

## Chapter 10: Glossary of Terms for Restoring the Urban Forest Ecosystem <sup>1</sup>

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Eliana Kämpf Binelli, Mary L. Duryea and Lawrence V. Korhna<sup>2</sup>

**Absorption:** The uptake of water, other fluids, or dissolved chemicals by a cell or an organism (as tree roots absorb dissolved nutrients in soil or leaves absorb chemicals in a foliar herbicide application).

**Age class:** A group of individuals of a species that have the same age.

**Anion exchange capacity (AEC):** The total number of exchangeable negatively charged ions (anions) that a soil can adsorb.

**Anthropogenic:** Of human origin or influence.

**Biodiversity:** The variety of life and all the processes that keep life functioning. It includes the variety of different species (plants, animals - including humans, microbes and other organisms), the genes they contain, and the structural diversity in ecosystems.

**Biomass:** The dry weight of all organic matter in a given ecosystem. It also refers to plant material that can be burned as fuel.

**Biosphere:** That part of the earth and atmosphere which contains all of the life. All the ecosystems on earth form the biosphere.

**Buffer zones:** Semi-natural areas located around areas or ecosystems with higher natural value to minimize external influences.

**Bulk density:** The relative density of a soil measured by dividing the dry weight of a soil by its volume.

**Canopy:** The percent of land area covered by tree crowns.

**Cation exchange capacity (CEC):** The total number of exchangeable positively charged ions (cations) that a soil can adsorb.

**Coarse woody debris:** Any piece of dead woody material, including logs, snags and stumps. It provides habitat for plants, animals, and insects and is a source of nutrients in soil.

**Colonizer:** Species that enter unoccupied or sparsely occupied habitats, perhaps following a major disturbance.

**Community:** An assemblage of living organisms (plants, animals, microbes) that interact with each other in energy flow and nutrient cycling

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2. Eliana Kämpf Binelli, Extension Forester, Mary L. Duryea, Professor, Lawrence V. Korhna, Senior Biological Scientist, School of Forest Resources and Conservation, Cooperative Extension Service, Institute of Agricultural Sciences, University of Florida, PO Box 110410, Gainesville, FL 32611.

processes in an ecosystem. The biotic component of a particular ecosystem.

**Compaction:** An increase in soil bulk density caused by foot or motor traffic and/or heavy machinery.

**Competition:** Occurs when species attempt to utilize the same common resources (space, light, water, and nutrients) for survival and growth when these resources are in limited supply.

**Connectivity:** Ways of restoring broken connections between fragmented ecosystems in the landscape. Essentially the opposite of fragmentation.

**Consumers:** Organisms that cannot photosynthesize but instead feed directly on the producers (i.e., herbivores) and other consumers (i.e., carnivores, detritivores or decomposers). Consumers include non-photosynthetic bacteria, fungi, and animals, including humans.

**Coppice:** The ability of certain species to produce shoots when the main stem is cut but the root system is left intact.

**Core area:** The undisturbed interior area of an ecosystem fragment.

**Corridor:** Any area of habitat through which an animal or plant has a high probability of moving.

**Cost-benefit analysis:** Determination and comparison of the costs and benefits of an activity to evaluate its economic viability.

**Cover:** Plant and non-plant ecosystem components that provide protection from weather and predators for an animal species.

**Decomposition:** A large number of interrelated processes by which organic matter is broken down to smaller particles and soluble forms.

**Detritus:** All dead organic matter including litter, humus, soil organic matter, dead standing trees, and downed logs. Often an important source of nutrients in a food web.

**Detrivore:** An organism that obtains its energy by consuming dead organic matter: a decomposer organism, also called a saprotroph.

**Disturbance:** Any event, either natural or human-induced (anthropogenic), that changes the existing condition of an ecosystem.

**Ecological management unit (EMU):** The smallest treatable unit of land - the smallest restorable unit; the focus for restoration management activities; a human-defined area which may include one or more ecosystems.

**Ecosystem health:** An ecosystem in which structure and function allow the maintenance of biodiversity, biotic integrity and ecological processes over time while providing for human needs.

**Ecosystem management:** The use of an ecological approach to achieve productive resource management by blending social, physical, economic and biological needs and values to provide healthy ecosystems.

**Ecosystem processes:** Natural disturbances (e.g., fire), ecological succession, nutrient cycling and hydrological cycling.

**Ecosystem services:** Valuable functions that ecosystems provide free of charge to human societies, including maintenance of atmospheric gases, regulation of the hydrologic cycle, provision of potable water, fertile soil, wood, fish, and other consumable products, processing of wastes, pollination of crops, etc.

**Ecosystem structure:** Attributes related to the physical state of an ecosystem; examples include density, diversity, and biomass.

**Edge:core ratio:** The amount of border area in an ecosystem compared to its interior area.

**Edge effects:** Sharp borders between ecosystems which may have negative impacts on ecosystem structure and function, and on wildlife and their habitats.

