



"STEWARDSHIP IN FORESTRY"

Timber Sale Appraisal  
Thor's Hammer  
Sale 341-14-32

District: Astoria

Date: October 07, 2013

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**cost summary**

	<b>Conifer</b>	<b>Hardwood</b>	<b>Total</b>
<b>Gross Timber Sale Value</b>	\$3,748,145.19	\$18,623.52	\$3,766,768.71
		<b>Project Work:</b>	\$(432,591.00)
		<b>Advertised Value:</b>	\$3,334,177.71



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**timber description**

**Location:** Portions of Sections 10, 11, 14, and 15, T5N, R6W and portions of Section 35, T6N, R6W, W.M., Clatsop County, Oregon.

**Stand Stocking:** 60%

SpecieName	AvgDBH	Amortization (%)	Recovery (%)
Douglas - Fir	23	0	97
Western Hemlock / Fir	13	0	97
Alder (Red)	20	0	95

Volume by Grade	2S	3S	4S	Camprun	Total
Douglas - Fir	8,271	1,477	259	0	10,007
Western Hemlock / Fir	0	34	10	0	44
Alder (Red)	0	0	0	54	54
Total	8,271	1,511	269	54	10,105



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**comments:** Pond Values Used: 3rd Quarter Calendar Year 2013.

Expected Log Markets: Mist, Clatskanie, Tillamook, Forest Grove, Longview, and Garibaldi.

Western redcedar and Other Cedars Stumpage Price = Pond Value  
minus Logging Cost:  
 $\$781.56/\text{MBF} = \$1,000/\text{MBF} - \$218.44/\text{MBF}$

SCALING COST ALLOWANCE = \$5.00/MBF

FUEL COST ALLOWANCE = \$4.00/Gallon

HAULING COST ALLOWANCE

Hauling costs equivalent to \$780 daily truck cost.

Other Costs (with Profit & Risk to be added):

100% Brand and Paint:  $\$1/\text{MBF} \times 10,105/\text{MBF} = \$10,105$

Log Loader Slash & Landing Piling (includes Move-In and Pile Materials): (see attached appraisal) = \$18,590

Machine Washing for Noxious Weed Compliance = \$2,000

TOTAL Other Costs (with Profit & Risk to be added) = \$30,695

Other Costs (No Profit & Risk added):

TOTAL Other Costs (No Profit & Risk added) = \$1,800



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**logging conditions**

**combination#: 1**            Douglas - Fir                            43.00%  
    Western Hemlock / Fir                43.00%  
    Alder (Red)                            43.00%

**yarding distance:** Medium (800 ft)                            **downhill yarding:** No  
**logging system:** Cable: Medium Tower >40 - <70            **Process:** Manual Falling/Delimiting  
**tree size:** Mature / Regen Cut (900 Bft/tree), 3-5 logs/MBF  
**loads / day:** 10.0    **bd. ft / load:** 4,000  
**cost / mbf:** \$86.50

**machines:** Log Loader (A)  
 Tower Yarder (Medium)

**combination#: 2**            Douglas - Fir                            43.00%  
    Western Hemlock / Fir                43.00%  
    Alder (Red)                            43.00%

**yarding distance:** Medium (800 ft)                            **downhill yarding:** No  
**logging system:** Shovel    **Process:** Manual Falling/Delimiting  
**tree size:** Mature / Regen Cut (900 Bft/tree), 3-5 logs/MBF  
**loads / day:** 12.0    **bd. ft / load:** 4,000  
**cost / mbf:** \$52.18

**machines:** Shovel Logger

**combination#: 3**            Douglas - Fir                            14.00%  
    Western Hemlock / Fir                14.00%  
    Alder (Red)                            14.00%

**yarding distance:** Medium (800 ft)                            **downhill yarding:** No  
**logging system:** Track Skidder                                    **Process:** Manual Falling/Delimiting  
**tree size:** Small / Thinning 10in (90 Bft/tree), 18-20 logs/MBF  
**loads / day:** 4.0    **bd. ft / load:** 4,000  
**cost / mbf:** \$215.03

**machines:** Log Loader (B)  
 Track Skidder





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**logging costs**

<b>Operating Seasons:</b>	3.00	<b>Profit Risk:</b>	14.00%
<b>Project Costs:</b>	\$432,591.00	<b>Other Costs (P/R):</b>	\$30,695.00
<b>Slash Disposal:</b>	\$0.00	<b>Other Costs:</b>	\$1,800.00

**Miles of Road**

Road Maintenance: \$4.75

Dirt	Rock (Contractor)	Rock (State)	Paved
0.0	0.0	0.0	0.0

**Hauling Costs**

Species	\$ / MBF	Trips/Day	MBF / Load
Douglas - Fir	\$0.00	2.0	4.0
Western Hemlock / Fir	\$0.00	3.0	4.0
Alder (Red)	\$0.00	2.0	3.5



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**logging costs breakdown**

Logging	Road Maint	Fire Protect	Hauling	Other P/R appl	Profit & Risk	Slash Disposal	Scaling	Other	Total
<b>Douglas - Fir</b>									
\$89.74	\$4.89	\$1.30	\$88.10	\$3.04	\$26.19	\$0.00	\$5.00	\$0.18	\$218.44
<b>Western Hemlock / Fir</b>									
\$89.74	\$4.89	\$1.30	\$58.73	\$3.04	\$22.08	\$0.00	\$5.00	\$0.18	\$184.96
<b>Alder (Red)</b>									
\$89.74	\$4.99	\$1.30	\$102.63	\$3.04	\$28.24	\$0.00	\$5.00	\$0.18	\$235.12

Specie	Amortization	Pond Value	Stumpage	Amortized
Douglas - Fir	\$0.00	\$591.81	\$373.37	\$0.00
Western Hemlock / Fir	\$0.00	\$453.86	\$268.90	\$0.00
Alder (Red)	\$0.00	\$580.00	\$344.88	\$0.00



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**summary**

**Amortized**

Specie	MBF	Value	Total
Douglas - Fir	0	\$0.00	\$0.00
Western Hemlock / Fir	0	\$0.00	\$0.00
Alder (Red)	0	\$0.00	\$0.00

**Unamortized**

Specie	MBF	Value	Total
Douglas - Fir	10,007	\$373.37	\$3,736,313.59
Western Hemlock / Fir	44	\$268.90	\$11,831.60
Alder (Red)	54	\$344.88	\$18,623.52

**Gross Timber Sale Value**

Recovery: \$3,766,768.71

Prepared by: Nick Haile

Phone: 503-325-5451

### Site Prep Appraisal

**Sale Number:** 341-14-32  
**Sale Name:** Thor's Hammer  
**Date:** 07/12/2013

Vegetation Type/Zone	Vegetation Type/Zone Code	Production Rate (hr/ac)	Estimated Piles/Acre
Doug-fir	A	1.0	3.0
Hemlock/Fir	B	1.5	4.0
Hemlock/Spruce	C	2.0	6.0
Hemlock	D	2.0	6.0
Conifer/Hardwood	E	1.5	3.0

Sale Area	Harvest Type	Veg Type/Zone	Ground Based Yarding Acres	Estimated Piling Hours/Area	Cost/Hour	Total Cost/Area
1	MC	A	26	26	\$110.00	\$2,860.00
2	MC	A	19	28.5	\$110.00	\$3,135.00
3	MC	A	33	66	\$110.00	\$7,260.00

**Sub Total = \$13,255.00**

Sale Area	Number of Landings to be Piled	Cost/Landing Pile*	Total Cost/Area	Number of In-Unit Piles	Material Cost/Pile	Total Cost/Area
1	4	\$263.00	\$1,052.00	78	\$5.00	\$390.00
2	3	\$263.00	\$789.00	76	\$5.00	\$380.00
3	3	\$263.00	\$789.00	198	\$5.00	\$990.00

\*Cost includes separating firewood

**Sub Total = \$4,390.00**

Move-In Allowance	Number of Move-In's	Total Move-In Allowance
\$945.00	1	\$945.00

**Sub Total = \$945.00**

**Grand Total = \$18,590.00**

**SUMMARY OF ALL PROJECT COSTS**

SALE NAME: Thor's Hammer

**ROAD CONSTRUCTION:**

<u>Road segment</u>	<u>Length/Sta</u>	<u>Cost</u>
1A-1B, 1C-1D,	17.50	\$21,364.00
2A-2B, 3A-3B,		
3C-3D		
<b>TOTALS</b>	17.50	\$21,364

**ROAD IMPROVEMENT:**

<u>Road segment</u>	<u>Length/Sta</u>	<u>Cost</u>
I1-I2, I2-I3, I4-I5,	505.4	\$189,146
I6-I7, I8-I9, I10-I11,		
I12-I13, & I14-I15		
<b>TOTALS</b>		\$189,146

**SPECIAL PROJECTS:**

<u>Description</u>	<u>Cost</u>
Project No. 3 - Green Mt.. No. 2 Crushing	\$148,575
Project No. 4 - Roadside Brushing & Spraying	\$49,647
Project No. 5 - Road Vacating	\$661
Project Road Maintenance	\$14,338
<b>TOTAL</b>	\$213,221

**MOVE IN:**

<u>Equipment</u>	<u>Cost</u>
Dozer (D8)	\$1,406.00
Excavator (C330)	\$1,406.00
Excavator (C315)	\$805.00
Dump Trucks (12cy x 6)	\$978.00
Dump Trucks (20cy x 2)	\$382.00
Front End Loader	\$778.00
Grader (14G)	\$778.00
Vibratory Roller	\$778.00
Rubber Tire Skidder (C518)	\$717.00
Water Truck (2,500 gallon)	\$190.00
Backhoe (C 580)	\$321.00
Brush Cutter	\$321.00
<b>TOTAL</b>	\$8,860.00

**GRAND TOTAL** **\$432,591**

Compiled By: FL N. Haile & C. Bangs

Date: 09/05/2013









SURFACING		Stations/ amount	x	Rate/ sta/amt	Cost
Subgrade prep:	Description				
	Grade, Shape and Ditch 18' (I1-I2, I2-I3, I8-I9, I10-I11, I12-I13, I14-I15)	414.70	x	\$21.55	\$8,936.79
	Light Grading/Sod Removal: Grader Hrs. (14-15, 16-17)	16.00	x	\$100.00	\$1,600.00
	Light Grading/Sod Removal: Backhoe Hrs. (14-15, 16-17)	8.00	x	\$55.00	\$440.00
	Sod Removal/Ditch Reconstruction (Extra grader \$/sta.)	416.90	x	\$5.00	\$2,084.50
	Sod Removal/Ditch Reconstruction (Backhoe \$/sta.)	416.90	x	\$8.65	\$3,606.19
	Sod Removal/Ditch Reconstruction (Dump Truck \$/sta.)	312.67	x	\$8.79	\$2,748.37
	Sod Removal/Ditch Reconstruction (Excavator \$/sta.)	208.45	x	\$13.24	\$2,759.88
	Windrow Surface Rock (portion of I1-I2: 7.0, I2-I3: 86.5) Grader hrs.	16.00	x	\$100.00	\$1,600.00
	Subgrade Compaction (I1-I2 Reinforcement areas, I2-I3, portion of I12-I13, I14-I15)	242.70	x	\$17.52	\$4,252.10

ROAD SEGMENT I1 to I2		POINT TO POINT I1 to I2		Sta. to Sta. 0+00 to 102+00		TOTAL VOLUME (CY)	Rate/ Sta./ amt.	Cost
Application	Rock Size and Type	Location	Depth of Rock (inches)	Volume (CY) per	Number of			
Base Rock	4"-0" crushed	18+50 to 21+00, 43+50 to 44+50, 50+00 to 51+50	6	station 38	loads 11	5.00	190	\$7.94 \$1,509
Leveling Rock	1 1/2"-0" stockpile		N/A	station 19	loads 34		374	\$12.11 \$4,529
Surface Rock	1 1/2"-0" stockpile		N/A	station 19	loads 5		95	\$12.11 \$1,150
Culvert Bedding/Backfill	1 1/2"-0" stockpile		N/A	culvert 22	culverts 5		110	\$12.11 \$1,332
Dissipator	24"-6" riprap	7+50, 20+90, 23+10, 58+30	N/A	dissipator 22	dissipators 4		88	\$9.20 \$810
Total Rock for Road Segment: I1 to I2						857		\$9,330

