

Glossary of terms

Helpful sources for this glossary were:

1. <http://www.ihe.nl/he/dicea/>, which is a browser-based information system, containing information regarding Coastal & Port Engineering., see <http://www.ihe.nl/he/dicea/int01/glossary.htm>.
2. <http://www.eb.com>, the Encyclopaedia Britannica on-line.

ecology, biology

Ecology: study of the relationships between organisms and their environment

Autecology: , the study of the interactions of an individual organism or a single species with the living and nonliving factors of its environment.

Synecology: study of a group or community of organisms and their relationships to each other and to their common environment

Biology: study of living things and their vital processes

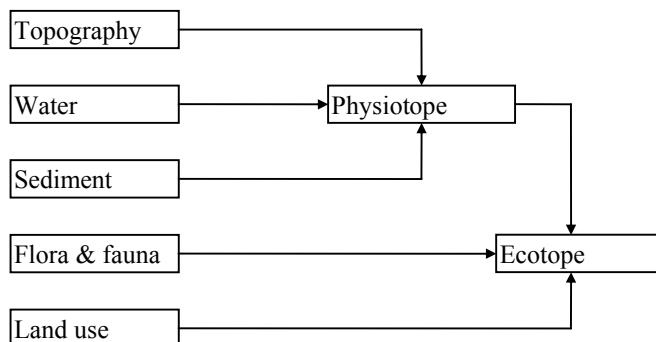
Ecosystem: the complex of living organisms, their physical environment, and all their interrelationships in a particular unit of space.

Carrying capacity: the maximum number of animals of one or more species that can be supported by a particular habitat or area through the most unfavourable period of the year

habitats, niches, ecotopes, ecotones and physiotopes

Habitat: place where an organism or a community of organisms lives, including all living and nonliving factors or conditions of the surrounding environment

Niche: in ecology, the smallest unit of a habitat that is occupied by an organism. Habitat **niche** refers to the physical space occupied by the organism; ecological **niche** refers to the role it plays in the community of organisms found in the habitat



Physiotope: a spatial unit defined by a combination of physical factors.

Ecotope: the combination of physiotopes with features on flora & fauna and anthropogenic land use.

Ecotone: Ecosystems are almost always a patchwork of communities that exist at different successional stages. The sizes, frequencies, and intensities of disturbances differ among ecosystems, creating differences in what is called the patch dynamics of communities. Along the edges of each of the patches are areas called **ecotones**

density, biomass, dry weight, ash free dry weight

Density: the number of organisms per unit area.

Biomass: the weight or total quantity of living organisms of one animal or plant species (species **biomass**) or of all the species in the community (community **biomass**), commonly referred to a unit area or volume of the habitat

Dry weight: Mass of organisms after drying at 130°C (so the weight without the water).

Ash free dry weight: The weight of organic material in an organism. This is derived by weighing the dry weight previous to incinerating the organism in a furnace. What's left after incineration is the inorganic material, so the weight difference is the organic material.

Species diversity

Species diversity is determined not only by the number of **species** within a biological community--*i.e.*, **species richness**--but also by the relative abundance of individuals in that community. **Species abundance** is the number of individuals per **species**, and relative abundance refers to the evenness of distribution of individuals among **species** in a community.

Biotic interaction

Biotic interaction: association among living organisms in a biological community.

Amensalism: association between organisms of two different species in which one is inhibited or destroyed and the other is unaffected (e.g. parasitism or predation).

Commensalism: a relation between individuals of two species in which one species obtains food or other benefits from the other without either harming or benefiting the latter.

Mutualism: association between organisms of two different species in which each is benefited.

Symbiosis: any of several living arrangements between members of two different species, including mutualism, commensalism, and parasitism. Both positive (beneficial) and negative (unfavourable to harmful) associations are therefore included, and the members are called symbionts.

Competition: utilization of the same resources by organisms of the same or of different species living together in a community, when the resources are not sufficient to fill the needs of all the organisms.

