Grazing lands definitions

- Rangeland=Natural grasslands, pasturelands, shrublands, meadows, tundras, coastal marhes, and savannas.
- Pastureland=consist of single- or native multigrass species and grass-legumes mixtures.
  - Pasturelands cover 40% of the terrestrial earth
- Grasslands=lands that are predominately covered by grass with <10% tree and shrub cover

Degradation of Rangeland

- Desertification of Rangelands results from
  - Drought
  - Over Grazing
  - Excessive harvest of trees
- Drought will intensify the effects of overgrazing
- Therefore, rangelands in dry areas are more susceptible than in humid and tropical areas.

Degradation of Rangeland

- The rate of desertification is a function of disturbance and the resilience of the rangeland.

Degradation of Pasturelands

- Pasturelands are seldom natural systems because of human influences
  - Cultivation
  - Excessive grazing
  - Fires???
  - Road construction
  - Introduction of invasive species
- Conversion to agricultural and urban land uses is the main factor responsible for reduced total area of pasturelands

Conversion of Pasture to Cropland

- The world's most productive natural grasslands have or are being converted to prime cropland.
- Grazing is therefore relegated to marginal lands
  - Marginal lands in drier areas or less productive soils
  - Oklahoma is a poster child for this practice
    - Many marginal lands were cultivated but then converted back to pastures

Reversion of cropland back to "Rangeland" in OK

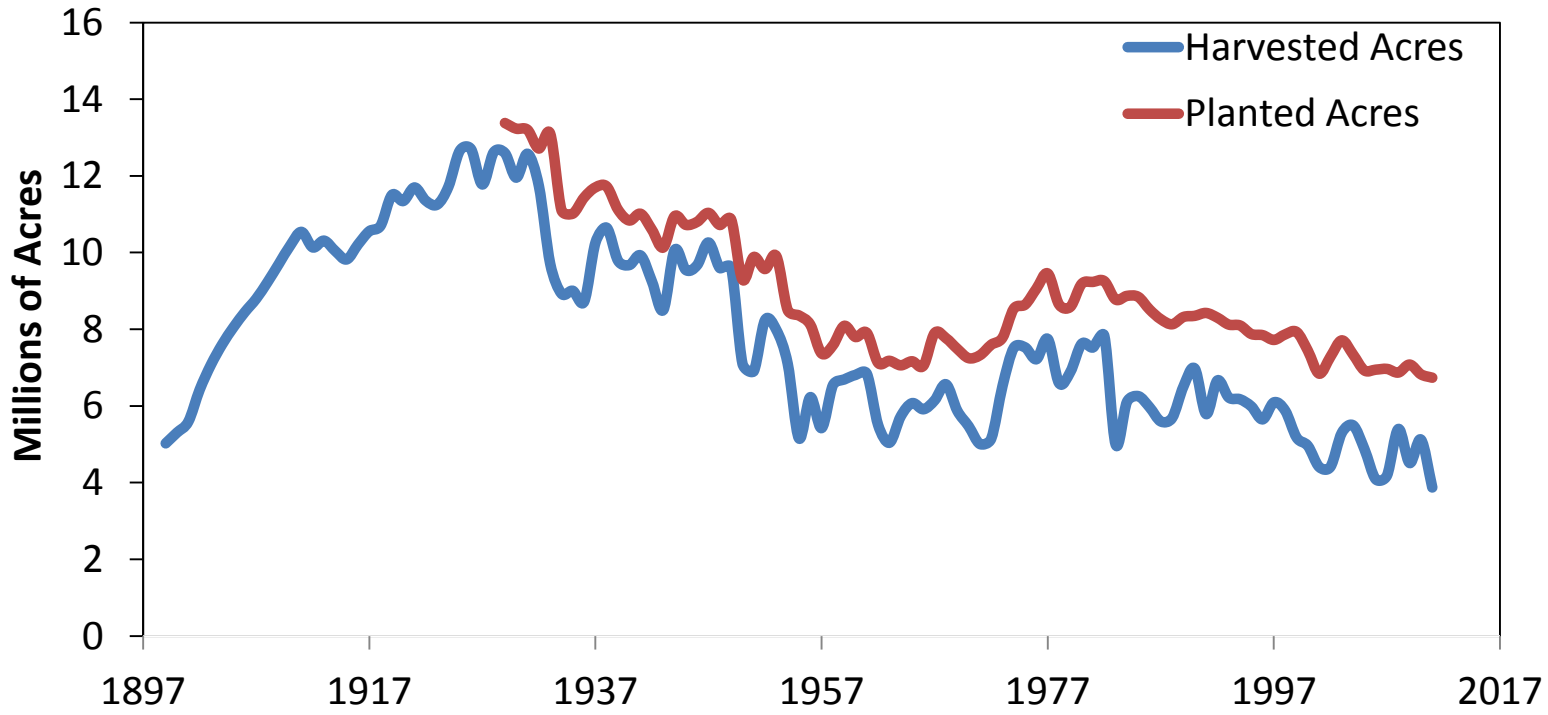
- Settlers did not understand the productivity and resilience of soils.
- No soil survey
- Were required to cultivate land to keep it.
- Very highly erosive and/or low productivity soils were "let back" during the 30s
  - These lands went through natural decolonization (succession)

