



"STEWARDSHIP-IN FORESTRY"

Timber Sale Appraisal Cost Summary Cougar Monster Sale 341-03-75

District: Astoria

Date: 5/12/03

	Conifer	Hardwood	Total
Gross Timber Sale Value	\$973,396.80	\$744,883.80	\$1,718,280.60
		Project Work	(\$713,756.00)
		Advertised Value	\$1,004,524.60



Timber Sale Appraisal Timber Description Cougar Monster Sale 341-03-75

"STEWARDSHIP IN FORESTRY"

District: Astoria

Location: Portions Sections 10,11,13,14 & 15, T4N, R8W, W.M., Clatsop County, Oregon

Date: 5/12/03

Stand Stocking: 60%

Species	Avg. DBH	Amortized%	Recovery%
Douglas - Fir	20	0	99
Western Hemlock / Fir	14	0	99
Sitka Spruce	15	0	100
Alder (Red)	14	0	99

Volume by Grade	Douglas - Fir	Western Hemlock / Fir	Sitka Spruce	Alder (Red)	Total
2S	1,221	929	319	0	2,469
3S	801	778	288	1,640	3,507
4S	120	334	92	665	1,211
Total	2,142	2,041	699	2,305	7,187

Comments: Pond Values Used: 1st Quarter 2003 + Local Pond Values

Other Costs with P&R:

Branding & Painting: $\$1/\text{MBF} \times 7,187\text{MBF} = \$7,187$

Additional Scaling Costs for Alder: $\$1/\text{MBF} \times 2,305\text{MBF} = \$2,305$

Total Other Costs with P&R = \$9,492

Other Costs without P&R:

Pile Slash at CC Cable Landings: $\$130/\text{Landing} \times 8 \text{ Landings} = \$1,040$

Road Use Fee to Longview Fibre (Area2) = \$1,000

Slash Piling in Areas 3, 4, 5, 6a, & 6b: $\$95/\text{hr} \times 227 \text{ hours} = \$21,565$

Slash Piling Excavator Move-In = \$500

Total Other Costs without P&R = \$24,105



Timber Sale Appraisal

Logging Conditions

Cougar Monster

Sale 341-03-75

"STEWARDSHIP IN FORESTRY"

Combination#: 1	Douglas - Fir	24.15%	
	Western Hemlock / Fir	12.01%	
	Sitka Spruce	17.11%	
	Alder (Red)	28.29%	
Yarding Distance:	Medium (800 ft)		Downhill Yarding: No
Logging System:	Cable: Large Tower >=70		Process: Stroke Delimber
Tree Size:	Mature Private Forest / Regen Cut (250 Bft/tree), 6-11 logs/MBF		
Loads/Day:	8		Bd. Ft./Load: 4,500
Cost/MBF:	\$104.02		
Machines:			
	Log Loader (A)		
	Stroke Delimber (A)		
	Tower Yarder (Large)		
Combination#: 2	Douglas - Fir	22.99%	
	Western Hemlock / Fir	40.58%	
	Sitka Spruce	33.19%	
	Alder (Red)	16.98%	
Yarding Distance:	Medium (800 ft)		Downhill Yarding: No
Logging System:	Cable: Small Tower <=40		Process: Manual Delimiting
Tree Size:	Small / Thinning 12in (130 Bft/tree), 12-17 logs/MBF		
Loads/Day:	4		Bd. Ft./Load: 3,500
Cost/MBF:	\$184.15		
Machines:			
	Log Loader (A)		
	Tower Yarder (Small)		
Combination#: 3	Douglas - Fir	36.22%	
	Western Hemlock / Fir	18.02%	
	Sitka Spruce	25.67%	
	Alder (Red)	42.43%	
Yarding Distance:	Medium (800 ft)		Downhill Yarding: Yes
Logging System:	Shovel		Process: Manual Delimiting
Tree Size:	Mature / Regen Cut (900 Bft/tree), 3-5 logs/MBF		
Loads/Day:	8		Bd. Ft./Load: 4,500
Cost/MBF:	\$64.49		
Machines:			
	Shovel Logger		
Combination#: 4	Douglas - Fir	16.65%	
	Western Hemlock / Fir	29.39%	
	Sitka Spruce	24.03%	
	Alder (Red)	12.30%	



Timber Sale Appraisal Logging Costs Cougar Monster Sale 341-03-75

"STEWARDSHIP IN FORESTRY"

Date: 5/12/03

Operating Seasons: 2.0

Profit & Risk: 20%

Project Costs: \$713,756

Other Costs (P/R): \$9,492

Slash Disposal: \$0

Other Costs: \$24,105

Miles of Road			
Dirt	Rock (Contractor)	Rock (State)	Paved
0.0	0.0	0.0	0.0

Road Maintenance: \$1.89

Hauling Costs

Species	\$/MBF	Trips/Day	MBF/Load
Douglas - Fir	\$0.00	3.0	4.5
Western Hemlock / Fir	\$0.00	3.0	3.5
Sitka Spruce	\$0.00	2.0	3.5
Alder (Red)	\$0.00	3.0	3.5

Local Pond Values

Date	Species	Grade	Value
5/12/03	Douglas - Fir	2S	\$530.00
5/12/03	Douglas - Fir	3S	\$505.00
5/12/03	Douglas - Fir	4S	\$455.00



"STEWARDSHIP IN FORESTRY"

Timber Sale Appraisal Logging Costs Breakdown Cougar Monster Sale 341-03-75

Costs	Douglas - Fir	Western Hemlock / Fir	Sitka Spruce	Alder (Red)
Logging	116.69	144.54	132.84	107.19
Road Maintenance	1.91	1.91	1.89	1.91
Fire Protection	0.75	0.75	0.75	0.75
Hauling	34.44	44.24	65.70	44.24
Other (P/R appl.)	1.32	1.32	1.32	1.32
Profit & Risk	31.02	38.55	40.50	31.08
Slash Disposal	0.00	0.00	0.00	0.00
Scaling	2.00	2.00	2.00	2.00
Other	3.35	3.35	3.35	3.35
Total	191.48	236.66	248.35	191.84

Amortization	0.00	0.00	0.00	0.00
Pond Value	516.45	336.20	354.43	515.00
Stumpage	324.97	99.54	106.08	323.16
Amortized	0.00	0.00	0.00	0.00



"STEWARDSHIP IN FORESTRY"

Timber Sale Appraisal Summary Cougar Monster Sale 341-03-75

Amortized

	Douglas - Fir	Western Hemlock / Fir	Sitka Spruce	Alder (Red)
MBF	0.00	0.00	0.00	0.00
Value	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00

Unamortized

	Douglas - Fir	Western Hemlock / Fir	Sitka Spruce	Alder (Red)
MBF	2,142.00	2,041.00	699.00	2,305.00
Value	324.97	99.54	106.08	323.16
Total	696,085.74	203,161.14	74,149.92	744,883.80

Gross Timber Sale Value

Recovery \$1,718,280.60

Prepared by: Dan Goody

Date: 5/12/03

District: Astoria

Phone: (503) 325-5451

Road Maintenance Cost Summary

Sale: Cougar Monster
Date: 10-Apr-03
By: Dan Goody

MBF: 7,187
\$\$/MBF: \$1.89

Type	Equipment/Rationale	Move-in Rate	Times	Hours	Rate	Cost
Progressive Operations Entries (1)	Grader	\$240	1	24	\$65	\$1,800
	Dump Truck	\$138	1	16	\$55	\$1,018
	FE Loader	\$370	1	16	\$40	\$1,010
Final Haul Road Maintenance Haul Route	Grader	\$240	1	48	\$65	\$3,360
	Dump Truck	\$138	1	24	\$55	\$1,458
	FE Loader	\$370	1	12	\$40	\$850
	Vibratory Roller	\$240	1	34	\$65	\$2,450
	Water Truck	\$138	1	24	\$55	\$1,458
	Labor			8	\$25	\$200
Total						\$13,604

Production Rates
Grader

Miles/day	Distance(miles)	Days
1.5	9.0	6.0

SURFACING		Subgrade prep:	Description	Stations/amount	x	Rate/sta/amt	Cost
			Grade, Shape and Ditch 16'	67.10	x	\$15.20	\$1,019.92
			Subgrade Compaction	67.10	x	\$12.50	\$838.75
					x		
					x		

ROAD SEGMENT	1A to 1D			POINT TO POINT		Sta. to Sta.	TOTAL VOLUME (CY)	Rate/ Sta./ amt.	Cost
Application	Rock Size and Type	Location	Depth of Rock (inches)	Volume (CY) per	Number of	0+00 to 11+40			
Base Rock	4"-0" Crushed		8	station	50	stations	11.40	\$3.41	\$1,944
Turnouts	4"-0" Crushed		8	turnout	22	turnouts	1	\$3.41	\$75
Junctions	4"-0" Crushed		8	junction	24	junctions	1	\$3.41	\$82
Junctions	1 1/2"-0" Crushed		N/A	junction	12	junctions	1	\$3.41	\$41
Landings	6"-0" Pit-run	1D	N/A	landing	60	landings	1	\$1.86	\$112
Total Rock for Road Segment:				1A to 1D			688		\$2,253

ROAD SEGMENT	1B to 1C			POINT TO POINT		Sta. to Sta.	TOTAL VOLUME (CY)	Rate/ Sta./ amt.	Cost
Application	Rock Size and Type	Location	Depth of Rock (inches)	Volume (CY) per	Number of	0+00 to 3+50			
Base Rock	4"-0" Crushed		8	station	50	stations	3.50	\$3.41	\$597
Junctions	4"-0" Crushed		8	junction	36	junctions	1	\$3.41	\$123
Landings	6"-0" Pit-run	1C	N/A	landing	60	landings	1	\$1.86	\$112
Total Rock for Road Segment:				1B to 1C			271		\$831

ROAD SEGMENT	2B to 2C			POINT TO POINT		Sta. to Sta.	TOTAL VOLUME (CY)	Rate/ Sta./ amt.	Cost
Application	Rock Size and Type	Location	Depth of Rock (inches)	Volume (CY) per	Number of	0+00 to 5+00			
Base Rock	4"-0" Crushed		8	station	50	stations	5.00	\$3.41	\$853
Junctions	4"-0" Crushed		8	junction	24	junctions	1	\$3.41	\$82
Junctions	1 1/2"-0" Crushed		N/A	junction	12	junctions	1	\$3.41	\$41
Turn-Arounds	4"-0" Crushed		N/A	TA	24	TAs	1	\$3.41	\$82
Energy Dissipator	24"-6" riprap	0+00	N/A	dissipator	12	dissipators	1	\$5.34	\$64
Landings	6"-0" Pit-run	2A, 2C	N/A	landing	60	landings	2	\$1.86	\$223
Total Rock for Road Segment:				2B to 2C			442		\$1,344

ROAD SEGMENT	2D to 2E			POINT TO POINT		Sta. to Sta.	TOTAL VOLUME (CY)	Rate/ Sta./ amt.	Cost
Application	Rock Size and Type	Location	Depth of Rock (inches)	Volume (CY) per	Number of	0+00 to 8+00			
Base Rock	4"-0" Crushed		8	station	50	stations	8.00	\$3.41	\$1,364
Turnouts	4"-0" Crushed		8	turnout	22	turnouts	1	\$3.41	\$75
Turn-Arounds	4"-0" Crushed		N/A	TA	24	TAs	1	\$3.41	\$82
Junctions	4"-0" Crushed		8	junction	24	junctions	1	\$3.41	\$82
Landings	6"-0" Pit-run	2E	N/A	landing	60	landings	1	\$1.86	\$112
Total Rock for Road Segment:				2D to 2E			530		\$1,714

ROAD SEGMENT	2F to 2J			POINT TO POINT		Sta. to Sta.	TOTAL VOLUME (CY)	Rate/ Sta./ amt.	Cost
Application	Rock Size and Type	Location	Depth of Rock (inches)	Volume (CY) per	Number of	0+00 to 14+30			
Base Rock	4"-0" Crushed		8	station	50	stations	14.30	\$3.41	\$2,438
Turnouts	4"-0" Crushed		8	turnout	22	turnouts	1	\$3.41	\$75
Junctions	4"-0" Crushed		8	junction	36	junctions	1	\$3.41	\$123
Landings	6"-0" Pit-run	2I, 2J	N/A	Landing	60	Landings	2	\$1.86	\$223
Total Rock for Road Segment:				2F to 2J			893		\$2,859

ROAD SEGMENT	2G to 2H			POINT TO POINT		Sta. to Sta.	TOTAL VOLUME (CY)	Rate/ Sta./ amt.	Cost
Application	Rock Size and Type	Location	Depth of Rock (inches)	Volume (CY) per	Number of	0+00 to 1+20			
Base Rock	4"-0" Crushed		8	station	50	stations	1.20	\$3.41	\$205
Junctions	4"-0" Crushed		8	junction	24	junctions	1	\$3.41	\$82
Landings	6"-0" Pit-run	2H	N/A	Landing	60	Landings	1	\$1.86	\$112
Total Rock for Road Segment:				2G to 2H			144		\$398

ROAD SEGMENT	2M to 2N			POINT TO POINT		Sta. to Sta.	TOTAL VOLUME (CY)	Rate/ Sta./ amt.	Cost
Application	Rock Size and Type	Location	Depth of Rock (inches)	Volume (CY) per	Number of	0+00 to 10+70			
Base Rock	4"-0" Crushed		8	station	50	stations	10.70	\$3.41	\$1,824
Turnouts	4"-0" Crushed		8	turnout	22	turnouts	1	\$3.41	\$75
Junctions	4"-0" Crushed		8	junction	36	junctions	1	\$3.41	\$123
Junctions	1 1/2"-0" Crushed		N/A	junction	12	junctions	1	\$3.41	\$41
Turn-Arounds	4"-0" Crushed		N/A	TA	24	TAs	1	\$3.41	\$82
Landings	6"-0" Pit-run	2N, 3A	N/A	Landing	60	Landings	2	\$1.86	\$223
Total Rock for Road Segment:				2M to 2N			749		\$2,368

ROAD SEGMENT	2O to 2P			POINT TO POINT		Sta. to Sta.	TOTAL VOLUME (CY)	Rate/ Sta./ amt.	Cost
Application	Rock Size and Type	Location	Depth of Rock (inches)	Volume (CY) per	Number of	0+00 to 9+60			
Base Rock	4"-0" Crushed		8	station	50	stations	9.60	\$3.41	\$1,637
Turnouts	4"-0" Crushed		8	turnout	22	turnouts	1	\$3.41	\$75
Junctions	4"-0" Crushed		8	junction	36	junctions	1	\$3.41	\$123
Junctions	1 1/2"-0" Crushed		N/A	junction	12	junctions	1	\$3.41	\$41
Turn-Arounds	4"-0" Crushed		N/A	TA	24	TAs	1	\$3.41	\$82
Landings	6"-0" Pit-run	2P	N/A	Landing	60	Landings	1	\$1.86	\$112
Total Rock for Road Segment:				2O to 2P			634		\$2,069

ROAD SEGMENT	2R to 2S			POINT TO POINT		Sta. to Sta.		TOTAL VOLUME (CY)	Rate/ Sta./ amt.	Cost					
	Rock Size and Type	Location	Depth of Rock (inches)	2R to 2S Volume (CY) per	0+00 to 3+40 Number of	station	stations								
Base Rock	4"-0" Crushed		8	station	50	stations	3.40	170	\$3.41	\$580					
Junctions	4"-0" Crushed		8	junction	24	junctions	1	24	\$3.41	\$82					
Landings	6"-0" Pit-run	2S	N/A	Landing	60	Landings	1	60	\$1.86	\$112					
Total Rock for Road Segment:								254			\$773				
Processing:															
Description								No.sta	Rate/sta	Cost					
Water, Process & Compact Crushed Rock (8" roads in 1 lift)								67.10	\$37.00	\$2,483					
SUB TOTAL FOR SURFACING															
								24"-6" fr	6"-0" gr	4"-0"	1 1/2"-0"	3/4"-0"	Total		
								12	720	3,825	48	4,605	4,605	\$18,952	
SPECIAL PROJECTS															
Description								Cost							
Energy Dissipator Placement								12 cy	X	\$1.00 per cy	\$12.00				
Develop pit-run rock								720 cy	X	\$1.75 per cy	\$1,260.00				
SUB TOTAL FOR SPECIAL PROJECTS															
										\$1,272					
GRAND TOTAL															
								Cost per Mile	\$33,661	\$42,778					

Compiled By: Dan Goody Date: 4/7/2003
x:\document\2004sales\Cougar Monster\Sale Prep\Projects\Wew Construction\Summary of Construction-Areas 1,2&3.xls

SURFACING		Subgrade prep:	Description	Stations/amount	x	Rate/ Sta./amt	Cost	
			Grade, Shape and Ditch 16'	116.90	x	\$15.20	\$1,776.88	
			Subgrade Compaction	116.90	x	\$12.50	\$1,461.25	
					x			
					x			
ROAD SEGMENT 4A to 4B								
Application	Rock Size and Type	Location	Depth of Rock (inches)	POINT TO POINT 4A to 4B Volume (CY) per	Sta. to Sta. 0+00 to 11+40 Number of	TOTAL VOLUME (CY)	Rate/ Sta./ amt.	Cost
Base Rock	4"-0" Crushed		10	station 63	stations 11.40	718	\$3.41	\$2,449
Surface Rock	1 1/2"-0" Crushed		3	station 19	stations 11.40	217	\$3.41	\$739
Turnouts	4"-0" Crushed		10	turnout 28	turnouts 1	28	\$3.41	\$95
Turnouts	1 1/2"-0" Crushed		3	turnout 10	turnouts 1	10	\$3.41	\$34
Junctions	4"-0" Crushed		10	junction 36	junctions 2	72	\$3.41	\$246
Junctions	1 1/2"-0" Crushed		3	junction 24	junctions 2	48	\$3.41	\$164
Curve Widening	4"-0" Crushed	8+20-10+20	10	station 12	stations 2	24	\$3.41	\$82
Curve Widening	1 1/2"-0" Crushed	8+20-10+20	3	station 6	stations 2	12	\$3.41	\$41
Energy Dissipator	24"-6" Riprap		N/A	dissipator 12	dissipators 1	12	\$5.34	\$64
Total Rock for Road Segment						1,141		\$3,913
ROAD SEGMENT 4C to 4D								
Application	Rock Size and Type	Location	Depth of Rock (inches)	POINT TO POINT 4C to 4D Volume (CY) per	Sta. to Sta. 0+00 to 3+40 Number of	TOTAL VOLUME (CY)	Rate/ Sta./ amt.	Cost
Base Rock	4"-0" Crushed		8	station 50	stations 3.40	170	\$3.41	\$580
Junctions	4"-0" Crushed		8	junction 36	junctions 1	36	\$3.41	\$123
Junctions	1 1/2"-0" Crushed		3	junction 12	junctions 1	12	\$3.41	\$41
Landings	6"-0" Pit-run	4D	N/A	landing 80	landings 1	80	\$1.86	\$149
Total Rock for Road Segment						298		\$892
ROAD SEGMENT 5A to 5B								
Application	Rock Size and Type	Location	Depth of Rock (inches)	POINT TO POINT 5A to 5B Volume (CY) per	Sta. to Sta. 0+00 to 28+00 Number of	TOTAL VOLUME (CY)	Rate/ Sta./ amt.	Cost
Base Rock	4"-0" Crushed		8	station 50	stations 28.00	1,400	\$3.41	\$4,774
Junctions	4"-0" Crushed		8	junction 36	junctions 2	72	\$3.41	\$246
Turnouts	4"-0" Crushed		8	turnout 22	turnouts 4	88	\$3.41	\$300
Turn-Arounds	4"-0" Crushed		N/A	TA 24	TAs 1	24	\$3.41	\$82
Curve Widening	4"-0" Crushed	2+50-4+50	8	station 12	stations 2	24	\$3.41	\$82
Energy Dissipator	24"-6" Riprap		N/A	dissipator 12	dissipators 1	12	\$5.34	\$64
Landings	6"-0" Pit-run	5B	N/A	Landing 80	Landings 1	80	\$1.86	\$149
Total Rock for Road Segment						1,700		\$5,696
ROAD SEGMENT 5C to 5D								
Application	Rock Size and Type	Location	Depth of Rock (inches)	POINT TO POINT 5C to 5D Volume (CY) per	Sta. to Sta. 0+00 to 9+10 Number of	TOTAL VOLUME (CY)	Rate/ Sta./ amt.	Cost
Base Rock	4"-0" Crushed		10	station 63	stations 9.10	573	\$3.41	\$1,955
Surface Rock	1 1/2"-0" Crushed		3	station 19	stations 9.10	173	\$3.41	\$590
Turn Outs	4"-0" Crushed		10	turnout 28	turnouts 2	56	\$3.41	\$191
Turnouts	1 1/2"-0" Crushed		3	turnout 10	turnouts 2	20	\$3.41	\$68
Junctions	4"-0" Crushed		10	junction 36	junctions 2	72	\$3.41	\$246
Junctions	1 1/2"-0" Crushed		3	junction 24	junctions 2	48	\$3.41	\$164
Energy Dissipator	24"-6" Riprap		N/A	dissipator 12	dissipators 1	12	\$5.34	\$64
Total Rock for Road Segment						954		\$3,277
ROAD SEGMENT 5E to 5F								
Application	Rock Size and Type	Location	Depth of Rock (inches)	POINT TO POINT 5E to 5F Volume (CY) per	Sta. to Sta. 0+00 to 23+50 Number of	TOTAL VOLUME (CY)	Rate/ Sta./ amt.	Cost
Base Rock	4"-0" Crushed		8	station 50	stations 23.50	1,175	\$3.41	\$4,007
Turnouts	4"-0" Crushed		8	turnout 22	turnouts 2	44	\$3.41	\$150
Turn-Arounds	4"-0" Crushed		N/A	TA 24	TAs 1	24	\$3.41	\$82
Junctions	4"-0" Crushed		8	junction 36	junctions 1	36	\$3.41	\$123
Junctions	1 1/2"-0" Crushed		N/A	junction 20	junctions 1	20	\$3.41	\$68
Curve Widening	4"-0" Crushed	6+50-8+50	8	station 12	stations 2	24	\$3.41	\$82
Landings	6"-0" Pit-run	5F	N/A	Landing 80	Landings 1	80	\$1.86	\$149
Total Rock for Road Segment						1,403		\$4,660
ROAD SEGMENT 5G to 5H								
Application	Rock Size and Type	Location	Depth of Rock (inches)	POINT TO POINT 5G to 5H Volume (CY) per	Sta. to Sta. 0+00 to 4+30 Number of	TOTAL VOLUME (CY)	Rate/ Sta./ amt.	Cost
Base Rock	4"-0" Crushed		8	station 50	stations 4.30	215	\$3.41	\$733
Turnouts	4"-0" Crushed		8	turnout 22	turnouts 1	22	\$3.41	\$75
Junctions	4"-0" Crushed		8	junction 30	junctions 1	30	\$3.41	\$102
Landings	6"-0" Pit-run	5H	N/A	Landing 80	Landings 1	80	\$1.86	\$149
Total Rock for Road Segment						347		\$1,059
ROAD SEGMENT 5J to 5K								
Application	Rock Size and Type	Location	Depth of Rock (inches)	POINT TO POINT 5J to 5K Volume (CY) per	Sta. to Sta. 0+00 to 7+60 Number of	TOTAL VOLUME (CY)	Rate/ Sta./ amt.	Cost
Base Rock	4"-0" Crushed		8	station 50	stations 7.60	380	\$3.41	\$1,296
Turnouts	4"-0" Crushed		8	turnout 22	turnouts 1	22	\$3.41	\$75
Junctions	4"-0" Crushed		8	junction 30	junctions 1	30	\$3.41	\$102
Turn-Arounds	4"-0" Crushed		N/A	TA 24	TAs 1	24	\$3.41	\$82
Landings	6"-0" Pit-run	5K	N/A	Landing 80	Landings 1	80	\$1.86	\$149
Total Rock for Road Segment						536		\$1,704
ROAD SEGMENT 5L to 5M								
Application	Rock Size and Type	Location	Depth of Rock (inches)	POINT TO POINT 5L to 5M Volume (CY) per	Sta. to Sta. 0+00 to 13+00 Number of	TOTAL VOLUME (CY)	Rate/ Sta./ amt.	Cost
Base Rock	4"-0" Crushed		8	station 50	stations 13.00	650	\$3.41	\$2,217
Turnouts	4"-0" Crushed		8	turnout 22	turnouts 1	22	\$3.41	\$75
Junctions	4"-0" Crushed		8	junction 30	junctions 1	30	\$3.41	\$102
Junctions	1 1/2"-0" Crushed		N/A	junction 20	junctions 1	20	\$3.41	\$68
Landings	6"-0" Pit-run	6+10. 5M	N/A	Landing 80	Landings 2	160	\$1.86	\$298
Total Rock for Road Segment						882		\$2,760

