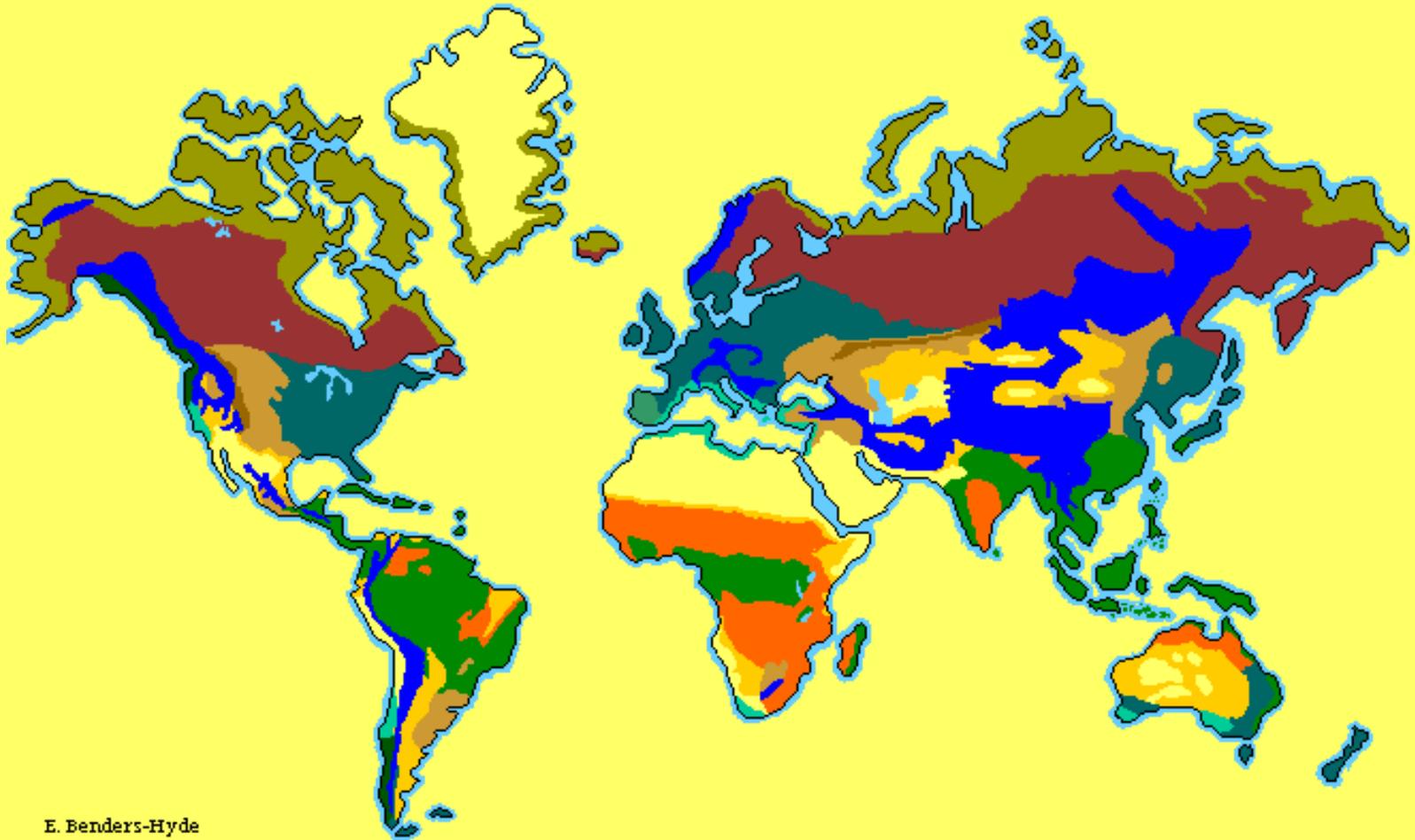
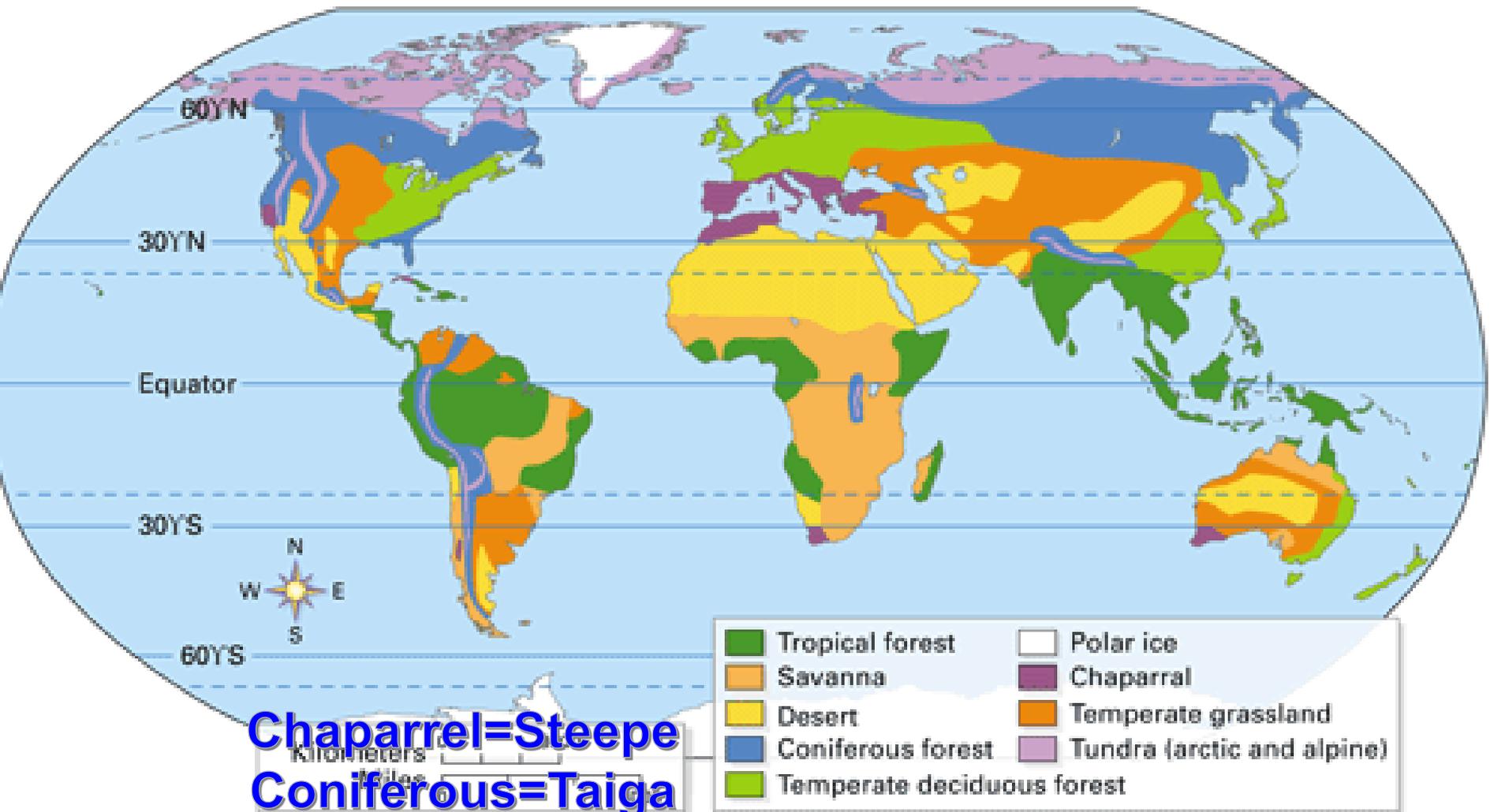


