

Temperate Grasslands



Temperate Grasslands

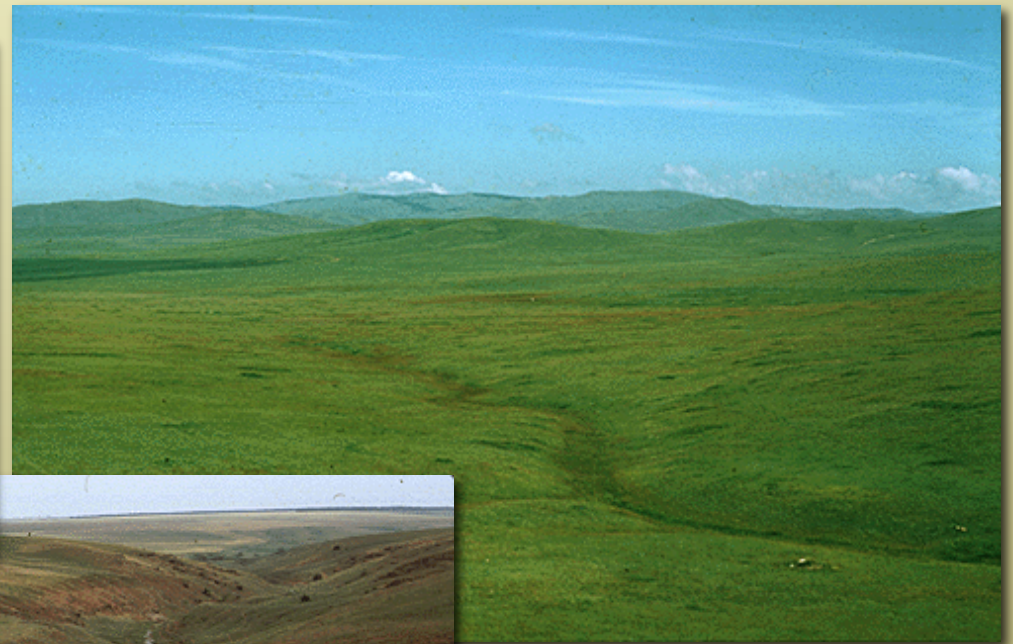
- One of the most extensive of the biomes
- North America: **prairies** 350 million ha running from eastern deciduous forest border to western cordilleras



Konza Prairie, Kansas

Temperate Grasslands

- One of the most extensive of the biomes
- Eurasia: **steppes** 250 million ha running from Hungary to Manchuria



Mongolian steppe



Russian Steppe

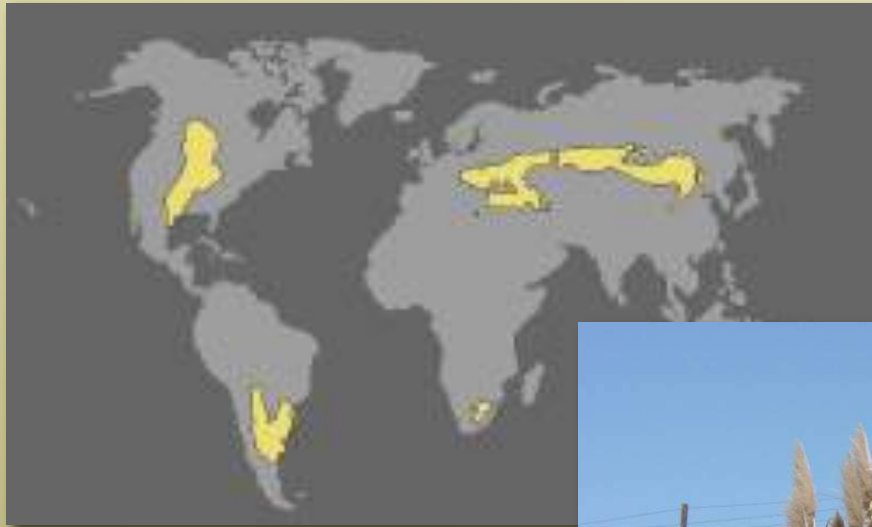
Temperate Grasslands

- One of the most extensive of the biomes
- Argentina, Uruguay: **pampas**



Temperate Grasslands

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- Argentina, Uruguay: **pampas**



