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A Glossary of Ecological Terms for Coastal Engineers

compiled by
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PREFACE

Recent increased public awareness of man's role in the environment has resulted in a proliferation in usage of technical ecological terminology. Many of these terms, popularized through common lay usage, have lost their original meaning or the meaning has become obscured. This glossary is designed to provide the coastal engineer with clear, nontechnical definitions of common coastal ecology terms. It is not intended as an authoritative technical reference for the professional ecologist. The definitions are syntheses of numerous definitions; no one source can be credited as a reference. Definitions and usage of many of the terms are still debated among professionals in the field and precise definitions may still be elusive.

The reader is referred to the following sources for the precise definition of a specific term used in a limited sense.

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NOTE: Comments on this publication are invited.

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Colonel, Corps of Engineers
Commander and Director

A GLOSSARY OF ECOLOGICAL TERMS FOR COASTAL ENGINEERS

— A —

adaptive radiation — An evolutionary process whereby a species goes through evolutionary divergence from a single phyletic line (a single species) into a series of different niches or adaptive zones usually as the result of intraspecific competition.

aerobe—An organism that can live and grow only in the presence of oxygen.

aggregation—(1) The clumping or nonrandom distribution of individuals. (2) A situation where certain dominant species or genera are always found in certain niches and have similar communities or associations.

algaculture—The growing, or farming, of algae, usually as a food source for higher organisms. See also **aquaculture** and **mariculture**.

alkaline—The excess of hydroxyl ions over hydrogen ions. Seawater is usually alkaline.

alkalinity—The capacity of a water to accept protons, i.e., hydrogen ions. It is usually expressed as milliequivalents per liter.

allochthonous—Usually refers to material resources which originated outside the division of an ecosystem under consideration.

allogenic succession — Succession induced by geochemical processes acting from outside the local community.

amensalism—The interaction of two species resulting in one species being inhibited and the other not affected.

anabolism—The metabolic process of building products from less complex substances (e.g., proteins from amino acids)—as opposed to **catabolism**. See also **metabolism**.

anadromous—A life cycle in which maturity is attained in the ocean and the adults ascend rivers and streams to spawn in freshwater (e.g., salmon).

anaerobic—An oxygen-independent type of respiration.

anaerobic sediment—A highly organic sediment with no free oxygen present. Usually rich in hydrogen sulfide.

anaerobic zone—A zone where oxygen is lacking. Substances are reduced, not oxidized.

anaerobe—An organism living under no or little oxygen concentrations. See also **facultative anaerobe** and **obligate anaerobe**.

annuals—Plants that go through an entire life cycle of seed to adult to seed in one year.

antagonism—A relationship between species in which at least one species is harmed.

antibiosis—The relationship between species in which certain substances produced or excreted by one species are generally harmful to others (e.g., fish kills caused by **red tide** toxins).

aphotic zone—An aquatic zone of no light penetration, therefore, no **primary productivity** takes place in this zone.

A—Continued

aquaculture—The farming of fish, shellfish, algae and other aquatic organisms and the development of methods of rearing aquatic organisms. See also **algaculture** and **mariculture**.

aquatic—Growing or living in, or frequenting, water—as opposed to **terrestrial**.

assimilation—The uptake of food material for production of new **biomass**.

association—In an ecological sense, a subunit of community organization identified by its major organisms.

aufwuchs—See **periphyton**.

autecology—The study of the individual organism or species rather than the community. Life history and behavior, rather than adaptation to environment, are usually emphasized.

autogenic succession — Succession induced by biotic processes acting from within the system.

autolysis—Self-breakdown of a cell. This is one pathway in detrital recycling of nutrients.

autotomy—The process of self-amputation of extremities or organs by reflex action. Regeneration usually follows.

autotroph—A self-nourishing organism that makes its own food from inorganic components.

autotrophic—(1) The process by which an organism manufactures its own food from inorganic compounds. (2) The ability to use simple inorganic substances and an energy source for synthesis of more complex compounds (e.g., green plants). Compare with **heterotrophic**.

autotrophic succession — A type of community succession in which productivity exceeds respiration in early successional stages, but the two tend to equilibrate in more mature stages. Compare with **heterotrophic succession**.

