149 Rock outcrop - Cryorthents complex, 5 to 50 percent slopes

Elevation: 8,300 to 10,600 feet Annual Precipitation: 40 to 60 inches

Map Unit Components	Rock outcrop	Cryothents
Approximate Proportion	70 percent	20 percent
Landscape Position	Mountainsides and ridges	Mountainsides and ridges
Slope		5 to 50 percent
Typical Vegetation Series		Lodgepole Pine, Western White Pine

Soil Profile Description

Surface Layer	Rock outcrop consists of massive exposures of regionally jointed and fractured granitic rock	0 to 6 inches; grayish brown very cobbly loamy coarse sand; weak granular structure; soft; 40 percent rock fragments; pH 4.0
Subsoil		6 to 39 inches; light yellowish brown very cobbly loamy coarse sand; massive; loose; 45 percent rock fragments; pH 5.0
Substratum		39 inches; fractured granodiorite

Soil Properties & Management Interpretations

Effective Rooting Depth	15 to 40 inches
Drainage	Somewhat excessively drained and excessively drained
Permeability	Moderately rapid and rapid
Available Water Capacity	
Upper 20 inches	0.8 to 1.4
Total	0.8 to 4.2
Hydrologic Soil Group	A
Unified Soil Classification	SP
Erosion Factor K	.15
Maximum Erosion Hazard	High and very high
Sensitivity	High
Soil Manageability Class	4XEd
Annual Forage Production	Less than 200 lbs/acre
Forest Survey Site Class	NC
Manageability Group	IV

Included Areas and Remarks:

Included in this unit are small areas of Entic Cryumbrepts. Included areas make up about 10 percent of the map unit area. The maximum erosion hazard of Cryorthents is high on slopes of 5 to 30 percent and very high on slopes of 30 to 50 percent.

150 Rock outcrop - Dystric Lithic Xerochrepts complex, 65 to 85 percent slopes

Elevation: 1,500 to 6,400 feet Annual Precipitation: 35 to 45 inches

Map Unit Components	Rock outrop	Dystric Lithic Xerochrepts
Approximate Proportion	50 percent	45 percent
Landscape Position	Mountainsides and ridges	Mountainsides and ridges
Slope		65 to 85 percent
Typical Vegetation Series		Annual Grass-Forb, Mariposa Manzanita, Mariposa Manzanita/Ponderosa Pine

Soil Profile Description

Surface Layer	Rock outcrop consists of isolated outcroppings and massive exposures of metasedimentary rock	0 to 7 inches; yellowish red cobbly loam; weak granular structure; slightly hard; 15 percent rock fragments; pH 6.5
Subsoil		7 to 11 inches; reddish yellow very cobbly loam; weak subangular blocky structure; slightly hard; 35 percent cobbles; pH 6.2
Substratum		11 inches; hard, fractured, weakly metamorposed sandstone

Soil Properties & Management Interpretations

Effective Rooting Depth	10" to 20"
Drainage	Somewhat excessively drained
Permeability	Moderately rapid
Available Water Capacity	
Upper 20 inches	1.3 to 2.9
Total	1.3 to 2.9
Hydrologic Soil Group	D
Unified Soil Classification	SM
Erosion Factor K	.28
Maximum Erosion Hazard	Very high
Sensitivity	High
Soil Manageability Class	4EXd
Annual Forage Production	Less than 200 lbs/acre
Forest Survey Site Class	6, 7, and NC
Manageability Group	IV

Included Areas and Remarks:

Included in this unit are small areas of soils similar to Dystric Lithic Xerochrepts that are on slopes of 50 to 65 percent, and soils on colluvial slopes that are moderately deep and have more than 35 percent rock fragments. Included areas make up about 5 percent of the map unit area. The majority of this unit is on the northwest side of Chowchilla Mountain on the Mariposa Ranger District.

151 Rock outcrop - Entic Cryumbrepts association, 25 to 60 percent slopes

Elevation: 8,500 to 10,600 feet Annual Precipitation: 40 to 60 inches

Map Unit Components	Rock outcrop	Entic Cryumbrepts
Approximate Proportion	55 percent	30 percent
Landscape Position	Mountainsides and ridges	Mountainsides and ridges in pockets between the Rock outcrop
Slope		25 to 60 percent
Typical Vegetation Series		Lodgepole Pine, Western White Pine

Soil Profile Description

Surface Layer	Rock outcrop consists of massive exposures of granitic rock	0 to 14 inches; grayish brown gravelly loamy coarse sand; weak granular structure; soft; 25 percent pebbles; pH 5.2
Subsoil		14 to 22 inches; light yellowish brown very stony loamy coarse sand; single grain; loose; 60 percent rock fragments; pH 5.3
Substratum		22 inches; highly fractured granodiorite

Soil Properties & Management Interpretations

Effective Rooting Depth	20" to 40"
Drainage	Somewhat excessively drained and excessively drained
Permeability	Moderately rapid and rapid
Available Water Capacity	
Upper 20 inches	0.9 to 2.3
Total	0.9 to 3.8
Hydrologic Soil Group	A
Unified Soil Classification	SW-SM/GW-GM
Erosion Factor K	.20
Maximum Erosion Hazard	Very high
Sensitivity	High
Soil Manageability Class	4EX
Annual Forage Production	Less than 200 lbs/acre
Forest Survey Site Class	NC
Manageability Group	IV

Included Areas and Remarks:

Included in this unit are small areas of Cryorthents and soils in the Stecum family. Included areas make up about 15 percent of the map unit area.

152 Rock outcrop - Lithic Xeropsamments complex, 15 to 45 percent slopes

Elevation: 6,000 to 8,400 feet Annual Precipitation: 30 to 50 inches

Map Unit Components	Rock outcrop	Lithic Xeropsamments
Approximate Proportion	60 percent	25 percent
Landscape Position	Mountainsides and ridges: glacially scoured and/or regionally fractured	In pockets and fractures on mountainsides and ridges: glacially scoured and/or regionally fractured
Slope		15 to 45 percent
Typical Vegetation Series		Greenleaf Manzanita/Jeffrey Pine

Soil Profile Description

Surface Layer	Rock outcrop consists of massive exposures of regionally jointed and fractured granitic rock	0 to 11 inches; brown gravelly loamy coarse sand; single grain; loose; 15 percent pebbles; pH 5.6
Subsoil		
Substratum		11 inches; unweathered granodiorite

Soil Properties & Management Interpretations

Effective Rooting Depth	4" to 20"
Drainage	Excessively drained
Permeability	Rapid
Available Water Capacity	
Upper 20 inches	0.3 to 1.5
Total	0.3 to 1.5
Hydrologic Soil Group	D
Unified Soil Classification	SW-SM
Erosion Factor K	.17
Maximum Erosion Hazard	High and very high
Sensitivity	High
Soil Manageability Class	4EDX
Annual Forage Production	Less than 200 lbs/acre
Forest Survey Site Class	6 and 7
Manageability Group	IV

Included Areas and Remarks:

Included in this map unit are small areas of soils similar to Lithic Xeropsamments but have more than 35 percent rock fragments or are on slopes of 45 to 55 percent. Also included are scattered remnants of soils in the Sirretta family. Included areas make up about 15 percent of the map unit area. Maximum erosion hazard of Lithic Xeropsamments is high on slopes of 15 to 30 percent and very high on slopes of 30 to 45 percent. A large expanse of this unit is in the South Fork San Joaquin River Drainage.

153 Rock outcrop - Lithic Xeropsamments complex, 45 to 85 percent slopes

Elevation: 5,200 to 8,400 feet Annual Precipitation: 25 to 45 inches

Map Unit Components	Rock outcrop	Lithic Xeropsamments
Approximate Proportion	60 percent	25 percent
Landscape Position	Glacially scoured and/or regionally fractured mountainsides	In pockets and fractures on glacially scoured and regionally fractured mountainsides
Slope		45 to 85 percent
Typical Vegetation Series		Greenleaf Manzanita/Jeffrey Pine

Soil Profile Description

Surface Layer	Rock outcrop consists of massive exposures of regionally jointed and fractured granitic rock	0 to 11 inches; brown gravelly loamy coarse sand; single grain; loose; 15 percent pebbles; pH 5.6
Subsoil		
Substratum		11 inches; unweathered granodiorite

Soil Properties & Management Interpretations

Effective Rooting Depth	4" to 20"
Drainage	Excessively drained
Permeability	Rapid
Available Water Capacity	
Upper 20 inches	0.3 to 1.5
Total	0.3 to 1.5
Hydrologic Soil Group	D
Unified Soil Classification	SW-SM
Erosion Factor K	.17
Maximum Erosion Hazard	Very high
Sensitivity	High
Soil Manageability Class	4EDX
Annual Forage Production	Less than 200 lbs/acre
Forest Survey Site Class	6 and 7
Manageability Group	IV

Included Areas and Remarks:

Included in this unit are small areas of soils similar to Lithic Xeropsamments but have more than 35 percent rock fragments or are on slopes of 35 to 45 percent. Also included are soils in the Cagwin family and scattered remnants of soils in the Sirretta family. Included areas make up about 15 percent of the map unit area Much of this unit is along the South Fork San Joaquin River.

154 Rock outcrop - Rubble land association

Elevation: 8,800 to 10,800 feet Annual Precipitation:

Map Unit Components	Rock outcrop	Rubble land
Approximate Proportion	60 percent	30 percent
Landscape Position	Cirques	Cirques
Slope		
Typical Vegetation Series		

Soil Profile Description

Surface Layer	Rock outcrop consists of exposures of bare bedrock	Rubble land consists of deposits of broken rock, usually stones and boulders that have fallen from and accumulated below rock outcroppings
Subsoil		
Substratum		

Soil Properties & Management Interpretations

Effective Rooting Depth
Drainage
Permeability
Available Water Capacity
  Upper 20 inches
  Total
Hydrologic Soil Group
Unified Soil Classification
Erosion Factor K
Maximum Erosion Hazard
Sensitivity
Soil Manageability Class
Annual Forage Production
Forest Survey Site Class
Manageability Group

Included Areas and Remarks:

Included in this unit are small areas of soils in the Stecum family that are stable enough to grow vegetation. It makes up about 10 percent of the map unit area. A cirque is a steep-walled recess, shaped like a half bowl, in a mountainside, excavated mainly by the erosive activity of a mountain glacier. There is not enough soil in this unit to support over 10 percent vegetation cover.

155 Rock outcrop - Stecum family association, 35 to 65 percent slopes

Elevation: 8,000 to 10,600 feet Annual Precipitation: 25 to 60 inches

Map Unit Components	Rock outcrop	Stecum family
Approximate Proportion	60 percent	30 percent
Landscape Position	Mountainsides, colluvial slopes, and moraines	Mountainsides, colluvial slopes, and moraines
Slope		35 to 65 percent
Typical Vegetation Series		Red Fir, Lodgepole Pine

Soil Profile Description

Surface Layer	Rock outcrop consists of massive exposures of granitic bedrock or boulder fields	0 to 6 inches; brown stony coarse sandy loam; weak granular structure; soft; 25 percent rock fragments; pH 4.5
Subsoil		6 to 32 inches; pale brown very cobbly loamy coarse sand; weak subangular blocky structure; soft; 40 percent rock fragments; pH 5.0
Substratum		32 to 60 inches; very pale brown very cobbly loamy coarse sand; massive; soft; 55 percent rock fragments; pH 5.5

Soil Properties & Management Interpretations

Effective Rooting Depth	60" or more
Drainage	Excessively drained
Permeability	Rapid
Available Water Capacity	
Upper 20 inches	0.9 to 1.2
Total	3.0 to 3.4
Hydrologic Soil Group	A
Unified Soil Classification	SM/SW/GW
Erosion Factor K	.20
Maximum Erosion Hazard	Moderate and high
Sensitivity	High
Soil Manageability Class	3Xe
Annual Forage Production	Less than 200 lbs/acre
Forest Survey Site Class	NC
Manageability Group	III

Included Areas and Remarks:

Included in this unit are small areas of soils similar to the Stecum family but are 20 to 60 inches deep, and Entic Cryumbrepts. Included areas make up about 10 percent of the map unit area. Soils in the Stecum family have maximum erosion hazard of moderate on slopes of 35 to 45 percent and high on slopes over 45 percent. Typically, 20 to 60 percent of the surface of these soils is covered with gravel, cobbles, and stones.

156 Shaver family, 5 to 35 percent slopes

Elevation: 3,000 to 6,000 feet Annual Precipitation: 30 to 45 inches

Map Unit Components	**Shaver family**
Approximate Proportion	80 percent
Landscape Position	Mountainsides and upland basins
Slope	5 to 35 percent
Typical Vegetation Series	Mixed Conifer-Pine, Mixed Conifer-Fir

Soil Profile Description

Surface Layer	0 to 5 inches; grayish brown coarse sandy loam; moderate granular structure; soft; pH 6.5
Subsoil	5 to 33 inches; brown coarse sandy loam; weak granular structure; soft; pH 6.5
Substratum	33 to 73 inches; pale brown coarse sandy loam; massive; slightly hard; pH 5.9
	73 inches; strongly weathered quartz diorite

Soil Properties & Management Interpretations

Effective Rooting Depth	40" to 80"
Drainage	Well drained
Permeability	Moderately rapid
Available Water Capacity	
Upper 20 inches	1.9 to 2.2
Total	4.2 to 6.2
Hydrologic Soil Group	B
Unified Soil Classification	SM
Erosion Factor K	.20
Maximum Erosion Hazard	Moderate
Sensitivity	Low
Soil Manageability Class	1
Annual Forage Production	Less than 200 lbs/acre
Forest Survey Site Class	3
Manageability Group	I
Included Areas and Remarks:	Included in this unit are small areas of soils similar to the Shaver family but the surface horizon isn't as thick or the subsoil is loamy sand. Also included are soils in the Chaix family, Chaix family, deep, and Holland family, Rock outcrop and wet meadows. Included areas make up about 20 percent of the map unit area. The artificial regeneration potential is good on this soil.

157 Shaver family, 35 to 65 percent slopes

Elevation: 3,000 to 6,400 feet Annual Precipitation: 30 to 45 inches

Map Unit Components	**Shaver family**
Approximate Proportion	80 percent
Landscape Position	Mountainsides
Slope	35 to 65 percent
Typical Vegetation Series	Mixed Conifer-Pine

Soil Profile Description

Surface Layer	0 to 5 inches; grayish brown coarse sandy loam; moderate granular structure; soft; pH 6.5
Subsoil	5 to 33 inches; brown coarse sandy loam; weak granular structure; soft; pH 6.5
Substratum	33 to 73 inches; pale brown coarse sandy loam; massive; slightly hard; pH 5.9
	73 inches; strongly weathered quartz diorite

Soil Properties & Management Interpretations

Effective Rooting Depth	40" to 80"
Drainage	Well drained
Permeability	Moderately rapid
Available Water Capacity	
Upper 20 inches	1.9 to 2.2
Total	4.2 to 6.2
Hydrologic Soil Group	B
Unified Soil Classification	SM
Erosion Factor K	.20
Maximum Erosion Hazard	High
Sensitivity	Moderate
Soil Manageability Class	3e
Annual Forage Production	Less than 200 lbs/acre
Forest Survey Site Class	4
Manageability Group	III
Included Areas and Remarks:	Included in this unit are small areas of soils similar to the Shaver family but the surface horizon isn't as thick, the subsoil is loamy sand, or it is only 30 to 40 inches deep. Also included are Rock outcrop, soils in the Chaix family, Chaix family, deep, and Holland family. Included areas make up about 20 percent of the map unit area.

158 Sirretta family, 25 to 50 percent slopes

Elevation: 6,000 to 8,400 feet Annual Precipitation: 30 to 55 inches

Map Unit Components	**Sirretta family**
Approximate Proportion	80 percent
Landscape Position	Moraines
Slope	25 to 50 percent
Typical Vegetation Series	Mixed Conifer - Fir, Red Fir, Jeffrey Pine

Soil Profile Description

Surface Layer	0 to 7 inches; grayish brown gravelly coarse sandy loam; strong granular structure; soft; 20 percent pebbles; pH 5.6
Subsoil	7 to 30 inches; light yellowish brown very cobbly loamy coarse sand; moderate granular structure; soft; 40 percent rock fragments; pH 5.4
Substratum	30 to 60 inches; very pale brown very gravelly loamy coarse sand; massive; slightly hard; 40 percent rock fragments; pH 5.3

Soil Properties & Management Interpretations

Effective Rooting Depth	60" or more
Drainage	Somewhat excessively drained and excessively drained
Permeability	Moderately rapid and rapid
Available Water Capacity	
Upper 20 inches	1.0 to 1.2
Total	4.8 to 5.3
Hydrologic Soil Group	A
Unified Soil Classification	SM/SW/SW
Erosion Factor K	.24
Maximum Erosion Hazard	Moderate and high
Sensitivity	Moderate
Soil Manageability Class	3x
Annual Forage Production	Less than 200 lbs/acre
Forest Survey Site Class	4 and 5
Manageability Group	III
Included Areas and Remarks:	Included in this unit are small areas of large glacial erratics, soils in the Cagwin and Umpa families, and soils similar to the Sirretta family but have darker surfaces. Also included are soils formed in colluvium from metamorphic rock in the Cow Creek drainage area. Included areas make up about 20 percent of the map unit area. Rock fragments are abundant in the soil profile, and sometimes on the surface. In the spring and early summer there are seeps or springs along road cutbanks. The maximum erosion hazard of this soil is moderate on slopes of 15 to 35 percent and high on slopes over 35 percent.

159 Sirretta family - Rock outcrop complex, 15 to 45 percent slopes

Elevation: 6,000 to 8,500 feet Annual Precipitation: 25 to 45 inches

Map Unit Components	Sirretta family	Rock outcrop
Approximate Proportion	60 percent	25 percent
Landscape Position	Moraines	Moraines
Slope	15 to 45 percent	
Typical Vegetation Series	Jeffrey Pine, Mixed Conifer - Fir, Red Fir	

Soil Profile Description

Surface Layer	0 to 7 inches; grayish brown gravelly coarse sandy loam; strong granular structure; soft; 20 percent pebbles; pH 5.6	Rock outcrop consists of large glacial erratics 10 to 25 feet in diameter
Subsoil	7 to 30 inches; light yellowish brown very cobbly loamy coarse sand; moderate granular structure; soft; 40 percent rock fragments; pH 5.4	
Substratum	30 to 60 inches; very pale brown very gravelly loamy coarse sand; massive; slightly hard; 40 percent rock fragments; pH 5.3	

Soil Properties & Management Interpretations

Effective Rooting Depth	40" or more
Drainage	Somewhat excessively drained and excessively drained
Permeability	Moderately rapid and rapid
Available Water Capacity	
Upper 20 inches	1.0 to 1.2
Total	2.4 to 5.3
Hydrologic Soil Group	A
Unified Soil Classification	SM/SW/SW
Erosion Factor K	.24
Maximum Erosion Hazard	Moderate and high
Sensitivity	Moderate
Soil Manageability Class	4X
Annual Forage Production	Less than 200 lbs/acre
Forest Survey Site Class	5
Manageability Group	IV

Included Areas and Remarks: Included in this unit are small areas of soils in the Cagwin and Gerle families and soils in the Cow Creek area that are formed from metamorphic colluvium and have cobbly sandy loam subsoils. Included areas make up about 15 percent of the map unit area. Rock fragments are abundant in the soil profile and on the surface in some areas. Numerous large boulders make equipment operation difficult. Seeps or springs occur along road cutbanks. The maximum erosion hazard of this soil is moderate on slopes of 15 to 35 percent and high on slopes over 35 percent. Artificial regeneration is difficult due to rock fragments and low available water capacity.

160 Sirretta family - Rock outcrop complex, 45 to 65 percent slopes

Elevation: 6,000 to 8,000 feet Annual Precipitation: 25 to 55 inches

Map Unit Components	Sirretta family	Rock outcrop
Approximate Proportion	60 percent	25 percent
Landscape Position	Moraines	Moraines
Slope	45 to 65 percent	
Typical Vegetation Series	Jeffrey Pine, Mixed Conifer - Fir, Red Fir	

Soil Profile Description

Surface Layer	0 to 7 inches; grayish brown gravelly coarse sandy loam; strong granular structure; soft; 20 percent pebbles; pH 5.6	Rock outcrop consists of large glacial erratics 10 to 25 feet in diameter
Subsoil	7 to 30 inches; light yellowish brown very cobbly loamy coarse sand; moderate granular structure; soft; 40 percent rock fragments, pH 5.4	
Substratum	30 to 60 inches; very pale brown very gravelly loamy coarse sand; massive; slightly hard; 40 percent rock fragments; pH 5.3	

Soil Properties & Management Interpretations

Effective Rooting Depth	40" or more
Drainage	Somewhat excessively drained and excessively drained
Permeability	Moderately rapid and rapid
Available Water Capacity	
Upper 20 inches	1.0 to 1.2
Total	2.4 to 5.3
Hydrologic Soil Group	A
Unified Soil Classification	SM/SW/SW
Erosion Factor K	.24
Maximum Erosion Hazard	High
Sensitivity	High
Soil Manageability Class	4Xe
Annual Forage Production	Less than 200 lbs/acre
Forest Survey Site Class	5
Manageability Group	IV

Included Areas and Remarks: Included in this unit are small areas of soils in the Cagwin family and soils similar to the Sirretta family but have cobbly sandy loam textures. Included areas make up about 15 percent of the map unit area. Cobbles, stones, and boulders are common in the soil profile and on the soil surface. These make equipment operation and artificial regeneration difficult.

161 Sirretta and Umpa, wet, families, 3 to 25 percent slopes

Elevation: 6,000 to 8,500 feet Annual Precipitation: 35 to 50 inches

Map Unit Components	Sirretta family	Umpa family, wet
Approximate Proportion	55 percent	30 percent
Landscape Position	Moraines in valleys and basins	Moraines in valleys and broad upland basins in areas which receive laterally moving water
Slope	3 to 25 percent	3 to 10 percent
Typical Vegetation Series	Mixed Conifer - Fir, Jeffrey Pine	Red Fir, Lodgepole Pine

Soil Profile Description

Surface Layer	0 to 7 inches; grayish brown gravelly coarse sandy loam; strong granular structure; soft; 20 perccent pebbles; pH 5.6	0 to 6 inches; yellowish brown stony coarse sandy loam; weak granular structure; soft; 15 percent rock fragments; pH 6.0
Subsoil	7 to 30 inches; light yellowish brown very cobbly loamy coarse sand; moderate granular structure; soft; 40 percent rock fragments; pH 5.4	6 to 24 inches; brown very stony coarse sandy loam; massive; hard; 40 percent rock fragments; pH 6.0
Substratum	30 to 60 inches; very pale brown very gravelly loamy coarse sand; massive; slightly hard; 40 percent rock fragments; pH 5.3	24 to 60 inches; brownish yellow very stony coarse sandy loam; massive; hard; 50 percent rock fragments; pH 6.0

Soil Properties & Management Interpretations

Effective Rooting Depth	60" or more	60" or more
Drainage	Somewhat excessively drained and excessively drained	Moderately well drained and well drained
Permeability	Moderately rapid	Moderate
Available Water Capacity		
Upper 20 inches	1.0 to 1.2	1.4 to 1.6
Total	4.8 to 5.3	4.0 to 5.0
Hydrologic Soil Group	A	B
Unified Soil Classification	SM/SW/SW	SM/SM/GM
Erosion Factor K	.24	.20
Maximum Erosion Hazard	Moderate	Moderate
Sensitivity	Low and moderate	Low
Soil Manageability Class	2x	2ewx
Annual Forage Production	200 to 600 lbs/acre	200 to 600 lbs/acre
Forest Survey Site Class	4	4
Manageability Group	II	II

Included Areas and Remarks:

Included in this unit are small areas of large glacial erratics, wet meadows, soils in the Cagwin family associated with soils in the Sirretta family, soils similar to and associated with the Umpa family but are darker, less developed or have less than 35 percent rock fragments. Also included are soils similar to the Sirretta and Umpa families but are colder, lying in pockets of cold air drainage. Included areas make up about 15 percent of the map unit area. These soils are not consistently associated geographically. Each delineation of this map unit has at least one of these soils and some have both. With the Umpa family, wet the water table is above 20 inches during the peak snow melt period. The artificial regeneration potential is good on Umpa family, wet soils and fair on Sirretta family soils. Sierretta family soils should be planted as soon after snowmelt as possible. The subsoil in Umpa family, wet is wet until mid-August. Soils in the Sirretta family have sensitivity of low on slopes of 3 to 15 percent and moderate on slopes of 15 to 25 percent.

