36. Human Disturbance of Communities and Ecosystems *(Chapters 51, 52, 54, 55)*

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I. Introduction *(1243-1247)*

A. Oddities of Human Ecology

1. Exponential population growth – constantly

2. Top predator – top predator everywhere, hunt for sport

3. Efficient hunting / Inefficient use of prey – tool, cooperation

4. Production of wastes – produce immense quantities of novel waste products

# B. Human Disturbance of Ecosystems

-Addition of material

-Removal of material (habitat restriction)

-Changing the transfer rates between bit nutrient pools

II. Cultural (Anthropogenic) Eutrophication of Aquatic Habitats *(1212-1213, 1283-1285)*

-Nutrient enrichment

A. Sources of Materials

-Agriculture – farmers fertilize (add limiting nutrients), irrigate (aquifer)

-Run-off from irrigation carries nutrients into streams and rivers

-Pesticides and herbicides get carried by water too

-Industry – coal power plants, sulfuric acid when S0\_2 mixes with water

-Acidify water (lower pH)

-Residential

-Sewage

-Detergents

-Nitrogen and phosphorus are the materials that are most often limiting

-Introduce these limiting nutrients to water through pollution

B. Consequences of Aquatic Pollution

-Add excessive nutrients 🡪

- N 🡪 K

- N > K (blooms of algae, bacteria, cyanobacteria)

-Organisms take over ecosystem

-Bacteria die in number and become a source for aerobic bacteria that decompose them

-O\_2 gets depleted and animals start to die (fish/invertebrates)

-Other animals are decomposed by anaerobic bacteria (becomes the 0\_2 is depleted)

-These bacteria produce H\_2S as by product of respiration

1. Major pollutants

2. Human waste = fertilizer

3. Results of eutrophication

C. Eutrophication of Lake Erie

1. Background

-Detroit, Toledo, Cleveland buffalo

-40-50 billion gallons of sewage dumped in the lake each year (untreated 1960’s)

-Phosphates 🡪 1930-1970 increased 300% (2/3 from household detergent and 1/3 from agriculture)

2. History of pollution

3. Ecological effects of pollution

4. Biological, recreational, economic importance

-Planktonic algae/cyanobacteria up 20-30x

-Coliform bacteria up 3x

-Change in the bottom fauna (organisms in mud), used to have insect larvae and replaced by oligochaete worms

-Fisheries collapse, 1915 20 \* 10^6 lbs fishing, 0 lbs in 1960, pollution eliminated all fish

### III. Deforestation *(1310-1311)*

A. Clearing of Tropical Rain Forests

1. Uniqueness of the biome

2. Ecological implications of large standing biomass

3. Effects of shifting agriculture

B. Desertification

### IV. Atmospheric Pollution *(1295-1297, 1301-1305, 1315-1316)*

A. Combustion of Fossil Fuels

1. Natural carbon pools

2. Incomplete combustion of fossil fuels: air pollution

3. Disruption of transfer rates among pools

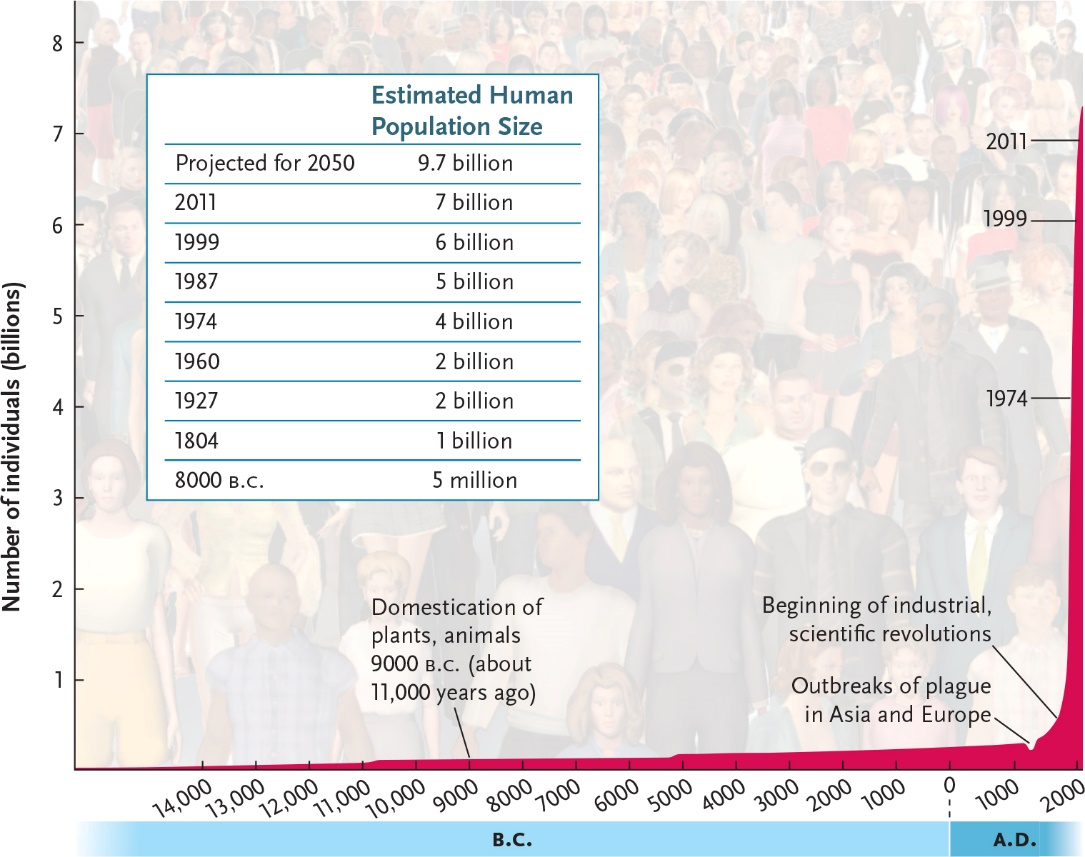
B. The Greenhouse Effect and Global Warming

