

**Dry Forest Restoration on Steep Terrain
A Harvesting Demonstration of Tethered Assist
Ground-based Operations on the Dry Side**

May 22 & 23, 2019

SCHEDULE

Demo Welcome and Introduction

Central Oregon Forest Stewardship Foundation Demonstration Purpose and Objectives	Vernita Ediger
Steep Terrain Harvesting Technology for the Dry Side Demonstration Overview and Logistics	Loren Kellogg
Wine Down Ranch Forest Land Management Objectives & Site Prescription	Roy and Mary Byer
Miller Timber Services Company overview of Forest and Fire Projects	Lee Miller
Miller Timber Services Soils Research on Tethered Assist	Preston Green

Car Pool and Travel to Field Site

Groups:

Harvester and Forwarder Operations
Soils Information and Discussion

Return From Field Site

Wrap Up Discussion

Optional Evening Follow-up Discussion

Crooked River Brewery, Main Street, Prineville, 5:00 – 7:30 PM

Thank you to our Harvesting Demonstration Supporters

Ponsse North America, Coburg Oregon

Miller Timber Services, Philomath Oregon

Lee Miller, Preston Green and Crew

Roy and Mary Beyer, Wine Down Ranch

John and Lynn Breese; Alternative Demo Site location

Intermountain Wood Energy and Rocking Double K Ranch

Loren and Peggy Kellogg

Provided lodging and meals for harvesting crew and others

Paul Adams, OSU College of Forestry, Retired

Central Oregon Forest Stewardship Foundation Board

Kit Dickey, John Jackson, Pete Calageri, Ed Keith, Vernita Ediger, Loren Kellogg

Property Description

Background and History

The property was homesteaded by the Demaris family in the 1880's and owned by that family until the early 1970's. It was owned by various timber companies until 1996 when it was purchased by Beyer Tree Farm (BTF), a family partnership, as a recreation and timber investment. By then, Most of the large, old, quality trees had been harvested by the previous owners. Starting in 1997, BTF selectively logged to reduce stocking levels and do sanitation logging. BTF also took over the hay and cattle operations in 1997. Roy & Mary bought the property from the partnership (BTF) in 2008 and made it their primary residence in 2012. They continue the agricultural practices to date in conjunction with the timber management. Since starting selective logging again in 2014, over 490 MBF of Ponderosa pine, Douglas-fir and western juniper saw logs and logs for chips and firewood have been harvested to date.

General Description

The forest type is a dry mixed conifer including Ponderosa pine, Douglas-fir and western juniper. The trees are of mixed ages and sizes, but exclude any old growth timber. The mixed conifer timber grows predominantly on north and east slopes and in creek draws. The south and west slope stands are predominantly Ponderosa pine and western juniper. Dwarf mistletoe is present in many of the stands. It is most prevalent in the pine stands at lower elevations and along McKay creek. The Douglas-fir mistletoe is predominantly in the higher elevation stands and much has been removed in the thinning and sanitation harvests that were started in late 1990's. The plan is to convert the dominant species to either Douglas-fir in the Ponderosa pine mistletoe areas and to favor Ponderosa pine in the Douglas-fir mistletoe areas. The mistletoe is indigenous to the dry conifer forests and is an important habitat for many birds, insects and other wildlife species. It will never be completely eliminated from the forest but managed at a level to benefit the timber production and wildlife use. The undergrowth includes many shrub species including deerbrush, sagebrush, bitterbrush, rabbitbrush and grasses among other common dry forest forbs. The forest floor is mainly pine needle duff and various grasses including cheatgrass and medusa head rye. Juniper and sagebrush dominate the south and rocky faces of the terrain. McKay Creek runs northeast to southwest through the property for approximately one and a half miles mainly through the hay meadows. Lincoln, Water Trough, Sawtell and Sealy Creeks (tributaries of McKay) run predominantly North and South. There are various seasonal and year-round springs and small ponds (some developed for cattle) and the home site includes a drilled domestic well.