162 Stecum family, 3 to 35 percent slopes

Elevation: 8,200 to 10,600 feet Annual Precipitation: 45 to 60 inches

Map Unit Components	**Stecum family**
Approximate Proportion	80 percent
Landscape Position	Moraines and outwash plains
Slope	3 to 35 percent
Typical Vegetation Series	Lodgepole Pine, Red Fir

Soil Profile Description

Surface Layer	0 to 6 inches; brown stony coarse sandy loam; weak granular structure; soft; 25 percent rock fragments; pH 4.5
Subsoil	6 to 32 inches; pale brown very cobbly loamy coarse sand; weak subangular blocky structure; soft; 40 percent rock fragments; pH 5.0
Substratum	32 to 60 inches; very pale brown very cobbly loamy coarse sand; massive; soft; 55 percent rock fragments; pH 5.5

Soil Properties & Management Interpretations

Effective Rooting Depth	60" or more
Drainage	Excessively drained
Permeability	Rapid
Available Water Capacity	
Upper 20 inches	0.9 to 1.2
Total	3.0 to 3.4
Hydrologic Soil Group	A
Unified Soil Classification	SM/SW/GW
Erosion Factor K	.20
Maximum Erosion Hazard	Moderate
Sensitivity	Moderate
Soil Manageability Class	2wx
Annual Forage Production	200 to 600 lbs/acre
Forest Survey Site Class	NC
Manageability Group	II
Included Areas and Remarks:	Included in this unit are small areas of Aquic Cryumbrepts, soils similar to the Stecum family but have less than 35 percent rock fragments, Entic Cryumbrepts, and large glacial erratics. Included areas make up about 20 percent of the map unit area. Walking trails made in this soil are sandy and/or rocky. Water seeps from roadcuts during and following snow melt.

163 Stecum family - Aquic Cryumbrepts association, 1 to 25 percent slopes

Elevation: 8,300 to 9,600 feet Annual Precipitation: 40 to 60 inches

Map Unit Components	Stecum family	Aquic Cryumbrepts
Approximate Proportion	60 percent	30 percent
Landscape Position	Moraines along the sides of basins	Outwash plains in basins
Slope	5 to 25 percent	1 to 10 percent
Typical Vegetation Series	Lodgepole Pine	Lodgepole Pine, Perennial Grass, Sedge-Rush

Soil Profile Description

Surface Layer	0 to 6 inches; brown stony coarse sandy loam; weak granular structure; soft; 25 percent rock fragments; pH 4.5	0 to 14 inches; grayish brown sandy loam; weak granular structure; soft; pH 5.5
Subsoil	6 to 32 inches; pale brown very cobbly loamy coarse sand; weak subangular blocky structure; soft; 40 percent rock fragments; pH 5.0	14 to 60 inches; stratified layers of sandy loam and gravelly loamy coarse sand; pH 6.5
Substratum	32 to 60 inches; very pale brown very cobbly loamy coarse sand; massive; soft; 55 percent rock fragments; pH 5.5	

Soil Properties & Management Interpretations

Effective Rooting Depth	60" or more	60" or more
Drainage	Excessively drained	Somewhat poorly drained
Permeability	Rapid	Moderate
Available Water Capacity		
Upper 20 inches	0.9 to 1.2	Moderate
Total	3.0 to 3.4	Moderate
Moderate Hydrologic Soil Group	A	B
Unified Soil Classification	SM/SW/GW	SM/SM,SW-SM
Erosion Factor K	.20	.20
Maximum Erosion Hazard	Moderate	High
Sensitivity	Moderate	Low
Soil Manageability Class	2x	2We
Annual Forage Production	200 to 600 lbs/acre	200 to 600 and 1,200 to 2,000
Forest Survey Site Class	NC	NC
Manageability Group	II	II

Included Areas and Remarks:

Included in this unit are small areas of Entic Cryumbrepts and large glacial erratics intricately intermingled with soils in the Stecum family. Included areas make up about 10 percent of the map unit area. There are many lakes in this unit associated with Aquic Cryumbrepts. Annual Forage Production (LBS/AC) for Aquic Cryumbrepts is 200 to 600 under the Lodgepole Pine Vegetation Series and 1,200 to 2,000 under the Perennial Grass and Sedge-Rush Vegetation Series. Aquic Cryumbrepts are wet most of the year. They are also susceptible to gully erosion when the protective cover is removed.

164 Stecum family - Rock outcrop complex, 5 to 45 percent slopes

Elevation: 8,300 to 10,000 feet Annual Precipitation: 35 to 55 inches

Map Unit Components	Stecum family	Rock outcrop
Approximate Proportion	70 percent	20 percent
Landscape Position	Moraines	Moraines
Slope	5 to 45 percent	
Typical Vegetation Series	Lodgepole Pine, Red Fir	

Soil Profile Description

Surface Layer	0 to 6 inches; brown stony coarse sandy loam; weak granular structure; soft; 25 percent rock fragments; pH 4.5	Rock outcrop consists of large glacial erratics 10 to 20 feet in diameter
Subsoil	6 to 32 inches; pale brown very cobbly loamy coarse sand; weak subangular blocky structure; soft; 40 percent rock fragments; pH 5.0	
Substratum	32 to 60 inches; very pale brown very cobbly loamy coarse sand; massive; soft; 55 percent rock fragments; pH 5.5	

Soil Properties & Management Interpretations

Effective Rooting Depth	60" or more
Drainage	Excessively drained
Permeability	Rapid
Available Water Capacity	
Upper 20 inches	0.9 to 1.2
Total	3.0 to 3.4
Hydrologic Soil Group	A
Unified Soil Classification	SM/SW/GW
Erosion Factor K	.20
Maximum Erosion Hazard	Moderate
Sensitivity	Moderate
Soil Manageability Class	3X
Annual Forage Production	200 to 600 lbs/acre
Forest Survey Site Class	NC
Manageability Group	III
Included Areas and Remarks:	Included in this unit are small areas of Aquic Cryumbrepts and Entic Cryumbrepts. Also included are soils similar to the Stecum family but have less than 35 percent rock fragments, are 30 to 60 inches deep to bedrock, or are on slopes of 45 to 65 percent. Included areas make up about 10 percent of the map unit area.

165 Stecum family - Rock outcrop association, 45 to 65 percent slopes

Elevation: 8,000 to 9,800 feet Annual Precipitation: 25 to 50 inches

Map Unit Components	Stecum family	Rock outcrop
Approximate Proportion	60 percent	30 percent
Landscape Position	Moraines and colluvial slopes	Colluvial slopes and/or moraines
Slope	45 to 65 percent	
Typical Vegetation Series	Lodgepole Pine, Red Fir, Western White Pine	

Soil Profile Description

Surface Layer	0 to 6 inches; stony coarse sandy loam; weak granular structure; soft; 25 percent rock fragments; pH 4.5	Rock outcrop consists of large exposures of granitic bedrock or boulder fields of glacial erratics
Subsoil	6 to 32 inches; pale brown very cobbly loamy coarse sand; weak subangular blocky structure; soft; 40 percent rock fragments; pH 5.0	
Substratum	32 to 60 inches; very pale brown very cobbly loamy coarse sand; massive; soft; 55 percent rock fragments; pH 5.5	

Soil Properties & Management Interpretations

Effective Rooting Depth	60" or more
Drainage	Excessively drained
Permeability	Rapid
Available Water Capacity	
Upper 20 inches	0.9 to 1.2
Total	3.0 to 3.4
Hydrologic Soil Group	A
Unified Soil Classification	SM/SW/GW
Erosion Factor K	.20
Maximum Erosion Hazard	High
Sensitivity	High
Soil Manageability Class	3Xe
Annual Forage Production	Less than 200 lbs/acre
Forest Survey Site Class	NC
Manageability Group	III

Included Areas and Remarks:

Included in this unit are small areas of soils similar to the Stecum family but have less than 35 percent rock fragments, or are less than 60 inches deep, or are slightly warmer. Also included are Entic Cryumbrepts and Rubble land. Included areas make up about 10 percent of the map unit area. Typically, 20 to 60 percent of the surface of Stecum family soils is covered with gravel, cobbles, and stones.

166 Tollhouse family - Rock outcrop complex, 30 to 60 percent slopes

Elevation: 2,000 to 5,000 feet Annual Precipitation: 25 to 35 inches

Map Unit Components	Tollhouse family	Rock outcrop
Approximate Proportion	65 percent	25 percent
Landscape Position	Mountainsides and ridges	Mountainsides and ridges
Slope	30 to 60 percent	
Typical Vegetation Series	Interior Live Oak, Mariposa Manzanita, Wedgeleaf Ceanothus	

Soil Profile Description

Surface Layer	0 to 18 inches; dark grayish brown gravelly coarse sandy loam; moderate granular structure; soft; 15 percent pebbles; pH 6.2	Rock outcrop consists of isolated outcroppings and massive exposures of granitic rock
Subsoil		
Substratum	18 inches; weathered quartz diorite	

Soil Properties & Management Interpretations

Effective Rooting Depth	14" to 20"
Drainage	Somewhat excessively drained
Permeability	Moderately rapid
Available Water Capacity	
Upper 20 inches	1.2 to 1.8
Total	1.2 to 1.8
Hydrologic Soil Group	D
Unified Soil Classification	SM
Erosion Factor K	.20
Maximum Erosion Hazard	High
Sensitivity	High
Soil Manageability Class	3Xed
Annual Forage Production	Less than 200 lbs/acre
Forest Survey Site Class	NC
Manageability Group	III
Included Areas and Remarks:	Included in this unit are small areas of soils in the Holland family, Auberry family, and Chaix family. Also included are soils similar to the Tollhouse family but are lighter colored, on hard bedrock, or warmer. Included areas make up about 10 percent of the map unit area.

167 Tollhouse family - Rock outcrop association, 60 to 85 percent slopes

Elevation: 2,000 to 4,400 feet Annual Precipitation: 25 to 35 inches

Map Unit Components	Tollhouse family	Rock outcrop
Approximate Proportion	55 percent	30 percent
Landscape Position	Mountainsides	Mountainsides
Slope	60 to 85 percent	
Typical Vegetation Series	Interior Live Oak, Canyon Live Oak, Mariposa Manzanita	

Soil Profile Description

Surface Layer	0 to 18 inches; dark grayish brown gravelly coarse sandy loam; moderate granular structure; soft; 15 percent pebbles; pH 6.2	Rock outcrop consists of isolated outcroppings and massive exposures of granitic rock
Subsoil		
Substratum	18 inches; weathered quartz diorite	

Soil Properties & Management Interpretations

Effective Rooting Depth	14" to 20"
Drainage	Somewhat excessively drained
Permeability	Moderately rapid
Available Water Capacity	
Upper 20 inches	1.2 to 1.8
Total	1.2 to 1.8
Hydrologic Soil Group	D
Unified Soil Classification	SM
Erosion Factor K	.20
Maximum Erosion Hazard	High
Sensitivity	High
Soil Manageability Class	4ed
Annual Forage Production	Less than 200 lbs/acre
Forest Survey Site Class	NC
Manageability Group	IV
Included Areas and Remarks:	Included in this unit are small areas of soils similar to the Tollhouse family but are lighter colored, on slopes of 50 to 60 percent, or warmer, particularly on south-facing slopes below 2,700 feet elevation. Included areas make up about 15 percent of the map unit area.

168 Typic Argixerolls, 15 to 50 percent slopes

Elevation: 1,100 to 4,400 Annual Precipitation: 25 to 35 inches

Map Unit Components	**Typic Argixerolls**
Approximate Proportion	85 percent
Landscape Position	Mountainsides
Slope	15 to 50 percent
Typical Vegetation Series	Blue Oak, Interior Live Oak

Soil Profile Description

Surface Layer	0 to 8 inches; dark brown sandy loam; moderate subangular blocky structure; hard; pH 7.2
Subsoil	8 to 55 inches; reddish brown gravelly sandy clay loam; moderate subangular blocky structure; hard; 20 percent rock fragments; pH 7.3
Substratum	55 inches; highly weathered hornblende gabbro

Soil Properties & Management Interpretations

Effective Rooting Depth	30" to 80"
Drainage	Well drained and moderately well drained
Permeability	Moderate and moderately slow
Available Water Capacity	
Upper 20 inches	2.8 to 3.1
Total	4.7 to 9.4
Hydrologic Soil Group	C
Unified Soil Classification	SM-SC/SC
Erosion Factor K	.24
Maximum Erosion Hazard	High
Sensitivity	Moderate
Soil Manageability Class	3e
Annual Forage Production	1,200 to 2,000 lbs/acre
Forest Survey Site Class	NC
Manageability Group	III
Included Areas and Remarks:	Included in this unit are small areas of Rock outcrop, and soils in the Coarsegold and Auberry families. Included areas make up about 15 percent of the map unit area. Unsurfaced roads are slick when wet and are very susceptible to gully erosion. Gully erosion on roads is reduced if traffic is prohibited when roads are wet. This unit occurs on the lower part of the Kings River Ranger District.

169 Typic Argixerolls - Coarsegold family association, 35 to 65 percent slopes

Elevation: 1,300 to 4,500 feet Annual Precipitation: 25 to 35 inches

Map Unit Components	Typic Argixerolls	Coarsegold family
Approximate Proportion	50 percent	30 percent
Landscape Position	Mountainsides	Mountainsides
Slope	30 to 50 percent	35 to 65 percent
Typical Vegetation Series	Blue Oak, Annual Grass-Forb	Interior Live Oak

Soil Profile Description

Surface Layer	0 to 8 inches; dark brown sandy loam; moderate subangular blocky structure; hard; pH 7.2	0 to 4 inches; brown loam; weak subangular blocky structure parting to moderate granular; soft; pH 6.3
Subsoil	8 to 55 inches; reddish brown gravelly sandy clay loam; moderate subangular blocky structure; hard; 20 percent rock fragments; pH 7.3	4 to 22 inches; brown gravelly clay loam; moderate angular blocky structure; very hard; 15 percent rock fragments; pH 6.7
Substratum	55 inches; highly weathered hornblende gabbro	22 inches; highly weathered metasedimentary rock

Soil Properties & Management Interpretations

Effective Rooting Depth	30" to 80"	20" to 50"
Drainage	Well drained and moderately well drained	Well drained
Permeability	Moderate and moderately slow	Moderate
Available Water Capacity		
Upper 20 inches	2.8 to 3.1	2.8 to 3.2
Total	4.7 to 9.4	2.8 to 8.0
Hydrologic Soil Group	C	C
Unified Soil Classification	SM-SC/SC	ML
Erosion Factor K	.24	.32
Maximum Erosion Hazard	High	High and very high
Sensitivity	Moderate	Moderate and high
Soil Manageability Class	3e	3E
Annual Forage Production	1,200 to 2,000 lbs/acre	1,200 to 2,000 lbs/acre
Forest Survey Site Class	NC	NC
Manageability Group	III	III

Included Areas and Remarks:

Included in this unit are small areas of Rock outcrop, soils in the Auberry family on granitic rock intrusions, soils similar to Typic Argixerolls in the Secata Ridge area which are on schist and are deeper, have thinner surface horizons, and redder subsoils. Also included are soils similar to the Coarsegold family but have more than 35 percent rock fragments. Included areas make up about 20 percent of the map unit area. Soils in the Coarsegold family have maximum erosion hazard of high on slopes of 35 to 50 percent and very high on slopes over 50 percent. Sensitivity of soils in the Coarsegold family is moderate on slopes of 35 to 50 percent and high on slopes over 50 percent. Roads are difficult to travel when wet, and rutting makes them susceptible to gully erosion. Small landslides are common in this map unit.

170 Typic Xerumbrepts, 5 to 20 percent slopes

Elevation: 6,800 to 8,600 feet Annual Precipitation: 40 to 55 inches

Map Unit Components	**Typic Xerumbrepts**
Approximate Proportion	85 percent
Landscape Position	Volcanic flows and till plains
Slope	5 to 20 percent
Typical Vegetation Series	Mixed Conifer - Fir, Red Fir, Jeffrey Pine

Soil Profile Description

Surface Layer	0 to 15 inches; very dark grayish brown loam; moderate granular structure; soft; pH 6.5
Subsoil	15 to 35 inches; strong brown gravelly sandy loam; weak subangular blocky structure; soft; 30 percent rock fragments; pH 6.2
Substratum	35 to 60 inches; light yellowish brown extremely gravelly loamy sand; massive; soft; 65 percent rock fragments; pH 6.3

Soil Properties & Management Interpretations

Effective Rooting Depth	40" to 70"
Drainage	Well drained
Permeability	Moderately rapid
Available Water Capacity	
Upper 20 inches	2.0 to 2.4
Total	3.7 to 5.0
Hydrologic Soil Group	B
Unified Soil Classification	SM/SM/GW-GM
Erosion Factor K	.20
Maximum Erosion Hazard	Moderate
Sensitivity	Low
Soil Manageability Class	1
Annual Forage Production	200 to 600 lbs/acre
Forest Survey Site Class	4
Manageability Group	I
Included Areas and Remarks:	Included in this unit are small areas of Dystric Xerochrepts, soils in the Umpa family, soils similar to Typic Xerumbrepts on 20 to 35 percent slopes, and large glacial erratics. Included areas make up about 15 percent of the map unit area. This map unit occurs mainly in the Clover/Jackass Meadows area of the Minarets Ranger District, and the Rancheria Creek area of the Kings River Ranger District.

171 Ultic Haploxeralfs, deep, 15 to 50 percent slopes

Elevation: 5,600 to 8,200 feet Annual Precipitation: 35 to 45 inches

Map Unit Components	**Ultic Haploxeralfs, deep**
Approximate Proportion	75 percent
Landscape Position	Mountainsides
Slope	15 to 50 percent
Typical Vegetation Series	Mixed Conifer-Pine, Mixed Conifer-Fir, Jeffrey Pine

Soil Profile Description

Surface Layer	0 to 8 inches; brown cobbly sandy loam; weak subangular blocky structure parting to weak granular; soft; 20 percent rock fragments; pH 6.5
Subsoil	8 to 50 inches; reddish brown very cobbly loam; moderate subangular blocky structure; slightly hard; 50 percent rock fragments
Substratum	50 inches; highly weathered and fractured andesite

Soil Properties & Management Interpretations

Effective Rooting Depth	40" to 60"
Drainage	Well drained
Permeability	Moderate
Available Water Capacity	
Upper 20 inches	1.6 to 2.9
Total	3.8 to 6.0
Hydrologic Soil Group	B
Unified Soil Classification	SM/GM-GC
Erosion Factor K	.24
Maximum Erosion Hazard	Moderate and high
Sensitivity	Moderate
Soil Manageability Class	3e
Annual Forage Production	Less than 200 lbs/acre
Forest Survey Site Class	4
Manageability Group	III
Included Areas and Remarks:	Included in this unit are small areas of Rock outcrop, Dystric Xerochrepts, and Typic Xerumbrepts. Also included are soils similar to Ultic Haploxeralfs, deep, but are not as developed. Included areas make up about 25 percent of the map unit area. The maximum erosion hazard for this soil is moderate on slopes of 15 to 35 percent and high on slopes over 35 percent. In some areas about 35 percent of the surface is covered by cobbles.

172 Ultic Haploxeralfs - Dystric Lithic Xerochrepts complex, 15 to 50 percent slopes

Elevation: 2,500 to 4,000 feet Annual Precipitation: 35 to 50 inches

Map Unit Components	Ultic Haploxeralfs	Dystric Lithic Xerochrepts
Approximate Proportion	60 percent	25 percent
Landscape Position	Mountainsides and ridges	Mountainsides and ridges
Slope	15 to 50 percent	15 to 50 percent
Typical Vegetation Series	Mariposa Manzanita, Mariposa Manzanita/ Knobcone Pine, Mariposa Manzanita/ Ponderosa Pine	Mariposa Manzanita, Mariposa Manzanita/ Knobcone Pine, Mariposa Manzanita/ Ponderosa Pine

Soil Profile Description

Surface Layer	0 to 3 inches; light yellowish brown gravelly loam; weak granular structure; soft; 15 percent pebbles; pH 7.0	0 to 7 inches; yellowish red cobbly loam; weak granular structure; slightly hard; 15 percent rock fragments; pH 6.5
Subsoil	3 to 32 inches; reddish yellow silt loam; weak subangular blocky structure; hard; pH 6.0	7 to 11 inches; reddish yellow silt loam; weak subangular blocky structure; slightly hard; 35 percent cobbles; pH 6.2
Substratum	32 inches; highly weathered weakly metamorphosed slate sandstone	11 inches; hard, fractured weakly metamorphosed

Soil Properties & Management Interpretations

Effective Rooting Depth	20" to 40"	10" to 20"
Drainage	Well drained	Somewhat excessively drained
Permeability	Moderate	Moderately rapid
Available Water Capacity		
Upper 20 inches	2.4 to 2.6	1.3 to 2.9
Total	2.4 to 5.4	1.3 to 2.9
Hydrologic Soil Group	C	D
Unified Soil Classification	SM/CL-ML	SM
Erosion Factor K	.28	.28
Maximum Erosion Hazard	High	High
Sensitivity	Moderate	High
Soil Manageability Class	3e	3ed
Annual Forage Production	Less than 200 lbs/acre	Less than 200 lbs/acre
Forest Survey Site Class	5, 6 and NC	6, 7 and NC
Manageability Group	III	III

Included Areas and Remarks:

Included in this unit are small areas of Rock outcrop, soils similar to Ultic Haploxeralfs but are less than 20 inches deep on south-facing slopes and over 40 inches deep on north-facing slopes. Also included are soils in the Holland family along drainages and on toeslopes, and soils similar to the Holland family but are on metavolcanic rock near the Forest boundary in the Midpines area. Included areas make up about 15 percent of the map unit area. Artificial regeneration is fair in this unit when a mulch is left during site preparation and competition from Mariposa manzanita is controlled.

173 Ultic Haploxeralfs - Dystric Lithic Xerochrepts complex, 50 to 85 percent slopes

Elevation: 1,700 to 5,400 feet Annual Precipitation: 35 to 45 inches

Map Unit Components	Ultic Haploxeralfs	Dystric Lithic Xerochrepts
Approximate Proportion	50 percent	35 percent
Landscape Position	Mountainsides	Mountainsides
Slope	50 to 65 percent	65 to 85 percent
Typical Vegetation Series	Mariposa Manzanita, Canyon Live Oak, Mariposa Manzanita/ Ponderosa Pine	Mariposa Manzanita, Canyon Live Oak, Mariposa Manzanita/ Ponderosa Pine

Soil Profile Description

Surface Layer	0 to 3 inches; light yellowish brown gravelly loam; weak granular structure; soft; 15 percent pebbles; pH 7.0	0 to 7 inches; yellowish red cobbly loam; weak granular structure; slightly hard; 15 percent rock fragments; pH 6.5
Subsoil	3 to 32 inches; reddish yellow silt loam; weak subangular blocky structure; hard; pH 6.0	7 to 11 inches; redish yellow very cobbly loam; weak subangular blocky structure; slightly hard; 35 percent cobbles; pH 6.2
Substratum	32 inches; highly weathered weakly metamorphosed slate sandstone	11 inches; hard, fractured weakly metamorphosed

Soil Properties & Management Interpretations

Effective Rooting Depth	20" to 40"	10" to 20"
Drainage	Well drained	Somewhat excessively drained
Permeability	Moderate	Moderately rapid
Available Water Capacity		
Upper 20 inches	2.4 to 2.6	1.3 to 2.9
Total	2.4 to 5.4	1.3 to 2.9
Hydrologic Soil Group	C	D
Unified Soil Classification	SM/CL-ML	SM
Erosion Factor K	.28	.28
Maximum Erosion Hazard	Very high	Very high
Sensitivity	High	High
Soil Manageability Class	3E	4Ed
Annual Forage Production	Less than 200 lbs/acre	Less than 200 lbs/acre
Forest Survey Site Class	NC and 6	NC and 7
Manageability Group	III	III

Included Areas and Remarks: Included in this unit are small areas of Rock outcrop, soils in the Holland and Neuns families, and soils similar to Ultic Haploxeralfs but are less than 20 inches deep. Included areas make up about 15 percent of the map unit area. Small landslides are common in this map unit. Typically, the Mariposa Manzanita Vegetation Series is on southern aspects, Canyon Live Oak on northern aspects, and Mariposa Manzanita/Ponderosa Pine above 3,000 feet elevation. This unit occurs only on the Mariposa Ranger District.

174 Umpa family, 5 to 35 percent slopes

Elevation: 6,000 to 7,600 feet Annual Precipitation: 30 to 50 inches

Map Unit Components	**Umpa family**
Approximate Proportion	80 percent
Landscape Position	Moraines
Slope	5 to 35 percent
Typical Vegetation Series	Mixed Conifer-Fir, Red Fir

Soil Profile Description

Surface Layer	0 to 6 inches; very dark grayish brown bouldery sandy loam; weak granular structure; soft; 15 percent rock fragments; pH 6.2
Subsoil	6 to 48 inches; yellowish brown very stony coarse sandy loam; weak subangular blocky structure; soft; 45 percent rock fragments; pH 5.6
Substratum	48 to 60 inches; yellow very stony coarse sandy loam; massive; slightly hard; 50 percent rock fragments; pH 5.4

Soil Properties & Management Interpretations

Effective Rooting Depth	60" or more
Drainage	Well drained
Permeability	Moderately rapid
Available Water Capacity	
Upper 20 inches	1.3 to 1.6
Total	4.0 to 5.0
Hydrologic Soil Group	B
Unified Soil Classification	SM/SM/GM
Erosion Factor K	.20
Maximum Erosion Hazard	Moderate
Sensitivity	Low
Soil Manageability Class	2wx
Annual Forage Production	Less than 200 lbs/acre
Forest Survey Site Class	4
Manageability Group	II
Included Areas and Remarks:	Included in this unit are small areas of soils in the Sirretta and Gerle families, soils similar to the Umpa family but have no development in the subsoil or that are warmer, and Aquic Dystric Xerochrepts in low lying areas. Included areas make up about 20 percent of the map unit area.

