

Appendix F – 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.

Activity fuels – Fuels resulting from, or altered by, forestry practices such as mechanical thinning or fuel management, as opposed to naturally created fuels (National Wildfire Coordinating Group 2018).

Adaptive management – The general framework encompassing the three phases of planning: assessment, plan development, and monitoring (36 CFR 219.5). This framework supports decision-making that meets management objectives while simultaneously accruing information to improve future management by adjusting the plan or plan implementation. Adaptive management is a structured, cyclical process for planning and decision-making in the face of uncertainty and changing conditions with feedback from monitoring, which includes using the planning process to actively test assumptions, track relevant conditions over time, and measure management effectiveness (FSH 1909.12, 05)

Administrative National Forest System roads – Maintenance level 2-5 roads with motorized access restricted to administrative use only. Traffic may be managed with gates. See Road maintenance levels.

Advancing fire – See Head fire.

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

Aquatic management zone (AMZ) – An administratively designated zone adjacent to stream channels and other waterbodies. The AMZ is delineated for applying special management controls aimed at maintaining and improving water quality or other water and riparian-dependent values, including groundwater-dependent ecosystems. The width of the AMZ is determined based on site-specific factors and local requirements. AMZ delineation may encompass the floodplain and riparian areas when present.

Background – The distant part of a landscape or surroundings, especially that behind something which provides harmony or contrast. Background is usually located 3 to 5 miles from the observer (Fargo 2018).

Backing fire – Fire spreading, or ignited to spread, into (against) the wind or downslope. A fire spreading on level ground in the absence of wind is a backing fire. May also refer to a portion of a fire with slower rates of fire spread and lower intensity normally moving into the wind and/or down slope. Also called a heel fire (National Wildfire Coordinating Group 2018).

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

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

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 – Multiple definitions include: an effect produced by heating; to undergo combustion (consume fuel and give off light, heat, and gases); 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) – The lowest height above the ground at which there is a sufficient amount of canopy fuel to propagate fire vertically into the canopy (Scott and Reinhardt 2001). It is 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)).

Canopy bulk density (CBD) – The mass of available canopy fuel per unit volume. It is a bulk property of a stand of trees, not individual trees (Scott and Reinhardt 2001). CBD is a good indicator of potential active crown fire (Scott 2003; Stratton 2009).

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 (Agee and Skinner 2005; Scott 2003; Scott and Reinhardt 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, that is, the percent of vertically projected canopy cover in the stand (Scott and Reinhardt 2005).

Clean Water Act – A congressional 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 (1972).

Closed road – An existing system road closed to vehicular traffic, including administrative traffic. Closed roads are coded maintenance level 1 in the forest transportation atlas database.

Clump – The aggregate of stems issuing from the same root, rhizome system, or stool; or an isolated generally dense group of trees (Society of American Foresters 1998). A clump is relatively isolated from other clumps or trees within a group of trees, but a stand-alone clump of trees can function as a tree group or a single structure (Reynolds and others 2013).

Coarse woody debris – Woody debris derived from tree limbs, boles, and roots, and larger than 7.5 cm (3 inches) in diameter (Graham and others 1994).

Comprehensive restoration – Restoration treatments that are designed to complement thinning and prescribed burning restoration treatments in target cover types. These treatments are proposed in order to restore non-target vegetation cover types and improve habitat for aquatic and terrestrial wildlife and rare plants. Comprehensive restoration activities include aspen restoration; restoration of areas that have experienced severe disturbances; restoration of savannas, grasslands, meadows, springs, and streams; road decommissioning and relocation; and construction of barriers to protect sensitive areas and species from grazing. See Target cover type.

Condition class – Depiction of the degree of departure from historical fire regimes, possibly resulting in alterations of key ecosystem components. The risk of loss of key ecosystem components from wildfires increases from Condition Class 1 (lowest risk) to Condition Class 3 (highest risk) (National Wildfire Coordinating Group 2018). See also Fire regime condition class.

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.

Connectivity – Ecological conditions that exist at several spatial and temporal scales that provide landscape linkages that 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 (36 CFR 219.19).

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

Controlled burn – See Prescribed fire.

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 (National Wildfire Coordinating Group 2018).

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.

Decommissioned roads – Roads that have been permanently removed from the National Forest System. They continue to be tracked in the forest transportation atlas for future reference. See also Road decommissioning.

