

Operations of a Combined Harvester/Forwarder



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US Forest Service

Partners

- SBS Woodshavings, Ruidoso, NM
- Timberline
- Lincoln National Forest, Smokey Bear RD
- TimberPro
- New Mexico State University

Outline

- Development of harwarder technology
- Review of New Mexico study and results

Multi-function Machines



Buschcombine--1961

Multi-function Machines



Probst Harvester

Its Obvious

Pro's

- Fewer operators
- Common components
- Less handling
- No balance issues
- Cheaper moves

Con's

- More complicated
- Less reliable
- Lower system output

Conventional CTL



Harwarder Technology: Dual

- Distinct functions using interchangeable attachments (grapple, harvester head)



Ponsse Buffalo Dual, Wisent Dual

Harwarder Technology: Combi

- Dedicated multi-function attachment
- Direct loading
- Rotatable load bunk



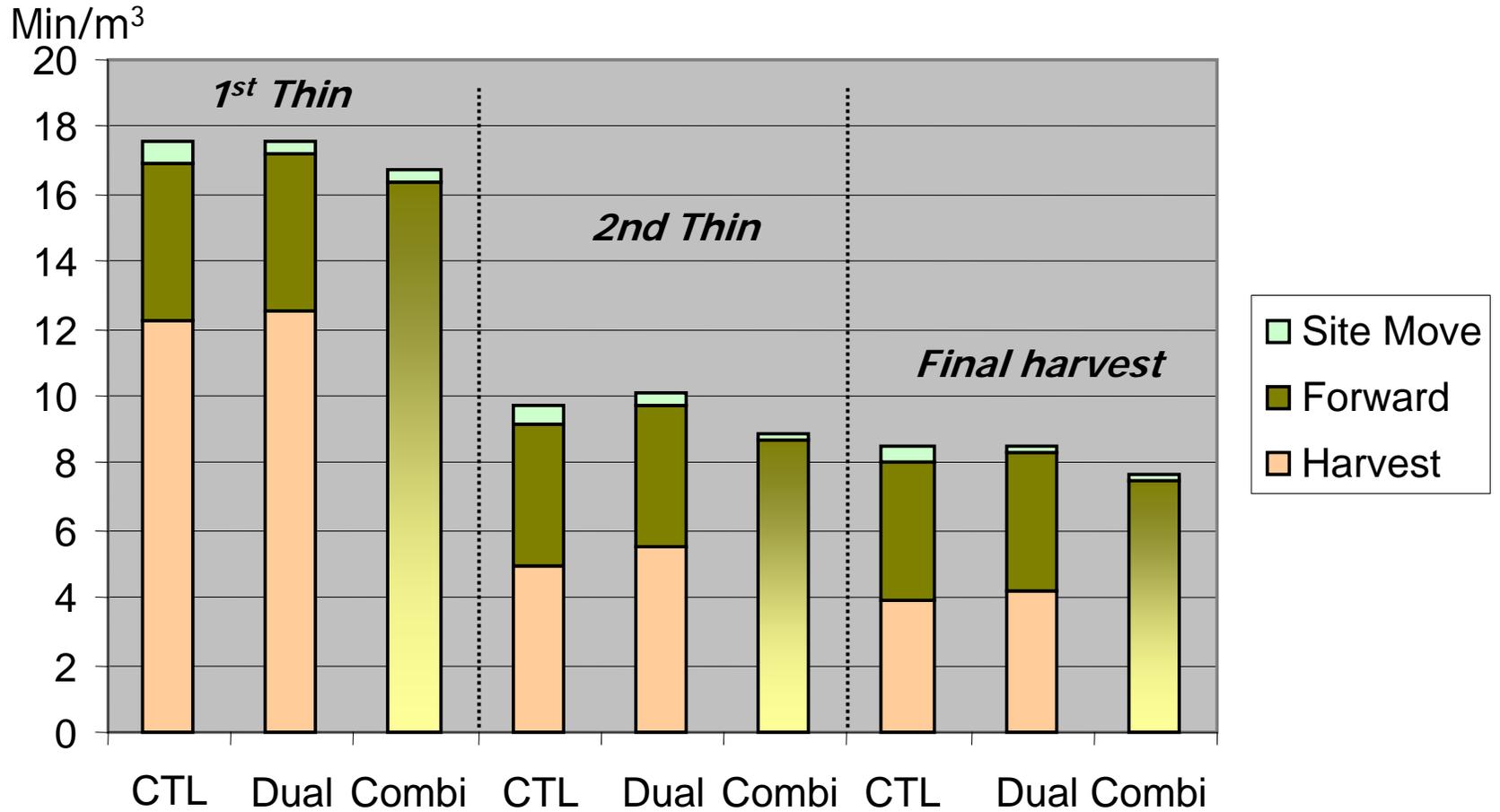
Valmet 801 Combi

Harwarder Combi



Pinox 728 Combi

Performance



Scandinavian Experience

- Dual technology is no faster than CTL
- Combi technology may be 6 - 10% faster
- Cost benefit depends on forwarding distance
- Number of product sorts impact
- Rotatable load space

New Mexico Study

- TimberPro 820-E
- Fuel reduction treatments
- Gross Time Study
- Elemental analysis
- Soil disturbance
- Assessment of erodability

TimberPro TF 820-E

- 250 to 300 hp
- 23' reach w/6'
- 10.5' wide, 33' long
- 52000 lbs
- \$460K
- Dual technology