— B —

balanus zone — The area where balanoid (stalkless, sessile) barnacles inhabit the shore, generally restricted to part of certain intertidal and splash zones.

barriers — In an ecological sense, those physical, chemical, climatic or biologic factors which are foreign to an organism's native habitat and exceed the tolerance of that organism. These factors may offer enough resistance to stop the dispersal or force the retreat of that organism.

benthic — Pertaining to the subaquatic bottom.

benthos—A collective term describing: (1) Bottom organisms attached or resting on or in the bottom sediments. (2) Community of animals living in or on the bottom.

bioassay—The use of living organisms as an index to determine environmental conditions.

Biochemical Oxygen Demand (BOD)—The amount of oxygen required by the biological population of a water sample to oxidize the organic matter in that water. It is usually determined over a 5-day period under standardized laboratory conditions and hence may not represent actual field conditions.

biocoenosis—Approximately equal to a biotic community of plants (phyto-coenosis) and animals (zoocoenosis). See also biogenocoenosis and ecosystem.

bioecology—A collective term that includes plant and animal ecology as one discipline.

bioenergetic—Of or relating to the energy flow of a population of organisms.

biogenic deposits—A geological deposit resulting from the physiological activity of organisms such as calcareous algae.

biogeochemical cycling—The cycling of chemical constituents through a biological system.

biogeocoenosis—Any unit that includes all the organisms, i.e., the biotic community in a given area interacting with the physical environment so that a flow of energy leads to clearly defined trophic structure, biotic diversity and material cycles within the system. See also biocoenosis and ecosystem.

biogeography—The study of geographical distribution of plants and animals and the reasons for the distribution.

biological clock—A physiological mechanism which allows an organism to estimate time. See circadian rhythm.

biological magnification—The concentration of certain substances up a food chain. A very important mechanism in concentrating pesticides and heavy metals in organisms such as fish.

bioluminescence—The production of light, without sensible heat, by living organisms as a result of a chemical reaction either within certain cells or organisms or extra-cellularly by some form of secretion.

biomass—The amount of living material in a unit area for a unit time. Also standing crop, standing stock, live-weight.

biomass pyramids—A graphic representation of biomass at each trophic level. It does not indicate importance of specific organisms.

biome—A major community of plants and animals associated with a stable environmental life zone or region (e.g., Northern Coniferous Forest or Great Plains).

biophages—Those organisms which obtain nourishment from other organisms (e.g., predators, parasites, and pathogens).

biosphere—The transitional zone between, and including parts of the earth and the atmosphere where all living organisms commonly dwell.

biostrome—Bedded structures such as shell beds consisting of, or built mainly by sedentary organisms.

biota—The living part of a system (flora and fauna).

biotic community—(1) All of the plant and animal populations occupying a given area, usually named after the dominant (in size or numbers) plant or animal in area. (2) An integrated, mutually adjusted assemblage of organisms inhabiting a natural area. The assemblage may or may not be self-sufficient and is considered to be in a state of dynamic equilibrium.

biotic factors—Factors of a biological nature such as availability of food, competition between species, predator-prey relationship etc., which besides the purely physical and chemical factors, also affect the distribution and abundance of species.

biotic potential—(1) The maximum reproduction power or ability. The inherent property of an organism to reproduce and survive in greater numbers. (2) The ability of an organism to reproduce in an optimum, unrestricted, noncompetitive environment.

biotic succession—The natural replacement of one or more groups of organisms occupying a specific habitat by new groups. The preceding groups in some ways prepare or favorably modify the habitat for succeeding groups.

carnivore—A flesh eater. The highest trophic level(s) at the top of most food chains.

carrying capacity—The maximum number of a species that any particular area can support over an extended period of time.

casts—Deposits of fecal material with attendant undigested sediment. Frequently found as pellets or strands.

catabolism—The metabolic process breaking compounds (e.g., sugar) into simpler substances to release energy—as opposed to **anabolism**. See also **metabolism**.

catadromous—A life cycle in which maturity is reached in freshwater and spawning takes place at sea (e.g., the American eel).

biotope—Habitat, a rather specific kind of living space. See also **ecotope**.

biotype—In plants or animals, a phenomenon where the **genotypes** are similar, but the **phenotypes** are different due to local conditions.

birthrate—Number of births in a given time period. Usually expressed as births per 1,000 population per year or per generation.

bloom—See **plankton bloom**.

