

50 Klicker-Trojan families-Aquolls association, 0 to 15 percent slopes

Map Unit Components	Klicker	Trojan	Aquolls
Approx. Proportion	40%	30%	15%
Position, Slope, and Elevation	Occurs on mountain slopes and flats; 0 to 15 percent slopes; 5,200 to 7,300 feet.	Occurs on mountain sideslopes, ridges, flats, and gently sloping hills; 0 to 15 percent slopes, 5,200 to 7,000 feet.	Meadows and valleys over the total forest; 0 to 15 percent slopes; 4,000 to 8,000 feet.
Typical Vegetation & Precipitation	Jeffrey pine, white fir, incense cedar, western juniper, mountain mahogany, big sage, greenleaf manzanita, pinemat manzanita and desert mountain mahogany; 18 to 25 inches ppt.	Jeffrey pine, white fir, incense cedar, western juniper, mountain mahogany, big sage, greenleaf manzanita, pinemat manzanita and desert mountain mahogany; 16 to 25 inches ppt.	Annual and perennial grasses, lodgepole pine, alder, aspen, willow and thistle, 20 to 25 inches ppt.
Soil Profile Description			
Surface Layer	0 to 11 inches, dark brown loam or cobbly loam; granular structure; slightly hard; 18 percent rock fragments; pH 7.0 to 6.8.	0 to 22 inches; yellowish brown to brown loam; granular to subangular blocky structure; soft to slightly hard; 2 to 10 percent rock fragments; pH 6.3 to 6.5.	0 to 9 inches; grayish brown loam or silt loam; granular and blocky structure, slightly hard; pH 5.8 to 6.0.
Subsoil	11 to 48 inches; brown to yellowish red very cobbly to extremely cobbly loam; subangular blocky structure; slightly hard; 45 to 80 percent rock fragments; pH 6.5.	22 to 46 inches; brown gravelly sandy clay loam to gravelly clay loam; subangular blocky structure; slightly hard; 15 to 25 percent rock fragments; pH 6.5.	9 to 16 inches; grayish brown sandy loam or silty clay loam; blocky structure, slightly hard; pH 6.2 to 7.6.
Substrata	48 inches; weathered basalt rock.	46 to 60 inches; slightly weathered basalt rock.	16 to 60 inches; light brownish gray loamy sand to a clay loam; massive; slightly hard; pH 6.2 to 7.6.
Soil Properties & Management Interpretations			
Rooting Depth (in.), Underlying Material	48 inches; weathered basalt rock.	46 inches; basalt.	10 to 20 in; gravelly silty clay
Erosion Factor (K)	.28	.28	.17
Max. Erosion Hazard	Moderate	Moderate	Low
Soil Permeability	Moderate	Moderate	Moderately slow
Soil Manageability Class	2px	2e	3W
Soil Manageability Group	II	II	II
Range Site	N/A	N/A	3
Water Runoff Potential	Slow	Slow	Very slow
Hydrologic Soil Group	B	B	C
Available Water Capacity (AWC) Total (Top 20")	4.3 (2.0)	6.4 (2.7)	8.2 (3.0)
Forest Site Class	5 (III-IV)	5 (IV)	N/A
Timber Regeneration Potential			
Plantability	Moderate	High	N/A
Seedling Survival	Low	Moderate	N/A

50 Klicker-Trojan families-Aquolls association (continued)

Estimated Engineering
Properties;
USDA Texture,
Unified, and ASSHTO

0-11; cobbly loam
Unified: GM-GC, ML
ASSHTO: A-1, A-4

0-22; loam
Unified: ML
ASSHTO: A-4, A-6

0-9; silt loam
Unified: ML
ASSHTO: A-7

11-28; very cobbly loam
Unified: GM-GC, ML-CL
ASSHTO: A-1, A-6

22-34; gravelly sandy clay
loam
Unified: GM-GC, SC
ASSHTO: A-2, A-2-6

9-16; silty clay loam
Unified: ML-CL
ASSHTO: A-6

28-48; extremely gravelly loam
Unified: GM-GC, ML
ASSHTO: A-1, A-7

34-46; gravelly clay loam
Unified: GM-GC, CL
ASSHTO: A-2, A-6, A-7

16-60; gravelly silty clay loam
Unified: ML-CL
ASSHTO: A-7

48; weathered basalt rock

46; weathered basalt rock

Included Areas

15% Sheld, moderately deep, Stony and De Masters

51 Lava Flow

Map Unit Components

Lava Flow

Approx. Proportion

90%

Position, Slope, and Elevation

Flat to very steep lava flows; at all elevations.

Typical Vegetation & Precipitation

Barren except there is scattered greenleaf manzanita, juniper, mountain mahogany and big sage in soil pockets; 16 to 70 inches ppt.

Soil Profile Description

Surface Layer

N/A

Subsoil

N/A

Substrata

Lava flow, generally of recent origin that has flowed over soil or bedrock.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material

N/A

Erosion Factor (K)

N/A

Max. Erosion Hazard

N/A

Soil Permeability

N/A

Soil Manageability

Class

N/A

Group

N/A

Range Site

N/A

Water Runoff Potential

Slow to very rapid

Hydrologic Soil Group

N/A

Available Water Capacity (AWC) Total (Top 20")

N/A

Forest Site Class

N/A

Timber Regeneration Potential

Plantability

N/A

Seedling Survival

N/A

Estimated Engineering Properties;

USDA Texture, Unified, and ASSHTO

N/A

Included Areas

10%; Lithic Xerochrepts and Lithic Xerumbrepts

52 Lava Flow-Lithic Haploxerolls association, 0 to 35 percent slopes

Map Unit Components	Lava Flow	Lithic Haploxerolls
Approx. Proportion	45%	40%
Position, Slope, and Elevation	Flat to very steep lava flows; at all elevations.	Occurs on relatively flat basalt flows; 0 to 35 percent slopes; 3,000 to 4,400 feet.
Typical Vegetation & Precipitation	Barren except there is scattered greenleaf manzanita, juniper, mountain mahogany and big sage in soil pockets; 16 to 30 inches ppt.	Sparse Jeffrey and ponderosa pine, juniper, digger pine, white oak, black oak, greenleaf manzanita, big sage, mountain mahogany, western redbud, yerba santa and chokecherry; 20 inches ppt.

Soil Profile Description

Surface Layer	N/A	0 to 9 inches; brown gravelly fine sandy loam to very gravelly sandy loam; granular structure; soft; 30 to 40 percent rock fragments; pH 6.8.
Subsoil	N/A	9 to 17 inches; yellowish brown cobbly to very cobbly loam; subangular blocky to massive structure; slightly hard; 25 to 45 percent rock fragments; pH 7.2 to 7.5.
Substrata	Lava Flow, generally of recent origin that has flowed over soil or bedrock.	17 inches; hard basalt rock.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	N/A	17 inches; basalt.
Erosion Factor (K)	N/A	.28
Max. Erosion Hazard	N/A	Moderate
Soil Permeability	N/A	Moderate
Soil Manageability Class	N/A	3Xp
Group	N/A	III
Range Site	N/A	N/A
Water Runoff Potential	Slow to very rapid	Moderate
Hydrologic Soil Group	N/A	D
Available Water Capacity (AWC) Total (Top 20")	N/A	1.3 (1.3)
Forest Site Class	N/A	7 (Noncommercial)
Timber Regeneration Potential		
Plantability	N/A	N/A
Seedling Survival	N/A	N/A
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	N/A	0-4; fine sandy loam Unified: SM ASSHTO: A-4
		4-9; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
		9-17; very cobbly loam Unified: GM-GC, ML ASSHTO: A-1, A-7
		17; hard basalt
Included Areas	15% Lithic Xerochrepts	

53 Lava Flow-Lithic Xerochrepts complex, 0 to 35 percent slopes

Map Unit Components	Lava Flow	Lithic Xerochrepts
Approx. Proportion	50%	40%
Position, Slope, and Elevation	Flat to very steep lava flows; at all elevations.	Occurs on relatively recent basalt flows; 0 to 35 percent slopes; 3,000 to 5,000 feet.
Typical Vegetation & Precipitation	Barren except there is scattered greenleaf manzanita, juniper, mountain mahogany and big sage in soil pockets; 16 to 30 inches ppt.	Sparse Jeffrey pine, incense cedar and juniper, with big sage, rabbit brush, desert mountain mahogany, greenleaf manzanita, pinemat manzanita and both annual and perennial grasses; 20 inches ppt.
Soil Profile Description		
Surface Layer	N/A	0 to 5 inches; grayish brown loamy sand to cobbly sandy loam; subangular blocky to granular structure; soft; 10 to 15 percent rock fragments; pH 6.3 to 6.8.
Subsoil	N/A	5 to 18 inches; yellowish brown cobbly to extremely cobbly sandy loam; subangular blocky to granular structure; soft; 15 to 75 percent rock fragments; pH 7.3 to 7.7.
Substrata	Lava Flow, generally of recent origin that has flowed over soil or bedrock.	18 inches; hard, slightly fractured basalt bedrock.
Soil Properties & Management Interpretations		
Rooting Depth (in.), Underlying Material	N/A	18 inches; basalt.
Erosion Factor (K)	N/A	.24
Max. Erosion Hazard	N/A	Low
Soil Permeability	N/A	Moderately rapid
Soil Manageability Class	N/A	3Xp
Group	N/A	III
Range Site	N/A	1
Water Runoff Potential	Slow to very rapid	Very slow
Hydrologic Soil Group	N/A	B
Available Water Capacity (AWC) Total (Top 20")	N/A	1.7 (1.7)
Forest Site Class	N/A	7 (Noncommercial)
Timber Regeneration Potential		
Plantability	N/A	N/A
Seedling Survival	N/A	N/A
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	N/A	0-5; cobbly sandy loam Unified: SM ASSHTO: A-2-4, A-4 5-18; very cobbly sandy loam Unified: SM ASSHTO: A-2-4, A-4 18; hard basalt bedrock
Included Areas	10% Washougal family, moderately deep	

54 Lithic Haploxeralfs-Skalan family complex, 0 to 15 percent slopes

Map Unit Components	Lithic Haploxeralfs	Skalan
Approx. Proportion	50%	30%
Position, Slope, and Elevation	Occurs on andesite, basalt and rhyolitic flows and mountain sideslopes; 0 to 15 percent slopes; 4,000 to 5,600 feet.	Occurs on mountain sideslopes; gently sloping hills and undulating flats; 0 to 15 percent slopes, 3,000 to 5,200 feet.
Typical Vegetation & Precipitation	Ponderosa pine, incense cedar, juniper, black oak, squaw carpet, bitterbrush, buckbrush and mule's ear; 18 to 30 inches ppt.	Jeffrey and ponderosa pine, sugar pine, white fir, incense cedar, black oak, huckleberry oak, western serviceberry, pinemat manzanita and chokecherry; 20 to 30 inches ppt.
Soil Profile Description		
Surface Layer	0 to 6 inches; light gray gravelly to extremely gravelly sandy loam; granular to subangular blocky structure; soft; 15 to 60 percent rock fragments; pH 6.3.	0 to 14 inches; brown gravelly sandy loam to loam; granular to subangular blocky structure; soft; 15 to 30 percent rock fragments; pH 6.5-6.7.
Subsoil	6-18 inches; pinkish gray very gravelly loam; subangular blocky structure; 50 percent rock fragments; pH 6.0.	14 to 31 inches; brown very gravelly loam to clay loam; subangular blocky structure; slightly hard; 40 to 50 percent rock fragments; pH 6.7.
Substrata	18 inches; hard rhyolitic tuff.	31 to 60 inches; yellowish brown very gravelly to extremely gravelly clay loam; subangular blocky structure; hard; 50 to 60 percent rock fragments; pH 6.7; underlain by andesite and basalt.
Soil Properties & Management Interpretations		
Rooting Depth (in.), Underlying Material	18 inches; hard rhyolitic tuff	60 inches; weathered basalt
Erosion Factor (K)	.20	.20
Max. Erosion Hazard	Low to moderate	Low
Soil Permeability	Moderate rapid	Moderate
Soil Manageability		
Class	3P	2p
Group	III	III
Range Site	N/A	N/A
Water Runoff Potential	Very slow	Slow
Hydrologic Soil Group	B	B
Available Water Capacity (AWC)		
Total (Top 20")	1.2 (1.2)	5.1 (1.7)
Forest Site Class	6-7 (V-)	4 (II)
Timber Regeneration		
Plantability	Low	Moderate
Seedling Survival	Very low	Very low to low

54 Lithic Haploxeralfs-Skalan family complex (continued)

Estimated Engineering
Properties;
USDA Texture,
Unified, and ASSHTO

0-2; gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

0-8; gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

2-6; very gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

8-14; gravelly loam
Unified: GM-GC, ML
ASSHTO: A-1, A-7

6-18; very gravelly loam
Unified: GM-GC, ML
ASSHTO: A-1, A-4

14-23; very gravelly loam
Unified: GM-GC, ML
ASSHTO: A-1, A-4

18; hard rhyolitic tuff

23-60; very gravelly clay loam
Unified: GM-GC, ML-CL
ASSHTO: A-2, A-6

Included Areas

20% Aquolls and Keating family

55 Lithic Haploxerolls-Aquolls complex, 0 to 15 percent slopes

Map Unit Components	Lithic Haploxerolls	Aquolls
Approx. Proportion	40%	40%
Position, Slope, and Elevation	Occurs on relatively flat basalt flows; 0 to 15 percent slopes; 3,000 to 4,400 feet.	Meadows and valleys over the total forest; 0 to 15 percent slopes; 4,000 to 8,000 feet.
Typical Vegetation & Precipitation	Sparse Jeffrey and ponderosa pine, juniper, digger pine, white oak, black oak, greenleaf manzanita, big sage, mountain mahogany, western redbud, yerba santa and chokecherry; 20 inches ppt.	Annual and perennial grasses, lodgepole pine, alder, aspen, willow and thistle, 20 to 35 inches ppt.
Soil Profile Description		
Surface Layer	0 to 9 inches; brown gravelly fine sandy loam to very gravelly sandy loam; granular structure; soft; 30 to 40 percent rock fragments; pH 6.8.	0 to 9 inches; grayish brown loam or silt loam; granular and blocky structure, slightly hard; pH 5.8 to 6.0.
Subsoil	9 to 17 inches; yellowish brown cobbly to very cobbly loam; subangular blocky to massive structure; slightly hard; 25 to 45 percent rock fragments; pH 7.2 to 7.5.	9 to 16 inches; grayish brown sandy loam or silty clay loam; blocky structure, slightly hard; pH 6.2 to 7.6.
Substrata	17 inches; hard basalt rock.	16 to 60 inches; light brownish gray loamy sand to a clay loam; massive; slightly hard; pH 6.2 to 7.6.
Soil Properties & Management Interpretations		
Rooting Depth (in.), Underlying Material	17 inches; basalt.	10 to 20 in; gravelly silty clay
Erosion Factor (K)	.28	.17
Max. Erosion Hazard	Moderate	Low
Soil Permeability	Moderate	Moderately slow
Soil Manageability Class	3Xp	3W
Group	III	III
Range Site	1	3
Water Runoff Potential	Moderate	Very slow
Hydrologic Soil Group	D	C
Available Water Capacity (AWC) Total (Top 20")	1.3 (1.3)	8.2 (3.0)
Forest Site Class	7 (Noncommercial)	N/A
Timber Regeneration Plantability	N/A	N/A
Seedling Survival	N/A	N/A
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-4; fine sandy loam Unified: SM ASSHTO: A-4	0-9; silt loam Unified: ML ASSHTO: A-7
	4-9; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	9-16; silty clay loam Unified: ML-CL ASSHTO: A-6
	9-17; very cobbly loam Unified: GM-GC, ML ASSHTO: A-1, A-7	16-60; gravelly silty clay loam Unified: ML-CL ASSHTO: A-7
Included Areas	17; hard basalt	
Map Unit 55	20% Ultic Palexeralfs and Trojan family	

56 Lithic Haploxerolls-Rock Outcrop-Trojan family association, 0 to 15 percent slopes

Map Unit Components	Lithic Haploxerolls	Rock Outcrop	Trojan
Approx. Proportion	45%	30%	15%
Position, Slope, and Elevation	Occurs on relatively flat basalt flows; 0 to 15 percent slopes; 3,000 to 4,400 feet.	Miscellaneous land type on mountain sideslopes and ridgetops; 4,000 to 9,000 feet.	Occurs on mountain sideslopes, ridges, flats, and gently sloping hills; 0 to 15 percent slopes, 5,200 to 7,000 feet.
Typical Vegetation & Precipitation	Sparse Jeffrey and ponderosa pine, juniper, digger pine, white oak, black oak, greenleaf manzanita, big sage, mountain mahogany, western redbud, yerba santa and chokecherry; 16 to 25 inches ppt.	Barren except for widely scattered brush that occurs in fractures in the rock or in small colluvial pockets of soil; 16 to 25 inches ppt.	Jeffrey pine, white fir, incense cedar, western juniper, mountain mahogany, big sage, greenleaf manzanita, pinemat manzanita and desert mountain mahogany; 16 to 25 inches ppt.

Soil Profile Description

Surface Layer	0 to 9 inches; brown gravelly fine sandy loam to very gravelly sandy loam; granular structure; soft; 30 to 40 percent rock fragments; pH 6.8.	N/A	0 to 22 inches; yellowish brown to brown loam; granular to subangular blocky structure; soft to slightly hard; 2 to 10 percent rock fragments; pH 6.3 to 6.5.
Subsoil	9 to 17 inches; yellowish brown cobbly to very cobbly loam; subangular blocky to massive structure; slightly hard; 25 to 45 percent rock fragments; pH 7.2 to 7.5.	N/A	22 to 46 inches; brown gravelly sandy clay loam to gravelly clay loam; subangular blocky structure; slightly hard; 15 to 25 percent rock fragments; pH 6.5.
Substrata	17 inches; hard basalt rock.	Protruding bedrock that has all soil eroded off.	46 to 60 inches; slightly weathered basalt rock.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	17 inches; basalt.	Nil; Any competent hard bedrock	46 inches; basalt.
Erosion Factor (K)	.28	N/A	.28
Max. Erosion Hazard	Moderate	N/A	Moderate
Soil Permeability	Moderate	N/A	Moderate
Soil Manageability Class	3Xp	N/A	2e
Group	III	N/A	III
Range Site	1	N/A	N/A
Water Runoff Potential	Moderate	Very rapid	Slow
Hydrologic Soil Group	D	N/A	B
Available Water Capacity (AWC) Total (Top 20")	1.3 (1.3)	N/A	6.4 (2.7)
Forest Site Class	7 (Noncommercial)	N/A	5 (IV)
Timber Regeneration Potential			
Plantability	N/A	N/A	High
Seedling Survival	N/A	N/A	Moderate

56 Lithic Haploxerolls-Rock Outcrop-Trojan family association (continued)

Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-4; fine sandy loam	N/A	0-22; loam
	Unified: SM		Unified: ML
	ASSHTO: A-4		ASSHTO: A-4, A-6
	4-9; very gravelly sandy loam		22-34; gravelly sandy clay loam
	Unified: GM-GC, SM		Unified: GM-GC, SC
	ASSHTO: A-1, A-2-4, A-4		ASSHTO: A-2, A-2-6
	9-17; very cobbly loam		34-46; gravelly clay loam
	Unified: GM-GC, ML		Unified: GM-GC, CL
	ASSHTO: A-1, A-7		ASSHTO: A-2, A-6, A-7
	17; hard basalt		46; weathered basalt rock
Included Areas	10% Inville family		

57 Lithic Haploxerolls-Rouen family-Rock Outcrop association, 0 to 15 percent slopes

Map Unit Components	Lithic Haploxerolls	Rouen	Rock Outcrop
Approx. Proportion	40%	25%	20%
Position, Slope, and Elevation	Occurs on relatively flat basalt flows; 0 to 15 percent slopes; 5,000 to 5,400 feet.	Occurs on alluvial fans and terraces around Eagle Lake; 0 to 15 percent slopes; 5,000 to 5,300 feet.	Miscellaneous land type on mountain sideslopes and ridgetops; 4,000 to 9,000 feet.
Typical Vegetation & Precipitation	Sparse Jeffrey and ponderosa pine, juniper, digger pine, white oak, black oak, greenleaf manzanita, big sage, mountain mahogany, western redbud, yerba santa and chokecherry; 20 inches ppt.	Rabbit brush, annual and perennial grasses and a few Jeffrey pine; 16 to 25 inches ppt.	Barren except for widely scattered brush that occurs in fractures in the rock or in small colluvial pockets of soil; 16 to 25 inches ppt.

Soil Profile Description

Surface Layer	0 to 9 inches; brown gravelly fine sandy loam to very gravelly sandy loam; granular structure; soft; 30 to 40 percent rock fragments; pH 6.8.	0 to 8 inches; pale brown to light gray sandy loam to silty clay; single grain to subangular blocky structure; slightly hard to hard; pH 7.0 to 7.5.	N/A
Subsoil	9 to 17 inches; yellowish brown cobbly to very cobbly loam; subangular blocky to massive structure; slightly hard; 25 to 45 percent rock fragments; pH 7.2 to 7.5.	8 to 22 inches; brownish gray silty clay; prismatic structure; very hard; pH 8.0.	N/A
Substrata	17 inches; hard basalt rock.	22 to 60 inches; brownish gray silty clay, massive; very hard; pH 8.0; underlain by consolidated lake sediments.	Protruding bedrock that has all soil eroded off.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	17 inches; basalt.	22 inches, lake sediments	Nil; Any competent hard bedrock
Erosion Factor (K)	.28	.43	N/A
Max. Erosion Hazard	Moderate	High	N/A
Soil Permeability	Moderate	Slow	N/A
Soil Manageability Class	3Xp	3X	N/A
Group	III	III	N/A
Range Site	1	2	N/A
Water Runoff Potential	Moderate	Moderate to rapid	Very rapid
Hydrologic Soil Group	D	D	N/A
Available Water Capacity (AWC) Total (Top 20")	1.3 (1.3)	3.1 (2.8)	N/A
Forest Site Class	7 (Noncommercial)	7 (Noncommercial)	N/A
Timber Regeneration Potential			
Plantability	N/A	N/A	N/A
Seedling Survival	N/A	N/A	N/A

57 Lithic Haploxerolls-Rouen family-Rock Outcrop association (continued)

Estimated Engineering
Properties;
USDA Texture,
Unified, and ASSHTO

0-4; fine sandy loam Unified: SM ASSHTO: A-4	0-3; sandy loam Unified: SM ASSHTO: A-2-4, A-4	N/A
4-9; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	3-60; silty clay Unified: MH ASSHTO: A-7	
9-17; very cobbly loam Unified: GM-GC, ML ASSHTO: A-1, A-7		
17; hard basalt		

Included Areas

15% Aquolls

58 Lithic Xerochrepts-Bobbitt family, moderately deep association 0 to 15 percent slopes

Map Unit Components	Lithic Xerochrepts	Bobbitt, mod. deep
Approx. Proportion	40%	40%
Position, Slope, and Elevation	Occurs on relatively recent basalt flows; 0 to 15 percent slopes; 3,000 to 5,000 feet.	Occurs on all aspects of mountainous uplands and ridge tops. When located on lava ridges it often has 0 to 60% of the surface covered with rock fragments. 0 to 15 percent slopes; 3,500 to 5,200 feet.
Typical Vegetation & Precipitation	Sparse Jeffrey pine, incense cedar and juniper, with big sage, rabbit brush, desert mountain mahogany, greenleaf manzanita, pinemat manzanita and both annual and perennial grasses; 16 to 20 inches ppt.	Jeffrey pine, ponderosa pine, digger pine, juniper, bitterbrush, mountain mahogany, rabbit brush, 16 to 20 inches ppt.
Soil Profile Description		
Surface Layer	0 to 5 inches; grayish brown loamy sand to cobbly sandy loam; subangular blocky to granular structure; soft; 10 to 15 percent rock fragments; pH 6.3 to 6.8.	0 to 8 inches; grayish brown loam, blocky structure; soft; pH 7.5.
Subsoil	5 to 18 inches; yellowish brown cobbly to extremely cobbly sandy loam; subangular blocky to granular structure; soft; 15 to 75 percent rock fragments; pH 7.3 to 7.7.	8 to 25 inches; brown very gravelly clay loam; subangular blocky structure; very hard; 40% rock fragments; pH 7.0 to 7.5.
Substrata	18 inches; hard, slightly fractured basalt bedrock.	25 inches; slightly weathered basalt with soil in the cracks.
Soil Properties & Management Interpretations		
Rooting Depth (in.), Underlying Material	18 inches; basalt.	22 to 40, andesite, basalt and pumice.
Erosion Factor (K)	.24	.32
Max. Erosion Hazard	Low	Moderate
Soil Permeability	Moderately rapid	Moderate to moderately slow.
Soil Manageability Class	3Xp	3X
Group	III	III
Range Site	1	N/A
Water Runoff Potential	Very slow	Slow
Hydrologic Soil Group	B	B
Available Water Capacity (AWC) Total (Top 20")	1.7 (1.7)	2.4 (1.9)
Forest Site Class	7 (Noncommercial)	6 (V)
Timber Regeneration Plantability	N/A	Moderate to Low (Rocks)
Seedling Survival	N/A	Low
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-5; cobbly sandy loam Unified: SM ASSHTO: A-2-4, A-4	0-8; loam Unified: ML ASSHTO: A-7
	5-18; very cobbly sandy loam Unified: SM ASSHTO: A-2-4, A-4	8-25; gravelly clay loam Unified: GM-GC, CL ASSHTO: A-2, A-6, A-7
	18; hard basalt bedrock	25; slightly weathered basalt
Included Areas	20% Rock Outcrop and Lithic Haploxeralfs	

59 Lithic Xerumbrepts-Rock Outcrop-Rubble Land association, 15 to 50 percent slopes

Map Unit Components	Lithic Xerumbrepts	Rock Outcrop	Rubble Land
Approx. Proportion	50%	20%	20%
Position, Slope, and Elevation	Occurs on flat lava flows and on mountain sideslopes and ridgetops; 15 to 50 percent slopes; 3,200 to 8,000 feet.	Miscellaneous land type on mountain sideslopes and ridgetops; 4,000 to 9,000 feet.	Miscellaneous land type on mountain sideslopes and steep escarpments.
Typical Vegetation & Precipitation	Greenleaf manzanita, pinemat manzanita, desert mountain mahogany and sparse Jeffrey pine, ponderosa pine, juniper and incense cedar; 20 to 80 inches ppt.	Barren except for widely scattered brush that occurs in fractures in the rock or in small colluvial pockets of soil; 16 to 80 inches ppt.	Somewhat barren, but vegetation may grow up through the rock fragments. The vegetation is growing in soil that is buried by the rock fragments; 16 to 80 inches ppt.
Soil Profile Description			
Surface Layer	0 to 6 inches; brown very gravelly sandy loam; granular structure; soft; 40 percent rock fragments; pH 6.5.	N/A	N/A
Subsoil	6-10 inches; yellowish brown very gravelly sandy loam; granular structure; 45 percent rock fragments; pH 6.0.	N/A	N/A
Substrata	10 inches; hard fractured basalt bedrock.	Protruding bedrock that has all soil eroded off.	Detached rock fragments ranging in size from 3 inches to about 5 feet in diameter.
Soil Properties & Management Interpretations			
Rooting Depth (in.), Underlying Material	10 inches; basalt	N/A	N/A
Erosion Factor (K)	.28	N/A	N/A
Max. Erosion Hazard	Moderate	N/A	N/A
Soil Permeability	Moderate	N/A	N/A
Soil Manageability Class	3Px	N/A	N/A
Group	III	N/A	N/A
Range Site	N/A	N/A	N/A
Water Runoff Potential	Moderate	Very rapid	Very slow to moderate
Hydrologic Soil Group	C	N/A	N/A
Available Water Capacity (AWC) Total (Top 20")	.8 (.8)	N/A	N/A
Forest Site Class	7 (Noncommercial)	N/A	N/A
Timber Regeneration Potential			
Plantability	N/A	N/A	N/A
Seedling Survival	N/A	N/A	N/A
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-10; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	N/A	N/A
Included Areas	10; hard fractured basalt 10% Sheld family, moderately deep		

**60 Lithic Xerumbrepts-Rubble Land-Sheld family, moderately deep association,
35 to 70 percent slopes**

Map Unit Components	Lithic Xerumbrepts	Rubble Land	Sheld, moderately deep
Approx. Proportion	50%	25%	20%
Position, Slope, and Elevation	Occurs on mountain sideslopes and ridgetops; 35 to 70 percent slopes; 3,200 to 8,000 feet.	Miscellaneous land type on mountain sideslopes and steep escarpments.	Occur on upland flats; mountain sideslopes, and undulating hills; 35 to 70 percent slopes; 5,200 to 8,000 feet.
Typical Vegetation & Precipitation	Greenleaf manzanita, pinemat manzanita, desert mountain mahogany and sparse Jeffrey pine, ponderosa pine, juniper and incense cedar; 00 to 80 inches ppt.	Somewhat barren, but vegetation may grow up through the rock fragments. The vegetation is growing in soil that is buried by the rock fragments; 35 to 80 inches ppt.	Red and white fir; sugar pine; incense cedar; Jeffrey pine, ponderosa pine, lodgepole pine; mountain hemlock; chinquapin; greenleaf manzanita and pinemat manzanita; 40 to 85 inches ppt.

Soil Profile Description

Surface Layer	0 to 6 inches; brown very gravelly sandy loam; granular structure; soft; 40 percent rock fragments; pH 6.5.	N/A	0 to 6 inches; dark brown gravelly sandy loam; granular structure; soft; 15 to 30 percent rock fragments; pH 6.0.
Subsoil	6-10 inches; yellowish brown very gravelly sandy loam; granular structure; 45 percent rock fragments; pH 6.0.	N/A	6 to 27 inches; brown very gravelly to extremely gravelly sandy loam to coarse sandy loam; subangular blocky to single grain structure; soft; 40 to 60 percent rock fragments; pH 6.2.
Substrata	10 inches; hard fractured basalt bedrock.	Detached rock fragments ranging in size from 3 inches to about 5 feet in diameter.	27 inches; Fractured and slightly weathered vesicular basalt.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	10 inches; basalt	N/A	27 inches; basalt
Erosion Factor (K)	.28	N/A	.20
Max. Erosion Hazard	Moderate	N/A	Moderate to high
Soil Permeability	Moderate	N/A	Moderate rapid
Soil Manageability Class	3Px	N/A	3gpx
Group	III	III	III
Range Site	N/A	N/A	N/A
Water Runoff Potential	Rapid	Very slow to moderate	Moderate
Hydrologic Soil Group	C	N/A	B
Available Water Capacity (AWC) Total (Top 20")	.8 (.8)	N/A	2.1 (1.7)
Forest Site Class	7 (Noncommercial)	N/A	5 (III)
Timber Regeneration Potential			
Plantability	N/A	N/A	Moderate
Seedling Survival	N/A	N/A	Low

60 Lithic Xerumbrepts-Rubble Land-Sheld family (continued)

Estimated Engineering
Properties;
USDA Texture,
Unified, and ASSHTO

0-10; very gravelly sandy loam N/A
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

0-6; gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

10; hard fractured basalt

6-27; very gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

27; slightly weathered basalt

Included Areas

5% Rock Outcrop

61 Los Gatos family-Lithic Haploxeralfs association, 0 to 15 percent slopes

Map Unit Components	Los Gatos	Lithic Haploxeralfs
Approx. Proportion	40%	40%
Position, Slope, and Elevation	Occurs on fans, terraces and benches along the northern boundary of the Forest near Slate Creek. 0 to 15 percent slopes; 4,800 to 5,600 ft.	Occurs on andesite, basalt and rhyolitic flows and mountain sideslopes; 0 to 15 percent slopes; 4,000 to 5,600 feet.
Typical Vegetation & Precipitation	Jeffrey pine, western juniper, black oak, big sage, rabbit brush and annual and perennial grasses; 20 to 25 inches ppt.	Ponderosa pine, incense cedar, juniper, black oak, squaw carpet, bitterbrush, and mule's ear; 18 to 30 inches ppt.