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)

Design features – Mitigation measures, best management practices, and conservation measures that are applied in treatment areas in order to mitigate, reduce, or avoid negative impacts of treatment activities. These features are developed based on forest plan direction, the Soil and Watershed Conservation Practices Handbook (USDA, 1990), the National Best Management Practices for Water Quality Management on National Forest System Lands, Volume 1: National Core BMP Technical Guide (FS990a), and resource specialist recommendations.

Desired conditions – A description of specific social, economic, and/or ecological characteristics of the (forest) plan area, or a portion of the (forest) plan area, toward which management of the land and resources should be directed. Desired conditions must be described in terms that are specific enough to allow progress toward their achievement to be determined, but do not include completion dates. Desired

conditions are achievable, and may reflect social, economic, or ecological attributes, including ecosystem processes and functions (FSH 1909.12, 05).

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

Distance zones – Areas of landscapes (foreground, middleground, or background) denoted by specific distances from the observer. Distance zones are used as a frame of reference in which to discuss landscape characteristics or activities of humans (Fargo 2018).

Disturbance – Any relatively discrete event in time that disrupts ecosystem, watershed, community, or species population structure and/or function and changes resources, substrate availability, or the physical environment (Regulations).

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), (White and Pickett 1985), (Agee 1993), (Skinner and Chang 1996), (Turner and Gardner 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 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) (Werth and others 2011).

Duff – The fermentation and humus layer lying below the litter layer but above mineral soil and consisting of partially decomposed organic matter whose origins can still be visually determined, as well as the fully decomposed humus layer. Neither freshly cast material in the litter layer, nor ash following a fire, is included in the duff layer (Brown and Smith 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 management unit (EMU) – A specific geographic area, identified based on physiographic provinces, biotic regimes, perceived threats to owls or their habitat, administrative boundaries, and known patterns of owl distribution, which is used to evaluate the status of Mexican spotted owls and for which to specific management guidelines were developed (USDI 2012). The EMUs specific to this analysis are the Upper Gila Mountains and Basin and Range West EMUs.

Ecological restoration – 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 ecosystems sustainability, resilience, and health under current and future conditions (FSH 1909.12, 05).

Economic efficiency analysis – Analysis of the net present value of the stream of benefits less the stream of costs over the life of a project (Jaworski 2018).

Economic impact analysis – Analysis of the changes in employment, labor income, and/or output in an economy due to a policy, program, or project (Jaworski 2018).

Ecosystem – 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:

Composition – The biological elements within the different levels of biological organization, from genes and species to communities and ecosystems.

Structure – 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.

Function – 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.

Connectivity – See also Connectivity (36 CFR 219.19).

Ecosystem resilience – The ability of an ecosystem to absorb and recover from disturbances without altering its inherent functions (SER 2004).

Ecosystem services – Benefits people obtain from ecosystems, including:

- ♦ provisioning services, such as clean air and fresh water, energy, food, fuel, forage, wood products or fiber, and minerals;
- ♦ 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;
- ♦ supporting services, such as pollination, seed dispersal, soil formation, and nutrient cycling; and
- ♦ cultural services, such as educational, aesthetic, spiritual, and cultural heritage values, recreational experiences, and tourism opportunities (FSH 1909.12, 05).

Ecosystem sustainability – The capacity of ecosystems to maintain ecosystem services in perpetuity without degradation of its productivity and function at all scales. For example, in the context of a restoration framework, sustainability results in maintaining the key elements in space and time (Reynolds and others 2013).

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 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.

Even-aged stand – A stand of trees composed of a predominately single age class in which the range of tree ages is usually less than 20 percent of the intended rotation.

Facilitative operations – The use of mechanical treatments or prescribed fire in non-target cover types (e.g., pinyon-juniper) to support the use of prescribed fire in cover types targeted for restoration (e.g., ponderosa pine types) when those non-target cover types lie between target cover types and natural or man-made features appropriate to use as prescribed fire unit boundaries. Facilitative operations are designed to improve safety and treatment effectiveness, expand burn windows, decrease undesirable fire behavior and effects, and minimize disturbance from fireline construction. Mechanical facilitative operations may include mastication/chipping; lop and scatter; thinning/limbing; and moving, rearranging, or removal of jackpots or excessive surface fuels. Prescribed fire facilitative operations may include broadcast burning, jackpotting, pile burning, or blacklining.