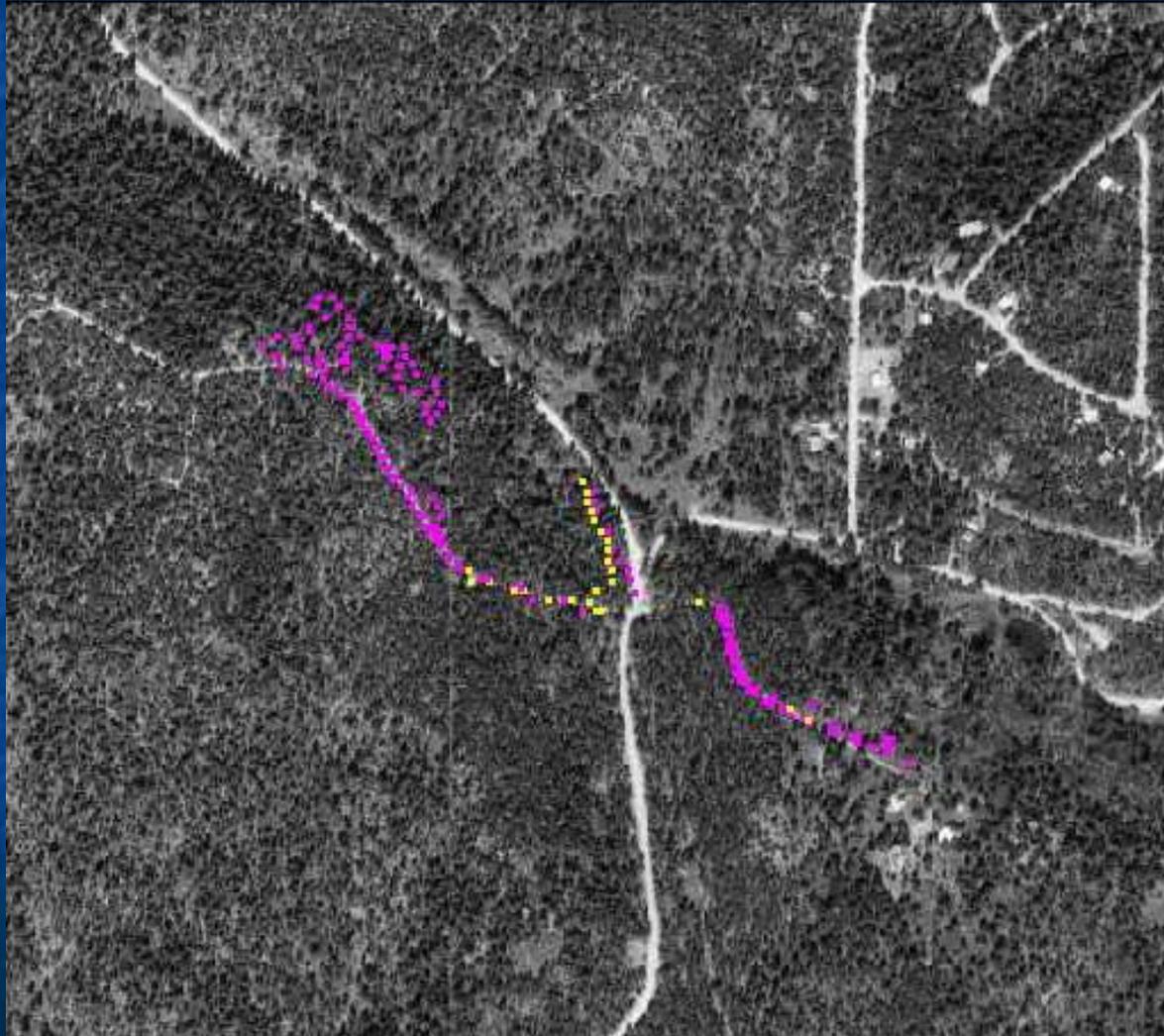




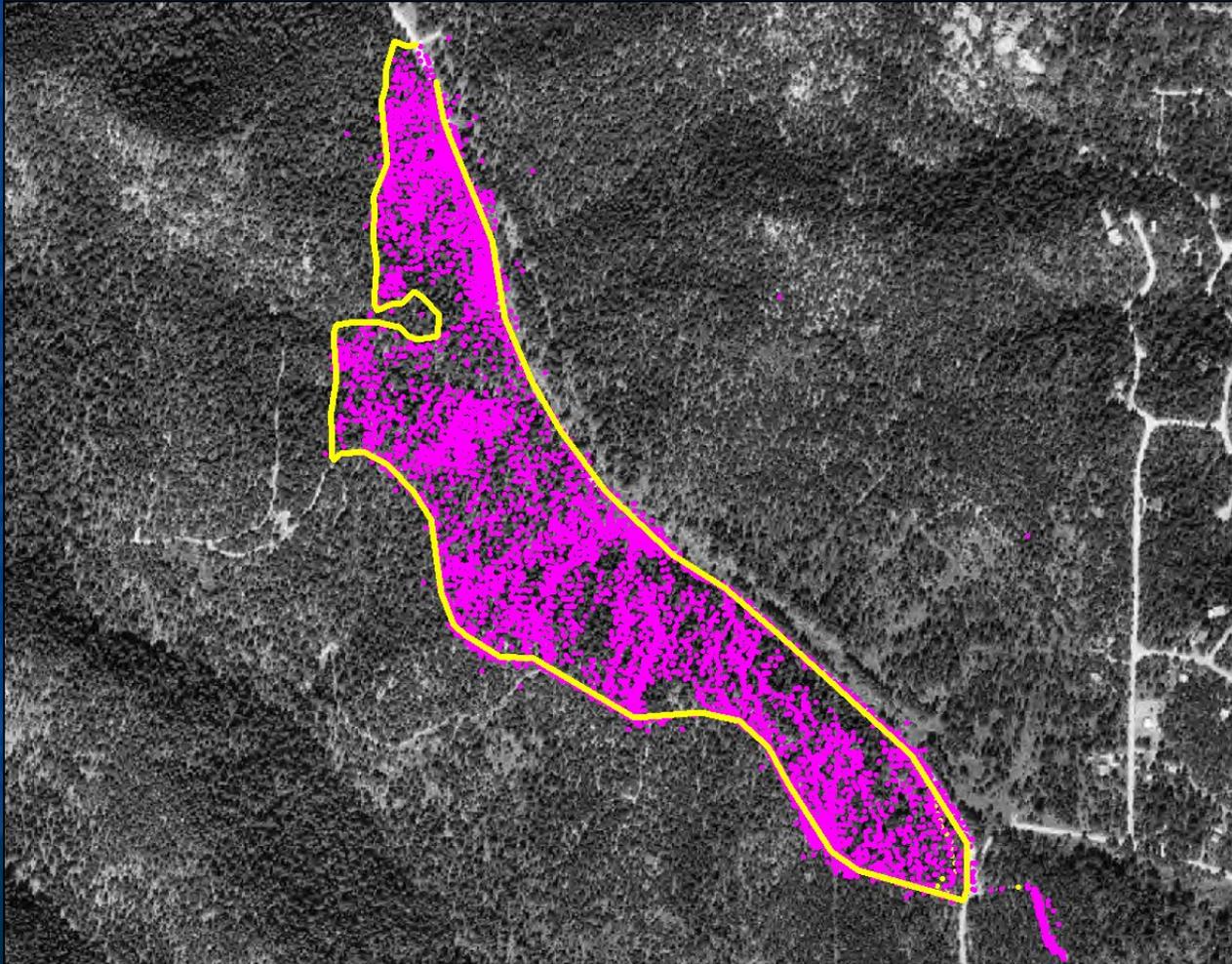




Mapping Production

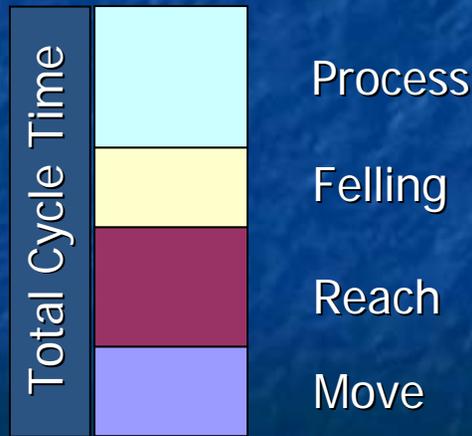


Unit 1

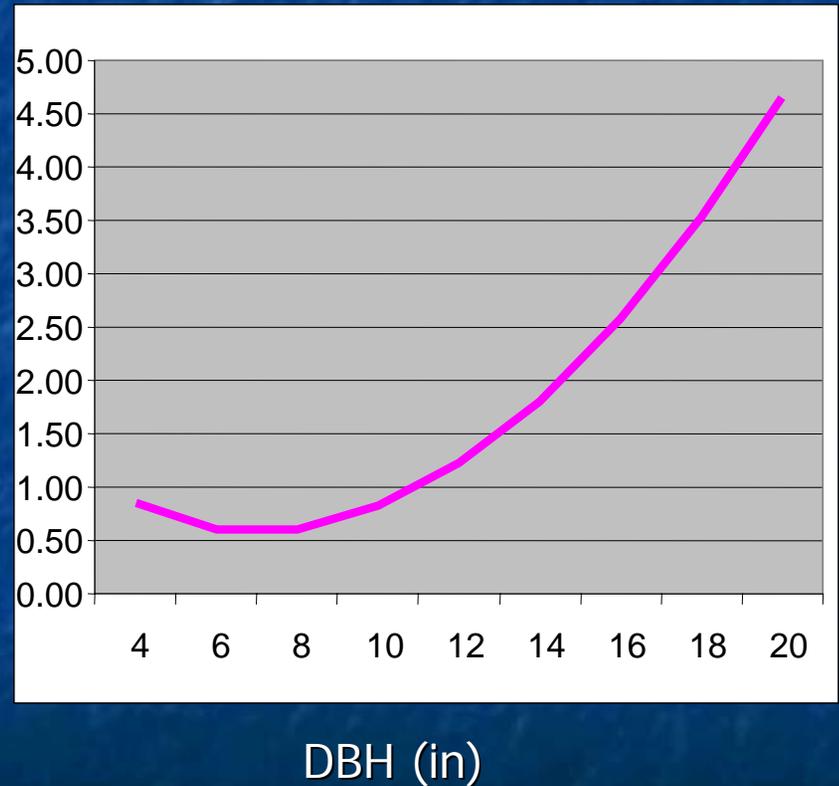


Harvesting Summary

- Ave 8" dbh, 9 cf
