

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. This survey was mapped to the family level. In table 3, the soils of the survey area are listed alphabetically and are classified according to the system. In table 4, there are listed for each soil those map units in which the soil occurs as a major component. 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 sol. An example is Alfisol.

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

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

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective 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 Haploxeralfs.

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 or of the substratum can differ within a series. Since the soils in this soil survey area were classified only to the family level, the series is not used in this report.

TABLE 3. - Classification by Soil Name

Family or Subgroup	Taxonomic Classification
Abgese	Xerollic Haplargids, fine-loamy, mixed, mesic
Bartine	Typic Cryoborolls, loamy-skeletal, carbonatic
Basket	Xerollic Haplargids, loamy-skeletal, mixed, frigid
Bearskin	Lithic Argixerolls, loamy, mixed, frigid
Berent	Xeric Torripsamments, mixed, mesic
Berning	Xerollic Haplargids, clayey-skeletal, montmorillonitic, mesic
Beveridge	Lithic Torriorthents, loamy-skeletal, carbonatic, frigid
Blackston	Typic Calciorthids, loamy-skeletal, mixed, mesic
Bluewing	Typic Torriorthents, sandy-skeletal, mixed, mesic
Bondranch	Lithic Xerollic Camborthids, loamy, mixed, frigid
Brad	Lithic Haploxerolls, sandy-skeletal, mixed, frigid
Bregar	Lithic Xerollic Haplargids, loamy-skeletal, mixed, frigid
Cath	Durixerollic Haplargids, fine-loamy, mixed, mesic
Checkett	Lithic Xerollic Haplargids, loamy-skeletal, mixed, mesic
Credo	Xerollic Haplargids, fine-loamy, mixed, frigid
Dunul	Typic Torriorthents, sandy-skeletal, mixed, frigid
Durargidic Argixerolls	Coarse-loamy, mixed, frigid
Finley	Xerollic Camborthids, loamy-skeletal, mixed, mesic
Gol	Xerollic Haplargids, loamy, mixed, frigid, shallow
Hartig	Aridic Haploxerolls, loamy-skeletal, mixed, frigid
Hymas	Lithic Haploxerolls, loamy-skeletal, carbonatic, frigid
Lithic Camborthids	Loamy-skeletal, mixed, mesic
Mackey	Xerollic Camborthids, loamy-skeletal, mixed, mesic
Mascamp	Lithic Argixerolls, loamy-skeletal, mixed, frigid

Family or Subgroup	Taxonomic Classification
Merlin	Lithic Argixerolls, clayey, montmorillonitic, frigid
Mexispring	Typic Torriorthents, loamy-skeletal, mixed, nonacid, mesic, shallow
Midas	Duric Camborthids, loamy-skeletal, mixed, mesic
Moano	Lithic Torriorthents, loamy, mixed, nonacid, mesic
Mulett	Lithic Xerollic Camborthids, loamy-skeletal, mixed, mesic
Packham	Xerollic Camborthids, loamy-skeletal, mixed, frigid
Pergelic Cryoborolls	Loamy-skeletal, mixed
Preston	Typic Xeropsamments, mixed, mesic
Risue	Abruptic Durargids, clayey, montmorillonitic, mesic, shallow
Sanpete	Xerollic Calciorthids, loamy-skeletal, carbonatic, mesic
Simpson	Aridic Argixerolls, fine, montmorillonitic, mesic
Slinger	Xeric Torriorthents, loamy-skeletal, mixed (calcareous), frigid
Soakpak	Pergelic Cryochrepts, loamy-skeletal, mixed
Spaa	Lithic Haploxerolls, loamy, mixed, frigid
Spanel	Typic Durargids, loamy, mixed, mesic, shallow
St. Marys	Typic Haploxerolls, loamy-skeletal, mixed, frigid
Sumine	Aridic Argixerolls, loamy-skeletal, mixed, frigid
Supervisor	Typic Cryoborolls, loamy-skeletal, mixed
Swift Creek	Typic Cryorthents, loamy-skeletal, carbonatic
Theriot	Lithic Torriorthents, loamy-skeletal, carbonatic, mesic
Toeja	Aridic Argixerolls, fine-loamy, mixed, frigid
Trocken	Typic Torriorthents, loamy-skeletal, mixed (calcareous), mesic
Tweedy	Typic Argixerolls, fine-loamy, mixed, mesic
Typic Haplargids	Fine, montmorillonitic, frigid
Typic Xerorthents	Coarse-loamy, mixed, nonacid, mesic

Family or Subgroup	Taxonomic Classification
Unionville	Typic Camborthids, coarse-loamy, mixed, mesic
Vipont	Pachic Argixerolls, loamy-skeletal, mixed, frigid
Washoe	Xerollic Haplargids, loamy-skeletal, mixed, mesic
Wenzel	Typic Argixerolls, clayey-skeletal, mixed, frigid
Wrango	Xeric Torriorthents, sandy-skeletal, mixed, mesic
Yuko	Xerollic Haplargids, loamy, mixed, mesic, shallow

TABLE 4. - Classification of the Soils into Higher Categories

Representative Series	Order	Subgroup	Family
Abgese family	Aridisols	Xerollic Haplargids	Fine-loamy, mixed, mesic
Bartine family	Mollisols	Typic Cryoborolls	Loamy-skeletal, carbonatic
Basket family	Aridisols	Xerollic Haplargids	Loamy-skeletal, mixed, frigid
Bearskin family	Mollisols	Lithic Argixerolls	Loamy, mixed, frigid
Berent family	Entisols	Xeric Torripsamments	Mixed, mesic
Berning family	Aridisols	Xerollic Haplargids	Clayey-skeletal, montmorillonitic, mesic
Beveridge family	Entisols	Lithic Torriorthents	Loamy-skeletal, carbonatic, frigid
Blackston family	Aridisols	Typic Calciorhids	Loamy-skeletal, mixed, mesic
Bluewing family	Entisols	Typic Torriorthents	Sandy-skeletal, mixed, mesic
Bondranch family	Aridisols	Lithic Xerollic Camborthids	Loamy, mixed, frigid
Brad family	Mollisols	Lithic Haploxerolls	Sandy-skeletal, mixed, frigid
Bregar family	Aridisols	Lithic Xerollic Haplargids	Loamy-skeletal, mixed, frigid
Cath family	Aridisols	Durixerollic Haplargids	Fine-loamy, mixed, mesic
Checkett family	Aridisols	Lithic Xerollic Haplargids	Loamy-skeletal, mixed, mesic
Credo family	Aridisols	Xerollic Haplargids	Fine-loamy, mixed, frigid
Dunul family	Entisols	Typic Torriorthents	Sandy-skeletal, mixed, frigid
Finley family	Aridisols	Xerollic Camborthids	Loamy-skeletal, mixed, mesic
Gol family	Aridisols	Xerollic Haplargids	Loamy, mixed, frigid, shallow
Hartig family	Mollisols	Aridic Haploxerolls	Loamy-skeletal, mixed, frigid
Hymas family	Mollisols	Lithic Haploxerolls	Loamy-skeletal, carbonatic, frigid
Mackey family	Aridisols	Xerollic Camborthids	Loamy-skeletal, mixed, mesic
Mascamp family	Mollisols	Lithic Argixerolls	Loamy-skeletal, mixed, frigid
Merlin family	Mollisols	Lithic Argixerolls	Clayey, montmorillonitic, frigid
Mexispring family	Entisols	Typic Torriorthents	Loamy-skeletal, mixed, nonacid, mesic, shallow
Midas family	Aridisols	Duric Camborthids	Loamy-skeletal, mixed, mesic
Moano family	Entisols	Lithic Torriorthents	Loamy, mixed, nonacid, mesic
Mulett family	Aridisols	Lithic Xerollic Camborthids	Loamy-skeletal, mixed, mesic
Packham family	Aridisols	Xerollic Camborthids	Loamy-skeletal, mixed, frigid

Representative Series	Order	Subgroup	Family
Preston family	Entisols	Typic Xeropsamments	Mixed, mesic
Risue family	Aridisols	Abruptic Durargids	Clayey, montmorillonitic, mesic, shallow
Sanpete family	Aridisols	Xerollic Calciorthids	Loamy-skeletal, carbonatic, mesic
Simpson family	Mollisols	Aridic Argixerolls	Fine, montmorillonitic, mesic
Slinger family	Entisols ¹	Xeric Torriorthents	Loamy-skeletal, mixed (calcareous), frigid
Soakpak family	Inceptisols	Pergelic Cryochrepts	Loamy-skeletal, mixed
Spaa family	Mollisols	Lithic Haploxerolls	Loamy, mixed, frigid
Spanel family	Aridisols	Typic Durargids	Loamy, mixed, mesic, shallow
St. Marys family	Mollisols	Typic Haploxerolls	Loamy-skeletal, mixed, frigid
Sumine family	Mollisols	Aridic Argixerolls	Loamy-skeletal, mixed, frigid
Supervisor family	Mollisols	Typic Cryoborolls	Loamy-skeletal, mixed
Swift Creek family	Entisols	Typic Cryorthents	Loamy-skeletal, carbonatic
Theriot family	Entisols	Lithic Torriorthents	Loamy-skeletal, carbonatic, mesic
Toeja family	Mollisols	Aridic Argixerolls	Fine-loamy, mixed, frigid
Trocken family	Entisols	Typic Torriorthents	Loamy-skeletal, mixed (calcareous), mesic
Tweedy family	Mollisols	Typic Argixerolls	Fine-loamy, mixed, mesic
Unionville	Aridisols	Typic Camborthids	Coarse-loamy, mixed, mesic
Vipont family	Mollisols	Pachic Arigixerolls	Loamy-skeletal, mixed, frigid
Washoe family	Aridisols	Xerollic Haplargids	Loamy-skeletal, mixed, mesic
Wenzel family	Mollisols	Typic Argixerolls	Clayey-skeletal, mixed frigid
Wrango family	Entisols	Xeric Torriorthents	Sandy-skeletal, mixed, mesic
Yuko family	Aridisols	Xerollic Haplargids	Loamy, mixed, mesic, shallow
*	Mollisols	Durargidic Argixerolls	Coarse-loamy, mixed, frigid
*	Aridisols	Lithic Camborthids	Loamy-skeletal, mixed, mesic
*	Mollisols	Pergelic Cryoborolls	Loamy-skeletal, mixed
*	Aridisols	Typic Haplargids	Fine, montmorillonitic, frigid
*	Entisols	Typic Xerorthents	Coarse-loamy, mixed, nonacid, mesic

*Taxonomic Units without representative families.

TABLE 5. - Classification by Taxonomic Category

Order	Suborder	Great Group	Subgroup	Family	Soil Name	Modal Number		
Aridisols	Argids	Durargids	Typic Durargids	loamy, mixed, mesic, shallow	Spanel	426-3		
			Abruptic Durargids	clayey, montmorillonitic, mesic, shallow	Risue	09-105-P68		
		Haplargids	Typic Haplargids	fine, montmorillonitic, frigid	Unnamed	09-15-1		
			Durixerollic Haplargids	fine-loamy, mixed, mesic	Cath	507-3		
			Lithic Xerollic Haplargids	loamy-skeletal, mixed, frigid	Bregar	04-71-1		
				loamy-skeletal, mixed, mesic	Checkett	516-2		
		Xerollic Haplargids	loamy-skeletal, mixed, frigid loamy-skeletal, mixed, mesic clayey-skeletal, montmorillonitic, mesic loamy, mixed, frigid, shallow loamy, mixed, mesic, shallow fine-loamy, mixed, frigid fine-loamy, mixed, mesic	Basket Washoe Berning Gol Yuko Credo Abgese	11-231-P79 C11-233-2A 01-39-3 A521-15 C11-239-1 973-105-P70 A516-4d			
		Orthids	Calciorthids	Typic Calciorthids	loamy-skeletal, mixed, mesic	Blackston	11-233-P85	
				Xerollic Calciorthids	loamy-skeletal, carbonatic, mesic	Sanpete	430-4	
			Camborthids	Typic Camborthids	coarse-loamy, mixed, mesic	Unionville	503-1	
	Duric Camborthids			loamy-skeletal, mixed, mesic	Midas	512-1		
	Lithic Camborthids			loamy-skeletal, mixed, mesic	Unnamed	429-5		
	Lithic Xerollic Camborthids			loamy-skeletal, mixed, mesic loamy, mixed, frigid	Mulett Bondbranch	01-143-2 11-233-P78		
	Xerollic Camborthids		loamy-skeletal, mixed, frigid loamy-skeletal, mixed, mesic loamy-skeletal, mixed, mesic	Packham Finley Mackey	11-233-P83 425-2B 502-1			
	Entisols		Orthents	Cryorthents	Typic Cryorthents	loamy-skeletal, carbonatic	Swift Creek	973-7-2
					Torriorthents	Typic Torriorthents	sandy-skeletal, mixed, frigid sandy-skeletal, mixed, mesic loamy-skeletal, mixed, nonacid, mesic, shallow loamy-skeletal, mixed (calcareous), mesic	Dunul Bluewing Mexispring Trocken

Order	Suborder	Great Group	Subgroup	Family	Soil Name	Modal Number
			Lithic Torriorthents	loamy-skeletal, carbonatic, frigid loamy-skeletal, carbonatic, mesic loamy, mixed, nonacid, mesic	Beveridge Theriot Moano	09-11-4 512-4 423-2
			Xeric Torriorthents	sandy-skeletal, mixed, mesic loamy-skeletal, mixed (calcareous), frigid	Wrango Slinger	9-13-5 01-39-7
		Xerorthents	Typic Xerorthents	coarse-loamy, mixed, nonacid, mesic	Unnamed	09-116-P72
	Psamments	Torripsamments	Xeric Torripsamments	mixed, mesic	Berent	09-69-P64
		Xeropsamments	Typic Xeropsamments	mixed, mesic	Preston	09-116-P71
Inceptisols	Ochrepts	Cryochrepts	Pergelic Cryochrepts	loamy-skeletal, mixed	Soakpak	01-35-1
Mollisols	Borolls	Cryoborolls	Typic Cryoborolls	loamy-skeletal, carbonatic loamy-skeletal, mixed	Bartine Supervisor	11-229-1 473-71-P76
			Pergelic Cryoborolls	loamy-skeletal, mixed	Unnamed	09-9-1
	Xerolls	Argixerolls	Typic Argixerolls	clayey-skeletal, mixed, frigid fine-loamy, mixed, mesic	Wenzel Tweedy	11-229-5 09-114-P74
			Aridic Argixerolls	loamy-skeletal, mixed, frigid fine-loamy, mixed, frigid fine, montmorillonitic, mesic	Sumine Toeja Simpson	518-1 01-39-5 01-39-2
			Durargidic Argixerolls	coarse-loamy, mixed, frigid	Unnamed	A520-25
			Lithic Argixerolls	loamy-skeletal, mixed, frigid loamy, mixed, frigid clayey, montmorillonitic, frigid	Mascamp Bearskin Merlin	523-4 09-69-P63 01-143-4
			Pachic Argixerolls	loamy-skeletal, mixed, frigid	Vipont	01-39-1
		Haploxerolls	Typic Haploxerolls	loamy-skeletal, mixed, frigid	St. Marys	10-04-P62
			Aridic Haploxerolls	loamy-skeletal, mixed, frigid	Hartig	11-229-4
			Lithic Haploxerolls	sandy-skeletal, mixed, frigid loamy-skeletal, carbonatic, frigid loamy, mixed, frigid	Brad Hymas Spaa	A522-15 521-2 01-39-4

TABLE 6. - Soil Components and Named Inclusions in Map Units

Soil Name	Named Primary Component	Named Inclusion
Abgese family	101, 102, 103, 152, 181	101, 102, 111, 132, 152
Bartine family	166, 167	127, 128, 147, 155, 169, 170
Basket family	105, 106, 107, 108, 109, 120	105, 107
Bearskin family	110, 165	136, 137
Berent family	101, 102, 103, 111, 112, 153	101, 102, 111, 183, 184
Berning family	175	101
Beveridge family	113	--
Blackston family	114	129, 130, 131, 172, 173, 174
Bluewing family	115, 178	132, 162, 163, 164
Bondranch family	105, 106, 107	105, 107, 184
Brad family	116, 156, 157	156
Bregar family	108, 117, 161	106, 117
Cath family	141, 142	141, 186
Checkett family	144, 185	122
Credo family	119, 120	--
Dunul family	124	--
Durargidic Argixerolls	123	151
Finley family	121, 122	106, 143, 163, 164, 185, 186
Gol family	123	--
Hartig family	124, 125, 126, 156, 157, 161	106, 108, 125, 137, 156, 167
Hymas family	127, 128, 155	127, 128, 155
Lithic Camborthids	129, 130, 131	178
Mackey family	101, 132, 133, 141, 142, 188	101, 114, 141
Mascamp family	134, 135, 136	--
Merlin family	137, 176, 177	--
Mexispring family	138, 139, 140	--
Midas family	141, 142, 180	101, 141, 153, 187
Moano family	122, 143	185

Soil Name	Named Primary Component	Named Inclusion
Mulett family	122, 144, 145, 185	106, 107, 160
Packham family	109, 126, 146, 147, 158	124, 167, 169, 170
Pergelic Cryoborolls	148, 149, 150, 168	150
Preston family	151, 152	181
Risue family	152, 153, 184	--
Sanpete family	159, 160	114
Simpson family	161, 175	--
Slinger family	117, 146	117, 124, 158, 178
Soakpak family	109, 150	124, 148, 150, 168
Spaa family	147, 182	119, 176
Spanel family	162, 163, 164	--
St. Marys family	165	136, 177
Sumine family	134, 135, 136	116, 145, 156, 157, 175
Supervisor family	166, 167, 168, 169, 170	156, 157, 171
Swift Creek family	171	149, 166, 171
Theriot family	159, 160, 172, 173, 174	159, 160
Toeja family	102, 103, 110, 145, 175, 176, 177	136, 175
Trocken family	115, 162, 163, 164, 178, 179, 180	115, 129, 130, 131, 134, 159, 179, 188, 189
Tweedy family	181	--
Typic Haplargids	182, 186	123, 161, 182
Typic Xerorthents	183	183
Unionville family	132, 184	183
Vipont family	182	182
Washoe family	133, 185, 186	122, 132, 141, 142, 161
Wenzel family	137	125, 134, 136, 165
Wrango family	187, 188	112, 122, 133, 151, 181, 185
Yuko family	189, 190, 191	--

Taxonomic Unit Descriptions

In this section, each soil family or higher category recognized in the survey area is described. The descriptions are arranged in alphabetical order. Characteristics of the soil and the material in which it formed are identified for each family. The pedon, a small three-dimensional area of the soil that is typical of the soil profile in the survey area, is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual.

Many of the technical terms used in the descriptions are defined in *Soil Taxonomy*. The soil moisture conditions at the time soil colors were described are given. Following the pedon description is the range of important characteristics of the soils in each family. The map units of each soil family are described in the section "Detailed Soil Map Units".

Abgese Family

The Abgese family consists of moderately deep to deep, well drained soils forming in alluvium from granitic rocks, or colluvium from basalt rock. These soils are on alluvial fans or on sideslopes of basalt flows. Slope is 2 to 70 percent. Elevation is 5,400 to 8,300 feet. The mean annual precipitation is about 10 inches and the mean annual air temperature is about 48°F.

Taxonomic Class: Fine-loamy, mixed, mesic Xerollic Haplargids

Typical Pedon: The representative profile for this soil is on a southeast-facing alluvial fan, under Big Sagebrush and Pinyon Pine, at an elevation of 8,200 feet. Slope is 5 percent. When described (5/16/80), the soil was moist throughout. (Colors are for dry soil, unless otherwise noted.)

A1 - 0 to 5 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, slightly sticky and nonplastic; few fine roots; few fine tubular and interstitial pores; 8 percent gravel; mildly alkaline (pH 7.8); clear smooth boundary.

B2t - 5 to 11 inches; yellowish brown (10YR 5/4) sandy loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; few fine tubular and interstitial pores; common moderately thick clay films lining pores and bridging mineral grains; 5 percent gravel; mildly alkaline (pH 7.8); clear smooth boundary.

B3 - 11 to 16 inches; yellowish brown (10YR 5/4) gravelly sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, friable, slightly sticky and nonplastic; few fine roots; few fine tubular and interstitial pores; 33 percent gravel; mildly alkaline (pH 7.8); gradual smooth boundary.

C1 - 16 to 60 inches; yellowish brown (10YR 5/4)

very gravelly sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; few fine roots; few fine tubular and interstitial pores; 35 percent gravel; mildly alkaline (pH 7.8).

The surface is covered with 2 percent cobbles.

Type Location: About 1/3 mile south of the apparent center of Section 31, T.10S., R.36E., MDBM, Waucoba Mountain SE Quadrangle.

Range in Characteristics: Soil depth is greater than 60 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control section is 4 to 12 inches. It is usually dry in all parts from early April to mid October. The textural control section includes either all of the argillic or the upper 20 inches of the argillic. It is heavy sandy loam or sandy clay loam, with 18 to 31 percent clay. Rock fragments are 0 to 5 percent by volume.

The A horizon has dry color of 10YR 5/3 or 6/2; moist color is 10YR 3/3 or 4/2. It is sandy loam or loamy sand with 3 to 12 percent clay. Rock fragments are 8 to 10 percent gravel, 0 to 20 percent cobbles and 0 to 30 percent stones by volume. Reaction is neutral to mildly alkaline (pH 6.6 to 7.8).

The B2t horizon has dry color of 10YR 5/4 or 6/3; moist color is 10YR 4/3. It is heavy sandy loam or sandy clay loam with 18 to 31 percent clay. Rock fragments are 0 to 5 percent gravel by volume. Reaction is slightly acid to mildly alkaline (pH 6.4 to 7.8).

The C horizon has dry color of 10YR 5/4 or 6/3; moist color is 10YR 3/3 or 4/3. It is sandy clay loam, sandy loam or loamy sand with 4 to 26 percent clay. Rock fragments are 10 to 35 percent gravel by volume. Reaction is slightly acid to mildly alkaline (pH 6.3 to 7.8).

Bartine Family

The Bartine family consists of deep, well drained soils forming in residuum and colluvium from limestone and dolomite. These soils are on mountainsides. Slope is 30 to 70 percent. Elevation is 8,800 to 11,400 feet. The mean annual precipitation is about 11 inches and the mean annual temperature is about 34°F.

Taxonomic Class: Loamy-skeletal, carbonatic Typic Cryoborolls

Typical Pedon: The representative profile for this soil is on a mountainside, under Bristlecone Pine and Limberpine, at an elevation of 9,160 feet. Slope is 70 percent. When described (6/23/80), the soil was dry in the upper 5 inches, and slightly moist in the rest of the profile. (Colors are for dry soil unless otherwise noted.)

A11 - 0 to 5 inches; dark grayish brown (10YR 4/2) cobbly sandy loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine, few fine and common coarse roots; many very fine and few fine interstitial pores; slightly effervescent, disseminated lime; 10 percent gravel and 10 percent cobbles; mildly alkaline (pH 7.8); clear wavy boundary.

A12 - 5 to 11 inches; brown (10YR 5/3) very cobbly sandy loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine, and few medium roots; many very fine and fine interstitial pores; slightly effervescent, disseminated lime; 15 percent gravel and 20 percent cobbles; mildly alkaline (pH 7.8); clear wavy boundary.

B21 - 11 to 20 inches; pale brown (10YR 6/3) very cobbly loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine, and common fine, medium, coarse and very coarse roots; many very fine and common fine interstitial pores; slightly effervescent, disseminated lime; 10 percent gravel and 30 percent cobbles; mildly alkaline (pH 7.8); gradual wavy boundary.

B22ca - 20 to 27 inches; pale brown (10YR 6/3) very cobbly loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable,

slightly sticky and slightly plastic; few very fine, and common fine, medium, coarse and very coarse roots; many very fine and common fine interstitial pores; violently effervescent lime coatings on the undersides of rock fragments; violently effervescent, disseminated lime; 20 percent gravel, 30 percent cobbles and 10 percent stones; moderately alkaline (pH 8.0); gradual wavy boundary.

B23ca - 27 to 42 inches; pale brown (10YR 6/3) extremely cobbly loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; few very fine, and common fine, medium, coarse and very coarse roots; many very fine and common fine interstitial pores; violently effervescent lime coatings and pendants on the undersides of rock fragments; violently effervescent, disseminated lime; 20 percent gravel, 40 percent cobbles and 15 percent stones; moderately alkaline (pH 8.0); abrupt wavy boundary.

R - 42 inches; hard, fractured dolomite.

The soil surface is covered with 10 percent gravel, 30 percent cobbles and 5 percent stones.

Type Location: About 3.6 miles east on Wyman Canyon road, from its intersection with the Ancient Bristlecone road, then 900 feet upslope, on the south side of the road; about 0.2 miles east of the northwest corner of Section 16, T.6S., R.35E., MDBM, Blanco Mountain NW Quadrangle.

Range in Characteristics: Depth to the lithic contact is 40 to 60 inches. The mean annual soil temperature at 20 inches is about 37°F, and the mean summer temperature is 58°F. The soil moisture control section is 8 to 38 inches. It is usually dry in all parts from mid-April to late September, and is usually moist in some or all parts the rest of the year. The 10 to 40 inch textural control section is sandy loam or loam, with 7 to 14 percent clay. Rock fragments are 30 to 80 percent by volume, and average about 61 percent. They are limestone rock fragments. The soil is mildly to moderately alkaline (pH 7.5 to 8.0) and slightly to violently effervescent throughout. Alkalinity and effervescence increases with increasing depth. Depth to secondary carbonates, in the form of soft coatings and pendants on the undersides of the rock fragments, is 12 to 20 inches.

The A horizon has dry color of 10YR 4/2, 4/3 or 5/3; moist color is 10YR 3/3. It is sandy loam, with 7 to 10 percent clay. Rock fragments are 10 to 15 percent gravel and 10 to 20 percent cobbles by volume. It is slightly effervescent and mildly alkaline (pH 7.5 to 7.8).

The B horizon has dry color of 10YR 6/3; moist color is 10YR 3/3 or 4/3. It is sandy loam or loam, with 11 to 14 percent clay. Rock fragments are 10 to 25 percent gravel, 30 to 45 percent cobbles and 0 to 15 percent stones by volume. It is slightly to violently effervescent and mildly to moderately alkaline (pH 7.8 to 8.0).

Basket Family

The Basket family consists of deep and moderately deep, well drained soils forming in colluvium and residuum weathered from mixed metasedimentary rocks. These soils are on mountainsides. Slope is 15 to 80 percent. Elevation is 6,000 to 9,700 feet. The mean annual precipitation is about 8 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Loamy - skeletal, mixed, frigid Xerollic Haplargids

Typical Pedon: The representative profile for this soil is on a south-facing mountainside, under Singleleaf Pinyon Pine, Big Sagebrush and Antelope Bitterbrush, at an elevation of 8,400 feet. Slope is 28 percent. When described (10/25/78), the soil was dry in the upper 37 inches and slightly moist in the remainder of the profile. (Colors are for dry soil unless otherwise noted; colors were taken as rubbed.)

A11 - 0 to 2 inches; pale brown (10YR 6/3) very channery fine sandy loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure, parting to weak very fine subangular blocky; soft, very friable, nonsticky and nonplastic; few medium and fine and common very fine roots; many very fine and fine tubular pores; 40 percent gravel and 20 percent cobbles; neutral (pH 6.9); clear smooth boundary.

A12 - 2 to 5 inches; pale brown (10YR 6/3) very channery loam, very dark grayish brown (10YR 3/2) moist; weak medium and fine subangular blocky structure, parting to weak very fine subangular blocky; soft, friable, slightly sticky and slightly plastic; few medium and fine, and common very fine roots; many very fine and fine tubular pores; 40 percent gravel and 20 percent cobbles; neutral (pH 6.9); clear smooth boundary.

A13 - 5 to 15 inches; pale brown (10YR 6/3) very channery loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure, parting to weak very fine subangular blocky; soft, friable, slightly sticky and slightly plastic; few medium and fine, and common very fine roots; few very fine, fine and medium tubular and interstitial pores; 40 percent gravel and 5 percent cobbles; neutral (pH 6.9); clear smooth boundary.

A3 - 15 to 28 inches; pale brown (10YR 6/3) extremely

channery loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure, parting to weak very fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; few fine and common very fine roots; common very fine tubular and interstitial pores; 70 percent gravel, 10 percent cobbles and 2 percent stones; neutral (pH 7.0); clear wavy boundary.

B1t - 28 to 37 inches; pale brown (10YR 6/3) extremely channery loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure, parting to weak very fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; few medium, fine and very fine roots; common very fine tubular and interstitial pores; few thin clay films bridging mineral sand grains; 70 percent gravel, 10 percent cobbles and 2 percent stones; neutral (pH 7.0); clear smooth boundary.

B21t - 37 to 48 inches; light yellowish brown (10YR 6/4) extremely channery clay loam, dark yellowish brown (10YR 4/4) moist; moderate very fine angular blocky structure; slightly hard, firm, sticky and plastic; few medium, fine and very fine roots; common very fine tubular pores; common moderately thick clay films on ped faces and in pores; 65 percent gravel and 5 percent cobbles; neutral (pH 7.0); clear smooth boundary.

B22t - 48 to 57 inches; light yellowish brown (10YR 6/4) extremely channery clay loam, dark yellowish brown (10YR 4/4) moist; moderate very fine angular blocky structure; hard, firm, sticky and plastic; few medium, fine and very fine roots; common very fine tubular pores; common moderately thick clay films on ped faces and in pores; 65 percent gravel and 5 percent cobbles; neutral (pH 7.0); abrupt wavy boundary.

R - 57 inches; hard metasedimentary rock.

The soil surface is covered with 78 percent gravel and cobbles. These fragments are channery (thin and flat, and less than 6 inches long).

Type Location: About 4.1 miles north on the Bristlecone road, from its intersection with Westgard road, then 0.3 miles west on Grandview Mine road and about 500 feet north of the road; the apparent center of the southwest quarter of Section 13, T.7S., R.34E., MDBM,

Blanco Mountain SW Quadrangle.

