

Glossary

An asterisk (*) indicates a term used in this manual. Other terms commonly used in rangeland monitoring are also included for reference.

Abundance The total number of individuals of a species in an area, population or community (SRM 1999).

Accuracy* The closeness of a measured or computed value to its true value (Elzinga et al. 2001). See also **precision***.

Active fraction The highly dynamic or labile portion of **soil organic matter*** that is readily available to soil organisms. May also include the living biomass. Particulate organic matter (POM) and light fraction (LF) are measurable indicators of the active fraction. POM particles are larger than other SOM and can be separated from soil by sieving. LF particles are lighter than other SOM and can be separated from soil by centrifugation.

Annual plant A plant that completes its life cycle and dies in one year or less. See also **biennial plant** and **perennial plant** (SRM 1999).

Annual production* (syn. **primary production**) The conversion of solar energy to chemical energy through the process of photosynthesis. It is represented by the total quantity of organic material produced within a year (SRM 1999). See **total annual production***.

ARS* Agricultural Research Service.

Aspect* The direction a slope faces.

Assessment* The process of estimating or judging the value or functional status of ecological processes (e.g., **rangeland health***).

Attribute* One of the three components—soil and site stability, hydrologic function, and integrity of the biotic community—that collectively define **rangeland health***.

Azimuth* Compass direction; from 0 to 360°.

Bank-full* The bank-full stage corresponds to the water level (stream discharge) just below the point that water enters the floodplain. It is the most effective stage for maintaining the shape of stream channels. The following features can be used to identify bank-full: top of the point bar, significant changes in vegetation, topographic slope break, change in size, staining or color of substrate, and change in the nature and amount of debris deposits. Definition and examples derived from Dunne and Leopold (1978), Rosgen (1996) and Prichard et al. (1998a). Bank-full flow events generally occur an average of every 18 months (R. Baker, pers. comm.). They occur less frequently in incised channels.

Bank angle* The slope of the bank. See Chapter 14 for calculations.

Bare ground* (bare soil) All land surface not covered by vegetation, rock or litter (SRM 1999). As used in this document, visible biological crusts and standing dead vegetation are included in cover estimates and are not bare ground. Bare ground should always be clearly defined for each monitoring program because there are many definitions.

Bare ground (%)* Bare ground occurs where there are no plant or litter intercepts, and mineral soil is intercepted. Bare ground (%) is calculated by counting the number of points with “None” in the top layer column, nothing in any of the “Lower layers” columns and “S” in the “Soil surface” column. Divide this sum by the total number of points sampled. Multiply this value by 100.

Basal area* (plants) (syn. **basal area**) The cross-sectional area of the stem or stems of a plant or of all plants in a stand. Basal area is measured at or near ground level (SRM 1999).

Basal cover (%)* Basal cover is the area covered by plant bases. Basal cover (%) is the percent of the soil surface covered by plant bases in the Line-point intercept method. Basal cover (%) is calculated by counting the number of basal intercepts in the “Soil surface” column. Divide this sum by the total number points sampled. Multiply this value by 100.

Basal gap A space between plant bases that is not occupied by rooted vegetation when viewed as a vertical projection from the transect tape edge to the ground. Minimum gap sizes are defined by the user, and are usually 20 cm (0.7 ft). Vegetation stems of any diameter, even 1 mm, can start or stop a basal gap, as long as they are rooted in soil. Vegetation may occur as live or standing dead. User must define if gaps can be terminated by any plant, or by perennial plants only.

Biennial plant* A plant that completes its life cycle and dies in two years or less. See also **annual plant** and **perennial plant**.

Biological crust* Microorganisms (e.g., lichens, algae, cyanobacteria, microfungi) and non-vascular plants (e.g., mosses, lichens) that grow on or just below the soil surface.

Biomass* (plants) The total amount of living plants above and below ground in an area at a given time (SRM 1999).

Biotic integrity* Capacity of a site to support characteristic functional and structural communities in the context of normal variability, to resist loss of this function and structure due to a disturbance, and to recover following such disturbance. See also **soil and site stability***, **hydrologic function*** and **rangeland health***.

BLM* Bureau of Land Management (USDI*).

C-3 plant A plant employing the pentose phosphate pathway of carbon dioxide assimilation during photosynthesis; a cool-season plant (USDA-NRCS 1997).

C-4 plant A plant employing the dicarboxylic acid pathway of carbon dioxide assimilation during photosynthesis; a warm-season plant (USDA-NRCS 1997).

Canopy cover The amount of ground covered by the vertical projection of the outer foliage and branches of a plant. Canopy cover overestimates the area of ground covered by vegetation because open spaces within a plant’s canopy are not excluded from the canopy cover estimate. Compare to Foliar cover.

