Inventory Monitoring and Assessment Community of Practice Glossary

Introduction

This document contains the glossary sections of numerous inventory and monitoring related technical guides, and other Forest Service publications as follows:

- Bechtold, W.A.; Patterson, P.L. 2005. The enhanced forest inventory and analysis program: national sampling design and estimation procedures. Gen. Tech. Rep. SRS-80. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 85 p.
- Brohman, R.; Bryant, L. eds. 2005. Existing Vegetation Classification and Mapping Technical Guide. Gen. Tech. Rep. WO–67. Washington, DC: U.S. Department of Agriculture Forest Service, Ecosystem Management Coordination Staff. 305 p.
- Landres, P.; Boutcher, S.; Mejicano, E., Sandeno, E. eds. 2020. Wilderness character monitoring technical guide. Gen. Tech. Rep. RMRS-GTR-426. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 364 p.
- Monitoring Team for Climate Change. Unpublished report. Unified Multi-Scale Monitoring Approach: Detailed Report Prepared for Agency Leadership. Unpublished report On file with: USDA Forest Service, Washington, DC.
- Nelson, M.L.; Brewer, C.K.; Solem, S.J., eds. 2015. Existing vegetation classification, mapping, and inventory technical guide, version 2.0. Gen. Tech. Rep. WO–90. Washington, DC: U.S. Department of Agriculture, Forest Service, Ecosystem Management Coordination Staff. 210 p.
- Rowland, M.M.; Vojta, C.D.; tech. eds. 2013. A technical guide for monitoring wildlife habitat. Gen. Tech. Rep. WO-89. Washington, DC: U.S. Department of Agriculture, Forest Service: 400 p.
- Solem, S.J.; Gilboy, A. 2017. Resource inventory and monitoring protocol development guidebook. Gen. Tech. Rep. WO-##. Washington, DC: U.S. Department of Agriculture, Forest Service. # p.
- Vesely, D.; McComb, B.C.; Vojta, C.D.; Suring, L.H.; Halaj, J.; Holthausen, R.S.; Zuckerberg, B.; Manley, P.M. 2006. Development of Protocols To Inventory or Monitor Wildlife, Fish, or Rare Plants. Gen. Tech. Rep. WO-72. Washington, DC: U.S. Department of Agriculture, Forest Service. 100 p.
- Winthers, E.; Fallon, D.; Haglund, J.; DeMeo, T.; Nowacki, G.; Tart, D.; Ferwerda, M.; Robertson, G.; Gallegos, A.; Rorick, A. Cleland, D. T. Robbie, W.2005. Terrestrial Ecological Unit Inventory technical guide. Washington, DC: U.S. Department of Agriculture, Forest Service, Washington Office, Ecosystem Management Coordination Staff. 245 p.

This compilation includes both the terms from the glossaries and the associated citations (where available). It is intended to provide a convenient reference document for Inventory, Monitoring, and Assessment Community of Practice (IM&A CoP) members to use for developing the glossary sections for various CoP documents and reports. Additional socialization of this glossary compilation among other interested groups, Directorates, and business areas may be warranted to determine broader applicability and potential use across the Agency.

Many of these terms in this compilation are used in multiple documents and provide the same definition, while some terms are used in multiple documents and provide different definitions (see accuracy example below). Each term is listed with the Forest Service document glossary that contained the term followed by the definition and the citation for the associated reference (see accuracy example below). Where multiple glossaries use the same definition all the documents where the term is used are listed chronologically. Where multiple documents use different definitions each occurrence is listed separately (see accuracy example below). Any term contained in a Forest Service Manual (FSM)or Forest Service Handbook (FSH) is given emphasis (**bold text and underlined**) because of the policy implications of the term (see adaptive management example below). Not surprisingly, many technical guides use and cite FSM or FSH definitions.

accuracy. The degree to which a measured quantity approaches the true value of what is being measured (as used in Brohman and Bryant 2005, and Winthers *et al*. 2005 citing Lincoln et al. 1998).

accuracy. (1) The closeness of computations or estimates to the exact or true value; (2) the magnitude of systematic errors or degree of bias associated with an estimation procedure that affects how well the estimated value represents the true value (not synonymous with precision) (as used in Vesely *et al*. 2006 with no citation provided).

accuracy. The closeness of results of observations, computations or estimates to the true values or the values accepted as being true (as used in Nelson *et al*. 2015 citing FGDC 1998).

adaptive management. A system of management practices based on clearly identified outcomes and monitoring to determine if management actions are meeting desired outcomes, and if not, to facilitate management changes that will best ensure that outcomes are met or reevaluated. Adaptive management stems from the recognition that knowledge about natural resource systems is sometimes uncertain (as used in Rowland and Vojta 2013, and Solem and Gilboy 2017 Review Draft citing **Forest Service Manual [FSM] 1940** USDA Forest Service 2009).

While these documents provide many inventory and monitoring related terms, they only define terms as used in their respective texts. As a result, this compilation is not exhaustive and there may be cases where the definitions included may not provide a suitable definition. In that event, CoP authors should always find and use an authoritative, published definition that is properly cited. (Note: CoP authors should not craft new definitions for terms 1) that do not have existing published definitions or 2) when the published definitions do not match the intended use of the term.) Forest Service Manual (FSM) and Forest Service Handbook (FSH) definitions should always be used when available. If a new definition is used the definition and the associated citation should be provided to the CoP Glossary Working Group (or their designated successors if the CoP no longer exists) for inclusion in future versions of this document. A suggested list of authoritative published dictionaries and glossaries is included below.

Suggested Authoritative References:

- Allaby, M. 1994. The concise Oxford dictionary of ecology. Oxford, United Kingdom: Oxford University Press. 415 p.

- American Society of Civil Engineers.; American Congress on Surveying and Mapping.; American Society for Photogrammetry and Remote Sensing.; 1994. Glossary of the mapping sciences. Bethesda MD. 581p.
- DAMA International. 2017. Data Management Body of Knowledge. (DAMA DMBOK) 2nd ed. Technics Publications. 626p.
- Deal, R., ed. 2018. The dictionary of forestry 2nd Edition. Bethesda, MD: Society of American Foresters. 208 p.
- Ford-Robertson, F.C. 1971. Terminology of forest science, technology, practice, and products. Washington, DC: Society of American Foresters. 349 p.
- Helms, J.A., ed. 1998. The dictionary of forestry. Bethesda, MD: Society of American Foresters. 210 p.
- Lincoln, R.; Boxshall, G.; Clark, P. 1998. A dictionary of ecology, evolution and systematics. 2nd ed. New York: Cambridge University Press. 361 p.
- Lincoln, R.J.; Boxshall, G.A.; Clark, P.F. 1982. A dictionary of ecology, evolution and systematics. New York: Cambridge University Press. 298 p.
- Project Management Institute. 2017. A guide to the project management body of knowledge (PMBOK® Guide). 6th ed. Newtown Square, PA: Project Management Institute, Inc. 756 p.
- Society of American Foresters. 1991. Task Force report on biological diversity in forest ecosystems. Bethesda, MD: Society of American Foresters. 52 p.
- Society for Range Management (SRM). 1989. A glossary of terms used in range management. Denver, CO: Society for Range Management. 36 p.
- Society for Range Management (SRM). 1998. Revised. A glossary of terms used in range management. Denver, CO: Society for Range Management. 32 p.
- Webster's II new Riverside University dictionary. 1984. Boston, MA: The Riverside Publishing Company. 1536 p.

Glossary Terms

303(d) list of impaired water bodies. The list of impaired and threatened waters that the Clean Water Act requires all states to identify. This list specifies where required pollution controls are not sufficient to attain or maintain applicable water quality standards, and helps establish priorities for development of total maximum daily loads based on the severity of the pollution and the sensitivity of the uses to be made of the waters, among other factors (as used in Landres *et al*. 2020 without definition citation).

abiotic. Pertaining to the nonliving parts of an ecosystem, such as soil particles, bedrock, air, and water (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, Monitoring Team for Climate Change Unpublished Report, and Nelson *et al*. 2015 citing Helms 1998).

absolute composition. List of the absolute amounts of each plant species present in a given area or stand. Express the amount of each plant taxon as absolute percent cover (as used in Brohman and Bryant 2005, citing FGDC 1997 and Jennings et al. 2003).

absolute composition. List of the absolute amounts of each plant species present in a given area or stand, expressed as percent cover (as used in Nelson *et al*. 2015 citing Jennings et al. 2003).

abundance. The total number of individuals of a taxon or taxa in an area, volume, population or community often measured as cover in plants (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 citing Lincoln et al. 1998).

abundance. The number of individuals in a population (as used in Landres *et al*. 2020 without definition citation).

accuracy. The degree to which a measured quantity approaches the true value of what is being measured (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 citing Lincoln et al. 1998).

accuracy. (1) The closeness of computations or estimates to the exact or true value; (2) the magnitude of systematic errors or degree of bias associated with an estimation procedure that affects how well the estimated value represents the true value (not synonymous with precision) (as used in Vesely *et al*. 2006 without definition citation).

accuracy. The closeness of results of observations, computations or estimates to the true values or the values accepted as being true (as used in Nelson *et al*. 2015 citing FGDC 1998).

accuracy assessment. Process by which the accuracy or correctness of an image (or map) is evaluated (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 without definition citation).

accuracy assessment. The process by which the correctness of an image, map, or other spatial layer is evaluated (as used in Rowland and Vojta 2013 citing Winthers et al. 2005).

accuracy assessment. In mapping, the process by which the accuracy or correctness of an image (or map) is evaluated. accuracy assessment site. In mapping, the site identified on a satellite image (or map) and on a reference dataset for the purposes of an accuracy assessment of the image or map (as used in Nelson *et al*. 2015 citing Lachowski et al. 1996).

accuracy assessment site. Site identified on a satellite image (or map) and on a reference dataset for the purposes of accuracy assessment of the image or map (as used in Brohman and Bryant 2005 citing Lachowski et al. 1996).

adaptive management. A system of management practices based on clearly identified outcomes and monitoring to determine if management actions are meeting desired outcomes, and if not, to facilitate management changes that will best ensure that outcomes are met or reevaluated. Adaptive management stems from the recognition that knowledge about natural resource systems is sometimes uncertain (as used in Rowland and Vojta 2013 and Solem and Gilboy 2017 Review Draft citing **Forest Service Manual [FSM] 1940**; USDA Forest Service 2009).

administrative authorization. An authorization to use motor vehicles, motorized equipment or mechanical transport determined as necessary to meet minimum requirements for the administration of the area that are not of an emergency nature, or allowed through a special provision in legislation (as used in Landres *et al*. 2020 without definition citation).

alliance. (1) A grouping of associations with a characteristic physiognomy and sharing one or more diagnostic species, which, as a rule, are found in the uppermost or dominant stratum of the vegetation (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 citing Jennings et al. 2003). (2) A physiognomically uniform group of associations sharing one or more diagnostic (dominant, differential, indicator, or character) species that, as a rule, are found in the

uppermost stratum of the vegetation (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 citing FGDC 1997).

alliance. A vegetation classification unit of low rank (7th level) containing one or more associations, and defined by a characteristic range of species composition, habitat conditions, physiognomy, and diagnostic species, typically at least one of which is found in the uppermost or dominant stratum of the vegetation (as used in Rowland and Vojta 2013 citing Jennings et al. 2006). Alliances reflect regional to subregional climate, substrates, hydrology, moisture or nutrient factors, and disturbance (as used in Rowland and Vojta 2013 citing FGDC 2008).

alliance. A vegetation classification unit containing one or more associations, with a defined by a characteristic range of species composition, habitat conditions, physiognomy, and diagnostic species, typically at least one of which is found in the upper most or dominant stratum of the vegetation (as used in Nelson *et al*. 2015 citing Jennings et al. 2006 as cited in FGDC 2008).

analytical. (1) Of or relating to analysis or analytics. (2) Separating into elemental parts or basic principles. (3) Reasoning from a perception of the parts and interrelations of a subject. (as used in Monitoring Team for Climate Change Unpublished Report citing Webster 1984).

animal unit months. The amount of forage required by a 1,000-pound cow, or the equivalent, for 1 month (as used in Landres *et al*. 2020 without definition citation).

aquatic herb. A flowering or non-flowering herb structurally adapted to live floating or submerged in an aquatic environment. Does not include emergent herbs, such as cattails and sedges [see Grassland] (as used in Brohman and Bryant 2005 citing FGDC 1997, Jennings et al. 2006). Examples include duckweed, water-lily, water hyacinth. arc. In reference to GIS, within a spatial context, a locus of points that forms a curve that is defined by a mathematical expression (as used in Brohman and Bryant 2005 citing an adaptation from FGDC 1998).

arc. In GIS, within a spatial context, a locus of points that forms a curve that is defined by a mathematical expression (as used in Winthers *et al*. 2005 citing FGDC 1998).

area change matrix. the area of the intersection of all combinations of initial and terminal condition classes between two points in time, compiled for a microplot, subplot, macroplot, or plot (as used in Bechtold and Patterson 2005 without definition citation).

area-based recreation. Any form of recreation that is not restricted to a linear route, but is constrained only by varying combinations of technologies, environmental conditions, and management regulations, such as snowmobiling (as used in Rowland and Vojta 2013 without definition citation).

area away from access and travel routes and developments inside wilderness. The area of a wilderness located more than ½ mile from wilderness trails, roads, and developments. The sights and sounds of human activity inside wilderness are generally less likely to impact this area (as used in Landres *et al*. 2020 without definition citation).

area away from adjacent travel routes and developments outside the wilderness. The area of a wilderness located more than ½ mile from nonwilderness roads, structures, and developments, including infrastructure located on inholdings and cherry-stemmed roads. The sights and sounds

of human activity outside the wilderness are generally less likely to impact this area (as used in Landres *et al*. 2020 without definition citation).

assessment. An analysis and interpretation of the social, economic, or ecological characteristics of an area using scientific principles to describe existing conditions as they affect sustainability. Assessments provide the foundation of independent information upon which to build conservation strategies and management decisions; and against which alternative approaches can be evaluated and modified (as used in Solem and Gilboy 2017 Review Draft citing USDA Forest Service 2009).

association. (1) A recurring plant community with a characteristic range in species composition, specific diagnostic species, and a defined range in habitat conditions and physiognomy or structure (as used in Brohman and Bryant 2005 citing Jennings et al. 2003). (2) A physiognomically uniform group of existing vegetation stands that share dominant overstory and understory species. These occur as repeatable patterns across the landscape (as used in Brohman and Bryant 2005 citing an adaptation from FGDC 1997). (3) A plant community type of definite floristic composition, uniform habitat conditions, and uniform physiognomy (as used in Brohman and Bryant 2005 citing Flahault and Schröter 1910, as cited in Jennings et al. 2003). Definition 3 is the most authoritative; the Federal Geographic Data Committee (FGDC) modified it for existing vegetation, and the modification is followed in this technical guide.

association (plant). The finest level of the (vegetation) classification standard; a physiognomically uniform group of vegetation stands that share one or more diagnostic (dominant, differential, indicator, or character) overstory and understory species and reflect topo-edaphic climate, substrates, hydrology, and disturbance regimes (as used in Rowland and Vojta 2013 citing FGDC 2008); a vegetation classification unit defined on the basis of a characteristic range of species composition, diagnostic species occurrence, habitat conditions, and physiognomy (as used in Rowland and Vojta 2013 citing Jennings et al. 2006).

association. A vegetation classification unit defined on the basis of a characteristic range of species composition, diagnostic species occurrence, habitat conditions, and physiognomy (as used in Nelson *et al*. 2015 citing Jennings et al. 2006 as cited in FGDC 2008).

association table. Summary of species data by plot for a given association. Association tables are essential to determine plot membership in a type and are used for comparison of individual plots to other plots in a type. They may include information on environmental characteristics (e.g., slope, aspect, or elevation). See also synthesis table (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 without definition citation).

attribute. a discrete or continuous variable, usually associated with the classification or measurement of area or vegetation (as used in Bechtold and Patterson 2005 without definition citation).

attribute. One of a set of descriptive terms; a characteristic (as used in Brohman and Bryant 2005Winthers *et al*. 2005, and Monitoring Team for Climate Change Unpublished Report citing adaptation from Lincoln et al. 1998).

attribute. A defined characteristic of an entity type (e.g., composition) (as used in Nelson *et al*. 2015 citing FGDC 1998).

attribute gaps. The attribute(s) needed to answer the question was not measured in previous studies or was measured without sufficient detail (e.g., classes instead of continuous measurements) (as used in Nelson *et al*. 2015 without definition citation).

authorized action. An action which is approved by an employee of the Forest Service to whom the appropriate authority has been delegated (as used in Landres *et al*. 2020 without definition citation).

authorized recreation features. Recreation features installed and maintained by the Forest Service, or historical structures used by visitors. These facilities include toilets, picnic tables, bear poles or other food storage structures, permanent fire rings/ grates, shelters, developed water sources, corrals for recreational stock holding, large bridges, and Forest Service-constructed tent pads or sleeping platforms (as used in Landres *et al*. 2020 without definition citation).

auxiliary database. A repository for data that is created and maintained outside of a corporate database structure, such as outside the Forest Service Natural Resource Manager (NRM). In the Forest Service, tabular and spatial data that do not meet national published NRM protocols are considered auxiliary and are either maintained at a local unit or with a contributing partner (as used in Rowland and Vojta 2013 without definition citiation).

basal cover. The area occupied by plant stems as they extend into the soil; calculated as the percent of the soil surface covered by plant stems, using a point-intercept method, such as line-point intercept (as used in Rowland and Vojta 2013 citing adaptation from Herrick et al. 2005)

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baseline conditions. The starting point for assessing change over time without value judgment as to whether these conditions are good, bad, or desired (as used in Landres *et al*. 2020 without definition citation).

Bayesian belief network. A graphical model based on Bayesian inference that uses a combination of empirical data and knowledge from experts to graphically express complex relationships and address uncertainties in a structured way to evaluate alternative scenarios and their outcomes (as used in Rowland and Vojta 2013 citing McCann et al. 2006).

bedrock geology. Characteristics of the consolidated material at the Earth's surface or that immediately underlies soil or other unconsolidated, surficial deposits, specifically lithology (rock type), weathering, structure (e.g., fracturing or bedding), and stratigraphy (the rock-unit age and designation) (as used in Winthers *et al*. 2005 without definition citiation).

best available scientific information. Determination of what information is the most accurate, reliable, and relevant to the issues being considered (as used in Solem and Gilboy 2017 Review Draft citing 2012 Planning Rule, 36 CFR 219.3).

best available scientific information. Scientific information which each local wilderness unit is required to use for all selected measures. Determined by subjective evaluation of data quantity, quality, and adequacy by resource specialists for all potential data sources considered for each measure. "Available" refers to information that currently exists in a useful form, and that does not require further data collection, modification, or validation. If the only available data are insufficient in quantity, they may still be considered the best available scientific information for the local unit.

In general, the highest quality data will be considered the best available scientific information (as used in Landres *et al*. 2020 without definition citation).

bi-areal plot. a plot design that incorporates two different plot sizes at each sample location for the purpose of measuring trees in two different tree diameter ranges (as used in Bechtold and Patterson 2005 without definition citation).

bias. A persistent statistical error associated with parameter estimates whose source is not random chance (as used in Rowland and Vojta 2013 citing Thompson et al. 1998).

bias. The difference between the true value of a parameter and its expected value based on sampling. Sources of bias include measurement error (e.g., poorly calibrated instruments) or use of inappropriate estimators for a given sampling design (e.g., failing to correct for a small sample size in estimating the variance of a sample, where n = 9) (as used in Vesely *et al*. 2006 without definition citation).

Bioindicator. the use of a biological entity's condition, frequency, and abundance as an indicator of ecosystem quality (as used in Bechtold and Patterson 2005 without definition citation).

biological population. A defined group of organisms of one species living in a particular area at a particular time (as used in Vesely *et al*. 2006 without definition citation).

biological studies. A wide range of scientific investigations designed to test hypotheses or elucidate ecological relationships. The following two general types of studies are particularly relevant to WFRP I&M technical guides:

Cause and effect studies—Experiments and rigorously controlled observational studies designed to test whether a change in a specific environmental, ecological, or human factor causes a measurable response in a population (as used in Vesely *et al*. 2006 without definition citation).

Wildlife-habitat relationship studies—The coincidental measurement of a population parameter (or an index) and ancillary measurements of the site or surrounding environment. Qualitative or quantitative analyses are conducted to determine correlative relationships between the population parameter and environmental variables for the purpose of determining species-habitat associations (as used in Vesely *et al*. 2006 without definition citation).

Biomass. (1) *Ecology* the total dry organic matter at a given time of living organisms of one or more species per unit area (species biomass) or of all the species in the community (community biomass). (2) The living or dead weight of organic matter in a tree, stand, or forest in units such as living or dead weight, wet or dry weight, ash-free weight, etc. (3) *Harvesting* the wood product obtained (usually) from in-woods chipping of all or some portion of trees including limbs, tops, and unmerchantable stems, usually for energy production (as used in Monitoring Team for Climate Change Unpublished Report citing Helms 1998).

Biomonitoring. The use of living organisms as indicators of environmental conditions, Environmental change or the impact of industrial effluents, wastes and other sources of pollution (as used in Monitoring Team for Climate Change Unpublished Report citing Lincoln et al. 1998).

biophysical environment "The earth and its community of life" including, but not limited to, vegetation, fish, wildlife, insects, pathogens, soil, and water (as used in Landres *et al*. 2020 without definition citation).

Biophysics. The application of physics to the study of living organisms and systems. (biophysical adj. (as used in Monitoring Team for Climate Change Unpublished Report citing Lincoln et al. 1998).

Biota. The total flora and fauna of a given area; bios (as used in Monitoring Team for Climate Change Unpublished Report citing Lincoln et al. 1998).

boundary (condition class). the border between two distinctly different condition classes (as used in Bechtold and Patterson 2005 without definition citation).

boundary (population). the border of a population or subpopulation (as used in Bechtold and Patterson 2005 without definition citation).

