622 Dome-Chaix-Rock outcrop association, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. Slope is 30 to 50 percent. The native plant communities are Yellow Pine Forest and Mixed Conifer Forest. Elevation is 5,000 to 8,040 feet. The average annual precipitation is about 24 to 51 inches.

This unit is 35 percent Dome sandy loam, 30 percent Chaix sandy loam, and 20 percent Rock outcrop.

Soil Map Unit Components	Dome	Chaix	Rock outcrop
Depth	40 to 60 in	20 to 40 in	
Available Water Capacity	Moderate to low	Low	
Total	5 to 6 in	3 to 4 in	
Upper 20"	2 in	2 in	
Permeability	Moderately rapid	Moderately rapid	
Hydrologic Soil Group	B	B	
Drainage Class	Well drained	Well drained or somewhat excessively drained	
Runoff	Rapid	Rapid	
Max Erosion Hazard	Moderate	Moderate	
Erosion Factor (K)	0.20	0.24	
Unified Soil Class	SM	SM	
Soil & Rock Color	Intermediate	Intermediate	
Soil Manageability Class	2ep	3eP	
Timber Production			
CMAI (cu ft/acre)	85 to 164	50 to 84	
Suitability	Suitable	Suitable	
Limiting Factors	Regeneration difficulty—d and f		
Range Production			
Seasons of Use	Summer	Summer	
Limiting Factors	Plant competition, steep slopes		
Soil Manageability Group	II	II	

Included Areas & Remarks

Included in this unit are small areas of Chawanakee soils and Junipero family soils. Included areas make up about 15 percent of the total acreage.

The Dome soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is grayish brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 21 inches thick. The subsoil is very pale brown sandy loam about 22 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

The Chaix soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 19 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

This unit is used mainly for timber production. It is also used as limited rangeland in summer.

624 Sirretta-Rock outcrop-Cannell complex, 5 to 30 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. The native plant communities are Yellow Pine Forest dominated by Jeffrey pine, White Fir Forest, and Montane Chaparral. Elevation is 6,990 to 8,790 feet. The average annual precipitation is about 20 to 39 inches.

This unit is 30 percent Sirretta gravelly coarse sandy loam, 30 percent Rock outcrop, and 20 percent Cannell sandy loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components	Sirretta	Rock outcrop	Cannell
Depth	20 to 40 in		40 to 60 in
Available Water Capacity	Very low		Moderate
Total	1 to 2 in		5 to 7 in
Upper 20"	1 in		2 in
Permeability	Rapid		Moderately rapid
Hydrologic Soil Group	A		B
Drainage Class	Excessively drained		Well drained
Runoff	Medium to rapid		Medium to rapid
Max Erosion Hazard	Moderate		Moderate
Erosion Factor (K)	0.17		0.20
Unified Soil Class	GM/SW		SM
Soil & Rock Color	Intermediate		Intermediate
Soil Manageability Class	4ePX		2ep
Timber Production			
CMAI (cu ft/acre)	20 to 49		85 to 119
Suitability	Poorly suited		Poorly suited
Limiting Factors	Regeneration difficulty—b, d, and e		
Range Production			
Seasons of Use	Summer		Summer
Limiting Factors	rock outcrop, plant competition		
Soil Manageability Group	IV		IV

Included Areas & Remarks

Included in this unit are small areas of Nanny family soils, Dome soils, and Chaix soils. Included areas make up about 20 percent of the total acreage.

The Sirretta soil is moderately deep and formed in residuum derived from granitic rock. This soil is 35 to 90 percent gravel and cobbles. Typically, the surface layer is dark grayish brown gravelly coarse sandy loam about 6 inches thick. The subsoil is brown and light yellowish brown gravelly loamy sand about 22 inches thick over fractured granitic rock.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

The Cannell soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam 7 inches thick. The subsoil is yellowish brown sandy loam about 20 inches thick. The substratum is yellowish brown sandy loam about 23 inches thick the surface layer is coarse sandy loam.

This unit is used mainly for timber production. It is also used as rangeland in summer.

625 Sirretta-Rock outcrop-Nanny family complex, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. The native plant communities are Yellow Pine Forest dominated by Jeffrey pine, White Fir Forest, and Montane Chaparral. Elevation is 7,220 to 8,400 feet. The average annual precipitation is about 20 to 39 inches.

This unit is 30 percent Sirretta gravelly coarse sandy loam, 30 percent Rock outcrop, and 20 percent Nanny family sandy loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components	Sirretta	Rock outcrop	Nanny family
Depth	20 to 40 in		60+ in
Available Water Capacity	Very low		Moderate to low
Total	1 to 2 in		4 to 6 in
Upper 20"	.5 in		2 in
Permeability	Rapid		Moderately rapid
Hydrologic Soil Group	A		B
Drainage Class	Excessively drained		Well drained
Runoff	Rapid		Rapid
Max Erosion Hazard	Moderate		Moderate
Erosion Factor (K)	0.17		0.29
Unified Soil Class	GM/SW		SM/GM
Soil & Rock Color	Intermediate		Intermediate
Soil Manageability Class	4ePX		2e
Timber Production			
CMAI (cu ft/acre)	20 to 49		50 to 84
Suitability	Poorly suited		Poorly suited
Limiting Factors	Regeneration difficulty—b, d, and e		
Range Production			
Seasons of Use	Summer		Summer
Limiting Factors	Rock outcrop, steep slopes, plant competition		
Soil Manageability Group	III		III

Included Areas & Remarks

Included in this unit are small areas of Cannell, Dome, and Chaix soils. Included areas make up about 20 percent of the total acreage.

The Sirretta soil is moderately deep and formed in residuum derived from granitic rock. This soil is 35 to 90 percent gravel and cobbles. Typically, the surface layer is dark grayish brown gravelly coarse sandy loam about 6 inches thick. The subsoil is brown and light yellowish brown gravelly loamy sand about 22 inches thick over fractured granitic rock.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

The Nanny family soil is deep and formed in residuum derived from granitic rock. This soil is 35 to 80 percent gravel and cobbles. Typically, the surface layer is very dark grayish brown sandy loam about 6 inches thick. The subsoil is brown and pale brown sandy loam and extremely gravelly fine sandy loam about 23 inches thick. The substratum is yellowish brown loamy fine sand and very gravelly loamy fine sand about 46 inches thick over highly weathered granitic rock.

This unit is used mainly for timber production. It is also used as limited rangeland in summer.

628 Nanny family-Toem complex, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. The native plant communities are Red Fir Forest, White Fir Forest, and Lodgepole Pine Forest. Elevation is 8,010 to 8,760 feet. The average annual precipitation is about 14 to 20 inches.

This unit is 65 percent Nanny family sandy loam and 25 percent Toem loamy sand. The components of this unit are so intricately intermingled that is was not practical to map them separately at the scale used.

Soil Map Unit Components	Nanny family	Toem
Depth	60+ in	4 to 20 in
Available Water Capacity	Moderate to low	Very low
Total	4 to 6 in	1 to 2 in
Upper 20"	2 in	2 in
Permeability	Moderately rapid	Rapid
Hydrologic Soil Group	B	D
Drainage Class	Well drained	Excessively drained
Runoff	Slow	Very rapid
Max Erosion Hazard	High	High
Erosion Factor (K)	0.29	0.32
Unified Soil Class	SM/GM	SM
Soil & Rock Color	Intermediate	Intermediate
Soil Manageability Class	3Ep	3Ed
Timber Production		
CMAI (cu ft/acre)	50 to 84	20 to 49
Suitability	Poorly suited	Poorly suited
Limiting Factors	Regeneration difficulty—a, b, d, and e, high erosion hazard	
Range Production		
Seasons of Use	Summer	Summer
Limiting Factors	Steep slopes, shallow soils, plant competition	
Soil Manageability Group	III	III

Included Areas & Remarks

Included in this unit are small areas of Rock outcrop. Included areas make up about 10 percent of the total acreage.

The Nanny family soil is deep and formed in residuum derived from granitic rock. This soil is 35 to 80 percent gravel and cobbles. Typically, the surface layer is very dark grayish brown sandy loam about 6 inches thick. The subsoil is brown and pale brown sandy loam and extremely gravelly fine sandy loam about 23 inches thick. The substratum is yellowish brown loamy fine sand and very gravelly loamy fine sand about 46 inches thick over highly weathered granitic rock.

The Toem soil is shallow and formed in residuum derived from granitic rock. Typically, the surface layer is dark grayish brown loamy sand about 3 inches thick. The substratum is brown loamy sand about 16 inches thick over highly weathered granitic rock.

This unit is used mainly for timber production. It is also used as limited rangeland in summer.

631 Chesaw family-Toem-Rock outcrop complex, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. The native plant communities are Sagebrush Scrub, Foxtail-Limber Pine Forest, Red Fir Forest, Lodgepole Pine Forest, and Montane Chaparral. Elevation is 7,780 to 9,190 feet. The average annual precipitation is about 12 to 18 inches.

This unit is 50 percent Chesaw family extremely cobbly loamy coarse sand, 30 percent Toem loamy sand, and 10 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components	Chesaw family	Toem	Rock outcrop
Depth	20 to 30 in	4 to 20 in	
Available Water Capacity	Very low	Very low	
Total	1 to 2 in	1 to 2 in	
Upper 20"	1 in	2 in	
Permeability	Rapid	Rapid	
Hydrologic Soil Group	A	D	
Drainage Class	Excessively drained	Excessively drained	
Runoff	Slow	Very rapid	
Max Erosion Hazard	High	High	
Erosion Factor (K)	0.17	0.32	
Unified Soil Class	SM/GM-GP	SM	
Soil & Rock Color	Intermediate	Intermediate	
Soil Manageability Class	4EPX	3Ed	
Timber Production			
CMAI (cu ft/acre)	20-49	20-49	
Suitability	Poorly suited	Poorly suited	
Limiting Factors			
Range Production			
Seasons of Use	Summer	Summer	
Limiting Factors	Shallow soils, steep slopes, plant competition		
Soil Manageability Group	IV	IV	

Included Areas & Remarks

Included in this unit are small areas of Nanny family soils and Cagwin soils. Included areas make up about 10 percent of the total acreage.

The Chesaw family soil is moderately deep and formed in residuum derived from granitic rock. This soil is 35 to 60 percent gravel and cobbles. Typically, the surface layer is brown extremely cobbly loamy coarse sand about 16 inches thick. The substratum is dark yellowish brown very stony loamy coarse sand about 14 inches thick over highly weathered granitic rock.

The Toem soil is shallow and formed in residuum derived from granitic rock. Typically, the surface layer is dark brown loamy sand about 3 inches thick. The subsoil is brown loamy sand about 16 inches thick over highly weathered granitic rock.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

This unit is used as limited rangeland in summer.

635 Hotaw Variant-Brownlee family-Rock outcrop complex, 40 to 75 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. The native plant communities are Yellow Pine Forest and White Fir Forest. Elevation is 4,000 to 7,200 feet. The average annual precipitation is about 30 to 39 inches.

This unit is 40 percent Hotaw Variant loam, 30 percent Brownlee family very fine sandy loam, and 20 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components	Hotaw variant	Brownlee family	Rock outcrop
Depth	20 to 30 in	60+ in	
Available Water Capacity	Low	Moderate	
Total	3 to 5 in	5 to 9 in	
Upper 20"	3 in	3 in	
Permeability	Moderately slow	Moderately slow	
Hydrologic Soil Group	B	B	
Drainage Class	Well drained	Well drained	
Runoff	Rapid to very rapid	Rapid to very rapid	
Max Erosion Hazard	High	High	
Erosion Factor (K)	0.37	0.32	
Unified Soil Class	ML/CL	ML/CL	
Soil & Rock Color	Low	Low	
Soil Manageability Class	4G	4G	
Timber Production			
CMAI (cu ft/acre)	50 to 84	85 to 119	
Suitability	Suitable	Suitable	
Limiting Factors	Very steep slopes, high erosion hazard		
Range Production			
Seasons of Use	Summer	Summer	
Limiting Factors	Steep and very steep slopes, plant competition		
Soil Manageability Group	IV	IV	

Included Areas & Remarks

Included in this unit are small areas of Shaver soils, Holland soils, and Chualar family soils. Included areas make up about 10 percent of the total acreage.

The Hotaw Variant soil is moderately deep and formed in residuum derived from metamorphic and metasedimentary rock. Typically, the surface layer is dark brown loam about 5 inches thick. The subsoil is dark brown gravelly loam and gravelly clay loam about 23 inches thick over fractured metasedimentary rock.

The Brownlee family soil is deep and formed in residuum derived from metamorphic and metasedimentary rock. Typically, the surface layer is brown very fine sandy loam and loam about 15 inches thick. The subsoil is yellowish brown and brownish yellow sandy clay loam about 51 inches thick over weathered metamorphic rock.

Rock outcrop occurs as isolated outcroppings and massive exposures of metasedimentary or metamorphic rock

This unit is used for timber production and as limited rangeland in summer.

638 Sirretta-Rock outcrop complex, 50 to 75 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. The native plant communities are Red Fir Forest, Lodgepole Pine Forest, and Montane Chaparral. Elevation is 8,400 to 10,600 feet. The average annual precipitation is about 20 to 35 inches.

This unit is 55 percent Sirretta soils and 35 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components	Sirretta	Rock outcrop
Depth	20 to 40 in	
Available Water Capacity	Very low	
Total	1 to 2 in	
Upper 20"	1 in	
Permeability	Rapid	
Hydrologic Soil Group	A	
Drainage Class	Excessively drained	
Runoff	Very rapid	
Max Erosion Hazard	Very high	
Erosion Factor (K)	0.17	
Unified Soil Class	GM/SW	
Soil & Rock Color	Intermediate	
Soil Manageability Class	4EPX	
Timber Production		
CMAI (cu ft/acre)	20 to 49	
Suitability	Poorly suited	
Limiting Factors	Regeneration difficulty—b, d, and e, steep slopes, very high erosion hazard	
Range Production		
Seasons of Use	Summer	
Limiting Factors	Rock outcrop, very steep slopes, plant competition, very high erosion hazard	
Soil Manageability Group	IV	

Included Areas & Remarks

Included in this unit are small areas of Toem and Cagwin soils. Included areas make up about 10 percent of the total acreage.

The Sirretta soil is moderately deep and formed in residuum derived from granitic rock. This soil is 35 to 90 percent gravel and cobbles. Typically, the surface layer is dark grayish brown gravelly coarse sandy loam about 6 inches thick. The subsoil is brown and light yellowish brown gravelly loamy sand about 22 inches thick over fractured granitic rock.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

This unit is used mainly as limited rangeland in summer. It is also used for timber production.

639 Cagwin-Toem-Monache association, 5 to 30 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and in upland basins. Slope is 5 to 30 percent. The native plant communities are Red Fir Forest, Lodgepole Pine Forest, and Montane Meadow. Elevation is 8,010 to 8,990 feet. The average annual precipitation is about 16 to 20 inches.

This unit is 45 percent Cagwin loamy sand, 35 percent Toem loamy sand, and 10 percent Monache very fine sandy loam.

Soil Map Unit Components	Cagwin	Toem	Monache
Depth	20 to 40 in	4 to 20 in	60+ in
Available Water Capacity	Very low	Very low	Moderate
Total	1 to 2 in	1 to 2 in	6 to 8 in
Upper 20"	1 in	2 in	3 in
Permeability	Rapid	Rapid	Moderate
Hydrologic Soil Group	A	D	B
Drainage Class	Somewhat excessively drained	Excessively drained	Moderately well drained
Runoff	Medium to rapid	Medium to rapid	Medium
Max Erosion Hazard	Moderate	Moderate	Moderate
Erosion Factor (K)	0.29	0.32	0.32
Unified Soil Class	SM	SM	ML/SM
Soil & Rock Color	Intermediate	Intermediate	Intermediate
Soil Manageability Class	2ep	2ed	2e
Timber Production			
CMAI (cu ft/acre)	50 to 84	20 to 49	—
Suitability	Poorly suited	Poorly suited	Unsuitable
Limiting Factors	Regeneration difficulty—a and d		
Range Production			
Seasons of Use	Summer	Summer	Summer
Limiting Factors	Plant competition, shallow soils		
Soil Manageability Group	II	II	II

Included Areas & Remarks

Included in this unit are small areas of Cannell soils and Monache Variant soil, drained. Included areas make up about 10 percent of the total acreage.

The Cagwin soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown loamy sand about 13 inches thick. The substratum is pale brown loamy coarse sand about 21 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam, coarse sandy loam, or loamy coarse sand.

The Toem soil is shallow and formed in residuum derived from granitic rock. Typically, the surface layer is dark grayish brown loamy sand about 3 inches thick. The substratum is brown loamy sand about 16 inches thick over highly weathered granitic rock.

The Monache soil is deep and formed in alluvium derived dominantly from granitic rock. Typically, the surface layer is grayish brown very fine sandy loam about 23 inches thick. The substratum to a depth of 60 inches or more is brown loam and gravelly sandy loam and is mottled. In some areas the surface layer is loam or fine sandy loam.

This unit is used mainly for timber production. It is also used as rangeland in summer.

640 Cagwin-Toem-Monache association, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and in upland basins. Slope is 30 to 50 percent. The native plant communities are Red Fir Forest, Lodgepole Pine Forest, and Montane Meadow. Elevation is 8,010 to 8,990 feet. The average annual precipitation is about 16 to 20 inches.

This unit is 45 percent Cagwin loamy sand, 35 percent Toem loamy sand, and 10 percent Monache very fine sandy loam.

Soil Map Unit Components	Cagwin	Toem	Monache
Depth	20 to 40 in	4 to 20 in	60+ in
Available Water Capacity	Very low	Very low	Moderate
Total	1 to 2 in	1 to 2 in	6 to 8 in
Upper 20"	1 in	2 in	3 in
Permeability	Rapid	Rapid	Moderate
Hydrologic Soil Group	A	D	B
Drainage Class	Somewhat excessively drained	Excessively drained	Moderately well drained
Runoff	Rapid	Rapid	Rapid
Max Erosion Hazard	High	High	High
Erosion Factor (K)	0.29	0.32	0.32
Unified Soil Class	SM	SM	ML/SM
Soil & Rock Color	Intermediate	Intermediate	Intermediate
Soil Manageability Class	3Ep	3Ed	2E
Timber Production			
CMAI (cu ft/acre)	50 to 84	20 to 49	—
Suitability	Poorly suited	Poorly suited	Unsuitable
Limiting Factors	Regeneration difficulty—a and d, high erosion hazard		
Range Production			
Seasons of Use	Summer	Summer	Summer
Limiting Factors	Plant competition, steep slopes, shallow soils		
Soil Manageability Group	III	III	III

Included Areas & Remarks

Included in this unit are small areas of Cannell soils and Monache Variant soils, drained. Included areas make up about 10 percent of the total acreage.

The Cagwin soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown loamy sand about 13 inches thick. The substratum is pale brown loamy coarse sand 21 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam, coarse sandy loam, or loamy coarse sand.

The Toem soil is shallow and formed in residuum derived from granitic rock. Typically, the surface layer is dark grayish brown loamy sand about 3 inches thick. The substratum is brown loamy sand about 16 inches thick over highly weathered granitic rock.

The Monache soil is deep and formed in alluvium derived dominantly from granitic rock. Typically, the surface layer is grayish brown very fine sandy loam about 23 inches thick. The substratum to a depth of 120 inches or more is brown loam and gravelly sandy loam and is mottled. In some areas the surface layer is loam or fine sandy loam.

The water table fluctuates between depths of 36 and 71 inches.

This unit is used mainly for timber production. It is also used as limited rangeland in summer.

643 Glean Variant extremely gravelly fine sandy loam, 20 to 60 percent slopes.

Physiographic Location, Elevation, and Precipitation	This moderately deep soil is on mountainsides and ridges. It formed in residuum derived dominantly from andesite. The native plant communities are Yellow Pine Forest, Lodgepole Pine Forest, and Sagebrush Scrub. Elevation is 7,600 to 9,910 feet. The average annual precipitation is about 20 to 30 inches.
Soil Map Unit Components	**Glean variant**
Depth	20 to 40 in
Available Water Capacity	Low
Total	2 to 3 in
Upper 20"	1 in
Permeability	Moderately rapid
Hydrologic Soil Group	B
Drainage Class	Somewhat excessively drained
Runoff	Medium to very rapid
Max Erosion Hazard	High
Erosion Factor (K)	0.20
Unified Soil Class	GM
Soil & Rock Color	Intermediate
Soil Manageability Class	4EP
Timber Production	
CMAI (cu ft/acre)	20 to 49
Suitability	Poorly suited
Limiting Factors	Regeneration difficulty—d, high erosion hazard
Range Production	
Seasons of Use	Summer
Limiting Factors	Plant competition, steep slopes
Soil Manageability Group	IV
Included Areas & Remarks	Included in this unit are small areas of Rock outcrop.

Typically, the surface layer is brown extremely gravelly fine sandy loam about 12 inches thick. The substratum is light brownish gray and pale brown extremely gravelly sandy loam about 25 inches thick over highly fractured andesite. This soil is 50 to 80 percent gravel and cobbles.

This unit is used mainly for timber production. It is also used as rangeland in summer.

645 Cannell-Kriest family-Rock outcrop complex, 5 to 30 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides. The native plant communities are Red Fir Forest and White Fir Forest. Elevation is 6,560 to 8,400 feet. The average annual precipitation is about 30 to 49 inches.

This unit is 55 percent Cannell sandy loam, 20 percent Kriest family sandy loam, and 15 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components	Cannell	Kriest family	Rock outcrop
Depth	40 to 60 in	20 to 40 in	
Available Water Capacity	Moderate	Low	
Total	5 to 7 in	3 to 4 in	
Upper 20"	2 in	2 in	
Permeability	Moderately rapid	Moderate	
Hydrologic Soil Group	B	B	
Drainage Class	Well drained	Well drained	
Runoff	Medium to rapid	Medium to rapid	
Max Erosion Hazard	Moderate	Moderate	
Erosion Factor (K)	0.20	0.24	
Unified Soil Class	SM	SM	
Soil & Rock Color	Intermediate	Intermediate	
Soil Manageability Class	2ep	2ep	
Timber Production			
CMAI (cu ft/acre)	85 to 119	50 to 84	
Suitability	Suitable	Suitable	
Limiting Factors	Regeneration difficulty—b and d		
Range Production			
Seasons of Use	Summer	Summer	
Limiting Factors	Plant competition, rock outcrop		
Soil Manageability Group	II	II	

Included Areas & Remarks

Included in this unit are small areas of Toem soils. Included areas make up about 10 percent of the total acreage.

The Cannell soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is yellowish brown sandy loam about 20 inches thick. The substratum is yellowish brown sandy loam about 23 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

The Kriest family soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is grayish brown sandy loam about 5 inches thick. The subsoil is pale brown sandy loam about 17 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

This unit is used mainly for timber production. It is also used as rangeland in summer.

646 Cannell-Kriest family-Rock outcrop complex, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides. The native plant communities are Red Fir Forest and White Fir Forest. Elevation is 6,560 to 8,990 feet. The average annual precipitation is about 30 to 49 inches.

This unit is 55 percent Cannell sandy loam, 20 percent Kriest family sandy loam, and 15 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components	Cannell	Kriest family	Rock outcrop
Depth	40 to 60 in	20 to 40 in	
Available Water Capacity	Moderate	Low	
Total	5 to 7 in	3 to 4 in	
Upper 20"	2 in	2 in	
Permeability	Moderately rapid	Moderate	
Hydrologic Soil Group	B	B	
Drainage Class	Well drained	Well drained	
Runoff	Rapid	Rapid	
Max Erosion Hazard	Moderate	High	
Erosion Factor (K)	0.20	0.24	
Unified Soil Class	SM	SM	
Soil & Rock Color	Intermediate	Intermediate	
Soil Manageability Class	3ep	3Ep	
Timber Production			
CMAI (cu ft/acre)	85 to 110	50 to 84	
Suitability	Suitable	Suitable	
Limiting Factors	Regeneration difficulty—b and d, high erosion hazard		
Range Production			
Seasons of Use	Summer	Summer	
Limiting Factors	Plant competition, steep slopes, rock outcrop		
Soil Manageability Group	III	III	

Included Areas & Remarks

Included in this unit are small areas of Toem soils. Included areas make up about 10 percent of the total acreage.

The Cannell soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is yellowish brown sandy loam about 20 inches thick. The substratum is yellowish brown sandy loam about 23 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

The Kriest family soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is grayish brown sandy loam about 5 inches thick. The subsoil is pale brown sandy loam about 27 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

This unit is used mainly for timber production. It is also used as limited rangeland in summer.

647 Cannell-Kriest family-Rock outcrop complex, 50 to 75 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides. The native plant communities are Red Fir Forest and White Fir Forest. Elevation is 6,560 to 8,790 feet. The average annual precipitation is about 30 to 49 inches.

This unit is 55 percent Cannell sandy loam, 20 percent Kriest family sandy loam, and 15 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components	Cannell	Kriest family	Rock outcrop
Depth	40 to 60 in	20 to 40 in	
Available Water Capacity	Moderate	Low	
Total	5 to 7 in	3 to 4 in	
Upper 20"	2 in	2 in	
Permeability	Moderately rapid	Moderate	
Hydrologic Soil Group	B	B	
Drainage Class	Well drained	Well drained	
Runoff	Very rapid	Very rapid	
Max Erosion Hazard	Very high	Very high	
Erosion Factor (K)	0.20	0.24	
Unified Soil Class	SM	SM	
Soil & Rock Color	Intermediate	Intermediate	
Soil Manageability Class	3Gp	3Gp	
Timber Production			
CMAI (cu ft/acre)	85 to 110	50 to 84	
Suitability	Suitable	Suitable	
Limiting Factors	Very steep slopes, regeneration difficulty—b and d, very high erosion hazard		
Range Production			
Seasons of Use	Summer	Summer	
Limiting Factors	Very steep slopes, plant competition, rock outcrop		
Soil Manageability Group	IV	IV	

Included Areas & Remarks

Included in this unit are small areas of Toem soils. Included areas make up about 10 percent of the total acreage.

The Cannell soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is yellowish brown sandy loam about 20 inches thick. The substratum is yellowish brown sandy loam about 23 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

The Kriest family soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is grayish brown sandy loam about 5 inches thick. The subsoil is pale brown sandy loam about 27 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

This unit is used mainly for timber production. It is also used as limited rangeland in summer.

648 Kriest family-Cannell-Rock outcrop complex, 5 to 30 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides. The native plant communities are Red Fir Forest, White Fir Forest, and Montane Chaparral. Elevation is 6,990 to 8,010 feet. The average annual precipitation is about 39 to 51 inches.

This unit is 50 percent Kriest family sandy loam, 20 percent Cannell sandy loam, and 20 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components

	Kriest family	Cannell	Rock outcrop
Depth	20 to 40 in	40 to 60 in	
Available Water Capacity	Low	Moderate	
Total	3 to 4 in	5 to 7 in	
Upper 20"	2 in	2 in	
Permeability	Moderate	Moderately rapid	
Hydrologic Soil Group	B	B	
Drainage Class	Well drained	Well drained	
Runoff	Medium to rapid	Medium to rapid	
Max Erosion Hazard	Moderate	Moderate	
Erosion Factor (K)	0.24	0.20	
Unified Soil Class	SM	SM	
Soil & Rock Color	Intermediate	Intermediate	
Soil Manageability Class	2ep	2ep	
Timber Production			
CMAI (cu ft/acre)	85 to 110	50 to 84	
Suitability	Suitable	Suitable	
Limiting Factors	Regeneration difficulty—b and d		
Range Production			
Seasons of Use	Summer	Summer	
Limiting Factors	Plant competition		
Soil Manageability Group	II	II	

Included Areas & Remarks

Included in this unit are small areas of Toem soils. Included areas make up about 10 percent of the total acreage.

The Kriest family soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is grayish brown sandy loam about 6 inches thick. The subsoil is pale brown sandy loam about 27 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

The Cannell soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is yellowish brown sandy loam about 20 inches thick. The substratum is yellowish brown sandy loam about 23 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

This unit is used mainly for timber production. It is also used as rangeland in summer.

651 Shaver-Holland association, 5 to 30 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides. Slope is 5 to 30 percent. The native plant communities are Yellow Pine Forest and White Fir Forest. Elevation is 4,000 to 5,590 feet. The average annual precipitation is about 30 to 51 inches.

This unit is 50 percent Shaver fine sandy loam and 40 percent Holland sandy loam.

Soil Map Unit Components	Shaver	Holland
Depth	40 to 60 in	60+ in
Available Water Capacity	Moderate	Moderate to high
Total	6 to 9 in	7 to 10 in
Upper 20"	3 in	3 in
Permeability	Moderately rapid	Moderately slow
Hydrologic Soil Group	B	B
Drainage Class	Well drained	Well drained
Runoff	Medium	Medium or rapid
Max Erosion Hazard	Moderate	Moderate
Erosion Factor (K)	0.24	0.20
Unified Soil Class	SM	SM
Soil & Rock Color	Intermediate	Intermediate
Soil Manageability Class	2e	2e
Timber Production		
CMAI (cu ft/acre)	85 to 119	120 to 169
Suitability	Suitable	Suitable
Limiting Factors	No prominent limitations	
Range Production		
Seasons of Use	Summer	Summer
Limiting Factors	Plant competition	
Soil Manageability Group	II	II

Included Areas & Remarks

Included in this unit are small areas of Hotaw soils, Chaix soils, and Rock outcrop. Included areas make up about 10 percent of the total acreage.

The Shaver soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown fine sandy loam about 43 inches thick. The substratum is yellowish brown gravelly fine sandy loam about 10 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam, coarse sandy loam, or loam.

The Holland soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 5 inches thick. The subsoil is pale brown and light yellowish brown sandy clay loam about 55 inches thick over highly weathered granitic rock. In some areas the surface layer is loam.

This unit is used mainly for timber production. It is also used as rangeland in summer.

655 Wind River family-Shaver association, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides. Slope is 30 to 50 percent. The native plant communities are Yellow Pine Forest and White Fir Forest. Elevation is 4,690 to 6,790 feet. The average annual precipitation is about 39 to 51 inches.

This unit is 55 percent Wind River family loam and 30 percent Shaver fine sandy loam.

Soil Map Unit Components	Wind River family	Shaver
Depth	40 to 60+ in	40 to 60 in
Available Water Capacity	Moderate to low	Moderate
Total	4 to 6 in	6 to 9 in
Upper 20"	3 in	3 in
Permeability	Moderate	Moderately rapid
Hydrologic Soil Group	B	B
Drainage Class	Well drained or moderately well drained	Well drained
Runoff	Rapid	Rapid
Max Erosion Hazard	Moderate	High
Erosion Factor (K)	0.20	0.24
Unified Soil Class	ML/SC	SM
Soil & Rock Color	Low	Low
Soil Manageability Class	3e	3E
Timber Production		
CMAI (cu ft/acre)	85 to 119	85 to 119
Suitability	Suitable	Suitable
Limiting Factors	Steep slopes	
Range Production		
Seasons of Use	Summer	Summer
Limiting Factors	Plant competition, steep slopes	
Soil Manageability Group	III	III

Included Areas & Remarks

Included in this unit are small areas of Holland soils and Rock outcrop. Included areas make up about 15 percent of the total acreage.

The Wind River family soil is deep and formed in residuum derived from metamorphic, metasedimentary, and granitic rock. Typically, the surface layer is brown loam about 12 inches thick. The subsoil is brown and strong brown loam and gravelly loam about 20 inches thick. The substratum is pinkish gray very gravelly sandy loam about 10 inches thick over fractured metasedimentary rock.

The Shaver soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown fine sandy loam about 43 inches thick. The substratum is yellowish brown gravelly fine sandy loam about 10 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam, coarse sandy loam, or loam.

This unit is used mainly for timber production. It is also used as limited rangeland in summer.

