Abiotic interactions. Interactions between an organism and physical and chemical aspects of the environment.

Abyssal plain. The deep ocean floor, an expanse of low relief at depths of 4,000–6,000 m.

Abyssobenthic. Referring to benthic organisms living at abyssal depths.

Abyssopelagic zone. The 4,000–6000 m depth zone, seaward of the shelf-slope break.

Acclimation. Given a change of a single parameter, a readjustment of the physiology of an organism, reaching a new steady state.

Accuracy. The correctness of a measure when comparing to a known standard. See also Resolution and Precision.

Action spectrum. Portion of the light spectrum used in photosynthesis.

Active suspension feeders. Suspension feeders that produce a current to actively entrain and capture particles.

Age structure. The relative abundance of different age classes in a population.

Aggregated spatial distribution. A case where individuals in a space occur in clusters too dense to be explained by chance.

Ahermatypic. Non-reef-building (referring to scleractinian corals).

Allee effect. The increase of probability of extinction when the population is so small that population density itself matters. Finding mates in a sparse population is the major mechanism of decline in such a case.

Allele. One of several variants that can occupy a locus on a chromosome.

Allelopathy. The production of a substance by one sessile species that is toxic to another species that may live adjacent to the first species.

Allopatric speciation. The differentiation of geographically isolated populations into distinct species.

Allozyme. A variant of an enzyme type. These may be variants of a specific enzyme (e.g., cytochrome c) that are the products of a single genetic locus.

Alternative stable states. Depending upon specific circumstances or sequences of events, a community might move toward and then exist in one of two or more states that are stable for long periods of time until a major perturbation occurs.

Amensal. Negatively affecting one or several species.

Amino acids. Basic structural units of proteins.

Amphidromic points. Points in the ocean that do not change in tidal height. Tidal currents tend to revolve around these points.

Anadromous fish. Fish species that spends most of its life feeding in the open ocean but migrates to spawn in freshwater.

Anchor dredge. A bottom dredge used to dig into soft sediments down to a specified depth below the sediment-water interface.

Annelida. Phylum characterized by worm shape, segmentation, free-living and parasitic forms usually benthic occurrence of free-living forms.

Annual. A species that is born and programmed to die after it reproduces in its first year of life.

Anoxic. Lacking oxygen.

Anthozoa. A class of the phylum Cnidaria, including anemones, corals, and sea fans.

Antibody. A specialized protein produced in response to the introduction of a foreign molecule into the body, usually to destroy the foreign body.

Apoptosis. A form of cell death, in which a series of cellular processes determines or programs the death of the cell, usually without harming the rest of the cells in the organism.

Aragonite. An orthorombic crystal variant of calcium carbonate that is less stable and more soluble than another variant, calcite. A common constituent of coral skeletons and many snail shells (exception: genus Conus).

Aristotle’s lantern. A jawlike structure found in sea urchins consisting of a complex series of mobile teeth that can scrape algae or invertebrates from a hard surface.

Arrow worms. Members of the phylum Chaetognatha, a group of planktonic carnivores.

Arthropoda. A phylum of invertebrates characterized by an outer skeleton of chitin, molting, and jointed appendages.

Asexual reproduction. Reproduction of the individual without the production of gametes and zygotes.

Assimilation efficiency. The fraction of ingested food that is absorbed and used in metabolism growth and reproduction.

Assortative mating. The mating of a given genotype mates with another genotype at a frequency disproportionate to that expected from random encounter.

Asteroidea. A class of carnivorous Echinodermata, the true starfish, having mobile arms, usually in multiples of five, and tube feet.

Atoll. A horseshoe or circular array of islands, capping a coral reef system perched around an oceanic volcanic seamount.

Attenuation (of light). Diminution of light intensity, explained, in the ocean, in terms of absorption and scattering.

Autotrophic algae. Algae capable of photosynthesis and growth using only dissolved inorganic nutrients.

Auxotrophic algae. Algae requiring a few organically derived substances, such as vitamins, along with dissolved inorganic nutrients for photosynthesis.

Azoic theory. Theory proposed by Edward Forbes in the nineteenth century that no living organisms can be found on the seabed at depths deeper than 300 fathoms.
Barrier island. Elongated offshore island parallel to a soft-sediment shore.

Batesian mimics. A species that is not poisonous that has evolved to resemble a poisonous model species.

Bathyal. A depth zone from 1,000–4,000 m.

Bathypelagic zone. The 1,000–4,000 m depth zone in the ocean.

Benthic-pelagic coupling. The cycling of nutrients between the bottom sediments and overlying water column.

Benthos. Organisms that live associated with the sea bottom. Examples include burrowing clams, sea grasses, sea urchins, acorn barnacles.

Berm. A broad area of low relief in the upper part of a beach.

Between-habitat comparison. A contrast of diversity in two localities of differing habitat type (e.g., sand versus mud bottoms).

Bilateria. A group of phyla consisting of bilaterally symmetrical organisms (including Annelida, Chordata, etc.) having a single evolutionary origin.

Bioassay. Use of a biological system, for example, some physiological parameter of an indicator species, to measure the degree of pollution.

Bioconcentration. The increase of concentration of a substance in a species, relative to its concentration in the external environment. See Biomagnification.

Biodiversity. See Species richness.

Biocorrosion. Erosion caused by organisms, such as boring sponges, bivalves, and other species.

Biogenic graded bedding. A regular change of sediment median grain size with depth below the sediment-water interface caused by the activities of burrowing organisms.

Biogenically reworked zone. The depth zone, within a sediment, that is actively burrowed by benthic organisms.

Biogeography. The study of the geographical arrangements of populations and species.

Biological pump. The process by which carbon is moved to deeper waters in the ocean as sedimenting biological particles.

Bioluminescence. Light emission, often as flashes, by many marine organisms.

Biomagnification. Increase in concentration of a substance as it moves from a species in one trophic level to a species in the next higher trophic level.

Biomass. See Standing crop.

Biosphere. The living organisms on Earth.

Black band disease. A disease attributed to scleractinian corals, where a black band appears, with abundant cyanobacteria.

Blade. The flattened terminal part(s) of a seaweed.

Blastula. An early stage of embryonic development consisting of a ball of cells.

Bleaching. Referring to corals. The expulsion of zooxanthellae from corals, resulting in coral tissue losing its color and appearing to be the white color of the coral skeleton beneath the living tissue.

Blood pigment. A molecule used by an organism to transport oxygen efficiently, usually in a circulatory system (e.g., hemoglobin).

Bloom (phytoplankton). A population burst of phytoplankton that remains within a defined part of the water column.

Bohr effect. When blood pH decreases, the ability of hemoglobin to bind to oxygen decreases. An adaptation to release oxygen in the oxygen-starved tissues in capillaries where respiratory carbon dioxide lowers blood pH.

Boreal. Pertaining to the Northern Hemisphere, north temperate zone.

Boring. Capable of penetrating a solid substratum by scraping or chemical dissolution.

Bottom trawls. Fishing by means of an apparatus using boards that hold open a net, which is dragged along the seafloor.

Bottom-up control. Refers to food webs. A control of a population that comes from change lower in a food web (e.g., control of a population of mussels by abundance of phytoplankton food).

Boundary layer. A layer of fluid near a surface, where flow is affected by viscous properties of the fluid. At the surface, fluid velocity must be zero, and the boundary layer is a thin film that depends on surface texture, fluid velocity in the “main-stream of flow,” and fluid mass properties such as salinity.

Bow wave. Water turbulence formed in the front of an object as it moves forward in the water.

Box corer. A ship-deployed benthic sampling device where a box is inserted into soft sediment and a bottom is inserted before the sampler is lifted toward the surface.

Brachiopods. A phylum of lophophorate invertebrates with two valves and a suspension-feeding lophophore.

Brackish sea. Semienclosed water body of large extent in which tidal stirring and seaward flow of freshwater do not exert enough of a mixing effect to prevent the body of water from having its own internal circulation pattern and lower salinity.

Browsers. Organisms that feed by scraping thin layers of living organisms from the surface of the substratum (e.g., periwinkles feeding on rock-surface diatom films;urchins scraping a thin, filmy sponge colony from a rock).

Bryozoan. A phylum of lophophorate invertebrates, colonial, with individuals living in a flat or upright colony.

Buoyant flow. Flow of lower-salinity surface estuarine water toward the open sea.

