

Glossary

Active crown fire – A fire in which a solid flame develops in the crowns of trees, but the surface and crown phases advance as a linked unit dependent on each other.

Adaptive management – Provides an implementation tool that goes beyond the “predict-mitigate-implement” model and incorporates an “implement-monitor-adapt” strategy that provides flexibility to account for inaccurate initial assumptions, to adapt to changes in environmental conditions, or to respond to subsequent monitoring information that indicates that desired conditions are not being met (Forest Service 1909.14.1).

Age class – A distinct aggregation (grouping) of trees originating from a single natural event commonly consisting of trees of similar age.

Basal area (BA) – The cross-sectional area of all trees, measured in square feet per acre.

Biomass – Multiple definitions include: organic matter produced by plants and other photosynthetic organisms; total dry weight of all living organisms that can be supported at each level of a food chain or web; dry weight of all organic matter in plants and animals in an ecosystem; plant materials and animal wastes that function as fuel for fire.

Burn – An effect produced by heating. To undergo combustion, consuming fuel and giving off light, heat, and gasses. Also, an area where fire has occurred in the past.

Canopy – A layer of foliage, generally the uppermost layer, in a forest stand. Can be used to refer to midstory or *understory* vegetation in multilayered stands.

Canopy base height (CBH) – A critical factor in crown fire initiation and can be used as an indicator of the potential for crown fire initiation (Agee and Skinner 2005, Stratton 2009, Scott 2003). The desired condition is for CBH to be greater than 18 feet in ponderosa pine.

Canopy bulk density (CBD) – For ponderosa pine and pine-oak stands. CBD is a good indicator of potential active crown fire (Stratton 2009, Scott 2003). The desired condition is for average CBD to be less than 0.05 kg/m³ in ponderosa pine.

Canopy characteristics – Canopy characteristics include canopy cover, canopy base heights (CBH), and canopy bulk density (CBD) which contribute significantly toward the type of fire that can occur (Scott and Reinhardt 2001). Canopy cover, CBH, and CBD directly affect the incidence and behavior of crown fires and are used for modeling potential fire behavior (Scott 2003, Scott and Reinhardt 2005, Agee and Skinner 2005).

Canopy cover – As used in modeling fire in the fire ecology analysis, canopy cover is the horizontal fraction of the ground that is covered directly overhead by tree canopy, the percent of vertically projected canopy cover in the stand (Scott and Reinhardt 2005).

Canopy density – In this analysis, the term “openness” is used interchangeably with the term “canopy density.” Openness is the percentage of the forested area that is grass/forb/shrub interspace.

Clean Water Act (CWA) – Act that provides the structure for regulating pollutant discharges to waters of the United States. The act’s objective is “...to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters,” and is aimed at controlling both point

and nonpoint sources of pollution. The U.S. EPA administers the act, but many permitting, administrative, and enforcement functions are delegated to state governments. In Arizona, the designated agency for enforcement of the Clean Water Act is the Arizona Department of Environmental Quality (ADEQ).

Closed road – Intermittent service roads that are closed to vehicular traffic. However, these roads may be available and suitable for nonmotorized uses. The closure period must exceed 1 year. Basic custodial maintenance is performed to keep damage to adjacent resources to an acceptable level and to perpetuate the road to facilitate future management activities. Emphasis is normally given to maintaining drainage facilities and runoff patterns. Planned road deterioration may occur at this maintenance level (USDA Forest Service 2005).

Clump – A tight cluster of two to five trees of similar age and size originating from a common rooting zone that typically lean away from each other when mature. A clump is relatively isolated from other clumps or trees within a group of trees. A stand-alone clump of trees can function as a tree group.

Condition class (reference FRCC) – A measure of departure from reference conditions that can be used to determine how “at risk” key ecosystem components are in the event of a disturbance event such as fire.

Conditional crown fire – A crown fire that is dependent on ladder fuels in adjacent stands in order for fire to access the crowns. In an area with conditional crown fire, ladder fuels are insufficient in a stand for crown fire to initiate, but canopy fuels are sufficient to support crown fire if it moves in from an adjacent stand.

Contemporary uses – The use of the forest for traditional and cultural purposes by tribes that have aboriginal ties to the land.

Controlled burn – Synonymous with prescribed fire.

Coarse woody debris (CWD) – Woody debris larger than 7.5 cm (3 inches) in diameter (Graham et al. 1994).

Cover type – Refers to a forest or woodland type, such as ponderosa pine, pine-oak, or mixed-conifer.

