APPENDIX 2-2

SOIL DESCRIPTIONS NRCS

Soil Descriptions for Appendix 2-2 are all hard copies no electronic copies exist.

APPENDIX 2-2

Order 3 Soil Map Unit Descriptions
(USDA, Natural Resource Conservation Service)

The soil survey of the Emery Area, Utah is in progress. This information is based on the status as of July 20, 1999. Many of the Soil Map Units are similar to units mapped in the soil survey of the Carbon Area, Utah. Some of the Carbon Area Soil Map Unit Descriptions are used for reference in this appendix.

BMD - Strych very stony loam, dry, 3 to 30 percent slopes. This very deep, well drained soil is on alluvial fans and terraces. It is at the foot of the Book Cliffs, extending from Horse Canyon to the town of Wattis. This soil formed in alluvium and glacial outwash derived dominantly from sandstone and shale. Slopes are 300 to 400 feet long and are concave to convex. The present vegetation is mainly Utah juniper, pinyon, Salina wildrye, Indian ricegrass, and Mormon-tea. Elevation is 5,400 to 6.400 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 47 to 49 degrees F, and the average freeze-free period is 110 to 135 days.

Typically, the surface layer is pale brown very stony loam about 3 inches thick. The next layer is pale brown very stony sandy loam about 21 inches thick. Below this to a depth of 60 inches or more is light yellowish brown very cobbly sandy loam.

Included in this unit are about 10 percent Mivida gravelly fine sandy loam and 5 percent Hernandez family loam.

Permeability of this Strych soil is moderately rapid. Available water capacity is about 3.5 to 7.0 inches. Water supplying capacity is 4 to 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland, woodland, and wildlife habitat.

The potential vegetation on the Strych soil includes an overstory of Utah juniper and pinyon with a canopy of 25 percent. The understory vegetation is 35 percent grasses, 15 percent forbs, and 50 percent shrubs. Among the important plants are Utah juniper, black sagebrush, galleta, and needle and thread.

The site index for Utah juniper and pinyon is 40. Average yield is 6 cords of wood per acre. The potential for the production of posts or Christmas trees is good. This unit is moderately limited for the harvesting of wood products because of the steepness of slope and the hazard of erosion. If wood products are harvested, the slash should be left scattered on the surface to protect the soil from erosion.

Management practices that maintain or improve the rangeland vegetation include proper grazing system, and proper location of water developments. If Utah juniper and pinyon are thinned, the desirable plants present can be expected to increase for a short period before the Utah juniper and pinyon revegetate the unit.

The suitability of this unit for rangeland seeding is poor. The main limitations are the content of rock fragments on and in the soil, low annual precipitation, and

competition from Utah juniper and pinyon. Broadcast seeding followed by surface dragging of an anchor chain or drag rail to cover the seed is a suitable practice. Plants that may be suitable for seeding are pubescent wheatgrass, crested wheatgrass, and adapted native plants.

This map unit is in capability subclass VIIs, nonirrigated, and in the Semidesert Stony Loam (Utah Juniper-Pinyon) woodland site.

Strych Very Stony Loam - BMD

Badland. Badland is steep or very steep, nearly barren areas of shale that are dissected by many intermittent drainageways; some areas of shale are interbedded with sandstone. Runoff is rapid to very high and geologic erosion is active. Badland is associated mainly with the Mancos Shale Formation and is in the Carbon County part of Castle Valley, at the base of the Book Cliffs and Gentry Mountains.

Included in this unit are about 5 percent Chipeta soils and 5 percent Gerst, dry, soils.

This unit is used as wildlife habitat.

This map unit is in capability subclass VIIIe, nonirigated. It is not placed in a range site.

Badland - BL-2

Gerst-Strych-Badland Complex, 50 to 70 percent slopes. This map unit is on side slopes of benches. It is at the base of the Book Cliffs and Gentry Mountain, extending from Horse Canyon to Huntington Canyon. Slopes are 100 to 300 feet long, are concave to convex, and have all aspects. Elevation ranges from 5,800 to 7,500 feet but is dominantly 6,000 to 7,000 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 45 to 47 degrees F, and the average freeze-free period is 100 to 120 days.

This unit is 50 percent Gerst extremely stony loam, 50 to 70 percent slopes, eroded; 15 percent Strych very stony loam, 50 to 70 percent slopes; 15 percent Badland; and 20 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 10 percent Rubbleland and 5 percent Travessilla sandy loam and 5 percent Rock outcrop on remnant tops. Also included are small

areas of Strych very stony loam.

The Gerst soil is shallow and well drained. It formed in colluvium and residuum derived dominantly from sandstone and shale. The present vegetation is mainly pinyon, juniper, Salina wildrye, Indian ricegrass, needleandthread, galleta, and birchleaf mountainmahogany.

Typically, the surface layer is light brownish gray extremely stony loam about 7 inches thick. The underlying material to a depth of 19 inches is gray and light brownish gray channery silt loam over weathered shale. Depth to shale ranges from 10 to 20 inches.

Permeability of this Gerst soil is moderately slow. Available water capacity is about 3 to 3 inches. Water supplying capacity is 3 to 5 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 1 to 3 percent. Runoff is rapid, and the hazard of water erosion is high.

The Strych soil is very deep and well drained. It formed in colluvium derived dominantly from sandstone and shale. The present vegetation is mainly pinyon, Utah juniper, Salina wildrye, Indian ricegrass, black sagebrush, and birchleaf mountainmahogany.

Typically, the surface layer is pinkish gray very stony loam about 5 inches thick. The next layer is light gray and very pale brown very stony loam about 42 inches thick. Below this depth of 60 inches or more is very pale brown cobbly sandy loam. A layer of secondary calcium carbonate accumulation is at a depth of about 5 inches.

Permeability of the Strych soil is moderately rapid. Available water capacity is about 3.5 to 6.5 inches. Water supplying capacity is 4 to 7 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 3 percent. Runoff is rapid, and the hazard of water erosion is high.

Badland is steep or very steep, nearly barren areas of shale that are dissected by many intermittent drainageways. Some areas are interbedded with sandstone. Runoff is rapid to very rapid, and geologic erosion is active.

This unit is used as wildlife habitat, rangeland, and woodland.

The potential vegetation on the Gerst soil includes an overstory of pinyon and Utah juniper with a canopy of 15 percent. The understory vegetation is 40 percent grasses, 20 percent forbs, and 40 percent shrubs. Among the important plants are Salina wildrye, Indian ricegrass, birchleaf mountainmahogany, and Utah

serviceberry.

The site index for Utah juniper and pinyon is 15 to 25. Average yield is 1 to 2 cords of wood per acre. The potential for the production of posts or Christmas trees is very poor. This unit is severely limited for the harvesting of wood products because of the steepness of slope and the hazard of erosion.

The suitability of the Gerst soil for grazing is poor. For critical erosion control, small areas can be mechanically treated and seeded. It is not practical to revegetate large areas of rangeland because of the shallow soil depth and the hazard of water erosion. Plants that may be suitable for critical area seedings are those native to the soil.

The potential vegetation on the Strych soil includes an overstory of pinyon and Utah juniper with a canopy of 30 percent. The understory vegetation is 45 percent grasses, 10 percent forbs, and 45 percent shrubs. Among the important plants are birchleaf mountainmahogany, black sagebrush, Salina wildrye, and needleandthread.

The site index for pinyon and Utah juniper is 50. Average yield is 6 cords of wood per acre. This unit is severely limited for the harvesting of wood products because of the steepness of slope and the hazard of erosion.

This unit is not grazeable by livestock because of the steepness of slope.

The Gerst and Strych soils are in capability subclass VIIe, and Badland is in capability subclass VIIIe. The Gerst soil is in the Upland Very Steep Shallow Clay Loam (Pinyon-Utah Juniper) woodland site. The Strych soil is in the Upland Very Steep Stony Loam (Pinyon-Utah Juniper) woodland site. Badland is not placed in a woodland site.

Gerst-Strych-Badland Complex-NGG2

Travessilla-Travessilla family-Rock outcrop complex. This map unit is on canyonsides in the Dry Canyon and Cottonwood Canyon areas. Slopes are 30 to 80 percent.

This unit is 35 percent Travessilla fine sandy loam, dry, 50 to 80 percent slopes; 20 percent Travesilla family channery sandy loam, dry 30 to 50 percent; 15 percent Rock outcrop; and 30 percent other soils. The Travessilla soil is generally near the canyon rims, the Travessilla family soil is near the canyon bottoms, and the Rock

outcrop is on nearly vertical cliffs. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 13 percent Strych very stony loam, dry; 10 percent Cabba family bouldery loam, 40 to 70 percent slopes; and 7 percent Badland.

The Travessilla soil is shallow and well drained. It formed in residuum derived dominantly from sandstone and interbedded shale. Slopes are 100 to 200 feet long, are convex, and have north aspect. The present vegetation in most areas is mainly pinyon, Utah juniper, shadscale, and eriogonum. Elevation is 5,600 to 6,200 feet. The average annual precipitation is 10 to 12 inches, the average annual air temperature is 47 to 49 degrees F, and the average freeze-free period is 110 to 135 days. Typically, the surface layer is brown fine sandy loam about 2 inches thick. The underlying material to a depth of 10 inches is brown fine sandy loam over sandstone. Depth to sandstone ranges from 8 to 20 inches.

Permeability of the Travesilla soil is moderately rapid. Available water capacity is about 1.0 to 1.5 inches. Water supplying capacity is 2 to 3 inches. Effective rooting depth is 8 to 20 inches. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate.

The Travessilla family soil is shallow and well drained. It formed in residuum derived dominantly from sandstone and interbedded shale. Slopes are 100 to 200 feet long, are convex, and have west aspect. The present vegetation in most areas is mainly black sagebrush, galleta, Indian ricegrass, yellowbrush, and fourwing saltbrush. Elevation is 5,600 to 5,800 feet. The average annual precipitation is 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average freeze-free period is 110 to 135 days. Typically, the surface layer is light yellowish brown channery sandy loam about 4 inches thick. The upper 7 inches of the underlying material is light yellowish brown sandy loam, and the lower part to a depth of 13 inches is very pale brown sandy loam over sandstone. Depth to sandstone ranges from 8 to 15 inches.

Permeability of the Travessilla family soil is moderately rapid. Available water capacity is about 1.5 to 2.0 inches. Water supplying capacity is 2 to 3 inches. Effective rooting depth is 8 to 15 inches. The organic mater content of the surface layer 0.5 to 2.0 percent. Runoff is rapid, and the hazard of water erosion is high.

Rock outcrop consists of areas of exposed sandstone. It is dominantly on nearly vertical cliffs. Sparse vegetation is in the cracks and fissures in the rock. The vegetation is dominantly juniper and pinyon.

This unit is used as rangeland, woodland, and wildlife habitat.

The potential vegetation on the Travessilla soil includes an overstory of Utah juniper and pinyon with a canopy of 30 percent. The understory vegetation is 15 percent grasses, 5 percent forbs, and 80 percent shrubs. Among the important plants are black sagebrush, Salina wildrye, bluebunch wheatgrass, and Mormon-tea.

The site index for Utah juniper and pinyon is 40. Average yield is 8 cords of wood per acre. The potential for the production of posts or Christmas trees is poor. This unit is severely limited for the harvesting of wood products because of the steepness of slope and the hazard of erosion.

The suitability of this soil for grazing is very poor. The main limitation is the steepness of slope, which results in poor distribution of livestock.

The potential plant community on the Travessilla family channery sandy loam is 35 percent grasses, 5 percent forbs, and 60 percent shrubs. Among the important plants are black sagebrush, Indian ricegrass, shadscale, and galleta.

Management practices that maintain or improve the rangeland vegetation include proper grazing use, a planned grazing system, and proper location of water developments.

The suitability of this soil for rangeland seeding is for because of the steepness of slope and shallow depth. It is not practical to revegetate large areas because of the shallow soil depth and low precipitation. For critical erosion control, small areas can be mechanically treated and seeded. Plants that may be suitable for critical area seedings are those native to the soil and prostrate kochia and crested wheatgrass.

This map unit is in capability subclass VIIe, nonirrigated. The Travessilla soil is in the semidesert Very Steep Shallow Loam (Utah Juniper-Pinyon) woodland site. The Travessilla family soil is in the Semidesert Shallow Loam (Black Sagebrush) range site. The Rock outcrop is not placed in a woodland site or a range site.

Travessilla-Travessilla family-Rock outcrop complex - RZH

Senchert loam, 3 to 15 percent slopes. This moderately deep, well drained soil is on plateaus and ridges. It is near Steer, Gooseneck, Buckskin, and Van Duesen Ridges and at the tip of Whit more Par. It formed in alluvium and residuum derived dominantly from sandstone and shale. Slopes are 100 to 200 feet long and are concave to convex. The present vegetation is mainly aspen and snowberry. Elevation is 8,700 to 9,500 feet. The average annual precipitation is about 20 to 30

inches, the average annual air temperature is 36 to 38 degrees F, and the average freeze-free period is 40 to 60 days.

Typically, the surface layer is very dark grayish brown loam about 4 inches thick. The upper part of the subsoil is brown loam about 12 inches thick, and the lower part to a depth of 35 inches is brown clay loam over calcareous sandstone. Depth to sandstone ranges from 20 to 40 inches.

Included in this unit are about 10 percent Senchert family soils, 3 to 15 percent slopes; 5 percent Senchert loam, 30 to 50 percent slopes; 5 percent Senchert fine sandy loam; and small areas soils that are similar to this Senchert soil but is deep or very deep.

Permeability of the Senchert soil is moderate. Available water capacity is about 5 to 6 inches. Water supplying capacity is 11 to 17 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 5 to 10 percent. Runoff is slow, and the hazard of water erosion is moderate.

This unit is used as rangeland, woodland, wildlife habitat, recreation, and watershed.

The potential vegetation on the Senchert soil includes an overstory of aspen with a canopy of 40 percent. The understory vegetation is 65 percent grasses, 15 percent forbs, and 20 percent shrubs. Among the important plants are slender wheatgrass, Columbia needlegrass, and Thurber fescue.

This unit is well suited to the production of aspen. The site index for aspen ranges from 60 to 80. The unit can produce about 40 cubic feet of aspen per acre per year. Limitations for the harvesting of wood products are slight.

The suitability of this unit for grazing is good. Management practices that maintain or improve the rangeland vegetation include proper grazing use, a planned grazing system, and proper location of water developments. If the desirable forage plants are mostly depleted, burning can be used to improve the rangeland vegetation.

The suitability of this unit for rangeland seeding is poor. The main limitation is competition from aspen.

This map unit is in capability subclass Vie, nonirrigated, and in the High Mountain Loam (Aspen) woodland site.

Senchert loam-RR

Travessilla sandy loam, 1 to 8 percent slopes. This shallow, well drained soil is on benches and mesas between Helper and Hiawatha. It formed in residuum derived dominantly from sandstone. Slopes are 300 to 400 feet long and are concave to convex. The present vegetation in most areas is mainly pinyon, juniper, Salina wildrye, Indian ricegrass, and birchleaf mountain mahogany. Elevation is 6,000 to 8,700 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 45 to 47 degrees F, and the average freeze-free period is 80 to 120 days.

Typically, the surface layer is brown sandy loam about 3 inches thick. The upper 6 inches of the underlying material is brown loam, and the lower part to a depth of 17 inches is light brown loam over sandstone. Depth to sandstone ranges from 7 to 20 inches.

Included in this unit are about 5 percent Rock out crop on ridges and 5 percent Chupadera fine sandy loam in concave areas.

Permeability of this Travessilla soil is moderate. Available water capacity is about 2 to 3 inches. Water supplying capacity is 3 to 4 inches. Effective rooting depth is 7 to 20 inches. The organic matter content of the surface layer is 1 to 2 percent. Runoff is slow, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used as rangeland, woodland, and wildlife habitat.

The potential vegetation on the Travessilla soil includes an overstory of pinyon and Utah juniper with a canopy of 60 percent. The understory vegetation is 15 percent grasses, 10 percent forbs, and 75 percent shrubs. Among the important plants are pinyon, Utah juniper, birchleaf mountainmahogany, Mexican cliffrose, and Salina wildrye.

The site index for pinyon and Utah juniper is 32. Average yield is 4 cords of wood per acre. The potential for the production of posts or Christmas trees is poor.

Limitations for the harvesting of wood products are slight.

Management practices that maintain or improve the rangeland vegetation include proper grazing use, a planned grazing system, and proper location of water developments. If pinyon and Utah juniper are thinned, the desirable plants present can be expected to increase for a short period before the pinyon and Utah juniper revegetate the unit.

The suitability of this unit for rangeland seeding is very poor because of the shallow soil depth. It is not practical to revegetate large areas of rangeland because of the shallow soil depth. For critical erosion control, small areas can be mechanically treated and seeded.

This map unit is in capability subclass VIIs, nonirrigated, and in the Upland Shallow Loam (Pinyon-Utah Juniper) woodland site.

Travessilla sandy loam - NXC

Strych very bouldery fine sandy loam, 3 to 20 percent slopes. This very deep, well drained soil is on dissected alluvial fans and fan terraces. It is in the vicinity of Horse Canyon. It formed in alluvium and glacial outwash derived dominantly from sandstone and shale. Slopes are 200 to 300 feet long, are convex, and have south, east, and west aspects. The present vegetation is mainly juniper, pinyon, Mormon-tea, and pricklypear. Elevation is 5,300 to 6,100 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 45 to 47 degrees F, and the average freeze-free period is 115 to 140 days.

Typically, the surface layer is pale brown very bouldery fine sandy loam 3 inches thick. The next layer is pale brown very stony sandy loam 21 inches thick. Below this to a depth of 60 inches or more is light yellowish brown very cobbly sandy loam.

Included in this unit are small areas of Strych very stony loam, 3 to 15 percent slopes; Strych very stony loam, dry; and Gerst soils that are dry and have slopes of 15 to 40 percent.

Permeability of this Strych soil is moderately rapid. Available water capacity is about 3.5 to 7.0 inches. Water supplying capacity is 4 to 5 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

The unit is used as rangeland and wildlife habitat.

The potential plant community on the Strych soil is 55 percent grasses, 10 percent forbs, and 35 percent shrubs. Among the important plants are Indian ricegrass, shadscale, Salina wildrye, and galleta.

Management practices that maintain or improve the rangeland vegetation include proper grazing use, a planned grazing system, and proper location of water developments.

The suitability of this unit for rangeland seeding is very poor. The main limitation is

boulders on the surface. The suitability for grazing is fair.

This map unit is in capability subclass VIIs, nonirrigated, and in the Semidesert Bouldery Loam range site.

Strych very bouldery fine sandy loam-NXC

Strych Series

The Strych series consists of very deep, well drained, moderately rapidly permeable soils on outwash plains, alluvial fans, toe slopes, fan terraces, and the sides of benches. These soils formed in colluvium, alluvium, and glacial outwash derived dominantly from sandstone and shale. Slope is 3 to 70 percent. Elevation is 5,300 to 7,500 feet. Average annual precipitation ranges from 8 to 14 inches, and average annual air temperature ranges from 45 to 47 degrees F.

These soils are loamy-skeletal, mixed, mesic Ustollic Calciorthids.

Typical pedon of Strych very stony loam, 3 to 15 percent slopes, about 2.5 miles southeast of Hiawatha, about 1,900 feet south and 2,300 feet west of the northeast corner of sec. 1, T. 16 S., R. 8 E.

A1 - 0 to 5 inches; pinkish gray (7.5YR 6.2) very stony loam, dark brown (7.5YR 4/2) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and many coarse roots; common very fine and few fine pores; 20 percent pebbles, 10 percent cobbles, and 15 percent stones; strongly calcareous; disseminated calcium carbonate; strongly alkaline (pH 8.6); gradual wavy boundary.

C1ca- 5 to 17 inches; light gray (10YR 7/2) very stony loam, grayish brown (10YR 5/2) moist; massive, hard, friable, slightly sticky and slightly plastic; common fine and many coarse roots; few very fine 10 percent pebbles, 15 percent cobbles, and 10 percent stones; strongly calcareous; veins of calcium carbonate; strongly alkaline (pH 8.6); gradual wavy boundary.

C2ca- 17-47 inches; very pale brown (10YR 7/3) very stony loam, brown (10YR 5.3) moist; massive; hard, friable, slightly sticky and slightly plastic; few fine and medium roots; many very fine and few fine pores; 15 percent pebbles, 25 percent cobbles, and 20 percent stones; strongly calcareous; powdery soft masses of calcium carbonate; strongly alkaline (pH 8.8); gradual wavy boundary.

C3- 47 to 60 inches; very pale brown (10YR 8/4) very cobbly sandy loam, light yellowish brown (10YR 6/4) moist; massive; slightly hard, very friable; few fine roots; few fine pores; 20 percent pebbles, 20 percent cobbles, and 5 percent stones; strongly calcareous; disseminated calcium carbonate; strongly alkaline (pH 8.8).

Secondary calcium carbonate is at a depth of 5 to 15 inches.

A horizon: Hue is 10YR or 7.5YR, can chroma is 2 to 4. Texture is very bouldery fine sandy loam, gravelly loam, or very stony loam. Calcium carbonate equivalent is 15 to 20 percent. Reaction is moderately alkaline or strongly alkaline.

Cca horizon: Value is 6 or 7 when dry, and chroma is 2 to 4. Texture is very stony sandy loam or very stony loam. Calcium carbonate equivalent is 25 to 40 percent.

C horizon: Hue is 7.5YR or 10YR, value is 6 to 8 when dry and 4 to 6 when moist, and chroma is 2 to 4. Texture is very cobbly sandy loam or very stony sandy loam. Calcium carbonate equivalent is 16 to 20 percent. Reaction is moderately alkaline or strongly alkaline.