Soil Profile Description

Surface Layer	0 to 14 inches, grayish brown loam to cobbly loam, subangular blocky structure; slightly hard; pH 6.4 to 5.9.	0 to 6 inches; light gray gravelly to extremely gravelly sandy loam; granular to subangular blocky structure; soft; 15 to 60 percent rock fragments; pH 6.3.
Subsoil	14 to 31 inches; brown clay loam; and gravelly clay loam; subangular blocky structure, hard; pH 5.8.	6-18 inches; pinkish gray very gravelly loam; subangular blocky structure; 50 percent rock fragments; pH 6.0.
Substrata	31 to 48 inches; brown very gravelly clay loam; subangular blocky structure; hard; pH 5.7; underlain by fractured basalt.	18 inches; hard rhyolitic tuff.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	48 inches; fractured basalt.	18 inches; hard rhyolitic tuff
Erosion Factor (K)	.24	.20
Max. Erosion Hazard	Moderate	Low to moderate
Soil Permeability	Moderately slow	
Soil Manageability Class	2e	3P
Soil Manageability Group	III	
Range Site	2	1
Water Runoff Potential	Moderate to rapid	Very slow
Hydrologic Soil Group	C	B
Available Water Capacity (AWC) Total (Top 20")	5.3 (2.5)	1.2 (1.2)
Forest Site Class	7 (Noncommercial)	6-7 (V-)
Timber Regeneration Plantability	N/A	Low
Timber Regeneration Seedling Survival	N/A	Very low

61 Los Gatos family-Lithic Haploxeralfs association (continued)

Estimated Engineering
Properties;
USDA Texture,
Unified, and ASSHTO

0-4; loam
Unified: ML
ASSHTO: A-7

0-2; gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

4-14; cobbly loam
Unified: ML-CL
ASSHTO: A-6

2-6; very gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

14-31; gravelly clay loam
Unified: GM-GC, CL
ASSHTO: A-2, A-6, A-7

6-18 very gravelly loam
Unified: GM-GC, ML
ASSHTO: A-1, A-4

31-48; very gravelly clay loam
Unified: GM-GC, CL
ASSHTO: A-2, A-6, A-7

18; hard rhyolitic tuff

48; fractured basalt

Included Areas

20% Rock Land, Supan family, and a dry Los Gatos family

62 Neer-Sadie families complex, 0 to 35 percent slopes

Map Unit Components	Neer	Sadie
Approx. Proportion	50%	40%
Position, Slope, and Elevation	Occurs on mountain sideslopes, escarpments of lava flows and gently sloping terrain; 0 to 35 percent slopes; 3,200 to 5,200 feet.	Occurs on mountain sideslopes and volcanic flows; 0 to 35 percent slopes; 3,000 to 5,200 feet.
Typical Vegetation & Precipitation	Ponderosa pine, sugar pine, white fir, incense cedar, black oak, huckleberry oak, serviceberry, pinemat manzanita and chokecherry; 20 to 50 inches ppt.	Ponderosa pine, sugar pine, incense cedar, white fir, Jeffrey pine, douglas fir, black oak, desert mountain mahogany, rabbit brush, greenleaf manzanita and big sage; 25 to 60 inches ppt.
Soil Profile Description		
Surface Layer	0 to 7 inches; brown gravelly sandy loam; granular structure; soft; 20 to 30 percent rock fragments, pH 6.8 to 7.0.	0 to 10 inches; dark yellowish brown fine sandy loam; granular to subangular blocky structure; soft; pH 6.5 to 7.3.
Subsoil	7 to 30 inches; brown very gravelly sandy loam; granular structure; soft; 40 percent rock fragments; pH 7.5.	10 to 51 inches; dark yellowish brown fine sandy loam; subangular blocky structure; soft; pH 7.0.
Substrata	30 to 60 inches; yellowish brown very gravelly fine sandy loam to loam; subangular blocky structure; soft; 35 to 50 percent rock fragments; pH 7.5.	51 to 58 inches; dark yellowish brown cobbly fine sandy loam; subangular blocky structure; soft; 27 percent rock fragments; pH 7.3; underlain by weathered vesicular basalt.
Soil Properties & Management Interpretations		
Rooting Depth (in.)	60+ inches	58 inches; basalt
Erosion Factor (K)	.20	.20
Max. Erosion Hazard	Low to moderate	Low to moderate
Soil Permeability	Moderately rapid	Moderately rapid
Soil Manageability Class	2p	1
Soil Manageability Group	II	II
Range Site	N/A	N/A
Water Runoff Potential	Very slow	Very slow
Hydrologic Soil Group	A	A
Available Water (AWC) Total (Top 20")	4.4 (1.8)	7.6 (2.8)
Forest Site Class	4 (II)	4 (II)
Timber Regeneration Plantability	Moderate	High
Seedling Survival	Very low to low	Moderate
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	<p>0-7; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4</p> <p>7-30; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4</p> <p>30-49; very gravelly fine sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-4</p> <p>49-60; extremely cobbly loam Unified: GM-GC, ML ASSHTO: A-1, A-7</p>	<p>0-51; fine sandy loam Unified: SM-SC ASSHTO: A-4</p> <p>51-58; cobbly fine sandy loam Unified: SM-SC ASSHTO: A-4</p> <p>58; weathered basalt</p>
Included Areas	10% Lava Flow	

63 Neer-Sadie families-Washougal family, moderately families complex, 0 to 35 percent slopes

Map Unit Components	Neer	Sadie	Washougal, mod. deep
Approx. Proportion	45%	25%	20%
Position, Slope, and Elevation	Occurs on mountain sideslopes, escarpments of lava flows and gently sloping terrain; 0 to 35 percent slopes; 3,200 to 5,200 feet.	Occurs on mountain sideslopes and volcanic flows; 0 to 35 percent slopes; 3,000 to 5,200 feet.	Occurs on mountain sideslopes and outwash terraces; 0 to 35 percent slopes; 3,500 to 5,200 feet.
Typical Vegetation & Precipitation	Ponderosa pine, sugar pine, white fir, incense cedar, black oak, huckleberry oak, serviceberry, pinemat manzanita and chokecherry; 20 to 50 inches ppt.	Ponderosa pine, sugar pine, incense cedar, white fir, Jeffrey pine, douglas fir, black oak, desert mountain mahogany, rabbit brush, inches ppt.	Jeffrey pine, lodgepole pine, white fir, greenleaf manzanita, rabbit brush and annual and perennial grasses; 35 to 50 inches ppt.

Soil Profile Description

Surface Layer	0 to 7 inches; brown gravelly sandy loam; granular structure; soft; 20 to 30 percent rock fragments, pH 6.8 to 7.0.	0 to 10 inches; dark yellowish brown fine sandy loam; granular to subangular blocky structure; soft; pH 6.5 to 7.3.	0 to 13 inches; brown gravelly sandy loam; granular structure; soft; 20 to 25 percent rock fragments; pH 5.8. 20 to 25 percent of the surface covered by rock fragments.
Subsoil	7 to 30 inches; brown very gravelly sandy loam; granular structure; soft; 40 percent rock fragments; pH 7.5.	10 to 51 inches; dark yellowish brown fine sandy loam; subangular blocky structure; soft; pH 7.0.	13 to 39 inches; brown to grayish brown very cobbly to extremely cobbly sandy loam; soft; 46 to 60 percent rock fragments; pH 6.0.
Substrata	30 to 60 inches; yellowish brown very gravelly fine sandy loam to loam; subangular blocky structure; soft; 35 to 50 percent rock fragments; pH 7.5.	51 to 58 inches; dark yellowish brown cobbly fine sandy loam; subangular blocky structure; soft; 27 percent rock fragments; pH 7.3; underlain by weathered vesicular basalt.	39 inches; glacial till.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	60+ inches	.20	39 inches; glacial till.
Erosion Factor (K)	.20		.20
Max. Erosion Hazard	Low to moderate	Low to moderate.	Moderate
Soil Permeability	Moderately rapid	Moderately rapid	Moderately rapid
Soil Manageability Class	2p	1	3xp
Group	II	II	II
Range Site	N/A	N/A	N/A
Water Runoff Potential	Very slow	Very slow	Slow
Hydrologic Soil Group	A	A	B
Available Water Capacity (AWC) Total (Top 20")	4.4 (1.8)	7.6 (2.8)	2.4 (1.5)
Forest Site Class	4 (II)	4 (II)	5 (IV)
Timber Regeneration Potential			
Plantability	Moderate	High	Moderate
Seedling Survival	Very low to low	Moderate	Very low to low

63 Neer-Sadie families-Washougal family (continued)

Estimated Engineering Properties;
USDA Texture, Unified, and ASSHTO

0-7; gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

0-51; fine sandy loam
Unified: SM-SC
ASSHTO: A-4

0-13; gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

7-30; very gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

51-58; cobbly fine sandy loam
Unified: SM-SC
ASSHTO: A-4

13-39; cobbly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

30-49; very gravelly fine sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-4

58; weathered basalt

26; glacial till

49-60; extremely cobbly loam
Unified: GM-GC, ML
ASSHTO: A-1, A-7

Included Areas

10% Neer family moderately deep

64 Neer-Skalan families complex, 0 to 35 percent slopes

Map Unit Components	Neer	Skalan
Approx. Proportion	45%	40%
Position, Slope, and Elevation	Occurs on mountain sideslopes, escarpments of lava flows and gently sloping terrain; 0 to 35 percent slopes; 3,200 to 5,200 feet.	Occurs on mountain sideslopes; gently sloping hills and undulating flats; 0 to 35 percent slopes, 3,000 to 5,200 feet.
Typical Vegetation & Precipitation	Ponderosa pine, sugar pine, white fir, incense cedar, black oak, huckleberry oak, serviceberry, pinemat manzanita and chokecherry; 20 to 50 inches ppt.	Jeffrey and ponderosa pine, sugar pine, white fir, incense cedar, black oak, huckleberry oak, western serviceberry, pinemat manzanita and chokecherry; 20 to 65 inches ppt.
Soil Profile Description		
Surface Layer	0 to 7 inches; brown gravelly sandy loam; granular structure; soft; 20 to 30 percent rock fragments, pH 6.8 to 7.0.	0 to 14 inches; brown gravelly sandy loam to loam; granular to subangular blocky structure; soft; 15 to 30 percent rock fragments; pH 6.5-6.7.
Subsoil	7 to 30 inches; brown very gravelly sandy loam; granular structure; soft; 40 percent rock fragments; pH 7.5.	14 to 31 inches; brown very gravelly loam to clay loam; subangular blocky structure; slightly hard; 40 to 50 percent rock fragments; pH 6.7.
Substrata	30 to 60 inches; yellowish brown very gravelly fine sandy loam to loam; subangular blocky structure; soft; 35 to 50 percent rock fragments; pH 7.5.	31 to 60 inches; yellowish brown very gravelly to extremely gravelly clay loam; subangular blocky structure; hard; 50 to 60 percent rock fragments; pH 6.7; underlain by andesite and basalt.
Soil Properties & Management Interpretations		
Rooting Depth (in.)	60+ inches	60 inches; weathered basalt
Erosion Factor (K)	.20	.20
Max. Erosion Hazard	Low to moderate	Low
Soil Permeability	Moderately rapid	Moderate
Soil Manageability Class	2p	2p
Group	II	II
Range Site	N/A	N/A
Water Runoff Potential	Very slow	Slow
Hydrologic Soil Group	A	B
Available Water (AWC) Total (Top 20")	4.4 (1.8)	5.1 (1.7)
Forest Site Class	4 (II)	4 (II)
Timber Regeneration Plantability	Moderate	Moderate
Seedling Survival	Very low to low	Very low to low
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-7; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	0-8; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	7-30; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	8-14; gravelly loam Unified: GM-GC, ML ASSHTO: A-1, A-7
	30-49; very gravelly fine sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-4	14-23; very gravelly loam Unified: GM-GC, ML ASSHTO: A-1, A-4
	49-60; extremely cobbly loam Unified: GM-GC, ML ASSHTO: A-1, A-7	23-60; very gravelly clay loam Unified: GM-GC, ML-CL ASSHTO: A-2, A-6
Included Areas	15% Washogal and Holland families and Rubble land	

65 Neer-Skalan families complex, 35 to 50 percent slopes

Map Unit Components
Approx. Proportion
Position, Slope, and
Elevation
Typical Vegetation &
Precipitation

Neer

45%

Occurs on mountain sideslopes and escarpments of lava flows; 35 to 50 percent slopes; 3,200 to 5,200

Ponderosa pine, sugar pine, white fir, incense cedar, black oak, huckleberry oak, serviceberry, pinemat manzanita and chokecherry; 20 to 50 inches ppt.

Skalan

45%

Occurs on mountain sideslopes and steeply sloping hills; 35 to 50 percent slopes, 3,000 to 5,200 feet.

Jeffrey and ponderosa pine, sugar pine, white fir, incense cedar, black oak, huckleberry oak, western serviceberry, pinemat manzanita and chokecherry; 20 to 65 inches ppt.

Soil Profile Description

Surface Layer

0 to 7 inches; brown gravelly sandy loam; granular structure; soft; 20 to 30 percent rock fragments; pH 6.8 to 7.0.

0 to 14 inches; brown gravelly sandy loam to loam; granular to subangular blocky structure; soft; 15 to 30 percent rock fragments; pH 6.5-6.7.

Subsoil

7 to 30 inches; brown very gravelly sandy loam; granular structure; soft; 40 percent rock fragments; pH 7.5.

14 to 31 inches; brown very gravelly loam to clay loam; subangular blocky structure; slightly hard; 40 to 50 percent rock fragments; pH 6.7.

Substrata

30 to 60 inches; yellowish brown very cobbly to extremely cobbly fine sandy loam to loam; subangular blocky structure; soft; 55 to 80 percent rock fragments; pH 7.5.

31 to 60 inches; yellowish brown very gravelly to extremely gravelly clay loam; subangular blocky structure; hard; 50 to 60 percent rock fragments; pH 6.7; underlain by andesite and basalt.

Soil Properties & Management Interpretations

Rooting Depth (in.)
Erosion Factor (K)
Max. Erosion Hazard
Soil Permeability
Soil Manageability
Class
Group
Range Site
Water Runoff Potential
Hydrologic Soil Group
Available Water (AWC)
Total (Top 20")
Forest Site Class
Timber Regeneration
Plantability
Seedling Survival
Estimated Engineering
Properties;
USDA Texture,
Unified, and ASSHTO
Included Areas

60+ inches

60 inches; weathered basalt

.20

.20

Moderate

Moderate

Moderately rapid

Moderate

3px
III

3gp
III

N/A

N/A

Slow

Moderate

A

B

4.2 (1.8)

5.1 (1.7)

4 (II)

4 (II)

Moderate
Very low to low

Moderate
Very low to low

0-7; gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

0-8; gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

7-30; very gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

8-14; gravelly loam
Unified: GM-GC, ML
ASSHTO: A-1, A-7

30-49; very gravelly fine sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-4

14-23; very gravelly loam
Unified: GM-GC, ML
ASSHTO: A-1, A-4

49-60; extremely cobbly loam
Unified: GM-GC, ML
ASSHTO: A-1, A-7

23-60; very gravelly clay loam
Unified: GM-GC, ML-CL
ASSHTO: A-2, A-6

10% Holland family and Rubble land

66 Neer-Skalan families, extremely stony-Rubble Land complex, 15 to 70 percent slopes

Map Unit Components	Neer	Skalan	Rubble Land
Approx. Proportion	30%	30%	30%
Position, Slope, and Elevation	Occurs on mountain sideslopes and escarpments of lava flows; 15 to 70 percent slopes; 3,200 to 5,200.	Occurs on mountain sideslopes, steeply sloping hills and lava badlands; 15 to 70 percent slopes; 3000 to 5200 feet.	Miscellaneous land type on mountain sideslopes and steep escarpments.
Typical Vegetation & Precipitation	Ponderosa pine, sugar pine, white fir, incense cedar, black oak, huckleberry oak, serviceberry, pinemat manzanita and chokecherry; 20 to 50 inches ppt.	Jeffrey and ponderosa pine, sugar pine, white fir, incense cedar, black oak, huckleberry oak, western serviceberry, pinemat manzanita, and chokecherry; 20 to 50 inches ppt.	Somewhat barren, but vegetation may grow up through the rock fragments. The vegetation is growing in soil that is buried by the rock fragments; 16 to 50 inches ppt.
Soil Profile Description			
Surface Layer	0 to 7 inches; brown gravelly sandy loam; granular structure; soft; 20 to 30 percent rock fragments; pH 6.8 to 7.0.	0 to 11 inches; brown very stony to extremely stony sandy loam; granular structure; soft; 50 to 75 percent rock fragments; pH 6.5 to 6.7.	N/A
Subsoil	7-30 inches; brown very gravelly sandy loam; granular structure; soft; 40 percent rock fragments; pH 7.5.	11 to 32 inches; brown very stony to extremely stony loam to clay loam; subangular blocky structure; slightly hard; 50 to 75 percent rock fragments; pH 6.7.	N/A
Substrata	30 to 60 inches; yellowish brown very gravelly fine sandy loam to loam; subangular blocky structure; soft; 35 to 50 percent rock fragments; pH 7.5.	32 to 50 inches; brown extremely stony loam; subangular blocky structure; slightly hard; 60 to 80 percent rock fragments; pH 6.7; underlain by basalt.	Detached rock fragments ranging in size from 3 inches to about 5 feet in diameter.
Soil Properties & Management Interpretations			
Rooting Depth (in.), Underlying Material	60 inches	50 inches; basalt	N/A
Erosion Factor (K)	.10	.20	N/A
Max. Erosion Hazard	Low	Low	N/A
Soil Permeability	Moderately rapid	Moderate	N/A
Soil Manageability Class	3X	3PX	N/A
Soil Manageability Group	III	III	N/A
Range Site	N/A	N/A	N/A
Water Runoff Potential	Very slow	Slow to moderate	Very slow to moderate
Hydrologic Soil Group	A	B	N/A
Available Water Capacity (AWC) Total (Top 20")	4.4 (1.8)	2.6 (1.1)	N/A
Forest Site Class	4 (II)	5 (III-IV)	N/A
Timber Regeneration Potential			
Plantability	Nonplantable	Low to nonplantable	N/A
Seedling Survival	Very low to low	Very low	N/A

66 Neer-Skalan families, extremely stony-Rubble Land complex (continued)

Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO

0-7; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	0-11; extremely stony sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	N/A
7-30; very gravelly sand loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	11-19; very stony sandy clay loam Unified: GM-GC, SC ASSHTO: A-2, A-2-6	
30-49; very gravelly fine sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-4	19-50; very stony loam Unified: GM-GC, ML ASSHTO: A-1, A-4	
49-60; extremely cobbly loam Unified: GM-GC, ML ASSHTO: A-1, A-7	50; hard basalt	

Included Areas

10% Skalan family, moderately deep, very stony

67 Neer-Washougal families complex, 0 to 35 percent slopes

Map Unit Components	Neer	Washougal
Approx. Proportion	45%	35%
Position, Slope, and Elevation	Occurs on mountain sideslopes, escarpments of lava flows and gently sloping terrain; 0 to 35 percent slopes; 3,200 to 5,200 feet.	Occurs on upland flats, mountain slopes and undulating hills; 0 to 35 percent slopes; 3,500 to 5,200 feet.
Typical Vegetation & Precipitation	Ponderosa pine, sugar pine, white fir, incense cedar, black oak, huckleberry oak, serviceberry, pinemat manzanita and chokecherry; 20 to 50 inches ppt.	Jeffrey pine, incense cedar, ponderosa pine, white fir, lodgepole pine, greenleaf manzanita and desert mountain mahogany; 25 to 50 inches ppt.
Soil Profile Description		
Surface Layer	0 to 7 inches; brown gravelly sandy loam; granular structure; soft; 20 to 30 percent rock fragments, pH 6.8 to 7.0.	0 to 10 inches; grayish brown gravelly sandy loam; granular structure; soft; 15 to 20 percent rock fragments; pH 6.0 to 6.3.
Subsoil	7 to 30 inches; brown very gravelly sandy loam; granular structure; soft; 40 percent rock fragments; pH 7.5.	10 to 42 inches; brown very cobbly sandy loam; granular structure; soft; 40 to 50 percent rock fragments; pH 6.5.
Substrata	30 to 60 inches; yellowish brown very gravelly fine sandy loam to loam; subangular blocky structure; soft; 35 to 50 percent rock fragments; pH 7.5.	42 inches; indurated glacial till.
Soil Properties & Management Interpretations		
Rooting Depth (in.)	60+ inches	42 inches indurated glacial till
Erosion Factor (K)	.20	.20
Max. Erosion Hazard	Low to moderate	Moderate
Soil Permeability	Moderately rapid	Moderately rapid
Soil Manageability Class	2p	2p
Group	II	III
Range Site	N/A	N/A
Water Runoff Potential	Very slow	Slow
Hydrologic Soil Group	A	B
Available Water (AWC) Total (Top 20")	4.4 (1.8)	3.6 (1.7)
Forest Site Class	4 (II)	5 (III)
Timber Regeneration Plantability	Moderate	High
Seedling Survival	Very low to low	Very low to low
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-7; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	0-10; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	7-30; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	10-47; very cobbly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	30-49; very gravelly fine sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-4	42; indurated glacial till
	49-60; extremely cobbly loam Unified: GM-GC, ML ASSHTO: A-1, A-7	
Included Areas	20% Sadie family; Washougal family, moderately deep and Aquolls	

68 Pass Canyon family-Lithic Haploxeralfs, rhyolitic complex, 0 to 35 percent slopes

Map Unit Components	Pass Canyon	Lithic Haploxeralfs
Approx. Proportion	45%	35%
Position, Slope, and Elevation	Occurs on mountain sideslopes near Coble Mtn. in the Hat Creek Ranger District; 0 to 35 percent slopes; 4,800 to 5,200 feet.	Occurs on andesite, basalt and rhyolitic flows and mountain sideslopes; 0 to 35 percent slopes; 4,000 to 5,600 feet.
Typical Vegetation & Precipitation	Jeffrey and ponderosa pine; incense cedar, big sage and balsam root; 18 to 25 inches ppt.	Ponderosa pine, incense cedar, juniper, black oak, squaw carpet, bitterbrush, buckbrush and mule's ear; 18 to 25 inches ppt.

Soil Profile Description

Surface Layer	0 to 11 inches; grayish brown sandy loam to loam; granular to subangular blocky structure; soft; 5 percent pebbles; pH 6.5.	0 to 6 inches; light gray gravelly to extremely gravelly sandy loam; granular to subangular blocky structure; soft; 15 to 60 percent rock fragments; pH 6.3.
Subsoil	11 to 20 inches; brown loam to sandy clay loam; subangular blocky structure; hard; 5 to 10 percent pebbles; pH 6.3 to 6.2.	6-18 inches; pinkish gray very gravelly loam; subangular blocky structure; 50 percent rock fragments; pH 6.0.
Substrata	20 inches; hard rhyolite.	18 inches; hard rhyolitic tuff.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	20 inches; rhyolite	18 inches; hard rhyolitic tuff
Erosion Factor (K)	.24	.20
Max. Erosion Hazard	Moderate	Low to moderate
Soil Permeability	Moderate	Moderate rapid
Soil Manageability Class	2ed	3P
Group	II	II
Range Site	N/A	N/A
Water Runoff Potential	Slow	Very slow
Hydrologic Soil Group	B	B
Available Water Capacity (AWC) Total (Top 20")	2.7 (2.7)	1.2 (1.2)
Forest Site Class	6 (V)	6-7 (V-)
Timber Regeneration Potential		
Plantability	Moderate	Low
Seedling Survival	Moderate	Very low
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-4; sandy loam Unified: SM ASSHTO: A-2-4, A-4	0-2; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	4-17; loam Unified: ML ASSHTO: A-4, A-7	2-6; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	17-20; sandy clay loam Unified: SC ASSHTO: A-2-6	6-18; very gravelly loam Unified: GM-GC, ML ASSHTO: A-1, A-4
	20; hard rhyolite	18; hard rhyolitic tuff
Included Areas	20% Brownlee and Aikman families	

69 Patio-De Masters families-Aquolls association, 0 to 15 percent slopes

Map Unit Components	Patio	De Masters	Aquolls
Approx. Proportion	30%	25%	25%
Position, Slope, and Elevation	Occurs on mountain sideslopes; escarpments and gently sloping hillsides; 0 to 15 percent slopes; 5,200 to 7,000 feet.	Occurs mainly on old, relatively flat lava flows; 0 to 15 percent slopes; 5,000 to 6,500 feet.	Meadows and valleys over the total forest; 0 to 15 percent slopes; 4,000 to 8,000 feet.
Typical Vegetation & Precipitation	Jeffrey and ponderosa pine, sugar pine, white fir, red fir, incense cedar, juniper, mountain mahogany, chinquapin, greenleaf manzanita; pinemat manzanita; desert mountain mahogany and big sage; 18 to 35 inches ppt.	Ponderosa and Jeffrey pine, white and red fir, incense cedar, western juniper, mountain mahogany, greenleaf manzanita, pinemat manzanita, desert mountain mahogany and big sage; 20 to 35 inches ppt.	Annual and perennial grasses, lodgepole pine, alder, aspen, willow and thistle, 20 to 35 inches ppt.
Soil Profile Description			
Surface Layer	0 to 9 inches; brown gravelly or cobbly fine sandy loam; granular structure; soft; 20 percent rock fragments; pH 6.5.	0 to 24 inches; dark brown sandy loam to loam; granular and blocky structure; soft to slightly hard; pH 6.5 to 6.3.	0 to 9 inches; grayish brown loam or silt loam; granular and blocky structure, slightly hard; pH 5.8 to 6.0.
Subsoil	9 to 29 inches; yellowish brown very cobbly loam; subangular blocky structure; soft; pH 6.5.	24 to 55 inches; brown clay loam; subangular blocky structure; slightly hard to hard; pH 6.3.	9 to 16 inches; grayish brown sandy loam or silty clay loam; blocky structure, slightly hard; pH 6.2 to 7.6.
Substrata	29 to 38 inches; fractured platy basalt with soil and roots in cracks.	55 to 60 inches; weathered basalt.	16 to 60 inches; light brownish gray loamy sand to a clay loam; massive; slightly hard; pH 6.2 to 7.6.
Soil Properties & Management Interpretations			
Rooting Depth (in.), Underlying Material	29 inches; basalt	55 inches; basalt.	10 to 20 in; gravelly silty clay
Erosion Factor (K)	.24	.28	.17
Max. Erosion Hazard	Moderate	Moderate to low	Low
Soil Permeability	Moderate	Moderate.	Moderately slow
Soil Manageability Class	2px	2e	3W
Soil Manageability Group	II	II	II
Range Site	N/A	2	3
Water Runoff Potential	Slow	Slow	Very slow
Hydrologic Soil Group	B	B	C
Available Water Capacity (AWC) Total (Top 20")	2.3 (1.7)	7.8 (2.6)	8.2 (3.0)
Forest Site Class	5 (IV)	4 (II-III)	N/A
Timber Regeneration Potential			
Plantability	Moderate	High	N/A
Seedling Survival	Low	Moderate	N/A

69 Patio-De Masters families-Aquolls association (continued)

Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO

0-9; gravelly fine sandy loam
Unified: GM-GC, SM-SC
ASSHTO: A-1, A-4

0-4; sandy loam
Unified: SM
ASSHTO: A-2-4, A-4

0-9; silt loam
Unified: ML
ASSHTO: A-7

9-29; very cobbly loam
Unified: ML-CL
ASSHTO: A-4

4-24; loam
Unified: ML
ASSHTO: A-7

9-16; silty clay loam
Unified: ML-CL
ASSHTO: A-6

29; fractured platy basalt

24-55; clay loam
Unified: CL
ASSHTO: A-6, A-7
55; weathered basalt

16-60; gravelly silty clay loam
Unified: ML-CL
ASSHTO: A-7

Included Areas

20% Trojan and Wintoner families

70 Patio family-Rock Outcrop-De Masters family association, 0 to 35 percent slopes

Map Unit Components	Patio	Rock Outcrop	De Masters
Approx. Proportion	40%	20%	20%
Position, Slope, and Elevation	Occurs on mountain sideslopes; escarpments and gently sloping hillsides; 0 to 35 percent slopes; 5,200 to 7,000 feet.	Miscellaneous land type on mountain sideslopes and ridgetops; 4,000 to 9,000 feet.	Occurs mainly on old, relatively flat lava flows; 0 to 35 percent slopes; 5,000 to 6,500 feet.
Typical Vegetation & Precipitation	Jeffrey and ponderosa pine, sugar pine, white fir, red fir, incense cedar, juniper, mountain mahogany, chinquapin, greenleaf manzanita; pinemat manzanita; desert mountain mahogany and big sage; 18 to 35 inches ppt.	Barren except for widely scattered brush that occurs in fractures in the rock or in small colluvial pockets of soil; 16 to 35 inches pat.	Ponderosa and Jeffrey pine, white and red fir, incense cedar, western juniper, mountain mahogany, greenleaf manzanita, pinemat manzanita, desert mountain mahogany and big sage; 20 to 35 inches pat.

Soil Profile Description

Surface Layer	0 to 9 inches; brown gravelly or cobbly fine sandy loam; granular structure; soft; 20 percent rock fragments; pH 6.5.	N/A	0 to 24 inches; dark brown sandy loam to loam; granular and blocky structure; soft to slightly hard; pH 6.5 to 6.3.
Subsoil	9 to 29 inches; yellowish brown very cobbly loam; subangular blocky structure; soft; pH 6.5.	N/A	24 to 55 inches; brown clay loam; subangular blocky structure; slightly hard to hard; pH 6.3.
Substrata	29 to 38 inches; fractured platy basalt with soil and roots in cracks.	Protruding bedrock that has all soil eroded off.	55 to 60 inches; weathered basalt.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	29 inches; basalt	N/A	55 inches; basalt.
Erosion Factor (K)	.24	N/A	.28
Max. Erosion Hazard	Moderate	N/A	Moderate to low
Soil Permeability	Moderate	N/A	Moderate.
Soil Manageability Class	2px	N/A	2e
Soil Manageability Group	II	N/A	II
Range Site	N/A	N/A	N/A
Water Runoff Potential	Slow	Very rapid	Slow
Hydrologic Soil Group	B	N/A	B
Available Water Capacity (AWC) Total (Top 20")	2.3 (1.7)	N/A	7.8 (2.6)
Forest Site Class	5 (IV)	N/A	4 (II-III)
Timber Regeneration Potential			
Plantability	Moderate	N/A	High
Seedling Survival	Low	N/A	Moderate

70 Patio family-Rock Outcrop-De Masters family association (continued)

<p>Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO</p>	<p>0-9; gravelly fine sandy loam N/A Unified: GM-GC, SM-SC ASSHTO: A-1, A-4</p>	<p>0-4; sandy loam Unified: SM ASSHTO: A-2-4, A-4</p>
	<p>9-29; very cobbly loam Unified: ML-CL ASSHTO: A-4</p>	<p>4-24; loam Unified: ML ASSHTO: A-7</p>
	<p>29; fractured platy basalt</p>	<p>24-55; clay loam Unified: CL ASSHTO: A-6, A-7</p>
		<p>55; weathered basalt</p>
<p>Included Areas</p>	<p>20% Portola family and Sheld family, moderately deep</p>	

71 Patio-Trojan-DeMasters families association, 0 to 35 percent slopes

Map Unit Components	Patio	Trojan	De Masters
Approx. Proportion	40%	25%	20%
Position, Slope, and Elevation	Occurs on mountain sideslopes; escarpments and gently sloping hillsides; 0 to 35 percent slopes; 5,200 to 7,000 feet.	Occurs on mountain sideslopes, ridges, flats, and gently sloping hills; 0 to 35 percent slopes, 5,200 to 7,000 feet.	Occurs mainly on old, relatively flat lava flows; 0 to 35 percent slopes; 5,000 to 6,500 feet.
Typical Vegetation & Precipitation	Jeffrey and ponderosa pine, sugar pine, white fir, red fir, incense cedar, juniper, mountain mahogany, chinquapin, greenleaf manzanita; pinemat manzanita; desert mountain mahogany and big sage; 18 to 35 inches ppt.	Jeffrey pine, white fir, incense cedar, western juniper, mountain mahogany, big sage, greenleaf manzanita, pinemat manzanita and desert mountain mahogany; 16 to 35 inches ppt.	Ponderosa and Jeffrey pine, white and red fir, incense cedar, western juniper, mountain mahogany, greenleaf manzanita, pinemat manzanita, desert mountain mahogany and big sage; 20 to 35 inches ppt.