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Canopy gap A space between plant canopies that is not occupied by rooted vegetation when viewed as a vertical projection from the canopy edge to the ground. Minimum gap sizes are defined by the user, and are usually 20 cm (0.7 ft). Vegetation may occur as live or dead. Edges of canopy gaps are defined as a point along a transect tape where at least 50% of a 3 cm segment of tape edge intercepts live or dead plant canopy. User must define if gaps can be terminated by any plant, or by perennial plants only.

Climate* The average or prevailing weather conditions of a place over a period of years (SRM 1999).

Community pathway Shifts in plant species compositions among biological communities within a single state.

Compaction layer* A layer of dense soil at or near the surface, caused by repeated impact on or disturbance of the soil surface. When soil is compacted, soil grains are rearranged, pore spaces are decreased and soil particles are brought into closer contact with one another, thereby increasing bulk density (SSSA 1997).

Composition* The proportions of various plant species in relation to the total on a given area; it may be expressed in terms of cover, density, weight, etc. (SRM 1999).

Cover* The proportion of the soil surface covered by a vertical projection of the cover class of interest, regardless of what is above or below the object: plant parts (**foliar cover***), plant bases (**basal cover***), woody and herbaceous litter (**litter cover***), lichens, mosses, duff, etc. The opposite of **bare ground***.

Cover by functional group (%)* A subset of **foliar cover***. Cover by functional group is the proportion of the soil surface covered by the vertical projection of plant canopies belonging to a specific **functional group**. Calculate cover by functional group by first determining which plant species belong to the functional group. Then count the total number of sample points where species in the designated functional group are intercepted. Divide this sum by the total number of sample points. Multiply this value by 100.

Cover by species resistant to fire, grazing, traffic, etc.* A subset of **foliar cover***. Cover by species resistant to fire, grazing, traffic, or cover by invasive species is the proportion of the soil surface covered by the vertical projection of plant canopies belonging to the specific group. Calculate cover by species resistant to fire, grazing, traffic, or cover by invasive species by first determining which plant species belong to the designated group. Then count the total number of sample points where species in the designated group are intercepted. Divide this sum by the total number of points sampled. Multiply this value by 100. See also **foliar cover***.

Culm A jointed grass stem. This may or may not be hollow.

DBH* See **diameter at breast height***.

Declination* Angle, in degrees, between magnetic north and geographical north.

Decomposition* The biochemical breakdown of organic matter into its original compounds and nutrients.

Diameter at Breast Height (DBH)* The diameter of a tree at breast height (1.4 m or 4.5 ft above the ground), measured outside of the bark (USDA Forest Service 2003).

Diameter at Root Collar (DRC)* The diameter of a tree measured at the ground line or stem root collar, measured outside of the bark.

DOQQ* Digital Orthophoto Quarter Quadrangle.

DRC* See **diameter at root collar**.

Duff* Partially decomposed plant litter. It consists of decomposing leaves and other organic material. You should see NO recognizable plant parts. When moss is present, the top of the duff layer is just below the green portion of the moss. The bottom of this layer is the point where mineral soil (A horizon) begins. See also **litter*** and **embedded litter***.

Ecological processes* Ecological processes include the water cycle (the capture, storage and redistribution of precipitation), energy flow (conversion of sunlight to plant and animal matter) and nutrient cycle (the cycle of nutrients, such as nitrogen and phosphorus, through the physical and biotic components of the environment). Ecological processes functioning within a normal range of variation at an ecological site will support specific plant and animal communities.

Ecological reference area An area representing a single ecological site in which ecological processes are functioning within a normal range of variability, and the plant community has adequate resistance to and resiliency from most disturbances. These areas do not need to be pristine, historically unused lands (e.g., climax plant communities or relict areas).

Ecological site* (syn. **rangeland ecological site**) A kind of land with specific physical characteristics, which differs from other kinds of land in its ability to produce distinctive kinds and amounts of vegetation and in its response to management. Apparently synonymous with ecological type used by USDA Forest Service (SRM 1999).

Ecological site description* Description of the soils, uses and potential of land with specific physical characteristics that produces distinctive kinds and amounts of vegetation.

Ecosystem* Organisms, together with their abiotic environment, that form an interacting system and inhabit an identifiable space (SRM 1999).

Embedded litter* Non-decomposed, detached plant material (**litter***) partially implanted or set in the soil surface such that, if the litter is removed, it will leave an indentation in the soil's surface. See also **litter***, **duff***.

Energy flow Conversion of sunlight to plant and animal matter; one of the **ecological processes***.

Erodibility* (syn. **soil erodibility***) The degree or intensity of a soil's state or condition of, or susceptibility to, being eroded by wind or water (adapted from SSSA 1997).

