Biomes:

We want to spend a little time describing the different kinds of major habitats that can be found on our planet.

This will be a good introduction to conservation biology - we'll have some idea where different environments are, and what can be found there.

First, the *biosphere*.

This is the "sphere" of life found on the planet.

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 almost solid rocks several miles under the surface!

But it's kind of hard to talk about the biosphere and get a good picture of life. Instead, let's talk about biomes.

These are large areas with similar environments. The 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

Other things such as amount of sunlight and wind can also 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 1,000m (only 2 lakes get deeper than 1,000 m).

Photosynthesis occurs at shallow depths, so there's a lot of food available.

Coral reefs, for example, are one of the most productive environments on the planet (most are quite shallow with lots of light).

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

Animals often depend on food trickling down from above.

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

Note that the number of biomes can vary a bit depending on who you talk to.

Your book generally does okay, but does do some weird things (see the first example).

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

Most ecologists would not lump rain forest and regular forests together.

Rain forests have lots of rain! They're also very productive

Some areas have in excess of 300 species of tree in a hectare.

Also 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* (loose their leaves during a dry season).

The diversity of animals and plants in a deciduous tropical forest is totally different from that found in rain forests.

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

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

There is often a rainy season (or sometimes two).

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!

But also found in some other areas like South America.

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 extremly 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.

Most animals generally are only active at night.

Deserts are not "dead". Many have an amazing variety of plants and animals.

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).

Often characterized by lots of shrubs and shorter trees.

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.

The amount of grass can vary with rainfall

These are also home to many animals - bison, antelope, deer, etc.

Most of the original North American grasslands are gone - now used for farming.

This is some of the most productive land on earth.

Many animals that used to be found here were shot up or exterminated.

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

These 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, have less undergrowth, bigger trees, etc.

There are just a few areas left (e.g. around Blacksburg) where one can see original old growth forest.

It looks quite different.

Also found in Europe, Asia, even in a few areas of South America.

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

This is referred to as coniferous forest by your text, but Taiga is a better word.

This is 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.

Inhabited by animals such as moose, elk, wolves, bears, etc.

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

The soil is permanently frozen (permafrost) - only the top few inches melt during the summers.

This prevents larger plants form growing.

Consists mostly of short grasses and shrubs

The soil is often marshy as water has a hard time getting deeper into the soil (it's forzen).

Animals include caribou, musk ox, rodents, snowy owls, water birds, and in some area *massive* amounts of mosquitoes.

IX. Others (not listed in your book, but should be!):

Polar ice: mentioned by your book but not as a biome. Yet one does find abundant animal life there at times:

Polar bears, seals, huge numbers of birds, etc.

Temperate rain forests: this really shouldn't be lumped together with Coniferous forests.

Good examples are the coastal forests of Washington (state), Oregon, western Canada & Alaska.

Very moist, but temperate. Some trees have more moss than leaves!

Olympic National Park (Washington State) is a very good example.

Mountains - this is a bit vague and covers a lot of ground

> The environment may be totally different on mountains than from the surrounding areas, or even areas that look similar elsewhere.

>> Many mountains form habitat islands where unique species are found.

> Often they provide a habitat type that simply doesn't "fit in" with the surroundings:

>> 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.