**Eutrophication:** The nutrient enrichment of aquatic ecosystems. Symptoms of eutrophication may include algal blooms, nuisance growth of other

aquatic plants, dissolved oxygen depletion, and altered species diversity and richness.

**Evapotranspiration:** Loss of water by evaporation from the soil, lakes and streams, and transpiration from plants.

**Even-aged:** A forest stand or forest type in which relatively small (10 to 20 year) age differences exist between individual trees.

**Exotic:** Plant or animal species introduced into an area where it does not occur naturally; either intentionally transplanted from another region or introduced accidentally. Typically we consider exotics to be those plants that came to North America with Europeans after 1500.

**Fire dependent ecosystems:** Ecosystems requiring one or more fires of varying frequency, timing, intensity, and size, in order to achieve optimal conditions for population survival and/or growth.

**Fire suppression:** Intentional exclusion of fires from ecosystems.

**Food web:** All the interactions of producers and consumers, included along with the exchange of nutrients into and out of the soil. These interactions connect the various members of an ecosystem, and describe how energy passes from one organism to another.

**Forest succession:** The change in species composition, age and size, and ecosystem structure and function over time.

**Forest structure:** The nature and abundance of the various vegetation layers (canopy, subcanopy, shrub layer and ground cover) and the presence of dead logs and snags.

**Fragmentation:** Landscapes become fragmented when natural ecosystems are broken up into remnants of vegetation that are isolated from each other.

**Goals:** Broad statements that give a project general direction.

**Greenhouse effect:** The warming of the Earth's atmosphere attributed to a buildup of carbon dioxide or other gases.

**Greenways:** A type of corridor designed to connect open spaces for ecological, cultural and/or recreational purposes.

**Ground water:** The water entering the soil which remains in the saturated soil and rock.

**Habitat:** The physical location or type of environment in which an organism or biological population lives or occurs.

**Heavy metals:** Elements, such as mercury, lead, nickel, zinc, and cadmium, that are of environmental concern because they do not degrade over time. Although many are necessary nutrients, they are sometimes magnified in the food web and in high concentrations that can be toxic to life.

**Herbivores:** Animals that only eat plants.

**Hydrologic cycle:** Also called the water cycle, including precipitation of water from the atmosphere as rain or snow, flow of water over or through the earth and evaporation or transpiration of water to the atmosphere.

**Hydrophobic soil layer:** Layer of soil that is water repellent, due either to natural or anthropogenic causes.

**Impervious:** Not easily penetrated by roots or water.

**Infiltration:** The movement of water from the soil surface into the soil.

**Interception:** The amount of precipitation that is held by living or dead plant material.

**Invader:** Species that have certain characteristics that give them an advantage in native ecosystems, such as being fast growers, having high flowering and fruiting, having easily dispersed seeds, exhibiting high germination rates and tolerating a variety of site conditions.

**Landscape:** An area where interacting ecosystems are grouped and repeated in similar form.

The traits, patterns, and structure of a specific geographic area, including its biological composition, its physical environment, and its anthropogenic or social patterns.

**Litter** (leaf litter or forest litter): The detritus of fallen leaves, branches and bark which accumulates in forests.

**Microclimate:** The climate of small areas. Specifically, the climate under a plant or other cover, differing in extremes of temperature and moisture from the climate outside that cover.

**Monoculture:** Even-aged, single-species forest stands, usually grown for commercial purposes.

**Mortality:** Rate of death as a result of competition, disease, insect damage, drought, wind, fire and other factors.

**Naturalize:** To become established as if native, to escape cultivation and successfully reproduce.

**Nitrogen-fixing species:** Biological fixation is accomplished by certain microorganisms that can reduce  $N_2$  and combine it into organic molecules such as amino acids and proteins.

**Non-point source pollution:** Runoff washing over the urban landscape which transports nutrients and other chemicals into aquatic ecosystems.

**Nutrient cycling:** The transformation of chemical elements from inorganic form in the environment to organic form in living organisms, then back to inorganic form. It includes the exchange of elements between and among the biotic and abiotic components of an ecosystem.

**Nutrient cycle:** The exchange of elements between the living and non-living components of an ecosystem.

**Objectives:** Statements which provide specific destinations and time lines for different aspects of a project. Progress toward these objectives should be measurable.

**Old-growth:** A forest of very large trees or very old trees, or a forest that has reached its climax successional stage. Old growth is not a type of forest

ecosystem, but rather a condition that a forest ecosystem can attain if sufficient time passes since the last disturbance.

**Omnivores:** Animals that eat both plants and animals.

**Organic matter:** Materials in the soil that were once living and are decomposing back into the soil.

**Organic matter amendments:** Organic materials which are added to the soil to improve soil properties such as cation exchange capacity and soil structure.