175 Umpa family, 35 to 55 percent slopes

Elevation: 6,000 to 7,600 feet Annual Precipitation: 30 to 50 inches

Map Unit Components	**Umpa family**
Approximate Proportion	80 percent
Landscape Position	Moraines
Slope	35 to 55 percent
Typical Vegetation Series	Mixed Conifer-Fir, Red Fir, Jeffrey Pine

Soil Profile Description

Surface Layer	0 to 6 inches; very dark grayish brown bouldery sandy loam; weak granular structure; soft; 15 percent rock fragments; pH 6.2
Subsoil	6 to 48 inches; yellowish brown very stony coarse sandy loam; weak subangular blocky structure; soft; 45 percent rock fragments; pH 5.6
Substratum	48 to 60 inches; yellow very stony coarse sandy loam; massive; slightly hard; 50 percent rock fragments; pH 5.4

Soil Properties & Management Interpretations

Effective Rooting Depth	60" or more
Drainage	Well drained
Permeability	Moderately rapid
Available Water Capacity	
Upper 20 inches	1.3 to 1.6
Total	4.0 to 5.0
Hydrologic Soil Group	B
Unified Soil Classification	SM/SM/GM
Erosion Factor K	.20
Maximum Erosion Hazard	Moderate
Sensitivity	Moderate
Soil Manageability Class	3wx
Annual Forage Production	Less than 200 lbs/acre
Forest Survey Site Class	4 and 5
Manageability Group	III
Included Areas and Remarks:	Included in this unit are small areas of soils in the Sirretta family, Cannell family, and soils similar to Umpa family but are darker, not as developed, or are warmer. Also included are large glacial erratics. Included areas make up about 20 percent of the map unit area. Water seeps out from road cutbanks in the fall and spring.

176 Umpa family, deep, 20 to 60 percent slopes

Elevation: 6,000 to 8,600 feet Annual Precipitation: 50 to 60 inches

Map Unit Components	**Umpa family, deep**
Approximate Proportion	70 percent
Landscape Position	Mountainsides, colluvial slopes, and moraines
Slope	20 to 60 percent
Typical Vegetation Series	Mixed Conifer - Fir, Red Fir

Soil Profile Description

Surface Layer	0 to 6 inches; very dark grayish brown cobbly sandy loam; weak granular structure; soft; 20 percent rock fragments; pH 6.5
Subsoil	6 to 54 inches; reddish yellow very cobbly loam; weak subangular blocky structure; slightly hard; 40 percent rock fragments; pH 6.5
Substratum	54 inches; fractured metasedimentary rock

Soil Properties & Management Interpretations

Effective Rooting Depth	40" to 60"
Drainage	Well drained
Permeability	Moderately rapid
Available Water Capacity	
Upper 20 inches	1.3 to 1.6
Total	3.8 to 6.0
Hydrologic Soil Group	B
Unified Soil Classification	SM
Erosion Factor K	.24
Maximum Erosion Hazard	Moderate and high
Sensitivity	Moderate and high
Soil Manageability Class	3e
Annual Forage Production	Less than 200 lbs/acre
Forest Survey Site Class	3 and 4
Manageability Group	III
Included Areas and Remarks:	Included in this unit are small areas of soils similar to the Umpa family, deep but have no subsoil development, have very cobbly loamy sand subsoils, or are darker, and soils with well developed subsoils in the Raymond Mountain and Whitechief Mountain areas. Also included are soils less than 20 inches deep and Rock outcrop on steep upper-slopes and ridges. Included areas make up about 30 percent of the map unit area. This soil occurs on several geologic materials and landscape positions. The majority of it is in the Raymond Mtn./Whitechief Mtn. area. The soil is unstable in the Tamarack Mtn. area. It has maximum erosion hazard and sensitivity of moderate on slopes of 20 to 50 percent and high on slopes over 50 percent.

TABLE 2. - Map Unit Legend, Map Unit Area, and Proportionate Extent

Map Symbol	Map Unit Name	Percent of Survey Area	Acres
101	Ahwahnee family, 5 to 35 percent slope	0.4	3,785
102	Ahwahnee family, 35 to 65 percent slope	0.9	8,970
103	Ahwahnee family-Rock outrop complex, 35 to 75 percent slope	0.8	7,520
104	Aquic Dystrict Xerochrepts, 1 to 15 percent slope	0.4	4,250
105	Auberry family, 5 to 35 percent slope	0.6	5,750
106	Auberry family 35 to 65 percent slope	1.2	11,730
107	Auberry-Ahwahnee families association, 5 to 35 percent slope	0.8	7,390
108	Auberry-Ahwahnee families association, 35 to 65 percent slope	1.1	11,115
109	Auberry family-Rock outcrop complex, 35 to 75 percent slope	0.3	3,235
110	Auberry-Tollhouse families-Rock outcrop association, 25 to 65 percent slope	1.1	11,010
111	Cagwin family, 25 to 60 percent slope	2.1	20,475
112	Cagwin-Cannell families complex, 2 to 25 percent slope	1.9	18,130
113	Cagwin family-Lithic Xeropsamments-Rock outcrop complex, 15 to 45 percent slope	2.8	27,285
114	Cagwin family-Lithic Xeropsamments-Rock outcrop complex, 56 to 65 percent slope	1.9	18,900
115	Cagwin family-Rock outcrop complex, 15 to 35 percent slope	0.3	2,735
116	Cagwin family-Rock outcrop complex, 35 to 65 percent slope	1.2	11,620
117	Cannell family, 15 to 45 percent slope	0.5	4,980
118	Chaix family, 5 to 35 percent slope	0.6	6,240

TABLE 2. - Map Unit Legend, Map Unit Area, and Proportionate Extent **(continued)**

Map Symbol	Map Unit Name	Percent of Survey Area	Acres
119	Chaix family, 35 to 65 percent slope	1.3	12,645
120	Chaix family, deep, 5 to 45 percent slope	2.0	19,775
121	Chaix family-Chaix family, deep complex, 15 to 50 percent slope	1.2	12,100
122	Chaix-Chawanakee families-Rock outcrop complex, 15 to 35 percent slope	1.0	10,110
123	Chaix-Chawanakee families-Rock outcrop complex, 35 to 65 percent slope	1.7	16,625
124	Chaix-Holland families complex, 15 to 35 percent slope	0.4	4,300
125	Chaix-Holland families complex, 35 to 65 percent slope	0.7	6,620
126	Chawanakee family-Rock outcrop complex, 35 to 65 percent slope	2.3	22,680
127	Coarsegold-Auberry families association, 35 to 65 percent slope	2.1	20,270
128	Coarsegold-Auberry families-Rock outcrop association, 35 to 85 percent slope	1.0	10,170
129	Delpiedra family-Rock coutcrop complex, 30 to 60 percent slope	0.1	690
130	Dystric Lithic Xerochrepts-Ultic Haploxeralfs-Rock outcrop association, 50 to 80 percent slope	1.9	18,615
131	Dystric Xerochrepts and Typic Xerumbrepts, 20 to 50 percent slope	0.6	6,250
132	Entic Cryumbrepts, 5 to 50 percent slope	0.2	2,210
133	Entic Cryumbrepts-Rock outcrop complex, 15 to 55 percent slope	1.9	18,745
134	Gerle-Cagwin families association, 5 to 35 percent slope	0.9	8,305
135	Gerle-Cagwin families association, 35 to 55 percent slope	1.0	10,125
136	Holland family, 5 to 35 percent slope	2.8	27,055

TABLE 2. - Map Unit Legend, Map Unit Area, and Proportionate Extent **(continued)**

Map Symbol	Map Unit Name	Percent of Survey Area	Acres
137	Holland family, 35 to 65 percent slope	3.4	33,030
138	Holland-Chaix families complex, 5 to 35 percent slope	2.3	22,180
139	Holland-Chaix families complex, 35 to 65 percent slope	2.9	28,135
140	Holland-Chawanakee families complex, 35 to 65 percent slope	3.3	31,873
141	Holland-Chawanakee families-Rock outcrop complex, 15 to 35 percent slope	1.1	10,792
142	Holland-Neuns families association, 15 to 45 percent slope	1.0	9,870
143	Ledford family-Entic Xerumbrepts-Rock outcrop association, 10 to 45 percent slope	2.0	19,355
144	Lithic Xeropsamments-Rock outcrop association, 5 to 40 percent slope	1.5	14,675
145	Lithic Xeropsamments-Rock outcrop association, 40 to 65 percent slope	0.9	9,045
146	Neuns family, 25 to 60 percent slope	1.4	13,150
147	Rock outcrop	2.4	23,610
148	Rock outcrop-Chawanakee family association, 35 to 65 percent slope	0.8	7,895
149	Rock outcrop-Cryorthents complex, 5 to 50 percent slope	0.9	8,900
150	Rock outcrop-Dystric Lithic Xerochrepts complex, 65 to 85 percent slope	0.3	2,775
151	Rock outcrop-Entic Cryumbrepts association, 25 to 60 percent slope	1.2	11,485
152	Rock outcrop-Lithic Xeropsamments complex, 15 to 45 percent slope	3.3	31,875
153	Rock outcrop-Lithic Xeropsamments complex, 45 to 85 percent slope	2.7	26,245
154	Rock outcrop-Rubble land association	0.9	8,880

TABLE 2. - Map Unit Legend, Map Unit Area, and Proportionate Extent (continued)

Map Symbol	Map Unit Name	Percent of Survey Area	Acres
155	Rock outcrop-Stecum family association, 35 to 65 percent slope	0.4	4,055
156	Shaver family, 5 to 35 percent slope	1.4	13,640
157	Shaver family, 35 to 65 percent slope	1.9	18,330
158	Sirretta family, 25 to 50 percent slope	1.4	13,390
159	Sirretta family-Rock outcrop complex, 15 to 45 percent slope	1.4	13,465
160	Sirretta family-Rock outcrop complex, 45 to 65 percent slope	0.6	5,830
161	Sirretta and Umpa, wet, families, 3 to 25 percent slope	2.7	26,005
162	Stecum family, 3 to 35 percent slope	1.6	15,935
163	Stecum family-Aquic Cryumbrepts association, 1 to 25 percent slope	1.4	13,700
164	Stecum family-Rock outcrop complex, 5 to 45 percent slope	2.0	19,425
165	Stecum family-Rock outcrop association, 45 to 65 percent slope	0.9	8,395
166	Tollhouse family-Rock outcrop complex, 30 to 60 percent slope	1.7	17,015
167	Tollhouse family-Rock outcrop association, 60 to 85 percent slope	0.7	7,165
168	Typic Argixerolls, 15 to 50 percent slope	0.4	3,810
169	Typic Argixerolls-Coarsegold family association, 35 to 75 percent slope	0.5	4,630
170	Typic Xerumbrepts, 5 to 20 percent slope	0.7	6,865
171	Ultic Haploxeralfs, deep, 15 to 50 percent slope	0.5	4,665
172	Ultic Haploxeralfs-Dystric Lithic Xerochrepts complex, 15 to 50 percent slope	1.0	9,880

TABLE 2. - Map Unit Legend, Map Unit Area, and Proportionate Extent **(continued)**

Map Symbol	Map Unit Name	Percent of Survey Area	Acres
173	Ultic Haploxeralfs-Dystric Lithic Xerochrepts complex, 50 to 85 percent slope	1.3	12,950
174	Umpa family, 5 to 35 percent slope	0.6	5,700
175	Umpa family, 35 to 55 percent slope	0.2	2,175
176	Umpa family, deep, 20 to 60 percent slope	1.4	13,740
		100	973,026

TABLE 3. - Soil Components in Map Units

Soil Name	Map Unit	Soil Name	Map Unit
Ahwahnee family	101, 102, 103, 107, 108	Gerle family	134, 135
Aquic Cryumbrepts	163	Holland family	124, 125, 136, 137, 138, 139, 140, 141, 142
Aquic Dystric Xerochrepts	104	Ledford family	143
Auberry family	105, 106, 107, 108, 109, 110, 127, 128	Lithic Xeropsamments	113, 114, 144, 145, 152, 153
Cagwin family	111, 112, 113, 114, 115, 116, 134, 135	Neuns family	142, 146
Cannell family	112, 117	Shaver family	156, 157
Chaix family	118, 119, 121, 133, 123, 124, 125, 138, 139	Sirretta family	158, 159, 160, 161
Chaix family, deep	120, 121	Stecum family	155, 162, 163, 164, 165
Chawanakee family	122, 123, 126, 140, 141, 148	Tollhouse family	110, 166, 167
Coarsefold family	127, 128, 169	Typic Argixerolls	168,169
Cryorthents	149	Typic Xerumbrepts	131,170
Delpiedra family	129	Ultic Haploxeralfs	130, 172, 173
Dystric Lithic Xerochrepts	130, 150, 172, 173	Ultic Hapoxeralfs deep	171
Dystric Xerochrepts	131	Umpa family	174,175
Entic Cryumbrepts	132, 133, 151	Umpa family, deep	176
Entic Xerumbrepts	173	Umpa family, wet	161

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. In table 1, the soils of the survey area are listed alphabetically and are classified according to the system. In table 2, the soils are listed by the categories. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by the word ending in "sol". An example is Alfisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Xeralf ("Xer", meaning dry, plus "alf", from Alfisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haploxeralf ("Hapl", meaning minimal horizonation, plus "xeralf", the suborder of the Alfisols that have a xeric moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective "Ultic" identifies the subgroup that has an argillic horizon with base saturation of 75 percent or less throughout the upper 30 inches or to a lithic or paralithic contact, whichever is shallower. An example is Ultic Haploxeralfs.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, thermic Ultic Hapoloxeralfs, or Auberry family.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer of the substratum can differ within a series. No soil series were identified in this survey area.

TABLE 4. - Classification by Soil Name

SOIL NAME	FAMILY OR HIGHER TAXONOMIC CLASS
Ahwahnee family	Coarse-loamy, mixeed, thermic Ultic haploxeralfs
Aquic Cryumbrepts	Aquic Cryumbrepts
Aquic Dystric Xerochrepts	Aquic Dystric Xerochrepts
Auberry family	Fine-loamy, mixed, thermic Ultic Haploxeralfs
Cagwin family	Mixed, frigid Dystric Xeropsamments
Cannell family	Coarse-loamy, mixed, frigid Dystric Xerochrepts
Chaix Family	Coarse-loamy, mixed, mesic Dystric Xerochrepts
Chawanakee family	Loamy, mixed, mesic, shallow Dystric Xerochrepts
Coarsegold family	Fine-loamy, mixed, thermic Molliic Haploxeralfs
Cyorthents	Cyorthents
Delpiedra family	Loamy, serpentinitic, thermic, shallow Mollic Haploxeralfs
Dystric Lithic Xerochrepts	Dystric Lithic Xerochrepts
Entic Cryumbrepts	Entic Cryumbrepts
Entic Xerumbrepts	Entic Xerumbrepts
Gerle family	Coarse-loamy, mixed, fridig Typic Xerumbrepts
Holland family	Fine-loamy, mixed, mesic Ultic Haploxeralfs
Ledford family	Coarse-loamy, mixed, frigid Entic Xerumbrepts
Lithic Xeropsamments	Lithic Xeropsamments
Neuns family	Loamy-skeletal, mixed, mesic Dystric Xerochrepts
Shaver family	Coarse-loamy, mixed mesic Pachic Xerumbrepts
Sirretta family	Sandy-skeletal, mixed, frigid Dystric Xerorthents
Stecum family	Sandy-skeletal, mixed Typic Cryorthents
Tollhouse family	Loamy, mixed, mesic, shallow Entic Haploxerolls
Typic Argixerolls	Typic Argixerolls
Typic Xerumbrepts	Typic Xerumbrepts
Ultic Haploxeralfs	Ultic Haploxeralfs
Umpa family	Loamy-skeletal, mixed, frigid Dystric Xerochrepts

TABLE 5 – CLASSIFICATION BY TAXONOMIC CATEGORY

ORDER	SUBORDER	GREAT GROUP	SUBGROUP	FAMILY	SOIL NAME
Alfisols	Xeralfs	Haploxeralfs	Mollic Haploxeralfs	fine-loamy, mixed, thermic	Coarsegold family
				loamy, serpentinitic, thermic, shallow	Delpiedra family
			Ultic Haploxeralfs		Ultic Haploxeralfs
				coarse-loamy, mixed, thermic	Ahwahnee family
				fine-loamy, mixed, thermic	Auberry family
				fine-loamy, mixed, mesic	Holland family
Entisols	Orthents	Cryothents			Cryorthents
			Typic Cryorthents	sandy-skeletal, mixed	Stecum family
		Xerorthents	Dystric Xerorthents	sandy-skeletal, mixed, frigid	Sirretta family
	Psamments	Xeropsamments	Dystric Xeropsamments	mixed, frigid	Cagwin family
			Lithic Xeropsamments		Lithic Xeropsamments
Inceptisols	Ochrepts	Xerochrepts	Aquic Dystric Xerochrepts		Aquic Dystric Xerochrepts
			Dystric Lithic Xerochrepts		Dystric Lithic Xerochrepts
			Dystric Xerochrepts		Dystric Xerochrepts
				coarse-loamy, mixed, mesic	Chaix family
				coarse-loamy, mixed, frigid	Cannell family
				loamy, mixed, mesic, shallow	Chawanakee family
				loamy-skeletal, mixed, mesic	Neuns family
				loamy-skeletal, mixed, frigid	Umpa family
	Umbrepts	Cryumbrepts	Aquic Cryumbrepts		Aquic Cryumbrepts
			Entic Cryumbrepts		Entic Cryumbrepts
		Xerumbrepts	Entic Xerumbrepts		Entic Xerumbrepts
				coarse-loamy, mixed, frigid	Ledford family
			Pachic Xerumbrepts	coarse-loamy, mixed, mesic	Shaver family
			Typic Xerumbrepts		Typic Xerumbrepts
				coarse-loamy, mixed, frigid	Gerle family
Mollisols	Xerolls	Argixerolls	Typic Argixerolls		Typic Argixerolls
		Haploxerolls	Entic Haploxerolls	loamy, mixed, mesic, shallow	Tollhouse family

Taxonomic Unit Descriptions

In this section, each soil recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified. A pedon, a small three dimensional area of soil, that is typical of the soil in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (7). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (8). Unless otherwise stated, colors in the descriptions are for dry soil. Following the pedon descriptions is the range of important characteristics of the soil.

AHWAHNEE FAMILY

The Ahwahnee family consists of moderately deep to deep, well drained soils formed in material weathered from granitic rocks. These soils are on mountainsides, foothills, and ridges and have slopes of 5 to 75 percent. Elevation is 1,000 to 3,300 feet and annual precipitation is 20 to 35 inches.

Taxonomic class: These soils are coarse-loamy, mixed, thermic Ultic Haploxeralfs.

Typical pedon of Ahwahnee family in a unit of Auberry-Ahwahnee association, 5 to 35 percent slopes. It is on a slope of 12 percent under annual grasses and occasional blue oak, at an elevation of 1,260 feet.

Oi–1/4 inch to 0; scattered litter from annual grass and forbs.

A1–0 to 1 inches; grayish brown (10YR 5/2) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, friable, slightly sticky and nonplastic; common very fine roots; many very fine and fine interstitial pores; medium acid (pH 5.8); abrupt wavy boundary.

A2–1 to 8 inches; grayish brown (10YR 5/2) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, friable, slightly sticky and nonplastic; few very fine and fine roots; common fine interstitial pores; medium acid (pH 5.8); clear smooth boundary.

BA–8 to 17 inches; brown (10YR 5/3) coarse sandy loam, dark brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky and nonplastic; common fine interstitial pores and few fine tubular pores; few colloidal stains on mineral grains; medium acid (pH 6.0); gradual smooth boundary.

Bt–17 to 29 inches; yellowish brown (10YR 5/4) coarse sandy loam, dark brown (10YR 4/3) moist; massive; hard, friable, slightly sticky and nonplastic; few fine, medium, and coarse roots; common fine interstitial pores and few fine tubular pores; common colloidal stains on mineral grains, few bridges, and few thin clay films lining pores; medium acid (pH 6.0); abrupt irregular boundary.

Cr–29 to 42 inches; granodiorite weathered to grus.

Type location: About 1 mile south of Kerckhoff Lake, about 30 feet north, 12° west of live oak tree in pasture, in front of a residence; in the NW1/4 of the NE1/4 of sec. 19, T. 9 S., R. 23 E., MDBM; North Fork Quadrangle; Pineridge Ranger District.

Range in characteristics: Depth to a paralithic contact is 20 to 60 inches. The mean annual soil temperature at 20 inches is 63° to 68° F. The soil between 8 and 24 inches is dry in some part from mid-May to late October and moist the rest of the year. Fine gravel averages 0 to 10 percent in the profile. Reaction is medium acid to neutral (pH 5.8 to 6.8).

The A horizon has dry color of 10YR 6/3, 5/3, 5/2, 4/3, or 4/2; and moist color of 10YR 4/2, 3/3, 3/2, or 2/2. Organic carbon content in the upper 10 inches is 0.6 to 2.4 percent. It is coarse sandy loam, sandy loam, fine sandy loam, or loam.

The Bt horizon has dry color of 10YR 6/4, 6/3, 6/2, 5/4, 5/3, or 5/2; and moist color of 10YR 5/4, 5/3, 4/4, 4/3, 4/2, 3/4, or 7.5YR 4/2. It is coarse sandy loam, sandy loam, or fine sandy loam. Clay content averages between 8 and 18 percent and is about 3 percent greater than in the A horizon. Clay films are present as bridgings or grain coatings.

AQUIC CRYUMBREPTS

Aquic Cryumbrepts consist of very deep, somewhat poorly drained soils formed in glacial outwash or recent alluvium from granitic rocks. These soils are on glaciofluvial outwash plains and have slopes of 1 to 10 percent. Elevation is 8,300 to 9,600 feet and annual precipitation is 40 to 60 inches.

Reference profile of Aquic Cryumbrepts in a unit of Stecum family-Aquic Cryumbrepts association, 1 to 25 percent slopes. It is on a slope of 2 percent under perennial grasses and annual forbs at an elevation of 8,500 feet.

A1–0 to 9 inches; grayish brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, friable; strongly acid (pH 5.5).

A2–9 to 14 inches; sandy loam; medium acid (pH 6.0).

AC–14 to 20 inches; loamy coarse sand; slightly acid (pH 6.5).

C–20 to 60 inches; gravelly loamy coarse sand; 20 percent pebbles; slightly acid (pH 6.5).

Type location: At the north end of Helms Meadow; in the SW1/4 of sec. 10, T. 9 S., R. 27 E., MDBM; Huntington Lake NE Quadrangle; Kings River Ranger District.

Range in characteristics: This soil is 60 inches or more deep. The mean annual soil temperature at 20 inches is 40° to 47° F. The mean summer (June, July, August) soil temperature is less than 59° F. The soil between 10 and 30 inches is usually moist or wet, except in 6 or more years out of 10, it is dry for at least 45 consecutive days after June 15. In the winter and spring the water table is probably at or near the soil surface, and in the summer it is about 4 feet below the surface. Reaction is very strongly acid to slightly acid. Base saturation is less than 50 percent throughout.

The A horizon is dark and has a high organic matter content. It is usually sandy loam or loam. Below the A horizon the soil is stratified. It is coarse sandy loam, sandy loam, loam, loamy fine sand, loamy coarse sand, or their gravelly or cobbly equivalents. Rock fragments range from 0 to 35 percent.

AQUIC DYSTRIC XEROCHREPTS

Aquic Dystric Xerochrepts consist of deep, somewhat poorly drained soils formed in glaciofluvial deposits over dense glacial till, mainly from granitic rocks. These soils are on glacial outwash plains and gently sloping mountainsides and have slopes of 1 to 15 percent. Elevation is 6,700 to 7,600 feet and annual precipitation is 50 to 55 inches.

Reference profile of Aquic Dystric Xerochrepts in a unit of Aquic Dystric Xerochrepts, 1 to 15 percent slopes. It is on a slope of 13 percent under red fir, white fir, and lodgepole pine at an elevation of 6,840 feet.

Oe–½ inch to 0; decomposing fir needles and twigs.

A–0 to 5 inches; very dark grayish brown (10YR 3/2) sandy loam, black (10YR 2/1) moist; weak fine granular structure; slightly hard, friable, nonsticky and nonplastic; many fine and medium roots; many very fine and fine interstitial pores; strongly acid (pH 5.4); clear smooth boundary.

