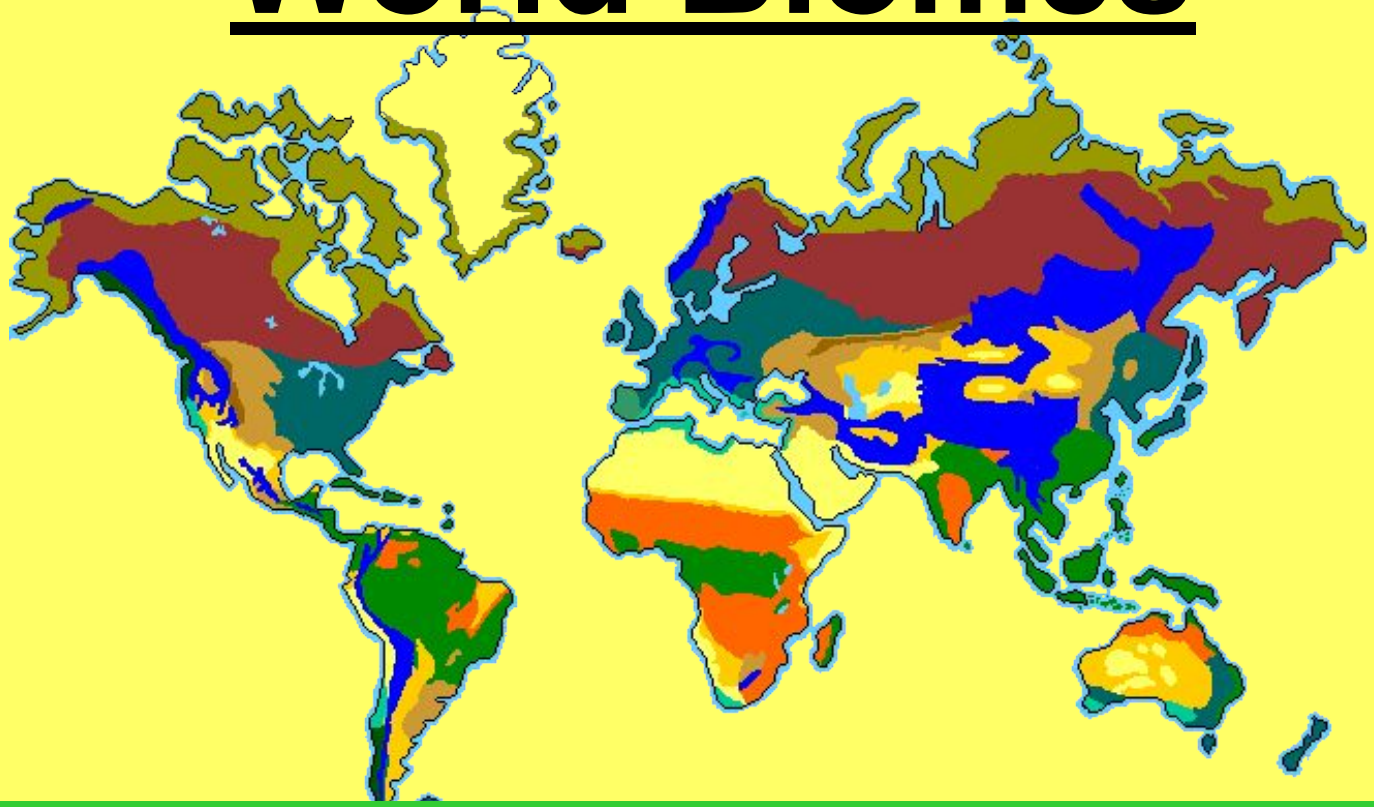
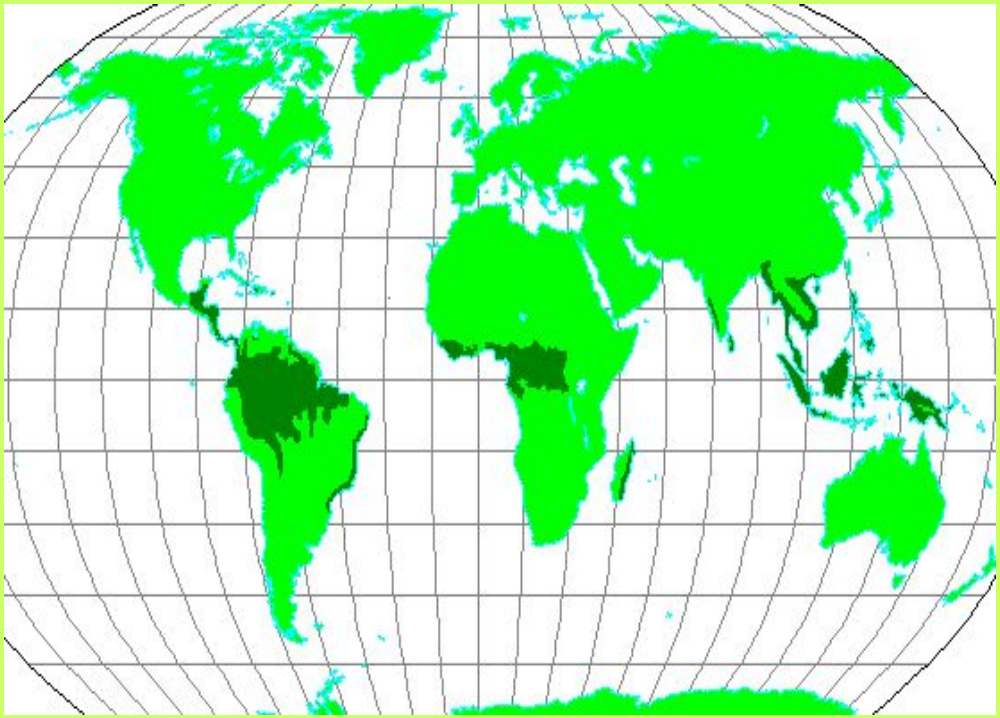
World Biomes



Follow along with your note packet to add/modify any notes you took as you read the chapter.



