

Glossary

The definitions below are taken from the following references: *The Concise Oxford Dictionary of Ecology*, edited by M. Allaby, published by Oxford University Press, Oxford, England, 1994; *The Dictionary of Ecology and Environmental Science*, edited by H. W. Art, published by Henry Holt and Company, 1993; *A Dictionary of Ecology, Evolution, and Systematics*, edited by R. J. Lincoln, G. A. Boxshall, and P. F. Clark, published by Cambridge University Press, Cambridge, England, 1982; *Glossary of Oceanography and the Related Geosciences with References*, by Steven K. Baum, Texas Center for Climate Studies, Texas A&M University; *Marine Biology: Function, Biodiversity, Ecology* by Jeffrey Levinton, published by Oxford University Press, New York; and *Webster's Third New International Dictionary*, published by Merriam-Webster, Springfield, Massachusetts, 1961, 1993.

Abyssal. Pertaining to zones of great depth in the oceans or lakes into which light does not penetrate; occasionally restricted to depths below 2,000 meters but more usually used for depths between 4,000 and 6,000 meters.

Accretion. Deposition of material by sedimentation which increases land area.

Achene. A small, usually single-seeded, dry fruit which remains closed at maturity. The achene is the simplest of any fruit.

Active layer. A seasonally thawed surface layer of soil in arctic or alpine regions that lies above permanently frozen ground and is between a few centimeters and about 3 meters thick.

Adaptive radiation. The evolutionary diversification of a taxon into a number of different forms, usually as a result of encounters with new resources or habitats. Adaptive radiation generally occurs over a relatively short period of time.

Adventive plant. A species of plant that is not native and has been introduced into the area but has not become permanently established.

Aeolian. Pertaining to the action or effect of the wind; wind-borne.

Aerenchyma. Spongy, modified cork tissue of many aquatic plants that facilitates gaseous exchange and maintains buoyancy.

Afforestation. The establishment of forest by natural succession or by the planting of trees on land where they did not grow formerly.

Albedo. A measure of surface reflectivity, usually expressed as a percentage, such as the proportion of solar radiation that is reflected back into space from the Earth, clouds, and atmosphere without heating the receiving surface. Studying a planet's albedo can help determine the composition of its surface.

Alcids. Any of the Alcidae family (Order Charadriiformes) of marine birds having a stout bill, short wings and tail, webbed feet, a large head and heavy body, and thick, compact plumage. Confined to the northern parts of the Northern Hemisphere, alcids include auks, guillemots, murrets, and puffins.

Alevin. A young fish, particularly a young salmon that is still attached to the yolk sac.

Algae. The common name for the relatively simple type of unicellular or multicellular plant which is never differentiated into root, stem, and leaves, contains chlorophyll *a* as its photosynthetic pigment, has no true vascular system, and has no sterile layer of cells surrounding its reproductive organs. Found in most habitats on Earth, though the majority occur in freshwater or marine environments.

Alliance. A group of related botanical or zoological families, especially a group of plants intermediate between a class and an order.

Allogenic. Resulting from factors acting from outside a system or material transported into an area from outside which alters the system's habitat.

Alluvial. Of or relating to river and stream deposits.

Alluvial soil. Soil formed in material deposited by the action of running water, such as a floodplain or delta.

Alpine tundra. A treeless region above the treeline of high mountains, characterized by cold winters and short, cool summers and having permafrost below a surface layer that may melt in summer.

Alvar. A plant community dominated by mosses and herbs, occurring on shallow, alkaline limestone soils.

Amphidromous. Referring to the migratory behavior of fishes moving from fresh water to the sea and vice versa, not for breeding purposes but occurring regularly at some stage of the life cycle (such as feeding or overwintering).

Amphipod. Any of a large order of small, usually aquatic crustaceans with a laterally compressed body, for example, beach fleas.

Anadromous. Referring to the life cycle of fishes, such as salmon, in which adults travel upriver from the sea to breed, usually returning to the area where they were born.

Anaerobic. Referring to an environment in which oxygen is absent, or to a process which occurs only in the absence of oxygen, or to an organism which lives, is active, or occurs in the absence of oxygen, such as some yeasts or bacteria.

Annelids. Any of a phylum (Annelida) of usually elongated, segmented coelomate invertebrates, such as earthworms, various marine worms, and leeches.

Anoxic. Greatly deficient in oxygen; oxygenless.

Anthropogenic. Of, relating to, or resulting from the influence of humans on nature.

Anticyclonic. Referring to an area or system of high atmospheric pressure having a characteristic pattern of air circulation which usually induces settled weather conditions. Light winds flow clockwise in the northern hemisphere and counterclockwise in the southern hemisphere.

Appendicularia. A genus of small, free-swimming, pelagic tunicates shaped somewhat like a tadpole and remarkable for their resemblance to larvae of other tunicates.

Arboreal. Resembling a tree, or inhabiting or frequenting trees.

Archaeobacteria. A taxonomic kingdom of bacteria, including sulphur-dependent bacteria, methane-producing bacteria, and halophilic bacteria.

Aromatic hydrocarbon. One of a group of hydrocarbon compounds containing one or more six-carbon rings characteristic of the benzene series. They are called aromatic because many of the earlier ones discovered, such as turpentine and wintergreen oil, have strong odors; many odorless aromatic compounds are now known.

Arroyo. A watercourse (such as a creek) or a water-carved gully or channel in an arid region.

Arthropod. Invertebrate animals with a segmented body and jointed appendages, for example, spiders, bees, and crabs.

Association. A stable grouping of two or more plant species that characterize or dominate a type of biotic community.

Avens. Any of a genus of perennial herbs of the rose family with white, purple, or yellow flowers.

Avian. Of, relating to, or derived from birds.

Avifauna. The birds of a specific region or period.

Barrens. A level area with poor, usually sandy or serpentine soils that is sparsely forested or unable to support normal vegetative cover and that generally has a low level of productivity. Plants growing in barrens are usually much smaller and stunted in comparison to individuals grown on more fertile soils. Barrens are frequently dominated by specialized groups of endemic plants.

Bathymetry. The measurement of the depth of the ocean floor from the water surface; the oceanic equivalent of topography.

Bathypelagic. Of, relating to, or living in the depths of the ocean, especially in the area between about 600 and 3,000 meters deep. The number of species and populations is relatively low in the bathypelagic zone, where no light source exists other than bioluminescence, temperature is uniformly low, and pressures are great.

Beach face. A strip of land that fronts a beach.

Benthic. Occurring at the bottom of a body of water, for example, a seabed, riverbed, or lake bottom.

Benthos. In freshwater and marine ecosystems, the collection of organisms both attached to or resting on the bottom sediments and burrowed into the sediments. In terms of size, benthos are generally divided into three categories: *meiobenthos*, the organisms that pass through a 0.5 millimeter sieve; *macrobenthos*, those that are caught by grabs or dredges but retained on the 0.5 millimeter sieve, and *epibenthos*, those organisms that live on rather than in the seabed.

Bight. A large indentation in a coastline or continental shelf margin forming an open bay.

Bioaccumulation. (Also called *biomagnification*.) The process by which chemical contaminants become more concentrated in the tissues of organisms as they pass higher up the food chain. Heavy metals and pesticides such as DDT are stored in the fatty tissues of animals and are passed along to predators of those animals. The resulting concentrations eventually reach harmful levels in predators at the top of the food chain.

Biodiversity. See *biological diversity*

Biogeochemical. Related to the partitioning and cycling of chemical elements and compounds between living organisms and nonliving components of the environment.

