

**Cable Yarding Analysis**

**Forest Operations**

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You will be analyzing a select profile from the Weyerhaeuser operation we visited a week ago.

For the analysis we use what we saw on the landing:

Yarder: Madill 172

Carriage: Bowman IV

Use default information such as lines, diameters etc.

Create profile by measuring distances and elevation changes as shown on the map. Create a profile that extends all the way up to the road (end point of blue line. Elevation of end point of blue line = 800ft.

1. Create design payload from data sheet
2. Analyze skyline profile using default log geometry

<b>Log geometry</b>	<b>Values</b>
tag length - ft	10.0
log length - ft	40.0
log diameter - in	12.0

Log suspension use default values: partial suspension and 5ft clearance

Establish payloads for live skyline and Standing Skyline for the following scenarios:

- A) Tailhold at unit edge at stump height -2ft. what are the payloads you can get to the landing for standing and live skyline configuration. Does it match the design payload?
- B) If not, how high do you have to rig a tail tree in order to get the desired payload
- C) Do you have to move to the road on the other side in order to get adequate payloads.

There are some issues with hmap contour elevations. Use 800 ft elev for the end point of the profile at the road and in the hRMZ

In your answer use screen captures to document your answers

**Weyerhaeuser Company  
Coastal Washington Timberlands  
May 17, 2010**

225,000 acres in Grays Harbor and Pacific County, 5500 to 6000 acres harvested annually, rotation age of 45 years.

8%

Average loads size:

- 9.00 Ccf (100 cubic feet)
- or /3.6 Mbf (1000 board feet)
- or /26 tons (standard log truck no extra axels)

Roughly 3 tons = 1 Ccf  
Roughly 7 tons = 1 Mbf

Piece size:

Log average is 19 cubic feet, 1.5 logs/tree, or roughly 29 cubic feet /tree  
9.00 Ccf/ load / .19 cubic feet per log = 47 logs/ load (1130 lbs per log)

Turn size:

(# of pieces or trees per turn) is a function of skyline loading.  
A rule of thumb is about 350 bucked logs or full trees yarded per day.

350 X .29 cubic feet per log = 101 Ccf yarded per day / 9 Ccf/load = 11 loads/day

cycle = 5 mins or less

Northwest cable logging manufactures:

There are no production manufacturing facilities of cable yarding machines. New yarders can be custom built for \$800,000 to \$1,000,000.

Defunct Northwest Manufactures: Washington Iron Works, Berger, Skookum/Tyee, Tillman, Edco Skagit, Thunderbird, Madill

Roger 132: 7 yrs ago - \$675,000 (parts)

Standard cable side +\$4500/day

Yarder, RC carriage, log processor, log loading shovel

Boomer Ordye. shaver/head

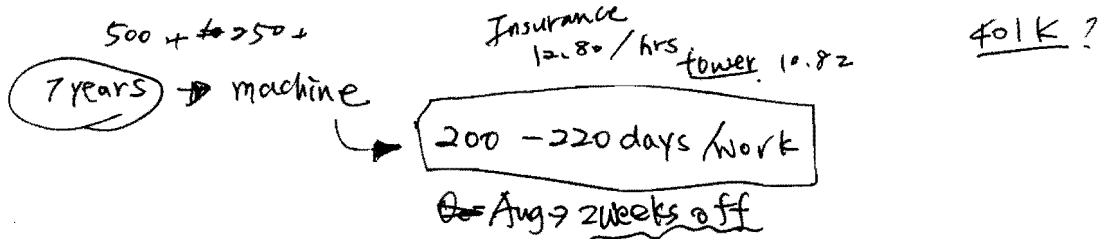
Labor: Yarder engineer, Log processor operator, Log loading operator  
Hooktender, Chaser, Rigging slinger, Choker setter, Choker setter

A standard cable side can burn 300 gallon of diesel per day.