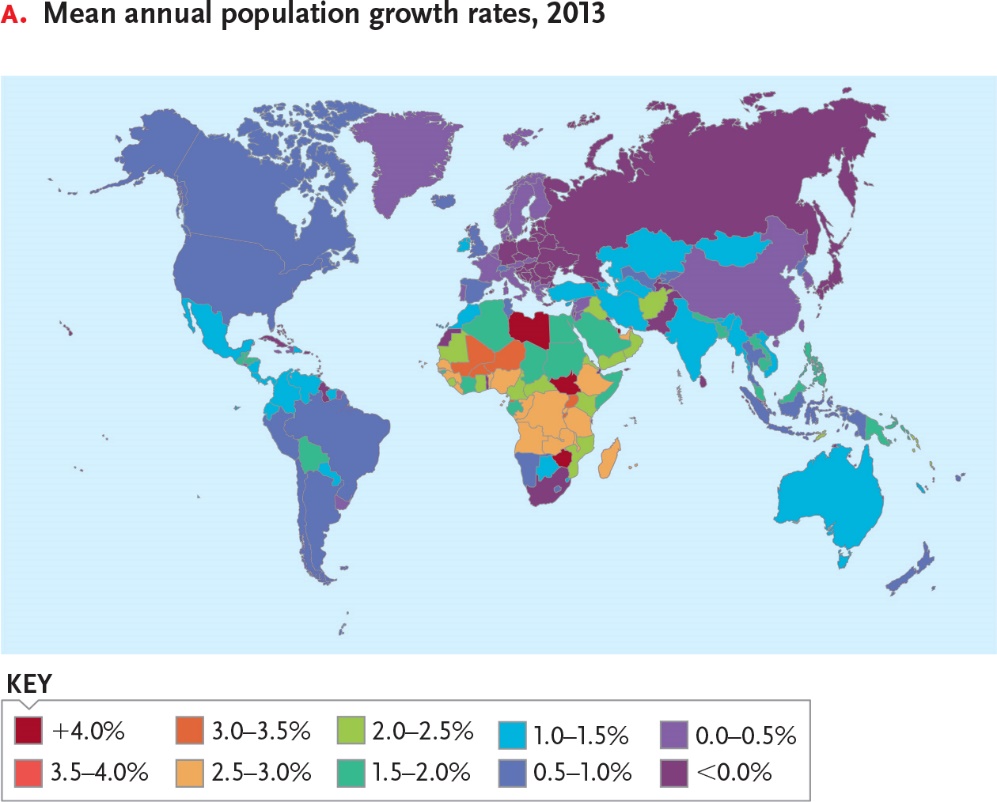
1. Rising CO2 levels and temperature trends