Box-and-whisker plot. A convenient method of graphically displaying the distribution of data in which five numbers are typically shown, including the minimum, maximum, and median values. The upper and lower lines of the box represent the upper (75th percentile) and lower (25th percentile) quartiles of the data. The middle line within the box represents the median value (as used in Rowland and Vojta 2013 without definition citation).

building. A structure to support, shelter, or enclose persons, animals, or property of any kind (as used in Landres *et al*. 2020 without definition citation).

building of historical value. Any prehistoric or historic building included in, or eligible for inclusion in, the National Register of Historic Places or which qualify for protection and preservation under the Archaeological Resources Protection Act (P.L. 96-95) (as used in Landres *et al*. 2020 without definition citation).

business needs. Ongoing tasks related to a particular business or project and the information and other support contributing to the completion of these tasks (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 without definition citation).

business requirements. A business need identified as necessary for successful achievement of business goals/objectives, (including strategic, tactical, legal, or operational objectives). Business requirements may be represented in a variety of contexts and are most often defined in response to establishing requirements for processes, compliance to business direction, and to identification of information technology functionality requirements (as used in Brohman and Bryant 2005, Rowland and Vojta 2013, Nelson *et al*. 2015, and Solem and Gilboy 2017 Review Draft citing **Forest Service Manual [FSM] 1940**).

business requirements. A list of management requirements and management questions pertaining to protocol focus. (as used in Solem and Gilboy 2017 Review Draft without definition citation)

business requirements analysis. The iterative process of focusing protocol development to meet specific goals and objectives (as used in Solem and Gilboy 2017 Review Draft without definition citation).

camp encounters. The daily mean number of camping groups visible or audible from a visitor's campsite during the primary use season (as used in Landres *et al*. 2020 without definition citation).

canopy closure. The proportion of ground, usually expressed as a percentage, that is occupied by the perpendicular projection downward of the aerial parts of the vegetation of one or more species. It usually refers to the tree life form of the uppermost canopy, as seen from above, and cannot exceed 100-percent. Canopy closure is similar in concept to absolute canopy (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 without definition citation).

canopy cover. (1) The proportion of ground, usually expressed as a percentage, that is occupied by the perpendicular projection down on to it of the aerial parts of the vegetation or the species under consideration. The additive cover of multiple strata or species may exceed 100-percent (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 citing FGDC 1997). (2) The percentage of ground covered by a vertical projection of the outermost perimeter of the natural spread of foliage of plants. Small openings in the canopy are included (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, Rowland and Vojta 2013, and Nelson *et al*. 2015 citing SRM 1989 and USDA NRCS 1997). Canopy cover is synonymous with canopy closure (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 and Winthers *et al*. 2005 citing Helms 1998). For woody plants, canopy cover is synonymous with crown cover (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 citing USDA NRCS 1997 and Helms 1998). Contrast with foliar cover.

canopy cover, (absolute). The canopy cover of a species in a plant community, regardless of the presence of other species. canopy cover, relative. The canopy cover of a species in a plant community, expressed as a percentage of the total cover of all species. canopy structure. The arrangement of vegetation layers in a plant community. class. A group of individuals or other units similar in selected properties and distinguished from all other classes of the same population by differences in these properties (as used in Winthers *et al*. 2005 citing Buol et al. 1973).

case study. The collection and presentation of detailed data from an inventory or monitoring effort that did not replicate treatments and/or did not collect observations in a random fashion. Conclusions may be drawn only about the area in which data were collected and only about the individuals from which observations were made. Case studies do not focus on the determination of findings that are generally applicable, nor do they typically provide cause-and-effect relationships; instead, emphasis is placed on exploration and description (as used in Vesely et al. 2006 without definition citation).

cause-and-effect monitoring. An approach for investigating the mechanisms that underlie habitat and species response to management and other forms of disturbance (as used in Rowland and Vojta 2013 citing Holthausen et al. 2005).

census. A complete enumeration or count of individuals to determine population size (as used in Vesely et al. 2006 without definition citation).

census water: areas of permanent water > 4.5 acres or > 200 feet wide (as used in Bechtold and Patterson 2005 without definition citation).

central data analyst. A Washington Office staff position that is responsible for gathering the data from national-level monitoring programs, e.g., the Forest Service Air Resource Management Program, and preparing these data and then entering them into the WCMD for each wilderness. This position is also responsible for consulting with a statistician to determine the appropriate type or form of regression used for statistically analyzing trend in the measures (as used in Landres *et al*. 2020 without definition citation).

change management. Defines the process for managing change (periodic review, evaluation of change requests, revision) of the protocol and/or protocol technical guide (as used in Solem and Gilboy 2017 Review Draft in section 7.0 without definition citation).

change management process. A comprehensive process necessary in all monitoring programs that begins with the identification of a need for change and ends with the resolution of that request (as used in Landres *et al*. 2020 without definition citation).

character species. A species that shows a distinct maximum concentration, (quantitatively and by presence), in a well-definable vegetation type… (as used in Brohman and Bryant 2005 citing Mueller-Dombois and Ellenberg 1974) … sometimes recognized at local, regional, and general geographic scales. Character species may also be viewed as very strong differential species (as used in Nelson *et al*. 2015 citing Bruelheide 2000 as cited in FGDC 2008, Mueller-Dombois and Ellenberg 1974: 93).

cherry-stemmed roads. A road or trail that is excluded from a wilderness by a non-wilderness corridor with designated wilderness on both sides (as used in Landres *et al*. 2020 without definition citation).

class. (1) The first (highest) level in the National Vegetation Classification Standard (NVCS) hierarchy based on the structure of the vegetation and determined by the relative percentage of cover and the height of the dominant, uppermost life forms (as used in Brohman and Bryant 2005 and Monitoring Team for Climate Change Unpublished Report citing Ecological Society of America 1999). (2) A group of individuals or other units similar in selected properties and distinguished from all other classes of the same population by differences in these properties (as used in Brohman and Bryant 2005, Monitoring Team for Climate Change Unpublished Report, and Nelson *et al*. 2015 citing Buol et al. 1973).

Class I area. Areas of the country protected under the Clean Air Act and afforded the opportunity for the highest level of air quality protection. As defined by the Clean Air Act, Class I areas include the following areas that were in existence as of August 7, 1977: national parks larger than 6,000 acres, national wilderness areas and national memorial parks larger than 5,000 acres, and international parks (as used in Landres *et al*. 2020 without definition citation).

Class II area. Areas of the country protected under the Clean Air Act, but identified for somewhat less stringent protection from air pollution damage than a Class I area (except in specified cases) (as used in Landres *et al*. 2020 without definition citation).

classification. (1) The process of grouping similar entities into named types or classes based on shared characteristics. (2) The grouping of similar types (in this case, vegetation) according to criteria (in this case, physiognomic and floristic)… (as used in Nelson *et al*. 2015 citing FGDC 2008) … that are considered significant for this specific purpose. The rules for classification must be clarified before the types are identified in the classification standard. The classification methods should be clear, precise, quantitative where possible, and based on objective criteria so that the outcome will be the same no matter who developed the definition (or description). Classification by definition involves definition of class boundaries (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Monitoring Team for Climate Change Unpublished Report citing FGDC 1997, citing UN-EP/FAO 1995).

classification (vegetation). Grouping of similar vegetation types according to physiognomic and floristic criteria, using objective rules that are established before being applied so that the outcome is theoretically independent of individual perceptions. (as used in Rowland and Vojta 2013 citing adapted from FGDC 2008).

classification accuracy. The degree to which a derived image classification agrees with reality (as used in Rowland and Vojta 2013 citing Foody 2002).

classification methodology standards. Procedures to follow to implement a data classification standard. Procedures describe how data are analyzed to produce a classification (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing FGDC 1996).

classification scheme or system. A set of target classes or a legend that serves as the basis of a classification or map (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing Lachowski et al. 1996).

classified satellite imagery: a map (satellite image) that defines and displays the spatial arrangement of each classified stratum on a pixel basis (as used in Bechtold and Patterson 2005 without definition citation).

clearinghouse. See National Geospatial Data Clearinghouse (as used in Brohman and Bryant 2005 citing FGDC 1998).

climate change vulnerability assessment. A method to evaluate the potential responses of species, habitats, and ecosystems to changes in climate resulting from elevated greenhouse gasses in the atmosphere, to carry out adaptation planning and support decisionmaking (as used in Rowland and Vojta 2013 citing Glick et al. 2011).

climax. A self-replacing plant community or species with no evidence of replacement by other plants (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 without definition citation).

climax plant community. Stable community in an ecological succession that is able to reproduce itself indefinitely under existing environmental conditions in the absence of disturbance. Viewed as the final stage or endpoint in plant succession for a site. The climax community develops and maintains itself in steady state conditions (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 without definition citation).

clinometer. Handheld instrument used to measure slope, height, and vertical angles, especially of vegetation or structures (as used in Rowland and Vojta 2013).

coarse filter. One of two major conservation strategies developed by The Nature Conservancy to efficiently capture and conserve as much biological diversity as possible. Focuses on communities and is expected to capture approximately 85 to 90 percent of the species found in a State, whereas the fine filter focuses on individual species that are not adequately captured by the coarse filter (as used in Rowland and Vojta 2013 citing Noss 1987).

coefficient. In statistics, a constant as distinguished from a variable; also used to denote a dimensionless description of a distribution or a set of data (as used in Rowland and Vojta 2013 citing Lincoln et al. 1998).

Collaboration. People working together to share knowledge and resources to describe and achieve desired conditions for National Forest System lands and for associated social, ecological, and economic systems in a plan area. Collaboration applies throughout land management, encompasses a wide range of external and internal relationships and entails formal and informal processes (as used in Solem and Gilboy 2017 Review Draft citing USDA Forest Service 2009)

Common Stand Exam (CSE). Nationally consistent protocols for acquiring terrestrial vegetation information, especially in forested sites, to meet site-specific analysis needs. The CSE provides procedures for describing vegetation composition, structure, and productivity in an ecological framework and is intended as a dynamic set of guidelines to be responsive to the changing needs of the various resources (as used in Rowland and Vojta 2013).

community. (1) A group of organisms living together and linked together by their effects on one another and their responses to the environment they share (as used in Nelson *et al*. 2015 citing Whittaker 1975 as cited in FGDC 2008). (2) Any group of organisms interacting among themselves (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, Monitoring Team for Climate Change Unpublished Report , and Nelson *et al*. 2015 citing Daubenmire 1978). (3) A general term for an assemblage of plants living together and interacting among themselves in a specific location; no particular ecological status is implied (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, Monitoring Team for Climate Change Unpublished Report , and Nelson *et al*. 2015 without definition citation).

community composition. The kinds, absolute amounts, or relative proportions of plant species present in a given area or stand. It can be described qualitatively or quantitatively. The latter may use absolute amounts or relative proportions of the plant taxa present. Typically expressed as percent cover for each plant taxon (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 citing FGDC 1997 and Jennings et al. 2003).

community type. (1) An aggregation of all plant communities with similar structure and floristic composition. (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 without definition citation) (2) A unit of vegetation in a classification with no particular successional status implied (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 without definition citation). See also vegetation type.

component. A subset of an ecological type used to describe the spatial arrangement of an ecological type within the map unit. A component may represent a narrower range of characteristics than the ecological type for which it is named (as used in Winthers *et al*. 2005 without definition citation).

component score. The score calculated for an individual component of an index. All component scores are combined to generate the index value (as used in Landres *et al*. 2020 without definition citation).

components of change: the different subdivisions of the changes that can occur to a tree between measurements, such as growth, mortality, and removals (as used in Bechtold and Patterson 2005 without definition citation).

composition. (1) The amount or proportion of the plant species on a given area (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, Nelson *et al*. 2015, and Monitoring Team for Climate Change Unpublished Report citing adapted from SRM 1989). (2) A list of the species that comprise a community or any other ecological unit (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, Nelson *et al*. 2015 citing Lincoln et al. 1998). See also community composition.

compositional group. A map unit that comprises a grouping of alliances or dominance types with similar taxonomic composition and physiognomy (as used in Brohman and Bryant 2005 citing Brackney and Jennings 1998).

compound element. A group of data elements and other compound elements. Compound elements represent higher level concepts that cannot be represented by individual data elements (as used in Brohman and Bryant 2005 citing FGDC 1998).

conceptual model. A method to outline the interconnections among ecosystem processes, structure, composition, and function, the strength and direction of those links, and the attributes that characterize the state of the ecosystem (as used in Rowland and Vojta 2013 citing Mulder et al. 1999).

condition class (or condition): the combination of discrete attributes that describe the area associated with a plot. These attributes include condition status (land use), forest type, stand origin, stand size, owner group, reserve status, and stand density, as well as other ancillary and computed attributes (as used in Bechtold and Patterson 2005 without definition citation).

confidence interval. Distance between upper and lower limits around a population parameter. Represents a range of potential values for the parameter given the model used and multiple repeated surveys or samples. For example, a 95-percent confidence interval shows the range of values that are expected to include the parameter in 95 percent of repeated surveys using the same model under the same survey or sampling conditions (as used in Rowland and Vojta 2013).

connectance. In landscape analysis, the number of functional joinings, in which each pair of patches is either joined together or not (as used in Rowland and Vojta 2013).

connectivity. Spatial continuity of habitat or a cover type across a landscape (as used in Rowland and Vojta 2013 citing Turner et al. 2001). contagion. Tendency of patch types to be spatially aggregated; that is, to occur in large, aggregated distributions.

constancy. The number of occurrences of a species in a group of plots, all the same size divided by the total number of plots. Expressed as a percentage; *i.e.*, if a particular community has 10 plots and a species is found in 8 of the 10, the constancy of that species is 80-percent (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 without definition citation).

constancy. The percentage of plots in a given data set that a taxon occurs in (as used in Nelson *et al*. 2015 citing Jennings et al. 2006 as cited in FGDC 2008). If a particular community has 10 plots and a taxon is found in 8 of the 10, the constancy of that taxon is 80 percent.

constant species. "species that are present in a high percentage of the plots that define a type, often defined as those species with at least 60 percent constancy" (as used in Nelson *et al*. 2015 citing Mueller-Dombois and Ellenberg 1974, as cited in FGDC 2008: 57).

content analysis. A research technique for the objective, systematic, and quantitative description of manifest content of communications (as used in Solem and Gilboy 2017 Review Draft citing Berelson 1974). Content analysis is a research tool focused on the actual content and internal features of media. It is used to determine the presence of certain words, concepts, themes, phrases, characters, or sentences within texts or sets of texts and to quantify this presence in an objective manner. Content analysis is used in the Forest Service for evaluation of large number of comments received for documents requesting public input such as National Forest Land Management Plans, proposed National Environmental Policy Act projects, and reviewer comments such as on data collection protocols.

context monitoring. An approach to tracking a broad array of ecosystem components at multiple scales without specific reference to influences of ongoing management (as used in Rowland and Vojta 2013 citing Holthausen et al. 2005).

contrasting condition: The condition class that differs from the condition class located at the subplot center (for boundaries on the subplot or macroplot) or at the microplot center (for boundaries on the microplot), i.e., the condition class present on the other side of a boundary (as used in Bechtold and Patterson 2005 without definition citation).

contrast-weighted edge density. Standardizes the number of instances within a rasterbased map that two adjacent pixels are of different types. The standardization involves dividing the total number of instances by the total number of pixels on the map (as used in Rowland and Vojta 2013 without definition citation).

convenience sampling. Act of collecting data where they are easy to obtain, such as along roads, trails, utility corridors, and in areas of high abundance and hence, not representative of the population of interest (as used in Rowland and Vojta 2013 citing Anderson 2001).

coordinates. In mapping, pairs of numbers that express horizontal distances along orthogonal axes; or, triplets of numbers measuring horizontal and vertical distances (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 citing FGDC 1998).

core area. Area unaffected by the edges of the patch; represents the interior area of patches after a user-specified edge buffer is eliminated (as used in Rowland and Vojta 2013 without definition citation).

core variable. An element of forest structure such as tree diameter that is routinely measured at all sampling points in the Forest Inventory and Analysis (FIA) program. Each FIA region may choose additional data elements to measure, but may not change the core requirements (as used in Rowland and Vojta 2013 without definition citation).

corporate database. Enterprise-wide information management systems using a common information structure and processes to store, maintain and access shared automated inventory, monitoring, and assessment data (as used in Rowland and Vojta 2013 citing **FSM 1940 USDA Forest Service 2009**).

correlation length. Average distance an organism can traverse a map from a random starting point and moving in a random direction, while remaining in a specific patch type (as used in Rowland and Vojta 2013 without definition citation).

cover. Usually meant as canopy cover that is the gross outline of the foliage of an individual plant or group of plants in a stand or plot. Expressed as a percent of the total area of the plot and may exceed 100- percent if more than one layer is considered. See also canopy cover and vegetation cover (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 without definition citation).

cover from above (CFA). The percentage of ground covered by a vertical projection of the outermost perimeter of the natural spread of foliage of plants visible from above. Any portion of a taxon, growth form, layer, or size class that is overtopped by taller vegetation is excluded from cover from above. Small openings in the canopy are included as cover. Contrast with canopy cover and foliar cover (as used in Nelson *et al*. 2015 without definition citation).

cover type. (1) A designation based on the plant species forming a plurality of composition in a given area, e.g., oak-hickory (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 citing FGDC 1997). (2) A vegetation type defined on the basis of the plant species forming a plurality of composition and abundance (as used in Nelson *et al*. 2015 citing Eyre 1980 as cited in FGDC 2008). The Society of American Foresters (SAF) forest cover types (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 citing Eyre 1980) and the Society for Range Management (SRM) rangeland cover types (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 citing Shiflet 1994) are examples of cover types.

cover type. A designation based upon the plant species forming a plurality of composition and abundance; typically based on the dominant species in the uppermost stratum of vegetation (e.g., oak-hickory) (as used in Rowland and Vojta 2013 citing adapted from Brewer et al. 2011b and FGDC 2008).

critical load. The amount of pollutant loading below which negative impacts to sensitive resources do not occur; a threshold for air pollution effects (as used in Landres *et al*. 2020 without definition citation).

crown closure (percent). Percentage of area covered by the vegetation canopy (as used in Brohman and Bryant 2005 citing USDA Forest Service 1999).

cultural vegetation. Vegetation with a distinctive structure, composition, and development determined by regular human activity (cultural vegetation sensu stricto of Küchler as cited in FGDC 2008). Cultural vegetation has typically been planted or treated, and has relatively distinctive physiognomic, floristic, or site features when compared with natural vegetation (as used in Nelson *et al*. 2015 citing FGDC 2008). Contrast with natural/seminatural vegetation.

cumulative effects. The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (as used in Landres *et al*. 2020 without definition citation).

cycle: one sequential and complete set of panels (as used in Bechtold and Patterson 2005 without definition citation).

cycle length: the period of time required to measure a complete set of panels (synonymous with measurement cycle) (as used in Bechtold and Patterson 2005 without definition citation).

dam. Any artificial barrier, including appurtenant works, that impounds or diverts water, either temporarily or long term (as used in Landres *et al*. 2020 without definition citation).

data accuracy Nearness of a measurement to the true value of the variable being measured (Zar 2010). Accuracy is a component of data quality and is used when defining the data standard. Data accuracy is the same as data collection accuracy. Data accuracy of measurements can only be determined during data collection when quality control is performed on the data values. Accuracy and precision are not the same thing when measuring attributes—(as used in Solem and Gilboy 2017 Review Draft without definition citation).

data accuracy. The degree to which the data express the true condition of the measure (as used in Landres *et al*. 2020 without definition citation).

data adequacy. The reliability of data to assess trends in a measure. Determined by combining the assessments of data quality and data quantity, and classified as “high,” “medium,” or “low.” (as used in Landres *et al*. 2020 without definition citation).

data collection protocol Technical guidance for inventory and monitoring data collection including more information than is typically in protocol methods (see protocol technical guide) —(as used in Solem and Gilboy 2017 Review Draft without definition citation).

data dictionary. A compilation of information that describes how one or more databases are structured, including information on data element names, data type, list or range of values, sources, accessibility, and the systems or applications that use the data (as used in Rowland and Vojta 2013 without definition citation).

data element. A logically primitive item of data (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 citing FGDC 1998).

data reconciliation. The comparison of the same data element at two points in time and the process used to reconcile any observed differences (as used in Nelson *et al*. 2015 without definition citation).

data classification standard. Provides groups or categories of data that serve an application, e.g., wetland and soil classifications (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing FGDC 1996). In other words, a data classification standard specifies and defines a set of categories that must be used or crosswalked to by Federal agencies. The physiognomic levels of the National Vegetation Classification Standard (NVCS) are a data classification standard.

data precision Refers to how consistent results are when measurements are repeated (as used in Solem and Gilboy 2017 Review Draft citing Zar 2010). Precise values differ from each other because of random error, which is a form of observational error. Measurements with high precision are usually grouped together on a scale or graph but may not be very close to the true value. Accuracy and precision are not the same thing when measuring attributes. data quality requirements—Determination of needed quality standards for each attribute in the protocol to meet certain goals.

data quality. The level of confidence about the data source and whether the data are of sufficient quality to reliably identify trends in the measure. Assessed by data accuracy, data reliability, and data relevance, and classified as "good," "moderate," or "poor." (as used in Landres *et al*. 2020 without definition citation).

data quantity. The level of confidence that all appropriate data records have been gathered; classified as "complete," "partial," or "insufficient." (as used in Landres *et al*. 2020 without definition citation).

data standard List of data attributes to be measured and quality standards that will meet business requirements for a particular protocol technical guide, and is the foundation for the attributes' data dictionary (see data collection protocol) (as used in Solem and Gilboy 2017 Review Draft without definition citation).

data standards. Describe objects, features, or items that are collected, automated, or affected by activities or functions of agencies. Data standards are semantic definitions that are structured in a model (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing FGDC 1996).

data steward. A person designated to manage large datasets and ensure their updating and quality (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 without definition citation).

data stewards Resource subject matter experts, often program managers, who are trustees of data assets acting on behalf of the agency, unit, and stakeholders. Data stewards are accountable for which data content to acquire and for the quality and integrity of data content (as used in Solem and Gilboy 2017 Review Draft citing USDA Forest Service 2016).

data validation. Evaluating the completeness, correctness, and conformance of specific data and evaluating these data to determine the data quality. The evaluation for completeness, correctness, and conformance is sometimes called verification (as used in Nelson *et al*. 2015 citing U.S. EPA 2002) and begins with the software to collect the data in the field.

dataset. Collection of related data. See also geospatial data (as used in Brohman and Bryant 2005 and Monitoring Team for Climate Change Unpublished Report citing USDA Forest Service 2004).

dataset. A collection of related data (as used in Nelson *et al*. 2015 citing FGDC 1998). See also geospatial data.

dataset metadata Information about the data (i.e., accuracy, Geographic Information System coordinates, elevation) that is stored with the dataset. Metadata is added during data collection and when the data are entered in the corporate databases. Protocol dataset metadata includes items such as protocol(s) name(s), methods, and standards used to collect the data. deliverables—Any unique and verifiable product, result, or capability to perform a service that is required to be produced to complete a process, phase, or project (as used in Solem and Gilboy 2017 Review Draft citing Project Management Institute 2017).

deciview. The unit of measurement of haze. Deciview is a measure of visibility derived from light extinction that is designed so that incremental changes in the haze index correspond to uniform incremental changes in visual perception, across the entire range of conditions from pristine to highly impaired. The haze index (in units of deciviews [dv]) is calculated directly from the total light extinction (as used in Landres *et al*. 2020 without definition citation).

decommissioned. A road that has been withdrawn from service. Decommissioning is defined as the "Demolition, dismantling, removal, obliteration or disposal of a deteriorated or otherwise unneeded asset or component, including necessary cleanup work" (as used in Landres *et al*. 2020 citing Financial Health–Common Definitions for Maintenance and Construction Terms, July 22, 1998).

delineation. The process of separating map units (repeating sets of polygons) using a consistent set of criteria (as used in Winthers *et al*. 2005 without definition citation).