Current price for off highway diesel is \$2.50/gal

2.5 x 3 = 750 day

**Have a good driving record, no tickets, be able to pass drug/alcohol test!**



Fire Shutdown Zone: Pacific-Cascade 651 N  
 Engineer: MJF/WSL  
 Harvest Manager:

# Weyerhaeuser Company

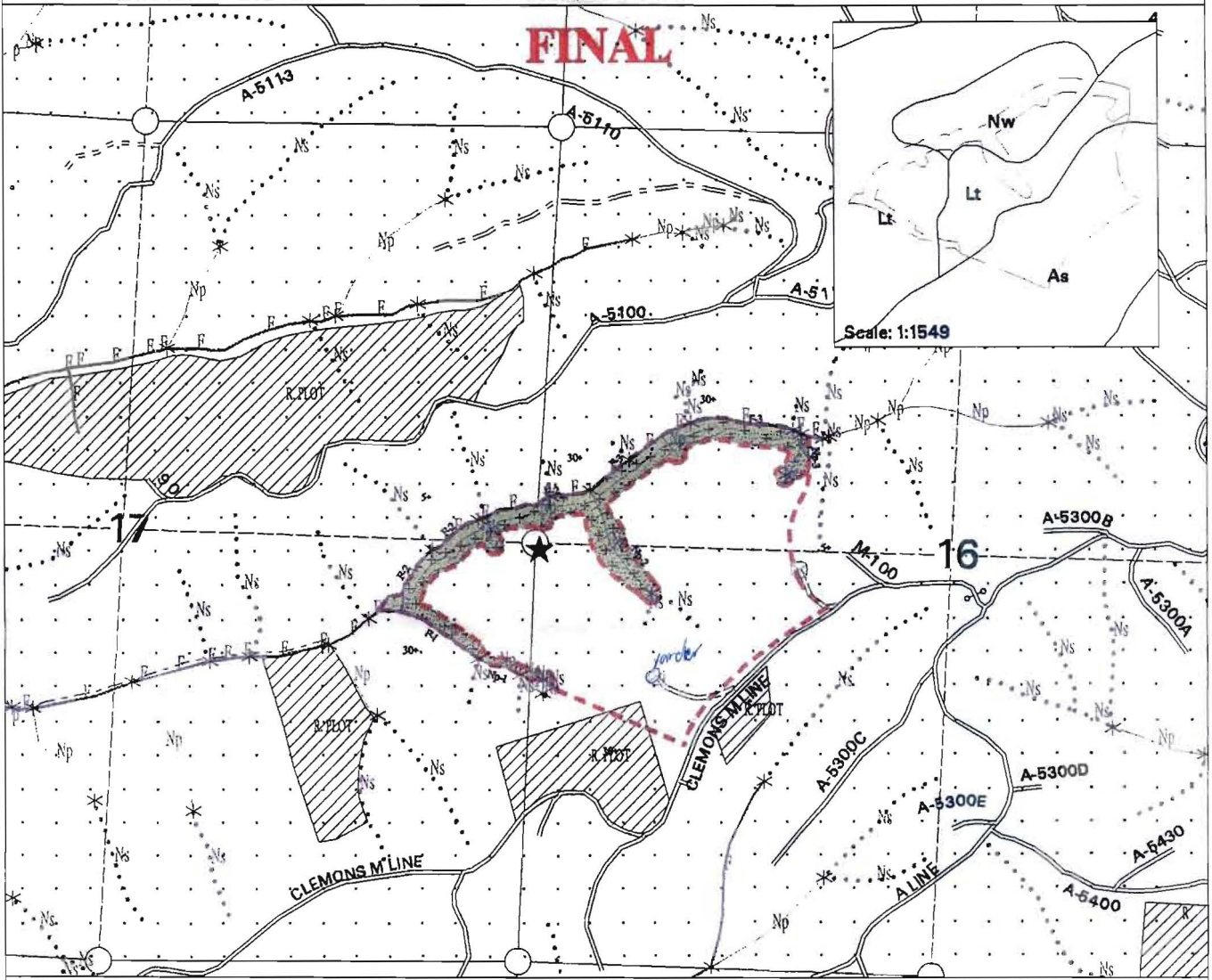
## Aberdeen Harvest Unit Map

### Vesta M-100A

Sec. 16, T16N, R06W  
 Latitude: 46° 52.4' North  
 Longitude: 123° 27.1' West

HPU#: 262205 Acres: 57

EMERGENCY ROUTE: *Start: Jct of North River & Vesta Crk Rds. Follow Vesta Crk Rd 0.7 mi to M-Line, right. Follow M-Line 6.7 mi to unit, left.*