Crown fire – A fire that advances from top to top of trees or shrubs more or less independent of a surface fire. Crown fires are sometimes classed as independent, conditional, or dependent (active or passive) to distinguish the degree of independence from the surface fire. Crown fires are common in coniferous forests and chaparral shrublands.

Declining – The senescent (aging) period in the lifespan of plants that (for trees) includes the presence of large dead and/or dying limbs, snag tops, large, old lightning scars, and other characteristics that indicate the later life stages.

Density-related mortality – Based upon established forest density/vigor relationships, density-related mortality begins to occur once the forest reaches 45 to 50 percent of maximum stand density, and mortality is likely at density levels over 60 percent of maximum stand density (Long 1985).

Diameter at breast height (d.b.h.) – A standard measure of tree diameter measured approximately 1.5 meters (4.5 feet) above the ground.

Disturbance – Any relatively discrete event or series of events, either natural or human induced that causes a change in the existing condition of an ecosystem, community, or population structure and alters the physical environment.

Disturbance regime – A set of recurring conditions due to a variety of disturbances (e.g., fire, flooding, insect outbreak) and their interaction, which characterize an ecosystem within a historic, natural, or human-induced context, within a given climate. This set of recurring conditions includes a specific range for each of the attributes of these disturbances. These attributes include: frequency, rotation period, intensity, severity, seasonality, patch size and distribution, residual structure, causal agent, the relative influence of each causal agent, and how they interact (Suffling and Perera 2004). The attributes researchers choose to represent a regime will vary depending on a researcher's area of interest (Sousa 1984, Pickett and White 1985, Agee 1993, Skinner and Chang 1996, Turner et al. 2001). An accurate description of a disturbance regime must include the full range of disturbance events, including those that are rare.

Diversity – The distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan.

Drought – Periods of abnormally dry weather sufficiently long enough to cause a serious hydrological imbalance. Drought is a relative term; therefore, any discussion in terms of precipitation deficit must refer to the particular precipitation-related activity that is under discussion. For example, there may be a shortage of precipitation during the growing season resulting in crop damage (agricultural drought), or during the winter runoff and percolation season affecting water supplies (hydrological drought).

Duff – The fermentation and humus layer lying below the litter layer and above mineral soil; consisting of partially decomposed organic matter whose origins can still be visually determined, as well as the fully decomposed humus layer. This layer does not include the freshly cast material in the litter layer, nor in the post-burn environment ash (Brown 2000). The top of the duff is where needles, leaves, fruits, and other castoff vegetative material have noticeably begun to decompose. Individual particles usually are bound by fungal mycelia. The bottom of the duff is mineral soil. There is a gradient, not a clear division between litter and duff.

Ecological restoration – The process of assisting the recovery of resilience and adaptive capacity of ecosystems that have been degraded, damaged, or destroyed. Restoration focuses on establishing the composition, structure, pattern, and ecological processes necessary to make terrestrial and aquatic ecosystems sustainable, resilient, and healthy under current and future conditions (USDA Forest Service 2008).

Environmental justice – The fair treatment and involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. The White House, with Executive Order 12898, elevated environmental justice issues to the Federal agency policy agenda. EO 12898 instructs each Federal agency to identify and address “disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations” (Clinton 1994).

Ephemeral stream – A stream that flows only briefly during and following a period of rainfall in the immediate locality.

Erosion – The wearing away of the land surface by rain or irrigation water, wind, ice, or other natural or anthropogenic agents that abrade, detach, and remove geologic parent material or soil from one point on the earth's surface and deposit it elsewhere.

Even-aged stand – A stand of trees composed of a single age class in which the range of tree ages is usually plus or minus 20 percent of rotation (SAF 2008).

Even-aged management – The application of a combination of actions that result in the creation of stands in which trees of essentially the same age grow together. Managed even-aged forests are characterized by a distribution of stands of varying ages (and, therefore, tree sizes) throughout the forest area. The difference in age between trees forming the main canopy level of a stand usually does not exceed 20 percent of the age of the stand at harvest rotation age. Regeneration in a particular stand is obtained during a short period at or near the time that a stand has reached the desired age or size for regeneration and is harvested. Clearcut, shelterwood, or seed tree cutting methods produce even-aged stands.

Evidence-based restoration – Using indicators of trees standing at the time of settlement that are no longer present as living trees including snags, downed logs, stumps, and stump holes to guide restoration objectives (ERI 2009).