Biogeographical region. Any geographical region characterized by distinctive flora or fauna (such as a *biome* or a *province*).

Biogeography. The science that deals with the geographical distribution of animals and plants.

Biological diversity. (Often called *biodiversity*.) Used to describe species richness, ecosystem complexity, and genetic variation.

Biomass. The total mass of all living organisms or of a particular set of organisms in an ecosystem or at a trophic level in a food chain; usually expressed as a dry weight or as the carbon, nitrogen, or caloric content per unit area.

Biome. A major regional ecological community characterized by distinctive life forms and principal plant or animal species, such as a tropical rain forest, a tundra, a grassland, or a desert.

Biota. The plants and animals of a specific region or period, or the total aggregation of organisms in the biosphere.

Bivalve. A mollusk whose body is enclosed by two hinged valves or shells.

Blowdown. An extensive toppling of trees by wind within a relatively small area which significantly alters the small-scale climate within the ecosystem.

Boreal forest. The circumpolar, subarctic forest of high northern latitudes that is dominated by conifers. The boreal forest stretches across North America, Europe, and northern Asia (regions characterized by short summers and long, cold winters). It is found south of the tundra in the Northern Hemisphere and often contains peaty or swampy areas.

Brachyuran. Of or belonging to the Brachyura, a group of crustaceans with a greatly reduced abdomen which is more or less folded against the ventral surface of the thorax, such as the typical crabs.

Brackish. Water that is saline but not as salty as seawater.

Braided channel. A stream consisting of a network of interlacing small channels separated by bars, which may be vegetated and stable or barren and unstable.

Breeding Bird Survey. The North American Breeding Bird Survey (BBS) was begun in 1966 to collect standardized data on bird populations along more than 3,400 survey routes across the continental United States and southern Canada. A cooperative effort, the BBS has been used to document distributions and establish continental, regional, and local population trends for more than 250 species.

Brood parasitism. (Also called *nest parasitism* or *breeding parasitism*.) The laying of eggs by one bird species in the nest of another bird species and the subsequent brooding of the egg and raising of the young by the parasitized host, usually to the detriment of the host's young.

Bunchgrass. Any of several grasses, especially of the western United States, that grow in tufts

rather than forming turf, for example, the genus *Andropogon*.

Bycatch. Nontarget organisms that are caught in fishing or other harvest operations and are usually discarded.

Calcareous. Consisting of or containing calcium carbonate; a soil rich in calcium salts, derived from limestone or chalk. Also, an organism which has an affinity for such an alkaline or basic soil.

Carrying capacity. The maximum population of a given organism that a particular environment or habitat can sustain; implies continuing yield without environmental damage; often denoted as *K*.

Catadromous. An organism which lives in fresh water and goes to the sea to spawn, such as some eels.

Catchment. The area drained by a river or body of water.

Cation. An ion or group of ions having a positive charge and characteristically moving toward the negative electrode in electrolysis.

Cay. A low island or reef of sand or coral.

Cetacean. Any of an order of aquatic, mostly marine mammals that include the whales, dolphins, porpoises, and related forms.

Chaetognaths. A group of small, active, transparent marine worms of uncertain systemic position with horizontal lateral and caudal fins and a row of moveable, curved spines around the mouth, for example, arrowworms.

Channelization. The straightening of rivers or streams by means of an artificial channel.

Chaparral. A vegetation type dominated by shrubs and small trees, especially evergreen trees with thick, small leaves.

Charismatic megafauna. Large vertebrate animals that evoke sentimental support from the general public, for example, deer, sea turtles, and wolves.

Chenier. A large, ridge-shaped deposit of sandy material built up by wave action in a marshy area. Chenier deposits are common on the Gulf of Mexico coast of North America.

Chironomids. Any of a family (Chironomidae) of midges that lack piercing mouthparts.

Chlorofluorocarbons. (Also called greenhouse gases or CFC's.) A group of gaseous compounds that contain carbon, chlorine, fluorine, and sometimes hydrogen and are used as refrigerants, cleaning solvents, and aerosol propellants and in the manufacture of plastic foams. They are suspected of being a major cause of stratospheric ozone depletion as well as of absorbing long-wave electromagnetic radiation.

Chlorophyll *a*. Chlorophyll, the green photosynthetic pigment found chiefly in chloroplasts of plants, occurs in variants of *a*, *b*, *c*, and *d*. Chlorophyll *a* is a waxy, blue-black microcrystalline, $C_{55}H_{72}MgN_4O_5$, with a characteristic blue-green alcohol solution.

Cirque. A steep hollow, often containing a small body of water, found at the upper end of a mountain valley.

CITES. Convention on International Trade in Endangered Species of Wild Fauna and Flora, an agreement between 103 nations to restrict international commerce involving endangered and threatened species of animals and plants, such as tropical birds, rhinoceros horns, orchids, and ivory.

Cladocerans. Any of an order (Cladocera) of minute, freshwater brachiopod crustaceans, including the water fleas.

Climax. The final stage of succession in an ecosystem. Also, a community that reached a steady state under a particular set of environmental conditions.

Clonal dispersal. The separation of parts of a modular organism, or the growth of such parts away from each other without actually detaching.

Clone. To reproduce individual organisms asexually, as in plant propagation through budding or layering. Also, an organism or group of organisms (or group of cells) so produced.

Close-crowned. Descriptive of crowded forests where closely spaced trees have tops that touch or overlap.

Cloud forest. A wet, tropical forest, often near peaks of coastal mountains and at an altitude usually between 1,000 and 2,500 meters, that is characterized by a profusion of epiphytes and the presence of clouds even in the dry season.

Cluster analysis. A method grouping those variables within a set of variables that are highly correlated and excluding from clusters those that are negatively correlated or uncorrelated. Used in numerical taxonomy as a procedure for arranging taxonomic units into homogenous clusters based on their mutual similarities.

Commensal. Referring to the relationship between two kinds of organisms in which one obtains food or other benefits from the other without damaging or benefitting it. Also, an organism which lives in this way.

Community. Any grouping of populations of different organisms that live together in a particular environment.

Conspecific. Of or relating to the same species.

Continental shelf. The shallow, gradually sloping seabed around a continental margin, not usually deeper than 200 meters and formed by submergence of part of a continent.

Copepods. Any of a large subclass (Copepoda) of usually minute freshwater and marine crustaceans that form an important element of the plankton in the marine environment and in some fresh waters.

Corridor. A more or less continuous connection between land masses or habitats; a migration route that allows more or less uninhibited migration of most of the animals of one faunal region to another. In terms of conservation biology, a connection between habitat fragments in a fragmented landscape.

Crevasse. A breach in a levee along the bank of a river through which floodwater may flow and produce sheetlike deposits of gravel or sandy sediment; or, a large, open fissure forming in a glacier as it moves and is deformed.

Crown fires. Fires that spread from tree crown to tree crown, usually indicative of particularly hot fires in dry conditions.

Crustacean. Any of a large class (Crustacea) of mostly aquatic mandibulate arthropods that have a chitinous or calcareous and chitinous exoskeleton, a pair of often modified appendages on each segment, and two pairs of antennae; includes lobsters, shrimps, crabs, wood lice, water fleas, and barnacles.

Ctenophore. Any of a phylum (Ctenophora) of marine animals superficially resembling jellyfishes but having biradial symmetry and swimming by means of eight meridional bands of transverse ciliated plates; also called *comb jellies*.

