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U.S. DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

RECONNAISSANCE SURFICIAL GEOLOGIC MAP OF THE LA JARA QUADRANGLE, ALAMOSA AND CONEJOS COUNTIES, COLORADO

by

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[1] Denver, Colorado

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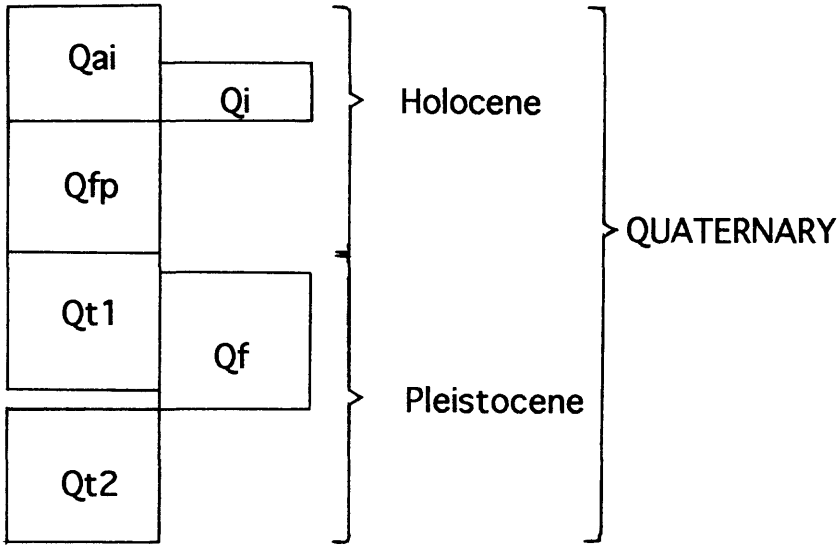
CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

[Surficial deposits shown on this map are estimated to be at least 1 m thick. Thinner deposits are not shown. Minor deposits of artificial fill beneath segments of Colorado Highway 285 and other paved roads, beneath the tracks of the adjacent Denver and Rio Grande Western Railroad, and along irrigation ditches, drains, and canals were not mapped. The mapped distribution of the surficial deposits is based primarily on the interpretation of 1:40,000-scale, black-and-white, aerial photographs taken on July 22 and August 10, 1988. The distribution of these deposits is also based in part on the interpretation of soil maps prepared by the U.S. Soil Conservation Service (Pannell and others, 1973; Yenter and others, 1980). The contacts between some of the surficial deposits are approximate or are inferred because these deposits have subtle morphologic expression and they are difficult to distinguish in the field and on aerial photographs due to effects of plowing, irrigation, and other agricultural practices. Most of the contacts on this map were transferred from the aerial photographs using a Kern stereoplotter. All of the surficial deposits in the map area are poorly exposed. All of the unit thicknesses are estimates, because the basal contacts of the surficial deposits are not exposed. Divisions of Pleistocene time correspond to those of Richmond and Fullerton (1986). Age assignments for surficial deposits are based chiefly on the degree of modification of original surface morphology, height above stream level, and degree of soil development. Soil-horizon designations are those of the Soil Survey Staff (1975) and Guthrie and Witty (1982). Most of the surficial deposits are calcareous and contain various amounts of secondary calcium carbonate. Some of these surficial deposits are saline and contain various amounts of salt and gypsum (Pannell and others, 1973; Yenter and others, 1980). Salt and gypsum are deleterious to uncoated steel and concrete. Stages of secondary calcium carbonate morphology are those of Gile and others (1966). Grain-size terminology is based on visual estimates and follow the modified Wentworth scale (American Geological Institute, 1982). The term clast refers to the fraction greater than 2 mm (0.08 in) in diameter, whereas the term matrix refers to the fraction less than 2 mm in diameter. The clasts in the surficial deposits in the map area are volcanic rocks that were eroded from the San Juan Mountains (Steven and others, 1974), about 20 km west of the map area. The dominant clast lithologies include quartz latite, rhyodacite, andesite, and basalt. Dry matrix colors of the surficial deposits in the map area were determined by comparison with Munsell Soil Color Charts (Munsell Color, 1973). The colors of these deposits are commonly light yellowish brown (2.5Y 6/4), pale yellow (2.5Y 7/4), light brownish gray (10YR 6/2), light gray (10YR 7/2), very pale brown (10YR 7/3 and 7/4), pale brown (10YR 6/3), light yellowish brown (10YR 6/4), and light brown (7.5YR 6/4). Some of the deposits are poorly drained and commonly have gray colors and high-chroma (6 and 8) mottles. Despite the extensive flood-plain deposits in the map area, none of the map units are mantled by loess or eolian sand. Bedrock is not exposed in the map area.]

ALLUVIAL DEPOSITS--Clay, silt, sand, and gravel in stream channels, flood plains, and terraces along the Alamosa River, La Jara Creek, and La Jara Arroyo and in a large alluvial fan north of the Alamosa River.