B.O.D.—See **Biochemical Oxygen Demand**.

brine—Water containing a concentration of dissolved salts higher than that of ordinary seawater.

budding—An asexual means of reproduction in lower organisms where a small replica of the adult grows from the parent.

— C —

chemotrophic nutrition—A process by which an organism manufactures its food by using the energy derived by oxidizing inorganic matter.

chitin—A nitrogenous polysaccharide forming the basic part of the arthropod exoskeleton.

chlorophyll—The green pigment used in photosynthesis, found primarily in plants.

circadian rhythm—The most common manifestation of the **biological clock**, being the ability to repeat certain functions daily without external clues, such as light-dark cycles. See also **diel periodicity**.

C—Continued

climatic community—A community that is in equilibrium with the general climate, theoretically the climax or final sere.

climax—The final stage in community succession. See also **climatic community**.

clone—A term describing all succeeding generations developed from one parent organism and therefore genetically uniform.

colonization — A natural phenomenon where a species invades an area previously unoccupied by that species and becomes established. To be successful the species must be able to reproduce in that area.

commensalism — A relationship between two interacting species or populations in

which one benefits while the other remains unaffected.

community, biotic—See **biotic community**.

constancy — The percentage of uniform samples containing the species. Used in determining associations.

contagious distribution — Nonrandom or clustered distribution of members of same species.

coprophagic—Animals that eat feces.

crepuscular—Refers to twilight time.

crude density—See **density**.

cryptozoa—Animals that remain hidden.

— D —

decomposers—Usually microconsumer organisms which break down organic matter and thus aid in recycling nutrients.

decreasers — A species that decreases in density under continued grazing and hence can be used as an index for range management. Opposite of **increasers**.

demersal—Organisms (usually fish) that live on or slightly above the bottom.

density—In an ecological sense density is usually subdivided into two categories: (1) **crude density**—the number or biomass per unit of total area and (2) **specific density**—the number or biomass per unit of habitable (colonizable) area.

detritovores—Detritus feeders.

detritus—Any fine particulate debris, usually of organic origin, but sometimes defined as organic and inorganic debris.

diel periodicity — Used in referring to a phenomenon that occurs regularly every 24-hour period. See also **circadian rhythm**.

dimictic lake—A lake with two seasonal overturns (periods of free circulation) usually in spring and fall.

dimorphism—Occurrence of two different forms of the same species.

dioecious—Male and female reproductive parts in different individuals.

disclimax—A stable nonclimax community that is maintained by animals or fire.

D—Continued

dispersal—Movement of individuals or their disseminants or propagules (seed, spores, larvae) out of a population or area.

disphotic zone—The dimly lit zone in bodies of water where there is insufficient light for photosynthesis.

diversity—Refers to the number of different kinds of species in an area.

diversity indices—Various formulas convert numbers and importance of species, and

numbers of individuals into dimensionless values which indicate variety.

dominants—A species or group of species which largely control the energy flow and strongly affect the environment within a community or association.

dystrophic lake—A lake which is low in productivity and contains brown-stained, low pH waters which have a high organic content.

— E —

ecdysis—The shedding of the old exoskeleton in arthropods.

ecological energetics—The cycling of energy through trophic levels. Some energy is lost when transferred from one trophic level to the next higher.

ecological indicators—Species or associations which indicate certain ecological conditions such as soil, type, climate, temperature or salinity.

ecological succession—See **succession**.

ecological valency—Refers to the range of environmental variation tolerated by a species.

ecosystem—The living organisms and the nonliving environment interacting in a given area. See also **biocoenosis** and **biogeocoenosis**.

ecotone—A transitional area between two or more communities. See also **edge effect**.

ecotope—Physical environment of a habitat. See also **biotope**.

edaphic—A term referring to the soil conditions or types as ecological factors.

edge effect — The change increase (usually increase) in species diversity and density in the transitional area between communities. See also **ecotone**.

eltonian pyramids—Refers to the concept of representing trophic levels as layers based on numbers of individuals or mass, thus forming a pyramid. Primary producers create the greatest mass and carnivores the least. See also **pyramids**.

emergent vegetation — Plants which although rooted in shallow water have most of their growth above the water.

endemic—Native to a specific geographic area.

endogenous—Originating or growing from a specific geographic area.

