

Sustainable Forest Management?

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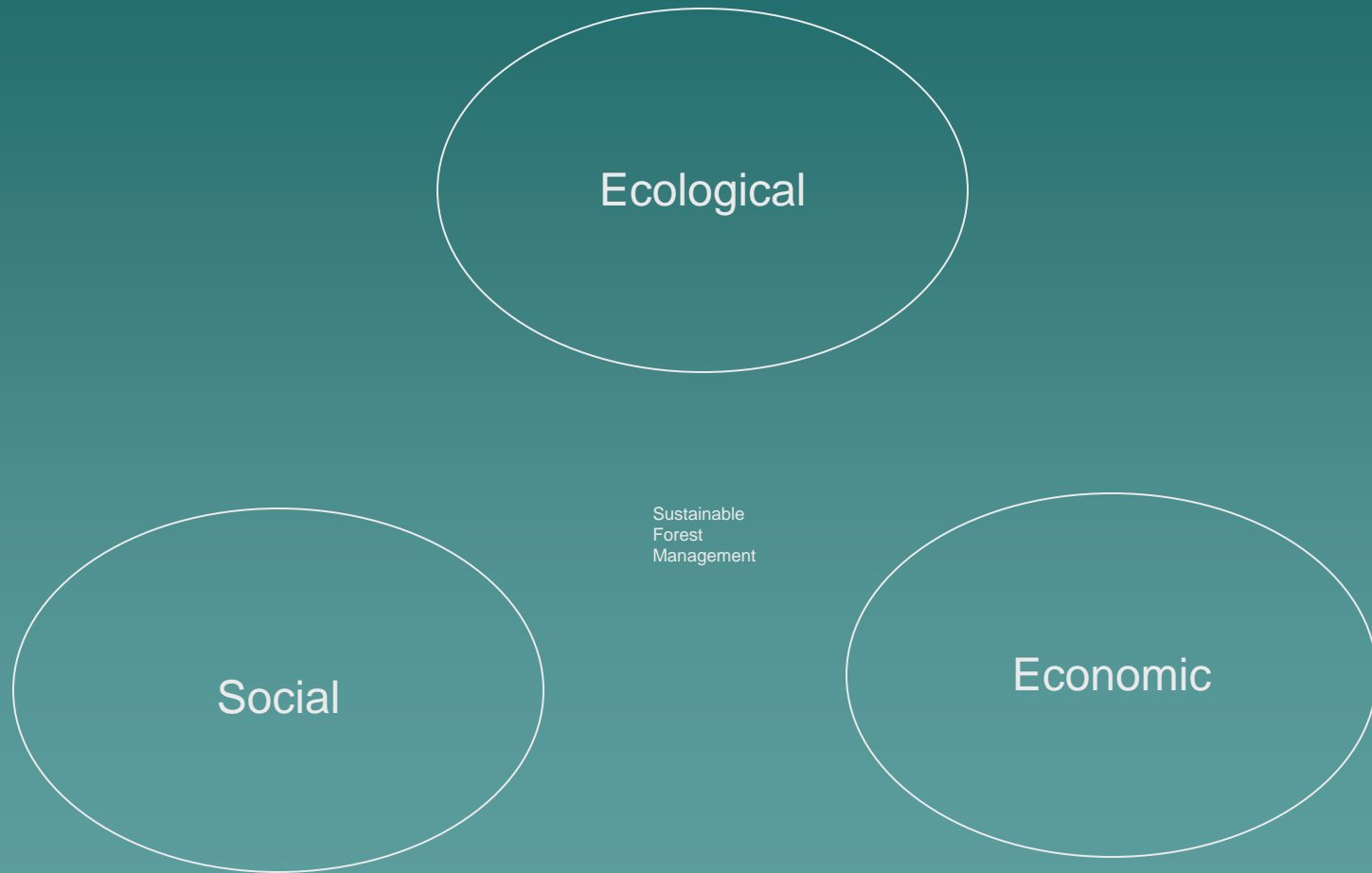
Outline

- ◆ Ecological and economic theory of sustainability
- ◆ Multiple Definitions of sustainable forestry
- ◆ Forestry examples as test case of sustainable forestry
- ◆ Forest certification's potential to increase sustainable forestry

