

# Fire Effects Information System Glossary

[A](#) [B](#) [C](#) [D](#) [E](#) [F](#) [G](#) [H](#) [I](#) [J](#) [K](#) [L](#) [M](#) [N](#) [O](#) [P](#) [Q](#) [R](#) [S](#) [T](#) [U](#) [V](#) [W](#) [X](#) [Y](#) [Z](#)

## **ACHENE:**

A small, usually single-seeded, dry, [indehiscent](#) fruit ([Allaby 1992](#)).

## **ACTIVE CROWN FIRE:**

A crown fire in which the entire fuel complex is involved in flame, but the crowning phase remains dependent on heat released from surface fuel for continued spread. An active crown fire may also be also called a running crown fire or continuous crown fire. An active crown fire presents a solid wall of flame from the surface through the canopy fuel layers. Flames appear to emanate from the canopy as a whole rather than from individual trees within the canopy. Active crown fire is one of several types of crown fire and is contrasted with [passive crown fires](#) which are less vigorous types of crown fire that do not emit continuous, solid flames from the canopy ([Scott and Reinhardt 2007](#)).

## **ADVENTITIOUS:**

Structures or organs developing in an unusual position, as roots originating on the stem ([Harris and Harris 2001](#)).

## **AERENCHYMA:**

Tissue with well-developed air spaces between the cells, characteristic of the roots and stems of water plants ([Hickey and King 2000](#)).

## **AESTIVATION:**

A period of dormancy during the summer that allows animals to avoid excessive heat or drought ([McFarland 2006](#)). Compare to [hibernation](#).

## **ALLELOPATHY:**

Chemical inhibition of one organism by another ([Lincoln and others 1998](#)).

## **ALLIANCE:**

A ranked category in vegetation classification, comprising one or more closely related associations ([Lincoln and others 1998](#)).

## **ALTRICIAL:**

Offspring that show a marked delay in attainment of independent self-maintenance ([Lincoln and others 1998](#)).

## **ALVAR:**

Plant community that is dominated by mosses and herbs and occurs on shallow, alkaline limestone soils ([Lincoln and others 1998](#)).

## **ANDRODIOECIOUS:**

Plant species having male and [perfect](#) flowers on separate plants ([Lincoln and others 1998](#)).

## **ANDROMONOECIOUS:**

Plant species having male and [perfect](#) flowers on the same plant ([Lincoln and others 1998](#)).

## **ANIMAL UNIT (AU):**

One mature (1,000 lb.) cow or the equivalent based upon average daily forage allowance of 26 lbs. dry matter per day under range conditions ([Frost and Ruyle 1993](#)).

## **ANIMAL UNIT MONTH (AUM):**

1) Amount of forage required by an animal unit for one month.

Native Ecosystems Council v. Weldon, No. 11-35659, archived on November 16, 2012

2) Tenure of one animal unit for a one-month period ([Frost and Ruyle 1993](#)).

**ANTHERIDIUM:**

In mosses and liverworts, the male reproductive organ containing sperm. *Plural:* antheridia ([Conard 1956](#)).

**APOMIXIS:**

Seed production without fertilization, in which meiosis and fusion of gametes are partially or totally suppressed ([Lincoln and others 1998](#), [Harris and Harris 2001](#)).

**ARCHEGONIUM:**

In mosses and liverworts, the female reproductive organ containing eggs. *Plural:* archegonia ([Conard 1956](#)).

**AREOLA:**

A small, well-defined area on the surface of a cactus bearing spines or flowers ([Harris and Harris 2001](#)).

**ARIL:**

A fleshy appendage forming an outer seed covering ([Hickey and King 2000](#)).

**ASSOCIATION:**

A climax plant community with 2 or more dominant species; sometimes used to refer to a large assemblages of organisms in a particular area or to a group of plants growing together and forming a small unit of natural vegetation ([Lincoln and others 1998](#)).

**AUTOGAMY:**

Self-fertilization ([Harris and Harris 2001](#)).

**AVOIDANCE:**

Used in animal ecology to indicate use of a resource in lower proportions than its availability ([Johnson 1980](#), [Rosenberg and McKelvey 1999](#)).

**BACKFIRE:**

A fire set along the inner edge of a fireline to consume the fuel in the path of a fire or to change the fire's convection column ([National Wildfire Coordinating Group, Incident Operations Standards Working Team 1996](#)).

**BASAL AREA:**

- 1) Cross-sectional area of a tree determined from the diameter at breast height (DBH).
- 2) Total area of ground covered by trees measured at breast height.
- 3) Actual surface area of soil covered by a plant measured close to the ground ([Lincoln and others 1998](#)).

**BISEXUAL:**

See [PERFECT](#).

**BOG:**

A poorly-drained, acidic, freshwater wetland that depends primarily on precipitation, snowmelt, and fog for water and is characterized by a buildup of peat, usually from *Sphagnum* mosses ([Nevada Division of Water Planning \[n.d.\]](#), [Warner and Rubec 1997](#)).

**BREEDING SYSTEM:**

Mode, pattern, and extent to which individuals interbreed with others from the same or different taxa ([Lincoln and others 1998](#)).

**BULB:**

An underground stem with thickened fleshy scales, as in the onion ([Harris and Harris 2001](#), [Hickey and King 2000](#)).

Native Ecosystems Council v. Weldon, No. 11-35659, archived on November 16, 2012

**BULBIL:**

A small bulb-like structure, generally formed in a leaf axil, that detaches from the parent plant and functions in vegetative reproduction ([Allaby 1992](#)).

**BURL:**

- 1) an irregular, commonly round growth on a tree stem or branch resulting from the entwined growth of a cluster of adventitious buds and having contorted grain ([Helms 1998](#)).
- 2) a subterranean woody structure consisting of short branchlets fused into a mass of wood; these branchlets are terminated by dormant buds, which can sprout when the main trunk is injured or destroyed. Functionally and ecologically similar to [lignotubers](#) that occur at ground level of some woody species ([James 1984](#)). FEIS uses "basal burl" to indicate this latter meaning.

**CALICHE:**

A zone near the soil surface that is more or less cemented by secondary carbonates of calcium or magnesium precipitated from the soil solution. It may occur as a soft, thin soil horizon, a hard, thick bed, or a layer exposed by erosion. ([Soil Science of America 2001](#)).

**CALYPTRA:**

In mosses and liverworts, a thin hood fitting over the top of the spore capsule ([Conard 1956](#)).

**CAPSULE:**

- 1) A dry, dehiscent fruit composed of more than one carpel ([Harris and Harris 2001](#)).
- 2) The spore-bearing structure of a moss or liverwort ([Allaby 1992](#)).

**CARYOPSIS:**

An [achene](#) with the ovary wall united with the seedcoat; this fruit type is typical of grasses ([Allaby 1992](#)). *plural* caryopses

**CAUDEX:**

The persistent and often woody base of an herbaceous perennial ([Harris and Harris 2001](#)). *plural* caudices

**CENTRAL SPINES:**

Cacti spines that are in the center of or form a circle around the [areole](#) ([Benson 1982](#)).

**CHAMAEPHYTE:**

Low woody or herbaceous plant with perennating tissue within 10 inches (25 cm) of soil surface ([Raunkiaer 1934](#)).

**CHARATE:**

Charred wood containing leachable chemicals that stimulate seed germination in some plant species ([Keeley and Nitzberg 1984](#)).

**CHASMOGAMY:**

Pollination occurring after the flower opens ([Lincoln and others 1998](#)).

**CLEISTOGAMY:**

Process by which flowers self-fertilize without opening ([Harris and Harris 2001](#)).

**CLIMAX:**

A biotic community that is in equilibrium with existing environmental conditions and represents the terminal stage of an ecological succession ([Smith 2000](#)).

**CODOMINANT:**

A species that shares equal dominance with another species in a plant community ([Lincoln and others 1998](#)).

Native Ecosystems Council v. Weldon, No. 11-35659, archived on October 16, 2012

**COHORT:**

A group of individuals of the same age, recruited into a population at the same time; age class ([Smith 2000](#)).

**COMA:**

A tuft of hairs at the end of some seeds, such as milkweed (*Asclepias*) and cotton (*Gossypium*) seeds ([Hickey and King 2000](#)).

