



TELEPHONE (541) 267-2872

FAX (541) 267-0588

www.stuntzner.com

705 South 4<sup>th</sup> Street – PO Box 118

Coos Bay, Oregon 97420

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June 24, 2020

Mr. Brian Bauder  
Real Estate & Facilities Operations Manager  
Oregon State University Foundation  
4238 SW Research Way  
Corvallis, OR 97333

RE: Missouri Bend Cruise Report

Mr. Bauder:

Per your request, we have completed the cruise report for the Missouri Bend timberland property located in Section 8, Township 14 South, Range 8 West, W.M., Benton County, Oregon. All operable timber acres were cruised for this assignment.

This tract of timberland includes a total of 110 acres, more or less of which all is forested. After application of the Oregon Forest Practices Act harvest restrictions, we found 47.9 acres to be operable. High landslide hazard locations (HLHL) above Highway 34 restrict the majority of this tract from timber harvest due to substantial downslope public safety risk. Stuntzner consulted with Oregon Department of Forestry to complete an assessment of the HLHL situation in 2011. I have attached our report from 2011 to the cruise report. With more accurate lidar topographic data now available, we made a small adjustment to the area impacted by HLHL for this 2020 cruise.

Our cruise report follows and includes a narrative on methodology, a summary table of volumes and stand statistics, and several maps produced. If you have any questions on the report, please feel free to contact me.

Respectfully,

*Cliff Barnhart*

Cliff Barnhart, ACF

# Timber Cruise Report

## OSU Foundation-Missouri Bend Tract

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### Cruise Objective

The primary objective of this cruise was to establish the volume of merchantable timber as of June, 2020. The cruised stand is found within Tax Lot 200 and Tax Lot 1400 of Section 08, Township 14 South, and Range 08 West. Volumes reported in this cruise report are based upon the June 18<sup>th</sup>, 2020 cruise date.

### Mapping and Acreage

The Benton County Assessor GIS was used to establish the mapped acreage and shape for the subject property. Blazed property boundaries on the ground matched well with this mapping based on spot checks made in the field using our tablet GPS. The assessor mapping has been updated and adjusted slightly since our last timber cruise on this property completed in 2011. The tax assessor acreage is 101.70 acres for Tax Lot 200 and 5.02 acres for Tax Lot 1400. The GIS acres for the subject property is 109.9 acres. The GIS acreages are used in this report for computing the timber cruise volumes.

### Timber Type Description

The timber types were mapped using 2018 color ortho-photography based upon differences in age and timber composition. The resulting map can be found attached to the back of this report. The following are timber descriptions for each of the timber types delineated on the timber type map.

Stand #1- This stand is the operable timber area on the subject. The primary species found in this stand is Douglas-fir with a significant component of merchantable bigleaf maple and red alder in areas. The stand as mapped includes 47.9 acres. Ages vary throughout the stand ranging from 50 to 70 years of age, along with a small component of older residual Douglas-fir and large older bigleaf maple. The Douglas-fir in this type is of good quality for the manufacturing of lumber or veneer. Douglas-fir trees in the stand average 19 inches DBH and contain merchantable heights that average 2-3 long logs. The bigleaf maple has an average bole length to a merchantable top of 32 feet and the red alder has an average bole length to a merchantable top of 57 feet.

Stand #2- Stand #2 is a riparian area located between Highway 34 and the Alsea River. This area is not operable for timber management.

Stand #3- is approximately 55 acres of with slopes that exceed 80 percent adjacent to or above Highway 34. This stand is considered off-limits to harvest due to the substantial downslope public safety risk. The timber consists of primarily alder and maple hardwood with patches of Douglas-fir intermixed. No timber cruise plots were sampled within this type.

Stand #4- is approximately 5.1 acres of isolated hardwood dominated timber. This stand contains merchantable hardwood timber on slopes that do not exceed 80%. However, access to the necessary landing locations would require construction through high landslide risk areas. Due to the infeasibility of access it is considered inoperable and therefore no timber cruise plots were sampled within this type.