Tropical Rainforest

Location: Found near equator…little variation in temperatures. No distinct seasonal changes.

Earth's most complex land biome

http://www.cotf.edu/ete/modules/msese/earthsysflr/

http://www.cotf.edu/ete/modules/msese/earthsysfl

Tropical Rainforest

Abiotic factors

- ✔ high biodiversity and biomass
- ✔ both hot and moist;
- ✔ ideal for bacteria and other microorganisms; they quickly decompose matter on the forest floor allowing nutrients to be recycled.
- ✔ <1 cm of topsoil
- ✔ About 100 in/yr of rainfall

Bougainvillea

Tropical Rainforest

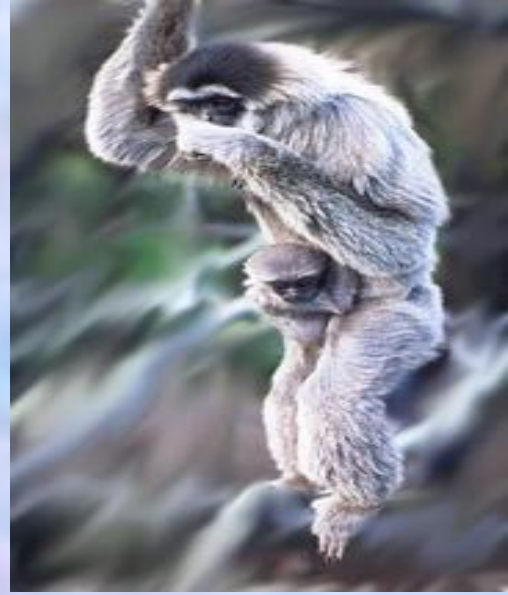
Plant adaptations

- Sunlight is a major limiting factor
- Plants grow in layers (canopy receives most light)
- Shallow, wide roots since soil is so thin and poor in nutrients
- Little sun reaches the floor

Bangul Bamboo

Wagler's pit viper

Silvery Gibbon



Tropical Rainforest

Animal Adaptations

- Many symbiotic relationships
- Live in different levels of canopy

Many animals are specialists and require special habitat components to survive

Camouflage is common

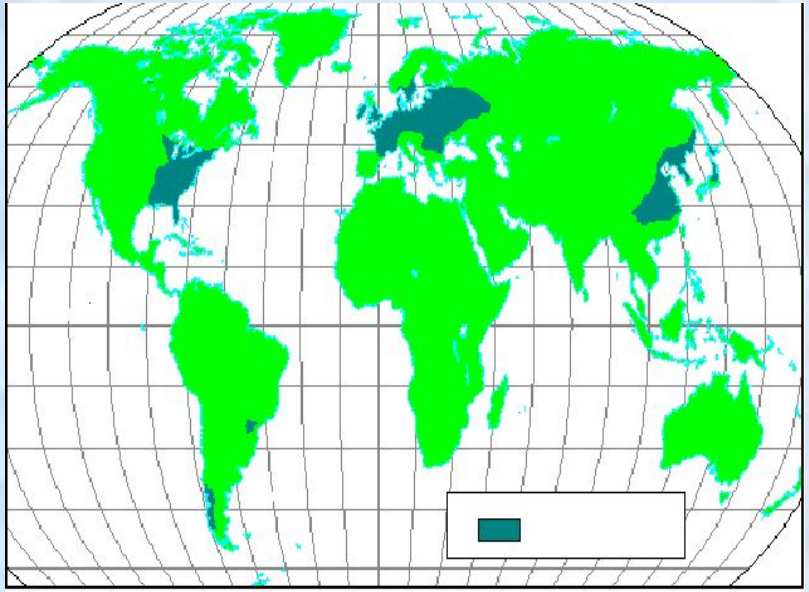
Slender Loris

http://www.blueplanetbiomes.org/rnfrst_animal_page.htm

Threats to the Tropical Rainforest

- Humans strip the rainforests for uses including logging and cattle ranching.
- In addition to the plants and animals that are displaced by this destruction, entire civilizations of people are also without a home.
- You can help by promoting sustainable use of the rainforests' products

http://www.blueplanetbiomes.org/rnfrst_animal_page.htm



http://www.runet.edu/~swoodwar/CLASSES/GEOG235/biomes/tbdf/tbdf.html

Temperate Deciduous Forests

Location:

- found in temperate zone
  (about 48^0 North lat)
- Much of the human population lives in this biome

http://www.cotf.edu/ete/modules/msese/earthsysflr/taiga.html

Temperate Deciduous Forests

Abiotic Factors

- Characterized by an abundance of deciduous (leaf bearing) trees

Characterized by 4 seasons

- Soils: Deep soil layers, rich in nutrients
- Precipitation: 30–100 in/yr in all forms (snow, rain, hail, fog, etc.)