Soil Profile Description

Surface Layer	0 to 9 inches; brown gravelly or cobbly fine sandy loam; granular structure; soft; 20 percent rock fragments; pH 6.5.	0 to 22 inches; yellowish brown to brown loam; granular to subangular blocky structure; soft to slightly hard; 2 to 10 percent rock fragments; pH 6.3 to 6.5.	0 to 24 inches; dark brown sandy loam to loam; granular and blocky structure; soft to slightly hard; pH 6.5 to 6.3.
Subsoil	9 to 29 inches; yellowish brown very cobbly loam; subangular blocky structure; soft; pH 6.5.	22 to 46 inches; brown gravelly sandy clay loam to gravelly clay loam; subangular blocky structure; slightly hard; 15 to 25 percent rock fragments; pH 6.5.	24 to 55 inches; brown clay loam; subangular blocky structure; slightly hard to hard; pH 6.3.
Substrata	29 to 38 inches; fractured platy basalt with soil and roots in cracks.	46 to 60 inches; slightly weathered basalt rock.	55 to 60 inches; weathered basalt.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	29 inches; basalt	46 inches; basalt.	55 inches; basalt.
Erosion Factor (K)	.24	.28	.28
Max. Erosion Hazard	Moderate	Moderate	Moderate to low
Soil Permeability	Moderate	Moderate	Moderate.
Soil Manageability Class	2px	2e	2e
Group	II	II	II
Range Site	N/A	2	2
Water Runoff Potential	Slow	Slow	Slow
Hydrologic Soil Group	B	B	B
Available Water Capacity (AWC) Total (Top 20")	2.3 (1.7)	6.4 (2.7)	7.8 (2.6)
Forest Site Class	5 (IV)	5 (IV)	4 (II-III)
Timber Regeneration Potential			
Plantability	Moderate	High	High
Seedling Survival	Low	Moderate	Moderate

71 Patio-Trojan-DeMasters families association (continued)

Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO

0-9; gravelly fine sandy loam
Unified: GM-GC, SM-SC
ASSHTO: A-1, A-4

0-22; loam
Unified: ML
ASSHTO: A-4, A-6

0-4; sandy loam
Unified: SM
ASSHTO: A-2-4, A-4

9-29; very cobbly loam
Unified: ML-CL
ASSHTO: A-4

22-34; gravelly sandy clay loam
Unified: GM-GC, SC
ASSHTO: A-2, A-2-6

4-24; loam
Unified: ML
ASSHTO: A-7

29; fractured platy basalt

34-46; gravelly clay loam
Unified: GM-GC, CL
ASSHTO: A-2, A-6, A-7

24-55; clay loam
Unified: CL
ASSHTO: A-6, A-7

46; weathered basalt rock

55; weathered basalt

Included Areas

15% Inville family and Aquolls

72 Portola-Yallani families, alluvial association, 0 to 15 percent slopes

Map Unit Components	Portola, alluvial	Yallani, alluvial
Approx. Proportion	45%	35%
Position, Slope, and Elevation	Occurs on flats and in riparian corridors, 0 to 15 percent slopes; 5,200 to 7,000 feet.	Occurs on flats and in riparian corridors; 5 to 15 percent slopes; 5,200 to 8,000 feet.
Typical Vegetation & Precipitation	Ponderosa pine, white fir, lodgepole pine, gooseberry, wedgeleaf ceanothus and perennial bunch grasses; 45 to 80 inches ppt.	White fir, Jeffrey pine, ponderosa pine, sugar pine, lodgepole pine, mountain hemlock, incense cedar, greenleaf manzanita, pinemat manzanita, chinquapin and squaw carpet; 35 to 80 inches ppt.
Soil Profile Description		
Surface Layer	0 to 10 inches; brown gravelly sandy loam; granular structure; soft; 15 percent pebbles; pH 6.5 to 6.8.	0 to 8 inches; brown gravelly fine sandy loam; granular structure; soft; 22 percent rock fragments; pH 6.3.
Subsoil	10 to 48 inches; brown gravelly sandy loam; weak granular structure; slightly hard; 15 percent pebbles; pH 7.0 to 7.2.	8 to 39 inches; brown to yellowish brown gravelly to very gravelly fine sandy loam; blocky structure; slightly hard; 30 to 42 percent rock fragments; pH 6.0
Substrata	48 to 60 inches; brownish gray gravelly fine sandy loam; massive; slightly hard; 15 percent pebbles; pH 7.2.	39 to 60 inches; yellowish brown very gravelly sandy loam; massive; 35 percent rock fragments; pH 6.0.
Soil Properties & Management Interpretations		
Rooting Depth (in.), Underlying Material	60 inches	60+ inches; basalt
Erosion Factor (K)	.20	.24
Max. Erosion Hazard	Low to moderate	Low to moderate
Soil Permeability	Moderate rapid	Moderately rapid
Soil Manageability Class	1	2p
Group	I	I
Range Site	N/A	N/A
Water Runoff Potential	Slow	Slow
Hydrologic Soil Group	B	B
Available Water Capacity (AWC) Total (Top 20")	6.2 (2.5)	5.9 (2.1)
Forest Site Class	4 (II)	3 (I)
Timber Regeneration Potential		
Plantability	High	High
Seedling Survival	Moderate	Low to moderate
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-60; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	0-24; gravelly fine sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-4 24-39; very gravelly fine sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-4 39-60; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
Included Areas	20% Sheld family and Riverwash	

73 Rock Outcrop-Patio family association, 0 to 50 percent slopes

Map Unit Components	Rock Outcrop	Patio
Approx. Proportion	55%	30%
Position, Slope, and Elevation	Miscellaneous land type on mountain sideslopes and ridgetops; 4,000 to 9,000 feet.	Occurs on mountain sideslopes; escarpments and gently sloping hillsides; 0 to 50 percent slopes; 5,200 to 7,000 feet.
Typical Vegetation & Precipitation	Barren except for widely scattered brush that occurs in fractures in the rock or in small colluvial pockets of soil; 30 to 50 inches ppt.	Jeffrey and ponderosa pine, sugar pine, white fir, red fir, incense cedar, juniper, mountain mahogany, chinquapin, greenleaf manzanita; pinemat manzanita; desert mountain mahogany and big sage; 30 to 50 inches ppt.

Soil Profile Description

Surface Layer	N/A	0 to 9 inches; brown gravelly or cobbly fine sandy loam; granular structure; soft; 20 percent rock fragments; pH 6.5.
Subsoil	N/A	9 to 29 inches; yellowish brown very cobbly loam; subangular blocky structure; soft; pH 6.5.
Substrata	Protruding bedrock that has all soil eroded off.	29 to 38 inches; fractured platy basalt with soil and roots in cracks.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	N/A	29 inches; basalt
Erosion Factor (K)	N/A	.24
Max. Erosion Hazard	N/A	Moderate
Soil Permeability	N/A	Moderate
Soil Manageability Class	N/A	2px
Group	N/A	II
Range Site	N/A	N/A
Water Runoff Potential	Very rapid	Slow
Hydrologic Soil Group	N/A	B
Available Water Capacity (AWC) Total (Top 20")	N/A	2.3 (1.7)
Forest Site Class	N/A	5 (IV)
Timber Regeneration Potential		
Plantability	N/A	Moderate
Seedling Survival	N/A	Low
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	N/A	0-9; gravelly fine sandy loam Unified: GM-GC, SM-SC ASSHTO: A-1, A-4 9-29; very cobbly loam Unified: ML-CL ASSHTO: A-4 29; fractured platy basalt
Included Areas	15% Portola Family and Aquolls	

74 Rock Outcrop-Rubble Land Complex

Map Unit Components	Rock Outcrop	Rubble Land
Approx. Proportion	60%	30%
Position, Slope, and Elevation	Miscellaneous land type on mountain sideslopes and ridgetops; 4,000 to 9,000 feet.	Miscellaneous land type on mountain sideslopes and steep escarpments.
Typical Vegetation & Precipitation	Barren except for widely scattered brush that occurs in fractures in the rock or in small colluvial pockets of soil; 16 to 80 inches ppt.	Somewhat barren, but vegetation may grow up through the rock fragments. The vegetation is growing in soil that is buried by the rock fragments; 16 to 80 inches ppt.
Soil Profile Description		
Surface Layer	N/A	N/A
Subsoil	N/A	N/A
Substrata	Protruding bedrock that has all soil eroded off.	Detached rock fragments ranging in size from 3 inches to about 5 feet in diameter.
Soil Properties & Management Interpretations		
Rooting Depth (in.), Underlying Material	N/A	N/A
Erosion Factor (K)	N/A	N/A
Max. Erosion Hazard	N/A	N/A
Soil Permeability	N/A	N/A
Soil Manageability		
Class	N/A	N/A
Group	N/A	N/A
Range Site	N/A	N/A
Water Runoff Potential	Very rapid	Very slow to moderate
Hydrologic Soil Group	N/A	N/A
Available Water Capacity (AWC)		
Total (Top 20")	N/A	N/A
Forest Site Class	N/A	N/A
Timber Regeneration Potential		
Plantability	N/A	N/A
Seedling Survival	N/A	N/A
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	N/A	N/A
Included Areas	10% Lithic Xerumbrepts	

75 Rubble Land-Deadwood family association, 35 to 70 percent slopes

Map Unit Components	Rubble Land	Deadwood
Approx. Proportion	50%	30%
Position, Slope, and Elevation	Miscellaneous land type on mountain sideslopes and steep escarpments.	Occurs on escarpments, mountain sideslopes and ridges; 35 to 70 percent slopes; 4,000 to 5,200 feet.
Typical Vegetation & Precipitation	Somewhat barren, but vegetation may grow up through the rock fragments. The vegetation is growing in soil that is buried by the rock fragments; 40 to 50 inches ppt.	Douglas fir, ponderosa pine, sugar pine, incense cedar, white fir, greenleaf manzanita, deerbrush and squaw carpet; 40 to 50 inches ppt.

Soil Profile Description

Surface Layer	N/A	0 to 2 inches; dark grayish brown very gravelly fine sandy loam; granular and single grain structure; soft; 50 percent pebbles, pH 6.3.
Subsoil	N/A	2 to 14 inches; light brownish gray very gravelly loam; granular and blocky structure; slightly hard; 50 percent pebbles, pH 6.0 to 5.8.
Substrata	Detached rock fragments ranging in size from 3 inches to about 5 feet in diameter.	14 inches, highly fractured shale with soil and roots in cracks. 90+ percent rock fragments.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	N/A	14 inches; shale.
Erosion Factor (K)	N/A	.20
Max. Erosion Hazard	N/A	Moderate
Soil Permeability	N/A	Moderate.
Soil Manageability Class	N/A	3Pe
Group	N/A	III
Range Site	N/A	N/A
Water Runoff Potential	Very slow to moderate	Moderate to rapid
Hydrologic Soil Group	N/A	B
Available Water Capacity (AWC) Total (Top 20")	N/A	.9 (.9)
Forest Site Class	N/A	6 (V)
Timber Regeneration Potential		
Plantability	N/A	Moderate
Seedling Survival	N/A	Very low
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	N/A	0-2; very gravelly fine sandy loam Unified: GM-GC, SM ASSHTO: A-2, A-4
		2-14; very gravelly loam Unified: GM-GC, ML-CL ASSHTO: A-2, A-6
		14; highly fractured shale
Included Areas	20% Rock Outcrop and Deadwood family	

**76 Rubble Land-Pass Canyon family-Bobbitt family, moderately deep association,
35 to 70 percent slopes**

Map Unit Components	Rubble Land	Pass Canyon	Bobbitt, mod. deep
Approx. Proportion	45%	20%	20%
Position, Slope, and Elevation	Miscellaneous land type on mountain sideslopes and steep escarpments.	Occurs on mountain sideslopes near Coble Mtn. in the Hat Creek Ranger District; 35 to 70 percent slopes; 4,800 to 5,200 feet.	Occurs on all aspects of mountainous uplands and ridgetops. When located on lava ridges it often has 35 to 60% of the surface covered with rock fragments. 35 to 50% slopes; 3,500 to 5,200 feet.
Typical Vegetation & Precipitation	Somewhat barren, but vegetation may grow up through the rock fragments. The vegetation is growing in soil that is buried by the rock fragments; 16 to 25 inches ppt.	Jeffrey and ponderosa pine; incense cedar, big sage and balsam root; 18 to 25 inches ppt.	Jeffrey pine, ponderosa pine, western juniper, black oak, mountain mahogany and squaw carpet. 16 to 25 inches ppt.
Soil Profile Description			
Surface Layer	N/A	0 to 11 inches; grayish brown sandy loam to loam; granular to subangular blocky structure; soft; 5 percent pebbles; pH 6.5.	0 to 12 inches; grayish brown gravelly loam to very gravelly loam; subangular blocky structure; soft; pH 6.8 to 6.6.
Subsoil	N/A	11 to 20 inches; brown loam to sandy clay loam; subangular blocky structure; hard; 5 to 10 percent pebbles; pH 6.3 to 6.2.	12 to 22 inches, brown extremely gravelly clay loam; subangular blocky structure; hard; 60% rock fragments; pH 6.5.
Substrata	Detached rock fragments ranging in size from 3 inches to about 5 feet in diameter.	20 inches; hard rhyolite.	22 to 44 inches; brown extremely gravelly sandy loam; massive; 70 percent rock fragments; pH 6.6; underlain by volcanic rock.
Soil Properties & Management Interpretations			
Rooting Depth (in.), Underlying Material	N/A	20 inches; rhyolite	40 to 50 inches; andesite and basalt.
Erosion Factor (K)	N/A	.24	.32
Max. Erosion Hazard	N/A	High	Moderate to high
Soil Permeability	N/A	Moderate	Moderate to moderately slow.
Soil Manageability Class	N/A	3Ed	3x
Group	N/A	III	III
Range Site	N/A	N/A	N/A
Water Runoff Potential	Very slow to moderate	Moderate	Moderate
Hydrologic Soil Group	N/A	B	B
Available Water Capacity (AWC) Total (Top 20")	N/A	2.7 (2.7)	2.7 (1.9)
Forest Site Class	N/A	6 (V)	5-6 (IV-V)
Timber Regeneration Potential			
Plantability	N/A	Moderate	Moderate to low (Rocks)
Seedling Survival	N/A	Moderate	Low to moderate

76 Rubble Land-Pass Canyon family-Bobbitt family (continued)

Estimated Engineering
Properties;
USDA Texture,
Unified, and ASSHTO

N/A

0-4; sandy loam
Unified: SM
ASSHTO: A-2-4, A-4

0-12; loam
Unified: ML
ASSHTO: A-7

4-17; loam
Unified: ML
ASSHTO: A-4, A-7

12-22; gravelly clay loam
Unified: GM-GC, CL
ASSHTO: A-2, A-6, A-7

17-20; sandy clay loam
Unified: SC
ASSHTO: A-2-6

22-44; very gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

Included Areas

15% Rock Outcrop and Lithic Xerochrepts

77 Sadie family-Lithic Haploxerolls-Rock Outcrop association, 70 to 80 percent slopes

Map Unit Components	Sadie	Lithic Haploxerolls	Rock Outcrop
Approx. Proportion	50%	20%	20%
Position, Slope, and Elevation	Occur on mountain sideslopes and volcanic flows; 70 to 80 percent slopes; 3,000 to 5,200 feet.	Occurs on mountain sideslopes; 70 to 80 percent slopes; 3,000 to 5,200 feet.	Miscellaneous land type on mountain sideslopes and ridgetops; 4,000 to 5,200 feet.
Typical Vegetation & Precipitation	Ponderosa pine, sugar pine, incense cedar, white fir, Jeffrey pine, douglas fir, black oak, desert mountain mahogany, rabbit brush, greenleaf manzanita and big sage; 25 to 40 inches ppt.	Sparse Jeffrey and ponderosa pine, juniper, digger pine, white oak, black oak, greenleaf manzanita, big sage, mountain mahogany, western redbud, yerba santa and chokecherry; 20 to 40 inches ppt.	Barren except for widely scattered brush that occurs in fractures in the rock or in small colluvial pockets of soil; 20 to 40 inches ppt.

Soil Profile Description

Surface Layer	0 to 10 inches; dark yellowish brown fine sandy loam; granular to subangular blocky structure; soft; pH 6.5 to 7.3.	0 to 9 inches; brown gravelly fine sandy loam to very gravelly sandy loam; granular structure; soft; 30 to 40 percent rock fragments; pH 6.8.	N/A
Subsoil	10 to 51 inches; dark yellowish brown fine sandy loam; subangular blocky structure; soft; pH 7.0.	9 to 17 inches; yellowish brown cobbly to very cobbly loam; subangular blocky to massive structure; slightly hard; 25 to 45 percent rock fragments; pH 7.2 to 7.5.	N/A
Substrata	51 to 58 inches; dark yellowish brown cobbly fine sandy loam; subangular blocky structure; soft; 27 percent rock fragments; pH 7.3; underlain by weathered vesicular basalt.	17 inches; hard basalt rock.	Protruding bedrock that has all soil eroded off.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	58 inches; basalt	17 inches; basalt.	N/A
Erosion Factor (K)	.20	.28	N/A
Max. Erosion Hazard	High	High	N/A
Soil Permeability	Moderately rapid	Moderate	N/A
Soil Manageability Class	4G	4GXp	N/A
Group	IV	IV	IV
Range Site	N/A	1	N/A
Water Runoff Potential	Moderate	Very rapid	Very rapid
Hydrologic Soil Group	A	D	N/A
Available Water Capacity (AWC) Total (Top 20")	7.6 (2.8)	1.3 (1.3)	N/A
Forest Site Class	4 (II)	7 (Noncommercial)	N/A
Timber Regeneration Potential			
Plantability	High	N/A	N/A
Seedling Survival	Moderate	N/A	N/A

77 Sadie family-Lithic Haploxerolls-Rock Outcrop association (continued)

Estimated Engineering
Properties;
USDA Texture,
Unified, and ASSHTO

0-51; fine sandy loam
Unified: SM-SC
ASSHTO: A-4

0-4; fine sandy loam
Unified: SM
ASSHTO: A-4

N/A

51-58; cobbly fine sandy loam
Unified: SM-SC
ASSHTO: A-4

4-9; very gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

58; weathered basalt

9-17; very cobbly loam
Unified: GM-GC, ML
ASSHTO: A-1, A-7

Included Areas

10% Skalan family

78 Sadie-Washougal families, alluvial association, 0 to 15 percent slopes

Map Unit Components	Sadie, alluvial	Washougal, alluvial
Approx. Proportion	50%	30%
Position, Slope, and Elevation	Occurs on flats and larger drainageways; 0 to 15 percent slopes; 3,000 to 5,200 feet.	Occurs on flats and the larger drainageways; 0 to 15 percent slopes; 3,500 to 5,200 feet.
Typical Vegetation & Precipitation	Ponderosa pine, sugar pine, incense cedar, white fir, Jeffrey pine, douglas fir, rabbit brush and greenleaf manzanita; 25 to 60 inches ppt.	Jeffrey pine, incense cedar, ponderosa pine, white fir, lodgepole pine and greenleaf manzanita; 25 to 60 inches ppt.

Soil Profile Description

Surface Layer	0 to 10 inches; dark yellowish brown fine sandy loam; granular to subangular blocky structure; soft; pH 6.5 to 7.3.	0 to 10 inches; grayish brown gravelly sandy loam; granular structure; soft; 15 to 20 percent rock fragments; pH 6.0 to 6.3.
Subsoil	10 to 51 inches; dark yellowish brown fine sandy loam; subangular blocky structure; soft; pH 7.0.	10 to 42 inches; brown very cobbly sandy loam; granular structure; soft; 40 to 50 percent rock fragments; pH 6.5.
Substrata	51 to 58 inches; dark yellowish brown cobbly fine sandy loam; subangular blocky structure; soft; 27 percent rock fragments; pH 7.3; underlain by weathered vesicular basalt.	42 inches; glacial outwash

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	58 inches; alluvium	42 inches; alluvium from glacial outwash
Erosion Factor (K)	.20	.20
Max. Erosion Hazard	Low to moderate	Moderate
Soil Permeability	Moderately rapid	Moderately rapid
Soil Manageability Class	1	2p
Group	I	I
Range Site	N/A	N/A
Water Runoff Potential	Very slow	Slow
Hydrologic Soil Group	A	B
Available Water Capacity (AWC) Total (Top 20")	7.6 (2.8)	3.6 (1.7)
Forest Site Class	4 (II)	5 (III)
Timber Regeneration Potential		
Plantability	High	High
Seedling Survival	Moderate	Very low to low
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-51; fine sandy loam Unified: SM-SC ASSHTO: A-4	0-10; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	51-58; cobbly fine sandy loam Unified: SM-SC ASSHTO: A-4	10-47; very cobbly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	58; weathered basalt	42; glacial outwash
Included Areas	20% Neer family; Lava Flow and Riverwash	

79 Sheld family, 0 to 35 percent slopes

Map Unit Components

Sheld

Approx. Proportion

70%

Position, Slope, and Elevation

Occurs on upland flats; mountain sideslopes, and undulating hills; 0 to 35 percent slopes; 5,200 to 8,000 feet.

Typical Vegetation & Precipitation

Red and white fir; sugar pine; incense cedar; Jeffrey pine, ponderosa pine, lodgepole pine; mountain hemlock; chinquapin; greenleaf manzanita and pinemat manzanita; 40 to 85 inches ppt.

Soil Profile Description

Surface Layer

0 to 14 inches; brown gravelly and cobbly sandy loam; granular structure; soft; 20 to 30 percent rock fragments; pH 6.5 to 6.0.

Subsoil

14 to 60 inches; yellowish brown very cobbly loam to sandy loam; subangular blocky structure; soft; 40 to 55 percent rock fragments; pH 5.5.

Substrata

Slightly weathered basalt and andesite.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material

60 inches; andesite and basalt

Erosion Factor (K)

.20

Max. Erosion Hazard

Moderate

Soil Permeability

Moderate

Soil Manageability

Class

2p

Group

MAP UNIT #: 79

Range Site

N/A

Water Runoff Potential

Slow

Hydrologic Soil Group

B

Available Water

Capacity (AWC)

Total (Top 20")

5.7 (2.2)

Forest Site Class

4 (II)

Timber Regeneration Potential

Plantability

High

Seedling Survival

Moderate

Estimated Engineering Properties;

USDA Texture,

Unified, and ASSHTO

0-14; gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

14-34; very cobbly loam
Unified: GM-GC, ML-CL
ASSHTO: A-1, A-4

34-60; very cobbly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

Included Areas

30% Sheld family, moderately deep, Aquolls, Portola family and Wintoner family

80 Sheld family, glacial-Aquolls association, 0 to 35 percent slopes

	Sheld, glacial	Aquolls
Map Unit Components		
Approx. Proportion	60%	30%
Position, Slope, and Elevation	Occurs on upland flats, mountain sideslopes and ground moraines; 0 to 35 percent slopes; 5,200 to 8,000 feet.	Meadows and valleys over the total forest; 0 to 15 percent slopes; 4,000 to 8,000 feet.
Typical Vegetation & Precipitation	Red and white fir, sugar pine, lodgepole pine, mountain hemlock, greenleaf manzanita and chinquapin; 40 to 85 inches ppt.	Annual and perennial grasses, lodgepole pine, alder, aspen, willow and thistle, 40 to 80 inches ppt.
Soil Profile Description		
Surface Layer	0 to 16 inches; dark grayish brown cobbly to very cobbly sandy loam; granular structure; 15 to 50 percent rock fragments; pH 6.5 to 6.3.	0 to 9 inches; grayish brown loam or silt loam; granular and blocky structure, slightly hard; pH 5.8 to 6.0.
Subsoil	16 to 42 inches; brown very cobbly to extremely cobbly sandy loam; granular to subangular blocky structure; 50 to 65 percent rock fragments; pH 6.0 to 5.8.	9 to 16 inches; grayish brown sandy loam or silty clay loam; blocky structure, slightly hard; pH 6.2 to 7.6.
Substrata	42 inches; fractured basalt	16 to 60 inches; light brownish gray loamy sand to a clay loam; massive; slightly hard; pH 6.2 to 7.6.
Soil Properties & Management Interpretations		
Rooting Depth (in.), Underlying Material	42 inches; basalt	10 to 20 in; gravelly silty clay
Erosion Factor (K)	.24	.17
Max. Erosion Hazard	Moderate	Low
Soil Permeability	Moderate	Moderately slow
Soil Manageability Class	3Xp	3W
Group	III	III
Range Site	N/A	3
Water Runoff Potential	slow	Very slow
Hydrologic Soil Group	B	C
Available Water Capacity (AWC) Total (Top 20")	2.9 (1.7)	8.2 (3.0)
Forest Site Class	4-5 (II-III)	N/A
Timber Regeneration Potential		
Plantability	Low to moderate	N/A
Seedling Survival	Low	N/A
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-4; sandy loam Unified: SL ASSHTO: A-2-4, A-4	0-9; silt loam Unified: ML ASSHTO: A-7
	4-42; cobbly sandy loam Unified: SM ASSHTO: A-2-4, A-4	9-16; silty clay loam Unified: ML-CL ASSHTO: A-6
	42; fractured basalt	16-60; gravelly silty clay loam Unified: ML-CL ASSHTO: A-7
Included Areas	10% Yallani family, glacial and Rubble Land	

81 Sheld-Inville families-Sheld family moderately deep complex, 0 to 35 percent slopes

Map Unit Components	Sheld	Inville	Sheld, Mod Deep
Approx. Proportion	40%	20%	20%
Position, Slope, and Elevation	Occurs on upland flats; mountain sideslopes, and undulating hills; 0 to 35 percent slopes; 5,200 to 8,000 feet.	Occurs on mountain sideslopes, ridges and canyons; 5 to 35 percent slopes, 5,200 to 7,000 feet.	Occurs on upland flats; mountain sideslopes, and undulating hills; 0 to 35 percent slopes; 5,200 to 8,000 feet.
Typical Vegetation & Precipitation	Red and white fir; sugar pine; incense cedar; Jeffrey pine, ponderosa pine, lodgepole pine; mountain hemlock; chinquapin; greenleaf manzanita and pinemat manzanita; 40 to 85 inches ppt.	Jeffrey and ponderosa pine, red and white fir, sugar pine, incense cedar, greenleaf manzanita, pinemat manzanita, chinquapin and desert mountain mahogany; 40 to 70 inches ppt.	Red and white fir; sugar pine; incense cedar; Jeffrey pine, ponderosa pine, lodgepole pine; mountain hemlock; chinquapin; greenleaf manzanita and pinemat manzanita; 40 to 85 inches ppt.
Soil Profile Description			
Surface Layer	0 to 14 inches; brown gravelly and cobbly sandy loam; granular structure; soft; 20 to 30 percent rock fragments; pH 6.5 to 6.0.	0 to 13 inches, brown gravelly sandy loam to loam; granular structure; soft; 10 to 30 percent rock fragments; pH 6.5.	0 to 6 inches; dark brown gravelly sandy loam; granular structure; soft; 15 to 30 percent rock fragments; pH 6.0.
Subsoil	14 to 60 inches; yellowish brown very cobbly loam to sandy loam; subangular blocky structure; soft; 40 to 55 percent rock fragments; pH 5.5.	13 to 60 inches; brown very gravelly to extremely gravelly clay loam; subangular blocky structure; slightly hard; 35 to 65 percent rock fragments; pH 6.0 - 5.5.	6 to 27 inches; brown very gravelly to extremely gravelly sandy loam to coarse sandy loam; subangular blocky to single grain structure; soft; 40 to 60 percent rock fragments; pH 6.0.
Substrata	Slightly weathered basalt and andesite.		27 inches; fractured and slightly and slightly weathered vesicular basalt.
Soil Properties & Management Interpretations			
Rooting Depth (in.), Underlying Material	60 inches; andesite and basalt	60+ inches.	27 inches; basalt
Erosion Factor (K)		.20	.20
Max. Erosion Hazard	Moderate	Low	Moderate
Soil Permeability	Moderate	Moderate	Moderately rapid
Soil Manageability Class Group	2P	I II	2p II
Range Site	N/A	N/A	N/A
Water Runoff Potential	Slow	Slow	Slow
Hydrologic Soil Group	B	B	B
Available Water Capacity (AWC) Total (Top 20")	5.7 (2.2)	6.8 (2.2)	2.1 (1.7)
Forest Site Class	4 (II)	5 (III)	5 (III)
Timber Regeneration Potential			
Plantability	High	Moderate	Moderate
Seedling Survival	Moderate	Moderate	Low

81 Sheld-Inville families-Sheld family moderately deep complex (continued)

Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO

0-14; gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

0-7; sandy loam
Unified: SM
ASSHTO: A-2-4, A-4

0-6; gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

14-34; very cobbly loam
Unified: GM-GC, ML-CL
ASSHTO: A-1, A-4

7-13; loam
Unified: ML
ASSHTO: A-7

6-27; very gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

34-60; very cobbly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

13-60; gravelly clay loam
Unified: GM-GC, CL
ASSHTO: A-2, A-6, A-7

27; slightly weathered basalt

Included Areas

20% Lithic Xerumbrepts, Rock Outcrop and Rubble Land

82 Shield family, moderately deep-Klicker family complex, 0 to 35 percent slopes

Map Unit Components	Shield, mod. deep	Klicker
Approx. Proportion	60%	20%
Position, Slope, and Elevation	Occurs on upland flats; mountain sideslopes, and undulating hills; 0 to 35 percent slopes; 5,200 to 8,000 feet.	Occurs on mountain slopes and flats; 5 to 35 percent slopes; 5,200 to 7,300 feet.
Typical Vegetation & Precipitation	Red and white fir; sugar pine; incense cedar; Jeffrey pine, ponderosa pine, lodgepole pine; mountain hemlock; chinquapin; greenleaf manzanita and pinemat manzanita; 25 to 35 inches ppt.	Jeffrey pine, white fir, incense cedar, western juniper, mountain mahogany, big sage, greenleaf manzanita, pinemat manzanita and desert mountain mahogany; 25 to 35 inches ppt.

Soil Profile Description

Surface Layer	0 to 6 inches; dark brown gravelly sandy loam; granular structure; soft; 15 to 30 percent rock fragments; pH 6.0.	0 to 11 inches, dark brown loam or cobbly loam, granular structure; slightly hard; 18 percent rock fragments; pH 7.0 to 6.8.
Subsoil	6 to 27 inches; brown very gravelly to extremely gravelly sandy loam to coarse sandy loam; subangular blocky to single grain structure; soft; 40 to 60 percent rock fragments; pH 6.2.	11 to 48 inches; brown to yellowish red very cobbly to extremely cobbly loam; subangular blocky structure; slightly hard; 45 to 80 percent rock fragments; pH 6.5.
Substrata	27 inches; fractured and slightly weathered vesicular basalt.	48 inches; weathered basalt rock.

Soil Properties & Management Interpretations

Rooting Depth (in.)	27 inches; basalt	48 inches; weathered basalt rock.
Erosion Factor (K)	.20	.28
Max. Erosion Hazard	Moderate	Moderate
Soil Permeability	Moderately rapid	Moderate
Soil Manageability		
Class	2p	2px
Group	II	II
Range Site	N/A	N/A
Water Runoff Potential	Slow	Slow
Hydrologic Soil Group	B	B
Available Water Capacity (AWC)		
Total (Top 20")	2.1 (1.7)	4.3 (2.0)
Forest Site Class	5 (III)	5 (III-IV)
Timber Regeneration		
Plantability	Moderate	Moderate
Seedling Survival	Low	Low
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-6; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	0-11; cobbly loam Unified: GM-GC, ML ASSHTO: A-1, A-4
	6-27; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	11-28; very cobbly loam Unified: GM-GC, ML-CL ASSHTO: A-1, A-6
	27; slightly weathered basalt	28-48; extremely gravelly loam Unified: GM-GC, ML ASSHTO: A-1, A-7
		48; weathered basalt rock
Included Areas	20% Aquolls and Klicker family, sedimentary	

83 Shield family, moderately deep-Klicker family complex, 35 to 50 percent slopes

Map Unit Components	Shield, mod. deep	Klicker
Approx. Proportion	40%	35%
Position, Slope, and Elevation	Occurs on upland flats; mountain sideslopes, and undulating hills; 35 to 50 percent slopes; 5,200 to 8,000 feet.	Occurs on mountain sideslopes and flats; 35 to 50 percent slopes; 5,200 to 7,300 feet.
Typical Vegetation & Precipitation	Red and white fir; sugar pine; incense cedar; Jeffrey pine, ponderosa pine, lodgepole pine; mountain hemlock; chinquapin; greenleaf manzanita and pinemat manzanita; 25 to 35 inches ppt.	Jeffrey pine, white fir, incense cedar, western juniper, mountain mahogany, big sage, greenleaf manzanita, pinemat manzanita and desert mountain mahogany; 25 to 35 inches ppt.