657 Chaix-Dome-Holland association, 5 to 30 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on foothills, mountainsides, and ridges. Slope is 5 to 30 percent. The native plant communities are Yellow Pine Forest, White Fir Forest, and Mixed Conifer Forest. Elevation is 4,920 to 7,220 feet. The average annual precipitation is about 35 to 51 inches.

This unit is 40 percent Chaix sandy loam, 30 percent Dome sandy loam, and 20 percent Holland sandy loam.

Soil Map Unit Components	Chaix	Dome	Holland
Depth	20 to 40 in	40 to 60 in	60+ in
Available Water Capacity	Low	Moderate to low	Moderate to high
Total	3 to 4 in	5 to 6 in	7 to 10 in
Upper 20"	2 in	2 in	3 in
Permeability	Moderately rapid	Moderately rapid	Moderately slow
Hydrologic Soil Group	B	B	B
Drainage Class	Well drained or somewhat excessively drained	Well drained	Well drained
Runoff	Medium to rapid	Medium to rapid	Medium to rapid
Max Erosion Hazard	Moderate	Moderate	Moderate
Erosion Factor (K)	0.24	0.20	0.20
Unified Soil Class	SM	SM	SM
Soil & Rock Color	Intermediate	Intermediate	Intermediate
Soil Manageability Class	2ep	2ep	2ep
Timber Production			
CMAI (cu ft/acre)	50 to 84	85 to 164	120 to 164
Suitability	Suitable	Suitable	Suitable
Limiting Factors	Regeneration difficulty—d and f		
Range Production			
Seasons of Use	Summer	Summer	Summer
Limiting Factors	Plant competition		
Soil Manageability Group	II	II	II

Included Areas & Remarks

Included in this unit are small areas of Rock outcrop and Chawanakee soils. Included areas make up about 10 percent of the total acreage.

The Chaix soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 19 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

The Dome soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is grayish brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 21 inches thick. The substratum is very pale brown sandy loam about 22 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

The Holland soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 5 inches thick. The subsoil is pale brown and light yellowish brown sandy clay loam about 55 inches thick over highly weathered granitic rock. In some areas the surface layer is loam.

This unit is used mainly for timber production. It is also used as rangeland in summer.

658 Chaix-Dome-Holland association, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on foothills, mountainsides, and ridges. Slope is 30 to 50 percent. The native plant communities are Yellow Pine Forest, White Fir Forest, and Mixed Conifer Forest. Elevation is 4,790 to 7,220 feet. The average annual precipitation is about 30 to 39 inches.

This is 40 percent Chaix sandy loam, 30 percent Dome sandy loam, and 20 percent Holland sandy loam.

Soil Map Unit Components	Chaix	Dome	Holland
Depth	20 to 40 in	40 to 60 in	60+ in
Available Water Capacity	Low	Moderate	Moderate to high
Total	3 to 4 in	5 to 6 in	7 to 10 in
Upper 20"	2 in	2 in	3 in
Permeability	Moderately rapid	Moderately rapid	Moderately slow
Hydrologic Soil Group	B	B	B
Drainage Class	Well drained or somewhat excessively drained	Well drained	Well drained
Runoff	Rapid	Rapid	Rapid
Max Erosion Hazard	High	High	High
Erosion Factor (K)	0.24	0.20	0.20
Unified Soil Class	SM	SM	SM
Soil & Rock Color	Intermediate	Intermediate	Intermediate
Soil Manageability Class	3Ep	3Ep	3Ep
Timber Production			
CMAI (cu ft/acre)	50 to 84	85 to 164	120 to 164
Suitability	Suitable	Suitable	Suitable
Limiting Factors	regeneration difficulty—d and f, high erosion hazard		
Range Production			
Seasons of Use	Summer	Summer	Summer
Limiting Factors	Plant competition, steep slopes		
Soil Manageability Group	III	III	III

Included Areas & Remarks

Included in this unit are small areas of Rock outcrop and Chawanakee soils. Included areas make up about 10 percent of the total acreage.

The Chaix soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 19 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

The Dome soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is grayish brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 21 inches thick. The substratum is very pale brown sandy loam about 22 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

The Holland soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 5 inches thick. The subsoil is pale brown and light yellowish brown sandy clay loam about 55 inches thick over highly weathered granitic rock. In some areas the surface layer is loam.

This unit is used mainly for timber production. It is also used as rangeland in summer.

660 Shaver-Chaix association, 2 to 30 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides. Slope is 2 to 30 percent. The native plant communities are Yellow Pine Forest and White Fir Forest. Elevation is 5,000 to 6,790 feet. The average annual precipitation is about 20 to 51 inches.

This unit is 60 percent Shaver fine sandy loam and 25 percent Chaix sandy loam.

Soil Map Unit Components	Shaver	Chaix
Depth	40 to 60 in	20 to 40 in
Available Water Capacity	Moderate	Low
Total	6 to 9 in	3 to 4 in
Upper 20"	3 in	2 in
Permeability	Moderately rapid	Moderately rapid
Hydrologic Soil Group	B	B
Drainage Class	Well drained	Well drained or somewhat excessively drained
Runoff	Slow to medium	Slow to medium
Max Erosion Hazard	Moderate	Moderate
Erosion Factor (K)	0.24	0.24
Unified Soil Class	SM	SM
Soil & Rock Color	Low	Low
Soil Manageability Class	2e	2ep
Timber Production		
CMAI (cu ft/acre)	85 to 119	50 to 84
Suitability	Suitable	Suitable
Limiting Factors	Regeneration difficulty—d and f	
Range Production		
Seasons of Use	Summer	Summer
Limiting Factors	Plant competition	
Soil Manageability Group	II	II

Included Areas & Remarks

Included in this unit are small areas of Monache Variant soils, drained, warm; Holland and Chawanakee soils soils; and Rock outcrop. Included areas make up about 15 percent of the total acreage.

The Shaver soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown fine sandy loam about 43 inches thick. The substratum is yellowish brown gravelly fine sandy loam about 10 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam, coarse sandy loam, or loam.

The Chaix soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 19 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

This unit is used mainly for timber production. It is also used as rangeland in summer.

661 Shaver-Chaix association, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides. Slope is 30 to 50 percent. The native plant communities are Yellow Pine Forest and White Fir Forest. Elevation is 4,530 to 7,600 feet. The average annual precipitation is about 20 to 51 inches.

This unit is 50 percent Shaver fine sandy loam and 35 percent Chaix sandy loam.

Soil Map Unit Components	Shaver	Chaix
Depth	40 to 60 in	20 to 40 in
Available Water Capacity	Moderate	Low
Total	6 to 9 in	3 to 4 in
Upper 20"	3 in	2 in
Permeability	Moderately rapid	Moderately rapid
Hydrologic Soil Group	B	B
Drainage Class	Well drained	Well drained or somewhat excessively drained
Runoff	Rapid	Rapid
Max Erosion Hazard	High	High
Erosion Factor (K)	0.24	0.24
Unified Soil Class	SM	SM
Soil & Rock Color	Intermediate	Intermediate
Soil Manageability Class	3E	3Ep
Timber Production		
CMAI (cu ft/acre)	85 to 119	50 to 84
Suitability	Suitable	Suitable
Limiting Factors	Regeneration difficulty—d and f, high erosion hazard	
Range Production		
Seasons of Use	Summer	Summer
Limiting Factors	Plant competition, steep slopes	
Soil Manageability Group	III	III

Included Areas & Remarks

Included in this unit are small areas of Monache Variant soils, drained, warm; Holland and Chawanakee soils; and Rock outcrop. Included areas make up about 15 percent of the total acreage.

The Shaver soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown fine sandy loam about 43 inches thick. The substratum is yellowish brown gravelly fine sandy loam about 10 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam, coarse sandy loam, or loam.

The Chaix soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 19 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

This unit is used mainly for timber production. It is also used as limited rangeland in summer.

662 Shaver-Chaix association, 50 to 75 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides. Slope is 50 to 75 percent. The native plant communities are Yellow Pine Forest and White Fir Forest. Elevation is 4,530 to 6,910 feet. The average annual precipitation is about 30 to 51 inches.

This unit is 50 percent Shaver fine sandy loam and 30 percent Chaix sandy loam.

Soil Map Unit Components	Shaver	Chaix
Depth	40 to 60 in	20 to 40 in
Available Water Capacity	Moderate	Low
Total	6 to 9 in	3 to 4 in
Upper 20"	3 in	2 in
Permeability	Moderately rapid	Moderately rapid
Hydrologic Soil Group	B	B
Drainage Class	Well drained	Well drained or somewhat excessively drained
Runoff	Very rapid	Very rapid
Max Erosion Hazard	High	High
Erosion Factor (K)	0.24	0.24
Unified Soil Class	SM	SM
Soil & Rock Color	Intermediate	Intermediate
Soil Manageability Class	3G	3G
Timber Production		
CMAI (cu ft/acre)	85 to 119	50 to 84
Suitability	Suitable	Suitable
Limiting Factors	Very steep slopes, regeneration difficulty—d and f, high erosion hazard	
Range Production		
Seasons of Use	Summer	Summer
Limiting Factors	Plant competition, very steep slopes	
Soil Manageability Group	IV	IV

Included Areas & Remarks

Included in this unit are small areas of Monache Variant soils, drained, warm; Holland and Chawanakee soils; and Rock outcrop. Included areas make up about 20 percent of the total acreage.

The Shaver soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown fine sandy loam about 43 inches thick. The substratum is yellowish brown gravelly fine sandy loam about 10 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam, coarse sandy loam, or loam.

The Chaix soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 19 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

This unit is used mainly for timber production. It is also used as rangeland in summer.

663 Chawanakee-Rock outcrop-Chaix complex, 5 to 30 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. The native plant communities are Montane Chaparral, Yellow Pine Forest, and White Fir Forest. Elevation is 4,500 to 6,560 feet. The average annual precipitation is about 26 to 39 inches.

This unit is 40 percent Chawanakee coarse sandy loam, 30 percent Rock outcrop, and 15 percent Chaix sandy loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components	Chawanakee	Rock outcrop	Chaix
Depth	8 to 20 in		20 to 40 in
Available Water Capacity	Very low		Low
Total	1 to 2 in		3 to 4 in
Upper 20"	1 in		2 in
Permeability	Moderately rapid		Moderately rapid
Hydrologic Soil Group	C		B
Drainage Class	Somewhat excessively drained		Well drained or somewhat excessively drained
Runoff	Medium to rapid		Medium to rapid
Max Erosion Hazard	High		High
Erosion Factor (K)	0.28		0.24
Unified Soil Class	SM		SM
Soil & Rock Color	Moderate		Moderate
Soil Manageability Class	4ED		2Ep
Timber Production			
CMAI (cu ft/acre)	20 to 49		50 to 84
Suitability	Poorly suited		Poorly suited
Limiting Factors	Regeneration difficulty—a and d, high erosion hazard		
Range Production			
Seasons of Use	Summer		Summer
Limiting Factors	Rock outcrop, shallow soils, plant competition		
Soil Manageability Group	IV		IV

Included Areas & Remarks

Included in this unit are small areas of Dome and Woolstalf soils. Included areas make up about 15 percent of the total acreage.

The Chawanakee soil is shallow and formed in residuum derived from granitic rock. Typically, the surface layer is grayish brown coarse sandy loam about 3 inches thick. The subsoil is yellowish brown sandy loam about 7 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

The Chaix soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 19 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

This unit is used for timber production and as rangeland in summer.

664 Chawanakee-Rock outcrop-Chaix complex, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. The native plant communities are Montane Chaparral, Yellow Pine Forest, White Fir Forest, and Mixed Conifer Forest. Elevation is 4,790 to 8,040 feet. The average annual precipitation is about 20 to 39 inches.

This unit is 40 percent Chawanakee coarse sandy loam, 30 percent Rock outcrop, and 15 percent Chaix sandy loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components	Chawanakee	Rock outcrop	Chaix
Depth	8 to 20 in		20 to 40 in
Available Water Capacity	Very low		Low
Total	1 to 2 in		3 to 4 in
Upper 20"	1 in		2 in
Permeability	Moderately rapid		Moderately rapid
Hydrologic Soil Group	C		B
Drainage Class	Somewhat excessively drained		Well drained or somewhat excessively drained
Runoff	Rapid		Rapid
Max Erosion Hazard	Very high		Very high
Erosion Factor (K)	0.28		0.24
Unified Soil Class	SM		SM
Soil & Rock Color	High		High
Soil Manageability Class	4ED		3Ep
Timber Production			
CMAI (cu ft/acre)	20 to 49		50 to 84
Suitability	Poorly suited		Poorly suited
Limiting Factors	Regeneration difficulty—a and d, very high erosion hazard		
Range Production			
Seasons of Use	Summer		Summer
Limiting Factors	Steep slopes, rock outcrop, shallow soils, plant competition, very high erosion hazard		
Soil Manageability Group	IV		IV

Included Areas & Remarks

Included in this unit are small areas of Dome and Woolstalf soils. Included areas make up about 15 percent of the total acreage.

The Chawanakee soil is shallow and formed in residuum derived from granitic rock. Typically, the surface layer is grayish brown coarse sandy loam about 3 inches thick. The subsoil is yellowish brown sandy loam about 7 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

The Chaix soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 19 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

This unit is used for limited timber production and as limited rangeland in summer.

665 Chawanakee-Rock outcrop-Chaix complex, 50 to 75 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. The native plant communities are Montane Chaparral, Yellow Pine Forest, and White Fir Forest. Elevation is 3,940 to 8,040 feet.The average annual precipitation is about 20 to 49 inches.

This unit is 40 percent Chawanakee coarse sandy loam, 40 percent Rock outcrop, and 10 percent Chaix sandy loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components	Chawanakee	Rock outcrop	Chaix
Depth	8 to 20 in		20 to 40 in
Available Water Capacity	Very low		Low
Total	1 to 2 in		3 to 4 in
Upper 20"	1 in		2 in
Permeability	Moderately rapid		Moderately rapid
Hydrologic Soil Group	C		B
Drainage Class	Somewhat excessively drained		Well drained or somewhat excessively drained
Runoff	Very rapid		Very rapid
Max Erosion Hazard	Very high		Very high
Erosion Factor (K)	0.28		0.24
Unified Soil Class	SM		SM
Soil & Rock Color	High		High
Soil Manageability Class	4GD		3Gp
Timber Production			
CMAI (cu ft/acre)	20 to 49		50 to 84
Suitability	Poorly suited		Poorly suited
Limiting Factors	Regeneration difficulty—a and d, very steep slopes, very high erosion hazard		
Range Production			
Seasons of Use	Summer		Summer
Limiting Factors	Very steep slopes, rock outcrop, shallow soils, plant competition, very high erosion hazard		
Soil Manageability Group	IV		IV

Included Areas & Remarks

Included in this unit are small areas of Dome, Shaver, and Woolstalf soils. Included areas make up about 15 percent of the total acreage.

The Chawanakee soil is shallow and formed in residuum derived from granitic rock. Typically, the surface layer is grayish brown coarse sandy loam about 3 inches thick. The subsoil is yellowish brown sandy loam about 7 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

The Chaix soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 19 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

This unit is used for limited timber production.

666 Wind River family-Rock outcrop association, 15 to 30 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides. Slope is 15 to 30 percent. The native plant community is Yellow Pine Forest. Elevation is 6,000 to 7,550 feet. The average annual precipitation is about 20 to 24 inches.

This unit is 70 percent Wind River family loam and 10 percent Rock outcrop.

Soil Map Unit Components	Wind River family	Rock outcrop
Depth	40 to 60+ in	
Available Water Capacity	Moderate to low	
Total	4 to 6 in	
Upper 20"	3 in	
Permeability	Moderate	
Hydrologic Soil Group	B	
Drainage Class	Well drained or moderately well drained	
Runoff	Rapid	
Max Erosion Hazard	Moderate	
Erosion Factor (K)	0.20	
Unified Soil Class	ML/SC	
Soil & Rock Color	Low	
Soil Manageability Class	2e	
Timber Production		
CMAI (cu ft/acre)	85 to 119	
Suitability	Suitable	
Limiting Factors		
Range Production		
Seasons of Use	Summer	
Limiting Factors	Plant competition	
Soil Manageability Group	II	

Included Areas & Remarks

Included in this unit are small areas of Woolstalf, Baldmountain, Toem, and Cagwin soils. Included areas make up about 20 percent of the total acreage.

The Wind River family soil is deep and formed in residuum derived from metamorphic, metasedimentary, or granitic rock. Typically, the surface layer is brown loam about 12 inches thick. The subsoil is brown and strong brown loam and gravelly loam about 20 inches thick. The substratum is pinkish gray very gravelly sandy loam about 10 inches thick over fractured metasedimentary rock.

Rock outcrop occurs as isolated outcroppings and massive exposures of metasedimentary or granitic rock.

This unit is used mainly for timber production. It is also used as rangeland in summer.

667 Wind River family-Rock outcrop association, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides. Slope is 30 to 50 percent. The native plant community is Yellow Pine Forest. Elevation is 5,000 to 6,400 feet. The average annual precipitation is about 24 to 35 inches.

This unit is 60 percent Wind River family loam and 20 percent Rock outcrop.

Soil Map Unit Components	Wind River family	Rock outcrop
Depth	40 to 60+ in	
Available Water Capacity	Moderate to low	
Total	4 to 6 in	
Upper 20"	3 in	
Permeability	Moderate	
Hydrologic Soil Group	B	
Drainage Class	Well drained or moderately well drained	
Runoff	Rapid	
Max Erosion Hazard	Moderate	
Erosion Factor (K)	0.20	
Unified Soil Class	ML/SC	
Soil & Rock Color	Low	
Soil Manageability Class	2e	
Timber Production		
CMAI (cu ft/acre)	85 to 119	
Suitability	Suitable	
Limiting Factors		
Range Production		
Seasons of Use	Summer	
Limiting Factors	Plant competition, steep slopes	
Soil Manageability Group	II	

Included Areas & Remarks

Included in this unit are small areas of Woolstalf, Baldmountain, Toem, and Cagwin soils. Included areas make up about 20 percent of the total acreage.

The Wind River family soil is deep and formed in residuum derived from metamorphic, metasedimentary, or granitic rock. Typically, the surface layer is brown loam about 12 inches thick. The subsoil is brown and strong brown loam and gravelly loam about 20 inches thick. The substratum is pinkish gray very gravelly sandy loam about 10 inches thick over fractured metasedimentary rock.

Rock outcrop occurs as isolated outcroppings and massive exposures predominantly of metasedimentary and granitic rock.

This unit is used mainly for timber production. It is also used as limited rangeland in summer.

670 Chaix-Dome-Rock outcrop complex, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. The native plant communities are Yellow Pine Forest, White Fir Forest, and Mixed Conifer Forest. Elevation is 5,000 to 8,040 feet. The average annual precipitation is about 30 to 51 inches.

This unit is 45 percent Chaix sandy loam, 25 percent Dome sandy loam, and 15 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components	Chaix	Dome	Rock outcrop
Depth	20 to 40 in	40 to 60 in	
Available Water Capacity	Low	Moderate to low	
Total	3 to 4 in	5 to 6 in	
Upper 20"	2 in	2 in	
Permeability	Moderately rapid	Moderately rapid	
Hydrologic Soil Group	B	B	
Drainage Class	Well drained or somewhat excessively drained	Well drained	
Runoff	Rapid	Rapid	
Max Erosion Hazard	High	High	
Erosion Factor (K)	0.24	0.20	
Unified Soil Class	SM	SM	
Soil & Rock Color	Intermediate	Intermediate	
Soil Manageability Class	3Ep	3Ep	
Timber Production			
CMAI (cu ft/acre)	50 to 84	85 to 164	
Suitability	Suitable	Suitable	
Limiting Factors	Regeneration difficulty—d and f, high erosion hazard		
Range Production			
Seasons of Use	Summer	Summer	
Limiting Factors	Plant competition, steep slopes		
Soil Manageability Group	III	III	

Included Areas & Remarks

Included in this unit are small areas of Chawanakee and Holland soils. Included areas make up about 15 percent of the total acreage.

The Chaix soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 19 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

The Dome soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is grayish brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 21 inches thick. The substratum is very pale brown sandy loam about 22 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

This unit is used mainly for timber production. It is also used as limited rangeland in summer.

671 Chaix-Dome-Rock outcrop complex, 50 to 75 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. The native plant communities are Yellow Pine Forest, White Fir Forest, and Mixed Conifer Forest. Elevation is 5,000 to 8,040 feet. The average annual precipitation is about 30 to 39 inches.

This unit is 45 percent Chaix sandy loam, 25 percent Dome sandy loam, and 15 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components	Chaix	Dome	Rock outcrop
Depth	20 to 40 in	40 to 60 in	
Available Water Capacity	Low	Moderate to low	
Total	3 to 4 in	5 to 6 in	
Upper 20"	2 in	2 in	
Permeability	Moderately rapid	Moderately rapid	
Hydrologic Soil Group	B	B	
Drainage Class	Well drained or somewhat excessively drained	Well drained	
Runoff	Very rapid	Very rapid	
Max Erosion Hazard	Very high	High	
Erosion Factor (K)	0.24	0.20	
Unified Soil Class	SM	SM	
Soil & Rock Color	Intermediate	Intermediate	
Soil Manageability Class	3Ep	3Ep	
Timber Production			
CMAI (cu ft/acre)	50 to 84	85 to 164	
Suitability	Suitable	Suitable	
Limiting Factors	Very steep slopes, regeneration difficulty—d and f, very high erosion hazard		
Range Production			
Seasons of Use	Summer	Summer	
Limiting Factors	Very steep slopes, plant competition		
Soil Manageability Group	IV	IV	

Included Areas & Remarks

Included in this unit are small areas of Chawanakee and Holland soils. Included areas make up about 15 percent of the total acreage.

The Chaix soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 19 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

The Dome soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is grayish brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 21 inches thick. The substratum is very pale brown sandy loam about 22 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

This unit is used mainly as timber production. It is also used for limited rangeland in summer.

672 Dome-Chaix association, 5 to 30 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. Slope is 5 to 30 percent. The native plant communities are Yellow Pine Forest, White Fir Forest, and Mixed Conifer Forest. Elevation is 5,000 to 8,040 feet. The average annual precipitation is about 30 to 51 inches.

This unit is 45 percent Dome sandy loam and 25 percent Chaix sandy loam.

Soil Map Unit Components	Dome	Chaix
Depth	40 to 60 in	20 to 40 in
Available Water Capacity	Moderate to low	Low
Total	5 to 6 in	3 to 4 in
Upper 20"	2 in	2 in
Permeability	Moderately rapid	Moderately rapid
Hydrologic Soil Group	B	B
Drainage Class	Well drained	Well drained or somewhat excessively drained
Runoff	Medium to rapid	Medium to rapid
Max Erosion Hazard	Moderate	Moderate
Erosion Factor (K)	0.20	0.24
Unified Soil Class	SM	SM
Soil & Rock Color	Intermediate	Intermediate
Soil Manageability Class	2ep	2ep
Timber Production		
CMAI (cu ft/acre)	85 to 164	50 to 84
Suitability	Suitable	Suitable
Limiting Factors	Regeneration difficulty—d and f	
Range Production		
Seasons of Use	Summer	Summer
Limiting Factors	Plant competition	
Soil Manageability Group	II	II

Included Areas & Remarks

Included in this unit are small areas of Chawanakee soils, Rock outcrop, and Woolstalf soils. Included areas make up about 30 percent of the total acreage.

The Dome soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is grayish brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 21 inches thick. The substratum is very pale brown sandy loam about 22 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

The Chaix soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 19 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

This unit is used mainly for timber production. It is also used as rangeland in summer.

673 Dome-Chaix association, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. Slope is 30 to 50 percent. The native plant communities are Yellow Pine Forest and White Fir Forest. Elevation is 5,000 to 7,420 feet. The average annual precipitation is about 30 to 51 inches.

This unit is 45 percent Dome sandy loam and 25 percent Chaix sandy loam.

Soil Map Unit Components	Dome	Chaix
Depth	40 to 60 in	20 to 40 in
Available Water Capacity	Moderate to low	Low
Total	5 to 6 in	3 to 4 in
Upper 20"	2 in	2 in
Permeability	Moderately rapid	Moderately rapid
Hydrologic Soil Group	B	B
Drainage Class	Well drained	Well drained or somewhat excessively drained
Runoff	Rapid	Rapid
Max Erosion Hazard	High	High
Erosion Factor (K)	0.20	0.24
Unified Soil Class	SM	SM
Soil & Rock Color	Intermediate	Intermediate
Soil Manageability Class	3Ep	3Ep
Timber Production		
CMAI (cu ft/acre)	85 to 164	50 to 84
Suitability	Suitable	Suitable
Limiting Factors	Regeneration difficulty—d and f, high erosion hazard	
Range Production		
Seasons of Use	Summer	Summer
Limiting Factors	Plant competition, steep slopes	
Soil Manageability Group	III	III

Included Areas & Remarks

Included in this unit are small areas of Chawanakee soils, Rock outcrop, and Woolstalf soils. Included areas make up about 30 percent of the total acreage.

The Dome soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is grayish brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 21 inches thick. The substratum is very pale brown sandy loam about 22 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

The Chaix soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 19 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

This unit is used mainly for timber production. It is also used as limited rangeland in summer.

674 Dome-Chaix association, 50 to 75 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. Slope is 50 to 75 percent. The native plant communities are Yellow Pine Forest and White Fir Forest. Elevation is 5,180 to 6,790 feet. The average annual precipitation is about 45 to 51 inches.

This unit is 45 percent Dome sandy loam and 25 percent Chaix sandy loam.

Soil Map Unit Components	Dome	Chaix
Depth	40 to 60 in	20 to 40 in
Available Water Capacity	Moderate to low	Low
Total	5 to 6 in	3 to 4 in
Upper 20"	2 in	2 in
Permeability	Moderately rapid	Moderately rapid
Hydrologic Soil Group	B	B
Drainage Class	Well drained	Well drained or somewhat excessively drained
Runoff	Very rapid	Very rapid
Max Erosion Hazard	High	High
Erosion Factor (K)	0.20	0.24
Unified Soil Class	SM	SM
Soil & Rock Color	Intermediate	Intermediate
Soil Manageability Class	3Ep	3Ep
Timber Production		
CMAI (cu ft/acre)	85 to 164	50 to 84
Suitability	Suitable	Suitable
Limiting Factors	Regeneration difficulty—d and f, very steep slopes, high erosion hazard	
Range Production		
Seasons of Use	Summer	Summer
Limiting Factors	Plant competition, very steep slopes	
Soil Manageability Group	IV	IV

Included Areas & Remarks

Included in this unit are small areas of Chawanakee soils, Rock outcrop, and Woolstalf soils. Included areas make up about 30 percent of the total acreage.

The Dome soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is grayish brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 17 inches thick. The substratum is very pale brown sandy loam about 22 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

The Chaix soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 19 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

This unit is used mainly for timber production. It is also used as limited rangeland in summer.

675 Woolstalf-Rock outcrop complex, 10 to 30 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides. The native plant communities are Yellow Pine Forest and Montane Chaparral. Elevation is 6,000 to 7,550 feet. The average annual precipitation is about 20 to 24 inches.

This unit is 50 percent Woolstalf gravelly fine sandy loam and 20 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components	Woolstalf	Rock outcrop
Depth	40 to 60 in	
Available Water Capacity	Moderate to low	
Total	5 to 6 in	
Upper 20"	2 in	
Permeability	Moderately rapid	
Hydrologic Soil Group	B	
Drainage Class	Well drained	
Runoff	Medium to rapid	
Max Erosion Hazard	Moderate	
Erosion Factor (K)	0.24	
Unified Soil Class	SM/GM	
Soil & Rock Color	Intermediate	
Soil Manageability Class	2ep	
Timber Production		
CMAI (cu ft/acre)	85 to 119	
Suitability	Suitable	
Limiting Factors		
Range Production		
Seasons of Use	Summer	
Limiting Factors	Plant competition	
Soil Manageability Group	II	

Included Areas & Remarks

Included in this unit are small areas of Baldmountain, Dome, and Chaix soils. Included areas make up about 20 percent of the total acreage.

The Woolstalf soil is deep and formed in residuum derived from metasedimentary rock. This soil is 35 to 75 percent gravel and cobbles. Typically, the surface layer is dark brown and brown, gravelly and very gravelly fine sandy loam about 37 inches thick. The subsoil is yellowish brown extremely gravelly fine sandy loam about 22 inches thick over weathered metasedimentary rock.

Rock outcrop occurs as isolated outcroppings and massive exposures dominantly of metasedimentary rock.

This unit is used mainly for timber production. It is also used as rangeland in summer.

676 Woolstalf-Rock outcrop complex, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides. The native plant communities are Yellow Pine Forest and Montane Chaparral. Elevation is 6,000 to 7,550 feet. The average annual precipitation is about 20 to 35 inches.

This unit is 50 percent Woolstalf gravelly fine sandy loam and 30 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components	Woolstalf	Rock outcrop
Depth	40 to 60 in	
Available Water Capacity	Moderate to low	
Total	5 to 6 in	
Upper 20"	2 in	
Permeability	Moderately rapid	
Hydrologic Soil Group	B	
Drainage Class	Well drained	
Runoff	Rapid	
Max Erosion Hazard	High	
Erosion Factor (K)	0.24	
Unified Soil Class	SM/GM	
Soil & Rock Color	Intermediate	
Soil Manageability Class	3Ep	
Timber Production		
CMAI (cu ft/acre)	85 to 119	
Suitability	Suitable	
Limiting Factors	Regeneration difficulty—high erosion hazard	
Range Production		
Seasons of Use	Summer	
Limiting Factors	Plant competition, rock outcrop, steep slopes	
Soil Manageability Group	III	

Included Areas & Remarks

Included in this unit are small areas of Baldmountain, Dome, and Chaix soils. Included areas make up about 20 percent of the total acreage.

The Woolstalf soil is deep and formed in residuum derived from metasedimentary rock. This soil is 35 to 75 percent gravel and cobbles. Typically, the surface layer is dark brown and brown, gravelly and very gravelly fine sandy loam about 37 inches thick. The subsoil is yellowish brown extremely gravelly fine sandy loam about 22 inches thick over weathered metasedimentary rock.

Rock outcrop occurs as isolated outcroppings and massive exposures dominantly of metasedimentary rock.

This unit is used mainly for timber production. It is also used as limited rangeland in summer.

677 Woolstalf-Rock outcrop complex, 50 to 75 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides. The native plant communities are Yellow Pine Forest and Montane Chaparral. Elevation is 5,090 to 7,550 feet. The average annual precipitation is about 20 to 35 inches.

This unit is 50 percent Woolstalf gravelly fine sandy loam and 35 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components	Woolstalf	Rock outcrop
Depth	40 to 60 in	
Available Water Capacity	Moderate to low	
Total	5 to 6 in	
Upper 20"	2 in	
Permeability	Moderately rapid	
Hydrologic Soil Group	B	
Drainage Class	Well drained	
Runoff	Very rapid	
Max Erosion Hazard	Very high	
Erosion Factor (K)	0.24	
Unified Soil Class	SM/GM	
Soil & Rock Color	Intermediate	
Soil Manageability Class	3Ep	
Timber Production		
CMAI (cu ft/acre)	85 to 119	
Suitability	Suitable	
Limiting Factors	Regeneration difficulty—d and e, very steep slopes, high erosion hazard	
Range Production		
Seasons of Use	Summer	
Limiting Factors	Plant competition, rock outcrop, very steep slopes	
Soil Manageability Group	IV	

Included Areas & Remarks

Included in this unit are small areas of Baldmountain, Dome, and Chaix soils. Included areas make up about 15 percent of the total acreage.

The Woolstalf soil is deep and formed in residuum derived from metasedimentary rock. This soil is 35 to 75 percent gravel and cobbles. Typically, the surface layer is dark brown and brown, gravelly and very gravelly fine sandy loam about 37 inches thick. The subsoil is yellowish brown extremely gravelly fine sandy loam about 22 inches thick over weathered metasedimentary rock.

Rock outcrop occurs as isolated outcroppings and massive exposures dominantly of metasedimentary rock.

This unit is used for timber production.

