



"STEWARDSHIP IN FORESTRY"

Timber Sale Appraisal
Crystal Clear
Sale WO-341-2021-W00689-01

District: West Oregon

Date: February 12, 2021

Cost Summary

	Conifer	Hardwood	Total
Gross Timber Sale Value	\$755,896.05	\$99.23	\$755,995.28
		Project Work:	(\$44,240.00)
		Advertised Value:	\$711,755.28



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Timber Description

Location:

Stand Stocking: 60%

Specie Name	AvgDBH	Amortization (%)	Recovery (%)
Douglas - Fir	33	0	97
Alder (Red)	21	0	95

Volume by Grade	2S	3S & 4S 6"-11"	3S 12"+	Camprun	Total
Douglas - Fir	1,457	79	219	0	1,755
Alder (Red)	0	0	0	1	1
Total	1,457	79	219	1	1,756

Comments: Pond Values Used: Local Pond Values, December, 2020

Other Conifers Stumpage Price = Pond Value minus Logging Cost:
 $\$198.51/\text{MBF} = \$526.00/\text{MBF} - \$327.49/\text{MBF}$

Western redcedar and Other Cedars Stumpage Price = Pond Value minus Logging Cost:
 $\$472.51/\text{MBF} = \$950.00/\text{MBF} - (\$327.49/\text{MBF} + \$150/\text{MBF}(\text{Extra Haul Cost}))$

Bigleaf maple and Other Hardwoods Stumpage Price = Hardwood Pulp price using a conversion factor of 10 MBF/ton: = $\$25.00/\text{MBF}$

PULP (Conifer and Hardwood Price) = $\$2.5/\text{TON}$

Other Costs (with Profit & Risk to be added):
Intermediate Support/Tail Trees: 4 supports @ $\$100/\text{support} = \400
TOTAL Other Costs (with Profit & Risk to be added) = $\$400$

Other Costs (No Profit & Risk added):
Equipment Cleaning (Invasive Species): $\$2,000$
Landing Slash Piling and sorting out firewood: 4 Landings @ $\$180/\text{Landing} = \720
TOTAL Other Costs (No Profit & Risk added) = $\$2,720$

ROAD MAINTENANCE
Move-in: (Grader) $\$875$
Final Road Maintenance: $\$9,200$
TOTAL Road Maintenance: $\$10,075/1,756 \text{ MBF} = \$5.74/\text{MBF}$

SLASH DISPOSAL
Move-In: $\$1,290$
Machine Wash: $\$300$
Project Work: 20 hrs @ $\$150/\text{hr} = \$3,000$
TOTAL Slash Disposal = $\$4,590$



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Logging Conditions

Combination#: 1 Douglas - Fir 82.00%
 Alder (Red) 82.00%

Logging System: Cable: Medium Tower >40 - <70 **Process:** Manual Falling/Delimbing
yarding distance: Medium (800 ft) **downhill yarding:** No
tree size: Mature / Regen Cut (900 Bft/tree), 3-5 logs/MBF
loads / day: 7 **bd. ft / load:** 4900
cost / mbf: \$192.42
machines: Log Loader (A)
 Tower Yarder (Medium)

Combination#: 2 Douglas - Fir 18.00%
 Alder (Red) 18.00%

Logging System: Shovel **Process:** Manual Falling/Delimbing
yarding distance: Short (400 ft) **downhill yarding:** No
tree size: Mature / Regen Cut (900 Bft/tree), 3-5 logs/MBF
loads / day: 10 **bd. ft / load:** 4900
cost / mbf: \$80.36
machines: Shovel Logger



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Logging Costs

Operating Seasons: 2.00	Profit Risk: 10%
Project Costs: \$44,240.00	Other Costs (P/R): \$400.00
Slash Disposal: \$4,590.00	Other Costs: \$2,720.00

Miles of Road

Road Maintenance: \$5.74

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

Hauling Costs

Species	\$ / MBF	Trips/Day	MBF / Load
Douglas - Fir	\$0.00	2.0	4.5
Alder (Red)	\$0.00	1.0	3.8



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Logging Costs Breakdown

Logging	Road Maint	Fire Protect	Hauling	Other P/R appl	Profit & Risk	Slash Disposal	Brand & Paint	Other	Total
Douglas - Fir									
\$172.25	\$5.91	\$5.00	\$108.73	\$0.23	\$29.21	\$2.61	\$2.00	\$1.55	\$327.49
Alder (Red)									
\$172.25	\$6.03	\$5.00	\$262.50	\$0.23	\$44.60	\$2.61	\$2.00	\$1.55	\$496.77

Specie	Amortization	Pond Value	Stumpage	Amortized
Douglas - Fir	\$0.00	\$758.20	\$430.71	\$0.00
Alder (Red)	\$0.00	\$596.00	\$99.23	\$0.00



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Summary

Amortized

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

Unamortized

Specie	MBF	Value	Total
Douglas - Fir	1,755	\$430.71	\$755,896.05
Alder (Red)	1	\$99.23	\$99.23

Gross Timber Sale Value

Recovery: \$755,995.28

Prepared By: Cody Valencia

Phone: 541-929-3266

SUMMARY OF ALL PROJECT COSTS

Sale Name: Crystal Clear

Date: February 2021

Project #1 - Improvements

<u>Road Segment</u>	<u>Length</u>	<u>Cost</u>	
1 to 2	161.5 sta	\$5,157	
2 to 3	77.6 sta	\$8,168	
2 to 4	51.8 sta	\$13,978	
5 to 6	9.5 sta	\$6,911	
7 to 8	18.5 sta	\$285	
9 to 10	4.4 sta	\$68	
11 to 12	2.5 sta	\$1,986	
TOTALS	325.8 sta		\$36,553

<u>Project #2 - Mechanical Brushing</u>	3.1 miles	\$3,709
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Project #3 - Move in

	<u>Cost</u>	
Excavator, C325 or equiv.	\$1,450	
Grader, Cat 14-G or equiv.	\$875	
Vibratory roller	\$875	
Road Brusher	\$778	
TOTAL		\$3,978