BA–5 to 18 inches; pinkish gray (7.5YR 6/2) cobbly coarse sandy loam, brown (7.5YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; common fine and medium roots; common very fine and fine interstitial pores, and common medium tubular pores; 10 percent pebbles and 15 percent cobbles; medium acid (pH 5.8); gradual smooth boundary.

Bw1–18 to 28 inches; light yellowish brown (10YR 6/4) cobbly coarse sandy loam, brown (7.5YR 4/4) moist; common, fine, distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; hard, firm, nonsticky and nonplastic; few fine and medium roots; common very fine and fine interstitial pores; 10 percent pebbles and 10 percent cobbles; medium acid (pH 5.6); clear smooth boundary.

Bw2–28 to 48 inches; reddish yellow (7.5YR 6/6) gravelly coarse sandy loam, strong brown (7.5YR 5/5) moist; many medium reddish yellow (5YR 6/8) mottles and common coarse light gray (10YR 7/2) mottles; massive; very hard, very firm, slightly sticky and plastic; few medium roots; few very fine and fine interstitial pores; 20 percent pebbles; medium acid (pH 5.6); clear wavy boundary.

Cr–48 to 60 inches; light brownish gray (2.5Y 6/2) very dense basal till which breaks down to coarse sandy loam, grayish brown (2.5Y 5/2) moist; massive; extremely hard, very firm, slightly sticky and plastic; slightly acid (pH 6.2).

Type location: About 2 miles south of Jackass Meadow on a roadcut on Forest Service road 5S40, near a culvert, about 0.7 miles west of the junction with Forest Service road 5S02; in the NW¼ of the SE¼ of sec. 27, T. 5 S., R. 24 E., MDBM; Shuteye Peak NE Quadrangle; Minarets Ranger District.

Range in characteristics: Depth to compacted basal till is 28 to 60 inches. The solum is 23 to 43 inches thick. The mean annual soil temperature at 20 inches is 40° to 47° F. The soil between 8 and 24 inches is estimated to be dry in July, August, and September and usually moist in some or all parts the rest of the year. Rock fragment content ranges from 0 to 20 percent. Reaction is strongly acid to slightly acid (pH 5.2 to 6.2). Texture is sandy loam, coarse sandy loam, their gravelly or cobbly equivalents, or loam. Base saturation is estimated to be less than 60 percent in some part between a depth of 10 and 30 inches.

The A horizon has dry color of 10YR 4/2, 3/3, or 3/2; and moist color of 10YR 3/3, 3/2, 2/2, 2/1, 7.5YR 3/2, or 5YR 2/2.

The BA horizon has dry color of 7.5YR 6/2, 5/6, 5/4, or 10YR 5/4; and moist color of 7.5YR 4/4, 4/3, 3/4, or 5YR 3/4.

The Bw horizon has dry color of 10YR 6/4, 5/6, 5/5, 5/4, or 7.5YR 5/6; and moist color of 7.5YR 6/5, 6/4, 5/4, 4/4, 3/4, 5YR 3/4, or 10YR 5/6. Faint mottling occurs in this horizon.

The C horizon has dry color of 10YR 7/6, 7/4, 7/3, 6/4, 5/6, 7.5YR 7/6, 6/6, or 2.5Y 6/2; and moist color of 7.5YR 5/6, 5/5, 4/6, 4/5, 10YR 6/6, 5/8, 5/6, or 2.5Y 5/2. Mottling and gleying occurs in this horizon.

AUBERRY FAMILY

The Auberry family consists of moderately deep to deep, well drained soils formed in material weathered from granitic rocks. These soils are on ridges, mountainsides, foothills, and upland basins and have slopes of 5 to 85 percent. Elevation is 1,000 to 4,400 feet and annual precipitation is 20 to 35 inches.

Taxonomic class: These soils are fine-loamy, mixed, thermic Ultic Haploxeralfs.

Typical pedon of Auberry family in a unit of Auberry very rocky coarse sandy loam, 3 to 30 percent slopes in the Eastern Fresno Area Soil Survey (1971). It is on a slope of 10 percent under annual grasses and scattered blue oak at an elevation of 2,300 feet.

Oi–1/2 inch to 0; loose litter of forbs and oak leaves.

A1–0 to 2 inches; brown (10YR 5/3) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine, medium, and coarse granular structure; slightly hard, friable, slightly sticky and nonplastic; common very fine roots; many fine interstitial pores; slightly acid (pH 6.4); clear wavy boundary.

A2–2 to 8 inches; brown (10YR 5/3) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine, medium, and coarse subangular blocky structure; slightly hard, friable, slightly sticky and nonplastic; few very fine and fine roots; few fine tubular pores, and common fine interstitial pores; slightly acid (pH 6.4); clear smooth boundary.

BA–8 to 17 inches; yellowish brown (10YR 5/4) coarse sandy loam, brown (10YR 4/3) moist; massive; hard, friable, slightly sticky and nonplastic; few fine and medium roots; slightly more compact and less porous than A2; medium acid (pH 6.0); gradual smooth boundary.

Bt1–17 to 29 inches; strong brown (7.5YR 5/6) sandy clay loam, dark yellowish brown (10YR 4/4) moist; moderate coarse subangular blocky structure; very hard, firm, sticky and plastic; few medium and coarse roots; common fine tubular pores and few fine interstitial pores; many moderately thick clay films on faces of peds; medium acid (pH 5.7); diffuse boundary.

Bt2–29 to 48 inches; light yellowish brown (10YR 6/4) coarse sandy loam, yellowish brown (10YR 5/4) moist; weak coarse subangular blocky structure; very hard, firm, sticky and plastic; few medium and coarse roots; few fine tubular pores; many thin clay films on faces of peds; strongly acid (pH 5.5); gradual wavy boundary.

BC–48 to 62 inches; light yellowish brown (10YR 6/4) coarse sandy loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, friable, slightly sticky and nonplastic; few coarse roots; few clay films bridging mineral grains; slightly acid (pH 6.4); abrupt wavy boundary.

Cr–62 inches; highly weathered granodiorite.

Type location: About 1.25 miles NNW of the town of Auberry and 0.25 miles W of the town of New Auberry, about 30 feet south of Powerhouse Road; in the NW1/4 of the NE1/4 of sec. 6, T. 10 S., R. 23 E., MDBM; Millerton Lake East Quadrangle; about 400 feet south of the Forest boundary.

Range in characteristics: Depth to a paralithic contact is 30 to 80 inches. The mean annual soil temperature at 20 inches is 59° to 65° F. The soil is usually dry between 8 and 24 inches from mid-May to late October and moist the rest of the year. The solum averages 0 to 10 percent gravel.

The A horizon has dry color of 10YR 6/3, 6/2, 5/3, 5/2, 4/3, 4/2, or 7.5YR 5/4; and moist color of 10YR 4/2, 3/3, 3/2, 3/1, or 7.5YR 3/4. Organic carbon is 0.6 to 1.4 percent and decreases regularly with depth. It is coarse sandy loam, sandy loam, or loam. Reaction is neutral to medium acid (pH 7.0 to 6.0).

The Bt horizon has dry color of 10YR 6/4, 6/3, 5/4, 5/3, 7.5YR 5/6, 5/4, 5YR 5/6, 5/4, 4/6, 4/4, 2.5YR 6/4, 5/4, or 4/4; and moist of color of 10YR 5/4, 4/4, 3/6, or 3/4. It is sandy clay loam, clay loam, sandy clay, coarse sandy loam, or loam and the clay content ranges from 18 to 34 percent. Reaction is slightly acid to strongly acid (pH 6.5 to 5.5). Base saturation is 50 to 74 percent.

CAGWIN FAMILY

The Cagwin family consists of moderately deep to deep, somewhat excessively drained soils formed in material weathered from granitic rocks. These soils are on mountainsides, ridges, toeslopes, and upland basins and have slopes of 2 to 65 percent. Elevation is 5,600 to 8,500 feet and annual precipitation is 30 to 55 inches.

Taxonomic class: These soils are mixed, frigid Dystric Xeropsamments.

Typical pedon of Cagwin family in a unit of Cagwin family-Rock outcrop complex, 5 to 35 percent slopes. It is on a slope of 5 percent under mixed conifers, at an elevation of 7,200 feet.

Oe–½ inch to 0; partially decomposed pine needles and twigs (few fresh needles).

A1–0 to 5 inches; dark gray (10YR 4/1) loamy coarse sand, very dark brown (10YR 2/2) moist; massive to single grain; loose; many very fine and fine roots; many very fine interstitial pores; strongly acid (pH 5.4); abrupt wavy boundary.

C1–5 to 17 inches; light yellowish brown (10YR 6/4) gravelly loamy coarse sand, dark yellowish brown (10YR 4/4) moist; single grain; soft, very friable; common fine and medium roots, and few coarse roots; many very fine interstitial pores; 15 percent pebbles; medium acid (pH 5.6); gradual smooth boundary.

C2–17 to 32 inches; very pale brown (10YR 7/4) gravelly loamy coarse sand, yellowish brown (10YR 5/4) moist; single grain; soft, very friable; common medium roots and few coarse roots; many very fine interstitial pores; 20 percent pebbles; strongly acid (pH 5.5); abrupt wavy boundary.

C3r–32 inches; white (10YR 8/1) with specks of dark gray (10YR 4/1) highly weathered granitic rock.

Type location: About 0.25 miles NNE of Cedar Crest Lodge on the north side of Huntington Lake; in the NE¼ of the NE¼ of sec. 12, T. 8 S., R. 25 E., MDBM; Kaiser Peak SW Quadrangle; Pineridge Ranger District.

Range in characteristics: Depth to a paralithic contact is 20 to 60 inches. The mean annual soil temperature at 20 inches is 40° to 44° F. The soil between 12 and 35 inches is estimated to be dry from late July to October, and moist in some or all parts the rest of the year.

The A horizon has dry color of 10YR 6/4, 5/3, 5/2, 4/2, 4/1, or 2.5Y 5/2; and moist color of 10YR 4/4, 3/4, 3/2, 2/2, 2/1, or 2.5Y 3/2. It is loamy coarse sand, gravelly loamy coarse sand, loamy sand, gravelly loamy sand, or gravelly sandy loam and averages 0 to 20 percent gravel. Reaction is strongly acid to slightly acid (pH 5.2 to 6.5).

The C horizon has dry color of 10YR 8/3, 7/4, 7/2, 6/4, 6/3, 6/2, or 2.5Y 6/2; and moist color of 10YR 6/3, 5/6, 5/4, 4/6, 4/4, or 4/3. It is loamy coarse sand, gravelly loamy coarse sand, or loamy sand and averages 0 to 30 percent gravel. Reaction is strongly acid to slightly acid (pH 5.2 to 6.0). The base saturation between depths of 10 and 30 inches is estimated to be 25 to 60 percent. It grades into highly weathered granitic rock.

CANNELL FAMILY

The Cannell family consists of deep, well drained soils formed in material weathered from granitic rocks. These soils are on mountainsides, toeslopes, and upland basins and have slopes of 2 to 45 percent. Elevation is 6,000 to 8,400 feet and annual precipitation is 35 to 55 inches.

Taxonomic class: These soils are coarse-loamy, mixed, frigid Dystric Xerochrepts.

Typical pedon of Cannell family in a unit of Cagwin-Cannell families complex, 2 to 25 percent slopes. It is on a slope of 15 percent under Jeffrey pine at an elevation of 6,640 feet.

Oe–½ inches to 0; partially decomposed pine needles and twigs.

A1–0 to 2 inches; gray (10YR 5/1) gravelly coarse sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine interstitial pores; 15 percent pebbles; medium acid (pH 6.0); clear smooth boundary.

A2–2 to 7 inches; grayish brown (10YR 5/2) gravelly coarse sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many fine roots; many very fine and fine interstitial pores; 15 percent pebbles; medium acid (pH 6.0); clear smooth boundary.

Bw1–7 to 14 inches; very pale brown (10YR 7/3) gravelly coarse sandy loam, dark yellowish brown (10YR 4/6) moist; massive; slightly hard, friable, nonsticky and nonplastic; common fine and medium roots; many fine interstitial pores; 20 percent pebbles; medium acid (pH 6.0); gradual wavy boundary.

Bw2–14 to 32 inches; very pale brown (10YR 7/4) gravelly coarse sandy loam, light yellowish brown (10YR 6/4) moist; massive; slightly hard, friable, nonsticky and nonplastic; common medium roots and few coarse roots; many fine interstitial pores; 20 percent pebbles; medium acid (pH 6.0); gradual wavy boundary.

C1–32 to 50 inches; very pale brown (10YR 7/4) gravelly loamy coarse sand, brownish yellow (10YR 6/6) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few medium and coarse roots; common fine interstitial pores; 25 percent pebbles; medium acid (pH 6.0); clear wavy boundary.

C2r–50 inches; highly weathered granodiorite that can be easily dug with a spade.

Type location: On a roadcut on Forest Service road 6S86 about 1.5 miles NW of Brown Cone, and about 4 miles NNW of Kaiser Diggings Station; in the SW¼ of the NW¼ of sec. 11, T. 6 S., R. 25 E., MDBM; Kaiser Peak NW Quadrangle; Pineridge Ranger District.

Range in characteristics: Depth to a paralithic contact is 40 to 80 inches. The mean annual soil temperature at 20 inches is 35° to 47° F. The soil between 8 and 24 inches is estimated to be dry from July through September and usually moist in some or all parts the rest of the year. The gravel content ranges from 5 to 30 percent. Texture is coarse sandy loam, gravelly coarse sandy loam, or gravelly sandy loam and can also be gravelly loamy coarse sand in the C horizon. Clay content is less than 18 percent.

The A horizon has dry color of 10YR 5/3, 5/2, or 5/1; and moist color of 10YR 3/3, 3/2, or 2/2. The thickness of the A horizon is 7 inches or less. Reaction is medium acid or slightly acid (pH 6.0 to 6.5).

The Bw horizon has dry color of 10YR 7/4, 7/3, 6/3, or 7.5YR 6/4; and moist color of 10YR 6/4, 5/6, 4/6, 4/4, or 7.5YR 4/4. Reaction is strongly acid to slightly acid (pH 5.5 to 6.5). Base saturation is estimated to be less than 60 percent in some parts between a depth of 10 and 30 inches.

The C horizon has dry color of 10YR 8/4 or 7/4; and moist color of 10YR 6/8 or 6/6. Reaction is very strongly acid to medium acid (pH 5.0 to 6.0).

CHAIX FAMILY

The Chaix family consists of moderately deep to deep, somewhat excessively drained or well drained soils formed in material weathered from granitic rock. These soils are on mountainsides, ridges, and upland basins and have slopes of 5 to 65 percent. Elevation is 2,700 to 6,700 feet and annual precipitation is 25 to 55 inches.

Taxonomic class: These soils are coarse-loamy, mixed, mesic Dystric Xerochrepts.

Typical pedon of Chaix family in a unit of Chaix family-Chaix family, deep complex, 15 to 50 percent slopes. It is on a slope of 30 percent under Jeffrey pine, white fir, sugar pine, and black oak at an elevation of 5,520 feet.

Oe–1 1/2 inch to 0; partially decomposed pine needles and twigs.

A1–0 to 6 inches; grayish brown (10YR 5/2) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; moderate coarse granular structure; slightly hard, very friable, nonsticky and nonplastic; common fine roots and few medium roots; common very fine and fine interstitial pores, and common fine and medium tubular pores; 10 percent pebbles; slightly acid (pH 6.2); clear smooth boundary.

Bw1–6 to 18 inches; very pale brown (10YR 7/3) coarse sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; few fine roots, and common medium roots; common very fine and fine interstitial pores, and common fine and medium tubular pores; 10 percent pebbles; slightly acid (pH 6.2); gradual smooth boundary.

Bw2–18 to 36 inches; very pale brown (10YR 8/3) gravelly coarse sandy loam, yellowish brown (10YR 5/4) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few fine roots, and few medium roots; common very fine interstitial pores; 15 percent pebbles; medium acid (pH 6.0); abrupt wavy boundary.

Cr–36 inches; very pale brown (10YR 8/3) highly weathered granodiorite.

Type location: About 1 mile north of the Minarets Work Center on a roadcut on Forest Service road 6S30, about 0.8 miles north of Forest Service road 6S01; in the SE1/4 of the NE1/4 of sec. 9, T. 6 S., R. 24 E., MDBM; Shuteye Peak NE Quadrangle; Minarets Ranger District.

Range in characteristics: Depth to a paralithic contact is 20 to 80 inches. The mean annual soil temperature at 20 inches is 47° to 59° F. The soil between 8 and 24 inches is estimated to be dry from mid-June to October and usually moist in some or all parts the rest of the year. It is coarse sandy loam, sandy loam, or their gravelly equivalents. In some pedons it is gravelly loamy coarse sand below 40 inches. Rock fragment content is 0 to 30 percent. Reaction is strongly acid to slightly acid in the upper 40 inches and very strongly acid to medium acid below. Base saturation is estimated to be 45 to 60 percent between a depth of 10 to 30 inches.

The A horizon has dry color of 10YR 6/4, 6/3, 6/2, 5/4, 5/3, 5/2, 4/4, 4/3, 4/2, 7.5YR 5/4, 4/4, or 4/2; and moist color of 10YR 4/4, 3/4, 3/3, 3/2, 3/1, 2/2, 7.5YR 4/4, 3/4, 3/2, or 2.5Y 3/2.

The Bw horizon has dry color of 10YR 8/3, 7/6, 7/4, 7/3, 7/2, 6/6, 6/4, 6/3, 6/2, 5/6, 5/4, 7.5YR 6/4, 5YR 6/6, 6/4, or 6/3; and moist color of 10YR 5/6, 5/4, 5/3, 4/6, 4/4, 4/3, 3/4, 7.5YR 4/6, 4/4, 5YR 4/6, 4/4, or 4/3. Clay content is less than 18 percent and it is 1 to 3 percent greater than in the A horizon.

In some areas a C horizon is present between the Bw and the highly weathered granitic rock. It has dry color of 10YR 7/4, 7/3, 7/2, 6/4, 6/3, or 7.5YR 7/6; and moist color of 10YR 6/3, 5/3, 7.5YR 6/6, or 4/6.

Remarks: This soil consists of two phases. Chaix family is 20 to 60 inches deep. Chaix family, deep is 60 to 80 inches deep.

CHAWANAKEE FAMILY

The Chawanakee family consists of shallow, somewhat excessively drained soils formed in material weathered from granitic rocks. These soils are on mountainsides and ridges and have slopes of 15 to 65 percent. Elevation is 2,800 to 6,700 feet and annual percipitation is 30 to 50 inches.

Taxonomic class: These soils are loamy, mixed, mesic, shallow Dystric Xerochrepts.

Typical pedon of Chawanakee family in a unit of Chaix-Chawanakee families-Rock outcrop complex, 35 to 65 percent slopes. It is on a slope of 50 percent under ponderosa, Jeffrey, and sugar pine, at an elevation of 5,650 feet.

Oe–1/2 inch to 0; discontinuous layer of partially decomposed pine needles and twigs.

A–0 to 4 inches; grayish brown (10YR 5/2) coarse sandy loam, dark brown (10YR 3/3) moist; weak medium granular structure; slightly hard, friable, nonsticky and nonplastic; few fine and medium roots; many fine interstitial pores, and common fine and medium tubular pores; 10 percent pebbles; slightly acid (pH 6.2); gradual smooth boundary.

Bw–4 to 19 inches; very pale brown (10YR 7/3) coarse sandy loam, yellowish brown (10YR 5/4) moist; weak medium subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; common very fine and fine, many medium roots, and common coarse roots; common fine interstitial pores, and common fine and medium tubular pores; 10 percent pebbles; medium acid (pH 5.8); clear wavy boundary.

Cr–19 inches; very pale brown (10YR 8/4) highly weathered granodiorite that breaks down to very gravelly loamy coarse sand; few medium and coarse roots.

Type location: About 1.2 miles (airline) NW of Minarets Work Center; about 50 yards uphill of Forest Service road 4S81, approximately 1.3 miles north of the junction with Forest Service road 6S01; in the SE1/4 of the NW1/4 of sec. 10, T. 6 S., R. 24 E., MDBM; Shuteye Peak NE Quadrangle; Minarets Ranger District.

Range in characteristics: Depth to a paralithic contact is 12 to 20 inches. The mean annual soil temperature just above the contact is 50° to 59° F. The soil between 8 inches and the paralithic contact is estimated to be dry from mid-June to mid-October and usually moist in some or all parts the rest of the year. The soil is sandy loam, coarse sandy loam, gravelly coarse sandy loam or cobbly coarse sandy loam and averages 5 to 30 percent pebbles and cobbles. It is strongly acid to slightly acid throughout. Base saturation is 60 to 70 percent in the A horizon and 50 to 60 percent in the B horizon.

The A horizon has dry color of 10YR 6/2, 5/3, 5/2, 4/3, or 4/2; and moist color of 10YR 4/2, 3/3, 3/2, 3/2, 2/2, or 2/1. It is 3 to 6 inches thick.

The Bw horizon has dry color of 10YR 7/3, 6/4, 6/3, 6/2, 5/4, or 5/3; and moist color of 10YR 5/4, 5/3, 5/2, 4/6, 4/4, 4/3, 3/4, 3/3, or 2.5Y 4/2. It has 1 to 5 percent more clay than the A horizon. It grades into highly weathered granitic rock. In some pedons a C horizon is present between the Bw horizon and the weathered rock.

COARSEGOLD FAMILY

The Coarsegold family consists of moderately deep to deep, well drained soils formed in material weathered from metasedimentary rocks. These soils are on foothills, mountainsides, and ridges and have slopes of 35 to 85 percent. Elevation is 1,000 to 4,500 feet and annual precipitation is 20 to 35 inches.

Taxonomic class: These soils are fine-loamy, mixed, thermic Mollic Haploxeralfs.

Typical pedon of Coarsegold family in a unit of Coarsegold-Auberry families association, 35 to 65 percent slopes. It is on a slope of 40 percent under annual grasses and blue oak, at an elevation of 1,300 feet.

A–0 to 4 inches; brown (7.5YR 5/4) loam, dark reddish brown (5YR 3/4) moist; weak fine subangular blocky structure parting to moderate fine and medium granular; soft, friable, slightly sticky and nonplastic; few very fine and fine roots; common fine interstitial pores and few fine tubular pores; slightly acid (pH 6.3); clear smooth boundary.

Bt1–4 to 15 inches; brown (7.5YR 5/4) clay loam, strong brown (7.5YR 4/6) moist; weak medium and coarse subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few fine roots; common fine and few medium tubular pores; common thin clay films on faces of peds and lining pores; slightly acid (pH 6.3); clear smooth boundary.

Bt2–15 to 22 inches; yellowish red (5YR 5/6) gravelly clay loam, yellowish red (5YR 4/6) moist; moderate medium angular blocky structure; very hard, firm, sticky and plastic; few very fine roots; common fine and few medium tubular pores; 10 percent pebbles, 5 percent cobbles; common moderately thick clay films on faces of peds and lining pores; neutral (pH 6.7); abrupt wavy boundary.

Cr–22 inches; highly weathered strong brown metasedimentary rock which can be broken out into pieces averaging 2 inches wide and 5 inches long; pockets of extremely weathered rock fragments are 1/4 to 1 inch in size; rock fragments are covered by red clay skins; few fine roots in cracks.

Type location: Roadcut on the old road about 30 feet above Forest Service road 11S69, about 1.4 miles north of the Trimmer Road; in the NW1/4 of the SE1/4 of sec. 33, T. 11 S., R. 25 E., MDBM; Patterson Mountain NW Quadrangle; Kings River Ranger District.

Range in characteristics: Depth to a paralithic contact is 20 to 50 inches. The mean annual soil temperature at 20 inches is 59° to 72° F. The soil between 5 and 15 inches is usually dry from May to October and is moist in some or all parts the rest of the year. Reaction is medium acid to neutral (pH 6.0 to 7.0).

The A horizon has dry color of 10YR 5/3, 5/2, 7.5YR 5/4, or 5/3; and moist color of 10YR 3/3, 3/2, 7.5YR 3/4, 3/2, or 5YR 3/4. It is loam, sandy loam, fine sandy loam, or very fine sandy loam and averages 0 to 10 percent rock fragments.

The Bt horizon has dry color of 10YR 7/4, 6/4, 5/3, 7.5YR 5/5, 5/4, 5YR 5/6, 5/4, or 4/4; and moist color of 7.5YR 4/6, 4/4, 5YR 4/6, 4/4, 4/3, or 3/4. It is heavy loam, sandy clay loam, clay loam, or gravelly clay loam and averages 5 to 20 percent rock fragments. Clay content averages 18 to 34 percent. Base saturation is over 75 percent. It grades into highly weathered metasedimentary rock with soil material as tongues and in pockets and fractures.

CRYORTHENTS

Cryorthents consist of shallow or moderately deep, somewhat excessively drained or excessively drained soils formed in material weathered from granitic or metamorphic rocks. These soils are on mountainsides and ridges and have slopes of 5 to 50 percent. Elevation is 8,300 to 10,600 feet and annual precipitation is 40 to 60 inches.

