

144 COWICHE FAMILY, 1 to 10 percent slopes

Map Unit Components	Cowiche family (70 percent)
Position, Slope, and Elevation	Mainly on toeslopes of mountain uplands and alluvial fans; 1 to 10 percent slopes; 4300 to 4800 feet.
Typical Vegetation and Precipitation (ppt)	Western juniper, big sagebrush, rabbitbrush, Idaho fescue, wheatgrass, cheatgrass; 12 to 14 inches ppt.
Surface Layer	0 to 6 inches; brown to grayish brown loam, platy and granular structure; soft to slightly hard; pH 6.2 to 6.4.
Substratum	25 plus inches; weathered volcanic tuff which can be dug with a spade.
Rooting Depth (in.) to Underlying Material	20 to 40; basalt, tuff
Erosion Factor (K)	.37
Max. Erosion Hazard	Low
Soil Permeability	Moderate
Drainage Class	Well drained
Soil Manageability Class	1
Group	I
Forest Site Class	7 (non-commercial)
Range Site	12
Water Runoff Potential	Very Slow
Watershed Sensitivity	8 (Low)
Hydrologic Soil Group	B
Available Water Capacity (AWC)	Low to Moderate
Upper 20 inches	2.5 inches
Susceptibility to Burning Damage	Moderate
Slope Stability Hazard	Low
Allowable Soil Loss	2 tons/acre/year
Chance of Seedling Survival	Not Rated
Rating for Timber Site	Not Rated
R-Value	30-60
Soil horizons in inches, USDA, Unified, AASHTO	0-6; Loam Unified; ML-CL, CL AASHTO: A-4, A-6 6-25; Clay loam, gravelly clay loam Unified: CL, MH AASHTO: A-6 25+; Weathered bedrock
Included Areas:	Included with this soil in mapping and making up about 30 percent of the acreage are the Pass Canyon, Searles, Supan, Stukel, Simpson and Wrentham families.

145 COWICHE-CASUSE FAMILIES-ROCK OUTCROP, TUFF ASSOCIATION, 2 to 30 percent slopes

Map Unit Components	Cowiche family (45 percent)	Casuse family (30 percent)	Rock outcrop (15 percent)
Position, Slope, and Elevation	On alluvial fans and lower sideslopes of mountain uplands; 2 to 20 percent slopes; 4500 to 5300 feet.	On sideslopes and toeslopes of mountain uplands; 5 to 30 percent slopes; 4500 to 5300 feet.	On ridges, knolls and deeply incised drainages. 5 to 30 percent slopes; 4500 to 5300 feet.
Typical Vegetation and Precipitation (ppt)	Dense western juniper, bitterbrush, big sagebrush, rabbitbrush, grasses; 14 to 16 inches ppt.	Western juniper, low sagebrush, mountain mahogany, Idaho fescue, cheatgrass, other grasses; 14 to 16 inches ppt.	
Surface Layer	0 to 6 inches; brown to grayish brown loam, platy and granular structure; soft to slightly hard; pH 6.2 to 6.4.	0 to 5 inches; light gray to light brownish gray loam, subangular blocky and granular structure, soft to slightly hard, pH 6.8.	NOT APPLICABLE: Platy and massive paralithic volcanic tuff which rubs to a sandy loam, loam, or clay loam texture.
Substratum	25 plus inches weathered volcanic tuff which can be dug with a spade.	14 plus inches; semi-soft weathered platy volcanic tuff.	
Rooting Depth (in.) to Underlying Material	20 to 40; basalt, tuff	7 to 20; tuff	
Erosion Factor (K)	.37	.49	
Max. Erosion Hazard	Low to moderate	Moderate to high	
Soil Permeability	Moderate	Moderate	
Drainage Class	Well drained	Well drained	
Soil Manageability Class Group	2e II	2ed	
Forest Site Class	7 (non-commercial)	7 (non-commercial)	
Range Site	13	4, 1	
Water Runoff Potential	Slow	Rapid	Very Rapid
Watershed Sensitivity	7 (High)	4	2
Hydrologic Soil Group	B	D	
Available Water Capacity (AWC) Upper 20 inches	Low to Moderate 2.5 inches	Very Low to Low 1.1 to 3.2 inches	
Susceptibility to Burning Damage	Moderate	Low	
Slope Stability Hazard	Low	Low	
Allowable Soil Loss	2 tons/acre/year	1 tons/acre/year	
Chance of Seedling Survival	Not Rated	Not Rated	
Rating for Timber Site	Not Rated	Not Rated	
R-Value	30-60	30-60	
Soil horizons in inches, USDA, Unified, AASHTO	0-6; Loam Unified: ML-CL, CL AASHTO: A-4, A-6 6-25; Clay loam, gravelly clay loam Unified: CL, MH AASHTO: A-6 25+; Weathered bedrock	0-5; Loam Unified: ML-CL, CL AASHTO: A-4, A-6 5-10; Clay loam Unified: CL, MH AASHTO: A-6 10-14; Very gravelly clay loam Unified: SC AASHTO: A-6, A-7 14+; Weathered bedrock	
Included Areas:	Included with this unit in mapping and making up about 10 percent of the acreage are the Pass Canyon, Keating and Hiibner families, Lithic Xerorthents, mesic, Xerofluvents and Aquolls.		

146 COWICHE-SIMPSON FAMILIES COMPLES, 1 to 15 percent slopes

Map Unit Components	Cowiche family (50 percent)	Simpson family (35 percent)
Position, Slope, and Elevation	On sideslopes and alluvial fans of basalt plateaus; 1 to 15 percent slopes; 4300 to 4600 feet.	On lower toeslopes and alluvial basin areas of basalt plateaus; 1 to 15 percent slopes; 4300 to 4600 feet.
Typical Vegetation and Precipitation (ppt)	Big sagebrush, rabbitbrush, bitterbrush, few western juniper, sandberg bluegrass, thurber needlegrass, bottlebrush, cheat- grass; 10 to 14 inches ppt.	Big sagebrush, rabbitbrush, bitterbrush, few western juniper, sandberg bluegrass, thurber needlegrass, bottlebrush, cheat- grass; 10 to 14 inches ppt.
Surface Layer	0 to 6 inches; brown to grayish brown loam, platy and granular structure; soft to slightly hard; pH 6.2 to 6.4.	0 to 3 inches; brown loam, granular structure, slightly hard, pH 7.2.
Substratum	25 plus inches; weathered volcanic tuff which can be dug with a spade.	28 to 30 inches; yellowish brown semi-consolidated ashy tuff which rubs to a clay loam, massive, very hard, pH 7.6.
Rooting Depth (in.) to Underlying Material	20 to 40; basalt, tuff	20 to 40; basalt, tuff
Erosion Factor (K)	.37	.43
Max. Erosion Hazard	Low	Low
Soil Permeability	Moderate	Slow
Drainage Class	Well drained	Well drained
Soil Manageability Class	1	1
Group	IA	
Forest Site Class	7 (non-commercial)	7 (non-commercial)
Range Site	12	12
Water Runoff Potential	Slow	Slow
Watershed Sensitivity	8 (Moderate)	6
Hydrologic Soil Group	B	C
Available Water Capacity (AWC)	Low to Moderate	Low to Moderate
Upper 20 inches	2.5 inches	2.7 inches
Susceptibility to Burning Damage	Low	Low
Slope Stability Hazard	Low	Low
Allowable Soil Loss	2 tons/acre/year	2 tons/acre/year
Chance of Seedling Survival	Not Rated	Not Rated
Rating for Timber Site	Not Rated	Not Rated
R-Value	30-60	0-30
Soil horizons in inches, USDA, Unified, AASHTO	0-6; Loam Unified: ML-CL, CL AASHTO: A-4, A-6 6-25; Clay loam, gravelly clay loam Unified: CL, MH AASHTO: A-6 25+; Weathered bedrock	0-3; Loam Unified: ML-CL, CL AASHTO: A-4, A-6 3-8; Silty clay loam Unified: CL, MH, CH AASHTO: A-6, A-7 8-28; Silty clay Unified: CH AASHTO: A-7 28-30; Clay loam Unified: CL, MH, CH AASHTO: A-6, A-7 30+; Unweathered bedrock
Included Areas:	Included with these soils in mapping and making up about 15 percent of the acreage are the Searles, Supan, Pass Canyon and Gwin families and Simpson Soils deeper than 40 inches.	

147 DEMASTERS-MERLIN-DEMASTERS deep FAMILIES ASSOCIATION, 1 to 20 percent slopes

Map Unit Components	DeMasters family (35 percent)	Merlin family (30 percent)	DeMasters family, deep (15 percent)
Position, Slope, and Elevation	On sideslopes and ridges of undulating basalt plateaus; 1 to 20 percent slopes; 5400 to 6000 feet.	On knolls, ridges and nearly level shallow rocky areas of basalt plateaus; 1 to 20 percent slopes; 5400 to 6000 feet.	On gentle concave areas and alluvial draws of undulating basalt plateaus; 1 to 15 percent slopes; 5400 to 6000 feet.
Typical Vegetation and Precipitation (ppt)	White fir forest, or mixed conifer forest of white fir, ponderosa pine, incense- cedar, plus western juniper, greenleaf manzanita, snowberry, mountain mahogany, mulesear, Ross's sedge, few grasses, note- in the northeast corner of the survey area stands of Ponderosa Pine/ Jeffrey Pine are found); 20 to 30 inches ppt.	Western juniper, low sagebrush, big sagebrush, mountain mahogany, forbes, Idaho fescue, Poa spp., bottlebrush, cheatgrass; 20 to 30 inches ppt.	
Surface Layer	2 to 0 inches of ponderosa pine and white fir needles and twigs, over 0 to 9 inches; dark brown loam, granular and blocky structure, soft, pH 6.6 to 6.8.	0 to 2 inches; grayish brown very cobbly clay loam, granular structure, slightly hard, pH 6.4.	1-1/2 to 0 inches of ponderosa pine and white fir needles and twigs, over 0 to 14 inches; brown loam, granular and blocky structure, soft, pH 5.6 to 6.4.
Rooting Depth (in.) to Underlying Material	20 to 40; soft to hard basalt	10 to 20; basalt	40 plus; soft to hard basalt
Erosion Factor (K)	.32	.32	.32
Max. Erosion Hazard	Low to moderate	Moderate	Low
Soil Permeability	Moderately slow	Slow	Moderately slow
Drainage Class	Well drained	Well drained	Well drained
Soil Manageability Class	2e	2ed	1
Soil Manageability Group	II		
Forest Site Class	5 (3-4)	7 (non-commercial)	4 (2-3)
Range Site	Not placed in a range site.	9	Not placed in a range site
Water Runoff Potential	Slow	Moderate	Very Slow
Watershed Sensitivity	7 (Moderate)	4	8
Hydrologic Soil Group	B	D	B
Available Water Capacity (AWC)	Low to Moderate	Very Low to Low	Moderate to High
Upper 20 inches	3.4 inches	1.1 to 2.3 inches	3.4 inches
Susceptibility to Burning Damage	Low to Moderate	Low	Low
Slope Stability Hazard	Low	Low	Low
Allowable Soil Loss	2 tons/acre/year	1 tons/acre/year	3 tons/acre/year
Chance of Seedling Survival	High	Not Rated	High
Rating for Timber Site	Fair (7)	Not Rated	Good
R-Value	30-60	0-30	30-60

147 DEMASTERS-MERLIN-DEMASTERS deep FAMILIES ASSOCIATION (continued)

Soil horizons in
inches, USDA,
Unified, AASHTO

0-9; Loam Unified: ML-CL, CL AASHTO: A-4, A-6	0-2; Very cobbly clay loam Unified: SC, CL AASHTO: A-6	0-14; Loam Unified: ML-CL, CL AASHTO: A-4, A-6
9-31; Loam, gravelly loam Unified: CL AASHTO: A-6	2-12; Gravelly clay Unified: CH AASHTO: A-7	14-37; Gravelly clay loam Unified: CL AASHTO: A-6
31+; Weathered bedrock	12+; Unweathered bedrock	37-60; Extremely cobbly clay loam Unified: SC, CL AASHTO: A-6, A-7

Included Areas:

Included with these soils in mapping and making up about 20 percent of the acreage are the Mascamp, Bearskin, Anatone, Smarts, Cavanaugh and Bertag families and Rock outcrop.

148 DEMASTERS-SMARTS FAMILIES, deep COMPLEX, 1 to 20 percent slopes

Map Unit Components	DeMasters family, deep (60 percent)	Smarts family, deep (25 percent)
Position, Slope, and Elevation	On smooth sloping sideslopes of mountain uplands; 1 to 20 percent slopes; 5500 to 7500 feet.	On ridges and convex areas of sideslopes of mountain uplands; 2 to 20 percent slopes; 5500 to 7500 feet.
Typical Vegetation and Precipitation (ppt)	White fir forest, or mixed conifer forest of white fir, ponderosa pine, incense- cedar, plus snowberry, serviceberry, Phlox spp., Ross's sedge, few grasses; 20 to 30 inches ppt.	White fir forest or mixed conifer forest of white fir, ponderosa pine, incense-cedar, plus few western juniper, few lodgepole pine at higher elevations, snowberry, serviceberry, Ross's sedge, few grasses; 20 to 30 inches ppt.
Surface Layer	1-1/2 to 0 inches of ponderosa pine and white fir needles and twigs, over 0 to 14 inches; brown loam, granular and blocky structure, soft, pH 5.6 to 6.4.	2 to 0 inches of decomposed and undecomposed white fir needles and twigs, over 0 to 18 inches; reddish brown stony loam, granular structure, soft, pH 6.2.
Substratum		32 to 50 inches; pale brown extremely gravelly loam, massive, soft, pH 6.0.
Rooting Depth (in.) to Underlying Material	40 plus; basalt	40 plus; basalt
Erosion Factor (K)	.32	.32
Max. Erosion Hazard	Low to moderate	Low to moderate
Soil Permeability	Moderately slow	Moderately slow
Drainage Class	Well drained	Well drained
Soil Manageability Class	2e	2ep
Group	II	
Forest Site Class	4 (2-3)	4 (2-3)
Range Site	Not placed in a range site.	Not placed in a range site.
Water Runoff Potential	Very Slow	Slow
Watershed Sensitivity	8 (Low)	8
Hydrologic Soil Group	B	B
Available Water Capacity (AWC)	Moderate to High	Moderate
Upper 20 inches	3.4 inches	2.6 inches
Susceptibility to Burning Damage	Low	Low to Moderate
Slope Stability Hazard	Low	Low
Allowable Soil Loss	3 tons/acre/year	3 tons/acre/year
Chance of Seedling Survival	High	Moderate
Rating for Timber Site	Good	Fair (1,8)
R-Value	30-60	30-60
Soil horizons in inches, USDA, Unified, AASHTO	0-14; Loam Unified: ML-CL, CL AASHTO: A-4, A-6 14-37; Gravelly clay loam Unified: CL AASHTO: A-6 37-60; Extremely cobbly clay loam Unified: SC, CL AASHTO: A-6, A-7	0-18; Stony loam Unified: ML-CL, CL AASHTO: A-4 18-50; Extremely gravelly clay loam, extremely gravelly loam Unified: SC AASHTO: A-2-6, A-6 50+; Weathered bedrock
Included Areas:	Included with these soils in mapping and making up about 15 percent of the acreage are the Lamondi, Bertag, Cavanaugh, Mascamp and Anatone families, and moderately deep DeMasters and smarts families and unnamed soils similar to DeMasters family but not Pachic.	

149 DEMASTERS-SMARTS FAMILIES, deep COMPLEX, 20 to 40 percent slopes

Map Unit Components	DeMasters family, deep (45 percent)	Smarts family, deep (40 percent)
Position, Slope, and Elevation	On smooth to concave sideslopes of mountain uplands; 20 to 35 percent slopes; 5500 to 7500 feet.	On ridges and convex areas of sideslopes of mountain uplands; 2 to 20 percent slopes; 5500 to 7500 feet.
Typical Vegetation and Precipitation (ppt)	White fir forest, or mixed conifer forest of white fir, ponderosa pine, incense- cedar, plus snowberry, serviceberry, Phlox spp., Ross's sedge, few grasses; 20 to 30 inches ppt.	White fir forest or mixed conifer forest of white fir, ponderosa pine, incense-cedar, plus few western juniper, few lodgepole pine at higher elevations, snowberry, serviceberry, Ross's sedge, few grasses; 20 to 30 inches ppt.
Surface Layer	1-1/2 to 0 inches of ponderosa pine and white fir needles and twigs, over 0 to 14 inches; dark brown loam, granular and blocky structure, soft, pH 5.6 to 6.4.	2 to 0 inches of decomposed and undecomposed white fir needles and twigs, over 0 to 18 inches; reddish brown stony loam, granular structure, soft, pH 6.2.
Substratum		32 to 50 inches; pale brown extremely gravelly loam, massive, soft, pH 6.0.
Rooting Depth (in.) to Underlying Material	40 plus; basalt	40 plus; basalt
Erosion Factor (K)	.32	.32
Max. Erosion Hazard	Moderate	Low to moderate
Soil Permeability	Moderately slow	Moderately slow
Drainage Class	Well drained	Well drained
Soil Manageability Class	2e	2ep
Group	II	
Forest Site Class	4 (2-3)	4 (2-3)
Range Site	Not placed in a range site.	Not placed in a range site.
Water Runoff Potential	Slow	Slow
Watershed Sensitivity	7 (Moderate)	8
Hydrologic Soil Group	B	B
Available Water Capacity (AWC)	Moderate to High	Moderate
Upper 20 inches	3.4 inches	2.6 inches
Susceptibility to Burning Damage	Low to moderate.	Low to Moderate
Slope Stability Hazard	Low	Low
Allowable Soil Loss	3 tons/acre/year	3 tons/acre/year
Chance of Seedling Survival	High	Moderate
Rating for Timber Site	Good	Fair (1,8)
R-Value	30-60	30-60
Soil horizons in inches, USDA, Unified, AASHTO	0-14; Loam Unified: ML-CL, CL AASHTO: A-4, A-6 14-37; Gravelly clay loam Unified: CL AASHTO: A-6 37-60; Extremely cobbly clay loam Unified: SC, CL AASHTO: A-6, A-7	0-18; Stony loam Unified: ML-CL, CL AASHTO: A-4 18-50; Extremely gravelly clay loam, extremely gravelly loam Unified: SC AASHTO: A-2-6, A-6 50+; Weathered bedrock
Included Areas:	Included with these soils in mapping and making up about 15 percent of the acreage are the Lamondi, Bertag, Cavanaugh, Mascamp and Anatone families, and moderately deep DeMasters and smarts families and unnamed soils similar to DeMasters family but not Pachic.	

150 DEVEN FAMILY, 1 to 10 percent slopes

Map Unit Components	Deven family (80 percent)
Position, Slope, and Elevation	On nearly level to undulating basalt plateaus; 1 to 10 percent slopes; 4600 to 5100 feet.
Typical Vegetation and Precipitation (ppt)	Normally dense western juniper plus big sagebrush, sandberg bluegrass, bottlebrush, Idaho fescue, cheatgrass; 14 to 16 inches ppt.
Surface Layer	0 to 5 inches; grayish brown and brown clay loam and clay, granular and blocky structure, hard to very hard, pH 6.4.
Rooting Depth (in.) to Underlying Material	14 to 20; basalt
Erosion Factor (K)	.43
Max. Erosion Hazard	Moderate
Soil Permeability	Slow
Drainage Class	Well drained
Soil Manageability Class	2ed
Group	II
Forest Site Class	7 (non-commercial)
Range Site	23
Water Runoff Potential	Moderate
Watershed Sensitivity	5 (Moderate)
Hydrologic Soil Group	D
Available Water Capacity (AWC)	Low
Upper 20 inches	1.6 to 2.4 inches
Susceptibility to Burning Damage	Low to Moderate
Slope Stability Hazard	Low
Allowable Soil Loss	1 tons/acre/year
Chance of Seedling Survival	Not Rated
Rating for Timber Site	Not Rated
R-Value	0-30
Soil horizons in inches, USDA, Unified, AASHTO	0-2; Clay loam Unified: CL, MH AASHTO: A-6, A-7
	2-17; Clay, cobbly clay Unified: CH AASHTO: A-7
	17+; Unweathered bedrock
Included Areas:	Included with this soil in mapping and making up about 20 percent of the acreage are the Barnard, Bieber, Keating, Packwood, Roval and Pass Canyon families.

151 DEVEN-BIEBER-BARNARD FAMILIES COMPLEX, 0 to 5 percent slopes

Map Unit Components	Deven family (45 percent)	Bieber family (25 percent)	Barnard family (20 percent)
Position, Slope, and Elevation	On upper areas of gently undulating basalt plateaus; 1 to 5 percent slopes; 4500 to 5500 feet.	On upper areas of gently undulating basalt plateaus; 1 to 5 percent slopes; 4500 to 5500 feet.	On low lying basin areas and drainageways of gently undulating basalt plateaus (subject to spring flooding); 0 to 2 percent slopes; 4500 to 5500 feet.
Typical Vegetation and Precipitation (ppt)	Western juniper, low sagebrush, big sagebrush, Phlox spp., Idaho fescue, sandberg bluegrass, bottlebrush, cheatgrass; 14 to 16 inches ppt.	Western juniper, low sagebrush, big sagebrush, Phlox spp., Idaho fescue, sandberg bluegrass, bottlebrush, cheatgrass; 14 to 16 inches ppt.	
Surface Layer	0 to 2 inches; brown cobbly loam, granular structure, soft, pH 6.3	0 to 4 inches; brown very cobbly loam, blocky and granular structure, hard, pH 6.8.	0 to 8 inches; grayish brown to dark grayish brown cobbly loam to gravelly clay loam, platy and blocky structure, slightly hard, pH 6.5 to 7.0.
Substratum		18 plus inches; strongly cemented silica duripan.	32 plus inches; weakly to strongly cemented silica duripan.
Rooting Depth (in.) to Underlying Material	10 to 20; basalt	10 to 20; silica duripan over basalt	20 to 40; silica duripan over basalt
Erosion Factor (K)	.37	.37	.37
Max. Erosion Hazard	Moderate	Moderate	Moderate
Soil Permeability	Slow	Very Slow	Slow
Drainage Class	Well Drained	Well Drained	Well drained
Soil Manageability Class	2edx	2ed	2e
Group	II		
Forest Site Class	7 (non-commercial)	7 (non-commercial)	7 (non-commercial)
Range Site	8	8	18, 24
Water Runoff Potential	Moderate	Moderate	Very Slow
Watershed Sensitivity	5 (Moderate)	5	6
Hydrologic Soil Group	D	D	C
Available Water Capacity (AWC) Upper 20 inches	Very Low to Low 1.4 to 2.8 inches	Very Low to Low 1.2 to 2.5 inches	Low to Moderate 2.6 inches
Susceptibility to Burning Damage	Low	Low	Low
Slope Stability Hazard	Low	Low	Low
Allowable Soil Loss	1 tons/acre/year	1 tons/acre/year	2 tons/acre/year
Chance of Seedling Survival	Not Rated	Not Rated	Not Rated
Rating for Timber Site	Not Rated	Not Rated	Not Rated
R-Value	0-30	0-30	0-30
Soil horizons in inches, USDA, Unified, AASHTO	0-2; Cobbly loam Unified: ML-CL, CL AASHTO: A-4, A-6 2-7; Clay loam Unified: CL, MH, CH AASHTO: A-6, A-7 7-16; Clay Unified: CH AASHTO: A-7 16+; Unweathered bedrock	0-4; Very cobbly loam Unified: SC, CL AASHTO: A-6 4-18; Clay Unified: CH AASHTO: A-7 18+; Silica duripan	0-3; Cobbly loam Unified: ML-CL, CL AASHTO: A-4, A-6 3-8; Gravelly clay loam Unified: CL, MH AASHTO: A-6, A-7 8-32; Clay, gravelly silty clay Unified: CH AASHTO: A-7 32+; Silica duripan

151 DEVEN-BIEBER-BARNARD FAMILIES COMPLEX (continued)

Included Areas:

Included with these soils in mapping and making up about 10 percent of the acreage are the Keating, Aikman, Packwood, Ruckles, and Puls families, Lithic Xerorthents, mesic, and Rock outcrop.

152 DEVEN-BIEBER-LAWYER FAMILIES ASSOCIATION, 1 to 10 percent slopes

Map Unit Components	Deven family (40 percent)	Bieber family (30 percent)	Lawyer family (20 percent)
Position, Slope, and Elevation	On gently undulating basalt plateaus; 1 to 5 percent slopes; 4600 to 5500 feet.	On gently undulating basalt plateaus; 1 to 5 percent slopes; 4600 to 5500 feet.	On slightly raised 2 to 15 acre islands surrounded by shallow rocky soil; 2 to 10 percent slopes; 4600 to 5500 feet.
Typical Vegetation and Precipitation (ppt)	Few western juniper, low sagebrush, Phlox spp., sandberg bluegrass, Idaho fescue, cheatgrass; 16 to 18 inches ppt.	Few western juniper, low sagebrush, Phlox spp., sandberg bluegrass, Idaho fescue, cheatgrass; 16 to 18 inches ppt.	
Surface Layer	0 to 2 inches; brown cobbly loam, granular structure, soft, pH 6.3.	0 to 4 inches; brown very cobbly loam, blocky and granular structure, hard, pH 6.8.	2 to 0 inches of ponderosa pine needles and twigs, over 0 to 8 inches; dark brown stony loam, granular structure, soft, pH 6.2.
Substratum		18 plus inches; strongly cemented silica duripan.	
Rooting Depth (in.) to Underlying Material	8 to 16; basalt	8 to 20; silica duripan over basalt	20 to 40; basalt
Erosion Factor (K)	.37	.37	.32
Max. Erosion Hazard	Moderate	Moderate	Low
Soil Permeability	Slow	Very slow	Moderately slow
Drainage Class	Well drained	Well drained	Well drained
Soil Manageability Class	2ed	2ed	1
Soil Manageability Group	II		
Forest Site Class	7 (non-commercial)	7 (non-commercial)	6 (4-5)
Range Site	8, 1	8, 1	Not placed in a range site.
Water Runoff Potential	Moderate	Moderate	Very Slow
Watershed Sensitivity	5 (Moderate)	5	8
Hydrologic Soil Group	D	D	B
Available Water Capacity (AWC)	Very Low to Low	Very Low to Low	Low to Moderate
Upper 20 inches	1.1 to 2.1 inches	1.0 to 2.5 inches	2.6 inches
Susceptibility to Burning Damage	Low	Low	Moderate
Slope Stability Hazard	Low	Low	Low
Allowable Soil Loss	1 tons/acre/year	1 tons/acre/year	2 tons/acre/year
Chance of Seedling Survival	Not Rated	Not Rated	Low to Moderate
Rating for Timber Site	Not Rated	Not Rated	Fair (1,3,7,10)
R-Value	0-30	0-30	30-60
Soil horizons in inches, USDA, Unified, AASHTO	0-2; Cobbly loam Unified: ML-CL, CL AASHTO: A-4, A-6 2-7; Clay loam Unified: CL, MH, CH AASHTO: A-6, A-7 7-16; Clay Unified: CH AASHTO: A-7 16+; Unweathered bedrock	0-4; Very cobbly loam Unified: SC, CL AASHTO: A-6 4-18; Clay Unified: CH AASHTO: A-7 18+; Silica duripan	0-8; Stony loam Unified: SM, SM-SC, ML, ML-CL AASHTO: A-4 8-24; Very cobbly clay loam, extremely cobbly clay loam Unified: SC AASHTO: A-6 24+; Weathered bedrock
Included Areas:	Included with these soils in mapping and making up about 10 percent of the acreage are the Pass Canyon, Jacket, Elmore, Fordice, Keating families and Lithic Xerorthents, mesic.		

153 DEVEN-BIEBER-PASS CANYON FAMILIES ASSOCIATION, 1 to 15 percent slopes

Map Unit Components	Deven family (45 percent)	Bieber family (30 percent)	Pass Canyon family (15 percent)
Position, Slope, and Elevation	On sideslopes, ridges and knolls of undulating basalt plateaus; 1 to 15 percent slopes; 4600 to 6000 feet.	On lower sideslopes and basins of undulating basalt plateaus; 1 to 10 percent slopes; 4600 to 6000 feet.	On knolls, ridges and upper sideslopes of undulating basalt plateaus; 2 to 15 percent slopes; 4600 to 6000 feet.
Typical Vegetation and Precipitation (ppt)	Western juniper, low sagebrush, big sagebrush, Eriog. spp., Idaho fescue, sandberg bluegrass, bottlebrush, 14 to 16 inches ppt.	Low sagebrush, Phlox spp., sandberg bluegrass, carex spp., Idaho fescue, bottlebrush, cheatgrass; 14 to 16 inches ppt.	
Surface Layer	0 to 2 inches; brown cobbly loam, granular structure, soft, pH 6.3.	0 to 4 inches; brown very cobbly loam, blocky and granular structure, hard, pH 6.8.	0 to 4 inches; very dark grayish brown to dark brown very cobbly loam and loam, granular and platy structure, slightly hard, pH 6.8 to 6.6.
Substratum		18 plus inches; strongly cemented silica duripan.	
Rooting Depth (in.) to Underlying Material	10 to 20; basalt, soft to hard tuff	8 to 15; silica duripan over basalt, tuff	10 to 20; basalt, soft to hard tuff
Erosion Factor (K)	.37	.37	.32
Max. Erosion Hazard	Moderate	Moderate	Moderate
Soil Permeability	Slow	Very slow	Moderately slow
Drainage Class	Well drained	Well drained	Well drained
Soil Manageability Class Group	2ed II	2ed	2ed
Forest Site Class	7 (non-commercial)	7 (non-commercial)	7 (non-commercial)
Range Site	8	8, 1	8
Water Runoff Potential	Moderate	Moderate	Moderate
Watershed Sensitivity	5 (Moderate)	5	6
Hydrologic Soil Group	D	D	D
Available Water Capacity (AWC) Upper 20 inches	Very Low to Low 1.4 to 2.8 inches	Very Low to Low 1.0 to 1.9 inches	Very Low to Low 1.3 to 2.6 inches
Susceptibility to Burning Damage	Low	Low	Low
Slope Stability Hazard	Low	Low	Low
Allowable Soil Loss	1 tons/acre/year	1 tons/acre/year	1 tons/acre/year
Chance of Seedling Survival	Not Rated	Not Rated	Not Rated
Rating for Timber Site	Not Rated	Not Rated	Not Rated
R-Value	0-30	0-30	30-60
Soil horizons in inches, USDA, Unified, AASHTO	0-2; Cobbly loam Unified: ML-CL, CL AASHTO: A-4, A-6 2-7; Clay loam Unified: CL, MH, CH AASHTO: A-6, A-7 7-16; Clay Unified: CH AASHTO: A-7 16+; Unweathered bedrock	0-4; Very cobbly loam Unified: SC, CL AASHTO: A-6 4-18; Clay Unified: CH AASHTO: A-7 18+; Silica duripan	0-2; Very cobbly loam Unified: SM, SM-SC AASHTO: A-4 2-4; Loam Unified: CL, ML-CL AASHTO: A-4, A-6 4-12; Clay loam, cobbly clay loam Unified: CL, MH AASHTO: A-6, A-7 12+; Unweathered bedrock
Included Areas:	Included with these soils in mapping and making up about 10 percent of the acreage are the Royal, Keating, Aikman, Gwin, Lawyer and Elmore Families and Lithic Xerorthents, mesic.		