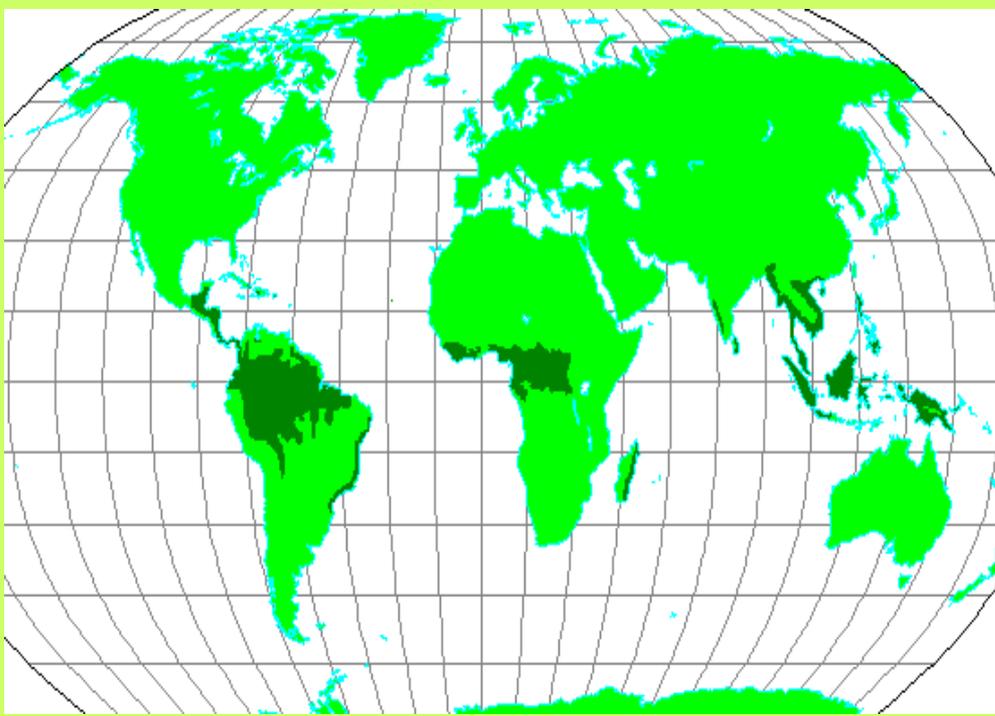
World Biomes



E. Benders-Hyde

World Biomes





Tropical Rainforest

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

Earth's most complex land
biome



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





Silvery Gibbon



Tropical Rainforest

Animal Adaptations

Wagler's pit viper

- Many symbiotic relationships
- Live in different levels of canopy

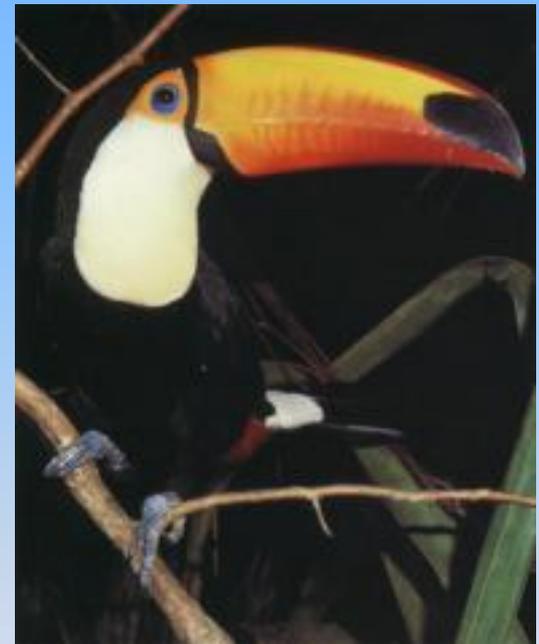
Many animals are specialists and require special habitat components to survive
Camouflage is common

Slender Loris



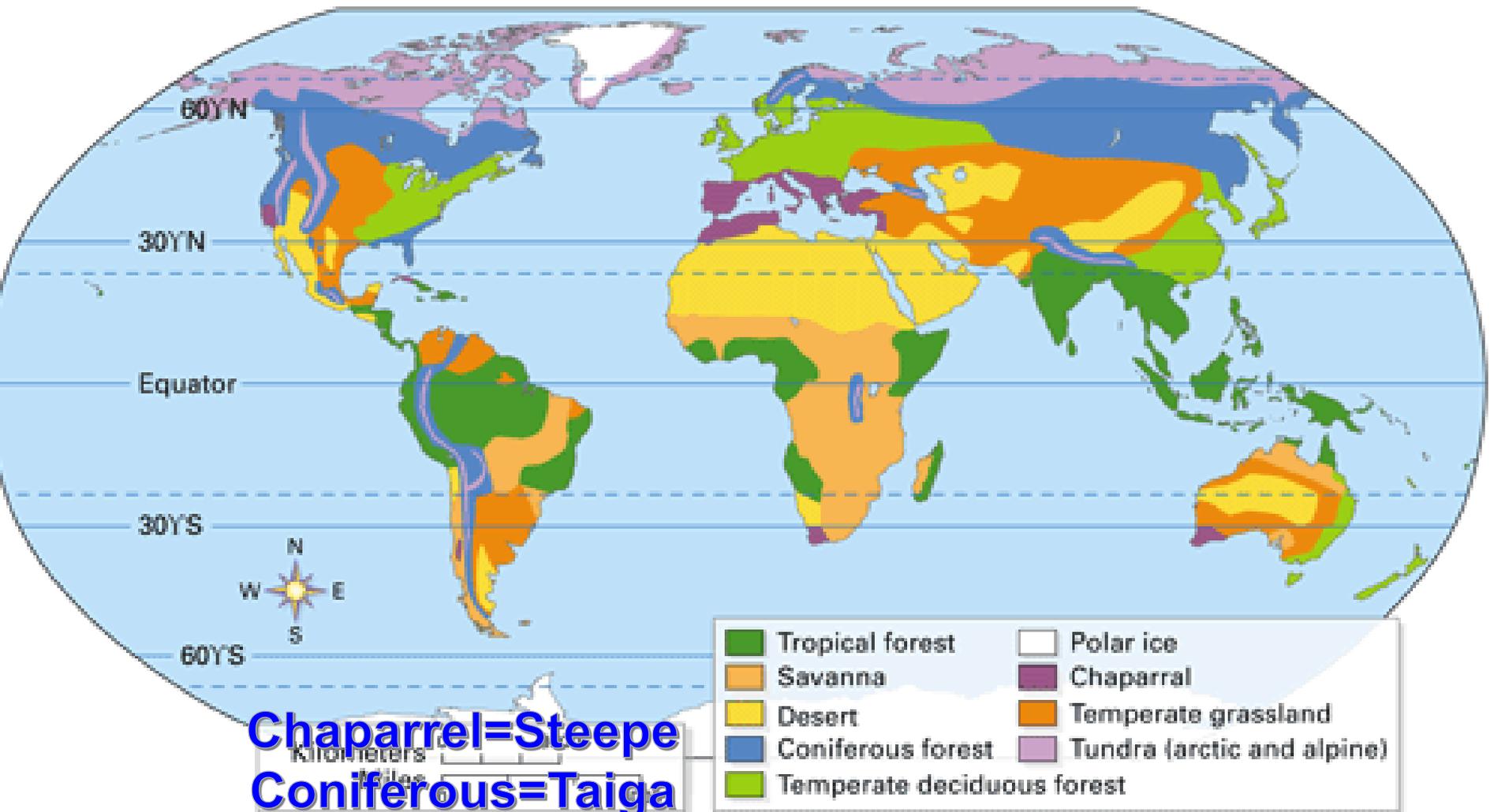
Threats to the Tropical Rainforest

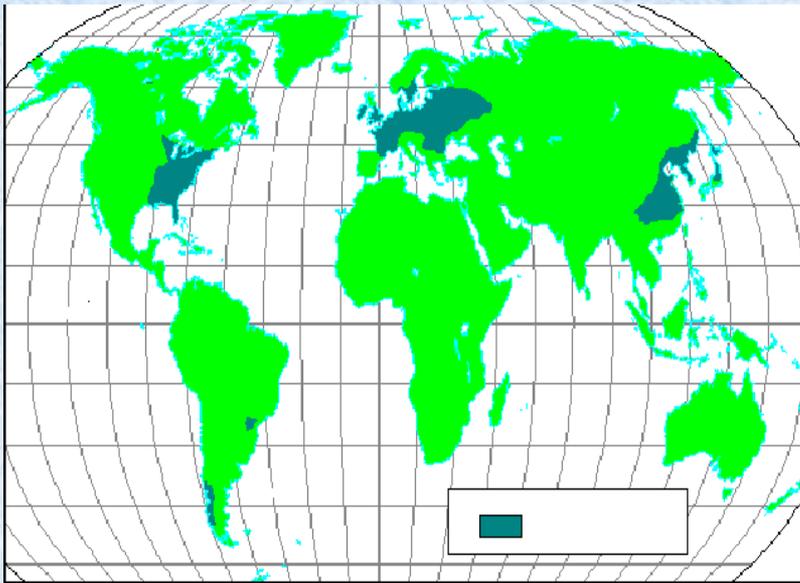
- Humans strip the rainforests for uses including logging and cattle ranching.
- In addition to the plants and animals that are displaced by this destruction, entire civilizations of people are also without a home.
- You can help by promoting sustainable use of the rainforests' products



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

World Biomes





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

Temperate Deciduous Forests

Location:

- found in temperate zone
(about 48⁰ 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
- Soils: Deep soil layers, rich in nutrients
- Precipitation: 30–100 in/yr in all forms (snow, rain, hail, fog, etc.)

