



Timber Sale Appraisal
Upper Horsehawk
Sale AT-341-2020-W00733-01

District: Astoria

Date: April 18, 2019

Cost Summary

	Conifer	Hardwood	Total
Gross Timber Sale Value	\$4,560,875.88	\$317,325.90	\$4,878,201.78
		Project Work:	(\$1,000.00)
		Advertised Value:	\$4,877,201.78



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Timber Description

Location: Portions of Section 2 T6N, R6W, and Sections 25, 26, 35 & 36T7N, R6W, W.M., Clatsop County, Oregon

Stand Stocking: 80%

Specie Name	AvgDBH	Amortization (%)	Recovery (%)
Douglas - Fir	19	0	98
Western Hemlock / Fir	17	0	98
Alder (Red)	16	0	95
Maple	15	0	95

Volume by Grade	2S	3S & 4S 6" - 11"	8" - 9"	10" - 11"	12"+	6" - 7"	Camprun	Total
Douglas - Fir	8,249	2,398	0	0	0	0	0	10,647
Western Hemlock / Fir	51	85	0	0	0	0	0	136
Alder (Red)	0	0	60	378	191	163	0	792
Maple	0	0	0	0	0	0	62	62
Total	8,300	2,483	60	378	191	163	62	11,637

Comments: Pond Values: Local Pond Values, March 2019.

Expected Log Markets: Mist, Willamina, Banks, North Plains, Clatskanie, Tillamook, Garibaldi, Forest Grove, Noti, Warrenton, Longview, WA, Vancouver, WA, Elma, WA, and Chehalis, WA.

Western redcedar and Other Cedars Stumpage Price = Pond Value minus Logging Cost:
 $\$937.95/\text{MBF} = \$1200.00/\text{MBF} - \$262.05/\text{MBF}$

Other hardwoods Stumpage Price = Pond Value minus Logging Cost:
 $\$151.17/\text{MBF} = \$459.00/\text{MBF} - \$307.83/\text{MBF}$

Other Costs (With Profit and Risk to be added):

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

Ditch Filters:

20 bales of straw @ \$10/bale = \$200

8 hours of labor @ \$40/hour = \$320

TOTAL Other Costs (with Profit and Risk to be added): \$2,520

SLASH PILING

(See attached Site Prep Cost Summary Sheet)

TOTAL Site Prep Cost: \$11,888.67

Other Costs (No Profit and Risk added):

None

ROAD MAINTENANCE

(See attached Road Maintenance Cost Summary Sheet)

TOTAL Road Maintenance: $\$22,904 / 11,637\text{MBF} = \$1.97/\text{MBF}$



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Logging Conditions

Combination#: 1

Douglas - Fir	85.00%
Western Hemlock / Fir	85.00%
Alder (Red)	85.00%
Maple	85.00%

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: 10 **bd. ft / load:** 4600
cost / mbf: \$143.48
machines: Log Loader (A)
Tower Yarder (Medium)

Combination#: 2

Douglas - Fir	15.00%
Western Hemlock / Fir	15.00%
Alder (Red)	15.00%
Maple	15.00%

Logging System: Shovel **Process:** Manual Falling/Delimbing
yarding distance: Medium (800 ft) **downhill yarding:** No
tree size: Mature / Partial Cut (900 Bft/tree), 3-5 logs/MBF
loads / day: 15 **bd. ft / load:** 4100
cost / mbf: \$64.02
machines: Shovel Logger



"STEWARDSHIP IN FORESTRY"

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District: Astoria

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Logging Costs

Operating Seasons: 2.00	Profit Risk: 10%
Project Costs: \$1,000.00	Other Costs (P/R): \$2,520.00
Slash Disposal: \$11,888.67	Other Costs: \$0.00

Miles of Road

Road Maintenance: \$1.97

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	4.8
Western Hemlock / Fir	\$0.00	2.0	3.8
Alder (Red)	\$0.00	2.0	3.5
Maple	\$0.00	2.0	3.5



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Logging Costs Breakdown

Logging	Road Maint	Fire Protect	Hauling	Other P/R appl	Profit & Risk	Slash Disposal	Brand & Paint	Other	Total
Douglas - Fir									
\$131.56	\$2.01	\$0.75	\$100.94	\$0.22	\$23.55	\$1.02	\$2.00	\$0.00	\$262.05
Western Hemlock / Fir									
\$131.56	\$2.01	\$0.75	\$127.50	\$0.22	\$26.20	\$1.02	\$2.00	\$0.00	\$291.26
Alder (Red)									
\$131.56	\$2.07	\$0.75	\$142.50	\$0.22	\$27.71	\$1.02	\$2.00	\$0.00	\$307.83
Maple									
\$131.56	\$2.07	\$0.75	\$142.50	\$0.22	\$27.71	\$1.02	\$2.00	\$0.00	\$307.83

Specie	Amortization	Pond Value	Stumpage	Amortized
Douglas - Fir	\$0.00	\$686.97	\$424.92	\$0.00
Western Hemlock / Fir	\$0.00	\$561.50	\$270.24	\$0.00
Alder (Red)	\$0.00	\$696.66	\$388.83	\$0.00
Maple	\$0.00	\$459.00	\$151.17	\$0.00



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Summary

Amortized

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

Unamortized

Specie	MBF	Value	Total
Douglas - Fir	10,647	\$424.92	\$4,524,123.24
Western Hemlock / Fir	136	\$270.24	\$36,752.64
Alder (Red)	792	\$388.83	\$307,953.36
Maple	62	\$151.17	\$9,372.54

Gross Timber Sale Value

Recovery: \$4,878,201.78

Prepared By: Cody Valencia

Phone: 503-325-5451

Site Prep/Machine Piling Appraisal

Sale Number: AT-341-2019-W00733-01

Sale Name: Upper Horsehawk

Date: 04/16/2019

Vegetation Type/Zone	Vegetation Type/Zone Code	Production Rate (hr/ac)	Estimated Piles/Acre	Landing Production Rate (hrs/30 acres)
Doug-fir	A	0.5	0.5	6
Hemlock/Fir	B	1.3	4.5	8
Hemlock/Spruce	C	1.8	6.0	10
Hemlock	D	1.8	6.0	8
Conifer/Hardwood	E	1.0	2.0	8
Whole Tree Yarding	F	0.5	0.5	12

Sale Area	Harvest Type	Veg Type/Zone	Ground Based Yarding Acres	Estimated Piling Hours/Area	Cost/Hour	Total Cost/Area	
1	MC	E	3	3	\$145	\$435	
2	MC	A	6	3	\$145	\$435	
3	MC	A	8	4	\$145	\$580	
4	MC	F	19	10	\$145	\$1,378	
						In-unit Piling	Sub Total = \$2,828
Sale Area	Number of Landings to be Piled	# cable acres per area	Total Cost/Area	Number of In-Unit Piles	Material Cost/Pile	Total Cost/Area	
1	5	64	\$2,475	11	\$5	\$55	
2	4	49	\$1,421	7	\$5	\$35	
3	5	83	\$2,407	9	\$5	\$45	
4	2	2	\$116	11.5	\$5	\$58	
*Cost includes separating firewood						Materials	Sub Total = \$193
						Landing Piling	Sub Total = \$6,419
Move-In Allowance	Number of Move-In's	Total Move-In Allowance					
\$1,290.00	1	\$1,290					
						Move-In	Sub Total = \$1,290
Slash Endhaul Dump Truck hrs	Cost/Hour	Total	Loader hrs	Cost/Hour	Total		
	\$89.00	\$0	8	\$145	\$1,160	Sub Total =	\$1,160
						Grand Total =	\$11,888.67

Road Maintenance Cost Summary (Interim and Post Harvest)

Sale: Upper Horsehawk
Date: April 16, 2019
By: Ella Salkeld

MBF: 11,637.00
\$/MBF: \$1.97

Type	Equipment/Rationale	Move-in Rate	Times	Hours	Rate	Cost
Interim Operations	Grader 14G	\$875	2	26	\$113	\$4,688
	Dump Truck 12CY	\$184	2	12	\$89	\$1,436
	FE Loader C966	\$875	1	4	\$94	\$1,251
	Vibratory Roller	\$875	1	8	\$87	\$1,571
Final Road Maintenance	Grader 14G	\$875	1	30	\$113	\$4,265
	Dump Truck 12CY	\$184	1	10	\$89	\$1,074
	FE Loader C966	\$875	1	8	\$94	\$1,627
	Vibratory Roller	\$875	1	30	\$87	\$3,485
	Water Truck 2,500 gallon	\$214	1	15	\$101	\$1,729
	Rubber Tired Backhoe-small	\$361	1	8	\$87	\$1,057
	Labor			8	\$45	\$721
Total						\$22,904

Interim Operations Road Maintenance

Production Rates	Miles/day	Distance (miles)	Days	Hours
Grader	2.5	5.6	2.2	18

Final Road Maintenance

Production Rates	Miles/day	Distance (miles)	Days	Hours
Grader	1.5	5.6	3.7	30
Vibratory Roller	1.5	5.6	3.7	30