Cortaderia -
pampas grass

Temperate Grasslands

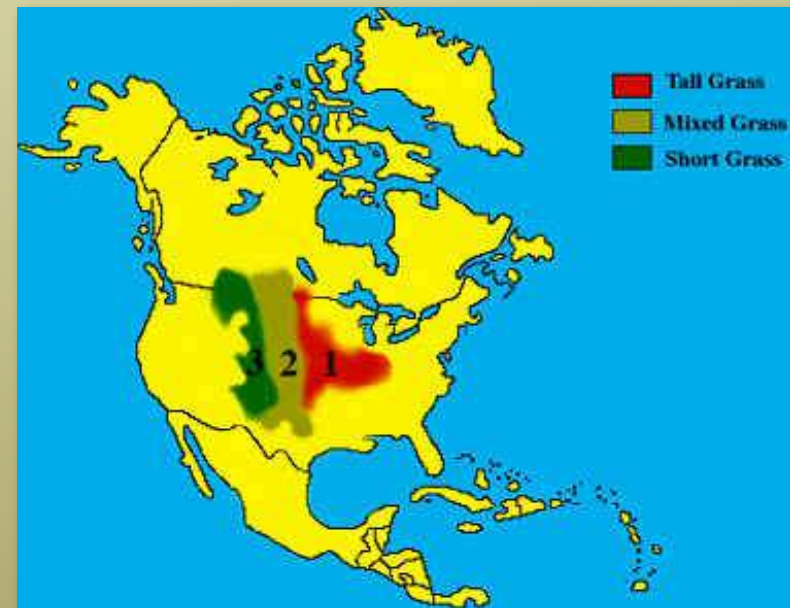
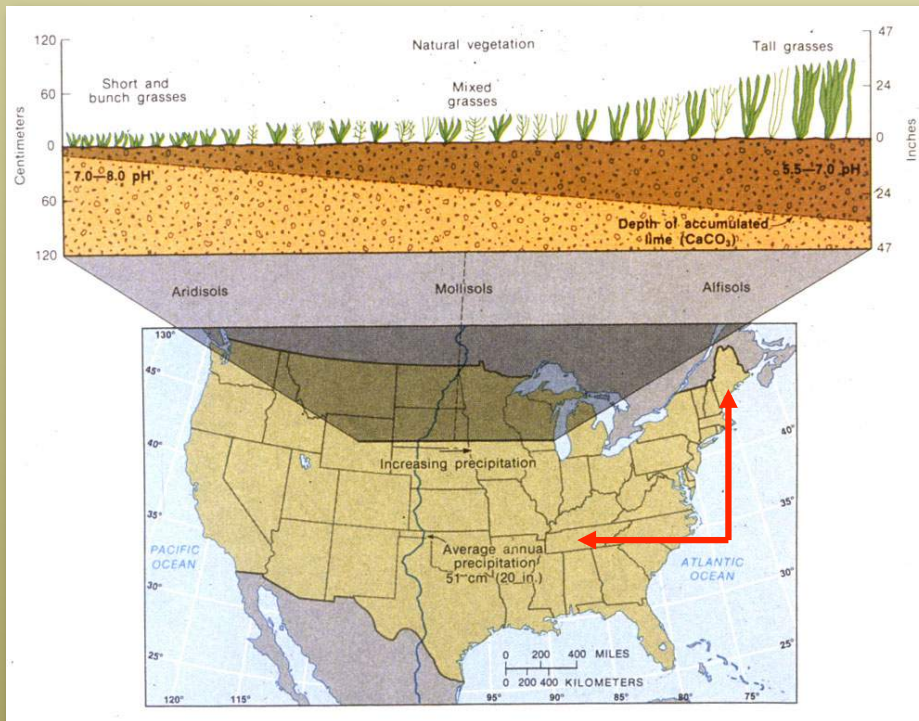
- One of the most extensive of the biomes
- South Africa: **grassveldt**



Temperate Grasslands

- Temperate grasslands are adapted to recurring drought (50 - 120 cm rain)
- Temperate grasslands appear homogenous but important structural and floristic differences have developed in response to regional and local conditions (e.g. in prairie province)