Fire-adapted ecosystem – An associated group of plant and animals that have made long term genetic changes in response to the presence of fire in their environment.

Fire ecology – The study of fire's interaction with ecosystems.

Fire line intensity – Rate of heat release in the flaming front.

Fire regime – A set of recurring fire conditions that characterize an ecosystem, within a historic, natural, or human induced context, within a given climate. This set of recurring conditions includes a specific range of attributes. Sugihara et al. (2006) use the following attributes: seasonality, frequency (fire return interval), intensity, severity, size, spatial complexity, and fire type. An accurate description of a fire regime will include the full range of fire events, including those that are rare and connect to the larger disturbance regime which contains the fire regime as a subset. There are five fire regimes:

Fire Regime I – 0 to 35 year frequency and low (surface fires most common, isolated torching can occur) to mixed severity (less than 75 percent of dominant overstory vegetation replaced);

Fire Regime II – 0 to 35 year frequency and high severity (greater than 75 percent of dominant overstory vegetation replaced);

Fire Regime III – 35 to 100+ year frequency and mixed severity;

Fire Regime IV – 35 to 100+ year frequency and high severity; and

Fire Regime V – 200+ year frequency and high severity.

Fire regime condition class (FRCC) – An ecological evaluation protocol that uses three classes for describing the relative degree of departure from historical fire regimes.

Fire return interval – The number of years between two successive fires in a designated area (i.e., the interval between two successive fires); the size of the area must be clearly specified (McPherson and others 1990).

Fire risk – In the context of technical risk assessments, the term “risk” considers not only the probability of an event, but also includes values and expected losses. Within wildland fire, “risk” refers only to the probability of ignition (both man- and lightning-caused) (Hardy 2005).

Fire type – Flaming front patterns that are characteristic of a fire.

First order fire effects – Effects resulting directly from the fire, such as fuel consumption and smoke production.

Forage – Browse and herbage which is available and can provide food for animals or be harvested for feeding; or to search for or consume forage (ITR 1734-4).

Forbs – A broadleaved, herbaceous plant (e.g., columbine).

Forest health – The perceived condition of a forest derived from concerns about such factors as its age, structure, composition, function, vigor, presence of unusual levels of insects or disease, and resilience to disturbance. Note perception and interpretation of forest health are influenced by individual and cultural viewpoints, land management objectives, spatial and temporal scales, the relative health of the stands that comprise the forest, and the appearance of the forest at a point in time (SAF 2008).

Fuel loads – The amount of combustible material present per unit area.

Group – A cluster of two or more trees with interlocking or nearly interlocking crowns at maturity surrounded by an opening. The size of tree groups is typically variable depending on forest community and site conditions and can range from fractions of an acre (a two-tree group) to many acres. Trees within groups are typically nonuniformly spaced, some of which may be tightly clumped (SAF 2008).

Group selection – A cutting procedure which creates a new age class by removing trees in groups or patches to allow seedlings to become established in the new opening (SAF 1998).

Habitat: A place where an animal or plant normally lives, often characterized by a dominant plant form or physical characteristic. Often described for individual species, e.g., spotted owl habitat, it is usually used as a generalization of where an animal may live (Fire Ecology Report 2013).

Heritage strategy – A strategy developed in consultation with the Arizona State Historic Preservation Officer to assist in reaching a “No Adverse Effect” determination for the project (see heritage specialist report).

Heterogeneity – For the purposes of this analysis, heterogeneity refers to having biodiversity in terms of habitat and forest structure across the landscape.

Historic range of variation (HRV) – Refers to ecosystem composition, structure, and process for a specified area and time period. Historic range of variation (HRV) is often used to determine our best estimate of “natural” conditions and functions and, thus, is often our best estimate of the natural range of variation (NRV). Ecosystems change over time. It is assumed that native species have adapted over thousands of years to natural change and that change outside of NRV may affect composition and distribution of species and their persistence (Fire Ecology Report 2013).

Hydrologic condition – The current state of the processes controlling the yield, timing, and quality of water in a watershed (FSM 2521.05).

Impaired waters – Under section 303(d) of the 1972 Clean Water Act, states, territories, and authorized tribes are required to develop lists of impaired waters. These impaired waters do not meet water quality standards that states, territories, and authorized tribes have set for them, even after point sources of pollution have installed the minimum required levels of pollution control technology. The law requires that these jurisdictions establish priority rankings for waters on the lists and develop TMDLs for these waters. See the water quality and riparian specialist report for additional information.

