Chapter 7 – Livestock Grazing and Rangeland Issues
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• Learning Objectives:
  – 1) To discuss contentious issues involving livestock grazing on arid and semiarid rangelands:
    • Desertification
    • Watersheds, wetlands, and riparian areas
    • Public lands grazing in the western U.S.
    • African, Asian, and Australian grasslands
    • Wildlife habitat and livestock
    • Preservation of endangered species
    • Predator and pest control programs
Chapter Outline:

I. OVERVIEW-LIVESTOCK GRAZING AND RANGELAND HEALTH
II. RANGELANDS, LIVESTOCK, AND DESERTIFICATION
III. LIVESTOCK-WILDLIFE INTERACTIONS
I. OVERVIEW-LIVESTOCK GRAZING AND RANGELAND HEALTH

Issue: Grazing livestock on rangelands is a controversial issue.

- Historically, once prime rangelands in the Mediterranean & Middle Eastern regions are now stark “human-made deserts” due to severe erosion, often associated with overgrazing by livestock.
II. RANGELANDS, LIVESTOCK, AND DESERTIFICATION

Rangelands: Those areas where the native vegetation is predominantly grasses, shrubs, or open woodlands.

• Figures:
  1. Account for 61 and 70% of land in U.S. and world
  2. Tend to be unsuitable for cultivation. Livestock grazing is the most ubiquitous human activity on Earth.
  3. In U.S., 84 and 74% of mammal and bird species are found in rangeland ecosystems with 1/3 being threatened – blamed mostly on cattle!
  4. Rangelands are mostly used for livestock grazing, which has affected global biodiversity (elimination of predators and pests) and has caused removal of fire fuel (dried grasses), which facilitated the invasion of exotic plants (including invasion of trees (cedars, junipers, and mesquite) and pathogens.
  5. Historically, large herbivores co-evolved over 45 million years with grasslands, which were also maintained by periodic fires
  6. Grazing, per se, does not destroy (grass) rangelands
  7. Most U.S. grasslands were destroyed by the plow! Dustbowl?
II. RANGELANDS, LIVESTOCK, AND DESERTIFICATION

**Watersheds**: An area drained by a distinct stream or river system and separated from other similar systems by ridgetop boundaries. Areas include most of the West, much of Australia, the Sahel, savanna of southern Africa, grasslands of So. America and steppes and plains of Europe

- Functions in capturing water, storing it in the soil, and slowly releasing it into springs and seeps and ultimately into streams and rivers
- Influences flooding, river levels, water storage, and vegetation patterns

- Sensitive to grazing management decisions
- Proper vegetation cover is critical to allow for normal water infiltration, which prevents run-off and erosion (flash floods)
- Plant species composition and litter are also important as is non-compacted soils and role of burrowing animals and insects
- Abuse takes years for recovery (no livestock grazing)

[http://walkerwaterworld.pbworks.com](http://walkerwaterworld.pbworks.com)
II. RANGELANDS, LIVESTOCK, AND DESERTIFICATION

Riparian area: The zone between a river or stream and the nearby upland areas (page 194). Can be protected with fences, proper grazing time, off-stream stock watering tanks and salt, etc.

- Overgrazing causes severe environmental damage of water-sheds and riparian areas. Ranchers and environmentalists should work together to solve problems! Livestock should be used as a tool to manage healthy ecosystems.
II. RANGELANDS, LIVESTOCK, AND DESERTIFICATION

**African Grasslands and the Sahel:** The Serengeti plains of East Africa provide a living laboratory of grassland:herbivore interactions.

- The Sahel is a region of semiarid land in northern Africa that lies between the Sahara to the north and savanna to the south.
- Since 1960’s, the Sahelian region has endured drought, desertification (expanding southward into the savanna), and famine.
II. RANGELANDS, LIVESTOCK, AND DESERTIFICATION

**African Grasslands and the Sahel:**
- A previously ecologically stable Nomadic system was destroyed and replaced with rapid population growth, overgrazing, soil erosion, desertification, and unstable cropping systems that emphasized short-term profits at the expense of sustainability.
- Desertification refers to long-lasting land degradation due, in part, to human activities (social and political residues of colonialism followed by misguided development programs, not overgrazing).
- One solution is the planting of trees and shrubs that are properly managed for forage and fuel.
II. RANGELANDS, LIVESTOCK, AND DESERTIFICATION

**African Grasslands and the Sahel**: The Serengeti plains of East Africa provide a living lab of grassland:herbivore interactions.