Reference profile of Cryorthents in a unit of Rock outcrop-Cryorthents complex, 5 to 50 percent slopes. It is on a slope of 30 percent under red fir, white fir, and lodgepole pine at an elevation of 8,320 feet.

Oi–1 inch to 0; fir and pine needles.

A1–0 to 3 inches; grayish brown (10YR 5/2) very cobbly loamy coarse sand, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, friable; many fine roots, common medium roots, and few coarse roots; many fine interstitial pores; 15 percent pebbles, 15 percent cobbles, and 10 percent stones; extremely acid (pH 4.0); clear smooth boundary.

A2–3 to 6 inches; light brownish gray (10YR 6/2) very cobbly loamy coarse sand, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable; common fine, medium, and coarse roots; many fine interstitial pores; 20 percent pebbles, 15 percent cobbles, and 10 percent stones; strongly acid (pH 5.3); gradual wavy boundary.

AC–6 to 21 inches; pale brown (10YR 6/3) very cobbly loamy coarse sand, dark yellowish brown (10YR 3/4) moist; weak fine granular structure; soft, very friable; common medium roots and few coarse roots; common fine interstitial pores; 15 percent pebbles, 20 percent cobbles, 10 percent stones, and 2 percent boulders; very strongly acid (pH 5.0); gradual wavy boundary.

C1–21 to 29 inches; light yellowish brown (10YR 6/4) very cobbly loamy coarse sand, dark yellowish brown (10YR 4/4) moist; massive; loose; few medium and coarse roots; common fine interstitial pores; 15 percent pebbles, 15 percent cobbles, 10 percent stones, and 2 percent boulders; very strongly acid (pH 4.5); gradual wavy boundary.

C2–29 to 39 inches; light yellowish brown (10YR 6/4) very stony loamy coarse sand, yellowish brown (10YR 5/4) moist; massive; loose; few coarse roots; common fine interstitial pores; 10 percent pebbles, 15 percent cobbles, 20 percent stones, 5 percent boulders; medium acid (pH 5.6); gradual wavy boundary.

C3r–39 inches; highly fractured granodiorite with soil material and few coarse roots in the fractures.

Type location: About 0.8 miles south of Courtright Village a few feet above Forest Service road 8S07; in the SW1/4 of the SW1/4 of sec. 36, T. 10 S., R. 27 E., MDBM; Blackcap Mountain SW Quadrangle; Kings River Ranger District.

Range in characteristics: Depth to highly fractured rock is 15 to 40 inches. The mean annual soil temperature is 40° to 47° F. The mean summer soil temperature is less than 59° F when an O horizon is absent and less than 47° F when it is present. The soil is gravelly, cobbly, or very cobbly coarse sandy loam, or very gravelly, very stony, very cobbly, or extremely cobbly loamy coarse sand. Rock fragment content averages 15 to 65 percent. Reaction is extremely acid to medium acid (pH 4.0 to 6.0).

The A horizon has dry color of 10YR 8/1, 6/2, 5/3, 5/2, or 2.5Y 5/2; and moist color of 10YR 4/3, 4/2, 3/3, 3/2, 2/2, or 2.5Y 6/2. It is 3 to 9 inches thick.

The AC horizon or C horizon has dry color of 10YR 6/4, 6/3, 2.5Y 7/4, or 7.5YR 5/4; and moist color of 10YR 5/4, 4/4, 4/3, 3/4, or 7.5 YR 4/4. Clay content does not increase in either of these two horizons from that which is in the A horizon.

The C horizon grades into or rests on highly fractured rock.

DELPIEDRA FAMILY

The Delpiedra family consists of shallow, well drained to somewhat excessively drained soils formed in material weathered from remetamorphosed serpentine rocks. These soils are on mountainsides and have slopes of 30 to 60 percent. Elevation is 1,000 to 3,200 feet and annual precipitation is 20 to 25 inches.

Taxonomic class: These soils are loamy, serpentinitic, thermic, shallow Mollic Haploxeralfs.

Typical pedon of Delpiedra family in a unit of Delpiedra family-Rock outcrop complex, 30 to 60 percent slopes. It is on a slope of 55 percent under annual grasses, at an elevation of 1,100 feet.

A–0 to 4 inches; reddish brown (5YR 5/4) gravelly loam, dark reddish brown (5YR 3/4) moist; weak fine and medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; many fine roots; common fine tubular pores; 20 percent pebbles; neutral (pH 6.9); abrupt irregular boundary.

Bt–4 to 12 inches; yellowish red (5YR 4/6) gravelly loam, dark reddish brown (2.5YR-5YR 3/4) moist; strong fine and medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; many fine roots; common fine tubular pores; many thin clay films on faces of peds and lining pores; 30 percent pebbles; neutral (pH 7.0); abrupt irregular boundary.

Cr–12 to 20 inches; pale olive highly weathered serpentine; rock fabric visible but fragmented; fragments are hard when dry but can be partly crushed in the hand when moist; few fine roots; grades abruptly and very irregularly into greenish gray unweathered but shattered serpentine parent rock.

Type location: On the north side of the Trimmer Springs Road about 1 mile east of the Forest boundary, 0.2 miles west of restaurant; approximately in the center of the SE1/4 of sec. 24, T. 12 S., R. 24 E., MDBM; Pine Flat Dam Quadrangle; Kings River Ranger District.

Range in characteristics: Depth to a paralithic contact is 10 to 20 inches. The mean annual soil temperature at 20 inches is 59° to 72° F. The soil between 4 inches and the paralithic contact is usually dry from May to November and moist the rest of the year.

The A horizon has dry color of 5YR 5/6, 5/4, or 4/8; and moist color of 5YR 5/4 or 3/4. It is loam or gravelly loam and averages 10 to 25 percent rock fragments. Reaction is slightly acid to mildly alkaline (pH 6.5 to 7.5).

The Bt horizon has dry color of 5YR 4/6, 2.5YR 3/6 or 3/4; and moist color of 5YR 3/4 or 2.5YR 3/4. It is heavy loam, heavy gravelly loam, heavy cobbly loam, or gravelly clay loam and averages 15 to 35 percent rock fragments. Reaction is neutral or mildly alkaline (pH 7.0 to 7.5).

DYSTRIC LITHIC XEROCHREPTS

Dystric Lithic Xerocrepts consist of shallow, somewhat excessively drained soils formed in material weathered from metasedimentary rock. These soils are on mountainsides and ridges and have slopes of 15 to 85 percent. Elevation is 1,500 to 6,400 feet and average annual precipitation is 35 to 50 inches.

Reference profile of Dystric Lithic Xerochrepts in a unit of Dystric Lithic Xerochrepts-Ultic Haploxeralfs-Rock outcrop complex, 50 to 85 percent slopes. It is on a slope of 50 percent under Mariposa manzanita and scattered ponderosa and Digger pines, at an elevation of 3,800 feet.

Oi–2 1/2 inches to 2; manzanita leaves.

Oe–2 inches to 0; partially decomposed leaves.

A–0 to 7 inches; yellowish red (5YR 5/6) cobbly loam, dark reddish brown (5YR 3/4) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and medium roots; common very fine interstitial pores and common fine tubular pores; 10 percent cobbles and 5 percent pebbles; slightly acid (pH 6.5); abrupt wavy boundary.

Bw–7 to 11 inches; reddish yellow (5YR 6/6) very cobbly loam, reddish brown (5YR 4/4) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common medium roots; few very fine interstitial pores and common fine tubular pores; 35 percent cobbles; slightly acid (pH 6.2); abrupt wavy boundary.

R–11 inches; fractured metasedimentary rock.

Type location: In the Snyder Gulch area about 25 feet below Forest Service road 3S02; in the SE1/4 of the SE1/4 of sec. 10, T. 4 S., R. 19 E., MDBM; Buckingham Mountain Quadrangle; Mariposa Ranger District.

Range in characteristics: Depth to a lithic contact is 11 to 20 inches. The mean annual soil temperature at the contact is 53° to 63° F. The soil between a depth of 7 inches and the lithic contact is dry from mid-May to October and is moist in all parts from November through April. Rock fragments make up 15 to 60 percent of the soil and tend to increase with increasing depth. The soil is neutral through medium acid and usually becomes more acid with increasing depth.

The A horizon has dry color of 5YR 5/6, 7.5YR 5/4, or 10YR 4/3; and moist color of 5YR 3/4, 3/3, 7.5YR 4/2, or 10YR 3/2. It is cobbly, gravelly, or very gravelly loam, but can be very gravelly sandy loam.

The Bw horizon has dry color of 5YR 7/6, 6/6, 7.5YR 6/6, or 10YR 6/4; and moist color of 5YR 5/4, 4/6, 4/4, or 7.5YR 4/4. It is cobbly to extremely cobbly or very gravelly loam. Base saturation is less than 60 percent below 10 inches.

DYSTRIC XEROCHREPTS

Dystric Xerochrepts consist of moderately deep to deep, well drained or somewhat excessively drained soils formed in material weathered from volcanic flow rock. These soils are on mountainsides, colluvial slopes, and volcanic flows and have slopes of 20 to 50 percent. The relief reflects much of the original contour form of the younger volcanic flows over older granitic rock. Elevation is 6,700 to 8,800 feet and annual precipitation is 30 to 55 inches.

Reference profile of Dystric Xerochrepts in a unit of Dystric Xerochrepts and Typic Xerumbrepts, 20 to 50 percent slopes. It is on a slope of 20 percent under white fir, lodgepole pine and Jeffrey pine, at an elevation of 7,900 feet.

Oi–1/2 inch to 0; white fir and Jeffrey pine litter.

A1–0 to 5 inches; grayish brown (10YR 5/2) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; few fine roots; many very fine and fine interstitial pores; 5 percent pebbles; medium acid (pH 6.0).

A2–5 to 18 inches; brown (10YR 5/3) cobbly coarse sandy loam, dark brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; few fine roots; 10 percent pebbles and 10 percent cobbles; strongly acid (pH 5.5).

Bw–18 to 32 inches; brown (10YR 5/3) cobbly coarse sandy loam, dark brown (10YR 4/3) moist; weak subangular blocky structure; slightly hard, friable, slightly sticky and nonplastic; few faint clay bridges; 10 percent pebbles, 10 percent cobbles; strongly acid (pH 5.5).

Cr–32 inches; brown to light gray highly weathered basalt, with occasional cracks.

Type location: About 1/3 mile NW of Onion Spring Meadow; in the SW1/4 of the SW1/4 of sec. 19, T. 6 S., R. 27 E., MDBM; Kaiser Peak NE Quadrangle; Pineridge Ranger District.

Range in characteristics: Depth to fractured (cobble and stone-sized fragments) rock is 22 to 54 inches. The mean annual soil temperature is 38° to 47° F. The soil between 10 and 30 inches is estimated to be dry in July, August, and September and usually moist in some or all parts the rest of the year. The soil is very strongly acid to medium acid (pH 5.0 to 6.0). Rock fragment content ranges from 10 to 60 percent. The content normally increases with increasing depth, and is made up mostly of pebble and cobble-size basalt fragments, with occasional granite rock fragments. Base saturation is estimated to range from 25 to 35 percent throughout the profile.

The A horizon has dry color of 10YR 6/6, 6/2, 5/3, 5/2, 7.5YR 5/2, 4/2, 5YR 5/3, or 5/2; and moist color of 10YR 4/3, 4/2, 3/2, 3/1, 2/2, 7.5YR 4/2, 2/2, 5YR 4/3, or 4/2. It is 3 to 18 inches thick, but dark colors are only in the upper 6 inches. It is coarse sandy loam, sandy loam, fine sandy loam, or their gravelly or cobbly equivalents.

The Bw horizon has dry color of 7.5YR 7/6, 6/4, 5/4, 4/4, 5YR 5/3, 5/2, or 10YR 5/3; and moist color of 5YR 4/3, 4/2, 3/3, 7.5YR 5/4, 4/4, or 10YR 4/3. It is coarse sandy loam, sandy loam, fine sandy loam, loamy sand, or their gravelly or cobbly to extremely cobbly equivalents. It grades into fractured rock with some material in the interstices. Water and roots can penetrate the fractured rock in some places.

ENTIC CRYUMBREPTS

Entic Cryumbrepts consist of moderately deep, somewhat excessively drained or excessively drained soils formed in material weathered from granitic rocks. These soils are on mountainsides and ridges and have slopes of 5 to 60 percent. Elevation is 8,300 to 10,600 feet and annual precipitation is 35 to 60 inches.

Reference profile of Entic Cryumbrepts in a unit of Entic Cryumbrepts, 5 to 50 percent slopes. It is on a slope of 15 percent under lodgepole pine and western white pine, at an elevation of 9,475 feet.

Oi–1/4 inch to 0; discontinuous litter layer.

A1–0 to 5 inches; grayish brown (10YR 5/2) gravelly loamy coarse sand, very dark grayish brown (10YR 3/2) moist; single grain; loose; few fine roots; 20 percent fine pebbles; very strongly acid (pH 4.9); clear smooth boundary.

A2–5 to 14 inches; grayish brown (10YR 5/2) gravelly loamy coarse sand, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable; few fine roots; 25 percent pebbles; strongly acid (pH 5.2); clear irregular boundary.

C–14 to 22 inches; light yellowish brown (10YR 6/4) very stony loamy coarse sand, dark yellowish brown (10YR 3/4) moist; single grain; loose; few medium and coarse roots; 20 percent pebbles and 40 percent stones; strongly acid (pH 5.3).

R–22 inches; slightly weathered, highly fractured granodiorite.

Type location: About 0.5 miles NE of Kaiser Pass near Forest Service road 7S32; in the SE1/4 of the NE1/4 of sec. 26, T. 7 S., R. 26 E., MDBM; Kaiser Peak SE Quadrangle; Pineridge Ranger District.

Range in characteristics: Depth to a fractured lithic or a paralithic contact is 20 to 40 inches. The mean annual soil temperature at 20 inches is 40° to 47° F. The mean summer (June, July, August) soil temperature is less than 59° F when an 0 horizon is absent and less than 47° F when it is present. The soil is very strongly acid to medium acid (pH 4.5 to 6.0) and is usually more acid in the surface soil.

The A horizon has dry color of 10YR 5/4, 5/3, 5/2, 4/3, or 2.5Y 4/2; and moist color of 10YR 3/3, 3/2 or 2/2. It is 10 to 14 inches thick. Organic carbon content is about 1.0 to 2.25 percent. Base saturation is estimated to be between 25 to 40 percent. It is coarse sandy loam, loamy coarse sand, or their gravelly equivalents. Pebbles and cobbles average 5 to 30 percent.

The C horizon has dry color of 10YR 7/4, 7/3, 6/4, 6/3, 5/4, or 2.5Y 6/4; and moist color of 10YR 5/4, 4/4, 4/3, 3/4, or 2.5Y 4/4. It is gravelly, cobbly, very cobbly or very stony loamy coarse sand. Rock fragments average 10 to 60 percent. It either rests on slightly weathered, jointed granitic rock or highly weathered, decomposed granitic rock. Roots and water can penetrate the parent rock.

ENTIC XERUMBREPTS

Entic Xerumbrepts consist of shallow, somewhat excessively drained soils formed in material weathered from granitic rocks. These soils are on mountainsides and ridges and have slopes of 10 to 45 percent. Elevation is 6,000 to 7,600 feet and annual precipitation is 40 to 60 inches.

Reference profile of Entic Xerumbrepts in a unit of Ledford family-Entic Xerumbrepts-Rock outcrop association, 10 to 45 percent slopes. It is on a slope of 25 percent under 8-year-old planted Jeffrey pine at an elevation of 6,920 feet.

A–0 to 8 inches; very dark grayish brown (10YR 3/2) sandy loam, very dark brown (10YR 2/2) moist; weak medium granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots, and few medium roots; many very fine and fine interstitial pores; 10 percent pebbles; slightly acid (pH 6.2); gradual irregular boundary.

Bw–8 to 12 inches; yellowish brown (10YR 5/4) gravelly coarse sandy loam, dark yellowish brown (10YR 3/4) moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine, fine, and medium roots; common very fine and many fine interstitial pores; 15 percent pebbles; medium acid (pH 5.8); gradual irregular boundary.

C1–12 to 18 inches; light gray (10YR 7/2) gravelly loamy coarse sand, brown (10YR 5/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; few medium roots; few fine and medium interstitial pores; 30 percent pebbles; medium acid (pH 5.8); gradual wavy boundary.

C2r–18 inches; highly weathered granodiorite.

Type location: About 2 miles NW of Jackass Rock, on the south side of a clearcut plantation, on the side of a logging road about 500 yards uphill from the end of Forest Service road 5S40; in the SW1/4 of the NW1/4 of sec. 35, T. 5 S., R. 24 E., MDBM; Shuteye Peak NE Quadrangle; Minarets Ranger District.

Range in characteristics: Depth to a paralithic contact is 10 to 20 inches. Mean annual soil temperature is 43° to 47° F. The soil throughout is estimated to be dry from mid-June to early October and is usually moist in some or all parts the rest of the year. Content of pebbles in the soil ranges from 0 to 30 percent. Base saturation is estimated to be less than 50 percent throughout the profile.

The A horizon has dry color of 10YR 5/2, 4/2, 4/1, 3/2, or 3/1; and moist color of 10YR 3/2, 2/2, or 2/1. It is sandy loam or coarse sandy loam. Reaction is strongly acid to slightly acid (pH 5.2 to 6.2).

The Bw horizon has dry color of 10YR 6/4, 5/4, 5/3, or 4/2; and moist color of 10YR 4/3, 3/4, 3/3, or 3/2. It is coarse sandy loam or gravelly coarse sandy loam. Reaction is strongly acid or medium acid (pH 5.2 to 5.8). It typically grades into highly weathered granitic rock. In some pedons, however, there is a thin C horizon between the AC and the weathered rock.

GERLE FAMILY

The Gerle family consists of moderately deep to deep, well drained soils formed in material weathered from granitic rocks. These soils are on mountainsides and have slopes of 5 to 55 percent. Elevation is 6,000 to 8,400 feet and annual precipitation is 40 to 55 inches.

Taxonomic class: These soils are coarse-loamy, mixed, frigid Typic Xerumbrepts.

Typical pedon of Gerle family in a unit of Gerle-Cagwin families assoication, 5 to 35 percent slopes. It is on a slope of 10 percent under white fir and red fir, at an elevation of 6,800 feet.

Oe–1 inch to 0; decomposing fir needles.

A1–0 to 3 inches; brown (10YR 5/3) gravelly coarse sandy loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, friable, nonsticky and nonplastic; common fine and medium roots, and few coarse roots; many fine interstitial pores; 10 percent pebbles and 5 percent cobbles; medium acid (pH 6.0); clear smooth boundary.

A2–3 to 7 inches; grayish brown (10YR 5/2) gravelly coarse sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; few fine roots, common medium roots, and few coarse roots; many fine interstitial pores; 10 percent pebbles and 5 percent cobbles; medium acid (pH 5.8); gradual smooth boundary.

A3–7 to 14 inches; brown (10YR 5/3) gravelly coarse sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common medium, few coarse roots; common fine interstitial pores; 10 percent pebbles and 5 percent cobbles; medium acid (pH 5.7); clear wavy boundary.

Bw–14 to 26 inches; light yellowish brown (10YR 6/4) cobbly coarse sandy loam, dark yellowish brown (10YR 3/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few coarse roots; common fine intersitial pores; 10 percent pebbles and 10 percent cobbles; strongly acid (pH 5.5); gradual wavy boundary.

BC–26 to 38 inches; pale brown (10YR 6/3) cobbly loamy coarse sand, dark yellowish brown (10YR 4/4) moist; massive; loose; few medium roots; few fine interstitial pores; 10 percent pebbles and 10 percent cobbles; strongly acid (pH 5.2); gradual wavy boundary.

Cr–38 inches; very pale brown (10YR 7/3) highly weathered granodiorite.

Type location: About 2.7 miles (airline) SE of Dinkey Creek Ranger Station, on Forest Service road 10S13, near the intersection with Forest Service road 10S66; in the NW1/4 of the NW1/4 of sec. 23, T. 10 S., R. 26 E., MDBM; Huntington Lake SE Quadrangle; Kings River District.

Range in characteristics: Depth to a paralithic contact is 30 to 50 inches. The mean annual soil temperature at 20 inches is 40° to 47° F. The soil between 8 to 24 inches is estimated to be dry from July to October and usually moist in some or all parts the rest of the year. Pebbles and cobbles range from 0 to 20 percent of the soil volume. Base saturation is 25 to 50 percent throughout the soil.

The A horizon has dry color of 10YR 5/3 or 5/2; and moist color of 10YR 3/3, 3/2 or 2/2. It is 10 to 18 inches thick. It is gravelly coarse sandy loam or sandy loam. Reaction is medium acid or slightly acid (pH 5.7 to 6.5).

The Bw horizon has dry color of 10YR 6/4, 6/3, or 7.5YR 5/4; and moist color of 10YR 3/4, 3/3, 7.5YR 4/6, 4/4, or 3/4. It is sandy loam or coarse sandy loam or their gravelly or cobbly equivalents. Clay content is 1 to 3 percent greater than in the A horizon. Reaction is strongly acid to slightly acid (pH 5.5 to 6.3).

The BC or C horizon (present in some pedons) is coarse sandy loam or loamy coarse sand or their gravelly or cobbly equivalents. Reaction is strongly acid or medium acid (pH 5.1 to 6.0). It grades into highly weathered granitic rock.

HOLLAND FAMILY

The Holland family consists of deep, well drained soils formed in material weathered from granitic or metamorphic rocks. These soils are on mountainsides and ridges and have slopes of 5 to 65 percent. Elevation is 2,700 to 6,000 feet and annual precipitation is 25 to 55 inches.

Taxonomic class: These soils are fine-loamy, mixed, mesic Ultic Haploxeralfs.

Typical pedon of Holland family in a unit of Holland family, 5 to 35 percent slopes. It is on a slope of 25 percent under ponderosa pine and bear clover at an elevation of 3,760 feet.

Oi–2 inches 0; fresh and decomposing needle and leaf litter.

A1–0 to 3 inches; brown (10YR 5/3) sandy loam, very dark grayish brown (10YR 3/2) moist; strong fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine interstitial pores and common fine tubular pores; medium acid (pH 5.7); abrupt wavy boundary.

A2–3 to 7 inches; brown (7.5YR 5/4) sandy loam, dark brown (7.5YR 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots, and common medium roots; many very fine interstitial pores and many fine tubular pores; medium acid (pH 5.9); abrupt wavy boundary.

AB–7 to 14 inches; light brown (7.5YR 6/4) light sandy clay loam, dark reddish brown (5YR 3/4) moist; weak fine subangular blocky structure parts to moderate fine granular; slightly hard, friable, sticky and plastic; many very fine and fine roots, and common medium and coarse roots; many very fine interstitial pores and fine tubular pores; medium acid (pH 5.9); clear smooth boundary.

BAt–14 to 25 inches; brown (7.5YR 5/4) sandy clay loam, dark reddish brown (5YR 3/4) moist; moderate fine subangular blocky structure; slightly hard, firm, sticky and plastic; common very fine, fine, and medium roots; many very fine interstitial pores, and many fine and medium tubular pores; common thin clay films on faces of peds and bridging mineral grains, many thin clay films lining pores; medium acid (pH 5.8); clear smooth boundary.

Bt1–25 to 34 inches; brown (7.5YR 5/4) clay loam, reddish brown (5YR 4/4) moist; strong fine subangular blocky structure; hard, firm, sticky and very plastic; few very fine roots, common fine and medium roots; many very fine interstitial pores, and many fine and medium tubular pores; many thin clay films on faces of peds, continuous moderately thick clay films lining pores; medium acid (pH 5.8); gradual smooth boundary.

Bt2–34 to 51 inches; brown (7.5YR 5/4) sandy clay loam, reddish brown (5YR 4/4) moist; strong fine and medium subangular blocky structure; very hard, very firm, sticky and very plastic; common fine and medium roots and few very fine and coarse roots; many very fine interstitial pores and many fine tubular pores; many thin and common moderately thick clay films on faces of peds, continuous moderately thick clay films lining pores; medium acid (pH 5.9); gradual smooth boundary.

Bt3–51 to 60 inches; light brown (7.5YR 6/4) sandy clay loam, brown (7.5YR 5/4) moist; strong medium and coarse subangular blocky structure; very hard, very firm, sticky and very plastic; common medium roots; many very fine interstitial pores and many fine tubular pores; continuous moderately thick clay films on faces of peds and lining pores; medium acid (pH 5.8); clear smooth boundary.

C–60 to 66 inches; very pale brown (10YR 7/4) sandy loam, yellowish brown (10YR 5/4) moist; moderate medium and coarse subangular blocky structure; extremely hard, very to extremely firm, sticky and plastic; common medium roots and few coarse roots; many very fine interstitial pores and many fine tubular pores; many moderately thick clay films on faces of peds, continuous moderately thick clay films lining pores; medium acid (pH 5.6).