Intermediate thinning – The thinning or cutting of trees to improve the composition, structure, condition, health, and growth of remaining trees (SAF 1998).

Interspace(s) – The open space between tree groups intended to be managed for grass/forb/shrub vegetation during the long term. Interspace(s) may include scattered single trees.

Invasive – any species which can establish, persist, and spread in an area, and be detrimental or destructive to native ecosystems, habitats, or species, and is difficult to control or eradicate.

Kaibab health focus: Multi-stakeholder, collaborative process that prioritized areas most in need of treatment. Primary indicators were related to high risk and high value such as those with closed canopies containing large trees. These areas were identified as high priority for restoration because they already contain many components of the desired condition, and a single treatment may come close to meeting the desired condition, but if lost, would take centuries to replace. See http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5120031.pdf.

Ladder fuel – Fuel, such as branches, shrubs, or an understory layer of trees, which allow a fire to spread from the ground to the canopy.

Landscape scale – A spatial scale and extent expressed in geographic terms within which to target action, e.g., projects aimed at forest landscape restoration. In this analysis, the landscape scale for vegetation is the ponderosa pine extent.

Large tree – A large tree as defined in the revised “Mexican Spotted Owl Recovery Plan” (USDI 2012) is a tree greater than 18-inch d.b.h.

Litter – The top layer of the forest, shrubland, or grassland floor above the duff layer, including freshly fallen leaves, needles, bark, flakes, fruits (e.g., acorns, cones), cone scales, dead matted grass, and a variety of accumulated dead organic matter which is unaltered or only slightly decomposed. This layer typically does not include twigs and larger stems. One rough measure to distinguish litter from duff is that you can pick up a piece of litter and tell what it was (a leaf or

leaf part, a needle, etc.). Duff is generally not identifiable. There is a gradient, not a clear division between litter and duff.

LOPFA – Landscapes outside of goshawk post-fledgling family areas as referenced in the Coconino NF and Kaibab NF forest plans.

Management area – The mission, goals, and objectives for the forest are realized by applying groups of management activities to specific units of land. Groups of management activities are called “prescriptions” and the land units are called “management areas.”

Mature tree – A tree that has attained most of its potential height growth.

Mechanical treatment – Any activity (e.g., silvicultural thinning, biomass removal) performed by human-controlled tools (e.g., chain saw, feller-buncher) that results in the removal or alteration of wood fiber. Does not include the use of fire.

Mexican spotted owl habitat – Three levels of habitat management are described in the recovery plan: protected areas, restricted areas, and other forest and woodland types.

Monitoring – A systematic process of collecting and storing data related to natural systems at specific locations and times. Determining a system’s status at various points in time yields information on trends, which is crucial in detecting changes in systems.

Mosaic – The spatial arrangement of habitat where there is stand heterogeneity, measured at many spatial scales from the patch, the stand, and the vegetative community.

Native species – a species which is an indigenous (originating where it is found) member of a biotic community. The term implies that humans were not involved in the dispersal or colonization of the species.

Nest/roost recovery habitat – Areas managed to replace nest/roost habitat lost to disturbance or senescence and to provide new nest/roost habitat for a recovering owl population (USDI 2012).

Nonmarket values – The benefits and values associated with national forests that do not have a monetary price including clean water and air, biodiversity, forest products, and other goods and services.

Nutrient cycling (soil) – The circulation of chemicals necessary for life, from the environment (mostly from soil and water) through organisms and back to the environment.

Old growth – The last stage in forest succession. Old-growth habitat is the sum of the physical and biological components of old-growth forest that are essential to maintaining populations of certain old growth dependent species of wildlife (Kaibab NF forest plan glossary).

Old growth protection and large tree retention strategy (OGP and LTRS) – Strategy developed by the 4FRI stakeholders in 2010 (finalized in 2011), which provides recommendations relating to the retention of large post-settlement and old growth trees.

Openness – The percentage of the forested area that is grass/forb/shrub interspace. In this analysis, the term “openness” is used interchangeably with the term “canopy density.” Classifications of openness for the 4FRI analysis are:

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- Very Open = 70 to 90 percent interspace
- Open = 40 to 70 percent interspace
- Moderately Closed = 25 to 40 percent interspace
- Closed = <25 percent interspace

Operational road maintenance levels – The level of service provided by, and maintenance required for, a specific road, consistent with road management objectives and maintenance criteria (FSH 7709.58, 12.3). There are five levels:

Level 1: These are roads that have been placed in storage between intermittent uses. The period of storage must exceed 1 year. Basic custodial maintenance is performed to prevent damage to adjacent resources and to perpetuate the road for future resource management needs.