Bycatch. The catch of a fishery that is unintended; for example, catching juvenile sturgeon when you were fishing for tuna.

Calanoid copepods. Copepods characterized by large antennae and very abundant in the water column throughout the world.

Calcareous. Made of calcium carbonate.

Calcite. Most common variant of calcium carbonate, a common constituent of limestone and shells and skeletons of many marine species (but not of corals, and most snails).

Cambrian explosion. A hypothetical origin and diversification of all of the Bilateria within the Cambrian geological period.

Canopy. A layer of photosynthetic organisms high off the water column, potentially shading lower layers near the seafloor.

Carbon pump. A mechanism of import of carbon dioxide to great depths by solution and storage in colder deep waters, where solubility is greater than in the surface.

Carnivore. An organism that captures and consumes animals.

Carrying capacity. The total number of individuals of a population that a given environment can sustain.

Catadromous fish. Fish that spawns in seawater but feeds and spends most of its life in estuarine or fresh water.

Catch per unit effort. The fishery take divided by a series of measures such as number of vessels, hours of fishing, and number of fishers. An estimate of how much fishing is done to acquire a given catch.

Center-of-origin theory. Theory that high-diversity areas are centers where species originate and then spread to lower-diversity areas.
Cephalopoda. A class of Mollusca characterized by carnivory, well-developed nervous systems, complex behavior, and mobility.

Chaetognaths. See Arrow worms.

Character displacement. A pattern in which two species with overlapping ecological requirements differ more when they co-occur than when they do not. The difference is usually in a morphological feature related to resource exploitation, as in the case of head size, which may be related to prey size.

Chemical signaling. Communication by means of production and release of various dissolved substances.

Chemolithotrophic bacteria. Bacteria that obtain energy independent of light by chemical modification of inorganic molecules.

Chemophototrophic organisms. Bacteria that obtain energy with the aid of light by chemical modification of inorganic molecules.

Chemosynthesis. Primary production of organic matter, using various substances instead of light as an energy source; confined to a few groups of microorganisms.

Chlorinated hydrocarbons. Compounds containing chlorine, carbon, and hydrogen, including solvents and pesticides, many of which are highly toxic.

Chlorinity. Grams of chloride ions per 1,000 grams of seawater.

Chloroplast. In eukaryotic organisms, the cellular organelle in which photosynthesis takes place.

Choanoocytes. Specialized cells found in sponges.

Chondrichthyes. Fishes united by the production of a cartilaginous skeleton.

Ciliates. A group of protistans characterized by a ciliated surface for locomotion and often a ciliated mouth.

Clade. A group of related species that arose from a single ancestor.

Cladogram. A tree-like diagram showing evolutionary relationships. Any two branch tips sharing the same immediate node are most closely related. All taxa that can be traced directly to one node (that is, they are “upstream of a node”) are said to be members of a monophyletic group.

Cline. A regular (usually monotonic) change in gene frequency over a geographic space.

Clone. A group of individuals that have derived from a single individual by nonsexual reproduction.

Cnidaria. A phylum characterized by radially symmetrical organisms with tentacles usually armed with nematocysts.

Coastal reef. A coral reef occurring near and parallel to a coastline.

Coelom. A body cavity within mesoderm tissue.

Coevolution. The continual evolutionary response between two species, as one species changes in response to the other species and vice versa.

Cold seeps. Sources of sulfide-rich brines or hydrocarbons from geological structures on the outer continental shelf or continental slope, providing substrates for bacterial growth.

Cold-core rings. A volume of water with warm surface water ringing a core of cooler water, formed when a meander of the Gulf Stream loops and encloses cooler water.

Collar cells. See Choanoocytes.

Comb jellies. Members of the phylum Ctenophora, a group of gelatinous forms feeding on smaller zooplankton.

Commensal. Having benefit for one member of a two-species association but neither positive nor negative effect on the other.

Community. A group of species living together and interacting through ecological processes such as competition and predation.

Compensation. In fisheries biology, the reduction of rate of population increase as population density passes an upper threshold.

Compensation depth. The depth of the compensation light intensity.

Compensation light intensity. That light intensity at which oxygen evolved from a photosynthesizing organism equals that consumed in its respiration.

Competent. Larvae capable of settlement and metamorphosis.

Competition. An interaction between or among two or more individuals or species in which exploitation of resources by one affects any others negatively.

Complex life cycle. A life cycle that consists of several distinct stages (e.g., larva and adult).

Compound eyes. Eyes belonging to arthropods consisting of multiple visual units that capture and transmit light signals to the nervous system.

Concentration boundary layer. A boundary layer of water near the bottom characterized by a difference in particle concentration from the overlying water.

Condition index. An index of health in bivalve mollusks determined by the amount of soft tissue relative to shell volume.

Conformer. An organism whose physiological state (e.g., body temperature) is identical to, and varies identically with, that of the external environment.

Continental drift. Horizontal movement of continents located in plates moving via seafloor spreading.

Continental rise. A transition zone between the continental slope and the abyssal plain.

Continental shelf. A broad expanse of ocean bottom sloping gently and seaward from the shoreline to the shelf-slope break at a depth of 100–200 m.

Continental slope. See Slope.

Contour feathers. Feathers that are found on the outside of a bird’s body and interlock to reduce heat loss and wetting of feathers beneath.

Convective heat loss. Loss of heat by movement of fluid across a surface.

Convergence. The contact at the sea surface between two water masses converging, with one plunging below the other.

Copepoda. Order of crustaceans found often in the plankton.

Ctenophora. A phylum characterized by radially symmetrical organisms with tentacles usually armed with nematocysts.

Ctenoid scales. See Scale.

Cyanobacteria. A group of photosynthetic bacteria.

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Correlation. A quantitative relationship between two or more variables collected at a series of locations or from a series of individuals.

Cost of metabolism. The energetic expenditure caused by metabolic activity.

Countercurrent exchange mechanism. Mechanism by which two vessels are set side by side, with fluid flowing in opposite directions, allowing efficient uptake and retention of heat, oxygen, or gas, depending upon the type of exchanger.

Countercurrent heat exchanger. A biological device where heat is conserved by moving fluids through adjacent circulatory vessels in opposite directions.

Counterrillumination. Having bioluminescent organs that are concentrated on the ventral surface so as to increase the effect of countershading (see also Countershading).

Countershading. Condition of organisms in the water column that are dark colored on top but light colored on the bottom.

Crinoidea. A class of echinoderms characterized by long arms covered with tube feet that capture zooplankton.

Critical depth. That depth above which total integrated photosynthetic rate equals total integrated respiration of photosynthesizers.

Critical salinity. A salinity of approximately 3–8 percent that marks a minimum of species richness in an estuarine system.

Crustacea. A group of arthropods characterized by two pairs of antennae.

Crypsis. Ability to have features that make the organism inconspicuous against an environmental background.

Ctenidium. The gill of a mollusk. Used for respiration and often for feeding.

Ctenophora. See Comb jellies.

Cyanobacteria. A group of photosynthetic and nitrogen-fixing bacteria that live as single cells or chains.

Daily estuary. An estuary in which tidal movements cause substantial changes in salinity at any one location on a daily basis.

Dalton. A measure of molecular mass. One dalton (Da) is equal to the mass of one hydrogen atom. Molecular mass is often measured in kDa, or thousands of daltons.

DDT. A pesticide consisting of chlorinated hydrocarbons, found to accumulate in marine species.

Dead zones. Large areas usually at the mouths of estuaries that have low concentrations or the absence of dissolved oxygen.

Deep layer. The layer extending from the lowest part of the thermocline to the bottom.

Deep-scattering layer. Well-defined horizon in the ocean that reflects sonar; indicates a layer usually consisting of fishes, squid, or other larger zooplankton.

Deep-sea coral mounds. Communities found in deep water dominated by scleractinian coral colonies.

Demersal. Nektonic, but associated with the seabed.

Demographic. Referring to numerical characteristics of a population (e.g., population size, age, structure).

Denitrifying bacteria. Free-living bacteria that convert nitrates to gaseous nitrogen.

Density (seawater). Grams of seawater in one cubic centimeter of fluid.

Density-dependent factors. Factors, such as resource availability, that vary with population density.

Density-mediated indirect interactions. An indirect action upon the abundance of a species when a species not directly interacting with the first species changes in abundance. An example would be the increase in abundance of a carnivore, which results in the increase of abundance of a plant because the plant's consumer is reduced in abundance.

