UNIT LOG

1. Project:	2. Date Visited:	3.Visited:
Toston Maudlow Salvage Sale	1/8/03 **Prepared:** 1/13/03	Unit #: 32 Helicopter Road #: 4190 and 4190B1 Other Activity: T6N R4E Sec 1 T6N R4E Sec 1

4. Project Area	5. (Name and Position)	
Ridgetop above Sulphur Bar Drainage	Sue Farley, Soil Scientist	Helena N.F. Helena N.F. Townsend Ranger District Townsend Ranger District

7. Parties Involved

Name	Position	
Vince Archer	Soil Scientist	
Rachel Fiegley	Wildlife Biologist	
Alicia Kitto	Biological Technician	

8. Activity Log

Activity Reviewed	
Helicopter Logging in unit 32	Trees were hand-felled, with limbs and tops processed on site, and distributed across the unit. Patches of green trees were left intact; thus not all acres within the unit were harvested. We measured standing snags (Bate et al. 1999) on one, 100 meter transect across the unit. We measured down woody material (Browns method) on five, 75 foot transects as spurs spaced at regular intervals along the 100 meter transect. Calculations of field data for down woody material document that an average of 4.2 tons per acre of fine woody material (<3 inch diameter) plus 5.2 tons per acre coarse woody material (>3 inch diameter) have been retained following helicopter salvage harvest.These measurements of down woody material demonstrate remaining coarse woody material is in compliance with mitigation specified in the FEIS (page 97) to retain 5-12 tons per arce of CWM in the dry forest types. Calculated results of the snag monitoring are not available yet. The raw field data shows snags retained in the harvested portion of the unit are numerous, but are all less than 3-4 inch diameter at breast height. These snags will provide a source for future recruitment of organic material on the ground within harvested areas, and will thus facilitate long-term nutrient cycling on the site. Larger snags are present in untreated portions of the unit, and on adjacent areas. Visual observations document no detrimental soil surface disturbance.
Main Blacktail Road 4190, and spur 4190B1	Roads are almost completely snow or ice- covered, and frozen solid (had to chain-up, as well as 4WD, for safe driving) – no resource issues were identified in association with roads

9 Findings and/or Recommendations

Helicopter units	Implementation monitoring documents compliance with mitigation specified in the FEIS for retention of coarse woody material in helicopter units (FEIS pg. 97). Visual observations document no detrimental soil surface disturbance.
Tractor units	Most tractor units are currently covered by snow, and the soil surface is not visible. It is recommended that implementation monitoring for soil quality be conducted in tractor units when ground conditions are visible after snow-melt occurs.

10. Prepared By: Sue Farley

Unit 32 - Woody Material Inventory - 01/14/2003

WOODY MATERIAL INVENTORY - DATA CALCULATIONS FOR I 14-Jan-03 date printed

Project Name	Maudlow Salvage Sale	INVENTORIED BY:	S.Farley and V.Archer
Unit Number	Helicopter unit 32	DATE INVENTORIED:	Jan. 8, 2003

0 - 3" LOAD tons/acre	4.20	Average Fuelbed Depth	#DIV/0!	inches
3" + LOAD tons/acre	5.23	Average Duff Depth	0.2	inches
Total Load tons/acre	9.43			

	FUEL LOADING 0" - 3" Diameter				FUEL LOADING 3 plus " Diameter Sound Logs					Rotten Logs	DOWN WOODY	DUFF DEPTH	AVERAGE HIGH PARTICLE DEPTH
PLOT #	0" - .25"	.25" - 1"	1" - 3"	Total 0" - 3"	3" - 5.9"	6" - 8.9"	9" - 20"	20" plus	Total Sound 3" plus	Total Rotten	Total	Total	Total
	Tons per Acre				Tons per Acre					Tons Acre	Tons Acre	Inches	Inches
1	0.08	1.76	6.78	8.61	0.00	7.10	0.00	0.00	7.10	0.00	15.71	0.3	#DIV/0!
2	0.05	1.17	2.90	4.13	0.00	0.00	0.00	0.00	0.00	0.00	4.13	0.0	#DIV/0!
3	0.42	2.05	1.94	4.41	5.29	3.18	0.00	0.00	8.47	0.00	12.88	0.3	#DIV/0!
4	0.27	0.29	1.94	2.50	4.88	0.00	0.00	0.00	4.88	0.00	7.38	0.3	#DIV/0!
5	0.09	0.29	0.97	1.35	5.68	0.00	0.00	0.00	5.68	0.00	7.03	0.3	#DIV/0!
MEAN	0.18	1.11	2.90	4.20 #	3.17	2.06	0.00	0.00	5.23 #	0.00 #	9.43 #	0.20 #	#DIV/0!
S.D.	0.14	0.73	2.03	2.47 #	2.60	2.81	0.00	0.00	2.89 #	0.00 #	4.23 #	0.10 #	#DIV/0!
S.E.	0.06	0.33	0.91	1.10	1.16	1.26	0.00	0.00	1.29	0.00	1.89	0.04	#DIV/0!
% Error	35.1%	29.2%	31.3%	26.3%	36.7%	61.1%	#DIV/0!	#DIV/0!	24.7%	#DIV/0! #	20.1% #	22.4%	#DIV/0!

