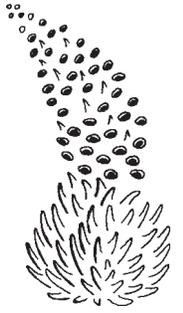

Glossary



The terms in this glossary appear in quotation marks the first time they appear in any student pages, where they are also explained or defined in the text. Some of these terms are used in teacher background or instructions. This glossary is primarily for instructor reference.

Each term is followed by a parenthetical notation which indicates the unit or units in which the term is used. These notations consist of a letter that indicates the module (A=alpine/aeolian, C=coastal, M=marine, R=rain forest) followed by a number that corresponds to the unit number.

‘A‘ā — lava that has a rough, spiny, or rubbly surface (A1)

Abiogenic — from a nonliving source, as sand that comes from rock (C1)

Absolute age — in geology, an age given in numbers as opposed to an age expressed relative to other geological formations (A1)

Abundance — relative degree of plentifulness (M5)

Accrete — build up, as sand on a beach (C1)

Active beach -- that part of a beach that is constantly changing (C1)

Adaptation — a change in an organism or species that enables it to survive in a particular habitat (A3, C3, R3, M2, M3)

Adaptive optics — telescope equipment that compensates for the effect of turbulence in the lower atmosphere as well as high above the earth’s surface (A5)

Adaptive radiation — the rapid development of many species from a single ancestral population (A3, R2, R3)

Adaptive shift — a discrete step in the process of adaptation (R3)

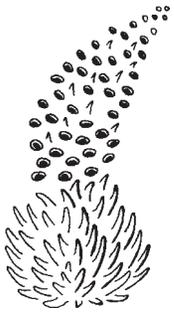
Alien — a species not native to a particular area (A3, C4, R5)

Anchialine pond — a brackish or saltwater pool with no surface connection to the ocean (C3)

Aquifer — underground source of water, an underground reservoir or flow-way (R1)

Arboreal — tree-dwelling (C4)

Arthropod — one of a group of invertebrate animals with jointed bodies and limbs that includes insects, spiders, scorpions, mites, and centipedes (A4, C4)



Assumption — a fact or statement that is taken as true (M5)

Baseline data — information or data used as a point of comparison (R4)

Beach — an accumulation of any sediment along a coastline (C1)

Bioaccumulation — concentration of toxic substances in living tissues (M2)

Biocontrol — the use of insects or diseases to control populations of pest insects or plants; also known as “biological control” (C4, R5)

Bioerosion — breakdown of rock or other hard substances such as coral reefs caused by the actions of animals (C1)

Biogenic — made up of the remains of once-living organisms, used to describe sands (C1)

Biological toxin — a substance of plant or animal origin that is toxic to other plants or animals (R5)

Biomass — the amount of living matter in a specified area (M4)

Brackish — somewhat salty, but not as salty as ocean water (C2, C3)

Brood — the larvae and pupae of an ant nest (A4)

Budding — among ants, a process in which a queen walks a short distance to establish a new nest (A4, C4)

Calcareous — consisting of or containing calcium carbonate (C1)

Canopy — continuous or nearly continuous covering of tree branches in a forest ceiling (R2, R5)

Carnivore — an animal that eats other animals (M2)

Cartilagenous fish — fish such as sharks and rays whose skeletons are largely composed of cartilage rather than bone (M2)

Ciguatoxin — a toxic substance produced by microscopic marine organisms called *Gambierdiscus toxicus* which blooms among and on marine algae (M2)

Cinder — Volcanic ejecta smaller than four centimeters (1.6 inches) in diameter, frothy fragments with highly irregular shapes (A1)



Cloud forest — an area which receives moisture directly from clouds as they hug the side of the mountain and condense on the foliage, as well as from rainfall (R1)

Comparative dating technique — a technique that requires establishing a historical baseline using a complementary dating technique (A1)

Confused seas — ocean condition caused by shifting winds and marked by inconsistent swell patterns (M1)