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

Fire front – The part of a fire within which continuous flaming combustion is taking place. Unless otherwise specified, the fire front is assumed to be the leading edge of the fire perimeter. In ground fires, the fire front may be mainly smoldering combustion (National Wildfire Coordinating Group 2018).

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

Fireline intensity – Rate of heat release per unit time per unit length of fire front. It is a quantitative measure of fire behavior that is a measure of the fire itself (not its effects). Indicators of fireline intensity include flame length, flame height, peak temperatures, energy output/time, and scorch height (as in indicator of flame height).

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 and others 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

Fire Regime V – 200+ year frequency and high severity

Fire regime current condition class – A qualitative measure classified into three classes describing the relative degree of departure from historical fire regimes, possibly resulting in alterations of key ecosystem components such as species composition, structural stage, stand age, canopy closure, and fuel loadings (National Wildfire Coordinating Group 2018). See also Condition class.

Fire return interval – The number of years between two successive fires in a designated area. 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 severity – A qualitative evaluation of immediate effects produced by the heat pulse of a fire on the biotic and abiotic components of an ecosystem. Indicators include the amount of biomass consumed, changes in the amount of mineral soil exposed, soil color, and top-killed surface vegetation.

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.

Flame length – The length of flames in the propagating fire front measured along the slant of the flame from the midpoint of its base to its tip.

Flanking (lateral) fire – A fire whose rate or spread and intensity usually falls somewhere in between advancing and backing with spread lateral to the main direction of fire travel (National Wildfire Coordinating Group 2018).

Flexible toolbox approach – A condition-based management framework that allows for consistent selection of the most appropriate treatment for any given set of existing conditions by applying an “if/then” approach. For example, if condition “X” exists on the ground, then treatment “Y” will be applied as the most appropriate means of moving a resource towards desired conditions. Alternatives two and three both incorporate two separate flexible toolbox approaches as part of their proposed activities: one for aquatic and watershed restoration activities and one for mechanical thinning restoration treatments.

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 (Coulloudon and others 1999).

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

Foreground – The detailed landscape typically found within zero to one-fourth mile of the observer (Fargo 2018).

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 (Foresters).

Forest plan (also referred to as a land and resource management plan or land management plan) – A document or set of documents that provide management direction for an administrative unit of the NFS developed under the requirements of the applicable planning rule. Forest plans provide a framework for integrated resource management and for guiding project and activity decision making on a national forest, grassland, prairie, or other administrative unit (Regulations).

Fuel – Living and dead vegetation that can be ignited.

Fuel continuity – A qualitative description of the distribution of fuel, both horizontally and vertically. Continuous fuel supports fire spread better than discontinuous fuel.

Fuel load – The amount of combustible material (usually measured by weight) present per unit area.

Fuel type – An identifiable association of fuel elements of distinctive species, form, size, arrangement, or other characteristics that will cause a predictable rate of spread, or resistance to control under specified weather conditions.

Ground fire – Fire that consumes the organic material below the litter layer, mostly by smoldering combustion. Fires in duff, peat, dead moss and lichens, and partly decomposed wood are typically ground fires. See also Surface fire and Underburn (National Wildfire Coordinating Group 2018).

Group – A cluster of two or more trees with interlocking or nearly interlocking crowns at maturity, surrounded by grass-forb-shrub interspaces. Size of tree groups is typically variable depending on forest type and site conditions and can range from fractions of an acre (e.g., a two-tree group), such as in ponderosa pine or dry mixed-conifer forests, to many acres, as is common in wet mixed-conifer and spruce fir forests. Trees within groups are typically non-uniformly spaced, some of which may be tightly clumped (Reynolds and others 2013).

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 (Foresters 1998)

Habitat – The dwelling place of an organism or community that provides the requisite conditions for its life processes (Society for Ecological Restoration International Science & Policy Working Group 2004).

Hand thinning – See Mechanical thinning.

Head (advancing) fire – That portion of a fire with rapid fire spread with higher intensity which is normally burning with the wind and/or up slope (National Wildfire Coordinating Group 2018).

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 Resource report.

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

Historical range of variation – See Natural range of variation.

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 Watershed and Aquatics reports for additional information.

