



# Glossary

**A1B storyline**—a set of assumptions developed by the Intergovernmental Panel on Climate Change describing a future of robust growth: greenhouse gas emissions (medium); population growth (medium); gross domestic product increase (high); energy consumption growth (high, but with a balanced renewable/fossil fuel portfolio); loss of forest land (high); greenhouse gas emissions (medium); and pace of energy technology developments (fast); among other characteristics. See Chapter 2 for details.

**A1B-BIO scenario**—the combination of the assumptions from (1) the A1B storyline with (2) a general circulation model estimating future climate conditions based on expected greenhouse gas emissions for the A1B storyline, and (3) projected increasing harvest level based on a relatively high rate of woody biomass utilization for energy production. See Chapter 2 for details.

**A1B-C scenario**—the combination of the assumptions from (1) the A1B storyline with (2) a general circulation model estimating future climate conditions based on expected greenhouse gas emissions for the A1B storyline, and (3) projected future harvest rates that are a continuation of harvest rates observed for the prior 5 years. See Chapter 2 for details.

**A2 storyline**—a set of assumptions developed by the Intergovernmental Panel on Climate Change describing a future of asymmetric growth: greenhouse gas emissions (high); population growth (high), gross domestic product increase (moderate), energy consumption growth (high), loss of forest land (moderate), greenhouse gas emissions (high), and pace of energy technology developments (slow), among other characteristics. See Chapter 2 for details.

**A2-BIO scenario**—the combination of the assumptions from (1) the A2 storyline with (2) a general circulation model estimating future climate conditions based on expected greenhouse gas emissions for the A2 storyline, and (3) projected increasing harvest level based on a relatively moderate rate of woody biomass utilization for energy production. See Chapter 2 for details.

**A2-C scenario**—the combination of the assumptions from (1) the A2 storyline with (2) a general circulation model estimating future climate conditions based on expected greenhouse gas emissions for the A2 storyline, and (3) projected future harvest rates that are a continuation of harvest rates observed for the prior 5 years. See Chapter 2 for details.

**A2-EAB scenario**—a variation of the A2-C scenario that also models the death of all ash trees within the expanding zone of projected emerald ash borer infestation over time. See Chapter 2 for details.

**activity day**—a day that an individual (or a collective group of individuals) participates for any period of time in a particular recreational activity. This metric is commonly used to measure recreational activities. Multiple recreation activities (such as hiking, photographing nature, and fishing) can be recorded for one person on the same day.

**afforestation**—planting trees to establish a forest in an area where the prior land use was not forest (as in planting trees on former agricultural land).

**annual growth**—the average annual net increase in the volume of trees during the period between surveys. Components include the increment in net volume of trees at the beginning of the specific year surviving to its end, plus the net volume of trees reaching the minimum size class during the year, minus the volume of trees that died during the year, and minus the net volume of trees that became cull trees.

**B2 storyline**—a set of assumptions developed by the Intergovernmental Panel on Climate Change describing a future of moderate growth: greenhouse gas emissions (low); population growth (medium), gross domestic product increase (medium), energy consumption growth (medium), loss of forest land (low), greenhouse gas emissions (low), and pace of energy technology developments (moderate), among other characteristics. See Chapter 2 for details.

**B2-BIO scenario**—the combination of the assumptions from (a) the B2 storyline with (b) a general circulation model estimating future climate conditions based on expected greenhouse gas emissions for the B2 storyline, and (c) projected increasing harvest level based on a relatively low rate of woody biomass utilization for energy production. See Chapter 2 for details.

**B2-C scenario**—the combination of the assumptions from (1) the B2 storyline with (2) a general circulation model estimating future climate conditions based on expected greenhouse gas emissions for the B2 storyline, and (3) projected future harvest rates that are a continuation of harvest rates observed for the prior 5 years. See Chapter 2 for details.

**biomass**—the weight of organic matter in a tree, stand, or forest. Biomass is commonly categorized into live or dead material and into bole, branch, bark, or root components. Weight can be reported in green tons (field weight at harvest) or dry tons (the oven-dry equivalent biomass). For a given sample, the green weight can be as much as twice the corresponding dry weight.