SURFACING		Stations/amount	x	Rate/sta/amt	Cost
Subgrade prep: Description					
Grade, Shape and Ditch 16'		62.20	x	\$15.20	\$945.44
Subgrade Compaction		62.20	x	\$12.50	\$777.50
			x		
			x		

ROAD SEGMENT	6A to 6B		POINT TO POINT		Sta. to Sta.	TOTAL VOLUME (CY)	Rate/ Sta./ amt.	Cost
Application	Rock Size and Type	Location	Depth of Rock (inches)	6A to 6B Volume (CY) per	Sta. to Sta. Number of			
Base Rock	4"-0" Crushed		8	station 50	0+00 to 34+80 stations 34.80	1,740	\$3.41	\$5,933
Turn Outs	4"-0" Crushed		8	turnout 22	turnouts 7	154	\$3.41	\$526
Turn Arounds	4"-0" Crushed		N/A	turnaround 24	turnarounds 1	24	\$3.41	\$82
Curve Widening	4"-0" Crushed	22+20 to 21+20	8	station 12	stations 1	12	\$3.41	\$41
Landings	6"-0" Pit-run	6B, 6E	N/A	landing 60	landings 2	120	\$1.86	\$223
Total Rock for Road Segment: 6A to 6B						2,050		\$6,805

ROAD SEGMENT	6C to 6D		POINT TO POINT		Sta. to Sta.	TOTAL VOLUME (CY)	Rate/ Sta./ amt.	Cost
Application	Rock Size and Type	Location	Depth of Rock (inches)	6C to 6D Volume (CY) per	Sta. to Sta. Number of			
Base Rock	4"-0" Crushed		8	station 50	0+00 to 1+20 stations 1.20	60	\$3.41	\$205
Junctions	4"-0" Crushed		8	junction 36	junctions 1	36	\$3.41	\$123
Landings	6"-0" Pit-run	6D	N/A	landing 60	landings 1	60	\$1.86	\$112
Total Rock for Road Segment: 6C to 6D						156		\$439

ROAD SEGMENT	7A to 7C		POINT TO POINT		Sta. to Sta.	TOTAL VOLUME (CY)	Rate/ Sta./ amt.	Cost
Application	Rock Size and Type	Location	Depth of Rock (inches)	7A to 7C Volume (CY) per	Sta. to Sta. Number of			
Base Rock	4"-0" Crushed		8	station 50	0+00 to 9+40 stations 9.40	470	\$3.41	\$1,603
Turn Outs	4"-0" Crushed		8	turnout 22	turnouts 1	22	\$3.41	\$75
Junctions	4"-0" Crushed		8	junction 36	junctions 1	36	\$3.41	\$123
Junctions	1 1/2"-0" Crushed		N/A	junction 12	junctions 1	12	\$3.41	\$41
Landings	6"-0" Pit-run	7B, 7C	N/A	landing 60	landings 2	120	\$1.86	\$223
Total Rock for Road Segment: 7A to 7C						660		\$2,065

ROAD SEGMENT	7D to 7F		POINT TO POINT		Sta. to Sta.	TOTAL VOLUME (CY)	Rate/ Sta./ amt.	Cost
Application	Rock Size and Type	Location	Depth of Rock (inches)	7D to 7F Volume (CY) per	Sta. to Sta. Number of			
Base Rock	4"-0" Crushed		8	station 50	0+00 to 8+60 stations 8.60	430	\$3.41	\$1,466
Junctions	4"-0" Crushed		8	junction 36	junctions 1	36	\$3.41	\$123
Turn Outs	4"-0" Crushed		8	turnout 22	turnouts 1	22	\$3.41	\$75
Landings	6"-0" Pit-run	7E, 7F	N/A	landing 60	landings 2	120	\$1.86	\$223
Total Rock for Road Segment: 7D to 7F						608		\$1,887

ROAD SEGMENT	7G to 7H		POINT TO POINT		Sta. to Sta.	TOTAL VOLUME (CY)	Rate/ Sta./ amt.	Cost
Application	Rock Size and Type	Location	Depth of Rock (inches)	7G to 7H Volume (CY) per	Sta. to Sta. Number of			
Base Rock	4"-0" Crushed		8	station 50	0+00 to 8+20 stations 8.20	410	\$3.41	\$1,398
Turn Outs	4"-0" Crushed		8	turnout 22	turnouts 1	22	\$3.41	\$75
Junctions	4"-0" Crushed		N/A	junction 36	junctions 1	36	\$3.41	\$123
Junctions	1 1/2"-0" Crushed		N/A	junction 12	junctions 1	12	\$3.41	\$41
Turn-Arounds	4"-0" Crushed		N/A	TA 24	TAs 1	24	\$3.41	\$82
Curve Widening	4"-0" Crushed	4+05 to 5+05	8	station 12	stations 1	12	\$3.41	\$41
Landings	6"-0" Pit-run	7H	N/A	Landing 60	Landings 1	60	\$1.86	\$112
Total Rock for Road Segment: 7G to 7H						576		\$1,871

Processing:	Description	No.sta	Rate/sta	Cost
	Water, Process & Compact Crushed Rock:	62.20	\$37.00	\$2,301
	(8' roads in 1 lift)			

SUB TOTAL FOR SURFACING		24"-6" pit	6"-0" pit	4"-0"	1 1/2"-0"	3/4"-0"	Total	
		480	3,546	24			4,050	4,050
								\$17,091

SPECIAL PROJECTS		Description	Cost
	Develop pit-run rock	480 cy X \$1.75 per cy	\$840.00
SUB TOTAL FOR SPECIAL PROJECTS			\$840

GRAND TOTAL	Cost per Mile	\$31,833	\$37,501
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Cougar Monster

Culvert Replacements I1 to I2

Location/Description	C325 #1	Skidder	Hand Compactor	Truck	Labor	Seed & Straw Mulch	Total
47+00 Fill Reconstruction/Culvert Replacement 24" X 50' CMP 14G Armor Fill Slopes	20 hr	4 hr	6 hr	16 hr	10 hr	8 bales	
47+50 Fill Reconstruction/Culvert Replacement 24" X 40' CMP 14G Armor Fill Slopes	12 hr	3 hr	6 hr	8 hr	8 hr	6 bales	
58+10 Fill Reconstruction/Culvert Replacement 36" x 60' CMP 14G Free-Draining Fill Armor Fill Slopes	30 hr	4 hr	8 hr	12 hr	10 hr	10 bales	
60+70 Trim Inlet of pipe					1 hr		
Haul all removed culverts to an approved refuse site.				3 hr	3 hr		
Total	62 hr	11 hr	20 hr	39 hr	32 hr	24 bales	
Rate	\$115 /hr	\$60 /hr	\$6 /hr	\$57 /hr	\$25 /hr	\$5.60 /bale*	
Cost	\$7,130	\$660	\$120	\$2,223	\$800	\$134.40	\$11,067

*Includes costs for grass seed.
Excavator costs include riprap placement for fill armor.

SURFACING		Stations/amount	x	Rate/ Sta/amt	Cost
Subgrade prep:	Description	138.10	x	\$15.20	\$2,099.12
	Grade, Shape and Ditch 16'	138.10	x	\$12.50	\$1,726.25
	Subgrade Compaction		x		
			x		

ROAD SEGMENT	LV1 to LV2	POINT TO POINT		Sta. to Sta.	TOTAL VOLUME (CY)	Rate/ Sta/ amt	Cost
Application	Rock Size and Type	Location	Depth of Rock (Inches)	LV1 to LV2 Volume (CY) per	0+00 to 124+10 Number of		
Surface Rock	1 1/2"-0" Crushed		4	station 25	stations 124.10	3,103	\$3.41 \$10,580
Turnouts	1 1/2"-0" Crushed		4	turnout 12	turnouts 16	192	\$3.41 \$655
Junctions	1 1/2"-0" Crushed		N/A	junction 24	junctions 10	240	\$3.41 \$818
Leveling Rock	1 1/2"-0" Crushed		N/A			500	\$3.41 \$1,705
Culvert Backfill	1 1/2"-0" Crushed	1+60				20	\$3.41 \$68
Energy Dissipator	24"-6" Riprap	1+60				12	\$5.34 \$64
Culvert Backfill	1 1/2"-0" Crushed	4+20				20	\$3.41 \$68
Energy Dissipator	24"-6" Riprap	4+20				12	\$5.34 \$64
Energy Dissipator	24"-6" Riprap	7+90				12	\$5.34 \$64
Armor Slope	24"-6" Riprap	10+60				60	\$5.34 \$327
Culvert Backfill	1 1/2"-0" Crushed	16+90				20	\$3.41 \$68
Energy Dissipator	24"-6" Riprap	16+90				12	\$5.34 \$64
Culvert Backfill	1 1/2"-0" Crushed	26+40				20	\$3.41 \$68
Energy Dissipator	24"-6" Riprap	26+40				12	\$5.34 \$64
Culvert Bedding/Backfill	1 1/2"-0" Crushed	63+90	N/A			40	\$3.41 \$136
Energy Dissipator	24"-6" Riprap	63+90	N/A			12	\$5.34 \$64
Fill Armor	24"-6" Riprap	63+90	N/A			60	\$5.34 \$320
Base Rock Restoration	4"-0" Crushed	63+90	10	station 63	stations 1.00	63	\$3.41 \$215
Culvert Bedding	1 1/2"-0" Crushed	66+60				20	\$3.41 \$68
Culvert Bedding/Backfill	1 1/2"-0" Crushed	95+00	N/A			60	\$3.41 \$205
Fill Armor	24"-6" Riprap	95+00	N/A			60	\$5.34 \$320
Base Rock Restoration	4"-0" Crushed	95+00	10	station 63	stations 1.00	63	\$3.41 \$215
Culvert Backfill	1 1/2"-0" Crushed	110+90				20	\$3.41 \$68

Total Rock for Road Segment: LV1 to LV2 4,653

\$16,390

ROAD SEGMENT	LV3 to LV4	POINT TO POINT		Sta. to Sta.	TOTAL VOLUME (CY)	Rate/ Sta/ amt	Cost
Application	Rock Size and Type	Location	Depth of Rock (Inches)	LV3 to LV4 Volume (CY) per	0+00 to 14+00 Number of		
Surface Rock	1 1/2"-0" Crushed		3	station 13	stations 14.00	266	\$3.41 \$907
Turnouts	1 1/2"-0" Crushed		3	turnout 10	turnouts 4	40	\$3.41 \$136
Leveling Rock	1 1/2"-0" Crushed		N/A			70	\$3.41 \$239
Junctions	1 1/2"-0" Crushed		N/A	junction 12	junctions 1	12	\$3.41 \$41
Culvert Bedding/Backfill	1 1/2"-0" Crushed	0+00	N/A			60	\$3.41 \$205
Energy Dissipator	24"-6" Riprap	0+00	N/A			24	\$5.34 \$128
Fill Armor	24"-6" Riprap	0+00	N/A			90	\$5.34 \$481
Base Rock Restoration	4"-0" Crushed	0+00	10	station 63	stations 1.50	95	\$3.41 \$322

Total Rock for Road Segment: LV3 to LV4 657

\$2,459

ROAD SEGMENT	LV5	POINT TO POINT		Sta. to Sta.	TOTAL VOLUME (CY)	Rate/ Sta/ amt	Cost
Application	Rock Size and Type	Location	Depth of Rock (Inches)	LV5 Volume (CY) per	Number of		
Culvert Bedding/Backfill	1 1/2"-0" Crushed		N/A			70	\$3.41 \$239
Energy Dissipator	24"-6" Riprap		N/A			24	\$5.34 \$128
Fill Armor	24"-6" Riprap		N/A			140	\$5.34 \$748
Base Rock Restoration	4"-0" Crushed		10	station 63	stations 1.50	95	\$3.41 \$322
Surface Rock Restoration	1 1/2"-0" Crushed		3	station 19	stations 1.50	29	\$3.41 \$97

Total Rock for Road Segment: LV5 357

\$1,534

ROAD SEGMENT	LV6	POINT TO POINT		Sta. to Sta.	TOTAL VOLUME (CY)	Rate/ Sta/ amt	Cost
Application	Rock Size and Type	Location	Depth of Rock (Inches)	LV6 Volume (CY) per	Number of		
Culvert Bedding/Backfill	1 1/2"-0" Crushed		N/A			100	\$1.57 \$157
Energy Dissipator	24"-6" Riprap		N/A			24	\$3.23 \$78
Fill Armor	24"-6" Riprap		N/A			50	\$3.23 \$162
Base Rock Restoration	4"-0" Crushed		10	station 63	stations 1.00	63	\$1.57 \$99
Surface Rock Restoration	1 1/2"-0" Crushed		3	station 19	stations 1.00	19	\$1.57 \$30

Total Rock for Road Segment: LV6 256

\$525

Processing:	Description	No. Sta	Rate/ Sta	Cost
	Water, Process & Compact Crushed Rock:	138.10	\$37.00	\$5,110

SUB TOTAL FOR SURFACING 624 378 4,920 5,922 5,922 \$29,842

SPECIAL PROJECTS		Description	Cost
		Fabric on all fills prior to base rock	Mirafi 600X Fabric 6.00 @a. X110% \$1.25 \$825.00

SUB TOTAL FOR SPECIAL PROJECTS \$825

GRAND TOTAL LV6 Costs \$11,174 Cost per Mile \$35,919 \$93,948

Compiled By: Dan Goody Date: 4/8/2003

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Cougar Monster

LV1 - LV2, LV3, LV5 and LV6

Location/Description	C325 #1	C325 #2	Skidder	Hand Compactor	Truck	Labor	Seed & Straw Mulch	Total
LV1-LV2 Culvert Replacement/ fill reconstruction 63+90 of Flagpole Ridge Road	24 hr	12 hr	8 hr	12 hr	8 hr	36 hr	12 bales	
LV1-LV2 Type F Culvert Replacement/ fill reconstruction 95+00 Flagpole Ridge Road	36 hr	0 hr	12 hr	16 hr	16 hr	40 hr	4 bales	
Point LV3 Culvert Replacement/ fill reconstruction Culvert on Property Line on Hopinscratchit Road	40 hr	16 hr	16 hr	16 hr	36 hr	24 hr	15 bales	
Point LV5 Culvert Replacement/ fill reconstruction Cougar Mtn. Road	50 hr	24 hr	16 hr	16 hr	36 hr	24 hr	20 bales	
Haul all removed culverts to an approved refuse site.					3 hr			
Total	150 hrs	52 hrs	52 hrs	60 hrs	99 hrs	124 hrs	51 bales	
Rate	\$115 /hr	\$115 /hr	\$60 /hr	\$6 /hr	\$57 /hr	\$25 /hr	\$4.75 / seed	
Cost	\$17,250	\$5,980	\$3,120	\$360	\$5,643	\$3,100	\$242.25 & bale	\$35,695

Munce Road Point LV6

Location/Description	C325 #1	Loader	Skidder	Hand Compactor	Truck	Labor	Seed & Straw Mulch	Total
LV6 Type F Culvert Replacement/ fill reconstruction Munce Road	24 hr	8 hr	8 hr	8 hr	12 hr	36 hr	8 bales	
Total	24 hrs	8 hrs	8 hrs	8 hrs	12 hrs	36 hrs	8 bales	
Rate	\$115 /hr	\$60 /hr	\$60 /hr	\$6 /hr	\$57 /hr	\$25 /hr	\$4.75 / seed	
Cost	\$2,760	\$480	\$480	\$48	\$684	\$900	\$38.00 & bale	\$5,390

* Rock development and haul for fill armor and energy dissipater included in estimate. Rock to be acquired from Munce Road Rock pit.

De-Watering Pump

87 hrs	\$14 /hr		\$1,218
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TOTAL INSTALLATION COSTS

\$42,303

CRUSHED ROCK COST

SALE NAME: Cougar Monster
 PROJECT: Road Rock
 QUARRY: Flagpole Ridge

ROCK TYPE: Crushed

DATE: 3/31/2003
 BY: D. Goody

Road Segment	Stations	Cubic Yards	ONE WAY HAUL IN MILES							Total Haul	
			40 MPH	35 MPH	25 MPH	20 MPH	15 MPH	10 MPH	5 MPH		
1A-1D	11.40	628			3	1.25	0.10	0.10	0.05	4.50	
1B-1C	3.50	221			3	1.25	0.15	0.10	0.05	4.55	
2B-2C	5.00	310			3	1.35	0.10	0.10	0.15	4.70	
2D-2E	8.00	470			3	1.35	0.20	0.10	0.10	4.75	
2F-2J	14.30	773			3	1.40	0.30	0.10	0.10	4.90	
2G-2H	1.20	84			3	1.40	0.35	0.10	0.10	4.95	
2M-2N	10.70	629			3	1.40	0.35	0.10	0.15	5.00	
2O-2P	9.60	574			3	1.45	0.40	0.15	0.20	5.20	
2R-2S	3.40	194			3	1.45	0.45	0.10	0.15	5.15	
4A-4B	11.40	1,129			3	1.60	0.50	0.10	0.10	5.30	
4C-4D	3.40	218			3	1.60	0.50	0.10	0.13	5.33	
5A-5B	28.00	1,608			3	1.75	0.40	0.25	0.15	5.55	
5C-5D	9.10	942			3	1.80	0.40	0.25	0.15	5.60	
5E-5F	23.50	1,323			3	1.85	0.45	0.20	0.15	5.65	
5G-5H	4.30	267			3	1.85	0.45	0.20	0.15	5.65	
5J-5K	7.60	456			3	1.85	0.45	0.20	0.15	5.65	
5L-5M	13.00	722			3	1.85	0.50	0.20	0.15	5.70	
I2-AA	14.40	1,333			3	1.80	0.35	0.20	0.10	5.45	
S1-S2	2.20	240			3	1.60	0.50	0.10	0.05	5.25	
6A-6B	34.80	1,930			4	1.75	0.40	0.15	0.05	6.35	
6C-6D	1.20	96			4	1.75	0.40	0.10	0.05	6.30	
7A-7C	9.40	540			4	1.60	0.40	0.15	0.10	6.25	
7D-7F	8.60	488			4	1.60	0.40	0.15	0.15	6.30	
7G-7H	8.20	516			4	1.65	0.40	0.20	0.15	6.40	
I1-I2	66.50	3,443			3	1.75	0.45	0.20	0.10	5.50	
I3-5A	19.70	913			3	1.80	0.40	0.20	0.10	5.50	
I7-6A	10.00	486			4	1.65	0.45	0.10	0.15	6.35	
I8-I10	23.50	1,153			4	1.65	0.40	0.10	0.15	6.30	
5D-5L	13.70	601			3	1.85	0.50	0.10	0.15	5.60	
I9-2R	6.35	151			3	1.45	0.40	0.10	0.10	5.05	
LV1-LV2	124.10	4,441			1	0.75	0.85		0.10	2.70	
LV3-LV4	14.00	543			4	2.00	0.40	0.10	0.15	6.65	
LV5	1.00	193			3	1.25	0.10	0.10	0.05	4.50	
TOTAL		295.65									
			27,615								
CUBIC YARD WEIGHTED HAUL		STA./NO.	CU. YD.			2.89	1.53	0.47	0.14	0.11	AVERAGE HAUL 5.14
Average Round Trip Distance (miles)										10.28	

ROCK HAUL:

Truck type: D20 No. trucks: 6
 Delay min.: 8 Efficiency: 85%

Truck type: D12 No. trucks: 4
 Delay min.: 6 Efficiency: 85%

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

Ave haul: \$2.76 /cy
 Load: \$0.25 /cy
 Spread: \$0.40 /cy

Production: cy/day = 1,828

CRUSHED ROCK HAUL COSTS 27,615 cy @ **\$3.41 /cy**

Cougar Monster Road Brushing Costs

Project No. 4

MODERATE BRUSHING

Point to Point
I1 to I2
I3 to 5A
5D to 5L

Mileage
1.26
0.37
0.27

Total 1.90

Rate per mile = \$1,100.00 at 1.90 miles = \$2,084.50

HEAVY BRUSHING

Point to Point
I8 to I10

Mileage
0.45

Total 0.45

Rate per mile = \$1,300.00 at 0.45 miles = \$585.00

Mobilization = \$225.00 \$225.00

Totals 2.35 miles = \$2,895

**COUGAR MONSTER
PROJECT NO. 5
ROAD VACATING COSTS**

Sta./Pt.	Description	C325	D-7 Cat	Labor	Dump Truck	Seed & Mulch	Totals
V1-V2 0+00 to 7+90	Sidecast Pullback	18 hr	8 hr	7 hr	hr	35 bales	
V3-V4 9+50 & 15+85	Remove Surface Culverts	5 hr	hr	1 hr	hr	2 bales	
V3-V4 25+50	Remove Surface Culvert	2.5 hr	hr	0.5 hr	hr	3 bales	
V3-V4 0+00 to 25+50	Construct Waterbars/ Block @ Pt.0+00	4 hr	2 hr	1 hr	hr	5 bales	
5D to AA 0+00 to 15+80	Remove 4 Surface Culverts Block @ Pt.0+00 & Pt.15+80	14 hr	hr	5 hr	hr	30 bales	
	Disposal of Old Culverts	Load 2 hr	hr	hr	3 hr		
Total		45.5 hr	10 hr	14.5 hr	3 hr	75 bales	
Rate		\$115.00 /hr	\$90.00 /hr	\$25.00 /hr	\$57.00 /hr	\$5.60 /bales	
Cost		\$5,232.50	\$900.00	\$362.50	\$171.00	\$420.00	\$7,086.00

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SUMMARY OF ROCK DEVELOPMENT AND CRUSHING COSTS

PROJECT NO. 7

Cougar Monster Timber Sale

Quarry: Flagpole Ridge
 Location: NW1/4, Sec. 3, 4N, 8W
 County: Clatsop
 By: F. Lertora
 Date: 4/7/2003

Swell: _____
 Shrink: 16%
 Reject: 3%

ROCK SIZE	GRADATION	STOCKPILE CU. YDS.	TRUCK MEAS CU. YDS.	TOTAL CU. YDS.
3/4"-0"	CR	5,000		5,800
1 1/2"-0"	CR	5,000	12,404	18,204
4"-0"	CR	10,522	15,109	27,315
6"-0"	PR			
24"-6"	RR		1,066	1,066
TOTAL CUBIC YARDS OF ROCK:		20,522	28,579	52,385

1) MOBILIZATION & SET UP:

EQUIPMENT MOBILIZATION	DISTANCE IN MILES	DIST. FACTOR	BASE RATE	COST
3 Stage Crusher	75	1.40	\$1,980	\$2,772
Screening Plants (2)	75	1.40	\$800	\$1,120
D8 Cat	75	1.40	\$500	\$700
Loader	75	1.40	\$370	\$518
Drill & Compressor	75	1.40	\$600	\$840
Powder	75	1.40	\$240	\$336
3 Dump Trucks	75	1.40	\$225	\$315
Excavator	75	1.40	\$500	\$700
SUB TOTAL FOR MOBILIZATION				\$7,301

EQUIPMENT SET UP	TIMES	RATE	COST
3 Stage Crusher	1	\$2,260	\$2,260
Screening Plants (2)	1	\$380	\$380
Change Gradation	2	\$350	\$700
SUB TOTAL FOR SET UP COSTS			\$3,340

TOTAL MOBILIZATION & SET UP COSTS \$10,641

2) CLEARING & GRUBBING

DESCRIPTION	QUANTITY	UNIT	RATE	COST

TOTAL CLEARING & GRUBBING COSTS

3) EXCAVATION

MATERIAL DESCRIPTION	QUANTITY	UNIT	RATE	COST

TOTAL EXCAVATION COSTS

4) DEVELOP ROCK

ROCK SUMMARY			METHOD	%	QUANTITY	RATE	COST
Type	Cu. yd. Vol.	Weight	Ripping			\$1.70	
crushed	51,319	98%	Drill & shoot	100%	53,924	\$1.90	\$102,456
pit run	0	0	Oversize red	1%	513	\$4.50	\$2,309
rip rap	1,066	2%	Other				
Total	52,385						
reject	1,540						

TOTAL ROCK DEVELOPMENT COSTS

\$104,765

5) CALIBRATION & TESTING

DESCRIPTION	NO.	\$/TEST	COST
Calibrate	3	\$365	\$1,095
Calibrate			
Test	27	\$45	\$1,215
Test			

TOTAL CALIBRATION & TESTING COSTS

\$2,310

6) FEEDING & LOADING

DESCRIPTION	CU. YD. QUANTITY	COST CU. YD.	TOTAL COST
Dig & Feed Rock	52,858	\$0.58	\$30,658

TOTAL FEEDING & LOADING COSTS

\$30,658

7) ROCK CRUSHING

ROCK SIZE	ROCK TYPE	CU. YD. QUANTITY	CRUSHER TYPE	HOURLY PRODUCTIO	RATE CU. YD.	TOTAL COST
3/4"-0"	crushed	5,800	3 stage w/s	110	\$2.95	\$17,136
1 1/2"-0"	crushed	18,204	3 stage w/s	120	\$2.71	\$49,303
4"-0"	crushed	27,315	2 stage w/s	140	\$2.07	\$56,580

TOTAL ROCK CRUSHING COSTS

\$123,019

8) STOCKPILING

STOCKPILE PREPARATION OR CONST	COST
Construct 230' x 230' Stockpile Site/Floor	\$2,106
(includes stockpile floor rock)	
(See Footnote)	
SUB TOTAL	\$2,106

HAUL & STOCKPILE	SIZE	# of TRUCKS 20cy - 10cy	CU. YDS.	RATE	COST
STOCKPILE LOCATION					
Cougar Mountain	3/4"-0"	6 - 1	5,800	\$3.41	\$19,778
Cougar Mountain	1-1/2"-0"	6 - 1	5,800	\$3.41	\$19,778
Cougar Mountain & Flagpole	4"-0"	6 - 1	12,206	\$3.41	\$41,621
Shape Stockpiles					\$1,500
SUB TOTAL					\$82,677

TOTAL STOCKPILING COSTS **\$84,783**

9) MISCELLANEOUS COSTS

DESCRIPTION	COST
Use front end loader to waste reject material at the waste area.	\$1,155
\$0.75/CY 1,540 CY	
Final Quarry Dev., Access Road Const., Waterbarring, Drainage, Block Quarry Access	\$2,000

TOTAL MISCELLANEOUS COSTS **\$3,155**

10) GRAND TOTAL: **\$359,330**

\$/Cubic Yard \$6.86

Footnotes:

Construct/Reconstruct Stockpile Floor

Equipment	Hours	Rate	Total
Dozer	8	\$93.00	\$744.00
Compactor	8	\$66.00	\$528.00
Grader	4	\$71.00	\$284.00
Excavator	5	\$110.00	\$550.00

\$2,106.00

Total Construct Stockpile Floor \$2,106.00

Costs for rocking floor including in road construction costs.