ROAD SEGMENT I2 to I3		POINT TO POINT I2 to I3		Sta. to Sta. 0+00 to 173+00		TOTAL VOLUME (CY)	Rate/ Sta./ amt.	Cost
Application	Rock Size and Type	Location	Depth of Rock (inches)	Volume (CY) per	Number of			
Base Rock	4"-0" crushed	0+00 to 173+00	6	station 38	stations 173.00		6,574	\$7.94 \$52,198
Curve Widening	4"-0" crushed		10	station 38	stations 5		190	\$7.94 \$1,509
Turnouts	4"-0" crushed		6	TO 22	TO's 29.00		638	\$7.94 \$5,066
Junctions	4"-0" crushed		6	junction 11	junctions 15		165	\$7.94 \$1,310
Culvert Bedding/Backfill	1 1/2"-0" stockpile		N/A	culvert 22	culverts 7		154	\$12.11 \$1,865
Dissipator	24"-6" riprap	45+20, 46+90, 69+40, 73+80, 170+10	N/A	dissipator 22	dissipators 5		110	\$9.20 \$1,012
Fill Armor	24"-6" riprap	79+00, 109+50	N/A	N/A	N/A		88	\$9.20 \$810
Total Rock for Road Segment: I2 to I3						7,919		\$63,769

ROAD SEGMENT I8 to I9		POINT TO POINT I8 to I9		Sta. to Sta. 0+00 to 40+00		TOTAL VOLUME (CY)	Rate/ Sta./ amt.	Cost
Application	Rock Size and Type	Location	Depth of Rock (inches)	Volume (CY) per	Number of			
Leveling Rock	4"-0" crushed		N/A	load 11	loads 11.00		121	\$7.94 \$961
Surface Rock	1 1/2"-0" stockpile	5+50 to 19+00	2	station 13	stations 14		176	\$12.11 \$2,125
Turnouts	1 1/2"-0" stockpile	14+50	2	turnout 11	turnouts 1		11	\$12.11 \$133
Culvert Bedding/Backfill	1 1/2"-0" stockpile		N/A	culvert 22	culverts 1		22	\$12.11 \$266
Total Rock for Road Segment: I8 to I9						330		\$3,486

ROAD SEGMENT I10 to I11		POINT TO POINT I10 to I11		Sta. to Sta. 0+00 to 13+50		TOTAL VOLUME (CY)	Rate/ Sta./ amt.	Cost
Application	Rock Size and Type	Location	Depth of Rock (inches)	Volume (CY) per	Number of			
Leveling Rock	4"-0" crushed		N/A	load 11	loads 9.00		99	\$7.94 \$786
Total Rock for Road Segment: I10 to I11						99		\$786

ROAD SEGMENT I12 to I13		POINT TO POINT I12 to I13		Sta. to Sta. 0+00 to 45+70		TOTAL VOLUME (CY)	Rate/ Sta./ amt.	Cost
Application	Rock Size and Type	Location	Depth of Rock (inches)	Volume (CY) per	Number of			
Leveling Rock	4"-0" crushed	0+00 to 34+70	N/A	load 11	loads 10.00		110	\$7.94 \$873
Leveling Rock	1 1/2"-0" stockpile	34+70 to 45+70	N/A	load 11	loads 5		55	\$12.11 \$666
Surface Rock	1 1/2"-0" stockpile	0+00 to 20+20	3	station 19	stations 20		384	\$12.11 \$4,648
Turnouts	1 1/2"-0" stockpile	2+80, 6+50, 15+40, 19+20	3	turnout 11	turnouts 4		44	\$12.11 \$533
Junctions	1 1/2"-0" stockpile	4+00, 10+80, 11+80, 20+20, 45+65	3	junction 11	junctions 5		55	\$12.11 \$666
Total Rock for Road Segment: I12 to I13						648		\$7,386

ROAD SEGMENT I14 to I15		POINT TO POINT I14 to I15		Sta. to Sta. 0+00 to 40+50		TOTAL VOLUME (CY)	Rate/ Sta./ amt.	Cost
Application	Rock Size and Type	Location	Depth of Rock (inches)	Volume (CY) per	Number of			
Base Rock	4"-0" crushed	0+00 to 38+00	6	station 38	stations 38.00		1,444	\$7.94 \$11,465
Turnouts	4"-0" crushed	6+00, 13+32, 14+40, 19+60, 24+50, 34+00	6	turnout 22	turnouts 6		132	\$7.94 \$1,048
Surface Rock	1 1/2"-0" stockpile	0+00 to 18+60	2	station 13	stations 19		242	\$12.11 \$2,928
Culvert Bedding/Backfill	1 1/2"-0" stockpile		N/A	culvert 22	culverts 4		88	\$12.11 \$1,066
Dissipator	24"-6" riprap	12+30, 20+80, 22+70, 8+30	N/A	dissipator 22	dissipators 4		88	\$9.20 \$810
Fill Armor	24"-6" riprap		N/A	N/A	N/A		66	\$9.20 \$607
Total Rock for Road Segment: I14 to I15						2,060		\$19,724

Processing:	Description	No.sta	Rate/sta	Cost
	Water, Process & Compact (Base Rock): I1-I2 Base Reinforcement, I2-I3, I14-I15	220.50	\$56.48	\$12,454
	Water, Process & Compact (Surface/Leveling Rock): I1-I2, I8-I9, I10-I11, I12-I13, I14-I15	219.80	\$56.48	\$12,414
	Water, Process & Compact (Salvaged Surface Rock): Portions of I1-I2, I2-I3	93.5	\$56.48	\$5,281
<b>SUB TOTAL FOR SURFACING</b>		440	9,663	1,809
				11,912
				\$160,857

SPECIAL PROJECTS		Description	Cost
		Geotextile Fabric (I1-I2 sta. 18+50 to 20+90)	\$ 390.00
		Seeding and mulching (waste areas: bales, seed, labor)	\$1,200.00
<b>SUB TOTAL FOR SPECIAL PROJECTS</b>			\$1,590

		Subtotal of Surfacing & Spec. Proj.	\$162,447
		Subtotal of Clearing, Exc., Culv.	\$26,699
<b>GRAND TOTAL</b>			\$189,146

**CRUSHED ROCK COST**

SALE NAME: Thor's Hammer  
 PROJECT: No. 1  
 QUARRY: Northrup Ridge Stockpile

MATERIAL: 1 1/2"-0" Crushed

DATE: 07/23/2013  
 BY: N. Haile

Segment	Stations	Cubic Yards					Misc	Total
		Base	Running	Turnout	Turnaround	Junction		
I1-I2	102.00		469				110	579
I2-I3	173.00						154	154
I8-I9	40.00		176	11			22	209
I12-I13	45.70		439	44		55		538
I14-I15	40.50		242				88	330
1C-1D	2.50		75					75
3A-3B	5.50		60					60
3C-3D	4.70		90					90
Grand Total	413.90		1,551	55		55	374	2,035

Road Segment	Stations	Cubic Yards	ONE WAY HAUL IN MILES							Total Haul
			50 MPH	30 MPH	25 MPH	20 MPH	15 MPH	10 MPH	5 MPH	
I1-I2	102.00	579	3	2	1	2.80	2.15	0.65	0.30	11.40
I2-I3	173.00	154	3	2	2	3.30	2.45	0.45	0.30	13.00
I8-I9	40.00	209	3	2	2	3.30	2.45	0.25	0.30	12.80
I12-I13	45.70	538	3	2	2	3.80	2.45	0.65	0.30	13.70
I14-I15	40.50	330	3	2	2	3.80	2.45	0.95	0.30	14.00
1C-1D	2.50	75	3	2	2	3.30	2.45	0.25	0.30	12.80
3A-3B	5.50	60	3	2	2	4.00	2.75	0.65	0.30	14.20
3C-3D	4.70	90	3	2	2	4.00	2.75	0.65	0.30	14.20
TOTAL	413.90	2,035								
CUBIC YARD WEIGHTED HAUL			2.50	2.00	1.72	3.42	2.39	0.63	0.30	AVERAGE HAUL 12.95

Average Round Trip Distance (miles) 25.91

**ROCK HAUL:**

Truck type: D20 No. trucks: 2  
 Delay min.: 8 Efficiency: 85%

Ave haul: \$9.71 /cy  
 Load: \$0.84 /cy  
 Spread: \$1.56 /cy

Truck type: D12 No. trucks: 6  
 Delay min.: 6 Efficiency: 85%

Truck type: D10 No. trucks:           
 Delay min.: 5 Efficiency: 85%

Production: cy/day = 555

**CRUSHED ROCK HAUL COSTS 2,035 cy @ \$12.11 /cy**

**CRUSHED ROCK COST**

SALE NAME: Thor's Hammer  
 PROJECT: No. 1  
 QUARRY: Green Mtn. #2

MATERIAL: 4"-0" Crushed

DATE: 07/23/2013  
 BY: N. Haile

Segment	Stations	Cubic Yards						Misc	Total
		Base	Running	Turnout	Turnaround	Junction			
I1-I2	102.00	190						190	
I2-I3	173.00	7,567						7,567	
I8-I9	40.00	121						121	
I10-I11	15.70	121						121	
I12-I13	45.70	110						110	
I14-I15	40.50	1,576						1,576	
1A-1B	1.00	50						50	
1C-1D	2.50	125						125	
2A-2B	3.80	190						190	
3A-3B	6.65	275			11			286	
3C-3D	4.70	257						257	
Grand Total	435.55	10,582			11			10,593	

Road Segment	Stations	Cubic Yards	ONE WAY HAUL IN MILES							Total Haul
			50 MPH	30 MPH	25 MPH	20 MPH	15 MPH	10 MPH	5 MPH	
I1-I2	102.00	190		1	2	4.00	1.00	1.00	0.30	9.30
I2-I3	173.00	7,567		1	2	1.00	1.00	1.40	0.30	6.70
I8-I9	40.00	121		1	2	2.00	1.00	1.24	0.30	7.54
I10-I11	15.70	121		1	2	2.00	1.00	1.11	0.30	7.41
I12-I13	45.70	110		1	2	1.00	1.00	1.59	0.30	6.89
I14-I15	40.50	1,576		1	2	1.50	1.50	1.10	0.30	7.40
1A-1B	1.00	50		1	2	2.00	1.00	1.00	0.30	7.30
1C-1D	2.50	125		1	2	2.00	1.00	1.10	0.30	7.40
2A-2B	3.80	190		1	2	1.50	0.50	0.50	0.30	5.80
3A-3B	6.65	286		1	2	1.00	1.00	1.65	0.30	6.95
3C-3D	4.70	257		1	2	1.00	1.00	1.70	0.30	7.00
TOTAL	435.55	10,593								
CUBIC YARD WEIGHTED HAUL		CU. YD.		1.00	2.00	1.18	1.07	1.34	0.30	AVERAGE HAUL 6.88

Average Round Trip Distance (miles) 13.76

**ROCK HAUL:**

Truck type: D20 No. trucks: 2  
 Delay min.: 8 Efficiency: 85%

Ave haul: \$6.86 /cy  
 Load: /cy  
 Spread: \$1.08 /cy

Truck type: D12 No. trucks: 6  
 Delay min.: 6 Efficiency: 85%

Truck type: D10 No. trucks: \_\_\_\_\_  
 Delay min.: 5 Efficiency: 85%

Production: cy/day = 786

**CRUSHED ROCK HAUL COSTS 10,593 cy @ \$7.94 /cy**

\*Loading off belt of





**SUMMARY OF ROCK DEVELOPMENT AND CRUSHING COSTS**

PROJECT NO. 3 Timber Sale Name: Thor's Hammer  
 Quarry: Green Mountain No. 2  
 Location: NE1/4, Section 34 T5N R6W Shrink: 16%  
 County: Clatsop  
 By: C.Bangs Loading Hopper: Yes  
 Date: 08/28/13

ROCK SIZE	REJECT	GRADATION	STOCKPILE CU. YDS.	TRUCK MEAS CU. YDS.	TOTAL CU. YDS.
3/4"-0"		CR			
1-1/2"-0"		CR			
4"-0"	40%	CR	2,000	10,571	12,891
6"-0"		PR		420	420
24"-6"		RR		440	440
36"		RR			
<b>TOTAL CUBIC YARDS OF ROCK:</b>			2,000	11,431	13,751

**1) MOBILIZATION & SET UP:**

Lowboy Mobilized							
EQUIPMENT	QUANTITY	RATE	COST	EQUIPMENT	QUANTITY	RATE	COST
Loading Hopper	1	\$553	\$553				
Screening Plants	1	\$553	\$553				
2 Stage Crusher	1	\$2,175	\$2,175				
Drill & Compressor	1	\$1,406	\$1,406				
Off Highway Dump Truck	1	\$774	\$774				
Excavator	1	\$1,406	\$1,406				
Front End Loader	1	\$805	\$805				
D6 Cat	1	\$778	\$778				
<b>Roaded from Town</b>							
Powder	1	\$351	\$351				

Note: The Loading Hopper, Screening Plant and 3 Stage crusher were 1/2 costed due to the close proximity of the two quarries.