Process and compact: All crushed rock roads

Fishhawk Tie-Through 0.7 Miles

Fishhawk Loop Road 3.0 Miles

Greasy Spoon Road 0.20 Miles

Unnamed Spurs 1.7 Miles

Grade & Process Total = 5.6

Upper Horsehawk
Project No 1. Stream Enhancement

Location	Number of trees			Placement method	\$ / tree	Cost per Site
	Site	per	site			
SE1-SE2	1	25		Felling	\$40.00	\$1,000.00

Project Total \$1,000

UPPER HORSEHAWK Timber Sale
FY 2019
TIMBER CRUISE REPORT

1. **Sale Area Location:** Areas 1, 2, 3, and 4 are located in portions of Sections 25, 26, 35, and 36, T7N, R6W and portions of Section 2, T6N, R6W, W.M., Clatsop County, Oregon

2. **Fund Distribution:** Fund: BOF 100% CSL 0%
Tax Code: 8-01 100%

3. **Sale Acreage by Area:**

Area	Harvest Type	Gross Acres	Green Tree Area	Stream Buffer Acres	New R/W Acres	Existing R/W Acres	Net Acreage
1	MC	87	-	18	-	2	67
2	MC	63	-	5	-	3	55
3	MC	112	-	17	-	4	91
4	MC	25	-	1	-	3	21
TOTALS		287	-	41	-	12	234

4. **Cruisers and Cruise Dates:** Area 1 was cruised on 4/9/19 by John Choate, Ella Salkeld, Justin Bush, Bryce Rodgers, and Avery Petersen. Areas 2 and 3 were cruised by John Choate, Ella Salkeld, Cody Valencia, and Bryce Rodgers on 4/2/2019 and 4/9/2019. Area 4 was cruised on 4/4/2019, 4/9/2019, and 4/10/2019 by John Choate, Ella Salkeld, Cody Valencia, Bryce Rodgers, Avery Petersen and Justin Bush.

5. **Cruise Method and Computation:** Area 1 is a modified clearcut unit. A variable plot cruise with a 54.44 BAF was used in this area. These plots were located on a 5 chain by 3 chain grid, with a count/cruise plot ratio of 2:1. A total of 45 plots were sampled with 19 measure plots and 26 count plots.

Area 2 and 3 are modified clearcut units. A variable plot cruise with a 54.44 BAF was used in this area. These plots were located on a 8 chain by 4 chain grid, with a count/cruise plot ratio of 2:1. A total of 52 plots were sampled with 20 measure plots and 32 count plots. Three count plots had minor species on them, resulting in additional measure plots. One count plot had a minor species measured, resulting in an additional measure plot.

Area 4 is a modified clearcut unit. A variable plot cruise with a 40 BAF was used in this area. These plots were located on a 3 chain by 2 chain grid, with a count/cruise ratio of 2:1. A total of 37 plots were sampled with 14 measure plots and 23 count plots.

Cruisers used Allegro 2 data collectors, and were downloaded to the Atterbury Super A.C.E. program at the Astoria 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.

<u>AREAS</u>	<u>PROJECT</u>	<u>TRACT</u>	<u>CRUISE TYPE</u>
1	UPPERH	A1	OOMC and TAKE
2 and 3	UPPERH	A23	OOMC and TAKE
4	UPPERH	A4	OOMC and TAKE

6. **Timber Description:** **Area 1** is approximately 70 year old stand of Douglas-fir, red alder, and western hemlock. The average take Douglas-fir tree size for harvest is approximately 20 inches DBH, with an average merchantable tree height of 75 feet. The average take red alder tree size is approximately 16 inches DBH, with an average merchantable tree height of 56 feet. The average take hemlock tree size is approximately 17 inches DBH, with an average merchantable tree height of 46 feet. The average volume per acre to be harvested (net) is approximately 55 MBF. All trees were cruised to a merchantable top of 6 inch DIB or 40% fp.

Areas 2 and 3 are approximately 65 year old stands of Douglas-fir, red alder, maple, and western hemlock. The average take Douglas-fir tree size for harvest is approximately 19 inches DBH, with an average merchantable tree height of 66 feet. The average take red alder tree size is approximately 17 inches DBH, with an average merchantable tree height of 58 feet. The average take maple tree size for harvest is approximately 15 inches DBH, with an average merchantable tree height of 40 feet. The average take hemlock tree size is approximately 16 inches DBH, with an average merchantable tree height of 77 feet. The average volume per acre to be harvested (net) is approximately 49 MBF. All trees were cruised to a merchantable top of 6 inch DIB or 40% fp.

Area 4 is an approximately 70 year old stand of Douglas-fir, western hemlock, and red alder. The average take Douglas-fir tree size for harvest is approximately 20 inches DBH, with an average merchantable tree height of 79 feet. The average take hemlock tree size is approximately 18 inches DBH, with an average merchantable tree height of 51 feet. The average take red alder tree size is approximately 15 inches DBH, with an average merchantable tree height of 53 feet. The average volume per acre to be harvested (net) is approximately 34 MBF. All trees were cruised to a merchantable top of 6 inch DIB or 40% fp. This stand was previously thinned in the late 1990's.

Cedar is a reserved species.

7. **Statistical Analysis: (See also "Statistics Reports," attached.)**

Area	Target CV	Target SE%	Actual CV	Actual SE%
1	55	8	41.3	6.1
2 and 3	55	8	39.4	5.5
4	45	8	33.4	5.5

The statistics are for all areas and Take and Leave trees combined based on Net BF/Acre.

8. **Take Volumes by Species and Log Grades for All Sale Areas by MBF:** (See "Species, Sort Grade-Board Feet Volumes (Project)", "Statistics (Project)", and the "Stand Table Summary" attached). Volumes do not include "in-growth." The majority of defect and breakage was taken out during the cruise.

Conifer

Species	DBH	Net Vol. MBF	2 Saw	3Saw	4 Saw	% D&B	% Sale
Douglas-fir	19	10,647	8,249	2,043	355	2.1	91%
W. Hemlock	17	136	51	64	21	0.9	1%

Hardwoods

Species	DBH	Net Vol. MBF	12"+	10-12"	8-10"	6-8"	% D&B	% Sale
Red Alder	16	792	191	378	60	163	2.7	7%
Bigleaf Maple	15	62	33	0	0	29	9.4	<1%

TOTAL NET VOLUME	11,637
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9. Prepared by: Ella Salkeld

Date: 4/16/19

10. Approved by: 

Date: 4/23/19

11. Attachments: Cruise Plans & Maps (6)
Species, Sort, Grade Report (4)
Statistics Reports (4)
Stand Table Summary Report (2)
Log Stock Table Report MBF (3)

**CRUISE DESIGN
ASTORIA DISTRICT**

Sale Name: Upper Horsehawk

Area 1

Harvest Type: (MC) Modified Clearcut

Approx. Cruise Acres: 71 **Estimated CV%** 55 Net BF/Acre **SE% Objective** 8 Net BF/Acre

Planned Sale Volume : 9.9 MMBF **Estimated Sale Area Value/Acre:** \$19,400/Acre
(40 MBF/Ac. @ \$485/MBF)

A. Cruise Goals: (a) Grade minimum 80 conifer and 20 hardwood trees
(b) Sample 45 cruise plots (19 grade/ 26 count); (c) Other goals (Determine "automark"
thinning standards; X Determine log grades for sale value; X Determine snag and leave
tree species and sizes.

B. Cruise Design:

1. Plot Cruises: BAF 54.45 (Full point)
Cruise Line Directions: Area 1: 34/214
Cruise Plot Spacing 3 (chains) 198 (Feet)
Cruise Line Spacing 5 (chains) 330 (Feet)
Grade/Count Ratio 1:2

Take plots as marked on cruise map. All cedar will be reserved. Record all snags as SN.

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

DO NOT RECORD 22' LENGTHS.

All hardwood will be measured to a G, or as appropriate.

C. Tree Measurements:

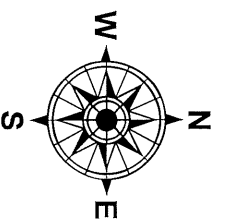
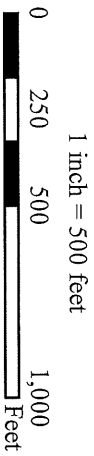
- 1. Diameter:** Minimum DBH to cruise is 8" for conifers and 8" for hardwoods.
Record dbh to nearest 1/2" for trees < 16", to nearest 1" for trees 16-24", and to nearest 2" for trees > 24". If tree diameters are estimated (only estimate on variable plot cruises), then record to closest estimate.
- 2. Bole Length:** Record bole length to nearest foot at TCD. For trees greater than 100 feet in merchantable height, estimating to the nearest 5 feet is acceptable.
- 3. Top Cruise Diameter (TCD):** Minimum top outside bark is 7" for conifers and 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 conifer trees > 18" dbh.
- 4. Form Factors:** (1) Measure or estimate a 16' form factor for every conifer tree measured/graded; OR (2) Measure a minimum of 20 form factors for each major conifer species on the cruise area, and use these to calculate average FF for the species on the cruise. Hardwood form factors are a Standard 87.