- increasing latitude & east to west:
warm to cold and moist to dry



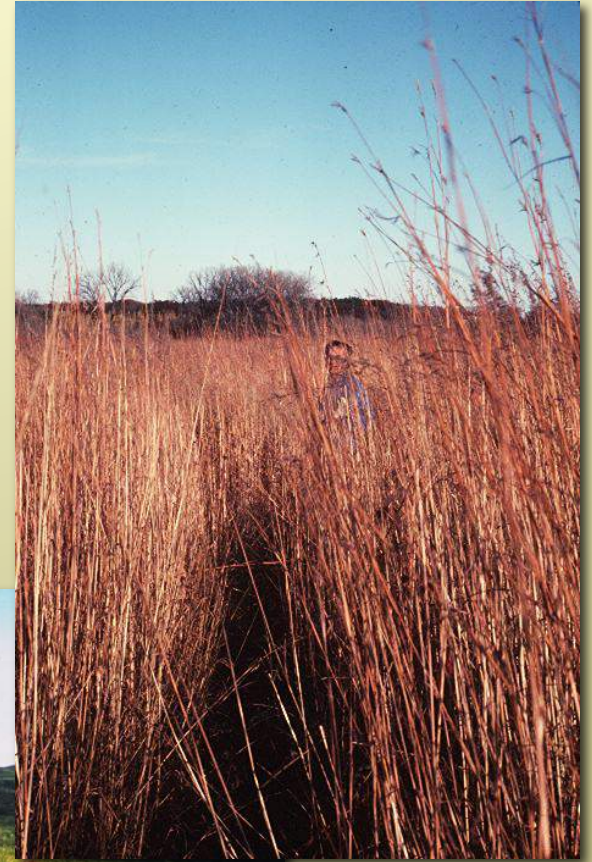
Temperate Grasslands

- American prairie gradients: west to east



Shortgrass prairie, Nebraska

Curtis Prairie
- tall grass,
Wisconsin



Konza Prairie - mixed grass, Kansas

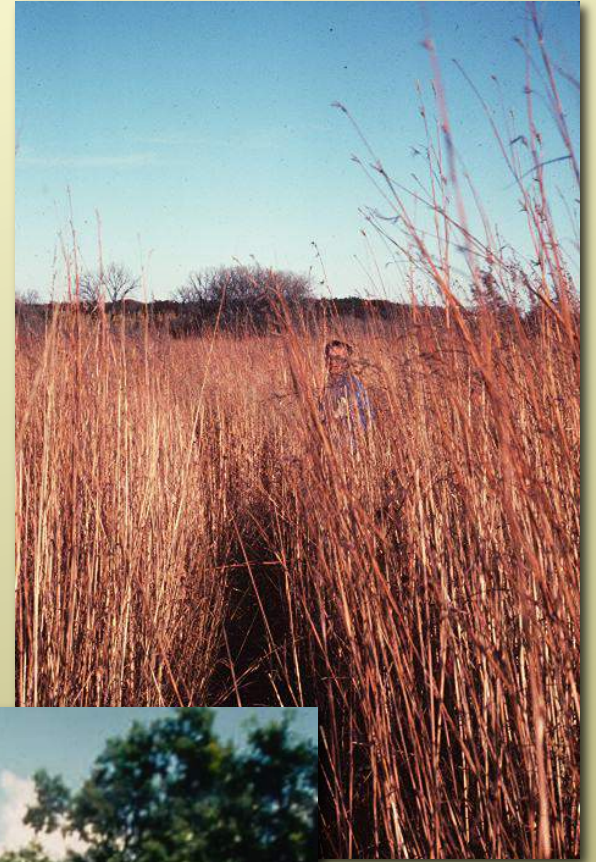
Temperate Grasslands

- American prairie gradients: forest - grassland



Prairie-oak savanna

Curtis Prairie
- tall grass,
Wisconsin



Temperate Grasslands

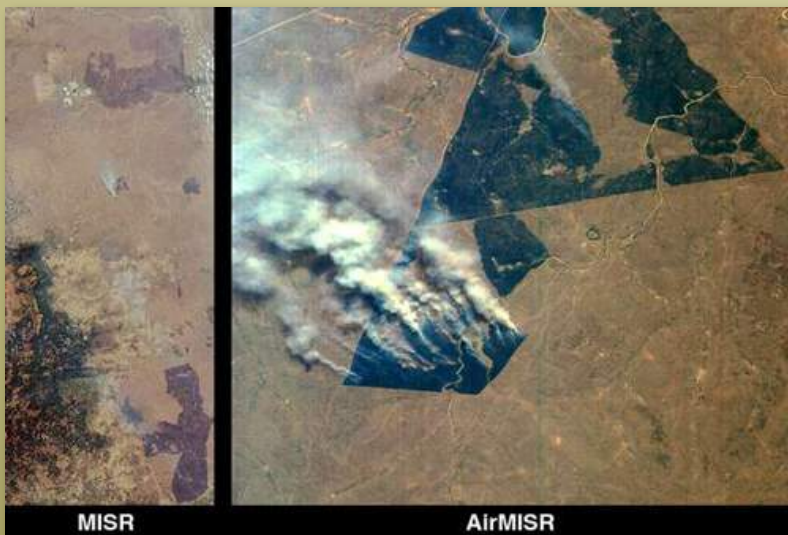
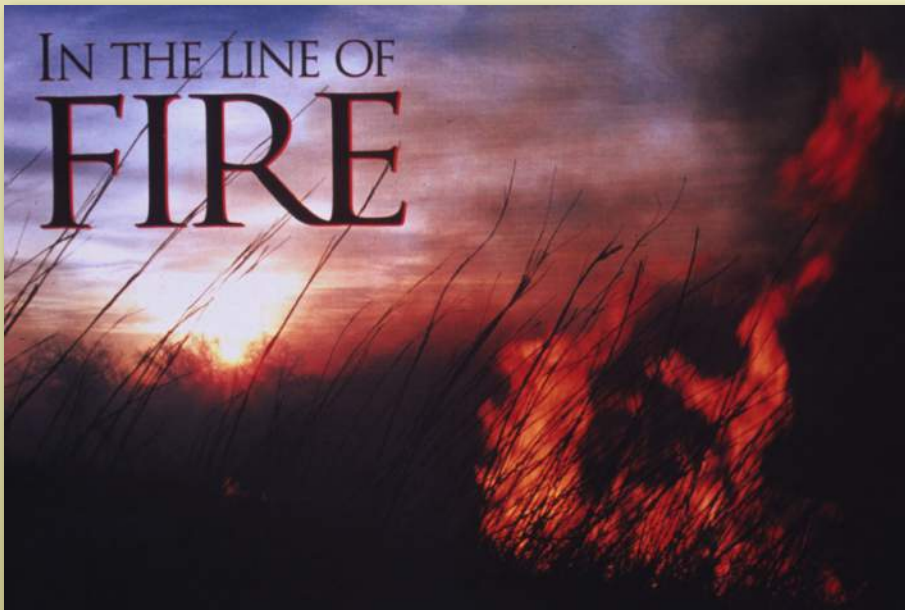
- soils are rich 'chernozems' or 'udolls'
- thick organic layer of very dark humus; active earthworm and soil fauna activity making this soil one of the most productive of terrestrial systems
- light rainfall and high evaporation makes mild leaching; therefore soil is neutral or only slightly acidic



