

## Glossary

**active restoration or management**—Direct interventions to achieve desired outcomes (including restoration), which may include harvesting and planting of vegetation and the intentional use of fire, among other activities (Carey 2003).

**actual evapotranspiration (AET)**—Amount of water that evaporates from the soil surface and is transpired by plants if current water availability is constrained. AET measures when conditions (energy + water) for plants are favorable to support photosynthesis.

**adaptive capacity**—The ability of ecosystems and social systems to respond, cope, or adapt to disturbances and stressors, including environmental change, to maintain options for future generations.

**adaptive management**—A structured, cyclical process for planning and decisionmaking 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. Additionally, adaptive management includes iterative decisionmaking through which results are evaluated and actions are adjusted based upon what has been learned.

**at-risk species**—The set of at-risk species for planning purposes includes federally recognized threatened, endangered, proposed and candidate species, and species of conservation concern.

**biodiversity**—In general, the variety of life forms and their processes and ecological functions, at all levels of biological organization from genes to populations, species, assemblages, communities, and ecosystems.

**biophysical settings (BpS)**—The biophysical settings layer from LANDFIRE is a potential natural vegetation layer. It represents the vegetation that may have been dominant on the landscape prior to Euro-American settlement and is based on both the current biophysical environment and an approximation of the historical disturbance regime.

**climate adaptation**—Management actions to reduce vulnerabilities to climate change and related disturbances.

**climate change**—Changes in average weather conditions (including temperature, precipitation, and risk of certain types of severe weather events) that persist over multiple decades or longer, and that result from both natural factors and human activities such as increased emissions of greenhouse gases (U.S. Global Change Research Program 2017).

**climatic water deficit (CWD)**—Annual evaporative demand that exceeds available water, summed annually. It is calculated based on potential evapotranspiration minus actual evapotranspiration. CWD measures when plants have insufficient water to support photosynthesis and is a measure of plant drought stress.

**community (plant and animal)**—A naturally occurring assemblage of plant and animal species living within a defined area or habitat.

**composition**—The biological elements within the various levels of biological organization, from genes and species to communities and ecosystems.

**connectivity (of habitats)**—Environmental conditions that exist at several spatial and temporal scales that provide landscape linkages that permit (1) the exchange of flow, sediments, and nutrients; (2) genetic interchange of genes among individuals between populations; and (3) the long distance range shifts of species, such as in response to climate change.

**designated area**—An area or feature identified and managed to maintain its unique special character or purpose. Some categories of designated areas may be designated only by statute, and some categories may be established administratively in the land management planning process or by other administrative processes of the federal executive branch. Examples of statutorily designated areas are national heritage areas, national recreational areas, national scenic trails, wild and scenic rivers, wilderness areas, and wilderness study areas. Examples of administratively designated areas are experimental forests, research natural areas, scenic byways, botanical areas, and significant caves.

**desired conditions**—A description of specific social, economic, or ecological characteristics toward which management of the land and resources are directed.

**digital elevation model**—A 3-dimensional spatial data layer representing ground surface topography.

**disturbance regime**—A description of the characteristic types of disturbance on a given landscape; the frequency, severity, and size distribution of these characteristic disturbance types and their interactions.

**disturbance**—Any relatively discrete event in time that disrupts ecosystem, watershed, community, or species population structure or function and changes resources, substrate availability, or the physical environment.

**early-seral vegetation**—Vegetation conditions in the early stages of succession following a disturbance that removes forest canopy (e.g., timber harvest, wildfire, windstorm), on sites that are capable of developing a closed canopy (Swanson et al. 2014). A nonforest or pre-forest condition occurs first, followed by an “early seral forest” as young trees develop during the process of succession.

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

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

**ecological restoration**—“The process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed” (SER 2004). 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 (36 CFR 219.19).

**ecosystem**—A spatially explicit, relatively homogeneous unit of the earth that includes all interacting organisms and elements of the abiotic environment within its boundaries.

**ecosystem services**—Benefits people obtain from ecosystems, including provisioning services (e.g., clean air, fresh water, food, wood products), regulating services (e.g., carbon storage, water filtration and storage; regulation of disturbances and diseases), supporting services (e.g., pollination, seed dispersal, soil formation, and nutrient cycling), and cultural services (e.g., spiritual, recreational, and aesthetic experiences). Some references distinguish “ecosystem goods” from services, while others categorize “goods” under “provisioning services.