History of Forestry and Sustainable Development

- ◆ Primary Forests-naturally regenerated without widespread harvesting by humans
 - Hunter-gather society with no need to manage consumption
- ◆ Economic Development often tied to liquidating primeval timber (clearcuts, high-grading, agriculture)
 - Mediterranean, Europe, Easter Island
 - Closing eastern frontier US 1850's
 - Closing western frontier US 1890's (Utilitarian conservation)
 - Aldo Leopold's Game Management, Land Ethic (Ecocentric ethic)
 - Tropical deforestation and mass extinction 1980's (Conservation Biology-Biocentric ethic)
 - Last of US old-growth liquidation 1990's? (Ecological forestry)
- ◆ Second growth forests-naturally or artificially regenerated (3rd/4th/5th?)
 - Poor practices→ deforestation, land conversion degradation, then restoration
 - Best management practices→ steady forest productivity

Sustainable Forestry-Systems Approach

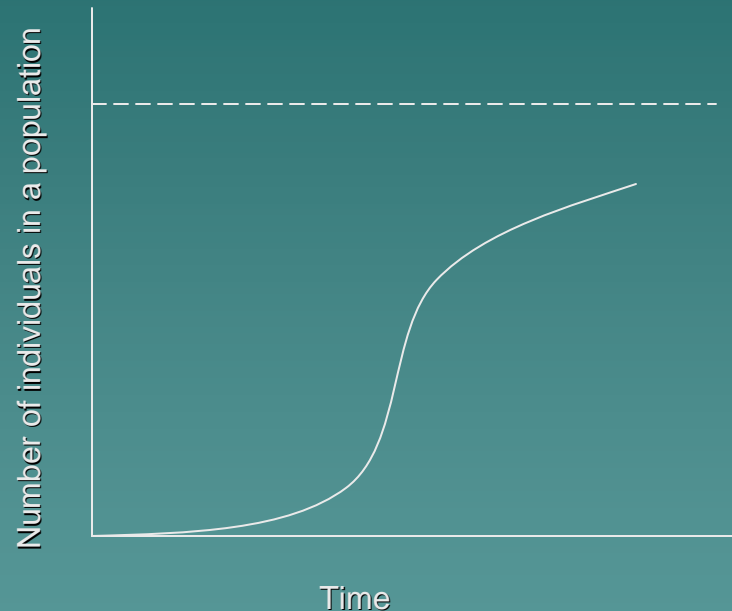


Ecological Primer

- ◆ Conservation of matter and energy, 2nd law of thermodynamics
- ◆ Organisms limited by available food sources, environmental tolerances
- ◆ Producers (photosynthetic plants, protists, and bacteria) form the foundation of energy (i.e. global energy available for life)
- ◆ Many organisms exist on the planet by occupying a variety of niches
- ◆ The biodiversity of the planet is interdependent but not perfectly, species evolve and go extinct, redundancy

Carrying Capacity

- ◆ Population limit
- ◆ 2 billion at comfortable standard (Pimentel)
- ◆ 12 billion in 2050?
- ◆ 50 billion humans?
- ◆ Dominance of 1 species means fewer others
- ◆ Human ability to essentially “create” energy changes the production limit
- ◆ Ecosystem services are critical life support
- ◆ Ecological footprint—the amount of area needed to support per capita consumption
- ◆ Ecological deficit—a regions footprint/land occupied



Economics (as told by a forest ecologist)

- ◆ Neo-classical economics (Smith, Ricardo, Friedman): supply and demand of goods and services interact with a person's rational behavior to maximize their utility of those goods and services—(i.e., free markets)
- ◆ Economic growth is an increase in goods and services
- ◆ Free markets allow for increase in economic growth and with a bigger pie (to divide) humanity is better off
- ◆ Potential Conflicts with ecological sustainability
 - Inadequate ways to price in environmental damage (external costs)
 - Free markets in combination with large discrepancies in wages and access to resources emphasize mass movement of goods and services
 - Lack of regulation encourages abuse of common resources
 - These conflicts are becoming more difficult to sweep under the rug