Level 2: Assigned to roads open for use by high-clearance vehicles. Passenger car traffic, user comfort, and user convenience are not considerations.

Level 3: Assigned to roads open and maintained for travel by a prudent driver in a standard passenger car.

Level 4: Assigned to roads that provide a moderate degree of user comfort and convenience at moderate travel speeds. Most roads are double lane and aggregate surfaced.

Level 5: Assigned to roads that provide a high degree of user comfort and convenience. These roads are normally double lane, paved facilities.

Overmature tree – A tree that has reached that stage of development when it is declining in vigor and health and reaching the end of its natural lifespan. Indications of later life stages in southwestern ponderosa pine include yellowing bark, large limbs, dead and/or dying limbs, flat tops, snag tops, lightning scars, and burn scars (cat face).

Passive crown fire – A fire in the crowns of trees in which trees or groups of trees torch, ignited by the passing front of the fire. The torching trees reinforce the spread rate, but these fires are not basically different from surface fires.

PFA – Goshawk post-fledgling family area as referenced in the Coconino NF and Kaibab NF forest plans.

Pile burning – Activity fuels, once piled by machine or by hand, are burned in place.

Planned ignition – The intentional initiation of a wildland fire by hand-held, mechanical, or aerial device where the distance and timing between ignition lines or points, and the sequence of igniting them is determined by environmental conditions (weather, fuel, topography), firing technique, and other factors which influence fire behavior and fire effects (see prescribed fire).

Precommercial thinning – The removal of trees not for immediate financial return but to reduce stocking to concentrate growth on the more desirable trees (SAF 2008).

Prescribed fire – A wildland fire originating from a planned ignition to meet specific objectives identified in a written, approved, prescribed fire plan for which NEPA requirements (where applicable) have been met prior to ignition (see planned ignition).

Properly functioning condition (PFC) – A methodology for assessing the physical functioning of riparian and wetland areas. The term PFC is used to describe both the assessment process and a defined, on-the-ground condition of a riparian-wetland area (National Riparian Service Team Definition, 2013).

Protected habitat (Mexican spotted owl) – Protected habitat consists of protected activity centers (PACs), slopes greater than 40 percent where timber harvest has not occurred in the last 20 years (steep slopes), and reserved lands which include wilderness, research natural areas, wild and scenic rivers, and congressionally recognized wilderness study areas. The primary objective for protected habitat is the protection of the best available habitat for Mexican spotted owls while retaining management flexibility to abate high fire risk and to improve habitat conditions for the owl and its prey.

Proposed action – In terms of the National Environmental Policy Act, the project, activity, or action that a Federal agency intends to implement or undertake (Coconino NF forest plan glossary).

Recovery unit – A specific geographic area, identified mainly from physiographic provinces, used to evaluate the status of Mexican spotted owls and within which to develop specific management guidelines (USDI 2012). The recovery unit specific to this analysis is the Upper Gila Mountain Recovery Unit (RU), also referred to as the UGMRU.

Recreational opportunity spectrum (ROS) – A classification system that describes different outdoor recreation settings across the forests using seven standard classes that range from primitive, undeveloped settings to urban, highly developed settings. Attributes typically considered in describing the settings are size, scenic quality, type, and degree of access, remoteness, level of development, social encounters, and the amount of onsite management. See the recreation and scenery report for additional information.

Reference condition (also referred to as historic reference condition) – A range of conditions (found in the present or the past) against which the effects of past and future actions can be compared. These states can provide an explicit, historically-based context for comparing different management effects. Examples include periods before fire suppression or the arrival of an invasive species, or a similar but “healthier” modern ecosystem. Ideally, these environmental conditions are based on functioning ecosystems where natural ecosystem structure, composition, and function are operating with limited human intervention (very minor human-caused ecological effects).

Regenerate – The act of renewing tree cover by establishing young trees naturally or artificially (SAF 2008).

Research natural area (RNA) – An area in as near a natural condition as possible that exemplifies typical or unique vegetation and associated biotic, soil, geologic, and aquatic features. RNAs are set aside to preserve a representative sample of an ecological community, primarily for scientific and educational purposes. Normally between 300 and 1,200 acres in size (Coconino NF forest plan glossary).

Residence time – Time required for the flaming front of a fire to pass a stationary point at the surface of the fuel. The length of time the flaming front occupies one point; relates to downward heating and fire effects below the surface.