2. Consequences of warming

C. Acid Precipitation

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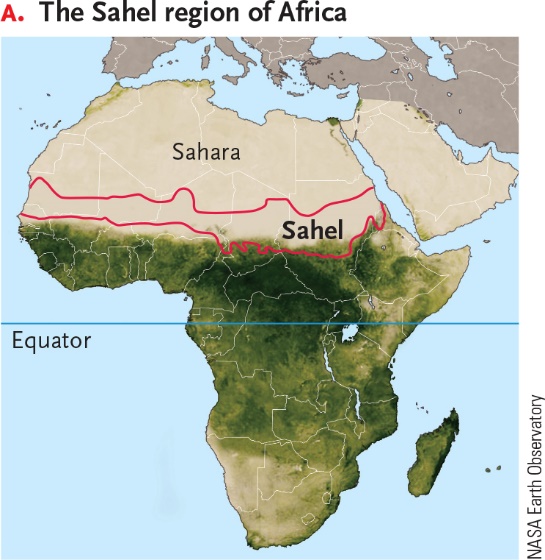
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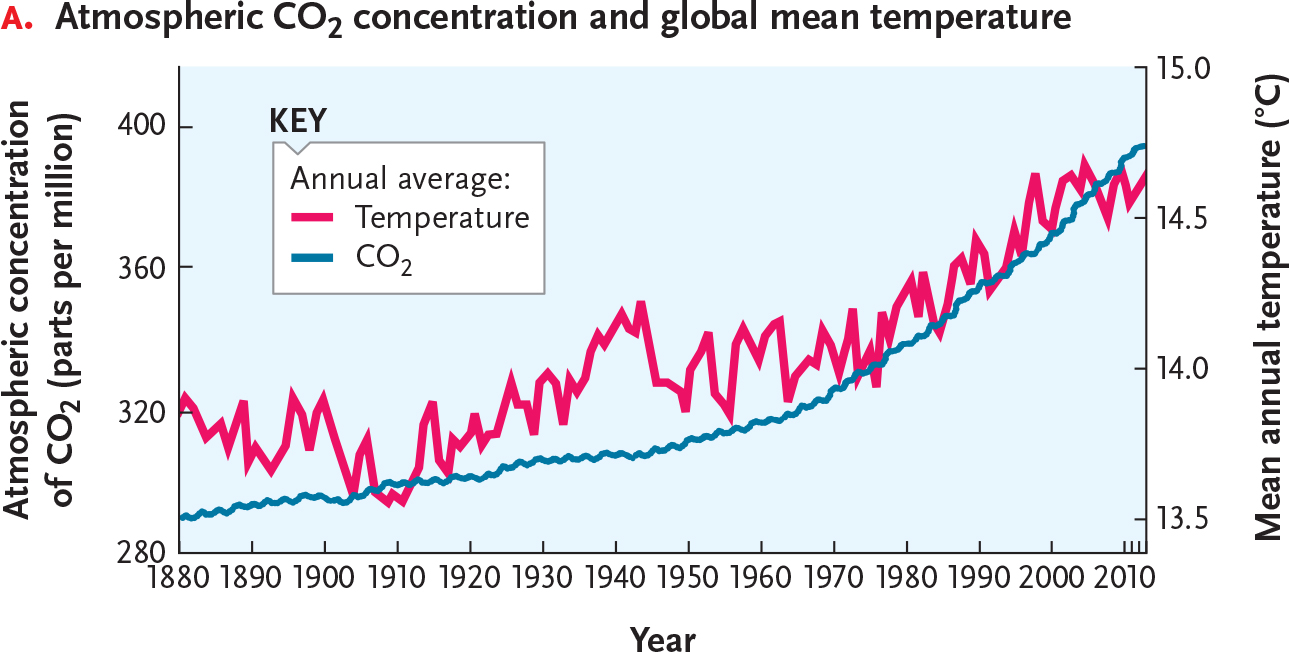
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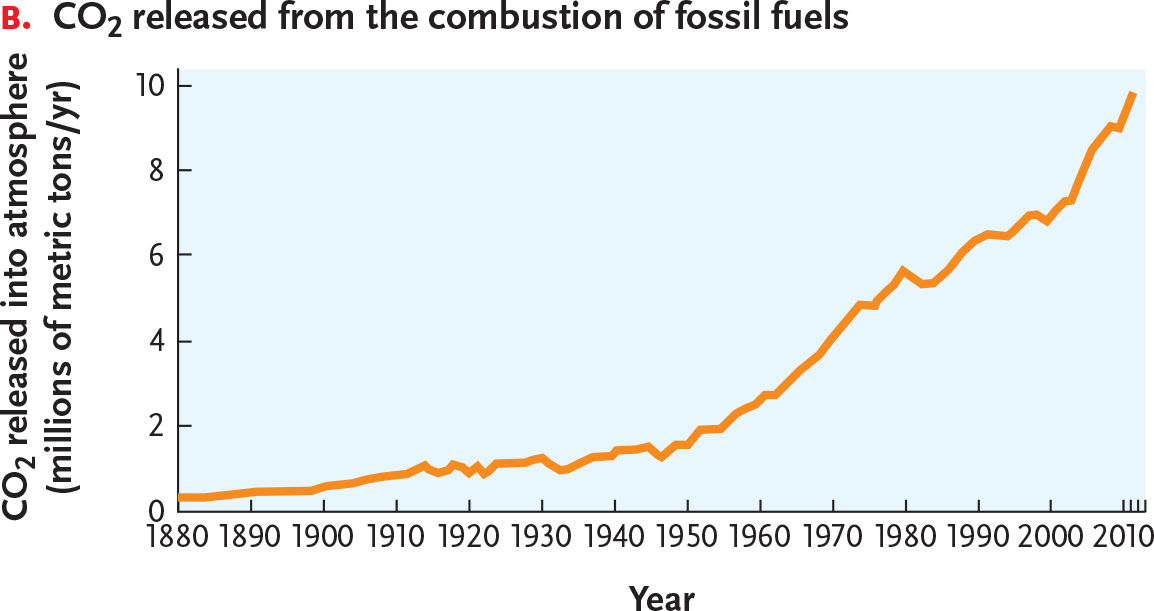
 