Soil Profile Description

Surface Layer	0 to 6 inches; dark brown gravelly sandy loam; granular structure; soft; 15 to 30 percent rock fragments; pH 6.0.	0 to 11 inches, dark brown loam or cobbly loam, granular structure; slightly hard; 18 percent rock fragments; pH 7.0 to 6.8.
Subsoil	6 to 27 inches; brown very gravelly to extremely gravelly sandy loam to coarse sandy loam; subangular blocky to single grain structure; soft; 40 to 60 percent rock fragments; pH 6.2.	11 to 48 inches; brown to yellowish brown very cobbly to extremely cobbly loam; subangular blocky structure; slightly hard; 45 to 80 percent rock fragments; pH 6.5.
Substrata	27 inches; fractured and slightly weathered vesicular basalt.	48 inches; weathered basalt rock.

Soil Properties & Management Interpretations

Rooting Depth (in.)	27 inches; basalt	48 inches; weathered basalt rock.
Erosion Factor (K)	.20	.28
Max. Erosion Hazard	Moderate to high	Moderate to high
Soil Permeability	Moderate rapid	Moderate
Soil Manageability Class	3gpx	3gp
Group	III	III
Range Site	N/A	N/A
Water Runoff Potential	Moderate	Moderate
Hydrologic Soil Group	B	B
Available Water Capacity (AWC) Total (Top 20")	2.1 (1.7)	4.3 (2.0)
Forest Site Class	5 (III)	5 (III-IV)
Timber Regeneration Plantability	Moderate	Moderate
Seedling Survival	Low	Low
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-6; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	0-11; cobbly loam Unified: GM-GC, ML ASSHTO: A-1, A-4
	6-27; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	11-28; very cobbly loam Unified: GM-GC, ML-CL ASSHTO: A-1, A-6
	27; slightly weathered basalt	28-48; extremely gravelly loam Unified: GM-GC, ML ASSHTO: A-1, A-7
		48; weathered basalt rock
Included Areas	25% Rock Outcrop and Klicker family, sedimentary	

84 Sheld family, moderately deep-Lithic Xerumbrepts association, 0 to 35 percent slopes.

Map Unit Components	Sheld, moderately deep	Lithic Xerumbrepts
Approx. Proportion	60%	20%
Position, Slope, and Elevation	Occurs on upland flats; mountain sideslopes, and undulating hills; 0 to 35 percent slopes; 5,200 to 8,000 feet.	Occurs on flat lava flows and on mountain sideslopes and ridgetops; 0 to 35 percent slopes; 3,200 to 8,000 feet.
Typical Vegetation & Precipitation	Red and white fir; sugar pine; incense cedar; Jeffrey pine, ponderosa pine, lodgepole pine; mountain hemlock; chinquapin; greenleaf manzanita and pinemat manzanita; 40 to 85 inches ppt.	Greenleaf manzanita, pinemat manzanita, desert mountain mahogany and sparse Jeffrey pine, ponderosa pine, juniper and incense cedar; 40 to 80 inches ppt.

Soil Profile Description

Surface Layer	0 to 6 inches; dark brown gravelly sandy loam; granular structure; soft; 15 to 30 percent rock fragments; pH 6.0.	0 to 6 inches; brown very gravelly sandy loam; granular structure; soft; 40 percent rock fragments; pH 6.5.
Subsoil	6 to 27 inches; brown very gravelly to extremely gravelly sandy loam to coarse sandy loam; subangular blocky to single grain structure; soft; 40 to 60 percent rock fragments; pH 6.2.	6-10 inches; yellowish brown very gravelly sandy loam; granular structure; 45 percent rock fragments; pH 6.0.
Substrata	Fractured and slightly weathered vesicular basalt.	10+ inches; hard fractured basalt bedrock.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	27 inches; basalt	10 inches; basalt
Erosion Factor (K)	.20	.28
Max. Erosion Hazard	Moderate	Moderate
Soil Permeability	Moderately rapid	Moderate
Soil Manageability Class	2p	3Px
Group	II	II
Range Site	N/A	N/A
Water Runoff Potential	Slow	Moderate
Hydrologic Soil Group	B	C
Available Water Capacity (AWC) Total (Top 20")	2.1 (1.7)	.8 (.8)
Forest Site Class	5 (III)	7 (Noncommercial)
Timber Regeneration Potential		
Plantability	Moderate	N/A
Seedling Survival	Low	N/A
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-6; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	0-10; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	6-27; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	10+; hard fractured basalt
	27+; slightly weathered basalt	

Included Areas

20% Rock Outcrop, Rubble Land and Sheld family.

85 Sheld family, moderately deep-Lithic Xerumbrepts association, 35 to 70 percent slopes.

Map Unit Components	Sheld, moderately deep	Lithic Xerumbrepts
Approx. Proportion	55%	25%
Position, Slope, and Elevation	Occurs on upland flats; mountain sideslopes, and undulating hills; 35 to 70 percent slopes; 5,200 to 8,000 feet.	Occurs on mountain sideslopes and ridgetops; 35 to 70 percent slopes; 3,200 to 8,000 feet.
Typical Vegetation & Precipitation	Red and white fir; sugar pine; incense cedar; Jeffrey pine, ponderosa pine, lodgepole pine; mountain hemlock; chinquapin; greenleaf manzanita and pinemat manzanita; 40 to 85 inches ppt.	Greenleaf manzanita, pinemat manzanita, desert mountain mahogany and sparse Jeffrey pine, ponderosa pine, juniper and incense cedar; 40 to 80 inches ppt.

Soil Profile Description

Surface Layer	0 to 6 inches; dark brown gravelly sandy loam; granular structure; soft; 15 to 30 percent rock fragments; pH 6.0.	0 to 6 inches; brown very gravelly sandy loam; granular structure; soft; 40 percent rock fragments; pH 6.5.
Subsoil	6 to 27 inches; brown very gravelly to extremely gravelly sandy loam to coarse sandy loam; subangular blocky to single grain structure; soft; 40 to 60 percent rock fragments; pH 6.2.	6-10 inches; yellowish brown very gravelly sandy loam; granular structure; 45 percent rock fragments; pH 6.0.
Substrata	27 inches; fractured and slightly weathered vesicular basalt.	10 inches; hard fractured basalt bedrock.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	27 inches; basalt	10 inches; basalt
Erosion Factor (K)	.20	.28
Max. Erosion Hazard	Moderate to high	Moderate
Soil Permeability	Moderate rapid	Moderate
Soil Manageability Class	3gpx	3Px
Group	III	III
Range Site	N/A	N/A
Water Runoff Potential	Moderate	Rapid
Hydrologic Soil Group	B	C
Available Water Capacity (AWC) Total (Top 20")	2.1 (1.7)	.8 (.8)
Forest Site Class	5 (III)	7 (Noncommercial)
Timber Regeneration Potential		
Plantability	Moderate	N/A
Seedling Survival	Low	N/A
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-6; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	0-10; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	6-27; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	10; hard fractured basalt
	27; slightly weathered basalt	
Included Areas	20% Rock Outcrop; Rubble Land and Sheld family	

86 Sheld family-Sheld family, moderately deep complex, 0 to 35 percent slopes

	Sheld	Sheld, mod deep
Map Unit Components	Sheld	Sheld, mod deep
Approx. Proportion	60%	20%
Position, Slope, and Elevation	Occurs on upland flats; mountain sideslopes, and undulating hills; 0 to 35 percent slopes; 5,200 to 8,000 feet.	Occurs on upland flats; mountain sideslopes, and undulating hills; 0 to 35 percent slopes; 5,200 to 8,000 feet.
Typical Vegetation & Precipitation	Red and white fir; sugar pine; incense cedar; Jeffrey pine, ponderosa pine, lodgepole pine; mountain hemlock; chinquapin; greenleaf manzanita and pinemat manzanita; 40 to 85 inches ppt.	Red and white fir; sugar pine; incense cedar; Jeffrey pine, ponderosa pine, lodgepole pine; mountain hemlock; chinquapin; greenleaf manzanita and pinemat manzanita; 40 to 85 inches ppt.
Soil Profile Description		
Surface Layer	0 to 14 inches; brown gravelly and cobbly sandy loam; granular structure; soft; 20 to 30 percent rock fragments; pH 6.5 to 6.0.	0 to 6 inches; dark brown gravelly sandy loam; granular structure; soft; 15 to 30 percent rock fragments; pH 6.0.
Subsoil	14 to 60 inches; yellowish brown very cobbly loam to sandy loam; subangular blocky structure; soft; 40 to 55 percent rock fragments; pH 5.5.	6 to 27 inches; brown very gravelly to extremely gravelly sandy loam to coarse sandy loam; subangular blocky to single grain structure; soft; 40 to 60 percent rock fragments; pH 6.2.
Substrata	Slightly weathered basalt and andesite.	27 inches; fractured and slightly weathered vesicular basalt.
Soil Properties & Management Interpretations		
Rooting Depth (in.), Underlying Material	60 inches; andesite and basalt	27 inches; basalt
Erosion Factor (K)	.20	.20
Max. Erosion Hazard	Moderate	Moderate
Soil Permeability	Moderate	Moderately rapid
Soil Manageability Class	2p	2p
Soil Manageability Group	II	II
Range Site	N/A	N/A
Water Runoff Potential	Slow	Slow
Hydrologic Soil Group	B	B
Available Water Capacity (AWC) Total (Top 20")	5.7 (2.2)	2.1 (1.7)
Forest Site Class	4 (II)	5 (III)
Timber Regeneration Potential		
Plantability	High	Moderate
Seedling Survival	Moderate	Low
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-14; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	0-6; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	14-34; very cobbly loam Unified: GM-GC, ML-CL ASSHTO: A-1, A-4	6-27; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	34-60; very cobbly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	27; slightly weathered basalt
Included Areas	20% Yallani family; Inville family and Rubble Land	

87 Sheld family-Sheld family, moderately deep complex, 35 to 50 percent slopes

Map Unit Components	Sheld	Sheld, mod deep
Approx. Proportion	40%	40%
Position, Slope, and Elevation	Occurs on upland flats; mountain sideslopes, and undulating hills; 35 to 50 percent slopes; 5,200 to 8,000 feet.	Occurs on upland flats; mountain sideslopes, and undulating hills; 35 to 50 percent slopes; 5,200 to 8,000 feet.
Typical Vegetation & Precipitation	Red and white fir; sugar pine; incense cedar; Jeffrey pine, ponderosa pine, lodgepole pine; mountain hemlock; chinquapin; greenleaf manzanita and pinemat manzanita; 40 to 85 inches ppt.	Red and white fir; sugar pine; incense cedar; Jeffrey pine, ponderosa pine, lodgepole pine; mountain hemlock; chinquapin; greenleaf manzanita and pinemat manzanita; 40 to 85 inches ppt.

Soil Profile Description

Surface Layer	0 to 14 inches; brown gravelly and cobbly sandy loam; granular structure; soft; 20 to 30 percent rock fragments; pH 6.5 to 6.0.	0 to 6 inches; dark brown gravelly sandy loam; granular structure; soft; 15 to 30 percent rock fragments; pH 6.0.
Subsoil	14 to 60 inches; yellowish brown very cobbly loam to sandy loam; subangular blocky structure; soft; 40 to 55 percent rock fragments; pH 5.5.	6 to 27 inches; brown very gravelly to extremely gravelly sandy loam to coarse sandy loam; subangular blocky to single grain structure; soft; 40 to 60 percent rock fragments; pH 6.2.
Substrata	Slightly weathered basalt and andesite.	27 inches; fractured and slightly weathered vesicular basalt.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	60 inches; andesite and basalt	27 inches; basalt
Erosion Factor (K)	.20	.20
Max. Erosion Hazard	Moderate to high	Moderate to high
Soil Permeability	Moderate	Moderate rapid
Soil Manageability Class Group	3gp III	3gpx III
Range Site	N/A	N/A
Water Runoff Potential	Moderate	Moderate
Hydrologic Soil Group	B	B
Available Water Capacity (AWC) Total (Top 20")	5.7 (2.2)	2.1 (1.7)
Forest Site Class	4 (II)	5 (III)
Timber Regeneration Potential		
Plantability	Moderate	Moderate
Seedling Survival	Moderate	Low
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-14; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	0-6; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	14-34; very cobbly loam Unified: GM-GC, ML-CL ASSHTO: A-1, A-4	6-27; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	34-60; very cobbly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	27; slightly weathered basalt
Included Areas	20% Yallani family; Rock Outcrop and Rubble Land	

88 Sheld family-Sheld family moderately deep complex, glacial 0 to 35 percent slopes

Map Unit Components	Sheld, glacial	Sheld, mod. deep, glacial
Approx. Proportion	45%	40%
Position, Slope, and Elevation	Occurs on upland flats, mountain sideslopes and ground moraines; 0 to 35 percent slopes; 5,200 to 8,000 feet.	Occurs on upland flats, mountain sideslopes and ground moraines; 0 to 35 percent slopes; 5,200 to 8,000 feet.
Typical Vegetation & Precipitation	Red and white fir, sugar pine, lodgepole pine, mountain hemlock, greenleaf manzanita and chinquapin; 40 to 85 inches ppt.	Red and white fir, sugar pine, lodgepole pine, mountain hemlock, greenleaf manzanita and chinquapin; 40 to 85 inches ppt.
Soil Profile Description		
Surface Layer	0 to 16 inches; dark grayish brown cobbly to very cobbly sandy loam; granular structure; 15 to 50 percent rock fragments; pH 6.5 to 6.3.	0 to 12 inches; dark grayish brown gravelly or very gravelly sandy loam to cobbly or very cobbly sandy loam; granular structure; soft; 20 to 40 percent rock fragments; pH 6.8 to 6.5; 20 to 50 percent rock fragments on the surface.
Subsoil	16 to 42 inches; brown very cobbly to extremely cobbly sandy loam; granular to subangular blocky structure; 50 to 65 percent rock fragments; pH 6.0 to 5.8.	12 to 33 inches; yellowish brown very cobbly to extremely cobbly sandy loam; granular to subangular blocky structure; 40 to 65 percent rock fragments; pH 6.0 to 5.8.
Substrata	42 inches; fractured basalt	33 inches; fractured basalt
Soil Properties & Management Interpretations		
Rooting Depth (in.), Underlying Material	42 inches; basalt	33 inches; basalt
Erosion Factor (K)	.24	.24
Max. Erosion Hazard	Moderate	Moderate
Soil Permeability	Moderate	Moderate
Soil Manageability Class	3Xp	3Xp
Group	III	III
Range Site	N/A	N/A
Water Runoff Potential	Slow	Slow
Hydrologic Soil Group	B	B
Available Water Capacity (AWC) Total (Top 20")	2.9 (1.7)	2.7 (1.7)
Forest Site Class	4-5 (II-III)	5 (III)
Timber Regeneration Potential		
Plantability	Low to moderate	Low to moderate
Seedling Survival	Low	Low
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-4; sandy loam Unified: SM ASSHTO: A-2-4, A-4	0-12; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	4-42; cobbly sandy loam Unified: SM ASSHTO: A-2-4, A-4	12-33; very cobbly sandy loam Unified: SM ASSHTO: A-2-4, A-4
	42; fractured basalt	33; fractured basalt
Included Areas	15% Yallani family, glacial; Aquolls and Rubble Land	

89 Sheld family-Sheld family moderately deep association, 15 to 35 percent slopes

Map Unit Components	Sheld	Sheld, mod. deep
Approx. Proportion	50%	35%
Position, Slope, and Elevation	Occurs on upland flats; mountain sideslopes, and undulating hills; 15 to 35 percent slopes; 5,200 to 8,000 feet.	Occurs on upland flats; mountain sideslopes, and undulating hills; 15 to 35 percent slopes; 5,200 to 8,000 feet.
Typical Vegetation & Precipitation	Red and white fir; sugar pine; incense cedar; Jeffrey pine, ponderosa pine, lodgepole pine; mountain hemlock; chinquapin; greenleaf manzanita and pinemat manzanita; 40 to 85 inches ppt.	Red and white fir; sugar pine; incense cedar; Jeffrey pine, ponderosa pine, lodgepole pine; mountain hemlock; chinquapin; greenleaf manzanita and pinemat manzanita; 40 to 85 inches ppt.

Soil Profile Description

Surface Layer	0 to 14 inches; brown gravelly and cobbly sandy loam; granular structure; soft; 20 to 30 percent rock fragments; pH 6.5 to 6.0.	0 to 6 inches; dark brown gravelly sandy loam; granular structure; soft; 15 to 30 percent rock fragments; pH 6.0.
Subsoil	14 to 60 inches; yellowish brown very cobbly loam to sandy loam; subangular blocky structure; soft; 40 to 55 percent rock fragments; pH 5.5.	6 to 27 inches; brown very gravelly to extremely gravelly sandy loam to coarse sandy loam; subangular blocky to single grain structure; soft; 40 to 60 percent rock fragments; pH 6.2.
Substrata	Slightly weathered basalt and andesite.	27 inches; fractured and slightly weathered vesicular basalt.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	60 inches; andesite and basalt	27 inches; basalt
Erosion Factor (K)	.20	.20
Max. Erosion Hazard	Moderate	Moderate
Soil Permeability	Moderate	Moderately rapid
Soil Manageability Class	2p	2p
Group	II	II
Range Site	N/A	N/A
Water Runoff Potential	Slow	Slow
Hydrologic Soil Group	B	B
Available Water Capacity (AWC) Total (Top 20")	5.7 (2.2)	2.1 (1.7)
Forest Site Class	4 (II)	5 (III)
Timber Regeneration Potential		
Plantability	High	Moderate
Seedling Survival	Moderate	Low
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-14; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	0-6; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	14-34; very cobbly loam Unified: GM-GC, ML-CL ASSHTO: A-1, A-4	6-27; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	34-60; very cobbly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	27; slightly weathered basalt

Included Areas

15% Skalan family, moderately deep; Bobbitt family, moderately deep and Rock Outcrop

Map Unit 89

90 Sheld family-Sheld family moderately deep association, 35 to 50 percent slopes

Map Unit Components	Sheld	Sheld, mod. deep
Approx. Proportion	40%	40%
Position, Slope, and Elevation	Occurs on upland flats; mountain sideslopes, and undulating hills; 35 to 50 percent slopes; 5,200 to 8,000 feet.	Occurs on upland flats; mountain sideslopes, and undulating hills; 35 to 50 percent slopes; 5,200 to 8,000 feet.
Typical Vegetation & Precipitation	Red and white fir; sugar pine; incense cedar; Jeffrey pine, ponderosa pine, lodgepole pine; mountain hemlock; chinquapin; greenleaf manzanita and pinemat manzanita; 40 to 85 inches ppt.	Red and white fir; sugar pine; incense cedar; Jeffrey pine, ponderosa pine, lodgepole pine; mountain hemlock; chinquapin; greenleaf manzanita and pinemat manzanita; 40 to 85 inches ppt.

Soil Profile Description

Surface Layer	0 to 14 inches; brown gravelly and cobbly sandy loam; granular structure; soft; 20 to 30 percent rock fragments; pH 6.5 to 6.0.	0 to 6 inches; dark brown gravelly sandy loam; granular structure; soft; 15 to 30 percent rock fragments; pH 6.0.
Subsoil	14 to 60 inches; yellowish brown very cobbly loam to sandy loam; subangular blocky structure; soft; 40 to 55 percent rock fragments; pH 5.5.	6 to 27 inches; brown very gravelly to extremely gravelly sandy loam to coarse sandy loam; subangular blocky to single grain structure; soft; 40 to 60 percent rock fragments; pH 6.2.
Substrata	Slightly weathered basalt and andesite.	27 inches; fractured and slightly weathered vesicular basalt.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	60 inches; andesite and basalt	27 inches; basalt
Erosion Factor (K)	.20	.20
Max. Erosion Hazard	Moderate to high	Moderate to high
Soil Permeability	Moderate	Moderate rapid
Soil Manageability Class Group	3gp III	3gpx III
Range Site	N/A	N/A
Water Runoff Potential	Moderate	Moderate
Hydrologic Soil Group	B	B
Available Water Capacity (AWC) Total (Top 20")	5.7 (2.2)	2.1 (1.7)
Forest Site Class	4 (II)	5 (III)
Timber Regeneration Potential		
Plantability	Moderate	Moderate
Seedling Survival	Moderate	Low
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-14; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	0-6; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	14-34; very cobbly loam Unified: GM-GC, ML-CL ASSHTO: A-1, A-4	6-27; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	34-60; very cobbly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	27; slightly weathered basalt
Included Areas	20% Skalan family, moderately deep; Bobbitt family, moderately deep and Rock Outcrop	

91 Shield family, moderately deep-Shield family-Rock Outcrop complex, 0 to 35 percent slopes

Map Unit Components	Shield, mod. deep	Shield	Rock Outcrop
Approx. Proportion	45%	25%	20%
Position, Slope, and Elevation	Occurs on upland flats, mountain sideslopes and ground moraines; 0 to 35 percent slopes; 5,200 to 8,000 feet.	Occurs on upland flats, mountain sideslopes and ground moraines; 0 to 35 percent slopes; 5,200 to 8,000 feet.	Miscellaneous land type on mountain sideslopes and ridgetops; 4,000 to 9,000 feet.
Typical Vegetation & Precipitation	Red and white fir, sugar pine, lodgepole pine, mountain hemlock, greenleaf manzanita and chinquapin; 40 to 85 inches ppt.	Red and white fir, sugar pine, lodgepole pine, mountain hemlock, greenleaf manzanita and chinquapin; 40 to 85 inches ppt.	Barren except for widely scattered brush that occurs in fractures in the rock or in small colluvial pockets of soil; 40 to 80 inches ppt.

Soil Profile Description

Surface Layer	0 to 12 inches; dark grayish brown gravelly sandy loam to cobbly sandy loam; granular structure; soft; 20 to 40 percent rock fragments; pH 6.8 to 6.5.	0 to 16 inches; dark grayish brown cobbly to very cobbly sandy loam; granular structure; 15 to 50 percent rock fragments; pH 6.5 to 6.3; 20 to 50 percent rock fragments on the surface.	N/A
Subsoil	12 to 33 inches; yellowish brown very cobbly to extremely cobbly sandy loam; granular to subangular blocky structure; 40 to 65 percent rock fragments; pH 6.0 to 5.8.	16 to 42 inches; brown very cobbly to extremely cobbly sandy loam; granular to subangular blocky structure; 50 to 65 percent rock fragments; pH 6.0 to 5.8.	N/A
Substrata	33 inches; fractured basalt	42 inches; fractured basalt	Protruding bedrock that has all soil eroded off.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	33 inches; basalt	42 inches; basalt	Nil; Any competent hard bedrock
Erosion Factor (K)	.24	.24	N/A
Max. Erosion Hazard	Moderate	Moderate	N/A
Soil Permeability	Moderate	Moderate	N/A
Soil Manageability Class	3Xp	3Xp	N/A
Group	III	III	N/A
Range Site	N/A	N/A	N/A
Water Runoff Potential	Slow	Slow	Very rapid
Hydrologic Soil Group	B	B	N/A
Available Water Capacity (AWC) Total (Top 20")	2.7 (1.7)	2.9 (1.7)	N/A
Forest Site Class	5 (III)	4-5 (II-III)	N/A
Timber Regeneration Potential			
Plantability	Low to moderate	Low to moderate	N/A
Seedling Survival	Low	Low	N/A

91 Sheld family, moderately deep-Sheld family-Rock Outcrop complex (continued)

Estimated Engineering
Properties;
USDA Texture,
Unified, and ASSHTO

0-12; gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

0-4; sandy loam
Unified: SM
ASSHTO: A-2-4, A-4

N/A

12-33; very cobbly sandy loam
Unified: SM
ASSHTO: A-2-4, A-4

4-42; cobbly sandy loam
Unified: SM
ASSHTO: A-2-4, A-4

33; fractured basalt

42; fractured basalt

Included Areas

10% Lithic Xerumbrepts

92 Sheld family, moderately deep-Sheld family-Rock Outcrop complex, 35 to 70 percent slopes

Map Unit Components	Sheld, mod deep	Sheld	Rock Outcrop
Approx. Proportion	50%	20%	20%
Position, Slope, and Elevation	Occurs on upland flats, mountain sideslopes and ground moraines; 35 to 70 percent slopes; 5,200 to 8,000 feet.	Occurs on mountain sideslopes and sloping lateral moraines; 35 to 70 percent slopes; 5,200 to 8,000 feet.	Miscellaneous land type on mountain sideslopes and ridgetops; 4,000 to 9,000 feet.
Typical Vegetation & Precipitation	Red and white fir, sugar pine, lodgepole pine, mountain hemlock, greenleaf manzanita and chinquapin; 40 to 85 inches ppt.	Red and white fir, sugar pine, lodgepole pine, mountain hemlock, greenleaf manzanita and chinquapin; 40 to 85 inches ppt.	Barren except for widely scattered brush that occurs in fractures in the rock or in small colluvial pockets of soil; 40 to 80 inches ppt.

Soil Profile Description

Surface Layer	0 to 12 inches; dark grayish brown gravelly or very gravelly sandy loam to cobbly or very cobbly sandy loam; granular structure; soft; 20 to 40 percent rock fragments; pH 6.8 to 6.5.	0 to 16 inches; dark grayish brown cobbly to very cobbly sandy loam; granular structure; 15 to 50 percent rock fragments; pH 6.5 to 6.3.	N/A
Subsoil	12 to 33 inches; yellowish brown very cobbly to extremely cobbly sandy loam; granular to subangular blocky structure; 40 to 65 percent rock fragments; pH 6.0 to 5.8.	16 to 42 inches; brown very cobbly to extremely cobbly sandy loam; granular to subangular blocky structure; 50 to 65 percent rock fragments; pH 6.0 to 5.8.	N/A
Substrata	33 inches; fractured basalt	42 inches; fractured basalt	N/A

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	33 inches; basalt	42 inches; basalt	
Erosion Factor (K)	.24	.24	N/A
Max. Erosion Hazard	Moderate	Moderate	N/A
Soil Permeability	Moderate	Moderate	N/A
Soil Manageability Class	3Xp	3Xgp	N/A
Soil Manageability Group	III	III	N/A
Range Site	N/A	N/A	N/A
Water Runoff Potential	Slow	Moderate	Very rapid
Hydrologic Soil Group	B	B	N/A
Available Water Capacity (AWC) Total (Top 20")	2.7 (1.7)	2.9 (1.7)	N/A
Forest Site Class	5 (III)	4-5 (II-III)	N/A
Timber Regeneration Potential			
Plantability	Low to moderate	Low to moderate	N/A
Seedling Survival	Low	Low	N/A

92 Sheld family, moderately deep-Sheld family-Rock Outcrop complex (continued)

Estimated Engineering
Properties;
USDA Texture,
Unified, and ASSHTO

0-12; gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

0-4; sandy loam
Unified: SM
ASSHTO: A-2-4, A-4

N/A

12-33; very cobbly sandy loam
Unified: SM
ASSHTO: A-2-4, A-4

4-42; cobbly sandy loam
Unified: SM
ASSHTO: A-2-4, A-4

33; fractured basalt

42; fractured basalt

Included Areas

10% Lithic Xerumbrepts

93 Sheld-Yallani families, moderately deep-Sheld family complex, stony, 15 to 50 percent slopes

Map Unit Components	Sheld, mod. deep, stony	Yallani, mod. deep, stony	Sheld, stony
Approx. Proportion	40%	20%	20%
Position, Slope, and Elevation	Occurs on upland flats, mountain sideslopes and ground moraines; 15 to 50 percent slopes; 5,200 to 8,000 feet.	Occurs on mountain sideslopes, ridges and canyons; 15 to 50 percent slopes; 5,200 to 8,000 feet.	Occurs on mountain sideslopes and sloping lateral moraines; 15 to 50 percent slopes; 5,200 to 8,000 feet.
Typical Vegetation & Precipitation	Red and white fir, sugar pine, lodgepole pine, mountain hemlock, greenleaf manzanita and chinquapin; 40 to 85 inches ppt.	Red and white fir, Jeffrey pine, ponderosa pine, sugar pine, lodgepole pine, mountain hemlock, incense cedar, greenleaf manzanita, pinemat manzanita, chinquapin and squaw carpet; 40 to 80 inches ppt.	Red and white fir, sugar pine, lodgepole pine, mountain hemlock, greenleaf manzanita and chinquapin; 40 to 85 inches ppt.

Soil Profile Description

Surface Layer	0 to 12 inches; dark grayish brown gravelly or very gravelly sandy loam to cobbly or very cobbly sandy loam; granular structure; soft; 20 to 40 percent rock fragments; pH 6.8 to 6.5.	0 to 6 inches; dark brown loamy sand; granular structure; loose; pH 6.5.	0 to 16 inches; dark grayish brown cobbly to very cobbly sandy loam; granular structure; 15 to 50 percent rock fragments; pH 6.5 to 6.3.
Subsoil	12 to 33 inches; yellowish brown very cobbly to extremely cobbly sandy loam; granular to subangular blocky structure; 40 to 65 percent rock fragments; pH 6.0 to 5.8.	6 to 31 inches; brown very cobbly loam; subangular blocky structure; soft to slightly hard; 55 percent rock fragments; pH 6.5 to 6.8.	16 to 42 inches; brown very cobbly to extremely cobbly sandy loam; granular to subangular blocky structure; 50 to 65 percent rock fragments; pH 6.0 to 5.8.
Substrata	33 inches; fractured basalt	31 to 42 inches; highly weathered andesite.	42 inches; fractured basalt

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	33 inches; basalt	31 inches; andesite	42 inches; basalt
Erosion Factor (K)	.24	.20	.24
Max. Erosion Hazard	Moderate	Moderate	Moderate
Soil Permeability	Moderate	Moderately rapid	Moderate
Soil Manageability Class Group	3Xp III	2p III	3Xgp III
Range Site	N/A	N/A	N/A
Water Runoff Potential	Moderate	Slow	Moderate
Hydrologic Soil Group	B	B	B
Available Water Capacity (AWC) Total (Top 20")	2.7 (1.7)	2.8 (1.8)	2.9 (1.7)
Forest Site Class	5 (III)	4 (II)	4-5 (II-III)
Timber Regeneration Potential			
Plantability	Low to moderate	High	Low to Moderate
Seedling Survival	Low	Low	Low

93 Sheld-Yallani families, moderately deep-Sheld family complex (continued)

Estimated Engineering
Properties;
USDA Texture,
Unified, and ASSHTO

0-12; gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

0-6; loamy sand
Unified: SM
ASSHTO: A-4

0-4; sandy loam
Unified: SM
ASSHTO: A-2-4, A-4

12-33; very cobbly sandy loam
Unified: SM
ASSHTO: A-2-4, A-4

6-31; very cobbly loam
Unified: GM-GC, ML-CL
ASSHTO: A-1, A-4

4-42; cobbly sandy loam
Unified: SM
ASSHTO: A-2-4, A-4

33; fractured basalt

31; weathered andesite

42; fractured basalt

Included Areas

20% Wintoner family; Lithic Xerumbrepts and Rubble Land

94 Skalan family, 0 to 15 percent slopes

Map Unit Components	Skalan
Approx. Proportion	80%
Position, Slope, and Elevation	Occurs on mountain sideslopes; gently sloping hills and undulating flats; 0 to 15 percent slopes, 3,000 to 5,200 feet.
Typical Vegetation & Precipitation	Jeffrey and ponderosa pine, sugar pine, white fir, incense cedar, black oak, huckleberry oak, western serviceberry, pinemat manzanita and chokecherry; 20 to 65 inches ppt.

Soil Profile Description

Surface Layer	0 to 14 inches; brown gravelly sandy loam to loam; granular to subangular blocky structure; soft; 15 to 30 percent rock fragments; pH 6.5 to 6.7.
Subsoil	14 to 31 inches; brown very gravelly loam to clay loam; subangular blocky structure; slightly hard; 40 to 50 percent rock fragments; pH 6.7.
Substrata	31 to 60 inches; yellowish brown very gravelly to extremely gravelly clay loam; subangular blocky structure; hard; 50 to 60 percent rock fragments; pH 6.7; underlain by andesite and basalt.