GRAND TOTAL **\$44,240**

Compiled by Cody Valencia

Date 02/23/2021

SUMMARY OF CONSTRUCTION COST

SALE Crystal Clear Project # 1 LENGTH improve 161.5 sta
ROAD 1 to 2 (Surfaced)

SURFACING

		Size	Cost/yd		
Spot rock	150 cy of	1½"-0"	\$26.72	=	\$4,008
Process surface rock (with road grader)	30 sta @		\$20.63 /sta	=	\$619
Compact road surface (with vibratory roller)	30 sta @		\$16.00 /sta	=	\$480

TOTAL ROCK COST = \$5,107

SPECIAL PROJECTS

Clean out culverts (inlets and outlets)	2 culverts @	\$25.00 ea =	\$50
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TOTAL SPECIAL PROJECTS COST = \$50

Compiled by:
Date:

Cody Valencia
Feb 23, 2021

GRAND TOTAL =====>

\$5,157

SUMMARY OF CONSTRUCTION COST

SALE Crystal Clear Project # 1 LENGTH improve 77.6 sta
ROAD 2 to 3 (Surfaced) Baber Corridor Rd.

IMPROVEMENT

Remove sod and brushing debris (with road grader)	77.6 sta	@	\$15.40 /sta	=	\$1,195
Re-establish ditch (with road grader) (Sta. 0+00 to 5+20)	5.2 sta	@	\$44.00 /sta	=	\$229
TOTAL IMPROVEMENT =					\$1,424

SURFACING

			Size	Cost/yd		
Spot rock	100 cy of		1½"-0"	\$26.72	=	\$2,672
Process surface (with road grader)	77.6 Sta	@	\$20.63 /sta	=	\$1,601	
Compact surfacing (with vibratory roller)	77.6 Sta	@	\$16.00 /sta	=	\$1,242	
TOTAL ROCK COST =						\$5,515

SPECIAL PROJECTS

Install Culvert (Sta. 24+20) (18"x40' cpp)	40 ft	@	\$13.75 /ft	=	\$550
Install Culvert	1 hr	@	\$145.00 /hr	=	\$145
Culvert Bedding and backfill rock (Sta. 24+20)	20 cy of	1½"-0"	\$26.72	=	\$534
TOTAL SPECIAL PROJECTS COST =					\$1,229

Compiled by:
Date:

Cody Valencia
Feb 23, 2021

GRAND TOTAL =====> \$8,168

SUMMARY OF CONSTRUCTION COST

SALE	Crystal Clear	Project #	1	LENGTH	improve	51.8 sta
ROAD	2 to 4 (Surfaced) Baber Butte Rd.					

EXCAVATION

With C325 excavator or equivalent

Bank slough removal (Sta. 12+50 to Sta. 18+50)	6 hrs	@	\$145.00 /hr	=	\$870
Endhaul waste material	150 cy	@	\$2.50 /cy	=	\$375

TOTAL EXCAVATION = \$1,245

IMPROVEMENT

Remove sod and brushing debris (with road grader)	51.8 sta	@	\$15.40 /sta	=	\$798
Construct Landing (Sta. 26+00, Sta 35+30)	2 Ldgs	@	\$435.00 /Ldg	=	\$870
Re-establish ditch (with road grader)	12 sta	@	\$44.00 /sta	=	\$528

TOTAL IMPROVEMENT = \$2,196

SURFACING

			Size	Cost/yd		
Trail Junction rock (Sta. 27+00)	10 cy of		3"-0"	\$26.38	=	\$264
Spot rock	200 cy of		1½"-0"	\$26.72	=	\$5,344
Landing rock (Sta. 26+00, Sta. 35+30)	100 cy of		Jaw-Run	\$25.03	=	\$2,503
Turnaround rock (Sta. 9+80, 41+30)	20 cy of		3"-0"	\$26.38	=	\$528
Process surface (with road grader)	51.8 Sta	@	\$20.63 /sta	=	\$1,069	
Compact surfacing (with vibratory roller)	51.8 Sta	@	\$16.00 /sta	=	\$829	

TOTAL ROCK COST = \$10,537

Compiled by:	Cody Valencia
Date:	Feb 23, 2021

GRAND TOTAL =====> \$13,978

SUMMARY OF CONSTRUCTION COST

SALE Crystal Clear Project # 1 LENGTH improve 9.5 sta
ROAD 5 to 6 (Surfaced)

EXCAVATION With C325 excavator or equivalent

Bank Slough removal	1 hrs	@	\$145.00 /hr	=	\$145
(Sta. 0+00 to Sta. 1+00)					
Endhaul waste material	10 cy	@	\$3.50 /cy	=	\$35

TOTAL EXCAVATION = \$180

IMPROVEMENT

Re-open road, remove	9.5 sta	@	\$15.40 /sta	=	\$146
sod and brushing debris					
(with road grader)					
Shape subgrade	9.5 sta	@	\$20.63 /sta	=	\$196
(with road grader)					

TOTAL IMPROVEMENT = \$342

SURFACING

Surface rock (4"lift)	210 cy of	3"-0"	\$26.38	=	\$5,540
Landing rock (Sta. 7+30)	20 cy of	Jaw-Run	\$25.03	=	\$501
Process surfacing	9.50 Sta	@	\$20.63 /sta	=	\$196
(with road grader)					
Compact surfacing	9.50 Sta	@	\$16.00 /sta	=	\$152
(with vibratory roller)					

TOTAL ROCK COST = \$6,389

Compiled by: Cody Valencia
Date: Feb 23, 2021

GRAND TOTAL =====> \$6,911

SUMMARY OF CONSTRUCTION COST

SALE Crystal Clear Project # 1 LENGTH improve 18.5 sta
ROAD 7 to 8 (Surfaced)

IMPROVEMENT

Remove sod and 18.5 sta @ \$15.40 /sta = \$285
brushing debris
(with road grader)

TOTAL IMPROVEMENT COST = \$285

Compiled by: Cody Valencia
Date: Feb 23, 2021

GRAND TOTAL =====> \$285

SUMMARY OF CONSTRUCTION COST

SALE Crystal Clear Project # 1 LENGTH improve 4.4 sta
ROAD 9-10 (Surfaced)

