

APPENDIX E: SOIL MAP UNIT DESCRIPTIONS

The following soil map unit descriptions have been excerpted and paraphrased from the complete descriptions found in the *Soil and ecological land unit survey: Wet Mountains and Spanish Peaks area, Colorado* (Irvine, in preparation).

Soil Mapping Unit 101F Silas family – Cryaquolls association Soil Properties

Silas family – Cryaquolls association typically occurs on 0 to 15 percent slopes. These soils are very deep alluvium on valley toeslopes and valley floodplains. The Silas family soils are generally well drained with seasonally high ground water found between 3 to 4 feet deep. The available water capacity and permeability are moderate with slow to moderate runoff. These soils are found at elevations between 7,800 to 10,500 feet above mean sea level (amsl) with average annual precipitation ranging between 20 to 30 inches. The mean annual air temperature is 36 to 44° F with 50 to 79 frost free days. Silas family soils are generally 60 inches to bedrock with loam or silt loam surface texture and sandy loam or sandy clay loam subsoil texture. Cryaquolls soils consist of very deep, very poorly drained soils which form alluvium from mixed sources. The depth to seasonally high water table is 1 foot with occasional flooding. Available water capacity is low to moderate, permeability is slow to moderately slow and runoff is slow. These soils occur in valley floodplains with gentle slopes at elevations ranging from 7,800 to 11,800 feet. The mean annual precipitation is 20 to 40 inches with mean annual air temperature ranging from 34 to 40° F with 30 to 70 frost free days. Soil depth to bedrock is greater than 60 inches. Soil texture silty clay loam and sandy clay loam at the surface and extremely stony sandy loam subsoil texture. The effective rooting depth for this unit is greater than 40 inches. Mass movement potential for landslides, debris flows and snow avalanche is low. Cut and fill slope stability limitations for roads and trails on Silas soils is moderate with fine textured materials and, on Cryaquolls soils, is severe due to high water table and variable textures. The limitation for improved unsurfaced roads is moderate due to low load bearing strength for Silas and severe for Cryaquolls due to high water table and low load bearing strength.

Soil Mapping Unit 702M Rogert family – Cryoborolls association Soil Properties

Rogert family – Cryoborolls complex typically occurs on 5 to 40 percent slopes. This soil classification is comprised of 50 percent Rogert and similar soils and 35 percent Cryoborolls and similar soils with 15 percent inclusions by Cryaquolls along stream drainages and seeps. The Rogert soils are shallow, excessively well drained formed in residuum from sedimentary, igneous and metamorphic rocks. These soils occur on gently sloping to very steep mountain slopes ranging between 5 to 80 percent. Rogert family soils are found at elevations between 9,000 and 11,800 feet above msl with a mean annual precipitation ranging between 16 to 20 inches. The mean annual air temperature is 36 to 44°F with 50 to 70 frost free days. The soil depth to bedrock is less than 20 inches with a fine sandy loam, sandy loam, or loam texture at the surface and a loam or sandy loam subsoil texture. Rogert soils have an effective rooting depth of less than 20 inches, are somewhat excessively drained with a depth to seasonal high water table greater than 6 feet. Available water capacity is low and permeability is moderate with runoff being moderate to rapid. The Cryoborolls complex consists of shallow to very deep, well drained soils formed in residuum and colluvium from igneous, metamorphic, and sedimentary rocks. These soils occur on gently sloping to very steep mountain slopes ranging from 5 to 80 percent. Cryoborolls soils occur at elevations between 9,000 and 11,800 feet with mean precipitation ranging between 16 to 25 inches, mean annual temperature between 34 and 44°F and between 30 to 70 frost free days. The soil surface soil is gravelly loam and subsoil

texture ranging from extremely cobbly sandy clay loam to extremely flaggy sandy clay loam. Cryoborolls soils are generally greater than 10 inches to bedrock with an effective rooting depth of less than 20 inches. This soil is well drained with seasonal high water table greater than 6 feet in depth. Available water capacity and permeability are moderate and runoff is moderate to rapid. The Rogert family – Cryoborolls association has a low mass movement potential and road and trail limitations are slight. Off-road vehicles and trails on Cryoborolls soils may cause some surface compaction and rutting. Revegetation limitations on Cryoborolls soils is slight and is moderate on Rogert soils due to shallow depth to bedrock and low available water capacity.