Range in Characteristics: Depth to the lithic contact ranges from 25 to 57 inches. The mean annual soil temperature at 20 inches is about 45°F, and the mean summer and mean winter temperatures differ by more than 9°F. The soil moisture control section is 7 to 20 inches. It is usually dry in all parts from early April to mid October. The textural control section is the argillic horizon. It is clay loam, sandy clay loam or silty clay loam, with 31 to 33 percent clay, and a weighted average of 32 percent. Rock fragments range from 40 to 70 percent, and average about 68 percent by volume.

Some pedons lack an A13, A3 or a B1t horizon. Some pedons include a buried A1 and B2t. Other pedons have

O horizons up to one-half inch thick.

The A horizon has dry color of 10YR 6/3; moist color is 10YR 3/2, 4/2, 3/3 or 4/3. It is loam, fine sandy loam or sand, with 7 to 26 percent clay. Rock fragments are 8 to 60 percent gravel, 5 to 20 percent cobbles and 0 to 20 percent stones by volume. It is neutral to moderately alkaline (pH 6.9 to 8.0).

The B2t horizon has dry color of 10YR 5/4 or 6/4; moist color is 10YR 4/4 or 7.5YR 4/4. It is clay loam, sandy clay loam or silty clay loam, with 31 to 33 percent clay. Rock fragments are 40 to 50 percent gravel, 30 to 65 percent cobbles and 0 to 5 percent stones by volume. It is neutral to strongly alkaline (pH 6.7 to 9.0).

Bearskin Family

The Bearskin family consists of shallow, well drained soils forming in residuum and colluvium from basalt and slate. These soils are on mountainsides. Slope is 15 to 60 percent. Elevation is 6,800 to 8,200 feet. The mean annual precipitation is about 12 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Loamy, mixed, frigid Lithic Argixerolls

Typical Pedon: The representative profile for this soil is on a northwest-facing mountainside, under Singleleaf Pinyon Pine, Big Sagebrush and Antelope Bitterbrush, at an elevation of 7,520 feet. Slope is 32 percent. When described (8/24/78), the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

O2 - 1 to 0 inches; highly decomposed pine needles, cones and twigs.

A1 - 0 to 2 inches; brown (10YR 5/3) very cobbly sandy loam, dark brown (7.5YR 3/2) moist; weak very fine and fine subangular blocky structure, parting to weak very fine and fine granular; soft, friable, nonsticky and slightly plastic; many very fine and fine roots; many medium interstitial pores; 20 percent gravel, 21 percent cobbles and 5 percent stones; neutral (pH 6.6); abrupt smooth boundary.

B1 - 2 to 5 inches; brown (10YR 5/3) cobbly sandy clay loam, dark brown (7.5YR 3/2) moist; weak fine and medium subangular blocky structure, parting to weak very fine and fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; few very fine, fine and medium roots; common fine tubular pores; 21 percent cobbles and 5 percent stones; neutral (pH 6.8); clear wavy boundary.

B21t - 5 to 11 inches; brown (10YR 4/3) sandy clay loam, dark brown (7.5YR 3/2) moist; moderate medium and coarse subangular blocky structure, parting to moderate fine subangular blocky; slightly hard, firm, sticky and slightly plastic; few very fine, fine and medium roots; common very fine, fine and medium tubular pores; few thin clay films bridging

mineral sand grains; neutral (pH 6.8); abrupt wavy boundary.

B22t - 11 to 17 inches; brown (7.5YR 4/4) sandy clay loam, dark reddish brown (5YR 3/4) moist; strong coarse subangular blocky structure, parting to strong fine and medium subangular blocky; hard, firm, sticky and plastic; few very fine and fine roots; few very fine and common fine tubular pores; common thin clay films on ped faces, and few thin clay films in pores; neutral (pH 6.8); abrupt wavy boundary.

R - 17 inches; hard basalt bedrock.

The soil surface is covered with 20 percent gravel, 20 percent cobbles and 5 percent stones.

Type Location: About 110 feet west and 80 feet south of the northeast corner of Section 4, T.1N., R.31E., MDBM, Glass Mountain NE Quadrangle.

Range in Characteristic: Depth to the lithic contact ranges from 13 to 20 inches. The mean annual soil temperature at the lithic contact is about 45°F, and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is 2 to 17 inches. It is usually dry in all parts from mid April to late September and is usually moist in some or all parts the rest of the year. The textural control section is the argillic horizon in pedons deeper than 14 inches and is all of the soil in shallower pedons. The texture is silt loam or sandy clay loam with 10 to 34 percent clay, and an average of about 32 percent. Rock fragments are 0 to 21 percent by volume.

Some pedons lack O horizons.

The O horizon is up to 1 inch thick.

The A horizon has dry color of 10YR 5/2 or 5/3; moist color is 10YR 3/2 or 7.5YR 3/2. It is sandy loam or silt loam with 10 to 18 percent clay. Rock fragments are 10 to 50 percent gravel and 0 to 21 percent cobbles by volume. Reaction is neutral to moderately alkaline (pH 6.6 to 8.0)

The B1 horizon has dry color of 10YR 5/3; moist color is 10YR 3/2 or 7.5YR 3/2. It is silt loam or sandy clay loam with 14 to 25 percent clay. Rock fragments are 0 to 16 percent gravel, 0 to 21 percent cobbles and 0 to 5 percent stones by volume. Reaction is neutral to moderately alkaline (pH 6.8 to 8.0).

The B2t horizon has dry color of 10YR 4/3 or 5/3, or 7.5YR 4/4; moist color is 10YR 3/3, or 7.5YR 3/2 or 5YR 3/4. It is silt loam or sandy clay loam with 16 to 34 percent clay. Rock fragments are 0 to 16 percent gravel and 0 to 5 percent cobbles by volume. Reaction is neutral to moderately alkaline (pH 6.8 to 8.0).

Berent Family

The Berent family consists of deep, well drained soils forming in alluvium and eolian deposits from mixed rocks. These soils are in basin fans, alluvial bottoms and on stabilized dunes. Slope is 2 to 30 percent. Elevation is 5,100 to 7,800 feet. The mean annual precipitation is about 10 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Mixed, mesic Xeric Torripsamments

Typical Pedon: The representative profile for this soil is in a north-facing basin fan, under Big Sagebrush and Antelope Bitterbrush, at an elevation of 6,520 feet. Slope is 7 percent. When described (10/19/81), the soil was slightly moist in the upper 6 inches and dry in the rest of the profile. (Colors are for dry soil unless otherwise noted.)

A11 - 0 to 6 inches; pale brown (10YR 6/3) loamy sand, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine and fine interstitial pores; 10 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

A12 - 6 to 13 inches; brown (10YR 5/3) gravelly medium sand, dark brown (10YR 3/3) moist; massive; loose, loose, nonsticky and nonplastic; few very fine and fine roots; many very fine and fine interstitial pores; 17 percent gravel; moderately alkaline (pH 8.0); gradual wavy boundary.

C1 - 13 to 22 inches; pale brown (10YR 6/3) loamy fine sand, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine, fine and medium roots; many very fine and fine interstitial pores; 10 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

C2 - 22 to 44 inches; light yellowish brown (10YR 6/4) medium sand, brown (10YR 4/3) moist; massive; hard, friable, nonsticky and nonplastic; few fine

roots; many very fine and fine interstitial pores; 10 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

C3 - 44 to 60 inches; light yellowish brown (10YR 6/4) gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine interstitial pores; 16 percent gravel; moderately alkaline (pH 8.0).

The surface is covered with 15 percent gravel.

Type Location: About 1.6 miles west on Wyman Canyon Road, from its intersection with Highway 3A (Westgard Pass Road), then 2.55 miles south on the south fork of the road, then 0.5 mile south on the south fork of the road, and about 25 feet east of the road; about 1,320 feet east and 360 feet south of the northwest corner of Section 28, T.6S., R.36E., MDBM, Blanco Mountain NE Quadrangle.

Range in Characteristics: Soil depth is greater than 60 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control is 13 to 60 inches. It is usually dry in all parts from early April to mid October. The 10 to 40 inch control section is loamy fine sand, loamy coarse sand, loamy sand, medium sand or sand, with 0 to 17 percent gravel by volume.

The A horizon has dry color of 10YR 5/3 or 6/3; moist color is 10YR 3/3 or 4/3. It is medium sand, fine sand, loamy coarse sand or loamy sand, with 5 to 20 percent gravel by volume. Reaction is slightly acid to moderately alkaline (pH 6.4 to 8.0).

The C horizon has dry color of 10YR 6/3 or 6/4; moist color is 10YR 3/3, 4/3, 4/4 or 5/3. It is sand, coarse sand, medium sand, loamy coarse sand, loamy sand, loamy fine sand and sandy loam, with less than 5 percent clay, and 0 to 17 percent gravel by volume. Reaction is slightly acid to moderately alkaline (pH 6.5 to 8.0).

Berning Family

The Berning family consists of moderately deep, well drained soils forming in colluvium and alluvium from rhyolitic and granitic rocks. These soils are on mountainsides and old alluvial fans. Slope is 30 to 60 percent. Elevation is 6,800 to 8,500 feet. The mean annual precipitation is about 11 inches and the mean annual temperature is 48°F.

Taxonomic Class: Clayey-skeletal, montmorillonitic, mesic Xerollic Haplargids

Typical Pedon: The representative profile for this soil is on a south-facing mountainside, under Singleleaf Pinyon Pine and Big Sagebrush, at an elevation of 8,440 feet. Slope is 50 percent. When described (9/29/80), the soil was dry throughout. (Colors are for dry soil, unless otherwise noted.)

A1 - 0 to 4 inches; light brownish gray (10YR 6/2) extremely stony loamy sand, dark grayish brown (10YR 4/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine and fine interstitial pores; 40 percent gravel, 20 percent cobbles and 15 percent stones; neutral (pH 7.0); clear wavy boundary.

B1t - 4 to 12 inches; pale brown (10YR 6/3) very stony loam, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, sticky and plastic; few very fine and fine, and common medium and coarse roots; many very fine and fine interstitial pores; few thin clay films bridging mineral sandgrains and in pores; 30 percent gravel, 20 percent cobbles and 15 percent stones; neutral (pH 7.0); clear irregular boundary.

B2t - 12 to 24 inches; reddish yellow (5YR 6/6) very cobbly clay, yellowish red (5YR 4/6) moist; massive; hard, friable, very sticky and very plastic; few fine and medium, and common very coarse roots; few very fine and fine tubular pores; common mod-

erately thick clay films in pores and on clod faces; 15 percent gravel, 20 percent cobbles and 10 percent stones; mildly alkaline (pH 7.5); abrupt irregular boundary.

R - 24 inches; hard, highly fractured rhyolite, with clay in cracks.

The surface is covered with 10 percent gravel, 20 percent cobbles, and 15 percent stones.

Type Location: About 4.8 miles east on Sugarloaf Road, from its intersection with Highway 395 at Montgomery Pass, and about 0.3 miles southeast of Sugarloaf Road; about 800 feet east and 1,425 feet south of the northeast corner of Section 21, T.1N., R.33E., MDBM, Benton NE Quadrangle.

Range in Characteristics: Depth to the lithic contact is 20 to 40 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control section is 7 to 20 inches. It is usually dry in all parts from early April to mid October. The control section is the argillic horizon. It is clay or clay loam with 35 to 45 percent clay. Rock fragments are 40 to 50 percent.

Some pedons have a C horizon.

The A horizon has dry color of 10YR 6/2 or 6/3; moist color is 10YR 4/2 or 4/3. It is loamy sand, coarse sandy loam or loam with 4 to 20 percent clay. Rock fragments are 15 to 40 percent gravel, 0 to 20 percent cobbles and 0 to 15 percent stones by volume. Reaction is neutral (pH 7.0).

The Bt horizon has dry color of 10YR 5/4 or 6/3, or 5Y 6/6; moist color is 10YR 4/3 or 4/4 or 5Y 4/6. It is loam, clay loam or clay, with 18 to 45 percent clay. Rock fragments are 15 to 40 percent gravel, 0 to 20 percent cobbles and 0 to 15 percent stones by volume. Reaction is neutral to mildly alkaline (pH 7.0 to 7.5).

Beveridge Family

The Beveridge family consists of shallow, well drained soils forming in colluvium from limestone and dolomite. These soils are on mountainsides. Slope is 60 to 80 percent. Elevation is 6,400 to 9,300 feet. The mean annual precipitation is about 11 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Loamy-skeletal, carbonatic, frigid Lithic Torriorthents.

Typical Pedon: The representative profile for this soil is on a south by southwest-facing mountainside, under Curleaf Mountain Mahogany, Singleleaf Pinyon Pine, and Big Sagebrush, at an elevation of 9,200 feet. Slope is 60 percent. When described (9/25/81), the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A1 - 0 to 2 inches; pale brown (10YR 6/3) very gravelly loamy sand, dark grayish brown (10YR 4/2) moist; single grain; loose, loose, nonsticky and nonplastic; few very fine and fine roots; many very fine intersitial pores; violently effervescent, disseminated lime; 35 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

C1 - 2 to 9 inches; brown (10YR 5/3) extremely cobbly loam, dark yellowish brown (10YR 3/4) moist; weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine and fine, and common medium and coarse roots; many very fine interstitial pores; violently effervescent, disseminated lime; 25 percent gravel, 40 percent cobbles and 5 percent stones; moderately alkaline (pH 8.0); gradual wavy boundary.

C2 - 9 to 13 inches; brown (10YR 5/3) extremely stony loam, brown (10YR 4/3) moist; weak very fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; few very fine and fine, many medium, and common coarse roots; many very fine interstitial pores; violently effervescent, disseminated lime; 30 percent gravel, 5 percent cob-

bles and 50 percent stones; moderately alkaline (pH 8.0); abrupt wavy boundary.

R - 13 inches; hard, fractured limestone.

Type Location: About 7.1 miles west on Indian Creek Road, from its intersection with Nevada Highway 3A, then 1.9 miles southwest on the south fork of the road and 0.3 miles upslope, on the east side of the road; about 0.4 mile east and 0.35 mile south of the northwest corner of Section 28, T.2S., R.34E., MDBM, Mt. Barcroft NW Quadrangle.

Range in Characteristics: Depth to the lithic contact is 10 to 20 inches. The mean annual soil temperature at the lithic contact is about 45°F., and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is 8 inches to the lithic contact. It is usually dry in all parts from early April to mid October when the soil temperature is above 9°F. The textural control section is the whole soil in soils 14 inches or less deep, and is at 10 inches to the lithic contact in soils deeper than 14 inches. It is medium sand, loamy sand, sandy loam or loam, with 2 to 13 percent clay, and an average of about 9 percent. Rock fragments range from 35 to 85 percent by volume, and average about 48 percent. It has about 50 percent calcium carbonates by weight, and no evidence of gypsum. Effervescence is violent throughout.

The A horizon has dry color of 10YR 5/3 or 6/3; moist color is 10YR 3/3, 4/2 or 4/3. It is medium sand, loamy sand or loam, with 2 to 10 percent clay. Rock fragments are 15 to 65 percent gravel and 0 to 5 percent cobbles by volume. Reaction is moderately alkaline (pH 8.0 to 8.2).

The B horizon has dry color of 10YR 5/3, 6/3 or 7/3; moist color is 10YR 3/4, 4/3 or 5/4. It is sandy loam or loam, with 7 to 13 percent clay. Rock fragments are 10 to 40 percent gravel, 0 to 40 percent cobbles and 0 to 50 percent stones by volume. Reaction is moderately alkaline (pH 7.8 to 8.0).

Blackston Family

The Blackston family consists of deep, well drained soils forming in older alluvium from mixed rock. These soils are on dissected alluvial fans. Slope is 15 to 30 percent. Elevation is 5,200 to 7,000 feet. The mean annual precipitation is about 6 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Loamy-skeletal, mixed, mesic Typic Calciorthids.

Typical Pedon: The representative profile for this soil is on a southwest-facing dissected alluvial fan, under Spiney Menodora and Nevada Ephedra, at an elevation of 6,000 feet. Slope is 19 percent. When described (10/30/78), the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A11 - 0 to 3 inches; very pale brown (10YR 7/3) gravelly sandy loam, brown (10YR 4/3) moist; moderate very thin and thin platy structure; soft, friable, nonsticky and nonplastic; many very fine vesicular pores; strongly effervescent, disseminated lime; 25 percent gravel; mildly alkaline (pH 7.6); clear smooth boundary.

A12 - 3 to 7 inches; very pale brown (10YR 7/3) gravelly sandy loam, brown (10YR 4/3) moist; weak very fine and fine subangular blocky structure; soft, friable, nonsticky and nonplastic; common very fine and few fine and medium roots; many very fine interstitial pores; strongly effervescent, disseminated lime; 25 percent gravel; mildly alkaline (pH 7.6); clear wavy boundary.

C1ca - 7 to 17 inches; light gray (10YR 7/2) gravelly loam, yellowish brown (10YR 5/4) moist; weak very fine, fine and medium subangular blocky and granular structure; soft, friable, slightly sticky and slightly plastic; common very fine, and few fine and medium roots; many very fine interstitial pores; violently effervescent lime coatings on the undersides of 50 percent of the rock fragments; strongly effervescent, disseminated lime; 20 percent gravel and 3 percent cobbles; mildly alkaline (pH 7.7); clear irregular boundary.

C2ca - 17 to 39 inches; white (10YR 8/2) extremely gravelly sandy loam, pale brown (10YR 6/3) moist; massive, soft, friable, slightly sticky and slightly plastic; few fine and medium roots; many very fine

interstitial pores; calcium carbonate equivalent is 58 percent; 24 percent degrading violently effervescent calcium carbonate fragments by volume; 13 percent violently effervescent calcium carbonate coatings and pendants by volume, on undersides of rock fragments; violently effervescent, disseminated lime; 70 percent gravel and 10 percent cobbles; mildly alkaline (pH 7.8); gradual wavy boundary.

C3ca - 39 to 60 inches; white (10YR 8/2) extremely gravelly sandy loam, pale brown (10YR 6/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine interstitial pores; 7 percent lenses of discontinuous indurated material by volume; 16 percent violently effervescent calcium carbonate coatings and pendants by volume, on undersides of rock fragments; 3 percent violently effervescent calcium carbonate concretions; violently effervescent, disseminated lime; 80 percent gravel and 15 percent cobbles; mildly alkaline (pH 7.8).

The soil surface is covered with 52 percent gravel.

Type Location: About 3.95 miles east on Westgard Road, from its intersection with Highway 395, then 0.95 mile north on jeep trail, and 685 feet west of the trail; about 0.2 mile west and 0.4 mile south of the northeast corner of Section 23, T.8S., R34E., MDBM, Waucoba Mountain NW Quadrangle.

Range in Characteristics: Soil depth is greater than 60 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control section is 8 to 35 inches. It is usually dry in all parts from early February to late November. The 10 to 40 inch textural control section is sandy loam or loam, with 17 to 19 percent clay, and an average of less than 18 percent. Rock fragments average 67 percent by volume. The soil is mildly alkaline (pH 7.6 to 7.8) and strongly to violently effervescent throughout.

The A horizon has dry color of 10YR 7/3; moist color is 10YR 4/3. It is sandy loam with 17 percent clay. Rock fragments are 25 percent gravel by volume.

The Cca horizon has dry color of 10YR 7/2 or 8/2; moist color is 10YR 5/4 or 6/3. It is sandy loam or loam with 17 to 19 percent clay. Rock fragments are 70 to 80 percent gravel and 10 to 15 percent cobbles by volume.

Bluewing Family

The Bluewing family consists of very deep, somewhat excessively drained soils forming in alluvium from mixed rock. These soils are on valley floors and in drainage bottoms. Slope is 5 to 30 percent. Elevation is 3,800 to 7,000 feet. The mean annual precipitation is about 6 inches and the mean annual temperature is about 56°F.

Taxonomic Class: Sandy-skeletal, mixed, mesic Typic Torriorthents.

Typical Pedon: The representative profile for this soil is on a west-facing drainage bottom, under Boxthorn and Shadscale, at an elevation of 4,600 feet. Slope is 8 percent. When described (4/27/80), the soil was dry throughout. (Colors are for day soil unless otherwise noted.)

A1 - 0 to 3 inches; pale brown (10YR 6/3) very stony loamy fine sand, brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common fine roots; many very fine and fine interstitial pores; violently effervescent, disseminated lime; 10 percent gravel, 30 percent cobbles and 20 percent stones; moderately alkaline (pH 8.0); clear irregular boundary.

C1 - 3 to 12 inches; pale brown (10YR 6/3) very stony loamy fine sand, brown (10YR 4/3) moist; very fine single grain; loose, loose, nonsticky and nonplastic; many fine and few medium roots; many very fine and fine interstitial pores; violently effervescent, disseminated lime; 10 percent gravel, 30 percent cobbles and 20 percent stones; moderately alkaline (pH 8.0); clear wavy boundary.

C2 - 12 to 35 inches; pale brown (10YR 6/3) very cobbly loamy fine sand, brown (10YR 4/3) moist; very fine single grain; loose, loose, nonsticky and nonplastic; common fine and few medium roots; many very fine and fine interstitial pores; violently effervescent,

disseminated lime; 30 percent gravel, 20 percent cobbles and 5 percent stones; moderately alkaline (pH 8.0); clear wavy boundary.

C3 - 35 to 70 inches; pale brown (10YR 6/3) extremely gravelly loamy sand, brown (10YR 4/3) moist; very fine single grain; loose, loose, nonsticky and nonplastic; few fine roots; many very fine and fine interstitial pores; violently effervescent, disseminated lime; 60 percent gravel, 5 percent cobbles and 5 percent stones; moderately alkaline (pH 8.0).

The soil surface is covered with 10 percent cobbles.

Type Location: About 3.5 miles east on Waucoba Road, from its intersection with Westgard Road and about 500 feet south of road; about 700 feet west and 800 feet north of the southwest corner of the northwest quarter of Section 18, T.9S., R.35E., MDBM, Waucoba Mountain NW Quadrangle.

Range in Characteristics: Soil depth is greater than 60 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control section is 19 to 54 inches. It is usually dry in all parts from early February to late November. Rock fragments in the control section range from 55 to 70 percent and average 60 percent. The profile is moderately alkaline (pH 8.0) and calcareous throughout.

The A horizon has dry color of 10YR 6/3 or 6/2; moist color is 10YR 4/3 or 4/2. It is loamy fine sand or loamy sand with 10 to 40 percent gravel, 5 to 30 percent cobbles, and 0 to 20 percent stones. Effervescence is slight to violent.

The C horizon has dry color of 10YR 6/3; moist color is 10YR 4/3 or 6/3. It is loamy fine sand and loamy sand, with 10 to 60 percent gravel, 5 to 40 percent cobbles and 5 to 20 percent stones. Effervescence is violent.

Bondranch Family

The Bondranch family consists of shallow, well drained soils forming in colluvium from sandstone, siltstone and shale. These soils are on mountainsides. Slope is 15 to 80 percent. Elevation is 6,000 to 9,800 feet. The mean annual precipitation is about 9 inches and the mean annual temperature is 44°F.

Taxonomic Class: Loamy, mixed, frigid Lithic Xerollic Camborthids.

Typical Pedon: The representative profile for this soil is on a southwest-facing mountainside, under Singleleaf Pinyon Pine and Mormon Tea, at an elevation of 8,800 feet. Slope is 21 percent. When described (10/23/78), the soil was slightly moist throughout. (Colors are for dry soil unless otherwise noted.)

A11 - 0 to 1 inch; pale brown (10YR 6/3) very gravelly sandy loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure, parting to weak very fine subangular blocky and granular; soft, friable, nonsticky and slightly plastic; few very fine roots; many very fine and common fine tubular pores; 45 percent gravel, 5 percent cobbles and 5 percent stones; neutral (pH 6.9); abrupt smooth boundary.

A12 - 1 to 5 inches; pale brown (10YR 6/3) gravelly loam, dark brown (10YR 3/3) moist; weak medium and coarse subangular blocky structure, parting to weak very fine and fine subangular blocky; slightly hard, friable, nonsticky and nonplastic; few very fine and fine roots; many very fine and fine tubular pores; 15 percent gravel and 2 percent cobbles; neutral (pH 7.2); clear wavy boundary.

B1 - 5 to 10 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure, parting to moderate fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common very fine and few fine and medium roots; common very fine and fine tubular pores; 30 percent gravel and 3 percent cobbles; neutral (pH 7.1); clear wavy boundary.

B2 - 10 to 16 inches; yellowish brown (10YR 5/4) gravelly loam, brown (10YR 4/3) moist; moderate

medium subangular blocky structure, parting to moderate fine subangular blocky; hard, firm, sticky and plastic; common very fine roots; common very fine tubular pores; 20 percent gravel; neutral (pH 6.9); abrupt wavy boundary.

R - 16 inches; hard metamorphosed cambrian marine bedrock.

The soil surface is covered with 65 percent gravel and 5 percent cobbles.

Type Location: About 6.45 miles north on Bristlecone Road, from its intersection with Westgard Road, then about 50 feet west of the road; about 0.1 mile east and 0.2 mile north of the southwest corner of Section 7, T.7S., R.35E., MDBM, Blanco Mountain SW Quadrangle.

Range in Characteristics: Depth to the lithic contact is 12 to 20 inches. The mean annual soil temperature at the lithic contact is about 45°F., and the mean summer and mean winter temperatures differ by more than 9°F. The soil moisture control section is 7 to 20 inches. It is usually dry in all parts from early April to mid October, and moist the rest of the year in some or all parts. The textural control section is 10 inches to the lithic contact for pedons deeper than 14 inches, or the whole soil in those pedons 14 inches or less deep. It is loamy sand, sandy loam or loam with 3 to 23 percent clay, and an average of 16 percent. Rock fragments range from 10 to 20 percent by volume and average 17 percent. Reaction is neutral (pH 6.9 to 7.2) throughout the soil profile.

The A horizon has dry color of 10YR 5/3 or 6/3; moist color is 10YR 3/3 or 4/2. It is loamy sand or sandy loam with 3 to 17 percent clay by weight. Rock fragments are 10 to 45 percent gravel, 0 to 5 percent cobbles and 0 to 5 percent stones by volume.

The B horizon has dry color of 10YR 5/3, 5/4 or 6/6; moist color is 10YR 3/3, 4/3 or 5/4. It is sandy loam or loam with 10 to 23 percent clay by weight. Rock fragments are 15 to 30 percent gravel and 0 to 3 percent cobbles by volume.

The lithic contact is sandstone, siltstone, or shale.

Brad Family

The Brad family consists of shallow, excessively drained soils forming in residuum from quartz monzonite. These soils are on upland sideslopes, ridges and benches. Slope is 15 to 80 percent. Elevation is 5,900 to 9,800 feet. The mean annual precipitation is about 11 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Sandy-skeletal, mixed, frigid Lithic Haploxerolls.

Typical Pedon: The representative profile for this soil is on a west-facing mountainside, under Singleleaf Pinyon Pine and Mountain Mahogany, at an elevation of 9,120 feet. Slope is 31 percent. When described (5/22/80), the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A1 - 0 to 3 inches; dark grayish brown (10YR 4/2) very gravelly sand, very dark grayish brown (10YR 3/2) moist; weak medium granular structure; soft, very friable, nonsticky and nonplastic; few fine roots; many fine interstitial pores; 50 percent gravel and 5 percent cobbles; neutral (pH 7.0); clear smooth boundary.

C1 - 3 to 6 inches; dark grayish brown (10YR 4/2) very gravelly loamy sand, very dark grayish brown (10YR 3/2) moist, massive; soft, very friable, nonsticky and nonplastic; common fine roots; many fine interstitial pores; 45 percent gravel and 5 percent cobbles; neutral (pH 7.3); abrupt smooth boundary.

R - 6 inches; hard quartz monzonite.

The soil surface is covered with 20 percent cobbles and 10 percent stones.

Type Location: About 1,100 feet east and 1,000 feet south of the center of Section 12, T.11S., R.35E., MDBM, Waucoba Mountain SE Quadrangle.

Range in Characteristics: Depth to the lithic contact is 4 to 8 inches. The mean annual soil temperature at the lithic contact is about 45°F., and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is 3 to 6 inches. It is usually dry in all parts from mid June to late September, and usually moist in some or all parts the rest of the year. The textural control section is the whole soil. It is sand or loamy sand, with an average of about 5 percent clay. Rock fragments range from 35 to 80 percent by volume and average 50 percent. Reaction is neutral (pH 7.0 to 7.3) throughout the profile.

The A horizon has dry color of 10YR 4/2, 5/2, 5/3 or 5/4; moist color is 10YR 3/2, 3/3 or 4/2. It is sand or loamy sand with 40 to 50 percent gravel, 5 to 20 percent cobbles and 0 to 20 percent stones.

The C horizon has dry color of 10YR 4/2, 5/2 or 5/3; moist color is 10YR 3/2 or 3/3. It is loamy sand with 35 to 45 percent gravel, 0 to 5 percent cobbles and 0 to 30 percent stones.

Bregar Family

The Bregar family consists of shallow, well drained soils forming in colluvium from siltstone, shale and sandstone. These soils are on mountainsides. Slope is 15 to 60 percent. Elevation is 6,100 to 9,800 feet. The mean annual precipitation is about 10 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Loamy-skeletal, mixed, frigid Lithic Xerollic Haplargids.

Typical Pedon: The representative profile for this soil is on a west-facing mountainside, under Singleleaf Pinyon Pine, Big Sagebrush and Antelope Bitterbrush, at an elevation of 8,960 feet. Slope is 45 percent. When described (9/23/80), the soil was dry in the upper two inches and slightly moist and moist below that depth. (Colors are for dry soil unless otherwise noted.)

A1 - 0 to 2 inches; light brownish gray (2.5Y 6/2) very cobbly loam, dark grayish brown (2.5Y 4/2) moist; weak medium platy structure; soft, very friable, sticky and plastic; few fine and medium roots; common very fine and fine interstitial, and common very fine and fine vesicular pores; 40 percent gravel, 15 percent cobbles, and 5 percent stones; mildly alkaline (pH 7.5); clear wavy boundary.