IMPROVEMENT

Remove sod and 4.4 sta @ \$15.40 /sta = \$68
brushing debris
(with road grader)

TOTAL IMPROVEMENT COST = \$68

Compiled by: Cody Valencia
Date: Feb 23, 2021

GRAND TOTAL =====> \$68

SUMMARY OF CONSTRUCTION COST

SALE Crystal Clear Project # 1 LENGTH improve 2.5 sta
ROAD 11-12 (Surfaced)

IMPROVEMENT

Remove sod and 2.5 sta @ \$15.40 /sta = \$39
brushing debris

(with road grader)

Shape subgrade 1.7 sta @ \$20.63 /sta = \$35

Sta. 0+00 to 1+70

(with road grader)

TOTAL IMPROVEMENT COST = \$74

SURFACING

Surface rock (4"lift) 40 cy of 3"-0" \$26.38 = \$1,055

Sta. 0+00 to 1+70

Junction rock 10 cy of 1½"-0" \$26.72 = \$267

Turnaround rock (Sta. 1+00) 20 cy of 3"-0" \$26.38 = \$528

Process surfacing 1.7 Sta @ \$20.63 /sta = \$35

(with road grader)

Compact surfacing 1.7 Sta @ \$16.00 /sta = \$27

(with vibratory roller)

TOTAL ROCK COST = \$1,912

Compiled by: Cody Valencia

Date: Feb 23, 2021

GRAND TOTAL =====> \$1,986

Mechanical Brushing Costs

Project # 2

Date: Feb 23, 2021

Road Segment/ Point	Road Name	Length (Feet)	Miles	Brush Density	Cost / Mile	Segment Cost
2 to 3	Baber Corridor Road	2,767	0.52	Light	\$800.00	\$416
2 to 3	Baber Corridor Road	4,993	0.95	Heavy	\$1,400.00	\$1,330
2 to 4	Baber Butte Road	5,180	0.98	Medium	\$1,100.00	\$1,078
5 to 6		950	0.18	Heavy	\$1,400.00	\$252
7 to 8		1,850	0.35	Heavy	\$1,400.00	\$490
9 to 10		440	0.08	Medium	\$1,100.00	\$88
11 to 12		250	0.05	Medium	\$1,100.00	\$55
Totals		16,430	3.1			\$3,709

Total Cost

\$3,709

SUMMARY OF MAINTENANCE COST

SALE

Crystal Clear

Final log haul Maintenance Cost Estimate

Grading

Move-in road grader	\$	875
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Road Segment	Length	Cost/Sta	Cost	Mileage
1 to 4	213.3	\$20.63	\$4,400	4.04
2 to 7	28.9	\$20.63	\$596	0.55
5 to 6	9.5	\$20.63	\$196	0.18
Total	251.7		\$5,192.00	4.77

Maintenance Rock:

	Volume	Cost/CY	Cost
1½"-0"	150	\$26.72	\$4,008.00
3"-0"	0	\$26.38	\$0.00

Grand Total	\$ 10,075
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TS Volume 1,756 MBF

Cost / MBF = \$5.74

NOTES:

(Costed in appraisal, not in project costs)

SALE NAME:	Crystal Clear	DATE:	Feb 23, 2021
ROAD NAME:	Baber Corridor Road	CLASS:	Medium
ROCK SOURCE	Hardrock		10 CY truck
Route:	Hwy 20, Trapp Creek, Baber Corridor Road		

Road speed time factors:

1.	55 MPH	30.1	MRT	32.8 minutes
2.	50 MPH		MRT	0.0 minutes
3.	45 MPH	10.0	MRT	13.3 minutes
4.	40 MPH		MRT	0.0 minutes
5.	35 MPH		MRT	0.0 minutes
6.	30 MPH		MRT	0.0 minutes
7.	25 MPH	6.1	MRT	14.6 minutes
8.	20 MPH		MRT	0.0 minutes
9.	15 MPH	2.0	MRT	8.0 minutes
10.	10 MPH	0.9	MRT	5.4 minutes
11.	05 MPH	0.1	MRT	1.2 minutes

Dump or spread time per RT	0.50	minutes
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Total hauling cycle time for this setting (100% efficiency)	75.80 minutes
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Operator efficiency correction	0.85	89.18 minutes
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Job efficiency correction	0.90	99.09 minutes
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Truck capacity (CY)	10.00	9.91	min/CY
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Loading time, delay time per CY	0.25	min/CY
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TIME (minutes) per cubic yard	10.16	min/CY
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COST per CY computation

Cost of truck and operator per hour	\$90.00 /hr.
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Cost of truck and operator per minute	\$1.50 /min
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Cost per CY	\$15.24 /CY
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Spread and compact	Water truck, Grader & Roller	\$1.50 /CY
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Size	Cost/Yd (Pit)	Cost Delivered w/o processing	Cost Delivered with processing
1½" - 0"	\$ 11.48	\$26.72	\$28.22
3" - 0"	\$ 11.14	\$26.38	\$27.88
Jaw-Run	\$ 9.79	\$25.03	\$26.53
Pit-Run	\$ 8.78	\$24.02	\$25.52

TIMBER CRUISE REPORT

Crystal Clear (WO-341-2021-W00689-01) FY 2021

1. **Sale Area Location:** Portions of Section 9 & 16, T11S, R9W, W.M., Lincoln County, Oregon.

2. **Fund Distribution:**

- a. **Fund** BOF 75%
 Administration Site 25%

3. **Sale Acreage by Area:**

Area	Treatment	Gross Acres	Stream Buffers	Existing Roads	Net Sale Acres	Acreage Comp. Method
1	Modified Clearcut	40	<1	2	38	GIS

4. **Cruisers and Cruise Dates:** The sale was cruised by David Bailey, Evelyn Hukari, Mike Loewen, Elliot Lowry, Aaron Mcewen, Cody Valencia and Zane Sandborg in December 2020.