Sustainability Definitions

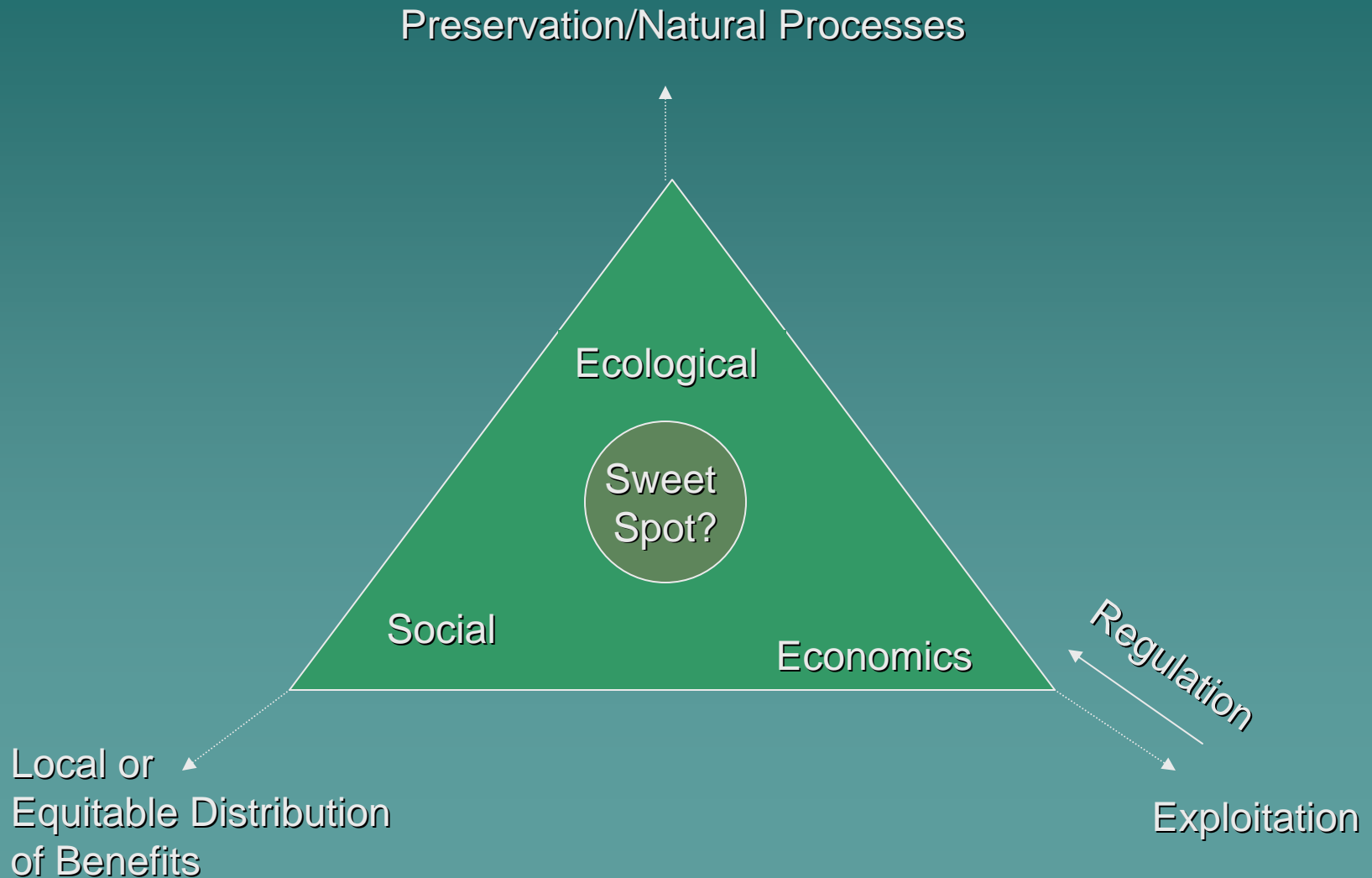
- ◆ Sustainable Development—development without growth in throughput of matter or energy beyond regenerative and absorptive capacities (Goodland and Daly 1996. Ecological Applications 6:1002-1017)
- ◆ Sustainable Forestry: “The stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfill, now and in the future, relevant ecological, economic, cultural and social functions, at local, national and global levels, and that does not cause damage to other ecosystems.” (U.S. Endowment for Forestry & Communities, Inc., 2008)

Should social, economic, and ecological sustainability be on equal footing?