5. **Tree Segments:** Record log segments in "standard" log lengths in general use, such as 32' and 40' lengths, whenever possible. Do not record odd segments just to maximize grade. Cull segments can be any length. For conifers, minimum merchantable segment length is 12'; for hardwoods, it's 8'. Maximum segment length is 40'. One foot of trim is assumed for each merch. segment. Do not use "double dash" (--) feature on the data recorder except for the top segment of the tree. Hardwoods shall be recorded in 8' and 10' multiples.
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
Hardwoods: Alder Grades: 12" + = 1 Sawmill; 10"-12" = 2 Sawmill; 10"-8" = 3 Sawmill; and 8"-6" 4 Sawmill, or R = Camp Run; 0 = Cull.
All Maple Camp Run = R
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 inter-visible 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.
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, 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.

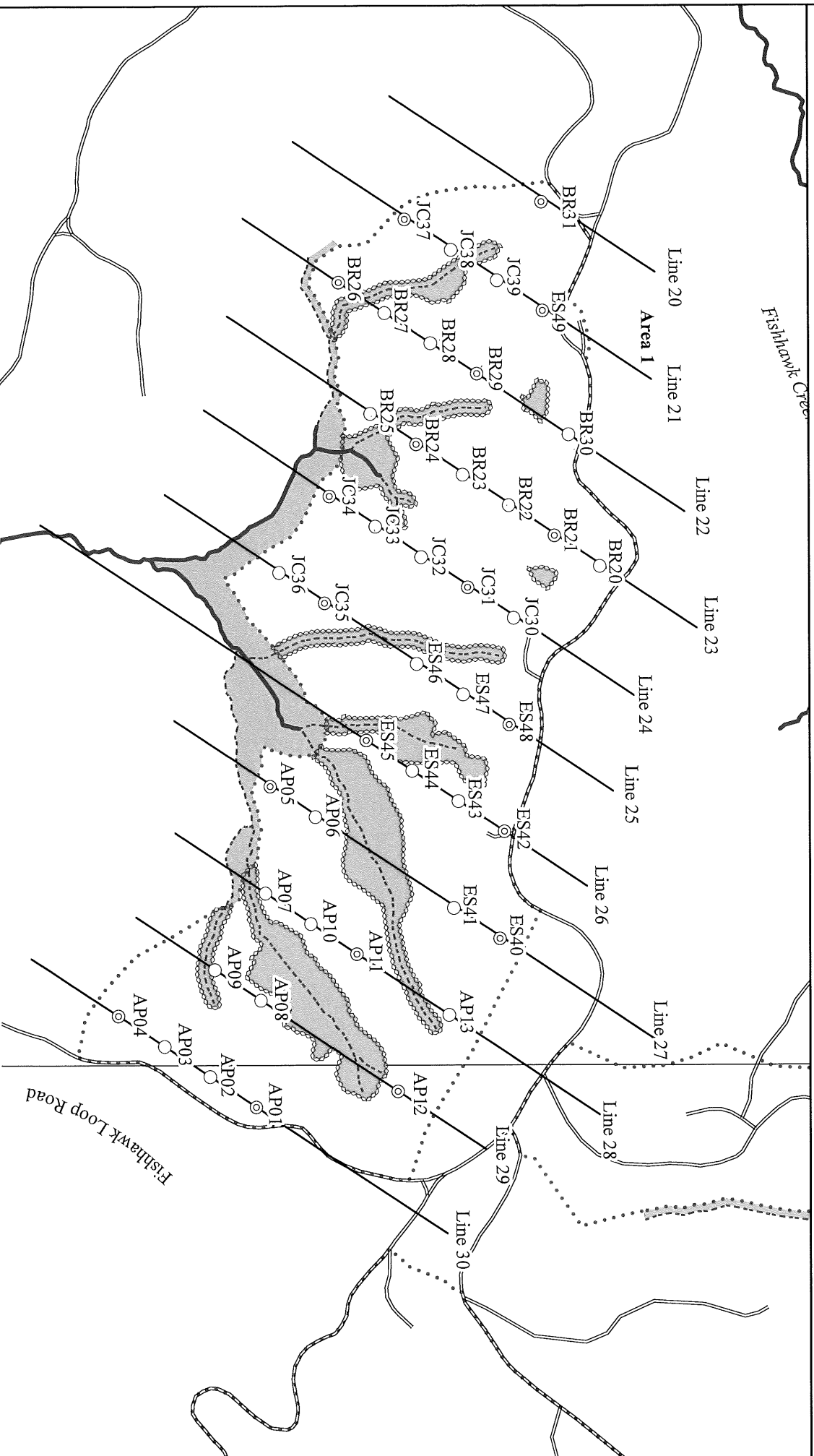
Cruise Design by: SACKALO
Approved by: John Till
Date: 4/2/2019

Legend

- Ownership Boundary
- Timber Sale Area
- Fish, Perennial
- Nonfish, Perennial
- Paved
- Count Plots
- Grade Plots
- Surfaced



Upper Horsehawk
 Area 1 (MC)
 Plots Total: 45
 Grade Plots: 19
 Count Plots: 26
 AZ: 34/214
 BAF: 54.45
 Plot Spacing: 3 (198 Ft)
 Line Spacing: 5 (330 Ft)
 Map Scale 1:6000



**CRUISE DESIGN
ASTORIA DISTRICT**

Sale Name: Upper Horsehawk

Area 2 and 3

Harvest Type: (MC) Modified Clearcut

Approx. Cruise Acres: 151 **Estimated CV%** 55 Net BF/Acre **SE% Objective** 8 Net BF/Acre

Planned Sale Volume : 9.9 MMBF **Estimated Sale Area Value/Acre:** \$20,664/Acre
(42 MBF/Ac. @ \$492/MBF)

A. Cruise Goals: (a) Grade minimum 100 conifer and 10 hardwood trees
(b) Sample 52 cruise plots (20 grade/ 32 count); (c) Other goals (Determine "automark"
thinning standards; X Determine log grades for sale value; X Determine snag and leave
tree species and sizes.

B. Cruise Design:

1. Plot Cruises: BAF 54.45 (Full point)
Cruise Line Directions: Area 2: 143/323 & Area 3: 82/262
Cruise Plot Spacing 4 (chains) 264 (Feet)
Cruise Line Spacing 8 (chains) 528 (Feet)
Grade/Count Ratio 1:2

Take plots as marked on cruise map. All cedar will be reserved. Record all snags as SN.

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

DO NOT RECORD 22' LENGTHS.

All hardwood will be measured to a G, or as appropriate.

C. Tree Measurements:

- 1. 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.
- 2. Bole Length:** Record bole length to nearest foot at TCD. For trees greater than 100 feet in merchantable height, estimating to the nearest 5 feet is acceptable.
- 3. Top Cruise Diameter (TCD):** Minimum top outside bark is 7" for conifers and 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 conifer trees > 18" dbh.
- 4. Form Factors:** (1) Measure or estimate a 16' form factor for every conifer tree measured/graded; OR (2) Measure a minimum of 20 form factors for each major conifer species on the cruise area, and use these to calculate average FF for the species on the cruise. Hardwood form factors are a Standard 87.

5. **Tree Segments:** Record log segments in "standard" log lengths in general use, such as 32' and 40' lengths, whenever possible. Do not record odd segments just to maximize grade. Cull segments can be any length. For conifers, minimum merchantable segment length is 12'; for hardwoods, it's 8'. Maximum segment length is 40'. One foot of trim is assumed for each merch. segment. Do not use "double dash" (--) feature on the data recorder except for the top segment of the tree. Hardwoods shall be recorded in 8' and 10' multiples.

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
Hardwoods: Alder Grades: 12" + = 1 Sawmill; 10"-12" = 2 Sawmill; 10"-8" = 3 Sawmill; and 8"-6" 4 Sawmill, or R = Camp Run; 0 = Cull.
All Maple Camp Run = R

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 inter-visible 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.