Reversion of cropland back to "Rangeland" in OK

- The Soil Bank Act of 1956 estabilished the first Conservation Reserve Program (CRP)
  - 28.7 million acres of cropland in the U.S. were converted to pastures and forests
- Current CRP program
  - 29.7 million acres in U.S.
  - Annual Rental Payments $1.7 Billion

Historic Cropland in Oklahoma

- Graph represents wheat, corn, soybeans, cotton, rye, canola, and Sunflower



Signs of Cultivation in Oklahoma Pastures

- Plow pans
- Terraces
- Gullies
- Low productivity
- Dominance of invasive species
  - Eastern Red Cedar is very competitive on previously cultivated pastures.
  - Low fertility and highly eroded.

Grazing Management

- Commercial Grazing:
  - Intensive grazing of managed grasslands
  - Grasslands are seeded and fertilized
- Traditional:
  - Less intensive grazing
  - Practiced on “native” rangelands
  - No fertilizer
  - Seeded to native species if at all

Grazing Impacts on Erosion

- Over grazing can result in excessive erosion due to:
- Removal of surface biomass and residue
  - Leaves bare surface susceptible to soil detachment
- Alteration of species diversity
  - Decreases resilience against desertification
- Hoof action, which causes lateral displacement (slumping) of soil on slopes

Impact of Overgrazing on Soil Structure

- Removal of biomass and residue in conjunction with hoof action decreases:
  - aggregate stability
  - Macroporosity
  - Total porosity
  - Water infiltration
- Removal of biomass increases:
  - Crusting

Excessive Grazing Impacts on Soil Compaction

- Excessive compaction results from an interaction between weight of animals and destruction/removal of biomass
- Below and aboveground biomass can prevent compaction from grazing
- Prolonged intense grazing removes biomass and exerts pressure on soil
  - This results in severe compaction

Rotational Grazing and Compaction

- Rotational grazing allows for more rapid biomass removal but then allows for recovery after cattle are removed
- Intensity of rotational grazing can vary
- Producers may move animals as few times as once per year or as often as twice per day (Mob grazing)
- More intensive rotations are being used in planted grasslands

Impact of Overgrazing on Soil Water

- Compaction and crusting causes decreased infiltration and increased runoff
- Areas where bare ground is exposed have less water and higher summer temperatures
- This causes a delay in recovery of damaged soils

Impact of grazing on Soil Organic Matter

- Overgrazing can cause decreases in soil organic matter
- This leads to decreased microbial activity, aggregation, and fertility
- Decreased organic matter can be responsible for permanent reduction in productivity

Impact of grazing on Soil Organic Matter

- Moderate grazing can stimulate growth by removing dead biomass
- This growth may maintain or increase SOM
- Although aboveground biomass is removed, root growth is stimulated and can add to SOM
- Moderate grazing can also enhance species diversity in some systems