

## Appendix L: Soils

### Soil Map Units within Thinning Units \_\_\_\_\_

Table L-1. Gemmill Action Area Soil Map Units

Map Unit	Map Unit Name	Percent of Map Unit – Major Soil
16	Brader, 40-60 % slopes	75
35	Deadwood-Nenus Complex, 40-60 % slopes	60
80	Goulding vgl , 40-60 % slopes	75
84	Goulding-Neuns Complex, 40-60 % slopes	50
115	Holland, 0-20 % slopes	75
126	Holland-Nenus Complex, 20-40 % slopes	55
137	Hugo-Nenus Complex, 20-40 % slopes	50
178	Marpa-Goulding Complex, 20-40 % slopes	50
182	Marpa-Holland Complex, 20-40 % slopes	60
202	Nenus, 20-40 % slopes	75
203	Nenus, 40-60 % slopes	75
206	Nenus-Deadwood Complex ,40-60 % slopes	50
216	Neuns- Hugo Complex, 40-60 % slopes	50
227	Nenus, deep-Hugo Complex ,20-40 % slopes	60
351	Xerofluvents – Riverwash, 0-20 % slopes	70

### Soil Descriptions taken in the Field \_\_\_\_\_

Table L-2. Soil Pit Descriptions (Generalized)

Soil Pit #	Map Unit	Series	Depth	Depth Class	Slope/Aspect	Parent Material	Position	Elevation
ST7809	80	Goulding	19"	Shallow	40%/SE-facing	Metasediment	Foothill	3700 ft
ST0423	137	Hugo	48"	Deep	10%/SW-facing	Nonmarine	Terrace	3976 ft
ST0424	178	Goulding	18"	Shallow	45%/S-facing	Metasediment	Mt. side	4510 ft
ST0425	137	Hugo	48"	Deep	15%/SE-facing	Metasediment	Summit	4038 ft
ST0426	137	Hugo	55"	Deep	15%/SE-facing	Nonmarine	Summit	4034 ft
ST0501	137	Hugo	62"	V-Deep	25%/E-facing	Metasediment	Mt. side	4060 ft
ST0502	203	Neuns	32"	M-deep	60%/NW-facing	Metasediment	Mt. side	3910 ft
ST0503	137	Hugo	42"	Deep	20%/S-facing	Metasediment	Foothill	3650 ft

*Soils are:* Deep to moderately deep with surface textures of loam to gravelly loam, and subsoil textures of clay loam, gravelly clay loam.

**Table L-3. Gemmill soil ratings for map units found in this project area (bare soil)**

Soil Series Slope Group	Map Units	Depth	Rock Type	Surface Texture	Clay %	Burn Damage	Compaction Rating	Erosion Hazard (bare soils)
<b>Brader</b>	16	S	MS	gl	15-25	moderate	high	H/22
<b>Deadwood 40 – 60%</b>	35, 206	S	MS	vgsl	10-20	moderate	moderate	H/15
<b>Hugo 20 – 40%</b>	137, 216	VD	LS	l	20-40	moderate	severe	H/14
<b>Goulding 20 – 60%</b>	80, 84, 178	S	MS	gsl	6-14	moderate	moderate	MH/12
<b>Holland 0 – 40%</b>	115, 182	MD	MS	l	20-38	moderate	severe	H/14
<b>Marpa 20 – 40%</b>	178, 182	MD	MS	gl	18-30	moderate	high	M/11
<b>Neuns 20 – 60%</b>	35, 84, 137,203 206,216	MD	MV	vgl	10-25	moderate	moderate	M/9

**Depth Classes:**

S = shallow (10-20")  
 MD = mod deep (20-40")  
 D = deep (40-60")  
 VD = very deep (>60")

**Parent Material:**

MS = metasediments  
 MV = metavolcanics  
 LS = landslide sediments

**Soil Texture:**

l = loam  
 gl = gravelly loam  
 vg = very gravelly  
 sl = sandy loam

**Compaction:**

Mod = slight harm  
 High = mod harm  
 Severe = harmful

**Erosion Hazard:**

L = low (<4)  
 M = moderate (4 -12)  
 H = high (13-29)