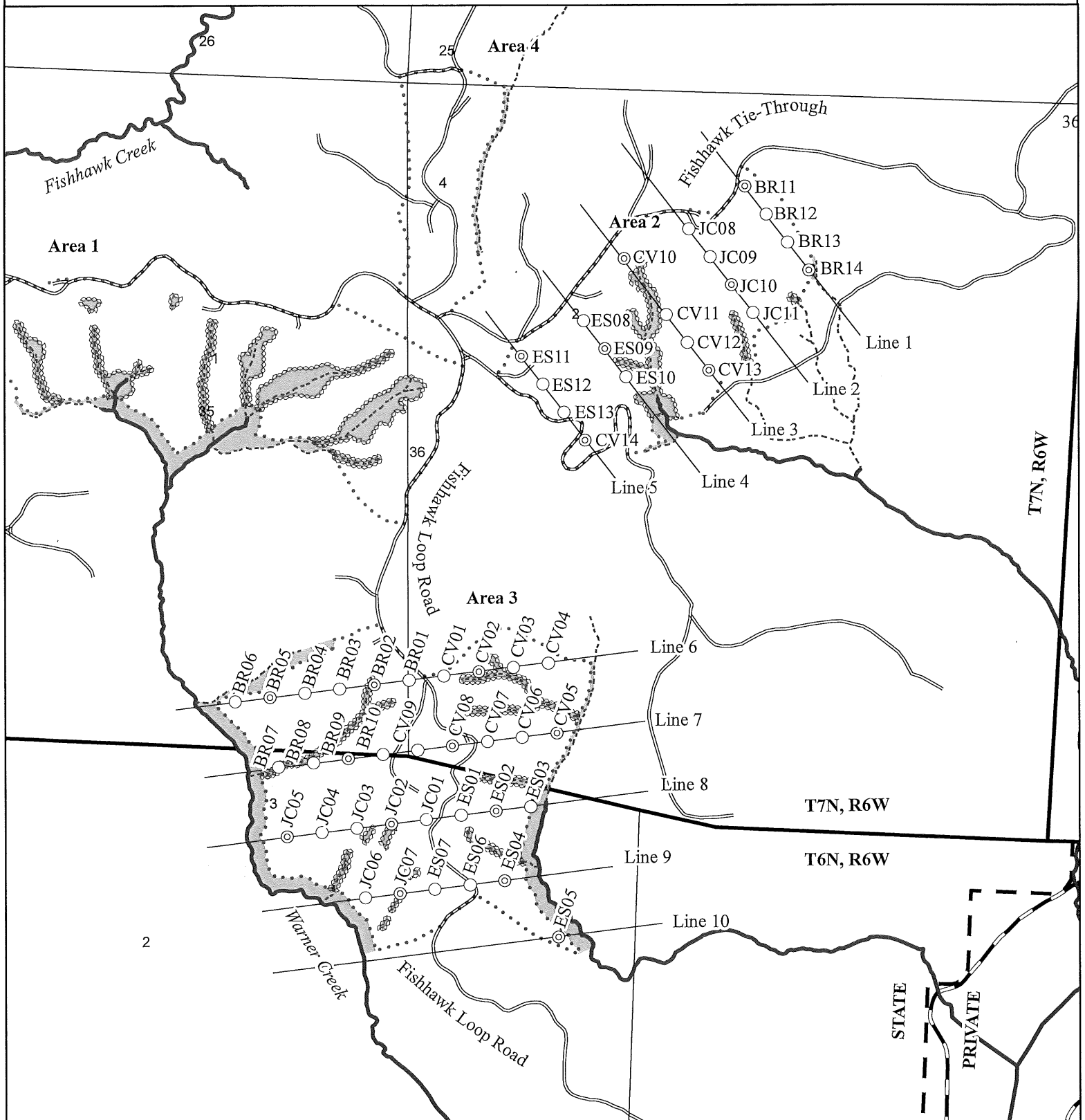
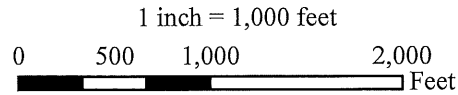
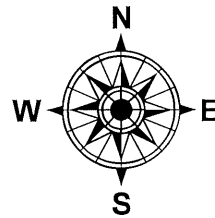
9. **Cruising Equipment:** Relaskop, Rangefinder, Logger's Tape (with dbh on back) Biltmore Stick, Compass, Cruise Cards in Tatum OR Data Recorder, Cruise Design, Cruise Map, Yellow Flagging, Blue Flagging, Yellow Paint.

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: SALKELD
Approved by: [Signature]
Date: 4/2/19

Legend

-  Ownership Boundary
-  Timber Sale Area
-  Fish, Perennial
-  Nonfish, Perennial
-  Paved
-  Surfaced
-  Grade Plots
-  Count Plots



**CRUISE DESIGN
ASTORIA DISTRICT**

Sale Name: Upper Horsehawk

Area 4

Harvest Type: (MC) Modified Clearcut

Approx. Cruise Acres: 21 **Estimated CV%** 45 Net BF/Acre **SE% Objective** 8 Net BF/Acre

Planned Sale Volume : 9.9 MMBF **Estimated Sale Area Value/Acre:** \$16,800/Acre
(32 MBF/Ac. @ \$525/MBF)

A. Cruise Goals: (a) Grade minimum 50 conifer and 15 hardwood trees
(b) Sample 37 cruise plots (14 grade/ 23 count); (c) Other goals (Determine "automark"
thinning standards; X Determine log grades for sale value; X Determine snag and leave
tree species and sizes.

B. Cruise Design:

1. Plot Cruises: BAF 40 (Full point)
Cruise Line Directions: 90/270
Cruise Plot Spacing 2 (chains) 132 (Feet)
Cruise Line Spacing 3 (chains) 198 (Feet)
Grade/Count Ratio 1:2

Take plots as marked on cruise map. All cedar will be reserved. Record all snags as SN.

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

DO NOT RECORD 22' LENGTHS.

All hardwood will be measured to a G, or as appropriate.

C. Tree Measurements:

- 1. Diameter:** Minimum DBH to cruise is 8" for conifers and 8" for hardwoods.
Record dbh to nearest $\frac{1}{2}$ " for trees < 16", to nearest 1" for trees 16-24", and to nearest 2" for trees > 24". If tree diameters are estimated (only estimate on variable plot cruises), then record to closest estimate.
- 2. Bole Length:** Record bole length to nearest foot at TCD. For trees greater than 100 feet in merchantable height, estimating to the nearest 5 feet is acceptable.
- 3. Top Cruise Diameter (TCD):** Minimum top outside bark is 7" for conifers and 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 conifer trees > 18" dbh.
- 4. Form Factors:** (1) Measure or estimate a 16' form factor for every conifer tree measured/graded; OR (2) Measure a minimum of 20 form factors for each major conifer species on the cruise area, and use these to calculate average FF for the species on the cruise. Hardwood form factors are a Standard 87.

5. Tree Segments: Record log segments in "standard" log lengths in general use, such as 32' and 40' lengths, whenever possible. Do not record odd segments just to maximize grade. Cull segments can be any length. For conifers, minimum merchantable segment length is 12'; for hardwoods, it's 8'. Maximum segment length is 40'. One foot of trim is assumed for each merch. segment. Do not use "double dash" (--) feature on the data recorder except for the top segment of the tree. Hardwoods shall be recorded in 8' and 10' multiples.

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
Hardwoods: Alder Grades: 12" + = 1 Sawmill; 10"-12" = 2 Sawmill; 10"-8" = 3 Sawmill; and 8"-6" 4 Sawmill, or R = Camp Run; 0 = Cull.
All Maple Camp Run = R

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 inter-visible 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.

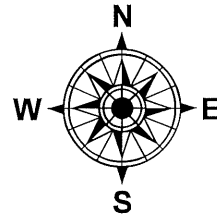
9. Cruising Equipment: Relaskop, Rangefinder, Logger's Tape (with dbh on back) Biltmore Stick, Compass, Cruise Cards in Tatum OR Data Recorder, Cruise Design, Cruise Map, Yellow Flagging, Blue Flagging, Yellow Paint.

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.

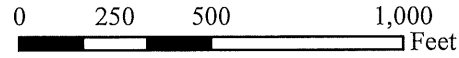
Cruise Design by: SALKELD
Approved by: [Signature]
Date: 4/2/2019

Legend

- | | | | |
|--|--------------------|--|---------------|
| | Ownership Boundary | | Paved Road |
| | Timber Sale Area | | Surfaced Road |
| | Fish, Perennial | | Grade Plots |
| | Nonfish, Perennial | | Count Plots |



1 inch = 500 feet



Upper Horsehawk

Page 1 of 2

Area 4 (MC)

