The Map of Surficial Geologic Materials of New Mexico

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EXPLANATION OF MAP UNITS

CLASS FIRST-ORDER SYMBOLS -- MAJOR GENETIC MATERIAL CLASSES*

A **Alluvium-undivided**. Stream deposits; fine to coarse grained, with local cementation by secondary carbonates, gypsum, or silica accumulation commonly present in older subunits. Derived from diverse lithologic terranes and landforms including: mountains, high plateaus and table lands, intermontane basins (bolsons), and regional plains. Deposited in diverse settings including: valley of streams ranging from small ephemeral to large perennial systems; shallowly- or non-incised drainageways on alluvial fans, piedmont alluvial plains, and bolson floors; and restricted closed depressions of solution subsidence, deflation, volcanic or structural origin.
Remarks: 1. Symbol when used only with lithologic and textural composition modifiers (without age modifier--u, o, u, t, etc.) indicates unit of Late Quaternary age (younger than 200-300 ka.). 2. Special subclasses include: 1) river alluvium (ar); 2) valley-fill alluvium (av); 3) thin deposits on piedmont and footslope erosion surfaces; 4) fan alluvium, and 5) bolson-floor alluvium.

AR **River Alluvium**. Fluvial (floodplain and channel) deposits of major perennial streams (Rio Grande, Pecos, San Juan, Animas, Gila, and Canadian). Includes valley-floor and terrace deposits, and contiguous narrow belts of colluvium and rock outcrop on steep valley-side slopes.
Remarks: 1. Major components of bedrock and colluvium are noted by secondary symbol combinations.

AV **Valley-fill Alluvium**. Deposits along narrow valleys and canyons of major streams within extensive upland areas such as mountain ranges and high plateaus. Includes valley-floor and terrace deposits, and contiguous narrow belts of colluvium and rock outcrop on steep valley-sideslopes.
Remarks: 1. Used for significant fluvial deposits in valleys too narrow (< 2 km width) to show at map scale. 2. Major components of bedrock and colluvium are noted by secondary symbol conginations.

*See NOTE on page 49

AP **Alluvium on erosion surfaces--piedmont and escarpment footslopes.** Stream deposits, with lesser amounts of sheetflood and debris-flow deposits that form relatively thin covers (< 10 m) on piedmont and footslope erosion surfaces. Unit includes alluvial veneers on rock pediments, and valley-flanking and mountain-front erosion surfaces cut on both bedrock and older valley basin fill.

AF **Fan alluvium-undivided**. Stream deposits, and lesser amounts of sheetflood and debris-flow deposits of fan-distributaries. Includes deposits of individual fans and interfan valleys in proximal piedmont areas (adjacent to mountain fronts and high escarpments), and coalescent-fan (bajada) deposits on medial to distal parts of piedmont slopes. Proximal piedmont facies are transitional to piedmont erosion-surface covers (AP) and distal facies grade to bolson (basin) floor units (AB). Unit also includes fan and coalescent-fan alluvium in terrains with lower local relief, such as the borders of major stream valleys and footslopes of low escarpments of structural or erosional origin.
Remarks: 1. symbol also used in lower-relief terrains to denote fan deposits on constructional toeslopes to valley sides and escarpments.

AB **Bolson-floor alluvium-undivided.** Streamflood and sheetflood deposits of distributary channels and interchannel areas at the distal part of bolson drainage systems; includes fine- to medium-grained deposits partly impregnated with calcium and sodium sulphate salts (abs); also includes small playas in widely scattered closed depressions and discontinuous eolian veneers.

Alluvium - First-order Subclasses

A **Alluvium**; undifferentiated ay and a_2; includes deposits of widespread, ephemeral and intermittent stream systems in valley, plains, and bolson (intermontane basin) settings; terraced units are usually within 50 m of valley floors. Zones of secondary calcium carbonate and clay accumulation occur in older deposits (a_2 and equivalents) as relict soil horizons; nonpedogenic carbonate zones include calcite-cemented older alluvium and spring deposits (travertine and tufa). Up to 50 m thick. Late Quaternary; coeval with AR, AV, AP, AF and AB; with vertebrate faunas of Rancholabrean provincial age.