Soil Properties & Management Interpretations

Rooting Depth (in.)	60 inches; weathered basalt
Erosion Factor (K)	.20
Max. Erosion Hazard	Low
Soil Permeability	Moderate
Soil Manageability Class	2p
Group	II
Range Site	N/A
Water Runoff Potential	Slow
Hydrologic Soil Group	B
Available Water Capacity (AWC) Total (Top 20")	5.1 (1.7)
Forest Site Class	4 (II)
Timber Regeneration Plantability	Moderate
Seedling Survival	Very low to low
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-8; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	8-14; gravelly loam Unified: GM-GC, ML ASSHTO: A-1, A-7
	14-23; very gravelly loam Unified: GM-GC, ML ASSHTO: A-1, A-4
	23-60; very gravelly clay loam Unified: GM-GC, ML-CL ASSHTO: A-2, A-6
Included Areas	20% Skalan family, moderately deep; Holland family and Rock Outcrop

95 Skalan-Bobbitt families association, 0 to 35 percent slopes

Map Unit Components
 Approx. Proportion
 Position, Slope, and
 Elevation
 Typical Vegetation &
 Precipitation

Skalan

50%
 Occurs on mountain sideslopes and steeply sloping hills; 0 to 35 percent slopes; 3,000 to 5,200 feet.

Jeffrey and ponderosa pine, sugar pine, white fir, incense cedar, black oak, huckleberry oak, western serviceberry, pinemat manzanita and chokecherry; 20 to 45 inches ppt.

Bobbitt

40%
 Occurs on all aspects of mountainous uplands and ridgetops. When located on lava ridges it often has 15 to 60 percent of the surface covered with rock fragments. 0 to 35 percent slopes; 3,500 to 5,200 feet.

Jeffrey pine, ponderosa pine, western juniper, black oak, mountain mahogany and squaw carpet. 20 to 45 inches ppt.

Soil Profile Description

Surface Layer

0 to 14 inches; brown gravelly sandy loam to loam; granular to subangular blocky structure; soft; 15 to 30 percent rock fragments; pH 6.5 to 6.7.

0 to 12 inches; grayish brown gravelly to very gravelly loam; subangular blocky structure; soft; pH 6.8 to 6.6.

Subsoil

14 to 31 inches; brown very gravelly loam to clay loam; subangular blocky structure; slightly hard; 40 to 50 percent rock fragments; pH 6.7.

12 to 22 inches, brown extremely gravelly clay loam; subangular blocky structure; hard; 60% rock fragments; pH 6.5.

Substrata

31 to 60 inches; yellowish brown very gravelly to extremely gravelly clay loam; subangular blocky structure; hard; 50 to 60 percent rock fragments; pH 6.7; underlain by andesite and basalt.

22 to 44 inches; brown extremely gravelly sandy loam; massive; 70 percent rock fragments; pH 6.6; underlain by volcanic rock.

Soil Properties & Management Interpretations

Rooting Depth (in.),
 Underlying Material

60 inches; weathered basalt

40 to 50 inches; andesite and basalt.

Erosion Factor (K)

.20

.32

Max. Erosion Hazard

Moderate

Moderate to high

Soil Permeability

Moderate

Moderate to moderately slow.

Soil Manageability

Class
 Group

3gp
 III

3x
 III

Range Site

N/A

N/A

Water Runoff Potential

Moderate

Moderate

Hydrologic Soil Group

B

B

Available Water
 Capacity (AWC)

Total (Top 20")

5.1 (1.7)

2.7 (1.9)

Forest Site Class

4 (II)

5-6 (IV-V)

Timber Regeneration
 Potential

Plantability
 Seedling Survival

Moderate
 Very low to low

Moderate to low (Rocks)
 Low to moderate

95 Skalan-Bobbitt families association (continued)

Estimated Engineering
Properties;
USDA Texture,
Unified, and ASSHTO

0-8; gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

0-12; loam
Unified: ML
ASSHTO: A-7

8-14; gravelly loam
Unified: GM-GC, ML
ASSHTO: A-1, A-7

12-22; gravelly clay loam
Unified: GM-GC, CL
ASSHTO: A-2, A-6, A-7

14-23; very gravelly loam
Unified: GM-GC, ML
ASSHTO: A-1, A-4

22-44; very gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

23-60; very gravelly clay loam
Unified: GM-GC, ML-CL
ASSHTO: A-2, A-6

44; basalt

Included Areas

10% Brownlee, and Rock Outcrop, and Skalan family on steeper slopes

96 Skalan family, moderately deep-Deadwood family association, 35 to 70 percent slopes

Map Unit Components	Skalan, mod. deep	Deadwood
Approx. Proportion	50%	30%
Position, Slope, and Elevation	Occurs on mountain sideslopes; steeply sloping hills; 35 to 70 percent slopes, 3,000 to 5,200 feet.	Occurs on escarpments, mountain sideslopes and ridges; 35 to 70 percent slopes; 4,000 to 5,200 feet.
Typical Vegetation & Precipitation	Jeffrey and ponderosa pine, sugar pine, white fir, incense cedar, black oak, huckleberry oak, western serviceberry, pinemat manzanita and chokecherry; 40 to 50 inches ppt.	Douglas fir, ponderosa pine, sugar pine, incense cedar, white fir, greenleaf manzanita, deerbrush and squaw carpet; 40 to 50 inches ppt.

Soil Profile Description

Surface Layer	0 to 8 inches; brown cobbly sandy loam; granular structure; loose; 25 percent rock fragments; pH 7.3.	0 to 2 inches; dark grayish brown very gravelly fine sandy loam; granular and single grain structure; soft; 50 percent pebbles, pH 6.3.
Subsoil	8 to 34 inches; brown very gravelly sandy clay loam; subangular blocky structure; slightly hard; 35 to 50 percent rock fragments; pH 7.0 to 6.8.	2 to 14 inches; light brownish gray very gravelly loam; granular and blocky structure; slightly hard; 50 percent pebbles, pH 6.0 to 5.8.
Substrata	34 inches; slightly weathered basalt.	14 inches, highly fractured shale with soil and roots in cracks. 90+ percent rock fragments.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	34 inches; weathered basalt	14 inches; shale.
Erosion Factor (K)	.24	.20
Max. Erosion Hazard	Moderate to high	Moderate
Soil Permeability	Moderate	Moderate.
Soil Manageability Class	3gp	3Pe
Group	III	III
Range Site	N/A	N/A
Water Runoff Potential	Moderate	Moderate to rapid
Hydrologic Soil Group	B	B
Available Water Capacity (AWC) Total (Top 20")	3.5 (2.1)	.9 (.9)
Forest Site Class	5 (III)	6 (V)
Timber Regeneration Potential		
Plantability	Moderate	Moderate
Seedling Survival	Low	Very low
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-8; cobbly sandy loam Unified: SM ASSHTO: A-2-4, A-4	0-2; very gravelly fine sandy loam Unified: GM-GC, SM ASSHTO: A-2, A-4
	8-34; gravelly sandy clay loam Unified: GM-GC, SC ASSHTO: A-1, A-2-6	2-14; very gravelly loam Unified: GM-GC, ML-CL ASSHTO: A-2, A-6
	34; weathered basalt	14; highly fractured shale
Included Areas	20% Holland family, metasedimentary; Skalan family, metasedimentary and Rock Outcrop	

97 Skalan-Holland families association, 0 to 35 percent slopes

Map Unit Components	Skalan	Holland
Approx. Proportion	60%	30%
Position, Slope, and Elevation	Occurs on mountain sideslopes; gently sloping hills and undulating flats; 0 to 35 percent slopes, 3,000 to 5,200 feet.	Occurs on large volcanic flats, ridges and mountain sideslopes; 0 to 35 percent slopes; 3,500 to 5,200 feet.
Typical Vegetation & Precipitation	Jeffrey and ponderosa pine, sugar pine, white fir, incense cedar, black oak, huckleberry oak, western serviceberry, pinemat manzanita and chokecherry; 30 to 65 inches ppt.	Jeffrey and ponderosa pine, white fir, douglas fir, sugar pine, incense cedar, mountain whitethorn, chinquapin, deerbrush, buckbrush, service berry, greenleaf manzanita and squaw carpet; 30 to 64 inches ppt.

Soil Profile Description

Surface Layer	0 to 14 inches; brown gravelly sandy loam to loam; granular to subangular blocky structure; soft; 15-30 percent rock fragments; pH 6.5- 6.7.	0 to 10 inches, reddish brown loam to gravelly loam; granular structure; soft; pH 6.5 to 6.2.
Subsoil	14 to 31 inches; brown very gravelly loam to clay loam; subangular blocky structure; slightly hard; 40 to 50 percent rock fragments; pH 6.7.	10 to 44 inches; brown to yellowish red gravelly loam to gravelly clay loam; subangular blocky structure; hard; pH 6.2 to 6.4.
Substrata	31 to 60 inches; yellowish brown very gravelly to extremely gravelly clay loam; subangular blocky structure; hard; 50 to 60 percent rock fragments; pH 6.7; underlain by andesite and basalt.	44 to 60 inches; yellowish brown gravelly silty clay loam; massive; hard; pH 6.2.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	60 inches; weathered basalt	60 inches.
Erosion Factor (K)	.20	.28
Max. Erosion Hazard	Low	Low
Soil Permeability	Moderate	Moderate
Soil Manageability		
Class	2p	1
Group	II	II
Range Site	N/A	N/A
Water Runoff Potential	Slow	Slow
Hydrologic Soil Group	B	B
Available Water Capacity (AWC)		
Total (Top 20")	5.1 (1.7)	7.7 (2.6)
Forest Site Class	4 (II)	3 (I)
Timber Regeneration		
Plantability	Moderate	High
Seedling Survival	Very low to low	Moderate

97 Skalan-Holland families association (continued)

Estimated Engineering
Properties;
USDA Texture,
Unified, and ASSHTO

0-8; gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

0-10; loam
Unified: ML-CL
ASSHTO: A-6

8-14; gravelly loam
Unified: GM-GC, ML
ASSHTO: A-1, A-7

10-24; gravelly loam
Unified: GM-GC, CL
ASSHTO: A-2, A-6

14-23; very gravelly loam
Unified: GM-GC, ML
ASSHTO: A-1, A-4

24-44; gravelly clay loam
Unified: GM-GC, CL
ASSHTO: A-2, A-6, A-7

23-60; very gravelly clay loam
Unified: GM-GC, ML-CL
ASSHTO: A-2, A-6

44-60; gravelly silty clay loam
Unified: GM-GC, CL
ASSHTO: A-2, A-6

Included Areas

10% Aquolls; Skalan family, moderately deep Keating Family and Rock Outcrop

98 Skalan-Holland families association, 35 to 50 percent slopes

Map Unit Components	Skalan	Holland
Approx. Proportion	60%	30%
Position, Slope, and Elevation	Occurs on mountain sideslopes and steeply sloping hills; 35 to 50 percent slopes, 3,000 to 5,200 feet.	Occurs on large volcanic ridges and mountain sideslopes; 35 to 50 percent slopes; 3,500 to 5,200 feet.
Typical Vegetation & Precipitation	Jeffrey and ponderosa pine, sugar pine, white fir, incense cedar, black oak, huckleberry oak, western serviceberry, pinemat manzanita and chokecherry; 30 to 65 inches ppt.	Jeffrey and ponderosa pine, white fir, douglas fir, sugar pine, incense cedar, mountain whitethorn, chinquapin, deerbrush, buckbrush, service berry, greenleaf manzanita and squaw carpet, 30-65" ppt.

Soil Profile Description

Surface Layer	0 to 14 inches; brown gravelly sandy loam to loam; granular to subangular blocky structure; soft; 15-30 percent rock fragments; pH 6.5-6.7.	0 to 10 inches, reddish brown loam to gravelly loam, granular structure; soft; pH 6.5 to 6.2.
Subsoil	14 to 31 inches; brown very gravelly loam to clay loam; subangular blocky structure; slightly hard; 40 to 50 percent rock fragments; pH 6.7.	10 to 44 inches; brown to yellowish red gravelly loam to gravelly clay loam; subangular blocky structure; hard; pH 6.2 to 6.4.
Substrata	31 to 60 inches; yellowish brown very gravelly to extremely gravelly clay loam; subangular blocky structure; hard; 50 to 60 percent rock fragments; pH 6.7; underlain by andesite and basalt.	44 to 60 inches; yellowish brown gravelly silty clay loam; massive; hard; pH 6.2.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	60 inches; weathered basalt	60+ inches.
Erosion Factor (K)	.20	.28
Max. Erosion Hazard	Moderate	Moderate
Soil Permeability	Moderate	Moderate
Soil Manageability		
Class	3gp	3g
Group	III	III
Range Site	N/A	N/A
Water Runoff Potential	Moderate	Moderate
Hydrologic Soil Group	B	B
Available Water Capacity (AWC)		
Total (Top 20")	5.1 (1.7)	7.7 (2.6)
Forest Site Class	4 (II)	3 (I)
Timber Regeneration		
Plantability	Moderate	High
Seedling Survival	Very low to low	Moderate

98 Skalan-Holland families association (continued)

Estimated Engineering
Properties;
USDA Texture,
Unified, and ASSHTO

0-8; gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

0-10; loam
Unified: ML-CL
ASSHTO: A-6

8-14; gravelly loam
Unified: GM-GC, ML
ASSHTO: A-1, A-7

10-24; gravelly loam
Unified: GM-GC, CL
ASSHTO: A-2, A-6

14-23; very gravelly loam
Unified: GM-GC, ML
ASSHTO: A-1, A-4

24-44; gravelly clay loam
Unified: GM-GC, CL
ASSHTO: A-2, A-6, A-7

23-60; very gravelly clay loam
Unified: GM-GC, ML-CL
ASSHTO: A-2, A-6

44-60; gravelly silty clay loam
Unified: GM-GC, CL
ASSHTO: A-2, A-6

Included Areas

10% Neer family; Skalan family, moderately deep and Rock Outcrop

**99 Skalan family-Holland family, moderately deep-Lithic Xerochrepts association,
15 to 35 percent slopes**

Map Unit Components	Skalan	Holland, mod. deep	Lithic Xerochrepts
Approx. Proportion	40%	30%	20%
Position, Slope, and Elevation	Occurs on mountain sideslopes; gently sloping hills and undulating flats; 15 to 35 percent slopes, 3,000 to 5,200 feet.	Occurs on large volcanic flats, ridges and mountain sideslopes; 15 to 35 percent slopes; 3,000 to 5,000 feet.	Occurs on relatively recent basalt flows; 15 to 35 percent slopes; 3,000 to 5,000 feet.
Typical Vegetation & Precipitation	Jeffrey and ponderosa pine, sugar pine, white fir, incense cedar, black oak, huckleberry oak, western serviceberry, pinemat manzanita and chokecherry; 30 to 40 inches ppt.	Jeffrey and ponderosa pine, douglas fir, black oak, deer brush and bear clover; 30 to 40 inches ppt.	Sparse Jeffrey pine, incense cedar and juniper, with big sage, rabbit brush, desert mountain mahogany, greenleaf manzanita, pinemat manzanita and both annual and perennial grasses; 20 to 40 inches ppt.

Soil Profile Description

Surface Layer	0 to 14 inches; brown gravelly sandy loam to loam; granular to subangular blocky structure; soft; 15 to 30 percent rock fragments; pH 6.5 to 6.7.	0 to 7 inches; brown fine sandy loam; subangular blocky structure; soft; pH 7.5 to 7.0.	0 to 5 inches; grayish brown loamy sand to cobbly sandy loam; subangular blocky to granular structure; soft; 10 to 15 percent rock fragments; pH 6.3 to 6.8.
Subsoil	14 to 31 inches; brown very gravelly loam to clay loam; subangular blocky structure; slightly hard; 40 to 50 percent rock fragments; pH 6.7.	7 to 27 inches; yellowish red loam; subangular blocky structure; slightly hard to hard; pH 7.0 to 6.5.	5 to 18 inches; yellowish brown cobbly to extremely cobbly sandy loam; subangular blocky to granular structure; soft; 15 to 75 percent rock fragments; pH 7.3 to 7.7.
Substrata	31 to 60 inches; yellowish brown very gravelly to extremely gravelly clay loam; subangular blocky structure; hard; 50 to 60 percent rock fragments; pH 6.7; underlain by andesite and basalt.	27 to 38 inches; brown clay loam; subangular blocky structure; very hard; pH 6.3; underlain by basalt.	18 inches; hard, slightly fractured basalt bedrock.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	60 inches; weathered basalt	38 inches; basalt	18 inches; basalt.
Erosion Factor (K)	.20	.28	.24
Max. Erosion Hazard	Low	Moderate	Low
Soil Permeability	Moderate	Moderate	Moderately rapid
Soil Manageability Class	2p	2e	3Xp
Group	II	III	II
Range Site	N/A	N/A	1
Water Runoff Potential	Slow	Slow	Very slow
Hydrologic Soil Group	B	B	B
Available Water Capacity (AWC) Total (Top 20")	5.1 (1.7)	5.3 (2.5)	1.7 (1.7)
Forest Site Class	4 (II)	4-5 (II-III)	7 (Noncommercial)
Timber Regeneration Potential			
Plantability	Moderate	High	N/A
Seedling Survival	Very low to low	Moderate	N/A

99 Skalan family-Holland family, moderately deep-Lithic Xerochrepts association (continued)

Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-8; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	0-7; fine sandy loam Unified: SM ASSHTO: A-4	0-5; cobbly sandy loam Unified: SM ASSHTO: A-2-4, A-4
	8-14; gravelly loam Unified: GM-GC, ML ASSHTO: A-1, A-7	7-27; loam Unified: ML ASSHTO: A-7	4-9; very cobbly sandy loam Unified: SM ASSHTO: A-2-4, A-4
	14-23; very gravelly loam Unified: GM-GC, ML ASSHTO: A-1, A-4	27-38; clay loam Unified: ML-CL ASSHTO: A-6	18; hard basalt bedrock
	23-60; very gravelly clay loam Unified: GM-GC, ML-CL ASSHTO: A-2, A-6	38; basalt bedrock	
Included Areas	10% Rock Land		

100 Skalan-Holland families-Rock Outcrop association, 35 to 50 percent slopes

Map Unit Components	Skalan	Holland	Rock Outcrop
Approx. Proportion	25%	25%	25%
Position, Slope, and Elevation	Occurs on mountain sideslopes and steeply sloping hills; 35 to 50 percent slopes, 3,000 to 5,200 feet.	Occurs on large volcanic ridges and mountain sideslopes; 35 to 50 percent slopes; 3,500 to 5,200 feet.	Miscellaneous land type on mountain sideslopes and ridgetops; 4,000 to 9,000 feet.
Typical Vegetation & Precipitation	Jeffrey and ponderosa pine, sugar pine, white fir, incense cedar, black oak, huckleberry oak, western serviceberry, pinemat manzanita and chokecherry; 30 to 65 inches ppt.	Jeffrey and ponderosa pine, white fir, douglas fir, sugar pine, incense cedar, mountain whitethorn, chinquapin, deerbrush, buckbrush, service berry, greenleaf manzanita and squaw carpet, 30 to 65 inches ppt.	Barren except for widely scattered brush that occurs in fractures in the rock or in small colluvial pockets of soil; 30 to 65 inches ppt.

Soil Profile Description

Surface Layer	0 to 14 inches; brown gravelly sandy loam to loam; granular to subangular blocky structure; soft; 15 to 30 percent rock fragments; pH 6.5 to 6.7.	0 to 10 inches, reddish brown loam to gravelly loam, granular structure; soft; pH 6.5 to 6.2.	N/A
Subsoil	14 to 31 inches; brown very gravelly loam to clay loam; subangular blocky structure; slightly hard; 40 to 50 percent rock fragments; pH 6.7.	10 to 44 inches; brown to yellowish red gravelly loam to gravelly clay loam; subangular blocky structure; hard; pH 6.2 to 6.4.	N/A
Substrata	31 to 60 inches; yellowish brown very gravelly to extremely gravelly clay loam; subangular blocky structure; hard; 50 to 60 percent rock fragments; pH 6.7; underlain by andesite and basalt.	44 to 60 inches; yellowish brown gravelly silty clay loam; massive; hard; pH 6.2.	Protruding bedrock that has all soil eroded off.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	60 inches; weathered basalt	60+ inches.	Nil; Any competent hard bedrock
Erosion Factor (K)	.20	.28	N/A
Max. Erosion Hazard	Moderate	Moderate	N/A
Soil Permeability	Moderate	Moderate	N/A
Soil Manageability Class	3gp	3g	N/A
Group	III	III	N/A
Range Site	N/A	N/A	N/A
Water Runoff Potential	Moderate	Moderate	Very rapid
Hydrologic Soil Group	B	B	N/A
Available Water Capacity (AWC) Total (Top 20")	5.1 (1.7)	7.7 (2.6)	N/A
Forest Site Class	4 (II)	3 (I)	N/A
Timber Regeneration Potential			
Plantability	Moderate	High	N/A
Seedling Survival	Very low to low	Moderate	N/A

100 Skalan-Holland families-Rock Outcrop association (continued)

Estimated Engineering
Properties;
USDA Texture,
Unified, and ASSHTO

0-8; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	0-10; loam Unified: ML-CL ASSHTO: A-6	N/A
8-14; gravelly loam Unified: GM-GC, ML ASSHTO: A-1, A-7	10-24; gravelly loam Unified: GM-GC, CL ASSHTO: A-2, A-6	
14-23; very gravelly loam Unified: GM-GC, ML ASSHTO: A-1, A-4	24-44; gravelly clay loam Unified: GM-GC, CL ASSHTO: A-2, A-6, A-7	
23-60; very gravelly clay loam Unified: GM-GC, ML-CL ASSHTO: A-2, A-6	44-60; gravelly silty clay loam Unified: GM-GC, CL ASSHTO: A-2, A-6	

Included Areas

25% Rubble Land and Lithic Xerochrepts

**101 Skalan-Holland families-Skalan, moderately deep association, diatomaceous,
15 to 50 percent slopes**

Map Unit Components	Skalan, diatomaceous	Holland, diatomaceous	Skalan, mod. deep, diat.
Approx. Proportion	30%	30%	20%
Position, Slope, and Elevation	Occurs on mountain sideslopes and steeply sloping hills; 15 to 50 percent slopes, 3,000 to 5,200 feet.	Occurs on ridgetops and mountain sideslopes; 15 to 50 percent slopes; 3,500 to 5,200 feet.	Occurs on mountain sideslopes; steeply sloping hills; 15 to 50 percent slopes, 3,000 to 5,200 feet.
Typical Vegetation & Precipitation	Jeffrey and ponderosa pine, sugar pine, white fir, incense cedar, black oak, huckleberry oak, western serviceberry, pinemat manzanita and chokecherry; 25 to 60 inches ppt.	Ponderosa pine, incense cedar, douglas fir, white fir, greenleaf manzanita and squaw carpet; 25 to 60 inches ppt.	Jeffrey and ponderosa pine, sugar pine, white fir, incense cedar, black oak, huckleberry oak, western serviceberry, pinemat manzanita and chokecherry; 25 to 60 inches ppt.

Soil Profile Description

Surface Layer	0 to 14 inches; brown gravelly sandy loam to loam; granular to subangular blocky structure; soft; 15 to 30 percent rock fragments; pH 6.5 to 6.7.	0 to 11 inches; brown to yellowish brown loam; granular structure; slightly hard; 5 percent pebbles; pH 6.0 to 5.8.	0 to 8 inches; brown cobbly sandy loam; granular structure; loose; 25 percent rock fragments; pH 7.3.
Subsoil	14 to 31 inches; brown very gravelly loam to clay loam; subangular blocky structure; slightly hard; 40 to 50 percent rock fragments; pH 6.7.	11 to 53 inches; yellowish brown gravelly to very gravelly sandy clay loam; subangular blocky structure; slightly hard; 15 to 35 percent pebbles; pH 5.5 to 6.0.	8 to 34 inches; brown very gravelly sandy clay loam; subangular blocky structure; slightly hard; 35 to 50 percent rock fragments; pH 7.0 to 6.8.
Substrata	31 to 60 inches; yellowish brown very gravelly to extremely gravelly clay loam; subangular blocky structure; hard; 50 to 60 percent rock fragments; pH 6.7; underlain by diatomaceous earth.	53 inches; diatomaceous earth.	34 inches; diatomaceous earth.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	60 inches; diatomaceous earth.	53 inches; diatomaceous earth.	34 inches; diatomaceous earth.
Erosion Factor (K)	.20	.28	.24
Max. Erosion Hazard	Moderate to high	High	Moderate to high
Soil Permeability	Moderate	Moderate	Moderate
Soil Manageability Class	3gp	3E	3gp
Group	III	III	III
Range Site	N/A	N/A	N/A
Water Runoff Potential	Moderate	Moderate	Moderate
Hydrologic Soil Group	B	B	B
Available Water Capacity (AWC) Total (Top 20")	5.1 (1.7)	7.0 (2.9)	3.5 (2.1)
Forest Site Class	4 (II)	4 (II)	5 (III)
Timber Regeneration Potential			
Plantability	Moderate	High	Moderate
Seedling Survival	Very low to low	Moderate	Low

101 Skalan-Holland families-Skalan, moderately deep association (continued)

Estimated Engineering
Properties;
USDA Texture,
Unified, and ASSHTO

0-8; gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

0-11; loam
Unified: ML
ASSHTO: A-7

0-8; cobbly sandy loam
Unified: SM
ASSHTO: A-2-4, A-4

8-14; gravelly loam
Unified: GM-GC, ML
ASSHTO: A-1, A-7

11-53; gravelly sandy clay
loam
Unified: GM-GC, SC
ASSHTO: A-2, A-2-6

8-34; gravelly sandy clay loam
Unified: GM-GC, SC
ASSHTO: A-1, A-2-6

14-23; very gravelly loam
Unified: GM-GC, ML
ASSHTO: A-1, A-4

53; diatomaceous earth.

34; diatomaceous earth.

23-60; very gravelly clay loam
Unified: GM-GC, ML-CL
ASSHTO: A-2, A-6

Included Areas

20% Bobbitt family, moderately deep and Rock Outcrop

**102 Skalan family-Washougal family, moderately deep, stony-Rock Outcrop association,
0 to 35 percent slopes**

Map Unit Components	Skalan	Washougal, mod deep, stony	Rock
Approx. Proportion	30%	25%	
Position, Slope, and Elevation	Occurs on mountain sideslopes; gently sloping hills and undulating flats; 0 to 35 percent slopes, 3,000 to 5,200 feet.	Occurs on mountain sideslopes and outwash terraces; 0 to 35 percent slopes; 3,500 to 5,200 feet.	Miscellaneous land type on mountain sideslopes and ridgetops; 4,000 to 9,000 feet.
Typical Vegetation & Precipitation	Jeffrey and ponderosa pine, sugar pine, white fir, incense cedar, black oak, huckleberry oak, western serviceberry, pinemat manzanita and chokecherry; 30 to 65 inches ppt.	Jeffrey pine, lodgepole pine, white fir, greenleaf manzanita, rabbit brush and annual and perennial grasses; 35 to 65 inches ppt.	Barren except for widely scattered brush that occurs in fractures in the rock or in small colluvial pockets of soil; 30 to 65 inches ppt.
Soil Profile Description			
Surface Layer	0 to 14 inches; brown gravelly sandy loam to loam; granular to subangular blocky structure; soft; 15 to 30 percent rock fragments; pH 6.5 to 6.7.	0 to 13 inches; brown gravelly sandy loam; granular structure; soft; 20 to 25 percent rock fragments; pH 5.8.	N/A
Subsoil	14 to 31 inches; brown very gravelly loam to clay loam; subangular blocky structure; slightly hard; 40 to 50 percent rock fragments; pH 6.7.	13 to 39 inches; brown to grayish brown very cobbly to extremely cobbly sandy loam; soft; 45 to 60 percent rock fragments; pH 6.0.	N/A
Substrata	31 to 60 inches; yellowish brown very gravelly to extremely gravelly clay loam; subangular blocky structure; hard; 50 to 60 percent rock fragments; pH 6.7; underlain by andesite and basalt.	39 inches; basalt	Protruding bedrock that has all soil eroded off.
Soil Properties & Management Interpretations			
Rooting Depth (in.), Underlying Material	60 inches; weathered basalt	39 inches; basalt	Nil; Any competent hard bedrock
Erosion Factor (K)	.20	.20	N/A
Max. Erosion Hazard	Low	Moderate	N/A
Soil Permeability	Moderate	Moderately rapid	N/A
Soil Manageability Class	2p	3Xp	N/A
Group	III	III	N/A
Range Site	N/A	N/A	N/A
Water Runoff Potential	Slow	Slow	Very rapid
Hydrologic Soil Group	B	B	N/A
Available Water Capacity (AWC) Total (Top 20")	5.1 (1.7)	2.4 (1.5)	N/A
Forest Site Class	4 (II)	5 (IV)	N/A
Timber Regeneration Potential			
Plantability	Moderate	Moderate	N/A
Seedling Survival	Very low to low	Very low to low	N/A

102 Skalan family-Washougal family, moderately deep, stony-Rock Outcrop association (continued)

Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-8; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	0-13; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	N/A
	8-14; gravelly loam Unified: GM-GC, ML ASSHTO: A-1, A-7	13-39; cobbly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	
	14-23; very gravelly loam Unified: GM-GC, ML ASSHTO: A-1, A-4	39; basalt	
	23-60; very gravelly clay loam Unified: GM-GC, ML-CL ASSHTO: A-2, A-6		

Included Areas 25% Washougal family and Lithic Xerumbrepts

103 Supan family, 0 to 15 percent slopes.

Map Unit Components	Supan
Approx. Proportion	90%
Typical Vegetation & Precipitation	Jeffrey and ponderosa pine, digger pine, western juniper, incense cedar, black oak, white oak, bitterbrush, big sage, desert mountain mahogany and annual grasses; 15 to 30 inches ppt.

Soil Profile Description

Surface Layer	0 to 4 inches; grayish brown sandy loam; granular to subangular blocky structure; slightly hard; pH 6.2 to 6.5.
Subsoil	4 to 33 inches; grayish brown loam to clay loam; subangular blocky structure; slightly hard to hard; pH 6.3 to 7.0.
Substrata	33 to 60 inches; brown loamy sand; massive; loose; pH 7.5.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	60 inches; alluvium
Erosion Factor (K)	.32
Max. Erosion Hazard	High
Soil Permeability	Moderate
Soil Manageability	
Class	3E
Group	III
Range Site	2
Water Runoff Potential	Slow
Hydrologic Soil Group	B
Available Water Capacity (AWC)	
Total (Top 20")	7.2 (3.0)
Forest Site Class	5 (IV)
Timber Regeneration Potential	
Plantability	High
Seedling Survival	Moderate
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	
	0-4; sandy loam Unified: SM ASSHTO: A-2-4, A-4
	4-10; loam Unified: ML ASSHTO: A-7
	10-33; clay loam Unified: CL ASSHTO: A-6, A-7
	33-60; loamy sand Unified: SM ASSHTO: A-2-4
Included Areas	10% Lava Flow and Alicel family

104 Trojan-Inville-BoomTown families association, 0 to 35 percent slopes

Map Unit Components	Trojan	Inville	BoomTown
Approx. Proportion	30%	25%	25%
Position, Slope, and Elevation	Occurs on mountain sideslopes, ridges, flats, and gently sloping hills; 0 to 35 percent slopes; 5,200 to 7,000 feet.	Occurs on mountain sideslopes, ridges and canyons; 5 to 35 percent slopes, 5,200 to 7,000 feet.	Occurs on relatively old volcanic flats, terraces and basins; 0 to 15 percent slopes; 5,200 to 6,500 feet.
Typical Vegetation & Precipitation	Jeffrey pine, white fir, incense cedar, western juniper, mountain mahogany, big sage, greenleaf manzanita, pinemat manzanita and desert mountain mahogany; 16 to 35 inches ppt.	Jeffrey and ponderosa pine, red and white fir, sugar pine, incense cedar, greenleaf manzanita, pinemat manzanita, chinquapin and desert mountain mahogany; 20 to 35 inches ppt.	Scattered Jeffrey pine and juniper with big sage, rabbitbrush and annual and perennial grasses; 18 to 35 inches ppt.