Characterized by 4 seasons



White Birch

Birch http://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

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



Least Weasel



Fat Dormouse

Threats to Temperate Deciduous Forests

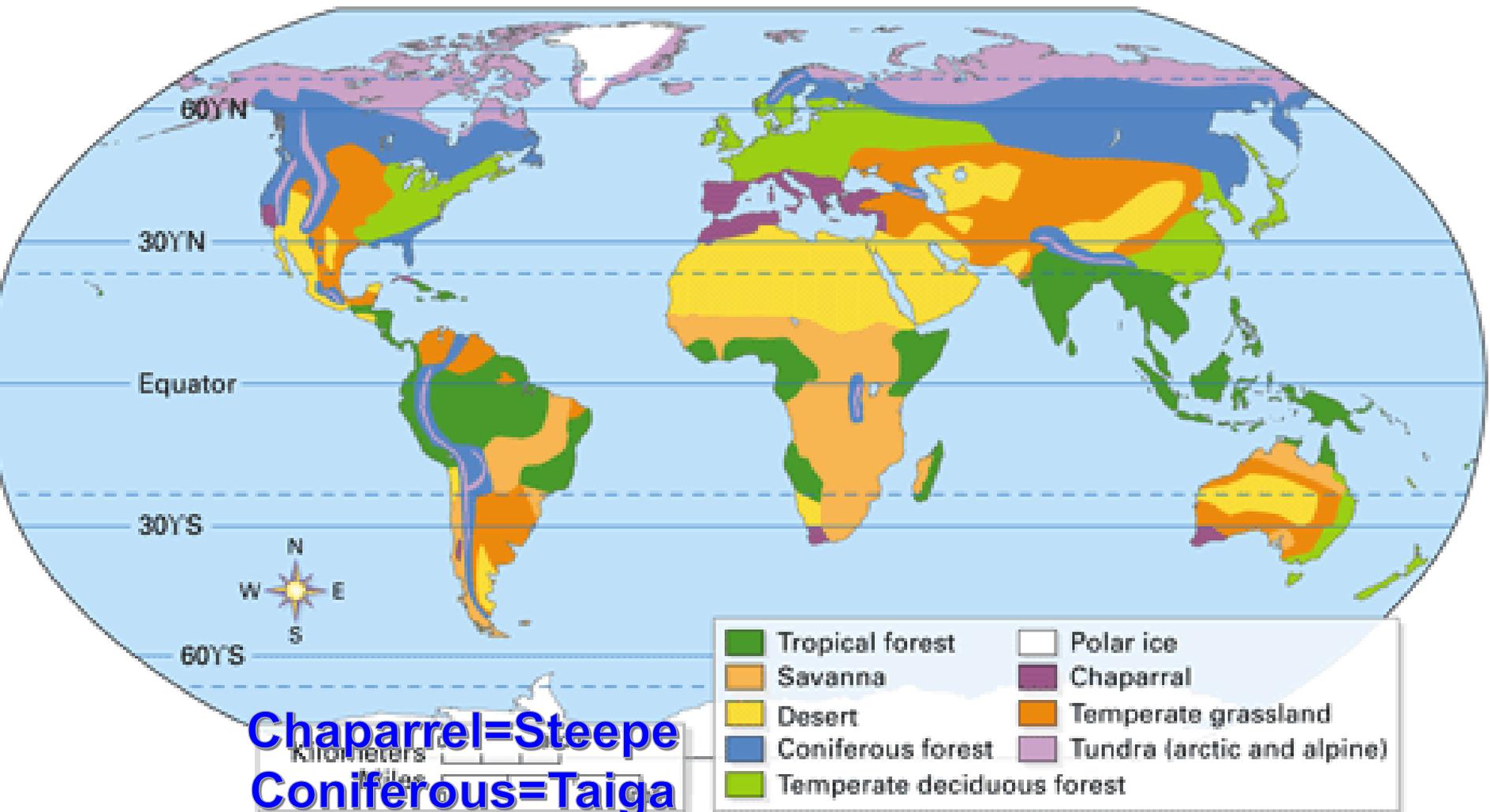
Many forests are cleared to provide housing for humans.

Careful use of the resource can provide a renewable system if we don't take too much habitat away.