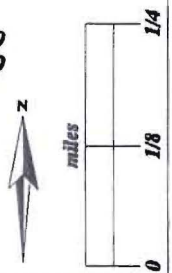


Harvest Year: **2007**  
 Harvest Window: **Year Round**  
 Watershed: **VESTA-LITTLE NORTH**  
 Inventory CCF/Ac: **71**  
 DOR EARR Qualified?: **Yes**  
 DOR Haul Zone / SVA: **2 / 2**  
 Road Amortization Area: **AS**  
 Logging Condition Code: **2**  
 DOR Volume Code: \_\_\_\_\_

Setting #: **A0202**  
 RW#: **NA**  
 FPA#: **2912824**  
 FPA Expires: **1/13/08**  
 HPA: **00000C8230-10**  
 HPA Expires: **9/30/2011**  
 Elevation: **478**  
 County: **Grays Harbor**

Site Index	Soil Type	Risk Class
140	Astoria	Moderate SDD=9
140	Lytell	Moderate SDD=9
140	Newlund	High SDD=6

RMZ				
Segment	Site Class	Stream Width	Option#	Width
F-1	II	<10	2	80
F-2	II	>10	NA	128
F-3	I	<10	NA	133



COMMENTS, CONSTRAINTS, SENSITIVITIES: **Geo review unit. RMZs marked with blue paint and blue flagging. Timber type change in unit.**



Fire Shutdown Zone: Pacific-Cascade 651N  
 Engineer: MJF/WSL  
 HPU#: 262205

# Weyerhaeuser Company

## Aberdeen Harvest Unit Map

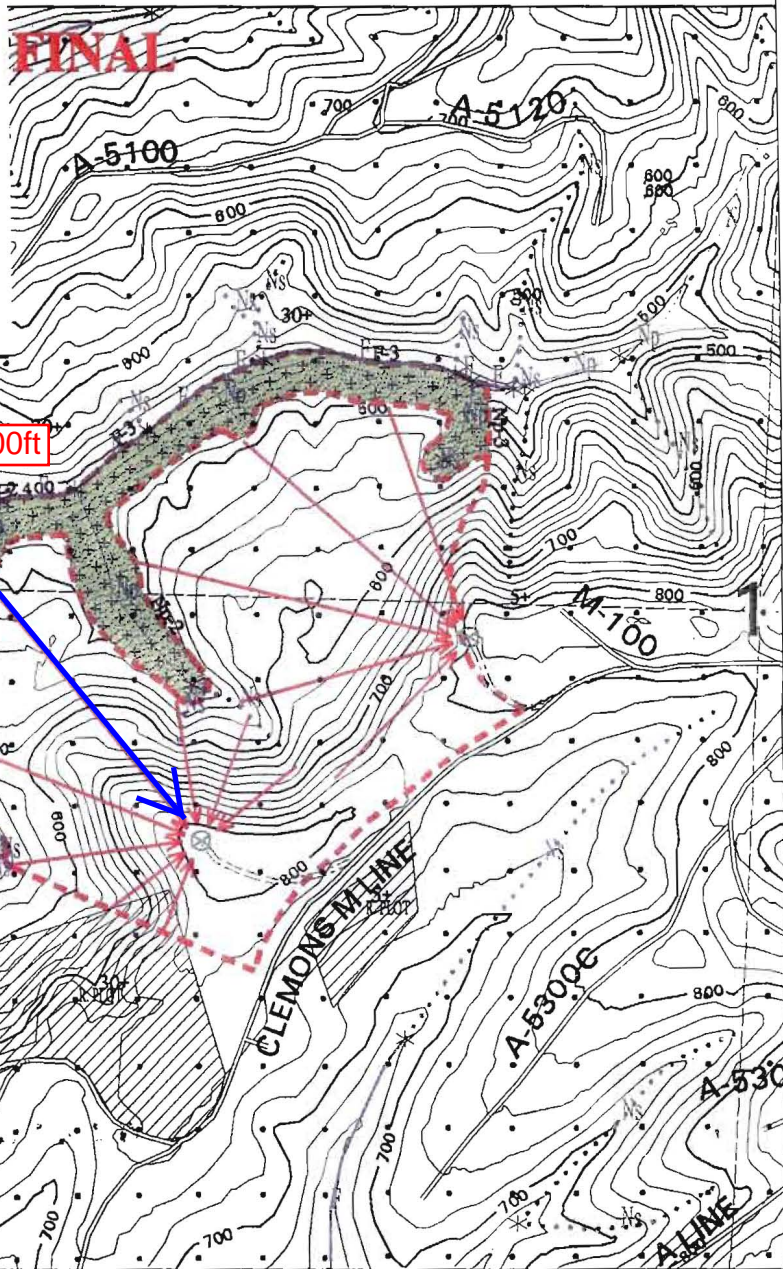
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### NEW SETTING