679 Woolstalf-Hotaw Variant complex, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides. The native plant community is Yellow Pine Forest. Elevation is 4,790 to 6,400 feet. The average annual precipitation is about 35 to 43 inches.

This unit is 60 percent Woolstalf gravelly fine sandy loam and 20 percent Hotaw Variant loam. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components	Woolstalf	Hotaw variant
Depth	40 to 60 in	20 to 30 in
Available Water Capacity	Moderate to low	Low
Total	5 to 6 in	3 to 5 in
Upper 20"	2 in	3 in
Permeability	Moderately rapid	Moderately slow
Hydrologic Soil Group	B	B
Drainage Class	Well drained	Well drained
Runoff	Rapid	Rapid
Max Erosion Hazard	High	High
Erosion Factor (K)	0.24	0.37
Unified Soil Class	SM/GM	ML/CL
Soil & Rock Color	Intermediate	Intermediate
Soil Manageability Class	3Ep	3E
Timber Production		
CMAI (cu ft/acre)	85 to 119	50 to 84
Suitability	Suitable	Suitable
Limiting Factors	Regeneration difficulty—d and e, high erosion hazard	
Range Production		
Seasons of Use	Summer	Summer
Limiting Factors	Plant competition, steep slopes	
Soil Manageability Group	III	III

Included Areas & Remarks

Included in this unit are small areas of shallow soils, Rock outcrop, and Brownlee family soils. Included areas make up about 20 percent of the total acreage.

The Woolstalf soil is deep and formed in residuum derived from metasedimentary rock. This soil is 35 to 75 percent gravel and cobbles. Typically, the surface layer is dark brown and brown, gravelly and very gravelly fine sandy loam about 37 inches thick. The subsoil is yellowish brown extremely gravelly fine sandy loam about 22 inches thick over weathered metasedimentary rock.

The Hotaw Variant soil is moderately deep and formed in residuum derived from metamorphic and metasedimentary rock. Typically, the surface layer is dark brown loam about 5 inches thick. The subsoil is dark brown gravelly loam and gravelly clay loam about 23 inches thick over fractured metasedimentary rock.

This unit is used for timber production and as limited rangeland in summer.

680 Woolstalf-Hotaw Variant-Rock outcrop complex, 50 to 75 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides. The native plant communities are Yellow Pine Forest and White Fir Forest. Elevation is 4,000 to 7,550 feet. The average annual precipitation is about 35 to 43 inches.

This unit is 40 percent Woolstalf gravelly fine sandy loam, 30 percent Hotaw Variant loam, and 20 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components	Woolstalf	Hotaw variant	Rock outcrop
Depth	40 to 60 in	20 to 30 in	
Available Water Capacity	Moderate to low	Low	
Total	5 to 6 in	3 to 5 in	
Upper 20"	2 in	3 in	
Permeability	Moderately rapid	Moderately slow	
Hydrologic Soil Group	B	B	
Drainage Class	Well drained	Well drained	
Runoff	Very rapid	Very rapid	
Max Erosion Hazard	Very high	Very high	
Erosion Factor (K)	0.24	0.37	
Unified Soil Class	SM/GM	ML/CL	
Soil & Rock Color	Intermediate	Intermediate	
Soil Manageability Class	3Ep	3E	
Timber Production			
CMAI (cu ft/acre)	85 to 119	50 to 84	
Suitability	Suitable	Suitable	
Limiting Factors	Regeneration difficulty—d and e, very steep slopes, very high erosion hazard		
Range Production			
Seasons of Use	Summer	Summer	
Limiting Factors	Plant competition, very steep slopes		
Soil Manageability Group	IV	IV	

Included Areas & Remarks

Included in this unit are small areas of shallow soils, Toem soils, Cagwin soils, and Brownlee family soils. Included areas make up about 10 percent of the total acreage.

The Woolstalf soil is deep and formed in residuum derived from metasedimentary rock. This soil is 35 to 75 percent gravel and cobbles. Typically, the surface layer is dark brown and brown, gravelly and very gravelly fine sandy loam about 37 inches thick. The subsoil is yellowish brown extremely gravelly fine sandy loam about 22 inches thick over weathered metasedimentary rock.

The Hotaw Variant soil is moderately deep and formed in residuum derived from metamorphic and metasedimentary rock. Typically, the surface layer is dark brown loam about 5 inches thick. The subsoil is dark brown gravelly loam and gravelly clay loam about 23 inches thick over fractured metasedimentary rock.

Rock outcrop occurs as isolated outcroppings and massive exposures of metamorphic and metasedimentary rock.

This unit is used for timber production and as limited rangeland in summer.

681 Boomer-Crozier-Rock outcrop complex, 5 to 40 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides. The native plant communities are White Fir Forest, Yellow Pine Forest, and Mixed Conifer Forest. Elevation is 4,790 to 6,560 feet. The average annual precipitation is about 20 to 39 inches.

This unit is 50 percent Boomer gravelly loam, 25 percent Crozier cobbly loam, and 15 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components	Boomer	Crozier	Rock outcrop
Depth	40 to 60+ in	20 to 40 in	
Available Water Capacity	Moderate	Low	
Total	6 to 8 in	4 to 5 in	
Upper 20"	3 in	3 in	
Permeability	Moderately slow	Moderate	
Hydrologic Soil Group	B	B	
Drainage Class	Well drained	Well drained	
Runoff	Medium to rapid	Medium to rapid	
Max Erosion Hazard	Moderate	Moderate	
Erosion Factor (K)	0.32	0.28	
Unified Soil Class	ML/CL	ML/CL	
Soil & Rock Color	Intermediate	Intermediate	
Soil Manageability Class	2e	3eX	
Timber Production			
CMAI (cu ft/acre)	85 to 119	50 to 84	
Suitability	Suitable	Suitable	
Limiting Factors			
Range Production			
Seasons of Use	Summer	Summer	
Limiting Factors	Plant competition		
Soil Manageability Group	II	II	

Included Areas & Remarks

Included in this unit are small areas of shallow soils. Included areas make up about 10 percent of the total acreage.

The Boomer soil is deep and formed in residuum derived from basalt. Typically, the surface layer is reddish brown gravelly loam and sandy loam about 13 inches thick. The subsoil is light reddish brown sandy clay loam and clay loam about 38 inches thick over weathered basalt.

The Crozier soil is moderately deep and formed in residuum derived from basalt. Typically, the surface layer is brown and dark brown cobbly loam and loam about 8 inches thick. The subsoil is brown cobbly loam and cobbly clay loam about 24 inches thick over weathered basalt.

This unit is used mainly for timber production. It is also used as rangeland in summer.

685 Holland-Shaver association, 20 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides and ridges. Slope is 20 to 50 percent. The native plant communities are Yellow Pine Forest and White Fir Forest. Elevation is 4,590 to 5,570 feet. The average annual precipitation is about 30 to 39 inches.

This unit is 55 percent Holland sandy loam and 20 percent Shaver fine sandy loam.

Soil Map Unit Components	Holland	Shaver
Depth	60+ in	40 to 60 in
Available Water Capacity	Moderate to high	Moderate
Total	7 to 10 in	6 to 9 in
Upper 20"	3 in	3 in
Permeability	Moderately slow	Moderately rapid
Hydrologic Soil Group	B	B
Drainage Class	Well drained	Well drained
Runoff	Medium to rapid	Medium to rapid
Max Erosion Hazard	High	High
Erosion Factor (K)	0.32	0.24
Unified Soil Class	ML/SC	SM
Soil & Rock Color	Intermediate	Intermediate
Soil Manageability Class	3E	3E
Timber Production		
CMAI (cu ft/acre)	120 to 164	85 to 119
Suitability	Suitable	Suitable
Limiting Factors		
Range Production		
Seasons of Use	Summer	Summer
Limiting Factors	Plant competition, steep slopes	
Soil Manageability Group	III	III

Included Areas & Remarks

Included in this unit are small areas of Chaix soils, Chawanakee soils, Auberry soils, Rock outcrop, and Monache Variant soils, drained, warm. Included areas make up about 25 percent of the total acreage.

The Shaver soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 5 inches thick thick. The subsoil is pale brown and light yellowish brown sandy clay loam about 55 inches thick over highly weathered granitic rock. In some areas the surface layer is loam.

The Holland soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown fine sandy loam about 43 inches thick. The substratum is yellowish brown gravelly fine sandy loam about 10 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam, coarse sandy loam, or loam.

This unit is used mainly for timber production. It is also used as limited rangeland in summer.

687 Wind River family-Dome-Rock outcrop association, 5 to 30 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountainsides. Slope is 5 to 30 percent. The native plant communities are Yellow Pine Forest and White Fir Forest. Elevation is 6,000 to 7,400 feet. The average annual precipitation is about 20 to 24 inches.

This unit is 40 percent Wind River family loam, 30 percent Dome sandy loam, and 15 percent Rock outcrop.

Soil Map Unit Components

	Wind River famly	Dome	Rock outcrop
Depth	40 to 60+ in	40 to 60 in	
Available Water Capacity	Moderate to low	Moderate to low	
Total	4 to 6 in	5 to 6 in	
Upper 20"	3 in	2 in	
Permeability	Moderate	Moderately rapid	
Hydrologic Soil Group	B	B	
Drainage Class	Well drained or moderately well drained	Well drained	
Runoff	Medium to rapid	Medium to rapid	
Max Erosion Hazard	Moderate	Moderate	
Erosion Factor (K)	0.20	0.20	
Unified Soil Class	ML/SC	SM	
Soil & Rock Color	Intermediate	Intermediate	
Soil Manageability Class	2e	2ep	
Timber Production			
CMAI (cu ft/acre)	85 to 119	85 to 164	
Suitability	Suitable	Suitable	
Limiting Factors			
Range Production			
Seasons of Use	Summer	Summer	
Limiting Factors	Plant competition		
Soil Manageability Group	II	II	

Included Areas & Remarks

Included in this unit are small areas of Chaix soils, Chawanakee soils, and Monache Variant soils, drained, warm. Included areas make up about 15 percent of the total acreage.

The Wind River family soil is deep and formed in residuum derived from metamorphic, metasedimentary, and granitic rock. Typically, the surface layer is brown loam about 12 inches thick. The subsoil is brown and strong brown loam and gravelly loam about 20 inches thick. The substratum is pinkish gray very gravelly sandy loam about 10 inches thick over fractured metasedimentary rock.

The Dome soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is grayish brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 21 inches thick. The substratum is very pale brown sandy loam about 22 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

This unit is used mainly for timber production. It is also used as rangeland in summer.

690 Holland-Dome-Chaix association, 5 to 40 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on foothills, mountainsides, and ridges. Slope is 5 to 40 percent. The native plant communities are Yellow Pine Forest and White Fir Forest. Elevation is 5,000 to 6,790 feet. The average annual precipitation is about 24 to 35 inches.

This unit is 30 percent Holland sandy loam, 30 percent Dome sandy loam, and 25 percent Chaix sandy loam.

Soil Map Unit Components	Holland	Dome	Chaix
Depth	60+ in	40 to 60 in	20 to 40 in
Available Water Capacity	Moderate to high	Moderate to low	Low
Total	7 to 10 in	5 to 6 in	3 to 4 in
Upper 20"	3 in	2 in	2 in
Permeability	Moderately slow	Moderately rapid	Moderately rapid
Hydrologic Soil Group	B	B	B
Drainage Class	Well drained	Well drained	Well drained
Runoff	Medium to rapid	Medium to rapid	Medium to rapid
Max Erosion Hazard	Moderate	Moderate	Moderate
Erosion Factor (K)	0.32	0.20	0.20
Unified Soil Class	SM/SC	SM	SM
Soil & Rock Color	Intermediate	Intermediate	Intermediate
Soil Manageability Class	2e	2ep	2ep
Timber Production			
CMAI (cu ft/acre)	120 to 164	85 to 164	50 to 84
Suitability	Suitable	Suitable	Suitable
Limiting Factors			
Range Production			
Seasons of Use	Summer	Summer	Summer
Limiting Factors	Plant competition		
Soil Manageability Group	II	II	II

Included Areas & Remarks

Included in this unit are small areas of Rock outcrop, Chawanakee soils, and Monache Variant soils, drained, warm. Included areas make up about 15 percent of the total acreage.

The Holland soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 5 inches thick. The subsoil is pale brown and light yellowish brown sandy clay loam about 55 inches thick over highly weathered granitic rock. In some areas the surface layer is loam.

The Dome soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is grayish brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 21 inches thick. The substratum is very pale brown sandy loam about 22 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

The Chaix soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 19 inches thick over highly weathered granitic rock.

This unit is used mainly for timber production. It is also used as rangeland in summer.

693 Holland-Hotaw association, 10 to 30 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on foothills, mountain sides, and ridges. Slope is 10 to 30 percent. The native plant communities are Yellow Pine Forest, White Fir Forest, and Montane Chaparral. Elevation is 3,610 to 9,510 feet. The average annual precipitation is about 24 to 35 inches.

This unit is 55 percent Holland sandy loam and 30 percent Hotaw sandy loam soils.

Soil Map Unit Components	Holland	Hotaw
Depth	60+ in	20 to 40 in
Available Water Capacity	Moderate to high	Moderate to low
Total	7 to 10 in	4 to 6 in
Upper 20"	3 in	3 in
Permeability	Moderately slow	Moderately slow
Hydrologic Soil Group	B	B
Drainage Class	Well drained	Well drained
Runoff	Medium or rapid	Medium or rapid
Max Erosion Hazard	Moderate	Moderate
Erosion Factor (K)	0.32	0.37
Unified Soil Class	SM/SC	SC/CL
Soil & Rock Color	Intermediate	Intermediate
Soil Manageability Class	2e	2e
Timber Production		
CMAI (cu ft/acre)	120 to 164	50 to 84
Suitability	Suitable	Suitable
Limiting Factors	No prominent limitations	
Range Production		
Seasons of Use	Summer	Summer
Limiting Factors	Plant competition	
Soil Manageability Group	II	II

Included Areas & Remarks

Included in this unit are small areas of Rock outcrop, Shaver, Chaix, and Chawanakee soils. Included areas make up about 15 percent of the total areas.

The Holland soil is deep and formed in residuum derived form granitic rock. Typically, the surface layer is brown sandy loam about 5 inches thick. The subsoil is pale brown and light yellowish brown sandy clay loam about 55 inches thick over highly weathered granitic rock. In some areas the surface layer is loam.

The Hotaw soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 6 inches thick. The subsoil is light yellowish brown and strong brown sandy clay loam and clay loam about 26 inches thick over highly weathered granitic rock.

This unit is used mainly for timber production. It is also used for summer range.

694 Holland-Hotaw association, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on foothills, mountain sides, and ridges. Slope is 30 to 50 percent. The native plant communities are Yellow Pine Forest and White Fir Forest. Elevation is 3,200 to 6,000 feet. The average annual precipitation is about 24 to 39 inches.

This unit is 55 percent Holland sandy loam and 30 percent Hotaw sandy loam soils.

Soil Map Unit Components	Holland	Hotaw
Depth	60+ in	20 to 40 in
Available Water Capacity	Moderate to high	Moderate to low
Total	7 to 10 in	4 to 6 in
Upper 20"	3 in	3 in
Permeability	Moderately slow	Moderately slow
Hydrologic Soil Group	B	B
Drainage Class	Well drained	Well drained
Runoff	Rapid	Rapid
Max Erosion Hazard	Moderate	High
Erosion Factor (K)	0.32	0.37
Unified Soil Class	SM/SC	SC/CL
Soil & Rock Color	Intermediate	Intermediate
Soil Manageability Class	2e	2E
Timber Production		
CMAI (cu ft/acre)	120 to 164	50 to 84
Suitability	Suitable	Suitable
Limiting Factors	No prominent limitations	
Range Production		
Seasons of Use	Summer	Summer
Limiting Factors	Plant competition, steep slopes	
Soil Manageability Group	II	II

Included Areas & Remarks

Included in this unit are small areas of Rock outcrop, Shaver, Chaix, and Chawanakee soils. Included areas make up about 15 percent of the total areas.

The Holland soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 5 inches thick. The subsoil is pale brown and light yellowish brown sandy clay loam about 55 inches thick over highly weathered granitic rock. In some areas the surface layer is loam.

The Hotaw soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 6 inches thick. The subsoil is light yellowish brown and strong brown sandy clay loam and clay loam about 26 inches thick over highly weathered granitic rock.

This unit is used mainly for timber production. It is also used as limited summer range.

696 Chaix-Rock Outcrop-Dome complex, 10 to 30 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountain sides and ridges. The native plant communities are Yellow Pine Forest, White Fir Forest, and Mixed Conifer Forest. Elevation is 5,410 to 7,710 feet. The average annual precipitation is about 35 to 51 inches.

This unit is 40 percent Chaix sandy loam soils, 20 percent Rock Outcrop, and 20 percent Dome sandy loam soils. The components of this are so intricately interminglad that it was not practice to map at the scale used.

Soil Map Unit Components	Chaix	Rock outcrop	Dome
Depth	20 to 40 in		40 to 60 in
Available Water Capacity	Low		Moderate to low
Total	3 to 4 in		5 to 6 in
Upper 20"	2 in		2 in
Permeability	Moderately rapid		Moderately rapid
Hydrologic Soil Group	B		B
Drainage Class	Well drained or somewhat excessively drained		Well drained
Runoff	Medium to rapid		Medium to rapid
Max Erosion Hazard	Moderate		Moderate
Erosion Factor (K)	0.20		0.20
Unified Soil Class	SM		SM
Soil & Rock Color	Intermediate		Intermediate
Soil Manageability Class	2ep		2ep
Timber Production			
CMAI (cu ft/acre)	50 to 84		85 to 164
Suitability	Suitable		Suitable
Limiting Factors	Regeneration difficulty—d and f		
Range Production			
Seasons of Use	Summer		Summer
Limiting Factors	Plant competition		
Soil Manageability Group	II		II

Included Areas & Remarks

Included in this are small areas of Chawanakee and Holland soils. Included areas make up about 20 percent of the total area.

The Chaix soil is moderately deep and formed in residuum derived form granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 19 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

The Dome soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is grayish brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 21 inches thick. The substratum is very pale brown sandy loam about 22 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

This unit is used mainly for timber production. It is also used as summer range.

697 Chaix-Rock Outcrop-Dome complex, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountain sides and ridges. The native plant communities are Yellow Pine Forest. White Fir Forest, and Montane Chaparral. Elevation is 4,760 to 8,370 feet. The annual precipitation is about 30 to 46 inches.

This unit is 40 percent Chaix sandy loam soils, 30 percent Rock Outcrop and 15 percent Dome sandy loam soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components	Chaix	Rock outcrop	Dome
Depth	20 to 40 in		40 to 60 in
Available Water Capacity	Low		Moderate to low
Total	3 to 4 in		5 to 6 in
Upper 20"	2 in		2 in
Permeability	Moderately rapid		Moderately rapid
Hydrologic Soil Group	B		B
Drainage Class	Well drained or somewhat excessively drained		Well drained
Runoff	Rapid		Rapid
Max Erosion Hazard	High		High
Erosion Factor (K)	0.20		0.20
Unified Soil Class	SM		SM
Soil & Rock Color	Intermediate		Intermediate
Soil Manageability Class	3Ep		3Ep
Timber Production			
CMAI (cu ft/acre)	50 to 84		85 to 164
Suitability	Poorly suited		Suitable
Limiting Factors	Regeneration difficulty—d and f, high erosion hazard		
Range Production			
Seasons of Use	Summer		Summer
Limiting Factors	Rock outcrop, steep slopes, plant competition		
Soil Manageability Group	III		III

Included Areas & Remarks

Included in this unit are small areas of Chawanakee and Holland soils. Included areas make up about 15 percent of the total area.

The Chaix soil is moderately deep and formed in residuum derived form granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is pale brown loam about 19 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

The Dome soil is deep and formed residuum derived from granitic rock. Typically, the surface layer is grayish brown sandy loam about 7 inches thick. The subsoil is brown sandy loam about 21 inches thick. The substratum is very pale brown sandy loam about 22 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam.

This unit is used mainly for timber production. It is also used as limited summer range.

698 Chaix-Rock Outcrop-Dome complex, 50 to 75 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountain and ridges. The native plant communities are Yellow Pine Forest, and Mixed Conifer Forest. Elevation is 4,430 to 8,370 feet. The average annual precipitation is about 30 to 45 inches.

This unit is 35 percent Chaix sandy loam soils, 35 percent Rock outcrop, and 15 percent Dome sandy loam soils. The components of this are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components	Chaix	Rock outcrop	Dome
Depth	20 to 40 in		40 to 60 in
Available Water Capacity	Low		Moderate to low
Total	3 to 4 in		5 to 6 in
Upper 20"	2 in		2 in
Permeability	Moderately rapid		Moderately rapid
Hydrologic Soil Group	B		B
Drainage Class	Well drained or somewhat excessively drained		Well drained
Runoff	Very rapid		Very rapid
Max Erosion Hazard	Very high		Very high
Erosion Factor (K)	0.20		0.20
Unified Soil Class	SM		SM
Soil & Rock Color	Intermediate		Intermediate
Soil Manageability Class	4Ep		4Ep
Timber Production			
CMAI (cu ft/acre)	50 to 84		85 to 164
Suitability	Poorly suited		Suitable
Limiting Factors	Regeneration difficulty—d and f, very steep slopes, very high erosion hazard		
Range Production			
Seasons of Use	Summer		Summer
Limiting Factors	Rock outcrop, very steep slopes, plant competition		
Soil Manageability Group	IV		IV

Included Areas & Remarks

Included in this unit are small areas of Chawanakee and Holland soils. Included areas make up about 15 percent of the total area.

The Chaix soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 19 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock.

The Dome soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is grayish brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 21 inches thick. The substratum is very pale brown sandy loam about 22 inches thick over highly weathered granitic rock. In areas the surface layer is coarse sandy loam.

This unit is used mainly for timber production. It is also used as limited summer range.

700 Holland-Bohna association, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on foothills and mountain sides. It is in a transitional from cool to warm soil temperatures. Slope is 30 to 50 percent. The native plant communities are Yellow Pine Forest, Montane Chaparral, Foothill Woodland, and Mixed Chaparral. Elevation is 3,610 to 5,810 feet. The average annual precipitation is about 45 to 90 centimeters.

This unit is 40 percent Holland sandy loam and 40 percent Bohna sandy loam soils.

Soil Map Unit Components	**Holland***	**Bohna**
Depth	60+ in	40 to 60 in
Available Water Capacity	Moderate to high	Moderate to high
Total	7 to 10 in	7 to 10 in
Upper 20"	3 in	3 in
Permeability	Moderately slow	Moderately slow
Hydrologic Soil Group	B	B
Drainage Class	Well drained	Well drained
Runoff	Rapid	Rapid
Max Erosion Hazard	High	High
Erosion Factor (K)	0.32	0.28
Unified Soil Class	SM/SC	ML-CL/CL
Soil & Rock Color	Intermediate	Intermediate
Soil Manageability Class	3E	3E
Timber Production		
CMAI (cu ft/acre)	50 to 84*	—
Suitability	Poorly suited	Incapable
Limiting Factors	Regeneration difficulty—c	
Range Production		
Seasons of Use	Spring and summer	Spring and summer
Limiting Factors		
Soil Manageability Group	III	III

Included Areas & Remarks

Included in this unit are small areas of Rock outcrop and Cieneba soils. Included areas make up about 20 percent of the total area.

The Holland soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 5 inches thick. The subsoil is pale brown and light yellowish brown sandy clay loam about 55 inches thick over highly weathered granitic rock. In some areas the surface layer is loam

The Bohna soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown loam about 19 inches thick. The subsoil is brown sandy clay loam about 24 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam.

This unit is used mainly as spring-summer range. It is also used for timber production.

* Footnote: Timber production value lower than typical for the Holland series in Sequoia National forest.

701 Holland-Bohna-Cieneba association, 50 to 75 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on foothills, mountain sides, and ridges. It is in a transitional areas from cool to warm soil temperatures. Slope is 50 to 75 percent. The native plant communities are Yellow Pine Forest, Montane Chaparral, Foothill Woodland, and Mixed Chaparral. Elevation is 3,940 to 6,200 feet. The average annual precipitation is about 24 to 39 inches.

This unit is 40 percent Holland, 30 percent Bohna, and 15 percent Cieneba soils.

Soil Map Unit Components	Holland*	Bohna	Cieneba
Depth	60+ in	40 to 60 in	4 to 20 in
Available Water Capacity	Moderate to high	Moderate to high	Very low
Total	7 to 10 in	7 to 10 in	1 to 2 in
Upper 20"	3 in	3 in	1 in
Permeability	Moderately slow	Moderately slow	Moderately rapid
Hydrologic Soil Group	B	B	C
Drainage Class	Well drained	Well drained	Somewhat excessively drained
Runoff	Very rapid	Very rapid	Very rapid
Max Erosion Hazard	High	High	Very high
Erosion Factor (K)	0.32	0.28	0.32
Unified Soil Class	SM/SC	ML-CL/CL	SM
Soil & Rock Color	Intermediate	Intermediate	Intermediate
Soil Manageability Class	4E	4E	4EPd
Timber Production			
CMAI (cu ft/acre)	50 to 84*	—	—
Suitability	Poorly suited	Incapable	Incapable
Limiting Factors	Regeneration difficulty—a, c and d, steep slopes, very high erosion hazard		
Range Production			
Seasons of Use	Spring and summer	Spring and summer	Spring and summer
Limiting Factors	Rock outcrop, shallow soils, very steep slopes		
Soil Manageability Group	IV	IV	IV

Included Areas & Remarks

Included in this unit are small areas of Rock outcrop. Included areas make up about 15 percent of the total areas.

The Holland soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown sandy loam about 5 inches thick. The subsoil is pale brown and light yellowish brown sandy clay loam about 55 inches thick over highly weathered granitic rock. In some areas the surface layer is loam

The Bohna soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is brown loam about 19 inches thick. The subsoil is brown sandy clay loam about 24 inches thick over highly weathered granitic rock. In some areas the surface layer is sandy loam.

The Cieneba soil is shallow and formed in residuum derived from granitic rock. The Cieneba soil is pale brown coarse sandy loam about 12 inches deep over highly weathered granitic rock. In some areas the surface layer is sandy loam.

This unit is used mainly as spring-summer range. It is also used for timber production.

* Footnote: Timber production value lower than typical for the Holland series in Sequoia National forest.

713 Jumpe-Chumstick families- Rock outcrop complex, 30 to 60 percent slopes.

Physiographic Location, Elevation, and Precipitation

The map unit is on mountain sides and ridges. The native plant communities are Red Fir Forest, Lodgepole Pine Forest, and White Fir Forest. Elevation is 7,990 to 8,790 feet. The average annual precipitation is about 35 to 39 inches.

This unit is 60 percent Jumpe family soils, 15 percent Chumstick family soils, and 10 percent Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map than separately at the scale used.

Soil Map Unit Components	Jumpe family	Chumstick family	Rock outcrop
Depth	40 to 60 in	6 to 20 in	
Available Water Capacity	Low	Very low	
Total	3 to 5 in	1 to 2 in	
Upper 20"	2 in	2 in	
Permeability	Moderately rapid	Moderate	
Hydrologic Soil Group	B	D	
Drainage Class	Well drained	Well drained	
Runoff	Rapid	Rapid	
Max Erosion Hazard	High	High	
Erosion Factor (K)	0.17	0.32	
Unified Soil Class	SM/GM	SM/GC	
Soil & Rock Color	Low	Low	
Soil Manageability Class	3Ep	3Epd	
Timber Production			
CMAI (cu ft/acre)	50 to 84	20 to 49	
Suitability	Poorly suited	Poorly suited	
Limiting Factors	Regeneration difficulty—a, and d, high erosion hazard		
Range Production			
Seasons of Use	Summer	Summer	
Limiting Factors	Plant competition, steep slopes		
Soil Manageability Group	III	III	

Included Areas & Remarks

Included in this unit are small areas of Baldmoutain soils. Included areas make up about 15 percent of the total area.

The Jumpe family soil is deep and formed in residuum derived from metasedimentary rock. This soil 35 to 90 percent gravel and cobbles. Typically, the surface layer is brown sandy loam about 8 inches thick. The subsoil brown fine sandy loam about 16 inches thick. The substatum is reddish yellow very loam and extremely gravelly and cobbly fine sandy loam about 28 inches thick over fractured metasedimentary rock.

The Chumstick family soil is shallow and formed in residuum derived from metamorphic rock. This soil is 35 to 65 percent gravel and cobbles. Typically, the surface layer is brown gravelly loam about 6 inches thick. The subsoil is brown gravelly and very gravelly loam about 11 inches thick over weathered, hard metamorphic rock. In some areas surface layer is clay loam.

Rock outcrop occurs as isolated outcroppings and massive exposures of metamorphic rock.

This unit is used for timber production and as limited summer range.

725 Dome-Rock outcrop-Chaix complex, 30 to 50 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountain sides and ridges. The native plant communities are Yellow Pine Forest, and Montane Chaparral. Elevation is 5,910 to 7,220 feet. The average annual precipitation is about 30 to 45 inches.

This unit is 40 percent Dome soils, 30 percent Rock outcrop, and 20 percent Chaix soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components	Dome	Rock outcrop	Chaix
Depth	40 to 60 in		20 to 40 in
Available Water Capacity	Moderate to low		Low
Total	5 to 6 in		1 to 3 in
Upper 20"	2 in		1 in
Permeability	Moderately rapid		Moderately rapid
Hydrologic Soil Group	B		B
Drainage Class	Well drained		Well drained to somewhat excessively drained
Runoff	Rapid		Rapid
Max Erosion Hazard	High		High
Erosion Factor (K)	0.20		0.24
Unified Soil Class	SM		SM
Soil & Rock Color	Intermediate		Intermediate
Soil Manageability Class	3Ep		4EP
Timber Production			
CMAI (cu ft/acre)	85 to 164		50 to 84
Suitability	Suitable		Suitable
Limiting Factors	Regeneration difficulty—d and f, high erosion hazard		
Range Production			
Seasons of Use	Summer		Summer
Limiting Factors	Plant competition, rock outcrop, steep slopes		
Soil Manageability Group	III		III

Included Areas & Remarks

Included in this unit are small areas of Holland soils. Included areas make up about 10 percent of the total area.

The Dome soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is grayish brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 21 inches thick. The substratum is very pale sandy loam about 22 inches thick over highly weathered granitic rock. In areas the surface layer is coarse sandy loam.

Rock outcrop occurs as isolated outcroppings and massive exposures of metamorphic rock.

The Chaix soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface is brown sandy loam about 7 inches thick. The subsoil is brown sandy loam about 19 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

This unit is used mainly for timber production and as limited summer range.

726 Dome-Rock outcrop-Chaix complex, 50 to 75 percent slopes.

Physiographic Location, Elevation, and Precipitation

This map unit is on mountain sides and ridges. The native plant communities are Yellow Pine Forest, White Fir Forest, and Montane Chaparral. Elevation is 4,760 to 7,220 feet. The average annual precipitation is about 24 to 39 inches.

This unit is 40 percent Dome soils, 30 percent Rock outcrop, and 25 percent Chaix soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Soil Map Unit Components	Dome	Rock outcrop	Chaix
Depth	40 to 60 in		20 to 40 in
Available Water Capacity	Moderate		Low
Total	5 to 6 in		1 to 3 in
Upper 20"	2 in		1 in
Permeability	Moderately rapid		Moderately rapid
Hydrologic Soil Group	B		B
Drainage Class	Well drained		Well drained to somewhat excessively drained
Runoff	Slow		Slow
Max Erosion Hazard	High		High
Erosion Factor (K)	0.20		0.24
Unified Soil Class	SM		SM
Soil & Rock Color	Intermediate		Intermediate
Soil Manageability Class	3Ep		4EP
Timber Production			
CMAI (cu ft/acre)	85 to 164		50 to 84
Suitability	Suitable		Poorly suited
Limiting Factors	Regeneration difficulty—d and f, very steep slopes, high erosion hazard		
Range Production			
Seasons of Use	Summer		Summer
Limiting Factors	Very steep slopes, rock outcrop, plant competition		
Soil Manageability Group	IV		IV

Included Areas & Remarks

Included in this unit are small areas of Holland soils. Included areas make up about 5 percent of the total area.