Cultivar. A variety of a plant produced and maintained by horticultural techniques and not normally found in wild populations.

Cyanobacteria. A large and varied group of bacteria which possess chlorophyll *a* and which carry out photosynthesis in the presence of light and air, producing oxygen. They were formerly regarded as algae and were called "blue-green" algae. The group is very old and is believed to have been the first oxygen-producing organisms on Earth.

Cyclonic. Referring to a region of low atmospheric sea level pressure; or, the wind system around such a low pressure center that has a clockwise rotation in the Northern Hemisphere and a counterclockwise rotation in the Southern Hemisphere.

Debouch. To emerge or issue; often used in reference to rivers or streams.

Debris torrent. A flood of debris (branches, shrubs, rocks, mud, and so forth) and water rushing down a stream channel, caused by excessive rainfall or snow melt. Debris torrents have a significant scouring effect on the stream ecosystem.

Deciduous. Plants having structures that are shed at regular intervals or at a given stage in development, such as trees that shed their leaves seasonally.

Degradation. The breaking down of a substance into smaller or simpler parts, usually by erosion.

Degree-days. Units used in the measurement of the duration of a life cycle or a particular growth phase of an organism; calculated as the product of time and temperature averaged over a specified interval.

Delta. An alluvial deposit at the mouth of a river or tidal inlet. Deltas occur when a sediment-laden current enters an open body of water, at which point there is a reduction in the velocity of the current, resulting in rapid deposition of the sediment, as at the mouth of a river where the river discharges into the sea or a lake.

Delta plain. A nearly horizontal portion of delta that, during low tide or other regression of water, is largely exposed to the atmosphere.

Demersal. Living at or near the sea floor but having the capacity for active swimming.

Dendritic. Branched, like a tree.

Dendrochronology. The science of dating events and variations in the environment by the comparative study of annual growth rings of trees.

Detritus. Debris or waste material, usually organic, such as dead or partially decayed plants and animals, often important as a source of nutrients; or, small particles of minerals from weathered rock, such as sand or silt.

Diapir. An anticlinal fold in which a mobile core, such as salt or gypsum, has broken through brittle overlying rocks.

Diel. A 24-hour period, usually encompassing 1 day and 1 night.

Dinoflagellates. Any of an order (Dinoflagellata) of chiefly marine, planktonic, usually solitary phytoflagellates (which have many characteristics in common with algae) that includes luminescent forms, forms important in marine food chains, and forms causing red tides.

Disjunct. Distinctly separate; a discontinuous range in which one or more populations are separated from other potentially interbreeding populations by a sufficient distance to preclude gene flow between them.

Distributary. A river branch flowing away from the main stream.

Disturbance. An event or change in the environment that alters the composition and successional status of a biological community and may deflect succession onto a new trajectory, such as a forest fire or hurricane, glaciation, agriculture, and urbanization.

Diurnal. Occurring or active only in daylight.

Diversity. The variety of species in a sample, community, or area.

Doliolids. Any of a small family of oceanic tunicates.

Dominance. The extent to which a given species or individual influences community composition or form because of its size, abundance, or coverage.

Downwelling. The downward movement of surface waters caused by the convergence of different water masses or where surface waters flow toward the coast.

Drawdown. A lowering of the water level in a reservoir or other body of water.

Echinoderms. Any of a phylum (Echinodermata) of radially symmetrical coelomate marine animals including the starfishes, sea urchins, and related forms.

Ecological succession. The chronological sequence of vegetation and associated animals in an area; or, continuous colonization, extinction, and replacement of species' populations at a particular site, due either to environmental changes or to the intrinsic properties of the plants and animals.

Ecoregion. See *biogeographical region*.

Ecosystem. A community of organisms and their physical environment that interact as an ecological unit.

Ecotone. The boundary or transitional zone between adjacent communities containing the characteristic species of each, such as the edge of a woodland next to a field or lawn.

Ectotherm. A cold-blooded animal, one having a body temperature determined primarily by the temperature of its surrounding environment. Terrestrial reptiles are ectotherms.

Edaphic. Pertaining to soil or to the physical, chemical, and biological properties of the soil or substratum which influence associated biota, such as pH and organic matter content.

Edge effect. The tendency for a transitional zone between communities (an *ecotone*) to contain a greater variety of species and more dense populations of species than either community surrounding it.

El Niño. (Also called *El Niño–Southern Oscillation Event*, or *ENSO*.) A warmwater current which periodically flows southward along the coast of Ecuador, associated with the Southern Oscillation in the atmosphere, and which affects climate throughout the Pacific region. Approximately once every seven years in late December, prevailing trade winds weaken and the equatorial countercurrent strengthens. Warm surface waters, normally driven westward by the wind to form a deep layer off Indonesia, flow eastward to overlie the cold waters of the Peru Current. The Southern Oscillation is a fluctuation of the intertropical atmospheric circulation in which air moves between the southeastern Pacific subtropical high and the Indonesian equatorial low, driven by the temperature difference between the two areas.

Elasmobranchs. Any of a subclass (Elasmobranchii) of cartilaginous fishes that have five to seven lateral gill openings on each side, comprising sharks, rays, skates, and extinct related fishes.

Electrophoresis. A technique for separating mixtures of organic molecules based on their different rates of travel in electric fields.

Emergent. An aquatic plant having most of its vegetative parts above water. Also, a tree which reaches or exceeds the level of the surrounding canopy.

Emersed. Rising above the surface of the water.

Empirical. Originating in or based upon observation or experience; capable of being verified or disproved by observation or experiment.

Encinal. Referring to live oaks; any of several American evergreen oaks, such as the Coast live oak (*Quercus agrifolia*) of coastal California and *Quercus virginiana* of northern Baja California, Mexico, and the southeastern United States.

Endangered Species Listing. See *List of Endangered or Threatened Species*.

Endemic. Belonging or native to a particular people or geographic region; a genetically unique life form.

Endotherm. A warm-blooded animal, one that maintains a body temperature largely independent of the temperature of the environment. Mammals are endothermic.

Epipelagic. The oceanic zone extending from the surface to about 200 meters, where enough light penetrates to allow photosynthesis.

Epiphyte. A plant that uses another plant (usually a tree) for support or anchorage but not for water or nutrients.

Epizootic. An outbreak of disease (an epidemic) in nonhuman animals, or pertaining to such an outbreak.

Ericaceous. Of, relating to, or being a heath or of the heath family of plants, which are mostly shrubby, dicotyledonous, and often evergreen plants that thrive on open, barren soil that is usually acidic and poorly drained.

Escapement. The number of fish that are permitted to survive and spawn (as by adjustment of fishing season or by provision of fishways).

Estuary. A semi-enclosed coastal body of water which has a free connection with the open sea and where fresh water derived from land drainage (usually mouths of rivers) is mixed with seawater; often subject to tidal action and cyclic fluctuations in salinity.

Euryhaline. Able to live in waters with a wide range of salinity.

Eustatic. Relating to or characterized by worldwide change in sea level such as that caused by tectonic movements or by the growth or decay of glaciers.

Eutrophication. The process by which a body of water acquires a high concentration of nutrients, especially phosphates and nitrates, which typically promote excessive growths of algae. As the algae die and decompose, the amount of available oxygen in the water is depleted, in turn causing the death of other organisms, such as fishes. Normally, eutrophication is a natural, slow-aging process for a body of water, but human activity can greatly speed up the process.

Evapotranspiration. Loss of water from the soil both by evaporation and by transpiration from plants.