**Cruise Method**

The stand was cruised using a variable radius plot cruise system for trees with at least one 16-foot log and a minimum diameter of 8" at DBH. Plots were placed on a 3 by 5 (198' by 330') chain grid which results in roughly 0.65 plots per acre. A 46.94 BAF was used, siting all trees at DBH. Most of the merchantable conifer species were cruised to a six inch scaling diameter top (seven inches outside bark). Any tree larger than 24" DBH was cruised to a variable top diameter equal to 40 percent of the tree diameter at 16 feet above the stump.

Plots were done on a cruise-cruise-count cadence. Measurements done on cruise plot trees included DBH to the nearest inch, bole height, and form factor (percentage of the diameter at 16' from stump height relative to the diameter at DBH). Defect and log grading were applied to each log according to cruisers visual judgment.

Logs were graded using Columbia River Scaling Bureau rules. Defect deductions were made as needed to each log segment using length, diameter, or percentage deductions. Sweep, crook, conk, forked tops, and spike knots were defects witnessed during the cruise.

Timber volumes for the merchantable stands are from the Super A.C.E. cruise program. This is a variable log length cruise program that computes volumes from the cruiser's measurement of tree diameter, form (taper) and merchantable bole height. Timber volumes are reported in terms of west-side Scribner board foot scale. Cruisers on this project included Logan Lucero and James Kirkpatrick, both foresters with Stuntzner Engineering & Forestry.

Timber volumes for the dominant species are summarized in the following tables. Additional species, sort and grade reports, log stock table reports and statistic reports from the cruise program can be found attached to this report.

## Missouri Bend Tract (Section 8, T14S R8W, Benton County)

### Volume Report For Merchantable Stands 50+ Years Old

Merch Stand Acres: 47.9

Stands Included: 1

#### MERCHANTABLE TIMBER-VOLUME SUMMARY

Species	Avg. Log	Age Class	Avg.	Avg.	Gross	Net	%	Net
	Length in	in	D4H	Merch.	Vol.	Vol.	Net to	UC Vol.
	feet	years	(inches)	Ht. (ft.)	MBF	MBF	Gross	MBF
Douglas fir	35	50-70	19	78	1,671	1,623	97%	0
BG Douglas-fir	34	120+	49	122	80	56	70%	0
WR Cedar	34	50+	36	85	28	22	79%	0
Bigleaf maple	28	50+	15	32	81	72	88%	0
Red Alder	31	50+	16	57	54	52	96%	0
<b>Total Volume</b>					<b>1,914</b>	<b>1,825</b>	<b>95%</b>	<b>0</b>
<b>Ave MBF/Acre</b>					<b>40.0</b>	<b>38.1</b>		

#### LOG GRADES PERCENT VOLUME:

Species	3P	SM	#2	#3	#4	R#3	Utility
	Saw	Saw	Saw	Saw	Saw	Saw	Cull
Douglas fir	1%	2%	70%	23%	3%	1%	0%
BG Douglas-fir			89%			11%	0%

#### PERCENT OF NET VOLUME BY LOG DIAMETER

Species	5"-7"	8"-11"	12"-19"	20"+
Douglas fir	10%	16%	47%	27%
BG Douglas-fir	0%	0%	8%	92%
Bigleaf maple	38%	46%	16%	
Red Alder	23%	65%	12%	0%

#### Topography and Logging

This unit will be primarily a cable yarding operation (90%), with approximately 10% shovel ground near the road on the west side of the tract. Landing locations will need to be on the ridgetop located at the west side of the unit. A large tower (70'-100') will be required for logging this timber. Tailholds will need to be located on the neighboring property to the east for logging the north half of Stand #1. Tailholds will need to stay on the property on the southern half of Stand #1 due to powerlines and a residence. The timber cruisers did have a chance to speak with the neighbor to the east and he stated that he was not opposed to working out an agreement to place tailholds on his property. The lower slopes on the south half of Stand #1 may need to be downhill logged to a road off Highway 34 that follows the eastern boundary.

The primary logging access is from a BLM road which is tributary to Winney road approximately 2 miles to the east of the subject tract. This is a rocky road, but the last 1.5 mile stretch before the subject tract has not been maintained. The road is in need of brushing, blading, and clearing out a small slide. Currently you can drive to almost the NW corner of the subject with 4-wheel drive.