INPUT

DOWN WOODY MATERIAL INVENTORY - DATA INPUT SECTION

PLOT #	% SLOPE	0 - .25"	.25" - 1"	1" - 3"	DUFF DEPTH 1	DUFF DEPTH 2	3" PLUS SOUND LOGS 3" - 5.9"	3" PLUS SOUND LOGS 6" - 8.9"	3" PLUS SOUND LOGS 9" -20"	3" PLUS SOUND LOGS 20" +	ROTTEN LOGS	HIGH PARTICLE DEPTH 1	HIGH PARTICLE DEPTH 2	HIGH PARTICLE DEPTH 3
1	6	6	6	7	0	0.5		6.3		7.2				
2	6	4	4	3	0	0								
3	6	33	7	2	0	0.5	4.3 4.2 3.8	6.4		4.2				
4	6	21	1	2	0	0.5	5 3.3			5.2				
5	6	7	1	1	0	0.5	4.9 4.5 4			3.6				

Project Name	Maudlow Salvage Sale
Unit Number	Helicopter unit 32
INVENTORIED BY:	S.Farley and V.Archer
NUMBER OF PLOTS TAKEN	5
DATE INVENTORIED:	Jan. 8, 2003

0" to .25" transect length	6	feet
.25" to 1" transect length	6	feet
1" to 3" transect length	15	feet
3 plus" transect length	60	feet

FUEL INVENTORY PARAMETERS

	diameter squared	a	s
0" to .25"	0.0120	1.15	0.48
.25" to 1"	0.2780	1.13	0.48
1" to 3"	2.8300	1.10	0.40
3 plus" SOUND		1.00	0.40
3 plus" ROTTEN		1.00	0.30

Date: 1/8/2003 Site Name/Code: MANDELOW - UNIT 32 BURNED/HELI-LOGGED

Farley / Archer

Downed Fuel Inventory Form

Block / Department		Sub-compartment / Stand Elevation		Aspect	S
				Cover Type	DF - CAR U
				Habitat Type	

Size Class (In):	0-1	1-3	3+
Length of Sampling Plane (Ft):	15 - 21 ft.	15 - 30 ft.	15 - 75 ft.

Plot No.	Slope	No. of Intersections			Duff Depth		3+ Diameter						Fuel Depth		
		0-.25"	.25-1"	1-3"	First	Second	I Sound	II Sound	III Sound	IV Rotten	V Rotten	Rotten	First	Second	Third
1-1	40	6	6	7	D 0	0.5		7.2"							
		4	4		L 0.5	0.5		6.5"							
1-2	40	4	4	3	D 0	0		Ø							
					L 0	0		Ø							
1-3	40	33	7	2	D 0	0		4.5							
					L 0	0.5		4.2							
								6.4							
								4.2							
								5.3							
1-4	40	21	1	2	D 0	D 0		5.2							
					L 0	L 0.5		5.0							
								3.5							
1-5	40	7	1	1	D 0	0.5		3.6							
					L 0	0.5		4.9							
								4.5							
								4.0							

Ground Fuel Composition:

Species	*Percent*
1.	
3.	

If heavy slash, code 1:

GENERAL FORM

PROJECT: PRESCRIBED FIRE AND BIRDS OF PONDEROSA PINE FORESTS IN THE INTERIOR WEST

STUDY LOCATION MT UNIT NAME 32 TREATMENT Heli PERIOD ___ STRATUM ___

DATE 1/8/03 RANDOM PT# ___ RECORDERS Feigley, Kitto, Farley

GPS LOCATION: N Top of unit Own NE corner

REFERENCE POINT:

COMMENTS:
Downy woodpecker activity w/in and adjacent to unit.
Hairy woodpeckers (2) observed on Douglas fir snag, ≈ 8" dbh

SPECIAL DIRECTIONS TO LOCATION:

MAP:

UNIT LOG

	1. Project: Toston Maudlow Salvage Sale	**2. Date Visited:** 1/8/03 **Prepared:** 1/13/03	**3.Visited:** Unit #: 29, 30, and 31 Road #: 147,147A1 and 4187 Other Activity: T7N R4E Sec 35,36 – Unit 29 T6N R4E Sec 1,2 – Unit 30 T6N R4E Sec 1,2 Unit 31
4. Project Area Sulphur Bar Drainage	**5. (Name and Position)** Sue Farley, Soil Scientist		

T7N R4E Sec 35, 36 - Unit 29
T6N R4E Sec 1, 2 - Unit 30
T6N R4E Sec 1, 2 - Unit 31

7. Parties Involved

Name	Position
Vince Archer	Soil Scientist
Rachel Fiegley	Wildlife Biologist
Alicia Kitto	Biological Technician

8. Activity Log

Activity Reviewed	
Helicopter Logging in units 29, 30 and 31	Trees were hand-felled, with limbs and tops processed on site, and distributed across the unit. Patches of green trees were left intact; thus not all acres within the units were harvested. We visually compared conditions in helicopter units 29, 30, and 31 with what we measured in unit 32. Post-harvest conditions appeared to be similar in these visually inspected units. Qualitative observations suggest down woody material is adequate for nutrient cycling (Graham et al. 1994), and is in compliance with mitigation specified in the FEIS (page 97). Snags retained in the harvested portion of the units are all small diameter (i.e. less than about 3-4 inch diameter at breast height). However, larger snags are present in untreated portions of the units, and on adjacent areas. Visual observations document no detrimental soil surface disturbance.
Log landing at bottom of helicopter unit 31 (or 30?)	This landing has been constructed with cut and fill that partially crosses the ephemeral stream channel. It is recommended that erosion control or reclamation work at this landing be completed before the period when spring runoff occurs, to prevent stream runoff from eroding the cut and fill material at this landing.
Main Sulphur Bar Road 147, with spur 147A1, and Black Butte Road 4187	Roads are almost completely snow or ice- covered, and frozen solid (had to chain-up, as well as 4WD, for safe driving) – no resource issues were identified in association with roads

9 Findings and/or Recommendations

Helicopter units	Implementation monitoring documents compliance with mitigation specified in the FEIS for retention of coarse woody material in helicopter units (FEIS pg. 97). Visual observations document no detrimental soil surface disturbance.
Log landing at bottom of helicopter unit 31 (or 30?)	It is recommended that erosion control or reclamation work at this landing be completed before the period when spring runoff occurs, to prevent stream runoff from eroding the cut and fill material at this landing.
Tractor units	Most tractor units are currently covered by snow, and the soil surface is not visible. It is recommended that implementation monitoring for soil quality be conducted in tractor units when ground conditions are visible after snow-melt occurs.