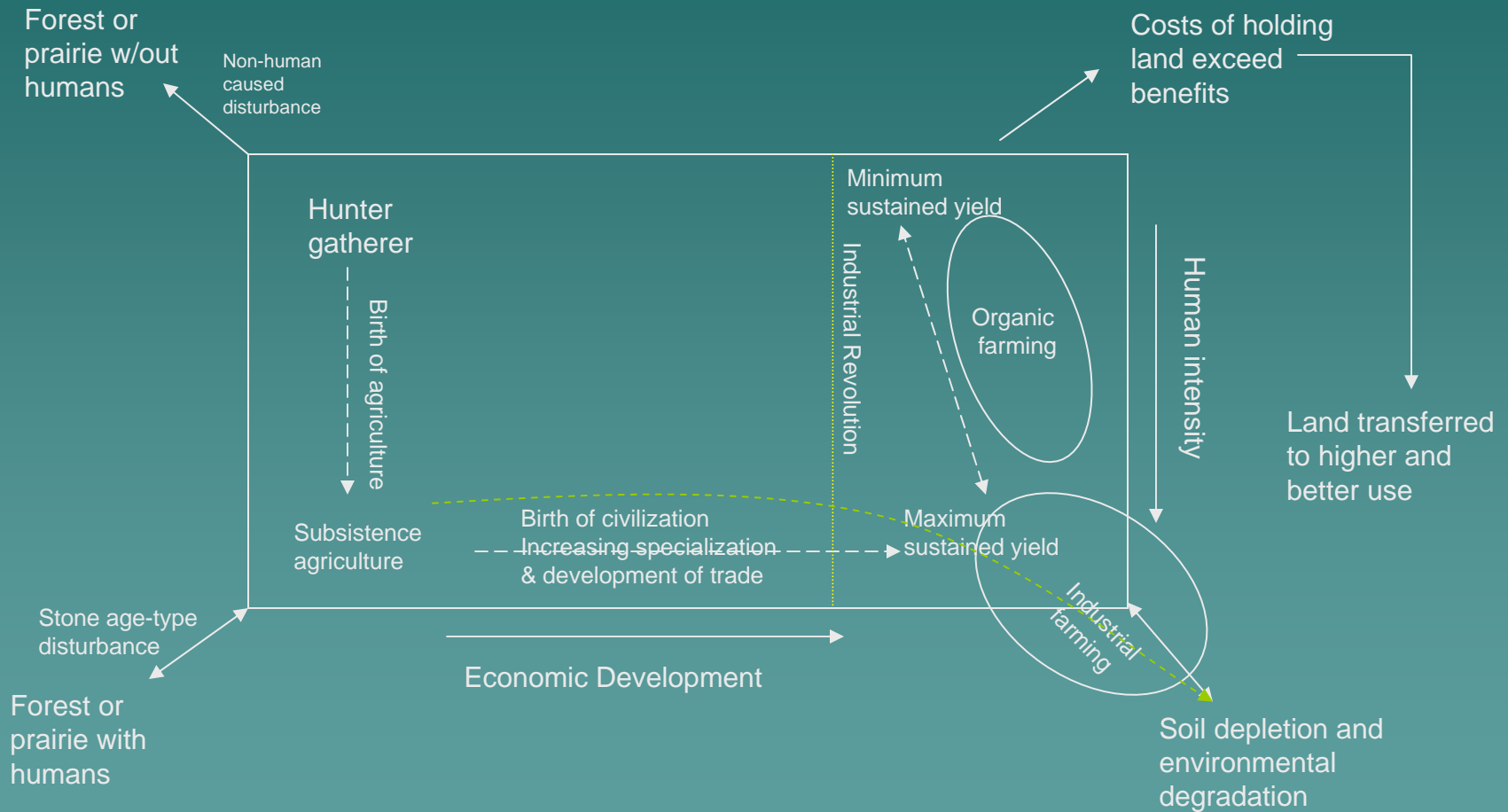
Ecological Economics

- ◆ Sustaining the health and resilience of natural ecosystems is given the highest priority
 - Extraction of resources only permitted if it doesn't degrade the system
- ◆ Robert Costanza 1996. *Ecol. Appl.* 6:978-990
 - Ensure the scale of human activity in the biosphere is ecologically sustainable
 - Social equity (current and generational)
 - Ecological sustainability depends on equitability of access to resources for all organisms (moral obligation to maintain species?)
 - Efficiently allocating resources depends on market and non-market goods, especially ecosystem services (internalize the externalities)
- ◆ Scale is difficult
- ◆ Economic growth emphasizes no increase use in throughputs, or waste streams
 - Increase efficiencies
 - If above sustainable capacity of system then growth is detrimental