From: Aberdeen Engineering Date: 3-17-10  
 Harvest Manager: BW Mach.Contr.: Smith  
 To: Bob Woodcock  
 Doug Mays Karen Goodenough  
 Jack Thein Karen Temen  
 Jan Bjorke Keith Arnold  
 Jay Zillyett Marty Brooks  
 Jim Pettit Phil Cook  
 John Ruddell Wendi Lubinus



11 logs  
 ↓  
 (14 logs)  
 5  
 (8-7 logs)

bio mass  
 (under 3 ft)

Chipped  
 bark machine  
 (save 6 months)

↓  
 No conversion  
 machine

hard-fuel

0 1/8 miles

**SCALE: 1 INCH = 600 FT**

	ACRES	ACRES
GROSS	72.4	New Road R/W
WTA/GRT - Wildlife Area	0	Existing Interior Road R/W
RMZ - Riparian Management Zone	14.6	Net to Log Excluding R/W
RLA - Riparian Leave Area	0	Tower / Cable
WMZ - Wetland Management Zone	0	Shovel / Ground
UNS - Unstable Area	0	
UNEVEN - Uneven Age Harvest	0	
SHOVEL - Shovel Ground	0	

Setting Boundary	---	Landing	⊗
Existing Road	—	Logger's Choice	⊙
New Construction	- - -	Tail Tree	⊖
Temporary Road	• • •	Marked GRT's	⊕
Re-construction	- • -	Culvert	—
Road Maintenance	▭	Rock Pit	⊕
Road Abandonment	▭	Waste Site	⊖
Property Line	▭	Stream Cleanout	⊕
Found Corner	★	Water Type	⊕
Perennial Initiation Point	PIP		

CONTOUR INTERVAL = 20 FT

NOTIFY ENGINEERING IF ANY SURVEY CORNERS OR MONUMENTS ARE DISTURBED

**Weyerhaeuser Company**  
**Coastal Washington Timberlands**  
**May 17, 2010**

**Vesta M100 Cable Side, RL Smith Logging, Olympia, WA**

Madill 172 yarder, Boman RC carriage, Kobelco 290 / Waratah processor,  
Komatsu loading shovel.