SUB TOTAL FOR MOBILIZATION

\$8,800

EQUIPMENT SET UP	TIMES	RATE	COST
2 Stage Crusher	1	\$2,175	\$2,175
Screening Plants	1	\$293	\$293
Loading Hopper	1	\$293	\$293
Original Calibration	1	\$544	\$544

SUB TOTAL FOR SET UP COSTS

\$3,305

**TOTAL MOBILIZATION & SET UP COSTS**

\$12,105

**2) CLEARING & GRUBBING**

DESCRIPTION	QUANTITY	UNIT	RATE	COST
Clear & Grub				
C330	8	Hours	\$155	\$1,240
Off Highway	8	Hours	\$127	\$1,016
Pile & burn C330	12	Hours	\$155	\$1,860

**TOTAL CLEARING & GRUBBING COSTS**

\$4,116

**3) EXCAVATION**

MATERIAL DESCRIPTION	QUANTITY	UNIT	RATE	COST
Overburden Removal	2,500	C.Y.	\$3.50	\$8,750
CAT HRS @ WA	8	Hours	\$155.00	\$1,240
Waste Area Compaction	2,500	C.Y.	\$0.40	\$1,000

**TOTAL EXCAVATION COSTS**

\$10,990

**4) DEVELOP ROCK**

ROCK SUMMARY			METHOD	%	QUANTITY	RATE	COST
Type	Cu. yd. Vol.	Weight	Ripping			\$2.20	
crushed	12,891	94%	Drill & shoot	100%	18,907	\$2.70	\$51,050
pit run	420	3%	Oversize red	5%	666	\$5.80	\$3,860
rip rap	440	3%	Other				
Total	13,751						
reject	5,156	37.5%					

**TOTAL ROCK DEVELOPMENT COSTS**

\$54,910

**5) CALIBRATION & TESTING**

DESCRIPTION	NO.	\$/TEST	COST
Calibrate			
Calibrate			
Test	7	\$57.30	\$401
Test			

**TOTAL CALIBRATION & TESTING COSTS**

\$401

**6) FEEDING & LOADING**

DESCRIPTION	CU. YD. QUANTITY	COST CU. YD.	TOTAL COST
Dig & Feed Rock	18,047	\$0.78	\$14,051

**TOTAL FEEDING & LOADING COSTS**

\$14,051

**7) ROCK CRUSHING**

ROCK SIZE	ROCK TYPE	CU. YD. QUANTITY	CRUSHER TYPE	HOURLY PRODUCTION	RATE CU. YD.	TOTAL COST
4"-0"	crushed	12,891	2 stage w/s	140	\$2.48	\$31,951

**TOTAL ROCK CRUSHING COSTS**

\$31,951

**8) STOCKPILING**

**STOCKPILE SITE PREPARATION**

Equipment	Hours	Rate	Total
Dozer	2	\$113.00	\$226.00
Compactor		\$77.00	
Grader		\$100.00	
Excavator		\$155.00	

Rock for Floor (CY)	\$/CY Haul	Total

\$226.00

SUB TOTAL

\$226

**HAUL & STOCKPILE**

**STOCKPILE LOCATION**

	SIZE	# of TRUCKS	CU. YDS.	RATE	COST
1. _____					
2. _____					
3. Green Mountain	4"-0"	4	2,320	\$2.47	\$5,724
4. _____					
5. _____					
6. _____					

SUB TOTAL

\$5,724

**TOTAL STOCKPILING COSTS**

\$5,950

**9) MISCELLANEOUS COSTS**

DESCRIPTION			COST
Load and haul reject material to Waste Area			\$10,313
\$2.00 /CY	5,156 CY		
Tractor hours to work waste area	8 Hours	\$113.00 /Hour	\$904
Compact Reject Material	5,156 CY	\$0.40 /CY	\$2,063
Final Quarry Maintenance			
C330	4 Hours	\$155.00 /Hour	\$620
Grader	2 Hours	\$100.00 /Hour	\$200

**TOTAL MISCELLANEOUS COSTS**

\$14,099

**10) GRAND TOTAL:**

\$148,575

\$/Cubic Yard

\$11.53

**Footnotes:**




## HAUL and STOCKPILE COST

SALE NAME: Thor's Hammer  
 QUARRY: Green Mountain No. 2

ROCK TYPE: Crushed

Location 1. 0	ONE WAY HAUL IN MILES						
	50 MPH	30 MPH	25 MPH	20 MPH	15 MPH	10 MPH	5 MPH
							0.10
Truck type: <u>D12</u>	No. trucks: <u>2</u>			Ave haul: <u>\$2.00</u>	/cy		
Delay min.: <u>15</u>	Efficiency: <u>75%</u>			Load: <u>\$0.00</u>	/cy		
Truck type: <u>D12</u>	No. trucks: <u>        </u>			Stockpile: <u>\$1.35</u>	/cy		
Delay min.: <u>12</u>	Efficiency: <u>75%</u>						
Truck type: <u>        </u>	No. trucks: <u>        </u>			Production: cy/day =	632		
Delay min.: <u>10</u>	Efficiency: <u>75%</u>						
<b>Location 1. 0</b>	<b>Haul and Stockpile Cost</b>			<b>\$3.34 /cy</b>			

Location 2. 0	ONE WAY HAUL IN MILES						
	50 MPH	30 MPH	25 MPH	20 MPH	15 MPH	10 MPH	5 MPH
			7.50		1.30		
Truck type: <u>D20</u>	No. trucks: <u>        </u>			Ave haul: <u>#DIV/0!</u>	/cy		
Delay min.: <u>15</u>	Efficiency: <u>75%</u>			Load: <u>\$0.00</u>	/cy		
Truck type: <u>D12</u>	No. trucks: <u>        </u>			Stockpile: <u>#N/A</u>	/cy		
Delay min.: <u>12</u>	Efficiency: <u>75%</u>						
Truck type: <u>D10</u>	No. trucks: <u>        </u>			Production: cy/day =	0		
Delay min.: <u>10</u>	Efficiency: <u>75%</u>						
<b>Location 2. 0</b>	<b>Haul and Stockpile Cost</b>			<b>#DIV/0! /cy</b>			

Location 3. Green Mountain 4"-0"	ONE WAY HAUL IN MILES						
	50 MPH	30 MPH	25 MPH	20 MPH	15 MPH	10 MPH	5 MPH
					0.30	0.10	0.10
Truck type: <u>OR</u>	No. trucks: <u>1</u>			Ave haul: <u>\$1.95</u>	/cy		
Delay min.: <u>12</u>	Efficiency: <u>85%</u>			Load: <u>\$0.00</u>	/cy		
Truck type: <u>D12</u>	No. trucks: <u>4</u>			Stockpile: <u>\$0.51</u>	/cy		
Delay min.: <u>12</u>	Efficiency: <u>85%</u>						
Truck type: <u>D10</u>	No. trucks: <u>        </u>			Production: cy/day =	1,813		
Delay min.: <u>5</u>	Efficiency: <u>75%</u>						
<b>Location 3. Green Mountain</b>	<b>Haul and Stockpile Cost</b>			<b>\$2.47 /cy</b>			

## HAUL and STOCKPILE COST

Location 4. 0	ONE WAY HAUL IN MILES						
	50 MPH	30 MPH	25 MPH	20 MPH	15 MPH	10 MPH	5 MPH
				1.00	1.00		
Truck type: <u>D20</u>	No. trucks: _____						
Delay min.: <u>15</u>	Efficiency: <u>75%</u>						
							Ave haul: #DIV/0! /cy
							Load: \$0.00 /cy
Truck type: <u>D12</u>	No. trucks: _____						Stockpile: #N/A /cy
Delay min.: <u>12</u>	Efficiency: <u>75%</u>						
Truck type: <u>D10</u>	No. trucks: _____						Production: cy/day = 0
Delay min.: <u>10</u>	Efficiency: <u>75%</u>						
<b>Location 4.</b>	<b>0</b>						<b>Haul &amp; Stockpile Cost #DIV/0! /cy</b>

Location 5. 0	ONE WAY HAUL IN MILES						
	50 MPH	30 MPH	25 MPH	20 MPH	15 MPH	10 MPH	5 MPH
							0.10
Truck type: <u>D20</u>	No. trucks: <u>2</u>						
Delay min.: <u>15</u>	Efficiency: <u>75%</u>						
							Ave haul: \$1.52 /cy
							Load: \$0.00 /cy
Truck type: <u>D12</u>	No. trucks: _____						Stockpile: \$0.83 /cy
Delay min.: <u>12</u>	Efficiency: <u>75%</u>						
Truck type: <u>D10</u>	No. trucks: _____						Production: cy/day = 1,054
Delay min.: <u>10</u>	Efficiency: <u>75%</u>						
<b>Location 5.</b>	<b>0</b>						<b>Haul &amp; Stockpile Cost \$2.35 /cy</b>

Location 6. 0	ONE WAY HAUL IN MILES						
	50 MPH	30 MPH	25 MPH	20 MPH	15 MPH	10 MPH	5 MPH
				1.00	1.00		
Truck type: <u>D20</u>	No. trucks: _____						
Delay min.: <u>15</u>	Efficiency: <u>75%</u>						
							Ave haul: #DIV/0! /cy
							Load: \$0.00 /cy
Truck type: <u>D12</u>	No. trucks: _____						Stockpile: #N/A /cy
Delay min.: <u>12</u>	Efficiency: <u>75%</u>						
Truck type: <u>D10</u>	No. trucks: _____						Production: cy/day = 0
Delay min.: <u>10</u>	Efficiency: <u>75%</u>						
<b>Location 6.</b>	<b>0</b>						<b>Haul &amp; Stockpile Cost #DIV/0! /cy</b>

**SPRAYING COST ANALYSIS**  
**THOR'S HAMMER**  
 FY2014  
 Will Lawrence  
 09/16/2013

	<b>\$/mi.</b>
Roadside Spraying Rate	170.00

**Total Cost= \$9,712**

**Total Miles= 57.13**  
**Avg. \$/mi.= \$170.00**

Mobilization included in rate/mile

**Hand Spraying**

Hrs	\$/Hr	\$
	40.00	\$0.00

Segments	Feet	Miles	\$	Notes
Total from brushing	232259.00	43.99	\$7,478.04	
S1	291.486076	0.06	\$9.38	
S2	423.863002	0.08	\$13.65	
S3	941.916164	0.18	\$30.33	
S4	547.100279	0.10	\$17.61	
S5	2584.448571	0.49	\$83.21	
S6	616.909453	0.12	\$19.86	
S7	1023.088529	0.19	\$32.94	
S8	2527.706295	0.48	\$81.38	
S9	571.009103	0.11	\$18.38	
S10	2869.726207	0.54	\$92.40	
S11	211.508909	0.04	\$6.81	
S12-S51	7546.110276	1.43	\$242.96	
S13	149.819563	0.03	\$4.82	
S14	1885.139151	0.36	\$60.70	
S15	872.834619	0.17	\$28.10	
S16	630.320129	0.12	\$20.29	
S17	1721.423074	0.33	\$55.42	
S18	612.674032	0.12	\$19.73	
S19	1152.413328	0.22	\$37.10	
S20	176.098202	0.03	\$5.67	
S21	361.13695	0.07	\$11.63	
S22	319.454519	0.06	\$10.29	
S23	6182.72325	1.17	\$199.06	
S24	1191.173053	0.23	\$38.35	
S25	1090.284048	0.21	\$35.10	
S26	2178.652105	0.41	\$70.15	
S27	238.908597	0.05	\$7.69	
S28	241.786818	0.05	\$7.78	
S29	2723.62337	0.52	\$87.69	
S30	685.512722	0.13	\$22.07	
S31	391.323536	0.07	\$12.60	
S32	327.681222	0.06	\$10.55	
S33	1441.060129	0.27	\$46.40	
S34	4007.169442	0.76	\$129.02	
S35	838.476532	0.16	\$27.00	
S36	2444.976991	0.46	\$78.72	
S37	581.233631	0.11	\$18.71	
S38	1711.839388	0.32	\$55.12	
S39	2057.102003	0.39	\$66.23	
S40	134.002884	0.03	\$4.31	
S41	320.987723	0.06	\$10.33	
S42	2808.30839	0.53	\$90.42	
S43	103.081444	0.02	\$3.32	
S44	3164.409036	0.60	\$101.88	
S45	2688.622856	0.51	\$86.57	
S46	1090.872113	0.21	\$35.12	
S47	475.4671	0.09	\$15.31	
S48	602.962954	0.11	\$19.41	
S49	256.620745	0.05	\$8.26	
S50	1356.438337	0.26	\$43.67	

