SOIL SURVEY OF
KERN CANYON STUDY AREA
SEQUOIA NATIONAL PARK

DESCRIPTION OF THE AREA

LOCATION

The Kern Canyon Study Area consists of approximately 38,000 acres of high alpine slopes in the eastern portion of the Sequoia National Park (Mount Whitney 15' quadrangle). The area is bounded by the following coordinates: latitudes 36^0 29' and 36^0 39' north and 118^0 17' and 118^0 28' west.

Beginning at its northernmost boundary at Mount Tyndall, the eastern boundary of the study area follows the Sierra Nevada divide across Mount Bernard, Tunnabora Peak, Mount Whitney, and Mount McAdie. From Mount McAdie, the study area boundary heads southwest along the Whitney Creek divide across Mount Newcomb and Mount Chamberlin to Mount Guyot and the Kern River. The Kern River forms the western boundary upstream to Junction Meadow. The northwest boundary then follows the ridgeline to Tawny Point, closing at Mount Tyndall. The primary watersheds are Wallace Creek, Whitney Creek, and Rock Creek. All three flow west and are tributaries of the Kern River.

TERRAIN

The area is hilly to mountainous with several deep canyons, glacial basins and valleys, mountain peaks and summits, cirques and tarns. The terrain is very irregular with transitions from rugged ranges to basins and canyons. Elevations range from 7,000 to 14,495 feet. More than 75 percent of the area has very steep to extremely steep slopes. The balance of the area consists of sloping to steep slopes which occur primarily in the meadow areas and plateaus. Most of the slopes are complex.

The terrain reflects the erosive action of moving waters, partly controlled by rock jointing and rock type; rainfall impact; mass wasting; glacial activity; and frost-freeze action.

GENERAL GEOLOGY

The survey area occupies the upper portion of the western slope of the Southern Sierra Nevada. Granite and granodiorite of Cretaceous origin, and similar acid igneous rocks comprise the vast majority of the area.

Glacial activity from the last Pleistocene episode left only a few alpine peaks and summits at elevations of 12,000 feet or more, unscoured. In the basins and canyons, the glaciers deposited a mantle of fill and debris upon which have developed moderately deep and deep soils. The remnants of past glaciation include moraines, erratic boulders, chain lakes, cirques, tarns, glacial polish on rocks, and U-shaped canyons.

VEGETATION

The natural vegetation reflects the soil and climatic patterns of the area. In the Kern Canyon Study Area, five vegetative communities have been identified:

- Mountain Chaparral
- Jeffrey Pine Forest
- Lodgepole Pine Forest
- Subalpine Forest
- Subalpine and Alpine Meadow

The Mountain Chaparral and Jeffrey Pine Forest communities occupy the lowest and warmest areas, elevations from 7000 feet on the warmer aspects. Evidence of wildfires is common. Brush thickets composed of plants such as snow brush, bitter cherry, manzanita,

sagebrush, chinquapin, and canyon oak comprise the mountain chaparral community. They occupy dry and rocky slopes often with large areas of talus. Jeffrey pine along with black oak, incense cedar, sugar pine, white fir, and western juniper make up the primary plants in the Jeffrey Pine Forest. This community often has a shrub understory.

By far the most common plant community in the survey area is the Lodgepole Pine Forest. The dominant plants are lodgepole pine, foxtail pine or both. Elevations range from 8,000 to 11,000 feet. The community occupies glacially scoured ridges, valleys and basins and lower mountain sideslopes. An understory component is typically absent and the accumulation of litter is thin.

The Subalpine Forest community is found on rocky mountain ridges, crests and sideslopes at elevations between 9,500 to 12,000 feet. Component species include lodgepole pine, western white pine and whitebark pine. Trees are typically stunted and sparsely distributed.

The Alpine Community occurs on the upper glacial basins, upper mountain ridges, and sideslopes above treeline. Plants are low growing and consist of alpine herbs such as pussypaws, dwarf Lewisia, buckwheat, and shrubs such as currant and willows.

The last community is the Subalpine and Alpine Meadows. Primary components are sedges, meadow grasses and willows.

TABLE 1-S

SOIL TAXONOMIC UNITS
(Alphabetical order)

Kern Canyon Study Area

Sequoia National Park

Aeric Cryaquepts, sandy-skeletal, mixed
Dystric Cryochrepts, sandy, mixed
Dystric Cryochrepts, sandy-skeletal, mixed
Dystric Cryochrepts, sandy-skeletal, mixed, shallow
Entic Xerumbrepts, sandy, mixed, frigid
Entic Xerumbrepts, sandy-skeletal, mixed, frigid
Lithic Cryochrepts, loamy-skeletal, mixed
Lithic Cryopsamments, mixed
Lithic Cryumbrepts, loamy, skeletal, mixed
Lithic Mollic Haploxeralfs, loamy-skeletal, mixed, frigid
Lithic Xerumbrepts, loamy-skeletal, mixed, frigid
Typic Cryaquepts, coarse-loamy, mixed
Typic Cryofluvents, sandy-skeletal, mixed
Typic Cryopsamments, mixed
Typic Cryorthents, sandy-skeletal, mixed
Typic Xerumbrepts, loamy-skeletal, mixed, frigid
Ultic Haploxeralfs, loamy-skeletal, mixed, frigid

TABLE 2-S

CLASSIFICATION TABLE OF TAXONOMIC UNITS

Kern Canyon Study Area

Sequoia National Park

ALFISOLS

Haploxeralfs

Lithic Mollic Haploxeralfs, loamy-skeletal, mixed, frigid
Ultic Haploxeralfs, loamy-skeletal, mixed, frigid

ENTISOLS

Cryofluvents

Typic Cryofluvents, sandy-skeletal, mixed

Cryopsamments

Typic Cryopsamments, mixed
Lithic Cryopsamments, mixed

Cryorthents

Typic Cryorthents, sandy-skeletal, mixed

INCEPTISOLS

Cryaquepts

Typic Cryaquepts, coarse-loamy, mixed
Aeric Cryaquepts, sandy-skeletal, mixed

Cryochrepts

Dystric Cryochrepts, sandy, mixed
Dystric Cryochrepts, sandy-skeletal, mixed
Dystric Cryochrepts, sandy-skeletal, mixed, shallow
Lithic Cryochrepts, loamy-skeletal, mixed

Cryumbrepts

Lithic Cryumbrepts, loamy, skeletal, mixed

Xerumbrepts

Typic Xerumbrepts, loamy-skeletal, mixed, frigid
Entic Xerumbrepts, sandy, mixed, frigid
Entic Xerumbrepts, sandy-skeletal, mixed, frigid
Lithic Xerumbrepts, loamy-skeletal, mixed, frigid

TAXONOMIC UNITS IN THE KERN CANYON STUDY AREA

DESCRIPTION OF TAXONOMIC UNITS

Aeric Cryaquepts, sandy-skeletal, mixed

This soil family consists of deep, very poorly and poorly drained soils that formed in alluvium and morainal material from granitic rock sources. They occur on drainageways and seeps. Slopes range from nearly level to 15 percent.

Typically the thin dark surface layer overlies a very gravelly or cobbly coarse sand substratum.

Following is a profile description of a representative pedon (DW14) found in the map unit *176 Dystric Cryochrepts - Aeric Cryaquepts - Jointed granitic outcrop complex, 0 to 25 percent slopes.* It is located in the upper Crabtree Meadows about .5 mile south of the Crabtree Ranger Station on the Mount Whitney 15' quadrangle. Elevation is approximately 10500 feet.

A1--0 to 2 inches; grayish brown (10YR 5/2) gravelly loam, very dark brown (10YR 2/2) moist; structureless heavily matted by roots; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine interstitial pores; 15 percent pebbles; abrupt smooth boundary.

A2--2 to 8 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; structureless - heavily matted by roots; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine interstitial pores; 15 percent pebbles; clear wavy boundary.

C--8 to 10 inches; light brownish gray (10YR 6/2) very gravelly coarse sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and few fine roots; many very fine interstitial pores; 30 percent pebbles and 5 percent cobbles; abrupt wavy boundary.

2C--10 to 60 inches; pale brown (10YR 6/3) stratified extremely gravelly coarse sand to gravelly sand, dark yellowish brown (10YR 4/4) moist; single grained; loose, nonsticky and nonplastic; few very fine and fine roots; 45 percent pebbles and 7 percent cobbles.

Remarks: These soils are wet for a significant part of the year. Depth to the water table is commonly less than 20 inches.

Dystric Cryochrepts, sandy, mixed

This soil family consists of moderately deep to a dense and brittle hardpan, excessively drained soils that formed in colluvium and morainal material weathered from granite and granodiorite rock. They occur on nearly level erosional deposits or plateaus below mountains. Slopes range from 5 to 30 percent.

These soils are poorly developed. Typically they have a thin, dark surface overlying a morphologic subsoil of brighter chroma.

Following is a profile description of a representative pedon (RA3) found in the map unit *170 Dystric Cryochrepts association, 5 to 45 percent slopes.* It is located in lower Sandy Meadows about 1.5 miles west of the Crabtree Ranger Station on the Mount Whitney 15' quadrangle. Elevation is approximately 10500 feet.

Oi--0.5 to 0 inches; slightly decomposed conifer needles, twigs, and cones.

A--O 0 to 7 inches; brown (10YR 4/3) very stony loamy coarse sand, very dark grayish brown (10YR 3/2) moist; moderate very fine and fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; many very fine, fine and medium interstitial pores; 25 percent pebbles, 10 percent cobbles, and 15 percent stones and boulders; abrupt wavy boundary.

