

USE OF ROLL-OFF CONTAINERS TO FACILITATE RECOVERY OF FOREST BIOMASS – A CASE STUDY



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Presentation Overview

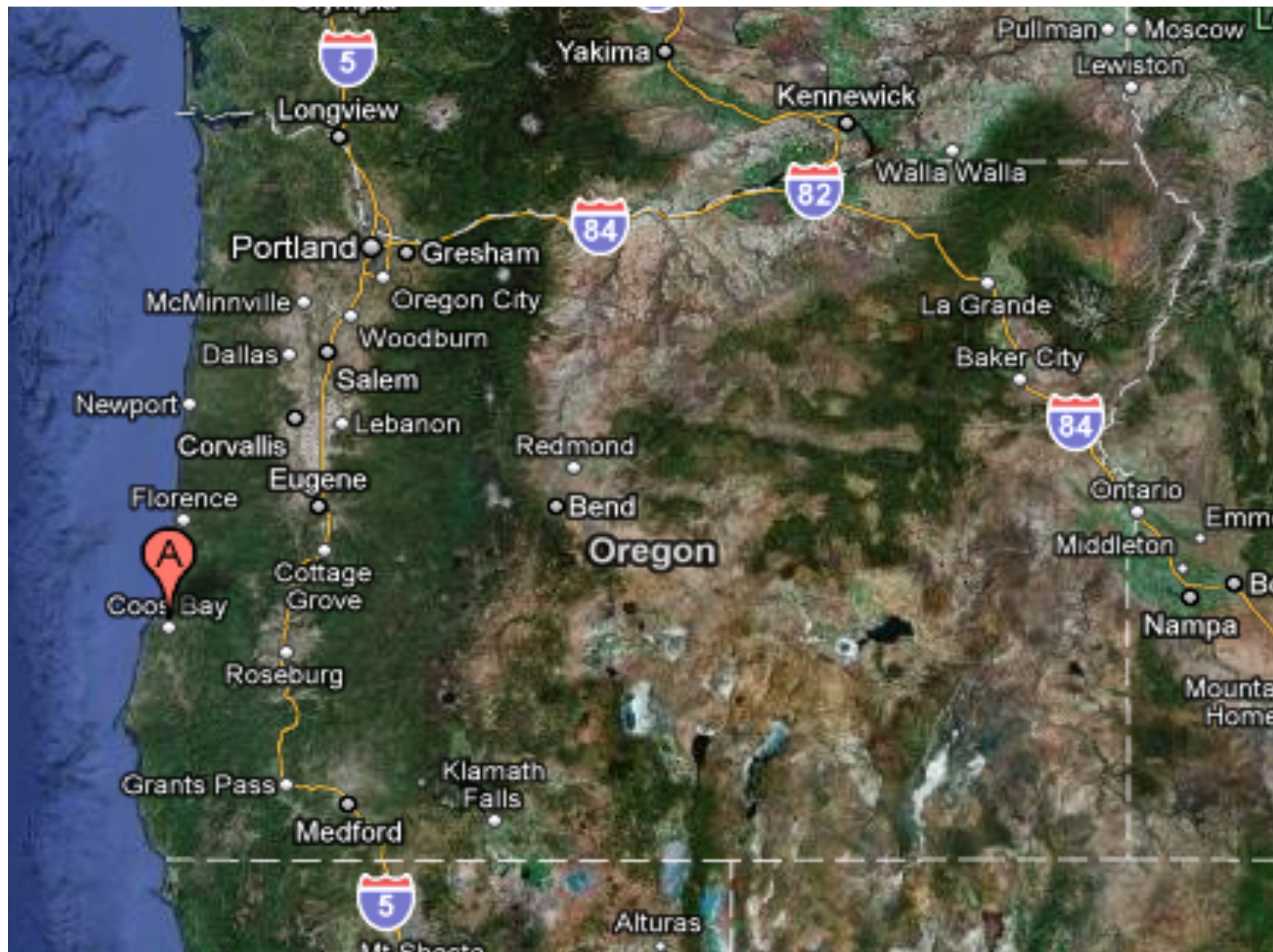
- Introduction
- Background Info
- Study Objectives
- Data Collection
- Recovery, Processing and Transport Costs
- Logistics
- Observations
- Acknowledgements



Project Sponsor – Coquille Indian Tribe

- Coquille Indian Tribe (CIT) is a federally recognized Tribe that actively manages about 5,400 acres of forest in the SW region of the Oregon coast.