**Table L-4. Gemmill Soil Physical Properties**

Series	AWC (in/in)	Drain.	Rock %	Erod. (Kf,K)	Particle Size Dis. Topsoil			Perm. (in/hr)	K Sat (in/h)	Hydro Group
					C	Si	S			
<b>Brader</b>	.13-.15	W	15-35	.37/.20	-	-	-	.6-2	9-33	C
<b>Deadwood</b>	.07-.09	W	50-85	.32/.10	-	-	-	2-6	33-99	D
<b>Goulding</b>	.13-.15	W	30-60	.37/.15	-	-	-	2-6	33-99	D
<b>Holland</b>	.13-.15	MW	15-35	.37/.20	11	27	62	.6-2	9-33	B
<b>Hugo</b>	.14-.16	W	10-25	.37/.32	5	25	70	.6-2	9-33	B
<b>Marpa</b>	.12-.14	W	25-50	.37/.24	13	63	24	.6-2	9-33	B
<b>Neuns</b>	.07-.09	W	40-65	.32/.10	17	31	48	2-6	33-99	C

Table L-5. Existing Soil Cover Conditions on Selected Harvest Units

Thin Unit #	Slope Range %	Soil Cover %	Duff Depth (in)	LWD (logs/ac)	Fuel (tons/ac)	Log Decomposition Class			
						2	3	4	5
16	20-30	100	2.5	No data	24.4	No data			
17	30-45	100	1.8	-	13.0		-		
18	5-15	100	5.0	-	23.0		-		
19	10-25	98	2.0	-	14.2		-		
20	5-40	95	2.5	-	28.2		-		
21	20-40	90	2.1	-	32.1		-		
22	10-45	98	2.5	-	28.3		-		
23	20-40	95	3.0	-	26.5		-		
24	40-55	100	3.5	-	37.3		-		
25	20-45	90	2.1	-	45.1		-		
26	5-35	95	2.5	10-20	38.2		x		
27	15-45	100	3.3	3-15	32.1	x	x		
28	30-40	100	1.8	1-5	5.5				
29	10-30	98	3.5	4-20	22.4			x	
30	5-40	95	3.8	3-8	23.7	x	x	x	
31	None								
32	5-35	100	2.0	4-16	21.0	x			
33	5-40	90	3.2	3-9	28.5		x	x	
34	None								
35	10-50	95	3.1	3-15	29.7			x	x
36	20-30	98	2.2	9-12	35.1		x	x	
37	20-30	100	1.8	5-9	42.3		x	x	
38	40-50	98	2.0	10-14	37.1		x	x	
39	30-40	98	2.0		48.7				

Table L-6. Erosion Hazard Ratings for bare (black), current (blue), and treated (red) slopes (on thinning unit soils)

% Slope	Texture	Erodibility	Water Movement	Runoff Production	Runoff Production Rating	Slope	Runoff Energy Rating	Soil Cover %	Soil Cover Rating	Erosion Hazard Rating	Rating
<b>Deadwood</b>											
40 - 60% bare	3	2	3	8	2.67	50	0.5	0-10	5	15.0	High
current	3	2	3	8	2.67	50	0.5	90-100	1	4.5	Mod
treated	3	2	3	8	2.67	50	0.5	50-70	2	9.0	Mod
<b>Goulding</b>											
20 - 40% bare	3	2	3	9	3.0	30	0.3	0-10	5	9.0	Mod
current	3	2	3	9	3.0	30	0.3	90-100	1	1.8	Low
treated	3	2	3	9	3.0	30	0.3	50-70	2	3.6	Low
40 - 60% bare	3	2	3	9	3.0	50	0.5	0-10	5	15.0	High
current	3	2	3	9	3.0	50	0.5	90-100	1	3.0	Low
treated	3	2	3	9	3.0	50	0.5	50-70	2	6.0	Mod
<b>Holland</b>											
0 - 20% bare	3	3	3	9	3.00	10	0.1	0-10	5	4.5	Mod
current	3	3	3	9	3.00	10	0.1	90-100	1	0.9	Low
treated	3	3	3	9	3.00	10	0.1	50-70	2	1.8	Low
20 - 40% bare	3	3	3	9	3.00	30	0.3	0-10	5	13.5	High
current	3	3	3	9	3.00	30	0.3	90-100	1	2.7	Low
treated	3	3	3	9	3.00	30	0.3	50-70	2	5.4	Mod
<b>Hugo</b>											
20 - 40% bare	3	3	3	9	3.00	30	0.3	0-10	5	13.5	High
current	3	3	3	9	3.00	30	0.3	90-100	1	2.7	Low
treated	3	3	3	9	3.00	30	0.3	50-70	2	5.4	Mod
<b>Marpa</b>											
20 - 40% bare	3	2	3	9	3.00	30	0.3	0-10	5	9.0	Mod
current	3	2	3	9	3.00	30	0.3	90-100	1	1.8	Low
treated	3	2	3	9	3.00	30	0.3	50-70	2	3.6	Low
<b>Nenus</b>											
20 - 40% bare	3	2	3	8	2.67	30	0.3	0-10	5	8.0	Mod
current	3	2	3	8	2.67	30	0.3	90-100	1	1.6	Low
treated	3	2	3	8	2.67	30	0.3	50-70	2	3.2	Low
40 - 60% bare	3	2	2	8	2.67	50	0.5	0-10	5	13.3	High
current	3	2	2	8	2.67	50	0.5	90-100	1	2.7	Low
treated	3	2	2	8	2.67	50	0.5	50-70	2	5.3	Mod