C--7 to 16 inches; very pale brown (10YR 7/4) very gravelly coarse sand, dark yellowish brown (10YR 4/6) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; common very fine and medium interstitial pores; 40 percent pebbles and 10 percent cobbles; abrupt wavy boundary.

2C--16 to 24 inches; very pale brown (10YR 7/4) gravelly sand, yellowish brown (10YR 5/4) moist; single grained; loose, loose, nonsticky and nonplastic; few fine, medium and coarse roots; few medium and coarse tubular pores; 15 percent pebbles and 3 percent cobbles; clear wavy boundary.

3Cx--24 to 28 inches; very pale brown (10YR 7/4) discontinuous dense and brittle hardpan that parts to gravelly sand; 25 percent pebbles; abrupt wavy boundary.

4C--28 to 40 inches; very pale brown (10YR 7/4) gravelly coarse sand, yellowish brown (10YR 5/4) moist; single grained; loose, loose, nonsticky and nonplastic; 25 percent pebbles and 3 percent cobbles.

Remarks: The particle size control section has an average of 15 to 35 rock fragments, mainly pebbles. Textures range from coarse sand to loamy fine sand. A discontinuous dense and brittle pan is often present between the depth of 10 to 40 inches. The soil temperature at 20 inches taken at 1:00 p.m. on 8/2/88 was 54^0F.

Dystric Cryochrepts, sandy-skeletal, mixed

This soil family consists of moderately deep to a dense and brittle hardpan, excessively drained soils that formed in alluvium and morainal material weathered from granitic rock sources. They occur on glaciated plateaus, moraines, and ground till. Slopes are commonly complex and range from 5 to 30 percent.

Typically these soils have a thin dark surface overlying a moderately developed subsoil that is lighter in color and has brighter chroma. A hard, dense and brittle pan, commonly mottled, follows and rests on a light colored substratum.

Following is a profile description of a representative pedon (RA4) found in the map unit *172 Dystric Cryochrepts - Typic Cryaquepts complex, 5 to 20 percent slopes.* It is located in the Wallace Creek drainage about 1 mile north west of the northern slopes of Mount Young on the Mount Whitney 15' quadrangle. Elevation is approximately 10600 feet.

Oi--0.5 to 0 inches; slightly decomposed conifer needles, twigs, and cones.

A1--0 to 4 inches; dark brown (10YR 3/3) extremely bouldary coarse sandy loam, very dark brown (10YR 2/2) moist; common very fine and fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine, fine and medium roots; common fine and medium interstitial pores; 30 percent pebbles, 20 percent cobbles, 15 percent stones, and 15 percent boulders; abrupt wavy boundary.

AC--4 to 23 inches; light yellowish brown (10YR 6/4) very cobbly coarse sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine and fine and common medium and coarse roots; common fine interstitial pores; 20 percent pebbles, 20 percent cobbles, and 15 percent stones; abrupt wavy boundary.

2Cx--23 to 27 inches; light gray (10YR 7/1) extremely gravelly coarse sand, olive gray (5Y 5/2) moist; common fine distinct yellowish brown (10YR 5/4) iron mottles; massive; hard, dense and brittle pan; few fine and medium roots; few very fine and fine interstitial pores; 30 percent pebbles, 15 percent cobbles, and 15 percent stones; clear wavy boundary.

3C--27 to 40 inches; very pale brown (10YR 7/3) extremely cobbly coarse sand, olive (5Y 5/3) moist; single grained; loose, loose, nonsticky and nonplastic; few fine and medium roots; common fine and medium interstitial pores; 30 percent pebbles and 60 percent cobbles.

Remarks: Depth to the hardpan ranges between 20 and 35 inches. The pan has features common to a fragipan but does not strictly meet its requirements. Textures include coarse sand, sand and loamy sand. The soil temperature taken at 20 inches on 8/4/88 at 11:30 a.m. was 55°F.

Dystric Cryochrepts, sandy-skeletal, mixed, shallow

This soil family consists of shallow to a dense and brittle hardpan, somewhat excessively drained soils that formed in alluvium and morainal material weathered from granitic rock sources. They occur on dissected plateaus. Slopes are complex and range from 25 to 45 percent.

Typically these soils have a thin dark surface layer overlying a light colored substratum. The substratum rests on top of a dense and brittle, root restricting hardpan.

Following is a profile description of a representative pedon (DW3) found in the map unit *170 Dystric Cryochrepts association, 5 to 45 percent slopes.* It is located about 1.5 miles northwest of Mount Guyot on the Mount Whitney 15' quadrangle. Elevation is approximately 10000 feet.

A--0 to 4 inches; brown (10YR 5/3) very cobbly loamy coarse sand, very dark grayish brown (10YR 3/2) moist; weak very fine and fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots; common very fine interstitial pores; 25 percent pebbles, 15 percent cobbles, and 5 percent stones; clear wavy boundary.

AC--4 to 9 inches; pale brown (10YR 6/3) very gravelly loamy sand, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky

and nonplastic; many very fine, common fine and few medium roots; common very fine and fine interstitial pores; 45 percent pebbles, 10 percent cobbles, and 4 percent stones; abrupt wavy boundary.

2Cx--9 to 27 inches; light gray (10YR 7/2) strong, dense and brittle hardpan; many medium prominent iron mottles; moderately difficult to break in hands; common very fine and fine roots on top of the pan surface.

Remarks: Depth to a hard and dense, root restricting pan ranges from 10 to 20 inches. Mottles are common in the pan.

Entic Xerumbrepts, sandy, mixed, frigid

This soil family consists of deep, excessively drained soils that formed in alluvium and morainal material from mixed granitic rock sources. They occur on glacial outwash and fluvial deposits. slopes are 5 to 15 percent.

Typically they have a moderately thick dark surface layer over a light colored sandy substratum.

Following is a profile description of a representative pedon (DW10) found in the map unit *101 Entic Xerumbrepts - Typic Xerumbrepts association, 5 to 25 percent slopes.* It is found in the Kern River Canyon on the east bank of the Kern River about 0.5 mile south of the confluence of Whitney Creek on the Mount Whitney 15' quadrangle. Elevation is approximately 7700 feet.

(The surface is covered by 20 percent pebbles, 5 percent cobbles, stones, and 1 percent boulders).

Oi--0.5 to 0 inches; conifer needles, cones, twigs, and bark fragments.

A1--0 to 6 inches; grayish brown (10YR 5/2) gravelly loamy sand, very grayish brown (10YR 3/2) moist; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and few fine roots; many very fine interstitial pores; 15 percent pebbles; clear smooth boundary.

A2--6 to 11 inches; grayish brown (10YR 5/2) gravelly loamy sand, very grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine, few fine and medium roots; common very fine and few fine tubular pores; 20 percent pebbles; abrupt smooth boundary.

C1--11 to 26 inches; light brownish gray (10YR 6/2) gravelly loamy sand, brown (10YR 4/2) moist; weak fine and medium subangular block structure; soft, very friable, nonsticky and nonplastic; few fine, medium, and coarse roots; common very fine interstitial pores; 15 percent pebbles and 3 percent cobbles; gradual smooth boundary.

C2--26 to 45 inches; very pale brown (10YR 7/3) gravelly loamy sand, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; common very fine interstitial pores; 20 percent pebbles and 2 percent cobbles.

Remarks: These soils have textures of loamy sand and sand with 15 to 35 percent coarse fragments, mainly pebbles. The soil temperature taken at 20 inches on 8/8/88 was 59^{0}F.

Entic Xerumbrepts, sandy-skeletal, mixed, frigid

This soil family consists of deep, excessively drained soils that formed in colluvium and some morainal material weathered from granitic rock sources. They occur on alluvial fans overlying the Kern River Canyon valley floor. Slopes are complex and range from 10 to 25 percent.

Typically these soils have a moderately thick and dark surface layer over a light colored sandy and extremely cobbly substratum.

Following is a profile description of a representative pedon (DW11) found in the map unit *101 Entic Xerumbrepts - Typic Xerumbrepts association, 5 to 25 percent slopes.* It is located in the Kern River Canyon on the east bank of the Kern River less than 0.5 mile south of the confluence of Whitney Creek on the Mount Whitney 15' quadrangle. Elevation is approximately 7700 feet.

(The soil surface is covered by 10 percent pebbles, 20 percent cobbles, 10 percent stones, and 5 percent boulders).

A1--0 to 4 inches; dark grayish brown (10YR 4/2) extremely cobbly coarse sandy loam, very dark grayish brown (10YR 2/2) moist; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and few fine roots; common very fine interstitial pores; 35 percent pebbles; 20 percent cobbles, and 10 percent stones; clear smooth boundary.

A2--4 to 11 inches; brown (10YR 5/3) extremely cobbly loamy sand, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very, few fine and medium roots; common very fine and few fine interstitial pores; 50 percent pebbles, 20

percent cobbles, and 10 percent stones; clear wavy boundary.

AC--11 to 23 inches; pale brown (10YR 6/3) extremely cobbly loamy sand, brown (10YR 4/3) moist; massice; soft, very friable, nonsticky and nonplastic; common very fine, fine and medium roots; common very fine interstitial pores; 45 percent pebbles, 25 percent cobbles, 15 percent stones, and 10 percent boulders; clear wavy boundary.

