Chapter 12: Grasslands, Forests, and Wilderness

Sustainable Management Strategies
Public Lands

- **Iowa is 49th of all 50 states in public land.**
- Federal Land Holding are significant in western states.
- Federal Departments Involved in Land Management Activities
  - USDA: **USFS**
  - US Dept of Interior: **BLM, USFWS, NPS**
Federal Regulations

- National Environmental Policy Act (NEPA)
- Multiple Use Sustained Yield Act
- Freedom of Information Act
- Wilderness Act
- Wild and Scenic Rivers Act
12.1 The Tragedy of the Commons

- Communal resources—resources held in common by people—often deteriorate as individuals become caught up in a cycle of self-gratification. For example:
  - Land
  - Air
  - Oceans
The Tragedy of the Commons

- Personal gain dictates actions that have negative effects shared by all who use communal property.

- Privately owned lands also deteriorate as a result of ignorance, greed, and other factors.
12.2 Rangelands and Range Management: Protecting the World’s Grasslands

- Rangelands—grasslands on which livestock graze—are an important element of the global agricultural system.

- When properly managed, they can be a sustainable food source.
Grasses form the base of the food chain on rangelands.

These hardy species are adapted to periodic drought, fire, and grazing as long as care is taken to protect the metabolic reserve of the plant.
The Condition of the World’s Rangeland

- A large percentage of publicly and privately owned rangeland in the United States and other countries has been degraded because of unsustainable land management practices such as overgrazing.
Figure 12.02: Private abuse. This privately owned farmland is deteriorating because of poor land management, which has led to severe soil erosion.

Courtesy of Lynn Betts/NRCS USDA
Grasses are well adapted to grazing pressure.

Grasslands and herbivores can coexist in a sustainable relationship that is beneficial to both.
Rangeland Management: A Sustainable Approach

- Rangeland and pasture use must be adjusted according to the carrying capacity of the land, which varies with the weather from one year to the next.
Rangeland Management: A Sustainable Approach

- Those who cannot adjust their herd size run the risk of lowering the carrying capacity of their land and even destroying grazing opportunities.
Rangeland Management: A Sustainable Approach

- Cattle can be shifted from one pasture to another to permit grasses to mature and produce seeds.

- This method enhances the condition of rangeland and may increase the carrying capacity in the long run.
Figure 12.04: Deferred grazing scheme. Each field gets nearly a 2-year rest during a 6-year rotation cycle.
Rangeland Management: A Sustainable Approach

- Fencing and careful distribution of water sources and salt licks can help promote a more uniform use of rangeland and protect some areas from serious degradation.
Rangeland Management: A Sustainable Approach

- Restoration of degraded grasslands is an essential element of building a sustainable system of livestock production.

- Efforts to boost the productivity of land, including periodic burns, also help.
Many ill-conceived government policies result in the deterioration of publicly owned rangeland.

To promote sustainable use of grasslands, government policies should be based on objective scientific criteria.
Sustainable Livestock Production

- In many countries, livestock are raised in pens and fed grains (grown on land) that could be used to feed large numbers of people.
Figure 12.06: U.S. forestland. This map shows the distribution of forestland in the United States.
12.3 Forests and Forest Management

- The world’s forests provide many social, economic, and environmental benefits.

- A large portion of the world’s forests have been logged or disturbed.

- Very little forested land is under permanent protection.
Status Report on the World’s Forests

- About one-half of the world’s forests have been cut.

- The land they once occupied has already been converted to other uses, mostly farming, or undergone severe deterioration.
Figure 12.01: Legacy of past abuse.
Status Report on the World’s Forests

- Deforestation continues today at a rapid pace and threatens the long-term sustainability of human civilization.

- Deforestation continues in:
  - tropical rain forests
  - northern coniferous forests
  - temperate deciduous forests
Deforestation results from many factors, including:

- frontierism
- a lack of knowledge of the importance of forests
- population growth
- poverty
- inequitable land ownership

Figure SOSD12.01: This boy in Nepal is holding trees that will be planted to restore lost rain forest.
Root Causes of Global Deforestation

- Many nations still view forests as vast untapped reserves of wealth and actively promote their exploitation, in spite of the many ecological benefits.