Feeding types

Filter feeding / suspension feeding: a form of food procurement in which food particles or small organisms are randomly strained from water

Deposit feeding: a form of feeding in which food particles are eaten from the sediment (either on top of the sediment or in the sediment).

Detritus: composed of leaves and other plant parts that fall into the water from surrounding terrestrial communities.

Zonation

Littoral zone: marine ecological realm that experiences the effects of tidal and longshore currents and breaking waves to a depth of 5 to 10 m (16 to 33 feet) below the low tide level, depending on the intensity of storm waves. The zone is characterized by abundant dissolved oxygen, sunlight, nutrients, generally high wave energies and water motion, and, in the intertidal subzone, alternating submergence and exposure. The geological nature of shorelines and nearshore bottoms is exceedingly varied. Consequently, the littoral fauna taken as a whole involves an enormous number of species and every major phylum, although the number of individuals may vary widely with locality. Coral reefs, rocky coasts, sandy

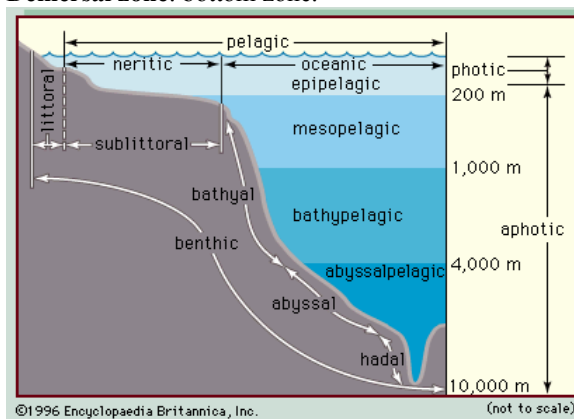
beaches, and sheltered embayments each possess specialized, intricately interrelated floral and faunal littoral populations

Estuary: Estuaries are partially enclosed bodies of water located along coastal regions where flow in downstream reaches of rivers is mixed with and diluted by seawater. The landward limit of an estuary is defined in terms of salinity, often where chlorinity is 0.01 parts per thousand. The inland extent of this chemical marker, however, varies according to numerous physical and chemical controls, especially the tidal range and the chemistry of river water. Actually, the term estuary is derived from the Latin words *aestus* ("the tide") and *aestuo* ("boil"), indicating the effect generated when tidal flow and river flow meet.

Tidal flat: level muddy surface bordering an estuary, alternately submerged and exposed to the air by changing tidal levels. The tidal waters enter and leave a tidal flat through fairly straight major channels, with minor channels serving as tributaries as well as distributaries. The minor channels meander and migrate considerably over periods of several years.

Pelagic zone: ecological realm that includes the entire ocean water column

Demersal zone: bottom zone.



Typology of plants and animals: benthos vs. plankton, fyto vs. zoo, micro-meio-macro, infauna, epifauna.

Biota: Biota can be classified broadly into those organisms living in either the pelagic environment (plankton and nekton) or the benthic environment (benthos). Some organisms, however, are benthic in one stage of life and pelagic in another.

Plankton: marine and freshwater organisms, which, because they are nonmotile or because they are too small or too weak to swim against the current, exist in a drifting, floating state. The term **plankton** is a collective name for all such organisms and includes certain algae, bacteria, protozoans, crustaceans, mollusks, and coelenterates, as well as representatives from almost every other phylum of animals.

Plankton is distinguished from nekton, which is composed of strong-swimming animals, and from benthos, which include sessile, creeping, and burrowing organisms on the seafloor. Large floating seaweeds (for example, *Sargassum*, which constitutes the Sargasso Sea) and various related multicellular algae are not considered **plankton** but pleuston. Organisms resting or swimming on the surface film of the water are called neuston (*e.g.*, the alga *Ochromonas*).