Extinction. The dying out of a species, or the condition of having no remaining living members; also, the process of bringing about such a condition.

Extirpation. The loss or removal of a species from one or more specific areas but not from all areas.

Fauna. The animal life of a region or geological period.

Fecundity. The potential reproductive capacity of an organism or population.

Fen. A marshy, low-lying wetland covered by shallow, usually stagnant, and often alkaline water that originates from groundwater sources.

Feral. Of or relating to plants or animals which have escaped from domestication and to their descendants.

Ferrous. Of or containing iron.

Fetch. The distance along open water or land over which the wind blows; the distance traversed by waves without obstruction.

Flora. Plant or bacterial life forms of a region or geological period.

Floristic. Relating to all of the plant species of a geographic or ecological area or region.

Fluvial. Pertaining to rivers or streams and their action.

Fold. A curve or bend in a stratum of rock.

Forb. An herbaceous plant which is not a grass.

Fragmentation. See *habitat fragmentation*.

Fringing reef. A coral reef that forms near the shoreline.

Gallery forest. A narrow strip of forest along the margins of a river in an otherwise unwooded landscape.

Gamete. A mature male or female germ cell possessing a haploid chromosome set and capable of fusing with a gamete of the opposite sex to produce a fertilized egg.

GAP analysis. The process of identifying and classifying components of biological diversity to determine which components already occur in protected areas and which are not present or are underrepresented in protected areas.

Gastropod. Any of a large class (Gastropoda) of mollusks, usually with a univalve shell or no shell and a distinct head bearing sensory organs, such as snails and slugs.

Geographic Information System (GIS). A combination of computer hardware and software that allows storage and manipulation of information suitable for mapping. A GIS software system synthesizes geographic position data and other data (such as the type of bottom sediment) in order to create a map. Data on processes (current speed, for example) can be incorporated to make a geographic model of flow, for example.

Geomorphology. The study of landforms on a planet's surface and of the processes that have fashioned them.

Geotropic. Referring to the involuntary response of a plant or one of its parts to gravity. Geotropism may be a positive or negative response: primary taproots show positive geotropism; vertical primary shoots show negative geotropism.

Glade. An open space in the forest.

Gorgonian. Any of an order (Gorgonacea) of colonial anthozoans (corals), usually with a horny and branching radial skeleton.

Gradient. A rate of change of a variable with distance; a regularly increasing or decreasing

change in a factor, such as ambient temperature; a character gradient.

Graminoid. Grasses and grasslike plants, such as sedges.

Gravid. Carrying eggs or young; pregnant.

Greenhouse effect. Heating of the Earth's atmosphere that is loosely analogous to the glass of a greenhouse letting light in but not letting heat out. Radiation from the sun easily enters the atmosphere as light waves, heating the Earth's surface and causing it to emit infrared radiation. Gases such as water vapor, carbon dioxide, methane, and chlorofluorocarbons absorb infrared radiation, preventing its energy from leaving the Earth.

Gregarious. Tending to form into groups which possess a social organization, such as schools of fish, herds of mammals, flocks of birds.

Groin. A breakwater structure extending seaward at a right angle to the shoreline, designed to inhibit the longshore drift of sediments.

Groundfish. A bottom-dwelling fish, especially one of commercial importance such as cod, haddock, pollack, or flounder.

Guild. A group of species having similar ecological resource requirements and foraging strategies and therefore having similar roles in the community.

Gymnosperm. A plant, such as a cycad or a conifer, whose seeds are not enclosed in an ovary (fruit).

Gyre. A circular or spiral system of movement, especially a giant circular oceanic surface current.

Habitat. The place, including physical and biotic conditions, where a plant or an animal usually occurs.

Habitat fragmentation. The breaking up of a habitat into unconnected patches interspersed with other habitat which may not be inhabitable by species occupying the habitat that was broken up. The breaking up is usually by human action, as, for example, the clearing of forest or grassland for agriculture, residential development, or overland electrical lines.

Habitat sharing. A situation in which species occupy the same habitat without competition, either through requiring different resources or being present at different times.

Halophytic. Referring to a plant that can tolerate or thrive in alkaline soil rich in sodium or calcium salts; tolerant of saline conditions.

Hard mast. Fruit of hardwood trees such as beech and oaks.

Hardwood hammock. A somewhat elevated area with hardwood trees and deeper soils, often

surrounded by pine forest on shallower soils. Most often found in the Southeast.

Heavy metals. A metallic element of high specific gravity, such as antimony, bismuth, cadmium, copper, gold, lead, mercury, nickel, silver, tin, and zinc. These metals, which are toxic even in low concentrations, persist in the environment and can accumulate to levels that stunt plant growth and interfere with animal life.

Hectare (ha). A metric unit of measure for area, equal to 2.47 acres.

Hermaphroditic. An individual that possesses both male and female sex organs.

Herptiles. Reptiles and amphibians collectively.

Heterogeneous. Consisting of diverse or dissimilar parts; having nonuniform structure or composition.

Heterotrophic. An organism that is unable to manufacture its own food from simple chemical compounds and therefore consumes other organisms, living or dead, as its main source of carbon.

Heterozygous. Having two different alleles at a particular gene locus on a chromosome pair. Provides a measure of genetic variation either in a population or in an individual.

Holocene. The present, post-Pleistocene geologic epoch of the Quaternary period, including the last 10,000 years; the recent or Post-glacial period.

Hybridization. Any crossing of individuals of different genetic composition, often belonging to separate species, resulting in hybrid offspring.

Hydric. Characterized by, relating to, or requiring an abundance of moisture.

Hydrocarbon. A naturally occurring organic compound that contains carbon and hydrogen; may be gaseous, solid, or liquid, for example, natural gas, bitumens, and petroleum.

Hydrographic. Relating to the characteristic features of bodies of water, such as depth and flow.

Hydrological cycle. The movement of water from the sea through the air to the land and back to the sea.

Hydrology. The study of the movement of water from the sea through the air to the land and back to the sea; the properties, distribution, and circulation of water on or below the Earth's surface and in the atmosphere.

Hydromorphic. Descriptive of an intrazonal soil formed under waterlogged or poorly drained conditions.

Hydroperiod. The duration and frequency of flooding.

Hypoxic. Deficient in oxygen.

Igneous rock. Rock formed by solidification of molten magma.

Impoundment. A natural or artificial body of water held back by a dam.

Indicator species. An organism whose presence or state of health is used to identify a specific type of biotic community or as a measure of ecological conditions or changes occurring in the environment.

Indigenous. A species that occurs naturally in an area; native.

Inf fauna. Benthic organisms that dig into the sea bed or construct tubes or burrows. They are most common in the subtidal and deeper zones.

Insolation. Incoming solar radiation. Also, a measurement of the amount of this solar energy falling on a surface perpendicular to the sun's rays, of a specified size and over a specified period of time.

Interglacial. A warm period between glacial epochs.

Intermediate host. The host occupied by juvenile stages of a parasite prior to the definitive host and in which asexual reproduction often occurs.

Intertidal. Relating to the littoral zone above the low-tide mark.

Invertebrate. An animal without a backbone, such as snails, worms, and insects.

Invertivore. An animal or plant that eats invertebrate animals.

Ion. An atom or group of atoms that carries a positive or negative electric charge as a result of having lost or gained one or more electrons.

Isobath. A line on a map or chart that connects all points having the same depth below the surface of a body of water; also, having constant depth.

Isopod. Any of a large order of sessile-eyed crustaceans with the body composed of seven free thoracic segments, each bearing a similar pair of legs.