Soil Profile Description

Surface Layer	0 to 22 inches; yellowish brown to brown loam; granular to subangular blocky structure; soft to slightly hard; 2 to 10 percent rock fragments; pH 6.3 to 6.5.	0 to 13 inches, brown gravelly sandy loam to loam; granular structure; soft; 10 to 30 percent rock fragments; pH 6.5.	0 to 7 inches; yellowish brown to brown loam; granular to platy structure; soft to slightly hard; pH 6.2 to 6.3.
Subsoil	22 to 46 inches; brown gravelly sandy clay loam to gravelly clay loam; subangular blocky structure; slightly hard; 15 to 25 percent rock fragments; pH 6.5.	13 to 60 inches; brown very gravelly to extremely gravelly clay loam; subangular blocky structure; slightly hard; 35 to 65 percent rock fragments; pH 6.0 - 5.5.	7 to 30 inches; brown sandy clay loam to clay; massive to prismatic structure; hard to extremely hard; 10 percent rock fragments; pH 6.5 to 7.0.
Substrata	46 to 60 inches; slightly weathered basalt rock.	N/A	30 inches; weathered basalt

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	46 inches; basalt.	60+ inches.	30 inches; basalt
Erosion Factor (K)	.28	.20	.32
Max. Erosion Hazard	Moderate	Low	Moderate
Soil Permeability	Moderate	Moderate	Moderately slow
Soil Manageability Class	2e	1	2e
Group	II	II	II
Range Site	N/A	N/A	2
Water Runoff Potential	Slow	Slow	Slow
Hydrologic Soil Group	B	B	C
Available Water Capacity (AWC) Total (Top 20")	6.4 (2.7)	6.8 (2.2)	4.3 (2.9)
Forest Site Class	5 (IV)	5 (III)	7 (Noncommercial)
Timber Regeneration Potential			
Plantability	High	Moderate	N/A
Seedling Survival	Moderate	Moderate	N/A

104 Trojan-Inville-BoomTown families association (continued)

Estimated Engineering
Properties;
USDA Texture,
Unified, and ASSHTO

0-22; loam Unified: ML ASSHTO: A-4, A-6	SM ASSHTO: A-2-4, A-4	0-7; loam Unified: ML ASSHTO: A-7
22-34; gravelly sandy clay loam Unified: GM-GC, SC ASSHTO: A-2, A-2-6	7-13; loam Unified: ML ASSHTO: A-7	7-17; sandy clay loam Unified: SC ASSHTO: A-2-6
34-46; gravelly clay loam Unified: GM-GC, CL ASSHTO: A-2, A-6, A-7	13-60; gravelly clay loam Unified: GM-GC, CL ASSHTO: A-2, A-6, A-7	17-30; clay Unified: CL ASSHTO: A-7
46; weathered basalt rock		30; weathered basalt

Included Areas

20% Keating family and Durixerolls

105 Trojan-Inville-Patio families association, 0 to 35 percent slopes

Map Unit Components	Trojan	Inville	Patio
Approx. Proportion	30%	30%	30%
Position, Slope, and Elevation	Occurs on mountain sideslopes, ridges, flats, and gently sloping hills; 0 to 35 percent slopes, 5,200 to 7,000 feet.	Occurs on mountain sideslopes, ridges and canyons; 5 to 35 percent slopes, 5,200 to 7,000 feet.	Occurs on mountain sideslopes; escarpments and gently sloping hillsides; 0 to 35 percent slopes; 5,200 to 7,000 feet.
Typical Vegetation & Precipitation	Jeffrey pine, white fir, incense cedar, eastern juniper, mountain mahogany, big sage, greenleaf manzanita, pinemat manzanita and desert mountain mahogany; 16 to 35 inches ppt.	Jeffrey and ponderosa pine, red and white fir, sugar pine, incense cedar, greenleaf manzanita, pinemat manzanita, chinquapin and desert mountain mahogany; 20 to 35 inches ppt.	Jeffrey and ponderosa pine, sugar pine, white fir, red fir, incense cedar, juniper, mountain mahogany, chinquapin, greenleaf manzanita; pinemat manzanita; desert mountain mahogany and big sage; 18 to 35 inches ppt.

Soil Profile Description

Surface Layer	0 to 22 inches; yellowish brown to brown loam; granular to subangular blocky structure; soft to slightly hard; 2 to 10 percent rock fragments; pH 6.3 to 6.5.	0 to 13 inches, brown gravelly sandy loam to loam, granular structure; soft; 10 to 30 percent rock fragments; pH 6.5.	0 to 9 inches; brown gravelly or cobbly fine sandy loam; granular structure; soft; 20 percent rock fragments; pH 6.5.
Subsoil	22 to 46 inches; brown gravelly sandy clay loam to gravelly clay loam; subangular blocky structure; slightly hard; 15 to 25 percent rock fragments; pH 6.5.	13 To 60 inches; brown very gravelly to extremely gravelly clay loam; subangular blocky structure; slightly hard; 35 to 65 percent rock fragments; pH 6.0 - 5.5.	9 to 29 inches; yellowish brown very cobbly loam; subangular blocky structure; soft; pH 6.5.
Substrata	46 to 60 inches; slightly weathered basalt rock.	N/A	29 to 38 inches; fractured platy basalt with soil and roots in cracks.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	46 inches; basalt.	60+ inches.	29 inches; basalt
Erosion Factor (K)	.28	.20	.24
Max. Erosion Hazard	Moderate	Low	Moderate
Soil Permeability	Moderate	Moderate	Moderate
Soil Manageability Class	2e	1	2px
Group	II	II	II
Range Site	N/A	N/A	N/A
Water Runoff Potential	Slow	Slow	Slow
Hydrologic Soil Group	B	B	B
Available Water Capacity (AWC) Total (Top 20")	6.4 (2.7)	6.8 (2.2)	2.3 (1.7)
Forest Site Class	5 (IV)	5 (III)	5 (IV)
Timber Regeneration Potential			
Plantability	High	Moderate	Moderate
Seedling Survival	Moderate	Moderate	Low

105 Trojan-Inville-Patio families association (continued)

Estimated Engineering
Properties;
USDA Texture,
Unified, and ASSHTO

0-22; loam Unified: ML ASSHTO: A-4, A-6	0-7; sandy loam Unified: SM ASSHTO: A-2-4, A-4	0-9; gravelly fine sandy loam Unified: GM-GC, SM-SC ASSHTO: A-1, A-4
22-34; gravelly sandy clay loam Unified: GM-GC, SC ASSHTO: A-2, A-2-6	7-13; loam Unified: ML ASSHTO: A-2, A-2-6	9-29; very cobbly loam Unified: ML-CL ASSHTO: A-4
34-46; gravelly clay loam Unified: GM-GC, CL ASSHTO: A-2, A-6, A-7	13-60; gravelly clay loam Unified: GM-GC, CL ASSHTO: A-2, A-6, A-7	29; fractured platy basalt
46; weathered basalt rock		

Included Areas

10% Rubble Land and Aquolls

106 Trojan-Kilmerque-Patio families association, 15 to 35 percent slopes

Map Unit Components	Trojan	Kilmerque	Patio
Approx. Proportion	30%	30%	
Position, Slope, and Elevation	Occurs on mountain sideslopes, ridges, flats and gently sloping hills; 15 to 35 percent slopes, 5,200 to 7,000 feet.	Occurs on alluvial fans and the flatter volcanic slopes; 15 to 35 percent slopes, 5,200 to 6,500 feet.	Occurs on mountain sideslopes; escarpments and gently sloping hillsides; 15 to 35 percent slopes; 5,200 to 7,000 feet.
Typical Vegetation & Precipitation	Jeffrey pine, white fir, incense cedar, western juniper, mountain mahogany, big sage, greenleaf mountain mahogany; 16 to 35 inches ppt..	Lodgepole pine, white fir, ponderosa pine, Jeffrey pine, big sage, rabbit brush, squaw carpet and bunchgrass; 20 to 45 inches ppt.	Jeffrey and ponderosa pine, sugar pine, white fir, red fir, incense cedar, juniper, mountain mahogany, chinguapin, greenleaf manzanita; pinemat manzanita; desert mountain mahogany and big sage; 18 to 40 inches ppt.

Soil Profile Description

Surface Layer	0 to 22 inches; yellowish brown to brown loam; granular to subangular blocky structure; soft fragments; pH 6.3 to 6.5.	0 to 12 inches; brown gravelly sandy loam; subangular blocky structure; soft; 15 percent rock fragments; pH 6.3 to 6.6.	0 to 9 inches; brown gravelly or cobbly fine sandy loam; granular structure; soft; 20 percent rock fragments; pH 6.5.
Subsoil	22 to 46 inches; brown gravelly sandy clay loam to gravelly clay loam; subangular blocky structure; slightly hard; 15 to 25 percent rock fragments; pH 6.5.	12 to 40 inches; brown sandy loam; subangular blocky structure; soft; 5 to 10 percent rock fragments; pH 6.6 to 6.7.	9 to 29 inches; yellowish brown cobbly fine sandy loam; granular structure; soft; 20 percent rock fragments; pH 6.5.
Substrata	46 to 60 inches; slightly weathered basalt rock.	40 to 60 inches; brown gravelly sandy loam; massive; hard; 20 percent rock fragments; pH 6.9.	29 to 38 inches; fractured platy basalt with soil and roots in cracks.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	46 inches; basalt.	40 inches; alluvium	29 inches; basalt
Erosion Factor (K)	.28	.15	.24
Max. Erosion Hazard	Moderate	Low to moderate	Moderate
Soil Permeability	Moderate	Moderately rapid	Moderate
Soil Manageability Class	2e	2p	2px
Group	II	II	II
Range Site	N/A	N/A	N/A
Water Runoff Potential	Slow	Very slow	Slow
Hydrologic Soil Group	B	A	B
Available Water Capacity (AWC) Total (Top 20")	6.4 (2.7)	6.3 (2.1)	2.3 (1.7)
Forest Site Class	5 (IV)	4 (II)	5 (IV)
Timber Regeneration Potential			
Plantability	High	High	Moderate
Seedling Survival	Moderate	Low	Low

106 Trojan-Klimerque-Patio families association (continued)

Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO

0-22; loam Unified: ML ASSHTO: A-4, A-6	0-40; sandy loam Unified: SM ASSHTO: A-2-4, A-4	0-9; gravelly fine sandy loam Unified: GM-GC, SM-SC ASSHTO: A-1, A-4
22-34; gravelly sandy clay loam Unified: GM-CG, SC ASSHTO: A-2, A-2-6	40-60; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	9-29; very cobbly loam Unified: ML-CL ASSHTO: A-4
34-46; gravelly clay loam Unified: GSM-GC, CL ASSHTO: A-2, A-6, A-7		29; fractured platy basalt
46; weathered basalt rock		
Included Areas	15% Sheld family, moderately deep and Inville family	

107 Trojan-Klicker families association, 35 to 50 percent slopes

Map Unit Components	Trojan	Klicker
Approx. Proportion	60%	30%
Position, Slope, and Elevation	Occurs on mountain sideslopes, ridges, and steeply sloping hills; 35 to 50 percent slopes, 5,200 to 7,000 feet.	Occurs on mountain sideslopes and flats; 35 to 50 percent slopes; 5,200 to 7,300 feet.
Typical Vegetation & Precipitation	Jeffrey pine, white fir, incense cedar, western juniper, mountain mahogany, big sage, greenleaf manzanita, pinemat manzanita and desert mountain mahogany; 16 to 25 inches ppt.	Jeffrey pine, white fir, incense cedar, western juniper, mountain mahogany, big sage, greenleaf manzanita, pinemat manzanita and desert mountain mahogany; 18 to 25 inches ppt.

Soil Profile Description

Surface Layer	0 to 22 inches; yellowish brown to brown loam; granular to subangular blocky structure; soft to slightly hard; 2 to 10 percent rock fragments; pH 6.3 to 6.5.	0 to 11 inches, dark brown cobbly loam, granular structure; slightly hard; 18 percent rock fragments; pH 7.0 to 6.8.
Subsoil	22 to 46 inches; brown gravelly sandy clay loam to gravelly clay loam; subangular blocky structure; slightly hard; 15 to 25 percent rock fragments; pH 6.5.	11 to 48 inches; brown to yellowish brown very cobbly to extremely cobbly loam; subangular blocky structure; slightly hard; 45 to 80 percent rock fragments; pH 6.5.
Substrata	46 to 60 inches; slightly weathered basalt rock.	48 inches; weathered basalt rock.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	46 inches;; basalt.	48 inches; weathered basalt rock.
Erosion Factor (K)	.28	.28
Max. Erosion Hazard	Moderate to high	Moderate to high
Soil Permeability	Moderate	Moderate
Soil Manageability Class	3e	3gp
Soil Manageability Group	III	III
Range Site	N/A	N/A
Water Runoff Potential	Moderate	Moderate
Hydrologic Soil Group	B	B
Available Water Capacity (AWC) Total (Top 20")	6.4 (2.7)	4.3 (2.0)
Forest Site Class	5 (IV)	5 (III-IV)
Timber Regeneration Potential		
Plantability	High	Moderate
Seedling Survival	Moderate	Low
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-22; loam Unified: ML ASSHTO: A-4, A-6	0-11; cobbly loam Unified: GM-GC, ML ASSHTO: A-1, A-4
	22-34; gravelly sandy clay loam Unified: GM-GC, SC ASSHTO: A-2, A-2-6	11-28; very cobbly loam Unified: GM-GC, ML-CL ASSHTO: A-1, A-6
	34-46; gravelly clay loam Unified: GM-GC, CL ASSHTO: A-2, A-6, A-7	28-48; extremely gravelly loam Unified: GM-GC, ML ASSHTO: A-1, A-7
	46; weathered basalt rock	48; weathered basalt rock
Included Areas	10% Klicker family, cobbly and Lithic Ultic Argixerolls	

108 Trojan-Klicker families, rhyolitic association, 0 to 35 percent slopes

Map Unit Components	Trojan, rhyolitic	Klicker, rhyolitic
Approx. Proportion	40%	35%
Position, Slope, and Elevation	Occurs on mountain sideslopes, ridges, flats and gently sloping hills; 0 to 35 percent slopes; 5,200 to 7,000 feet.	Occurs on mountain sideslopes and rolling hills; 5 to 35 percent slopes; 6,000 to 7,000 feet.
Typical Vegetation & Precipitation	Jeffrey pine, greenleaf manzanita, pinemat manzanita and desert mountain mahogany; 20 to 25 inches ppt.	Jeffrey pine, incense cedar, greenleaf manzanita, pinemat manzanita and desert mountain mahogany; 18 to 25 inches ppt.
Soil Profile Description		
Surface Layer	0 to 27 inches; grayish brown to brown coarse sandy loam; granular to subangular blocky structure; soft; pH 6.3 to 6.5.	0 to 17 inches; brown cobbly sandy loam; granular structure; soft; 25 percent rock fragments; pH 7.0 to 6.5.
Subsoil	27 to 45 inches; brown to yellowish brown gravelly sandy clay loam; subangular blocky structure; pH 6.5.	17 to 41 inches; pinkish gray very cobbly sandy clay loam; subangular blocky structure; 35 to 45 percent rock fragments; pH 6.5.
Substrata	45 inches; slightly weathered rhyolite.	41 inches; weathered rhyolite.
Soil Properties & Management Interpretations		
Rooting Depth (in.), Underlying Material	45 inches; rhyolite	41 inches; rhyolite
Erosion Factor (K)	.28	.28
Max. Erosion Hazard	Moderate to high	Moderate to high
Soil Permeability	Moderate	Moderate
Soil Manageability Class	2ep	2ep
Group	II	II
Range Site	N/A	N/A
Water Runoff Potential	Slow	Slow
Hydrologic Soil Group	B	B
Available Water Capacity (AWC) Total (Top 20")	4.7 (1.5)	4.0 (1.6)
Forest Site Class	6 (V)	6 (V)
Timber Regeneration Potential		
Plantability	High	Moderate
Seedling Survival	Very low to low	Very low to low
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-27; coarse sandy loam Unified: SM ASSHTO: A-2-4, A-4	0-17; cobbly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	27-45; gravelly sandy clay loam Unified: GM-GC, SC ASSHTO: A-2, A-2-6	17-41; cobbly sandy clay loam Unified: GM-GC, SC ASSHTO: A-1, A-2-6
	45; weathered rhyolite	41; weathered rhyolite
Included Areas	25% Wintoner family; Lithic Xerochrepts and Rock Outcrop	

109 Trojan-Klicker-Wintoner families association, 0 to 35 percent slopes

Map Unit Components	Trojan	Klicker	Wintoner
Approx. Proportion	40%	30%	20%
Position, Slope, and Elevation	Occurs on mountain sideslopes, ridges, flats, and gently sloping hills; 0 to 35 percent slopes, 5,200 to 7,000 feet.	Occurs on mountain slopes and flats; 5 to 35 percent slopes; 5,200 to 7,300 feet.	Occurs on gently to steeply sloping mountain sideslopes, ridges and canyons; 5 to 35 percent slopes; 5,200 to 7,000 feet.
Typical Vegetation & Precipitation	Jeffrey pine, white fir, incense cedar, western juniper, mountain mahogany, big sage, greenleaf manzanita, pinemat manzanita and desert mountain mahogany; 16 to 25 inches ppt.	Jeffrey pine, white fir, incense cedar, western juniper, mountain mahogany, big sage, greenleaf manzanita, pinemat manzanita and desert mountain mahogany; 18 to 25 inches ppt.	Red and white fir, sugar pine, ponderosa pine, Jeffrey pine, incense cedar and chinquapin; 20 to 25 inches ppt.

Soil Profile Description

Surface Layer	0 to 22 inches; yellowish brown to brown loam; granular to subangular blocky structure; soft to slightly hard; 2 to 10 percent rock fragments; pH 6.3 to 6.5.	0 to 11 inches, dark brown cobbly loam; granular structure; slightly hard; 18 percent rock fragments; pH 7.0 to 6.8.	0 to 22 inches; yellowish brown to brown gravelly sandy loam to loam; granular structure; soft; 10 to 15 percent rock fragments; pH 7.0 to 6.2.
Subsoil	22 to 46 inches; brown gravelly sandy clay loam to gravelly clay loam; subangular blocky structure; slightly hard; 15 to 25 percent rock fragments; pH 6.5.	11 to 48 inches; brown to yellowish red very cobbly to extremely cobbly loam; subangular blocky structure; slightly hard; 45 to 80 percent rock fragments; pH 6.5.	22 to 43 inches; brown to yellowish brown loam to clay loam; subangular blocky to massive structure; slightly hard; 5 to 12 percent rock fragments; pH 6.0 to 5.5.
Substrata	46 to 60 inches; slightly weathered basalt rock.	48 inches; weathered basalt rock.	43 to 50 inches; strongly weathered andesite bedrock.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	46 inches; basalt.	48 inches; weathered basalt rock.	43 inches; andesite.
Erosion Factor (K)	.28	.28	.20
Max. Erosion Hazard	Moderate	Moderate	Low to moderate
Soil Permeability	Moderate	Moderate	Moderate
Soil Manageability Class	2e	2px	1
Soil Manageability Group	II	II	II
Range Site	N/A	N/A	N/A
Water Runoff Potential	Slow	Slow	Slow
Hydrologic Soil Group	B	B	B
Available Water Capacity (AWC) Total (Top 20")	6.4 (2.7)	4.3 (2.0)	5.6 (2.4)
Forest Site Class	5 (IV)	5 (III-IV)	4 (II)
Timber Regeneration Potential			
Plantability	High	Moderate	High
Seedling Survival	Moderate	Low	Moderate

109 Trojan-Klicker-Wintoner families association (continued)

Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO

0-22; loam Unified: ML ASSHTO: A-4, A-6	0-11; cobbly loam Unified: GM-GC, ML ASSHTO: A-1, A-4	0-5; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
22-34; gravelly sandy clay loam Unified: GM-GC, SC ASSHTO: A-2, A-2-6	11-28; very cobbly loam Unified: GM-GC, ML-CL ASSHTO: A-1, A-6	5-34; loam Unified: ML ASSHTO: A-7
34-46; gravelly clay loam Unified: GM-GC, CL ASSHTO: A-2, A-6, A-7	28-48; extremely gravelly loam Unified: GM-GC, ML ASSHTO: A-1, A-7	34-43; clay loam Unified: CL ASSHTO: A-6, A-7
46; weathered basalt rock	48; weathered basalt rock	43; weathered andesite

Included Areas

10% Klicker family, moderately deep

110 Trojan family-Lithic Haploxerolls-Rouen family association, 0 to 15 percent slopes

Map Unit Components	Trojan	Lithic Haploxerolls	Rouen
Approx. Proportion	35%	30%	20%
Position, Slope, and Elevation	Occurs on mountain sideslopes, ridges, flats, and gently sloping hills; 0 to 15 percent slopes, 5,100 to 7,000 feet.	Occurs on relatively flat basalt flows; 0 to 15 percent slopes; 5,000 to 5,500 feet.	Occurs on alluvial fans and terraces around Eagle Lake; 0 to 15 percent slopes; 5,000 to 5,300 feet.
Typical Vegetation & Precipitation	Jeffrey pine, white fir, incense cedar, western juniper, mountain mahogany, big sage, greenleaf manzanita, pinemat manzanita and desert mountain mahogany; 16 to 30 inches ppt.	Sparse Jeffrey and ponderosa pine, juniper, digger pine, white oak, black oak, greenleaf manzanita, big sage, mountain mahogany, western redbud, yerba santa and chokecherry; 16 to 30 inches ppt.	Rabbit brush, annual and perennial grasses and a few Jeffrey pine; 16 to 30 inches ppt.

Soil Profile Description

	Trojan	Lithic Haploxerolls	Rouen
Surface Layer	0 to 22 inches; yellowish brown to brown loam; granular to subangular blocky structure; soft to slightly hard; 2 to 10 percent rock fragments; pH 6.3 to 6.5.	0 to 9 inches; brown gravelly fine sandy loam to very gravelly sandy loam; granular structure; soft; 30 to 40 percent rock fragments; pH 6.8.	0 to 8 inches; pale brown to light gray sandy loam to silty clay; single grain to subangular blocky structure; slightly hard to hard; pH 7.0 to 7.5.
Subsoil	22 to 46 inches; brown gravelly sandy clay loam to gravelly clay loam; subangular blocky structure; slightly hard; 15 to 25 percent rock fragments; pH 6.5.	9 to 17 inches; yellowish brown cobbly to very cobbly loam; subangular blocky to massive structure; slightly hard; 25 to 45 percent rock fragments; pH 7.2 to 7.5.	8 to 22 inches; brownish gray silty clay; prismatic structure; very hard; pH 8.0.
Substrata	46 to 60 inches; slightly weathered basalt rock.	17 inches; hard basalt rock.	22 to 60 inches; brownish gray silty clay, massive; very hard; pH 8.0; underlain by consolidated lake sediments.

Soil Properties & Management Interpretations

	Trojan	Lithic Haploxerolls	Rouen
Rooting Depth (in.), Underlying Material	46 inches; basalt.	17 inches; basalt.	22 inches, lake sediments
Erosion Factor (K)	.28	.28	.43
Max. Erosion Hazard	Moderate	Moderate	High
Soil Permeability	Moderate	Moderate	Slow
Soil Manageability Class	2e	3Xp	3X
Soil Manageability Group	III	III	III
Range Site	N/A	1	2
Water Runoff Potential	Slow	Moderate	Moderate to rapid
Hydrologic Soil Group	B	D	D
Available Water Capacity (AWC) Total (Top 20")	6.4 (2.7)	1.3 (1.3)	3.1 (2.8)
Forest Site Class	5 (IV)	7 (Noncommercial)	7 (Noncommercial)
Timber Regeneration Potential			
Plantability	High	N/A	N/A
Seedling Survival	Moderate	N/A	N/A

110 Trojan family-Lithic Haploxerolls-Rouen family association (continued)

Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-22; loam	0-4; fine sandy loam	0-3; sandy loam
	Unified: ML	Unified: SM	Unified: SM
	ASSHTO: A-4, A-6	ASSHTO: A-4	ASSHTO: A-2-4, A-4
	22-34; gravelly sandy clay loam	4-9; very gravelly sandy loam	3-60; silty clay
Unified: GM-GC, SC	Unified: GM-GC, SM	Unified: MH	
ASSHTO: A-2, A-2-6	ASSHTO: A-1, A-2-4, A-4	ASSHTO: A-7	
34-46; gravelly clay loam	9-17; very cobbly loam		
Unified: GM-GC, CL	Unified: GM-GC, ML		
ASSHTO: A-2, A-6, A-7	ASSHTO: A-1, A-7		
46; weathered basalt rock	17; hard basalt		
Included Areas	15% Rock Outcrop		

111 Typic Xerorthents, 15 to 50 percent slopes

Map Unit Components
 Approx. Proportion
 Position, Slope, and
 Elevation
 Typical Vegetation &
 Precipitation

Typic Xerorthents

80%
 Occurs on cinder cones; 15 to 50 percent slopes; 3,500 to 7,500 feet.
 Red and white fir; Jeffrey pine, ponderosa pine, mountain hemlock, chinquapin, pinemat manzanita, bitterbrush and currant; 30 to 55 inches.

Soil Profile Description

Surface Layer 0 to 12 inches; brown gravelly sandy loam to gravelly coarse sandy loam; granular structure; soft; 20 to 30 percent rock fragments; pH 6.5 to 7.0.
 Subsoil 12 to 41 inches; light brown to brownish yellow very gravelly loamy coarse sand; granular to subangular blocky structure; soft; 40 percent rock fragments; pH 7.0.
 Substrata 41 to 60 inches; basaltic cinders, predominantly 1 to 10 mm in size.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material 41 inches; cinders
 Erosion Factor (K) .17
 Max. Erosion Hazard Low to moderate
 Soil Permeability Moderately rapid to rapid
 Soil Manageability
 Class 3gp
 Group III
 Range Site N/A
 Water Runoff Potential Very slow
 Hydrologic Soil Group A
 Available Water Capacity (AWC)
 Total (Top 20") 2.9 (1.5)
 Forest Site Class 4 (II)
 Timber Regeneration Potential
 Plantability High
 Seedling Survival Very low
 Estimated Engineering Properties;
 USDA Texture, Unified, and ASSHTO
 0-12; gravelly sandy loam
 Unified: GM-GC, SM
 ASSHTO: A-1, A-2-4, A-4
 12-41; very gravelly loamy coarse sand
 Unified: GM-GC, SM
 ASSHTO: A-1, A-2-4
 41 basaltic cinders
 Unified: GW
 ASSHTO: A-1
 Included Areas 20% Washougal family and Sheld family

112 Typic Xerorthents-Yallani family association, 0 to 35 percent slopes

Map Unit Components	Typic Xerorthents	Yallani
Approx. Proportion	50%	35%
Position, Slope, and Elevation	Occurs on cinder cones; 0 to 35 percent slopes; 5,200 to 7,500 feet.	Occurs on mountain sideslopes, ridges and canyons; 0 to 35 percent slopes; 5,200 to 8,000 feet.
Typical Vegetation & Precipitation	Red and white fir; Jeffrey pine, ponderosa pine, mountain hemlock, chinquapin, pinemat manzanita, bitterbrush and currant; 30 to 55 inches.	Red and white fir, Jeffrey pine, ponderosa pine, sugar pine, lodgepole pine, mountain hemlock, incense cedar, greenleaf manzanita, pinemat manzanita, chinquapin and squaw carpet; 30 to 55 inches ppt.
Soil Profile Description		
Surface Layer	0 to 12 inches; brown gravelly sandy loam to gravelly coarse sandy loam; granular structure; soft; 20 to 30 percent rock fragments; pH 6.5 to 7.0.	0 to 8 inches; brown gravelly fine sandy loam; granular structure; soft; 22 percent rock fragments; pH 6.3.
Subsoil	12 to 41 inches; light brown to brownish yellow very gravelly loamy coarse sand; granular to subangular blocky structure; soft; 40 percent rock fragments; pH 7.0.	8 to 39 inches; brown to yellowish brown gravelly to very gravelly fine sandy loam; blocky and massive structure; slightly hard; 30 to 42 percent rock fragments; pH 6.0
Substrata	41 to 60 inches; basaltic cinders, predominantly 1 to 10 mm in size.	39 to 60 inches; yellowish brown very gravelly sandy loam; massive; 32 percent rock fragments; pH 6.0.
Soil Properties & Management Interpretations		
Rooting Depth (in.), Underlying Material	41 inches; cinders	60 inches; basalt
Erosion Factor (K)	.17	.24
Max. Erosion Hazard	Low to moderate	Low to moderate
Soil Permeability	Moderately rapid to rapid	Moderately rapid
Soil Manageability Class	3gp	2p
Group	III	III
Range Site	N/A	N/A
Water Runoff Potential	Very slow	Slow
Hydrologic Soil Group	A	B
Available Water Capacity (AWC) Total (Top 20")	2.9 (1.5)	5.9 (2.1)
Forest Site Class	4 (II)	3 (I)
Timber Regeneration Plantability	High	High
Seedling Survival	Very low	Low to moderate
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-12; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	0-24; gravelly fine sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-4
	12-41; very gravelly loamy coarse sand Unified: GM-GC, SM ASSHTO: A-1, A-2-4	24-39; very gravelly fine sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-4
	41 basaltic cinders Unified: GW ASSHTO: A-1	39-60; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
Included Areas	15% Portola family and Lava Flow	

113 Typic Xerorthents-Yallani family association, 35 to 50 percent slopes

Map Unit Components	Typic Xerorthents	Yallani
Approx. Proportion	60%	25%
Position, Slope, and Elevation	Occurs on cinder cones; 35 to 50 percent slopes; 5,200 to 7,500 feet.	Occurs on mountain sideslopes, ridges and canyons; 35 to 50 percent slopes; 5,200 to 8,000 feet.
Typical Vegetation & Precipitation	Red and white fir; Jeffrey pine, ponderosa pine, mountain hemlock, chinquapin, pinemat manzanita, bitterbrush and currant; 30 to 55 inches.	Red and white fir, Jeffrey pine, ponderosa pine, sugar pine, lodgepole pine, mountain hemlock, incense cedar, greenleaf manzanita, pinemat manzanita, chinquapin and squaw carpet; 30 to 55 inches ppt.

