



Background Essay: Energy Flow in the Coral Reef Ecosystem

All living things require energy to carry out life functions such as growth, movement, and reproduction. For nearly all ecosystems—diverse collections of species that interact with each other and their physical environment—the major source of energy is the sun. The flow of energy tends to follow the same basic pattern whether the ecosystem is a tropical rainforest or a coral reef.

To portray the transfer of energy through an ecosystem, ecologists use simple models called food chains. Organisms can be organized into different trophic levels, or positions in a food chain; organisms at higher trophic levels feed on those at lower levels.

As producers, plants and some microorganisms are an ecosystem's foundation species. Producers make their own food from energy that comes directly from the sun. When sunlight enters a coral reef, for example, phytoplankton, algae, and plants such as sea grasses convert the light energy into chemical energy through the process of photosynthesis.

However, not all organisms can make their own food. Consumers are organisms that obtain food and the energy stored within food by eating organisms. Consumers that feed only on plant life are called herbivores. Consumers that feed only on animals are called carnivores. Omnivores feed on both plants and other animals. Because organisms use about 90 percent of the energy they take in for their own survival and growth—leaving only about 10 percent for the consumer that eats it—there are fewer organisms supported in successively higher trophic levels.

Scavengers and decomposers also play an important role in an ecosystem: They are its primary recyclers. Scavengers are animals that feed on dead members of different trophic levels. Decomposers, which include bacteria and fungi, break down organic waste material and return essential elements, such as nitrogen and phosphorous, to an ecosystem.

While a food chain shows just one possible pathway along which energy can move, most consumers have more than one food source. To portray all feeding relationships in an ecosystem, a more complex model, called a food web, is used. Each organism in a food web plays an important role, so the loss of any one species due to environmental threats such as disease and pollution can disrupt a strand and thus may potentially threaten the health of an entire ecosystem.

To learn more about the coral reef ecosystem and the relationships among different reef inhabitants, check out [Coral Kid](#) and [Coral Reef Connections](#).

To learn more about how much energy is transferred from one level to the next within a food chain, check out [Energy Flow](#).

To learn how certain organisms in an ecosystem break down dead plant and animal tissue to release nutrients for reuse, check out [Decomposers](#).

To learn more about the ecological importance and fragility of life in another threatened ecosystem—the

rainforest—check out [Amazon Rainforest](#).