Gerst Series

The Gerst series consists of shallow, well drained, moderately slowly permeable soils on the sides of mesas, benches, terraces, and canyons and on mountain slopes and hillslopes. These soils formed in residuum and colluvium derived dominantly from shale and sandstone. Slope is 3 to 70 percent. Elevation is 5,200 to 8,000 feet. Average annual precipitation ranges from 8 to 14 inches, and average annual air temperature ranges from 45 to 50 degrees F.

These soils are loamy, mixed (calcareous), mesic, shallow Ustic Torriorthents.

Typical pedon of a Gerst extremely stony loam in an area of Gerst-Strych-Badland complex, 50 to 70 percent slopes, about 5 miles north west of East Carbon City, about 2,400 feet south and 1,200 feet west of the northeast corner of sec. 16, T. 14 S., R. 13 E.

A1- 0 to 7 inches; light brownish gray (10YR 6/2) extremely stony loam, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine, few fine, and many coarse roots; many fine and few medium pores; 30 percent pebbles, 10 percent cobbles, and 30 percent stones and boulders; strongly calcareous; disseminated calcium carbonate; moderately alkaline (pH 8.2); clear smooth boundary.

C1- 7 to 16 inches; gray (10YR 6/1) channery silt loam, dark grayish brown (10YR 4/2) moist; massive; hard, friable, sticky and plastic; common very fine roots and few medium and coarse roots; 15 percent shale fragments; strongly calcareous; disseminated calcium carbonate; strongly alkaline (pH 8.6); clear smooth boundary.

C2- 16 to 19 inches; light brownish gray (10YR 6/2) channery silt loam, grayish brown (10YR 5/2) moist; massive; hard, friable, slightly sticky and plastic; few strongly calcareous; disseminated calcium carbonate; strongly alkaline (pH 8.6); clear smooth boundary.

Cr- 19 inches; partly weathered shale.

Para lithic contact is at a depth of 8 to 20 inches.

A horizon: Value is 4 to 5 when moist, and chroma is 2 or 3. Texture is very channery loam, cobbly loam, or extremely stony loam. Reaction is moderately alkaline or strongly alkaline.

C horizon: Hue is 10YR or 2.5Y, value is 4 or 5 when moist, and chroma is 1 or 2. Texture is channery loam, channery silt loam, or channery clay loam. Clay content is 18 to 32 percent. Rock fragment content is 15 to 25 percent.

Travessilla Series

The Travessilla series consists of shallow, well drained, moderately permeable and moderately rapidly permeable soils on mesas, benches, canyonsides, mountain slopes, and foot slopes. These soils formed in residuum and colluvium derived dominantly from sandstone and interbedded shale. Slope is 1 to 80 percent. Elevation is 5,000 to 8,700 feet but is dominantly 5,500 to 6,500 feet. Average annual precipitation is 10 to 14 inches, and average annual air temperature is 45 to 50 degrees F.

These soils are loamy, mixed (calcareous), mesic Lithic Ustic Torriorthents.

Typical pedon of a Travessilla fine sandy loam in an area of Travessilla-Rock outcrop complex, about 5 miles west of Price, about 2,400 feet north and 2,500 feet east of the southwest corner of sec. 15, T. 14 S., R. 9 E.

A1- 0 to 2 inches; brown (10YR 5/3) fine sandy loam, dark yellowish brown (10YR 4/4) moist; weak thick platy structure; soft, very friable; few fine and medium roots; few fine pores; slightly calcareous; mildly alkaline (pH 7.6); clear smooth boundary.

C1- 2 to 5 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 4/3) moist; weak medium subangular blocky structure parting to weak fine subangular blocky; soft, very friable; few fine and medium roots; few fine pores; 15 percent channers; mildly alkaline (pH 7.5); clear smooth boundary.

C2- 5 to 10 inches; brown (10YR 5/3) fine sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable; few fine and medium roots; few fine and medium pores; 15 percent channers; moderately calcareous; mildly alkaline (pH 7.6); abrupt wavy boundary.

R- 10 inches; sandstone.

Bedrock is at a depth of 7 to 20 inches.

A horizon: Hue is 7.5YR or 10YR, value is 5 or 6 when dry and 3 or 4 when moist, and chroma is 3 or 4. Texture is sandy loam, very gravelly fine sandy loam, fine sandy loam, or extremely bouldery loam. Reaction is mildly alkaline or moderately alkaline.

C horizon: Hue is 7.5YR or 10YR, value is 5 to 7 when dry and 4 to 6 when moist, and chroma is 3 or 4. Texture is sandy loam, fine sandy loam, very fine sandy loam, or loam. Rock fragment content is 0 to 15 percent. Reaction is mildly alkaline or moderately alkaline.

Travessilla Family

The Travessilla family consists of shallow, well drained, moderately rapidly permeable soil on benches and canyonsides. These soils formed in residuum derived dominantly from sand stone. Slope is 1 to 5 percent. Elevation is 5,600 to

5,800 feet. Average annual precipitation is 8 to 10 inches, and average annual air temperature is 48 to 50 degrees F.

These soils are loamy, mixed (calcareous), mesic Lithic Ustic Torriorthents.

Reference pedon of Travessilla family, 1 to 8 percent slopes, 1,500 feet north and 500 feet west of the southeast corner of sec. 1, T. 11 S., R. 17 E.

A- 0 to 4 inches; light yellowish brown (10YR 6/4) channery sandy loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky; common very fine and fine roots and few medium and coarse roots; few very fine pores; slightly calcareous; moderately alkaline (pH 8.4); abrupt wavy boundary.

C1- 4 to 11 inches; light yellowish brown (10YR 6/4) sandy loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine roots; few very fine pores; moderately calcareous; disseminated calcium carbonate; moderately alkaline (pH 8.4); clear wavy boundary.

C2- 11 to 13 inches; very pale brown (10YR 7/4) sandy loam, light yellowish brown (10YR 6/4) moist; massive; soft, very friable, slightly sticky and slightly plastic; moderately calcareous; disseminated calcium carbonate; strongly alkaline (pH 8.8); abrupt wavy boundary.

R- 13 inches; sandstone.

Bedrock is at a depth of 7 to 20 inches. Clay content in the practice-size control section ranges from 8 to 18 percent.

Senchert Series

The Senchert series consists of moderately deep, well drained, moderately permeable and moderately slowly permeable soils on mountain slopes, benches, and ridges of plateaus. These soils formed in residuum, colluvium, and alluvium derived dominantly from shale or sandstone. Slope is 1 to 50 percent. Elevation is 7,200 to 10,100 feet. Average annual precipitation is 20 to 30 inches, and average annual air temperature is 36 to 38 degrees F.

These soils are fine-loamy, mixed Argic Pachic Cryoborolls.

Typical pedon of Senchert loam, 3 to 15 percent slopes, about 10 miles north and 2 miles west of East Carbon City, about 1,000 feet north and 300 feet west of the southeast corner of sec. 32, T. 15 S., R. 16 E.

O1- 3 inches to 0; partly decomposed leaves and twigs.

A1- 0 to 4 inches; very dark grayish brown (10YR 3/2) loam, very dark brown (10YR 2/2) moist; moderate medium granular structure; soft, very friable; few very fine and fine roots; neutral (pH 7.2); abrupt smooth boundary.

B21t- 4 to 9 inches; brown (10YR 4/3) loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few fine, medium, and coarse roots; few very fine and fine pores; few thin clay films on ped faces and in pores; neutral (pH 7.2); clear smooth boundary.

B22t- 9 to 16 inches; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; very hard, firm, slightly sticky and slightly plastic; few very fine, fine, and medium roots; few very fine and fine pores; common moderately thick clay films on ped faces and in pores; mildly alkaline (pH 7.6); clear smooth boundary.

B23t- 16 to 35 inches; brown (10YR 5/3) clay loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; hard, firm, sticky and plastic; few very fine, fine, and medium roots; few very fine and fine pores; few thin clay films on ped faces and in pores; mildly alkaline (pH 7.6); abrupt smooth boundary.

R- 35 inches; calcareous sandstone.

Bedrock is at a depth of 20 to 40 inches. The mollic epipedon and solum are 18 to 35 inches thick.

A horizon: Value is 3 to 5 when dry and 2 or 3 when moist, and chroma is 2 or 3. Texture is loam, very fine sandy loam, or fine sandy loam.

B2t horizon: Value is 4 or 5 when dry, and chroma is 2 or 3. Texture is loam or clay loam. Clay content is 24 to 35 percent. Reaction is neutral or mildly alkaline.

C horizon (where present): Texture is clay loam or silty clay. This horizon is 0 to 7

inches thick.

Senchert Family

The Senchert family consists of moderately deep, well drained, moderately permeable soils on mountain slopes, plateaus, and ridges. These soils formed in residuum and alluvium derived dominantly from sandstone and shale. Slope is 1 to 50 percent. Elevation is 8,000 to 10,100 feet. Average annual precipitation is 20 to 30 inches, and average annual air temperature is 36 to 38 degrees F.

These soils are fine-loamy, mixed Argic Pachic Cryoborolls.

Reference pedon of Senchert family, 3 to 15 percent slopes, about 150 feet south and 1,000 feet east of the northwest corner of sec. 10, T. 16 S., R. 16 E.

A11- 0 to 1 inch; dark grayish brown (10YR 4/2) loam, very dark gray (10YR 3/1) moist; weak fine granular structure; slightly hard, friable; common very fine and fine roots; neutral (pH 7.2); abrupt smooth boundary.

A12- 1 to 11 inches; dark grayish brown (10YR 4/2) loam, very dark gray (10YR 3/2) moist; weak medium subangular blocky structure; hard, friable, slightly plastic; many very fine and fine roots; common very fine and fine pores; neutral (pH 7.2); clear smooth boundary.

A13- 11 to 23 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; hard, friable; slight sticky and slightly plastic; common very fine and fine roots; many fine pores; mildly alkaline (pH 7.4); clear smooth boundary.

B2t- 23 to 35 inches; dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; very hard, firm sticky and plastic; few very fine and fine roots; few very fine and fine pores; mildly alkaline (pH 7.4); clear smooth boundary.

R- 35 inches; sandstone.

Bedrock is at a depth of 20 to 4o inches. Clay content in the particle-size control section ranges from 18 to 35 percent.

BMD

114—Strych very stony loam, dry, 3 to 30 percent slopes. This very deep, well drained soil is on alluvial fans and terraces. It is at the foot of the Book Cliffs, extending from Horse Canyon to the town of Wattis. This soil formed in alluvium and glacial outwash derived dominantly from sandstone and shale. Slopes are 300 to 400 feet long and are concave to convex. The present vegetation is mainly Utah juniper, pinyon, Salina wildrye, Indian ricegrass, and Mormon-tea. Elevation is 5,400 to 6,400 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 47 to 49 degrees F, and the average freeze-free period is 110 to 135 days.

Typically, the surface layer is pale brown very stony loam about 3 inches thick. The next layer is pale brown very stony sandy loam about 21 inches thick. Below this to a depth of 60 inches or more is light yellowish brown very cobbly sandy loam.

Included in this unit are about 10 percent Mivida gravelly fine sandy loam and 5 percent Hernandez family loam.

Permeability of this Strych soil is moderately rapid. Available water capacity is about 3.5 to 7.0 inches. Water supplying capacity is 4 to 6 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland, woodland, and wildlife habitat.

The potential vegetation on the Strych soil includes an overstory of Utah juniper and pinyon with a canopy of 25 percent. The understory vegetation is 35 percent grasses, 15 percent forbs, and 50 percent shrubs. Among the important plants are Utah juniper, black sagebrush, galleta, and needleandthread.

The site index for Utah juniper and pinyon is 40. Average yield is 6 cords of wood per acre. The potential for the production of posts or Christmas trees is good. This unit is moderately limited for the harvesting of wood products because of the steepness of slope and the hazard of erosion. If wood products are harvested, the slash should be left scattered on the surface to protect the soil from erosion.

Management practices that maintain or improve the rangeland vegetation include proper grazing use, a planned grazing system, and proper location of water developments. If Utah juniper and pinyon are thinned, the desirable plants present can be expected to increase for a short period before the Utah juniper and pinyon revegetate the unit.

The suitability of this unit for rangeland seeding is poor. The main limitations are the content of rock fragments on and in the soil, low annual precipitation, and competition from Utah juniper and pinyon. Broadcast seeding followed by surface dragging of an anchor chain or drag rail to cover the seed is a suitable practice. Plants that may be suitable for seeding are pubescent wheatgrass, crested wheatgrass, and adapted native plants.

This map unit is in capability subclass VIIs, nonirrigated, and in the Semidesert Stony Loam (Utah Juniper-Pinyon) woodland site.

BNE2

112—Strych very bouldery fine sandy loam, 3 to 20 percent slopes. This very deep, well drained soil is on dissected alluvial fans and fan terraces. It is in the vicinity of Horse Canyon. It formed in alluvium and glacial outwash derived dominantly from sandstone and shale. Slopes are 200 to 300 feet long, are convex, and have south, east, and west aspects. The present vegetation is mainly juniper, pinyon, Mormon-tea, and pricklypear. Elevation is 5,300 to 6,100 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 45 to 47 degrees F, and the average freeze-free period is 115 to 140 days.

Typically, the surface layer is pale brown very bouldery fine sandy loam 3 inches thick. The next layer is pale brown very stony sandy loam 21 inches thick. Below this to a depth of 60 inches or more is light yellowish brown very cobbly sandy loam.

Included in this unit are small areas of Strych very stony loam, 3 to 15 percent slopes; Strych very stony loam, dry; and Gerst soils that are dry and have slopes of 15 to 40 percent.

Permeability of this Strych soil is moderately rapid. Available water capacity is about 3.5 to 7.0 inches. Water supplying capacity is 4 to 5 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on the Strych soil is 55 percent grasses, 10 percent forbs, and 35 percent shrubs. Among the important plants are Indian ricegrass, shadscale, Salina wildrye, and galleta.

Management practices that maintain or improve the rangeland vegetation include proper grazing use, a planned grazing system, and proper location of water developments.

The suitability of this unit for rangeland seeding is very poor. The main limitation is boulders on the surface. The suitability for grazing is fair.

This map unit is in capability subclass VIIs, nonirrigated, and in the Semidesert Bouldery Loam range site.

DHG2

20—Comodore-Datino Variant complex. This map unit is on mountain slopes and toe slopes in the Book Cliffs, northeast of Price. Slopes are 40 to 60 percent. Elevation is 6,800 to 8,100 feet. The average annual precipitation is about 16 to 20 inches, the average annual air temperature is 38 to 45 degrees F, and the average freeze-free period is 60 to 100 days.

This unit is 50 percent Comodore very stony fine sandy loam, moist, 50 to 60 percent slopes; 35 percent Datino Variant extremely stony fine sandy loam, 40 to 60 percent slopes; and 15 percent other soils. About 15 percent of the unit has slopes of 40 to 50 percent. The Comodore soil is on side slopes, and the Datino Variant soil is on toe slopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Perma soils that have slopes of 15 to 40 percent, 5 percent Toze family soils that have slopes of 60 to 90 percent, small areas of soils that are similar to this Datino Variant soil but are 20 to 40 inches thick, and small areas of Rock outcrop.

The Comodore soil is shallow and well drained. It formed in colluvium derived dominantly from sandstone and shale. Slopes have northwest and east aspects, are 300 to 400 feet long, and are convex. The present vegetation is mainly Douglas-fir, Salina wildrye, snowberry, serviceberry, and mountain big sagebrush.

Typically, the surface layer is dark grayish brown very stony fine sandy loam about 6 inches thick. The underlying material to a depth of 14 inches is very dark grayish brown very stony loam over sandstone. Depth to sandstone ranges from 10 to 20 inches.

Permeability of the Comodore soil is moderate. Available water capacity is about 1 to 2 inches. Water supplying capacity is 3 to 6 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 3 to 5 percent. Runoff is rapid, and the hazard of water erosion is high.

The Datino Variant soil is very deep and well drained. It formed in colluvium derived dominantly from sandstone and shale. Slopes are 300 to 400 feet long, are convex, and have east and west aspects. The present vegetation is mainly Douglas-fir, pinyon, Salina wildrye, bluebunch wheatgrass, snowberry, and serviceberry.

Typically, the surface layer is brown extremely stony fine sandy loam about 9 inches thick. The subsoil is brown very stony loam about 7 inches thick. The substratum to a depth of 60 inches or more is pale brown very stony fine sandy loam. A layer of calcium carbonate accumulation is at a depth of about 16 inches.

Permeability of the Datino Variant soil is moderate. Available water capacity is about 4 to 6 inches. Water supplying capacity is 6 to 8 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 3 to 5 percent. Runoff is rapid, and the hazard of water erosion is high.

This unit is used as wildlife habitat and woodland.

The potential vegetation on the Comodore and Datino Variant soils includes an overstory of Rocky Mountain Douglas-fir and pinyon with a canopy of 50 percent. The understory vegetation is 40 percent grasses, 15 percent forbs, and 45 percent shrubs. Among the important plants are Salina wildrye, slender wheatgrass, birchleaf mountainmahogany, and snowberry.

This unit is limited for harvesting wood products because of the steepness of slope, stones and boulders on the surface, and the areas of Rock outcrop.

This unit is not grazeable by livestock because of the steepness of slope.

This unit is in capability subclass VIIe, nonirrigated, and in the Mountain Very Steep Stony Loam (Douglas-fir) woodland site.

DSG2, HUG

62—Midfork family-Comodore complex.* This map unit is on mountain slopes. It is along the Book Cliffs and Whitmore and Price Canyons. Slopes are 200 to 300 feet long and are convex. The present vegetation is mainly Douglas-fir, snowberry, and quaking aspen. Elevation is 7,900 to 9,500 feet.

This unit is 50 percent Midfork family bouldery loam, 50 to 70 percent slopes; 20 percent Comodore bouldery loam, 50 to 70 percent slopes; and 30 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 15 percent soils that are similar to the Midfork family soil but have a dark-colored surface layer less than 6 inches thick; 10 percent soils that are similar to the Midfork family soil but have a thick surface layer and a layer of calcium carbonate accumulation; and 5 percent Comodore very stony fine sandy loam, moist.

The Midfork family soil is very deep and well drained. It formed in colluvium derived dominantly from sandstone and shale. The average annual precipitation is 20 to 25 inches, the average annual air temperature is 34 to 38 degrees F, and the average freeze-free period is 40 to 60 days.

Typically, the surface is covered with a mat of partially decomposed twigs, leaves, and needles about 2 inches thick. The surface layer is brown bouldery loam about 7 inches thick. The next layer is yellowish brown very channery loam 10 inches thick. Below this to a depth of 60 inches or more is yellowish brown very gravelly loam.

Permeability of the Midfork family soil is moderate. Available water capacity is about 5.5 to 7.0 inches. Water supplying capacity is 10 to 17 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 5 to 10 percent. Runoff is rapid, and the hazard of water erosion is high.

The Comodore soil is shallow and well drained. It formed in colluvium derived dominantly from sandstone, siltstone, and shale. The average annual precipitation is 16 to 20 inches, the average annual air temperature is 38 to 45 degrees F, and the average freeze-free period is 60 to 80 days.

Typically, the surface is covered with a mat of needles and twigs about 1 inch thick. The surface layer is brown bouldery loam about 6 inches thick. The underlying material to a depth of 19 inches is brown very stony loam over sandstone. Depth to sandstone ranges from 10 to 20 inches.

Permeability of the Comodore soil is moderate. Available water capacity is about 1.5 to 2.5 inches. Water supplying capacity is 3 to 5 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 3 to 5 percent. Runoff is rapid, and the hazard of water erosion is high.

This unit is used for wildlife habitat and woodland.

The potential vegetation on this unit includes an overstory of Douglas-fir with a canopy of 90 percent. The understory vegetation is 10 percent grasses, 5 percent forbs, and 85 percent shrubs. Among the important plants are sedge, mountainlover, and snowberry.

The site index for Douglas-fir is 50. Average yield is about 27,200 board feet per acre for 100-year-old trees 12 inches in diameter or more.

This unit is severely limited for the harvesting of wood products because of the steepness of slope and the hazard of erosion.

This map unit is in capability subclass VIIe, nonirrigated, and in the High Mountain Very Steep Loam (Douglas-fir) woodland site.

* DSG2 and HUG have Tingey soils as a component
Midfork 35%
Tingey 25%
Comodore 25%

GNA

<SCS-UTAH CONSOCIATION TEMPLATE, 7/90>
September 16, 1996

Neto fine sandy loam, 1 to 5 percent slopes

Setting

Position on landscape: Alluvial bottoms
Elevation: 6600 to 7500 feet
Average annual precipitation: About 12 to 15 inches
Average annual air temperature: About 40 to 45 degrees F
Frost-free period: About 85 to 100 days
Shape of slopes: Concave alluvial bottoms

Composition

* soil and similar inclusions: * percent
Contrasting inclusions: * percent

Characteristics of the Neto Soil

Present vegetation: *

<Typical><Reference> profile:

0 to 5 inches=pale brown fine sandy loam
5 to 17 inches=light yellowish brown loam
17 to 22 inches=very pale brown loam
22 to 34 inches=very pale brown fine sandy loam
34 to 60 inches=light yellowish brown gravelly sandy loam
Depth to a gravelly strata: 15 to 38 inches
Depth class: Very deep
Drainage class: Well drained
Parent material: Kind=alluvium; source=sandstone, limestone and shale
Permeability: Moderately rapid
Available water capacity: * (6 to 9 inches)
Water-supplying capacity: 6 to 8 inches
Potential rooting depth: 60 inches or more
Runoff: Medium to slow
Hazard of water erosion: Moderate
Hazard of wind erosion: *
Salinity: 0 to 2 millimhos per centimeter
Surface crust: *

Included Areas

Contrasting inclusions:
15 percent Shupert loam in similiar locations with greater influence from shale
5 percent Winetti cobbley fine sandy loams on small alluvial fans from side streams entering from steeper sideslopes
5 percent other soils including Haverdad and Luhon loams and Glenberg and Notter fine sandy loams

Similar inclusions:
Soil similiar to Neto soils which lack gravelly strata with in 40 inches

Major Uses

GNA

Rangeland, wildlife habitat and recreation

Major Management Factors

Soil-related factors:
*
Climate-related factors:
Short growing season
Rangeland
Composition of potential plant community: * percent grasses, * percent forbs, * percent shrubs
Dominant vegetation in potential plant community: *
General management considerations:
Suitability for seeding is *
*
*
*
*

Interpretive Groups

Capability classification: VIc, nonirrigated;
Range site: *

KXH

84—Podo-Rock outcrop complex. This map unit is on mountain slopes between the Green River and Range Creek. Slopes are 50 to 70 percent, 300 to 400 feet long, and plane to slightly convex. They have south aspect at lower elevations and north aspect at higher elevations. The present vegetation is mainly pinyon, Utah juniper, Salina wildrye, Mormon-tea, and Douglas-fir. Elevation is 5,200 to 8,900 feet. The average annual precipitation is about 14 to 16 inches, the average annual air temperature is 42 to 45 degrees F, and the average freeze-free period is 100 to 120 days.

