

The surface layer of Carjo soils is a grayish brown loam, or very fine sandy loam, about 10 cm thick. The subsoil is a brown and reddish brown clay loam and clay about 40 cm thick. The substratum is a light brown, very fine sandy loam about 10 cm thick. Depth to tuff and the effective rooting depth range from 51 to 102 cm, and the available water holding capacity is medium. Runoff in this slowly permeable soil is medium, and the water erosion hazard is moderate.

A typical profile description of Carjo loam (1 to 8% slope) is given as follows:

- A1 0-10 cm, grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft and very friable moist; many fine roots; many very fine interstitial pores; neutral; clear smooth boundary.
- B1 10-30 cm, brown (7.5YR 4/4) clay loam, dark brown (7.5YR 3/3) moist; weak fine subangular blocky structure; slightly hard and very friable moist; sticky and plastic wet; many fine roots; many very fine interstitial pores; neutral; clear smooth boundary.
- B2t 30-51 cm, reddish brown (5YR 4/4) clay, dark reddish brown (5YR 3/4) moist; moderate fine angular blocky structure; hard and firm moist, sticky and plastic wet; many fine and medium roots; common fine tubular pores; thin discontinuous clay films on peds; neutral; clear smooth boundary.
- C 51-64 cm, light brown (7.5YR 6/4) very fine sandy loam, brown (7.5YR 4/4) moist; massive; few fine roots; common fine tubular pores; mildly alkaline; abrupt smooth boundary.
- R 64+ cm, tuff.

**2. Frijoles Series.** The Frijoles series consists of deep, well-drained soils that formed in thick pumice beds on nearly level to moderately sloping mesa tops (Fig. 10). Included with this soil in mapping are Seaby, Nyjack, and fine Typic Eutroboralf soils; these inclusions make up about 10% of the mapping unit. Native vegetation is mainly piñon pine, one-seed juniper, and blue grama.

Typically, the surface layer is a brown, very fine sandy loam, or loam, about 5 cm thick. The subsoil is reddish brown and brown, very gravelly clay loam and very gravelly sandy clay loam about 40 cm thick and contains about 35 to 70% pumice. The substratum consists of gravel-sized white pumice to 152 cm or more and may be banded with clay films. Permeability is moderately slow in the upper 45 cm and very rapid below. The available water capacity is very low, and the effective rooting depth is about 45 cm. Runoff is slow to medium, and the erosion hazard is moderate.

A typical profile of Frijoles very fine sandy loam (1 to 8% slope) is described as follows:

- A1 0-5 cm, brown (10YR 5/3) very fine sandy loam, dark brown (10YR 4/3) moist; weak fine granular structure; soft and very friable moist; many fine roots; many fine vesicular pores; neutral; abrupt smooth boundary.
- B2t 5-30 cm, reddish brown (5YR 4/4) very gravelly clay loam, dark reddish brown (5YR 3/4) moist; weak fine subangular blocky structure; slightly hard and friable moist, sticky and plastic wet; many fine roots; many fine vesicular pores; thin discontinuous clay films on peds; 55% fine gravel-sized pumice; neutral; clear smooth boundary.
- B3 30-46 cm, brown (7.5YR 4/4) very gravelly sandy clay loam, dark brown (7.5YR 3/4) moist; weak fine granular structure; soft and very friable moist, sticky and plastic wet; many fine roots; many fine vesicular pores; 55% fine gravel-sized pumice; moderately alkaline; clear smooth boundary.
- C 46-152+ cm, white (N 8/0) gravel, white (N 8/0) moist; single grain; loose, dry and moist; few fine roots; many fine vesicular pores; 85% fine gravel-sized pumice; slightly calcareous; strongly alkaline.