154 DEVEN-PASS CANYON FAMILIES COMPLEX, 1 to 10 percent slopes

Map Unit Components	Deven family (45 percent)	Pass Canyon family (35 percent)
Position, Slope, and Elevation	On nearly level to undulating basalt plateaus; 1 to 10 percent slopes; 4400 to 5500 feet.	On nearly level to undulating basalt plateaus; 1 to 10 percent slopes; 4400 to 5500 feet.
Typical Vegetation and Precipitation (ppt)	Western juniper, few ponderosa pine, low sagebrush, big sagebrush, mulesear, bitterbrush, rabbitbrush, sandberg bluegrass, Idaho fescue, bottlebrush; 14 to 18 inches ppt.	Western juniper, few ponderosa pine, low sagebrush, big sagebrush, bitterbrush, rabbitbrush, sandberg bluegrass, Idaho fescue, cheatgrass, 14 to 18 inches ppt.
Surface Layer	0 to 2 inches; brown cobbly loam, granular structure, soft, pH 6.3.	0 to 4 inches; very dark grayish brown to dark brown very cobbly loam, and loam, granular and platy structure, slightly hard, pH 6.6 to 6.8.
Rooting Depth (in.) to Underlying Material	12 to 20; basalt, soft to hard tuff	10 to 20; basalt, soft to hard tuff
Erosion Factor (K)	.37	.32
Max. Erosion Hazard	Moderate	Moderate
Soil Permeability	Slow	Moderately slow
Drainage Class	Well drained	Well drained
Soil Manageability Class	2ed	2ed
Soil Manageability Group	II	
Forest Site Class	7 (non-commercial)	7 (non-commercial)
Range Site	8	8, 4
Water Runoff Potential	Moderate	Moderate
Watershed Sensitivity	5 (Moderate)	6
Hydrologic Soil Group	D	D
Available Water Capacity (AWC)	Low	Very Low to Low
Upper 20 inches	1.7 to 2.8 inches	1.3 to 2.6 inches
Susceptibility to Burning Damage	Low	Low
Slope Stability Hazard	Low	Low
Allowable Soil Loss	1 tons/acre/year	1 tons/acre/year
Chance of Seedling Survival	Not Rated	Not Rated
Rating for Timber Site	Not Rated	Not Rated
R-Value	0-30	30-60
Soil horizons in inches, USDA, Unified, AASHTO	0-2; Cobbly loam Unified: ML-CL, CL AASHTO: A-4, A-6 2-7; Clay loam Unified: CL, MH, CH AASHTO: A-6, A-7 7-16; Clay Unified: CH AASHTO: A-7 16+; Unweathered bedrock	0-2; Very cobbly loam Unified: SM, SM-SC AASHTO: A-4 2-4; Loam Unified: CL, ML-CL AASHTO: A-4, A-6 4-12; Clay loam, cobbly clay loam Unified: CL, MH AASHTO: A-6, A-7 12+; Unweathered bedrock
Included Areas:	Included with these soils in mapping and making up about 20 percent of the acreage are the Bieber, Barnard, Hiibner, Los Gatos, Keating, Aikman, Lawyer and Gwin families and Lithic Xerorthents, mesic.	

155 DEVEN-PASS CANYON-KEATING FAMILIES COMPLEX, 1 to 15 percent slopes

Map Unit Components	Deven family (40 percent)	Pass Canyon family (25 percent)	Keating family (20 percent)
Position, Slope, and Elevation	On sideslopes of mountain uplands; 1 to 15 percent slopes; 4400 to 5800 feet.	On sideslopes, ridges and knolls of mountain uplands; 1 to 15 percent slopes; 4400 to 5800 feet	On lower sideslopes and concave areas of mountain uplands; 1 to 15 percent slopes; 4400 to 5800 feet.
Typical Vegetation and Precipitation (ppt)	Few western juniper, low sagebrush, big sagebrush, rabbitbrush, bitterbrush, Indian Paint brush, mulesear, Idaho fescue, bottlebrush, cheatgrass; 14 to 18 inches ppt.	Few western juniper, low sagebrush, buckwheat, cheatgrass, Idaho fescue; 14 to 18 inches ppt.	
Surface Layer	0 to 2 inches; brown cobbly loam, platy and granular structure, slightly hard, pH 7.0.	0 to 3 inches; grayish brown cobbly loam, granular structure, slightly hard, pH 6.4.	0 to 2 inches dark grayish brown cobbly clay loam, granular structure, hard, pH 6.8.
Substratum	13 to 25 plus inches; weathered in place platy to massive soft to hard volcanic tuff.	14 plus inches; weathered in place platy to massive semi-soft to hard volcanic tuff.	
Rooting Depth (in.) to Underlying Material	10 to 20; soft to hard tuff, basalt	8 to 14; soft to hard tuff, basalt	20 to 40; tuff, basalt
Erosion Factor (K)	.37	.37	.32
Max. Erosion Hazard	Moderate	Moderate	Low to moderate
Soil Permeability	Slow	Moderately slow	Slow
Drainage Class	Well drained	Well drained	Well drained
Soil Manageability Class Group	2ed II	2ed	2e
Forest Site Class	7 (non-commercial)	7 (non-commercial)	7 (non-commercial)
Range Site	8, 23	8, 1	18
Water Runoff Potential	Moderate	Moderate	Slow
Watershed Sensitivity	5 (Moderate)	5	6
Hydrologic Soil Group	D	D	C
Available Water Capacity (AWC) Upper 20 inches	Low 1.5 to 2.9 inches	Very Low to Low 1.2 to 2.1 inches	Low to Moderate 2.7 inches
Susceptibility to Burning Damage	Low	Low	Moderate
Slope Stability Hazard	Low	Low	Low
Allowable Soil Loss	1 tons/acre/year	1 tons/acre/year	2 tons/acre/year
Chance of Seedling Survival	Not Rated	Not Rated	Not Rated
Rating for Timber Site	Not Rated	Not Rated	Not Rated
R-Value	0-30	30-60	0-30
Soil horizons in inches, USDA, Unified, AASHTO	0-2; Cobbly loam Unified: ML-CL, CL AASHTO: A-4, A-6 2-13; Clay loam, clay Unified: CL, CH AASHTO: A-7 13+; Weathered bedrock	0-3; cobbly loam Unified: ML-CL, CL AASHTO: A-4, A-6 3-14; CLay loam Unified: CL, MH AASHTO: A-6, A-7 14+; Weathered bedrock	0-6; Cobbly clay loam, clay loam Unified: CL, MH, CH AASHTO: A-6, A-7 6-32; Clay Unified: CH AASHTO: A-7 32+; Unweathered bedrock
Included Areas:	Included with these soils in mapping and making up about 15 percent of the acreage are the Roval, Bieber, Hiibner, Gwin, Elmore, Lawyer, Fordice and Jacket families and Lithic Xerorthents, mesic.		

156 DEVEN-PASS CANYON-KEATING FAMILIES COMPLEX, 15 to 35 percent slopes

Map Unit Components	Deven family (40 percent)	Pass Canyon family (25 percent)	Keating family (20 percent)
Position, Slope, and Elevation	On sideslopes of mountain uplands; 15 to 35 percent slopes; 4400 to 5800 feet.	On sideslopes, ridges and knolls of mountain uplands; 15 to 35 percent slopes; 4400 to 5800 feet.	On lower sideslopes and concave areas of mountain uplands; 15 to 35 percent slopes; 4400 to 5800 feet.
Typical Vegetation and Precipitation (ppt)	Few western juniper, low sagebrush, big sagebrush, rabbitbrush, bitterbrush, Indian paint brush, mulesear, Idaho fescue, bottlebrush, cheatgrass; 14 to 18 inches ppt.	Few western juniper, low sagebrush, buckwheat, cheatgrass, Idaho fescue; 14 to 18 inches ppt.	
Surface Layer	0 to 2 inches; brown cobbly loam, platy and granular structure, slightly hard, pH 7.0.	0 to 3 inches; grayish brown cobbly loam, granular structure, slightly hard, pH 6.4.	0 to 2 inches; dark grayish brown cobbly clay loam, granular structure, hard, pH 6.8.
Substratum	13 to 25 plus inches; weathered in place platy to massive soft to hard volcanic tuff.	14 plus inches; weathered in place platy to massive semi-soft to hard volcanic tuff.	
Rooting Depth (in.) to Underlying Material	10 to 20; soft to hard tuff, basalt	8 to 14; soft to hard tuff, basalt	20 to 40; tuff, basalt
Erosion Factor (K)	.37	.37	.32
Max. Erosion Hazard	Moderate to high	Moderate to high	Moderate
Soil Permeability	Slow	Moderately slow	Slow
Drainage Class	Well drained	Well drained	Well drained
Soil Manageability Class Group	3Ed III	3Ed	2s
Forest Site Class	7 (non-commercial)	7 (non-commercial)	7 (non-commercial)
Range Site	8, 23	8, 1	18
Water Runoff Potential	Rapid	Rapid	Moderate
Watershed Sensitivity	3 (High)	4	5
Hydrologic Soil Group	D	D	C
Available Water Capacity (AWC) Upper 20 inches	Low 1.5 to 2.9 inches	Very Low to Low 1.2 to 2.1 inches	Low to Moderate 2.7 inches
Susceptibility to Burning Damage	Moderate	Moderate	Moderate
Slope Stability Hazard	Low to Moderate	Low	Low to Moderate
Allowable Soil Loss	1 tons/acre/year	1 tons/acre/year	2 tons/acre/year
Chance of Seedling Survival	Not Rated	Not Rated	Not Rated
Rating for Timber Site	Not Rated	Not Rated	Not Rated
R-Value	0-30	30-60	0-30
Soil horizons in inches, USDA, Unified, AASHTO	0-2; Cobbly Loam Unified: ML-CL, CL AASHTO: A-4, A-6 2-13; Clay loam, clay Unified: CL, CH AASHTO: A-7 13+; Weathered bedrock	0-3; cobbly loam Unified: ML-CL, CL AASHTO: A-4, A-6 3-14; Clay loam Unified: CL, MH AASHTO: A-6, A-7 14+; Weathered bedrock	0-6; Cobbly clay loam, clay loam Unified: CL, MH, CH AASHTO: A-6, A-7 6-32; Clay Unified: CH AASHTO: A-7 32+; Unweathered bedrock
Included Areas:	Included with these soils in mapping and making up about 15 percent of the acreage are the Roval, Bieber, Hiibner, Gwin, Elmore, Lawyer, Fordice and Jacket families and Lithic Xerorthents, mesic.		

157 DEVEN-PASS CANYON-KEATING FAMILIES COMPLEX, 35 to 60 percent slopes

Map Unit Components	Deven family (35 percent)	Pass Canyon family (25 percent)	Keating family (20 percent)
Position, Slope, and Elevation	On sideslopes of mountain uplands; 35 to 60 percent slopes; 4400 to 5800 feet.	On sideslopes, ridges and knolls of mountain uplands; 35 to 60 percent slopes; 4400 to 5800 feet.	On lower sideslopes and concave areas of mountain uplands; 35 to 60 percent slopes; 4400 to 5800 feet.
Typical Vegetation and Precipitation (ppt)	Few western juniper, low sagebrush, big sagebrush, rabbitbrush, bitterbrush, Indian Paint brush, mulesear, Idaho fescue, bottlebrush, cheatgrass; 14 to 18 inches ppt.	Few western juniper, low sagebrush, buckwheat, cheatgrass, Idaho fescue; 14 to 18 inches ppt.	
Surface Layer	0 to 2 inches; brown cobbly loam, platy and granular structure, slightly hard, pH 7.0.	0 to 3 inches; grayish brown cobbly loam, granular structure, slightly hard, pH 6.4.	0 to 2 inches; dark grayish brown cobbly clay loam, granular structure, hard, pH 6.8.
Substratum	13 to 25 plus inches; weathered in place platy to massive soft to hard volcanic tuff.	14 plus inches; weathered in place platy to massive semi-soft to hard volcanic tuff.	
Rooting Depth (in.) to Underlying Material	10 to 20; soft to hard tuff, basalt	8 to 14; soft to hard tuff, basalt	20 to 40; tuff, basalt
Erosion Factor (K)	.37	.37	.32
Max. Erosion Hazard	High to very high	High to very high	High
Soil Permeability	Slow	Moderately slow	Slow
Drainage Class	Well drained	Well drained	Well drained
Soil Manageability Class Group	3Sd III	3Ed	3S
Forest Site Class	7 (non-commercial)	7 (non-commercial)	7 (non-commercial)
Range Site	8, 23	8, 1	18
Water Runoff Potential	Very Rapid	Very Rapid	Rapid
Watershed Sensitivity	2 (High)	2	4
Hydrologic Soil Group	D	D	C
Available Water Capacity (AWC) Upper 20 inches	Low 1.5 to 2.9 inches	Very Low to Low 1.2 to 2.1 inches	Low to Moderate 2.7 inches
Susceptibility to Burning Damage	Moderate	Moderate	High
Slope Stability Hazard	High	Low	High
Allowable Soil Loss	1 tons/acre/year	1 tons/acre/year	2 tons/acre/year
Chance of Seedling Survival	Not Rated	Not Rated	Not Rated
Rating for Timber Site R-Value	Not Rated 0-30	Not Rated 30-60	Not Rated 0-30
Soil horizons in inches, USDA, Unified, AASHTO	0-2; Cobbly Loam Unified: ML-CL, CL AASHTO: A-4, A-6 2-13; Clay loam, clay Unified: CL, CH AASHTO: A-7 13+; Weathered bedrock	0-3; Cobbly loam Unified: ML-CL, CL AASHTO: A-4, A-6 3-14; Clay loam Unified: CL, MH AASHTO: A-6, A-7 14+; Weathered Bedrock	0-6; Cobbly clay loam, clay loam Unified: CL, MH, CH AASHTO: A-6, A-7 6-32; Clay Unified: CH AASHTO: A-7 32+; Unweathered bedrock
Included Areas:	Included with these soils in mapping and making up about 20 percent of the acreage are the Roval, Bieber, Hiibner, Gwin, Elmore, Lawyer, Fordice and Jacket families and Lithic Xerorthents, mesic.		

158 DEVEN-PULS FAMILIES ASSOCIATION, 1 to 15 percent slopes

Map Unit Components	Deven family (50 percent)	Puls family (35 percent)
Position, Slope, and Elevation	On upper sideslopes and knolls of undulating basalt plateaus and mountain uplands; 2 to 15 percent slopes; 4500 to 5700 feet.	On lower sideslopes and slightly concave drainageways of undulating basalt plateaus and mountain uplands; 1 to 10 percent slopes; 4500 to 5700 feet.
Typical Vegetation and Precipitation (ppt)	Western juniper, low sagebrush, Phlox spp., Idaho fescue, bottlebrush, sandberg bluegrass, cheatgrass; 14 to 16 inches ppt.	Low sagebrush, black sagebrush, sedges, sandberg bluegrass, cheatgrass; 14 to 16 inches ppt.
Surface Layer	0 to 2 inches; brown cobbly loam, granular structure, soft, pH 6.3.	0 to 5 inches; pinkish gray very stony clay loam, granular structure, slightly hard, pH 6.3.
Substratum		19 to 28 inches; indurated silica cemented duripan.
Rooting Depth (in.) to Underlying Material	10 to 20; basalt	5 to 10; dense very hard clay over silica duripan below 10 to 20 inches
Erosion Factor (K)	.37	.37
Max. Erosion Hazard	Moderate	Moderate
Soil Permeability	Slow	Very slow
Drainage Class	Well drained	Well drained
Soil Manageability Class	2ed	3eDx
Group	II	
Forest Site Class	7 (non-commercial)	7 (non-commercial)
Range Site	8	1
Water Runoff Potential	Moderate	Moderate
Watershed Sensitivity	5 (Moderate)	5
Hydrologic Soil Group	D	D
Available Water Capacity (AWC)	Very Low to Low	Very Low to Low
Upper 20 inches	1.4 to 2.8 inches	1.1 to 2.7 inches
Susceptibility to Burning Damage	Low	Low
Slope Stability Hazard	Low	Low
Allowable Soil Loss	1 tons/acre/year	1 tons/acre/year
Chance of Seedling Survival	Not Rated	Not Rated
Rating for Timber Site	Not Rated	Not Rated
R-Value	0-30	0-30
Soil horizons in inches, USDA, Unified, AASHTO	0-2; Cobbly loam Unified: ML-CL, CL AASHTO: A-4, A-6 2-7; Clay loam Unified: CL, MH, CH AASHTO: A-6, A-7 7-16; Clay Unified: CH AASHTO: A-7 16+; Unweathered bedrock	0-5; Very stony clay loam Unified: ML, CL AASHTO: A-6, A-7 5-19; Clay Unified: CL, CH AASHTO: A-7 19-28; Silica duripan 28+; Unweathered bedrock
Included Areas:	Included with these soils in mapping and making up about 15 percent of the acreage are the Bieber, Royal, Barnard, Castlevale families, Lithic Xerorthents, mesic, Rock outcrop and unnamed soils similar to the Bieber family but with an abrupt textural change.	

159 DEVEN FAMILY-ROCK OUTCROP ASSOCIATION, 1 to 20 percent slopes

Map Unit Components	Deven family (65 percent)	Rock outcrop (15 percent)
Position, Slope, and Elevation	On basalt plateaus; 1 to 20 percent slopes; 4500 to 6000 feet.	On upper slopes and knolls of basalt plateaus; 5 to 20 percent slopes; 4500 to 6000 feet.
Typical Vegetation and Precipitation (ppt)	Few western juniper, low sagebrush, cheatgrass, Idaho fescue, oatgrass, Carex spp. other grasses; 14 to 18 inches ppt.	Barren; 14 to 18 inches ppt.
Surface Layer	0 to 2 inches; brown cobbly loam, granular structure, soft, pH 6.3.	NOT APPLICABLE: Basalt or andesite bedrock with minor accumulations of Aeolian soil deposition in some fractures.
Rooting Depth (in.) to Underlying Material	8 to 16 inches; hard fractured basalt	
Erosion Factor (K)	.37	
Max. Erosion Hazard	Moderate	
Soil Permeability	Slow	
Drainage Class	Well Drained	
Soil Manageability Class	2edx	
Group	II	
Forest Site Class	7 (non-commercial)	
Range Site	8, 1	
Water Runoff Potential	Moderate	Rapid
Watershed Sensitivity	5 (High)	2
Hydrologic Soil Group	D	
Available Water Capacity (AWC) Upper 20 inches	Very Low to Low 1.0 to 2.1 inches	
Susceptibility to Burning Damage	Low	
Slope Stability Hazard	Low	
Allowable Soil Loss	1 tons/acre/year	
Chance of Seedling Survival	Not Rated	
Rating for Timber Site	Not Rated	
R-Value	0-30	
Soil horizons in inches, USDA, Unified, AASHTO	0-2; Cobbly loam Unified: ML-CL, CL AASHTO: A-4, A-6 2-7; Clay loam Unified: CL, MH, CH AASHTO: A-6, A-7 7-16; Clay Unified: CH AASHTO: A-7 16+; Unweathered bedrock	
Included Areas:	Included with this unit in mapping and making up about 20 percent of the acreage are the Pass Canyon, Roval, Bieber, Aikman and Keating families and Lithic Xerorthents, mesic.	

**161 DIVERS-LAPINE-KINZEL FAMILIES ASSOCIATION, 2 to 15 inch pumice overburden,
2 to 30 percent slopes**

Map Unit Components	Divers family, pumice overburden phase (40 percent)	Lapine family, pumice overburden phase (25 percent)	Kinzel family (20 percent)
Position, Slope, and Elevation	On upper sideslopes, ridges and knolls of volcanic mountain uplands; 10 to 30 percent slopes; 6600 to 7500 feet.	On lower sideslopes and toeslopes of volcanic mountain uplands; 2 to 30 percent slopes; 6600 to 7500 feet.	On undulating hummocky lower areas of the unit; 2 to 25 percent slopes; 6600 to 7500 feet.
Typical Vegetation and Precipitation (ppt)	Red fir forest, or mixed conifer forest of red fir, lodgepole pine, western white pine, mountain hemlock, plus prostrate manzanita, mint.; 40 to 45 inches ppt.	Red fir forest, or mixed conifer forest of red fir, lodgepole pine, western white pine, mountain hemlock, plus prostrate manzanita, mint.; 40 to 45 inches ppt.	
Surface Layer	15 inches of pumice overburden consisting of light brownish gray gravelly sandy loam grading to a white very gravelly sand texture (Thickness ranges from 2 to 15 inches) OVER 15 to 26 inches; brown very gravelly loamy sand to extremely cobbly sandy loam, platy and granular structure, soft, pH 5.2.	1 to 0 inches; red fir needles and twigs, over 23 inches of pumice overburden consisting of grayish brown very gravelly coarse sand to a pale brown extremely gravelly coarse sand; (Thickness in this unit ranges from 2 to 15 inches.) OVER 23 to 26 inches; yellowish brown very gravelly sandy loam, granular structure, loose, pH 6.0.	A thin pumice overburden up to 10 inches thick is present in some pedons, OVER 0 to 10 inches; dark grayish brown gravelly loamy sand to very cobbly sandy loam, single grain and subangular blocky structure, loose and soft, pH 5.5 to 6.0.
Substratum		26 to 60 inches; brownish yellow extremely stony sandy loam, extremely gravelly sandy loam and extremely gravelly loamy coarse sand, massive and single grained, soft to loose pH 6.2 to 6.6.	30 to 41 plus inches; light yellowish gray weakly cemented volcanic ash that rubs to a sandy loam texture, massive, very hard.
Rooting Depth (in.) to Underlying Material	30 plus; basalt andesite	40 plus; cinders, basalt	20 to 40 volcanic ash, basalt, andesite
Erosion Factor (K)	.17	.20	.17
Max. Erosion Hazard	Moderate	Low to moderate	Moderate
Soil Permeability	Rapid in the overburden, and moderately rapid below	Rapid	Moderately rapid
Drainage Class	Somewhat excessively drained	Somewhat excessively drained	Well drained
Soil Manageability Class Group	2ep II	2ep	2ep
Forest Site Class	5 (3-4)	5 (3-4)	6 (4-5)
Range Site	Not placed in a range site.	Not placed in a range site.	Not placed in a range site.
Water Runoff Potential	Very Slow	Very Slow	Slow
Watershed Sensitivity	8 (Low)	8	7
Hydrologic Soil Group	A	A	C
Available Water Capacity (AWC) Upper 20 inches	Moderate 2.6 inches	Moderate to High 2.5 inches	Low to Moderate 2.2 inches
Susceptibility to Burning Damage	Moderate	Moderate	Moderate
Slope Stability Hazard	Low	Low	Low
Allowable Soil Loss	3 tons/acre/year	3 tons/acre/year	2 tons/acre/year

161 DIVERS-LAPINE-KINZEL FAMILIES ASSOCIATION (continued)

Chance of Seedling Survival	Moderate to High	Moderate to High	Moderate
Rating for Timber Site	Fair (1, 3, 5)	Fair (5)	Fair (1, 7)
R-Value	60+	60+	60+
Soil horizons in inches, USDA, Unified, AASHTO	0-4; Gravelly sandy loam Unified: SM AASHTO: A-1-b 4-15; Very gravelly sand Unified: SW-SM, SM AASHTO: A-1-a, A-1-b 15-60; Gravelly loamy sand, extremely cobbly sandy loam Unified: SM AASHTO: A-1-b	0-2; Very gravelly coarse sand Unified: SW-SM AASHTO: A-1-a 2-23; extremely gravelly coarse sand Unified: GP AASHTO: A-1-a 23-50; Very gravelly sandy loam, extremely stony sandy loam, extremely gravelly sandy loam Unified: SW-SM, SM AASHTO: A-1-a, A-1-b 50-60; Extremely gravelly loamy coarse sand Unified: GP, GW-GM AASHTO: A-1-a	0-6; Gravelly loamy sand Unified: SM AASHTO: A-1-b 6-30; Very cobbly sandy loam, extremely tony sandy loam Unified: SM, SM-SC AASHTO: A-2-4 30+; Weathered bedrock

Included Areas:

Included with these soils in mapping and making up about 15 percent of the acreage are the Wuksi and Ahart families, and Rock outcrop.

162 DIVERS-LAPINE-KINZEL FAMILIES ASSOCIATION, 30 to 55 percent slopes

Map Unit Components	Divers family (40 percent)	Lapine family (25 percent)	Kinzel family (20 percent)
Position, Slope, and Elevation	On sideslopes, ridges and knolls of volcanic mountain uplands; 30 to 55 percent slopes; 6700 to 7600 feet.	On sideslopes of volcanic mountain uplands; 30 to 50 percent slopes; 6700 to 7600 feet.	On lower sideslopes and depressions of volcanic mountain uplands; 30 to 40 percent slopes; 6700 to 7500 feet.
Typical Vegetation and Precipitation (ppt)	Red fir forest, or mixed conifer forest of red fir, ponderosa pine, western white pine, mountain hemlock, plus prostrate manzanita, current spp., snowberry, few grasses; 40 to 45 inches ppt.	Red fir forest, or mixed conifer forest of red fir, lodgepole pine, western white pine, mountain hemlock, plus prostrate manzanita, current spp., rabbitbrush, grasses; 40 to 45 inches ppt.	
Surface Layer	A thin pumice overburden up to 6 inches thick is present in some pedons OVER 0 to 11 inches; brown very gravelly loamy coarse sand and extremely cobbly sandy loam, platy and granular structure, loose to soft, pH 5.2.	A thin pumice overburden up to 6 inches thick may be present in some pedons, OVER 0 to 14 inches; brown to pale brown gravelly to very gravelly sandy loam, granular structure, soft, pH 6.0 to 7.0.	A thin pumice overburden up to 6 inches thick may be present in some pedons, OVER 0 to 10 inches; dark grayish brown gravelly loamy sand to very cobbly sandy loam; single grain and subangular blocky structure, loose and soft, pH 5.5 to 6.0.
Substratum		14 to 60 inches; pale brown to strong brown very gravelly sandy loam and extremely gravelly loamy sand to weathered gravel size cinders, massive, slightly hard, pH 7.0 to 6.0.	30 to 41 plus inches; light yellowish gray weakly cemented volcanic ash that rubs to a sandy loam texture, massive, very hard.
Rooting Depth (in.) to Underlying Material	30 plus; basalt, andesite	40 plus; cinders, basalt	20 to 40; volcanic ash, basalt, andesite
Erosion Factor (K)	.17	.20	.17
Max. Erosion Hazard	Moderate to high	Moderate to high	Moderate to high
Soil Permeability	Moderate rapid	Rapid	Moderately rapid
Drainage Class	Somewhat excessively drained	Somewhat excessively drained	Well drained
Soil Manageability Class Group	3Ep III	3Ep	3Ep
Forest Site Class	5 (3-4)	5 (3-4)	6 (4-5)
Range Site	Not placed in a range site.	Not placed in a range site.	Not placed in a range site.
Water Runoff Potential	Moderate	Moderate	Moderate
Watershed Sensitivity	7 (Moderate)	7	6
Hydrologic Soil Group	A	A	C
Available Water Capacity (AWC) Upper 20 inches	Moderate 2.1 inches	Moderate to High 3.0 inches	Low to Moderate 2.2 inches
Susceptibility to Burning Damage	High	High	High
Slope Stability Hazard	Low	Low	Low
Allowable Soil Loss	3 tons/acre/year	3 tons/acre/year	2 tons/acre/year
Chance of Seedling Survival	Moderate	High	Moderate
Rating for Timber Site	Fair (1,3,8)	Fair (8)	Fair (3,7)
R-Value	60+	60+	60+

162 DIVERS-LAPINE-KINZEL FAMILIES ASSOCIATION (continued)

Soil horizons in
inches, USDA,
Unified, AASHTO

0-3; Very gravelly loamy coarse sand Unified: SM AASHTO: A-1-a, A-1-b	0-8; Gravelly sandy loam Unified: SM AASHTO: A-1-b	0-6; Gravelly loamy sand Unified: SM AASHTO: A-1-b
3-60; Extremely cobbly sandy loam Unified: SM AASHTO: A-1-b	8-22; Very gravelly sandy loam Unified: SW-SM, SM AASHTO: A-1-a, A-1-b	6-30; Very cobbly sandy loam, extremely stony sandy loam Unified: SM, SM-SC AASHTO: A-2-4
	22-60; Extremely gravelly loamy sand Unified: GP, GW-GM AASHTO: A-1-a	30+; Weathered bedrock

Included Areas:

Included with these soils in mapping and making up about 15 percent of the acreage is the Ahart family, and Rock outcrop and unnamed medial over cindery, frigid Xerumberpts.