C--23 to 41 inches; very pale brown (10YR 7/3) extremely cobbly loamy sand, brown (10YR 5/3) moist; single grained; loose, loose, nonsticky and nonplastic; weak very fine and fine roots; common very fine and fine interstitial pores; 40 percent pebbles, 25 percent cobbles, and 15 percent stones.

Remarks: These soils have textures of loamy sand, loamy coarse sand, and sand. The soil temperature taken at 20 inches on 8/8/88 was 62^{0}F.

Lithic Cryochrepts, loamy-skeletal, mixed

This soil family consists of very shallow and shallow, well drained soils that formed in colluvium and residuum weathered from granitic rock sources. They occur on glacially scoured basins and canyon walls often around Jointed granitic outcrops between rock joints, crevices and on rock ledges. Slopes are complex and range from 10 to 130 percent.

Typically they have a thin dark surface layer that overlies a moderately developed lighter colored and brighter chroma subsoil. In turn, these rest on hard granitic bedrock.

Following is a profile description of a representative pedon (DW13) found in the map unit *33 Jointed granitic outcrop - Lithic Cryochrepts complex, 15 to 45 percent slopes.* It is located in the Crabtree meadow area less than 0.5 mile east of the Crabtree Ranger Station on the Mount Whitney 15' quadrangle. Elevation is approximately 10900 feet.

Oi--1 to 0 inches; slightly decomposed conifer needles, twigs, and cones.

A--0 to 5 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; weak very fine subangular blocky and granular structure; soft, very friable, nonsticky and nonplastic; common very fine and few coarse roots; common very fine interstitial pores; 20 percent pebbles and 5 percent cobbles; clear wavy boundary.

Bw--5 to 17 inches; yellowish brown (10YR 5/4) very gravelly sandy loam, dark yellowish brown (10YR 3/4) moist; moderated fine and medium subangular blocky structure; few very fine, fine and coarse roots; common very fine interstitial and few fine tubular pores; 30 percent pebbles, 5 percent cobbles, and 10 percent stones; abrupt wavy boundary.

2R--17 inches; hard granodiorite.

Remarks: The textures of the particle size control section include sandy loam, coarse sandy loam, and some loamy sand. The rock fragments average 35 to 50 percent, largely pebbles. The soil temperature taken at 17 inches on 8/13/88 was 53^{0}F.

Lithic Cryopsamments, mixed

This soil family consists of very shallow and shallow, excessively drained soils that formed in colluvium and residuum weathered from granitic rock sources. They occur on cirque basins often between rock joints and crevices. Slopes are complex and range from 15 to 35 percent.

These soils are poorly developed. Typically they have a thin, slightly dark layer over a light colored subsoil. They in turn, rest on hard granitic bedrock.

Following is a profile description of a representative pedon (RA8) found in the map unit *37 Jointed granitic outcrop - Typic Cryorthents - Lithic Cryopsamments complex, 5 to 35 percent slopes.* It is located in the upper Wallace Creek drainage about 1 mile southwest of Wales Lake on the Mount Whitney 15' quadrangle. Elevation is approximately 11500 feet.

A--0 to 6 inches; yellowish brown (10YR 5/4) very stony loamy coarse sand, dark yellowish brown (10YR 3/4) moist; moderate fine and medium structure; soft, very friable, nonsticky and nonplastic; common very fine roots; common very fine interstitial pores; 20 percent pebbles, 10 percent cobbles, 15 percent stones, and 10 percent boulders; clear wavy boundary.

B--6 to 17 inches; light yellowish brown (10YR 6/4) cobbly coarse sand, dark yellowish brown (10YR 3/4) moist; single grained; loose, loose, nonsticky and nonplastic; few very fine roots; few very fine interstitial pores; 15 percent pebbles, 10 percent cobbles, and 5 percent stones; abrupt smooth boundary.

2R--17 to 21 inches; hard, jointed granitic rock.

Remarks: In the particle-size control section the textures include loamy coarse sand, coarse sand, and sand. The soil temperature taken at 17 inches on 8/7/88 at 12:00 p.m. was 53^0F.

Lithic Cryumbrepts, loamy-skeletal, mixed

This soil family consists of very shallow and shallow, well drained soils that formed in colluvium, residuum, and morainal material weathered from granitic rock sources. They occur on cirque basins. Slopes are complex and range from 10 to 30 percent.

Typically these soils are dark colored, resting on granitic rock. They have very friable consistence from constant frost freezing.

Following is a profile description of a representative pedon (DW15) found in the map unit *31 Jointed granitic outcrop Lithic Cryumbrepts complex, 10 to 30 percent slopes.* It is located west of Mount Whitney about 0.5 mile north of Hitchcock Lakes on the Mount Whitney 15' quadrangle. Elevation is approximately 11500 feet.

(The soil surface is covered by 10 percent pebbles, 25 percent cobbles, and 20 percent stones).

A1--0 to 2 inches; grayish brown (10YR 5/2) very cobbly coarse sandy loam, dark grayish brown (10YR 3/2) moist; moderate very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; common very fine interstitial and few fine tubular pores; 15 percent pebbles, 20 percent cobbles, and 20 percent stones; abrupt smooth boundary.

A2--2 to 4 inches; brown (10YR 5/3) very cobbly loam, dark brown (10YR 3/3) moist moderate very fine and fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; common very fine

and few fine tubular pores; 20 percent pebbles, 10 percent cobbles, and 5 percent stones; abrupt smooth boundary.

A3--4 to 10 inches; yellowish brown (10YR 5/4) very cobbly sandy loam, dark brown (10YR 3/3) moist; many very fine roots; common very fine and few fine tubular pores; few faint distinct mottles on undersides of rock fragments; 15 percent pebbles, 15 percent and 5 percent stones; abrupt wavy boundary.

2R--10 inches; hard granodiorite.

Remarks: The particle size control textures include sandy loam and loam. Rock fragments average 35 to 50 percent.

Lithic Mollic Haploxeralfs, loamy-skeletal, mixed, frigid

This soil family consists of shallow, somewhat excessively drained soils that formed from colluvium and residuum weathered from granitic rock sources. They occur on sideslopes of the Kern River Canyon on mainly west facing aspects. Slopes are complex and range from 45 to 75 percent.

Typically the soils are dark colored and have a moderately developed subsoil. The soils rest on hard granitic rock.
Following is a profile description of a representative pedon (DW8) found in the map unit *140 Lithic Mollic Haploxeralfs - Jointed granitic outcrop - Granitic talus complex, 45 to 75 percent slopes.* It is located in the Kern River Canyon about 2 miles west of Crabtree Meadow on the Mount Whitney 15' quadrangle. Elevation is approximately 8300 feet.

Oi--0.5 to 0 inches; manzanita leaves and twigs.

A1--0 to 2 inches; dark grayish brown (10YR 4/2) very cobbly sandy loam, very dark brown (10YR 2/2) moist; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and few fine roots; common very fine interstitial pores; 15 percent pebbles, 20 percent cobbles, and 5 percent stones; abrupt wavy boundary.

A2--2 to 8 inches; brown (10YR 5/3) very cobbly sandy loam, dark brown (10YR 3/2) Moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and few coarse roots; common very fine interstitial and few fine tubular pores; 30 percent pebbles, 20 percent cobbles, and 5 percent stones; clear wavy boundary.

Bt--8 to 18 inches; brown (10YR 5/3) extremely cobbly sandy loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine, fine and coarse roots; common very fine and fine tubular pores; common thin clay films on ped faces and lining pores; 45 percent pebbles, 25 percent cobbles, and 7 percent stones; abrupt wavy boundary.

2R--18 to 22 inches; hard, slightly fractured granitic rock.

Remarks: The particle-size control section textures include sandy loam, coarse sandy loam, and loam. The soil temperature taken at 18 inches on 8/7/88 was 62^{0}F.

Lithic Xerumbrepts, loamy-skeletal, mixed, frigid

This soil family consists of very shallow and shallow to granitic rock, somewhat excessively drained soils that formed in colluvium and residuum from granitic rock sources. They occur on the Kern River Canyon sideslopes, mainly on west aspects between rock joints, crevices, and ledges. Slopes are complex and range from 45 to 150 percent.

Typically these soils have dark colored, very cobbly coarse textured layers over granitic rock.

Following is a profile description of a representative pedon (DW 7) found in the map unit *30 Jointed Granitic Outcrop - Lithic Xerumbrepts Complex, 45 to 150 percent slopes.* It is located in the Kern River Canyon about 1.5 miles west of the lower Crabtree Meadows on the Mount Whitney 15' quadrangle. Elevation is approximately 9400 feet.

Oi--4 to 2 inches; slightly decomposed conifer needles, twigs, and cones.

Oe--2 to 0 inches; moderately decomposed conifer litter.

A1--0 to 3 inches; dark grayish brown (10YR 4/2) very stony sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and common fine roots; common very fine interstitial pores; 10 percent pebbles, 10 percent cobbles, and 15 percent stones; clear wavy boundary.

A2--3 to 8 inches; brown (10YR 5/3) very cobbly coarse sandy loam, dark brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; soft, very

friable, nonsticky and nonplastic; common very fine, medium and coarse roots; common very fine and fine tubular pores; 15 percent pebbles, 15 percent cobbles, and 10 percent stones; abrupt smooth boundary.

R--8 to 12 inches; hard, slightly fractured granodiorite.

Remarks: The soil temperature taken at 8 inches on 8/7/88 was 60^0F.