Control site — a site similar to one being studied except for the absence of the activity or agent under test, and which is used as a standard of comparison in judging the effects of that activity or agent (M5)

Coralline algae — marine plants that produce a calcareous structure similar to that created by corals (C1, M2)

Coriolis effect — the deflection of winds by the spinning of the earth (A2)

Cover — in vegetation studies, the area of ground overlain by a plant species or type, expressed as a percentage of the total ground area within a plot (R4)

Crater — the bowl-shaped depression around the orifice of a volcano; what is often called the “crater” at the top of Haleakalā is actually a valley carved by streams during the erosional stage of the volcano’s history (A1)

Cyst — a structure similar to an eggshell in which brine shrimp eggs, for example, are initially housed (C4)

Daughter product — an atom that results from the process of radioactive decay (A1)

Decomposers — bacteria, fungi, and some animals that break down organic material; the term may be used to mean “decomposing bacteria,” which break down organic material into its inorganic components (M2)

Detrital — produced by disintegration or erosion of land, used to describe sand (C1)

Detritivore — animal that feeds on organic materials on the seafloor (M2)

Detritus — remains of dead organisms or cast-off material from living organisms (M2)

Dew point — the temperature at which water vapor in the air begins to condense (R1)



Dinoflagellate — microscopic marine organisms of the order Dinoflagellata (M2)

Dispersal mechanism — a means by which plant seeds are spread, enabling the plant to become established in a new area (R5)

Doldrums — a weather condition characterized by windless conditions, squalls, and light, shifting winds; also, the part of the ocean near the equator that is characterized by these conditions (M1)

Echinoderm — one of a phylum (Echinodermata) of marine animals including starfish, brittlestars, sea urchins, and sea cucumbers (C1)

Ecosystem — a community of living organisms and the nonliving environment they occupy

Emergent land — land that comes out of the water, an island (C3)

Endangered — in immediate danger of becoming extinct (A3, C4)

Endemic — unique to an area; native to no other place on earth

Endemism — occurrence of unique species to a geographic area (R3)

Environmental assessment — a written evaluation that is part of the environmental review process; these evaluations attempt to determine whether a proposed action may have a significant effect on the environment and are required by various government agencies in specified circumstances (A5)

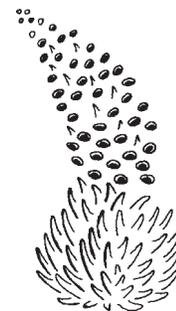
Environmental impact statement — a written statement that is part of the environmental review process; this statement examines a proposed projects' environmental effects, effects on the community and state social and economic welfare, effects on economic activities, attempts to minimize adverse effects, and alternatives and their environmental effects (A5)

Environmental review — a formal process in which the potential affects of a proposed project on the environment (and often on social and economic conditions) are examined; this process is mandated under federal, state, and local laws for many types of development (A5)

Ephemeral — lasting for a short time (M3)

Eutrophication — creating high-nutrient, low-oxygen conditions (M4)

Evapotranspiration — water evaporated from soil and water surfaces and water evaporated as plants transpire (R1)



Exoskeleton — an external supportive covering of an invertebrate (A3)

Experimental design — the process of developing a procedure to test a hypothesis (M5)

Extrapolate — project known data to an unknown circumstance or location, as in using a sample to draw conclusions about a broader area (M4)

Feral animal — a wild animal descended from domestic animals (R3, R4)

Finding of No Significant Impact (FONSI) — a written statement that is part of the environmental review process; a finding that the project under review will not have significant environmental impact and thus is exempt from requirement for an environmental impact statement (A5)

Fixed photoquadrat method — a research technique in which photographs of specified areas of the ocean bottom are studied over time; see “photoquadrat method” (M4)

Fog drip — condensation from clouds or fog that accumulates on the surfaces of plants and the ground (R1)

Foraminifera — tiny single-celled marine animals that have a shell-like appearance (C1)

Fossil assemblage — a grouping of similar fossils (A1)

Founding species — an original migrant species from which native plant or animal species evolved (R3)