The Dome soil is deep and formed in residuum derived from granitic rock. Typically, the surface layer is grayish brown sandy loam about 7 inches thick. The subsoil is pale brown sandy loam about 21 inches thick. The substratum is very pale sandy loam about 22 inches thick over highly weathered granitic rock. In areas the surface layer is coarse sandy loam.

Rock outcrop occurs as isolated outcroppings and massive exposures of metamorphic rock.

The Chaix soil is moderately deep and formed in residuum derived from granitic rock. Typically, the surface is brown sandy loam about 7 inches thick. The subsoil is brown sandy loam about 19 inches thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam.

This unit is used mainly for timber production and as limited summer range.

Notice

The soil map unit descriptions in this reprint have been updated and printed in a more compact form. Most map units took two pages in the previous version of this document, now each map unit takes only one page. The map unit descriptions in this reprint end on page 140, instead of page 241 as they did in the previous version.

The rest of this document has been reprinted without change (including the page numbers), creating a gap in the *numbering* of the pages only. This is the reason page numbers 141 through 240 are omitted in this reprint.

Map symbol	Map unit name	Acres	Percent
303	Monache Variant, drained-Monache association, gently sloping	12,560	0.9
306	Monache Variant, drained, warm-Junipero family association, gently sloping	3,205	0.2
309	Monache-Tyoic Haloxerolls-Cagwin Vaiant association, sloping	4,949	0.4
310	Cagwin Variant loamy coarse sand, 5 to 15 percent slopes	3,366	0.2
311	Cannell-Nanny family-Monache Variant association moderately steep	3,571	0.3
400	Rock outcrop	90,456	6.7
404	Rock outcrop-Xerorthents association, steep	2,881	0.2
409	Rock outcrop-Toem-Sirretta complex, 10 to 30 percent slopes	13,586	1.0
410	Rock outcrop-Toem complex, 30 to 50 percent slopes,	28,566	2.1
411	Rock outcrop-Toem complex, 50 to 75 percent slopes,	11,994	0.9
414	Rock outcrop-Chualar family complex, 50 to 75 percent slopes	3,699	0.3
419	Rock outcrop-Cieneba complex, 30 to 50 percent slopes	3,326	0.2
420	Rock outcrop-Cieneba complex, 50 to 75 percent slopes	40,295	3.0
421	Rock outcrop-Tollhouse complex, 15 to 30 percent slopes	19,946	1.5
422	Rock outcrop-Tollhouse complex, 30 to 50 percent slopes	19,331	1.4
423	Rock outcrop-Tollhouse complex, 50 to 75 percent slopes	15,721	1.2
429	Rock outcrop-Cieneba-Chawanakee complex, 30 to 75 percent slopes	9,948	0.7
430	Rock outcrop-Chawanakee-Chaix complex, 15 to 30 percent slopes	11,354	0.8
431	Rock outcrop-Chawanakee-Chaix complex, 30 to 50 percent slopes	2,399	0.2
432	Rock outcrop-Chawanakee-Chaix complex, 50 to 75 percent slopes	12,763	0.9
434	Rock outcrop-Baldmountain complex, 30 to 50 percent slopes	2,224	0.2
435	Rock outcrop-Baldmountain complex, 50 to 75 percent slopes	11,391	0.8
443	Rubble land-Xerorthents complex, 5 to 30 percent slopes	2,790	0.2
444	Rock outcrop-Brader-Siskiyou families complex, 20 to 60 percent slopes	7,114	0.6
445	Rock outcrop-Cieneba-Brader family complex, 50 to 75 percent slopes	51,459	3.9

Map symbol	Map unit name	Acres	Percent
446	Siskiyou-Brader families-Rock outcrop complex, 5 to 30 percent slopes	14,164	1.2
447	Siskiyou family-Rock outcrop-Brader family complex, 30 to 75 percent slopes	29,696	2.3
500	Tollhouse-Rock outcrop complex, 10 to 30 percent slopes	18,594	1.4
501	Tollhouse-Rock outcrop complex, 30 to 50 percent slopes	8,794	0.6
502	Tollhouse-Rock outcrop complex, 50 to 75 percent slopes	15,676	1.2
503	Tollhouse-Chaix association, moderately steep	8,139	0.6
509	Chaix-Wind River family-Tollhouse association, sloping	73,042	0.5
601	Brownlee family-Hotaw Variant complex, 30 to 50 percent slopes	7,514	0.6
603	Cannell-Sirretta-Nanny family complex, 5 to 30 percent slopes	32,491	2.4
604	Cannell-Sirretta-Nanny family complex, 30 to 50 percent slopes	15,931	1.2
606	Toem-Rock outcrop-Cagwin complex, 5 to 30 percent slopes	23,596	1.7
607	Toem-Rock outcrop-Cagwin complex, 30 to 75 percent slopes	50,774	3.8
609	Cagwin-Toem-Rock outcrop complex, 5 to 30 percent slopes	43,747	3.3
610	Cagwin-Toem-Rock outcrop complex, 30 to 50 percent slopes	24,510	1.8
611	Cagwin-Toem-Rock outcrop complex, 50 to 75 percent slopes	18,241	1.3
612	Baldmountain-Rock outcrop-Jumpe family complex, 5 to 30 percent slopes	6,370	0.5
613	Baldmountain-Rock outcrop-Jumpe family complex, 30 to 50 percent slopes	7,964	0.6
618	Chaix-Chawanakee-Rock outcrop complex, 5 to 30 percent slopes	17,826	1.3
619	Chaix-Rock outcrop-Chawanakee complex, 30 to 50 percent slopes	27,967	2.0
620	Chaix-Rock outcrop-Chawanakee complex, 50 to 75 percent slopes	12,918	0.9
621	Dome-Chaix-Rock outcrop association, moderately steep	27,690	2.0
622	Dome-Chaix-Rock outcrop association, steep	13,919	1.0
624	Sirretta-Rock outcrop-Cannell complex, 5 to 30 percent slopes	1,885	0.1
625	Sirretta-Rock outcrop-Nanny family complex, 30 to 50 percent slopes	7,561	0.5
628	Nanny family-Toem complex, 30 to 50 percent slopes	2,535	0.1

Map symbol	Map unit name	Acres	Percent
631	Chesaw family-Toem-Rock outcrop complex, 30 to 50 percent slopes	2,501	0.2
635	Hotaw Variant-Brownlee family-Rock outcrop complex, 40 to 75 percent slopes	2,629	0.2
638	Sirretta-Rock outcrop complex, 50 to 75 percent slopes	62,313	4.6
639	Cagwin-Toem-Monache association, moderately steep	7,682	0.6
640	Cagwin-Toem-Monache association, steep	3,840	0.3
643	Glean Variant extremely gravelly fine sandy loam, 20 to 60 percent slopes	4,401	0.3
645	Cannell-Kriest family-Rock outcrop complex, 5 to 30 percent slopes	10,410	1.8
646	Cannell-Kriest family-Rock outcrop complex, 30 to 50 percent slopes	11,391	0.8
647	Cannell-Kriest family-Rock outcrop complex, 50 to 75 percent slopes	2,864	0.2
648	Kriest family-Cannell-Rock outcrop complex, 5 to 30 percent slopes	4,171	0.3
651	Shaver-Holland association, moderately steep	2,691	0.2
655	Wind River family-Shaver association, steep	1,915	0.1
657	Chaix-Dome-Holland association, moderately steep	2,520	0.2
658	Chaix-Dome-Holland association, steep	4,759	0.3
660	Shaver-Chaix association, moderately steep	6,071	0.4
661	Shaver-Chaix association, steep	3,279	0.2
662	Shaver-Chaix association, very steep	1,910	0.1
663	Chawanakee-Rock outcrop-Chaix complex, 5 to 30 percent slopes	4,650	0.3
664	Chawanakee-Rock outcrop-Chaix complex, 30 to 50 percent slopes	27,139	2.0
665	Chawanakee-Rock outcrop-Chaix complex, 50 to 75 percent slopes	9,664	0.7
666	Wind River family-Rock outcrop association, moderately steep	3,820	0.3
667	Wind River family-Rock outcrop association, steep	1,320	0.1
670	Chaix-Dome-Rock outcrop complex, 30 to 50 percent slopes	22,036	1.6
671	Chaix-Dome-Rock outcrop complex, 50 to 75 percent slopes	4,465	0.3
672	Dome-Chaix association, moderately steep	7,371	0.5
673	Dome-Chaix association, steep	2,261	0.2
674	Dome-Chaix association, very steep	1,740	0.1
675	Woolstalf-Rock outcrop complex, 10 to 30 percent slopes	1,720	0.1
676	Woolstalf-Rock outcrop complex, 30 to 50 percent slopes	14,080	1.0
677	Woolstalf-Rock outcrop complex, 50 to 75 percent slopes	1,930	0.1

Map symbol	Map unit name	Acres	Percent
679	Woolstalf-Hotaw Variant complex, 30 to 50 percent slopes	1,124	0.1
680	Woolstalf-Hotaw Variant-Rock outcrop complex, 50 to 75 percent slopes	7,840	0.6
681	Boomer-Crozier-Rock outcrop complex, 5 to 40 percent slopes	7,220	0.5
685	Holland-Shaver association, steep	3,220	0.2
687	Wind River family-Dome-Rock outcrop association, moderately steep	1,779	0.1
690	Holland-Dome-Chaix association, moderately steep	4,201	0.3
693	Holland-Hotaw association, moderately steep	12,595	0.9
694	Holland-Hotaw association, steep	7,734	0.6
696	Chaix-Rock outcrop-Dome complex, 10 to 30 percent slopes	2,511	0.2
697	Chaix-Rock outcrop-Dome complex, 30 to 50 percent slopes	10,586	0.8
698	Chaix-Rock outcrop-Dome complex, 50 to 75 percent slopes	5,886	0.4
700	Holland-Bohna association, steep	4,749	0.3
701	Holland-Bohna-Cieneba association, very steep	2,251	0.2
713	Jumpe-Chumstick families-Rock outcrop complex, 30 to 60 percent slopes	3,010	0.2
725	Dome-Rock outcrop-Chaix complex, 20 to 50 percent slopes	4,220	0.3
726	Dome-Rock outcrop-Chaix complex, 50 to 75 percent slopes	4,129	0.3
	TOTAL	1,360,577	

Table 3. - Soil Components in Map Units

Component name	Named Primary Component	Named Inclusion
Auberry	105,112,114,119,120, 212,213,224,225	125,685
Baldmountain	434,435,612,613	666,667,675,676, 677,713
Bohna	106,107,700,701	
Boomer	681	
Brader family	444,445,446,447	
Brownlee family	601,635	679,680
Cagwin	606,607,609,610,611 639,640	303,409,410,411,430, 431,432,434,435,603, 604,612,613,631,638, 666,667,680
Cagwin Variant	309,310	303
Cannell	311,603,604,624,645, 646,647,648	303,409,435,606,607, 609,610,611,612,613, 625,639,640
Chaix	430,431,432,503,509, 618,619,620,621,622, 657,658,660,661,662, 663,664,665,670,671 672,673,674,690,696, 697,698,726	212,213,306,421,422, 429,444,446,447,500, 624,625,651,675,676, 677,685,687,693,694
Chawanakee	429,430,431,432,618, 619,620,663,664,665	212,213,444,445,446, 447,621,622,657,660, 661,662,670,671,672, 673,674,684,685,687, 690,693,694,694,697, 698
Chawanakee Variant	122,123	
Chesaw family	219,221,631	309,310
Chualar family	203,205,414	201,202,236,238,419, 420,635

Component name	Named Primary Component	Named Inclusion
Chumstick family	713	
Cieneba	201,202,212,213, 419,420,429,445,	105,106,107,112,114, 125,203,205,224,225, 414,421,422,423,501, 502,700
Crozier	681	
Dome	621,622,657,658,670, 671,672,673,674,687, 690,696,697,698,725 726	302,306,430,431,432, 444,446,447,618,619, 620,624,625,663,664 665,675,676,677
Glean Variant	643	
Gullied lands		125
Holland	112,114,651,657,658, 685,690,693,694,700,	302,618,619,620,621, 635,655,660,661,662, 670,671,696,697,698, 725,726
Hotaw	693,694	651,690
Hotaw Variant	601,635,679,680	
Jumpe family	612,613,713	
Junipero family	306	621,622
Kanaka family	116,119,120,122, 123	
Kriest family	645,646,647,648	
Livermore family	236,238	
Millerton family	116	
Monache	221,303,309,639,640 610	603,604,606,607,609,
Monache Variant	311	
Monache Variant, drained	303	310,603,604,606,607, 609,610,639,640,

Component name	Named Primary Component	Named Inclusion
Monache Variant, drained, warm	302,306	660,661,662,685,687, 690
Nanny family	219,221,311,603, 604,625,628	309,310,409,606,607, 609,610,611,612,613, 624,631
Riverwash	300	
Rock outcrop	116,119,120,122,123, 125,200,201,202,203, 205,212,213,219,236, 238,400,401,402,404, 409,410,411,414,419, 420,421,422,428,429, 430,431,432,434,435, 500,501,502,606,607, 609,610,611,612,613, 619,620,621,622,624, 625,628,631,635,638, 645,646,647,648,663, 664,665,666,667,670, 671,677,680,687,696, 697,698,713,714,724, 725	105,106,107,112,114, 221,224,225,302,311, 443,503,509,601,603, 604,643,651,657,658, 660,661,662,672,673, 674,684,685,690,693, 694,701,702,703
Rubble land	443	
Shallow Soils		116,125,679,680,681
Shaver	651,660,661,662,685	635,665,693,694
Shaver Variant	125	
Sirretta	409,603,604,624,625, 638	313,606,607,609,610, 611
Siskuyou		
Toem	409,410,411,606,607, 609,610,611,628,631, 639,640	303,430,431,432,434, 435,603,604,612,613, 638,645,646,647,666, 667,680
Tollhouse	421,422,423,500,501, 502,503,509	125,200,201,202,419, 428,429,430,434,
Tollhouse Variant	125	

Component name	Named Primary Component	Named Inclusion
Typic Haploxerolls	309	
Wind River family	302,509,655,666,667, 687	212,213,434
Woolstalf	675,676,677,679,680	663,664,665,666,667, 672,673,674
Xerofluvent	301,302	203,205
Xerorthents	300,301,404,443	

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 4, the soils of the survey area are listed alphabetically and are classified according to the system. In table 5, 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 a word ending in "soil". 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 inter-grades 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 king of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective "Lithic" identifies the subgroup that has hard parent rock within 50 centimeters of the surface. An example is Lithic 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 loamy, mixed, thermic Lithic Hapoloxeralfs.

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.

Table 7 lists laboratory and field analysis for selected soils. The levels of base saturation and organic carbon are used to place the soils in the classification categories. After the analysis with field kits, duplicate samples of selected soils were sent to the National Soil Survey Laboratory for verification. All samples were from the typical pedon except for the Chaix and Cagwin series.

Table 4. - Classification by Soil Name

Soil name	Family or higher taxonomic class
Auberry*	Fine-loamy, mixed, thermic Ultic Haploxeralfs
Baldmountain	Coarse-loamy, mixed, frigid Ultic Haploxerolls
Bohna	Fine-loamy, mixed, thermic Typic Argixerolls
Boomer	Fine-loamy, mixed, mesic Ultic Haploxeralfs
Brader family	Loamy, mixed, mesic, shallow Typic Xerochrepts
Brownlee family	Fine-loamy, mixed, mesic Ultic Argixerolls
Cagwin	Mixed, frigid Dystric Xeropsamments
Cagwin Variant	Mixed, frigid Dystric Xeropsamments
Cannell	Coarse-loamy, mixed, frigid Dystric Xerochrepts
Chaix*	Coarse-loamy, mixed, mesic Dystric Xerochrepts
Chawanakee	Loamy, mixed, mesic, shallow Dystric Xerochrepts
Chawanakee Variant	Loamy, mixed, thermic, shallow Dystric Xerochrepts
Chesaw family	Sandy-skeletal, mixed, frigid Entic Haploxerolls
Chualar family	Fine-loamy, mixed, thermic Typic Argixerolls
Chumstick family	Loamy-skeletal, mixed, frigid Lithic Xerochrepts
Cieneba	Loamy, mixed, nonacid, thermic, shallow Typic Xerorthents
Crozier	Fine-loamy, mixed, mesic Ultic Haploxeralfs
Dome	Coarse-loamy, mixed, mesic Dystric Xerochrepts
Glean Variant	Loamy-skeletal, mixed, frigid Entic Ultic Haploxerolls
Holland*	Fine-loamy, mixed, mesic Ultic Haploxeralfs
Hotaw	Fine-loamy, mixed, mesic Ultic Haploxeralfs
Hotaw Variant	Fine-loamy, mixed, mesic Ultic Haploxeralfs
Jumpe family	Loamy-skeletal, mixed, frigid Dystric Xerochrepts
Junipero family	Coarse-loamy, mixed, mesic Pachic Ultic Haploxerolls
Kanaka family	Coarse-loamy, mixed, thermic Dystric Xerochrepts
Kriest family	Coarse-loamy, mixed, frigid Dystric Xerochrepts
Livermore family	Loamy-skeletal, mixed, thermic Typic Haploxerolls
Millerton family	Loamy, mixed, thermic Lithic Haploxeralfs
Monache	Coarse-loamy, mixed, frigid cumulic Ultic Haploxerolls
Monache Variant	Coarse-loamy, mixed, frigid Cumulic Haplaquolls
Nanny family	Loamy-skeletal, mixed, frigid Typic Xerumbrepts
Shaver	Coarse-loamy, mixed, mesic Pachic Xerumbrepts
Shaver Variant	Coarse-loamy, mixed, thermic Pachic Ultic Haploxerolls
Sirretta	Sandy-skeletal, mixed, frigid Dystric Xerorthents
Siskiyou family	Coarse-loamy, mixed, mesic Typic Xerochrepts
Toem	Mixed, frigid, shallow Dystric Xeropsamments
Tollhouse	Loamy, mixed, mesic, shallow Entic Haploxerolls
Tollhouse Variant	Loamy, mixed, thermic, shallow Entic Haploxerolls
Wind River family	Coarse-loamy, mixed, mesic Ultic Haploxerolls
Woolstalf	Loamy-skeletal, mixed, mesic Pachic Ultic Haploxerolls

* Indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series.

Table 5. - Classification by Taxonomic Category

Order	Suborder	Great Group	Subgroup	Family	Soil Name
ALFISOLS	Xeralfs	Haploxeralfs	Lithic Haploxeralfs	loamy, mixed, thermic	Millerton family
			Ultic Haploxeralfs	fine-loamy, mixed, mesic	Boomer
					Crozier
					Holland
					Hotaw
					Hotaw Variant
				fine-loamy, mixed, thermic	Auberry
ENTISOLS	Fluvents	Xerofluvents			Xerofluvents
	Orthents	Xerorthents			Xerorthents
			Typic Xerorthents	loamy, mixed, nonacid, thermic shallow	Cienaba
			Dystric Xerorthents	sandy-skeletal, mixed, frigid	Sirretta
	Psamments	Xeropsamments	Dystric Xeropsamments	mixed, frigid	Cagwin
					Cagwin Variant
				mixed, frigid, shallow	Toem
INCEPTISOLS	Ochrepts	Xerochrepts	Typic Xerochrepts	loamy, mixed, mesic, shallow	Brader family
				coarse-loamy, mixed, mesic	Siskiyou family
			Dystric Xerochrepts	loamy-skeletal, mixed, frigid	Jumpe family
				loamy, mixed, mesic, shallow	Chawanakee
				loamy, mixed, thermic, shallow	Chawanakee Var.
				coarse-loamy, mixed, frigid	Cannell
					Kriest family
				coarse-loamy, mixed, mesic	Chaix
					Dome
				coarse-loamy, mixed thermic	Kanaka family
			Lithic Xerochrepts	loamy-skeletal, mixed, frigid	Chumstick family
	Umbrepts	Xerumbrepts	Typic Xerumbrepts	loamy-skeletal, mixed, frigid	Nanny family
			Pachic Xerumbrepts	coarse-loamy, mixed, mesic	Shaver

Order	Suborder	Great Group	Subgroup	Family	Soil Name
MOLLISOLS	Aquolls	Haplaquolls	Cumulic Haplaquolls	coarse-loamy, mixed, frigid	Monache Variant
	Xerolls	Argixerolls	Typic Argixerolls	fine-loamy, mixed, thermic	Bohna
					Chualar family
			Ultic Argixerolls	fine-loamy, mixed, mesic	Brownlee family
		Haploxerolls	Typic Haploxerolls		Typic Haploxerolls
				loamy-skeletal, mixed, thermic	Livermore family
			Cumulic Ultic Haploxerolls	coarse-loamy, mixed, frigid	Monache
			Entic Haploxerolls	sandy-skeletal, mixed, frigid	Chesaw family
				loamy, mixed, mesic, shallow	Tollhouse
			Entic Ultic Haploxerolls	loamy, mixed, thermic, shallow	Tollhouse Var.
				loamy-skeletal, mixed, frigid	Glean Variant
			Pachic Ultic Haploxerolls	loamy-skeletal, mixed, mesic	Woolstalf
				coarse-loamy, mixed, mesic	Junipero family
				coarse-loamy, mixed, thermic	Shaver Variant
			Ultic Haploxerolls	coarse-loamy, mixed, frigid	Baldmountain
				coarse-loamy, mixed, mesic	Wind River fam.

TABLE 6 -- KEY FOR SOIL IDENTIFICATION

[The symbol < means less than; > means more than]

Soil Name	Parent material: Metamorphic rock	Parent material: Granitic rock	Parent material: Basic igneous rock	Parent material: Alluvium	Depth cm: <50	Depth cm: 50-100	Depth cm: >100	Diagnostic horizons: Epipedon: Mollic <50cm	Diagnostic horizons: Epipedon: Mollic >50cm	Diagnostic horizons: Epipedon: Umbric <50cm	Diagnostic horizons: Epipedon: Umbric >50cm	Diagnostic horizons: Epipedon: Ochric	Diagnostic horizons: Sub-surface: None	Diagnostic horizons: Sub-surface: Cambic	Diagnostic horizons: Sub-surface: Argillic	Particle size class: Sandy-skeletal	Particle size class: Loamy-skeletal	Particle size class: Sandy	Particle size class: Loamy	Particle size class: Coarse-loamy	Particle size class: Fine-loamy	Drainage class: Poorly	Drainage class: Somewhat poorly	Drainage class: Moderately well
SOILS OF THE LOWER MONTANE ZONE UNDER PINYON-JUNIPER WOODLAND OR SAGEBRUSH SCRUB PLANT COMMUNITIES (MESIC)																								
Tollhouse	●	●			●			●					●						●					
SOILS OF MONTANE MEADOWS AND MEADOW EDGES																								
Typic Haploxerolls				●			●	●						●						●				●
Monache Variant				●			●		●				●	●						●	●			
Monache Variant, drained				●			●		●				●	●						●		●		
Monache				●			●		●				●	●						●				●
Junipero family				●			●		●				●	●						●				●
SOILS OF THE UPPER MONTANE AND SUBALPINE ZONES UNDER RED FIR FOREST, MONTANE CHAPARRAL, LODGEPOLE PINE FOREST, WHITE FIR FOREST, OR FOXTAIL-LIMBER PINE FOREST PLANT COMMUNITIES (FRIGID)																								
Chumstick family	●				●							●		●			●							
Baldmountain	●						●	●						●						●				
Jumpe family	●						●					●		●			●							
Toem		●			●							●	●					●						
Chesaw family	●	●				●		●					●			●				●				
Nanny family		●					●			●					●		●							
Sirretta		●				●						●	●			●								
Cagwin		●				●						●	●					●						
Kriest family		●				●						●			●					●				
Cagwin Variant		●					●					●	●					●						
Cannell		●					●					●			●					●				
Glean Variant			●			●		●					●				●							

TABLE 6 -- KEY FOR SOIL IDENTIFICATION

[The symbol < means less than; > means more than]

Soil Name	Parent material: Metamorphic rock	Parent material: Granitic rock	Parent material: Basic igneous rock	Parent material: Alluvium	Depth cm: <50	Depth cm: 50-100	Depth cm: >100	Diagnostic horizons: Epipedon: Mollic <50cm	Diagnostic horizons: Epipedon: Mollic >50cm	Diagnostic horizons: Epipedon: Umbric <50cm	Diagnostic horizons: Epipedon: Umbric >50cm	Diagnostic horizons: Epipedon: Ochric	Diagnostic horizons: Sub-surface: None	Diagnostic horizons: Sub-surface: Cambic	Diagnostic horizons: Sub-surface: Argillic	Particle size class: Sandy-skeletal	Particle size class: Loamy-skeletal	Particle size class: Sandy	Particle size class: Loamy	Particle size class: Coarse-loamy	Particle size class: Fine-loamy	Drainage class: Poorly	Drainage class: Somewhat poorly	Drainage class: Moderately well
SOILS OF THE FOOTHILL ZONE UNDER FOOTHILL WOODLAND OR MIXED CHAPARRAL PLANT COMMUNITIES (THERMIC)																								
Livermore family	●					●		●						●			●							
Chualar family	●		●			●		●							●					●				
Tollhouse Variant		●			●			●					●						●					
Cieneba		●			●							●	●						●					
Chawanakee Variant					●							●		●					●					
Millerton family		◗			●							●			●				●					
Shaver Variant		●				●			●				●	●						●				
Kanaka family		●				●						●		●						●				
Bohna		●					●	●							●					●				
Auberry							●					●			●					●				
SOILS OF THE LOWER MONTANE ZONE UNDER YELLOW PINE FOREST, MONTANE CHAPARRAL, WHITE FIR FOREST, OR MIXED CONIFER FOREST PLANT COMMUNITIES (MESIC)																								
Hotaw Variant	●					●						●			●					●				
Wind River family	●						●	●						●						●				
Woolstalf	●						●		●				●	●			●							
Brownlee family	●						●	●							●					●				
Chawanakee		●			●							●		●					●					
Chaix		●				●						●		●						●				
Hotaw		●				●						●			●					●				
Shaver		●					●			●			●	●						●				
Dome		●					●					●		●						●				
Holland		●					●					●			●					●				
Crozier			◗			●						●			●					●				
Boomer			●				●					●			●					●				

Table 7. - Laboratory and Field Analysis for Selected Soils

[Absence of an entry indicates that the soil was not rated]

Soil Name	Depth (inches)	Horizon	Percentage of base saturation			Percentage of organic carbon	
			NSSL (1)		Hach Kit	NSSL	La Motte Kit
			Sum	NH40AC	(2)	(1)	(3)
Auberry	14-21	B21t			60		
	21-30	B22t			63		
	30-41	B23t			69		
Baldmountain	0-8	A1	45	56	58		1.60
	3-8	B21	63	69	69	0.53	
	21-35	B22			83		
Bohna	0-8	A11/ A12	85	100	84	2.46	3.77
	8-19	B1	80	98	92	0.79	1.21
	19-36	B21t			82		
Boomer	13-19	B21t			67		
	19-25	B22t			74		
Brownlee fam	0-7	A11			58		
	7-15	A12			63		
Cagwin	3-9	A12			25		
	9-27	A13			0		
Cannell	0-7	A1	55	57		0.47	0.63
	7-27	B2	75	83			
Chaix	11-26	B22			50		
Chawanakee Var	7-18	B2			56		
Chesaw family	0-16	A1			75		
Chualar fam	9-29	B21t/ B22t			83		
Dome	7-28	B2			55		
Kanaka family	9-19	B2			63		
	19-26	C1			57		
Kriest family	5-14	B1			27		
	14-33	B2			42		
Nanny family	0-6	A1			31		3.90
	6-16	B21	37	49	37	1.42	1.45
Shaver	0-4	A11			44		
	4-14	A12			61		
	14-43	A13			55		2.38
Shaver Variant	0-4	A11			67		
	4-8	A12			60		
	8-20	B21			57		
Sirretta	0-6	A1			35		
Tollhouse Var	0-5	A11			67		
	5-11	A12			71		
Wind River fam	0-12	A1	67	80	68	1.58	2.24
	12-22	B2	72	81	69	1.06	
	22-33	B3	77	88	75		

Soil Name	Depth (inches)	Horizon	Percentage of base saturation			Percentage of organic carbon	
			NSSL (1)		Hach Kit	NSSL	La Motte Kit
			Sum	NH40AC	(2)	(1)	(3)
Woolstalf	0-6	A11	46	61	54		
	6-15	A12	45	58	55		
	10					3.30	5.28
	20					1.51	2.26
	15-27	A13			53		

[1] Soil Conservation Service, National Soil Survey Laboratory, Lincoln, NE
[2] Soil Analysis Kit, Model SA2, Hach Chemical Company.
[3] La Motte Organic Matter Outfit, Model ST-1001-OR.

Table 8. - Soil Component Area and Proportionate Extent

Component Name	Acres	Percent of Total
Auberry	45,066	3.3
Baldmountain	13,526	1.0
Bohna	13,440	1.0
Boomer	3,499	0.3
Brader family	16,047	1.1
Brownlee family	5,570	0.4
Cagwin	67,614	5.0
Cagwin Variant	3,627	0.3
Cannell	41,710	3.1
Chaix	83,117	6.1
Chawanakee	43,853	3.3
Chawanakee Variant	736	*
Chesaw family	5,587	0.4
Chualar family	19,652	1.4
Chumstick family	460	*
Cieneba	83,164	6.1
Crozier	450	*
Dome	49,304	3.6
Glean Variant	3,963	0.3
Gullied land	163	*
Holland	32,699	2.4
Hotaw	14,658	1.1
Hotaw Variant	3,536	0.3
Jumpe family	4,673	0.3
Junipero family	3,232	0.3
Kanaka family	2,871	0.2
Kriest family	6,603	0.5
Livermore family	9,321	0.7
Millerton family	2,179	0.2
Monache	17,304	1.3
Monache Variant	899	*
Monache Variant, drained	10,692	0.8
Monache Variant, drained, warm	2,982	0.2
Nanny family	23,220	1.7
Riverwash	1,076	0.2
Rock outcrop	465,366	34.2
Rubble land	1,374	0.1
Shallow soils	1,379	0.1
Shaver	8,186	0.6
Shaver Variant	662	*
Sirretta	51,747	8.0
Siskiyou family	22,222	1.6

Component Name	Acres	Percent of Total
Toem	85,971	6.3
Tollhouse	45,340	3.4
Tollhouse Variant	1,307	0.1
Typic Haploxerolls	999	*
Wind River family	9,099	0.7
Woolstalf	16,961	1.3
Xerofluvents	6,099	0.5
Xerorthents	5,792	0.4
Total	13,606,853	100.0

* Less than 0.1%.

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 (12). unless otherwise stated, colors in the descriptions are for dry soil. Following the pedon description is the range of important characteristics of the soil. The soil is compared with other soils in the same taxonomic family and with soils in other closely related families. The soil is also compared with other soils that are associated geographically.

The map units of each soil are listed in Table 2 and are described in the section "Detailed soil map units."

Table 8 lists the area of each soil and map unit component, and identifies its proportionate extent of the survey area.

AUBERRY SERIES

The Auberry series consists of deep, well drained soils on foothills, canyon sides, and mountain sides. These soils formed in residuum derived from granitic rock. Slope ranges from 10 to 75 percent. The main plant communities are Foothill Woodland and Mixed Chaparral. The elevation is 1,600 to 5,000 feet. The average annual precipitation is 16 to 40 inches, and the average annual growing season is 180 to 300 days.

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

Typical pedon of Auberry series in a unit of Rock outcrop-Auberry-Kanaka family association, steep, in Sequoia National Forest, Tulare County, Tule River Ranger District; on east side of dirt road, 60 steps north of bunkers which are 0.2 miles north of Highway 190; dirt road services pipeline and is 0.6 miles east of Coffee Camp Campground; in the NW1/4, NW1/4 of sec. 28, T.20S., R.30E.

