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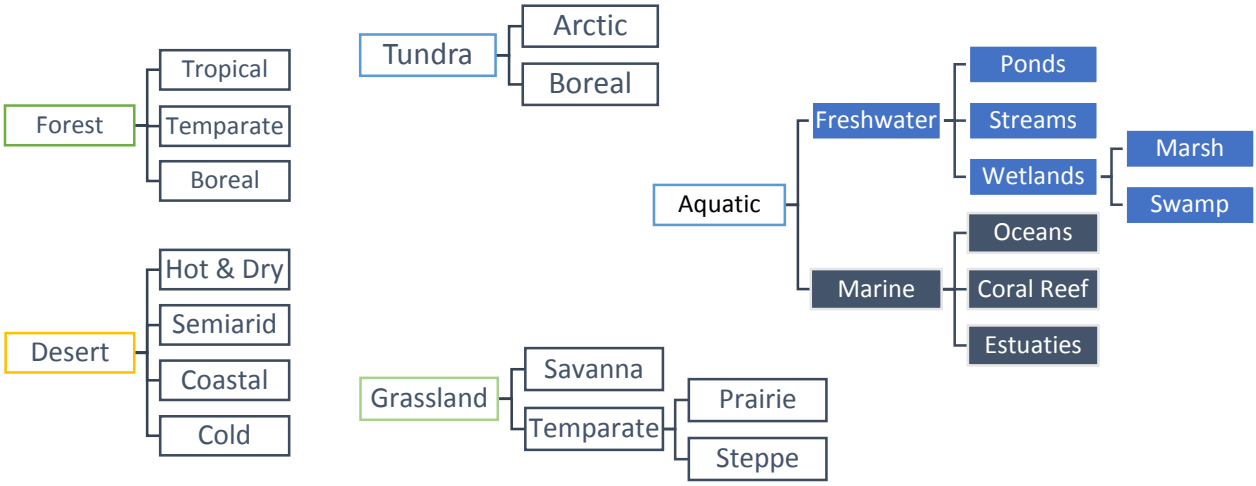
Geography

World Biomes

A biome is a large expanse of land with specific plant and animals which have adapted to the geographic, and atmospheric properties of said area. On earth there are four distinct groups that branch off into smaller sub-categories. These include: grasslands, desert, tundra, forest, and aquatic to be technical. Of these five, a branching chart can best describe the more specific zones.



What distinguishes one biome from another is its independence from the outlying life or weather that could blow in from other neighboring areas. For instance, the Arctic tundra, the earth's youngest biome, takes up 20% of our planet's surface and is for the most part exclusive to 55° to 70° north in our current timeframe.

Biomes are highly dependent on the variations in temperature that corresponds with their locations on earth. As a general rule, the closer to the equator you travel, the hotter it gets. This is a result of the earth's 23.5° tilt towards the sun, as well as the earth's 365-day rotation period each year. Stronger exposure to the sun's rays in places such as South America, Africa, India, and Australia dictates what kinds of vegetation can grow. Typically, the deserts and tropical rainforests of the world congregate between 30°N and 40°S of the equator in a long strip. It is predicted that in the next several hundred million years, the resulting increase in the sun's heat expenditure will cause the earth's ambient surface temperature to be so great, that all biomes will be brought to a true desert state, similar to the landscape of Venus or Mars.

The Grassland

Grasslands are widespread land masses with rich, deep soil that are ideal for growing crops. There are two alternating seasons every year in a grassland: a growing season and a dormant season. During the growing season rainfall is higher and the climate is warmer, which can often cause natural wildfires that clear any larger foliage such as trees. Grasslands diverge into two groups.

Savanna

Savannas cover half the surface of Africa and offer a much more extreme growing season with intense moisture and driness. Trees are sparse as they are in any grassland, but some trees have prevailed. The Umbrella thorn acacia (*Acacia tortillis*) and baobab (*Adansonia digitata*) trees are two of the most common.