**BRUSHING COST ANALYSIS**  
**THOR'S HAMMER**  
 FY2014  
 Will Lawrence  
 09/13/2013

Brushing Type	\$/mi.
Light (L)	850
Medium (M)	1100
Heavy (H)	1550

**Total Cost= \$39,935**

**Total Miles= 43.99**  
**Avg. \$/mi.= \$907.85**

**Hand Brushing**

Hrs	\$/Hr	\$
25	40.00	\$1,000.00

Road Segment	Road Name	Measured Feet	Miles	Brushing Type	\$	Notes
B1-B2	Nehalem X-Over	8657	1.64	L	\$1,393.65	
B3-B4	Sager Rd.	4995	0.95	L	\$804.12	
B5		2716	0.51	L	\$437.23	
B4-B6	W. Sager Rd.	24360	4.61	L	\$3,921.59	
B7-B8	August Johnson Rd.	4830	0.91	L	\$777.56	
B4-B9	E. Sager Rd.	41669	7.89	L	\$6,708.08	
B10-B11	Jones Road	6864	1.30	L	\$1,105.00	
B12		4857	0.92	M	\$1,011.88	
B13		1425	0.27	L	\$229.40	
B14		1056	0.20	L	\$170.00	
B15		2748	0.52	L	\$442.39	
B16		2640	0.50	L	\$425.00	
B17		156	0.03	L	\$45.80	
B18		10560	2.00	L	\$1,700.00	
B18		1056	0.20	H	\$310.00	
B19		168	0.03	M	\$35.00	
B20		2116	0.40	L	\$340.64	
B21		1056	0.20	L	\$170.00	
B22		1584	0.30	L	\$255.00	
B23		1139	0.22	M	\$237.29	
B24		3865	0.73	L	\$622.21	
B25		665	0.13	L	\$107.05	
B26		463	0.09	L	\$74.54	
B27		366	0.07	L	\$58.92	
B28		222	0.04	L	\$35.74	
B29		4000	0.76	L	\$643.94	
B30		1625	0.31	L	\$261.60	
B31		4710	0.89	L	\$758.24	
B32		240	0.05	L	\$38.64	
B33		490	0.09	L	\$78.88	
B34		4200	0.80	L	\$676.14	
B35-B36	Deep Creek Road	10296	1.95	L	\$1,657.50	
B37		5808	1.10	L	\$935.00	
B38		1420	0.27	M	\$295.83	
B39		335	0.06	M	\$69.79	
B40		1390	0.26	M	\$289.58	
B41		3696	0.70	M	\$770.00	
B42		1848	0.35	L	\$297.50	
B43		1320	0.25	L	\$212.50	
B44		5491	1.04	L	\$883.97	
B45		3063	0.58	L	\$493.10	
B46		2692	0.51	L	\$433.37	
B47		158	0.03	L	\$25.44	
B48		211	0.04	L	\$199.61	
B49		5630	1.07	L	\$906.34	
B50		1142	0.22	H	\$335.25	
B51		290	0.05	M	\$60.42	
B52		280	0.05	L	\$45.08	
B53		444	0.08	M	\$92.50	
B9-B54	Buster Creek Mainline	8800	1.67	M	\$1,833.33	
B54-B55	Buster Creek Mainline	6430	1.22	L	\$1,035.13	
B56-B57	Walker Ridge Rd.	26017	4.93	L	\$4,188.34	Hand brush fills

**Thor's Hammer Timber Sale**  
**Vacating Costs (Segment V1 to V2 and V3 to V4)**

Work Description	C315	Labor	Straw	Seed-lbs
V1 to V2				
Sidecast Pullback/Waterbar/Block	2.00	2	15	10
V3 to V4				
Waterbar/Block	2.00			
<b>Total Quantity (Hours)</b>	4	2	15	10
<b>Rates</b>	\$101.00	\$40.00	\$10.73	\$1.60
<b>Total Dollars</b>	\$404	\$80	\$161	\$16

**Total Segment Cost**

**\$661**

**Road Maintenance after completion of Projects**

**Sale:** Thor's Hammer  
**Date:** 08/30/13  
**By:** C. Bangs

**Road Segments to Maintain:** Green Mtn. #2 Quarry to Point 13, Northrup Quarry 1 1/2"-0" Stockpile to County Rd.

Type	Equipment/Rationale	Move in Rate	Hours	Rate	Cost
Post- Project Road Maintenance	Grader 14G	\$778	40	\$100	\$4,778
	Dump Truck 12CY		16	\$79	\$1,264
	FE Loader C966 *		16	\$43	\$688
	Vibratory Roller	\$778	40	\$77	\$3,858
	Water Truck 2500 gallon	\$190	40	\$89	\$3,750
<b>Total</b>					<b>\$14,338</b>

Production Rates	Miles/day	Distance(miles)	Days
Grader	1.5	7.0	4.7

\* Rate is without operator, truck drivers will load themselves.  
 Move in is for secondary mobilization to Northrup Creek. Everything else is already on-site

**Road Maintenance Cost Summary**

Sale: Thor's Hammer  
 Date: 15-Jul-13  
 By: N. Halle

MBF: 10,104  
 \$\$/MBF: \$4.75

Type	Equipment/Rationale	Move-in Rate	Times	Hours	Rate	Cost	Production Rates			
							Production Rates	Miles/day	Distance(miles)	Days
Progressive Operations 1st Entry	Grader 14G	\$778	1	18	\$100	\$2,578	Grader	2.5	4.5	1.8
	Dump Truck 12CY x 2	\$163	2	14	\$79	\$2,538				
	FE Loader C966	\$778	1	14	\$83	\$1,940				
Progressive Operations 2nd Entry	Grader 14G	\$778	1	18	\$100	\$2,578	Grader	2.5	4.5	1.8
	Dump Truck 12CY x 2	\$163	2	14	\$79	\$2,538				
	FE Loader C966	\$778	1	14	\$83	\$1,940				
Final Road Maintenance	Grader 14G	\$778	1	68	\$100	\$7,578	Grader	1.5	10.1	6.8
	Dump Truck 12CY x 2	\$163	2	55	\$79	\$9,016				
	FE Loader C966	\$778	1	55	\$83	\$5,343	Vibratory Roller	1.5	10.1	6.8
	Vibratory Roller	\$778	1	68	\$77	\$6,014				
	Water Truck 2,500 gallon Labor	\$190	1	60	\$89	\$5,530				
				10	\$40	\$400				
<b>Total</b>						<b>\$47,993</b>				

**Thor's Hammer  
TIMBER CRUISE REPORT  
FY 2014**

1. **Sale Area Location:** Areas 1, 2, and 3 are located in portions of Sections 10, 11, 14, and 15, T5N, R6W, and Area 4 is located in Section 35 of T6N, R6W, W.M., Clatsop County, Oregon.
2. **Fund Distribution:** BOF 100%  
Tax Code 8-01 (100%)
3. **Sale Acreage by Area:**

Area	Treatment	Gross Acres	Existing R/W	New R/W*	Stream Buffer	Net Acres	Survey Method
1	Modified Clearcut	72	1	0	4	67	GIS
2	Modified Clearcut	31	0	1	2	28	GIS
3	Modified Clearcut	75	2	1	8	64	GIS
4	Partial Clearcut	29	3	0	0	26	GIS
5	Right-of-Way	2	0	0	0	2	GIS
<b>TOTALS</b>		<b>209</b>	<b>6</b>	<b>2</b>	<b>14</b>	<b>187</b>	

4. **Cruisers and Cruise Dates:** Areas 1, 2, 3, and 4 were cruised by Nick Haile, Ty Williams, David Rygell, Derek Bangs and Kevin Berry on May 6 through the 10 and the 13, 2013.

**5. Cruise Method and Computation:**

Areas 1, 2, and 3 are Modified Clearcut units and were variable plot cruised using a 40 BAF. The plots are located on a 3 chain by 8 chain grid, with every third plot measured and graded. A total of 71 plots were sampled, with 24 measured and graded plots, and 47 count plots. Hemlocks were graded on three of the count plots because of the rarity of the species in the cruise; this meant that those count plots were regarded as cruise plots.

Area 4 is a Partial Cut unit and was variable plot cruised using a 33.61 BAF. The target basal area for this unit is 130 square feet. These plots are located on a 3 chain by 3 chain grid, with every third plot measured and graded. A total of 29 plots were sampled, with 10 measured and graded plots, and 19 count plots. A hemlock was graded on a count plot because of the rarity of the species in the cruise; this meant that count plot was regarded as a cruise plot.

All cruisers used Corvallis MicroTechnology (CMT) and/or Allegro data collectors, and were downloaded to the Atterbury Super A.C.E. program in District for computing. See the attached Cruise Design for more details on the cruise method. The cruise calculations were processed in the Astoria district office.

AREA	CRUISE	TRACT	TYPE	ACRES
1, 2, 3	T5NR6W11	AREA1	TAKE	159
4	T6NR6W35	AREA4	TAKE	26
5	T5NR6W11	RIGHT-OF-WAY	ROW	2

6. **Timber Description:** Areas 1, 2, and 3 are a modified clearcut units, approximately 75 to 80 year-old, consisting of Douglas-fir, with minor amounts of western hemlock, red alder, and maple. The average Douglas-fir tree size to be harvested is 23.8 inches DBH, with an average height of 106 feet to a merchantable top (40% of DBH). The average volume (net) is approximately 61 MBF/acre.



Area 4 is a partial cut unit, approximately 35 to 40 years-old, consisting of Douglas-fir, with minor amounts of western hemlock. The average Douglas-fir tree size to be harvested is 15.0 inches DBH, with an average height of 54 feet to a merchantable top (6 inch d.i.b.). The average volume (net) is approximately 8 MBF/acre.

Area 5 R/W is similar to the timber description mentioned above for Areas 1, 2, and 3. The average volume (net) is approximately 61 MBF/acre.

**7. Statistical Analysis and Stand Summary:** (See "Statistics" - Type Reports, attached)

Statistics for Stand B.F. volumes

Area	Estimated CV	Target SE%	Actual CV	Actual SE%
1, 2, and 3	50%	8%	31.7%	3.8%
4	30%	7%	23.1%	4.4%

**8. Volumes by Species and Log Grade:** (See "Species, Sort, Grade" - Project Report, attached).

Volumes by Species and Grade for All Sale Areas: (MBF) Volumes do not include "in-growth."

