

Ecologists study relationships at different levels of organization.

Ecology is the study of the interactions among living things, and between living things and their surroundings. Ecologists study nature on different levels, from a local to a global scale.

- **Organism** An organism is one individual living thing.
- **Population** A population is a group of the same species that lives in one area.
- **Community** A **community** is a group of different species that live together in one area.
- **Ecosystem** An **ecosystem** includes all of the organisms as well as the climate, soil, water, rocks, and other nonliving things in an area. An entire ecosystem may live within a single decaying log. But the log may be part of a larger ecosystem, such as a forest.
- **Biome** A **biome** (BY-OHM) is a major regional or global community of organisms. A biome is usually defined by the climate and by the plant communities that live in an area.

Organism



Population



Community



Ecosystem



Biome



LEVELS OF ORGANIZATION

The Florida Everglades is an example of the subtropical savanna biome. Many organisms live in this aquatic ecosystem.

Ecosystem

Community

Population

Organism



Ecologists study relationships within and between each level of organization. For example, one ecologist might study a single population of Pacific salmon. Another ecologist might study how the current loss of Pacific salmon affects other species. Yet another ecologist might study the effects of this loss on a global scale.



What are five different levels of organization at which an ecologist might study biological relationships?

Ecological research methods include observation, experimentation, and modeling.

Ecological research involves many different methods and tools. Three main components of ecological research are observation, experimentation, and modeling.

Observation

Observation is the act of carefully watching something over time. Observation may be part of short-term or long-term studies. Long-term studies are important because many environmental changes happen slowly over time.

Observation can involve directly watching populations of organisms. It can also involve indirectly observing populations by tracing signs of the organism's presence, such as tracks. Scientists also use radio collars to follow the movements of some animals. These collars allow scientists to track organisms that move long distances, such as coyotes.

Experimentation

Scientists may perform experiments in a lab or in the natural area where the organisms live. There are benefits and drawbacks to each type of experiment. A lab experiment allows for more control of variables. But at the same time, it does not include the complex interactions that happen in nature. An experiment in a natural setting gives a better picture of how organisms really interact. However, a natural setting also makes it difficult to identify the effects of individual variables.



Observation involves carefully watching something over a certain period of time.

Modeling

Some questions cannot be easily investigated through observations or experiments. Models can be used to explore organisms and whole ecosystems in ways that would not be possible in a natural setting. One way of thinking about modeling is that it can be used to answer questions that start with “What would happen if...?”

Models use real data to predict outcomes for different situations. For example, a wide variety of data was combined into a model of Yellowstone National Park. This model was then used to decide how best to reintroduce grey wolves into the park.



What are three components of ecological research?

13.1 Vocabulary Check

ecology	ecosystem
community	biome

Mark It Up

Go back and highlight each sentence that has a vocabulary word in **bold**.



Fill in the blanks with the correct term from the list above.

- _____ is the study of interactions among living things, and between living things and their surroundings.
- A major regional or global community of organisms is a(n) _____.
- A(n) _____ is all of the living things as well as the nonliving things in an area.
- A group of different species that all live together in one area is a(n) _____.

13.1 The Big Picture

- Put the following in order from largest to smallest level of organization: *community, biome, population, individual, ecosystem*.

- Describe the benefits and drawbacks of experiments in a laboratory compared with experiments in a natural setting.

