

Biosphere and biomes

- OUTLINE

- biosphere
- global environmental concerns
- biodiversity in biomes
- climate patterns
- the ocean biome
- terrestrial biomes
 - tropical forests
 - savannas
 - deserts
 - chaparral
 - temperate grasslands
 - temperate forests
 - coniferous forests
 - tundra



- Biomes are patchy - lots of variation
- Global environmental concerns
 - Warming
 - Pollution
 - Extinction



Pollution - pesticides

- Rachel Carson

- Recognized global danger of pesticides
- 1962 - *Silent Spring*
- Played a key role in environmental awareness



Biodiversity in biomes

- The presence and success of a species depends upon its ability to adapt to biotic and abiotic environment
 - Biotic
 - predation and competition



- Abiotic

- Climate
- Disturbances: fires, hurricanes, volcanoes

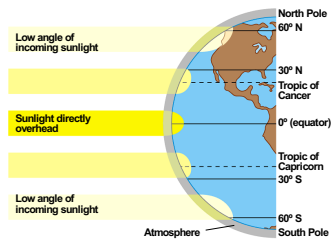


Climate patterns

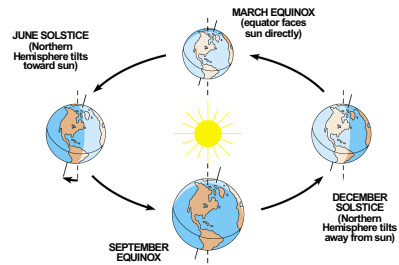
- Determined by solar energy & earth's movement in space



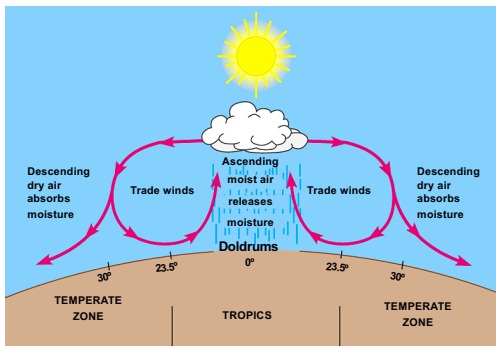
- Uneven heating of Earth's surface due to angle of sun



- Seasons due to permanent tilt of earth on its axis as it orbits the sun

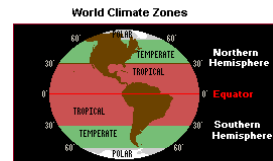


- Tropical zones: rainy seasons & high temperatures



- Temperate zones

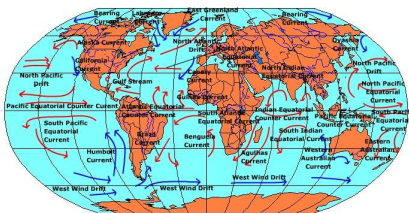
- Seasonal variations in climate
- Temperatures moderate



The differences in the sun's heating power cause different climate zones on earth. Climatologists divide the earth into temperature zones according to latitude.

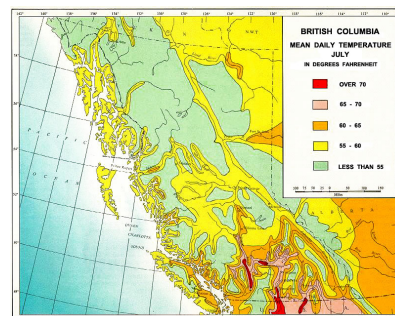
- Ocean currents

- warm or cool coastal areas



- Temperature

- British Columbia



- Landforms, such as mountains, can affect local climate

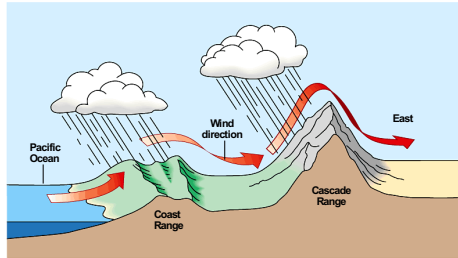
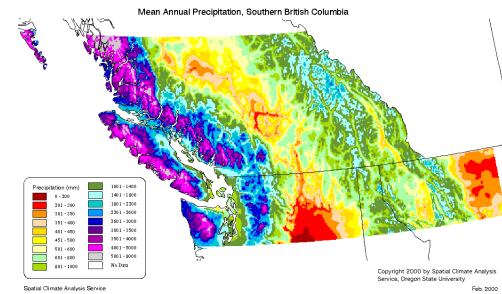
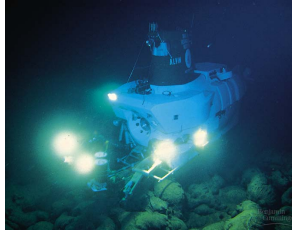