Erosion* Detachment and movement of soil or rock fragments by water, wind, ice, gravity; the process whereby the land surface is worn away by running water, wind, ice or other geological agents, including such processes as gravitational creep (SRM 1999).

Erosivity* The capacity of rainfall to detach soil particles. This is a function of raindrop size and rainfall intensity.

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Exotic plant* A plant growing or occurring in an ecosystem that is beyond its natural range of existence or natural zone of potential dispersal (SRM 1999).

Flow pattern The path that water takes (i.e., accumulates) as it moves across the soil surface during overland flow.

Foliage height diversity (FHD)* Foliage height diversity is the vertical structural diversity of vegetation. It is calculated using the Shannon-Weiner diversity index. See Chapter 11 for calculations from the Vegetation structure method. The same calculations can be applied to the Line-point intercept with Height method (Ch. 15); given height classes are developed (such as 0-50 cm, 51-100 cm, 101-150 cm and 151-200 cm). See also **vegetation structure***.

Foliar cover* Proportion of the soil surface covered by a vertical projection of a plant cover. This is effectively the area that is protected from raindrops and the area in shade when the sun is directly overhead. This is the definition used in erosion models.

Foliar cover (%)* Foliar cover (%) is calculated by counting the number of plant intercepts ("Top layer" = species code). Divide this sum by the total number of points sampled. Multiply this value by 100.

Forb* Any broad-leaved, herbaceous plant, other than those in the Poaceae (grasses), Cyperaceae (sedges) and Juncaceae (rushes) families (SRM 1999). May or may not be woody.

Functional/structural groups* A suite or group of species that, because of similar shoot or root structure, photosynthetic pathways, nitrogen-fixing ability, life cycle, etc., are grouped together.

GIS* Geographic Information System.

GPS* Global Positioning System.

Grassland* An area of vegetation dominated by herbaceous grasses. Grassland constitutes a major world vegetation type and occurs where there is sufficient moisture for grass growth, but where the environmental conditions, both climatic and anthropogenic, prevent tree growth. Its occurrence, therefore, is correlated with a rainfall intensity between that of desert and forest.

Greenline* The first perennial vegetation that forms a lineal grouping of community types on or near the water's edge. It occurs most often at or slightly below the bank-full stage (Winward 2000).

Ground cover* The percentage of material (e.g., **litter***, **standing dead vegetation***, gravel/rocks, vegetation and **biological crust***) excluding **bare soil***, covering the land surface. See also **soil surface***.

Gully A furrow, channel or miniature valley, usually with steep sides, through which water commonly flows during and immediately after rains or snow melt (SRM 1999).

Half-shrub (syn. **sub-shrub**) A perennial plant with a woody base, whose annually produced stems die each year (SRM 1999).

Hillslope profile component* The landscape element along a hill's slope. Distinguished by shape, position and long-term erosion or sedimentation related to soil formation. These components include: summit, shoulder, backslope, footslope and toeslope (Wysocki and Zanner 2003).

Horizontal slope shape* The geometric shape along an elevation contour across the hillslope (the elevation contour). Slope shape can be convex, concave or linear. Compare with **vertical slope shape***.

Humus (syn. **stabilized organic matter**) Usually a synonym for stabilized organic matter, but is sometimes used to refer to all soil organic matter (SSSA 1997). See **stabilized organic matter**.

Hydrologic function* The capacity of a site to capture, store and safely release water from rainfall, run-on and snowmelt (where relevant); to resist a reduction in this capacity; and to recover this capacity following degradation (one of the three attributes of **rangeland health***). See also **biotic integrity*** and **soil and site stability***.

Indicators* Components of a system whose characteristics (e.g., presence or absence, quantity, distribution) are used as an index of an attribute (e.g., **biotic integrity***) that is too difficult, inconvenient or expensive to measure.

Infiltration* The entry of water into the soil (SSSA 1997).

Infiltration rate (mm/hr)* The rate (or speed) at which water infiltrates the soil during a specified time period. See Chapter 8 for calculations. **Ratio of interspace:under plant canopy*** is calculated by dividing the average infiltration rate in plant canopy interspaces (Veg class = NC) by the average infiltration rate under plant canopies (Veg class = G, Sh, F or T). See also **infiltration***.

INIFAP* Instituto Nacional de Investigaciones, Agrícolas y Forestales (Mexico).

Interspace* An area between the canopies of two or more plants, or between the bases of two or more plants. Interspaces can consist of **bare soil**, **litter***, plants of a different **functional group*** (i.e., grass between shrubs), or soil surface features, including rocks, **biological crusts***, **duff*** and **embedded litter***.