**COMPETITION:**

Interaction of 2 or more organisms restricting each other's survival when at least 1 resource (for example, water, nutrients, light, space) is limiting ([Birch 1957](#), [Clements and others 1929](#), [Mather 1961](#), [Milne 1961](#), [Hall 1974](#)). Contrast with [facilitation](#). Also see [interference](#).

**COMPOSITE FIRE INTERVAL:** Number of years between fires that scarred one or more trees within a given area ([Dieterich 1980](#)). Often indicates the number of years between fires that scarred at least one tree in the area (for example, [Heyerdahl and others 2001](#)), but may describe number of years between fires that scarred a certain proportion of trees in the area (for example, [Stephens and others 2003](#)). This criterion (single tree, two or more, 10% or more, etc.) must be specified. The Composite Fire Interval is estimated from a pool of trees within an area, and is intended to account for the likelihood that not every tree will be scarred by every fire that occurs in the area ([Patton 2007](#)). See also [fire interval](#) and [point fire interval](#).

**CONSOCIES:**

Part of an association lacking one or more of its dominant species ([Lincoln and others 1998](#)).

**CONSTANCY:**

The relative consistency of occurrence of a species.

1) May be expressed as proportion of samples in which a species occurs, in which case it is similar to [frequency](#) ([Helms 1998](#)).

2) May be described as one of several classes representing dominance or cover (for example, [Atzet and others 1996](#)). FEIS uses FREQUENCY if that is clearly the author's meaning. Otherwise, FEIS uses CONSTANCY.

**COOL-SEASON:**

A plant that makes most of its growth during winter and spring and sets seed in late spring or early summer ([Frost and Ruyle 1993](#)). Also see [warm-season](#)

**COOPERATIVE BREEDING:**

A breeding system where older siblings or adults other than the parents help rear the current-year's brood ([Elphick and others 2001](#), [Wilson 2000](#)).

**COPPICE SPROUT:**

Any stem arising from an adventitious or dormant bud at or near the base of a woody plant that has been **cut** back ([Ford-Robertson 1971](#)).

**CORM:**

A short, solid, vertical underground stem with thin papery leaves ([Harris and Harris 2001](#)).

**CORPUSCULUM:**

The gland connecting the 2 waxy pollen grain masses in milkweeds (Asclepiadaceae) ([Harris and Harris 2001](#)).

**COTYLEDON:**

An embryonic seed leaf; there is characteristically 1 for Monocots and 2 for Dicots ([Allaby 1992](#)).

**COVER:**

The proportion of ground covered by the aerial parts of individuals of a species, usually expressed as a percentage. Total cover for all species on a site can exceed 100%. However, [top-cover](#), the proportion of ground for which a

Native Ecosystems Council, Weldon, Va. 11-35659, archived on November 16, 2012

species provides the uppermost cover, cannot exceed 100% ([Grieg-Smith 1983](#)). [Mueller-Dombois and Ellenberg \(1974\)](#) consider basal area a special kind of "cover," but FEIS does not usually use COVER in this way.

**CREPUSCULAR:**

Active during twilight hours of dusk and dawn ([Lincoln and others 1998](#)).

**CROWN CLASS:**

Measure of stand structure classifying trees within a stand as dominant (crowns rise through or above general canopy and receive full light from above and partial light from the sides), codominant (crowns in upper canopy but are blocked from receiving light from the sides by neighboring crowns), emergent (crowns completely above main canopy), intermediate (crowns receive little light from above and none from the side), overtopped or suppressed (one or more neighboring trees completely overtop crowns), and seedlings ([Helms 1998](#)).

**CROWN FIRE:**

Fire that burns in the crowns of trees and shrubs. Usually ignited by a surface fire. Crown fires are common in coniferous forests and chaparral-type shrublands ([Brown 2000](#)).

**CROWN RESIDUAL COLONIZER:**

A plant species that establishes after a disturbance such as fire from seeds that were present prior to the disturbance in crowned-stored cones or fruits ([Stickney 1989](#)).

**CULM:**

The stem, especially the flowering stem of a grass ([Hickey and King 2000](#)).

**CYME:**

A flat-topped or round-topped, determinate inflorescence in which the terminal flower blooms first ([Harris and Harris 2001](#)).

**CYPSELA:**

A dry, single-seeded, **indehiscent** fruit with a **pappus**, common in the Asteraceae ([Harris and Harris 2001](#)).

**DEHISCENT:**

Opening at maturity or when ripe to release contents, as with a fruit or anther ([Harris and Harris 2001](#)).

**DENSITY:**

In plant ecology,  $DENSITY = (\text{Total number of individuals}) / (\text{total number of quadrats})$  ([Grieg-Smith 1983](#)). Sometimes called **abundance** ([Mueller-Dombois and Ellenberg 1974](#)), a term usually not used in FEIS because of its ambiguity. In range and wildlife ecology, the number of animals per unit area at a given time; stocking ([Ford-Robertson 1971](#)).

**DETERMINANT FLOWERING:**

Inflorescence in which the terminal flower blooms first, halting further elongation of the main axis ([Harris and Harris 2001](#)).

**DICHOGAMOUS:**

Having pistils and stamens that mature at different times to prevent self-fertilization ([Harris and Harris 2001](#)).

**DICHOTOMOUS:**

Branched or forked into 2 more or less equal divisions ([Harris and Harris 2001](#)).

**DIOECIOUS:**

Having male and female flowers on separate plants ([Harris and Harris 2001](#)).

**DIPLOID:**

Having 2 full sets of chromosomes in each cell ([Harris and Harris 2001](#)).

Native Ecosystems Council v. Weldon, No. 11-35659, archived on November 16, 2012

**DIRECT EFFECTS OF FIRE:**

Described in FEIS plant species summaries under Fire Effects; Immediate Fire Effect on Plant, and Discussion and Qualification of Plant Response.

**DOMINANCE (DOMINANT):**

The extent to which a given species predominates in a community because of its size, abundance, or coverage ([Lincoln and others 1998](#)).

**DOUGH STAGE:**

Developmental stage of plant in which seeds are nearly mature and of dough-like consistency; follows [milk stage](#) ([National Academy of Sciences 1972](#)).

**DUFF:**

Partially decomposed organic matter lying beneath the litter layer and above the mineral soil. Includes the fermentation and humus layers of the forest floor (O2 soil horizon) ([Brown 2000](#)).

**DUFF MOISTURE CODE:**

The moisture in the 2.8-inch (7 cm)- deep layer below the fine fuel layer, assumed to be a layer of loosely compacted organic material. The duff moisture code has a time lag of approximately 12 days. It is an indicator for the fire consumption of a moderate duff layer or medium-diameter woody debris. The duff moisture code is always positive, but has no maximum, and high values indicate drier litter and higher fire spread/danger than low values ([U.S. Department of Agriculture, Forest Service, North Central Research Station 2007](#)).

**EARLYWOOD:**

An annual ring of secondary xylem formed early in the growing season, with relatively large, thin-walled cells compared to cells formed late in the growing season ([Helms 1998](#)).

**ECOTYPE:**

A group of individuals having the same genotype resulting from the selective pressures of the local environment; a locally adapted population; ecological race ([Ford-Robertson 1971](#), [Lincoln and others 1998](#)).

**ELAIOSOME:**

A seed appendage on some plants (for example, *Viola*, *Helleborus* spp.) that contains oily substances attractive to ants; ants often aid in seed dispersal when these appendages are present ([Hickey and King 2000](#)).

**EPICORMIC BRANCHING OR SPROUTING:**

A shoot arising spontaneously from an adventitious or dormant bud on the stem or branch of a woody plant, often following exposure to increased light levels or fire ([Helms 1998](#)).

**EPIGEAL:**

A mode of seed germination in which the cotyledons are carried above the soil on the axis or hypocotyl ([Allaby 1992](#)).

**EPIPHYTE:**

Plant growing entirely aboveground, on the trunk or branches of woody plants ([Raunkiaer 1934](#)).

**ERUPTION:**

Departure from the home region (i.e., a “bursting out”, emigration, or evasion from the home region); arrival in the new area is called an [irruption](#) ([Berthold, Peter; Bauer, Hans-Gunther; Westhead, Valarie. 2001](#)).