Isotherm. A line on a map or chart of the Earth's surface connecting points having the same temperature at a given time or the same mean temperature for a given period.

Karst. A limestone landscape that is characterized by sinks, underground streams, and caverns.

Keystone species. Organisms that play dominant roles in an ecosystem and affect many other organisms. The removal of a keystone

predator from an ecosystem causes a reduction of the species diversity among its former prey.

Krill. Planktonic crustaceans and larvae that constitute the primary food of baleen whales.

Krummholz. A discontinuous belt of stunted forest or scrub typical of windswept alpine regions close to treeline; a wind-deformed tree at high elevations.

Lacustrine. Pertaining to or living in lakes or ponds.

Lagoon. A shallow waterbody that is near or connected to a larger body of water.

Larvae. The wingless and often wormlike hatchlings of insects; also, the early form of an animal (such as a frog or sea urchin) which at birth or hatching is fundamentally unlike its parent and must metamorphose before assuming adult characteristics.

Leachate. The solution that is formed when water percolates through a permeable medium. A leachate may contain toxic material or bacteria.

Leaching. The removal of readily soluble components, such as chlorides, sulfates, organic matter, and carbonates, from soil by percolating water. The remaining upper layer of leached soil becomes increasingly acidic and deficient in plant nutrients.

Lentic. Related to still waters such as ponds, lakes, or swamps.

Levee. A raised embankment along the edge of a river channel. Natural levees result from periodic overbank flooding, when coarser sediment is immediately deposited because of a reduction in river velocity. Levees are often constructed by humans living in low-lying areas as protection against flooding.

Lichen. A composite organism consisting of a fungus and an alga or cyanobacterium living in symbiotic association. Lichens may be crust-like, scaly or leafy, or shrubby in form and are classified on the basis of the fungal partner. Many lichens are extremely sensitive to atmospheric pollution and have been used as pollution indicators.

Life history. The significant features of the life cycle through which an organism passes, with particular reference to strategies influencing survival and reproduction.

Life zone. See *biome*.

Limnic. Pertaining to lakes or to other bodies of standing fresh water; often used with reference only to the open water of a lake away from the bottom; limnetic.

List of Endangered or Threatened Species. A listing of animals and plants administratively

determined to meet legal criteria for protection under provisions of the U.S. Endangered Species Act.

Littoral zone. The biogeographic zone in a body of fresh water where light penetration is sufficient for the growth of plants; the intertidal zone of the seashore.

Loess. Unconsolidated sediment deposited by wind. Loess is usually composed of unstratified fine sand or silt.

Long-line fishing. A method of fishing which utilizes a piece of ground line (often kilometers in length) to which short (0.5 to 1.0 meter) ganglion lines are attached at intervals of 1 to 10 meters, with a baited hook at the end of each ganglion line.

Lotic. Relating to or living in moving water, such as a river or stream.

Macrofauna. Animals large enough to be seen with the naked eye.

Marsh. An ecosystem of more or less continuously waterlogged soil dominated by emergent herbaceous plants but without a surface accumulation of peat. A marsh differs from a swamp in that it is dominated by rushes, reeds, cattails, and sedges, with few if any woody plants, and differs from a bog in having soil rather than peat as its base.

Maximum Sustainable Yield. The maximum yield or crop which may be harvested year after year without damage to the system, or the theoretical point at which the size of a population is such as to produce a maximum rate of increase. The concept has been applied widely to commercial fisheries, forming the basis for models that predict stocking density required to maintain optimum fish production and the harvest methods and food supply required to maintain production at that level.

Megafauna. The largest size category of animals in a community.

Meiofauna. That part of the microfauna which inhabits algae, rock fissures, and superficial layers of the muddy sea bottom. They are smaller than 1 millimeter but larger than 0.1 millimeter.

Meristems. The undifferentiated, growing parts of plants, consisting of groups of cells capable of actively dividing.

Meroplankton. Temporary zooplankton, such as the larval stages of some organisms (fishes and crabs, for example).

Mesic. Neither wet (*hydric*) nor dry (*xeric*); intermediate in moisture, without extremes.

Mesopelagic. The ocean zone from 200 to 1,000 meters deep, where little light penetrates and the temperature gradient is even and gradual with little seasonal variation. This zone

contains an oxygen minimum layer and usually has the maximum concentrations of the nutrients nitrate and phosphate. It overlies the *bathypelagic* zone and is overlain by the *epipelagic* zone.

Metabolite. A product of metabolism or a substance that is essential to the metabolism of an organism or to a metabolic process.

Metamorphic rock. Preexisting rock that is restructured by high temperature and pressure.

Metapopulation. A group of populations, usually of the same species, which exist at the same time but in different places.

Microclimate. The climate that prevails in a small area, usually in the layer near the ground.

Microfauna. The smallest animals in a community, not visible to the naked eye.

Microturbellarians. Any of a class of mostly aquatic and free-living flatworms (Turbellaria), for example, planarians.

Midden. A heap of refuse. Also, a pile of seeds or of various items that were gathered by a rodent, for example, by a squirrel or packrat.

Miocene. A geologic epoch within the Tertiary period (about 26 to 5 million years B.C.).

Mollusk. An organism in the phylum Mollusca (for example, snails, clams, or squids), whose soft, unsegmented body parts are frequently enclosed in a shell.

Montane. Of, relating to, growing in, or being the biogeographical zone of relatively moist, cool upland slopes below the timberline, often dominated by large coniferous trees.

Moraine. An accumulation of boulders, stones, or other debris carried and deposited by a glacier.

Morphology. The form and structure of organisms.

Mosaic. Heterogeneous ecological conditions on a landscape, usually produced by the variable, patchy effects of disturbances; a patchwork of vegetation communities within a landscape as determined by environmental conditions.

Mustelid. One of a large, widely distributed family of small, lithe, carnivorous mammals, including weasels, otters, skunks, wolverines, and minks.

Mutagen. Any agent that produces a mutation or enhances the rate of mutation in an organism, for example, x-rays, gamma rays, and certain chemicals.

Mutualism. An interaction between members of two species which benefits both; in strict terms, obligatory mutualism, in which neither

species can survive under natural conditions without the other.

Mycorrhizae. The mutually beneficial association between a fungus and the roots of a plant; a mycorrhizal root takes up nutrients more efficiently than an uninfected root. Some plants seem to be incapable of normal development in the absence of their mycorrhizal fungi.

Nannoplankton. Minute planktonic organisms with a body diameter between 0.2 and 20 micrometers.

Nekton. (Also spelled *necton*.) Free-swimming organisms in aquatic ecosystems; unlike plankton, they are able to navigate at will (such as fishes, amphibians, and large swimming insects).

Nematode. Any of a phylum (Nematoda or Nemata) of elongated cylindrical worms parasitic in animals or plants, or free-living in soil or water.

Nemerteans. Any of a phylum (Nemertea) of often vividly colored marine worms, most of which burrow in the mud or sand along sea-coasts; often called ribbon worms.

Neotenic. Referring to an organism which has attained sexual maturity while retaining juvenile characteristics.

Neotropical migrant. A bird that nests in temperate regions and migrates to the Neotropical faunal region, which includes the West Indies, Mexico, Central America, and that part of South America within the tropics.

Neritic. Of, relating to, or inhabiting the shallow water, or nearshore marine zone extending from the low-tide level to a depth of 200 meters. The neritic zone is populated by benthic organisms because of the penetration of sunlight to these shallow depths.