Interspace(s) – Areas not currently under the vertical projection of the outermost perimeter of tree canopies (drip-line). They are generally composed of grass-forb-shrub communities but could also be areas with scattered rock or exposed mineral soil. Interspaces do not include meadows, grasslands, rock outcroppings, and wetlands (i.e., exclusions adjacent to and sometimes within forested landscapes). As spaces between trees, tree groups and tree clumps, interspaces contribute to the “open canopy” character of frequent-fire forests. They often connect with other interspaces and thus are variably shaped and sized. Interspaces and tree group locations are dynamic and shift over time (Reynolds and others 2013). See also Openings.

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.

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 unit of land approximately 10,000 acres or greater, typically composed of variable elevations, slopes, aspects, soils, plant associations, and natural ecological processes. 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 inches 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.

Management area – A spatially defined area with a common set of desired conditions, objectives, standards, guidelines, suitability determinations, and monitoring requirements that may differ from those of the general forest. Management areas are defined by the desired settings and types of uses that would occur within in them under the forest plan.

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

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

Middleground – The space between the foreground and background in a viewed landscape. The area is usually located from one-fourth through one-fourth to 3 through 5 miles from the observer (Fargo 2018).

Monitoring – A systematic process of collecting information to evaluate effects of actions or changes in conditions or relationships (Regulations).

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

Motorized trail – A trail designated for motorized vehicle travel that is wholly or partly within or adjacent to and serving the National Forest System that the Forest Service determines is necessary for the protection, administration, and utilization of the National Forest System and the use and development of its resources (Regulations).

Motorized vehicle – A self-propelled vehicle, other than a vehicle operated on rails or a wheelchair or mobility device (including one that is battery powered) that is designed solely for use by a mobility-impaired person for locomotion and that is suitable for use in an indoor pedestrian area.(Regulations)

National Forest System road – A forest road other than a road which has been authorized by a legally documented right-of-way held by a State, county, or other local public road authority (Regulations).

National Forest System trail – A forest trail other than a trail which has been authorized by a legally documented right-of-way held by a State, county, or other local public road authority (Regulations).

Natural range of variation – A description of the change over time and space in the ecological condition of potential natural vegetation types and the ecological processes that shape those types. Potential natural vegetation types (PNVTs) represent the vegetation type and characteristics that would occur when natural disturbance regimes and biological processes prevail (Keane and others 2009; Reynolds and others 2013; Schussman and Smith 2006).

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.

Nesting and roosting recovery habitat – Areas managed to replace nesting and roosting habitat lost to disturbance or senescence and to provide new nesting and roosting habitat for a recovering owl population.

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.

Northern goshawk post-fledging family areas (PFAs) – Areas that surround the nest areas. They represent an area of concentrated use by the northern goshawk family until the time the young are no longer dependent on adults for food. PFAs are approximately 420 acres in size (not including the nest area acres)

Noxious weed – A legal term applied to plants regulated by Federal and state laws, such as plants designated as noxious weeds by the Secretary of Agriculture or by the responsible state official. Noxious

weeds generally possess one or more of the following characteristics: aggressive and difficult to manage, poisonous, toxic, parasitic, a carrier or host of serious insect or disease, and being not native or new or not common to the United States or parts thereof.

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.

Objective road maintenance level – The maintenance level to be assigned to a road or road segment at a future date considering future road management objectives, traffic needs, budget constraints, and environmental concerns. The objective maintenance level may be the same as, higher than, or lower than the operational maintenance level. The transition from operational maintenance level to objective maintenance level may depend on reconstruction or disinvestment. (FSH 7709.59, 62.31).

Old growth – In southwestern forested ecosystems is defined differently than the traditional definition based on Northwestern infrequent-fire forests. Due to large differences among Southwest forest types and their characteristic disturbances, old growth forests vary extensively in tree size, age classes, presence and abundance of structural elements, stability, and presence of understory. Important structural features of old growth in frequent-fire forests are large trees, old trees, age variability, snags, large dead and downed fuels, and between-patch structural variability (Reynolds and others 2013).

Old Growth Protection And Large Tree Retention Strategy – Strategy developed by the 4FRI stakeholders in 2011 (revised in 2012), which provides recommendations relating to the retention of large post-settlement and old growth trees (Stakeholders 2012).

Opening a road – The act of allowing motorized use on an existing maintenance level 1 National Forest System road. Activities to accommodate motorized use include removing physical barricades such as berms, boulders, vegetation, and re-establishing and maintaining drainages and runoff patterns along the roadway.