**163 DIVERS-LAPINE FAMILIES-ROCK OUTCROP ASSOCIATION, 5 to 15 inch pumice overburden,
30 to 60 percent slopes**

Map Unit Components	Divers family, pumice overburden phase (40 percent)	Lapine family, pumice overburden phase (30 percent)	Rock outcrop (15 percent)
Position, Slope, and Elevation	On sideslopes of volcanic mountain uplands; 30 to 60 percent slopes; 6700 to 7600 feet.	On lower sideslopes of volcanic mountain uplands; 30 to 45 percent slopes; 6700 to 7600 feet.	On ridge tops and sideslopes of mountain uplands; 35 to 60 percent slopes; 6700 to 7600 feet.
Typical Vegetation and Precipitation (ppt)	Red fir forest, or mixed conifer forest of red fir, white fir, western white pine, mountain hemlock, plus greenleaf manzanita, snowbrush, mint; 40 to 45 inches ppt.	Red fir forest, or mixed conifer forest of red fir, white fir, western white pine, mountain hemlock plus greenleaf manzanita, snowbrush, mint; 40 to 45 inches ppt.	
Surface Layer	15 inches of pumice overburden consisting of light brownish gray gravelly sandy loam grading to a white very gravelly sand texture (Thickness ranges from 5 to 15 inches) OVER 15 to 26 inches; brown very gravelly loamy sand to extremely cobbly sandy loam, platy and granular structure, soft, pH 5.2.	1 to 0 inches; red fir needles and twigs, over 23 inches of pumice overburden consisting of grayish brown very gravelly coarse sand to a pale brown extremely gravelly coarse sand; (Thickness in this unit ranges from 5 to 15 inches.) OVER 23 to 26 inches; yellowish brown very gravelly sandy loam, granular structure, loose, pH 6.0.	NOT APPLICABLE; Basalt or andesite bedrock with minor accumulations of aeolian soil deposition in some fractures.
Rooting Depth (in.) to Underlying Material	30 plus; basalt, andesite	30 plus; cinders	
Erosion Factor (K)	.17	.20	
Max. Erosion Hazard	Moderate to high	Moderate to high	
Soil Permeability	Rapid in the overburden and moderately rapid below	Rapid	
Drainage Class	Somewhat excessively drained	Somewhat excessively drained	
Soil Manageability Class Group	3Ep III	3Ep	
Forest Site Class	5 (3-4)	5-6 (3-5)	
Range Site	Not placed in a range site.	Not placed in a range site.	
Water Runoff Potential	Moderate	Slow	Very Rapid
Watershed Sensitivity	7 (Moderate)	7	0
Hydrologic Soil Group	A	A	
Available Water Capacity (AWC) Upper 20 inches	Moderate 2.6 inches	Moderate to high 2.5 inches	
Susceptibility to Burning Damage	High	High	
Slope Stability Hazard	Low	Low	
Allowable Soil Loss	3 tons/acre/year	3 tons/acre/year	
Chance of Seedling Survival	Moderate to high	Moderate to high	
Rating for Timber Site R-Value	Fair (1, 5, 7, 8) 60+	Fair (5, 8) 60+	

163 DIVERS-LAPINE FAMILIES-ROCK OUTCROP ASSOCIATION

Soil horizons in
inches, USDA,
Unified, AASHTO

- | | |
|--|--|
| <p>0-4; Gravelly sandy loam
Unified: SM
AASHTO: A-1-b</p> <p>4-15; Very gravelly sand
Unified: SW-SM, SM
AASHTO: A-1-a, A-1-b</p> <p>15-60; Gravelly loamy sand,
extremely cobbly
sandy loam
Unified: SM
AASHTO: A-1-b</p> | <p>0-2; Very gravelly coarse sand
Unified: SW-SM
AASHTO: A-1-a</p> <p>2-23; Extremely gravelly
coarse sand
Unified: GP
AASHTO: A-1-a</p> <p>23-50; Very gravelly sandy
loam, extremely stony sandy
loam, extremely gravelly
sandy loam
Unified: SW-SM, SM
AASHTO: A-1-a, A-1-b</p> <p>50-60; Extremely gravelly
loamy coarse sand
Unified: GP, GW-GM
AASHTO: A-1-a</p> |
|--|--|

Included Areas:

Included with this unit in mapping and making up about 15 percent of the acreage are Lithic Cryorthents, Kinzel family, Rubble land and unnamed Xerumbrepts, medial, frigid.

164 ELMORE deep FAMILY, 1 to 15 percent slopes.

Map Unit Components	Elmore family, deep (75 percent)
Position, Slope, and Elevation	On undulating basalt plateaus and alluvial fans and lower sideslopes of mountain uplands; 1 to 15 percent slopes; 4300 to 6000 feet.
Typical Vegetation and Precipitation (ppt)	Ponderosa pine, Jeffrey pine, few incense-cedar and white fir, (few black oak in south central portion of survey area), big sagebrush, bitterbrush, greenleaf manzanita, squaw carpet, mulesear, lupine, Ross's sedge, grasses; 16 to 25 inches ppt.
Surface Layer	2 to 0 inches; of decomposed and undecomposed ponderosa pine needles and twigs, over 0 to 13 inches; dark brown and reddish brown loam, granular structure, very friable, pH 6.4 to 6.6.
Rooting Depth (in.) to Underlying Material	40 plus; soft to hard basalt
Erosion Factor (K)	.37
Max. Erosion Hazard	Low
Soil Permeability	Moderately slow
Drainage Class	Well drained
Soil Manageability Class	1
Group	IA
Forest Site Class	5 (2-3)
Range Site	Not placed in a range site.
Water Runoff Potential	Slow
Watershed Sensitivity	8 (Low)
Hydrologic Soil Group	B
Available Water Capacity (AWC)	High
Upper 20 inches	3.4 inches
Susceptibility to Burning Damage	Low
Slope Stability Hazard	Low
Allowable Soil Loss	3 tons/acre/year
Chance of Seedling Survival	Moderate to High
Rating for Timber Site	Good (10)
R-Value	30-60
Soil horizons in inches, USDA, Unified, AASHTO	0-13; Loam Unified: ML-CL, CL AASHTO: A-4, A-6 13-48; Gravelly loam, gravelly clay loam Unified: CL, MH AASHTO: A-6, A-7 48+; Weathered bedrock
Included Areas:	Included with this soil in mapping and making up about 25 percent of the acreage are the Lawyer, Elmore, moderately deep, Jacket, Fordice, Gwin, Germany and Pass Canyon families, rock outcrop, and unnamed soils similar to the Elmore family but not Pachic.

165 ELMORE deep FAMILY, 15 to 40 percent slopes.

Map Unit Components	Elmore family, deep (70 percent)
Position, Slope, and Elevation	On smooth middle to lower sideslopes of mountain uplands; 15 to 40 percent slopes; 4600 to 5800 feet.
Typical Vegetation and Precipitation (ppt)	Ponderosa pine, Jeffrey pine, few incense-cedar, white fir and black oak, big sagebrush, bitterbrush, ceonothus, snowberry, greenleaf manzanita, mulesear, lupine, Ross's sedge, grasses; 16 to 25 inches ppt.
Surface Layer	2 to 0 inches; decomposed and undecomposed ponderosa pine needles and twigs, over 0 to 13 inches; dark brown and reddish brown loam, granular structure, very friable, pH 6.4 to 6.6.
Rooting Depth (in.) to Underlying Material	40 plus; basalt andesite
Erosion Factor (K)	.37
Max. Erosion Hazard	Moderate
Soil Permeability	Moderately slow
Drainage Class	Well drained
Soil Manageability Class	2e
Group	II
Forest Site Class	5 (2-3)
Range Site	Not placed in a range site.
Water Runoff Potential	Moderate
Watershed Sensitivity	7 (Moderate)
Hydrologic Soil Group	B
Available Water Capacity (AWC)	High
Upper 20 inches	3.4 inches
Susceptibility to Burning Damage	Low to Moderate
Slope Stability Hazard	Low
Allowable Soil Loss	3 tons/acre/year
Chance of Seedling Survival	Moderate to High
Rating for Timber Site	Good (10)
R-Value	30-60
Soil horizons in inches, USDA, Unified, AASHTO	0-13; Loam Unified: ML-CL, CL AASHTO: A-4, A-6 13-48; Gravelly loam, gravelly clay loam Unified: CL, MH AASHTO: A-6, A-7 48+; Weathered bedrock
Included Areas:	Included with this soil in mapping and making up about 30 percent of the acreage are the Lawyer, Elmore, moderately deep, Jacket, Fordice, Gwin and Pass Canyon families, Rock outcrop, and unnamed soils similar to the Elmore family but not Peachic.

166 ELMORE-DEVEN-ELMORE deep FAMILIES ASSOCIATION, 1 to 20 percent slopes

Map Unit Components	Elmore family (35 percent)	Deven family (30 percent)	Elmore family, deep (15 percent)
Position, Slope, and Elevation	On sideslopes of undulating basalt plateaus; 1 to 20 percent slopes; 4700 to 5400 feet.	On knolls, ridges and nearly level areas of basalt plateaus; 1 to 20 percent slopes; 4700 to 5400 feet.	On gentle concave areas and alluvial draws of undulating basalt plateaus; 1 to 15 percent slopes; 4700 to 5400 feet.
Typical Vegetation and Precipitation (ppt)	Ponderosa pine, western juniper, mountain mahogany, big sagebrush, bitterbrush, squaw carpet, western yarrow, Ross's sedge, grasses; 16 to 20 inches ppt.	Western juniper, low sagebrush, big sagebrush, mountain mahogany, Phlox spp., Idaho fescue, bottlebrush, sandberg gluegrass, thrubers needlesgrass; 16 to 20 inches ppt.	
Surface Layer	1 to 0 inches of ponderosa pine needles and twigs, over 0 to 8 inches; brown loam, platy and granular structure, slightly hard, pH 6.0.	0 to 2 inches; brown cobbly loam, granular structure, soft, pH 6.3.	2 to 0 inches; decomposed and undecomposed P. pine needles and twigs, over 0 to 13 inches; dark brown and reddish brown loam, granular structure, very friable, pH 6.4 to 6.6.
Rooting Depth (in.) to Underlying Material	20 to 40; soft to hard basalt	10 to 20; soft to hard basalt	40 plus; soft to hard basalt
Erosion Factor (K)	.37	.37	.37
Max. Erosion Hazard	Low to moderate	Moderate	Low
Soil Permeability	Moderately slow	Slow	Moderately slow
Drainage Class	Well drained	Well drained	Well drained
Soil Manageability Class Group	2e II	2ed	1
Forest Site Class	5-6 (3-5)	7 (non-commercial)	5 (2-4)
Range Site	Not placed in a range site.	8	Not placed in a range site.
Water Runoff Potential	Slow	Moderate	Very Slow
Watershed Sensitivity	8 (Moderate)	5	8
Hydrologic Soil Group	B	D	B
Available Water Capacity (AWC) Upper 20 inches	Low to Moderate 3.2 inches	Very Low to Low 1.4 to 2.8 inches	High 3.4 inches
Susceptibility to Burning Damage	Low to Moderate	Low	Low
Slope Stability Hazard	Low	Low	Low
Allowable Soil Loss	2 tons/acre/year	1 tons/acre/year	3 tons/acre/year
Chance of Seedling Survival	Moderate	Not Rated	Moderate to High
Rating for Timber Site	Fair (7,10)	Not Rated	Good (10)
R-Value	30-60	0-30	30-60
Soil horizons in inches, USDA, Unified, AASHTO	0-8; Loam Unified: ML-CL, CL AASHTO: A-4, A-6 8-27; Clay loam, gravelly clay loam Unified: CL, MH AASHTO: A-6, A-7 27+; Unweathered bedrock	0-2; Cobbly loam Unified: ML-CL, CL AASHTO: A-4, A-6 2-7; Clay loam Unified: CL, MH, CH AASHTO: A-6, A-7 7-16; Clay Unified: CH AASHTO: A-7 16+; Unweathered bedrock	0-13; Loam Unified: ML-CL, CL AASHTO: A-4, A-6 13-48; Gravelly loam, gravelly clay loam Unified: CL, MH AASHTO: A-6, A-7 48+; Weathered bedrock

Included Areas:

Included with these soils in mapping and making up about 20 percent of the acreage are the Pass Canyon, Bieber, Roval, Lawyer, Jacket and Keating families.

167 ELMORE-JACKET, deep-LAWYER FAMILIES ASSOCIATION, 1 to 20 percent slopes

Map Unit Components	Elmore family, deep (45 percent)	Jacket family, deep (30 percent)	Lawyer family (15 percent)
Position, Slope, and Elevation	On sideslopes and toeslopes of mountain uplands; 1 to 15 percent slopes; 4400 to 5800 feet.	On sideslopes and in drainages of mountain uplands; 1 to 20 percent slopes; 4400 to 5800 feet.	On upper sideslopes and convex areas of mountain uplands; 5 to 20 percent slopes; 4400 to 5800 feet.
Typical Vegetation and Precipitation (ppt)	Ponderosa pine, incense-cedar, black oak, manzanita, squaw carpet, bitterbrush, Ross's sedge, few grasses; 16 to 25 inches ppt.	Ponderosa pine, incense-cedar, black oak, squaw carpet, manzanita, forbes, Ross's sedge, few grasses; 16 to 25 inches ppt.	
Surface Layer	2 to 0 inches; decomposed and undecomposed ponderosa pine needles and twigs, over 0 to 13 inches; dark brown and reddish brown loam, granular structure, very friable, pH 6.4 to 6.6.	2 to 0 inches of ponderosa pine needles and twigs, over 0 to 9 inches; dark brown and reddish brown loam, granular and blocky structure, slightly hard, pH 6.2 to 6.4.	2 to 0 inches of ponderosa pine needles and twigs, over 0 to 8 inches; dark stony loam, granular structure, soft, pH 6.2.
Rooting Depth (in.) to Underlying Material	40 plus; basalt alluvium	40 plus; tuff alluvium	20 to 40; basalt
Erosion Factor (K)	.37	.37	.32
Max. Erosion Hazard	Low	Low to moderate	Low to moderate
Soil Permeability	Moderately slow	Slow	Moderately slow
Drainage Class	Well drained	Well drained	Well drained
Soil Manageability Class	1	2e	2e
Group	II		
Forest Site Class	5 (2-4)	5 (2-4)	6 (4-5)
Range Site	Not placed in a range site.	Not placed in a range site.	Not placed in a range site.
Water Runoff Potential	Slow	Moderate	Slow
Watershed Sensitivity	8 (Moderate)	5	7
Hydrologic Soil Group	B	C	B
Available Water Capacity (AWC) Upper 20 inches	High 3.4 inches	Moderate to High 3.0 inches	Low to Moderate 2.6 inches
Susceptibility to Burning Damage	Low	Low to Moderate	Moderate
Slope Stability Hazard	Low	Low	Low
Allowable Soil Loss	3 tons/acre/year	3 tons/acre/year	2 tons/acre/year
Chance of Seedling Survival	Moderate to High	Moderate	Low to Moderate
Rating for Timber Site	Good (10)	Good (10)	Fair (1,3,7,10)
R-Value	30-60	0-30	30-60
Soil horizons in inches, USDA, Unified, AASHTO	0-13; Loam Unified: ML-CL, CL AASHTO: A-4, A-6 13-48; Gravelly loam, gravelly clay loam Unified: CL, MH AASHTO: A-6, A-7 48+; Weathered bedrock	0-9; Loam Unified: CL AASHTO: A-4, A-6 9-14; Clay loam Unified: CL, MH, CH AASHTO: A-6, A-7 14-36; Clay Unified: CH AASHTO: A-7 36-60; Gravelly Clay Loam Unified: CL, MH, CH AASHTO: A-6, A-7	0-8; Stony loam Unified: SM, SM-SC, ML, ML-CL AASHTO: A-4 8-24; Very cobbly clay loam, extremely cobbly clay loam Unified: SC AASHTO: A-6 24+; Weathered bedrock
Included Areas:	Included with these soils in mapping and making up about 10 percent of the acreage are the Pass Canyon, Gwin and Fordice families and Rock outcrop.		

168 ELMORE-JACKET, deep-LAWYER FAMILIES ASSOCIATION, 20 to 40 percent slopes

Map Unit Components	Elmore family, deep (35 percent)	Jacket family, deep (30 percent)	Lawyer family (20 percent)
Position, Slope, and Elevation	On sideslopes of mountain uplands; 20 to 35 percent slopes; 4400 to 5800 feet.	On sideslopes and in drainages of mountain uplands; 20 to 35 percent slopes; 4400 to 5800 feet.	On upper sideslopes and convey areas of mountain uplands; 20 to 40 percent slopes; 4400 to 5800 feet.
Typical Vegetation and Precipitation (ppt)	Ponderosa pine, incense-cedar, black oak, green leaf manzanita, squaw carpet, bitterbrush, Ross's sedge, few grasses; 16 to 25 inches ppt.	Ponderosa pine, incense-cedar, black oak, squaw carpet, green leaf manzanita, forbes, Ross's sedge, few grasses; 16 to 25 inches ppt.	
Surface Layer	2 to 0 inches; decomposed and undecomposed ponderosa pine needles and twigs, over 0 to 13 inches; dark brown and reddish brown loam, granular structure, very friable; pH 6.4 to 6.6.	2 to 0 inches of ponderosa pine needles and twigs, over 0 to 9 inches; dark brown and reddish brown loam, granular and blocky structure, slightly hard, Ph 6.2	2 to 0 inches of ponderosa pine needles and twigs, over 0 to 8 inches; dark brown stony loam, granular structure, soft, pH 6.2.
Rooting Depth (in.) to Underlying Material	40 plus; basalt, alluvium	40 plus; tuff, alluvium	20 to 40; basalt
Erosion Factor (K)	.37	.37	.32
Max. Erosion Hazard	Moderate	Moderate	Moderate
Soil Permeability	Moderately slow	Slow	Moderately slow
Drainage Class	Well drained	Well drained	Well drained
Soil Manageability Class Group	2e II	2e	2e
Forest Site Class	5 (2-4)	5 (2-4)	6 (4-5)
Range Site	Not placed in a range site.	Not placed in a range site.	Not placed in a range site.
Water Runoff Potential	Slow	Rapid	Moderate
Watershed Sensitivity	7 (Moderate)	5	7
Hydrologic Soil Group	B	C	B
Available Water Capacity (AWC) Upper 20 inches	High 3.4 inches	Moderate to High 3.0 inches	Low to Moderate 2.6 inches
Susceptibility to Burning Damage	Low to Moderate	Low to Moderate	Moderate
Slope Stability Hazard	Low	Low to Moderate	Low
Allowable Soil Loss	3 tons/acre/year	3 tons/acre/year	2 tons/acre/year
Chance of Seedling Survival	Moderate to High	Moderate	Low to Moderate
Rating for Timber Site	Good (10)	Good (10)	Fair (1,3,7,10)
R-Value	30-60	0-30	30-60
Soil horizons in inches, USDA, Unified, AASHTO	0-13; Loam Unified: ML-CL, CL AASHTO: A-4, A-6 13-48; Gravelly loam, gravelly clay loam Unified: CL, MH AASHTO: A-6, A-7 48+; Weathered bedrock	0-9; Loam Unified: CL AASHTO: A-4, A-6 9-14; Clay loam Unified: CL, MH, CH AASHTO: A-6, A-7 14-36; Clay Unified: CH AASHTO: A-7 36-60; Gravelly clay loam Unified: CL, MH, CH AASHTO: A-6, A-7	0-8; Stony loam Unified: SM, SM-SC, ML, ML-CL AASHTO: A-4 8-24; Very cobbly clay loam, extremely cobbly clay loam Unified: SC AASHTO: A-6 24+; Weathered bedrock

Included Areas:

Included with these soils in mapping and making up about 15 percent of the acreage are the Pass Canyon, Gwin and Fordice families and Rock outcrop.

169 ELMORE, deep-ELMORE FAMILY-LAVA FLOW ASSOCIATION, 5 to 30 percent slopes

Map Unit Components	Elmore family, deep (30 percent)	Elmore family (25 percent)	Lava flow (25 percent)
Position, Slope, and Elevation	On concave areas of strongly undulating topography between lava flow rock on basalt plateaus; 5 to 15 percent slopes; 4600 to 5000 feet.	On sideslopes of strongly undulating topography adjacent to lava flow rock on basalt plateaus; 10 to 25 percent slopes; 4600 to 5000 feet.	Disaggregated mounds of fractured basalt lava flow rock on undulating basalt plateaus; 10 to 30 percent slopes; 4600 to 5000 feet.
Typical Vegetation and Precipitation (ppt)	Ponderosa pine, Jeffrey pine, western juniper, big sagebrush, bitterbrush, mulesear, Ross's sedge, grasses; 16 to 20 inches ppt.	Ponderosa pine, Jeffrey pine, western juniper, mountain mahogany, big sagebrush, mulesear, Ross's sedge, grasses; 16 to 20 inches ppt.	
Surface Layer	2 to 0 inches; decomposed and undecomposed ponderosa pine needles and twigs over 0 to 13 inches; dark brown and reddish brown, loam, granular structure, very friable, pH 6.4 to 6.6.	1 to 0 inches of ponderosa pine needles and twigs, over 0 to 8 inches; brown loam, platy and granular structure, slightly hard, pH 6.0.	NOT APPLICABLE: Fractured vesicular basalt flow rock with minor accumulations of aeolian soil deposition in some fractures.
Rooting Depth (in.) to Underlying Material	40 plus; basalt	20 to 40; basalt	
Erosion Factor (K)	.37	.37	
Max. Erosion Hazard	Low	Moderate	
Soil Permeability	Moderately slow	Moderately slow	
Drainage Class	Well Drained	Well drained	
Soil Manageability Class	1	2e	
Group	II		
Forest Site Class	5 (3)	5-6 (4-5)	
Range Site	Not placed in a range site.	Not placed in a range site.	
Water Runoff Potential	Slow	Slow	Rapid
Watershed Sensitivity	8 (Moderate)	7	4
Hydrologic Soil Group	B	B	
Available Water Capacity (AWC) Upper 20 inches	High	Low to Moderate	
Susceptibility to Burning Damage	3.4 inches	3.2 inches	
Slope Stability Hazard	Low	Low to Moderate	
Allowable Soil Loss	Low	Low	
Chance of Seedling Survival	3 tons/acre/year	2 tons/acre/year	
Rating for Timber Site	Moderate to High	Moderate	
R-Value	Good (10)	Fair (1,7,10)	
Soil horizons in inches, USDA, Unified, AASHTO	30-60	30-60	
	0-13; Loam Unified: ML-CL, CL AASHTO: A-4, A-6	0-8; Loam Unified: ML-CL, CL AASHTO: A-4, A-6	
	13-48; Gravelly loam, gravelly clay loam Unified: CL, MH AASHTO: A-6, A-7	8-27; Clay loam, gravelly clay loam Unified: CL, MH AASHTO: A-6, A-7	
	48+; Weathered bedrock	27+; Unweathered bedrock	
Included Areas:	Included with this unit in mapping and making up about 20 percent of the acreage are the Fordice, Lawyer, Pass Canyon, Gwin and Germany families and Lithic Xerumbrepts, mesic, and unnamed soils similar to the Elmore family but have a cambic horizon.		

170 GALLATIN-BEHANIN deep-DUNCOM FAMILIES COMPLEX, 5 to 30 percent slopes

Map Unit Components	Gallatin family (35 percent)	Behanin family, deep (25 percent)	Duncom family (25 percent)
Position, Slope, and Elevation	On sideslopes and broad alluvial drainageways of mountain uplands; 5 to 25 percent slopes; 7000 to 8000 feet.	On sideslopes of mountain uplands; 5 to 30 percent slopes; 7000 to 8000 feet.	On upper slopes and knolls of mountain uplands; 5 to 30 percent slopes; 7000 to 8000 feet.
Typical Vegetation and Precipitation (ppt)	Big sagebrush, lupine, mulesear, few white fir; few ponderosa pine, Idaho fescue Poa spp., other grasses; 25 to 35 inches ppt.	White fir, lodgepole pine, quaking aspen, big sagebrush, mulesear, Ross's sedge, few grasses; 25 to 35 inches ppt.	
Surface Layer	0 to 29 inches; dark grayish brown loam to very cobbly loam granular to subangular blocky structure slightly hard, pH 6.2 to 6.4.	1-1/2 to 0 inches of white fir needles and twigs, over 0 to 60 inches; very dark grayish brown to brown very gravelly loam, very stony loam and extremely gravelly loam, granular to subangular blocky structure, slightly hard, pH 6.0 to 6.4.	0 to 17 inches; brown to dark grayish brown loam, granular to subangular blocky structure, slightly hard, pH 6.4 to 6.6.
Rooting Depth (in.) to Underlying Material	40 plus; andesite, basalt	20 to 40; basalt, tuff	10 to 20; basalt, tuff
Erosion Factor (K)	.32	.28	.37
Max. Erosion Hazard	Moderate	Moderate	Moderate
Soil Permeability	Moderate	Moderate	Moderate
Drainage Class	Well drained	Well drained	Well drained
Soil Manageability Class Group	2e II	2e	2ed
Forest Site Class	7 (non-commercial)	5 (3-4)	7 (non-commercial)
Range Site	14, 19	Not placed in a range site.	9
Water Runoff Potential	Slow	Slow	Rapid
Watershed Sensitivity	6 (Moderate)	7	4
Hydrologic Soil Group	B	B	D
Available Water Capacity (AWC) Upper 20 inches	Low to Moderate 3.2 inches	Moderate 2.4 inches	Low 1.6 to 3.2 inches
Susceptibility to Burning Damage	Low	Low to Moderate	Low
Slope Stability Hazard	Low	Low	Low
Allowable Soil Loss	2 tons/acre/year	3 tons/acre/year	1 tons/acre/year
Chance of Seedling Survival	Not Rated	Moderate	Not Rated
Rating for Timber Site	Not Rated	Fair (1,12)	Not Rated
R-Value	30-60	30-60	30-60
Soil horizons in inches, USDA, Unified, AASHTO	0-21; Loam Unified: ML-CL, CL AASHTO: A-4, A-6 21-29; Very cobbly loam Unified: SM-SC, SC, ML-CL, CL AASHTO: A-4, A-6 29+; Unweathered bedrock	0-34; Very gravelly loam, very stony loam Unified: SM, ML, ML-CL AASHTO: A-4 34-60; Extremely gravelly loam Unified: GM, GM-GC AASHTO: A-2-4, A-2-6	0-17; Loam Unified: ML-CL, CL AASHTO: A-4, A-6 17+; Unweathered bedrock
Included Areas:	Included with these soils in mapping and making up about 15 percent of the acreage are the Cheadle, Supervisor and Woodhurst families, and Cryoborolls, wet.		

171 GALLATIN-CHEADLE FAMILIES-CRYOBOROLLS, wet ASSOCIATION, 15 to 40 percent slopes

Map Unit Components	Gallatin family (35 percent)	Cheadle family (30 percent)	Cryoborolls, wet (20 percent)
Position, Slope, and Elevation	On sideslopes and toeslopes of mountain uplands; 15 to 35 percent slopes; 7000 to 9000 feet.	On uppersideslopes, ridges and knolls of mountain uplands; 20 to 40 percent slopes; 7000 to 9000 feet.	On broad toeslopes and alluvial fans of mountain uplands; 15 to 30 percent slopes; 7000 to 8500 feet.
Typical Vegetation and Precipitation (ppt)	Few white fir, few white bark pine, big sagebrush, mulesear, Idaho fescue, wheatgrass, Poa spp.; 25 to 35 inches ppt.	Big sagebrush, low sagebrush, buckwheat, Phlox spp., mulesear, Idaho fescue; 25 to 35 inches ppt.	
Surface Layer	0 to 29 inches; dark grayish brown loam to very cobbly loam, granular to subangular blocky structure, slightly hard, pH 6.2 to 6.4.	0 to 17 inches; dark grayish brown to brown very cobbly loam to very cobbly clay loam; granular and subangular blocky structure, slightly hard to hard, pH 6.6.	0 to 23 inches; very dark gray, dark grayish brown and brown gravelly loam and very gravelly loam; granular and blocky structure; yellowish brown mottles below 14 inches; slightly hard; pH 6.0 to 6.6.
Substratum			23 to 35 inches; grayish brown extremely cobbly loam; light olive brown mottles; massive; slightly hard; pH 6.0.
Rooting Depth (in.) to Underlying Material	20 to 40; basalt, andesite	10 to 20; andesite	20 plus; basalt, andesite, alluvium
Erosion Factor (K)	.32	.37	Variable
Max. Erosion Hazard	Moderate	Moderate to high	Moderate
Soil Permeability	Moderate	Moderate	Slow to moderate
Drainage Class	Well drained	Well drained	Poorly drained
Soil Manageability Class Group	2e II	2ed	3eW
Forest Site Class	7 (non-commercial)	7 (non-commercial)	7 (non-commercial)
Range Site	14, 19	9	25
Water Runoff Potential	Slow	Rapid	Moderate
Watershed Sensitivity	6 (Moderate)	4	6
Hydrologic Soil Group	B	D	D
Available Water Capacity (AWC) Upper 20 inches	Low to Moderate 3.2 inches	Very Low to Low 1.2 to 2.4 inches	Low to High 2.8 inches
Susceptibility to Burning Damage	Moderate	Moderate	Low
Slope Stability Hazard	Low	Low	Low
Allowable Soil Loss	2 tons/acre/year	1 tons/acre/year	2-3 tons/acre/year
Chance of Seedling Survival	Not Rated	Not Rated	Not Rated
Rating for Timber Site	Not Rated	Not Rated	Not Rated
R-Value	30-60	30-60	Not Rated
Soil horizons in inches, USDA, Unified, AASHTO	0-21; Loam Unified: ML-CL, CL AASHTO: A-4, A-6 21-29; Very cobbly loam Unified: SM-SC, SC, ML-CL, CL AASHTO: A-4, A-6 29+; Unweathered bedrock	0-12; Very cobbly loam Unified: SM, SM-SC AASHTO: A-4, A-6 12-17; Very cobbly clay loam Unified: SC AASHTO: A-6, A-7 17+; Unweathered bedrock	0-35; Variable Unified: Not Rated AASHTO: Not Rated 35+; Unweathered bedrock
Included Areas:	Included with these soils in mapping and making up about 15 percent of the acreage are the Woodhurst, Behanin, Supervisor and Duncom families, rock outcrop, and Lithic Cryochrepts.		