desired conditions. A description of specific social, economic, and ecological characteristics of the plan area, or a portion of the 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 (as used in Rowland and Vojta 2013 citing U.S. Department of Agriculture, Forest Service 2012; 36 CFR Part 219, RIN0596-AD02; National Forest System Land Management Planning).

detectability. The conditional probability that an individual from the target population will be observed or captured on a sampling unit, given that the species is present. Only in rare situations is it tenable to assume that every individual is detected in a sample or that detectability is uniform across the sampling frame. Pilot studies, double sampling, and capture-recapture methods may be employed to estimate detectability and improve estimates of population size or density (as used in Vesely et al. 2006 without definition citation).

developed trails. Maintained National Forest System trails in Trail Classes 3 to 5 (as used in Landres *et al*. 2020 without definition citation).

diagnostic species. Any species or group of species whose relative constancy or abundance clearly differentiates one type from another (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 citing Jennings et al. 2003). This definition implies that diagnostic species must be determined empirically through analysis of plot data (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 citing Mueller-Dombois and Ellenberg 1974).

diagnostic species. Any species or group of species whose relative constancy or abundance differentiates one vegetation type from another (as used in Nelson *et al*. 2015 citing Jennings et al. 2006 as cited in FGDC 2008). It can include character, differential, constant, indicator or dominant species. Some authors restrict the term to include only character, differential, and constant species (as used in Nelson *et al*. 2015 citing Westhoff and van der Maarel 1973 as cited in FGDC 2008).

diameter at breast height (DBH). The mean diameter at 4.5 feet or 1.37 meters above the ground (as used in Nelson *et al*. 2015 citing Helms 1998).

diameter at breast height (d.b.h.): the diameter of a tree stem, located at 4.5 feet above the ground (breast height) on the uphill side of a tree. The point of diameter measurement may vary on abnormally formed trees (as used in Bechtold and Patterson 2005 without definition citation).

diameter at root collar (d.r.c.): the diameter of a shrub-like "woodland" tree species, measured outside bark at the ground line or stem root collar (as used in Bechtold and Patterson 2005 without definition citation).

differential species. A plant species that, because of its greater fidelity in one kind of community than in others, can be used to distinguish vegetation units (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 citing Gabriel and Talbot 1984, as cited in Jennings et al. 2003).

differential species. A plant species that is distinctly more widespread or successful in one of a pair of plant communities than in the other, although it may be still more successful in other communities not under discussion (as used in Nelson *et al*. 2015 citing Curtis 1959 and Bruelheide 2000 as cited in FGDC 2008).

differentiating characteristics. Properties selected as the basis for grouping individuals into classes (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 citing Buol et al. 1973).

digital elevation model (DEM). Digital data file containing an array of elevation information over a portion of the Earth's surface (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 citing USDA Forest Service 1999).

digital image or imagery. A two-dimensional (2-D) array of regularly spaced picture elements (pixels) constituting a picture (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing FGDC 1998).

digital number (DN). The numerical value of a specific pixel. The DN corresponds to the average radiance measured in each pixel (as used in Brohman and Bryant 2005 citing Lachowski et al. 1996).

digital orthophoto quad (DOQ). Digital representation of an aerial photo with ground features located in their "true" positions (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing USDA Forest Service 1999) (as used in Winthers *et al*. 2005 citing Clarke 1999).

distance band. A method of characterizing effects of landscape elements, often disturbance related, such as roads or cellular towers. Concentric strips of equal width (e.g., 100 yards) are drawn around the element, such that the landscape of interest can be quantified in relation to what proportion of the area is located in each band. Often animal locations also are quantified in the bands to estimate selection (avoidance or preference) in relation to the feature (as used in Rowland and Vojta 2013 without definition citation).

distribution categories. Categories based on the known or estimated geographic distribution of a species over the entire wilderness. Used for the measures Index of Nonindigenous Terrestrial Animal Species and Index of Nonindigenous Aquatic Animal Species (sections 3.3.1 and 3.3.2 in part 2, respectively) (as used in Landres *et al*. 2020 without definition citation).

diversion. A dam built to divert water from a waterway or stream into another watercourse (as used in Landres *et al*. 2020 without definition citation).

division. The level in the FGDC physiognomic hierarchy separating earth cover into either vegetated or nonvegetated categories (as used in Brohman and Bryant 2005 and Monitoring Team for Climate Change Unpublished Report citing ESA et al. 1999).

division. The fourth level in the National Vegetation Classification (NVC) natural vegetation hierarchy, in which each vegetation unit is defined by a group of plant communities in a given continental or other broad geographic area exhibiting a common set of dominant growth forms and many diagnostic plant taxa (including character taxa of the dominant growth forms) corresponding to broad climatic and environmental characteristics (as used in Nelson *et al*. 2015 citing Westhoff and van der Maarel 1973, Whittaker 1975 as cited in FGDC 2008).

division. (1) In terrestrial ecological unit inventory, an ecological unit in the ecoregion planning and analysis scale of the National Hierarchy Framework corresponding to subdivisions of a domain that have the same regional climate (as used in Winthers *et al*. 2005 citing ECOMAP 1993). (2) In the Federal Geographic Data Committee (FGDC) physiognomic hierarchy, the level separating Earth cover into either vegetated or nonvegetated categories (as used in Winthers *et al*. 2005 citing Grossman et al. 1998).

domain: a class (or combination of classes) for which a population estimate is made for some attribute of interest. Domains are typically the row and column margins of tabular output tables (e.g., saw timber stands on publicly owned timberland) (as used in Bechtold and Patterson 2005 without definition citation).

dominance. The extent to which a given species has a strong influence in a community because of its size, abundance, or coverage. Strong dominance affects the fitness of associated species (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 citing adapted from Lincoln et al. 1998).

dominance. The extent to which a given taxon or growth form has a strong influence in a community because of its size, abundance, or cover (as used in Nelson *et al*. 2015 citing Lincoln et al. 1998 as cited in FGDC 2008).

dominance. Extent to which a given species influences a community because of its size, abundance, or coverage (as used in Rowland and Vojta 2013 citing Warbington 2011), typically estimated by calculating relative cover.

dominance type. A recurring plant community defined by the dominance of one or more species that are usually the most important ones in the uppermost or dominant layer of the community, but sometimes of a lower layer of higher coverage (as used in Brohman and Bryant 2005 and Monitoring Team for Climate Change Unpublished Report citing adapted from Gabriel and Talbot 1984, as cited in Jennings et al. 2003).

dominance type. A class of communities defined by the dominance of one or more species, which are usually the most important ones in the uppermost or dominant layer of the community, but sometimes of a lower layer of higher coverage (as used in Nelson *et al*. 2015 citing Gabriel and Talbot 1984 as cited in FGDC 2008).

dominant. An organism exerting considerable influence on a community by its size, abundance, or coverage (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 citing Lincoln et al. 1998).

dominant growth form. growth form with the highest percent of cover, usually in the uppermost dominant layer (in other contexts dominant growth forms can be defined in terms of biomass, density, height, coverage, etc. (as used in Brohman and Bryant 2005 without definition citation).

dominant species. The species with the highest percentage of cover, usually in the uppermost layer (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 citing Kimmins 1997, as cited in Jennings et al. 2003).

dominant species. The species with the highest percent of cover, usually in the uppermost dominant layer (in other contexts dominant species can be defined in terms of biomass, density, height, coverage, etc.; (as used in Nelson *et al*. 2015 citing Kimmins 1997 as cited in FGDC 2008).

double sampling for stratification. A sample design alternative for when stratum sizes cannot be known with certainty but can be estimated by sampling. Sample allocation and estimation of the totals are the same as for stratified random sampling. Samples are chosen as a subsampling of the points (as used in Nelson *et al*. 2015 citing Cochran 1977).

double sampling for stratification: a sampling method whereby a large sample of plots are stratified in Phase 1, then a subsample are measured for all attributes in Phase 2. When the strata are homogeneous with respect to the attribute, then the estimators are more accurate versus simple random sampling (as used in Bechtold and Patterson 2005 without definition citation).

down woody material Dead pieces of wood > 3.0 inches in diameter. Down woody material includes downed, dead tree and shrub boles, large limbs, and other woody pieces that are severed from their original source of growth or are leaning more than 45 degrees from vertical (as used in Bechtold and Patterson 2005 without definition citation) and (as used in Monitoring Team for Climate Change Unpublished Report citing Bechtold, Patterson 2005).

dry deposition. The fraction of atmospheric deposition deposited in dry weather through such processes as settling, impaction, and adsorption (as used in Landres *et al*. 2020 without definition citation).

dynamic sampling. The collection and analysis of resource data to measure changes in the amounts, spatial distribution, or condition of resource types or parameters over time (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing adapted from Helms 1998).

dwarf trees. Trees that are typically less than 39.4 feet (12 meters) tall at maturity due to genetic and environmental constraints (e.g., pinyons and junipers) (as used in Nelson *et al*. 2015 citing FGDC 2008).

earth cover. The observed physical cover as seen on the ground or through remote sensing. Examples of earth cover classes include vegetated, unvegetated, water, and artificial cover (human construction). A given piece of land can fit in one earth cover class only, which makes earth cover mutually exclusive at the same scale of mapping (as used in Brohman and Bryant 2005 citing FGDC 1997).

ecological type. A category of land with a distinctive (i.e., mappable) combination of landscape elements. The elements making up an ecological type are climate, geology, geomorphology, soils, and potential natural vegetation. Ecological types differ from each other in their ability to produce vegetation and respond to management and natural disturbances (as used in Winthers *et al*. 2005 without definition citation).

ecological units. Map units designed to identify land and water areas at different levels of resolution based on similar capabilities and potentials for response to management and natural disturbance. These capabilities and potentials derive from multiple elements: climate, geomorphology, geology, soils, water, and potential natural vegetation. Ecological units should, by design, be rather stable. They may, however, be refined or updated as better information becomes available (as used in Winthers *et al*. 2005 without definition citation).

ecosystem. A complete interacting system of organisms and their environment (as used in Brohman and Bryant 2005 and Monitoring Team for Climate Change Unpublished Report citing USDA FS 1991).

ecosystem. A functional system of interacting organisms and their environment (as used in Winthers *et al*. 2005 citing Whittaker 1962). Ecosystems have six major attributes: structure, function, complexity, interaction/interdependency, scale, and change over time (as used in Winthers *et al*. 2005 citing Kimmins 1997).

ecosystem. (1) A complete interacting system of organisms and their environment (as used in Nelson *et al*. 2015 citing USDA Forest Service 1991). (2) A community of organisms and their physical environment interacting as an ecological unit: the entire biological and physical content of a biotope (as used in Nelson *et al*. 2015 citing Lincoln et al. 1998).

ecotone. The boundary or transitional zone between adjacent communities or biomes; tension zone (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, Nelson *et al*. 2015, and Monitoring Team for Climate Change Unpublished Report citing Lincoln et al. 1998).

ecotone. The boundary or transitional zone between adjacent communities (as used in Rowland and Vojta 2013 citing Lincoln et al. 1998).

effect size. The expected difference among means of groups that are subjected to different treatments (as used in Rowland and Vojta 2013 citing Gotelli and Ellison 2004).

effect size. The magnitude of a biological effect, often expressed in the original units of measurements as a difference between two means divided by their pooled standard deviation. The power of a statistical test depends, in part, on the effect size identified by the investigator based on biological (as opposed to statistical) significance (as used in Vesely et al. 2006 without definition citation).

effective population size. The number of breeding individuals in a population (as used in Vesely et al. 2006 without definition citation).

electromagnetic spectrum. The range of energy transmitted through space in the form of electric or magnetic waves, extending from cosmic waves to radio waves. Included in this spectrum are visible and infrared regions that are particularly important for land remote sensing applications (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing Lachowski et al. 1996).

element. Parts of the sections or chapters in the Federal Geographic Data Committee (FGDC) Content Standards for Digital Geospatial Metadata (http://www.fs.fed.us/gac/metadata/glossary.html). They are numbered starting with the section number. A set of elements with subparts is called a compound element, for example, 2.1.1 (Data Quality Information, Attribute Accuracy, Attribute Accuracy Report). The FGDC standard contains 334 different elements, 119 of which exist only to contain other elements) (as used in Brohman and Bryant 2005, Nelson *et al*. 2015, and Monitoring Team for Climate Change Unpublished Report citing USDA Forest Service 2004c and FGDC 1998).

element. An individual, object, or item of interest that is directly measured, counted, or recorded (as used in Vesely et al. 2006 without definition citation).

elements. In this document, the attributes of a landscape that describe its environmental characteristics. Examples include climate, bedrock geology, surficial geology, soils, and potential vegetation (as used in Winthers *et al*. 2005 without definition citation).

emergency incident. An event relating to public health and safety that may require a response from emergency personnel and of which an emergency responder is aware (as used in Landres *et al*. 2020 without definition citation).

emergent plant. A plant species which roots below the water surface but having most of its vegetative parts above water (as used in Brohman and Bryant 2005 citing Box et al. 1998).

emphasis species. Any plant or animal that warrants specific attention in planning or analysis, regardless of its formal or legal designation (e.g., Federal or State listed species, species of public interest, focal species, or keystone species) (as used in Rowland and Vojta 2013 without definition citation).

encounter. Meeting other people while traveling through an area as well as seeing or hearing other campers (as used in Landres *et al*. 2020 without definition citation).

enhanced prescribed core variable: all FIA units produce a value for these variables and there is a prescribed national protocol for measuring or calculating these variables. However, a given FIA unit is collecting data in greater detail than national protocol requires, and the detailed data can be aggregated to core specifications. Examples: fifth micro-plot in NE, additional disturbance codes beyond the prescribed codes (as used in Bechtold and Patterson 2005 without definition citation).

Enterprise Data Warehouse (EDW). A Forest Service corporate data storage structure providing read-only, historical, and aggregated data; formerly called the Corporate Data Warehouse. Benefits include availability of outputs for general use, many formats for data delivery (such as reports, maps, raw and summarized data), data in national extents, the ability to alter published outputs without changing applications, and reduced impacts to the server system by updating data in off-peak hours. Accessed through various database connection methods including standard ArcMap and the Geospatial Interface (GI) (as used in Rowland and Vojta 2013 without definition citation).

error matrix. A table used as a starting point for a series of descriptive and analytical statistical techniques used for accuracy assessment of maps or other products. Error matrices score each observation (sample) according to the class it has been assigned to in the classified map and the "true" class, as determined by reference data. Error matrixes are sometimes referred to as confusion or difference matrixes because reference data is not always absolutely accurate (as used in Brohman and Bryant 2005 citing Lachowski et al. 1996).

error matrix. A contingency table used as a starting point for a series of descriptive and analytical statistical techniques used for accuracy assessment of maps or other products. Error matrices score each observation (sample) according to the class it has been assigned to in the classified map and the actual ("true") class, as determined by reference data. Error matrixes are sometimes referred to as confusion or difference matrixes because reference data are not always absolutely accurate (as used in Nelson *et al*. 2015 citing Lachowski et al. 1996).

evaluation. The comparison of dynamic sampling results to management objectives consisting of predetermined standards, expected norms, threshold values, and/or trigger points (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 without definition citation) (as used in Monitoring Team for Climate Change Unpublished Report citing Brohman and Bryant 2005).

evaluation. An appraisal and study of social, economic, and ecological conditions and trends relevant to a unit. The analysis of monitoring data that produces information needed to answer specific monitoring questions. Evaluation may include comparing monitoring results with a predetermined guideline or expected norm that may lead to recommendations for changes in management, a land management plan, or monitoring plan. Evaluations provide an updated compilation of information for use in environmental analysis of future project and activity decisions (as used in Nelson *et al*. 2015 citing USDA Forest Service 2009).

existing vegetation. (1) The plant cover or floristic composition and vegetation structure occurring at a given location at the current time. (2) The plant species existing at a location at the present

time. Contrast with potential natural vegetation (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 without definition citation).

existing vegetation. Vegetation found at a given location at the time of observation (as used in Nelson *et al*. 2015 citing Jennings et al. 2006 as cited in FGDC 2008). Contrast with potential natural vegetation.

existing vegetation. The floristic composition and structure occurring at a given location at the current time (as used in Rowland and Vojta 2013 citing adapted from Tart et al. 2011).

exotic species. Non-native species that are not considered invasive (as used in Landres *et al*. 2020 without definition citation).

extirpated species. An indigenous species that formerly occurred within an area but is no longer present there. An extirpated species is different from an extinct species in that extinction is the loss of all the individuals of a species on Earth, whereas a species may be extirpated from one area but still living in another area (as used in Landres *et al*. 2020 without definition citation).

exurban. Areas with very low-density development, including" ranchette" development in the Western United States, which occurs typically at 1 unit per 35 to 45 acres (as used in Rowland and Vojta 2013 citing Theobald 2001).

feature selection. A preprocessing technique that aims to reduce the amount of data in an image by isolating individual raw bands for further image processing (as used in Brohman and Bryant 2005 citing Lachowski et al. 1996).

Federal Geographic Data Committee (FGDC). An interagency committee, organized in 1990 under the Office of Management and Budget (OMB) Circular A-16 that promotes the coordinated use, sharing, and dissemination of geospatial data on a national basis. The FGDC is composed of representatives from 17 Cabinet-level and independent Federal agencies (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing USDA Forest Service 2004c) (as used in Winthers *et al*. 2005 citing FGDC 1998).

Federal Geographic Data Committee (FGDC) compliant metadata. To be compliant with the Federal Geographic Data Committee (FGDC) metadata standard, a metadata record must successfully pass through the FGDC metaparser. The metaparser is often run directly from the metadata creation tool, such as MetaLite, but can also be run separately. If the record is incomplete or improperly formatted, the metaparser flags the errors. In general terms, FGDC compliant metadata can be relatively simple or complex depending on the number of elements that are required. If the metadata exists for a required element, it should be entered (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing USDA Forest Service 2004).

Federal Geographic Data Committee (FGDC) compliant metadata. File of information which captures the basic characteristics of a data or information resource by representing the who, what, when, where, why and how of the resource. These metadata must meet standards that are endorsed by the FGDC (as used in Landres *et al*. 2020 referring to FGDC 1998).

Federal land manager. The federal official(s) who have the authority to administer federal lands (as used in Landres *et al*. 2020 without definition citation).

fidelity. The degree of restriction of a plant species to a particular situation, community, or association (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 citing Lincoln et al. 1998).

fidelity. The degree to which a species is confined in a given vegetation unit. The fidelity of a species determines whether it can be considered a differential or character species, or just a companion (a species not particularly restricted to any vegetation type) or accidental species (a species not normally occurring in a particular vegetation type or habitat: (as used in Nelson *et al*. 2015 citing Bruelheide 2000, Lincoln et al. 1998 as cited in FGDC 2008).

field test Testing of protocol methods and procedures with proposed equipment and sampling designs on the ground. Members of the protocol development team conduct alpha field tests and beta field tests on representative field units (national forests and grasslands) (as used in Solem and Gilboy 2017 Review Draft without definition citation).

fire suppression. Management action to extinguish a fire or contain fire spread, beginning with its discovery (as used in Landres *et al*. 2020 without definition citation).

fixed instrumentation site. An unattended measurement device left in place for at least one year for the purpose of recording environmental data, such as meteorology or seismic activity (as used in Landres *et al*. 2020 without definition citation).

floating vegetation. Rooted or drifting plants that float on the water surface (as used in Brohman and Bryant 2005 citing NVCS 2008, referring back to Brohman and Bryant 2005).

flora (adj. floral, floristic). (1) All the plant species that make up the vegetation of a given area (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 citing Allaby 1994). (2) The plant life of a given region, habitat, or geological stratum (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 citing Lincoln et al. 1998).

floristic classification. Classification of plant communities, emphasizing species composition. It may include considerations of species abundance, dominance, growth form, and so on. Floristic classifications emphasize the plant species comprising the vegetation instead of life forms or structure. Floristic classifications are based on community composition and/or diagnostic species (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 without definition citation).

floristic composition. A list of plant species of a given area, habitat, or association (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 citing Lincoln et al. 1998).

focal patch. In landscape ecology, the landscape element that is of interest in the analysis, such as a particular vegetation cover type. Landscape metrics are calculated for the focal patches (e.g., patch density or isolation) (as used in Rowland and Vojta 2013 without definition citation).

focal species. A suite of plants or animals whose requirements for persistence define the attributes that must be present if a landscape is to meet the requirements for all species that occur there (Lambeck 1997). A small subset of taxa whose status permits inference to the integrity of the larger ecological system to which it belongs and provides meaningful information regarding the effectiveness of the plan in maintaining or restoring the ecological conditions to maintain the diversity of plant and animal communities in the plan area. Focal species would be commonly

selected on the basis of their functional role in ecosystems (as used in Rowland and Vojta 2013 citing USDA Forest Service 2012).

foliage height diversity (FHD). An index of canopy complexity derived by measuring the proportion of total foliage that occurs in each of several pre-defined horizontal canopy layers (as used in Rowland and Vojta 2013 citing MacArthur and MacArthur 1961); more generally, a measure of how evenly foliage is vertically distributed among vegetation layers (as used in Rowland and Vojta 2013 citing Cooperrider et al. 1986).

foliar cover. The percentage of ground covered by the vertical projection of the aerial portion of plants. Small openings in the canopy and intraspecific overlap are excluded (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing SRM 1989) (as used in Rowland and Vojta 2013 citing from SRM 1989, cited in Warbington 2011). Note: foliar cover never exceeds canopy cover..

forb. Broad-leaved herbaceous plant (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 citing adapted from FGDC 1997).

forb. A nonaquatic, nongraminoid herb with relatively broad leaves and/or showy flowers. Includes both flowering and spore-bearing, nongraminoid herbs (as used in Nelson *et al*. 2015 citing FGDC 2008).

forest (or forest land): land that is at least 10 percent stocked by forest trees of any size, or land formerly having such tree cover, and not currently developed for a nonforest use. The minimum area for classification as forest land is one acre. Roadside, stream-side, and shelterbelt strips of timber must be at least 120 feet wide to qualify as forest land. Unimproved roads and trails, streams and other bodies of water, or natural clearings in forested areas are classified as forest, if less than 120 feet in width or one acre in size. Grazed woodlands, reverting fields, and pastures that are not actively maintained are included if the above qualifications are satisfied. Forest land includes three subcategories: timberland, reserved forest land, and other forest land (as used in Bechtold and Patterson 2005 without definition citation).

Forest Service Information System The policy, technology, and resources employed by the Forest Service to capture, process, and share information within and outside the agency in support of Forest Service activities (as used in Solem and Gilboy 2017 Review Draft citing USDA Forest Service 2012).

