species abundance

biology

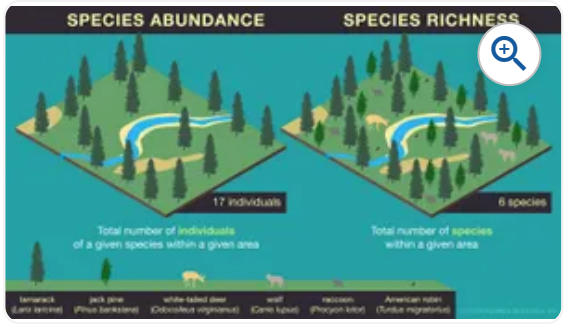
Ask the Chatbot a Question

More Actions

Also known as: abundance

Written by Anna Dubey
Fact-checked by The Editors of Encyclopaedia Britannica

Article History



species abundance and species richness
Species abundance and species richness are two of the tools used to measure biodiversity.

Table of Contents

species abundance, typically, the sum total of individuals from a given species within a given area. A species is considered abundant when it has a high population relative to the size of the area it inhabits. It can also include other measures of performance for plants, animals, or other forms of life in a given area, including number of breeding pairs, population density, and even biomass. In ecology, species abundance can serve as a tool to measure biological diversity and inform conservation efforts.

Also called: abundance

Related Topics: conservation • population • endangered species • biodiversity • species

See all related content

A distinction exists between absolute and relative species abundance. The former counts only the raw number of individuals of a species in a given area; the latter considers the proportion of individuals of one species within the wider biological community and measures how evenly the community's total population numbers are distributed across species.

Patterns of species abundance

Researchers assessing abundance have observed several patterns that hold true across species, and these patterns can reveal the dynamics between different

occur,

. In

another example, if a species is abundant in one part of a habitat but absent in

another part marked by an ecological disturbance, it is likely that a wildfire, flood, damaging wind event, or other disturbance limited the species' abundance in the latter part.

Only a few species tend to occur in high numbers in most biological communities, and thus members of these species together make up the bulk of the community's total population of individuals. This phenomenon may result from either niche differences (such as each species preferring a different part of the shared habitat or a different suite of food sources) or variations in neutral dynamics (which consider how randomness affects factors such as rates of birth, death, immigration, extinction, and speciation to change how abundant a species is at different times) in species whose ranges overlap with one another.

One central pattern of species abundance is called the distribution-abundance relationship. On a broad scale, species that are distributed over wider areas tend to have a greater population density than species that occupy smaller, limited areas. The main idea behind this relationship is intuitive: the total number of individuals in a habitat increases as the size of the habitat increases, since, all things being equal, a larger living space can support more individuals.

Conservation of biodiversity

In conservation, species abundance is one of several measurements used to assess biodiversity. A related but separate term, species richness, considers the number of unique species in a certain region rather than the population count of a single species. Both measures, however, do not necessarily correspond. In areas without a wide range of habitats, species richness may be very poor because of low habitat diversity, whereas species abundance might be high for the few species that are most successful there. A third term, species diversity, combines species abundance and species richness to gauge the number of unique species in a region along with each species' population size.

Measuring species abundance can also inform conservation efforts with respect to rare and endangered species. To compile its Red List of Threatened Species, the

examining trends that emerge from a series of population surveys (either through direct counts or through statistical tools that estimate population size). Such time series data help to illuminate patterns of population increase or decrease, which can then be placed in context with changes to a species' habitat, geographic range, and demographic factors (such as birth rates, death rates, the ratios of breeding individuals to nonbreeding individuals, and the ratios of breeding males to breeding females) to determine the risk of that species becoming extinct.

Anna Dubey

habitat loss

ecology

Written by Jennifer Murtoff, John P. Rafferty • All
Fact-checked by The Editors of Encyclopaedia Britannica
Article History

Table of Contents

Borneo deforestation Satellite images showing deforestation in Borneo from 2000 to 2018.

News • A migratory bird haven under threat from human activities • Nov. 29, 2024, 2:37 AM ET (The Hindu)

Related Topics: ecological disturbance • biodiversity loss • endangered species • defo...*(Show more)*

See all related content

habitat loss, in ecology, the reduction or elimination of the space in which a species or community of organisms lives and reproduces. Habitat loss, which may be caused by natural disturbances (such as volcanic eruptions, floods, and landslides), is largely the product of human development of natural areas for profit (such as deforestation, strip mining, agriculture, and residential and commercial

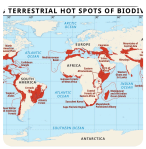
eded
here,
increasing their chances of becoming extinct. Habitat loss is the leading cause of

the global decline in biodiversity (*see also* biodiversity loss). There are three major types of habitat loss: habitat destruction, habitat fragmentation, and habitat degradation.

habitat loss Deforestation, as in this quarry in Kerala, India, reduces the overall habitat available to native plants and animals.

Habitat destruction occurs when an ecosystem is changed to such a degree that it can no longer support native species. For example, forests are often cut down to make room for crops or grazing land for livestock. This process often involves the removal of most of the forest's vegetation (much of which serves as food and shelter for animals and other forms of life). Deprived of living space, organisms in the area must either migrate or risk dying in the transformed environment.

Habitat fragmentation is similar in that it involves the destruction of some amount of habitat, reducing the overall amount available to species in the ecosystem. However, instead of completely transforming the ecosystem, it subdivides larger habitat blocks into smaller disconnected pieces or patches. The effects of fragmentation on different forms of life vary according to species, and the effects depend on the distance between remaining pieces of habitat and the threats posed by the region that separates one patch of habitat and another, or the matrix. For example, habitat fragmentation may have little effect on birds and other animals that can move quickly between one habitat and the next, if the matrix is small (such as a narrow forest cut, road bed, or a power-line corridor). With increased distance between habitat patches, an animal is at a higher risk of encountering predators, being struck by a vehicle, staying too long in less-than-hospitable conditions while moving between patches, or becoming isolated from others. For immobile species, such as plants, or for mobile species in situations where long distances separate habitat patches, in addition to altering important abiotic factors of the nearby environment (such as water availability, temperature, soil nutrients, wind exposure, etc.), habitat fragmentation can hinder reproduction by reducing



More From Britannica

conservation: Habitat loss

Habitat degradation occurs when the ecosystem is disrupted but not destroyed, increasing the difficulty of survival for native plants and animals. Often habitat degradation results from pollution or the invasion of exotic species. The effects of pollution depend largely on the type of pollutant and how intensely various forms of life are exposed to it. In general, pollution increases the stress on ecosystems and its members. For example, nitrogen fertilizers that run off into lakes can supercharge the growth of algae, which, after they die and begin to decompose, reduce the amount of dissolved oxygen in the water available to fishes and other species (*see also* eutrophication). Invasive species can also disrupt native ecosystems. An invasive predator may be so adept at capturing prey that prey populations decline over time, eventually eliminating prey species from the habitat, whereas other invasive plants and animals may outcompete native species by preventing them from obtaining food, water, living space, or other resources. One example of an invasive competitor in North America is the common buckthorn (*Rhamnus cathartica*), which grows in a variety of conditions, including full sun and dense shade. Brought from Eurasia, the common buckthorn creates a wall of dense vegetation that blocks sunlight, displacing native plants.

algae bloom Aerial view of algae blooming on the Dnieper River in Kyiv, Ukraine.

Jennifer Murtoff

John P. Rafferty