

The Role of Animals in Ecosystems

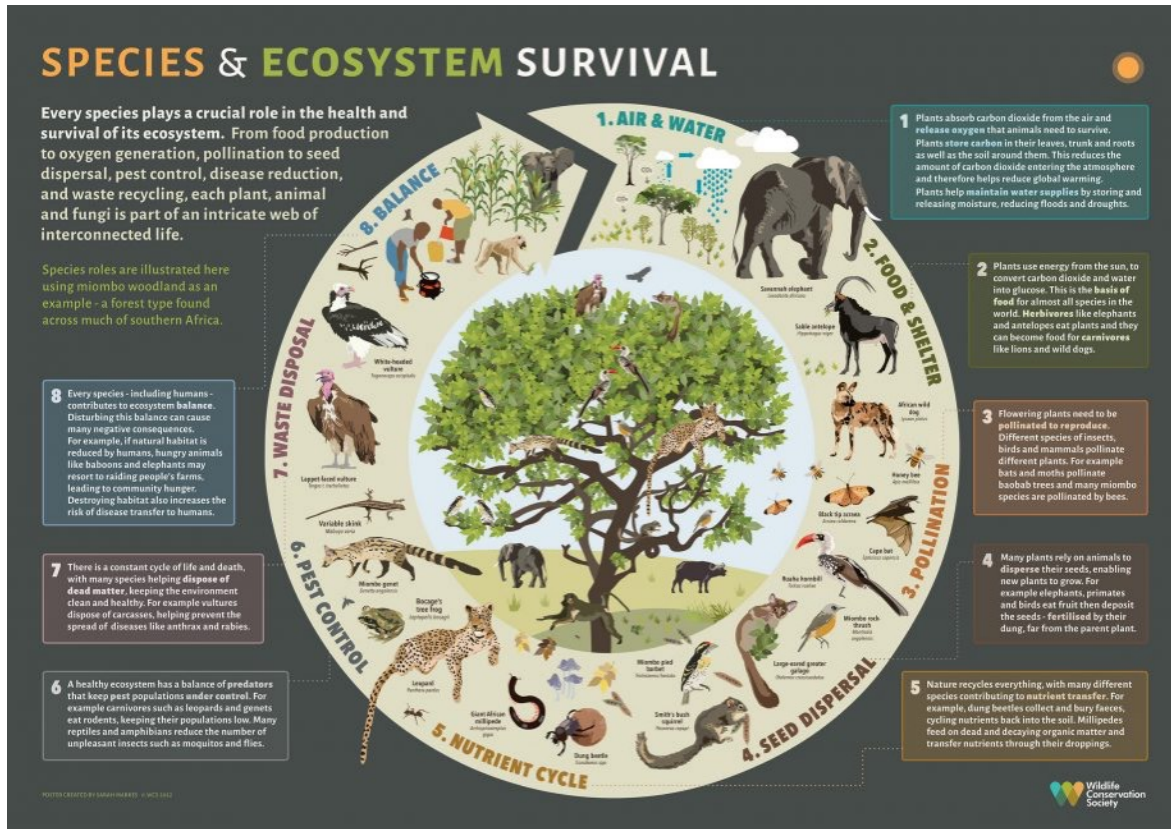


Roles

Animals play critical roles in ecosystems, including pollination, seed dispersal, nutrient cycling, maintaining biodiversity through predator-prey relationships, and food webs.

- **Pollination** — Many animals, like bees, butterflies, and birds, help pollinate plants by transferring pollen from one flower to another. This is essential for plant reproduction and the production of fruits and seeds, which are food sources for animals and humans.
- **Seed Dispersal** — Animals consume fruits and seeds, and then release them in their droppings, often far from the parent plant. This helps plants spread and colonize new areas, contributing to biodiversity.
- **Nutrient Cycling** — Animals consume plants and other animals, and their waste products and remains are decomposed by microorganisms. This process releases nutrients back into the soil, which plants can then absorb and use for growth.
- **Maintaining Biodiversity** — Predator-prey relationships help control populations of different species, preventing any one species from becoming overly abundant. This maintains a healthy balance within the ecosystem and supports a wide variety of plant and animal life. Animals also create habitats for other species, such as beavers building dams or birds nesting in trees.