Invasive plant* Plants that are not part of (exotic) or a minor component of (native) the original plant community or communities that increase above what's expected given the normal range of variability of a site.

Inventory (syn. rangeland inventory): (1) The systematic acquisition and analysis of resource information needed for planning and management of rangeland; (2) the information acquired through rangeland inventory (SRM 1999).

Landscape unit* A type of land that can be defined based on slope, aspect, landscape position (including elevation) and soil. Landscape units repeat across the landscape for a particular region. Landscape unit is a generic term that is generally equivalent to ecological sites used by the NRCS and ecological types used by the USFS. The only difference is that ecological sites and types are defined at a particular scale (generally including several soil series). Landscape units can be defined very coarsely (e.g., basin vs. range) or extremely finely (e.g., Stellar fine sandy loam on east-facing 1-2% slopes), depending on objectives. It is appropriate to substitute either the term "ecological site" or "ecological type" for "landscape unit" throughout this manual.

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Lineal* Along a line.

Litter* The uppermost layer of organic debris on the soil surface; essentially, the freshly fallen or slightly decomposed plant matter (SRM 1999). Includes persistent and non-persistent organic matter that is in contact with the soil surface (i.e., not rooted in the soil). See also **embedded litter***, **duff***, **woody litter*** and **litter cover (%)***.

Litter cover (%)* The proportion of the soil surface covered by a vertical projection of **litter***. Calculate litter cover (%) by counting the total number of sample points where litter (L or WL) is intercepted. Divide this sum by the total number of points sampled. Multiply this value by 100. See also **litter***, **woody litter***, **foliar cover***, **bare ground*** and **basal cover***.

Minimum estimate of species richness* A minimum estimate of the total number of species in an area. This can be estimated from the Line-point intercept or Plant production methods. Simply count the number of species detected with either method, making sure not to count the same species twice. See also **species richness***.

Monitoring* The orderly and quantitative collection, analysis and interpretation of resource data to evaluate progress toward meeting management objectives. The process must be conducted over time in order to determine whether or not management objectives are being met (SRM 1999).

Monitoring plot* A transect or set of transects (plot) permanently located within a monitoring unit from which monitoring data are collected.

Monitoring site* (syn. **monitoring plot***) Locations selected for monitoring.

Monitoring unit* Areas located on a particular part of the landscape (e.g., valley bottom), within which vegetation, soil type, use intensity, and the status of the soil and vegetation are relatively homogeneous. Monitoring units may range in size from less than an acre to a square mile or more and may be repeated across the landscape. Not all monitoring units will actually be monitored. A monitoring unit in riparian zones is equivalent to a riparian complex. Monitoring units are typically smaller than, and subsets of, a **landscape unit***.

Normal variability or **normal range of variability*** The deviation of characteristics of biotic communities and their environment that can be expected, given natural variability in climate and disturbance regimes.

Noxious weed Any plant designated by a federal, state or county government to be injurious to public health, agriculture, recreation, wildlife, or any public or private property (Sheley et al. 1999).

NRCS* National Resources Conservation Service (**USDA***)

Number of strikes per depth increment* The number of impact penetrometer strikes for each depth increment (0-5 cm, 5-10 cm, 10-15 cm, 15-20 cm, etc.). This is not the cumulative number of strikes per depth (see Chapter 7). **Ratio of interspace:under plant canopy*** is calculated by dividing the average number of strikes in plant canopy interspaces (Veg class = NC) by the average number of strikes under plant canopies (Veg class = G, Sh, F or T) for each depth increment. See also **compaction layer***.

Organic matter* Any material that is part of, or originated from, living organisms. Includes **soil organic matter***, plant residue, mulch, compost, and other materials (SSSA 1997). See also **soil organic matter***.

Parent material The unconsolidated and more or less chemically weathered rocks, mineral matter or organic accumulations (e.g., peat) from which soils are developed by pedogenic processes (simplified from SSSA 1997).

PDF* Portable Document Format. Documents in a format easily downloaded, viewed and printed from the Internet.

Pedestal (erosional)* Plants or rocks that appear elevated as a result of soil loss by wind or water erosion (does not include plant or rock elevation as a result of non-erosional processes such as frost heaving). Compare to **terracette**.

Pedon. A three-dimensional body of soil with lateral dimensions large enough to permit the study of horizon shapes and relations. Its area ranges from 1 to 10 m² (10 to 100 ft²) (see SSSA 1997 for more detail).

Percent basal cover* See **basal cover (%)***.

Perennial plant* A plant that has a life span of three or more years (USDA-NRCS 1997). See also **annual plant** and **biennial plant**.

