

## Key Concept 5: Changes in Ecological Communities

### Learning Objectives

Students will be able to ...

### Essential Knowledge

Students need to know that ...

#### Natural Changes in Biodiversity

**ECO 5.1(a)** Explain how natural changes in the ecosystem effect ecosystem dynamics.

**ECO 5.1(b)** Create and/or use models to make predictions about how changes in biodiversity affect local ecosystems.

**ECO 5.1(c)** Analyze data to make predictions about the effects on biodiversity in response to environmental changes.

**ECO 5.1.1 Ecosystem biodiversity is influenced by several naturally occurring factors that alter the environment.**

- Changes in energy, nutrient, and niche availability from natural events (e.g., forest fires, hurricanes, volcanic eruptions) may influence an ecosystem's biodiversity.
- Mass extinctions open new, available niches for colonization and therefore can have significant impacts on biodiversity (e.g., the mammalian diversity explosion post-dinosaur extinction, 65 mya).
- Keystone species and ecosystem engineers (e.g., elephants, beavers) dramatically affect biodiversity in the ecosystem.

#### Human-Induced Changes in Biodiversity

**ECO 5.2(a)** Use evidence to support the claim that changes in ecosystems have resulted from human activities.

**ECO 5.2(b)** Given a human activity, predict the potential biological consequences for an ecosystem's biodiversity.

**ECO 5.2(c)** Create and/or use models to design solutions that mitigate the adverse effects of a human-induced environmental change on the biodiversity of an ecosystem.

**ECO 5.2.1 Human activities (e.g., urbanization, farming, tree harvesting) also alter availability of nutrients, food, and niches for species and therefore affect population and community dynamics.**

- Human activities include anthropogenic climate change, the introduction of invasive species, habitat destruction, and air/water pollution.
- The effects of human-induced environmental changes and its impact on species are the subject of a significant amount of current scientific research.

**Content Boundary:** There are numerous examples of human-induced changes to ecosystems. The *focus* here is on identifying a few examples of how human activities affect interactions in ecological systems by reducing biodiversity. Understanding topics such as desertification and salinization resulting from human activity are *beyond the scope* of this course.