- Food Webs and Food Chains — Animals are an integral part of food webs and food chains — the flow of energy and nutrients through an ecosystem. Plants are the primary producers, and animals are the consumers, with different roles like herbivores (plant-eaters), carnivores (meat-eaters), and omnivores (both plant- and meat-eaters).



The interactions between species and their surroundings maintain the overall balance of the ecosystem.

Keystone Species

Keystone species are defined as those that support a network of others, and without them the network would collapse. Keystone species have low functional redundancy, meaning that if the species were to disappear from the ecosystem, no other species would be able to fill its ecological niche. The ecosystem would be forced to radically change, allowing new and possibly invasive species to populate the habitat.

In B.C., salmon are considered a keystone species because their nutrient-rich bodies support a wide variety of animals (e.g., whales, eagles, bears, insects), and ecosystems (e.g., oceans, rivers, forests).

The Canada lynx (*Lynx canadensis*) is a cold-adapted carnivore found in the boreal forest of North America. Lynx play an important role as a predator of snowshoe hare (*Lepus americanus*). It is considered a keystone species of boreal ecosystems.

Bison are regarded as a keystone species of the plains because they have a ripple effect on numerous species that live in this ecosystem. Their habit of wallowing in the dirt to evade flies opens up new earth for seeds to sprout and animals to create burrows. Bison carry hitchhiking seeds over great distances in their fur. They leave fertilizer in the form of dung in their path. Hundreds of insects lay their eggs in bison poop and in turn feed other creatures, including now-threatened bird species. For thousands of years, bison were also a life-giving source of food for a variety of creatures, including wolves and humans.

Keystone Mutualists

Keystone mutualists are two or more species that engage in mutually beneficial interactions. A change in one species would impact the other, and change the entire ecosystem. Keystone mutualists are often pollinators, such as bees. Pollinators often maintain gene flow and dispersal throughout widespread ecosystems. On the grasslands of Patagonia (at the southern tip of South America) a species of hummingbird and indigenous plants act together as keystone mutualists.

Other Organism Categories Important to Ecosystems

Umbrella Species

Umbrella species are often conflated with keystone species. Both terms describe a single species upon which many other species depend. Umbrella species have large habitat needs. Most umbrella species are migratory, and their range may include different habitat types. The identification of an umbrella species can be an important aspect of conservation. The minimum species range of an umbrella species is often the basis for establishing the size of a protected area.

Ecosystem Engineers

Ecosystem engineers contribute to the physical geography of their habitat. Ecosystem engineers modify, create, and maintain habitats. Allogenic engineers physically change their environment from one state to another. Beavers are a classic example of allogenic engineers. Beavers help maintain woodland ecosystems by thinning out older trees and allowing young saplings to grow. Dams radically alter woodland meadows and streams, changing them into wetland habitats. Invasive species are often ecosystem engineers because they can significantly change the ecosystem.

Indicator Species

Indicator species are sometimes known as “sentinel species.” An indicator species describes an organism that is very sensitive to environmental changes in its ecosystem. Indicator species are almost immediately affected by changes to the ecosystem and can give early warning that a habitat is suffering. Changes associated with external influences such as water pollution, air pollution, or climate change first appear in indicator species. Frogs are considered indicator species because their thin skin absorbs water and air, which makes them highly susceptible to environmental changes.



The pileated woodpecker is a keystone species

Apex Predators

Apex predators (e.g., orcas, wolves, bears) are at the top of a food chain, meaning they have no natural predators. They play a vital role in maintaining ecosystem balance by regulating prey population numbers and their distribution.

Flagship Species

A flagship species acts as a symbol for an environmental habitat, movement, campaign, or issue. They can be mascots for entire ecosystems. The identification of a flagship species relies heavily on the social, cultural, and economic value of a species. They are often “charismatic megafauna”—large animals with popular appeal due to their appearance or cultural significance. Flagship species may or may not be keystone or indicator species.

The movement to end seal hunting found its flagship species in the juvenile harp seal. Polar bears are the unchallenged flagship species associated with climate change. The giant panda is perhaps the most familiar flagship species. Pandas are the global symbol of endangered species and the value of captive breeding.