Physical crust* Impact of raindrops on bare soil causes the soil surface to seal and form a thin surface layer that inhibits water absorption.

Plant base* Located above the roots and below the stems of a plant, at and just above the soil surface.

Plant decadence In a plant community, decadence refers to an overabundance of dead or dying plants relative to what is expected for a site, given the natural range of variability in disease, climate and management influences.

Plant density* The number of individuals per unit area (see Chapter 15).

Plant density by size class* The number of individuals, within a given size class, per unit area. See Chapter 15 for calculations.

Plant production* See **total annual production***.

Polypedon. A group of contiguous similar pedons. The limits of a polypedon are reached where there is no soil, or where the pedons have characteristics that differ significantly (SSSA 1997).

Precision* The closeness of repeated measurements of the same quantity (Elzinga et al. 2001). See also **accuracy***.

Primary production See **annual production***.

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Production by plant species* (or annual production by plant species) All aboveground plant biomass produced during a single growing year for a given plant species. Production by plant species is expressed in pounds per acre (lb/ac). See Chapter 9 for methods of estimating and calculating total annual production. See also **total annual production***.

Production by functional group* (or annual production by functional group) All aboveground plant biomass produced during a single growing year for a given plant **functional group***. Calculate production by functional group by first determining which plant species belong to the functional group. Using the methods described in Chapter 9 for estimating and calculating total annual production, measure and calculate production by plant species. Then add together annual plant production for each individual species in the functional group to determine plant production for the functional group. Production by functional group is expressed in pounds per acre (lb/ac). See also **total annual production***, **production by plant species*** and **functional/structural groups***.

Proportion of dead plant intercepts (by species)* For a given species, count the number of dead plant intercepts (i.e., hit a dead plant part; the entire plant does not have to be dead). Divide this sum by the total number of plant intercepts for the selected species. Multiply this value by 100.

PVC* Polyvinyl Chloride.

Qualitative data* Non-quantitative data derived from observations, commonly visual, and recorded descriptively. Qualitative data is not measured (e.g., descriptive or non-numerical data).

Qualitative rangeland health assessment The determination of the functional status of an attribute(s) through non-numerical observations of indicators. Qualitative assessments have an element of subjectivity.

Quantitative data* Data derived from measurements, such as counts, dimensions, weights, etc., and recorded numerically; may include ratios or other values. Qualitative numerical estimates, such as ocular cover and production estimates, are often referred to as “semi-quantitative.”

Quantitative rangeland health assessment The determination of the functional status of an attribute(s) through measurements of vegetation, soil or landscape characteristics that are indicators, or can be used to derive indicators. Quantitative assessments have a known level of precision and accuracy, and require a quantitative reference value for comparison.

Rangeland* Land on which the indigenous vegetation (climax or natural potential) is predominantly grasses, grass-like plants, forbs or shrubs and is managed as a natural ecosystem. If plants are introduced, they are managed similarly. Rangelands include natural grasslands, savannas, shrublands, many deserts, tundra, alpine communities, marshes and wet meadows (SRM 1999). Oak and piñon-juniper woodlands could also be included in this definition.

Rangeland ecological site See **ecological site***.

Rangeland health* The degree to which the integrity of the soil, vegetation, water and air, as well as the ecological processes of the rangeland ecosystem, are balanced and sustained. Integrity is defined as maintenance of the structural and functional attributes characteristic of a locale, including normal variability (SRM 1999) (see footnote at end of Glossary).

Ratio of interspace:under plant canopy* See **infiltration rate (mm/hr)*** for infiltration (Single-ring infiltrometer) and **number of strikes per depth increment*** for compaction (Compaction test).

Reference area or site A landscape unit or monitoring unit at the **reference state**. Often used or referred to for **qualitative** and **quantitative assessments**.

Reference state* The state where functional capacities represented by soil and site stability, hydrologic function and biotic integrity are performing at an optimum level under the natural disturbance regime. This state usually includes, but is not limited to, what is often referred to as the potential native plant community (PNC).

Resilience* The capacity of ecological processes to recover following a disturbance. Resilience can be defined in terms of the rate of recovery, the extent of recovery during a particular period of time, or both.

Resistance* The capacity of ecological processes to continue to function without change following a disturbance.

Rhizomatous plant A plant that develops clonal shoots by producing rhizomes. Rhizomes are horizontal underground stems that usually produce roots and shoots from nodes (SRM 1999).

Rill* A small, intermittent watercourse with steep sides, usually no more than several centimeters deep (SSSA 1997). Rills generally are linear erosion features.