**carbon emissions**—quantity (typically tons or metric tons) of carbon emitted to the atmosphere from combustion of fuels, decomposition of organic matter, and other processes; often expressed as quantity of carbon dioxide (CO<sub>2</sub>) with the mass of oxygen molecules included and sometimes expressed as carbon dioxide equivalent (CO<sub>2</sub>e) where the quantity of greenhouse gasses other than carbon dioxide (for example methane) are included in the total by converting those gasses to the amount of carbon dioxide expected to have a comparable greenhouse effect.

**carbon sequestration (in forests)**—the quantity of carbon, or carbon dioxide (CO<sub>2</sub>) equivalent, held in plant tissues and soils in a forest ecosystem. The amount of sequestered carbon is often estimated by components (including live trees, dead trees, aboveground tree parts, belowground tree parts, soil, or forest floor).

**challenge recreation activities**—physically challenging recreation such as caving, mountain climbing, and rock climbing. These activities are often associated with affluent young adults.

**chlorosis**—abnormal reduction or loss of the normal green coloration of leaves, typically caused by iron deficiency in lime-rich soils, by disease, or by lack of light.

**climate change**—long-term trends or fluctuations in temperature, precipitation, wind, and other climate variables. In contemporary usage, the term often is used to indicate changes and fluctuations associated with increased atmospheric carbon dioxide and other greenhouse gasses (Helms 1998).

**community land**—places that have geopolitical boundaries (such as cities, towns, or unincorporated named places) that may include all, some, or no urban land within their boundaries.

**composite products**—wood products composed of a resin matrix in combination with a wood fiber reinforcement. Composite wood pertains to, but is not limited to, particleboard, plywood, medium-density fiberboard, composite veneer, and oriented strandboard.

**cull tree**—a tree  $\geq 5$  inches d.b.h. that is unmerchantable as a saw log because it is rotten, poorly formed, or of an undesirable species.

**d.b.h.**—tree diameter at breast height; tree diameter at breast height measured as inches of tree diameter at a height of 4.5 feet above ground level.

**d.o.b.**—tree diameter outside the bark measured at a specified height (other than d.b.h.), often used to indicate the upper (or small) diameter of a merchantable tree bole.

**early successional forest habitat**—a young forest (typically no more than 10 years old) that has regenerated following a large disturbance (such as a regeneration harvest) or by planting or natural succession on other open land.

**ecological region**—see ecoregion.

**econometric model**—a statistical or mathematical model used to describe or predict economic quantities or relationships.

**ecoregion**—a contiguous geographic area with relatively uniform macroclimate, altitude, predominant natural vegetation, or other features that influence ecosystem function. Ecoregions can be split into finer divisions or aggregated into coarser categories based on macroclimate, landform, geology, hydrology, native vegetation, or other factors that affect plants and animals (Bailey 1995).

**ecosystem services**—the benefits that people derive from ecosystems. These include provisioning services such as food and water; regulating services such as flood and disease control; cultural services such as spiritual, recreational, and cultural benefits; and supporting services such as nutrient cycling that maintain the conditions for life on Earth. Ecosystems provide food, clothes, fuels, and many of the commodities used to manufacture the products used in daily life. Ecosystems also purify and store water, help clean air, regulate climate, provide protection from natural hazards such as hurricanes, pollinate crops, and regulate pests. They can process and detoxify wastes, provide places to play and reflect, and contribute to a person’s cultural, inspirational, and intellectual well-being by providing a sense of place.

**edge**—the transition between forest and nonforest land, between mature forest and young forest, or between two other contrasting forest conditions.

**employees (number of)**—all the full-time and part-time employees who are on the payrolls of establishments and worked or received pay for any part of a pay period that includes the 12th of March, June, September, or December. Included are employees on paid sick leave, paid holidays, and paid vacations; not included are proprietors and partners of unincorporated businesses. Employment data for prior years represent the average number of production workers for the payroll periods that include the 12th of March, May, August, and November. The “all employees” number is the average number of production workers plus the number of other employees in mid-March.