B21t - 2 to 11 inches; light yellowish brown (2.5Y 6/4) extremely cobbly loam, olive brown (2.5Y 4/4) moist; massive; slightly hard, very friable, sticky and plastic; few fine and medium, and common coarse roots; common very fine and fine interstitial, and few very fine and fine tubular pores; few thin clay films bridging mineral sandgrains and in pores; common violently effervescent lime coatings on the undersides of rock fragments, and slightly effervescent disseminated lime; 50 percent gravel, 20 percent cobbles and 5 percent stones; neutral (pH 7.0); clear irregular boundary.

B22t - 11 to 15 inches; light yellowish brown (2.5Y 6/4) extremely gravelly loam, olive brown (2.5Y 4/4) moist; massive; slightly hard, very friable, sticky and plastic; few fine and medium roots; common very fine and fine interstitial, and few very fine and fine tubular pores; few thin clay films bridging

mineral sandgrains and in pores; common violently effervescent lime coatings on the undersides of rock fragments, and slightly effervescent disseminated lime; 70 percent gravel and 5 percent cobbles; mildly alkaline (pH 7.5); abrupt irregular boundary.

R - 15 inches; hard, fractured silty shale.

The surface is covered with 40 percent gravel, 15 percent cobbles and 5 percent stones.

Type Location: About 2.2 miles west on Silver Canyon Road, from its intersection with the Bristlecone Road, on the south shoulder of the road; about 530 feet west and 265 feet north of the southeast corner of Section 23, T.6S., R.34E., MDBM, Blanco Mountain NW Quadrangle.

Range in Characteristics: Depth to the lithic contact is 15 to 20 inches. The mean annual soil temperature at the lithic contact is about 45°F., and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is from the 5 inch depth to the lithic contact. It is usually dry in all parts from early April to mid October. The control section is the argillic horizon. It is loam or clay loam with 25 to 30 percent clay. Rock fragments are 75 to 80 percent by volume.

Some pedons are nocalcareous throughout.

The A horizon has dry color of 10YR 6/3 or 6/4, or 2.5Y 6/2; moist color is 10YR 4/3, or 2.5Y 4/2 or 4/4. It is sandy loam, loam or clay loam with 10 to 60 percent gravel, 5 to 15 percent cobbles and 0 to 5 percent stones by volume. Clay content ranges from 16 to 24 percent. Reaction is neutral to mildly alkaline (pH 6.8 to 7.5).

The B horizon has dry color of 10YR 5/4 or 2.5Y 6/4; moist color is 10YR 4/4 or 2.5Y 4/4. It is loam, sandy clay loam or clay loam, with 10 to 70 percent gravel, 5 to 60 percent cobbles and 0 to 5 percent stones by volume. Clay content ranges from 25 to 30 percent. Effervescence is none to slight, and lime coatings on undersides of rock fragments may or may not be present. Reaction is neutral to mildly alkaline (pH 6.7 to 7.8).

Cath Family

The Cath family consists of deep, well drained soils forming in calcareous alluvium from mixed rocks. These soils are on ridges of dissected alluvial fans. Slope is 4 to 30 percent. Elevation is 6,400 to 8,300 feet. The mean annual precipitation is about 9 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Fine-loamy, mixed, mesic Durixerollic Haplargids.

Typical Pedon: The representative profile for this soil is on a north-facing ridge of an alluvial fan, under Big Sagebrush and Goldenbrush, at an elevation of 7,120 feet. Slope is 6 percent. When described (5/7/80), the soil was moist in the 3 to 18 inch part and dry in all other parts. (Colors are for dry soil unless otherwise noted.)

A1 – 0 to 3 inches; grayish brown (10YR 5/2) gravelly sandy loam, dark grayish brown (10YR 4/2) moist; weak thin platy structure; soft, friable, nonsticky and nonplastic; common fine and medium roots; common very fine vesicular pores; 20 percent gravel and 1 percent cobbles; mildly alkaline (pH 7.5); clear smooth boundary.

B2t – 3 to 12 inches; yellowish brown (10YR 5/4) gravelly clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; common fine and medium roots; common fine tubular pores; common moderately thick clay films on ped faces and lining pores; 15 percent gravel and 2 percent cobbles; mildly alkaline (pH 7.5); gradual smooth boundary.

B3t – 12 to 18 inches; yellowish brown (10YR 5/4) very gravelly loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few medium roots; few fine interstitial and tubular pores; few moderately thick clay films on ped faces; 30 percent

gravel, 5 percent cobbles and 1 percent stones; moderately alkaline (pH 8.0); abrupt wavy boundary.

C1sica – 18 to 60 inches; discontinuous indurated pan, which is brittle and has a very firm consistence when moist.

The soil surface is covered with 10 percent cobbles.

Type Location: About 9.25 miles east on Waucoba Road, from its intersection with Westgard Road, then about 2.7 miles south on a jeep trail, on the south side of the road, then 0.25 mile south on the south fork of the trail, and 165 feet west of the trail; about 370 feet south of the apparent center of Section 3, T.10S., R.35E., MDBM, Waucoba Mountain SW Quadrangle.

Range in Characteristics: Soil depth is greater than 60 inches. Depth to the fractured pan is 12 to 18 inches. The mean annual soil temperature at the pan is 47 to 59°F. The soil moisture control section is 5 to 17 inches. It is usually dry in all parts from early April to mid November. The textural control section is the argillic horizon. It is loam or clay loam with 27 to 30 percent clay. Rock fragments are 15 to 17 percent by volume.

The A horizon has dry color of 10YR 5/2; moist color is 10YR 4/2. It is sandy loam or fine sandy loam with 10 to 12 percent clay. Rock fragments are 20 to 25 percent gravel and 1 to 2 percent cobbles by volume. Reaction is mildly alkaline (pH 7.5).

The Bt horizon has dry color of 10YR 5/4; moist color is 10YR 4/3 or 4/4. It is loam or clay loam with 26 to 30 percent clay. Rock fragments are 10 to 30 percent gravel, 2 to 5 percent cobbles and 0 to 1 percent stones by volume. Reaction is mildly to moderately alkaline (pH 7.5 to 8.0).

The Csica horizon is a highly fractured duripan, with roots present in cracks.

Checkett Family

The Checkett family consists of shallow, well drained soils forming in colluvium from metasediments dominated by quartzitic sandstone. The soils are on mountainsides. Slope is 30 to 80 percent. Elevation is 5,800 to 8,400 feet. The mean annual precipitation is about 8 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Loamy-skeletal, mixed, mesic Lithic Xerollic Haplargids.

Typical Pedon: The representative profile for this soil is on a west-facing mountainside, under Singleleaf Pinyon Pine and Big Sagebrush, at an elevation of 7,360 feet. Slope is 40 percent. When described (5/16/81), the soil was slightly moist throughout. (Colors are for dry soil, unless otherwise noted.)

A11 - 0 to 2 inches; pale brown (10YR 6/3) gravelly fine sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine vesicular and interstitial pores; 15 percent gravel; moderately alkaline (pH 8.0); clear smooth boundary.

A12 - 2 to 6 inches; pale brown (10YR 6/3) gravelly fine sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common fine roots; few fine interstitial pores; 20 percent gravel and 5 percent cobbles; moderately alkaline (pH 8.0); clear smooth boundary.

B21t - 6 to 15 inches; yellowish brown (10YR 5/4) very gravelly sandy clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; soft, friable, sticky and plastic; common fine and medium roots; common medium tubular pores; common moderately thick clay films on ped faces; 30 percent gravel and 10 percent cobbles; moderately alkaline (pH 8.0); clear smooth boundary.

B22t - 15 to 19 inches; yellowish brown (10YR 5/4) very cobbly sandy clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky struc-

ture; slightly hard, firm, sticky and plastic; common fine roots; common medium tubular pores; common moderately thick clay films on ped faces; 25 percent gravel and 15 percent cobbles; moderately alkaline (pH 8.0); abrupt wavy boundary.

R - 19 inches; hard metasediments.

The surface is covered with 20 percent cobbles and 10 percent stones.

Type Location: About 10.8 miles east of Highway 395 on Westgard Road, then about 1.7 miles south on jeep trail, then about 500 feet east on the east fork of the trail and about 250 feet south of the trail; 300 feet east and 250 feet south of the apparent center of Section 21, T.8S., R.35E., MDBM, Waucoba Mountain NW Quadrangle.

Range in Characteristics: Depth to the lithic contact ranges from 9 to 19 inches. The mean annual soil temperature at the lithic contact is 47 to 59°F. The soil moisture control section is 6 to 17 inches. It is usually dry in all parts from early April to mid October. The textural control section is the argillic horizon for pedons deeper than 14 inches, or the whole soil for pedons 14 inches or less deep. It is sandy loam, sandy clay loam or clay, with 7 to 43 percent clay and an average of 28 percent. Rock fragments range from 30 to 55 percent by volume, and average 41 percent.

The A horizon has dry color of 10YR 5/3 or 6/3; moist color is 10YR 3/3 or 4/3. It is sandy loam, fine sandy loam or sandy clay loam, with 15 to 40 percent gravel and 0 to 5 percent cobbles. Clay content is 7 to 25 percent. Reaction is neutral to moderately alkaline (pH 7.0 to 8.0).

The Bt horizon has dry color of 10YR 5/4 or 7.5YR 6/4; moist color is 10YR 3/3 or 4/3, or 7.5YR 4/4. It is sandy clay loam, clay loam or clay, with 25 to 50 percent gravel and 0 to 20 percent cobbles. Clay content is 20 to 43 percent and averages less than 35 percent. Reaction is mildly to moderately alkaline (pH 7.5 to 8.0).

Credo Family

The Credo family consists of moderately deep to deep, well drained soils forming in residuum from pyroclastic rocks. These soils are on mountainsides. Slope is 15 to 60 percent. Elevation is 7,300 to 8,600 feet. The mean annual precipitation is about 12 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Fine-loamy, mixed, frigid Xerollic Haplargids.

Typical Pedon: The representative profile for this soil is on a west-facing mountainside, under Singleleaf Pinyon Pine, Juniper and Rabbitbrush, at an elevation of 8,000 feet. Slope is 35 percent. When described (9/12/78), the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A1 – 0 to 2 inches; light brownish gray (10YR 6/2) very gravelly coarse sand, 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 interstitial pores; 40 percent gravel; slightly acid (pH 6.4); clear smooth boundary.

B1 – 2 to 9 inches; light brownish gray (10YR 6/2) sandy loam, dark brown (10YR 3/3) moist; moderate coarse and medium subangular blocky structure, parting to moderate very fine and fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine and fine tubular pores; 5 percent gravel and 5 percent cobbles; slightly acid (pH 6.3); clear wavy boundary.

B21t – 9 to 16 inches; pale brown (10YR 6/3) gravelly sandy clay loam, brown (10YR 4/3) moist; moderate coarse subangular blocky structure, parting to moderate fine and medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; few very fine, fine and medium roots; many very fine and common fine tubular pores; few thin clay films bridging mineral sand grains; 20 percent gravel and 5 percent cobbles; medium acid (pH 5.8); abrupt smooth boundary.

B22t – 16 to 28 inches; pale brown (10YR 6/3) gravelly sandy clay loam, brown (10YR 4/3) moist; moderate coarse subangular blocky structure, parting

to moderate fine and medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine and fine, and common medium tubular pores; common thin and moderately thick clay films on ped faces and in pores; 20 percent gravel and 5 percent cobbles; medium acid (pH 5.8); clear wavy boundary.

C1 – 28 to 37 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine, fine and medium interstitial pores; 5 percent gravel and 5 percent cobbles; medium acid (pH 5.9).

Cr – 37 inches; highly weathered pyroclastic material.

Type Location: About 0.2 mile east and 0.3 mile north of the southwest corner of Section 24, T.3N., R.29E., MDBM, Huntoon Valley SW Quadrangle.

Range in Characteristics: Soil depth is 37 to greater than 60 inches. The mean annual soil temperature at 20 inches is about 45°F., and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is 5 to 21 inches. It is usually dry in all parts from early April to mid November. The textural control section is the argillic horizon. It is loam, sandy clay loam or clay loam, with 21 to 28 percent clay. Rock fragments are 0 to 25 percent by volume.

The A horizon has dry color of 10YR 6/2; moist color is 10YR 3/2, 4/2, or 4/3. It is coarse sand, loamy sand or sandy clay loam, with 2 to 21 percent clay. Rock fragments are 0 to 40 percent gravel by volume. Reaction is slightly acid to neutral (pH 6.3 to 6.6).

The B horizon has dry color of 10YR 5/3, 6/2 or 6/3; moist color is 10YR 3/3 or 4/3. It is sandy loam, loam, sandy clay loam or clay loam, with 19 to 28 percent clay. Rock fragments are 0 to 20 percent gravel and 0 to 5 percent cobbles by volume. Reaction is medium acid to neutral (pH 5.8 to 6.7).

The C horizon has dry color of 10YR 6/3; moist color is 10YR 4/3. It is sandy loam, loam or clay loam, with 13 to 28 percent clay. Rock fragments are 0 to 5 percent gravel and 0 to 5 percent cobbles by volume. Reaction is medium acid to neutral (pH 5.9 to 6.6).

Dunul Family

The Dunul family consists of deep, well drained soils forming in colluvium from granitic rocks. These soils are on mountainsides. Slope is 50 to 70 percent. Elevation is 5,900 to 9,500 feet. The mean annual precipitation is about 9 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Sandy-skeletal, mixed, frigid Typic Torriorthents.

Typical Pedon: The representative profile for this soil is on a south-facing mountainside, under Singleleaf Pinyon Pine and Big Sagebrush, at an elevation of 7,960 feet. Slope is 65 percent. When described (9/3/81), the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

O1 – 1 to 0 inches; pine needles; abrupt wavy boundary.

A1 – 0 to 3 inches; pale brown (10YR 6/3) very gravelly loamy sand, grayish brown (10YR 5/2) moist; weak very fine granular structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and few fine roots; many very fine and fine pores; 35 percent gravel; slightly acid (pH 6.5); clear wavy boundary.

C1 – 3 to 8 inches; pale brown (10YR 6/3) very gravelly loamy sand, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine, and common fine, medium and coarse roots; many very fine and fine interstitial pores; 45 percent gravel and 15 percent cobbles; neutral (pH 7.0); clear wavy boundary.

C2 – 8 to 15 inches; pale brown (10YR 6/3) very gravelly medium sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and medium roots; many very fine and fine interstitial pores; 50 percent gravel; mildly alkaline (pH 7.5); clear smooth boundary.

C3 – 15 to 26 inches; very pale brown (10YR 7/4) very gravelly medium sand, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few fine and very coarse roots;

many very fine and fine interstitial pores; 40 percent gravel; mildly alkaline (pH 7.5); gradual smooth boundary.

C4 – 26 to 60 inches; very pale brown (10YR 7/4) gravelly medium sand, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few fine and medium and common coarse roots; many very fine and fine interstitial pores; 30 percent gravel and 3 percent cobbles; moderately alkaline (pH 8.0).

The soil surface is covered with 5 percent gravel, 10 percent cobbles and 30 percent stones.

Type Location: About 6.75 miles west on Leidy Creek Road, from its intersection with Nevada Highway 3A, and 0.2 mile upslope, on the north side of the road; about 2,000 feet west of the southeast corner of Section 3, T.3S., R.34E., MDBM, Mt. Barcroft NW Quadrangle.

Range in Characteristics: Soil depth is greater than 60 inches. The mean annual soil temperature at 20 inches is about 45°F., and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is 17 to 50 inches. It is usually dry in all parts from early February to late November. The textural control section is 10 to 40 inches. It is medium sand or loamy sand with about 2 percent clay. Rock fragments are 33 to 50 percent by volume, and average about 42 percent.

The O horizon is 1/2 to 1 inch thick.

The A horizon has dry color of 10YR 6/3; moist color is 10YR 4/3 or 5/2. It is loamy sand with 2 percent clay. Rock fragments are 35 to 40 percent gravel by volume. Reaction is slightly acid (pH 6.5).

The C horizon has dry color of 10YR 6/3, 6/4 or 7/4; moist color is 10YR 4/3 or 4/4. It is medium sand or loamy sand with 2 percent clay. Rock fragments are 30 to 50 percent gravel and 0 to 15 percent cobbles by volume. Reaction is neutral to moderately alkaline (pH 7.0 to 8.0).

Durargidic Argixerolls

These Durargidic Argixerolls consist of deep, well drained soils forming in alluvium from mixed granitic rocks. These soils are on alluvial fans. Slope is 2 to 15 percent. Elevation is 8,400 to 10,100 feet. The mean annual precipitation is about 10 inches and the mean annual temperature is 44°F.

Taxonomic Class: Coarse-loamy, mixed, frigid Durargidic Argixerolls.

Reference Pedon: The representative profile for this soil is on a south-facing alluvial fan, under Black Sagebrush and Cottonthorn, at an elevation of 8,450 feet. Slope is 2 percent. When described (5/20/80), the soil was slightly moist in the 12 to 25 inch section and dry throughout the rest of the profile. (Colors are for dry soil unless otherwise noted.)

A1 – 0 to 4 inches; brown (10YR 5/3) loamy sand, dark brown (10YR 3/3) moist; weak medium granular structure; soft, very friable, nonsticky and nonplastic; common fine roots; many fine interstitial pores; 5 percent gravel; neutral (pH 7.0); clear smooth boundary.

B1 – 4 to 12 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; common fine and few medium roots; many very fine interstitial and few fine tubular pores; 10 percent gravel-size durinodes by volume; 10 percent gravel; neutral (pH 7.0); clear smooth boundary.

B2t – 12 to 25 inches; pale brown (10YR 6/3) gravelly sandy loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few fine roots; common fine tubular pores; 25 percent gravel-size durinodes; common thin clay films on ped faces and in pores; 5 percent gravel; neutral (pH 7.2); gradual smooth boundary.

C1 – 25 to 35 inches; pale brown (10YR 6/3) gravelly sandy loam, brown (10YR 4/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; few fine roots; many fine interstitial, and common fine

tubular pores; 15 percent gravel; mildly alkaline (pH 7.5); clear smooth boundary.

C2 – 35 to 45 inches; yellowish brown (10YR 5/4) gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, nonsticky and nonplastic; few fine roots; many fine interstitial pores; 30 percent gravel; mildly alkaline (pH 7.4); gradual wavy boundary.

Cr – 45 inches; highly weathered adamellite.

Type Location: In Papoose Flat; about 105 feet west and 0.35 mile north of the southeast corner of Section 2, T.11S., R.35E., MDBM, Waucoba Mountain SE Quadrangle.

Range in Characteristics: Soil depth is 45 to 60 inches. The mean annual soil temperature at 20 inches is about 45°F., and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is 8 to 30 inches. It is usually dry in all parts from mid April to late September and is usually moist in some or all parts the rest of the year. The textural control section is the argillic horizon. It is sandy loam, with 12 to 15 percent clay. Rock fragments are 5 to 10 percent gravel by volume. Gravel-size durinodes are 20 to 25 percent by volume. The soil matrix is nonbrittle. The transitional B horizon has 10 percent gravel-size durinodes by volume, in a non-brittle matrix.

The A horizon has dry color of 10YR 5/3; moist color is 10YR 3/3. It is loamy sand or sandy loam, with 5 to 7 percent clay. Rock fragments are 5 percent gravel by volume. Reaction is neutral (pH 7.0 to 7.2).

The B horizon has dry color of 10YR 5/3, 5/4 or 6/3; moist color is 10YR 3/3 or 4/3. It is sandy loam with 10 to 15 percent clay. Rock fragments are 5 to 15 percent gravel by volume. Gravel-size durinodes are 10 to 25 percent by volume. Reaction is neutral to mildly alkaline (pH 7.0 to 7.6).

The C horizon has dry color of 10YR 5/4, 6/3 or 6/6; moist color is 10YR 4/3, 4/4 or 5/6. It is coarse sandy loam or sandy loam, with 8 to 12 percent clay. Rock fragments are 15 to 30 percent gravel by volume. Reaction is mildly alkaline (pH 7.4 to 7.8).

Finley Family

The Finley family consists of moderately deep, well drained soils forming in colluvium from sedimentary rocks, composed mainly of quartzitic sandstone. These soils are on mountainsides. Slope is 15 to 40 percent. Elevation is 5,600 to 7,800 feet. The mean annual precipitation is about 9 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Loamy - skeletal, mixed, mesic Xerollic Camborthids.

Typical Pedon: The representative profile for this soil is on an east-facing mountainside, under Singleleaf Pinyon Pine and Big Sagebrush, at an elevation of 7,400 feet. Slope is 40 percent. When described (4/25/80), the soil was slightly moist below 7 inches. (Colors are for dry soil, unless otherwise noted.)

- A1 - 0 to 7 inches; light brownish gray (10YR 6/2) gravelly fine sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, slightly sticky and nonplastic; common very fine roots; few very fine interstitial and tubular pores; 20 percent gravel; mildly alkaline (pH 7.8); clear smooth boundary.
- B2 - 7 to 18 inches; pale brown (10YR 6/3) very gravelly loam, brown (10YR 4/3) moist; moderate fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; few medium, common fine and very fine roots; few fine interstitial pores; 45 percent gravel and 15 percent cobbles; mildly alkaline (pH 7.5); clear smooth boundary.
- C1 - 18 to 29 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; massive; soft, friable, slightly sticky and nonplastic; few fine roots; few fine interstitial pores; slightly effervescent, disseminated line; 40 percent gravel; moderately alkaline (pH 8.0); abrupt smooth boundary.
- R - 29 inches; Hard sedimentary rock.

The surface is covered by 40 percent cobbles and 5 percent stones.

Type Location: About 15.1 miles east on Westgard Road, from its intersection with Highway 395, then about 0.95 mile east on jeep trail on east side of road, and about 100 feet west of jeep trail; 200 feet west of the southeast corner of the northeast quarter of Section 29, T.7S., R.35E., MDBM, Blanco Mountain SW Quadrangle.

Range in Characteristics: Depth to the lithic contact ranges from 25 to 35 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control section is 12 to 36 inches. It is usually dry in all parts from early April to mid October. The textural control section is 10 to 35 inches. It is sandy loam, fine sandy loam, loam, sandy clay loam or clay loam, with 11 to 29 percent clay, and an average of about 16 percent. Rock fragments range from 40 to 80 percent by volume and average about 52 percent.

The A horizon has dry color of 10YR 5/2 or 6/2; moist color is 10YR 3/3 or 3/2. It is loamy sand, fine sandy loam or loam, with 4 to 15 percent clay. Rock fragments are 20 to 45 percent gravel, 0 to 20 percent cobbles and 0 to 5 percent stones by volume. Reaction is neutral to mildly alkaline (pH 6.6 to 7.8).

The B horizon has dry color of 10YR 5/3, 4/2 or 6/3; moist color is 10YR 4/3. It is loam, sandy clay loam or clay loam, with 16 to 22 percent clay. Rock fragments are 30 to 45 percent gravel, 5 to 15 percent cobbles and 0 to 5 percent stones by volume. Reaction is neutral to mildly alkaline (pH 6.6 to 7.8).

The C horizon has dry color of 10YR 5/4 or 6/3, or 7.5YR 5/4; moist color is 10YR 4/3 or 4/4, or 7.5YR 4/4. It is sandy loam, loam or sandy clay loam, with 11 to 26 percent clay. Rock fragments are 35 to 80 percent gravel, 0 to 10 percent cobbles and 0 to 5 percent stones by volume. Effervescence is none to slight. Reaction is slightly acid to moderately alkaline (pH 6.5 to 8.0).

Gol Family

The Gol family consists of shallow, well drained soils forming in alluvium from quartz monzonite. These soils are on sideslopes of alluvial fans. Slope is 4 to 15 percent. Elevation is 8,400 to 9,800 feet. The mean annual precipitation is about 10 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Loamy, mixed, frigid, shallow Xerollic Haplargids.

Typical Pedon: The representative profile for this soil is on a north-facing alluvial fan ridge, under Big Sagebrush and Mormon Tea, at an elevation of 8,500 feet. Slope is 4 percent. When described (5/21/80), the soil was dry throughout. (Colors are for dry soil, unless otherwise noted.)

A1 - 0 to 4 inches; brown (10YR 5/3) gravelly loamy sand, dark brown (10YR 3/3) moist; weak medium granular structure; soft, very friable, nonsticky and nonplastic; few fine roots; common fine and medium interstitial pores; 20 percent gravel; neutral (pH 7.2); clear smooth boundary.

B21t - 4 to 9 inches; yellowish brown (10YR 5/4) gravelly sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine and medium roots; common fine tubular and interstitial pores; common thin clay films coating mineral sandgrains; 25 percent gravel and 5 percent cobbles; mildly alkaline (pH 7.4); clear smooth boundary.

B22t - 9 to 14 inches; yellowish brown (10YR 5/4) very gravelly sandy loam, brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky and non-

plastic; few fine roots; many fine interstitial pores; few moderately thick clay films coating mineral sandgrains; 45 percent gravel and 5 percent cobbles; mildly alkaline (pH 7.4); clear wavy boundary.

Cr - 14 inches; weathered adamellite.

The surface is covered with 2 percent cobbles.

Type Location: In Papoose Flat, about 530 feet west and 1,060 feet south of the apparent center of Section 2, T.11S., R.35E., MDBM, Waucoba Mountain SE Quadrangle.

Range Characteristics: Depth to the paralithic contact ranges from 9 to 14 inches. The mean annual soil temperature at the paralithic contact is about 45°F., and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is 8 to 14 inches. It is usually dry in all parts from early April to mid October. The control section includes all of the soil profile. It is loamy sand and sandy loam, with an average of 14 percent clay. Rock fragments are 10 to 45 percent gravel and 0 to 5 percent cobbles by volume, and average about 28 percent.

The A horizon has dry color of 10YR 5/3; moist color is 10YR 3/2 or 3/3. It is loamy sand or sandy loam, with 5 to 10 percent clay and 10 to 20 percent gravel. Reaction is neutral (pH 7.2).

The Bt horizon has dry color of 10YR 4/4 or 5/4; moist color is 10YR 4/3. It is sandy loam with 17 percent clay, and 25 to 45 percent gravel and 5 percent cobbles. Reaction is neutral to moderately alkaline (pH 7.2 to 7.4).

Hartig Family

The Hartig family consists of moderately deep and deep, well drained soils forming in colluvium from granitic rocks. These soils are on mountainsides. Slope is 30 to 80 percent. Elevation is 5,800 to 10,300 feet. The mean annual precipitation is about 9 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Loamy-skeletal, mixed, frigid, Aridic Hapoxerolls.

Typical Pedon: The representative profile for this soil is on a west-facing mountainside, under Big Sagebrush and Common Pricklygilia at an elevation of 10,240 feet. Slope is 50 percent. When described (7/27/80), the soil was dry in the upper 5 inches and slightly moist in the rest of the profile. (Colors are for dry soil unless otherwise noted.)

A11 - 0 to 5 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; moderate very fine and fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine, few fine and medium roots; many very fine and common fine interstitial pores; 15 percent gravel; mildly alkaline (pH 7.6); clear wavy boundary.

A12 - 5 to 11 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; moderate very fine and fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine, few fine, medium and coarse roots; many very fine interstitial pores; 20 percent gravel and 10 percent cobbles; mildly alkaline (pH 7.8); clear wavy boundary.

C1 - 11 to 33 inches; brown (10YR 5/3) extremely stony fine sandy loam, dark brown (10YR 4/3) moist; moderate very fine and fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine, common fine and medium, and few coarse roots; many very fine and few fine interstitial pores; violently effervescent lime coatings on the undersides of 20 percent of the rock fragments; 35 percent gravel, 10 percent cobbles and 20 percent stones; mildly alkaline (pH 7.8); abrupt irregular boundary.

R - 33 inches; hard fractured bedrock.

The soil surface is covered with 2 percent stones, 10 percent cobbles and 25 percent gravel.

Type Location: About 1.55 miles east of Camp Bristlecone, on North Fork Crooked Creek Road, and about 200 yards upslope, on the north side of the road; about 850 feet west and 580 feet north of the southeast corner of Section 17, T.5S., R.35E., MDBM, Mt. Barcroft SW Quadrangle.

Range in Characteristics: Depth to the lithic contact ranges from 24 to 60 inches. The mean annual soil temperature at 20 inches is about 45°F., and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is 8 to 38 inches. It is usually dry in all parts from April to late September and is usually moist in some or all parts the rest of the year. Reaction ranges from neutral to mildly alkaline and increases with increasing depth. The textural control section is 10 to 40 inches. It is loamy sand, sandy loam, fine sandy loam, loam or sandy clay loam, with 5 to 25 percent clay and an average of 11 percent. Rock fragments are 30 to 90 percent by volume, and average 61 percent.

Some pedons have B2 horizons and lack C horizons. Other pedons have thin O horizons.

The A horizon has dry color of 10YR 4/2 or 5/3; moist color is 10YR 3/2 or 3/3. It is loamy sand, sandy loam or loam, with 5 to 17 percent clay. Rock fragments are 5 to 35 percent gravel, 0 to 20 percent cobbles and 0 to 30 percent stones by volume. Reaction is neutral to moderately alkaline (pH 6.8 to 8.0).

The C horizon has dry color of 10YR 5/3, 6/3 or 6/4; moist color is 10YR 3/4, 4/3 or 5/4. It is sand, loamy sand, sandy loam or fine sandy loam, with 3 to 11 percent clay. Rock fragments are 15 to 65 percent gravel, 0 to 30 percent cobbles and 0 to 45 percent stones by volume. Effervescence is none to violent. Reaction is neutral to moderately alkaline (pH 7.2 to 8.0).

Hymas Family

The Hymas family consists of shallow, well drained soils forming in colluvium from calcareous sedimentary rock, made up mostly of limestone and dolomite. These soils are on mountainsides. Slope is 15 to 80 percent. Elevation is 5,600 to 10,000 feet. The mean annual precipitation is about 10 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Loamy-skeletal, carbonatic, frigid Lithic Haploxerolls.