Soil Profile Description

Surface Layer	0 to 12 inches; brown gravelly sandy loam to gravelly coarse sandy loam; granular structure; soft; 20 to 30 percent rock fragments; pH 6.5 to 7.0.	0 to 8 inches; brown gravelly fine sandy loam; granular structure; soft; 22 percent rock fragments; pH 6.3.
Subsoil	12 to 41 inches; light brown to brownish yellow very gravelly loamy coarse sand; granular to subangular blocky structure; soft; 40 percent rock fragments; pH 7.0.	8 to 39 inches; brown to yellowish brown gravelly to very gravelly fine sandy loam; blocky and massive structure; slightly hard; 30 to 42 percent rock fragments; pH 6.0.
Substrata	41 to 60 inches; basaltic cinders, predominantly 1 to 10 mm in size.	39 to 60 inches; yellowish brown very gravelly sandy loam; massive; 35 percent rock fragments; pH 6.0.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	41 inches; cinders	60 inches; basalt
Erosion Factor (K)	.17	.24
Max. Erosion Hazard	Low to moderate	Moderate
Soil Permeability	Moderately rapid to rapid	Moderately rapid
Soil Manageability Class	3gp	3gp
Group	III	III
Range Site	N/A	N/A
Water Runoff Potential	Very slow	Moderate
Hydrologic Soil Group	A	B
Available Water Capacity (AWC) Total (Top 20")	2.9 (1.5)	5.9 (2.1)
Forest Site Class	4 (II)	3 (I)
Timber Regeneration Plantability	High	Moderate
Seedling Survival	Very low	Low to moderate
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-12; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	0-24; gravelly fine sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-4
	12-41; very gravelly loamy coarse sand Unified: GM-GC, SM ASSHTO: A-1, A-2-4	24-39; very gravelly fine sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-4
	41 basaltic cinders Unified: GW ASSHTO: A-1	39-60; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
Included Areas	15% Portola Family and Lava Flow	

114 Typic Xerorthents-Zynbar families association, 0 to 35 percent slopes

Map Unit Components	Typic Xerorthents	Zynbar
Approx. Proportion	50%	40%
Position, Slope, and Elevation	Occurs on cinder cones; 10 to 35 percent slopes; 5,200 to 7,500 feet.	Occur on flats and mountain sideslopes; 0 to 35 percent slopes; 5,200 to 6,500 feet.
Typical Vegetation & Precipitation	Red and white fir; Jeffrey pine, ponderosa pine, mountain hemlock, chinquapin, pinemat manzanita, bitterbrush and currant; 30-55 inches.	White and red fir, ponderosa pine and incense cedar; 30 to 55 inches ppt.
Soil Profile Description		
Surface Layer	0 to 12 inches; brown gravelly sandy loam to gravelly coarse sandy loam; granular structure; soft; 20 to 30 percent rock fragments; pH 6.5 to 7.0.	0 to 21 inches; gray to pale red coarse sandy loam, loamy coarse sand or gravelly sandy loam; granular or subangular blocky structure; soft; 5 to 15 percent rock fragments; pH 5.2 to 6.3.
Subsoil	12 to 41 inches; light brown to brownish yellow very gravelly loamy coarse sand; granular to subangular blocky structure; soft; 40 percent rock fragments; pH 7.0.	21 to 60 inches; yellowish brown gravelly to extremely gravelly coarse sand or sandy loam; single grain or granular structure; soft; 30 to 70 percent rock fragments; pH 6.3 to 6.7.
Substrata	41 to 60 inches; basaltic cinders, predominantly 1 to 10 mm in size.	N/A
Soil Properties & Management Interpretations		
Rooting Depth (in.)	41 inches; cinders	60 inches.
Erosion Factor (K)	.17	.24
Max. Erosion Hazard	Low to moderate	Moderate to high
Soil Permeability	Moderately rapid to rapid	Moderately rapid
Soil Manageability Class	3gp	2e
Soil Manageability Group	III	III
Range Site	N/A	N/A
Water Runoff Potential	Very slow	Very slow
Hydrologic Soil Group	A	A
Available Water Capacity (AWC) Total (Top 20")	2.9 (1.5)	5.6 (2.5)
Forest Site Class	4 (II)	5 (III)
Timber Regeneration Plantability	High	High
Timber Regeneration Seedling Survival	Very low	Moderate

114 Typic Xerorthents-Zynbar families association (continued)

Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO

0-12; gravelly sandy loam
 Unified: GM-GC, SM
 ASSHTO: A-1, A-2-4, A-4

0-3; coarse sandy loam
 Unified: SM
 ASSHTO: A-2-4

12-41; very gravelly loamy coarse sand
 Unified: GM-GC, SM
 ASSHTO: A-1, A-2-4

3-8; loam coarse sand
 Unified: SM
 ASSHTO: A-2-4

41 basaltic cinders
 Unified: GW
 ASSHTO: A-1

8-21; sandy loam
 Unified: SM
 ASSHTO: A-2-4, A-4

21-27; very gravelly coarse sand
 Unified: GP-GW, SP-SM
 ASSHTO: A-1

27-60; gravelly coarse sandy loam
 Unified: GP-GW, SM
 ASSHTO: A-1, A-2-4

Included Areas

10% Yallani family and Sheld family

115 Typic Xerorthents-Zynbar family association, 35 to 50 percent slopes

Map Unit Components	Typic Xerorthents	Zynbar
Approx. Proportion	55%	30%
Position, Slope, and Elevation	Occurs on cinder cones; 35 to 50 percent slopes; 5,200 to 7,500 feet.	Occurs on flats and mountain sideslopes; 35 to 50 percent slopes; 5,200 to 6,500 feet.
Typical Vegetation & Precipitation	Red and white fir; Jeffrey pine, ponderosa pine, mountain hemlock, chinquapin, pinemat manzanita, bitterbrush and currant; 30 to 55 inches.	White and red fir, ponderosa pine and incense cedar; 30 to 55 inches ppt.

Soil Profile Description

Surface Layer	0 to 12 inches; brown gravelly sandy loam to gravelly coarse sandy loam; granular structure; soft; 20 to 30 percent rock fragments; pH 6.5 to 7.0.	0 to 21 inches; gray to pale red coarse sandy loam, loamy coarse sand or gravelly sandy loam; granular or subangular blocky structure; soft; 5 to 15 percent rock fragments; pH 5.2 to 6.3.
Subsoil	12 to 41 inches; light brown to brownish yellow very gravelly loamy coarse sand; granular to subangular blocky structure; soft; 40 percent rock fragments; pH 7.0.	21 to 60 inches; yellowish brown gravelly to extremely gravelly coarse sand or sandy loam; single grain or granular structure; soft; 30 to 70 percent rock fragments; pH 6.3 to 6.7.
Substrata	41 to 60 inches; basaltic cinders, predominantly 1 to 10 mm in size.	N/A

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	41 inches; cinders	60 inches.
Erosion Factor (K)	.17	.24
Max. Erosion Hazard	Low to moderate	Moderate to high
Soil Permeability	Moderately rapid to rapid	Moderately rapid
Soil Manageability Class	3gp	3e
Group	III	III
Range Site	N/A	N/A
Water Runoff Potential	Very slow	Very slow
Hydrologic Soil Group	A	A
Available Water Capacity (AWC) Total (Top 20")	2.9 (1.5)	5.6 (2.5)
Forest Site Class	4 (II)	5 (III)
Timber Regeneration Potential		
Plantability	High	High
Seedling Survival	Very low	Moderate

115 Typic Xerorthents-Zynbar family association (continued)

Estimated Engineering
Properties;
USDA Texture,
Unified, and ASSHTO

0-12; gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

0-3; coarse sandy loam
Unified: SM
ASSHTO: A-2-4

12-41; very gravelly loamy coarse sand
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4

3-8; loam coarse sand
Unified: SM
ASSHTO: A-2-4

41 basaltic cinders
Unified: GW
ASSHTO: A-1

8-21; sandy loam
Unified: SM
ASSHTO: A-2-4, A-4

21-27; very gravelly coarse sand
Unified: GP-GW, SP-SM
ASSHTO: A-1

27-60; gravelly coarse sandy loam
Unified: GP-GW, SM
ASSHTO: A-1, A-2-4

Included Areas

15% Yallani family and Sheld family

116 Washougal family, 0 to 35 percent slopes

Map Unit Components	Washougal
Approx. Proportion	80%
Position, Slope, and Elevation	Occurs on upland flats, mountain slopes and undulating hills; 0 to 35 percent slopes; 3,500 to 5,200 feet.
Typical Vegetation & Precipitation	Jeffrey pine, incense cedar, ponderosa pine, white fir, lodgepole pine, greenleaf manzanita and desert mountain mahogany; 35 to 80 inches ppt.
Soil Profile Description	
Surface Layer	0 to 10 inches; grayish brown gravelly sandy loam; granular structure; soft; 15 to 20 percent rock fragments; pH 6.0 to 6.3.
Subsoil	10 to 42 inches; brown very cobbly sandy loam; granular structure; soft; 40 to 50 percent rock fragments; pH 6.5.
Substrata	42 inches; indurated glacial till.
Soil Properties & Management Interpretations	
Rooting Depth (in.), Underlying Material	42 inches; indurated glacial till
Erosion Factor (K)	.20
Max. Erosion Hazard	Moderate
Soil Permeability	Moderately rapid
Soil Manageability Class	2p
Group	II
Range Site	N/A
Water Runoff Potential	Slow
Hydrologic Soil Group	B
Available Water Capacity (AWC) Total (Top 20")	3.6 (1.7)
Forest Site Class	5 (III)
Timber Regeneration Potential	
Plantability	High
Seedling Survival	Very low to
Estimated Engineering Properties;	0-10; gravelly sandy loam
USDA Texture, Unified, and ASSHTO	Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	10-42; very cobbly sandy loam
	Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	42; indurated glacial till
Included Areas	20% Washougal family, moderately deep and Aquolls

117 Washougal family, glacial, 0 to 35 percent slopes

Map Unit Components	Washougal, glacial
Approx. Proportion	80%
Position, Slope, and Elevation	Occurs on mountain sideslopes and outwash terraces; 0 to 35 percent slopes; 3,500 to 5,200 feet.
Typical Vegetation & Precipitation	Jeffrey pine, lodgepole pine, white fir, greenleaf manzanita, rabbit brush and annual and perennial grasses; 35 to 80 inches ppt.

Soil Profile Description

Surface Layer	0 to 13 inches; brown gravelly sandy loam; granular structure; soft; 20 to 25 percent rock fragments; pH 5.8.
Subsoil	13 to 39 inches; brown to grayish brown very cobbly to extremely cobbly sandy loam; soft; 45 to 60 percent rock fragments; pH 6.0.
Substrata	39 inches; glacial till

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	39 inches; glacial till
Erosion Factor (K)	.20
Max. Erosion Hazard	Moderate
Soil Permeability	Moderately rapid
Soil Manageability Class	3Xp
Group	III
Range Site	N/A
Water Runoff Potential	Slow
Hydrologic Soil Group	B
Available Water Capacity (AWC) Total (Top 20")	2.4 (1.5)
Forest Site Class	5 (IV)
Timber Regeneration Potential	
Plantability	Moderate
Seedling Survival	Very low to low
Estimated Engineering Properties;	0-13; gravelly sandy loam
USDA Texture, Unified, and ASSHTO	Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	13-39; cobbly sandy loam
	Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	26; glacial till
Included Areas	20% Typic Xerorthents; Andic Fragiumbrepts and Aquolls

118 Washougal-Neer-Sadie families complex, 35 to 70 percent slopes

Map Unit Components	Washougal	Neer	Sadie
Approx. Proportion	40%	25%	25%
Position, Slope, and Elevation	Occurs on mountain slopes and undulating hills; 35 to 70 percent slopes; 3,500 to 5,200 feet.	Occurs on mountain sideslopes and escarpments of lava flows; 35 to 70 percent slopes; 3,200 to 5,200	Occurs on mountain sideslopes and volcanic flows; 35 to 70 percent slopes; 3,000 to 5,200 feet.
Typical Vegetation & Precipitation	Jeffrey pine, incense cedar, ponderosa pine, white fir, lodgepole pine, greenleaf manzanita and desert mountain mahogany; 30 to 60 inches ppt.	Ponderosa pine, sugar pine, white fir, incense cedar, black oak, huckleberry oak, serviceberry, pinemat manzanita and chokecherry; 30 to 60 inches ppt.	Ponderosa pine, sugar pine, incense cedar, white fir, jeffrey pine, douglas fir, black oak, desert mountain mahogany, rabbit brush, greenleaf manzanita and big sage; 30 to 60 inches ppt.

Soil Profile Description

Surface Layer	0 to 10 inches; grayish brown gravelly sandy loam; granular structure; soft; 15 to 20 percent rock fragments; pH 6.0 to 6.3.	0 to 7 inches; brown gravelly sandy loam; granular structure; soft; 20 to 30 percent rock fragments; pH 6.8 to 7.0.	0 to 10 inches; dark yellowish brown fine sandy loam; granular to subangular blocky structure; soft; pH 6.5 to 7.3.
Subsoil	10 to 42 inches; brown very cobbly sandy loam; granular structure; soft; 40 to 50 percent rock fragments; pH 6.5.	7 to 30 inches; brown very gravelly sandy loam; granular structure; soft; 40 percent rock fragments; pH 7.5.	10 to 51 inches; dark yellowish brown fine sandy loam; subangular blocky structure; soft; pH 7.0.
Substrata	42 inches; indurated glacial till.	30 to 60 inches; yellowish brown very cobbly to extremely cobbly fine sandy loam to loam; subangular blocky structure; soft; 55 to 80 percent rock fragments; pH 7.5.	51 to 58 inches; dark yellowish brown cobbly fine sandy loam; subangular blocky structure; soft; 27 percent rock fragments; pH 7.3; underlain by weathered vesicular basalt.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	42 inches; indurated glacial till	60 inches	58 inches; basalt
Erosion Factor (K)	.20	.20	.20
Max. Erosion Hazard	Moderate	Moderate	Moderate to high
Soil Permeability	Moderately rapid	Moderately rapid	Moderately rapid
Soil Manageability Class	3gp	3px	3g
Group	III	III	III
Range Site	N/A	N/A	N/A
Water Runoff Potential	Moderate	Slow	Slow
Hydrologic Soil Group	B	A	A
Available Water Capacity (AWC) Total (Top 20")	3.6 (1.7)	4.2 (1.8)	7.6 (2.8)
Forest Site Class	5 (III)	4 (II)	4 (II)
Timber Regeneration Potential			
Plantability	Moderate	Moderate	High
Seedling Survival	Very low to low	Very low to low	Moderate

118 Washougal-Neer-Sadie families complex (continued)

Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO

0-10; gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

0-7; gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

0-51; fine sandy loam
Unified: SM-SC
ASSHTO: A-4

10-42; very cobbly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

7-30; very gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

51-58; cobbly fine sandy loam
Unified: SM-SC
ASSHTO: A-4

42; indurated glacial till

30-49; very gravelly fine sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-4

58; weathered basalt

49-60; extremely cobbly loam
Unified: GM-GC, ML
ASSHTO: A-1, A-7

Included Areas

10% Rock Outcrop and Lithic Xerumbrepts

119 Washougal-Skalan families association, 15 to 35 percent slopes

Map Unit Components	Washougal	Skalan
Approx. Proportion	50%	35%
Position, Slope, and Elevation	Occurs on upland flats, mountain slopes and undulating hills; 15 to 35 percent slopes; 3,500 to 5,200 feet.	Occurs on mountain sideslopes; gently sloping hills and undulating flats; 15 to 35 percent slopes, 3,000 to 5,200 feet.
Typical Vegetation & Precipitation	Jeffrey pine, incense cedar, ponderosa pine, white fir, lodgepole pine, greenleaf manzanita and desert mountain mahogany; 35 to 60 inches ppt.	Jeffrey and ponderosa pine, sugar pine, white fir, incense cedar, black oak, huckleberry oak, western serviceberry, pinemat manzanita and chokecherry; 35 to 65 inches ppt.
Soil Profile Description		
Surface Layer	0 to 10 inches; grayish brown gravelly sandy loam; granular structure; soft; 15 to 20 percent rock fragments; pH 6.0 to 6.3.	0 to 14 inches; brown gravelly sandy loam to loam; granular to subangular blocky structure; soft; 15 to 30 percent rock fragments; pH 6.5 to 6.7.
Subsoil	10 to 42 inches; brown very cobbly sandy loam; granular structure; soft; 40 to 50 percent rock fragments; pH 6.5.	14 to 31 inches; brown very gravelly loam to clay loam; subangular blocky structure; slightly hard; 40 to 50 percent rock fragments; pH 6.7.
Substrata	42 inches; indurated glacial till.	31 to 60 inches; yellowish brown very gravelly to extremely gravelly clay loam; subangular blocky structure; hard; 50 to 60 percent rock fragments; pH 6.7; underlain by andesite and basalt.
Soil Properties & Management Interpretations		
Rooting Depth (in.), Underlying Material	42 inches; undurated glacial till	60 inches; weathered basalt
Erosion Factor (K)	.20	.20
Max. Erosion Hazard	Moderate	Low
Soil Permeability	Moderately rapid	Moderate
Soil Manageability		
Class	2p	2p
Group	II	II
Range Site	N/A	N/A
Water Runoff Potential	Slow	Slow
Hydrologic Soil Group	B	B
Available Water Capacity (AWC)		
Total (Top 20")	3.6 (1.7)	5.1 (1.7)
Forest Site Class	5 (III)	4 (II)
Timber Regeneration Potential		
Plantability	High	Moderate
Seedling Survival	Very low to low	Very low to low

119 Washougal-Skalan families association (continued)

Estimated Engineering
Properties;
USDA Texture,
Unified, and ASSHTO

0-10; gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

0-8; gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

10-42; very cobbly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

8-14; gravelly loam
Unified: GM-GC, ML
ASSHTO: A-1, A-7

42; indurated glacial till

14-23; very gravelly loam
Unified: GM-GC, ML
ASSHTO: A-1, A-4

23-60; very gravelly clay loam
Unified: GM-GC, ML-CL
ASSHTO: A-2, A-6

Included Areas

15% Washougal family, moderately deep, stony and Rock Outcrop

120 Washougal-Skalan families association, 35 to 50 percent slopes

Map Unit Components	Washougal	Skalan
Approx. Proportion	45%	35%
Position, Slope, and Elevation	Occurs on mountain slopes and undulating hills; 35 to 50 percent slopes; 3,500 to 5,200 feet.	Occurs on mountain sideslopes and steeply sloping hills; 35 to 50 percent slopes, 3,000 to 5,200 feet.
Typical Vegetation & Precipitation	Jeffrey pine, incense cedar, ponderosa pine, white fir, lodgepole pine, greenleaf manzanita and desert mountain mahogany; 35 to 65 inches ppt.	Jeffrey and ponderosa pine, sugar pine, white fir, incense cedar, black oak, huckleberry oak, western serviceberry, pinemat manzanita and chokecherry; 35 to 65 inches ppt.
Soil Profile Description		
Surface Layer	0 to 10 inches; grayish brown gravelly sandy loam; granular structure; soft; 15 to 20 percent rock fragments; pH 6.0 to 6.3.	0 to 14 inches; brown gravelly sandy loam to loam; granular to subangular blocky structure; soft; 15 to 30 percent rock fragments; pH 6.5 to 6.7.
Subsoil	10 to 42 inches; brown very cobbly sandy loam; granular structure; soft; 40 to 50 percent rock fragments; pH 6.5.	14 to 31 inches; brown very gravelly loam to clay loam; subangular blocky structure; slightly hard; 40 to 50 percent rock fragments; pH 6.7.
Substrata	42 inches; indurated glacial till.	31 to 60 inches; yellowish brown very gravelly to extremely gravelly clay loam; subangular blocky structure; hard; 50 to 60 percent rock fragments; pH 6.7; underlain by andesite and basalt.
Soil Properties & Management Interpretations		
Rooting Depth (in.), Underlying Material	42 inches; undurated glacial till	60 inches; weathered basalt
Erosion Factor (K)	.20	.20
Max. Erosion Hazard	Moderate	Moderate
Soil Permeability	Moderately rapid	Moderate
Soil Manageability Class Group	3gp III	3gp III
Range Site	N/A	N/A
Water Runoff Potential	Moderate	Moderate
Hydrologic Soil Group	B	B
Available Water Capacity (AWC) Total (Top 20")	3.6 (1.7)	5.1 (1.7)
Forest Site Class	5 (III)	4 (II)
Timber Regeneration Potential		
Plantability	Moderate	Moderate
Seedling Survival	Very low to low	Very low to low

120 Washougal-Skalan families association (continued)

Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO

0-10; gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

0-8; gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

10-42; very cobbly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

8-14; gravelly loam
Unified: GM-GC, ML
ASSHTO: A-1, A-7

42; indurated glacial till

14-23; very gravelly loam
Unified: GM-GC, ML
ASSHTO: A-1, A-4

23-60; very gravelly clay loam
Unified: GM-GC, ML-CL
ASSHTO: A-2, A-6

Included Areas

20% Washougal family, moderately deep, stony; Lithic Xerumbrepts and Rock Outcrop

121 Wintoner family-Aquolls-Patio families association, 0 to 15 percent slopes

Map Unit Components	Wintoner	Aquolls	Patio
Approx. Proportion	35%	25%	25%
Position, Slope, and Elevation	Occurs on gently to steeply sloping mountain sideslopes, ridges and canyons; 0 to 15 percent slopes; 5,200 to 7,000 feet.	Meadows and valleys over the total forest; 0 to 15 percent slopes; 5,200 to 8,000 feet.	Occurs on mountain sideslopes; escarpments and gently sloping hillsides; 0 to 15 percent slopes; 5,200 to 7,000 feet.
Typical Vegetation & Precipitation	Red and white fir, sugar pine, ponderosa pine, Jeffrey pine, incense cedar and chinquapin; 20 to 50 inches ppt.	Annual and perennial grasses, lodgepole pine, alder, aspen, willow and thistle, 20 to 50 inches ppt.	Jeffrey and ponderosa pine, sugar pine, white fir, red fir, incense cedar, juniper, mountain mahogany, chinquapin, greenleaf manzanita; pinemat manzanita; desert mountain mahogany and big sage; 18 to 50 inches ppt.

Soil Profile Description

Surface Layer	0 to 22 inches; yellowish brown to brown gravelly sandy loam to loam; granular structure; soft; 10 to 15 percent rock fragments; pH 7.0 to 6.2.	0 to 9 inches; grayish brown loam or silt loam; granular and blocky structure, slightly hard; pH 5.8 to 6.0.	0 to 9 inches; brown gravelly or cobbly fine sandy loam; granular structure; soft; 20 percent rock fragments; pH 6.5.
Subsoil	22 to 43 inches; brown to yellowish brown loam to clay loam; subangular blocky to massive structure; slightly hard; 5 to 12 percent rock fragments; pH 6.0 to 5.5.	9 to 16 inches; grayish brown sandy loam or silty clay loam; blocky structure, slightly hard; pH 6.2 to 7.6.	9 to 29 inches; yellowish brown very cobbly loam; subangular blocky structure; soft; pH 6.5.
Substrata	43 to 50 inches; strongly weathered andesite bedrock.	16 to 60 inches; light brownish gray loamy sand to a clay loam; massive; slightly hard; pH 6.2 to 7.6.	29 to 38 inches; fractured platy basalt with soil and roots in cracks.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	43 inches; andesite.	10 to 20 in; gravelly silty clay	29 inches; basalt
Erosion Factor (K)	.20	.17	.24
Max. Erosion Hazard	Low to moderate	Low	Moderate
Soil Permeability	Moderate	Moderately slow	Moderate
Soil Manageability Class	1	3W	2px
Soil Manageability Group	II	II	II
Range Site	N/A	3	N/A
Water Runoff Potential	Slow	Very slow	Slow
Hydrologic Soil Group	B	C	B
Available Water Capacity (AWC) Total (Top 20")	5.6 (2.4)	8.2 (3.0)	2.3 (1.7)
Forest Site Class	4 (II)	N/A	5 (IV)
Timber Regeneration Potential			
Plantability	High	N/A	Moderate
Seedling Survival	Moderate	N/A	Low

121 Wintoner family-Aquolls-Patio families association (continued)

Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-5; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	0-9; silt loam Unified: ML ASSHTO: A-7	0-9; gravelly fine sandy loam Unified: GM-GC, SM-SC ASSHTO: A-1, A-4
	5-34; loam Unified: ML ASSHTO: A-7	9-16; silty clay loam Unified: ML-CL ASSHTO: A-6	9-29; very cobbly loam Unified: ML-CL ASSHTO: A-4
	34-43; clay loam Unified: CL ASSHTO: A-6, A-7	16-60; gravelly silty clay loam Unified: ML-CL ASSHTO: A-7	29; fractured platy basalt
	43; andesite		
Included Areas	15% Sheld family, moderately deep cobbly and Patio family, cobbly		

122 Wintoner-Trojan-De Masters families association, 0 to 15 percent slopes

Map Unit Components	Wintoner	Trojan	De Masters
Approx. Proportion	40%	30%	20%
Position, Slope, and Elevation	Occurs on gently to steeply sloping mountain sideslopes, ridges and canyons; 0 to 15 percent slopes; 5,200 to 7,000 feet.	Occurs on mountain sideslopes, ridges, flats, and gently sloping hills; 0 to 15 percent slopes, 5,200 to 7,000 feet.	Occurs mainly on old, relatively flat lava flows; 0 to 15 percent slopes; 5,000 to 6,500 feet.
Typical Vegetation & Precipitation	Red and white fir, sugar pine, ponderosa pine, Jeffrey pine, incense cedar and chinquapin; 20 to 35 inches ppt.	Jeffrey pine, white fir, incense cedar, western juniper, mountain mahogany, big sage, greenleaf manzanita, pinemat manzanita and desert mountain mahogany; 16 to 35 inches ppt.	Ponderosa and Jeffrey pine, white and red fir, incense cedar, western juniper, mountain mahogany, greenleaf manzanita, pinemat manzanita, desert mountain mahogany and big sage; 20 to 35 inches ppt

Soil Profile Description

Surface Layer	0 to 22 inches; yellowish brown to brown gravelly sandy loam to loam; granular structure; soft; 10 to 15 percent rock fragments; pH 7.0 to 6.2.	0 to 22 inches; yellowish brown to brown loam; granular to subangular blocky structure; soft to slightly hard; 2 to 10 percent rock fragments; pH 6.3 to 6.5.	0 to 24 inches; dark brown sandy loam to loam; granular and blocky structure; soft to slightly hard; pH 6.5 to 6.3.
Subsoil	22 to 43 inches; brown to yellowish brown loam to clay loam; subangular blocky to massive structure; slightly hard; 5 to 12 percent rock fragments; pH 6.0 to 5.5.	22 to 46 inches; brown gravelly sandy clay loam to gravelly clay loam; subangular blocky structure; slightly hard; 15 to 25 percent rock fragments; pH 6.5.	24 to 55 inches; brown clay loam; subangular blocky structure; slightly hard to hard; pH 6.3.
Substrata	43 to 50 inches; strongly weathered andesite bedrock.	46 to 60 inches; slightly weathered basalt rock.	55 to 60 inches; weathered basalt.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	43 inches; andesite.	46 inches; basalt.	55 inches; basalt.
Erosion Factor (K)	Low to moderate	.28	.28
Max. Erosion Hazard		Moderate	Moderate to low
Soil Permeability	Moderate	Moderate	Moderate.
Soil Manageability Class	1	2e	2e
Group	II	II	II
Range Site	N/A	N/A	N/A
Water Runoff Potential	Slow	Slow	Slow
Hydrologic Soil Group	B	B	B
Available Water Capacity (AWC) Total (Top 20")	5.6 (2.4)	6.4 (2.7)	7.8 (2.6)
Forest Site Class	4 (II)	5 (IV)	4 (II-III)
Timber Regeneration Potential			
Plantability	High	High	High
Seedling Survival	Moderate	Moderate	Moderate

122 Wintoner-Trojan-De Masters families association (continued)

Estimated Engineering
Properties;
USDA Texture,
Unified, and ASSHTO

0-5; gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

0-22; loam
Unified: ML
ASSHTO: A-4, A-6

0-4; sandy loam
Unified: SM
ASSHTO: A-2-4, A-4

5-34; loam
Unified: ML
ASSHTO: A-7

22-34; gravelly sandy clay
loam
Unified: GM-GC, SC
ASSHTO: A-2, A-2-6

4-24; loam
Unified: ML
ASSHTO: A-7

34-43; clay loam
Unified: CL
ASSHTO: A-6, A-7

34-46; gravelly clay loam
Unified: GM-GC, CL
ASSHTO: A-2, A-6, A-7

24-55; clay loam
Unified: CL
ASSHTO: A-6, A-7

43; weathered andesite

46; weathered basalt rock

55; weathered basalt

Included Areas

10% Aquolls

123 Wintoner-Yallani families complex, 0 to 35 percent slopes

Map Unit Components	Wintoner	Yallani
Approx. Proportion	60%	20%
Position, Slope, and Elevation	Occurs on gently to steeply sloping mountain sideslopes, ridges and canyons; 0 to 35 percent slopes; 5,200 to 7,000 feet.	Occurs on mountain sideslopes, ridges and canyons; 0 to 35 percent slopes; 5,200 to 8,000 feet.
Typical Vegetation & Precipitation	Red and white fir, sugar pine, ponderosa pine, Jeffrey pine, incense cedar and chinquapin; 35 to 50 inches ppt.	Red and white fir, Jeffrey pine, ponderosa pine, sugar pine, lodgepole pine, mountain hemlock, incense cedar, greenleaf manzanita, pinemat manzanita, chinquapin and squaw carpet; 35 to 50 inches ppt.

Soil Profile Description

Surface Layer	0 to 22 inches; yellowish brown to brown gravelly sandy loam to loam; granular structure; soft; 10 to 15 percent rock fragments; pH 7.0 to 6.2.	0 to 8 inches; brown gravelly fine sandy loam; granular structure; soft; 22 percent rock fragments; pH 6.3.
Subsoil	22 to 43 inches; brown to yellowish brown loam to clay loam; subangular blocky to massive structure; slightly hard; 5 to 12 percent rock fragments; pH 6.0 to 5.5.	8 to 39 inches; brown to yellowish brown gravelly to very gravelly fine sandy loam; blocky and massive structure; slightly hard; 30 to 42 percent rock fragments; pH 6.0
Substrata	43 to 50 inches; strongly weathered andesite bedrock.	39 to 60 inches; yellowish brown very gravelly sandy loam; massive; 35 percent rock fragments; pH 6.0.

Soil Properties & Management Interpretations

Rooting Depth (in.)	43 inches; andesite.	60+ inches; basalt
Erosion Factor (K)	.20	.24
Max. Erosion Hazard	Low to moderate	Low to moderate
Soil Permeability	Moderate	Moderately rapid
Soil Manageability Class	1	2p
Soil Manageability Group	I	I
Range Site	N/A	N/A
Water Runoff Potential	Slow	Slow
Hydrologic Soil Group	B	B
Available Water (AWC) Total (Top 20")	5.6 (2.4)	5.9 (2.1)
Forest Site Class	4 (II)	3 (I)
Timber Regeneration Plantability	High	High
Timber Regeneration Seedling Survival	Moderate	Low to moderate
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-5; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	0-24; gravelly fine sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-4
	5-34; loam Unified: ML ASSHTO: A-7	24-39; very gravelly fine sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-4
	34-43; clay loam Unified: CL ASSHTO: A-6, A-7	39-60; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	43; weathered andesite	
Included Areas	20% Portola family; Aquolls and Yallani family cobbly	

124 Xeric Durandepts-Xeric Durandepts, ashy association, 0 to 35 percent slopes

Map Unit Components	Xeric Durandepts	Xeric Durandepts, ashy
Approx. Proportion	40%	40%
Position, Slope, and Elevation	Occurs on glacial ridges and ground moraines; 0 to 35 percent slopes; 5,200 to 7,500 feet.	Occurs on alluvial outwash, glacial ridges, and ground moraines; 0 to 35 percent slopes; 5,200 to 7,500 feet.
Typical Vegetation & Precipitation	White fir, lodgepole pine, jeffrey pine, greenleaf manzanita, pinemat manzanita and annual grasses; 35 to 45 inches ppt.	Scattered red and white fir and lodgepole pine with some greenleaf manzanita and annual and perennial grasses; 35 to 45 inches ppt.
Soil Profile Description		
Surface Layer	0 to 7 inches; grayish brown fine sandy loam; subangular blocky structure; soft; 7 percent pebbles; pH 6.4.	0 to 13 inches; brown sandy loam or gravelly sandy loam; granular structure; soft; 10 to 15 percent rock fragments; pH 6.0 to 6.3.
Subsoil	7 to 22 inches; yellowish brown very cobbly sandy loam to loam; subangular blocky structure; 35 percent rock fragments; pH 6.4 to 6.7.	13 to 24 inches; yellowish brown gravelly loamy sand; subangular blocky structure; slightly hard; 30 percent rock fragments; pH 6.8.
Substrata	22 to 34 inches; brown very gravelly loam; massive; hard; 55 percent rock fragments; pH 6.8; underlain by compacted glacial till.	24 to 60 inches; yellowish brown to brown extremely gravelly sand and coarse sand; massive; extremely hard (loose underneath); 60 to 90 percent rock fragments; pH 7.0.
Soil Properties & Management Interpretations		
Rooting Depth (in.), Underlying Material	34 inches; compacted glacial till	24 inches; stratified alluvium
Erosion Factor (K)	.28	.20
Max. Erosion Hazard	Moderate	Moderate
Soil Permeability	Moderate	Moderate
Soil Manageability		
Class	2e	2ep
Group	II	II
Range Site	N/A	N/A
Water Runoff Potential	Slow	Slow
Hydrologic Soil Group	B	B
Available Water Capacity (AWC)		
Total (Top 20")	4.0 (2.7)	2.4 (2.1)
Forest Site Class	6 (V)	7 (Noncommercial)
Timber Regeneration Potential		
Plantability	Moderate	N/A
Seedling Survival	Moderate	N/A

124 Xeric Durandepts-Xeric Durandepts, ashy association (continued)

Estimated Engineering
Properties;
USDA Texture,
Unified, and ASSHTO

0-7; fine sandy loam
Unified: SM
ASSHTO: A-4

0-13; sandy loam
Unified: SM
ASSHTO: A-2-4, A-4

7-17; cobbly sandy loam
Unified: SM
ASSHTO: A-2-4, A-4

13-24; gravelly loamy sand
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4

17-22; cobbly loam
Unified: ML
ASSHTO: A-7

24-60; extremely gravelly sand
Unified: GP-GW, SP
ASSHTO: A-1, A-3

22-34; very gravelly loam
Unified: GM-GC, ML
ASSHTO: A-1, A-7

34; compacted glacial till

Included Areas

20% Sheld and Yallani families

125 Yallani-Patio families, rhyolitic complex, 15 to 50 percent slopes

Map Unit Components	Yallani, rhyolitic	Patio, rhyolitic
Approx. Proportion	50%	30%
Position, Slope, and Elevation	Occurs on mountain sideslopes, ridges and canyons; 15 to 50 percent slopes; 5,200 to 7,300 feet.	Occurs on mountain sideslopes and escarpments; 15 to 50 percent slopes; 5,200 to 7,000 feet.
Typical Vegetation & Precipitation	White fir, red fir, sugar pine, incense cedar chinquapin, pinemat manzanita and greenleaf manzanita; 35 to 50 inches ppt.	Sugar pine, ponderosa pine, Jeffrey pine, chinquapin, greenleaf manzanita and pinemat manzanita; 35 to 50 inches ppt.