A horizon

Temperate Grasslands

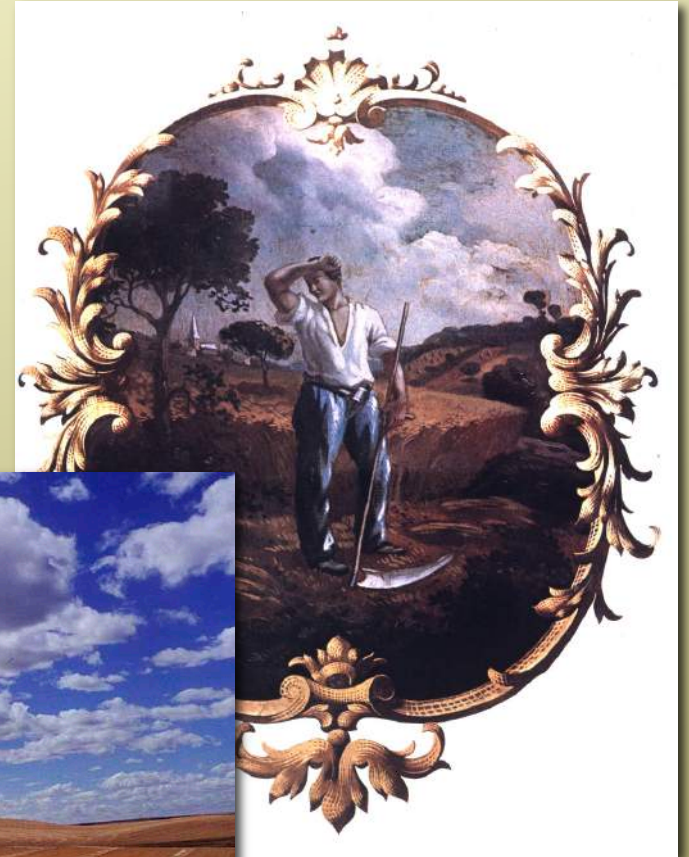
- **Changes:** fire suppression - once frequent and kept out woody species



- fire for agriculture still prevalent in South African veldt and South American pampas

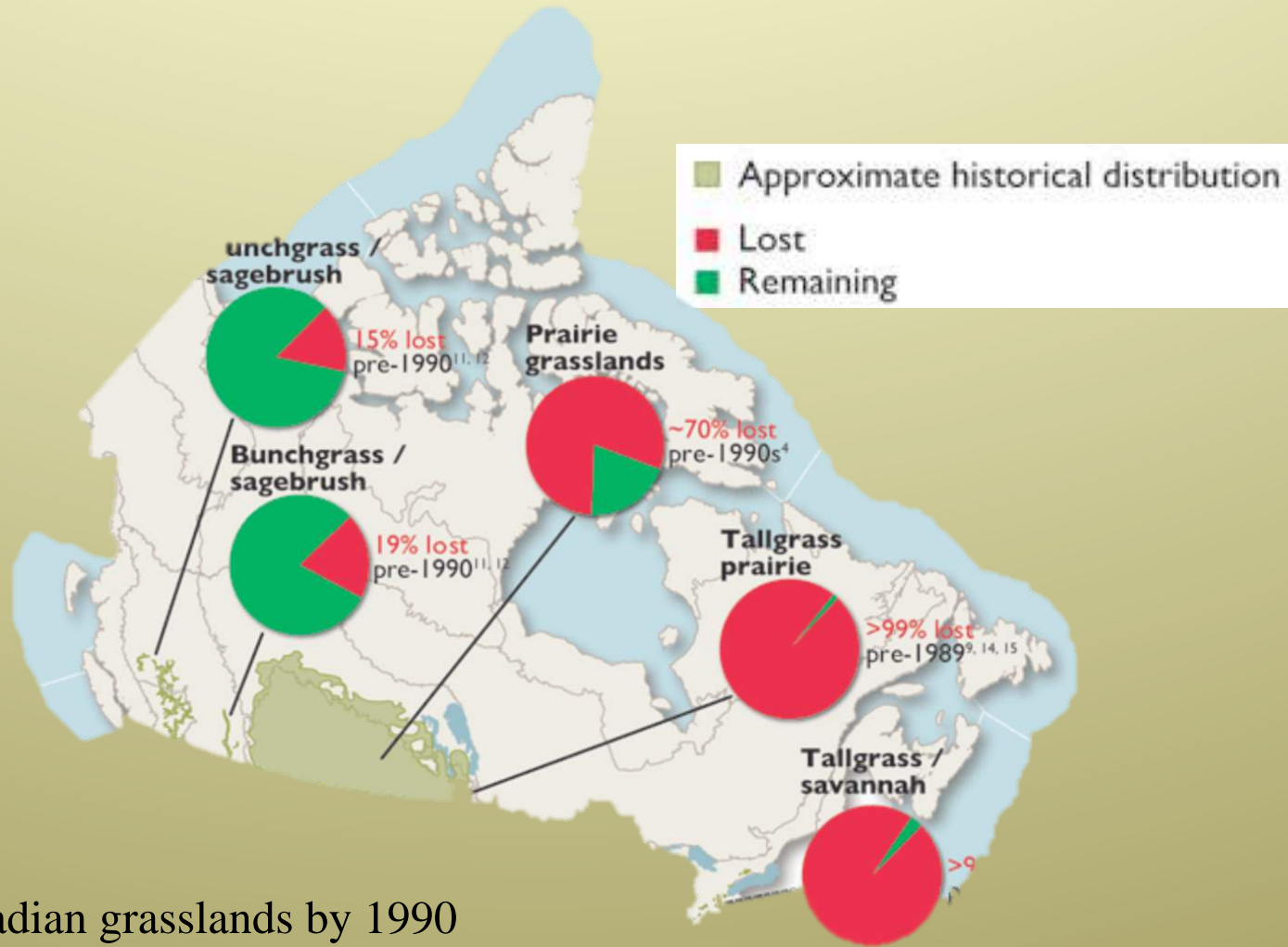
Temperate Grasslands

- **Changes:** large areas converted to agriculture (wheat, maize, legumes)