Typical Pedon: The representative profile for this soil is on a southwest-facing mountainside, under Singleleaf Pinyon Pine and Juniper, at an elevation of 8,880 feet. Slope is 40 percent. When described (5/21/80), the soil was slightly moist throughout. (Colors are for dry soil, unless otherwise noted.)

A11 - 0 to 1 inch; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common medium vesicular pores, slightly effervescent disseminated lime; 20 percent gravel; moderately alkaline (pH 8.0); clear smooth boundary.

A12 - 1 to 6 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common fine roots; few fine interstitial pores; strongly effervescent, disseminated lime; 25 percent gravel; moderately alkaline (pH 8.0); clear smooth boundary.

C1ca - 6 to 19 inches; yellowish brown (10YR 5/4) very gravelly sandy loam, brown (10YR 4/3) moist; moderate fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; common fine and medium roots; few fine interstitial pores;

violently effervescent, disseminated lime; 40 percent gravel; moderately alkaline (pH 8.0); abrupt wavy boundary.

R - 19 inches; hard, fractured dolomite.

The surface is covered by 20 percent cobbles and 10 percent stones.

Type Location: About 1,000 feet south of Blue Bell Mine, on loop trail, and 600 feet east of trail (east of Badger Flat); about 1,200 feet east and 600 feet north of the apparent center of Section 24, T.11S., R.35E., MDBM, Independence NE Quadrangle.

Range in Characteristics: Depth to the lithic contact is 4 to 20 inches. The mean annual soil temperature at the lithic contact is about 45°F., and the mean summer and mean winter temperatures differ by more than 9°F. The soil moisture control section is 10 to 19 inches. It is usually dry in all parts from mid June to mid August, and usually moist in some or all parts the rest of the year. The textural control section is 10 to 20 inches in pedons deeper than 14 inches, or the entire profile in pedons 14 inches or less deep. It is sandy loam or loam with 14 to 22 percent clay and an average of 17 percent. Rock fragments average 40 percent by volume. The soil is moderately alkaline (pH 8.0) and calcareous throughout.

The A horizon has dry color of 10YR 5/3; moist color is 10YR 3/2 or 3/3. It is sandy loam or loam with 13 to 17 percent clay. Rock fragments are 20 to 35 percent by volume. Effervescence is slight to strong.

The Cca horizon has dry color of 10YR 5/4; moist color is 10YR 3/3 or 4/3. It is sandy loam or loam with 16 to 22 percent clay. Rock fragments are 40 percent by volume. Effervescence is violent.

Lithic Camborthids

These Lithic Camborthids consist of shallow, well drained soils forming in colluvium weathered from metasedimentary rocks. These soils are on mountainsides. Slope is 2 to 60 percent. Elevation is 4,100 to 6,900 feet. The mean annual precipitation is about 6 inches and the mean annual temperature is about 56°F.

Taxonomic Class: Loamy-skeletal, mixed, mesic, Lithic Camborthids.

Reference Pedon: The representative profile for this soil is on a southeast-facing mountainside, under Shadscale and Boxthorn, at an elevation of 6,100 feet. Slope is 40 percent. When described (4/29/80), the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A1 - 0 to 3 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; few fine roots; many fine and very fine interstitial pores; strongly effervescent, disseminated lime; 20 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

B2 - 3 to 8 inches; pale brown (10YR 6/2) very cobbly loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; soft, very friable, sticky and plastic; many fine roots; many fine and very fine interstitial pores; slightly effervescent, disseminated lime; 20 percent gravel and 30 percent cobbles; moderately alkaline (pH 8.0); clear irregular boundary.

R - 8 inches; hard fractured metasediments.

The soil surface is covered with 10 percent cobbles.

Type Location: About 11.9 miles east on Citrus Road, from its intersection with Highway 395, just south of Independence, and 265 feet west of the road; about 2,375 feet east and 1,160 feet south of the northwest corner of Section 19, T.12S., R.36E., MDBM, Independence NE Quadrangle.

Range in Characteristics: Depth to the lithic contact is 8 to 20 inches. The mean annual soil temperature at the lithic contact is 47 to 59°F. The soil moisture control section is 6 to 8 inches. It is usually dry in all parts from early February to late November. The textural control section includes all of the soil from the surface to the lithic contact. It is loam or sandy loam with an average of about 21 percent clay. Rock fragments average 44 percent.

The A horizon has dry color of 10YR 5/2; moist color is 10YR 3/2. It is loam or sandy loam with 16 to 22 percent clay. Rock fragments are 20 to 40 percent gravel and 0 to 5 percent cobbles. Effervescence is slight to strong. Reaction is moderately alkaline (pH 8.0).

The B horizon has dry color of 10YR 6/3; moist color is 10YR 4/3. It is loam or sandy loam with 18 to 25 percent clay. Rock fragments are 30 to 50 percent gravel and 0 to 20 percent cobbles. Effervescence is slight to strong. Reaction is moderately alkaline (pH 8.0).

Mackey Family

The Mackey family consists of deep, well drained soils forming in alluvium from metasedimentary rocks. These soils are on alluvial fans. Slope is 2 to 30 percent. Elevation is 5,100 to 8,400 feet. The mean annual precipitation is about 10 inches and the mean annual temperature is about 45°F.

Taxonomic Class: Loamy - skeletal, mixed, mesic Xerollic Camborthids.

Typical Pedon: The representative profile for this soil is on a southeast-facing alluvial fan, under Big Sagebrush and Goldenbush, at an elevation of 7,120 feet. When described (5/2/80), the soil was moist in the upper 42 inches and dry in the rest of the profile. (Colors are for dry soil, unless otherwise noted.)

A1 - 0 to 3 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common fine and medium roots; common fine interstitial pores; 30 percent gravel and 2 percent cobbles; mildly alkaline (pH 7.8); clear smooth boundary.

B2 - 3 to 24 inches; brown (10YR 5/3) very gravelly sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, friable, nonsticky and slightly plastic; common fine and medium roots; common fine interstitial pores; 35 percent gravel and 5 percent cobbles; mildly alkaline (pH 7.8); clear smooth boundary.

B3ca - 24 to 42 inches; yellowish brown (10YR 5/4) very gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, friable, nonsticky and nonplastic; few medium roots; common fine interstitial pores; slightly effervescent, disseminated lime; 40 percent gravel and 10 percent cobbles; moderately alkaline (pH 8.0); clear wavy boundary.

C1ca - 42 to 60 inches; light brownish gray (10YR 6/2) extremely gravelly loamy sand, dark grayish brown (10YR 4/2) moist; massive; soft, friable, nonsticky and nonplastic; many fine interstitial pores; strongly effervescent, disseminated lime; 45 percent gravel, 20 percent cobbles and 1 percent stones; moderately alkaline (pH 8.2).

The surface is covered by 10 percent gravel.

Type Location: About 9.25 miles east on Waucoba Road, from its intersection with Westgard Road, then about 3.0 miles south on a jeep trail on the south side of the road, staying on the westerly forks of the trail, then about 0.2 mile upslope on a mine jeep trail on the north side of the first mentioned jeep trail and about 750 feet west of the mine jeep trail; about 530 feet east and 1,320 feet south of the northwest corner of Section 3, T.10S., R.35E., MDBM, Waucoba Mountain SW Quadrangle.

Range in Characteristics: Soil depth is greater than 60 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control section is 12 to 35 inches. It is usually dry in all parts from early April to mid November. The textural control section is 10 to 40 inches. It is coarse sand, loamy sand, coarse sandy loam, sandy loam or loam with 2 to 18 percent clay, and an average of about 9 percent. Rock fragments range from 15 to 90 percent, and average 59 percent. Depth to the calcareous layer is 24 to 42 inches.

Some pedons have thin O horizons.

The A horizon has dry color of 10YR 5/2, 5/3, 6/2 or 6/3; moist color is 10YR 3/2, 3/3 or 4/2. It is loamy sand, loamy fine sand or sandy loam with 3 to 12 percent clay. Rock fragments are 3 to 40 percent gravel, 0 to 10 percent cobbles and 0 to 5 percent stones. Reaction is slightly acid to moderately alkaline (pH 6.5 to 8.0).

The B2 horizon has dry color of 10YR 5/3, 6/3, 6/4 or 7/4; moist color is 10YR 3/3, 4/3 or 4/4. It is sandy loam or loam with 7 to 18 percent clay. Rock fragments are 12 to 60 percent gravel, 0 to 10 percent cobbles and 0 to 15 percent stones by volume. It is noneffervescent to violently effervescent. Reaction is neutral to moderately alkaline (pH 7.0 to 8.0).

The B3 horizon has dry color of 10YR 5/4 or 6/3; moist color is 10YR 4/3 or 4/4. It is sandy loam with 12 percent clay. Rock fragments are 40 percent gravel, 8 to 10 percent cobbles and 0 to 2 percent stones. It is noneffervescent to slightly effervescent. Reaction is moderately alkaline (pH 8.0).

The C horizon has dry color of 10YR 6/2, 6/3, 6/4, 7/3, 7/4, 7/6 or 8/6, or 7.5YR 6/6; moist color is 10YR 4/2, 4/3, 5/4 or 5/6, or 7.5YR 5/6. It is coarse sand, loamy sand, coarse sandy loam or sandy loam, with 2 to

18 percent clay. Rock fragments are 12 to 60 percent gravel, 5 to 40 percent cobbles and 0 to 20 percent stones. It is strongly to violently effervescent. Reaction is moderately alkaline (pH 8.0 to 8.2).

Mascamp Family

The Mascamp family consists of shallow, well drained soils forming in residuum and colluvium from metasedimentary rocks. These soils are on mountainsides. Slope is 15 to 60 percent. Elevation is 7,200 to 10,100 feet. The mean annual precipitation is about 11 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Loamy-skeletal, mixed, frigid Lithic Argixerolls.

Typical Pedon: The representative profile for this soil is on a north-facing mountainside, under Big Sagebrush and Rabbitbrush, at an elevation of 8,720 feet. Slope is 37 percent. When described (5/23/80), this soil was slightly moist throughout. (Colors are for dry soil unless otherwise noted.)

A1 - 0 to 7 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; moderate medium granular structure; soft, very friable, slightly sticky and slightly plastic; common fine roots; common fine interstitial pores; 25 percent gravel; neutral (pH 7.0); clear smooth boundary.

B2t - 7 to 14 inches; yellowish brown (10YR 5/4) very gravelly clay loam, brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, sticky and plastic; common fine and medium roots; common fine interstitial pores; few thin clay films on ped faces; 40 percent gravel and 10 percent cobbles; neutral (pH 7.0); abrupt wavy boundary.

R - 14 inches; hard fractured metasedimentary rock, with fractures 14 inches or more apart.

The surface is covered by 10 percent cobbles.

Type Location: About 0.3 mile west and 0.2 mile south of the northeast corner of Section 23, T.10S., R.35E., MDBM, Waucoba Mountain SE Quadrangle.

Range in Characteristics: Depth to the lithic contact ranges from 13 to 20 inches. The mean annual soil temperature at the lithic contact is about 45°F, and the mean summer and mean winter temperatures differ by more than 9°F. The soil moisture control section is 6 to 19 inches. It is usually dry in all parts from mid April to late September and usually moist in some or all parts the rest of the year. The textural control section is the argillic horizon in those pedons deeper than 14 inches, and is the whole soil in those pedons 14 inches or less deep. Texture of the control section is sandy loam and clay loam, with 18 to 30 percent clay. Rock fragments average 38 percent.

The A horizon has dry color of 10YR 5/3; moist color is 10YR 3/3. It is sandy loam or loam with 18 to 22 percent clay. Rock fragments are 25 percent gravel and 0 to 5 percent cobbles. Reaction is neutral to moderately alkaline (pH 7.0 to 8.0).

The B2t horizon has dry color of 10YR 5/4; moist color is 10YR 4/3. It is clay loam with an average of 30 percent clay. Rock fragments are 40 percent gravel and 10 to 15 percent cobbles. Reaction is neutral to moderately alkaline (pH 7.0 to 8.0).

Merlin Family

The Merlin family consists of shallow, well drained soils forming in residuum from basalt. These soils are on plateau tops, upper mountainsides and on ridges. Slope is 5 to 60 percent. Elevation is 6,700 to 10,000 feet. The mean annual precipitation is about 11 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Clayey, montmorillonitic, frigid
Lithic Argixerolls

Typical Pedon: The representative profile for this soil is on a northerly-facing plateau top, under Low Sagebrush and Squirreltail Grass, at an elevation of 8,320 feet. Slope is 3 percent. When described (9/9/80), the soil was slightly moist below 4 inches. (Colors are for dry soil, unless otherwise noted.)

A11 - 0 to 2 inches; brown (7.5YR 5/2) very gravelly sandy loam, dark brown (7.5YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; few fine roots; many very fine and few fine interstitial pores; 45 percent gravel and 15 percent cobbles; medium acid (pH 6.0); clear wavy boundary.

A12 - 2 to 4 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; few fine, medium and coarse roots; many very fine interstitial pores; 15 percent gravel; slightly acid (pH 6.5); abrupt wavy boundary.

B2t - 4 to 15 inches; brown (7.5YR 5/2) gravelly clay loam, dark brown (7.5YR 3/2) moist; moderate fine and medium subangular blocky structure; hard, firm, very sticky and very plastic; few fine and medium roots; common very fine and few fine tubular pores; many pressure faces on ped faces; 15 percent gravel; neutral (pH 7.0); abrupt irregular boundary.

R - 15 inches; basalt bedrock, which is slightly weathered in the upper inch.

The surface is covered with 60 percent gravel.

Type Location: About 3.5 miles east on Camp Bristlecone Road, from its intersection with the Bristlecone Road and 50 feet east of the Camp Bristlecone Road; about 0.3 mile east, and 0.1 mile south of the north-west corner of Section 4, T.6S., R.36E., MDBM, Blanco Mountain NE Quadrangle.

Range of Characteristics: Depth to the lithic contact ranges from 10 to 20 inches. The mean annual soil temperature at the lithic contact is about 45°F., and the mean summer and mean winter temperatures differ by more than 9°F. The soil moisture control section is 4 to 12 inches. It is usually dry in all parts from mid April to late September, and is usually moist in some or all parts the rest of the year. The textural control section is the argillic horizon in those pedons deeper than 14 inches, and is the whole soil in those pedons 14 inches or less deep. Texture is loam, clay loam or clay, with 20 to 50 percent clay, and a weighted average of about 37 percent. Rock fragments average 15 percent by volume.

The A horizon has dry color of 10YR 5/3 or 7.5YR 5/3; moist color is 10YR 3/3 or 7.5YR 3/2. It is sandy loam or loam, with about 15 percent clay. Rock fragments are 15 to 45 percent gravel and 0 to 20 percent cobbles by volume. Reaction ranges from medium acid to slightly acid (pH 6.0 to 6.5).

The Bt horizon has dry color of 7.5YR 5/2 or 6/3; moist color is 7.5YR 3/2 or 4/3. It is clay loam or clay, with about 37 percent clay. Rock fragments are 0 to 15 percent gravel by volume. Reaction ranges from slightly acid to neutral (pH 6.4 to 7.0).

Mexispring Family

The Mexispring family consists of shallow, well drained soils forming in colluvium from granitic rocks. These soils are on mountainsides. Slope is 15 to 80 percent. Elevation is 3,800 to 7,000 feet. The mean annual precipitation is about 6 inches and the mean annual temperature is about 56°F.

Taxonomic Class: Loamy-skeletal, mixed, nonacid, mesic shallow Typic Torriorthents.

Typical Pedon: The representative profile for this soil is on a northwest-facing mountainside, under Saltbush, Buckwheat and Ephedra, at an elevation of 5,840 feet. Slope is 20 percent. When described (4/24/80), the soil was dry throughout. (Colors are for dry soil, unless otherwise noted.)

A1 - 0 to 5 inches; pale brown (10YR 6/3) very gravelly loamy coarse sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine interstitial pores; slightly effervescent, disseminated lime; 45 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

AC - 5 to 11 inches; very pale brown (10YR 7/3) gravelly coarse sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few fine and medium roots; many very fine and fine interstitial pores; 30 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

Cr - 11 inches; slightly fractured granodiorite, with fractures about 1mm wide and 40cm apart, which allow a few roots to enter.

The soil surface is covered with 10 percent gravel.

Type Location: About 10.8 miles east on Citrus Road, from its intersection with Highway 395, just south of Independence, and 1.0 mile west of the road; about 0.45 mile east, and 0.25 mile south of the northwest corner of Section 25, T.12S., R.35E., MDBM, Independence NE Quadrangle.

Range in Characteristics: Depth to the paralithic contact is 8 to 12 inches. The mean annual soil temperature at the paralithic contact is 47 to 59°F. The soil moisture control section is from 4 inches to the paralithic contact. It is usually dry in all parts from early February to mid October. The textural control section is the whole soil. It is loamy sand, coarse sandy loam or sandy loam, with 6 to 10 percent clay. Rock fragments are 30 to 45 percent gravel by volume, and average about 38 percent. The soil is moderately alkaline throughout (pH 8.0).

The A horizon has dry color of 10YR 6/3 or 7/3; moist color is 10YR 4/3. It is noneffervescent to slightly effervescent.

Midas Family

The Midas family consists of deep, well drained soils forming in alluvium from mixed rocks. These soils are on alluvial fans and terraces. Slope is 4 to 30 percent. Elevation is 5,500 to 8,100 feet. The mean annual precipitation is about 9 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Loamy-skeletal, mixed, mesic Duric Camborthids.

Typical Pedon: The representative profile for this soil is on a northwest-facing alluvial fan top, under Greenfire and Fourwing Saltbush, at an elevation of 6,890 feet. Slope is 5 percent. When described (5/4/80), the soil was moist throughout. (Colors are for dry soil, unless otherwise noted.)

A1 - 0 to 4 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; weak fine granular structure; soft, friable, nonsticky and nonplastic; common fine and medium roots; common fine tubular pores; strongly effervescent, disseminated lime; 35 percent gravel, 2 percent cobbles and 1 percent stones; moderately alkaline (pH 8.0); clear smooth boundary.

B2 - 4 to 14 inches; light yellowish brown (10YR 6/4) very gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, friable, nonsticky and nonplastic; few fine and medium roots; common fine interstitial pores; strongly effervescent, disseminated lime; 40 percent gravel, 5 percent cobbles and 2 percent stones; moderately alkaline (pH 8.0) abrupt irregular boundary.

C1sica - 14 to 16 inches; light yellowish brown (10YR 6/4), very gravelly loamy sand, yellowish brown (10YR 5/4) moist; massive; hard, firm, nonsticky and nonplastic; few medium roots; strongly effervescent, disseminated lime; 45 percent gravel, 10 percent cobbles and 5 percent stones; brittle when moist; moderately alkaline (pH 8.0); smooth clear boundary.

C2sica - 16 to 60 inches; light yellowish brown (10YR 6/4) extremely gravelly loamy sand, yellowish brown

(10YR 5/4) moist; massive; hard, firm, nonsticky and nonplastic; few fine tubular pores; strongly effervescent, disseminated lime; 45 percent gravel, 15 percent cobbles and 5 percent stones; brittle when moist; moderately alkaline (pH 8.0).

The soil surface is covered with 10 percent cobbles.

Type Location: About 9.25 miles east on Waucoba Road, from its intersection with Westgard Road, then 0.9 mile south on jeep trail on south side of road, then about 0.2 mile on the east side of the jeep trail; about 0.5 mile south of the northeast corner of Section 35, T.9S., R.35E., MDBM, Waucoba Mountain SE Quadrangle.

Range in Characteristics: Soil depth is greater than 60 inches. Depth to the silica-calcium carbonate cemented layer is 12 to 40 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control section is 8 to 38 inches. It is usually dry in all parts for early February to late November. The textural control section is 10 to 40 inches. It is loamy sand, sandy loam, loam or sandy clay loam, with 6 to 20 percent clay, and an average of about 12 percent. Rock fragments range from 35 to 65 percent by volume, and average about 56 percent. Effervescence is strong to violent and reaction is moderately alkaline (pH 8.0) throughout.

The A horizon has dry color of 10YR 5/2, 6/2 or 6/3; moist color is 10YR 4/2 or 4/3. It is sandy loam or loam, with 10 to 16 percent clay. Rock fragments are 35 to 45 percent gravel, 0 to 10 percent cobbles and 0 to 10 percent stones by volume.

The B horizon has dry color of 10YR 5/3, 5/4, 6/3 or 6/4; moist color is 10YR 4/3, 4/4 or 5/4. It is sandy loam, loam or sandy clay loam, with 14 to 20 percent clay. Rock fragments are 30 to 50 percent gravel, 2 to 10 percent cobbles and 0 to 5 percent stones by volume.

The C horizon has dry color of 10YR 6/3, 6/4 or 7/2; moist color is 10YR 5/3, 5/4, or 6/3. It is loamy sand or sandy loam, with 6 to 17 percent clay. Rock fragments are 40 to 50 percent gravel, 5 to 15 percent cobbles and 0 to 15 percent stones by volume.

Moano Family

The Moano family consists of shallow, well drained soils forming in colluvium from sedimentary rocks composed predominately of quartzitic sandstone. These soils are on ridgetops and mountainsides. Slope is 5 to 80 percent. Elevation is 5,400 to 8,200 feet. The mean annual precipitation is about 8 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Loamy, mixed, nonacid, mesic
Lithic Torriorthents.

Typical Pedon: The representative profile for this soil is on a northwest-facing ridgetop, under Big Sagebrush and Singleleaf Pinyon Pine, at an elevation of 7,280 feet. Slope is 7 percent. When described (4/23/80), the soil was dry throughout. (Colors are for dry soil, unless otherwise noted.)

- A1 - 0 to 3 inches; light yellowish brown (10YR 6/4) loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, friable, slightly sticky and non-plastic; common very fine roots; few fine interstitial pores; 5 percent gravel; moderately alkaline (pH 8.0); clear smooth boundary.
- C1 - 3 to 12 inches; brownish yellow (10YR 6/6) very cobbly clay loam, brown (10YR 4/3) moist; massive; hard, firm, sticky and plastic; few fine roots; few fine tubular pores; 20 percent gravel and 20 percent cobbles; moderately alkaline (pH 8.0); abrupt smooth boundary.
- R - 12 inches; hard quartzitic sandstone.

The soil surface is covered with 20 percent cobbles and 20 percent stones.

Type Location: About 15.1 miles east on Westgard Road, from its intersection with Highway 395, then about 0.95 mile east on jeep trail on east side of road, and about 400 feet west of jeep trail; about 500 feet west of the southeast corner of the northeast quarter of Section 29, T.7S., R.35E., MDBM, Blanco SW Mountain Quadrangle.

Range in Characteristics: Depth to the lithic contact ranges from 12 to 14 inches. The mean annual soil temperature at the lithic contact is 47 to 59°F. The soil moisture control section is 6 to 12 inches. It is usually dry in all parts from early February to late November. The control section includes all of the soil profile. It is fine sandy loam, loam or clay loam with 12 to 28 percent clay. Rock fragments are 31 to 35 percent by volume and average about 33 percent.

The A horizon has dry color of 10YR 6/3 or 6/4; moist color is 10YR 3/3. It is loam or fine sandy loam with 15 to 26 percent clay. Rock fragments are 5 to 30 percent gravel by volume. Reaction is neutral to moderately alkaline (pH 7.0 to 8.0).

The C horizon has dry color of 10YR 6/4 or 6/6; moist color is 10YR 4/3. It is loam or clay loam with 17 to 28 percent clay. Rock fragments are 20 to 40 percent gravel and 0 to 20 percent cobbles by volume. Reaction is moderately alkaline (pH 8.0).

Mulett Family

The Mulett family consists of shallow, well drained soils forming in colluvium from noncalcareous sedimentary rocks. These soils are on mountainsides. Slope is 30 to 80 percent. Elevation is 5,300 to 8,500 feet. The mean annual precipitation is about 8 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Loamy-skeletal, mixed, mesic Lithic Xerollic Camborthids.

Typical Pedon: The representative profile for this soil is on a southwest-facing mountainside, under Singleleaf Pinyon Pine and Big Sagebrush, at an elevation of 7,260 feet. Slope is 30 percent. When described (5/16/80), the soil was slightly moist throughout. (Colors are for dry soil, unless otherwise noted.)

A11 - 0 to 1 inch; pale brown (10YR 6/3) sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine interstitial pores; 10 percent gravel; mildly alkaline (pH 7.5) clear smooth boundary.

A12 - 1 to 6 inches; pale brown (10YR 6/3) very gravelly sandy clay loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; soft, very friable, sticky and slightly plastic; common very fine roots; common very fine and fine interstitial pores; 35 percent gravel; mildly alkaline (pH 7.5); clear smooth boundary.

B2 - 6 to 13 inches; light yellowish brown (10YR 6/4) very gravelly clay loam, yellowish brown (10YR 5/4) moist; moderate medium subangular blocky structure; soft, very friable, sticky and plastic; common very fine and fine roots; few fine interstitial pores; 40 percent gravel; mildly alkaline (pH 7.5); abrupt wavy boundary.

R - 13 inches; hard nonclareous sedimentary rock.

The soil surface is covered with 10 percent cobbles.

Type Location: About 10.8 miles east on Westgard Road, from its intersection with Highway 395, then 0.6 mile south on a jeep trail, and 100 feet north of the jeep trail; about 825 feet east and 0.5 mile north of the southwest corner of Section 16, T.8S., R.35E., MDBM, Blanco Mountain SW Quadrangle.

Range in Characteristics: Depth to the lithic contact is 10 to 20 inches. The mean annual soil temperature at the lithic contact is 47 to 59°F. The soil moisture control section is 5 to 17 inches. It is usually dry in all parts from early April to mid October. The textural control section is the whole soil in soils 14 inches or less deep, and is at 10 inches to the lithic contact in soils deeper than 14 inches. It is sandy loam, loam or clay loam, with 7 to 28 percent clay, and an average of 19 percent. Rock fragments range from 10 to 70 percent by volume, and average about 47 percent.

Some pedons have C horizons.

The A horizon has dry color of 10YR 5/3 or 6/3; moist color is 10YR 3/3. It is sandy loam or loam with 7 to 23 percent clay. Rock fragments are 10 to 40 percent gravel by volume. Reaction is mildly to strongly alkaline (pH 7.5 to 8.5).

The B2 horizon has dry color of 10YR 5/4, 6/3, 6/4 or 7/3; moist color is 10YR 4/3 or 5/4. It is sandy loam, loam or clay loam with 9 to 30 percent clay. Rock fragments are 25 to 40 percent gravel, and 0 to 5 percent cobbles by volume. Effervescence is none to slight and reaction is mildly to strongly alkaline (pH 7.5 to 8.5).

Packham Family

The Packham family consists of moderately deep to deep, well drained soils forming in colluvium and alluvium from mixed rocks. These soils are on mountainsides and alluvial fans. Slope is 30 to 80 percent. Elevation is 6,100 to 10,000 feet. The mean annual precipitation is about 11 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Loamy - skeletal, mixed, frigid Xerollic Camborthids

Typical Pedon: The representative profile for this soil is on a northwest facing mountainside, under Singleleaf Pinyon Pine, Big Sagebrush and Arizona Wheatgrass, at an elevation of 8,360 feet. Slope is 40 percent. When described (10/6/80), the soil was slightly moist from 3 to 15 inches, and dry throughout the rest of the profile. (Colors are for dry soils unless otherwise noted.)

A1 - 0 to 3 inches; pale brown (10YR 6/3) very cobbly sandy loam, brown (10YR 4/3) moist; moderate very thick platy structure; slightly hard, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine and fine interstitial pores; 30 percent gravel, 20 percent cobbles and 10 percent stones; neutral (pH 7.0); clear wavy boundary.

B21 - 3 to 7 inches; yellowish brown (10YR 5/4) very gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist; massive; hard, friable, sticky and plastic; common very fine, few fine interstitial, and few very fine and fine tubular pores; 40 percent gravel; neutral (pH 7.0); clear wavy boundary.

B22 - 7 to 15 inches; yellowish brown (10YR 5/4) extremely gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist; massive; hard, friable, sticky and plastic; few very fine and fine, and common medium and coarse roots; common very fine, few fine interstitial, and few very fine and fine tubular pores; 60 percent gravel and 10 percent cobbles; neutral (pH 7.0); clear wavy boundary.

C1 - 15 to 27 inches; light yellowish brown (10YR 6/4) extremely gravelly sandy loam; dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine, fine and coarse, and common medium roots; many very fine and fine interstitial pores; 50 percent gravel and 15 percent cobbles; neutral (pH 7.0); clear wavy boundary.

C2 - 27 to 40 inches; light yellowish brown (10YR 6/4) extremely gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few fine and coarse, and common medium roots; many very fine and fine interstitial pores; 75 percent gravel and 5 percent cobbles; neutral (pH 7.0); clear wavy boundary.

C3ca - 40 to 44 inches; light yellowish brown (10YR 6/4) very gravelly loamy sand, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few fine, medium and coarse roots; many very fine and fine interstitial pores; strongly effervescent, disseminated lime; 50 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

C4ca - 44 to 50 inches; very pale brown (10YR 7/3) very gravelly loamy sand, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few medium roots; many very fine and fine interstitial pores; violently effervescent, disseminated lime; many fine irregularly shaped segregated secondary carbonates occurring in seams; 50 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

C5ca - 50 to 60 inches; light yellowish brown (10YR 6/4) gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine interstitial pores; slightly effervescent, disseminated lime; many fine irregularly shaped segregated secondary carbonates occurring in seams; 25 percent gravel and 5 percent cobbles; moderately alkaline (pH 8.0).

The soil surface is covered with 30 percent gravel, 20 percent cobbles and 10 percent stones.

Type Location: About 4.3 miles east on Queen Canyon Road, from its intersection with Highway 6, then about 0.4 mile south on jeep trail, from its intersection with Queen Canyon Road; about 1,270 feet east and 530 feet north of the southwest corner of Section 31, T.1N., R.33E., MDBM, Benton NE Quadrangle.