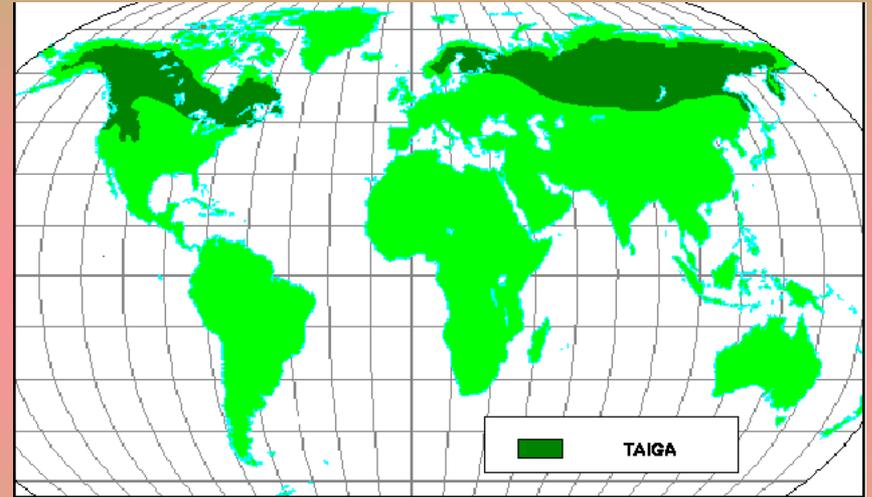


<http://www.runet.edu/~swoodwar/CLASSES/GEOG235/biomes/tbdf/tbdf.html>

World Biomes



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

Balsam Fir





Moose

Animal Adaptations of the Taiga

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



Great Grey Owl

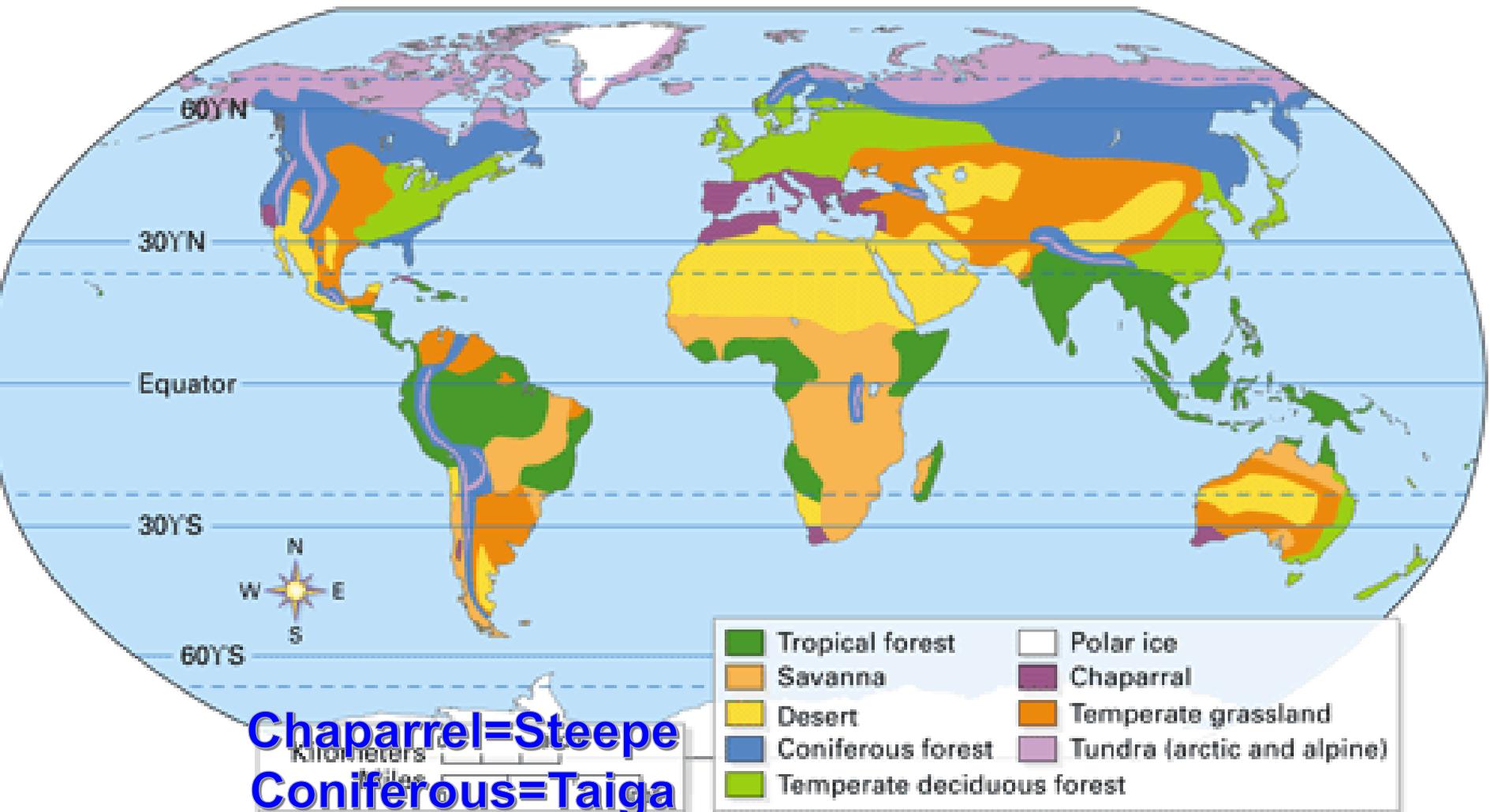
Threats to the Taiga

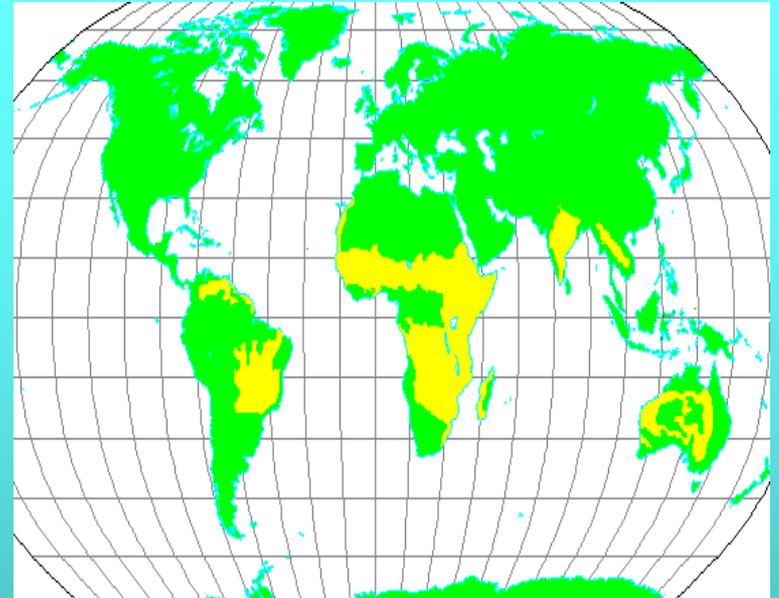


Mining operations can irreparably damage this fragile ecosystem.

Pollution left behind can also put animals and plants at risk.

World Biomes





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



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/mseese/earthsystlr/savannah.html>

Whistling
Thorn



Umbrella Thorn Acacia



Kangaroos Paws



Baobab

Tropical Savanna Plant Adaptations

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



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

Threats to the Tropical Savanna

- Invasive species
- Changes in fire management



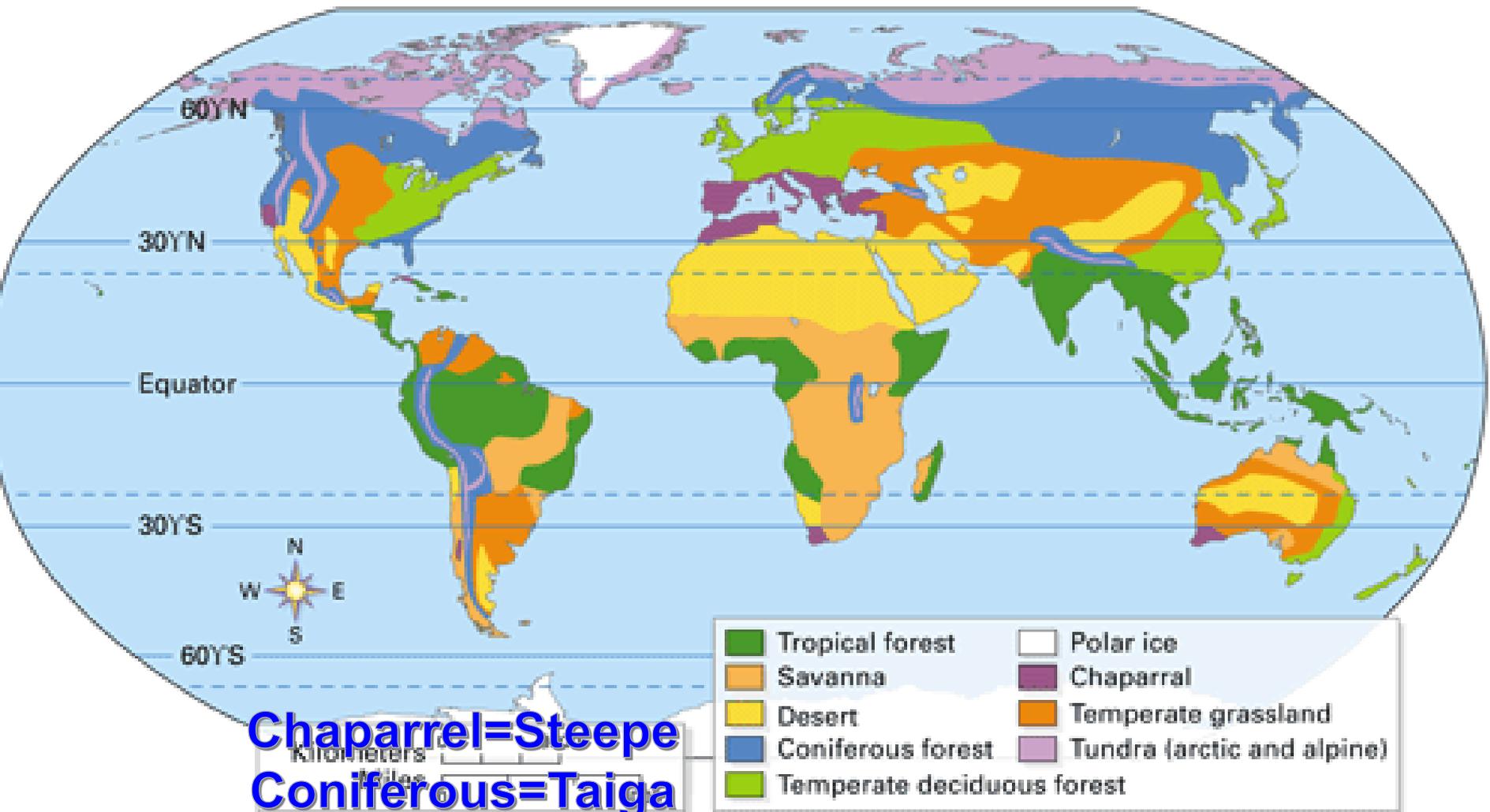
Koala



Elephant

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

World Biomes



Steppe/Chaparral

Dry, cold, grasslands
or hot, dry grasslands



Location: Found in
Russia and the
Ukraine

Steppe/Chaparral Abiotic Factors



www.wsu.edu

<50 in/year precipitation

Mountains often play a role
in climate
characteristics



www.plasmacy.de

Abiotic Factors

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



California Chaparral



Mediterranean Chaparral

Plant adaptations

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

Tumbleweed



Sweet Vernal

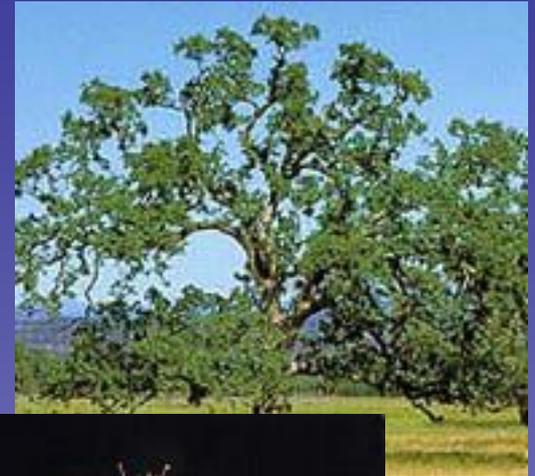
Plant Adaptations

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

Adaptations of Animals

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

Mongolian Gerbil



Saiga Antelope



Gazelle herd

Animal Adaptations



Aardwolf

Camouflage—to avoid predation



Puma

Many animals will change their diet as the season changes.

Threats



Lynx



Milk vetch

- 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



Corsac fox

Threats



Grey Fox

Human development—
very desirable climate
for humans to live.

