Harvest Technologies and Economics of Forest Restoration

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Topics

- “Setting the Stage” for Successful Forest Restoration Harvesting
- Appropriate Harvesting Technologies
- Harvest Planning and Unit Layout
- Conclusions/Suggestions

Characteristics of a "Successful" Harvesting System

1. Environmental (or ecological) including protection of soil, water, wildlife and other forest resources
2. Economic including harvesting productivity and costs
3. Social including working with communities, visual, noise etc.
4. Technical including equipment feasibility and safety

Factors Affecting Harvesting Economics

- Stand level characteristics
- Road characteristics and transport distances
- Productivity & costs of harvesting systems
- Equipment availability and contractor expertise
- Conventional and new wood utilization markets

Biomass Energy and Biofuels from Oregon's Forests

Harvesting and Transport **Challenges**……

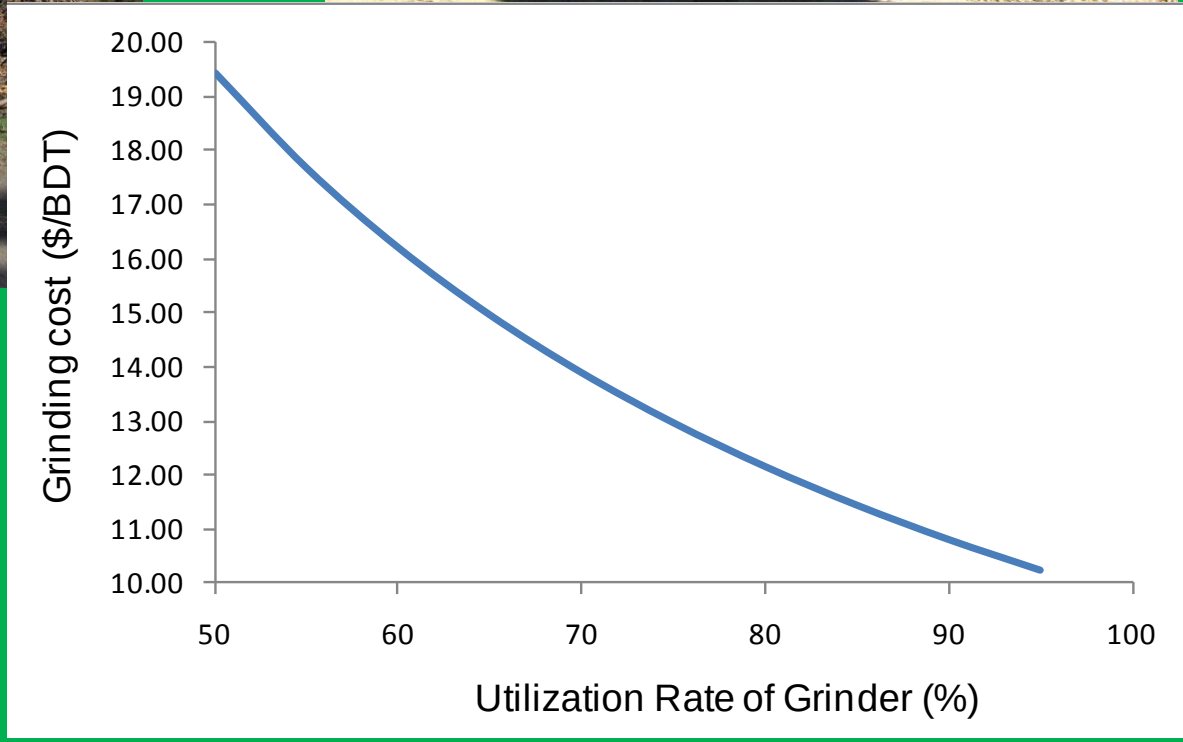
Difficult to Handle

– Size & Shape

– Low bulk density

Challenges ….

- Scattered across landscape



Challenges ….

- Limited access with many forest road conditions

Challenges…..