**EXTREME FIRE BEHAVIOR:**

Fire behavior characteristics that ordinarily preclude methods of direct control action. One or more of the following is usually involved: high rate of spread, prolific crowning and/or spotting, presence of fire whirls, strong convection

column. Characteristics of such fires may change rapidly and dangerously. Terms used to describe extreme fire behavior include "blowup", "flare-up", and "fire storm" ([National Wildfire Coordinating Group 1996](#)).

**FACIATION:**

A subdivision of a plant [association](#) that lacks some of the typically dominant species due to local differences in climate ([Lincoln and others 1998](#)).

**FACILITATION:**

A positive effect of one plant or plant species upon another ([Callaway 1995](#), [Radosevich and others 1997](#)). Contrast with [interference](#) and [competition](#).

**FACILITATION MODEL OF SUCCESSION:**

The improvement of site characteristics by early seral species, which allows for later seral species to invade and grow; opposite of the [inhibition model of succession](#) ([Connell and Slatyer 1977](#)).

**FEN:**

A wetland that derives most of its water from moving ground- and surface waters that are rich in calcium and magnesium and therefore [minerotrophic](#); usually less acidic than a [bog](#) and dominated by mosses (Bryopsida) and/or sedges (Cyperaceae) on a peat substrate ([Nevada Division of Water Planning \[n.d.\]](#), [Palmer 2003](#)).

**FERN ALLY:**

A diverse group of primitive vascular plants of classes other than Filicopsida (true ferns); includes clubmosses, spikemosses, horsetails, quillworts, wisk ferns, adder's-tongues, moonworts, and grape-ferns ([Warner and Rubec 1997](#)).

**FIRE AVOIDANT:**

See [fire-resistant species](#).

**FIRE CYCLE:**

Length of time for an area equal to the entire area of interest to burn; size of the area of interest must be clearly specified ([McPherson and others 1990](#)).

**FIRE DURATION:**

The length of time that combustion occurs at a given point ([McPherson and others 1990](#)). Fire duration relates closely to downward heating and fire effects below the fuel surface as well as heating of tree boles above the surface.

**FIRE EXCLUSION:**

The policy of suppressing all wildland fires in an area ([Smith 2000](#)).

**FIRE-FREE INTERVAL:**

See [fire-return interval](#).

**FIRE FREQUENCY = FIRE OCCURRENCE:**

Number of fires per unit time in a specified area ([McPherson and others 1990](#)). Ideally, the size of the area should be specified.

**FIRE INTENSITY:**

A general term relating to the heat energy released in a fire ([Keeley 2009](#), [McPherson and others 1990](#)). Wherever possible, FEIS uses more specific terms to describe rate of heat release. See [fireline intensity](#) below.

**FIRE INTERVAL:**

See [fire-return interval](#).

**FIRE-RETURN INTERVAL:**

*Native Ecosystems Council v. Weldon, No. 11-35659, archived on November 16, 2012*

Number of years between two successive fires in a designated area (i.e., the interval between two successive fires); the size of the area must be clearly specified ([McPherson and others 1990](#)). Usually indicates **composite fire interval**, but may indicate **point fire interval**.

### **FIRELINE INTENSITY:**

The rate of heat release per unit time per unit length of fire front. Numerically, the product of the heat of combustion, quantity of fuel consumed per unit area in the fire front, and the rate of spread of a fire, expressed in kW/m ([McPherson and others 1990](#)). Not synonymous with **FIRE SEVERITY**, which refers to the degree of environmental change caused by fire.

### **FIRE REGIME:**

Describes the patterns of fire occurrence, size, and severity—and sometimes, vegetation and fire effects as well—in a given area or ecosystem ([Agee 1994](#), [Mutch 1992](#), [Johnson and Van Wagner 1985](#)). A fire regime is a generalization based on fire histories at individual sites. Fire regimes can often be described as cycles because some parts of the histories usually get repeated, and the repetitions can be counted and measured. The fire regime on a particular kind of site or in a particular ecosystem is not cyclic in a deterministic sense; it is, rather, a story about climate, human use, other disturbance, and species dispersion as they have all changed and interacted to affect an ecosystem, both suddenly and subtly, over millennia. The concept of fire regime as story lets us think about the future in that type or ecosystem as a question, perhaps a choice, rather than a destiny. According to [Agee \(1994\)](#), "A fire regime is a generalized way of integrating various fire characteristics. The organization may be according to the characteristics of the disturbance..., dominant or potential (climax) vegetation on the site..., or fire severity, the magnitude of effects on dominant vegetation...." According to [Mutch \(1992\)](#), "A natural fire regime is the total pattern of fires over time that is characteristic of a natural region or ecosystem. The classification of fire regimes includes variations in ignition, fire intensity and behavior, typical fire size, fire return intervals, and ecological effects." According to [Johnson and Van Wagner \(1985\)](#), "... fire regime is a multivariate system characterized by (i) the fire history measured in fire frequency or fire return period, (ii) fire intensity measured in kW/m, and (iii) depth of burn (duff removed) measured in kg/m, or percent...."

### **FIRE-RESISTANT SPECIES:**

Species with morphological characteristics that give it a lower probability of being injured or killed by fire than a FIRE-SENSITIVE species, which has a "relatively high" probability of being injured or killed by fire ([McPherson and others 1990](#)). Implies that the organism does not get injured by things that would seem able to injure it ([Johnson and Van Wagner 1985](#)). [Rowe \(1983\)](#) uses a more restrictive definition of resistance - relating it only to plants with aboveground parts that survive fire.) According to [Levitt \(1980\)](#), there are two kinds of RESISTANCE: (1) TOLERANCE, which describes species that mitigate dangerous, often lethal conditions. In regard to fire, TOLERANCE means that living cells are severely heated but survive anyway—such traits are rare. (2) AVOIDANCE, which describes ways of preventing cells from heating to lethal temperatures. Most plant cells that survive fire do so through AVOIDANCE—because of insulating tissues, for example, or because of an insulated microenvironment. Since [Rowe \(1983\)](#) uses AVOIDANCE with a meaning different from this one, FEIS usually uses RESISTANCE to indicate both FIRE TOLERANCE and AVOIDANCE.

### **FIRE ROTATION INTERVAL:**

The time required to burn the equivalent of a specified area ([Bond and Keeley 2005](#)).

### **FIRE SEVERITY:**

Fire severity is defined and measured in several different ways. FEIS uses the term to indicate the degree of environmental change caused by fire (following [NWCG 1996](#)). Another definition with similar meaning is: the effect of a fire on ecosystem properties, usually defined by the degree of soil heating or mortality of vegetation ([Scott and Reinhardt 2007](#)). Other definitions of fire severity include the product of fire intensity and residence time ([McPherson and others 1990](#), [Agee 1994](#), [Rowe 1983](#)) and aboveground and belowground organic matter consumption from fire ([Keeley 2009](#)). Because "fire severity" is not used consistently in the literature, Jain and others ([2004](#)) recommend that it be defined and the measurement method explained whenever it is used quantitatively.

**FIRE TOLERANT:**

See [fire-resistant species](#).

**FITNESS:**

A measure of the contribution of a given genotype to the subsequent generation relative to that of other genotypes ([Lincoln and others 1998](#)).

**FLAME LENGTH:**

The length of flames in a fire front measured along the slant of the flame, from the midpoint of its base to its tip. Flame length is mathematically related to fireline intensity and tree crown scorch height ([Brown 2000](#)).

**FOLLICLE:**

A dry, [dehiscent](#) fruit consisting of a single carpel that opens along a single side, characteristic of milkweeds (Asclepiadaceae) ([Harris and Harris 2001](#)).

**FORAGING TECHNIQUES OR MANEUVERS:**

Flycatching or hawking: Flying from a perch to take aerial prey ([Airola and Barrett 1985](#)).

Gleaning: Taking stationary prey from the surface of a substrate while standing ([Airola and Barrett 1985](#), [Pasinelli and Hegelback 1997](#)).

Hovering: Taking prey from a substrate while in flight.

Lunging: Leaping from a stationary position to take moving prey ([Airola and Barrett 1985](#)).

Probing: Searching for and taking prey from within a substrate ([Castillo-Guerrero and others 2009](#), [Pasinelli and Hegelback 1997](#)) such as soil, bark, or litter ([Remsen and Robinson 1990](#)).

Remsen and Robinson ([Remsen and Robinson 1990](#)) provide a foraging classification system specific to terrestrial birds.