173 GERMANY deep-SADIE FAMILIES COMPLEX, 1 to 5 percent slopes.

Map Unit Components	Germany family, deep (50 percent)	Sadie family, (35 percent)
Position, Slope, and Elevation	On undulating basalt plateaus; 1 to 5 percent slopes; 4350 to 4500 feet.	On undulating basalt plateaus; 1 to 5 percent slopes; 4350 to 4500 feet.
Typical Vegetation and Precipitation (ppt)	Mixed conifer forest of ponderosa pine, Jeffrey pine, white fir, plus green leaf manzanita, ceonothus, rabbitbrush, Ross's sedge, grasses; 22 to 28 inches ppt.	Mixed conifer forest of ponderosa pine, Jeffrey pine, white fir, plus green leaf manzanita, ceonothus, rabbitbrush, Ross's sedge, grasses; 22 to 28 inches ppt.
Surface Layer	1 to 0 inches of ponderosa pine needles and twigs, over 0 to 14 inches; dark yellowish brown and yellowish brown fine sandy loam; platy and subangular blocky structure; soft; pH 6.2.	2 to 0 inches of ponderosa pine and white fir needles and twigs, over 0 to 5 inches; yellowish brown gravelly sandy loam, granular structure, soft, pH 7.0.
Substratum	32 to 47 inches; brownish yellow very cobbly fine sandy loam; massive; slightly hard; pH 6.0.	19 to 50 inches; brownish yellow gravelly coarse sandy loam, massive, slightly hard, pH 6.8.
Rooting Depth (in.) to Underlying Material	40 plus; hard vesicular basalt	40 plus; hard vesicular basalt
Erosion Factor (K)	.20	.20
Max. Erosion Hazard	Low	Low
Soil Permeability	Moderately rapid	Moderately rapid
Drainage Class	Well drained	Well drained
Soil Manageability Class	1	1
Group	IA	
Forest Site Class	3 (1-2)	3-4 (2-3)
Range Site	Not placed in a range site.	Not placed in a range site.
Water Runoff Potential	Very Slow	Very Slow
Watershed Sensitivity	9 (Low)	9
Hydrologic Soil Group	B	B
Available Water Capacity (AWC) Upper 20 inches	Moderate to High 2.8 inches	Moderate to High 2.7 inches
Susceptibility to Burning Damage	Moderate	Moderate
Slope Stability Hazard	Low	Low
Allowable Soil Loss	3 tons/acre/year	3 tons/acre/year
Chance of Seedling Survival	Moderate	Moderate
Rating for Timber Site	Good	Good
R-Value	60+	60+
Soil horizons in inches, USDA, Unified, AASHTO	0-47; Fine sandy loam, cobbly fine sandy loam, very cobbly fine sandy loam Unified: SM, SM-SC AASHTO: A-4 47+; Unweathered bedrock	0-5; Gravelly sandy loam Unified: SM, SM-SC AASHTO: A-4 5-50; Gravelly coarse sandy loam Unified: SM AASHTO: A-1-b, A-2-4 50+; Unweathered bedrock
Included Areas:	Included with these soils in mapping and making up about 15 percent of the acreage is lava flow rock, Lithic Xerumbrepts and Elmore families, and unnamed soils similar to Germany family but medial skeletal.	

174 GERMANY FAMILY-LITHIC XERUMBREPTS-LAVA FLOW ASSOCIATION, 1 to 20 percent slopes

Map Unit Components	Germany family (35 percent)	Lithic Xerumbrepts, mesic (25 percent)	Lava flow (20 percent)
Position, Slope, and Elevation	On isolated concave 0.1 to 2 acre pockets between hummocky broken lava flow rock on basalt plateaus; 1 to 5 percent slopes; 4300 to 5000 feet.	On isolated concave 0.1 to 2 acre islands mainly on top of or immediately adjacent to hummocky broken lava flow rock on basalt plateaus; 1 to 10 percent slopes; 4300 to 5000 feet.	Hummocky, disaggregated lava flow rock and collapsed lava tubes on basalt plateaus with slope lengths of 10 to 40 feet; 5 to 20 percent slopes; 4300 to 5000 feet.
Typical Vegetation and Precipitation (ppt)	Ponderosa pine, Jeffrey pine, incense- cedar, white fir, western juniper, rabbitbrush, bitterbrush, greenleaf manzanita, Phlox spp., Carex spp., Ross's sedge bottlebrush, Junegrass, needlegrass, other grasses; 18 to 25 inches ppt.	Few ponderosa pine, Jeffrey pine, incense- cedar; western juniper, bitterbrush, big sagebrush, greenleaf manzanita, squaw carpet, Phlox spp., Carex spp., Ross's sedge, grasses; 18 to 25 inches ppt.	
Surface Layer	0 to 24 inches; yellowish brown loam, granular and massive structure, soft, pH 6.0 to 6.2.	1/2 to 0 inches of ponderosa pine and brush needles, leaves and twigs, over 0 to 12 inches; brown and yellowish brown very cobbly sandy loam and extremely cobbly sandy loam, granular structure, soft, pH 6.0 to 6.2.	NOT APPLICABLE: Fractured vesicular basalt flow rock with minor accumulations of aeolian soil deposition and duff material in some fractures.
Rooting Depth (in.) to Underlying Material	20 to 40; hard fractured vesicular basalt	10 to 20; hard fractured vesicular basalt	
Erosion Factor (K)	.32	Variable	
Max. Erosion Hazard	Low	Low	
Soil Permeability	Moderately rapid	Moderately rapid	
Drainage Class	Well drained	Well drained	
Soil Manageability Class	3eX	3eX	
Group	III		
Forest Site Class	5-6 (3-5)	6-7 (5 to Non-commercial)	
Range Site	Not placed in a range site.	8, 9	
Water Runoff Potential	Very Slow	Slow	Rapid
Watershed Sensitivity	8 (Low)	8	7
Hydrologic Soil Group	B	D	
Available Water Capacity (AWC)	Low to Moderate	Very Low to Low	
Upper 20 inches	2.8 inches	1.0 to 2.0 inches	
Susceptibility to Burning Damage	Moderate	Moderate	
Slope Stability Hazard	Low	Low	
Allowable Soil Loss	2 tons/acre/year	1 tons/acre/year	
Chance of Seedling Survival	Moderate	Very Low	
Rating for Timber Site	Poor (2, 7, 10)	Poor (1 or 2, 3 or 4, 8, 10)	
R-Value	60+	Not Rated	

174 GERMANY FAMILY-LITHIC XERUMBREPTS-LAVA FLOW ASSOCIATION (continued)

Soil horizons in
inches, USDA,
Unified, AASHTO

0-24; Loam
Unified: SM, SM-SC,
ML, ML-CL
AASHTO: A-4
24+; Unweathered bedrock

0-12; Variable
Unified: Not Rated
AASHTO: Not Rated
12+; Unweathered bedrock

Included Areas:

Included with this unit in mapping and making up about 20 percent of the acreage are the Pass Canyon, Sheld, Ahart, Germany deep, Gwin, Bakeoven, Sadie, Neer and Alcot families unnamed soils similar to Germany family but medial-sketetal and Lava flow rock with steeper slopes.

**175 GWIN-PASS CANYON FAMILIES-LITHIC XERORTHERTS, MESIC COMPLEX,
1 to 20 percent slopes**

Map Unit Components	Gwin family (40 percent)	Pass Canyon family (30 percent)	Lithic Xerorthents, mesic (15 percent)
Position, Slope, and Elevation	Mainly on southeast to westerly aspects on sideslopes of mountain uplands; 1 to 20 percent slopes; 4500 to 6000 feet.	Mainly on southeast to westerly aspects on sideslopes of mountain uplands; 1 to 20 percent slopes; 4500 to 6000 feet.	Mainly on southeast to westerly aspects on ridges, knolls and highly eroded drainages of mountain uplands; 1 to 20 percent slopes; 4500 to 6000 feet.
Typical Vegetation and Precipitation (ppt)	Low sagebrush, western yarrow, Phlox spp., buckwheat, mulesear, cheatgrass, Idaho fescue; 14 to 18 inches ppt.	Western juniper, low sagebrush, big sagebrush, rabbitbrush, western yarrow, Phlox spp., mulesear, cheatgrass, Idaho fescue, sandberg bluegrass; 14 to 18 inches ppt.	
Surface Layer	0 to 11 inches; dark grayish brown very cobbly loam, granular and blocky structure; slightly hard, pH 6.8.	0 to 4 inches; very dark grayish brown to dark brown very cobbly loam, and loam, granular and platy structure, slightly hard, pH 6.6 to 6.8.	0 to 5 inches; brown and yellowish brown very cobbly loam and gravelly loam; platy and granular structure; slightly hard; pH 6.6 to 6.8.
Rooting Depth (in.) to Underlying Material	10 to 20 basalt	10 to 20; basalt	4 to 10; basalt
Erosion Factor (K)	.37	.32	Variable
Max. Erosion Hazard	Moderate	Moderate	Moderate to high
Soil Permeability	Moderately slow	Moderately slow	Moderate
Drainage Class	Well drained	Well drained	Somewhat excessively drained
Soil Manageability Class Group	2edx II	2edx	3edx
Forest Site Class	7 (non-commercial)	7 (non-commercial)	7 (non-commercial)
Range Site	8	8	1
Water Runoff Potential	Moderate	Moderate	Moderate
Watershed Sensitivity	6 (Moderate)	6	4
Hydrologic Soil Group	D	D	D
Available Water Capacity (AWC)	Very Low to Low	Very Low to Low	Very Low
Upper 20 inches	1.0 to 2.0 inches	1.3 to 2.6 inches	0.6 to 1.5 inches
Susceptibility to Burning Damage	Low	Low	Low
Slope Stability Hazard	Low	Low	Low
Allowable Soil Loss	1 tons/acre/year	1 tons/acre/year	1 tons/acre/year
Chance of Seedling Survival	Not Rated	Not Rated	Not Rated
Rating for Timber Site	Not Rated	Not Rated	Not Rated
R-Value	30-60	30-60	Not Rated

175 GWIN-PASS CANYON FAMILIES-LITHIC XERORTHENTS, MESIC COMPLEX (continued)

Soil horizons in
inches, USDA,
Unified, AASHTO

0-11; Very cobbly loam Unified: SM, SM-SC AASHTO: A-4	0-2; Very cobbly loam Unified: SM, SM-SC AASHTO: A-4	0-5; Variable Unified: Not Rated AASHTO: Not Rated
11-18; Extremely cobbly clay loam Unified: SC, CL AASHTO: A-6	2-4; Loam Unified: ML-CL, CL AASHTO: A-4, A-6	5+; Weathered bedrock
18+; Unweathered bedrock	4-12; Clay loam, cobbly clay loam Unified: CL, MH AASHTO: A-6, A-7	
	12+; Unweathered bedrock	

Included Areas:

Included with these soils in mapping and making up about 15 percent of the acreage are the Ruckles, Ridd, Los Gatos, Deven, Keating, Supan, Fordice families and rock outcrop.

**176 GWIN-PASS CANYON FAMILIES-LITHIC XERORTHENTS, MESIC COMPLEX,
20 to 40 percent slopes**

Map Unit Components	Gwin family (45 percent)	Pass Canyon family (25 percent)	Lithic Xerorthents, mesic (15 percent)
Position, Slope, and Elevation	Mainly on southeast to westerly aspects on sideslopes of mountain uplands; 20 to 40 percent slopes; 4500 to 6000 feet.	Mainly on southeast to westerly aspects on sideslopes of mountain uplands; 20 to 40 percent slopes; 4500 to 6000 feet.	Mainly on southeast to westerly aspects on ridges, knolls and highly eroded drainages of mountain uplands; 20 to 40 percent slopes; 4500 to 6000 feet.
Typical Vegetation and Precipitation (ppt)	Low sagebrush, western yarrow, Phlox spp., buckwheat, mulesear, cheatgrass, Idaho fescue; 14 to 18 inches ppt.	Western juniper, low sagebrush, big sagebrush, rabbitbrush, western yarrow, Phlox spp., mulesear, cheatgrass, Idaho fescue, sandberg bluegrass; 14 to 18 inches ppt.	
Surface Layer	0 to 11 inches; dark grayish brown very cobbly loam, granular and blocky structure, slightly hard, pH 6.8.	0 to 4 inches; very dark grayish brown to dark brown very cobbly loam, and loam, granular and platy structure, slightly hard, pH 6.6 to 6.8.	0 to 5 inches; brown and yellowish brown very cobbly loam and gravelly loam; platy and granular structure; slightly hard; pH 6.6 to 6.8.
Rooting Depth (in.) to Underlying Material	10 to 20; basalt	10 to 20; basalt	4 to 10; basalt
Erosion Factor (K)	.37	.32	Variable
Max. Erosion Hazard	Moderate to high	Moderate to high	High
Soil Permeability	Moderately slow	Moderately slow	Moderate
Drainage Class	Well drained	Well drained	Somewhat excessively drained
Soil Manageability Class Group	3Edx III	3Edx	3EDx
Forest Site Class	7 (non-commercial)	7 (non-commercial)	7 (non-commercial)
Range Site	8	8	1
Water Runoff Potential	Rapid	Rapid	Rapid
Watershed Sensitivity	5 (Moderate)	5	3
Hydrologic Soil Group	D	D	D
Available Water Capacity (AWC) Upper 20 inches	Very Low to Low 1.0 to 2.0 inches	Very Low to Low 1.3 to 2.6 inches	Very Low 0.6 to 1.5 inches
Susceptibility to Burning Damage	Moderate	Moderate	Moderate
Slope Stability Hazard	Low	Low	Low
Allowable Soil Loss	1 tons/acre/year	1 tons/acre/year	1 tons/acre/year
Chance of Seedling Survival	Not Rated	Not Rated	Not Rated
Rating for Timber Site R-Value	Not Rated 30-60	Not Rated 30-60	Not Rated Not Rated

176 GWIN-PASS CANYON FAMILIES-LITHIC XERORTHENTS, MESIC COMPLEX (continued)

Soil horizons in
inches, USDA,
Unified, AASHTO

0-11; Very cobbly loam Unified: SM, SM-SC AASHTO: A-4	0-2; Very cobbly loam Unified: SM, SM-SC AASHTO: A-4	0-5; Variable Unified: Not Rated AASHTO: Not Rated
11-18; Extremely cobbly clay loam Unified: SC, CL AASHTO: A-6	2-4; Loam Unified: ML-CL, CL AASHTO: A-4, A-6	5+; Weathered bedrock
18+; Unweathered bedrock	4-12; Clay loam, cobbly clay loam Unified: CL, MH AASHTO: A-6, A-7	
	12+; Unweathered bedrock	

Included Areas:

Included with these soils in mapping and making up about 15 percent of the acreage are the Ruckles, Ridd, Los Gatos, Deven, Keating, Supan, Fordice families and rock outcrop.

**177 GWIN-PASS CANYON FAMILIES-LITHIC XERORTHERTS, MESIC COMPLEX,
40 to 70 percent slopes**

Map Unit Components	Gwin family (50 percent)	Pass Canyon family (20 percent)	Lithic Xerorthents, mesic (20 percent)
Position, Slope, and Elevation	Mainly on southeast to westerly aspects on sideslopes of mountain uplands; 40 to 70 percent slopes; 4500 to 6000 feet.	Mainly on southeast to westerly aspects on sideslopes of mountain uplands; 40 to 60 percent slopes; 4500 to 6000 feet.	Mainly on southeast to westerly aspects on ridges, knolls and highly eroded drainages of mountain uplands; 40 to 70 percent slopes; 4500 to 6000 feet.
Typical Vegetation and Precipitation (ppt)	Low sagebrush, western yarrow, Phlox spp., buckwheat, mulesear, cheatgrass, Idaho fescue; 14 to 18 inches ppt.	Western juniper, low sagebrush, big sagebrush, rabbitbrush, western yarrow, Phlox spp., mulesear, cheatgrass, Idaho fescue, sandberg bluegrass; 14 to 18 inches ppt.	
Surface Layer	0 to 11 inches; dark grayish brown very cobbly loam, granular and blocky structure, slightly hard, pH 6.8.	0 to 4 inches; very dark grayish brown to dark brown very cobbly loam, and loam, granular and platy structure, slightly hard, pH 6.6 to 6.8.	0 to 5 inches; brown and yellowish brown very cobbly loam and gravelly loam; platy and granular structure; slightly hard; pH 6.6 to 6.8.
Rooting Depth (in.) to Underlying Material	10 to 20; basalt	10 to 20; basalt	4 to 10; basalt
Erosion Factor (K)	.37	.32	Variable
Max. Erosion Hazard	High to very high	High to very high	Very high
Soil Permeability	Moderately slow	Moderately slow	Moderate
Drainage Class	Well drained	Well drained	Somewhat excessively drained
Soil Manageability Class Group	3Edx III	3Edx	3EDx
Forest Site Class	7 (non-commercial)	7 (non-commercial)	7 (non-commercial)
Range Site	8	8	1
Water Runoff Potential	Very Rapid	Very Rapid	Very Rapid
Watershed Sensitivity	3 (High)	3	1
Hydrologic Soil Group	D	D	D
Available Water Capacity (AWC) Upper 20 inches	Very Low to Low 1.0 to 2.0 inches	Very Low to Low 1.3 to 2.6 inches	Very Low 0.6 to 1.5 inches
Susceptibility to Burning Damage	Moderate	Moderate	Moderate
Slope Stability Hazard	Low	Low	Low
Allowable Soil Loss	1 tons/acre/year	1 tons/acre/year	1 tons/acre/year
Chance of Seedling Survival	Not Rated	Not Rated	Not Rated
Rating for Timber Site	Not Rated	Not Rated	Not Rated
R-Value	30-60	30-60	Not Rated

177 GWIN-PASS CANYON FAMILIES-LITHIC XERORTHENTS, MESIC COMPLEX (continued)

Soil horizons in
inches, USDA,
Unified, AASHTO

0-11; Very cobbly loam Unified: SM, SM-SC AASHTO: A-4	0-2; Very cobbly loam Unified: SM, SM-SC AASHTO: A-4	0-5; Variable Unified: Not Rated AASHTO: Not Rated
11-18; Extremely cobbly clay loam Unified: SC, CL AASHTO: A-6	2-4; Loam Unified: ML-CL, CL AASHTO: A-4, A-6	5+; Weathered bedrock
18+; Unweathered bedrock	4-12; Clay loam, cobbly clay loam Unified: CL, MH AASHTO: A-6, A-7	
	12+; Unweathered bedrock	

Included Areas:

Included with these soils in mapping and making up about 10 percent of the acreage are the Ruckles, Ridd, Los Gatos, Deven, Keating, Supan, Fordice families and rock outcrop.

178 GWIN-RUCKLES FAMILIES-ROCK OUTCROP ASSOCIATION, 40 to 70 percent slopes

Map Unit Components	Gwin family (35 percent)	Ruckles family (30 percent)	Rock outcrop (20 percent)
Position, Slope, and Elevation	Mainly on southerly and westerly aspects of mountain uplands; 40 to 70 percent slopes; 4800 to 6400 feet.	Mainly on southerly and westerly aspects of mountain uplands; 40 to 70 percent slopes; 4800 to 6400 feet.	On ridges and knolls of mountain uplands; 45 to 70 percent slopes; 4800 to 6400 feet.
Typical Vegetation and Precipitation (ppt)	Western juniper, mountain mahogany, low sagebrush, few big sagebrush, mulesear, Idaho fescue, sandberg bluegrass, cheatgrass; 16 to 20 inches ppt.	Western juniper, mountain mahogany few ponderosa pine and white fir, low sagebrush, big sagebrush, mulesear, Idaho fescue, bottlebrush, sandberg bluegrass, 16 to 20 inches ppt.	
Surface Layer	0 to 11 inches; dark grayish brown very cobbly loam, granular and blocky structure, slightly hard, pH 6.8.	0 to 4 inches; brown very cobbly loam, granular structure, soft, pH 7.0.	NOT APPLICABLE: Basalt, andesite or conglomerated tuff bedrock with minor accumulations of aeolian soil deposition in some fractures.
Rooting Depth (in.) to Underlying Material	8 to 20; basalt	10 to 20; basalt, tuff	
Erosion Factor (K)	.37	.37	
Max. Erosion Hazard	High to very high	High to very high	
Soil Permeability	Moderately slow	Slow	
Drainage Class	Well drained	Well drained	
Soil Manageability Class Group	3Edx III	3Sd	
Forest Site Class	7 (non-commercial)	7 (non-commercial)	
Range Site	8, 1	8	
Water Runoff Potential	Very Rapid	Very Rapid	Very Rapid
Watershed Sensitivity	3 (Very High)	2	0
Hydrologic Soil Group	D	D	
Available Water Capacity (AWC) Upper 20 inches	Very Low to Low 0.8 to 2.0 inches	Very Low to Low 1.0 to 2.0 inches	
Susceptibility to Burning Damage	Moderate	Moderate	
Slope Stability Hazard	Low	High	
Allowable Soil Loss	1 tons/acre/year	1 tons/acre/year	
Chance of Seedling Survival	Not Rated	Not Rated	
Rating for Timber Site	Not Rated	Not Rated	
R-Value	30-60	0-30	
Soil horizons in inches, USDA, Unified, AASHTO	0-11; Very cobbly loam Unified: SM, SM-SC AASHTO: A-4 11-18; Extremely cobbly clay loam Unified: SC, CL AASHTO: A-6 18+; Unweathered bedrock	0-4; Very cobbly loam Unified: SM, SC AASHTO: A-4, A-6 4-14; Very gravelly clay Unified: GC, CH AASHTO: A-7 14+; Unweathered bedrock	
Included Areas:	Included with this unit in mapping and making up about 15 percent of the acreage are Lithic Xerorthents, mesic, rubbleland, Pass Canyon, Deven, Fordice, and Lawyer families.		

179 HADES-VIPONT-ANATONE FAMILIES ASSOCIATION, 10 to 30 percent slopes

Map Unit Components	Hades family (40 percent)	Vipont family (25 percent)	Anatone family (20 percent)
Position, Slope, and Elevation	On lower sideslopes and alluvial fans of mountain uplands; 10 to 25 percent slopes; 5700 to 6500 feet.	On sideslopes and drainages of mountain uplands; 15 to 30 percent slopes; 5700 to 6500 feet.	On upper sideslopes, ridges and knolls of mountain uplands; 15 to 30 percent slopes; 5700 to 6500 feet.
Typical Vegetation and Precipitation (ppt)	Few white fir, few ponderosa pine, western juniper, mountain mahogany, big sagebrush, ceonothus, greenleaf manzanita, snowberry, bitterbrush, mulesear, wheatgrass, Ross's sedge, Idaho fescue; 20 to 22 inches ppt.	Few white fir, few ponderosa pine, western juniper, mountain mahogany, big sagebrush, ceonothus, greenleaf manzanita, snowberry, bitterbrush, mulesear, wheatgrass, Ross's sedge, Idaho fescue; 20 to 22 inches ppt.	
Surface Layer	0 to 15 inches; dark brown loam, granular and blocky structure, slightly hard, pH 6.6 to 6.8.	0 to 16 inches; brown very gravelly loam, granular and blocky structure slightly hard, pH 6.8.	0 to 17 inches; brown cobbly loam to very cobbly loam, granular and blocky structure, slightly hard, pH 6.8 to 7.0.
Rooting Depth (in.) to Underlying Material	20 to 40; basalt	20 to 40; basalt	10 to 20; basalt, andesite
Erosion Factor (K)	.32	.28	.37
Max. Erosion Hazard	Moderate	Moderate	Moderate
Soil Permeability	Moderately slow	Moderately slow	Moderate
Drainage Class	Well drained	Well drained	Well drained
Soil Manageability Class Group	2e II	2e	2ed
Forest Site Class	5 (3-4)	5-6 (4-5)	7 (non-commercial)
Range Site	Not placed in a range site.	Not placed in a range site.	9
Water Runoff Potential	Slow	Slow	Rapid
Watershed Sensitivity	7 (Moderate)	7	4
Hydrologic Soil Group	B	B	D
Available Water Capacity (AWC) Upper 20 inches	Low to Moderate 3.2 inches	Low to Moderate 2.8 inches	Very Low to Low 1.2 to 2.5 inches
Susceptibility to Burning Damage	Moderate	Moderate	Moderate
Slope Stability Hazard	Low	Low	Low
Allowable Soil Loss	2 tons/acre/year	2 tons/acre/year	1 tons/acre/year
Chance of Seedling Survival	Moderate to High	Moderate	Not Rated
Rating for Timber Site	Fair (7, 10)	Fair (1,7,10)	Not Rated
R-Value	30-60	30-60	30-60
Soil horizons in inches, USDA, Unified, AASHTO	0-15: Loam Unified: ML-CL, CL AASHTO: A-4, A-6 15-36; Gravelly clay loam, gravelly silty clay loam Unified: CL, MH AASHTO: A-6, A-7 36+; Unweathered bedrock	0-16; Very gravelly loam Unified: SM, SM-SC AASHTO: A-4 16-32; Very gravelly clay loam, very cobbly clay loam, extremely cobbly clay loam Unified: SC, CL AASHTO: A-6, A-7 32+; Weathered bedrock	0-8; Cobbly loam Unified: ML, ML-CL AASHTO: A-4 8-17; Very cobbly loam Unified: SM, SC AASHTO: A-4, A-6 17+; Unweathered bedrock
Included Areas:	Included with these soils in mapping and making up about 15 percent of the acreage are the Ginser, Mascamp, Bearskin, Smarts, Ridd, Lamondi families and rock outcrop and unnamed soils similar to the Hades family but with a cambic horizon.		

180 HIBNER-DEVEN-KEATING FAMILIES COMPLEX, 20 to 60 percent slopes

Map Unit Components	Hiibner family (35 percent)	Deven family (25 percent)	Keating family (20 percent)
Position, Slope, and Elevation	Mainly on southeast to westerly aspects of sideslopes of hills and basalt plateaus; 20 to 60 percent slopes; 4400 to 5800 feet.	Mainly on southeast to westerly aspects of sideslopes and toeslopes of hills and basalt plateaus; 20 to 60 percent slopes; 4400 to 5800 feet.	Mainly on southeast to westerly aspects of sideslopes of hills and basalt plateaus; 20 to 60 percent slopes; 4400 to 5800 feet.
Typical Vegetation and Precipitation (ppt)	Western juniper, few scattered ponderosa pine, big sagebrush, low sagebrush, mountain mahogany, rabbitbrush, Ross's sedge, grasses; 14 to 16 inches ppt.	Western juniper, low sagebrush, mountain mahogany, rabbitbrush, phlox spp., grasses; 14 to 16 inches ppt.	
Surface Layer	0 to 12 inches; brown stony loam and very cobbly clay loam, granular and blocky structure, slightly hard, pH 6.6.	0 to 2 inches; brown cobbly loam, platy and granular structure, slightly hard, pH 7.0.	0 to 2 inches; dark grayish brown cobbly clay loam, granular structure, hard, pH 6.8.
Substratum		13 to 25 plus inches; weathered in place platy to massive soft to hard tuff.	
Rooting Depth (in.) to Underlying Material	20 to 40; tuff and basalt	10 to 20; soft to hard tuff and basalt bedrock.	20 to 40; basalt and tuff.
Erosion Factor (K)	.37	.37	.32
Max. Erosion Hazard	Moderate to high	High	Moderate to high
Soil Permeability	Slow	Slow	Slow
Drainage Class	Well drained	Well drained	Well drained
Soil Manageability Class Group	3Epx III	3Edx	3E
Forest Site Class	7 (non-commercial)	7 (non-commercial)	7 (non-commercial)
Range Site	18	8, 23	18, 13
Water Runoff Potential	Rapid	Rapid	Rapid
Watershed Sensitivity	4 (High)	3	4
Hydrologic Soil Group	C	D	C
Available Water Capacity (AWC) Upper 20 inches	Low to Moderate 2.3 inches	Low 1.5 to 2.9 inches	Low to Moderate 2.7 inches
Susceptibility to Burning Damage	Moderate	Moderate	Moderate
Slope Stability Hazard	Low to High	Low to High	Low to High
Allowable Soil Loss	2 tons/acre/year	1 tons/acre/year	2 tons/acre/year
Chance of Seedling Survival	Not Rated	Not Rated	Not Rated
Rating for Timber Site R-Value	Not Rated 0-30	Not Rated 0-30	Not Rated 0-30
Soil horizons in inches, USDA, Unified, AASHTO	0-3; Stony loam Unified: ML, CL AASHTO: A-4, A-6 3-12; Very cobbly clay loam Unified: CL, MH AASHTO: A-6, A-7 12-25; Very cobbly clay Unified: CH AASHTO: A-7 25+; Weathered bedrock	0-2; Cobbly loam Unified: ML-CL, CL AASHTO: A-4, A-6 2-13; Clay loam, clay Unified: CL, CH AASHTO: A-7 13+; Weathered bedrock	0-6; Cobbly clay loam, clay loam Unified: CL, MH, CH AASHTO: A-6, A-7 6-32; Clay Unified: CH AASHTO: A-7 32+; Unweathered bedrock

180 HIIBNER-DEVEN-KEATING FAMILIES COMPLEX (continued)

Included Areas:

Included with these soils in mapping and making up about 20 percent of the acreage are Rock outcrop, Rubble land, Ridd, Gwin, Ruckles and Fordice families, and soils similar to Hiibner family but are Pachic.

181 HIIBNER-RUCKLES FAMILIES COMPLEX, 15 to 35 percent slopes

Map Unit Components	Hiibner family (50 percent)	Ruckles family (35 percent)
Position, Slope, and Elevation	Mainly on southeast to westerly aspects of smooth sideslopes of mountain uplands; 15 to 35 percent slopes; 4600 to 5800 feet.	Mainly on southeast to westerly aspects of ridges and sideslopes of mountain uplands; 15 to 35 percent slopes; 4600 to 5800 feet.
Typical Vegetation and Precipitation (ppt)	Ponderosa pine, Jeffrey pine, Western juniper mountain mahogany, big sagebrush, bitterbrush, Ross's sedge, grasses; 16 to 20 inches ppt.	Western juniper, mountain mahogany, big sagebrush, low sagebrush, rabbitbrush, cheatgrass, bottlebrush, Idaho fescue; 16 to 20 inches ppt.
Surface Layer	0 to 12 inches; brown stony loam and very cobbly clay loam, granular and blocky structure, slightly hard, pH 6.6.	0 to 4 inches; brown very cobbly loam, granular structure, soft, pH 7.0.
Rooting Depth (in.) to Underlying Material	20 to 40; basalt, tuff	10 to 20; basalt, tuff
Erosion Factor (K)	.37	.37
Max. Erosion Hazard	Moderate	Moderate
Soil Permeability	Slow	Slow
Drainage Class	Well drained	Well drained
Soil Manageability Class	2epx	2edx
Soil Manageability Group	II	
Forest Site Class	6 (4-5)	7 (non-commercial)
Range Site	Not placed in a range site.	8, 23
Water Runoff Potential	Moderate	Rapid
Watershed Sensitivity	6 (Moderate)	4
Hydrologic Soil Group	C	D
Available Water Capacity (AWC)	Low to Moderate	Very Low to Low
Upper 20 inches	2.3 inches	1.0 to 2.0 inches
Susceptibility to Burning Damage	Moderate to High	Moderate
Slope Stability Hazard	Low to Moderate	Low to Moderate
Allowable Soil Loss	2 tons/acre/year	1 tons/acre/year
Chance of Seedling Survival	Low to Very Low	Not Rated
Rating for Timber Site	Poor (1,4,7,11)	Not Rated
R-Value	0-30	0-30
Soil horizons in inches, USDA, Unified, AASHTO	0-3; Stony loam Unified: ML, CL AASHTO: A-4, A-6 3-12; Very cobbly clay loam Unified: CL, MH AASHTO: A-6, A-7 12-25; Very cobbly clay Unified: CH AASHTO: A-7 25+; Weathered bedrock	0-4; Very cobbly loam Unified: SM, SC AASHTO: A-4, A-6 4-14; Very gravelly clay Unified: GC, CH AASHTO: A-7 14+; Unweathered bedrock
Included Areas:	Included with these soils in mapping and making up about 15 percent of the acreage are the Gwin, Lawyer, Fordice, Pass Canyon, Deven and Jacket families, Lithic Xerorthents, mesic, and Rock outcrop.	