- Low market value
- High cost of new equipment

Harvesting Contractor Operations

- Often capital limited or production limited by the economy
- Make due with available equipment
- Harvesting productivity affected by tree size and volume removal per acre
- Hard to find, train and keep workers
- Provide family wage income year round
- Constant attention to worker safety required
- Dependable production needed to supply different markets

Topic 2: Harvesting Technologies for Forest Restoration

Whole Tree System

Cut-to-Length System

Harvesting Technologies for Forest Restoration

Using Conventional Harvesting Technology in New Ways

Example 1: **Cut-To-Length Integrated Forest Restoration Thinning**

OSU Research with Melcher Logging Company, Sweet Home, Oregon

Deschutes National Forest, Sisters Ranger District, Metolius River Basin, Camp Sherman

Step 1

Step 2

Changing the Harvest Method

- Bunch tops, small trees and limbs
- Forward bunched biomass
- Accumulate in an area suitable for further utilization

Harvester Felling and Processing

- Sawlogs
- Pulplogs
- Biomass

Biomass Extraction with Forwarder

Example 2…**Using “New” Harvesting Technology**

Facilitating Change in the Forest Harvesting Environment

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Evaluation of "New" versus "Conventional" Harvesting Technology

- ✓ **Determine the Extent of the Need**

  How much work is there for the new system? Can management offer and sustain a program for the new system? "Landscape Level Planning"

- ✓ **Provide Support and Administration for Success**

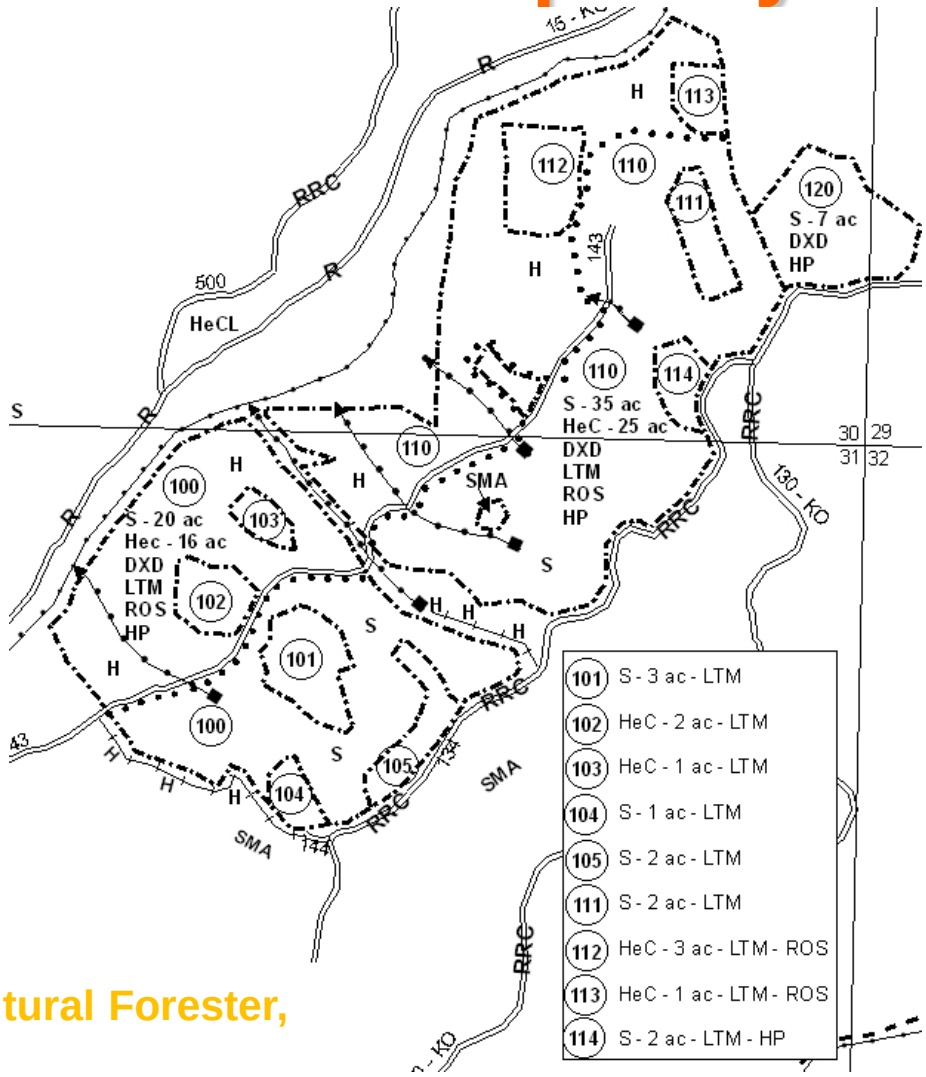
  What needs/opportunities are there for providing staff and loggers with the needed knowledge and skills to successfully implement new systems?