Depensation. In fisheries biology: the case where rate of population increase declines because population size is at a lower threshold. Corresponds to the Allee effect.

Deposit feeder. An organism that derives its nutrition by consuming some fraction of a soft sediment.

Detritus. Particulate material that enters into a marine or aquatic system. If derived from decaying organic matter, it is organic detritus.

Deuterostomes. A group of bilaterian phyla including Echinodermata and Chordata, distinguished by DNA sequence relationships and characteristics of the early embryo, such as formation of the anus at the opening of the gastular invagination.

Diadromous. Migratory species that move between the open sea and within an estuary.

Diatom. Dominant planktonic algal form with siliceous test, occurring as a single cell or as a chain of cells.

Diffusion. The net movement of units of a substance from areas of higher concentration to areas of lower concentration of that substance.

Diet. The fraction of living food that does not survive passage through a predator's gut.

Dinoflagellate. Dominant planktonic algal form, occurring as a single cell, often biflagellate.

Direct interception. The interception of particles by suspension feeders from the water directly on threadlike structures such as cilia.

Direct release. The release of juveniles directly into the immediate environment of the parent with little dispersal.

Directional selection. Preferential change in a population, favoring the increase in frequency of one allele over another.

Dispersal. Spread of organisms, usually progeny, from one location to another.

Dissolved organic matter. Dissolved molecules derived from degradation of dead organisms or excretion of molecules synthesized by organisms.

Disturbance. A rapid change in an environment that greatly alters a previously persistent biological community.

Diurnal vertical migrations. Migration found in many zooplankton and fish where animals rise toward the surface at night and sink to depth during the daytime.

Diversity. A parameter describing, in combination, the species richness and evenness of a collection of species. Diversity is often used as a synonym for species richness.

Diversity gradient. A regular change in diversity correlated with a geographic space or gradient of some environmental factor.

DNA. A helical, double-stranded pair of macromolecules consisting of two chains of nucleotides whose primary function is to carry of genetic information.

Domoic acid. A toxic substance produced by some phytoplankton responsible for amnesic shellfish poisoning.

Down feathers. Relatively fluffy bird feathers that occupy high volume and enclose air for insulation of the body from the cold external environment.

Drag. A force created on an object because the pressure is different on either side of it.

Dredges. Samplers deployed from ships that drag the bottom and recover sediments with organisms.
**Dynamic viscosity.** A measure of molecular stickiness of a fluid, or a measure of resistance of a fluid to deform when a force is applied.

**Ecdysozoa.** A group of protostome phyla, including arthropods and nematodes, united by DNA sequence relationships and an external cuticle.

**Echinodermata.** Phylum characterized by a spiny skin that encloses a skeleton of interlocking calcium carbonate plates, a water vascular system, and tube feet.

**Echinoida.** A class of living Echinodermata, including sea urchins, sand dollars, and heart urchins.

**Ecological niche.** The range of physical and biological habitats occupied by a species.

**Ecology.** The study of the interaction of organisms with their physical and biological environments, and how these interactions determine the distribution and abundance of the organisms.

**Ecosystem.** A group of interdependent biological communities and abiotic factors in a single geographic area that are strongly interactive.

**Ecosystem engineer.** A species whose activities strongly affect the physical structure of the environment. Often used interchangeably with foundation species.

**Ecosystem management.** An approach to conserve ecosystems that includes components of environmental protection, the social community that interacts with the ecosystem, and economic considerations.

**Ecosystem services.** The economic values of a variety of benefits that ecosystems perform for humans, such as the protection by coastal vegetation against storm damage.

**Ekman transport.** Movement of surface water at an angle from the wind, as a result of the Coriolis effect.

**El Niño-Southern Oscillation (ENSO).** Condition in which warm surface water moves into the eastern Pacific, collapsing upwelling and increasing surface-water temperatures and precipitation along the west coasts of North and South America.

**Elasticity analysis.** A population analysis where one examines the effect on population growth by a change of one parameter, such as mortality rate of a single age class.

**Emigration.** The departure of individuals from a given area.

**Endemic.** Restricted in geographic range to a particular region.

**Endogenous rhythms.** A biological rhythm that, at least for a time, is maintained without any outside environmental variation.

**Endoparasite.** See Parasite.

**Endosymbiotic.** Being symbiotic and living within the body of an individual of the associated species.

**Entrainment.** The case when a particle is taken up with the flow of a fluid and moves with the fluid.

**Environmental stress.** Variously defined as (a) an environmental change to which an organism cannot acclimate and (b) an environmental change that increases the probability of death.

**Enzyme polymorphisms.** Genetic variation at genetic loci that code for enzymes.

**Epibenthic (epifaunal or epifloral).** Living on the surface of the seabed.

**Epidemic spawning.** Simultaneous shedding of gametes by a large number of individuals.

**Epifaunal.** An animal living on the surface of the seabed.

**Epipelagic zone.** The 0- to 150-m depth zone, seaward of the shelf-slope break.

**Epiphyte.** Microalgal organism living on a surface (e.g., on a seaweed frond).

**Estuarine flow.** Seaward flow of low-salinity surface water over a deeper and higher-salinity layer.

**Estuarine realms.** Large coastal water regions that have geographic continuity are bounded landward by a stretch of coastline with freshwater input, and are bounded seaward by a salinity front.

**Estuary.** A semienclosed body of water that has a free connection with the open sea and within which seawater is diluted measurably with freshwater that is derived from land drainage.

**Eubacteria.** A group of bacteria often distinguished by cell walls, presence of flagella, and molecular sequence similarity. One of three major divisions of life.

**Eukaryotes.** Organisms distinguished by their cells, which have distinct nuclei and cell organelles, and all cells except gametes reproduce by mitosis (see also Prokaryotes).

**Euphausiacea.** A group of shrimp-like crustaceans, up to a few centimeters long; zooplankton, found usually in upwelling regions.

**Euphausiid.** Member of an order of holoplanktonic crustacea.

**Eusocial.** Social organisms where different groups of individuals in a colony serve different purposes and have morphologies determined by a combination of genotype and environment.

**Eutrophic.** Water bodies or habitats having high concentrations of nutrients.

**Eutrophication.** Addition of high nutrient concentrations to a water body.

**Evaporative cooling.** Cooling of an organism by evaporating water from the body surface.

**Evenness.** The component of diversity accounting for the degree to which all species are equal in abundance, as opposed to strong dominance by one or a few species.

**Exclusive Economic Zone.** A coastal zone within which a nation has exclusive rights to its fisheries.

**False color.** Remote sensing data often are summarized in maps, and the variation in a parameter, e.g. sea-surface temperature, is represented in a color code, which is not a photographic representation of the original signal but an artificial color code.

**Fecal coliform bacteria.** Technically, all the facultative anaerobic gram-negative, non-sporo-forming, rod-shaped bacteria that ferment lactose in EC medium with gas production within 24 hours at 44.5°C. A measure of bacteria mostly originating from guts that enters waters. Believed to be correlated with disease-causing (pathogenic) bacteria.

**Fecal pellets.** See Pellets.

**Fecundity.** The number of eggs produced per female per unit time (often: per spawning season).

**Fermentation.** See fermenting bacteria.

**Fermenting bacteria.** Bacteria that gain energy by fermentation, the anaerobic breakdown of organic material into end products such as alcohols.

**Field experiments.** Experiments that are designed to manipulate natural communities in the field.

**Fish balls.** A type of fish aggregation into a ball, where fish move continuously from the surface of the ball to the interior.
Flow cytometer. A device that uses a laser light source on particles to analyze for fluorescence and other characteristics that can distinguish the particle from other types (e.g., different types of phytoplankton cells).

Flume. A research device that uses moving water in a contained space to investigate water movement and the response of organisms to water motion.

Flushing time. The time it takes for a parcel of water to leave a confined water body such as a bay.

Foliareal coral. A coral whose skeletal form approximates that of a broad, flattened plate.

Food chain. An abstraction describing the network of feeding relationships in a community as a series of links of trophic levels, such as primary producers, herbivores, and primary carnivores; a linear connection of organisms to show the feeding linkages of predators and prey.

Food chain efficiency. Amount of energy or some other quantity extracted from a trophic level, divided by the amount of energy produced by the next-lower trophic level.