The subject property is included in the reciprocal Right of Way agreement Starker Forests Inc. has with the BLM. A partial assignment of this easement to OSU Foundation has not yet been completed.

PROJECT STATISTICS										PAGE	1
PROJECT MBEND										DATE	6/19/2020
TWP	RGE	SC	TRACT	TYPE	ACRES	PLOTS	TREES	CuFt	BdFt		
14S	08	08	2020	1	47.90	31	158	S	W		
				TREES	ESTIMATED	PERCENT					
				PER PLOT	TOTAL	SAMPLE					
					TREES	TREES					
TOTAL			31	158	5.1						
CRUISE			21	106	5.0	6,584	1.6				
DBH COUNT											
REFOREST											
COUNT			10	52	5.2						
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			62	85.8	18.8	78	38.1	165.0	34,875	33,886	7,488
BL MAPLE			30	42.0	15.0	32	13.3	51.5	1,701	1,500	566
R ALDER			7	8.6	16.1	57	3.0	12.1	1,127	1,091	329
DF RESID			4	.5	49.3	122	0.9	6.1	1,667	1,178	293
WR CEDAR			3	.6	36.4	85	0.8	4.5	582	466	131
TOTAL			106	137.5	17.9	63	56.6	239.2	39,952	38,121	8,808
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 - CF					# OF TREES REQ.		INF. POP.	
SD:	1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5 10		15		
DOUG FIR			81.0	10.3	164	183	201				
BL MAPLE			101.1	20.6	14	18	21				
R ALDER			60.4	24.6	32	43	53				
DF RESID			75.3	43.0	384	675	965				
WR CEDAR			33.0	22.9	137	178	218				
TOTAL			129.0	12.8	132	151	171	664	166	74	
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			87.8	15.7	72	86	99				
BL MAPLE			213.4	38.3	26	42	58				
R ALDER			234.2	42.0	5	9	12				
DF RESID			330.3	59.3	0	0	1				
WR CEDAR			556.8	99.9	0	1	1				
TOTAL			66.8	12.0	121	137	154	178	45	20	
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			69.2	12.4	145	165	186				
BL MAPLE			162.0	29.1	37	51	66				
R ALDER			223.0	40.0	7	12	17				
DF RESID			331.3	59.5	2	6	10				
WR CEDAR			556.8	99.9	0	5	9				
TOTAL			39.0	7.0	222	239	256	61	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			74.1	13.3	29,379	33,886	38,393				
BL MAPLE			165.8	29.7	1,054	1,500	1,946				
R ALDER			228.7	41.0	643	1,091	1,538				
DF RESID			363.6	65.2	410	1,178	1,947				
WR CEDAR			556.8	99.9	0	466	932				
TOTAL			60.7	10.9	33,968	38,121	42,275	147	37	16	