Soil Profile Description

Surface Layer	0 to 22 inches; grayish brown to pale brown sandy loam to very gravelly sandy loam; granular structure; soft to slightly hard; 10 to 50 percent rock fragments; pH 5.5.	0 to 13 inches; grayish brown to brown very gravelly to extremely gravelly sandy loam; granular to subangular blocky structure; soft; 50 to 70 percent rock fragments; pH 6.0 to 7.0.
Subsoil	22 to 43 inches; light gray to pale brown very gravelly to extremely gravelly coarse sandy loam; subangular blocky structure; slightly hard; 50 to 70 percent rock fragments; pH 5.0.	13 to 55 inches; very pale brown extremely gravelly loam; subangular blocky structure; 60 to 75 percent rock fragments; pH 7.0.
Substrata	43 to 50 inches; light gray very cobbly to extremely gravelly sandy loam; subangular blocky structure; slightly hard; 55 to 65 percent rock fragments; pH 4.8; underlain by weathered rhyolite.	55 inches; slightly weathered rhyolite

Soil Properties & Management Interpretations

Rooting Depth (in.)	50 inches; rhyolite	55 inches; rhyolite
Erosion Factor (K)	.28	.28
Max. Erosion Hazard	High	High
Soil Permeability	Moderately rapid	Moderately rapid
Soil Manageability Class	3Ep	3EP
Group	III	III
Range Site	N/A	N/A
Water Runoff Potential	Slow	Slow
Hydrologic Soil Group	A	A
Available Water (AWC) Total (Top 20")	3.2 (1.8)	1.9 (.7)
Forest Site Class	5-6 (IV-V)	6 (V)
Timber Regeneration Plantability	Moderate	High
Seedling Survival	Low	Very low
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-22; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	0-13; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	22-43; extremely gravelly coarse sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	13-55; extremely gravelly loam Unified: GM-GC, ML ASSHTO: A-1, A-4
	43-50; cobbly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	55; rhyolite
	50; weathered rhyolite	
Included Areas	20% Trojan family, rhyolitic and Rubble Land	

126 Yallani-Portola families association, 0 to 35 percent slopes

Map Unit Components	Yallani	Portola
Approx. Proportion	50%	30%
Position, Slope, and Elevation	Occurs on mountain sideslopes, ridges and canyons; 5 to 35 percent slopes; 5,200 to 8,000 feet.	Occurs on volcanic flats and mountain sideslopes, 0 to 35 percent slopes; 5,200 to 7,000 feet.
Typical Vegetation & Precipitation	Red and white fir, Jeffrey pine, ponderosa pine, sugar pine, lodgepole pine, mountain hemlock, incense cedar, greenleaf manzanita, pinemat manzanita, chinquapin and squaw carpet; 35 to 80 inches ppt.	Ponderosa pine, white fir, red fir, gooseberry, wedgeleaf ceanothus and perennial bunch grasses; 35 to 80 inches ppt.

Soil Profile Description

Surface Layer	0 to 8 inches; brown gravelly fine sandy loam; granular structure; soft; 22 percent rock fragments; pH 6.3.	0 to 10 inches; brown gravelly sandy loam; granular structure; soft; 15 percent pebbles; pH 6.5 to 6.8.
Subsoil	8 to 39 inches; brown to yellowish brown gravelly to very gravelly fine sandy loam; blocky and massive structure; slightly hard; 30 to 42 percent rock fragments; pH 6.0	10 to 48 inches; brown gravelly sandy loam; weak granular to massive structure; slightly hard; 15 percent pebbles; pH 7.0 to 7.2.
Substrata	39 to 60 inches; yellowish brown very gravelly sandy loam; massive; 35 percent rock fragments; pH 6.0.	48 to 60 inches; brownish gray gravelly fine sandy loam; massive; slightly hard; 15 percent pebbles; pH 7.2.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	60+ inches; basalt	60 inches; andesite
Erosion Factor (K)	.24	.20
Max. Erosion Hazard	Low to moderate	Low to moderate
Soil Permeability	Moderately rapid	Moderate rapid
Soil Manageability Class	2p	1
Group	II	II
Range Site	N/A	N/A
Water Runoff Potential	Slow	Slow
Hydrologic Soil Group	B	B
Available Water Capacity (AWC) Total (Top 20")	5.9 (2.1)	6.2 (2.5)
Forest Site Class	3 (I)	4 (II)
Timber Regeneration Plantability	High	High
Seedling Survival	Low to moderate	Moderate
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-24; gravelly fine sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-4	0-60; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	24-39; very gravelly fine sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-4	
	39-60; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	
Included Areas	20% Sheld family; Yallani family, moderately deep and Lava Flow	

127 Yallani family Lava Flow-Sheld family, moderately deep association, 0 to 35 percent slopes

Map Unit Components	Yallani	Lava Flow	Sheld, mod. deep
Approx. Proportion	50%	20%	20%
Position, Slope, and Elevation	Occurs on mountain sideslopes, ridges and canyons; 5 to 35 percent slopes; 5,200 to 8,000 feet.	Flat to very steep lava flows; at all elevations.	Occurs on upland flats, mountain sideslopes and ground moraines; 0 to 35 percent slopes; 5,200 to 8,000 feet.
Typical Vegetation & Precipitation	Jeffrey and ponderosa pine, red fir, white s fir, sugar pine, lodgepole pine, mountain hemlock, incense cedar, greenleaf manzanita, pinemat manzanita, chinquapin and squaw carpet; 35 to 80 inches ppt.	Barren except there is scattered greenleaf manzanita, juniper, mountain mahogany and big age in soil pockets; 35 to 70 inches ppt. R	ed and white fir, sugar pine, lodgepole pine, mountain hemlock, greenleaf manzanita and chinquapin; 35 to 80 inches ppt.

Soil Profile Description

Surface Layer	0 to 8 inches; brown gravelly sandy loam; granular structure; soft; 20 to 25 percent rock fragments; pH 6.3;	N/A	0 to 12 inches; dark grayish brown gravelly to very gravelly sandy loam or cobbly to very cobbly sandy loam; granular structure; soft; 20 to 40 percent rock fragments; pH 6.8 to 6.5; 20 to 50 percent rock fragments on the surface.
Subsoil	8 to 39 inches; brown to yellowish brown very gravelly sandy loam; subangular blocky structure; slightly hard; 35 to 45 percent rock fragments; pH 6.0.	N/A	12 to 33 inches; yellowish brown very cobbly to extremely cobbly sandy loam; granular to subangular blocky structure; 40 to 65 percent rock fragments; pH 6.0 to 5.8.
Substrata	39 to 60 inches; yellowish brown very gravelly to extremely gravelly sandy loam; massive; structure; slightly hard; 40 to 60 percent rock fragments; pH 6.0; underlain by basalt.	Lava Flow, generally of recent origin that has flowed over soil or bedrock.	33 inches; fractured basalt

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	60 inches; basalt	Nil; Lava flow	33 inches; basalt
Erosion Factor (K)	.24	N/A	.24
Max. Erosion Hazard	Low	N/A	Moderate
Soil Permeability	Moderately rapid	N/A	Moderate
Soil Manageability Class	3Xp	N/A	3Xp
Group	III	N/A	III
Range Site	N/A	N/A	N/A
Water Runoff Potential	Slow	Slow to very rapid	Slow
Hydrologic Soil Group	B	N/A	B
Available Water Capacity (AWC) Total (Top 20")	5.9 (2.1)	N/A	2.7 (1.7)
Forest Site Class	4 (II)	N/A	5 (III)
Timber Regeneration Potential			
Plantability	Low	N/A	Low to moderate
Seedling Survival	Low to moderate	N/A	Low

127 Yallani family Lava Flow-Sheld family (continued)

Estimated Engineering Properties;
USDA Texture, Unified, and ASSHTO

0-24; gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

N/A

0-12; gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

24-39; very gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

12-33; very cobbly sandy loam
Unified: SM
ASSHTO: A-2-4, A-4

39-60; very gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

33; fractured basalt

Included Areas

10% Inville family

128 Yallani-Sheld families complex, 0 to 35 percent slopes

Map Unit Components	Yallani	Sheld
Approx. Proportion	60%	20%
Position, Slope, and Elevation	Occurs on mountain sideslopes, ridges and canyons; 5 to 35 percent slopes; 5,200 to 8,000 feet.	Occurs on upland flats; mountain sideslopes, and undulating hills; 0 to 35 percent slopes; 5,200 to 8,000 feet.
Typical Vegetation & Precipitation	Red and white fir, Jeffrey pine, ponderosa pine, sugar pine, lodgepole pine, mountain hemlock, incense cedar, greenleaf manzanita, pinemat manzanita, chinquapin and squaw carpet; 35 to 80 inches ppt.	Red and white fir, sugar pine, incense cedar, Jeffrey pine, ponderosa pine, lodgepole pine, mountain hemlock, chinquapin, greenleaf manzanita and pinemat manzanita; 35 to 85 inches ppt.
Soil Profile Description		
Surface Layer	0 to 8 inches; brown gravelly fine sandy loam; granular structure; soft; 22 percent rock fragments; pH 6.3.	0 to 14 inches; brown gravelly and cobbly sandy loam; granular structure; soft; 20 to 30 percent rock fragments; pH 6.5 to 6.0.
Subsoil	8 to 39 inches; brown to yellowish brown gravelly to very gravelly fine sandy loam; blocky and massive structure; slightly hard; 30 to 42 percent rock fragments; pH 6.0	14 to 60 inches; yellowish brown very cobbly loam to sandy loam; subangular blocky structure; soft; 40 to 55 percent rock fragments; pH 5.5.
Substrata	39 to 60 inches; yellowish brown very gravelly sandy loam; massive; 35 percent rock fragments; pH 6.0.	60 inches; slightly weathered basalt and andesite.
Soil Properties & Management Interpretations		
Rooting Depth (in.), Underlying Material	60+ inches; basalt	60 inches; andesite and basalt
Erosion Factor (K)	.24	.20
Max. Erosion Hazard	Low to moderate	Moderate
Soil Permeability	Moderately rapid	Moderate
Soil Manageability Class	2p	2p
Group	II	II
Range Site	N/A	N/A
Water Runoff Potential	Slow	Slow
Hydrologic Soil Group	B	B
Available Water Capacity (AWC) Total (Top 20")	5.9 (2.1)	5.7 (2.2)
Forest Site Class	3 (I)	4 (II)
Timber Regeneration Potential		
Plantability	High	High
Seedling Survival	Low to moderate	Moderate
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-24; gravelly fine sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-4	0-14; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	24-39; very gravelly fine sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-4	14-34; very cobbly loam Unified: GM-GC, ML-CL ASSHTO: A-1, A-4
	39-60; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	34-60; very cobbly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
Included Areas	20% Wintoner family; Portola family and Aquolls	

129 Yallani-Sheld families complex, 35 to 50 percent slopes

Map Unit Components	Yallani	Sheld
Approx. Proportion	50%	30%
Position, Slope, and Elevation	Occurs on mountain sideslopes, ridges and canyons; 35 to 50 percent slopes; 5,200 to 8,000 feet.	Occurs on upland flats; mountain sideslopes, and undulating hills; 35 to 50 percent slopes; 5,200 to 8,000 feet.
Typical Vegetation & Precipitation	Red and white fir, Jeffrey pine, ponderosa pine, sugar pine, lodgepole pine, mountain hemlock, incense cedar, greenleaf manzanita, pinemat manzanita, chinquapin and squaw carpet; 35 to 80 inches ppt.	Red and white fir, sugar pine, incense cedar, Jeffrey pine, ponderosa pine, lodgepole pine, mountain hemlock, chinquapin, greenleaf manzanita and pinemat manzanita; 35 to 85 inches ppt.
Soil Profile Description		
Surface Layer	0 to 8 inches; brown gravelly fine sandy loam; granular structure; soft; 22 percent rock fragments; pH 6.3.	0 to 14 inches; brown gravelly and cobbly sandy loam; granular structure; soft; 20 to 30 percent rock fragments; pH 6.5 to 6.0.
Subsoil	8 to 39 inches; brown to yellowish brown gravelly to very gravelly fine sandy loam; blocky and massive structure; slightly hard; 30 to 42 percent rock fragments; pH 6.0.	14 to 60 inches; yellowish brown very cobbly loam to sandy loam; subangular blocky structure; soft; 40 to 55 percent rock fragments; pH 5.5.
Substrata	39 to 60 inches; yellowish brown very gravelly sandy loam; massive; 35 percent rock fragments; pH 6.0.	60 inches; slightly weathered basalt and andesite.
Soil Properties & Management Interpretations		
Rooting Depth (in.), Underlying Material	60+ inches; basalt	60 inches; andesite and basalt
Erosion Factor (K)	.24	.20
Max. Erosion Hazard	Moderate	Moderate to high
Soil Permeability	Moderately rapid	Moderate
Soil Manageability Class Group	3gp III	3gp III
Range Site	N/A	N/A
Water Runoff Potential	Moderate	Moderate
Hydrologic Soil Group	B	B
Available Water Capacity (AWC) Total (Top 20")	5.9 (2.1)	5.7 (2.2)
Forest Site Class	3 (I)	4 (II)
Timber Regeneration Potential Plantability Seedling Survival	Moderate Low to moderate	Moderate Moderate
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-24; gravelly fine sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-4 24-39; very gravelly fine sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-4 39-60; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	0-14; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4 14-34; very cobbly loam Unified: GM-GC, ML-CL ASSHTO: A-1, A-4 34-60; very cobbly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
Included Areas	20% Portola family; Inville family and Aquolls	

130 Yallani family-Sheld family, moderately deep association, 15 to 35 percent slopes.

Map Unit Components	Yallani	Sheld, moderately deep
Approx. Proportion	45%	35%
Position, Slope, and Elevation	Occurs on mountain sideslopes, ridges and canyons; 15 to 35 percent slopes; 5,200 to 8,000 feet.	Occurs on upland flats; mountain sideslopes, and undulating hills; 15 to 35 percent slopes; 5,200 to 8,000 feet.
Typical Vegetation & Precipitation	Red and white fir, Jeffrey pine, ponderosa pine, sugar pine, lodgepole pine, mountain hemlock, incense cedar, greenleaf manzanita, pinemat manzanita, chinquapin and squaw carpet; 35 to 80 inches ppt.	Red and white fir, sugar pine, incense cedar, Jeffrey pine, ponderosa pine, lodgepole pine, mountain hemlock, chinquapin; greenleaf manzanita and pinemat manzanita; 35 to 85 inches ppt.

Soil Profile Description

Surface Layer	0 to 8 inches; brown gravelly fine sandy loam; granular structure; soft; 22 percent rock fragments; pH 6.3.	0 to 6 inches; dark brown gravelly sandy loam; granular structure; soft; 15 to 30 percent rock fragments; pH 6.0.
Subsoil	8 to 39 inches; brown to yellowish brown gravelly to very gravelly fine sandy loam; blocky and massive structure; slightly hard; 30 to 42 percent rock fragments; pH 6.0	6 to 27 inches; brown very gravelly sandy loam to coarse sandy loam; subangular blocky to single grain structure; soft; 40 to 60 percent rock fragments; pH 6.2.
Substrata	39 to 60 inches; yellowish brown very gravelly sandy loam; massive; 35 percent rock fragments; pH 6.0.	27 inches; fractured and slightly weathered vesicular basalt.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	60+ inches; basalt	27 inches; basalt
Erosion Factor (K)	.24	.20
Max. Erosion Hazard	Low to moderate	Moderate
Soil Permeability	Moderately rapid	Moderately rapid
Soil Manageability Class	2p	2p
Group	II	II
Range Site	N/A	N/A
Water Runoff Potential	Slow	Slow
Hydrologic Soil Group	B	B
Available Water Capacity (AWC) Total (Top 20")	5.9 (2.1)	2.1 (1.7)
Forest Site Class	3 (I)	5 (III)
Timber Regeneration Potential		
Plantability	High	Moderate
Seedling Survival	Low to moderate	Low
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-24; gravelly fine sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-4	0-6; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	24-39; very gravelly fine sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-4	6-27; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	39-60; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	27; slightly weathered basalt
Included Areas	20% Portola Family and Inville Family	

131 Yallani family-Sheld family, moderately deep association, 35 to 70 percent slopes.

Map Unit Components	Yallani	Sheld, moderately deep
Approx. Proportion	50%	35%
Position, Slope, and Elevation	Occurs on mountain sideslopes, ridges and canyons; 35 to 70 percent slopes; 5,200 to 8,000 feet.	Occurs on upland flats; mountain sideslopes, and undulating hills; 35 to 70 percent slopes; 5,200 to 8,000 feet.
Typical Vegetation & Precipitation	Red and white fir, Jeffrey pine, ponderosa pine, sugar pine, lodgepole pine, mountain hemlock, incense cedar, greenleaf manzanita, pinemat manzanita, chinquapin and squaw carpet; 35 to 80 inches ppt.	Red and white fir, sugar pine, incense cedar, Jeffrey pine, ponderosa pine, lodgepole pine, mountain hemlock, chinquapin, greenleaf manzanita and pinemat manzanita; 35 to 85 inches ppt.

Soil Profile Description

Surface Layer	0 to 8 inches; brown gravelly fine sandy loam; granular structure; soft; 22 percent rock fragments; pH 6.3.	0 to 6 inches; dark brown gravelly sandy loam; granular structure; soft; 15 to 30 percent rock fragments; pH 6.0.
Subsoil	8 to 39 inches; brown to yellowish brown gravelly to very gravelly fine sandy loam; blocky and massive structure; slightly hard; 30 to 42 percent rock fragments; pH 6.0.	6 to 27 inches; brown very gravelly to extremely gravelly sandy loam to coarse sandy loam; subangular blocky to single grain structure; soft; 40 to 60 percent rock fragments; pH 6.2.
Substrata	39 to 60 inches; yellowish brown very gravelly sandy loam; massive; structure; 35 percent rock fragments; pH 6.0.	27 inches; fractured and slightly weathered vesicular basalt.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	60+ inches; basalt	27 inches; basalt
Erosion Factor (K)	.24	.20
Max. Erosion Hazard	Moderate	Moderate to high
Soil Permeability	Moderately rapid	Moderate rapid
Soil Manageability		
Class	3gp	3gpx
Group	III	III
Range Site	N/A	N/A
Water Runoff Potential	Moderate	Moderate
Hydrologic Soil Group	B	B
Available Water Capacity (AWC)		
Total (Top 20")	5.9 (2.1)	2.1 (1.7)
Forest Site Class	3 (I)	5 (III)
Timber Regeneration Potential		
Plantability	Moderate	Moderate
Seedling Survival	Low to moderate	Low
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO		
	0-24; gravelly fine sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-4	0-6; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	24-39; very gravelly fine sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-4	6-27; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	39-60; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	27; slightly weathered basalt
Included Areas	15% Lithic Xerumbrepts; Rock Outcrop and Rubble Land	

132 Yallani-Sheld families, moderately deep, cobbly complex, 0 to 35 percent slopes

Map Unit Components	Yallani	Sheld
Approx. Proportion	50%	30%
Position, Slope, and Elevation	Occurs on mountain sideslopes, ridges and canyons; 5 to 35 percent slopes; 5,200 to 8,000 feet.	Occurs on upland flats, mountain sideslopes and ground moraines; 0 to 35 percent slopes; 5,200 to 8,000 feet.
Typical Vegetation & Precipitation	Red and white fir, Jeffrey pine, ponderosa pine, sugar pine, lodgepole pine, mountain hemlock, incense cedar, greenleaf manzanita, pinemat manzanita, chinquapin and squaw carpet; 35 to 80 inches ppt.	Red and white fir, sugar pine, lodgepole pine, mountain hemlock, greenleaf manzanita and chinquapin; 35 to 85 inches ppt.

Soil Profile Description

Surface Layer	0 to 6 inches; dark brown loamy sand; granular structure; loose; pH 6.5.	0 to 12 inches; dark grayish brown gravelly to very gravelly sandy loam or cobbly to very cobbly sandy loam; granular structure; soft; 20 to 40 percent rock fragments; pH 6.8 to 6.5; 20 to 50 percent rock fragments on the surface.
Subsoil	6 to 31 inches; brown very cobbly loam; subangular blocky structure; soft to slightly hard; 55 percent rock fragments; pH 6.5 to 6.8.	12 to 33 inches; yellowish brown very cobbly to extremely cobbly sandy loam; granular to subangular blocky structure; 40 to 65 percent rock fragments; pH 6.0 to 5.8.
Substrata	31 to 42 inches; highly weathered andesite.	33 inches; fractured basalt

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	31 inches; andesite	33 inches; basalt
Erosion Factor (K)	.20	.24
Max. Erosion Hazard	Low to moderate	Moderate
Soil Permeability	Moderately rapid	Moderate
Soil Manageability Class	2p	3Xp
Group	II	II
Range Site	N/A	N/A
Water Runoff Potential	Slow	Slow
Hydrologic Soil Group	B	B
Available Water Capacity (AWC) Total (Top 20")	2.8 (1.8)	2.7 (1.7)
Forest Site Class	4 (II)	5 (III)
Timber Regeneration Potential		
Plantability	High	Low to moderate
Seedling Survival	Low	Low
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-6; loamy sand Unified: SM ASSHTO: A-4	0-12; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4
	6-31; very cobbly loam Unified: GM-GC, ML-CL ASSHTO: A-1, A-4	12-33; very cobbly sandy loam Unified: SM ASSHTO: A-2-4, A-4
	31-42; weathered andesite	33; fractured basalt
Included Areas	20% Wintoner family and Lithic Xerumbrepts	

133 Yallani-Sheld families, glacial complex, 0 to 35 percent slopes

Map Unit Components	Yallani, glacial	Sheld, glacial
Approx. Proportion	40%	40%
Position, Slope, and Elevation	Occurs on mountain sideslopes, ridges and canyons; 5 to 35 percent slopes; 5,200 to 8,000 feet.	Occurs on upland flats, mountain sideslopes and ground moraines; 0 to 35 percent slopes; 5,200 to 8,000 feet.
Typical Vegetation & Precipitation	Jeffrey and ponderosa pine, red fir, white fir, sugar pine, lodgepole pine, mountain hemlock, incense cedar, greenleaf manzanita, pinemat manzanita, chinquapin and squaw carpet; 35 to 80 inches ppt.	Red and white fir, sugar pine, lodgepole pine, mountain hemlock, greenleaf manzanita and chinquapin; 35 to 85 inches ppt.
Soil Profile Description		
Surface Layer	0 to 8 inches; brown gravelly sandy loam; granular structure; soft; 20 to 25 percent rock fragments; pH 6.3.	0 to 16 inches; dark grayish brown cobbly to very cobbly sandy loam; granular structure; 15 to 50 percent rock fragments; pH 6.5 to 6.3.
Subsoil	8 to 39 inches; brown to yellowish brown very gravelly sandy loam; subangular blocky structure; slightly hard; 35 to 45 percent rock fragments; pH 6.0.	16 to 42 inches; brown very cobbly to extremely cobbly sandy loam; granular to subangular blocky structure; 50 to 65 percent rock fragments; pH 6.0 to 5.8.
Substrata	39 to 60 inches; yellowish brown very gravelly to extremely gravelly sandy loam; massive; slightly hard; 40 to 60 percent rock fragments; pH 6.0; underlain by basalt.	42 inches; fractured basalt
Soil Properties & Management Interpretations		
Rooting Depth (in.)	60 inches; basalt	42 inches; basalt
Erosion Factor (K)	.24	.24
Max. Erosion Hazard	Low	Moderate
Soil Permeability	Moderately rapid	Moderate
Soil Manageability Class	3Xp	3Xp
Group	III	III
Range Site	N/A	N/A
Water Runoff Potential	Slow	Slow
Hydrologic Soil Group	B	B
Available Water Capacity (AWC) Total (Top 20")	5.9 (2.1)	2.9 (1.7)
Forest Site Class	4 (II)	4-5 (II-III)
Timber Regeneration Plantability	Low	Low to moderate
Seedling Survival	Low to moderate	Low
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-24; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	0-4; sandy loam Unified: SM ASSHTO: A-2-4, A-4
	24-39; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	4-42; cobbly sandy loam Unified: SM ASSHTO: A-2-4, A-4
	39-60; very gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4	42; fractured basalt
Included Areas	20% Sheld family, moderately deep glacial; Lithic Xerumbrepts and Rubble Land	

134 Yallani-Sheld-Portola families association, 0 to 35 percent slopes

Map Unit Components	Yallani	Sheld	Portola
Approx. Proportion	40%	20%	20%
Position, Slope, and Elevation	Occurs on mountain sideslopes, ridges and canyons; 5 to 35 percent slopes; 5,200 to 8,000 feet.	Occurs on upland flats; mountain sideslopes, and undulating hills; 0 to 35 percent slopes; 5,200 to 8,000 feet.	Occurs on volcanic flats and mountain sideslopes, 0 to 35 percent slopes; 5,200 to 7,000 feet.
Typical Vegetation & Precipitation	Red and white fir, Jeffrey pine, ponderosa pine, sugar pine, lodgepole pine, mountain hemlock, incense cedar, greenleaf manzanita, pinemat manzanita, chinquapin and squaw carpet; 35 to 80 inches ppt.	Red and white fir, sugar pine, incense cedar, Jeffrey pine, ponderosa pine, lodgepole pine, mountain hemlock, chinquapin greenleaf manzanita and pinemat manzanita; 35 to 85 inches ppt.	Ponderosa pine, white fir, red fir, gooseberry, wedgeleaf ceanothus and perennial bunch grasses; 35 to 80 inches ppt.

Soil Profile Description

Surface Layer	0 to 8 inches; brown gravelly fine sandy loam; granular structure; soft; 22 percent rock fragments; pH 6.3.	0 to 14 inches; brown gravelly and cobbly sandy loam; granular structure; soft; 20 to 30 percent rock fragments; pH 6.5 to 6.0.	0 to 10 inches; brown gravelly sandy loam; granular structure; soft; 15 percent pebbles; pH 6.5 to 6.8.
Subsoil	8 to 39 inches; brown to yellowish brown gravelly to very gravelly fine sandy loam; blocky and massive structure; slightly hard; 30 to 42 percent rock fragments; pH 6.0	14 to 60 inches; yellowish brown very cobbly loam to sandy loam; subangular blocky structure; soft; 40 to 55 percent rock fragments; pH 5.5.	10 to 48 inches; brown gravelly sandy loam; weak granular to massive structure; slightly hard; 15 percent pebbles; pH 7.0 to 7.2.
Substrata	39 to 60 inches; yellowish brown very gravelly sandy loam; massive; 35 percent rock fragments; pH 6.0.	60 inches; slightly weathered basalt and andesite.	48 to 60 inches; brownish gray gravelly fine sandy loam; massive; slightly hard; 15 percent pebbles; pH 7.2.

Soil Properties & Management Interpretations

Rooting Depth (in.), Underlying Material	60+ inches; basalt	60 inches; slightly weathered basalt and andesite.	60 inches; basalt
Erosion Factor (K)	.24	.20	.20
Max. Erosion Hazard	Low to moderate	Moderate	Low to moderate
Soil Permeability	Moderately rapid	Moderate	Moderate rapid
Soil Manageability Class	2p	2p	1
Group	II	II	II
Range Site	N/A	N/A	N/A
Water Runoff Potential	Slow	Slow	Slow
Hydrologic Soil Group	B	B	B
Available Water Capacity (AWC) Total (Top 20")	5.9 (2.1)	5.7 (2.2)	6.2 (2.5)
Forest Site Class	3 (I)	4 (II)	4 (II)
Timber Regeneration Potential			
Plantability	High	High	High
Seedling Survival	Low to moderate	Moderate	Moderate

134 Yallani-Sheld-Portola families association (continued)

Estimated Engineering Properties, USDA Texture, Unified, and ASSHTO

0-24; gravelly fine sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-4

0-14; gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

0-60; gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

24-39; very gravelly fine sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-4

14-34; very cobbly loam
Unified: GM-GC, ML-CL
ASSHTO: A-1, A-4

39-60; very gravelly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

34-60; very cobbly sandy loam
Unified: GM-GC, SM
ASSHTO: A-1, A-2-4, A-4

Included Areas

20% Typic Xerorthents and Sheld family, moderately deep

135 Yallani family-Yallani family, moderately deep association, rhyolitic, 15 to 50 percent slopes

Map Unit Components	Yallani, rhyolitic	Yallani, mod. deep, rhyolitic
Approx. Proportion	50%	30
Position, Slope, and Elevation	Occurs on mountain sideslopes, ridges and canyons; 15 to 50 percent slopes; 5,200 to 7,300 feet.	Occurs on mountain sideslopes, ridges, canyons, and dissected hillsides; 15 to 50 percent slopes; 5,200 to 7,300 feet.
Typical Vegetation & Precipitation	White fir, red fir, sugar pine, incense cedar chinquapin, pinemat manzanita and greenleaf manzanita; 35 to 50 inches ppt.	White fir, red fir, sugar pine, incense cedar, chinquapin, pinemat manzanita, and greenleaf manzanita; 35 to 50 inches ppt.
Soil Profile Description		
Surface Layer	0 to 22 inches; grayish brown to pale brown sandy loam to very gravelly sandy loam; granular structure; soft to slightly hard; 10 to 50 percent rock fragments; pH 5.5.	0 to 4 inches; grayish brown to brownish gray sandy loam to very gravelly sandy loam; granular structure; soft; 5 to 40 percent rock fragments; pH 5.5 to 5.8.
Subsoil	22 to 43 inches; light gray to pale brown very gravelly to extremely gravelly coarse sandy loam; subangular blocky structure; slightly hard; 50 to 70 percent rock fragments; pH 5.0.	4 to 34 inches; pale brown to light gray very gravelly coarse sandy loam; granular structure; soft; 40 to 50 percent rock fragments; pH 6.0.
Substrata	43 to 50 inches; light gray very cobbly to extremely cobbly sandy loam; subangular blocky structure; slightly hard; 55 to 65 percent rock fragments; pH 4.8; underlain by weathered rhyolite.	34 inches; weathered rhyolite
Soil Properties & Management Interpretations		
Rooting Depth (in.)	50 inches; rhyolite	34 inches; rhyolite
Erosion Factor (K)	.28	.28
Max. Erosion Hazard	High	Moderate to high
Soil Permeability	Moderately rapid	Moderately rapid
Soil Manageability Class Group	3Ep III	3Ep III
Range Site	N/A	N/A
Water Runoff Potential	Slow	Slow
Hydrologic Soil Group	A	A
Available Water (AWC) Total (Top 20")	3.2 (1.8)	2.5 (1.6)
Forest Site Class	5-6 (IV-V)	6 (V)
Timber Regeneration Plantability Seedling Survival	Moderate Low	Moderate Very low to low
Estimated Engineering Properties; USDA Texture, Unified, and ASSHTO	0-22; gravelly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4 22-43; extremely gravelly coarse sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4 43-50; cobbly sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4 50; weathered rhyolite	0-4; sandy loam Unified: SM ASSHTO: A-2-4, A-4 4-34; very gravelly coarse sandy loam Unified: GM-GC, SM ASSHTO: A-1, A-2-4, A-4 34; weathered rhyolite
Included Areas	20% Inville family, rhyolitic and Portola family	

(This page left blank for notes.)