

Forest Operations: A Tool for Forest Management

Developments, Challenges, and Opportunities Unique to Steep Slope Harvesting in the Southern and Central Appalachians

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Mainline Natural Resources



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Mainline Natural Resources

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- Consulting in Harvesting Systems: Steep Slope, Mechanization, Cable, and Winch- Assist, and System Costing
 - Logging Contractors
 - Federal (US Forest Service)
 - Private: sawmills, forest landowners
 - Non-Profits
 - Equipment Manufacturers

- Contracting
 - Forest Engineering
 - Forest Management
 - Forest Certification

- Timber Falling Contractors



Using Forest Management as a Tool:

Ruffed Grouse Society and American Woodcock Society

- Increase structural diversity
- benefit at-risk species



Daniel Boone National Forest

- Harvesting a tool for land management purposes
- Increasing percentage of operations on steep slopes
- Operating restrictions on steep slopes
- Marketability of Steep Terrain timber sales



Appalachian Regional Statistics

- **11 states, 1000 miles north to south**
- **Landownership Breakdown:**
 - Private 110.2 million acres
 - Federal 8.1 million acres (6.2 is US Forest Service)
 - State, County, and Non-Federal 4.78 million acres
- **1/2 volume is on slopes > 30%**
- **Nearly 1/4 volume on slopes > 50%**

Regional Site and Stand Conditions

- Regulatory Environment
- High site variability
 - Volume/acre
 - \$/acre
- Broken ground
- Small tracts
- Typical crew size 2-5
- Access
- Low product utilization (waste)
- Range of stem diameters

Regional Logging Workforce



Perpetuating Cycle:

- Weather Exposure and Utilization
- Employee Retention
- Fixed Cost vs. Variable Costs
- Risk
- Heavy Disturbance with Steeper Slopes

Strongest Crews

- Family
- Multi-generational

Advances in Regional Mechanization



PROS:

- Reduced manpower, increased productivity
- Fixed cost : variable cost retained



CONS:

- compromise on safety
- Increased disturbance



Regional Industry Challenges

Physical

- High impact/disturbance
- Scale (acres per day: loads per day)
- Slope length, tract size, site parameters

Social

- Poor safety record
- Training
- Forestry staff: no forest or logging engineers
- Ex. Hooktender
- Planning/machine scheduling/utilization
- Aging Workforce
- Stable markets and stable relationships

Financial

- Utilization
- Financial risk and high fixed costs





Scarcity drives innovation



3 Factors of a Successful Harvest (Rien Visser!)

1. Physically Feasible
2. Financially Viable
3. Socially Acceptable

-OUR GOAL-

Financially viable, readily accepted, reduced impact and safe access to steep slopes

Opportunities: Economic

Shared Risk: Favorable financing

Mobilization

Utilization:

- Road vs logging costs, opportunity cost
- Machine scheduling, anticipate the bottlenecks
- Decoupled Logging
- Contract falling, Trucking: Utilization
- Multi-purpose equipment



Opportunities: Social

Understand the Culture

Engineering and Management

Partnerships and Collaboration

Leadership Training

- Supervision
- Management
- Safety



Opportunities: Physical

Reduce Impact and Improve Utilization

Cross-over capabilities:

- shift capacity to manage bottlenecks and surges
- Adapt to low fixed cost model
- Mobility at Landings
- Examples:
 - **Shovel:** shovel log and process load
 - **Excavator:** Dig/shovel/process/load
 - **Track Harvester:** Fell/Shovel (winch assist)
 - **Jammer/Yoader/Shovel/Load**
 - **Forwarder:** Pre-haul/Load
- Versatility in Cable:
 - MTH, haulback, carriages, mobile



Recent Advancements:



Cable

Heli

Tethering

Hydraulic Yarders

Specialized turn-key crews

Felling heads vs. bunchers

Specialized contractor model

Manual felling with mechanized processing



What is the lowest hanging fruit?

How Do We Get There?

- Partnership
- Leadership
- Management

What Are Our Results?

- Reduced Impact
- Improved Safety
- More Acres Treated

THIS BUSINESS
SUPPORTED BY
TIMBER DOLLARS

PAYMENTS

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