TC PSTATS

**PROJECT STATISTICS**

PAGE

**2**

PROJECT

MBEND

DATE

6/19/2020

TWP	RGE	SC	TRACT	TYPE	ACRES	PLOTS	TREES	CuFt	BdFt
14S	08	08	2020	1	47.90	31	158	S	W

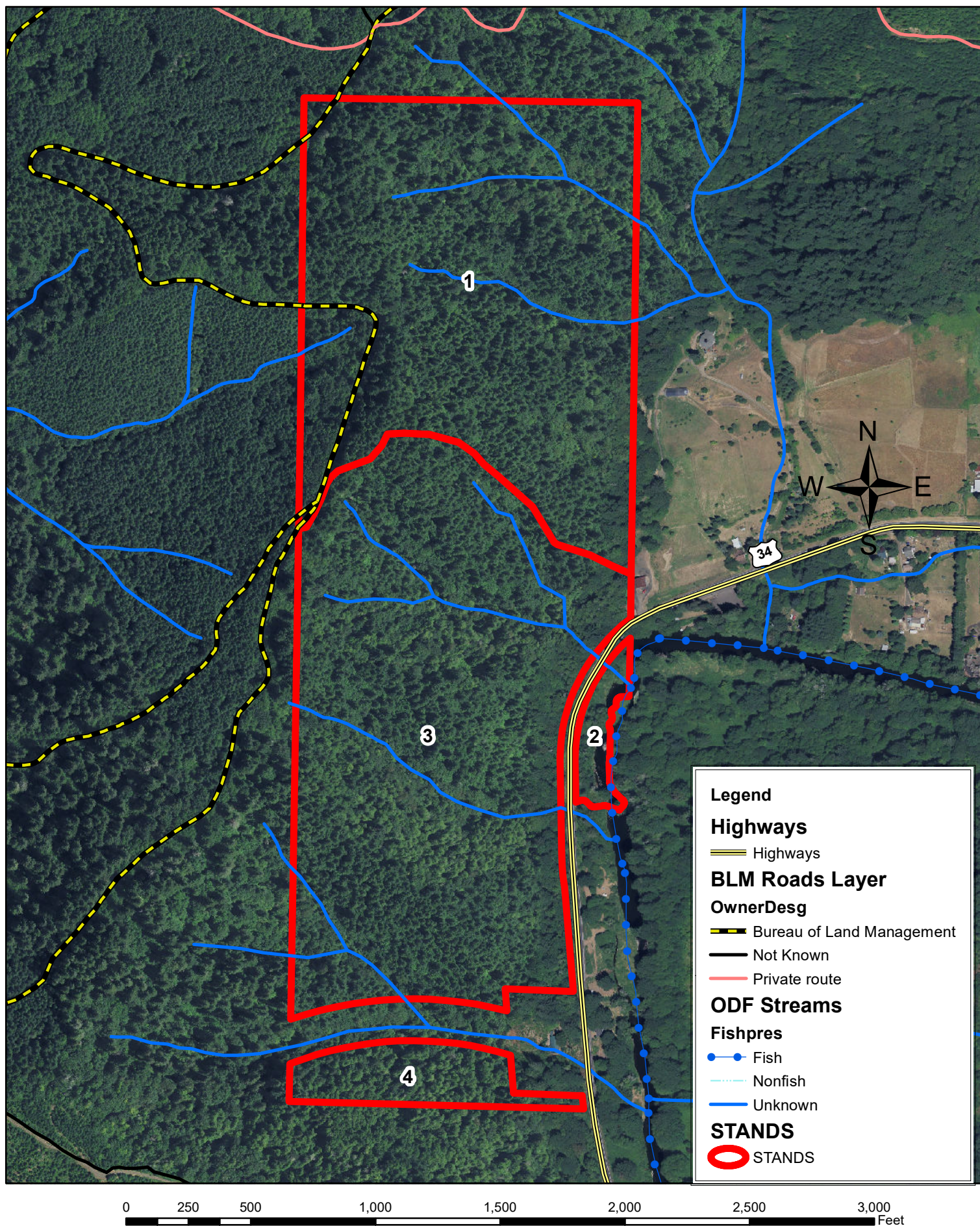
  

CL	68.1	COEFF	V_BAR/ACRE			# OF PLOTS REQ.		INF. POP.	
SD:	1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5	10	15
DOUG FIR				178	205	233			
BL MAPLE		160.7	28.8	20	29	38			
R ALDER		217.5	39.0	53	90	127			
DF RESID		363.6	65.2	68	195	321			
WR CEDAR		556.8	99.9	0	103	205			
<b>TOTAL</b>		60.7	10.9	142	159	177	147	37	16