**FOUNDER EFFECT:**

Where only a small fraction of the genetic variation of a parent population or species is present in the small number of founder members of a new colony or population.

**FREQUENCY:**

(Number of occupied quadrats)/(total number of quadrats) × 100 ([Grieg-Smith 1983](#)). Although FREQUENCY can be used in a qualitative sense ([Ford-Robertson 1971](#)), FEIS does not usually use the term in this way.

**FRESH:**

A soil moisture regime where the soil has neither a water surplus nor a water deficit in the growing season (that is, actual evapotranspiration equals potential evapotranspiration). In the Canadian forest site classification, fresh lies on a gradient between dry forest and wet forest ([Fons and Klinka 1998](#), [Klinka and others 1984](#), [Ringius and Sims 1997](#), [Rowe 1956](#)).

**FRONDS:**

A large, divided leaf; characteristic of palms or ferns ([Harris and Harris 2001](#)).

**FUEL:**

Fuel is comprised of living and dead vegetation that can be ignited. It is often classified as dead or alive and as natural fuels or activity fuels (resulting from human actions, usually from logging operations). Fuel components refer to such items as downed dead woody material by various size classes, litter, duff, herbaceous vegetation, live foliage, etc. ([Brown 2000](#)).

**FUEL CLASS:**

A set of fuels with similar traits. Fuels are categorized as herbaceous or woody and live or dead. Dead fuels are classed as 1-, 10-, 100-, or 1,000-hour timelag fuels, based on the time needed for fuel moisture to come into equilibrium with the environment:

Native Ecosystems Council v. Weldon, No. 11-35659, archived on November 16, 2012

1-hour timelag fuels: Dead fuels comprised of herbaceous plants or woody plants less than about 0.25 inch (6.4 mm) in diameter and the surface layer of litter on the forest floor.

10-hour timelag fuels: Dead fuels comprised of wood from 0.25 to 1 inch (0.6-2.5 cm) in diameter and the litter from just beneath the surface to around 0.75 inch (1.9 cm) below ground.

100-hour timelag fuels: Dead fuels comprised of wood from 1 to 3 inches (2.5-7.6 cm) in diameter and litter from around 0.75 to about 4 inches (1.9-10 cm) below ground.

1,000-hour timelag fuels: Dead fuels comprised of wood from 3 to 8 inches (7.6-20.3) in diameter and the forest floor layer >4 inches (10 cm) below ground ([National Wildfire Coordinating Group, Incident Operations Standards Working Team 1996](#)).

#### **FUEL CONTINUITY:**

A qualitative description of the distribution of fuel both horizontally and vertically. Continuous fuels readily support fire spread. The larger the fuel discontinuity, the greater the fire intensity required for fire spread ([Brown 2000](#)).

#### **FUEL LOADING:**

The weight per unit area of fuel, often expressed in tons per acre or tonnes per hectare. Dead woody fuel loadings are commonly described for small material in diameter classes of 0 to 1/4-, 1/4 to 1-, and 1 to 3-inches and for large material in one class greater than 3 inches ([Brown 2000](#)).

#### **FUEL MOISTURE:**

Percent or fraction of oven dry weight of fuel. It is the most important fuel property controlling flammability. In living plants it is physiologically bound. Its daily fluctuations vary considerably by species but are usually above 80 to 100%. As plants mature, moisture content decreases. When herbaceous plants cure, their moisture content responds as dead fuel moisture content, which fluctuates according to changes in temperature, humidity, and precipitation ([Brown 2000](#)).

#### **FULL-TREE HARVESTING:**

Cutting and removing an entire upper portion of a tree consisting of trunk, branches, and leaves or needles ([Ontario Ministry of Natural Resources 2003](#)).

#### **GAMETOPHYTE:**

The sexual stage in the life cycle vascular plants, when the chromosomes in each cell are reduced to half the usual number, typically diploid reduced to haploid. Gametophyte plants are small and inconspicuous (compare [sporophyte](#)) ([Harris and Harris 2001](#), [Hickey and King 2000](#)).

#### **GEITONOLOGY:**

Pollination between flowers on the same plant ([Harris and Harris 2001](#)).

#### **GEMMA:**

A cell or cluster of often bud-like cells, borne on the [gametophyte](#), that can reproduce the plant vegetatively. *Plural:* gemmae ([Conard, Henry S. 1956](#)).

#### **GENET:**

A unit or group derived by asexual regeneration from a single original zygote; a clone ([Lincoln and others 1998](#)).

#### **GENOTYPE:**

The hereditary or genetic constitution of an individual; all the genetic material of a cell (usually only nuclear material); all the individuals sharing the same genetic constitution ([Lincoln and others 1998](#)).

#### **GEOPHYTE:**

Plant with perennating tissue below the soil surface; may possesses tuberous underground stems filled with stored food

(for example, [bulb](#), [corm](#), [rhizome](#), stem tuber) or sprout from root tissue ([Raunkiaer 1934](#)).

**GRAMINOID:**

A grass or grasslike monocot; includes the sedge (Cyperaceae), rush (Juncaceae), arrowgrass (Juncaginaceae), grass (Poaceae), and cattail (Typhaceae) families. ([Hickey and King 2000](#), [Kuchler 1949](#)).

**GRAVID:**

Carrying eggs or young ([Lincoln and others 1998](#)).

**GRASS/FIRE CYCLE:**

An altered fire regime that may result when nonnative invasive grass species dominate the herbaceous layer in a plant community. The process occurs in this way: the nonnative grass colonizes an area and provides a continuous fine fuel that is readily ignited and facilitates fire spread. Larger and possibly more severe fires then occur more frequently in the invaded area than in similar, uninvaded communities. Following these grass-fueled fires, nonnative grasses typically recover more rapidly than native species, further increasing the probability of fire and the possibility of greater fire size and severity and decline of native species (adapted from [D'Antonio and Vitousek 1992](#); also see [Brooks and others 2004](#)).

**GREENSTRIP:**

A long, narrow band of fire-retardant vegetation that is created by seeding ([Davison and Smith 2008](#)).

**GROUND FIRE:**

Fire that burns in the organic material below the litter layer, mostly by smoldering combustion. Fires in duff, peat, dead moss and lichens, and punky wood are typically ground fires ([Brown 2000](#)).

**GROUND RESIDUAL COLONIZER:**

A plant species that establishes after a disturbance such as fire from soil-stored seed that was already on site prior to the disturbance ([Stickney 1989](#)).

**GYNODIOECIOUS**

Plant species with female and [perfect](#) flowers on separate plants ([Harris and Harris 2001](#)).

**GYNOMONOECIOUS:**

Plant species with female and [perfect](#) flowers on the same plant ([Harris and Harris 2001](#)).

**HAPLOTYPE:**

The collective genotype of a number of closely linked [loci](#); the constellation of alleles present at a particular region of a chromosome ([Lincoln and others 1998](#)).

**HARDWOOD:**

- 1) Angiosperm trees or
- 2) the xylem of angiosperm trees.

The wood of hardwood trees may be physically hard (high specific gravity) or soft (low specific gravity) ([Helms 1998](#)).

**HEAD FIRE:**

A fire spreading or set to spread with the wind ([National Wildfire Coordinating Group, Incident Operations Standards Working Team 1996](#)).

**HEATH:**

Species within the plant families Ericaceae, Empetraceae, and/or Diapensiaceae. A heathland is dominated by species in those families ([Bliss 1988](#)).

**HELOPHYTE:**

*Native Ecosystems Council v. Weldon, No. 11-3589, archived on November 16, 2012*

Freshwater plant with perennating tissue in water or saturated soil beneath water ([Raunkiaer 1934](#)).

**HEMICRYPTOPHYTE:**

Herbaceous perennial or biennial plant with perennating tissue at the soil surface ([Raunkiaer 1934](#)).

**HERMAPHRODITIC:**

See [perfect](#).

**HIBERNACULUM:**

A shelter in which animal(s) hibernate or overwinter ([Averill-Murray and others 2002](#), [Lincoln and others 1998](#)).

**HIBERNATION:**

The act or condition of passing the winter in a dormant state characterized by a slowing of metabolic processes that is more dramatic than [torpor](#); typically involving the abandonment of thermal homeostasis in mammals ([Elphick and others 2001](#), [McFarland 2006](#), [Lincoln and others 1998](#)). Compare to [aestivation](#).