Soil Mapping Unit 706YB Cathedral family – Rock outcrop complex, 40 to 150 percent slopes, rubbly

The Cathedral family – Rock outcrop complex, 40 to 150 percent slopes, rubbly consists of 12.5 percent (583.3 acres) of the analysis area. Cathedral and similar soils comprise 60 percent of this map unit and 25 percent is rock outcrop and 15 percent is contrasting inclusions of deep soils in swales and toeslopes. Cathedral family soils are shallow, somewhat excessively drained, which formed in residuum from igneous and metamorphic rocks. These soils occur on steep to very steep mountain slopes ranging from 40 to 80 percent. Cathedral soils generally occur at 6,500 to 9,500 feet with a mean annual precipitation of 16 and 25 inches, mean annual air temperature of 40 to 48°F, and 70 to 90 frost free days. The soil depth to bedrock and effective rooting depth is less than 20 inches. Cathedral soil texture is very stony sandy loam at the surface and extremely stony sandy loam in the subsoil. This soil is somewhat excessively drained with a seasonal high water table greater than 6 feet with low available water capacity, moderate permeability, and rapid runoff. Rock outcrops are generally comprised of cliffs and talus landforms developed in residuum and colluvium from igneous and metamorphic rocks. Rock outcrops have rapid and slow runoff. The Cathedral family – Rock outcrop complex, 40 to 150 percent slopes, rubbly has low landslide potential, moderate debris flow potential, and moderate snow avalanche potential. Roads and trail limitations are moderate due to slope on cut and fill and severe on unimproved surfaces due to slope, cliffs and unstable talus. Off-road vehicle roads and trails have a severe limitation due to slope, erosion hazard, cliffs, and unstable talus. Sediment delivery efficiency is high.

Soil Mapping Unit 707Y Merino family – Rock outcrop complex, 40 to 150 percent slopes, rubbly (Draft Soil and Soil Mapping Unit Survey, 5/12/2008. pp 79-80; 146-147)

The Merino family – Rock outcrop complex typically occurs on 40 to 150 percent slopes. Merino soils and similar soils, 30 percent rock outcrop, and 15 percent Leighcan family contrasting inclusions in swales and toeslopes. Merino family soils are shallow, somewhat excessively drained formed in residuum from igneous and metamorphic rocks. These soils occur on very steep mountain slopes ranging from 40 to 80 percent at elevations ranging from 6,800 to 10,500 feet. The mean annual precipitation for this soil is 20 to 30 inches, with an annual mean air temperature of 36 to 44°F and 50 to 70 frost free days. The Merino soil has an effective rooting depth and depth to bedrock of less than 20 inches. The surface soil texture is gravelly sandy loam and subsoil texture is extremely gravelly sandy loam. The soil is somewhat excessively drained with a depth to seasonal high water table greater than 6 feet. Available water capacity is very low and permeability and runoff are rapid. The rock outcrops are generally cliffs and talus formed in residuum and colluvium from igneous and metamorphic rocks. The rock outcrop has rapid and slow runoff. Management consideration for the Merino family – Rock outcrop complex, 40 to 150 percent slope, rubbly mapping unit include low potential for landslides and high potential for debris flows and snow avalanche. The sediment delivery efficiency for these soils is high. Cut and fill slope stability limitation is moderate due to slope and improved unsurfaced roads is severe due to slope, cliffs, and unstable talus. Off-road vehicle limitation is severe due to slope, erosion hazards, cliffs, and unstable talus. Timber

management potential is limited due to steep slopes, high erosion hazard, areas with shallow depth to bedrock, and rubbly soil surface.