Range in Characteristics: Depth to the lithic contact is 30 to greater than 60 inches. The mean annual soil temperature at 20 inches is about 45°F, and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is 4

is 30 to greater than 60 inches. The mean annual soil temperature at 20 inches is about 45°F, and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is 4 to 30 inches. It is usually dry in all parts from early April to mid October. The 10 to 40 inch textural control section is sandy loam, fine sandy loam, loam, sandy clay loam or clay loam, with 6 to 33 percent clay, and an average of about 16 percent. Rock fragments range from 20 to 80 percent by volume, and average about 50 percent. Depth to secondary carbonate accumulations ranges from 3 to 40 inches, but typically is at depths greater than 8 inches.

Some pedons are calcareous throughout.

The A horizon has dry color of 10YR 5/3, 5/4 or 6/3; moist color is 10YR 3/3 or 4/3. It is loam or sandy loam, with 6 to 20 percent clay. Rock fragments are 5 to 30 percent gravel, 0 to 20 percent cobbles and 0 to 10 percent stones by volume. Effervescence is none to

violent. Reaction is slightly acid to moderately alkaline (pH 6.5 to 8.0).

The B horizon has dry color of 10YR 5/4, 6/3, 6/4, 7/3, or 2.5Y 6/2; moist color is 10YR 4/3, 4/4 or 5/4, or 2.5Y 5/2. It is sandy loam, loam, sandy clay loam or clay loam, with 12 to 33 percent clay. Rock fragments are 15 to 60 percent gravel, 0 to 20 percent cobbles and 0 to 5 percent stones by volume. Effervescence is none to violent. Reaction is slightly acid to moderately alkaline (pH 6.5 to 8.0).

The C horizon has dry color of 10YR 6/4, 7/3 or 7/4, or 2.5Y 6/2; moist color is 10YR 4/3, 4/4 or 5/3, or 2.5Y 3/2. It is loamy sand, sandy loam, fine sandy loam, loam or sandy clay loam, with 4 to 26 percent clay. Rock fragments are 10 to 75 percent gravel, 0 to 25 percent cobbles and 0 to 25 percent stones by volume. Effervescence is none to violent. Reaction is neutral to moderately alkaline (pH 7.0 to 8.4).

Pergelic Cryoborolls

The Pergelic Cryoborolls consist of moderately deep to deep, well drained soils forming in colluvium from granitic rocks. These soils are on mountainsides. Slope is 30 to 80 percent. Elevation is 9,000 to 14,250 feet. The mean annual precipitation is about 18 inches and the mean annual temperature is about 28°F.

Taxonomic Class: Loamy-skeletal, mixed Pergelic Cryoborolls

Reference Pedon: The representative profile for this soil is on a west-facing mountainside, under Golden-brush, Buckwheat and Pringle Bluegrass, at an elevation of 13,050 feet. Slope is 38 percent. When described, (7/16/80), the soil was moist throughout. (Colors are for dry soil unless otherwise noted.)

O1 - 1 to 0 inch; organic mat, made up of grass roots; abrupt smooth boundary.

A1 - 0 to 2 inches; dark grayish brown (10YR 4/2) very stony loam, very dark grayish brown (10YR 3/2) moist; moderate medium and coarse subangular blocky structure, parting to fine and medium subangular blocky; soft, very friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine and common fine interstitial pores; 10 percent gravel, 15 percent cobbles and 10 percent stones; neutral (pH 7.0); clear smooth boundary.

B21 - 2 to 9 inches; brown (10YR 5/3) very stony loam, dark brown (10YR 3/3) moist; moderate medium and coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine and common fine and medium roots; common very fine and fine interstitial pores; 30 percent gravel, 10 percent cobbles and 20 percent stones; neutral (pH 7.0); abrupt wavy boundary.

B22 - 9 to 14 inches; yellowish brown (10YR 5/4) very stony loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, sticky and plastic; common very fine and fine roots; common very fine interstitial and few very fine tubular pores; 20 percent gravel, 10 percent cobbles and 25 percent stones; slightly acid (pH 6.5); abrupt wavy boundary.

C1 - 14 to 23 inches; pale brown (10YR 6/3) very stony loam, brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; slightly hard,

friable, sticky and plastic; few very fine and fine roots; few very fine and fine interstitial and tubular pores; 20 percent gravel, 15 percent cobbles and 25 percent stones; slightly acid (pH 6.5); abrupt wavy boundary.

C2 - 23 to 39 inches; pale brown (10YR 6/3) extremely stony loam, brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, sticky and plastic; few very fine roots; common very fine interstitial, and few very fine and fine tubular pores; 10 percent gravel, 20 percent cobbles and 35 percent stones; strongly acid (pH 5.5); abrupt irregular boundary.

R - 39 inches; hard, fractured granodiorite.

The soil surface is covered with 15 percent gravel, 20 percent cobbles and 15 percent stones.

Type Location: About 0.15 mile east and 320 feet north of the southeast corner of Section 8, T.4S., R.34E., MDBM, Mt. Barcroft SW Quadrangle.

Range in Characteristics: Depth to bedrock is 35 to greater than 60 inches. The mean annual soil temperature at 20 inches is less than 32°F. The soil moisture control section is 4 to 19 inches. It is usually dry in all parts from mid-April to late September, and moist in some or all parts the rest of the year. The textural control section is 10 to 40 inches. It is sandy loam or loam, with an average of less than 18 percent clay. Rock fragments average about 60 percent by volume.

Some pedons lack O horizons. Other pedons lack B horizons

The O horizon is up to 1 inch thick.

The A horizon has dry color of 10YR 4/2, 4/3 or 5/3, or 2.5Y 5/2; moist color is 10YR 2/2, 3/2 or 3/3, or 2.5Y 3/2. It is sandy loam or loam, with 6 to 15 percent clay. Rock fragments are 5 to 30 percent gravel, 0 to 40 percent cobbles and 0 to 10 percent stones by volume. Reaction is medium acid to mildly alkaline (pH 6.0 to 7.5).

The B horizon has dry color of 10YR 5/3 or 5/4; moist color is 10YR 3/3. It is loam, with 19 percent clay. Rock fragments are 20 to 30 percent gravel, 10 percent

cobbles and 20 to 25 percent stones by volume. Reaction is slightly acid to neutral (pH 6.5 to 7.0).

The C horizon has dry color of 10YR 5/3, 5/4, 6/3 or 6/4; moist color is 10YR 3/3, 3/4, 4/3 or 4/4. It is sandy

loam or loam, with 7 to 17 percent clay. Rock fragments are 5 to 55 percent gravel, 0 to 40 percent cobbles and 0 to 35 percent stones by volume. Reaction is slightly to strongly acid (pH 5.5 to 6.5).

Preston Family

The Preston family consists of deep, somewhat excessively drained soils forming in eolian deposits from mixed rocks. These soils are on stabilized dunes and in depressions. Slope is 1 to 15 percent. Elevation is 6,400 to 7,900 feet. The mean annual precipitation is about 10 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Mixed, mesic Typic Xeropsamments.

Typical Pedon: The representative profile for this soil is on a stabilized dune, under Big Sagebrush and Indian Ricegrass, at an elevation of 6,900 feet. Slope is 8 percent. When described (9/12/78), the soil was dry throughout. (Colors are for dry soil, unless otherwise noted.)

A11 - 0 to 2 inches; pale brown (10YR 6/3) sand, dark grayish brown (10YR 4/2) moist; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; few very fine, fine and medium roots; many medium interstitial pores; 5 percent gravel; neutral (pH 6.6); clear smooth boundary.

A12 - 2 to 6 inches; pale brown (10YR 6/3) sand, dark grayish brown (10YR 4/2) moist; single grain; loose, loose, nonsticky and nonplastic; few very fine and fine roots; many medium interstitial pores; 5 percent gravel; neutral (pH 6.6); clear wavy boundary.

C1 - 6 to 9 inches; pale brown (10YR 6/3) fine sand, dark grayish brown (10YR 4/2) moist; single grain; loose, loose, nonsticky and nonplastic; common very fine, and few fine and medium roots; many medium interstitial pores; 5 percent gravel; neutral (pH 6.7); clear wavy boundary.

C2 - 9 to 14 inches; light brownish gray (10YR 6/2) sand, dark grayish brown (10YR 4/2) moist; single grain; loose, loose, nonsticky and nonplastic; few very fine and fine roots; many medium interstitial

pores; 10 percent gravel; neutral (pH 6.7); gradual smooth boundary.

C3 - 14 to 21 inches; light gray (10YR 7/1) fine sand, grayish brown (10YR 5/2) moist; single grain; loose, loose, nonsticky and nonplastic; few very fine, fine and medium roots; many medium interstitial pores; neutral (pH 6.6); clear smooth boundary.

C4 - 21 to 60 inches; pale brown (10YR 6/3) fine sand, brown (10YR 4/3) moist; single grain; loose, loose, nonsticky and nonplastic; few very fine roots; many medium interstitial pores; neutral (pH 6.9).

The surface is covered with 5 percent gravel.

Type Location: About 1,600 feet east and 330 feet north of the southwest corner of Section 34, T.3N., R.29E., MDBM, Trench Canyon SE Quadrangle.

Range in Characteristics: Soil depth is greater than 60 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control section is 13 to 60 inches. It is usually dry in all parts from mid April to late September. The 10 to 40 inch textural control section is coarse sand, sand, fine sand, loamy coarse sand or loamy sand, with 2 to 3 percent clay. Rock fragments are gravel, and range from 0 to 15 percent by volume.

The A horizon has dry color of 10YR 6/2 or 6/3; moist color is 10YR 4/2. It is sand or loamy sand with 2 percent clay. Rock fragments are 0 to 15 percent gravel by volume. Reaction is slightly acid to neutral (pH 6.3 to 6.6).

The C horizon has dry color of 10YR 6/2, 6/3, 7/1, 7/2 or 7/3; moist color is 10YR 4/2, 4/3 or 5/2. It is coarse sand, sand, fine sand, loamy coarse sand or loamy sand, with 2 to 3 percent clay. Rock fragments are 0 to 15 percent gravel by volume. Reaction is neutral (pH 6.6 to 6.9).

Risue Family

The Risue family consists of shallow, well drained soils forming in residuum from basalt. These soils are on lava flows. Slope is 2 to 30 percent. Elevation is 6,700 to 7,400 feet. The mean annual precipitation is about 11 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Clayey, montmorillonitic, mesic, shallow Abruptic Durargids.

Typical Pedon: The representative profile for this soil is on a north-facing lava flow, under Big Sagebrush and Rabbitbrush, at an elevation of 7,340 feet. Slope is 8 percent. When described (8/25/78), the soil was dry throughout. (Colors are for dry soil, unless otherwise noted.)

A11 - 0 to 2 inches; pale brown (10YR 6/3) cobbly loamy sand, dark grayish brown (10YR 4/2) moist; weak very fine granular structure; soft, very friable, non-sticky and nonplastic; few very fine roots; common very fine tubular and interstitial pores; 10 percent gravel and 20 percent cobbles; neutral (pH 6.7); clear smooth boundary.

A12 - 2 to 6 inches; pale brown (10YR 6/3) loamy sand, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure, parting to weak fine granular; soft, very friable, nonsticky and nonplastic; common very fine and few fine roots; many very fine and fine tubular, and many very fine interstitial pores; 5 percent gravel; neutral (pH 6.8); abrupt irregular boundary.

B21t - 6 to 10 inches; yellowish brown (10YR 5/4) sandy clay loam, dark yellowish brown (10YR 4/4) moist; strong medium subangular blocky structure, parting to strong very fine and fine subangular blocky; slightly hard, firm, sticky and plastic; many very fine and few fine roots; many very fine and fine, and few coarse and medium tubular pores; many moderately thick clay films on ped faces, and common thin clay films in pores; 5 percent gravel; neutral (pH 6.6); clear smooth boundary.

B22t - 10 to 16 inches; brown (7.5YR 5/4) clay, dark

brown (7.5YR 4/4) moist; strong medium and coarse subangular blocky structure, parting to strong fine and medium angular blocky; hard, firm, sticky and plastic; few very fine roots; many very fine and fine, few coarse and medium tubular pores; many moderately thick clay films on ped faces and in pores; 10 percent gravel; neutral (pH 6.6); abrupt smooth boundary.

C1sim - 16 to 25 inches; strong brown (7.5YR 5/6) silica-cemented indurated pan, with a sandy clay loam texture, dark brown (7.5YR 4/4) moist; massive; very hard, firm, slightly sticky and slightly plastic; 5 percent gravel; neutral (pH 6.9).

The soil surface is covered with 10 percent gravel and 20 percent cobbles.

Type Location: About 0.25 mile east and 0.10 mile south of the northwest corner of Section 17, T2N., R.30E., MDBM, Huntoon Valley SW Quadrangle.

Range in Characteristics: Solum thickness and depth to the indurated pan is 16 inches. The mean annual soil temperature at the pan is 48 to 59°F. The soil moisture control section is 6 to 16 inches. It is usually dry in all parts from early February to late November. The textural control section is the argillic horizon. It is sandy clay loam or clay, with an average of 37 percent clay. Rock fragments average 8 percent by volume. The profile is neutral throughout (pH 6.6 to 6.9).

The A horizon has dry color of 10YR 6/3; moist color is 10YR 4/2 or 4/3. It is loamy sand with 2 percent clay. Rock fragments are 0 to 5 percent gravel and 0 to 20 percent cobbles by volume.

The Bt horizon has dry color of 10YR 5/4 or 7.5YR 5/4; moist color is 10YR 4/4 or 7.5YR 4/4. It is sandy clay loam or clay, with 30 to 40 percent clay. Rock fragments are 5 to 10 percent gravel by volume.

The Csim horizon has dry color of 7.5YR 5/6; moist color is 7.5YR 4/4. It is sandy clay loam with 26 percent clay. Rock fragments are 5 percent gravel by volume.

Sanpete Family

The Sanpete family consists of moderately deep, well drained soils forming in residuum from calcareous metasedimentary rocks, composed mainly of limestone and dolomite. These soils are on mountainsides. Slope is 30 to 80 percent. Elevation is 4,700 to 7,800 feet. The mean annual precipitation is about 9 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Loamy-skeletal, carbonatic, mesic Xerollic Calciorthids.

Typical Pedon: The representative profile for this soil is on a southwest-facing mountainside, under Singleleaf Pinyon Pine, Juniper, and Black Sagebrush, at an elevation of 7,720 feet. Slope is 45 percent. When described (4/30/80), the soil was slightly moist throughout. (Colors are for dry soil, unless otherwise noted.)

A1 - 0 to 2 inches; pale brown (10YR 6/3) gravelly fine sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots; many very fine interstitial pores; violently effervescent lime pendants on undersides of rock fragments and violently effervescent, disseminated lime; 15 percent gravel; moderately alkaline (pH 8.0); clear smooth boundary.

B2 - 2 to 21 inches; light yellowish brown (10YR 6/4) very cobbly fine sandy loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine and medium roots; many very fine interstitial pores; violently effervescent, disseminated lime; 10 percent gravel and 35 percent cobbles; moderately alkaline (pH 8.0); clear smooth boundary.

C1ca - 21 to 24 inches; white (10YR 8/1) very cobbly fine sandy loam, very pale brown (10YR 7/3) moist; massive; soft, very friable, nonsticky and nonplastic; common medium and coarse roots; many very fine interstitial pores; violently effervescent lime pendants on undersides of rock fragments and violently effervescent, disseminated lime; 5 percent gravel, 45 percent cobbles and 5 percent stones; moderately alkaline (pH 8.0); abrupt wavy boundary.

R - 24 inches; hard calcareous metasedimentary rock.

The surface is covered with 30 percent cobbles.

Type Location: About 11.4 miles east on Waucoba Road, from its intersection with Westgard Road, then about 3.7 miles north on Loretto Road, from its intersection with Waucoba Road, then about 2.35 miles up jeep trail on the west side of the road, and about 530 feet east of the trail; about 530 feet east and 950 feet south of the northwest corner of the northeast quarter of Section 17, T.9S., R.36E., MDBM, Waucoba Mountain NE Quadrangle.

Range in Characteristics: Depth to the lithic contact is 21 to 40 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control section is 12 to 24 inches. It is usually dry in all parts from early April to mid October. The textural control section is fine sandy loam with 7 to 14 percent clay. Rock fragments average 45 percent. Effervescence is strong to violent throughout. Reaction is moderately alkaline (pH 8.0) throughout.

Some pedons have thin O horizons.

The A horizon has dry color of 10YR 5/3 or 6/3; moist color is 10YR 3/3 or 4/3. It is fine sandy loam with 7 to 12 percent clay. Rock fragments are 15 to 50 percent gravel and 0 to 5 percent cobbles by volume.

The B2 horizon has dry color of 10YR 6/4; moist color is 10YR 4/3 or 4/4. It is fine sandy loam with 12 to 14 percent clay. Rock fragments are 10 to 40 percent gravel, 5 to 35 percent cobbles and 0 to 5 percent stones. Calcium carbonate equivalent is 16 percent by the syringe method.

The Cca horizon has dry color of 10YR 7/3 or 8/1, 5Y 8/2 or 7.5Y 8/2; moist color is 10YR 7/3, 2.5Y 6/4, 5Y 6/3 or 7.5YR 7/4. It is fine sandy loam with 7 to 12 percent clay. Rock fragments are 5 to 46 percent gravel, 0 to 45 percent cobbles and 0 to 5 percent stones. Calcium carbonate equivalent is about 46 percent by the syringe method.

Simpson Family

The Simpson family consists of moderately deep, well drained soils forming in colluvium and residuum from andesite and rhyolite. These soils are on mountainsides. Slope is 15 to 60 percent. Elevation is 6,800 to 8,300 feet. The mean annual precipitation is about 10 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Fine, montmorillonitic, mesic Aridic Argixerolls.

Typical Pedon: The representative profile for this soil is on a south-facing mountainside, under Singleleaf Pinyon Pine and Big Sagebrush, at an elevation of 7,400 feet. When described (7/15/81), the soil was dry in the upper 8 inches and slightly moist in the rest of the profile. (Colors are for dry soil, unless otherwise noted.)

A11 – 0 to 2 inches; pale brown (10YR 6/3) gravelly loamy sand, brown (10YR 4/3) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine interstitial pores; 30 percent gravel; neutral (pH 7.0); clear smooth boundary.

A12 – 2 to 8 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine and fine interstitial pores; 20 percent gravel; mildly alkaline (pH 7.5); clear wavy boundary.

B2t – 8 to 15 inches; light yellowish brown (10YR 6/4) clay loam, strong brown (7.5YR 5.6) moist; moderate fine prismatic structure, parting to strong medium and coarse subangular blocky; hard, very friable, very sticky and very plastic; few very fine, fine and medium roots; few very fine and fine tubular pores; common pressure faces on ped faces; strongly effervescent, disseminated lime; 10 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

B3t – 15 to 23 inches; reddish yellow (7.5YR 6/6) cobbly clay loam, strong brown (7.5YR 5/6) moist; moderate fine, medium and coarse subangular blocky structure; very hard, friable, sticky and plastic; few very fine, fine and medium roots; few very fine and

fine tubular pores; common pressure faces on ped faces; strongly effervescent, disseminated lime; 10 percent gravel and 15 percent cobbles; moderately alkaline (pH 8.0); abrupt irregular boundary.

R – 23 inches; andesite bedrock, which is slightly weathered in the upper 1 inch.

The surface is covered with 30 percent gravel, 10 percent cobbles, and 30 percent stones.

Type Location: About 9.95 miles west on Trail Canyon Road, from its intersection with Highway 3A, and about 50 feet south of the road; about 0.3 mile west and 0.3 mile south of the northeast corner of Section 6, T.1S., R.34E., MDBM, Davis Mountain NW Quadrangle.

Range in Characteristics: Soil depth is 20 to 40 inches. The mean annual temperature at 20 inches is 47 to 59°F. The soil moisture control section is 5 to 20 inches. It is usually dry in all parts from mid April to late September, and usually moist in some or all parts the rest of the year. The textural control section is the argillic horizon. It is clay loam or clay with 35 to 50 percent clay. Rock fragments are 10 to 40 percent gravel, 0 to 5 percent cobbles and 0 to 10 percent stones by volume, and average less than 34 percent.

Some pedons have transitional B1 horizons and some pedons are noncalcareous throughout.

The A horizon has dry color of 10YR 5/3 or 6/3; moist color is 10YR 3/3 or 4/3. It is loamy sand, sandy loam or loam with 5 to 16 percent clay. Rock fragments are 20 to 30 percent gravel, 0 to 10 percent cobbles and 0 to 5 percent stones by volume. Reaction is neutral to mildly alkaline (pH 7.0 to 7.5).

The Bt horizon has dry color of 10YR 6/4, or 7.5YR 6/3, 6/4 or 6/6; moist color is 7.5YR 4/3, 4/4 or 5/6. It is clay loam or clay with 30 to 50 percent clay. Rock fragments are 10 to 40 percent gravel, 0 to 15 percent cobbles and 0 to 10 percent stones by volume. Effervescence is none to strong. Reaction is slightly acid to moderately alkaline (pH 6.5 to 8.0).

Slinger Family

The Slinger family consists of moderately deep to deep, well drained soils forming in colluvium from granitic and sedimentary rocks. These soils are on mountainsides. Slope is 30 to 60 percent. Elevation is 6,100 to 9,500 feet. The mean annual precipitation is about 11 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Loamy-skeletal, mixed (calcareous), frigid Xeric Torriorthents.

Typical Pedon: The representative profile for this soil is on a southwest-facing mountainside, under Singleleaf Pinyon Pine and Big Sagebrush, at an elevation of 7,480 feet. Slope is 60 percent. When described (10/8/80), the soil was dry throughout. (Colors are for dry soil, unless otherwise noted.)

01 - 1 to 0 inch; organic mat, made up of pine needles, twigs and cones; clear wavy boundary.

A11 - 0 to 2 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; weak fine granular structure; loose, loose, nonsticky and nonplastic; few very fine and fine roots; many very fine and fine interstitial pores; slightly effervescent, disseminated lime; 30 percent gravel and 10 percent cobbles; mildly alkaline (pH 7.8); clear wavy boundary.

A12 - 2 to 5 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; weak fine granular structure; loose, loose, nonsticky and nonplastic; common very fine and fine roots; many very fine and fine interstitial pores; slightly effervescent, disseminated lime; 30 percent gravel and 5 percent cobbles; mildly alkaline (pH 7.8); clear wavy boundary.

A13 - 5 to 14 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and common fine and medium roots; many very fine and fine interstitial pores; strongly effervescent, disseminated lime; 40 percent gravel and 5 percent cobbles; mildly alkaline (pH 7.8); clear wavy boundary.

C1ca - 14 to 18 inches; light gray (10YR 7/2) very gravelly sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; few fine and common medium and coarse roots;

many very fine and fine interstitial pores; violently effervescent, disseminated lime; 55 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

C2ca - 18 to 24 inches; very pale brown (10YR 7/3) very gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few fine, medium and coarse roots; many very fine and fine interstitial pores; violently effervescent, disseminated lime; 60 percent gravel; moderately alkaline (pH 8.2); clear wavy boundary.

C3ca - 24 to 38 inches; very pale brown (10YR 7/3) very gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few fine and medium roots; many very fine and fine interstitial pores; violently effervescent, disseminated lime; 50 percent gravel and 5 percent cobbles; moderately alkaline (pH 8.2); clear wavy boundary.

C4ca - 38 to 60 inches; very pale brown (10YR 7/3) very gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few medium and common coarse roots; many very fine and fine interstitial pores; violently effervescent, disseminated lime; 45 percent gravel and 15 percent cobbles; moderately alkaline (pH 8.2).

The surface is covered with 30 percent gravel and 10 percent cobbles.

Type Location: About 1.95 miles southeast on Queen Canyon Road, from its intersection with Highway 395, then 0.5 mile southwest on jeep trail, then 0.65 mile southeast on southeast fork of trail and 0.3 mile upslope, in a southeasterly direction; about 0.15 mile east and 0.45 mile north of the southeast corner of Section 35., T.1N., R.32E., MDBM, Benton NE Quadrangle.

Range in Characteristics: Soil depth is 35 to greater than 60 inches. The mean annual soil temperature at 20 inches is about 45°F., and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is 8 to 37 inches. It is usually dry in all parts from early June to mid August, and moist in some or all parts the rest of the year. The textural control section is 10 to 40 inches. It is sandy loam or loam, with 6 to 19 percent clay, and an average

of less than 18 percent. Rock fragments are 30 to 70 percent by volume and average about 59 percent.

Some pedons do not have an O horizon.

The O horizon is 1/2 to 1 inch thick.

The A horizon has dry color of 10YR 6/3 or 6/4; moist color is 10YR 3/3, 4/3 or 4/4. It is sandy loam or loam, with 8 to 19 percent clay. Rock fragments are 25 to 40 percent gravel, 5 to 20 percent cobbles and 0 to

10 percent stones by volume. Effervescence is slight to strong. Reaction is mildly to moderately alkaline (pH 7.8 to 8.0).

The C horizon has dry color of 10YR 7/1, 7/2 or 7/3, or 5Y 8/1; moist color is 10YR 4/3, 4/4 or 5/3, or 2.5Y 4/3 or 5/2, or 5Y 6/2. It is sandy loam or loam, with 6 to 19 percent clay. Rock fragments are 30 to 65 percent gravel, 0 to 5 percent cobbles and 0 to 5 percent stones by volume. Effervescence is strong to violent. Reaction is moderately alkaline (pH 8.0 to 8.2).

Soakpak Family

The Soakpak family consists of moderately deep to deep, well drained soils forming in alluvium and colluvium from mixed granitic rocks. These soils are on remnant alluvial fans, in alluvial-colluvial flats and on mountainsides. Slope is 5 to 60 percent. Elevation is 9,000 to 13,900 feet. The mean annual precipitation is about 12 inches and the mean annual temperature is about 28°F.

Taxonomic Class: Loamy-skeletal, mixed Pergelic Cryochrepts.

Typical Pedon: The representative profile for this soil is on a south-facing remnant alluvial fan, under Carex, Low Phlox and Pringle Bluegrass, at an elevation of 13,200 feet. When described (7/17/80), the soil was dry throughout. (Colors are for day soil, unless otherwise noted.)

A11 - 0 to 3 inches; grayish brown (10YR 5/2) very cobbly loam, very dark gray (10YR 3/1) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine interstitial, and common very fine tubular pores; 20 percent gravel, 10 percent cobbles and 5 percent stones; slightly acid (pH 6.5); clear smooth boundary.

A12 - 3 to 9 inches; brown (10YR 5/3) very gravelly sandy loam, very dark gray (10YR 3/1) moist; weak very fine and fine subangular blocky structure; slightly hard, very friable, sticky and plastic; many very fine and common fine interstitial pores; 40 percent gravel; medium acid (pH 6.0); clear wavy boundary.

B21 - 9 to 13 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; weak very fine and fine subangular blocky structure; slightly hard, very friable, sticky and plastic; common very fine and fine, and few medium pores; common very fine, and few fine interstitial pores; 35 percent gravel; medium acid (pH 6.0); clear wavy boundary.

B22 - 13 to 27 inches; pale brown (10YR 6/3) very gravelly sandy loam, yellowish brown (10YR 5/4)

moist; weak very fine and fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine and few fine interstitial pores; 55 percent gravel; medium acid (pH 6.0); clear wavy boundary.

C1 - 27 to 42 inches; light gray (10YR 7/2) very gravelly sandy loam, olive brown (2.5Y 4/4) moist; weak very fine and fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; few very fine and fine interstitial pores; 55 percent gravel; medium acid (pH 6.0); abrupt irregular boundary.

R - 42 inches; hard, fractured granodiorite.

The surface is covered with 15 percent gravel, 10 percent cobbles and 5 percent stones.

Type Location: About 2.7 miles north of the White Mountain Research Station and about 180 feet west of the road; about 0.3 mile south of the apparent center of Section 30, T.3S., R.34E., MDBM, White Mountain Peak NE Quadrangle.

Range in Characteristics: Soil depth is 30 to greater than 60 inches. The mean annual soil temperature at 20 inches is less than 32°F. The soil moisture control section is 4 to 30 inches. It is usually dry in all parts from mid April to late September, and moist in some or all parts the rest of the year. The textural control section is 10 to 40 inches. It is loamy sand, sandy loam or loam, with 6 to 17 percent clay, and an average of about 11 percent. Rock fragments are 25 to 60 percent gravel, 0 to 15 percent cobbles and 0 to 30 percent stones by volume, and average 53 percent.

The A horizon has dry color of 10YR 5/2, 5/3 or 5/4; moist color is 10YR 3/1, 3/2, 3/3 or 4/3. It is loamy sand, sandy loam or loam, with 4 to 15 percent clay. Rock fragments are 15 to 70 percent gravel, 5 to 15 percent cobbles and 5 to 30 percent stones by volume. Reaction is medium acid to mildly alkaline (pH 6.0 to 7.5).

The B2 horizon has dry color of 10YR 6/3 or 7/4; moist color is 10YR 3/3, 4/3 or 5/4. It is loamy sand, sandy loam or loam, with 6 to 17 percent clay. Rock fragments are 25 to 60 percent gravel, 0 to 15 percent cobbles and 0 to 10 percent stones by volume. Reaction is medium acid to mildly alkaline (pH 6.0 to 7.5).

The C horizon has dry color of 10YR 7/2, 7/3 or 7/4, or 2.5Y 7/4; moist color is 10YR 4/3, 4/4 or 6/4, or 2.5Y 4/4. It is sandy loam with 6 to 16 percent clay. Rock fragments 35 to 55 percent gravel, 0 to 10 percent cobbles and 0 to 30 percent stones by volume. Reaction is medium acid to mildly alkaline (pH 6.0 to 7.5).

Spaa Family

The Spaa family consists of shallow, well drained soils forming in colluvium from rhyolite. These soils are on ridges and mountainsides. Slope is 5 to 60 percent. Elevation is 6,200 to 9,800 feet. The mean annual precipitation is about 9 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Loamy, mixed, frigid Lithic Haploxerolls.

