

# Uneven-aged Management in New England: Does It Make Economic Sense?

**Ted Howard**  
**Professor of Forestry Economics**  
**Department of Natural Resources**  
**University of New Hampshire**  
**Durham, NH 03824**

# Introduction

- A matter of sense and cents
- Complex economics made more complex by the intricacies of uneven-aged silviculture
- Goal: economic framework for analyzing alternative prescriptions

# Outline

- Economic principles
- Analytic framework
- Factors affecting financial performance
- A case study
  - Background
  - Experimental design
- Findings and operational considerations
- Summary of key points

# Economic Principles

- It is not about the money
  - Making choices
  - Non-monetary landowner objectives dominate
  - Measuring un-priced values for comparative purposes
  - Using opportunity cost

# Economic Principles

- It is *all* about the money
  - Financial analysis
    - Helps measure actual and opportunity costs
    - Identifies cost effective means to ends
    - Supports the decision making process

# Analytic Framework

- Forests are natural capital – sustaining stocks, flows, outcomes, and conditions
- Forests are financial capital – how much and how long to invest
- Imperfect markets – qualified price-takers in a spatially distributed market
- Economic efficiency is a means, not an end

# Analytic Framework

- Criteria include Net Present Value (NPV) and Return on Investment (ROI)
- Consistent treatment of real and nominal prices and rates
- Uncertainty and risk

# Influences on Financial Performance

- Biological growth rates
- Stumpage price growth rates
- Product class movement and price premiums
- Discount rates
- Forecasts of future values of parameters

# Decisions

- Timber and non-timber objectives
- Desired species and products
- Target diameter distribution, stocking, and maximum diameter
- Cutting cycle length
  - Balancing frequency of income versus value growth
  - Realizing income from at-risk crop trees

# Case Study

- Valuable mixed hardwood stand
- Assume no land use change
- Per acre data
  - \$1490 initial retail stumpage value
  - 120 square feet of basal area
  - 276 trees per acre
  - 2300 cubic feet, 50% in sawlog volume
  - Biological growth rate of 3.8%

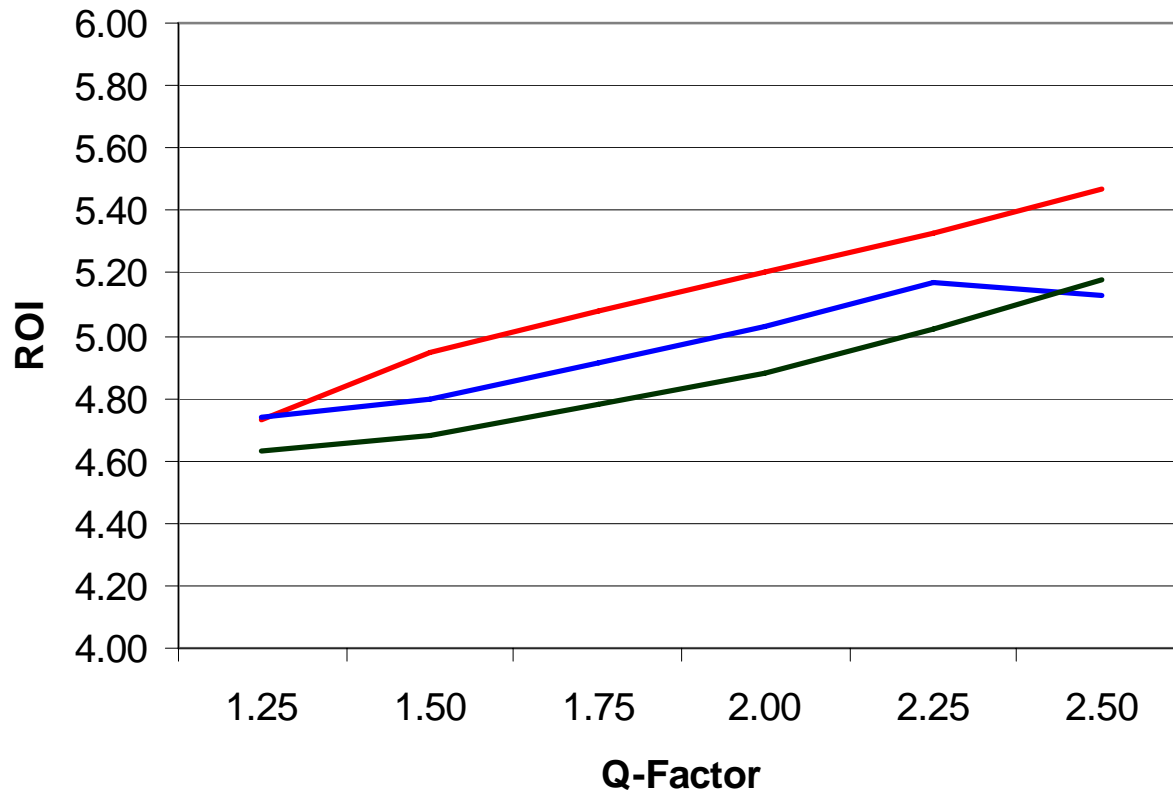
# Experimental Design

- Calculate initial harvest value and total ROI from treatment combinations spanning
  - Q-factors 1.25 to 2.50, increments of 0.25
  - Target basal areas ( $B^*$ ) of 120, 140, and 160 square feet per acre
  - Annual growth rates
    - Biological - 3.82% and 2.52%
    - Expected price - 0% and 2%
  - Immediate treatment and at end of cycle

# Findings

- End of cycle treatment
  - ROI not influenced by choice of  $q$  for given  $B^*$
  - ROI determined by biological and price growth rates
    - Price growth influence is approximately additive
    - Impact of biological growth rate is proportional

### Immediate Treatment ROI by Target Q-Factor and Basal Area



— 120 — 140 — 160

# Findings

- Immediate treatment
  - ROI higher than end of cycle cuts due to near term harvest outweighing future value growth
  - Lower  $B^*$  implies higher ROI for given  $q$ , due to higher harvest levels
  - ROI rises with  $q$  for given  $B^*$  due to marginal gains in near term harvests
  - Growth rates
    - Expected price growth is additive
    - Biological growth rate change is proportional

# Operational Considerations

- Small group selection and patch cuts
  - Lower damage to residual stand
  - Economies of scale
    - Higher volumes per unit area treated
    - Higher production rates per unit of time (less equipment maneuvering)
  - Favors valuable fast-growing intolerant and mid-tolerant species

# Key Points

- It is about the money
- Financial analysis is a tool for finance and for benchmarking non-market values
- ROI depends on
  - Growth rate
  - Timing and intensity of harvests
  - Forecasts and performance of prices and yields
  - Operational details

# The Final Word(s)

“There is no free lunch. All else is elaboration.” Milton Friedman, Nobel Prize winning, one-handed economist