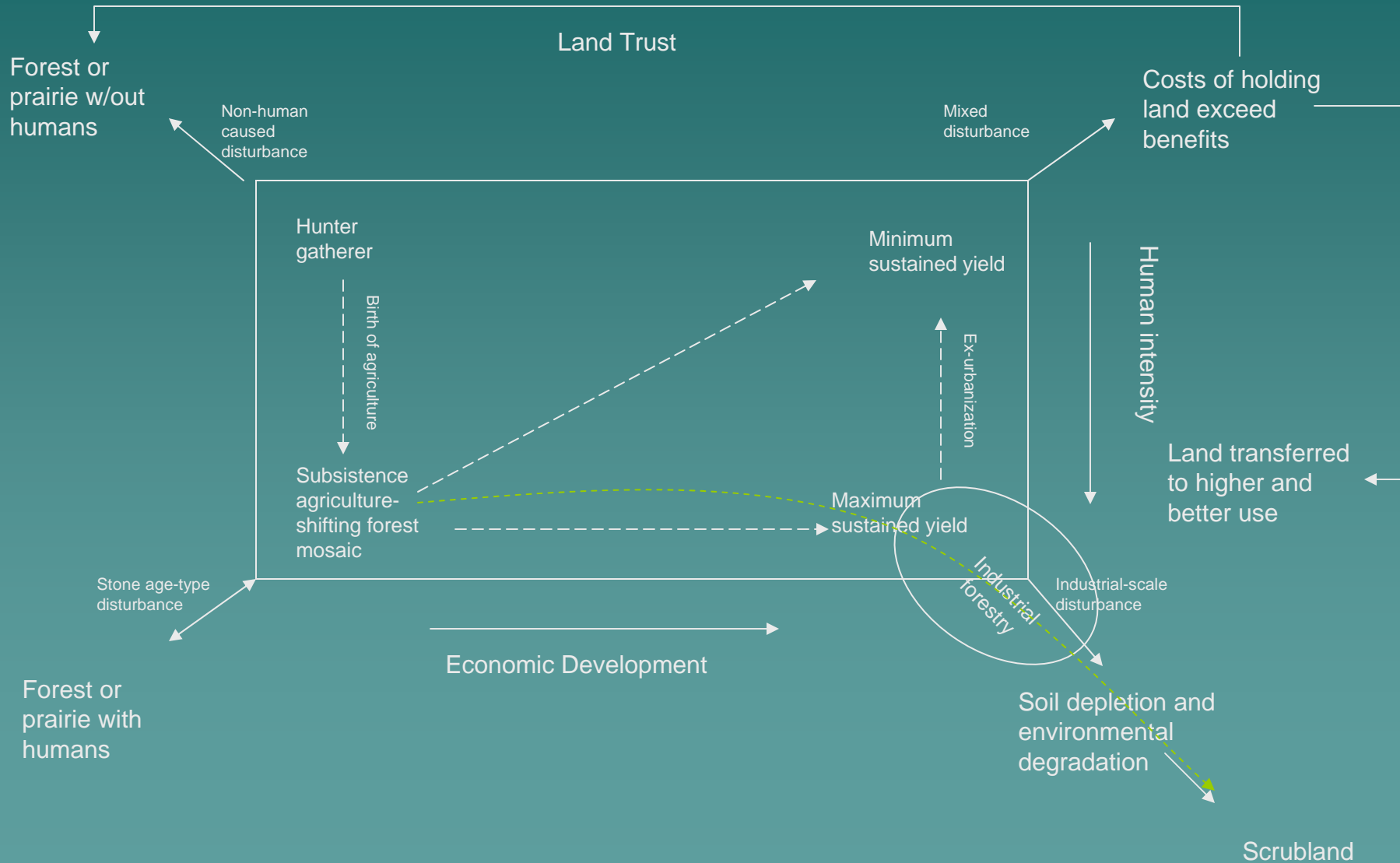
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