

# Glossary of Ecological Terms

**Lecture 1: Introduction – 3-Act Play**

**Lecture 2: Biomes – Climate – Terrain**

**Lecture 3: Individual – Population – Community**

**Lecture 4: Ecosystem - Cycling**

**Lecture 5: Old Growth – Disturbance – Succession**

**Lecture 6: BEC – Eco-province – Zones – Subzones**

**Lecture 7: Site Assessment**

**Abiotic** The non-living components of ecosystems (all physical and chemical conditions); for example, physiography and climate

**Ammonification** a.k.a. mineralization; decomposition of organic matter whereby N is released in the form of ammonia

**Assimilation** absorption and incorporation of nutrients into the body

**Autecology** A branch of ecology that focuses on the relationships and interactions between individuals of a species and their abiotic environment; see *synecology*

**Autotroph** Organism that derives energy from inorganic sources (light or inorganic chemical reactions); a producer

**Biogeochemical cycling** The continuous flow and transformation of chemical elements through an ecosystem's living and non-living components, including both *biotic* and *abiotic* portions

**Biogeoclimatic Ecosystem Classification (BEC)** A hierarchal system to delineate the landscape into geographic areas with similar climax vegetation (e.g. trees) that reflects similar regional climate, terrain & dirt (that's right, dirt, not soil).

**Biomass** The total dry weight per unit area (= "density") of living matter.

**Biome** A community of plants & animals that occupy a distinct region; basic terrestrial biomes (defined by climate & dominant vegetation): tundra, desert, grassland & forest; can be subdivided, i.e. boreal, temperate & tropical forests

**Biosphere** The global ecosystem (all living things on Earth) and their interactions with each other and their environment

**Biotic** The living component of ecosystems (organisms, such as plants and animals)

**Boreal forest:** see Taiga

**Carbon cycle** The biogeochemical cycle by which carbon is exchanged among the land, oceans and atmosphere

**Carnivore** A predator that captures, kills, and consumes other animals

**Carrying Capacity (K)** Maximum pop'n an area can sustain without degradation

**Climate** Prevailing weather conditions in an area, based on long term (e.g. 30 year) averages

**Climax** An ecological community that represents the culminating stage of natural forest succession for its locality; it has reached a "stable" and steady-state

**Commensalism** Type of symbiosis where one benefits and the other derives no benefit nor harm

**Community** A group of populations occurring in a defined area; also a sitcom with Chevy Chase

**Competition** The interaction between two species over a limiting resource that negatively affects one or both of their population growth rates

**Continentality:** the degree to which the climate reflects the "interior condition" of a large landmass ... lacking a marine influence, and so tends to be hotter/drier in the summer and colder/drier in the winter

**Decomposer** An organism that breaks down dead and decaying plants, animals or their waste products; (e.g., earthworms, fungi, bacteria); aka *saprotroph*

**Decomposition** The breakdown of biotic matter into its organic and (ultimately) inorganic constituents

**De-nitrification** conversion by bacteria of nitrates into N<sub>2</sub> gas

**Desert:** arid biome (may be cold or hot) that supports very little plant or animal life

**Distribution** spatial relationship between individuals in a population; uniform = equally spaced, random = no predictable pattern, clumped = individuals clustered into groups

**Disturbance** An event that alters the ecosystem, i.e. the plant community and possibly the physical environment; natural disturbances include fire, landslides, windthrow, insects, disease, etc.

**tree-level:** affects single trees or small groups of trees

**stand-level:** affecting large groups (many hectares) of trees (insect epidemic, hurricane, logging, wildfire)

**site-level:** affecting the physical environment in a dramatic way that all life is lost and a new soil environment is created (lavaflow, glacier, landslide)

**planet-level:** affecting the planet as a whole (big meteor, death star, that sort of thing)

**Diversity** The variety or richness in species composition of a community

**Ecological amplitude** The limits (or range) of environmental conditions within which an organism can live and function; may be described as broad, narrow, etc.

**Ecological equivalence** same climax plant community occurring over a range of sites ... i.e. a climax community that occurs on a zonal site (mid-slope) may occur a wetter subzone but on upper (relatively drier) slopes ... i.e. upper/drier slope position compensates for a wetter subzone

**Ecology** The study of the interactions between an organism and the physical and biological components of its environment

**Ecoprovince** subunit of an ecozone ... has uniform climate, geological history and terrain

**Ecosystem** The sum of the abiotic and biotic components of a defined system or region, such as a lake or a forest

**Endemic:** (1) disease/insect condition *typically* found in a population (forest)  
(2) native/restricted to a certain area