5. **Cruise Method and Computation:** The sale consists of one modified clearcut area that was cruised using variable radius plot sampling. The sale area was cruised using a 54.45 BAF with plots spaced 3 chains apart on plot lines spaced 3 chains apart. A total of 40 plots were taken with 22 measure plots and 18 count plots.

6. Measure plots were measured for DBH, height, form factor, grade, and defect. Data was entered into the Atterbury SuperACE cruise program to determine stand statistics and net board foot volume. Additional volume was removed to account for hidden defect and breakage.

Digital ortho photos, Lidar data, and GPS data were used to map the boundaries for the sale, and ArcMap GIS was used to determine gross and net acreage.

7. **Measurement Standards:** Tree heights were measured to the nearest foot, to a top diameter of 6 inches inside bark or to 40% of form factor. Diameters at breast height (DBH) were measured to the nearest inch, and a form point of 16 feet was used to calculate form factor. Form factors were measured or estimated on every tree. Most trees were graded in 40 foot log segments unless breakage, defect, or length to top of grade cruise diameter warranted otherwise.

8. **Timber Description:** Timber in the sale area includes 38 acres of 79 to 97 year-old Douglas-fir with some scattered red alder. The average Douglas-fir to be removed is approximately 33 inches DBH, with an average height of 123 feet to a merchantable top. The average volume per acre to be harvested (net) is approximately 46 MBF. Conifer trees other than Douglas-fir are reserved from cutting.

9. Statistical Analysis and Stand Summary: (See attached “Statistics”).

Area	Target CV	Target SE	Actual CV	Actual SE
1	53%	9%	60.8%	9.4%

Note: Statistics shown are for conifer and hardwood trees combined. Percentages are for net board foot volume.

10. Total Volume (MBF) by Species and Grade: (See attached volume report “Species, Sort Grade – Board Foot Volumes - Project”).

Species	Gross Cruise Volume	Cruised D & B	Cruised D & B (MBF)	Hidden D & B	Hidden D & B (MBF)	Net Sale Volume
Douglas-fir	1,923	2.9%	56	6%	112	1,755
Red Alder	1	28.6%	--	--	--	1
Total	1,924	--	56	--	112	1,756

Species	Ave. DBH	Net Vol.	2-Saw	3-Saw	4-Saw	Camp Run
Douglas-fir	33	Grade %	83%	16%	1%	-
		1,755	1,457	281	17	-
Red Alder	21	Grade %	-	-	-	100%
		1	-	-	-	1
Total		1,756	1,457	281	17	1

Attachments: Cruise Design
Cruise Map
Species, Sort Grade – Board Foot Volumes
Statistics
Stand Table Summary
Log Stock Table – MBF

Prepared by: Cody Valencia

Date: 1/25/2021

Unit Forester: 
Evelyn Hukari

Date: 2/16/2021

CRUISE DESIGN WEST OREGON DISTRICT

Sale Name: Crystal Clear **Area** 1

Harvest Type: MC

Approx. Cruise Acres: 38 **Estimated CV%** 53 Net BF /Acre **SE% Objective** 9 Net BF /Acre

Planned Sale Volume: 1.8 MMBF **Estimated Sale Area Value/Acre:** \$ 21,600.

- A. Cruise Goals:** (a) Grade minimum 80 conifer and 24 hardwood trees:
 (b) Sample 40 cruise plots (20 grade: 20 count); (c) Other goals X Determine log grades for sale value; Determine take and leave tree species and sizes.

(Special cruising directions – leave trees etc.) Take plots as shown on map. Do not take plots in buffers.

DO NOT RECORD 12', 22' and 32' (for Hardwoods).

DO NOT RECORD 22' LENGTHS.

B. Cruise Design:

- 1. Plot Cruises:** BAF 40 (Full point; Half point) (circle one)
 Cruise Line Direction(s) 7°/187°
 Cruise Line Spacing 3/198 (chains) (feet)
 Cruise Plot Spacing 3/198 (chains) (feet)
 Grade/Count Ratio 1:1

C. Tree Measurements:

- 1. Diameter:** Minimum DBH to cruise is 8" for conifers and 10" for hardwoods.
 Record dbh to nearest ½" for trees < 16", to nearest 1" for trees 16-24", and to nearest 2" for trees > 24". If tree diameters are estimated (only estimate on variable plot cruises), then record to closest estimate.
- 2. Bole Length:** Record bole length to nearest foot at TCD. For trees greater than 100 feet in merchantable height, estimating to the nearest 5 feet is acceptable.
- 3. Top Cruise Diameter (TCD):** Minimum top outside bark for conifer is 7", 7" for hardwoods or 40 % of dob at 16' form point. Generally, use 7" outside bark for trees < 18" dbh and 40% of dob @ FP for trees > 18" dbh.
- 4. Form Factors:** (1) Measure or estimate a 16' form factor for every conifer tree measured/graded; OR (2) Measure a minimum of 20 form factors for each major conifer species on the cruise area, and use these to calculate average FF for the species on the cruise. Hardwood form factors are a Standard 87.
- 5. Tree Segments:** Record log segments in "standard" log lengths in general use, such as 32' and 40' lengths, whenever possible. Do not record odd segments just to maximize grade. Cull segments can be any length. For conifers, minimum merchantable segment length is 12'; for