Plots Toatal:37

Grade Plots:14

Count Plots:23

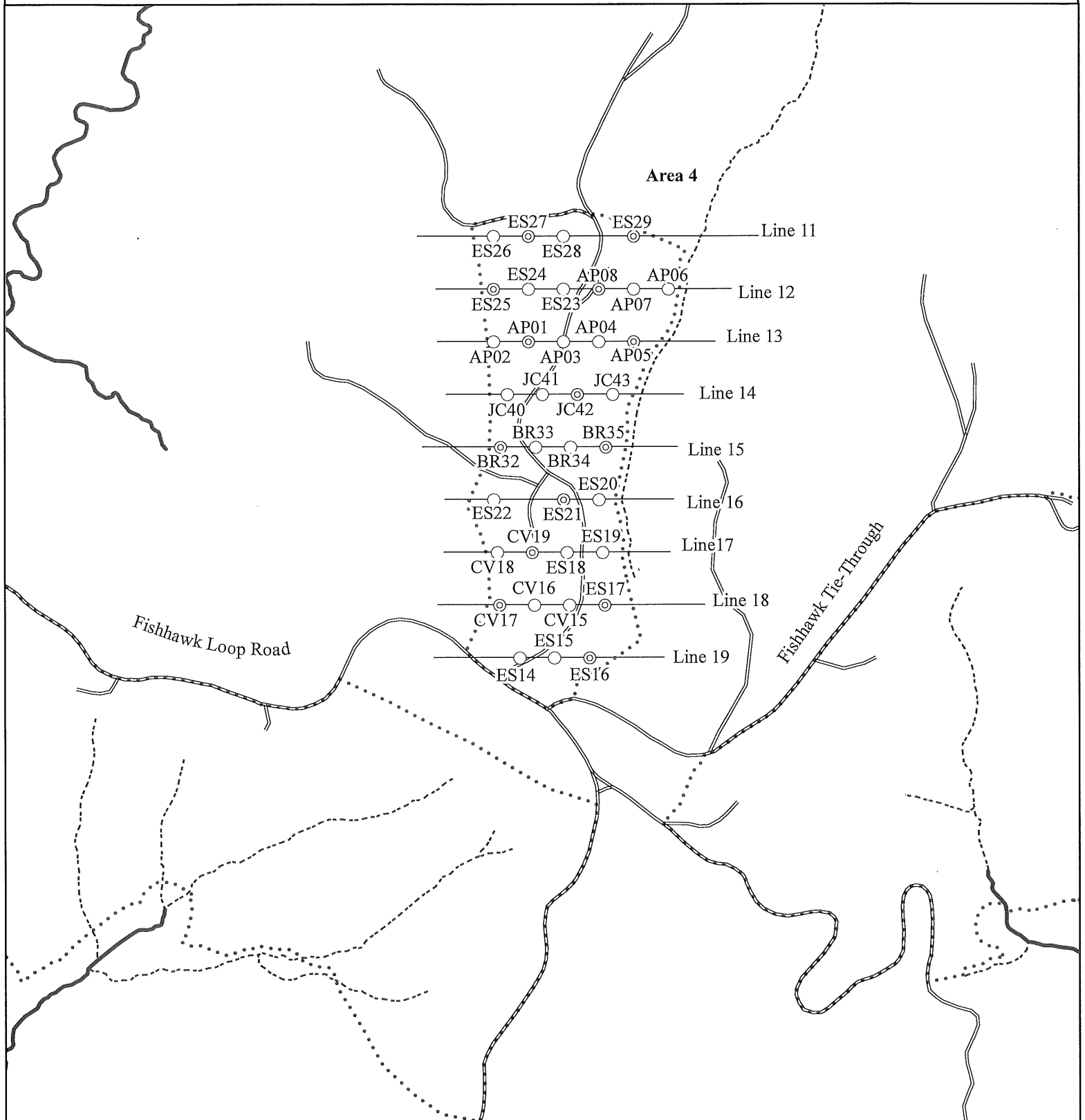
AZ: 90/270

BAF: 40

Plot Spacing: 2 (132 Ft)

Line Spacing: 3 (198 Ft)

Map Scale 1:6000



TC		PSPCSTGR		Species, Sort Grade - Board Foot Volumes (Project)																
<div>T07N R06W S35 Ty00MC67.00</div> <div>T07N R06W S35 Ty00MC146.00</div> <div>T07N R06W S36 Ty00MC21.00</div>				Project: UPPERH										Page 1						
				Acres 234.00										Date 4/16/2019						
														Time 3:06:04PM						
S Spp	So T	Gr rt ad	% Net BdFt	Bd. Ft. per Acre			Total Net MBF	Percent of Net Board Foot Volume								Average Log				Logs Per /Acre
								Log Scale Dia.				Log Length				Ln Dia Bd CF/ Ft In Ft Lf				
				4-5	6-11	12-16		17+	12-20	21-30	31-35	36-99								
D		DOCU		100.0	663											12	10		0.00	13.4
D		DO2S	77	.8	35,521	35,254	8,249			34	66	0	1	1	97	39	17	470	2.52	75.0
D		DO3S	19	.3	8,756	8,729	2,043		98	1	1	2	8	19	72	36	8	94	0.74	93.2
D		DO4S	4		1,517	1,517	355		100			68	25	2	5	18	7	27	0.44	57.0
D Totals			91	2.1	46,456	45,500	10,647		22	26	52	3	3	4	89	31	11	191	1.38	238.6
H		DO2S	37	2.4	223	217	51			55	45		5	6	89	38	17	412	2.40	.5
H		DO3S	47		273	273	64		100			1		19	80	37	9	125	0.94	2.2
H		DO4S	16		90	90	21		100			33	39	16	12	24	7	38	0.64	2.4
H Totals			1	.9	585	580	136		63	21	17	6	8	14	73	31	9	114	1.01	5.1
A		DOCU		100.0	70											7	14		0.00	.8
A		DO1S	24		815	815	191			100					100	39	13	238	1.69	3.4
A		DO2S	47	.8	1,630	1,617	378		100			4	20	6	71	35	11	147	1.20	11.0
A		DO3S	8		254	254	60		100				36		64	35	9	90	0.77	2.8
A		DO4S	21	1.4	708	698	163		100			51	8		41	24	6	32	0.50	21.9
A Totals			7	2.7	3,477	3,383	792		76	24		13	14	3	71	29	8	85	0.90	39.9
M		DOCU		100.0	15											4	17		0.00	.3
M		DO1S	53		143	143	33			54	46	46	54			25	14	172	1.57	.8
M		DO4S	47	8.9	138	126	29		100			57	12	30		21	7	31	0.59	4.1
M Totals			1	9.4	296	269	62.63		47	29	24	51	35	14		21	9	52	0.77	5.2
Totals				2.1	50,815	49,732	11,637		26	26	47	4	4	4	87	31	10	172	1.31	288.8

T		TSPCSTGR		Species, Sort Grade - Board Foot Volumes (Type)										Page		1						
				Project: UPPERH										Date		4/16/2019						
														Time		3:08:26PM						
T07N R06W S35 T00MC										T07N R06W S35 T00MC												
Twp	Rge	Sec	Tract	Type	Acres	Plots	Sample Trees	CuFt	BdFt													
07N	06W	35	TAKEA1	00MC	67.00	45	102	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	Lf	
D	DO	CU		100.0	734													14	9		0.00	14.2
D	DO	2S	76	1.1	35,085	34,697	2,325					42	58	1	1	1	98	40	16	438	2.31	79.3
D	DO	3S	20	.4	8,897	8,862	594				96	1	4	3	5	20	72	35	9	101	0.80	88.0
D	DO	4S	4		1,663	1,663	111				100			44	39	4	13	22	6	30	0.45	54.8
D	Totals		83	2.5	46,380	45,223	3,030			22	32	45		3	3	4	89	32	11	191	1.35	236.2
A	DO	CU		100.0	244													7	14		0.00	2.7
A	DO	1S	32		2,845	2,845	191			100						100		39	13	238	1.69	12.0
A	DO	2S	36	1.4	3,262	3,215	215			100				7	19	10	64	34	11	140	1.18	22.9
A	DO	3S	9		762	762	51			100					42		58	34	9	86	0.76	8.8
A	DO	4S	23	1.7	2,063	2,028	136			100				45	6		49	25	6	34	0.50	58.9
A	Totals		16	3.6	9,176	8,850	593			68	32			13	12	4	72	29	8	84	0.88	105.3
H	DO	3S	69		390	390	26			100						100		40	10	150	0.98	2.6
H	DO	4S	31		170	170	11			100				46	54			22	7	35	0.69	4.9
H	Totals		1		560	560	38			100				14	16		70	28	8	75	0.83	7.5
Type Totals				2.6	56,116	54,633	3,660			31	32	37		5	5	4	86	31	10	157	1.21	349.1

T		TSPCSTGR		Species, Sort Grade - Board Foot Volumes (Type)										Page		1				
				Project: UPPERH										Date		4/16/2019				
														Time		3:08:52PM				
T07N R06W S35 T00MC										T07N R06W S35 T00MC										
Twp		Rge		Sec		Tract		Type		Acres		Plots		Sample Trees		CuFt		BdFt		
07N		06W		35		TAKEA23		00MC		146.00		52		80		1		W		
S So Gr T rt ad Spp			%	Bd. Ft. per Acre			Total	Percent Net Board Foot Volume								Average Log				Logs Per /Acre
								Log Scale Dia.				Log Length				Ln Dia Bd CF/				
			Net	Def%	Gross	Net	Net MBF	4-5	6-11	12-16	17+	12-20	21-30	31-35	36-99	Ft	In	Ft	Lf	
D			DO	CU	87	100.0	677									10	10		0.00	
D			DO	2S	78	.6	37,382	37,160	5,425		29	71	0	2	1	97	39	17	495	2.67
D			DO	3S	19	.3	8,943	8,918	1,302		99	1	1	10	19	70	36	8	88	0.70
D			DO	4S	3		1,424	1,424	208		100		86	14			16	7	24	0.43
D Totals				96	1.9	48,425	47,502	6,935		22	23	55	3	4	4	89	31	11	191	1.41
A			DO	2S	87		1,067	1,067	156		100			22		78	37	11	158	1.21
A			DO	4S	13		152	152	22		100		100				19	6	22	0.50
A Totals				2		1,218	1,218	178		100			12	19		68	28	8	90	0.97
M			DO	CU		100.0	25										4	17		0.00
M			DO	1S	53		229	229	33		54	46	46	54			25	14	172	1.57
M			DO	4S	47	8.9	222	202	29		100		57	12	30		21	7	31	0.59
M Totals				1	9.4	475	430	63		47	29	24	51	35	14		21	9	52	0.77
H			DO	3S	100		180	180	26		100			25	75		36	9	120	0.87
H Totals				0		180	180	26		100				25	75		36	9	120	0.87
Type Totals					1.9	50,298	49,331	7,202		24	22	54	4	4	4	88	30	10	181	1.37