Temperate Grasslands

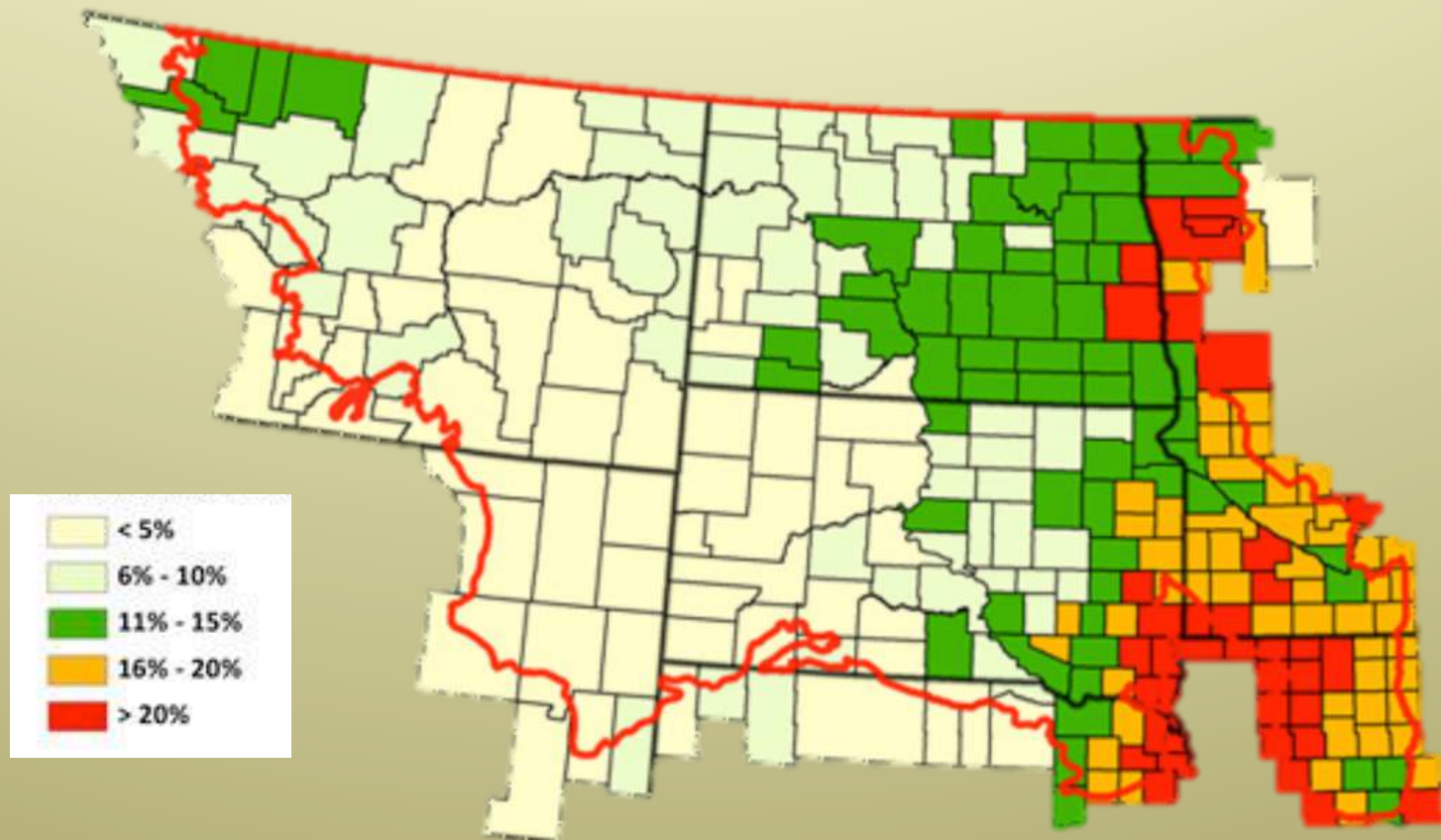
- **Changes:** large areas converted to agriculture (wheat, maize, legumes)



loss of Canadian grasslands by 1990

Temperate Grasslands

- **Changes:** large areas converted to agriculture (wheat, maize, legumes)



% grasslands & wetlands converted from 2008-2011

Temperate Grasslands

- **Changes:** loss of characteristic **cursorial fauna** of ungulates (bison, antelope, gazelle, wild horse) or equivalent flightless birds in South America (rhea)



Buffalo, South Dakota



Pronghorns on short grass prairie, Nebraska

Temperate Grasslands

- **Changes:** loss of characteristic **cursorial fauna** of ungulates (bison, antelope, gazelle, wild horse) or equivalent flightless birds in South America (rhea)