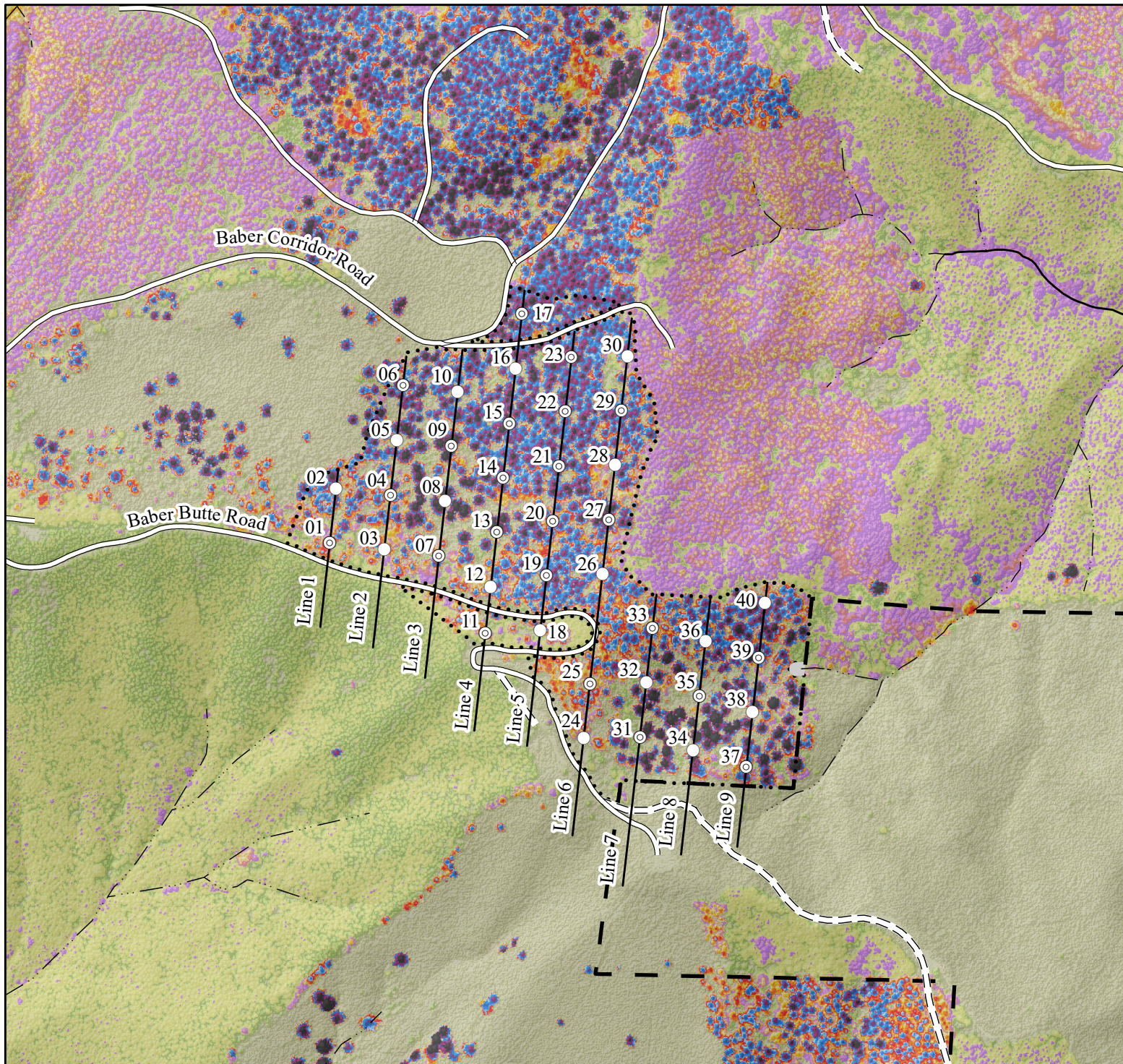
hardwoods, it's 8'. Maximum segment length is 40'. One foot of trim is assumed for each merch. log segment. Do not use "double dash" (--) feature on the data recorder except for the top segment of the tree.

- 6. Species, Sort, and Grade Codes:** A. Species: Record as DF (Douglas-fir). WH (Western hemlock); SS (Sitka Spruce); RC (Western red cedar); NF (Noble fir). SF (Silver fir); RA (Red alder); BM (Bigleaf maple). For "leave trees" in partial cuts, or for marked "wildlife trees," add an "L" to the species code (such as DFL, 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; K = Camp Run; 0 = Cull.
Hardwoods: K = Camprun; #1 Sawmill = 12"+ scaling diameter; #2 Sawmill = 10" and 11". #3 Sawmill = 8" and 9"; #4 Sawmill = 6" and 7"
- 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 points with red flagging. Write plot identification numbers and line direction on the ribbon. At each plot, tie red flagging above eye level near plot center and another red flagging around a sturdy wooden stake marking plot center. On red flagging, write the plot identification number. On "measure/grade" plots write the tree number and/or tree diameter on all measured trees (clockwise from the line direction) in yellow paint. Mark leave trees with an L for leave.
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 or Lazer, Logger's Tape (with dbh on back), Biltmore Stick, Compass, Cruise Cards or Data Recorder, Cruise Design, Cruise Map, Yellow Flagging, Blue Flagging, Yellow Paint.
- 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.

Cruise Design by: Cody Valencia

Approved by: _____

Date: _____



Legend

- Ownership
- ⋯ Timber Sale Boundary
- Stream Buffer
- Type F Stream
- ⋯ Type N Stream
- == Surfaced Road
- == Unsurfaced Road
- ⊙ Grade Plot
- Count Plot

Crystal Clear Cruise Map

Plot Spacing 3 chains 198'
Line Spacing 3 chains 198'
Bearing 7/187

This product is for informational use and may not have been prepared for or be suitable for legal, engineering or survey purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of this information.