Riparian colonizing species* Plant species that become established in open, barren areas. They are often among the first plants to occupy open sites. In riparian areas they “colonize” edges of bars or areas where stream banks have freshly eroded. They are rhizomatous/stoloniferous in growth form, but the roots are shallow and the stems are relatively weak. Although they are short-lived, they have a capacity to grow very rapidly—up to one to four centimeters per day. They initiate shallow roots every few centimeters and, as water force aligns their stems parallel to the water’s edge, they develop temporary bands/stringers of vegetation along stream edges. Their primary function is to filter and catch very fine (flour-like) sediments and build substrate for the stronger, more permanent “stabilizing” species (see definition for **riparian stabilizing species***). As such, they play a crucial role in initiating recovery/maintenance of stream banks. Typical examples include brookgrass (*Catabrosia aquatica*) and water-cress (*Rorippa nasturtium-aquaticum*) (Winward 2000).

Riparian complex* A unit of land characterized by a unique set of biotic and abiotic factors. Complexes are identified on the basis of their topography, soils, stream gradient, associated water flow features, and their general vegetation patterns. A riparian complex is similar in definition to a valley segment, except that the valley segment refers to the stream channel proper, while the riparian complex is used to describe the full width of the riparian area across a particular portion of a valley. Generally, a limited set of stream reaches is nested within a given riparian complex (Winward 2000).

Riparian greenline* See **greenline***.

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Riparian stabilizing species* Plant species that become established along edges of streams, rivers, ponds and lakes. Although they generally require hydric settings for establishment, some may persist in drier conditions once they become firmly established. They commonly have strong, cord-like rhizomes as well as deep fibrous root masses. In addition, they have coarse leaves and strong crowns, which, along with their massive root systems, are able to buffer stream banks against the erosive force of moving water. Along with enhancing streambank strength, they filter sediments and, with the force of water, build/rebuild eroded portions of stream banks. They likewise filter chemicals, which is important in improving water quality. The presence of these species, thereby, plays a significant role in attaining/maintaining proper functioning of riparian and aquatic ecosystems (based on Winward 2000).

Runoff* The portion of precipitation, snowmelt or irrigation on an area that does not infiltrate, but instead is discharged by the area (SSSA 1997).

Savanna* A plant community found between a tropical, subtropical or temperate forest biome and a desert biome; transitional in character between grassland or desert and forest, it typically has drought-resistant vegetation dominated by grasses with shrubs and scattered tall trees.

Shrub* A plant that has persistent, woody stems and a relatively low-growth habit, and that generally produces several basal shoots instead of a single trunk. It differs from a tree in its low stature (generally less than five meters, or sixteen feet) and non-arborescent form (SRM 1999).

Site* See **monitoring site***. See also **monitoring plot*** and **ecological site***.

Slope shape* The geometric shape of the hillslope (convex, concave or linear). See **vertical slope shape*** and **horizontal slope shape***.

Soil and site stability* The capacity of a site to limit redistribution and loss of soil resources (including nutrients and organic matter) by wind and water; one of the three **attributes*** of **rangeland health***.

Soil association Each delineation on the soil map shows the boundaries, shape and location of a **landscape unit*** composed of two or more **soil components***. The individual bodies of component soils are *large enough* to be delineated at the scale of mapping. Several to numerous bodies of each kind of component soil are apt to occur in each delineation, and they occur in a fairly repetitive and describable pattern (SSSA 1997).

Soil complex Each delineation on the soil map shows the boundaries, shape and location of a **landscape unit*** composed of two or more **soil components***. The individual bodies of component soils are *too small* to be delineated at the scale of mapping. Several to numerous bodies of each kind of component soil are apt to occur in each delineation, although their pattern may not be apparent (SSSA 1997).

Soil component* A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness and thickness (USDA-NRCS Soil Survey Staff 1993). See also **soil inclusion** and **soil map unit***.

Soil erodibility* See **erodibility***.

Soil inclusion One or more **soil component*** within a delineation of a **soil map unit***, not identified by the map unit name (i.e., is not one of the named component soils). Such soils or areas are either too small to be delineated separately without creating excessive map or legend detail, occur too erratically to be considered a named component, or are not identifiable by practical mapping methods. Inclusions reduce the homogeneity of map units (SSSA 1997).

Soil organic matter (SOM)* The total organic matter in the soil. It can be divided into three general pools: living biomass of microorganisms, fresh and partially decomposed residues (the **active fraction**), and the well-decomposed and highly stable organic material (**stabilized organic matter**). Surface **litter*** is generally not included as part of soil organic matter (SSSA 1997).

Soil map unit* A kind of soil, a combination of kinds of soil, or miscellaneous land type or types, that can be shown at the scale of mapping for the defined purposes and objectives of the survey. Soil map units are the basis for the delineations of a soil survey map (Donahue et al. 1977). See also **soil component***, **soil inclusion**, **soil complex** and **soil association**.