Temperate Grassland

This type of grassland is more common in North America and Europe. Described as having almost no vegetation other than grass, the temperate grassland receives less rain than savannas. Two variations of this type are prairies which have taller grass, and steppes, which are dry short grass areas with hot summers and cold winters. The fauna found in steppes include blue grama, buffalo grass, cacti, sagebrush, speargrass, and small relatives of the sunflower.

The Forest

Forest biomes comprise the most frequently inhabited human territories on earth. Most major cities can be found within this type of biome as the temperature fluxuation between the seasons is much milder, which living things tend to prefer.

Today, forests occupy approximately one-third of Earth's land area, account for over two-thirds of the leaf area of land plants, and contain about 70% of carbon present in living things. They have been held in reverence in folklore and worshipped in ancient religions. However, forests are becoming major casualties of civilization as human populations have increased over the past several thousand years, bringing deforestation, pollution, and industrial usage problems to this important biome.

Tropical

Tropical forests are characterized by the greatest diversity of species. They occur near the equator, within the area bounded by latitudes 23.5 degrees N and 23.5 degrees S. One of the major characteristics of tropical forests is their distinct seasonality: winter is absent, and only two seasons are present (rainy and dry). The length of daylight is 12 hours and varies little.

Temperate

Temperate forests occur in eastern North America, northeastern Asia, and western and central Europe. Well-defined seasons with a distinct winter characterize this forest biome. Moderate climate and a growing season of 140-200 days during 4-6 frost-free months distinguish temperate forests.

Boreal

Boreal forests, or taiga, represent the largest terrestial biome. Occuring between 50 and 60 degrees north latitudes, boreal forests can be found in the broad belt of Eurasia and North America: two-thirds in Siberia with the rest in Scandinavia, Alaska, and Canada. Seasons are divided into short, moist, and moderately warm summers and long, cold, and dry winters. The length of the growing season in boreal forests is 130 days.

The Desert

Deserts cover about one fifth of the Earth's surface and occur where rainfall is less than 50 cm/year. Although most deserts, such as the Sahara of North Africa and the deserts of the southwestern U.S., Mexico, and Australia, occur at low latitudes, another kind of desert, cold deserts, occur in the basin and range area of Utah and Nevada and in parts of western Asia. Most deserts have a considerable amount of specialized vegetation, as well as specialized vertebrate and invertebrate animals. Soils often have abundant nutrients because they need only water to become very productive and have little or no organic matter. Disturbances are common in the form of occasional fires or cold weather, and sudden, infrequent, but intense rains that cause flooding.

Hot and Dry Desert

The seasons are generally warm throughout the year and very hot in the summer. The winters usually bring little rainfall. Temperatures exhibit daily extremes because the atmosphere contains little humidity to block the Sun's rays.

Semiarid Desert

The summers are moderately long and dry, and like hot deserts, the winters normally bring low concentrations of rainfall. Summer temperatures usually average between 21-27° C. It normally does not go above 38° C and evening temperatures are cool, at around 10° C. Cool nights help both plants and animals by reducing moisture loss from transpiration, sweating and breathing.

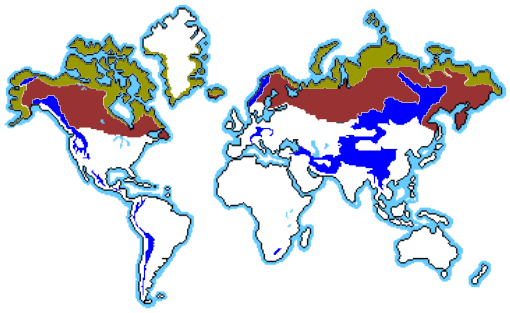
Coastal Desert

These deserts occur in moderately cool to warm areas such as the Nearctic and Neotropical realm. A good example is the Atacama of Chile.

Cold Desert

These deserts are characterized by cold winters with snowfall and high overall rainfall throughout the winter and occasionally over the summer. They occur in the Antarctic, Greenland and the Nearctic realm. They have short, moist, and moderately warm summers with fairly long, cold winters.