**endangered species**—Any species or subspecies that the secretary of the Interior or the secretary of commerce has deemed in danger of extinction throughout all or a significant portion of its range.

**endemic**—Native and restricted to a specific, geographical area.

**exposure**—The sum of climate and climate-related changes that may negatively or positively affect an ecosystem, population, or other resource.

**fire-dependent vegetation types**—A vegetative community that evolved with fire as a necessary contributor to vitality and renewal of habitat for its member species.

**fire exclusion**—Curtailed of wildland fire because of deliberate suppression of ignitions, as well as unintentional effects of human activities such as intensive grazing that removes grasses and other fuels that carry fire (Keane et al. 2002).

**fire intensity**—The amount of energy or heat released during a fire.

**fire regime**—A characterization of long-term patterns of fire in a given ecosystem over a specified and relatively long period of time, based upon multiple attributes including frequency, severity, extent, spatial complexity, and seasonality of fire occurrence.

**fire return interval**—The amount of time between successive fire events in a given area.

**fire return interval departure**—Comparison between pre-Euro-American settlement and contemporary fire return intervals.

**fire risk**—The likelihood of a negative outcome and the severity of subsequent negative consequences resulting from fire.

**fire severity**—The magnitude of the effects of fire on ecosystem components, including vegetation or soils.

**fire suppression**—The act of extinguishing wildfires by humans (Keane et al. 2002).

**founder stand**—Small groups of trees strategically planted in mesic and less fire-prone locations to serve as the future seed source for trees in the surrounding area (North et al. 2019).

**fuelbed**—A combination of one or more fuel strata.

**fuels (wildland)**—Combustible material in wildland areas including live and dead plant biomass such as trees, shrubs, grass, leaves, litter, snags, and logs.

**fuels management**—Manipulation of wildland fuels through mechanical, chemical, biological, or manual means, or by fire, in support of land management objectives to control or mitigate the effects of future wildland fire.

**function (ecological)**—Ecological processes, such as energy flow; nutrient cycling and retention; soil development and retention; predation and herbivory; and natural disturbances such as wind, fire, and floods that sustain composition and structure.

**future range of variation (FRV)**—The natural fluctuation of pattern components of healthy ecosystems that might occur in the future, primarily affected by climate change, human infrastructure, invasive species, and other anticipated stressors.

**goals (in land management plans)**—Broad statements of intent, other than desired conditions, that do not include expected completion dates.

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

**habitat**—An area with the environmental conditions and resources that are necessary for occupancy by a species and for individuals of that species to survive and reproduce.

**habitat fragmentation**—Discontinuity in the spatial distribution of resources and conditions present in an area at a given scale that affects occupancy, reproduction, and survival in a particular species.

**heterogeneity (forest)**—Diversity, often applied to variation in forest structure within stands in horizontal (e.g., single trees, clumps of trees, and gaps of no trees) and vertical (e.g., vegetation at different heights from the forest floor to the top of the forest canopy) dimensions, or across large landscapes (North et al. 2009).

**heterotrophic respiration**—Carbon dioxide emitted by all heterotrophic organisms (i.e., consumers) in an ecosystem, including animals, fungi, and other organisms that do not produce their own food.

**high-severity burn patch**—A contiguous area of high severity or stand-replacing fire.

**historical range of variation (HRV)**—Past fluctuation or range of ecosystem conditions over a specified area and period of time.

**invasive species**—Any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to a particular ecosystem, and whose deliberate, accidental, or self-introduction is likely to cause economic or environmental harm or harm to human health.

**land and resource management plan (USDA Forest Service)**—A document or set of documents that provide management direction for national forest administrative unit.

**land type association** — Landscape-scale terrestrial ecosystems used in national forest planning as a framework for analysis, conservation design, and project planning.

**landscape**—A defined area irrespective of ownership or other artificial boundaries, encompassing a mixture of terrestrial and aquatic ecosystems, landforms, and plant communities, repeated in similar form throughout such a defined area.

**landscape management unit (LMU)**—Broad topographic categories based on slope position and aspect (North et al. 2012).

**LiDAR**—(Light Detection and Ranging)—Remote sensing survey method that uses pulsed laser light to measure the height and coverage of terrain and vegetation.