Food web. A network describing the feeding interactions of the species in an area.

Foraminifera. Protozoan group, individuals of which usually secrete a calcareous test; both planktonic and benthic representatives.

Foraminiferan ooze. A deep-sea sediment composed primarily of skeletons of Foraminifera.

Foundation species. Species that are structurally important for the organization of a community. Includes abundant species like reef-forming corals and sea grasses.

Founder principle. A small colonizing population is genetically unrepresentative of the source of population.

Free amino acids. Amino acids that are synthesized and kept in free concentration in cells for the purpose of osmoregulation.

Free spawning. Gametes are released directly into the water column.

Freshet. An increase of water flow into an estuary during the late winter or spring, owing to increased precipitation and snow melt in the watershed.

Front. In seaweeds: typically, a flattened structure attached to the stipe, where much of the photosynthesis occurs.

Front. A major discontinuity separating ocean currents and water masses in any combination.

Fugitive species. A species adapted to colonize newly disturbed habitats.

Functional biology. The study of how an organism carries out the basic functions such as reproduction, locomotion, feeding, and the cellular and biochemical processes relating to digestion, respiration, and other aspects of metabolism.

Functional group. A groups of species with similar ecological function (e.g., herbivore species).

Functional redundancy. The case where the ecological function (e.g., nitrogen fixation) of one species in a community can be replaced by the presence of another ecologically similar species.

Gametophyte. Haploid stage in the life cycle of a plant.

Gastropoda. A class of mollusks characterized usually by a spiral shell, a muscular foot, and twisting of the embryo during development.

Gelatinous zooplankton. Zooplankton that have a gelatinous support skeleton, including many distantly related phyla such as Cnidaria, Ctenophora, and members of the Chordata.

Gene duplication. A process whereby a gene is duplicated owing to an error in DNA duplication in meiosis or even a duplication of a whole chromosome. Genes may be duplicated by a number of other processes related to DNA replication and repair.

Gene expression. The degree to which a given gene is stimulated to produce a gene product such as a protein.

Gene family. A group of genes that are similar in sequence and usually function and all derive from the same ancestral gene, usually by means of gene duplication and natural selection.

Generation time. The time period from birth to average age of reproduction.

Genetic code. The arrangement of nucleotides to form a code specifying different amino acids.

Genetic drift. Changes in allele frequencies that can be ascribed to random effects.

Genetic locus. A location on a chromosome (possibly of a diploid organism with variants that segregate according to the rules of Mendelian heredity).

Genetic polymorphism. Presence of several genetically controlled variants in a population.

Genome. The total functioning DNA of an organism.

Genotype. The genetic makeup of an organism; with respect to a given genetic locus, the alleles it carries.

Genotype by environment interaction. The same genotype may have a different phenotype when raised in different environments.

Genus. (plural: genera) The level of the taxonomic hierarchy above the species but below the family level.

Geostrophic flow. Movement of water in the oceans as a combined response to the Coriolis effect and gravitational forces created by an uneven sea surface.

Geotactic. Moving in response to the earth’s gravitational field.

Gill arch. A part of a fish skeleton that supports the gills.

Gill rakers. Projections along the gill arch.

Global conveyor belt system. A movement of water currents that couples surface water motion with deep thermohaline water motion.

Global warming. Predicted increase in the earth’s oceanic and atmospheric temperature, owing to additions of carbon dioxide to the atmosphere, often as a result of human activities.

Glycoproteins. A protein having a carbohydrate component.

Gonochoristic. Having separate sexes.

GPS: Global Positioning System. An electronic device that uses positioning signals from satellites in order to locate precisely latitude and longitude. Now used nearly exclusively for locating fish sampling stations at sea, but also useful for locations near and on shore.

Grab. Benthic sampling device with two or more curved metal plates designed to converge when the sampler hits bottom, grabbing a specified volume of bottom sediment.

Gravity cores. A coring device that drops into the sediment with the aid of a weight, simply by force of gravity.
Glossary

Grazer. A predator that consumes organisms far smaller than itself (e.g., copepods graze on diatoms).

Greenhouse effect. Carbon dioxide traps solar-derived heat in the atmosphere near the earth.

Greenhouse gases. Gases such as carbon dioxide that enable the greenhouse effect.

Gregarious settling. Settlement of larvae that have been attracted to members of their own species.

Gross primary productivity. The total primary production, not counting the loss in respiration.

Growth efficiency. The efficiency that ingested food is converted into somatic growth.

Guild. A group of species, possibly unrelated taxonomically, that exploit overlapping or similar resources.

Gyre. Major cyclonic surface current systems in the oceans.

Hadal. The depth zone corresponding to oceanic trenches.

Hardy-Weinberg law. Law that states that the frequencies of genotypes in a population at a locus are determined by random mating and allele frequency.

Harmful algal bloom. A bloom of (usually) planktonic microalgae belonging to a strain of a species that has a toxin harmful to marine organisms or humans consuming marine organisms.

Heat of vaporization (water). The amount of heat required to convert a unit mass of water at its boiling point into vapor without an increase in temperature.

Heat shock proteins. Proteins that are produced under heat stress and reduce the unfolding of functioning enzymes.

Herbivore. An organism that consumes plants.

Heritable character. A morphological character whose given state can be explained partially in terms of the genotype of the individual.

Hermaphroditic. An individual capable of producing both eggs and sperm during its lifetime.

Hermatypic. Reef-building.

Heterocysts. Enlarged cells in cyanobacteria, where nitrogen fixation occurs.

Heterotrophic algae. Algae that take up organic molecules as a primary source of nutrition.

Heterozygote. With respect to a given genetic locus, a diploid individual carrying two different alleles.

Highly stratified estuary. An estuary having a distinct surface layer of fresh or very-low-salinity water, capping a deeper layer of higher-salinity, more oceanic water.

High-nutrient–low-productivity areas (HNLP). Areas of the surface ocean that have relatively high concentrations of nitrogen and phosphorus but nevertheless have low primary productivity, probably because of iron limitation.

Hirudinea. The leeches, a class of annelids having a fixed number of segments, lacking parapodia or chaetae, and typically parasitic.

Histogram. A multiple-bar diagram representing the frequency distribution of a group as a function of some variable. The frequency of each class is proportional to the length of its associated bar.

HNLP. See High-nutrient–low-productivity areas.

Holost. In sea urchins: A structure that attaches the seaweed to the substratum.

Holoplankton. Organisms spending all their life in the water column and not on or in the seabed.

Holothuroidea. A class of Echinodermata, the sea cucumbers, characterized by a worm shape, a crown of tentacles with tube feet, and either a deposit- or suspension-feeding ecology.

Homeotherm. An organism that regulates its body temperature despite changes in the external environmental temperature.

Homologous. Having the same evolutionary origin.

Homozygote. With respect to a given genetic locus, a diploid individual carrying two identical alleles.

Hot vents. Openings in oceanic ridge rocks of volcanic origin with hot water emanating with concentrated metals and sulfide.

Hydrogen bonds. A chemical bond with a hydrogen atom between two negatively charges atoms (e.g., oxygen).

Hydrographic. Referring to the arrangement and movement of bodies of water, such as currents and water masses.

Hydrothermal vents. Sites in the deep-ocean floor where hot, sulfur-rich water is released from geothermally heated rock.

Hyperosmotic. Having a higher salt content or higher content of materials that affect osmosis (e.g., osmolytes), within cells than exists in the surrounding external water environment.

Hypoomotic. Having a lower salt content or lower content of materials that affect osmosis, within cells than in the surrounding external water environment.

Hypothesis. A refutable statement about one or a series of phenomena.

Hypoxia. The presence of low concentrations of oxygen in the water that is stressful to marine organisms.

Ice algae. A wide variety of microalgae and macroalgae that live in association with ice floes in polar oceans.

Immunofluorescence. A method of identifying cells by means of using antibodies that are coupled to fluorescent dyes.

Impingement. When a screen in a power plant captures fish or other marine organisms as water is sucked into an intake channel.

Indirect effect. An ecological effect of one species on another that is mediated through changes in abundance of a third species that interacts with the first species.

Inducible defense. A defense against predation that grows or develops after an individual is exposed to a predator.

Inertial forces. Forces where an object tends to keep moving after ceasing to apply a force to that object.

Infraunal. Living within a soft sediment and being large enough to displace sedimentary grains.