182 HOLLAND FAMILY, 4 to 15 inch pumice overburden, 1 to 10 percent slopes

Map Unit Components	Holland family (65 percent)
Position, Slope, and Elevation	On nearly level to undulating basalt plateaus; 1 to 10 percent slopes; 4200 to 4500 feet.
Typical Vegetation and Precipitation (ppt)	Ponderosa pine, Jeffrey pine, western juniper bitterbrush, big sagebrush, rabbitbrush, Ross's sedge, grasses; 16 to 20 inches ppt.
Surface Layer	1 to 0 inches ponderosa pine needles and twigs, over 12 inches of pumice overburden consisting of 0 to 5 inches grayish brown gravelly coarse sand; 5 to 12 inches; very pale brown extremely gravelly coarse sand (thickness ranges from 4 to 15 inches; OVER 12 to 21 inches; brown loam, subangular blocky structure, hard, pH 6.6.
Rooting Depth (in.) to Underlying Material	20 to 40; basalt
Erosion Factor (K)	.20
Max. Erosion Hazard	Low
Soil Permeability	Rapid in pumice overburden and moderately slow below.
Drainage Class	Well drained
Soil Manageability Class	2p
Group	II
Forest Site Class	6 (4-5)
Range Site	Not placed in a range site.
Water Runoff Potential	Very Slow
Watershed Sensitivity	9 (Low)
Hydrologic Soil Group	B
Available Water Capacity (AWC)	Low to Moderate
Upper 20 inches	2.6 inches
Susceptibility to Burning Damage	Moderate to High
Slope Stability Hazard	Low
Allowable Soil Loss	2 tons/acre/year
Chance of Seedling Survival	Moderate
Rating for Timber Site	Fair (5,7,10)
R-Value	30-60
Soil horizons in inches, USDA, Unified, AASHTO	0-5; Gravelly coarse sand Unified: SW-SM, SM AASHTO: A-1-a 5-12; Extremely gravelly coarse sand Unified: GW-GM AASHTO: A-1-a 12-21; Loam Unified: CL AASHTO: A-6 21-37; Clay loam Unified: CL, MH AASHTO: A-6, A-7 37+; Unweathered bedrock
Included Areas:	Included with this soil in mapping and making up about 35 percent of the acreage are the Alcot, menzel and Skalan families, Lithic Xerorthents, mesic, and soils similar to the Holland family but with greater and lesser amounts of pumice overburden.

**183 HOLLAND deep-SKALAN FAMILIES COMPLEX, 8 to 20 inch pumice overburden,
1 to 10 percent slopes**

Map Unit Components	Holland family, deep (45 percent)	Skalan family (35 percent)
Position, Slope, and Elevation	On undulating basalt plateaus; 1 to 10 percent slopes; 4200 to 4500 feet.	On undulating basalt plateaus; 1 to 10 percent slopes; 4200 to 4500 feet.
Typical Vegetation and Precipitation (ppt)	Ponderosa pine, Jeffrey pine, few western juniper, bitterbrush, big sagebrush, rabbitbrush, cheatgrass, bottlebrush, Ross's sedge, Idaho fescue; 16 to 20 inches ppt.	Few ponderosa pine, Jeffrey pine, western juniper, big sagebrush, rabbitbrush, bitterbrush cheatgrass, bottlebrush, Ross's sedge, Idaho fescue; 16 to 20 inches ppt.
Surface Layer	1/2 to 0 inches of ponderosa and Jeffrey pine needles over 11 inches of pumice consisting of 0 to 6 inches; grayish brown gravelly coarse loamy sand; 6 to 11 inches; very pale brown extremely gravelly coarse sand (thickness ranges from 8 to 20 inches) OVER 11 to 17 inches; yellowish brown loam, granular and blocky structure, hard, pH 6.6.	8 inches of pumice overburden consisting of 0 to 4 inches; grayish brown gravelly coarse loamy sand; 4 to 8 inches very pale brown extremely gravelly coarse sand (pumice thickness ranges from 8 to 20 inches) OVER 8 to 20 inches; light yellowish brown extremely cobbly loam, granular and blocky structure, slightly hard, pH 6.4.
Rooting Depth (in.) to Underlying Material	40 plus; basalt	30 plus; basalt
Erosion Factor (K)	.20	.20
Max. Erosion Hazard	Low	Low
Soil Permeability	Rapid in the pumice overburden and moderately slow below	Rapid in the pumice overburden and moderately slow below.
Drainage Class	Well drained	Well drained
Soil Manageability Class	2p	2p
Group	II	
Forest Site Class	5 (3-4)	6 (4-5)
Range Site	Not placed in a range site.	Not placed in a range site.
Water Runoff Potential	Very Slow	Very Slow
Watershed Sensitivity	9 (Low)	9
Hydrologic Soil Group	B	B
Available Water Capacity (AWC)	Moderate to High	Moderate
Upper 20 inches	2.6 inches	2.1 inches
Susceptibility to Burning Damage	Moderate to High	Moderate to High
Slope Stability Hazard	Low	Low
Allowable Soil Loss	3 tons/acre/year	2 tons/acre/year
Chance of Seedling Survival	Moderate	Low
Rating for Timber Site	Fair (5,10)	Fair (3,5,7,10)
R-Value	30-60	30-60
Soil horizons in inches, USDA, Unified, AASHTO	0-6; Gravelly loamy coarse sand Unified: SM AASHTO: A-1-b 6-11; Extremely gravelly coarse sand Unified: GW-GM AASHTO: A-1-a 11-17; Loam Unified: CL AASHTO: A-6 17-48; Clay loam, gravelly clay loam Unified: CL, MH AASHTO: A-6, A-7 48+; Unweathered bedrock	0-4; Gravelly loamy coarse sand Unified: SM AASHTO: A-1-b 4-8; Extremely gravelly coarse sand Unified: GW-GM AASHTO: A-1-a 8-20; Extremely cobbly loam Unified: SM, SM-SC, ML, ML-CL AASHTO: A-4, A-6 20-32; Extremely stony clay loam Unified: CL AASHTO: A-6 32+; Unweathered bedrock

183 HOLLAND deep-SKALAN FAMILIES COMPLEX (continued)

Included Areas:

Included with this unit in mapping and making up about 20 percent of acreage are the Alcot, Menzel, and Germany families and Lithic Xerumbrepts, mesic, and rock outcrop.

184 INDIAN CREEK FAMILY, 1 to 5 percent slopes

Map Unit Components	Indian Creek family (65 percent)
Position, Slope, and Elevation	On nearly level to gently undulating basalt plateaus; 1 to 5 percent slopes; 4500 to 4800 feet.
Typical Vegetation and Precipitation (ppt)	Western juniper, low sagebrush, black sagebrush, few big sagebrush, rabbitbrush, Idaho fescue, Poa spp., cheatgrass; 12 to 14 inches ppt.
Surface Layer	0 to 5 inches; brown and light brown, cobbly clay loam and clay loam, granular and platy structure, hard, pH 6.8.
Substratum	11 to 60 inches, weakly cemented silica duripan which becomes strongly cemented with depth and is generally over basalt bedrock.
Rooting Depth (in.) to Underlying Material	8 to 20; silica duripan over basalt
Erosion Factor (K)	.43
Max. Erosion Hazard	Moderate
Soil Permeability	Very slow
Drainage Class	Well drained
Soil Manageability Class	2edx
Group	II
Forest Site Class	7 (non-commercial)
Range Site	7, 1
Water Runoff Potential	Slow
Watershed Sensitivity	5 (Moderate)
Hydrologic Soil Group	D
Available Water Capacity (AWC)	Very Low to Low
Upper 20 inches	1.1 to 2.8 inches
Susceptibility to Burning Damage	Low
Slope Stability Hazard	Low
Allowable Soil Loss	1 tons/acre/year
Chance of Seedling Survival	Not Rated
Rating for Timber Site	Not Rated
R-Value	0-30
Soil horizons in inches, USDA, Unified, AASHTO	0-5; Cobbly clay loam, clay loam Unified: CL, MH, CH AASHTO: A-6, A-7 5-11; Clay Unified: CH AASHTO: A-7 11-60; Silica duripan
Included Areas:	Included with the soil in mapping and making up about 35 percent of the acreage are the Puls, Packwood, Barnard, Bieber, Aikman and Deven families and Lithic Xerorthents, mesic.

185 INDIAN CREEK-PULS-BARNARD FAMILIES COMPLEX, 0 to 2 percent slopes

Map Unit Components	Indian Creek family (40 percent)	Puls family (30 percent)	Barnard family (15 percent)
Position, Slope, and Elevation	On shallow clay basins of basalt plateaus, (subject to spring flooding), 0 to 2 percent slopes, 4300 to 5300 feet.	On shallow clay basins of basalt plateaus, (subject to spring flooding), 0 to 2 percent slopes; 4300 to 5300 feet.	On clay basins of basalt plateaus, (subject to spring flooding), 0 to 2 percent slopes, 4300 to 5300 feet.
Typical Vegetation and Precipitation (ppt)	Western juniper, low sagebrush, sandberg bluegrass, bottlebrush, other grasses; 12 to 14 inches ppt.	Low sagebrush, black sagebrush, Phlox spp., sandburg, bluegrass, cheatgrass, other grasses; 12 to 14 inches ppt.	
Surface Layer	0 to 5 inches, brown and light brown, cobbly clay loam, and clay loam, granular and platy structure, hard, pH 6.8.	0 to 5 inches; pinkish gray very stony clay loam, granular structure, slightly hard, pH 6.3.	0 to 8 inches; grayish brown to dark grayish brown cobbly loam to gravelly clay loam, platy and blocky structure, slightly hard, pH 6.5 to 7.0.
Substratum	11 to 60 inches, weakly cemented duripan which becomes strongly cemented with depth and is generally over basalt bedrock.	19 to 28 inches; indurated silica cemented duripan.	32 plus inches; weakly to strongly cemented silica duripan.
Rooting Depth (in.) to Underlying Material	10 to 20; silica duripan over basalt	0 to 10; dense very hard clay, over silica duripan at 10 to 20 inches	20 to 40; silica duripan
Erosion Factor (K)	.43	.37	.37
Max. Erosion Hazard	Moderate	Moderate	Low
Soil Permeability	Very slow	Very slow	Slow
Drainage Class	Well drained	Well drained	Well drained
Soil Manageability Class Group	2edx II	3eDx	1
Forest Site Class	7 (non-commercial)	7 (non-commercial)	7 (non-commercial)
Range Site	7	1	17, 24
Water Runoff Potential	Very Slow	Very Slow	Very Slow
Watershed Sensitivity	5 (Moderate)	5	6
Hydrologic Soil Group	D	D	C
Available Water Capacity (AWC)	Very Low to Low	Very Low to Low	Low to Moderate
Upper 20 inches	1.4 to 2.8 inches	1.1 to 2.8 inches	2.6 inches
Susceptibility to Burning Damage	Low	Low	Low
Slope Stability Hazard	Low	Low	Low
Allowable Soil Loss	1 tons/acre/year	1 tons/acre/year	2 tons/acre/year
Chance of Seedling Survival	Not Rated	Not Rated	Not Rated
Rating for Timber Site	Not Rated	Not Rated	Not Rated
R-Value	0-30	0-30	0-30

185 INDIAN CREEK-PULS-BARNARD FAMILIES COMPLEX (continued)

Soil horizons in inches, USDA, Unified, AASHTO

0-5; Cobbly clay loam, clay loam Unified: CL, MH, CH AASHTO: A-6, A-7	0-5; Very stony clay loam Unified: ML, CL AASHTO: A-6, A-7	0-3; Cobbly loam Unified: ML-CL, CL AASHTO: A-4, A-6
5-11; Clay Unified: CH AASHTO: A-7	5-19; Clay loam, clay Unified: CL, CH AASHTO: A-7	3-8; Gravelly clay loam Unified: CL, MH AASHTO: A-6, A-7
11-60; Silica duripan	19-28; Silica duripan 28+; Unweathered bedrock	8-32; Clay, Gravelly silty clay Unified: CH AASHTO: A-7 32+; Silica duripan

Included Areas:

Included with these soils in mapping and making up about 15 percent of the acreage are the Packwood, Dishner, Ditchcamp, Deven, Aikman and Fordice families and rubbleland.

186 INVILLE-YALLANI FAMILIES COMPLEX, 10 to 20 inch pumice overburden, 2 to 20 percent slopes

Map Unit Components	Inville family (50 percent)	Yallani family, pumice overburden phase (25 percent)
Position, Slope, and Elevation	On sideslopes of volcanic mountain uplands; 2 to 20 percent slopes; 5300 to 6400 feet.	On sideslopes of volcanic mountain uplands; 2 to 20 percent slopes; 5300 to 6400 feet.
Typical Vegetation and Precipitation (ppt)	Mixed conifer forest of ponderosa pine, white fir, incense-cedar, plus greenleaf manzanita, bitterbrush, squaw carpet, Ross's sedge, bunch grasses; 25 to 40 inches ppt.	Mixed conifer forest of ponderosa pine, white fir, incense-cedar, plus greenleaf manzanita, bitterbrush, squaw carpet, Ross's sedge, bunch grasses; 25 to 40 inches ppt.
Surface Layer	2 to 0 inches; decomposed and undecomposed Jeffrey pine and ponderosa pine needles and twigs, over 12 inches of pumice consisting of dark grayish brown to pale brown very gravelly loamy coarse sand grading to grayish brown gravelly loamy fine sand. (Thickness ranges from 10 to 20 inches). OVER 12 to 15 inches; yellowish brown very gravelly sandy loam, granular structure, soft, pH 6.4.	1 to 0 inches; undecomposed ponderosa pine and white fir needles and twigs, over 17 inches of pumice consisting of gray extremely gravelly loamy coarse sand grading to white extremely gravelly very coarse sand. (Thickness ranges from 10 to 20 inches). OVER 17 to 23 inches; yellowish brown gravelly coarse sandy loam, granular structure, soft, pH 6.2.
Rooting Depth (in.) to Underlying Material	40 plus; basalt, andesite	40 plus; basalt, andesite
Erosion Factor (K)	.17	.15
Max. Erosion Hazard	Low to moderate	Low
Soil Permeability	Rapid in the pumice overburden and moderate below.	Rapid in the pumice overburden and moderately rapid below.
Drainage Class	Well drained	Well drained
Soil Manageability Class	2ep	2ep
Group	II	
Forest Site Class	4-5 (3-4)	5 (4)
Range Site	Not placed in a range site.	Not placed in a range site.
Water Runoff Potential	Slow	Very Slow
Watershed Sensitivity	8 (Low)	8
Hydrologic Soil Group	B	B
Available Water Capacity (AWC)	Moderate to High	Moderate
Upper 20 inches	2.3 inches	2.3 inches
Susceptibility to Burning Damage	High	High
Slope Stability Hazard	Low	Low
Allowable Soil Loss	3 tons/acre/year	3 tons/acre/year
Chance of Seedling Survival	Moderate	Moderate
Rating for Timber Site	Fair (5)	Fair (3, 5)
R-Value	30-60	60+
Soil horizons in inches, USDA, Unified, AASHTO	0-6; Very gravelly loamy coarse sand Unified: SW-SM, SM AASHTO: A-1-a 6-12; Very gravelly loamy fine sand Unified: SM AASHTO: A-2-4 12-21; Very gravelly sandy loam Unified: SM AASHTO: A-1-b 21-60; Very gravelly loam Unified: SM, SM-SC AASHTO: A-2-4, A-2-6	0-2; Extremely gravelly loamy coarse sand Unified: SW-SM AASHTO: A-1-a 2-17; Extremely gravelly coarse sand Unified: GW-GM AASHTO: A-1-a 17-60; Gravelly coarse sandy loam, extremely stony coarse sandy loam, extremely cobbly coarse sandy loam Unified: SM AASHTO: A-1-b, A-2-4

186 INVILLE-YALLANI FAMILIES COMPLEX (continued)

Included Areas:

Included with these soils in mapping and making up about 25 percent of the acreage are the Stonewell family, pumice overburden, unnamed cindery over medial-skeletal, frigid soils, Lithic Xerorthents, frigid, and rock outcrop.

187 JACKET-DEVEN-HIIBNER FAMILIES ASSOCIATION, 1 to 15 percent slopes

Map Unit Components	Jacket family (45 percent)	Deven family (30 percent)	Hiibner family (15 percent)
Position, Slope, and Elevation	On smooth sideslopes and concave areas of mountain uplands; 1 to 15 percent slopes; 4400 to 5800 feet.	On upper sideslopes ridges and knolls of mountain uplands; 5 to 15 percent slopes; 4400 to 5800 feet.	On sideslopes and slight convex areas of mountain uplands; 1 to 15 percent slopes; 4400 to 5800 feet.
Typical Vegetation and Precipitation (ppt)	Ponderosa pine, incense-cedar, black oak, few white fir and western juniper, snowberry, serviceberry, big sagebrush, greenleaf manzanita, lupine, Ross's sedge, vetch, grasses; 16 to 20 inches ppt.	Western juniper, low sagebrush, big sagebrush, lupine, wild onion, mulesear, cheatgrass, bottlebrush, Idaho fescue, sandberg bluegrass; 16 to 20 inches ppt.	
Surface Layer	1 to 0 inches, ponderosa pine needles and twigs, over 0 to 2 inches; very dark grayish brown cobbly clay loam, granular structure, slightly hard, pH 6.2.	0 to 2 inches; brown cobbly clay loam, platy and granular structure, slightly hard, pH 7.0.	Thin mantle of ponderosa pine needles over 0 to 12 inches; brown stony loam and very cobbly clay loam, granular and blocky structure, slightly hard, pH 6.6.
Substratum	34 plus inches; weathered in place platy to massive semi-soft volcanic tuff.	13 to 25 plus inches; weathered in place platy to massive soft to hard volcanic tuff.	
Rooting Depth (in.) to Underlying Material	20 to 40; tuff	10 to 20; soft to hard tuff, basalt	20 to 40; tuff, basalt
Erosion Factor (K)	.32	.37	.37
Max. Erosion Hazard	Low to moderate	Moderate	Low to moderate
Soil Permeability	Slow	Slow	Slow
Drainage Class	Well drained	Well drained	Well drained
Soil Manageability Class	2e	2edx	2ep
Group	II		
Forest Site Class	5-6 (3-5)	7 (non-commercial)	6 (4-5)
Range Site	Not placed in a range site.	23, 8	Not placed in a range site.
Water Runoff Potential	Slow	Moderate	Slow
Watershed Sensitivity	6 (Moderate)	5	6
Hydrologic Soil Group	C	D	C
Available Water Capacity (AWC)	Low to Moderate	Low	Low to Moderate
Upper 20 inches	2.6 inches	1.5 to 2.9 inches	2.3 inches
Susceptibility to Burning Damage	Moderate	Low	Moderate
Slope Stability Hazard	Low	Low	Low
Allowable Soil Loss	2 tons/acre/year	1 tons/acre/year	2 tons/acre/year
Chance of Seedling Survival	Moderate	Not Rated	Low
Rating for Timber Site	Fair (7,10)	Not Rated	Fair (1,3,7,10)
R-Value	0-30	0-30	0-30

187 JACKET-DEVEN-HIIBNER FAMILIES ASSOCIATION (continued)

Soil horizons in
inches, USDA,
Unified, AASHTO

0-2; Cobble clay loam Unified: CL, MH AASHTO: A-6, A-7	0-2; Cobble loam Unified: ML-CL, CL AASHTO: A-4, A-6	0-3; Stony loam Unified: ML, CL AASHTO: A-4, A-6
2-34; Clay Unified: CH AASHTO: A-7	2-13; Clay loam, clay Unified: CL, CH AASHTO: A-7	3-12; Very cobbly clay loam Unified: CL, MH AASHTO: A-6, A-7
34+; Weathered bedrock	13+; Weathered bedrock	12-26; Very cobbly clay Unified: CH AASHTO: A-7 25+; Weathered bedrock

Included Areas:

Included with these soils in mapping and making up about 10 percent of the acreage are the Gwin, Pass Canyon, Fordice, Lawyer, Elmore and Keating families, Jacket Family deep, and Lithic Xerorthents, mesic.

188 JACKET-DEVEN-HIIBNER FAMILIES ASSOCIATION, 15 to 35 percent slopes

Map Unit Components	Jacket family (40 percent)	Deven family (30 percent)	Hiibner family (15 percent)
Position, Slope, and Elevation	On smooth sideslopes and concave areas of mountain uplands; 15 to 35 percent slopes; 4400 to 5800 feet.	On upper sideslopes ridges and knolls of mountain uplands; 15 to 35 percent slopes; 4400 to 5800 feet.	On sideslopes and slight convex areas of mountain uplands; 15 to 35 percent slopes; 4400 to 5800 feet.
Typical Vegetation and Precipitation (ppt)	Ponderosa pine, incense-cedar, black oak, few white fir and western juniper, snowberry, serviceberry, big sagebrush, greenleaf manzanita, lupine, vetch, Ross's sedge, grasses; 16 to 20 inches ppt.	Western juniper, low sagebrush, big sagebrush, lupine, wild onion, mulesear, cheatgrass, bottlebrush, Idaho fescue, sandberg bluegrass; 16 to 20 inches ppt.	
Surface Layer	1 to 0 inches, ponderosa pine needles and twigs, over 0 to 2 inches; very dark grayish brown cobbly clay loam, granular structure, slightly hard, pH 6.2.	0 to 2 inches; brown cobbly clay loam, platy and granular structure, slightly hard, pH 7.0.	Thin mantle of ponderosa pine needles over 0 to 12 inches; brown stony loam and very cobbly clay loam, granular and blocky structure, slightly hard, pH 6.6.
Substratum	34 plus inches; weathered in place platy to massive semi-soft volcanic tuff.	13 to 25 plus inches; weathered in place platy to massive soft to hard volcanic tuff.	
Rooting Depth (in.) to Underlying Material	20 to 40; tuff	10 to 20; soft to hard tuff, basalt.	20 to 40; tuff, basalt.
Erosion Factor (K)	.32	.37	.37
Max. Erosion Hazard	Moderate	Moderate to high	Moderate
Soil Permeability	Slow	Slow	Slow
Drainage Class	Well drained	Well drained	Well drained
Soil Manageability Class	2s	3Edx	2sp
Soil Manageability Group	II		
Forest Site Class	5-6 (3-5)	7 (non-commercial)	6 (4-5)
Range Site	Not placed in a range site.	23, 8	Not placed in a range site.
Water Runoff Potential	Moderate	Rapid	Moderate
Watershed Sensitivity	5 (Moderate)	4	5
Hydrologic Soil Group	C	D	C
Available Water Capacity (AWC)	Low to Moderate	Low	Low to Moderate
Upper 20 inches	2.6 inches	1.5 to 2.9 inches	2.3 inches
Susceptibility to Burning Damage	Moderate	Low	Moderate
Slope Stability Hazard	Low to Moderate	Low to Moderate	Low to Moderate
Allowable Soil Loss	2 tons/acre/year	1 tons/acre/year	2 tons/acre/year
Chance of Seedling Survival	Moderate	Not Rated	Low
Rating for Timber Site	Fair (7,11)	Not Rated	Fair (1,3,7,11)
R-Value	0-30	0-30	0-30
Soil horizons in inches, USDA, Unified, AASHTO	0-2; Cobbly clay loam Unified: CL, MH AASHTO: A-6, A-7 2-34; Clay Unified: CH AASHTO: A-7 34+; Weathered bedrock	0-2; Cobbly loam Unified: ML-CL, CL AASHTO: A-4, A-6 2-13; Clay loam, clay Unified: CL, CH AASHTO: A-7 13+; Weathered bedrock	0-3; Stony loam Unified: ML, CL AASHTO: A-4, A-6 3-12; Very cobbly clay loam Unified: CL, MH AASHTO: A-6, A-7 12-25; Very cobbly clay

188 JACKET-DEVEN-HIIBNER FAMILIES ASSOCIATION (continued)

Included Areas:

Included with these soils in mapping and making up about 15 percent of the acreage are the Gwin, Pass Canyon, Fordice, Lawyer, Elmore and Keating families, Jacket family deep, and Lithic Xerorthents, mesic.

189 JACKET-DEVEN-HIBNER FAMILIES ASSOCIATION, 35 to 60 percent slopes

Map Unit Components	Jacket family (30 percent)	Deven family (30 percent)	Hiibner family (25 percent)
Position, Slope, and Elevation	On smooth sideslopes and concave areas of mountain uplands; 35 to 60 percent slopes; 4400 to 5800 feet.	On upper sideslopes ridges and knolls of mountain uplands; 35 to 60 percent slopes; 4400 to 5800 feet.	On sideslopes and slight convex areas of mountain uplands; 35 to 60 percent slopes; 4400 to 5800 feet.
Typical Vegetation and Precipitation (ppt)	Ponderosa pine, incense-cedar, black oak, few white fir and western juniper, snowberry, serviceberry, big sagebrush, greenleaf manzanita, lupine, vetch, Ross's sedge, grasses; 16 to 20 inches ppt.	Western juniper, low sagebrush, big sagebrush, lupine, wild onion, mulesear, cheatgrass, bottlebrush, Idaho fescue, sandberg bluegrass; 16 to 20 inches ppt.	
Surface Layer	1 to 0 inches, ponderosa pine needles and twigs, over 0 to 2 inches; very dark grayish brown cobbly clay loam, granular structure, slightly hard, pH 6.2.	0 to 2 inches; brown cobbly clay loam, platy and granular structure, slightly hard, pH 7.0.	Thin mantle of ponderosa pine needles over 0 to 12 inches; brown stony loam and very cobbly clay loam, granular and blocky structure, slightly hard, pH 6.6.
Substratum	34 plus inches; weathered in place platy to massive semi-soft volcanic tuff.	13 to 25 plus inches; weathered in place platy to massive soft to hard volcanic tuff.	
Rooting Depth (in.) to Underlying Material	20 to 40; tuff	10 to 20; soft to hard tuff, basalt.	20 to 40; tuff, basalt.
Erosion Factor (K)	.32	.37	.37
Max. Erosion Hazard	High	High to very high	High
Soil Permeability	Slow	Slow	Slow
Drainage Class	Well drained	Well drained	Well drained
Soil Manageability Class	3s	3Edx	3Sp
Soil Manageability Group	III		
Forest Site Class	5-6 (3-5)	7 (non-commercial)	6 (4-5)
Range Site	Not placed in a range site.	23, 8	Not placed in a range site.
Water Runoff Potential	Rapid	Rapid	Rapid
Watershed Sensitivity	4 (High)	3	4
Hydrologic Soil Group	C	D	C
Available Water Capacity (AWC)	Low to Moderate	Low	Low to Moderate
Upper 20 inches	2.6 inches	1.5 to 2.9 inches	2.3 inches
Susceptibility to Burning Damage	Moderate	Moderate	Moderate to high
Slope Stability Hazard	High	High	High
Allowable Soil Loss	2 tons/acre/year	1 tons/acre/year	2 tons/acre/year
Chance of Seedling Survival	Moderate	Not Rated	Low
Rating for Timber Site	Poor (7,9,12)	Not Rated	Poor (1,3,7,9,12)
R-Value	0-30	0-30	0-30
Soil horizons in inches, USDA, Unified, AASHTO	0-2; Cobbly clay loam Unified: CL, MH AASHTO: A-6,A-7 2-34; Clay Unified: CH AASHTO: A-7, 34+; Weathered bedrock	0-2; Cobbly loam Unified: ML-CL, CL AASHTO: A-4, A-6 2-13; Clay loam, clay Unified: CL, CH AASHTO: A-7 13+; Weathered bedrock	0-3; Stony loam Unified: ML,CL AASHTO: A-4, A-6 3-12; Very cobbly clay loam Unified: CL,CH AASHTO: A-6,A-7 12-25; Very cobbly clay

189 JACKET-DEVEN-HIIBNER FAMILIES ASSOCIATION (continued)

Included Areas:

Included with these soils in mapping and making up about 15 percent of the acreage are the Gwin, Pass Canyon, Fordice, Lawyer, Elmore and Keating families, Jacket family deep, and Lithic Xerorthents, mesic.