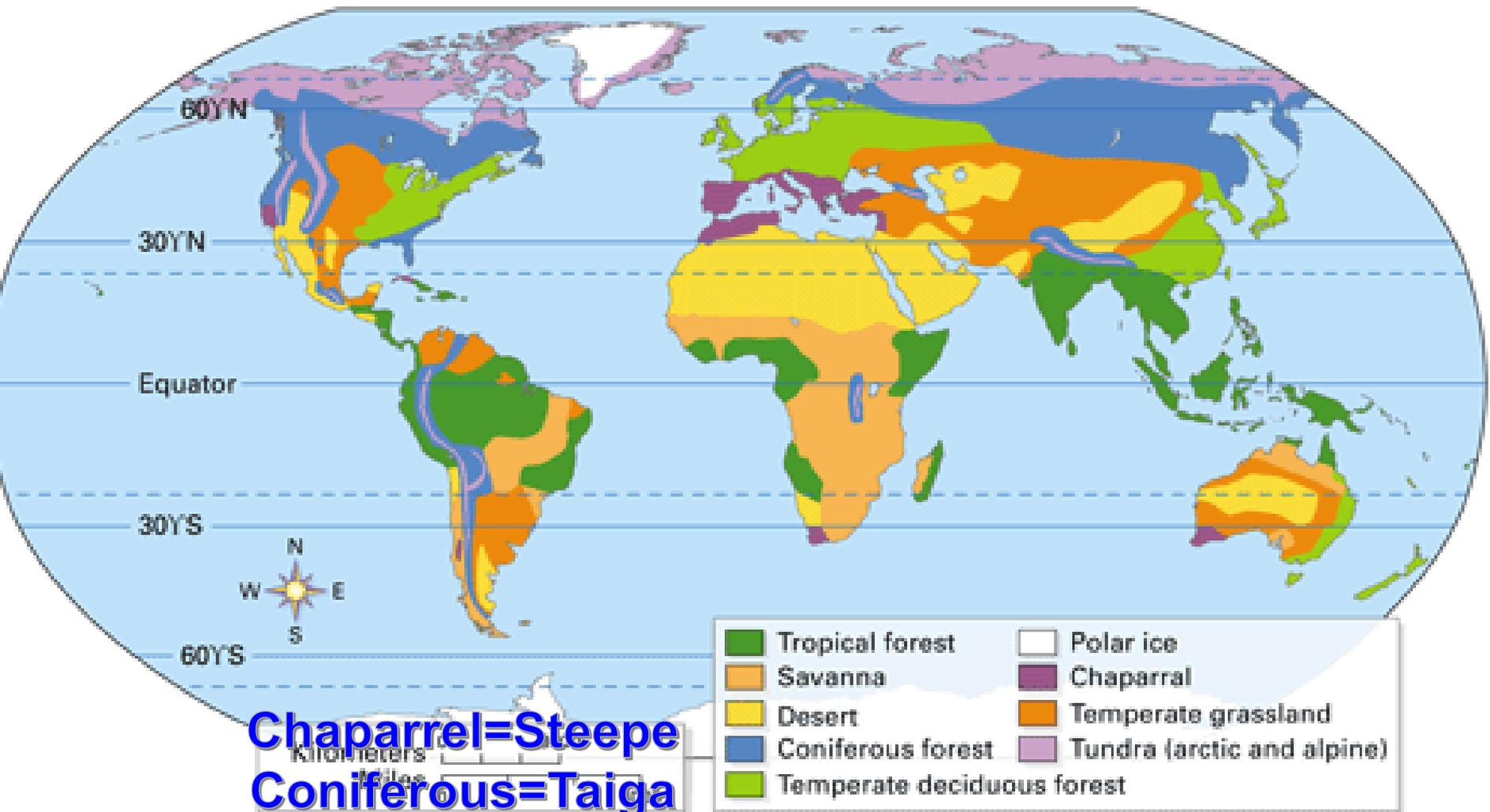


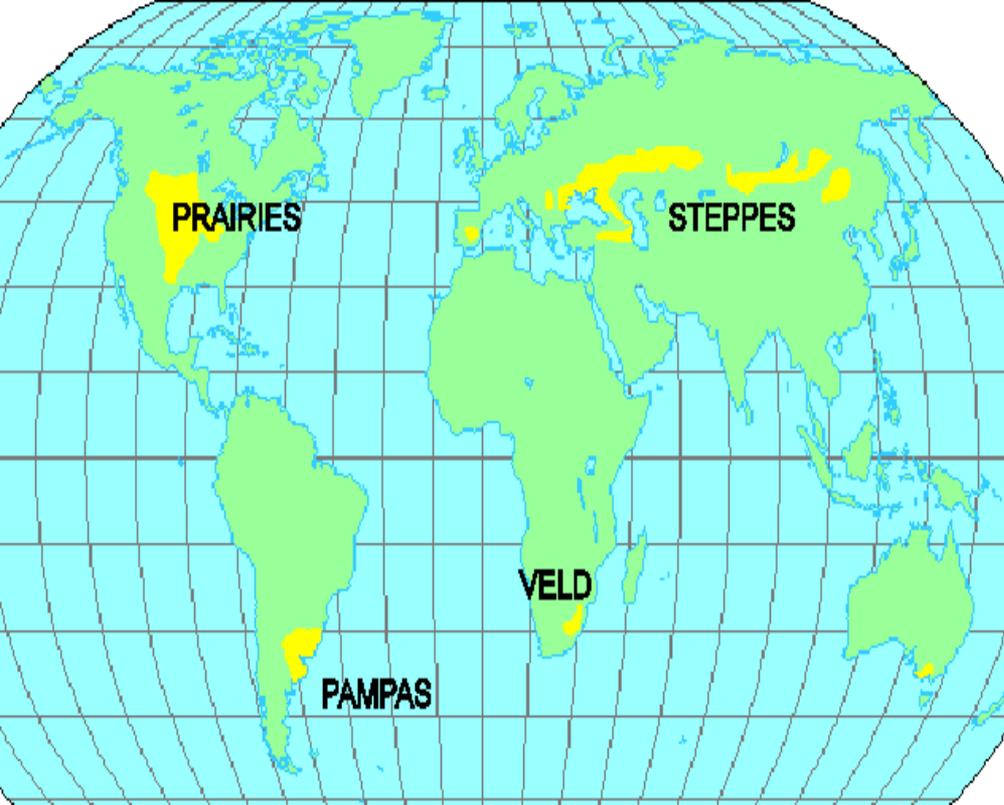
King Protea

Wild Goat



World Biomes





<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

Many adaptations to survive extremes



Geoffrey's cat



Prairie dog

Bobcat

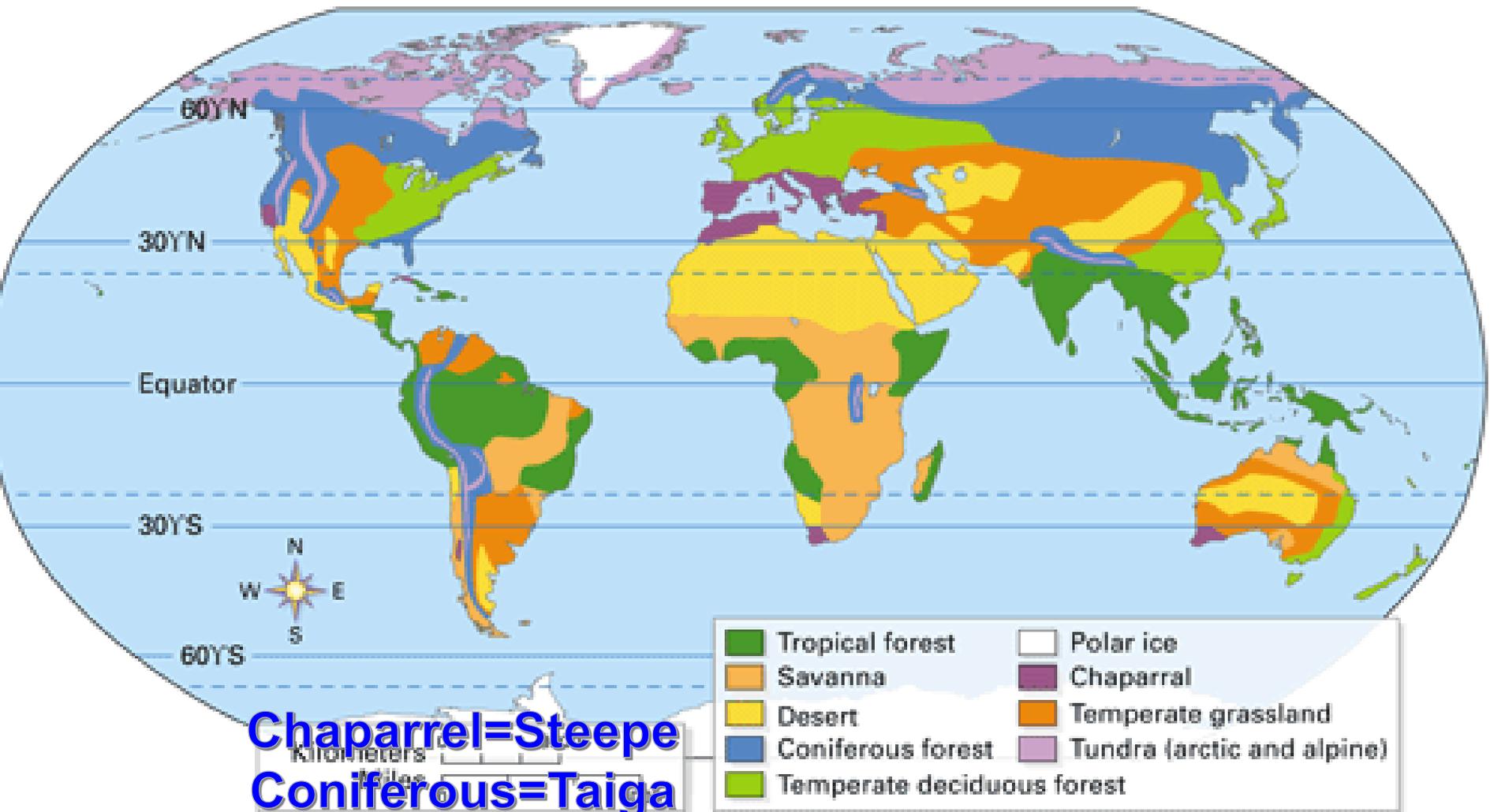


Grasslands

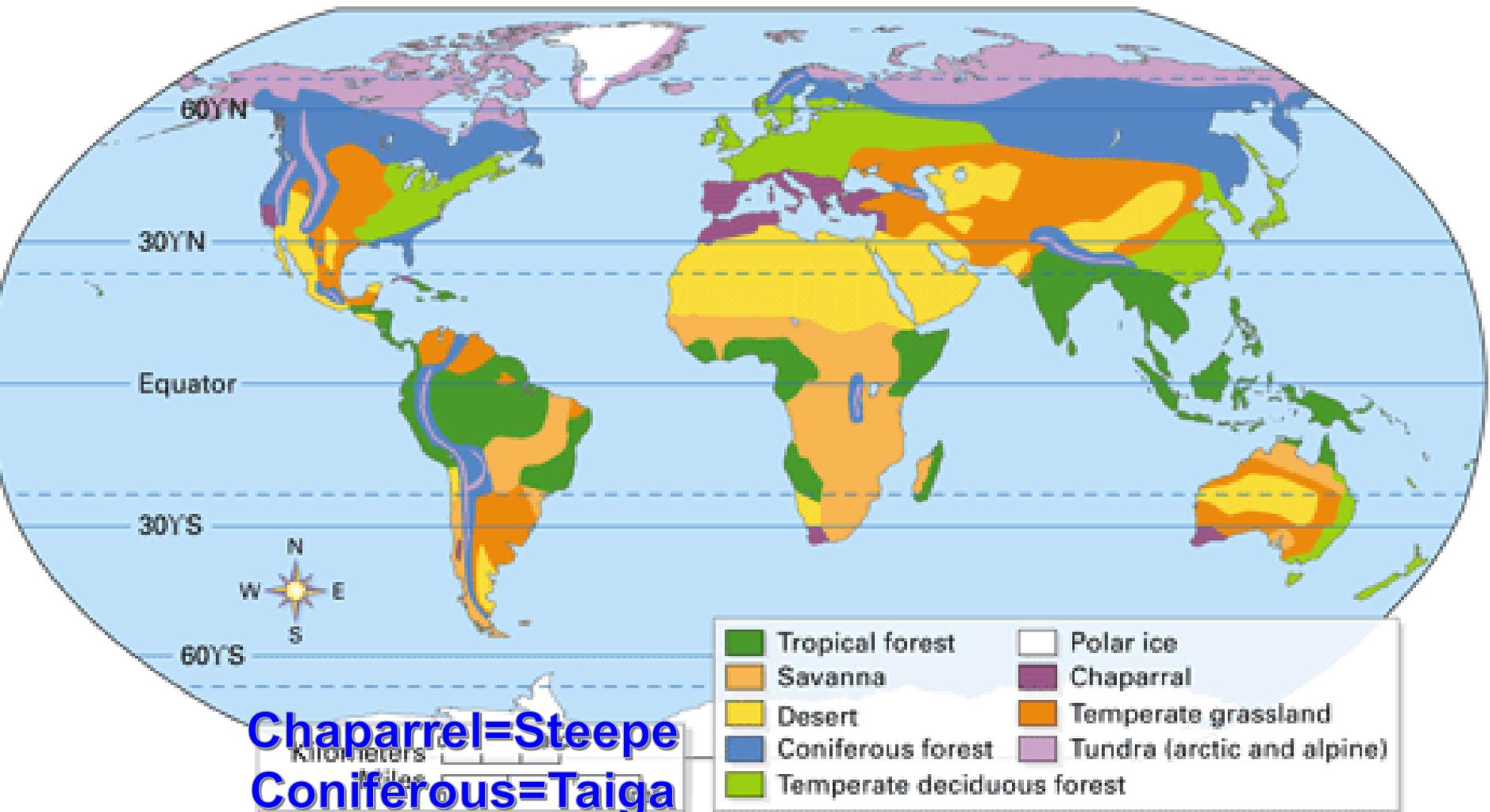
<http://www.blueplanetbiomes.org/grasslands.htm>

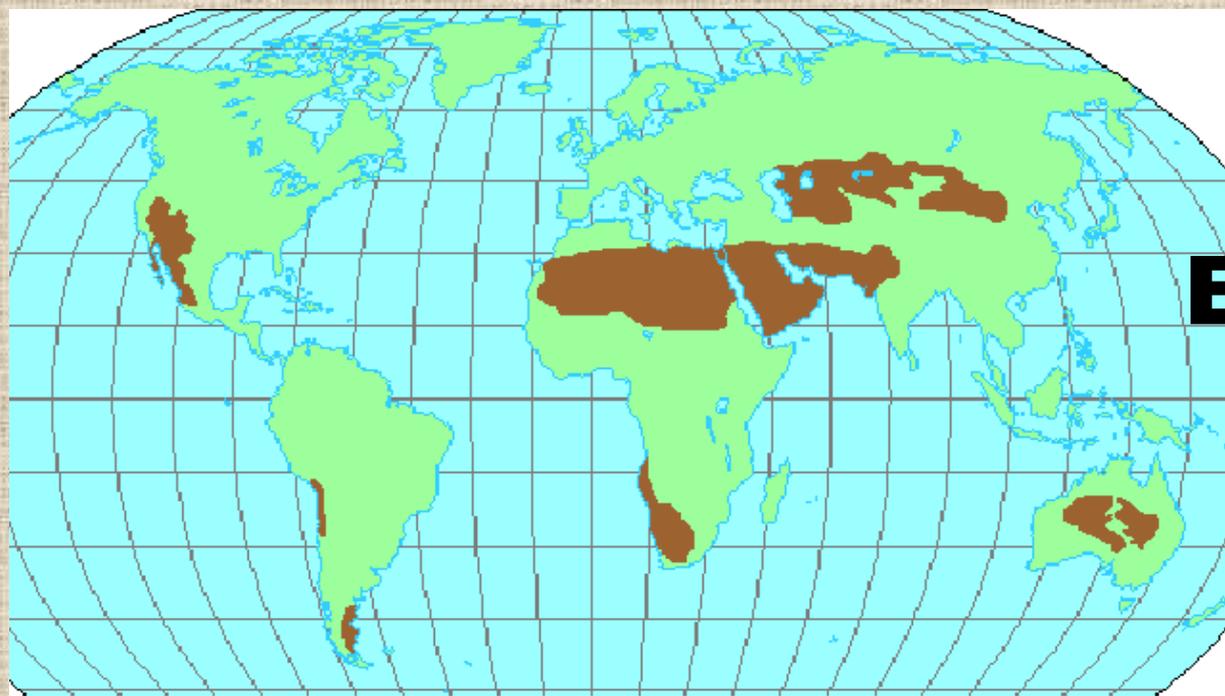


World Biomes



World Biomes





Desert Ecosystems

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