White Birch

Birchhttp://www.blueplanetbiomes.org/deciduous_plant_page.htm

Lady Fern

Temperate Deciduous forest

Plant adaptations

More diversity in the deciduous forest vs. the coniferous forest due to increased sunlight.

Trees adapt to varied climate by becoming dormant in winter

Deciduous forests grow in layers

More sunlight reaches the ground compared to a rainforest so you will find more ground dwelling plants.

Geulder Rose

Bald Eagle

Temperate Deciduous Forest

Animal Adaptations

Least Weasel

- Lose Winter Coat
- Adapt to many seasons
- Eat from different layers of the forest

Fat Dormouse

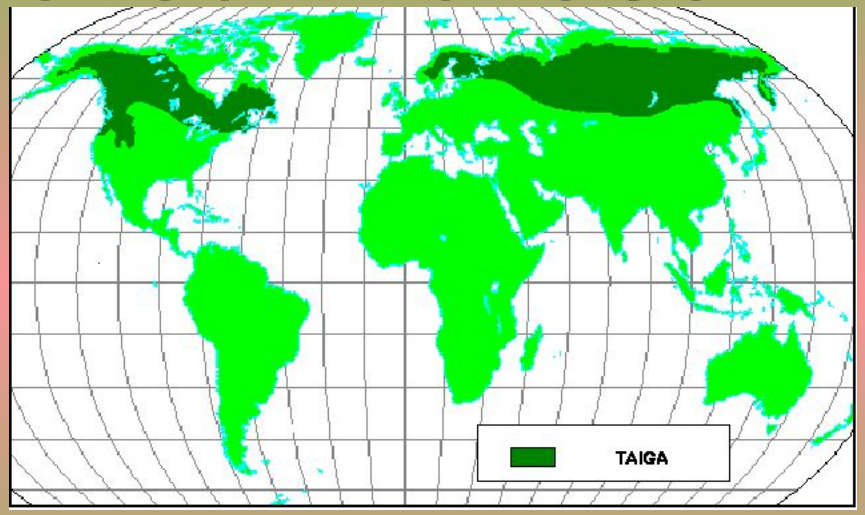
http://www.blueplanetbiomes.org/deciduous_animal_page.htm

Threats to Temperate Deciduous Forests

- Many forests are cleared to provide housing for humans.
- Careful use of the resource can provide a renewable system if we don't take too much habitat away.

http://www.runet.edu/~swoodwar/CLASSES/GEOG235/biomes/tbdf/tbdf.html

Taiga
aka Northern Coniferous Forest or Boreal Forest



Location: Found only in Northern Hemisphere

Taiga

Abiotic factors

- Winters are long and cold
- Averages 100 in/yr precipitation—mostly snow
- Soil poor in nutrients and very acidic
- Growing season is very short

http://www.uwsp.edu/geo/faculty/ritter/geog101/modules/ecosystems_biomes/biomes_northern_forest.html

Taiga Plant adaptations

Fireweed

- Coniferous (needle-bearing) trees are abundant
- Roots long to anchor trees
- Needles long, thin and waxy
- Low sunlight and poor soil keeps plants from growing on forest floor

http://www.inchinapinch.com/hab_pgs/terres/coniferous/plants.htm

Balsam Fir

Moose

Animal Adaptations of the Taiga

- Adapt for cold winters
- Burrow, hibernate, warm coat, insulation, etc.

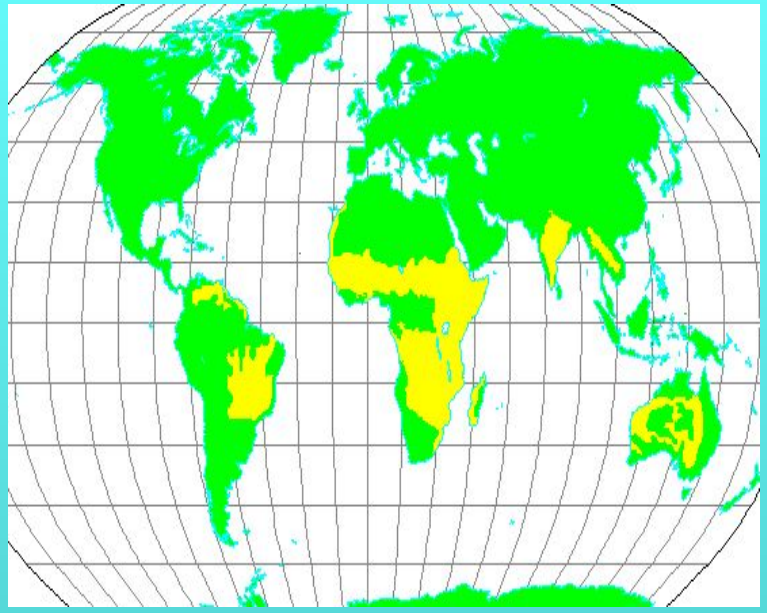
Great Grey Owl

http://www.inchinapinch.com/hab_pgs/terres/coniferous/animals.htm

Threats to the Taiga

- Mining operations can irreparably damage this fragile ecosystem.
- Pollution left behind can also put animals and plants at risk.

http://www.blueplanetbiomes.org/taiga.h



Savannas (Tropical Grasslands)

Contain the greatest number of grazing animals on Earth.

