



Laurea / B.A.  
in Global Governance



# TEMPERATE GRASSLANDS, TAIGA

*2020/2021*

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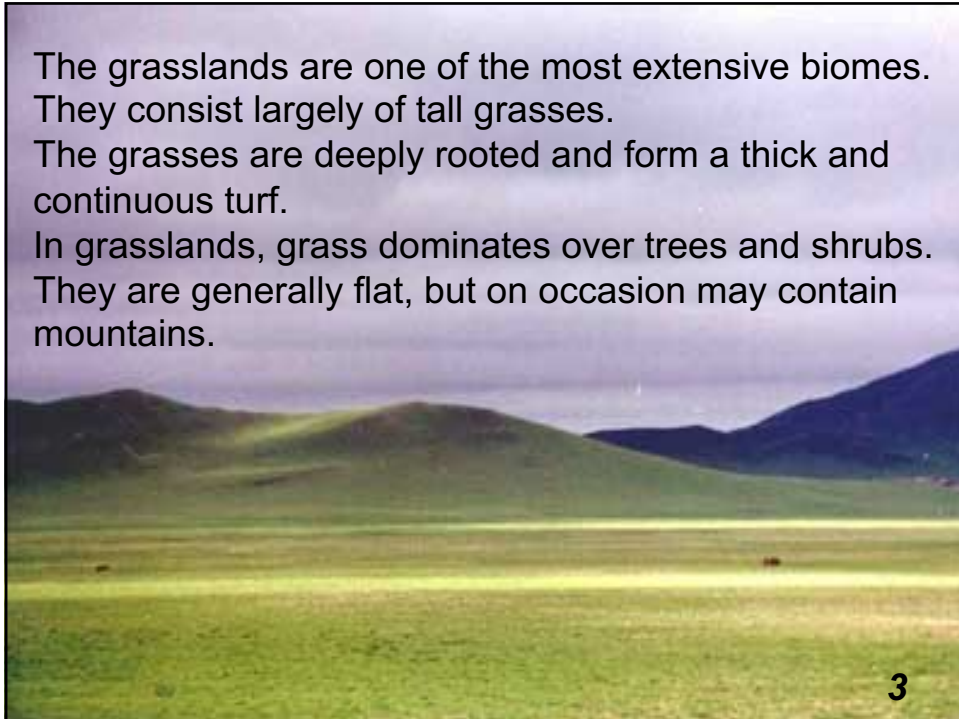
## Temperate grasslands



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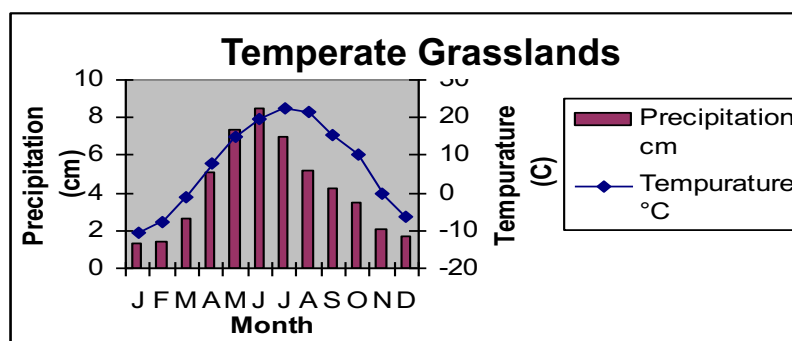
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The grasslands are one of the most extensive biomes. They consist largely of tall grasses. The grasses are deeply rooted and form a thick and continuous turf. In grasslands, grass dominates over trees and shrubs. They are generally flat, but on occasion may contain mountains.



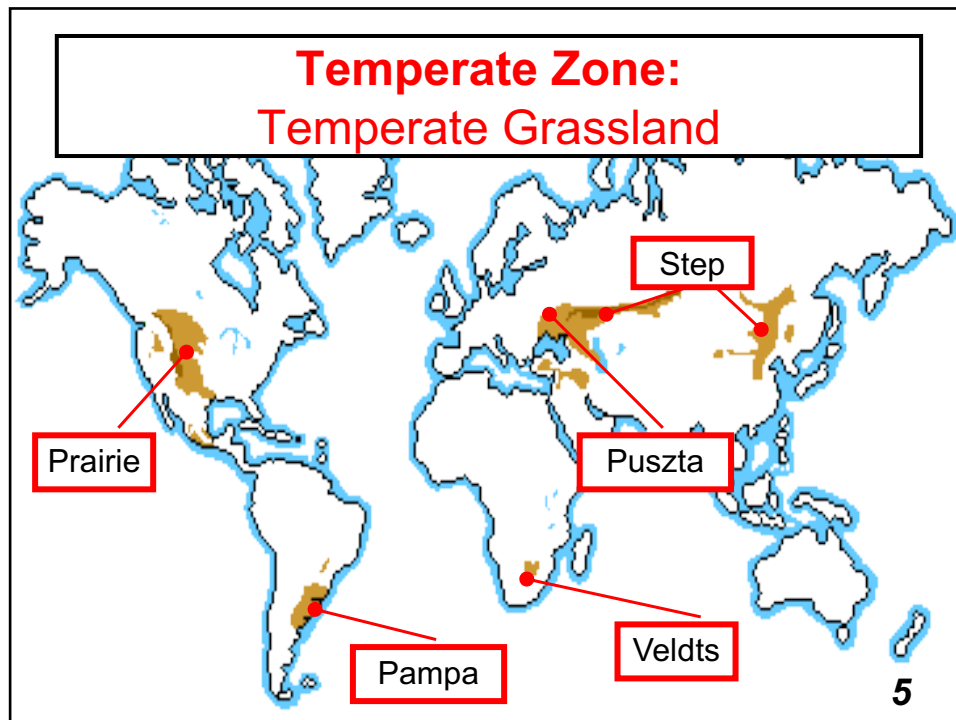
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## Temperate Grasslands



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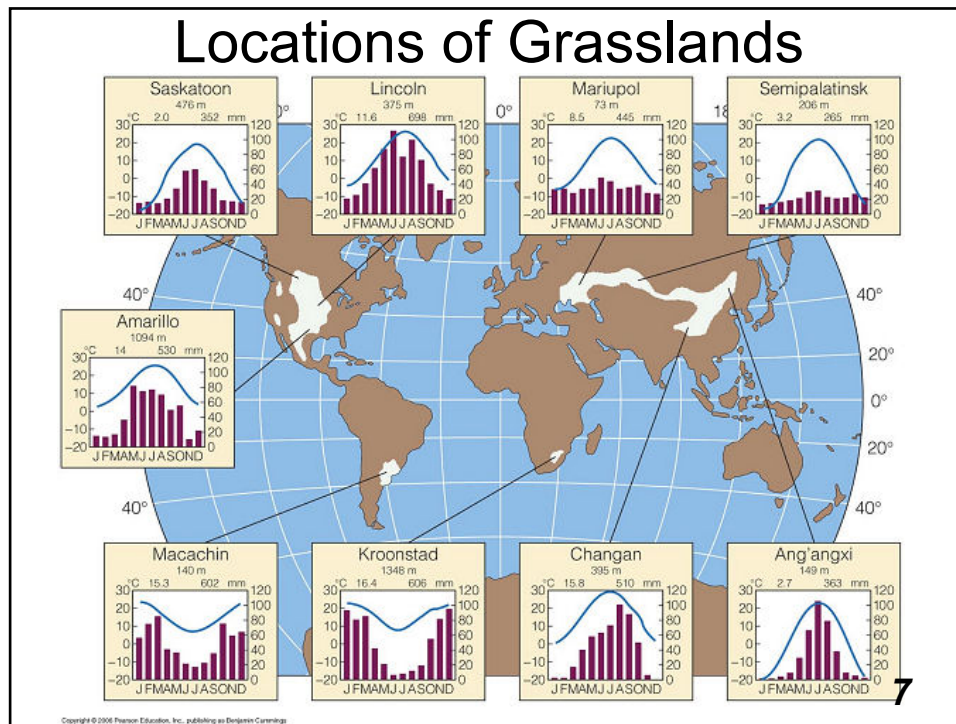
## Climate

The typical climate for a Grassland Biome is relatively humid and very wet during the spring and for the rest of the year it is generally dry.