Figure 34.6F



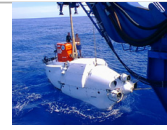
- *Alvin* - exploration of the deep sea



Manned Submersibles

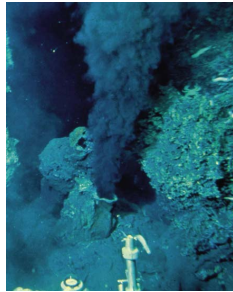


Automated Underwater Vehicles

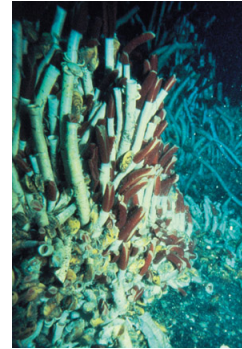


Remotely-Operated Vehicles

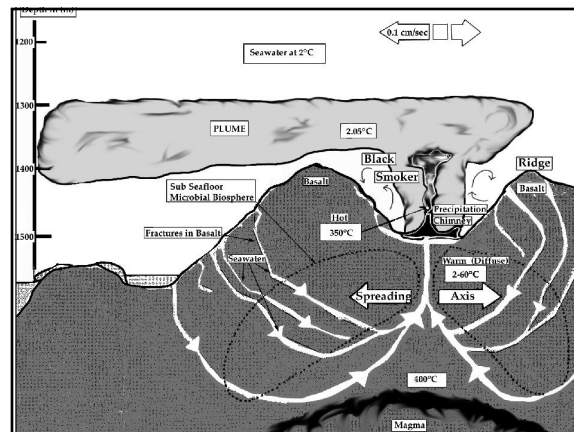
- Hydrothermal vents

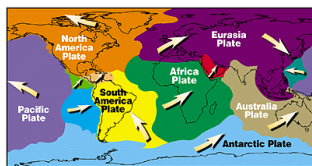


- Many animals thrive in the extreme environment around hydrothermal vents

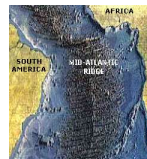


- Population of clams near an ocean vent





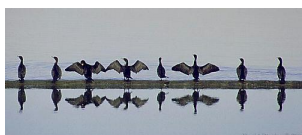
This map shows the major tectonic plates that make up the Earth's crust and the directions in which they are moving.
Map adapted from NOAA.



Estuaries

– Productive areas where rivers meet ocean

- Nurseries for oysters, crabs, and many fishes
- Often bordered by wetlands



Cormorants

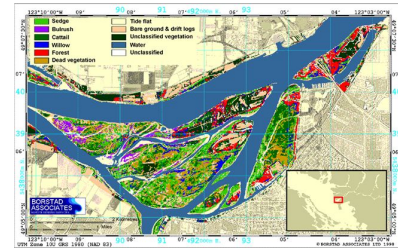
Photo: David Blevins





Photo: Brian Klirkerberg

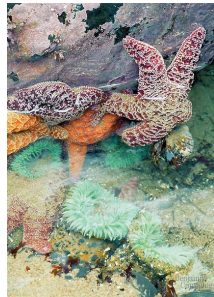
Fraser River Estuary



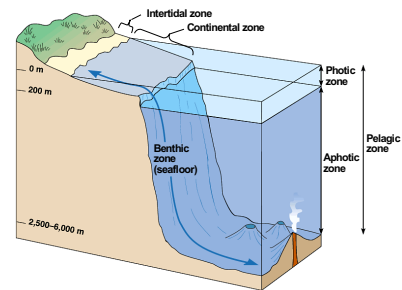
Intertidal zone

- edge of an estuary or ocean, where water meets land

- Salt marshes, sand and rocky beaches, and tide pools



- Abiotic conditions dictate the communities ocean zones support

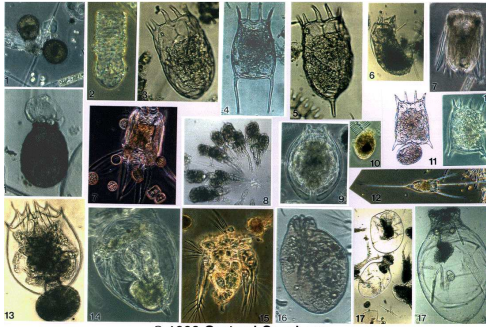


Pelagic zone - open ocean

- Highly motile animals: fishes, squids, and marine mammals



– Zooplankton



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– Phytoplankton

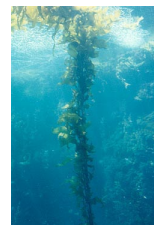


Benthic zone - bottom of ocean



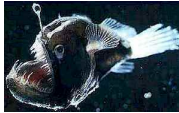
Photic zone - portion of ocean where light penetrates

– Photosynthesis occurs here



Aphotic zone - vast, dark region of ocean

- Most extensive part of biosphere
- Diverse and dense population



Sperm whale



Giant squid



Coral reefs - warm tropical waters above continental shelf

- Huge diversity of invertebrates and fishes
- Coral reefs are easily degraded by
 - pollution
 - native and introduced predators
 - human souvenir hunters