Forest Service management and technical review Focuses on technical, managerial, and policy aspects associated with the revised technical guide including feasibility and relevance to field needs. The review is an initiated and requested by the Deputy Chief for National Forest System in a 60-day "reply requested" letter and is an internal Forest Service review conducted by Forest Service regional, station, area, and Washington Office staff line officers and staff members as part of their regular duties (as used in Solem and Gilboy 2017 Review Draft without definition citation).

formation class. The first (highest) level in the National Vegetation Classification (NVC) natural vegetation hierarchy, in which each vegetation unit is defined by a characteristic combination of dominant growth forms adapted to a very basic set of moisture/temperature regimes (as used in Nelson *et al*. 2015 citing FGDC 2008).

frequency. Within this technical guide, frequency refers to how often data are compiled, analyzed, and entered into the WCMD (as used in Landres *et al*. 2020 without definition citation)

frequentist statistics. An analysis framework that uses probability statements based entirely on the hypothetical distribution of the estimate of the fixed parameter generated under the model and repeated sampling (as used in Rowland and Vojta 2013 without definition citation).

full-time residential (year-round) building. Buildings occupied by people for a cumulative total of more than 6 months each year, such as certain crew quarters (as used in Landres *et al*. 2020 without definition citation).

fuzzy logic. A type of reasoning designed to accommodate ambiguity. Using fuzzy sets in accuracy assessment permits explicit recognition of the possibility of ambiguity regarding appropriate map labels for some locations on a map/classification. This recognition can help the user determine the relative (not absolute) accuracy of a particular classification, and thus the usefulness of that classification for applications requiring varying levels of accuracy (as used in Brohman and Bryant 2005 citing Lachowski et al. 1996) (as used in Winthers *et al*. 2005 citing Wirth et al. 1996).

geographic area of interest. The geographic extent that is to be studied (as used in Nelson *et al*. 2015 without definition citation).

geographic information system (GIS). The term frequently applied to geographically oriented computer technology. In its broadest sense, GIS is a system for capturing, storing, checking, manipulating, analyzing, and displaying data that are spatially referenced to the Earth (as used in Brohman and Bryant 2005, Monitoring Team for Climate Change Unpublished Report, and Nelson *et al*. 2015 citing Lachowski et al. 1996).

Geographic Information System (GIS). A set of computer tools for collecting, storing, retrieving, transforming, and displaying spatial data from the real world for a particular set of purposes. Spatial data in GIS are characterized by their position, attributes, and spatial interrelationships (topology) (as used in Winthers *et al*. 2005 citing Burrough 1986).

geometric correction. An image processing technique that reorients the image data to compensate for the Earth's rotation and variations in satellite position and attitude (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing USDA Forest Service 1999).

geomorphology. The classification, description, nature, origin, and development of present landforms and their relationships to underlying structures, and of the history of geologic changes as recorded by these surface features (as used in Winthers *et al*. 2005 without definition citation).

geospatial data. Information that identifies the geographic location and characteristics of natural or constructed features and boundaries on the earth. This information may be derived from remote sensing, mapping, and surveying technologies (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 citing FGDC 1998).

Geospatial Interface (GI). An ArcMap extension that provides (1) tools to simplify loading data, accessing custom products for display, and analyzing and exporting data; and (2) the ability to

export data and maps to Microsoft Excel, Access, and Word or a text format. Data located in several different locations can be preset for quick access; can be used to run spatial overlays like clip, intersect, and identity, enabling users to repeat standard analyses on data (as used in Rowland and Vojta 2013 without definition citation).

Geospatial Interface (GI) Geospatial Interface (GI) is an ArcMap extension that helps resource specialist's work efficiently with ArcMap by providing tools which simplify loading data and providing various custom products to display and output data (as used in Monitoring Team for Climate Change Unpublished Report without definition citation).

global positioning system (GPS). An array of space satellites and ground receivers that use geometry to provide information about the precise latitude, longitude, and elevation of a particular point (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing Lachowski et al. 1996).

Global Positioning System (GPS). An array of space satellites and ground receivers that use geometry to provide information about the precise latitude, longitude, and elevation of a particular point (as used in Winthers *et al*. 2005 citing Wirth et al. 1996)

gradsect technique. The gradsect technique is a form of stratified random sampling that may be cost effective for sampling vegetation patterns along environmental gradients (as used in Brohman and Bryant 2005 citing Gillison and Brewer 1985). See also representative sampling.

grain. The resolution at which spatial patterns are measured, or the plot size used to measure characteristics (as used in Rowland and Vojta 2013 citing Wiens 1989).

grazing infrastructure. Structural range "improvements" on or relating to rangelands which are designed to improve production of forage, change vegetative composition, control patterns of use, provide water, stabilize soil and water conditions, and provide habitat for livestock and wildlife. These improvements can be permanent (e.g., dams, ponds, pipelines, wells, and fences) or temporary (e.g., portable troughs, pumps, and electric fences) (as used in Landres *et al*. 2020 without definition citation).

grid. (1) A set of grid cells forming a regular, or nearly regular, tessellation of a surface. (2) Set of points arrayed in a pattern that forms a regular, or nearly regular, tessellation of a surface. The tessellation is regular if formed by repeating the pattern of a regular polygon, such as a square, equilateral triangle, or regular hexagon. The tessellation is nearly regular if formed by repeating the pattern of an "almost" regular polygon such as a rectangle, nonsquare parallelogram, or nonequilateral triangle (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing FGDC 1998).

grid. A rectilinear arrangement. Examples include the Public Land Survey, raster GIS, and systematic field sampling schemes (as used in Winthers *et al*. 2005 without definition citation).

group. The level in the National Vegetation Classification Standard (NCVS) hierarchy below subclass based on leaf characters and identified and named in conjunction with broadly defined macroclimatic types to provide a structural-geographic orientation ((as used in Brohman and Bryant 2005 citing ESA et al. 1999).

group. The sixth level in the National Vegetation Classification (NVC) natural vegetation hierarchy, in which each vegetation unit is defined by a group of plant communities with a common set of growth forms and diagnostic species or taxa (including several character species of the

dominant growth forms), preferentially sharing a similar set of regional edaphic, topographic, and disturbance factors (as used in Nelson *et al*. 2015 citing cf. Pignatti et al. 1994, Specht and Specht 2001 as cited in FGDC 2008).

group. An aggregation of similar items. The word can also have specific meanings that vary with discipline (e.g., soil Great Groups and National Vegetation Classification System vegetation groups are very different entities) (as used in Winthers *et al*. 2005 without definition citation).

growth form. The shape or appearance of a plant reflecting growing conditions and genetics. Growth form is usually consistent within a species, but may vary under extremes of environment (as used in Nelson *et al*. 2015 citing Mueller-Dombois and Ellenberg 1974 as cited in FGDC 2008). Growth forms determine the visible structure or physiognomy of plant communities (as used in Nelson *et al*. 2015 citing Whittaker 1975 as cited in FGDC 2008).

habit. The general growth form and appearance of a species (as used in Brohman and Bryant 2005 without definition citation). See also growth form and physiognomy.

habitat. (1) The combination of environmental or site conditions and ecological processes influencing a plant community (as used in Brohman and Bryant 2005, Monitoring Team for Climate Change Unpublished Report, and Nelson *et al*. 2015 citing Jennings et al. 2003). (2) Area or type of environment in which an organism or population normally lives or occurs (as used in Brohman and Bryant 2005 without definition citation and Monitoring Team for Climate Change Unpublished Report citing Brohman and Bryant 2005).

habitat. A general term referring to the locality, site and particular type of local environment occupied by an organism or community ((as used in Nelson *et al*. 2015 citing Lincoln et al. 1998 as cited in FGDC 2008).

habitat. A physical location with the resources and conditions present that produce occupancy—including survival and reproduction, or both—by a given organism. Habitat is organism-specific; it relates the presence of a species, population, or individual (animal or plant) to an area's physical and biological characteristics. Habitat implies more than vegetation or vegetation structure; it is the sum of the specific resources that are needed by organisms (as used in Rowland and Vojta 2013 citing modified from Hall et al. 1997).

habitat abundance. The amount and distribution of resources in an area used by an animal (as used in Rowland and Vojta 2013 citing modified from Hall et al. 1997); not synonymous with habitat availability.

habitat attribute. Any living or nonliving feature of the environment that provides resources necessary for a species in a particular setting (as used in Rowland and Vojta 2013 without definition citation).

habitat effectiveness. A measure of the reduction in the potential for an environment to meet the needs of a species, often due to the influence of direct human disturbance, such as traffic on roads (as used in Rowland and Vojta 2013 without definition citation).

habitat element. Abiotic and biotic features such as rock, soil, elevation, vegetation types, snags, ground cover, and litter that may be ecologically important to a species' welfare (as used in Vesely et al. 2006 without definition citation).

habitat quality. The ability of the environment to provide conditions appropriate for individual and population persistence; a continuous variable, ranging from low to high, and based on resources available for survival, reproduction, and population persistence. Ideally measured by examining demographic characteristics of individuals or populations and not numbers of organisms (as used in Rowland and Vojta 2013 citing Hall et al. 1997); used conceptually in this document to represent habitat conditions believed to influence population persistence, but for which demographic data relating to those conditions may be unavailable.

habitat requirements. Elements that must occur for the species to meet a life requisite (as used in Rowland and Vojta 2013 citing Peek 1986:83). This term should not be confused with preferred habitat attributes.

habitat selection. A hierarchical process involving a series of innate and learned behavioral decisions made by an animal about what habitat it would use at different scales of the environment (as used in Rowland and Vojta 2013 citing Morrison et al. 2006).

habitat type. A collective term for all parts of the land surface supporting, or capable of supporting, a particular kind of climax plant association (as used in Nelson *et al*. 2015 citing Daubenmire 1978; Gabriel and Talbot 1984 as cited in FGDC 2008). See also potential natural vegetation.

habitat type. The vegetation association in an area or the area that will be occupied by that association as plant succession advances (as used in Rowland and Vojta 2013 citing Daubenmire 1952).

Haze. An atmospheric aerosol of sufficient concentration to be visible caused by suspended particles that absorb and scatter light. The particles are so small that they cannot be seen individually, but are still effective at attenuating light and reducing visual range (as used in Landres *et al*. 2020 without definition citation).

herb. Nonwoody vascular plants, such as grasses, grass-like plants, and forbs (as used in Brohman and Bryant 2005 citing adapted from FGDC 1997).

herb. A vascular plant without perennial aboveground woody stems, with perennating buds borne at or below the ground surface (as used in Nelson *et al*. 2015 citing Whittaker 1975 as cited in FGDC 2008). Includes forbs (both flowering forbs and spore-bearing ferns), graminoids, and herbaceous vines (as used in Nelson *et al*. 2015 citing FGDC 2008).

high resolution visible (HRV). The type of sensor mounted on SPOT satellites. The HRV "push broom" scanning system is different than the Landsat mirror-sweep scanning systems, and has the advantage of eliminating geometric errors introduced in the sensing process by variations in scan mirror velocity (as used in Brohman and Bryant 2005 citing Lachowski et al. 1996).

homogeneous types. Map units composed of a homogeneous condition of vegetation or uniform type; map unit that comprises a single alliance or dominance type, with at least 85-percent of the area in a polygon (as used in Brohman and Bryant 2005 without definition citation).

horizontal. Tangent to the geoid or parallel to a plane that is tangent to the geoid (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing FGDC 1998).

human disturbance agent. Any anthropogenic factor that affects native habitats or species in either a positive or negative way (as used in Rowland and Vojta 2013 without definition citation).

hybrid classification: a combination of supervised and unsupervised classification (e.g., guided classification) (as used in Bechtold and Patterson 2005 without definition citation).

Hydrologic Unit Code (HUC). Each hydrologic unit is identified by a unique hydrologic unit code (HUC) consisting of two to twelve digits based on the six levels of classification: 2-digit HUC first-level (region) 4-digit HUC second-level (subregion) 6-digit HUC third-level (accounting unit) 8-digit HUC fourth-level (cataloguing unit) 10-digit HUC fifth-level (watershed) 12-digit HUC sixth-level (subwatershed) (as used in Landres *et al*. 2020 without definition citation).

image classification. The process of assigning the pixels of an image to discrete categories or classes (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing Lachowski et al. 1996).

image interpretation. (1) The systematic examination of image data; frequently involves other supporting materials, such as maps and field observations (as used in Brohman and Bryant 2005 citing Lillesand and Kiefer 2000). (2) Basis for delineation of map units is normally discontinuities in texture reflecting life form composition, stocking, tree crown size differences, and/or apparent tree height (as used in Brohman and Bryant 2005 citing Stage and Alley 1973).

image processing. A general term referring to manipulation of digital image data; includes image enhancement, image classification, and image preprocessing (or rectification) operations (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing Lachowski et al. 1996) (as used in Winthers *et al*. 2005 citing Wirth et al. 1996).

image segmentation. The process of dividing digital images into spatially cohesive units or regions. These regions represent discrete objects or areas in the image (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing Ryerd and Woodcock 1996).

impact categories. Categories which estimate the relative effect of a nonindigenous animal species on the Natural Quality of wilderness character. Used for the Index of Nonindigenous Terrestrial Animal Species and Index of Nonindigenous Aquatic Animal Species measures (sections 3.3.1 and 3.3.2, respectively) (as used in Landres *et al*. 2020 without definition citation).

impaired watershed. According to the Watershed Condition Framework (WCF), a class of watersheds with significant impairment to beneficial uses of the water bodies in the watershed. These watersheds have impaired function because some physical, hydrological, or biological threshold has been exceeded (as used in Landres *et al*. 2020 without definition citation).

imputation. The process of estimating missing data (as used in Nelson *et al*. 2015 citing Schreuder et al. 1993b). and the production of Nearest Neighbor imputation–based data surfaces (i.e., geospatial modeling of design-based inventory data; (as used in Nelson *et al*. 2015 citing Grossmann et al. 2009, Wilson et al. 2012).

imputation. In statistics, the substitution of an estimated value for missing data. In spatial data analysis, imputation is the estimation of a cell value using information from other, similar cells. Many imputation techniques are available. After all missing values have been imputed, the dataset can then be analyzed using standard techniques for complete data. The analysis should ideally take

into account that a greater degree of uncertainty is present than if the imputed values had actually been observed, which generally requires some modification of the standard complete-data analysis methods (as used in Rowland and Vojta 2013 without definition citation).

index value. The value calculated by totaling the component scores for all components in an index. For measures that use an index based on an annual or 5-year frequency of data compilation and analysis, the index value is the same as the measure value. For measures that use an index based on a 3-year rolling average, the index value is calculated each year and the measure value is the 3-year rolling average (as used in Landres *et al*. 2020 without definition citation).

indicator function. a variable with a value of 0 or 1 that is used to specify attributes of interest (e.g., white-oak growing-stock volume), and domains of interest (e.g., northern hardwood forest types) in the estimation process (as used in Bechtold and Patterson 2005 without definition citation).

indicator species. (1) A species whose presence, abundance, or vigor is considered to indicate certain environmental conditions (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 citing Gabriel and Talbot 1984, as cited in Jennings et al. 2003). (2) Species that are sensitive to important environmental feature of a site such that its constancy or abundance reflect significant changes in environmental factors. (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 without definition citation) (3) Plant whose presence indicates specific site conditions or a type (as used in Winthers *et al*. 2005 and Nelson *et al*. 2015 without definition citation).

Indicators. Distinct and important components under each monitoring question (as used in Landres *et al*. 2020 without definition citation).

indigenous species. A species that originally inhabited a particular wilderness; same as native species (as used in Landres *et al*. 2020 without definition citation).

inholdings. Land parcels that are not federally owned, including patented mining claims, which occur entirely inside a wilderness (as used in Landres *et al*. 2020 without definition citation).

instream structures. Constructed features found within a river channel, including dams and other instream structures such as diversions, fish ladders and weirs (as used in Landres *et al*. 2020 without definition citation).

integral cultural features. Prehistoric and historical features which make an area's meaning and significance as wilderness clearer and more distinct. The physical feature should convey a story about a distinctive interwoven human relationship with the land that helps enrich the meaning of the area as wilderness and may have educational, scientific, or scenic values (as used in Landres *et al*. 2020 without definition citation).

Integral site-specific features of value. Certain features which make an area's meaning and significance as wilderness clearer and more distinct (e.g., geological, paleontological, biological, cultural, and other significant features) (as used in Landres *et al*. 2020 without definition citation).

intentional manipulation. An action that purposefully alters, hinders, restricts, controls, or manipulates "the earth and its community of life," including effects to the type, amount, or distribution of plants, animals, soil, water, or biophysical processes (such as fire) inside a designated wilderness (as used in Landres *et al*. 2020 without definition citation).

invasive species. A species that is alien (or non-native) to a wilderness and whose introduction causes or is likely to cause economic or environmental harm, or harm to human health (as used in Landres *et al*. 2020 without definition citation

inventory. To survey an area or entity for determination of such data as contents, condition, or value, for specific purposes such as planning, evaluation, or management. An inventory activity may include an information needs assessment; planning and scheduling; data collection, classification, mapping, data entry, storage and maintenance; product development; evaluation; and reporting phases (as used in Brohman and Bryant 2005, Rowland and Vojta 2013, Nelson *et al*. 2015, and Solem and Gilboy 2017 Review Draft citing **FSM 1940** USDA Forest Service 2009).

inventory. (2) An objective set of sampling methods designed to quantify the spatial distribution, composition, and rates of change of resource parameters within specified limits of statistical precision and the listing (enumeration) of data from such a survey (as used in Nelson *et al*. 2015 citing following Helms 1998). Contrast with monitoring.

inventory. The systematic acquisition, analysis, and organization of resource information needed for planning and implementing land management (as used in Winthers *et al*. 2005, and Monitoring Team for Climate Change Unpublished Report citing USDA NRCS 1997).

inventory. (1) The process of collecting data to describe the size, status, or distribution of a population; (2) A survey designed to develop a list of species in a particular area (as used in Vesely et al. 2006 without definition citation).

keystone species. A species whose impact on the community or ecosystem is disproportionately large relative to its abundance (as used in Rowland and Vojta 2013 citing Mills et al. 1993).

land cover. (1) The ecological state and physical appearance of the land surface, e.g., forest and grassland. Note that land may be changed by human intervention, natural disturbances, or plant succession (as used in Brohman and Bryant 2005, Monitoring Team for Climate Change Unpublished Report, and Nelson *et al*. 2015 citing Helms 1998). (2) The observed physical categories of an area as seen on the ground or through remote sensing. Examples include vegetated, nonvegetated, surface water, urban and developed. Land cover classes are mutually exclusive at the same scale of mapping (as used in Brohman and Bryant 2005 and Monitoring Team for Climate Change Unpublished Report citing adapted from FGDC 1997).

land cover. (2) The observed (bio)physical cover of the Earth's surface (as used in Nelson *et al*. 2015 citing Di Gregorio and Jansen 1996 as cited in FGDC 2008).

Landsat. Name for the series of Earth-observing satellites first launched in 1972 by NASA; originally named Earth Resource Technology Satellite (ERTS). Landsat satellites serve as platforms for several sensors including the return beam vidicon, Landsat Multispectral Scanner(MSS), and Landsat Thematic Mapper (TM) (as used in Brohman and Bryant 2005 and Monitoring Team for Climate Change Unpublished Report citing Lachowski et al. 1996) (as used in Winthers *et al*. 2005 citing Wirth et al. 1996).

Landscape. (1) A defined area irrespective of ownership or other artificial boundaries, such as a spatial mosaic of terrestrial and aquatic ecosystems, landforms, and plant communities, repeated in similar form throughout such a defined area. (as used in Solem and Gilboy 2017 Review Draft citing 36 CFR part 219.19, Federal Register 77(68): 21162–21276; Helms 1998). (2) Large regional units of land that are viewed as a mosaic of communities irrespective of political or other artificial boundaries (as used in Solem and Gilboy 2017 Review Draft citing Society of American Foresters 1991).

landscape. A spatially heterogeneous area, scaled relative to the organism or process of interest (as used in Vesely et al. 2006 without definition citation).

landtype association (LTA). Landscape scale map units defined by a dominant geomorphic process type, similar landforms, surficial and near-surface geologic formations, and associations of soil families and potential natural vegetation at the series level (as used in Winthers *et al*. 2005 citing Forman and Godron 1986, ECOMAP 1993, Cleland et al. 1997).

land unit. The finest planning analysis scale in the Forest Service's National Hierarchy Framework of Ecological Units (as used in Rowland and Vojta 2013 citing Cleland et al. 1997). It includes two ecological unit levels: landtype (from hundreds to thousands of acres) and landtype phase (less than 100 acres). Used for activities such as delineating ecosystems, assessing resources, conducting environmental analyses, and managing and monitoring natural resources.

layer (geographic information system [GIS]). A digital information storage unit, also known as a theme. Different kinds of information (e.g., roads, boundaries, lakes, and vegetation) can be grouped and stored as separate digital layers or themes in a GIS (as used in Brohman and Bryant 2005 and in Nelson *et al*. 2015 citing Lachowski et al. 1996) (as used in Winthers *et al*. 2005 citing Wirth et al. 1996).

layer (mapping). An integrated, areally distributed, set of spatial data usually representing entity instances within one theme, or having one common attribute or attribute value in an association of spatial objects. In the context of raster data, a layer is specifically a two-dimensional (2-D) array of scalar values associated with all of part of a grid or image (as used in Nelson *et al*. 2015 citing FGDC 1998).

layer (vegetation). (1) A structural component of a community consisting of plants of approximately the same height and growth form (e.g., tree overstory, tree regeneration) (as used in Nelson *et al*. 2015 citing FGDC 2008). (2) The definition and measurement of these structural components in their vertical and height relationships to each other (e.g., tree subcanopy layer, shrub understory layer) (as used in Nelson *et al*. 2015 citing adapted from ESA, Nature Conservancy, USGS, FGDC 1999).

layer or stratum. (1) A structural component of a community consisting of plants of approximately the same height structure (e.g., tree, shrub, and herbaceous layers). (2) The definition and measurement of these structural components in their vertical and height relationships to each other (e.g., tree subcanopy layer, shrub understory layer) (as used in Brohman and Bryant 2005 citing adapted from Ecological Society of America 1999) (as used in Winthers *et al*. 2005 citing Grossman et al. 1998).

least squares regression. A method for estimating the relationship between one dependent variable and one or more independent variables by reducing the error term associated with all dependent values used in the equation (as used in Rowland and Vojta 2013 without definition citation).

legacy. Refers to natural resource information that was generally collected before the establishment of the corporate database; must meet minimum standards and metadata requirements, including a description of data collection protocols, to be entered into the corporate database (as used in Rowland and Vojta 2013 without definition citation).

legacy or historical data. Data that pre-date the WCM baseline year. Legacy data may be used in WCM if they were collected (1) after the area was designated as wilderness or managed to preserve wilderness character and (2) using consistent, credible, and documented protocols that are directly relevant to WCM (as used in Landres *et al*. 2020 without definition citation).

lek. An assembly area for communal courtship display (as used in Rowland and Vojta 2013 citing Lincoln et al. 1998).

level of effort. The amount of work, time, and energy put into data collection (as used in Landres *et al*. 2020 without definition citation).