**epicormic branching**—branches growing from a previously dormant bud on the trunk or a limb of a tree.

**family forest owners**—families, individuals, trusts, estates, family partnerships, and other unincorporated groups of individuals that own forest land. This group is a subset of nonindustrial private forest owners.

**FIA**—see Forest Inventory and Analysis.

**forest associated birds, mammals, and vascular plants**—birds, mammals, and vascular plants that normally spend part of their lives in a forest habitat.

**Forest Inventory and Analysis (FIA)**—the U.S. Forest Service research and development group charged with conducting and reporting inventories of forest vegetation, soils, health, and product outputs.

**forest land**—land  $\geq 120$  feet wide and 1 acre in area with  $\geq 10$  percent cover (or equivalent stocking) by live trees of any size; includes land that formerly had such tree cover and that will be naturally or artificially regenerated. Forest land includes transition zones, such as areas between forests and nonforest lands that have  $\geq 10$  percent cover and forest areas adjacent to urban and built-up lands. Roadside, streamside, and shelterbelt strips of trees must have a crown width of  $\geq 120$  feet and continuous length of  $\geq 363$  feet to qualify as forest land. Unimproved roads and trails, streams, and clearings in forest areas are classified as forest land if they are  $< 120$  feet wide or 1 acre in area. Tree-covered areas in agricultural production settings, such as fruit orchards, or tree-covered areas in urban settings, such as city parks, are not considered forest land.

**forest stand**—a contiguous group of trees of similar age structure and size structure. In the North, stands are typically 5 to 40 acres in extent.

**forest stewardship plan**—a forest management plan that addresses the management objectives of the forest owner while maintaining the forest in a healthy condition for future generations.

**forest type**—a classification of forest land based on the tree species that presently form the plurality of live tree stocking, for example, the white oak (*Quercus alba*) forest type or the red pine (*Pinus resinosa*) forest type.

**forest-type group**—a combination of forest types that share closely associated species or site requirements and generally are combined for brevity of reporting, for example the oak-hickory (*Quercus* spp. – *Carya* spp.) forest-type group or the white-red-jack pine (*Pinus strobus* – *Pinus resinosa* – *Pinus banksiana*) forest-type group.

**fragmentation (forest)**—the process of breaking up contiguous forest cover into various nonforest land uses.

**fuelwood**—wood used for conversion to some form of energy.

**GCM**—see general circulation model.

**general circulation model (GCM)**—numerical models that represent the physical processes in the atmosphere, oceans, and land surface and have been applied to predict and map climate response to increased greenhouse gas emissions. The numerous GCMs are competing hypotheses about how climate will change in response to increased greenhouse gas emissions.

**global circulation model**—see general circulation model (GCM).

**greenhouse gas (GHG) emissions**—atmospheric emission of carbon dioxide (CO<sub>2</sub>) and other gasses known to trap heat in the atmosphere.

**growing stock**—a classification of the timber inventory that excludes cull trees and includes live trees of commercial species meeting specified standards of quality or vigor. When associated with volume, growing stock includes only trees  $\geq 5.0$  inches d.b.h.

**habitat restoration**—returning forest species composition, size structure, or ecosystem processes to a desired range of conditions, typically conditions with increased diversity and/or resilience. In some cases the desired state may be representative of a former period of time (for example before European settlement).

**hardwood**—trees belonging to the botanical group Angiospermae. These broad-leaved trees typically drop their leaves in autumn. Examples include oaks (*Quercus* spp.), maples (*Acer* spp.), elms (*Ulmus* spp.), cottonwood (*Populus* spp.), quaking aspen (*Populus tremuloides*), and birch (*Betula* spp.). Although the wood of hardwoods physically ranges from hard or soft, it is usually hard compared to the wood of softwoods.

**indicator**—qualitative or quantitative variable that functions as a signal to relay complex ecological information in a simple and useful manner. Effective indicator variables must be indicative of a larger ecological process, easily measured, cost effective, and repeatable.