Netplankton. Plankton larger than 25 micrometers in diameter.

Nitrogen fixation. The process of converting inorganic, atmospheric nitrogen into an organic form of nitrogen, ammonia. This process can be carried out by lightning, by photochemical fixation in the atmosphere, or by the action of microorganisms. Also, the chemical processes used in the manufacture of fertilizers.

Nival. Of, relating to, or growing under or in snow.

Nonindigenous. (Also called *exotic*, *nonnative*, *introduced*, and *alien*.) A plant or animal that is not native to the area in which it occurs; it was either purposely or accidentally introduced.

Nonpoint. Not from a single, well-defined site. Nonpoint sources are pollution-producing entities not tied to a specific origin, such as an

individual smokestack. Nonpoint sources of water pollution include runoff which washes pollutants from roads into storm sewers and bodies of water or agricultural chemicals from lawns, fields, and golf courses.

Nunatak. An exposed hill or mountain completely surrounded by glacial ice.

Obligate. Essential, necessary; unable to exist in any other state, mode, or relationship; restricted to one particularly characteristic mode of life. An obligate predator lives off of only one species or specific group of prey; an obligate parasite is capable of living naturally only as a parasite and only on its single host; an obligate halophyte is a plant that requires salty soils in order to thrive; an obligate relationship is a relationship between organisms in which neither can exist without the other.

Old-growth. Referring to an ecosystem or community, particularly a forest, which has not experienced intense or widespread disturbance for a long time relative to the lifespans of the dominant species and which has entered a late successional stage; usually associated with high diversity of species, specialization, and structural complexity.

Oligochaetes. Any of a class or order (Oligochaeta) of hermaphroditic terrestrial or aquatic annelid worms that lack a specialized head.

Oligotrophic. Waters or soils that are poor in nutrients and have low primary productivity.

Ontogenetic. Relative to the course of growth and development of an individual organism.

Osmerid. A member of the family of fishes (Osmeridae) to which the true smelts belong; smelts and smeltlike fishes.

Ovigerous. Carrying eggs, or modified for carrying eggs.

Oxidation. A reaction in which atoms or molecules gain oxygen or lose hydrogen or electrons.

Pair bonding. The forming of a pair for breeding.

Paleoecology. The application of ecological concepts to fossil communities.

Palustrine. Pertaining to wet or marshy habitats.

Palynology. The study of living and fossil pollen and spores.

Parasite. An organism that is intimately associated with and metabolically dependent on another living organism (the host) for completion of its life cycle, and which is typically detrimental to the host.

Passerine. Of or relating to the largest order (Passeriformes) of birds, which includes more than half of all living birds and consists primarily of perching songbirds, whose young are hatched in an immature and helpless condition.

Patch dynamics. The idea that communities are a mosaic of different areas (patches) within which nonbiological disturbances (such as climate) and biological interactions proceed.

Pathogen. A specific causative agent of a disease, such as a bacterium or a virus.

Patterned ground. An assemblage of small, geometric features (circles, polygons, nets, steps) at the surface of nonconsolidated, weathered rock, resulting from disturbance by frost action such as cracking, heaving, and mass movement.

Pelagic. Referring to or occurring in the open sea.

Percent cover. In descriptions of plant communities, the proportion of ground, expressed as a percentage, that is occupied by the perpendicular projection down onto it of the aerial parts of individuals of the species under consideration.

Perennial. A plant that normally lives for more than two seasons and which, often after an initial period, produces flowers annually.

Permafrost. A permanently frozen layer of soil at variable depth below the surface in frigid regions of a planet. It may be discontinuous, that is, it may be interspersed with areas that are free of permafrost.

pH. A measure of acidity and alkalinity of a solution, taken by measuring the relative concentration of hydrogen ions in the solution.

Phenology. The study of the relationship between climate and the timing of periodic natural phenomena such as migration of birds, bud bursting, or flowering of plants.

Phenotype. The observable manifestation of a specific genetic makeup; those observable properties of structure and function of an organism as modified by genetic structure in conjunction with the environment.

Piscivores. Fish-eaters; those organisms that subsist exclusively or primarily on fish.

Photic zone. The surface zone of the sea or a lake having sufficient light penetration for photosynthesis.

Photoperiod. The length of time an organism is daily exposed to light, especially with regard to how that exposure affects growth and development.

Phreatophyte. A plant that absorbs groundwater from the permanent watertable.

Phylogenetic. Pertaining to the evolutionary history of a group or lineage, or the evolutionary relationships within and between taxonomic levels; the relationships of groups of organisms as reflected by their evolutionary history.

Physiognomy. The physical features of something. For example, the physiognomy of a landscape includes its topography and vegetation.

Physiographic province. A region of the landscape with distinctive geographical features.

Physiography. Landform; physical geography.

Phytoplankton. One of two groups into which *plankton* are divided, the other being *zooplankton*. Phytoplankton comprise all the freely floating photosynthetic forms in the oceans.

Pingo. A low hill or mound forced up by hydrostatic pressure in an area underlain by permafrost and consisting of an outer layer of soil covering a core of solid ice. Pingos range from 2 to 50 meters in height.

Pinniped. Any of a suborder of aquatic carnivorous mammals with all four limbs modified into flippers; includes seals, sea lions, and walrus.

Pioneer. The first species or community to colonize or recolonize a barren or disturbed area, thereby commencing a new biological succession.

Placer mining. The removal of ore from placers, which are glacial or alluvial deposits of sand or gravel containing valuable minerals.

Plankton. One of three major ecological groups into which marine organisms are divided, the other two being the *nekton* and the *benthos*. Plankton are small aquatic organisms (animals and plants) that, generally having no locomotive organs, drift with the currents. The animals in this category include protozoans, small crustaceans, and the larval stages of larger organisms, while plant forms are mainly diatoms.

Playa. A nearly level area at the bottom of an undrained desert basin, sometimes temporarily covered with water during wet periods. Playas are barren and usually saline.

Pleistocene. The earlier epoch of the Quaternary period or the corresponding system of rocks; 1.6 million–10,000 years ago; the “Ice Age.”

Plutonic. Of or relating to conditions of rock formation from magma within the crust of the Earth.

Pluvial. Characterized by abundant rain.

Pocosin. A swamp or marsh in an upland coastal region. The term is chiefly used in the South Atlantic states of Virginia, Maryland, Delaware, and the Carolinas.

Polychaetes. Any of a class (Polychaeta) of chiefly marine annelid worms (such as clam worms), usually with paired segmental appendages, separate sexes, and a free-swimming trochophore larva.

Polychlorinated biphenyls (PCB's). A group of toxic, carcinogenic organic compounds containing more than one chlorine atom. PCB's were used in the manufacture of plastics and as insulating fluids in electrical transformers and capacitors. They behave much like DDT in the environment in that they are very stable compounds and are also fat-soluble; therefore, they accumulate in ever-higher concentrations as they move up the food chain. The use of PCB's was banned in the United States in 1979.

Population. A group of organisms, all of the same species, which occupies a particular area. Also, the total number of individuals of a species within an ecosystem, or of any group of similar individuals.

Primary producer. An organism capable of using the energy derived from light or a chemical substance in order to manufacture energy-rich organic compounds, mainly green plants.

Primary productivity. The rate at which biomass is produced by organisms which synthesize complex organic substances from simple inorganic substrates, such as in photosynthesis and chemosynthesis.

Primary production. The biomass produced through photosynthesis and chemosynthesis in a community or group of communities.