**mixed chaparral**—Shrubland vegetation type confined to Mediterranean climate zone in California that occurs in the lower elevation foothill zone generally below 1520 m (5,000 ft).

**montane chaparral**—Shrubland vegetation type confined to Mediterranean climate zone in California that generally occurs with the montane or upper montane zones.

**monitoring**—A systematic process of collecting information to track implementation (implementation monitoring), to evaluate effects of actions or changes in conditions or relationships (effectiveness monitoring), or to test underlying assumptions (validation monitoring).

**native species**—A species historically or currently present in a particular ecosystem as a result of natural migratory or evolutionary processes and not as a result of an accidental or deliberate introduction or invasion into that ecosystem.

**natural range of variation (NRV)**—Spatial and temporal variation in ecosystem characteristics under historical disturbance regimes during a reference period or from a reference location (Safford and Stevens 2017).

**nitrophilic**—capable of thriving in a nitrogen-rich habitat.

**objective (in land management plans)**—Concise, measurable, and time-specific statement of a desired rate of progress toward a desired condition.

**old-growth forest**—A forest distinguished by old trees (>150 years) and related structural attributes that often (but not always) include large trees, high biomass of dead wood (i.e., snags, downed coarse wood), multiple canopy layers, distinctive species composition and functions, and vertical and horizontal diversity in the tree canopy. In dry, fire-frequent forests, old growth is characterized by large, old fire-resistant trees and relatively open stands without canopy layering.

**passive management**—A management approach where natural processes are allowed to occur without human intervention to desired outcomes.

**patch**—A relatively small area with similar environmental conditions, such as vegetative structure and composition. Sometimes used interchangeably with vegetation or forest stand.

**potential evapotranspiration**—Amount of water that evaporates from the soil surface and is transpired by plants if water were not a limiting factor.

**potential natural vegetation (PNV)**—Vegetation that a landscape would support given environmental conditions (e.g., geology, soils, climate) and functioning natural disturbance regimes in the absence of “unnatural” anthropogenic activities.

**potential wildland fire operational delineation unit (POD)**—Spatial representation of an area that summarizes wildfire risk in a meaningful operational fire management context. Potential operational delineations can follow fine-scale features such as ridgetops, water bodies, roads, barren areas, elevation changes, or major fuel changes.

**pre-settlement fire regime groups (PFR)**—Classes of vegetation that are categorized based on the characteristic fire regime prior to settlement/colonization by European Americans in California (generally before the mid- to late-19<sup>th</sup> century) that led to extensive impacts on vegetation, fire regimes, and indigenous peoples within natural ecosystems.

**prescribed fire**—A wildland fire originating from a planned ignition to meet specific objectives identified in a written, approved, prescribed fire plan for which National Environmental Policy Act requirements (where applicable) have been met prior to ignition (synonymous with controlled burn).

**reburn**—Fire that burns an area where fuels (such as scorched needles, twigs, branches, and tree boles that fall to the surface) are primarily derived from a previous burn. Reburns may result in reduced ecosystem integrity when they facilitate fire regime transitions outside the natural range of variation, such as fire burning too frequently or severely.

**recovery (ecosystem)**—The reestablishment of essential ecosystem structure, composition, and function that supports long-term ecological integrity, health, and sustainability. Recovered ecosystems contain sufficient biotic and abiotic resources to continue successional development without assistance, are functionally self-sustaining, exhibit resilience to anticipated environmental stressors and perturbations, and interact with adjoining connected ecosystems (SER 2004) (see “ecological restoration”).

**refugia**—An area that remains less altered by climatic and environmental change (including disturbances such as wind and fire) affecting surrounding regions and that therefore forms a haven for relict fauna and flora.

**resilience**—The capacity of an ecosystem to absorb disturbance and reorganize (or return to its previous organization) so as to retain essentially the same function, structure, identity, and feedbacks. Definitions emphasize the capacity of a system or its constituent entities to respond or regrow after mortality induced by a disturbance event, although broad definitions of resilience may also encompass “resistance” (see below), under which such mortality may be averted.

**resistance**—The capacity of an ecosystem or an entity to withstand a disturbance event without much change or alteration in essential characteristics.

**restoration, ecological**—see “ecological restoration.”

**restoration, functional**—Restoration of dynamic abiotic and biotic processes in degraded ecosystems, without necessarily a focus on structural condition and composition.