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

Inc. PR Dev.,
Load, Haul

Rock for stockpile floor is pit run rock from the Cougar Mountain Quarry
Use excavator to sort & pile wood and slash to facilitate burning

Project Work Road Maintenance Cost Summary

Sale: Cougar Monster
Date: 31-Mar-03
By: D. Goody

Type	Equipment/Rationale	Move-in Rate	Times	Hours	Rate	Cost
Progressive Operations Entries (1)	Grader	\$540	1	16	\$65	\$1,580
	Dump Truck	\$114	1	8	\$55	\$554
	FE Loader	\$520	1	8	\$40	\$840
Final Haul Road Maintenance Haul Route	Grader	\$540	1	24	\$65	\$2,100
	Dump Truck	\$114	1	16	\$55	\$994
	FE Loader	\$520	1	8	\$40	\$840
	Vibratory Roller	\$540	1	18	\$65	\$1,710
	Water Truck	\$132	1	16	\$55	\$1,012
	Labor			8	\$25	\$200
Total						\$9,830

Production Rates
Grader

Miles/day	Distance(miles)	Days
1.5	4.0	2.7

**Cougar Monster
FY 2000
TIMBER CRUISE REPORT**

1. Sale Area Location: All sale areas are within Township 4 North, Range 8 West, W.M., Clatsop County, Oregon. Area 1 – Portions of S ½ NW ¼ Section 11; Areas 2 and 3 – Portions of the S ½ Section 11 and SE ¼ Section 10; Area 4 – Portions of NW ¼ Section 14; Area 5 – Portions of the SW ¼ Section 13 and portions of the E ½ Section 14; Area 6 – Portions of S ¼ of Section 14 and SE ¼ of Section 15; Area 7 – Portions of SE ¼ Section 15; Area 8 (R/W) – within sale areas 1-7 above. Timber sale areas 1-7 are posted with ODF “Timber Sale Boundary” signs, pink ribbon, and blue paint. Area 8 R/W is posted with ODF “Right-of-Way Boundary” signs

2. Fund Distribution: **Fund:** BOF (82%) **Tax Code:** 8-01 (100%)
 Fund: CSL (18%)
 Fund: LCR Section 13, T4N, R8W = \$7,832.45
 LCR Section 14, T4N, R8W = \$4,307.85

3. Sale Acreage by Area:

AREA	TREATMENT	GROSS ACRES	ACREAGE ADJUST.	NET ACRES	ACREAGE METHOD	CLOSURE
1	Partial Cut	26.4	Road – 0.5 R/W – 1.5 Buffer – 0.3	24.1	Traverse	1:161
2	Partial Cut	164.6	Roads - 7.5 R/W - 5.0	152.1	Ortho	N.A.
3	Regen. Har.	12.9	None	12.9	Traverse	Unknown
4	Regen. Har.	70.4	GTRA – 3.3	67.1	GPS	N.A.
5	Regen. Har.	92.5	Buffers – 5.9 GTRA – 1.0	85.6	GPS	N.A.
6a	Partial Cut	30.2	R/W – 3.2	27.0	GPS/Ortho	N.A.
6b	Partial Cut	18.0	None	18.0	Ortho	N.A.
7	Partial Cut	44.2	Road – 2.2 R/W – 2.7	39.3	Traverse	1:134
8	R/W Inside Partial Cuts	None	R/W +12.4	12.4	Road Design Calcs.	N.A.
Total Sale		459.2	-20.7	438.5		N.A.

“Ortho” means boundaries were located on aerial photos, transferred in 1994 orthophotography, then digitized on the GIS base map, and acres calculated. “GPS” means boundaries were located in the field with a Global Positioning System unit, differentially corrected, then digitized on the GIS base map. “Traverse” means the boundaries were field surveyed with compass and tape or laser tape, and acreage calculated from the closed traverse. “Road design calcs.” means that clearing widths and road lengths were used to determine R/W acreages.

4. Cruisers and Cruise Dates: Areas 1, 2, and 7 (partial cuts, including R/W’s inside these areas) were cruised in June, 1999 by Tom Scoggins, Ed Holloran, John Tillotson, Steve Kendall, Chuck Day, and Becky Mittner. Areas 3, 4, and 5 (regeneration harvest areas) were cruised in April, 1999 by Tom Scoggins, Ed Holloran, John Tillotson, Steve Kendall, Steve

Wilson, Ty Williams, Becky Mittner, and Meg Anderson. Areas 6a and 6b (partial cuts) were cruised by Tom Scoggins and Kraig Kirkpatrick in April, 2003.

5. Cruise Method and Computation: All cruises used Corvallis MicroTechnology (CMT) 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. Because a fixed plot cruise method was used in the 3 thinning areas (1, 2, and 7) and “count plots” were used, much of the Super A.C.E. reports needed to be adjusted for the information gathered in the count plots, which the program does not utilize. Additionally, since Area 6b was a marked partial cut, with actual tree counts for take and leave trees, the VP cruise data was adjusted by the actual tree counts and recalculated to produce the final report for Area 6. These adjustments were all made by Tom Scoggins.

<u>AREA</u>	<u>CRUISE PROJECT</u>	<u>CRUISE TYPES</u>
1, 2, & 7	Thinnings-Total Stand	*4N8W 11,15-0001,0002,0007
1, 2, & 7	Thinnings-Take Trees	*4N8W 11,15-A1T, A2T, A7T
1, 2, & 7	Thinnings-Leave Trees	*4N8W 11,15-A1L, A2L, A7L
3, 4, & 5	Regen. Harvest Units	4N8W 14-0003,0004,0005
6a & 6b	Partial cuts in Area 6	4N8W 14-006A, 006B
8 (R/W)	R/W Within PC Area 6	4N8W 14-RW6A
8 (R/W)	R/W Within Thinnings	*4N8W 11,15-0001,0002,0007

*Grade plots only. Does not reflect adjustments made for count plot data.

6. Timber Description: Areas 1, 2, and 7 (the thinning areas) are all mixed conifer stands, 53 to 62 years old. None of these stands has been previously thinned. Average diameter is about 15 inches and stocking varies from 200 to 240 merchantable trees per acre, averaging 210. Basal area of merchantable trees averages 278, with hemlock and spruce being the dominant species on Areas I and II, and Douglas-fir dominating Area VII. Volumes to remove in these thinnings averages 10.8 MBF, while retaining residual basal areas of 170 square feet per acre in Area I, 150 square feet per acre in Area II, and 160 square feet per acre in Area VII. Trees to be removed average about 13 inches, dbh, and 47 feet in merchantable height.

Areas 3, 4, and 5 (the regeneration harvest areas) are mixed conifer-hardwood stands, 54 to 108 years old. Average diameter of the conifers (which comprise about 53% of the tree stocking) is about 18 inches, with merchantable height averaging about 67 feet. Alder, which makes up the remainder of the stocking, averages about 15 inches dbh and 44 feet of merchantable height. Volume to be removed averages about 10.6 MBF of conifer and 9.6 MBF of alder per acre. This does not include an estimated 5 trees and 2 MBF per acre of “wildlife trees,” which are not to be cut.

Area 6 (a partial cut area) is divided into Areas 6a and 6b. Area 6a is an “automark” partial cut, leaving 80-100 square feet of the biggest and best conifers. All hardwoods are to be cut. Alder makes up about 1/3 of the basal area of trees to be removed, and averages about 16” dbh and 7.0 MBF per acre. Conifers make up the remaining 2/3 of the basal area, average about 15” dbh, and 18.4 MBF per acre.

Area 6b is a marked partial cut, with the leave trees, of all species, marked with blue paint. Conifers make up about 80% of the basal area to be removed, range from 11” to 40” dbh, averaging about 25” dbh, and 16.0 MBF per acre. Alder makes up the other 20% of the basal area to be removed, averages about 17” dbh, and 2.1 MBF per acre.

Area 8 R/W within the three thinning areas and one partial cut area is comprised of 12.4 acres which represent the species, size, and stocking of the thinning areas.

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

Sale Areas	Target CV	Target SE%	Actual CV	Actual SE%
Thinnings 1, 2, & 7	40%	12%	63%	12.7%
Partial Cut Area 6	60%	12%	55%	10.8%
Clearcuts 3, 4, & 5	75%	12%	76%	12.1%
Combined Cruise Areas	55%	10%	---	7.9%*

* Combined SE% was determined using the formula: $SE\% = \frac{\sqrt{\sum (SE)^2}}{\sum \text{Stratum Volumes}} (100)$

8. **Volumes by Species and Log Grades for All Sale Areas by MBF:** See "Species, Sort, Grade, Length % Type Reports" attached, of the thinning, partial cut, and clearcut areas combined. Volumes do not include "ingrowth." The majority of defect and breakage was culled out during the cruise.

Species	DBH	Net MBF	2 Saw	3 Saw	4 Saw	D & B	% Sp.
Douglas-fir	13-24"	2,142	1,221	801	120	101	30
Hemlock	12-22"	2,041	929	778	334	30	28
Spruce	10-16"	699	319	288	92	5	10
Alder	14-16"	2,305		1,640	665	104	32
Totals		7,187	2,469	3,507	1,211	240	100

9. **Approvals:**

Prepared by: Tom Scoggins

Date: August 13, 1999

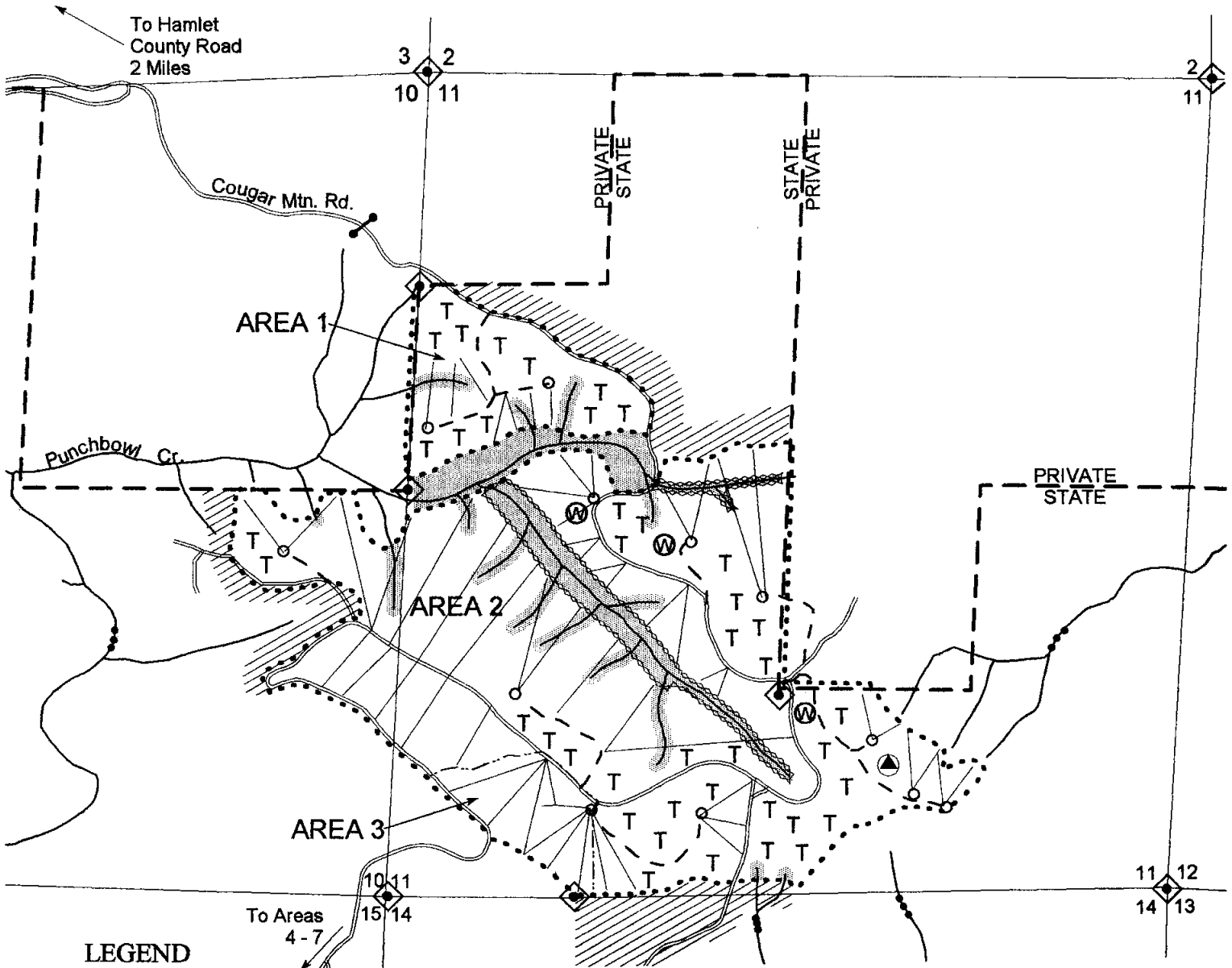
Revised by: Tom Scoggins

Date: April 3, 2003

Approved by: *Dan Goeh*
District Cruise Specialist

Date: 4/15/03

10. **Attachments:** Summary Volume Reports (2)
Species, Sort, Grade Reports (9)
Area 6b Adjusted Volume by Grade (1)
Statistics-Stand Summary Reports (9)
Stand Table Reports (3)
Cruise Plans (3)
Cruise Maps (3)



LEGEND

- T Tractor Logging
- ☼ Cable Logging
- STA. 0+00 Survey Station
- POINT "A" Point For Project Work
- ◆ Known Land Survey Corner
- ⊗ Rock Quarry
- ~ Type F Stream
- ~ Type N Stream
- ⊙ Stock Pile Site
- Landing To Be Constructed
- ⊕ Helicopter Evacuation Location
- ⊖ Waste Area
- ⊙ Old Fire Lookout
- - - Ownership Boundary
- - - CSL/BOF Property Line
- ⋯ TIMBER SALE BOUNDARY
- - - Area Boundary
- - - Right Of Way Boundary
- ▨ Posted Stream Buffer
- ▨ Unposted Stream Buffer
- ▨ Reforestation Area
- ▨ Special Felling Area
- - - Unsurfaced Road
- == Surfaced Road
- - - New Construction
- == State Highway
- ⊢ Road to be Vacated
- Locked Gate

HARVEST METHOD BY AREA:

	TRACTOR	CABLE
AREA 1	57%	43%
AREA 2	36%	64%
AREA 3	8%	92%
AREA 4	60%	40%
AREA 5	53%	47%
AREA 6a & 6b	55%	45%
AREA 7	54%	46%
TOTAL :	47%	53%

Logging Plan

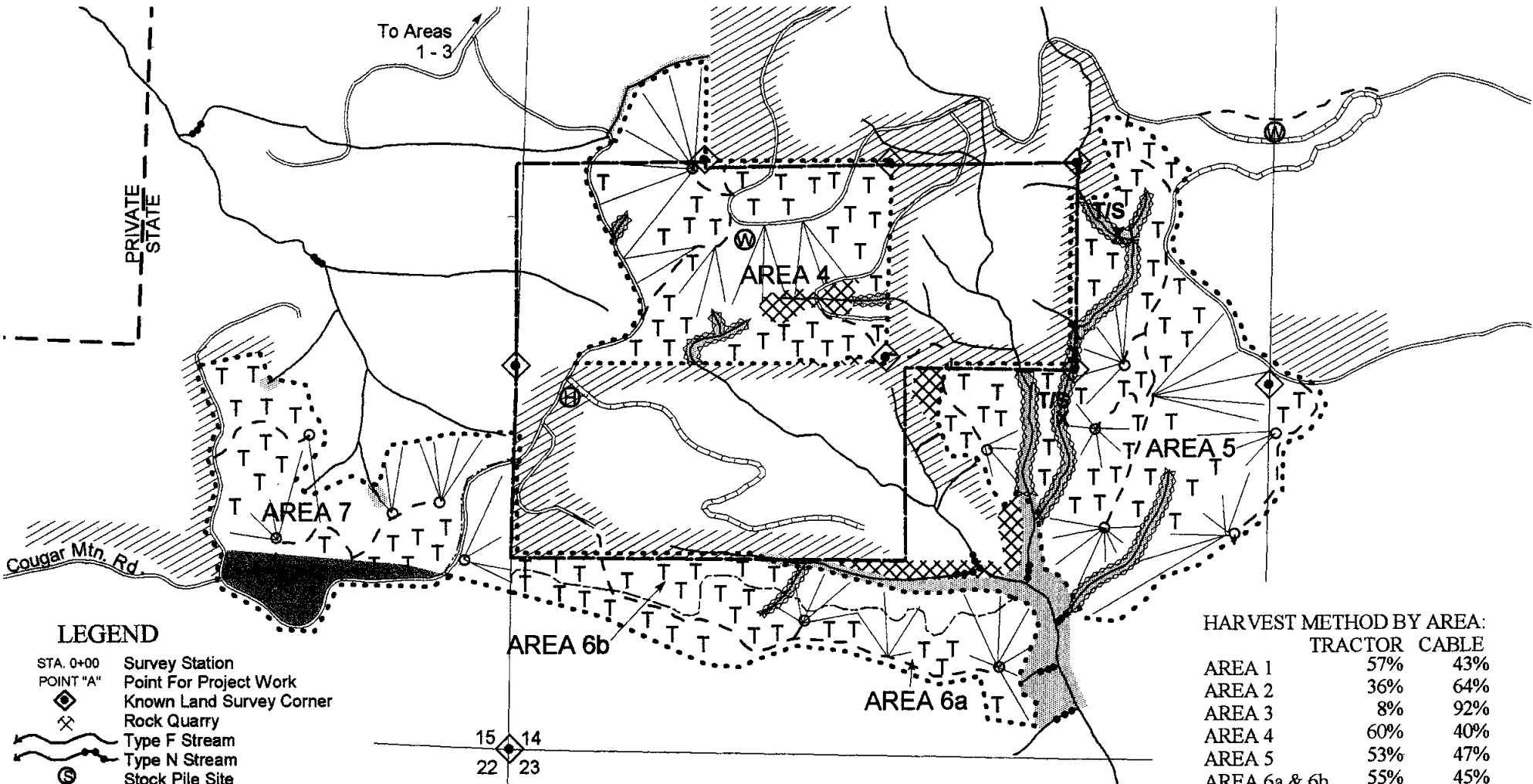
OF TIMBER SALE CONTRACT NO. 341-03-75
 COUGAR MONSTER
 PORTIONS OF SECTIONS 10,11,13,14 AND 15,
 T4N,R8W, W.M.,
 CLATSOP COUNTY, OREGON
APPROX. SCALE 1"=1,000'

500 0 500 1000 Feet



APPROXIMATE ACREAGE:

AREA 1 (PC)	24.1
AREA 2 (PC)	152.1
AREA 3 (CC)	12.9
AREA 4 (CC)	67.1
AREA 5 (CC)	85.6
AREA 6a (PC)	27.0
AREA 6b (PC)	18.0
AREA 7 (PC)	39.3
AREA 8 R/W	12.4
TOTAL PC ACRES	260.5
TOTAL CC ACRES	165.6
TOTAL R/W ACRES	12.4
GRAND TOTAL	438.5



LEGEND

- STA. 0+00 Survey Station
- POINT "A" Point For Project Work
- Known Land Survey Corner
- Rock Quarry
- Type F Stream
- Type N Stream
- Stock Pile Site
- Landing To Be Constructed
- Helicopter Evacuation Location
- Waste Area
- Old Fire Lookout
- Ownership Boundary
- CSL/BOF Property Line
- TIMBER SALE BOUNDARY
- Area Boundary
- Right Of Way Boundary
- Posted Stream Buffer
- Unposted Stream Buffer
- Reforestation Area
- Special Felling Area
- Green Tree Retention Area
- Unsurfaced Road
- Surfaced Road
- New Construction
- State Highway
- Road to be Vacated
- Locked Gate
- T/SX Temporary Stream Crossing
- T Tractor Logging
- S Cable Logging

HARVEST METHOD BY AREA:

	TRACTOR	CABLE
AREA 1	57%	43%
AREA 2	36%	64%
AREA 3	8%	92%
AREA 4	60%	40%
AREA 5	53%	47%
AREA 6a & 6b	55%	45%
AREA 7	54%	46%
TOTAL :	47%	53%

Logging Plan

OF TIMBER SALE CONTRACT NO. 341-03-75
 COUGAR MONSTER
 PORTIONS OF SECTIONS 10,11,13,14 AND 15,
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 APPROX. SCALE 1"=1,000'

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TOTAL PC ACRES	260.5
TOTAL CC ACRES	165.6
TOTAL R/W ACRES	12.4
GRAND TOTAL	438.5

**COUGAR MONSTER
SUMMARY VOLUME REPORT (MBF)**

Sale Area(s)	Species	Net MBF	2Saw	3Saw	4Saw	D&B	%Spp.
Thinnings 1, 2, & 7	Douglas-fir	288	92	156	40	11	14%
Clearcuts 3, 4, & 5	Douglas-fir	1,144	828	263	53	34	53%
Partial Cut 6a & 6b	Douglas-fir	561	230	312	19	51	26%
8 R/W (in thinning)	Douglas-fir	70	47	20	3	1	3%
8 R/W (in Area 6)	Douglas-fir	79	24	50	5	4	4%
Totals	Douglas-fir	2,142	1,221	801	120	101	30%

