

Biomes:

Before discussing communities, we want to spend a little time describing the different kinds of habitats that can be found on our planet.

- As mentioned on the first day of class in 103, all life on the planet can be considered to be in the “biosphere”.
 - Your text is not terribly generous here - it starts with the Himalayas on one end and oceanic trenches on the other.
 - Life (bacteria, pollen, spores, etc.) extends much higher up in the atmosphere than the Himalayas
 - While oceanic trenches are about as deep as things go, bacteria have also been found in rocks several miles under the surface!

But it's kind of hard to talk about the “biosphere” and get a good picture of life. Let's go down a level to what are called biomes.

- These are large areas with similar environments. They don't have to be in the same area.
- Some biomes are a bit arbitrary, and most certainly don't have hard boundaries, but they do give us a way to talk about different environments.
 - In the water, biomes are defined by such things as temperature, salinity and depth.
 - On land, it's mostly rainfall and temperature (though other things such as amount of sunlight and wind can be important).

Aquatic biomes:

An obvious division is fresh vs. salt water.

Fresh water environments vary quite a bit: streams, rivers, lakes, ponds, swamps, deltas, estuaries are all a bit different (deltas and estuaries can be saline).

In salt water, light levels are also very important [**Fig. 34.6A, p. 688**]

- Starting with intertidal zones, oceans can get to 10,000 m deep. Light levels continue to drop until they become non-existent around 1,000 m (only 2 lakes get deeper than 1,000 m).
- At shallow depths, photosynthesis can occur, so there's a lot of food available.
- Coral reefs, for example, are one of the most productive environments

on the planet.

- The deeper one goes, the less food there is. Animals also become stranger at deeper levels.

Terrestrial biomes [Fig. 34.8, p. 691]:

Note that the number can vary a bit depending on who you talk to. Your book generally does okay, but does do some weird things. For example:

I. Tropical forests [Fig. 34.9, p. 692]:

- most scientists would not lump rain forest and regular forests together.

- Rain forests have lots of rain! They're also very productive, and have sometimes in excess of 300 species of tree in a hectare.

- have incredible numbers of animals living in them.

- e.g., monkeys, birds, forest elephants, snakes, frogs, and a huge number of insects.

- grow in very poor soil (which is why it's so dangerous to cut down trees in a tropical rain forest).

- Other tropical forests may be deciduous (lose their leaves during a dry season).

II. Savannas [Fig. 34.10, p. 692]:

- fairly dry grasslands, with scattered trees, though rainfall can pick up at times.

- probably best known from Africa, as this is where you find your zebras, lions, elephants, rhinos, cheetahs, etc.

- truly some of the most spectacular wildlife on the planet!

III. Deserts [Fig. 34.11, p. 693]:

- obviously dry. Note that deserts don't have to be hot, some can be quite cold (parts of Antarctica are often described as a desert because it rarely snows).

- Animals and plants are adapted to extremely dry conditions. Plants may only grow after a rainfall, which in some deserts may not occur for decades.

- seeds can lie dormant for a long time, before germinating and temporarily "painting" the desert with amazing colors.

- animals generally are only active at night.

IV. Chaparral [Fig. 34.12, p. 694]:

- Sometimes called “Mediterranean”. Generally mild wet winters and hot dry summers.
 - e.g., mud slides and fires in California.
- many species are fire adapted due to constant fires (e.g., will only grow after fires).

V. Temperate grasslands [Fig. 34.13, p. 694]:

- similar to savannas, but usually a lot less trees.
- also have a cold time of year - this allows nutrients to pile up from year to year.
- amount of grass can vary with rainfall
- also home to many animals - bison, antelope, deer, etc.
 - most of the original North American grasslands are gone - now used for farming (some of the most productive land on earth).
 - many animals were also shot up or exterminated.

VI. Temperate forests [Fig. 34.14, p. 695]:

- grow in temperate zones with more rainfall than grasslands get.
- have a thick rich soil, again due to a cold season.
- not as diverse as tropical rain forests.
- This is what we find around here.
 - Note that almost all the eastern deciduous forests were destroyed for agriculture.
 - Even the Shenandoah National Park has nothing except “second growth forest”
 - Old growth forests are richer, less undergrowth, bigger trees, etc. There are a few areas left (e.g. around Blacksburg) where one can see original old growth forest.
- found not just in Eastern U.S.

VII. Taiga [Fig. 34.15, p. 696]:

- referred to as coniferous forest by your text, but Taiga is probably a better word.
- the largest land biome in terms of area. Made up mostly of coniferous trees.
- long winters, acid soil. Conifers are better adapted to this environment.
- moose, elk, wolves, bears, etc.

VIII. Tundra [Fig. 34.16, p. 696]:

- Soil is permanently frozen (permafrost) - only the top few inches melt during the summers.
- Prevents larger plants from growing.
- Mostly short grasses and shrubs
- Soil is often marshy as water has a hard time getting deeper into the soil (it's frozen).
- Animals include caribou, musk ox, rodents, snowy owls, water birds, and in some areas massive amounts of mosquitoes.

IX. Others:

- Polar ice: mentioned by your book but not as a biome. Yet one does find abundant animal life there at times:
 - polar bears, seals, birds, etc.
- Temperate rain forests: really shouldn't be lumped together with Coniferous forests.
 - good examples are the coastal forests of Washington (state), Oregon, western Canada & Alaska.
- Mountains - covers lots of ground, but the environment may be totally different on mountains.
 - sometimes it provides a biome similar to another one, but not where it should be.
 - e.g., the high mountains in East Africa are covered with Rain forest, but surrounded by savanna.
 - sometimes the environment is unique

- not much except rocks, a few shrubs, or glaciers.

- Alpine meadows (though sometimes compared to Tundra).

- Caves - often are their own little ecosystem.