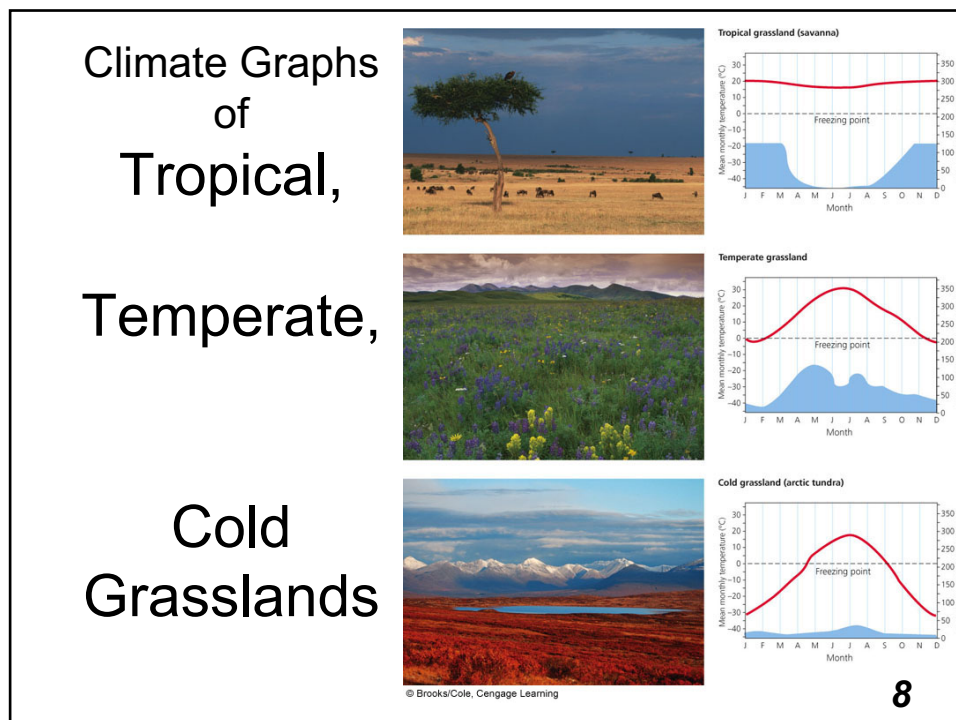
The rain season begins in March with concentrated rainfall. Rainfall occurs from late spring to early summer which creates ideal agricultural conditions. Then in October begins the dry season.

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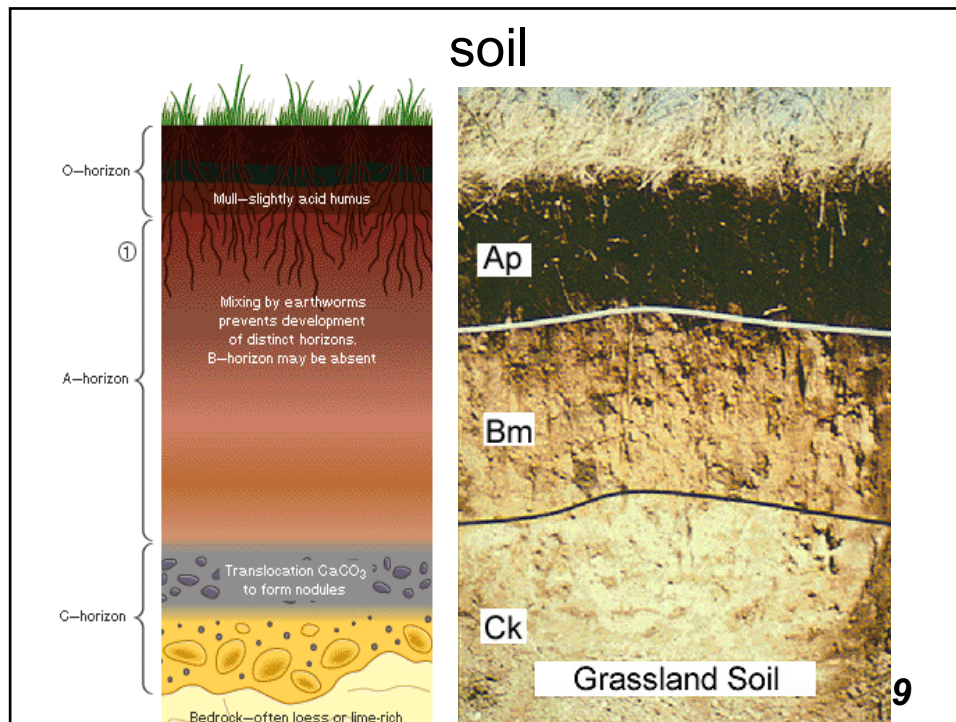


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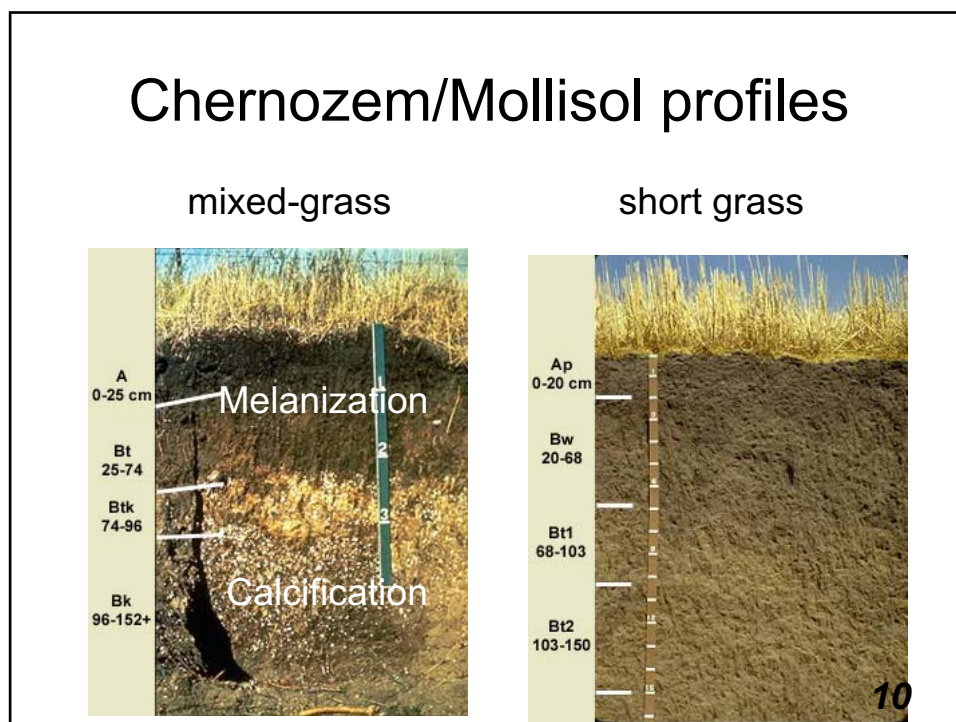