10. Prepared By: Sue Farley

UNIT LOG

1. **Project:** Toston Maudlow Salvage Sale	2. **Date Visited:** 7/18/02 *Prepared*: 7/23/02	3.**Visited:** Unit #: 53 Road #: Sulphur Bar Road Other Activity:
4. **Project Area** Sulphur Bar Drainage	5. **(Name and Position)**	T7N R4E Sec 35 T7N R4E Sec 35

7. Parties Involved

Name	Position	
Bo Stuart	Hydrologist	
Sue Farley	Soil Scientist	

8. Activity Log

Activity Reviewed	
Sulphur Bar Road	Runoff from unit and road – adequate filtration zone in SMZ to catch sediment, but could use slash filter windrow below culvert to promote infiltration of water which is causing erosion of slope above stream
Tractor Log 3 acres	Slash spread at bottom of unit, but thin on skidding routes above, needs water bars on skid routes due to bare ground – moderate rilling on skid routes. Slope 26%, photo #3

9 Findings and/or Recommendations

	Had difficulty tracking this unit in the FEIS.

10. Prepared By: Notes taken by Sue Farley, Prepared by Bo Stuart

UNIT LOG

1. Project:	2. Date Visited:	3.Visited:
Toston Maudlow Salvage Sale	7/18/02 **Prepared:** 7/23/02	Unit #: 4 Road #: Sulphur Bar Other Activity: T7N R4E Sec 35 T7NR4E Sec 35

4. Project Area	5. (Name and Position)	
Sulphur Bar Drainage		

7. Parties Involved

Name	Position	
Bo Stuart	Hydrologist	
Sue Farley	Soil Scientist	

8. Activity Log

Activity Reviewed	
Tractor Log on 1 acre	Equipment tracks on hilslope had some slash placement for erosion but needs water bars; top ½ end of unit 35% slope; moderate rilling in skid routes. Photo #1 & 2.
Main Sulphur Bar Road	Rock on inside of ditch ☺. Culvert partially blocked – entrance cleared with shovel, but still needs maintenance

9 Findings and/or Recommendations

	Had difficulty tracking this unit in the FEIS.

10. Prepared By: Notes taken by Sue Farley, Prepared by Bo Stuart

UNIT LOG

	1. Project: Toston Maudlow Salvage Sale	**2. Date Visited:** 7/18/02 *Prepared*: 7/23/02	**3.Visited:** Unit #: 52 Road #: Sulphur Bar Road Other Activity:
4. Project Area Sulphur Bar Drainage	**5. (Name and Position)**		T6N R4E Sec 2 T6N R4E Sec 2

7. Parties Involved

Name	Position	
Bo Stuart	Hydrologist	
Sue Farley	Soil Scientist	

8. Activity Log

Activity Reviewed	
Main Sulpur Bar Road	Erosion of inside ditch below unit – culvert partially blocked, but entrance was cleaned w/ shovel – steep back at outlet of culvert needs erosion mitigation, such as slash filter windrows and inlet ditch needs armoring (has evidence of recent substantial erosion w/ sediment delivery (fines0 to Sulphur Bar
Tractor log 2 acres	Unit has gentle terrain – 15% - some slash on skid routes; minor sheet wash on bare ground; no water bars. SMZ marked, but not necessary ☺ Photo #4

9 Findings and/or Recommendations

	Had difficulty tracking this unit in the FEIS.

10. Prepared By: Notes taken by Sue Farley, Prepared by Bo Stuart

UNIT LOG

1. **Project:** Toston Maudlow Salvage Sale	2. **Date Visited:** 7/18/02 ***Prepared***: 7/23/02	**3.Visited:** Unit #: 51 Road #: Sulphur Bar Road Other Activity:
4. Project Area Sulphur Bar Drainage	**5. (Name and Position)**	T6N R4E Sec 2 T6N R4E Sec 2

7. Parties Involved

Name	Position	
Bo Stuart	Hydrologist	
Sue Farley	Soil Scientist	

8. Activity Log

Activity Reviewed	
Sulphur Bar Road	Inside ditch partially blocked, but cleared w/ shovel; outlet @ culvert has small rill; adequate filtration zone between culvert & stream
Tractor log 1 acre	Fairly good slash distribution, w/ hummocky terrain = minor sheet wash on bare soil, but no major erosion, slope 22%, equipment access on road cut partially filled ditch already & may continue
	Photo # 5

9 Findings and/or Recommendations

	Had difficulty tracking this unit in the FEIS.

10. Prepared By: Notes taken by Sue Farley, Prepared by Bo Stuart

UNIT LOG

1Project: Toston Maudlow Salvage Sale	2. Date Visited: 7/18/02 *Prepared:* 7/23/02	3.Visited: Unit #: 37 Road #: Sulphur Bar Other Activity:

4. Project Area	5. (Name and Position)	T6N R4E Sec 12 NE¼
Sulphur Bar Drainage		T6N R4E Sec 12, NE 1/4

7. Parties Involved

Name	Position	
Bo Stuart	Hydrologist	
Sue Farley	Soil Scientist	

8. Activity Log

Activity Reviewed	
Access route	Skid road has no functional water bars, two water bars at bottom not functional, logs lengthwise on skid road, slope of main skid road 31% - bare soil and minor sheet wash evident, slash placed up and down slope rather than on contour – no water bars
Main Sulkphur Bar Road	Drain dips in main Sulphur Bar Road needed below main skid road & before stream, sediment delivery has occurred. Under State BMP audit procedure this would have been noted as a major departue.
	Photo #'s 6-8

9 Findings and/or Recommendations

	Place slash on contour, repair water bars, and place water bars on skid trails. Install drain dips on approaches to Sulphur Bar Creek.