Typical Pedon: The representative profile for this soil is on a southeast-facing mountain ridge, under Curlleaf Mountain Mahogany and Big Sagebrush, at an elevation of 9,120 feet. Slope is 40 percent. When described (11/7/81), the soil was dry throughout. (Colors are for dry soil, unless otherwise noted.)

A1 - 0 to 3 inches; brown (10YR 5/3) very cobbly sandy loam, dark brown (10YR 3/3) moist; weak medium and coarse platy structure; soft, very friable, non-sticky and nonplastic; many very fine and fine interstitial pores; 25 percent gravel and 20 percent cobbles; medium acid (pH 6.0); clear smooth boundary.

C1 - 3 to 8 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; soft, very friable, non-sticky and nonplastic; few very fine and fine, and common medium roots; many very fine and fine interstitial pores; 10 percent gravel; slightly acid (pH 6.5); clear wavy boundary.

C2 - 8 to 16 inches; pale brown (10YR 6/3) gravelly sandy loam, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine, medium and coarse roots; many very fine and fine interstitial pores; 20 percent gravel; slightly acid (pH 6.5); abrupt wavy boundary.

R - 16 inches; Hard rhyolite.

The soil surface is covered with 25 percent gravel and 20 percent cobbles.

Type Location: About 6.8 miles east on Sugarloaf Road, from its intersection with Highway 395, at Montgomery Pass, then about 1.5 miles southeast of where the road deadends; about 1/4 mile west of the apparent center of Section 28, T.1N., R.33E., MDBM, Benton NE Quadrangle.

Range in Characteristics: Depth to the lithic contact is 12 to 16 inches. The mean annual soil temperature at the lithic contact is about 45°F., and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is at 8 inches to the lithic contact. It is usually dry in all parts from mid April to late September, and moist in some or all parts the rest of the year. The textural control section is the whole soil for pedons 14 inches deep or shallower, or 10 to 16 inches for pedons 15 inches deep or deeper. It is loamy sand or sandy loam, with 2 to 7 percent clay. Rock fragments are 4 to 40 percent by volume, and average about 24 percent.

The A horizon had dry color of 10YR 5/2 or 5/3; moist color is 10YR 3/2 or 3/3. It is loamy sand or sandy loam, with 2 to 6 percent clay. Rock fragments are 20 to 25 percent gravel and 20 percent cobbles by volume. Reaction is medium to slightly acid (pH 6.0 to 6.5).

The C horizon has dry color of 10YR 5/2, 5/3, 6/2 or 6/3, moist color is 10YR 3/2, 3/3, 4/2 or 4/3. It is sandy loam with 7 percent clay. Rock fragments are 4 to 25 percent gravel and 0 to 5 percent cobbles by volume. Reaction is slightly acid (pH 6.5).

Spanel Family

The Spanel family consists of shallow, well drained soils forming in alluvium from mixed calcareous rocks. These soils are on alluvial fans and terraces. Slope is 2 to 60 percent. Elevation is 4,100 to 7,100 feet. The mean annual precipitation is about 6 inches and the mean annual temperature is about 56°F.

Taxonomic Class: Loamy, mixed, mesic, shallow
Typic Durargids.

Typical Pedon: The representative profile for this soil is on a southwest-facing alluvial terrace, under Shadscale and Mormon Tea, at an elevation of 5,080 feet. When described (4/26/80), the soil was dry throughout. (Colors are for day soil unless otherwise noted.)

A11 - 0 to 1 inch; pale brown (10YR 6/3) gravelly loam, brown (10YR 4/3) moist; moderate very thin and thin platy structure; soft, very friable, nonsticky and nonplastic; common fine roots; many medium vesicular pores; slightly effervescent, disseminated lime; 20 percent gravel and 10 percent cobbles; moderately alkaline (pH 8.0); smooth clear boundary.

A12 - 1 to 3 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine roots; many fine vesicular pores; slightly effervescent, disseminated lime; 5 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

B1t - 3 to 10 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; soft, friable, slightly sticky and slightly plastic; common fine and few medium roots; common medium vesicular pores; common thin clay films on ped faces; slightly effervescent, disseminated lime; 5 percent gravel; moderately alkaline (pH 8.0); gradual wavy boundary.

B2t - 10 to 19 inches; light yellowish brown (10YR 6/4) loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and few medium roots; common very fine vesicular and few fine tubular pores; common thin clay films on ped faces, and few moderately thick clay films in pores; slightly effervescent, dis-

seminated lime; 10 percent gravel and 1 percent cobbles; moderately alkaline (pH 8.0); abrupt wavy boundary.

C1sicam - 19 to 60 inches; light gray (10YR 7/2) indurated pan, grayish brown (10YR 5/2); moist; massive; extremely hard, troweled surface of laminar silica and calcium excluding root penetration; violently effervescent; moderately alkaline (pH 8.0).

The surface is covered with 10 percent cobbles.

Type Location: About 1.5 miles east of Waucoba Road, from its intersection with Westgard Road, then about 2.7 miles north on a jeep trail, and about 200 feet south of the trail; about 530 feet east and 925 feet north of the southwest corner of the northwest quarter of Section 6, T.9S., R.35E., MDBM, Waucoba Mountain NW Quadrangle.

Range in Characteristics: Soil depth is greater than 60 inches. Depth to the indurated pan ranges from 8 to 19 inches. The mean annual soil temperature at the pan is 47 to 59°F. The soil moisture control section is 4 to 12 inches. It is usually dry in all parts from early February to late November. The control section is clay loam, loam, fine sandy loam or sandy loam, with 10 to 32 percent clay, and an average of 23 percent clay. Rock fragments range from 5 to 35 percent and average 18 percent by volume. The soil is moderately alkaline (pH 8.0) and calcareous throughout.

The A horizon has dry color of 10YR 6/2 or 6/3; moist color is 10YR 4/2 or 4/3. It is loam, fine sandy loam or sandy loam, with 10 to 18 percent clay. Rock fragments are 5 to 25 percent gravel, 0 to 10 percent cobbles and 0 to 1 percent stones by volume. Effervescence is slightly to strong.

The Bt horizon has dry color of 10YR 5/4, 6/3 or 6/4; moist color is 10YR 4/3, 4/4 or 5/4. It is loam or clay loam with 20 to 32 percent clay. Rock fragments are 5 to 30 percent gravel and 0 to 5 percent cobbles by volume. Effervescence is slight to strong.

The Csicam horizon is massive, extremely hard and brittle. It is very difficult to dig through with hand tools and does not slake in concentrated HCL. The degree of induration usually decreases with increasing depth.

St. Marys Family

The St. Marys family consists of deep, well drained soils forming in colluvium from basalt. These soils are on mountainsides. Slope is 30 to 60 percent. Elevation is 7,500 to 8,200 feet. The mean annual precipitation is about 11 inches, and the mean annual temperature is about 44°F.

Taxonomic Class: Loamy-skeletal, mixed, frigid Typic Haploxerolls.

Typical Pedon: The representative profile for this soil is on a west-facing mountainside, under Big Sagebrush and Buckwheat, at an elevation of 8,000 feet. Slope is 40 percent. When described (8/24/78), the soil was dry throughout. (Colors are for dry soil, unless otherwise noted.)

A11 - 0 to 3 inches; grayish brown (10YR 5/2) extremely stony loamy sand, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure, parting to weak very fine granular; soft, very friable, nonsticky and nonplastic; few very fine roots; many medium interstitial pores; 40 percent gravel, 20 percent cobbles and 20 percent stones; neutral (pH 7.0); clear wavy boundary.

A12 - 3 to 9 inches; brown (10YR 5/3) extremely stony loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure, parting to weak very fine subangular blocky; slightly hard, friable, slightly sticky and nonplastic; common very fine roots; many medium interstitial pores; 45 percent gravel, 15 percent cobbles and 15 percent stones; neutral (pH 7.0); gradual wavy boundary.

B21 - 9 to 17 inches; brown (10YR 5/3) very gravelly clay loam, dark brown (10YR 3/3) moist; massive; slightly hard, firm, slightly sticky and slightly plastic; many very fine and fine roots; many medium interstitial pores; 45 percent gravel; neutral (pH 7.0); gradual wavy boundary.

B22 - 17 to 26 inches; yellowish brown (10YR 5/4) very gravelly loam, dark yellowish brown (10YR 3/4) moist; massive; hard, firm, slightly sticky and slightly plastic; many very fine and fine, and few medium and coarse roots; many medium interstitial

pores; 45 percent gravel; neutral (pH 7.0); gradual irregular boundary.

C1 - 26 to 38 inches; yellowish brown (10YR 5/4) extremely gravelly loam, dark yellowish brown (10YR 3/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; common medium interstitial pores; 65 percent gravel; neutral (pH 7.0); clear wavy boundary.

C2 - 38 to 60 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 3/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; many medium interstitial pores; neutral (pH 7.0).

Type Location: About 0.2 mile west and 0.15 mile south of the northeast corner of Section 10, T.1N., R.31E., MDBM, Benton NW Quadrangle.

Range in Characteristics: Soil depth is greater than 60 inches. The mean annual soil temperature at 20 inches is about 45°F., and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is 4 to 19 inches. It is usually dry in all parts from mid April to late September, and is usually moist in some or all parts the rest of the year. The textural control section is 10 to 40 inches. It is loam or clay loam, with an average of about 27 percent clay. Rock fragments average about 50 percent by volume. The soil is neutral (pH 7.0) throughout the profile.

The A horizon has dry color of 10YR 5/2 or 5/3; moist color is 10YR 3/2 or 3/3. It is loamy sand or loam, with 3 to 13 percent clay. Rock fragments are 40 to 45 percent gravel, 15 to 20 percent cobbles and 15 to 20 percent stones by volume.

The B horizon has dry color of 10YR 5/3 or 5/4; moist color is 10YR 3/3 or 3/4. It is loam, with 15 to 18 percent clay. Rock fragments are 45 percent gravel by volume.

The C horizon has dry color of 10YR 5/4; moist color is 10YR 3/4. It is loam, with about 26 percent clay. Rock fragments are 0 to 65 percent gravel by volume.

Sumine Family

The Sumine family consists of moderately deep to deep, well drained soils forming in colluvium and residuum from sedimentary rocks, primarily shale and sandstone. These soils are on mountainsides. Slope is 15 to 60 percent. Elevation is 7,200 to 10,000 feet. The mean annual precipitation is about 10 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Loamy-skeletal, mixed, frigid Aridic Argixerolls.

Typical Pedon: The representative profile for this soil is on a southeast-facing mountainside, under Singleleaf Pinyon Pine and Big Sagebrush, at an elevation of 8,640 feet. When described (5/18/80), the soil was dry throughout. (Colors are for day soil, unless otherwise noted.)

O1 - 2 to 0 inches; slightly decomposed Pinyon Pine needles; abrupt smooth boundary.

A1 - 0 to 3 inches; dark grayish brown (10YR 4/2) gravelly fine sandy loam, very dark brown (10YR 2/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few fine roots; common fine interstitial pores; 15 percent gravel; neutral (pH 7.0); abrupt smooth boundary.

B11t - 3 to 10 inches; grayish brown (10YR 5/2) gravelly sandy clay loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common fine and few medium roots; few fine and medium interstitial pores; few thin clay films on ped faces and bridging mineral sandgrains; 20 percent gravel and 10 percent cobbles; mildly alkaline (pH 7.8); clear wavy boundary.

B12t - 10 to 15 inches; brown (10YR 5/3) gravelly clay loam, dark brown (10YR 3/3) moist; moderate medium and strong fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common fine and few medium and coarse roots; few fine interstitial and common medium and coarse tubular pores; common thin clay films on ped faces and lining pores; 20 percent gravel and 10 percent cobbles; moderately alkaline (pH 8.0); clear wavy boundary.

B21t - 15 to 32 inches; light yellowish brown (10YR 6/4) very stony clay loam, dark yellowish brown (10YR

4/4) moist; moderate coarse subangular blocky structure, parting to moderate medium subangular blocky; slightly hard, very friable, sticky and plastic; few medium and coarse roots; common medium and coarse tubular pores; common thin and moderately thick clay films on ped faces and lining pores; 20 percent gravel, 15 percent cobbles and 15 percent stones; moderately alkaline (pH 8.0); clear wavy boundary.

B22t - 32 to 44 inches; light brown (7.5YR 6/4) cobbly clay loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, sticky and plastic; few medium roots; common medium tubular pores; common moderately thick clay films lining pores; 10 percent gravel and 10 percent cobbles; moderately alkaline (pH 8.0); clear wavy boundary.

B3t - 44 to 52 inches; light brown (7.5 YR 6/4) very gravelly clay loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, sticky and plastic; few medium roots; common fine tubular pores; common moderately thick clay films lining pores; 25 percent gravel, 5 percent cobbles and 5 percent stones; mildly alkaline (pH 7.5); abrupt irregular boundary.

R - 52 inches; hard fractured shale.

The surface is covered by 10 percent cobbles.

Type Location: About 13.7 miles east on Citrus Road, from its intersection with Highway 395, then about 4.25 miles north on Al Rose Canyon Trail, and about 0.1 mile west of trail; 1,160 feet east and 740 feet north of the southwest corner of the northwest quarter of Section 25, T.11S., R.35E., MDBM, Independence NE Quadrangle.

Range in Characteristics: Soil depth is 25 to 60 inches. The mean annual soil temperature at 20 inches is about 45°F., and the mean winter and mean summer soil temperatures differ by more than 9°F. The soil moisture control section is 5 to 15 inches. It is usually dry in all parts from mid April to late September, and usually moist in some or all parts the rest of the year. The textural control section is 10 to 40 inches, or from 10 inches to the lithic contact. Texture of the control section is clay loam or sandy clay loam with 20 to 36 percent clay, and averaging less than 35 percent. Rock fragments in the control section are 10 to 40 percent gravel, 10 to 35 percent cobbles and 0 to 15

percent stones by volume, and average about 37 percent. Reaction ranges from neutral (pH 6.9) to moderately alkaline (pH 8.0).

Some pedons have C horizons below the argillic horizon and are moderately deep to a paralithic contact. Other pedons do not have an O horizon. Many pedons lack transitional B1t and B3t horizons.

The O horizon is up to 2 inches thick.

The A horizon has dry color of 10YR 4/2; moist color is

10YR 2/2 or 3/2. It is fine sandy loam or loam, with 10 to 14 percent clay. Rock fragments are 15 to 35 percent gravel, 0 to 20 percent cobbles and 0 to 10 percent stones by volume. Reaction is neutral (pH 6.8 to 7.0).

The Bt horizon has dry color of 10YR 5/2, 5/3 or 6/4, or 7.5YR 6/4; moist color is 10YR 3/2, 3/3, 4/4 or 5/4. It is sandy clay loam or clay loam with 20 to 38 percent clay, and averages 21 to 33 percent clay. Rock fragments are 10 to 25 percent gravel, 5 to 35 percent cobbles and 0 to 15 percent stones by volume. Reaction is neutral to moderately alkaline (pH 7.0 to 8.0).

Supervisor Family

The Supervisor family consists of moderately deep to deep, well drained soils forming in colluvium from metasedimentary rocks. These soils are on mountainsides. Slope is 5 to 80 percent. Elevation is 8,800 to 12,600 feet. The mean annual precipitation is about 17 inches and the mean annual temperature is about 34°F.

Taxonomic Class: Loamy - skeletal, mixed Typic Cryoborolls.

Typical Pedon: The representative profile for this soil is on a southeast-facing mountainside, under Big Sagebrush and Lupine, at an elevation of 10,550 feet. Slope is 10 percent. When described (10/23/78), the soil was slightly moist throughout. (Colors are for dry soil, unless otherwise noted.)

A11 - 0 to 4 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak very fine and fine subangular blocky structure, parting to weak fine granular; soft, friable, nonsticky and nonplastic; many very fine and few fine roots; many very fine interstitial pores; 20 percent gravel; neutral (pH 6.7); clear smooth boundary.

A12 - 4 to 13 inches; grayish brown (10YR 5/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure, parting to weak very fine and fine subangular blocky; slightly hard, friable, nonsticky and slightly plastic; many very fine and few fine roots; many very fine interstitial pores; 35 percent gravel; neutral (pH 6.8); clear smooth boundary.

C1 - 13 to 37 inches; very pale brown (10YR 7/3) extremely gravelly clay loam, dark brown (10YR 3/3) moist; massive; hard, firm, slightly sticky and slightly plastic; few very fine roots; many very fine interstitial pores; 70 percent gravel, 15 percent cobbles and 2 percent stones; neutral (pH 6.9); gradual irregular boundary.

C2 - 37 to 60 inches; very pale brown (10YR 7/4) extremely cobbly clay loam, light olive brown (2.5Y 5/4) moist; massive; hard, firm, sticky and plastic; many very fine interstitial pores; 40 percent gravel, 30 percent cobbles and 3 percent stones; neutral (pH 6.6).

The soil surface is covered with 60 percent gravel.

Type Location: North on the Bristlecone Road, about 660 feet past the Silver Canyon turnoff, and about 330 feet west of the road; about 2,150 feet west of the northeast corner of Section 24, T.6S., R.34E., MDBM, Blanco Mountain NW Quadrangle.

Range in Characteristics: Soil depth ranges from 30 to 60 inches. The mean annual soil temperature at 20 inches is about 33°F., and the mean summer soil temperature is about 37°F. The soil moisture control section is 8 to 50 inches. It is usually dry in all parts from mid April to late September, and usually moist in some or all parts the rest of the year. The 10 to 40 inch textural control section is loam or clay loam, with 14 to 32 percent clay and an average of 28 percent. Rock fragments are 20 to 70 percent gravel, 10 to 60 percent cobbles and 0 to 10 percent stones by volume, and average about 78 percent.

Some pedons have a B2 horizon and lack an A12 horizon. Some pedons have 0 horizons.

The A horizon has dry color of 10YR 5/2; moist color is 10YR 3/2 or 3/3. It is loam with 10 to 27 percent clay and contains 10 to 40 percent gravel and 0 to 30 percent cobbles. Reaction is neutral to slightly acid (pH 6.5 to 7.0).

The C horizon has dry color of 10YR 6/3, 6/4, 7/3 or 7/4, or 2.5Y 6/3; moist color is 10YR 3/3 or 4/4, or 2.5Y 5/4 or 4/4. It is loam or clay loam with 14 to 31 percent clay and contains 20 to 70 percent gravel, 10 to 60 percent cobbles and 0 to 10 percent stones. Reaction is slightly acid to moderately alkaline (pH 6.6 to 8.0).

Swift Creek Family

The Swift Creek family consists of moderately deep, well drained soils forming in colluvium from dolomite. These soils are on mountainsides. Slope is 15 to 30 percent. Elevation is 10,000 to 11,700 feet. The mean annual precipitation is about 11 inches and the mean annual temperature is about 34°F.

Taxonomic Class: Loamy-skeletal, carbonatic Typic Cryorthents.

Typical Pedon: The representative profile for this soil is on a northwest-facing mountainside, under Buckwheat and Bluegrass, at an elevation of 11,400 feet. Slope is 19 percent. When described (7/15/80), the soil was dry in the upper 4 inches and slightly moist throughout the rest of the profile. (Colors are for dry soil unless otherwise noted.)

A11 - 0 to 4 inches; brown (10YR 5/3) very cobbly sandy loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine and common fine interstitial pores; strongly effervescent, disseminated lime; 25 percent gravel and 15 percent cobbles; mildly alkaline (pH 7.8); clear wavy boundary.

A12ca - 4 to 7 inches; pale brown (10YR 6/3) very cobbly sandy loam, brown (10YR 4/3) moist; weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine and common fine interstitial pores; violently effervescent lime pendants on the undersides of rock fragments; violently effervescent, disseminated lime; 30 percent gravel and 20 percent cobbles; moderately alkaline (pH 8.0); clear wavy boundary.

C1ca - 7 to 15 inches; light yellowish brown (10YR 6/4) very cobbly sandy loam, dark yellowish brown (10YR 4/4) moist; weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine and common fine interstitial pores; violently effervescent lime pendants on the undersides of rock fragments; violently effervescent, disseminated lime; 35 percent gravel and 25 percent cobbles; moderately alkaline (pH 8.0) gradual wavy boundary.

C2ca - 15 to 35 inches; very pale brown (10YR 7/4) extremely cobbly sandy loam, yellowish brown (10YR 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine and common fine interstitial pores; violently effervescent lime pendants on the undersides of rock fragments; violently effervescent, disseminated lime; 40 percent gravel and 35 percent cobbles; moderately alkaline (pH 8.0); abrupt irregular boundary.

R - 35 inches; Fractured Dolomite.

The soil surface is covered with 5 percent gravel and 50 percent cobbles.

Type Location: About 7.85 miles north on the Ancient Bristlecone Road, from its intersection with Wyman Canyon Road, then 0.65 mile east of Eva Belle Mine Road, north of the Patriarch Grove, and 0.2 mile southeast of the road; about 1,475 feet east and 2,530 feet south of the northwest corner of Section 1, T.5S., R.34E., MDBM, Mt. Barcroft SW Quadrangle.

Range in Characteristics: Depth to the lithic contact is 21 to 40 inches. The mean annual soil temperature at 20 inches is about 37°F., and the mean summer temperature is about 58°F. The soil moisture control section is from 8 inches, to the lithic contact. It is usually dry in all parts from early April to mid October. The textural control section is from 10 inches to the lithic contact. It is sandy loam with 6 to 7 percent clay. Rock fragments average about 60 percent by volume. They are dolomite rock fragments. The soil is mildly to moderately alkaline throughout (pH 7.8 to 8.0). Effervescence is strong to violent throughout. Depth to secondary carbonates in the form of pendants on the undersides of rock fragments is 4 inches.

The A horizon has dry color of 10YR 5/3 or 6/3; moist color is 10YR 3/3 or 4/3. It is sandy loam with 7 to 8 percent clay. Rock fragments are 25 to 30 percent gravel and 15 to 20 percent cobbles by volume.

The C horizon has dry color of 10YR 6/4 or 7/4; moist color is 10YR 4/4 or 5/4. It is sandy loam with 6 to 7 percent clay. Rock fragments are 35 to 40 percent gravel and 25 to 35 percent cobbles by volume.

Theriot Family

The Theriot family consists of shallow, well drained soils forming in colluvium and residuum from limestone and dolomite rocks. These soils are on mountainsides and ridges. Slope is 15 to 80 percent. Elevation is 4,100 to 8,500 feet. The mean annual precipitation is about 8 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Loamy-skeletal, carbonatic, mesic Lithic Torriorthents.

Typical Pedon: The representative profile for this soil is on a northwest-facing mountainside, under Singleleaf Pinyon Pine and Big Sagebrush, at an elevation of 8,000 feet. Slope is 15 percent. When described (5/12/80), the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A11 - 0 to 3 inches; pale brown (10YR 6/3) gravelly sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; few very fine roots; common fine interstitial pores; slightly effervescent, disseminated lime; 25 percent gravel and 5 percent cobbles; moderately alkaline (pH 8.0); clear smooth boundary.

A12 - 3 to 6 inches; light yellowish brown (10YR 6/4) very cobbly sandy loam, brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common fine and medium roots; common fine interstitial pores; slightly effervescent, disseminated lime; 15 percent gravel and 36 percent cobbles; moderately alkaline (pH 8.0); abrupt wavy boundary.

R - 6 inches; hard limestone.

The soil surface is covered with 30 percent cobbles and 20 percent stones.

Type Location: Approximately 350 feet east and 175 feet south of the apparent center of the southwest quarter of Section 8, T.9S., R.36E., MDBM, Waucoba Mountain NE Quadrangle.

Range in Characteristics: Depth to the lithic contact ranges from 6 to 18 inches. The mean annual soil temperature at the lithic contact is 47 to 59°F. The soil moisture control section is 4 to 18 inches. It is usually dry in all parts from early February to late November. The textural control section is all of the soil profile for pedons less than 14 inches deep, and 10 to 18 inches for pedons deeper than 14 inches. It is sandy loam, fine sandy loam, loam or sandy clay loam, with 4 to 22 percent clay and an average of 13 percent. Rock fragments are 15 to 40 percent gravel, 0 to 36 percent cobbles and 0 to 10 percent stones by volume, and average about 42 percent. Reaction is moderately alkaline (pH 8.0) throughout, and effervescence ranges from slight to violent.

Some pedons have C horizons.

The A horizon has dry color of 10YR 5/3, 6/3 or 6/4; moist color is 10YR 3/2, 3/3 or 4/3. It is sandy loam, fine sandy loam or loam, with 5 to 22 percent clay. Rock fragments are 15 to 40 percent gravel, 0 to 36 percent cobbles and 0 to 10 percent stones by volume.

Toeja Family

The Toeja family consists of moderately deep, well drained soils forming in colluvium and residuum from igneous rocks. These soils are on mountainsides, mountain tops and benches on mountainsides. Slope is 15 to 70 percent. Elevation is 6,600 to 9,400 feet. The mean annual precipitation is about 11 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Fine-loamy, mixed, frigid Aridic Argixerolls.

Typical Pedon: The representative profile for this soil is on a north-facing mountainside, under Singleleaf Pinyon Pine, Curlleaf Mountain Mahogany and Big Sagebrush, at an elevation of 8,380 feet. Slope is 25 percent. When described (9/30/80), the soil was dry in the upper 8 inches and slightly moist in the lower 14 inches. (Colors are for day soil, unless otherwise noted.)

O1 - 1 to 0 inch; organic mat made up of undecomposed pine needles, twigs and cones; abrupt broken boundary.

A11 - 0 to 2 inches; light brownish gray (10YR 6/2) very cobbly sandy loam, dark grayish brown (10YR 4/2) moist; weak very thick platy structure; soft, very friable, nonsticky and nonplastic; few very fine and common fine and medium roots; many very fine and fine interstitial, and common fine tubular pores; 25 percent gravel and 15 percent cobbles; moderately alkaline (pH 8.0); abrupt wavy boundary.

A12 - 2 to 8 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine, fine and medium roots; many very fine and fine interstitial pores; 15 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

A13 - 8 to 12 inches; light brownish gray (10YR 6/2) gravelly loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine, fine and medium roots; many very fine and fine interstitial pores; 20

percent gravel; moderately alkaline (pH 8.0); abrupt wavy boundary.

B2t - 12 to 22 inches; yellowish brown (10YR 5/4) gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist; strong fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine, medium and coarse roots; few very fine and fine interstitial, and common very fine and fine tubular pores; common thick and moderately thick clay films on ped faces and in pores; 30 percent gravel; moderately alkaline (pH 8.0); abrupt wavy boundary.

Cr - 22 inches, weathered rhyolite, which can be cut with a tile spade, but still retains its original rock structure.

The soil surface is covered with 25 percent gravel and 15 percent cobbles.

Type Location: About 3.9 miles east on Sugarloaf Road, from its intersection with Highway 395 at Montgomery Pass, and 265 feet north of the road; about 790 feet west, and 370 feet south of the northeast corner of Section 16, T.1N., R.33E., MDBM, Benton NE Quadrangle.

Range in Characteristics: Depth to the paralithic or lithic contact is 21 to 24 inches. The mean annual soil temperature at 20 inches is about 45°F., and the mean summer and mean winter temperatures differ by more than 9°F. The soil moisture control section is from 8 inches to the contact. It is usually dry in all parts from mid April to late September, and usually moist in some or all parts the rest of the year. The textural control section is the argillic horizon. It is loam or clay loam with 15 to 34 percent clay, and an average of 30 percent. Rock fragments range from 10 to 30 percent by volume, and average 18 percent.

Some pedons have transitional B1 horizons between the surface layer and argillic horizon.

The O horizon is 1 to 2 inches thick.

The A horizon has dry color of 10YR 5/2, 5/3 or 6/2; moist color is 10YR 3/2, 3/3, 4/2 or 4/3. It is sandy loam or loam with 4 to 9 percent clay. Rock fragments are 0 to 25 percent gravel, 0 to 30 percent cobbles and 0 to 20 percent stones by volume. Reaction is slightly acid to moderately alkaline (pH 6.4 to 8.0).

The B horizon has dry color of 10YR 4/3, 5/2, 5/4, 6/3, 6/4 or 7/4; moist color is 10YR 3/2, 3/3, 4/3, 4/4, 5/4

or 5/6. It is loam, sandy clay loam or clay loam, with 11 to 34 percent clay. Rock fragments are 0 to 30 percent gravel, 0 to 15 percent cobbles and 0 to 5 percent stones by volume. Reaction is neutral to moderately alkaline (pH 6.7 to 8.0).

The contact is lithic or paralithic rhyolite, andesite, basalt or slate.

Trocken Family

The Trocken family consists of moderately deep to deep, well drained soils forming in colluvium and alluvium from mixed rocks. These soils are on sideslopes of alluvial fans. Slope is 2 to 80 percent. Elevation is 3,800 to 8,000 feet. The mean annual precipitation is about 9 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Loamy-skeletal, mixed (calcareous), mesic Typic Torriorthents.

Typical Pedon: The representative profile for this soil is on a north-facing alluvial fan sideslope, under Big Sagebrush and Greenfire, at an elevation of 6,850 feet. Slope is 35 percent. When described (5/4/80), the soil was slightly moist throughout. (Colors are for dry soil unless otherwise noted.)

A11 - 0 to 3 inches; light brownish gray (10YR 6/2) very gravelly sandy loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many fine and common medium roots; many fine interstitial pores; slightly effervescent, disseminated lime; 35 percent gravel, 5 percent cobbles and 1 percent stones; moderately alkaline (pH 8.0); smooth gradual boundary.

A12 - 3 to 9 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common fine and medium roots; common fine interstitial pores; slightly effervescent, disseminated lime; 30 percent gravel, 10 percent cobbles and 1 percent stones; moderately alkaline (pH 8.0); smooth gradual boundary.

C1 - 9 to 60 inches; light yellowish brown (10YR 6/4) very gravelly sandy loam, yellowish brown (10YR 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; few medium roots; few fine interstitial pores; strongly effervescent, disseminated lime; 40 percent gravel, 15 percent cobbles and 2 percent stones; moderately alkaline (pH 8.0).