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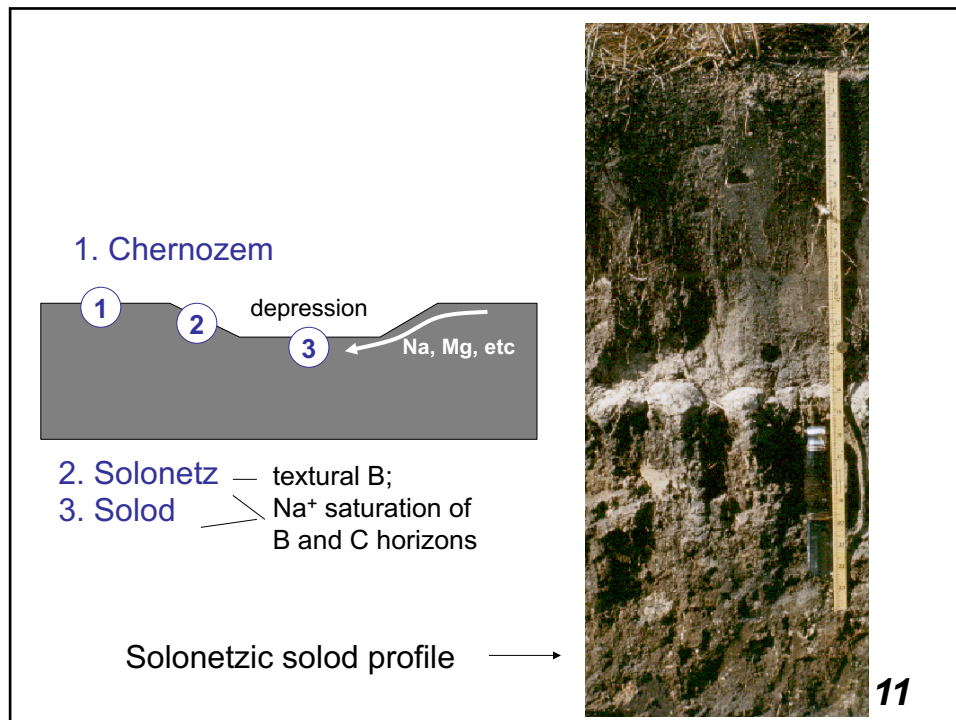




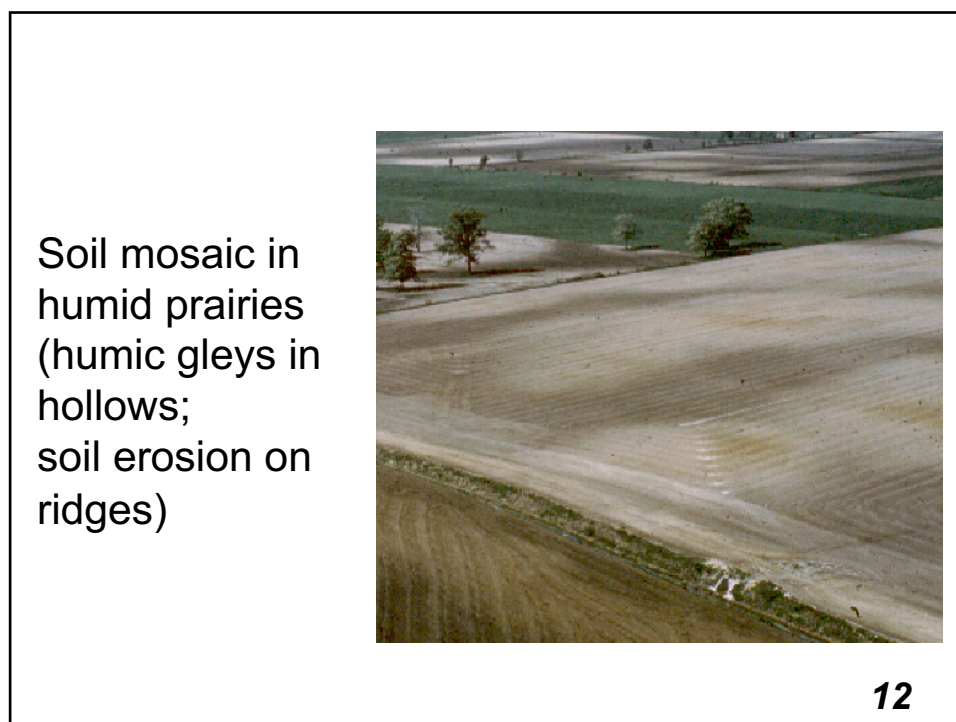
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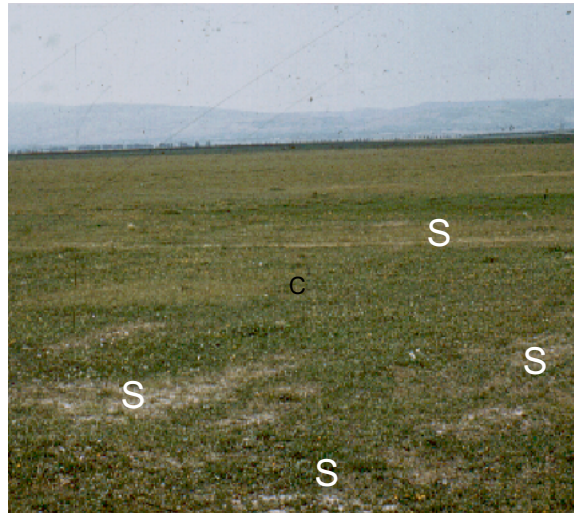


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Chernozem  
-solonetz  
mosaic in  
grazed  
steppe,  
Rumania



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## Vegetation

Flora characterizing the biome consists mainly of perennial hemicryptophytes, adapted to the fires summer and cold winter.

Grasses store most of their biomass in the roots, this ensures their recovery after a fire, and after grazers have eaten their tops

They are also well represented some species of *Artemisia* (**Asteraceae**), which is prevalent in steppe formations of semiarid climate.

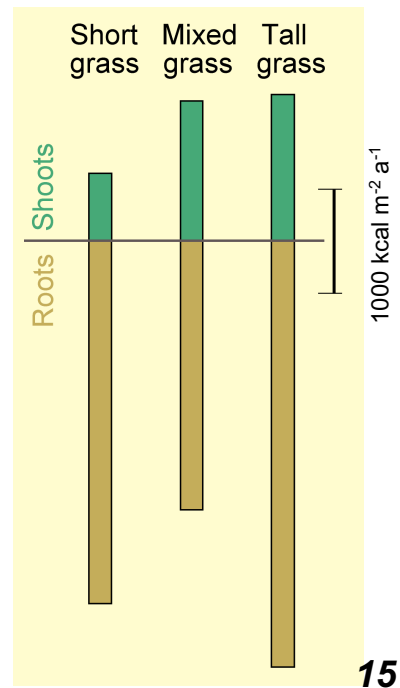
(Phanerophytes or camefite truncated basally woody)

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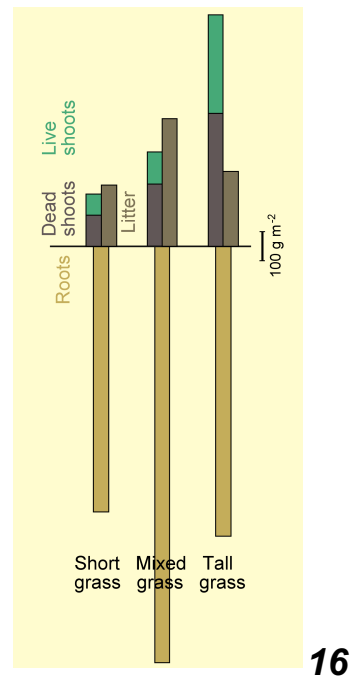
# Annual production of plant biomass in prairie grasslands