Coquille Indian Tribe – Continued

- Headquartered in North Bend, Oregon.
- 840 enrolled tribal members as of 11/05.
- In 1998 5,410 acres of forestland were returned to tribal stewardship.
- Considering development of a biomass energy project.
- Tribal initiatives include increasing the self-sustainability of its people.
- Woody Biomass Utilization Grant (USFS) to purchase a hydraulic hook-lift truck and bins.

Study Objectives

- CIT is considering development of a commercial scale biomass power generation facility.
- Due to steep topography and road systems designed for log truck traffic, alternative transport systems are required.
- Beta-Test alternative recovery and transport systems to optimize recovery and costs.



Roll-off Containers

- Used where traditional transport systems (full-sized chip vans) can not negotiate roads due to curve radius and steep grades.
- Two-stage transportation
 - Roll-off containers transport slash to concentration yard.
 - Biomass is processed and loaded into chip vans.
 - Full-sized chip vans haul biomass fuel to end user.



Hot Collection

- Either bin trucks get into rotation, or
- Set out bins (initial concept) on landings
 - Landings often need to be modified to allow for bins.
 - Full bins are collected at the end of the active logging shift.



Cold Collection

- Move in an excavator after the logging is completed, or
- Logging contractor loads out slash after logging operations.
- 2-3 bins set out at landing.
- Excavator can complete some site preparation while loading (or waiting for) bins.



Data Collection

- Trip tickets are completed by the driver for each load:
 - Date
 - Sale or project name
 - Landing number
 - Bin load time (minutes)
 - Loaded trip time (minutes)
- All trip ticket data is entered into a database maintained by CIT.