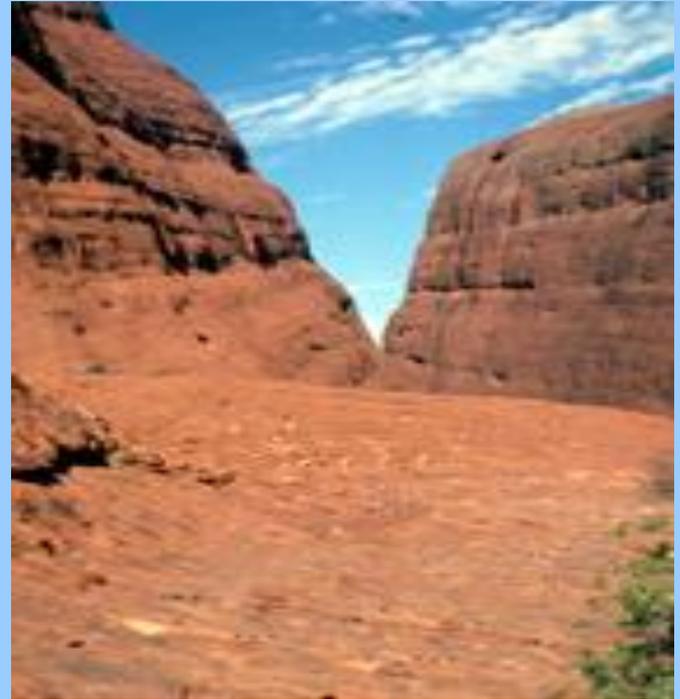


Desert

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.cof.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!



▪ Ocotillo



Barrel Cactus

Desert Plant Adaptations:

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



Joshua Tree



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

Threats to the Desert

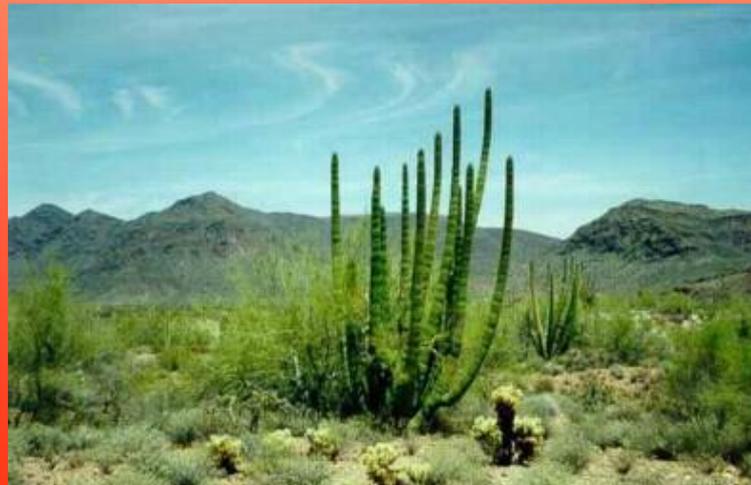
Residential development

Off road recreational activities destroy habitat for plants and animals.