Phytoplankton: a flora of freely floating, often minute organisms that drift with water currents. Like land vegetation, phytoplankton uses carbon dioxide, releases oxygen, and converts minerals to a form animals can use

Zooplankton: small floating or weakly swimming organisms that drift with water currents and, with phytoplankton, make up the planktonic food supply upon which almost all oceanic organisms are ultimately dependent. Many animals, from single-celled Radiolaria to the eggs or larvae of herrings, crabs, and lobsters, are found among the zooplankton. Permanent **plankton**, or holoplankton, such as protozoa

and copepods (an important food for larger animals), spend their lives as **plankton**. Temporary plankton, or meroplankton, such as young starfish, clams, worms, and other bottom-dwelling animals, live and feed as **plankton** until they leave to become adults in their proper habitats.

Benthos: the assemblage of organisms inhabiting the sediment.

Benthic epifauna: Benthic organisms that live upon the seafloor or upon bottom objects.

Benthic infauna: Benthic organisms that live within the sediments of the seafloor.

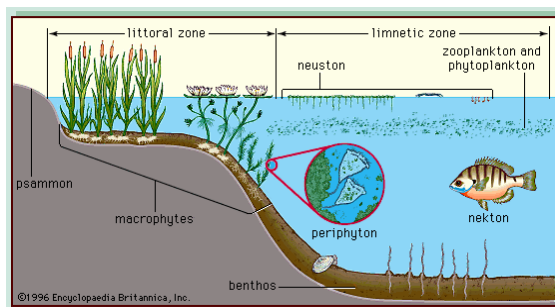
Macrobenthos: those forms larger than 1 mm, which are dominated by polychaete worms, pelecypods, anthozoans, echinoderms, sponges, ascidians, and crustaceans.

Meiobenthos: those organisms between 0.1 and 1 mm in size, include polychaetes, pelecypods, copepods, ostracodes, cumaceans, nematodes, turbellarians, and foraminiferans.

Microbenthos: smaller than 0.1 mm, include bacteria, diatoms, ciliates, amoeba, and flagellates.

Anadromous fish: fish that live in the sea and migrate to fresh water to breed. Their adaptations to conditions of different habitats are precise, particularly with regard to salinity of the water.

Catadromous fish: fish that spend most of their lives in fresh water, then migrate to the sea to breed.



diatoms, green algae, polychaetes, molluscs, bivalves, crustacea,

Algae: members of a group of predominantly aquatic, photosynthetic organisms of the kingdom Protista. They range in size from the tiny flagellate *Micromonas* that is 1 micrometre (0.00004 inch) in diameter to giant kelp that reach 60 metres (200 feet) in length.

Blue-green algae: also called CYANOBACTERIA, any of a large, heterogeneous group of prokaryotic, principally photosynthetic organisms. Cyanobacteria resemble the eukaryotic algae in many ways, including morphological characteristics and ecological niches, and were at one time treated as algae, hence the common name of blue-green algae

Diatoms: any member of the algal division or phylum Bacillariophyta (about 16,000 species) found floating in all the waters of the Earth. Diatoms may be either unicellular or colonial. The silicified cell wall forms a pillbox-like shell (frustule) composed of overlapping halves (epitheca and hypotheca)

Chlorophyll: any member of one of the most important classes of pigments involved in photosynthesis, the process by which light energy is converted to chemical energy through the synthesis of organic compounds. Chlorophyll is found in virtually all photosynthetic organisms, including green plants, cyanophytes (blue-green algae), and certain protists and bacteria. It absorbs energy from light; this energy is then used to convert carbon dioxide to carbohydrates.

Photosynthesis: the process by which green plants and certain other organisms transform light energy into chemical energy. Photosynthesis in green plants harnesses the energy of sunlight to convert carbon dioxide, water, and minerals into organic compounds and gaseous oxygen.

Angiosperm: any member of the more than 250,000 species of flowering plants (division Magnoliophyta), the largest and most diverse group within the kingdom Plantae. Angiosperms represent approximately 80 percent of all the known green plants now living.

Polychaete: any worm of the class Polychaeta (phylum Annelida). About 5,400 living species are known. **Polychaetes**, which include rag worms, lugworms, bloodworms, sea mice, and others, are marine worms

notable for well-defined segmentation of the body. They vary in size from a few millimetres to about 3 m (10 feet) and are divided informally into two groups; the errantia, or free-moving forms, and sedentaria, or tube-dwelling forms.