1:6,000

0 250 500 1,000
Feet



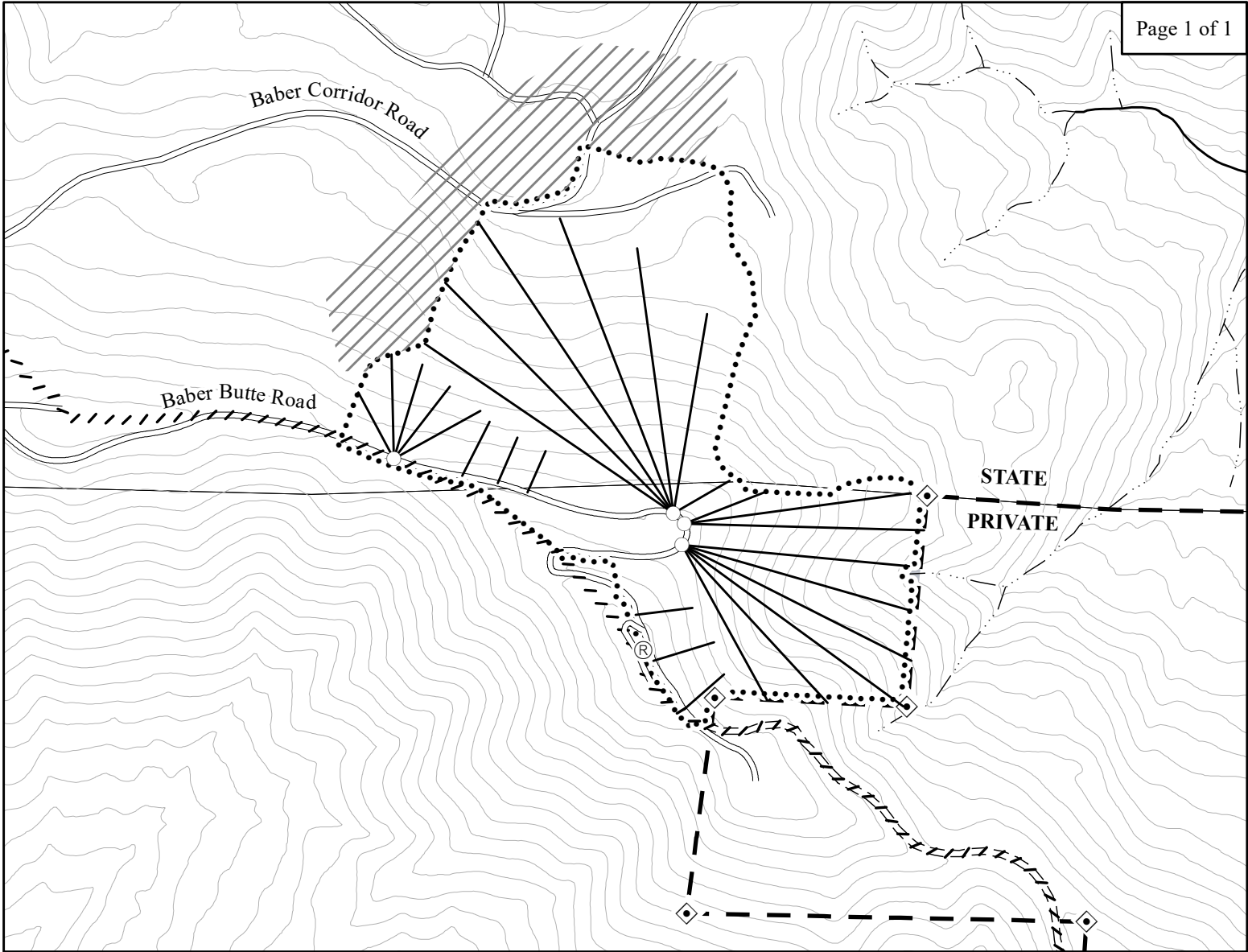
TC TSTATS				STATISTICS				PAGE	1		
				PROJECT	CRYSTAL			DATE	1/25/2021		
TWP	RGE	SECT	TRACT	TYPE	ACRES	PLOTS	TREES	CuFt	BdFt		
11S	09W	09	A1	TAKE	38.00	40	126	1	W		
				TREES	ESTIMATED	PERCENT					
				PER PLOT	TOTAL	SAMPLE					
					TREES	TREES					
TOTAL			40	126	3.2						
CRUISE			22	71	3.2	1,121		6.3			
DBH COUNT											
REFOREST											
COUNT			17	55	3.2						
BLANKS			1								
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
DF			70	28.9	32.8	123	29.7	170.2	50,542	49,099	9,908
R ALDER			1	.6	21.0	28	0.3	1.4	40	28	22
TOTAL			71	29.5	32.7	121	30.0	171.5	50,582	49,127	9,929
CONFIDENCE LIMITS OF THE SAMPLE											
67.1 TIMES OUT OF 100 THE VOLUME WILL BE WITHIN THE SAMPLE ERROR											
CL:	67.1 %	COEFF		SAMPLE TREES - BF				# OF TREES REQ.		INF. POP.	
SD:	1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5		10	15	
DF		77.4	9.1	2,380	2,618	2,855					
R ALDER											
TOTAL		78.8	9.2	2,345	2,581	2,818	238	60	26		
CL:	67.1 %	COEFF		TREES/ACRE				# OF PLOTS REQ.		INF. POP.	
SD:	1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5		10	15	
DF		69.2	10.7	26	29	32					
R ALDER		632.5	98.0	0	1	1					
TOTAL		66.3	10.3	26	29	33	169	42	19		
CL:	67.1 %	COEFF		BASAL AREA/ACRE				# OF PLOTS REQ.		INF. POP.	
SD:	1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5		10	15	
DF		59.0	9.1	155	170	186					
R ALDER		632.5	98.0	0	1	3					
TOTAL		57.8	8.9	156	172	187	128	32	14		
CL:	67.1 %	COEFF		NET BF/ACRE				# OF PLOTS REQ.		INF. POP.	
SD:	1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5		10	15	
DF		60.9	9.4	44,471	49,099	53,727					
R ALDER		632.5	98.0	1	28	56					
TOTAL		60.8	9.4	44,504	49,127	53,751	142	35	16		

T	Species, Sort Grade - Board Foot Volumes (Type)														Page 1					
Project: CRYSTAL																Date	1/25/2021			
																Time	10:18:17AM			
T11S R09W S09 TTAKE																T11S R09W S09 TTAKE				
Twp	Rge	Sec	Tract	Type	Acres	Plots	Sample Trees	CuFt	BdFt											
11S	09W	09	A1	TAKE	38.00	40	71	1	W											
S So Gr T rt ad Spp			% 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	Dia	Bd	CF/ Lf			
								4-5	6-11	12-16	17+	12-20	21-30	31-35	36-99	Ft	In	Ft		
DF	DO	CU														20	24		0.00	.5
DF	DO	2M	83	2.7	41,998	40,884	1,554			16	84	1	0	1	98	38	19	651	3.36	62.8
DF	DO	3M	16	4.0	8,174	7,845	298		24	7	69	3	2	7	88	35	13	314	1.97	25.0
DF	DO	4M	1		370	370	14		100			58		26	15	18	9	44	0.75	8.4
DF	Totals		100	2.9	50,542	49,099	1,866		5	15	81	2	1	2	96	36	16	508	2.88	96.7
RA	DO	CR	100	28.6	40	28	1		100				100			28	9	50	1.36	.6
RA	Totals		0	28.6	40	28	1		100				100			28	9	50	1.36	.6
Type Totals				2.9	50,582	49,127	1,867		5	15	81	2	1	2	95	36	16	505	2.87	97.3