Soil Mapping Unit 708SB Hechtman – Guffey families complex, 40 to 60 percent slopes, extremely bouldery (Draft Soil and Soil Mapping Unit Survey, 5/12/2008. pp 80-81; 136-138)

The Hechtman – Guffey families complex typically occurs on 40 to 60 percent slopes and is characterized as extremely bouldery. Hechtman soils are shallow, somewhat excessively drained formed in residuum from igneous and metamorphic rocks. Hechtman soils occur on gently sloping to steep bench and mountain slopes ranging from 5 to 80 percent at elevations of 8,000 to 11,800 feet. The mean annual precipitation is 20 to 40 inches and mean annual air temperature is 34 to 44°F with 30 to 70 frost free days. The soil depth to bedrock and effective rooting depth is less than 20 inches. The surface soil texture is gravelly loam and gravelly sandy clay loam and a subsoil texture of very gravelly sandy loam and extremely gravelly sandy loam. The Hechtman soil is somewhat excessively drained with a seasonally high water table depth greater than 6 feet. The available water capacity is low, permeability is moderately rapid, and runoff is rapid. The Guffey family soils are moderately deep, well drained formed in residuum and colluvium from igneous and metamorphic rocks. These soils occur on steep mountain slopes ranging from 40 to 60 percent slope at elevations of 8,000 to 10,000 feet. The mean annual precipitation is 20 to 30 inches and mean annual temperature is 36 to 44°F with 50 to 70 frost free days. The soil depth to bedrock is more than 60 inches and effective rooting depth is 20 to 40 inches. The surface soil texture is very fine sandy loam and sandy loam with a subsoil texture of gravelly sandy loam and very gravelly sandy clay loam. The Guffey soil is well drained with a seasonally high water table depth greater than 6 feet. The available water capacity is moderate, permeability is moderate to moderately rapid, and runoff is rapid. Management considerations for the Hechtman – Guffey families complex includes low mass movement potential for landslides, debris flows, and snow avalanche. Sediment delivery for this soil unit is high. Road and trail limitation are moderate and improved unsurfaced roads and off-road vehicle roads and trails is severe due to slope and erosion hazard. Revegetation limitations are severe due to slope, erosion hazard, shallow depth to bedrock, and low available water capacity. Timber management is limited by steep slopes, higher erosion hazards, areas of shallow depths to bedrock and extremely bouldery soil surfaces.

Soil Mapping Unit 709YB Cathedral family, moist – Rock outcrop complex, 40 to 150 percent slopes, rubbly.

The Cathedral family, moist – Rock outcrop complex typically occurs on 40 to 150 percent slopes and is characterized as rubbly. The Cathedral family and Rock outcrop complex descriptions are provided above. Management considerations for this soil unit include low landslide potential, moderate debris flows and snow avalanche, and high sediment delivery efficiency. Road and trail limitation are moderate for cut and fill slopes stability, severe for improved unsurfaced roads and off-road vehicle roads and trails. Revegetation limitations are severe due to slope, erosion hazard, shallow depth to bedrock, low available water capacity, cliff, and talus.

Soil Mapping Unit 710M Hechtman – Ashcroft families complex, 5 to 25 percent slopes, extremely bouldery

The Hechtman – Ashcroft families complex typically occurs on 5 to 25 percent slopes and is characterized as extremely bouldery. This soil unit consists of 60 percent Hechtman and similar soils, 25 percent Ashcroft and similar soils, and contrasting inclusions of 10 percent Guffey family and 5 percent exposed bedrock. The Hechtman family soils are described above. The Ashcroft soils are moderately deep to very deep, well drained soils which formed in residuum and slope wash from sedimentary, igneous and metamorphic rocks. Ashcroft soils form on gently to moderately steep mountain, mesa, and bench slopes which range 5 to 40 percent in elevations of 8,000 to 11,800 feet. The mean annual precipitation is 20 to 40 inches and mean annual air temperature of 34 to 44°F with 30 to 70 frost free days. Ashcroft soils are generally greater than 40 inches to bedrock and effective rooting depth greater than 20 inches. The soil is well drained with a seasonally high water table greater than 6 feet in depth. Available water capacity and permeability is moderate and runoff is moderate to rapid. Mass movement potential of the Hechtman – Ashcroft families complex, 5 to 25 percent slopes, extremely bouldery is low including landslides, debris flows, and snow avalanche. Sediment delivery efficiency is low to moderate and road and trail limitations are slight. The Ashcroft soils are moderately limited for off-road vehicle roads and trails because of surface compaction and rutting. Revegetation limitations are slight for Ashcroft soils and moderate for Hechtman soils due to shallow depth to bedrock and low available water capacity. Timber management should be limited to convex slopes by shallow depth to bedrock, low available water capacity, wind throw hazard and extremely bouldery soil surfaces.