Mollusk: also spelled **MOLLUSC**, any soft-bodied invertebrate of the phylum Mollusca, usually wholly or partly enclosed in a calcium carbonate shell secreted by a soft mantle covering the body (so: shells).

Bivalve: also called PELECYPODA, any member of the class Bivalvia, of the phylum Mollusca, characterized by a shell that is divided from front to back into left and right valves. Enclosure in a shell has resulted in loss of the head. Similarly, the adoption of deposit-feeding using labial palps and, later, suspension feeding utilizing the respiratory gills modified into organs of filtration called ctenidia have resulted in loss of the radula from the mouth. **Bivalves** include clams, oysters, and shells.

Crustacean: any member of the subphylum Crustacea (phylum Arthropoda), a group of invertebrate animals consisting of some 39,000 species distributed worldwide. Crabs, lobsters, shrimps, and wood lice are among the best-known crustaceans, but the group also includes an enormous variety of other forms without popular names.

germination, succession: pioneer-consolidation-climaxstage

Germination: the sprouting of a seed, spore, or other reproductive body, usually after a period of dormancy

Succession: The structure of communities is constantly changing. All communities are subject to periodic disturbances, ranging from events that have only localized effects, such as the loss of a tree that creates a gap in the canopy of a forest, to those that have catastrophic consequences, which include wildfires that sweep across vast landscapes or storms that pound immense stretches of shoreline. Each new disturbance within a landscape creates an opportunity for a new species to colonize that region. New species also alter the character of the community, creating an environment that is suitable to even newer species. By this process, known as ecological **succession**, the structure of the community evolves over time.

The succession of ecosystems generally occurs in two phases. The early, or growth, phase is characterized by ecosystems that have few species and short food chains. These ecosystems are relatively unstable but highly productive, in the sense that they build up organic matter faster than they break it down. The ecosystems of the later, or mature, phase are more complex, more diversified, and more stable. The final, or climax, ecosystem is characterized by a great diversity of species, complex food webs, and high stability. The major energy flow has shifted from production to maintenance.

Pioneer stage: the first stage of biotic succession.

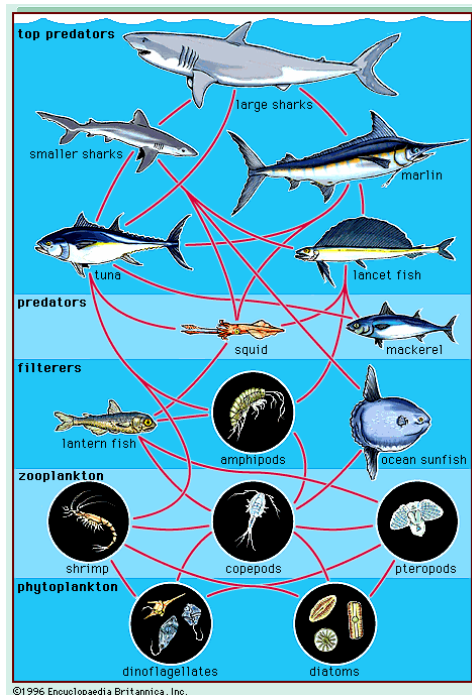
Climax stage: the final **stage** of biotic succession attainable by a plant community in an area under the environmental conditions present at a particular time.

species vs. communities,

Species: biological classification comprising related organisms that share common characteristics and are capable of interbreeding

Community: an interacting group of various species in a common location. For example, a forest of trees and undergrowth plants, inhabited by animals and rooted in soil containing bacteria and fungi, constitutes a biological **community**.

Food chain



Food chain: in ecology, the sequence of transfers of matter and energy from organism to organism in the form of food. Food chains intertwine locally into a food web because most organisms consume more than one type of animal or plant.

Producers: plants which maintain and reproduce themselves at the expense of energy from sunlight and inorganic materials taken from the nonliving environment around them (autotrophs)

Consumers: animals which ingest plant material or feed on plants, using the energy stored in this food to sustain themselves (heterotrophs).