Typic Cryaquepts, coarse-loamy, mixed

This soil family consists of deep, somewhat poorly and poorly drained soils that formed in alluvium and some colluvium weathered from granitic rock sources. They occur on lower parts of glacial basins on drainageways and glacial outwash deposits. Slopes range from 5 to 15 percent.

Typically they have a thin dark colored surface that is high in organic matter. It overlies a stratified, highly mottled substratum.

Following is a profile description of a representative pedon (RA2) found in the map unit *174 Dystric Cryochrepts - Typic Cryaquepts complex, 5 to 15 percent slopes.* It is located in Sandy Meadow about 1.5 miles west of the Crabtree Ranger Station on the Mount Whitney 15' quadrangle. Elevation is approximately 10500 feet.

Oa--1 to 0 inches; very dark brown (10YR 2/2) gritty muck; structureless; held together by a thick sod of many very fine and fine roots; abrupt wavy boundary.

A--0 to 4 inches; grayish brown (10YR 5/2) silt loam, very dark brown (10YR 2/2) moist; strong very fine and fine granular structure; soft, very friable, nonsticky

and slightly plastic; many very fine and fine roots; many very fine, fine and medium interstitial pores; abrupt wavy boundary.

Ag--4 to 9 inches; light brownish gray (10YR 6/2) silt loam, very dark grayish brown (10YR 3/2) moist; strong very fine and fine granular structure; slightly hard, very friable, nonsticky and slightly plastic; many very fine and fine roots; common very fine and fine interstitial pores; common medium distinct dark brown (7.5YR 3/4) iron mottles (moist); clear wavy boundary.

Cg--9 to 14 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; medium fine and medium subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine and fine interstitial pores; common distinct prominent yellowish red (5YR 4/6) iron mottles (moist); abrupt wavy boundary.

2Cg--14 to 18 inches; light yellowish brown (2.5Y 6/4) loam, olive brown (2.5Y 4/4) moist; weak medium and coarse platy structure; slightly hard, very friable, sticky and plastic; common very fine roots; few very fine and fine interstitial pores; many medium prominent dark gray (10YR 4/1) mottles (moist); 10 percent pebbles; abrupt wavy boundary.

3Cg--18 to 47 inches; light gray (10YR 7/1) sandy loam, gray (10YR 5/1) moist; massive; slightly hard, very friable, slightly sticky and nonplastic; few very fine roots; few very fine and fine interstitial pores; common medium prominent reddish brown (2.5YR 5/4) iron mottles (moist).

Remarks: The particle-size control section averages 8 to 18 percent clay with textures of silt loam to coarse sandy loam. It has more than 15 percent with particles of fine sand or coarser. The soil temperature taken at 20 inches on 8/2/88 at 11:00 a.m. was 48^0F.

Typic Cryofluvents, sandy-skeletal, mixed

This soil family consists of deep, somewhat poorly drained soils that formed in alluvium and morainal material from mixed granitic rock sources. They occur on glacial outwash deposits and drainage-ways. Slopes range from nearly level to 5 percent.

Typically these soils have stratified layers of very gravelly coarse sand over a dense, compacted substratum.

Following is a profile description of a representative pedon (DW6) found in the map unit *171 Dystric Cryochrepts - Typic Cryofluvents - Aeric Cryaquepts complex, 0 to 30 percent slopes.* It is located in Guyot Flat, an area about 0.5 mile north of Mount Guyot on the Mount Whitney 15' quadrangle. Elevation is approximately 10600 feet.

A1--0 to 3 inches; grayish brown (10YR 5/2) very gravelly loamy coarse sand, dark brown (10YR 3/3) moist; weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine roots; common very fine interstitial pores; 45 percent pebbles; clear smooth boundary.

A2--3 to 11 inches; brown (10YR 5/3) very gravelly loamy coarse sand, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine

roots; common very fine interstitial pores; 35 percent pebbles; abrupt smooth boundary.

2C--11 to 15 inches; pale brown (10YR 6/3) very gravelly coarse sand, dark yellowish brown (10YR 4/4) moist; common medium prominent strong brown (10YR 4/6) iron mottles; massive; slightly hard, loose, nonsticky and nonplastic; few very fine roots; many very fine interstitial pores; 40 percent pebbles; abrupt smooth boundary.

3C--15 to 35 inches; very pale brown (10YR 7/3) very gravelly coarse sand, brown (10YR 5/3) moist; many medium prominent yellowish red (5YR 4/6) iron mottles; massive; hard, loose, nonsticky and nonplastic; common very fine interstitial pores; 55 percent pebbles.

Remarks: A thin irregular thickness (0.75 inch average thickness) of silt loam was found at 28 inches. It was slightly sticky, nonplastic, and highly mottled. Depth to a root restricting, dense layer ranges from 10 to 20 inches. The coarse fragments are mainly small pebbles. Very sparse vegetation consisting of low growing plants such as buckwheat grasses and sedges grow on these soils. The soil temperature taken at 20 inches on 8/5/88 was 59^0F.

Typic Cryopsamments, mixed

This soil family consists of moderately deep and deep, excessively drained soils that formed in alluvium and colluvium from granitic rock sources. They occur on dissected alluvial fans and lower mountain sideslopes. Slopes are complex and range from 10 to 35 percent.

These soils are poorly developed. They consist of a slightly darkened surface layer overlying a light colored substratum.

Following is a profile description of a representative pedon (DW1) found in the map unit *160 Typic Cryopsamments complex, 10 to 60 percent slopes.* It is located 1 mile north of Guyot Flat and 1 mile south of Crabtree Meadow, on the Mount Whitney 15' quadrangle. Elevation is approximately 10700 feet.

A1--0 to 3 inches; brown (10YR 5/3) very gravelly loamy coarse sand, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; common very fine interstitial pores; 50 percent pebbles; abrupt smooth boundary.

A2--3 to 7 inches; pale brown (10YR 6/3) extremely gravelly coarse sand, brown (10YR 4/3) moist; single grained; loose, nonsticky and nonplastic; common very fine roots, common very fine interstitial pores; 65 percent pebbles; abrupt wavy boundary.

AC--7 to 22 inches; pale brown (10YR 6/3) gravelly coarse sand, brown (10YR 5/3) moist; single grained; few very fine interstitial pores; 15 percent pebbles; abrupt wavy boundary.

C--22 to 41 inches; light grayish brown (10YR 6/4) gravelly loamy sand, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, loose, nonsticky and nonplastic; common fine and few coarse roots; common very fine interstitial pores; 25 percent pebbles and 2 percent cobbles.

Remarks: The particle-size control section textures include loamy coarse sand, loamy sand, coarse sand, and sand. Rock fragments average 15 to 35 percent, mainly pebbles. The soil temperature taken at 20 inches on 8/3/88 was 56^0F.

Typic Cryorthents, sandy-skeletal, mixed

This soil family consists of moderately deep and deep, excessively drained soils that formed in colluvium and morainal material weathered from granitic rock sources. They occur on glaciated and unglaciated mountain sideslopes, overlying felsenmeer, moraines and glacial dumps. Slopes are commonly complex and range from 5 to 75 percent.

These soils show little development. Typically they have a thin dark surface layer over a light colored, higher chroma substratum.

Following is a profile description of a representative pedon (DW5) found in the map unit *12 Typic Cryorthents - Jointed granitic outcrop complex, 45 to 75 percent slopes.* It is located near the lower Crabtree Meadows about 1 mile south of Sandy Meadow on the Mount Whitney 15' quadrangle. Elevation is approximately 10200 feet.

Oi--0.5 to 0 inches; slightly decomposed conifer needles, twigs, and cones.

A--0 to 5 inches; grayish brown (10YR 5/2) very stony coarse sand, very dark grayish brown (10YR 3/2) moist; weak subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine roots; common very fine interstitial pores; 35 percent pebbles, 10 percent cobbles, and 14 percent stones; clear wavy boundary.

AC--5 to 10 inches; light yellowish gray (10YR 6/4) extremely gravelly coarse sand, brown (10YR 4/3) moist; single grained; loose, loose, nonsticky and nonplastic; many very fine and few fine roots; common very fine interstitial pores; 50 percent pebbles, 5

percent cobbles, and 10 percent stones; abrupt wavy boundary.

C--10 to 44 inches; very pale brown (10YR 7/3) extremely stony coarse sand, yellowish brown (10YR 5/4) moist; single grained; loose, loose, nonsticky and nonplastic; common very fine and few medium and coarse roots; few very fine interstitial pores; 40 percent pebbles, 15 percent cobbles, and 20 percent stones.

Remarks: In the particle-size control section the textures include coarse sand, sand, loamy coarse sand, and loamy sand. Most of these soils have a thin AC horizon. The soil temperature taken at 20 inches on 8/5/88 was 57^{0}F.

Typic Xerumbrepts, loamy-skeletal, mixed, frigid

This soil family consists of moderately deep and deep, somewhat excessively drained soils that formed in colluvium from granitic rock sources. They occur on alluvial fans and lower sideslopes of the Kern River Canyon. Slopes are complex and range from 10 to 45 percent slopes.

Typically these soils have a thick dark surface layer on top of a higher chroma subsoil. In turn the subsoil rests on a light colored substratum.

Following is a profile description of a representative pedon (RA15) found in the map unit *101 Entic Xerumbrepts - Typic Xerumbrepts complex, 5 to 25 percent slopes.* It is located in the Kern River Canyon about 1 mile south of Junction Meadow on the Mount Whitney 15' quadrangle. Elevation is approximately 8100 feet.