Inorganic carbon. Carbon in molecules not manufactured by organisms; e.g., as CO₂.

Intermediate predation effect. Predation maximizes the number of coexisting and competing species at some intermediate level of predation.

Interspecific competition. Condition in which one species’ exploitation of a limiting resource negatively affects another species.

Interstitial. Living in the pore spaces among sedimentary grains in a soft sediment.

Intertidal zone. Vaguely defined as the zone between the highest and lowest extent of the tide.

Isotonic. Having the same overall concentration of dissolved substances as a given reference solution.

Iteroparity. The condition where an individual reproduces more than once.

Kelp. A group of brown seaweeds belonging to the group Laminariales, characterized by rapid growth and occurrence as foundation species of subtidal kelp forests.

Kelp forests. Shallow subtidal communities in relatively cold water, dominated by kelps.

Keystone species. A predator at the top of a food web, or discrete subweb, capable of consuming organisms of more than
Logistic population growth. Population growth that is modulated by the population size relative to carrying capacity. Population growth declines as population approaches carrying capacity, and is negative when population size is greater than carrying capacity.

Meiobenthos (meiofauna or meioflora). Benthic organisms (animals or plants) whose shortest dimension is less than 0.5 mm but greater than or equal to 0.1 mm.

Meiofauna. Animals whose shortest dimension is less than 0.5 mm but greater than or equal to 0.1 mm.

Membrane order. The degree of packing of the structural phospholipids in a cell membrane.

Megaplanктон. Planktonic organisms that are greater than or equal to 2,000 µm in size.

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Mesopelagic. The 200–1,000 m depth zone, seaward of the shelf-slope break.

Messenger RNA. RNA molecule that is the template for the amino acid sequence of a protein.

Metabolic rate. The overall rate of biochemical reactions in an organism. Often estimated by rate of oxygen consumption in aerobes.

Metamorphosis. Major developmental change as the larva develops into an immature adult.

Metapopulation. A group of interconnected subpopulations, usually of subequal size. The features of individuals now found in one subpopulation might have been determined by conditions affecting them when they were located in another subpopulation.

Metazoan. Equivalent to all of the animals.

Methanogenic bacteria. Anaerobic bacteria that use carbon dioxide as a source of carbon and produce methane as a by-product.

Methyl mercury. Organic form of mercury and the form of mercury that is most easily bioaccumulated.

Microarray. An array of sequences, usually attached to a plastic chip, used to test for binding of similar sequences extracted from a species. Used to estimate the degree of gene expression or the presence of given DNA sequences in a given individual.

Microbenthos (microfauna or microflora). Benthic organisms (animals or plants) whose shortest dimension is less than 0.1 mm.

Microbial loop. A part of a marine food web where bacteria is consumed by protists, which are eventually consumed by larger consumers in the food web.

Microbial stripping hypothesis. When a deposit feeder feeds on sediment, it digests the microbial organisms on particulate organic matter with great efficiency but digests the particulate organic matter itself with very low efficiency.

Microfauna. Animals whose shortest dimension is less than 0.1 mm.

Microsatellites. DNA sequences used as genetic markers. Usually consist of highly repetitive sequences that are quite variable and therefore useful in marking individual populations of a species.

Migration. A directed movement of an organism between specific areas.

Mixed tides. Tides where the vertical extent of the tide is very uneven, usually with two very different alternating low tides.

Mixing depth. The water depth to which wind energy evenly mixes the water column.

Mixoplankton. Planktonic organisms that can be classified at several trophic levels. For example, some ciliates can be photosynthetic but also can ingest other plankton and are heterotrophic or may retain ingested chloroplasts.

Moderately stratified estuary. An estuary in which seaward flow of surface low-salinity water and moderate vertical mixing result in a modest vertical salinity gradient.

Modular organisms. Organisms that consist of repeated connected units that are genetically identical and of similar ecological function (e.g., a coral colony).

Module. A unit in a modular organism.

Molecular clocks. The dating of a biological event (e.g., origin of an evolutionary group) by using the rate at which DNA sequences change over time.

Mollusks. A phylum of protostome mollusks characterized usually by a mantle, calcium carbonate shell(s), unsegmented body, including snails, bivalves, and squids.

Momentum boundary layer. A layer of water near a surface where physical transport of fluid is affected by the presence of the surface.

Monophyletic. Refers to a group of species that all have a single common ancestral species.

Monophasocephora. Antibodies produced by a single cell.

Mucous-bag suspension feeder. Suspension feeder employing a sheet or bag of mucus to trap particles nonselectively.

 Müllerian mimicry. Mimicry where two species resemble each other and both are toxic.

Multibeam sonar. A sonar signal in a fan shape that can map the spatial arrangement of depth on the sea floor and even detect properties of the seabed.

Mustelids. A family of mammals including minks and otters.

Mutualism. An interaction between two species in which both derive some benefit.

Mycorrhizae. Fungi involved in a symbiosis with roots of plants and aiding in plant nutrient uptake.

Mysticeti. Group of Cetacea that use baleen for feeding.

Nanoplankton. Planktonic organisms that are 2–20 μm in size.

NAO. See North Atlantic Oscillation.

Natural selection. The differential contribution of genes to the next generation because of fitness differences.

Neap tides. Tides occurring when the vertical range is minimal.

Negative correlation. An inverse relationship between the values of one parameter and the values of another.

Nekton. Organisms with swimming abilities that permit them to move actively through the water column and to move against currents.

Nematoblast. Cells found in Cnidaria, which contain hooks, stingers, or mucus to entrap prey.

Nematocysts. The stinging, hooking, or mucus-producing elements that emerge from nematoblasts.

Nematoda. Free-living and parasitic worms with a cuticle and longitudinal muscles.

Nemertea. Elongate free-living worms, with complete gut; carnivorous, using barbed proboscis to kill prey.

Neritic. Seawater environments landward of the shelf-slope break.

Net primary productivity. Total primary production, minus the amount consumed in respiration.

Neuston. Planktonic organisms associated with the air–water interface.

New production. Primary production in a body of water that can be explained by import of usually inorganic nutrients from outside the system, as in upwelling.

Niche. A general term referring to the range of environmental space occupied by a species.

Niche overlap. An overlap in resource requirements by two species.

Niche structure. Any predictable partitioning by coexisting species of a habitat into subhabitats.

Nitrification. A process caused by nitrifying bacteria, where ammonium is oxidized to nitrite or nitrate.

Nitrogen fixation. The conversion of gaseous nitrogen to nitrate or ammonium by specialized bacteria.

Non-point source effects. Pollution sources that come from the watershed to many points along a water body, as opposed from a single source, such as an industrial pipe.
Nonrenewable resource. A resource that, when consumed, is no longer available over the lifetime of the organism.

North Atlantic Oscillation (NAO). A cycle of changing difference in air pressure between a low atmospheric pressure over Iceland at about 64°N latitude and a higher atmospheric pressure over the Azores, at approximately 38°N latitude.

No-slip condition. The condition where water has zero velocity when in contact with a surface.

No-take areas. Geographic areas where by law no one is allowed to fish or collect biological specimens. Rules could apply to one or all species.

No-take sanctuary. A marine preserve with a rule that prevents taking of a given species or group of species.

Nucleotides. A building block of a DNA or RNA strand.

Nutrients. Those constituents required by organisms for maintenance and growth (we use this term in this book in application to plants).

Ocean observatories. Remote sensing systems, on the seafloor or in midwaters, used to collect data and transmit them to land-based laboratories.

Oceanic. Associated with seawater environments seaward of the shelf-slope break.

Oceanic ridge. A sinuous ridge rising from the deep-sea floor.

Odontoceti. A group of Cetacea characterized by reduced appendages, flukes, and teeth used in carnivory.

Oligochaeta. A class of Annelida that are wormlike, usually free living, and have chaetae but lack parapodia; includes earthworms.

Oligotrophic. Refers to water bodies or habitats with low concentrations of nutrients.

Omnivory. Being able to feed in more than one distinct way (e.g., an organism capable of carnivory and herbivory).

Operculum. Hard organic covering of the foot of gastropods, used in the inner ear of a fish for perception of balance. The mass often grows in increments that can allow us to age the fish.

Parapatric speciation. A condition in which organisms occur in patches. A condition in which organisms occur in aggregations.