Species	DBH	Net Vol.	2 Saw	3 Saw	4 Saw	Camp Run	% D & B	% Sale
Douglas-fir	23.1"	10,007	8,271	1,477	259	0	3.1%	99%
Hemlock/True-fir	12.9"	44	0	34	10	0	<1%	<1%
Red Alder	19.7"	54	0	0	0	54	<1%	<1%
<b>TOTALS</b>		<b>10,105</b>						

**9. Approvals:**

Prepared by: Nick Haile Date: 6/28/13

Unit Forester Approval:  Date: 6/29/13

- 10. Attachments:**
- Cruise Designs and Maps – 6 pages
  - Volume Report - 4 pages
  - Statistics Reports - 2 pages
  - Log Stock Tables - 5 pages
  - Stand Table Summary – 3 pages

**CRUISE DESIGN  
ASTORIA DISTRICT**

Sale Name: Thor's Hammer Area(s) 1, 2, & 3

Harvest Type: Modified Clearcut

Approx. Cruise Acres: 162 Estimated CV% 50 Net BF or BA/Acre SE% Objective 8

Planned Sale Volume: 7,479MBF Estimated Sale Area Value/Acre: \$ 16,158

A. **Cruise Goals:** (a) Grade minimum 100 conifer trees:  
Determine log grades for sale value; Determine snag and leave tree species and sizes;  
Determine "diameter limit" harvest parameters;

**B. Cruise Design:**

1. **Plot Cruises:** BAF 40 (Full point; Half point) (circle one)

Cruise Line Direction(s) Area 1 360' az  
Area 2 & 3 90'az

Cruise Line Spacing 8 chains

Cruise Plot Spacing 3 chains

Grade/Count Ratio 1:2

Record all hardwood as camp run. Record all cedar as leave. Record all snags as SN and record diameter & total height. If plot lands in buffer then offset at least 1/2 chain outside the buffer.

**C. Tree Measurements:**

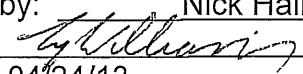
1. **Diameter:** Minimum DBH to cruise is 8" for conifers and 10" for hardwoods. Record dbh to nearest 1/2" for trees < 16", to nearest 1" for trees 16-24", and to nearest 2" for trees > 24". If tree diameters are estimated (only estimate on variable plot cruises), then record to closest estimate.

2. **Bole Length:** Record bole length to nearest foot at TCD. For trees greater than 100 feet in merchantable height, estimating to the nearest 5 feet is acceptable.

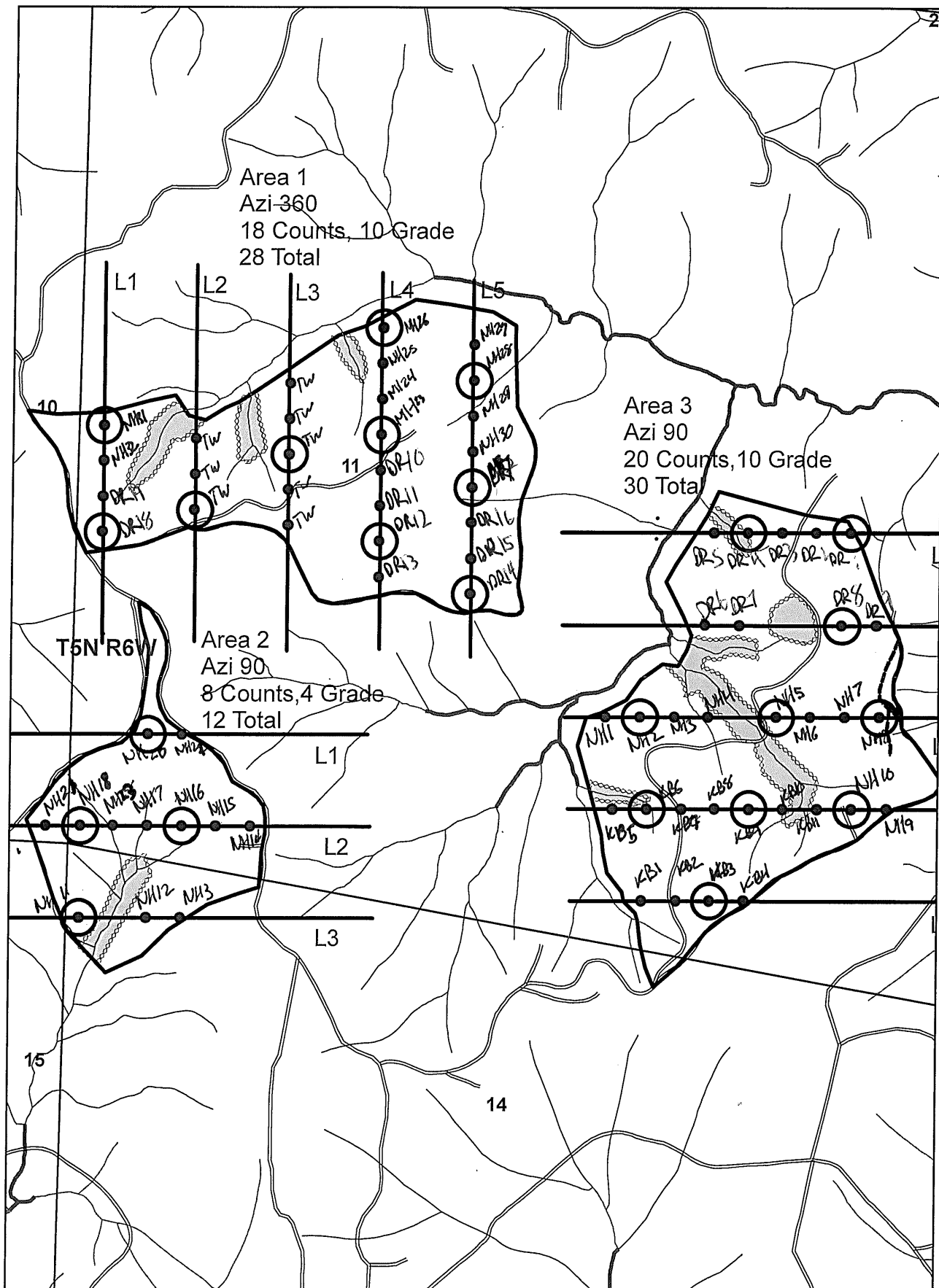
3. **Top Cruise Diameter (TCD):** Minimum top outside bark is 7" or 40% of dob at 16' form point. Generally, use 7" outside bark for trees < 18" dbh and 40% of dob @ FP for trees > 18" dbh.

4. **Form Factors:** (1) Measure or estimate a 16' form factor for every conifer tree measured/graded; OR (2) Measure a minimum of 20 form factors for each major conifer species on the cruise area, and use these to calculate average FF for the species on the cruise. Hardwood form factors are a Standard 87.

5. **Tree Segments:** Record log segments in "standard" log lengths in general use, such as 32' and 40' lengths, whenever possible. Do not record odd segments just to maximize grade. Cull segments can be any length. For conifers, minimum merchantable segment length is 12'; for hardwoods, it's 8'. Maximum segment length is 40'. One foot of trim is assumed for each merch. segment. Do not use "double dash" (--) feature on the data recorder except for the top segment of the tree.
6. **Species, Sort, and Grade Codes:** A. Species: Record as D (Douglas-fir); H (Western hemlock); S (Sitka Spruce); C (Western red cedar); NF (Noble fir); SF (Silver fir); A (Red alder); M (Bigleaf maple); DL(Douglas-fir over 30"dbh); HL(Western hemlock over 30" dbh); SL(Sitka spruce over 30" dbh); CL (Western red cedar over 30" dbh); NFL (Noble fir over 30" dbh); SFL (Silver fir over 30" dbh)  
 B. Sort: Use code "1" (Domestic).  
 C. Grade: A = 1 Peeler; B = 2 Peeler; C = 3 Peeler; D = Special Mill; 2 = 2 Sawmill; 3 = 3 Sawmill; 4 = 4 Sawmill; R = Camp Run; 0 = Cull
7. **Deductions:** Estimate visible defect or damage as a "length deduction" (most often), or as a "diameter deduction," as applicable. Estimate hidden defect and breakage (usually some breakage is encountered in trees > 100 feet in height) on a "per tree" basis. Steep and broken topography generally results in higher breakage percentages than gentler topography, and hemlock generally breaks more than D-fir and spruce.
8. **Standard Field Procedures:** Plot Type Cruises: Mark cruise line beginning and end points with blue/yellow flagging. Write plot identification numbers and line direction on the ribbon. At each plot, tie yellow flagging above eye level near plot center and another yellow flagging around a sturdy wooden stake marking plot center. On each yellow flagging, write the plot identification number. Between plots, along the cruise line, tie blue flagging at intervisible points, not to exceed 100' apart. On "measure/grade" plots write the tree number and/or tree diameter on at least the first measured tree (clockwise from the line direction) in yellow paint. All trees on the plot may be marked this way, if the cruiser chooses.  
ITS and 100% Cruises: Mark cruise "strips" with various colored flagging (not pink). Mark trees measured and graded with yellow paint.
9. **Cruising Equipment:** Relaskop, Rangefinder, Logger's Tape (with dbh on back), Biltmore Stick, Compass, Cruise Cards in Tatum OR Data Recorder, Cruise Design, Cruise Map, Yellow Flagging, Blue Flagging
10. **Attachments:** A. Cruise Map (showing cruise unit boundaries, cruise lines and plot locations, legal description and section lines, BAF or plot size, measure/count plot ratio, north arrow, and scale.

Cruise Design by: Nick Haile  
 Approved by:   
 Date: 04/24/13

# Thor's Hammer Cruise Map Area 1 - 3 MC



1 inch equals 800 feet



**CRUISE DESIGN  
ASTORIA DISTRICT**

Sale Name: Thor's Hammer Area(s) 4

Harvest Type: (PC)

Approx. Cruise Acres: 24 Estimated CV% 30 Net BF or BA/Acre SE% Objective 7

Planned Sale Volume: 158MBF Estimated Sale Area Value/Acre: \$1,365/Ac  
(7MBF/AC)

**A. Cruise Goals:** (a) Grade minimum 180 conifer trees:

(b) Sample 30 cruise plots (10 grade/20 count); Determine log grades for sale value; Determine snag and leave tree species and sizes; Determine "diameter limit" harvest parameters;

**B. Cruise Design:**

1. **Plot Cruises:** BAF 33.61 (Full point; Half point) (circle one)

Cruise Line Direction(s) Area 4 360' az

Cruise Line Spacing 3 chains

Cruise Plot Spacing 3 chains

Grade/Count Ratio 1:2

The BA target is 120 sq. ft. **Select 3 to 4 leave trees per plot, leaving 4 more often than not.** Mark Leave trees with an "L" using yellow paint on graded plots only. Cruise all take and leave trees. If a cruise line ends up paralleling or a plot ends up in a buffer or a road offset by 1 chain and continue. Plots that would have landed within a road right of way or unthinnable area through the systematic design have been dropped; pace through these dropped plots. All cedars are leave trees and count towards the leave tree basal area. Hardwoods are also a reserve species, but will not count towards the leave tree BA. Grade alder as camprun-sawlogs. Record all snags as SN and estimate diameter and total height.

**C. Tree Measurements:**

1. **Diameter:** Minimum DBH to cruise is 8" for conifers and 10" for hardwoods.

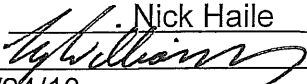
Record dbh to nearest 1/2" for trees < 16", to nearest 1" for trees 16-24", and to nearest 2" for trees > 24". If tree diameters are estimated (only estimate on variable plot cruises), then record to closest estimate.

2. **Bole Length:** Record bole length to nearest foot at TCD. For trees greater than 100 feet in merchantable height, estimating to the nearest 5 feet is acceptable.