Topic 3: Harvest Planning and Unit Layout for Forest Restoration

Photo Credit: Kurt Steele, Silvicultural Forester, Willamette National Forest

Issues with Increased Unit Complexity

- More complex physical layout
- Increase GPSing
- Increase in cruise time
- More complex maps (harder to interpret)
- Increase in contract requirements
- Next scheduled entries



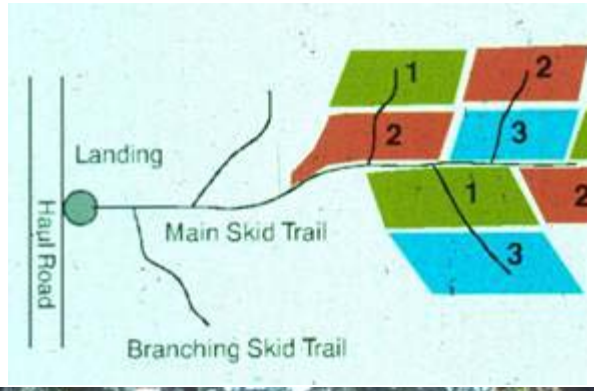
Slide Credit: Kurt Steele, Silvicultural Forester, Willamette National Forest

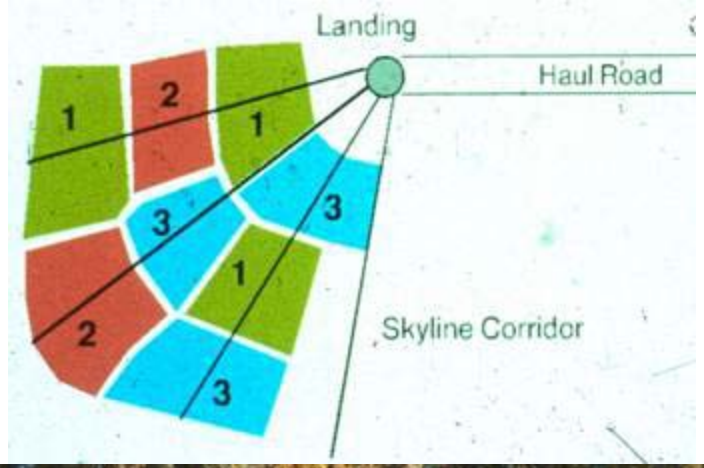
Westside Unevenaged Management Research

OSU CFIR Project

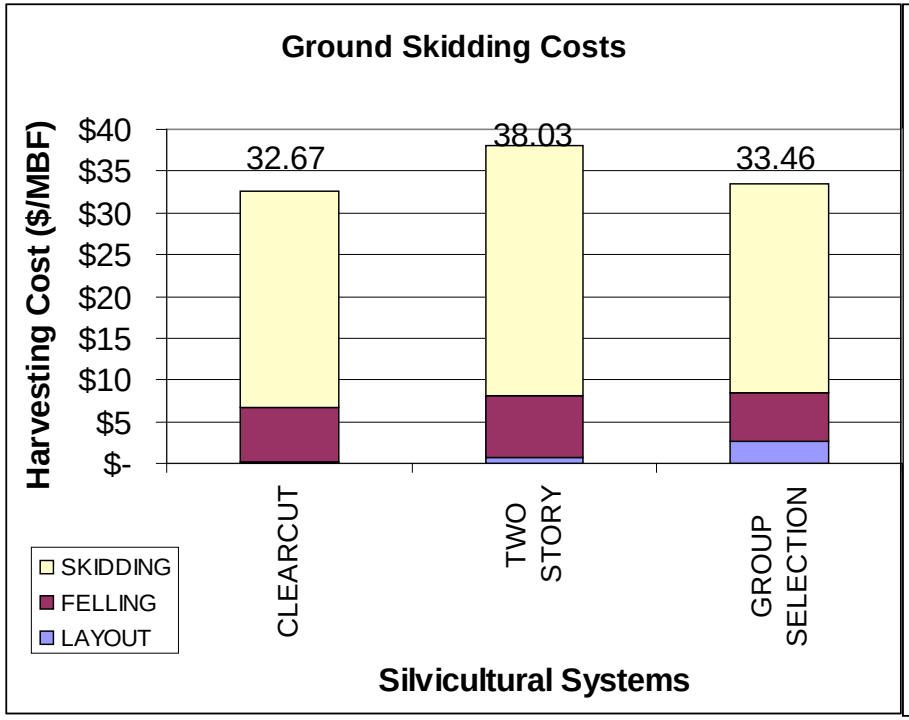
- Stand prescriptions similar to natural disturbances
- Two-story stand development
- Group-selection
- Individual-tree selection
- Evenaged Regeneration Harvest
- Wildlife trees - scattered & clumped