The Tundra



Tundra is the coldest of all the biomes. Tundra comes from the Finnish word *tunturia*, meaning treeless plain. It is noted for its frost-molded landscapes, extremely low temperatures, little precipitation, poor nutrients, and short growing seasons. Dead organic material functions as a nutrient pool. The two major nutrients are nitrogen and phosphorus. Nitrogen is created by biological fixation, and phosphorus is created by precipitation. Tundra is separated into two types: arctic tundra and alpine tundra.

Arctic

Arctic tundra is located in the northern hemisphere, encircling the north pole and extending south to the coniferous forests of the taiga. The arctic is known for its cold, desert-like conditions. Soil is formed slowly. A layer of permanently frozen subsoil called permafrost exists, consisting mostly of gravel and finer material. When water saturates the upper surface, bogs and ponds may form, providing moisture for plants. There are no deep root systems in the vegetation of the arctic tundra, however, there are still a wide variety of plants that are able to resist the cold climate. There are about 1,700 kinds of plants in the arctic and subarctic that include low shrubs, sedges, reindeer mosses, liverworts, and grasses, 400 varieties of flowers, and crustose and foliose lichen.

Alpine

Alpine tundra is located on mountains throughout the world at high altitude where trees cannot grow. The growing season is approximately 180 days. The nighttime temperature is usually below freezing. Unlike the arctic tundra, the soil in the alpine is well drained. Plants in this region include tussock grasses, dwarf trees, and small-leafed shrubs.

Freshwater Regions

Freshwater is defined as having a low salt concentration—usually less than 1%. Plants and animals in freshwater regions are adjusted to the low salt content and would not be able to survive in areas of high salt concentration such as the ocean. There are different types of freshwater regions: ponds and lakes, streams and rivers, and wetlands. The following sections describe the characteristics of these three freshwater zones.

Ponds and Lakes

These regions range in size from just a few square meters to thousands of square kilometers. Scattered throughout the earth, several are remnants from the Pleistocene glaciation. Many ponds are seasonal, lasting just a couple of months such as sessile pools, while lakes may exist for hundreds of years or more.

The topmost zone near the shore of a lake or pond is the littoral zone. This zone is the warmest since it is shallow and can absorb more of the Sun's heat. It sustains a fairly diverse community, which can include several species of algae like diatoms, rooted and floating aquatic plants, grazing snails, clams, insects, crustaceans, fishes, and amphibians.

Streams and Rivers

These are bodies of flowing water moving in one direction. Streams and rivers can be found everywhere—they get their starts at headwaters, which may be springs, snowmelt or even lakes, and then travel all the way to their mouths, usually another water channel or the ocean.

Wetlands

Wetlands are areas of standing water that support aquatic plants. Marshes, swamps, and bogs are all considered wetlands. Plant species adapted to the very moist and humid conditions are called hydrophytes. These include pond lilies, cattails, sedges, tamarack, and black spruce. Marsh flora also include such species as cypress and gum.

Marine Regions

Marine regions cover about three-fourths of the Earth's surface and include oceans, coral reefs, and estuaries. Marine algae supply much of the world's oxygen supply and take in a huge amount of atmospheric carbon dioxide. The evaporation of the seawater provides rainwater for the land.

Oceans

The largest of all the ecosystems, oceans are very large bodies of water that dominate the Earth's surface. Like ponds and lakes, the ocean regions are separated into separate zones: intertidal, pelagic, abyssal, and benthic.

Coral Reefs

Coral reefs are widely distributed in warm shallow waters. They can be found as barriers along continents (e.g., the Great Barrier Reef off Australia), fringing islands, and atolls. Naturally, the dominant organisms in coral reefs are corals. Corals are interesting since they consist of both algae (zooanthellae) and tissues of animal polyp.

Estuaries

Estuaries are areas where freshwater streams or rivers merge with the ocean. This mixing of waters with such different salt concentrations creates a very interesting and unique ecosystem.

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