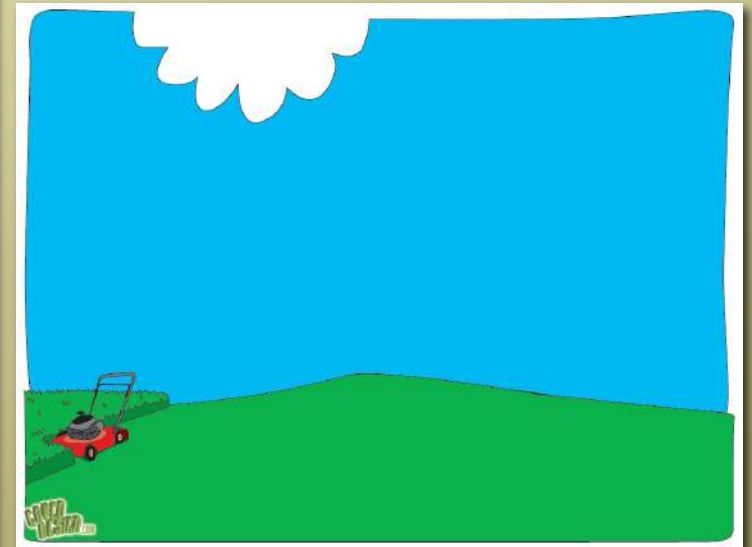
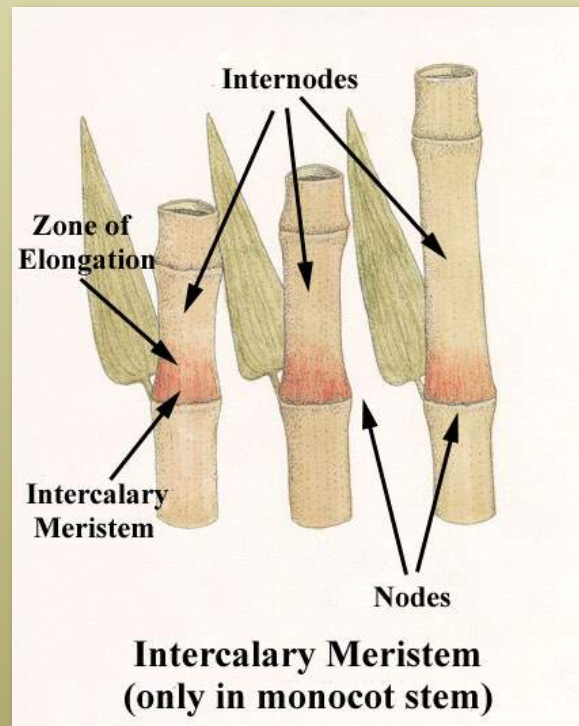


Rhea, Argentinan pampas

Antelope, Asian steppes

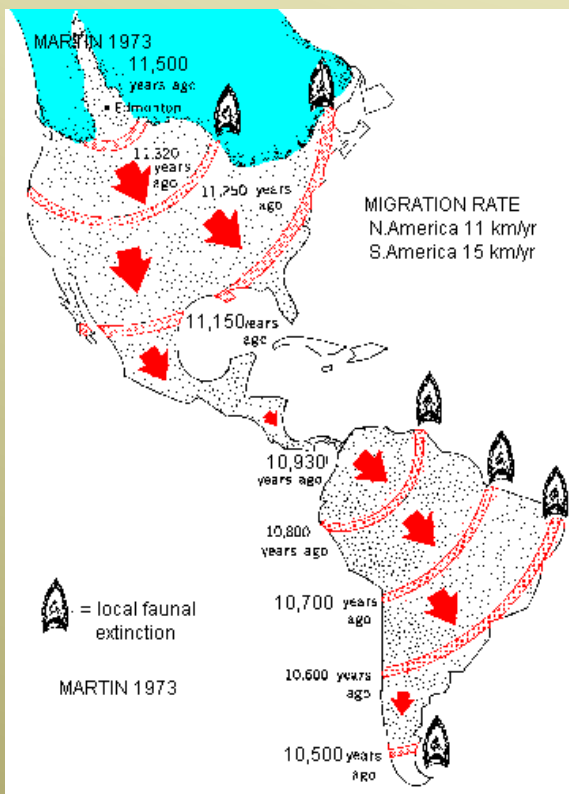
Temperate Grasslands

- grasses and sedges have **high silica content** in leaves
- ungulates acquired early on **high-crowned teeth** in which growth continually replaces the worn surfaces as adaptation
- grasses and sedges have ability to resprout after grazing (good example is the prairie ungulate replacer: the **lawn mower**)