This unit is 50 percent Podo very bouldery sandy loam, dry, 50 to 70 percent slopes; 30 percent Rock outcrop; and 20 percent other soils. The Podo soil is on mountain slopes, and the areas of Rock outcrop occur as nearly vertical ledges and cliffs. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 10 percent Cabba bouldery loam, 40 to 70 percent slopes; 5 percent Beje very gravelly fine sandy loam; and 5 percent Guben soils that have slopes of 50 to 80 percent. These included soils are intermingled throughout the unit.

The Podo soil is shallow and well drained. It formed in colluvium and residuum derived dominantly from sandstone and shale. Typically, the surface layer is brown very bouldery sandy loam about 5 inches thick. The underlying material to a depth of 12 inches is strong brown gravelly sandy loam. Depth to sandstone ranges from 10 to 20 inches.

Permeability of the Podo soil is moderately rapid. Available water capacity 1 to 2 inches. Water supplying capacity is 2 to 4 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 1 to 3 percent. Runoff is rapid, and the hazard of water erosion is high.

Rock outcrop consists of areas of exposed bedrock, dominantly sandstone.

This unit is used for wildlife habitat.

The potential vegetation on the Podo soil includes an overstory of pinyon, Utah juniper, and Douglas-fir with a canopy of 50 percent. The understory vegetation is 10 percent grasses, 15 percent forbs, and 75 percent shrubs. Among the important plants are birchleaf mountainmahogany, Utah serviceberry, bluegrass, and Salina wildrye.

The site index for pinyon and Utah juniper is 37. Average yield is 6 cords of wood per acre. The potential for the production of posts or Christmas trees is poor. Limitations for the harvesting of wood products are severe because of the steepness of slope, the hazard of erosion, and rock fragments on the surface.

This unit is not grazeable by livestock because of the steepness of slope and the bouldery surface layer.

The Podo soil is in capability subclass VIIe, nonirrigated, and the Rock outcrop is in capability subclass VIIIs. The Podo soil is in the Upland Very Steep Shallow Loam (Pinyon-Utah Juniper) woodland site. Rock outcrop is not placed in a range site.

MHE, MSC

82—Podo gravelly sandy loam, 1 to 8 percent slopes. This shallow and well drained soil is on benches and mesa tops. It is predominantly in the Cottonwood Ridge area. Slopes are 100 to 200 feet long and are concave to convex. It formed in residuum derived dominantly from sandstone of the Green River Formation. The present vegetation in most areas is mainly pinyon and Utah juniper with an understory of black sagebrush, Mormon-tea, and birchleaf mountainmahogany. Elevation is 6,300 to 7,700 feet. The average annual precipitation is about 14 to 16 inches, the average annual air temperature is 42 to 45 degrees F, and the average freeze-free period is 100 to 120 days.

Typically, the surface layer is brown gravelly sandy loam about 2 inches thick. The next layer is brown loam about 6 inches thick. Below this to a depth of about 11 inches is brown gravelly sandy loam underlain by sandstone. Depth to bedrock ranges from 10 to 20 inches.

Included in this unit are about 10 percent Rock outcrop, 10 percent Cabba family gravelly loam, and small areas of Haverdad loam, moist, and Podo gravelly sandy loam in the steeper areas. The included areas are intermingled throughout the unit.

Permeability of the Podo soil is moderately rapid. Available water capacity is about 1 to 2 inches. Water supplying capacity is 2 to 4 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 1 to 3 percent. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland, woodland, and wildlife habitat.

The potential vegetation on the Podo soil includes an overstory of pinyon and Utah juniper with a canopy of 60 percent. The understory vegetation is 15 percent grasses, 10 percent forbs, and 75 percent shrubs. Among the important plants are pinyon, Utah juniper, birchleaf mountainmahogany, and Mexican cliffrose.

The site index for pinyon and Utah juniper is 32. Average yield is 4 cords of wood per acre. The potential of this soil for the production of posts or Christmas trees is fair.

Limitations for the harvesting of wood products are slight.

Management practices that maintain or improve the rangeland vegetation include proper grazing use, a planned grazing system, and proper location of water developments. If pinyon and Utah juniper are thinned, the desirable plants present can be expected to increase for a short period before the pinyon and Utah juniper revegetate the unit.

The suitability of this unit for rangeland seeding is very poor because of the shallow soil depth. It is not practical to revegetate large areas of the unit because of the shallow soil depth. For critical erosion control, small areas can be mechanically treated and seeded.

This map unit is in capability subclass VIIs, nonirrigated, and in the Upland Shallow Loam (Pinyon-Utah Juniper) woodland site.

MRG

121—Travessilla-Rock outcrop-Gerst complex. This map unit is on canyonsides in the area of Jack Creek and along the Book Cliffs, extending from Price Canyon to Sunnyside. Slopes are 40 to 70 percent. Elevation ranges from 5,000 to 8,100 feet but dominantly is 6,000 to 7,500 feet.

This unit is 40 percent Travessilla extremely bouldery loam, 40 to 70 percent slopes; 30 percent Rock outcrop; 20 percent Gerst very channery loam, dry, 50 to 70 percent slopes; and 10 percent other soils. About 25 percent of the Travessilla soil has slopes of 40 to 50 percent. The Travessilla soil is on north and west aspects at the higher elevations. Rock outcrop is on canyon rims and ledges. The Gerst soil is on south and west aspects at the lower elevations. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Travessilla sandy loam on benches and 5 percent Guben extremely bouldery loam on canyonsides.

The Travessilla soil is shallow and well drained. It formed in residuum and colluvium derived dominantly from sandstone and shale. Slopes are 100 to 200 feet long, are concave to convex, and have north and east aspects. The present vegetation in most areas is mainly pinyon, juniper, Douglas-fir, Salina wildrye, and birchleaf mountainmahogany. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 45 to 47 degrees F, and the average freeze-free period is 80 to 120 days. Typically, the surface layer is pale brown extremely bouldery loam about 2 inches thick. The underlying material to a depth of 12 inches is pale brown very fine sandy loam over sandstone. Depth to sandstone ranges from 10 to 20 inches.

Permeability of the Travessilla soil is moderately rapid. Available water capacity is about 1 to 2 inches. Water supplying capacity is 3 to 4 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 1 to 2 inches. Runoff is rapid, and the hazard of water erosion is high.

Rock outcrop consists of areas of exposed sandstone and siltstone.

The Gerst soil is shallow and well drained. It formed in residuum derived dominantly from shale. Slopes are 100 to 200 feet long, are concave to convex, and have south and west aspects. The present vegetation in most areas is mainly juniper, pinyon, Salina wildrye, and Mormon-tea. The average annual precipitation is 10 to 12 inches, the average annual air temperature is 47 to 49 degrees F, and the average freeze-free period is 110 to 135 days. Typically, the surface layer is light brownish gray very channery loam about 5 inches thick. The underlying material to a depth of 19 inches is light brownish gray channery loam over weathered shale. Weathered shale is at a depth of 10 to 20 inches.

Permeability of the Gerst soil is moderately slow. Available water capacity is about 1.5 to 3.0 inches. Water supplying capacity is 2 to 3 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 0.5 to 1.0 percent. Runoff is rapid, and the hazard of water erosion is high.

This unit is used as rangeland, woodland, and wildlife habitat.

The potential vegetation on the Travessilla soil includes an overstory of pinyon, Utah juniper, and Douglas-fir with a canopy of 30 percent. The understory vegetation is 10 percent grasses, 15 percent forbs, and 75 percent shrubs. Among the important plants are birchleaf mountainmahogany, Utah serviceberry, bluegrass, and Salina wildrye.

The site index for pinyon and Utah juniper is 37. Average yield is 6 cords of wood per acre. The potential for the production of posts or Christmas trees is very poor. This unit is severely limited for the harvesting of wood products because of the steepness of slope and the hazard of erosion.

This soil is not grazeable by livestock because of the steepness of slope and the stony surface layer.

The potential vegetation on the Gerst soil includes an overstory of Utah juniper and pinyon with a canopy of 5 to 20 percent. The understory vegetation is 10 percent grasses, 10 percent forbs, and 80 percent shrubs. Among the important plants are galleta, Salina wildrye, and shadscale.

The site index for Utah juniper and pinyon is 15 to 20. Average yield is 1 to 2 cords of wood per acre. The potential for the production of posts or Christmas trees is poor. Limitations for the harvesting of wood products are severe because of the steepness of slope and the hazard of erosion.

The suitability of this soil for grazing is very poor. The main limitations are steepness of slope and the hazard of erosion.

This map unit is in capability subclass VIIe, nonirrigated. The Travessilla soil is in the Upland Very Steep Shallow Loam (Pinyon-Utah Juniper) woodland site. The Gerst soil is in the Semidesert Very Steep Shallow Clay (Utah Juniper) woodland site. The Rock outcrop is not placed in a woodland site.

(Travessilla changed to Vessilla)

MTH

13—Cabba family-Guben-Rock outcrop complex. This map unit is on canyonsides, mainly east of Price Canyon and south of Nine Mile Canyon. Slopes are 40 to 75 percent, 300 to 400 feet long, and convex. Elevation is 6,000 to 8,200 feet. The average annual precipitation is about 14 to 16 inches, the average annual air temperature is 42 to 45 degrees F, and the average freeze-free period is 60 to 120 days.

This unit is 50 percent Cabba family bouldery loam, 40 to 70 percent slopes; 20 percent Guben extremely bouldery loam, dry, 40 to 75 percent slopes; 15 percent Rock outcrop; and 15 percent other soils. About 30 percent of this unit has slopes of 40 to 50 percent. The Cabba family soil is on canyonsides between ledges of Rock outcrop, the Guben soil is on toe slopes, and Rock outcrop is on canyon rims, ledges, and very steep side slopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 8 percent Guben extremely bouldery fine sandy loam, 5 percent Guben extremely stony loam, and small areas of Winetti soils on the bottoms of drainageways.

The Cabba family soil is shallow and well drained. It formed in residuum and colluvium derived dominantly from sandstone and shale of the Green River Formation. The present vegetation is mainly pinyon, juniper, Salina wildrye, and Mormon-tea. Typically, the surface layer is pale brown bouldery loam about 3 inches thick. The underlying material is brown and light yellowish brown loam about 12 inches thick. Soft shale is at a depth of about 15 inches. Depth to shale ranges from 8 to 20 inches.

Permeability of the Cabba family soil is moderate. Available water capacity is about 1.5 to 3.0 inches. Water supplying capacity is 3 to 6 inches. Effective rooting depth is 8 to 20 inches. The organic matter content of the surface layer is 1 to 3 percent. Runoff is rapid, and the hazard of water erosion is high.

The Guben soil is very deep and well drained. It formed in colluvium derived dominantly from sandstone and shale of the Green River Formation. The present vegetation is mainly Douglas-fir, pinyon, juniper, Salina wildrye, birchleaf mountainmahogany, and serviceberry. Typically, the surface is covered with a mat of partially decomposed leaves, twigs, and needles about 0.5 inch thick. The surface layer is grayish brown extremely bouldery loam about 7 inches thick. The subsoil is pale brown very stony loam about 8 inches thick. The upper 15 inches of the substratum is very pale brown very stony loam, and the lower part to a depth of 60 inches or more is light yellowish brown very stony loam. A layer of carbonate accumulation is at a depth of about 15 inches.

Permeability of the Guben soil is moderate. Available water capacity is about 3.5 to 5.0 inches. Water supplying capacity is 7 to 10 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 3 to 5 percent. Runoff is rapid, and the hazard of water erosion is high.

Rock outcrop consists of areas of exposed bedrock. It is dominantly sandstone and shale and is on canyon rims, ledges, and very steep side slopes.

This unit is used as wildlife habitat, rangeland, and woodland.

The potential vegetation on the Cabba family and Guben soils includes an overstory of pinyon, Utah juniper, and Douglas-fir with a canopy of 50 percent. The understory vegetation is 10 percent grasses, 15 percent forbs, and 75 percent shrubs. Among the important plants are birchleaf mountainmahogany, Utah serviceberry, bluegrass, and Salina wildrye.

The site index for pinyon and Utah juniper is 37. Average yield is 6 cords of wood per acre. The potential is poor for production of posts or Christmas trees. The unit is severely limited for the harvesting of wood products because of the steepness of slope, rock fragments on the surface, and the hazard of erosion.

This unit is not grazeable by livestock because of the steepness of slope and the bouldery surface layer.

The Cabba family and Guben soils are in capability subclass VIIe, nonirrigated, and in the Upland Very Steep Shallow Loam (Pinyon-Utah Juniper) woodland site. Rock outcrop is in capability subclass VIIIs. It is not placed in a woodland site.

MUE

Cabba family-Podo-Doney family

Shallow and moderately deep, well drained, nearly level to very steep soils; on benches, mesas, and canyonsides

This map unit is in the northeastern part of the survey area, adjacent to the Carbon-Duchesne County line. Slope is 1 to 70 percent. The vegetation on the Cabba family and Podo, dry, soils is mainly pinyon, Utah juniper, Salina wildrye, birchleaf mountainmahogany, and Douglas-fir. The vegetation on the Doney family soils is mainly Wyoming big sagebrush, Salina wildrye, western wheatgrass, and fourwing saltbush. Elevation is 5,900 to 8,200 feet. The average annual precipitation is about 12 to 16 inches, the average annual air temperature is 42 to 45 degrees F, and the average freeze-free period is 80 to 120 days.

This unit makes up about 11 percent of the survey area. It is about 35 percent Cabba family and similar soils, 30 percent Podo soils that are dry and similar soils, and 10 percent Doney family soils. The remaining 25 percent is components of minor extent.

Cabba family soils are on benches, mesas, and canyonsides. These soils are shallow and well drained. They formed in residuum derived dominantly from shale and siltstone. The surface layer is pale brown bouldery loam. Below this to a depth of 15 inches the soils are brown and light yellowish brown loam. Weathered shale is at a depth of 7 to 20 inches.

Podo soils are on benches, mesas, and canyonsides. These soils are shallow and well drained. They formed in residuum and colluvium derived dominantly from sandstone. The surface layer is brown gravelly sandy loam. Below this to a depth of 11 inches the soils are brown loam and gravelly loam. Unweathered sandstone is at a depth of 10 to 20 inches.

Doney family soils are on benches. These soils are moderately deep and well drained. They formed in residuum and colluvium derived dominantly from sandstone and shale. The surface layer is light brownish gray silt loam. Below this to a depth of 36 inches the soils are pale brown and light gray loam. Weathered shale is at a depth of 20 to 40 inches.

Of minor extent in this unit are Travessilla, Grobutte, Guben, Haverdad, and Hernandez family soils and Rock outcrop.

This unit is used as rangeland, woodland, and wildlife habitat.

NGG2

37—Gerst-Strych-Badland complex, 50 to 70 percent slopes. This map unit is on side slopes of benches. It is at the base of the Book Cliffs and Gentry Mountain, extending from Horse Canyon to Huntington Canyon. Slopes are 100 to 300 feet long, are concave to convex, and have all aspects. Elevation ranges from 5,800 to 7,500 feet but is dominantly 6,000 to 7,000 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 45 to 47 degrees F, and the average freeze-free period is 100 to 120 days.

This unit is 50 percent Gerst extremely stony loam, 50 to 70 percent slopes, eroded; 15 percent Strych very stony loam, 50 to 70 percent slopes; 15 percent Badland; and 20 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 10 percent Rubbleland and 5 percent Travessilla sandy loam and 5 percent Rock outcrop on remnant tops. Also included are small areas of Strych very stony loam.

The Gerst soil is shallow and well drained. It formed in colluvium and residuum derived dominantly from sandstone and shale. The present vegetation is mainly pinyon, juniper, Salina wildrye, Indian ricegrass, needleandthread, galleta, and birchleaf mountainmahogany.

Typically, the surface layer is light brownish gray extremely stony loam about 7 inches thick. The underlying material to a depth of 19 inches is gray and light brownish gray channery silt loam over weathered shale. Depth to shale ranges from 10 to 20 inches.

Permeability of this Gerst soil is moderately slow. Available water capacity is about 2 to 3 inches. Water supplying capacity is 3 to 5 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 1 to 3 percent. Runoff is rapid, and the hazard of water erosion is high.

The Strych soil is very deep and well drained. It formed in colluvium derived dominantly from sandstone and shale. The present vegetation is mainly pinyon, Utah juniper, Salina wildrye, Indian ricegrass, black sagebrush, and birchleaf mountainmahogany.

Typically, the surface layer is pinkish gray very stony loam about 5 inches thick. The next layer is light gray and very pale brown very stony loam about 42 inches thick. Below this to a depth of 60 inches or more is very pale brown very cobbly sandy loam. A layer of secondary calcium carbonate accumulation is at a depth of about 5 inches.

Permeability of the Strych soil is moderately rapid. Available water capacity is about 3.5 to 6.5 inches. Water supplying capacity is 4 to 7 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 3 percent. Runoff is rapid, and the hazard of water erosion is high.

Badland is steep or very steep, nearly barren areas of shale that are dissected by many intermittent drainageways. Some areas are interbedded with sandstone. Runoff is rapid to very rapid, and geologic erosion is active.

This unit is used as wildlife habitat, rangeland, and woodland.

The potential vegetation on the Gerst soil includes an overstory of pinyon and Utah juniper with a canopy of 15 percent. The understory vegetation is 40 percent grasses, 20 percent forbs, and 40 percent shrubs. Among the important plants are Salina wildrye, Indian ricegrass, birchleaf mountainmahogany, and Utah serviceberry.

The site index for Utah juniper and pinyon is 15 to 25. Average yield is 1 to 2 cords of wood per acre. The potential for the production of posts or Christmas trees is very poor. This unit is severely limited for the harvesting of wood products because of the steepness of slope and the hazard of erosion.

The suitability of the Gerst soil for grazing is poor. For critical erosion control, small areas can be mechanically treated and seeded. It is not practical to revegetate large areas of rangeland because of the shallow soil depth and the hazard of water erosion. Plants that may be suitable for critical area seedings are those native to the soil.

The potential vegetation on the Strych soil includes an overstory of pinyon and Utah juniper with a canopy of 30 percent. The understory vegetation is 45 percent grasses, 10 percent forbs, and 45 percent shrubs. Among the important plants are birchleaf mountainmahogany, black sagebrush, Salina wildrye, and needleandthread.

The site index for pinyon and Utah juniper is 50. Average yield is 6 cords of wood per acre. This unit is severely limited for the harvesting of wood products because of the steepness of slope and the hazard of erosion.

This unit is not grazeable by livestock because of the steepness of slope.

The Gerst and Strych soils are in capability subclass VIIe, and Badland is in capability subclass VIIIe. The Gerst soil is in the Upland Very Steep Shallow Clay Loam (Pinyon-Utah Juniper) woodland site. The Strych soil is in the Upland Very Steep Stony Loam (Pinyon-Utah Juniper) woodland site. Badland is not placed in a woodland site.

NVF2

34—Gerst-Badland-Rubbleland complex, 50 to 70 percent slopes. This map unit is on benches and mountain slopes. It is north of Wattis and southeast of Mohrland. Slopes are 100 to 300 feet long and are concave to convex. The present vegetation is mainly Salina wildrye, Indian ricegrass, daisy, skeleton locoweed, shadscale, black sagebrush, and birchleaf mountainmahogany. Elevation is 6,200 to 7,200 feet. The average annual precipitation is about 12 to 14 inches, the average annual air temperature is 45 to 47 degrees F, and the average freeze-free period is 100 to 120 days.

This unit is 45 percent Gerst extremely stony loam, 50 to 70 percent slopes, eroded; 25 percent Badland; 20 percent Rubbleland; and 10 percent other soils and miscellaneous areas. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are 5 percent Strych very stony loam and 5 percent Rock outcrop.

The Gerst soil is shallow and well drained. It formed in colluvium and residuum derived dominantly from sandstone and shale. Typically, the surface layer is light brownish gray extremely stony loam about 7 inches thick. The underlying material to a depth of 19 inches is gray and light brownish gray channery silt loam over weathered shale. Depth to weathered shale ranges from 10 to 20 inches.

Permeability of the Gerst soil is moderately slow. Available water capacity is about 2 to 3 inches. Water supplying capacity is 3 to 5 inches. Effective rooting depth is 10 to 20 inches. The organic matter content of the surface layer is 1 to 3 percent. Runoff is rapid, and the hazard of water erosion is high.

Badland consists of steep and very steep, nearly barren beds of actively eroding shale, shale interbedded with gypsum, and small areas of shale capped with sandstone.

Rubbleland consists of areas covered by stones and boulders. It supports very little vegetation.

This unit is used as wildlife habitat and woodland.

The potential vegetation on the Gerst soil includes an overstory of pinyon and Utah juniper with a canopy of 15 percent. The understory vegetation is 40 percent grasses, 20 percent forbs, and 40 percent shrubs. Among the important plants are Salina wildrye, Indian ricegrass, birchleaf mountainmahogany, and Utah serviceberry.