note:  
60-80% below-ground



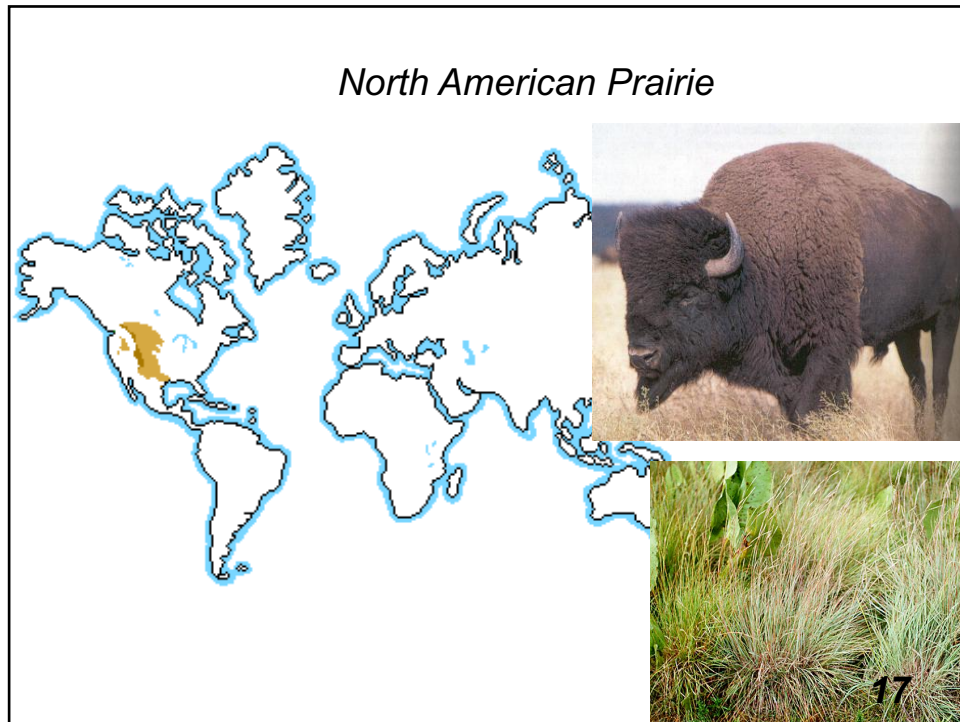
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# Biomass (ungrazed prairie)



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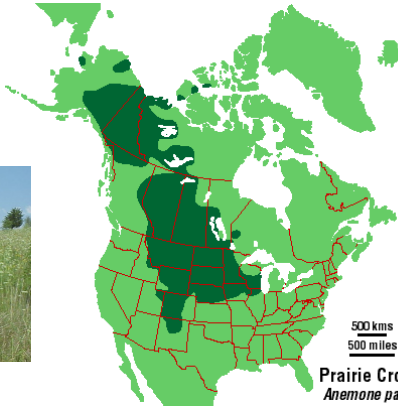
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## Prairie


PRAIRIES extends only in the geographical area of North America.

The word "prairie" is from the French word for a meadow grazed by cattle. It was applied by the early French explorers to the vast inland area of North America that is mostly devoid of trees and instead covered with waving grasses.

In the "prairie" North American, as were baptized by the pioneers, herbs tall are predominant in the central states such as Wisconsin, while going to the Rocky Mountains the height of the plants decrease

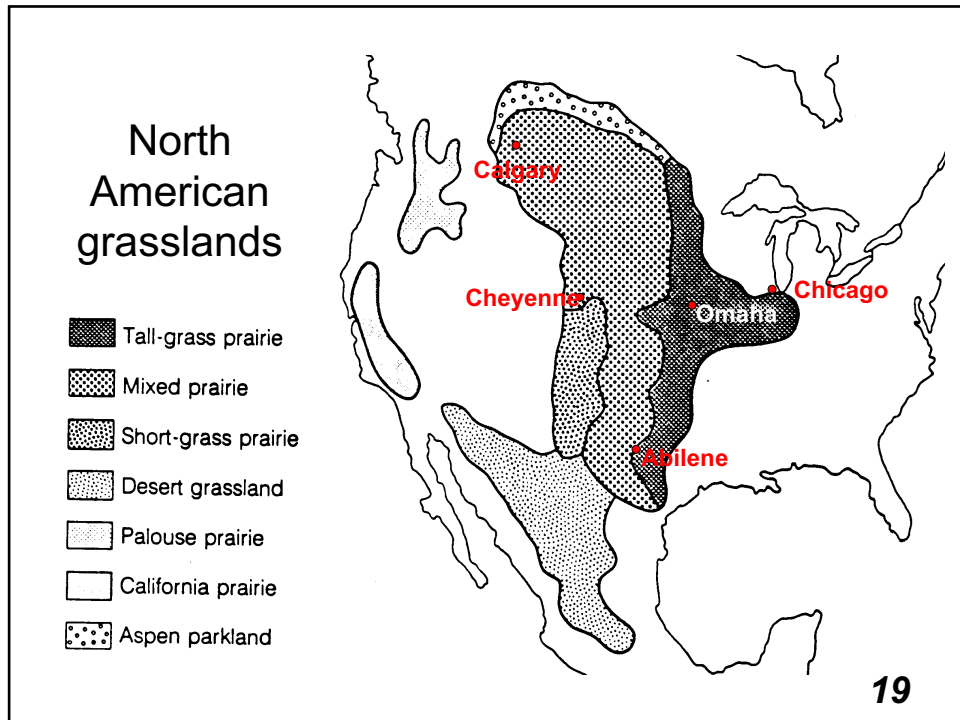



The central states are subject to low precipitation and characterized by a plant physiognomy lower.

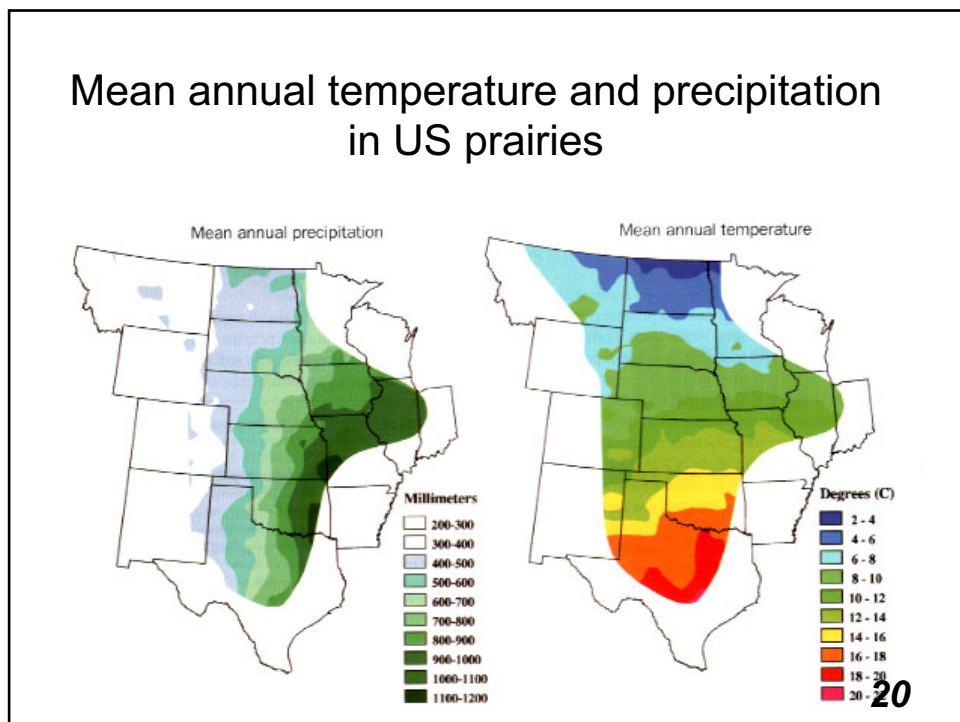


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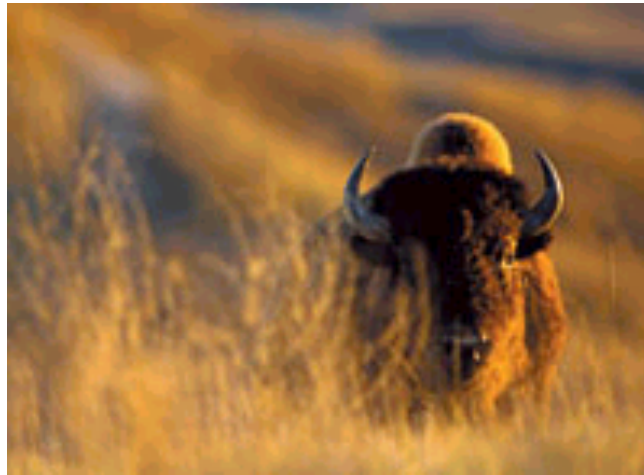


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## The Prairie Was Further Developed By:

- Presence of large herbivores.