Tree length <sup>(lighter)</sup> Douglas Fir and Red Alder

57 acres

71 Ccf/Acre

✓ 4047 Ccf Total

Production information to date:

<u>Pieces/load</u>	52
<u>Cubic Ft./piece</u>	20
<u>Cubic Ft./Load</u>	<u>10.38</u>
<u>Board Ft./piece</u>	80
<u>Board Ft./load</u>	4164

On board truck cost/ load

\$498.00

Cutting cost/load

~~\$67.50~~ → manual

Yard, Process and Load cost

\$430.50

Gross \$/day for C,Y &L, 11 loads /day

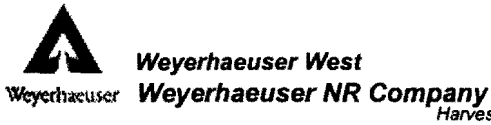
~~\$5478.00~~ total cost

157

→ 50 → 6 loads  
↓  
manuals.

# Raw Material Recap by Destination

Fiscal Date: Year To Date [Jan 01,2010 00:00:00 , May 17,2010 23:59:59]



Dest ID	Sp	Raw Material	# loads	Pieces	-- MBF --		-- CCF --		Net Tons	Supplier		OBT		Hauling		Sales	
					Gross MBF	Net MBF	Gross CCF	Net CCF		Amount	\$/Net CCF	Amount	\$/Net CCF	Amount	\$/Net CCF	Amount	\$/Net CCF
BUSE_DUNL DF		SCALESAW	9	62	51.890	43.780	81.98	81.98	0.00	0.00	0.00	3,935.04	48.00	1,638.57	19.99	16,252.60	198.25
<b>Total BUSE_DUNLAP</b>			<b>9</b>	<b>62</b>	<b>51.890</b>	<b>43.780</b>	<b>81.98</b>	<b>81.98</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>3,935.04</b>	<b>48.00</b>	<b>1,638.57</b>	<b>19.99</b>	<b>16,252.60</b>	<b>198.25</b>
HIP-CENT	AL	PULP	7	739	24.371	21.486	68.11	66.11	189.95	0.00	0.00	3,173.28	48.00	1,325.76	20.05	6,078.40	91.94
	AL	SCALESAW	5	183	19.050	17.310	48.92	48.92	139.13	0.00	0.00	2,348.16	48.00	1,152.34	23.56	9,770.10	199.72
<b>Total HIP-CENT</b>			<b>12</b>	<b>922</b>	<b>43.421</b>	<b>38.796</b>	<b>115.03</b>	<b>115.03</b>	<b>329.08</b>	<b>0.00</b>	<b>0.00</b>	<b>5,521.44</b>	<b>48.00</b>	<b>2,478.10</b>	<b>21.54</b>	<b>15,848.50</b>	<b>137.78</b>
OLYMPIA-YD	DF	WA_EXPORT	25	466	140.970	133.130	284.27	284.23		0.00	0.00	13,643.04	48.00	6,166.34	21.69	74,079.35	260.63
	WW	WA_EXPORT	1	22	5.020	5.000	10.76	10.76		0.00	0.00	516.48	48.00	253.49	23.56	2,313.00	214.96
<b>Total OLYMPIA-YD</b>			<b>26</b>	<b>488</b>	<b>145.990</b>	<b>138.130</b>	<b>295.03</b>	<b>294.99</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>14,159.52</b>	<b>48.00</b>	<b>6,419.83</b>	<b>21.76</b>	<b>76,392.35</b>	<b>258.97</b>
SP-AB	DF	SCALESAW	46	1,345	218.520	207.340	505.84	505.84	1,297.90	0.00	0.00	24,280.32	48.00	9,266.49	18.32	108,859.80	215.21
	WW	SCALESAW	4	119	19.360	18.500	45.54	45.54	115.26	0.00	0.00	2,185.92	48.00	452.10	9.93	9,990.00	219.37
<b>Total SP-AB</b>			<b>50</b>	<b>1,464</b>	<b>237.880</b>	<b>225.840</b>	<b>551.38</b>	<b>551.38</b>	<b>1,413.16</b>	<b>0.00</b>	<b>0.00</b>	<b>26,466.24</b>	<b>48.00</b>	<b>9,718.59</b>	<b>17.63</b>	<b>118,849.80</b>	<b>215.55</b>
SP-CENT	DF	CNS	38	2,450	140.327	133.349	397.92	397.92	1,083.56	0.00	0.00	19,100.16	48.00	7,575.98	19.04	71,724.64	180.25
<b>Total SP-CENT</b>			<b>38</b>	<b>2,450</b>	<b>140.327</b>	<b>133.349</b>	<b>397.92</b>	<b>397.92</b>	<b>1,083.56</b>	<b>0.00</b>	<b>0.00</b>	<b>19,100.16</b>	<b>48.00</b>	<b>7,575.98</b>	<b>19.04</b>	<b>71,724.64</b>	<b>180.25</b>
WILLIS-PV	DF	PULP	25	2,940	94.117	86.346	218.72	218.72	645.22	0.00	0.00	10,498.56	48.00	2,468.78	11.29	20,001.82	91.45
<b>Total WILLIS-PV (pulp)</b>			<b>25</b>	<b>2,940</b>	<b>94.117</b>	<b>86.346</b>	<b>218.72</b>	<b>218.72</b>	<b>645.22</b>	<b>0.00</b>	<b>0.00</b>	<b>10,498.56</b>	<b>48.00</b>	<b>2,468.78</b>	<b>11.29</b>	<b>20,001.82</b>	<b>91.45</b>
<b>Total for report</b>			<b>160</b>	<b>8,328</b>	<b>713.625</b>	<b>666.241</b>	<b>1,660.06</b>	<b>1,660.02</b>	<b>3,471.02</b>	<b>0.00</b>	<b>0.00</b>	<b>79,680.96</b>	<b>48.00</b>	<b>30,299.85</b>	<b>18.25</b>	<b>319,069.71</b>	<b>192.21</b>