The site index for Utah juniper and pinyon is 15 to 25. Average yield is 1 to 2 cords of wood per acre. The potential for the production of posts or Christmas trees is very poor. This unit is severely limited for the harvesting of wood products because of the steepness of slope and the hazard of erosion.

The suitability of the Gerst soil for grazing is very poor. For critical erosion control, small areas can be mechanically treated and seeded. It is not practical to revegetate large areas of rangeland because of the shallow soil depth and and the hazard of erosion. Plants that may be suitable for critical area seedings are those native to the soil.

The Gerst soil is in capability subclass VIIe, nonirrigated, and in the Upland Very Steep Shallow Clay Loam (Utah Juniper-Pinyon) woodland site. Badland is in capability subclass VIIIe, and Rubbleland is in capability subclass VIIIs. Badland and Rubbleland are not placed in a woodland site.

NXC LAZEAR-ROCK OUTCROP COMPLEX, HIGH RAINFALL, 1 TO 8 PERCENT SLOPES

This complex consists of about 65 percent Lazear sandy clay loam, high rainfall, 1 to 8 percent slopes; 25 percent Rock outcrop; and 10 percent other soils.

This complex occurs on bench and mesa tops. The Lazear soil is intermixed with the Rock outcrop. Elevations are 5,600 to 7,200 feet. The Lazear soil formed in residuum from sandstone.

The average annual precipitation is 12 to 14 inches. Mean annual air temperature is 45° to 49° F, mean annual soil temperature is 47° to 51° F, and the average freeze-free season is 100 to 140 days. This complex occurs on the Book Cliffs and west of Helper. Slopes are 1 to 8 percent and on all aspects. They are medium and long in length and undulating in shape.

Present vegetation is dominantly pinyon, juniper, salina wildrye, birchleaf mountainmahogany, and snowberry.

Included in mapping are small areas of a soil similar to Lazear except moderately deep and Shingle extremely stony loam, 8 to 20 percent slopes, eroded.

Lazear sandy clay loam, high rainfall, 1 to 8 percent slopes

This Lazear soil is very shallow and somewhat excessively drained.

In a representative profile the surface layer is reddish brown sandy clay loam about 3 inches thick. The underlying layer is reddish brown loam underlain by sandstone at depth of about 7 inches.

Permeability is moderate. Available water capacity is about 2 to 3 inches above the sandstone. Water supplying capacity is about 3 to 4 inches. Organic matter content in the surface layer is low. Effective rooting depth is about 3 to 20 inches. Surface runoff is slow and erosion hazard is moderate. The Erosion Condition Class is slight-39.

This soil is used for rangeland and wildlife habitat.

NXC

R--7 inches; sandstone.

Depth to sandstone ranges from 3 to 20 inches.

The A horizon is moderate or strongly calcareous and moderate or strongly alkaline. It is 1 to 5 inches thick.

The C horizon is loam, sandy clay loam, and gravelly fine sandy loam. Gravel content ranges from 0 to 35 percent. The C horizon is moderately to strongly calcareous and moderately to strongly alkaline.

Rock outcrop

Rock outcrop is exposed bedrock consisting of sandstone, conglomerate sandstone and limestone.

Rock outcrop is in Capability Subclass VIIIs, and is not rated for an ecological site.

RR

95—Rock outcrop. Rock outcrop is throughout the survey area. It consists of exposures of bedrock in the form of steep and very steep escarpments and ridges. The rock is sandstone, siltstone, and shale. The areas of Rock outcrop are mostly barren; however, enough soil material has collected in small depressional areas, crevices, and cracks to support some grasses and stunted trees and shrubs.

This unit is used for wildlife habitat.

This map unit is in capability subclass VIIIs, nonirrigated. It is not placed in a range site.

RWG

96—Rock outcrop-Rubbleland-Travessilla complex. This map unit is on mesa escarpments and canyonsides. It is on the Book Cliffs and in the Hiawatha area. Slopes are 30 to 70 percent and 100 to 200 feet long. The present vegetation is mainly Utah juniper, pinyon, Salina wildrye, and galleta. Elevation is 6,500 to 8,700 feet. The average annual precipitation is about 12 to 14 inches, the average annual air temperature is 45 to 47 degrees F, and the average freeze-free period is 80 to 120 days.

This unit is 35 percent Rock outcrop; 30 percent Rubbleland; 25 percent Travessilla very gravelly fine sandy loam, 30 to 70 percent slopes; and 10 percent other soils. About 25 percent of the acreage of the Travessilla soil has slopes of 30 to 50 percent slopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Strych very stony loam, 50 to 70 percent slopes, and Gerst extremely stony loam, 50 to 70 percent slopes.

Rock outcrop is exposed sandstone and limestone.

Rubbleland is areas of stones and boulders that are virtually free of vegetation.

The Travessilla soil is shallow and well drained. It formed in residuum and colluvium derived dominantly from sandstone. Typically, the surface layer is brown very gravelly fine sandy loam about 3 inches thick. The upper 6 inches of the underlying material is brown loam, and the lower part to a depth of 17 inches is light brown loam over sandstone. Depth to sandstone ranges from 7 to 20 inches.

Permeability of the Travessilla soil is moderately rapid. Available water capacity is 2 to 3 inches. Water supplying capacity is 3 to 4 inches. Effective rooting depth is 7 to 20 inches. Organic matter content in the surface layer is 1 to 2 percent. Runoff is very rapid, and the hazard of water erosion is severe.

This unit is used for wildlife habitat, rangeland, and woodland.

The potential vegetation on the Travessilla soil includes an overstory of pinyon, Utah juniper, and Douglas-fir with a canopy of 30 percent. The understory vegetation is 10 percent grasses, 15 percent forbs, and 75 percent shrubs. Among the important plants are birchleaf mountainmahogany, Utah serviceberry, bluegrass, and Salina wildrye.

The site index for pinyon and Utah juniper is 37. Average yield is 6 cords of wood per acre. The potential for the production of posts or Christmas trees is poor. Limitations for the harvesting of wood products are severe because of the steepness of slopes, the hazard of erosion, and rock fragments on the surface.

The Travessilla soil is not grazeable by livestock because of the steepness of slope and the stoniness of the surface layer.

This map unit is in capability subclass VIIIs, nonirrigated. The Travessilla soil is in the Upland Very Steep Shallow Loam (Pinyon-Utah Juniper) woodland site. The Rock outcrop and Rubbleland are not placed in a woodland site.

UMF2

46—Guben-Pathead extremely stony loams. This map unit is on mountain slopes south and west of Hiawatha. Slopes are 30 to 50 percent, are 300 to 400 feet long and convex, and have north, west, and east aspects. Elevation is 7,500 to 8,700 feet. The average annual precipitation is 16 to 18 inches, the average annual air temperature is 38 to 45 degrees F, and the average freeze-free period is 60 to 100 days.

This unit is 60 percent Guben extremely stony loam, 30 to 50 percent slopes; 25 percent Pathead extremely stony loam, 30 to 50 percent slopes; and 15 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 10 percent Comodore very stony fine sandy loam, moist, on north aspects and 5 percent Rock outcrop on ridges.

The Guben soil is very deep and well drained. It formed in colluvium derived dominantly from sandstone. The present vegetation in most areas is mainly Salina wildrye, birchleaf mountainmahogany, serviceberry, and a few Douglas-fir and white fir.

Typically, the surface layer is dark brown extremely stony loam about 8 inches thick. The subsoil is grayish brown and light brownish gray very cobbly loam about 15 inches thick. The substratum to a depth of 60 inches or more is brown and pale brown very cobbly fine sandy loam and very stony loam.

Permeability of the Guben soil is moderate. Available water capacity is about 3.5 to 5.0 inches. Water supplying capacity is 6 to 10 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 3 to 5 percent. Runoff is medium, and the hazard of water erosion is moderate.

The Pathead soil is moderately deep and well drained. It formed in colluvium and residuum derived dominantly from sandstone. The present vegetation in most areas is mainly Salina wildrye, eriogonum, birchleaf mountainmahogany, and yellowbrush.

Typically, the surface layer is brown extremely stony loam 3 inches thick. The underlying material to a depth of 26 inches is pale brown very cobbly loam over sandstone. Sandstone is at a depth of 20 to 40 inches.

Permeability of the Pathead soil is moderate. Available water capacity is about 1 to 2 inches. Water supplying capacity is 3.5 to 5.5 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 1 to 3 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland, wildlife habitat, and recreation areas.

The potential plant community on the Guben soil is 20 percent grasses, 10 percent forbs, and 70 percent shrubs. Among the important plants are birchleaf mountainmahogany and serviceberry.

Management practices that maintain or improve the rangeland vegetation include proper grazing use, a planned grazing system, and proper location of water developments.

It is not practical to revegetate large areas of this soil because of the stoniness of the soil. For critical erosion control, small areas can be mechanically treated and seeded. Plants that may be suitable for critical area seedings are those native to the soil, intermediate wheatgrass, orchardgrass, smooth brome, ladak alfalfa, Lewis flax, small burnet, and yellow sweetclover.

The potential plant community on the Pathead soil is 60 percent grasses, 15 percent forbs, and 25 percent shrubs. Among the important plants are Salina wildrye, bluegrasses, and snowberry.

Management practices that maintain or improve the rangeland vegetation include proper grazing use, a planned grazing system, and proper location of water developments.

The suitability of the Pathead soil for rangeland seeding is very poor. The main limitations are the moderate depth to bedrock and steepness of slope.

This map unit is in capability subclass VIIs, nonirrigated. The Guben soil is in the Mountain Stony Loam (Browse) range site. The Pathead soil is in the Mountain Shallow Loam (Saline Wildrye) range site.

85—Rabbitex silt loam, 15 to 50 percent slopes. This deep, well drained soil is on mountain ridgetops and side slopes in the Price Canyon area, near Beaver Ridge. It formed in residuum and colluvium derived from limestone, sandstone, and shale. Slopes are 300 to 400 feet long and are concave to convex. The present vegetation is mainly Salina wildrye and mountain big sagebrush. Elevation is 8,400 to 9,000 feet. The average annual precipitation is about 16 to 20 inches, the average annual air temperature is 38 to 45 degrees F, and the average freeze-free period is 60 to 100 days.

Typically, the surface layer is brown silt loam about 10 inches thick. The next layer is dark yellowish brown gravelly loam about 4 inches thick. The next layer is light yellowish brown and pale brown cobbly loam 30 inches thick. The underlying material to a depth of 59 inches is

(UMF2 is Carbon Area 46 and 85 combined)

UMF2

very pale brown loam. Sandstone is at a depth of 59 inches.

Included in this unit are about 10 percent Datino Variant very stony loam on ridgetops, 10 percent soils that are similar to this Rabbitex soil but have a thicker, dark-colored surface layer and are in concave areas, 5 percent soils that are similar to this Rabbitex soil but are more than 60 percent rock fragments, and 5 percent soils, on ridgetops, that are similar to this Rabbitex soil but are shallow and have slopes of 3 to 15 percent.

Permeability of the Rabbitex soil is moderate. Available water capacity is about 7 to 10 inches. Water supplying capacity is 10 to 16 inches. Effective rooting depth is 40 to 60 inches or more. The organic matter content of the surface layer is 3 to 5 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland, wildlife habitat, and recreation areas.

The potential plant community on the Rabbitex soil is 60 percent grasses, 15 percent forbs, and 25 percent shrubs. Among the important plants are Salina wildrye, bluebunch wheatgrass, bluegrasses, and snowberry.

Management practices that maintain or improve the rangeland vegetation include proper grazing use, a planned grazing system, and proper location of water developments.

The suitability of this unit for rangeland seeding is very poor. The main limitation is the shallow soil depth.

This map unit is in capability subclass VIIe, nonirrigated, and in the Mountain Loam (Saline Wildrye) range site.

VOH

47—Guben-Rock outcrop complex. This map unit is on mountain slopes. It is in the Book Cliffs, north of Helper and west of the Green River. Slopes are 50 to 80 percent, 100 to 200 feet long, and plane to convex. The present vegetation is mainly Douglas-fir, serviceberry, birchleaf mountainmahogany, mockorange, and western wheatgrass. Elevation ranges from 5,000 to 9,500 feet but is dominantly 6,000 to 7,500 feet. The average annual precipitation is about 16 to 20 inches, the average annual air temperature is 38 to 45 degrees F, and the average freeze-free period is 60 to 100 days.

This unit is 55 percent Guben extremely bouldery fine sandy loam, 50 to 80 percent slopes; 20 percent Rock outcrop, and 25 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 12 percent Midfork family soils in concave areas and 10 percent Comodore very stony fine sandy loam, moist, intermingled throughout the unit. Also included are small areas of Perma family soils that have slopes of 60 to 80 percent.

The Guben soil is very deep and well drained. It formed in colluvium derived dominantly from sandstone and shale. Typically, the surface is covered with a mat of partially decomposed needles, twigs, and leaves about 0.5 inch thick. The surface layer is brown extremely bouldery fine sandy loam about 7 inches thick. The subsoil is brown very stony loam about 17 inches thick. The substratum to a depth of 60 inches or more is light brown very stony loam.

Permeability of the Guben soil is moderate. Available water capacity is about 3.5 to 5.0 inches. Water supplying capacity is 8.5 to 12.0 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 3 to 5 percent. Runoff is moderate, and the hazard of water erosion is slight.

Rock outcrop consists of areas of exposed bedrock, dominantly interbedded sandstone and shale. It occurs as ledges.

This unit is used as rangeland, wildlife habitat, woodland, and recreation areas.

The potential vegetation on the Guben soil includes an overstory of Rocky Mountain Douglas-fir and pinyon with a canopy of 50 percent. The understory vegetation is 40 percent grasses, 15 percent forbs, and 45 percent shrubs. Among the important plants are Salina wildrye, wheatgrass, birchleaf mountainmahogany, and snowberry.

This unit is severely limited for harvesting wood products because of the steepness of slope, the hazard of erosion, and stones and boulders on the surface.

This unit is not grazeable by livestock because of the steepness of slope.

The Guben soil is in capability subclass VIIe, nonirrigated, and in the Mountain Very Steep Stony Loam (Douglas-fir) woodland site. Rock outcrop is in capability subclass VIIIs. It is not placed in a woodland site.

LOCATION ATCHEE UT

Tentative Series
Rev. NZ/RJ/RB
1/99

ATCHEE SERIES

The Atchee series consists of very shallow and shallow, well drained and moderately rapidly permeable soils that formed in residuum and colluvium from weathered sandstone and shale of the Uinta Formation. Atchee soils are on hillslopes of plateaus and have slopes of 2 to 70 percent. Mean annual air temperature is about 45 degrees F., and the mean annual precipitation is about 11 inches.

TAXONOMIC CLASS: Loamy-skeletal, mixed, calcareous, mesic Lithic Ustic Torriorthents

TYPICAL PEDON: Atchee extremely channery sandy loam-rangeland. (Colors are for air-dry soil unless otherwise noted).

A--0 to 2 inches; pale brown (10YR 6/3) extremely channery sandy loam, dark brown (10YR 3/3) moist; weak thin platy structure parting to moderate very fine subangular blocky; slightly hard, very friable, common very fine and fine, few medium and coarse roots; common very fine, fine and medium vesicular pores; 10 percent flagstones and 35 percent channers; 80 percent of surface is covered with flagstones and channers; moderately calcareous; carbonates are disseminated; moderately alkaline (pH 8.2); abrupt smooth boundary. (1 to 9 inches thick)

C1--2 to 7 inches; pale brown (10YR 6/3) very channery sandy loam, brown (10YR 4/3) moist; massive; soft, very friable; common very fine and fine, few medium and coarse horizontal roots; few very fine and fine tubular pores; 10 percent flagstones and 35 percent channers; strongly calcareous; carbonates are disseminated; moderately alkaline (pH 8.4); abrupt wavy boundary. (0 to 10 inches thick)

C2--7 to 14 inches; light gray (10YR 7/2) very channery sandy loam, brown (10YR 5/3) moist; massive; slightly hard, very friable; common very fine and fine, few medium and coarse horizontal roots; few very fine and fine tubular pores; 10 percent flagstones and 45 percent channers; strongly calcareous; carbonates are disseminated; moderately alkaline (pH 8.4); abrupt wavy boundary. (0 to 9 inches thick)

R--14 inches; fractured sandstone.

TYPE LOCATION: Uintah County, Utah; about 23 miles south and 7 miles east of Ouray; 800 feet north and 100 feet west of the southeast corner of sec. 22, T. 12 S., R. 21 E.

RANGE IN CHARACTERISTICS:

Soil temperature ranges from 47 to 54 degrees F.

Sandstone occurs at depths of 5 to 20 inches.

Rock fragments within the control section range from 35 to 90 percent. Channers, flagstone and stones cover 60 to 80 percent of the soil surface.

Control section ranges from 5 to 18 percent clay.

A horizon has values of 5 through 7 dry, 3 through 5 moist;

Chroma: 2 through 4.

Reaction: slightly calcareous or moderately calcareous.

C horizon has value of 5 through 7 dry, 4 through 6 moist

Chroma of 2 through 4.

Texture: extremely channery sandy loam and very channery sandy loam and less commonly extremely flaggy sandy loam.

Typically rock fragments are in horizontal beds of sandstone and shale that have soil material between the rock fragments and in cracks.

Reaction: slightly calcareous through strongly calcareous and moderately alkaline or strongly alkaline.

COMPETING SERIES: These are the Farfall (T AZ), Meriwhitica (AZ), Redsun (WY), Reef (T UT), Skos (UT), Sunup (WY), Teesto (AZ), and Windcomb (UT), series. Farfall and Meriwhitica soils are derived from limestone colluvium and/or residuum. Meriwhitica and Skos soils have a mean annual soil temperature of more than 50 degrees F. Redsun soils have hues of 7.5YR to 2.5YR and have less than 15 percent fine sand or coarser. Reef soils have hues of 5YR or 7.5YR. Skos and Windcomb soils have hues of 5YR or redder. Sunup and Teesto soils contain more than 18 percent clay in the control section. In addition, Teesto soils are derived from basalt parent material.

GEOGRAPHIC SETTING: The Atchee series occurs on gently sloping through very steep hillslopes and cliffsides. Slopes range from 2 to 70 percent. These soils formed in residuum and colluvium from weathered sandstone and shale of the Uinta Formation. Elevations vary from 5,000 to 7000 feet. Mean annual air temperature ranges from 44 to 52 degrees F., and the average annual precipitation range from 10 to 14 inches. Past correlations may have ranged precipitation to as low as 8 inches. The freeze-free period is about 90 to 160 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are Farb, Glenberg, Haverdad, Lanver, Nelman, Pherson, Walknolls, and the competing series Rentsac and Sunup. Walknolls soils have more than 18 percent clay in the control section. Farb soils have 0 to 25 percent rock fragments in the control section. Glenberg, Haverdad, Lanver, Nelman, and Pherson soils are greater than 20 inches deep.

DRAINAGE AND PERMEABILITY: Well drained, very slow to very rapid runoff; moderately rapid permeability.

USE AND VEGETATION: The soils are used mainly for rangeland, wildlife habitat, and recreation. Native vegetation is mainly Utah juniper, pinyon, black sagebrush, shadscale, galleta, and blue grama.

DISTRIBUTION AND EXTENT: Northeastern Utah. The series is extensive. MLRA 34 and 35.

MLRA OFFICE RESPONSIBLE: Phoenix, Arizona

SERIES PROPOSED: Uintah County, Utah, 1981. The name is of a prominent ridge in the survey area where it was mapped.

REMARKS: Diagnostic horizons and features in this pedon include:

Ochric epipedon - from 0 to 2 inches (A horizon).

Lithic feature - fractured sandstone at 14 inches (R horizon).

ADDITIONAL DATA: Lab number S80UT-047-006 sampled by the NSSL.

National Cooperative Soil Survey
U.S.A.

LOCATION CABBA MT+ND SD UT

Established Series
Rev. NRS-JAL-CJH
2/97

CABBA SERIES

The Cabba series consists of shallow, well drained soils that formed in residuum or colluvium derived from semiconsolidated, loamy sedimentary beds. These soils are on hills, escarpments, and sedimentary plains. Slopes are 2 to 70 percent. Mean annual precipitation is about 16 inches, and mean annual air temperature is about 43 degrees F.

TAXONOMIC CLASS: Loamy, mixed, superactive, calcareous, frigid, shallow Typic Ustorthents

TYPICAL PEDON: Cabba loam in rangeland. (Colors are for dry soil unless otherwise noted)

A--0 to 3 inches; grayish brown (2.5Y 5/2) loam, dark grayish brown (2.5Y 4/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; slightly effervescent; slightly alkaline (pH 7.6); clear smooth boundary. (3 to 4 inches thick)

Bk1--3 to 8 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine pores; common fine masses of lime; strongly effervescent; slightly alkaline (pH 7.8); clear wavy boundary.

Bk2--8 to 15 inches; pale brown (10YR 6/3) clay loam, brown (10YR 5/3) moist; strong thin platy structure; hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine pores; common fine masses of lime; strongly effervescent; moderately alkaline; (pH 8.0); clear wavy boundary. (Combined Bk horizons 7 to 18 inches thick)

Cr--15 to 60 inches; pale brown (10YR 6/3) semiconsolidated sedimentary beds consisting of interbedded sandstone and shale, brown (10YR 5/3) moist; few very fine and fine roots in vertical cracks in upper part; strongly effervescent; moderately alkaline (pH 8.2).

TYPE LOCATION: Chouteau County, Montana; 2,100 feet north and 1,000 feet east of the SW corner of sec. 15, T. 21 N., R. 9 E.

RANGE IN CHARACTERISTICS:

Soil temperature - 41 to 47 degrees F.

Moisture control section - between 4 to 12 inches or to the paralithic contact.

Rock fragments - 0 to 35 percent in the particle-size control section.

Particle-size control section - 20 to 35 percent clay, 0 to 35 rock fragments.

Individual horizons may have as much as 45 percent rock fragments with less than 15 percent lithic fragments.