Lichen A composite organism formed from the symbiotic association of a true fungus and an alga (as used in Monitoring Team for Climate Change Unpublished Report citing Helms 1998).

lidar. Acronym for light detection and ranging. A technology that involves the use of pulses of laser light to calculate distances between the sensor and various surfaces detected by the pulses (as used in Rowland and Vojta 2013 citing Lillesand and Kiefer 2000).

life form. (1) The characteristic structural features and method of perennation of a plant species; the result of the interaction of all life processes, both genetic and environmental (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 citing Lincoln et al. 1998). Life form is related to growth form, physiognomy, and habit but also includes consideration of the type and position of renewal (perennating) buds that the other terms typically do not include. (2) Includes gross morphology (size, woodiness, etc.), leaf morphology, life span, and phonological (or life cycle) phenomena (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 citing Barbour et al. 1980)

life form (3) Plant type defined by the characteristic structural features and method of perennation, generally as defined by Raunkiaer (1934); (as used in Nelson *et al*. 2015 noting see Beard 1973 as cited in FGDC 2008).

life form. (as used in Rowland and Vojta 2013) Characteristic structural features and processes of a plant species, both genetic and environmental, including growth structure, physiognomy, phenology, and methods of surviving unfavorable periods outside of the growing season. Typical life forms include trees, shrubs, grasses, and forbs (as used in Rowland and Vojta 2013 citing adapted from Warbington 2011).

limiting factors. Environmental features or conditions that exist at a suboptimal level and prevent a population from increasing (as used in Rowland and Vojta 2013 citing Lincoln et al. 1998) (Law of the Minimum; Taylor 1934). These conditions may not be continuously effective but only occur

at some critical period during the year or perhaps only during some critical year in a climatic cycle.

linear-based recreation. Any form of leisure activity that follows a narrow landscape feature, such as roads, trails, rivers, riparian zones, and ridgetops that are conducive to human travel (as used in Rowland and Vojta 2013 without definition citation).

local management unit. The scale at which local Forest Service planning is done, e.g., national forest, grassland, prairie, or recreation area (as used in Rowland and Vojta 2013 without definition citation).

logistic regression. Form of statistical analysis, most commonly with a dependent variable that can take on only two possible categories (i.e., binary), such as presence or absence, or used or not used; assumes the residuals (or error terms) follow a binomial distribution (as used in Rowland and Vojta 2013 without definition citation).

macroplot. Relatively large areas with sampling units such as quadrats, lines, or points randomly located within them (as used in Rowland and Vojta 2013 citing Elzinga *et al*. 1998).

macroplot: a circular area with a fixed horizontal radius of 58.9 feet (1/4 acre). Macroplot centers are co-located with subplot centers. Macroplots are used in the optional tri-areal design, primarily for sampling relatively rare events (as used in Bechtold and Patterson 2005 without definition citation).

management indicator species (MIS). Plant and animal taxa, communities, or special habitats selected for emphasis in planning, and which are monitored during forest plan implementation to assess the effects of management activities on their populations and the populations of other species with similar habitat needs which they may represent (**FSM 2620.5**) (as used in Rowland and Vojta 2013 citing USDA Forest Service 1991).

management indicator species. Those species whose response to environmental conditions is assumed to index like responses of a larger number of species and whose habitats can therefore be managed to benefit a larger set of species; more broadly, species for which a set of management guidelines has been written (as used in Vesely et al. 2006 without definition citation).

management questions Land management questions that identify different types of information and protocols needed to address specific business requirements (as used in Solem and Gilboy 2017 Review Draft without definition citation).

map. (1) A spatial representation, usually graphic on a flat surface, of spatial phenomena (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, Monitoring Team for Climate Change Unpublished Report , and Nelson *et al*. 2015 citing FGDC 1998). (2) A representation, usually on a plane surface, of a region of the Earth or heavens (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, Monitoring Team for Climate Change Unpublished Report , and Nelson *et al*. 2015 citing Robinson *et al*. 1978).

map feature. An individual area or delineation on a map is a map feature. Specific map features are nonoverlapping and geographically unique, but will contain one or more thematic components

(i.e., map unit) that may be repeated across multiple map features. Map feature is synonymous with the commonly used terms of polygon and region (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 without definition citation).

map keys. (as used in Nelson *et al*. 2015) Define relationships between the taxonomic units or technical groups from vegetation classifications and the map units identified in the map unit design process. Map keys are developed as a part of the map unit design process and included in project metadata (as used in Nelson *et al*. 2015 without definition citation).

map levels. Define different intensities of field study, different degrees of detail in mapping, different levels of abstraction in defining and naming map units, and different map unit designs. Adjustment in these elements forms the basis for differentiating four levels of vegetation mapping: national, broad, mid, and base. The levels are intended to aid in the identification of the operational procedures used to conduct vegetation mapping activities and also indicate general levels of the quality control applied during mapping. These levels affect the kind and precision of subsequent interpretations and predictions (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing adapted from USDA Soil Survey Division Staff 1993).

map scale. The extent of reduction required to display a portion of the Earth's surface on a map; defined as a ratio of distances between corresponding points on the map and on the ground (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 citing Robinson et al. 1978). Scale indirectly determines the information content and size of the area being represented. The mapping scale is determined by the agency's business needs and the characteristics of the data obtained for the project area. Maps generated from digital imagery can appropriately be displayed at a range of scales.

map unit. A collection of features defined and named the same in terms of their vegetation characteristics (a unifying theme) (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 citing USDA Soil Survey Division Staff 1993). Each map unit differs in some respect from all others in a geographic extent. Map units are differentiated in map unit design and defined in a map unit description. Design of map units generalizes the taxonomic units present to the smallest set that (1) meets the objectives of the map, and (2) is feasible to delineate with available resources and technology.

map unit aggregation type. A map unit attribute that describes the arrangement of vegetated condition found in a map feature or polygon. An aggregation type consists of a homogenous dominance type, plant association, compositional group, or vegetation complex arrangements of dominance types or plant associations (as used in Brohman and Bryant 2005 without definition citation).

map unit characterization. The description of the elements in a map unit. In regard to ecological units, includes the "primary five" (geomorphology, geology, climate, soils, and potential vegetation), but also often includes supporting elements, such as hydrology, disturbance regimes, etc. (as used in Winthers *et al*. 2005 without definition citation).

map unit delineation. The criteria used to spatially differentiate between map units. For ecological units, the relative importance of these criteria varies with scale. For example, at landtype

association scale, differences in geomorphology and geology are normally the primary delineation criteria between map units, whereas at land unit scale, soils and potential vegetation become more important (as used in Winthers *et al*. 2005 without definition citation).

map unit description (MUD). Describes the composition of ecological types (or components) as they occur in a map unit. These descriptions form the primary reference document for identifying the ecological types that occur within a map unit (as used in Winthers *et al*. 2005 without definition citation).

map unit design. The process establishing the relationship between vegetation classifications and map products depicting them (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 without definition citation).

map unit design. (as used in Winthers *et al*. 2005) The process establishing the relationship between classifications and map products depicting them. In this document, design considerations include the interrelationships between elements, component relationships within the map unit, and how the map unit relates to other scales (as used in Winthers *et al*. 2005 without definition citation).

map unit legend. A list of the map units that occur in a specific inventory area, including the map unit code and map unit name, and is developed using national coding and naming procedures (as used in Winthers *et al*. 2005 without definition citation).

map unit validation. In this paper, the process of verifying the accuracy of ecological unit differentiation, delineation, and characterization (as used in Winthers *et al*. 2005 without definition citation).

mapped plot: a plot that has been partitioned into unique and distinct condition classes by establishing the boundaries between them (as used in Bechtold and Patterson 2005 without definition citation).

mapping. In its most generic sense, the process of using points, lines, polygons, or pixels to represent geographic features spatially (as used in Winthers *et al*. 2005 without definition citation).

meaningful change. The amount of change in the data that would result in a change in trend for a measure. Thresholds for meaningful change are defined for each measure. Meaningful change in a measure is not directly tied to, or based on, a national forest's land or resource management plan, nor does it represent significant change or impacts as defined by NEPA (as used in Landres *et al*. 2020 without definition citation)

measure baseline year. The first year that data for a measure have been compiled; the reference point against which the trend in a measure is assessed and evaluated (as used in Landres *et al*. 2020 without definition citation).

measure value. The single value produced for each year of data compilation for a measure; this value is used to derive the trend in the measure. For measures that use an index based on an annual or 5-year frequency of data compilation and analysis, the index value is the same as the measure value. For measures that use an index based on a 3-year rolling average, the index value is

calculated each year and the measure value is the 3-year rolling average (as used in Landres *et al*. 2020 without definition citation).

measures. The specific elements under each indicator on which data are collected to assess the trend of each indicator of each wilderness character quality; data compiled for a measure must be relevant, reliable, and cost-efficient (as used in Landres *et al*. 2020 without definition citation).

mechanical transportation. Any contrivance for moving people or material in or over land, water, or air, having moving parts, that provides a mechanical advantage to the user, and that is powered by a living or nonliving power source. This category includes, but is not limited to, sailboats, hang gliders, parachutes, bicycles, game carriers, carts, and wagons. It does not include wheelchairs when used as necessary medical appliances. It also does not include skis, snowshoes, rafts, canoes, sleds, travois, or similar primitive devices without moving parts (as used in Landres *et al*. 2020 without definition citation).

metadata. Refers to "data about data"; describes the content, quality, condition, and other characteristics of a given set of data. Its purpose is to provide information about a dataset or some larger data holdings to data catalogues, clearinghouses, and users. Metadata is intended to provide a capability for organizing and maintaining an institution's investment in data to provide information for the application and interpretation of data received through a transfer from an external source (as used in Brohman and Bryant 2005 and Monitoring Team for Climate Change Unpublished Report citing Jennings et al. 2003, as modified from FGDC 1997).

metadata. Information about data. The term describes the content, quality, condition, and other characteristics of a given dataset. Its purpose is to provide information about a dataset or some larger data holdings to data catalogues, clearinghouses, and users. Metadata are intended to provide a capability for organizing and maintaining an institution's investment in data and to provide information for applying and interpreting data received through a transfer from an external source (as used in Nelson *et al*. 2015 citing FGDC 2008).

metadata. Data about the data: the content, quality, condition, and other characteristics of a given set of data. Metadata is intended to provide a capability for organizing and maintaining an institution's investment in data as well as to provide information for the application and interpretation of data received through a transfer from an external source (as used in Winthers *et al*. 2005 citing Jennings, et al. 2004, as modified from FGDC 1997) (as used in Solem and Gilboy 2017 Review Draft citing FGDC 2008). Metadata often includes details on the methodologies used in data collection, relevant literature references, purpose of data collection, etc.

metadata. Information that describes the content, quality, condition, and other characteristics of a given dataset (as used in Rowland and Vojta 2013 citing FGDC 2008).

Metadata. A set of data that describes and gives information about other data (as used in Landres *et al*. 2020 without definition citation).

metapopulation. Several groups of individuals of the same species within some larger area, where migration from one local group to at least some other patches typically is possible (as used in Rowland and Vojta 2013 citing adapted from Hanski and Simberloff 1997). These groups are sufficiently separated so that each group experiences different environmental events, resulting in each group having a unique potential for extinction, which may be followed by recolonization from a neighboring group.

metapopulation. Distinct subpopulations linked by the migration of individuals, which permits the recolonization of an area after the occurrence of a local extinction (as used in Vesely et al. 2006 without definition citation).

microplot: a circular area with a fixed horizontal radius of 6.8 feet (1/300 acre), primarily used to sample trees less than 5.0 inches at d.b.h./d.r.c (as used in Bechtold and Patterson 2005 without definition citation).

minimum detectable change. The smallest size or percent change that a monitoring team hopes to detect, given a specific sampling design and sampling effort. The minimum detectable change should represent a biologically meaningful quantity, given the likely degree of natural variation in the attribute being measured. Values for minimum detectable change greatly influence statistical power (as used in Rowland and Vojta 2013 citing Elzinga *et al*. 1998).

minimum map unit (MMU). Smallest map feature delineated; requirements vary for different map levels (as used in Brohman and Bryant 2005 without definition citation) (as used in Rowland and Vojta 2013 citing Warbington 2011).

minimum map feature. Smallest map feature delineated; requirements vary for different map levels. (Note: The term minimum map feature, as used in this technical guide, is analogous to the term minimum mapping unit, which is widely [although imprecisely] used in the mapping literature.) (as used in Nelson *et al*. 2015 without definition citation)

minimum requirements analyses (MRA). Analyses designed for use when making a determination that one of the 'prohibited uses,' listed in Section 4(c) of The Wilderness Act of 1964, is the minimum necessary requirement. The determination that an administrative action is necessary in wilderness and the selection of the minimum method or tool to be used is made within the constraints of law and agency policy. Once a determination has been made that action is necessary, Forest Service policy sets conditions under which exceptions to the prohibited uses (e.g., motorized equipment, mechanical transport) may be considered and guidelines for when the exceptions should be applied (as used in Landres *et al*. 2020 without definition citation).

modeling. In reference to geospatial data, the process of creating a new GIS layer by combining or operating on existing layers. Modeling creates images that contain several types of information comprising several GIS variables; e.g., a scene may be considered in terms of its vegetation, elevation, water, and climate at the same time (as used in Brohman and Bryant 2005 and Monitoring Team for Climate Change Unpublished Report citing Lachowski et al. 1996) (as used in Winthers *et al*. 2005 citing Wirth et al. 1996)..

modeling units. The elemental modeling entities for the mapping process. Modeling units can be polygons (manual delineations or regions of raster cells) or individual raster cells (as used in Nelson *et al*. 2015 without definition citation).

monitor. To watch, keep track of, or check, usually for a special purpose (as used in Vesely et al. 2006 without definition citation).

monitoring. The collection and analysis of repeated observations or measurements to evaluate changes in condition and progress toward meeting a resource or management objective. A monitoring activity may include an information needs assessment; planning and scheduling; data collection, classification, mapping, data entry, storage and maintenance; product development; evaluation; and reporting phases (as used in Brohman and Bryant 2005, Nelson *et al*. 2015, and Solem and Gilboy 2017 Review Draft citing **FSM 1940**; USDA Forest Service 2009).

monitoring. (2) The systematic collection, analysis, and interpretation of resource data to evaluate progress toward meeting management objectives (as used in Winthers *et al*. 2005, Monitoring Team for Climate Change Unpublished Report, and Nelson *et al*. 2015 citing adapted from SRM 1989). Contrast with inventory.

monitoring. (2) The collection and analysis of resource data to measure changes in the amounts, spatial distribution, or condition of resource types or parameters over time (as used in Winthers *et al*. 2005 without definition citation) as used in Monitoring Team for Climate Change Unpublished Report citing Brohman and Bryant 2005)..

monitoring. The collection and analysis of repeated observations or measurements to evaluate changes in condition and progress toward meeting a resource or management objective (as used in Rowland and Vojta 2013 without definition citation).

monitoring measure. Quantitative criteria for measuring or assessing the attainment of project objectives and/or the effects of project activities. Monitoring measures should be explicit, pertinent, and objectively verifiable (as used in Vesely et al. 2006 without definition citation).

monitoring questions. Questions which capture the essential components of each wilderness character quality that are significantly different from one another and address specific management questions and monitoring goals (as used in Landres *et al*. 2020 without definition citation).

monotonic (function). A mathematical function that preserves the given order; as x (independent variable) increases or decreases, y (dependent variable) increases or decreases or stays the same (as used in Rowland and Vojta 2013 without definition citation).

moosehorn. Handheld tubular device for estimating forest canopy cover with a narrow (10°) angle of view and a 25-dot matrix etched in glass at one end; often used as an unbiased standard for comparing estimates of canopy cover from other methods (as used in Rowland and Vojta 2013 citing Cook et al. 1995).

morphometry. The measurement and mathematical analysis of the configuration of the Earth's surface and of the shape and dimensions of its landforms (i.e., relief, elevation range, slope aspect, gradient, shape, and position, dissection frequency and depth, and drainage pattern and density) (as used in Winthers *et al*. 2005 without definition citation).

motorized equipment. Machines that use a motor, engine, or other nonliving power sources. This category includes, but is not limited to, such machines as chain saws, aircraft, snowmobiles, generators, motor boats, and motor vehicles. It does not include small battery or gas-powered hand-carried devices such as shavers, wristwatches, flashlights, cameras, stoves, or other similar equipment (as used in Landres *et al*. 2020 without definition citation).

moving average: a weighted average of the estimates for distinct panels (as used in Bechtold and Patterson 2005 without definition citation).

moving window. In landscape pattern analysis, used to calculate landscape metrics for focal landscapes continuously across a landscape (as used in Rowland and Vojta 2013 without definition citation).

multiple logistic regression. An extension of logistic regression in which more than one predictor variable is used; similar to multiple linear regression in having multiple predictor variables, but with a binary response variable (as used in Rowland and Vojta 2013 without definition citation).

multispectral. Sensors or images that record or display data from two or more bands of the electromagnetic spectrum (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing USDA Forest Service 1999).

multispectral data. Information that is obtained through sensors that simultaneously capture multiple, narrow wave length ranges located at various points ranging from the visible through the thermal spectral region (as used in Rowland and Vojta 2013 citing adapted from Lillesand and Kiefer 2000).

National Forest System (NFS) road. A road wholly or partly within or adjacent to the NFS that the Forest Service determines is necessary for the protection, administration, and utilization of the NFS and the use and development of its resources. This is a forest road other than a road which has been authorized by a legally documented right-of-way held by a state, county, or local public road authority (as used in Landres *et al*. 2020 without definition citation).

National Forest System (NFS) 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 local public road authority (as used in Landres *et al*. 2020 without definition citation).

National Hierarchy of Ecological Units. The Forest Service's multiple-scale, multiple-element system of map units used to characterize the natural world and provide a framework for national forest planning and management (as used in Winthers *et al*. 2005 citing Cleland et al. 1997). Other State and Federal agencies also use the National Hierarchy, particularly at broader scales.

native plant species. Plant species occurring in a particular area, environment, or region as a result of natural biological processes (as used in Brohman and Bryant 2005 citing Box et al. 1998) such as evolution, immigration, and competition.

native species. A species that originally inhabited a particular wilderness; same as indigenous species (as used in Landres *et al*. 2020 without definition citation).

natural classification. Classification in which the differentiating criteria are selected to "bring out relationships of the most important properties of the population being classified, without reference to any single specified and applied objective." (as used in Brohman and Bryant 2005 citing Buol et al. 1973). Also called scientific classification.

Natural Quality. A quality of wilderness character; wilderness ecological systems are substantially free from the effects of modern civilization (as used in Landres *et al*. 2020 without definition citation).

Natural Resource Manager (NRM). A system of database tools for managing Agency data across the Forest Service. Natural Resource Manager includes: Forest Service Activity Tracking System (FACTS), Infrastructure (Infra), Natural Resource Information System (NRIS), and Timber Information Manager (TIM) applications. NRM applications provide tools for most of the agency's natural resource business areas (as used in Landres *et al*. 2020 without definition citation).

natural/seminatural. (1) Areas dominated by native or established vegetation that has not been cultivated or treated with any annual management or manipulation regime. (2) Areas that cannot be assessed as to whether the vegetation was planted or cultivated by humans (as used in Brohman and Bryant 2005 citing adapted from FGDC 1997).

natural/seminatural vegetation. Vegetation where ecological processes primarily determine species and site characteristics; that is, vegetation comprised of a largely spontaneously growing set of plant species that are shaped by both site and biotic processes (as used in Nelson *et al*. 2015 citing Küchler 1969, Westhoff and van der Maarel 1973 as cited in FGDC 2008). Contrast with cultural vegetation

naturally ignited fire. Any fire ignited by natural means such as a lightning strike (as used in Landres *et al*. 2020 without definition citation).

neutral landscape. A landscape generated as a random map against which effects of the processes that structure actual landscapes can be tested (as used in Rowland and Vojta 2013 citing Turner et al. 2001).

noise. In vegetation data analysis, nonmeaningful variation in species abundances that obscure patterns and relationships in the dataset. Sources of noise include chance distribution and establishment of seeds, local disturbances, microsite variation, outliers, and misidentification of species. (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 without definition citation).

noncensus water: bodies of water from 1 to 4.5 acres in size and water courses from 30 feet to 200 feet in width (as used in Bechtold and Patterson 2005 without definition citation).

nonforest: areas defined as nonforest land, census water, or noncensus wate (as used in Bechtold and Patterson 2005 without definition citation)r.

nonforest land: land that does not support, or has never supported, forests, and lands formerly forested where use for timber management is precluded by development for other uses. Includes areas used for crops, improved pasture, residential areas, city parks, improved roads of any width and adjoining rights-of-way, power line clearings of any width, and noncensus water. If intermingled in forest areas, unimproved roads and nonforest strips must be more than 120 feet wide, and clearings, etc., more than 1 acre in size, to qualify as nonforest land (as used in Bechtold and Patterson 2005 without definition citation).

nonindigenous species. Any species that occurs inside a wilderness because of human influence, including intentional and unintentional introductions and transplants, as well as feral

domesticated animals such as feral horses; same as nonnative species (as used in Landres *et al*. 2020 without definition citation).

non-native plant species. Plant species occurring in a particular area, environment, or region outside its native range as a result of human activity, either deliberate or accidental (as used in Brohman and Bryant 2005 citing Box et al. 1998, Wikipedia).

non-native species. Any species that occurs inside a wilderness because of human influence, including intentional and unintentional introductions and transplants, as well as feral domesticated animals such as feral horses; same as nonindigenous species (as used in Landres *et al*. 2020 without definition citation).

nonprescribed core variable: all FIA regions must produce a value for the variable; but there is no prescribed protocol for measuring or calculating the variable. Examples: tree volume, site index (as used in Bechtold and Patterson 2005 without definition citation).

nonprescribed optional variable: a value is produced for the variable at the discretion of the FIA regions, and there is no prescribed national protocol for measuring or calculating the variable (as used in Bechtold and Patterson 2005 without definition citation).

non-primitive grazing related infrastructure. Grazing related infrastructure which is constructed predominantly of non-native materials (metal or treated wood posts) (as used in Landres *et al*. 2020 without definition citation).

non-recreational physical development. Any physical development that is constructed for any purpose other than recreation such as a dam or utility infrastructure (as used in Landres *et al*. 2020 without definition citation).

non-residential, unoccupied, or abandoned building. A building that is not occupied by people, including non-residential buildings that are designed and built to support functions other than human habitation, such as storage sheds, as well as residential buildings that were occupied in the past but no longer are, such as repurposed or abandoned structures (as used in Landres *et al*. 2020 without definition citation).

non-system roads. Roads that are not actively managed as NFS roads, but that are still visible to the visitor and are clearly distinguishable as having been constructed or used as a road. They may have fallen into disrepair, been actively decommissioned, been constructed by users, or may pre-date wilderness designation (as used in Landres *et al*. 2020 without definition citation).