10. Prepared By: Notes taken by Sue Farley, Prepared by Bo Stuart

UNIT LOG	1Project: Toston Maudlow Salvage Sale	2. Date Visited: 7/18/02 *Prepared*: 7/23/02	3.Visited: Unit #: Road #: Reconstruction #147-A1 Other Activity:
4. Project Area Trib to Sulphur Bar	5. (Name and Position)		

7. Parties Involved

Name	Position	
Bo Staurt	Hydrologist	
Sue Farley	Soil Scientist	

8. Activity Log

Activity Reviewed	
Road 147-A1	9 drain dips armored @ outlet and show evidence of properly functioning ☺. 1 drain dip – non-functional or partially functional – needs maintenance
	SMZ designation on sale map – really not an SMZ via State law - no violation because it is not a stream, but if it was a stream then would need a site specific exemption for reconstruction or it would be a violation.

9 Findings and/or Recommendations

10. Prepared By: Notes taken by Sue Farley, Prepared by Bo Stuart

UNIT LOG	1. Project: Toston Maudlow Salvage Sale	2. Date Visited: 10/16/03 Prepared: 10/17/03	3.Visited: Unit #: 17 Winter Tractor Log Road #: Other Activity: T6N R4E Sec 3 NW¼
4. Project Area Sulphur Bar	5. (Name and Position) Vince Archer, Soil Scientist		T6N R4E Sec 3, NW 1/4

7. Parties Involved

Name	Position	
Vince Archer	Soil Scientist	
Sue Farley	Soil Scientist	

8. Activity Log

Activity Reviewed	Monitoring BMP Effectiveness
Skyline Summer Logging	Trees were hand fallen and then skidded using a skyline cable system during summer. Photos documented log skid trails. Based on ocular estimation, best management practices (BMPs) limited bare soil displacement below 15% threshold. BMPs had not yet been implemented for erosion control on yarding corridors at the time of this field review. However, waterbars were subsequently installed on skyline cable yarding corridors. Observations found evident skid trails with no water bars present and downward oriented logs along the skidding corridor. This log orientation would not check gully erosion as effectively as cross orientation. From above, the skid trails were not as evident as from below.
Skyline Winter Logging	Trees were hand fallen and skidded using a skyline cable system. Activities took place during winter. Photos documented finished work. Observations found the best compliance of BMPs. Minimal soil was disturbed in yarding corridors and overall disturbance well below the 15% threshold. Overall, the low soil disturbance of the unit resembled higher standards of soil conservation achieved with Helicopter logging.
Winter Tractor Logging in Unit 17	Trees were felled using feller buncher and tractor skidded down to log landing. Temporary roads were used to haul logs to main forest road. Work was done over winter 2002/2003. Temporary roads have since been decommissioned to full recontour. Pre-existing non-system roads were ripped and seeded. BMP monitoring was initiated to check for compaction and document soil strength for future comparisons between non-logged and logged sites. In addition, this data will serve to contrast impacts of various logging systems. The data also investigates the correlation between re-emergence of sterile triticale (×*Triticosecale rimpaui* Wittm.) two years after planting and winter logging activities. Possibly, an unknown ecological threshold was passed that enabled triticale re-emergence. Soil strength measures were taken using a cone penetrometer (model 29-3739(CN-970)). Resistance and depth measures were taken throughout the unit along with information on soil cover type, presence of triticale, soil moisture, and soil disturbance class (Howes, 2000). Sampling was done at sixty gridded points to account for variability. Nine bulk density measures were taken stratified by triticale presence and topography. Sets of three samples were gathered at flat ground with triticale, moderate slope ground with triticale and moderate slope ground without triticale. Calculations for soil groundcover showed bare areas tended to have higher strength measures than areas with duff/litter, moss, or wood (see Figure 1). Twenty four of the sixty points had bare soil, though higher penetration resistance here cannot be directly tied to management effects. Bare soil in these areas may have topsoil loss from sheet erosion following wildfire. In

	addition, lack of fine roots may lead to higher penetration resistance with less soil "churning" from roots and associated soil biological activity. Comparing soil strength data for triticale presence and absence, no significant influences were evident using a student t-test (Figure 2, $P \geq 0.1$). Field observations found less remnant duff material and overall soil cover in the triticale areas. Possibly, wildfire burning was more severe in these areas. Grid sampling picked up only 2 out of 60 points with high soil displacement (see Table 3). Calculated results of the bulk densities found no significant differences between bulk density samples for areas of triticale and native vegetation (see Figure 3, P=0.8). More variability was found associated with steeper ground, probably due to greater displacement observed in these areas. The range of bulk density was high compared to sampling in non-burn areas. The loss of top litter and organics from fire may relate to higher bulk density.
9 Findings and/or Recommendations	
Skyline units	Both skyline units appeared to have not exceeded soil quality guidelines with bare soil below 15%. The winter logged skyline units appeared to have much less bare soil than the summer skidded skyline units. Summer skyline units need erosion control in skidtrail corridors.
Winter tractor unit	Field observations found no conclusive evidence for compaction from winter logging at this unit. Penetrometer data did validate the importance of groundcover for soil conservation. Future sampling will help contrast the degree of compaction between summer and winter logged sites. Winter logging successfully minimized soil displacement to affect only 3% of the winter tractor unit. Minimal displacement occurred on this 3% of the unit in areas with skid trails with greater than 1-2 tractor passes and steeper areas of the unit. The data serves as a baseline to reference for future monitoring in unlogged areas and against different logging systems. The interaction of winter logging and triticale re-emergence should be given further investigation.
10. Prepared By: Sue Farley (final document produced Feb. 13, 2004)	

ICS 214

Table 1: Mean and standard error of soil strength associated with types of soil cover. Measures taken with cone penetrometer (lbs/in depth).