Oi--1 to 0 inches; slightly decomposed conifer needles, twigs, and cones.

A--0 to 10 inches; grayish brown (10YR 5/2) grayish brown very cobbly coarse sandy loam, very dark grayish brown (10YR 3/2) moist; moderate very fine and fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; few very fine, fine and medium interstitial pores; 20 percent pebbles, 15 percent cobbles, 10 percent stones, and 5 percent boulders; abrupt wavy boundary.

Bw--10 to 18 inches; yellowish brown (10YR 5/4) very cobbly coarse sandy loam, dark yellowish brown (10YR 3/4) moist; moderate fine and medium subangular blocky structure; soft very friable, nonsticky and nonplastic; common very fine, fine and medium roots; common very fine and fine interstitial pores; 20 percent pebbles, 20 percent cobbles, 10 percent stones, and 5 percent boulders; clear wavy boundary.

C1--18 to 40 inches; light brownish gray (10YR 6/2) very stony loamy coarse sand, yellowish brown (10YR 5/4) moist; single grained; loose, loose, nonsticky and nonplastic; few fine and medium roots; few very fine and fine interstitial pores; 20 percent pebbles, 10 percent cobbles, 20 percent stones, and 5 percent boulders.

Remarks: Textures in the particle size control section include coarse sandy loam, sandy loam, loam, and a small amount of loamy coarse sand. The soil temperature taken at 20 inches on 8/13/88 was 62°F.

Ultic Haploxeralfs, loamy-skeletal, mixed, frigid

This soil family consists of moderately deep and deep, somewhat excessively drained soils that formed in colluvium mainly from granite and granodiorite rock. They occur on sideslopes of the Kern River Canyon. Slopes are complex and range from 30 to 45 percent.

These soils have a moderately thick dark surface layer resting on top of a moderately developed and higher chroma subsoil.

Following is a profile description of a representative pedon (RA16) found in the map unit *200 Ultic Haploxeralfs - Granitic talus - Jointed granitic outcrop complex, 30 to 45 percent slopes.* It is located in the Kern River Canyon about 0.75 miles south southeast of Junction Meadow on the Mount Whitney 15' quadrangle. Elevation is approximately 8600 feet.

Oi--0.5 to 0 inches; slightly decomposed conifer needles, twigs, and bark.

A--0 to 10 inches; dark gray (10YR 4/1) extremely bouldery coarse sandy loam, very dark gray (10YR 3/1) moist; weak fine and medium subangular blocky parting to fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine, fine and medium roots; many very fine, fine and medium tubular pores; 10 percent pebbles, 20 percent cobbles, 20 percent stones, and 20 percent boulders; abrupt irregular boundary.

Bt--10 to 18 inches; yellowish brown (10YR 5/4) extremely stony coarse sandy loam, dark yellowish brown (10YR 3/4) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and

slightly plastic; many very fine and fine roots; many very fine, fine and medium tubular pores; few thin clay films on ped faces; 20 percent pebbles, 20 percent cobbles, 20 percent stones, and 15 percent boulders; abrupt irregular boundary.

C1--18 to 24 inches; light yellowish brown (10YR 6/4) extremely stony coarse sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and few medium and coarse roots; few very fine, fine and medium interstitial pores; 16 percent cobbles, and 20 percent gravels; abrupt irregular boundary.

C2--24 to 28 inches; interlocking granitic cobbles, and stones; coarse sandy loam soil material in the interstices; 10 percent cobbles, and 20 percent gravels.

Remarks: The particle-size control section textures include coarse sandy loam or sandy loam and clay content between 12 to 20 percent. Rock fragments average over 50 percent. About half of the soil surface is covered by a 1 to 3 cm. layer of plant litter. The soil temperature taken at 50 cm. on 8/14/88 at 1:00 p.m. was 67^{0}F.

TABLE 3-S

MAP UNIT LEGEND
KERN CANYON STUDY AREA
Sequoia National Park

SYMBOL	MAP UNIT NAME
11	Typic Cryorthents complex, 15 to 75 percent slopes
12	Typic Cryorthents - Jointed granitic outcrop complex, 45 to 75 percent slopes
13	Typic Cryorthents complex, 15 to 75 percent slopes
14	Typic Cryorthents - Rubbleland complex, 15 to 45 percent slopes
16	Typic Cryorthents - Rubbleland - Jointed granitic outcrop complex, 15 to 45 percent slopes
17	Typic Cryorthents - Jointed granitic outcrop complex, 15 to 45 percent slopes
19	Typic Cryorthents - Jointed granitic outcrop - Granitic talus complex, 45 to 75 percent slopes
30	Jointed granitic outcrop - Lithic Xerumbrepts complex 45 to 150 percent slopes
31	Jointed granitic outcrop - Lithic Cryumbrepts complex, 10 to 30 percent slopes
32	Jointed granitic outcrop - Typic Cryorthents - Lithic Cryochrepts complex, 10 to 45 percent slopes
33	Jointed granitic outcrop - Lithic Cryochrepts complex, 15 to 45 percent slopes
34	Jointed granitic outcrop - Typic Cryorthents - Granitic talus complex, 45 to 75 percent slopes
35	Jointed granitic outcrop - Granitic talus complex, 45 to 130 percent slopes
36	Jointed granitic outcrop - Lithic Cryochrepts - Typic Xerumbrepts complex, 30 to 130 percent slopes
37	Jointed granitic outcrop - Typic Cryorthents - Lithic Cryopsamments complex, 5 to 35 percent slopes

MAP UNIT LEGEND, Continued

SYMBOL	MAP UNIT NAME
38	Jointed granitic outcrop - Lithic Cryopsamments - Typic Cryorthents complex, 20 to 70 percent slopes
101	Entic Xerumbrepts - Typic Xerumbrepts association, 5 to 25 percent slopes
140	Lithic Mollic Haploxeralfs - Jointed granitic outcrop - Granitic talus complex, 45 to 75 percent slopes
160	Typic Cryopsamments complex, 10 to 60 percent slopes
170	Dystric Cryochrepts association, 5 to 45 percent slopes
171	Dystric Cryochrepts - Typic Cryofluvents - Aeric Cryaquepts complex, 0 to 30 percent slopes
172	Dystric Cryochrepts - Typic Cryaquepts complex, 5 to 20 percent slopes
173	Dystric Cryochrepts - Typic Cryorthents complex, 10 to 30 percent slopes
174	Dystric Cryochrepts - Typic Cryaquepts complex, 5 to 15 percent slopes
176	Dystric Cryochrepts - Aeric Cryaquepts - Jointed granitic outcrop complex, 0 to 25 percent slopes
180	Felsenmeer - Typic Cryorthents - Jointed granitic outcrop complex, 25 to 65 percent slopes
191	Rubbleland - Typic Cryorthents complex, 15 to 35 percent slopes
200	Ultic Haploxeralfs - Granitic talus - Jointed granitic outcrop complex, 30 to 45 percent slopes
W	Lakes and Other Water Bodies

MAP UNITS OF THE KERN CANYON STUDY AREA

DESCRIPTIONS OF MAP UNITS

11 Typic Cryorthents complex, 15 to 75 percent slopes

This map unit occurs on mountain sideslopes and moraines. Slopes are complex. This map unit has two primary components.

50% Typic Cryorthents, sandy-skeletal, mixed, 45 to 75 percent slopes
35% Typic Cryorthents, sandy-skeletal, mixed, 15 to 45 percent slopes

The Typic Cryorthents are deep, excessively drained soils that occur on steep glaciated and unglaciated mountain sideslopes and on moraines. Typically the soil surface is covered by about 70 percent rock fragments. On the glaciated areas, the rock fragments have a mixed size range. On the unglaciated areas, the rock fragments are dominated by pea-size pebbles. The second Typic Cryorthents are deep, somewhat excessively drained soils that occur on gently sloping moraines.

Vegetative cover is mostly foxtail pine with very little understory plants.

There are two inclusions in this map unit.

10% Typic Cryorthents, sandy-skeletal, mixed, 0 to 10 percent slopes
5% Dystric Cryochrepts, sandy-skeletal, mixed, 5 to 20 percent slopes

The Typic Cryorthents are similar to the secondary component except they have fewer rock fragments on the surface and the upper part of their profiles are mainly loamy sands. The Dystric Cryochrepts are moderately deep to a dense and brittle hardpan, excessively drained soils that occur on more stable landscapes.

12 Typic Cryorthents - Jointed granitic outcrop complex, 45 to 75 percent slopes

This map unit is on moraines along the lower part of Whitney Creek. The unit is composed of two components.

70% Typic Cryorthents, sandy-skeletal, mixed, 45 to 75 percent slopes
20% Jointed granitic outcrop

The Typic Cryorthents are mostly deep, somewhat excessively drained soils that occur on sideslopes of lateral moraines. However, they are moderately deep on shoulders of the moraine and near rock outcrops. Typically the soil surfaces are covered by 50 percent rock fragments, mostly pebbles and cobbles, and about 30 percent plant litter.

Vegetative cover is scattered lodgepole pine and foxtail pine with very little understory plants.

There are three inclusions in the map unit.

4% Rubbleland (glacial)
3% Cryofluvents, 5 to 15 percent slopes
3% Lithic Cryochrepts, sandy-skeletal, mixed

The Cryofluvents are located near Whitney Creek. They are deep, somewhat poorly and poorly drained soils that are covered by subalpine meadow vegetation. The Lithic Cryochrepts are shallow,

excessively drained soils that occur near the Jointed granitic outcrops.