Soil particles (syn. soil separates) Mineral particles, <2.0 mm in equivalent diameter, ranging between specified size limits. The names and size limits of separates recognized by the USDA are: very coarse sand (1-2 mm); coarse sand (0.5-1 mm); medium sand (0.25-0.5 mm); fine sand (0.1-0.25 mm); very fine sand (0.05-0.5 mm); silt (0.002-0.05 mm); and clay (<0.002 mm) (SSSA 1997).

Soil quality* The capacity of a specific kind of soil to function within natural or managed ecosystem boundaries, to sustain biological productivity, maintain environmental quality, and promote plant and animal health (SSSA 1997) (see footnote at end of Glossary).

Soil series* The lowest category of U.S. system of soil taxonomy; a conceptualized class of soil bodies (**polypedons**) that have limits and ranges more restrictive than all higher taxa. Soil series are commonly used to name dominant or codominant **polypedons** represented on detailed soil maps. The soil series serve as a major vehicle to transfer soil information and research knowledge from one soil area to another.

Soil structure* The combination or arrangement of primary **soil particles** into secondary units or peds. The secondary units are characterized on the basis of size, shape and grade (degree of distinctiveness) (SSSA 1997). See <http://soil.gsfc.nasa.gov/pvg/prop1.htm> for diagrams illustrating different types of structure (accessed September 25, 2008).

Soil surface* Term used to indicate classes of material on or at the soil or land surface (e.g., plant base, rock fragments, bedrock, **embedded litter***, **duff***, mosses, lichens, dark cyanobacteria, or soil that is visibly unprotected by any of the above). See also **ground cover***.

Soil surface in canopy gaps > __* The proportion (or percent) of the soil surface encompassed by gaps between plant canopies (as measured along a vegetation transect) that are longer than a specified minimum length. Determine the minimum gap size of concern, such as the minimum canopy gap at which wind erosion or weed invasion becomes a significant risk. List all canopy gap sizes that are equal to, or larger than the selected minimum canopy gap size. Add these gap sizes together. Divide this sum by the total length of the vegetation transect. Be sure to keep units consistent; if gaps are recorded in centimeters and line length in meters, convert line length to centimeters. Multiply this value by 100. See Volume I: Quick Start and Chapter 17 for further discussion on the Canopy Gap intercept method and canopy gaps.

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Soil surface in basal gaps > __* The proportion (or percent) of the soil surface encompassed by gaps between plant bases (as measured along a vegetation transect) that are longer than a specified minimum length. Determine the minimum gap size of concern, such as the minimum basal gap at which water erosion or runoff becomes a significant risk. List all basal gap sizes that are equal to, or larger than the selected minimum basal gap size. Add these gap sizes together. Divide this sum by the total length of the vegetation transect. Be sure to keep units consistent; if gaps are recorded in centimeters and line length in meters, convert line length to centimeters. Multiply this value by 100. See Volume I: Quick Start and Chapter 17 for further discussion on the Basal Gap intercept method and basal gaps.

Soil survey* The systematic examination, description, classification and mapping of soils in an area. Soil surveys are classified according to the kind and intensity of field examination (SSSA 1997).

Soil texture* The relative proportions of the various **soil particles** (sand, silt and clay) (SSSA 1997).

Species composition* The proportions of various species in relation to the total in a given area. Plant species composition may be expressed in terms of cover, density or weight (SRM 1999).

Species richness* The total number of species in an area. This is one indicator of biodiversity. See Chapter 10 for calculations. See also **minimum estimate of species richness***.

SRM* Society for Range Management.

SSSA* Soil Science Society of America.

Stabilized organic matter (syn. **humus**) The pool of **soil organic matter** that is resistant to biological degradation because it is either physically or chemically inaccessible to microbial activity. These compounds are created through a combination of biological activity and chemical reactions in the soil (SSSA 1997).

Standing dead* (or **standing dead vegetation**) Dead plant material still attached to a rooted plant. All standing dead vegetation produced in previous (not the current) growing season(s) not in contact with the soil surface (Pellant et al. 2005). Compare to **litter***, **woody litter***, **duff*** and **embedded litter***.

State* A state includes one or more biological (including soil) communities that occur on a particular ecological site and that are functionally similar with respect to the three attributes (soil and site stability, hydrologic function and biotic integrity). States are distinguished by relatively large differences in plant functional groups, soil properties and ecosystem processes and, consequently, in vegetation structure, biodiversity and management requirements. They are also distinguished by their responses to disturbance. A number of different plant communities may be included in a state and the communities are often connected by traditionally defined successional pathways (Pellant et al. 2005 based on Bestelmeyer et al. 2003 and Stringham et al. 2001, 2003).