Depth to Cr horizon - 10 to 20 inches.

The chromas of 1 are lithochromic.

Soil phases - stony, gravelly; PE greater than 31. The hard rock fragments in the stony and gravelly phases are mainly surficial deposits.

A horizon - Hue: 10YR or 2.5Y

Value: 3, 4, 5, or 6 dry; 3 or 4 moist

Chroma: 1, 2, 3, or 4

Texture: fine sandy loam, loam, silt loam, clay loam, or silty clay loam

Clay content: 10 to 35 percent

Rock fragments: 0 to 60 percent--0 to 40 percent stones, cobbles, boulders; 0 to 30 percent pebbles or channers

Rock fragments, surface cover: 0.01 to 0.1 percent stones

EC: 0 to 4 mmhos/cm

Effervescence: none to violently

Calcium carbonate equivalent: 0 to 10 percent

Reaction: pH 6.6 to 9.0

Bk horizons - Hue: 10YR, 2.5Y, or 5Y

Value: 5, 6, 7, or 8 dry; 4, 5, 6, or 7 moist

Chroma; 1, 2, 3, 4, or 6

Texture: loam, silt loam, clay loam, or silty clay loam

Clay content: 18 to 35 percent

Structure: massive thin platy, subangular blocky or prismatic

Rock fragments: 0 to 35 percent--0 to 5 percent cobbles, 0 to 30 percent pebbles or channers

Calcium carbonate equivalent: 2 to 15 percent

EC: 0 to 8 mmhos/cm

Reaction: pH 7.4 to 9.0

Effervescence: slight to violently

Cr horizon: This horizon consists of interbedded layers of silt, sand, and clay or a mixture of the three. They crush to loam, silt loam, very fine sandy loam, clay loam, or silty clay loam. Some layers are harder than others, but all are considered rippable or soft and are readily dug with power tools.

Reaction: pH 7.4 to 8.4

COMPETING SERIES:

Abac (MT) - has hues of 5YR and redder.

Cohagen (ND) - has a coarse-loamy particle-size control section.

Wiggler (UT) - has its precipitation evenly distributed throughout the year; moisture control section is not frozen during winter and is dry in some part for 60 to 75 days in

winter; does not have accumulation of secondary carbonates.

GEOGRAPHIC SETTING:

Landform - sedimentary plains; escarpments; hills.

Elevation - 1,600 to 6,800 feet.

Slope - 2 to 70 percent.

Parent material - formed in residuum from semiconsolidated loamy sedimentary beds or in colluvium over the beds.

Climate - cool with long, cold winters; moist springs; warm, dry summers.

Mean annual precipitation - 12 to 19 inches. Some areas receive less than 14 inches of precipitation and have cooler temperatures and lower evaporation.

Mean annual air temperature - 37 to 45 degrees F.

Frost-free period - 70 to 135 days.

DRAINAGE AND PERMEABILITY: Well drained. Moderate permeability. Runoff is very low to high depending on slope.

USE AND VEGETATION: Used as rangeland. The potential native vegetation is mainly little bluestem, western wheatgrass, needleandthread, prairie sandreed, bluebunch wheatgrass, green needlegrass, plains muhly, forbs, and shrubs.

DISTRIBUTION AND EXTENT: Widely distributed in central and eastern Montana and in western North Dakota. Cabba soils are of moderate extent.

MLRA OFFICE RESPONSIBLE: Bismarck, North Dakota

SERIES ESTABLISHED: Granite County, Montana, 1969.

REMARKS: Soil interpretation records: MT0048, MT0253, MT0254, MT0463, MT0686.

Diagnostic horizons and features recognized in this pedon are: ochric epipedon - the zone from the soil surface of the soil to a depth of 7 inches (A and Bk1 horizons); particle size-control section - the zone from 10 to 15 inches (Bk2 horizon); paralithic contact - at a

depth of 15 inches (Cr horizon). Cabba soils have a frigid temperature regime and an ustic moisture regime.

National Cooperative Soil Survey
U.S.A.

LOCATION COMODORE CO+UT

Established Series
Rev. GB
02/1999

COMODORE SERIES

The Comodore series consists of shallow, well drained soils that formed in material weathered from igneous or metamorphic rocks. Comodore soils are on upland hills, ridges and mountain sides and have slopes of 4 to 70 percent. The mean annual precipitation is about 18 inches and the mean annual temperature is about 42 degrees F.

TAXONOMIC CLASS: Loamy-skeletal, mixed, superactive, frigid Lithic Haplustolls

TYPICAL PEDON: Comodore very stony loam, grassland. (Colors are for dry soil unless otherwise noted.)

A--0 to 9 inches; grayish brown (10YR 5/2) very stony loam, very dark brown (10YR 2/2) moist; weak fine subangular blocky structure parting to fine granular; soft, very friable, slightly sticky, slightly plastic; 60 percent stones; slightly acid; clear smooth boundary. (6 to 16 inches thick)

C--9 to 13 inches; brown (10YR 5/3) extremely stony loam, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky, slightly plastic; 70 percent stones; slightly acid; abrupt smooth boundary. (4 to 14 inches thick)

R--13 inches; hard igneous and metamorphic bedrock.

TYPE LOCATION: Alamosa County, Colorado; approximately 1/4 mile west of the southeast corner, sec. 9, T. 28 S., R. 73 W.

RANGE IN CHARACTERISTICS: The soils usually are noncalcareous throughout but have thin discontinuous calcareous subhorizons just above the bedrock in some pedons. Base saturation is more than 20 percent and ranges from 60 to 100 percent. Depth to the lithic contact ranges from 10 to 20 inches. The particle size control section is usually very stony, extremely stony, or very cobbly loam, sandy clay loam, or clay loam but in the fine earth fraction has 18 to 35 percent clay, 5 to 55 percent silt and 20 to 70 percent sand with more than 15 percent being fine or coarser sand. Rock fragments range from 35 to 85 percent and range dominantly from 10 to 36 inches in diameter. However, some pedons have rock fragments less than 10 inches with 15 to 20 percent pebbles and 10 to 15

percent cobbles. The A and C horizons range from slightly acid to mildly alkaline. The mean annual soil temperature is 45 degrees F, and mean summer soil temperature is 62 degrees F.

The A horizon has hue of 2.5Y through 7.5YR, value of 4 or 5, 2 or 3 moist, and chroma of 1 to 3.

The C horizon has hue of 2.5Y through 7.5YR, value of 5 or 6, 3 or 4 moist, and chroma of 2 or 3.

COMPETING SERIES: These are the Boriana, Castner, Cathedral, Celeste, Firo, Onaqui, Paunsaugunt, and Pendant series. Castner, Paunsaugunt, and Pendant soils are calcareous at or near the surface. Boriana and Cathedral soils have fine earth matrix material that is coarse sandy loam, or loam with less than 18 percent clay. In addition, Cathedral soils have a large proportion of medium, coarse, and very coarse angular granite sand. Celeste soils have hue of 5YR or redder. Firo and Onaqui soils lack coarse fragments that predominantly are greater than 10 inches in diameter.

GEOGRAPHIC SETTING: Comodore soils are on upland hills, ridges, and mountainsides. Slope gradients range from 4 to 70 percent. The soil formed in material weathered from underlying igneous or metamorphic rock. The average annual precipitation is 16 to 18 inches with peak periods of precipitation occurring in the spring and early summer. Mean annual temperature ranges from 40 to 45 degrees F. In Utah and elsewhere in Colorado, the average annual precipitation ranges from 12 to 20 inches at elevations of 6,800 to 9,500 feet.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the competing Firo soils and the Uracca soils. Uracca soils have argillic horizons and lack bedrock above depth of 20 inches.

DRAINAGE AND PERMEABILITY: Well drained to excessively drained; runoff is rapid; permeability is moderate above the bedrock.

USE AND VEGETATION: These soils are used principally as native pastureland or for recreational purposes. Principal native vegetation is mainly pinon pine, juniper, cedar, blue grama, mountain muhly, fringe sage, and mountainmahogany. Some spruce and fir occur on north facing slopes.

DISTRIBUTION AND EXTENT: Mountainous areas of south central Colorado surrounding the Alamosa Basin and northeastern and southern parts of Utah. The series is of moderate extent.

MLRA OFFICE RESPONSIBLE: Lakewood, Colorado

SERIES ESTABLISHED: Alamosa County, Colorado, 1974.

National Cooperative Soil Survey
U.S.A.

LOCATION DATINO UT

Established Series
Rev. WRM/AJE
2/73

DATINO SERIES

Typically, Datino soils have grayish brown, neutral very gravelly light loam A1 horizons about 3 inches thick; brown, mildly alkaline, very cobbly heavy loam B2 horizons and pinkish white, moderately alkaline, very cobbly loam Cca horizons.

TAXONOMIC CLASS: Loamy-skeletal, mixed Typic Haploborolls

TYPICAL PEDON: Datino very gravelly loam, rangeland. (Colors are for dry soil unless otherwise noted.)

A11--0 to 2 inches; grayish brown (10YR 5/2) very gravelly light loam, dark brown (10YR 3/3) moist; weak medium platy structure that parts to weak fine granular; soft, friable, slightly sticky and nonplastic; common fine vesicular pores; 40 percent gravel and 3 percent cobbles; noneffervescent; neutral (pH 7.0); clear smooth boundary. (2 to 9 inches thick)

B1--2 to 7 inches; brown (7.5YR 4/2) very gravelly light clay loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine and medium roots; few fine interstitial and tubular pores; 20 percent gravel and 15 percent cobbles; noneffervescent; mildly alkaline (pH 7.5); gradual wavy boundary. (0 to 6 inches thick)

B2--7 to 11 inches; brown (7.5YR 5/2) very cobbly heavy loam, dark brown (7.5YR 4/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine, medium and coarse roots; few fine interstitial pores; few thin clay films in pores; few fine distinct pinkish white (7.5YR 8/2) carbonate segregations, pinkish gray (7.5YR 7/2) moist; 30 percent cobbles and 20 percent gravel coated on bottom sides with carbonates; matrix is slightly effervescent and the carbonate segregations are violently effervescent; mildly alkaline (pH 7.8); gradual wavy boundary. (3 to 10 inches thick)

C1ca--11 to 17 inches; pinkish white (7.5YR 8/2) very cobbly loam, pinkish gray (7.5YR 7/2) moist; massive; hard, firm, slightly sticky and nonplastic; few fine, medium and coarse roots; few fine and coarse interstitial pores; 40 percent cobbles and 20 percent gravel

coated with carbonates; violently effervescent; moderately alkaline (pH 8.0); gradual wavy boundary. (4 to 7 inches thick)

C2ca--17 to 32 inches; pinkish white (7.5YR 8/2) extremely cobbly loam, pinkish gray (7.5YR 7/2) moist; massive; hard, firm, slightly sticky and nonplastic; few very fine roots; few fine and coarse interstitial pores; 50 percent cobbles and 30 percent gravel coated with carbonates; violently effervescent; moderately alkaline (pH 8.0); gradual wavy boundary. (10 to 18 inches thick)

C3ca--32 to 50 inches; pink (7.5YR 7/4) extremely cobbly light loam, light brown (7.5YR 6/4) moist; massive; slightly hard, firm, nonsticky and nonplastic; few fine and coarse interstitial pores; 50 percent cobbles and 30 percent gravel coated with carbonates; violently effervescent; moderately alkaline (pH 8.0).

TYPE LOCATION: 32 to 50 inches; (7.5YR 7/4) extremely gravelly cobbly light loam, light brown (7.5YR 6/4) moist; massive; slightly hard, firm, nonsticky and nonplastic; few fine and coarse interstitial pores; 50 percent cobbles and 30 percent gravel coated with carbonates; violently effervescent; moderately alkaline (pH 8.0).

TYPE LOCATION: Garfield County, Utah; Lost Creek, S1/4 corner section 30, T.31S., R.3W.

RANGE IN CHARACTERISTICS: The estimated depth of regolith to bedrock is 20 to 50 feet. The mollic epipedon is 7 to 9 inches thick and is over 1/3 the thickness of the solum. The rock fragments range from 20 to 50 percent in the A1 horizon, 50 to 80 percent in the B and C horizons and average 35 to 60 percent in the A1 horizon, 50 to 80 percent in the B and C horizona and average 35 to 60 percent in the control section. These soils are noneffervescent in the upper 7 inches and increase to violently effervescent in the Cca horizon. Depth to the Cca (calcic) horizon ranges from 10 to 17 inches. These soils have a mean annual soil temperature of 44 to 47 degrees F., and a mean summer soil temperature at a depth of 20 inches of 59 to 64 degrees F. The soils are dry in all parts of the moisture control section for less than 60 consecutive days in more than 7 out of 10 years. They are moist in some part of the moisture control section more than 1/2 the time the soil temperature is above 41 degrees F. The A1 and B1 horizons have hue of 7.5YR or 10YR, value of 4 or 5 dry, 2 or 3 moist, and chroma of 2 or 3. The B2 (cambic) horizon has value of 5 to 8 dry, 4 to 7 moist, and chroma of 2 or 3. It ranges from very gravelly or very cobbly loam to stony loam, very gravelly or very cobbly light clay loam. The Cca horizon has hue of 7.5YR or 10YR, value of 6 to 8 dry, 5 to 7 moist, and chroma of 2 to 4. It ranges from very extremely gravelly or very extremely cobbly sandy loam to very extremely gravelly or very extremely cobbly loam and very stony fine sandy loam.

COMPETING SERIES AND THEIR DIFFERENTIAE: These are the Brycan,

Guben, Losee, Mitch, Panguitch, Paunsaugunt, Perma, Peso, Syrett and Widtsoe series. Brycan, Mitch, and Panguitch soils have less than 35 percent rock fragments in the control section. Guben soils are calcareous to the surface. Losee soils lack a mollic epipedon. Paunsagunt soils have a lithic contact within a depth of 20 inches. Perma soils are noncalcareous to depths of at least 40 inches. Peso soils have limestone bedrock at depths of at least 40 inches. Peso soils have limestone bedrock at depths of 20 to 40 inches. Syrett soils lack a cambic horizon and have a lithic contact within a depth of 40 inches. Widtsoe soils have an argillic horizon and a weakly to strongly cemented Cca horizons.

GEOGRAPHIC SETTING: Datino soils are on gently to strongly sloping alluvial fans dissected by many intermittent drainageways. Elevations ranges from 6,800 to 8,700 feet. The soils formed in mixed volcanic alluvium. Slope gradients are 5 to 80 percent. The average annual precipitation is 12 to 20 inches. The mean annual temperature is 38 to 45 degrees F., and the average summer temperature is 59 to 64 degrees F. The frost free season ranges from 60 to 120 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the competing Panguitch and Widtsoe soils.

DRAINAGE AND PERMEABILITY: Well drained; rapid runoff; slow permeability.

USE AND VEGETATION: Used for rangeland, wildlife and watershed. Native vegetation is pinyon pine, Utah juniper, big sagebrush, Indian ricegrass, needleandthread grass, blue grama grass, and snakeweed.

DISTRIBUTION AND EXTENT: These soils are in the south central part of Utah. They are inextensive.

MLRA OFFICE RESPONSIBLE: Phoenix, Arizona

SERIES ESTABLISHED: Garfield County (Paunsaugunt Area), Utah, 1969.

REMARKS: These soils were formerly classified as Calcisols.

National Cooperative Soil Survey
U. S. A.

LOCATION DONEY MT+UT WY

Established Series
Rev. DES-JAL-HAL-CJH
10/98

DONEY SERIES

The Doney series consists of moderately deep, well drained soils that formed in residuum and colluvium from semiconsolidated interbedded sandy and silty sedimentary beds. These soils are on sedimentary plains and hills. Slopes are 2 to 90 percent. Mean annual precipitation is about 17 inches, and mean annual air temperature is about 41 degrees F.

TAXONOMIC CLASS: Fine-loamy, mixed, superactive, frigid Typic Haplustepts

TYPICAL PEDON: Doney loam, cultivated. (Colors are for dry soil unless otherwise noted)

Ap--0 to 4 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots; slightly effervescent; moderately alkaline (pH 7.9); abrupt boundary. (4 to 6 inches thick)

Bw--4 to 14 inches; pale yellow (10YR 7/3) loam, light yellowish brown (10YR 6/3) moist; weak coarse prismatic structure; hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots, many fine and very fine pores; few fine masses and threads of lime; strongly effervescent; moderately alkaline (pH 7.9); gradual wavy boundary. (7 to 13 inches thick)

Bk--14 to 25 inches; pale yellow (10YR 7/3) loam, light yellowish brown (10YR 6/3) moist; very weak coarse prismatic structure; hard, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine pores; 10 percent sandstone and siltstone pebbles; few to common threads of lime; strongly effervescent; moderately alkaline (pH 8.4); gradual wavy boundary. (9 to 21 inches thick)

Cr--25 to 60 inches; pale yellow (2.5Y 7.4) semiconsolidated interbedded sandy and silty sedimentary beds that crush to loam; light yellowish brown (2.5Y 6/4) moist; massive; hard, friable, nonsticky and nonplastic; strongly effervescent; moderately alkaline (pH 8.4).

TYPE LOCATION: Fergus County, Montana; about 1,000 feet west and 917 feet north

of the SW corner of sec. 30, T. 19 N., R. 14 E.

RANGE IN CHARACTERISTICS:

Soil temperature - 41 to 47 degrees F.

Moisture control section - between 4 and 12 inches.

Depth to bedrock - 20 to 40 inches.

Soil phases - gravelly; very gravelly.

Ap horizon - Hue: 10YR or 2.5Y

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 1, 2, or 3

Texture: loam, clay loam, silty clay loam, or silt loam

Clay content: 10 to 35 percent

Rock fragments: 0 to 55 percent--0 to 10 percent cobbles; 0 to 45 percent pebbles

Reaction: pH 6.6 to 8.4

Uncultivated areas have a thin A horizon, the value is 5 or 6 dry; 3, 4, or 5 moist; chroma is 1, 2, or 3.

Bw horizon - Hue: 10YR or 2.5Y

Value: 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma: 2, 3, or 4

Texture: loam, clay loam, or silty clay loam

Clay content: 18 to 30 percent

Rock fragments: 0 to 35 percent--0 to 10 percent cobbles; 0 to 25 percent pebbles

Calcium carbonate equivalent: less than 15 percent.

Reaction: pH 7.4 to 9.0

Bk horizon - Hue: 10YR or 2.5Y

Value: 6, 7 or 8 dry; 5, 6 or 7 moist

Chroma: 1, 2, 3, or 4

Texture: loam, clay loam, or silty clay loam

Clay content: 18 to 30 percent

Rock fragments: 0 to 30 percent--0 to 10 percent cobbles; 0 to 20 percent pebbles and channers

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.9 to 9.0

Cr horizon - semiconsolidated interbedded sandy and silty sedimentary beds

COMPETING SERIES:

Arikara (ND) - does not have a paralithic contact.

Broadus (MT) - does not have a paralithic contact.

Eaglewing (MT) - does not have a paralithic contact.

Macar (MT) - does not have a paralithic contact.

Mara (NM) - does not have a paralithic contact.

Slategoat (MT) - does not have a paralithic contact.

GEOGRAPHIC SETTING:

Landform - sedimentary plains; hills.

Elevation - 2,900 to 5,400 feet.

Slope - 2 to 90 percent.

Parent material - residuum and colluvium from semiconsolidated interbedded sandy and silty sedimentary beds.

Climate - long, cold winters; moist springs; warm summers.

Mean annual precipitation - 12 to 19 inches.

Mean annual air temperature - 39 to 45 degrees F.

Frost-free period - 90 to 135 days.

DRAINAGE AND PERMEABILITY: Well drained. Moderate permeability. Runoff is very low to high depending on slope.

USE AND VEGETATION: Doney soils are used mainly for rangeland. Potential native vegetation is mainly bluebunch wheatgrass, western wheatgrass, silver sagebrush, green sagewort, lupine, and phlox.

DISTRIBUTION AND EXTENT: Doney soils are of moderate extent in central and eastern Montana.

MLRA OFFICE RESPONSIBLE: Bismarck, North Dakota

SERIES ESTABLISHED: Big Horn County, Montana, 1970.

REMARKS: Soil interpretation records: MT0238, MT1029, MT0740.

Diagnostic horizons and features recognized in this pedon are: ochric epipedon - the zone from the surface of the soils to a depth of 7 inches (after mixing) (Ap and Bw horizons); cambic horizon - the zone from 4 to 14 inches (Bw horizon); layer of carbonate accumulation - the zone from 14 to 25 inches (Bk horizon); paralithic contact - at 25 inches (Cr horizon). The Doney soils have a frigid temperature regime and an ustic moisture regime.

National Cooperative Soil Survey

LOCATION GERST UT+WY

Established Series
Rev GWL/MJD/SSP
05/1999

GERST SERIES

The Gerst series consists of very shallow and shallow, well drained soils that formed in slope alluvium and colluvium over residuum derived from shale and sandstone. Gerst soils are on hillslopes. Slopes range from 2 to 70 percent. Mean annual precipitation is about 10 inches and the mean annual temperature is about 45 degrees F.

TAXONOMIC CLASS: Loamy, mixed, superactive, calcareous, mesic, shallow Ustic Torriorthents

TYPICAL PEDON: Gerst parachannery loam, on a northwest facing, convex-concave, 6 percent slope in black sagebrush-shadscale rangeland at an elevation of 6,320 feet. (Colors are for air-dry soil unless otherwise noted)

The surface is covered by 55 percent angular parachanners.

