Foundations of Forest Sustainability

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Natural Resources & Forest Sustainability

- Issues to contemplate (after Floyd):
  - Concept of sustainability has evolved over thousands of generations
  - Historically, forest protection, food production, population growth and development are inextricably linked
  - More recently, global climate change, search for new sources of energy (fossil and renewable bio sources), and population growth have arisen

Natural Resources & Forest Sustainability

- Issues to consider (after Floyd):
  - The things we want from our forests change over time: place of worship - solitude – source of food, fiber, and fuel – recreation - biodiversity – global climate mitigation – spans over 5,000 years of human history
  - Many things we want from forests are mutually exclusive at the local level
  - In developing countries, forests are converted to agriculture and grazing to support larger human populations

Natural Resources & Forest Sustainability

- Issues to consider (after Floyd):
  - In developed countries forest issues involve enhancing biodiversity, protecting natural forests, and making our forests as resilient as possible in the face of climate change
  - In developed countries, population growth is slowing, food is produced on fewer acres and forest area is expanding

Natural Resources & Forest Sustainability

- In developed countries a big issue is how to balance intensive forest management (plantations) on some lands and protect sensitive natural forests elsewhere
- Trade offs exist between:
  - Forest plantations
  - Working forests
  - Protected forests

Shifting Management Philosophy

- 19-20th Centuries
- Agricultural Model
- Utilitarian
- Output oriented
- Forest productivity
- Stand level
- Timber primacy (sustained yield)
- Multiple use & carrying capacity

- 21st Century
- Ecosystem Model
- Eco-centric
- State oriented
- Forest resiliency
- Landscape level
- Multi-resource (sustainability)
- Integrated use

Why a Paradigm Shift?

- Changing societal values of a growing, affluent, and urbanized population
- Growing awareness of the ecological and environmental implications of climate change and globalization of trade and business
- Living beyond the ecological limitations of our natural systems

Why a Paradigm Shift?

- Growing concern over loss of biodiversity in managed forests, fragmentation, invasive and endangered species, wildfire, clean water/air, recreation and forest health

21st Century Environment

- Combined, these influences have had a significant impact on the way we view our forest resources and how society expects them to be treated in the future
- Creates opportunities for new thinking and approaches

Context of Sustainability

- In USA, the evolution of conservation and sustainability began over 150 years ago with the Conservation Movement (Marsh, Hough, Fernow, Pinchot, T. Roosevelt). Preceded by Penn and Jefferson who tried to balance material use of forests with a more romantic concept where unspoiled forest virtues were stressed.
- Environmentalism was also prevalent with Emerson, Thoreau, Muir, Leopold and then later with Carson, Nelson (Earth Day) and UNCED (Rio 1992)