Thinnings 1, 2, & 7	Hemlock	1,216	414	535	267	24	60%
Clearcuts 3, 4, & 5	Hemlock	441	262	135	44	4	21%
Partial Cut 6a & 6b	Hemlock	212	153	53	6	0	10%
8 R/W (in thinning)	Hemlock	137	76	46	15	2	7%
8 R/W (in Area 6)	Hemlock	35	24	9	2	0	2%
Totals	Hemlock	2,041	929	778	334	30	28%

Thinnings 1, 2, & 7	Alder	447		277	170	26	19%
Clearcuts 3, 4, & 5	Alder	1,589		1,140	449	76	69%
Partial Cut 6a & 6b	Alder	228		191	37	1	10%
8 R/W (in thinning)	Alder	21		15	6	1	1%
8 R/W (in Area 6)	Alder	20		17	3	0	1%
Totals	Alder	2,305		1,640	665	104	32%

Thinnings 1, 2, & 7	Spruce	388	136	186	66	3	56%
Clearcuts 3, 4, & 5	Spruce	177	86	83	8	0	25%
Partial Cut 6a & 6b	Spruce	12			12	0	2%
8 R/W (in thinning)	Spruce	118	95	18	5	1	17%
8 R/W (in Area 6)	Spruce	4	2	1	1	1	0%
Totals	Spruce	699	319	288	92	5	10%

Grand Total		7,187	2,469	3,507	1,211	240	100%
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X:\document\2000sales\Cougar Monster\Sale Prep\Cougar Monster Cruise Volumes Summary.xls

COUGAR MONSTER SUMMARY VOLUME REPORT (MBF)

Harvest Type	Species	Net MBF	2Saw	3Saw	4Saw	%Spp.
PC Areas 1,2,6, & 7	Douglas-fir	849	322	468	59	40%
Clearcuts & R/Ws	Douglas-fir	1,293	899	333	61	60%
Totals	Douglas-fir	2,142	1,221	801	120	30%

PC Areas 1,2,6, & 7	Hemlock	1,428	567	588	273	70%
Clearcuts & R/Ws	Hemlock	613	362	190	61	30%
Totals	Hemlock	2,041	929	778	334	28%

PC Areas 1,2,6,& 7	Alder	675		468	207	29%
Clearcuts & R/Ws	Alder	1,630		1,172	458	71%
Totals	Alder	2,305		1,640	665	32%

PC Areas 1,2,6, & 7	Spruce	400	136	186	78	57%
Clearcuts & R/Ws	Spruce	299	183	102	14	43%
Totals	Spruce	699	319	288	92	10%

Grand Total		7,187	2,469	3,507	1,211	100%
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Clearcuts & R/Ws	Douglas-fir	1,293	899	333	61	34%
	Hemlock	613	362	190	61	16%
	Alder	1,630		1,172	458	42%
	Spruce	299	183	102	14	8%
	Total	3,835	1,444	1,797	594	53%
Thinnings & PC Areas	Douglas-fir	849	322	468	59	25%
	Hemlock	1,428	567	588	273	43%
	Alder	675		468	207	20%
	Spruce	400	136	186	78	12%
	Total	3,352	1,025	1,710	617	47%
Total Sale Area		7,187	2,469	3,507	1,211	100%

X:\document\2000sales\Cougar Monster\Sale Prep\Cougar Monster Cruise Volumes by Harvest Type.xls

TYPE REPORT

SPECIES, GRADE, LENGTH % - BOARD FEET

OREGON DEPARTMENT OF FORESTRY

PLOTS: 69

PROJECT: COUGAR MO

TREES: 579

TRACT: THINNING AREAS 1, 2, & 7

(TAKE TREES)

PROJECT ACRES: 215.5

Species	Grade	% Bd. Ft.	Bd. Ft./Acre		Total MBF	Ave. Length	Bd. Ft./Log	Logs/Acre
			Gross	Net				
D. fir	2 sawmill	32	428	428	92	33	163	
	3 sawmill	54	723	723	156	37	69	
	4 sawmill	14	187	187	40	25	34	
	Cull		51					
	Total	12	1,389	1,338	288	34	94	36
Hemlock	2 sawmill	34	1,920	1,920	414	34	203	
	3 sawmill	44	2,484	2,484	535	34	79	
	4 sawmill	22	1,242	1,242	267	19	26	
	Cull		113					
	Total	52	5,759	5,646	1,216	31	110	94
Spruce	2 sawmill	35	631	631	136	33	236	
	3 sawmill	48	865	865	186	35	79	
	4 sawmill	17	306	306	66	22	28	
	Cull		16					
	Total	17	1,818	1,802	388	32	126	43
Alder	3 sawmill	62	1,285	1,285	277	29	109	
	4 sawmill	38	787	787	170	24	41	
	Cull		122					
	Total	19	2,194	2,072	447	27	83	26
Thinning Total		100	11,160	10,858	2,339	31	106	199

T04N R08W S14 TTAKE										T04N R08W S14 TTAKE			
Twp	Rge	Sec	Tract	Type	Acre	Plots	Sample Trees	CuFt	BdFt				
04N	08W	14	CC AREAS	TAKE	165.60	39	173	1	W				

Spp	So	Gr	%	Net BdFt	Bd. Ft. per Acre			Total Net MBF	Percent 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						
A	DO	CU			00.0	283										6		0.00	4.9			
A	DO	3S	72		1.2	6,964	6,883	1,140		73	19	8		16	29	26	29	29	99	0.98	69.7	
A	DO	4S	28		3.2	2,802	2,711	449		100				23	27	28	23	27	47	0.54	58.0	
A	Totals		47		4.5	10,050	9,594	1,589		81	14	6		18	28	27	27	27	72	0.78	132.6	
D	DO	CU			00.0	160												2		0.00	5.8	
D	DO	2S	72		.5	5,026	4,999	828		1	79	20		3	15	27	56	34	239	1.64	20.9	
D	DO	3S	23		1.0	1,604	1,588	263		97	3			4	33	14	49	33	72	0.68	22.2	
D	DO	4S	5			323	323	53		8	92			34	51	16		21	27	0.42	12.1	
D	Totals		34		2.9	7,113	6,909	1,144		0	28	58	14	4	21	23	52	28	113	1.04	61.0	
H	DO	CU			00.0	25												2		0.00	.8	
H	DO	2S	59			1,581	1,581	262			75	25		3	30	25	42	30	220	1.70	7.2	
H	DO	3S	31			816	816	135		100						29	71	38	88	0.69	9.3	
H	DO	4S	10			266	266	44		100				28	45	27		23	35	0.56	7.6	
H	Totals		13		.9	2,687	2,662	441		41	45	15		4	22	26	47	30	107	0.96	24.9	
S	DO	2S	49			519	519	86			87	13			51	49		27	234	1.97	2.2	
S	DO	3S	47			498	498	82		82	18				7	29	63	37	73	0.81	6.8	
S	DO	4S	5			49	49	8		100				100				17	30	0.83	1.6	
S	Totals		5			1,066	1,066	177		43	51	6		5	28	38	30	32	100	1.01	10.7	
Type Totals					3.3	20,916	20,232	3,350		0	55	35	10		11	25	26	38	28	88	0.88	229.2

**COUGAR MONSTER – AREA 6
COMBINED VOLUMES BY GRADE
Types 6a & 6b (45 Acres)**

Species	Grade	% Net BF	Defect %	Board Feet	Per Acre	Total
				Gross	Net	Net MBF
Douglas-Fir	Cull			991	---	---
	2Saw	41	17	5,243	5,111	230
	3 Saw	56	0	6,945	6,933	312
	4 Saw	3	0	422	422	19
DF Totals		55	9	13,601	12,466	561
Hemlock	Cull			0	---	---
	2 Saw	72	0	3,393	3,393	153
	3 Saw	25	0	1,189	1,189	53
	4 Saw	3	0	134	134	6
WH Totals		21	0	4,716	4,716	212
Spruce	4 Saw	100	0	256	256	12
SS Totals		1	0	256	256	12
Alder	3 Saw	84	0	4,256	4,238	191
	4 Saw	16	2	820	808	37
RA Totals		23	1	5,076	5,046	228
Area 6 Total		100	5	23,649	22,484	1,013

TYPE REPORT

SPECIES, GRADE, LENGTH % - BOARD FEET

OREGON DEPARTMENT OF FORESTRY

PLOTS: 69

PROJECT: COUGAR MO

TREES: 579

TRACT: R/W AREA 8

(WITHIN THINNING AREAS)

PROJECT ACRES: 9.2

Species	Grade	% Bd. Ft.	Bd. Ft./Acre		Total MBF	Ave. Length	Bd. Ft./ Log	Logs/ Acre
			Gross	Net				
D. fir	2 sawmill	67	5,109	5,109	47	32		
	3 sawmill	29	2,174	2,174	20	34		
	4 sawmill	4	326	326	3	25		
	Cull		107					
	Total	20	7,716	7,609	70	33	98	78
Hemlock	2 sawmill	56	8,261	8,261	76	34		
	3 sawmill	34	5,000	5,000	46	37		
	4 sawmill	10	1,630	1,630	15	20		
	Cull		223					
	Total	40	15,114	14,891	137	35	87	172
Spruce	2 sawmill	81	10,326	10,326	95	36		
	3 sawmill	15	1,957	1,957	18	35		
	4 sawmill	4	543	543	5	21		
	Cull		90					
	Total	34	12,916	12,826	118	35	155	83
Alder	3 sawmill	71	1,630	1,630	15	34		
	4 sawmill	29	652	652	6	20		
	Cull		135					
	Total	6	2,417	2,282	21	26	88	26
R/W TOTAL		100	38,163	37,608	346	34	105	359

T04N R08W S14 TRW6A T04N R08W S14 TRW6A
 Twp Rge Sec Tract Type Acre Plots Sample Trees CuFt BdFt
 04N 08W 14 ROAD 6A RW6A 3.20 12 33 1 W

Spp	S T	So rt	Gr ad	% Net BdFt	Bd. Ft. per Acre			Total Net MBF	Percent 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	?	?			00.0	661										3		0.00	21.3	
D	?	2S		30	8.0	8,073	7,427	24		100		28	30	24	18	24	150	1.60	49.4	
D	?	3S		64		15,752	15,752	50	86	14			7	39	54	35	96	0.74	163.8	
D	?	4S		6		1,423	1,423	5	100			47	53			21	24	0.37	58.6	
D	Totals			57	5.0	25,909	24,602	79	61	39		11	17	32	40	28	84	0.80	293.1	
H	?	?																0.00	1.7	
H	?	2S		70		7,616	7,616	24		52	48			66	34	35	312	1.94	24.4	
H	?	3S		24		2,601	2,601	8	100				7	37	56	35	73	0.57	35.5	
H	?	4S		7		719	719	2	75	25		25	75			22	27	0.32	26.9	
H	Totals			25		10,936	10,936	35	5	25	36	33	2	7	55	37	30	124	0.95	88.5
A	?	3S		84	.5	5,414	5,386	17	53	47			20	80		31	132	1.15	40.7	
A	?	4S		16		1,015	1,015	3	100			64	36			18	25	0.51	40.7	
A	Totals			15	.4	6,430	6,401	20	61	39		10	23	67		25	79	0.91	81.3	
S	?	2S		55	2.5	758	739	2		100				100		40	390	2.30	1.9	
S	?	3S		21		284	284	1	100					100		40	150	1.08	1.9	
S	?	4S		24		332	332	1	100		100					18	20	0.45	16.6	
S	Totals			3	1.4	1,373	1,354	4	45	55		24		76		22	66	0.87	20.4	
Type Totals					3.0	44,647	43,293	139	1	52	39	8	9	14	42	34	28	90	0.85	483.3

TYPE REPORT(FJ)
SPP, SORT, GRADE, LEN % - BDFT

OREGON DEPT. OF FORESTRY
PROJECT COUGARMO TRACT: RH AREA 3
TWP 04N RGE 08W SEC 14 TY 0003 AC 12.90

Plots 4 BFT:W PAGE 1
Trees 13 CUB:1 DATE: 06/07/99
WILSON TIME: 01:45pm

SP	SORT	GRADE	PCT BDFT /		ACRE	TOT	%BDFT/AC BY GROSS LEN.				AV	BDFT/	LOGS	
			BDFT	GROSS			NET	MBF	12-19	20-25				26-34
A	DOMESTIC	3SAWMILL	49	2142	2142	28				41	59	36	97	22
A	DOMESTIC	4SAWMILL	51	2200	2200	28	13	17		70		26	49	45
A	0	CULL		1254										
A	TOTAL		42	5596	4342	56	7	9	56	29	29	65	67	
H	DOMESTIC	2SAWMILL	82	851	851	11			100			32	670	1
H	DOMESTIC	3SAWMILL	18	190	190	2	100					13	150	1
H	0	CULL		241										
H	TOTAL		10	1282	1041	13	18		82		23	410	3	
S	DOMESTIC	2SAWMILL	46	2245	2245	29					100	40	1240	2
S	DOMESTIC	3SAWMILL	54	2685	2652	34	4		96		28	436	6	
S	TOTAL		48	4930	4898	63	2		52	46	31	621	8	
TYPE TOTAL			100	11809	10281	133	6	4	57	34	29	133	77	

TYPE REPORT (FJ)
SPP, SORT, GRADE, LEN % - BDFT

OREGON DEPT. OF FORESTRY
PROJECT COUGARMO TRACT: RH AREA 4
TWP 04N RGE 08W SEC 14 TY 0004 AC 67.10

Plots 14 BFT:W PAGE 1
Trees 66 CUB:1 DATE: 06/07/99
SCOGGINS TIME: 01:45pm

SP	SORT	GRADE	PCT BDFT / BDFT GROSS	ACRE NET	TOT MBF	%BDFT/AC 12-19	20-25	BY GROSS 26-34	LEN. 35-40	AV LN	BDFT/ LOG	LOGS ACRE
A	DOMESTIC	3SAWMILL	85	6887	6772	454	10	16	38	36	30	69
A	DOMESTIC	4SAWMILL	15	1313	1213	81	17	23	46	13	25	27
A	0	CULL		232								
A	TOTAL		37	8432	7985	536	11	17	39	32	29	96
D	DOMESTIC	2SAWMILL	65	5758	5709	383		12	40	48	32	22
D	DOMESTIC	3SAWMILL	28	2467	2429	163	7	1	38	54	34	31
D	DOMESTIC	4SAWMILL	8	689	689	46	40	22	38		20	27
D	0	CULL		176								
D	TOTAL		41	9090	8827	592	5	10	40	46	29	79
H	DOMESTIC	2SAWMILL	78	1479	1479	99		18	82	28	216	7
H	DOMESTIC	3SAWMILL	19	357	357	24			40	60	36	5
H	DOMESTIC	4SAWMILL	3	54	54	4		100		21	30	2
H	0	CULL		30								
H	TOTAL		9	1920	1890	127		17	71	11	30	14
S	DOMESTIC	2SAWMILL	55	1447	1447	97		51	49	27	234	6
S	DOMESTIC	3SAWMILL	39	1025	1025	69			39	61	38	13
S	DOMESTIC	4SAWMILL	5	136	136	9	100			17	30	5
S	TOTAL		12	2609	2609	175	5	28	43	24	31	23
TYPE TOTAL			100	22051	21311	1430	7	15	43	35	29	212

Species, Sort Grade
Project: COUGARMO

T04N R08W S14 T0005

T04N R08W S14 T0005

Twp Rge Sec Tract Type Acres Plots Sample Trees
04N 08W 14 RH AREA 5 0005 85.60 21 102

S Spp T Sort Grd	% Net BdFt	BdFt per Acre Def% Gross Net		Total Net MBF	Percent Net Board Foot Volume								Av. Log Ln Board Ft Feet		Logs Per /Acre	
					Log Scale Dia.				Log Length							
					4-5	6-11	12-16	17+	12-20	21-30	31-35	36-99				
A DO CU		00.0	133											13		1.0
A DO 3S	67	.9	7,934	7,860	673		77	16	7	14	31	32	23	29	100	79.0
A DO 4S	33	2.6	3,910	3,808	326		100			18	32	20	30	27	47	81.4
A Totals	48	2.6	11,976	11,667	999		84	11	5	15	31	28	25	28	72	161.4
D DO CU		00.0	180											2		5.2
D DO 2S	81	.3	6,560	6,542	560		2	76	22	2	7	25	67	36	255	25.7
D DO 3S	17	.4	1,379	1,373	118		100			1	38	19	41	32	65	21.1
D DO 4S	2		140	140	12	33	67			13	44	43		24	30	4.6
D Totals	33	2.5	8,258	8,055	690	1	20	62	18	2	13	24	61	30	142	56.6
H DO CU		00.0	26											2		.9
H DO 2S	61		2,711	2,711	232			67	33	3	12	25	60	32	269	10.1
H DO 3S	29		1,296	1,296	111		100			1		26	72	38	90	14.3
H DO 4S	10		457	457	39		100			31	41	29		23	35	12.9
H Totals	18	.6	4,491	4,464	382		39	41	20	5	11	26	58	30	117	38.2
S DO 3S	100		241	241	21		100				28		72	36	57	4.3
S Totals	1		241	241	21		100				28		72	36	57	4.3
Type Totals		2.2	24,966	24,428	2,091	0	55	33	12	9	21	26	44	29	94	260.5

Species, Sort Grade - Board Foot Volumes (Type)

Project: COUGARMO

T04N R08W S14 TTK6A

T04N R08W S14 TTK6A

Twp Rge Sec Tract Type Acre Plots Sample Trees CuFt
04N 08W 14 AREA6A TAKE TK6A 27.00 11 19 1

BdFt
W

Spp	S T	So rt	Gr ad	% Net BdFt	Bd. Ft. per Acre		Total Net MBF	Percent Net Board Foot Volume								Average Log			Logs Per /Acre
					Def%	Gross		Net	Log Scale Dia.				Log Length				Ln Ft	Bd Ft	
								4-5	6-11	12-16	17+	12-20	21-30	31-35	36-99				
D	?	?			100.0	865										4		0.00	21.9
D	?	2S		7	18.2	1,062	869			100		100				16	90	1.69	9.7
D	?	3S		89		10,475	10,475	283	85	15				43	57	35	97	0.72	107.6
D	?	4S		4		446	446	12	100			100				19	20	0.34	22.3
D	Totals			46	8.2	12,848	11,790	318	80	20		11		39	50	28	73	0.70	161.4
A	?	3S		84	.5	5,907	5,876	159	53	47			20	80		31	132	1.15	44.4
A	?	4S		16		1,107	1,107	30	100			64	36			18	25	0.51	44.4
A	Totals			27	.4	7,014	6,983	189	61	39		10	23	67		25	79	0.91	88.7
H	?	?																0.00	3.0
H	?	2S		72		4,515	4,515	122		65	35			100		40	255	1.49	17.7
H	?	3S		25		1,562	1,562	42	100					45	55	36	88	0.74	17.7
H	?	4S		3		156	156	4	100			100				20	20	0.40	7.8
H	Totals			25		6,233	6,233	168	28	47	25	3		11	86	33	135	1.06	46.2
S		DO	4S	100		427	427	12	100			100				18	20	0.44	21.4
S	Totals			2		427	427	12	100			100				18	20	0.44	21.4
Type Totals					4.1	26,523	25,434	687	62	32	6	10	6	39	44	27	80	0.81	317.6

COUGAR MONSTER – AREA 6b (18 Acres)
Adjusted Volume by Grade
Using Actual Tree Count Date

Species	Grade	% Net BF	Defect %	Board Feet	Per Acre	Total
				Gross	Net	Net MBF
Douglas-Fir	Cull		---	1,180	---	---
	2Saw	85	0	11,490	11,490	207
	3 Saw	12	2	1,650	1,620	29
	4 Saw	3	0	410	410	7
DF Totals		75	8	14,730	13,520	243
Hemlock	Cull			---	---	---
	2 Saw	70	0	1,710	1,710	31
	3 Saw	26	0	630	630	11
	4 Saw	4	0	100	100	2
WH Totals		13	0	2,440	2,440	44
Alder	3 Saw	83	0	1,780	1,780	32
	4 Saw	17	8	390	360	7
RA Totals		12	1	2,170	2,140	39
Area 6b Total		100	7	19,340	18,100	326

X:\DOCUMENT\2000 FY Sales\Cougar Monster\Sale Prep\Area 6b Cruise Adjusted Volume Table.doc

X:\DOCUMENT\2000 FY Sales\Cougar Monster\Sale Prep\Area 6 Cruise Combined Volume Table.doc

PROJECT REPORT

STATISTICS – STAND SUMMARY

OREGON DEPARTMENT OF FORESTRY

PLOTS: 69

PROJECT: COUGARMO

TREES: 339

TRACT: THINNING AREAS 1, 2, & 7

(TAKE TREES)

PROJECT ACRES: 215.5

FIXED AREA PLOT SIZE: F1 = 0.04 (1/25 ACRE)

	PLOTS	TREES	TREES/PLOT	EST TOTAL TREES	% SAMPLE
TOTAL	69	339	4.9	28,175	1.2
CRUISE	25	149	6.0		
COUNT	42	190	4.5		
BLANKS	2				

STAND SUMMARY

SPECIES	SAMPLE TREES	TREES /ACRE	AVE D4H	BOLE LENGTH	BASAL AREA	GROSS BF/AC	NET BF/AC
D-fir	56	20.3	13.4	60	19.9	1,389	1,338
Hemlock	159	57.6	12.4	45	48.4	5,759	5,646
Spruce	61	22.1	12.5	47	18.8	1,818	1,802
Alder	64	23.2	14.0	41	24.8	2,194	2,072
TOTALS	340	123.2	12.9	47	111.9	11,160	10,858

	<u>COEF. VAR %</u>	<u>S.E. %</u>
TREES PER ACRE	67.3	8.1
NET BF PER ACRE	62.6	12.5

PROJECT REPORT

STATISTICS – STAND SUMMARY

OREGON DEPARTMENT OF FORESTRY

PLOTS: 69

PROJECT: COUGARMO

TREES: 212

TRACT: THINNING AREAS 1, 2, & 7

(LEAVE TREES)

PROJECT ACRES: 215.5

FIXED AREA PLOT SIZE: F1 = 0.04 (1/25 ACRE)

	PLOTS	TREES	TREES/PLOT	EST TOTAL TREES	% SAMPLE
TOTAL	69	215	3.1	17,917	1.2
CRUISE	25	78	3.1		
COUNT	43	134	3.1		
BLANKS	1				

STAND SUMMARY

SPECIES	SAMPLE TREES	TREES /ACRE	AVE D4H	BOLE LENGTH	BASAL AREA	GROSS BF/AC	NET BF/AC
D-fir	61	22.1	19.8	81	47.3	9,697	9,591
Hemlock	100	36.2	17.1	68	57.6	8,760	8,665
Spruce	49	17.8	22.3	75	48.2	8,584	8,524
Cedar	5	1.8	12.0	24	1.4	4	4
TOTALS	215	77.9	19.0	72	154.5	27,045	26,784

	<u>COEF. VAR %</u>	<u>S.E. %</u>
TREES PER ACRE	29.0	3.5
NET BF PER ACRE	101.8	20.4

PROJECT REPORT

STATISTICS – STAND SUMMARY

OREGON DEPARTMENT OF FORESTRY

PLOTS: 69

PROJECT: COUGARMO

TREES: 579

TRACT: THINNING AREAS 1, 2 & 7

(TOTAL STAND)

PROJECT ACRES: 215.5

FIXED AREA PLOT SIZE: F1 = 0.04 (1/25 ACRE)

	PLOTS	TREES	TREES/PLOT	EST TOTAL TREES	% SAMPLE
TOTAL	69	579	8.4	48,250	1.2
CRUISE	25	233	9.3		
COUNT	43	346	8.0		
BLANKS	1				

STAND SUMMARY

SPECIES	SAMPLE TREES	TREES /ACRE	AVE D4H	BOLE LENGTH	BASAL AREA	GROSS BF/AC	NET BF/AC
D-fir	56	20.3	13.4	60	19.9	1,389	1,338
Hemlock	159	57.6	12.4	45	48.4	5,759	5,646
Spruce	61	22.1	12.5	47	18.8	1,818	1,802
Alder	64	23.2	14.0	41	24.8	2,194	2,072
D-fir – Leave	61	22.1	19.8	81	47.3	9,697	9,591
Hemlock – Leave	100	36.2	17.1	68	57.6	8,760	8,665
Spruce – Leave	49	17.8	22.3	75	48.2	8,584	8,524
Cedar – Leave	5	1.8	12.0	24	1.4	4	4
Snags	28	10.1	14.4	45	11.4	1,237	0
TOTALS	579	209.7	15.4	55	277.8	39,442	37,642