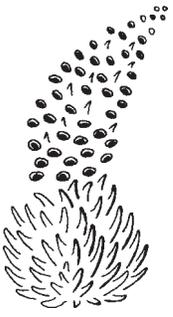
Frequency — in vegetation studies, the number of plots a particular plant species or type appears in, expressed as a percentage of the total number of plots (R4)

Frugivorous — feeding primarily on fruit and seeds (R3)

Generalist — an animal able to feed on many types of food, not specially adapted to a particular food source (R3)

Groin — a structure resembling a wall and constructed perpendicular to the shoreline and extending into the ocean from the beach (C1)

Ground water — water that flows through naturally porous or fractured rocks and soils beneath the surface of the land; also, water trapped between dikes (vertical, underground sheets of volcanic rock) or floating on seawater within rocks (C3, R1)



Ground water recharge — water that filters into the soil from the surface, percolating until it reaches the underground reservoirs and flow-ways called aquifers (R1)

Hadley Cell — a global air circulation pattern involving rising, flowing, and subsiding air currents (A2)

Heliioseismology -- a study of the sun's interior made by measuring waves given off or frequencies of various regions of the sun (A5)

Herbivore — an animal that feeds only on plants (M2, M5)

Hypothesis — a tentative assumption or explanation that is tested in scientific investigations

Impact site — a site being studied to determine the effects of an activity or agent (M5)

Impoundment -- sediments trapped behind human-made structures (C1)

Indigenous — native to an area but not unique to that area

Insecticide — a substance toxic to insects used to control their populations (A4)

Insectivore — an animal that feeds primarily on insects (R3)

Instrumental value — worth or desirability that is ascribed to something because of what it can do for people or a person (R5)

Intertidal zone — the area between the normal limits of high and low tides; the transition area between land and the ocean (M3)

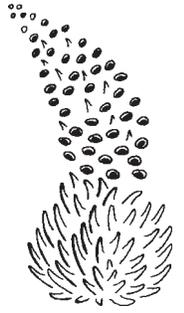
Interisland dispersal — the spread of plant or animal species from one island to another (R3)

Intrinsic value — worth or desirability that is ascribed to something simply because it exists; also known as “existence value” (R5)

Introduced species — a nonnative plant or animal species

Invasive plant — a nonnative plant species that grows quickly and reproduces rapidly, aggressively taking over new areas and outcompeting native plants for light, water, and nutrients (R5)

Inversion layer — a barrier to clouds formed by a mass of warm air overlying a mass of cooler air (R1)



Invertebrate — an animal without a backbone or cartilage (C4)

Isotope — an atom of an element that has the same number of protons but different numbers of neutrons than other atoms of the same element (A1)

Knot — one nautical mile per hour (M1)

Lapse rate — the constant rate at which rising air cools (A2)

Larva — the early, free-living form of any animal that changes structurally when it becomes an adult or undergoes metamorphosis (A4, M1)

Lifting condensation level — the altitude at which water vapor condenses out of rising air, forming clouds and/or rain (R1)

Littoral — relating to the shoreline (C1)

Littoral budget — the amount and movement of sediment between different parts of the active beach, onto the beach from elsewhere, and away from the beach to another location offshore or down-current (C1)

Littoral zone — intertidal zone; the transition area between land and the ocean (M3)

Longshore current — a flow of water (current) in the ocean that runs along or parallel to the shore (C1)

Magnetic secular variation — changes in the orientation of the earth's magnetic field over time (A1)

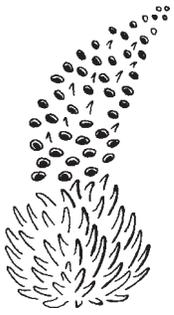
Marine protected area — a part of the ocean protected by legal restrictions on fishing, collecting, and other human activities that directly affect populations of marine and other life (M5)

Mechanical erosion — breakdown of rock or other hard substances such as coral reefs caused by nonliving forces such as wave action (C1)