- Ill-advised government policies, including below-cost timber sales, contribute to widespread deforestation and unsustainable forest management.

- These policies are often promoted by powerful economic interests that stand to gain from lenient timber-harvesting practices.
Trees are harvested primarily in four ways:

- clear-cutting
- strip-cutting
- selective cutting
- shelter-wood cutting

Figure 12.07: Clear-cutting. This clear-cut is not only an eyesore but also increases soil erosion, impairing forest regrowth and polluting nearby lakes and streams.
Introduction to Forest Harvesting and Management

- Clear-cutting removes entire forests quickly and efficiently.

- Some tree species such as pines, which grow in open sunny fields, are best harvested in clear-cuts.

- Clear-cuts benefit certain wildlife but tend to destroy and fragment the habitat of others.

- Clear-cutting creates ugly scars and can cause considerable environmental damage such as increased soil erosion.
Figure 12.08A: A bird and its forest. The spotted owl is just one of many species that are adapted to.

Figure 12.08B: Old-growth forests. When its habitat is destroyed, the owl disappears.
Clear-cutting can be carried out on a smaller scale to minimize visual and environmental impacts.

One technique is known as strip-cutting—clear-cutting smaller, narrower strips of forest.
Selective cutting takes place in multi-species forests with species whose seedlings grow best in shade.

It reduces visual scarring but is expensive and time-consuming and can cause considerable damage to unharvested trees.
Introduction to Forest Harvesting and Management

- Selective harvesting can be modified to correct its problems through shelter-wood cutting.

- This method, while more expensive, helps preserve multi-species forests.
Creating a Sustainable System of Forestry

Four measures are required to create a sustainable system of wood production:

1. reductions in demand for wood and wood products
2. sustainable management
3. establishment of forest preserves
4. restoration of forest land
Creating a Sustainable System of Forestry

- Demand for wood and wood products can be greatly reduced by:
  - controlling growth of the human population
  - using wood and wood products more efficiently
  - finding alternatives
  - recycling paper and wood materials

Figure 12.09A: The wooden I-beam.
Figure 12.09A: The wooden I-beam.
Better management of existing forests, based on sound scientific principles, helps to create a more diverse and healthier forest that is less susceptible to disease and insects:

- tree thinning
- prescribed burns
- replanting

Certification programs can help promote sustainable forest management.
Figure 12.10A: Benefits of forest fires. Dense undergrowth in an Oregon pine stand results from the control of forest fires.
Figure 12.10B: Controlled burning removes the undergrowth.
Figure 12.10C: Periodic burning prevents disastrous fires, returns nutrients to the soil, and increases forage and wildlife.

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Creating a Sustainable System of Forestry

- Saving uncut or primary forests helps preserve biodiversity and protects nearby harvested forests from outbreaks of pests.

- Building a sustainable system of forestry will require efforts to replant millions of acres of forestland that has been cut and never replanted.
12.4 Wilderness and Wilderness Management

- Large tracts of wilderness, land largely untouched by humans, exist today.

- Pressure is mounting to develop many of these lands for timber, oil, and other resources.
Why Save Wilderness?

Wilderness offers many benefits to humans:

- provides refuge from urban life
- offers valuable ecological services
- is home to many species of plants and animals

Figure 12.11: More than just a pretty place. Wilderness restores us. It also offers numerous free ecological services, from climate control to watershed protection.
Why Save Wilderness?

- Historically, wilderness has largely been viewed as either a source of resources or an impediment to human progress.

- These opposing views are at the root of the controversy over wilderness protection.
The United States has a long history of wilderness preservation that continues today through the Wilderness Act. This law directs federal agencies to establish wilderness areas and stipulates the type of human activities that are permitted on these lands.