TC		PSPCSTGR		Species, Sort Grade - Board Foot Volumes (Project)																	
<div>T14S R08W S08 Ty147.90</div>				Project: MBEND												Page 1					
				Acres 47.90												Date 6/19/2020 Time 11:12:17AM					
Spp	S So Gr rt ad	% Net BdFt	Bd. Ft. per Acre			Total Net MBF	Percent of Net Board Foot Volume								Average Log				Logs Per /Acre		
		Def%	Gross	Net	Log Scale Dia.				Log Length				Ln Ft	Dia In	Bd Ft	CF/ Lf					
					5-7		8-11	12-19	20+	12-20	21-30	31-35					36-99				
BM	2S 2M	16	9.8	267	241	12	100				100				29	12	131	1.43	1.8		
BM	3S 3M	17	11.7	288	255	12	100				17	52	31		26	10	88	1.29	2.9		
BM	4S 4M	67	12.3	1,146	1,005	48	57	43				54	23	22	29	7	46	0.60	22.1		
BM	PU CU														26	8		0.00	17.3		
BM Totals		4	11.8	1,701	1,500	72	38	46	16		3	61	21	15	28	8	34	0.46	44.2		
DF	DO SM	2		874	874	42	100				100				40	17	494	2.21	1.8		
DF	DO 2M	70	3.8	24,611	23,674	1,134			63	37		0		100	38	16	407	2.23	58.1		
DF	DO 3M	23	.6	7,995	7,946	381	31	69			0	1	4	95	38	8	91	0.61	87.0		
DF	DO 4M	3		901	901	43	94	6			47	53			20	6	26	0.31	35.0		
DF	DO 3P	1		434	434	21				100				100	36	24	910	4.36	.5		
DF	R 3M	1	4.2	61	58	3			100					100	40	13	230	2.03	.3		
DF Totals		89	2.8	34,875	33,886	1,623	10	16	46	27	1	2	1	96	35	10	186	1.18	182.6		
RA	2S 2M	11		130	130	6	100				100				20	15	180	1.93	.7		
RA	3S 3M	38	5.1	433	412	20	100				100				38	10	141	1.11	2.9		
RA	4S 4M	51	2.5	564	550	26	46	54			13	18		69	29	7	55	0.62	10.0		
RA	PU CU														32	7		0.00	1.4		
RA Totals		3	3.2	1,127	1,091	52	23	65	12		18	9		73	31	8	73	0.72	15.0		
DFR	DO 2M	89	23.3	1,376	1,054	51	496				2395				35	25	882	4.48	1.2		
DFR	PU CU														36	27		0.00	.1		
DFR	R 3M	11	57.4	291	124	6	4654				73954				26	22	425	3.37	.3		
DFR Totals		3	29.3	1,667	1,178	56	892				1291				34	25	735	3.98	1.6		
RC	DO 3M	100	19.9	582	466	22	1363				595				36	16	371	2.51	1.3		
RC Totals		1	19.9	582	466	22	1363				595				36	16	371	2.51	1.3		
Totals			4.6	39,952	38,121	1,826	11	18	43	28	2	4	2	92	33	10	156	1.07	244.7		