A--0 to 5 inches; very pale brown (10YR 7/3) parachannery loam, pale brown (10YR 6/3) moist; weak very fine, fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky, and slightly plastic; common fine, very fine, few medium roots; many fine and very fine, common medium pores; 20 percent parachanners; slightly effervescent, (13 percent calcium carbonate equivalent) carbonates are disseminated; moderately alkaline (pH 8.2); abrupt smooth boundary. (1 to 7 inches thick)

C1--5 to 9 inches; pale brown (10YR 6/3) parachannery loam, brown (10YR 5/3) moist; moderate very thin and thin platy geogenic structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and very fine, few medium roots; common very fine and fine pores; 30 percent parachanners; strongly effervescent, (35 percent calcium carbonate equivalent) carbonates are disseminated; moderately alkaline (pH 8.2); clear smooth boundary. (4 to 10 inches thick)

C2--9 to 13 inches; pale brown (10YR 6/3) parachannery loam; brown (10YR 5/3) moist; weak thick and medium platy geogenic structure; hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; 25 percent parachanners; strongly effervescent, (33 percent calcium carbonate equivalent) carbonates are disseminated; moderately alkaline (pH 8.4); clear smooth boundary. (3 to 8 inches thick)

Cr--13 inches; highly fractured shale.

TYPE LOCATION: Uintah County, Utah; about 20 miles southwest of Ouray; 1,200 feet north and 100 feet west of the southeast corner of sec. 12, T. 13 S., R. 18 E., SLBM; Dog Knoll, Utah USGS quad. Latitude 39 degrees 41 minutes 46 seconds N. and longitude 109 degrees 50 minutes 31 seconds W. NAD 27.

RANGE IN CHARACTERISTICS:

Soil moisture: The moisture control section is affected by precipitation that falls evenly through the year with a slight increase in the late summer and fall. Aridic moisture regime bordering on ustic.
Mean annual soil temperature: 47 to 52 degrees F.
Depth to paralithic contact: 6 to 20 inches to weathered shale.
Particle-size control section: 18 to 35 percent clay and 15 to 35 percent pararock fragments
Gypsum content: 0 to 1 percent.

A horizon:
Hue: 10YR to 5Y
Value: 5 to 7 dry, 3 to 6 moist
Chroma: 2 to 4 dry or moist
Texture: parachannery loam, extremely stony loam, very channery loam, cobbly loam, or loam
Reaction: moderately alkaline or strongly alkaline

C horizon:
Hue: 10YR to 5Y
Value: 5 to 7 dry, 4 to 6 moist
Chroma: 1 to 4 dry or moist
Texture: parachannery clay loam, parachannery silt loam, or parachannery loam
Reaction: moderately alkaline or strongly alkaline.

COMPETING SERIES: These are the Canyon), Dulce), Epping), Eslendo, Fairburn Kinusta), Klondike), Picante Redarrow Sandoval), shingle, Spearfish), Taluce), and Tassel series. Canyon, Epping, Fairburn, Eslendo, Picante, Sandoval, and shingle soils have less than 15 percent rock fragments in the particle-size control section. Klondike, Redarrow, and Spearfish soils have hue of 7.5YR or redder. Dulce, Kinusta, Taluce, and Tassel soils contain less than 18 percent clay in the particle-size control section.

GEOGRAPHIC SETTING:

Parent material: slope alluvium and colluvium over residuum derived from shale and sandstone
Landform: structural benches, mesas, terraces, mountain slopes and hillslopes
Slopes: 2 to 70 percent
Elevation: 5,200 to 6,800
Mean annual air temperature: 44 to 50 degrees F.
Mean annual precipitation: 8 to 14 inches
Frost-free period: 110 to 140 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Denco, Mikim, Milok, and Strych soils. .
Denco soils are on hillslopes and have a fine family particle-size control section and are moderately deep
Mikim, Milok , and Strych soils are on alluvial flats and fan remnants and very deep

DRAINAGE AND PERMEABILITY: Well drained; rapid runoff; moderate and moderately slow permeability.

USE AND VEGETATION: The major uses are rangeland, wildlife habitat, and recreation. Potential native vegetation is black sagebrush, shadscale, bluegrass, Utah juniper, and pinyon. This soil has been correlated to the Semidesert Shallow Loam (Utah Juniper-Pinyon) - 034XY227UT range site at the type location in Utah.

DISTRIBUTION AND EXTENT: Northeastern Utah. LRR D, MLRA 34. This soils is of moderate extent.

MLRA OFFICE RESPONSIBLE: Lakewood, Colorado

SERIES ESTABLISHED: Carbon County, Utah, 1983.

REMARKS: Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - the zone from the surface to 5 inches (A horizon).

Paralithic contact - the contact with fractured shale at 13 inches (Cr horizon).

The cation exchange activity class was inferred from laboratory data in the Uintah Area Soil Survey.

Taxonomic version: Eighth Edition, 1998.

LOCATION GUBEN UT+CO

Established Series
Rev. WRM-RLT
02/1999

GUBEN SERIES

The Guben series consist of very deep, well drained, moderately permeable soils. These soils formed in mixed volcanic alluvium on stream terraces. Slopes range from 0 to 50 percent. The mean annual precipitation is about 16 inches and mean annual temperature is about 41 degrees F.

TAXONOMIC CLASS: Loamy-skeletal, mixed, superactive, frigid Aridic Calciustolls

TYPICAL PEDON: Guben gravelly loam--rangeland. (Colors are for air-dry soil unless otherwise stated.)

A1--0 to 1 inch; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, friable, slightly sticky and slightly plastic; common fine roots; common fine interstitial pores; 30 percent gravel; slightly calcareous; neutral (pH 7.0); abrupt smooth boundary. (1 to 4 inches thick)

A2--1 to 4 inches; brown (10YR 4/3) gravelly loam, dark brown (10YR 3/3) moist, crushed; weak medium platy structure parting to weak very fine granular; soft, very friable; many very fine and fine roots; few very fine pores; 30 percent gravel; slightly calcareous; neutral (pH 7.0); clear smooth boundary. (2 to 4 inches thick)

ABt--4 to 10 inches; brown (10YR 4/3) gravelly loam, dark brown (10YR 3/3) moist, crushed; weak medium and coarse subangular blocky structure parting to weak fine subangular blocky; slightly plastic; very fine and fine roots; few very fine pores; common thin clay bridges; 30 percent gravel; slightly calcareous; neutral (pH 7.0); clear smooth boundary. (4 to 8 inches thick)

Bt--10 to 14 inches; brown (10YR 5/3) gravelly sandy clay loam, dark brown (10YR 4/3) moist, crushed; weak coarse and medium subangular blocky structure parting to weak fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; few very fine pores; few thin clay films in pores; 30 percent gravel and 5 percent cobbles; strongly calcareous; mildly alkaline (pH 7.5) gradual wavy boundary. (0 to 9 inches thick)

Btk--14 to 22 inches; grayish brown and light gray (10YR 5/2 and 7/2) extremely gravelly sandy clay loam, dark grayish brown (10YR 4/2) moist, crushed; weak medium angular and subangular blocky structure parting to weak fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; few very fine pores; few thin clay bridges; 50 percent gravel and 20 percent cobbles; strongly calcareous; mildly alkaline (pH 7.5); gradual wavy boundary. (0 to 9 inches thick)

Bk1--22 to 40 inches; light gray (10YR 7/2) very gravelly sandy clay loam, brown (10YR 5/3) moist, crushed; massive; loose, friable; few fine roots; 10 percent cobbles and 50 percent gravel; strongly calcareous; mildly alkaline (pH 7.7); clear smooth boundary. (10 to 20 inches thick)

Bk2--40 to 44 inches; white (10YR 8/2) very gravelly loam, light gray (10YR 7/2) moist; weak and moderate thin platy structure; laminar in some parts and weakly to strongly cemented; slightly sticky and slightly plastic; few fine roots in fractures; few fine tubular pores; 50 percent gravel and 10 percent cobbles; strongly calcareous; moderately alkaline (pH 8.0); abrupt smooth boundary. (0 to 6 inches thick)

C3--44 to 60 inches; light gray (10YR 7/2) extremely gravelly sandy loam, grayish brown (10YR 5/2) moist, single grain; loose; few very fine roots; common medium and large interstitial pores; 50 percent gravel and 15 percent cobbles; strongly calcareous; moderately alkaline (pH 8.0).

TYPE LOCATION: Garfield County, Utah; Tom Best Spring Road, southeast 1/4, sec. 21, T. 35 S., R. 4 W.

RANGE IN CHARACTERISTICS: The mollic epipedon ranges from 7 to 13 inches thick. The depth to the calcic horizon ranges from 10 to 24 inches. Rock fragments average 35 to 60 percent in the particle size control section. The mean annual soil temperature is about 42 to 47 degrees F, and the mean summer soil temperature at depth of 20 inches is about 59 to 64 degrees F. The soils are moist in some parts of the moisture control section for 50 to 60 percent of the time the soil temperature is above 41 degrees F. These soils are slightly calcareous to strongly calcareous in the A horizon.

The A and ABt horizons have hue of 7.5YR or 10YR, value of 4 or 5 dry, 2 or 3 moist and chroma of 2 to 4 dry and 2 or 3 moist.

The Bt and Btk horizons have hue of 7.5YR or 10YR, value of 4 to 7 dry and 2 or 3 moist and chroma of 2 to 4. They range from gravelly, very gravelly and extremely gravelly sandy loam to gravelly, very gravelly and extremely gravelly clay loam, very stony loam and very cobbly loam. It is mildly alkaline or moderately alkaline.

The Bk horizon has hue of 7.5YR or 10YR, value of 4 to 8 dry and chroma of 2 to 4. It ranges from very gravelly and very cobbly loamy sand to very gravelly, very cobbly sandy clay loam, very stony loam, very cobbly loam, and very cobbly fine sandy loam. It is moderately alkaline or strongly alkaline.

COMPETING SERIES: These are the Eagar, Tosca (T) and Winspect (T) series. Eagar and Winspect soils lack a cambic horizon. Tosca soils contain less than 12 percent clay in the particle size control section.

GEOGRAPHIC SETTING: Guben soils formed on stream terraces and in a thick mantle of mixed volcanic alluvium on pediment surfaces. The relief is nearly level to steep. Elevations range from 5,800 to 9,500 feet. The mean annual precipitation is 12 to 20 inches and the freeze-free period ranges from 60 to 120 days. The mean annual temperature is 38 to 45 degrees F, and the mean summer temperature is 59 to 62 degrees F.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Circleville, Datino, and Showalter soils. Circleville soils have bedrock between 20 to 40 inches. Datino soils are noncalcareous in the upper part. Showalter soils have an argillic horizon with 35 percent or more clay.

DRAINAGE AND PERMEABILITY: Well drained; medium runoff; moderate permeability.

USE AND VEGETATION: Rangeland. Native vegetation is mainly black sagebrush and rabbitbrush.

DISTRIBUTION AND EXTENT: South-central part of Utah and northwestern Colorado. (Approximately 1,757 acres in Rio Blancho County, Colorado) This series is inextensive.

MLRA OFFICE RESPONSIBLE: Lakewood, Colorado

SERIES ESTABLISHED: Paunsaugunt Survey Area, Utah, 1969.

REMARKS: These soils were formerly classified as Calcisols. Diagnostic horizons and features recognized in this pedon are:

Mollic epipedon -the zone from the surface to 10 inches (A1, A2, ABt horizons)

Calcic horizon -the zone from 14 to 44 inches (Btk, Bk1, Bk2 horizons)

Cambic horizon -the zone from 10 to 14 inches (Bt horizon)

National Cooperative Soil Survey
U.S.A.

LOCATION LAZEAR CO+UT WY

Established Series
Rev. GB/JWH/WWJ
6/97

LAZEAR SERIES

The Lazear series consists of shallow, well drained soils that formed in residuum derived from interbedded shales, loamstone, and sandstone. Lazear soils are on hills, mesas, and ridges. Slopes range from 0 to 65 percent. Mean annual precipitation is about 12 inches and the mean annual temperature is about 53 degrees F.

TAXONOMIC CLASS: Loamy, mixed, superactive, calcareous, mesic Lithic Ustic Torriorthents

TYPICAL PEDON: Lazear gravelly loam in grassland. (Colors are for dry soil unless otherwise noted.)

A--0 to 4 inches; light brownish gray (10YR 6/2) gravelly loam, dark grayish brown (10YR 4/2) moist; moderate fine granular structure; soft, very friable; 15 percent sandstone gravel; strongly effervescent; moderately alkaline (pH 8.2); clear smooth boundary. (3 to 5 inches thick)

C--4 to 14 inches; light brown (7.5YR 6/3) gravelly loam, brown (7.5YR 4/3) moist; massive; slightly hard, very friable; 20 percent sandstone gravel; strongly effervescent; moderately alkaline (pH 8.2); abrupt wavy boundary. (7 to 17 inches thick)

R--14 inches; hard calcareous sandstone bedrock.

TYPE LOCATION: Delta County, Colorado; SW 1/4 of the NW 1/4 of sec. 29, T. 4 S., R. 3 E.; USGS quad; lat. 38 degrees 43 minutes 50 seconds N. and long. 108 degrees 17 minutes 20 seconds W., NAD

RANGE IN CHARACTERISTICS:

Soil moisture regime: aridic bordering on ustic

Soil temperature regime: mesic

Mean annual soil temperature: 47 to 58 degrees F

Mean summer soil temperature: 60 to 78 degrees F

Particle-size control section: 18 to 35 percent clay

Depth to lithic contact: 10 to 20 inches to hard calcareous sandstone

A horizon:

Hue: 7.5YR or 10YR

Value: 5 to 7 (3 to 5 moist)

Chroma: 2 to 4

Rock fragments: 0 to 35 percent

EC (mmhos/cm): 0 to 1

Reaction: slightly to strongly alkaline

C horizon:

Hue: 7.5YR to 2.5Y

Value: 5 to 8 (4 to 6 moist)

Chroma: 2 to 4

Texture: loam or clay loam

Rock fragments: 0 to 35 percent

Calcium carbonate equivalent: 1 to 6 percent

EC (mmhos/cm): 0 to 1

Reaction: slightly to strongly alkaline

COMPETING SERIES: These are the Farview, Redspear, Rizno, Rizozo, Skyvillage, and Travessilla, Travson, and Zukan soils. Farview soils are less than 10 inches to hard bedrock. Redspear soils have a mean annual soil temperature of less than 50 degrees F. Rizno soils have less than 18 percent clay in the particle size control section. Rizozo soils have hues of 5YR or redder. Travessilla and Skyvillage soils have particle size control sections with less than 18 percent clay. Zukan soils are over limestone bedrock and have an horizon of carbonate accumulation. Travson soils contain less than 18 percent clay in the control section. Similar soils and previously competing series are Gladel. The Gladel soil was reclassified to an Ustochrept.

GEOGRAPHIC SETTING:

Parent material: residuum derived from interbedded shales, loamstone, and sandstone

Landform: hills, mesas, and ridges

Slopes: 0 to 65 percent

Elevation: 4,800 to 6,200 feet

Mean annual temperature: 47 to 56 degrees F

Mean annual precipitation: 10 to 13 to inches

Frost-free period: 120 to 140 days

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Shavano soils and the competing Travessilla soils. Shavano soils have a lithic contact at depths greater than 20 inches and Travessilla soils contain less than 18 percent clay in the particle size control section.

DRAINAGE AND PERMEABILITY: well drained, negligible to high runoff, moderate permeability

USE AND VEGETATION: These soils are used principally as native pastureland. Native vegetation is galleta grass, cactus, greasewood, and snakeweed.

DISTRIBUTION AND EXTENT: The foothill areas of western and southwest Colorado and adjacent parts of Wyoming. LRR D, MLRA 34B. This series is of moderate extent.

MLRA OFFICE RESPONSIBLE: Phoenix, Arizona

SERIES ESTABLISHED: Delta County, (Paonia Area) Colorado. 1970.

REMARKS: Diagnostic horizons and features recognized in this pedon are:

ochric epipedon: The zone from 0 to 4 inches. (A)

lithic contact: The zone at 14 inches. (R).

Taxonomy version, 7th Edition 1996

Secondary carbonates usually coat the surface of the bedrock.

Particle size control section: The zone from 0 to 14 inches. (A, C)

National Cooperative Soil Survey
U.S.A.

LOCATION MIDFORK WY+UT

Established Series
Rev. PSD
02/1999

MIDFORK SERIES

The Midfork series consists of deep, well drained soils that formed in stream and slope alluvium. Midfork soils are on fan aprons and mountain slopes. Slopes are 3 to 70 percent. The mean annual precipitation is about 45 inches, and the mean annual temperature is about 32 degrees F.

TAXONOMIC CLASS: Loamy-skeletal, mixed, superactive Typic Haplocryolls

TYPICAL PEDON: Midfork very stony loam-rangeland. (Colors are for dry soil unless otherwise stated.)

A1--0 to 4 inches; brown (7.5YR 5/2) very stony loam, dark brown (7.5YR 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; many fine, medium, and coarse roots; 20 percent limestone and dolomite pebbles, 10 percent cobbles and 10 percent stones; mildly alkaline (pH 7.7); clear wavy boundary. (4 to 15 inches thick)

A2--4 to 10 inches; brown (7.5YR 5/2) very stony loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure parting to weak medium and fine granular; soft, very friable, sticky and slightly plastic; common fine, many medium and coarse roots; 20 percent limestone and dolomite pebbles, 10 percent cobbles and 10 percent stones; mildly alkaline (pH 7.7); gradual wavy boundary. (0 to 10 inches thick)

C1--10 to 15 inches; brown (7.5YR 5/3) very cobbly loam, dark brown (7.5YR 4/3) moist; weak medium subangular blocky structure; slightly hard, very friable, sticky and slightly plastic; common fine, many medium and coarse roots; 20 percent limestone and dolomite pebbles, 20 percent cobbles, 10 percent stones; mildly alkaline (pH 7.7); gradual wavy boundary. (0 to 10 inches thick)

C2--15 to 60 inches; light brownish gray (10YR 6/2) very cobbly loam, grayish brown (10YR 5/2) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; few medium and fine roots; strongly effervescent, lime disseminated; 20 percent limestone and dolomite pebbles, 20 percent cobbles, and 10 percent stones; moderately alkaline (pH 8.0).

TYPE LOCATION: Teton County, Wyoming; 200 feet east of Middlefork cutoff--Moose Creek trail junction; unsectionized area.

RANGE IN CHARACTERISTICS: The mollic epipedon is 7 to 15 inches thick. Depth to uniformly calcareous material is 4 to 15 inches. The mean annual soil temperature is 32 to 36 degrees F. The control section is very cobbly loam, very 2 - Midfork Series

gravelly loam, very channery loam, or very cobbly clay loam and averages 18 to 35 percent clay. Coarse fragments range from 35 to 65 percent.
The A horizon has hue of 10YR or 7.5YR, value of 4 or 5 dry, 2 or 3 moist, and chroma of 2 or 3. It is neutral through moderately alkaline.

The C horizon has hue of 10YR or 7.5YR. It is mildly alkaline through strongly alkaline. Calcium carbonate equivalent is 1 to 14 percent.

COMPETING SERIES: These are the Antrobus, Broad Canyon, Farlow, Fairydell, Foxmount, Grafen, Greyback, Handran, Kamack, McCort, Maurice, Midelight, Parachute, Sebud, Supervisor, Teemat, Tiban, and Tineman series. Antrobus soils formed in material from basalt and have many dark colored mineral grains in the sand and silt fraction. Broad Canyon, Foxmount, Grafen, Handran, Kamack, McCort, Maurice, Sebud, and Supervisor soils are noncalcareous. Fairydell soils have a horizon of silicate accumulation. Farlow soils have more than 15 percent calcium carbonate equivalent. Greyback soils grade to sandy-skeletal material in the lower part. Midelight soils have a very channery loam control section. Parachute soils have a lithic contact at a depth of 20 to 40 inches. Teemat soils have less than 18 percent clay in the control section. Tiban soils have a C2 horizon with hue of 2.5YR. Tineman soils have a horizon of gravelly sand or loamy sand in the lower part of the control section.

GEOGRAPHIC SETTING: Midfork soils are on fans and mountainsides. Slopes are 3 to 70 percent. The soils formed in alluvium weathered from calcareous sedimentary rocks. Elevation is 7,000 to 11,000 feet. The average annual precipitation is about 30 to 60 inches. The mean annual temperature is about 30 to 38 degrees F.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Kitchell, Starman, and Spearhead soils. Kitchell and Spearhead soils are pachic. Kitchell soils also have a calcic horizon. Starman soils are shallow over sandstone and are neutral or slightly acid throughout.

DRAINAGE AND PERMEABILITY: Well drained; medium to rapid runoff; moderate permeability.

USE AND VEGETATION: These soils are used for recreation and wildlife habitat. Native vegetation is parsley, wild geranium, and wild flax.

DISTRIBUTION AND EXTENT: Mountains of western Wyoming. The series is of small extent.

MLRA OFFICE RESPONSIBLE: Lakewood, Colorado

SERIES ESTABLISHED: Teton County, Wyoming, Grand Teton National Park Area; 1976.

National Cooperative Soil Survey
U.S.A.

LOCATION NETO UT

Established Series
REV: WRM/RLT
02/97

NETO SERIES

The Neto series consists of very deep, somewhat excessively drained, moderately rapidly permeable soils on stream bottoms and alluvial fans. They formed in mixed alluvium. Slopes range from 0 to 5 percent. Mean annual temperature is 44 degrees F. and the mean annual precipitation is 16 inches.

TAXONOMIC CLASS: Coarse-loamy, mixed, calcareous, frigid Typic Ustifluvents

TYPICAL PEDON: Neto sandy loam--rangeland. (Colors are for air-dry soil unless otherwise stated.)