Location: Found in the tropics…near equator

Amount of precipitation supports tall grasses but only occasional trees.

The word savanna stems from an Amerind term for plains

http://www.runet.edu/~swoodwar/CLASSES/GEOG235/biomes/savanna/savanna.html

Tropical Savanna
Abiotic Factors

Rainy and dry season
25-150 in/yr precipitation
Fire plays a large role in this ecosystem

http://www.cotf.edu/ete/modules/msese/earthsysflr/savannah.html

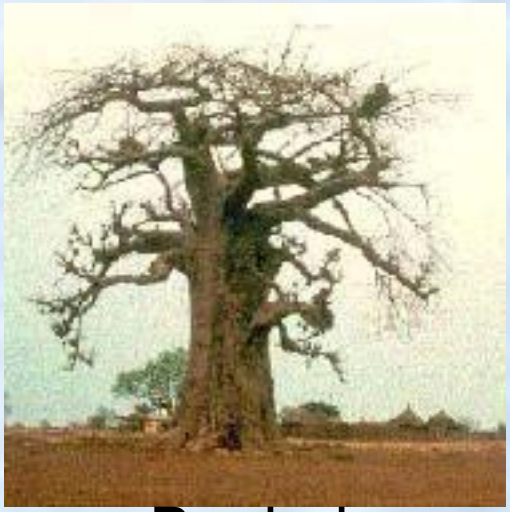
Whistling Thorn

Umbrella Thorn Acacia

Tropical Savanna Plant Adaptations

- Grows in Tufts
- Resistance to Drought
- Many plants have thorns and sharp leaves to protect against predation.

Kangaroos Paws



Baobab

http://www.blueplanetbiomes.org/savanna_plant_page.htm

Zebras

Chacma Baboon

Tropical Savanna
Animal Adaptations

Adapt for short rainy season—migrate as necessary

Limited food leads to vertical feeding

Reproduce during rainy season—ensures more young survive

http://www.blueplanetbiomes.org/savanna_animal_page.htm

Threats to the Tropical Savanna

- Invasive species
- Changes in fire management

Elephant

Koala

- Because of their low elevation, some savannas are threatened by minor rises in sea level associated with global climate change

http://www.blueplanetbiomes.org/savanna_animal_page.htm

Steppe

Dry, cold, grasslands

Location: Found in Russia and the Ukraine

http://www.blueplanetbiomes.org/steppe.htm

Steppe Abiotic Factors

www.wsu.edu

<50 in/year precipitation

Mountains often play a role in climate characteristics

www.plasmacy.de

Plant adaptations of the Steppe

- most abundant are plants called Bunch grasses, fine bladed grasses that grow in clumps to preserve water

Tumbleweed

Sweet Vernal

http://www.blueplanetbiomes.org/steppe_plant_page.htm

Adaptations of Steppe Animals

- Many migrate, hibernate or burrow during extremes in temp and precipitation

Mongolian Gerbil

Saiga Antelope

Gazelle herd

http://www.blueplanetbiomes.org/steppe_animal_page.htm

Threats to the Steppe

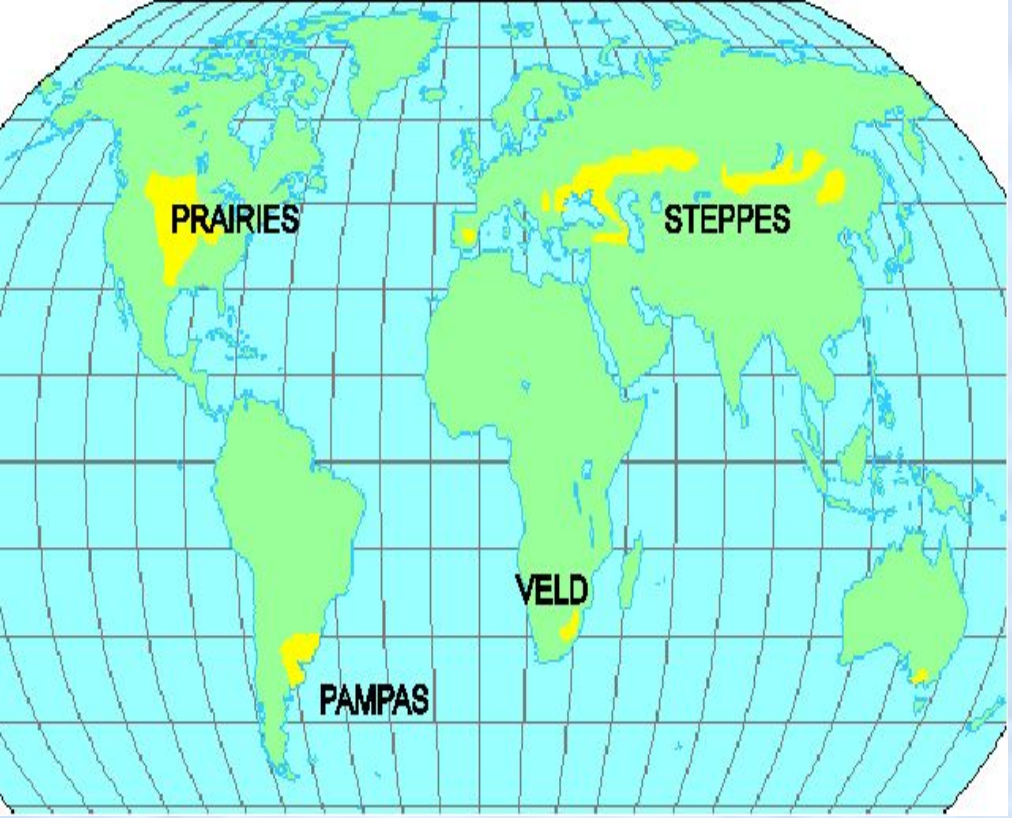
Lynx

- Overgrazing…nomadic tribes have started to spend more time in one location,
- Infrastructure development (roads, buildings, etc)
- Unmanaged hunting and poaching is destroying herds of animals