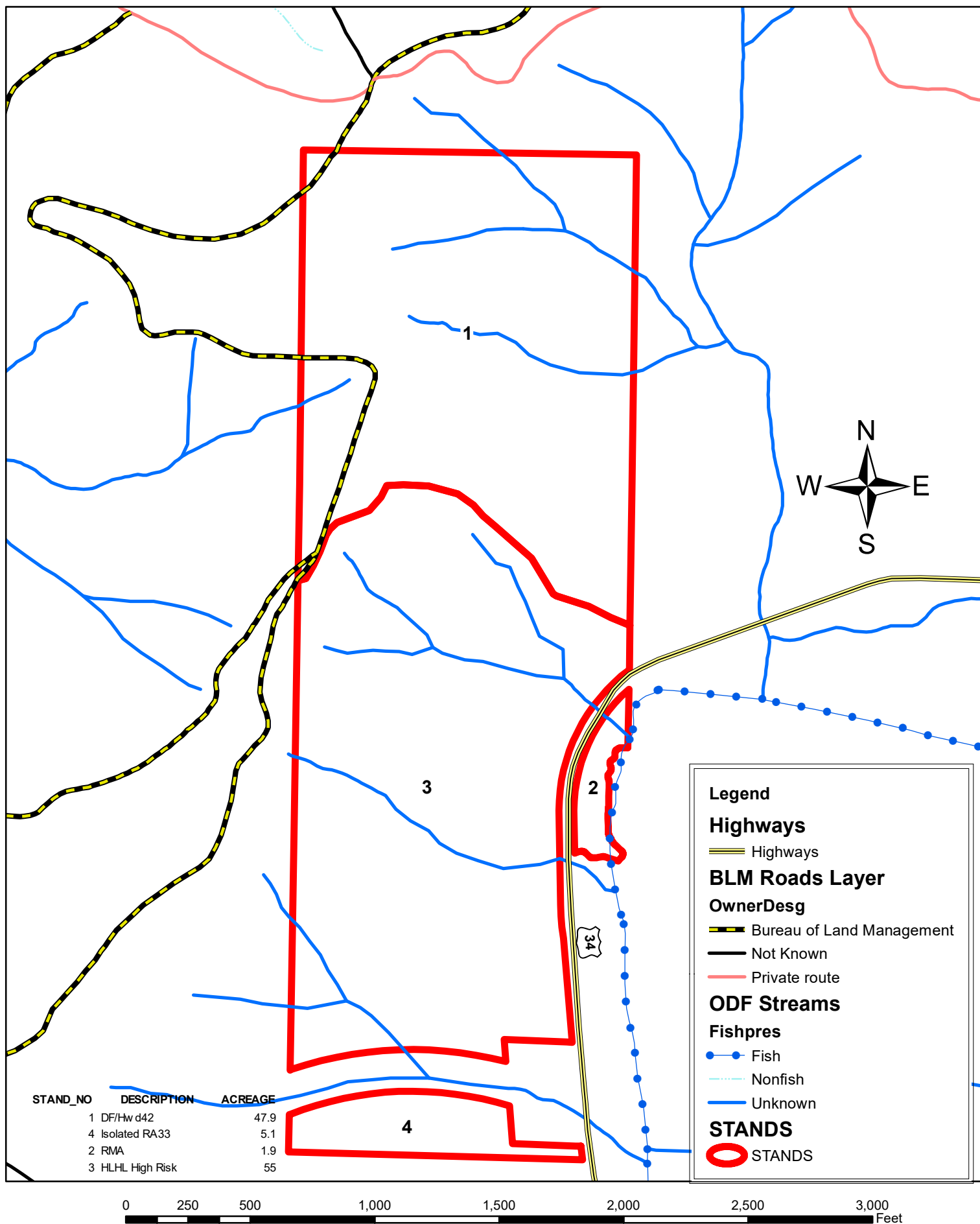
Missouri Bend Tract Timber Type Map  
T14S, R8W, Section 8, Benton County, Oregon





