

Chapter 38: Conservation Biology

Honors Biology 2011



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Conservation Biology

- Goal is to stop the loss of biodiversity
 - Can do this by protecting one species
 - Also can do this by protecting an ecosystem
- Biodiversity - variety of living organisms

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Levels of Biodiversity

- Three levels:
 - Genetic diversity - microevolution and adaptation
 - Species diversity - variety of species in an ecosystem
 - Ecosystem diversity - variety of ecosystems



Fig. 32.2

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Endangered vs. Threatened Species

- Defined by the U.S. Endangered Species Act
- Endangered Species - species in danger of extinction throughout all or a significant portion of its range
- Threatened Species - species likely to become endangered

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Habitat Destruction

- Greatest threat to biodiversity = human alteration of habitats
- Ways habitats are altered:
 - Agriculture
 - Urban Development
 - Deforestation
 - Mining
 - Environmental pollution

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Invasive Species

- Often considered the second greatest threat to biodiversity
- What do invasive species do?
 - Compete with native species
 - Prey on native species
 - Parasitize native species



Fig. 38.3

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Overexploitation

- Over-harvesting threatens plants and animals
- Hunting wild animals depletes biodiversity



Fig. 38.3B

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Pollution

- Pollution is transferred from one species to another through natural cycles (like the water cycle)
 - Sulfur and nitrogen oxides emitted into the atmosphere are converted into acid rain
- Ozone Layer Depletion
 - Ozone thinned by chlorofluorocarbons from aerosol cans and manufacturing

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Nutrient Pollution

- Pollution from fertilizers and wastes
 - Fertilizers used in the midwest have been linked to “dead zones” in the Gulf of Mexico
 - Excess nutrients cause algal blooms
 - As algae die, their decomposition uses so much oxygen that the waters become oxygen depleted and other organisms die

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Pesticides

- Biological Magnification - effects of pollution are more obvious at higher trophic levels

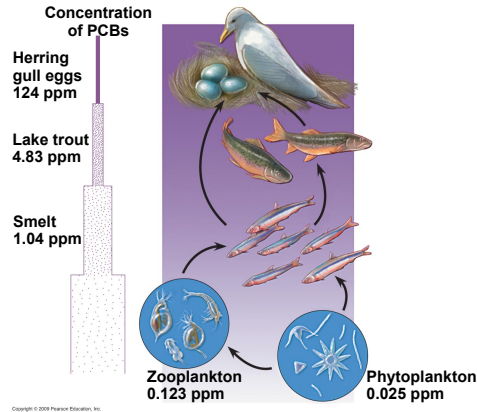


Fig. 38.4

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Global Warming

- Global temperature has risen
 - 0.8°C in the last 100 years
 - 0.6°C of that in the last 30 years
 - 2 to 4.5°C increases are likely by the end of the century
- Problems this causes:
 - Shrinking sea ice
 - Thinning ice sheets
 - Melting permafrost

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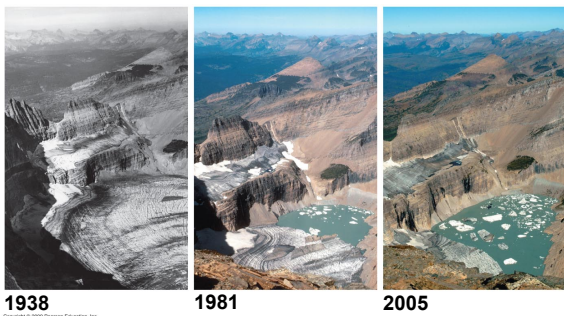
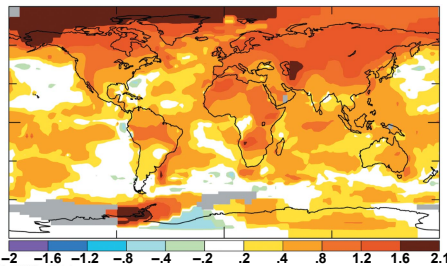


Figure 38.5B
Grinnell
Glacier in
Glacier
National Park

Figure 38.5A
2000–2005
temperature
deviations relative
to 1951–1980 (°C).



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Human Activities Cause Global Warming

- Atmospheric CO₂ did not exceed 300ppm for 650,000 years
- Atmospheric CO₂ is now about 385ppm
- Methane and nitrous oxide also trap heat

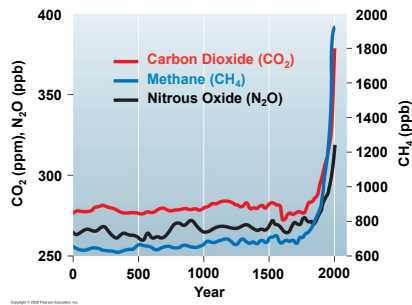


Fig. 38.6A

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Impact on Biomes

- Terrestrial Biomes are determined by temperature and precipitation
 - Both change because of global warming
 - Impacts where species can live
 - Impacts seasonal changes in living organisms (especially plants)



Fig. 38.7

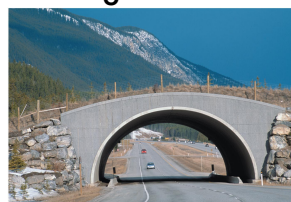
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Landscape Ecology

- Landscape ecology - application of ecological principals to the study of the dynamics of several ecosystems
 - Ex. the boarder of a forest with a grassland
- May create a movement corridor
 - Narrow strip of high quality habitat connecting otherwise isolated patches



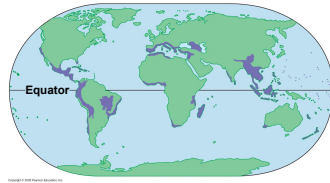
Fig. 38.10



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Biodiversity Hot Spots

- Small areas with large numbers of endangered and threatened species
 - Often have many endemic species
 - endemic species - species not found elsewhere on earth
- Often found on islands and coastal areas near the tropics



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Zoned Reserves

- Zoned reserve - extensive region of land that includes one or more areas undisturbed by humans
- Land surrounding the undisturbed areas are protected from alteration by humans



Fig. 38.12A

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Sustainable Development

- long-term prosperity of human societies and the ecosystems that support them
- Biosphere is very complex
 - Research has to be done to understand the complexity and make well-informed decisions

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