Milk vetch

Corsac fox

http://www.blueplanetbiomes.org/steppe.h



http://www.blueplanetbiomes.org/steppe.htm

Prairie and Steppe: Grassland areas

- 50-75 cm/yr
- Characteristic high Winds

Prairie Plant Adaptations

Sod-forming grasses that won't dry out or blow away in wind.

Buffalo Grass

Fleabane

http://www.blueplanetbiomes.org/prairie_plants_page.htm

Prairie Animal Adaptations

Geoffrey's cat

Many adaptations to survive extremes

Prairie dog

Bobcat

http://www.blueplanetbiomes.org/pampas_animal_page.htm

Grasslands

http://www.blueplanetbiomes.org/grasslands.htm

Chaparral

Location: Primarily in coastal areas with Mediterranean climates. About 30^0 N and S of the equator.

http://www.blueplanetbiomes.org/chaparral.htm

Chaparral—Abiotic Factors

- Climate: hot, dry summers, mild, wet winters. Slight variations in seasonal temperatures…NICE!

California Chaparral

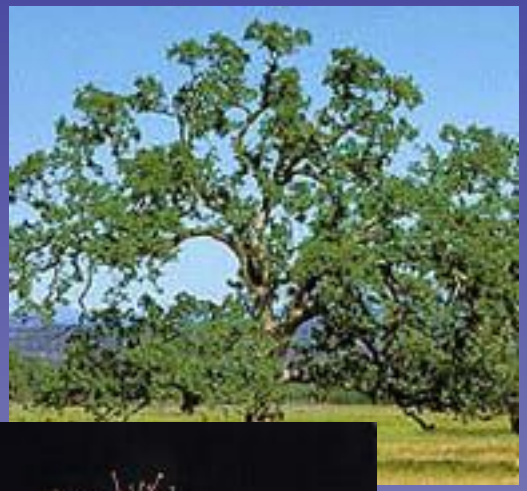
Mediterranean Chaparral

http://www.blueplanetbiomes.org/world_biomes.htm

Chaparral—Plant Adaptations

- Mostly low-lying shrubs and small trees.
- Many plants have leathery leaves to resist water loss
- Many plant species have oils in leaves to help them resist fire…the fire will take out “weaker” plants that don’t belong.

Blue Oak



Fairy Duster

Chaparral—Animal Adaptations

Aardwolf

Camouflage—to avoid predation

Puma

Many animals will change their diet as the season changes.

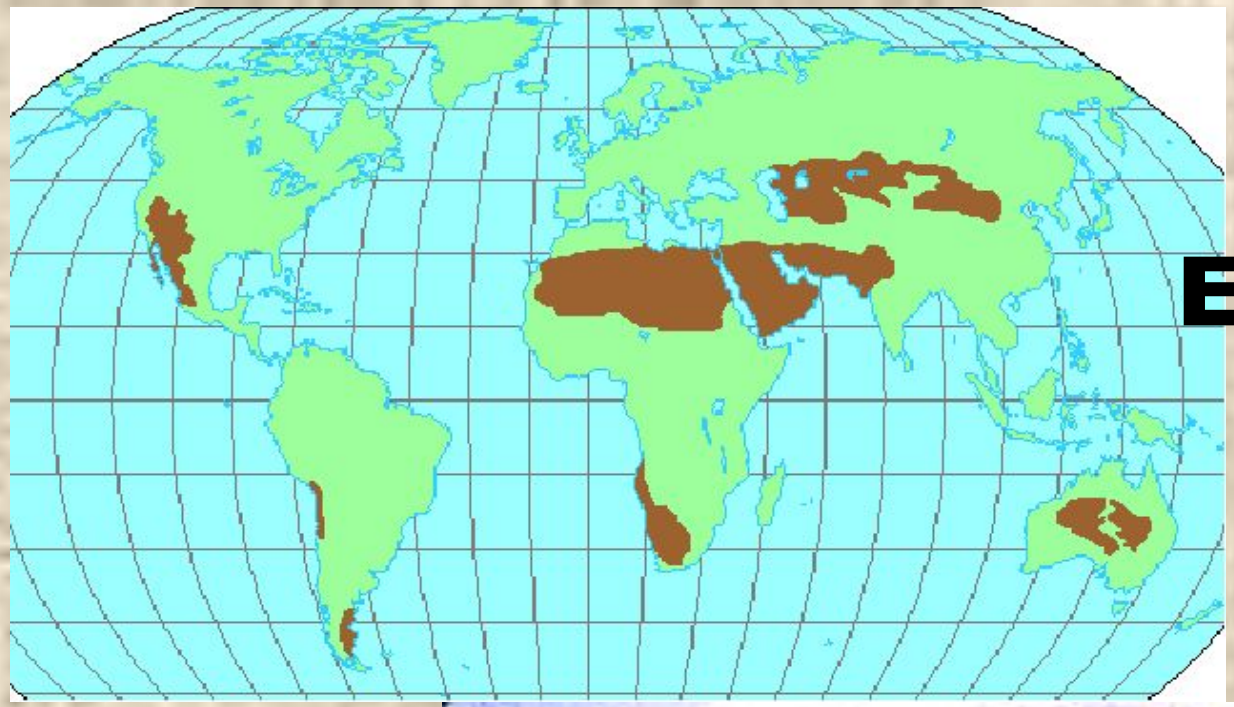
Threats to the Chaparral

Grey Fox

Human development—very desirable climate for humans to live.