01–2 inches to 0; annual grass and oak litter mixed with soil material.

A1–0 to 7 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine interstitial pores and few very fine tubular pores; medium acid; gradual smooth boundary.

A3–7 to 14 inches; brown (7.5YR 5/4) sandy clay loam, dark brown (7.5YR 3/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few fine and common medium roots; many very fine interstitial pores, common very fine and fine tubular pores, and few medium tubular pores; medium acid; gradual smooth boundary.

B21t–14 to 21 inches; brown (7.5YR 5/4) sandy clay loam, dark brown (7.5YR 3/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few fine and coarse roots; many very fine interstitial pores and common very fine and medium tubular pores; very few thin clay films as bridges between mineral grains, common colloid stains on mineral grains; medium acid; clear smooth boundary.

B22t–21 to 30 inches; brown (7.5YR 5/4) sandy clay loam, dark brown (7.5YR 3/4) moist; moderate medium and coarse subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few medium and coarse roots; many very fine tubular pores and common fine and medium tubular pores; common thin reddish brown (5YR 5/3) clay films in pores and common moderately thick reddish brown (5YR 5/3) clay films on faces of peds; medium acid; gradual smooth boundary.

B23t–30 to 41 inches; brown (7.5YR 5/4) clay loam, dark brown (7.5YR 4/4) moist; moderate medium and coarse subangular blocky structure; hard, friable, slightly sticky and plastic; few fine roots; common very fine and few fine tubular pores; common moderately thick reddish brown (5YR 5/3) clay films on faces of peds and few thin clay films lining tubular pores; medium acid; clear smooth boundary.

Cr–41 inches; reddish yellow (7.5YR 6/6) weathered granitic materials that has relic rock structure; thin and moderately thick reddish brown (5YR 4/4) clay films in joints.

Range in Characteristics: Depth to a paralithic contact is 40 to 70 inches. The profile ranges from 0 to 10 percent gravel. It is slightly acid or medium acid.

The A1 horizon has dry color of 10YR or 7.5YR 5/3, 5/4, or 6/3 and moist color of 10YR or 7.5YR 3/2, 3/3, 4/3, or 4/4. It is coarse sandy loam, sandy loam, or loam. The A1 horizon ranges from 15 to 18 inches in thickness.

The B2t horizon has dominant dry colors of 10YR or 7.5YR. 4/3, 4/4, 5/3, 5/4, 5/6, 6/3, or 6/4 and moist color of 10YR or 7.5YR. 3/3, 3/4, 3/6, 4/3, 4/4, or 4/6. In some areas the color ranges to 5YR. The B2t horizon is clay loam or sandy clay loam. The base saturation ranges from 60 to 69 percent.

Competing soils: These are the Bohna, Boomer, Brownlee family, Chualar family, Crozier, Holland, and Hotaw soils in other families. Bohna soils have a mollic epipedon. Boomer, Brownlee family, Crozier, Holland and Hotsaw soils occur in the montane coniferous forest communities of Yellow Pine Forest and White Fir Forest. Boomer soils formed in basalt. Brownlee family soils formed in metamorphic rock. Chualar family soils are moderately deep and formed in metamorphic rock. Crozier soils are moderately deep and formed in basalt. Hotaw soils are moderately deep.

Geographically associated soils: These are the Cieneba, Kanaka family, Millerton family, Shaver Variant, and Tollhouse Variant soils, and the competing Holland soils. Cieneba soils do not have an argillic horizon and are shallow. Tollhouse Variant and Shaver Variant soils have

a mollic epipedon and do not have an argillic horozon. Tollhouse Variant soils are shallow. Kanaka family soils do not have an argillic horizon and are moderately deep. Millerton family soils are shallow and lithic.

BALDMOUNTAIN SERIES

The Baldmountain series consists of deep, well drained soils on mountain sides. These soils formed in residuum derived from metamorphic and metasedimentary rock. Slope ranges from 5 to 75 percent. The main plant communities are Yellow Pine Forest dominated by Jeffrey pine, Red Fir Forest, White Fir Forest, and Montane Chaparral. The elevation is 6,790 to 10,000 feet. The average annual precipitation is 18 to 39 inches, and the average annual growing season is 90 to 135 days.

Taxonomic class: These soils are coarse-loamy, mixed, frigid Ultic Haploxeroils.

Typical pedon of Baldmountain series in a unit of Baldmountain Rocky outcrop-Jumpe family complex, 30 to 50 percent slopes; in Tulare County, California; Sequoia National Forest, Cannell Meadow Ranger District; from intersection of Forest Service roads 22S77 and 35EO8, 0.4 miles south on 35E08 to a spur road, and 1.5 miles west on spur road; about 40 feet west of roadcut; in the SE1/4 of sec. 3, T.22S., R.34E.

01–1 inch to 0; layer of dead and decomposing needles and twigs.

A1–0 to 8 inches; brown (7.5YR 5/4) silt loam, dark brown (7.5YR 3/2) moist; moderate medium and fine subangular blocky structure and moderate fine granular structure; slightly hard, friable, slightly sticky fine sticky and plastic; common fine and very fine roots; common very fine tubular and interstitial pores; 5 percent pebbles; neutral; clear smooth boundary.

B21–8 to 21 inches; brown (7.5YR 4/4) silt loam, dark brown (7.5YR 3/3) moist, moderate medium and fine subangular blocky structure; slightly hard, friable, slightly sticky and plastic; common medium, fine, and very fine roots; common very fine tubular pores; 10 percent pebbles; neutral; gradual smooth boundary.

B22–21 to 35 inches; brown (7.5YR 4/4) loam, dark brown (7.5YR 3/4) moist; moderate medium and fine subangular blocky structure; slightly hard, friable; slightly sticky and plastic; many coarse and medium roots; common very fine tubular pores; 10 percent pebbles; neutral; clear smooth boundary.

C1–35 to 57 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4) moist; weak mediu... and fine subangular blocky structure; slightly hard, friable, slightly sticky and plastic; many coarse and medium roots; common very fine tubular pores; 10 percent pebbles; neutral; gradual smooth boundary.

C2r–51 inches; weathered metasedimentary material that has relic rock structure.

Range in characteristics: Depth to a paralithic contact is 40 to 60 inches. The profile ranges from 5 to 30 percent gravel. It is silt loam or loam and is less than 18 percent clay. The profile is slightly acid or neutral. Organic carbon content is 0.5 percent in the lower part of the B21 horizon.

The A1 horizon has dry color of 7.5YR if 10YR 4/2, 4/3, 4/4, 5/2, 5/3, or 5/4 and moist color of 7.5YR or 10YR 3/2 or 3/3.

The B21 horizon has dry color of 7.5YR or 10YR 4/3, 4/4, 5/4, or 5/3, or and moist color of 7.5YR or 10YR 3/2 or 3/3.

The B22 horizon has dry color of 7.5YR or 10YR 4/4, 5/4, 6/3, or 6/4 and moist color of 7.5YR or 10YR 3/4, 4/3, or 4/4.

The C1 horizon has dry color of 7.5YR or 10YR 5/4 or 5/6, and moist color of 7.5YR or 10YR 4/4, 4/6, 5/4, or 5/6.

Competing soils: These are the Junipero family and Shaver soils, Typic Haploxerolls, and Wind River family soils in other families. Typic Haploxerolls soils are formed in alluvium associated with meadows and are moderately well drained. Shaver and Junipero family soils are pachic and occur in Yellow Pine Forest dominated by ponderosa pine. Wind River family soils occur in Yellow Pine Forest dominated by ponderosa pine and mixed Conifer Forest.

Geographically associated soils: These are the Cagwin, Cannell, Nanny family, and Woolstalf soils, and the competing Wind Family soils. Cagwin soils are moderately deep, have an ochric epipedon, and are sandy. Cannell soils have an orchric epipedon and formed in granite. Nanny family soils have an umbric epipedon, are loamy skeletal, and formed in granite. Woolstalf soils are pachic and loamy-skeletal.

BOHNA SERIES

The Bohna series consists of deep, well drained soils on foothills and mountain sides. These soils formed in residuum derived from granitic rock. Slope ranges from 5 to 75 percent. The main plant communities are Foothill Woodland and Mixed Chaparral. The elevation is 2,300 to 5,800 feet. The average annual precipitation is 18 to 40 inches, and the average annual growing season is 180 to 300 days.

Taxonomic class: These soils are fine-loamy, mixed, thermic, Typic Argixerolls.

Typical pedon of Bohna series in a unit of Bohna loam, 5 to 30 percent slopes, in Kern County, California; Sequoia National Forest, Greenhorn Ranger District; 100 feet north of Forest Service road 25S04, about 0.3 miles south of the intersection with Highway 155; in the NW1/4, NE1/4 sec. 26, T.25S., R.31E.

01–2 inches to 0; decomposed oak and grass litter.

A11–0 to 4 inches; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium granular structure; slightly hard, friable, nonsticky and slightly plastic; many very fine roots; many very fine tubular pores; neutral wavy boundary.

A12–4 to 8 inches; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; slightly hard, friable, nonsticky and slightly plastic; many fine roots; many very fine tubular pores; neutral; gradual wavy boundary.

B1–8 to 18 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; few medium and common very fine roots; common fine tubular pores; neutral; gradual wavy boundary.

B21t–18 to 36 inches; strong brown (7.5YR 5/6) sandy clay loam, brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; common fine tubular pores; few thin clay bridges between mineral grains and few thin clay films lining tubular pores and on faces of peds; neutral; gradual wavy boundary.

B22t–36 to 44 inches; strong brown (7.5YR 5/6) sandy clay loam, brown (7.5YR 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common moderately thick and thin yellowish red (5YR 5/6) clay bridges between mineral grains; slightly acid; diffuse irregular boundary.

Cr–44 inches; yellowish red (7.5YR 5/6 and 4/6) weathered granitic material that has relic rock structure.

Range in characteristics: Depth to a paralithic contact is 40 to 60 inches. The mollic epipedon ranges from 10 to 19 inches in thickness.

The A1 horizon has dry color of 10YR or 7.5YR 5/2, 5/3, or 5/4 and moist color of 10YR or 7.5YR 3/2 or 3/3. It is loam or sandy loam. The A1 horizon is neutral or slightly acid.

The B2t horizon has dry color of 10YR or 7.5YR 4/4, 4/6, 5/4, 5/6, 6/4, or 6/6 and moist color of 10YR or 7.5YR 4/7, 5/4, or 5/6. It is sandy clay loam or clay loam. The B2t horizon is neutral or slightly acid.

Competing soils: These are the Chualar family soils in the same family, and the Auberry, Boomer, Brownlee family, Crozier, and Holland soils in other families. Chualar family soils are moderately deep over basic igneous rock. Auberry soils have an ochric epipedon. Boomer and Crozier soils have an ochric epipedon, formed in basalt, and occur in the montane coniferous forest communities of Yellow Pine Forest and White Fir Forest. Brownlee family soils formed in metamorphic rocks. Holland soils have an ochric epedon. Brownlee family and Holland soils are in montane coniferous forest communities.

Geographically associated soils: These are the competing Auberry and Holland soils, and the Cieneba soils. Cieneba soils are shallow and have an ochric epipedon.

BOOMER SERIES

The Boomer series consists of deep, well drained soils on mountain sides. These soils formed in residuum derived from basalt. Slope ranges from 5 to 40 percent. The main plant communities are White Fir Forest, Yellow Pine Forest, Montane Chaparral and Mixed Conifer Forest. The elevation is 4,800 to 6,600 feet. The average annual precipitation is 30 to 40 inches, and the average annual growing season is 120 to 210 days.

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

Typical pedon of Boomer series in a unit of Boomer-Crozier-Rock outcrop complex, 5 to 40 percent slopes; in Fresno County, California, Sequoia National Forest, Hume Lake Ranger District, on the north side of Forest Service road 13S07 approximately 0.5 miles north of the intersection of Highway 180 and Forest Service road 13S07; in the NE1/4 of sec. 9, T.13S., R.28E.

01–1 inch to 0; partially decomposed needle, leaf, and twig litter.

A1–0 to 7 inches; reddish brown (5YR 5/3) gravelly loam, dark reddish brown (5YR 3/2) moist; moderate fine granular structure; slightly hard, friable, nonsticky and slightly plastic; many very fine, and medium roots; common fine interstitial pores; 20 percent pebbles; slightly acid; clear smooth boundary.

B1t–7 to 13 inches; reddish brown (5YR 5/4) sandy loam, dark reddish brown (5YR 3/4) moist; moderate fine subangular blocky stucture; slightly hard, friable, sticky and plastic; many very fine, fine, and medium root; common fine tubular pores; few thin clay films as bridges between mineral grains; few stains on mineral grains; 5 percent pebbles; medium acid; gradual smooth boundary.

B21t–13 to 19 inches; light reddish brown (5YR 6/4) sandy clay loam, reddish brown (5YR 4/3) moist; moderate medium and fine subangular blocky structure; slightly hard, friable, sticky and plastic; common fine roots; common fine tubular pores; few thin clay films as bridges between mineral grains; few stains on mineral grains; 5 percent pebbles; medium acid; gradual smooth boundary.

B22t–19 to 25 inches; light reddish brown (5YR 6/4) clay loam, reddish brown 5YR 4/3) moist; moderate medium and fine subangular blocky structure; slightly hard, friable, sticky and plastic; common fine and medium roots; common fine tubular pores; few thin clay films on faces of peds and as bridges between mineral grains; few stains on mineral grains; 5 percent pebbles; medium acid; gradual smooth boundary.

B23t–25 to 35 inches; light reddish brown (5YR 6/4) cobbly clay loam, reddish brown (5YR 4/3) moist; moderate medium and fine subangular blocky structure; hard, friable, sticky and plastic; few fine and medium roots; few fine tubular pores; few thin clay films on faces of peds and as bridges between mineral grains; few stains on mineral grains; 10 percent cobbles and 10 percent pebbles; medium acid; gradual smooth boundary.

B3t–35 to 50 inches; yellowish red (5YR 4/6) sandy loam, dark reddish brown (5YR 3/4) moist; massive; hard, firm, sticky and plastic; few fine and medium roots; few fine tubular pores; few thin clay films as bridges between mineral grains; few stains on mineral grains; medium acid.

Range in characteristics: Depth to a paralithic contact is 40 to 80 inches. The profile ranges from 5 to 35 percent gravel and cobbles.

The A1 horizon has dry color of 5YR 5/3 or 5/4 and moist color of 5YR or 2.5YR 3/2, 3/3, or 3/4. The A1 horizon ranges from 7 to 9 inches in thickness.

The B2t horizon has dry color of 5YR 4/4, 4/6, 5/4, 5/6, or 6/4 and most color of 5YR or 2.5YR 3/4, 3/6, 4/3, 4/4, or 4/6.

Competing soils: These are the Crozier, Holland, and Hotaw soils in the same family, and the Auberry and Brownlee family soils in other families. Crozier soils are moderately deep and have a hue of 7.5YR. Holland soils have a hue of 7.5YR or 10YR and formed in granitic rock. Hotaw soils do not have a hue redder than 7.5 YR, are moderately deep, and formed in granite. Auberry soils have a hue of 7.5YR or 10YR and are in areas of Foothill Woodland and Mixed Chaparral. Brownlee family soils have a mollic epipedon and do not have a hue redder than 5YR.

Geographically associated soils: These are the Chaix, Chawanakee, and Dome soils, and the competing Crozier soils. Chaix, Chawanakee, and Dome soils do not have an argillic horizon and are coarse-loamy.

BRADER FAMILY

The Brader family consists of shallow, somewhat excessively drained soils on mountain sides and ridges. These soils formed in residuum derived from granitic rock. Slopes range from 2 to 75 percent. The main plant communities are Montane Chaparrel and Sagebrush Scrub. The elevation is 2,200 to 5,000 feet. The average annual precipitation is 8 to 25 inches, and the average annual growing season is 120 to 210 days.

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

Typical pedon of Brader family soil in a unit of Rock outcrop-Brader-Siskiyou families complex, 20 to 60 percent slopes; in Tulare County, California, Sequoia National Forest, Cannell Meadow Ranger District; in the NW1/4, SE1/4 of sec. 16, T. 35E.

A1–0 to 6 inches; brown (10YR 5/3) gravelly coarse sandy loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, very fine roots; many very fine tubular pores; 15 percent pebbles; neutral; clear smooth boundary.

B2–6 to 16 inches; light yellowish brown (10YR 6/4) gravelly sandy loam, dark brown (10YR 4/3) moist; weak medium and fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; few very fine, fine, and medium roots; few fine tubular pores; 15 percent pebbles; neutral; abrupt smooth boundary.

Cr–16 inches; highly weathered granitic material that has relic rock structure.

Range in characteristics: Depth to a paralithic contact is 8 to 20 inches. The profile is coarse sandy loam, gravelly coarse sandy loam, sandy loam, or gravelly sandy loam. It ranges from 5 to 30 percent gravel. The profile is slightly acid or neutral.

The A horizon has dry color of 10YR 4/2, or 5/3 and moist color of 10YR 3/2 or 3/3. The horizon ranges from 3 to 6 inches in thickness.

The B2 horizon has dry color of 10YR 6/4 or 5/3 and moist color of 10YR 3/3, 4/3, or 4/4.

Competing Soils: These are the Chaix, Chawanakee, Dome, and Siskiyou family soils in other families. The Chaix, Chawanakee, and Dome soils occur in areas that have a mean annual precipitation of more that 26 inches and have base saturation of less than 60 percent in some part below a depth of 10 inches. Chaix soils are moderately deep, and Dome soils are deep. Siskiyou family soils are moderately deep.

Geographically associated soils: These are the Cieneba and Tollhouse family soils, and the competing Chaix, Dome, and Siskiyou family soils. The Cieneba soils are thermic and do not have a cambic horizon. The Tollhouse soils have a mollic epipedon and do not have a cambic horizon.

BROWNLEE FAMILY

The Brownlee family consists of deep, well drained soils on mountain sides and ridges. These soils formed in residuum derived from metamorphic or metasedimentary rock. Slope ranges from 30 to 75 percent. The main plant communities are Yellow Pine Forest, White Fir Forest, and Montane Chaparral. The elevation is 3,900 to 7,200 feet. The average annual precipitation is 30 to 40 inches, and the average annual growing season is 120 to 210 days.

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

Typical pedon of Brownlee family in a unit of Hotaw Variant-Brownlee family-rock outcrop complex, 40 to 75 percent slopes;in Tulare County, California; Sequoia National Forest, Hume Lake Ranger District; on north side of Forest Service Road 14S42 approximately 1.2 miles east of intersection of Forest roads 14S43 and 14S42; in the SW1/4 sec. 18, T.14S., R.28E.

01–1 inch to 0; partially decomposed forest litter.

A11–0 to 7 inches; brown (10YR 5/3) very fine sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure, and medium and fine granular structure; slightly hard, friable, nonsticky and slightly plastic; common fine and very fine roots; common very fine tubular pores; medium acid; clear smooth boundary.

A12–7 to 15 inches; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure, and medium and fine granular structure; slightly hard, firm, nonsticky and slightly plastic; common fine and very fine roots; common very fine tubular pores; slightly acid; clear wavy boundary.

B21t–15 to 25 inches; yellowish brown (10YR 5/4) sandy clay loam, dark brown (7.5YR 4/4) moist; moderate medium and fine subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; common fine and medium roots; common very fine tubular pores; very few thin clay films as bridges between mineral grains; slightly acid; gradual smooth boundary.

B22t–25 to 35 inches; yellowish brown (10YR 5/4) sandy clay loam, dark brown (7.5YR 4/4) moist; moderate medium and fine subangular blocky structure; hard, firm, slightly sticky and plastic; common fine and medium roots; common very fine tubular pores; few moderately thick and medium roots; few moderately thick clay films on faces of peds; slightly acid; gradual smooth boundary.

B23t–35 to 48 inches; yellowish brown (10YR 5/6) sandy clay loam, dark brown (7.5YR 4/4) moist; moderate medium and fine subangular blocky structure; hard, firm, slightly sticky and plastic; common fine and medium roots; common very fine tubular pores; common moderately thick clay films on faces of peds; slightly acid; gradual smooth boundary.

B3–48 to 65 inches; brownish yellow (10YR 6/6) sandy loam, dark yellowish brown (10YR 4/4) moist; weak medium and coarse subangular blocky structure; ard, friable, slightly sticky and slightly plastic; common fine and medium roots; few very fine tubular pores; slightly acid; clear wavy boundary.

Cr–65 inches; interbedded soft to hard metamorphic rock that is nearly vertically tilted.

Range in characteristics: Depth to a paralithic contact is 60 to 65 inches.

The A1 horizon has dry color of 10YR 5/3 or 7.5YR 4/2 and moist color of 10YR or 7.5YR 3/2. The horizon is very fine sandy loam. It is medium acid or slightly acid. The A1 horizon ranges from 10 to 17 inches in thickness.

The B2t horizon has dry color of 10YR or 7.5YR 5/4 or 5/6 and moist color of 7.5YR 4/4 or 5YR 3/4. The horizon is sandy clay loam or loam.

Competing soils: These are the Bohna, Chualar family, Boomer, Crozier, Holland, and Hotaw soil In other families. Bohna soils formed in granite and occur under Foothill Woodland and Mixed Chapparral. Chualar family soils are moderately deep, formed in granite, and occur under Mixed Chaparral, Inland Closed-cone Coniferous Woodland, and Pinyon-Juniper Woodland. Boomer soils have an ochric epipedon and a hue of 5YR and 2.5YR. Crozier soils are moderately deep and have an ochric epipedon. Holland soils have an ochric epipedon and formed in granite. Hotaw soils are moderately deep and have an ochric epipric epipedon, and formed in granite.

Geographically associated soils: These are the Hotaw Variant and Shaver soils, and the competing Chualar family and Holland soils. Hotaw Variant soils are moderately deep. Shaver soils have a thick umbric epipedon and do not have an argillic horizon.

CAGWIN SERIES

The Cagwin series consists of moderately deep, somewhat excessiveley drained soils on mountain sides. These soils formed in residuum derived from granitic rock. Slope ranges from 5 to 75 percent. The main plant communities are Red Fir Forest, Lodgepole Pine Forest, White Fir Forest, Yellow Pine Forest dominated by Jeffrey pine, and Montane Chaparral. The elevation is 6,400 to 8,500 feet. The average annual precipitation is 30 to 50 inches, and the average annual growing season is 90 to 135 days.

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

Typical pedon of Cagwin series in a unit of Cagwin-Toem-Rock outcrop complex, 30 to 50 percent slopes; in Tulare County, California; Sequoia National Forest, Cannell Meadow Ranger District; from the intersection of Foest Service road 20S25 and Osa Creek, 1.2 miles north to ridgetop on west side of road; in the NW1/4 sect. 16, T.20S., R.34E.

01–2 inches to 0; forest duff; dead and decomposing needles, twigs, bark, and cones.

A1–0 to 7 inches; brown (10YR 5/3) loamy sand, very dark grayish brown (10YR 3/2) moist; moderate medium and fine granular structure; soft, very friable, nonsticky and slightly plastic; common medium, fine, and very fine roots; common fine tubular pores; 5 percent pebbles; strongly acid; clear smooth boundary.

AC–7 to 13 inches; brown (10YR 5/3) loamy sand, dark brown (10YR 4/3) moist; weak fine and very fine granular structure; soft, very fine roots; common fine tubular pores; 8 percent pebbles; medium acid; clear smooth boundary.

C1–13 to 34 inches; pale brown (10YR 6/3) loamy coarse sand, brown (10YR 5/3) moist; single grain; loose; common medium and coarse roots; many fine interstitial pores; 15 percent pebbles; medium acid; gradual smooth boundary.

C2r–34 inches; highly weathered granitic material that has rock structure.

Range in characteristics: Depth to a paralithic contact is 20 to 40 inches. The profile ranges from 5 to 25 percent gravel and cobbles. It is medium acid or strongly acid.

The A horizon has dry color of 10YR 4/2, 4/3, 5/2, or 5/3 and moist color of 10YR 3/2, 3/3, 4/2, or 4/3. The horizon is loamy sand or loamy coarse sand. It ranges from 5 to 9 inches in thickness.

The C horizon has dry color of 10YR 6/2, 6/3, 6/4, 7/2, 7/3, or 7/4 and moist color of 10YR 4/2, 4/3, 4/4, 5/2, 5/4, 6/2, 6/3, or 6/4.

Competing soils: These are the Cagwin Variant soils in the same family, and the Cannell, Kriest family, and Toem soils in other families. Cagwin Variant soils are deep. Cannell soils are deep, have a cambic horizon, and are coarse-loamy. Toem soils are shallow.

Geographically associated soils: These are the Nanny family and Sirretta soils, and the competing Cagwin Variant, Cannell, and Toem soils. Nanny family soils have an umbric epipedon, are deep, and are loamy-skeletal. Sirretta soils are sandy-skeletal.

CAGWIN VARIANT

The Cagwin Variant consists of deep, excessively drained soils on the toe slopes of mountains and on alluvial fans adjacent to upland basins. The soils formed in alluvium derived from granitic rock. Slope ranges from 0 to 15 percent. The main vegetation is occasional montane forbs and lodgepole pine. The elevation is 7,500 to 8,500 feet. The average annual precipitation is 16 to 24 inches, and the average annual growing season is 90 to 135 days.

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

Typical pedon of Cagwin Variant in a unit of Cagwin Variant loamy coarse sand, 5 to 15 percent slopes; in Sequoia National Forest, Hot Springs District, Tulare County, California, 1/4 of a mile on road to Sand Flat from the junction with Forest Highway 90 above Frog Meadow Station; in the NE1/4, NE1/4 sec. 1, T.24S., R.31E.

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

C1–4 to 10 inches; light brownish gray (10YR 6/2) gravelly loamy sand, grayish brown (10YR 5/2) moist; single grain; loose; many medium and coarse roots; many very fine interstitial pores; 15 percent pebbles; slightly acid; gradual smooth boundary.

C2–10 to 60 inches; pale brown (10YR 6/3) gravelly loamy coarse sand, brown (10YR 5/3) moist; single grain; loose; few coarse roots; many very fine interstitial pores; 20 percent pebbles; slightly acid.

Range in characteristics: The solum ranges from 4 to 10 inches in thickness. The profile ranges from 5 to 20 percent gravel. It is slightly acid or medium acid.

The A horizon has dry color of 10YR 4/2, 4/3, 4/4, 5/2, 5/3, 5/4, 6/2, 6/3, or 6/4 and moist color of 10YR 3/2, 3/3, 3/4, 4/2, 4/3, or 4/4. The horizon ranges from 4 to 8 inches in thickness.

The C horizon has dry color of 10YR 6/2, 6/3, 6/4, 7/2, 7/3, 7/4 8/2, 8/3, or 8/4 and moist color of 10YR 4/2, 4/3, 4/4, 5/2, 5/3, 6/2, 6/3, or 6/4.

Competing Soils: These are the Cagwin soils in the same family, and the Cannell, Kriest family, and Toem soils in other families. Cagwin soils are moderately deep. Cannell and Kriest family soils have a cambic horizon and are coarse-loamy. Toem soils are shallow.

Geographically associated soils: These are the Nanny family and Sirretta soils, and the competing Cagwin, Cannell, and Toem soils. Nanny family soils have an umbric epipedon and are loamy-skeletal. Sirretta soils are moderately deep and are sandy-skeletal.

CANNELL SERIES

The Cannell series consists of deep, well drained soils on mountain sides. These soils formed in residuum derived from granitic rock. Slope ranges from 2 to 75 percent. The main plant communities are Red Fir Forest, White Fir Forest, Lodgepole Pine Forest, Yellow Pine Forest dominated by Jeffrey pine, and Montane Chaparral. The elevation is 7,000 to 9,000 feet, and the average annual precipitation is 25 to 50 inches, and the average annual growing season is 90 to 135 days.

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

Typical pedon of Cannell series in a unit of Cannell-Sirretta Nanny family complex, 5 to 30 percent slopes; in Tulare County, California; Sequoia National Forest; Cannell Meadow Ranger District; approximately 15 miles north of Blackrock Station on Forest Service Road 21S03, on the west side of road; in the NW1/4 sec. 12, T.21S., R.34E.

O1–2 inches to 0; forest duff of dead and decomposing pine needles, twigs, and bark.

A1–0 to 7 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure and moderate fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and very fine roots; common fine and very tubular and interstitial pores; 10 percent pebbles; medium acid; clear smooth boundary.

B2–18 to 27 inches; yellowish brown (10YR 5/4 sandy loam, dark yellowish brown (10YR 3/4) moist; moderate medium and fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and very fine roots and many medium and coarse roots; common fine and very fine tubular pores; 10 percent pebbles; strongly acid; gradual smooth boundary.

C1–27 to 50 inches; yellowish brown (10YR 5/4) sandy loam, dark brown (10YR 4/3) moist; weak coarse and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and very fine roots and many medium and coarse roots; common fine and very fine tubular pores; strongly acid; gradual smooth boundary.

C2r–50 inches; highly weathered granitic rock that has mineral grains retaining original orientation.

Range in characteristics: The solum ranges from 20 to 35 inches in thickness, and the depth to rock is 40 to 59 inches. The profile ranges from 5 to 20 percent gravel. It is coarse sandy loam or sandy loam and is less than 18 percent clay. Mollic colors do not extend below a depth of 8 inches.

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

The B2 horizon has dry color of 10YR 5/3, 5/4, or 6/2 and moist color of 10YR 3/2, 3/4, or 5/3.

Competing soils: These are the Kriest family soils in the same family, and the Cagwin Variant, Dome, and Nanny family soils in other families. Kriest family soils are moderately deep. Cagwin Variant soils are sandy. Dome soils occur in the lower montane communities of Yellow Pine Forest dominated by ponderosa pine, and White Fir Forest. Nanny family soils are loamy-skeletal.

Geographically associated soils: These are the Cagwin, Monache, Monache Variant and Sirretta soils, and the competing Kriest family soils. Cagwin soils are sandy and moderately deep. Monache soils and Monache Variant, drained soils have a mollic epipedon and occur in meadows. Sirretta soils are moderately deep and are sandy-skeletal.

CHAIX SERIES

The Chaix series consists of moderately deep, well drained and somewhat excessively drained soils on mountain sides and ridges. These soils formed in residuum derived from granitic rock. Slope ranges from 2 to 75 percent. The main plant communities are Yellow Pine Forest, White Fir Forest, and Montane Chaparral. The elevation is 6,000 to 9,000 feet. The average annual precipitation is 20 to 50 inches, and the average annual growing season is 120 to 210 days.

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

Typical pedon of Chaix series in a unit of Rock outcrop-Chawanakee-Chaix complex, 30 to 50 percent slopes; in Tulare County, California; Sequoia National Forest, Cannell Meadow Ranger District; approximately 0.2 miles west of intersection of Forest Service road 24S13 and Bartolas road, on 24S13 and 50 feet south of road; in the SW1/4SE1/4 Sec. 26, T.24S., R.34WE.

A1–0 to 7 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure parting to moderate medium and fine granular; slightly hard, very friable, nonsticky and slightly plastic; common fine and very fine roots; common very fine tubular and interstitial pores; 10 percent pebbles; slightly acid; clear smooth boundary.

B2–7 to 25 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 4/4) moist; weak medium and fine subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; few very fine and fine roots and many medium and coarse roots; common very fine, fine, fine and medium tubular pores; 10 percent pebbles; slightly acid; abrupt smooth boundary.

Cr–25 inches; weathered granitic rock that has mineral grains retaining original rock structure.

Range in characteristics: Depth to a paralithic contact is 20 to 40 inches. The profile is sandy loam and coarse sandy loam. It ranges from 5 to 25 percent gravel.

The A horizon has dry color of 10YR 4/2, 4/3, or 5/3 and moist color of 10YR 3/2, 3/3, or 3/4. The horizon ranges from 5 to 9 inches in thickness.