190 JACKKNIFE-AIKMAN FAMILIES ASSOCIATION, 0 to 5 percent slopes

Map Unit Components	Jackknife family (50 percent)	Aikman family (30 Percent)
Position, Slope, and Elevation	On alluvial fans on basalt plateaus and mountain uplands; 1 to 5 percent slopes; 4400 to 5300 feet.	On slightly concave alluvial basins and drainages (subject to spring flooding); 0 to 2 percent slopes; 4400 to 5300 feet.
Typical Vegetation and Precipitation (ppt)	Few western juniper, few scattered ponderosa pine, big sagebrush, rabbitbrush, western yarrow, lupine, Idaho fescue, Poa spp., other grasses; 14 to 18 inches ppt.	Silver sagebrush, rabbitbrush, low sagebrush, sedges, forbes, timothy, bottlebrush, cheatgrass, other grasses; 14 to 18 inches ppt.
Surface Layer	0 to 4 inches; brown loam platy and granular structure, hard, pH 6.2.	0 to 4 inches; dark gray and dark grayish brown silty clay, granular and platy structure; very hard, pH 6.6 to 7.0.
Substratum	42 to 60 inches; brown stratified lenses of loam, sandy loam and loamy sand, platy and massive, hard to loose, pH 6.6.	4 to 60 inches; dark grayish brown to grayish brown silty clay, prismatic and blocky structure to massive, very hard to extremely hard, pH 7.0 to 7.4.
Rooting Depth (in.) to Underlying Material	40 plus; alluvium, basalt	40 plus; alluvium, basalt
Erosion Factor (K)	.37	.37
Max. Erosion Hazard	Moderate	Moderate
Soil Permeability	Slow	Very slow
Drainage Class	Well drained	Moderately well drained
Soil Manageability Class	2e	2ew
Group	II	
Forest Site Class	7 (non-commercial)	7 (non-commercial)
Range Site	13	24, 26
Water Runoff Potential	Slow	Very Slow
Watershed Sensitivity	6 (Moderate)	6
Hydrologic Soil Group	C	D
Available Water Capacity (AWC)	Moderate to High	Moderate to High
Upper 20 inches	3.0 inches	2.6 inches
Susceptibility to Burning Damage	Low	Low
Slope Stability Hazard	Low	Low
Allowable Soil Loss	3 tons/acre/year	5 tons/acre/year
Chance of Seedling Survival	Not Rated	Not Rated
Rating for Timber Site	Not Rated	Not Rated
R-Value	0-30	0-30
Soil horizons in inches, USDA, Unified, AASHTO	0-4; Loam Unified: CL AASHTO: A-4, A-6 4-17; Silty clay loam Unified: CL, MH, CH AASHTO: A-6, A-7 17-42; Silty clay, clay Unified: CH AASHTO: A-7 42-60; Loam, sandy loam, loamy sand Unified: ML,ML-CL,CL, SM AASHTO: A-4, A-6, A-2-4	0-60; Silty clay Unified: CH AASHTO: A-7
Included Areas:	Included with these soils in mapping and making up about 20 percent of the acreage are the Barnard, Supan, Los Gatos, Cardon, Bieber, and Keating families.	

191 KEATING-DEVEN FAMILIES ASSOCIATION, 1 to 20 percent slopes

Map Unit Components	Keating family (45 percent)	Deven family (35 percent)
Position, Slope, and Elevation	On smooth sideslopes of mountain uplands; 1 to 20 percent slopes; 4400 to 6000 feet.	On upper sideslopes and knolls of mountain uplands; 5 to 20 percent slopes; 4400 to 6000 feet.
Typical Vegetation and Precipitation (ppt)	Big sagebrush, western juniper, bitter- brush, mountain mahogany, rabbitbrush, grasses; 14 to 18 inches ppt.	Western juniper, low sagebrush, Phlox spp., cheatgrass, other grasses; 14 to 18 inches ppt.
Surface Layer	0 to 2 inches; dark grayish brown cobbly clay loam, granular structure, hard, pH 6.8.	0 to 2 inches; brown cobbly loam, granular structure, soft, pH 6.3.
Rooting Depth (in.) to Underlying Material	20 to 40; basalt, tuff	10 to 20; basalt, tuff
Erosion Factor (K)	.32	.37
Max. Erosion Hazard	Low to moderate	Moderate
Soil Permeability	Slow	Slow
Drainage Class	Well drained	Well drained
Soil Manageability Class	2e	2edx
Soil Manageability Group	II	
Forest Site Class	7 (non-commercial)	7 (non-commercial)
Range Site	18	8, 23
Water Runoff Potential	Moderate	Moderate
Watershed Sensitivity	6 (Moderate)	5
Hydrologic Soil Group	C	D
Available Water Capacity (AWC)	Low to Moderate	Very Low to Low
Upper 20 inches	2.7 inches	1.4 to 2.8 inches
Susceptibility to Burning Damage	Low	Low
Slope Stability Hazard	Low	Low
Allowable Soil Loss	2 tons/acre/year	1 tons/acre/year
Chance of Seedling Survival	Not Rated	Not Rated
Rating for Timber Site	Not Rated	Not Rated
R-Value	0-30	0-30
Soil horizons in inches, USDA, Unified, AASHTO	0-6; Cobbly clay loam, clay loam Unified: CL, MH, CH AASHTO: A-6, A-7 6-32; Clay Unified: CH AASHTO: A-7 32+; Unweathered bedrock	0-2; Cobbly loam Unified: ML-CL, CL AASHTO: A-4, A-6 2-7; Clay loam Unified: CL, MH, CH AASHTO: A-6, A-7 7-16; Clay Unified: CH AASHTO: A-7 16+; Unweathered bedrock
Included Areas:	Included with these soils in mapping and making up about 20 percent of the acreage are the Pass Canyon, Aikman, Ruckles, Bieber, Roval, Gwin, Puls and Los gatos families and Rock outcrop.	

192 KEATING-DEVEN FAMILIES ASSOCIATION, 20 to 40 percent slopes

Map Unit Components	Keating family (45 percent)	Deven family (35 percent)
Position, Slope, and Elevation	On smooth sideslopes of mountain uplands; 20 to 35 percent slopes; 4400 to 6000 feet.	On upper sideslopes, ridges and knolls of mountain uplands, 20 to 40 percent slopes; 4400 to 6000 feet.
Typical Vegetation and Precipitation (ppt)	Big sagebrush, western juniper, mountain mahogany, rabbitbrush, grasses; 14 to 18 inches ppt.	Western juniper, low sagebrush, big sagebrush, Phlox spp., cheatgrass, other grasses; 14 to 18 inches ppt.
Surface Layer	0 to 2 inches; dark grayish brown cobbly clay loam, granular structure, hard, pH 6.8.	0 to 2 inches; brown cobbly loam, granular structure, soft, pH 6.3.
Rooting Depth (in.) to Underlying Material	20 to 40; basalt, tuff	10 to 20; basalt tuff
Erosion Factor (K)	.32	.37
Max. Erosion Hazard	Moderate	Moderate to high
Soil Permeability	Slow	Slow
Drainage Class	Well drained	Well drained
Soil Manageability Class	2e	3Edx
Soil Manageability Group	II	
Forest Site Class	7 (non-commercial)	7 (non-commercial)
Range Site	18	8,23
Water Runoff Potential	Rapid	Rapid
Watershed Sensitivity	5 (Moderate)	4
Hydrologic Soil Group	C	D
Available Water Capacity (AWC)	Low to Moderate	Very Low to Low
Upper 20 inches	2.7 inches	1.4 to 2.8 inches
Susceptibility to Burning Damage	Low	Low
Slope Stability Hazard	Low to Moderate	Low to Moderate
Allowable Soil Loss	2 tons/acre/year	1 tons/acre/year
Chance of Seedling Survival	Not Rated	Not Rated
Rating for Timber Site	Not Rated	Not Rated
R-Value	0-30	0-30
Soil horizons in inches, USDA, Unified, AASHTO	0-6; Cobbly clay loam, Clay loam Unified: CL, MH, CH AASHTO: A-6, A-7 6-32; Clay Unified: CH AASHTO: A-7 32+; Unweathered bedrock	0-2; Cobbly loam Unified: ML-CL, CL AASHTO: A-4, A-6 2-7; Clay loam Unified: CL, MH, CH AASHTO: A-6, A-7 7-16; Clay Unified: CH AASHTO: A-7 16+; Unweathered bedrock
Included Areas:	Included with these soils in mapping and making up about 20 percent of the acreage are the Pass Canyon, Aikman, Bieber, Gwin, Ruckles, Roval and Los Gatos families and Rock outcrop.	

**193 KINZEL-LAPINE-DIVERS FAMILIES ASSOCIATION, 2 to 12 inch pumice overburden,
1 to 15 percent slopes**

Map Unit Components	Kinzel family (40 percent)	Lapine family, pumice overburden phase (25 percent)	Divers family, pumice overburden phase (20 percent)
Position, Slope, and Elevation	On concave areas of the Medicine Lake Caldera and its proximity; 1 to 10 percent slopes; 6500 to 7200 feet.	On smooth areas of the Medicine Lake Caldera and its proximity; 1 to 10 percent slopes; 6500 to 7200 feet.	On sideslopes and knolls of the Medicine Lake Caldera and its proximity; 5 to 15 percent slopes; 6500 to 7200 feet.
Typical Vegetation and Precipitation (ppt)	Western white pine, lodgepole pine, rabbitbrush, lupine, mint., Ross's sedge, grasses; 35 to 45 inches ppt.	Red fir forest, or mixed conifer forest of red fir, western white pine, mint., snowberry, carex species; 35 to 45 inches ppt.	
Surface Layer	A thin 2 to 12 inch pumice overburden is present on most pedons, OVER 0 to 10 inches; dark grayish brown gravelly loamy sand to very cobbly sandy loam, single grain and subangular blocky structure, loose and soft, pH 5.5 to 6.0. *SUBSOIL: 10 to 30 inches; yellowish brown to pale brown extremely stony sandy loam, subangular blocky structure, soft, pH 6.5.	1 to 0 inches; red fir needles and twigs, over 23 inches of pumice overburden consisting of grayish brown very gravelly coarse sand to a pale brown extremely gravelly coarse sand: (Thickness in this unit ranges from 2 to 12 inches.) OVER 23 to 26 inches; yellowish brown very gravelly sandy loam, granular structure, loose, pH 6.0.	15 inches of pumice overburden consisting of light brownish gray gravelly sandy loam grading to a white very gravelly sand texture (Thickness ranges from 2 to 12 inches) OVER 15 to 26 inches; brown very gravelly loamy sand with extremely cobbly sandy loam, platy and granular structure, soft, pH 5.2. *SUBSOIL: 26 to 60 inches; yellowish brown extremely cobbly sandy loam, subangular blocky structure, soft, pH 5.4 to 5.8.
Substratum	30 to 41 plus inches; light yellowish gray weakly cemented volcanic ash that rubs to a sandy loam texture, massive, very hard.	26 to 60 inches; brownish yellow extremely stony sandy loam, extremely gravelly sandy loam and extremely gravelly loamy coarse sand, massive and single grained, soft to loose pH 6.2 to 6.6.	
Rooting Depth (in.) to Underlying Material	20 to 40; volcanic ash, hard basalt	30 plus; cinders, basalt, andesite	30 plus; basalt, andesite
Erosion Factor (K)	.17	.20	.17
Max. Erosion Hazard	Low to moderate	Low	Low to moderate
Soil Permeability	Moderately rapid	Rapid	Moderately rapid
Drainage Class	Well drained	Somewhat excessively drained	Somewhat excessively drained
Soil Manageability Class Group	2ep II	1	2ep
Forest Site Class	6 (4-5)	5-6 (3-5)	5 (3-4)
Range Site	Not placed in a range site.	Not placed in a range site.	Not placed in a range site.
Water Runoff Potential	Very Slow	Very Slow	Very Slow
Watershed Sensitivity	7 (Low)	9	8
Hydrologic Soil Group	C	A	A
Available Water Capacity (AWC) Upper 20 inches	Low to Moderate 2.2 inches	Moderate to High 2.5 inches	Moderate 2.6 inches
Susceptibility to Burning Damage	Moderate	Moderate	Moderate
Slope Stability Hazard	Low	Low	Low
Allowable Soil Loss	2 tons/acre/year	3 tons/acre/year	3 tons/acre/year

193 KINZEL-LAPINE-DIVERS FAMILIES ASSOCIATION (continued)

	Moderate	Moderate to High	Moderate to High
Chance of Seedling Survival			
Rating for Timber Site	Fair (3,5,7)	Fair (5)	Fair (1,3,5)
R-Value	60+	60+	60+
Soil horizons in inches, USDA, Unified, AASHTO	0-6; Gravelly sand Unified: SM AASHTO: A-1-b 6-30; Very cobbly sandy loam Unified: SM, SM-SC AASHTO: A-2-4 30+; Weathered bedrock	0-2; Very gravelly coarse sand Unified: SW-SM AASHTO: A-1-a 2-23; Extremely gravelly coarse sand Unified: GP AASHTO: A-1-a 23-50; Very gravelly sandy loam, extremely stony sandy loam extremely gravelly sandy loam	0-4; Gravelly sandy loam Unified: SM AASHTO: A-1-b 4-15; Very gravelly sand Unified: SW-SM, SM AASHTO: A-1-a, A-1-b 15-60; Gravelly loamy sand, extremely cobbly sandy loam Unified: SM AASHTO: A-1-b
Included Areas:	Included with these soils in mapping and making up about 15 percent of the acreage are the Wuksi family, Rock outcrop and obsidian and lava flow rock.		

194 LAMONDI-SMARTS deep FAMILIES COMPLEX, 2 to 20 percent slopes

Map Unit Components	Lamondi family (55 percent)	Smarts family, deep (25 percent)
Position, Slope, and Elevation	On smooth sideslopes of mountain uplands; 2 to 20 percent slopes; 5500 to 7500 feet.	On smooth sideslopes and concave areas of mountain uplands; 2 to 20 percent slopes; 5500 to 7500 feet.
Typical Vegetation and Precipitation (ppt)	White fir forest, or mixed conifer forest of white fir, ponderosa pine, incense-cedar, plus snowberry, serviceberry, Ribes spp., Ross's sedge, few grasses; 20 to 30 inches ppt.	White fir forest, or mixed conifer forest of white fir, ponderosa pine, incense-cedar, plus snowberry, serviceberry, Ribes spp., Ross's sedge, few grasses; 20 to 30 inches ppt.
Surface Layer	4 to 0 inches of decomposed and undecomposed white fir needles and twigs, over 0 to 26 inches; brown gravelly loam to very gravelly loam, granular and blocky structure; soft, pH 6.2 to 6.4.	2 to 0 inches of decomposed and undecomposed white fir needles and twigs, over 0 to 18 inches; brown stony loam, granular structure, soft, pH 6.2.
Substratum		32 to 50 inches; pale brown extremely gravelly loam, massive, soft, pH 6.0.
Rooting Depth (in.) to Underlying Material	40 plus; andesite, tuff	40 plus; basalt, tuff
Erosion Factor (K)	.32	.32
Max. Erosion Hazard	Low to moderate	Low to moderate
Soil Permeability	Moderate	Moderately slow
Drainage Class	Well drained	Well drained
Soil Manageability Class	2e	2ep
Group	II	
Forest Site Class	4-5 (2-4)	4 (2-3)
Range Site	Not placed in a range site.	Not placed in a range site.
Water Runoff Potential	Very slow	Slow
Watershed Sensitivity	8 (Low)	8
Hydrologic Soil Group	B	B
Available Water Capacity (AWC)	Moderate to High	Moderate
Upper 20 inches	2.7 inches	2.6 inches
Susceptibility to Burning Damage	Low to Moderate	Low to Moderate
Slope Stability Hazard	Low	Low
Allowable Soil Loss	3 tons/acre/year	3 tons/acre/year
Chance of Seedling Survival	Moderate to High	Moderate
Rating for Timber Site	Good	Fair (1)
R-Value	30-60, 60+	30-60
Soil horizons in inches, USDA, Unified, AASHTO	0-26; Gravelly loam, very gravelly loam Unified: SM, SM-SC AASHTO: A-4 26-42; Extremely gravelly loam Unified: GM, GM-GC AASHTO: A-1-b, A-2-4 42+; Weathered bedrock	0-18; Stony loam Unified: ML-CL, CL AASHTO: A-4 18-50; Extremely gravelly clay loam, extremely gravelly loam Unified: SC AASHTO: A-2-6, A-6 50+; Weathered bedrock
Included Areas:	Included with these soils in mapping and making up about 20 percent of the acreage are the DeMasters, Patio, Wapal, and Anatone families and unnamed soils similar to the Smarts family but not Pachic.	

195 LAMONDI-SMARTS deep FAMILIES COMPLEX, 20 to 40 percent slopes

Map Unit Components	Lamondi family (60 percent)	Smarts family, deep (25 percent)
Position, Slope, and Elevation	On smooth sideslopes of mountain uplands; 20 to 40 percent slopes; 5500 to 7500 feet.	On smooth sideslopes and concave areas of mountain uplands; 20 to 40 percent slopes; 5500 to 7500 feet.
Typical Vegetation and Precipitation (ppt)	White fir forest or mixed conifer forest of white fir, ponderosa pine, incense-cedar, plus snowberry, serviceberry, Ribes spp., Ross's sedges, few grasses; 20 to 30 inches ppt.	White fir forest or mixed conifer forest of white fir, ponderosa pine, incense-cedar, plus snowberry, serviceberry, Ribes spp., Ross's sedge, few grasses; 20 to 30 inches ppt.
Surface Layer	4 to 0 inches of decomposed and undecomposed white fir needles and twigs, over 0 to 26 inches; brown gravelly loam to very gravelly loam, granular and blocky structure; soft, pH 6.2 to 6.4	2 to 0 inches of decomposed and undecomposed white fir needles and twigs, over 0 to 18 inches; brown stony loam, granular structure, soft, pH 6.2
Substratum		32 to 50 inches; pale brown extremely gravelly loam, massive, soft, pH 6.0.
Rooting Depth (in.) to Underlying Material	40 plus; andesite, tuff	40 plus; basalt, tuff
Erosion Factor (K)	.32	.32
Max. Erosion Hazard	Moderate	Moderate
Soil Permeability	Moderate	Moderately slow
Drainage Class	Well drained	Well drained
Soil Manageability Class	2e	2ep
Group	II	
Forest Site Class	4-5 (2-4)	4 (2-3)
Range Site	Not placed in a range site.	Not placed in a range site.
Water Runoff Potential	Slow	Slow
Watershed Sensitivity	7 (Moderate)	7
Hydrologic Soil Group	B	B
Available Water Capacity (AWC)	Moderate to High	Moderate
Upper 20 inches	2.7 inches	2.6 inches
Susceptibility to Burning Damage	Moderate	Low to Moderate
Slope Stability Hazard	Low	Low
Allowable Soil Loss	3 tons/acre/year	3 tons/acre/year
Chance of Seedling Survival	Moderate to High	Moderate to High
Rating for Timber Site	Good	Fair (1)
R-Value	30-60, 60+	30-60
Soil horizons in inches, USDA, Unified, AASHTO	0-26; Gravelly loam, very gravelly loam Unified: SM, SM-SC AASHTO: A-4 26-42; Extremely gravelly loam Unified: GM, GM-GC AASHTO: A-1-b, A-2-4 42+; Weathered bedrock	0-18; Stony loam Unified: ML-CL, CL AASHTO: A-4 18-50; Extremely gravelly clay loam, extremely gravelly loam Unified: SC AASHTO: A-2-6, A-6 50+; Weathered bedrock
Included Areas:	Included with these soils in mapping and making up about 15 percent of the acreage are the DeMasters, Patio, Wapal, and Anatone families, Rock outcrop and unnamed soils similar to DeMasters family but colder and not Pachic.	

196 LAMONDI-SMARTS deep FAMILIES COMPLEX, 40 to 60 percent slopes

Map Unit Components	Lamondi family (60 percent)	Smarts family, deep (20 percent)
Position, Slope, and Elevation	On smooth sideslopes of mountain uplands; 40 to 60 percent slopes; 5500 to 7500 feet.	On smooth sideslopes and concave areas of mountain uplands; 40 to 60 percent slopes; 5500 to 7500 feet.
Typical Vegetation and Precipitation (ppt)	White fir forest or mixed conifer forest of white fir, ponderosa pine, incense-cedar, plus snowberry, serviceberry, Ribes spp., Ross's sedge, few grasses; 20 to 30 inches ppt.	White fir forest or mixed conifer forest of white fir, ponderosa pine, incense-cedar, plus snowberry, serviceberry, Ribes spp., Ross's sedge, few grasses; 20 to 30 inches ppt.
Surface Layer	4 to 0 inches of decomposed and undecomposed white fir needles and twigs, over 0 to 26 inches; brown gravelly loam to very gravelly loam, granular and blocky structure; soft, pH 6.2 to 6.4	2 to 0 inches of decomposed and undecomposed white fir needles and twigs, over 0 to 18 inches; brown stony loam, granular structure, soft, pH 6.2
Substratum		32 to 50 inches; pale brown extremely gravelly loam, massive, soft, pH 6.0.
Rooting Depth (in.) to Underlying Material	40 plus; andesite, tuff	40 plus; basalt, tuff
Erosion Factor (K)	.32	.32
Max. Erosion Hazard	High	High
Soil Permeability	Moderate	Moderately slow
Drainage Class	Well drained	Well drained
Soil Manageability Class	3e	3ep
Group	III	
Forest Site Class	4-5 (2-4)	4 (2-3)
Range Site	Not placed in a range site.	Not placed in a range site.
Water Runoff Potential	Moderate	Moderate
Watershed Sensitivity	6 (Moderate)	6
Hydrologic Soil Group	B	B
Available Water Capacity (AWC)	Moderate to High	Moderate
Upper 20 inches	2.7 inches	2.6 inches
Susceptibility to Burning Damage	Moderate	Moderate
Slope Stability Hazard	Low	Low
Allowable Soil Loss	3 tons/acre/year	3 tons/acre/year
Chance of Seedling Survival	High	Moderate to High
Rating for Timber Site	Fair (8)	Fair (1,8)
R-Value	30-60, 60+	30-60
Soil horizons in inches, USDA, Unified, AASHTO	0-26; Gravelly loam, very gravelly loam Unified: SM, SM-SC AASHTO: A-4 26-42; Extremely gravelly loam Unified: GM, GM-GC AASHTO: A-1-b, A-2-4 42+; Weathered bedrock	0-18; Stony loam Unified: ML-CL, CL AASHTO: A-4 18-50; Extremely gravelly clay loam, extremely gravelly loam Unified: SC AASHTO: A-2-6, A-6 50+; Weathered bedrock
Included Areas:	Included with these soils in mapping and making up about 20 percent of the acreage are the DeMasters, Patio, Wapal, Anatone families, Lithic Xerorthents, frigid, and Rock outcrop.	

197 LAPINE-DIVERS FAMILIES ASSOCIATION, 10 to 24 inch pumice overburden, 20 to 40 percent slopes

Map Unit Components	Lapine family, pumice overburden phase (60 percent)	Divers family, pumice overburden phase (20 percent)
Position, Slope, and Elevation	On smooth sideslopes of volcanic mountain uplands; 20 to 40 percent slopes; 7000 to 7600 feet.	On upper sideslopes, ridges and knolls of volcanic mountain uplands, 20 to 40 percent slopes; 7000 to 7600 feet.
Typical Vegetation and Precipitation (ppt)	Red fir forest, or mixed conifer forest of red fir, mountain hemlock, western white pine, lodgepole pine, plus penstamen, mint.; 40 to 45 inches ppt.	Red fir forest, or mixed conifer forest of red fir, mountain hemlock, western white pine, lodgepole pine, plus chinqupine, prostrate manzanita, mint.; 40 to 45 inches ppt.
Surface Layer	1 to 0 inches; red fir needles and twigs, over 23 inches of pumice overburden consisting of grayish brown very gravelly coarse sand to a pale brown extremely gravelly coarse sand (Thickness in this unit ranges from 10 to 24 inches.) OVER 23 to 26 inches; yellowish brown very gravelly sandy loam, granular structure, loose, pH 6.0	15 inches of pumice overburden consisting of light brownish gray gravelly sandy loam grading to a white very gravelly sand texture (Thickness ranges from 10 to 24 inches) OVER 15 to 26 inches; brown very gravelly loamy sand and extremely cobbly sandy loam, platy and granular structure, soft, pH 5.2.
Substratum	26 to 60 inches; brownish yellow extremely stony sandy loam, extremely gravelly sandy loam and extremely gravelly loamy coarse sand, massive and single grained, soft to loose, pH 6.2 to 6.6	26 to 60 inches; yellowish brown extremely cobbly sandy loam, subangular blocky structure, soft, pH 5.4 to 5.8.
Rooting Depth (in.) to Underlying Material	40 plus; cinders, basalt	40 plus; basalt, andesite
Erosion Factor (K)	.20	.17
Max. Erosion Hazard	Moderate	Moderate
Soil Permeability	Rapid	Rapid in the overburden over moderately rapid below
Drainage Class	Somewhat excessively drained	Somewhat excessively drained
Soil Manageability Class	2ep	2ep
Group	II	
Forest Site Class	5 (3-4)	5 (3-4)
Range Site	Not placed in a range site.	Not placed in a range site.
Water Runoff Potential	Slow	SLow
Watershed Sensitivity	8 (Low)	8
Hydrologic Soil Group	A	A
Available Water Capacity (AWC)	Moderate to High	Moderate
Upper 20 inches	2.5 inches	2.6 inches
Susceptibility to Burning Damage	Moderate to High	Moderate to High
Slope Stability Hazard	Low	Low
Allowable Soil Loss	3 tons/acre/year	3 tons/acre/year
Chance of Seedling Survival	Moderate to High	Moderate to High
Rating for Timber Site	Fair (5)	Fair 3,5)
R-Value	60+	60+

197 LAPINE-DIVERS FAMILIES ASSOCIATION (continued)

Soil horizons in
inches, USDA,
Unified, AASHTO

<p>0-2; Very gravelly coarse sand Unified: SW-SM AASHTO: A-1-a</p> <p>2-23; Extremely gravelly coarse sand Unified: GP AASHTO: A-1-a</p> <p>23-50; Very gravelly sandy loam, extremely stony sandy loam, extremely gravelly sandy loam Unified: SW-SM, SM AASHTO: A-1-a, A-1-b</p> <p>50-60; Extremely gravelly loamy coarse sand Unified: GP, GW-GM AASHTO: A-1-a</p>	<p>0-4; Gravelly sandy loam Unified: SM AASHTO: A-1-b</p> <p>4-15; Very gravelly sand Unified: SW-SM, SM AASHTO: A-1-a, A-1-b</p> <p>15-60; Gravelly loamy sand, extremely cobbly sandy loam Unified: SM AASHTO: A-1-b</p>
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Included Areas:

Included with these soils in mapping and making up about 20 percent of the acreage are the Wuksi and Kinzel families, and Rock outcrop.

198 LAPINE-DIVERS FAMILIES ASSOCIATION, 10 to 24 inch pumice overburden, 40 to 60 percent slopes

Map Unit Components	Lapine family, pumice overburden phase (55 percent)	Divers family, pumice overburden phase (25 percent)
Position, Slope, and Elevation	On smooth sideslopes of volcanic mountain uplands; 40 to 60 percent slopes; 6800 to 7600 feet.	On upper sideslopes, ridges and knolls of volcanic mountain uplands, 40 to 60 percent slopes; 6800 to 7600 feet.
Typical Vegetation and Precipitation (ppt)	Red fir forest, or mixed conifer forest of red fir, mountain hemlock, western white pine, lodgepole pine, plus penstamen, mint.; 35 to 45 inches ppt.	Red fir forest, or mixed conifer forest of red fir, mountain hemlock, western white pine, lodgepole pine, plus chinqupine, prostrate manzanita, mint.; 35 to 45 inches ppt.
Surface Layer	1 to 0 inches; red fir needles and twigs, over 23 inches of pumice overburden consisting of grayish brown very gravelly coarse sand to a pale brown extremely gravelly coarse sand (Thickness in this unit ranges from 10 to 24 inches.) OVER 23 to 26 inches; yellowish brown very gravelly sandy loam, granular structure, loose, pH 6.0	15 inches of pumice overburden consisting of light brownish gray gravelly sandy loam grading to a white very gravelly sand texture (Thickness ranges from 10 to 24 inches) OVER 15 to 26 inches; brown very gravelly loamy sand and extremely cobbly sandy loam, platy and granular structure, soft, pH 5.2.
Substratum	26 to 60 inches; brownish yellow extremely stony sandy loam, extremely gravelly sandy loam and extremely gravelly loamy coarse sand, massive and single grained, soft to loose, pH 6.2 to 6.6	26 to 60 inches; yellowish brown extremely cobbly sandy loam, subangular blocky structure, soft, pH 5.4 to 5.8.
Rooting Depth (in.) to Underlying Material	40 plus; cinders, basalt	40 plus; basalt, andesite
Erosion Factor (K)	.20	.17
Max. Erosion Hazard	High	High
Soil Permeability	Rapid	Rapid in the overburden over moderately rapid below.
Drainage Class	Somewhat excessively drained	Somewhat excessively drained
Soil Manageability Class Group	3Ep III	3Ep
Forest Site Class	5 (3-4)	5 (3-4)
Range Site	Not placed in a range site.	Not placed in a range site.
Water Runoff Potential	Moderate	Moderate
Watershed Sensitivity	7 (Moderate)	7
Hydrologic Soil Group	A	A
Available Water Capacity (AWC)	Moderate to High	Moderate
Upper 20 inches	2.5 inches	2.6 inches
Susceptibility to Burning Damage	High	High
Slope Stability Hazard	Low	Low
Allowable Soil Loss	3 tons/acre/year	3 tons/acre/year
Chance of Seedling Survival	Moderate to High	Moderate to High
Rating for Timber Site	Fair (5,8)	Fair (3,5,8)
R-Value	60+	60+

198 LAPINE-DIVERS FAMILIES ASSOCIATION (continued)

Soil horizons in
inches, USDA,
Unified, AASHTO

<p>0-2; Very gravelly coarse sand Unified: SW-SM AASHTO: A-1-a</p> <p>2-23; Extremely gravelly coarse sand Unified: GP AASHTO: A-1-a</p> <p>23-50; Very gravelly sandy loam, extremely stony sandy loam, extremely gravelly sandy loam Unified: SW-SM, SM AASHTO: A-1-a, A-1-b</p> <p>50-60; Extremely gravelly loamy coarse sand Unified: GP, GW-GM AASHTO: A-1-a</p>	<p>0-4; Gravelly sandy loam Unified: SM AASHTO: A-1-b</p> <p>4-15; Very gravelly sand Unified: SW-SM, SM AASHTO: A-1-a, A-1-b</p> <p>15-60; Gravelly loamy sand, extremely cobbly sandy loam Unified: SM AASHTO: A-1-b</p>
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Included Areas:

Included with these soils in mapping and making up about 20 percent of the acreage are the Wuksi and Kinzel families, and Rock outcrop.