STATISTICS

	<u>COEF. VAR %</u>	<u>S.E. %</u>
TREES PER ACRE	46.7	5.6
NET BF PER ACRE	63.4	12.7

STATISTICS
PROJECT COUGARMO

TWP	RGE	SECT	TRACT	TYPE	ACRES	PLOTS	TREES	CuFt	BdFt
04N	08W	14	CC AREAS	TAKE	165.60	39	173	1	W

	PLOTS	TREES	TREES PER PLOT	ESTIMATED TOTAL TREES	PERCENT SAMPLE TREES
TOTAL	39	173	4.4		
CRUISE	37	173	4.7	22,323	.8
DBH COUNT					
REFOREST COUNT					
BLANKS	2				
100 %					

STAND SUMMARY

	SAMPLE TREES	TREES /ACRE	AVG DBH	BOLE LEN	REL DEN	BASAL AREA	GROSS BF/AC	NET BF/AC	GROSS CF/AC	NET CF/AC
R ALDER	98	88.5	14.4	43		100.5	10,050	9,594	2,897	2,844
DOUG FIR	44	25.1	18.2	71		45.1	7,113	6,909	1,812	1,779
WHEMLOCK	19	13.0	16.6	60		19.5	2,687	2,662	720	715
S SPRUCE	12	8.2	16.6	43		12.3	1,066	1,066	348	348
TOTAL	<i>173</i>	<i>134.8</i>	<i>15.5</i>	<i>50</i>		<i>177.4</i>	<i>20,916</i>	<i>20,232</i>	<i>5,777</i>	<i>5,687</i>

SD:	1	COEFF VAR.	S.E.%	TREES/ACRE			# OF PLOTS REQ.		INF. POP.
				LOW	AVG	HIGH	5	10	15
R ALDER		97.9	15.7	75	89	102			
DOUG FIR		203.3	32.6	17	25	33			
WHEMLOCK		186.3	29.8	9	13	17			
S SPRUCE		221.4	35.4	5	8	11			
TOTAL		<i>75.8</i>	<i>12.1</i>	<i>118</i>	<i>135</i>	<i>151</i>	<i>230</i>	<i>58</i>	<i>26</i>

SD:	1	COEFF VAR.	S.E.%	BASAL AREA/ACRE			# OF PLOTS REQ.		INF. POP.
				LOW	AVG	HIGH	5	10	15
R ALDER		81.1	13.0	87	101	114			
DOUG FIR		162.9	26.1	33	45	57			
WHEMLOCK		162.3	26.0	14	19	25			
S SPRUCE		199.4	31.9	8	12	16			
TOTAL		<i>58.7</i>	<i>9.4</i>	<i>161</i>	<i>177</i>	<i>194</i>	<i>138</i>	<i>34</i>	<i>15</i>

SD:	1	COEFF VAR.	S.E.%	NET BF/ACRE			# OF PLOTS REQ.		INF. POP.
				LOW	AVG	HIGH	5	10	15
R ALDER		104.7	16.8	7,985	9,594	11,203			
DOUG FIR		161.8	25.9	5,119	6,909	8,700			
WHEMLOCK		198.6	31.8	1,815	2,662	3,509			
S SPRUCE		241.6	38.7	654	1,066	1,479			
TOTAL		<i>78.8</i>	<i>12.6</i>	<i>17,681</i>	<i>20,232</i>	<i>22,783</i>	<i>248</i>	<i>62</i>	<i>28</i>

TYPE REPORT (KC)
STATISTICAL SUMMARY

OREGON DEPT. OF FORESTRY
PROJECT COUGARMO TRACT: RH AREA 4
TWP 04N RGE 08W SEC 14 TY 0004 AC 67.10

Plots 14
Trees 66
SCOGGINS

BFT:W PAGE 1
CUB:1 DATE: 06/07/99
TIME: 01:45pm

	PLOTS	TREES	TREES PER PLOT	ESTIMATED TOTAL TREES	PERCENT SAMPLE TREES
TOTAL	14	66	4.7		
CRUISE COUNT	13	66	5.1	8733	0.8
BLANKS 100%	1				

STAND SUMMARY										
	SAMPLE TREES	TREES /ACRE	AVE D4H	BOLE LEN	REL DEN	BASAL AREA	GROSS BF/AC	NET BF/AC	GROSS CF/AC	NET CF/AC
R ALDER	29	68.3	14.9	42		82.9	8432	7985	2389	2338
WHEMLOCK	5	6.8	19.6	63		14.3	1920	1890	512	506
DOUG FIR	22	38.6	17.3	62		62.9	9090	8827	2300	2262
S SPRUCE	10	16.5	17.8	46		28.6	2609	2609	839	839
TOTAL	66	130.2	16.3	49		188.6	22051	21311	6040	5945

SD:1	COEFF. VAR. %	S.E. %	TREES/ACRE			# OF PLOTS REQ. - INF. POP.		
			LOW	AVE	HIGH	5%	10%	15%
R ALDER	119.3	31.9	46.5	68.3	90.1			
WHEMLOCK	147.7	39.5	4.1	6.8	9.5			
DOUG FIR	180.4	48.2	20.0	38.6	57.2			
S SPRUCE	139.4	37.3	10.3	16.5	22.6			
TOTAL	65.9	17.6	107.2	130.2	153.1	174	43	19

SD:1	COEFF. VAR. %	S.E. %	BASAL AREA/ACRE			# OF PLOTS REQ. - INF. POP.		
			LOW	AVE	HIGH	5%	10%	15%
R ALDER	106.2	28.4	59.3	82.9	106.4			
WHEMLOCK	139.2	37.2	9.0	14.3	19.6			
DOUG FIR	133.8	35.7	40.4	62.9	85.3			
S SPRUCE	115.6	30.9	19.7	28.6	37.4			
TOTAL	60.8	16.3	157.9	188.6	219.2	148	37	16

SD:1	COEFF. VAR. %	S.E. %	NET BF/ACRE			# OF PLOTS REQ. - INF. POP.		
			LOW	AVE	HIGH	5%	10%	15%
R ALDER	132.9	35.5	5148	7985	10822			
WHEMLOCK	139.8	37.4	1184	1890	2596			
DOUG FIR	134.5	36.0	5654	8827	12000			
S SPRUCE	145.0	38.8	1598	2609	3620			
TOTAL	84.8	22.7	16480	21311	26142	288	72	32

SD:1	COEFF. VAR. %	S.E. %	NET CUBIC FT/ACRE			# OF PLOTS REQ. - INF. POP.		
			LOW	AVE	HIGH	5%	10%	15%
R ALDER	119.9	32.0	1589	2338	3086			
WHEMLOCK	139.8	37.4	317	506	695			
DOUG FIR	134.4	35.9	1449	2262	3075			
S SPRUCE	129.0	34.5	550	839	1129			
TOTAL	74.3	19.9	4765	5945	7126	221	55	25

TC TSTATS				STATISTICS						
				PROJECT		COUGARMO				
TWP	RGE	SECT	TRACT	TYPE	ACRES	PLOTS	TREES	PAGE	1	
04N	08W	14	RH AREA 5	0005	85.60	21	102	DATE	8/13/99	
		PLOTS	TREES	TREES PER PLOT	ESTIMATED TOTAL TREES	PERCENT SAMPLE TREES				
TOTAL		21	102	4.9						
CRUISE COUNT BLANKS 100 %		21	102	4.9	13,013	.8				
STAND SUMMARY										
	SAMPLE TREES	TREES /ACRE	AVE DBH	BOLE LEN	REL DEN	BASAL AREA	GROSS BF/AC	NET BF/AC	GROSS CF/AC	NET CF/AC
R ALDER	60	106.2	14.0	44		114.3	11,843	11,667	3,405	3,405
DOUG FIR	24	21.4	19.8	83		45.7	8,078	8,055	2,007	2,007
WHEMLOCK	16	20.3	16.6	60		30.5	4,464	4,464	1,159	1,159
S SPRUCE	2	4.3	12.8	37		3.8	241	241	87	87
TOTAL	102	152.0	15.3	52		194.3	24,627	24,428	6,658	6,658
SD:	COEFF VAR.%	S.E.%	SAMPLE TREES - BF			# OF TREES REQ.		INF. POP.		
1			LOW	AVE	HIGH	5	10	15		
R ALDER	130.6	12.9	69	80	90					
DOUG FIR	205.5	20.3	88	110	133					
WHEMLOCK	346.0	34.3	40	61	82					
S SPRUCE	713.6	70.7	0	1	2					
TOTAL	101.2	10.0	227	252	277	410	102	46		
SD:	COEFF VAR.%	S.E.%	SAMPLE TREES - CF			# OF TREES REQ.		INF. POP.		
1			LOW	AVE	HIGH	5	10	15		
R ALDER	116.7	11.6	21	23	26					
DOUG FIR	199.2	19.7	22	27	32					
WHEMLOCK	321.8	31.9	10	15	19					
S SPRUCE	715.7	70.9	0	0	1					
TOTAL	84.2	8.3	60	65	71	284	71	32		
SD:	COEFF VAR.%	S.E.%	TREES/ACRE			# OF PLOTS REQ.		INF. POP.		
1			LOW	AVE	HIGH	5	10	15		
R ALDER	88.6	19.3	86	106	127					
DOUG FIR	181.1	39.5	13	21	30					
WHEMLOCK	149.9	32.7	14	20	27					
S SPRUCE	337.5	73.6	1	4	7					
TOTAL	76.3	16.6	127	152	177	233	58	26		
SD:	COEFF VAR.%	S.E.%	BASAL AREA/ACRE			# OF PLOTS REQ.		INF. POP.		
1			LOW	AVE	HIGH	5	10	15		
R ALDER	71.1	15.5	97	114	132					
DOUG FIR	154.8	33.8	30	46	61					
WHEMLOCK	123.9	27.0	22	30	39					
S SPRUCE	315.8	68.9	1	4	6					
TOTAL	53.0	11.6	172	194	217	112	28	12		
SD:	COEFF VAR.%	S.E.%	NET BF/ACRE			# OF PLOTS REQ.		INF. POP.		
1			LOW	AVE	HIGH	5	10	15		
R ALDER	88.0	19.2	9,427	11,667	13,908					
DOUG FIR	148.7	32.4	5,442	8,055	10,669					
WHEMLOCK	151.4	33.0	2,989	4,464	5,939					
S SPRUCE	347.3	75.8	58	241	424					
TOTAL	66.3	14.5	20,895	24,428	27,961	176	44	20		
SD:	COEFF VAR.%	S.E.%	NET CUFT FT/ACRE			# OF PLOTS REQ.		INF. POP.		
1			LOW	AVE	HIGH	5	10	15		

TC TSTATS				STATISTICS				PAGE 1		
				PROJECT COUGARMO		DATE 4/2/2003				
TWP	RGE	SECT	TRACT	TYPE	ACRES	PLOTS	TREES	CuFt	BdFt	
04N	08W	14	AREA6A TAKE	TK6A	27.00	11	43	1	W	
				TREES	ESTIMATED	PERCENT				
				PER PLOT	TOTAL	SAMPLE				
					TREES	TREES				
TOTAL		11	43	3.9						
CRUISE		5	19	3.8	3,964		.5			
DBH COUNT										
REFOREST										
COUNT		6	24	4.0						
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	5	63.4	16.0	74		88.5	12,848	11,790	3,353	3,151
R ALDER	10	44.4	16.3	52		64.0	7,014	6,983	2,016	2,016
WHEMLOCK	3	17.7	18.4	88		32.7	6,233	6,233	1,597	1,597
S SPRUCE	1	21.4	10.0	19		11.7	427	427	171	171
TOTAL	19	146.8	15.7	61		196.8	26,523	25,434	7,137	6,935
	COEFF	TREES/ACRE				# OF PLOTS REQ.		INF. POP.		
SD: 1	VAR.	S.E.%	LOW	AVG	HIGH	5	10	15		
DOUG FIR	100.0	30.1	44	63	82					
R ALDER	142.2	42.9	25	44	63					
WHEMLOCK	203.2	61.3	7	18	29					
S SPRUCE	222.5	67.1	7	21	36					
TOTAL	64.6	19.5	118	147	175	167	42	19		
	COEFF	BASAL AREA/ACRE				# OF PLOTS REQ.		INF. POP.		
SD: 1	VAR.	S.E.%	LOW	AVG	HIGH	5	10	15		
DOUG FIR	102.7	31.0	61	88	116					
R ALDER	142.1	42.8	37	64	91					
WHEMLOCK	203.2	61.3	13	33	53					
S SPRUCE	222.5	67.1	4	12	19					
TOTAL	63.8	19.2	159	197	235	163	41	18		
	COEFF	NET BF/ACRE				# OF PLOTS REQ.		INF. POP.		
SD: 1	VAR.	S.E.%	LOW	AVG	HIGH	5	10	15		
DOUG FIR	100.3	30.2	8,224	11,790	15,355					
R ALDER	145.6	43.9	3,917	6,983	10,050					
WHEMLOCK	203.2	61.3	2,415	6,233	10,052					
S SPRUCE	222.5	67.1	141	427	714					
TOTAL	70.8	21.3	20,004	25,434	30,863	201	50	22		

COUGAR MONSTER – AREA 6a
Leave Tree Stand Table
(As Marked in Field)

Species	Diameter Range	Ave. DBH	Trees/Acre	BA/Acre	Bd. Ft./Acre
Douglas-fir	11-19"	16"	2.0	2.8	460
	20-29"	26"	5.0	18.5	5,000
	30-40"	34"	5.8	36.6	9,210
	41"+	46"	6.9	79.6	24,180
Total DF			19.7	137.5	38,850
Hemlock	11-19"	14"	10.0	10.7	950
	20-29"	24"	1.3	4.1	700
	30-40"	31"	1.0	5.2	1,250
Total WH			12.3	20.0	2,900
Spruce	30-40"	36"	0.2	1.4	370
Total SS			0.2	1.4	370
Cedar	41"+	46"	0.2	2.3	380
Total WRC			0,2	2.3	380
Alder & Maple	11-28"	13"	3.2	2.9	300
Total Hdwd.			3.2	2.9	300
Total Stand			35.6	164.1	42,800

Take Tree Stand Table
(Unmarked Trees)

Species	Diameter Range	Ave. DBH	Trees/Acre	BA/Acre	Bd. Ft./Acre
Douglas-fir	11-19"	16"	4.7	5.6	1,110
	20-29"	24"	9.0	28.6	5,030
	30-40"	36"	4.5	31.8	7,380
Total DF			18.2	66.0	13,520
Hemlock	11-19"	18"	2.0	3.5	420
	20-29"	22"	2.2	5.8	620
	30-40"	33"	0.9	5.4	1,400
Total WH			5.1	14.7	2,440
Alder	12-24"	17"	12.2	19.2	2,140
Total Alder			12.2	19.2	2,140
Total Stand			35.5	99.9	18,100

Stand Table Summary

Project COUGARMO

T04N R08W S14 TCC

T04N R08W S14 TCC

**Twp Rge Sec Tract
04N 08W 14 CC AREAS**

**Type Acres Plots Sample Trees
CC 165.60 39 181**

**Page: 1
Date: 4/3/03
Time: 1:45:49PM**

S Spc	T	DBH	Sample Trees	FF 16'	Av Ht Tot	Trees/ BA/ Acre	Logs Acre	Average Log		Net Cu.Ft.	Net Bd.Ft.	Net Tons/ Acre	Net Cu.Ft. Acre	Net Bd.Ft. Acre	Totals		
								Net Cu.Ft.	Net Bd.Ft.						Tons	Cunits	MBF
A		10	3	87	67	5.641	3.08	5.64	15.7	56.7		88	320		146	53	
A		11	8	87	75	12.462	8.21	15.57	15.6	54.0		243	841		402	139	
A		12	6	87	60	7.927	6.15	9.23	16.5	51.5		152	476		252	79	
A		13	16	86	68	17.894	16.41	26.89	16.4	57.5		442	1,546		732	256	
A		14	11	86	62	10.698	11.28	14.54	20.3	67.3		296	978		490	162	
A		15	14	87	76	11.668	14.36	21.67	21.4	75.3		463	1,630		766	270	
A		16	13	86	62	9.684	13.33	14.23	25.1	79.0		357	1,125		592	186	
A		17	3	86	66	1.992	3.08	3.33	27.3	87.9		91	293		151	49	
A		18	6	87	72	3.482	6.15	5.80	32.0	101.0		186	586		308	97	
A		19	4	86	64	2.084	4.10	3.65	33.1	108.6		121	396		200	66	
A		20	5	87	66	2.351	5.13	3.29	41.7	130.0		137	428		227	71	
A		21	1	87	59	.426	1.03	.43	64.0	180.0		27	77		45	13	
A		24	2	86	96	.653	2.05	1.31	61.0	270.0		80	353		132	58	
A		26	4	87	76	1.113	4.10	1.67	77.5	293.3		129	490		214	81	
A		29	2	87	52	.447	2.05	.45	72.0	130.0		32	58		53	10	
A		Totals	98	87	68	88.523	100.51	127.68	22.3	75.1		2,844	9,594		4,710	1,589	
D		10	1	87	90	1.880	1.03	3.76	8.0	25.0		30	94		50	16	
D		11	1	87	62	1.706	1.03	1.71	14.0	50.0		24	85		40	14	
D		12	2	83	60	2.612	2.05	3.92	12.0	40.0		47	157		78	26	
D		14	1	91	86	.959	1.03	1.92	19.0	70.0		36	134		60	22	
D		15	1	90	85	.836	1.03	1.67	22.5	85.0		38	142		62	24	
D		16	1	90	102	.783	1.03	2.35	16.7	63.3		39	149		65	25	
D		17	5	87	107	3.253	5.13	7.81	27.0	102.5		211	800		349	133	
D		18	4	89	114	2.322	4.10	5.22	34.8	126.7		182	662		301	110	
D		19	2	88	85	1.042	2.05	2.60	26.2	98.0		68	255		113	42	
D		20	7	88	104	3.291	7.18	7.99	34.7	131.8		277	1,053		459	174	
D		21	1	89	98	.426	1.03	.85	47.5	175.0		41	149		67	25	
D		22	4	86	96	1.554	4.10	3.11	47.4	168.7		147	525		244	87	
D		23	4	86	128	1.438	4.10	3.96	49.0	206.2		194	816		321	135	
D		24	4	86	116	1.306	4.10	3.59	49.6	201.8		178	725		295	120	
D		25	2	84	121	.602	2.05	1.50	57.2	238.0		86	358		142	59	
D		26	2	86	112	.556	2.05	1.67	51.8	226.7		87	378		143	63	
D		27	1	89	140	.260	1.03	.78	70.3	320.0		55	249		91	41	
D		28	1	86	107	.240	1.03	.72	54.7	246.7		39	177		65	29	
D		Totals	44	87	97	25.066	45.13	55.13	32.3	125.3		1,779	6,909		2,946	1,144	
H		12	3	89	68	3.918	3.08	5.22	16.8	55.0		87	287		145	48	
H		14	2	85	80	1.879	2.05	2.80	24.4	79.7		68	223		113	37	
H		15	1	81	46	.803	1.03	.80	26.0	50.0		21	40		35	7	
H		16	1	88	131	.763	1.03	2.29	24.0	103.3		55	236		91	39	
H		17	3	87	70	1.952	3.08	3.90	25.3	90.0		99	351		164	58	
H		18	1	88	110	.580	1.03	1.74	28.3	110.0		49	192		82	32	
H		20	2	87	87	.940	2.05	1.88	40.5	145.0		76	273		126	45	
H		21	1	85	111	.426	1.03	1.28	38.0	150.0		49	192		80	32	
H		22	1	90	87	.389	1.03	.78	49.5	220.0		38	171		64	28	
H		23	2	88	98	.711	2.05	1.78	50.2	210.0		89	373		148	62	
H		24	2	86	92	.653	2.05	1.63	51.0	198.0		83	323		138	54	
H		Totals	19	87	81	13.014	19.49	24.11	29.7	110.4		715	2,662		1,185	441	
S		11	1	86	67	1.554	1.03	1.55	19.0	60.0		30	93		49	15	
S		12	1	83	67	1.306	1.03	1.31	24.0	70.0		31	91		52	15	
S		13	1	75	18	1.113	1.03	1.11	12.0	30.0		13	33		22	6	

Stand Table Summary

Project **COUGARMO**

T04N R08W S14 TCC

T04N R08W S14 TCC

Twp Rge Sec Tract
04N 08W 14 CC AREAS

Type Acres Plots Sample Trees
CC 165.60 39 181

Page: 2
Date: 4/3/03
Time: 1:45:49PM

S Spc	T	DBH	Sample Trees	FF 16'	Av Ht Tot	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
S		16	1	92	38	.735	1.03	.73	24.0	50.0		18	37		29	6
S		17	1	87	82	.651	1.03	1.30	29.0	105.0		38	137		62	23
S		19	1	73	51	.521	1.03	.52	49.0	60.0		26	31		42	5
S		20	3	84	73	1.410	3.08	2.35	42.8	138.0		101	324		167	54
S		22	1	86	80	.389	1.03	.78	49.5	190.0		38	148		64	24
S		26	1	83	61	.278	1.03	.56	54.0	175.0		30	97		50	16
S		28	1	75	50	.240	1.03	.48	50.5	155.0		24	74		40	12
S		Totals	12	83	59	8.196	12.31	10.69	32.6	99.7		348	1,066		577	177
DL		34	1	84	133	.163	1.03	.49	103.0	473.3		50	231		83	38
DL		40	1	91	166	.118	1.03	.47	136.2	777.5		64	366		106	61
DL		Totals	2	87	147	.280	2.05	.96	119.3	622.6		114	597		189	99
HL		30	1	89	99	.209	1.03	.63	70.3	333.3		44	209		73	35
HL		37	1	88	103	.137	1.03	.27	166.5	770.0		46	212		76	35
HL		38	1	77	71	.130	1.03	.26	99.5	410.0		26	107		43	18
HL		Totals	3	85	93	.477	3.08	1.16	99.6	453.8		116	527		192	87
SL		35	1	78	76	.154	1.03	.31	113.0	430.0		35	132		57	22
SL		41	1	77	78	.112	1.03	.22	157.5	580.0		35	130		58	21
SL		45	1	80	117	.093	1.03	.28	182.0	863.3		51	241		84	40
SL		Totals	3	78	87	.358	3.08	.81	149.1	620.6		121	502		200	83
Totals			181	86	74	135.913	185.64	220.54	27.4	99.1		6038	21,858		9,999	3,620

CRUISE DESIGN

Sale Name Cougar Monster Area(s) I, II, VII
1 2 7

1. Cruise Method:

- A. Variable Plot: BAF Full or Half Point
Sighting point (BH or 16') BH
- B. Fixed Radius Plot: Plot Size (Acres) 1/25 Plot Radius 23.55 feet
- C. Strip Cruise: Strip Width feet Strip Spacing feet
Strip factor Strip (plot) length feet
- D. ITS Cruise: Measure/grade to Count ratio by Species:
D-fir ; Hemlock ; Spruce ; Cedar ; Hdwd ; Other
- E. 100% Cruise: Grade all trees ; Grade 1 in trees by Species:
D-fir ; Hemlock ; Spruce ; Cedar ; Hdwd ; Other
- F. Clearcut; or Partial Cut: Indicate Take (T) and Leave (L) trees.

2. Plot Spacing: Lines are 8 ~~ft~~ chains apart (circle correct one)

Plots are 4 ~~ft~~ chains apart

Cruise line direction is: AREA 1 = North/South, Area 2 = 45°/225°
Area 7 = East/West

3. Detailed Cruising Directions: (include cruise objectives, such as estimated stand CV, target SB% for board foot volume, target number of conifer grade trees, estimated volume per acre, expected defect and breakage factors, grade/measure/count ratios, etc.)

Measure and Cruise every third Plot. Cruise Cut and Leave Trees Record Leave as species with an 'L' i.e.

DL = Douglas Fir Leave, D = Douglas Fir Cut Grade Leave Trees

Record Snag Banks AS CAMP RUN (R) All CEDAR ARE RESERVED (Not "leave Tree")
Cut All Hardwoods. Other Plots Count Plots 2:1 Ratio

CV 25 to 47 Ave = 40 TARGET SE ≤ 10% Target 200 Conifer Graded Trees

4. Form Factors (FF): Measure or estimate a 16' form factor for every conifer tree graded. For "old growth" D-fir (>48" dbh), measure form factors at 32'.