**HOMOGAMOUS:**

Having pistils and stamens that mature at the same time ([Harris and Harris 2001](#)).

**HYBRID SWARM:**

A group of morphologically distinctive individuals that results from the creation of hybrids between two parent species, then the backcrossing of the offspring to members of the parent species and the interbreeding among the hybrid individuals ([BioTech Resources Web Project 1999](#)).

**HYDROPERIOD:**

The frequency and duration of inundation or saturation of an ecosystem. In the context of characterizing wetlands, the term describes that length of time during the year that the substrate is either saturated or covered with water.

**HYDROPHYTE:**

Freshwater plant with perennating tissue below the surface of the water; vegetative shoots are submerged and leaves are submerged or floating; only flowers rise above the water surface ([Raunkiaer 1934](#)).

**HYPANTHIUM:**

A cup-shaped extension of the floral axis, usually formed from the union of the basal parts of the calyx, corolla, and stamens, commonly surrounding or enclosing the pistils. *Plural:* hypanthia. ([Harris and Harris 2001](#)).

**HYPOCOTYL:**

The portion of the embryonic shoot below the [cotyledon](#) and above the [radicle](#) ([Allaby 1992](#)).

**HYPOGEAL:**

A mode of seed germination in which the [cotyledons](#) remain below ground ([Allaby 1992](#)).

**IMPERFECT:**

A flower having either pistils or stamens, but not both; unisexual ([Harris and Harris 2001](#)).

**IMPORTANCE VALUE:**

A measure of overall importance of a given species in a community ([Lincoln and others 1998](#)). Definitions are inconsistent. Importance value is often calculated as the sum of relative frequency, relative density, and relative dominance, where relative dominance is synonymous with relative basal area ([Grieg-Smith 1983](#), [Lincoln and others 1998](#)) or some similar measure ([Allaby 1992](#), [Mueller-Dombois and Ellenberg 1974](#)). When importance value is defined otherwise, FEIS should define the term as used by the author cited.

**INDEHISCENT:**

Not opening at maturity ([Harris and Harris 2001](#)).

**INDETERMINATE FLOWERING:**

Inflorescence in which the outer or lower flowers open first ([Harris and Harris 2001](#)).

**INDICATOR VALUE:**

Product of the relative abundance and relative frequency of occurrence for a species in group samples ([Dufrene and Legendre 1997](#)).

**INHIBITION MODEL OF SUCCESSION:**

The hindrance of subsequent species colonization or suppression of growth of species already present due to establishment of earlier colonists; opposite of the [facilitation model of succession](#) ([Connell and Slatyer 1977](#)).

**INITIAL OFF-SITE COLONIZER:**

A plant species that establishes in early succession from seed dispersed onto the disturbed site ([Stickney 1989](#)).

**INTERFERENCE:**

The negative effect of one organism upon another, regardless of the presence of a limiting resource. [Competition](#) is one facet of interference; [allelopathy](#) is another ([Birch 1957](#); [Harper 1961](#)). Note, however, that use of this term in the ecological literature is inconsistent; [Harper \(1977\)](#), [Hall \(1974\)](#), and [Radosevich and others \(1997\)](#) use "interference" to refer to both positive and negative interactions between organisms.

**INVASIVE SPECIES:**

A species that can establish, persist, and spread in an area ([Mack and others 2000](#), [Sakai and others 2001](#)). In addition, the species must cause-or have potential to cause-harm; in natural areas, "harm" usually occurs in the form of significant changes in ecosystem composition, structure, or function ([Westbrooks 1998](#)). [Randall \(1997\)](#) states this idea pragmatically: A plant species must interfere with management goals to be considered invasive. A nonnative species is not invasive simply because it is present in a wildland ecosystem; it must also have impacts on the ecosystem that interfere with attainment of management objectives. Fire-related impacts of nonnative invasive plants may include changes in the species composition or structure of postfire plant communities, especially when these changes occur at the expense of native species, and changes in fuel properties that alter fire behavior or fire regimes.

**INVOLUCRE:**

A whorl of bracts below an inflorescence or cone ([Allaby 1992](#), [Hickey and King 2000](#)).

**IRRUPTION:**

An irregular, periodic migration where large parts of a population leave their home region and move into unusual areas for a season (i.e. a "bursting in", immigration, or invasion into other regions). It may be triggered by high population densities, food shortages, or both. An irruption differs from true migration because it is irregular and does not necessarily have a return movement matching the outward movement (also see [eruption](#)) ([Berthold, Peter; Bauer, Hans-Gunther; Westhead, Valarie. 2001](#)).

**LADDER FUELS:**

Shrubs and young trees that provide continuous fine material from the forest floor into the crowns of dominant trees ([Smith 2000](#)).

**LATEWOOD:**

An annual ring of secondary xylem formed late in the growing season, with relatively smaller, thicker, denser, and darker cells than cells formed early in the growing season ([Helms 1998](#)).

**LAYERING:**

A form of vegetative reproduction in which an intact branch develops roots as the result of contact with soil or other media ([Helms 1998](#)).

**LEAF-AREA INDEX:**

Ratio of total leaf area (one side of leaf only) to total ground surface, a unitless measure ([Mueller-Dombois and Ellenberg 1974](#)).

**LIANA:**

A climbing woody plant ([Kuchler 1949](#)).

**LIGNOTUBER:**

A woody storage structure forming a swelling, more or less at ground level, from which dormant buds can develop ([Helms 1998](#)). Functionally and ecologically similar to [burls](#) that occur at ground level of some woody species ([James 1984](#)).

**LITTER:**

Recently fallen plant material that is only partially decomposed and is still discernable ([Lincoln and others 1998](#)).

**LOCUS:**

The position of a given gene on a chromosome. *Plural*: loci ([Lincoln and others 1998](#)).

**LONG-TERM EFFECTS:**

Effects lasting more than 10 years (Personal communication (Oct. 21, 1998) with Wendell Hann, Fire Ecologist and assistant to National Fuels Specialist, U.S. Department of Agriculture, Forest Service).

**LOW-SEVERITY FIRE:**

A fire that kills or top-kills a relatively small proportion (less than 25% according to [Hann and others 2004](#), less than 20% according to [Smith \(2000\)](#) of the upper layer of vegetation. Low-severity fires can open a fuel canopy or maintain an open canopy ([Hann and others 2004](#)).

**MARSH:**

A low-lying wetland that has shallow water; water levels that fluctuate daily, seasonally, or annually due to tides, flooding, evapotranspiration, groundwater recharge, and/or seepage losses; is vegetated with monocots; and does not accumulate appreciable peat deposits. Marshes often form a transitional zone between water and land ([Nevada Division of Water Planning n.d.](#), [Warner and Rubec 1997](#)).

**MAST:**

- 1) Exceptionally high seed production ([Lincoln and others 1998](#)).
- 2) Seeds of all plants used by wildlife, including seeds with fleshy exteriors (such as berries) and seeds with dry or hard exteriors (such as nuts and cones). Collectively, the fruit of masting species ([McShea and Healy 2002](#)).

**MEAN FIRE-FREE INTERVAL:**

See [mean fire interval](#).

**MEAN FIRE INTERVAL:**

Arithmetic average of all [fire intervals](#) determined, in years, for a designated area during a specified time period; the size of the area and the time period must be specified ([McPherson and others 1990](#)).

**MESIC:**

Pertaining to conditions of moderate moisture or water supply ([Smith 2000](#)).

**MILK STAGE:**

Developmental stage of plant in which seeds are well formed but soft and immature; precedes [dough stage](#) ([National Academy of Sciences 1972](#)).

**MINEROTROPHIC:**

A site with high dissolved mineral content, with the nutrients intruded from groundwater flow in addition to precipitation. Compare with [ombrotrophic](#) ([Warner and Rubec 1997](#)).

**MIRE:**

A **bog** or **fen**; also referred to as a carr ([Nevada Division of Water Planning \[n.d.\]](#)).

**MIXED-SEVERITY FIRE:**

Fire that either causes selective mortality in dominant vegetation, depending on different species' susceptibility to fire, or varies in time or space between understory and stand replacement ([Smith 2000](#)). Mixed-severity fires include patchy, mosaic-creating fires and other fires that are intermediate in effects ([Hann and others 2004](#)).