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Despite the long and frequent periods of drought and torrential rains the grasslands of the Great Plains are not subject to a major soil erosion.

The deep root system interconnected consolidates the soil and prevents run-off.

These roots also help herbs to reach the water in times of drought being also very deep. In fact, the grasslands have evolved in a hostile environment and relatively dry, so well bear the drought.

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However the Americans have converted 70% of these great plains in intensive crops especially wheat, leaving a few pieces of land with the local flora. The complex equilibria whether created in thousands of years are calibrated on extensive portions of land, and leaving only small portions of the prairie these balances are to break.

Besides the introduced plants have often become competitor of native even outside of controlled areas and cultivated.

This proved to be a very serious problem for the last remaining herds of bison, because it was taken from them foraging not being accustomed to feed on cereals, but only of grass species such as *Stipa*.



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## Buffalo

**Buffalo are now nearly extinct there use to be 60 million in 1889 that number was decreased to 500.000 individual buffalo. Most of the buffalo are located in the Yellowstone National Park.**

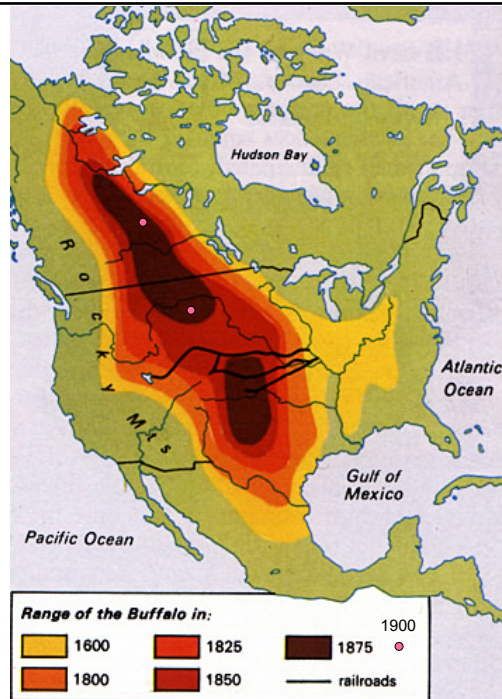


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Rapid decline in grazer populations in last 200 years as a result of habitat destruction and hunting.

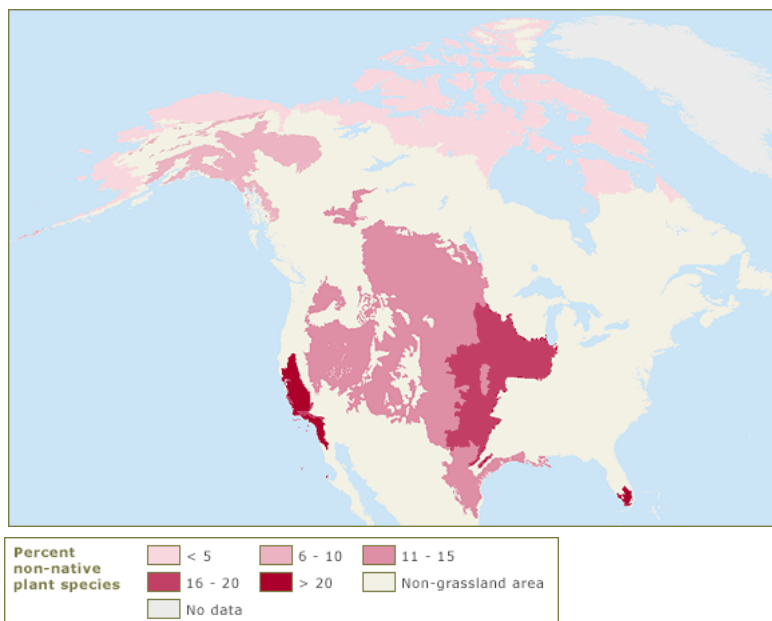
Buffalo - almost extinct;  
Gophers - 98% decline



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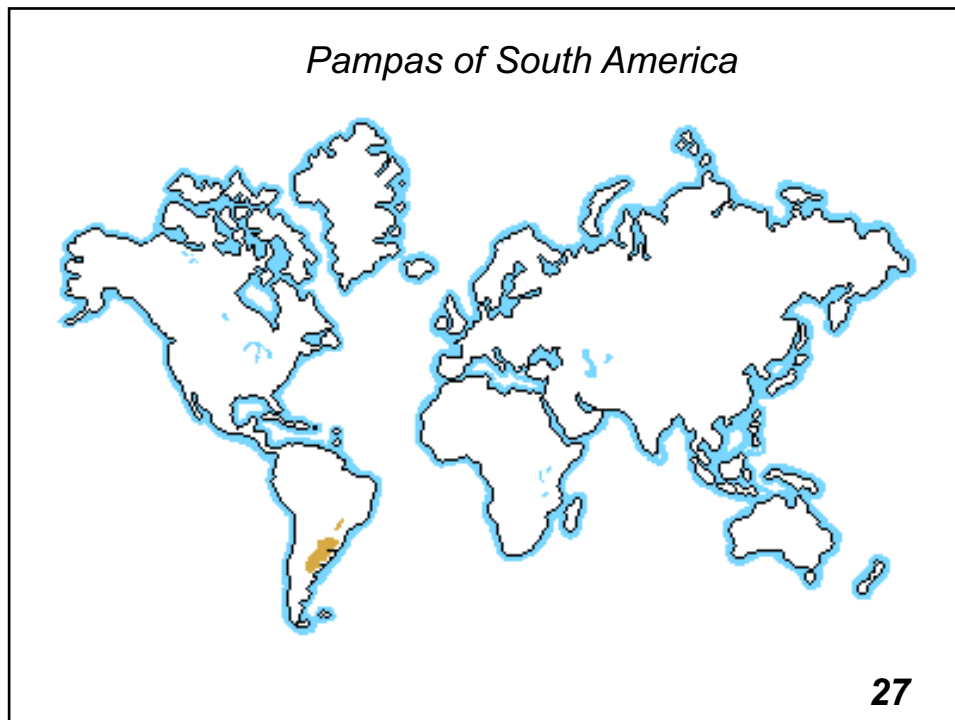
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### Non-native Plant Species