13 Typic Cryorthents complex, 15 to 75 percent slopes

This map unit is on sideslopes on mountains and glacial valley plateaus. This unit is composed of three components.

40% Typic Cryorthents, sandy-skeletal, mixed, 30 to 45 percent slopes
25% Typic Cryorthents, sandy-skeletal, mixed, 45 to 75 percent slopes, extremely bouldary
25% Typic Cryorthents, sandy-skeletal, mixed, 15 to 30 percent slopes, (moderately deep to a hardpan)

The first component are deep, excessively drained soils that occur on the lower and middle sideslopes of mountains. Typically the soil surfaces have 50 percent rock fragments dominated by cobbles, stones, and pebbles.

The second component are deep, excessively drained soils that occur on the upper sideslopes of mountains. Typically they have 70 percent rock fragments on the surface with boulders and stones dominating.

The third component are moderately deep to a hardpan, excessively drained soils that occur on undulating glacial valley plateaus.

Vegetative cover is scattered lodgepole and foxtail pines with very little understory.

There are four inclusions in this map unit.

5% Granitic talus
3% Cryaquepts, 5 to 15 percent slopes

1% Jointed granitic outcrop
1% Felsenmeer

The Cryaquepts are deep, somewhat poorly drained soils that occur around seeps covered by subalpine meadow vegetation.

14 Typic Cryorthents - Rubbleland complex, 15 to 45 percent slopes

This map unit is on upper areas of glacially scoured basins near treeline. Slopes are complex. The unit is composed of two components.

60% Typic Cryorthents, sandy-skeletal, mixed, 15 to 45 percent slopes
25% Rubbleland (glacial)

The Typic Cryorthents are deep, somewhat excessively drained soils that occur in between rock outcrop, commonly in slightly concave positions. A similar soil that is moderately well drained are in depressions between rock outcrops covered by sedges and small grasses.

Vegetative cover is lodgepole pine with about 10 percent canopy cover. The understory is sparse.

Included in this map unit are two inclusions.

10% Jointed granitic outcrop
5% Cryofluvents, 0 to 10 percent slopes

The Cryofluvents are somewhat poorly and poorly drained soils that occur around seeps, springs and creeks and are covered by subalpine vegetation.

16 Typic Cryorthents - Rubbleland - Jointed granitic outcrop complex, 15 to 45 percent slopes

The map unit is on moraines and scoured glacial basin floors. It is extremely bouldary. The unit is composed of three components.

45% Typic Cryorthents, sandy-skeletal, mixed, 15 to 45 percent slopes
25% Rubbleland (glacial)
20% Jointed granitic outcrop

The Typic Cryorthents are mostly deep, somewhat excessively drained soils that occur on sideslopes of lateral moraines. Typically they are covered by 75 percent rock fragments, dominated by stones and boulders.

Vegetative cover is lodgepole and foxtail pines. Some individual western juniper trees occur on warmer, drier and more exposed areas. The plant cover averages 5 to 15 percent. Understory plants are sparse.

There are two inclusions in this map unit.

5% Granitic talus
5% Lithic Cryumbrepts

The Lithic Cryumbrepts are shallow and skeletal soils around rock outcrops.

17 Typic Cryorthents - Jointed granitic outcrop complex, 15 to 45 percent slopes

This map unit is on mountain sideslopes and ridges. Slopes are complex. It is composed of two components.

75% Typic Cryorthents, sandy-skeletal, mixed, 15 to 45 percent slopes
15% Jointed granitic outcrop

The Typic Cryorthents are mainly deep, excessively drained soils that occur on mostly unglaciated mountain sideslopes and ridges. Typically they are covered by about 80 percent rock fragments, dominated by boulders.

Vegetative cover is mostly foxtail pine with a sparse understory of sedges and herbs. Some lodgepole pines occur on lower elevations. The plant cover is about 5 to 10 percent. Litter cover is less than 10 percent.

There are two inclusions in this map unit.

5% Felsenmeer
5% Granitic talus

Some of the felsenmeer have under 10 percent soil material between the interspaces and overlying the surface. The material is made of coarse sands and pebbles.

19 Typic Cryorthents - Jointed granitic outcrop - Granitic talus complex, 45 to 75 percent slopes

This map unit is on sidewalls of glacially scoured basins. Slopes are complex. The unit is composed of three components.

40% Typic Cryorthents, sandy-skeletal, mixed, 45 to 75 percent slopes
25% Jointed granitic outcrop
25% Granitic talus

The Typic Cryorthents are mostly deep, excessively drained soils that occur near rock outcrops. Typically they are covered by 60 percent rock fragments, dominated by stones and boulders.

Vegetative cover is scattered lodgepole pine and foxtail pine with very little understory.

There are two inclusions in this map unit.

5% Rubbleland (glacial)
5% Lithic Cryumbrepts, loamy-skeletal, mixed

The Lithic Cryumbrepts are shallow, well drained soils that occur near rock outcrops.

30 Jointed Granitic outcrop - Lithic Xerumbrepts complex, 45 to 150 percent slopes

This map unit is sidewalls of the Kern Canyon. Slopes are complex. The unit is composed of two components.

70% Jointed granitic outcrop
15% Lithic Xerumbrepts, loamy-skeletal, mixed, frigid, 45 to 150 percent slopes

The Jointed granitic outcrops are sparsely jointed granodiorite and some granite. The Lithic Xerumbrepts are very shallow and shallow to granitic rock, well drained soils that occur between rock joints, crevices, and on ledges. The aspects are primarily westerly. Typically they are covered by 75 percent rock fragments, dominated by pebbles.

Vegetative cover is mostly western juniper, Jeffrey pine, manzanita and chinquapin. Also there are a few little foxtail and lodgepole pines. Understory plants cover about 15 percent.

31 Jointed granitic outcrop - Lithic Cryumbrepts complex, 10 to 30 percent slopes

This map unit is on cirque basin floors, benches, and lower sidewalls above treeline. Slopes are complex. The unit is composed of two components.

60% Jointed granitic outcrop
30% Lithic Cryumbrepts, loamy-skeletal, mixed, 10 to 30 percent slopes

The Lithic Cryumbrepts are very shallow and shallow, well drained soils that occur on cirque basin floors, benches, and lower side walls. Typically they are covered by 45 percent fragments, dominated by cobbles and stones. This soil is subject to nearly continuous frost action and are very friable and fluffy.

Vegetative cover are low growing alpine plants such as sedges, grasses, buckwheats, pussypaws, and Indian paintbrush. Protected areas behind rocks sometimes have currants and willow.

There is one inclusion in this map unit.

10% Typic Cryaquepts, 0 to 10 percent slopes

Typic Cryaquepts are poorly and very poorly drained soils that occur near seeps and in depressions near water. They have alpine meadow vegetation.

32 Jointed granitic outcrop - Typic Cryorthents - Lithic Cryochrepts complex, 10 to 45 percent slopes

This map unit is on scoured glacial basins and moraines. Slopes are complex, often forming a series of benches. The unit is composed of three components.

35% Jointed granitic outcrop
30% Typic Cryorthents, sandy-skeletal, mixed, 15 to 45 percent slopes
20% Lithic Cryochrepts, loamy-skeletal, mixed, 10 to 30 percent slopes

The Jointed granitic outcrops are frequently jointed at right angles and form a bench-basin landscape. The Typic Cryorthents are moderately deep and deep, excessively drained soils that occur on moraines and depressions between rock outcrops. The Lithic Cryochrepts are very shallow and shallow, well drained soils that occur between rock joints and crevices and ledges.

Vegetative cover is a mixture of lodgepole and foxtail pines with very little understory plants.

There are two inclusions in this map unit.

10% Typic Cryorthents, sandy-skeletal, mixed, 5 to 15 percent slopes
5% Aeric Cryaquepts, 0 to 10 percent slopes

The Typic Cryochrepts are moderately deep to a hardpan, well drained and moderately well drained soils that occur in depressions. The Aeric Cryaquepts are somewhat poorly drained soils that occur along drainages and closed basins.

33 Jointed granitic outcrop - Lithic Cryochrepts complex, 15 to 45 percent slopes

This map unit is on glacially scoured basins. Slopes are complex. The unit is composed of two components.

70% Jointed granitic outcrop

20% Lithic Cryochrepts, loamy-skeletal, mixed, 15 to 45 percent slopes

The Jointed granitic outcrops are sparsely jointed mainly granodiorite. The Lithic Cryochrepts are very shallow and shallow, well drained soils that occur between rock joints and crevices and on ledges. Typically they are covered by 50 percent rock fragments, dominated by pebbles.

Vegetative cover is a mixture of lodgepole and foxtail pines with very few understory components.

There is one inclusion in this map unit.

10% Typic Cryorthents, sandy-skeletal, mixed, 15 to 45 percent slopes

They are moderately deep and deep, excessively drained soils that occur on slightly concave areas below rock outcrops.

34 Jointed granitic outcrop - Typic Cryorthents - Granitic talus complex, 45 to 75 percent slopes

This map unit is on scoured glacial basins and moraines. Slopes are complex. The unit is composed of three components.

30% Jointed granitic outcrop
30% Typic Cryorthents, sandy-skeletal, mixed, 45 to 75 percent slopes
30% Granitic talus

The Jointed granitic outcrops are sparsely jointed granodiorite and some granite. Typic Cryorthents are deep, excessively drained soils that occur on lateral moraines. They are covered by 20 to 60 percent boulders.

Vegetative cover is scattered lodgepole and foxtail pines with very little understory plants.