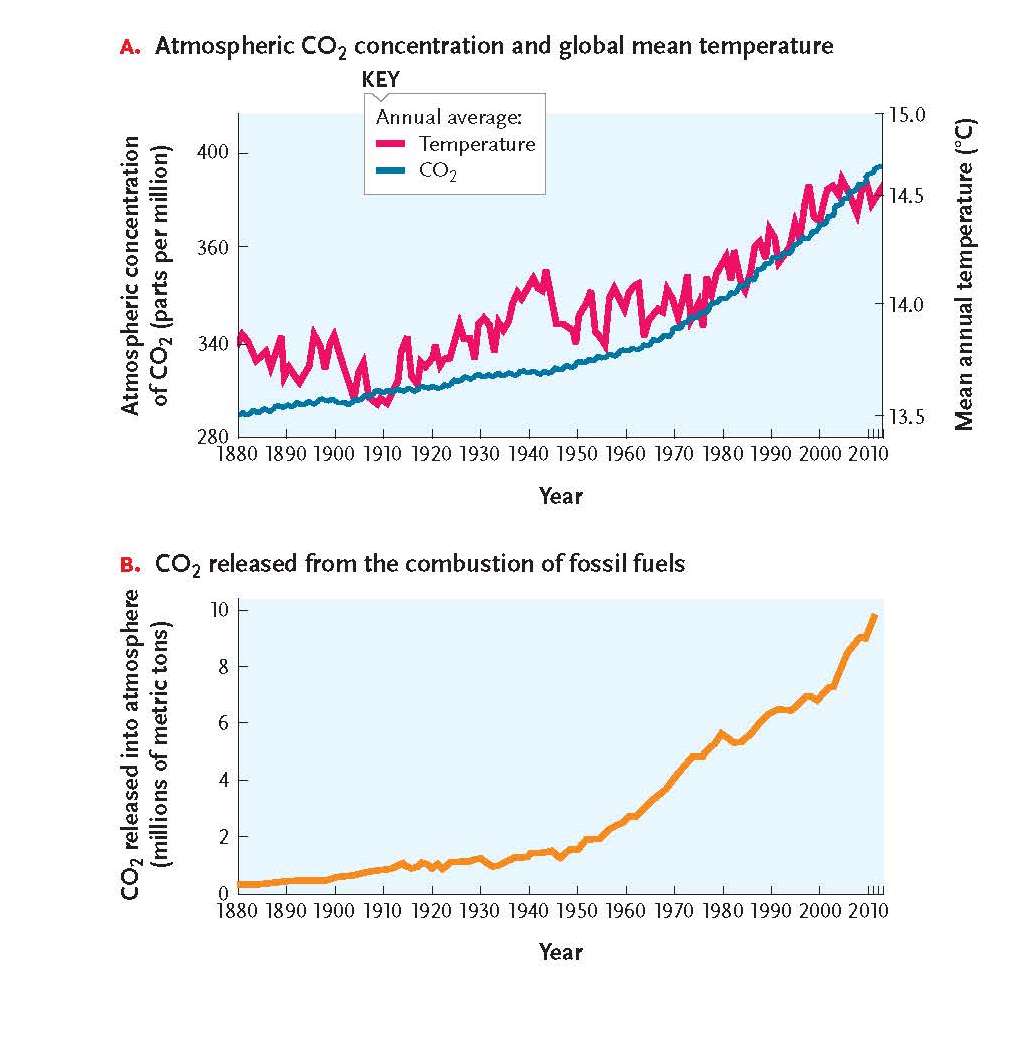
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