Nonvascular. a plant or plant-like organism without specialized water or fluid conductive tissue (xylem and phloem). Includes mosses, liverworts, hornworts, lichens, and algae (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing adapted from FGDC 1997).

nonvegetated (mapping). Vegetation comprises less than 1-percent cover at the peak of the growing season. In the land cover classification system (Anderson Level I), water, barren land, perennial snow/ice, and urban/built-up land are examples of nonvegetated landscapes (as used in Brohman and Bryant 2005 citing Anderson et al. 1976).

nonvegetated (mapping). A category used to classify lands with limited capacity to support life and typically having less than 1 percent vegetative cover. Vegetation, if present, is widely spaced. The typical components of the surface of barren land are sand, rock, exposed subsoil, or salt-affected soils. Subcategories include salt flats; sand dunes; mud flats; beaches; bare exposed rock; quarries, strip mines, gravel pits, and borrow pits; river wash; oil wasteland; mixed barren lands; and other barren land (adapted from NRI 2003 as cited in FGDC 2008). Exceptions include vegetation, which exhibits a distinct composition under very sparse conditions (e.g., sea rocket coastal shore vegetation, or amaranth coastal vegetation). These types rarely have greater than 1 percent cover (as used in Nelson *et al*. 2015 citing FGDC 2008).

nonvegetated (soil). Landscape usually associated with open water or human-modified land, such as heavy industrial commercial transportation facilities (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing adapted from USDA Soil Survey Division Staff 1993).

object. A digital representation of all or part of an entity instance (as used in Brohman and Bryant 2005 citing FGDC 1998).

offsetting stable trend. The trend in an indicator when there is an equal number of improving- and degrading-trending measures (as used in Landres *et al*. 2020 without definition citation).

omission error. In remote sensing, a mistake of exclusion occurring in an image classification. Omission errors are displayed in an error matrix during the accuracy assessment process and serve to alert the analyst to mislabeling of reference sites (as used in Brohman and Bryant 2005 citing Lachowski et al. 1996).

operational maintenance level. FSH 7709.59, section 62.3, defines this as: "…the level of service provided by, and maintenance required for, a specific road. Maintenance levels must be consistent with road management objectives and maintenance criteria." (as used in Landres *et al*. 2020 quoting **Forest Service Handbook FSH 7709.59, section 62.3**).

order. In the National Vegetation Classification Standard hierarchy, order is the lower level immediately following division. The orders in the Vegetated division are generally defined by dominant life form (tree, shrub, dwarf shrub, herbaceous, or nonvascular) (as used in Brohman and Bryant 2005 citing FGDC 1997).

Other Features of Value Quality. A quality of wilderness character; ecological, geological, or other features of scientific, educational, scenic, or historical value (as used in Landres *et al*. 2020 without definition citation).

other forest land: forest land other than timberland and reserved forest land. It includes available and reserved low-productivity forest land, which is incapable of producing 20 cubic feet of growing stock per acre annually under natural conditions because of adverse site conditions such as sterile soil, dry climate, poor drainage, high elevation, steepness, or rockiness (as used in Bechtold and Patterson 2005 without definition citation).

outlier. Refers to data or a sample that has low similarity to all other samples in the dataset (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 without definition citation).

overall accuracy. A common measure of a classification's accuracy. Overall accuracy is calculated by dividing the total number of correct samples by the total number of assessment sites (as used in Brohman and Bryant 2005 citing Lachowski et al. 1996).

overall accuracy. The number of samples where observed and mapped types agree divided by the total number of samples. The percentage of all samples where the observed and mapped types agree (as used in Nelson *et al*. 2015 citing Jensen 2004).

overstory. The canopy layer of a forest (as used in Winthers *et al*. 2005 without definition citation).

overstory tree diameter. The mean diameter at breast height (4.5 feet or 1.37 meters above the ground) for the trees forming the upper or uppermost canopy layer (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing Helms 1998).

ozone. A pollutant formed when emissions of nitrogen oxides and volatile organic compounds react in *the presence of sunlight (as used in Landres et al. 2020 without definition citation).*

part-time residential (seasonal) building. Buildings occupied by people for a cumulative total of 6 months or less each year, such as functioning fire lookouts (as used in Landres *et al*. 2020 without definition citation).

panchromatic. Refers to single band imagery (as used in Brohman and Bryant 2005 citing USDA Forest Service 1999).

panel: a sample in which the same elements are measured on two or more occasions. FIA divides plots into five panels that can be used to independently sample the population.

parameter. A statistical metric that describes the central tendency (e.g., population mean), dispersion (e.g., standard deviation), or other variable of interest for a population. Parameter values are based on a complete set of observations for every member of the population, a circumstance that is very rarely attained in natural resource inventories. Typically, parameter values are approximated using measurements, called statistics, based on data from an incomplete sample of the population (as used in Vesely et al. 2006 without definition citation).

partner and affiliates review Accomplished by external technical experts in other agencies, organizations, and universities, this technical review is conducted concurrent with the internal Forest Service review. The intent is to solicit comments from conservation partners and principal users of the technical guide prior to completing the revision (as used in Solem and Gilboy 2017 Review Draft without definition citation).

patch. A relatively homogenous nonlinear area that differs from its surroundings (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 citing Forman 1995); can specifically describe forested patches, nonforest vegetation patches, rock/barren patches, or water patches.

patch (habitat). A recognizable geographic area that contrasts, in structure or occurrence of resources, with adjacent areas and has definable boundaries (as used in Rowland and Vojta 2013 citing Morrison et al. 2006).

patch mosaic model. A landscape model that recognizes three major landscape elements: patch, corridor, and matrix. Also known as the patch-corridor-matrix model (as used in Rowland and Vojta 2013 citing McGarigal et al. 2012).

pattern. Repeating coordinated species abundance and groups of samples with similar species composition (as used in Brohman and Bryant 2005, Winthers *et al*. 2005 and Nelson *et al*. 2015 without definition citation).

pedon. A three-dimensional unit sometimes referred to as a soil profile. Consists of a succession of layers (horizons) in a more-or-less vertical section down into loose weathered rock; a describable unit composed of mineral and organic matter as well as air and water. Layers differ from one another by mineralogy, chemistry, physical or morphological characteristics (as used in Rowland and Vojta 2013 without definition citation).

pedon (1) Those organisms that live on or in the substrate of an aquatic habitat. (as used in Monitoring Team for Climate Change Unpublished Report without definition citation) (2) The smallest vertical column of soil containing all the soil horizons at a given location (as used in Monitoring Team for Climate Change Unpublished Report citing Lincoln et al. 1998).

periodic survey: a noncontinuous inventory system. A survey strategy whereby a set of inventory panels is measured simultaneously over a short time frame, often 1 to 3 years in the case of FIA, and there is a time lag, often many years, before the panels are remeasured (as used in Bechtold and Patterson 2005 without definition citation).

persistent structure. Anything built with the intent of altering the biophysical environment in wilderness (e.g., fish barriers, dams, water diversions, trail systems, guzzlers, bat gates, fencing) (as used in Landres *et al*. 2020 without definition citation).

phase 1: FIA activities related to remote-sensing, the primary purpose of which is to obtain strata weights for population estimates (as used in Bechtold and Patterson 2005 without definition citation).

phase 2: FIA activities conducted on the network of ground plots. The primary purpose is to obtain field data that enable classification and summarization of area, tree, and other attributes associated with forest land uses (as used in Bechtold and Patterson 2005 without definition citation).

phase 3: a subset of Phase 2 plots where additional attributes related to forest health are measured (as used in Bechtold and Patterson 2005 without definition citation).

Phenology Study of the temporal aspects of recurrent natural phenomena and their relation to weather and climate; phaenology; phenomenology (as used in Monitoring Team for Climate Change Unpublished Report citing Lincoln et al. 1998).

physiognomic. Term referring to vegetation type as defined by the visible structure or outward appearance of a plant community expressed by the dominant growth forms, such as their leaf appearance or whether leaves or deciduous or not (as used in Rowland and Vojta 2013 citing adapted from FGDC 2008).

physiognomic classification. A level in the classification hierarchy defined by the relative percent canopy cover of the tree, shrub, dwarf shrub, herb, and nonvascular life form in the uppermost strata during the peak of the growing season (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing FGDC 2008)

physiognomy. (1) The overall size and shape of an organism. Descriptions such as 'trees', 'shrubs', and 'herbs' are frequently used to characterize the general appearance of the vegetation of a region. Moreover, plant physiognomy can be broadly correlated with environmental conditions, so that regions of the world with similar climates tend to have a dominant vegetation of similar life forms. (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing A Dictionary of Biology. 2004. Encyclopedia.com. 28 Dec. 2010 .) (2) The characteristic feature or appearance of a plant community or vegetation (as used in Brohman and Bryant 2005, Winthers *et al*. 2005 and Nelson *et al*. 2015 citing Lincoln et al. 1998). (3) The overall appearance of a kind of vegetation (as used in Brohman and Bryant 2005, Winthers *et al*. 2005 and Nelson *et al*. 2015 citing Daubenmire 1968, Barbour et al. 1980). (4) The expression of the life forms of the dominant plants and vegetation structure (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 citing MuellerDombois and Ellenberg 1974, Barbour et al. 1980).

physiognomy. (1) The visible structure or outward appearance of a plant community as expressed by the dominant growth forms, such as their leaf appearance or deciduousness (as used in Nelson *et al*. 2015 citing Fosberg 1961, Jennings et al. 2006 as cited in FGDC 2008).

piscicide. A chemical substance that is poisonous to fish (as used in Landres *et al*. 2020 without definition citation)

pixel. Two-dimensional picture element that is the smallest nondivisible element of a digital (raster) image (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 citing FGDC 1998). Common pixel resolutions are 30 m and 90 m (i.e., each pixel represents a square of the Earth's surface 30 m or 90 m on a side).

pixel: picture elements—the elements of a digitized picture. The resolution of a picture is dependent on the size and number of elements of which it consists (as used in Bechtold and Patterson 2005 without definition citation).

plant association. A recurring potential natural plant community with a characteristic range in species composition, specific diagnostic species, and a defined range in habitat conditions and physiognomy or structure (as used in Winthers *et al*. 2005 citing Jennings et al. 2004). These occur as repeatable patterns across the landscape (as used in Winthers *et al*. 2005 citing FGDC 1997).

platform. In remote sensing, the physical object (e.g., balloon, rocket, or satellite) that carries the remote sensor. In computing use, may also refer to a type of technical system that is used for processing, displaying, querying, and storing information, e.g., a "technology platform" (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing Lachowski et al. 1996).

platform. In remote sensing, the physical object (e.g., balloon, rocket, or satellite) that carries the remote sensor (as used in Rowland and Vojta 2013 citing Rees 1999).

plot. (1) "A circumscribed sampling area for vegetation" (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 citing Lincoln et al. 1998). (2) "any two-dimensional sample area of any size. This includes quadrates, rectangular plots, circular plots and belt transects (very long rectangular plots). Belt transects are often called strips or transects" (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 citing Mueller-Dombois and Ellenburg 1974).

plot. (3) In the context of vegetation classification, an area of defined size and shape that is intended for characterizing a homogenous occurrence of vegetation (as used in Nelson *et al*. 2015 without definition citation).

plot: a cluster of 4 points arranged such that point 1 is central, with points 2, 3, and 4 located 120 feet from point 1 at azimuths of 360, 120, and 240 degrees, respectively. Each point includes a microplot, a subplot, and an optional macroplot (as used in Bechtold and Patterson 2005 without definition citation).

pocosin wetlands. An upland swamp or bog of the coastal plain of the southeastern United States (as used in Brohman and Bryant 2005 citing Helms 1998).

point. In reference to geospatial data, a dimensional-dimensional object that specifies geometric location. One coordinate pair or triplet specifies the location. Area point, entity point, and label point are special implementations of the general case (as used in Brohman and Bryant 2005 citing USDA Forest Service 2004) (as used in Winthers *et al*. 2005 FGDC 1998) (as used in Nelson *et al*. 2015 citing Brohman and Bryant 2005).

point frame. A rigid vegetation sampling structure that organizes pins in either a rectangular or square grid pattern. The pins are lowered and intercept recorded for each pin in the frame. Multiple frame designs are available (as used in Rowland and Vojta 2013 citing Bonham 1989, Elzinga et al. 1998).

polar. A classification of climate based on the Koppen System for regions where the warmest month is colder than 50° F (10° C) (as used in Brohman and Bryant 2005 citing Bailey 1980).

polygon. An areal feature that occupies a unique spatial location (as used in Winthers *et al*. 2005 without definition citation).

population. The area or aggregation of objects from which the sample is to be drawn (as used in Nelson *et al*. 2015 citing c.f. Bechtold and Patterson [2005], Cochran [1977]). In vegetation sampling, population is usually equivalent to the area of interest; however, the population may be larger to ensure that all of the area of interest is included, such as when sampling a mosaic of forest and nonforest areas.

population: a basic building block of land area for which the number of plots and the land area being sampled are known. Typically, this is the county, but some counties may be grouped into super-counties due to small numbers of forested plots or to mask a large landowner (as used in Bechtold and Patterson 2005 without definition citation).

population monitoring. The process by which a biological population is repeatedly sampled over time for the purpose of detecting changes in abundance, distribution, or demographic parameters (as used in Vesely et al. 2006 without definition citation).

potential natural vegetation (PNV). The vegetation that would become established, if all successional sequences were completed without interference by man under the present climatic and edaphic conditions (as used in Brohman and Bryant 2005, Monitoring Team for Climate Change Unpublished Report, and Nelson *et al*. 2015 citing adapted from Tuxen 1956, as cited in Mueller-Dombois and Ellenberg 1974). Concepts such as succession, site, and environmental factors are all part of PNV. Existing vegetation is simply what is there at the time of sampling. PNV classifications are based on existing vegetation. succession and environmental factors (e.g., climate, geology, soil) considered together. Although climax vegetation and PNV are sometimes used synonymously, common usage is for PNV to have a shorter time reference (e.g., tens to a few hundreds of years) than that associated with climax vegetation (several hundred or more years). Contrast with existing vegetation.

potential natural vegetation (PNV). The plant community that would become established if all successional sequences were completed without human interference under the present environmental and floristic conditions, including those created by man (as used in Winthers *et al*. 2005 citing Tüxen 1956, as cited in Mueller-Dombois and Ellenberg 1974) (as used in Rowland and Vojta 2013 citing Tüxen 1956, as cited in Winthers et al. 2005).

power analysis. A method based on the number of observations for determining the likelihood of detecting a statistically significant effect (as used in Rowland and Vojta 2013 citing Dytham 2011).

precision. The closeness to each other of repeated measurements of the same quantity (not synonymous with accuracy) (as used in Vesely et al. 2006 without definition citation).

precision gap. The existing sample size is too small to achieve the precision required for the current analysis (as used in Nelson *et al*. 2015 without definition citation).

preferential sampling. Locating plots subjectively without preconceived bias (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing Mueller-Dombois and Ellenberg 1974).

preprocessing. In mapping and remote sensing use, the group of processes typically completed on an image before analysis or classification with the goal of improving the quality of the data. Preprocessing operations may include geometric and radiometric corrections (as used in Brohman and Bryant 2005 citing Lachowski et al. 1996).

prescribed core variable: all FIA regions produce a value for these variables and there is a prescribed national protocol for measuring or calculating these variables. Examples: d.b.h., azimuth, distance, species (as used in Bechtold and Patterson 2005 without definition citation).

prescribed fire. Any fire ignited by management actions under certain, predetermined conditions to meet specific objectives related to hazardous fuels or habitat improvement. A written, approved prescribed fire plan must exist, and National Environmental Policy Act requirements must be met before ignition. Prescribed fires are ignited and managed within a “window” of very specific

conditions, including winds, temperatures, humidity, and other factors specified in the burn plan (as used in Landres *et al*. 2020 without definition citation).

prescribed optional variable: a value is produced for these variables at the discretion of the FIA regions; but, when measured, the protocol must conform to prescribed national standards. Examples: magnetic declination, subplot condition list, sapling damage, percent rough cull (as used in Bechtold and Patterson 2005 without definition citation).

preserved. In the context of wilderness character monitoring, wilderness character is preserved if the overall trend is either stable or improving (as used in Landres *et al*. 2020 without definition citation).

primary use areas. Locally identified areas that receive approximately 80 percent of the total use of a wilderness. The following link provides information about primary use areas: http://www.wilderness.net/toolboxes/documents/recsitemonitor/National%20Minimum%20Recreation%20Site%20Monitoring%20Protocol.pdf (as used in Landres *et al*. 2020 without additional definition citation).

primary measure. Cannot be locally modified, must be assigned when multiple "Required to Select At Least One" measures are selected (as used in Landres *et al*. 2020 without definition citation).

primitive grazing related infrastructure. Grazing related infrastructure which is constructed of native materials or native materials and wire (as used in Landres *et al*. 2020 without definition citation).

primitive recreation. A type of recreation that requires self-reliance and demonstration of skills in wilderness travel that reinforce the connection to our ancestors and our American heritage. This encompasses reliance on personal skills to travel and camp in an area (rather than reliance on facilities or outside help), travel by non-motorized and non-mechanical means (such as horse, foot, canoe), and living in an environment with minimal facilities (as used in Landres *et al*. 2020 without definition citation)

probabilistic sample. A sample in which every sample unit has a known and positive probability of selection. Probabilistic (random) sampling of a population generates unbiased information about the population, including means and error estimates of the attributes of interest. By using a probabilistic sampling design, one can measure attributes of selected individuals of a population and infer results to the entire population (as used in Nelson *et al*. 2015 without definition citation).

process standards. (as used in Nelson *et al*. 2015) Describe how to do something, procedures to follow, methodologies to apply, procedures to present information, or business rules to follow to implement standards (as used in Nelson *et al*. 2015 citing FGDC 1996).

process variation. General term for the inherent stochasticity of changes in the population level, which includes demographic, spatial, temporal, and individual variability; also referred to as environmental variation (as used in Rowland and Vojta 2013 citing White 2000).

producer's accuracy. An accuracy measure based on omission error as shown in the error matrix. The producer's accuracy is calculated by dividing the total number of correctly classified sites of a certain category by the total number of sites surveyed in the same category (as used in Brohman and Bryant 2005 citing Lachowski et al. 1996).

Product An artifact that is produced, is quantifiable, and can be either an end item in itself or a component item (as used in Solem and Gilboy 2017 Review Draft citing Project Management Institute 2017).

project charter A document issued by the project initiator or sponsor that formally authorizes the existence of a project and provides the project manager with the authority to apply organizational resources to project activities (as used in Solem and Gilboy 2017 Review Draft citing Project Management Institute 2017).

project management The application of knowledge, skills, tools, and techniques to project activities to meet the project requirements (as used in Solem and Gilboy 2017 Review Draft citing Project Management Institute 2017).

project management. The discipline of planning, organizing, securing, and managing resources to achieve specific goals (as used in Nelson *et al*. 2015 without definition citation).

project manager The person assigned by the performing organization to lead the team that is responsible for achieving the project objectives (as used in Solem and Gilboy 2017 Review Draft citing Project Management Institute 2017).

project scope The work performed to deliver a product, service or result with the specified features and functions (as used in Solem and Gilboy 2017 Review Draft citing Project Management Institute 2017).

project scope management Project scope management includes the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully (as used in Solem and Gilboy 2017 Review Draft citing Project Management Institute 2017).

protocol. Repeatable instructions for inventory, monitoring, and assessment activities for such tasks as assessing information needs, and collecting, mapping, classifying, analyzing and evaluating, and applying information (as used in Brohman and Bryant 2005 and Solem and Gilboy 2017 Review Draft citing **FSM 1940**; USDA Forest Service 2009). Each protocol contains a list of data attributes to be measured and quality standards that meet business requirements (data standard) for the collection methods (as used in Solem and Gilboy 2017 Review Draft without definition citation).

protocol. A detailed study plan that explains how data are to be collected, managed, analyzed, and reported and a key component of quality assurance for natural resource monitoring programs (as used in Rowland and Vojta 2013 citing Oakley et al. 2003).

protocol. Step by step instructions on how to compile, analyze, and enter data for a measure (as used in Landres *et al*. 2020 without definition citation).

protocol governance The process of ensuring that data collection protocols or other types of protocol methodologies perform activities discussed within t the protocol lifecycle management phases.

protocol lifecycle management—Cyclic process for initiating, developing, operating, and adapting data collection protocols to ensure the methods are based on the best available scientific information and meet the business requirements and information quality standards of the agency (as used in Solem and Gilboy 2017 Review Draft without definition citation).

protocol metadata Information about data collection protocols (including name, description, data collection methods, data attribute list, description of where the data is stored, and so on). Metadata for Forest Service national data collection protocols can be found in the Protocol SharePoint site (https://ems-team.usda.gov/sites/fs-rig-pr/SitePages/ Home.aspx) (as used in Solem and Gilboy 2017 Review Draft without definition citation).

protocol technical guide A document containing the protocol (methods and standards) for collection of data along with the associated information required for ensuring the protocol can be used in repeatable collection efforts for long-term determination of environmental changes. This associated information includes the business requirements describing why the data needs to be collected, the data standard describing the list of attributes and to what quality the data needs to be collected, the management questions that this collection of data will answer, the sampling design describing the type of statistical layout and/or seasonal requirements, the training methods to ensure that the field crews will collect data consistently, and the description of how and where the data will be stored (as used in Solem and Gilboy 2017 Review Draft without definition citation).

proximity index. An isolation metric that is calculated for individual patches as the size of and distance to all neighboring patches of the same class, within a specified search distance. The enumeration of size and distance provides the index. A patch with many large patches in close proximity will have a large index value (i.e., low isolation) (as used in Rowland and Vojta 2013 citing McGarigal et al. 2012).

public values. Within wilderness, these include, but are not limited to, opportunities for scientific study, education, solitude, physical and mental challenge and stimulation, inspiration, and primitive recreation experiences (as used in Landres *et al*. 2020 without definition citation).

qualities. The primary elements of wilderness character that link directly to the statutory language of the 1964 Wilderness Act. The following qualities apply nationwide to every wilderness managed by the Forest Service: Untrammeled, Natural, Undeveloped, and Solitude or Primitive and Unconfined Recreation. Another quality, Other Features of Value, may also apply to a wilderness managed by the Forest Service (as used in Landres *et al*. 2020 without definition citation).

quality assurance (QA). (1) The total integrated program for ensuring that the uncertainties inherent in inventory and monitoring data are known and do not exceed acceptable magnitudes, within a stated level of confidence. QA encompasses the plans, specifications, and policies affecting the collection, processing, and reporting of data. It is the system of activities designed to provide officials with independent assurance that quality control (QC) is being effectively implemented uniformly throughout the inventory and monitoring programs (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing **FSM 1940**; USDA Forest Service 2009); (as used in Landres *et al*. 2020 without definition citation). (2) A process-based approach for ensuring that the uncertainties inherent in inventory and monitoring data are made known and do not exceed

acceptable magnitudes, within a stated level of confidence. QA encompasses the plans, specifications, and policies affecting the collection, processing, and reporting of data. The most cost-effective QA tool used to ensure the integrity of data is a comprehensive manual for data collection. A key concept of the QA component is an independent, objective review by a third party to assess the effectiveness of the internal QC program and the quality of the inventory. QA should also reduce or eliminate measurement error. In summary, a comprehensive QA review program provides the best available indication of the inventory's overall quality completeness, accuracy, precision, representativeness, and comparability of data gathered (as used in Nelson *et al*. 2015 and Solem and Gilboy 2017 Review Draft citing USDA Forest Service 2010, U.S. EPA 1997).

