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

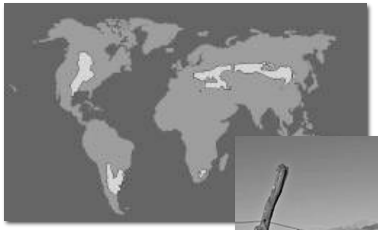
- One of the most extensive of the biomes
- Eurasia: **steppes** 250 million ha running from Hungary to Manchuria

Mongolian steppe

Russian Steppe

Temperate Grasslands

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



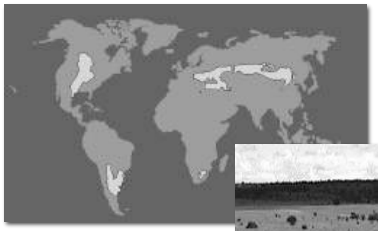
Temperate Grasslands

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

Cortaderia - pampas grass

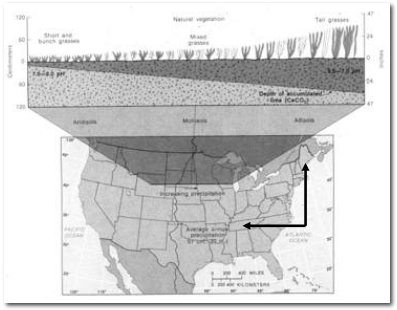
Temperate Grasslands

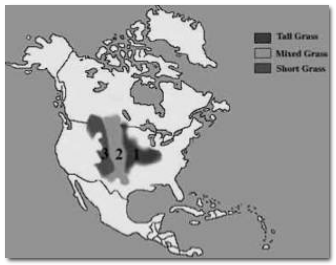
- One of the most extensive of the biomes
- South Africa: **grassveldt**



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

Curtis Prairie - tall grass, Wisconsin

Prairie-oak savanna

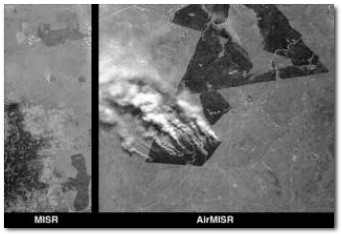
Temperate Grasslands

- soils are rich 'chernozens' 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 supression - once frequent and kept out woody species



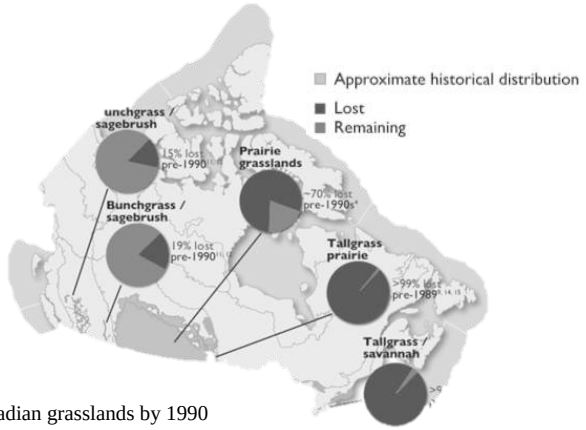
- fire for agriculture still prevalent in South African veldt and South American pampas

Temperate Grasslands

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

Temperate Grasslands

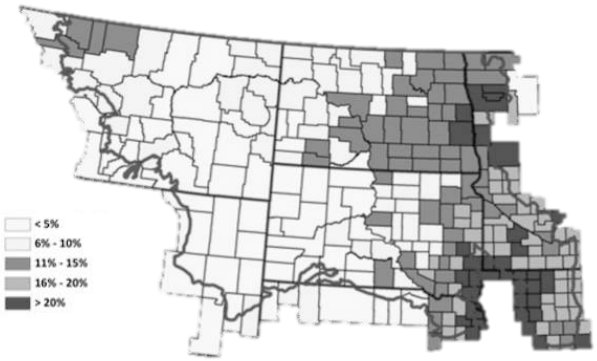
- **Changes**: large areas converted to agriculture (wheat, maize, legumes)



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

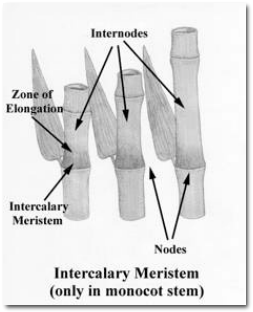
- **Changes**: loss of characteristic cursorial fauna of ungulates (bison, antelope, gazelle, wild horse) or equivalent flightless birds in South America (rhea)

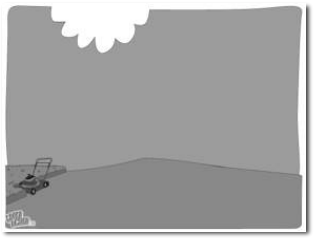
Antelope, Asian steppes

Rhea, Argentinan pampas

Temperate Grasslands

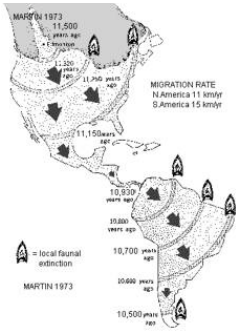
- grasses and sedges have high silica content in leaves
- ungulates acquired early on high-crowned teeth in which growth continually replaces the worn surfaces as adaptation
- grasses and sedges have ability to resprout after grazing (good example is the prairie ungulate replacer: the **lawn mower**)



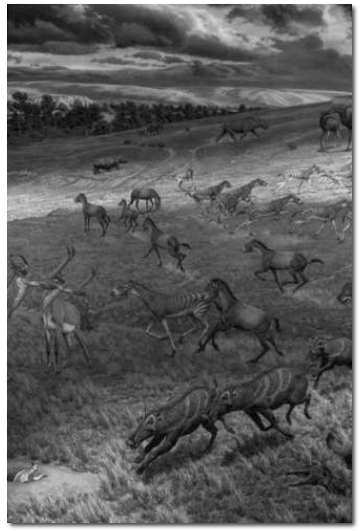


Temperate Grasslands

- **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:
- Prairie peninsula of tall grasses may have extended to East Coast - floristic (and faunistic) linkages

Temperate Grasslands

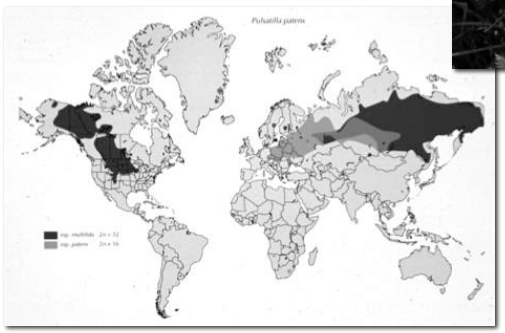
- **Floristics** of American prairies:
- few endemic species suggesting that prairies developed comparatively recently and attained present distribution only in post-glaciation or Holocene (Axelrod, 1985)

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)

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