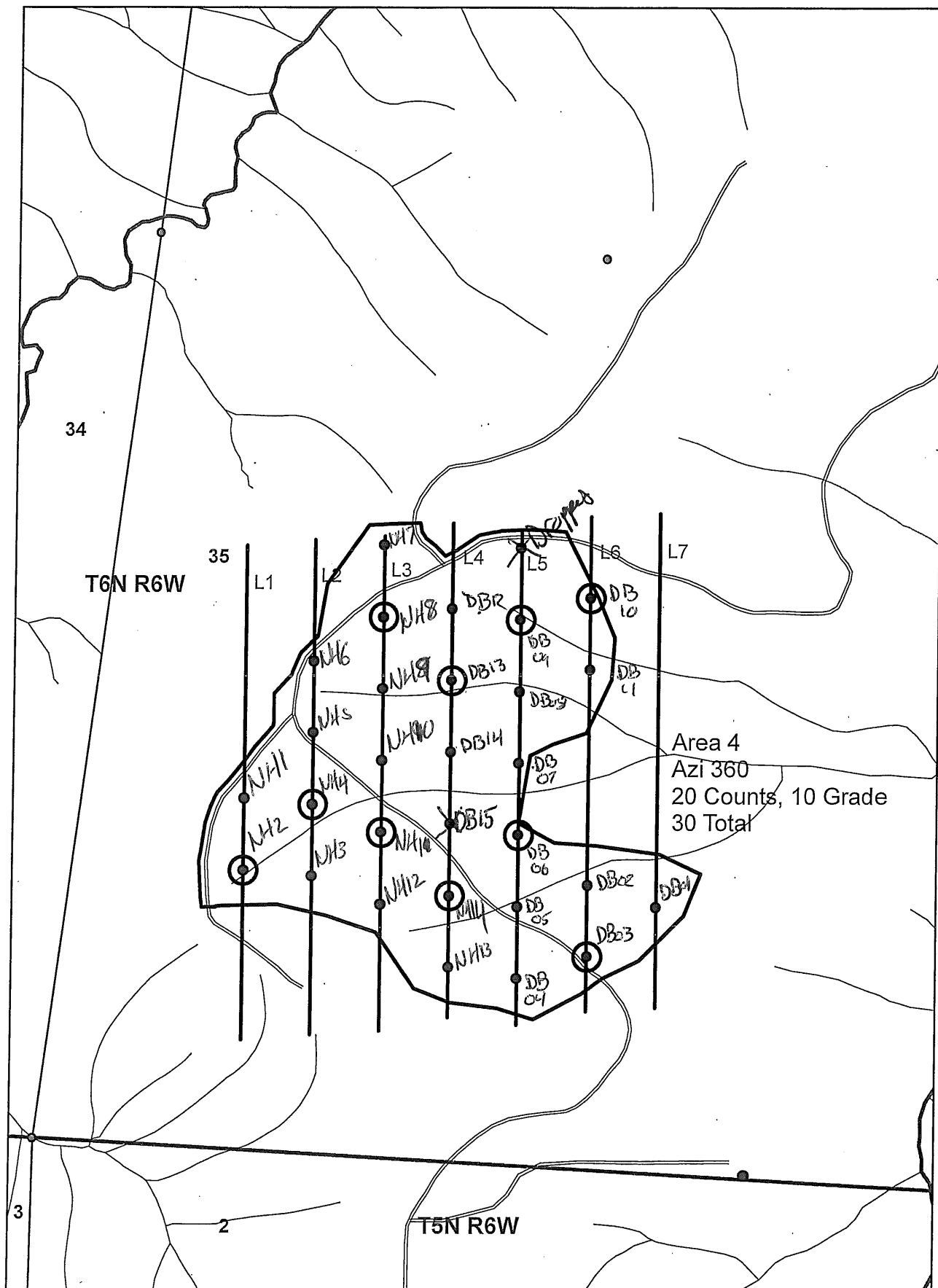
3. **Top Cruise Diameter (TCD):** Minimum top outside bark is 7" or 40% of dob at 16' form point. Generally, use 7" outside bark for trees < 18" dbh and 40% of dob @ FP for trees > 18" dbh.

4. **Form Factors:** (1) Measure or estimate a 16' form factor for every conifer tree measured/graded; OR (2) Measure a minimum of 20 form factors for each major conifer species on the cruise area, and use these to calculate average FF for the species on the cruise. Hardwood form factors are a Standard 87.

5. **Tree Segments:** Record log segments in "standard" log lengths in general use, such as 32' and 40' lengths, whenever possible. Do not record odd segments just to maximize grade. Cull segments can be any length. For conifers, minimum merchantable segment length is 12'; for hardwoods, it's 8'. Maximum segment length is 40'. One foot of trim is assumed for each merch. segment. Do not use "double dash" (--) feature on the data recorder except for the top segment of the tree.
6. **Species, Sort, and Grade Codes:** A. Species: Record as D (Douglas-fir); H (Western hemlock); S (Sitka Spruce); C (Western red cedar); NF (Noble fir); SF (Silver fir); A (Red alder); M (Bigleaf maple); DL(Douglas-fir over 30" dbh); HL(Western hemlock over 30" dbh); SL(Sitka spruce over 30" dbh); CL (Western red cedar over 30" dbh); NFL (Noble fir over 30" dbh); SFL (Silver fir over 30" dbh)  
 B. Sort: Use code "1" (Domestic).  
 C. Grade: A = 1 Peeler; B = 2 Peeler; C = 3 Peeler; D = Special Mill; 2 = 2 Sawmill; 3 = 3 Sawmill; 4 = 4 Sawmill; R = Camp Run; 0 = Cull
7. **Deductions:** Estimate visible defect or damage as a "length deduction" (most often), or as a "diameter deduction," as applicable. Estimate hidden defect and breakage (usually some breakage is encountered in trees > 100 feet in height) on a "per tree" basis. Steep and broken topography generally results in higher breakage percentages than gentler topography, and hemlock generally breaks more than D-fir and spruce.
8. **Standard Field Procedures:** Plot Type Cruises: Mark cruise line beginning and end points with blue/yellow flagging. Write plot identification numbers and line direction on the ribbon. At each plot, tie yellow flagging above eye level near plot center and another yellow flagging around a sturdy wooden stake marking plot center. On each yellow flagging, write the plot identification number. Between plots, along the cruise line, tie blue flagging at intervisible points, not to exceed 100' apart. On "measure/grade" plots write the tree number and/or tree diameter on at least the first measured tree (clockwise from the line direction) in yellow paint. All trees on the plot may be marked this way, if the cruiser chooses.  
ITS and 100% Cruises: Mark cruise "strips" with various colored flagging (not pink). Mark trees measured and graded with yellow paint.
9. **Cruising Equipment:** Relaskop, Rangefinder, Logger's Tape (with dbh on back), Biltmore Stick, Compass, Cruise Cards in Tatum OR Data Recorder, Cruise Design, Cruise Map, Yellow Flagging, Blue Flagging
10. **Attachments:** A. Cruise Map (showing cruise unit boundaries, cruise lines and plot locations, legal description and section lines, BAF or plot size, measure/count plot ratio, north arrow, and scale.

Cruise Design by: Nick Haile  
 Approved by:   
 Date: 04/24/13

# Thor's Hammer Cruise Map Area 4 PC



1 inch equals 400 feet



**Species, Sort Grade - Board Foot Volumes (Project)**

T05N R06W S11 TyROW	2.00
T05N R06W S11 TyTAKE	159.00
T06N R06W S35 TyTAKE	26.00

**Project: THORS**  
**Acres 187.00**

**Page 1**  
**Date 6/13/2013**  
**Time 1:01:32PM**

S Spp	So T	Gr rt ad	% Net BdFt	Bd. Ft. per Acre			Total Net MBF	Percent of Net Board Foot Volume								Average Log			Logs Per /Acre	
				Def%	Gross	Net		Log Scale Dia.				Log Length				Ln Ft	Bd Ft	CF/ Lf		
								4-5	6-11	12-16	17+	12-20	21-30	31-35	36-99					
D	DOCU			100.0	872												7		0.00	11.3
D	DO2S		82	1.7	44,973	44,230	8,271		2	40	58		1	0	7	92	39	407	2.26	108.6
D	DO3S		15	1.1	7,988	7,898	1,477			94	6		3	7	25	64	34	98	0.80	80.8
D	DO4S		3	.5	1,391	1,384	259		0	96	3		15	59	19	7	24	36	0.49	38.5
<b>D Totals</b>			99	3.1	55,225	53,512	10,007		0	18	34	48	1	3	10	85	33	224	1.52	239.1
H	DO3S		77		180	180	34			100					93	7	33	98	0.74	1.8
H	DO4S		23		51	51	10		27	73				73	27		30	32	0.37	1.6
<b>H Totals</b>			0		231	231	43		6	94				16	78	5	31	67	0.57	3.5
A	DOCR		100		288	288	54			56	44			55	45		31	98	1.25	2.9
<b>A Totals</b>			1		288	288	54			56	44			55	45		31	98	1.25	2.9
<b>Totals</b>				3.1	55,743	54,031	10,104		0	19	34	47	1	3	10	85	33	220	1.51	245.5









TC TSTATS				STATISTICS				PAGE	1	
				PROJECT	THORS		DATE	6/13/2013		
TWP	RGE	SECT	TRACT	TYPE	ACRES	PLOTS	TREES	CuFt	BdFt	
05N	06W	11	AREA123	TAKE	159.00	70	477	1	W	
				TREES	ESTIMATED	PERCENT				
				PER PLOT	TOTAL	SAMPLE				
				TREES	TREES	TREES				
TOTAL	70	477	6.8							
CRUISE	27	138	5.1	14,352			1.0			
DBH COUNT										
REFOREST										
COUNT	43	321	7.5							
BLANKS										
100 %										
STAND SUMMARY										
	SAMPLE	TREES	AVG	BOLE	REL	BASAL	GROSS	NET	GROSS	NET
	TREES	/ACRE	DBH	LEN	DEN	AREA	BF/AC	BF/AC	CF/AC	CF/AC
DOUG FIR	133	85.9	23.8	106		266.4	61,821	60,849	13,763	13,754
R ALDER	3	2.4	19.7	49		5.1	334	334	132	132
WHEMLOCK	2	1.9	12.9	64		1.7	254	254	68	68
<b>TOTAL</b>	<i>138</i>	<i>90.3</i>	<i>23.6</i>	<i>104</i>		<i>273.3</i>	<i>62,409</i>	<i>61,437</i>	<i>13,962</i>	<i>13,953</i>
CONFIDENCE LIMITS OF THE SAMPLE										
68.1 TIMES OUT OF 100 THE VOLUME WILL BE WITHIN THE SAMPLE ERROR										
CL: 68.1 %	COEFF	SAMPLE TREES - BF				# OF TREES REQ.		INF. POP.		
SD: 1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5	10	15		
DOUG FIR	61.2	5.3	904	955	1,006					
R ALDER	38.5	26.6	98	133	169					
WHEMLOCK	5.2	4.9	128	135	142					
<b>TOTAL</b>	<i>64.2</i>	<i>5.5</i>	<i>875</i>	<i>925</i>	<i>976</i>	<i>165</i>	<i>41</i>	<i>18</i>		
CL: 68.1 %	COEFF	TREES/ACRE				# OF PLOTS REQ.		INF. POP.		
SD: 1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5	10	15		
DOUG FIR	36.4	4.4	82	86	90					
R ALDER	438.8	52.4	1	2	4					
WHEMLOCK	479.9	57.3	1	2	3					
<b>TOTAL</b>	<i>31.5</i>	<i>3.8</i>	<i>87</i>	<i>90</i>	<i>94</i>	<i>40</i>	<i>10</i>	<i>4</i>		
CL: 68.1 %	COEFF	BASAL AREA/ACRE				# OF PLOTS REQ.		INF. POP.		
SD: 1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5	10	15		
DOUG FIR	32.7	3.9	256	266	277					
R ALDER	437.6	52.3	2	5	8					
WHEMLOCK	476.0	56.8	1	2	3					
<b>TOTAL</b>	<i>29.1</i>	<i>3.5</i>	<i>264</i>	<i>273</i>	<i>283</i>	<i>34</i>	<i>8</i>	<i>4</i>		
CL: 68.1 %	COEFF	NET BF/ACRE				# OF PLOTS REQ.		INF. POP.		
SD: 1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5	10	15		
DOUG FIR	33.4	4.0	58,424	60,849	63,273					
R ALDER	444.0	53.0	157	334	511					
WHEMLOCK	478.2	57.1	109	254	399					
<b>TOTAL</b>	<i>31.7</i>	<i>3.8</i>	<i>59,108</i>	<i>61,437</i>	<i>63,766</i>	<i>40</i>	<i>10</i>	<i>4</i>		