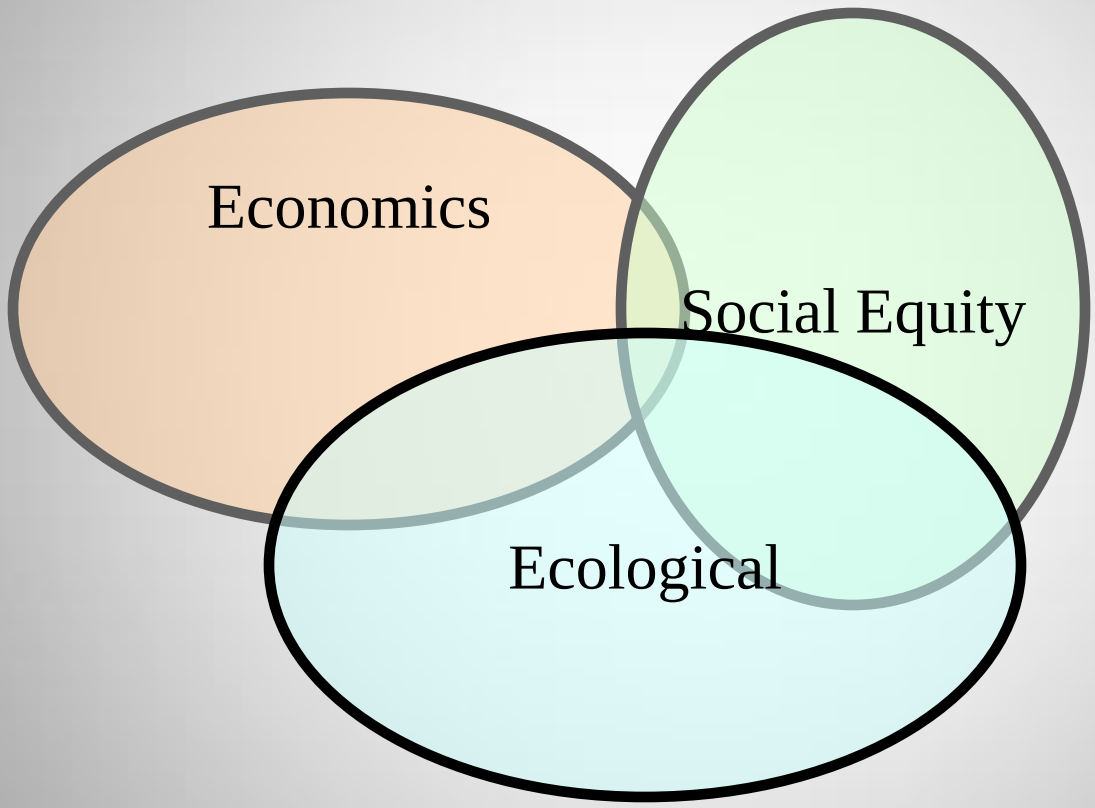
Context of Sustainability

- The UN established IPF (1995-97); IFF (1997-2000); UNFF (2000) to build political commitment for SFM
- 2011 was the UN's International Year of Forests
- The evolution of the conservation and environmental pathways have created the sustainability movement or revolution

Context of Sustainability

- Characteristics include (after Edwards, The Sustainability Revolution p.7)
  - Concern for environment, economy and social equity
  - Knowledge of limits of Earth's ecosystems and detrimental impact of unchecked human activities
  - Long-term, intergenerational perspective in actions and goals
  - Understanding our dependence on health of natural systems

Defining Sustainability



To Be Sustainable

- In the long run: resource consumption cannot exceed resource production
- Sustainability is related to concept of carrying capacity for wildlife populations – what population level to sustain without damaging the productive capacity of the resource into the future
- We need to consider our choices so that future generations will have options to use natural resources to best meet their needs

What Is Sustainability?

- A set of activities or processes that produce desired products and services over long periods of time (i.e., to sustain is to endure)
- Rational approach that seeks a dynamic equilibrium. Seeks to balance economic goals and ecological health in a socially acceptable manner
- Uses interdisciplinary set of social, ecological and economic sciences in an integrated fashion
- Future generations have the opportunity to enjoy the same products and amenities

Sustainability

- Sustainability -- an alternative to the Industrial Revolution -- that supports economic viability and healthy ecosystems by modifying consumption patterns and implementing a more equitable social framework.

Source: Edwards, The Sustainability Revolution, p.3

Sustainability

- Sustainability applies to all resources; considers the needs of future generations as well as those of the present; is concerned with ecological functions and conditions; and is as much a social and economic as an ecological process

Sustainability

- A goal and not a specific endpoint
- A direction (i.e., a pathway) in conservation and forestry reflecting an evolution in societal perspectives and scientific knowledge

Source: Lindenmayer and Franklin, Towards Forest Sustainability, 2003

Conservation

- Conservation
  - Definition: to protect from loss or waste
  - The careful management (or stewardship) of the environment and of natural resources
  - Sustainability, conservation, and stewardship all imply the wise use of natural resources
- A means to achieving sustainability; to endure or maintain

Living Sustainably

- Requires that we meet the needs of the present without compromising the ability of future generations to meet their own needs

Source: Our Common Future, World Commission on Development and Environment, 1987

Sustainable Forestry

- A land stewardship ethic that integrates reforestation, growing, and harvesting trees for useful products while conserving soil, air, and water quality, wildlife and fish habitat and aesthetics, and protecting: a) the resource from fire, pests, and diseases and b) lands of special significance

Source: American Forest and Paper Association

Achieving Sustainability

- Complex undertaking
- Many stakeholders
- Multiple and conflicting goals (trade offs)
- Uncertainty
  - future societal needs
  - future state of ecosystem and unknown environmental factors
  - lack of complete understanding of ecosystem behavior and reaction to natural or man caused perturbations

Achieving Sustainability

- Value preferences expressed through the economic, political, and legal systems will largely determine the ultimate balance
- Requires that we adopt an integrated, holistic, adaptive approach that simultaneously considers all values and stakeholders

Context of Sustainability

- Natural resource managers have a long tradition based on the concepts of sustainable resource use, stewardship, conservation, protection, and carrying capacity
- Sustainable resource use has largely been synonymous with maximum biological sustained yield (agricultural model)

Context of Sustainability

- Few concepts have received more attention in natural resource management than that of sustained yield and carrying capacity
- The basic idea is that existing stocks of renewable natural resources should be managed to guarantee that rates of replenishment (reproduction and growth) are in balance with rates of removal (harvest)

Multiple Use

- Historically used as a policy instrument for rationalizing uses across a landscape
- Is largely normative and not prescriptive
- Too closely identified with forest outputs instead of desired future states. Multiple use must be modified to meet the changing demands of society.
- A new paradigm that extends our traditional reliance on multiple outputs is needed. Sustainability offers this promise.

The End