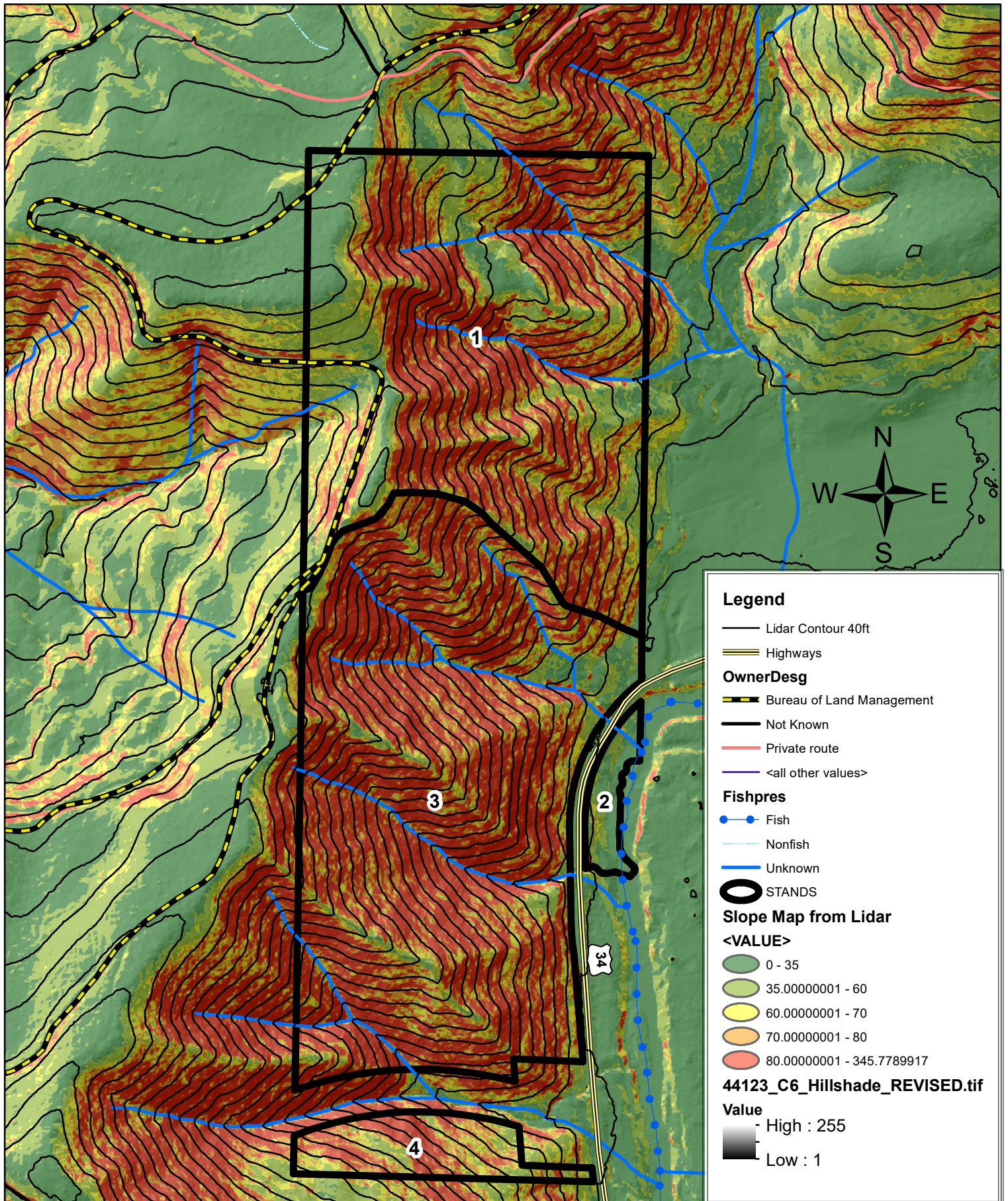
# Missouri Bend Tract Timber Type Map

## T14S, R8W, Section 8, Benton County, Oregon





Missouri Bend Tract Slope Map  
T14S, R8W, Section 8, Benton County, Oregon



0 250 500 1,000 1,500 2,000 2,500 3,000 Feet



# MISSOURI BEND

## HIGH-RISK SITE ASSESSMENT

During the initial field inspection slopes greater than 80% for distances greater than 100 feet were observed on the subject property. These slopes were directly above Oregon State Highway 34. Slopes in the headwalls of the draws exceeded 100% in many places. After these observations were made it was decided that further consultation with the Oregon Department of Forestry was necessary.

On Tuesday the 8<sup>th</sup> of November, Stewardship Forester Russ Anderson met on site and hiked the subject property. The area south of where Highway 34 meets the subject property was inspected on foot. During this inspection Mr. Anderson concluded that the slopes exceeded 80% across a majority of the subject and that the slopes maintained the steepness to the highway. The draws that led to the highway did not contain the slopes of 8% or less for at least 300 feet that would facilitate a catch area for debris.

The isolated parcel of the subject located to the south of the main body did not contain the slopes that exceeded 80%. Mr. Anderson stated that he felt this area could be logged if access was available. The problem with this parcel is exactly that, the access. In order to reach the high ground on the west of the parcel, road would have to be constructed through slide-prone areas. This of course would not be allowed. Downhill yarding would be very difficult due to topography and limited landing availability.

Mr. Anderson stated during the site visit that the adjacent landowners to the south had the same problem. All of the area that sloped towards the highway had been deemed off-limits to harvest due to high slide risk that would endanger the public. He also stated that the landowner could hire a geotechnical expert and try to prove that there was a legal way to harvest the subject property. Although this would still have to be approved by the Oregon Department of Forestry and he felt that it would be highly unlikely that any plan would be approved.

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