Patchiness. A condition in which organisms occur in aggregations.

PCR. See Polymerase chain reaction.

Peat. A sediment that is rich in organic matter.

Pelagic. Living in the water column seaward of the shelf-slope break.

Pellets. Compacted aggregations of particles resulting either from egestion (fecal pellets) or from burrow-constructing activities of marine organisms.

Penetration anchor. In hydraulically burrowing organisms, any device used to penetrate and gain an initial purchase on the sediment so that the body can be thrust in farther.

Peptidyl. Chains of amino acids; often portions of a protein molecule, or functional molecules in their own right.

Petersen grab. A bottom grab that enters the seafloor by gravity and then closes as a chain pulls the sampler upward toward the ship.

Photosynthetically active radiation. PAR. Photosynthetically active radiation.

Photosynthesis. The movement of pure water across a membrane from a compartment with relatively low dissolved ions to a compartment with higher concentrations of dissolved ions.

Phytoplankton. A microscopic aquatic plant, whether free living, and have chaetae but lack parapodia; includes earthworms.

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pH. Measure of the acidity or basicity of water (−log 10 of the activity of hydrogen ions in water).

Phenotype. The form of an organism or a trait (as opposed to its genotype).

Phenotypic plasticity. The capacity of an individual to produce different phenotypes under different conditions. Nongenetic potential variability within the range of a single individual.

Phi scale. Scale used for measuring the grain size of sediments. = −log2 (grain diameter).

Phleger corer. A small, gravity-driven bottom corer.

Phoronida. A phylum of wormlike animals, having a lophophore and living infaunally.

Photic zone. The depth zone in the ocean extending from the surface to that depth permitting photosynthesis.

Photorespiration. Enhanced respiration of plants in the light relative to dark respiration.

Photosynthetic rate. The rate of conversion of dissolved carbon dioxide and bicarbonate ion to photosynthetic product.

Photosynthetically active radiation (PAR). That part of the light spectrum that can be used in photosynthesis.

Phototactic. Moving in response to light.

Phylogeography. The study that combines geographic and evolutionary aspects of the distribution of species.

Physiological integration. A general term signifying the degree of coordination of different physiological and biochemical processes within a cell or within an organism.

Physiological race. A geographically defined population of a species that is physiologically distinct from other populations.

Physiological tolerance. The degree to which an organism can survive an extreme environment, by virtue of its physiological traits.

Phytodetritus. Particulate organic matter settling through the water column that derives from dead phytoplankton.

Phytoplankton. The photosynthesizing organisms residing in the plankton.

Pinnipedia. A diverse group of semi-aquatic marine mammals with fin-shaped feet, including seals, sea lions, and walruses.

Planktivorous. Feeding on planktonic organisms.

Plankton. Organisms living suspended in the water column and incapable of moving against water currents.

Planktotrophic larva. Planktonic-dispersing larva that derives its nourishment by feeding in the plankton.

Plant nutrients. Substances required by plants for growth.

Planula. The planktonic larval form produced by scleractinian corals and coelenterates.

Plate. Major section of the earth's crust, bounded by such features as mid-ocean ridges.

Platyhelminthes. A phylum of invertebrates, commonly known as flatworms, with free-living and parasitic representatives.

Pleistocene. Period of time, going back to approximately 2 million years before the present, in which alternating periods of glaciation and deglaciation have dominated the earth's climate.

Pleuston. Refers to plankton that have a float protruding above the sea surface, such as the Portuguese man-of-war.

Pneumatocysts. Gas-containing floats found in some brown seaweeds, such as kelps.

Pocillogonic. Species with more than one larval developmental mode.

Pogonophora. A phylum of wormlike animals that are gutless, have a symbiosis with bacteria, and are usually found in deep-sea environments.

Poikilotherm. An organism whose body temperature is identical to that of the external environment.

Point source. A pollution source from a confined spot, such as an industrial pipe.

Polychlorinated biphenyls (PCBs). Usually very toxic compounds manufactured for insulation, but released into the marine and estuarine environments.

Polycyclic aromatic hydrocarbons (PAHs). Derived from fossil fuels and very toxic and known to be carcinogenic.

Polymerase chain reaction (PCR). A reaction based on fluctuating thermal conditions used to amplify DNA by means of annealing specific strands with nucleotides that bind and amplify the original DNA strand to great abundance.

Polymorphism. The presence of coexisting and distinctly different forms of a species; may be caused by genetic differences or phenotypic plasticity.

Polyp. An individual of a solitary coelenterate or one member of a coelenterate colony.

Polyphyletic. Refers to a group of species that do not have one common ancestor species.

Polyplocahora. A class of Mollusca, comprising the chitons.

Poorly sorted sediments. Sediment consisting of a wide range of mixed groups of differently sized particles.

Pop-off archival tags. Fish tags that are designed to become disattached from fish after a time, so that they can rise to the surface and be detected by a global positioning system.

Population density. Number of individuals per unit area or volume.

Porifera. The phylum comprising the sponges.

Positive correlation. An increase in one variable occurs with an increase in another variable, or a decrease in one variable occurs with a corresponding decrease in another variable.

Postmaturing isolation. Reproductive isolation between species due to mechanisms such as genetic compatibility, despite the fact that mating occurs.

Posttranslational modification. Chemical change (e.g., attachment of oligosaccharides) in a protein after it is translated, or after its amino acid sequence is specified.

ppt. A measure of the salt content of seawater in terms of kilograms of salt per kilogram of water, reckoned in parts per thousand. A conductivity version of this measure is the psu, which differs from ppt by very little, on the order of 0.02 psu or less.

Practical salinity. See PSU.

Precision. Precision is the repeatability of a measurement. A measurement can be precise, but not accurate. See also Accuracy and Resolution.

Predation. The consumption of one organism by another.

Predator. An organism that consumes another living organism (carnivores and herbivores are both predators by this definition).

Premating isolation. Reproductive isolation between species that involves mechanisms such as time of reproduction and mate-recognition signals.

Pressure drag. A difference in pressure upstream and downstream of an object in a flow.
Primary producer. An organism capable of using the energy derived from light or a chemical substance in order to manufacture energy-rich organic compounds.

Primary production. The production of living matter by photosynthesizing organisms or by chemosynthesizing organisms. Usually expressed as grams of carbon per square meter per year.

Primary treatment. Simple screening of organic particulates before sewage is released into the water.

Productivity. The amount of biological material (usually expressed as carbon) produced per unit time (usually expressed per unit of area in the ocean).

Prokaryotes. Organisms distinguished by cells that lack true nuclei or organelles and do not reproduce by means of mitosis.

Protandrous. An animal that, when sexually mature, is first a male and then switches sex to female.

Protein. A molecule consisting of one or more chains of amino acids in a specific order.

Protein polymorphism. Presence of several variants of a protein of a given type (e.g., a certain enzyme, such as carboxylase) in a population.

Protista. Kingdom of mostly unicellular organisms with a true nucleus and chromosomes. Includes ciliates, flagellates, and some macroalgae.

Protogynous. An animal that, when sexually mature, is first a female and then switches sex to a male.

Protostomes. Individuals belonging to a group of Bilateria, including phyla of ecdysozoans such as Arthropoda and lophotrochozoans such as Annelida.

Province. A geographically defined area with a characteristic set of species or characteristic percentage representation by given species.

Pseudofeces. Material rejected by suspension feeders or deposit feeders as potential food before entering the gut.

psu. Practical salinity unit. A measure of the salt content of seawater.

Pteropods. An organism that can maintain constant some aspect of its physiology (e.g., body temperature) despite different and changing properties of the external environment.

Pycnocline. Depth zone within which seawater density changes.

Pycnogonida. A group of crustaceas having long, spiderlike legs.

Pyrimidines. The bases cytosine, thymine, and uracil in DNA and RNA.

Q10. Increase of metabolic rate with an increase of 10°C.

Quantitative genetics. The study of the genetic basis of traits, usually explained in terms of the interaction of a group of genes with the environment.

R. The intrinsic rate of increase of a population.

Radial cleavage. A type of cell division in early embryonic growth in which the cleavage plane is parallel or perpendicular to a single embryonic axis.

Radiance. The amount of electromagnetic radiation (e.g., light energy) arriving at a point on the earth's surface.