Stand Table Summary															
Project CRYSTAL															
T11S R09W S09 TTAKE										T11S R09W S09 TTAKE					
Twp	Rge	Sec	Tract	Type			Acres	Plots	Sample Trees		Page:	1			
11S	09W	09	A1	TAKE			38.00	40	71		Date:	01/25/2021			
											Time:	10:18:18AM			
S Spc	T	Sample		FF	Ht	Trees/ Acre	BA/ Acre	Logs Acre	Average Log		Tons/ Acre	Net	Net	T o t a l s	
		DBH	Trees	16'	Tot				Net Cu.Ft.	Net Bd.Ft.		Cu.Ft. Acre	Bd.Ft. Acre		Tons
DF		19	1	83	154	1.235	2.43	3.70	33.3	133.3		123	494	47	19
DF		22	1	86	147	.921	2.43	2.76	47.0	193.3		130	534	49	20
DF		23	2	87	135	1.685	4.86	4.21	52.0	220.0		219	927	83	35
DF		24	3	85	148	2.321	7.29	6.96	55.9	224.4		389	1,563	148	59
DF		25	3	87	157	2.139	7.29	6.42	64.6	277.8		414	1,783	157	68
DF		26	2	88	149	1.319	4.86	3.96	67.2	290.0		266	1,147	101	44
DF		27	1	86	166	.611	2.43	2.45	60.0	270.0		147	660	56	25
DF		28	5	87	157	2.842	12.15	9.10	75.4	344.4		686	3,132	261	119
DF		29	1	89	188	.530	2.43	2.12	76.8	392.5		163	832	62	32
DF		30	4	87	153	1.981	9.72	6.93	78.3	367.9		543	2,550	206	97
DF		31	5	87	166	2.319	12.15	8.35	81.6	403.9		681	3,372	259	128
DF		32	3	85	165	1.306	7.29	4.35	96.7	439.0		421	1,911	160	73
DF		33	6	87	164	2.456	14.58	9.00	96.6	478.2		870	4,305	330	164
DF		34	1	86	160	.386	2.43	1.16	122.0	576.7		141	667	54	25
DF		36	4	87	164	1.376	9.72	4.47	128.9	643.8		576	2,878	219	109
DF		37	1	86	158	.326	2.43	.98	140.0	696.7		137	680	52	26
DF		38	2	87	203	.617	4.86	2.47	139.3	773.8		344	1,910	131	73
DF		39	2	86	172	.586	4.86	2.34	125.9	648.7		295	1,521	112	58
DF		41	1	88	198	.265	2.43	1.06	163.0	950.0		173	1,007	66	38
DF		42	2	84	156	.505	4.86	1.52	164.5	813.3		249	1,233	95	47
DF		43	2	84	173	.482	4.86	1.93	151.7	790.0		293	1,523	111	58
DF		46	1	84	165	.211	2.43	.63	183.0	956.7		116	604	44	23
DF		47	1	86	190	.202	2.43	.81	200.0	1077.5		161	870	61	33
DF		48	2	87	173	.387	4.86	1.35	216.0	1134.3		292	1,536	111	58
DF		51	1	83	181	.171	2.43	.69	214.0	1110.0		147	761	56	29
DF		52	1	89	198	.165	2.43	.66	261.7	1545.0		173	1,019	66	39
DF		53	2	87	167	.317	4.86	1.11	260.6	1365.7		289	1,517	110	58
DF		54	1	89	182	.153	2.43	.61	259.5	1480.0		159	905	60	34
DF		56	3	86	176	.426	7.29	1.71	256.7	1455.0		438	2,481	166	94
DF		57	1	89	189	.137	2.43	.55	301.5	1777.5		165	975	63	37
DF		60	2	85	172	.248	4.86	.87	331.1	1812.9		287	1,571	109	60
DF		63	1	86	173	.112	2.43	.45	325.5	1797.5		146	807	56	31
DF		68	1	86	165	.096	2.43	.29	478.3	2666.7		138	771	53	29
DF		70	1	86	163	.091	2.43	.27	499.7	2386.7		136	651	52	25
DF		Totals	70	86	160	28.923	170.16	96.23	103.0	510.2		9,908	49,099	3,765	1,866
RA		21	1	86	36	.566	1.36	.57	38.0	50.0		22	28	8	1
RA		Totals	1	86	36	.566	1.36	.57	38.0	50.0		22	28	8	1
Totals			71	86	158	29.489	171.52	96.79	102.6	507.6		9929	49,127	3,773	1,867