- Ironically, in the Sahel, and other semiarid regions of the world, range livestock production is probably the only sustainable, ecologically sound system capable of producing human food.
- Unfortunately, foreign experts have perceived livestock production as the problem rather than the solution.
II. RANGELANDS, LIVESTOCK, AND DESERTIFICATION

Desertification of Rangelands in Asia: Desertification of rangelands of north China is occurring at a rate of > 1 million hectares per year.

- The degradation of grasslands, triggered by conversion of the fragile semiarid region into production of grains and cash crops, caused traditional nomadic herders to become more sedentary in a smaller area, leading to overgrazing/severe wind and water erosion.
- As the case of the Sahel, the problem has not been livestock, *per se*, but due to political and economic events.
Livestock Grazing and Australian Grasslands:

- The flora of Australia evolved in the absence of large and hoofed mammalian herbivores and the eradication of natural predators. Grass- and shrub-lands have been severely damaged from heavy grazing by camels, cattle, goats, and sheep, and rabbits! Because of the soil types, the exposure leads to extensive erosion.
- Major clearing of native eucalyptus forests, in combination with a complex interaction of factors, has resulted in rising water tables, causing severe soil salination (“tree die-back”).
- Government has launched a major program: “Greening Australia” in planting ~1 billion trees.
- “In situ” wildlife tourism is being recommended to restore ecosystems and revitalize the economy.
- Developing drought-resistant emergency fodder crops (e.g., spineless cactus and American aloe).
III. LIVESTOCK-WILDLIFE INTERACTIONS

Habitat and Food Resource Interactions: Is there competition?
• Grazers (grass) – cattle, horses, bison, elk, and nilgai
• Intermediate feeders – sheep, goats
• Concentrate selectors (browse) – deer, proghorn

Dietary vs. Habitat Overlap:
• Deer and Cattle (habitat but not dietary overlap)
• Elk and Cattle (dietary but not habitat overlap)
• Deer and Elk (neither dietary nor habitat overlap)
III. LIVESTOCK-WILDLIFE INTERACTIONS

**Myth:** Cattle, goat, and sheep grazing harms wildlife habitat

- Cattle can be used as a tool to improve habitat/forage for wildlife (e.g., elk prefer to graze succulent regrowth from previous cattle grazing).
- Well-managed pastures can become a magnet for small mammal, bird, and insect populations (e.g., Greg Judy).
- Many ranchers have become key players in wildlife conservation efforts (e.g., Environmental Stewardships awards).
III. LIVESTOCK-WILDLIFE INTERACTIONS

Serengeti Model: Animals share forage resources very efficiently, while avoiding competition; also movement (migration) and “mob action”; role of natural predators - to maintain a healthy balance of biodiversity.

• It has been proposed that it would be more ecological and economically sustainable to properly practice sustainable “game farming” in the region rather than to raise livestock (more vulnerable to tropical diseases).
III. LIVESTOCK-WILDLIFE INTERACTIONS

Game Farming and Ranching: The issue of raising wild animals on ranches is controversial in North America.

- V. Giest (wildlife biologist from Univ. Calgary) vigorously opposes this practice. NA wildlife are less competitive (evolved in cold, dry climates - low pathogen load – less genetic resistance). Outcome: Native species have either been “driven out” or “genetically polluted” (e.g., Bighorn sheep/White-tailed deer). However, bison vs. cattle is more acceptable to environmentalists.

Predator/Pest Control Programs: U.S. efforts have been largely unsuccessful (e.g., coyote). Protect livestock with guard animals.
III. LIVESTOCK-WILDLIFE INTERACTIONS

Game Farming and Ranching:

- **South Africa:**
  - Game ranching has been highly profitable and sustainable. Why?
  - Native species have been preserved.
  - Landowners are considered owners of wildlife on their property, hence a strong incentive to practice sustainable harvest levels.
  - Cattle have been integrated with wildlife – balance of grazing and browsing, optimizing land use.

- **Australia:**
  - Kangaroos vs. sheep – Kangaroos have soft pads vs. hard hooves, use less water, and have 30% lower metabolic rate than sheep. Overgrazing by sheep has caused tremendous land degradation and severe damage to native vegetation.