TC TSTATS				STATISTICS				PAGE 1		
				PROJECT THORS		DATE 6/13/2013				
TWP	RGE	SECT	TRACT	TYPE	ACRES	PLOTS	TREES	CuFt	BdFt	
06N	06W	35	AREA4	00PC	26.00	29	176	1	W	
				TREES	ESTIMATED	PERCENT				
				PER PLOT	TOTAL	SAMPLE				
					TREES	TREES				
TOTAL		29	176	6.1						
CRUISE		11	66	6.0	3,745		1.8			
DBH COUNT										
REFOREST										
COUNT		18	103	5.7						
BLANKS										
100 %										
<b>STAND SUMMARY</b>										
	SAMPLE	TREES	AVG	BOLE	REL	BASAL	GROSS	NET	GROSS	NET
	TREES	/ACRE	DBH	LEN	DEN	AREA	BF/AC	BF/AC	CF/AC	CF/AC
DOUGLEAV	35	69.3	17.8	67		119.4	15,042	14,902	4,183	4,183
DOUG FIR	27	62.5	15.0	54		76.5	8,103	8,082	2,280	2,280
SNAG	3	10.9	9.9	34		5.8				
HEMLEAV	1	1.3	18.0	64		2.3	275	275	84	84
<b>TOTAL</b>	<i>66</i>	<i>144.0</i>	<i>16.1</i>	<i>59</i>		<i>204.0</i>	<i>23,420</i>	<i>23,260</i>	<i>6,546</i>	<i>6,546</i>
CONFIDENCE LIMITS OF THE SAMPLE										
68.1 TIMES OUT OF 100 THE VOLUME WILL BE WITHIN THE SAMPLE ERROR										
CL: 68.1 %	COEFF	<b>SAMPLE TREES - BF</b>				# OF TREES REQ.		INF. POP.		
SD: 1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5	10	15		
DOUGLEAV	32.0	5.4	221	234	246					
DOUG FIR	50.0	9.8	135	149	164					
SNAG										
HEMLEAV										
<b>TOTAL</b>	<i>49.1</i>	<i>6.0</i>	<i>177</i>	<i>188</i>	<i>200</i>		<i>96</i>	<i>24</i>	<i>11</i>	
CL: 68.1 %	COEFF	<b>TREES/ACRE</b>				# OF PLOTS REQ.		INF. POP.		
SD: 1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5	10	15		
DOUGLEAV	23.0	4.3	66	69	72					
DOUG FIR	61.0	11.5	55	62	70					
SNAG	233.9	44.2	6	11	16					
HEMLEAV	373.9	70.6	0	1	2					
<b>TOTAL</b>	<i>35.8</i>	<i>6.8</i>	<i>134</i>	<i>144</i>	<i>154</i>		<i>53</i>	<i>13</i>	<i>6</i>	
CL: 68.1 %	COEFF	<b>BASAL AREA/ACRE</b>				# OF PLOTS REQ.		INF. POP.		
SD: 1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5	10	15		
DOUGLEAV	20.7	3.9	115	119	124					
DOUG FIR	62.0	11.7	68	76	85					
SNAG	223.0	42.1	3	6	8					
HEMLEAV	373.9	70.6	1	2	4					
<b>TOTAL</b>	<i>24.9</i>	<i>4.7</i>	<i>194</i>	<i>204</i>	<i>214</i>		<i>26</i>	<i>6</i>	<i>3</i>	
CL: 68.1 %	COEFF	<b>NET BF/ACRE</b>				# OF PLOTS REQ.		INF. POP.		
SD: 1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5	10	15		
DOUGLEAV	22.0	4.2	14,283	14,902	15,521					
DOUG FIR	65.1	12.3	7,089	8,082	9,075					
SNAG										
HEMLEAV	373.9	70.6	81	275	470					
<b>TOTAL</b>	<i>23.1</i>	<i>4.4</i>	<i>22,246</i>	<i>23,260</i>	<i>24,273</i>		<i>22</i>	<i>6</i>	<i>2</i>	

Log Stock Table - MBF

T05N R06W S11 TyTAKE 159.00  
T06N R06W S35 TyTAKE 26.00

Project: THORS  
Acres 185.00

Spp	S T	So Gr rt de	Log Len	Gross MBF	Def %	Net MBF	% Spc	Net Volume by Scaling Diameter in Inches															
								2-3	4-5	6-7	8-9	10-11	12-13	14-15	16-19	20-23	24-29	30-39	40+				
D		DO 2S	20	56		56	.6						10	16		30							
D		DO 2S	21	5		5	.0				5												
D		DO 2S	22	5		5	.1					5											
D		DO 2S	27	15		15	.2						15										
D		DO 2S	28	17	7.1	16	.2						16										
D		DO 2S	32	558	1.2	551	5.6					70	128	60	109	94	46	45					
D		DO 2S	34	25		25	.3							25									
D		DO 2S	35	7		7	.1				7												
D		DO 2S	36	43		43	.4								43								
D		DO 2S	40	7,574	1.7	7,444	75.3					108	957	1133	2752	1512	924	59					
D		DO 3S	11	2		2	.0					2											
D		DO 3S	12	2		2	.0			2													
D		DO 3S	18	6		6	.1					6											
D		DO 3S	20	39	2.1	38	.4			4	26			9									
D		DO 3S	21	4		4	.0				4												
D		DO 3S	22	27		27	.3			6	15		5										
D		DO 3S	25	13		13	.1				8		4										
D		DO 3S	26	1		1	.0			1													
D		DO 3S	27	36	3.5	35	.4			4	3		23	5									
D		DO 3S	28	6		6	.1			6													
D		DO 3S	29	5		5	.0				5												
D		DO 3S	30	18		18	.2			8			10										
D		DO 3S	32	290	2.8	282	2.9			28	141		69	43									
D		DO 3S	33	52		52	.5				29		16	7									
D		DO 3S	35	36		36	.4			14	22												
D		DO 3S	36	13		13	.1			4	9												
D		DO 3S	37	54		53	.5			25	20		8										
D		DO 3S	38	9		9	.1			9													
D		DO 3S	39	18		18	.2						9	9									
D		DO 3S	40	820		814	8.2			89	236		477	12									
D		DO 3S	41	27		27	.3				14		14										
D		DO 4S	11	1		1	.0				1												
D		DO 4S	12	2		2	.0				2												
D		DO 4S	13	2		2	.0				2												
D		DO 4S	15	2		2	.0				2												
D		DO 4S	16	3		3	.0				3												
D		DO 4S	17	12		12	.1				5	6											

Log Stock Table - MBF

T05N R06W S11 TyTAKE 159.00  
T06N R06W S35 TyTAKE 26.00

Project: THORS  
Acres 185.00

Spp	S T	So Gr rt de	Log Len	Gross MBF	Def %	Net MBF	% Spc	Net Volume by Scaling Diameter in Inches										
								2-3	4-5	6-7	8-9	10-11	12-13	14-15	16-19	20-23	24-29	30-39
D		DO 4S	18	8		8	.1			8								
D		DO 4S	19	5		5	.1			5								
D		DO 4S	20	3		3	.0			0	3							
D		DO 4S	21	1		1	.0			1								
D		DO 4S	22	16		16	.2			12		4						
D		DO 4S	23	10		10	.1			10								
D		DO 4S	24	4		4	.0			4								
D		DO 4S	25	29		29	.3			24	4							
D		DO 4S	26	16		16	.2			16								
D		DO 4S	27	24		24	.2			24								
D		DO 4S	28	23		23	.2			12	5	6						
D		DO 4S	29	15		15	.1			5	10							
D		DO 4S	30	14		14	.1			14								
D		DO 4S	31	30		30	.3			16	6		8					
D		DO 4S	32	7	20.0	5	.1			5								
D		DO 4S	33	13		13	.1			13								
D		DO 4S	37	7		7	.1			7								
D		DO 4S	40	10		10	.1	1			9							
D		Totals		10,040	1.5	9,885	99.0	1		394	581	836	1200	1216	2946	1637	970	104
H		DO 3S	32	31		31	72.4				16	15						
H		DO 3S	37	2		2	5.4			2								
H		DO 4S	29	7		7	16.3			7								
H		DO 4S	31	3		3	6.0		3									
H		Totals		43		43	.4		3	9	16	15						
A		DO CR	24	29		29	55.2				6	23						
A		DO CR	40	24		24	44.8				24							
A		Totals		53		53	.5				30	23						
Total		All Species		10,136	1.5	9,981	100.0	1	3	403	627	852	1223	1216	2946	1637	970	104





**Log Stock Table - MBF**

Project: **THORS**

**T05N R06W S11 TTAKE**

**T05N R06W S11 TTAK**

**Twp Rge Sec Tract**  
**05N 06W 11 AREA123**

**Type Acres Plots Sample Trees**  
**TAKE 159.00 70 138**

**Page 2**  
**Date 6/13/2013**  
**Time 8:42:14AM**

Spp	T	S	So	Gr	Log	Gross MBF	% Def	Net MBF	% Spc	Net Volume by Scaling Diameter in Inches												
										2-3	4-5	6-7	8-9	10-11	12-13	14-15	16-19	20-23	24-29	30-39	40+	
D		DO	4S	40		10		10	.1	1			9									
D Totals						9,830	1.6	9,675	99.0	1		331	544	759	1187	1202	2941	1637	970	104		
A		DO	CR	24		29		29	55.2				6		23							
A		DO	CR	40		24		24	44.8				24									
A Totals						53		53	.5				30		23							
H		DO	3S	32		31		31	76.5				16	15								
H		DO	4S	29		7		7	17.2				7									
H		DO	4S	31		3		3	6.3		3											
H Totals						40		40	.4		3	7	16	15								
Total All Species						9,923	1.6	9,768	100.0	1	3	338	590	774	1210	1202	2941	1637	970	104		

**Log Stock Table - MBF**  
**Project: THORS**

T06N R06W S35 TTAKE

T06N R06W S35 TTAK

Twp Rge Sec Tract Type Acres Plots Sample Trees  
 06N 06W 35 AREA4 TAKE 26.00 29 28

Page 1  
 Date 6/13/2013  
 Time 8:42:46AM

Spp	S	So	Gr	Log	Gross MBF	% Def	Net MBF	% Spc	Net Volume by Scaling Diameter in Inches										
									2-3	4-5	6-7	8-9	10-11	12-13	14-15	16-19	20-23	24-29	30-39
D	DO	CU	6																
D	DO	CU	9																
D	DO	CU	20																
D	DO	2S	20		5		5	2.6							5				
D	DO	2S	22		5		5	2.6					5						
D	DO	2S	32		6		6	2.8				6							
D	DO	2S	40		16		16	7.7				7	9						
D	DO	3S	18		6		6	2.6			6								
D	DO	3S	20		4		4	1.9				4							
D	DO	3S	26		1		1	.7			1								
D	DO	3S	32		37		37	17.7			8	13	15						
D	DO	3S	36		4		4	2.0			4								
D	DO	3S	37		6	9.1	5	2.5				5							
D	DO	3S	38		9		9	4.4			9								
D	DO	3S	40		84		84	40.0			14	14	56						
D	DO	4S	11		1		1	.3			1								
D	DO	4S	17		3		3	1.2			3								
D	DO	4S	18		1		1	.6			1								
D	DO	4S	19		1		1	.5			1								
D	DO	4S	20		0		0	.2			0								
D	DO	4S	21		1		1	.5			1								
D	DO	4S	22		2		2	.8			2								
D	DO	4S	23		1		1	.5			1								
D	DO	4S	24		4		4	1.9			4								
D	DO	4S	26		1		1	.7			1								
D	DO	4S	27		1		1	.7			1								
D	DO	4S	28		2		2	.9			2								
D	DO	4S	29		5		5	2.3			5								
D	DO	4S	30		3		3	1.5			3								
D	Totals				211		210	98.9			63	37	77	13	14	5			
H	DO	3S	37		2		2	100.0			2								
H	Totals				2		2	1.1			2								
Total All Species					213		212	100.0			65	37	77	13	14	5			

