Grazing lands definitions

- Rangeland=Natural grasslands, pasturelands, shrublands, meadows, tundras, coastal marshes, 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 established 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