**Epidemic:** disease/insect condition *above* the typical level; a.k.a. "outbreak"

**Epiphyte** A plant that grows on another plant for support (e.g., lichens or moss on trees)

**Evapotranspiration** The loss of water to the atmosphere from plants and from the soil

**Forest** An ecosystem dominated by trees. FAO: area >0.5ha, tree canopy >10%, capable of growing 5m tall

**Forestry** The science, art and practice of sustainably managing the composition, structure and function of forest ecosystems for a multitude of social, environmental and cultural values

**Forest ecology** The scientific study of the patterns, processes, interrelationships and organisms (flora, fauna) in forest ecosystems; the biological basis of forest management

**Grasslands:** semiarid biome with rolling terrain of grasses (flowers & herbs); precipitation is enough to support grasses and maybe some scattered trees, but not enough for forests  
prairie: characterized by tall grasses  
steppe: characterized by short grasses  
savannah: city in Georgia ... nope, that's not it ... tall grasses, with wet & dry seasons and maintained by fire

**Groot:** a tree of few words

**Gross primary production (GPP)** The total rate of accumulation of energy by photosynthesis, before the energy used by respiration has been subtracted

**Habitat** The physical location of an organism in the environment; the type of environment inhabited by a species

**Herbivores** Animals that eat only plants; vegetarians

**Heterotrophs** Animals that derive energy either from organic compounds in the environment or from other organisms; a consumer

**Hierarchical** Arranged according to ranks (e.g. military ranks or BEC)

**Hydrological cycle** The circulation of water from the atmosphere to the earth's surface and back; aka the *water cycle*

**Hygic** Describes an environment or habitat with a greater supply of moisture than *mesic*, but less than *hydric*

**Hydric** Describes an environment or habitat with soils that are typically saturated or flooded long enough for anaerobic (i.e., without oxygen) conditions to develop

**Jet Stream** fast-flowing, narrow, meandering air current acting as a partition between arctic and warmer (southern) air masses

**Keystone Cops** fictional and incompetent police featured in silent films; has nothing to do with this course, it's the next term you are interested in

**Keystone Species** A species on which other species largely depend – its removal creates dramatic change in the ecosystem

**Lag Time** (the musical that never was, it was Ragtime that made it big) time delay between two closely related events

**Landform** A physical feature of the earth's surface; used at many scales (e.g., mountain range, hill, ridge)

**Legacies:** organisms and organic matter that remains after a significant disturbance.

**Limiting Factor** any abiotic (temperature, moisture) or biotic (food, competitor) factor that limits population growth

**Macroclimate** Climate at a broad, regional scale; influenced by factors such as elevation, latitude, continentality

**Marine influence:** Oceans have a moderating effect on climate, resulting in cooler summers and warmer winters than interior areas of a landmass, plus moisture

**Mesic** Describes an environment or habitat with a moderate or well-balanced supply of moisture

**Mutualism** Type of symbiosis where both parties benefit

**Natural disturbance type:** the regime of natural disturbance patterns ... specifically frequency and intensity of stand-initiating (disturbance) events

**Net primary production (NPP)** The amount of biomass accumulation for a given time period (e.g. per year) after the energy used by respiration is subtracted from gross production

**Niche** The ecological role of a species in the community, including all interactions in which it participates; the range of conditions under which a species occurs; see fundamental & realized niche

**Nitrification** conversion, by bacteria, of ammonia to nitrate

**Nitrogen-fixing** The natural process by which nitrogen in the atmosphere ( $N_2$ ) is converted to ammonia ( $NH_3$ ); various bacteria fix N (e.g., *Frankia* in alder root nodules, *Rhizobia* in legumes)

**Nutrient cycling:** The movement and exchange of organic and inorganic matter back into the production of living matter

**Old Growth:** Many definitions! A condition of a forest ecosystem that is attained if enough time passes; typified by old/large trees, snags/CWD, gaps, multi-age/multi-layered stand; last seral stage in succession.

**Organism** An **individual** form of life, such as a plant, animal, bacterium, protist (single-celled), or fungus

**Oreographic** can be considered a misspelling of the word below, or better yet, a tall stack of cookies (made by Mr. Christie)

**Orographic Lift** occurs when an air mass moves over a mountain range, air cools, drops precipitation, then as air moves down the lee side it warms and creates a rainshadow

**Parasitism** Type of symbiosis where one benefits at the expense of the other

**Population** A group of individuals of one species in a specified area

**Population Dynamics** change in population over space & time due to abiotic and biotic influences

**Population growth** Increase in numbers of a species within a given area; exponential growth = unrestricted growth ( $r$ ) at a constant rate, logistic growth = growth is limited due to resource limitations and levels off as pop'n approaches the carrying capacity ( $K$ )