Type location: A roadcut on Forest Service road 10S18 in the Blue Canyon area, a little over 1 mile NNW of Blue Canyon Work Center; in the SE1/4 of the SW1/4 of sec. 16, T. 10 S., R. 25 E., MDBM; Shaver Lake SE Quadrangle; Kings River Ranger District.

Range in characteristics: Depth to a paralithic or lithic contact is 60 to 80 inches. The mean annual soil temperature at 20 inches is 47° to 59° F. The soil between 4 and 15 inches is estimated to be dry from June to mid-October and usually moist the rest of the

year. Typically, the soil contains 0 to 15 percent rock fragments, but may go up to 30 percent in some areas.

The A horizon has dry color of 10YR 7/4, 6/4, 6/3, 5/4 5/3, 5/2, 4/3, 4/2, 7.5YR 6/4, 5/6, 5/4, 5/2, 4/4, 2.5Y 6/6, 6/2, 5/2, 5YR 6/6, 4/6, or 4/4; and moist color of 10YR 5/3, 4/4, 4/3, 3/3, 3/2, 3/1, 2/2, 7.5YR 5/4, 4/6, 4/4, 4/3, 4/2, 3/4, 3/2, 5YR 4/3, 3/4, 3/3, 2.5Y 3/6, or 3/2. It is loam, gravelly loam, sandy loam, fine sandy loam, or coarse sandy loam. Reaction is strongly acid to slightly acid (pH 5.5 to 6.5).

The Bt horizon has dry color of 5YR 7/8, 6/8, 6/6, 6/4, 5/8, 5/6, 5/4, 4/6, 4/4, 7.5YR 7/4, 6/6, 6/4, 5/6, 5/4, 2.5YR 5/8, 5/6, 5/4, 4/8, 4/6, 10YR 6/4, or 5/3; and moist color of 5YR 5/8, 5/6, 5/4, 4/8, 4/6, 4/4, 3/6, 3/4, 7.5YR 6/6, 5/4, 4/6, 4/4, 4/3, 3/4, 3/3, 2.5YR 5/6, 4/8, 4/6, 3/6, 3/4, 10YR 5/4, or 4/4. It is clay loam, sandy clay loam, heavy loam, or their gravelly or cobbly equivalents. The base saturation in the upper 30 inches of this horizon is 40 to 75 percent. Reaction is very strongly acid to neutral (pH 5.0 to 7.0).

The C horizon has dry color of 10YR 7/6, 7/4, 7/3, 7/2, 6/4, 7.5YR 6/6, 6/4, 5/4, 5YR 6/6, 5/8, or 2.5YR 8/2; and moist color of 10YR 5/4, 5/3, 4/4, 7.5YR 6/6, 5/4, 4/4, 5YR 5/6, 5/4, 4/6, 2.5YR 7/4 or 4/6. It is sandy loam or loam. Reaction is very strongly acid to slightly acid (pH 5.0 to 6.5).

LEDFORD FAMILY

The Ledford family consists of deep, somewhat excessively drained soils formed in material weathered from granitic rocks. These soils are on mountainsides and have slopes of 10 to 35 percent. Elevation is 6,000 to 7,600 feet and annual precipitation is 40 to 60 inches.

Taxonomic class: These soils are coarse-loamy, mixed, frigid, Entic Xerumbrepts.

Typical pedon of Ledford family in a unit of Ledford family-Entic Xerumbrepts-Rock outcrop association, 10 to 45 percent slopes. It is on a slope of 25 percent, under white fir, red fir, Jeffrey and ponderosa pine at an elevation of 7,280 feet.

0i–1½ inches to 0; decaying needles and twigs.

A1–0 to 8 inches; dark grayish brown (10YR 4/2) coarse sandy loam, very dark brown (10YR 2/2) moist; moderate medium granular structure; soft, very friable, nonsticky and nonplastic; common very fine, fine, and medium roots; many very fine and fine interstitial pores; medium acid (pH 5.8); gradual smooth boundary.

AC–8 to 18 inches; brown (10YR 5/3) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; few fine roots, common medium and coarse roots; many very fine and fine, few medium and coarse interstitial pores; medium acid (pH 5.6); gradual smooth boundary.

C1–18 to 36 inches; pale brown (10YR 6/3) coarse sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few fine roots, many medium and coarse roots; common very fine and fine interstitial pores, and few medium tubular pores; strongly acid (pH 5.4); diffuse smooth boundary.

C2–36 to 60 inches; very pale brown (10YR 7/3) gravelly coarse sandy loam, yellowish brown (10YR 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; common medium and coarse roots; common very fine and fine interstitial pores; 15 percent pebbles; strongly acid (pH 5.2).

Type location: About 1½ miles SSW of Jackass Meadow; about 0.2 miles south of large clearcut on west side of Forest Service road 5S02; in the SW¼ of the SW¼ of sec. 22, T. 5 S., R. 24 E., MDBM; Shuteye Peak NE Quadrangle; Minarets Ranger District.

Range in characteristics: Depth to a paralithic contact is 40 to 80 inches. The mean annual soil temperature at 20 inches is 43° to 47° F. The soil between 10 and 28 inches is usually dry from late July to late September and moist the rest of the year. Between depths of 10 and 40 inches the rock fragment content, typically pebbles, averages 0 to 20 percent.

The A horizon has dry color of 10YR 5/3, 4/3, 4/2, or 3/3; and moist color of 10YR 3/3, 3/2, 2/2, 2/1, or 7.5YR 3/2. It is loam, sandy loam, coarse sandy loam, or gravelly coarse sandy loam. Reaction is medium acid or slightly acid (pH 5.8 to 6.5). It is 7 to 14 inches thick. Organic carbon content is 0.6 to 2.0 percent. Base saturation is estimated to be 40 to 50 percent.

The AC horizon has dry color of 10YR 5/4, 5/3, or 5/2; and moist color of 10YR 4/4, 3/4, 3/2, or 7.5YR 4/4. It is sandy loam, coarse sandy loam, or gravelly coarse sandy loam. Reaction is strongly acid to slightly acid (pH 5.4 to 6.4).

The C horizon has dry color of 10YR 8/2, 7/4, 7/3, 6/3, 2.5YR 7/4, 7/2, or 6/2; and moist color of 10YR 6/2, 5/6, 5/4, 4/4, 4/3, 2.5Y 5/3, or 4/4. It is coarse sandy loam, gravelly coarse sandy loam, or gravelly loamy coarse sand in the lower part. Reaction is strongly acid or medium acid (pH 5.2 to 5.8). It grades into highly weathered granodiorite or quartz diorite that can easily be dug with a spade.

LITHIC XEROPSAMMENTS

Lithic Xeropsamments consist of shallow, excessively drained soils formed in material weathered from ganitic rock. These soils are on mountainsides and ridges and have slopes of 5 to 85 percent. Elevation is 5,200 to 8,400 feet and annual precipitation is 25 to 60 inches.

Reference profile of Lithic Xeropsamments in a unit of Cagwin family-Lithic Xeropsamments-Rock outcrop complex, 15 to 45 percent slopes. It is on a slope of 15 percent under an open stand of Jeffrey pine and sugar pine, at an elevation of 6,560 feet.

Oe–1 inch to 0; fresh and decomposing needle and leaf litter.

A1–0 to 4 inches; grayish brown (10YR 5/2) gravelly loamy coarse sand, very dark grayish brown (10YR 3/2) moist; single grain; loose; many very fine and fine roots; many very fine interstitial pores; 20 percent fine pebbles; medium acid (pH 5.8); clear smooth boundary.

A2–4 to 9 inches; brown (10YR 5/3) gravelly loamy coarse sand, dark brown (10YR 3/3) moist; single grain; loose; many very fine and fine roots, and common medium roots; many very fine interstitial pores; 15 percent pebbles; medium acid (pH 5.6); clear smooth boundary.

C–9 to 11 inches; light yellowish brown (10YR 6/4) gravelly loamy coarse sand, dark yellowish brown (10YR 4/4) moist; single grain; loose; many very fine and fine roots, and common medium roots; many very fine interstitial pores; 15 percent fine pebbles; medium acid (pH 5.6); abrupt smooth boundary.

R–11 inches; unweathered granodiorite.

Type location: About 1.5 miles NE of Brown Cone; in the NW1/4 of the NW1/4 of sec. 11, T. 6 S., R. 25 E., MDBM; Kaiser Peak NW Quadrangle; Pineridge Ranger District.

Range in characteristics: Depth to a lithic contact is 4 to 20 inches. The mean annual soil temperature at the contact is 40° to 50° F. The soil is dry for 45 consecutive days or more between June and November and moist in some or all parts the rest of the year. Fine gravel ranges from 5 to 20 percent in the soil. Reaction is very strongly acid to medium acid (pH 5.0 to 5.8).

The A horizon has dry color of 10YR 6/3, 5/3, or 5/2; and moist color of 10YR 3/3, 3/2, or 3/1. It is gravelly loamy coarse sand or gravelly sandy loam.

The C horizon has dry color of 10YR 6/4, 6/3, 6/2, 5/6, or 5/4; and moist color of 10YR 5/3, 4/6, 4/4, 4/3, 3/4, or 3/3. It is gravelly loamy coarse sand or gravelly coarse sand.

NEUNS FAMILY

The Neuns family consists of moderately deep to deep, well drained soils formed in material weathered from metamorphosed sedimentary and metamorphosed igneous rocks. These soils are on mountainsides, colluvial slopes, and ridges and have slopes of 15 to 60 percent. Elevation is 3,000 to 6,400 feet and annual precipitation is 35 to 50 inches.

Taxonomic class: These soils are loamy-skeletal, mixed, mesic Dystric Xerochrepts.

Typical pedon of Neuns family in a unit of Neuns family, 25 to 60 percent slopes. It is on a slope of 60 percent under a mixed coniferous forest of ponderosa pine, sugar pine, and white fir at an elevation of 4,800 feet.

Oi–1 inch to 0; slightly decomposed pine needles and bark.

A–0 to 7 inches; dark yellowish brown (10YR 4/6) gravelly loam, dark brown (7.5YR 3/4) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots and few medium roots; many fine interstitial pores; 25 percent pebbles; slightly acid (pH 6.5); abrupt wavy boundary.

Bw1–7 to 13 inches; brown (7.5YR 5/4) gravelly loam, dark brown (7.5YR 3/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine and medium roots; many fine interstitial pores; 25 percent pebbles; medium acid (pH 6.0); abrupt smooth boundary.

Bw2–13 to 25 inches; reddish yellow (7.5YR 6/6) cobbly loam, dark brown (7.5YR 4/4) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine roots, common medium and coarse roots; many fine interstitial pores; one 5-inch diameter animal burrow filled with A material; 15 percent pebbles and 10 percent cobbles; medium acid (pH 6.0); clear wavy boundary.

Bw3–25 to 45 inches; brownish yellow (10YR 6/6) very cobbly loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine roots, many medium roots, and common coarse roots; common fine interstitial pores and few fine tubular pores; 40 percent pebbles and 20 percent cobbles; strongly acid (pH 5.5); clear wavy boundary.

C1–45 to 54 inches; brownish yellow (10YR 6/6) extremely cobbly loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine roots, many medium roots, and common coarse roots; common fine interstitial pores; 45 percent cobbles and 30 percent pebbles; very strongly acid (pH 5.0); clear wavy boundary.

C2r–54 inches; highly weathered and fractured metasedimentary rock which can be broken apart in the hands into cobble-size fragments.

Type location: About 1/4 mile NW of Kirby Peak, on a small roadcut failure on Forest Service road 5S25; in the NE1/4 of the SE1/4 of sec. 5, T. 5 S., R. 20 E., MDBM; Buckingham Mountain Quadrangle; Mariposa Ranger District.

Range in characteristics: Depth to a paralithic or lithic contact is 20 to 60 inches. The mean annual soil temperature at 20 inches is 47° to 54° F. The soil between 10 and 28 inches is estimated to be dry from June through October and usually moist in some or all parts the rest of the year. Base saturation below a depth of 10 inches ranges from 35 to 60 percent. Between a depth of 10 and 40 inches, rock fragments, mostly pebbles and cobbles, range from 35 to 60 percent.

The A horizon has dry color of 10YR 4/6, 3/3, or 7.5 YR 4/4; and moist color of 10YR 2/2 or 7.5YR 3/4. It is 6 to 14 inches thick. It is loam, sandy loam, or their gravelly or cobbly equivalents and averages 10 to 25 percent rock fragments. Reaction is slightly acid to moderately alkaline (pH 6.5 to 7.8).

The Bw horizon has dry color of 10YR 6/6, 5/6, 5/4, 7.5YR 6/6, 5/4, 5YR 6/6, or 5/6; and moist color of 7.5YR 4/4, 3/4, 10YR 4/4, or 5YR 4/4. It is loam, sandy loam, or their cobbly or very cobbly equivalents and averages 25 to 60 percent rock fragments. It has 1 to 7 percent more clay than the A horizon. Reaction is strongly acid to neutral (pH 5.5 to 7.0). In some pedons this horizon grades into the weathered bedrock.

The C horizon has dry color of 10YR 6/6 or 5/6. It has 60 to 75 percent rock fragments. It grades into highly fractured metamorphic rock.

SHAVER FAMILY

The Shaver family consists of deep, well drained soils formed in material weathered from granitic rocks. These soils are on mountainsides and upland basins and have slopes of 5 to 65 percent. Elevation is 3,000 to 6,400 feet and annual precipitation is 30 to 45 inches.

Taxonomic class: These soils are coarse-loamy, mixed mesic Pachic Xerumbrepts.

Typical pedon of Shaver family in a unit of Shaver family, 5 to 35 percent slopes. It is on a slope of 20 percent under mixed conifers, at an elevation of 5,800 feet.

0i–3 inches to 2; dry litter of white fir and sugar pine needles, some twigs.

0a–2 inches to 0; partially decomposed litter; many white fungal mycelia; abrupt boundary.

A1–0 to 2 inches; dark grayish brown (10YR 4/2) coarse sandy loam, very dark brown (10YR 2/2) moist; strong fine granular structure; soft, very friable, nonsticky and nonplastic; many fine roots, common medium roots, and few coarse roots; many fine interstitial pores; slightly acid (pH 6.5); clear wavy boundary.

A2–2 to 5 inches; grayish brown (10YR 5/2) coarse sandy loam, dark brown (10YR 3/3) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; many fine roots, common medium roots, and few coarse roots; many fine interstitial pores; slightly acid (pH 6.5); clear wavy boundary.

A3–5 to 33 inches; brown (10YR 5/3) coarse sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many fine roots, common medium and coarse roots; many fine interstitial pores; slightly acid (pH 6.5); abrupt wavy boundary.

C1–33 to 73 inches; pale brown (10YR 6/3) coarse sandy loam, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky and nonplastic; many fine, medium, and coarse roots; many fine interstitial pores; medium acid (pH 5.9); abrupt irregular boundary.

C2r–73 inches; light gray, strongly weathered quartz diorite; original rock fabric clearly visible in place; easily excavated and crushes readily to coarse sand; few large tree roots.

Type location: About 0.75 miles (airline) SSE of Dinkey Creek Ranger Station on the old grade of Forest Service road 11S40 in the SW1/4 of the SW1/4 of sec. 16, T. 10 S., R. 26 E., MDBM; Huntington Lake SW Quadrangle; Kings River Ranger District.

Range in characteristics: Depth to a paralithic contact is 40 to 80 inches. The mean annual soil temperature at 20 inches is 47° to 59° F. The soil between 8 and 24 inches is dry from about June until late October and moist in some or all parts the rest of the year. The profile is strongly acid to slightly acid (pH 5.5 to 6.5). Rock fragments, mostly pebbles, make up 5 to 20 percent of the soil profile.

The A horizon has dry color of 10YR 5/3, 5/2, 4/3, or 4/2; and moist color of 10YR 3/3, 3/2, 2/2, or 2/1. It is sandy loam, coarse sandy loam, or gravelly sandy loam. Base saturation is 25 to 50 percent. The organic matter content is 1.5 to 4.5 percent in the upper part and decreases regularly to less than 1 percent at depths of 25 to 35 inches.

The C horizon has dry color of 10YR 7/4, 7/3, 7/2, 7/1, 6/4, 6/3, 6/2, 5/6, 5/4, or 5/3; and moist color of 10YR 6/2, 5/4, 5/2, 4/6, 4/4, 4/3, 4/2, 3/6, 3/4, or 3/3. It is sandy loam, coarse sandy loam, or it can be loamy coarse sand or gravelly loamy coarse sand below about 30 inches in depth. Some pedons have a weak B horizon between the A and C horizons.

SIRRETTA FAMILY

The Sirretta family consists of deep, somewhat excessively drained or excessively drained soils formed in glacial till from granitic rocks. These soils are on moraines and have slopes of 3 to 65 percent. Elevation is 6,000 to 8,500 feet and annual precipitation is 25 to 55 inches.

Taxonomic class: These soils are sandy-sketetal, mixed, frigid Dystric Xerorthents.

Typical pedon of Sierretta family in a unit of Sirretta family, 25 to 50 percent slopes. It is on a slope of 25 percent under red fir at an elevation of 8,400 feet.

Oi–1 1/2 inches to 1/2; dry litter of red fir needles and bush chinquapin leaves.

Oa–1/2 inches to 0; partially decomposed litter.

A1–0 to 1 inches; grayish brown (10YR 5/2) gravelly coarse sandy loam, very dark grayish brown (10YR 3/2) moist; strong fine granular structure; soft, very friable, nonsticky and nonplastic; common fine and medium roots; many fine interstitial pores; 20 percent pebbles; medium acid (pH 5.6); abrupt wavy boundary.

A2–1 to 7 inches; pale brown (10YR 6/3) gravelly coarse sandy loam, dark grayish brown (10YR 4/2) moist; strong fine granular structure; soft, very friable, nonsticky and nonplastic; common medium and coarse roots; many fine interstitial pores; 20 percent pebbles; medium acid (pH 5.6); clear irregular boundary.

A3–7 to 30 inches; light yellowish brown (10YR 6/4) very cobbly loamy coarse sand, dark brown (10YR 4/3) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; common medium and coarse roots; many fine interstitial pores; 20 percent pebbles and 20 percent cobbles; strongly acid (pH 5.4); clear wavy boundary.

C1–30 to 45 inches; very pale brown (10YR 7/3) very gravelly loamy coarse sand, finely stratified with thin lenses of silt loam (rock flour), yellowish brown (10YR 5/4) moist; massive; slightly hard, friable, nonsticky and nonplastic; common medium and few coarse roots; common fine interstitial pores; 30 percent pebbles and 5 percent cobbles; strongly acid (pH 5.3); clear wavy boundary.

C2–45 to 60 inches; light gray (2.5Y 7/2) very gravelly loamy coarse sand, light olive brown (2.5Y 5/4) moist; massive; slightly hard, friable, nonsticky and nonplastic; few coarse roots; common fine interstitial pores; 35 percent pebbles and 5 percent cobbles; strongly acid (pH 5.3).

Type location: Between Courtright and Wishon Reservoirs, off of Forest Service road 10S16; in the NW1/4 of the NW1/4 of sec. 24, T. 10 S., R. 27 E., MDBM; Blackcap Mountain SW Quadrangle; Kings River Ranger District.

Range in characteristics: Depth to a paralithic or lithic contact is 40 to over 80 inches. The mean annual soil temperature at 20 inches is 32° to 47° F. The soil between a depth of 12 and 35 inches is estimated to be dry in July, August, and September and usually moist in some or all parts the rest of the year. Rock fragments, including boulders, cover 10 to 35 percent of the soil surface. Reaction throughout the profile is strongly acid to slightly acid (pH 5.3 to 6.5).

The A horizon has dry color of 10YR 6/4, 6/3, 6/2, 5/4, 5/3, 5/2, or 4/3; and moist color of 10YR 4/4, 4/3, 4/2, 4/1, 3/4, 3/3, 3/2, 2/2, 2/1, 2.5YR 3/2, 7.5YR 4/4, or 3/4. It is sandy loam, coarse sandy loam, or loamy coarse sand and contains 10 to 45 percent rock fragments.

The C horizon has dry color of 10YR 7/4, 7/3, 7/2, 6/4, 6/3, 5/4, or 2.5YR 7/2; and moist color of 10YR 5/4, 4/4, 4/3, 3/6, 3/4, 2.5YR 6/4, 5/4, 4/4, 4/2, or 7.5YR 5/6. It is loamy coarse sand or may have a glacial flour layer of coarse sandy loam and contains 35 to 75 percent rock fragments. Base saturation between 10 and 30 inches is 30 to 60 percent.

STECUM FAMILY

The Stecum family consists of deep, excessively drained soils formed in glacial till from granitic rocks. These soils are on moraines, mountainsides, colluvial slopes, and outwash plains and have slopes of 3 to 65 percent. Elevation is 8,000 to 10,600 feet and annual precipitation is 25 to 60 inches.

Taxonomic class: These soils are sandy-skeletal, mixed Typic Cryorthents.

Typical pedon of Stecum family in a unit of Stecum family, 3 to 35 percent slopes. It is on a slope of 10 percent under red fir, white fir, and lodgepole pine at an elevation of 8,240 feet.

Oe–1 inch to 0; decomposing pine needles.

A–0 to 6 inches; brown (10YR 5/3) stony coarse sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common fine roots, few medium and coarse roots; many fine interstitial pores; 10 percent pebbles, 10 percent cobbles, and 5 percent stones; very strongly acid (pH 4.5); clear smooth boundary.

Bw1–6 to 15 inches; pale brown (10YR 6/3) cobbly loamy coarse sand, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable; common medium roots and few coarse roots; common fine interstitial pores; 10 percent pebbles, 15 percent cobbles, and 5 percent stones; very strongly acid (pH 5.0); clear smooth boundary.

Bw2–15 to 32 inches; light yellowish brown (10YR 6/4) very cobbly loamy coarse sand, dark yellowish brown (10YR 3/4) moist; weak fine subangular blocky structure; soft, very friable; few medium and coarse roots; common fine interstitial pores; 15 percent pebbles, 25 percent cobbles, 5 percent stones, and 1 percent boulders; strongly acid (pH 5.5); clear smooth boundary.

C1–32 to 46 inches; very pale brown (10YR 7/4) very cobbly loamy coarse sand, dark yellowish brown (10YR 4/4) moist; massive; soft, friable; few coarse roots; common fine interstitial pores; 20 percent pebbles, 25 percent cobbles, 10 percent stones, and 1 percent boulders; strongly acid (pH 5.5); abrupt wavy boundary.

C2–46 to 60 inches; light gray (10YR 7/1) extremely cobbly loamy coarse sand, gray (10YR 5/1) moist; massive; slightly hard, friable; few fine intersitial pores; 25 percent pebbles, 25 percent cobbles, 10 percent stones, and 1 percent boulders; slightly acid (pH 6.3).

Type location: Near the SW corner of Courtright Reservoir about 0.8 miles north of Marmot Rock Campground on Forest Service road 8S07; in the SE1/4 of the SW1/4 of sec. 1, T. 10 S., R. 27 E., MDBM; Blackcap Mountain SW Quadrangle; Kings River Ranger District.

Range in characteristics: This soil is 60 inches or more deep. The mean annual soil temperature at 20 inches is 34° to 42° F. The soil between 12 and 36 inches is usually moist but is dry for at least 45 consecutive days in July, August, and September. Rock fragments average 35 to 60 percent between a depth of 10 and 40 inches and they cover 20 to 60 percent of the soil surface.

The A horizon has dry color of 10YR 6/3, 5/3, 5/2, or 2.5Y 6/2; and moist color of 10YR 4/4, 3/3, or 3/2. It is 2 to 8 inches thick. It is gravelly, very gravelly, very stony or cobbly coarse sandy loam, or cobbly or very stony loamy coarse sand. Reaction is very strongly acid or strongly acid (pH 4.5 to 5.5).

The Bw horizon has dry color of 10YR 6/4 or 6/3; and moist color of 10YR 5/6, 4/6, 4/4, 3/4, or 3/3. It is cobbly, very cobbly, or extremely cobbly loamy coarse sand. Clay content is the same or less than in the A horizon. Reaction is very strongly acid or strongly acid (pH 5.0 to 5.5). Some profiles have an AC horizon in place of this Bw.

The C horizon has dry color of 10YR 7/4, 7/1, 6/4, 6/1, or 2.5Y 8/2; and moist color of 10YR 6/3, 6/2, 5/1, 4/6, 4/4, 2.5Y 6/4, or 4/2. It is very cobbly, extremely cobbly, or extremely gravelly loamy coarse sand or sand. Reaction is strongly acid to slightly acid (pH 5.5 to 6.5).

TOLLHOUSE FAMILY

The Tollhouse family consists of shallow, somewhat excessively drained soils formed in material weathered from granitic rocks. These soils are on mountainsides and ridges and have slopes of 30 to 85 percent. Elevation is 1,800 to 5,000 feet and annual precipitation is 20 to 35 inches.

Taxonomic class: These soils are loamy, mixed, mesic, shallow Entic Haploxerolls.

Typical pedon of Tollhouse family in a unit of Auberry-Tollhouse families-Rock outcrop association, 25 to 65 percent slopes. It is on a slope of 50 percent under interior live oak, at an elevation of 2,100 feet.