The soil surface is covered with 15 percent cobbles.

Type Location: About 9.25 miles east on Waucoba Road, from its intersection with Westgard Road, then about 0.95 mile south on jeep trail on the south side of the road, then about 300 feet upslope, on the east side of the jeep trail; about 900 feet west and 250 feet south of the northeast corner of the southeast quarter of Section 35, T.9S., R.35E., MDBM, Waucoba Mountain SE Quadrangle.

Range in Characteristics: Soil depth is 24 to greater than 60 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control section is 12 to 36 inches. It is usually dry in all parts from early February to late November. The textural control section is 10 to 40 inches. It is very coarse sandy loam, coarse sandy loam, sandy loam, fine sandy loam or loam, with 5 to 14 percent clay, and an average of about 9 percent. Rock fragments average about 44 percent by volume. Reaction is moderately alkaline (pH 8.0) throughout the soil profile.

The A horizon has dry color of 10YR 5/2, 6/2, 6/3 or 7/2, or 2.5Y 6/2 or 5Y 6/2; moist color is 10YR 3/2, 4/2, 5/2, or 4/3 or 2.5Y 5/2, or 5Y 4/2. It is sandy loam, fine sandy loam, coarse sandy loam or loamy sand, with 5 to 12 percent clay. Rock fragments are 20 to 50 percent gravel, 0 to 20 percent cobbles and 0 to 10 percent stones by volume. Effervescence is slight to violent.

The C horizon has dry color of 10YR 6/3, 6/4, 7/2 or 7/4, or 2.5Y 7/2, or 5Y 7/2 or 7/3; moist color is 10YR 4/3, 5/2, 5/3 or 5/4, or 2.5Y 5/2 or 5Y 5/3. It is very coarse sandy loam, coarse sandy loam, sandy loam or fine sandy loam, with 5 to 14 percent clay. Rock fragments are 25 to 60 percent gravel, 0 to 35 percent cobbles and 0 to 25 percent stones by volume. Effervescence is slight to violent, and some pedons have lime pendants on the undersides of rock fragments.

Tweedy Family

The Tweedy family consists of moderately deep, well drained soils forming in residuum from basalt. These soils are on basalt flow tops. Slope is 1 to 9 percent. Elevation is 7,000 to 8,000 feet. The mean annual precipitation is about 11 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Fine-loamy, mixed, mesic Typic Argixerolls.

Typical Pedon: The representative profile for this soil is on a bench top, under Juniper and Singleleaf Pinyon Pine, at an elevation of 7,220 feet. Slope is 2 percent. When described (9/12/78), the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A11 – 0 to 2 inches; grayish brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; many medium interstitial pores; 5 percent gravel; neutral (pH 6.7); clear smooth boundary.

A12 – 2 to 7 inches; grayish brown (10YR 5/2) sandy loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure, parting to weak fine granular; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; many medium interstitial pores; neutral (pH 6.7); gradual wavy boundary.

B1 – 7 to 11 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; weak medium and coarse subangular blocky structure, parting to weak very fine and fine subangular blocky; slightly hard, firm, slightly sticky and slightly plastic; few fine and medium roots; few very fine and fine tubular pores; neutral (pH 6.7); abrupt wavy boundary.

B2t – 11 to 21 inches; yellowish brown (10YR 5/4) gravelly clay loam, dark yellowish brown (10YR 4/4) moist; strong medium and coarse subangular blocky structure, parting to moderate fine and medium subangular blocky; hard, firm, sticky and plastic; few very fine roots; few very fine and fine tubular pores; many moderately thick clay films on ped faces and in pores; 20 percent gravel and 5 percent cobbles; neutral (pH 6.6); clear wavy boundary.

B3t – 21 to 32 inches; yellowish brown (10YR 5/4) gravelly sandy loam, brown (10YR 4/3) moist; strong medium subangular blocky structure, parting to weak very fine and fine subangular blocky; hard, friable, slightly sticky and slightly plastic; few very fine and fine tubular pores; common moderately thick clay films on ped faces, and common thin clay films in pores; 25 percent gravel; neutral (pH 6.7); gradual wavy boundary.

C1 – 32 to 38 inches; pale brown (10YR 6/3) very gravelly sand, brown (10YR 4/3) moist; massive; very hard, very firm, nonsticky and nonplastic; many very fine and few fine interstitial pores; 40 percent gravel; neutral (pH 6.7).

R – 38 inches; hard basalt.

The soil surface is covered with 5 percent gravel.

Type Location: About 22.2 miles northeast on Highway 167, from its intersection with Highway 395, then 5.2 miles south on dirt road, and 0.45 mile east of the road; the northwest corner of Section 26, T.3N., R.29E., MDBM, Trench Canyon SE Quadrangle.

Range in Characteristics: Depth to the lithic contact is 20 to 40 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control section is 8 to 18 inches. It is dry in all parts from early June to mid August, and moist in some or all parts the rest of the year. The textural control section is the argillic horizon. It is clay loam with 28 to 33 percent clay. Rock fragments are 25 percent by volume.

The A horizon has dry color of 10YR 5/2; moist color is 10YR 3/2 or 3/3. It is sandy loam with 2 to 4 percent clay. Rock fragments are 0 to 5 percent gravel by volume. Reaction is neutral (pH 6.7).

The B horizon has dry color of 10YR 5/3 or 5/4; moist color is 10YR 3/3, 4/3 or 4/4. It is sandy loam or clay loam, with 19 to 33 percent clay. Rock fragments are 0 to 25 percent gravel and 0 to 5 percent cobbles by volume. Reaction is neutral (pH 6.6 to 6.7).

The C horizon has dry color of 10YR 6/3; moist color is 10YR 4/3. It is sand with 2 percent clay. Rock fragments are 40 percent gravel by volume. Reaction is neutral (pH 6.7).

Typic Haplargids

These Typic Haplargids consist of moderately deep to deep, well drained soils forming in residuum from rhyolitic tuff. These soils are on mountainsides. Slope is 15 to 60 percent. Elevation is 7,100 to 9,600 feet. The mean annual precipitation is about 10 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Fine, montmorillonitic, frigid Typic Haplargids.

Reference Pedon: The representative profile for this soil is on a north-facing mountainside, under Singleleaf Pinyon Pine and Big Sagebrush, at an elevation of 7,680 feet. Slope is 35 percent. When described (11/4/80), the soil was moist or slightly moist in the 2 to 15 inch part, and dry in the rest of the profile. (Colors are for dry soil unless otherwise noted.)

A1 – 0 to 2 inches; variegated light reddish brown (5YR 6/3) and white (5YR 8/1) very gravelly clay loam, brown (10YR 5/3) and pinkish gray (5YR 7/2) moist; weak very fine and fine subangular blocky structure; soft, very friable, sticky and plastic; few very fine roots; few very fine and fine interstitial, and common very fine tubular pores; 40 percent gravel and 10 percent cobbles; mildly alkaline (pH 7.8); clear wavy boundary.

B21t – 2 to 9 inches; light reddish brown (5YR 6/4) clay, reddish brown (5YR 4/4) moist; moderate medium prismatic structure, parting to strong medium and coarse subangular blocky; hard, firm, very sticky and very plastic; common very fine, fine and medium roots; few very fine tubular pores; common pressure faces; slightly effervescent, disseminated lime; 10 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

B22t – 9 to 15 inches; light reddish brown (5YR 6/4) clay, reddish brown (5YR 5/4) moist; moderate medium prismatic structure; hard, firm, very sticky and very plastic; few very fine and fine and common medium roots; few very fine tubular pores; common pressure faces; strongly effervescent, disseminated lime; moderately alkaline (pH 8.0); clear irregular boundary.

C1ca – 15 to 23 inches; brown (7.5YR 5/4) loam, dark reddish brown (5YR 3/4) moist; massive; slightly hard, very friable, sticky and plastic; few very fine and fine and common medium roots; common

very fine and fine interstitial, and few very fine tubular pores; violently effervescent lime in common irregular concretions; moderately alkaline (pH 8.2); clear wavy boundary.

C2ca – 23 to 43 inches; variegated pinkish gray (7.5YR 6/2) and white (N8/) very gravelly loam, brown (7.5YR 5/2) and pinkish white (7.5YR 8/2) moist; massive; hard, very friable, slightly sticky and slightly plastic; few very fine, fine and medium roots; many very fine and fine interstitial pores; violently effervescent lime in common irregular concretions; 50 percent gravel; moderately alkaline (pH 8.2); abrupt wavy boundary.

Cr – 43 inches; rhyolite tuff, which can be cut with a knife, but retains its original rock structure.

The surface is covered with 40 percent gravel and 10 percent cobbles.

Type Location: About 10.6 miles west on Trail Canyon Road, from its intersection with Nevada Highway 3A, on the south shoulder of the road; about 330 feet east and 0.4 mile south of the northwest corner of Section 6, T.1S., R.34E., MDBM, Davis Mountain NW Quadrangle.

Range in Characteristics: Soil depth is 22 to 60 inches. The mean annual soil temperature at 20 inches is about 45°F., and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is 7 to 20 inches. It is usually dry in all parts from early April to mid October, and moist in some or all parts the rest of the year. The control section is the argillic horizon. It is clay loam, sandy clay or clay with an average of 35 to 45 percent clay. Rock fragments are 0 to 10 percent gravel and 0 to 5 percent cobbles.

Some pedons lack secondary carbonates and lime concretions. Some pedons have a transitional B1 horizon.

The A horizon has dry color of 5YR 6/3 or 8/1, or 10YR 5/3; moist color is 10YR 3/2, 3/3 or 5/3, or 5YR 7/2. It is coarse sandy loam, sandy loam or clay loam with 8 to 30 percent clay. Rock fragments are 5 to 40 percent gravel and 0 to 10 percent cobbles by volume. Reaction is mildly alkaline (pH 7.5 to 7.8).

The Bt horizon has dry color of 5YR 6/4, 10YR 5/4 or 2.5Y 5/4; moist color is 5YR 4/4 or 5/4, or 10YR 4/3, 4/4 or 5/3. It is clay loam, sandy clay or clay with 30 to 45 percent clay. Rock fragments are 0 to 10 percent gravel and 0 to 5 percent cobbles by volume. Effervescence is none to strong. Reaction is mildly to moderately alkaline (pH 7.8 to 8.1).

7.5YR 5/4 or 6/2, or N8/; moist color is 10YR 3/3 or 5/6, or 5YR 3/4, or 7.5YR 5/2 or 8/2. It is loam or sandy clay loam with 10 to 35 percent clay. Rock fragments are 0 to 50 percent gravel and 0 to 10 percent cobbles by volume. Effervescence is none to violent. Reaction is mildly to moderately alkaline (pH 7.5 to 8.2).

The C horizon has dry color of 10YR 5/4 or 5/6, or

Typic Xerorthents

These Typic Xerorthents consist of deep, well drained soils forming in alluvium from mixed rocks. These soils are in depressions. Slope is 2 to 15 percent. Elevation is 6,700 to 7,800 feet. The mean annual precipitation is about 8 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Coarse-loamy, mixed, nonacid, mesic Typic Xerorthents.

Reference Pedon: The representative profile for this soil is in an alluvial depression, under Saltgrass and Rabbitbrush, at an elevation of 7,200 feet. Slope is 2 percent. When described (9/12/78), the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A11 - 0 to 1 inch; light brownish gray (10YR 6/2) gravelly sand, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; many medium interstitial pores; 15 percent gravel; slightly acid (pH 6.4); clear wavy boundary.

A12 - 1 to 4 inches; light brownish gray (10YR 6/2) loamy sand, brown (10YR 4/3) moist; weak very fine subangular blocky structure, parting to weak very fine granular; soft, very friable, nonsticky and nonplastic; common very fine and few fine roots; common medium interstitial pores; 10 percent gravel; slightly acid (pH 6.4); clear wavy boundary.

C1 - 4 to 12 inches; light brownish gray (10YR 6/2) loamy sand, brown (10YR 4/3) moist; weak medium and coarse subangular blocky structure, parting to weak very fine and fine subangular blocky; soft, very friable, nonsticky and nonplastic; common very fine roots; few medium interstitial pores; 5 percent gravel; neutral (pH 6.7); gradual wavy boundary.

C2 - 12 to 24 inches; pale brown (10YR 6/3) gravelly sandy loam, brown (10YR 4/3) moist; weak medium and coarse subangular blocky structure, parting to weak fine subangular blocky; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; few very fine tubular pores; 15 percent gravel; neutral (pH 7.0); gradual smooth boundary.

C3 - 24 to 36 inches; pale brown (10YR 6/3) gravelly sandy loam, brown (10YR 4/3) moist; moderate medium and coarse subangular blocky structure, parting to moderate very fine and fine subangular blocky; hard, very friable, nonsticky and nonplastic; few very fine roots; many medium interstitial and tubular pores; 20 percent gravel; neutral (pH 6.8); clear wavy boundary.

C4 - 36 to 60 inches; pale brown (10YR 6/3) very cobbly loamy sand, brown (10YR 4/3) moist; massive; hard, very friable, nonsticky and nonplastic; many medium interstitial pores; 30 percent gravel and 20 percent cobbles; neutral (pH 6.6).

The soil surface is covered with 15 percent gravel.

Type Location: About 16.5 miles northeast on Highway 167, from its intersection with Highway 395, then 9.6 miles southeast on dirt road, then 0.75 mile east on the east fork of the dirt road, and 0.2 mile south of the road; the apparent center of Section 14, T.2N., R.29E., MDBM, Huntoon Valley SW Quadrangle.

Range in Characteristics: Soil depth is greater than 60 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control section is 12 to 42 inches. It is dry in all parts from June 1 to mid August, and moist in some or all parts the rest of the year. The textural control section is 10 to 40 inches. It is loamy sand or sandy loam with 2 to 3 percent clay. Rock fragments are 5 to 30 percent gravel and 0 to 20 percent cobbles by volume, and average 21 percent.

The A horizon has dry color of 10YR 6/2; moist color is 10YR 4/2 or 4/3. It is sand or loamy sand with 1 to 2 percent clay. Rock fragments are 10 to 15 percent gravel by volume. Reaction is slightly acid (pH 6.4).

The C horizon has dry color of 10YR 6/2 or 6/3; moist color is 10YR 4/3. It is loamy sand or sandy loam with 2 to 3 percent clay. Rock fragments are 5 to 30 percent gravel and 0 to 20 percent cobbles by volume. Reaction is neutral (pH 6.6 to 7.0).

Unionville Family

The Unionville family consists of moderately deep and deep, well drained soils forming in alluvium from mixed sedimentary rocks or in colluvium from basalt. These soils are on alluvial fans, valley bottoms and basalt flows. Slope is 3 to 30 percent. Elevation is 6,000 to 8,000 feet. The mean annual precipitation is about 11 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Coarse-loamy, mixed, mesic Typic Camborthids.

Typical Pedon: The representative profile for this soil is on a northwest-facing alluvial fan, under Juniper and Big Sagebrush, at an elevation of 7,280 feet. When described (5/3/80), the soil was moist in the upper 38 inches and dry in the rest of the profile. (Colors are for dry soil unless otherwise noted).

- A1 – 0 to 4 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; weak thin platy structure; soft, very friable, nonsticky and nonplastic; common fine and few medium roots; common fine vesicular pores; 15 percent gravel; moderately alkaline (pH 8.0); clear smooth boundary.
- B2 – 4 to 26 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, friable, nonsticky and nonplastic; few fine and medium roots; common fine interstitial pores; slightly effervescent, disseminated lime; 10 percent gravel; moderately alkaline (pH 8.0); gradual smooth boundary.
- B3ca – 26 to 38 inches; pale brown (10YR 6/3) gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, friable, nonsticky and nonplastic; few medium roots; common fine interstitial pores; violently effervescent, disseminated lime; 20 percent gravel; moderately alkaline (pH 8.0); clear smooth boundary.
- C1ca – 38 to 60 inches; light yellowish brown (10YR 6/4) gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; hard, friable, nonsticky and nonplastic; few fine intersitital pores; violently effervescent, disseminated lime; 32 percent gravel and 2 percent cobbles; moderately alkaline (pH 8.0).

The surface is covered by 2 percent cobbles.

Type Location: About 9.25 miles east on Waucoba Road, from its intersection with Westgard Road, then about 4.2 miles south on a jeep trail on the south side of the road, staying on the westerly forks of the trail, then about 50 feet east of the jeep trail, in the southwest end of Harkless Flat; about 0.3 mile west and 0.35 mile south of the northeast corner of Section 9, T.10S., R.35E., MDBM, Waucoba Mountain SW Quadrangle.

Range in Characteristics: Soil depth is 35 to 60 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control section is 9 to 26 inches. It is usually dry in all parts from early April to mid October. Effervescence ranges from noneffervescent to violently effervescent. The control section is sandy loam with 4 to 16 percent clay, and an average of 12 percent. Rock fragments range from 5 to 17 percent, and average about 14 percent.

Some pedons do not have B3ca horizons.

The A horizon has dry color of 10YR 5/3 or 7.5YR 5/2; moist color is 10YR 3/3 or 4/3, or 7.5YR 3/2. It is sandy loam with 4 to 10 percent clay. Rock fragments are 10 to 33 percent gravel and 0 to 12 percent cobbles by volume. It is noneffervescent to slightly effervescent. Reaction is slightly acid to moderately alkaline (pH 6.4 to 8.0).

The B2 horizon has dry color of 10YR 6/3 or 7.5YR 5/3; moist color is 10YR 4/3 or 4/4, or 5YR 3/4. It is sandy loam with 9 to 16 percent clay. Rock fragments are 10 to 20 percent gravel by volume. Effervescence is none to slight. Reaction is neutral to moderately alkaline (pH 6.7 to 8.0).

The B3ca horizon has dry color of 10YR 6/3 or 6/4; moist color is 10YR 4/4. It is sandy loam with 15 to 20 percent gravel and 2 percent cobbles. Clay content is 10 to 14 percent. It is strongly to violently effervescent. Reaction is moderately alkaline (pH 8.0).

The C1ca horizon has dry color of 10YR 6/4 or 7/4, or 7.5YR 5/4, or 5YR 5/3; moist color is 10YR 4/4 or 5/4, or 5YR 3/3, or 2.5YR 3/4. It is sandy loam with 3 to 10 percent clay. Rock fragments are 0 to 32 percent gravel and 0 to 5 percent stones by volume. Effervescence is none to violent and reaction is neutral to moderately alkaline (pH 6.6 to 8.0).

Vipont Family

The Vipont family consists of deep, well drained soils forming in colluvium from andesite and rhyolite. These soils are on mountainsides. Slope is 60 to 70 percent. Elevation is 8,000 to 9,900 feet. The mean annual precipitation is about 10 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Loamy-skeletal, mixed, frigid Pachic Argixerolls.

Typical Pedon: The representative profile for this soil is on a north-facing mountainside, under Big Sagebrush, Ephedra and Bluegrass, at an elevation of 8,800 feet. Slope is 65 percent. When described (9/26/80), the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A11 - 0 to 6 inches; grayish brown (10YR 5/2) extremely cobbly loamy sand, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine interstitial pores; 11 percent gravel, 50 percent cobbles and 20 percent stones; moderately alkaline (pH 8.0); clear wavy boundary.

A12 - 6 to 12 inches; brown (10YR 5/3) cobbly sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine, fine, medium and coarse roots; many very fine and fine interstitial pores; 5 percent gravel and 15 percent cobbles; moderately alkaline (pH 8.0); gradual wavy boundary.

A13 - 12 to 17 inches; grayish brown (10YR 5/2) very cobbly sandy loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine, fine and medium roots; many very fine and fine interstitial pores; 10 percent gravel and 40 percent cobbles; moderately alkaline (pH 8.0); clear wavy boundary.

B1 - 17 to 24 inches; brown (10YR 5/3) very cobbly sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common fine, medium and coarse roots; common very fine and fine interstitial, and few very fine and fine tubular pores; 15 percent gravel and 40 percent cobbles; moderately alkaline (pH 8.0); clear wavy boundary.

B2t - 24 to 35 inches; light yellowish brown (10YR 6/4) very gravelly clay loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine and common medium and coarse roots; few very fine and fine interstitial, and common very fine and fine tubular pores; few thin and moderately thick clay films bridging mineral sand grains and in pores; 40 percent gravel and 10 percent cobbles; moderately alkaline (pH 8.0); clear wavy boundary.

C1 - 35 to 48 inches; light yellowish brown (10YR 6/4) extremely cobbly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and few medium and coarse roots; many very fine and fine interstitial pores; violently effervescent, secondary lime coatings on the undersides of 25 percent of the rock fragments; 20 percent gravel and 65 percent cobbles; moderately alkaline (pH 8.0); clear wavy boundary.

C2 - 48 to 60 inches; pale brown (10YR 6/3) extremely cobbly sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few fine, medium and coarse roots; many very fine and fine interstitial pores; violently effervescent, secondary lime coatings on the undersides of 25 percent of the rock fragments; 30 percent gravel, 30 percent cobbles and 15 percent stones; moderately alkaline (pH 8.0).

The soil surface is covered with 10 percent gravel, 45 percent cobbles and 15 percent stones.

Type Location: About 5.45 miles east on Sugarloaf Road, from its intersection with Highway 395, at Montgomery Pass, and 0.3 mile east of the road; about 800 feet east and 425 feet south of the apparent center of Section 21, T.1N., R.33E., MDBM, Benton NE Quadrangle.

Range in Characteristics: Soil depth is greater than 60 inches. The mean annual soil temperature at 20 inches is about 45°F., and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is 8 to 36 inches. It is dry in all parts from early June to mid August, and moist in some or all parts the rest of the year. The textural control section is the argillic horizon. It is clay loam with 33 percent clay. Rock fragments average 50 percent

by volume. The soil is moderately alkaline (pH 8.0) throughout. Depth to secondary lime accumulations is 35 inches.

The A horizon has dry color of 10YR 5/2 or 5/3; moist color is 10YR 3/2. It is loamy sand or sandy loam with 2 to 7 percent clay. Rock fragments are 5 to 11 percent gravel, 15 to 50 percent cobbles and 0 to 20 percent stones by volume.

The B horizon has dry color of 10YR 6/4; moist color is 10YR 4/4. It is clay loam with 30 to 35 percent clay. Rock fragments are 40 percent gravel and 10 percent cobbles by volume.

The C horizon has dry color of 10YR 6/3 or 6/4; moist color is 10YR 4/3 or 4/4. It is sandy loam with 7 percent clay. Rock fragments are 20 to 30 percent gravel, 30 to 65 percent cobbles and 0 to 10 percent stones by volume.

Washoe Family

The Washoe family consists of moderately deep to deep, well drained soils forming in colluvium and residuum from rhyolite, siltstone and shale. These soils are on mountainsides and older stabilized alluvial fans. Slope is 3 to 60 percent. Elevation is 5,500 to 8,500 feet. The mean annual precipitation is about 9 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Loamy - skeletal, mixed, mesic Xerollic Haplargids.

Typical Pedon: The representative profile for this soil is on a southwest-facing mountainside, under Singleleaf Pinyon Pine and Big Sagebrush, at an elevation of 7,870 feet. Slope is 50 percent. When described (11/6/80), the soils was slightly moist from 4 to 19 inches and dry in the rest of the profile. (Colors are for dry soil unless otherwise noted.)

A1 - 0 to 4 inches; light brownish gray (10YR 6/2) very gravelly sandy loam, dark grayish brown (10YR 4/2) moist; weak very thin platy structure, parting to granular; soft, very friable, nonsticky and nonplastic; common very fine and few fine roots; many very fine and fine interstitial pores; 50 percent gravel; neutral (pH 7.0); clear wavy boundary.

B21t - 4 to 7 inches; light brown (7.5YR 6/4) very gravelly clay loam, brown (7.5YR 4/4) moist; massive; hard, friable, very sticky and plastic; few very fine and fine, and common medium and coarse roots; few very fine interstitial and common very fine and fine tubular pores; common thin and moderately thick clay films lining pores and on clod faces; 30 percent gravel and 10 percent cobbles; neutral (pH 7.0); clear wavy boundary.

B22t - 7 to 19 inches; light brown (7.5YR 6/4) very gravelly sandy clay loam, brown (7.5YR 4/4) moist; massive; slightly hard, very friable, sticky and plastic; few fine and medium roots; common very fine and fine interstitial and common very fine and fine tubular pores; common thin and moderately thick clay films lining pores and on clod faces; 50 percent gravel and 10 percent cobbles; neutral (pH 7.0); clear wavy boundary.

C1ca - 19 to 28 inches; light yellowish brown (10YR 6/4) extremely gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and

fine interstitial pores; strongly effervescent, disseminated lime; 55 percent gravel and 15 percent cobbles; moderately alkaline (pH 8.0); gradual wavy boundary.

C2ca - 28 to 60 inches; light yellowish brown (10YR 6/4) extremely gravelly loamy sand, dark yellowish brown (10YR 4/4) moist; massive, soft, very friable, nonsticky and nonplastic; many very fine and fine interstitial pores; violently effervescent, disseminated lime; 60 percent gravel and 20 percent cobbles; moderately alkaline (pH 8.0).

The surface is covered with 80 percent gravel and 10 percent cobbles.

Type Location: About 7.0 miles west on Middle Creek Road, from its intersection with the Nevada Highway 3A, then about 3.35 miles north on Trail Canyon Fork, and about 225 feet upslope, on the north side of the road; about 0.15 mile east and 0.15 mile north of the southwest corner of Section 1, T.1S., R.33E., MDBM, Benton NE Quadrangle.

Range in Characteristics: Soil depth is 23' to greater than 60 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control section is 7 to 20 inches. It is usually dry in all parts from early April to mid October. The textural control section includes all of the argillic. It is coarse sandy loam, loam, sandy clay loam or clay loam with 17 to 35 percent clay, and an average of 27 percent. Rock fragments are 30 to 53 percent gravel, 0 to 15 percent cobbles and 0 to 15 percent stones by volume, and average 53 percent.

Some pedons have B1, B1t, B3 or B3t transitional horizons. Some pedons lack C horizons.

The A horizon has dry color of 10YR 5/3, 6/2 or 6/3; moist color is 10YR 3/3, 4/2 or 4/3. It is sandy loam or loam with 6 to 20 percent clay. Rock fragments are 5 to 50 percent gravel, 0 to 5 percent cobbles and 0 to 5 percent stones by volume. Reaction is neutral to moderately alkaline (pH 7.0 to 8.0).

The Bt horizon has dry color of 10YR 5/3, 5/4 or 6/4, or 7.5YR 6/4, 6/6 or 7/4; moist color is 10YR 3/3, 4/3, 4/4, 5/3 or 5/4, or 7.5YR 4/4, or 5YR 4/6. It is coarse sandy loam, loam, sandy clay loam or clay loam with 17 to 35 percent clay. Rock fragments are 25 to 55 percent gravel, 0 to 15 percent cobbles and 0 to 15 percent stones

by volume. Reaction is slightly acid to mildly alkaline (pH 6.5 to 7.6).

The Cca horizon has dry color of 10YR 6/3, 6/4, 7/2 or 7/3; moist color is 10YR 4/4, 5/3 or 5/4. It is

coarse sand, loamy sand, coarse sandy loam or sandy loam, with 2 to 10 percent clay. Rock fragments are 40 to 60 percent gravel, 5 to 30 percent cobbles and 0 to 10 percent stones by volume. Effervescence is noneffervescent to violently effervescent. Reaction is moderately alkaline (pH 8.0).

Wenzel Family

The Wenzel family consists of moderately deep, well drained soils forming in colluvium from siltstone and shale. These soils are on mountainsides. Slope is 30 to 60 percent. Elevation is 7,400 to 10,000 feet. The mean annual precipitation is about 11 inches and the mean annual temperature is about 44°F.

Taxonomic Class: Clayey-skeletal, mixed, frigid Typic Argixerolls.

Typical Pedon: The representative profile for this soil is on a southwest-facing mountainside, under Curlleaf Mountain Mahogany and Big Sagebrush, at an elevation of 9,520 feet. Slope is 60 percent. When described (7/29/80), the soil was dry in the upper 4 inches and slightly moist throughout the rest of the profile. (Colors are for dry soil unless otherwise noted.)

A1 - 0 to 4 inches; grayish brown (10YR 5/2) gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; common very fine, fine and medium interstitial pores; 30 percent gravel; moderately alkaline (pH 8.2); abrupt smooth boundary.

B1 - 4 to 7 inches; brown (10YR 5/3) very gravelly clay loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; soft, very friable, sticky and plastic; common very fine, fine and medium roots; many very fine and fine interstitial pores; 50 percent gravel; moderately alkaline (pH 8.0); abrupt wavy boundary.

B21t - 7 to 12 inches; yellowish brown (10YR 5/4) very gravelly clay loam, dark yellowish brown (10YR 3/4) moist; strong fine and medium angular blocky structure; hard, friable, sticky and plastic; few very fine, fine and medium roots; few very fine and fine interstitial, and common very fine and fine tubular pores; many moderately thick clay films on ped faces and in pores; 4 percent soft gypsum masses, 1 to 2 millimeters in size; 45 percent gravel; mildly alkaline (pH 7.8); gradual wavy boundary.

B22t - 12 to 29 inches; brown (7.5YR 5/4) very gravelly

clay, dark brown (7.5YR 4/4) moist; strong fine and medium angular blocky structure; hard, friable, very sticky and very plastic; few very fine, fine, medium and coarse roots; few very fine and fine interstitial, and few fine tubular pores; many thick clay films on ped faces and in pores; 4 percent soft gypsum masses, 1 to 2 millimeters in size; 35 percent gravel; mildly alkaline (pH 7.8); abrupt wavy boundary.

R - 29 inches; hard, fractured siltstone.

The soil surface is covered with 25 percent gravel, 20 percent cobbles and 5 percent stones.

Type Location: About 5.35 miles east, on the North Fork Crooked Creek Road, from its intersection with the Ancient Bristlecone Road, and about 780 feet upslope, on the north side of the road; about 265 feet east and 1,215 feet north of the southwest corner of Section 24, T.5S., R.35E., MDBM, Blanco Mountain NE Quadrangle.