T TSPCSTGR		Species, Sort Grade - Board Foot Volumes (Type)										Page 1									
		Project: UPPERH										Date	4/16/2019								
												Time	3:09:21PM								
T07N R06W S36 T00MC										T07N R06W S36 T00MC											
Twp	Rge	Sec	Tract	Type	Acres	Plots	Sample Trees	CuFt	BdFt												
07N	06W	36	TAKEA4	00MC	21.00	37	66	1	W												
S So Gr Spp T rt ad		% Net BdFt	Bd. Ft. per Acre Def% Gross Net			Total Net MBF	Percent Net Board Foot Volume								Average Log		Logs Per /Acre				
							Log Scale Dia.				Log Length				Ln	Dia		Bd	CF/ Lf		
D	DO	CU		100.0	334											17	7		0.00	9.8	
D	DO	2S	73	.8	23,973	23,774	499			45	55			2	98	40	16	395	2.16	60.2	
D	DO	3S	21	.3	7,007	6,987	147		100			1	3	13	83	37	9	127	0.93	54.8	
D	DO	4S	6		1,703	1,703	36		100			41	45	7	7	23	7	34	0.50	50.0	
D	Totals		88	1.7	33,016	32,464	682		27	33	40	2	3	5	90	33	11	186	1.32	174.8	
H	DO	2S	70	2.4	2,482	2,422	51			55	45		5	6	89	38	17	412	2.40	5.9	
H	DO	3S	16		547	547	11		100			6		48	45	36	9	96	1.00	5.7	
H	DO	4S	14		456	456	10		100			18	21	35	27	27	7	42	0.58	10.9	
H	Totals		9	1.7	3,485	3,425	72		29	39	32	3	6	17	74	32	10	153	1.26	22.4	
A	DO	2S	34		343	343	7		100						100	40	10	150	1.15	2.3	
A	DO	3S	41		405	405	8		100						100	40	9	120	0.85	3.4	
A	DO	4S	25		248	248	5		100			18	82			25	6	27	0.49	9.0	
A	Totals		3		995	995	21		100			5	20		75	31	7	68	0.73	14.7	
Type Totals				1.6	37,497	36,884	775		29	33	38	2	4	6	88	33	10	174	1.28	212.0	

TC PSTATS			PROJECT STATISTICS							PAGE	1	
			PROJECT		UPPERH			DATE	4/16/2019			
TWP	RGE	SC	TRACT	TYPE		ACRES		PLOTS	TREES	CuFt	BdFt	
07N	06	35	TAKEA1	00MC		234.00		134	678	1	W	
07N	06W	35	TAKEA23	00MC								
07N	06W	36	TAKEA4	00MC								
			PLOTS	TREES	TREES PER PLOT	ESTIMATED TOTAL TREES		PERCENT SAMPLE TREES				
TOTAL			134	678	5.1							
CRUISE			54	247	4.6	32,689		.8				
DBH COUNT REFOREST COUNT			80	425	5.3							
BLANKS 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
DOUG FIR			200	112.4	19.2	69	51.5	225.8	46,456	45,500	10,497	10,363
R ALDER			30	21.3	16.1	56	7.5	30.0	3,477	3,383	1,039	1,026
WHEMLOCK			13	3.2	16.9	52	1.2	5.0	585	580	161	161
BL MAPLE			4	2.8	14.6	40	0.9	3.3	296	269	85	83
TOTAL			247	139.7	18.6	66	61.2	264.1	50,815	49,732	11,782	11,633
CONFIDENCE LIMITS OF THE SAMPLE												
68.1 TIMES OUT OF 100 THE VOLUME WILL BE WITHIN THE SAMPLE ERROR												
CL	68.1	COEFF	SAMPLE TREES - BF						# OF TREES REQ.		INF. POP.	
SD:	1.0	VAR.%	S.E.%	LOW	AVG	HIGH			5	10	15	
DOUG FIR			77.3	5.5	752	796	839					
R ALDER			45.8	8.5	165	181	196					
WHEMLOCK			93.4	26.9	261	357	453					
BL MAPLE			77.1	44.0	74	133	191					
TOTAL			87.8	5.6	649	687	725		308	77	34	
CL	68.1	COEFF	TREES/ACRE						# OF PLOTS REQ.		INF. POP.	
SD:	1.0	VAR.%	S.E.%	LOW	AVG	HIGH			5	10	15	
DOUG FIR			106.1	9.2	102	112	123					
R ALDER			219.5	18.9	17	21	25					
WHEMLOCK			308.3	26.6	2	3	4					
BL MAPLE			741.9	64.0	1	3	5					
TOTAL			87.1	7.5	129	140	150		303	76	34	
CL	68.1	COEFF	BASAL AREA/ACRE						# OF PLOTS REQ.		INF. POP.	
SD:	1.0	VAR.%	S.E.%	LOW	AVG	HIGH			5	10	15	
DOUG FIR			80.7	7.0	210	226	242					
R ALDER			216.6	18.7	24	30	36					
WHEMLOCK			293.3	25.3	4	5	6					
BL MAPLE			689.9	59.5	1	3	5					
TOTAL			68.9	5.9	248	264	280		189	47	21	
CL	68.1	COEFF	NET BF/ACRE						# OF PLOTS REQ.		INF. POP.	
SD:	1.0	VAR.%	S.E.%	LOW	AVG	HIGH			5	10	15	
DOUG FIR			79.4	6.9	42,383	45,500	48,617					
R ALDER			219.0	18.9	2,744	3,383	4,023					
WHEMLOCK			318.7	27.5	420	580	740					
BL MAPLE			709.9	61.3	104	269	433					
TOTAL			70.9	6.1	46,688	49,732	52,776		201	50	22	

TC TSTATS				STATISTICS				PAGE	1		
				PROJECT	UPPERH			DATE	4/16/2019		
TWP	RGE	SECT	TRACT	TYPE	ACRES	PLOTS	TREES	CuFt	BdFt		
07N	06W	35	TAKEA1	00MC	67.00	45	251	1	W		
				TREES	ESTIMATED	PERCENT					
				PER PLOT	TOTAL	SAMPLE					
					TREES	TREES					
TOTAL		45	251	5.6							
CRUISE		19	101	5.3	11,171		.9				
DBH COUNT											
REFOREST											
COUNT		26	149	5.7							
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		76	105.1	19.5	75	49.3	217.8	46,380	45,223	10,448	10,292
R ALDER		23	56.7	15.9	56	19.7	78.6	9,176	8,850	2,730	2,686
WHEMLOCK		2	4.9	16.5	46	1.8	7.3	560	560	176	176
TOTAL		101	166.7	18.3	68	71.0	303.7	56,116	54,633	13,353	13,154
CONFIDENCE LIMITS OF THE SAMPLE											
68.1 TIMES OUT OF 100 THE VOLUME WILL BE WITHIN THE SAMPLE ERROR											
CL:	68.1 %	COEFF	SAMPLE TREES - BF				# OF TREES REQ.		INF. POP.		
SD:	1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5	10	15		
DOUG FIR		78.3	9.0	722	793	864					
R ALDER		46.6	9.9	170	188	207					
WHEMLOCK		90.0	84.3	17	110	203					
TOTAL		93.7	9.3	582	642	702	350	88	39		
CL:	68.1 %	COEFF	TREES/ACRE				# OF PLOTS REQ.		INF. POP.		
SD:	1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5	10	15		
DOUG FIR		90.1	13.4	91	105	119					
R ALDER		134.5	20.0	45	57	68					
WHEMLOCK		303.5	45.2	3	5	7					
TOTAL		59.4	8.8	152	167	181	141	35	16		
CL:	68.1 %	COEFF	BASAL AREA/ACRE				# OF PLOTS REQ.		INF. POP.		
SD:	1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5	10	15		
DOUG FIR		61.7	9.2	198	218	238					
R ALDER		130.8	19.5	63	79	94					
WHEMLOCK		303.4	45.2	4	7	11					
TOTAL		39.4	5.9	286	304	321	62	16	7		
CL:	68.1 %	COEFF	NET BF/ACRE				# OF PLOTS REQ.		INF. POP.		
SD:	1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5	10	15		
DOUG FIR		59.6	8.9	41,205	45,223	49,241					
R ALDER		132.1	19.7	7,108	8,850	10,592					
WHEMLOCK		321.8	47.9	292	560	828					
TOTAL		41.3	6.1	51,273	54,633	57,992	68	17	8		