energetics, ecological—See **ecological energetics**.

epilimnion—In lakes, the layer of water above the thermocline. It is the area where main primary productivity takes place.

epipelagic—The upper portion of the oceanic province extending from the surface to a depth of about 185 meters.

estuary—In ecological usage: a semi-enclosed coastal body of water which has a free connection with the open sea. The seawater is usually measurably diluted with freshwater.

eulittoral—That part of the littoral zone less than 50 meters in depth.

euphotic zone—The layer of water which receives ample sunlight for photosynthesis. It varies with the light extinction coefficient. Usually no deeper than about 60 meters.

eury—A prefix referring to a wide range of some parameter. Opposite of *steno*.

eutrophic lake—A shallow lake that has good primary productivity, usually abundant littoral vegetation, and dense plankton population. Blooms occur

when nutrient and physical conditions are right. The bottom water, during later stages of eutrophication, tends to become depleted of oxygen during the summer.

eutrophication—The process whereby a body of water becomes highly productive due to the input of large quantities of nutrients. It may have high dissolved oxygen concentrations near the surface during the day and low concentrations during the night. The bottom waters usually have low dissolved oxygen and high organic concentrations at all times of day.

exoskeleton—A hard outer covering which acts as a support structure for muscle attachment.

exotics—Nonendemics. Organisms which are not native but introduced.

exploitation—Usually the use of one species by another. Usually only one species benefits from this relationship.

— F —

facultative anaerobe—An organism that doesn't necessarily require lack of oxygen for survival, but is able to live either in the presence (usually at low concentrations) or absence of oxygen. See also *anaerobe* and *obligate anaerobe*.

fauna—Animal life as opposed to *flora* (plant life). Generally the entire group of animals found in an area.

fecundity—The amount of egg or sperm production per individual or population.

feral—An adjective describing formerly domesticated animals gone wild.

fidelity—The degree of restriction of a species to a particular association.

filter feeding—A feeding process employed by many aquatic organisms in which water currents are passed through a filtering system and small organisms are selectively strained out and eaten.

flora—Plant life as opposed to *fauna* (animal life). The entire group of plants found in an area.

F—Continued

flushing time—The time required to replace all the water in an estuary, harbor, etc., by action of current.

food chain—The sequence of organisms in which each is food for a higher member of the sequence. Due to energy loss at each level there are usually not more than four or five steps per chain.

food cycle—Production, consumption and decomposition of food and the energy relationships involved.

food web—A group of interrelated food chains. See also **food chain**.

fouling organism—An organism that attaches to the surface of submerged or introduced objects regardless of whether the objects are natural or man-made.

— G —

genotype—The genetic makeup of an organism regardless of whether the genetic trait is expressed or not.

geobiocoenosis—See **biogeocoenosis**.

grazing—In aquatic habitats, the consumption of phytoplankton by zooplankton.

growth forms—Populations have characteristic patterns of increase which are called **population growth forms**. These are represented by two curves: (1) J-shaped and (2) S-shaped. Trees, shrubs and herbs also have characteristic growth forms, patterns, or shapes.

— H —

habitat—The place where an organism lives.

halophyte—A plant that tolerates and lives in salty soil.

herbivores—Animals that feed primarily on plants.

heterotrophic—A metabolic process dependent on complex organic food originating in other plants and animals. Compare with **autotrophic**.

heterotrophic succession—A type of community succession in which respiration exceeds production in early successional stages, but the two tend to equilibrate in more mature stages. Compare with **autotrophic succession**.

holocoen—The interactions between environmental factors and organisms, equivalent to **ecosystem**

holological approach—Analysis of a system (e.g., as to heat budget) where the system is taken as a whole and treated as a "black box" where only input and output are considered. See also **merological approach**.

holomictic lakes—Lakes where bottom and surface waters are mixed periodically.

home range—The area which an individual or family uses. It is more or less fixed. If actually defended, it is the animal's **territory**.

homeostasis—The tendency of a system to remain at or return to normal, after or during an outside stress.

H—Continued

homoiosmotic—Referring to an organism which steadily maintains a total internal concentration of body fluids independent of that of the environment.

hydrophyte—A water- or moisture-loving plant. As opposed to **xerophyte**.

hydrosere,—A wet sere. See also **sere**.

hypertonic—Osmotic concentration higher than the surrounding medium.

hypotonic—Osmotic concentration lower than the surrounding medium.

hypolimnion—That part of a lake below the thermocline.

