distinct classes: primitive, semi-primitive non-motorized, semi-primitive motorized, roaded natural, rural, and urban.

Resilience is the ability of an ecosystem and its component parts to absorb, or recover from the effects of disturbance through preservation, restoration or improvement of its essential structures and functions, and redundancy of ecological patterns across the landscape.

Restocked is the condition of the growing space occupancy of trees that is to be achieved after a disturbance that substantially altered the previous stocking.

Riparian areas include terrestrial and aquatic ecosystems that extend down into the groundwater, up above the canopy, outward across the floodplain, up the near-slopes that drain to the water, laterally into the terrestrial ecosystem, and along the water course at variable widths.

Risk is a combination of the likelihood that a negative outcome will occur and the severity of the subsequent negative consequences

Rotation is the number of years (including the regeneration period) required to establish and grow timber under an even-aged management system to a specified condition or maturity for regeneration harvest.

Satisfactory soils are soil conditions with favorable structure and infiltration characteristics to absorb and filter precipitation, and support adequate vegetative cover to minimize erosion and sustain desired habitat diversity.

Satisfactory condition for range vegetation is good to excellent vegetation condition or fair vegetation condition with an upward trend.

Scenic character is a combination of the physical, biological and cultural images that give an area its scenic identity and contributes to its sense of place. Scenic character provides a frame of reference from which to determine scenic attractiveness and to measure scenic integrity.

Scenic integrity objectives in the context of the forest plan are equivalent to goals or desired conditions. Scenic integrity describes the state of naturalness or a measure of the degree to which a landscape is visually perceived to be “complete.” The highest scenic integrity ratings are given to those landscapes that have little or no deviation from the landscape character valued by constituents for its aesthetic quality. Scenic integrity is the state of naturalness or, conversely, the state of disturbance created by human activities or alteration. Scenic integrity is measured in five levels:

Very high: landscapes where the valued landscape character “is” intact with only minute, if any deviations. The existing landscape character and sense of place is expressed at the highest possible level.

High: landscapes where the valued landscape character appears unaltered. Deviations may be present but must repeat the form, line, color, texture and pattern common to the landscape character so completely and at such scale that they are not evident.

Moderate: landscapes where the valued landscape character appears slightly altered. Noticeable deviations must remain visually subordinate to the landscape character being viewed.

Low: landscapes where the valued landscape character appears moderately altered. Deviations begin to dominate the valued landscape character being viewed but they borrow valued attributes such as size, shape, edge effect, pattern of natural openings, vegetative type changes or architectural styles outside the landscape being viewed. They should not only appear as valued character outside the landscape being viewed, but compatible or complimentary to the character within.

Very Low: landscapes where the valued landscape character appears heavily altered. Deviations may strongly dominate the valued landscape character. They may not borrow from valued attributes such as size, shape, edge effect, pattern of natural openings, vegetative type changes or architectural styles within or outside the landscape being viewed. However, deviations must be shaped and blended with the natural terrain so that elements such as unnatural edges, roads, landings and structures do not dominate the composition.

Species of conservation concern are species, other than federally recognized threatened, endangered, proposed, or candidate species, that is known to occur in the plan area and for which the Regional Forester has determined that the best available scientific information indicates substantial concern about the species' capability to persist over the long-term in the plan area.

Stand is a contiguous group of trees sufficiently uniform in age class distribution, composition and structure, and growing on a site of sufficiently uniform quality, to be a distinguishable unit, such as mixed, pure, even-aged and uneven-aged stands.

Stressors are factors that may directly or indirectly degrade or impair ecosystem composition, structure or ecological process in a manner that may impair its ecological integrity, such as invasive species, loss of connectivity, or the disruption of a natural disturbance regime.

Sustainability is the capability to meet the needs of the present generation without compromising the ability of future generations to meet their needs. For the purposes of the land management

planning regulation at 36 CFR part 219, ecological sustainability refers to the capability of ecosystems to maintain ecological integrity; economic sustainability refers to the capability of society to produce and consume or otherwise benefit from goods and services, including contributions to jobs and market and nonmarket benefits; and social sustainability refers to the capability of society to support the network of relationships, traditions, culture and activities that connect people to the land and to one another, and support vibrant communities.

Sustainable recreation refers to the set of recreation settings and opportunities on the National Forest System that is ecologically, economically and socially sustainable for present and future generations.

Threatened species is any species that the Secretary of the Interior or the Secretary of Commerce has determined is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Threatened species are listed at 50 CFR sections 17.11, 17.12, and 223.102.

Timber harvest refers to the removal of trees for wood fiber use and other multiple use purposes.

Timber production is the purposeful growing, tending, harvesting, and regeneration of regulated crops of trees to be cut into logs, bolts or other round sections for industrial or consumer use (36 CFR 219.19).

Trail Corridor is an allocation established through the land use planning process, pursuant to Section 7(a)(2) of the National Trails System Act (“rights-of-way”), for a public land area of sufficient width, within which to encompass national trail resources, qualities, values and associated settings, and the primary use or uses that are present or to be restored.

Two-aged system is a planned sequence of treatments designed to regenerate or maintain a timber stand with two age classes. A two-aged system is a form of even-aged management.

Uncharacteristic wildfire refers to wildfire that exceeds the natural range of variation in fire severity (e.g., high severity proportion, high severity patch size) and other fire effects indicators for a specific vegetation type²³.

Undesirable wildfire refers to wildfire that does not meet the desired conditions for a specific vegetation type.

Utilization standards are specifications for merchantable forest products offered in a timber sale.

Viable population is a population of a species that continues to persist over the long term with sufficient distribution to be resilient and adaptable to stressors and likely future environments (36 CFR 219.19).

Visible foreground is the area within the foreground distance zone (up to 0.5 mile) that is visible from a height of 5 feet on the trail, using terrain to define the boundaries.

Watershed is a region or land area drained by a single stream, river, or drainage network, a drainage basin.

²³ Hardy, C. C. 2005. Wildland fire hazard and risk: Problems, definitions, and context. *Forest ecology and management*, 211(1), 73-82.

Watershed condition is the state of a watershed based on physical and biogeochemical characteristics and processes.

Watershed condition framework is a national comprehensive and consistent approach for classifying watershed condition, proactively implementing integrated restoration in priority watersheds on national forests and grasslands, and tracking and monitoring outcome-based program accomplishments for performance accountability²⁴.

Wild and Scenic River is a river designated by Congress as part of the National Wild and Scenic Rivers System that was established in the Wild and Scenic Rivers Act of 1968 (16 U.S.C. 1271 (note), 1271–1287).

Wilderness is any area of land designated by Congress as part of the National Wilderness Preservation System that was established in the Wilderness Act of 1964 (16 U.S.C. 1131–1136).

Wildland fire refers to wildfire or prescribed fire.

²⁴ USDA, Forest Service. 2011. Watershed Condition Framework; a framework for assessing and tracking changes to watershed condition. U.S. Department of Agriculture, Forest Service, Washington, Report FS-977

