Terrestrial Biomes & Biodiversity

Lecture 5

ENHL 220

OUTLINE

- 1- Climate & Terrestrial Biomes

- 2- Types of Terrestrial Biomes

✓ 2.1- Desert Biomes

✓ 2.2- Grassland Biomes

✓ 2.3- Forest Biomes

✓ 2.4- Mountain Biomes

- 3- Human Impacts on Terrestrial Biomes

Reference Book for this Lecture: Miller, T. & Spoolman, S. (2009).Living in the Environment (16th ed.). Canada : Cengage Learning
Co Reference: Same Book – Editions 15 & 17 &18

1- Climate & Terrestrial Biomes

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1- Climate & Terrestrial Biomes

- Terrestrial Biomes: “Large terrestrial regions characterized by similar **climates**, soil, plants & animals, regardless of where they are found in the world” (Miller, 2009/7)

- Different climates → different communities of organisms (ex: vegetation mainly).

- Climate change → change in the nature of the biomes (deserts, forests, grasslands & mountains).

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1- Climate & Terrestrial Biomes (Cont'd)

- Weather:

✓ "an area's lower atmosphere physical conditions (**temperature, precipitation**, humidity, wind speed, cloud cover, & others) over hours or days" (Miller, 2009/7).

- Climate:

✓ "a region's general pattern of weather conditions over a long time (years, decades & centuries)" (Miller, 2009/7).

✓ along with the "altitude" & "latitude", the 2 main factors that determine the climate are:

- o average temperature
- o average precipitation.

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1- Climate & Terrestrial Biomes (Cont'd)

- Average annual precipitation & temperature are the most important factors in producing tropical (hot), temperate (moderate) or polar (cold) deserts, grasslands and forests.