Radiocarbon technique (primary productivity). The estimation of primary productivity by the measurement of radiocarbon uptake.
Respiratory pigment. A molecule, polymer, or other complex adapted to bind and transport oxygen efficiently, usually in a circulatory system (e.g., hemoglobin).

Respiratory quotient. The ratio of moles of carbon dioxide produced to oxygen consumed in respiration.

Respiratory trees. Paired, branching structures emerging from the cloaca of a sea cucumber.

Rete mirabile. A countercurrent exchange structure of capillaries that allows gas uptake in a fish swim bladder.

Retention time. The time a unit of water remains in a water body such as an estuary before being mixed into an outside water body, such as the shelf.

Reverse Bohr effect. Effect that occurs when lactate builds up in the blood of certain invertebrates and pH decreases, increasing the affinity of hemocyanin for oxygen.

Reynolds number (Re). A number that represents the relative importance of viscous forces and inertial forces in a fluid. As Re increases, inertial forces become more important. In seawater, Re increases with increasing water velocity and with the size of the object in the water.

Rhizome system. A system of runners below the sediment surface that allow sea grasses and salt marsh plants to extend coverage of a plant over large areas and permits transfer of nutrients to new areas where shoots can emerge at the sediment surface.

Rip current. A concentrated rapid current moving offshore from a beach fronting a longshore current.

Ripple marks. Surface sedimentary structure formed by movement of water over the bottom, resulting in cyclical highs and lows in the sediment.

Rise. Bottom of low relief at the base of the continental slope.

RNA. A macromolecule consisting of a chain of nucleotides, whose primary function is protein synthesis.

ROV. See Remotely Operated Vehicle.

Salinity. Number of kilograms of dissolved salts in 1 kg of seawater, measured in parts per thousand. Actually this definition stands alongside another definition based upon water standards whose electrical conductivities are measured. See also ppt and psu.

Salps. A group of pelagic tunicates (phylum Urochordata), either colonial or solitary, with buccal and atrial siphons on opposite sides of the body.

Salt glands. In mangroves: in some species, glands in the leaves that excrete salts to the leaf surface.

Salt marsh. A coastal habitat consisting of salt-resistant plants residing in an organic-rich sediment accreting toward sea level.

Saprophytic organisms. Organisms that break down and decay organic matter.

Satellite radiometer. A device in a satellite that measures the amount of electromagnetic radiation over a specified range of wavelengths.

Saturated solution. With respect to a given substance that might precipitate from solution: the concentration of dissolved components are at a maximum before precipitation will occur.

SAV. Submerged attached vegetation.

Saxitoxin. A neurotoxin that blocks sodium channels, produced by certain phytoplankton species.

Scaphopoda. Class of the phylum Mollusca with elongate tusk-shaped conical shell.

Scattering. Interaction of particles in the water column with light, resulting in a decline of light energy with depth.

Scavenger. An organism that feeds on dead or decomposing animals or macrophytes.

Schooling. Fish: movement, usually coordinated, in groups.

Scientific method. Organized means of learning about the natural world, using observation, forming of hypotheses, and hypothesis testing.

Scleractinia. Order of coelenterates, usually producing calcareous skeletons with hexameral symmetry.

Scope for growth. The surplus of energy available for growth beyond that required for maintenance.

Scyphozoa. The true jellyfish, members of the phylum Cnidaria.

Seafloor spreading. The horizontal movement of oceanic crust.

Seasonal estuary. An estuary in which salinity at any one geographic point changes seasonally (e.g., decreases during the spring melt).

Seaward. Side of an island that faces the direction of wave action generated either by winds or by currents generated by more indirect forces.

Secondary compounds. Molecules that are manufactured for defense against attack by a predator, parasite, or competitor.

Secondary production. The production of living material per unit area (or volume) per unit time by herbivores. Usually expressed as grams of carbon per meter square per year.

Secondary treatment. Treatment of sewage that encourages breakdown of particulate organic matter but releases dissolved nutrients into the marine environment.

Sedimentation. Deposition of particles and chemical precipitation to form deposits in water.

Seine nets. Nets placed in the water and pulled along, capturing marine organisms in the mesh.

Selection. A change in allele frequency over time in a population.

Semelparity. Reproducing only once.

Semi-infaunal organisms. Organisms that live partially buried within the sediment but partially projecting into the water column.

Sequential hermaphrodite. An individual that sequentially produces male and then female gametes or vice versa.

Sessile. Immobile because of an attachment to a substratum.

Seston. Particulate matter suspended in seawater.

Setules. Chitinous projections from copepod maxillipeds that trap food particles.

Sex. Combining genetic materials from different types, known as sexes, usually in the production of offspring.

Sexual selection. Selection for traits that are involved in mating success, such as visual elements (e.g., color) and combat structures (e.g., antlers of deer).

Shelf-slope break. Line marking a change from the gently inclined continental shelf to the much steeper depth gradient of the continental slope.

Shifting baselines. Concept that our perception of the natural environment may change according to how the environment changes over the generations, resulting in a misperception of what was natural several generations before human degradation.

Short-term (acute) effects. Immediate response to an environmental change.

Shotgun sequencing. Mass acquisition of DNA fragments from a sample with sequencing of all DNA.

Sibling species. Closely related species that are so similar that they are nearly indistinguishable morphologically.

Side-scan SONAR. A sonar system producing sound energy that bounces off the seafloor and is subsequently picked up
by a detector. The signal gives a picture of the seabed surface, revealing a variety of surface sedimentary features. See also Multibeam SONAR.

**Sigma.** Parameter expressing the seawater density and equal to $1 - \text{density of seawater, measured at a given temperature and at a pressure of 1 atmosphere.}$

**Silt-clay fraction.** The particle fraction of a sediment that is less than 62 µm in diameter.

**Simultaneous hermaphrodites.** Hermaphrodites that have potential simultaneous male and female sexual functions.

**Siphonophores.** A group of specialized hydrozoan cnidarians, consisting of large planktonic polymorphic colonies.

**Sled.** A benthic sampling device designed to slide along the sediment surface, digging into the bottom to a depth of at most a few centimeters.

**Slope.** A steep-sloping bottom extending seaward from the edge of the continental shelf and downward toward the rise.

**Smith–McIntyre grab.** A device that collects a bottom sample by means of spring-loaded sections that close together and enclose a sediment sample. See Grab.

**Snow.** See Marine snow.

**Soft sediment.** Sediment composed of separate sedimentary grains.

**Somatic growth.** Growth of the body, exclusive of gametes.

**Sorting (of a sediment).** The range of scatter of particle sizes about the median grain size of a sediment.

**Space limited.** Description of a situation in which space is a limiting resource.

**Spatial autocorrelation.** A situation in which some parameter at any location (e.g., population density) can be predicted through a knowledge of the values of the parameter in other locations.

**Spatial distribution.** The arrangement of individuals in a space.

**Speciation.** The process of formation of new species.

**Species.** A population or group of populations that are in reproductive contact but are reproductively isolated from all other populations.

**Species richness.** The number of species in an area or biological collection.

**Species-area effect.** A regular logarithmic relationship between the number of species in a confined geographic area (e.g., an island) and the area in which the species occur.

**Sperm attractants.** Chemicals that sperm use to follow concentration gradients to eggs.

**Spicules.** Skeletal elements made of silica found in the outer wall of a sponge.

**Spongine.** The organic material of which the sponge skeleton is composed.

**Sporophyte.** Diploid stage in the life cycle of a plant.

**Spring diatom increase.** The major rapid population increase of diatoms, occurring in the spring in temperate-boreal latitudes.

**Spring freshet.** The increase of flow in an estuary in spring, owing to snow melt and precipitation in the watershed.

**Spring tide.** The biweekly time, corresponding to full and new moons, of maximum tidal vertical range.

**Spur-and-groove topography.** Topographic feature of some coral reefs with massive colonies forming an alternation of projections and hollows.

**Stability-time hypothesis.** Hypothesis that states that higher diversity occurs in habitats that are ancient and stable environmentally.

**Standing crop.** The amount of living material per unit area or volume; may be expressed as grams of carbon, total dry weight, and so on.

**Stipe.** In seaweeds: the structure that connects the holdfast to the frond(s) or blades and usually provides mechanical strength to the seaweed in a current.

**Stock recruitment models.** Fishery models that predict the amount of juvenile recruitment as a function of the parent stock.

**Stratification.** In benthos, the presence of different infaunal species at distinct respective horizons below the sediment-water interface.