↓  
cost

↓  
benefit



R. E. YARDING MATRIX

TURN CYCLES / HOUR

HI-LEAD									SLACKLINE											
Span Distance	0 - 700		700-1000		1000-1500		1500+		0 - 700			700 - 1000			1000 - 1500			1500+		
Cover density	Hvy	Lt.	Hvy	Lt.	Hvy	Lt.	Hvy	Lt.	Hvy	Ave	Lt.	Hvy	Ave	Lt.	Hvy	Ave	Lt.	Hvy	Ave	Lt.
Flat	14	16	12	14	7	8	5	6	10	12	14	10	12	14						
Moderate	14	16	12	14	7 8	8 9	5 6	6 7	12	14	16	10	12	14	8	10	12			
Down Hill Steep	8 10	10 12	8 10	9 11	6 7	7 8	4 5	6 7	12	14	16	8	10	12	6	8	10	5	7	9
Up Hill Steep	10 12	11 13	10 12	11 13	7 8	8 9	5 6	6 7	13	15	17	10	12	14	8	10	12	6	8	10
	GRAVITY																			
	12	14																		
	14	16	15	17																
	13	15	13	15	11	12	9	11												

SWING YARDER [GRAPPLE R.E. \ CHOKER R.E.]									NORTH BEND											
Span Distance	0 - 350		350-500		500-700		700+		0 - 700			700 - 1000			1000 - 1500			1500+		
Cover density	Hvy	Lt.	Hvy	Lt.	Hvy	Lt.	Hvy	Lt.	Hvy	Ave	Lt.	Hvy	Ave	Lt.	Hvy	Ave	Lt.	Hvy	Ave	Lt.
Down Hill Steep	13 45	18 50	13 30	18 45	12 15	16 25	12 12	14 20	11	13	15	8	10	13	8	10	12	7	8	11
Flat	10 40	13 45	10 xx	13 xx	8 xx	10 xx	5 xx	7 xx	8	11	13	7	10	12						
Moderate	14 42	18 46	16 34	14 38	10 18	12 22	10 10	xx 14	11	13	15	11	13	15	10	12	14	9	11	13
Up Hill Steep	12 45	14 48	12 36	10 40	8 20	11 26	9 12	xx 12	10	12	14	10	12	14	9	11	13	8	10	12