USE TABLE ON MAP TO Decide Number of Leave Trees.

5. Top Cruise Diameter (TD): Minimum top outside bark is 7" and/or 40% of d.o.b. at 16'. (Generally, for large timber, use 6" and 0.4 (40%); for thinning size timber, use 4 or 5" TCD. For "old growth", use 0.5 (50%) of d.o.b. at 16'.)
Alder 8' and 10' Lengths 7" Top 12 ft Length = 20 dbh

6. Diameter Recording: Minimum dbh to cruise is 8" for conifers and 8" for hardwoods. Record dbh (measured) to nearest 0.5" for trees <12" dbh, to nearest 1" for trees 12 to 20" dbh, and to nearest 2" for trees >20" dbh. If tree diameters are estimated, then record to closest estimate.

7. Bole Length (Merch. tree height): Record bole length to TCD to nearest foot. Do not record total tree height, except in certain special cases (such as inventory plots).

Sale Name Cougar Monster Area(s) I, II, VII
1 2 7

8. Tree Segments: Record log segments to maximize grade within scaling standards and within practicality. Minimum segment length is 12 feet (except cull segments); Maximum segment length is 40 feet. One foot of trim is assumed for each merch. segment. Do not use the "double dash" (--) feature on the data recorder except for the top segment of the tree.

9. Species, Sort, and Grade Codes:

- A. Species: D-fir = D; Hemlock = H; Sitka Spruce = S; Red Cedar = C; Silver fir = SF; Grand fir = GF; Noble fir = NF; Red Alder = A; Bifleaf Maple = M.
 B. Sorts: Domestic = 1; Leave tree = L; Take tree = T.
 C. Grades: #1 Peeler = A; #2 Peeler = B; #3 Peeler = C; Special Mill = D; #2 Sawmill = 2; #3 Sawmill = 3; #4 Sawmill = 4; Pulp = P; Camp Run = R; Cull = 0

10. Standard Field Procedures: Cruise line ends are to be marked with blue and yellow ribbon, with cruise line number, cruising direction, cruiser's initials, and cruise date. At plot, sink a sturdy stake into the ground, marked with a yellow ribbon, labeled with cruise plot number. Hang another labeled yellow ribbon above eye height near the plot center. Label plot ribbons with cruiser's initials and plot number (eg. "TS01") and mark the location of the plot on the cruise map. Between plots, hang blue ribbons at visible intervals along the cruise line. Mark the first tree on each plot with yellow paint. A tree number or tree dbh may be used as a marking. The first tree should be the first "in" tree to the right (clockwise) of the cruise line direction. If half plots are used, mark "wing points" carefully about 20 feet either side of the plot center, using yellow ribbon. (These procedures apply to "plot" type cruises.) On "strip" cruises, the strip center should be plainly marked with yellow ribbon, and line ends should be marked with blue and yellow ribbon.

11. Cruising Equipment: Relaskop, rangefinder, diameter tape or rewind tape, biltmore stick, compass, increment borer, tatum and cruise cards or CMT data recorder, yellow and blue ribbon, permanent marker, Scaling and Grading Rules book, and Cruise Design and Map.

12. Attachments:

A. Cruise Map showing unit boundaries, major roads and streams, north arrow, legal description, approximate acreage, numbered cruise lines and approximate number of plots on each line, plot spacing, cruise line directions, BAF, measure/grade/count ratio, if applicable.

B. Miscellaneous Tatum Aids: (1) CMT data entry guides; (2) _____

B. Cruise Design

- Objectives: (1) SE combined $\leq 10\%$ total stand
 (2) Min 200 graded conifers
 (3) Sufficient BA + SPA data for prescription

Area	# plots	CV	SE	Acres	WT
1	9	40	13	26 25.6	12 .116
2	8	25	9	16.6 14.2 15.1	6 .695
7	12	47	14	48 42	22 .18
	<u>29</u>	<u>40</u>		26 22.7	

$$n = \frac{(c)^2}{(A)^2} = \frac{1600}{100} = 16 \text{ plots}$$

$\sqrt{25}$ Acre Plot, (23.55' radius) \bar{x} TC = 9

200 trees / 9 per plot = 22 plots 9.8 ac / plot

Count plots 2:1 ratio 3.3 Ac / plot

8 ch. between lines + 4 ch between plots = 1 plot / 3.2 Acres

$$22.7 / 3.3 = 67$$

$$216 / 3.2 = 67 \text{ plots} \quad \text{Plan} \quad \text{Actual}$$

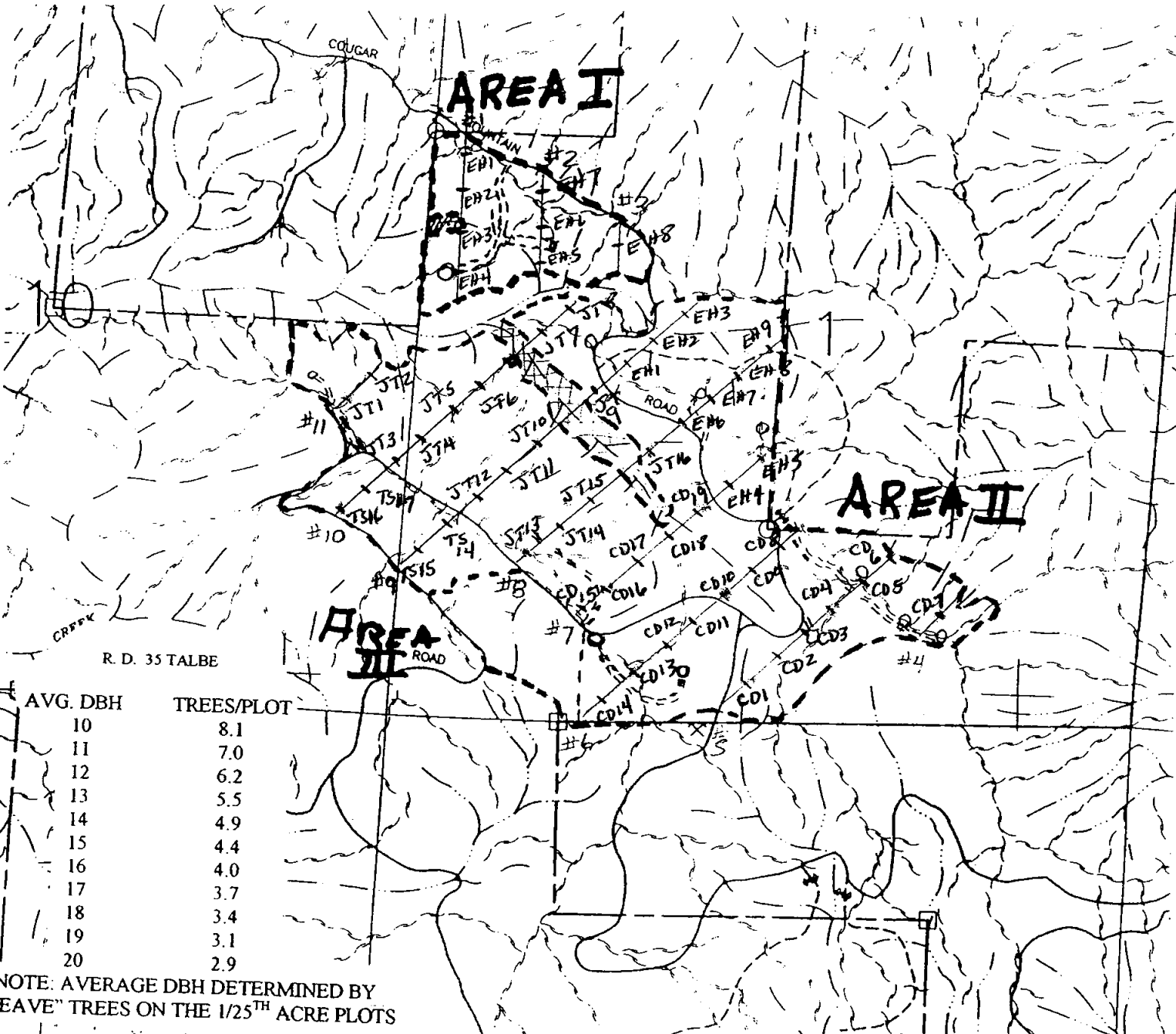
$$A I = 7.8 \text{ plots} = 8$$

$$A II = 46.6 \text{ plots} = 49 \quad 157.1$$

$$A VII = 12.7 \text{ plots} = 13$$

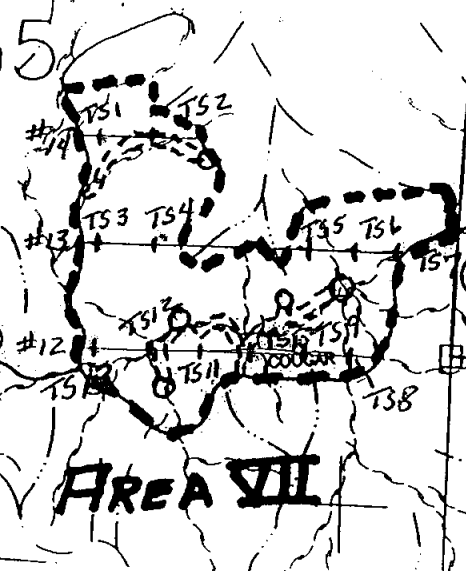
70 plots

$$\div 4 \text{ cruisers} = 17.5 / \text{team}$$



AVG. DBH	TREES/PLOT
10	8.1
11	7.0
12	6.2
13	5.5
14	4.9
15	4.4
16	4.0
17	3.7
18	3.4
19	3.1
20	2.9

NOTE: AVERAGE DBH DETERMINED BY
EAVE" TREES ON THE 1/25TH ACRE PLOTS



COUGAR MONSTER
PARTIAL CUT UNIT CRUISE

PLOTS WILL BE 4 CHAINS APART, LINES WILL BE 8 CHAINS APART. DO NOT PACE THROUGH EXISTING ROADS OR POSTED BUFFERS. ALL PLOTS WILL BE 1/25 ACRE (23.55 FT. HORIZONTAL RADIUS) FIXED PLOTS. LINES ON THE BASE LINE WILL BE MARKED WITH YELLOW AND BLUE RIBBON WITH LINE NUMBERS. CRUISE AND GRADE EVERY THIRD PLOT. COUNT PLOTS ON THE OTHERS.

- REFER TO "R. D. TABLE" FOR REQUIRED DESIGNATED LEAVE TREES PER PLOT.
- UNIT I: 8 PLOTS PLANNED, BASE LINE ON THE COUGAR MT. RD FROM THE NORTH EDGE., NORTH/ SOUTH ORIENTATION.
- UNIT II: 50 PLOTS PLANNED, BASE LINE ON THE COUGAR MT. RD FROM THE WEST EDGE., N. 45° E. (45°) / S. 45° W. (225°) ORIENTATION.
- UNIT VII: 13 PLOTS PLANNED, BASE LINE ON THE SPUR ROAD ON THE WEST SIDE OF THE UNIT, EAST / WEST ORIENTATION.

CUT ALL AIDER, RESERVE ALL CEDAR

Cougar Monster

Grade Plots =

CRUISE DESIGN

Sale Name Cougar Monster (FY 2000) Area(s) RH Areas 3, 4, 5, & 6

1. Cruise Method:

- A. Variable Plot: BAF 40 Full or Half Point F
Sighting point (BH or 16') BH
- B. Fixed Radius Plot: Plot Size (Acres) _____ Plot Radius _____ feet
- C. Strip Cruise: Strip Width _____ feet Strip Spacing _____ feet
Strip factor _____ Strip (plot) length _____ feet
- D. ITS Cruise: Measure/grade to Count ratio by Species:
D-fir _____; Hemlock _____; Spruce _____; Cedar _____; Hdwd _____; Other _____
- E. 100% Cruise: Grade all trees _____; Grade 1 in _____ trees by Species:
D-fir _____; Hemlock _____; Spruce _____; Cedar _____; Hdwd _____; Other _____
- F. Clearcut; or Partial Cut: Indicate Take (T) and Leave (L) trees.

2. Plot Spacing: Lines are 8 feet, chains apart (circle correct one)

Plots are 8 feet, chains apart

Cruise line direction is See Maps for Individual Areas.

3. Detailed Cruising Directions: (Include cruise objectives, such as estimated stand CV, target SE% for board foot volume, target number of conifer grade trees, estimated volume per acre, expected defect and breakage factors, grade/measure/count ratios, etc.)

Stands are mixtures of conifer & hardwoods. Estimated combined CV = 50% SE objective is 10%. Minimum 150 conifer grade trees. Estimate 300 total grade trees. Grade all trees on all plots. Record & grade snags as "DD" species. Cedars are reserved on sale areas. See individual sale area map. Record "wildlife trees" as CL, DL, HL, etc.

4. Form Factors (FF): Measure or estimate a 16' form factor for every conifer tree graded. ~~For "old growth" D-fir (>48" dbh), measure form factors at 32'.~~

5. Top Cruise Diameter (D): Minimum top outside bark is 7 ", and/or 40 % of d.o.b. at 16'. (Generally, for large timber, use 6" and 0.4 (40%); for thinning size timber, use 4 or 5" TCD. For "old growth", use 0.5 (50%) of d.o.b. at 16'.)

For alder sawlogs, cruise to 8" to 10" top, and preferred lengths are 8' & 10' multiples.

6. Diameter Recording: Minimum dbh to cruise is 10 " for conifers and 10 " for hardwoods. Record dbh (measured) to nearest 0.5" for trees <12" dbh, to nearest 1" for trees 12 to 20" dbh, and to nearest 2" for trees >20" dbh. If tree diameters are estimated, then record to closest estimate.

7. Bole Length (Merch. tree height): Record bole length to TCD to nearest foot. Do not record total tree height, except in certain special cases (such as inventory plots).

Sale Name Cougar Monster (Fy2000) Area(s) 3, 4, 5, 6

8. Tree Segments: Record log segments to maximize grade within scaling standards and within practicality. Minimum segment length is 12 feet (except cull segments). Maximum segment length is 40 feet. One foot of trim is assumed for each merch. segment. Do not use the "double dash" (--) feature on the data recorder except for the top segment of the tree.

9. Species, Sort, and Grade Codes: DD = Snag Wildlife Tree = CL, DL, HL, etc.
 A. Species: D-fir = D; Hemlock = H; Sitka Spruce = S; Red Cedar = C; Silver fir = SF; Grand fir = GF; Noble fir = NF; Red Alder = A; Bifleaf Maple = M.
 B. Sorts: Domestic = 1; Leave tree = L; Take tree = T.
 C. Grades: #1 Peeler = A; #2 Peeler = B; #3 Peeler = C; Special Mill = D; #2 Sawmill = 2; #3 Sawmill = 3; #4 Sawmill = 4; Pulp = P; Camp Run = R; Cull = 0

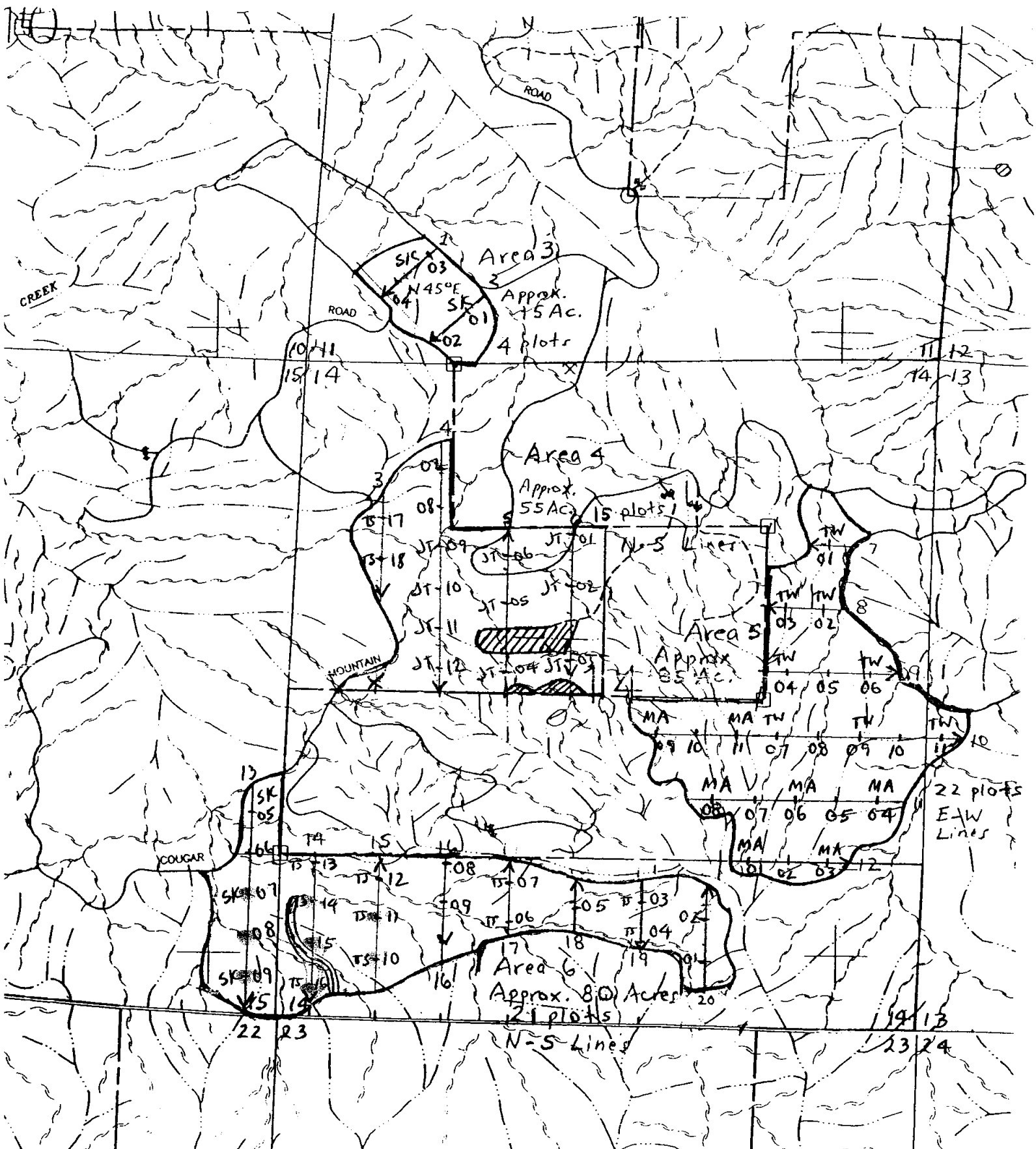
10. Standard Field Procedures: Cruise line ends are to be marked with blue and yellow ribbon, with cruise line number, cruising direction, cruiser's initials, and cruise date. At plot, sink a sturdy stake into the ground, marked with a yellow ribbon, labeled with cruise plot number. Hang another labeled yellow ribbon above eye height near the plot center. Label plot ribbons with cruiser's initials and plot number (eg. "TS01") and mark the location of the plot on the cruise map. Between plots, hang blue ribbons at visible intervals along the cruise line. Mark the first tree on each plot with yellow paint. A tree number or tree dbh may be used as a marking. The first tree should be the first "in" tree to the right (clockwise) of the cruise line direction. If half plots are used, mark "wing points" carefully about 20 feet either side of the plot center, using yellow ribbon. (These procedures apply to "plot" type cruises.) On "strip" cruises, the strip center should be plainly marked with yellow ribbon, and line ends should be marked with blue and yellow ribbon.

11. Cruising Equipment: Relaskop, rangefinder, diameter tape or rewind tape, biltmore stick, compass, increment borer, tatum and cruise cards or CMT data recorder, yellow and blue ribbon, permanent marker, Scaling and Grading Rules book, and Cruise Design and Map.

12. Attachments:

A. Cruise Map showing unit boundaries, major roads and streams, north arrow, legal description, approximate acreage, numbered cruise lines and approximate number of plots on each line, plot spacing, cruise line directions, BAF, measure/grade/count ratio, if applicable.

B. Miscellaneous Tatum Aids: (1) CMT data entry guides; (2) _____



235 Acres
62 plots

40 BAF - full plot
8ch. x 5ch. spacing

Plots deleted for
Revised Sale Area 6

**TIMBER CRUISE MAP - COUGAR MONSTER
REGEN. HARVEST AREAS 3, 4, 5 & 6
Sections 11, 13, 14, 15 & 23, T4N, R8W, W.M.**

KRAIG
TOM

COUGAR MO - 04N08W14

Type 006A + 006B

Areas 6A + 6B

Revised August, 2002

CRUISE DESIGN
ASTORIA DISTRICT

Sale Name: Cougar Monster Area(s) 6A + 6B

Harvest Type: CC PC CT Automark Thinning (circle one) Marked PC

Approx. Cruise Acres: 48 Estimated CV% 60 ^{Net BF or} BA/Acre SE% Objective 12 ^{Net BF or} BA/Acre

Planned Sale Volume: 8.0 MMBF Estimated Sale Area Value/Acre: \$7,000

- A. **Cruise Goals:** (a) Grade minimum 60 conifer and 8 hardwood trees;
 (b) Sample 23 cruise plots; (c) Other goals (Determine "automark" thinning standards; Determine log grades for sale value; Determine snag and leave tree species and sizes; Determine LWD (down wood) cubic feet and decay classes; Determine "diameter limit" harvest parameters;

Area 6B - leave trees are marked. All H.S + C < 12" are "leave"
Area 6A - leave 80-100 BA "biggest + best" conifer. Take all
leave conifer > 30" dbh. hardwood.

B. **Cruise Design:**

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

Fixed Plot Size Plot Radius feet

Cruise Line Direction(s) E-W

Cruise Line Spacing 4 (chains) (feet)

Cruise Plot Spacing 5 (chains) (feet)

Grade/Count Ratio 1:2 Measure/grade all cedar.