TC TSTATS				STATISTICS				PAGE	1		
				PROJECT	UPPERH			DATE	4/16/2019		
TWP	RGE	SECT	TRACT	TYPE	ACRES	PLOTS	TREES	CuFt	BdFt		
07N	06W	35	TAKEA23	00MC	146.00	52	244	1	W		
				TREES	ESTIMATED	PERCENT					
				PER PLOT	TOTAL	SAMPLE					
					TREES	TREES					
PLOTS		TREES									
TOTAL		52	244	4.7							
CRUISE		21	80	3.8		19,431		.4			
DBH COUNT											
REFOREST											
COUNT		31	159	5.1							
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		71	121.0	19.0	66	54.7	238.7	48,425	47,502	10,921	
R ALDER		4	6.8	16.9	58	2.5	10.5	1,218	1,218	365	
BL MAPLE		4	4.5	14.6	40	1.4	5.2	475	430	137	
WHEMLOCK		1	.7	16.0	77	0.3	1.0	180	180	47	
TOTAL		80	133.1	18.8	65	59.0	255.4	50,298	49,331	11,470	
CONFIDENCE LIMITS OF THE SAMPLE											
68.1 TIMES OUT OF 100 THE VOLUME WILL BE WITHIN THE SAMPLE ERROR											
CL:	68.1 %	COEFF		SAMPLE TREES - BF			# OF TREES REQ.		INF. POP.		
SD:	1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5 10		15		
DOUG FIR		79.9	9.5	826	913	999					
R ALDER		20.0	11.4	164	185	206					
BL MAPLE		77.1	44.0	74	133	191					
WHEMLOCK											
TOTAL		87.6	9.8	748	829	910	307 77		34		
CL:	68.1 %	COEFF		TREES/ACRE			# OF PLOTS REQ.		INF. POP.		
SD:	1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5 10		15		
DOUG FIR		69.7	9.7	109	121	133					
R ALDER		288.7	40.0	4	7	9					
BL MAPLE		458.1	63.5	2	5	7					
WHEMLOCK		721.1	99.9	0	1	1					
TOTAL		63.2	8.8	121	133	145	160 40		18		
CL:	68.1 %	COEFF		BASAL AREA/ACRE			# OF PLOTS REQ.		INF. POP.		
SD:	1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5 10		15		
DOUG FIR		42.4	5.9	225	239	253					
R ALDER		292.0	40.5	6	10	15					
BL MAPLE		425.1	58.9	2	5	8					
WHEMLOCK		721.1	99.9	0	1	2					
TOTAL		39.3	5.4	242	255	269	62 15		7		
CL:	68.1 %	COEFF		NET BF/ACRE			# OF PLOTS REQ.		INF. POP.		
SD:	1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5 10		15		
DOUG FIR		42.1	5.8	44,731	47,502	50,273					
R ALDER		291.2	40.4	727	1,218	1,710					
BL MAPLE		437.8	60.7	169	430	691					
WHEMLOCK		721.1	99.9	0	180	360					
TOTAL		39.4	5.5	46,634	49,331	52,027	62 16		7		

TC TSTATS				STATISTICS				PAGE	1		
				PROJECT	UPPERH	DATE				4/16/2019	
TWP	RGE	SECT	TRACT	TYPE	ACRES	PLOTS	TREES	CuFt	BdFt		
07N	06W	36	TAKEA4	00MC	21.00	37	183	1	W		
				TREES	ESTIMATED	PERCENT					
				PER PLOT	TOTAL	SAMPLE					
					TREES	TREES					
TOTAL		37	183	4.9							
CRUISE		14	66	4.7	2,088		3.2				
DBH COUNT											
REFOREST											
COUNT		23	117	5.1							
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		53	75.7	19.8	79	36.4	162.2	33,016	32,464	7,706	
WHEMLOCK		10	14.7	17.6	51	5.9	24.9	3,485	3,425	902	
R ALDER		3	9.0	14.8	53	2.8	10.8	995	995	332	
TOTAL		66	99.4	19.1	72	45.3	197.8	37,497	36,884	8,940	
CONFIDENCE LIMITS OF THE SAMPLE											
68.1 TIMES OUT OF 100 THE VOLUME WILL BE WITHIN THE SAMPLE ERROR											
CL: 68.1 %	COEFF	SAMPLE TREES - BF					# OF TREES REQ.		INF. POP.		
SD: 1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5 10		15			
DOUG FIR		57.1	7.8	592	642	693					
WHEMLOCK		85.5	28.5	299	418	537					
R ALDER		64.9	44.9	64	117	169					
TOTAL		64.6	7.9	538	585	631		167	42		
CL: 68.1 %	COEFF	TREES/ACRE					# OF PLOTS REQ.		INF. POP.		
SD: 1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5 10		15			
DOUG FIR		49.3	8.1	70	76	82					
WHEMLOCK		138.8	22.8	11	15	18					
R ALDER		283.2	46.5	5	9	13					
TOTAL		48.0	7.9	92	99	107		92	23		
CL: 68.1 %	COEFF	BASAL AREA/ACRE					# OF PLOTS REQ.		INF. POP.		
SD: 1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5 10		15			
DOUG FIR		33.4	5.5	153	162	171					
WHEMLOCK		133.3	21.9	19	25	30					
R ALDER		284.6	46.7	6	11	16					
TOTAL		34.0	5.6	187	198	209		46	12		
CL: 68.1 %	COEFF	NET BF/ACRE					# OF PLOTS REQ.		INF. POP.		
SD: 1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5 10		15			
DOUG FIR		35.9	5.9	30,551	32,464	34,377					
WHEMLOCK		159.3	26.2	2,529	3,425	4,321					
R ALDER		299.9	49.3	505	995	1,486					
TOTAL		33.4	5.5	34,863	36,884	38,906		44	11		

TC		PSTNDSUM		Stand Table Summary										Page Date:		1 4/16/2019	
<div>T07N R06W S35 Ty00MC67.00 T07N R06W S35 Ty00MC146.00 T07N R06W S36 Ty00MC21.00</div>					ProjectUPPERH					Time:		3:18:41PM					
					Acres234.00					Grown Year:							
S Spc	T	Sample		Tot		Trees/ Acre	BA/ Acre	Logs Acre	Average Log		Tons/ Acre	Net Cu.Ft. Acre	Net Bd.Ft. Acre	Totals			
		DBH	Trees	FF 16'	Av Ht				Net Cu.Ft.	Net Bd.Ft.				Tons	Cunits	MBF	
D		8	3	89	21	9.146	3.19										
D		9	3	86	81	10.118	4.47	10.12	14.3	58.2		145	588		338	138	
D		10	4	87	65	10.700	5.84	14.55	9.3	38.4		135	558		315	131	
D		11	3	89	85	7.600	5.02	13.96	10.1	36.8		141	514		330	120	
D		12	3	87	55	6.386	5.02	9.06	11.8	42.3		107	383		250	90	
D		13	5	87	81	5.836	5.38	9.89	16.5	54.1		163	535		382	125	
D		14	2	90	106	2.730	2.92	5.46	22.7	91.6		124	500		290	117	
D		15	8	87	102	6.095	7.48	13.53	20.4	75.6		275	1,022		644	239	
D		16	4	86	85	2.483	3.47	4.97	23.9	75.7		119	376		278	88	
D		17	7	90	120	4.225	6.66	10.30	29.6	112.8		305	1,162		714	272	
D		18	4	88	113	2.994	5.29	8.83	26.7	98.5		236	870		551	204	
D		19	7	90	115	4.308	8.48	10.65	36.9	140.2		393	1,494		920	349	
D		20	11	90	128	3.386	7.39	9.41	39.7	160.9		374	1,514		874	354	
D		21	9	89	123	2.466	5.93	7.40	37.7	157.3		279	1,164		653	272	
D		22	5	88	131	1.831	4.83	5.49	44.5	184.5		244	1,013		572	237	
D		23	12	87	118	5.311	15.32	13.75	50.8	206.3		699	2,838		1,635	664	
D		24	10	87	132	2.323	7.30	6.62	55.6	236.3		368	1,564		862	366	
D		25	8	87	128	2.569	8.76	7.09	61.1	257.8		433	1,829		1,014	428	
D		26	14	87	138	3.118	11.50	9.35	62.1	267.7		580	2,504		1,358	586	
D		27	12	87	121	2.432	9.67	6.77	63.6	277.1		430	1,876		1,007	439	
D		28	9	88	148	1.642	7.02	4.93	79.3	373.8		391	1,842		914	431	
D		29	10	85	138	2.943	13.50	8.83	78.6	353.6		694	3,121		1,623	730	
D		30	10	88	146	2.230	10.94	6.69	89.5	428.5		599	2,866		1,401	671	
D		31	7	87	139	2.070	10.85	6.21	89.9	427.0		558	2,652		1,306	621	
D		32	11	87	138	3.119	17.42	8.83	100.8	481.8		890	4,256		2,084	996	
D		33	5	89	129	1.121	6.66	3.01	108.3	541.7		326	1,630		762	381	
D		34	3	85	148	.998	6.29	2.99	116.4	562.2		349	1,683		816	394	
D		36	1	88	157	.116	.82	.35	136.3	716.7		47	250		111	58	
D		37	2	87	140	.562	4.20	1.69	132.7	666.7		224	1,124		523	263	
D		38	2	84	147	.533	4.20	1.60	125.8	626.7		201	1,001		471	234	
D		39	1	88	157	.099	.82	.30	160.0	846.7		47	251		111	59	
D		40	1	88	157	.240	2.10	.72	170.3	876.7		123	632		287	148	
D		42	1	89	157	.218	2.10	.65	190.3	1010.0		124	661		291	155	
D		44	1	89	138	.199	2.10	.60	182.3	993.3		109	592		254	139	
D		45	1	89	103	.190	2.10	.38	219.0	1000.0		83	380		195	89	
D		46	1	88	154	.071	.82	.21	224.7	1196.7		48	255		112	60	
D		Totals	200	88	97	112.408	225.83	225.18	46.0	202.1		10,363	45,500		24,250	10,647	
A		10	1	87	80	1.795	.98	1.79	16.0	60.0		29	108		67	25	
A		11	1	86	108	1.483	.98	2.97	13.0	45.0		39	133		90	31	
A		12	1	87	61	1.246	.98	1.25	22.0	60.0		27	75		64	17	
A		13	2	87	86	2.124	1.96	4.25	17.5	60.0		74	255		174	60	
A		14	2	87	69	.605	.65	.91	20.7	60.0		19	54		44	13	
A		15	2	87	69	2.128	2.61	4.26	19.7	65.0		84	277		196	65	
A		16	3	86	66	2.103	2.94	4.21	22.5	78.3		95	330		221	77	
A		17	2	86	79	1.241	1.96	2.48	29.1	101.7		72	252		169	59	
A		18	7	87	76	4.618	8.16	9.24	31.3	99.4		289	918		676	215	
A		19	3	86	66	1.492	2.94	2.49	36.6	106.0		91	264		213	62	
A		20	3	86	85	1.346	2.94	3.14	35.4	127.1		111	399		260	93	
A		21	1	86	86	.407	.98	.81	47.5	165.0		39	134		90	31	
A		22	1	86	72	.371	.98	.74	44.5	135.0		33	100		77	23	
A		24	1	87	85	.312	.98	.62	40.0	135.0		25	84		58	20	
A		Totals	30	87	77	21.272	30.02	39.15	26.2	86.4		1,026	3,383		2,402	792	