Mesoscale -- climate patterns formed in a small geographic area (R2)

Migratory — passing periodically from one region or climate to another for feeding or breeding (C2, C4)

Monitoring — long-term studies involving repeated surveys done in the same sites over time (C4, R4)



Monogyne — an ant behavior strategy in which each nest has only one queen (A4)

Monomorphic — occurring in one shape or type (C4)

Montane bog — a permanently saturated opening of low vegetation in the rain forest situated on relatively level sites at upper elevations (R4)

Multicolonial — an ant behavior strategy in which a local population of ants of a given species is made up of many separate colonies (A4)

Naiad — larva (as of a damselfly) (C2)

Narrowly endemic — occurring only in a very small area (R2, R3)

Native — a species that arrived or evolved in an area without the assistance of humans

Natural population — a group of organisms of the same species that inhabits a certain area absent of human interference (M5)

Nautical mile — a distance of 1852 meters (6076.115 feet), the length of a minute of arc of a great circle of the earth (M1)

Neap tide — a tide of minimum range occurring during the first and third quarters of the moon (M3)

Nectivorous — feeding primarily on nectar (R3)

Nuptial flight — a process of dispersal among many ant species in which new queens fly from the nest along with winged males to mate and establish new colonies (A4)

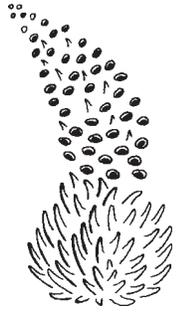
Observatory — a building equipped for observing natural phenomena, as in astronomy (A5)

Observer bias — error introduced into scientific investigations because of the person collecting data (M4, M5)

Orographic lifting — the forcing of air up a mountain's slopes (R1)

Orographic rain — rainfall that results from the clouds formed by orographic lifting of a moist air mass (R1)

Osmoconformer — organism that is not able to control salt concentrations in its bodily tissues (M3)



Osmoregulator — organism that is able to control salt concentrations in its bodily tissues (M3)

Overexploitation — use of a resource at a rate or to an extent that cannot be sustained over the long term, as in the harvest of fish that depletes populations so they cannot maintain their numbers (M5)

Pāhoehoe — lava with smooth, billowy, or ropy surfaces (A1)

Paleomagnetic dating — a radiometric dating technique that analyzes variations in the magnetic orientation of minerals in lava flows (A1)

Parasitism — an association between two or more kinds of organisms in which the parasite obtains benefits from a host, which it usually injures (C2, R5)

Pelagic — living in the open ocean (M1)

Percent cover — in coral reef monitoring, the proportion of a given area that is covered by coral (M4)

Permeability rate — how quickly water filters through soil (R1)

Pesticide — a substance toxic to plants or insects used to control their populations (A4, C4)

Photoquadrat method — research technique used to study coral cover or invertebrate species that live on a coral reef; involves photographing portions of the ocean bottom and later analyzing the photographs (M4)

Photosynthesis — formation of carbohydrates in the chlorophyll-containing tissues of plants and corals exposed to light (M2)

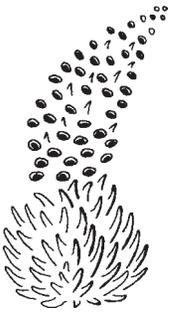
Phytoplankton — plankton composed of microscopic plants (M2)

Pipped egg — an egg with a shell that has been broken through in the initial stages of hatching (C4)

Piscivorous — feeding on fish (M5)

Pitfall trap — a container buried flush with the ground surface and filled with bait and a preservative to attract, trap, and preserve foraging invertebrates (A4)

Plankton — tiny organisms that float freely through the ocean or freshwater (M2)