The B horizon has dry color of 10YR 5/3, 5/4, 6/3, or 6/4 and moist color of 10YR 4/3, 4/4, 5/3, or 5/4.

The Chaix soils in this survey area are a taxadjunct to the Chaix series because the B2 horizon is slightly acid. This difference, however, does not significantly effect use and management.

Competing soils: These are the Dome soils in the same family, and the Chawanakee and Kriest family soils in other families. Dome soils are deep. Chawanakee soils are shallow. Kriest family soils are under the upper montane community of Red Fir Forest.

Geographically associated soils: These are the Holland, Wind River family, and Tollhouse soils, and the competing Chawanakee and Dome soils. The Holland soils are deep and have an argillic horizon. Wind River family soils are deep and have a mollic epipedon. Tollhouse soils are shallow and have a mollic epipedon.

CHAWANAKEE SERIES

The Chawanakee series consists of shallow, somewhat excessively drained soils on mountain sides and ridges. These soils formed in residuum derived from granitic rock. Slope ranges from 2 to 75 percent. The main plant communities are Montane Chaparral, Yellow Pine Forest, and White Fir-Sugar Pine Forest. The elevation is 3,000 to 8,000 feet. The average annual precipitation is 25 to 50 inches, and the average annual growing season is 120 to 210 days.

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

Typical pedon of Chawanakee series in a unit of Chawanakee-Rock outcrop-Chaix complex, 30 to 50 percent slopes; in Tulare County, California; Sequoia National Forest, Hot Springs Ranger District; on Forest Service road 23S03, about 0.85 miles south of the Parker Pass junction with Forest Service road 23S81 and about 100 feet north of the road at culvert crossing that has large gully; in the NE1/4, SW1/4 of sec. 9, T.23S., R.31E.

A1–0 to 3 inches; grayish brown (10YR 4/2) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; single grain; loose, very friable, nonsticky and nonplastic; common very fine interstitial pores; 10 percent pebble; slightly acid; clear smooth boundary.

B2–3 to 10 inches; yellowish brown (10YR 5/4) sandy loam, dark yellowish brown (10YR 3/4) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and coarse roots and common fine roots; many very fine interstitial pores; medium acid; abrupt smooth boundary.

Cr–10 inches; highly weathered granitic material that has relic rock structure.

Range in characteristics: Depth to a paralithic contact is 8 to 20 inches. The profile is coarse sandy loam and sandy loam. It ranges from 5 to 30 percent gravel. The profile is slightly acid or medium acid.

The A horizon has dry color of 10YR 4/2, 5/2, or 5/3 and moist color of 10YR 3/2 or 3/3. The horizon ranges from 3 to 6 inches in thickness.

The B2 horizon has dry color of 10YR 6/4 or 5/3 and moist color of 10YR 3/3, 4/3, or 4/4.

Competing soils: These are the Chaix, Chawanakee Variant, Cieneba, Dome, and Toem soils in other families. Chaix soils are, moderately deep. Chawanakee Variant soils occur under Mixed Chaparral and Chamise. Cieneba soils do not have a cambic horizon and occur under Foothill Woodland and Mixed Chaparral. Dome soils are deep. Toem soils are sandy and occur under montane community of Montane Chaparral associated with Red Fir Forest and Lodgepole Pine Forest.

Geographically associated soils: These are the Holland, Shaver, Wind River family, and Woolstalf soils, and the competing Chaix and Dome soils. The Holland soils are deep and have an argillic horizon. Shaver soils are deep and have thick umbric epipedon. Wind River family soils are deep and have a mollic epipedon. Woolstalf soils have a thick mollic epipdeon, are deep, and are loamy-skeletal.

CHAWANAKEE VARIANT

The Chawanakee Variant consists of shallow, well drained soils on foothills, mountain sides, and ridges. These soils formed in residuum derived from granitic rock. Slope ranges from 30 to 75 percent. The main plant community is Mixed Chaparral. The elevation is 2,400 to 5,000 feet. The average annual precipitation is 23 to 35 inches, and the average annual growing season is 180 to 300 days.

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

Typical pedon of Chawanakee Variant in a unit of Kanaka family-Chawanakee Variant-Rock outcrop association, very steep; in Tulare County, Sequoia National Forest, Tule River Ranger District; on trail 30E19 in Stevenson Canyon on the south side of the Middle Fork of the Tule River; in the NE1/4, NE1/4 of sec. 26, T.20S., R.30E.

01–1/3 inch to 0; White-leaf manzanita litter.

A11–0 to 5 inches; yellowish brown (10YR 5/4) sandy loam, very dark grayish brown (10YR 3/2) moist; weak very fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and few medium roots; common very fine and fine tubular pores; medium acid; gradual smooth boundary.

A12–5 to 7 inches; light yellowish brown (10YR 6/4) sandy loam, brown (7.5YR 4/4) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; few very fine, medium and course roots; common very fine and few fine tubular pores; slightly acid; gradual smooth boundary.

B2–7 to 18 inches; yellowish brown (10YR 5/4) sandy loam, brown (7.5YR 4/4) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; few fine coarse roots; few very fine and fine tubular pores; medium acid; gradual smooth boundary.

Cr–18 inches; brownish yellow (10YR 6/6) weathered granitic material retaining rock structure.

Range in characteristics: Depth to a paralithic contact is 8 to 20 inches.

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

The B horizon has dry color of 10YR or 7.5YR 5/4 or 6/4 and moist color of 10YR or 7.5YR 4/4. The base saturation ranges from 50 to 70 percent.

Competing soils: These are the Chawanakee, Cieneba, Millerton family, and Tollhouse Variant soils in other families. Chawanakee soils occur under the lower montane communities of Montane Chaparral and Yellow Pine Forest.

Geographically associated soils: These are the Auberry, Shaver Variant, and Kanaka family soils, and the competing Cieneba and Tollhouse Variant soils. Auberry soils are deep and have an argillic horizon. Shaver Variant soils are moderately deep and have a mollic epipedon. Kanaka family soils are moderately deep.

CHESAW FAMILY

The Chesaw family consists of moderately deep, excessively drained soils on mountain sides and ridges. These soils formed in residuum derived from granitic and metamorphic rock. Slope ranges from 2 to 50 percent. The main plant communities are Sagebrush Scrub and Foxtail Limber Pine Forest. The elevation is 7,600 to 9,200 feet. The average annual precipitation is 12 to 20 inches, and the average annual growing season is 90 to 135 days.

Taxonomic class: These soils are sandy-skeletal, mixed, frigid Entic Haploxerolls.

Typical pedon of Chesaw family in a unit of Chesaw-Nanny families association, steep; in Tulare County, California; Inyo National Forest, Mt. Whitney Ranger District; 0.75 mile north of the intersection of South Fork Kern River jeep trail and Summit Meadow jeep intersection, then 20 feet east of the Summit Meadow trail; in the SW1/4 sec. 17, T.20S., R.36E.

O1–1/2 inch to 0; decomposing sagebrush litter.

A1–0 to 16 inches; brown (10YR 5/3) extremely cobbly loamy coarse sand, very dark grayish brown (10YR 3/2) moist; single grain; loose, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine interstitial pores; 10 percent pebbles, 60 percent cobbles and 10 percent stones; slightly acid; gradual smooth boundary.

C1–16 to 30 inches; brown (10.5YR 5/3) very stony loamy coarse sand, dark yellowish brown (10.5YR 3/4) moist; single grain; loose; common very fine and fine roots; common very fine and fine interstitial pores; 40 percent pebbles, 5 percent cobbles, and 15 percent stones; slightly acid; gradual smooth boundary.

C2r–30 inches; strong brown (7.5YR 5/6) weathered granitic material that retains original rock structure.

Range in characteristics: Depth to a paralithic contact is 20 to 30 inches. Cobbles, stones, and gravel cover 50 to 60 percent of the soil surface. The profile ranges from 35 to 60 percent gravel, cobbles, and stones.

Competing soils: These are the Glean Variant, Jumpe family, Nanny family, and Sirretta soils in other families. Glean Variant soils are loamy-skeletal and formed in andesite. Jumpe family soils are deep, have an ochric epipedon and a cambic horizon, and are loamy-skeletal. Nanny family soils are deep and have an umbric epipedon and a cambic horizon. Sirretta soils have an ochric epipedon and are not as red as 7.5YR.

Geographically associated soils: These are the Cannell, Cagwin, Cagwin Variant, and Toem soils, and the competing Nanny family soils. Cannell soils are deep and, have an ochric epipedon and a cambic and are coarse-loamy. Cagwin soils have an ochric epipedon and are not skeletal. Cagwin Variant soils are deep, have an ochric epipedon, and are not skeletal. Toem soils are shallow, have an ochric epipedon, and are not skeletal.

CHUALAR FAMILY

The Chualar family consists of moderately deep, well drained soils on mountain sides and ridges. These soils formed in residuum derived from metamorphic, metasedimentary, and basic igneous rocks. Slope ranges from 15 to 75 percent. The main plant communities are Mixed Chaparral, Inland Closed-cone Coniferous Woodland, and Pinyon-Juniper Woodland. The elevation is 1,200 to 6,500 ft. The average annual precipitation is 10 to 30 inches, and the average annual growing season is 180 to 300 days.

Taxonomic class: These soils are fine-loamy, mixed, thermic Typic Argixerolls.

Typical pedon of Chualar family in a unit of Chualar family-Rock outcrop complex, 50 to 75 percent slopes; Sequoia National Forest, Greenhorn Ranger District, Kern County; in the Piute Mountains, 0.85 miles southeast of the Forest boundary on Forest Service road 27S02; in the SE1/4 sec. 30, T.27S., R.33E.

01–1 inch to 0; cypress litter.

A1–0 to 2 inches; dark brown (10YR 3/3) loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine interstitial pores; 5 to 20 percent pebbles and cobbles; neutral; clear smooth boundary.

B1t–2 to 9 inches; dark brown (10YR 3/3) loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; fine and very fine roots and few medium roots; many fine tubular pores; few thin clay skins on face of peds; neutral; clear wavy boundary.

B21t–9 to 13 inches; brown (10YR 4/3) clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; common moderately thick clay films lining pores and few thin clay films on faces of peds; 10 percent pebbles and 5 percent cobbles; neutral; gradual wavy boundary.

B22t–13 to 29 inches; yellowish brown (10YR 5/4) clay loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; hard, firm, sticky and plastic; few medium roots; common fine tubular pores; common moderately thick clay films as bridges between mineral grains and lining tubular pores; neutral; gradual wavy boundary.

Cr–29 inches; light yellowish brown weathered basic igneous rock.

Range in characteristics: Depth to a paralithic contact is 20 to 50 inches. The profile ranges from 5 to 20 percent gravel. It is slightly acid or neutral.

The A horizon has dry color of 10YR, 7.5YR 5/3, 5/4, 4/3, or 4/4 and moist color of 10YR, 7.5YR, or 5YR 3/2, 3/3, or 4/4. The horizon is fine sandy loam, sandy loam, loam, or sandy clay loam.

The B2t horizon has dry color of 10YR 5/4, 4/3, 7.5YR 4/4, 5/6, 6/4, or 5YR 4/4 and moist color of 10YR 3/2, 3/3, 4/4, 7.5YR 3/2, or 5YR 3/3. The horizon is clay loam or sandy clay loam.

Competing soils: These are the Bohna soils in the same family, and the Auberry, Brownlee family, Crozier, Hotaw, and Hotaw Variant soils in other families. Bohna soils are deep and formed in granite. Auberry soils have an ochric epipedon and are deep over granite. Brownlee family, Crozier, Hotaw, and Hotaw Variant soils occur under the montane communities of Yellow Pine Forest and Montane Chaparral. Brownlee family soils are deep. Crozier soils have an ochric epipedon. Hotaw soils have an ochric epipedon and formed in granite. Hotaw Variant soils have an ochric epipedon.

Geographically associated soils: These are the Cieneba and Livermore family soils, and the competing Auberry and Bohna soils. Cieneba soils have an ochric epipedon, do not have an argillic horizon, and are shallow. Livermore family soils do not have an argillic horizon and are loamy-skeletal.

CHUMSTICK FAMILY

The Chumstick family consists of shallow, well drained soils on mountain sides and ridges. These soils formed in residuum derived from metamorphic rocks. Slope ranges from 30 to 75 percent. The main plant communities are Montane Chaparral, Lodgepole Pine Forest, and Red Fir Forest. The elevation is 8,000 to 9,300 feet. The average annual precipitation is 35 to 40 inches, and the average annual growing season is 90 to 135 days.

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

Typical pedon of Chumstick family in a unit of Jumpe-Chumstick families-Rock outcrop complex, 30 to 50 percent slopes; Sequoia National Forest, Tule River Ranger District, Tulare County; in the NE1/4, NE1/4, SW1/4 of sec. 14, T.21S., R.31E.

01–1/3 inch to 0; partially decomposed fir litter.

A1–0 to 2 inches; brown (10YR 4/3) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate very fine granular structure; slightly hard, friable, slightly sticky and nonplastic; common medium roots; common very fine interstitial pores; 30 percent pebbles; medium acid; abrupt smooth boundary.

B1–2 to 6 inches; brown (7.5YR 4/4) gravelly loam, dark brown (7.5YR 3/4) moist; moderate very fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many medium and common very fine roots; common very fine interstitial pores; 30 percent pebbles; medium acid; clear smooth boundary.

B21–6 to 10 inches; brown (7.5YR 5/4) very gravelly loam, brown (7.5YR 4/4) moist; weak very fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; few fine and very fine roots; many medium interstitial pores; 35 percent pebbles; medium acid; clear smooth boundary.

B22–10 to 17 inches; brown (7.5YR 5/4) very gravelly loam, brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and slightly plastic; few fine roots; many medium interstitial pores; 40 percent pebbles; medium acid; abrupt wavy boundary.

R–17 inches; weathered, hard metamorphic bedrock.

Range in characteristics: Depth to a lithic contact is 10 to 20 inches. The profile ranges from 35 to 65 percent gravel and cobbles. It is medium acid or slightly acid. The profile is loam or clay loam and is 18 to 35 percent clay. The profile has hues of 10YR or 7.5YR.

Competing soils: These are the Chesaw family, Nanny family, Sirretta, and loem soils in other families. Nanny family soils are deep, have an umbric epipedon, and formed in granite. Chesaw family soils have a mollic epipedon, are moderately deep, and are sandy-skeletal. Sirretta soils are moderately deep, do not have a cambic horizon, and are sandy-skeletal. Toem soils are sandy, do not have a cambic horizon, and are sandy-skeletal. Toem soils are sandy, do not have a cambic horizon, and formed in granite.

Geographically associated soils: These are the Baldmountain, Cannell, Cagwin, and Jumpe family soils, and the competing Nanny family soils. Baldmountain soils are deep, have a mollic epipedon, and are coarse-loamy. Cannell soils are deep, coarse-loamy and formed in granite. Cagwin soils are moderately deep, do not have a cambic horizon, and are sandy. Jumpe family soils are deep.

CIENEBA SERIES

The Cieneba series consists of shallow, somewhat excessively drained soils on foothills, mountain sides, and ridges. These soils formed in residuum derived from granite rock. Slope ranges from 5 to 75 percent. The main plant communities are Foothill Woodland and Mixed Chaparral. The elevation is mainly 1,000 to 6,600 feet. The average annual precipitation is mainly 18 to 29 inches. The soil may range to lower elevations and precipitations. The average annual growing season is 180 to 300 days.

Taxonomic class: These soils are loamy, mixed, nonacid, thermic, shallow Typic Xerorthents.

Typical pedon of Cieneba series in a unit of Rock outcrop-Cieneba complex, 50 to 75 percent slopes; Kern County, California; Sequoia National Forest, Cannell Meadow Ranger District; from the junction of Kernville road and Sierra Way in Kernville; 0.9 miles south on Sierra Way and 1/2 way up west-facing mountain slope; in the NW1/4 Sec. 23, T.25S., R.33E.

A1–0 to 12inches; pale brown (10YR 6/3) coarse sandy loam, brown (10YR 4/3) moist; moderate fine and medium granular structure; soft very friable, nonsticky and nonplastic; common very fine roots; common very fine interstitial pores; slightly acid; abrupt smooth boundary.

Cr–12 inches; highly weathered granitic material that has relic rock structure.

Range in characteristics: Depth to a paralithic contact is 40 to 20 inches. The profile ranges from 5 to 20 percent gravel. It is slightly acid or neutral. The profile is course sandy loam or sandy loam.

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

Competing soils: These are the Chawanakee Variant, Millerton family, Tollhouse Variant, and Kanaka family soils in other families. Millerton family soils have a lithic contact and an argillic horizon. Chawanakee Variant soils have a cambic horizon. Tollhouse Variant soils have a mollic epipedon. Kanaka family soils are moderately deep and have a cambic horizon.

Geographically associated soils: These are the Auberry, Bohna, and Chualar family soils, and the competing Chawanakee Variant soils. Auberry soils are deep and have an argillic horizon. Bohna soils are deep, have a mollic epipedon, and an argillic horizon. Chualar family soils are moderately deep, and have a mollic epipedon and an argillic horizon.

CROZIER SERIES

The Crozier series consists of moderately deep, well drained soils on mountain sides. These soils formed in residium derived dominantly from basalt. Slope ranges from 5 to 40 percent. The main plant communities are Yellow Pine Forest, White Fir-Sugar Pine Forest, Montane Chaparral, and Mixed Conifer. The elevation is 4,800 to 6,600 feet. The average annual precipitation is 20 to 39 inches, and the average annual growing season is 120 to 210 days.

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

Typical pedon of Crozier series in a unit of Boomer-Crozier-Rock outcrop complex, 5 to 40 percent slopes; Sequoia National Forest, Tulare County, Tule River Ranger District; about 0.5 miles west of Fish Creek on the south side of trail 32E16; in the NW1/4, SW1/4, NE1/4 sec. 11, T.20S., R.32E.

01–3 to 2 inches; undecomposed pine litter.

02–2 inches to 0; partially decomposed pine litter.

A11–0 to 3 inches; brown (7.5YR 5/3) cobbly loam, dark brown (7.5YR 3/4) moist; strong medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; 5 percent pebbles and 10 percent cobbles; neutral; abrupt smooth boundary.

A12–3 to 8 inches; dark brown (7.5YR 4/4) loam, dark brown (7.5YR 3/3) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; 5 percent pebbles; neutral; gradual smooth boundary.

B1–8 to 20 inches; brown (7.5YR 5/3) cobbly loam, dark reddish brown (5YR 3/3) moist; moderate medium and fine subangular blocky structure; hard, firm, slightly sticky and slightly plastic; common very fine and fine roots; many very fine tubular pores; 5 percent pebbles and 10 percent cobbles; neutral; gradual smooth boundary.

B2t–20 to 32 inches; brown (7.5YR 5/4) cobbly clay loam, dark brown (7.5YR 3/4) moist; moderate medium and fine subangular blocky structure; hard, firm, sticky and plastic; few very fine, fine and medium roots; few very fine and fine tubular pores; common thin clay films on faces of peds; 20 percent weathered basalt cobbles; slightly acid; clear wavy boundary.

R–32 inches; weathered basalt.

Range in characteristics: Depth to a lithic contact is 29 to 39 inches. The profile ranges from 5 to 35 percent gravel and cobbles. It is slightly acid or neutral.

Competing soils: These are the Boomer, Holland, Hotaw, and Hotaw Variant soils in the same family, and the Brownlee family soils in another family. Boomer soils are deep and are redder than 5YR. Holland soils are deep and have paralithic contact with granitic rock. Hotaw soils do not have hues of 5YR and have a paralithic contact with granitic rock. Hotaw Variant soils are 70 to 29 inches deep over metasedimentary rock. Brownlee family soils are deep, have a mollic epipedon, and have a paralithic contact with metamorphic rock.

Geographically associated soils: These are the Chaix, Chawanakee, and Dome soils, and the competing Boomer soils. Chaix, Chawanakee, and Dome soils don not have an argillic horizon and are coarse-loamy. Dome soils are deep, and Chawanakee soils are shallow.

DOME SERIES

The Dome series consists of deep, well drained soils on mountain sides. These soils formed in residuum derived from granitic rock. Slope ranges from 5 to 75 percent. The main plant communities are Yellow Pine Forest, Mixed Conifer Forest, White Fir-Sugar Pine Forest, and Montane Chaparral. The elevation is 5,000 to 7,400 feet. The average annual precipitation is 25 to 51 inches, and the average annual growning season is 120 to 210 days.

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

Typical pedon of Dome series in a unit of Dome-Chaix outcrop association, moderately steep; in Tulare County, California; Sequoia National Forest, Cannell Meadow Ranger District; on Bartolas Road, approximately 0.1 miles south of intersection of Forest Service Road 24S13, and 50 feet west of Bartolas Road; in the NE1/4 of sec. 35, T24S., R.34E.

01–2 inches to 0; forest duff of dead and decomposing pine needles, twigs, and bark.

A1–0 to 7 inches; grayish brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; weak coarse and medium subangular blocky structure parting to moderate fine and medium granular; slightly hard, very friable, nonsticky and nonplastic; common fine and very fine roots; few very fine and fine tubular pores and common very fine and fine interstitial pores; 14 percent pebbles; medium acid; clear smooth boundary.

B2–7 to 28 inches; pale brown (10YR 6/3) sandy loam, dark brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; many medium and coarse roots; common very fine tubular pores; 10 percent pebbles; medium acid; gradual smooth boundary.

C1–28 to 50 inches; very pale brown (10YR 7/3 sandy loam, yellowish brown (10YR 5/4) moist; massive;slightly hard, friable, nonsticky and nonplastic; many medium and coarse roots; few very fine and fine tubular pores; 10 percent pebbles; medium acid; clear smooth boundary.

C2–50 inches; highly weathered granitic rock that has retained original rock structure.

Range in characteristics: Depth to a paralithic contact is 39 to 59 inches. The profile ranges from 5 to 20 percent as gravel. It is coarse sandy loam or sandy loam.

The A horizon has dry color of 10YR 4/2, 4/3, 5/2, or 5/3 and moist color 10YR 3/2, 3/3, 4/2, or 4/3. Mollic colors do not extend below a depth of 9 inches. The horizon is slightly acid or medium acid. It ranges from 6 to 9 inches in thickness.

The B horizon has dry color of 10YR 5/3, 5/4, 6/3, or 6/4 and moist color of 10YR 3/3, 3/4, 4/3, 4/4, 5/3, or 5/4. Base saturation is 55 percent. The horizon is medium acid or stronly acid.

The C horizon has dry color of 10YR 6/3, 6/4, or 7/3 and moist color of 10YR 4/3, 4/4, or 5/4. The horizon is medium acid or strongly acid.

Competing soils: These are the Chaix soils in the same family, and the Cannell, Chawanakee, Shaver, and Wind River family soils in other families. Chaix soils are moderately deep. Cannell soils occur in the upper montane under Red Fir Forest. Chawanakee soils are shallow. Shaver soils have a thick unbric epipedon. Wind River family soils have a mollic epipedon.

Geographically associated soils: These are the Holland, Junipero family, and Woolstalf soils, and the competing Chaix and Chawanakee soils. Holland soils have an argillic horizon and are fine-loamy. Junipero family soils have a thick mollic epipedon. Woolstalf soils have a thick mollic epipedon and are loamy-skeletal.

GLEAN VARIANT

The Glean Variant consists of moderately deep, somewhat excessively drained soils on mountain sides and ridges. These soils formed in residuum derived from andesite. Slope ranges from 20 to 60 percent. The main plant communities are Yellow Pine Forest, Lodgepole Pine Forest, and Sagebrush Scrub. The elevation is 7,600 to 9,900 feet. The average annual precipitation is 20 to 29 inches, and the average annual growing season is 90 to 135 days.

Taxonomic class: These soils are loamy-skeletal, mixed, frigid Entic Ultic Haploxerolls.

Typical pedon of Glean Variant in a unit of Glean Variant extremely gravelly fine sandy loam, 20 to 60 percent slopes; in Inyo National Forest, Tulare County, Mt. Whitney Ranger District. On the east slope of Monache Mountain, about 1,000 feet south of trail 25E28 and 35E15 intersection, and about 1,500 feet west of trail 25E28; in the NE1/4, NE1/4 of sec. 9, T.20S., R.35E.

01–2 inches to 0; dead and decomposing pine needles.

A1–0 to 12 inches; brown (10YR 5/3) extremely gravelly fine sandy loam, very dark grayish brown (10YR 3/2) moist, weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many fine and medium roots; many fine and medium tubular pores; 60 percent pebbles and cobbles; neutral; clear wavy boundary.

C1–12 to 30 inches; light brownish gray (10YR 6/2) extremely gravelly sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure and single grain; soft, very friable, nonsticky and nonplastic; common medium and coarse roots; common fine tubular pores; 75 percent pebbles and cobbles; neutral; clear wavy boundary.

C2–30 to 36 inches; pale brown (10YR 6/3) extremely gravelly coarse sandy loam, dark yellowish brown (10YR 4/4) moist; single grain;loose; few coarse roots; 80 percent pebbles and cobbles; neutral; gradual wavy boundary.

R–26 inches; highly fractured andesite rock.

Range in characteristics: Depth to a lithic contact is 20 to 39 inches. The profile is fine sandy loam, sandy loam, or course sandy loam. It ranges from 50 to 80 percent as gravel and cobbles. The profile is slightly acid or neutral.

The A horizon has dry color of 10YR 5/2 or 5/3.

The C horizon has dry color of 10YR 6/2 or 6/3 and moist color of 10YR 4/3 or 4/4.

Competing soils: These are the Typic Haploxerolls, Jumpe family, Nanny family, Chesaw family, and Sirretta soils in other families. Typic Haploxerolls have a cambic horizon, are moderately well drained, and formed in alluvium. Jumpe family soils have an umbric epipedon and a cambic horizon. Chesaw family soils are sandy-skeletal. Sirretta soils have an ochric epipedon, a cambic horizon, and are moderately deep.

Geographically associated soils: These are the Cagwin, Cannell, and Toem soils, and the competing Nanny family and Sirretta soils. Cagwin soils are moderately deep, sandy, and have an ochric epipedon. Cannell soils have an ochric epipedon, a cambic horizon, and are coarse-loamy. Toem soils are shallow sandy soils that have an ochric epipedon.

HOLLAND SERIES

The Holland consists of deep, well drained soils on foothills, mountain sides, and ridges. These soils formed in residuum derived from granitic rock. Slope ranges from 2 to 75 percent. The main plant communities are Yellow Pine Forest, White Fir Forest, and Montane Chaparral. The elevation is 3,020 to 7,380 feet. The average annual precipitation is 20 to 51 inches and the average annual growing season is 120 to 210 days.

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

Typical pedon of Holland in a unit of Holland-Hotaw association, moderately steep; in Fresno County, California, Sequoia National Forest, Hume Lake Ranger District. On north side of Forest Service road 13S42, approximately 1 mile west of junction of 13S42 and 13S01; in the SW1/4, SW1/4 of sec. 15, T.13S., R.28E.

01–1 inch to 0; dead and decomposing pine and cedar needles, twigs, and bark.

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

B1–5 to 9 inches; pale brown (10YR 6/3) sandy loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and medium roots; common very fine tubular pores; very few thin clay films as bridges between mineral grains; medium acid; gradual smooth boundary.

B21t–9 to 18 inches; pale brown (10YR 6/3) sandy clay loam, dark brown (10YR 4/3) moist; weak medium and coarse subangular blocky structure; hard, firm, slightly sticky and slightly plastic; common fine and medium roots; common very fine tubular pores; few thin clay films as bridges between mineral grains; medium acid; gradual smooth boundary.

B22t–18 to 25 inches; light yellowish brown (10YR 6/4) sandy clay loam, dark brown (10YR 4/3) moist; weak medium and coarse subangular blocky structure; hard, firm, sticky and plastic; few medium roots; few very fine tubular pores; few thin clay films as bridges between mineral grains; medium acid; gradual smooth boundary.

B23t–25 to 46 inches; yellowish brown (10YR 5/4) sandy clay loam, brown (7.5YR 4/4) moist; weak medium and coarse subangular blocky structure; hard, firm, sticky and plastic; few medium roots; few very fine tubular pores; common thin clay films on faces of peds and as bridges between mineral grains; medium acid; gradual smooth boundary.

B3t–46 to 59 inches; light yellowish brown (10YR 6/4) sandy clay loam; yellowish brown (10YR 5/4) moist; weak medium and coarse subangular blocky structure; hard, firm, sticky and plastic; few medium roots; few very fine tubular pores; common thin clay films as bridges between mineral grains; medium acid.

Range in characterisitics: Depth to a paralithic contact is 59 to 78 inches. The profile is slightly acid in the surface layer and strongly acid in the subsoil.

The A horizon has dry color of 10YR 4/2, 5/2, 5/3, or 7.5YR 5/4 and moist color of 10YR 4/3, 3/3, or 3/2. The horizon is sandy loam or loam. It ranges from 5 to 8 inches in thickness.

The B2t horizon has dominant dry color of 7.5YR 5/6 or 6/6 or 5YR 5/6 and moist color of 7.5YR 4/4 or 5/6 or 5YR 4/6 or 4/8. The horizon is sandy clay loam or clay loam or clay loam. In some areas the dry color ranges to 10YR 6/3, 6/4, or 5/4 and the moist color ranges to 10YR 4/3, 4/4, 5/4, or 5/6.

Some of the Holland soils in this survey area a taxadjunct to the Holland series because they have a hue of 10YR. This difference, however, does not significantly effect use and management.

Competing soils: These are the Boomer, Crozier, Hotaw, and Hotaw Variant soils in the same family, and the Auberry and Brownlee family soils in other families. Boomer soils do not have a hue of 7.5YR or 5YR and they formed in basalt. Crozier soils are moderately deep, have a lithic contact, and formed in basalt. Hotaw soils are moderately deep and do not have a hue of 5YR. Hotaw Variant soils are moderately deep over metasedimentary rock. Auberry occur at lower elevations under communities of Foothill Woodland, Mixed Chaparral, or Chamisal. Brownlee family soils have a mollic epipedon and formed in metamorphic rock.

Geographically associated soils: These are the Bohna, Chaix, Chawanakee, Dome, and Shaver soils, and the competing Auberry and Hotaw soils. Bohna soils have a mollic epipedon and occur under communities of Foothill Woodland or Mixed Chaparral. Chaix

soils are moderately deep, do not have an argillic horizon, and are coarse-loamy. Chawanakee soils are shallow, do not have an argillic horizon, and are coarse-loamy. Dome soils do not have an argillic horizon and are couarse-loamy. Shaver soils have a thick unbric epipedon, do not have an argillic horizon, and are coarse-loamy.

HOTAW SERIES

The Hotaw series consists of moderately deep, well drained soils on foothills, mountain sides, and ridges. These soils formed in residuum dervived from granitic rock. Slope ranges from 5 to 50 percent. The main plant communities are Yellow Pine Forest, White Fir Forest, and Montane Chaparral. The elevation is 3,200 to 7,600 feet. The average annual precipitation is 29 to 51 inches, and the average annual growing season is 120 to 210 days.

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

Typical pedon of Hotaw series in a unit of Holland-Hotaw association, moderately steep; in Sequoia National Forest, Fresno County, Hume Lake Ranger District; on the north side of Forest Service road 13S42, approximately 1.2 miles west of its junction with road 13S01; in the SE1/4, SE1/4 of sec. 16, T.13S., R.28E.

A1–0 to 6 inches; brown (10YR 5/3) sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium and fine subangular blocky structure and moderate medium and fine granular; slightly hard, very friable, nonsticky and slightly plastic; common fine and very fine roots; common very fine and fine interstitial pores; slightly acid; clear smooth boundary.

B1t–6 to 14 inches; light yellowish brown (10YR 6/4) sandy clay loam, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common fine, medium, and coarse roots; few fine and very fine tubular pores; few thin clay films as bridges between mineral grains; medium acid; gradual wavy boundary.