TC PSTNDSUM		Stand Table Summary										Page	1			
												Date:	6/13/2013			
T05N R06W S11 TyTAKE 159.00		Project THORS										Time: 8:47:16AM				
T06N R06W S35 TyTAKE 26.00		Acres 185.00										Grown Year:				
S Spc T	Sample DBH	Trees	Tot		Trees/ Acre	BA/ Acre	Logs Acre	Average Log		Tons/ Acre	Net		Totals			
			FF 16'	Av Ht				Net Cu.Ft.	Net Bd.Ft.		Cu.Ft. Acre	Bd.Ft. Acre	Tons	Cunits	MBF	
D	10	1	89	68	.730	.40	.73	12.0	50.0		9	37			16	7
D	11	1	88	130	2.602	1.72	5.20	13.5	50.0		70	260			130	48
D	12	2	86	106	2.693	2.12	4.88	15.2	52.1		74	254			137	47
D	13	3	88	78	1.331	1.19	2.20	15.0	54.1		33	119			61	22
D	14	6	90	99	3.497	3.71	8.20	17.3	65.9		142	540			263	100
D	15	5	87	96	2.697	3.31	5.39	22.8	87.4		123	471			227	87
D	16	6	87	111	2.656	3.71	6.26	25.6	94.4		160	590			296	109
D	17	9	88	128	7.677	12.10	20.55	26.4	104.3		542	2,144			1,002	397
D	18	4	86	118	3.887	6.87	9.72	29.5	111.0		287	1,079			530	200
D	19	2	83	132	1.074	2.12	3.02	33.8	125.3		102	379			189	70
D	20	5	86	148	3.331	7.27	10.60	36.4	146.6		386	1,554			713	287
D	21	7	85	138	3.900	9.38	11.37	42.7	171.9		485	1,955			898	362
D	22	8	87	137	5.204	13.74	16.26	43.0	180.0		699	2,927			1,294	542
D	23	13	87	137	7.737	22.32	23.80	47.0	193.5		1,119	4,606			2,071	852
D	24	11	85	147	5.592	17.57	17.20	54.5	221.1		938	3,803			1,735	704
D	25	8	85	144	4.030	13.74	13.10	55.2	231.9		723	3,037			1,337	562
D	26	12	88	143	5.589	20.60	16.30	66.1	296.6		1,078	4,834			1,995	894
D	27	10	89	144	4.319	17.17	12.96	72.0	335.3		933	4,344			1,726	804
D	28	5	87	149	2.008	8.59	6.42	71.7	332.5		461	2,136			852	395
D	29	3	86	140	1.123	5.15	2.62	86.1	385.7		226	1,011			418	187
D	30	5	87	144	1.749	8.59	5.25	83.3	403.3		437	2,116			809	392
D	31	6	85	162	1.966	10.30	6.88	87.0	402.9		598	2,771			1,107	513
D	32	10	86	150	3.074	17.17	8.92	99.9	472.8		890	4,215			1,647	780
D	33	4	90	148	1.156	6.87	4.05	93.2	486.4		377	1,969			698	364
D	34	1	89	146	.272	1.72	.82	117.0	606.7		96	496			177	92
D	35	1	89	158	.257	1.72	.77	133.3	746.7		103	576			190	106
D	36	3	84	141	.729	5.15	2.19	119.2	527.8		261	1,154			482	213
D	38	2	87	143	.436	3.43	1.31	141.3	736.7		185	964			342	178
D	39	2	86	151	.414	3.43	1.24	150.8	770.0		187	956			347	177
D	40	2	89	148	.394	3.43	1.18	154.5	795.0		182	939			337	174
D	42	2	85	113	.357	3.43	.71	192.0	905.0		137	646			254	120
D	44	1	92	145	.163	1.72	.49	200.7	1130.0		98	551			181	102
D	Totals	160	87	133	82.641	239.73	230.57	52.7	231.7		12,141	53,433			22,461	9,885
A	18	1	87	67	.834	1.47	1.67	26.5	95.0		44	158			82	29
A	19	1	85	53	.748	1.47	.75	47.0	90.0		35	67			65	12
A	23	1	85	51	.511	1.47	.51	66.0	120.0		34	61			62	11
A	Totals	3	86	58	2.093	4.42	2.93	38.6	98.1		113	287			209	53
H	12	2	88	91	1.145	.90	2.08	17.1	64.5		36	134			66	25
H	14	1	88	78	.689	.74	1.38	19.0	70.0		26	96			48	18
H	Totals	3	88	86	1.834	1.64	3.46	17.9	66.7		62	231			114	43
Totals		166	87	130	86.568	245.78	236.95	52.0	227.7		12,316	53,951			22,785	9,981

TC TSTNDSUM		Stand Table Summary													
Project THORS											T05N R06W S11 TTAK				
T05N R06W S11 TTAK											T05N R06W S11 TTAK				
Twp	Rge	Sec	Tract	Type	Acres	Plots	Sample Trees	Page:							
05N	06W	11	AREA123	TAKE	159.00	70	138	1	Date:	06/13/20					
								Time:	8:46:21AM						
S Spc	T	Sample DBH	FF Trees	Av Ht 16'	Trees/ Acre	BA/ Acre	Logs Acre	Average Log		Net Tons/ Acre	Net Cu.Ft. Acre	Net Bd.Ft. Acre	Totals		
								Net Cu.Ft.	Net Bd.Ft.				Tons	Cunits	MBF
D		11	1	88	130	3.027	2.00	6.05	13.5	50.0	82	303		130	48
D		12	1	85	114	2.544	2.00	5.09	14.5	50.0	74	254		117	40
D		14	1	91	129	1.869	2.00	5.61	17.7	70.0	99	392		157	62
D		15	1	86	108	1.628	2.00	3.26	25.0	100.0	81	326		129	52
D		16	1	85	141	1.431	2.00	4.29	25.7	96.7	110	415		175	66
D		17	6	88	134	8.051	12.69	22.44	26.3	105.7	591	2,371		940	377
D		18	4	86	118	4.522	7.99	11.31	29.5	111.0	334	1,255		530	200
D		19	1	82	146	1.015	2.00	3.04	34.7	130.0	106	396		168	63
D		20	4	86	152	3.663	7.99	11.90	36.8	148.5	438	1,767		696	281
D		21	5	85	142	4.153	9.99	12.46	42.5	172.7	529	2,151		841	342
D		22	8	87	137	6.055	15.98	18.92	43.0	180.0	814	3,406		1,294	542
D		23	13	87	137	9.002	25.97	27.70	47.0	193.5	1,302	5,359		2,071	852
D		24	10	85	149	6.359	19.98	19.71	54.9	222.6	1,082	4,388		1,721	698
D		25	8	85	144	4.689	15.98	15.24	55.2	231.9	841	3,534		1,337	562
D		26	12	88	143	6.502	23.97	18.97	66.1	296.6	1,254	5,625		1,995	894
D		27	10	89	144	5.025	19.98	15.07	72.0	335.3	1,086	5,055		1,726	804
D		28	5	87	149	2.336	9.99	7.48	71.7	332.5	536	2,486		852	395
D		29	3	86	140	1.307	5.99	3.05	86.1	385.7	263	1,176		418	187
D		30	5	87	144	2.035	9.99	6.10	83.3	403.3	509	2,462		809	392
D		31	6	85	162	2.287	11.99	8.00	87.0	402.9	696	3,225		1,107	513
D		32	10	86	150	3.577	19.98	10.37	99.9	472.8	1,036	4,904		1,647	780
D		33	4	90	148	1.345	7.99	4.71	93.2	486.4	439	2,291		698	364
D		34	1	89	146	.317	2.00	.95	117.0	606.7	111	577		177	92
D		35	1	89	158	.299	2.00	.90	133.3	746.7	120	670		190	106
D		36	3	84	141	.848	5.99	2.54	119.2	527.8	303	1,343		482	213
D		38	2	87	143	.507	4.00	1.52	141.3	736.7	215	1,121		342	178
D		39	2	86	151	.482	4.00	1.44	150.8	770.0	218	1,113		347	177
D		40	2	89	148	.458	4.00	1.37	154.5	795.0	212	1,092		337	174
D		42	2	85	113	.415	4.00	.83	192.0	905.0	159	752		254	120
D		44	1	92	145	.189	2.00	.57	200.7	1130.0	114	641		181	102
D		Totals	133	87	139	85.937	266.42	250.91	54.8	242.5	13,754	60,849		21,868	9,675
A		18	1	87	67	.970	1.71	1.94	26.5	95.0	51	184		82	29
A		19	1	85	53	.871	1.71	.87	47.0	90.0	41	78		65	12
A		23	1	85	51	.594	1.71	.59	66.0	120.0	39	71		62	11
A		Totals	3	86	58	2.435	5.14	3.40	38.6	98.1	132	334		209	53
H		12	1	88	99	1.091	.86	2.18	17.0	65.0	37	142		59	23
H		14	1	88	78	.802	.86	1.60	19.0	70.0	30	112		48	18
H		Totals	2	88	90	1.893	1.71	3.79	17.8	67.1	68	254		107	40
Totals			138	87	136	90.265	273.27	258.10	54.1	238.0	13953	61,437		22,185	9,768

TC	TSTNDSUM	Stand Table Summary													
Project												THORS			
T06N R06W S35 TTAKE										T06N R06W S35 TTAK					
Twp	Rge	Sec	Tract	Type	Acres	Plots	Sample Trees	Page:	1						
06N	06W	35	AREA4	TAKE	26.00	29	28	Date:	06/13/20						
								Time:	8:46:53AM						
S Spc	T	Sample		Av	Trees/ Acre	BA/ Acre	Logs Acre	Average Log		Net Tons/ Acre	Net Cu.Ft. Acre	Net Bd.Ft. Acre	Totals		
		DBH	Trees	FF 16'				Ht Tot	Net Cu.Ft.				Net Bd.Ft.	Tons	Cunits
D		10	1	89	68	5.194	2.83	5.19	12.0	50.0	62	260		16	7
D		12	1	91	70	3.607	2.83	3.61	21.0	70.0	76	252		20	7
D		13	3	88	78	9.471	8.50	15.62	15.0	54.1	235	845		61	22
D		14	5	89	74	13.451	14.17	24.05	16.8	60.1	405	1,445		105	38
D		15	4	88	83	9.234	11.33	18.47	20.4	73.8	376	1,362		98	35
D		16	5	88	85	10.145	14.17	18.26	25.4	91.1	465	1,664		121	43
D		17	3	87	70	5.392	8.50	8.99	26.8	84.0	241	755		63	20
D		19	1	85	69	1.439	2.83	2.88	28.5	95.0	82	273		21	7
D		20	1	85	69	1.299	2.83	2.60	25.5	95.0	66	247		17	6
D		21	2	87	95	2.356	5.67	4.71	46.0	160.0	217	754		56	20
D		24	1	84	73	.902	2.83	1.80	30.5	125.0	55	225		14	6
D		Totals	27	88	77	62.489	76.49	106.18	21.5	76.1	2,280	8,082		593	210
H		12	1	88	55	1.476	1.16	1.48	18.0	60.0	27	89		7	2
H		Totals	1	88	55	1.476	1.16	1.48	18.0	60.0	27	89		7	2
Totals			28	88	77	63.965	77.65	107.65	21.4	75.9	2306	8,171		600	212

### Logging Plan Map

OF TIMBER SALE CONTRACT NO. 341-14-32  
 THOR'S HAMMER  
 PORTIONS OF SECTIONS 10, 11, 14, AND  
 15, T5N, R6W, W.M., AND  
 SECTION 35, T6N, R6W W.M.  
 CLATSOP COUNTY, OREGON.

Approximate Net Acreage:

	PC Acres	MC Acres
Area 1 (MC) -	0	67
Area 2 (MC) -	0	28
Area 3 (MC) -	0	64
Area 4 (PC) -	26	0
Area 5 (R/W) -	0	2
Total by prescription	26	161
Total Sale Acreage	187	

Approximate Scale = 1"=1,000'



Area	Ground%	Cable%
1	39	61
2	68	32
3	51	49
4	100	0
5 (R/W)	100	0

### Legend

- ⊙ Waste Area
- Existing Landings
- ⊙ Landings Constructed
- ◆ Known Survey Marker
- - - New Road Construction
- Yarding Area-Cable
- T Yarding Area-Ground
- Type F Stream
- Type N Stream
- Existing Surfaced Road
- New Road Construction - Surfaced
- /// Reforestation Area
- ⋯ Timber Sale Boundary
- Buffer Zone
- ▨ Posted Stream Buffer
- - - New Road Construction Right-of-Way