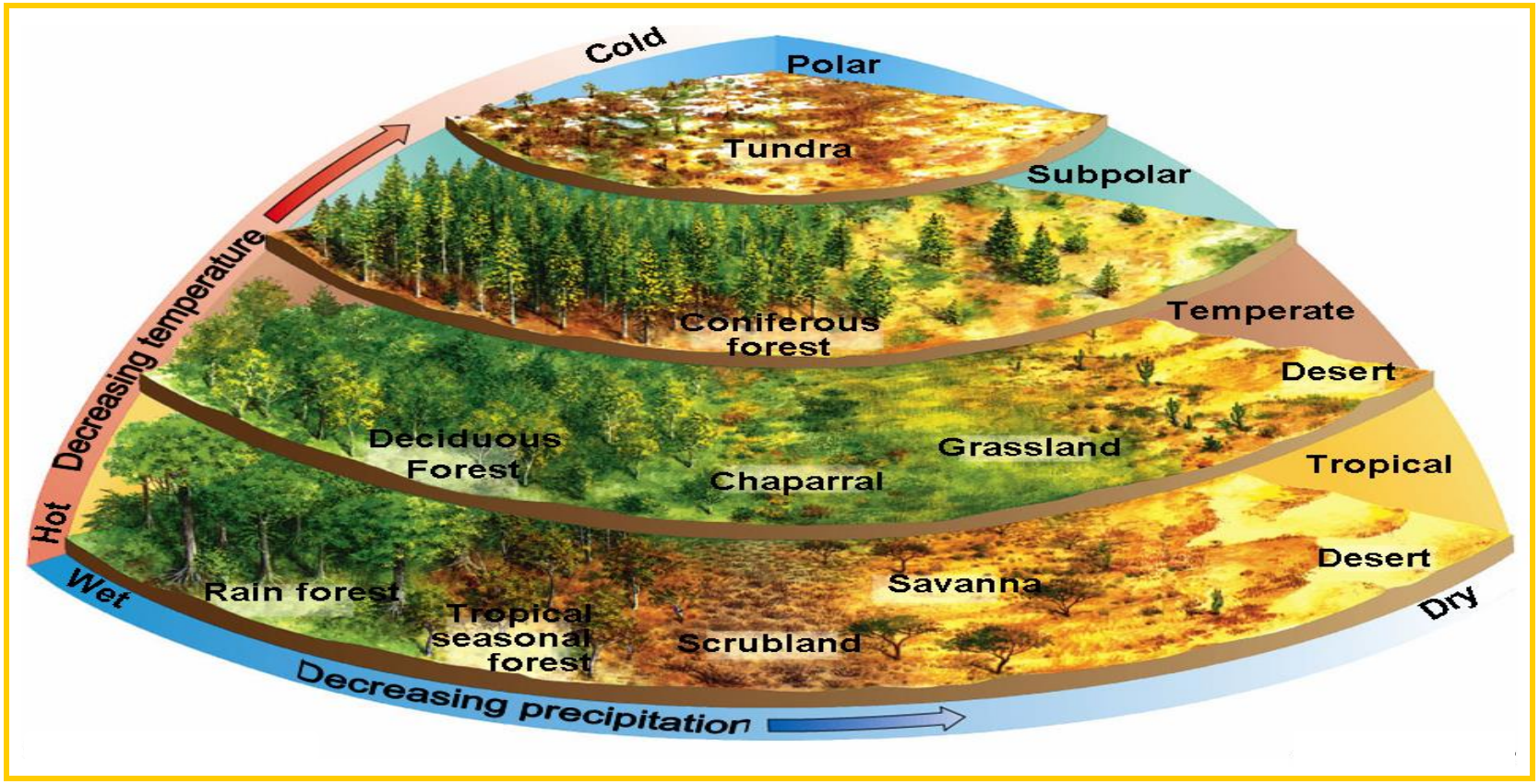

Figure 1: Precipitation, Temperature & Different Biomes (Miller, 2007/9)

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2- Types of Terrestrial Biomes

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2- Types of Terrestrial Biomes

- Four main types of Terrestrial Biomes exist. These are:

✓ 1- Desert Biomes

✓ 2- Grassland Biomes

✓ 3- Forest Biomes

✓ 4- Mountain Biomes

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2.1- Desert Biomes

- Desert:

✓ Biomes “where evaporation exceeds precipitation” (Miller, 2009/7).

✓ driest of the earths’ biomes

✓ cover 30% of the earth’s surface.

✓ **low** precipitation

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2.1- Desert Biomes (Cont'd)

Tropical Desert

Temperate Desert

Cold Desert

- Three main types of deserts exist. These are:

✓ 1- Tropical Deserts

✓ 2- Temperate Deserts

✓ 3- Cold Deserts

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2.1- Deserts; Brief Comparative Table

	Temperature	Precipitation	Biological Life (few characteristics)
Tropical Desert	•Hot & Dry (most of the year)	•Low → Less than in temperate deserts	•Fragile because of: ✓Slow plant growth ✓Drought resistant vegetation ✓Few species ✓Slow nutrient cycle ✓Lack of water
Temperate Desert	•High (summer) ; Low (winter)	•Low → More than in tropical deserts	•Fragile because of: ✓Slow plant growth ✓Drought resistant vegetation ✓Few species ✓Slow nutrient cycle ✓Lack of water
Cold Desert	•V. Cold (winter) ; Hot (Summer)	•Low	•Fragile because of: ✓Slow plant growth ✓Drought resistant vegetation ✓Few species ✓Slow nutrient cycle ✓Lack of water

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2.1- Desert Biomes (Cont'd)

- Some desert plants' characteristics & strategies for survival:

✓ have no leaves → no water loss by evapotranspiration (cactus).

✓ expandable fleshy tissues → store water (cactus).

✓ wax coated leaves → reduce water loss (evergreen plants).

✓ deep roots → reach groundwater sources.

✓ spread, shallow roots → collect water after brief showers.

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2.1- Desert Biomes (Cont'd)

- Some desert animals' characteristics & strategies for survival:

✓ hide → daytime / come out → night & early morning (cooler temperatures).

✓ dormant → during extreme heat or drought.

✓ thick outer coverings → minimize water loss by evaporation (ex: insects & reptiles).

✓ get water → from dew or the food they eat
(ex: insects & spiders).

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2.2- Grassland Biomes

- Grasslands or Prairies:

✓ Biomes with "enough precipitation to support grasses but not enough to support large stands of trees" (Miller, 2009/7).

✓ seasonal drought + grazing by large herbivores + occasional fires → keep large numbers of shrubs & trees from growing.

✓ located in areas → too moist for deserts & too dry for forests

✓ **slight** precipitation

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2.2- Grassland Biomes (Cont'd)

- Grasslands are divided into 2 categories. These are:

✓ 1- Rangelands:
- natural grasslands
- unfenced
- supply vegetation for grazing (grass-eating) & browsing (shrub-eating).