Resiliency – The capacity of a (plant) community or ecosystem to maintain or regain normal function and development following disturbance (SAF 2008).

Resource protection measures – Measures (design features or mitigation) implemented to minimize nonpoint source pollution as outlined in the intergovernmental agreement between the Arizona Department of Environmental Quality and the Southwestern Region of the Forest Service (ADEQ 2008).

Restoration subunit (SU) – A contiguous geographic area that ranges from 4,000 acres to 109,000 acres in size. Boundaries are based on 6th code watershed boundaries, state and forest transportation systems, and forest administrative boundaries.

Restoration treatments – Treatments that help recover forest ecosystem resilience and the adaptive capacity of forest ecosystems that have been degraded, or are otherwise outside the natural range of variation that would preclude sustainability through time.

Restoration unit (RU) – A contiguous geographic area that ranges from 46,000 acres to 335,000 acres in size where a need for change (vegetation structure, pattern, spatial arrangement, potential for destructive fire behavior and effects) has been identified. Restoration unit boundaries are based on 6th code watershed boundaries, state and forest transportation systems, and forest administrative boundaries

Restricted habitat (Mexican spotted owl) – In the case of the 4FRI, restricted habitat is ponderosa pine-Gambel oak habitat that does not meet the definitions of protected habitat, i.e., there are no known resident Mexican spotted owls, it is not on a slope with 40 percent or greater slope and has not had timber harvested in the last 20 years, and is not considered a reserved land (e.g., designated wilderness, research natural areas, etc.). The objective in restricted habitat is to manage the landscape to maintain and create replacement owl habitat where appropriate while providing a diversity of stand conditions and stand sizes across the landscape.

Riparian area – Riparian ecosystems are distinguished by the presence of free water within the common rooting depth of native perennial plants during at least a portion of the growing season. Riparian ecosystems are normally associated with seeps, springs, streams, marshes, ponds, or lakes. The potential vegetation of these areas commonly includes a mixture of water (aquatic) and land (phreatic) ecosystems (Coconino NF forest plan glossary).

Road construction or reconstruction – Supervising, inspecting, actual building, and incurrence of all costs incidental to the construction or reconstruction of a road (36 CFR 212.1).

Road decommission – Activities that result in the stabilization and restoration of unneeded roads to a more natural state (36 CFR 212.1, FSM 7705—Transportation System, USDA 2003). FSM 7712.11- Exhibit 01 identifies five levels of treatments for road decommissioning which can achieve the intent of the definition. These include blocking the entrance, revegetation waterbarring, removing fills and culverts, establishing drainageways and removing unstable road shoulders, and full obliteration, recontouring, and restoring natural slopes.

Road reconstruction and improvement – Any activity that results in an increase of an existing road’s traffic service level, expansion of its capacity, or a change in its original design function. Activities include, but are not limited to, the construction of bridges and major culverts, placing bar ditches, subgrade repairs, shoulder widening, lane widening, ditch widening, roadway prism widening, horizontal and vertical alignment changes, curve widening, and improving site distance at road intersections. Vegetation would likely be removed with these activities.

Road reconstruction and relocation – Any activity that moves all or parts of the horizontal and vertical alignment of a road, i.e., the roadway prism to a new location and decommissions the old alignment. Generally, realignments are for the purpose of moving the road location to a more suitable area to mitigate impacts to streams, critical wildlife habitat, and other natural or cultural resources. Often, reconstruction is used interchangeably with road relocation. This activity includes creating a new road alignment in an upland position, installing the proper drainage features, signage, and surfacing on the new road alignment, and decommissioning of the old road alignment. The new road alignment would require the removal of vegetation at the new alignment site.

Road (route) obliteration – See road decommission.

Road realignment – Activity that results in a new location of an existing road or portions of an existing road and treatment of the old roadway.

Scenery management systems (SMS) – Guidance developed by the Forest Service for managing scenery and determining the relative value and importance of scenery in the national forest (also see VMS and the scenery specialist report for additional information).

Second order fire effects – The secondary effects of fire such as tree regeneration, plant succession, and changes in site productivity. Although second order fire effects are dependent, in part, on first order fire effects, they also involve interaction with many other nonfire variables (e.g., weather).

Severity – The quality or state of distress inflicted by a force. The degree of environmental change caused by a disturbance (e.g., fire).

Slash – The residue left on the ground after timber harvest or as a result of storms, fire, girdling, or poisoning. Slash includes unused logs, uprooted stumps, broken or uprooted stems, and the heavier branchwood, lighter tops, twigs, leaves, bark, and chips.