TC PSTNDSUM		Stand Table Summary										Page 2			
												Date: 4/16/2019			
T07N R06W S35 Ty00MC 67.00					Project UPPERH					Time: 3:18:41PM					
T07N R06W S35 Ty00MC 146.00					Acres 234.00					Grown Year:					
T07N R06W S36 Ty00MC 21.00															
S Spec T	Tot							Average Log		Net Net		Totals			
	DBH	Sample Trees	FF 16'	Av Ht	Trees/ Acre	BA/ Acre	Logs Acre	Net Cu.Ft.	Net Bd.Ft.	Tons/ Acre	Cu.Ft. Acre	Bd.Ft. Acre	Tons	Cunits	MBF
H	12	2	87	39	.568	.45	.57	14.0	40.0		8	23		19	5
H	15	1	86	48	.182	.22	.18	26.0	60.0		5	11		11	3
H	16	2	87	90	1.212	1.69	2.42	27.2	101.6		66	246		154	58
H	17	2	82	32	.801	1.26	.80	24.0	45.3		19	36		45	8
H	22	3	90	107	.254	.67	.68	46.6	193.8		32	131		74	31
H	24	1	89	99	.071	.22	.14	70.5	275.0		10	39		23	9
H	27	1	89	111	.056	.22	.17	65.0	273.3		11	46		26	11
H	30	1	86	107	.045	.22	.14	76.0	350.0		10	48		24	11
H	Totals	13	86	66	3.189	4.96	5.10	31.5	113.8		161	580		376	136
M	11	1	87	53	1.237	.82	2.47	8.0	25.0		20	62		46	14
M	14	1	87	45	.764	.82	.76	21.0	50.0		16	38		38	9
M	17	1	86	65	.518	.82	1.04	25.0	85.0		26	88		61	21
M	22	1	87	60	.309	.82	.62	34.0	130.0		21	80		49	19
M	Totals	4	87	54	2.828	3.27	4.89	16.9	54.9		83	269		194	63
Totals	247		87	92	139.698	264.08	274.32	42.4	181.3		11,633	49,732		27,221	11,637

TC PLOGSTVB		Log Stock Table - MBF																			
<div>T07N R06W S35 Ty00MC 67.00 T07N R06W S35 Ty00MC 146.00 T07N R06W S36 Ty00MC 21.00</div>						Project: UPPERH Acres 234.00														Page 1 Date 4/16/2019 Time 3:17:51PM	
Spp	S T	So rt	Gr de	Log Len	Gross MBF	Def %	Net MBF	% Spc	Net Volume by Scaling Diameter in Inches												
									2-3	4-5	6-7	8-9	10-11	12-13	14-15	16-19	20-23	24-29	30-39	40+	
D		DO	CU	4	9	100.0															
D		DO	CU	5	7	100.0															
D		DO	CU	8	82	100.0															
D		DO	CU	10	3	100.0															
D		DO	CU	12	14	100.0															
D		DO	CU	14	12	100.0															
D		DO	CU	16	11	100.0															
D		DO	CU	18	4	100.0															
D		DO	CU	20	13	100.0															
D		DO	2S	16	5		5	.0					5								
D		DO	2S	20	36		36	.3							19	17					
D		DO	2S	24	87		87	.8							49		38				
D		DO	2S	26	9		9	.1					9								
D		DO	2S	30	28		28	.3								28					
D		DO	2S	32	72		72	.7					6	66							
D		DO	2S	36	47		47	.4						47							
D		DO	2S	38	173		173	1.6						56	46	71					
D		DO	2S	40	7,855		7,793	73.2						755	1243	2393	2127	992	282		
D		DO	3S	18	7		7	.1					7								
D		DO	3S	20	32		32	.3			2	8	22								
D		DO	3S	24	27		27	.3				4	23								
D		DO	3S	26	19		19	.2			18	1									
D		DO	3S	28	37		37	.4				19	9	9							
D		DO	3S	30	75	1.1	74	.7			49	18	8								
D		DO	3S	32	282		280	2.6			38	120	122								
D		DO	3S	34	104		104	1.0			77	21	6								
D		DO	3S	36	98		98	.9			48	38	12								
D		DO	3S	38	80		80	.7			67	2	6	6							
D		DO	3S	40	1,288		1,284	12.1			220	392	650				21				
D		DO	4S	12	26		26	.2			4	22									
D		DO	4S	14	63		63	.6			57	6									
D		DO	4S	16	93		93	.9			83	10									
D		DO	4S	18	27		27	.3			9	18									
D		DO	4S	20	33		33	.3			30	4									
D		DO	4S	24	42		42	.4			24	19									
D		DO	4S	26	9		9	.1			7	2									

TC PLOGSTVB				Log Stock Table - MBF															
<div>T07N R06W S35 Ty00MC 67.00 T07N R06W S35 Ty00MC 146.00 T07N R06W S36 Ty00MC 21.00</div>				Project: UPPERH Acres 234.00										Page 3 Date 4/16/2019 Time 3:17:51PM					
S T Spp	So rt	Gr de	Log Len	Gross MBF	Def %	Net MBF	% Spc	Net Volume by Scaling Diameter in Inches											
								2-3	4-5	6-7	8-9	10-11	12-13	14-15	16-19	20-23	24-29	30-39	40+
A	DO	4S	28	4		4	.5			4									
A	DO	4S	30	10	22.2	8	1.0			8									
A	DO	4S	38	25		25	3.2			25									
A	DO	4S	40	42		42	5.3			42									
A	Totals			814	2.7	792	6.8			167	56	378	136	55					
M	DO	CU	4	4	100.0														
M	DO	1S	16	15		15	24.2							15					
M	DO	1S	30	18		18	28.9					18							
M	DO	4S	16	17	16.7	14	23.0			6	9								
M	DO	4S	20	2		2	3.9			2									
M	DO	4S	30	4		4	5.8			4									
M	DO	4S	34	9		9	14.2			9									
M	Totals			69	9.4	63	.5			21	9	18		15					
Total	All Species			11,891	2.1	11,637	100.0			1007	769	1301	994	1472	2580	2180	1051		282

Legend

- Timber Sale Boundary
- Reforestation Area
- Posted Stream Buffer
- Buffer Zone
- Type "F" Stream
- Type "N" Stream
- Existing Surfaced Road
- Cable-Based Yarding Area

- Ground-Based Yarding Area
- Existing Landing
- Survey Monument



LOGGING PLAN Page 1 of 1

OF TIMBER SALE CONTRACT NO.
AT-341-2019-W00733-01 UPPER HORSEHAWK
PORTIONS OF SECTIONS 25, 26, 35, and 36
T7N, R6W and PORTIONS OF SECTION 2,
T6N, R6W, W.M., CLATSOP COUNTY, OREGON

Logging Breakdown	Tractor	Cable
Area 1	4%	96%
Area 2	11%	89%
Area 3	9%	91%
Area 4	90%	10%
Total	15%	85%

Approximate Net Acreage	MC Acres
Area 1 (MC) =	67 Acres
Area 2 (MC) =	55 Acres
Area 3 (MC) =	91 Acres
Area 4 (MC) =	21 Acres
Total Sale Acreage =	234