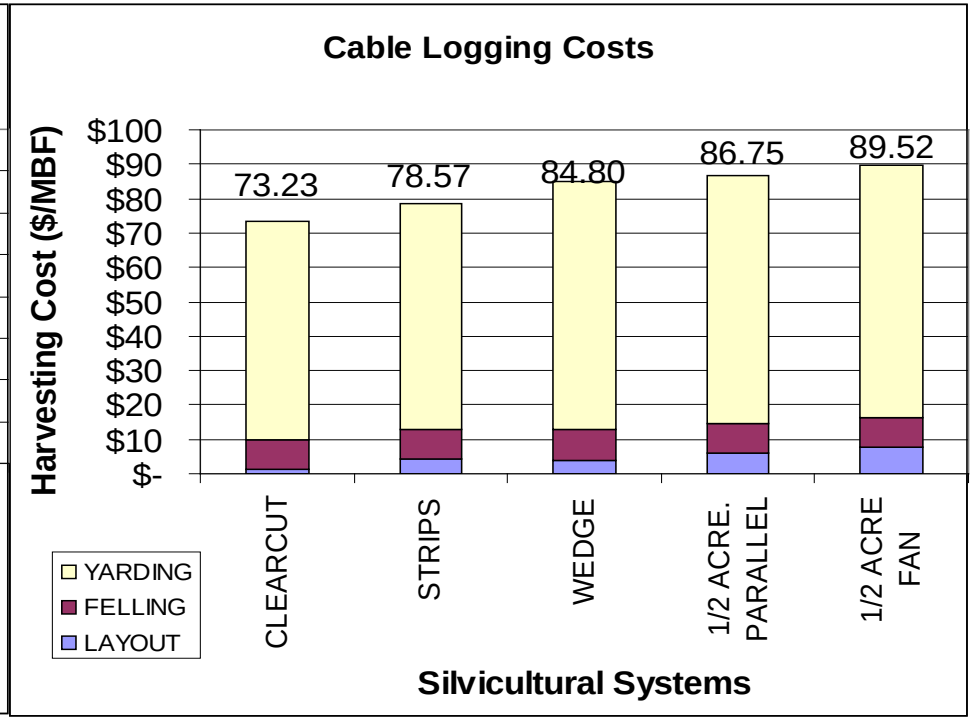
Harvest Planning and Unit Layout



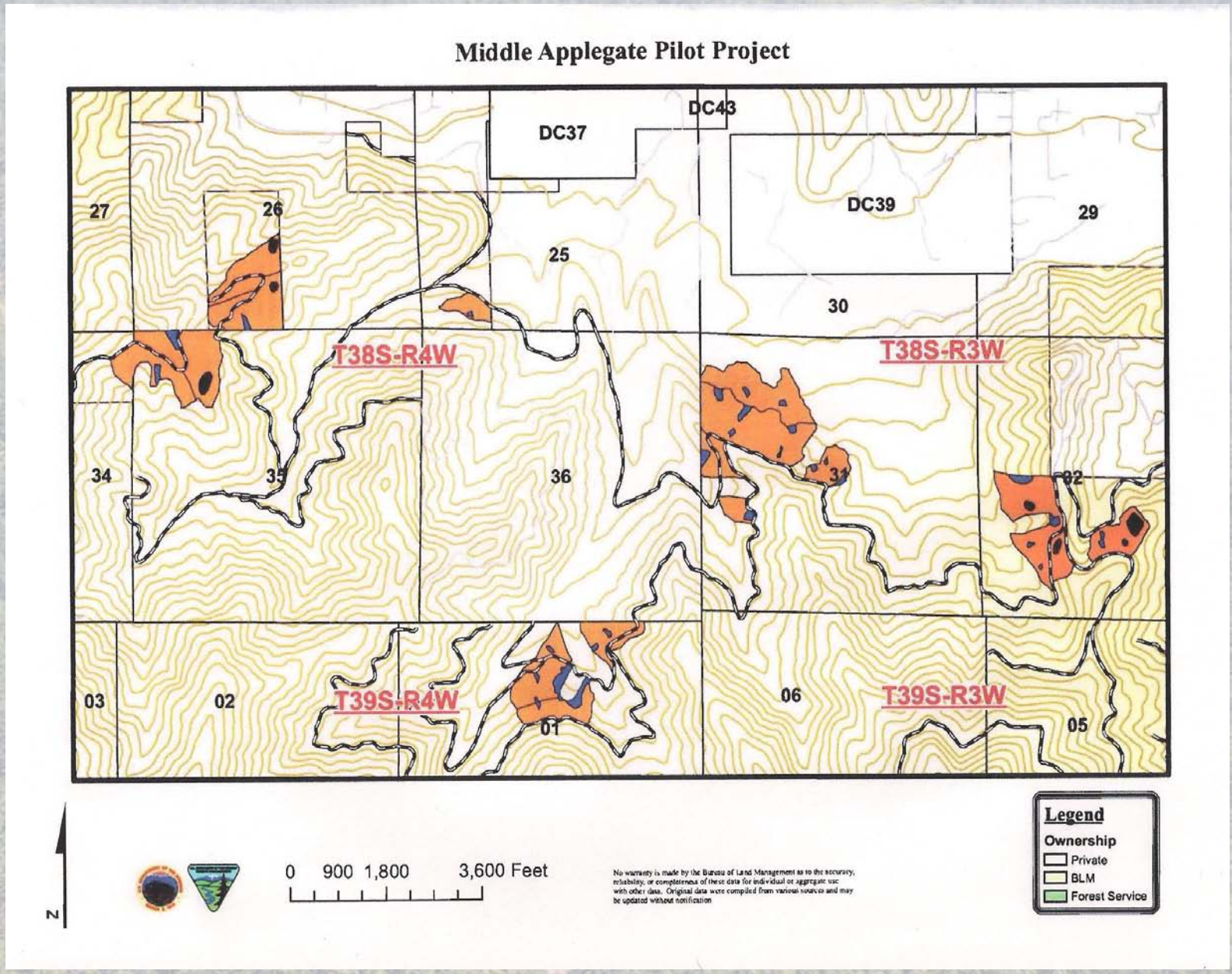