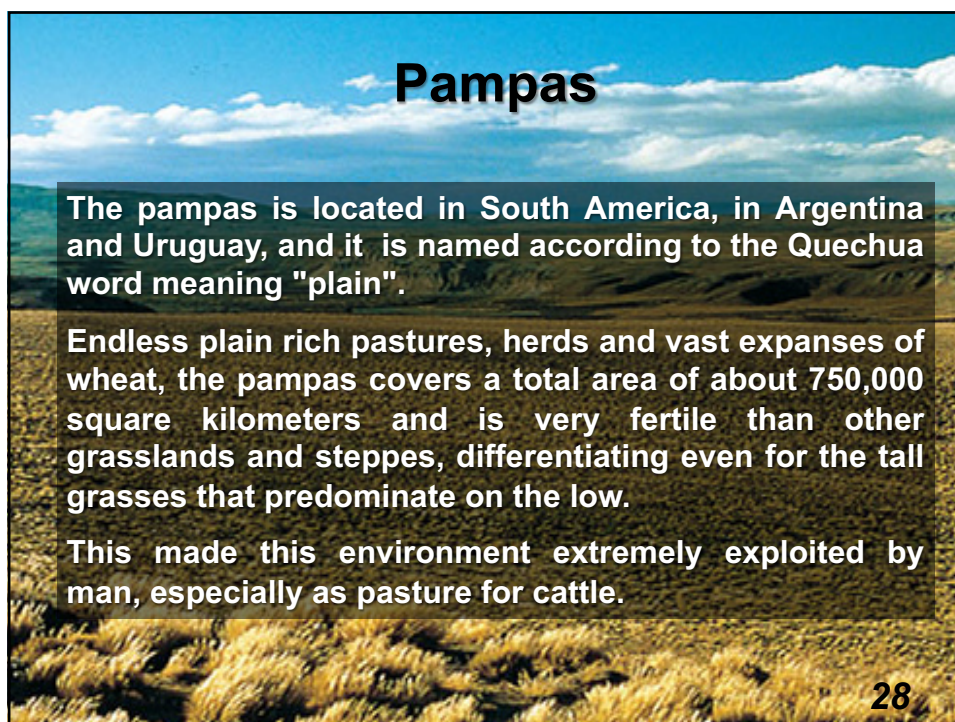


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## climate


The absence of reliefs makes this area vulnerable to flooding of the few rivers that cross it.

The climate is more temperate of North American grasslands (T average 18°C) and the geographical area is clearly exposed to more precipitation, being close to the coast and ocean currents that cause significant effects on precipitation in areas near the coast. The rainfall regime varies from 600 to 1200 mm per year. These increases in the areas of the humid pampas, occupied by water for most of the year.

As in other areas of this biome often rain falls in a period of the year were followed by a long dry season.



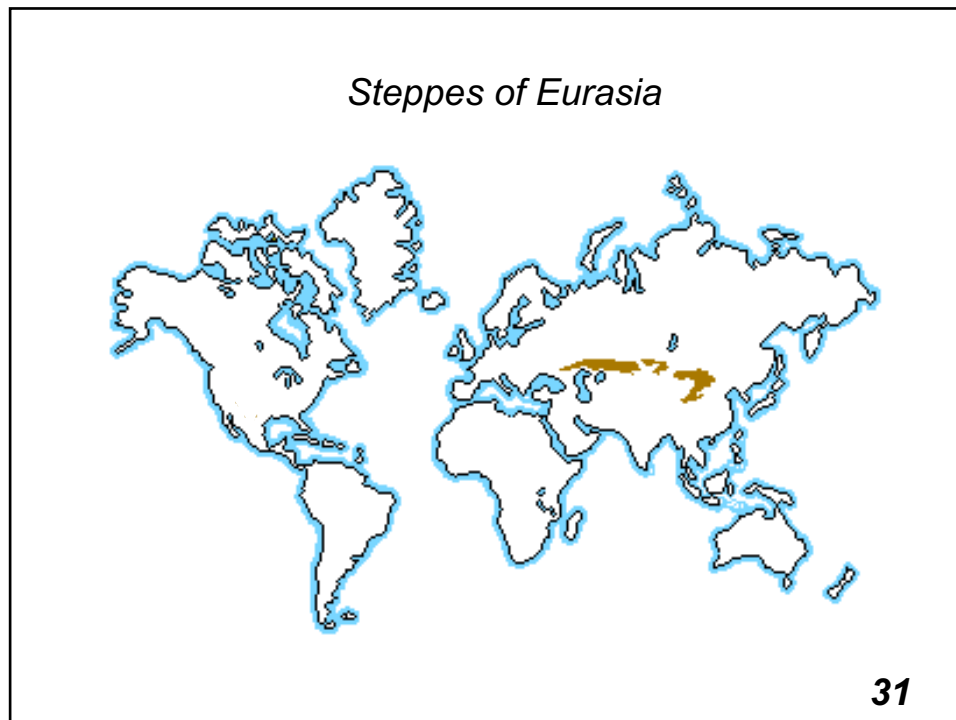
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Longitudinal gradient of aridity: with the approach to the Andes vegetation suffers the most of the semi-arid climate; appear so some Cactaceae (*Opuntia* and *Cereus*).

Along the coast, however, the beneficial effect of the Atlantic winds laden with moisture, allows the development of grasslands in Gramineae of temperate environment, typical of the biome

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## Steppe climate

The steppe crosses the Russian plain, south of the taiga, penetrating deep into Siberia. It comprises three main types, which run in roughly parallel bands from east to west: forest steppe in the north, true steppe, to semi-desert steppe in the south. Within these belts, zones of temporary inundation on floodplains or in zones of internal drainage provide valuable hay land. The steppe was increasingly ploughed for crops during the twentieth century; initially crops were rotated with naturally regenerated grassland, but from mid-century cultivation was increasingly intensive.

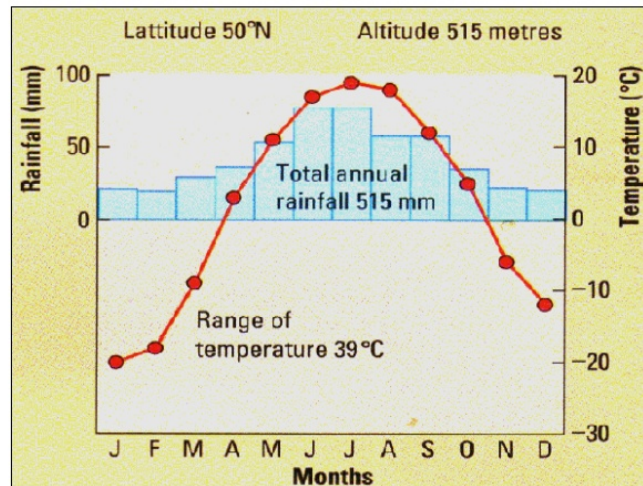
**Mean annual temperatures ranging from  $-15$  in winter to  $+20$  in summer. Continental interior results in low temperatures during winter.**

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### Typical Steppe climate graph



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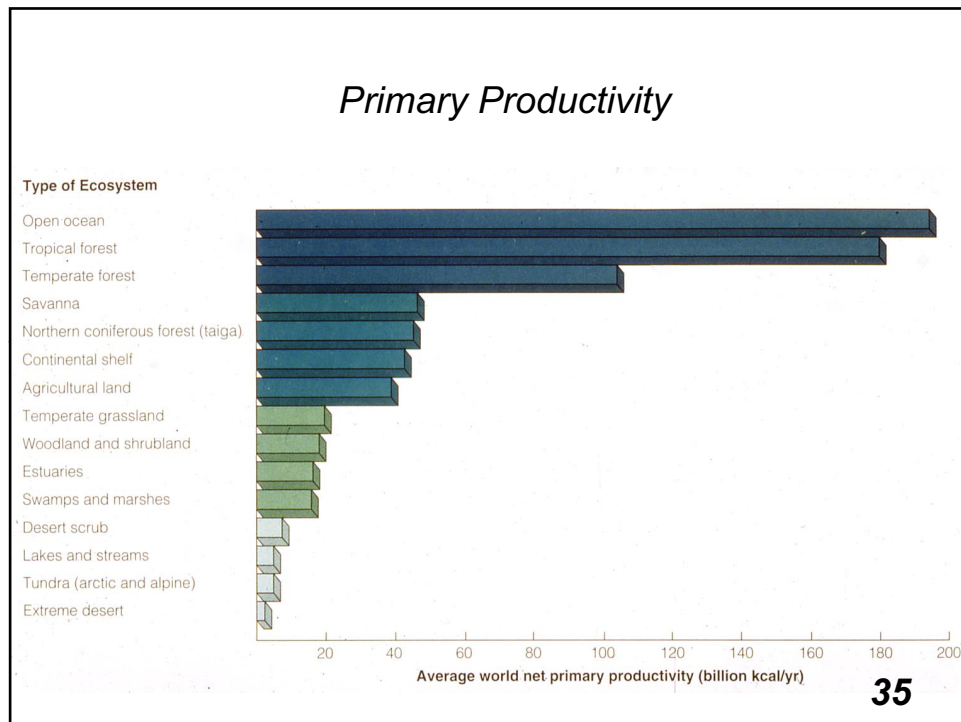
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Thick grass cover – prevents tree seeds from taking hold.  
 Low precipitation inhibits tree growth.  
 Fire destroys any trees that may take hold – underground stems and buds of perennial grasses not affected by fire (as opposed to trees and shrubs that have above-ground stems and buds).  
 Grazing animals quickly destroy emerging shrubs and sapling trees.  
 Grasses are hardy and quick growing.