Some plants are removed by collectors, endangering the population.

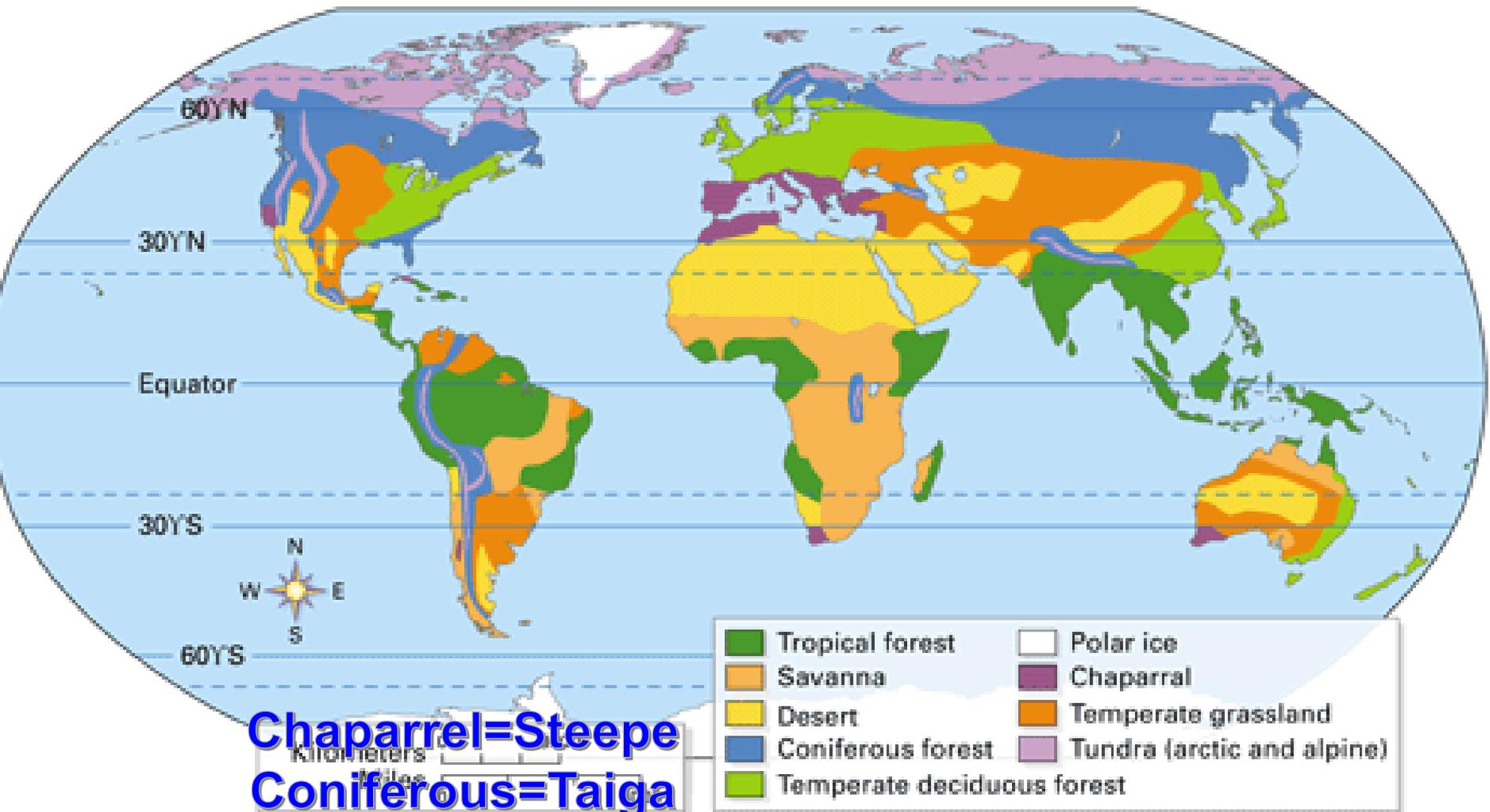


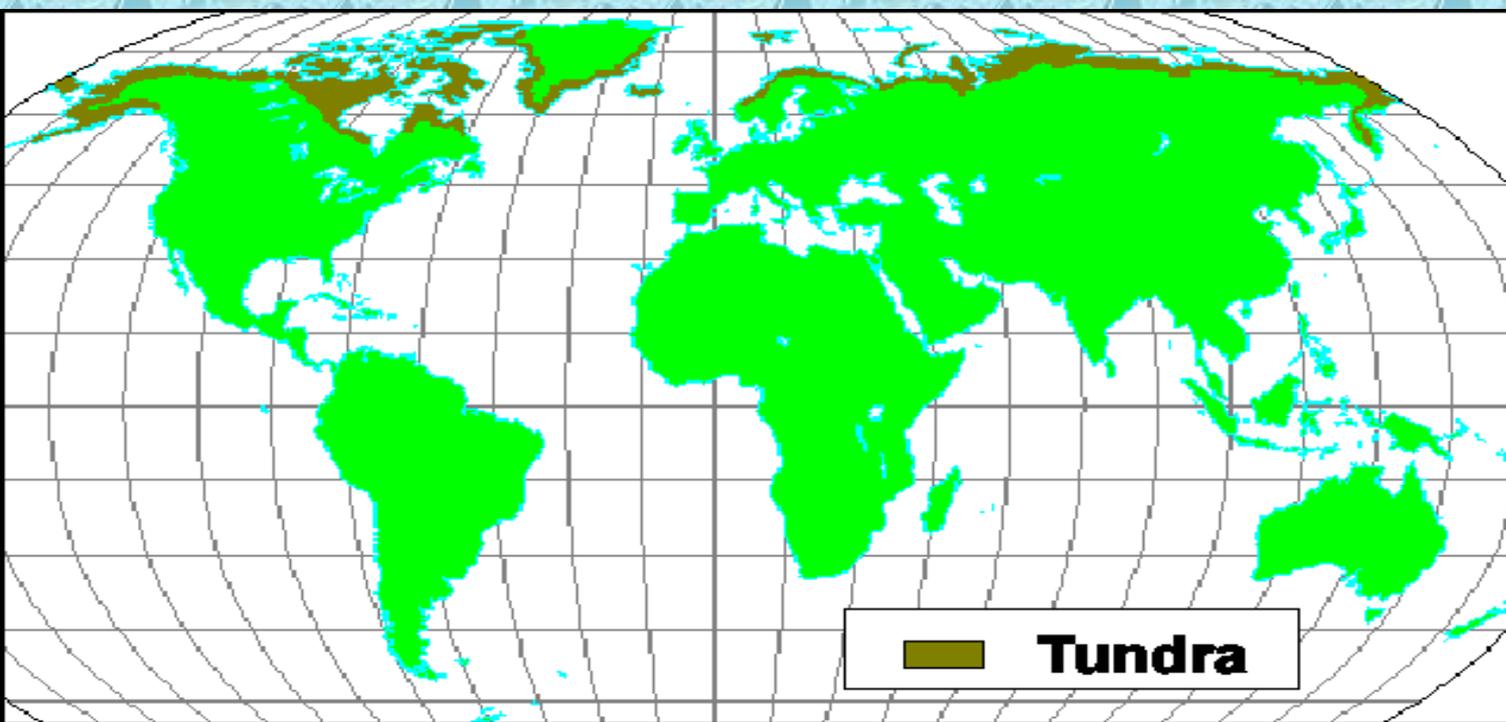
Dry Desert



Sonoran Desert

World Biomes





Tundra

Location:
Found
north of
the Arctic
Circle



Tundra Abiotic Factors

- <25 in/year
- Temp rarely higher than 10⁰C
- Permafrost layer
- Short growing season