quality control (QC). (1) The routine application of prescribed field and office procedures to reduce random and systematic errors and ensure that data are generated within known and acceptable performance limits. QC involves use of qualified personnel, reliable equipment and supplies, training of personnel, and strict adherence to service-wide standard operating procedures for tasks such as information needs assessments, establishment of standards and methods, data collection, data processing, classification, mapping, analysis, and dissemination (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing **FSM 1940**; USDA Forest Service 2009a). (2) The routine application of prescribed field or database procedures to reduce random and systematic errors and ensure that data are generated, analyzed, interpreted, synthesized, communicated, and used within known and acceptable performance limits. Whereas QA is a process-based approach, QC is a product-based approach. QC encompasses hiring, training, and certifying qualified field crews; using reliable equipment and supplies; and adhering to recommended operating procedures, standardized protocols, and controls on lists of values. Data editing and data collection inspections are integral components of QC (as used in Nelson *et al*. 2015 and Solem and Gilboy 2017 Review Draft citing USDA Forest Service 2010, U.S. EPA 1997); (as used in Landres *et al*. 2020 without definition citation).

quantitative inventory. The objective quantification of the amount, composition, condition, and/or productivity of resource types or parameters within specified levels of statistical precision. (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing adapted from Helms 1998).

radiometric correction. In remote sensing, an image preprocessing technique that adjusts for influence from scene illumination, atmospheric conditions, viewing geometry, and instrument response characteristics (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing USDA Forest Service 1999).

raster. A spatial data structure that uses an array of values in which each cell in the array is a separate unit that can be located spatially by its row and column coordinates (as used in Rowland and Vojta 2013 citing Campbell 1996).

raster data. Data organized in a grid of columns and rows. Raster data usually represent a planar graph or geographical area (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing Lachowski et al. 1996).

ratio of means: an estimator which is computed as the ratio of the means of two random variates (attributes), such as the volume per acre of forested land (as used in Bechtold and Patterson 2005 without definition citation).

recreation site. A place where visible impacts to vegetation or soil are documented as a result of repeated recreational use (as used in Landres *et al*. 2020 without definition citation).

reference data. (1) "Ground truth" data used in the image classification and accuracy assessment processes and/or for direct image interpretation. Ground truth data are assumed to be "true" information regarding surface features. In remote sensing projects, reference data serve two main purposes: (a) reference data establish a link between variation on the ground and in the image that is necessary for assigning image-modeling units (pixels or regions) to discrete land cover classes in the image classification process; and (b) reference data help assess the accuracy of a map. (2) Any secondary data that support the primary remote sensing data and thus may include the ancillary data used to classify the image (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing adapted from Lachowski et al. 1996).

reference framework. In landscape pattern analysis, a landscape used in comparison with another landscape; provides a measure of landscape composition and configuration that is typically used to provide a goal for restoration (as used in Rowland and Vojta 2013 without definition citation).

reflectance. The total solar energy incident on a given feature minus the energy that is either absorbed or transmitted by the feature. Reflectance is dependent on the material type and condition, and allows different features in a visual image to be distinguished (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing Lachowski et al. 1996) (as used in Winthers *et al*. 2005 citing Wirth et al. 1996).

regression. A commonly used statistical technique to determine if there is a significant change in one variable, for example, the amount of nitrogen deposition or the number of trammeling actions, in relation to another variable, such as time over several years. There are many different regression models (that is, types or forms of regression), and the appropriate model for each measure will be chosen by the central data analyst in consultation with a statistician based on the properties of the data used for each measure (as used in Landres *et al*. 2020 without definition citation).

relative composition. (as used in Brohman and Bryant 2005) List of the proportions of each plant species relative to the total amount of all species present in a given area or stand (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing FGDC 1997, Jennings et al. 2003).

relevé method. An approach developed in Europe to describe the vegetation of an area together with appropriate environmental data (adapted from Lincoln et al. 1998); based on subjectively placed representative standard plots whose size varies depending on the vegetation type and associated size and spacing of the species or plant life form of interest (as used in Rowland and Vojta 2013 citing Barbour et al. 1987).

remoteness. Having distance from the sights and sounds of civilization (as used in Landres *et al*. 2020 without definition citation).

remote sensing. (1) The gathering of data regarding an object or phenomenon by a recording device (sensor) that is not in physical contact with the object or phenomenon under observation (as used in Brohman and Bryant 2005, Monitoring Team for Climate Change Unpublished Report, and Nelson *et al*. 2015 citing and Lachowski et al. 1996) (as used in Winthers *et al*. 2005 citing Wirth et al. 1996). (2) The science and art of obtaining information about an object, area, or phenomenon through the analysis of data acquired by a device that is not in contact with the object, area, or phenomenon under investigation (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, Rowland and Vojta 2013, Monitoring Team for Climate Change Unpublished Report, and Nelson *et al*. 2015 citing Lillesand and Kiefer 1987).

remotely sensed data. Information that is obtained about an object without actually coming into contact with it (as used in Rowland and Vojta 2013 citing Rees 1999).

representative sampling. Systematic or random location of plots within strata; rejection criteria may be necessary, however, to avoid sampling obvious ecotones, which are of limited use for classifying vegetation. The gradsect technique or gradient directed sampling is one example of this approach (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 citing Austin and Heylingers 1991, as cited in Jennings et al. 2003). The gradsect technique is a form of stratified random sampling that may be cost effective for sampling vegetation patterns along environmental gradients (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 citing Gillison and Brewer 1985). See also gradsect technique..

reserved forest land: land permanently reserved from wood products utilization through statute or administrative designation (as used in Bechtold and Patterson 2005 without definition citation).

residual. In a regression model, the difference between an observed value and the value predicted from a model (as used in Rowland and Vojta 2013 citing Zar 2010).

resolution. The minimum difference between two independently measured or computed values that can be distinguished by the measurement or analytical method being considered or used (as used in Brohman and Bryant 2005 and Monitoring Team for Climate Change Unpublished Report citing USDA Forest Service 2004).

resolution. The fineness with which an instrument can distinguish between different values of some measured property (as used in Rowland and Vojta 2013 citing Rees 1999); analogous to grain (defined above).

resource mapping. The delineation of the geographic distribution, extent, and landscape patterns of resource types or attributes (as used in Winthers *et al*. 2005 citing FGDC 1998) (as used in Brohman and Bryant 2005 without definition citation) (as used in Nelson *et al*. 2015 citing Brohman and Bryant 2005).

restrictions on visitor behavior. Formally adopted regulations or policies that govern visitor behavior, travel, or equipment (as used in Landres *et al*. 2020 without definition citation).

risk. An uncertain event or condition that, if it occurs, has a positive or negative effect on one or more project objectives (as used in Solem and Gilboy 2017 Review Draft citing Project Management Institute 2017).

road. A motor vehicle route over 50 inches wide, unless identified and managed as a trail (as used in Landres *et al*. 2020 without definition citation).

Root Mean Square Error (RMSE). A frequently used measure of differences between values predicted by a model or an estimator and the values actually observed from the attribute being modeled or estimated. It is a good measure of precision (as used in Rowland and Vojta 2013 without definition citation).

sampled population. The subset of the target population that is actually surveyed (as used in Rowland and Vojta 2013 citing Morrison et al. 2001).

sampled population. All elements associated with sampling units listed or mapped within the sampling frame (as used in Vesely et al. 2006 without definition citation).

sampling. The process of selecting and observing (or measuring) a portion of a population for the purpose of estimating a population parameter. sampling frame. The spatial and temporal limits of the sampled population. A list of all possible sampling units eligible to be selected for sampling (as used in Vesely et al. 2006 without definition citation).

sampling design Strategies and techniques for decreasing sampling error and increasing the accuracy of the sampled data compared to the population of interest (as used in Solem and Gilboy 2017 Review Draft citing Elzinga et al. 1998).

sampling frame. A complete list or map of units that are surveyed (as used in Rowland and Vojta 2013 citing adapted from Thompson et al. 1998).

sampling unit. An individual object within a population about which inferences will be drawn; the basic component of study (as used in Rowland and Vojta 2013 without definition citation).

sampling unit: the sampling unit is the basic unit of selection and observation. All FIA units use the center point of the 4-point cluster of subplots as the primary sampling unit (as used in Bechtold and Patterson 2005 without definition citation).

sampling unit. The basic component of sampling on which observations or measurements are performed. Examples include plots, transects, or individual organisms (as used in Vesely et al. 2006 without definition citation).

sampling variation. (as used in Rowland and Vojta 2013) The range of values contributed by attempts, always inexact, to estimate population parameters, in contrast to variation inherent in populations (see process variation; can be estimated) (as used in Rowland and Vojta 2013 citing White 2000).

scale. (1) The relationship between a distance on a map and the corresponding distance on the Earth. For example, a scale of 1:24,000 means that 1 unit of measure on the map equals 24,000 of the same units on the earth's surface (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, Monitoring Team for Climate Change Unpublished Report, and Nelson *et al*. 2015 citing Helms

1998). (2) Ecology, the level of spatial resolution perceived or considered (as used in Brohman and Bryant 2005, Monitoring Team for Climate Change Unpublished Report, and Nelson *et al*. 2015 citing Helms 1998). (3) In general, the degree of resolution at which ecological processes, structures, and changes across space and time are observed and measured (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 citing USDA Forest Service 1993).

scale. (3) Describes the proportion that defines the relationship of a map, image, or photograph to that which it represents, such as distance on the ground (as used in Winthers *et al*. 2005 citing Burrough 1986).

scale, spatial. A measure that is characterized by extent and grain. Extent refers to the area across which the population of interest is distributed. Grain refers to the size of the sampling unit on which observations are made. From a cartographic perspective, the extent is the area of the landscape encompassed within the boundaries of a map, and grain is determined by the size of the minimum mapping unit (e.g., a 25-m pixel) (as used in Vesely et al. 2006 without definition citation).

scale, temporal. A measure of time, usually in years or groups of years. scope of inference. The scale (of space or time) over which the results can be extrapolated. The scope of inference will depend on the area from which sampling sites were randomly chosen, which is the statistical population or sampling frame. If choice of sites is not random, then the scope of inference is only to those sites and not to other areas (i.e., a case study) (as used in Vesely et al. 2006 without definition citation).

scenario a word picture of a fixed sequence of future events in a defined environment—note a scenario is normally used to focus attention on casual processes, decision points, and potential consequences (as used in Monitoring Team for Climate Change Unpublished Report citing Helms 1998).

scientific classification. See natural classification (as used in Brohman and Bryant 2005).

scope creep The uncontrolled expansion to product or product scope without adjustments to time, cost, and resources (as used in Solem and Gilboy 2017 Review Draft citing Project Management Institute 2017).

sensitive lichen species. Species of lichen that develop structural changes in response to air pollution, including reduced photosynthesis and bleaching. Sensitive lichen species eventually die or diminish if pollution levels are elevated. Lichen communities that retain the species most sensitive to air pollution indicate good air quality (as used in Landres *et al*. 2020 without definition citation).

sensitive species. Plants and animals identified by a regional forester for which population viability is a concern, as evidenced by (1) significant current or predicted downward trends in population numbers or density, or (2) significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution (as used in Rowland and Vojta 2013 citing **FSM 2670**) (USDA Forest Service 2005).

sensor. A device that records electromagnetic radiation or other data about an object and presents it in a form suitable for obtaining information about the environment (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing Lachowski et al. 1996) (as used in Winthers *et al*. 2005 citing Wirth et al. 1996).

sensor. Instrument that remotely collects electromagnetic radiation and converts it to some other form, usually a digitized electronic signal (as used in Rowland and Vojta 2013 citing Rees 1999).

seral stage. A temporal and intermediate state in the process of plant succession (as used in Rowland and Vojta 2013 citing Helms 1998).

series. In vegetation classification, an aggregation of taxonomically related plant associations that takes the name of climax species that dominate the principle layer; a group of associations or habitat types with the same dominant climax species. Conceptually a series is analogous to an alliance; the series is a PNV concept (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 citing adapted from Driscoll et al. 1984).

series. (2) In soil science, a group of soils having horizons similar in differentiating characteristics and arrangement in the soil profile, except for texture of the surface horizon (as used in Winthers *et al*. 2005 citing USDA NRCS 1993).

shrub. A woody plant that generally has several erect, spreading, or prostrate stems that give it a bushy appearance. For instances in which growth form cannot be determined, woody plants less than 16 feet (4.9 meters) in height at maturity shall be considered shrubs. Includes dwarf- shrubs, krummholz, and low or short woody vines (as used in Nelson *et al*. 2015 citing Box 1981 as cited in FGDC 2008).

shrubs. Woody plants that generally exhibit several erect, spreading, or prostrate stems and have a bushy appearance. In instances where life form cannot be determined, woody plants less than 5 meters in height are considered shrubs (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 citing FGDC 1997).

simple random sample. A sample design in which plot locations are randomly chosen within the geographic area of interest until the desired number of samples is chosen (as used in Nelson *et al*. 2015 citing Gregoire and Valentine 2008).

simple random sample: a method of selecting n units out of the N such that every one of the samples has an equal chance of being chosen (as used in Bechtold and Patterson 2005 without definition citation).

site. An area delimited by fairly uniform climatic and soil conditions (similar to habitat) (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, Monitoring Team for Climate Change Unpublished Report, and Nelson *et al*. 2015 without definition citation).

site index: the average total height that dominant and codominant trees in fully-stocked, even-aged stands will obtain at key ages, usually 25 or 50 years (as used in Bechtold and Patterson 2005 without definition citation).

site productivity class (or site class): the maximum mean annual increment in cubic feet per acre that can be expected in fully-stocked, natural even-aged stands (as used in Bechtold and Patterson 2005 without definition citation).

sliver: a condition class that occupies less than 25 percent of a plot (less than one full subplot and not encountered on other subplots) (as used in Bechtold and Patterson 2005 without definition citation).

Solitude. The quality or state of being alone or remote from society. This encapsulates a range of experiences, including privacy, being away from civilization, inspiration, self-paced activities, and a sense of connection with times past (as used in Landres *et al*. 2020 without definition citation).

Solitude or Primitive and Unconfined Recreation Quality. A quality of wilderness character; these outstanding opportunities must be provided for people to experience in a wilderness, including opportunities for inspiration, introspection, natural quiet, physical and mental challenge, and freedom from society and regulation (as used in Landres *et al*. 2020 without definition citation).

spatial data. Data that record the geographic location and shape of geographic features and their spatial relationships to other features (as used in Brohman and Bryant 2005 and Monitoring Team for Climate Change Unpublished Report citing USDA Forest Service 2004) (as used in Winthers *et al*. 2005 citing FGDC 1998).

spatial data. See geospatial data (as used in Nelson *et al*. 2015).

spatial gap. The existing data do not cover the entire area of interest (as used in Nelson *et al*. 2015 without definition citation).

spatial extent. (1) The area over which observations are made (e.g., the boundaries of a study area, a species range); (2) the area of a geographic dataset specified by the minimum bounding rectangle (i.e., xmin and ymin, and xmax and ymax) (as used in Vesely et al. 2006 without definition citation) (as used in Rowland and Vojta 2013 citing Vesely et al. 2006).

spatial inventory compilation. The intersection of inventory data with map products. Spatial inventory compilation allows for the use of map information as classification (domain) variables; the inventory data are then summarized to quantify various vegetation characteristics for each map class (as used in Nelson *et al*. 2015 without definition citation).

spatial resolution. The measure of sharpness or fineness in spatial detail.; determines the smallest object that can be resolved by a given sensor, or the area on the ground represented by each pixel. For digital imagery, spatial resolution corresponds to pixel size and may be understood as roughly analogous to "grain" in photographic images (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, Monitoring Team for Climate Change Unpublished Report, and Nelson *et al*. 2015 citing Helms 1998).

spatial resolution. A measure of the smallest distance between two objects that can be distinguished by a sensor (as used in Rowland and Vojta 2013 citing Rees 1999); the measure of sharpness or fineness in spatial detail (as used in Rowland and Vojta 2013 citing Helms 1998).

spatial scale. Characterized by extent and grain (see definitions for "spatial extent" and "grain"). From a cartographic perspective, the extent is the area of the landscape encompassed within the boundaries of a map, and grain is determined by the size of the minimum mapping unit (e.g., 1 acre) (as used in Rowland and Vojta 2013 citing Vesely et al. 2006).

special provision authorization. An authorization to use motor vehicles, motorized equipment, or mechanical transport as specified by statute (as used in Landres *et al*. 2020 without definition citation).

species. In biological classification, the category below genus and above the level of subspecies and variety; the basic unit of biological classification (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, Monitoring Team for Climate Change Unpublished Report, and Nelson *et al*. 2015 citing adapted from Lincoln et al. 1998).

spectral resolution. The dimension and number of specific bands (wavelength intervals) in the electromagnetic spectrum that a sensor can detect (as used in Brohman and Bryant 2005 citing Lachowski et al. 1996).

spherical densiometer. A hand-held instrument used to measure canopy closure of vegetation from the ground (as used in Rowland and Vojta 2013 without definition citation).

sponsor A person who initiates and promotes the project by providing resources and support and is accountable for enabling success. From initial conception through project closure, the sponsor promotes the project by serving as spokesperson to higher level management to gather support throughout the organization and promoting the benefits the project brings (as used in Solem and Gilboy 2017 Review Draft citing Project Management Institute 2017).

stakeholder An individual, group, or organization who may affect, be affected by, or perceive itself to be affected by a decision, activity, or outcome of a project (as used in Solem and Gilboy 2017 Review Draft citing Project Management Institute 2017).

stand. (1)The basic unit of mapping and inventory (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing Graves 1913). (2) A community, particularly of trees, possessing sufficient uniformity regarding composition, age, spatial arrangement, or condition, to be distinguishable from adjacent communities, so forming a silvicultural or management entity (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 citing Ford-Robertson 1971). In the context of the protocol supported by this technical guide, the terms "patch" and "stand" may be synonymous depending on the degree that management considerations are incorporated into stand delineations along with compositional and structural characteristics.

stand. (1) A spatially continuous unit of vegetation with uniform composition, structure, and environmental conditions. This term is often used to indicate a particular example of a plant community (as used in Nelson *et al*. 2015 citing Jennings et al. 2006 as cited in FGDC 2008). In the context of the protocol supported by this technical guide, the terms patch and stand may be synonymous, depending on the degree that management considerations are incorporated into stand delineations along with compositional and structural characteristics.

standard. Criteria for desirable or tolerable conditions, or a statement or demonstration representing conditions of a job done properly. Standards define how well something should be done, rather than what should be done (as used in Nelson *et al*. 2015 citing USDA Forest Service 2009).

standards. Criteria for desirable or tolerable conditions, or a statement or demonstration representing conditions of a job done properly. Standards define how well something should be done, rather than what should be done (as used in Brohman and Bryant 2005 and Solem and Gilboy 2017 Review Draft citing **FSM 1940** USDA Forest Service 2009).

standards-based approach and information management framework. An administrative structure for managing inventory, monitoring, and assessment information based upon explicit standards of performance and operation, explicitly standardized tools, and clear standards of success. Such a framework could include a transparent Quality Assurance System, a basic Information Needs Assessment process, an explicit National Protocol Governance System, or an Agency-wide Monitoring and Evaluation Framework that specifies agency priorities. It also could include Technology Transfer and Knowledge Transfer processes that facilitate leveraging work for multiple purposes (as used in Brohman and Bryant 2005 without definition citation).

standard error. The square root of the variance of a sample; the standard deviation of a sampling distribution of sample estimates (as used in Rowland and Vojta 2013 citing Thompson et al. 1998).

statistical population. The entire underlying set of individuals from which samples are drawn. The population is defined implicitly by the sampling frame (as used in Vesely et al. 2006 without definition citation).

stocking: at the tree level, stocking is the density value assigned to a sampled tree, usually in terms of numbers of trees or basal area per acre, expressed as a percent of the total tree density required to fully utilize the growth potential of the land. At the stand level, stocking refers to the sum of the stocking values of all trees sampled (as used in Bechtold and Patterson 2005 without definition citation).

Strata Nonoverlapping subdivisions of the population such that each primary sampling unit is assigned to one and only one subdivision (or stratum). The relative sizes of these strata are used to compute strata weights (as used in Bechtold and Patterson 2005 without definition citation) (as used in Monitoring Team for Climate Change Unpublished Report citing Bechtold and Patterson 2005).

stratification. Process of grouping sampling units by some unifying characteristic to decrease the variance within the stratum and increase variance across the strata (as used in Rowland and Vojta 2013 without definition citation).

Stratification A statistical tool used to reduce the variance of the attributes of interest by partitioning the population into homogenous strata. It may also involve partitioning a highly variable but small portion of the population (as used in Bechtold and Patterson 2005 without definition citation) (as used in Monitoring Team for Climate Change Unpublished Report citing Bechtold and Patterson 2005).

stratified estimation: estimation of population attributes using the total area of the population, strata means, and known strata weights. Strata means and weights are obtained from the stratification of the population either before or after the selection of sampling units (as used in Bechtold and Patterson 2005 without definition citation).

stratified random sample. A sample design that develops strata based on grouping similar entities, therefore reducing uncertainty in estimates for key attributes of interest within the strata and subsequently reducing the sample size to meet the precision requirements. This sample design focuses on minimizing the variability within strata and maximizing the variability between strata. (as used in Nelson *et al*. 2015 citing Cochran 1977).

stratum. In general, one of a series of layers, levels, or gradations in an ordered system. In the natural environment, the term is used in the sense of (1) a region of sea, atmosphere, or geology that is distinguished by natural or arbitrary limits, or (2) a structural component of a community consisting of plants of approximately the same height; e.g., tree, shrub, or herb strata (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 citing adapted from FGDC 1998) (as used in Nelson *et al*. 2015 citing Jennings et al. 2006 as cited in FGDC 2008). (3) Strata in stratified random sampling (as used in Nelson *et al*. 2015 citing Cochran 1977) are used as a way to group similar entities therefore reducing variability of the key attributes of interest within the strata and subsequently reducing the sample size within each strata.