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- Plot — a measured, designated land area used in a scientific study such as a vegetation survey (R4)
- Point-intercept method — a research technique used to study coral cover or invertebrate species that live on a coral reef; involves identifying the type of cover at various points along a transect (M4)
- Polygyne — an ant behavior strategy in which each nest has more than one queen (A4)
- Polynesian introduction — a species that was brought to Hawai‘i by early Polynesian settlers
- Polyp — characteristic shape of coral and other animals in the phylum Coelenterata, somewhat flower-shaped with a cylindrical body attached at one end and opening at the other through a central mouth (M1, M4)
- Porous — possessing or full of holes and permeable to liquids (A1)
- Potassium-argon dating — a radiometric dating technique that uses the radioactive isotope potassium-40, the stable daughter product of which is argon-40 (A1)
- Primary consumers — herbivores; animals that eat algae and comprise the second trophic level in marine food webs (M2)
- Primary producers — the plants that form the first trophic level in marine food webs (M2)
- Pupa — an intermediate stage of a metamorphic insect (such as a moth, ant, or beetle) that is usually enclosed in a cocoon or case (A4)
- Pyroclastic — the word means “fire-broken,” refers to rocks produced in volcanic eruptions (A1)
- Quantitative — expressed in terms of quantity or amount (M5)
- Quarantine — a restraint upon the transport of goods designed to prevent the spread of diseases or pests (C4)
- Queen — a reproductive female ant (A4, C4)
- Radio frequency interference — a distortion of image or sound caused by competing electrical signals (A5)
- Radioactivity — a property possessed by some elements (e.g., uranium) in which streams of charged nuclear particles are emitted due to the disintegration of the nuclei of atoms (A1)



Radioactive decay — a process that involves the formation of daughter products from the original parent isotope (A1)

Radiocarbon dating — a process for determining the age of organic (carbon-containing) materials using the rate of radioactive decay of Carbon-14, also known as Carbon-14 (C-14) dating (A1)

Radiometric dating — establishing an age based on changes in atomic structure (A1)

Reference course — an ideal course based on average wind and current conditions, charted before beginning a voyage in a traditional Hawaiian canoe or another vessels (M1)

Relative humidity — the ratio between the amount of water vapor in the air currently and the highest amount of water vapor possible in the current air temperature (R1)

Relative time scale — as in the geologic time scale, one that expresses age or length in relationship to other periods of time or geologic formations (A1)

Revetment — a sloping type of shoreline armoring often constructed from large, interlocking boulders (C1)

Rhizome — a rootlike plant stem that grows underground or along the ground surface, is often thickened by deposits of reserve food material, and produces shoots above and roots below (R5)

Runoff — water that flows across the land surface and into stream channels promptly after rainfall (R1)

Salinity — salt content of water (C3, M3)

Sand banks -- an underwater deposit of sand (C1)

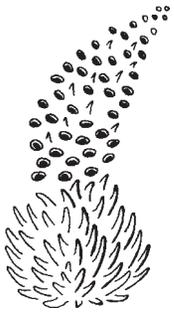
Scarping — the erosion of a sand dune by high storm waves or large swells (C1)

Seawall — a vertical or near-vertical type of shoreline armoring characterized by a smooth surface (C1)

Secondary consumers — carnivores; animals that eat primary consumers and comprise the third trophic level in marine food webs (M2)

Sediment — any material deposited by waves (C1)

Sediment sink — a place/process such as a crosscurrent that removes sand from a beach system (C1)



Sediment source — a place or process that adds sand to the beach system (C1)

Sedimentation — the process of forming or depositing sediment, often caused by soil being eroded and washed into the ocean (C4, M4)

Shoreline armoring — structures such as seawalls, revetments, and groins designed to slow coastal erosion (C1)

Shoreline setback — the legally required distance from a structure to the shoreline (C1)

Significant — in statistics, refers to differences that are unlikely to occur based on chance alone (M5)

Sinks -- places where beach sediments are stored/taken away from a beach, such as offshore (C1)

Soil-moisture storage — the volume of water held in a specified volume of soil; a component of a water budget (R1)

Sources -- contributors to the materials found on a beach, such as coral skeletons, eroded rocks (C1)

Spatter — volcanic ejecta that is partly liquid when it strikes the ground, flattening out or splashing when it hits (A1)