**199 LAPINE-WUKSI-DIVERS FAMILIES ASSOCIATION, 2 to 8 inch pumice overburden,
5 to 30 percent slopes**

Map Unit Components	Lapine family, pumice overburden phase (35 percent)	Wuksi family (30 percent)	Divers family, pumice overburden phase (20 percent)
Position, Slope, and Elevation	On sideslopes on south end of the Medicine Lake Caldera; 5 to 15 percent slopes; 6600 to 7000 feet.	On the basalt/cinder contact zone on ridges and knolls on the south end of the Medicine Lake Caldera; 5 to 30 percent slopes; 6600 to 7000 feet.	On upper sideslopes and ridges on the south end of the Medicine Lake Caldera; 5 to 30 percent slopes; 6600 to 7000 feet.
Typical Vegetation and Precipitation (ppt)	Red fir forest, or mixed conifer forest of red fir, western white pine, plus mint., prostrate manzanita; 40 to 45 inches ppt.	Western white pine, lodgepole pine, red fir, prostrate manzanita, penstament; 40 to 45 inches ppt.	
Surface Layer	1 to 0 inches; red fir needles and twigs, over 23 inches of pumice overburden consisting of grayish brown very gravelly coarse sand to a pale brown extremely gravelly coarse sand; (Thickness in this unit ranges from 2 to 8 inches.) OVER 23 to 26 inches; yellowish brown very gravelly sandy loam, granular structure loose, pH 6.0.	1 to 0 inches of western white pine and red fir needles and twigs, over 2 to 8 inches of light gray gravelly coarse sand composed of pumice (thickness ranges from 2 to 8 inches); OVER 8 to 18 inches; pale brown extremely gravelly loamy coarse sand, single grain, loose pH 6.2	15 inches of pumice overburden consisting of light brownish gray gravelly sandy loam grading to a white very gravelly sand texture (Thickness ranges from 2 to 8 inches OVER 15 to 26 inches; brown very gravelly loamy sand with extremely cobbly sandy loam, platy and granular structure, soft, pH 5.2.
Subsoil			26 to 60 inches; yellowish brown extremely cobbly sandy loam, subangular blocky structure, soft, pH 5.4 to 5.8.
Substratum	26 to 60 inches; brownish yellow extremely stony sandy loam, extremely gravelly sandy loam and extremely gravelly loamy coarse sand, massive and single grained, soft to loose; pH 6.2 to 6.6.	18 to 32 inches; yellowish brown extremely cobbly loamy coarse sand, single grain, loose, pH 6.0.	
Rooting Depth (in.) to Underlying Material	30 plus; cinders, basalt	20 to 40; cinders, scoriaceous basalt	30 plus; basalt andesite
Erosion Factor (K)	.20	.17	.17
Max. Erosion Hazard	Low to Moderate	Low to Moderate	Low to Moderate
Soil Permeability	Rapid	Rapid	Moderately rapid
Drainage Class	Somewhat excessively drained	Somewhat excessively drained	Somewhat excessively drained
Soil Manageability Class Group	2ep II	2ep	2ep
Forest Site Class	5-6 (3-5)	6 (5)	5 (3-4)
Range Site	Not placed in range site.	Not placed in a range site.	Not placed in a range site.
Water Runoff Potential	Very Slow	Very Slow	Very Slow
Watershed Sensitivity	8 (Low)	8	8
Hydrologic Soil Group	A	A	A
Available Water Capacity (AWC) Upper 20 inches	Moderate to High 2.5 inches	Low 1.8 inches	Moderate 2.6 inches
Susceptibility to Burning Damage	Moderate	High	Moderate
Slope Stability Hazard	Low	Low	Low
Allowable Soil Loss	3 tons/acre/year	2 tons/acre/year	3 tons/acre/year

199 LAPINE-WUKSI-DIVERS FAMILIES ASSOCIATION (continued)

	Moderate High	Low to Moderate	Moderate to High
Chance of Seedling Survival			
Rating for Timber Site	Fair (5)	Poor (1,4,5,7)	Fair (1,3,5)
R-Value	60+	60+	60+
Soil horizons in inches, USDA, Unified, AASHTO	0-2; Very gravelly coarse sand Unified: SW-SM AASHTO: A-1-a 2-23; Extremely gravelly coarse sand Unified: GP AASHTO: A-1-a 23-50; Very gravelly sandy loam, extremely stony sandy loam, extremely gravelly sandy loam Unified: SW-SM, SM AASHTO: A-1-a, A-1-b 50-60; Extremely gravelly loamy coarse sand Unified: GP, GW-GM AASHTO: A-1-a	0-8; Gravelly coarse sand Unified: SM AASHTO: A-1-a 8-32; Extremely gravelly loamy coarse sand, extremely cobbly loamy coarse sand Unified: SW-SM AASHTO: A-1-a 32+; Weathered bedrock	0-4; Gravelly sandy loam Unified: SM AASHTO: A-1-b 4-15; Very gravelly sand Unified: SW-SM, SM AASHTO: A-1-a, A-1-b 15-60; Gravelly loamy sand, extremely cobbly sandy loam Unified: SM AASHTO: A-1-b

Included Areas:

Included with these soils in mapping and making up about 15 percent if the acreage is the Kinzel family and Rock outcrop.

200 LAWYER deep-LAWYER FAMILY COMPLEX, 1 to 20 percent slopes

Map Unit Components	Lawyer family, deep (50 percent)	Lawyer family (30 percent)
Position, Slope, and Elevation	On lower slopes of undulating basalt plateaus; 1 to 15 percent slopes; 4900 to 5800 feet.	On upper sideslopes and ridges of undulating basalt plateaus; 2 to 20 percent slopes; 4900 to 5800 feet.
Typical Vegetation and Precipitation (ppt)	Ponderosa pine, incense-cedar, greenleaf manzanita, squaw carpet, big sagebrush, Ross's sedge, few grasses; 18 to 25 inches ppt.	Ponderosa pine, western juniper, squaw carpet, mountain mahogany, greenleaf manzanita, big sagebrush, few grasses; 18 to 25 inches ppt.
Surface Layer	1 to 0 inches of ponderosa pine needles and twigs, over 0 to 13 inches; dark reddish brown and reddish brown loam, granular and blocky structure, slightly hard, pH 6.2 and 6.0	2 to 0 inches of ponderosa pine needles and twigs, over 0 to 8 inches; dark brown stony loam, granular structure, soft, pH 6.2.
Rooting Depth (in.) to Underlying Material	40 plus; soft to hard basalt.	20 to 40; soft to hard basalt.
Erosion Factor (K)	.37	.37
Max. Erosion Hazard	Low	Low to Moderate
Soil Permeability	Moderately slow	Moderately slow
Drainage Class	Well drained	Well drained
Soil Manageability Class	1	2e
Soil Manageability Group	I	
Forest Site Class	5 (3-4)	6 (4-5)
Range Site	Not placed in a range site.	Not placed in a range site.
Water Runoff Potential	Very Slow	Slow
Watershed Sensitivity	8 (Low)	7
Hydrologic Soil Group	B	B
Available Water Capacity (AWC) Upper 20 inches	Moderate to High 3.0 inches	Low to Moderate 2.6 inches
Susceptibility to Burning Damage	Low	Low to Moderate
Slope Stability Hazard	Low	Low
Allowable Soil Loss	3 tons/acre/year	2 tons/acre/year
Chance of Seedling Survival	Moderate	Low to Moderate
Rating for Timber Site	Good (10)	Fair (7,10)
R-Value	30-60	30-60
Soil horizons in inches, USDA, Unified, AASHTO	0-21; Loam, gravelly loam Unified: ML-CL, CL AASHTO: A-4, A-6 21-45; Extremely gravelly clay loam Unified: GC AASHTO: A-2-6, A-2-7 45+; Weathered bedrock	0-8; Stony loam Unified: SM, SM-SC, ML, ML-CL AASHTO: A-4 8-24; Cobbly clay loam, extremely cobbly clay loam Unified: SC AASHTO: A-6 24+; Weathered bedrock
Included Areas:	Included with these soils in mapping and making up about 20 percent of the acreage are the Deven, Elmore, Jacket, Hiibner and Pass Canyon families and Rock outcrop.	

201 LAWYER-ELMORE FAMILIES, deep ASSOCIATION, 1 to 20 percent slopes

Map Unit Components	Lawyer family, deep (50 percent)	Elmore family, deep (40 percent)
Position, Slope, and Elevation	On upper sideslopes, ridges and knolls of undulating basalt plateaus and mountain uplands; 1 to 20 percent slopes; 4300 to 6000 feet.	On lower sideslopes, and concave areas of undulating basalt plateaus and mountain uplands; 1 to 20 percent slopes; 4300 to 6000 feet.
Typical Vegetation and Precipitation (ppt)	Ponderosa pine, Jeffrey pine, few western juniper and incense-cedar, big sagebrush, bitterbrush, greenleaf manzanita, squaw carpet, Ross's sedge, grasses; 16 to 25 inches ppt.	Ponderosa pine, Jeffrey pine, incense-cedar, big sagebrush, bitterbrush, greenleaf, manzanita, ceonothus, squaw carpet, Ross's sedge, grasses; 16 to 25 inches ppt.
Surface Layer	1 to 0 inches; undecomposed ponderosa pine needles and twigs, over 0 to 21 inches; brown to reddish brown stony loam cobbly loam and very cobbly loam, granular and blocky structure, soft to slightly hard, pH 6.0 to 6.2.	2 to 0 inches; decomposed and undecomposed ponderosa pine needles and twigs, over 0 to 13 inches; dark brown and reddish brown loam, granular structure, very friable, pH 6.4 to 6.6.
Rooting Depth (in.) to Underlying Material	40 plus; soft to hard basalt.	40 plus; soft to hard basalt.
Erosion Factor (K)	.32	.37
Max. Erosion Hazard	Low to moderate	Low to moderate
Soil Permeability	Moderately slow	Moderately slow
Drainage Class	Well drained	Well drained
Soil Manageability Class	2e	1
Group	II	
Forest Site Class	5 (3-4)	5 (2-4)
Range Site	Not placed in a range site.	Not placed in a range site.
Water Runoff Potential	Slow	Slow
Watershed Sensitivity	8 (Low)	8
Hydrologic Soil Group	B	B
Available Water Capacity (AWC)	Moderate to High	High
Upper 20 inches	2.6 inches	3.4 inches
Susceptibility to Burning Damage	Low to Moderate	Low
Slope Stability Hazard	Low	Low
Allowable Soil Loss	3 tons/acre/year	3 tons/acre/year
Chance of Seedling Survival	Low to Moderate	Moderate to High
Rating for Timber Site	Fair (1,3,10)	Good (10)
R-Value	30-60	30-60
Soil horizons in inches, USDA, Unified, AASHTO	0-21; Stony loam, cobbly loam, very cobbly loam Unified: SM, SC, ML, CL AASHTO: A-4, A-6 21-50; Very cobbly clay loam, extremely cobbly clay loam Unified: SC, CL, MH AASHTO: A-6, A-7 50+; Weathered bedrock	0-13; Loam Unified: ML-CL, CL AASHTO: A-4, A-6 13-48; Gravelly loam, gravelly clay loam Unified: CL, MH AASHTO: A-6, A-7 48+; Weathered bedrock
Included Areas:	Included with these soils in mapping and making up about 10 percent of the acreage are the Jacket, Hiebner, Fordice, Gwin, Lamondi, SMarts deep, DeMasters deep, Pass Canyon families and unnamed soils similar to the Skalan family and Rock outcrop.	

202 LAWYER-ELMORE FAMILIES, deep ASSOCIATION, 20 to 40 percent slopes

Map Unit Components	Lawyer family, deep (55 percent)	Elmore family, deep (30 percent)
Position, Slope, and Elevation	On upper sideslopes, ridges and knolls of mountain uplands; 20 to 40 percent slopes; 4600 to 6000 feet.	On sideslopes and concave acres of mountain uplands; 20 to 40 percent slopes; 4600 to 6000 feet.
Typical Vegetation and Precipitation (ppt)	Ponderosa pine, Jeffrey pine, few western juniper and Incense-cedar, big sagebrush, bitterbrush, greenleaf manzanita, squaw carpet, Ross's sedge, grasses; 16 to 25 inches ppt.	Ponderosa pine, Jeffrey pine, incense-cedar, big sagebrush, bitterbrush, greenleaf manzanita, ceonothus, squaw carpet, Ross's sedge, grasses; 16 to 25 inches ppt.
Surface Layer	1 to 0 inches; undecomposed ponderosa pine needles and twigs, over 0 to 21 inches; brown to reddish brown stony loam cobbly loam and very cobbly loam, granular and blocky structure, soft to slightly hard, pH 6.0 to 6.2.	2 to 0 inches; decomposed and undecomposed ponderosa pine needles and twigs, over 0 to 13 inches; dark brown and reddish brown loam, granular structure, very friable, pH 6.4 to 6.6
Rooting Depth (in.) to Underlying Material	40 plus; soft to hard basalt.	40 plus; soft to hard basalt.
Erosion Factor (K)	.32	.37
Max. Erosion Hazard	Moderate	Moderate
Soil Permeability	Moderately slow	Moderately slow
Drainage Class	Well drained	Well drained
Soil Manageability Class Group	2e II	2e
Forest Site Class	5 (3-4)	5 (2-4)
Range Site	Not placed in a range site	Not placed in a range site.
Water Runoff Potential	Moderate	Moderate
Watershed Sensitivity	7 (Moderate)	7
Hydrologic Soil Group	B	B
Available Water Capacity (AWC)	Moderate to High	High
Upper 20 inches	2.6 inches	3.4 inches
Susceptibility to Burning Damage	Moderate	Low to Moderate
Slope Stability Hazard	Low	Low
Allowable Soil Loss	3 tons/acre/year	3 tons/acre/year
Chance of Seedling Survival	Low to Moderate	Moderate to High
Rating for Timber Site	Fair (1,3,10)	Good (10)
R-Value	30-60	30-60
Soil horizons in inches, USDA, Unified, AASHTO	0-21; Stony loam, cobbly loam, very cobbly loam Unified: SM, SC, ML, CL AASHTO: A-4, A-6 21-50; Very cobbly clay loam, extremely cobbly clay loam Unified: SC, CL, MH AASHTO: A-6, A-7 50+; Weathered bedrock	0-13; Loam Unified: ML-CL, CL AASHTO: A-4, A-6 13-48; Gravelly loam, gravelly clay loam Unified: CL, MH AASHTO: A-6, A-7 48+; Weathered bedrock
Included Areas:	Included with these soils in mapping and making up about 15 percent of the acreage are the Jacket, Hiibner, Fordice, Gwin, Lamondi, Smarts deep, DeMasters deep, Pass Canyon families and Rock outcrop.	

203 LAWYER-ELMORE FAMILIES, deep ASSOCIATION, 40 to 60 percent slopes

Map Unit Components	Lawyer family, deep (60 percent)	Elmore family, deep (25 percent)
Position, Slope, and Elevation	On sideslopes, ridges and knolls of mountain uplands; 40 to 60 percent slopes; 4600 to 6000 feet.	On lower sideslopes and concave acres of mountain uplands; 40 to 50 percent slopes; 4600 to 6000 feet.
Typical Vegetation and Precipitation (ppt)	Ponderosa pine, Jeffrey pine, few western juniper and Incense-cedar, big sagebrush, bitterbrush, greenleaf manzanita, squaw carpet, Ross's sedge, grasses; 16 to 25 inches ppt.	Ponderosa pine, Jeffrey pine, incense-cedar, big sagebrush, bitterbrush, greenleaf manzanita, ceonothus, squaw carpet, Ross's sedge, grasses; 16 to 25 inches ppt.
Surface Layer	1 to 0 inches; undecomposed ponderosa pine needles and twigs, over 0 to 21 inches; brown to reddish brown stony loam cobbly loam and very cobbly loam, granular and blocky structure, soft to slightly hard, pH 6.0 to 6.2.	2 to 0 inches; decomposed and undecomposed ponderosa pine needles and twigs, over 0 to 13 inches; dark brown and reddish brown loam, granular structure, very friable, pH 6.4 to 6.6
Rooting Depth (in.) to Underlying Material	40 plus; soft to hard basalt.	40 plus; soft to hard basalt.
Erosion Factor (K)	.32	.37
Max. Erosion Hazard	High	High
Soil Permeability	Moderately slow	Moderately slow
Drainage Class	Well drained	Well drained
Soil Manageability Class Group	3e III	3e
Forest Site Class	5 (3-4)	5 (2-4)
Range Site	Not placed in a range site	Not placed in a range site.
Water Runoff Potential	Moderate	Moderate
Watershed Sensitivity	6 (Moderate)	7
Hydrologic Soil Group	B	B
Available Water Capacity (AWC)	Moderate to High	High
Upper 20 inches	2.6 inches	3.4 inches
Susceptibility to Burning Damage	Moderate	Moderate
Slope Stability Hazard	Low	Low
Allowable Soil Loss	3 tons/acre/year	3 tons/acre/year
Chance of Seedling Survival	Low to Moderate	Moderate to High
Rating for Timber Site	Fair (1,3,8,10)	Fair (8,10)
R-Value	30-60	30-60
Soil horizons in inches, USDA, Unified, AASHTO	0-21; Stony loam, cobbly loam, very cobbly loam Unified: SM, SC, ML, CL AASHTO: A-4, A-6 21-50; Very cobbly clay loam, extremely cobbly clay loam Unified: SC, CL, MH AASHTO: A-6, A-7 50+; Weathered bedrock	0-13; Loam Unified: ML-CL, CL AASHTO: A-4, A-6 13-48; Gravelly loam, gravelly clay loam Unified: CL, MH AASHTO: A-6, A-7 48+; Weathered bedrock
Included Areas:	Included with these soils in mapping and making up about 15 percent of the acreage are the Jacket, Hiibner, Fordice, Gwin, Lamondi, Smarts deep, DeMasters deep, Pass Canyon families and Rock outcrop.	

204 LAWYER-ELMORE-GWIN FAMILIES ASSOCIATION, 1 to 20 percent slopes

Map Unit Components	Lawyer family (35 percent)	Elmore family (30 Percent)	Gwin family (15 percent)
Position, Slope, and Elevation	On undulating basalt plateaus and sideslopes of mountain uplands; 1 to 20 percent slopes; 4300 to 6000 feet.	On undulating basalt plateaus and sideslopes of mountain uplands; 1 to 20 percent slopes; 4300 to 6000 feet.	On upper sideslopes, ridges and knolls of undulating basalt plateaus and mountain uplands; 5 to 20 percent slopes; 4300 to 6000 feet.
Typical Vegetation and Precipitation (ppt)	Ponderosa pine, Jeffrey pine, western juniper, (few black oak in the south- western portion of the survey area) big sagebrush, mountain mahogany, bitterbrush, squaw carpet, mulesear, lupine, western yarrow, Ross's sedge, grasses; 16 to 20 inches ppt.	Ponderosa pine, Jeffrey pine, western juniper, (few black oak in the south- western portion of the survey area) big sagebrush, bitterbrush, squaw carpet, gooseberry, chokecherry, lupine, mulesear, western yarrow, Ross's sedge, grasses; 16 to 20 inches ppt.	
Surface Layer	2 to 0 inches on ponderosa pine needles and twigs over 0 to 8 inches; dark brown stony loam, granular structure, soft, pH 6.2	1 to 0 inches of ponderosa pine needles and twigs, over 0 to 8 inches; brown loam, platy and granular structure, slightly hard, pH 6.0.	0 to 11 inches; dark grayish brown very cobbly loam, granular and blocky structure; slightly hard, pH 6.8.
Rooting Depth (in.) to Underlying Material	20 to 40 inches; soft to hard basalt, andesite	20 to 40 inches; soft to hard basalt, andesite, tuff	10 to 20 inches; basalt, andesite
Erosion Factor (K)	.32	.32	.37
Max. Erosion Hazard	Low to Moderate	Low to moderate	Moderate
Soil Permeability	Moderately slow	Moderately slow	Moderately slow
Drainage Class	Well drained	Well drained	Well drained
Soil Manageability Class Group	2e II	2e	2edx
Forest Site Class	6 (4-5)	5-6 (3-5)	7 (non-commercial)
Range Site	Not placed in a range site	Not placed in a range site.	8
Water Runoff Potential	SLow	SLow	Moderate
Watershed Sensitivity	7 (Moderate)	8	6
Hydrologic Soil Group	B	B	D
Available Water Capacity (AWC)	Low to Moderate	Low to Moderate	Very Low to Low
Upper 20 inches	2.6 inches	3.2 inches	1.0 to 2.0 inches
Susceptibility to Burning Damage	Low to Moderate	Low to Moderate	Low
Slope Stability Hazard	Low	Low	Low
Allowable Soil Loss	2 tons/acre/year	2 tons/acre/year	1 tons/acre/year
Chance of Seedling Survival	Low to Moderate	Moderate	Not Rated
Rating for Timber Site	Fair (1,3,7,10)	Fair (7,10)	Not Rated
R-Value	30-60	30-60	30-60
Soil horizons in inches, USDA, Unified, AASHTO	0-8; Stony loam Unified: SM, SM-SC, ML, ML-CL AASHTO: A-4 8-24; Very cobbly clay loam, extremely cobbly clay loam Unified: SC AASHTO: A-6 24+; Weathered bedrock	0-8; Loam Unified: ML-CL, CL AASHTO: A-4, A-6 8-27; Clay loam, gravelly clay loam Unified: CL, MH AASHTO: A-6, A-7 27+; Unweathered bedrock	0-11; Very cobbly loam Unified: SM, SM-SC AASHTO: A-4 11-18; Extremely cobbly clay loam Unified: SC, CL AASHTO: A-6 18+; Unweathered bedrock

204 LAWYER-ELMORE-GWIN FAMILIES ASSOCIATION (continued)

Included Areas:

Included with these soils in mapping and making up about 20 percent of the acreage are the Elmore and Lawyer families deeper than 40 inches, Deven, Pass Canyon, Packwood, Bieber, DeMasters, Smarts, Jacket and Fordice families and Rock outcrop.

205 LAWYER-ELMORE-GWIN FAMILIES ASSOCIATION, 20 to 40 percent slopes

Map Unit Components	Lawyer family (40 percent)	Elmore family (25 Percent)	Gwin family (15 percent)
Position, Slope, and Elevation	On sideslopes and slightly convex areas of mountain uplands; 20 to 40 percent slopes; 4300 to 6000 feet.	On sideslopes and concave areas of mountain uplands; 20 to 40 percent slopes; 4600 to 6000 feet.	On upper sideslopes, ridges and knolls of mountain uplands; 20 to 40 percent slopes; 4600 to 6000 feet.
Typical Vegetation and Precipitation (ppt)	Ponderosa pine, Jeffrey pine, western juniper, (few black oak in the south- western portion of the survey area) big sagebrush, mountain mahogany, bitterbrush, squaw carpet, mulesear, lupine, western yarrow, Ross's sedge, grasses; 16 to 20 inches ppt.	Ponderosa pine, Jeffrey pine, western juniper, (few black oak in the south- western portion of the survey area) big sagebrush, bitterbrush, squaw carpet, gooseberry, chokecherry, lupine, mulesear, western yarrow, Ross's sedge, grasses; 16 to 20 inches ppt.	
Surface Layer	2 to 0 inches on ponderosa pine needles and twigs over 0 to 8 inches; dark brown stony loam, granular structure, soft, pH 6.2	1 to 0 inches of ponderosa pine needles and twigs, over 0 to 8 inches; brown loam, platy and granular structure, slightly hard, pH 6.0.	0 to 11 inches; dark grayish brown very cobbly loam, granular and blocky structure; slightly hard, pH 6.8.
Rooting Depth (in.) to Underlying Material	20 to 40 inches; soft to hard basalt, andesite	20 to 40 inches; soft to hard basalt, andesite, tuff	10 to 20 inches; basalt, andesite
Erosion Factor (K)	.32	.32	.37
Max. Erosion Hazard	Moderate	Moderate	Moderate to high
Soil Permeability	Moderately slow	Moderately slow	Moderately slow
Drainage Class	Well drained	Well drained	Well drained
Soil Manageability Class Group	2e II	2e	3Edx
Forest Site Class	6 (4-5)	5-6 (3-5)	7 (non-commercial)
Range Site	Not placed in a range site	Not placed in a range site.	8
Water Runoff Potential	Slow	Slow	Rapid
Watershed Sensitivity	7 (Moderate)	7	5
Hydrologic Soil Group	B	B	D
Available Water Capacity (AWC) Upper 20 inches	Low to Moderate 2.6 inches	Low to Moderate 3.2 inches	Very Low to Low 1.0 to 2.0 inches
Susceptibility to Burning Damage	Moderate	Moderate	Moderate
Slope Stability Hazard	Low	Low	Low
Allowable Soil Loss	2 tons/acre/year	2 tons/acre/year	1 tons/acre/year
Chance of Seedling Survival	Low to Moderate	Moderate	Not Rated
Rating for Timber Site	Fair (1,3,7,10)	Fair (7,10)	Not Rated
R-Value	30-60	30-60	30-60
Soil horizons in inches, USDA, Unified, AASHTO	0-8; Stony loam Unified: SM, SM-SC, ML, ML-CL AASHTO: A-4 8-24; Very cobbly clay loam, extremely cobbly clay loam Unified: SC AASHTO: A-6 24+; Weathered bedrock	0-8; Loam Unified: ML-CL, CL AASHTO: A-4, A-6 8-27; Clay loam, gravelly clay loam Unified: CL, MH AASHTO: A-6, A-7 27+; Unweathered bedrock	0-11; Very cobbly loam Unified: SM, SM-SC AASHTO: A-4 11-18; Extremely cobbly clay loam Unified: SC, CL AASHTO: A-6 18+; Unweathered bedrock

205 LAWYER-ELMORE-GWIN FAMILIES ASSOCIATION (continued)

Included Areas:

Included with these soils in mapping and making up about 20 percent of the acreage are the Elmore and Lawyer families deeper than 40 inches, Deven, Pass Canyon, Packwood, Bieber, DeMasters, Smarts, Jacket and Fordice families and Rock outcrop.

206 LAWYER-ELMORE-GWIN FAMILIES ASSOCIATION, 40 to 60 percent slopes

Map Unit Components	Lawyer family (50 percent)	Elmore family (15 Percent)	Gwin family (15 percent)
Position, Slope, and Elevation	On sideslopes and slightly convex areas of mountain uplands; 40 to 60 percent slopes; 4300 to 6000 feet.	On sideslopes and concave areas of mountain uplands; 40 to 50 percent slopes; 4600 to 6000 feet.	On upper sideslopes, ridges and knolls of mountain uplands; 40 to 60 percent slopes; 4600 to 6000 feet.
Typical Vegetation and Precipitation (ppt)	Ponderosa pine, Jeffrey pine, western juniper, (few black oak in the south- western portion of the survey area) big sagebrush, mountain mahogany, bitterbrush, squaw carpet, mulesear, lupine, western yarrow, Ross's sedge, grasses; 16 to 20 inches ppt.	Ponderosa pine, Jeffery pine, western juniper, (few black oak in the south- western portion of the survey area) big sagebrush, bitterbrush, squaw carpet, gooseberry, chokecherry, lupine, mulesear, western yarrow, Ross's sedge, grasses; 16 to 20 inches ppt.	
Surface Layer	2 to 0 inches on ponderosa pine needles and twigs over 0 to 8 inches; dark brown stony loam, granular structure, soft, pH 6.2	1 to 0 inches of ponderosa pine needles and twigs, over 0 to 8 inches; brown loam, platy and granular structure, slightly hard, pH 6.0.	0 to 11 inches; dark grayish brown very cobbly loam, granular and blocky structure; slightly hard, pH 6.8.
Rooting Depth (in.) to Underlying Material	20 to 40 inches; soft to hard basalt, andesite	20 to 40 inches; soft to hard basalt, andesite, tuff	10 to 20 inches; basalt, andesite
Erosion Factor (K)	.32	.32	.37
Max. Erosion Hazard	High	High	High to very high
Soil Permeability	Moderately slow	Moderately slow	Moderately slow
Drainage Class	Well drained	Well drained	Well drained
Soil Manageability Class Group	3e III	3e	3Edx
Forest Site Class	6 (4-5)	5-6 (3-5)	7 (non-commercial)
Range Site	Not placed in a range site	Not placed in a range site.	8
Water Runoff Potential	Moderate	Moderate	Very Rapid
Watershed Sensitivity	6 (Moderate)	6	4
Hydrologic Soil Group	B	B	D
Available Water Capacity (AWC) Upper 20 inches	Low to Moderate 2.6 inches	Low to Moderate 3.2 inches	Very Low to Low 1.0 to 2.0 inches
Susceptibility to Burning Damage	Moderate	Moderate	Moderate
Slope Stability Hazard	Low	Low	Low
Allowable Soil Loss	2 tons/acre/year	2 tons/acre/year	1 tons/acre/year
Chance of Seedling Survival	Low to Moderate	Moderate	Not Rated
Rating for Timber Site	Fair (1,3,7,8,10)	Fair (7,8,10)	Not Rated
R-Value	30-60	30-60	30-60
Soil horizons in inches, USDA, Unified, AASHTO	0-8; Stony loam Unified: SM, SM-SC, ML, ML-CL AASHTO: A-4 8-24; Very cobbly clay loam, extremely cobbly clay loam Unified: SC AASHTO: A-6 24+; Weathered bedrock	0-8; Loam Unified: ML-CL, CL AASHTO: A-4, A-6 8-27; Clay loam, gravelly clay loam Unified: CL, MH AASHTO: A-6, A-7 27+; Unweathered bedrock	0-11; Very cobbly loam Unified: SM, SM-SC AASHTO: A-4 11-18; Extremely cobbly clay loam Unified: SC, CL AASHTO: A-6 18+; Unweathered bedrock

206 LAWYER-ELMORE-GWIN FAMILIES ASSOCIATION (continued)

Included Areas:

Included with these soils in mapping and making up about 20 percent of the acreage are the Elmore and Lawyer families deeper than 40 inches, Deven, Pass Canyon, Packwood, Bieber, DeMasters, Smarts, Jacket and Fordice families and Rock outcrop.