King Protea

Wild Goat



Desert Ecosystems

- Location: Depending on type of desert, you will find them in various locations.

Desert

Abiotic factors

- <10 in/yr of rain
- Little to no topsoil due to high winds.
- Minerals not deep in soil.
- Too dry for decay

http://www.cotf.edu/ete/modules/msese/earthsysflr/taiga.html

While there are many types of deserts, they all share one characteristic: They are the driest places on Earth!

Barrel Cactus

Desert Plant Adaptations:

- Spines
- Succulents
- Thick, waxy cuticle
- Shallow, broad roots

Joshua Tree

http://www.blueplanetbiomes.org/desert_plant_page.htm

- Ocotollio

Armadillo Lizard

Javelina

Bob Cat

Desert Animal Adaptations:

- Get water from food
- Thick outer coat
- Burrow during day
- Large ears
- Smaller animals =
  less surface area

http://www.blueplanetbiomes.org/desert_animal_page.htm

http://www.blueplanetbiomes.org/world_biomes.htm

Threats to the Desert

Residential development

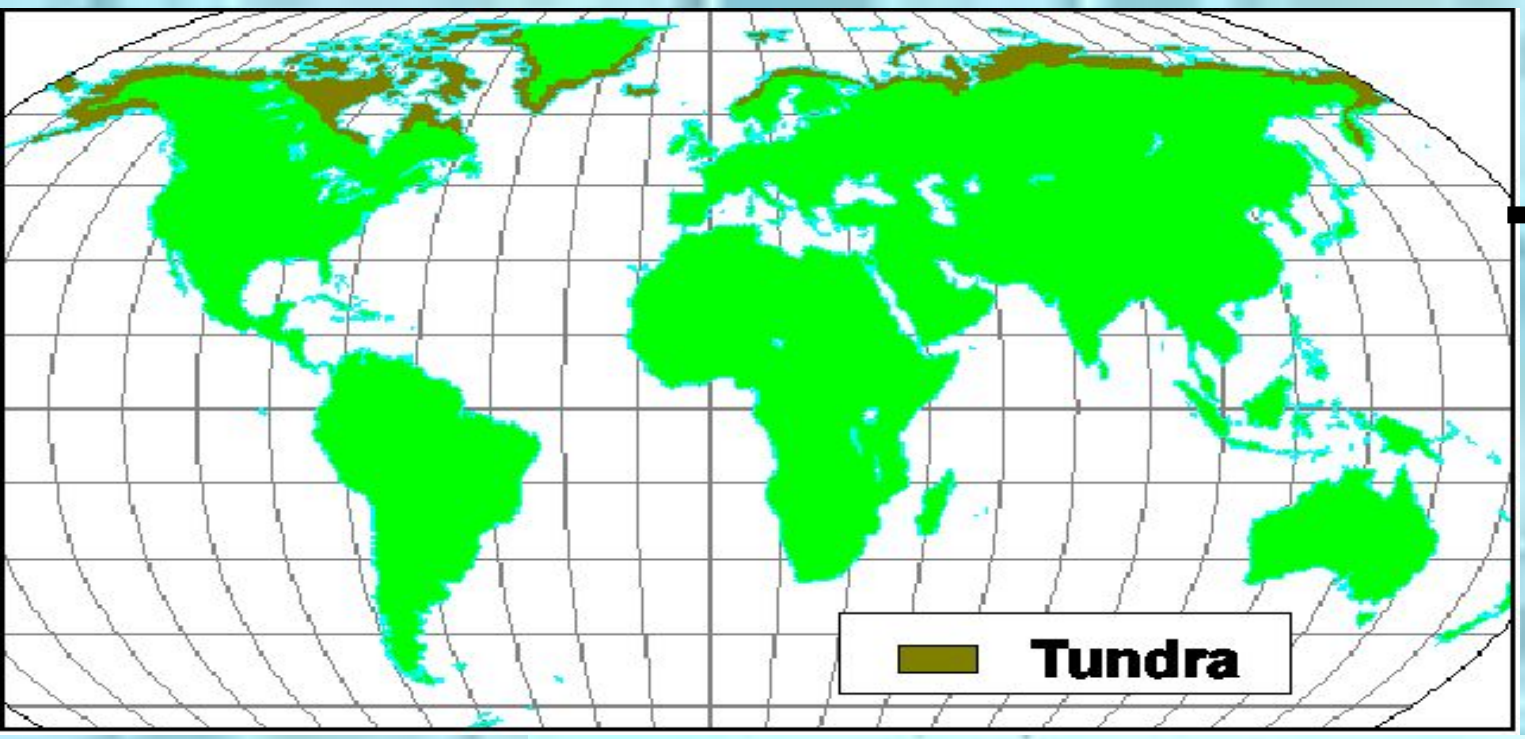
Off road recreational activities destroy habitat for plants and animals.