Decomposers: fungi and bacteria, that break down plant and animal material and return it to the environment in a form that can be used again by plants in a constantly renewed cycle.

bioturbation

Bioturbation: the reworking and alteration of sediment by organisms, leading to instability of the sediment.

Biostabilisation: the reworking and alteration of sediment by organisms, leading to stabilisation of the sediment.

morphology general

Geomorphology: the study of the forms of the land's surface and of the processes that mold them.

Erosion: removal of surface material from the Earth's crust, primarily soil and rock debris, and the transportation of the eroded materials by natural agencies from the point of removal

Sedimentation: process of deposition of a solid material from a state of suspension or solution in a fluid (usually air or water).

Cohesion: the intermolecular attractive force acting between two adjacent portions of a substance, particularly of a solid or liquid. It is this force that holds a piece of matter together.

Adhesion: intermolecular forces acting between two dissimilar substances in contact.

Denudation: is the wearing away of the terrestrial surface by processes including weathering and erosion

Aggradation: a build-up or raising of the river/sea bed due to sediment deposition.

Shear stress: force tending to cause deformation of a material by slippage along a plane or planes parallel to the imposed **stress**. The resultant **shear** is of great importance in nature, being intimately related to the downslope movement of earth materials and to earthquakes. **Shear stress** may occur in solids or liquids; in the latter it is related to fluid viscosity.

Coastal morphology

Longshore: parallel and close to the coastline

Barrier beach: a sand or shingle bar above high tide, parallel to the coastline and separated from it by a lagoon

Beach: a deposit of non-cohesive material (e.g. sand, gravel) situated on the interface between dry land and the sea (or other large expanse of water) and actively "worked" by present-day hydrodynamics processes (i.e. waves, tides and currents) and sometimes by winds

Bed forms: features on a seabed (e.g. ripples and sand waves) resulting from the movement of sediment over it

Littoral drift: the movement of beach material in the littoral zone by waves and currents. Includes movement parallel (long shore drift) and sometimes also perpendicular (cross-shore transport) to the shore

Mean wave height: the mean of all individual waves in an observation interval of approximately half an hour. In case of a Rayleigh-distribution 63% of the significant wave height.

Significant wave height: the average height of the highest one third of the waves in a given sea state

Morphologically averaged: a single wave condition producing the same next longshore wave condition drift as a given proportion of the annual wave climate

Nearshore: the zone which extends from the swash zone to the position marking the start of the offshore zone, typically at water depths of the order of 20 m.

Offshore: the zone beyond the nearshore zone where sediment motion induced by waves alone effectively ceases and where the influence of the sea bed on wave action is small in comparison with the effect of wind

Overwash: the effect of waves overtopping a coastal defense, often carrying sediment land wards which is then lost to the beach system

Rip current: jet-like seaward-going current normal to the shoreline associated with wave-induced longshore currents

Sediment cell: in the context of a strategic approach to coastal management, a length of coastline in which interruptions to the movement of sand or shingle along the beaches or near shore sea bed do not significantly affect beaches in the adjacent lengths of coastline

Seiche: standing wave oscillation in an effectively closed body of water (e.g. a harbour basin)

Shallow water: water of such depth that surface waves are noticeably affected by bottom topography. Typically this implies a water depth equivalent to less than half the wavelength

Surf zone: the zone of wave action extending from the water line (which varies with tide, surge, set-up, etc.) out to the most seaward point of the zone (breaker zone) at which waves approaching the coastline commence breaking, typically in water depths of between 5 to 10 metres

Swash zone: the zone of wave action on the beach, which moves as water levels vary, extending from the limit of run-down to the limit of run-up

Swell (waves): remotely wind-generated waves. Swell characteristically exhibits a more regular and longer period and has longer crests than locally generated waves

Tidal prism: volume of water that flows into a tidal channel and out again during a complete tide, excluding any upland discharges

Upstream: along coasts with obliquely approaching waves there is a longshore (wave-driven) current. For this current one can define an upstream and a downstream direction. For example there is a beach with an orientation west east, the sea is north. Suppose the waves come from NW. Then the current goes from West to East. Then Upstream is West of the observer, and East is downstream of the observer.