Cover	Pressure AVE	Pressure_depth AVE	Pressure_se SE	Pressure_depth_se SE
Bare Soil	157.97	57.51	2.63	4.29
Duff/Litter	147.27	44.04	2.29	3.15
Moss	155.33	41.05	0.95	7.97
Vegetation	170.13	108.03		
Wood	146.46	43.93	6.67	4.36

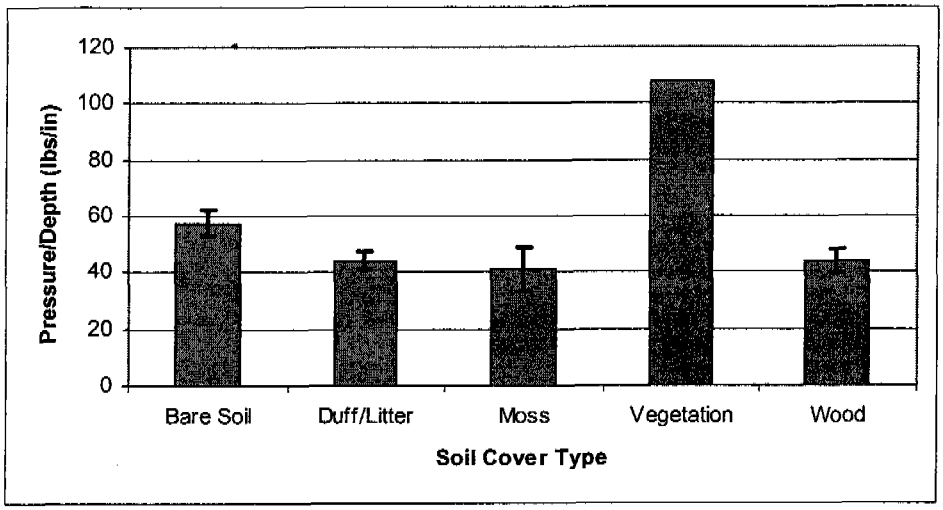

Figure 1: Shows average and standard error of penetrometer measures for types of soil cover.

Table 2: Soil strength mean and standard error associated with presence of grass. Measures taken with cone penetrometer (lbs/cm depth).

Triticale	Pressure/depth	
	AVE	SE
N	56.12	5.2
Y	48.11	2.93

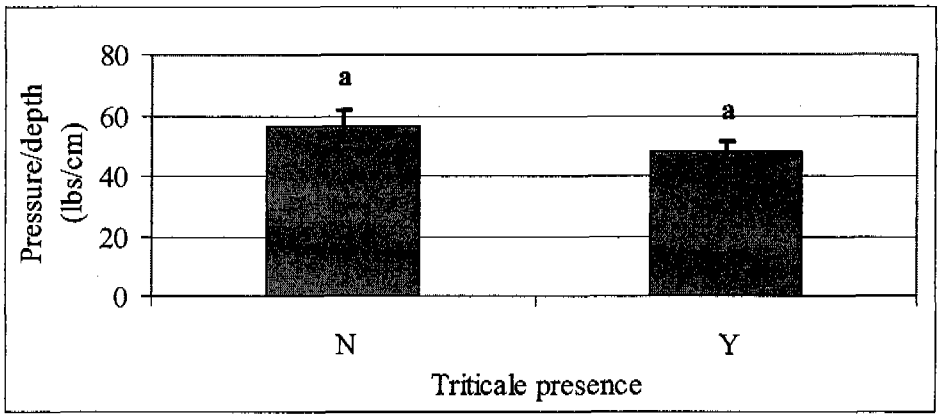

Figure 2: Shows presence and absence of triticale grass and average penetrometer scores. A student t-test suggested not enough evidence for differences between mean penetrometer scores for areas with or without triticale. Error bars display standard error.

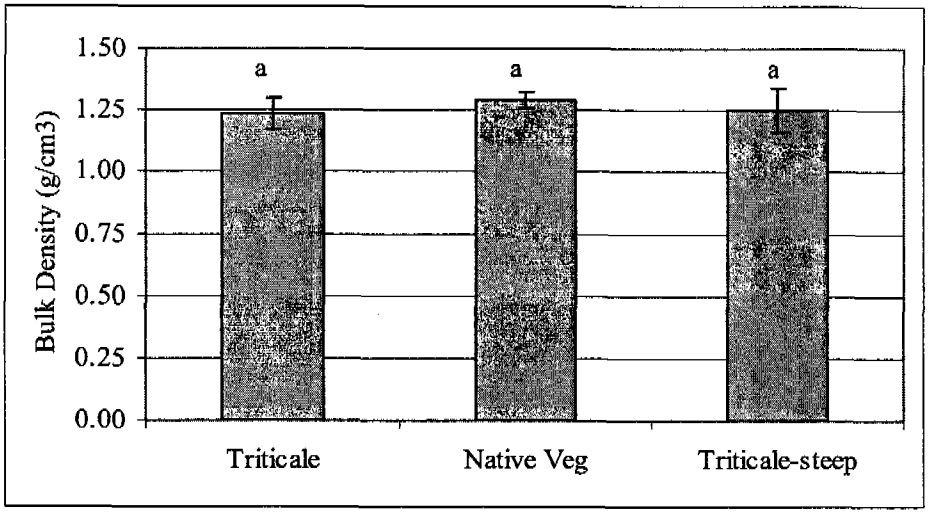

Figure 3: Average bulk density for areas with triticale on low slope ground, native pinegrass and elk sedge on low slope ground, and triticale on steep slopes. Error bars display standard error. A one-way ANOVA found no differences amongst the areas for bulk density (P = 0.80).

Table 3: Raw and derived penetrometer data along with attributes for cover and disturbance classification.