Terrain and Topography

Elevation ranges from 3400-4500 ft. Bottom ground meadows run along McKay Creek and are used for hay production and grazing. Foothills rise in moderate to steep slopes to a prominent southern ridge and Little Table Mountain, a 360-degree rim rock peak. Property extends south of the ridge across the draw of Sawtell creek. Steep hills rise north of McKay Creek. Topography is part of the Ochoco Mountains.

Current Uses

The property is the residence of the owners and agricultural activities include a commercial beef cattle ranching herd, hay farming, and logging (including logs for chip and commercial fire wood). Recreational activities include big game hunting, horseback riding, hiking, camping and star-gazing. Wine Down Ranch also hosts guests in bunk house accommodations, and guests commonly explore the property.

Oregon's Forest Management Plan Template
July 2013

Landscape Context

The property borders the Ochoco National Forest to the East, so neighboring wildfire fuel levels and the threat of fire spreading are major concerns. There is evidence of a wildfire that burned in the Water Trough drainage in the 1930's. The stands in those areas are 70 to 80 years old compared to many of the other stands which are in the 120-130 year age class. BTF did some under burning in the stands north of Little Table Mountain after they thinned them in the early 2000's to reduce slash loads following the timber harvests. In 2003, most of the steep ground on the south slopes above McKay Creek were cable logged to remove much of the diseased Douglas-fir. Almost all of the Ponderosa pine were left as seed trees for the natural regeneration process and additional Ponderosa pine seedlings were planted to supplement the natural seeding. The landing slash from the logging harvests have been regularly burned the season following the harvests and in the area of the harvests. The property also includes a mule deer and elk wintering range, and McKay Creek has been included in the efforts to reintroduce steelhead to the Crooked river watershed .

Cable-assisted Harvesting



Preston Green, MS, MBA
Forester, Operations Specialist
CTL Division
Miller Timber Services



Oregon State
University

NIOSH Research Team:

Francesca Belart, Woodam Chung, Robert Crawford, Stephen Fitzgerald, John Garland, Ben Leshchinsky, Brett Morrissette, John Sessions, Jeff Wimer

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- Benefits and challenges with CTL
- Management implications, take-away messages



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System Types

- **Static Line System**
 - One line remains fixed relative to ground
 - Tree or machine anchor
 - Common in thinning applications (short logs up to 28')
 - Fully integrated winch



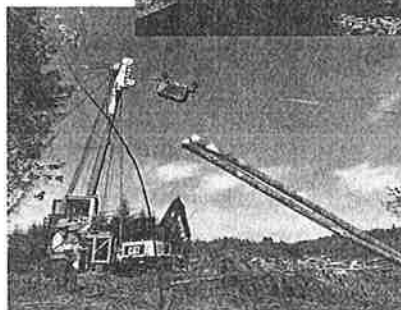
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System Types

- **Dynamic Line System**
 - Two lines moving
 - Machine anchor
 - Excavator-based harvesting machine and anchor
 - Clearcut application
 - Radio-controlled anchor machine
 - Harvesting often followed by tethered grapple skidder or skyline system



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Ponsse Harvester-Forwarder System

Bear Harvester



Elephant King Forwarder



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Ponsse Harvester-Forwarder System

Bear Harvester

- Approximately 52,470 lbs.
- 322 hp Mercedes-Benz diesel engine
- 51,706 lbf tractive force
- Versatile platform for difference cranes and heads
- 8W Bogies, articulated chassis

Elephant King Forwarder

- Approximately 52,250 lbs.
- 275 hp Mercedes-Benz diesel engine
- 53,954 lbf tractive force
- Load capacity of 44,092 lbs.
- 8W Bogies, articulated chassis



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Why does cable-assistance work?

...And soil type!