Unevenaged Prescriptions: Harvest Costs

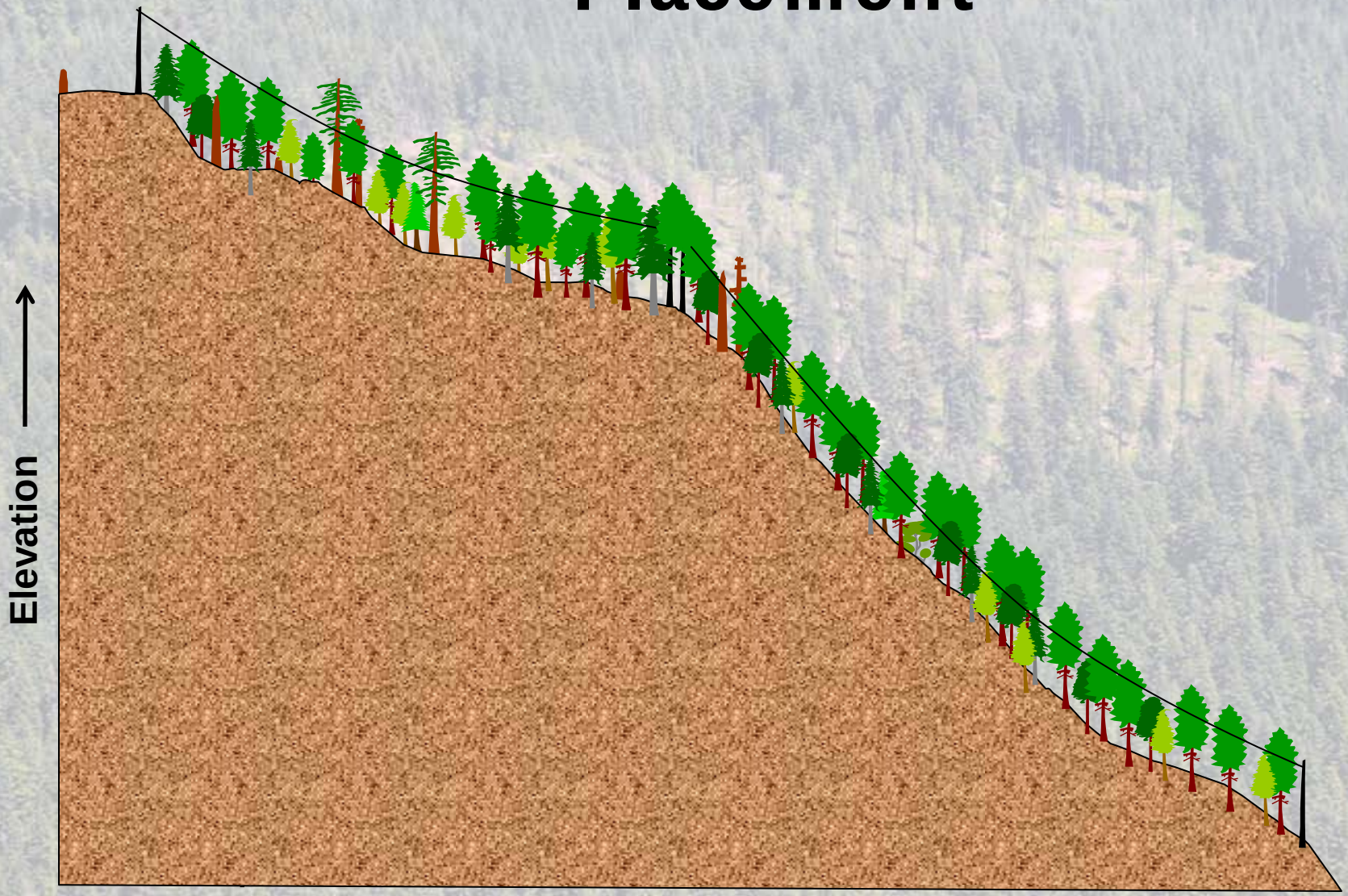




Harvesting Systems…Skip and Gap Placement