Oi–1/4 inch to 0; thin scattered layer of dried grass parts and shrub leaves.

A1–0 to 11 inches; dark grayish brown (10YR 4/2) gravelly coarse sandy loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; common fine and medium roots; many fine interstitial pores; 15 percent fine pebbles; slightly acid (pH 6.3); clear wavy boundary.

A2–11 to 18 inches; dark grayish brown (10YR 4/2) gravelly coarse sandy loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; few fine and medium roots; many fine interstitial pores; 20 percent fine pebbles; slightly acid (pH 6.2); abrupt irregular boundary.

Cr–18 inches; very pale brown and white with dark flecks, weathered quartz diorite; rock fabric clearly visible; crushes to very coarse sand; grades to unweathered rock.

Type location: About 2 1/4 miles (airline) NE of town of Auberry; 2 miles from the junction of Auberry Mission Road and Auberry Pineridge Road on old railroad grade; near the center of the SW 1/4 of sec. 34, T. 9 S., R. 23 E., MDBM; Shaver Lake SW Quadrangle; Pineridge Ranger District.

Range in characteristics: Depth to a paralithic contact is 14 to 20 inches. The mean annual soil temperature at 20 inches is 54° to 59° F. The soil below 8 inches is dry from May to late October and moist the rest of the year.

The A horizon has dry color of 10YR 5/3, 5/2, 4/2, or 2.5Y 4/2; and moist color of 10YR 3/3, 3/2, 3/1, or 2/2. Organic carbon content is 1.0 to 3.8 percent. Base saturation is 75 to 100 percent. It is sandy loam, gravelly coarse sandy loam, fine sandy loam or loam and averages 5 to 30 percent rock fragments, which are mostly pebbles. Reaction is medium acid or slightly acid (pH 6.0 to 6.5). In most pedons the A horizon rests directly on the highly weathered rock.

TYPIC ARGIXEROLLS

Typic Argixerolls consist of moderately deep to deep, moderately well drained or well drained soils formed in material weathered from gabbro or metasedimentary rock. These soils are on mountainsides and have slopes of 15 to 50 percent. Elevation is 1,100 to 4,500 feet and annual precipitation is 25 to 35 inches.

Representative profile of Typic Argixerolls in a unit of Typic Argixerolls, 15 to 50 percent slopes. It is on a slope of 50 percent under blue oak and annual grasses, at an elevation of 2,250 feet.

Oi–1/4 inch to 0; dead grass and blue oak leaves.

A1–0 to 4 inches; dark brown (10YR 4/3) sandy loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; many fine roots; common fine interstitial pores; neutral (pH 7.2); clear wavy boundary.

A2–4 to 8 inches; reddish brown (5YR 4/3) sandy clay loam, dark reddish brown (5YR 3/3) moist; moderate medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; common fine and few medium roots; common fine interstitial pores and few fine tubular pores; mildly alkaline (pH 7.4); clear wavy boundary.

BAt–8 to 16 inches; reddish brown (5YR 4/3) gravelly sandy clay loam, dark reddish brown (5YR 3/3) moist; moderate medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few fine, medium, and coarse roots; common fine tubular pores; 15 percent pebbles; few thin clay films on faces of peds; mildly alkaline (pH 7.4); clear smooth boundary.

Bt–16 to 43 inches; reddish brown (5YR 4/4) gravelly clay loam, dark reddish brown (2.5YR 3/4) moist; strong medium and coarse subangular blocky structure; very hard, very firm, sticky and plastic; few fine, medium, and coarse roots; common fine tubular pores; 15 percent pebbles and 5 percent cobbles; common thin clay films on faces of peds; neutral (pH 7.3); abrupt irregular boundary.

BCt–43 to 55 inches; reddish brown (5YR 4/3) cobbly sandy clay loam, dark reddish brown (5YR 3/4) moist; moderate medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few coarse roots; common fine tubular pores; 15 percent cobbles and 5 percent pebbles; neutral (pH 7.1); abrupt irregular boundary.

Cr–55 inches; highly weathered hornblende gabbro with red colloid stains on joint faces.

Type location: About 1 1/4 miles (airline) NW of Balch Camp near Sycamore Springs; about 1000 feet east of BM 2304; in the SE1/4 of sec. 4, T. 12 S., R. 26 E., MDBM; Patterson Mountain NW Quadrangle; Kings River District.

Range in characteristics: Depth to a paralithic contact is 30 to 80 inches. The mean annual soil temperature at 20 inches is 59° to 68° F. The soil between 4 and 12 inches is dry for at least 45 consecutive days between May and October and is moist the rest of the year. Angular rock fragments make up 0 to 25 percent of the profile. Reaction is medium acid to mildly alkaline (pH 6.0 to 7.4). Base saturation is 75 to 85 percent between the surface and a depth of 30 inches.

The A horizon has dry color of 10YR 5/3, 4/3, 4/2, 7.5YR 5/4, 5YR 5/3 or 4/3; and moist color of 10YR 3/3, 3/2, 7.5YR 3/2, or 5YR 3/3. Organic carbon content is 1.0 to 4.0 percent to a depth of more than 10 inches and decreases regularly and is less than 0.6 percent at a depth of 20 inches. It is loam, sandy loam, fine sandy loam, coarse sandy loam, or sandy clay loam.

The Bt horizon has dry color of 5YR 5/6, 4/6, 4/4, 4/3, 2.5YR 4/4, or 10YR 5/3; and moist color of 5YR 4/4, 3/4, 3/3, 2.5YR 4/4, 3/4, or 10YR 3/4. It is gravelly clay loam, clay loam, gravelly sandy clay loam, clay, or sandy clay.

TYPIC XERUMBREPTS

Typic Xerumbrepts consist of deep, well drained soils formed in colluvium, glacial deposits and/or residuum from basalt or andesite rock. These soils are on mountainsides, colluvial slopes, till plains, or volcanic flows and have slopes of 5 to 50 percent. Elevation is 6,700 to 8,800 feet and annual precipitation is 30 to 55 inches.

Reference profile of Typic Xerumbrepts in a unit of Dystric Xerochrepts and Typic Xerumbrepts, 20 to 50 percent slopes. It is on a slope of 40 percent under a mixed conifer forest of red fir, white fir, and Jeffrey pine at an elevation of 6,700 feet.

Oe–1 inch to 0; decaying needles and twigs.

A–0 to 7 inches; very dark grayish brown (10YR 3/2) loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine and fine interstitial pores, and common medium tubular pores; 5 percent pebbles; slightly acid (pH 6.5); clear wavy boundary.

AB–7 to 15 inches; brown (7.5YR 4/4) gravelly loam, dark brown (7.5YR 3/3) moist; moderate very fine and fine granular structure; soft, very friable, nonsticky and nonplastic; common fine and many medium roots; many very fine and fine interstitial pores, and common medium tubular pores; 15 percent pebbles; slightly acid (pH 6.4); gradual smooth boundary.

Bw–15 to 25 inches; strong brown (7.5YR 5/6) gravelly sandy loam, dark brown (7.5YR 3/4) moist; weak medium subangular blocky structure parts to moderate fine granular; soft, very friable, nonsticky and nonplastic; common fine roots and many medium roots; many very fine and fine, common medium interstitial pores, and few coarse tubular pores; 20 percent pebbles and 10 percent cobbles; slightly acid (pH 6.2); gradual smooth boundary.

BC–25 to 35 inches; light brown (7.5YR 6/4) very gravelly coarse sandy loam, strong brown (7.5YR 4/5) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; common fine roots and many medium roots; common very fine and fine, and few medium interstitial pores; 30 percent pebbles and 15 percent cobbles; slightly acid (pH 6.2); gradual smooth boundary.

C–35 to 60 inches; light yellowish brown (10YR 6/4) extremely gravelly loamy sand, yellowish brown (10YR 5/6) moist; massive; soft, very friable; common fine and many medium roots; common very fine, fine, and medium interstitial pores; 50 percent pebbles and 15 percent cobbles; slightly acid (pH 6.3).

Type location: About 1 mile SW of Graveyard Meadow, approximately 0.6 miles south of the junction with Forest Service road 5S64; in the NE1/4 of the SE1/4 of sec. 35, T. 5 S., R. 24 E., MDBM; Shuteye Peak NE Quadrangle; Minarets Ranger District.

Range in characteristics: Depth to a paralithic or lithic contact is 40 to 70 inches. The mean annual soil temperature at 20 inches is 43° to 47° F. The soil between 8 and 24 inches is estimated to be dry in July, August, and September and usually moist in some or all parts the rest of the year. The base saturation throughout the profile is estimated to be between 35 and 50 percent. The soil is medium acid to slightly acid (pH 5.6 to 6.5) and becomes more acid with depth. The profile averages 5 to 25 percent rock fragments in the A horizon and 5 to 65 percent in the B and C horizon. Rock fragments are mainly pebbles and cobbles with some stones and they are mostly andesite and basalt with a few granitic fragments.

The A horizon has dry color of 10YR 3/2 or 7.5YR 4/2; and moist color of 10YR 2/2, 2/1, or 7.5YR 3/2. It is sandy loam, loam, or gravelly loam.

The Bw horizon has dry color of 10YR 6/4, 5/3, or 7.5YR 5/6; and moist color of 10YR 4/3, 3/2, 7.5YR 4/4, or 3/4. It is sandy loam or loam or their gravelly, very gravelly, cobbly, or very cobbly equivalents. Clay content is about 2 to 3 percent more than in the A horizon.

The C horizon has dry color of 10YR 7/4 or 6/4; and moist color of 10YR 5/6 or 5/4. It is coarse sandy loam or loamy sand or their very or extremely gravelly or cobbly equivalents.

ULTIC HAPLOXERALFS

Ultic Haploxeralfs consist of moderately deep or deep, well drained soils formed in material weathered from metasedimentary, andesitic or basaltic rock. These soils are on mountainsides and ridges and have slopes of 15 to 65 percent. Elevation is 1,700 to 8,200 feet and annual precipitation is 35 to 50 inches.

Reference profile of Ultic Haploxeralfs in a unit of Ultic Haploxeralfs, deep, 15 to 50 percent slopes. It is on a slope of 15 percent under ponderosa pine, sugar pine, and incense cedar at an elevation of 5,200 feet.

Oe–1 inch to 0; partially decomposed pine needles and twigs.

A1–0 to 2 inches; brown (7.5YR 5/4) cobbly sandy loam, dark yellowish brown (10YR 3/4) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine interstitial pores; 10 percent pebbles and 10 percent cobbles; slightly acid (pH 6.5); abrupt smooth boundary.

A2–2 to 8 inches; brown (7.5YR 5/4) cobbly sandy loam, dark reddish brown (5YR 3/4) moist; weak fine subangular blocky structure parts to weak fine granular; soft, friable, slightly sticky and nonplastic; many fine and medium roots; many fine interstitial pores; 5 percent pebbles and 20 percent cobbles, 5 percent stones; slightly acid (pH 6.5); clear wavy boundary.

BA–8 to 18 inches; reddish brown (5YR 5/3) very cobbly loam, dark reddish brown (5YR 3/3) moist; weak medium subangular blocky structure; soft, friable, slightly sticky and slightly plastic; common fine and medium roots; common fine tubular pores; 10 percent pebbles, 30 percent cobbles, 10 percent stones; slightly acid (pH 6.5); abrupt wavy boundary.

Bt1–18 to 24 inches; reddish brown (5YR 5/3) very stony loam, dark reddish brown (5YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, firm, sticky and slightly plastic; common medium roots; common fine tubular pores; few faint clay bridges; 10 percent pebbles, 30 percent cobbles, 20 percent stones; medium acid (pH 6.0); diffuse irregular boundary.

Bt2–24 to 50 inches; reddish brown (5YR 5/3) extremely stony loam, dark reddish brown (5YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, firm, sticky and slightly plastic; few medium and coarse roots; many fine tubular pores; common faint clay skins on faces of peds and lining pores; 10 percent pebbles, 20 percent cobbles, and 40 percent stones; strongly acid (pH 5.5); diffuse irregular boundary.

R–50 inches; highly weathered and fractured vesicular andesite bedrock.

Type location: About midway (airline) between Lower Chiquito and Soda Springs Campgrounds on Forest Service road 6S71; in the NE1/4 of the NE1/4 of sec. 19, T. 6 S., R. 24 E., MDBM; Shuteye Peak NW Quadrangle; Minarets Ranger District.

Range in characteristics: This soil consists of two phases; Ultic Haploxeralfs, deep and Ultic Haploxeralfs.

Ultic Haploxeralfs, deep have depth to a lithic contact of 40 to 60 inches. The mean annual soil temperature at 20 inches is 40° to 50° F. The soil between about 8 and 16 inches is dry for at least 45 consecutive days between June and October and is usually moist the rest of the year. Rock fragments in the soil profile range from 10 to 70 percent and usually increase with depth. They cover 5 to 40 percent of the soil surface. The base saturation throughout the profile ranges from 35 to 50 percent.

The A horizon has dry color of 5YR 6/3, 5/4, 4/4, 4/3, 4/2, 7.5YR 5/4, 4/4, 10YR 4/2, or 4/1; and moist color of 5YR 4/4, 3/4, 3/3, 3/2, 7.5YR 3/2, 10YR 3/4, 3/1, 2/2, or 2.5YR 3/4. It is loam or sandy loam or their stony, cobbly, very cobbly, gravelly, or very gravelly equivalents. Reaction is medium acid or slightly acid (pH 6.0 to 6.5).

The Bt horizon has dry color of 5YR 7/6, 6/8, 6/4, 6/3, 5/4, 5/3, 4/6, 4/4, 2.5YR 5/6, 5/4, or 7.5YR 5/4; and moist color of 5YR 5/6, 4/6, 4/4, 3/6, 3/4, 3/3, 2.5YR 4/4, 3/6, 3/4, or 7.5YR 4/2. It is loam, sandy clay loam, clay loam, or their stony, very stony, extremely stony, or cobbly equivalents. Reaction is strongly acid or medium acid (pH 5.5 to 6.0).

Ultic Haploxeralfs have depth to a paralithic contact of 20 to 40 inches. The mean annual soil temperature at 20 inches is mainly 50° to 59° F., but goes up to 65° F. on south aspects where the natural vegetation has been disturbed. The soil between 4 and 12 inches is usually dry from mid-May through October and is moist the rest of the year. Rock fragments make up 10 to 30 percent of the profile and can occupy up to 45 percent on the soil surface.

The A horizon has dry color of 10YR 7/4, 6/4, 6/3, 5/3, or 7.5YR 6/2; and moist color of 10YR 4/4, 4/3, 7.5YR 5/6, or 4/4. It is gravelly or very gravelly loam or gravelly silt loam. Reaction is neutral to medium acid (pH 7.0 to 6.0).

The Bt horizon has dry color of 7.5YR 7/6, 7/4, 5/6, 5YR 6/4, 2.5YR 5/6, or 10YR 5/4; and moist color of 7.5YR 6/6, 5/6, 4/6, 5YR 5/4, 2.5YR 3/6, or 10YR 4/4. It is gravelly loam, silt loam, gravelly silt loam, clay loam, cobbly clay loam, or gravelly silty clay loam. Clay content is 18 through 34 percent and the fine sand content may be more or less than 15 percent. The ratio of total clay in this horizon to that in either the A or BA horizon is 1.2 to 1.3. The organic carbon is assumed to be less than 0.9 percent in the upper 6 inches in this horizon. Base saturation is assumed to range from 35 to 50 percent immediately above the paralithic contact. Reaction is very strongly acid to slightly acid (pH 5.0 to 6.5).

UMPA FAMILY

The Umpa family consists of deep, well drained and moderately well drained soils formed in glacial till, colluvium or residuum from metasedimentary, granitic and/or metavolcanic rocks. These soils are on moraines, colluvial slopes, and mountainsides and have slopes of 3 to 60 percent. Elevation is 6,000 to 8,600 feet and annual precipitation is 30 to 60 inches.

Taxonomic class: These soils are loamy-skeletal, mixed, frigid Dystric Xerochrepts.

Typical pedon of Umpa family in a unit of Umpa family, 5 to 35 percent slopes. It is on a slope of 25 percent under a mixed conifer forest of red fir, white fir, Jeffrey pine, and sugar pine at an elevation of 7,130 feet.

Oe–1 inch to 0; decaying needles and twigs.

A–0 to 6 inches; very dark grayish brown (10YR 3/2) bouldery sandy loam, very dark brown (10YR 2/2) moist; weak medium granular structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots, and common medium roots; few very fine and fine interstitial pores; 5 percent pebbles and 10 percent boulders; slightly acid (pH 6.2); gradual wavy boundary.

AB–6 to 18 inches; yellowish brown (10YR 5/4) very stony coarse sandy loam, dark brown (7.5YR 4/5) moist; weak medium granular structure; soft, very friable, nonsticky and nonplastic; common fine roots, and many medium and coarse roots; many very fine and fine interstitial pores, and common medium tubular pores; 5 percent pebbles, 15 percent cobbles, 15 percent stones, and 10 percent boulders; medium acid (pH 5.8); gradual smooth boundary.

Bw–18 to 32 inches; yellowish brown (10YR 5/6) very stony coarse sandy loam, strong brown (7.5YR 4/6) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine roots, common fine roots, and many medium and coarse roots; common very fine and fine interstitial pores, and few medium tubular pores; 5 percent pebbles, 15 percent cobbles, 15 percent stones, and 10 percent boulders; medium acid (pH 5.6); diffuse smooth boundary.

BC–32 to 48 inches; reddish yellow (7.5YR 6/6) very stony coarse sandy loam, strong brown (7.5YR 5/6) moist; massive; soft, friable, nonsticky and nonplastic; many medium roots, few fine and coarse roots; common fine interstitial pores; 10 percent pebbles, 20 percent cobbles, 15 percent stones, and 5 percent boulders; medium acid (pH 5.6); gradual wavy boundary.

C–48 to 60 inches; yellow (10YR 7/6) very stony coarse sandy loam, yellowish brown (10YR 5/6) moist; massive; slightly hard, friable, nonsticky and nonplastic; common medium roots; common very fine and fine interstitial pores; 10 percent pebbles, 20 percent cobbles, 15 percent stones, and 5 percent boulders; strongly acid (pH 5.4).

Type location: About 1.75 miles WNW of Jackass Meadow on Forest Service road 5S07, approximately 60 yards east of Portuguese Creek; in the SW1/4 of the SW1/4 of sec. 8, T. 5 S., R. 24 E., MDBM; Merced Peak SE Quadrangle; Minarets Ranger District.

Range in characteristics: The Umpa family and Umpa family, wet are 60 or more inches deep and formed in glacial till. Umpa family, deep is 40 to 60 inches deep to glacial, colluvial, or residual material. Umpa family, wet is subject to a laterally moving, well aerated water table, resulting in high chroma iron staining and mottling within 20 inches of the soil surface. The water table exists only during snow melt period and is at the periphery of valleys and upland basins.

The mean annual soil temperature at 20 inches is 35° to 47° F. The soil between a depth of 10 to 35 inches is usually moist, but is estimated to be dry from mid-July to late September. Rock fragments between a depth of 10 and 40 inches range from 35 to 65 percent. Base saturation is estimated to be 35 to 60 percent between a depth of 10 and 30 inches.

The A horizon has dry color of 10YR 6/4, 6/3, 5/3, 4/4, 4/3, 4/2, 3/3, 3/2, 7.5YR 4/2, or 5YR 5/6; and moist color of 10YR 5/6, 4/6, 3/3, 2/2, 2/1, 7.5YR 4/4, 4/2, 3/3, 3/2, 5YR 4/4, 4/3, 3/4, or 3/3. It is sandy loam or cobbly, very cobbly, gravelly, very gravelly, or bouldery sandy loam and averages 5 to 45 percent rock fragments. Reaction is strongly acid to slightly acid (pH 5.4 to 6.5).

The Bw horizon has dry color of 10YR 7/4, 6/6, 6/4, 5/6, 5/4, 5/3, 7.5YR 6/8, 6/6, 5/4, or 5YR 5/6; and moist color of 10YR 5/6, 4/6, 4/4, 3/6, 3/4, 7.5YR 5/8, 5/6, 5/4, 4/6, 5YR 5/8, or 4/6. It is very cobbly loam or very gravelly, cobbly, very cobbly or extremely cobbly

sandy loam, or very or extremely cobbly coarse sandy loam, and averages 35 to 70 percent rock fragments. It has 2 to 5 percent more clay than the A horizon. Reaction is very strongly acid to slightly acid (pH 4.8 to 6.5).

A C horizon is usually present in Umpa family. It has dry color of 10YR 8/1, 7/6, or 7/3; and moist color of 10YR 5/6, 5/4, or 2.5Y 6/3. It is very stony or extremely stony coarse sandy loam and averages 40 to 65 percent rock fragments. Reaction is strongly acid to slightly acid (pH 5.2 to 6.2).

Soil Properties

The results of physical and chemical analyses of selected soils are given in table 6. The data are for soils sampled at carefully selected sites. The pedons are typical of the families and are described in the section "Taxonomic Unit Descriptions". Soil samples were analyzed by the U.S. Department of Agriculture, Soil Conservation Service, National Soil Survey Laboratory, Lincoln, Nebraska. Most determinations, except those for grain-size analysis, were made on soil material less than 2 millimeters in diameter. Measurements reported as percent or quantity of unit weight were calculated on an ovendry basis.

TABLE 6– PHYSICAL AND CHEMICAL DATA FOR SELECTED SOILS

Soil Name Lab Sample No.	Depth (inches)	Horizon	% Sand	% Silt	% Clay	Bulk Density Ovendry (g/cc)	Organic Matter Carbon (percent)	Organic Matter Nitrogen (percent)	Sum of Extractable Bases NH_4OAC (meq/100g)	Cation Exchange Capacity NH_4OAC, pH7.0 meq/100g)	Base Saturation NH_4OAC (percent)	Base Saturation Sum of Cations (percent)	pH 1:1 H_2O
Chaix family, deep	0-2	A1	66.3	23.9	9.8	1.11	4.34	0.204	11.7	17.9	65		5.5
S77CA-019-1	2-7	A2	65.7	24.6	9.7	1.37	2.16	0.095	6.3	11.1	57		5.5
	7-18	Bw1	66.0	23.8	10.2	1.53	0.46	0.032	4.0	6.8	59		5.8
	18-28	Bw2	64.4	23.4	12.2	1.56	0.49		3.4	6.5	52		5.6
	28-42	C1	67.9	19.5	12.6	1.53	0.24		3.0	5.4	56		5.5
Holland Family	0-6	A	60.6	28.4	11.0	1.30	1.68	0.081	6.3	12.0	53		
S77CA-019-3	6-11	AB	59.1	25.3	15.6	1.39	0.77	0.038	6.2	9.4	66		5.4
	11-23	Bt1	57.5	20.1	22.4	1.62	0.26	0.016	5.4	8.5	64		5.4
	23-36	Bt2	61.4	17.5	21.1	1.57	0.17		4.9	8.5	58		5.3
	36-44	BCt	68.6	17.6	13.8	1.49	0.17		4.1	7.7	53		5.3
	44-58	C1	72.8	18.3	8.9	1.47	0.14		4.0	7.7	52		5.2
	58-71	C2	70.7	22.8	6.5	1.45	0.08		4.1	8.6	48		5.2
Lithic	0.4	A1	84.6	12.9	2.5		1.81	0.064	3.8	10.2	37		5.7
Xeropsamment*	4-9	A2	85.1	14.1	0.8		1.16	0.043	1.2	6.7	18		5.6
S77CA-019-9	9-11	C	85.3	14.7	trace		0.93		0.5	5.5	9		5.6
Holland Family**	0-3	A1	54.3	28.9	16.8	1.16	3.26	0.153	8.8	20.5	43		5.7
S77CA-019-13	3-7	A2	53.3	31.0	15.7	1.08	1.60	0.098	6.1	15.8	39		5.9
	7-14	AB	49.8	27.7	22.5	1.35	0.78	0.053	5.1	11.9	43		5.9
	14-25	BAt	47.3	26.0	26.7	1.45	0.36		5.0	10.8	46		5.8
	25-34	Bt1	44.4	26.4	29.2	1.56	0.26	0.031	5.8	11.1	52		5.8
	34-51	Bt2	47.8	23.9	28.3	1.76	0.18		6.4	11.8	54		5.9
	51-60	Bt3	52.6	21.6	25.8	1.83	0.12		6.4	10.4	62		5.8
	60-66	C	65.1	16.6	18.3	1.79	0.12		5.2	9.2	57		5.6
Entic Cryumbrepts	0-6	A1	79.7	13.7	6.6	1.10	2.72	0.153	0.7	13.5	5		4.7
S77CA-019-14	6-13	A2	79.1	15.4	5.5	1.18	1.83	0.124	0.4	9.6	4		5.1
	13-21	C1	78.4	15.7	5.9	1.27	1.34	0.087	0.3	7.9	4		5.2
	21-30	C2	79.8	15.7	4.5	1.36	0.65		0.2	6.6	3		5.3
Cagwin Family**	0-5	A	77.1	19.4	3.5	1.12	3.08	.136	4.0	16.6	24		5.4
S77CA-019-15	5-17	C1	77.9	18.0	4.1	1.23	1.12		2.4	8.8	27		5.6
						1.26	0.29	0.024					
							0.12						
Ahwahnee Family**	0-1	A1	73.9	20.4	5.7		1.06	0.082	4.5	6.2	73	59	5.8
S78CA-019-1	1-8	A2	74.6	20.5	4.9		0.88	0.073	4.4	5.8	76	60	5.8
	8-17	BA	74.0	18.7	7.3		0.29	0.024	3.6	4.5	80	68	6.0
	17-29	Bt	76.2	15.7	8.1		0.12		3.0	3.5	86	71	6.0
Auberry Family**	0-2	A1	72.2	19.0	8.8		1.88	0.139	7.1	7.8	91	71	6.4
S78CA-019-2	2-8	A2	71.9	18.6	9.5		1.18	0.096	6.0	6.7	90	73	6.4
	8-17	BA	66.9	21.3	11.8		0.41	0.037	4.3	5.3	81	66	6.0
	17-29	Bt1	57.4	21.5	21.1		0.13		6.4	8.2	78	65	5.7
	29-48	Bt2	65.1	16.3	18.6		0.05		5.5	6.7	82	71	5.5
	48-62	BC	74.4	13.1	12.5		0.05		5.8	6.3	92	81	6.4
Holland Family S82CA-043-1	50-59	Bt4							5.6	10.1	55	47	5.9
Holland Family S82CA-043-2	55-58	Bt2							5.0	7.9	63	50	5.9
Neuns Family** S82CA-043-3	25-30	Bw3							0.3	6.1	5	4	4.8
Holland Family S82CA-039-1	50-54	Bt4							7.3	10.4	70	56	5.8
Cagwin Family S82CA-019-1	25-30	C1							2.4	4.3	56	50	6.2

All analyses were done by the National Soil Survey Laboratory, USDA Soil Conservation Service, Lincoln, Nebraska.
Absence of an entry indicates that the soil was not rated.
*This is also the Reference Profile for the survey area.
**This is also the Typical Pedon for the survey area.