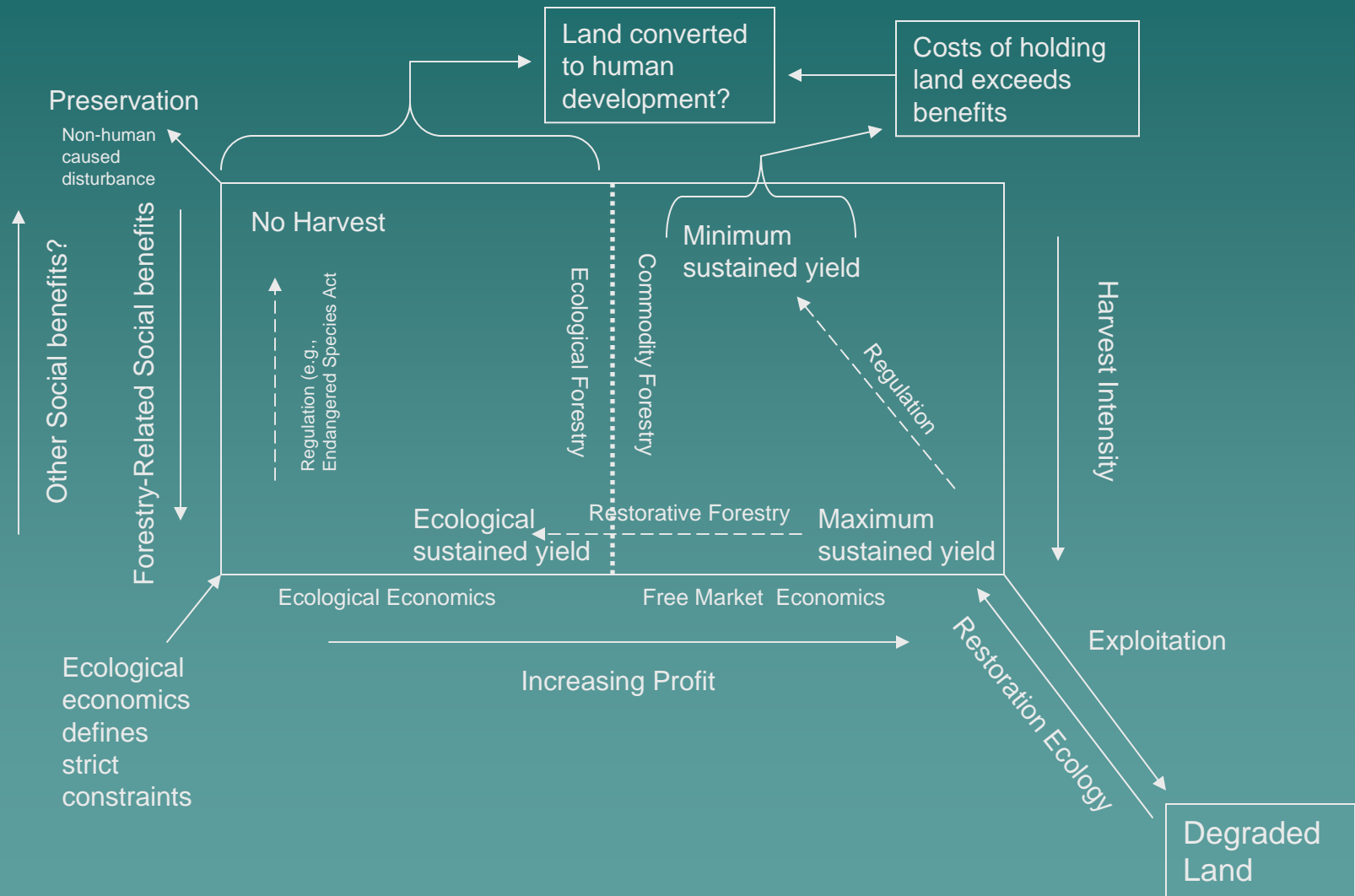
Sustainable Agriculture