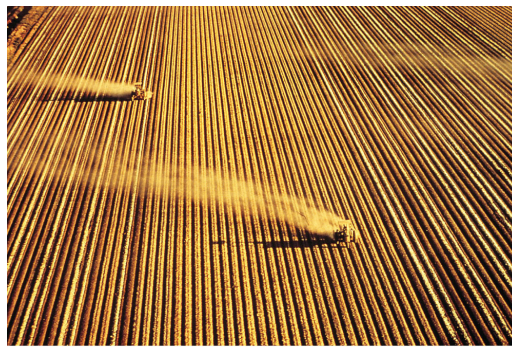
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The grasslands are very fertile, with the ability to produce a lot of biomass yearly. The grasslands are the “breadbaskets” of the worlds – where most of our food is produced.



**Monoculture Crop Replacing Biologically Diverse  
Temperate Grassland**

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## Human Impact

- Humans have caused great changes on the face of the grasslands across the globe.
- Many large areas have become developed into farmland, because of their low flat terrain.
- Often, large fires are started, and quickly tear across the land.
- Moreover, many animals have been hunted near to extinction (ie. Lions, elephants, bison)
- Thankfully, the hunting of such animals has been banned.
- Only 1% of the total grasslands are protected today, but governments are finally more aware of the issue at hand.

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## Grasslands in the Future

- More than 60% of the grassland biome has already been modified - forestry and agriculture playing the largest roles. In South Africa only 2.23% of the Grassland Biome is formally conserved. The grassland biome is the least conserved, and the most transformed of all the biomes of the world.

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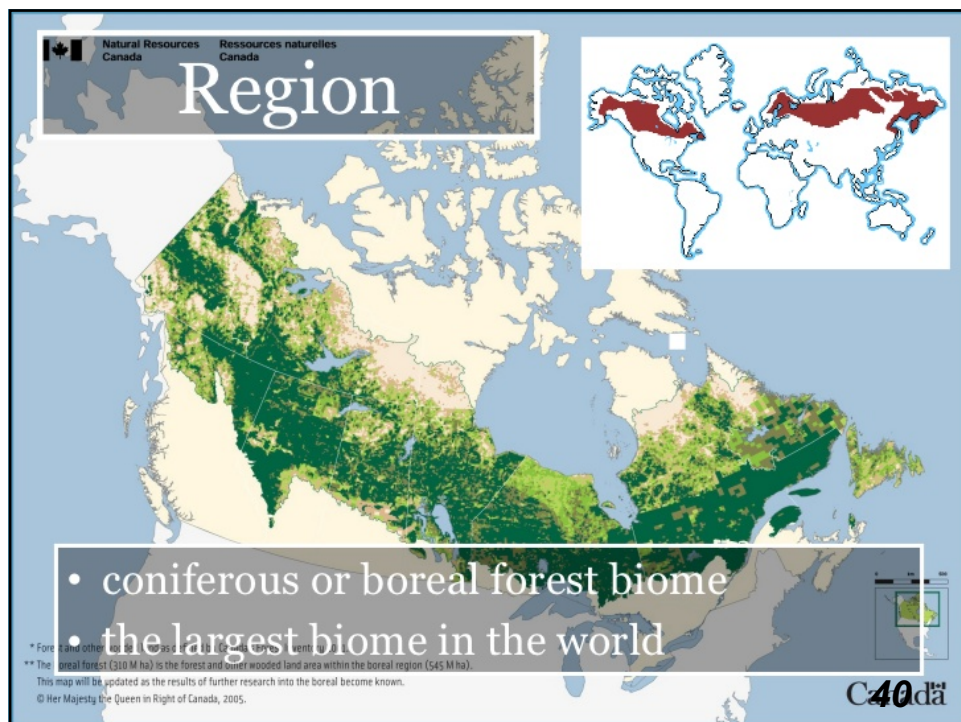
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# THE TAIGA

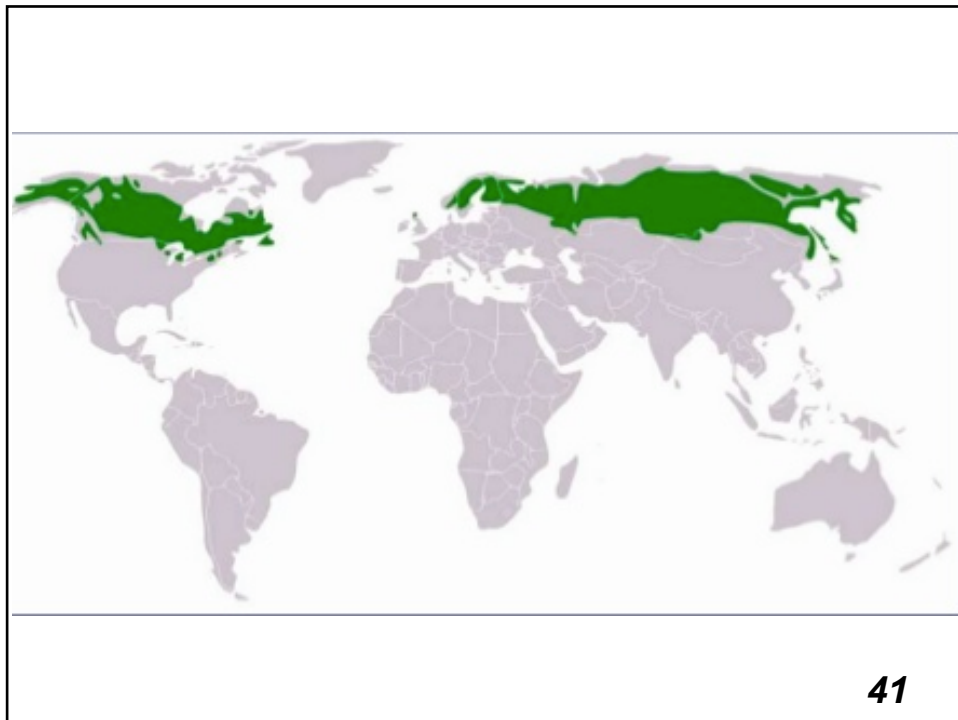
## The Boreal Forests

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## Forest area in selected countries

Country	Total forest area (millions of ha.)	Percentage of global forested area
• <b>Russia</b>	764	22
• <b>Brazil</b>	566	16
• <b>Canada</b>	247	7
• <b>U.S.A.</b>	210	6
• <b>China</b>	134	4
• <b>Indonesia</b>	116	3
• <b>Zaire</b>	113	3
• <b>Nordic countries</b>	53	2
• <b>All other</b>	1239	36