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Glossary

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity. The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point.

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K) expresses as a percentage of the total cation exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Boulders. Rock fragments larger than 2 feet in diameter.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value.

Cirque. Semicircular, concave, bowllike areas that have steep faces primarily resulting from glacial ice and snow abrasion.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter, in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriental clay on the surface of a soil aggregate or lining pores or root channels.

Cobble. A rounded or partly rounded fragment of rock 3 to 10 inches in diameter.

Colluvial material. Soil and rock fragments that have moved downhill and has accumulated on lower slopes and/or at the bottom of the hill; moved downhill by the force of gravity and to some extent by frost action and local wash.

Colluvial slope. An inclined surface usually at the base of mountainsides formed by material transported and deposited by mass wasting (direct gravitational action) and local unconcentrated runoff.

Compaction, soil. Densifying or increasing the unit weight of a soil mass and inversely decreasing its porosity - effectiveness being a function of soil moisture, the nature of soil involved, and pressure applied.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose. Noncoherent when dry or moist; does not hold together in a mass.

Friable. When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together in a lump.

Firm. When moist, crushes under moderate pressure between thumb and forefinger, but resistence is distinctly noticeable.

Plastic. When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky. When wet, adheres to other material and tends to stretch somewhat and pull apart rather then to pull free from other material.

Hard. When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft. When dry, breaks into powder or individual grains under very slight pressure.

Cryic. A soil temperature regime where mean annual soil temperature is higher than 32° F. but lower than 47° F. and the difference between mean winter and mean summer soil temperature is less than 9° F. at a depth of 20 inches or at a lithic or paralithic contact, whichever is shallower.

Deep. As a soil depth classification, greater than 40 inches.

Erosion. The wearing away of the land surface by running water, wind, ice, or other geological agents and by such processes as gravitational creep.

Gully erosion. The erosion process whereby water accumulates in narrow channels and, over short periods, removes the soil from this narrow area to considerable depths, ranging from 1 or 2 feet to as much as 30 feet.

Sheet erosion. The removal of a fairly uniform layer of soil from the land surface by runoff water.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain.

Foothill. A steeply sloping upland that has relief of as much as 1,000 feet and fringes a mountain range or high-plateau escarpment.

Frigid. A soil temperature regime that has mean annual soil temperature lower than 47° F. and the difference between mean winter and mean summer soil temperature is more than 9° F. at a depth of 20 inches or at a lithic or paralithic contact, whichever is shallower.

Glacial drift. Pulverized and other rock material transported by glacial ice and then deposited. Also the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial erratics. Rock fragments carried by glacier ice and deposited when the ice melted at some distance from the outcrop from which the fragment was derived. They are generally of boulder size, although the fragments range from pebbles to house-sized blocks.

Glacial moraine. (See Moraine).

Glacial outwash. Gravel, sand, and silt, commonly stratified, deposited by glacial melt water.

Glacial outwash plain. An area generally low in relief and smooth, forming the surface of a body of coarse textured, glaciofluvial material.

Glacial till. Unsorted, nonstratified glacial drift consisting of clay, silt, sand, gravel, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits. Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plans.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Gravel. Rounded or angular gragments of rock as much as 3 inches in diameter. An individual piece is a pebble.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall.

Infiltration. The downward entry of water into the immediate surface of soil or other material.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Lithic contact. The boundary between soil and continuous, coherent, underlying material (hard rock), which is hard enough to prohibit digging with hand tools and if fractured the pieces are not displaced relative to each other.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Mesic. A soil temperature regime in which the mean annual soil temperature is 47° F. or higher but lower than 59° F., and the difference between mean summer and mean winter soil temperature is more than 9° F. at a depth of 20 inches or at a lithic or

paralithic contact, whichever is shallower.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately deep. Soils that are 20 to 40 inches in depth to a lithic or paralithic contact.

Moraine. An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage.

Mountain. A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (related to a plateau) and generally having steep sides and considerable bare-rock surface. A mountain can occur as a single, isolated mass or in a group forming a chain or range.

Munsell notation. A designation of color by degrees of the three single variables; hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Paralithic contact. The boundary between soil and coherent, continuous underlying material (soft rock), which is soft enough to permit digging with hand tools and, if fractured, the pieces are not displaced relative to each other.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Pebble. (See Gravel).

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume than can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet depending on the variability of the soil.

pH value. A numerical designation a acidity and alkalinity in soil. (See Reaction, soil).

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity (pH) is expressed as:

Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Ridge. A long, narrow elevation of the land surface, usually sharp crested with steep sides.

Roadcut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters (0.078 inches) or more; for example, pebbles, cobbles, stones, and boulders.

Sensitivity. The relative susceptibility of a soil to a decrease of its inherent productivity after being disturbed.

Shallow. As a soil depth classification, less than 20 inches.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches in diameter.

Stratified. Arranged in strata, or layers. The term refers to geologic material. Layers in soils that result from the processes of soil formation are called horizons; those inherited from the parent material are called strata.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are platy (laminated), prismatic (vertical axis of aggregates longer than horizontal), columnar (prisms with rounded tops), blocky (angular or subangular), and granular. Structureless soils are either single grained (each grain by itself, as in dune sand) or massive (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches. Frequently designated as the "A horizon."

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thermic. A soil temperature regime that has mean annual soil temperature of 59° F. or higher but lower than 72° F., and the difference between mean summer and mean winter soil temperatures is more than 9° F. at a depth of 20 inches or at a lithic or paralithic contact, whichever is shallower.

Till plain. An extensive flat to undulating area underlain by glacial till.

Toe slope. The geomorphic component that forms the outermost, gently-inclined surface at the base of a mountainside.

Upland basin. A nearly level to gently sloping depressed area in mountains with limited or no surface outlet.

Volcanic flow. A mass of deep-seated igneous material extruded onto the earth's surface typically forming a gently to moderately sloping, relatively flat incline.

Water table. The upper surface of ground water or that level below which soil is saturated with water.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Wilting point. The moisture content of soil, on an ovendry basis, at which a plant wilts so much that it does not recover when placed in a humid, dark chamber.

TABLE 7. - Soil Identification Table [1]

SOIL SURVEY OF SIERRA NATIONAL FOREST AREA, CALIFORNIA

Soil Name	Elevation (feet)	Parent Material	Surface soil texture	Surface soil color (dry)	Surface soil rock fragments (% vol.)	Subsoil texture	Subsoil color (dry)	Subsoil rock fragments (% vol.)	Depth to bedrock (inches)	Vegetation Series	Forest Survey Site Class
SOILS UNDER THE HERBACEOUS FORMATION [2]											
Delpiedra family	1,000 to 3,200[3]	serpentinitic	gravelly loam	reddish brown	10 to 25; gr,c,st[4]	gravelly loam	yellowish red	15 to 35; gr,c,st	10 to 20	HG[5]	NC
Auberry family	1,000 to 4,400	granitic	sandy loam or loam	brown	0 to 10; gr	sandy clay loam	strong brown	0 to 10; gr	30 to 80	HG	NC
Coarsegold family	1,000 to 4,500	metamorphic	loam	brown	0 to 10; gr,c	gravelly clay loam	yellowish red	5 to 20; gr,c	20 to 50	HG	NC
Typic Argixerolls	1,100 to 4,500	basic igneous or metamorphic	sandy loam or loam	dark brown	0 to 10; gr	gravelly clay loam	reddish brown	0 to 25; gr,c	30 to 80	HG	NC
Dystric Lithic Xerochrepts	1,500 to 5,600	metasedimentary	cobbly loam	yellowish red	15 to 45; gr,c	very cobbly loam	reddish yellow	15 to 60; gr,c	11 to 20	HG	NC
Ultic Haploxeralfs	1,700 to 5,600	metasedimentary	gravelly loam	light yellowish brown	10 to 45; gr,c	silt loam	reddish yellow	10 to 30; gr,c	20 to 40	HG	NC
Aquic Cryumbrepts	8,300 to 9,600	granitic alluvium sand	sandy loam	grayish brown	0 to 30; gr,c,st	sandy loam or loamy	--	0 to 30; gr,c,st	over 60	HM,HJ	NC
SOILS UNDER THE CHAPPARRAL AND HARDWOOD FOREST FORMATIONS											
Ahwahnee family	1,000 to 3,300	granitic	coarse sandy loam	grayish brown	0 to 10; gr	sandy loam	yellowish brown	0 to 10; gr	20 to 60	CL,CE,QW,QD	NC

Soil Name	Elevation (feet)	Parent Material	Surface soil texture	Surface soil color (dry)	Surface soil rock fragments (% vol.)	Subsoil texture	Subsoil color (dry)	Subsoil rock fragments (% vol.)	Depth to bedrock (inches)	Vegetation Series	Forest Survey Site Class
Auberry family	1,000 to 4,400	granitic	sandy loam or loam	brown	0 to 10; gr	sandy clay loam	strong brown	0 to 10; gr	30 to 80	CL,CE,QW, QD,QC	NC
Coarsegold family	1,000 to 4,500	meta-morphic	loam	brown	0 to 10; gr,c	gravelly clay loam	yellowish red	5 to 20; gr,c	20 to 50	QD,QW	NC
Typic Argixerolls	1,100 to 4,500	basic igneous or meta-morphic	sandy loam or loam	dark brown	0 to 10; gr	gravelly clay loam	reddish brown	0 to 25; gr,c	30 to 80	QD,QW	NC
Dystric Lithic Xerochrepts	1,500 to 6,400	metasedi-mentary	cobbly loam	yellowish red	15 to 45; gr,c	very cobbly loam	reddish yellow	15 to 60; gr,c	11 to 20	CE,QC	NC
Ultic Haploxeralfs	1,700 to 5,600	metasedi-mentary	gravelly loam	light yellowish brown	10 to 45; gr,c	silt loam	reddish yellow	10 to 30; gr,c	20 to 40	CE,QC	NC
Tollhouse family	1,800 to 5,000	granitic	gravelly coarse sandy loam	dark grayish brown	5 to 30; gr	gravelly coarse sandy loam	dark grayish brown	5 to 30; gr	14 to 20	CL,CE,QW, QC	NC
Chawanakee family	2,800 to 6,400	granitic	coarse sandy loam	grayish brown	5 to 30; gr,c	coarse sandy loam	very pale brown	5 to 30; gr,c	12 to 20	CE,QC	NC
SOILS UNDER CHAPARRAL/CONIFER FOREST AND HARDWOOD FOREST/CONIFER FOREST FORMATIONS											
Dystric Lithic Xerochrepts	1,500 to 6,400	metasedi-mentary	cobbly loam	yellowish red	15 to 45; gr,c	very cobbly loam	reddish yellow	15 to 60; gr,c	11 to 20	CE/PP, CE/KP	6,7
Ultic Haploxeralfs	1,700 to 5,600	metasedi-mentary	gravelly loam	light yellowish brown	10 to 45; gr,c	silt loam	reddish yellow	10 to 30; gr,c	20 to 40	CE/KP, CE/PP	5,6
Chaix family	2,700 to 6,400	granitic	coarse sandy loam	grayish brown	0 to 30; gr	coarse sandy loam	very pale brown	0 to 30; gr	20 to 60	CE/PP	6,7

Soil Name	Elevation (feet)	Parent Material	Surface soil texture	Surface soil color (dry)	Surface soil rock fragments (% vol.)	Subsoil texture	Subsoil color (dry)	Subsoil rock fragments (% vol.)	Depth to bedrock (inches)	Vegetation Series	Forest Survey Site Class
Chawanakee family	2,800 to 6,400	granitic	coarse sandy loam	grayish brown	5 to 30; gr,c	coarse sandy loam	very pale brown	5 to 30; gr,c	12 to 20	QK/PP, CE/PP	6,7
Neuns family	3,000 to 4,400	metasedimentary	loam	brown	10 to 25; gr,c	very cobbly loam	reddish yellow	25 to 60; gr,c	20 to 40	CE/PP	4,5
Lithic Xeropsamments	5,200 to 8,400	granitic	gravelly loamy coarse sand	grayish brown	5 to 20; gr	gravelly loamy coarse sand	light yellowish brown	5 to 20; gr	4 to 20	CG/JP	6,7
SOILS UNDER CONIFER FOREST FORMATION											
Holland family	2,700 to 6,400	granitic	sandy loam or loam	brown	0 to 15; gr	sandy clay loam	brown	0 to 30; gr,c	60 to 80	PP,MP,MF	3,4
Chaix family	2,700 to 6,700	granitic	coarse sandy loam	grayish brown	0 to 30; gr	coarse sandy loam	very pale brown	0 to 30; gr	20 to 60	PP,MP	3,4,5
Shaver family	3,000 to 6,400	granitic	coarse sandy loam	dark grayish brown	5 to 20; gr	coarse sandy loam	brown	5 to 20; gr	40 to 80	MP,MF	3,4
Neuns family	3,800 to 6,400	metasedimentary	gravelly loam	dark yellowish brown	10 to 25; gr,c	cobbly loam	reddish yellow	25 to 60; gr,c	40 to 60	PP,MP,MF	3
Chaix family, deep	4,400 to 6,300	granitic	sandy loam	pale brown	0 to 30; gr	coarse sandy loam	very pale brown	0 to 30; gr	60 to 80	BT,MF,MP	2,3
Ultic Haploxeralfs, deep	5,600 to 8,200	basalt or andesite	cobbly sandy loam	brown	10 to 50; gr,c,st	very cobbly loam	reddish brown	10 to 70; gr,c,st	40 to 60	JP,MP,MF	4
Cagwin family	5,600 to 8,800	granitic	loamy coarse sand	dark gray	0 to 20; gr	gravelly loamy coarse sand	very pale brown	0 to 30; gr	20 to 60	JP,MF,RF	3,4,5
Entic Xerumbrepts	6,000 to 7,600	granitic	sandy loam	very dark grayish brown	0 to 30; gr	gravelly coarse sandy loam	yellowish brown	10 to 30; gr	10 to 20	JP,MF	5,6

Soil Name	Elevation (feet)	Parent Material	Surface soil texture	Surface soil color (dry)	Surface soil rock fragments (% vol.)	Subsoil texture	Subsoil color (dry)	Subsoil rock fragments (% vol.)	Depth to bedrock (inches)	Vegetation Series	Forest Survey Site Class
Ledford family	6,000 to 7,600	granitic	coarse sandy loam	dark grayish brown	0 to 20; gr	coarse sandy loam	pale brown	0 to 20; gr	40 to 80	RF,MF	4
Cannell family	6,000 to 7,600	granitic	gravelly coarse sand loam	grayish brown	5 to 30; gr	gravelly coarse sandy loam	very pale brown	5 to 30; gr	40 to 80	JP,RF,MF	3
Gerle family	6,000 to 8,400	granitic	gravelly coarse sandy loam	grayish brown	0 to 20; gr,c	cobbly coarse sandy loam	light yellowish brown	0 to 20; gr,c	30 to 50	RF	3
Sirretta family	6,000 to 8,500	granitic-glacial till	gravelly coarse sandy loam	pale brown	10 to 45; gr,c,st,b	very cobbly loamy coarse sand	very pale brown	35 to 75; gr,c,st,b	40 to over 60	RF,JP,MF	4,5
Umpa family	6,000 to 8,600	glacial till-mixed sources	bouldery sandy loam	very dark grayish brown	5 to 45; gr,c,st,b	very stony coarse sandy loam	yellowish brown	35 to 70; gr,c,st,b	over 60	JP,MF,RF	4,5
Umpa family, wet	6,000 to 8,600	glacial till-mixed sources	stony coarse sandy loam	yellowish brown	5 to 45; gr,c,st	very stony coarse sandy loam	brown	35 to 70; gr,c,st,b	over 60	RF,LP	4
Umpa family, deep	6,000 to 8,600	mixed colluvium	cobbly sandy loam	very dark grayish brown	5 to 45; gr,c,st	very cobbly loam	reddish yellow	35 to 70; gr,c,st	40 to 60	RF, MF	3,4
Aquic Dystric Xerochrepts	6,700 to 7,600	granitic-glacio-fluvial	sandy loam	very dark grayish brown	0 to 20; gr,c	cobbly coarse sandy loam	light yellowish brown	0 to 20; gr,c	over 60	RF,LP	4
Typic Xerumbrepts	6,700 to 8,800	basalt or andesite	loam	very dark grayish brown	5 to 25; gr	very gravelly coarse sandy loam	light brown	5 to 65; gr,c,st	40 to 70	RF,JP,MF	4

Soil Name	Elevation (feet)	Parent Material	Surface soil texture	Surface soil color (dry)	Surface soil rock fragments (% vol.)	Subsoil texture	Subsoil color (dry)	Subsoil rock fragments (% vol.)	Depth to bedrock (inches)	Vegetation Series	Forest Survey Site Class
Dystric Xerochrepts	6,700 to 8,800	volcanic	coarse sandy loam	grayish brown	10 to 30; gr,c	cobbly coarse sandy loam	brown	10 to 60; gr,c	22 to 54	RF	4,5
Stecum family	8,000 to 10,600	granitic-glacial-till	stony coarse sandy loam	brown	20 to 60; gr,c,st,b	very cobbly loamy coarse sand	light yellowish brown	35 to 60; gr,c,st,b	over 60	RF,LP,WW	NC
Aquic Cryumbrepts	8,300 to 9,600	granitic alluvium	sandy loam	grayish brown	0 to 30; gr,c,st	sandy loam or loamy sand	--	0 to 30; gr,c,st	over 60	LP	NC
Entic Cryumbrepts	8,300 to 10,600	granitic	gravelly loamy coarse sand	grayish brown	5 to 30; gr,c	very stony loamy coarse sand	light yellowish brown	10 to 60; gr,c,st	20 to 40	LP,WW	NC
Cryorthents	8,300 to 10,600	granitic and meta-morphic	very cobbly loamy coarse sand	grayish brown	15 to 65; gr,c,st	very cobbly loamy coarse sand	light yellowish brown	15 to 65; gr,c,st	15 to 40	LP,WW	NC

[1] This table was developed to assist people in the field to recognize the soil types found in the Sierra National Forest Area, Soil Survey.

[2] First, the soils are grouped by Vegetation Formation Class, taken from *CALVEG: A Classification of California Vegetation*, Regional Ecology Group, R-5, Jan.1981.

Herbaceous Formation:
Greater than 2 percent herbaceous cover with less than 25 percent tree crown closure and less than 25 percent chaparral cover.

Chaparral Formation:
Greater than 25 percent cover of chaparral with less than 10 percent tree crown closure.

Hardwood Forest Formation:
Greater than 25 percent of the crown closure is hardwood species and less than 10 percent of the crown closure is conifer species.

Chaparral/Conifer Forest or Hardwood Forest/Conifer Forest Formation:
Greater than 25 percent of the crown closure is chaparral or hardwood species and 10 to 25 percent of the crown closure is conifer species.

Conifer Forest Formation:
Greater than 25 percent of the crown closure is conifer species.

[3] Next, the soils are listed by elevation from lowest to highest. If two soils have the same or overlapping elevation, then look at the next column for the parent material of which they are forming from. If this is the same, continue across the columns until you come to one where the characteristics are contrasting enough to enable you to chose between the two soil types.

[4] The abbreviations used in columns six and nine are explained below.

gr = gravel; less than 3 inches in diameter
c = cobbles; 3 to 10 inches in diameter
st = stones; 10 to 24 inches in diameter
b = boulders; more than 24 inches in diameter

[5] This classification level (Calveg System) identifies vegetation by the dominant species within a given area based on composition.

HG = Annual Grass-Forb
HM = Perennial Grass
HJ = Sedge-Rush

CE = Mariposa Manzanita
CL = Wedgeleaf Ceanothus
CG = Grennleaf Manzanita

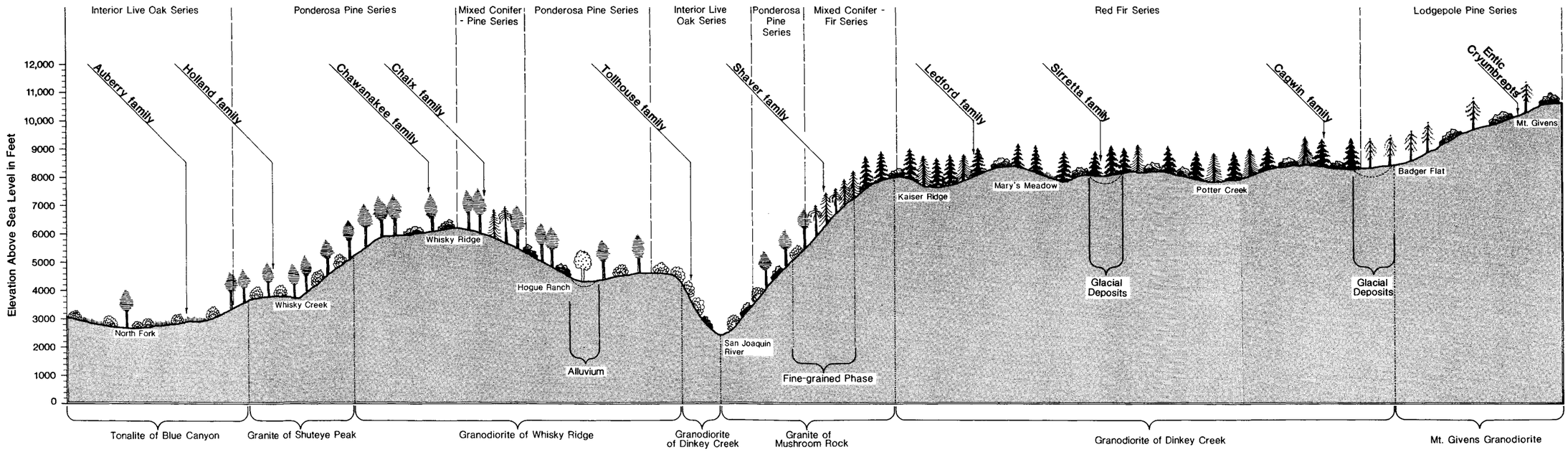
QC = Canyon Live Oak
QW = Interior Live Oak
QK = Black Oak
QD = Blue Oak

BT = Big Tree
MF = Mixed Conifer-Fir

JP = Jeffrey Pine
RF = Red Fir
LP = Lodgepole Pine
KP = Knobcone Pine
PP = Ponderosa Pine
WW = Western White Pine
MP = Mixed Conifer-Pine

SOIL–VEGETATION–GEOLOGY PROFILE

Sierra National Forest Area, California



Legend

Grass
Rock Outcrop
Interior/Canyon Live Oak
Apple Tree
Ponderosa Pine
Sugar Pine
White Fir
Red Fir
Lodgepole Pine

A conceptual cross-section of a part of the survey area, approximately between North Fork and Mt. Givens, showing the relationship of several soils to each other and to elevation, vegetation type, and rock type.
This is a general overview of the position of these soils on the land and is not meant to show their actual location.

0 1/4 1/2 1 2 3 4 5
Scale in Miles

North

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