**MIXED-SEVERITY FIRE REGIME:**

Fire regime in which fires either cause selective mortality in dominant vegetation, depending on different species' susceptibility to fire, or vary between understory and stand replacement ([Smith 2000](#)). Mixed-severity fires include patchy, mosaic-creating fires and other fires that are intermediate in effects ([Hann and others 2004](#)).

**MONOCARPIC:**

Flowering and bearing fruit only once and then dying; term can apply to annuals, biennials, or perennials ([Harris and Harris 2001](#)).

**MONOECIOUS:**

Male and female flowers borne on the same plant ([Harris and Harris 2001](#)).

**MONOESTROUS:**

Having one reproductive cycle or breeding period per year ([Lincoln and others 1998](#)).

**MONOPODIAL:**

Having branches arise from a single main axis ([Harris and Harris 2001](#)).

**MOSAIC FIRE:**

A landscape-scale mixed-severity fire that produces scattered patches of burned and unburned vegetation ([Hann and others 2004](#)).

**MUTUALISM:**

An interdependent relationship in which both organisms benefit; frequently a relationship of complete dependence ([Lincoln and others 1998](#)).

**NIDICOLOUS:**

Living in a nest; also used of young animals, especially birds, that remain in the nest for a prolonged period ([Lincoln and others 1998](#)).

**NONNATIVE SPECIES:**

An introduced species evolved elsewhere that has been transported and purposefully or accidentally disseminated by humans (for our purposes, in North America) ([Li 1995](#)).

**NONREFRACTORY:**

In FEIS, seeds that germinate in the absence of fire related stimuli; seeds may germinate readily upon wetting or they may have a dormancy that is overcome by some factor unrelated to fire ([Keeley 1991](#)).

**OLD-GROWTH STAGE:**

Fourth stage of forest stand development following major disturbance, as described by [Oliver \(1981\)](#). In this stage, stems in the overstory gradually die out and stems in the understory slowly replace them. Also see [stand initiation stage](#), [stem exclusion stage](#), and [understory reinitiation stage](#).

**OLIGOHALINE:**

1) An organism that is tolerant of only a moderate range of salinities

Native Ecosystems Council, Weldon, No. 11-35659, archived on November 16, 2012

2) Brackish water with a salinity from 0.3 to 3.0 parts per thousand, or sea water with a salinity from 17 to 30 parts per thousand ([Lincoln and others 1998](#)).

**OLIGOTROPHIC:**

A lake or other body of water with extremely low dissolved mineral content, resulting in very moderate productivity ([Nevada Division of Water Planning \[n.d.\]](#)).

**OMBOTROPHIC:**

A site with low dissolved mineral content, with the nutrients coming exclusively from precipitation. Compare with [minerotrophic](#) ([Warner and Rubec 1997](#)).

**ONTOGENY:**

The growth and physical development of an individual ([Lincoln and others 1998](#)).

**ORGANIC SOILS:**

Deep layers of organic matter that develop in poorly drained areas such as bogs, swamps, and marshes ([Brown 2000](#)).

**OVOVIVIPAROUS:**

Producing fully formed eggs that are retained and hatched inside the maternal body, with the release of live offspring ([Lincoln and others 1998](#)).

**PAPPUS:** The modified calyx of the Asteraceae, consisting of awns, scales, or bristles at the apex of the [achene](#) ([Harris and Harris 2001](#)).

**PARTURITION:**

The act of giving birth ([Lincoln and others 1998](#)).

**PASSIVE CROWN FIRE:**

A type of crown fire in which the crowns of individual trees or small groups of trees burn, but solid flaming in the canopy cannot be maintained except for short periods. Passive crown fire encompasses a wide range of crown fire behavior, from occasional torching of isolated trees to nearly active crown fire. Passive crown fire is also called torching or candling. A fire in the crowns of the trees in which trees or groups of trees torch, ignited by the passing front of the fire. The torching trees reinforce the spread rate, but these fires are not basically different from surface fires ([Scott and Reinhardt 2007](#)).

**PEAT:**

Organic soil material formed by partial decomposition of plants, especially *Sphagnum* spp. mosses, in water ([Nevada Division of Water Planning \[n.d.\]](#), [Soil Science of America. 2001](#)).

**PEATLAND:**

An ecosystem in which organic matter is produced faster than it decomposes, resulting in an accumulation of partially decomposed vegetative matter ([Nevada Division of Water Planning \[n.d.\]](#)). To distinguish between peatlands and peaty mineral soils, minimum depths of organic deposits are sometimes set at 8 to 12 inches (20-30 cm) in the United States ([Heinselman, Miron L. 1963](#)); in Canada, the minimum depth of organic deposits required for classification as peatland is 16 inches (40 cm) ([Soil Classification Working Group. 1998](#)).

**PERFECT:**

Flowers with both male and female reproductive organs; can also be called [bisexual](#) or [hermaphroditic](#) ([Harris and Harris 2001](#)).

**PERICARP:**

The fruit wall ([Allaby 1992](#)).

**PERIGYNIUM:**

A scale-like bract enclosing the pistil in *Carex* ([Harris and Harris 2001](#)).

**PHANEROPHYTE:**

Woody plant with perennating tissue more than 10 inches (25 cm) above the soil surface ([Raunkiaer 1934](#)).

**PHENOLOGY:**

The study of the relationship between weather and climate and the timing of periodic natural phenomena such as bud bursting and flowering of plants or migration of birds ([Lincoln and others 1998](#)).

**PHENOTYPE:**

The sum total of observable structural and functional properties of an organism; the product of the interaction between the genotype and the environment ([Ford-Robertson 1971](#), [Lincoln and others 1998](#)).

**PHENOTYPIC PLASTICITY:**

The capacity for marked variation in the phenotype as a result of environmental influences on the genotype during development ([Lincoln and others 1998](#)).

**PHILOPATRIC:**

Exhibiting a tendency to remain in the native locality. Used of species or groups that show little capacity to spread or disperse and of individuals that tend to remain in, or return to, their home areas or domiciles ([Lincoln and others 1998](#)).

**POINT FIRE INTERVAL:**

A composite fire interval over a relatively small area that the author considers to be a point (for example, 1 or 2 ha). May refer to number of years between fire scars on a single tree. Since a fire can burn through a small area without scarring any trees, the Point Fire Interval may underestimate fire frequency ([Patton 2007](#), [Taylor 2000](#)). See also [fire interval](#) and [composite fire interval](#).

**POLLINIA:**

Masses of waxy pollen grains transported as a unit in many orchids (Orchidaceae) and milkweeds (Asclepiadaceae). Milkweed pollinia are joined by a [corpusculum](#) ([Harris and Harris 2001](#)).

**POLYCARPIC:**

Producing flowers or spores more than once during a life cycle ([Lincoln and others 1998](#)).

**POLYGAMODIOECIOUS:**

A plant that is mostly [dioecious](#) but with some [perfect](#) flowers ([Harris and Harris 2001](#)).

**POLYGAMOMONOECIOS:**

A plant that is mostly [monoecious](#) but with some [perfect](#) flowers ([Harris and Harris 2001](#)).

**POLYGAMOUS:**

A mating system in which each adult may mate with more than one member of the opposite sex ([McFarland 2006](#)).

**POLYGYNY:**

A mating system in which males mate with a large number of females and father a large number of offspring ([McFarland 2006](#)).

**POLYPLOID:**

Having 3 or more complete sets of chromosomes in each cell ([Harris and Harris 2001](#)).

**POPULATION INDEX:**

Any indicator of the size of a population (for example, mountain bluebird nests/km<sup>2</sup>) ([Ford-Robertson 1971](#)).

**POTENTIAL NATURAL VEGETATION:**

The vegetation that would occur on a given site if disturbance by humans was excluded. It is a reflection of the environmental setting, or the biological potential of a land area to generate a specific ecosystem within the constraints of the nonanthropogenic disturbance regime on that site ([Hann and others 2008](#), [Kuchler 1974](#), Tüxen 1956, as cited by [Kuchler 1969](#)).

**PRESCRIBED FIRE:**

Any fire ignited by management actions to meet specific objectives. Prior to ignition, a written, approved prescribed fire plan must exist, and National Environmental Protection Act requirements must be met ([National Park Service and others 1998](#)).