Qai Undifferentiated alluvium in active and inactive stream channels (upper Holocene)--Silty clay to pebble gravel within active and inactive stream channels incised into flood-plain alluvium (Qfp) along the Alamosa River, La Jara Creek, and La Jara Arroyo. Silt and clay are probably most abundant in the upper part of the inactive stream-channel alluvium. Locally includes minor amounts of flood-plain alluvium (Qfp). The map unit commonly has prominent meander scrolls, ox-bow lakes, and point bars. The unit is prone to periodic flooding; has seasonal high water-table conditions; and may contain significant sand and gravel resources. Thickness unknown; possibly 1-10 m

Qi Alluvium in inactive stream channels (upper Holocene)--Silty clay to pebble gravel within inactive stream channels incised into flood-plain alluvium (Qfp) near the Alamosa River and La Jara Creek. The upper part of the map unit probably contains more silt and clay than the lower part. The map unit probably accumulated during flood events on the above streams. Locally includes minor amounts of flood-plain alluvium (Qfp). The map unit commonly has subdued surface expression of meander scrolls, ox bows, and point bars. The unit is prone to periodic flooding; has seasonal high water-table conditions; and probably lacks significant sand and gravel resources. Thickness unknown; possibly 1-5 m

Qfp Flood-plain alluvium (upper and lower(?) Holocene)--The unit probably consists primarily of pebbly sand and pebble gravel that is overlain by 1 to greater than 1.7 m of overbank alluvium. The overbank alluvium consists of poorly to moderately well sorted, stratified, non-pebbly to pebbly, silty clay to silty sand . A driller`s log for a water well about 5 km northwest of the community of La Jara (SE1/4 NW 1/4 sec. 4, T. 35 N., R. 9 E.) reports 85 m of clay, interbedded sand, and minor gravel that overlies volcanic rock (Powell, 1958, p. 264, well 35-9-4bc). The sediments at a depth of greater than 10 m are probably alluviums of Pleistocene age or older. Locally includes minor amounts of alluvium in inactive stream-channels (Qi) and in narrow active channels (Qai) along and near the Alamosa River, La Jara Creek, and La Jara Arroyo. The map unit commonly lacks surface expression of meander scrolls, ox bows, and point bars. The unit is prone to periodic flooding and has seasonal high water-table conditions. The lower part of the unit probably contains significant sand and gravel resources. Thickness unknown; possibly 5-10 m

Qt1 terrace alluvium, unit 1 (upper Pleistocene)- -Stream alluvium that underlies a large terrace and three small terrace remnants that are about 1-3 m above La Jara Creek. The unit consists of moderately well sorted, clast-supported, pebble gravel with a sand matrix and pebbly sand that is overlain by about 50-70 cm of sandy silt and silty sand. The alluvium that underlies the large terrace along the southern boundary of the map area may have been deposited by the Conejos River, which is just south and east of the

map area. The map unit lacks surface expression of bars and channels. The unit may be prone to periodic flooding and has seasonal high water-table conditions. The large terrace probably contains significant sand and gravel resources. The three small terrace remnants may contain minor sand and gravel resources. The map unit was probably deposited during the Pinedale glaciation (Thompson and Machette, 1989), which occurred about 12,000-35,000 years ago (Richmond, 1986, chart 1A). In the adjacent Capulin 7.5 minute quadrangle this unit is designated Qt, because an older terrace unit (Qt2) is not present (Shroba and Thompson, 1996). Thickness unknown; possibly 5-10 m

Qf Fan alluvium (upper Pleistocene)--The map unit underlies the surface of an extensive, low-gradient, alluvial fan that was deposited primarily by the Alamosa River. In the map area, the fan slopes northeastward at about 2 m/km, is less than 3 m above the Alamosa River, and lacks bar-and-swale surface morphology. The unit consists of pebble gravel with a sand matrix. Beds and lenses of silt to pebbly sand are locally present. The upper 1 to greater than 1.5 m of the unit consists of slightly pebbly, silty sand. The gently sloping area west of the community of Estrella (in secs. 13 and 14, T. 36N., R. 9 E.) may locally contain minor unmapped sheetwash deposits. The unit may be locally prone to periodic flooding and locally has seasonal high water-table conditions. The lower part of the unit probably contain significant sand and gravel resources; however, beds and lenses of silty alluvium are locally present. The well preserved bar-and-swale surface morphology of the fan west of the map area as well as the thin argillic B horizons and stage I to weak stage II Cca (Bk) horizons that are formed in the map unit suggest that the map unit was deposited during the Pinedale glaciation (Hall and Shroba, 1993; Thompson and Machette, 1989; Yenter and others, 1980). In the adjacent Capulin quadrangle this unit is designated Qf2, because a younger fan unit (Qf1) is present (Shroba and Thompson, 1996). Thickness unknown; possibly 10-15 m

Qt2 terrace alluvium, unit 2 (upper middle(?) Pleistocene)- -Stream alluvium that underlies a large, north-east trending terrace near the southeastern corner of the map area. This terrace is parallel to and about 4 m above the Conejos River. The alluvium that underlies the terrace was probably deposited by the Conejos. The unit consists of moderately well sorted, clast-supported, pebble gravel with a sand matrix that is overlain by a thin layer of silty and sandy alluvium. The unit lacks surface expression of bars and channels. The unit may not be prone to periodic flooding, may have seasonal high water-table conditions, and probably contains significant sand and gravel resources. The unit may have been deposited during the Bull Lake glaciation (Thompson and Machette, 1989), which occurred about 140,000-150,000 (Pierce, 1979) or 130,000-300,000 years ago (Richmond, 1986, chart 1A). Thickness unknown; possibly 5-10 m

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inferred.

Boundary of inactive gravel pits

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CONVERSION FACTORS

Multiply	By	To Obtain
centimeters (cm)	0.3937	inches (in)
meters (m)	3.2808	feet (ft)
kilometers (km)	0.6214	miles (mi)