River morphology

Thalweg

The locus of the deepest points in a valley at successive cross-sections

Bifurcation: location where a river separates in two or more reaches or branches (the opposite of a confluence)

Confluence: the junction of two or more river reaches or branches (the opposite of a bifurcation)

Backwater curve: the longitudinal profile of the water surface in an open channel where the depth of flow has been increased by an obstruction as a weir or a dam across the channel, by increase in channel roughness, by decrease in channel width or by a decrease of the bed gradient

grain size (clay, silt, sand), graded sediment

Grain size: Particle **size** is an important textural parameter of clastic rocks because it supplies information on the conditions of transportation, sorting, and deposition of the sediment and provides some clues to the history of events that occurred at the depositional site prior to final induration.

Table 54: Grain-Size Scale for Sediments				
	U.S. standard sieve mesh	millimetres	phi (ϕ) units	Wentworth size class
Gravel		4,096	-12	
		1,024	-10	boulder
		256	-8	
		64	-6	cobble
		4	-2	pebble
		3.36	-1.75	
		2.83	-1.5	granule
		2.38	-1.25	
		2.00	-1.0	
		1.68	-0.75	
Sand		1.41	-0.5	very coarse sand
		1.19	-0.25	
		1.00	0	
		0.84	0.25	
		0.71	0.5	coarse sand
		0.59	0.75	
		0.50	1.0	
		0.42	1.25	
		0.35	1.5	medium sand
		0.30	1.75	
		0.25	2.0	
		0.210	2.25	
		0.177	2.5	fine sand
		0.149	2.75	
		0.125	3.0	
		0.105	3.25	
		0.088	3.5	very fine sand
	0.074	3.75		
	0.0625	4.0		
Silt		0.053	4.25	
		0.044	4.5	coarse silt
		0.037	4.75	
		0.031	5.0	
		0.0156	6.0	medium silt
Mud		0.0078	7.0	fine silt
		0.0039	8.0	very fine silt
		0.0020	9.0	
		0.00098	10.0	
		0.00049	11.0	clay
		0.00024	12.0	
		0.00012	13.0	
	0.00006	14.0		
Clay				

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Sediment transport

Sediment transport: sediment is transported in suspension, in solution, and as material rolling or moving very near the bed, the water samples will contain suspended and dissolved load and perhaps some bed load.

Suspended load: A mode of sediment transport in which the particles are supported, and carried along by the fluid

Bed load: Sediment transport mode in which individual particles either roll or slide along the bed as a shallow, mobile layer a few particle diameters deep

Wash load: part of the suspended load with particle sizes smaller than those found in the bed; it is in near-permanent suspension and transported without deposition; the amount of wash load transported through a reach does not depend on the transport capacity of the flow; the load is expressed in mass or volume per unit of time

Morphological patterns

Cusp: Seaward bulge, approximately parabolic in shape, in the beach contours. May occur singly, in the lee of an offshore bank or island, or as one of a number of similar, approximately regularly-spaced features on a long straight beach

Dunes:

(1) Accumulations of windblown sand on the backshore, usually in the form of small hills or ridges, stabilized by vegetation or control structures

(2) A type of bed form indicating significant sediment transport over a sandy seabed

Mud flat: an area of fine silt usually exposed at low tide but covered at high tide, occurring in sheltered estuaries or behind shingle bars or sand spits

Pocket Beach: a beach, usually small, between two headlands

Macro-tidal: tidal range greater than 4 m

Meso-tidal: tidal range between 2 m and 4 m

Micro-tidal: tidal range less than 2 m

Oxbow lake: small lake located in an abandoned meander loop of a river channel

Shoal: accumulation of sediment in a river channel or on a continental shelf

Floodplain: also called alluvial plain, flat land area adjacent to a stream, composed of unconsolidated sedimentary deposits (alluvium) and subject to periodic inundation by the stream.