**instar**—a phase between two periods of molting in the development of an insect larva or other invertebrate animal.

**integrated harvesting**—a logging operation that combines harvesting of small-diameter trees for energy production with harvesting of large-diameter trees for pulping and milling.

**Intergovernmental Panel on Climate Change (IPCC)**—the international body established in 1988 by the United Nations Environment Programme and the World Meteorological Organization (WMO) and charged with providing a clear scientific view on the current state of knowledge about climate change and its potential environmental and socioeconomic impacts (<http://www.ipcc.ch/> [accessed August 19, 2014]).

**interior**—locations within mature forest cover that are removed by some minimum distance (such as 50 yards) from a forest edge.

**invasive plants and animals**—see invasive species.

**invasive species**—a species whose introduction causes, or is likely to cause, economic or environmental harm or harm to human health. Only a small proportion of nonnative species are invasive.

**IUCN protected status**—see protected area.

**land-use change**—change in the classification of land; for example from forests to urban land.

**lumber**—timber sawn into boards, planks, or other structural members of standard or specified length.

**national forest**—an ownership class of Federal lands, designated by Executive Order or statute as national forests or purchase units, and other lands under the administration of the U.S. Forest Service.

**net annual forest growth**—the average annual net increase in the volume of trees during the period between surveys. Components include the increment in net volume of trees at the beginning of the specific year surviving to its end, plus the net volume of trees reaching the minimum size class during the year, minus the volume of trees that died during the year, and minus the net volume of trees that became cull trees during the year.

**nonindustrial private forest**—all private forest owners excluding forest products companies.



**nontimber forest products**—products not commonly listed as outputs of the forest products industry, but that are used in the herbal medicine, culinary, crafts, and floral industries. They range from edible products (such as fruits, nuts, mushrooms, ramps, and maple syrup) to medicinal type products (such as ginseng and bloodroot) to ornamental products (such as pine cones, boughs, and grapevines) to landscape products (such as native plants) to specialty woods (such as burl and crotch wood for fine crafts) to wildgrown Christmas trees. As used here the category also includes post, poles, or residential fuelwood sold in small quantities.

**old-growth forest**—a subjective term describing forests that are relatively old for their forest cover type and relatively undisturbed by humans. Old-growth forests are characterized by the presence of large trees of late-successional (climax) species, multiple age cohorts, decaying trees, large snags, down wood in multiple stages of decay, and large-diameter down trees.

**other Federal**—an ownership class of Federal lands other than those administered by the Forest Service or Bureau of Land Management. This category includes land managed by the National Park Service, Fish and Wildlife Service, Department of Defense, and Department of Energy.

**paper and paperboard products**—products from pulp or recycled pulp and paper.

**parcellation**—the division of a property (individual ownership) into smaller parcels split among multiple owners.

**phloem**—the food-conducting tissues of a vascular plant that transport sugars produced by photosynthesis in the leaves. In trees the phloem is the innermost layer of the bark.

**primary forest**—see old-growth forest.

**private forest**—forest land held by private individuals, forest products companies, corporations, or other nongovernmental entities.

**private forest owners**—owners other than Federal, State, county, or municipal governments. This category includes private corporate (forest products industry and other incorporated) and private noncorporate entities.

**private noncorporate owners**—owners of private lands excluding lands owned by corporate interests. This category includes land owned by individuals, Native American lands, unincorporated partnerships, clubs, and lands leased by corporate interests.

**protected area**—an area that is especially dedicated to the protection and maintenance of biological diversity and natural and associated cultural resources, and is managed through legal or other effective means (see also reserved forest). Although all protected areas meet the general purposes contained in this definition, in practice the precise purposes for which protected areas are managed differ greatly. The International Union for Conservation of Nature (IUCN) has defined a series of six protected area management categories, based on primary management objective (DellaSalla et al. 2001, Dudley 2008, International Union for Conservation of Nature 2015).

**Category I:** an area possessing some outstanding or representative ecosystems, geological or physiological features, or species that is available primarily for scientific research or environmental monitoring; or a large unmodified or slightly modified area, which retains its natural character and influence without permanent or significant habitation, that is protected and managed so as to preserve its natural condition. Strict nature reserves (Ia) are distinguished from wilderness areas (Ib).