Harvesting Systems and Gap Placement



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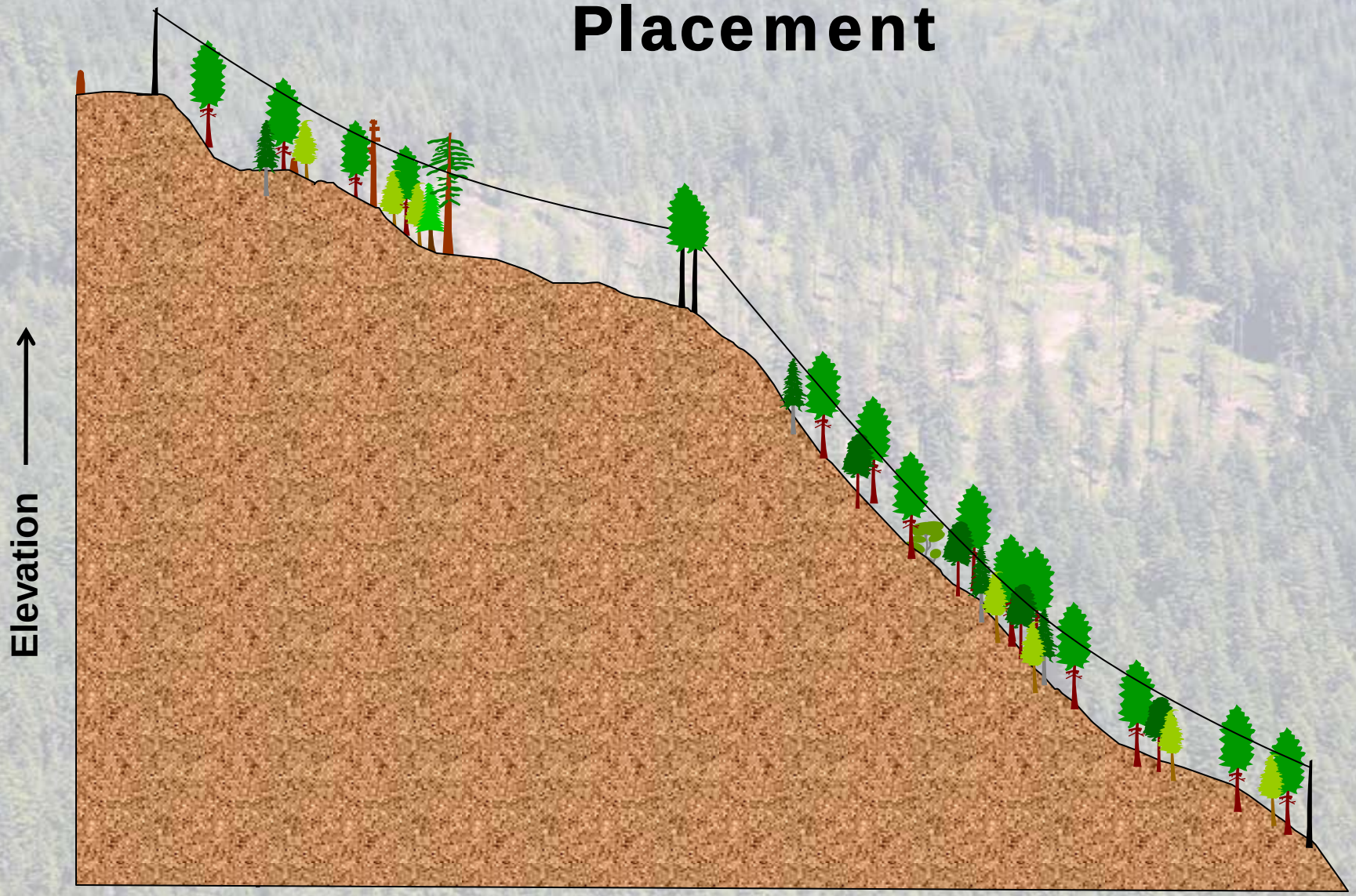