Stressor(s). Any physical, chemical, or biological perturbations to a system that are either (1) foreign to that system or (2) natural to the system but applied at an excessive (or deficient) level (as used in Rowland and Vojta 2013 and Vesely et al. 2006 citing Barrett et al. 1976). Stressors cause significant changes in the ecological components, patterns, and processes in natural systems. Examples include water withdrawal, pesticide use, traffic emissions, stream acidification, trampling, poaching, land-use change, and air pollution.

structure. (1) The spatial arrangement of the components of vegetation (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 citing Lincoln et al. 1998). (2) A function of plant size and height, vertical stratification into layers, and horizontal spacing of plants. Physiognomy refers to the general appearance of the vegetation; structure describes the spatial arrangement of plants in more detail. Do not confuse physiognomy and structure (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 citing Mueller-Dombois and Ellenberg 1974) (as used in Nelson *et al*. 2015 citing Mueller-Dombois and Ellenberg 1974 as cited in FGDC 2008).

structure. (1) The spatial pattern of growth forms in a plant community, especially regarding their height, abundance, or coverage within the individual layers (as used in Nelson *et al*. 2015 citing Gabriel and Talbot 1984 as cited in FGDC 2008).

structural stage. Stand classification based on 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 (as used in Rowland and Vojta 2013 citing Helms 1998).

subject matter experts Persons holding specialized knowledge or skills in a particular area of expertise usually designated by job function or title (e.g., soil scientist, research wildlife biologist,

rangeland management specialist, and rangeland scientist) as used in Solem and Gilboy 2017 Review Draft without definition citation).

submerged vegetation. Rooted or drifting plants that by-and-large remain submerged in the water column or on the aquatic bottom (e.g., sea grass) (as used in Brohman and Bryant 2005 without definition citation).

subplot: a circular area with a fixed horizontal radius of 24.0 feet (1/24 acre), primarily used to sample trees at least 5.0 inches at d.b.h./d.r.c. subpopulation: a subdivision of a population for which the area sampled is known and controlled for, such as the area within a county in national forest ownership. Sub-populations are not necessarily a subset of one single population (as used in Bechtold and Patterson 2005 without definition citation).

subshrub. A perennial plant having woody stems, typically less than 20 inches (in) tall, except for the terminal part of the new growth which is killed back annually; distinguished by its ground-hugging stems and lower height. Does not include shrubs that are less than 20 in tall because of young age or disturbance (as used in Rowland and Vojta 2013 without definition citation).

succession. Partial or complete replacement of one community by another (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 citing Daubenmire 1978). successive refinement. The basic working approach of community ecologists; involves repeated cycles of knowledge, questions, and observations (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing Pfister and Arno 1980, Gauch 1982).

super-county: a group of counties that have been combined to form a single population. Counties are combined into super-counties when the sample size for individual counties is too small (as used in Bechtold and Patterson 2005 without definition citation).

supervised classification. A method of image classification that depends on the direct involvement of the analyst in the pattern recognition process. See also unsupervised classification (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing USDA Forest Service 1999).
supervised classification: training sites with known properties are used to extract spectral statistics from an image data set by interactively identifying sites in the image. These statistics are used to establish starting values for cluster means, and a clustering algorithm is used to classify the image (as used in Bechtold and Patterson 2005 without definition citation).

surficial geology. The mode of deposition of unconsolidated deposits lying on bedrock or occurring on the Earth's surface, and the rock type(s) from which those deposits are derived, known as "kind" and "origin," respectively (as used in Winthers *et al*. 2005 without definition citation).

surrogate (species). Species that are used to represent other species or aspects of the environment to attain a conservation objective (as used in Rowland and Vojta 2013 citing Caro 2010).

survey. Within the Forest Service, the term commonly refers to inventories performed at a small spatial scale, usually for an individual project. Surveys are distinguished from field checks, site visits, and other casual inspections of an area or a condition because surveys typically have written,

systematic protocols for data collection (as used in Vesely et al. 2006 without definition citation).

synthesis tables. Summaries of mean and constancy by species and by types in a table with types across the top and species down the side. These are essential to compare between types. The data are summed by type in a synthesis table; association tables present data by plots or sample units (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 without definition citation).

systematic sample. A sample design in which a grid is randomly placed over the study area. Each point on the grid represents the same number of acres within the geographic area of inference and ensures a spatially balanced sample across the population (assuming that the population does not have any pattern that matches the grid); (as used in Nelson *et al*. 2015 citing Cochran 1977).

systematic sample: a method of selecting n units out of the N such that restrictions are placed on the samples chance of being chosen (as used in Bechtold and Patterson 2005 without definition citation).

tabular data. Data that describe things using characters and numbers formatted in columns and rows (as used in Brohman and Bryant 2005 citing USDA Forest Service 2004).

tabular database. Data that describe things using characters and numbers formatted in columns and rows (as used in Nelson *et al*. 2015 citing Brohman and Bryant 2005).

tabular inventory compilation. A process used to compile an unbiased quantification of the composition of vegetation for the inventory area. After being compiled, inventory data summaries that quantify various vegetation characteristics for each map class can be produced (as used in Nelson *et al*. 2015 without definition citation).

target population. The collection of all sampling or experimental units about which one would like to make an inference (as used in Rowland and Vojta 2013 citing Morrison et al. 2001).

target population. All elements representing the species of interest within some defined area and time period (as used in Vesely et al. 2006 without definition citation).

targeted monitoring. An activity to track the condition and response to management of species and habitats that are identified as being of concern or interest (as used in Rowland and Vojta 2013 citing Holthausen et al. 2005).

taxa. The plural form of taxon, which is a classification entity (as used in Winthers *et al*. 2005 without definition citation).

taxonomic unit (taxon (s.), taxa (pl.). The basic set of classes or types that comprise a classification. Taxonomic units can be developed for physiognomic classifications (e.g., tree dominated classes or shrub dominated classes), floristic classifications (e.g., dominance type classes or plant association classes), and they can be developed for structural classifications (e.g., canopy cover classes and/or tree size classes). Taxonomic units represent a conceptual description of ranges and/or modal conditions in vegetation characteristics. A taxonomic unit (or taxon) is a class developed through the scientific classification process, or a class that is part of a taxonomy (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing USDA Soil Survey Division 1999).

taxonomic unit. The basic set of classes or types that comprise a classification; in this document, a classification of environmental elements or integrated enviornmental elements (ecological types). Taxonomic units represent a conceptual description of ranges and/or modal conditions in environmental characteristics. A taxonomic unit (or taxon) is a class developed through the scientific classification process, or a class that is part of a taxonomy (as used in Winthers *et al*. 2005 citing USDA NRCS 1993). A taxonomic unit is the physical representation of a taxon, or the physical representation of a unit of a classification.

technical classification (or technical grouping). A classification in which the differentiating characteristics are selected "for a specific, applied, practical purpose" (as used in Brohman and Bryant 2005 citing Buol et al. 1973, Pfister and Arno 1980).

technical review Conducted by independent third-party subject matter experts, this review focuses on the technical aspects and application of relevant science within the technical guide. The review process follows guidance provided in the participant agreements and includes a formal written response. The formality of this review can range from the blind peer-review procedures used by technical journals to an informal independent third-party review (as used in Solem and Gilboy 2017 Review Draft without definition citation).

temporal gap. The existing data are not current enough due to changing conditions (as used in Nelson *et al*. 2015 without definition citation).

temporal grain. The smallest unit selected for measuring time, i.e., day, month, year, decade, century, or geologic period (as used in Rowland and Vojta 2013 without definition citation).

temporal resolution. A measure of how often a given sensor obtains imagery of a particular area, also called coverage. For satellite data, temporal resolution depends on the satellite's orbit schedule and off-nadir pointing capability. Temporal resolution is important for projects requiring multitemporal imagery, such as change detection projects (as used in Brohman and Bryant 2005 citing Lachowski et al. 1996).

terrain correction. An image processing technique that corrects for the distortion resulting from recording a three-dimensional view in two dimensions. Terrain correction is recommended if precise location is required, and if the study area has topographic relief differences greater than 500 feet (152.4 meters) (as used in Nelson *et al*. 2015 citing Lachowski et al. 1996).

tertiary data (Human dimension) is derived from science and research activities based on primary or secondary data. (2) Being third in position, order, degree, or rank. (as used in Monitoring Team for Climate Change Unpublished Report citing Webster 1984).

Theil-Sen slope. A non-parametric regression which minimizes the influence of data outliers (e.g., an extreme value will not unduly affect the trend calculation) (as used in Landres *et al*. 2020 without definition citation).

thematic aggregation. The process of combining spatially distinct map features based on their categorical similarity and spatial arrangement (as used in Brohman and Bryant 2005 without definition citation).

Thematic Mapper (TM). A sensor carried aboard Landsat 4 and 5. Data are collected in seven electromagnetic spectral bands that were selected for vegetation analysis. Landsat 7also has a panchromatic band with 15- meter spatial resolution; an onboard, full aperture, 5-percent absolute radiometric calibration; and a thermal infrared channel with 60-meter spatial resolution (as used in Brohman and Bryant 2005 citing USDA Forest Service 1999).

thematic resolution. The level of categorical detail present within a given map unit. In a general sense, increased thematic resolution is represented by an increase in the number of map units and conversely fewer map units for coarser thematic resolution. While thematic resolution is often implied by geographic or spatial resolution, a direct relationship is not inherent (as used in Brohman and Bryant 2005 citing Helms 1998).

thematic resolution. The level of categorical detail present within a given map unit; increased thematic resolution results in an increased number of classes in the map legend. Whereas thematic resolution is often implied by geographic or spatial resolution, a direct relationship is not inherent (as used in Rowland and Vojta 2013 citing adapted from Helms 1998).

theme. Group of data that represent a place or thing such as soils, vegetation, or roads. A theme may be less concrete, such as population density, school districts, or administrative boundaries (as used in Brohman and Bryant 2005 and Monitoring Team for Climate Change Unpublished Report citing USDA Forest Service 2004) (as used in Nelson *et al*. 2015 citing Brohman and Bryant 2005) (as used in Winthers *et al*. 2005 citing FGDC 1998).

theme (GIS). See layer (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015).

threshold. A value selected before a monitoring program indicating the point at which management changes would be considered or go into effect; point at which a substantial or rapid change in a response variable occurs, given a marginal change in environmental conditions (as used in Rowland and Vojta 2013 citing Sonderegger et al. 2009). Also known as a trigger.

threshold. The amount of change in the data necessary to qualify as a meaningful change in the measure (as used in Landres *et al*. 2020 without definition citation).

timberland: Forest land that is producing or capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment (MAI). Timberland excludes reserved forest lands (as used in Bechtold and Patterson 2005 without definition citation).

time series. A sequence of data points measured typically at uniform time intervals; analyses use methods that account for the fact that observations close in time will be more closely related than will observations taken farther apart (as used in Rowland and Vojta 2013 without definition citation).

total deposition. The sum of atmospheric deposition from wet and dry deposition (as used in Landres *et al*. 2020 without definition citation).

trail. A route 50 inches or less in width or a route over 50 inches wide that is identified and managed as a trail (as used in Landres *et al*. 2020 without definition citation).

trail class. The prescribed scale of development for a trail, representing its intended design and management standards. Each trail class is defined in terms of applicable tread and traffic flow, obstacles, constructed feature and trail elements, signs, typical recreation environment, and experience. Trail classes range from trail class 1 (minimally developed) to trail class 5 (fully developed) (as used in Landres *et al*. 2020 without definition citation).

training site. In mapping, the geographical area represented by the pixels in a training sample. Usually, training sites have been previously identified through ground truth data or aerial photography. Also called training fields (as used in Brohman and Bryant 2005 citing Lachowski et al. 1996).

trammeling action. An action or persistent structure that intentionally manipulates "the earth and its community of life" inside a designated wilderness or inside an area that by agency policy is managed as wilderness (as used in Landres *et al*. 2020 without definition citation).

transactional data. In the Forest Service, the storage structure for tabular and spatial information that is designed for short, online uses. Data are entered and edited by users who are closely involved with collection of the data and have the appropriate authorizations. Data entered into this secure repository are related to protocol-driven, day-to-day activities (as used in Rowland and Vojta 2013 without definition citation).

travel routes. Trails, roads, and aircraft landing sites (as used in Landres *et al*. 2020 without definition citation).

traveling encounters. The mean number of other groups (or people) seen per standardized unit of time (typically an 8-hour day) while in wilderness during the primary use season (as used in Landres *et al*. 2020 without definition citation).

Tree(s). a woody plant that generally has a single main stem and a more or less definite crown. In instances where growth form cannot be determined, woody plants equal to or greater than 5 m in height at maturity shall be considered trees (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 citing adapted from FGDC 1997). Includes dwarf trees (as used in Brohman and Bryant 2005 citing Tart et al. 2005b) or "treelets" (as used in Brohman and Bryant 2005 citing Box 1981).

tree. A woody plant that generally has a single main stem and a more or less definite crown. In instances where growth form cannot be determined, woody plants equal to or greater than 16 feet (4.9 meters) in height at maturity shall be considered trees (as used in Nelson *et al*. 2015 citing FGDC 2008). Includes dwarf trees (as used in Nelson *et al*. 2015 citing FGDC 2008) or treelets (as used in Nelson *et al*. 2015 citing Box 1981 as cited in FGDC 2008).

trend in a measure. How a measure is changing over time to evaluate whether a certain measure is improving, degrading or remaining stable since the baseline year of data collection (as used in Landres *et al*. 2020 without definition citation).

trend in wilderness character. How wilderness character is changing over time; whether wilderness character has remained stable or improved (i.e., has been preserved), or has degraded, since the year of designation (as used in Landres *et al*. 2020 without definition citation).

tri-areal plot: a plot design that incorporates three different plot sizes at each sample location for the purpose of measuring trees in three different tree-diameter ranges (as used in Bechtold and Patterson 2005 without definition citation).

trigger. See definition for threshold (as used in Rowland and Vojta 2013 without definition citation).

trigger point. A value of the parameter being monitored. When this value is reached or exceeded, specific, previously defined mitigation measures are implemented (as used in Vesely et al. 2006 without definition citation).

Type I error. In statistical tests, the rejection of the null hypothesis when it is in fact true (as used in Rowland and Vojta 2013 without definition citation).

Type II error. In statistical tests, the failure to detect a false null hypothesis (as used in Rowland and Vojta 2013 without definition citation).

umbrella species. An organism, usually a mammal or bird, whose conservation confers protection to a large number of naturally co-occurring organisms; the umbrella species concept is used in conservation planning as a shortcut method for maintaining biodiversity (as used in Rowland and Vojta 2013 citing Roberge and Angelstam 2004).

unauthorized action. An action which is not approved by an employee of the U.S. Forest Service to whom the appropriate authority has been delegated (as used in Landres *et al*. 2020 without definition citation).

unauthorized trail. A trail that is not a forest trail or a temporary trail and that is not included in a forest transportation atlas. This includes user-created trails as well as other routes (e.g., decommissioned roads or trails) that are in use (as used in Landres *et al*. 2020 without definition citation).

unconfined recreation. A type of recreation in which visitors experience a high degree of freedom over their own actions and decisions. This encompasses the sense of discovery, adventure, exploration, and mental challenge presented by large wildernesses in which one can travel widely and explore unique and unknown environments on one's own without having to conform to society's norms or rules (as used in Landres *et al*. 2020 without definition citation).

Undeveloped Quality. A quality of wilderness character; wilderness retains its primeval character and influence, and is essentially without permanent improvements or modern human occupation (as used in Landres *et al*. 2020 without definition citation).

unsupervised classification. In mapping, a computer-automated method of spectral pattern recognition in which some parameters are specified by the user and used to uncover statistical patterns

inherent in the image data. See also supervised classification (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing USDA Forest Service 1999).

unsupervised classification: radiance values of an image data set are used in a statistical clustering algorithm. The clusters are labeled after the classification (as used in Bechtold and Patterson 2005 without definition citation).

Untrammeled Quality. A quality of wilderness character; wilderness is essentially unhindered and free from modern human control or manipulation (as used in Landres *et al*. 2020 without definition citation).

user-created sites. Unauthorized developments or infrastructure which has not been authorized by a Forest Service Federal land manager. In wilderness, these areas are often constructed to support recreational use, such as hitching posts, fire rings, and temporary shelters (as used in Landres *et al*. 2020 without definition citation).

user-created trails. Trails which were not created by an authorized action (as used in Landres *et al*. 2020 without definition citation).

user's accuracy. In reference to accuracy assessment, an accuracy measure based on a commission error in the error matrix. Also known as reliability, user's accuracy is the probability that pixels classified on the map actually represent the category on the ground. User's accuracy is calculated by dividing the total number of correctly classified sites of a certain category by the total number of the certain category classified by the map (as used in Brohman and Bryant 2005 citing Lachowski et al. 1996) (as used in Winthers *et al*. 2005 citing Wirth et al. 1996).

User Views. Functionality that allows for direct querying of data tables and provide tabular reports that can be exported to Microsoft Excel; accessible through the I-Web interface main menu and focused on specific business area needs (as used in Rowland and Vojta 2013 without definition citation).

utility infrastructure. The constructed features used to convey or support basic services such as electricity, telecommunication, gas, or water. Utility infrastructure is classified as "small scale" (an individual site occupying less than one acre in total size), "moderate scale" (either (a) an individual site that equals or exceeds one acre in size or (b) requires an above-ground linear corridor, but is of a generally small scale, typically less than a half-mile in length), or "large scale" (requires an above-ground linear corridor, but is of a generally large scale, typically equal to or greater than a half-mile in length) (as used in Landres *et al*. 2020 without definition citation).

variance. A measure of precision; average of squared differences between a set of values and the mean of the distribution of those values (as used in Rowland and Vojta 2013 citing Thompson et al. 1998).

vascular plant. Plant with specialized water and fluid conductive tissue (xylem and phloem); includes seed plants, ferns, and fern allies (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 citing FGDC 1997) (as used in Nelson *et al*. 2015 citing FGDC 2008).

vector data. Data that represents physical forms (elements) such as points, lines, and polygons. In terms of GIS, vectors typically represent a boundary between spatial objects (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing Lachowski et al. 1996).

vegetated. Areas having at least 1-percent or more of the land or water surface with live vegetation cover at the peak of the growing season (as used in Brohman and Bryant 2005 citing FGDC 1997) (as used in Nelson *et al*. 2015 citing FGDC 2008).

Vegetation. The total plant life or cover in an area; also used as a general term for plant life; the assemblage of plant species in a given area; *cf.* faunation (as used in Monitoring Team for Climate Change Unpublished Report citing Lincoln et al. 1998).

Vegetation complexes. Map units that comprise a grouping of dissimilar alliances that are spatially and ecologically related on the landscape (as used in Brohman and Bryant 2005 citing called ecological complex in GAP Bulletin 7, Brackney and Jennings 1998).

vegetation cover. Vegetation that covers or is visible at or above the land or water surface; a subcategory of earth cover. The percentage of the ground covered by a vertical projection of the outermost perimeter of the natural spread of the foliage of plants (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 citing FGDC 1997).

vegetation data. The attributes of the vegetation that are used to classify and characterize the vegetation type and to map vegetation stand. These data come from the interpretation of remotely sensed imagery, fieldwork, and other thematic data sources (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 citing FGDC 1997).

vegetation mapping. The process of delineating the geographic distribution, extent, and landscape patterns of vegetation types based on composition, physiognomy, and structure (as used in Brohman and Bryant 2005, Winthers *et al*. 2005, and Nelson *et al*. 2015 without definition citation).

vegetation type. A named class of plant community or vegetation defined on the basis of selected shared floristic, physiognomic, and/or structural characteristics that distinguish it from other classes of plant communities or vegetation (as used in Brohman and Bryant 2005 and Winthers *et al*. 2005 citing Jennings et al. 2003).

vegetation type. A named category of plant community or vegetation defined on the basis of shared floristic and/or physiognomic characteristics that distinguish it from other kinds of plant communities or vegetation (as used in Nelson *et al*. 2015 citing FGDC 2008) (as used in Rowland and Vojta 2013 citing FGDC 2008, Tart et al. 2011). This term can refer to units in any level of the National Vegetation Classification (NVC) hierarchy (FGDC 2008).

vernal pool. A seasonal water body, usually originating in autumn, filling from spring rains on snowpack and drying by early summer to mid-summer (as used in Rowland and Vojta 2013 without definition citation).

vertical. At right angles to the horizontal; includes altitude and depth (as used in Brohman and Bryant 2005 and Nelson *et al*. 2015 citing FGDC 1998).

watershed condition. The state of the physical and biological characteristics and processes within a watershed that affect the soil and hydrologic functions supporting aquatic ecosystems. Watershed condition reflects a range of variability from natural pristine (functioning properly) to degraded (severely altered state or impaired) (as used in Landres *et al*. 2020 without definition citation).

watershed condition class. Within the Watershed Condition Framework (WCF), this describes the watershed condition in terms of discrete categories (or classes) that reflect the level of watershed health or integrity; classified as Class 1 = functioning properly, Class 2 = functioning at risk, or Class 3 = impaired function (as used in Landres *et al*. 2020 without definition citation).

watershed score. Within the Watershed Condition Framework (WCF), this numerical value reflects the level of watershed health or integrity based on 12 different indicators: water quality, water quantity, aquatic habitat, aquatic biota, roads and trails, soils, riparian/wetland vegetation, fire regime or wildfire, forest cover, rangeland vegetation, terrestrial invasive species, and forest health. Watershed condition scores are tracked to one decimal point and reported as watershed condition classes 1, 2, or 3. Class 1 = scores from 1.0 to 1.6, Class 2 = scores from 1.7 to 2.2, and Class 3 = scores from 2.3 to 3.0. (as used in Landres *et al*. 2020 without definition citation).

WCM baseline year. The first year that data for all measures have been compiled; the reference point against which the trend in wilderness character is assessed and evaluated (as used in Landres *et al*. 2020 without definition citation).

wet deposition. The fraction of atmospheric deposition contained in precipitation, predominantly rain and snow (as used in Landres *et al*. 2020 without definition citation).

Wilderness. "A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least 5,000 acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value." (as used in Landres *et al*. 2020 quoting 1964 Wilderness Act, Public Law 88-577, Section 2c).

wilderness character. "Wilderness character is a holistic concept based on the interaction of (1) biophysical environments primarily free from modern human manipulation and impact, (2) personal experiences in natural environments relatively free from the encumbrances and signs of modern society, and (3) symbolic meanings of humility, restraint, and interdependence that inspire human connection with nature. Taken together, these tangible and intangible values define wilderness character and distinguish wilderness from all other lands." (as used in Landres *et al*. 2020 citing Landres et al. 2015).

wilderness character monitoring (WCM). The process of assessing the overall trend in wilderness character using the interagency strategy described in Keeping it Wild 2 (as used in Landres *et al*. 2020 citing Landres et al. 2015).

Wilderness Character Monitoring Database (WCMD). A single place for all agencies to enter their wilderness character monitoring data, store these data, and develop trend reports (as used in Landres *et al*. 2020 without definition citation).

wilderness stewardship. Mandated by the Wilderness Act of 1964 such that each agency administering any area designated as wilderness shall be responsible for preserving the wilderness character of the area (as used in Landres *et al*. 2020 without definition citation).

Wilderness Stewardship Performance (WSP). A framework to track how well the U.S. Forest Service is meeting our primary responsibility under the Wilderness Act- which is to preserve wilderness character (as used in Landres *et al*. 2020 without definition citation).

zenith angle. The number of degrees between a direction of interest and the local direction of reference (as used in Rowland and Vojta 2013 without definition citation).

z-statistic. A value whose distribution under the null hypothesis can be approximated by a normal distribution; has a single critical value for a given significance level (e.g., 5 percent) (as used in Rowland and Vojta 2013 without definition citation).

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