B2t–14 to 32 inches; strong brown (7.5YR 5/6) clay loam, dark brown (7.5YR 4/4) moist; moderate medium and fine subangular blocky structure; hard, firm, sticky and plastic; few fine and very fine roots and common medium and coarse roots; common fone and very fine tubular pores; common moderately thick clay films on faces of peds; medium acid; clear wavy boundary.

Cr–32 inches; highly weathered granitic rock material retaining original rock structure; massive; common moderately thick clay films as bridges between mineral grains.

Range in characteristics: Depth to a paralithic contact is 21 to 39 inches.

The A horizon has dry color of 10YR 5/3 or 7.5YR and moist color of 10YR 3/2 or 7.5YR 4/4 or 3/2. The horizon is sandy loam, loam, or clay loam, It is slightly acid or neutral. The A horizon ranges from 5 to 9 inches in thickness.

The B2t horizon has dry color of 7.5YR 4/4 or 5/6 or 10YR 4/3 and moist color of 7.5YR 4/4 or 3/4 or 10YR 4/2.

Competing soils: These are the Boomer, Crozier, Holland, and Hotaw Variant soils in the same family, and the Auberry and Brownlee family soils in other families. Boomer soils are deep and have a hue redder than 7.5YR. Crozier soils have a lithlic contact and formed in basalt. Holland soils are deep. Hotaw Variant soils have a lithic contact and formed in metasedimentary rock. Auberry soils are deep and occur under communities of Foothill Woodland, Mixed Chaparral, or Chamisal. Brownlee family soils are deep and have a mollic epipedon.

Geographically associated soils: These are the Chaix, Chawanakee, Dome, and Shaver soils, and the competing Holland soils. Chaix soils do not have an argillic and are coarse-loamy. Chawanakee soils are shallow, do not have an argillic horizon, and are coarse-loamy. Dome soils are deep, do not have a argillic horizon, and are coarse-loamy. Shaver soils are deep, have a thick umbric epipedon, do not have an argillic horizon, and are coarse loamy.

HOTAW VARIANT

The Hotaw Variant consists of moderately deep, well drained soils on mountain sides and ridges. These soils formed in residuum derived from metamorphic and metasedimentary rock. Slope ranges from 30 to 75 percent. The main plant communities are Yellow Pine Forest, White Fir Forest, and Montane Chaparral. The elevation is 3,900 to 7,200 feet. The average annual precipitation is 29 to 39 inches, and the average annual growing season is 120 to 210 days.

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

Typical pedon of Hotaw Variant in a unit of Hotaw Variant-Brownlee family-Rock outcrop complex, 40 to 75 percent slopes; in Tulare County, California, Sequoia National Forest, Hume Lake Ranger District; on north side of Forest Service Road 14S35 approximately 1.1 miles east of the junction with road 14S43; in the center of the NE1/4, SE1/4 of sec. 13, T.14S., R.28E.

A1–0 to 5 inches; dark brown (7.5YR 4/4) loam, dark brown (7.5YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine, medium, and coarse roots; common fine and very fine tubular pores; 10 percent pebbles; slightly acid; clear smooth boundary.

B21–5 to 16 inches; dark brown (7.5YR 4/4) gravelly loam, dark brown (7.5YR 3/4) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and very fine tubular pores; 20 percent pebbles; slightly acid; clear smooth boundary.

B22t–16 to 28 inches; dark brown (10YR 4/3) gravelly clay loam, dark grayish brown (10YR 4/2) moist; strong medium and fine subangular blocky structure; hard, friable, sticky and plastic; common fine, medium, and coarse roots; common fine, and course tubular pores; few thin clay films as bridges between mineral grains and on faces of peds; 20 percent pebbles; slightly acid; abrupt irregular boundary.

R–28 inches; vertically tilted and highly fractured metasedimentary rock.

Range in characteristics: Depth to a lithic contact is 20 to 29 inches.

Competing soils: These are the Boomer, Crozier, Holland, and Hotaw soils in the same family, and the Brownlee family soils in another family. Boomer soils are deep and have a hue redder than 7.5YR. Crozier soils have a hue redder than 7.5YR and formed in basalt. Holland soils are deep and formed in granite. Hotaw soils are formed in granite and typically are more than 30 inches deep. Brownlee family soils are deep and have a mollic epipedon.

Geographically associated soils: These are the Chualar family and Shaver soils, and the competing Brownlee family and Holland soils. Chualar family soils have a mollic epipedon and occur under a community of Mixed Chaparral. Shaver soils have a thick umbric epipedon and do not have an argillic horizon.

JUMPE FAMILY

The Jumpe family consists of deep, well drained soils on mountain sides. These soils formed in residuum derived from metasedimentary rock. Slope ranges from 30 to 75 percent. The main plant communities are Red Fir Forest, Lodgepole Pine Forest, and White Fir Forest. The elevation is 7,200 to 9,300 feet. The average annual precipitation is 20 to 39 inches, and the average annual growing season is 90 to 135 days.

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

Typical pedon of Jumpe family in a unit of Baldmountain-Rock outcrop-Jump family complex, 5 to 30 percent slopes; in Sequoia National Forest, Tulare County, Cannell Meadow Ranger District; on the east side of Forest Service road 22S01 at the junction with Forest Service road 12S10; in the SW1/4, NE1/4 of sec. 24, T.23S., R.33E.

A1–0 to 8 inches; brown (7.5YR 4/4) sandy loam, dark reddish brown (5YR 3/3) moist; moderate medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many fine and medium roots; many fine tubular pores; neutral; clear smooth boundary.

B2–8 to 23 inches; brown (7.5YR 4/4) gravelly fine sandy loam, reddish brown (5YR 4/3) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common fine and medium roots; many fine tubular pores; 30 percent pebbles and 15 percent cobbles; neutral; clear smooth boundary.

C1–23 to 47 inches; reddish yellow (7.5YR 7/6) very gravelly loam, strong brown (7.5YR 5/6) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; common medium roots; common fine tubular pores; 50 percent pebbles; few thin clay films lining tubular pores; slightly acid; clear smooth boundary.

C2–47 to 51 inches; reddish yellow (7.5YR 6/6) extremely gravelly and cobbly fine sandy loam, strong brown (7.5YR 5/6) moist; moderate medium subangular blocky structure grading to massive; slightly hard, friable, slightly sticky and slightly plastic; few coarse roots; common fine tubular pores; 65 percent pebbles and 25 percent cobbles; slightly acid.

Range in characteristics: The solum ranges from 8 to 23 inches in thickness. Depth to rock ranges from 51 to 78 inches. The profile ranges from 35 to 90 percent gravel and cobbles. It is neutral or slightly acid.

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

The B horizon has dry color of 10YR 6/4 or 7.5YR 4/4 OR 5/4 and moist color of 10YR 4/4, 5YR, 4/3, or 7.5YR 3/4.

Competing soils: These are the Glean Variant, Nanny family, Chesaw family, and Sirretta soils in other families. Glean Variant soils are moderately deep, have a mollic epipedon, and do not have a cambic horizon. Nanny family soils are only as red as 7.5YR and have an umbric epipedon. Chesaw family soils are moderately deep, have a mollic epipedon, do not have a cambic horizon, and are sandy-skeletal. Sirretta soils are moderately deep, do not have a cambic horizon, and are sandy-skeletal.

Geographically associated soils: These are the Baldmountain, Cagwin, Cannell, and Chumstick family soils, and the competing Nanny family soils. Baldmountain soils have a mollic epipedon and are coarse-loamy. Cagwin soils are moderately deep, sandy, and do not have a cambic horizon. Cannell soils are coarse-loamy and formed in granite. Chumstick family soils are shallow.

JUNIPERO FAMILY

The Junipero family consists of deep, moderately well drained soils in upland basins. These soils formed in alluvium derived from granitic and metamorphic rock. Slope ranges from 0 to 15 percent. The main plant community is Montane Meadow. The elevation is 4,700 to 7,600 feet. The average annual precipitation is 20 to 40 inches, and the average annual growing season is 120 to 210 days.

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

Typical pedon of Junipero family in a unit of Monache Variant, drained, warm-Junipero family association, gently sloping; in Tulare County, California, Sequoia National Forest, Cannell Meadow Ranger District; at the south end of True Meadow; in NW1/4, NW1/4 of sec. 34, T.24S., R.34E.

A1–0 to 12 inches; grayish brown (10YR 5/2) loam, very dark gray (10YR 3/1) moist; weak medium subangular blocky structure parting to strong very fine and fine granular; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; common fine tubular pores; many very fine and fine interstitial pores; slightly acid; gradual smooth boundary.

B2–12 to 30 inches; grayish brown (10YR 5/2) sandy loam, very dark gray (10YR 3/1) moist; moderate medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; very few fine and fine roots; common very fine and fine tubular pores; slightly acid; clear smooth boundary.

C1–30 to 48 inches; light brownish gray (10 YR 6/2) sandy loam, grayish brown (10YR 5/2) moist; few fine faint mottles that are dark brown (10YR 4/3) when moist; weak medium and coarse subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; very few fine and fine roots; few very fine tubular pores; neutral; gradual smooth boundary.

C2–48 to 59 inches; light brownish gray (10YR 6/2) loamy sand, grayish brown (10YR 5/2) moist; few fine and medium distinct mottles that are yellowish brown (10YR 5/6) when moist; weak medium and coarse subangular blocky structure; soft very friable, nonsticky and nonplastic; very few very fine and fine roots; few very fine tubular pores; neutral.

Range in characteristics: The solum ranges from 20 to 29 inches in thickness. The profile is mainly loam and sandy loam, but in some pedons the substratum is coarser textured. The profile is neutral or slightly acid.

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

The B2 horizon has colors similar to those of the horizon.

The C horizon has dry color of 10YR 6/2 or 6/3 and moist color of 10YR 5/2 or 5/3. The mottles have moist color of 10YR 4/3, 5/3, 5/4, 5/6, or 5/8.

Competing soils: These are the Typic Haploxerolls, Monache, the Monache Variant, drained, warm, and the Shaver and Shaver Variant soils in other families. Typic Haploxerolls have a mollic epipedon that is not thick, and they are in an upper montane community of Montane Meadow. Monache soils have an irregular decrease in organic matter as depth increases, and are in the upper montane communities of Montane Meadow and Lodgepole Pine Forest. Monache Variant, drained, warm soils are somewhat poorly drained and have an irregular decrease in organic matter as depth increases. Shaver soils are well drained, have thick umbric epipedon, and a paralithic contact. Shaver Variant soils are well drained, moderately deep, have a paralithic contact, and occur under Foothill Woodland and Mixed Chaparral communities.

Geographically associated soils: These are the Chaix, Chawanakee, Dome, and Holland soils, and the competing Monache Variant, drained, warm soils. Chaix soils have an ochric epipedon and are moderately deep. Chawanakee soils are shallow and have an ochric epipedon. Dome soils have an ochric epipedon and are well drained. Holland soils are well drained, have an ochric epipedon and an argillic horizon, and are fine-loamy.

KANAKA FAMILY

The Kanaka family consists of moderately deep, well drained soils on foothills and mountain sides. These soils formed in residuum derived from granitic rock. Slope ranges from 30 to 75 percent. The main plant communities are Foothill Woodland and Mixed Chaparral. The elevation is 1,600 to 5,000 feet. The average annual precipitation is 23 to 29 inches, and the average annual growing season is 180 to 300 days.

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

Typical pedon of Kanaka family in a unit of Kanaka-Millerton families-Rock outcrop association, steep; in Sequoia National Forest, Tule River Ranger District, Tulare County; at the Forest entry sign on Highway 190, about 220 feet north of the highway; in NE1/4, NW1/4 of sec. 6, T.21S., R.30E.

A11–0 to 2 inches; pale brown (10YR 6/3) gravelly coarse sandy loam, brown (10YR 4/3) moist; weak fine granular structure; slightly hard, very friable, nonsticky and nonplastic; many very fine roots; many very fine and fine interstitial pores; 30 percent pebbles; slightly acid; clear smooth boundary.

A12–2 to 9 inches; brown (10YR 5/3) gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots; many very fine and fine interstitial pores and common very fine tubular pores; 20 percent pebbles; slightly acid; clear smooth boundary.

B2–9 to 18 inches; yellowish brown (10YR 5/4) gravelly sandy loam, dark yellowish brown (10YR 3/4) moist; weak fine and very fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots; many very fine and fine interstitial pores and common very fine tubular pores; very few thin clay films lining tubular pores; 15 percent pebbles; slightly acid; clear smooth boundary.

C1–18 to 26 inches; light yellowish brown (10YR 6/4) gravelly coarse sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine and fine tubular and interstitial pores; few moderately thick clay films lining tubular pores and bridging mineral grains around pebbles; 15 percent pebbles; slightly acid; clear smooth boundary.

C2r–26 inches; light yellowish brown (10YR 6/4) highly weathered granitic rock, dark yellowish brown (10YR 4/4) moist; relic rock structure; many moderately thick clay films lining pores and bringing mineral grains.

Range in characteristics: Depth to a paralithic contact is 20 to 39 inches. The profile ranges from 5 to 30 percent gravel. It is sandy loam or coarse sandy loam. The profile is slightly acid or neutral.

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

The B2 horizon has dry color of 10YR 5/4 or 6/4 and moist color of 10YR 3/4 or 4/3, 4/4 or 7.5YR 4/4.

Competing soils: These are the Cieneba and Shaver Variant soils in other families. Cieneba soils do not have a cambic horizon and are shallow. Shaver Variant soils have a thick mollic epipedon.

Geographically associated soils: These are the Auberry, Chawanakee Variant, and Millerton family soils. Auberry soils are deep and have a fine-loamy atgillic horizon. Chawanakee Variant soils are shallow. Millerton family soils are shallow with a lithic contact and do not have a cambic horizon.

KRIEST FAMILY

The Kriest family, consists of moderately deep, well drained soils on mountain sides. These soils formed in residuum derived from granitic rock. Slope ranges from 5 to 75 percent. The main plant communities are Red Fir Forest, White Fir Forest, and Montane Chaparral. The elevation is 6,560 to 9,000 feet. The average annual precipitation is 29 to 51 inches, and the average annual growing season is 90 to 135 days.

Taxonomic class: coarse-loamy, mixed, frigid Dystric Xerochrepts

Typical pedon of Kriest family, in a unit of Cannell-Kriest family-Rock outcrop complex, 5 to 30 percent slopes; in Fresno County, California, Sequoia National Forest, Hume Lake Ranger District; on Forest Service road 13S04, approximately 1.4 miles south of intersection of Forest Service roads 13S04 and 14S02 toward Buck Rock Lookout; in the SE1/4 of sec. 31, T.13S., R.29E.

01–2 inches to 0; partially decomposed forest litter.

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

B1–5 to 14 inches; pale brown (10YR 6/3) sandy loam, dark brown (10YR 4/3) moist; moderate fine granular structure and weak fine subangular blocky; soft, very friable, nonsticky and nonplastic; many medium and coarse roots; common fine interstitial pores; 10 percent pebbles; neutral; gradual smooth boundary.

B2–14 to 32 inches; pale brown (10YR 6/3) sandy loam, dark brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many medium and coarse roots; common fine interstitial pores; 10 percent pebbles; slightly acid; abrupt wavy boundary.

Cr–32 inches; weathered granitic rock retaining original rock structure.

Range in characteristics: Depth to a paralithic contact is 20 to 40 inches. The profile is slightly acid or neutral and is sandy loam or course sandy loam. It ranges from 5 to 20 percent gravel.

The A horizon has dry color of 10YR 4/2, 4/3, or 5/2 and moist color of 10YR 3/2, 3/3, or 3/4. The A horizon ranges from 5 to 8 inches in thickness.

The B horizon has dry color of 10YR 5/3, 5/4, 6/3, or 6/4 and moist color of 10YR 4/3, 4/4, 5/3, or 5/4.

Competing soils: These are the Cannell soils in the same family, and the Cagwin and Chaix soils in other families. Cannell soils are deep. Cagwin soils are sandy and do not have a cambic horizon. Chaix soils occur the lower montane community of Yellow Pine Forest.

Geographically associated soils: These are the Nanny family and Toem soils and the competing Cagwin and Cannell soils. Nanny family soils are deep, have an umbric epipedon, and are skeletal. Toem soils are shallow, sandy, and do not have a cambic horizon.

LIVERMORE FAMILY

The Livermore family consists of moderately deep, well drained soils on foothills and mountain sides. These soils formed in residuum derived from metasedimentary rock. Slope ranges from 30 to 75 percent. The main plant communities are foothill Woodland and Mixed Chaparral. The elevation is 3,500 to 7,000 feet. The average annual precipitation is 8 to 30 inches, and the average annual growing season is 180 to 300 days.

Taxonomic class: These soils are loamy-skeletal, mixed, thermic Typic Haploxerolls.

Typical pedon of Livermore family in a unit of Livermore family-Rock outcrop complex, 30 to 50 percent slopes; in Sequoia National Forest, Greenhorn Ranger District, Kern County; above large cutbank on Highway 155, about 0.4 miles east of Cedar Creek campground; in the NE1/4, NW1/4 of sec. 19, T.25S., R.32E.

01–1 inch to 0; litter from oaks and shrubs.

A11–0 to 5 inches; dark brown (10YR 3/3) stony sandy loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine and few fine tubular pores; 15 percent pebbles and 5 percent stones; slightly acid; gradual wavy boundary.

A12–5 to 18 inches; dark brown (10YR 3/3) cobbly sandy loam, very dark brown (10YR 2/2) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many fine roots; many fine tubular pores; 15 percent pebbles and 15 percent cobbles; slightlu acid; gradual wavy boundary.

B2–18 to 25 inches; strong brown (7.5YR 5/6) very gravelly sandy loam, brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine roots; many very fine tubular fine interstitial pores; 45 percent pebbles and 20 percent cobbles; slightly acid; clear smooth boundary.

C1–25 to 29 inches; brown (7.5YR 5/4) very gravelly sandy loam, brown (7.5YR 4/4) moist; weak medium subangular blocky structure and massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; 65 percent pebbles and 25 percent cobbles; slightly acid; gradual wavy boundary.

C2r–29 inches; weathered metasedimentary rock.

Range in characteristics: Depth to a paralithic or lithic contact is 20 to 39 inches. The profile ranges from 35 to 90 percent gravel and cobbles. It is slightly acid or neutral.

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

The B horizon has dry color of 10YR 5/4 or 7.5YR 5/6 and moist color of 10YR 4/3 or 7.5YR 4/4.

Competing soils: These are the Shaver Variant and Tollhouse Variant soils in other families. Shaver Variant soils have a thick mollic epipedon and are coarse-loamy. Tollhouse Variant soils do not have a cambic horizon and are loamy and shallow.

Geographically associated soils: These are the Auberry, Bohna, Chualar family, and Cieneba soils. Auberry soils are deep and have an ochric epipedon and an argillic horizon. Bohna soils are deep and have an argillic horizon. Chualar family soils have anrgillic horizon and are not skeletal. Cieneba soils have an ochric epipedon, are shallow, and are not skeletal.

MILLERTON FAMILY

The Millerton family consists of shallow, well drained soils on foothills and mountain sides. These soils formed in residuum derived from granitic rock. Slope ranges from 30 to 50 percent. The main plant communities are Foothill Woodland and Mixed Chaparral. The elevation is 1,600 to 4,000 feet. The average annual precipitation is 16 to 35 inches, and the average annual growing season is 180 to 300 days.

Taxonomic class: These soils are loamy, mixed, thermic Lithic Haploxeralfs.

Typical pedon of Millerton family in a unit of Kanaka-Millerton families-Rock outcrop association, steep; in Sequoia National Forest, Tule River Ranger District, Tulare County; about 300 feet north of large turnout on Highway 190 just west, and overlooking, Coffee Camp Picnic area (and 30 to 45 feet north of range enclosure fence); in the SE1/4, SW1/4 of sec. 29, T.20S., R.30E.

01–1 inch to 0; annual grass litter.

A11–0 to 1 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; moderate fine granular structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine interstitial pores; 15 percent pebbles; neutral; abrupt smooth boundary.

A12–1 to 6 inches; light yellowish brown (10YR 6/4) gravelly sandy loam, dark yellowish brown (10YR 3/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; common very fine tubular pores; 15 percent pebbles; slightly acid; clear smooth boundary.

B1–6 to 11 inches; brown (7.5YR 5/4) gravelly sandy loam, dark brown (7.5YR 3/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; common very fine and fine tubular pores; 20 percent pebbles; slightly acid; clear smooth boundary.

B2t–11 to 14 inches; brown (7.5YR 5/4) sandy clay loam, dark brown (7.5YR 3/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine tubular pores; few thin clay films in pores and bridging sand grains; slightly acid; abrupt smooth boundary.

R–14 inches; hard granitic rock; thin, discontinuous, brown clay films coating upper surface of the rock.

Range in characteristics: Depth to a lithic contact is 8 to 20 inches.
Competing soils: These are the Chawanakee Variant, Cieneba, and Tollhouse Variant soils in other families. Chawanakee Variant soils have a cambic horizon and a paralithic contact. Cieneba soils have a paralithic contact. Tollhouse Variant soils have a mollic epipedon and a paralithic contact.

Geographically associated soils: These are the Auberry and Kanaka family soils, and the competing Cieneba soils. Auberry soils are deep and have a paralithic contact. Kanaka family soils are moderately deep and have a cambic horizon and a paralithic contact.

MONACHE SERIES

The Monache series consists of deep, moderately well drained soils on the edges of upland basin. These soils formed in alluvium derived dominantly from granitic rock. Slope ranges from 0 to 15 percent. The main plant communities are Sagebrush Scrub and Lodgepole Pine Forest. The elevation is 6,000 to 9,000 feet. The average annual precipitation is 14 to 50 inches, and the average annual growing season is 90 to 135 days.

Taxonomic class: These soils are coarse-loamy, mixed, frigid Cumulic Ultic Haploxerolls.

Typical pedon of Monache series in a unit of Monache Variant, drained-Monache association, gently sloping; in Tulare County, California, Sequoia National Forest, Cannell Meadow Ranger District; approximately 0.2 miles northeast of Troy Meadow campground, where Fish Creek disects Troy Meadows; in the SW1/4, NE1/4 of sec. 30, T.21S., R.35E

A11–0 to 13 inches; grayish brown (10YR 4/2) very fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium and fine subangular blocky structure and moderate fine and very fine granular structure; soft, very friable, nonsticky and slightly plastic; many medium, fine and very fine roots; few fine and very fine tubular pores and common fine and very fine interstitial pores; slightly acid; gradual smooth boundary.

A12–13 to 23 inches; grayish brown (10YR 5/2) very fine sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common medium, fine and very fine roots; very few very fine tubular pores; slightly acid; gradual smooth boundary.

C1–23 to 35 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; few fine faint dark brown (10YR 4/3) mottles; weak coarse and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few medium, fine, and very fine roots; very few very fine tubular pores; 5 percent pebbles; slightly acid; clear smooth boundary.

C2–35 to 59 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; common fine faint dark brown (10YR 4/3) mottles; weak coarse, medium, and fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; very few fine and very fine roots; very few very fine tubular pores; 20 percent pebbles; neutral.

Range in characteristics: The solum ranges from 20 to 23 inches in thickness. The profile is slightly acid or neutral. Faint mottles occur below a depth of 20 inches.

The A horizon has dry color of 10YR 4/2, 4/3, 5/2, or 5/3 and moist color of 10YR 3/2 or 3/3. The horizon is fine sandy loam, very fine sandy loam, or loam. It ranges from 20 to 30 inches in thickness.

The C horizon has dry color of 10YR 4/2, 4/3, 5/3, 6/2, or 6/3 and moist color of 10YR 3/2, 3/3, 4/2, 4/3, or 4/4. The horizon is loam or sandy loam. It ranges from 0 to 30 percent gravel.

Competing soils: These are the Monache Variant soils, drained, Typic Haploxerolls, and Junipero family soils in other families. Monache Variant soils, drained have a water table that fluctuates between depths of 6 and 2 feet and have faint mottles. Typic Haploxerolls soils do not have a thick mollic epipedon and have organic matter that decreases regularly as depth increases. Junipero family soils occur in montane meadows associated with Yellow Pine Forest.

Geographically associated soils: These are the Cagwin, Monache Variant, Nanny family, Chesaw family, and Toem soils, and the competing Monache Variant soils, drained. Cagwin soils have an ochric epipedon, are moderately deep, and are sandy. Nanny family soils have an umbric epipedon and are loamy-skeletal and well drained. Chesaw family soils are moderately deep, do not have a thick mollic epipedon, and are sandy-skeletal. Toem soils are shallow, have an ochric epipedon, and are sandy.

MONACHE VARIANT

The Monache Variant consists of deep, poorly drained soils on upland basins. These soils formed in alluvium derived dominantly from granitic rock. Slope ranges from 2 to 5 percent. The main plant community is Montane Meadow. The elevation is 7,200 to 8,500 feet. The average annual precipitation is 25 to 39 inches, and the average annual growing season is 90 to 135 days.

Taxonomic class: These soils are coarse-loamy, mixed, frigid Cumulic Haplaqolls.

Typical pedon of Monache Variant in a unit of Cannell-Nanny family-Monache Variant association, moderately steep, moderately steep; in Sequoia National Forest, Tulare County, Tule River Ranger District; west of Forest Service road 20S75, near the center of Coffee Mill Meadow; in the E1/2, SE1/4 of sec, 31, T.20S., R.32E. (Colors are for moist soil.)

A11–0 to 16 inches, black (2.5YR 2/0) silt loam; many very fine, fine, and medium roots; moist throughout; strongly acid.

A12–16 to 25 inches; black and very dark gray (10YR 2/1 and 3/1) silt loam; many very fine and fine roots; standing water in auger hole at 20 inches; stongly acid.

A13–25 to 37 inches; very dark gray (10YR 3/1) silt loam and strata of silty clay loam, common medium distinct reddish brown (5YR 5/3) mottles; many very fine roots and common fine and medium roots; saturated; standing water in auger hole; strongly acid.

C–37 to 43 inches; very dark grayish brown (2.5YR 3/2) silty clay loam; common medium distinct reddish brown (5YR 5/3) mottles as above; common roots; saturated; standing water in auger hole; strongly acid.

Range in characteristics: The profile is erratically stratified with loamy sand to silty clay loam. The control section averages loam or silt loam and is less than 18 percent clay.

Some pedons are partially drained by entrechment of the streamcourse and have annual soil temperatures that exceed 8 degrees centigrade. These differences do not affect use and management.

Competing soils: These are the Typic Haploxerolls and the Monache soils in other families. Typic Haploxerolls have a mollic epipedon less than 20 inches thick, are moderately well drained, and are neutral or mildy alkaline. Monache soils are moderately well drained and are slightly acid or neutral.

Geographically associated soils: These are the Cannell and Nanny family soils. Cannell soils have an ochric epipedon, a cambic horizon, and a paralithic contact. Nanny family soils have an umbric epipedon, a cambic horizon, are loamy-skeletal, and have a paralithic contacy. Both soils are well drained.

NANNY FAMILY

The Nanny family consists of deep, well drained soils on mountain sides and ridges. These soils formed in residuum derived from granitic rock. Slope ranges from 2 to 50 percent. The main plant communities are Red Fir Forest, White Fir Forest, Lodgepole Pine Forest, and Montane Chaparral. The elevation is 7,200 to 9,800 feet. The average annual precipitation is 14 to 45 inches, and the average annual growing season is 90 to 135 days.

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

Typical pedon of Nanny family in a unit of Sirretta-Rock outcrop Nanny family complex, 30 to 50 percent slopes; in Tulare County, California, Sequoia National Forest, Hot Springs Ranger District; on west side of Forest Service road 24S08, toward the Tobias Lookout, and south about 0.5 miles from the junction of Forest road 24S24 and 24S08; near the center of sec. 7, T.24S., R.32E.

01–1 inch to 0; red fir litter.

A1–0 to 6 inches; very dark grayish brown (10YR 3/2) stony sandy loam, very dark gray (10YR 3/1) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many fine and few medium roots; many very fine tubular and interstitial pores; 10 percent pebbles, 10 percent cobbles, and 5 percent stones; medium acid, clear wavy boundary.

B21–6 to 16 inches; brown (10YR 4/3) sandy loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many fine and few medium roots; many very fine tubular and interstitial pores; medium acid; clear wavy boundary.

IIB22–16 to 29 inches; pale brown (10YR 6/3) extremely gravelly fine sandy loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many fine and few medium roots; many very fine interstitial pores and few very fine tubular pores; 35 percent pebbles, 20 percent cobbles, and 15 percent stones; medium acid; clear smooth boundary.

IIC1–29 to 42 inches; yellowish brown (10YR 5/4) very gravelly loamy fine sand, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and coarse roots; common very fine interstitial pores; 40 percent pebbles, 10 percent cobbles, and 5 percent stones; medium acid; clear smooth boundary.

IIC2–42 to 74 inches; yellowish brown (10YR 5/4) loamy fine sand, brown (10YR 5/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine and coarse roots; common very fine intersitial pores; slightly acid.

Range in characteristics: Depth to a paralithic contact is 59 to 78 inches. The profile ranges from 35 to 80 percent gravel, cobbles, and stones.

The A horizon has dry color of 10YR 5/3, 4/2, or 3/2 and moist color of 10YR 3/1 or 3/2. It is sandy loam or gravelly sandy loam. Base saturation is 31 percent.

The B2 horizon has dry color of 10YR 6/3 or 4/3 and moist color of 10YR 3/3, 4/3, or 5/3. It is sandy loam, gravelly sandy loam, or very gravelly fine sandy loam and is medium acid or neutral. Base saturation of the B21 horizon is 37 percent.

The C horizon has dry color of 10YR 6/3, 7/3, or 5/4 and moist color of 10YR 4/3, 5/3, or 6/3. It is gravelly sandy loam, very gravelly loamy fine sand, or loamy fine sand and is neutral or slightly acid.

Competing soils: These are the Chesaw family, Glean Variant, Jumpe family, and Sirretta soils in other families. Glean Variant soils have a mollic epipedon, are moderately deep, and do not have a cambic horizon. Jumpe family soils have an ochric epipedon and have colors redder than 7.5YR. Chesaw family soils are moderately deep, have a mollic epipedon, do not have a cambic horizon, and are sandy-skeletal. Sirretta soils have an ochric epipedon, are moderately deep, do not have a cambic horizon, and are sandy-skeletal.

Geographically associated soils: These are the Cagwin, Cannell, Kriest family, and Toem soils, and the competing Chesaw family soils. Cagwin soils are moderately deep and sandy. They have an ochric epipedon and are coarse-loamy. Kriest family soils are moderately deep, have an ochric epipedon and are coarse-loamy. Toem soils are shallow and sandy and do not have a cambic horizon.

SHAVER SERIES

The Shaver series consists of deep, well drained soils on mountain sides. These soils are formed in residuum derived from granitic rock. Slope ranges from 2 to 75 percent. The main plant communities are Yellow Pine Forest, White Fir Forest, and Montane Chaparral. The elevation is 4,500 to 7,500 feet. The average annual precipitation is 25 to 51 inches, and the average growing season is 120 to 210 days.

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

Typical pedon of Shaver series in a unit of Shaver-Chaix association, moderately steep. Kern County, California, Sequoia National Forest, Greenhorn Ranger District; on right side of Forest Service road 27S02, 2.5 miles southeast of Saddle Spring campground, at red metal fencepost; in the SW1/4 of sec. 13, t.28S., R.33E.

01–2 inches to 0; undecomposed and partially decomposed needles and twigs.

A11–0 to 4 inches; brown (10YR 4/3) fine sandy loam, very dark grayish brown (10YR 3/2) moist; moderate very fine granular structure; soft, very friable, nonsticky and nonplastic; many fine and medium roots; many fine interstitial pores; 5 percent fine and very fine pebbles; slightly acid; clear smooth boundary.

A12–4 to 14 inches; brown (10YR 4/3) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many fine roots and few medium and coarse roots; many fine tubular and interstitial pores; 5 percent fine and very fine pebbles; slightly acid; clear smooth boundary.