Soil Mapping Unit 713Y Hechtman family – Rock outcrop complex, 40 to 150 percent slopes, extremely bouldery

The Hechtman family – Rock outcrop complex typically occurs on 40 to 150 percent slopes and is characterized as extremely bouldery. Both Hechtman and Rock outcrop are described above. This map unit has low to moderate mass movement potential and high sediment delivery efficiency. Road and trail limitations are moderate for cut and fill, severe for improved unsurfaced roads and off-road vehicle roads and trails due to slope, cliffs, and unstable talus. Revegetation limitations are severe due to slope, erosion hazard, shallow depth to bedrock, and low available water capacity. Timber management is limited by rugged slopes, high erosion hazard, shallow depth to bedrock, windthrow hazard, rock outcrop, and rubbly soil surfaces. Reforestation is limited by low available water capacity.

Soil Mapping Unit 716M Teaspoon – Trag families complex, 25 to 40 percent slopes, extremely stony

The Teaspoon – Trag families complex typically occurs on 25 to 40 percent slopes and is characterized as extremely stony. The Teaspoon soils consist of shallow, well drained soils formed in residuum from igneous and metamorphic rocks. Teaspoon soils occur on gently sloping to moderately steep bench slopes which range 5 to 40 percent at elevations between 6,800 to 9,000 feet above msl. The mean annual precipitation for this soil is 16 to 25 inches and a mean annual temperature of 40 to 48°F with 70 to 90 frost free days. Effective rooting depth and soil depth to bedrock is less than 20 inches. Teaspoon soil is well drained with depth to seasonal high water table is greater than 6 feet. Available water capacity is low, permeability is moderate, and runoff is moderate to rapid. Surface soil texture is gravelly silt loam and subsoil texture is very to extremely gravelly clay loam. The Trag soil families consist of moderately deep to very deep, well drained soils, formed in residuum and slope wash from igneous and sedimentary rocks. These soils occur on gently sloping to moderately steep mountain slopes ranging from 5 to 40 percent at elevations of 6,800 to 9,000 feet above msl. Trag soils have a mean annual precipitation of 16 to 25 inches and mean annual temperature of 40 to 48°F with 70 to 90 frost free days. Effective rooting depth in Trag is greater than 20 inches and depth to bedrock is greater than 40 inches. Trag soils are well drained with depth to seasonal high water table is greater than 6 feet. Surface soil texture is loam and subsoil texture is gravelly sandy clay loam to gravelly loam. Trag available water capacity and permeability is moderate and runoff is moderate to rapid. Management considerations for Teaspoon – Trag families complex, 25 to 40 percent slopes, extremely stony include low potential mass movement, and slight road and trail limitations. Trag has slight revegetation limitations and Teaspoon has moderate revegetation limitations due to shallow depth to bedrock and low available water capacity. Reforestation is limited to convex slopes by low available water capacity, and ponderosa pines on convex slopes with shallow soils are susceptible to windthrow hazard.

Soil Mapping Unit 719Y Cryoborolls – Rock outcrop complex, 40 to 150 percent slope

The Cryoborolls soils are described in Soil Mapping Unit 702 above. The composition of this soil unit is 60 percent Cryoborolls and similar soils and 25 percent rock outcrop. Contrasting inclusions include 15 percent deep soils on swales and toeslopes. Effective rooting depth is greater than 10 inches with a seasonal high water table greater than 6 feet. Available water capacity and permeability is moderate and runoff is rapid. The rock outcrop takes the form of cliff and talus with a rapid to slow runoff potential. Management considerations for this soil type are low landslide potential, moderate debris flows, and snow avalanche with a high sediment delivery efficiency. Road and trail limitations for cut and fill slope stability are moderate due to slope and severe on improved unsurfaced roads and off-road vehicle roads and trails. Revegetation limitation is moderate due to slope and erosion hazard and cliffs and talus. Potential natural communities are slow to return on south facing slopes.