**Subtropical.** Refers to the portion of the temperate zone closest to the equator.

**Succession.** A predictable ordering of a dominance of a species or groups of species following the opening of an environment to biological colonization.

**Sulfate-reducing bacteria.** Bacteria that use sulfate as an oxidizing agent, reducing it to sulfide.

**Surface layer.** The layer of the ocean extending from the surface to a depth above which the ocean is homogeneous due to wind mixing.

**Surface mixing hypothesis.** Explanation for diurnal vertical migrations of zooplankton, arguing that zooplankton go to depth in order to rise to newly mixed surface waters.

**Surfactant.** A substance that reduces the surface tension between water and various hydrophobic organic compounds (detergent action) and aids in removing these compounds from surfaces. Present in deposit-feeder guts to aid in removing organic compounds from particle surfaces.

**Survivorship curve.** The curve describing changes of mortality rate as a function of age.

**Suspension feeder.** An organism that feeds by capturing particles suspended in the water column.

**Swash rider.** Invertebrate that can migrate up and down shore with the rising and falling tide, in order to maintain station at a level that is moist but not overly washed by the waves.

**Swim bladder.** In fishes, a gas-filled chamber whose volume can be regulated so that fish can regulate their depth.

**Tags.** Devices of varying design that are implanted in marine organisms for identification.

**Teleplanic larva.** Larva capable of dispersal over long distances, such as across oceans.

**Temperate.** Pertaining to the latitudinal belt between the tropics (23.5°N latitude) and the Arctic or Antarctic Circle (66.5° latitude), in the Northern and Southern hemispheres, respectively.

**Tentacle-tube-foot suspension feeder.** Suspension feeder that traps particles on distinct tentacles or tube feet (in echinoderms).

**TEP.** See Transparent exopolymers.

**Terminal anchor.** In hydraulically burrowing organisms: any device used to anchor the leading portion of the burrower, permitting muscular contraction to drag the rest of the body into the sediment.

**Territoriality.** Defense of a specified location against intruders.

**Tertiary production.** The production of living material per unit area (or volume) per unit time by organisms consuming the herbivores. Usually expressed as grams of carbon per meter square per year.

**Tertiary treatment.** Treatment of sewage that removes dissolved nutrients before it enters the environment.
Tethys. An ancient sea that connected the present Indian Ocean with the Mediterranean and Atlantic. The sea was eliminated by a terrestrial uplift in the Miocene.

Thallus. In seaweeds: the life-history form that is usually macroscopic and attaches to a substratum.

Theory of limiting similarity. Theory that predicts a specified degree of difference between two species that are closely related and are competing for resources.

Thermocline. Depth zone within which temperature changes maximally.

Thermohaline circulation. Movement of seawater that is controlled by density differences that are largely explained in terms of temperature and salinity.

Thixotropy. Property of watery sediment where it liquefies more when a pressure is applied to it.

Tidal current. A water current generated by regularly varying tidal forces.

Tides. Periodic movement of water resulting from gravitational attraction between the earth, sun, and moon.

Top-down control. Refers to food webs where control of a population is mainly explained by consumption by a species or group of species at higher levels of the food chain (e.g., population change of population of mussels controlled by sea star predation).

Toxic algal blooms. Blooms, usually of phytoplankton, that result in toxic effects on other marine organisms or humans.

Trace elements. Elements in the ocean at an average concentration less than one part per million.

Trade winds. Persistent winds at low latitudes in both the Northern and Southern hemispheres, blowing toward the west and the equator.

Trait-mediated indirect interaction. A plastic trait, where a species changes its behavior or morphology depending on the presence of an interacting species (e.g., a predator), which may lead to different interactions within a community. See also Density-mediated indirect interactions.

Transferrins. Proteins in vertebrate blood that bind to iron.

Translation. The process of protein synthesis that determines the amino acid sequence of the protein (primary structure).

Transparent exopolymers (TEP). Large transparent polymers of mainly acidic polysaccharides that enhance aggregation of fine organic particles. TEP are produced mainly by planktonic diatoms.

Transverse faults. Large-scale geological faults in oceanic crust.

Trench. Deep and sinuous depression in the ocean floor, usually seaward of a continental margin or an arcuate group of volcanic islands.

Trichomes. Rows of connected cells of cyanobacteria.

Trilobita. Group of extinct arthropods.

Trophic cascade. A strong interaction among trophic levels in a food chain, where changes in density at one level results in indirect effects at a trophic level that does not directly interact with the first level. An example is an increase in carnivores, which indirectly results in the increase in abundance of plants, since herbivores have been reduced.

Trophic group amensalism. Hypothesis of negative effects of deposit feeders in soft sediments on suspension feeders living in the same habitat type.

Trophic level. In a food chain, a level containing organisms of identical feeding habits with respect to the chain (e.g., herbivores).

Trophosome. A part of the body of a vestimentiferan worm that contains symbiotic bacteria.

Tropical. Being within the latitudinal zone bounded by the two tropics (23°, 27° north and south latitude).

True jellyfish. Jellyfish belonging to the Cnidarian class Scyphozoa.

Tube feet. Structures in echinoderms used in locomotion or feeding.

Turbidity. The weight of particulate matter per unit volume of seawater.

Turbulent flow. Movement of water that can be characterized by streamlines moving in a very irregular fashion.

Ubiquitin. Protein found in all eukaryotic cells that can remove degrading proteins.

Ultraplankton. Planktonic organisms that are less than 2 micrometers in size.

Uniform spatial distribution. Situation in which individuals are more evenly spread in space than would be expected on the basis of chance alone.

Upper-canopy kelps. Kelps that extend far above the seafloor and have the potential to shade seaweeds below.

Upwelling. The movement of nutrient-rich water from a specified depth to the surface, usually driven by surface winds.

Urochordata. Deuterostome phylum including sea squirts and salps, with larvae that have characters of chordates.

Vadose layer. In mangrove forests, a sediment layer with high saltwater content.

Vents. See Hydrothermal vents.

Vertical zonation. The presence of different depth bands dominated by different species in the intertidal zone.

Vertically homogeneous estuary. An estuary in which, at any given location, wind or tidal mixing homogenizes salinity throughout the water column.

Viscosity. As in dynamic viscosity: a measure of the degree that the fluid resists deformation under a force; a measure of “stickiness” of the fluid.

Viscous forces. Forces in a fluid that are explained by viscosity.

Vitamin. Chemical substance required in trace concentrations, acting as a cofactor with enzymes in catalyzing biochemical reactions.

Viviparous (development). Refers to development of an organism through the juvenile stage within a parent.

Warm-core ring. A blob of water formed by a meander of the Gulf Stream, which encloses even warmer water in the ocean, usually on the continental shelf in summer.

Wash zone. The depth zone in which sediments are disturbed by wave action near the shoreline.

Water mass. A body of water that maintains its identity and can be characterized by such parameters as temperature and salinity.

Water vascular system. A system of tubes in echinoderms used to extend and provide suction to tube feet.

Watershed. The land area that is drained by a river or estuary and its tributaries.

Wave height. The vertical distance from the crest to the trough of a wave.

Wave length. The distance between crests in a system of waves.

Westerlies (prevailing westerlies). Persistent eastward-equatorward winds in midlatitudes in both the Northern and Southern hemispheres.
White band disease. Coral disease, perhaps caused by a bacterium, that results in an advancing white band in the colony.

White muscle fibers. Muscle fibers that are lower in myoglobin and have fewer mitochondria.

White plague. A complex of coral diseases, sometimes associated with a coccolid bacterium.

Windward [side]. The side of an island that faces a persistent wind.


Within-habitat comparison. A contrast of diversity between two localities of similar habitat type.

Wrack zone. A bank of accumulated litter at the strandline.

Year-class effect. The common domination of a species population by individuals recruited in one reproductive season.

Young-of-the-year. The new year class of an exploited species, formed usually in a restricted reproductive season.

Zonation. Occurrence of single species or groups of species in recognizable bands that might delineate a range of water depth or a range of height in the intertidal zone.

Zooids. Individuals in a bryozoan colony.

Zooplanktivore. Organism that eats zooplankton.

Zooplankton. Animal members of the plankton.

Zooxanthellae. A group of dinoflagellates living endosymbiotically in association with one of a variety of invertebrate groups (e.g., corals).