— I —

increasers—A species which increases in abundance under continuous grazing. Opposite of **decreasers**.

interstitial—A term referring to the spaces between particles, (e.g., the spaces between the sand grains). See also **meiofauna**.

instar—A term referring to the period in an arthropod's life between each ecdysis or molt.

intrinsic factors—When referring to colonization by an organism, those attributes or **genotypes** of that organism which permit it to invade and survive in a new area (e.g., locomotor ability, structure, physiological and behavioral properties).

— L —

lake, dimictic—See **dimictic lake**.

lake, dystrophic—See **dystrophic lake**.

lake, eutrophic—See **eutrophic lake**.

lake, meromictic—See **meromictic lake**.

lake, monomictic—See **monomictic lake**.

lake, oligomictic—See **oligomictic lake**.

lake, oligotrophic—See **oligotrophic lake**.

lake, polymictic—See **polymictic lake**.

larva—A sexually immature form of any animal unlike its adult form and requiring changes before reaching the basic adult form.

lentic—Standing waters, lakes and ponds, as opposed to **lotic**, running waters.

light compensation level — The depth at which production by photosynthesis just balances respiration.

light-dark-bottle technique—A method for measuring primary productivity. Two representative water samples are taken and one is covered so no light can penetrate. The bottles are "incubated" at the original depths and location, then oxygen content is measured. The difference can be related to productivity.

limnetic zone — In freshwater, the water zone from the surface to the **light compensation level**.

L—Continued

limnology—The study of freshwater bodies, physically, biologically, and chemically.

littoral—Several usages in ecology: (1) The zone between extreme high and extreme low tides. (2) Occasionally the zone from the shore to the light compensation level. (3) In lakes, shallow water from

the shore to the light compensation level. (4) The zone from high tide level to edge of Continental Shelf.

live weight—See **biomass**.

lotic—Running waters, streams, and rivers as opposed to **lentic**, standing waters.

— M —

macrobiota—Large life forms visible to the naked eye.

macroclimate—The most general overall climate picture for an area, usually not specifically including the area immediately next to the surface. See also **microclimate**.

macrofauna—Those animals equal to or larger than 1 millimeter in size.

macronutrients—Elements and their compounds needed in relatively large amounts as opposed to **micronutrients**.

macroplankton—Planktonic organisms that can be readily seen with the unaided eye or those greater than or equal to 1 millimeter in length.

mariculture—The culturing of fish, shellfish, etc. in saltwater. See also **algaculture** and **aquaculture**.

marine-littoral sediments — (1) **Neritic**: Composed of earth mixed with organic substances of shallow water. (2) **Terrestrial**: Mineralized substances carried into the sea by rivers.

marsh—In biological usage: (1) A herbaceous plant-dominated ecosystem in which the rooting medium is inundated for long periods if not continually, (2) An area of

soft, wet flatland periodically flooded by saltwater is called a **salt marsh**.

megaloplankton—Plankton greater than 1 centimeter.

meiofauna—Generally those interstitial animals between 1.0 and 0.5 millimeters in size.

merological approach—As opposed to the "black box" approach, a method which attempts to investigate an ecosystem as individual units making up the whole system. See also **holological approach**.

meromictic lake—A permanently stratified lake, most commonly as a result of chemical differences in **hypolimnial** and **epilimnial** waters.

meroplankton—Nonpermanent planktonic larval stages of **benthos** and **nekton**.

meso — A prefix referring to or of the middle.

mesophyte—Plants adapted to medium moisture conditions, neither a **xerophyte** nor a **hydrophyte**.

mesoplankton—A subdivision of the **macroplankton** containing organisms between 1 millimeter and 1 centimeter in size. It is also used to describe plankton in mid-depth waters and hence can be a confusing term.