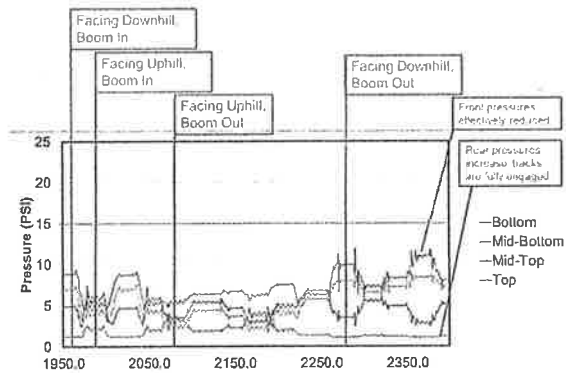
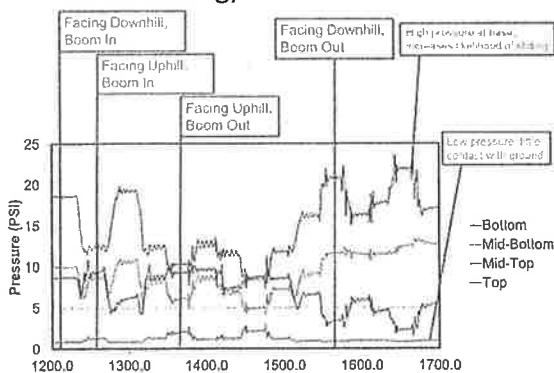


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Why does cable-assistance work?

Reduction of maximum track pressures (no tension vs 9,000 lbs. tension, excavator-based testing):



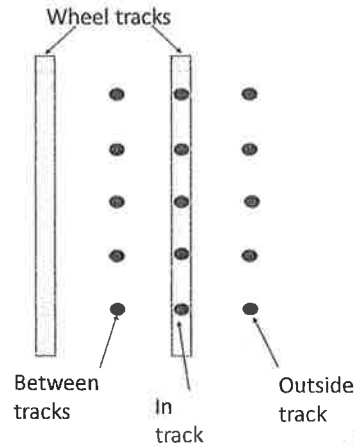
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Why does cable-assistance work?

Control of vertical and horizontal spread of influence (harvester-forwarder testing):

- Paired corridor approach
- Untethered on gentler terrain, tethered on steeper terrain
- Fixed sampling before harvest, after harvest, after forwarding
- Surficial and at-depth measurements taken
 - Dry bulk density and penetration resistance



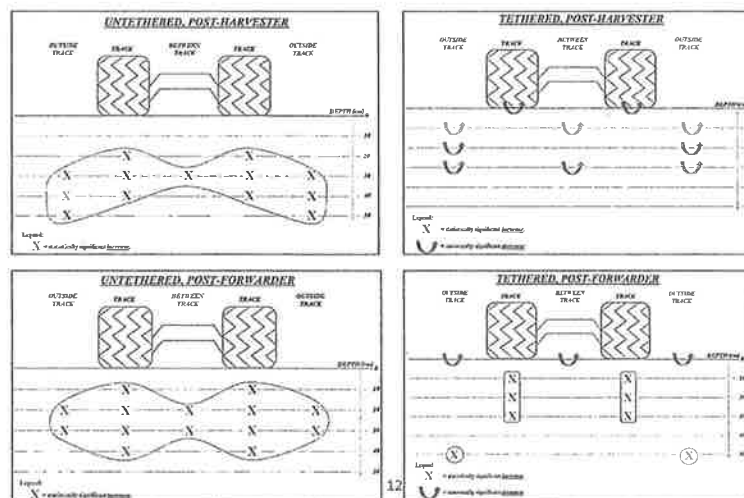
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Why does cable-assistance work?

Control of vertical and horizontal spread of influence (harvester-forwarder testing):



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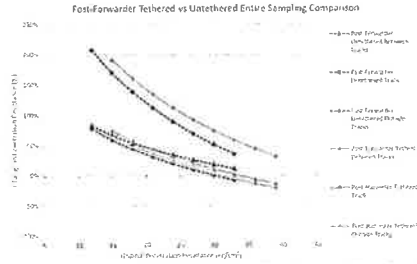
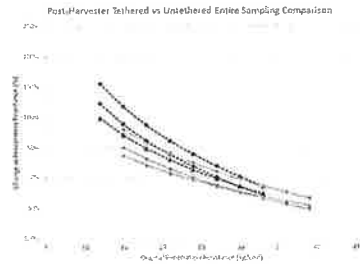
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Why does cable-assistance work?