Snag – Standing dead tree from which the leaves or needles have fallen.

Soil function – The characteristic physical and biological activity of soils that influences productivity, capability, and resiliency (FSM 2521.05).

Soil productivity – The capacity of soil, in its normal environment, to support plant growth.

(Soil) Tolerance – The point beyond which there is high risk that potential may be permanently altered or impaired through changes in specified physical, chemical, and biological factors brought about by management activities or natural events (FSM 2521.05).

Spatial pattern – Arrangement of forested areas and openings on the landscape.

Spring – In this analysis, springs are natural water features that existed prior to Euro-American settlement and were probably functional due to lack of human disturbances (USDA 2009).

Stand – A contiguous area of trees sufficiently uniform in forest type, composition, structure, and age class distribution, growing on a site of sufficiently uniform conditions to be a distinguishable unit. Four classification characteristics are generally used to distinguish forest stands: biophysical site (soils, aspect, elevation, plant community association, climate, etc.), species composition, structure (density, and age (1-aged, 2-aged, uneven-aged)), and management emphasis (administrative requirements and local management emphasis that will shape structure over time). Based upon Agency guidelines, the minimum stand mapping size is 10 acres.

Stand density – A measure of the degree of crowding of trees within stocked areas commonly expressed by various growing space ratios (e.g., height/spacing) (SAF 2008).

Stand density index (SDI) – A measure of the stocking of a stand of trees based on the number of trees per unit area and diameter at breast height (d.b.h.) of the tree of average basal area. It may also be defined as the degree of crowding within stocked areas, using various growing space ratios based on crown length or diameter, tree height or diameter, and spacing. The computed value of SDI is often compared to the species maximum to determine the relative “stand density” or stocking of the stand.

Stand structure – The horizontal and vertical distribution of components of a forest stand including the height, diameter, crown layers, and stems of trees, shrubs, herbaceous understory, snags, and down woody debris (SAF 2008).

State Historic Preservation Office (SHPO) – The state office responsible for consultation and assistance regarding the presence and significance of cultural resources in a project area, efforts needed to find and evaluate them, whether the project will cause harmful effects to the cultural resource, and how to reduce or avoid the harm.

Stratum/strata (plural) – A layer of soil with internally consistent characteristics that distinguish it from other layers.

Surface fire – A fire that burns over the forest floor, consuming litter, killing aboveground parts of herbaceous plants and shrubs, and typically scorching the bases and crowns of trees. See also backing fire, crown fire, fire, flanking fire, ground fire, head fire, and understory fire.

Surface fuel – Fuels lying on or near the surface of the ground, consisting of leaf and needle litter, dead branch material, downed logs, bark, tree cones, and low stature living plants. See also duff, fuel, large woody debris, and litter.

Target habitat – A category of Mexican spotted owl restricted habitat intended to provide future nesting and roosting habitat (see definition for restricted habitat). A variety of forest structural attributes is used to define nesting and roosting habitat (summarized in table III.B.1 of the recovery plan and table C-2 of the draft recovery plan). The minimum values identified for the forest attributes represent the threshold for meeting nesting and roosting conditions (see the definition for threshold habitat). They can also be targets to be achieved with time and management. If less than 10 percent of the restricted habitat in ponderosa pine-Gambel oak qualifies as threshold habitat, the areas that can eventually achieve all threshold conditions simultaneously should be identified as *target habitat* and managed to achieve threshold

conditions as rapidly as possible. Because no known Mexican spotted owl nests or roosts occur in restricted habitat, target habitat is considered future nesting and roosting habitat.

Temporary road or trail – A road or trail necessary for emergency operations or authorized by contract, permit, lease, or other written authorization that is not a forest road or trail and that is not included in a forest transportation atlas (36 CFR 212).

Threatened and endangered species – Species identified by the Secretary of the Interior in accordance with the 1973 Endangered Species Act, as amended. See the wildlife report for additional information.

Threshold habitat – A category of Mexican spotted owl restricted habitat intended to provide for future nesting and roosting habitat (see definition for restricted habitat). A variety of forest structural attributes is used to define when nesting and roosting habitat is achieved (summarized in table III.B.1 of the recovery plan and table C-2 of the draft recovery plan). These values are targets that can be achieved with time and management (see definition for target habitat). When the minimum values identified for the forest attributes are met simultaneously, they represent the *threshold* of nesting and roosting conditions. Ten percent of restricted habitat in ponderosa pine-Gambel oak should be designated as threshold habitat. Management in threshold habitat cannot lower any of the forest attribute values below the nesting and roosting threshold unless a landscape analysis demonstrates an abundance of this habitat. Because no known Mexican spotted owl nests or roosts occur in restricted habitat, target habitat is managed as future nesting and roosting habitat.