M—Continued

metabolism—The process by which an organism builds and breaks down compounds within the organism. See also **anabolism** and **catabolism**.

metagenesis — Alternation of generations; the occurrence of an asexual stage followed by a sexual stage in the life history of an organism.

metamorphosis—The process of changing through stages from egg to adult. (1) Complete: egg, larva, pupa, adult. (2) Incomplete: egg, nymph, adult.

microbiota—Small microscopic organisms. Opposite of **macrobiota**.

microclimate—The climate conditions in small areas that, due to localized conditions, are different from the general climatic conditions in the area (e.g., south-facing slope or under-rock habitat). See also **macroclimate**.

microfauna—Those animals equal to or less than 0.5 millimeter in size.

micronutrient—A nutrient needed in small or trace amounts, as opposed to **macronutrient**.

nannoplankton—Plankton in the size range 5 to 60 micrometers, defined as uncatchable in standard plankton nets.

natality—See **birthrate**.

natural selection—The differential perpetuation of genotypes, where selective pressure favors one **genotype** over another.

microplankton—Plankton within size range of 60 micrometers to 1 millimeter.

mixed layer—A water layer mixed by wind, wave, or thermal action.

molt—In arthropods, the shedding of the **exoskeleton** to allow for growth and development.

monocultural system—A system where one species is maintained, usually artificially.

monoecious—The production of sperm and eggs by the same organism but not necessarily self-fertilizing.

monomictic lake—A lake with only one overturn per year. There are two types: (1) Warm—water never below 4°C, overturn in the winter; and (2) Cold—water never above 4°C, overturn in the summer.

mortality—Number of deaths in a given time period. Usually expressed as deaths per 1,000 population per year or per generation.

mutualism—A symbiotic relationship in which both members benefit. Neither can survive without the other.

— N —

nekton—Those aquatic animals able to swim efficiently, and not mainly at the mercy of currents.

neritic—(1) Refers to waters over the Continental Shelf. (2) Pertaining to that part of the Continental Shelf between the low tide line and depths of 200 meters including both bottom and overlying waters.

N—Continued

neuston—Those organisms living in association with the surface film layer at the air surface interface.

neutralism—A symbiotic relationship with no effect on either organism.

niche—An organism's habitat and functional role in the community.

nitrogen cycle—The numerous biogeochemical processes which result in the cycling of nitrogen in the many chemical forms required by various organisms.

nitrogen fixation—An energy requiring process whereby nitrogen gas is converted to **amino** or **ammonia** nitrogen.

— O —

obligate anaerobe — An organism that requires the absence of molecular oxygen to survive. See also **anaerobe** and **facultative anaerobe**.

oligo—Prefix referring to or of few.

oligomictic lake—A lake whose waters are rarely or very slowly mixed. It is thermally stable and usually located in the tropics.

oligotrophic lake—A lake which is low in nutrients and therefore has low productivity. These lakes are generally geologically young.

omnivore—An animal that eats both animal and plant material.

organism—Any living individual whether plant or animal.

osmoregulation—The ability to regulate ionic concentrations in body fluids.

osmosis—The diffusion of substances, solute or solvent, through a semipermeable membrane from a region of high concentration to a region of low concentration resulting in the tendency for the concentrations to equilibrate.

overturn—The mixing of **hypolimnion** and **epilimnion** zones in lakes.

ovigerous—Bearing eggs as in a berried lobster or crab.

oviparous—A form of reproduction where the eggs hatch outside the body. Compare with **ovoviviparous** and **viviparous**.

ovoviviparous—A form of reproduction where the eggs are hatched in the mother's body, but derive no nourishment directly from her. The young are born alive. Compare with **oviparous** and **viviparous**.

oxygen debt — A temporary phenomenon that occurs in an organism when available oxygen is inadequate for respiratory demand. Partially metabolized products are stored and oxidized when oxygen is available.

oxygen deficit — The difference between oxygen, concentration actually present and the amount that would theoretically be present at 100 percent saturation for the existing conditions of temperature and pressure.

oxygen sag — The temporary decrease in oxygen concentration due to reduced **photosynthesis** or increased oxygen demand.

pandemic—Widespread throughout an area.

panne—A depression among dunes kept moist by capillary transport from the water table.

parasitism—A symbiotic relationship between two organisms in which one lives in or on the body of its host and obtains nutrition from the host tissue. This is usually harmful or fatal to the host.

parthenogenesis—The process by which an egg undergoes development without fertilization by sperm.

peat—Fibrous, partly decayed fragments of vascular plants which retain enough structure so that the peat can be identified as originating from certain plants (e.g., sphagnum peat or sedge peat).

pelagic—All ocean waters covering the benthic region.