Soils are important! Particularly the original soil condition:

Post-Harvester		
Rank	Location	% Change
1	Untethered Track	51%
2	Untethered Outside Track	30%
3	Untethered Between Tracks	22%
4	Tethered Track	7%
5	Tethered Between Tracks	-15%
6	Tethered Outside Track	-17%

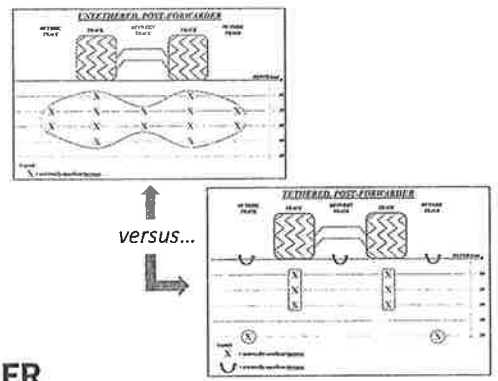
Post-Forwarder		
Rank	Location	% Change
1	Untethered Track	106%
2	Tethered Track	89%
3	Untethered Between Tracks	41%
4	Untethered Outside Track	27%
5	Tethered Between Tracks	18%
6	Tethered Outside Track	11%



Why does cable-assistance work?

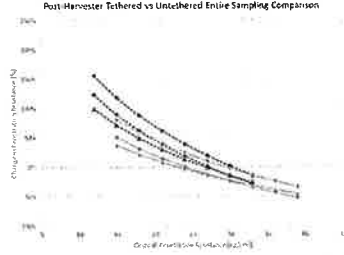
Horizontal benefits

- Controlled 'track wander'
- Less significant ground coverage



Vertical benefits

- Reduces maximum ground pressure → reduces shear displacement (maintaining soil profile) → enables more passes to reach densification



Other benefits of CTL (over cable yarding)

- Increased tree utilization and product recovery – better economics in low-value stands
- No landings = reduced road network and construction
- No landings = no slash piles = reduced spatial impact of harvesting
- Ability to work around sensitive areas (riparian, mgmt. areas, etc.)
- Safer, cheaper and more efficient than cable yarding alternatives
- Versatile operating ability – night, snow, rain, wet, dry, etc.
- Better control and handling of trees for reduced residual damage
- Two machines and operators reduces transportation and overhead costs



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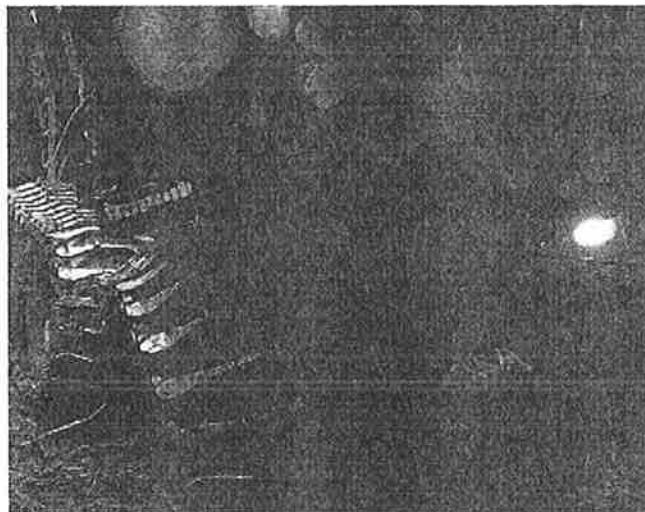
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Challenges with CTL

Systems need year-round work, but are designed to work in a variety of conditions

Sidehill – the machines can turn with the landscape and terrain features, but are not advised on excessive sidehill

Learning curve and training take time, experience, and skill



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Take-away Messages, Management Implications

- ***Soils are complex, site conditions are important! Wet, dry, clay, sand, etc.***
- Horizontal and vertical benefits through careful implementation of cable-assistance
- Use of cable-assistance enables reduced ground pressures which provides:
 - Less soil displacement (slip and rutting)
 - Access to steeper slopes
 - Improved mobility, stability
- As we develop steep-slope technology, where are our new opportunities for improvement?
 - Operator training/ability
 - Machine maintenance/design
 - Regulatory environment



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Thank you! Questions?

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