DESCRIPTION OF MAP UNITS

[The following 9 individual map units are shown on the 1:24,000-scale maps only; the units are either grouped or renamed on the 1:100,000-scale Valle map. A complete description of map units for both the 1:24,000- and 1:100,000-scale maps is included in the pamphlet that accompanies the Valle 1:100,000-scale map.]

SURFICIAL DEPOSITS

Qs **Stream-channel deposits (Holocene)**—Interbedded gray, brown, and light-red mud, silt, sand, gravel, and pebble to boulder gravel; unconsolidated and poorly sorted. Locally overlaps young alluvial fan (**Qa1**) and young terrace-gravel (**Qg1**) deposits, and upper part of valley-fill (**Qv**) deposits. Inset against intermediate alluvial fan (**Qa2**) and intermediate terrace-gravel (**Qg2**) deposits. Stream channels subject to intermittent high-energy flows and flash floods. Differences from valley-fill (**Qv**) deposits are steeper gradient, stronger current velocity, and erosion and deposition alternate within shorter time. Little or no vegetation in stream channels except grass and high desert shrubs and some sagebrush. Thickness, 2 to 10 ft

Qg1 **Young terrace-gravel deposits (Holocene)**—Light brown, pale-red, and gray, poorly sorted mud, silt, sand, gravel, pebbles, cobbles, and boulders. Composed mainly of subangular to well-rounded Paleozoic sandstone, limestone, and chert clasts of local origin. Include well-rounded clasts of quartzite, chert, some assorted metamorphic crystalline rocks, and well-rounded volcanic rocks derived from Tertiary sediments (**Ts**). Interbedded silt, sand, gravel, and pebbles to boulders are partly consolidated by gypsum and calcite cement. Locally overlaps young alluvial fan (**Qa1**) and valley-fill (**Qv**) deposits. Occur in southwest and southeast parts of map area. Contact with adjacent alluvial and eolian deposits is approximate. Subject to flash flood and sheet wash erosion. Forms fluvial terrace benches about 3 to 15 ft above stream bottoms. Deposit intertongues with landslide (**Ql**) and talus and rock fall (**Qtr**) deposits in Cataract Canyon. Fills erosion channels cut into bedrock and young to intermediate alluvial fan (**Qa1**, **Qa2**) deposits. Support moderate growth of local shrubs, sagebrush, and grass. Thickness, 3 to 20 ft (1 to 6 m)

Qa1 **Young alluvial fan deposits (Holocene)**—Gray-brown silt, sand, gravel, and some cobbles and boulders. Clasts are subangular to rounded limestone, chert, and sandstone locally derived from Mesozoic and Paleozoic outcrops of the Moenkopi and Kaibab Formations. Include medium- to coarse-grained sand and gravel to well-rounded pebbles of quartzite and chert derived from Tertiary sediments (**Ts**) south edge of map area. Subrounded to angular basalt, andesite, rhyolite, and obsidian clasts are derived from the Mount Floyd Volcanic Field in southwest part of map area. Rounded to subrounded clasts of basalt, obsidian, and pyroclastic material in southeast quarter of map area are derived from the San Francisco Volcanic field. In the vicinity of Red Butte, includes subrounded to angular basalt clasts (**Trb**) from Red Butte. Partly consolidated by silt, gypsum, and calcite cement. Intertongue with upper part of valley-fill (**Qv**) deposits and young to intermediate terrace-gravel (**Qg1**, **Qg2**) deposits. Surfaces are mantled with thin sandy calcrete soil mixed with large cobbles and boulders of basalt near Mount Floyd Volcanic Field. Unit is extensively eroded and cut by numerous arroyos near Farm Dam Draw and other principal tributaries to Cataract Canyon. Subject to extensive sheet-wash erosion and flash flood deposits. Support moderate growth of high desert shrubs, sagebrush, cactus, and grass. Thickness, 3 to 25 ft (1 to 8 m)