**Category II:** a natural area designated to (1) protect the ecological integrity of one or more ecosystems for present and future generations; (2) exclude exploitation or occupation inimical to the purposes of designation of the area; and (3) provide a foundation for spiritual, educational, recreational, and visitor opportunities, all of which must be environmentally and culturally comparable.

**Category III:** an area containing one or more specific natural or natural/cultural features that are of outstanding or unique value because of their inherent rarity, representative or esthetic qualities, or cultural significance.

**Category IV:** an area of land and/or sea subject to active intervention for management purposes so as to ensure the maintenance of habitats and/or to meet the requirements of specific species.

**Category V:** an area of land with coast and sea as appropriate, where the interaction of people and nature over time has created a distinct character with significant esthetic, ecological, or cultural value, and often with high biological diversity. Safeguarding the integrity of this traditional interaction is vital to the protection, maintenance, and evolution of such an area.

**Category VI:** an area containing predominantly unmodified natural systems, managed to ensure long-term protection and maintenance of biological diversity, while at the same time providing a sustainable flow of natural products and services to meet community needs.

**protected forest**—see protected area.

**public forest land**—forest managed by Federal, State, county, municipal, or other governmental entities.

**pulpwood**—roundwood, whole-tree chips, or wood residues that are used for production of wood pulp.

**removals**—the net volume of growing-stock trees removed from the inventory by harvesting, cultural operations such as timber stand improvement, or land clearing during a specified period of time (usually expressed as an annual average for a specified period of time).

**reserved forest land**—forest land withdrawn from timber extraction through statute, administrative regulation, or designation without regard to productive status. This is usually public forest land. See also protected area.

**roundwood products**—logs, bolts, and other round timber generated from harvesting trees for industrial or consumer use.

**scenario**—as used here it is the combination of the assumptions from (1) one of the IPCC storylines with (2) a general circulation model estimating future climate conditions based on expected greenhouse gas emissions for the selected storyline, and (3) an estimated pattern of future forest harvesting. In this study future harvest rates were modeled as either a continuation of harvest rates for the prior 5 years or one of three levels of increased biomass harvesting for energy production.

**serotinous**—able to release seeds in response to a fire or other disturbance.

**softwood**—trees belonging to the botanical group Gymnospermae. These needle-bearing trees typically produce seeds in cones. Examples include pines (*Pinus* spp.), spruces (*Picea* spp.), firs (*Abies* spp.), hemlocks (*Tsuga* spp.), and eastern redcedar (*Juniperus virginiana*). Although the wood of softwoods physically ranges from soft or hard, it is usually soft compared to the wood of hardwoods.

**soil horizon**—a specific layer in the land area that is parallel to the soil surface and possesses different physical characteristics from the layers above and beneath.

**spatial scale**—the degree of aggregation or disaggregation that one chooses to examine an issue. Spatial scales are hierarchical, and each scale can be split into finer units or combined into coarser units. Examples of spatial scale include national > State > county > township > section > woodlot (about 20 acres) < all woodlots along same south-facing ridge (about 100 to 500 acres) < small landscape (about 1,000 acres) < cluster of landscapes (thousands to millions of acres). Other relevant spatial scales might include the area around an individual tree, a forest stand, a group of forest stands, the typical home range of a wildlife species, an ecoregion, a watershed, a community, or an urban area.

**statistical imputation**—a process used to determine and assign replacement values for missing data or missing observations. As used here, future FIA plot conditions are “imputed” by drawing a replacement plot from a pool of candidate plots with the appropriate conditions. During a 10-year simulation time step, for example, an undisturbed 50-year-old oak-hickory (*Quercus* spp. – *Carya* spp.) forest plot would be replaced by a different 60-year-old oak-hickory forest plot chosen at random from among many dozens of candidate plots. But if the original plot were instead predicted to be harvested, it would be replaced by a newly regenerated forest plot, selected at random from a large pool of candidate plots. Imputation schemes can be quite complex. For example, climate change effects can be modeled by selecting future replacement plots from locations with warmer temperature regimes, similar to those expected in future decades.