2. ITS (Sample Tree) Cruises: Measure-grade ratios: D-fir Hemlock
Spruce True Fir Cedar Hardwood

C. **Tree Measurements:**

- Diameter:** Minimum DBH to cruise is 8" for conifers and 8" 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.
- 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.
- 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.
- 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). For "leave trees" in partial cuts, or for marked "wildlife trees," add an "L" to the species code (such as DL, HL, CL, etc.)
 - 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

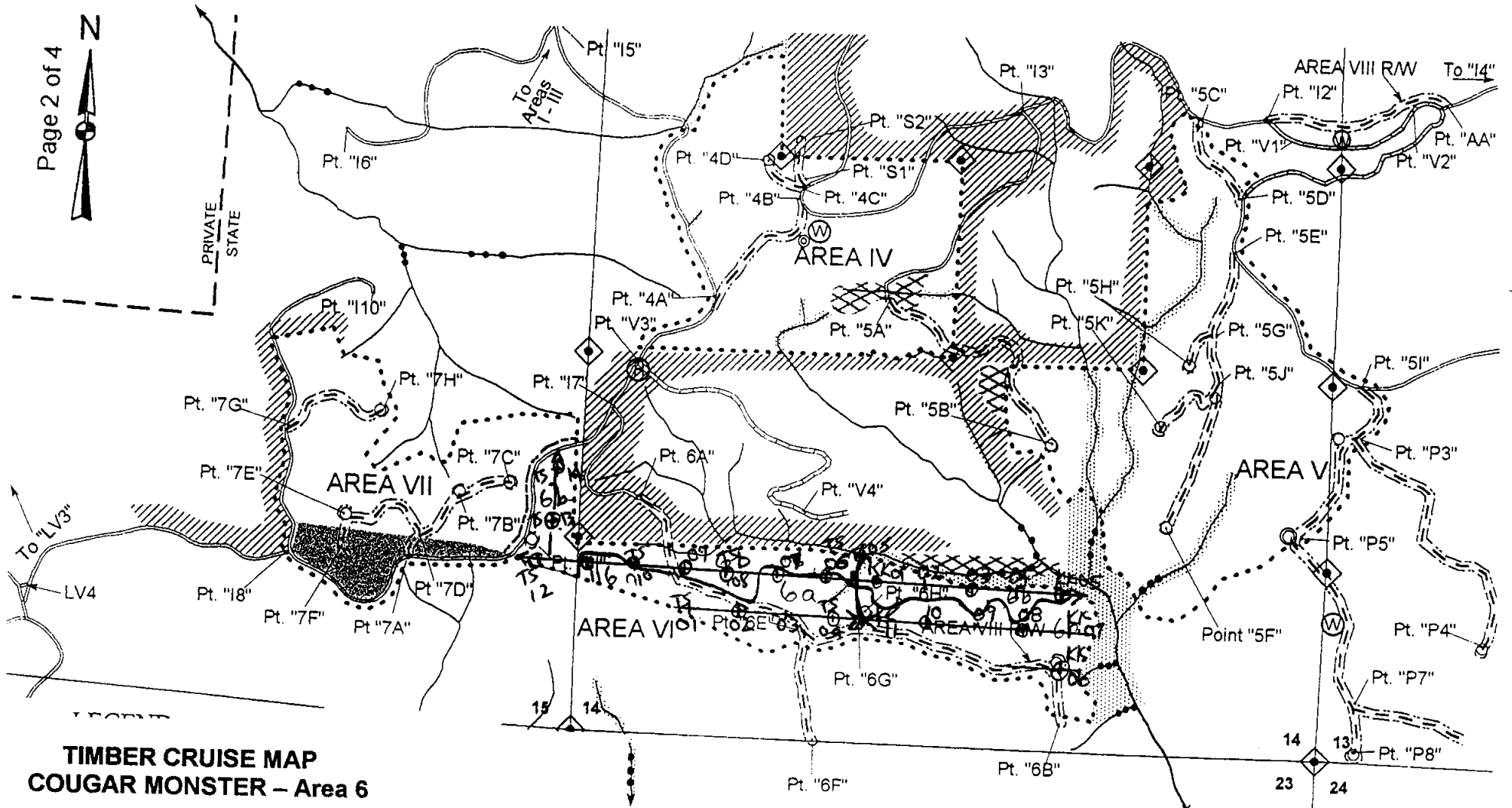
7. **Deductions:** Estimate visible defect or damage as a "length deduction" (most often), or as a "diameter deduction," as applicable. Estimate hidden defect and breakage (usually some breakage is encountered in trees > 100 feet in height) on a "per tree" basis. Steep and broken topography generally 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, roads, streams, approx. acres/unit, cruise lines and plot locations, legal description and section lines, BAF or plot size, measure/count plot ratio, north arrow, and scale.
 - B. Data Recorder Instructions
 - C. Other

Cruise Design by: TOM SUGGINS
 Approved by: _____
 Date: _____



**TIMBER CRUISE MAP
COUGAR MONSTER – Area 6**

Lines E-W, 4 chains between lines
Plots 5 chains apart along lines
VP plots 40 BAF, FP

Measure/Grade "circled" plots

In Area 6a, leave trees are conifers @ 80-100 BA

In Area 6b, leave trees are marked w/ blue paint

Use plot centers from April, 2002 "recon cruise"

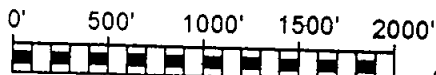
Area 6a (and road RW) = Approx. 30 acres

Area 6b = Approx. 18 acres

Exhibit "A"

OF TIMBER SALE CONTRACT NO. 341-⁰³⁻⁷⁵~~03-60~~
COUGAR MONSTER
DNS OF SECTIONS 10, 11, 13, 14, AND 15, T4N, R8W, W.M.
CLATSOP COUNTY, OREGON

APPROX. SCALE 1"=1,000'



26 plots

6a = 12 plots

6b = 14 plots

APPROXIMATE ACREAGE:

AREA I	24.1 ACRES
AREA II	152.1 ACRES
AREA III	12.9 ACRES
AREA IV	67.1 ACRES
AREA V	85.6 ACRES
AREA VI	48.2 ACRES
AREA VII	39.3 ACRES
AREA VIII RW	21.7 ACRES
TOTAL	451.0 ACRES

Area 8 n/w = 3 Ac.

6b ≈ 18 Acres.

6a ≈ 27 Ac.

FPA "Written Plan" for Harvest of State Timber Sale
COUGAR MONSTER
Portions of Sections 10,11,13,14, & 15 T4N, R8W, W.M., Clatsop County, Oregon.

Protected Resources:

Unnamed Small Type F tributary streams to the Nehalem River, located in or adjacent to sale Areas 5, 6a, and 6b of the Cougar Monster timber sale.

Specific Site Characteristics and Vegetation Retention:

Type F streams are all headwater streams, and Area 5 is a clearcut harvest unit. In Area 5, the Type F portion of the stream extends for about 300 feet into the southern tip of the harvest unit. This stream, along with 3 perennial Type N streams which drain into it, is buffered with a posted boundary at least 100 feet wide. The buffer consists of conifers, hardwoods, and dense brush. No logging will occur across the Type F or the lower portions of the Type N streams.

Areas 6a and 6b are partial cuts. In Areas 6a and 6b, the Type F stream lies downhill to the east, and adjacent to the north for a portion of the harvest area. The timber sale boundary along this stream is at least 100 feet from the stream. Buffer vegetation consists mainly of conifer trees and light brush. No logging will occur within or across either stream. However, it will be necessary to string cables across both streams to achieve lift for logging lines.

Resource Protection Measures:

Felling: Trees are to be felled away from or parallel to the RMA to prevent them from entering the RMA. Any felled trees that may accidentally enter the RMA will be removed only with the STATE contract administrator's approval. Any felled trees that may accidentally enter the RMA will be yarded out of the RMA before limbing and bucking.

Yarding: There will be no machine activity permitted within the RMA and no temporary stream crossings will be permitted across Type F streams. When cables pass through or over the RMA, precautions will be taken to protect the residual timber. These precaution measures include but are not limited to:

- A. Cables will be pulled out of the residual timber before rigging the next yarding road.
- B. Operator will avoid lowering the skyline into RMA during the yarding cycle. If this is not feasible, then lowering of the skyline will be limited to that which is necessary to release logs at the landing and lines will be eased into and out of the RMA to minimize damage to vegetation.
- C. Yarding roads will be located in "natural" openings and/or where cables will not cause damage to conifer trees within the RMA.
- D. All skid trails on slopes exceeding 10%, or within 100 feet of a stream, will be water barred prior to the rainy season.

Aquatic Protection: Debris entering the RMA or aquatic area will be removed by the end of operations each day or as soon as possible and placed in a stable location, unless an alternate practice is approved by STATE.

FPA "Written Plan" for Harvest of State Timber Sale
COUGAR MONSTER
Portions of Sections 10,11,13,14, & 15 T4N, R8W, W.M., Clatsop County, Oregon.

I, the undersigned, submit this written plan in compliance with the requirements in the Forest Practices Act regarding the operations conducted within 100 feet of streams with the Riparian Management Areas (buffer strips) as shown on the attached map, Exhibit "A".

Submitted by: _____
Operator

Date: _____

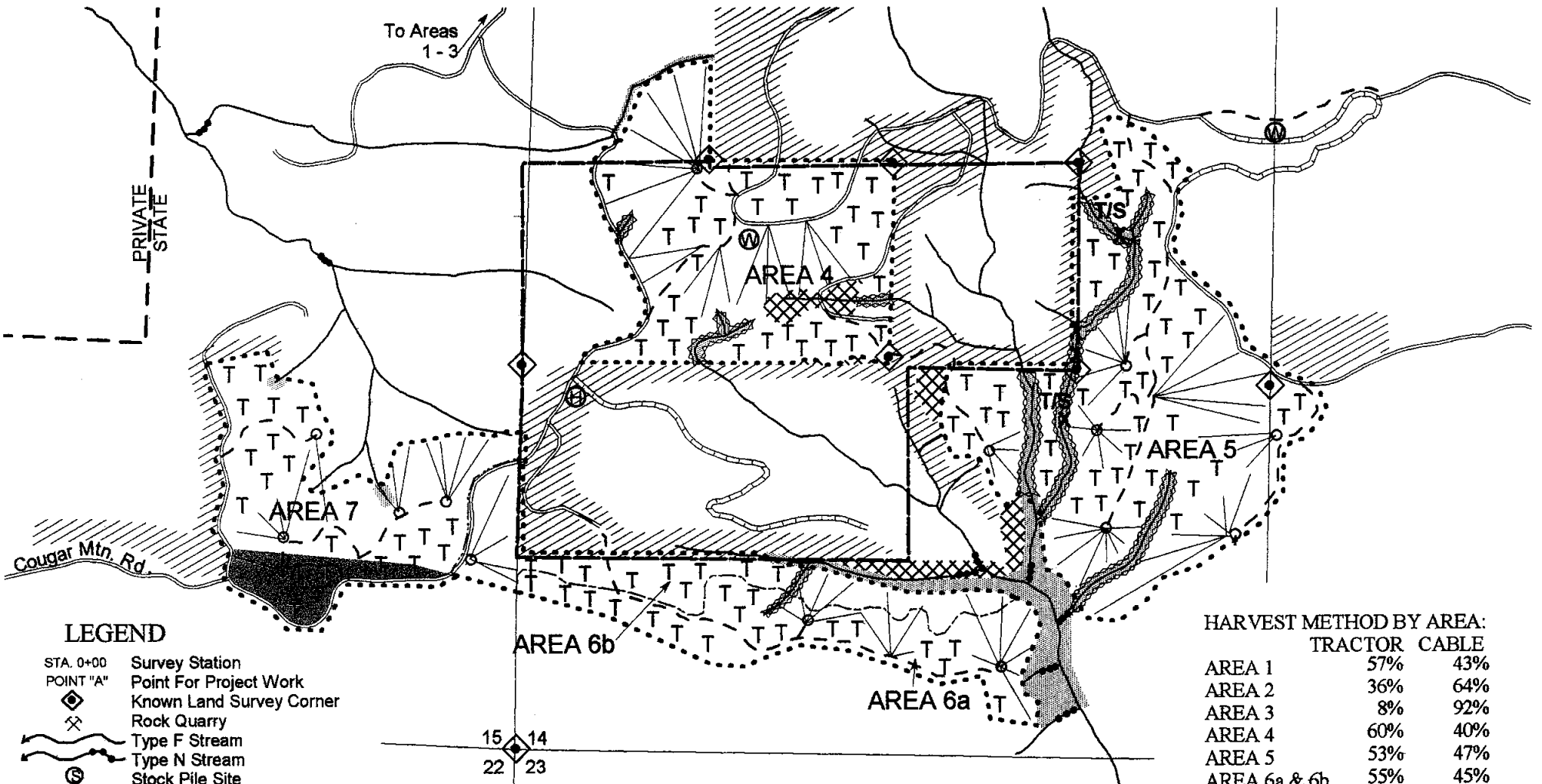
Approved by: _____
State Lands Forester

Date: _____

Forest Practices Forester

Date: _____

Attachments: Timber Sale Exhibit "A" map



LEGEND

- STA. 0+00 Survey Station
- POINT "A" Point For Project Work
- Known Land Survey Corner
- Rock Quarry
- Type F Stream
- Type N Stream
- Stock Pile Site
- Landing To Be Constructed
- Helicopter Evacuation Location
- Waste Area
- Old Fire Lookout
- Ownership Boundary
- CSL/BOF Property Line
- TIMBER SALE BOUNDARY
- Area Boundary
- Right Of Way Boundary
- Posted Stream Buffer
- Unposted Stream Buffer
- Reforestation Area
- Special Felling Area
- Green Tree Retention Area
- Unsurfaced Road
- Surfaced Road
- New Construction
- State Highway
- Road to be Vacated
- Locked Gate
- T/SX Temporary Stream Crossing
- T Tractor Logging
- * Cable Logging

HARVEST METHOD BY AREA:

	TRACTOR	CABLE
AREA 1	57%	43%
AREA 2	36%	64%
AREA 3	8%	92%
AREA 4	60%	40%
AREA 5	53%	47%
AREA 6a & 6b	55%	45%
AREA 7	54%	46%
TOTAL :	47%	53%

Logging Plan

OF TIMBER SALE CONTRACT NO. 341-03-75
 COUGAR MONSTER
 PORTIONS OF SECTIONS 10,11,13,14 AND 15,
 T4N,R8W, W.M.,
 CLATSOP COUNTY, OREGON
 APPROX. SCALE 1"=1,000'

500 0 500 1000 Feet



APPROXIMATE ACREAGE:

AREA 1 (PC)	24.1
AREA 2 (PC)	152.1
AREA 3 (CC)	12.9
AREA 4 (CC)	67.1
AREA 5 (CC)	85.6
AREA 6a (PC)	27.0
AREA 6b (PC)	18.0
AREA 7 (PC)	39.3
AREA 8 R/W	12.4
TOTAL PC ACRES	260.5
TOTAL CC ACRES	165.6
TOTAL R/W ACRES	12.4
GRAND TOTAL	438.5

**FPA "Written Plan" for State Timber Sale Road Improvement Project
Point LV3 (Hopinscratchit Road)
Cougar Monster Timber Sale**

Portions of Sections 15 & 16, T4N, R8W, W.M., Clatsop County, Oregon

Landowners:

Oregon Department of Forestry (Section 15)
92219 Hwy 202
Astoria, OR 97103
(503) 325-5451

Longview Fibre (Section 16)
P.O. Box 2323
Gearhart, OR 97138
(503) 717-8288

Protected Resources: An unnamed tributary of Punchbowl Creek a small, non fish type resource. The fill to be removed is an estimated height of 20 feet. A written plan is required when building or replacement of fills over 15 feet in height.

Situation: A 24 inch diameter culvert on Hopinscratchit Road is undersized and is failing. As part of the road improvement for Cougar Monster timber sale (Road Point LV3), this culvert will be replaced with a 54" drainage structure. Further detailed work specifications for this project are included as Project No. 2 of the Cougar Monster Timber Sale Contract shown/described in Exhibits A, B, C, H and L.

Drainage Area and Culvert Design:

- ❖ The stream crossing drainage area is 38 acres.
- ❖ Stored stream sediment will be removed to restore the stream channel for 25 feet above the culvert inlet.
- ❖ The 50 year peak flow for this drainage is 400 cfs per square mile. Therefore, the 50 year flow for this stream crossing is 24 cfs. Current FPA guidelines require that a culvert with a minimum diameter of 33 inches is necessary to pass the 50 year peak flow.
- ❖ A 54 inch diameter, 10 gauge aluminized steel culvert will be installed.
- ❖ Riprap rock will be used to restore the stream channel elevation at the plunge pool created from the existing culvert.
- ❖ The fill slopes will be armored with riprap rock to minimize surface erosion. The culvert design includes a 1:1 beveled inlet opening to improve efficiency.

Resource Protection Measures:

- 1) Work will be performed only during dry weather periods, low water stream flows and between May 1 and September 30, annually.
- 2) Riprap rock will be used to armor the fill slopes to minimize erosion and to construct an energy dissipater.
- 3) Machine activity in stream channels will be minimized. All excavation and riprap rock placement will be performed using a minimum 1½ cubic-yard track-mounted excavator.
- 4) De-watering of the installation area during development of the culvert bed and stream channel will be accomplished by use of coffer dams, temporary diversion ditches, or drainage structures and/or damming and pumping.
- 5) Selected native earth materials free from woody debris will be used for backfilling. Fill material will be thoroughly compacted with specialized compaction equipment.
- 6) Excavated waste materials will be hauled to approved waste areas and left in a stable condition.
- 7) All bare soils shall be mulched with a straw and grass seeded approved by STATE. Applied mulch shall be a minimum of 3 inches deep and provide a uniform cover.

**FPA "Written Plan" for State Timber Sale Road Improvement Project
Point LV3 (Hopinscratchit Road)
Cougar Monster Timber Sale**

Portions of Sections 15 & 16, T4N, R8W, W.M., Clatsop County, Oregon

I, the undersigned, submit this written plan in compliance with the requirements in the Forest Practices Act regarding the operations conducted when, fills work exceeds 15 feet in height. I agree to the protection measures listed on this plan:

Submitted by: _____ **Date:** _____
Operator/Purchaser

Approved by: _____ **Date:** _____
State Lands Forester

Approved by: _____ **Date:** _____
Landowner-LVF

Approved by: _____ **Date:** _____
Forest Practices Forester

Attachments: Projects Map
Cross Section Diagram

CC: Landowners, Operator, Purchaser, District file, Salem, Eng. Unit, Sunset Unit

X:\DOCUMENT\2004 FY Sales\Cougar Monster\Projects\Written Plans\Written Plan-Cougar Monster LV3 pipe.doc

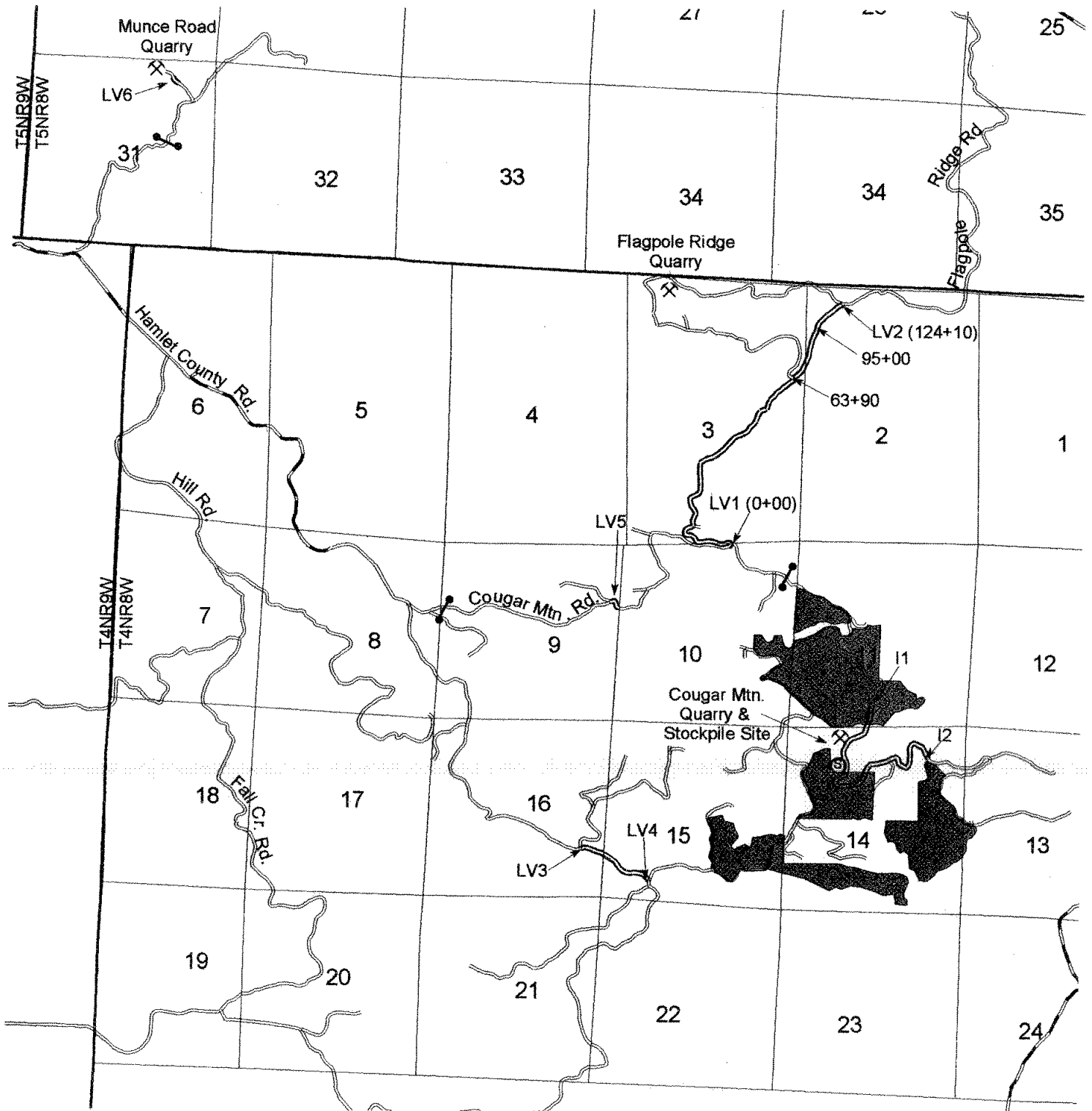


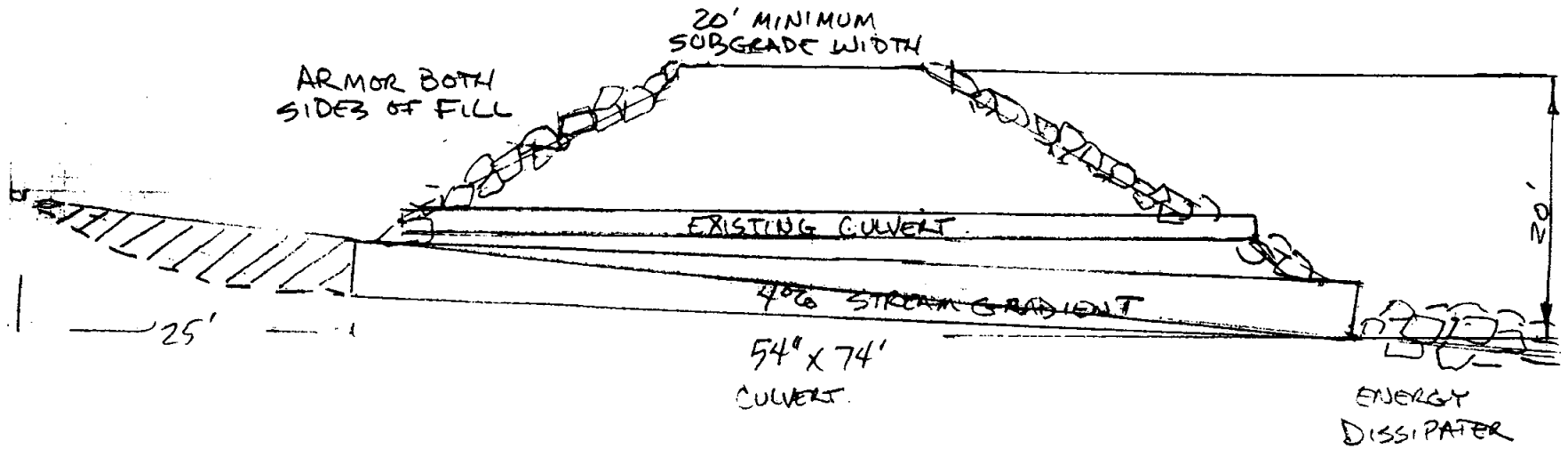
Exhibit "A"


Projects Map

OF TIMBER SALE CONTRACT NO. 341-03-75
COUGAR MONSTER
W.M., CLATSOP COUNTY, OREGON



HOPINSCRATCHIT ROAD



 STREAM SEDIMENT TO BE REMOVED.

LV3

38 ACRE DRAINAGE AREA.

$$\frac{38 \text{ ACRES}}{640} \times 400 = 23.75$$

FPA RECOMMENDS - 33" Dia.

USING 54" DIA.

FPA "Written Plan" for State Timber Sale Road Improvement Cougar Monster Timber Sale

Landowner: Longview Fibre
P.O. Box 2323
Gearhart, OR 97138
(503) 717-8288

ITEM NO. 1. Point LV5 (Cougar Mountain Road) Portions of Sections 9 & 10, T4N, R8W, W.M., Clatsop County, Oregon.

Protected Resources: An unnamed tributary of North Fork Nehalem a small, non fish type resource. The fill to be removed is an estimated height of 30 feet. A written plan is required when building or replacement of fills over 15 feet in height.

Situation: A 30 inch diameter culvert on Cougar Mountain Road is undersized and is failing. As part of the road improvement for Cougar Monster timber sale (Point LV5), this culvert will be replaced with a 54" drainage structure. Further detailed work specifications for this project are included as Project No. 2 of the Cougar Monster Timber Sale Contract shown/described in Exhibits A, B, C, H and L.