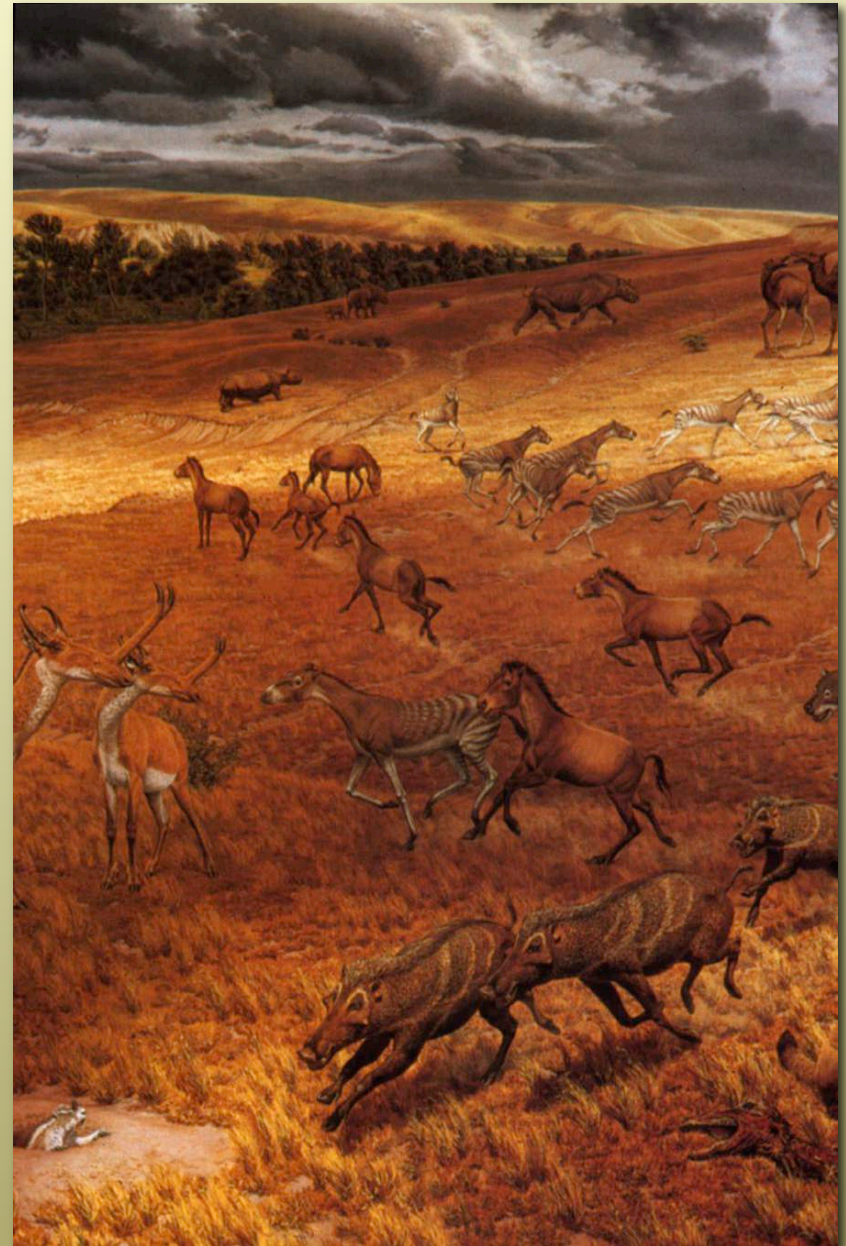
Temperate Grasslands

- **Changes:** major extinction of megafauna in North America from the Pleistocene - Holocene



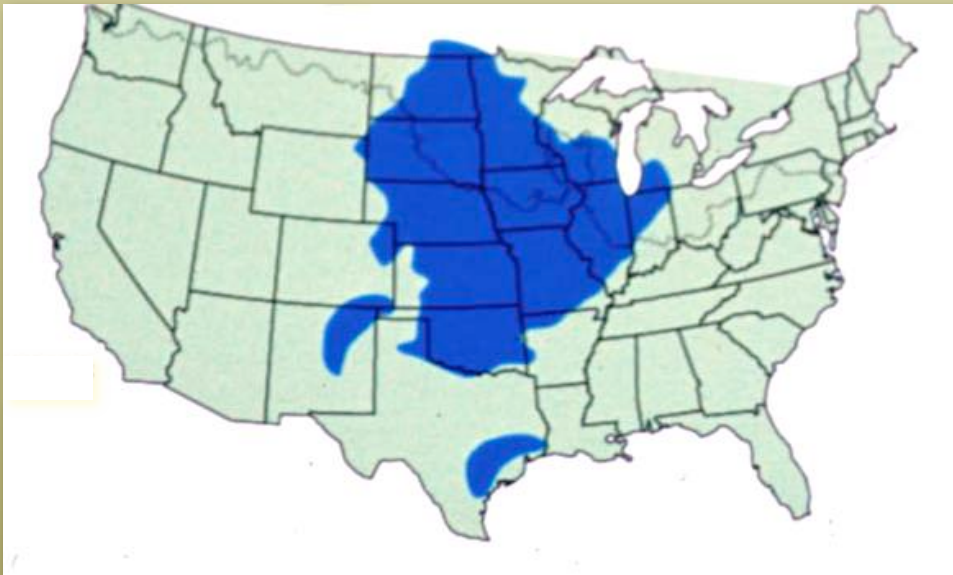
“Overkill” hypothesis?

Missouri in Pliocene 5-6mya



Temperate Grasslands

- **Floristics** of American prairies:
- few endemic species suggesting that prairies developed comparatively recently and attained present distribution only in post-glaciation or Holocene (Axelrod, 1985)



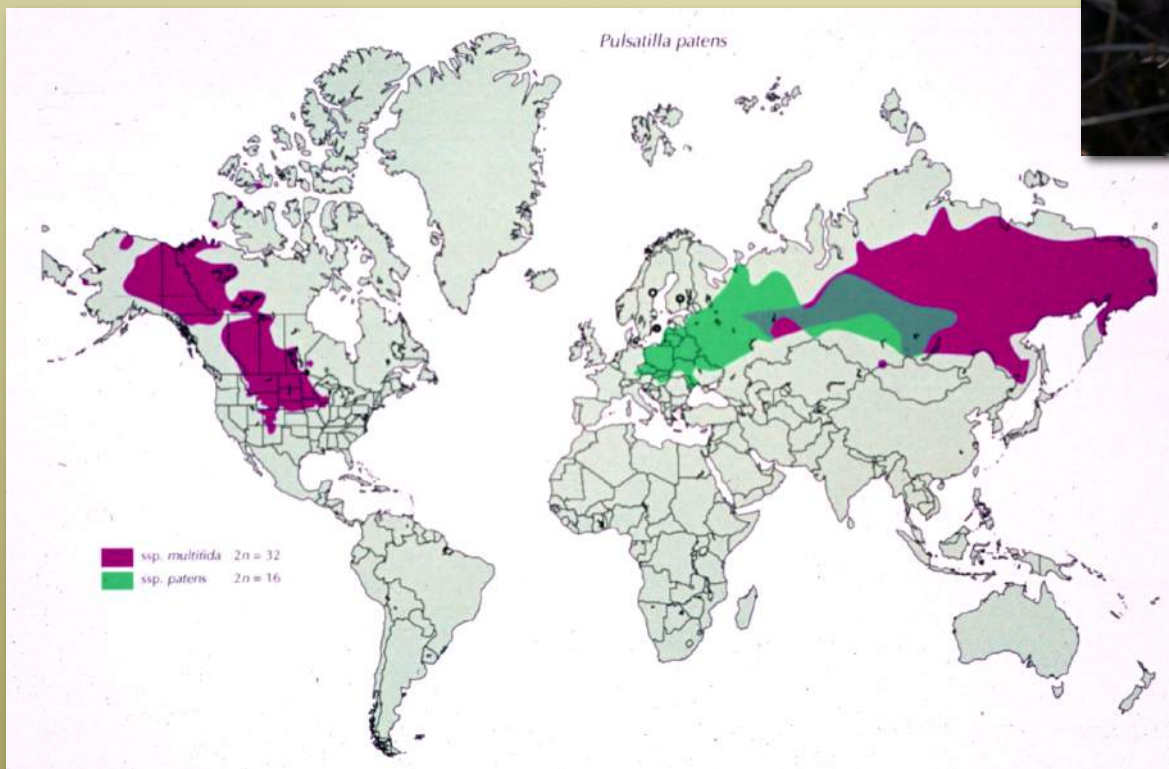
Amorpha canadense
Leadplant (Fabaceae)