Openings – Generally persistent treeless areas having a fairly distinct shape or size, occurring naturally due to differences in soil types as compared to sites that support forests or woodlands. Openings include meadows, grasslands, rock outcroppings, and wetlands. They may also result from disturbances like severe fire or windthrow, or management activities to intentionally create space for new tree regeneration. Natural and created openings are not the same as interspaces found in frequent-fire forests or woodlands. See also Interspaces.

Openness – In this analysis, openness conveys the percentage of the forested area that is grass-forb-shrub interspace.

Open reference condition – Forested ponderosa pine areas with mollic-integrate soils to be managed as a relatively open forest with trees typically aggregated in small groups within a grass/forb/shrub matrix.

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.

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 (National Wildfire Coordinating Group 2018).

Percentile weather – For a given weather parameter (such as temperature, wind speed, relative humidity, precipitation, etc.,) the percent of days in a year that fall below it. For example, if the 90th percentile

temperature for a given location is 90°F, it means that for 90% of days in a year, the temperature is lower than 90°F.

Piling and burning (pile burning) – Piling slash resulting from logging or fuel management activities and subsequently burning the individual piles (National Wildfire Coordinating Group 2018).

Planned ignition – The intentional initiation of a wildland fire by hand-held, mechanical, or aerial devices 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 also Prescribed fire.

Potential natural vegetation type (PNVT) – Coarse-scale groupings of ecosystem types that share similar geography, soils, vegetation, and historic ecosystem disturbances such as fire, drought, and grazing by native species. PNVTs represent the vegetation type and characteristics that would occur when natural disturbance regimes and biological processes prevail.

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

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

Proper 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 activity center (PAC) – An area established around an owl nest (or sometimes roost) site, for the purpose of protecting that area. Management of these areas is largely restricted to managing for forest-health objectives (USDI 2012). See also Recovery habitat.

Proposed action – A proposal made by the Forest Service to authorize or implement an action to meet a specific purpose and need. A proposed action exists when the Agency gives public notice of a proposal (FSH 1909.15, 05).

Recovery habitat (Mexican spotted owl) – Areas outside of protected activity centers (PACs) that are managed as nest/roost, foraging, dispersal, and wintering habitat. Recovery habitat includes pine-oak, mixed-conifer, and riparian forests as well as rocky canyons (USDI 2012). See also Protected activity center.

Recreation opportunity spectrum – A framework for stratifying and defining classes of outdoor recreation environments, activities, and experience opportunities. The settings, activities, and opportunities for obtaining experiences are arranged across a continuum or spectrum of six classes: primitive, semiprimitive non-motorized, semiprimitive motorized, roaded natural, rural, and urban. 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 reports 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 (i.e., with very minor human-caused ecological effects).

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

Research natural area – Research natural areas are part of a national network of ecological areas designated in perpetuity for research and education and/or to maintain biological diversity on National Forest System lands. Research natural areas are principally for nonmanipulative research, observation, and study. They also may assist in implementing provisions of special acts, such as the Endangered Species Act of 1973 and the monitoring provisions of the National Forest Management Act of 1976 (Agriculture 2018).

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

Resilience – The ability of an ecosystem and its component parts to absorb, or recover from the effects of disturbances through preservation, restoration, or improvement of its essential structures and functions and redundancy of ecological patterns across the landscape (FSH 1909.12, 05).

Resource protection measures – Measures designed to:

- reduce the impacts of restoration activities to the productivity of soils and the functionality of aquatic ecosystems;

- protect stream water quality and temperature;

- minimize erosion and protect drainage system integrity on road ways;

- prevent the invasion or spread of noxious weeds on or originating from National Forest System lands; and

- minimize nonpoint source pollution as outlined in the 2013 intergovernmental agreement between the Arizona Department of Environmental Quality and the Southwestern Region of the Forest Service.

The resource protection measures included for this project refer to standard soil and watershed conservation practices and best management practices found in the Soil and Watershed Conservation Practices Handbook (USDA, 1990) and the National Best Management Practices for Water Quality Management on National Forest System Lands, Volume 1: National Core BMP Technical Guide (FS990a). Resource protection measures are implemented to.

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 variability that would preclude sustainability through time.