Drainage Area and Culvert Design:

- ❖ At Point LV5 on Cougar Mountain Road, the stream crossing drainage area is 47 acres.
- ❖ The fill height will be reduced by an estimated 4 feet, road approach slopes will be re-graded to meet existing road grades on both approaches.
- ❖ The stored stream sediment will be removed to restore the stream channel for a distance of 25 feet above the culvert inlet.
- ❖ The 50 year peak flow for this drainage is 400 cfs per square mile. Therefore, the 50 year flow for this stream crossing is 29 cfs. Current FPA guidelines require that a culvert with a minimum diameter of 36 inches is necessary to pass the 50 year peak flow.
- ❖ A 54 inch diameter, 10 gauge aluminized steel culvert will be installed.
- ❖ Riprap rock will also be used to restore the stream channel elevation at the plunge pool created from the existing culvert.
- ❖ The fill slopes will be armored with riprap rock to minimize surface erosion. The culvert design includes a 1:1 beveled inlet opening to improve efficiency.

Resource Protection Measures:

- 1) Work will be performed only during dry weather periods, low water stream flows and between May 1 and September 30, annually.
- 2) Riprap rock will be used to armor the fill slopes to minimize erosion and to construct an energy dissipater.
- 3) Machine activity in stream channels will be minimized. All excavation and riprap rock placement will be performed using a minimum 1½ cubic-yard track-mounted excavator.
- 4) De-watering of the installation area during development of the culvert bed and stream channel will be accomplished by use of coffer dams, temporary diversion ditches, or drainage structures and/or damming and pumping.
- 5) Selected native earth materials free from woody debris will be used for backfilling. Fill material will be thoroughly compacted with specialized compaction equipment.
- 6) Excavated waste materials will be hauled to approved waste areas and left in a stable condition.

FPA "Written Plan" for State Timber Sale Road Improvement Cougar Monster Timber Sale

- 7) All bare soils shall be mulched with straw and grass seeded approved by STATE.

ITEM NO. 2. LV1 to LV2 Station 95+00 (Flagpole Ridge Road) Portions of Section 2 & 3, T4N, R8W, W.M., Clatsop County, Oregon.

Protected Resources: An unnamed tributary to George Creek, a small, Type F fisheries resources. A written plan is required for any activities within 100 feet of a Type F stream.

Situation: A 30 inch diameter culvert on Flagpole Ridge Road blocks fish access on the unnamed tributary to George Creek. As part of the road improvement LV1 to LV2 at Station 95+00 Flagpole Ridge Road, this culvert will be replaced with a drainage structure meeting FPA guidance. Further detailed work specifications for this project are included as Project No. 2 of the Cougar Monster Timber Sale Contract shown/described in Exhibits A, B, C and L.

Drainage Area and Culvert Design:

- ❖ Road Improvement Point LV1 to LV2 at Station 95+00, on Flagpole Ridge Road the stream crossing drainage area is 17 acres and the existing and projected stream gradient are 2%-3%. The active stream channel width is 3 feet to 4 feet.
- ❖ The substrate material is composed of mostly Deep Valley Fill, with fines, sand, and some gravel and cobble. The Deep Valley fill is approximately 5 feet deep.
- ❖ The 50 year peak flow for this drainage is 400 cfs per square mile. Therefore, the 50 year flow for this stream crossing is 11 cfs. Current FPA guidelines require that a culvert with a minimum diameter of 24 inches is necessary to pass the 50 year peak flow.
- ❖ Because the culvert must be embedded 18 inches to allow fish passage, a 60 inch wide by 46 inch high by 60 feet in length pipe-arch culvert will be installed at a gradient of 0%-2%. This will also allow additional space for rock and debris to accumulate on the bottom of the culvert and provide the minimum required opening to pass the 50 year peak flow after in-filling has occurred inside the culvert.
- ❖ The resultant flow capacity of the culvert will be 39 cfs after 18 inches of native material migrates into the culvert bottom.
- ❖ Riprap rock will be embedded at the culvert outlet to aid in trapping native substrate material in the bottom of the culvert. Riprap rock will also be used to restore the projected stream channel elevation at the plunge pool created from the existing culvert.
- ❖ The inlet fill slopes will be armored with riprap rock to minimize surface erosion. The culvert design includes a 1:1 beveled inlet opening to improve efficiency.
- ❖ A 12 gauge aluminized steel culvert will be installed.

Resource Protection Measures:

- 1) Work will be performed only during dry weather periods, low water stream flows and between July 15 and September 30, annually.
- 2) Riprap rock will be used to armor the fill slopes to minimize erosion.
- 3) Machine activity in stream channels will be minimized. All excavation and riprap rock placement will be performed using a minimum 1½ cubic-yard track-mounted excavator.
- 4) De-watering of the installation area during development of the culvert bed and stream channel will be accomplished by use of coffer dams, temporary diversion ditches, or drainage structures and/or damming and pumping.

FPA "Written Plan" for State Timber Sale Road Improvement Cougar Monster Timber Sale

- 5) Selected native earth materials free from woody debris will be used for backfilling. Fill material will be thoroughly compacted with specialized compaction equipment.
- 6) Excavated waste materials will be hauled to approved waste areas and left in a stable condition.

ITEM NO. 3. Point LV6 (Munce Road) Portions of Section 31, T5N, R8W, W.M., Clatsop County, Oregon.

Protected Resources: An unnamed tributary to the Little North Fork of the Nehalem River, small, Type F fisheries resources. A written plan is required for any activities within 100 feet of a Type F stream.

Situation: A 30 inch diameter culvert on the Munce Quarry Road blocks fish access on the unnamed tributary to Little North Fork of the Nehalem River. As part of the road improvement (Point LV6) to Munce Road Quarry, this culvert will be replaced with a drainage structure meeting FPA guidance. Further detailed work specifications for this project are included as Project No. 5 of the Cougar Monster Timber Sale Contract shown/described in Exhibits A, B, C, H and L.

Drainage Area and Culvert Design:

- ❖ At Point LV6, on Munce Road the stream crossing drainage area is 88 acres and the existing and projected stream gradient are 1%-2%. The active stream channel width is 6 feet to 8 feet.
- ❖ The substrate material is composed of mostly Deep Valley Fill, with fines, sand, and some gravel and cobble. The Deep Valley fill is approximately 10 feet deep. Stream sediment will be removed to restore the stream channel for 25 feet above the culvert inlet.
- ❖ Stream sediment will be removed to restore the stream channel for 25 feet above the culvert inlet.
- ❖ The 50 year peak flow for this drainage is 400 cfs per square mile. Therefore, the 50 year flow for this stream crossing is 55 cfs. Current FPA guidelines require that a culvert with a minimum diameter of 58 inches X 36 inches is necessary to pass the 50 year peak flow.
- ❖ Because the culvert must be embedded 18 inches to allow fish passage, a 112 inch wide by 75 inch high by 50 feet in length pipe-arch culvert will be installed at a gradient of 0%-2%. This will also allow additional space for rock and debris to accumulate on the bottom of the culvert and provide the minimum required opening to pass the 50 year peak flow after in-filling has occurred inside the culvert.
- ❖ The resultant flow capacity of the culvert will be 178 cfs after 18 inches of native material migrates into the culvert bottom.
- ❖ Riprap rock will be embedded at the culvert outlet to aid in trapping native substrate material in the bottom of the culvert. Riprap rock will also be used to restore the projected stream channel elevation at the plunge pool created from the existing culvert.
- ❖ The fill slopes will be armored with riprap rock to minimize surface erosion. The culvert design includes a 1:1 beveled inlet opening to improve efficiency.
- ❖ A 12 gauge aluminized steel culvert will be installed.

Resource Protection Measures:

- 1) Work will be performed only during dry weather periods, low water stream flows and between July 15 and September 30, annually.
- 2) Riprap rock will be used to armor the fill slopes to minimize erosion.
- 3) Machine activity in stream channels will be minimized. All excavation and riprap rock placement will be performed using a minimum 1½ cubic-yard track-mounted excavator.

**FPA "Written Plan" for State Timber Sale Road Improvement
Cougar Monster Timber Sale**

- 4) The de-watering of the installation area during development of the culvert bed and stream channel will be accomplished by use of coffer dams, temporary diversion ditches, or drainage structures and/or damming and pumping.
- 5) Selected native earth materials free from woody debris will be used for backfilling. Fill material will be thoroughly compacted with specialized compaction equipment.
- 6) Excavated waste materials will be hauled to approved waste areas and left in a stable condition.

I, the undersigned, submit this written plan in compliance with the requirements in the Forest Practices Act regarding the operations conducted when, fills work exceeds 15 feet in height. I agree to the protection measures listed on this plan:

Submitted by: _____ **Date:** _____
Operator/Purchaser

Approved by: _____ **Date:** _____
State Lands Forester

Approved by: _____ **Date:** _____
Landowner-Longview Fibre

Approved by: _____ **Date:** _____
Forest Practices Forester

Attachments: Projects Map
Cross Section Diagrams (3)
Culvert Capacity Calculations (2)

CC: Landowner, Operator, Purchaser, District file, Salem, Eng. Unit, Sunset Unit

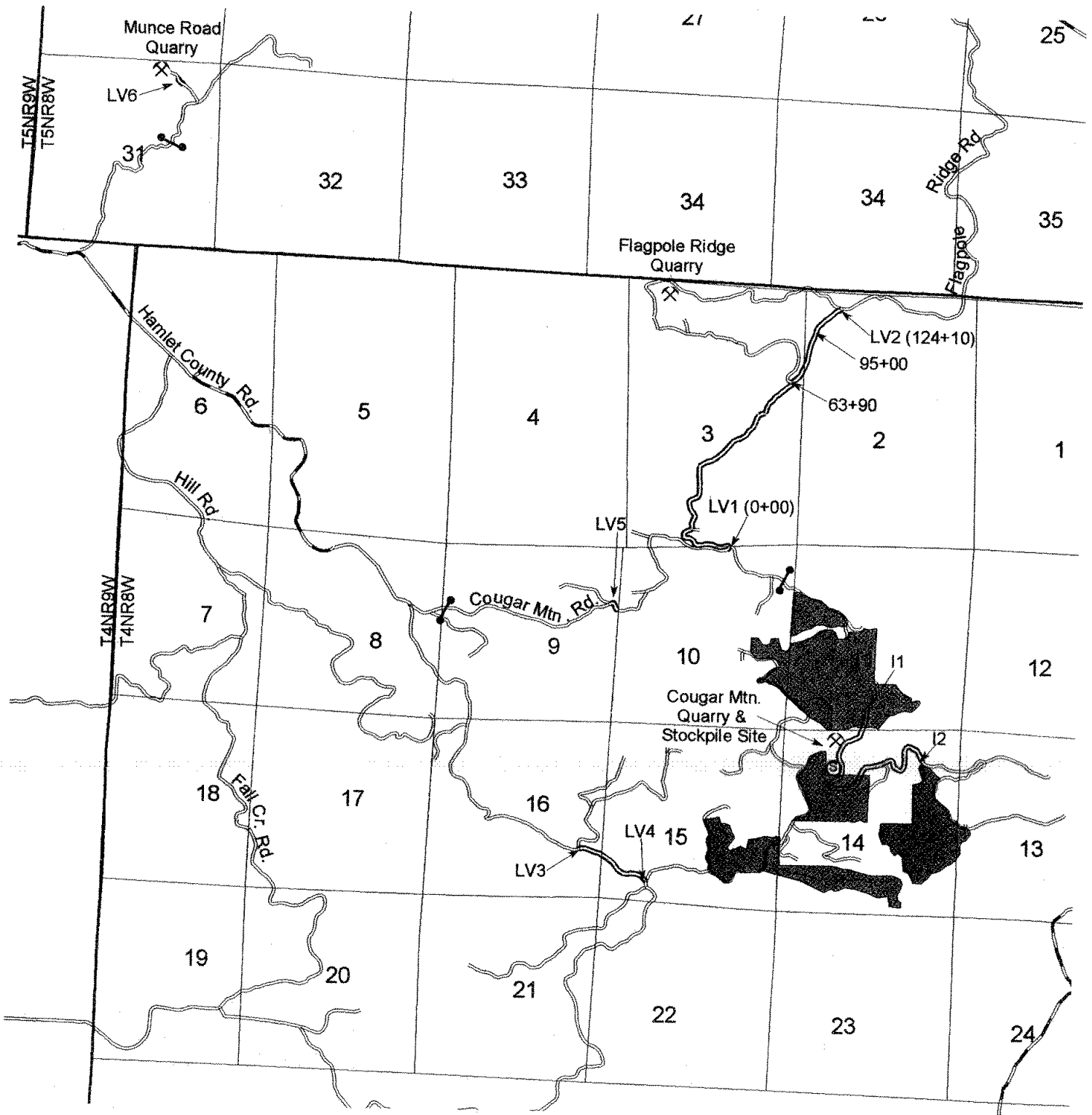


Exhibit "A"

Projects Map

OF TIMBER SALE CONTRACT NO. 341-03-75

COUGAR MONSTER

W.M., CLATSOP COUNTY, OREGON



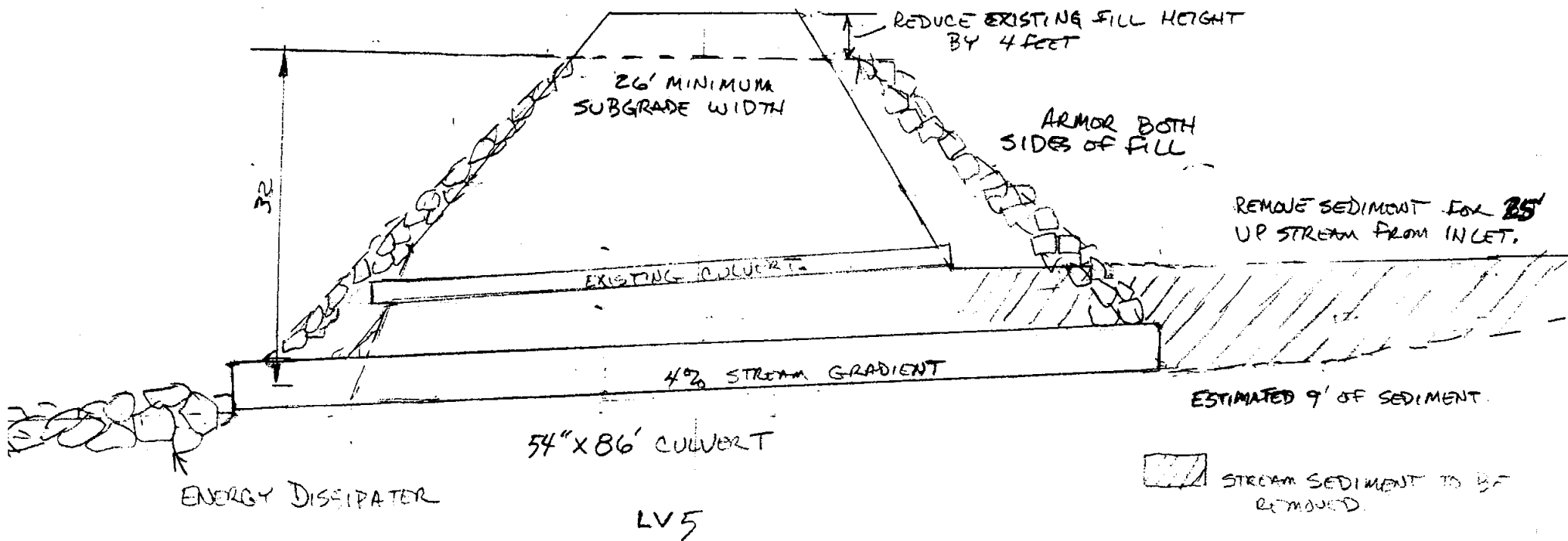
17 ACRES DRAINAGE AREA.

$$\frac{47}{640} \times 400 = 29.375$$

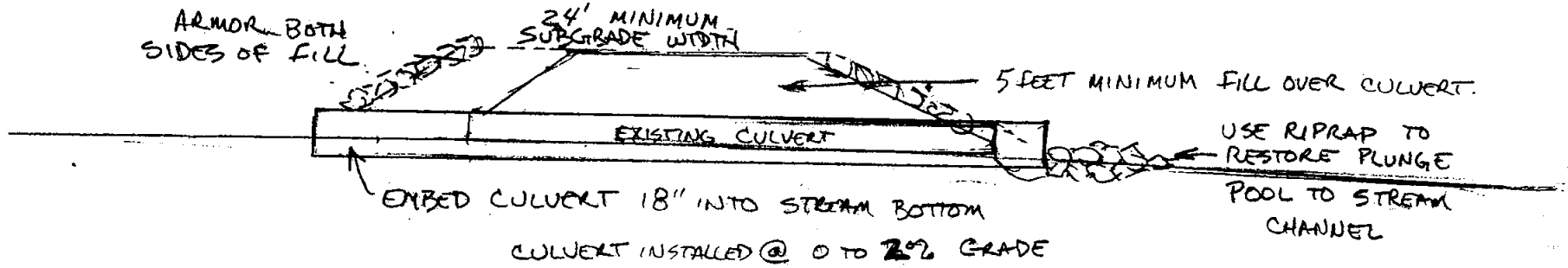
FPA RECOMMENDS 36" DIA.

USING 54" DIA.

COUGAR MOUNTAIN ROAD



FLAGPOLE RIDGE ROAD.



60" x 46" x 60'

STATION 95+00 LV1 - LV2

17 ACRE DRAINAGE AREA.

$$\frac{17}{640} \times 400 = 10.625 \text{ CFS}$$

FPA RE COMMENDS 24" DIA.

USING 60" x 46" ARCH PIPE.

Table 3. Comparison of percent of culvert diameter or rise with baffles or embedding and corresponding cross-sectional area loss for the culvert.

Percent of rise or diameter with baffle or embeddi inside culvert	%	%
	Xsec Area	Xsec Area
	Loss	Loss
	Round Culvert	Pipe Arch Culvert
10	5	8
15	9	14
20	14	20
25	20	26
30	25	33
35	31	39
40	37	45
45	44	51
50	50	57
55	56	63
60	63	69
65	69	74
70	75	79

**COUGAR MONSTER TIMBER SALE
PROJECT NO. 2 STATION 95+00 ON LV1 TO LV2**

18 inch loss due to embedding and migration of native materials into the culvert barrel.

18 inches embedding / 46 inches culvert height = 39%

Approximately 40% loss in height corresponds to 45% loss in flow capacity.

The remaining flow capacity of 55% X 70 cfs (from page 17 of FPA Guidance Memo) results in 39 cfs.

Drainage acreage requires 11 cfs.

COUGAR MONSTER

PROJECT NO. 2 STATION 95+00 ON LV1 TO LV2

Memorandum: Fish Passage Guidance, June 27, 1997; page 17

Table 2. Flow capacity for circular culverts and pipe-arch culverts.

CIRCULAR CULVERTS			PIPE-ARCH CULVERTS		
DIAMETER (inches)	Cross- Section Area Culvert (ft ²)	MAX FLOW in Culvert (cfs)	SPAN x RISE (feet and/or inches)	Cross- Section Area Culvert (ft ²)	MAX FLOW in Culvert (cfs)
15	1.2	3.5	22" x 13"	1.6	4.5
18	1.8	5	25" x 16"	2.2	7
21	2.4	8	29" x 18"	2.9	10
<i>Min. Required</i> 24	3.1	11	36" x 22"	4.3	16
27	4	15	43" x 27"	6.4	26
30	4.9	20	50" x 31"	8.5	37
33	5.9	25	58" x 36"	11.4	55
36	7.1	31	65" x 40"	14.2	70
42	9.6	46	72" x 44"	17.3	90
48	12.6	64	6'-1" x 4'-7"	22	130
54	15.9	87	7'-0" x 5'-1"	28	170
60	19.6	113	8'-2" x 5'-9"	38	240
66	23.8	145	9'-6" x 6'-5"	48	340
72	28.3	178	11'-5" x 7'-3"	63	470
78	33.2	219	12'-10" x 8'-4"	85	650
84	38.5	262	15'-4" x 9'-3"	107	930
90	44.2	313			
96	50.3	367			
102	56.7	427			
108	63.6	491			
114	70.9	556			
120	78.5	645			
132	95	840			
144	113.1	1000			

Approx. 60" x 46"

Adapted from the landowners reference manual (1994). The assumptions for this table are projecting inlet and headwater depth equal to diameter or height of culvert. These assumptions are not relevant for fish passage designs. Therefore, oversizing as described in text needs to be employed.

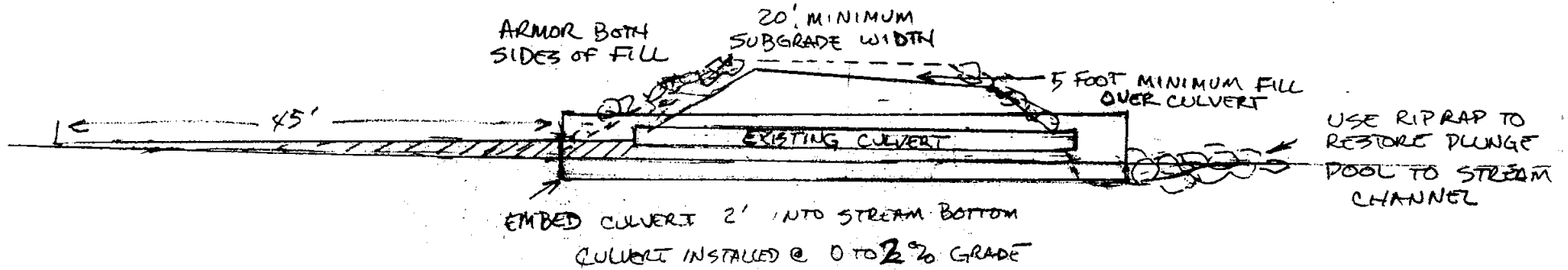
DO NOT DISTURB FILL.

$$\frac{88}{640} \times 400 = 55 \text{ CFS.}$$


FPA RECOMMENDS 58" X 36"

USING 112" X 75" ARCH PIPE

MUNCE ROAD



112" X 75" X 50'

 STREAM SEDIMENT TO BE REMOVED.

LV6

Table 3. Comparison of percent of culvert diameter or rise with baffles or embedding and corresponding cross-sectional area loss for the culvert.

Percent of rise or diameter with baffle or embeddi inside culvert	%	%
	Xsec Area	Xsec Area
	Loss	Loss
	Round Culvert	Pipe Arch Culvert
10	5	8
15	9	14
20	14	20
25	20	26
30	25	33
35	31	39
40	37	45
45	44	51
50	50	57
55	56	63
60	63	69
65	69	74
70	75	79

COUGAR MONSTER TIMBER SALE
PROJECT NO. 2 POINT LV6

18 inch loss due to embedding and migration of native materials into the culvert barrel.

18 inches embedding / 75 inches culvert height = 24%

Approximately 25% loss in height corresponds to 26% loss in flow capacity.

The remaining flow capacity of 74% X 240 cfs (from page 17 of FPA Guidance Memo) results in 178 cfs.

Drainage acreage requires 55 cfs.

C. IGAR MONSTER

PROJECT NO. 2 POINT LV6

Memorandum: Fish Passage Guidance, June 27, 1997; page 17

Table 2. Flow capacity for circular culverts and pipe-arch culverts.

CIRCULAR CULVERTS			PIPE-ARCH CULVERTS		
DIAMETER (inches)	Gross Section Area Culvert (ft ²)	MAX FLOW in Culvert (cfs)	SPAN x RISE (feet and/or inches)	Gross Section Area Culvert (ft ²)	MAX FLOW in Culvert (cfs)
15	1.2	3.5	22" x 13"	1.6	4.5
18	1.8	5	25" x 16"	2.2	7
21	2.4	8	29" x 18"	2.9	10
24	3.1	11	36" x 22"	4.3	16
27	4	15	43" x 27"	6.4	26
30	4.9	20	50" x 31"	8.5	37
33	5.9	25	58" x 36"	11.4	55
36	7.1	31	65" x 40"	14.2	70
42	9.6	46	72" x 44"	17.3	90
Min. 48	12.6	64	6'-1" x 4'-7"	22	130
54	15.9	87	7'-0" x 5'-1"	28	170
60	19.6	113	8'-2" x 5'-9"	38	240
66	23.8	145	9'-6" x 6'-5"	48	340
72	28.3	178	11'-5" x 7'-3"	63	470
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90	44.2	313			
96	50.3	367			
102	56.7	427			
108	63.6	491			
114	70.9	556			
120	78.5	645			
132	95	840			
144	113.1	1000			

Min.

Adapted from the landowners reference manual (1994). The assumptions for this table are projecting inlet and headwater depth equal to diameter or height of culvert. These assumptions are not relevant for fish passage designs. Therefore, oversizing as described in text needs to be employed.