Progradation. The outward building of a sedimentary deposit, such as the seaward advance of a delta or shoreline, or the outbuilding of an alluvial fan.

Province. An area of land, less extensive than a region, having a characteristic plant and animal population.

Purse seine. A large seine net designed to be set by two boats around a school of fish and so arranged that after the ends have been brought together, the bottom can be closed.

Pyroclastic. Formed by or involving fragmentation as a result of volcanic or igneous action.

Quaternary. The period of geological time, a sub-era of the Cenozoic, which covers the last 1.6 million years; comprises the Pleistocene (“Ice Age”) and the Holocene epochs to the present and is noted for numerous major ice sheet advances in the northern hemisphere.

Radiation. In ecology, the spread of a group of organisms into new habitats.

Reagent. A compound involved in a chemical or biochemical reaction, especially one used in chemical analysis to produce a characteristic

reaction in order to determine the presence of another compound.

Recovery plan. A plan that lists the actions that must be taken and the objectives that must be reached before an organism is no longer endangered or threatened and may be removed from the list of endangered and threatened species.

Recruitment. The influx of new members into a population by reproduction or immigration.

Reduction. A chemical reaction in which atoms or molecules either lose oxygen or gain hydrogen or electrons.

Refugium. An isolated area where extensive changes, typically due to changing climate (such as glaciation) but also due to large-scale disturbances such as those caused by humans, have not occurred and where plants and animals typical of a region may survive. Such a refuge is a center of *relict* forms from which dispersion and speciation may take place after environmental readjustment.

Regime. A regular pattern of occurrence or action.

Region. An area of the Earth having a distinctive plant or animal life.

Relict. Persistent remnants of a formerly widespread species in certain isolated areas.

Remigrant. An individual migrant that returns to its previous or former location.

Remote sensing. Methods for gathering data on a large or landscape scale which do not involve on-the-ground measurement, especially satellite photographs and aerial photographs; often used in conjunction with Geographic Information Systems.

Resource partitioning. Division of some resource or resources among two or more co-occurring species; for example, eating slightly different foods.

Revetment. A facing made of supporting material, such as masonry or concrete, used to support an embankment.

Rhyolite. An acidic, volcanic rock that is the lava form of granite.

Riparian. Relating to, living, or located on the bank of a natural watercourse (such as a river) or sometimes of a lake or a tidewater.

Riprap. A general term for large, blocky stones that are artificially placed to stabilize and prevent erosion along a riverbank or shoreline.

Rookery. A breeding or nesting place for some gregarious mammals and birds.

Rotifers. Any of a class (Rotifera of the phylum Aschelminthes) of minute, usually microscopic but many-celled, chiefly freshwater aquatic invertebrates having the anterior end modified

into a retractile disk bearing circles of strong cilia that often give the appearance of rapidly revolving wheels. Rotifers mostly live in freshwater environments and eat a variety of bacteria and planktonic species.

Runoff. Precipitation on land that runs off to a body of water.

Salinity. A measure of the total concentration of dissolved salts in water. The salinity of ocean water is in the range 33–38 parts per thousand.

Salmonid. Any of a family of elongate bony fishes (such as salmon or trout) that have the last three vertebrae upturned.

Savanna. (Also spelled *savannah*.) A grassland–woodland mosaic vegetation type found in tropical and subtropical regions with long dry periods and receiving more rainfall than desert areas but not enough to support complete forest cover. A savanna is characterized by scattered trees or scattered clumps of trees and drought-resistant grasses. Fire often plays an important role in maintaining the vegetation.

Seamount. An underwater mountain (usually a submarine volcanic mountain peak) rising from the ocean floor whose summit is below the water's surface.

Secondary production. The biomass production resulting from the assimilation of organic matter produced by a primary consumer; production by organisms (mainly animals) which consume primary producers (mainly plants).

Secondary productivity. The rate of biomass production resulting from the assimilation of organic matter produced by a primary consumer; production by organisms (mainly animals) which consume primary producers (mainly plants).

Sediment. Materials that sink to the bottom of a body of water or materials that are deposited by wind, water, or glaciers.

Seleniferous. Referring to an ore containing selenium, or referring to a plant that absorbs selenium from the soil and concentrates the selenium within its tissues.

Senescence. The aging process in mature individuals; or, the period near the end of an organism's life cycle; in deciduous plants, the process that occurs before the shedding of leaves.

Seral. Relating to a phase in the sequential development of ecological communities formed in ecological succession in a particular habitat and leading to a particular climax association; intermediate communities in an ecological succession.

Serotinous. Late in developing or blooming.

Serotinous cones. Pine cones that remain on the tree for many years and are tightly closed

until stimulated by the heat of a forest fire to open and release seeds.

Serpentine. A mineral rock consisting essentially of a hydrous magnesium silicate (chrysotile and antigorite) and usually having a dull green color and often a mottled appearance; or, the usually infertile, excessively well-drained soil derived from serpentine.

Sessile. Permanently attached to a substrate or established; not free to move about. Also, attached without a stalk.

Short-stopping. The process of creating habitat improvements to hold geese or ducks throughout the winter in an area that was historically used only as a migratory stopover point en route to wintering grounds farther south. Examples of short-stopping methods include measures that keep water bodies open (that is, unfrozen) and available to birds all winter, or providing food items on which birds can forage throughout the winter in areas where little or no food was formerly available.

Silviculture. The management of forests or woodlands for the production of timber and other wood products; growing trees as a crop.

Sink. A sinkhole; or, an area with a demand for metabolic substances. For example, growing meristems are sinks for energy compounds from photosynthesis, mitochondria are oxygen sinks, and tropical rainforests or deep oceans may act as carbon sinks, absorbing carbon dioxide from the atmosphere.

Sinkhole. A hollow place or depression in which water collects and goes underground, generally occurring in limestone regions and formed by solution or by collapse of a cavern roof.

Slough. A swamp, marsh, or muddy backwater.

Smolt. The stage in the life of salmon and similar fishes in which the subadult individuals acquire a silvery color and migrate down the river to begin their adult lives in the open sea.

Snag. A standing dead tree or stump that provides habitat for a broad range of wildlife, from beetle larvae (and the birds that feed upon them) to dens for raccoons. Or, a tree or branch embedded in a river or lake.

Solifluction. The slow creeping of fragmented material such as soil down a slope.

Spawn. The eggs of certain aquatic organisms; also, the act of producing such eggs or egg masses.

Species. A group of organisms formally recognized as distinct from other groups; the taxon rank in the hierarchy of biological classification below genus; the basic unit of biological classification, defined by the reproductive

isolation of the group from all other groups of organisms.

Species diversity. See *diversity*.

Species richness. The absolute number of species in an assemblage or community.

Staging area. A traditional area, usually a lake, where birds that migrate in flocks rest and feed either immediately before or during migration. Many flocks may be gathered in such an area.

Standard error. In statistics, the standard deviation of the sampling distribution of a statistic; an estimate of the range by which the means of a number of sets of data deviate about the mean of those means.

Standing stock. Biomass; the total mass of organisms comprising all or part of a population or other specified group or within a given area; measured as volume, mass, or energy.

Steppe. Specifically, the temperate, semiarid areas of treeless grassland in the midlatitudes of Europe and Asia; more generally, any such grassland.

Stochastic. Random.

Subaerial. Occurring immediately above the surface of the ground.

Subalpine. The zone just below treeline on temperate mountains, usually dominated by a coniferous forest ecologically similar to boreal forest. The elevation of this zone increases with a decrease in latitude.