Stratify* To separate, divide or delineate into classes.

Structure (soil)* See **soil structure***.

Structure* (syn. **vegetation structure***) The height and area occupied by different plants or life forms (and spatial diversity thereof) in a community.

Sub-shrub* See **half-shrub**.

Sub-surface stability (class)* The stability value ranging from one to six that is assigned to a sub-surface stability sample during the Soil stability test. See Volume I: Quick Start for more details.

Surface stability (class)* The stability value ranging from one to six that is assigned to a surface stability sample during the Soil Stability test. See Volume I: Quick Start for more details. Another indicator is the **proportion of surface values = class 6***. Calculate the proportion of surface values = class 6 by counting the number of *surface* samples with a stability class equal to six. Then divide this sum by the total number of surface samples taken. Multiply this value by 100.

T&E* Threatened and Endangered (species).

Terracette. “Benches” of soil deposition behind obstacles caused by water erosion, not wind erosion (Pellant et al. 2005). May or may not reflect current erosion. Compare to **pedestal**.

Threshold* A transition boundary that an ecosystem crosses, which results in a new stable **state*** that is not easily reversed without significant inputs of resources.

Total annual production* All aboveground plant biomass produced during a single growing year, including woody material and regardless of palatability or accessibility to grazing animals. Total annual production is expressed in pounds per acre (lb/ac). See Chapter 9 for methods of estimating and calculating total annual production.

TNC* The Nature Conservancy.

Transition* A shift between two states. Transitions are not reversible by simply altering the intensity or direction of factors that produced the change. Instead, they require new inputs such as revegetation or shrub removal. Practices such as these that accelerate succession (USDA-NRCS 1997) are often expensive to apply.

Tree* A woody perennial, usually single-stemmed plant that has a definite crown shape and reaches a mature height of at least 4 meters (13.1 ft). The distinction between woody plants known as trees and those called shrubs is gradual. Some plants, such as oaks (*Quercus* spp.), may grow as either trees or shrubs (SRM 1999).

Trend* The direction of change in ecological status or resource value rating observed over time (SRM 1999).

USDA* United States Department of Agriculture.

USDI* United States Department of the Interior.

USFS* United States Forest Service (USDA).

USGS* United States Geological Survey (USDI).

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Vegetation class* Used in this document to distinguish between different types of vegetation for the purpose of stratifying soil measurements. The vegetation class is defined as NC (no canopy) if there is less than 50 percent canopy cover over the area measured or sampled. The vegetation class is defined as G if greater than 50 percent canopy cover over the area measured is grass or a grass/shrub mixture; F for perennial forb, Sh for shrub canopy and T for tree canopy.

Vegetation structure* (syn. **structure***) Vegetation structure is the vertical and horizontal distribution of vegetation in space. The height and area occupied by different plants or life forms (and spatial diversity thereof) in a community. See also **foliage height diversity*** and **visual obstruction***.

Vertical slope shape* The geometric shape of the vertical profile (up and down slope) of a hillslope. This can be convex, concave or linear. Compare to **horizontal slope shape***.

Vesicular crust A type of physical crust that contains numerous small, unconnected air pockets or pores similar to a sponge. As with all physical crusts, they seal the soil's surface, causing a reduction in infiltration rate.

Visual obstruction* An indicator that reflects the vertical plant cover or the density of vegetation at different heights. Observers determine what proportion of a cover pole, Robel pole, or cover board is visually obstructed from view by plant cover at standard height intervals. Visual obstruction measurements can be used to estimate standing crop biomass, **vegetation structure*** and **foliage height diversity***. See Chapter 11 for calculations from the Vegetation structure method. The same calculations can be applied to the Line-point intercept with Height method (Ch. 15); given height classes are developed (such as 0-50 cm, 51-100 cm, 101-150 cm and 151-200 cm). See also **vegetation structure*** and **foliage height diversity***.

Weather* The current state of the atmosphere with regard to wind, temperature, cloudiness, moisture, pressure, etc.

Width-depth ratio* This is the width of a channel or gully divided by its depth. The width is the horizontal distance between the points used for the bank angle (Riparian channel and gully profile) at the top of each bank. The depth is the greatest vertical distance from a straight line drawn between the two points used for the bank angle and the bottom of the channel. See Chapter 14 for more information on calculations.

Woody litter* Detached plant material (**litter***) that is greater than 5 mm ($\sim 1/4$ in) in diameter that is in direct contact with the soil.

Footnote: Together, rangeland health and soil quality focus on above - and below - ground soil and vegetation features important for rangeland function. They can be thought of as the foundation upon which most land uses and values depend.