**stewardship**—the administration of land and associated resources in a manner that enables their passing on to future generations in a healthy condition.

**stewardship plan**—see forest stewardship plan.

**storyline**—as used here, a set of assumptions about future changes in population, gross domestic product, land use, and greenhouse gas emissions. The projected forest conditions described in this report are based on the A1B, A2, or B2 storylines developed by the Intergovernmental Panel on Climate Change.

**successional pathway**—as a forest area progresses from pioneering community to climax community after a stand-replacing disturbance, the series of vegetation types that follow one another as the new stand matures (all depending on site and climate conditions).

**susceptibility**—the potential for introduction and establishment, over a 15-year period, of a forest pest within a tree species or tree-species group.

**timberland**—forest land that is producing or is capable of producing crops of industrial wood and not withdrawn from timber utilization by statute or administrative regulation. Areas qualifying as timberland are capable of producing >20 cubic feet per acre per year of industrial wood in natural stands. Currently inaccessible and inoperable areas are included.

**total wages**—the annual payroll or gross earnings paid in each calendar year to employees at the establishment. Total wage includes all forms of compensation (such as salaries, wages, commissions, dismissal pay, bonuses, vacation and sick leave pay, and compensation in kind) before such deductions as employees' Social Security contributions, withholding taxes, group insurance, union dues, and savings bonds purchases. The total includes salaries of officers of corporations; it excludes payments to proprietors or partners of unincorporated entities. Also excluded are payments to members of Armed Forces and pensioners carried on the active payrolls of manufacturing establishments. Also included are fringe benefits for employees, including the employer's costs for Social Security taxes, unemployment taxes, workmen's compensation insurance, State disability insurance pension plans, stock purchase plans, union-negotiated benefits, life insurance premiums, and insurance premiums on hospital and medical plans for employees. Also included are the employer's costs for benefits to individual employees such as stock purchase plans, deferred profit-sharing plans, and defined benefit and defined contribution retirement plans. Also excluded are such benefits as company-operated cafeterias, in-plant medical services, free parking lots, discounts on employee purchases, and uniforms and work clothing.

**turbidity**—a measure of water clarity measured by how much the material suspended in water decreases the passage of light through the water. Higher turbidity increases water temperatures because suspended particles absorb more heat. This, in turn, reduces the concentration of dissolved oxygen because warm water holds less dissolved oxygen than cold.

**urban or community land**—all territory, population, and housing units located within urbanized areas or urban clusters, which is based on population density (areas with core population density of 1,000 people per square mile) but also includes surrounding areas with lesser population density. Community lands are places that have geopolitical boundaries (for example, cities, towns, or unincorporated named places) and may include all, some, or no urban land within their boundaries. As urban land defines the more heavily populated areas (population density-based definition) and community land defines both urban and rural (nonurban) communities that are recognized by their geopolitical boundaries (political definition), both definitions provide information related to human settlements and the forest resources within those settlements. Because some urban land exists beyond community boundaries and not all community land is urban (communities are often a mix of urban and rural land), the category of “urban or community” was created to understand forest attributes accumulated by the union of these two definitions (U.S. Census Bureau 2015).

**urban or community population**—total population within a region that resides within urban or community land.

**urban land**—all the territory, population, and housing units located within urbanized areas or urban clusters, each with a core population density of 1,000 people per square mile and including surrounding areas that have lower population densities (U.S. Census Bureau 2015).

**vertically integrated company**—a company that is engaged in different parts of the production process, such as growing, transporting, and processing raw materials; and manufacturing, transporting, and marketing products.

**volume of timber**—the gross volume in cubic feet of wood for standing trees or for cut trees  $\geq 4.0$ -inch top d.o.b. less deductions for rot, roughness, and poor form.

**vulnerability**—the potential for experiencing mortality of a tree species, over a 15-year period, if a forest pest were to become established.

**watershed**—as defined in nature by topography, the land area that drains to a waterbody and affects its flow, water level, loadings of pollutants, and other processes. In both a real and figurative sense, a lake or river is a reflection of its watershed. The U.S. Geological Survey has developed a hydrologic unit classification (HUC) system of watersheds at various scales and mapped these watersheds. The HUCs depicted in the figures of this report are at the “eight-digit scale” (USGS 2015).