periphyton—Any organism attached or clinging to stems, leaves or other surfaces of plants under the water. See also **aufwuchs**.

phagotrophs—Macroconsumers, heterotrophic organisms chiefly animals which ingest other organisms, or particulate organic matter.

phenotype—The outward expression of the **genotype**, usually environmentally influenced.

philopatry—The tendency to return to the birthplace.

photoperiod — Refers to the number of hours of light or darkness in the day.

photosynthesis—The manufacture of carbohydrates from carbon dioxide and water in the presence of chlorophyll using sunlight as an energy source.

phototrophism—A reaction or response to light.

phytocoenosis—The plant community.

phytoplankton—Plant plankton. Members of this group are in the ocean and are important primary producers.

pisciculture—The growing, or farming of fish.

plankter—A planktonic organism.

plankton—Those organisms passively drifting or weakly swimming in marine or freshwater.

plankton bloom—A sudden rapid increase (usually geometric) to an enormous number of individual plankters under certain conditions. See also **bloom**.

poly—A prefix referring to or of many.

polymictic lake—A lake which is continually mixing or with very short stagnation periods.

polymorphism—The presence of two or more forms (morphs) of the same species (e.g., males and females which differ in appearance).

population growth forms — See **growth forms**.

potential, biotic—See **biotic potential**.

- predation**—A relationship between two species or populations where one directly attacks (hunts, grasps, kills and eats) the other.
- predator**—Animals that actively hunt other living animals as a food source.
- primary productivity**—The rate at which energy is stored by photosynthesizing organisms (chiefly green plants) in the form of organic substances.
- primary succession**—Succession which starts from a virgin area. Compare with secondary succession.
- productivity**—The rate at which energy is stored by anabolic processes in organisms. See also **primary productivity**.
- profundal zone**—In lakes, the bottom and deepwater areas beneath the **light compensation level**.
- protista**—Acellular organisms having a nucleus, chromosomes and mitotic cell division (e.g., protozoans, most algae, slime molds and fungi).
- psammolittoral habitat**—Refers to the area among the sand grains at the water's edge.
- psammon**—Interstitial organisms found between sand grains.
- pyramids**—The use of pyramids to show an organism's **trophic level**. There are three basic types: numbers, biomass, and energy. See also **eltonian pyramids**.

— R —

- red tide**—Discoloration of surface waters, most frequently in coastal zones, caused by large concentrations of microorganisms, particularly **dinoflagellates**. They may or may not be toxic.
- redd**—A bed prepared in sand or gravel to receive the spawn of fishes.
- respiration**—The chemical and physical processes involved in providing oxygen for **metabolism** and removing the carbon dioxide resulting from metabolism.
- rheotaxis**—The alignment of an organism in relation to a current.

— S —

- salt marsh**—See **marsh**.
- saprophytic nutrition**—The process by which certain plants absorb food from their surroundings, usually after the food has been dissolved externally.
- saprotroph**—An organism that feeds on dead organic matter.
- saprozoic**—The process by which certain animals absorb food from their surroundings, usually after the food has been dissolved externally.
- scavengers**—Those animals that eat dead organisms.
- sea grass**—Members of marine seed plants that grow chiefly on sand or sand-mud bottom. They are most abundant in water less than 9 meters deep. The common types are: Eel grass (*Zostera*), Turtle grass (*Thalassia*), and Manatee grass (*Syringodium*).

seaweed zonation—Zones of algal growth related to mean tide level. Usually designated by type of algae: (1), green seaweed growing in pools near or slightly above high water mark (*Enteromorpha*); (2), brown, mostly intertidal (*Fucus*); (3), red, shallow waters offshore or at the bottom of deep rock pools.

secondary succession — Succession which starts in an area where the previous community was destroyed (e.g., by fire, flood, etc.).

sediments, marine-littoral — See **marine-littoral sediments**.

sere—A stage in succession to the climax community.

serology—The study of the development of a climax community and the stages that lead to it.

sessile—An organism which usually is fixed but may move infrequently or may be permanently attached.

seston—Refers to all material, organic and inorganic, suspended in the water column. See also **tripton**.

shellfish—Any aquatic invertebrate with a hard external covering; more commonly mollusks and crustaceans.

spat—The larvae of young bivalve mollusks just after settling.