Some plants are removed by collectors, endangering the population.

Dry Desert

Sonoran Desert

Tundra



Location:

Found north of the Arctic Circle

http://www.runet.edu/~swoodwar/CLASSES/GEOG235/biomes/tundra/tundra.html

Tundra Abiotic Factors

- <25 in/year
- Temp rarely higher than 10^0C
- Permafrost layer
- Short growing season

http://www.cotf.edu/ete/modules/msese/earthsysflr/taiga.html

Reindeer lichen

Tundra Plant Adaptations

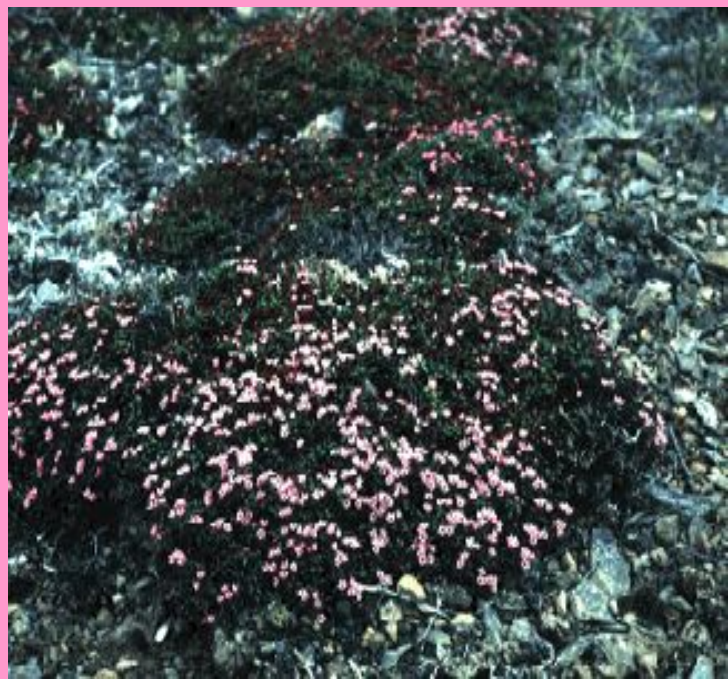
- Growing close to the ground
- Having shallow roots to absorb the limited water resources.
- Trees grow less than 1 m high!

cottongrass

Perennials

Woody shrubs

Heaths



Examples of Tundra Plants

http://www.runet.edu/~swoodwar/CLASSES/GEOG235/biomes/tundra/tundra.html

snowy owl

Arctic fox

Small ears

Insulation, thick coat

Tundra Animal Adaptations

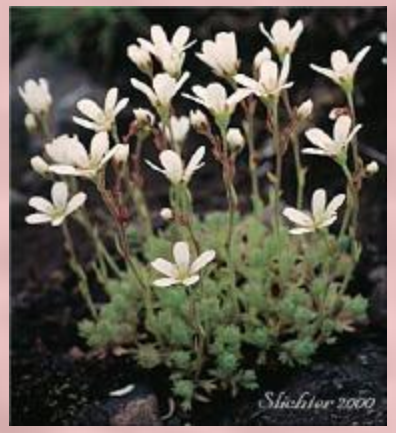
Many visitors, migration

Few predators

Little Competition

Grizzly Bear

Threats to the Tundra



Tufted Saxifrage

One of the most fragile biomes on the planet


Polar Bear

Oil drilling is proposed in Alaska and other areas!

The tundra is slow to recover from damage.

Freshwater Ecosystems

- Salinity <0.5 ppt.
- Lake are the deepest of fresh water systems
- Lakes are fed by underground aquifer or stream
- Ponds are fed by rainfall and may be seasonal

http://mbgnet.mobot.org/fresh/

Ponds

Microscopic Animals and Algae

- Sun can reach bottom
- Fed by rainfall
- May be seasonal
- Algae and plants throughout

Lakes and ponds—Abiotic Factors

Littoral zone:
nutrient rich area found close to shore

www.dnr.wi.gov

Benthic zone:
bottom of the lake where no sunlight can reach.

www.uwsp.edu

Lakes and ponds: Plants and Animals Adaptations

- Plants are floating algae and plants along shoreline
- Animals live in or near water

Threats to lakes and ponds

All water systems are being polluted and degraded by human impact

www.aquaticbiomes.gov

Marsh

http://mbgnet.mobot.org/fresh/wetlands/

Types: Brackish and freshwater

Uses:

- Animal/plant homes
- Carbon "sink"
- Water recharge areas, removing pollutants

Marsh—Plant adaptations

- Very shallow with land occasionally exposed
- Saturated soil
- Low oxygen in water and soil
- Emergent plants