There are two inclusions in this map unit.

7% Rubbleland (glacial)
3% Lithic Cryorthents, sandy-skeletal, mixed, 55 to 75 percent slopes

The Lithic Cryorthents are very shallow and shallow, excessively drained soils that occur near rock outcrops.

35 Jointed granitic outcrop - Granitic talus complex, 45 to 130 percent slopes

This map unit is on headwalls of cirque basins. slopes are complex. The area is above treeline. The unit is composed of two components.

50% Jointed granitic outcrop
40% Granitic talus

The Jointed granitic outcrops are mainly granodiorite and some granite. They occur mostly on slopes greater than 50 percent. The granitic talus is made of mostly stones and boulders.

Vegetative cover is of herbs and low growing alpine plants such as buckwheats, pussypaws, and mountain heather.

There is one inclusion in this map unit.

10% Typic Cryorthents, sandy-skeletal, mixed, 30 to 60 percent slopes

They are moderately deep and deep, excessively drained soils that occurs in between rocks on talus.

36 Jointed granitic outcrop - Lithic Cryochrepts - Typic Xerumbrepts complex, 30 to 130 percent slopes

This map unit is on canyon walls of the Kern River Canyon and lower Wallace Creek drainage. Slopes are complex. The unit is composed of three components.

50% Jointed granitic outcrop
20% Lithic Cryochrepts, loamy-skeletal, mixed, 45 to 130 percent slopes
15% Typic Xerumbrepts, loamy-skeletal, mixed, frigid, 30 to 45 percent slopes

The Lithic Cryochrepts are very shallow and shallow, well drained soils that occur on cooler areas (north and east aspects and higher elevations) often around Jointed granitic outcrop. The Typic Xerumbrepts are moderately deep to deep to hard granitic rock, somewhat excessively drained soils that occur on warmer areas (south and west aspects and lower elevations) on the lower canyon walls by granitic talus.

Vegetative cover is mostly Jeffrey, lodgepole and foxtail pines with small scattered western juniper on the drier, harsher sites.

Shrub cover is 10 to 50 percent and includes manzanita, ceanothus, and chinquapin.

There are two inclusions in this map unit.

10% Granitic talus
5% Lithic Cryorthents, sandy-skeletal, mixed

The Lithic Cryorthents are shallow, excessively drained soils that occur around granitic outcrops.

37 Jointed granitic outcrop - Typic Cryorthents - Lithic Cryopsamments complex, 5 to 35 percent slopes

This map unit is on cirque basins and moraines above treeline. Slopes are complex. The unit is composed of three components.

50% Jointed granitic outcrop
25% Typic Cryorthents, sandy-skeletal, mixed, 5 to 20 percent slopes
15% Lithic Cryopsamments, mixed, 15 to 35 percent slopes

The Typic Cryorthents are moderately deep, excessively drained soils that occur on moraines and glacial dumps. The Lithic Cryopsamments are very shallow and shallow, excessively drained soils that occur between rock joints and crevices. Typically both of these soils are covered by about 55 percent rock fragments. Vegetative cover includes alpine plants such as buckwheat, pussypaws, and mountain heather.

There is one inclusion in this map unit.

5% Typic Cryaquepts, 0 to 10 percent slopes

The Typic Cryaquepts are somewhat poorly and poorly drained soils that occur near seeps and drainages.

38 Jointed granitic outcrop - Lithic Cryopsamments - Typic Cryorthents complex, 20 to 70 percent slopes

This map unit is on cirque basins, moraines, and sidewalls above treeline. Slopes are complex. The unit is composed of three components.

45% Jointed granitic outcrop
30% Lithic Cryopsamments, mixed, 35 to 70 percent slopes
15% Typic Cryorthents, sandy-skeletal, mixed, 20 to 40 percent slopes

The Lithic Cryopsamments are very shallow and shallow to granitic rock, excessively drained soils that occur in between rock joints and crevices and on ledges. The Typic Cryorthents are mostly moderately deep, excessively drained soils that occur on slightly concave positions below rock outcrops and on moraines.

Vegetative cover includes low growing alpine plants such as buckwheat, pussypaws, and mountain heather.

There are two inclusions in this map unit.

7% Rubbleland (glacial)
3% Surface water

101 Entic Xerumbrepts - Typic Xerumbrepts association, 5 to 25 percent slopes

This map unit is on the floor of the Kern River Canyon. Slopes are complex. The unit has three primary components.

50% Entic Xerumbrepts, sandy-skeletal, mixed, frigid, 10 to 25 percent slopes
20% Typic Xerumbrepts, loamy-skeletal, mixed, frigid, 10 to 25 percent slopes
15% Entic Xerumbrepts, sandy, mixed, frigid, 5 to 15 percent slopes

The first component are deep, excessively drained soils that occur on alluvial fans overlying the canyon floor. Typically these soils surfaces are covered by 60 percent rock fragments. The Typic

Xerumbrepts are deep, somewhat excessively drained soils that occur on dissected terraces. Typically these soils have 50 percent rock fragments, dominated by cobbles and stones, on the surface. The Entic Xerumbrepts, sandy, mixed, frigid are deep, somewhat excessively drained soils that occur on glacial outwash and fluvial deposits. Typically they are covered by 20 percent rock fragments, mainly pebbles.

Vegetative cover is dominated by Jeffrey pine with smaller amounts of white fir, lodgepole, and western juniper. Shrubs are ceanothus, manzanita, chinquapin, and currant.

There are four inclusions in this map unit.

- 5% River sand and gravel bars
- 4% Lithic Xerumbrepts, loamy-skeletal, mixed, frigid, 15 to 35 percent slopes
- 4% Jointed granitic outcrop
- 2% Humaquepts, 0 to 10 percent slopes

The Lithic Xerumbrepts are shallow, somewhat excessively drained soils that occur around rock outcrops. The Humaquepts are deep, somewhat poorly drained and poorly drained soils that support subalpine meadow vegetation.

140 Lithic Mollic Haploxeralfs - Jointed granitic outcrop - Granitic talus complex, 45 to 75 percent slopes

This map unit is on the sideslopes of the Kern River Canyon. Aspects are mainly westerly and slopes are complex. The unit is composed of three components.

- 45% Lithic Mollic Haploxeralfs, loamy-skeletal, mixed, frigid, 45 to 75 percent slopes
- 25% Jointed granitic outcrop

20% Granitic talus

The Lithic Mollic Haploxeralfs are shallow, somewhat excessively drained soils that occur on the middle and lower sideslopes of canyons. They occur on unstable slopes. Typically the soil surface is covered by 65 percent rock fragments, dominated by cobbles and stones. The Jointed granitic outcrops are sparsely jointed and occur on the middle portions of sideslopes but occasionally appear all the way down to the rivers edge. The granitic talus occurs mainly on the lower portions of sideslopes and consists of loosely arranged boulders and stones.
Vegetative cover is mainly shrubs such as manzanita and ceanothus. There are, however, some scattered Jeffrey pines and western junipers.

There is one inclusion in this map unit.

10% Entic Xerumbrepts, sandy-skeletal, mixed, frigid, 15 to 35 percent slopes

160 Typic Cryopsamments complex, 10 to 60 percent slopes

This map unit is on unglaciated alluvial fans and mountain sideslopes. Slopes are complex. The unit is composed of two components.

55% Typic Cryopsamments, mixed, 10 to 35 percent slopes
35% Typic Cryopsamments, mixed, 35 to 60 percent slopes

The first component are deep, excessively drained soils that occur on dissected alluvial fans and lower mountain sideslopes. Typically the soil surface is covered by 55 percent rock fragments, mainly pebbles. The second component soils are moderately deep and deep, excessively drained soils that occur on upper mountain sideslopes often below very broken, Jointed granitic outcrops. Typically the

soil is found between huge boulders, commonly more than 3 meters across. The boulders cover about 75 percent of the surface.

Vegetative cover is made up almost entirely of foxtail pine. Plant cover is about 15 percent.

There are two inclusions in this map unit.

- 5% Jointed granitic outcrop
- 5% Typic Cryorthents, sandy-skeletal, mixed, 45 to 60 percent slopes

170 Dystric Cryochrepts association, 5 to 45 percent slopes

This map unit is on a glacial till overlying broad plateaus. The unit is composed of three components.

- 55% Dystric Cryochrepts, sandy, mixed, 5 to 15 percent slopes
- 20% Dystric Cryochrepts, sandy-skeletal, mixed, 15 to 30 percent slopes
- 15% Dystric Cryochrepts, sandy-skeletal, mixed, shallow, 25 to 45 percent slopes

The Dystric Cryochrepts, sandy, mixed are moderately deep to a hardpan, excessively drained soils that occur on the upper and smoother portion of plateaus. Typically they are covered by 35 percent rock fragments, dominated by stones and boulders. The Dystric Cryochrepts, sandy-skeletal are moderately deep to a hardpan, somewhat drained soils that occur on the middle portions of the plateau. The plateaus are moderately dissected. Typically the soils surface is covered by 45 percent rock fragments, dominated by stones and boulders. The third component is shallow to a hardpan, somewhat drained and occurs on very dissected, lower

portions of plateaus. Typically they are covered by 45 percent rock fragment.

Vegetative cover is lodgepole and foxtail pines with very little understory plants. Plant cover is about 20 to 25 percent.

There are two inclusions in this map unit.