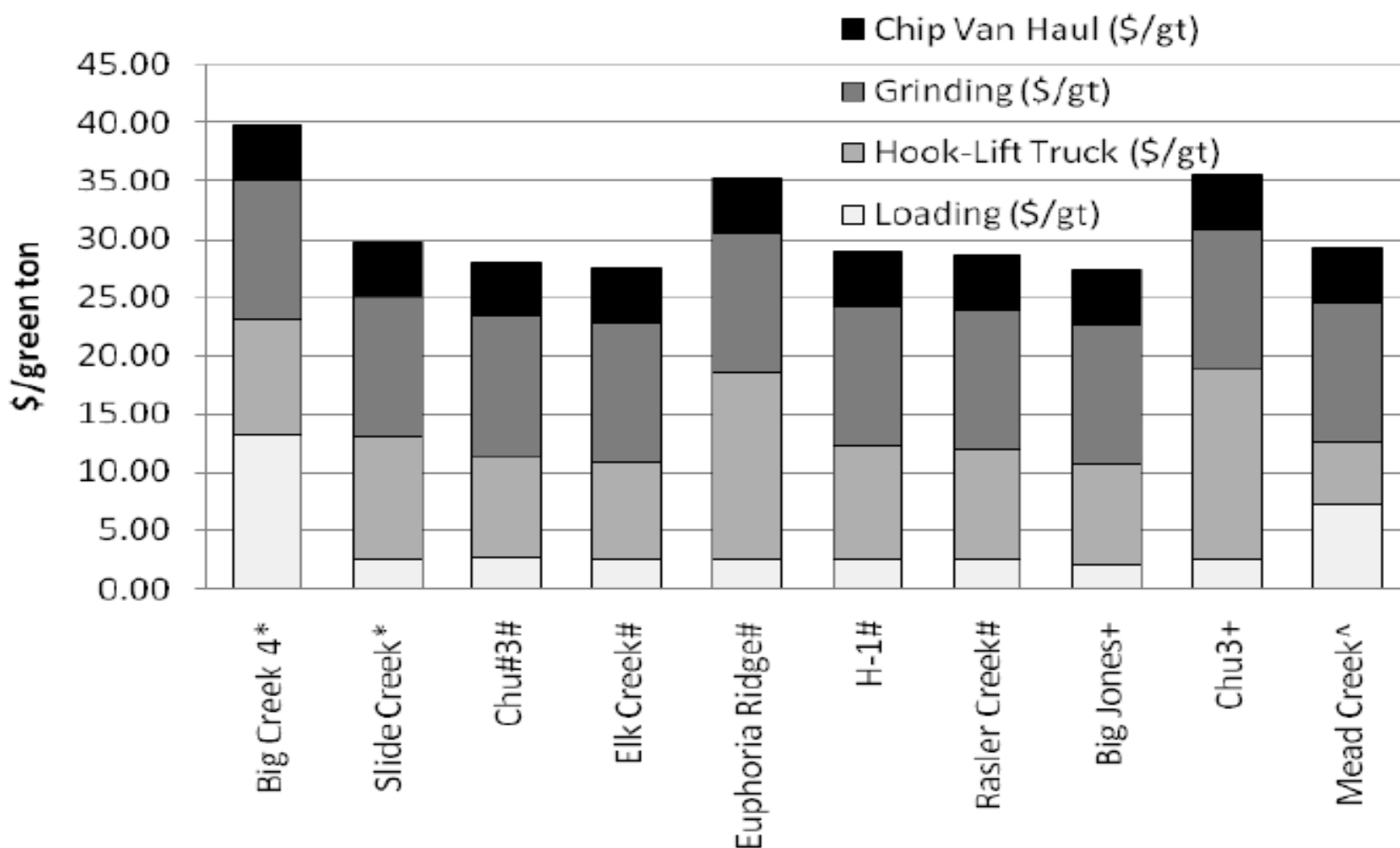
Slash Collection 10/08-1/10

Sale Name	Grind	Hot or Cold Collection	Landowner	Logging System	Sale Volume (MBF)	Slash Volume (green tons)	Number of Bin Loads
Big Creek 4	2	Cold	Industrial	Cable	incomplete	405	37
Big Jones	Both	Both	Industrial	Cable	4680	1779	156
Chu#3	1	Cold	CIT	Cable	incomplete	677	53
Chu3	2	Both	CIT	Cable	incomplete	718	49
Elk Creek*	2	Cold	CIT	Road Reconstruction	n/a	40	5
Euphoria Ridge*	2	Cold	CIT	Cable	960	159	15
H-1	2	Cold	CIT	Cable	1260	691	59
Mead Creek	Both	Hot	CIT	Cable	incomplete	1793	182
Rasler Creek*	2	Cold	CIT	Road Daylighting	n/a	307	37
Slide Creek	2	Cold	Industrial	Cable	2940	2149	230
Misc.	1					92	11
Total						8807	834

Travel Time

	Aggregate-surfaced (miles)	Paved (miles)	Total one-way distance (miles)	One-way travel time (minutes)
Big Creek 4	1.1	8.0	9.1	34.2
Big Jones	5.2	8.2	13.4	37.2
Chu#3	6.0	7.7	13.7	41.8
Chu3	2.6	6.7	9.3	40.9
Elk Creek	6.0	10.0	16.0	41.0
Euphoria Ridge	4.0	9.0	13.0	27.7
H-1	3.0	8.0	11.0	35.3
Mead Creek	2.3	10.7	13.0	25.8
Rasler Creek	7.0	11.0	18.0	44.9
Slide Creek	2.0	0.3	2.3	9.6
Misc.	6.4	10.0	16.4	45.0
Overall	3.3	6.6	9.9	27.6

Cost Summary – Hot vs. Cold



*Cold - separate contractor; #Cold - logging contractor; +Both hot and cold; ^Hot

Hot vs. Cold Slash Collection

HOT collection

- Loading cost: \$2.00-\$2.70/green ton.
- Production: 2-4 bins/day
- Need multiple sides per truck.
- Recovery is higher.
- Integrated operations – requires a willing operator.

Cold collection

- Loading cost: \$14/green ton.
- Production: 12-15 bins/day.
- Need multiple trucks per side.
- Recovery is lower.
- Decoupled operations – operations as usual.

Biomass Recovery

- Biomass recovery rate:
- 0.8 – 1.4 GT/MBF
- or 0.5 - 0.9 BDT/MBF
- (35% MC)
- Impacted by:
 - Harvest system
 - Topography



Biomass Recovery - Continued

- Recovery impacted by:
 - When bins are loaded:
 - Highest when bins are loaded during operations(hot).
 - Timber characteristics.
 - Industrial sales average 8.5 green tons/bin
 - Tribal sales averaging 10-12 green tons/bin









Biomass Collection Logistics

- Landing size
- Landing configuration
- Number of log sorts
- Timber characteristics
- Whole-tree vs. log length
- Leave requirements
- Operator willingness



General Observations/Findings

- Roll-offs may be a good option when:
 - Slash is not accessible with other transportation options.
 - Grinding efficiency with a concentration yard is great enough to offset costs of hook-lift truck.



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Tad Mason, CEO
TSS Consultants
2724 Kilgore Road
Rancho Cordova, CA 95670
916.266.0546
tmason@tssconsultants.com
www.tssconsultants.com