207 LITHIC CRYOCHREPTS-CHEADLE FAMILY ASSOCIATION, 10 to 40 percent slopes

Map Unit Components	Lithic Cryochrepts (45 percent)	Cheadle family (35 percent)
Position, Slope, and Elevation	On smooth sideslopes and concave areas of mountain uplands; 10 to 40 percent slopes; 7300 to 8000 feet.	On upper sideslopes, ridges and knolls of mountain uplands; 15 to 40 percent slopes; 7300 to 8000 feet.
Typical Vegetation and Precipitation (ppt)	Low sagebrush, big sagebrush, lupine, Phlox spp., buckwheat, Idaho fescue, other grasses; 30 to 35 inches ppt.	Few white bark pine and lodgepole pine, low sagebrush, Phlox spp., mountain mahogany, Idaho fescue, other grasses; 30 to 35 inches ppt.
Surface Layer	0 to 2 inches; grayish brown extremely gravelly clay; blocky and granular structure, hard, pH 7.0	0 to 17 inches; dark grayish brown to brown very cobbly loam to very cobbly clay loam; granular and subangular blocky structure, slightly hard to hard, pH 6.6.
Rooting Depth (in.) to Underlying Material	6 to 20; tuff, andesite, basalt	10 to 20; andesite tuff.
Erosion Factor (K)	Variable	.37
Max. Erosion Hazard	Moderate to high	Moderate to high
Soil Permeability	Slow	Moderate
Drainage Class	Well drained	Well drained
Soil Manageability Class	3Ed	3Ed
Group	III	
Forest Site Class	7 (non-commercial)	7 (non-commercial)
Range Site	9, 1	9
Water Runoff Potential	Rapid	Rapid
Watershed Sensitivity	3 (High)	4
Hydrologic Soil Group	D	D
Available Water Capacity (AWC)	Very low to Low	Very Low to Low
Upper 20 inches	0.6 to 2.0 inches	1.2 to 2.4 inches
Susceptibility to Burning Damage	Low	Low
Slope Stability Hazard	Low to Moderate	Low
Allowable Soil Loss	1 tons/acre/year	1 tons/acre/year
Chance of Seedling Survival	Not Rated	Not Rated
Rating for Timber Site	Not Rated	Not Rated
R-Value	Not Rated	30-60
Soil horizons in inches, USDA, Unified, AASHTO	0-16; Variable Unified: Not Rated AASHTO: Not Rated 16+; Unweathered bedrock	0-12; Very cobbly loam Unified: SM-SC, SC AASHTO: A-4, A-6 12-17; Very cobbly clay loam Unified: SC AASHTO: A-6, A-7 17+; Unweathered bedrock
Included Areas:	Included with these soils is mapping and making up about 20 percent of the acreage are the Friana, Duncom, Behanin and Gallatin families, Rock outcrop and areas of greater slopes.	

208 LITHIC XERORTHERTS, MESIC-DEVEN FAMILY COMPLEX, 1 to 15 percent slopes

Map Unit Components	Litchic Xerorthents, mesic (45 percent)	Deven family (35 percent)
Position, Slope, and Elevation	On upper sideslopes and convex areas of mountain uplands and basalt plateaus; 1 to 15 percent slopes; 4300 to 5200 feet	On upper sideslopes and convex areas of mountain uplands and basalt plateaus; 1 to 15 percent slopes; 4300 to 5200 feet
Typical Vegetation and Precipitation (ppt)	Few western juniper, low sagebrush, Phlox spp., buckwheat, cheatgrass; 14 to 16 inches ppt.	Western juniper, low sagebrush, big sagebrush, rabbitbrush, Idaho fescue, bottlebrush, cheatgrass; 14 to 16 inches ppt.
Surface Layer	0 to 5 inches; brown and yellowish brown very cobbly loam and gravelly loam; platy and granular structure; slightly hard; pH 6.6 to 6.8.	0 to 2 inches; brown cobbly loam, granular structure, soft, pH 6.3
Rooting Depth (in.) to Underlying Material	4 to 10; basalt, tuff.	10 to 20; basalt, soft to hard tuff.
Erosion Factor (K)	Variable	.37
Max. Erosion Hazard	Moderate	Moderate
Soil Permeability	Moderate	Moderate
Drainage Class	Somewhat excessively drained.	Well drained
Soil Manageability Class	3eDx	2edX
Soil Manageability Group	III	
Forest Site Class	7 (non-commercial)	7 (non-commercial)
Range Site	1	8
Water Runoff Potential	Rapid	Moderate.
Watershed Sensitivity	4 (High)	5
Hydrologic Soil Group	D	D
Available Water Capacity (AWC)	Very Low	Very Low to Low
Upper 20 inches	0.6 to 1.5 inches	1.4 to 2.8 inches
Susceptibility to Burning Damage	Low	Low
Slope Stability Hazard	Low	Low
Allowable Soil Loss	1 tons/acre/year	1 tons/acre/year
Chance of Seedling Survival	Not Rated	Not Rated
Rating for Timber Site	Not Rated	Not Rated
R-Value	Not Rated	Not Rated
Soil horizons in inches, USDA, Unified, AASHTO	0-5; Variable Unified: Not Rated AASHTO: Not Rated 5+; Unweathered bedrock	0-2; Cobbly loam Unified: ML-CL, CL AASHTO: A-4, A-6 2-7; Clay loam Unified: CL, MH, CH AASHTO: A-6, A-7 7-16; Clay Unified: CH AASHTO: A-7 16+; Unweathered bedrock
Included Areas:	Included with these soils in mapping and making up about 20 percent of the acreage are the Pass Canyon, Gwin, Stukel, Bakeoven, Dishner families and Rock outcrop.	

209 LITHIC XERORTHENTS, MESIC-LAVA FLOW COMPLEX, 1 to 20 percent slopes

Map Unit Components	Lithic Xerorthents, mesic (45 percent)	Lava flow (30 percent)
Position, Slope, and Elevation	In depressions between hummocky lava flow rock; 1 to 10 percent slopes; 4200 to 5000 feet.	Hummocky lava flow rock in an interlocking maze; 5 to 20 percent slopes; 4200 to 5000 feet.
Typical Vegetation and Precipitation (ppt)	Mountain mahogany, western juniper, bitterbrush, big sagebrush, rabbitbrush, grasses; 10 to 14 inches ppt.	Mostly barren with mountain mahogany and western juniper in some fractures; 10 to 14 inches ppt.
Surface Layer	0 to 15 inches; brown and yellowish brown very gravelly sandy loam and very gravelly coarse sandy loam; loose and granular structure; soft; pH 6.6 to 6.8.	NOT APPLICABLE; Fractured vesicular basalt flow rock with minor accumulations of aeolian soil deposition in some fractures
Rooting Depth (in.) to Underlying Material	10 to 20; basalt	
Erosion Factor (K)	Variable	
Max. Erosion Hazard	Moderate	
Soil Permeability	Moderately rapid	
Drainage Class	Somewhat excessively drained	
Soil Manageability Class	3edX	
Group	III	
Forest Site Class	7 (non-commercial)	
Range Site	7	
Water Runoff Potential	Slow	Moderate
Watershed Sensitivity	7 (Moderate)	4
Hydrologic Soil Group	D	
Available Water Capacity (AWC)	Low	
Upper 20 inches	1.5 to 2.5 inches	
Susceptibility to Burning Damage	Low	
Slope Stability Hazard	Low	
Allowable Soil Loss	1 tons/acre/year	
Chance of Seedling Survival	Not Rated	
Rating for Timber Site	Not Rated	
R-Value	Not Rated	
Soil horizons in inches, USDA, Unified, AASHTO	0-15; Variable Unified: Not Rated AASHTO: Not Rated 15+; Unweathered bedrock	
Included Areas:	Included with this unit in mapping and making up about 25 percent of the acreage are the Searles, Stukel, Bakeoven, Alcot and Neer families and lava flow rock with steeper slopes.	

**210 LITHIC XERORTHENTS, MESIC-XEROFLUENTS, MESIC-AQUOLLS ASSOCIATION,
0 to 20 percent slopes**

Map Unit Components	Lithic Xerorthents, mesic (35 percent)	Xerofluents, mesic (20 percent)	Aquolls (20 percent)
Position, Slope, and Elevation	On sideslopes of narrow incised drainages and ridge crests adjacent to drainages; 1 to 20 percent slopes; 4300 to 5500 feet.	On lower sideslopes of alluvial drainages (subject to spring flooding); 1 to 10 percent slopes; 4300 to 5500 feet.	On concave areas of alluvial drainages (subject to flooding); 0 to 2 percent slopes; 4300 to 5500 feet.
Typical Vegetation and Precipitation (ppt)	Western juniper, low sagebrush, buckwheat, cheatgrass, other grasses; 14 to 18 inches ppt.	Western juniper, low sagebrush, big sagebrush, rabbitbrush, grasses; 14 to 18 inches ppt.	
Surface Layer	0 to 5 inches; brown and yellowish brown very cobbly loam and gravelly loam; platy and granular structure; slightly hard; pH 6.6 to 6.8.	0 to 37 inches; dark gray, grayish brown and light brownish gray silty clay loam, sandy loam, coarse sandy loam and loam; prismatic, blocky and massive structure; soft, slightly hard and hard; pH 6.8 to 8.0.	0 to 4 inches; dark grayish brown silty clay loam, granular structure, hard, pH 6.6. *SUBSOIL: 4 to 26 inches; dark grayish brown and grayish brown clay with yellowish brown mottles in lower part, prismatic and blocky structure, very hard, pH 6.8 to 7.0.
Substratum		37 to 60 inches; very pale brown sandy loam, platy structure, slightly hard, pH 7.4.	26 to 60 inches; gray and dark gray clay and stratified gravelly clay and very gravelly clay loam, massive, hard and very hard, pH 6.4 to 6.6.
Rooting Depth (in.) to Underlying Material	4 to 10; basalt	20 plus; alluvium, basalt	40 plus; alluvium, basalt
Erosion Factor (K)	Variable	Variable	Variable
Max. Erosion Hazard	Moderate to high	Moderate	Moderate
Soil Permeability	Moderate	Slow	Variable
Drainage Class	Somewhat excessively drained	Well drained	Poorly drained
Soil Manageability Class Group	3EDX III	2e	3eW
Forest Site Class	7 (non-commercial)	7 (non-commercial)	7 (non-commercial)
Range Site	1	18, 13	25
Water Runoff Potential	Rapid	Slow	Very Slow
Watershed Sensitivity	3 (Moderate)	6	7
Hydrologic Soil Group	D	C	D
Available Water Capacity (AWC) Upper 20 inches	Very Low 0.6 to 1.5 inches	Low to High 2.8 inches	Moderate to High 3.0 inches
Susceptibility to Burning Damage	Low	Low	Low
Slope Stability Hazard	Low	Low	Low
Allowable Soil Loss	1 tons/acre/year	2, 3 tons/acre/year	3 tons/acre/year
Chance of Seedling Survival	Not Rated	Not Rated	Not Rated
Rating for Timber Site	Not Rated	Not Rated	Not Rated
R-Value	Not Rated	Not Rated	Not Rated
Soil horizons in inches, USDA, Unified, AASHTO	0-5; Variable Unified: Not Rated AASHTO: Not Rated 5+; Unweathered bedrock	0-60; Variable Unified: Not Rated AASHTO: Not Rated	0-60; Variable Unified: Not Rated AASHTO: Not Rated

210 LITHIC XERORTHENTS, MESIC-XEROFLUVENTS, MESIC-AQUOLLS ASSOCIATION (continued)

Included Areas:

Included with these soils in mapping and making up about 25 percent of the acreage are the Pass Canyon, Gwin, Roval, Bieber, Deven and Fordice families, unnamed fluvaquents, Rock outcrop, Rubble land and areas with steeper slopes.

211 LOBERG-FRIANA-CHEADLE FAMILIES ASSOCIATION, 30 to 65 percent slopes

Map Unit Components Position, Slope, and Elevation	Loberg famiy (40 percent)	Friana family (25 percent)	Cheadle family (20 percent)
Typical Vegetation and Precipitation (ppt)	Lodgepole pine, white fir, western white pine, prostrate manzanita, few forbes, few grasses; 25 to 30 inches ppt.	Lodgepole pine, white fir, big sagebrush, lupine, ceonothus, bottlebrush, needlegrass; 25 to 30 inches ppt.	On upper sideslopes, ridges and knolls of mountain uplands; 35 to 65 percent slopes; 7000 to 8000 feet.
Surface Layer	2 to 0 inches of lodgepole pine needles and twigs, over 0 to 15 inches; brown and light brown gravelly loam to very gravelly loam, granular and blocky structure, slightly hard, pH 5.8 to 6.0.	1/2 to 0 inches of lodgepole pine and white fir needles, over 0 to 11 inches; dark grayish brown silty clay loam, granular and blocky structure, slightly hard and hard, pH 6.2 to 6.4.	0 to 17 inches; dark grayish brown to brown very cobbly loam to very cobbly clay loam; granular and subangular blocky structure, slightly hard to hard; pH 6.6.
Substratum	37 to 60 inches; weathering in place semi-soft light brown tuff conglomerate which rubs to a clay loam.		
Rooting Depth (in.) to Underlying Material	20 to 40; tuff	30 plus; tuff	10 to 20; andesite, tuff
Erosion Factor (K)	.43	.37	.37
Max. Erosion Hazard	High	High	High to very high
Soil Permeability	Slow	Slow	Moderate
Drainage Class	Well drained	Well drained	Well drained
Soil Manageability Class Group	3S III	3S	3Ed
Forest Site Class	6(5)	6 (4-5)	7 (non-commercial)
Range Site	Not placed in a range site.	Not placed in a range site.	9
Water Runoff Potential	Rapid	Rapid	Very Rapid
Watershed Sensitivity	3 (High)	3	3
Hydrologic Soil Group	C	C	D
Available Water Capacity (AWC) Upper 20 inches	Low to Moderate 2.6 inches	Moderate to High 3.0 inches	Very Low to Low 1.2 to 2.4 inches
Susceptibility to Burning Damage	High	moderate	Moderate
Slope Stability Hazard	Moderate to high	Moderate to High	Low
Allowable Soil Loss	2 tons/acre/year	2, 3 tons/acre/year	1 tons/acre/year
Chance of Seedling Survival	Moderate	High	Not Rated
Rating for Timber Site R-Value	Fair (12) 0-30	Fair (12) 0-30	Not Rated 30-60
Soil horizons in inches, USDA, Unified, AASHTO	0-15; Gravelly loam, very gravelly loam Unified: SC, CL AASHTO: A-6 15-37; Very gravelly clay loam Unified: SC, CH AASHTO: A-7 37+; Weathered bedrock	0-11; Silty clay loam Unified: CL, CH AASHTO: A-6, A-7 11-38; Silty clay Unified: CH AASHTO: A-7 38-53; Very gravelly silty clay loam Unified: GC, CH AASHTO: A-7 53+; Weathered bedrock	0-12; Very cobbly loam Unified: SM, SM-SC AASHTO: A-4, A_6 12-17; Very cobbly clay loam Unified: SC AASHTO: A-6, A-7 17+; Unweathered bedrock

211 LOBERG-FRIANA-CHEADLE FAMILIES ASSOCIATION (continued)

Included Areas:

Included with these soils in mapping and making up about 15 percent of the acreage are the Supervisor, Behanin, Gralic families, Lithic Cryochrepts, Rock outcrop, and Rubble land.

212 MANILA-MERLIN-MASCAMP FAMILIES ASSOCIATION, 10 to 35 percent slopes

Map Unit Components	Manila family (40 percent)	Merlin family (25 percent)	Mascamp family (20 percent)
Position, Slope, and Elevation	On sideslopes, toeslopes and draws of mountain uplands; 10 to 35 percent slopes; 5500 to 7000 feet.	On middle to upper sideslopes of mountain uplands; 10 to 35 percent slopes; 5500 to 7000 feet.	On upper sideslopes, ridges and knolls of mountain uplands; 15 to 35 percent slopes; 5500 to 7000 feet.
Typical Vegetation and Precipitation (ppt)	Western juniper, few white fir and ponderosa pine, big sagebrush, current spp., mulesear, Idaho fescue; 20 to 25 inches ppt.	western juniper, low sagebrush, big sagebrush, western yarrow, Phlox spp., Idaho fescue, other grasses; 20 to 25 inches ppt.	
Surface Layer	0 to 4 inches; dark grayish brown cobbly clay loam, platy and granular structure, slightly hard, pH 6.6.	0 to 2 inches; grayish brown very cobbly clay loam, granular structure, slightly hard, pH 6.4.	0 to 6 inches; dark grayish brown very cobbly loam, granular structure, slightly hard, pH 6.8.
Substratum	27 plus inches; weathering in place light brownish gray semi-soft tuff conglomerate which rubs to a clay loam.		
Rooting Depth (in.) to Underlying Material	20 to 40; conglomerated tuff	10 to 20; conglomerated tuff	8 to 20; andesite, conglomerated tuff, basalt
Erosion Factor (K)	.32	.32	.37
Max. Erosion Hazard	Moderate	Moderate to High	Moderate to high
Soil Permeability	Slow	Slow	Moderate
Drainage Class	Well drained	Well drained	Well drained
Soil Manageability Class Group	2s II	3Ed	3Ed
Forest Site Class	7 (non-commercial)	7 (non-commercial)	7 (non-commercial)
Range Site	19	9	9, 1
Water Runoff Potential	Moderate	Rapid	Rapid
Watershed Sensitivity	5 (High)	3	4
Hydrologic Soil Group	C	D	D
Available Water Capacity (AWC) Upper 20 inches	Low to Moderate 2.7 inches	Very Low to Low 1.1 to 2.3 inches	Very Low to Low 1.0 to 1.9 inches
Susceptibility to Burning Damage	Moderate	Moderate	Moderate
Slope Stability Hazard	Low to Moderate	Low to Moderate	Low
Allowable Soil Loss	2 tons/acre/year	1 tons/acre/year	1 tons/acre/year
Chance of Seedling Survival	Not Rated	Not Rated	Not Rated
Rating for Timber Site	Not Rated	Not Rated	Not Rated
R-Value	0-30	0-30	30-60
Soil horizons in inches, USDA, Unified, AASHTO	0-13; Cobbly clay loam, clay loam Unified: CL, CH AASHTO: A-6, A-7 13-27; Silty clay, gravelly silty clay Unified: CH AASHTO: A-7 27+; Weathered bedrock	0-2; Very cobbly clay loam Unified: SC, CL AASHTO: A-6 2-12; Gravelly clay Unified: CH AASHTO: A-7 12+; Unweathered bedrock	0-12; Very cobbly loam, very gravelly loam Unified: SM-SC, SC AASHTO: A-4 12-19; Very gravelly clay loam Unified: SC AASHTO: A-2-6, A-6 19+; Unweathered bedrock
Included Areas:	Included with these soils in mapping and making up about 15 percent of the acreage are the Bertag, Smarts, DeMasters, Vipont, Los Gatos, Ridd, Bearskin, and Anatone families and Rock outcrop.		

213 MANILA-MERLIN-MASCAMP FAMILIES ASSOCIATION, 35 to 60 percent slopes

Map Unit Components	Manila family (40 percent)	Merlin family (25 percent)	Mascamp family (20 percent)
Position, Slope, and Elevation	On sideslopes, toeslopes and draws of mountain uplands; 35 to 50 percent slopes; 5500 to 7000 feet.	On middle to upper sideslopes of mountain uplands; 35 to 60 percent slopes; 5500 to 7000 feet.	On upper sideslopes, ridges and knolls of mountain uplands; 35 to 60 percent slopes; 5500 to 7000 feet.
Typical Vegetation and Precipitation (ppt)	Western juniper, few white fir and ponderosa pine, big sagebrush, current spp., mulesear, Idaho fescue; 20 to 25 inches ppt.	Western juniper, low sagebrush, big sagebrush, western yarrow, Phlox spp., Idaho fescue, other grasses; 20 to 25 inches ppt.	
Surface Layer	0 to 4 inches; dark grayish brown cobbly clay loam, platy and granular structure, slightly hard, pH 6.6.	0 to 2 inches; grayish brown very cobbly clay loam, granular structure, slightly hard, pH 6.4	0 to 6 inches; dark grayish brown very cobbly loam, granular structure, slightly hard, pH 6.8.
Substratum	27 plus inches; weathering in place light brownish gray semi-soft tuff conglomerate which rubs to a clay loam.		
Rooting Depth (in.) to Underlying Material	20 to 40; conglomerated tuff	10 to 20; conglomerated tuff	8 to 20; andesite, conglomerated tuff, basalt
Erosion Factor (K)	.32	.32	.37
Max. Erosion Hazard	High	High to very high	High to very high
Soil Permeability	Slow	Slow	Moderate
Drainage Class	Well drained	Well drained	Well drained
Soil Manageability Class Group	3S III	3Sd	3Ed
Forest Site Class	7 (non-commercial)	7 (non-commercial)	7 (non-commercial)
Range Site	19	9	9, 1
Water Runoff Potential	Rapid	Very Rapid	Rapid
Watershed Sensitivity	3 (High)	2	4
Hydrologic Soil Group	C	D	D
Available Water Capacity (AWC) Upper 20 inches	Low to Moderate 2.7 inches	Very Low to Low 1.1 to 2.3 inches	Very Low to Low 1.0 to 1.9 inches
Susceptibility to Burning Damage	Moderate	Moderate	Moderate
Slope Stability Hazard	High	High	Low
Allowable Soil Loss	2 tons/acre/year	1 tons/acre/year	1 tons/acre/year
Chance of Seedling Survival	Not Rated	Not Rated	Not Rated
Rating for Timber Site	Not Rated	Not Rated	Not Rated
R-Value	0-30	0-30	30-60
Soil horizons in inches, USDA, Unified, AASHTO	0-13; Cobbly clay loam, clay loam Unified: CL, CH AASHTO: A-6, A-7 13-27; Silty clay, gravelly silty clay Unified: CH AASHTO: A-7 27+; Weathered bedrock	0-2; Very cobbly clay loam Unified: SC, CL AASHTO: A-6 2-12; Gravelly clay Unified: CH AASHTO: A-7 12+; Unweathered bedrock	0-12; Very cobbly loam, very gravelly loam Unified: SM-SC, SC AASHTO: A-4 12-19; Very gravelly clay loam Unified: SC AASHTO: A-2-6, A-6 19+; Unweathered bedrock
Included Areas:	Included with these soils in mapping and making up about 15 percent of the acreage are the Bertag, Smarts, DeMasters, Vipont, Bearskin, and Anatone families and Rock outcrop.		

214 MERLIN FAMILY, 1 to 10 percent slopes

Map Unit Components	Merlin family (75 percent)
Position, Slope, and Elevation	On basalt plateaus; 1 to 10 percent slopes; 5800 to 7000 feet.
Typical Vegetation and Precipitation (ppt)	Few western juniper, trace of ponderosa pine, low sagebrush, big sagebrush, buckwheat, Phlox spp., Idaho fescue, Poa spp., other grasses; 20 to 30 inches ppt.
Surface Layer	0 to 2 inches; grayish brown very cobbly clay loam, granular structure, slightly hard, pH 6.4.
Rooting Depth (in.) to Underlying Material	10 to 20; basalt, tuff
Erosion Factor (K)	.32
Max. Erosion Hazard	Moderate
Soil Permeability	Slow
Drainage Class	Well drained
Soil Manageability Class	2ed
Group	II
Forest Site Class	7 (non-commercial)
Range Site	9
Water Runoff Potential	Moderate
Watershed Sensitivity	4 (High)
Hydrologic Soil Group	D
Available Water Capacity (AWC)	Very Low to Low
Upper 20 inches	1.1 to 2.3 inches
Susceptibility to Burning Damage	Low
Slope Stability Hazard	Low
Allowable Soil Loss	1 tons/acre/year
Chance of Seedling Survival	Not Rated
Rating for Timber Site	Not Rated
R-Value	0-30
Soil horizons in inches, USDA, Unified, AASHTO	0-2; Very cobbly clay loam Unified: SC, CL AASHTO: A-6 2-12; Gravelly clay Unified: CH AASHTO: A-7 12+; Unweathered bedrock
Included Areas:	Included with this soil in mapping and making up about 25 percent of the acreage are the Manila, Bearskin, Mascamp, Anatone, Smarts, and Bertag families and Lithic Xerorthents, frigid.

215 GRALIC-LOBERG FAMILIES-RUBBLE LAND ASSOCIATION, 35 to 80 percent slopes

Map Unit Components	Gralic family (35 percent)	Loberg family (30 percent)	Rubble land (20 percent)
Position, Slope, and Elevation	On sideslopes of mountain uplands; 35 to 65 percent slopes; 7000 to 8000 feet.	On sideslopes and toeslopes of mountain uplands; 35 to 60 percent slopes; 7000 to 8000 feet.	On scarp breaks and upper sideslopes of mountain uplands; 50 to 80 percent slopes; 7000 to 8000 feet.
Typical Vegetation and Precipitation (ppt)	Lodgepole pine, white fir, prostrate manzanita, current spp., princess pine, Ross's sedge, few grasses; 25 to 30 inches ppt.	Lodgepole pine, white fir, prostrate manzanita, current spp., princess pine, bottlebrush, needlegrass, Ross's sedge, Poa spp.; 25 to 30 inches ppt.	
Surface Layer	1 to 0 inches; lodgepole pine needles, over 0 to 17 inches; grayish brown to pale brown very gravelly fine sandy loam, granular structure, soft, pH 6.2.	2 to 0 inches of lodgepole pine needles and twigs, over 0 to 15 inches; brown and light brown gravelly loam to very gravelly loam, granular and blocky structure, slightly hard, pH 5.8 to 6.0.	NOT APPLICABLE: Colluvial deposition of angular cobbles, stones and boulders of basalt or andesite rock material.
Substratum	17 to 60 inches; light yellowish brown to very pale brown very gravelly sandy loam to very gravelly loamy sand, single grain and massive, loose and soft, pH 6.2 to 6.4.	37 to 60 inches; weathering in place semi-soft light brown tuff conglomerate which rubs to a clay loam.	
Rooting Depth (in.) to Underlying Material	30 plus; andesite	20 to 40; tuff	
Erosion Factor (K)	.24	.43	
Max. Erosion Hazard	High	High	
Soil Permeability	Moderately rapid	SLow	
Drainage Class	Well drained	Well drained	
Soil Manageability Class Group	3Ep III	3S	
Forest Site Class	6-7 (5 to non-commercial)	6 (5)	
Range Site	Not placed in a range site.	Not placed in a range site.	
Water Runoff Potential	Moderate	Rapid	Very Rapid
Watershed Sensitivity	6 (High)	3	2
Hydrologic Soil Group	B	C	
Available Water Capacity (AWC)	Low to Moderate	Low to Moderate	
Upper 20 inches	1.8 inches	2.6 inches	
Susceptibility to Burning Damage	High	High	
Slope Stability Hazard	Low	High	
Allowable Soil Loss	2-3 tons/acre/year	2 tons/acre/year	
Chance of Seedling Survival	Low to Moderate	Moderate	
Rating for Timber Site	Fair (12)	Fair (12)	
R-Value	60+	0-30	

215 GRALIC-LOBERG FAMILIES-RUBBLE LAND ASSOCIATION (continued)

Soil horizons in
inches, USDA,
Unified, AASHTO

0-17; Very gravelly fine
sandy loam
Unified: SM
AASHTO: A-2-4

17-60; Very gravelly sandy
loam, very gravelly
loamy sand
Unified: SM
AASHTO: A-1-b

0-15; Gravelly loam, very
gravelly loam

Unified: SC, CL
AASHTO: A-6

15-37; Very gravelly clay loam
Unified: SC, CH

AASHTO: A-7

37+; Weathered bedrock

Included Areas:

Included with this unit in mapping and making up about 15 percent of the acreage are the Supervisor, Cheadle, Friana families and Lithic Cryochrepts and Rock outcrop and areas of lesser slopes.

216 GRALIC-SUPERVISOR FAMILIES COMPLEX, 10 to 35 percent slopes

Map Unit Components	Gralic family (60 percent)	Supervisor family (25 percent)
Position, Slope, and Elevation	On sideslopes and convex areas of mountain uplands; 10 to 35 percent slopes; 7000 to 7800 feet.	On sideslopes of mountain uplands; 10 to 35 percent slopes; 7000 to 7800 feet.
Typical Vegetation and Precipitation (ppt)	Lodgepole pine, washoe pine, white fir, western white pine, prostrate manzanita, ceonothus, few forbes, Ross's sedge, few grasses; 25 to 30 inches ppt.	Lodgepole pine, washoe pine, white fir, western white pine, prostrate manzanita, ceonothus, few forbes, Ross's sedge, few grasses; 25 to 30 inches ppt.
Surface Layer	1 to 0 inches; lodgepole pine needles, over 0 to 17 inches, grayish brown to pale brown very gravelly fine sandy loam, granular structure, soft, pH 6.2.	1 to 0 inches; lodgepole pine needles, over 0 to 12 inches; dark grayish brown to brown gravelly fine sandy loam, granular and blocky structure, slightly hard, pH 6.0 to 6.2.
Substratum	17 to 60 inches; light yellowish brown to very pale brown very gravelly sandy loam to very gravelly loamy sand, single grain and massive, loose and soft, pH 6.2 to 6.4.	26 to 37 inches; weathering in place pale brown to reddish brown semi-soft tuff conglomerate.
Rooting Depth (in.) to Underlying Material	30 plus; andesite, obsidian.	20 to 40; andesite tuff, obsidian.
Erosion Factor (K)	.24	.20
Max. Erosion Hazard	Moderate	Moderate
Soil Permeability	Moderately rapid	Moderate
Drainage Class	Well drained	Well drained
Soil Manageability Class	2ep	2ep
Soil Manageability Group	II	
Forest Site Class	6-7 (5 to non-commercial)	6 (4-5)
Range Site	Not placed in a range site.	Not placed in a range site.
Water Runoff Potential	Slow	Slow
Watershed Sensitivity	7 (Moderate)	7
Hydrologic Soil Group	B	B
Available Water Capacity (AWC)	Low to Moderate	Low to Moderate
Upper 20 inches	1.8 inches	2.2 inches
Susceptibility to Burning Damage	Moderate	Moderate
Slope Stability Hazard	Low	Low
Allowable Soil Loss	2,3 tons/acre/year	2 tons/acre/year
Chance of Seedling Survival	Low to Moderate	Low to Moderate
Rating for Timber Site	Fair (12)	Fair (7,12)
R-Value	60+	60+
Soil horizons in inches, USDA, Unified, AASHTO	0-17; Very gravelly fine sandy loam Unified: SM AASHTO: A-2-4 17-60; Very gravelly sandy loam, very gravelly loamy sand Unified: SM AASHTO: A-1-b	0-12; Gravelly fine sandy loam Unified: SM AASHTO: A-2-4, A-4 12-26; Very gravelly sandy loam Unified: SM AASHTO: A-1-b 26+; Weathered bedrock
Included Areas:	Included with these soils in mapping and making up about 15 percent of the acreage are the Wapal, Patio, Cheadle families and soils similar to the Supervisor family but deeper than 40 inches, and Rock outcrop.	