An erosion hazard rating (EHR) of 1 to 4 is low, 4 to 12 is moderate, 13 to 29 is high, and greater than 29 is very high. Soil cover can be any combination of duff mat, litter, fine organic materials (<3 in. dia.),

coarse organic materials (>3 in. dia.), live vegetation in contact with soil, or rock fragments (>3/4 in. dia.).

This table shows (in **yellow**) when you change the cover amounts (removal by fire) that the erosion hazard is 2 to 5 times as much. It assumes a natural vegetative cover (**blue**) of 90 to 100% and the effect of complete vegetative cover removal leaving only 0 to 10% (hot intensity fire). Planned treatment (**red**) of fuels will leave 50 to 70% cover and erosion hazard levels will be on the whole low to moderate. Some soils can handle complete removal of vegetation without increasing erosion too much (Goulding and Nenus). This is due to the rock content of the soil and rocky cover. Others are dependent of soil cover and without it erode (Hugo, Marpa, and Holland).

**Table L-7. Gemmill Action Area WEPP Surface Erosion Rates** (selected major soils)

<b>Hillslope erosion: (50 year average)</b>		
<b>Condition</b>	<b>Erosion (t/a)</b>	<b>Sediment (t/a)</b>
<b>Predevelopment</b>		
Neuns	0.09	0.09
Hugo	0.07	0.07
<b>Severe Wildfire</b>		
Neuns	73.80	73.80
Hugo	29.56	29.56
<b>Pvt - GTR/Clearcut</b>		
Neuns	0.65	0.24
Hugo	0.37	0.09
<b>Thinned Stand</b>		
Neuns	0.25	0.18
Hugo	0.17	0.06
<b>Prescribed Fire (low to mod. with forested buffer)</b>		
<b>Underburn - 50% cover</b>		
Neuns	6.15	0.69
Hugo	5.16	0.23
<b>Brushburn - 30% cover</b>		
Neuns	27.11	1.06
Hugo	22.17	0.35
<b>Skid-Trails (5 to 10% of area) with forested buffer</b>		
bare soils -Neuns	39.93	0.55
bare soils -Hugo	25.60	0.18
slash cover - Neuns	0.64	0.18
slash cover - Hugo	0.75	0.15
<b>Landings (60ea @ 1ac = 60 acres) flat areas</b>		
bare soils -Neuns	0.34	0.29
bare soils -Hugo	0.20	0.16
slash cover - Neuns	0.02	0.02
slash cover - Hugo	0.01	0.01
<b>Post Harvest Recoveries</b>		
<b>1 yr after GTR + burn with forested buffer</b>		
Neuns	8.67	0.99
Hugo	8.50	0.26
<b>2-4 yrs after GTR + burn with forested buffer</b>		
Neuns	0.87	0.25
Hugo	0.77	0.13
<b>4-6 yrs after GTR + burn with forested buffer</b>		
Neuns	0.02	0.01
Hugo	0.04	0.04
<b>4-6 yrs after selective thin with forested buffer</b>		
Neuns	0.16	0.12
Hugo	0.09	0.06