#	Penetrometer raw	Penetrometer Depth (in)	Cover	Grass	Force (lbs)	Force/depth (lbs/inch)	Howe's Class
1	400	5D		Y	129.18	65.62	2
2	396	25D		Y	127.92	13.00	2
3	450	7B		Y	144.93	52.59	2
4	470	6D		N	151.23	64.02	2
5	342	9W		Y	110.91	31.30	2
6	478	9B		Y	153.75	43.39	2
7	508	8D		N	163.20	51.82	2
8	500	6B		Y	160.68	68.02	2
9	515	9W		Y	165.41	46.68	2
10	439	8D		Y	141.47	44.92	2
11	446	7B		N	143.67	52.13	2
12	491	7B		N	157.85	57.28	4
13	485	10B		Y	155.96	39.61	2
14	460	7B		Y	148.08	53.73	2
15	416	7D		Y	134.22	48.70	2
16	478	9D		N	153.75	43.39	2
17	461	6D		N	148.40	62.82	2
18	429	11D		Y	138.32	31.94	2
19	446	8B		Y	143.67	45.62	2
20	505	7D		N	162.26	58.88	2
21	496	13B		Y	159.42	31.15	2
22	486	12M		Y	156.27	33.08	2
23	508	5B		Y	163.20	82.91	2
24	465	7W		Y	149.66	54.30	2
25	482	7B		Y	155.01	56.25	2
26	446	7D		Y	143.67	52.13	2
27	450	10D		Y	144.93	36.81	2
28	512	12D		Y	164.46	34.81	2
29	381	19D		Y	123.20	16.47	2
30	494	13D		Y	158.79	31.03	2
31	450	12D		Y	144.93	30.68	2
32	498	10D		Y	160.05	40.65	2
33	492	8B		Y	158.16	50.22	2

#	Penetrometer raw	Penetrometer depth	Cover*	Triticale Presence	Force (lbs)	Force/depth (lbs/inch)	Howe's Class
34		503	9W	Y	161.63	45.62	2
35		492	14D	N	158.16	28.70	2
36		480	8M	N	154.38	49.02	2
37		545	4B	Y	174.86	111.03	2
38		470	5D	N	151.23	76.83	2
39		450	6W	Y	144.93	61.35	2
40		457	10D	Y	147.14	37.37	2
41		520	6B	N	166.98	70.69	2
42		595	5B	Y	190.61	96.83	2
43		465	7D	Y	149.66	54.30	2
44		465	7B	Y	149.66	54.30	2
45		512	7B	Y	164.46	59.68	2
46		468	8D	N	150.60	47.82	2
47		465	7B	Y	149.66	54.30	2
48		449	12W	Y	144.62	30.61	2
49		460	10W	Y	148.08	37.61	2
50		502	13B	Y	161.31	31.52	4
51		415	16D	N	133.91	21.26	2
52		530	4P	N	170.13	108.03	2
53		505	7D	Y	162.26	58.88	2
54		520	5B	N	166.98	84.83	2
55		420	6D	Y	135.48	57.35	2
56		520	9B	N	166.98	47.13	2
57		430	12B	N	138.63	29.34	2
58		468	11D	Y	150.60	34.78	2
59		425	11B	Y	137.06	31.65	2
60		560	6B	Y	179.58	76.02	2

* Cover includes bare soil (B), litter-duff(D), rock >3 inch (R), plant basal cover (P), gravel (G), wood > 3 inch (W), and moss (M).

References:

Howes, S.W. 2000. Proposed Soil Resource Condition Assessment. Wallowa-Whitman National Forest. Baker City, OR. 9p.

UNIT 17

Timber Unit Soil Condition Assessment

Area Maudlow Salvage Date 10/16/03 Area covered (acres)

Plot MTW1 Observer SF Habitat

Dist_Class	a 1	b 2	c 3	d 4	e 5	f 6	g 7	h 8	i 9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	X24	Y25
Penetrometer (raw)	400	390	452	470	342	478	528	500	515	439	446	491	495	460	416	473	461	429	446	505	496	486	508	465	482
Depth (cm)	5	25	7	6	9	4	8	6	9	8	7	7	10	7	7	9	6	11	8	7	13	12	5	7	7
Cover	D	D	B	D	W	B	D	B	W	D	B	B	B	B	D	D	D	D	B	D	B	M	B	W	B
Moisture (%)																									
Azimuth																									
Pace																									
Notes	T	T	T	NT	T	T	NT	T	T	T	NT	NT	T	T	T	NT	NT	T	T	NT	T	T	T	T	T

Dist_Class	26	AA 27	AB 28	AC 29	AD 30	AE 31	AF 32	AG 33	AH 34	AI 35	AJ 36	AK 37	AL 38	AM 39	AN 40	AO 41	AP 42	AQ 43	AR 44	AS 45	AT 46	AU 47	AV 48	AW 49	AX 50
Penetrometer (raw)	446	450	512	381	494	450	498	492	503	492	480	546	470	450	467	520	595	465	465	512	468	465	449	460	502
Depth (cm)	7	10	12	19	13	12	10	8	9	14	8	4	5	6	10	6	5	7	7	7	8	7	12	10	13
Cover	D	D	P	D	D	D	D	B	W	D	M	B	D	W	D	B	B	D	B	B	D	B	W	W	B
Moisture (%)																									
Azimuth																									
Pace																									
Notes	T	T	T	T	T	T	T	T	T	NT	NT	T (4)	NT	T	T	NT	T	T	T	T	T	NT	T	T	T (3-4)

Cover= Rock (>3 inch) (R), Duff/litter (D), Bare soil (B), Plant (basal cover) (P), Gravel (G) Wood (W) Moss (M)

Disturbance Class= 0 (Undisturbed), 1 (Slight Disturbance), 2 (Some Disturbance), 3 (Moderate Disturbance), 4 (High Disturbance), 5 (Sever Disturbance), 6 (Altered Drainage)

X Pounds= 0.315 * (Penetrometer Reading) + 3.183

Timber Unit Soil Condition Assessment

	AV	AW	AX	AY	AZ																				
Dist_Class	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Penetrometer (raw)	415	530	505	520	420	520	430	468	415	560															
Depth (cm)	16	4	7	5	6	9	12	11	11	6															
Cover	P	P	D	B	D	D	B	D	B	B															
Moisture (%)																									
Azimuth																									
Pace																									
Notes	NT	NT	T	NT	T	NT	NT	T	T	T															