Temperate Grasslands

- **Floristics** of American prairies:
- widespread distribution across Beringia into Eurasian steppes common



Anemone patens
Pasque flower (Ranunculaceae)



Temperate Grasslands

- **Floristics** of American prairies: 3 major families
- Poaceae - grasses



Sorghastrum nutans - Indian grass



Andropogon gerardii - big bluestem

Temperate Grasslands

- **Floristics** of American prairies: 3 major families
- Poaceae - grasses



Panicum virgatum -
switch grass



Bouteloua - side oats
gamma grass



Sporobolus heterolepis -
prairie dropseed

Temperate Grasslands

- **Floristics** of American prairies: 3 major families
- Fabaceae - legumes



Lupinus perennis - lupine



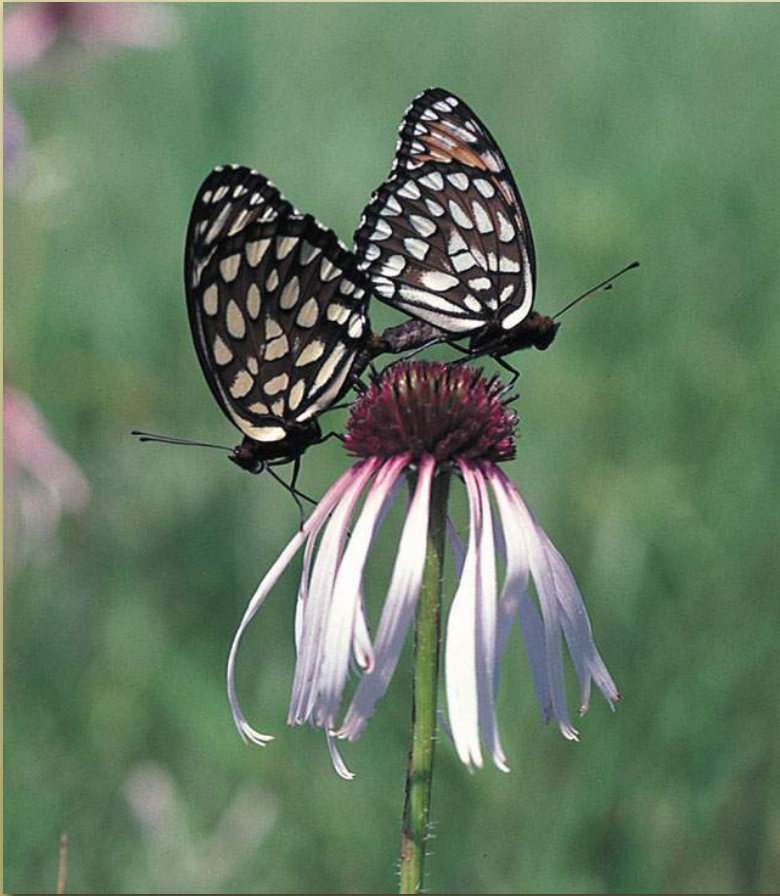
Baptisia bracteata -
creamy wild indigo



Amorpha canescens - lead plant

Temperate Grasslands

- **Floristics** of American prairies: 3 major families
- Asteraceae - composites



Echinacea - purple coneflower



Silphium terebinthinaceum / *laciniatum* -
prairie dock, compass plant

Temperate Grasslands

- **Floristics** of American prairies: 3 major families
- Asteraceae - composites



Liatris aspera - blazing star



Solidago rigida - stiff goldenrod

Temperate Grasslands

- **Floristics** of American prairies:

Extra Credit!

Take digital image of this
“harbinger of spring” for prairies

Anemone patens - pasque flower
(Ranunculaceae)



A landscape photograph showing a vast field of tall, thin grasses in the foreground, extending to a distant horizon. The sky is a pale, hazy blue, suggesting dusk or dawn, with a single, bright, circular object (likely the moon) visible in the upper left quadrant. The overall mood is serene and contemplative.

Close the book on biomes for now

we will revisit some of these
biomes after first examining
the twin issues of evolution of
earth and life