Range in Characteristics: Depth to the lithic contact is 20 to 30 inches. The mean annual soil temperature at 20 inches is about 45°F., and the mean summer and mean winter soil temperatures differ by more than 9°F. The soil moisture control section is 7 to 28 inches. It is dry in all parts from early June to mid August, and moist in some or all parts the rest of the year. The textural control section is the argillic horizon. It is clay loam or clay, with 30 to 43 percent clay and an average of about 40 percent. Rock fragments are 35 to 45 percent by volume and average about 38 percent.

The A horizon has dry color of 10YR 5/2 or 5/3; moist color is 10YR 3/2 or 3/3. It is sandy loam or fine sandy loam with 9 to 18 percent clay. Rock fragments are 20 to 30 percent gravel and 0 to 5 percent cobbles by volume. Reaction is moderately alkaline (pH 8.0 to 8.2).

The B horizon has dry color of 10YR 5/4, or 7.5YR 5/4 or 7/6; moist color is 10YR 3/4, or 7.5YR 4/4 or 5/6. It is clay loam or clay with 30 to 43 percent clay. Rock fragments are 35 to 40 percent gravel and 0 to 5 percent cobbles by volume. Reaction is mildly to moderately alkaline (pH 7.8 to 8.0).

Wrango Family

The Wrango family consists of deep, well drained soils forming in alluvium from mixed rocks. These soils are on dissected alluvial fans and terraces. Slope is 3 to 15 percent. Elevation is 5,000 to 8,500 feet. The mean annual precipitation is about 7 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Sandy-skeletal, mixed, mesic Xeric Torriorthents.

Typical Pedon: The representative profile for this soil is on an east-facing dissected alluvial terrace, under Big Sagebrush, Nevada Ephedra and Needlegrass, at an elevation of 7,480 feet. Slope is 8 percent. When described (7/15/81), the soil was dry throughout. (Colors are for dry soil unless otherwise noted.)

A1 – 0 to 3 inches; light brownish gray (10YR 6/2) gravelly loamy sand, dark grayish brown (10YR 4/2) moist; weak thin and medium platy structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; common very fine and fine interstitial pores; 19 percent gravel; mildly alkaline (pH 7.8); clear smooth boundary.

C1 – 3 to 17 inches; brown (10YR 5/3) gravelly loamy sand, brown (10YR 4/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine and fine roots; common very fine and fine interstitial pores; 15 percent gravel and 3 percent cobbles; mildly alkaline (pH 7.8); clear wavy boundary.

C2 – 17 to 39 inches; pale brown (10YR 6/3) extremely gravelly loamy sand, brown (10YR 4/3) moist; massive; very hard, firm, nonsticky and nonplastic; common very fine and fine, and few medium roots; common very fine interstitial pores; 55 percent gravel and 18 percent stones; mildly alkaline (pH 7.8); gradual wavy boundary.

C3 – 39 to 50 inches; very pale brown (10YR 7/3) very gravelly loamy sand, brown (10YR 5/3) moist; massive; hard, firm, nonsticky and nonplastic; common very fine and few fine roots; common very fine interstitial pores; 35 percent gravel and 3 percent stones; mildly alkaline (pH 7.4); clear wavy boundary.

C4ca – 50 to 60 inches; pale brown (10YR 6/3) gravelly loamy sand, dark brown (10YR 3/3) moist; massive; hard, firm, nonsticky and nonplastic; common very fine interstitial pores; strongly effervescent, disseminated lime; 25 percent gravel; moderately alkaline (pH 8.4).

The soil surface is covered with 40 percent gravel.

Type Location: About 7.2 miles west on Trail Canyon Road, from its intersection with Nevada Highway 3A, then about 1.5 miles west on Middle Canyon Road, and 130 feet north of the road; about 175 feet east and 0.5 mile south of the northwest corner of Section 19, T.1S., R.34E., MDBM, Davis Mountain SW Quadrangle.

Range in Characteristics: Soil depth is greater than 60 inches. The mean annual soil temperature at 20 inches is 47 to 59°F. The soil moisture control section is 12 to 52 inches. It is usually dry in all parts from early April to mid October. The textural control section is 10 to 40 inches. It is loamy coarse sand, loamy sand, coarse sandy loam or sandy loam, with 2 to 8 percent clay, and an average texture of loamy sand. Rock fragments are 18 to 90 percent by volume and average about 63 percent. Depth to calcium carbonates is 11 to 50 inches.

The A horizon has dry color of 10YR 5/3, 6/2, 6/3 or 7/3; moist color is 10YR 3/2, 3/3, 4/2 or 4/3. It is loamy sand with 3 to 7 percent clay. Rock fragments are 5 to 33 percent gravel and 0 to 5 percent cobbles by volume. Reaction is slightly acid to moderately alkaline (pH 6.5 to 8.0).

The C horizon has dry color of 10YR 4/3, 5/3, 6/3, 6/4, 7/3, 7/4 or 8/1, or 7.5YR 6/4, or 5YR 6/6; moist color is 10YR 3/3, 4/3, 4/4, 5/3 or 5/4, or 7.5YR 5/4, or 5YR 5/6. It is loamy coarse sand, loamy sand, coarse sandy loam or sandy loam with 2 to 11 percent clay. Rock fragments are 15 to 60 percent gravel, 0 to 25 percent cobbles and 0 to 25 percent stones by volume. Effervescence is none to strong. Reaction is neutral to moderately alkaline (pH 7.0 to 8.4).

Yuko Family

The Yuko family consists of shallow, moderately well drained soils forming in residuum from granodiorite and granite. These soils are on mountainsides. Slope is 15 to 80 percent. Elevation is 4,700 to 8,200 feet. The mean annual precipitation is about 8 inches and the mean annual temperature is about 48°F.

Taxonomic Class: Loamy, mixed, mesic, shallow Xerollic Haplargids.

Typical Pedon: The representative profile for this soil is on a south-facing mountainside, under Big Sagebrush and Ephedra, at an elevation of 7,500 feet. Slope is 25 percent. When described (4/28/80), the soil was slightly moist from 4 to 7 inches and dry in the rest of the profile. (Colors are for dry soil unless otherwise noted.)

A1 – 0 to 4 inches; brown (10YR 5/3) very gravelly sandy loam, dark brown (10YR 3/3) moist; single grain; soft, very friable, nonsticky and nonplastic; few fine roots; many very fine and fine interstitial pores; 40 percent gravel; moderately alkaline (pH 8.0); clear smooth boundary.

B2t – 4 to 7 inches; yellowish brown (10YR 5/4) gravelly sandy clay loam, brown (10YR 4/3) moist; moderate medium subangular block structure; slightly hard, very friable, sticky and slightly plastic; common fine and very fine roots; few fine tubular pores; common thin clay films on ped faces; 20 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

B3t – 7 to 10 inches; brown (7.5YR 5/4) gravelly sandy loam, dark brown (7.5YR 4/4) moist; massive; slightly hard, very friable, slightly sticky and nonplastic; few fine roots; common very fine and fine interstitial pores; common moderately thick clay films bridging mineral grains; 30 percent gravel; moderately alkaline (pH 8.0); clear irregular boundary.

Cr – 10 inches; degraded granodiorite.

The surface is covered with 15 percent cobbles and 10 percent stones.

Type Location: About 370 feet west and 1,950 feet north of the southeast corner of Section 34, T.11S., R.35E., MDBM, Independence NW Quadrangle.

Range in Characteristics: Depth to the paralithic contact is 10 to 18 inches. The mean annual soil temperature at the contact is 47 to 59°F. The soil moisture control section is 5 to 10 inches. It is usually dry in all parts from early April to mid October. The control section includes all of the soil profile for those pedons 14 inches deep or shallower, or the entire argillic horizon for those pedons deeper than 14 inches. It is sandy loam, fine sandy loam, sandy clay loam or clay loam with 19 to 34 percent clay by weight, and an average of 26 percent. Rock fragments are 0 to 40 percent gravel and average 20 percent gravel by volume. Reaction for the profile is mildly to moderately alkaline (pH 7.6 to 8.0).

Some pedons lack a B3t horizon or have a C1 horizon.

The A horizon has dry color of 10YR 5/2 or 5/3; moist color is 10YR 3/2, 3/3 or 4/2. It is sandy loam, fine sandy loam or loam with 9 to 17 percent clay, and 0 to 40 percent gravel by volume. Reaction is mildly to moderately alkaline (pH 7.8 to 8.0).

The B2t horizon has dry color of 10YR 5/3 or 5/4, or 7.5YR 5/4; moist color is 10YR 4/3 or 4/4. It is sandy clay loam or clay loam with 25 to 34 percent clay by weight, and 0 to 20 percent gravel by volume. Reaction is mildly to moderately alkaline (pH 7.6 to 8.0).

The Cr horizon is degraded granodiorite, highly weathered granite or highly weathered adamellite.

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Table 7. -- Key for Soil Identification

Soils of the Alluvial Plains -- Moderate and Cool Soil Temperatures (MESIC and FRIGID)	Parent Material						Soil Depth			Diagnostic Horizons						Particle-size Class								Drainage Class			
	Limestone rock	Granitic rock	Mixed rock	Sedimentary rock	Metasedimentary rock	Volcanic rock	0 to 20 inches	20 to 40 inches	More than 40 inches	Epipedon			Subsoil			Sandy-skeletal	Loamy-skeletal	Sandy	Loamy	Coarse-loamy	Fine-loamy	Clayey-skeletal	Clayey	Fine	Well	Somewhat Excessive	Excessive
										Mollic	Pachic	Ochric	None	Cambic	Argillic												
SOIL NAME																											
Berent family			x					x				x	x					x							x		
Bluewing family			x					x				x				x									x		
Durargidic Argixerolls		x						x		x					x					x					x		
Gol family		x					x					x			x				x						x		
Mackey family			x					x				x		x			x								x		
Preston family			x					x				x	x					x									x
Spanel family			x					x				x			x				x						x		
Trocken family			x				x	x				x	x				x								x		
Typic Xerorthents			x					x				x	x							x					x		
Unionville family			x				x	x				x		x						x					x		
Wrango family			x					x				x	x			x									x		

Table 7. -- Key for Soil Identification (Continued)

Soils of the Temperate Uplands -- Moderate and Cool Soil Temperatures (MESIC, FRIGID and CRYIC)	Parent Material						Soil Depth			Diagnostic Horizons						Particle-size Class							Drainage Class				
	Limestone rock	Granitic rock	Mixed rock	Sedimentary rock	Metasedimentary rock	Volcanic rock	0 to 20 inches	20 to 40 inches	More than 40 inches	Epipedon			Subsoil			Sandy-skeletal	Loamy-skeletal	Sandy	Loamy	Coarse-loamy	Fine-loamy	Clayey-skeletal	Clayey	Fine	Well	Somewhat Excessive	Excessive
										Mollic	Pachic	Ochric	None	Cambic	Argillic												
SOIL NAME																											
Abgese family		x				x		x					x						x						x		
Bearskin family					x	x	x			x				x			x								x		
Berning family						x		x				x									x				x		
Beveridge family	x						x					x	x			x									x		
Credo family						x		x	x				x							x					x		
Hymas family	x						x				x		x												x		
Lithic Camborthids					x		x						x			x									x		
Merlin family						x	x				x												x			x	
Risue family						x	x						x										x			x	
Sanpete family	x							x					x													x	
Simpson family						x		x			x															x	
St. Marys family						x		x			x			x												x	
Swift Creek family	x							x					x	x												x	
Theriot family	x						x							x	x											x	
Toeja family						x		x			x										x					x	
Tweedy family						x		x			x										x					x	
Wenzel family					x			x			x												x			x	

Table 7. -- Key for Soil Identification (Continued)

SOIL NAME	Parent Material						Soil Depth			Diagnostic Horizons						Particle-size Class							Drainage Class				
	Limestone rock	Granitic rock	Mixed rock	Sedimentary rock	Metasedimentary rock	Volcanic rock	0 to 20 inches	20 to 40 inches	More than 40 inches	Epihedon			Subsoil			Sandy-skeletal	Loamy-skeletal	Sandy	Loamy	Coarse-loamy	Fine-loamy	Clayey-skeletal	Clayey	Fine	Well	Somewhat Excessive	Excessive
										Mollic	Pachic	Ochric	None	Cambic	Argillic												
Soils of the Cold Uplands -- Cold Soil Temperatures (Cryic and Pergelic)																											
Bartine family	x							x	x						x										x		
Pergelic Cryoborolls		x					x	x	x						x										x		
Soakpak family		x					x	x			x				x										x		
Supervisor family				x			x	x	x			x			x										x		

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Glossary

- Adamellite.** A phaneritic rock containing major plagioclase, orthoclase and quartz, with minor amounts of biotite and hornblende.
- Alkaline Soil.** Any soil having a pH higher than 7.0.
See **Reaction, soil**.
- Alluvial depressions.** Low-lying areas subject to alluvial deposition. These include playas, basins, stream valleys, washes and other drainages.
- Alluvial fan.** A sloping, fan-shaped mass of sediment deposited by a stream where it emerges from an upland onto a plain.
- Alluvial terrace.** An old alluvial plain, ordinarily flat or undulating, bordering a river, lake or sea. Stream terraces are frequently called second bottoms, as contrasted to flood plains, and are seldom subject to overflow. Marine terraces were deposited by the sea and are generally wide.
- Alluvium.** Material, such as sand, silt, or clay, deposited on land by water action.
- Andesite.** A volcanic rock composed essentially of andesine and one or more mafic constituents.
- Argillic horizon.** See **Diagnostic horizons**.
- Aspect.** The direction a slope is facing; its exposure in relation to the sun.
- Association, soil.** A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.
- Ballena.** A ridgecrest (literally, a whale).
- Basalt.** An extrusive rock composed primarily of calcic plagioclase and pyroxene, with or without olivine.
- Base saturation.** The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K) expressed as a percentage of the total cation exchange capacity.
- Bedrock.** Solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.
- Boulders.** Rock fragments larger than 2 feet (60 centimeters) in diameter.
- Calcareous soil.** A soil containing enough calcium carbonate (commonly occurring with magnesium carbonate) to effervesce (fizz) visibly when treated with cold, dilute hydrochloric acid. A soil having measurable amounts of calcium carbonate or magnesium carbonate.
- Calcic horizon.** See **Diagnostic horizons**.
- Cambic horizon.** See **Diagnostic horizons**.
- Clay.** As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.
- Clay film.** A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels.
Synonyms: Clay coating, clay skin.
- Claypan.** A dense, compact layer in the subsoil having a much higher clay content than the overlying material, from which it is separated by a sharply defined boundary; formed by the downward movement of clay or by synthesis of clay in place during soil formation. Claypans mainly are hard when dry and plastic and sticky when wet. They generally impede the movement of water and air and the growth of plant roots.
- Cobble.** A fragment of rock 3 to 10 inches (7.62 to 25.40 cm) in diameter.
- Colluvial slope.** An inclined surface usually at the base of mountainsides formed by material transported and deposited by mass wasting (direct gravitational action) and local unconcentrated runoff.
- Colluvium.** A deposit of soil material, rock fragments, or both, accumulated on steep slopes or at the base of steep slopes primarily by the action of gravity but facilitated by the overland flow of water.
- Color.** See **Munsell notation**.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate geographical pattern or so small in area that it is not practical to map them separately at the selected scale of mapping.

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

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

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

Consociation, soil. A map unit in which only one kind of soil or miscellaneous area dominates.

Control Section. That part of a soil profile containing the horizons that determine the placement of the soil in the new system of soil classification. Generally, these horizons are between a depth of 10 inches and 40 inches.

Cryic soil temperature regime. A soil temperature regime where mean annual soil temperature is higher than 32° F. (0°C), but lower than 47° F. (8°C) and the mean summer soil temperature is less than 59° F. (15°C), at a depth of 20 inches or at a lithic or paralithic contact, whichever is shallower.

Depth Class. The distance from the surface of the soil to underlying bedrock, consolidated substra-

tum, or other material that would greatly restrict either root distribution or soil moisture and nutrient supply.

Very shallow	less than 10 inches
Shallow	10 to 20 inches
Moderately deep	20 to 40 inches
Deep	40 to 60 inches
Very deep	more than 60 inches

Diagnostic horizons. As used in the soil classification system of the National Cooperative Soil Survey in the United States, combinations of specific characteristics that indicate certain classes of soils. Those that occur at the soil's surface are called epipedons. Those below the surface are called diagnostic subsurface horizons:

Argillic horizon. A subsurface horizon into which clay has moved. It has more than 1.2 times the amount of clay that the horizons above it have. The presence of clay films on ped surfaces and in soil pores is evidence of clay movement.

Calcic horizon. A horizon of accumulation of calcium carbonate or of calcium carbonate and magnesium carbonate, usually in the C horizon, but may also be in other horizons such as a mollic epipedon, an argillic or a natric horizon, or a duripan.

Cambic horizon. A subsurface horizon that is finer than loamy fine sand in texture and in which materials have been altered or removed, but have not accumulated. Elimination of fine stratification; changes caused by wetness, such as gray color and mottling; redistribution of carbonates; and yellow or redder color than in underlying horizons are evidence of alteration.

Mollic epipedon. A dark-colored surface horizon, generally more than 7 inches thick. It contains more than 1 percent organic matter and has more than 50 percent base saturation. It is not both hard and massive when dry. Color is darker than 3.5 in value when moist and 5.5 in value when dry, and is less than 3.5 in chroma when moist.

Ochric epipedon. A surface horizon that is too light in color (higher in value or chroma than a mollic epipedon), too low in organic matter or too thin to be a mollic or umbric epipedon.

Pachic epipedon. A dark-colored surface horizon, similar to the Mollic epipedon, but thicker than 20 inches.

Dolomite. A mineral, $\text{CaMg}(\text{CO}_3)_2$, commonly with some Fe replacing the Mg.

Drainages, modern. A drainage whose capacity to transport a load is greater than the load it is called upon to carry. These drainages usually have a steep gradient and therefore swift water movement. (Contrast with a mature drainage, whose capacity to transport a load is equal to the load it is called upon to carry.)

Drainages, recent. See **Drainages, modern.**

Durinodes. Silica-cemented soil aggregates.

Duripan. A subsurface horizon that is cemented by silica to the point that fragments from the air-dry horizon will not slake after prolonged soaking in water or hydrochloric acid.

Effervescence. The reaction of soil carbonates to 1 Normal hydrochloric acid. The classes of effervescence are slightly, strongly and violently effervescent. Soils with slight effervescence form readily observable gas bubbles; soils with strong effervescence form a low gas foam; and soils with violent effervescence form a thick gas foam, which "jumps" up.

Eolian. Soil material accumulated through wind action.

Epipedon. A horizon at the soil surface which has been either appreciably darkened by organic matter or eluviated, or, as a minimum, the rock structure has been destroyed. Also see **Diagnostic horizons.**

Erosion. The wearing away of the land surface by running water, waves, moving ice, wind, or other geologic processes, such as mass wasting or gravitational creep. Also, the detachment and movement of soil or rock. Geologic erosion refers to natural processes occurring over long periods of time. Accelerated erosion is erosion much more rapid than natural geologic erosion, primarily as a result of the influence of the activities of man or, in some cases, of animals.

Family, soil. A grouping of soils within a subgroup having similar physical and chemical properties that affect their responses to management and manipulation for use.

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

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

Frigid Soil Temperature regime. A soil temperature regime that has a mean annual soil temperature lower than 47°F (8°C) and the difference between mean winter and mean summer soil temperature is more than 9° F. (5°C) at a depth of 20 inches (50 centimeters) or at a lithic or paralithic contact, whichever is shallower.

Glacial moraine. See **Moraine.**

Granitic rock. Light-colored, coarse-grained rock formed by solidification from a molten or partially molten state.

Granodiorite. A plutonic rock consisting of quartz, calcic oligoclase or andesite, and orthoclase with biotite, hornblende or pyroxene.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 mm. to 7.5 cm.) in diameter. An individual piece is a pebble.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. It is larger than 4 inches (10 centimeters) deep and 6 inches (15 centimeters) wide.

Hard bedrock. See **Lithic Contact.**

Hardpan. Synonymous with **Duripan.**

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. The major horizons of mineral soils 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 forming 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 change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused by (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) by a combination of these.

- 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 horizons. The material of a C horizon may be either like or unlike that in which the solum is presumed to have formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.
- R layer.** Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.
- Igneous rock.** Rock that formed from the cooling and solidification of magma and that has not been changed appreciably since its formation.
- Inclusions.** Soils occurring in the map unit that are not identified by their names because the area they occupy is too small.
- Infiltration.** The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is a movement of water through soil layers or material.
- Lava flow.** See **Volcanic flow**.
- Limestone.** A bedded sedimentary deposit consisting chiefly of calcium carbonate.
- Lithic contact.** The boundary between soil and continuous, coherent, underlying material (hard rock), which is hard enough to prohibit digging with hand tools and if fractured, the pieces are not displaced relative to each other.
- Loam.** Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.
- Marble.** A metamorphic rock composed essentially of calcite and/or dolomite.
- Mesic soil temperature regime.** A soil temperature regime in which the mean annual soil temperature is 47°F. (8°C) or higher but lower than 59° F. (15°C), and the difference between mean summer and mean winter soil temperature is more than 9° F. (5°C) at a depth of 20 inches (50 centimeters) or at a lithic or paralithic contact, whichever is shallower.
- Metamorphic rock.** Rock of any origin altered in mineralogical composition, chemical composition or structure by heat, pressure and movement. Nearly all such rocks are crystalline.
- Metasedimentary rock.** Sedimentary rock altered in mineralogical composition, chemical composition or structure by heat, pressure and movement.
- Mineral soil.** Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of an organic soil.
- Miscellaneous area.** An area that has little or no natural soil material capable of supporting vegetation (for example, Rock outcrop).
- Modern Drainage.** A drainage whose capacity to transport a load is greater than the load it is called upon to carry. These drainages usually have a steep gradient and therefore swift water movement. (Contrast with a mature drainage, whose capacity to transport a load is equal to the load it is called upon to carry).
- Mollic epipedon.** See **Diagnostic horizons**.
- Moraine.** An accumulation of earth, stones and other debris by a glacier. Some types are terminal, lateral, medial and ground.
- Mountain.** A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (related to a plateau) and generally having steep sides and considerable bare-rock surface. A mountain can occur as a single, isolated mass or in a group forming a chain or range.
- Munsell notation.** A designation of color by degrees of the three single variables; hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.
- Nutrient, plant.** Any element taken in by a plant that is essential to its growth. Plant nutrients are mainly nitrogen, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron and zinc obtained from the soil; and carbon, hydrogen and oxygen obtained from the air and water.
- Ochric epipedon.** See **Diagnostic horizons**.
- Older alluvial fan.** An alluvial fan that is a remnant of old landslides or debris flows.
- Organic layer.** A layer of fresh and decaying plant residue at the surface of a mineral soil.
- Organic matter, soil.** The organic fraction of the soil including plant and animal residues at various

stages of decomposition, cells and tissues of soil organisms, and substances synthesized by organisms living in the soil. Soil organic matter commonly is determined by measuring the amount of organic material in a soil sample passed through a 2-millimeter sieve.

Pachic epipedon. See **Diagnostic horizons**.

Paralithic contact. A boundary between soil and continuous coherent underlying material. If the underlying material is a single mineral, it has a hardness by Moh's scale of less than 3. If it is not a single mineral, chunks of gravel size that can be broken out will disperse more or less completely during 15 hours of end-over-end shaking in water or in sodium hexametaphosphate solution and, when moist, the material can be dug with difficulty with a spade. There may be cracks in the rock, but the horizontal spacing between cracks should be 10 cm or more.

Parent material. The unconsolidated and more or less chemically weathered mineral or organic matter from which the solum of soils is developed by pedogenic processes.

Particle-size class. The grain-size distribution of the whole soil. It is not the same as texture, which refers to the fine-earth fraction (material 2 mm and smaller). The following are those recognized in this survey area:

Sandy-skeletal. Rock fragments 2 mm in diameter or larger make up 35 percent or more of the soil by volume, there is enough fine earth to fill the interstices larger than 1 mm, and the fraction finer than 2 mm is sandy, as defined for the sandy particle-size class.

Loamy-skeletal. Rock fragments make up 35 percent or more of the soil by volume, there is enough fine earth to fill interstices larger than 1 millimeter, and the fraction finer than 2 millimeters is loamy, as defined for the loamy particle-size class.

Clayey-skeletal. Rock fragments make up 35 percent or more of the soil by volume, there is enough fine earth to fill interstices larger than 1 millimeter and the fraction finer than 2 millimeters is clayey, as defined for the clayey particle-size class.

Sandy. The texture of the fine earth is a sand or loamy sand that is coarser than very fine sand or loamy very fine sand respectively, and rock fragments make up less than 35 percent by volume.

Loamy. The texture of the fine earth is loamy very fine sand, very fine sand or finer, but the amount of clay is less than 35 percent, and the rock fragments are less than 35 percent by volume.

Coarse-loamy. By weight, 15 percent or more of the particles are fine sand (0.25 to 0.1 millimeter in diameter) or coarser, including fragments up to 7.5 centimeters in diameter; and there is less than 18 percent clay in the fine-earth fraction.

Fine-loamy. By weight, 15 percent or more of the particles are fine sand (0.25 to 0.1 millimeters in diameter) or coarser, including fragments up to 7.5 centimeters in diameter; and there is 18 through 34 percent clay in the fine-earth fraction.

Clayey. The fine earth contains 35 percent or more clay by weight, and the rock fragments are less than 35 percent by volume.

Fine. A clayey particle-size class that has 35 through 59 percent clay in the fine-earth fraction.

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

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit the study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Pergelic soil temperature regime. A soil temperature regime in which the mean annual soil temperature is lower than 32°F (0°C), at a depth of 20 inches (50 centimeters), or at a lithic or paralithic contact, whichever is shallower.

pH value. A numerical designation of acidity and alkalinity in soil. See **Reaction, soil**.

Plutonic rock. An igneous rock formed at great depth by magmatic crystallization or chemical alteration.

Precipitation, mean annual. The average precipitation received annually by an area. It includes both rainfall and snow.

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

Pyroclastic rock. Any rock consisting of unworked solid material of whatever size, explosively or aeri-ally ejected from a volcanic vent.

Quartz monzonite. Synonymous with Adamellite.

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

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

Recent Drainage. See **Modern Drainage.**

Residuum or residual soil material. Unconsolidated, weathered or partly weathered mineral materials accumulated by disintegration of consolidated rock in place.

Rhyolite. The aphanitic (fine rock texture) equivalent of granite.

Rhyolitic tuff. A rock formed from compacted rhyolite fragments, generally less than 4 millimeters in diameter.

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

Riverwash. Barren alluvial land, usually coarse-textured, exposed along streams at low water and subject to shifting during normal high water. A miscellaneous land type.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters (0.078 inches) or more; in order of increasing size, gravel (pebbles), cobbles, stones, and boulders.

Rubbleland. An area with 90 percent or more surface cover of stones and boulders.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter 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.

Sandstone. A cemented or otherwise compacted detrital sediment composed predominantly of quartz grains.

Sediment. Solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water, or ice, and has come to rest on the earth's surface.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Shale. A sedimentary rock formed by induration of a clay or silty clay deposit and having the tendency to split into thin layers.

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.

Siltstone. A very fine-grained consolidated clastic rock composed predominantly of particles of the silt grade.

Slate. A fine-grained metamorphic rock possessing a well-developed fissility (slaty cleavage).

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

Soft bedrock. See **Paralithic contact.**

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

Soil Depth Class. The depth classes used in this survey area are:

Shallow. Less than 20 inches to a lithic or paralithic contact, or a duripan.

Moderately deep. 20 to 40 inches to the contact.

Deep. 40 to 60 inches to the contact.

Very deep. Greater than 60 inches to the contact.

Soil formation factors. The variables - parent material, climate, organisms, topography, and time-active in and responsible for the formation of soil.

Soil pores. That part of the bulk volume of soil not occupied by soil particles; the interstices or voids.

Soil Separates. The individual size-groups of mineral particles. See **Clay, Silt, and Sand**.

Soil survey. The systematic examination, description, classification, and mapping of soils in an area. Soil surveys are classified according to the kind and intensity of field examination.

Soil Temperature regimes are based on mean annual soil temperature and the difference between mean summer and mean winter temperature. Soil temperature is determined at a depth of 20 inches (50 cm) or at a lithic or paralithic contact, whichever is shallower. Unless indicated in a higher category, soil temperature classes are used at the family level. See **Mesic, Frigid, Cryic and Pergelic soil temperature regimes**.

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in mature soils 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 other plant and animal life characteristics of the soil are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining 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. The soil structure grades are structureless, weak, moderate, and strong. Structureless soils are either single grained (noncoherent) or massive (coherent).

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

Substratum. The part of the soil below the solum.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "A horizon."

Temperature, mean annual. The average air temperature of an area on a yearly basis.

Temperature, mean annual soil. The average soil temperature at a depth of 20 inches (50 centimeters), on a yearly basis.

Temperature, mean summer soil. The average soil temperature at a depth of 20 inches (50 centimeters), for the months of June, July and August.

Temperature, mean winter soil. The average soil temperature at a depth of 20 inches (50 centimeters), for the months of December, January and February.

Temperature regimes, soil. See **Thermic, Mesic, Frigid, Cryic and Pergelic soil temperature regimes**.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea. A stream terrace is frequently called a second bottom, in contrast with a flood plain, and is seldom subject to overflow. A marine terrace, generally wide, was deposited by the sea.

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

Texture modifier. Adjective included in a soil textural class name, based on the percentage of rock fragments in the soil. Examples:

Gravelly	15 to 35 percent
Very gravelly	35 to 60 percent
Extremely gravelly	over 60 percent

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

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

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

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

Volcanic rock. The class of igneous rocks that have

been poured out or ejected at or near the earth's surface.

Water table. The upper surface of ground water or that level in the ground where water is at atmospheric pressure.

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

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