	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
Dist_Class																									
Penetrometer (raw)																									
Depth (cm)																									
Cover																									
Moisture (%)																									
Azimuth																									
Pace																									
Notes																									

UNIT LOG	1. Project: Toston Maudlow Salvage Sale	2. Date Visited: 10/29/03 Prepared: 10/29/03	3.Visited: Unit #: 8 Winter Tractor Log Road #: Other Activity: T 7N R4E Sec 34
4. Project Area Sulpher Bar	5. (Name and Position) Vince Archer, Soil Scientist		T6N R4E Sec 3 T7N R4E Sec 34 T6N R4E Sec 3

7. Parties Involved

Name	Position	
Vince Archer	Soil Scientist	
Sue Farley	Soil Scientist	

8. Activity Log

Activity Reviewed	Monitoring BMP Effectiveness
Winter Tractor Logging in Unit 8	Trees were felled using feller buncher and tractor skidded down to log landing. Temporary roads were used to haul logs to main forest road. Work was done over winter 2002/2003. Temporary roads have since been decommissioned to full recontour. Pre-existing non-system roads were ripped and seeded. BMP monitoring was initiated to document coarse woody debris standards and amount of ground cover Sampling was done to verify standards for coarse wood debris and characterize surface organic factions. Fuel sampling was done following FIREMON protocol (Lutes, 2003, *http://www.fire.org/firemon/*). Groundcover data was estimated at one foot intervals along 50 foot transects. Weather at time of sampling was less than agreeable with some snow accumulation. Sue had warm food; Lois and Vince did not. Results found coarse wood debris (CWD) at 7.4 tons per acre, within range of the recommended standard for this habitat type (Graham et al, 1994, see Figure 1). In considering the distribution of CWD throughout the unit, the range was fairly even with values from 4-10 tons/acre (Figure 1). Duff and litter had appreciable amounts at 4.3 and 2.3 tons/acre, though much lower than unburned areas. The fine fuel fraction was the lowest at 1.3 tons/acre showing that most of the resident wood material resides as larger >3 inch diameter material (see Figure 1). Groundcover values showed 35% bare soil in addition to duff/litter cover at 39% (Figure 2). The variability was quite high with bare ground measures ranging between 4% and 56% (Table 2). Moderate amounts of groundcover and adequate downed wood debris may minimize erosion potential at this unit, especially given the lower slope angle and ridge position. However, the lopsided distribution of organic

	matter stores, favoring CWD may impact soil processes at the site. Readily decomposable substrate may be limited at this site. This limited amount of fine woody material is due to effects of wildfire, and not post-fire salvage logging. Additional information on plant species abundance and cover during the growing season with inferences to carbon substrate would help ascertain the status of soil productivity.
9	**Findings and/or Recommendations**
Winter tractor unit	Coarse woody debris standards were met with measures averaging 7.4 +/- 2.2 tons/acre, within range of the target 7 tons/acre. This CWD acts to slow erosion at the unit, though moderate amounts of bare soil exists, possibly remnant from severe burning by wildfire. Lower amounts of fine organic matter stores may impact nutrient cycling at this location, though this is due to effects of wildfire and not salvage logging. We recommend sampling vegetation during the growing season for better inferences about short-term nutrient cycling.
10. Prepared By: Vince Archer, Sue Farley (updated 12-2-03 by Sue Farley)	

ICS 214

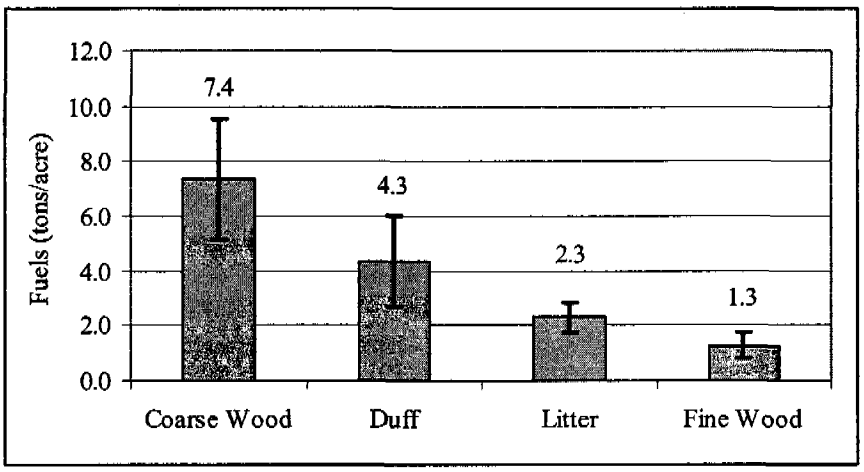

Figure 1: Fuel fractions measured at Unit 8. Classifications define coarse wood as > 3 inch diameter and fines including 1 hr (0-0.25 inches diameter), 10 hr (0.25-1 inch diameter) and 100 hr (1-3 inches diameter) wood pieces. For coarse wood, the majority sampled had decayed much and retained structure integrity.

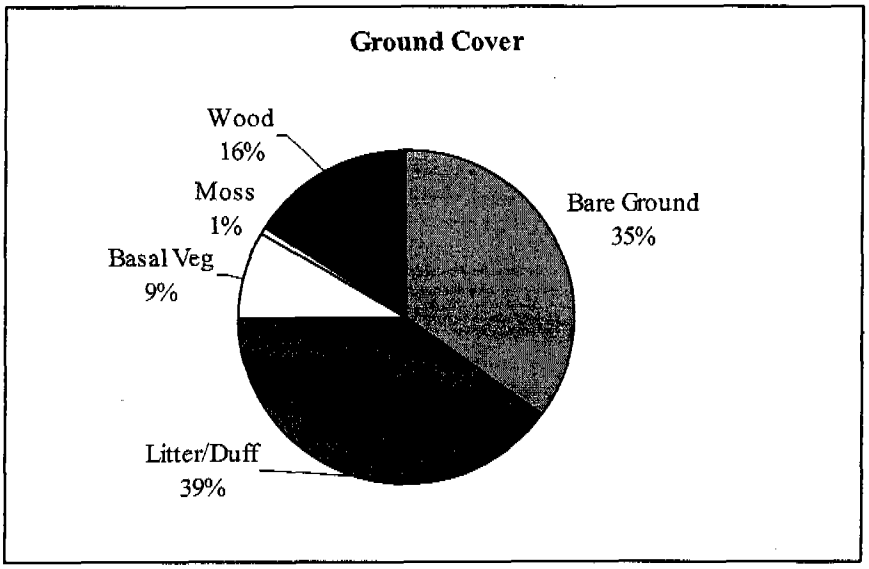

Figure 2: Groundcover percentages from 50 foot transects at Unit 8. Measures were taken at every foot. See Table 1 for average +/- standard error.