A--0 to 2 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, slightly sticky; common fine roots; common fine interstitial pores; about 2 percent gravel; strongly calcareous; moderately alkaline (pH 8.0); clear smooth boundary. (1 to 12 inches thick)

C1--2 to 13 inches; pale brown (10YR 6/3) sandy loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, friable; common fine and very fine roots; few fine interstitial and common fine tubular pores; strongly calcareous; moderately alkaline (pH 8.0); abrupt wavy boundary. (10 to 14 inches thick)

C2--13 to 16 inches; light brown (7.5YR 6/4) very gravelly loamy sand, brown (7.5YR 5/4) moist; single grain; loose; common very fine and few coarse roots; common medium interstitial pores; 50 percent fine gravel; very strongly calcareous; moderately alkaline (pH 8.0); abrupt wavy boundary. (1 to 4 inches thick)

C3--16 to 28 inches; brown (10YR 5/3) sandy loam, brown (10YR 4/3) moist; massive; slightly hard, friable; few fine roots; 2 percent gravel; very strongly calcareous; moderately alkaline (pH 8.0); gradual wavy boundary. (10 to 14 inches thick)

C4--28 to 38 inches; pale brown (10YR 6/3) loamy sand, yellowish brown (10YR 5/4) moist; massive; soft, friable; 5 percent gravel; strongly calcareous; moderately alkaline (pH 8.0); abrupt wavy boundary. (0 to 12 inches thick)

C5--38 to 60 inches; pale brown (10YR 6/3) extremely gravelly loamy sand, brown (10YR 4/3) moist; single grain; loose; 75 percent medium and coarse gravel; strongly calcareous; moderately alkaline (pH 8.0).

TYPE LOCATION: Garfield County, Utah; Noon Canyon; SE 1/4 sec. 26, T. 37 S., R. 4 W.

RANGE IN CHARACTERISTICS: The mean annual soil temperature is about 44 to 57 degrees F. and the mean summer soil temperature at a depth of 20 inches is about 59 to 64 degrees F. The soils are usually moist but are dry for 90 cumulative days or more in 7 out 10 years in some subhorizons between depths of 8 and 24 inches but are not continuously dry in all parts between these depths for as long as 60 consecutive days. These soils are slightly calcareous to very strongly calcareous in the A and C horizons.

The A horizon has hue of 7.5YR to 2.5Y, value of 5 or 6 dry, 3 to 5 moist, and chroma of 3 to 6.

The C horizon has hue of 7.5YR or 10YR, value of 4 to 7 dry, 3 to 6 moist, and chroma of 3 to 6. It is stratified loam, sandy loam, loamy sand, silt loam, silty clay loam, and gravelly, very gravelly or extremely gravelly loamy sand and averages less than 18 percent clay in the particle size control section.

COMPETING SERIES: These are the competing Trembles series and the Shupert and Winetti series in similar families. Trembles soils lack gravelly strata in the particle size control section. Shupert soils are in the fine-loamy family. Winetti soils are in the loamy-skeletal family.

GEOGRAPHIC SETTING: Neto soils are in long narrow nearly level bottoms and gently sloping alluvial fans at elevations of 6,600 to 8,400 feet. Slope gradients are 0 to 5 percent. These soils formed in mixed alluvium from sandstone, limestone, and shale. The average annual precipitation is 13 to 20 inches and the freeze-free period ranges from 70 to 100 days. The mean annual temperature is 42 to 45 degrees F. and the average summer temperature is 59 to 64 degrees F.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Kade soils and the competing Shupert and Winetti soils. Kade soils have over 35 percent clay in the particle size control section and have mottles within 20 inches.

DRAINAGE AND PERMEABILITY: Somewhat excessively drained; medium runoff; moderately rapid permeability.

USE AND VEGETATION: Neto soils are used for rangeland and wildlife. The native vegetation is Utah juniper, pinyon pine, big sagebrush, bitterbrush, rabbitbrush, blue grama, western wheatgrass, and needleandthread grass.

DISTRIBUTION AND EXTENT: These soils are in the south-central part of Utah. They are not extensive.

MLRA OFFICE RESPONSIBLE: Lakewood, Colorado

SERIES ESTABLISHED: Garfield County (Panguitch Soil Survey Area), Utah, 1969.

REMARKS: These soils were formerly classified as Alluvial soils. Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - the zone from the surface of the soil to 2 inches. (A horizon)

Fluvent feature - an irregular decrease in organic matter.

Ustic feature - dry in some or all parts of the moisture control section for 90 or more days cumulative, but not dry in all parts more than half the time that the soil temperature at 20 inches is 41 degrees F. or more.

National Cooperative Soil Survey
U.S.A.

LOCATION PATHEAD UT

Established Series
REV: JMD/LDS/SSP
05/1999

PATHEAD SERIES

The Pathead series consists of moderately deep, well drained, moderately permeable soils that formed in slope alluvium and colluvium derived from sandstone and shale. These soils are on benches and mountain slopes. Slopes range from 25 to 80 percent. Average annual precipitation is about 18 inches, and mean annual temperature is about 42 degrees F.

TAXONOMIC CLASS: Loamy-skeletal, mixed, superactive, frigid Typic Haplustepts

TYPICAL PEDON: Pathead extremely stony loam, rangeland. (Colors are for air-dry soil unless otherwise noted.)

A--0 to 3 inches; brown (10YR 5/3) extremely stony loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots; few very fine pores; 5 percent angular gravel, 15 percent cobbles, 40 percent stones, and 5 percent boulders; strongly effervescent; carbonates are disseminated, (13 percent calcium carbonate equivalent); strongly alkaline (pH 8.6); abrupt smooth boundary. (2 to 7 inches thick)

Bw--3 to 14 inches; pale brown (10YR 6/3) very cobbly loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine, few fine and medium roots; many very fine pores; 20 percent angular gravel, 15 percent cobbles, and 5 percent stones; strongly effervescent; carbonates are disseminated, (10 percent calcium carbonate equivalent); strongly alkaline (pH 8.8); clear smooth boundary. (3 to 21 inches thick)

Bk--14 to 26 inches; pale brown (10YR 6/3) very cobbly loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; soft, friable, slightly sticky, and slightly plastic; common very fine, few fine roots; few very fine pores; 20 percent gravel, 25 percent cobbles, and 5 percent stones; strongly effervescent; carbonates are disseminated and segregated as common thin coatings on lower sides of rock fragments, (12 percent calcium carbonate equivalent); strongly alkaline (pH 8.8); clear smooth boundary. (12 to 26 inches thick)

R--26 inches; sandstone.

TYPE LOCATION: Carbon County, Utah; about 2 miles north and 4 miles west of Helper; 1,100 feet north and 400 feet west of the SE corner of sec. 6, T. 13 S., R. 9 E.

RANGE IN CHARACTERISTICS:
Soil moisture: The soil moisture control section is affected by precipitation that falls evenly throughout the year with a significant peak during late summer and early fall.
Depth to lithic contact: 20 to 40 inches to sandstone
Depth to cambic horizon: 2 to 6 inches
Depth to secondary calcium carbonate: 10 to 28 inches

Particle-size control section: 18 to 27 percent clay and 35 to 80 percent rock fragments

A horizon:
Value: 5 or 6 dry, 3 to 5 moist
Chroma: 2 or 3
Calcium carbonate equivalent: 1 to 15 percent
Reaction: slightly alkaline to strongly alkaline

Bw horizon:
Hue: 10YR or 2.5Y
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 2, 3 or 4
Texture: very stony loam, very cobbly loam, very stony fine sandy loam, extremely channery loam, very channery loam, stony loam or gravelly loam
Calcium carbonate equivalent: 1 to 15 percent
Reaction: moderately alkaline or strongly alkaline

Bk or BCk horizon:
Hue: 10YR or 2.5Y
Value: 6 or 7 dry, 3 to 6 moist
Chroma: 2 to 4
Texture: very cobbly loam, extremely cobbly loam, very channery loam, extremely channery loam, extremely stony loam, very stony loam or very stony fine sandy loam, thin strata of gravelly loam or gravelly fine sandy loam are in the upper part of this horizon in some pedons.
Calcium carbonate equivalent: 1 to 15 percent
Reaction: moderately alkaline or strongly alkaline

COMPETING SERIES: These are the Kadygulch, Mowbray, Repkie, Specie, Wilde, and Wilspring series.
Kadygulch, Mowbray, Repkie, and Specie: do not have a lithic contact within 60 inches of

the mineral surface.

Wilde: has reaction more acid than pH 7.4.

Wilspring: have soil moisture control sections that are affected by peak precipitation during the spring.

GEOGRAPHIC SETTING:
Parent material: slope alluvium and colluvium derived from sandstone and shale
Landform: benches and mountain slopes
Slopes: 25 to 80 percent
Elevation: 6,600 to 9,400 feet
Mean annual temperature: 38 to 45 degrees F.
Mean annual precipitation: 16 to 22 inches, with a late summer peak
Frost-free period: 60 to 110 days

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Doney, Grobutte, Guben, Rabbitex, and Sheepcan soils. Doney soils are fine-loamy. Grobutte soils lack bedrock within a depth of 40 inches. Guben soils have a mollic epipedon, a calcic horizon, and lack bedrock within 40 inches. Rabbitex soils have a mollic epipedon, a calcic horizon, and are fine-loamy. Sheepcan soils are fine-loamy and lack bedrock within a depth of 40 inches.

DRAINAGE AND PERMEABILITY: Well drained; medium or high runoff; moderate permeability.

USE AND VEGETATION: Used mainly for rangeland and wildlife habitat. Present vegetation is Salina wildrye, black sagebrush, winterfat, bluegrass, pinyon, Utah juniper, curlleaf mountainmahogany, and some poor quality Douglas-fir.

DISTRIBUTION AND EXTENT: Eastern Utah. LRR E, MLRA 47 and 48A.

MLRA OFFICE RESPONSIBLE: Lakewood, Colorado

SERIES ESTABLISHED: Carbon County, Utah, 1982.

REMARKS: Diagnostic horizons and features in this pedon include:

Particle-size control section: The zone from 10 to 26 inches. (Bw and Bk horizons)
Ochric epipedon: The zone from 0 to 3 inches. (A horizon)
Cambic horizon: The zone from 3 to 26 inches. (Bw and Bk horizons)
Secondary calcium carbonate: The zone from 14 to 26 inches. (Bk horizon)
Lithic contact: The contact with sandstone bedrock at 26 inches. (R layer)

The cation exchange activity class was inferred from laboratory data from similar soils in the soil survey area.

The classification was changed from Typic Ustorthent to Typic Haplustept May 1999.

Taxonomic version: Eighth Edition, 1998.

National Cooperative Soil Survey
U.S.A.

LOCATION PINON NM+UT

Established Series
RD: BDS/CDL/RJA
5/86

PINON SERIES

The Pinon series consists of shallow, well drained, moderately slowly permeable soils that formed in alluvium and residuum derived from limestone. These soils are on knolls, ridges, mesas and hillslopes with slopes ranging from 1 to 30 percent. Mean annual precipitation is about 13 inches; mean annual temperature is about 53 degrees F.

TAXONOMIC CLASS: Loamy, mixed, mesic Lithic Ustollic Calciorthids

TYPICAL PEDON: Pinon channery loam - rangeland. (Colors are for dry soil unless otherwise noted.)

A--0 to 7 inches; brown (7.5YR 5/3) channery loam, dark brown (7.5YR 4/3) moist; moderate very fine granular structure; soft, very friable, slightly sticky and slightly plastic; many fine and fine roots; about 4 percent limestone fragments; strongly effervescent; disseminated calcium carbonate; moderately alkaline; clear smooth boundary. (3 to 10 inches thick)

Bk1--7 to 10 inches; light brown (7.5YR 6/3) channery loam, brown (7.5YR 5/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; strongly effervescent with common large concretions, few thin seams and streaks of calcium carbonate; moderately alkaline; clear smooth boundary. (2 to 4 inches thick)

Bk2--10 to 16 inches; pinkish white (7.5YR 8/2) channery loam, pinkish gray (7.5YR 6/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few fine and medium roots; violently effervescent with many soft segregations of calcium carbonate; moderately alkaline; abrupt smooth boundary. (5 to 10 inches thick)

R--16 inches; fractured limestone with many lime coatings on rock fragments.

TYPE LOCATION: Torrance County, New Mexico; 2,340 feet east of the NW corner sec. 15, T. 2 N., R. 7 E.

RANGE IN CHARACTERISTICS:

Depth to bedrock: 10 to 20 inches
Rock fragments: 5 to 35 percent
Soil temperature: 52 to 57 degrees F.
Reaction: mildly to moderately alkaline

A horizon: Hue - 7.5YR or 10YR
Value: 4 through 6 dry, 2 through 5 moist
Chroma: 2 through 4

Bk horizon: Hue - 5YR through 10YR
Value: 5 through 8 dry, 4 through 7 moist
Chroma: 2 through 4
Texture: loam, sandy clay loam, or clay loam (averages 18 to 30 percent clay).
Calcium carbonate equivalent: 15 to 40 percent

COMPETING SERIES: These are the Bisodi (T), Shalaco (T), and Wayneco (T) series. Bisodi, Shalaco and Wayneco soils have less than 18 percent clay.

GEOGRAPHIC SETTING: Pinon soils are on knolls, ridges, mesas and hillslopes at elevations of 5,500 to 6,700 feet. Slope gradients range from 1 to 30 percent. These soils formed in alluvium and residuum derived from limestone. Pinon soils are in a warm climate having mean annual temperature ranging from 49 to 56 degrees F., and a mean summer temperature of 64 degrees F. Mean annual precipitation ranges from 10 to 15 inches. The frost-free period is 130 to 170 days. In Colorado these soils have air temperatures ranging from 45 to 48 degrees F. and have a frost-free period of 90 to 130 days with elevations up to 7,400 feet.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Dean and Deama soils and the competing Harvey soils. Dean soils have 40 percent or more carbonate in the control section and they lack a lithic contact within a depth of 20 inches. Deama soils have more than 35 percent rock fragments in the particle-size control section.

DRAINAGE AND PERMEABILITY: Well drained; slow surface runoff; moderately slow permeability.

USE AND VEGETATION: These soils are used primarily for livestock grazing. Native vegetation is pinyon, juniper, grama grass and shrubs.

DISTRIBUTION AND EXTENT: Central New Mexico and southern Colorado. The series is of moderate extent.

MLRA OFFICE RESPONSIBLE: Temple, Texas

SERIES ESTABLISHED: Valencia County (East Valencia Area), New Mexico, 1970.

REMARKS: DIAGNOSTIC HORIZONS AND FEATURES RECOGNIZED IN THIS PEDON ARE:

Ochric epipedon - from the soil surface to a depth of about 7 inches. (A horizon)

Calcic horizons - the zone between 7 and 16 inches. (Bk1, Bk2 horizons)

Lithic contact - the occurrence of limestone at 16 inches.

National Cooperative Soil Survey

U.S.A.

LOCATION PODO UT

Established Series
REV: WRM/RLT
02/97

PODO SERIES

The Podo series consists of shallow, well drained, moderately rapidly permeable soils that formed in residuum and colluvium from sandstone. Podo soils occur on benches, ridge tops, hillsides and mountainsides. Slopes are 20 to 70 percent. The average annual precipitation is about 16 inches and mean annual temperature is about 44 degrees F.

TAXONOMIC CLASS: Loamy, mixed, calcareous, frigid Lithic Ustorthents

TYPICAL PEDON: Podo gravelly sandy loam--rangeland. (Colors are for air-dry soil unless otherwise stated.)

A1--0 to 2 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 4/3) moist; weak fine granular structure; soft, very friable; common fine roots; common very fine interstitial pores; 25 percent pebbles 5 percent cobbles and 2 percent stones; slightly calcareous; moderately alkaline (pH 8.0); clear smooth boundary. (2 to 4 inches thick)

A2--2 to 6 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 4/3) moist; weak fine granular structure; soft, friable; common fine and very fine roots; common fine interstitial pores; 20 percent pebbles and 5 percent cobbles; strongly calcareous; moderately alkaline (pH 8.0); clear wavy boundary. (0 to 4 inches thick)

C1--6 to 12 inches; light yellowish brown (10YR 6/4) gravelly sandy loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, friable, slightly sticky; common very fine, medium and coarse roots; few fine interstitial and tubular pores; 15 percent pebbles and 5 percent cobbles; strongly calcareous; moderately alkaline (pH 8.0); gradual wavy boundary. (4 to 7 inches thick)

C2--12 to 19 inches; light yellowish brown (10YR 5/4) cobbly sandy loam, light yellowish brown (10YR 5/4) moist; massive; slightly hard, firm, slightly sticky; few very fine, medium and coarse roots; few fine and medium interstitial pores; few large faint brown root channels; 25 percent cobbles and 10 percent pebbles; strongly calcareous; moderately alkaline (pH 8.2); abrupt wavy boundary. (2 to 8 inches thick)

R--19 inches; calcareous sandstone.

TYPE LOCATION: Kane County, Utah; Ponderosa Canyon; southwest 1/4 of sec. 9, T. 38 S., R. 4 W.
RANGE IN CHARACTERISTICS: The depth to bedrock (lithic contact) ranges from 8 to 20 inches. Rock fragments in individual layers range from 5 to 70 percent, but average less than 35 percent in the particle-size control section. These soils have a mean annual soil temperature of 44 to 47 degrees F. and a mean summer soil temperature of 59 to 64 degrees F.

The A horizon has hue of 7.5YR or 10YR, value of 5 to 7 dry, 3 to 5 moist, and chroma of 2 to 4. It is noncalcareous or slightly calcareous.

The C horizon has hue of 5YR to 10YR, value of 5 to 7 dry, 4 to 6 moist, and chroma of 2 to 8. It is sandy loam, gravelly sandy loam, cobbly sandy loam to clay loam, gravelly fine sandy loam, loam, gravelly loam, and channery loam. This horizon is slightly calcareous to strongly calcareous.

COMPETING SERIES: There are no competing series in the family but Cabba, Kettner, Paunsaugunt, Rachert, Ruko, and Vanet series are in similar families or subgroups. Cabba and Kettner soils have a paralithic contact within a depth of 20 inches. Paunsaugunt soils have a mollic epipedon and have more than 35 percent rock fragments in the particle-size control section. Rachert soils have a cambic horizon and have more than 40 percent carbonates and more than 35 percent rock fragments in the particle-size control section. Ruko soils have a fine particle size control section and are shallow to a paralithic contact. Vanet soils have a cambic horizon and have a paralithic contact within a depth of 20 inches.

GEOGRAPHIC SETTING: Podo soils are on gently sloping benches, ridge tops, hillsides and mountainsides at elevations of 6,500 to 8,700 feet. They formed on calcareous sandstone, limestone, and sandy shale. Slope gradients are 20 to 70 percent. The average annual precipitation is 12 to 20 inches and the freeze-free period ranges from 70 to 90 days. The mean annual temperature is 42 to 45 degrees F. and the average summer temperature is 59 to 64 degrees F.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Sheege and Shupert soils and the competing Rachert and Ruko soils. Shupert soils are deeper than 20 inches to a lithic contact. Sheege soils have a mollic epipedon and have a mean summer soil temperature at bedrock of less than 59 degrees F.

DRAINAGE AND PERMEABILITY: Somewhat excessively drained; rapid runoff; moderately rapid permeability.

USE AND VEGETATION: Wildlife and some limited use for rangeland. The potential vegetation is pinyon pine, Utah juniper, bitterbrush, curlleaf mountainmahogany with an understory of Indian ricegrass and needleandthread.

MLRA OFFICE RESPONSIBLE: Lakewood, Colorado

DISTRIBUTION AND EXTENT: These soils are in the south-central part of Utah. They are of small extent.
SERIES ESTABLISHED: Kane County (Paunsaugunt Area), Utah, 1969.

REMARKS: These soils were formerly classified as Lithosols.

National Cooperative Soil Survey
U.S.A.

LOCATION RABBITEX CO+UT WY

Established Series
Rev. LWW/GB/JPP
02/1999

RABBITEX SERIES

The Rabbitex series consists of deep or very deep or very deep, well drained soils formed in colluvium and residuum weathered from calcareous sedimentary rocks. Rabbitex soils are on mountainsides and ridgetops. Slopes range from 10 to 70 percent. The mean annual precipitation is about 17 inches and the mean annual temperature is about 40 degrees F.

TAXONOMIC CLASS: Fine-loamy, mixed, superactive, frigid Aridic Calciustolls

TYPICAL PEDON: Rabbitex flaggy loam - native range. (Colors are for dry soil unless otherwise noted.)

A--0 to 12 inches; brown (10YR 5/3) flaggy loam, dark grayish brown (10YR 3/2) moist; moderate medium granular structure; soft, very friable, nonsticky and nonplastic; 5 percent flagstones on the surface, 5 percent fine channers within horizon; strongly effervescent; moderately alkaline; clear wavy boundary. (6 to 14 inches thick)

Bk1--12 to 21 inches; pale brown (10YR 6/3) channery loam, brown (10YR 4/3) moist; weak medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; 15 percent channers; strongly effervescent; moderately alkaline; clear wavy boundary. (0 to 14 inches thick)

Bk2--21 to 43 inches; white (10YR 8/2) channery loam, pale brown (10YR 6/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; 20 percent channers; violently effervescent with lime disseminated and as soft masses; strongly alkaline; clear wavy boundary. (12 to 32 inches thick)

R--43 inches; fractured calcareous sandstone.

TYPE LOCATION: Rio Blanco County, Colorado; about 20 miles south of Rangely and 2 miles northwest of Texas Mountain; 1,540 feet south and 20 feet east of the northwest corner of Sec. 8, T. 3 S., R 102 W. U.S.G.S. Texas Creek quad.; Lat. 39 degrees, 48 minutes, 18 seconds N., and Long. 108 degrees, 52 minutes, 32 seconds W.

RANGE IN CHARACTERISTICS: Mean annual soil temperature ranges from 43 to 47

degrees F., and mean summer soil temperature ranges from 59 to 62 degrees F. The soils are dry in some part of the moisture control section less than 6/10 of the time in most years between May 10 and October 30. The mollic epipedon is 7 to 14 inches thick. Depth to the top of the calcic horizon is 17 to 43 inches. The particle-size control section has 18 to 35 percent clay. Rock fragments, which are mainly channers, range from 15 to 35 percent. Depth to bedrock ranges from 40 to more than 60 inches, but is generally less than 60 inches.