**restoration strategy**—A strategic vision that describes broad ecological restoration approaches that support ecosystem management goals and objectives within a specific landscape of interest.

**riparian areas**—Three-dimensional ecotones (the transition zone between two adjoining communities) of interaction that include terrestrial and aquatic ecosystems that extend down into the groundwater, up above the canopy, outward across the floodplain, up the near-slopes that drain to the water, laterally into the terrestrial ecosystem, and along the water course at variable widths (36 CFR 219.19).

**scale**—In ecological terms, the extent and resolution in spatial and temporal terms of a phenomenon or analysis, which differs from the definition in cartography regarding the ratio of map distance to earth surface distance (Jenerette and Wu 2000).

**segmentation**—A process for subdividing spatial data into ecologically similar landscape units.

**sensitive species**—Plant or animal species that receive special conservation attention because of threats to their populations or habitats, but which do not have special status as listed or candidates for listing under the U.S. Endangered Species Act.

**serotinous**—An ecological adaptation in some plants in which seed release occurs in response to an environmental trigger such as heat or smoke from a fire.

**shrubfield**—A vegetation patch (relatively small area) dominated by shrubs.

**shrubland**—An area (generally large and persistent) dominated by shrubs.

**soil burn severity**—The effect of fire on ground surface characteristics, including organic matter loss, reduced infiltration, char accumulation, and altered soil structure.

**special status species**—Species that have been listed or proposed for listing as threatened or endangered under the U.S. Endangered Species Act.

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

**stand**—A land management unit consisting of a contiguous group of trees sufficiently uniform in age-class distribution, composition, and structure, and growing on a site of sufficiently uniform quality, to be a distinguishable unit.

**stand-replacing fire**—High-severity fire, where fire kills more than 75 percent of the dominant vegetation (see “vegetation burn severity”).

**stressors**—Factors that may directly or indirectly degrade or impair ecosystem composition, structure or ecological process in a manner that may impair its ecological integrity, such as an invasive species, loss of connectivity, or the disruption of a natural disturbance regime (36 CFR 219.19).

**structure (ecosystem)**—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.

**sustainability**—The capability to meet the needs of the present generation without compromising the ability of future generations to meet their needs. Sustainability is sometimes defined in terms of three dimensions: ecological (capability to maintain ecological integrity), economic (capability to produce and benefit from goods and services), and social (capability to support networks of relationships, traditions, culture, and activities that connect people to the land and to one another in vibrant communities). (36 CFR 219.19)

**sustainability (ecological)**—The capability of ecosystems to maintain ecological integrity (36 CFR 219.19).

**succession**—Nonseasonal and directional change in species composition and structure in an ecological community over time.

**timber harvest**—The removal of trees for wood fiber use and other multiple-use purposes.

**understory**—Vegetation growing below the tree canopy in a forest, including shrubs, herbs, and short-statured trees.

**vegetation burn severity**—The magnitude of the effect of fire on vegetation (see “fire severity”), often classified as (1) low severity, with <25 percent mortality of the dominant vegetation (e.g., trees, shrubs); (2) moderate severity, with 25 to 75 percent mortality of the dominant vegetation; and (3) high severity, with >75 percent mortality of the dominant vegetation (also referred to as “stand-replacing fire”).

**vegetation type**—A general term for a combination or community of plants (including grasses, forbs, shrubs, or trees), typically applied to existing vegetation rather than potential vegetation.

**vulnerability**—The degree to which a system is susceptible to, or unable to cope with, change.

**watershed**—A region or land area drained by a single stream, river, or drainage network; a drainage basin.

**watershed condition class**—a category that reflects the level of watershed health or integrity relative to natural potential condition (Potyondy and Geier 2011).

**watershed restoration**—Restoration activities that focus on restoring the key ecological processes required to create and maintain favorable environmental conditions for aquatic and riparian-dependent organisms.

**wilderness**—Any area of land designated by Congress as part of the National Wilderness Preservation System that was established in the Wilderness Act of 1964.

**wildlife**—Undomesticated animal species including amphibians, reptiles, birds, mammals, fish and invertebrates or even all biota that live wild in an area without being introduced by humans.

**wildfire**—Unplanned ignition of a wildland fire (such as a fire caused by lightning, volcanoes, unauthorized and accidental human-caused fires) and escaped prescribed fires.

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

## References

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