- Delimiting significant



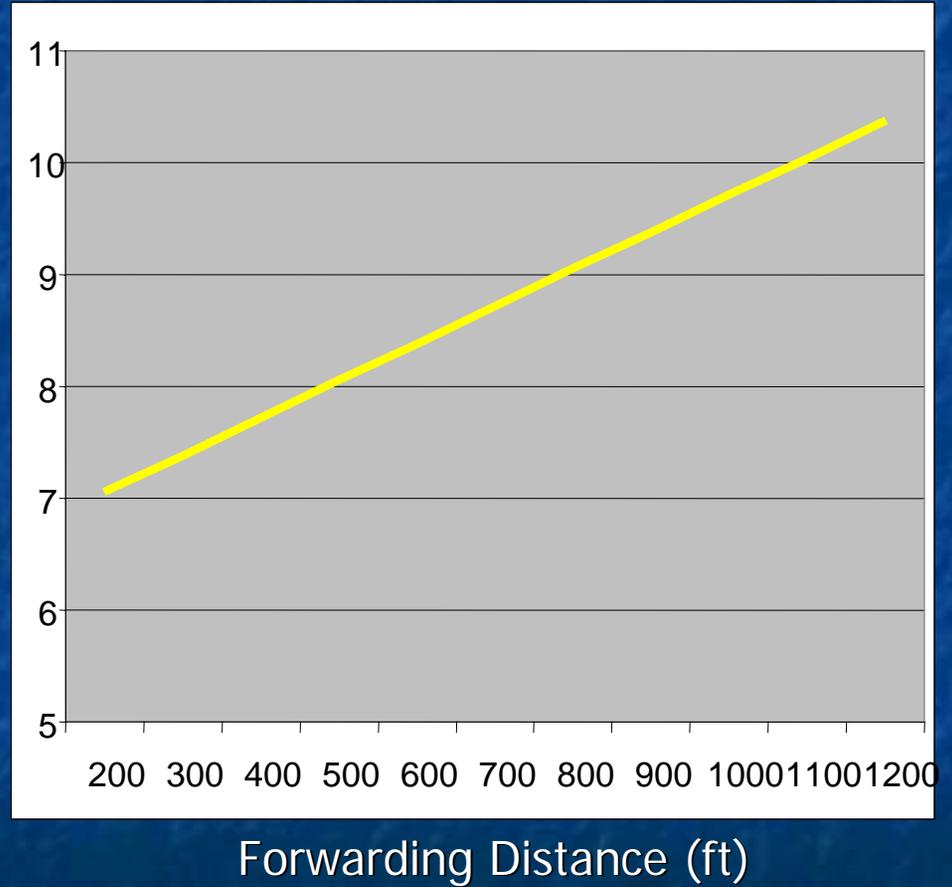
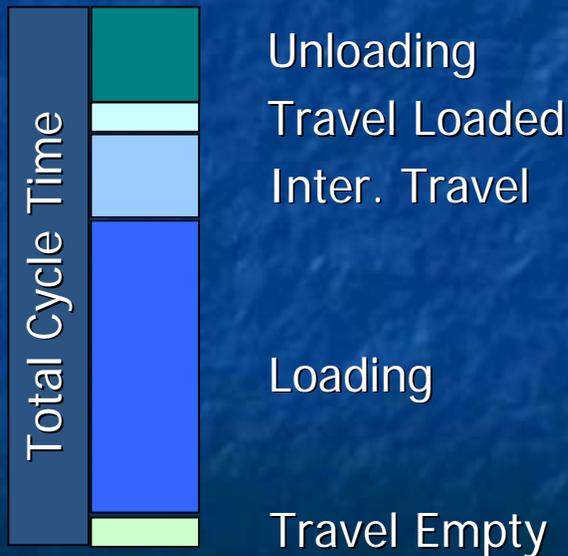
Time/Tree (min)



Forwarding

Min/CCF

- 20 to 600 ft
- Ave 410 cf, 70 pcs



System Productivity

- Removed ~ 9 CCF/acre, 3.8 PMH/acre
- Elemental times ~ 16 min/CCF
- Gross time ~ 25 min/CCF
- Misc. elements nearly half of all operating time

Harwarder Costs

- Capital costs \$60/SMH
- Fuel and lube \$22.50/PMH
- Tires, sawchain \$7.00/PMH
- R&M \$45/PMH
- Labor \$40/SMH

With Profit and Overhead \$200/SMH

Conclusions

- Productivity was similar to Scandinavian studies of first thinning
- Terrain was limiting in some areas
- Forwarding was relatively short
- ~\$900/acre

Questions?

