

**Map Unit:** 654D—Tolby family - Rock outcrop - Hiwan family complex, 40 to 150 percent slopes.

**Ecological Land Unit:** 654D—lodgepole pine, subalpine fir and Engelmann spruce on montane and subalpine, south facing steep to very steep mountain slopes.

#### MAP UNIT SETTINGS

**Location:** mountainous areas where igneous and metamorphic rocks predominate.

**Landform:** steep to very steep mountain slopes.

**Parent material:** residuum and colluvium.

**Geologic symbol:** Tmi, Xb, Xfh, Xg, Yg.

**Elevation range:** 9,000 to 11,800 feet.

**Aspect:** south.

**Climatic zone:** montane and subalpine.

**Mean annual precipitation:** 20 to 40 inches.

**Mean annual air temperature:** 36°F. to 44°F.

**Average annual snowfall:** 200 to 400 inches.

#### COMPOSITION

40 percent Tolby and similar soils.

30 percent Rock outcrop.

20 percent Hiwan and similar soils.

#### Contrasting inclusions

10 percent Cryoborolls shallow to deep on south slopes under grass and shrub canopy.

#### TYPICAL PROFILES:

##### Tolby

Surface covering layer:

1 to 0 inches - partially decomposed needle and twig litter.

Surface layer (s):

0 to 12 inches - brown, gravelly silt loam.

Subsurface layer (s):

12 to 33 inches - dark yellowish brown, very cobbly, loamy fine sand.

Subsoil layer (s):

33 to 60 inches, dark yellowish brown, very cobbly coarse sand.

##### Rock outcrop

##### Hiwan

Surface covering layer:

1 to 0 inches - spruce, fir and pine litter and duff.

Surface layer(s):

0 to 4 inches - brown, very gravelly sandy loam.

Substratum layer(s):

4 to 16 inches - light brownish gray, very gravelly loamy sand.

#### SOIL PROPERTIES AND QUALITIES

##### Tolby

**Effective rooting depth:** greater than 20 inches.

**Natural drainage class:** excessively.

**Depth to seasonal high water table:** greater than 6 feet.

**Available water capacity:** very low.

**Permeability:** rapid.

**Runoff:** moderate.

##### Rock outcrop

##### Hiwan

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#### VEGETATION

##### Potential natural communities:

**Tolby:** subalpine fir-Engelmann spruce/common juniper (Abla-Pien1/Juco) typical site and lodgepole pine/common juniper (Pico/Juco) below 10,000 feet and limber pine/common juniper (Pifl/Juco) dry site.

**Hiwan:** (Abla-Pien1/Juco) typical site and (Pico/Juco) below 10,000 feet and (Pifi/Juco) dry site.  
**Seral stages:** dominated with lodgepole pine and other plants of the respective potential natural communities.  
**Present vegetation:** includes plants of the respective potential natural communities.

## USE AND MANAGEMENT CONSIDERATIONS

**Major uses:** dispersed non-motorized recreation, wildlife habitat and watershed.

### **Mass movement potential:**

**Landslides:** moderate.

**Debris flows:** high.

**Snow avalanche:** high.

### **Road and trail limitations:**

#### **Cut and fill slope stability**

**Tolby:** severe - slope and sandy parent material.

**Rock outcrop:** slight- bedrock.

**Hiwan:** moderate - slope.

#### **Improved unsurfaced roads:**

**Tolby:** severe - slope.

**Rock outcrop:** severe - cliffs and unstable talus.

**Hiwan:** severe - slope and shallow depth to bedrock.

#### **Offroad vehicle roads and trails:**

**Tolby:** severe - slope and erosion hazard.

**Rock outcrop:** severe - cliffs and unstable talus.

**Hiwan:** severe - slope and erosion hazard.

#### **Foot trails and paths:**

**Tolby:** moderate - slope.

**Rock outcrop:** severe - cliffs and unstable talus.

**Hiwan:** moderate - slope.

#### **Revegetation limitations:**

**Tolby:** severe - low available water capacity, low inherent fertility, slope and erosion hazard.

**Rock outcrop:** severe - bedrock.

**Hiwan:** severe - low available water capacity, low inherent fertility, shallow depth to bedrock, slope and erosion hazard.

**Revegetation considerations:** Plant drought tolerant plants to survive south facing slopes. Mulch will conserve soil moisture and protect seedling establishment. Surface netting in conjunction with mulching will reduce the erosion hazard.

**Timber management considerations:** Conventional logging operations limited by slope, rock outcrop and erosion hazards.

**Wildlife management considerations:** This map unit provides shelter for upland game animals.

**Acid precipitation buffering capacity:** low.