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

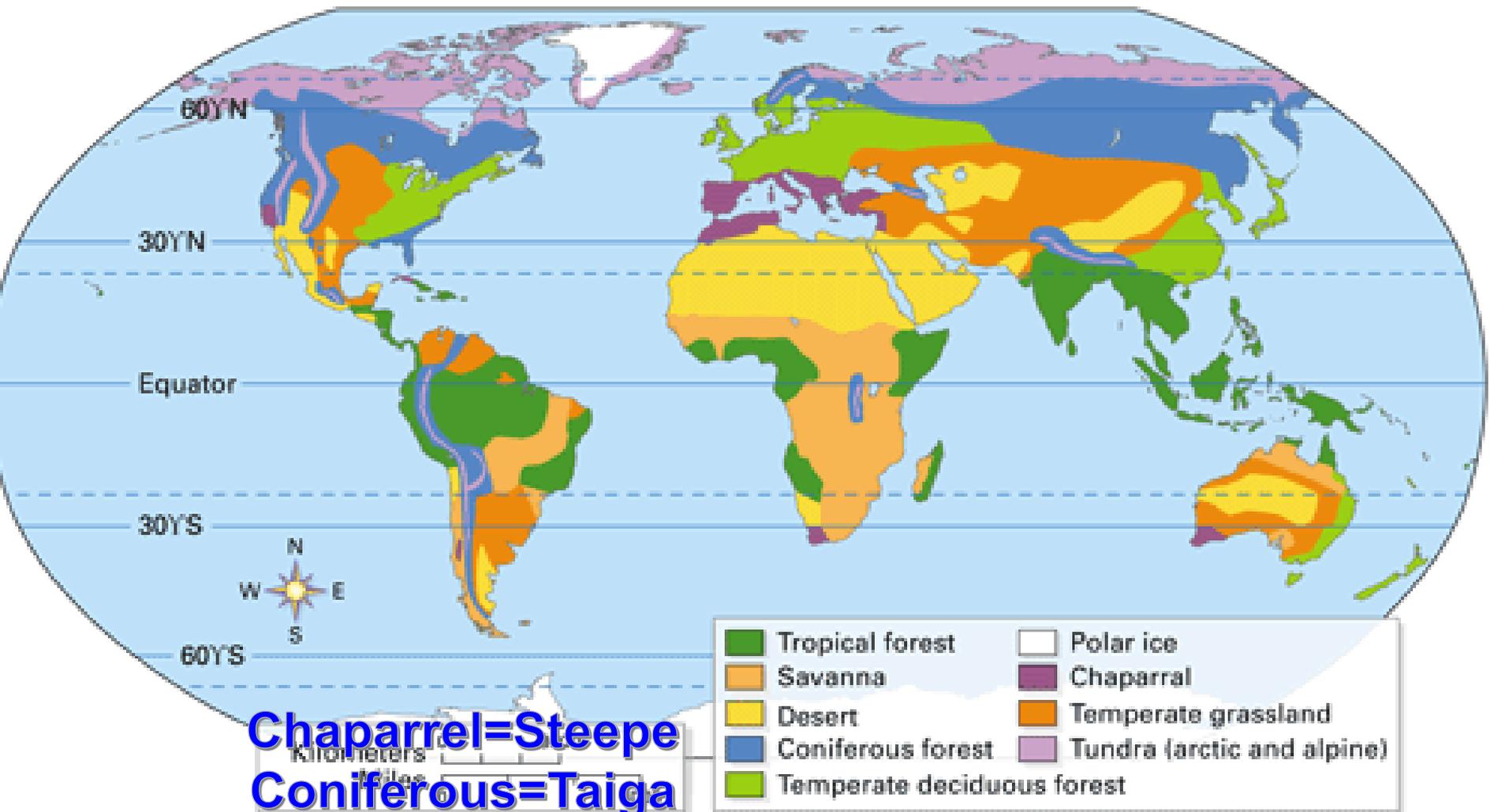


Polar Bear

Oil drilling is proposed in Alaska and other areas!

The tundra is slow to recover from damage.

World Biomes

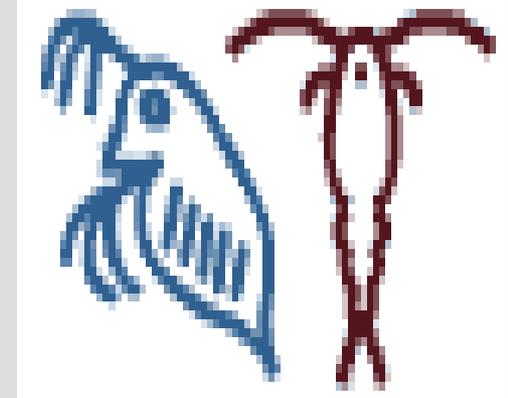




Freshwater Ecosystems

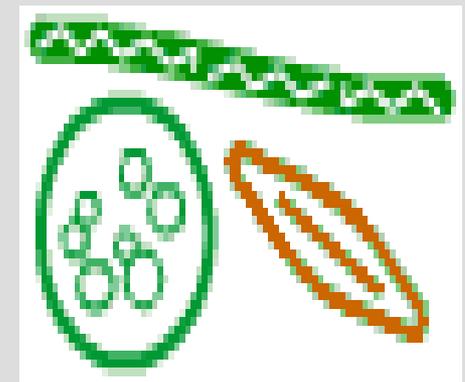
- Salinity <0.5 ppt.
- Lake are the deepest of fresh water systems
- Lakes are fed by underground aquifer or stream
- Ponds are fed by rainfall and may be seasonal

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.



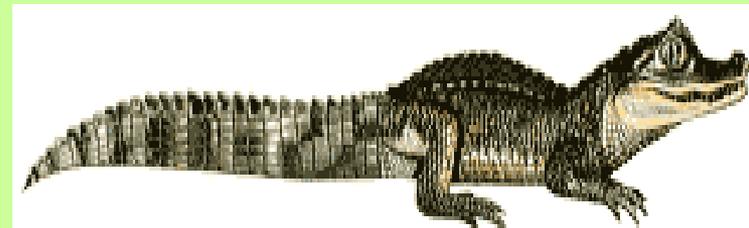
www.uwsp.edu



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

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

Swamp/Bogs



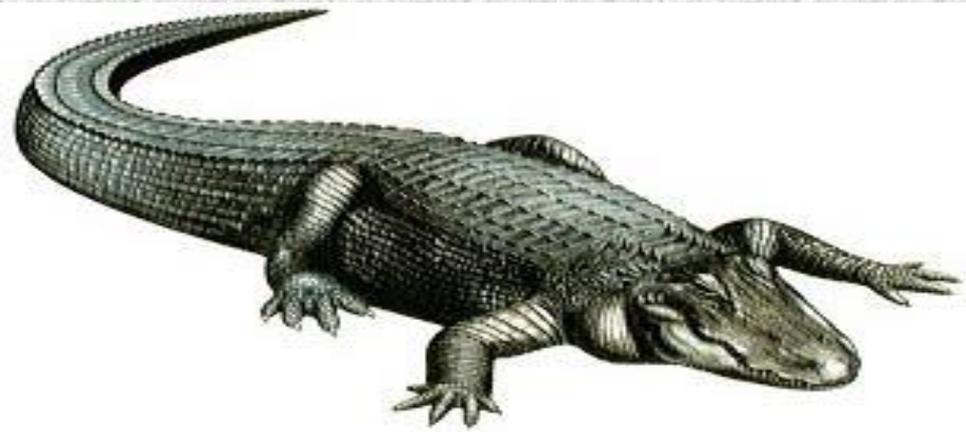
Location: Found on flat, poorly drained land, often near streams

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



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

Threats to Estuaries

- Many ports are found on estuaries—pollution



pers-erf.org

population

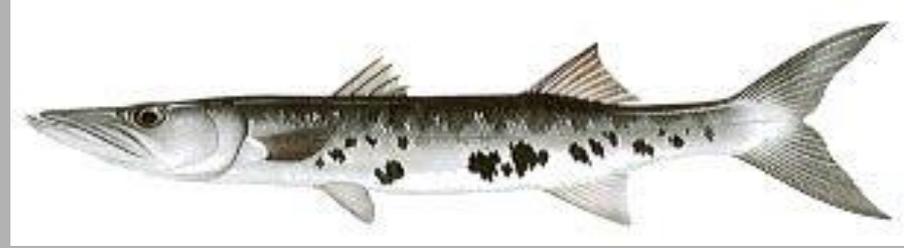


www.davenewbould.co.uk

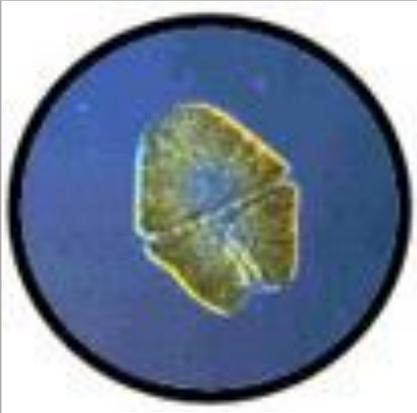
Coral Reefs



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

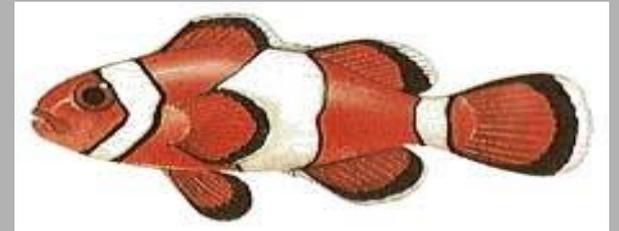


Animal adaptations of the Coral Reef



- 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 $\frac{3}{4}$ of the Earth's surface.



Ocean Plant adaptations

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



Ocean Animal Adaptations



Hammerhead

Zooplankton—
sea's smallest
herbivores



Lion fish

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

Threats to the Oceans



While the oceans are vast, they are becoming more polluted

Overfishing and some fishing methods are destroying fishing grounds.

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 bears found

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