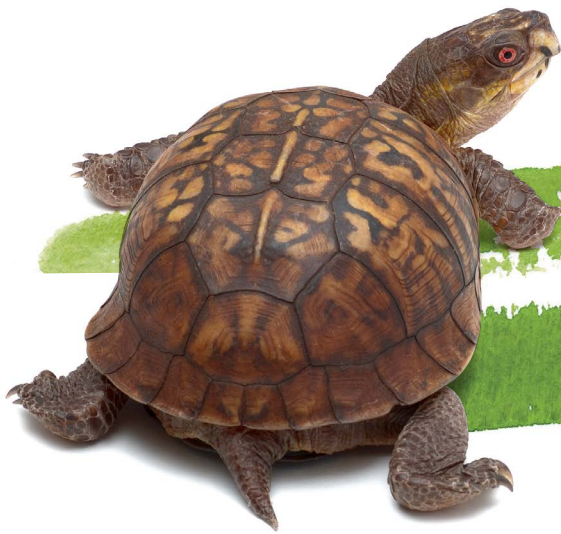
**wildland-urban interface**—where houses meet or intermingle with wildland vegetation. The wildland-urban interface is composed of both interface and intermix communities. In both interface and intermix communities, housing must meet or exceed a minimum density of one structure per 40 acres. Intermix communities are places where housing and vegetation intermingle; wildland vegetation is continuous, covering  $\geq 50$  percent of the land, in areas  $>1$  house per 40 acres. Interface communities are areas with housing in the vicinity of contiguous vegetation; they have  $>1$  house per 40 acres, have  $<50$  percent vegetation, and are within 1.5 miles of an area (made up of one or more contiguous census blocks) that is  $>1,325$  acres (500 ha) and  $>75$  percent vegetated (this minimum size limit ensures that areas surrounding small urban parks are not classified as interface).

**witches’ broom**—dense twiggy growth in a tree caused by infection with fungus (especially rusts), mites, or viruses.

**wood panels**—engineered wood board such as plywood, veneer, oriented strandboard (OSB), particle board, medium-density board, and materials that are made from wood and glue.

**xylem**—the water conducting tissues of a vascular plant. Xylem transports water absorbed by roots throughout a tree.





## Literature Cited

**Bailey, R.G. 1995.** Description of the ecoregions of the United States. Misc. Pub. 1391. Washington, DC: U.S. Dept. of Agriculture, Forest Service. 108 p.

**DellaSalla, D.A.; Staus, N.L.; Strittholt, J.R.; Hackman, A.; Iacobelli, A. 2001.** An updated protected areas database for the United States and Canada. *Natural Areas Journal*. 21: 124-135.

**Dudley, N., ed. 2008.** Guidelines for applying protected area management categories. Gland, Switzerland: International Union for Conservation of Nature. 86 p. [http://cmsdata.iucn.org/downloads/guidelines\\_for\\_applying\\_protected\\_area\\_management\\_categories.pdf](http://cmsdata.iucn.org/downloads/guidelines_for_applying_protected_area_management_categories.pdf) (accessed January 15, 2015).

**Helms, J.A. 1998.** The dictionary of forestry. Bethesda, MD: Society of American Foresters. 210 p.

**International Union for Conservation of Nature. 2015.** The International Union for Conservation of Nature. Gland, Switzerland: International Union for Conservation of Nature. <http://www.iucn.org/> (accessed January 15, 2015).

**U.S. Census Bureau. 2015.** Geography: urban and rural classification. Washington, DC: U.S. Department of Commerce, Census Bureau. <http://www.census.gov/geo/reference/urban-rural.html> (accessed January 15, 2015).

**U.S. Geological Survey. 2015.** Water resources of the United States: hydrologic unit maps. Washington, DC: U.S. Department of Interior, Geological Survey. <http://water.usgs.gov/GIS/huc.html> (accessed January 15, 2015).