**PRESCRIBED NATURAL FIRE:**

Naturally ignited wildland fire that burns under specified conditions where the fire is confined to a predetermined area and produce the fire behavior and fire characteristics required to attain planned fire treatment and resource management objectives ([National Wildfire Coordinating Group, Incident Operations Standards Working Team 1996](#)).

**PRESENCE:**

A constancy class derived from samples of indefinite area ([Ford-Robertson 1971](#)). FEIS usually cites the original author's definition when this term is used.

**PRESETTLEMENT FIRE REGIME:**

The time from about 1500 to the mid- to late-1800s, a period when Native American populations had already been heavily impacted by European presence and before extensive settlement by European Americans in most parts of North America, before extensive conversion of wildlands for agricultural and other purposes, and before fires were effectively suppressed in many areas ([Smith 2000](#)).

**PROTANDROUS:**

Mating system by which anthers release pollen before the stigma is receptive ([Harris and Harris 2001](#)).

**PROTOGYNOUS:**

- 1) Mating system by which the stigma is receptive before the release of pollen ([Harris and Harris 2001](#)).
- 2) A plant with **perfect** flowers that assumes a functional female condition before changing to a functional male state ([Lincoln and others 1998](#)).

**RADIAL SPINES:**

Cacti spines that radiate from the margins of the **areole** ([Benson 1982](#)).

**RADICLE:**

The embryonic root ([Allaby 1992](#)).

**RAMET:**

A member or unit of a clone, which may follow an independent existence if separated from the parent ([Lincoln and others 1998](#)).

**RANGELAND CONDITION:**

A rating of rangeland condition based on total percentage of native climax vegetation within a given habitat type. This approach assumes that climax vegetation can be determined for the habitat type ([Dyksterhuis 1949](#), [Dyksterhuis 1958](#)).

Rangeland condition class	Percent of climax vegetation
Excellent	76-100
Good	50-75

Fair	26-50
Poor	1-25

**RECLAMATION:**

Restoration of biophysical capacity ([Everett 1994](#)).

**REFRACTORY:**

A term used in FEIS to describe seeds that require a fire related stimulus, alone, or in conjunction with other conditions such as cold stratification to germinate ([Keeley 1991](#)).

**RELATIVE DENSITY:**

Number of individuals of a given species per unit area expressed as a percentage of total number of individuals of all species per unit area ([Mueller-Dombois and Ellenberg 1974](#), [Spurr and Barnes 1973](#)).

**RELATIVE DOMINANCE:**

Basal area of a species expressed as percentage of total basal area ([Mueller-Dombois and Ellenberg 1974](#), [Spurr and Barnes 1973](#)).

**RELATIVE FREQUENCY:**

Frequency of a species divided by sum of frequencies of all species, expressed as a percent ([Mueller-Dombois and Ellenberg 1974](#)).

**RELICT:**

A biotic community or fragment of a community that has survived some important change, often to become in appearance an integral part of existing vegetation ([Clements 1934](#)).

**RESISTANCE:**

See [fire-resistant species](#).

**RESTORATION:**

Restoration of biophysical capacity by returning sites to previous, desired conditions ([Everett 1994](#)).

**RHIZOID:**

In mosses and liverworts, a thread-like growth, simple or branched, which provides anchorage and absorption ([Conard 1956](#)).

**RHIZOME:**

A horizontal underground stem with of a series of nodes that commonly produce roots ([Brown 2000](#), [Harris and Harris 2001](#)).

**ROOT COLLAR:**

See [root crown](#).

**ROOT CROWN:**

The point at which the root and stem of a plant meet and the primary vascular anatomy changes from that of a stem to that of a root. Transition point between stem and root. It may be clearly or vaguely apparent ([Brown 2000](#)).

**ROOT SUCKER:**

A root sprout ([Sutton and Tinus 1983](#)).

**SCATTER-HOARD:**

Seed cached in scattered shallow holes, a common caching behavior for some rodents ([Smith 2000](#)).

Native Ecosystems Council v. Weldon, No. 11-35659, archived on November 16, 2012

**SCHIZOCARP:**

A dry, [indehiscent](#) fruit that splits into separate one-seeded segments at maturity ([Harris and Harris 2001](#)).

**SCLEROPHYLLOUS:**

Having tough, leathery, usually evergreen leaves ([Hickey and King 2000](#)).

**SCORIA:**

Vesicular, cindery dark lava formed by the escape and expansion of gasses in basaltic and andesite magma; generally denser and darker than pumice ([Parker 2003](#)).

**SECONDARY COLONIZER:**

A plant species that establishes from seed after early succession; establishment may be from soil-stored seed, seed dispersed from initially colonizing plants, or seed dispersed from off-site sources ([Stickney 1989](#)).

**SEED TREE:**

1. A tree left standing for providing seed
2. A method of natural regeneration ([Helms 1998](#)).

**SELECTION:**

Used in animal ecology to indicate use of a resource in higher proportions than its availability ([Johnson 1980](#), [Rosenberg and McKelvey 1999](#)).

**SERE:**

A succession of plant communities leading to a particular plant association ([Smith 2000](#)).

**SERIES:**

A general vegetation classification association that is named for the dominant overstory species. The "series" category does not imply greater heterogeneity than the plant association ([Paysen and others 1998](#)).

**SEROTINOUS:**

Pertaining to fruit or cones that remain on a tree without opening for one or more years. In some species (for example, lodgepole pine), cones open and seeds are shed when heat is provided by fire or hot, dry conditions ([Helms 1998](#)).

**SERPENTINE SOILS:**

Soils derived from serpentine parent rock materials that have high levels of nickel, chromium, and magnesium and low levels of calcium, magnesium, and other nutritionally essential minerals that plants can uptake in a chemically available state ([Kruckeberg 1984](#), [Walker 1954](#)).

**SEVERITY:**

See [fire severity](#).

**SHORT-TERM EFFECTS:**

Effects lasting less than 10 years (Personal communication (Oct. 21, 1998) with Wendell Hann, Fire Ecologist and assistant to National Fuels Specialist, U.S. Department of Agriculture, Forest Service).

**SINK HABITAT:**

A site that does not support self-sustaining populations and relies on immigration from populations from [source habitats](#) ([Elphick and others 2001](#)).

**SILICLE:**

A dry, [dehiscent](#) fruit of the Brassicaceae with 2 valves that separate at maturity; fruit is typically less than twice as long as wide ([Harris and Harris 2001](#)).

Native Ecosystems Council, Weldon, NC 11-35659, archived on November 16, 2012

**SILIQUE:**

A dry, [dehiscent](#) fruit of the Brassicaceae with 2 valves that separate at maturity; fruit is typically more than twice as long as wide ([Harris and Harris 2001](#)).

**SNAG:**

A standing dead tree from which the leaves and some of the branches have fallen ([Smith 2000](#)).

**SOBOL:**

A shoot arising from underground stem tissue ([Harris and Harris 2001](#)).

**SOBOLIFEROUS:**

Having several loosely clumped, principal stems that arise from a common underground stem system, each distinct above ground level ([Hunt Institute for Botanical Documentation 2001](#)).

**SOFTWOOD:**

- 1) Gymnosperm or conifer trees
- 2) the xylem of conifer trees ([Helms 1998](#)).

**SORI:**

Groups of [sporangia](#) ([Hickey and King 2000](#)).

**SOURCE HABITAT:**

A site with positive or stationary population growth, with the population persisting as long as the habitat is not destroyed ([Elphick and others 2001](#), [Wisdom and others 2000](#)). Also see [sink habitat](#).

**SPORANGIA:**

A spore-bearing case or sac ([Harris and Harris 2001](#)).

**SPOROPHYTE:**

The spore-producing stage in the life cycle of plant plants, when cells are diploid or more rarely, polyploid. Sporophyte plants are large and conspicuous compared to [gametophyte](#) plants ([Harris and Harris 2001](#), [Hickey and King 2000](#)).

**STAND INITIATION STAGE:**

First stage of forest stand development, as described by [Oliver \(1981\)](#). In this stage, following major disturbance, plant species reoccupy an area by developing stems from pre-existing stumps and underground parts, buried or newly dispersed seeds, and advance regeneration (small individuals growing negligibly in the forest understory but adapted to accelerate growth when released). Also see [stem exclusion stage](#), [understory reinitiation stage](#), and [old-growth stage](#).