Riparian areas – Geographically delineable areas with distinctive resource values and characteristics that are comprised of the aquatic and riparian ecosystems (FSM 2526.05).

Riparian ecosystems – A transition area between the aquatic ecosystem and the adjacent terrestrial ecosystem; identified by soil characteristics or distinctive vegetation communities that require free or unbound water (FSM 2526.05).

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 decommissioning – Activities that result in the stabilization and restoration of unneeded roads to a more natural state (Regulations). Forest Service Manual 7734.1 identifies various treatments for road decommissioning which can achieve the intent of this definition. These include revegetation and slope stabilization, blocking the entrance or installing waterbars, removing fills and culverts, reestablishing drainages and removing unstable road shoulders, full obliteration, recontouring and restoring natural slopes, or other methods designed to meet the specific conditions associated with the unneeded road.

Road maintenance – The upkeep of the entire transportation facility including surface and shoulders, parking and side areas, structures, and such traffic-control devices as are necessary for its safe and efficient utilization (Regulations). This work may include brushing of roadside vegetation, falling danger trees, road blading, cleaning ditches, cleaning culvert inlets and outlets, or other activities designed to meet maintenance objectives.

Road maintenance levels – Defines the level of service provided by, and maintenance required for, a specific road, consistent with road management objectives and maintenance criteria (FSH 7709.59, 62.32). There are five levels:

NFS ROADS CLOSED TO ALL MOTOR VEHICLES:

Maintenance 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 to an acceptable level and to perpetuate the road for future resource management needs. Emphasis is normally given to maintaining drainage facilities and runoff patterns. Planned road deterioration may occur at this level. Appropriate traffic management strategies are “prohibit” and “eliminate” all traffic. Roads receiving level 1 maintenance may be of any type, class, or construction standard, and may be managed at any other maintenance level during the time they are open for traffic. However, while being maintained at level 1, they are closed to vehicular/ motorized traffic but may be available and suitable for non-motorized uses.

NFS ROADS OPEN TO ALL MOTOR VEHICLES:

Maintenance level 2 - Assigned to roads open for use by high-clearance vehicles. Passenger car traffic, user comfort, and user convenience are not considerations. Warning signs and traffic control devices are not provided with the exception that some signing, such as “Warning No Traffic” signs may be posted at intersections. Motorists should have no expectations of being alerted to potential hazards while driving these roads. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation, or other specialized uses. Log haul may occur at this level. Appropriate traffic management strategies are either to (a) discourage or prohibit passenger cars or (b) accept or discourage high-clearance vehicles.

NFS ROADS OPEN ONLY TO HIGHWAY LEGAL VEHICLES:

Maintenance level 3 - Assigned to roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. The Manual on Uniform Traffic Control Devices (MUTCD) is applicable. Warning signs and traffic control devices are provided to alert motorists of situations that may violate expectations. Roads in this maintenance level are typically low speed, with single lanes and turnouts. Appropriate traffic management strategies are either “encourage” or “accept.” “Discourage” or “prohibit” strategies may be employed for certain classes of vehicles or users.

Maintenance 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. However, some roads may be single lane. Some roads may be paved and/or dust abated. Manual on Uniform Traffic Control Devices (MUTCD) is applicable. The most appropriate traffic management strategy is “encourage.” However, the “prohibit” strategy may apply to specific classes of vehicles or users at certain times.

Maintenance level 5 – Assigned to roads that provide a high degree of user comfort and convenience. These roads are normally double lane, paved facilities. Some may be aggregate surfaced and dust abated. Manual on Uniform Traffic Control Devices (MUTCD) is applicable. The appropriate traffic management strategy is “encourage.”

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 sight 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 may require the removal of vegetation at the new alignment site.

Road (route) obliteration – See Road decommissioning.

Road realignment – See Road reconstruction and relocation.

Scenery Management System (SMS) – Guidance developed by the Forest Service for managing scenery and determining the relative value and importance of scenery in national forests. SMS was developed to better accommodate ecosystem management and the time frames and disturbance patterns of natural systems than the Visual Management System which it replaced. SIOs range from very high, meaning the landscape character is unaltered, to very low, meaning the landscape character is highly altered. Intermediate levels include high, moderate, and low. The revised Coconino (2018) and Apache-Sitgreaves (2016) Forest Plans use SMS for managing scenery. See also Visual Management System and the Scenery report for additional information (Fargo 2018).