The A horizon has hue of 2.5Y through 7.5YR, value of 3 through 5 dry, 2 or 3 moist, and chroma of 2 or 3. Rock fragments, consisting chiefly of flat pieces of marlstone and sandstone, constitute 5 to 35 percent of the volume. It commonly has granular structure, but in some pedons it has subangular blocky structure in the lower part.

The Bk horizons have hue of 2.5Y through 7.5YR, value of 5 through 8 dry, 4 through 7 moist, and chroma of 2 through 4. It is loam or sandy clay loam or clay loam, modified with channers, cobbles, or pebbles. It has 18 to 35 percent clay. Reaction is moderately alkaline or strongly alkaline. Calcium carbonate equivalent ranges from 15 to 40 percent.

COMPETING SERIES: These are the Beanlake (MT), Buse (MT), Ipano (MT), Kiev (MT) Roundor (MT), and Zahl (ND) series. Beanlake soils are very deep, formed in glacial till, and have horizons with gypsum accumulation. Buse soils are very deep, formed in glacial till of Wisconsin age, and have 2 to 12 percent rock fragments in the A and C horizons. Ipano and Roundor soils have bedrock at a depth of 20 to 40 inches. Kiev soils have less than 15 percent rock fragments in the particle-size control section and lack bedrock within a depth of 70 inches. Zahl soils lack rock fragments in the particle-size control section.

GEOGRAPHIC SETTING: Rabbitex soils are on mountainsides and ridgetops. Slopes range from 10 to 70 percent. The soil formed in colluvium and residuum weathered from calcareous sedimentary rocks (marlstone, calcareous shale, siltstone and sandstone). Elevation ranges from 5,800 to 9,000 feet. The mean annual precipitation ranges from 14 to 20 inches, which is about evenly distributed in forms of rain and snow. Mean annual temperature ranges from 36 to 45 degrees F. The frost-free period varies widely from 70 to 110 days. In Utah the frost free-period is as low as 50 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Moyerson, Rentsac, and Work soils. Moyerson soils have an ochric epipedon, are shallow, fine-textured, and have montmorillonitic mineralogy. Rentsac soils have an ochric epipedon, have a lithic contact within 20 inches, and are loamy-skeletal. Work soils have an argillic horizon which is fine-textured and of montmorillonitic mineralogy.

DRAINAGE AND PERMEABILITY: Well drained; medium runoff; moderate

permeability.

USE AND VEGETATION: These soils are used for grazing as habitat for wildlife and for watershed purposes. Native vegetation consists of pinyon, serviceberry, spiny phlox, and bluebunch wheatgrass. In Utah this soil is under Gambel oak and ponderosa pine.

DISTRIBUTION AND EXTENT: Northwestern Colorado and eastern parts of Utah. The series is of moderate extent.

MLRA OFFICE RESPONSIBLE: Lakewood, Colorado

SERIES ESTABLISHED: Rio Blanco County, Colorado, 1979.

REMARKS: Diagnostic horizons and features recognized in this pedon are: Mollic epipedon - the zone from 0 to 12 inches; Calcic horizon - the zone from 12 to 43 inches; lithic contact - at 43 inches. It has an ustic moisture regime; and a frigid temperature regime. Last updated by the state 4/95.

National Cooperative Soil Survey
U.S.A.

LOCATION STRYCH UT+AZ NM WY

Established Series
REV: DTH/RLT/RLB
4/98

STRYCH SERIES

The Strych series consists of very deep, well drained, moderately rapidly permeable soils that formed in mixed alluvium and colluvium derived from sandstone shale and conglomerate. Strych soils are on highly dissected alluvial fans, toeslopes, and terraces and have slopes of 1 to 70 percent. The average annual precipitation is about 11 inches, and the mean annual temperature is about 48 degrees.

TAXONOMIC CLASS: Loamy-skeletal, mixed, superactive, mesic Ustic Haplocalcids

TYPICAL PEDON: Strych fine sandy loam--rangeland. (Colors are for air-dry soil unless otherwise stated)

A--0 to 1 inch; yellowish brown (10YR 5/4) fine sandy loam, brown (10YR 4/3) moist; weak thin platy structure; slightly hard, very friable, slightly sticky, and slightly plastic; few very fine roots; common very fine and fine interstitial pores; 10 percent pebbles and 5 percent stones on the soil surface; slightly calcareous; carbonates are disseminated; moderately alkaline (pH 8.0); abrupt smooth boundary. (1 to 3 inches thick)

Bw--1 to 6 inches; brown (10YR 5/3) fine sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine and fine, few medium interstitial pores; 10 percent pebbles; slightly calcareous; carbonates are disseminated; strongly alkaline (pH 8.6); clear smooth boundary. (0 to 8 inches thick)

Bk1--6 to 11 inches; pale brown (10YR 6/3) stony loam, yellowish brown (10YR 5/4) moist; weak medium subangular blocky structure; slightly hard, friable, sticky and slightly plastic; few very fine, fine, and medium tubular pores; 15 percent pebbles; 5 percent stones and 5 percent cobbles; moderately calcareous; carbonates are disseminated and as thin coatings on undersides of rock fragments; strongly alkaline (pH 8.6); clear smooth boundary. (4 to 7 inches thick)

Bk2--11 to 25 inches; pale brown (10YR 6/3) very stony loam, brown (10YR 5/3) moist; massive; very hard, firm, slightly sticky and slightly plastic; few very fine, fine, medium

and coarse roots; few very fine tubular pores; 20 percent pebbles, 15 percent stones, and 5 percent cobbles; strongly calcareous; carbonates are in common fine veins and as coatings on rock fragments; strongly alkaline (pH 8.6); clear smooth boundary. (10 to 16 inches thick)

Bk3--25 to 48 inches; pale brown (10YR 6/3) very stony loam, yellowish brown (10YR 5/4) moist; massive; very hard, firm, slightly sticky and slightly plastic; few fine, medium, and coarse roots; common very fine tubular pores; 20 percent cobbles; 20 percent stones and 5 percent boulders; strongly calcareous, carbonates are in few fine veins and as coatings on rock fragments; strongly alkaline (pH 8.8); clear smooth boundary. (13 to 25 inches thick)

C--48 to 60 inches; light yellowish brown (10YR 6/4) stony sandy loam, yellowish brown (10YR 5/4) moist; massive; hard, firm, slightly sticky and slightly plastic; few fine and medium roots; 10 percent stone and 5 percent pebbles; strongly calcareous, carbonates are disseminated; moderately alkaline (pH 8.4).

TYPE LOCATION: Grand County, Utah, about 2 miles northeast of the mouth of Nash Wash Canyon in the Book Cliffs, about 500 feet south and 2,500 feet west of the northeast corner of sec. 11, T. 20 S., R. 21 E.

RANGE IN CHARACTERISTICS: Depth to the calcic horizon ranges from 11 to 39 inches and the thickness of the solum ranges from 6 to 60 inches. The particle-size control section has 35 to 75 percent rock fragments. Clay content ranges from 8 to 18 percent. Mean annual soil temperature is about 47 to 54 degrees F. Hue is 5YR to 10YR. These soils are dry 50 to 65 percent of the time cumulative when the soil temperature is greater than 41 degrees F. but are not moist for 90 consecutive days when the soil temperature is greater than 47 degrees F. The moist period occurs during the first 4 months following the summer solstice. Hue is 7.5YR or 10YR.

The A horizon has value of 4 or 5 dry, 3 or 4 moist, and chroma of 3 to 6. It is slightly alkaline, to strongly alkaline.

The Bw horizon has value of 4 to 6 dry and chroma of 3 to 6. It is fine sandy loam, gravelly fine sandy loam, cobbly fine sandy loam, stony fine sandy loam, very stony loam, and very cobbly fine sandy loam. This horizon is moderately alkaline or strongly alkaline.

The Bk horizon has a value of 4 to 8 dry, and chroma of 2 to 8. It is very stony loam, very gravelly fine sandy loam, very cobbly loam, very cobbly fine sandy loam, very stony fine sandy loam, extremely cobbly fine sandy loam, very cobbly sandy loam, and very stony sandy loam. This horizon is slightly alkaline to very strongly alkaline and has 8 to 40 percent calcium carbonate equivalent.

COMPETING SERIES: These are the Clapper, Ildefonso, Lanver, Placitas, Saraton and Seis series. Clapper soils have 18 to 27 percent clay in the particle-size control section. Ildefonso soils are more moist. Lanver soils have bedrock at depths of 20 to 40 inches. Placitas, Saraton and Seis soils are less than 40 inches deep to bedrock or paralithic contact.

GEOGRAPHIC SETTING: Strych soils are on sloping to moderately steep slopes on highly dissected alluvial fans, toeslopes and terraces. These soils formed in mixed alluvium and colluvium from sandstone, shale, and conglomerate. Elevations range from 5,000 to 9,000 feet. Mean annual air temperature is 45 to 53 degrees F. and the average annual precipitation is 8 to 15 inches. The precipitation is distributed evenly throughout the year with a slight bulge in July, August, September, and October. The driest months are April, May and June. The freeze-free period is about 100 to 180 days. At elevations above 7,000 feet Strych soils are mainly on south facing slopes.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Barx and Shalako soils. The Barx soils have an argillic horizon and lack rock fragments in the particle-size control section. The Shalako soils have bedrock within 20 inches of the surface.

DRAINAGE AND PERMEABILITY: Well drained; medium runoff; moderate permeability.

USE AND VEGETATION: Used mainly for rangeland. The potential vegetation is Utah juniper, Salina wildrye, Indian ricegrass, and needleandthread.

DISTRIBUTION AND EXTENT: Southeastern Utah and Northern Arizona. The series is of moderate extent.

MLRA OFFICE RESPONSIBLE: Phoenix, Arizona

SERIES ESTABLISHED: Henry Mountains Area, Utah, September, 1982.

REMARKS: Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - the zone from the surface of the soil to 1 inch. (A horizon)

Cambic horizon - the zone from 1 to 6 inches. (Bw horizon)

Calcic horizon - the zone from 6 to 48 inches. (Bk1, Bk2, Bk3 horizons)

LOCATION TINGEY UT

Established Series
Rev. JLS/AJE
02/1999

TINGEY SERIES

The Tingey soils consists of very deep, well drained, moderately slowly permeable soils that formed in alluvium and colluvium from sandstone and limestone. These soils are on steep and very steep mountain slopes. The mean annual soil temperature is 44 degrees F., and the average annual precipitation is about 23 inches.

TAXONOMIC CLASS: Fine-loamy, mixed, superactive Ustic Argicryolls

TYPICAL PEDON: Tingey stony silt loam - rangeland
(Colors are for dry soil unless otherwise noted.)

All--0 to 4 inches; brown (10YR 4/3) stony silt loam; very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; common fine and few very fine roots; few fine and medium pores; 5 to 10 percent of the surface is covered with stones; slightly acid (pH 6 .4); clear smooth boundary . (2 to 4 inches thick)

A12--4 to 9 inches; brown (10YR 4/3) silt loam; very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; few medium, fine and very fine roots; few fine pores; slightly acid (pH 6 .4); gradual smooth boundary. (5 to 7 inches thick)

Bl--9 to 14 inches; brown (10YR 5/3) sandy clay loam; dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; hard, firm, slightly sticky, plastic; common fine and few medium roots; few fine and medium pores; neutral (pH 6.6); gradual smooth boundary. (0 to 5 inches thick)

B21t--14 to 20 inches; yellowish brown (10YR 5/4) stony clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; very hard, firm, sticky, plastic; few fine and very fine roots; few fine and medium pores; common thin clay films; 20 percent coarse fragments, dominantly stones; neutral (pH 6 .8); gradual smooth boundary . (4 to 8 inches thick)

B22t--20 to 28 inches; light yellowish brown (10YR 6/4) stony clay loam, dark yellowish

brown (10YR 4/4) moist; strong medium subangular blocky structure; very hard, very firm, sticky, plastic; few medium, fine and very fine roots; few coarse, medium, and fine pores; common thin clay films; 25 percent coarse fragments, dominantly stones; neutral (pH 7.2).

B3ca--28 to 41 inches; light yellowish brown (10YR 6/4) stony sandy clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; hard, firm, sticky, plastic; few fine and medium roots; few fine and very fine pores; 25 percent coarse fragments, dominantly stones; slightly calcareous, lime is disseminated and segregated on coarse fragments; neutral (pH 7.2); gradual wavy boundary . (6 to 15 inches thick)

Clca--41 to 53 inches; light yellowish brown (10YR 6/4) very stony heavy loam; dark yellowish brown (10YR 4/4) moist; massive; hard, friable, slightly sticky, slightly plastic; few fine and medium roots; few fine and medium pores; 30 percent coarse fragments, dominantly stones; moderately calcareous, lime is disseminated and segregated on coarse fragments; neutral (pH 7.2); gradual wavy boundary. (10 to 20 inches thick)

C2ca--53 to 60 inches; light yellowish brown (10YR 6/4) very stony loam; dark yellowish brown (10YR 4/4) moist; hard, friable, slightly sticky, slightly plastic; few fine and medium roots, few fine pores; 70 percent coarse fragments, dominantly stones and cobbles; moderately calcareous, lime is disseminated and segregated on coarse fragments; neutral (pH 7.2).

TYPE LOCATION: Sanpete County, Utah; two miles east of the lower power plant in Pleasant Creek Canyon; 500 feet north of creek above the spring near log cabin, sec. 10, T.15S., R.5E.

RANGE IN CHARACTERISTICS: Solum thickness above the Cca horizon ranges from 27 to 50 inches. The mean annual soil temperature at 20 inches ranges from 44 to 47 degrees F. The mean summer soil temperature ranges from 57 to 59 degrees F. The soils are usually moist.

The Al horizon is dark brown or brown. It has a value of 3 through 5 dry, and 2 or 3 moist, and chroma of 2 or 3. This horizon has weak moderate fine granular to moderate fine subangular blocky structure. It is slightly acid to neutral

The B2t horizon has hue of 10YR or 7.5YR, value of 4 through 6 dry, 3 or 4 moist, and chroma of 2 through 4. It is stony clay loam to stony sandy clay loam, and contains 15 to 35 percent coarse fragments. This horizon has few to continuous thin clay films. It is slightly acid to neutral.

The Cca horizon has hue of 10YR or 7.5YR, value of 5 or 6 dry, 4 or 5 moist and chroma

of 2 through 6. It is stony loam to silty clay loam, and contains 35 to 70 percent stones. This horizon has 3 to 30 percent carbonate, and is neutral to moderately alkaline,

COMPETING SERIES: These are the Amsden, Dra, Echard, Elwood, Gurney, Hoodle, Hourglass, Kezar, Kimmons, Kittredge, Leavitt, Lucky, Lymanson, Lyonman, Michelson, Miracle, Mult, Newlands, Passcreek, Primeaux, Rammel, Sessions, Sponseller, Tripit, Troutdale, Tatiyee, Wellsville, Woosley, Youga, and Zeesix series. Amsden soils have hue of 5YR through 10R in the B2t horizon. Dra, Elwood, Mult, Rammel, and Primeaux soils are less than 40 inches deep over bedrock. Echard, Gurney, Sessions, Tatiyee and Zeesix soils have more than 35 percent clay in their control section. Elwood, Hoodle, Tatiyee and Zeesix soils have more than 35 percent coarse fragments in their control section. Elwood, Hourglass, Lyonman, Newlands Sessions, Sponseller and Tatiyee soils lack horizons of carbonate accumulation. Gurney and Sponselier soils have a dominant hue of 5YR or redder. Hourglass, Leavitt, Michelson, Mult and Wellsville soils are not stony in the B2t horizon. Also, Michelson soils have a calcic horizon. Kimmons, Lymanson and Tripit soils have a paralithic contact at depths less than 40 inches. Leavitt soils have less than 15 percent coarse fragments in the control section. Passcreek, Troutdale, and Woosley soils have a lithic contact. Zeesix soils have more than 40 percent carbonates in their control sections.

GEOGRAPHIC SETTING: Tingey soils are on steep and very steep mountain slopes at elevations of 7,200 to 8,400 feet. They formed in alluvium and colluvium from sandstone and limestone. The climate is moist subhumid and the average annual precipitation ranges from 20 to 25 inches. Mean annual temperature ranges from 43 to 45 degrees F. Frost-free period is 80 to 90 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Deer Creek, Lizzant, Mortenson, Pritchett, Skylick and Toze and the competing Zeesix soils. Deer Creek soils have more than 35 percent clay in the argillic horizon, and the average summer temperature at 20 inches is more than 59 degrees F. Lizzant and Toze soils lack argillic horizons. Mortenson, Pritchett and Skylick soils have more than 35 percent clay in the argillic horizon. Mortenson and Pritchett soils have albic horizons. Skylick soils have mollic epipedons more than 20 inches thick.

DRAINAGE AND PERMEABILITY: Well-drained; medium to rapid runoff; moderately slow permeability.

USE AND VEGETATION: These soils are used for range for livestock and wildlife. Principal vegetation is oakbrush, bluebunch wheatgrass, mountain bromegrass, horsemint, snowberry, bitterbrush, squaw apple, and peavine.

DISTRIBUTION AND EXTENT: Central Utah. The series is inextensive.

MLRA OFFICE RESPONSIBLE: Lakewood, Colorado

SERIES ESTABLISHED: Sanpete Survey Area, Utah, 1971.

REMARKS: In the 1938 classification these soils were classified as Brunizems.

OSED scanned by NSSQA. Last revised by state 8/71.

National Cooperative Soil Survey
U.S.A.

LOCATION TRAVESSILLA NM+AZ CO KS MT OK SD UT WY

Established Series
Rev. VGL-AJC-RJA
11/97

TRAVESSILLA SERIES

The Travessilla series consists of shallow, well drained soils that formed in calcareous eolian sediments and material weathered from sandstone. These soils are on hills, cuestas, and mesas with slopes ranging from 0 to 75 percent. Mean annual precipitation is about 11 inches. The mean annual temperature is above 53 degrees F.

TAXONOMIC CLASS: Loamy, mixed, superactive, calcareous, mesic Lithic Ustic Torriorthents

TYPICAL PEDON: Travessilla stony sandy loam - rangeland. (Colors are for dry soil unless otherwise noted.)

A--0 to 4 inches; light brownish gray (10YR 6/2) stony sandy loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and medium roots; common fine pores; 15 percent stones; slightly effervescent; mildly alkaline; clear smooth boundary. (2 to 6 inches thick)

C--4 to 8 inches; pale brown (10YR 6/3) channery loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common fine and medium roots; common fine pores; 20 percent channers; slightly effervescent; moderately alkaline; abrupt smooth boundary. ((2 to 14 inches thick)

2R--8 inches; hard sandstone with some fractures.

TYPE LOCATION: Union County, New Mexico; approximately 1,560 feet north and 4,200 feet west of the southeast corner, sec. 24, T. 31 N., R. 36 E.

RANGE IN CHARACTERISTICS:

Soil Moisture - Typically, moist intermittently from April 30 through October in some part of the soil moisture control section and dry in all parts periodically from November 1 to April 30.

Soil Temperature - 50 to 58 degrees F.

Depth to bedrock - 4 to 20 inches.

Reaction - Mildly or moderately alkaline calcareous throughout.

Particle-size Control Section - Rock Fragments: 0 to 10 percent stones, 0 to 10 percent cobbles and 0 to 25 percent pebbles but weighted average is less than 35 percent.

Fine Earth Fraction: Sandy loam, fine sandy loam, loam or very fine sandy loam.
Clay Content: 5 to 18 percent.
Silt Content: 5 to 50 percent.
Sand Content: 40 to 90 percent with more than 25 percent fine sand or coarser.

A and C horizons -
Hue: 2.5Y through 7.5YR
Value: 5 to 7 dry, 3 to 5 moist
Chroma: 2 to 4

COMPETING SERIES: These are the Gladel, Lazear, Redspear, Rizno, Rizozo, Skyvillage, and Travson series. Gladel soils have continuous genetic subhorizons of secondary calcium carbonate and/or sulfate. Lazear soils have more than 18 percent clay. Redspear, Rizno and Rizozo soils have hues of 5YR or redder. Skyvillage soils are dry in all parts of the soil moisture control section periodically from February 15 to June 30. Travson soils are dry in the soil moisture control section July through September.

GEOGRAPHIC SETTING: The Travessilla soils are on hills, cuestas, and mesas with slopes ranging from 0 to 75 percent. Elevation ranges from about 4,700 to 8,000 feet. They formed from calcareous eolian sediments and material weathered from sandstone and shale. Outcrops of sandstone with a minor amount of shale are common on steep slopes. Typically, the average annual precipitation ranges from about 10 to 13 inches, but has ranged higher in the past. The average annual temperature ranges from about 47 to 57 degrees F. Frost-free period is typically 115 to 170 days. Utah has a frost-free period as low as 70 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Bernal, Carnero, Hagerman, Quay and Pajarito soils. Bernal and Hagerman soils have argillic horizons. Carnero soils lack bedrock at depths of less than 20 inches. Quay and Pajarito soils lack bedrock within a depth of 40 inches and Quay soils have more than 18 percent clay in the control section and have a prominent zone of lime accumulation.

DRAINAGE AND PERMEABILITY: Well drained; medium to rapid runoff; moderate or moderately rapid permeability.

USE AND VEGETATION: Rangeland. Juniper, squawbush, oakbrush, blue grama, sideoats grama and snakeweed are the principal plants.

DISTRIBUTION AND EXTENT: Northern New Mexico, Arizona, Colorado, Montana, western Oklahoma, Utah and Wyoming. The series is extensive.

MLRA OFFICE RESPONSIBLE: Temple, Texas

SERIES ESTABLISHED: Eastern New Mexico Reconnaissance, Harding County, New Mexico, 1937.

REMARKS: Diagnostic horizons and features recognized in this pedon are:

Ochric Epipedon - The zone from the surface of the soil to a depth of 4 inches (A horizon).

Lithic Contact - The occurrence of hard sandstone at about 8 inches (2R horizon).

Particle-size Control Section - The zone from the surface of the soil to about 8 inches (A, C horizons).

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