**Photosynthesis:** The manufacture by plants of carbohydrates and oxygen from carbon dioxide and water. The reaction is driven by the energy of sunlight and catalyzed by chlorophyll.

**Plan:** A predetermined course of action to meet a vision, goals and objectives.

**Piedmont:** A plateau in the Southeastern U.S. between the coastal plain and the Appalachian Mountains including parts of Virginia, North Carolina, South Carolina, Georgia, and Alabama.

**Pioneer:** A usually prolific, fast-growing and short-lived species, generally intolerant of shade. Pioneers are capable of invading bare sites (e.g. a newly exposed soil surface) and persisting there or "colonizing" them, until supplanted, by other successional species.

**Pore space:** Voids or spaces between solid soil particles in the soil; pores holding water and air.

**Prescribed fire (or burning):** The application of fire to an area to meet predetermined resource management objectives.

**Primary production:** The quantity of organic carbon fixed by photosynthesis per unit time.

**Primary succession:** Plant and animal establishment and development that occurs in environments that lack organic matter and which have not yet been altered in any way by living organisms. It includes the development over time of the original substrate into soil.

**Producers:** Mainly green plants that take light energy and store it through the process of photosynthesis.

**Restoring the urban forest ecosystem:**

Reestablishing the ecological health of the urban forest ecosystem. Altering a site to a state which is more ecologically sustainable to the community. Restoration might reestablish ecological structure, functions, pathways and/or cycles.

**Riparian forest buffers:** Forests along creeks, streams and rivers that stabilize banks, take up nutrients, and provide shade, habitat, and food for aquatic ecosystems.

**Runoff:** Water from rain, snow melt, or irrigation water that runs off the land into streams or other surface-water. It can carry pollutants from the air and land into receiving waters.

**Savanna:** A type of woodland characterized by open spacing between trees and the intervening areas of grassland.

**Secondary succession:** Plant and animal establishment and development that occurs in an environment that has supported mature vegetation in the past, and where, after a disturbance, the substrate (i.e., soil) remains relatively intact.

**Seepage:** Water which enters the soil and moves down through the soil.

**Shade tolerant:** A plant that develops and grows better in the shade of, and in competition with, other trees or plants. Antonym is shade intolerant.

**Site assessment:** The first step in any restoration process to determine the site's resources.

**Site context:** A description of the potential restoration site; a site picture which assesses the site's current and past conditions.

**Site evaluation checklist:** A quick-and-easy instrument to assess the ecological value of a site. Used especially to estimate the suitability of a site for wildlife species.

**Snag:** A dead standing tree.

**Soil aeration:** The movement of atmospheric air into pores in the soil.

**Soil assessment:** An evaluation of the chemical, physical, and biological features of soil resources which can limit colonization, survival, and growth of living organisms.

**Soil structure:** The combination or arrangement of primary soil particles into secondary particles or units.

**Soil texture:** The relative percentage of sand, silt, and clay-sized particles in the mineral portion of the soil.

**Space:** The size of an area containing sufficient food, cover, and water for an animal species to survive.

**Stakeholders:** All parties who will be impacted by a restoration project, e.g., communities, government, NGOs, universities, private sector, investors, and others.

**Stepping stones:** Smaller habitats or ecosystems that permit the flow of some plants and animals to move across the landscape from one ecosystem fragment to the other.

**Stocking:** Releasing wildlife offspring or transplanting wildlife into suitable habitat areas.

**Substrate:** Supporting surface on which an organism grows. It may simply provide structural support or may provide water and nutrients. It may be inorganic, such as rock or soil, or it may be organic, such as wood.

**Thinning:** Cutting of parts of a tree or individual trees in a stand to improve average growth, health and form of the remaining trees.

**Throughfall:** Precipitation that is not intercepted by plants or that drips to the ground.

**Transpiration:** The evaporation of water from within living plant tissue through leaf openings called stomata.

**Trophic enrichment of the soil:** The addition, infection, contamination or repatriation of a site with various living organisms such as worms, arthropods, fungi, bacteria, and organic materials.

**Understory vegetation:** Any plant growing under the canopy formed by other plants, particularly herbaceous and shrub vegetation under a tree canopy.

**Urban forest ecosystem:** A collection of living organic matter (plants, animals, people, insects, microbes, etc.) and dead organic matter (lawn clippings, leaf-fall, branches) on a soil (with all its urban characteristics) through which there is a cycling of chemicals and water and a flow of energy.

**Urban heat island:** The increase in temperature in cities compared to the surrounding rural lands.

**Vision:** A desired future condition or state for a restoration site.

**Weed:** A plant out of place.

**Wetlands:** Ecosystems that are periodically inundated with water at a frequency and duration to support vegetation which is adapted for life in saturated soils.

**Wildlife habitat:** The area where an animal species lives or may potentially live because it provides all the live-sustaining requirements for that particular species.