**STAND-REPLACEMENT FIRE:**

Fire that kills or top-kills aboveground parts of the dominant vegetation, changing aboveground structure substantially. The majority (more than 75% according to [Hann and others 2004](#), more than 80% according to [Smith \(2000\)](#)) of the aboveground, dominant vegetation is either consumed or dies as a result of the fire. Applies to forests, shrublands, and grasslands ([Smith 2000](#)), though not often used to describe grasslands.

**STAND-REPLACEMENT FIRE REGIME:**

Fire regime in which fires kill or top-kill aboveground parts of the dominant vegetation, changing the aboveground structure substantially. The majority (more than 75% according to [Hann and others 2004](#), more than 80% according to [Smith \(2000\)](#)) of the aboveground, dominant vegetation is either consumed or dies as a result of fires. Applies to forests, shrublands, and grasslands ([Smith 2000](#)), though not often used to describe grasslands.

**STEM EXCLUSION STAGE:**

Second stage of forest stand development following major disturbance, as described by [Oliver \(1981\)](#). This stage

Native Ecosystems Council v. Weldon, No. 11-35659, archived on November 16, 2012

usually occurs upon canopy closure, when one or more growth factors (such as light) is limiting, so new stems cannot become established and the existing stems develop vertical stratification by species. Also see [stand initiation stage](#), [understory reinitiation stage](#), and [old-growth stage](#).

**STEM SUCCULENT:**

Plant with succulent stems, without proper foliage leaves; perennating tissue more than 10 inches (25 cm) above soil surface (often a cactus) ([Raunkiaer 1934](#)).

**STIPE:**

A stalk, especially the petiole of a fern or palm frond, or the caudicle in an orchid flower ([Hickey and King 2000](#)).

**STOLON:**

An elongate, horizontal stem that creeps above ground and roots at the nodes or tips, giving rise to a new plant ([Harris and Harris 2001](#)).

**STOOL:**

The persistent woody base of a tree or shrub that is capable of sprouting after removal or damage to the main stem ([Ford-Robertson 1971](#), [Allaby 1992](#)).

**STRIGOSE:**

Bearing straight, stiff, sharp, appressed hairs ([Harris and Harris 2001](#)).

**SUCCESSION:**

The gradual, somewhat predictable process of community change and replacement leading toward a climax community; the process of continuous colonization and extinction of populations at a particular site ([Smith 2000](#)).

**SUFFRUTESCENT:**

Woody only at the stem base or root crown ([Hickey and King 2000](#)).

**SURFACE ROOT SYSTEM:**

That part of a tree's root system that lies within approximately 10 inches (30 cm) of the soil surface (review by [Sutton and Tinus 1983](#)).

**SURFACE FIRE:**

Fire that burns in litter and other live and dead fuels at or near the surface of the ground, mostly by flaming combustion ([Brown 2000](#)).

**SWALE:**

A piece of meadow, often a in slight depression or valley, that is marshy and rank with vegetation. Water typically flows in swales only during or immediately after rainfall or snowmelt ([Nevada Division of Water Planning \[n.d.\]](#)).

**SWAMP:**

A wetland with seasonal water-level fluctuations and relatively strong water flows influenced by [minerotrophic](#) groundwater; sometimes inundated and characteristically dominated by trees or shrubs; may have a mineral, organic, or peat substrate. Swamps may be fresh- or saltwater and tidal or nontidal. Not as wet as marshes, fens, and bogs ([Nevada Division of Water Planning \[n.d.\]](#), [Warner and Rubec 1997](#)).

**TAIGA:**

The northern coniferous forest biome adjacent to arctic [tundra](#) ([Lincoln and others 1998](#)).

**THEROPHYTE:**

Plant with perennating tissue contained in seed (annual plant) ([Raunkiaer 1934](#)).

**TILLER:**

A basal or subterranean shoot which is more or less erect; common in bunchgrasses (Poaceae) and other monocotyledons ([Harris and Harris 2001](#), [Hunt Institute for Botanical Documentation 2001](#)).

**TOLERANCE MODEL OF SUCCESSION:**

An intermediate between the [facilitation model of succession](#) and the [inhibition model of succession](#), in which modifications made to the environment by earlier colonists neither increase or decrease rates of recruitment and growth to maturity of later colonists ([Connell and Slatyer 1977](#)).

**TOP-COVER:**

The proportion of ground for which a species provides the uppermost cover; cannot exceed 100% ([Grieg-Smith 1983](#)). Differs from [cover](#), above.

**TOP-KILL:**

Kills aboveground tissues of plant without killing underground parts from which the plant can produce new stems and leaves ([Smith 2000](#)).

**TORPOR:**

A state of reduced activity and metabolism in which organisms can save energy; not as deep a reduction in metabolic activity as [hibernation](#) ([Elphick and others 2001](#)).

**TOTAL HEAT RELEASE:**

The heat released by combustion during burnout of all fuels, expressed in BTU per square foot or kilocalories per square meter ([Brown 2000](#)).

**TREE-LENGTH HARVESTING:**

Removing the merchantable portion of a tree to the roadside ([Ontario Ministry of Natural Resources 2003](#)).

**TRICHASIUM:**

A [cyme](#) with 3 branches ([Harris and Harris 2001](#)).

**TRICHOME:**

A hairlike outgrowth of the epidermis ([Harris and Harris 2001](#)).

**TUNDRA:**

The zone of treeless, low arctic vegetation between [taiga](#) to the south and the region of perpetual snow and ice to the north ([Helms, John A., ed. 1998](#)).

**TUSSOCK:**

A clump or tuft, especially of a [graminoid](#) ([Hickey and King 2000](#)).

**ULTRAMAFIC SOILS:**

Ultrabasic soils derived from >70% ferromagnesian or mafic parent rock materials, including serpentine, olivine, and hornblendes, that have high levels of nickel, chromium, and other heavy metals and low levels of calcium, magnesium, and other nutritionally essential minerals that plants can uptake in a chemically available state ([Kruckeberg 1984](#), [Wyllie 1967](#)).

**UNDERBURN:**

See [UNDERSTORY FIRE](#).

**UNDERSTORY FIRE:**

Fire that is not generally lethal to the dominant vegetation and does not substantially change the structure of the dominant vegetation. Most of the aboveground dominant vegetation survives fires (75% according to [Hann and others 2004](#), , 80% according to [Smith \(2000\)](#). Applies mostly to forest and woodland vegetation types ([Smith 2000](#)).

Native Ecosystems Council, Weldon, No. 11-35659, archived on November 16, 2012

**UNDERSTORY FIRE REGIME:**

Fire regime in which fires are generally not lethal to the dominant vegetation and do not substantially change the structure of the dominant vegetation. Most of the aboveground dominant vegetation survives fires (75% according to [Hann and others 2004](#), 80% according to [Smith \(2000\)](#)). Applies mostly to forest and woodland vegetation types ([Smith 2000](#)).

**UNDERSTORY REINITIATION STAGE:**

Third stage of forest stand development following major disturbance, as described by [Oliver \(1981\)](#). In this stage, brush and advanced regeneration reinvade the understory (following the [stem exclusion stage](#)) as the overstory becomes very mature. Also see [stand initiation stage](#) and [old-growth stage](#).

**UTRICLE:**

A small, thin-walled, one-seeded, bladder-like fruit ([Harris and Harris 2001](#)).

**VERNALIZATION:**

A process of thermal induction in plants, in which growth and flowering are promoted by exposure to low temperatures ([Lincoln and others 1998](#)).

**WARM-SEASON:**

A plant that makes most of its growth during spring and summer and sets seed in late summer or early fall ([Frost and Ruyle 1993](#)). It is normally dormant in winter. Also see [cool-season](#).

**WILDLAND FIRE:**

Any nonstructural fire, other than prescribed fire, that occurs in a wildland ([National Park Service and others 1998](#)).

**XENOLOGY:**

Cross fertilization ([Lincoln and others 1998](#)).

**XERIC:**

Having very little moisture; tolerating or adapted to dry conditions ([Smith 2000](#)).

Native Ecosystems Council v. Weldon, No. 11-35659, archived on November 16, 2012

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Native Ecosystems Council v. Weldon, No. 11-35859, Archived on November 16, 2017