Succession — process through which the balance among species within a natural community changes over time (R4)

Sustainable yield — using resources in a way that can be maintained over time; taking animals at a time and in a way that enables their populations to maintain themselves over time (M5)

Succulent — having fleshy tissues designed to conserve moisture (A3, C2)

Substratum — the base on which an organism lives (M5)

Surface water — water that flows across or is pooled on the surface of the land, as in streams and ponds (R1)

Swell — a long, often massive and crestless wave or succession of waves generated by weather events such as storms, and often continuing beyond or after the initial cause (M1)

Target screen — a destination area set in charting a navigational course in which the highest points of the destination islands will be visible (M1)



Tephra — volcanic ejecta (A1)

Terrestrial — ground-dwelling (C4)

Terrigenous — originating from land, used to describe sand (C1)

Tertiary consumers — predators that feed on secondary consumers and comprise the fourth trophic level of marine food webs (M2)

Test — sea urchin skeleton (C1)

Toxicant — poison (A4)

Trade wind — a wind blowing almost constantly in one direction; in Hawai‘i, the trade winds blow from the northeast toward the equator (A2)

Trade wind inversion — an atmospheric phenomenon caused by the interaction between the Hadley Cell phenomenon and the trade winds which creates a level at which the air on top is warmer than the air beneath (A2)

Tramp species — any species (such as an ant) that is well-adapted to living in close association with humans and easily dispersed around the world as humans ship goods and travel from one place to another (A4, C4)

Transect — a sample area, usually in the form of a long, continuous strip; in coral reef monitoring, often a marked line across the reef (M4, M5)

Transpire — the process of vaporizing water through plant leaf surfaces (R1)

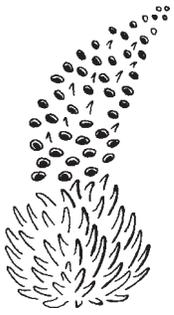
Trophallaxis — a process by which regurgitated food is passed among members of an ant colony (A4)

Trophic levels — pathways and levels through which nutrients and energy flow between organisms (M2)

Tropical alpine environment -- a mountain environment above the treeline within tropical latitudes (A2)

Tropopause — the boundary between the atmospheric layers troposphere and stratosphere where the drop in temperature with increasing altitude ceases (A2)

Under-rock survey — a research technique in which researchers lift rocks and catalogue the invertebrates they find there (A4)



Unicolonial — an ant behavior strategy in which ants of the same species form large colonies of many different nests (A4)

Unicolony — a large colony of ants in which it is often impossible to distinguish between individual nests (A4)

Vertebrate — an animal with a backbone (C4)

Vesicle — a hole left behind when lava cools quickly and traps gases (A1)

Viable — able to germinate (as a seed) or hatch (as an egg) (C2)

Viscosity — fluidity (A1)

Visual strip-transect search — a research method for studying fish in which two divers swim side-by-side down either side of a transect, counting all fishes seen within a specified corridor (M4)

Vog — smog-like air pollution caused by volcanic gases and particulates (R1)

Volcanic ash — volcanic ejecta that is less than .5 centimeters (.2 inch) in diameter comprised of already solid rock, crystals from solid rock, or particles of lava that were thrown up as liquid spray (A1)

Volcanic ejecta — fragments of lava or already solidified rock that is thrown into the air (or “ejected”) by a volcanic explosion (A1)

Volcano — a place where magma (molten rock) and/or gas comes to the surface from within the earth’s core (A1)

Water budget — a model that estimates how much water enters and leaves a particular area, and through which mechanisms (R1)

Wayfinder — in traditional Polynesian voyaging, the person who navigates the canoe using no instruments (M1)

Windward ability — the capacity of a sailing vessel to sail into the wind (M1)

Zonation — the distribution of plants and animals according to environmental conditions, generally in a pattern of vertical banding (M3)

Zooplankton — plankton composed of tiny animals (M2)

Zooxanthellae — single-celled organisms that live in the tissue of corals and provide energy to the corals (M2)