Freshwater biomes

- Rivers, lakes, ponds communities shaped by
 - light
 - temperature
 - the availability of nutrients and dissolved oxygen

- A river environment changes greatly along its length



- Wetlands are among the richest biomes in terms of species diversity



Terrestrial biomes

- Mainly temperature and rainfall shape biomes
- Grade into each other
- Local variation
 - This gives vegetation a patchy, rather than uniform, appearance

• Major terrestrial biomes

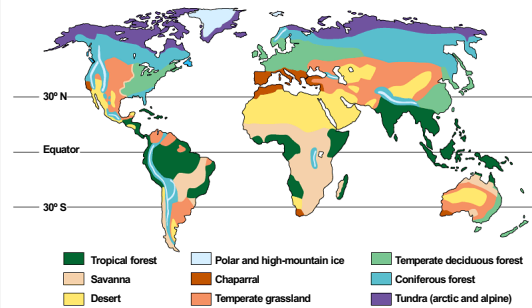


Figure 34.9

Tropical forests

- Several types of tropical forests occur in the warm, moist belt along the equator

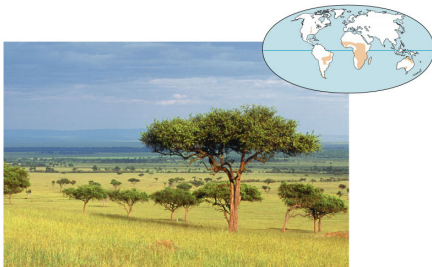




- Most diverse ecosystem
- Large-scale human destruction of tropical rain forests continues to endanger many species
 - It may also alter world climate



Savannas are grasslands
with scattered trees



Deserts



- Deserts are the driest biomes



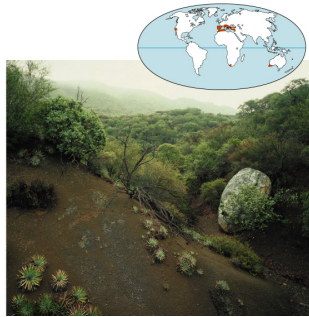
– Desertification
is a significant
environmental
problem





Chaparral

- A shrubland with cool, rainy winters and dry, hot summers
- Periodic fires



Temperate grasslands include the North American prairies

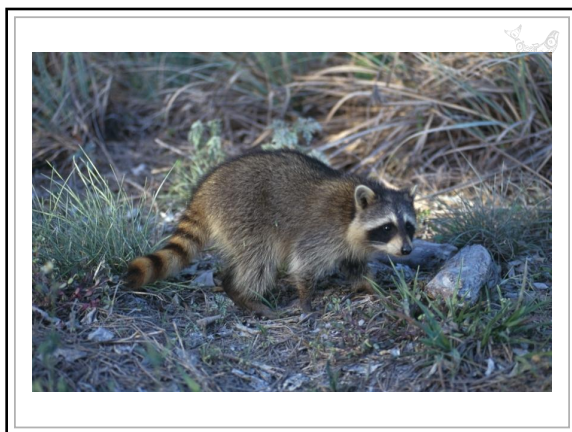
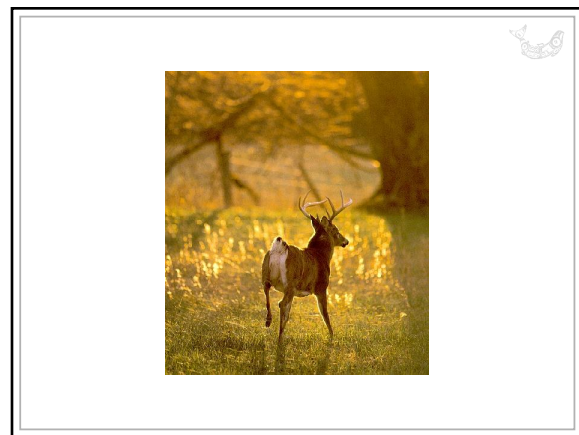
- Found in the interiors of continents -winters are cold
 - Drought, fires, and grazing animals prevent trees from growing
 - Farms have replaced most of North America's temperate grasslands



Temperate forests

- Temperate deciduous forests grow where sufficient moisture supports growth of large trees
 - Drastically altered by agriculture and urban development

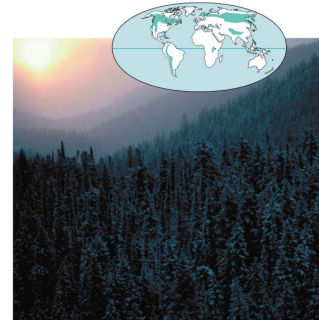






Coniferous forests

- Few tree species
- The Taiga is the largest terrestrial biome



- Long, cold winters and short, wet summers
- Coastal coniferous forests of the Pacific Northwest are actually temperate rain forests

Tundra

- The arctic tundra lies between the taiga and the permanently frozen polar regions
 - Treeless
 - extreme cold, wind, permafrost