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 non-fire variables such as weather.

Severity – The quality or state of distress inflicted by a force. The degree of environmental change caused by a disturbance such as 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 (Agriculture 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).

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.

State Historic Preservation Office – 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.

Suppression – A wildfire response strategy to “put the fire out”, as efficiently and effectively as possible, while providing for firefighter and public safety (National Wildfire Coordinating Group 2018).

Surface fire – A fire that burns loose debris on the surface, which includes dead branches, leaves, and low vegetation, and which may scorch the bases and crowns of trees. See also Backing fire, Crown fire, Flanking fire, Ground fire, Head fire, and Underburn (National Wildfire Coordinating Group 2018).

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, Coarse woody debris, and Litter.

Target cover type – Frequent fire-adapted ponderosa pine and mixed conifer forest types that are the targets for restoration treatments. The four target cover types for Rim Country include ponderosa pine, ponderosa pine-Gambel oak, ponderosa pine-evergreen oak, and dry mixed conifer.

Temporal – A characteristic that refers to the time at which a given data set was acquired. Also relates to measuring time.

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 (Regulations).

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.

Topography – The physical features of a geographic area, such as those represented on a map, taken collectively, especially the relief and contours of the land.

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 Watershed and Riparian report for additional information.

Torching – See Passive crown fire.

Traditional cultural property (TCP) – Traditional use areas and places that hold a central and important place in American Indian culture and have been used by cultural groups over generations. Natural springs, prominent bodies of water, and mountains are considered TCPs and/or sacred sites by numerous tribes. Many plants are gathered for ceremonial use on or near TCPs.

Travel management atlas – An atlas that consists of a forest transportation atlas and a motor vehicle use map or maps (Regulations)

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 – a count of the total number of trees on an acre.

Type conversion – Changing one vegetative type to another. Generally thought of as a rapid conversion from one type to a completely different type but can also occur subtly over time. This is different than successional trajectory where vegetation follows expected changes in type over time. An example is converting an area that would naturally contain mixed conifer hardwood forest to a pure conifer forest by removing hardwoods and planting only conifers. Another example could be suppressing frequent fires allowing conifers to shade out hardwoods converting mixed conifer hardwood forests to conifer forests.

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

Underburn – A fire that consumes surface fuels but not the overstory canopy (National Wildfire Coordinating Group 2018).

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. An uneven-aged, regulated forest is one which has a balanced progression of three or more age/size-classes, such that each younger/smaller class is advancing to replace the class above it on approximately the same acreage, until it is mature for harvest or other resource objectives. A regulated forest reaches sustained yield when the volume cut periodically equals the amount of net volume growth for that same period.

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 Silviculture report for details (Moore 2018).

Visual Management System (VMS) – The VMS was used to develop the visual quality objectives (VQOs) that are prescribed in the forest plan for all lands within the Tonto National Forest. The VQO classifications range from preservation, retention, partial retention, modification, to maximum modification. Since the development of the Tonto Forest Plan in 1985, the VMS has been replaced by the Scenery Management System (SMS). For treatments proposed on the Tonto National Forest, the current VMS is used to ensure consistency with the Tonto Forest Plan. However, the SMS terminology is used in this analysis to more clearly describe effects and for consistency with the terminology in the Coconino and Apache-Sitgreaves Forest Plans. See also Scenery Management System and the Scenery report for additional information (Fargo 2018)

Watershed – A region or land area drained by a single stream, river, or drainage network; a drainage basin (Regulations).

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).

Wildfire – An unplanned ignition of a wildland fire (such as a fire caused by lightning, volcanoes, unauthorized or accidental human-caused fires) or an escaped prescribed fire.

Wildland fire – A general term describing any non-structure fire that occurs in the wildland.

Wildland-urban interface (WUI) – Generally refers to the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels (National Wildfire Coordinating Group 2018). It is that portion of the landscape where structures and vegetation are sufficiently close that a wildland fire could spread to structures, or a structure fire could ignite vegetation. Many WUI areas are scattered across the project area, though areas of the greatest concern are relatively focused around towns or along travelways. For this analysis, the wildland urban interface is defined by a 0.5 mile buffer surrounding non-Forest System lands where structures are present. Other critical infrastructure (transmission lines and communication sites) and high value Forest Service infrastructure (buildings and recreation sites) were also included within the WUI for this project.

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