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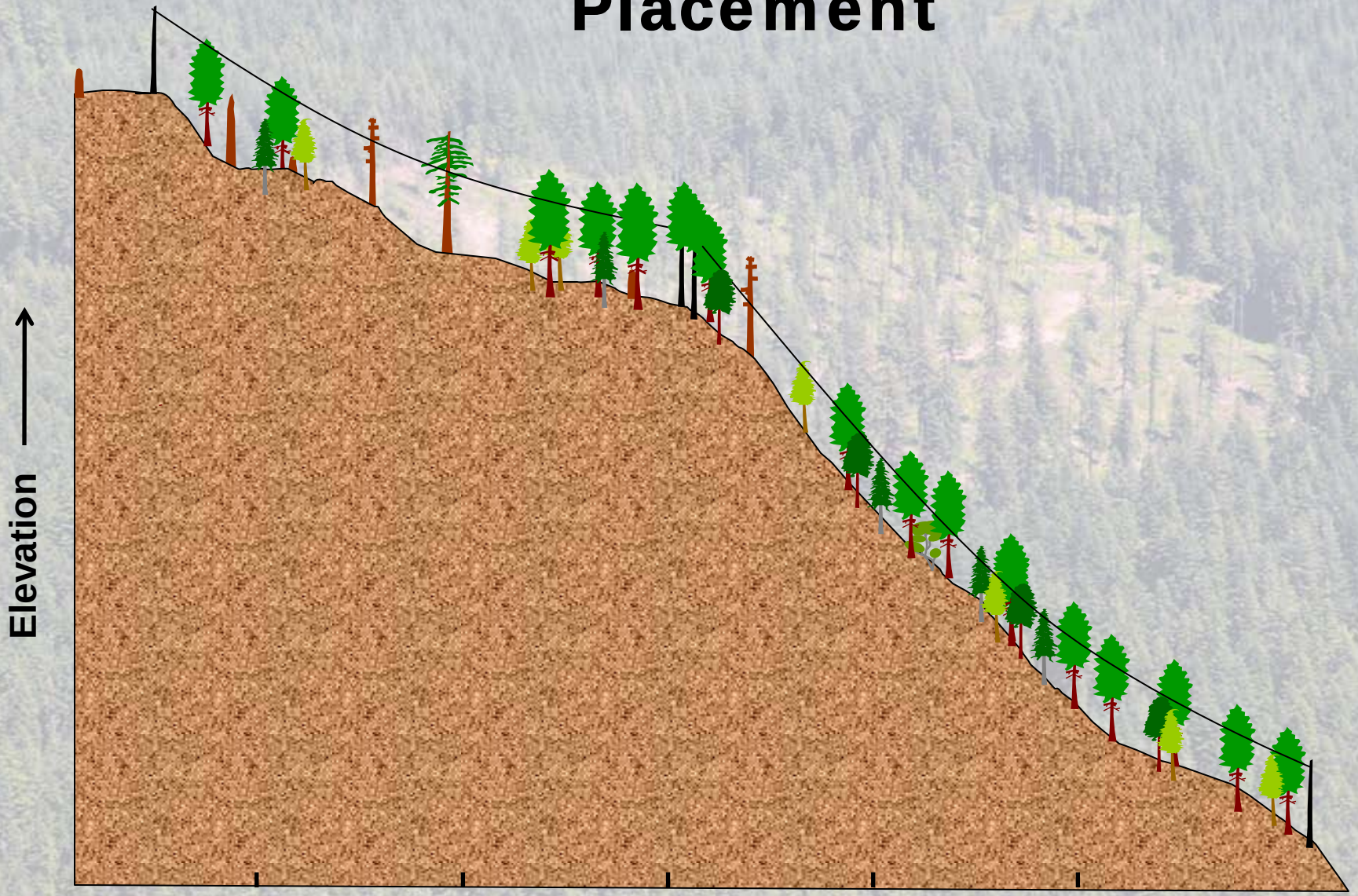
Harvesting Systems and Gap Placement