**3. Hackroy Series.** The Hackroy series consists of very shallow to shallow, well-drained soils that formed in material weathered from tuff on mesa tops (Fig. 11). Individual areas of Hackroy soils are 5 to 80 acres in size and include small areas (<2 acres) of rock outcrop, and Nyjack and fine-loamy Typic Eutroboralf soils; the inclusions may compose 25% of this mapping



unit. A Hackroy-Rock outcrop complex was also mapped in the survey and consists of small areas of Hackroy soils and 70% rock outcrop that are so intermingled that they could not be separated at the scale selected for mapping. This second unit consists of nearly level to moderately sloping shallow soils over tuff bedrock and tuff rock outcrop; mapped areas are mostly elongated and oriented with the mesa tops and are 1/4 to 3 acres in size. The shallow, well-drained Hackroy soils make up about 20% of this complex and the Nyjack soils and very shallow undeveloped soils make up about 10% of the Hackroy-Rock outcrop mapping unit. The native vegetation is mainly piñon pine, one-seed juniper, scattered ponderosa pine, and blue grama.

The surface layer of the Hackroy soils is a brown sandy loam, or loam, about 10 cm thick. The subsoil is a reddish brown clay, gravelly clay, or clay loam, about 20 cm thick. The depth to tuff bedrock and the effective rooting depth are 20 to 50 cm. Both the Hackroy and the Hackroy-Rock outcrop mapping units exhibit slow permeability and low available water capacities. The Hackroy mapping unit has medium runoff and only moderate water erosion hazard, whereas the Hackroy-Rock outcrop unit has a moderate to severe water erosion hazard and medium to high runoff.

A typical profile of Hackroy sandy loam (1 to 5% slope) is described as follows:

- A1** 0-8 cm, brown (10YR 5/3) sandy loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; hard and friable moist; many fine roots; common fine tubular pores; mildly alkaline; abrupt smooth boundary.
- B2t** 8-25 cm, dark reddish brown (5YR 3/4) clay, dark reddish brown (5YR 3/4) moist; moderate fine prismatic structure; hard and firm moist, sticky and plastic wet; many fine roots; few very fine tubular pores; 3% gravel; continuous clay films on peds; mildly alkaline; abrupt smooth boundary.
- B3** 25-30 cm, yellowish red (5YR 5/6) gravelly clay, yellowish red (5YR 5/6) moist; moderate fine subangular blocky structure; slightly hard and firm moist, sticky and plastic wet; many fine roots; 25% gravel; slightly calcareous; neutral.
- R** 30+ cm, tuff bedrock.

**4. Nyjack Series.** The Nyjack series consists of moderately deep, well-drained soils that formed in material weathered from tuff on nearly level to gently sloping mesa tops (Fig. 12). Individual areas of these soils are 5 to 75 acres in size and include about 20% rock outcrop, and Hackroy and fine-loamy Typic Eutroboralf soils in the mapping unit. The native vegetation is mainly piñon pine, one-seed juniper and blue grama.

Typically, the surface layer is a brown loam, very fine sandy loam, or sandy loam about 5 cm thick, and the subsoil is a brown clay loam about 50 cm thick. The substratum is a gravelly sandy loam about 40 cm thick, which may contain as much as 30% pumice. Depth to tuff bedrock and the effective rooting depth range from 50 to 102 cm. Available water capacity is medium. Runoff is slow in this moderately permeable soil, and the water erosion hazard is slight.

A representative profile of Nyjack loam (1 to 5% slope) is given as follows:

- A1** 0-8 cm, brown (10YR 5/3) loam, dark brown (7.5YR 3/2) moist; weak fine granular structure; soft and very friable moist; many fine roots; many vesicular pores; slightly acid; abrupt smooth boundary.
- B1** 8-33 cm, brown (7.5YR 5/4) light clay loam, brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard and very friable moist, slightly sticky and slightly plastic wet; many medium roots; many vesicular pores; neutral; clear smooth boundary.
- B2t** 33-61 cm, brown (7.5YR 4/4) clay loam (est. 34% clay), dark brown (7.5YR 3/4) moist; moderate medium angular blocky structure; hard and friable moist; sticky and plastic wet; few fine roots; many fine tubular pores; thin discontinuous clay films on peds; neutral; abrupt smooth boundary.