spawn—To produce or deposit eggs or sperm (verb). Also the young produced (noun).

species—An aggregate of interbreeding populations that under natural conditions is reproductively isolated.

species diversity index—The ratio between the number of species in an area and the

importance values (e.g., numbers, biomass, productivity) for each species. There are several formulas for **species diversity indices** varying primarily in the determination of the importance values. Each index has its own advantages and limitations. See also **Diversity**.

specific density—See **density**.

splash zone — The zone immediately landward of the mean higher high water level affected by the wave spray. See also **supralittoral**.

spring maximum—Occurrence of abundant phytoplankton (predominately diatoms) after a winter minimum. The production of phytoplankton is generally the highest for the year during this period.

standing crop—See **biomass**.

standing stock—See **biomass**.

steno—A prefix referring to a narrow range. Opposite of **Eury**.

subclimax—Usually refers to a stage or **sere** before the **climax**.

sublittoral zone—(1) In lakes, the region below the area of rooted vascular plants extending to the **profundal zone** (deep bottom). (2) In the oceans, the region extending below the intertidal to the edge of the Continental Shelf.

submergent vegetation—Plants which grow primarily under the water surface.

succession—In an ecological sense, an orderly process of community development and changes with time, which results from interactions between species and environment. See also **ecological succession**.

S—Continued

- succession, allogenic**—See **allogenic succession**.
- succession, autogenic**—See **autogenic succession**.
- succession, autotrophic**—See **autotrophic succession**.
- succession, heterotrophic**—See **heterotrophic succession**.
- succession, primary**—See **primary succession**.
- succession, secondary**—See **secondary succession**.
- supralittoral**—The zone immediately adjacent (landward) to the mean high water level; commonly called the **splash zone**. See also **supratidal**.
- supratidal**—See **supralittoral**.
- symbiosis**—A term referring to two species living together. It may be a commensal, mutual or parasitic relationship.
- synecology**—The study of the ecology of communities, associations or groups of organisms living together, as opposed to **autecology**.
- synergism**—Total effect of all interactants when acting together is greater than the sum of interactants acting individually.

— T —

- temperature compensation**—An organism's compensatory reaction to changes in temperature via physical change(s) or change(s) in habit(s) which tend to favor maintenance of a more nearly optimal body temperature.
- terrestrial**—Of or relating to the earth and its inhabitants—as opposed to **aquatic**.
- territory**—The area an animal lives in and actively defends.
- thallophyte**—A taxonomic grouping of simple plants which lack true stems, leaves and roots (e.g., algae, fungi, etc.).
- thermocline**—In vertically stratified water, the layer where there is a rapid change in temperature from the overlying to the underlying waters.
- thigmotaxis**—The response and alignment to touch or contact.
- tidal flat**—Flat land areas which are covered and uncovered by the rise and fall of the tide. Vegetation, if present, consists of rushes, grasses and other **halophytes**.
- tolerance**—The relative capability of an organism to endure or adapt to unfavorable environmental factors.
- tripton**—Dead particulate matter suspended in water; the nonliving part of the **seston**.
- trophic levels**—Levels of food production and consumption beginning with the primary level, the producers, and continuing up through the consumer levels, the herbivores, omnivores and carnivores.
- trophism**—A directed movement in response to a stimulus.

T—Continued

turbidity—A condition where transparency of water is reduced. It is an optical phenomenon and does not necessarily have a direct linear relationship to particulate concentration.

turnover—(1) in production, the rate at which something is used up and replaced. (2) In a limnological sense, the mixing of layers of **lentic** waters and the redistribution of oxygen and nutrients.

— U —

ultraplankton—Organisms smaller than 5 micrometers in size.

— V —

vagility—The innate ability of an organism to move. Locomotion, dispersion, etc.

vitality—Reproductive success.

viviporous—A type of reproduction where the offspring are born alive. They develop within the mother's body and derive nourishment directly from her. Compare with **oviparous** and **ovoviviparous**.

— X —

xeric—A prefix meaning dry.

xerophyte—A plant with very low water requirements as opposed to **hydrophyte**.

— Z —

zoocoenosis—The animal community as opposed to **phytoceonosis**, the plant community. See also **biocoenosis**.

zooneuston—Animals found on the surface film of water.

zooplankton—Animals in the plankton.

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