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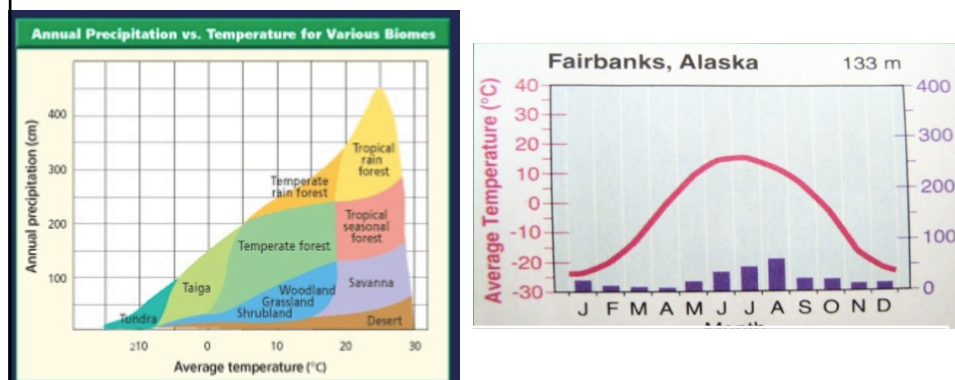


Ecosystems (in order of productivity)	Area (10 <sup>6</sup> km <sup>2</sup> )	Mean Net Primary Productivity per Unit Area (g/m <sup>2</sup> /yr)	World Net Primary Productivity (10 <sup>9</sup> Mt/yr)	Mean Biomass per Unit Area (kg/m <sup>2</sup> )	Relative Net Primary Productivity (Mean Net Primary Productivity/Mean Biomass per Unit Area (g/g/yr))
<b>Continental</b>					
Tropical rain forest	17.0	2000.0	34.00	44.00	0.045
Tropical seasonal forest	7.5	1500.0	11.30	36.00	0.042
Temperate evergreen forest	5.0	1300.0	6.40	36.00	0.036
Temperate deciduous forest	7.0	1200.0	8.40	30.00	0.040
<b>Boreal forest</b>	12.0	800.0	9.50	20.00	0.040
Savanna	16.0	700.0	10.40	6.00	0.175
Cultivated land	14.0	644.0	9.10	1.10	0.585
Woodland and shrubland	8.0	600.0	4.90	6.80	0.088
Temperate grassland	9.0	500.0	4.40	1.60	0.313
Tundra and alpine meadow	8.0	144.0	1.10	0.67	0.215
Desert shrub	18.0	71.0	1.30	0.67	0.106
Rock, ice, sand	24.0	3.3	0.09	0.02	—
Swamp and marsh	2.0	2500.0	4.90	15.00	0.167
Lake and stream	2.5	500.0	1.30	0.02	25.0
<b>Total continental</b>	<b>149.0</b>	<b>720.0</b>	<b>107.09</b>	<b>12.30</b>	
<b>Marine</b>					
Algal beds and reefs	0.6	2000.0	1.10	2.00	1.0
Estuaries	1.4	1800.0	2.40	1.00	1.8
Upwelling zones	0.4	500.0	0.22	0.02	25.0
Continental shelf	26.6	360.0	9.60	0.01	36.0
Open ocean	332.0	127.0	42.00	0.003	42.3
<b>Total marine</b>	<b>361.0</b>	<b>153.0</b>	<b>55.32</b>	<b>0.01</b>	<b>15.3</b>
<b>World total</b>	<b>510.0</b>	<b>320.0</b>	<b>162.41</b>	<b>3.62</b>	

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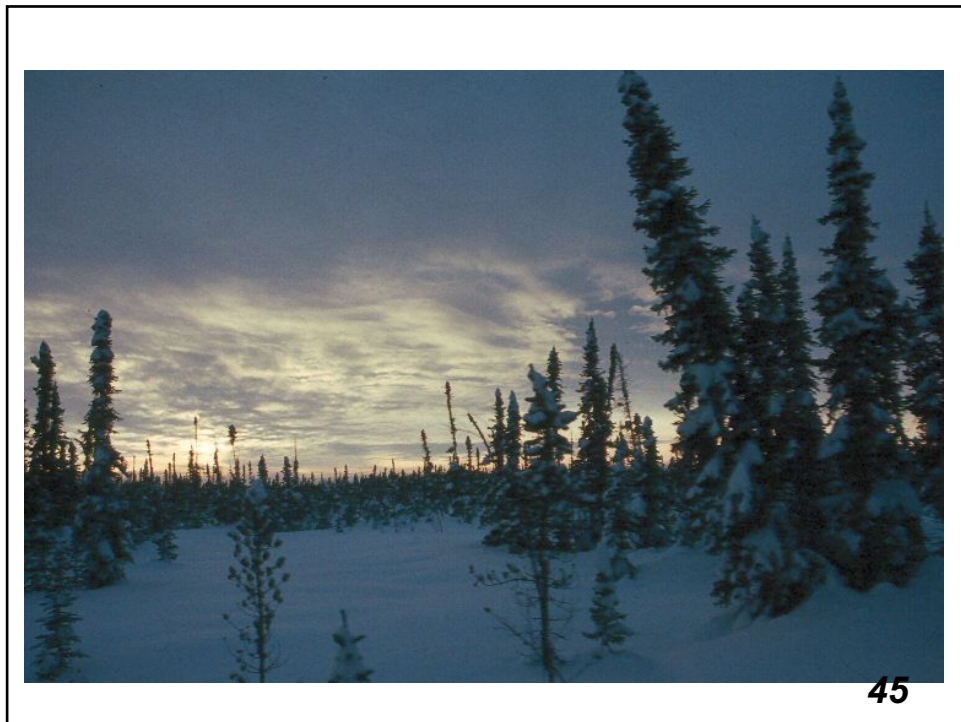
## climate



Average temperature is below freezing for half of the year  
 Precipitation: 30-85 cm in rain, dew and snow

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## Types of Plants



- Evergreens
  - Spruce
  - Fir
  - Pine
- Tamarack
- Birch
- Aspen

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## Vegetation type



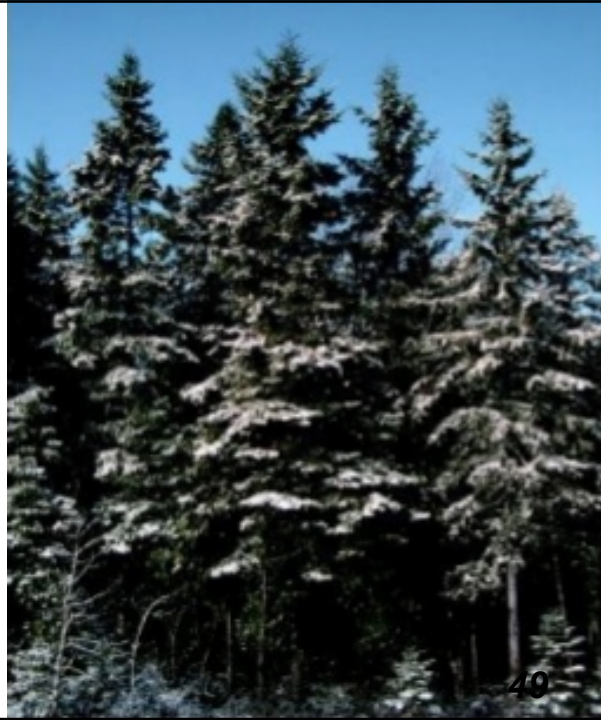
- south: Closed canopy forest
- North: Sparse taiga: lichen woodland

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Plants:  
needles to  
reduce water  
loss  
branches flexible  
to withstand the  
weight of heavy  
snow shaped to  
shed snow with  
ease



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Spruce, *Picea abies*.



Larch, *Larix decidua*

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Fir, *Abies* sp



Scott pine, *pinus sylvestris*

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Forest fires, mining, reindeer herding, and small-scale logging followed by little to no replanting of harvested trees

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## Issues in the Taiga

- Endangered animals (i.e. beavers, wood bison)
- Logging and deforestation
- Pollution (i.e. acid rain, oil stains)



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