A13–14 to 43 inches; brown (10YR 4/3) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common coarse and medium roots; common fine and medium tubular and interstitial pores; 10 percent fine and very fine pebbles; slightly acid; gradual wavy boundary.

C1–43 to 53 inches; yellowish brown (10YR 5/4) gravelly fine sandy loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; few medium to coarse roots; common fine and medium tubular and interstitial pores; 20 percent fine and very fine pebbles; slightly acid.

Range in characteristics: Depth to a paralithic contact is 40 to 60 inches. The profile is slightly acid or medium acid.

The A horizon has dry color of 10YR 3/2, 4/2, 4/3, 5/2, or 5/3 and moist color of 10YR 2/1, 2/2, 3/2 or 3/3. It is fine sandy loam, sandy loam, coarse sandy loam, or loam and is less than 18 percent clay. The A horizon ranges from 20 to 39 inches in thickness.

The C horizon has dry color of 10YR 7/3, 6/3, 5/3, or 5/4 and moist color of 10YR 5/3, 4/3, or 3/3. It is sandy loam, coarse sandy loam, or gravelly coarse sandy loam.

Competing soils: These are the Cagwin Variant, Dome, Junipero family, and Wind River family soils in other families. Cagwin Variant soils have an ochric epipedon and are sandy. Dome soils have an Ochric epipedon. Junipero family soils have a thick mollic epipedon, mottles in the subsoil, and have a water table between depths of 47 and 63 inches. Wind River family soils have a mollic epipedon that is not thick.

Geographically associated soils: These are the Chaix, Holland, Hotaw, and Monache Variant soils, drained, warm, and the competing Wind River soils. The Chaix soils are moderately deep and have an achric epipedon. Holland soils have an ochric epipedon and a fine-loamy argillic horizon. Hotaw soils are moderately deep and have an achric epipedon and a fine-loamy argillic horizon. Monache Variant soils, drained, warm, have a thick mollic epipedon and are somewhat poorly drained.

SHAVER VARIANT

The Shaver Variant consists of moderately deep, well drained soils on foothills and mountain sides. These soils formed in residuum derived from granitic rock. Slope ranges from 30 to 50 percent. The main plant communities are Foothill Woodland and Mixed Chaparral. The elevation is 2,400 to 4,400 feet. The average annual precipitation is 29 to 35 inches, and the average annual growing season is 180 to 300 days.

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

Typical pedon of Shaver Variant in a unit of Tollhouse Variant-Shaver Variant-Rock outcrop complex, 30 to 50 percent slopes; in Sequoia National Forest, Tule River Ranger District, Tulare County; in the NW1/4, NE1/4 of sec. 5, T.20S., R.30E.

01–1/3 inch to 0; oak and grass litter.

A11–0 to 4 inches; brown (10YR 5/3) sandy loam, very dark grayish brown (10YR 3/2) moist; moderate very fine granular structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; common very fine tubular and interstitial pores; slightly acid; clear smooth boundary.

A12–4 to 8 inches; brown (10YR 5/3 sandy loam, dark brown (10YR 3/3) moist; moderate very fine granular structure; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; common very fine and fine tubular pores; slightly acid; clear smooth boundary.

B21–8 to 20 inches; yellowish brown (10YR 5/4) sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; many very fine tubular pores; slightly acid; clear smooth boundary.

B22–20 to 24 inches; yellowish brown (10YR 5/4) sandy loam, dark yellowish brown (10YR 3/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; many very fine tubular pores; neutral; clear smooth boundary.

Cr–29 inches; yellowish brown (10YR 5/4) decomposed granite that has rock structure.

Range in characteristics: Depth to a paralithic contact is 20 to 39 inches. The profile is slightly acid or neutral and is sandy loam or coarse sandy loam.

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

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

Competing soils: These are the Kanaka family soils in another family. Kanaka family soils have an ochric epipedon.

Geographically associated soils: These are the Chawanakee Variant and Tollhouse Variant family soils, and the competing Kanaka family soils. Chawanakee Variant soils have an ochric epipedon and are shallow. Tollhouse Variant soils are shallow and do not have a thick mollic epipedon.

SIRRETTA SERIES

The Sirretta series consists of moderately deep, excessively drained soils on mountain sides and ridges. These soils formed in residuum derived from granitic rock. Slope ranges from 5 to 75 percent. The main plant communities are Red Fir Forest, Lodgepole Pine Forest, Foxtail-Limber Pine Forest, and Montane Chaparral. The elevation is 7,500 to 9,500 feet. The average annual precipitation is 20 to 39 inches, and the average annual growing season is 90 to 135 days.

Taxonomic class: These soils are sandy-skeletal, mixed, frigid Dystric Xeorthents.

Typical pedon of Sirretta series in a unit of Rock outcrop-Toem-Sirretta complex, 10 to 30 percent slopes; in Sequoia National Forest, Tulare County, Cannell Meadow Ranger District; about 30 feet north of Forest Service road 23S41, 2 miles west of the Junction with Forest Service road 22S01 and 23S01 and 23S41; in the SW1/4, SE1/4 of sec. 15, T.23S., R.33E.

A1–0 to 6 inches; dark grayish brown (10YR 4/2) gravelly coarse sandy loam, very dark brown (10YR 2/2) moist; single grain; loose; many fine roots; many fine and medium interstitial pores; 30 percent pebbles, 15 percent cobbles and 5 percent stones; slightly acid; gradual smooth boundary.

C1–6 to 24 inches; brown (10YR 5/3) extremely cobbly loamy sand, dark yellowish brown (10YR 4/4) moist; single grain; loose; common medium roots; many fine and medium interstitial pores; 40 percent pebbles, 40 percent cobbles and 10 percent stones; slightly acid; gradual smooth boundary.

C2–24 to 28 inches; light yellowish brown (10YR 6/4) extremely cobbly loamy coarse sand, yellowish brown (10YR 5/4) moist; single grain; loose; few medium and coarse roots; many fine and medium interstitial pores; 40 percent pebbles, 20 percent cobbles and 10 percent stones; medium acid; gradual smooth boundary.

R–28 inches; fractured, hard granitic rock.

Range in characteristics: Depth to a lithic contact is 20 to 39 inches. The profile ranges from 35 to 90 percent gravel, cobbles, and stones. It is slightly acid or medium acid.

The A horizon has dry color of 10YR 3/3, 4/2, or 6/3 and moist color of 10YR 2/2 or 4/3. The horizon ranges from 5 to 9 inches in thickness.

The C horizon has dry color of 10YR 6/4, 5/3, or 4/4 and moist color of 10YR 5/4, 4/4, or 4/3.

Competing soils: These are the Glean Variant, Jumpe family, Nanny family, and Chesaw family soils in other families. Glean Variant soils have a mollic epipedon and are loamy-skeletal. Jumpe family soils have a cambic horizon and are loamy-skeletal. Nanny family soils are deep, have an umbric epipedon and a cambic horizon, and are loamy-skeletal. Chesaw family soils have a mollic epipedon.

Geographically associated soils: These are the Cagwin, Cannell, Kriest family, and Toem soils, and the competing Nanny family soils. Cagwin soils are not skeletal. Cannell soils are deep, have a cambic horizon, and are coarse-loamy. Kriest family soils have a cambic horizon and are coarse-loamy. Toem soils are shallow and are not skeletal.

SISKIYOU FAMILY

The Siskiyou family consists of moderately deep, well drained to somewhat excessively drained soils on mountain sides and ridges. These soils are formed in residuum derived from granitic rock. Slope ranges from 2 to 75 percent. The main plant communities are Yellow Pine Forest and Montane Chaparral. The elevation is 4,800 to 8,000 feet. The average annual precipitation is 10 to 25 inches, and the average annual growing season is 120 to 210 days.

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

Typical pedon of Siskiyou family in a unit of Siskiyou-Brader families-Rock outcrop complex, 5 to 30 percent slopes; in Kern County, California, Sequoia National Forest, Greenhorn Ranger District; in road bank on south side of Saddle Springs Road 17S02, about 0.1 mile northwest of saddle Springs campground road; in the NW1/4, SW1/4 of sec, 2, T,28S., R.33E.

A1–0 to 5 inches; brown (10YR 4/3) loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many fine and very fine roots; many fine tubular and interstitial pores; 10 percent pebbles; neutral; gradual smooth boundary.

B2–5 to 23 inches; brown (10YR 5/3) gravelly sandy loam, brown (10YR 4/4) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; many very fine tubular and interstitial pores; 20 percent pebbles; slightly acid; gradual smooth boundary.

C1–23 to 28 inches; brown (7.5YR 5/4) gravelly coarse sandy loam, dark brown (7.5YR 4/4) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; common very fine interstitial pores; 25 percent pebbles; slightly acid; gradual smooth boundary.

C2–28 inches; weathered granitic rock, mineral grains have original rock structure.

Range in characteristics: Depth to a paralithic contract is 20 to 30 inches. Texture is loam, coarse sandy loam, sandy loam, or gravelly sandy loam. The profile ranges form 2 to 30 percent gravel. The A horizon has dry color of 10YR 4/3, 5/2, 6/2, or 6/3 and moist color of 10YR 3/2, 3/3, or 4/2. It ranges from 4 to 7 inches in thickness.

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

Competing soils: These are the Brader family, Chaix, Chawanakee, and Dome soils in other families. The Brader family and Chawanakee soils are shallow. The Chaix and Dome soils occur in areas that receive more than 25 inches mean annual precipitation and have base saturation of less than 60 percent in some part below a depth of 10 inches. Dome soils are deep.

Geographically associated soils: These are the Cieneba and Tollhouse soils, and the competing Brader family, Chaix, and Dome soils. The Cieneba soils are shallow and thermic and do not have a cambic horizon. The Tollhouse soils have a mollic epipedon, do not have a cambic horizon, and are shallow.

TOEM SERIES

The Toem series consists of shallow, excessively drained soils on mountain sides and ridges. These soils formed in residuum derived from granitic rock. Slope ranges from 5 to 75 percent. The main plant communities are Montane Chaparral, Lodgepole Pine Forest, Foxtail-Limber Pine Forest, and Red Fir Forest. The elevation is 6,400 to 10,000 feet. The average annual precipitation is 20 to 51 inches, and the average annual growing season is 90 to 135 days.

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

Typical pedon of Toem series in a unit of Cagwin-Toem-Rock outcrop complex, 5 to 30 percent slopes; in Tulare County, California, Sequoia National Forest, Cannell Meadow Ranger District; from intersection of Forest Service roads 21S42 and 20S96, 2 miles south on 20S96 and 30 feet east of road; about 0.25 mile east of north end of Little Horse Meadow; in the NW1/4 sec. 33, T.20S., R.34E.

A1–0 to 3 inches; dark grayish brown (10YR 4/2) loamy sand, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine and very fine interstitial pores; 10 percent fine and very fine pebbles; medium acid; clear smooth boundary.

C1–3 to 19 inches; brown (10YR 5/3) loamy sand, dark brown (10YR 4/3) moist; weak medium and fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common medium, fine, and very fine roots; many fine and very fine interstitial pores; 7 percent fine and very fine pebbles; medium acid; abrupt wavy boundary.

C2r–19 inches; multicolored highly weathered granitic material that has relic rock structure.

Range in characteristics: Depth to a paralithic contact is 4 to 20 inches. The profile ranges from 5 to 20 percent gravel.

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

The C horizon has dry color of 10YR 5/3, 5/4, 6/3, 6/4, 7/3, or 7/4 and moist color of 10YR 4/3, 4/4, 5/3, or 5/4.

Competing soils: These are the Cagwin, Cagwin Variant, Chawanakee, Chesaw family, and Tollhouse soils in other families. Cagwin soils are moderately deep. Cagwin Variant soils are deep. Chawanakee soils are course-loamy and occur in the lower montane associated with Yellow Pine Forest. Chesaw family soils have a mollic epipedon and are sandy-skeletal. Tollhouse soils have a mollic epipedon, are loamy, and occur under Pinon-Juniper Woodland and Sagebrush Scrub communities.

Geographically associated soils: These are the Cannell, Nanny family, and Sirretta soils, and the competing Cagwin and Chesaw family soils. Cannell soils are deep and coarse-loamy. Nanny family soils are deep, have an umbric epipedon, and are loamy-skeletal. Sirretta soils are moderately deep and sandy-skeletal.

TOLLHOUSE SERIES

The Tollhouse series consists of shallow, somewhat excessively drained soils on mountain sides and ridges. These soils formed in residuum derived from granitic rock or metamorphic rock. Slope ranges from 5 to 75 percent. The main plant communities are Pinyon-Juniper Woodland and Sagebrush Scrub. The elevation is 4,400 to 8,800 feet. The average annual precipitation is 12 to 23 inches, and the average annual growing season is 120 to 210 days.

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

Typical pedon of Tollhouse series in a unit of Tollhouse-Rock outcrop complex, 50 to 75 percent slopes; in Sequoia National Forest, Kern County, Cannell Meadow Ranger District; from Highway 178 in sec. 22, T.26S., R.37E., southwest 1.8 miles on dirt road to the eastern Forest boundary; in the SE1/4, NE1/4 of sec. 29, T.26S., R.37E.

A11–0 to 8 inches; brown (10YR 5/3) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; common very fine and fine interstitial pores; 10 percent pebbles; neutral; clear smooth boundary.

A12–8 to 17 inches; brown (10YR 5/3) coarse sandy loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many medium and coarse roots; common very fine and fine interstitial pores; 10 percent pebbles; neutral; abrupt smooth boundary.

Cr–17 inches; highly weathered granitic material that has relic rock structure.

Range in characteristics: Depth to a paralithic contact is 8 to 19 inches. The profile ranges from 5 to 20 percent gravel.

The A horizon has dry color of 4/2, 5/2, or 5/3 and moist color of 10YR 3/1, 3/2, or 3/3. The profile is coarse sandy loam, sandy loam, or silt loam and is 5 to 25 percent clay. The profile is slightly acid or neutral.

Competing soils: These are the Chawanakee, Cieneba, and Tollhouse Variant soils in other families. Chawanakee soils have an ochric epipedon and a cambic horizon. Cieneba soils have an ochric epipedon and occur under Foothill Woodland and Mixed Chaparral communities. Tollhouse Variant soils occur under Foothill Woodland and Mixed Chaparral communities.

Geographically associated soils: These are the Chaix soils, and the competing Chawanakee and Cieneba soils. Chaix soils are moderatly deep and have an ochric epipedon and a cambic horizon.

TOLLHOUSE VARIANT

The Tollhouse Variant consists of shallow, somewhat excessively drained soils on mountain sides and ridges. These soils formed in residuum derived from granitic rock. Slope ranges from 30 to 50 percent. The main plant communities are Foothill Woodland and Mixed Chaparral. The elevation is 2,400 to 4,400 feet. The average annual precipitation is 29 to 35 inches, and the average annual growing season is 180 to 300 days.

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

Typical pedon of Tollhouse Variant in a unit of Tollhouse Variant-Shaver Variant-Rock outcrop complex, 30 to 50 percent slopes; in Sequoia National Forest, Tule River Ranger District, Tulare County; about 0.5 miles east of Forest boundary on Bear Creek road to private road in section 5 and north on private road to Forest entry sign located on left side of road; in the SE1/4, NW1/4 of sec. 5, T.20S., R.30E.

01–1 inch to 0; oak and grass litter.

A11–0 to 5 inches; brown (10YR 5/3) sandy loam, very dark grayish brown (10YR 3/2) moist; weak very fine granular structure; slightly hard, very friable, nonsticky and nonplastic; many very fine roots and few fine and medium roots; few very fine tubular pores and many very fine interstitial pores; neutral; clear smooth boundary.

A12–5 to 11 inches; brown (10YR 5/3) sandy loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots and few medium roots; common very fine tubular pores; slightly acid; clear smooth boundary.

C1–11 to 16 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine, fine, medium, and coarse roots; common very fine and fine horizontal tubular pores; slightly acid; clear smooth boundary.

C2r–16 inches; yellowish brown (10YR 5/4) highly weathered granite.

Range in characteristics: Depth to a paralithic contact is 7 to 16 inches. The profile is sandy loam or coarse sandy loam and is slightly acid or neutral. The horizon ranges from 7 to 11 inches in thickness.

The A horizon dry color of 10YR 5/2 or 5/3 and moist color of 10YR 3/2 or 3/3.

Competing soils: These are the Chawanakee Variant, Cieneba, Millerton family, and Tollhouse soils in other families. Chawanakee Variant soils have an ochric epipedon and a cambic horizon. Cieneba soils have an ochric epipedon. Millerton family soils have an ochric epipedon and a lithic contact. Tollhouse soils occur under Pinyon-Juniper Woodland and Sagebrush Scrub communitites.

Geographically associated soils: These are the Shaver Variant and Kanaka family soils, and the competing Chawanakee Variant soils. Shaver Variant soils are moderately deep and have a thick mollic epipedon and have a cambic horizon. Kanaka family soils are moderately deep and have an ochric epipedon and a cambic horizon.

TYPIC HAPLOXEROLLS

The Typic Haploxerolls consist of moderately deep, moderately well drained soils on the edges of upland basins. These soils formed in alluvium derived from granitic rock. Slope ranges from 0 to 15 percent. The main plant community is Montane Meadow. The elevation is 7,500 to 8,000. The average annual precipitation is 12 to 18 inches, and the average annual growing season is 90 to 135 days.

Taxonomic class: These soils are Typic Haploxerolls.

Typical pedon of Typic Haploxerolls in a unit of Monache-Typic Haploxerolls-Cagwin Variant association, sloping; in Inyo National Forest, Tulare County, Mt. Whitney Ranger District; on the west edge of the meadow through which the South Fork Kern River flows; in the NW1/4, SE1/4, NE1/4 of sec. 33, T.19S., R.35E.

01–1 inch to 0; dead grass litter.

A1–0 to 14 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many fine and very fine roots; many fine and very fine tubular and interstitial pores; neutral; clear smooth boundary.

B2–14 to 25 inches; pale brown (10YR 6/3) fine sandy loam, dark brown (10YR 3/3) moist; few common distinct yellowish brown (10YR 5/6) mottles, strong brown (7.5YR 5/6) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common fine and very fine roots; many very fine and fine tubular and interstitial pores; neutral; abrupt smooth boundary.

IIC–25 to 39 inches; multicolored, mottled very gravelly coarse sand; single grain; very few very fine roots; 40 percent pebbles; mildly alkaline.

Range in characteristics: The solum ranges from 20 to 35 inches in thickness. It ranges from 0 to 15 percent rock fragments. The substratum ranges from 35 to 50 percent rock fragments. The profile is slightly acid to mildly alkaline. The A horizon is loam, sandy loam, or fine sandy loam. The B horizon is fine sandy loam or sandy loam. The IIC horizon is gravelly loamy sand or very gravelly coarse sand.

Competing soils: These are the Monache Variant, Monache, and Monache Variant soils, drained, in other families. Monache Variant soils are poorly drained, have a thick mollic epipedon, and are strongly acid. Monache soils have a thick mollic epipedon, an irregular decrease in organic matter as depth increases, and are slightly acid or neutral. Monache Variant soils, drained, have a thick mollic epipedon, are somewhat porrly drained, and are slightly acid or neutral.

Geographically associated soils: These are the Cagwin Variant, Nanny family, and Chesaw family soils, and the competing Monache soils. Cagwin Variant soils are excessively drained and sandy. Nanny family soils are well drained and loamy-skeletal. Chesaw family soils are moderately deep, sandy-skeletal, and excessively drained.

WIND RIVER FAMILY

The Wind River family consists of deep, well drained and moderately well drained soils on mountain sides and ridges. These soils formed in residuum derived from metamorphic, metasedimentary, and granitic rock. Slope ranges from 5 to 50 percent. The main plantcommunities are Yellow Pine Forest, Mixed Conifer Forest, and Montane Chaparral. The elevation is 4,700 to 7,500 feet. The average annual precipitation is 21 to 51 inches, and the average annual growing season is 120 to 210 days.

Taxonomic class: These soils are coarse-loamy, mixed, mesic Ultic Haploxerolls.

Typical pedon of Wind River family in a unit of Wind river Family-Rock outcrop association, moderately steep; in the Piute Mountains in Sequoia National Forest, Kern County, Greenhorn Ranger District; 150 feet north of Forest Service road 27S02, about 2 miles southeast of the junction with Forest Service road 28S18 to Brown Meadow; in the NE1/4, SW1/4 of sec. 25, T.28S., R.33E.

01–1 inch to 0; decomposing pine and fir litter.

A1–0 to 12 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many fine tubular pores; 5 percent pebbles; slightly acid; clear wavy boundary.

B2–12 to 22 inches; brown (7.5YR 5/4) loam, dark brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common medium and coarse roots; common fine tubular pores; 10 percent pebbles; slightly acid; clear wavy boundary.

B3–22 to 32 inches; strong brown (7.5YR 5/6) gravelly loam, brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common medium and coarse roots; common fine tubular pores; few thin clay films on faces of peds; 20 percent pebbles and 10 percent cobbles; slightly acid; clear wavy boundary.

C1–32 to 42 inches; pinkish gray (7.5YR 6/2) very gravelly sandy loam, brown (7.5YR 5/4) moist; massive; hard, firm, slightly sticky and slightly plastic; few coarse roots; few medium tubular pores; 40 percent pebbles and 35 percent cobbles; slightly acid; clear wavy boundary.

C2r–42 inches; fractured metasedimentary rock.

Range in characteristics: Depth to a paralithic contact is 39 to 78 inches. The solum ranges from 5 to 20 percent gravel. The substratum ranges from 5 to 75 percent gravel and cobbles. The profile is medium acid or slightly acid.

The A horizon has dry color of 10YR 5/2, 5/3, 4/3, or 4/4 and moist color of 7.5YR 3/2 or 3/4 or 10YR 3/3 or 3/2. It is coarse sandy loam, sandy loam, or loam.

The B horizon has dry color of 10YR 6/3, 4/3, or 4/4 7.5YR 4/4 or 5/4 and moist color of 7.5YR 4/4 or 10YR 4/2, 4/3, or 3/3. It is loam, very fine sandy loam, sandy loam, or gravelly coarse sandy loam and is less than 18 percent clay.

Competing soils: These are the Chaix, Dome, Junipero family, and Shaver soils in other families. Chaix soils are moderately deep and have an ochric epipedon. Dome soils have an ochric epipedon. Junipero family soils have a thick mollic epipedon and are moderately well drained. Shaver soils have a thick umbric epipdon.

Geographically associated soils: These are the Baldmountain, Chawanakee, and Woolstalf soils, and the competing Chaix, Dome, and Shaver soils. Baldmountain soils occur under the upper montane communities of Red Fir Forest and White Fir Forest. Chawanakee soils are shallow and have an ochric epipedon. Woolstalf soils have a thick mollic epipedon and are loamy-skeletal.

WOOLSTALF SERIES

The Woolstaff series consists of deep, well drained soils on mountain sides and ridges. These soils formed in sesiduum derived from metasedimentary rock. Slope ranges from 5 to 75 percent. The main plant communities are Yellow Pine Forest, White Fir Forest, and Montana Chaparral. The elevation is 5,100 to 7,500 feet. The average annual precipitation is 20 to 43 inches, and the average annual growing season is 120 to 210 days.

Taxonomic class: These soils are loamy-skeletal, mixed, mesic Pachic Ultic Haploxerolls.

Typical pedon of Woolstalf seris in a unit of woolstalf-Rock outcrop complex, 30 to 50 percent slopes; in Kern County, Califonia, Sequoia National Forest, Greenhorn Ranger District, Piute Mountains; on Forerst Service road 26S01, 2.8 miles north of junction with Forest Service road 28S01, then 100 feet west of road; in the SE1/4, NW1/4 of sec. 29, t.28S., R.34E.

O1–1 inch to 0; decomposing pine and fir needles.

All–0 to 6 inches; dark brown (10YR 4/3) gravelly fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; many very fine roots; many fine interstitial pores; 30 percent pebbles; slightly acid; clear smooth boundary.

A12–6 to 15 inches; dark brown (10YR 4/3) gravelly fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; many fine roots; many fine interstitial pores; 30 percent pebbles; medium acid; clear smooth boundary.

A13–15 to 36 inches; brown (10YR 5/3) very gravelly fine sandy loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine to coarse roots; many fine interstitial pores; 40 percent pebbles; medium acid; clear smooth boundary.

B2–36 to 58 inches; yellowish brown (10YR 5/4) extremely gravelly fine sandy loam, dark yellowish brown (10YR 3/4) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few coarse roots; common fine interstitial pores; 75 percent pebbles; medium acid; clear smooth boundary.

Cr–58 inches; weathered metasedimentary rock that has original rock structure.

Range in characteristics: Depth to a paralithic contact is 39 to 59 inches. The profile ranges from 35 to 75 percent gravel. It is gravelly fine sandy loam, and very gravelly fine sandy loam, or very gravelly loam and is 10 to 18 percent clay.

The A1 horizon has dry color of 10YR 5/2, 5/3, 4/2, or 4/3 and moist color of 10YR 3/2, or 3/3 or 7.5YR 3/2.

The B2 horizon has dry color of 10YR 5/4 or 4/4 or 7.5YR 5/6 or 4/4, and moist color of 10YR 3/4 or 4/3 or 7.5YR 3/2, 3/4, or 5/6.

Competing soils: These are the Chesaw family, Glean Variant, Jumpe family, Livermore family, Nanny family and Sirretta soils in other families. Chesaw family, Glean Variant, Nanny family, Jumpe family occur under montane communities of Red Fir Forest and White Fir-Sugar Pine Forest. Chesaw family and Glean Variant soils fo not have a thick mollic epipedon nor a cambic horizon. Jumpe family soils have an ochric epipedon. Nanny family soils have an umbric epipedon. Livermore family soils do not have a thick mollic epipedon and occur on Foothill Woodland and Mixed Chaparral.

Geographically associated soils: These are the Baldmountain, Chaix, Chawanakee, and Dome soils. Baldmountain soils are not pachic nor skeletal. Chaix soils have an ochric epipedon, are moderately deep, and are coarse-loamy. Chawanakee soils are shallow, have an ochric epipedon, and are coarse-loamy. Dome soils have an ochric epipedon and are coarse-loamy.

XEROFLUVENTS

These lands occur as recent alluvium adjacent to the Kern River and its tributaries. They are deep gravelly, cobbly, and stony sands and sandy loams and have many stones and boulders on the surface. Slopes are 0 to 15 percent.

These lands have been recently deposited br streams and are subject to change by stream overflow, erosion, and deposition. They are poorly to somewhat excessively drained and have medium to rapid runoff. Erodibility is high.

Some of these lands are used for recreation. Numerous campgrounds adjacent to the Kern River are located on these lands.

XERORTHENTS

These lands consists of moderately steep and steep areas of unconsolidated recent colluvium. They are varying textures of soil material and rock fragments. They do not have distinct soil horizons. Slopes are 5 to 50 percent. They are well to somewhat excessively drained and have medium to rapid runoff. Erodibility is high.

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Glossary

Alluvial fan: A body of alluvium whose surface forms a segment of a cone that radiates downslope from the point where the stream emerges from a narrow valley onto a plain.

Alluvium: Material, such as clay, silt, and sand deposited by streams.

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

Base saturation: The degree to which material having cation exchange properties is saturated with exchangeable bases (sum if calcium, magnesium, sodium, and potassium), expressed as a percentage of the total cation exchange capacity.

Basic igneous rock: Rock formed from the cooling and solidification of magna and has not been changed appreciably since its formation. It is high in content of iron and magnesium.

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

Boulder: Rock fragments larger than 60 centimeters in diameter.

Canyon: A long, deep, narrow, very steep sided valley with high and precipitous walls in an area of high local relief.

Clay: As a soil seperate, the mineral soil particle less than 0.002 millimeters 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 skin: A thin coating of oriented clay on the surface of a soil aggregate, or lining pores or root channels. Synonyms: clay coating, clay film.

Coarse fragments: Rock or mineral particles 2 millimeters to 25 centimeters in diameter.

Cobbles: Rounded or partially rounded fragments of rock 7.5 to 25 centimeters in diameter.

Colluvium: Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

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

Consistance, 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 forfinger and can be pressed together into a lump.

Firm - When moist, crushes under moderate pressure between thumb and forefinger, but resistance 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 than 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.

Cemented - Hard; little affected by moistening.

Culmination Mean Annual Increment (CMAI): The point where a stand reaches its maximum annual rate of growth. The main annual increment is computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase.

Deep: As soil depth classification, greater than 100 centimeters.

Effective rooting depth: The vertical distance from the soil surface to bedrock or any other layer that stops or hinders the penetration of roots.

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

Forb: Any herbaceous plant not a grass or a sedge.

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

Gravel: Rounded or angular rock fragments from 2 millimeters to 7.5 centimeters in diameter; an individual piece is a pebble.

Ground Water: Water filling all unblocked pores of underlying material below the water table.

Gully: A steep sided depression cut by running water larger than 10 centimeters deep and 15 centimeters wide.

Horizon, soil: A layer of soil, approximately parallel to the surface, having distict characteristics produced by soil-forming processes. The major hoeizons if mineral soil are as follows:

O horizon - An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon - The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material.

B horizon - The mineral horizon below an A horizon. The B horizon is in part a layer of ransition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1)accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3)redder or browner colors than those in a A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon - The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.

R horizon - Consolidated rock beneath the soil. The rock commonly underlies a C horizon.

Infiltration: The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Lithic contact: Boundary between soil and underlying rock which is a barrier to root penetration and water movement. Rock is essentially unweathered and can only be chipped by a spade.

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

Metamorphic rock: Rock of any orgin altered in mineralogical composition, chemical compositions, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil: Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Moderately deep: As a soil depth classification, between 50 and 100 centimeters.

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

Nutrient, plant: Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, potassium, calcium, magnesium, sulfer, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

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

Paralithic contact: Boundary between soil and underlying weathered rock which is a barrier to root penetration and water movement. Material retains rock structure but when moist can be dug with a spade.

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

Pedon: The smallest volume that can be called "a soil". A pedon is three dimensional and large enough to permit a study of all horizons. Its area ranges from about 1 square meter to 10 square meters, depending on the variability of the soil.

Percolation: The downward movement of water through the soil.

Permeability: The quality of the soil that enables water to move downward through the profile.

Productivity, soil: The capability of a soil for producing a specified plant or sequence of plants under specific management.

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

Reaction: A measure of acidity or alkalinity of the 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 is expressed as: Extremely acid - below 4.5; Very strongly acid, 4.5-5.0; Strongly acid, 5.1-5.5; Medium acid, 5.6-6.0; Slightly acid, 6.1-6.5; Neutral, 6.6-7.3; Mildly alkaline, 7.4-7.8; Moderately alkaline, 7.9-8.4; Strongly alkaline, 8.5 to 9.0; Very strongly alkaline, higher than 9.0.

Rill: A steep sided channel in the soil surface less than 10 centimeters deep and 15 centimeters wide caused by the washing away of soil material.

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

Sand: As a soil seperate, individual rock or mineral fragments from 0.05 millimeters to 2.0 millimeters in diameter. As a soil textural class, a soil that is 85 percent or more sand, and not more than 10 percent clay.

Series, soils: A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shallow: As a soil depth classification, less than 50 centimeters.

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.

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 plants and animal activities are largely confined to the solum.

Spring-summer range: Annual grasslands grazed in spring and early summer.

Stones: Rock fragments 25 to 60 centimeters in diameter.

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.

Summer range: Perennial grasslands and mountain meadows grazed during summer months.

Talus: Fragments of rock and other soil material accumlated at the foot of clifffs or steep slopes

Taxadjuncts: Soils that cannot be classified into a recognized series in the classification system. Such soils are named for a series they strongly resemble and are designated as texadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terminal moraine: A belt of thick glacial drift that generally marks the tremination of important glacial advances.

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, silty clay loam. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine"

Toe slopes: The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil: The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter.

Upland: Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variant: A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

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

Watershed: The total area above a given point on a stream that contributes water to the flow at that point.

Weathering: All physical and chemical changes produed 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.

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