**Photosynthesis** The chemical process that converts carbon dioxide into organic compounds, especially sugars, using the energy from sunlight

**Physiography** Physical geography; landform, including surface geometry and underlying geologic material

**Primary consumer** A heterotroph that feeds on plants = herbivore

**Primary production** The process by which organisms make their own food from inorganic sources, such as photosynthesis by plants

**Primary succession** The development of a community from an essentially abiotic setting due to a site altering event (e.g., after glaciation, lava flow)

**Reproductive Strategy** adaptations to improve survival;  $r$  strategy = high reproductive rate usu. associated with low survival,  $K$  strategy = low reproductive rate usu. associated with high survival

**Respiration** A process in plants involving the breakdown of carbohydrates (sugar / starch) and release of  $CO_2 + H_2O +$  energy

**Rocket** an anthropomorphic raccoon who is representing all wildlife on the ecological stage with Groot

**Secondary consumer** Heterotroph that feeds on herbivores

**Secondary succession:** The development of a (forest) community after a stand replacing event (insects, disease, wind, etc.)

**Seral stage** An individual period or condition (e.g., plant community) within a *sere*

**Sere** The entire sequence of stages in succession for a particular site, made up of many *seral stages*

**Seasonality:** typical, repeating weather patterns over a year (spring-summer-fall-winter, or wet & dry seasons)

**Silvics** The study of the life history, characteristics and ecology of forest trees

**Silviculture** The branch of forestry concerned with managing and tending a forest; applied forest ecology

**Site potential** indicates the climax plant community ... even though the present plant community is alder-Indian paintbrush, it will become HwCw – flat moss

**Site Series** all sites capable of producing the same climax community ... within a given subzone-variant (e.g. zonal sites within the CWH vm1)

**Stand Development** process that occurs after a stand-level disturbance event whereby a forest gets established and progresses through to old growth (see stand initiation, stem exclusion, understory re-initiation, late seral/ old growth)

**Stand initiation:** Follows stand-level disturbance ... when a new plant community established itself in the area ... abundant with light and nutrients ... followed by stem exclusion.

**Stem exclusion:** Occurs after stand initiation; crowns begin to close, greatly limiting light, with nutrients and light in short supply, new trees do not establish and in fact, competition leads to mortality as the dominant trees establish themselves ... followed by understory re-initiation.

**Subzones** subunits of zones, based on precipitation and continentality (coast) or temperature (interior), e.g. coast: CWH xm vs CWH vh, and interior: IDF dk vs IDF dc

**Succession:** A sequence of changes in plant communities occupying a particular site, which sometimes leads to a stable *climax* community

**Symbiosis:** Two species living together in close association whereby one or both benefit, see mutualism, commensalism & parasitism

**Synecology:** A branch of ecology that focuses on the study of ecological communities and populations; see *autecology*

**Taiga:** = boreal forest; largest terrestrial biome, characterized by having very cold winters and coniferous forests

**Tectonics:** “earth building”; pertaining to the structure of the earth’s crust

**Temporal** Relating to time

**Temperate forest:** biome characterized by moderate climate (temperature & rainfall), and dominated by coniferous and/or deciduous trees

**Terrain:** see topography

**Tertiary consumer** Heterotrophs that feed on secondary consumers in a food chain

**Tolerance** The capacity [ability] of an organism to endure [survive, withstand] adverse effects from unfavourable environmental conditions; the opposite of sensitivity

**Top carnivore** The predator occupying the highest trophic level within a given food web (a “tertiary” consumer).

**Topography** The physical attributes and pattern of a piece of ground; includes landforms, elevation, slope position, aspect, & steepness

**Tree** Perennial plants with above and below-ground woody structures, large (generally >3m tall) and typically dominated by a single stem

**Trophic level** A position in the food chain described by the number of energy transfer steps to reach that level; primary producer = 1, primary consumer = 2, secondary consumer = 3, tertiary consumer = 4

**Tundra:** coldest biome (extreme latitude or elevation) typified by lack of trees; “treeless plain”

**Understory re-initiation:** Occurs after stem exclusion; tree-level disturbance removes individual and small groups of trees, creating gaps and allowing light and therefore an understory to develop ... followed by old growth.

**Xeric** Describes an environment or habitat with little moisture; dry to very dry

**Zonal** Term for sites that best reflect the regional climate and are least influenced by the local topography and/or soil properties; typically with intermediate soil moisture and nutrient regimes, mid slope positions on gentle to moderate slopes, with moderately deep to deep soils and free drainage (*from BEC Web*)

**Zones** primary units in the BEC system, characterized by forest types (e.g. coastal Douglas-fir, alpine tundra, bunch grass, etc.) which are determined by climate and geology

**Sources:**

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