Total maximum daily load (TMDL) – A written analysis that determines the maximum amount of a pollutant that a surface water can assimilate (the “load”), and still attain water quality standards during all conditions. The TMDL allocates the loading capacity of the surface water to point sources and nonpoint sources identified in the watershed, accounting for natural background levels and seasonal variation, with an allocation set aside as a margin of safety. See the water quality and riparian specialist report for additional information.

Torching – See passive crown fire.

Traditional cultural property (TCP) – Traditional use areas and places that have been used by cultural groups over generations. TCPs within the project area include the San Francisco Peaks on the Coconino NF and Red Butte and Bill Williams Mountain on the Kaibab NF. Natural springs are also considered TCPs and/or sacred sites by some tribes. Many plants are gathered for ceremonial use on or near TCPs. See appendix A of the heritage report for additional discussion on management of TCPs.

Travel Management Rule (TMR) – On December 9, 2005, the Forest Service published the TMR. The Agency rewrote direction for motor vehicle use on National Forest System lands under 36 CFR, Parts 212, 251, and 261, and eliminated 36 CFR 295. The rule was written to address, at least in part, the issue of unmanaged recreation. The rule provides guidance to the Forest Service on how to designate and manage motorized recreation on the forests. The rule requires each national forest and grassland to designate those roads, motorized trails, and areas that are open to motor vehicle use.

Trees per acre (TPA) – a count of the total number of trees on an acre.

Unauthorized road – A road that is not a forest road or a temporary road or trail and that is not included in a forest transportation atlas (36 CFR 212).

Understory – The trees and other woody species growing under a more or less continuous cover of branches and foliage formed collectively by the upper portion of adjacent trees and other woody growth. In this analysis, the term understory is also referred to as “herbaceous understory.”

Uneven-aged forests – Forests that are comprised of three or more distinct age classes of trees, either intimately mixed or in small groups.

Uneven-aged management – The application of a combination of actions needed to simultaneously maintain continuous high forest cover, recurring regeneration of desirable species, and the orderly growth and development of trees through a range of diameter or age classes (to provide a sustained yield of forest products). Cutting is usually regulated by specifying the number or proportion of trees of particular sizes to retain within each area, thereby maintaining a planned distribution of size classes. Cutting methods that develop and maintain uneven-aged stands are single-tree selection and group selection.

Vegetation structural stage (VSS) – A method of describing forest age and tree size from seedling to old forests. The VSS classification is based on the tree size class with the highest square foot of basal area and is an indication of the dominant tree diameter distribution (see silvicultural report for details (McCusker, 2013).

Visual Management System (VMS) – The VMS was used to develop visual quality objectives (VQOs) that are prescribed in the forest plan for all lands within the CNF. The VQO classifications range from preservation, retention, partial retention, modification, to maximum modification. The VMS process has been updated in the Scenery Management System (SMS). See the scenery report for additional information.

Watershed – The area that contributes water to a drainage or stream (Coconino NF forest plan glossary).

Watershed condition – The state of a watershed based upon physical and biological characteristics and processes affecting hydrologic and soil functions (FSM 2521.05).

Watershed condition framework – A framework established by the Forest Service that provides a new consistent, comparable, and credible process for improving the health of watersheds on national forests and grasslands. The framework includes a technical guide which provides protocol for assessing watershed condition across all 193 million acres of National Forest System lands (<http://www.fs.fed.us/publications/watershed>).

Water quality – See Clean Water Act

Water yield – The total net amount of water produced including streamflow and groundwater recharge (Coconino NF forest plan glossary).

Wildland fire – A general term describing any nonstructure fire that occurs in the wildland.

Wildland-urban interface (WUI) – The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetation fuels. WUI areas are

spread across the project area and are located within or adjacent to the communities of Flagstaff (RU 1, 3, 4, 5), Williams (RU 3, 4), Tusayan (RU 6), Parks (RU 3, 4), Belmont (RU 3, 4), and scattered developments such as Doney Park (RU 5), Munds Park (RU 1), and Kachina Village (RU 3).

Woody debris – The dead and downed material on the forest floor consisting of fallen tree trunks and branches.