✓ 2- Pastures:
- managed grasslands
- enclosed meadows usually planted with domesticated grasses or other forages.

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2.2- Grassland Biomes (Cont'd)

Tropical Grassland

Temperate Grassland

Polar Grassland

- There are three main types of Grasslands. These are:

✓ 1- Tropical Grasslands

✓ 2 –Temperate Grasslands

✓ 3- Polar Grasslands

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2.2- Grasslands; Brief Comparative Table

	Temperature	Precipitation	Biological life (Few Characteristics)
Tropical Grasslands	•Warm (all year long)	•Slight Alternating Dry & Wet Seasons	•Scattered clumps of trees with thorn + adapted to drought & heat. •Many groups of grazing/browsing animals •Drought, occasional fires, intense grazing →inhibition of trees & bushes growth
Temperate Grasslands	•Cold (winter) ; Hot / Dry (summer)	•Annual precipitation: light + unevenly distributed	•Deep & fertile soil. •Drought, occasional fires, intense grazing →inhibition of trees & bushes growth
Polar Grasslands	•V. Cold / Windy (most of the time) •Snow (except in brief summer)	•Slight precipitation : mostly as snow	•Fragile •Low growing plants (grass)…tall plants can't live → lose most of their heat •All animals have survivorship means (fur-fox / feathers-owl)

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2.3- Forest Biomes

- Forests:

✓ "undisturbed areas with moderate to **high** average annual precipitation tend to be covered by forests" (Miller, 2009/7).

✓ contain various species of trees and smaller forms of vegetation.

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2.3- Forest Biomes (Cont'd)

Tropical Rain Forests

Temperate Deciduous Forests

Evergreen Coniferous Forest

- There are three main types of forests. These are:

✓ 1- Tropical Forests

✓ 2- Temperate Forests

✓ 3- Evergreen Coniferous Forest

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2.3- Forests; Brief Comparative Table

	Temperature	Precipitation	Biological Life (Few Characteristics)
Tropical Rain Forest	•Uniform Warm / Humid (all year long)	•Heavy rainfall (almost daily)	•Very dense vegetation (evergreen plants + huge trees). •Very rich Biodiversity. •Tops of trees so dense → block sunlight → little ground level vegetation •Humidity → quick decomposition
Temperate Deciduous Forest	•Moderate average temperature (long warm summer – cold winter)	•Abundant precipitation (sometimes spread evenly during the year)	•Most trees survive winter by dropping their leaves during fall (dormant). •Fewer trees than tropical forest + richer ground plants diversity •Slow decomposition
Evergreen Coniferous Forest	•Long/dry/extremely cold/snowy (winter) •Short/cool to warm (summer)	•Abundant precipitation	•Low plant diversity (mostly evergreen trees with waxy needles → withstand cold & drought) •Wide variety of wildlife •Slow decomposition

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2.4- Mountain Biomes

- Mountains:

✓ “high elevation forested islands of biodiversity & often have snow-covered peaks that reflect solar radiation & gradually release water to lower elevation streams & ecosystems” (Miller, 2009/7).

✓ huge biodiversity.

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3- Human Impacts on Terrestrial Biomes

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3- Human Impacts on Terrestrial Biomes

- <u>Deserts:</u>

✓ Large desert cities.

✓ Soil destruction by off road vehicles.

✓ Soil salinization from irrigation.

✓ Depletion of groundwater.

✓ Land disturbance & pollution from mineral extraction.

- <u>Grasslands:</u>

✓ Conversion to croplands.

✓ Release of CO2 from grassland burning.

✓ Overgrazing by livestock.

✓ Oil production & off road vehicles.

- <u>Forests:</u>

✓ Clearing for agriculture, tree plantation & urban development.

✓ Damage from off road vehicles.

✓ pollution of forest streams

- <u>Mountains:</u>

✓ Agriculture

✓ Timber & mineral extraction.

✓ Tourism

✓ Air pollution

✓ Off road vehicles.

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Reference Book

Reference Book:

Miller, T. & Spoolman, S (2009). *Living in the Environment* (16th ed.) Canada: Cengage Learning – Brooks/Cole

Co- reference: Same Book – Editions 15 & 17 & 18

n.b: All the material in this class presentation is taken from the previously mentioned reference book.

(for educational purposes)