Sustainable Forestry-Agriculture Parallels



Variation in Sustainable Forest Management



Definitions of sustained yield

- ◆ Maximum sustained yield—maximum amount of timber that can be harvested perpetually without diminished return
- ◆ Minimum sustained yield—the minimum amount of timber that can be harvested and still meet the costs of holding and managing the land
- ◆ Maximum ecological sustained yield—the maximum amount of timber that can be removed that maintains viable populations of all native species and all ecosystem functions
- ◆ Restorative sustained yield—the maximum amount of timber that can be removed while increasing ecosystem function; improves the system's ability to better support all native species

Multiple Definitions of Sustainable Forestry

- ◆ Economic Sustainable Forestry—non-diminishing maximum sustainable yield. Harvest the maximum timber that allows maintenance of soil quality.
- ◆ Balanced Sustainable Forestry—seeks equal weight to social, ecological, and economic needs.
 - Must be less than maximum sustained yield
 - Must be greater than minimum sustained yield
 - Provides local economic and community development
 - Provides suitable habitat for native species
 - Degraded land returned to forest production through restoration
- ◆ Ecological Sustainable Forestry—timber production only permitted as it can mimic natural disturbance processes and therefore
 - Economic development tied to resources land can provide given this restriction
 - Encourages restorative forestry—transition all plantations to native forests
 - Social needs subordinate to ecologically determined yields
- ◆ Subsistence Sustainable Forestry—harvesting is restricted to those needs required for minimal living standard needs
 - Clearing land for agriculture (rotating?), or family-scale trade
 - Materials for building basic structures
 - Minimal fuelwood needs
 - Free market economics are repudiated

Sustainable Forestry?

- Global?
 - Global ecological deficit—Are we over long-term carrying capacity?
 - Global deforestation continues (FAO 2005—FAO.org)
 - Species extinctions
 - Externalized costs have yet to be fully integrated into the system
 - Small populations of rare species
 - Long-term pollution effects
 - Global climate change
- United States (Oliver and Deal. 2007. *J. Sust. For* 24:141-163)
 - Dramatic loss of forest since 1630, although bottomed out 1920's
 - Shift to younger age classes
 - Loss of many unique deciduous forests
 - Global markets allow lower US harvest than consumption
- Washington
 - Wood supply is increasing (Lippke et al. 2007. *Future of Washington's Forests, 2007*)
 - Forestry economy is down (decreasing?)
 - Stands are probably getting older, but well below 1630 ages
 - Spotted owl is decreasing
 - Native salmon runs are uncertain



Forest Practice Rules: Time for Change?

CFR 541 Winter Quarter 2009

Friday 2:30-4:20. Anderson 22,

College of Forest Resources, University of Washington..

- 9 January **Forest Practice Rules: An introduction to their content and application.** *David Ford, Greg Ettl and Don Hanley Forest Resources, U.W.*
- 16 January **Development and Evolution of the Forest Practice Rules .** *Chuck Turley, Washington State Forest Practices.*
- 23 January **The Historic and Future Role of Litigation in Improving Forestry on State and Private Land.** *Peter Goldman, Washington Forest Law Center.*
- 30 January **Assessing Impacts of Forest Practices on Landslides: Reflections on 40 years of Landslide Inventories.** *Fred Swanson, Oregon State University.*
- 6 February **The Impact of Riparian Management Zones on Small Landowners.** *Kevin Zobrist Washington State Extension Service and Steve Stinson, Family Forest Foundation.*
- 13 February **Ecological Implications of Forest Practices for Aquatic and Riparian Communities.** *Christian Torgersen, U.S. Geological Survey and U.W.*
- 20 February **The Role of DNR's Habitat Conservation Plan in Restoring Northern Spotted Owl and Marbled Murrelet Habitat.** *John Calhoun and John Marzluff, U.W.*
- 27 February **To be announced**