Qg2 **Intermediate terrace-gravel deposits (Holocene)**—Unconsolidated gray and brown sand, gravel, and conglomerate. Lithologically similar to young terrace-gravel (Qg1) deposits. Composed mainly of gray and brown siltstone and fine-grained sandstone matrix mixed with subangular to rounded pebbles and boulders of various lithologies. Include well-rounded basalt, quartzite, and limestone clasts along Cataract Canyon and its tributaries. Form terrace benches about 15 to 30 ft above modern streambeds and about 5 to 20 ft above young terrace-gravel (**Qg1**) deposits. Locally intertongue with young and intermediate alluvial fan (**Qa1**, **Qa2**) deposits. Locally intertongue with or overlain by talus and rock fall debris (**Qtr**), young alluvial fan (**Qa1**), valley-fill (**Qv**), and landslide (**Ql**) deposits. Subject to erosion by flash flood. Thickness, 6 to 20 ft (2 to 6 m)

Qa2 **Intermediate alluvial fan deposits (Holocene)**—Lithologically similar to young alluvial fan (**Qa1**) deposits; partly cemented by calcite and gypsum. Surfaces are rocky and cut by arroyos as much as 10 ft deep. Commonly overlapped by young alluvial fan (**Qa1**) deposits; intertongue with or overlap valley-fill (**Qv**), talus and rock fall (**Qtr**), and young and intermediate terrace-gravel (**Qg1**, **Qg2**) deposits. Include abundant subrounded to subangular basalt clasts and quartzite clasts in southwest quarter of map area and along tributaries to Cataract Canyon in southeast quarter of map area. Support moderate growth of grass, sagebrush, and cactus. Thickness, 6 to 50 ft (2 to 15 m)

Qg3 **Old terrace-gravel deposits (Holocene and Pleistocene)**—Lithologically similar to young and intermediate terrace-gravel (**Qg1**, **Qg2**) deposits; partly consolidated by calcite and gypsum cement. Include well-rounded basalt clasts up to 1 ft (0.3 m) in diameter along upper Cataract Canyon; smaller basalt cobbles form desert pavement surfaces along some tributaries to Cataract Canyon in southeast part of map area. Form terraces about 12 to 40 ft (4 to 12 m) above modern streambed of Cataract Canyon and lower reaches of Red Horse Wash. Thickness, 2 to 40 ft (0.6 to 12 m)

Qa3 **Old alluvial fan deposits (Pleistocene)**—Lithologically similar to young and intermediate alluvial fan (**Qa1**, **Qa2**) deposits; partly consolidated by calcite and gypsum cement. Surface has thin upper calcrete soil that forms flat rocky and sandy surface near Mount Floyd Volcanic Field outcrops. Include numerous basalt clasts from Mount Floyd Volcanic Field in southwest quarter of map area. Commonly overlapped by or intertongue with talus and rock fall (**Qtr**), landslide (**Ql**), and young to intermediate alluvial fan (**Qa1**, **Qa2**) deposits. Support moderate growth of grass, sagebrush, cactus, cliffrose and scattered pinyon and juniper trees. Thickness, 5 to 25 ft (1.5 to 7.5 m)

QTg4 **Older terrace-gravel deposits (Pleistocene and Pleistocene(?)**—Lithologically similar to young, intermediate, and old terrace-gravel (**Qg1**, **Qg2**, **Qg3**) deposits. Form terraces about 30 to 120 ft (9 to 36 m) above modern drainage of Cataract Canyon. Clasts of pebbles and boulders are supported by fine-grained silt and sand matrix. Thickness, 20 to 40 ft (6 to 12 m)

QTg5 **Oldest terrace-gravel deposits (Pleistocene and Pliocene(?)**—Gray to light-brown, sand, gravel, pebble, and boulders deposits. Composed mainly of well rounded quartzite, schist, and chert clasts derived from Tertiary sediments (**Ts**) in south part of map area. Supported in matrix of fine- to coarse-grained quartz and chert sand. Form isolated terrace benches or small mesas about 30 to 120 ft (9 to 37 m) above modern drainage of Cataract Canyon near Redlands Ranch. Deposits near Redlands Ranch were once part of a thicker and more widespread deposit along Cataract Canyon. Thickness, 10 to 20 ft (3 to 6 m)