Table 2: Groundcover average percent for Unit 8.

Transect	*Bare Ground*	*Litter/Duff*	*Basal Veg*	*Moss*	*Wood*	*Gravel*	*Rock*
Average	35.33	40.00	8.67	0.67	16.00	0.00	0.00
Standard Error	15.93	19.29	2.91	0.67	7.02	0.00	0.00

Reference:

Graham, R.T., A.E. Harvey, M.F. Jurgenson, T.B. Jain, J.R. Tonn, and D.S. Page-Dumroese. 1994. Managing coarse woody debris in forests of the Rocky Mountains. Res. Pap. INT-RP-477. Intermountain Research Station, USDA Forest Service: 1-13

Lutes, D. 2003. Fire Effects Monitoring and Inventory Protocol: Sampling Methods. Systems for Environmental Management. Missoula, Montana. [Online]. Available: *http://www.fire.org/firemon/FLv3_Methods.pdf* [2003].

Unit 8 - Maudlow Salvage - Downed Fuel Inventory Form

UNIT 8 Maudlow Salvage Unit 8 T-W

Date: 10-29-03	Site Name/Code:

10/29/2003

Downed Fuel Inventory Form

Block / Compartment		Sub-compartment / Stand Elevation		Aspect	
				Cover Type	
				Habitat Type	

Size Class (In):	0-1	1-3	3+
Length of Sampling Plane (Ft):			

Plot No.	Slope	No. of Intersections			Duff Depth		3+ Diameter						Fuel Depth		
		0-.25"	.25-1"	1-3"	First	Second	Sound	Sound	Sound	Rotten	Rotten	Rotten	First	Second	Third
8	T-1	7	1	5	0-0	0-0				5"	5"	5"			
					duff-	litter				III	III	III			
										4"	4"	4"			
										III	III	III			
										4"	5"	5"			
										III	III	III			
	T-2	0	0	0	0-0	1cm-2cm				3"	4"	5"			
						duff-litter				IV	III	III			
										3"					
										IV					
	T-3	2	3	2	0-1cm	1cm-2cm				5"	5"	3"			
						duff-litter				III	III	III			
										4"	5"	4"			
										III	III	III			
										5"					
										III					
		3	2	7	0-1cm	1-1cm				3"	6"	4"			
					duff-litter					II	III	II			
										6"	6"	4"			
										III	III	IV			
										4"	4"	3"			
										II	III	III			
										4"					
										III					

Ground Fuel Composition:		If heavy slash, code 1:
Species	*Percent*	
1.		
3.		

UNIT 8 ENTERED

Date: 10-30-03 | Site Name/Code: Maudlow Salvage

Downed Fuel Inventory Form

Block / Compartment		Sub-compartment / Stand Elevation		Aspect	
				Cover Type	
				Habitat Type	

	Size Class (In):	0-1	1-3	3+
	Length of Sampling Plane (Ft):			

Plot No.	Slope	No. of Intersections			Duff Depth		3+ Diameter						Fuel Depth		
		0-.25"	.25-1"	1-3"	First	Second	Sound	Sound	Sound	Rotten	Rotten	Rotten	First	Second	Third
	T-5	5	7	4	2-1 cm	3-3 cm				4"					
					duff-litter					III					
		2	2	2	2	2	2	2	2	2	1	2	2	2	1
	T-6	0	0	0	1cm-1cm	1cm-1cm				4"	4"	4"			
										II	II	II			
										4"	4"	3"			
										III	II	II			
										3"	4"	4"			
										II	II	II			
										6"					
										II					

Ground Fuel Composition:		If heavy slash, code 1:
Species	*Percent*	

BULK DENSITIES

MARSHALL T.

WHAT TRACTOR UNIT

		Sw
MTW 1 -	1A	407.4
"	1B	431.5
	1C	364.4
	2A	424.8
	2B	377.1
	2C	411.3
TRIT	3A	375.2
↓	3B	349.3
	3C	423.9

		Sat + tin	tin
MTW /			
TRIT	3A	371.6	19.3
TRIT	3B	319.3	18.1
	3C	405.6	18.6
?	1A	359.1	17.8
	1B	397.1	17.9
	1C	328.9	17.7
PINE GRASS ELKSEDGE	2A	395.6	18.0
	2B	368.5	18.3
	2C	368.8	17.6

Unit 8 - Maudlow Salvage
Tractor - Winter

50 FT TRANSECT,
PT @ 1 FT INTERVAL

5/02

Ground Cover Monitoring for Range, Wildfire, Rx Fire and Recreation Impacts

UNIT 8

Date 10-30-03 Examiner _____ Quad _____

Location: Section _____, T____, R____ Ranger District _____

Landform, PM _____

Habitat Type _____ Slope____ Aspect _____ Elev _____

Common species _____

_____

GPS location of start N _____ W _____

Maudlow Salvage Unit 8 Tractor - winter

Tran #	Bare Soil	Litter & Duff	Basal Veg	Gravel (0.1-3in)	Rock (>3 in)	Wood	Moss/ Lichen	Water	Soil Descrip #
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									