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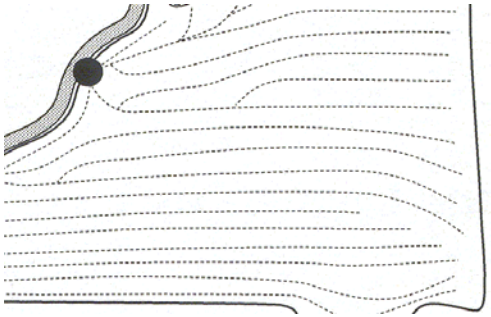
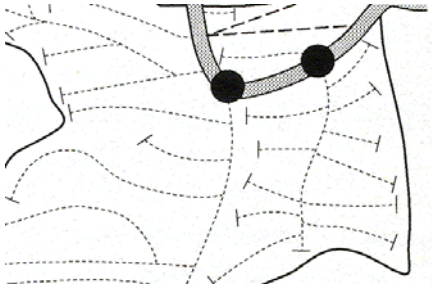
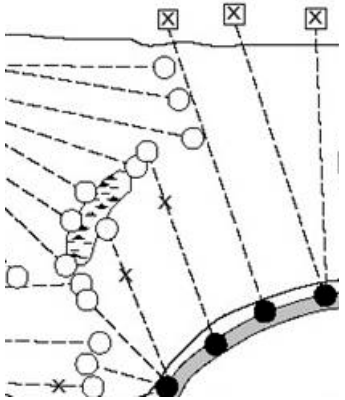
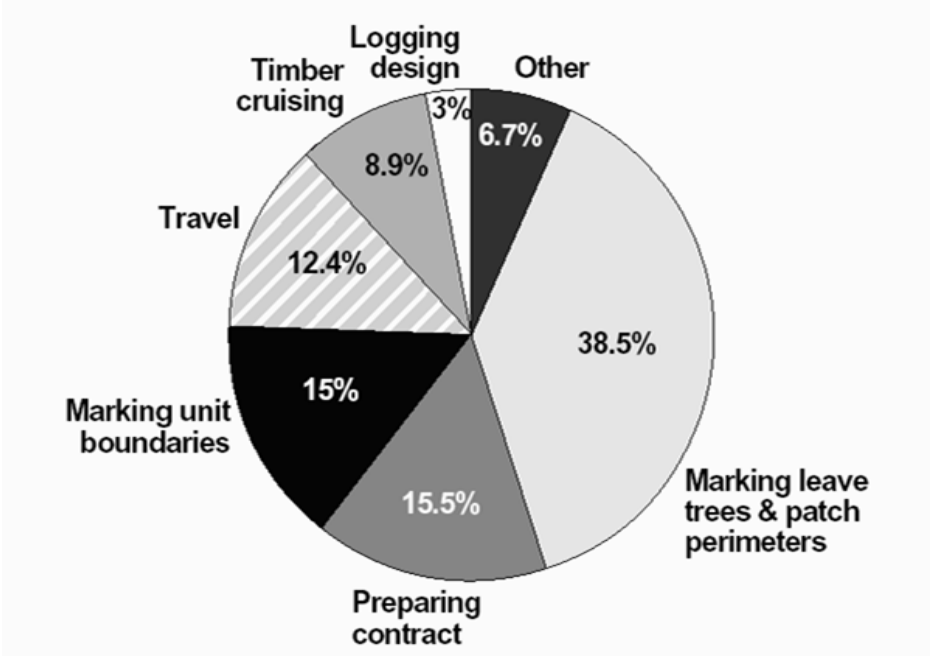
Involving Professional Loggers in Implementing Forest Restoration Projects







Willamette Young Stand Study
Planning and Layout



Forest Service Planning and Layout

Components; All Sales

Contractor Planning & Layout

Landings, Skid trails and Skyline Corridors

Tree selection, Gaps and Skips

Conclusions/Suggestions

1. Stronger linkages early-on with silviculture and harvesting
   - Develop a harvestings systems matrix to assist resource planners
   - Locations of gaps & skips
   - Tailtree and intermediate support leave tree zones
2. Integrate forest restoration activities
3. Use “new” harvesting technologies in forest restoration applications where appropriate
4. Involve professional loggers with unit layout and implementation of forest restoration prescriptions


Thank You