TC TLOGSTVB				Log Stock Table - MBF																			
				Project: CRYSTAL																			
T11S R09W S09 TTAKE										T11S R09W S09 TTAK													
Twp	Rge	Sec	Tract	Type	Acres	Plots	Sample Trees	Page	1														
11S	09W	09	A1	TAKE	38.00	40	71	Date	1/25/2021														
										Time	10:18:17AM												
Spp	S	So	Gr	Log	Gross	%	Net	%	Net Volume by Scaling Diameter in Inches														
									MBF	Def	MBF	Spc	2-3	4-5	6-7	8-9	10-11	12-13	14-15	16-19	20-23	24-29	30-39
DF	DO	CU	20																				
DF	DO	2M	12		5	1.3	5	.2					1			2	1						
DF	DO	2M	14		1		1	.1							1								
DF	DO	2M	16		2		2	.1					1	1									
DF	DO	2M	18		1		1	.1					1										
DF	DO	2M	20		4		4	.2					4										
DF	DO	2M	24		1		1	.1					1										
DF	DO	2M	26		1		1	.1						1									
DF	DO	2M	28		2		2	.1					2										
DF	DO	2M	32		18		18	.9					14			4							
DF	DO	2M	36		15		15	.8					8			3	5						
DF	DO	2M	38		53	1.1	52	2.8					17	11		6				18			
DF	DO	2M	40		1,493	2.8	1,451	77.8					40	75	325	336	346	213	115				
DF	DO	3M	16		10	7.7	9	.5					2	1		1				5			
DF	DO	3M	24		2		2	.1					2										
DF	DO	3M	26		5		5	.3				1				3							
DF	DO	3M	32		21	5.1	20	1.1			5	5	2			2	3	3					
DF	DO	3M	34		2		2	.1				2											
DF	DO	3M	36		17	2.7	17	.9				2	15										
DF	DO	3M	38		25	1.0	25	1.3			2	4	4			16							
DF	DO	3M	40		229	4.3	219	11.7				7	18	17		27	14	18	64	54			
DF	DO	4M	12		6		6	.3				4	2										
DF	DO	4M	16		3		3	.1				3											
DF	DO	4M	32		4		4	.2			2	2											
DF	DO	4M	38		2		2	.1					2										
DF	Totals				1,921	2.9	1,866	99.9			9	29	46	107	88	391	358	385	283	169			
RA	DO	CR	28		2	28.6	1	100.0				1											
RA	Totals				2	28.6	1	.1				1											
Total All Species					1,922	2.9	1,867	100.0			9	30	46	107	88	391	358	385	283	169			

TC TSTATS				STATISTICS				PAGE	1		
				PROJECT	CRYSTAL			DATE	1/25/2021		
TWP	RGE	SECT	TRACT	TYPE	ACRES	PLOTS	TREES	CuFt	BdFt		
11S	09W	09	A1	ALL	38.00	40	156	1	W		
				TREES	ESTIMATED	PERCENT					
				PER PLOT	TOTAL	SAMPLE					
					TREES	TREES					
PLOTS				TREES							
TOTAL				40	156	3.9					
CRUISE				22	92	4.2	1,506	6.1			
DBH COUNT											
REFOREST											
COUNT				17	63	3.7					
BLANKS				1							
100 %											
STAND SUMMARY											
SAMPLE				TREES	AVG	BOLE	REL	BASAL	GROSS	NET	GROSS
TREES				/ACRE	DBH	LEN	DEN	AREA	BF/AC	BF/AC	CF/AC
NET				CF/AC	NET						
CF/AC				CF/AC							
DF				70	28.9	32.8	123	29.7	170.2	50,542	49,099
SNAG				15	7.1	27.2	106	5.5	28.6		
DF LEAVE				4	.4	65.9	138	1.2	9.5	1,522	1,447
WHEMLOCK				2	2.7	13.6	33	0.7	2.7	199	199
R ALDER				1	.6	21.0	28	0.3	1.4	40	28
TOTAL				92	39.6	31.3	113	37.9	212.4	52,303	50,774
10,275				10,275							
CONFIDENCE LIMITS OF THE SAMPLE											
67.1 TIMES OUT OF 100 THE VOLUME WILL BE WITHIN THE SAMPLE ERROR											
CL: 67.1 %				COEFF	SAMPLE TREES - BF				# OF TREES REQ.		INF. POP.
SD: 1.0				VAR.%	S.E.%	LOW	AVG	HIGH	5	10	15
DF				77.4	9.1	2,380	2,618	2,855			
SNAG											
DF LEAVE				127.7	71.4	1,148	4,013	6,877			
WHEMLOCK				107.5	98.2	2	125	248			
R ALDER											
TOTAL				105.1	10.7	1,936	2,169	2,402	424	106	47
CL: 67.1 %				COEFF	TREES/ACRE				# OF PLOTS REQ.		INF. POP.
SD: 1.0				VAR.%	S.E.%	LOW	AVG	HIGH	5	10	15
DF				69.2	10.7	26	29	32			
SNAG				173.8	26.9	5	7	9			
DF LEAVE				227.5	35.2	0	0	1			
WHEMLOCK				503.7	78.0	1	3	5			
R ALDER				632.5	98.0	0	1	1			
TOTAL				65.3	10.1	36	40	44	164	41	18
CL: 67.1 %				COEFF	BASAL AREA/ACRE				# OF PLOTS REQ.		INF. POP.
SD: 1.0				VAR.%	S.E.%	LOW	AVG	HIGH	5	10	15
DF				59.0	9.1	155	170	186			
SNAG				161.3	25.0	21	29	36			
DF LEAVE				219.9	34.1	6	10	13			
WHEMLOCK				441.4	68.4	1	3	5			
R ALDER				632.5	98.0	0	1	3			
TOTAL				43.0	6.7	198	212	226	71	18	8
CL: 67.1 %				COEFF	NET BF/ACRE				# OF PLOTS REQ.		INF. POP.
SD: 1.0				VAR.%	S.E.%	LOW	AVG	HIGH	5	10	15
DF				60.9	9.4	44,471	49,099	53,727			
SNAG											
DF LEAVE				287.4	44.5	803	1,447	2,092			
WHEMLOCK				473.6	73.4	53	199	345			
R ALDER				632.5	98.0	1	28	56			
TOTAL				59.6	9.2	46,089	50,774	55,459	136	34	15



Legend

- Timber Sale Boundary
- Reforestation Area
- Stream Buffer
- Roads
 - Surfaced Road
 - Unsurfaced Road
 - Motorized Trail
- Streams
 - Type F Stream
 - Type N Stream
 - Cable Corridor
- Landing
- Land Survey Monument
- Radio Tower Site

LOGGING PLAN

OF TIMBER SALE CONTRACT NO.
WO-341-2021-W00689-01
CRYSTAL CLEAR
PORTIONS OF SECTIONS 9 AND 16.
OF T11S, R9W, W.M.
LINCOLN COUNTY, OREGON.

	Tractor	Cable
UNIT	ACRES	ACRES
1 (MC)	7	31
TOTAL	7	31

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