Heron

http://www.blueplanetbiomes.org/world_biomes.htm

Swamp/Bogs

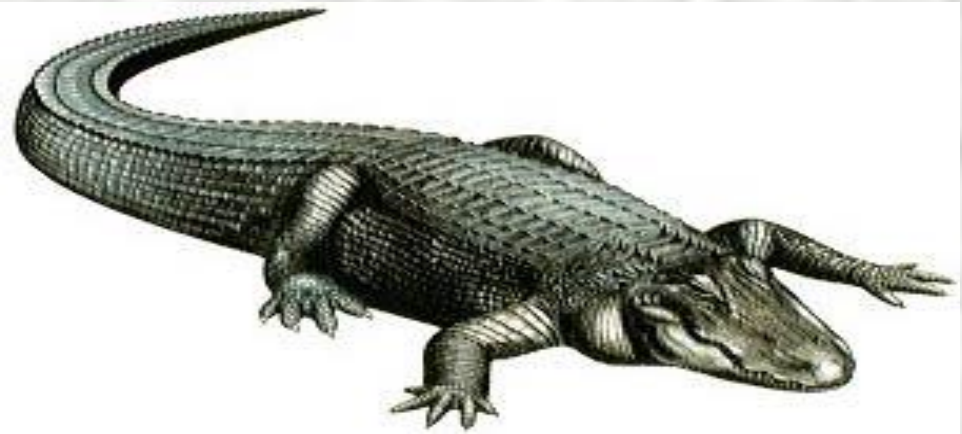
Location: Found on flat, poorly drained land, often near streams

Swamps/Bogs Abiotic factors

Land soaked because of poor drainage
Decay is slow - Soil is acidic

Swamps

Large trees/shrubs
Adapted to muddy soils



Bogs - sphagnum moss is dominant

http://mbgnet.mobot.org/fresh/wetlands/

Threats to Wetlands

www.kathimitchell.com

Previous backfilling and clearing for farmland or development has been a concern.

http://www.ucmp.berkeley.edu/glossary/gloss5/biome/aquatic.html

Rivers

At headwaters, usually cold and highly oxygenated. As it flows, it will broaden out, warm up and this completely changes the biota you'll

River: Plant and Animal Adaptations

www.3d-screensaver-downloads.com

www.cs.dartmouth.edu

Will vary based on where in the river they are…at the headwaters, organisms need to hang on!

Threats to Rivers

- Industry uses water to dispose of waste products
- Runoff from homes and other places causes changes in

- Dams alter the flow of the water

www.nwk.usace.army.mil

Estuaries

http://mbgnet.mobot.org/salt/sandy/

- Fresh and salt water meet

Plant and Animal Adaptations of Estuaries

Manatee and goose

- Very productive biome because it receives lots of light and nutrients
- Often used as nursery for young

www.lookoutnow.com & www.visualparadox.com

Threats to Estuaries

- Many ports are found on estuaries—pollution

bulation

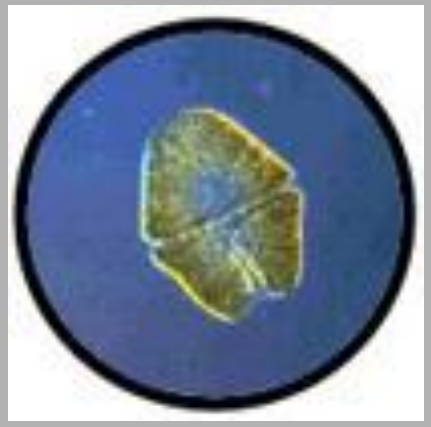
pers-erf.org

www.davenewbould.co.uk

Coral Reefs

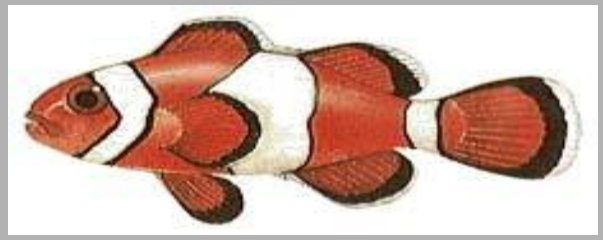
- Close to equator
- Consistent water temperature
- Shallow water
- Low in Nutrients

Animal adaptations of the Coral Reef



- Breeding area for many fish

http://mbgnet.mobot.org/salt/coral/



Threats to the Coral Reefs

Temperature is important, too hot or too cold and the animals can't live there to create limestone

Human intrusion (scuba diving) is damaging if you touch/step on the reef

Pollution is also a concern.

www.calacademy.org

Oceans

http://mbgnet.mobot.org/salt/sandy/

Ocean Abiotic factors

Open ocean is one of the least productive areas on earth, too little sunlight to support plant growth

Covers nearly ¾ of the Earth's surface.

http://www.worldbiomes.com/biomes_aquatic.htm

Ocean Plant adaptations

Plants are micro and macroscopic
Have floating plants (kelp shown here)

ttp://www.calstatela.edu/faculty/eviau/edit557/oceans/norma/onfrm.htm

Ocean Animal Adaptations

Hammerhead

Zooplankton—sea's smallest herbivores

Lion fish

Deep ocean animals feed on detritus—floating debris in the water column.

http://www.kidzworld.com/site/p1951.htm

Threats to the Oceans

While the oceans are vast, they are becoming more polluted

Overfishing and some fishing methods are destroying fishing grounds.

http://www.worldbiomes.com/biomes_aquatic.htm

Polar Ecosystems

Can be considered marine ecosystems since the base of food chain is phytoplankton

www.awi-bremerhaven.de

www.defenders.org

Arctic vs. Antarctic

Arctic
- Relatively shallow, lots of nutrients for large variety of animals in food web, People, seals and polar

Antarctic
- Penguins live here—only continent not used by humans (exc. Research)

nmml.afsc.noaa.gov

Threats to the Polar Ecosystems

- Reserves of minerals draw humans to these fragile ecosystems.
- The main threat to wildlife has been the increase in tourism—garbage left behind

newt.phys.unsw.edu.au