Sublittoral zone. The deeper zone of a lake below the limit of rooted vegetation; the marine zone extending from the lower margin of the intertidal (littoral) to the outer edge of the continental shelf at a depth of about 200 meters; sometimes used for the zone between low tide and the greatest depth to which photosynthetic plants can grow.

Submersed. Pertaining to a plant or plant structure growing entirely underwater.

Subnivian. Beneath the snow cover; specifically, the interface between snow and the surface of the ground where small mammals are active in winter.

Subsidence. The process of sinking or settling of a land surface or a crustal elevation because of natural or artificial causes.

Subspecies. A race of a species that is granted a taxonomic name; rules for designating subspecies are subjective, but subspecies are generally geographically distinct and form populations (not merely morphs) which differ to some degree from other geographic populations of the species.

Substrate. The surface or medium that serves as a base for something.

Subterranean. Under the surface of the Earth.

Subtidal. Applied to that portion of a tidal-flat environment which lies below the level of mean low water for spring tides. Normally it is covered by water at all states of the tide. Often used as a general descriptive term for a subaqueous but shallow marine depositional environment.

Subtropical. The latitudinal zone between 23.5° and 34.0° in either hemisphere, bordering the tropical zone. Also can refer to vegetation, organisms, or weather typical of subtropical habitats.

Succession. See *ecological succession*.

Succulent. A plant that has a specialized fleshy tissue in roots, stems, or leaves for the conservation of water. Most succulents are xerophytes, plants preferring dry climates, such as cactus or aloe, but some are halophytes, adapted for living in salty soils where water retention is a problem.

Suspended sediment. Sediment suspended in a fluid by the upward components of turbulent currents, moving ice, or wind.

Sustainability. Economic development that takes full account of the environmental consequences of economic activity and is based on the use of resources that can be replaced or renewed and therefore are not depleted.

Swale. A low tract of land, especially when moist or marshy.

Sympatric. Referring to populations, species, or taxa occurring together in the same geographical area; they may occupy the same habitat or different habitats within the same geographical area.

Synergistic. Of or pertaining to the cooperative action of two or more agencies such that the total is greater than the sum of the component actions; combined action or operation.

Syntopic. Relating to or displaying conditions as they exist simultaneously over a broad area, as of the atmosphere or weather.

Tailings. The fine-grained waste materials from an ore-processing operation.

Taxon (taxa). Any organism or group of organisms of the same taxonomic rank; for example, members of an order, family, genus, or species.

Tectonic movement. The formation of faults and folds on the crust of a planet.

Temporal niche. The functional position of an organism in its environment as determined by the periods of time during which it occurs and is active there.

Teratogen. A substance which interferes with the normal development of a fetus or embryo.

Tertiary. The first period of the Cenozoic Era which began about 65 million years and lasted to 1.6 million years before the present, marked by formation of high mountains, the dominance of mammals on land, and angiosperms superseding gymnosperms as dominant plants.

Thaliaceans. Any of a small order of tunicates consisting of various aberrant, free-swimming pelagic forms, including those of the genera *Salpa* and *Doliolum*.

Thermokarst. A landscape characterized by shallow pits and depressions caused by selective thawing of ground ice, or permafrost.

Topography. The natural and constructed relief of an area.

Transect. A line or narrow belt used in ecological surveys to provide a means of measuring and representing graphically the distributions of organisms across a given area.

Transpiration. The loss of water vapor from a plant to the outside atmosphere, mainly through the stomata of leaves and the lenticels of stems.

Treeline. The upper limits of tree growth in mountains or at high latitudes.

Triploid. A polyploid having three sets of homologous chromosomes.

Trophic. Pertaining to nutrition or to a position in a food web, food chain, or food pyramid.

Tropical. Referring to the zone between the Tropic of Cancer (23°27'N) and the Tropic of Capricorn (23°27'S); characterized by a climate with high temperatures, humidity, and rainfall. Also can refer to vegetation, organisms, or weather typical of tropical conditions.

Tundra. A level or rolling treeless plain in the arctic or subarctic regions; the soil is black and mucky, the subsoil is permanently frozen, and the vegetation is dominated by mosses, lichens, herbs, and dwarf shrubs. A similar environment occurs in mountainous areas above the timberline.

Tunicate. Any of a subphylum (Urochordata or Tunicata) of marine chordate animals that have a thick secreted covering layer, a greatly reduced nervous system, a heart able to reverse the direction of blood flow, and a notochord in the larval stage.

Turbid. Having sediment or foreign particles stirred up or suspended; muddy.

Tussock. A compact tuft of grass or sedges, or an area of raised solid ground, which is held together by roots of low vegetation, found in a wetland or tundra.

Ultisol. A member of a soil characterized by acidic, highly weathered layers with accumulations of silicate clays in subsurface layers; usually forms in tropical and subtropical climates.

Ultraviolet radiation. Electromagnetic radiation at wavelengths between 10 and 400 nanometers lying just beyond the high-energy (violet) end of the visible-light band of the solar spectrum; about 5% of the radiation the Earth receives from the sun, much of which is absorbed by the atmosphere. UV-A = 315 to 400 nanometers wavelength; UV-B = 280 to 315 nanometers; UV-C = 100 to 280 nanometers. UV-B is the part of the spectrum that causes sunburn and has been linked to skin cancer.

Umbellifer. A plant bearing flat-topped or rounded flower clusters in which the individual flower stalks arise from about the same point, such as the geranium, milkweed, onion, and chive.

Understory. The vegetation layer between the overstory or canopy and the groundcover of a forest community, usually formed by shade-tolerant species or young individuals of emergent species. May also refer to the groundcover if no tree or shrub layer is present.

Ungulate. Any four-footed, hoofed, grazing mammal (such as a ruminant, swine, camel, hippopotamus, horse, tapir, rhinoceros, elephant, or hyrax) that is adapted for running but is not necessarily related to other ungulates.

Upwelling. The upward movement of cold, nutrient-rich water from ocean depths, produced by wind or diverging currents.

Vascular plant. A plant with a specialized conducting system (for the transport of water and nutrients) that includes xylem and phloem; includes familiar higher plants such as trees, shrubs, and grasses.

Vegetative reproduction. (Also called *vegetative propagation*.) A reproductive process that is asexual and so does not involve a recombination

of genetic material. It involves unspecialized plant parts which may become reproductive structures (such as roots, stems, or leaves). Compared with sexual reproduction, it represents a savings of material and energy for the plant. It is especially common among grasses.

Vertebrate. An animal with a backbone; includes mammals, birds, reptiles, amphibians, and fishes.

Volant. Flying or capable of flying.

Watershed. An area or a region that is bordered by a divide and from which water drains to a particular watercourse or body of water.

Wetland. A general term applied to land areas which are seasonally or permanently waterlogged, including lakes, rivers, estuaries, and freshwater marshes; an area of low-lying land submerged or inundated periodically by fresh or saline water.

Woodland. A vegetation community that includes widely spaced large trees. The tree crowns are typically more spreading in form than those of forest trees and do not form a closed canopy. Grass, heath, or scrub may develop between the trees.

Xeric. Dry; tolerating or adapted to dry conditions.

Year-class. Fish of a given species spawned or hatched in a given year; for example, a three-year-old fish caught in 1998 would be a member of the 1995 year-class.

Zoeae. The free-swimming, planktonic larval forms of many decapod crustaceans (especially crabs) that have a relatively large cephalothorax, conspicuous eyes, and fringed antennae and mouthparts.

Zooplankton. See *plankton*.