- 7% Typic Cryorthents, sandy-skeletal, mixed, 35 to 75 percent slopes
- 3% Typic Cryaquepts, 5 to 15 percent slopes

The Typic Cryorthents are moderately deep and deep soils that occur on moraine sideslopes. Typic Cryaquepts are in wet areas.

171 Dystric Cryochrepts - Typic Cryofluvents - Aeric Cryaquepts complex, 0 to 30 percent slopes

This map unit is on moraines, drainageways and glacial outwash deposits. Slopes are complex. The unit is composed of three components.

- 55% Dystric Cryochrepts, sandy-skeletal, mixed, 10 to 30 percent slopes
- 25% Typic Cryofluvents, sandy-skeletal, mixed, 0 to 5 percent slopes
- 15% Aeric Cryaquepts, sandy-skeletal, mixed, 5 to 15 percent slopes

The Dystric Cryochrepts are moderately deep to hardpan, excessively drained soils that occur on lateral moraines. The Typic Cryofluvents are deep, somewhat poorly drained soils that occur on glacial outwash deposits and drainageways. The Aeric Cryaquepts are deep, poorly and very poorly drained soils that occur around seeps and drainageways.

Vegetative cover is scattered lodgepole pines and foxtail pines with very little understory on the Dystric Cryochrepts soils. Scattered lodgepole pine with meadow grasses and sedges occur in the second and third components.

There are two inclusions in this map unit.

- 3% Rubbleland (glacial)
- 2% Typic Cryorthents, sandy-skeletal, mixed, 5 to 25 percent slopes

The Typic Cryorthents are mostly deep, excessively drained soils that occur on steeper sideslopes of moraines.

172 Dystric Cryochrepts - Typic Cryaquepts complex, 5 to 20 percent slopes

This map unit is on glacial basins. Slopes are complex. The unit is composed of two components.

- 70% Dystric Cryochrepts, sandy-skeletal, mixed, 5 to 20 percent slopes
- 15% Typic Cryaquepts, coarse-loamy, mixed, 5 to 10 percent slopes

The Dystric Cryochrepts are moderately deep to a hardpan, excessively drained soils that occur on moraines on top of the glacial basins. The Typic Cryaquepts are deep, poorly drained soils that occur on shallow drainageways associated with eskers, kettles and outwashes.

Vegetative cover is lodgepole and foxtail pines with very little understory on the Dystric Cryochrepts, Meadow Vegetation occurs on the Typic Cryaquepts.

There are three inclusions in this map unit.

5% Rubbleland (glacial)
5% Jointed granitic outcrop
5% Lithic Cryorthents, sandy-skeletal, mixed

173 Dystric Cryochrepts - Typic Cryorthents complex, 10 to 30 percent slopes

This map unit is on glacial plateaus at and above treeline. Slopes are complex. The unit is composed of two components.

60% Dystric Cryochrepts, sandy, mixed, 10 to 30 percent slopes
25% Typic Cryorthents, sandy-skeletal, mixed, 10 to 30 percent slopes

The Dystric Cryochrepts are moderately deep to a hardpan, excessively drained soils that occur on mostly slightly undulating plateaus. Typically the soil surface is covered by 75 percent rock fragments, mainly small pebbles. The Typic Cryorthents are deep, excessively drained soils that occur on ground till. Typically the soil surface is covered by 80 percent rock fragments, dominated by cobbles and stones.

Vegetative cover is scattered foxtail pine with 5 to 10 percent canopy cover with some sedges and grasses. Above treeline there are only sedges and grasses.

There are three inclusions in this map unit.

5% Jointed granitic outcrop
5% Rubbleland (glacial)
5% Typic Cryaquepts, 5 to 15 percent slopes

The Typic Cryaquepts are deep, somewhat poorly and poorly drained soils that are covered by meadow vegetation.

174 Dystric Cryochrepts - Typic Cryaquepts complex, 5 to 15 percent slopes

This map unit is on glacial basins near treeline. Slopes are complex. The unit is composed of two components.

35% Dystric Cryochrepts, sandy-skeletal, mixed, 5 to 15 percent slopes
35% Typic Cryaquepts, sandy, mixed, 5 to 15 percent slopes

The Dystric Cryochrepts are moderately deep to a dense and brittle hardpan, excessively drained. They are on moraines and ground till overlying glacial basins. Typically the soil surface is covered by 75 percent rock fragments. The Typic Cryaquepts are deep, somewhat poorly and poorly drained soils that occur on drainageways and glacial outwash deposits.

Vegetative cover is sparse lodgepole and foxtail pines with little understory on the Dystric Cryochrepts. Wet and semi-wet meadow vegetation cover the Typic Cryaquepts.

There are three inclusions in this map unit.

5% Rubbleland (glacial)
5% Jointed granitic outcrop
5% Typic Cryopsamments, mixed

176 Dystric Cryochrepts - Aeric Cryaquepts - Jointed granitic outcrop complex, 0 to 25 percent slopes

This map unit is on glacial basins. Slopes are complex. The unit is composed of three components.

45% Dystric Cryochrepts, sandy-skeletal, mixed, 5 to 25 percent slopes
30% Aeric Cryaquepts, sandy-skeletal, mixed, 0 to 10 percent slopes
15% Jointed granitic outcrop

The Dystric Cryochrepts are moderately deep to a dense and brittle hardpan, excessively drained soils that occur on moraines and ground till. Typically the soil surface is covered by about 60 percent rock fragments. The Aeric Cryaquepts are deep poorly and very poorly drained soils that occur around drainageways and seeps.

Vegetative cover is lodgepole and foxtail pine with very little understory plants on the top of the Dystric Cryochrepts. Subalpine wet meadow and semi-wet meadow grasses, sedges and forbs lie on top of the Aeric Cryaquepts.

There are two inclusions in this map unit.

5% typic Cryorthents, sandy-skeletal, mixed, 10 to 30 percent slopes
5% Humic Cryaquepts, 0 to 5 percent slopes

The Typic Cryorthents occur on steeper sideslopes of moraines. The Humic Cryaquepts are poorly and very poorly drained soils that have ponded water.

180 Felsenmeer - Typic Cryorthents - Jointed granitic outcrop complex, 25 to 65 percent slopes

This map unit occurs on very high, unglaciated mountain ridges and sideslopes. Slopes are complex. The unit is composed of three components.

45% Felsenmeer (granitic)
20% Typic Cryorthents, sandy-skeletal, mixed, 25 to 65 percent slopes
15% Jointed granitic outcrop

This map unit is extremely stony and bouldary. Rock fragments are angular and frost shattered. The Typic Cryorthents are moderately deep and deep, excessively drained soils that are commonly overlying felsenmeer.

Vegetative cover is a very sparse mixture of small alpine grasses, sedges, and forbs. The plants grow among large rocks mainly in sheltered sites away from the cold and wind.
There are three inclusions in this map unit.

10% Granitic talus
5% Lithic Cryorthents, sandy-skeletal, mixed
5% Lithic Cryopsamments, mixed

191 Rubbleland - Typic Cryorthents complex, 15 to 35 percent slopes

This map unit is on moraines and glacial dumps at or near treeline. Slopes are commonly complex. The unit is composed of two components.

50% Rubbleland (glacial)
35% Typic Cryorthents, sandy-skeletal, mixed, 15 to 35 percent slopes

The Typic Cryorthents are moderately deep and deep, excessively drained soils that occur on lateral and recessional moraines. Typically the soil surface is covered by 75 percent rock fragments, dominantly stones and boulders.

Vegetative cover is scattered lodgepole and foxtail pines. Canopy cover is less than 5 percent.

There are three inclusions in this map unit.

- 5% Jointed granitic outcrop
- 5% Typic Cryofluvents, sandy-skeletal, mixed, 5 to 15 percent slopes
- 5% Aeric Typic Cryaquepts, sandy-skeletal, mixed, 5 to 15 percent slopes

The Cryofluvents and Cryaquepts are deep and somewhat poorly or poorly drained soils. The vegetation consists of willows, meadow grasses, and sedges.

200 Ultic Haploxeralfs - Granitic talus - Jointed granitic outcrop complex, 30 to 45 percent slopes

This map unit is on sideslopes of the Kern River Canyon. The unit is composed of three units.

- 40% Ultic Haploxeralfs, loamy-skeletal, mixed, frigid, 30 to 45 percent slopes
- 35% Granitic talus
- 15% Jointed granitic outcrop

The Ultic Haploxeralfs are moderately deep and deep, somewhat excessively drained soils that occur on smooth and convex unstable slopes of the canyon. Typically the soil surface is covered by 75 percent rock fragments, dominated by cobbles, stones, and boulders.

The granitic talus occurs below Jointed granitic outcrops and cliffs commonly in the upper part of the unit. The Jointed granitic outcrop occurs throughout the unit on steeper slopes (45 to 130%).

Vegetative cover consists of Jeffrey pine and white fir with manzanita, chinquapin, and ceanothus. Canopy cover is about 5 to 10 percent.

There is one inclusion in this map unit.

10% Lithic Mollic Haploxeralfs, loamy-skeletal, mixed, frigid, 45 to 60 percent slopes

W Lakes and Other Water Bodies

This miscellaneous unit consists of lakes formed by the ice streams of Kern glacier during the Wisconsin Stage.

APPENDIX B

DATA TABLES

Supplemental Text to

SURVEY OF SOIL MAP UNIT SENSITIVITY
TO ACID DEPOSITION
IN THE
SIERRA NEVADA, CALIFORNIA

SURVEY OF SOILS FOR SENSITIVITY
TO ACID DEPOSITION