Ay **Alluvium-younger**; includes deposits of widespread ephemeral and intermittent stream systems in valley, plains, and bolson settings. Pedogenic horizons of clay and carbonate accumulation are weak or absent. Up to 40 m thick. Correlative with Fort Selden and Lakewood morphostratigraphic units and younger alluvium of the Rio Grande and Pecos valleys (late Wisconsin and Holocene).

AH **Alluvium-Holocene**; includes deposits of ephemeral and intermittent stream systems as in unit ay; excludes basal valley fill (mostly channel deposits) of late Wisconsin age. Up to 20m thick.

a_2 Alluvium-older(late phase); includes stream deposits of intermediate-level valley-border and piedmont surfaces (terrace fills, fan alluvium, and erosion-surface veneers); with relict soil horizons of carbonate (kg) and clay accumulation; nonpedogenic carbonate zones include calcite-cemented sandstones, conglomerates, and spring deposits. Up to 40 m thick. Correlative with Pichacho and Tortugas, and Orchard Park and Blackdom morphostratigraphic units, respectively, of the Rio Grande and Pecos valleys (mainly late Pleistocene).

a_1 Alluvium-older (early phase); includes stream deposits of high-level valley-border and piedmont surfaces; with prominent relict and buried soil horizons of carbonate (km) and clay accumulation; secondary carbonate zones also include nonpedogenic conglomerates and sandstones. Up to 50 m thick. Correlative with younger members of Camp Rice, Sierra Ladrones, Garuña, Tule, Mimbres, and "upper Gila" formations; with tephra deposits including Lava Creek (Pearlette-O), Bishop, Tsankawe, Cerro Toledo, and Guaje ashes; vertebrate faunas are of Irvingtonian provincial age.

ao Alluvium-older (undivided); undifferentiated a_1 and a_2; up to 50 m thick.

at Alluvial-Pliocene and lower Pleistocene; includes stream deposits of 1) high-level valley-border and piedmont surfaces and 2) summit areas of major drainage divides; with prominent buried and relict soil horizons of carbonate (Kt, km) and clay accumulation, as well as thick, nonpedogenic calcite-cemented conglomerates and sandstones. Up to 50 m thick. Correlative with Blanco Formation of west Texas and older members of Camp Rice, Sierra Ladrones, Garuña, Mimbres, and "upper Gila" formations; with tephra deposits including Huckleberry Ridge (Pearlette-B), and "Blanco" ashes (west Texas); vertebrate faunas of Blancan and early Irvingtonian(?) provincial ages.

au Alluvium-undivided ay and ao

Alluvium-River

ar — River alluvium; mainly sand and pebble gravel, with loamy to clayey surficial layers; fluvial (floodplain and channel) deposits of major perennial streams (Rio Grande, Pecos, San Juan, Gila, Canadian); including terrace fills (ar_2) within 50 m of valley floors, with discontinuous, partly-indurated horizons of soil-carbonate accumulation and nonpedogenic, calcite-cemented zones; includes lesser amounts of colluvium and locally derived alluvium. Up to 40 m thick. Undifferentiated equivalent of ary and ar_2; coeval with a, ag.

ary — River alluvium-younger; mainly sand and pebble gravel with loamy to clayey surficial layers; floodplain and channel deposits of major perennial streams, including distributary channels of lower Mimbres River (with bye inclusions); secondary carbonate zones usually absent. Up to 40 m thick. Coeval with ay, agy, by, bye.

arh — River alluvium-Holocene; like unit ary, but excludes basal valley fill (mostly channel sand and gravel) of late Wisconsin age. Up to 20 m thick.

ar_2 — River alluvium-older (late phase); mainly sand and gravel (pbls, cbls), with discontinuous, loamy surficial layers; fluvial deposits of major perennial streams in terraces within 50 m of valley floors; with relict soil horizons of carbonate (ig) clay accumulation; nonpedogenic carbonate zones include calcite-cemented sandstones and conglomerates. Up to 40 m thick. Correlative with fluvial facies of Picacho and Tortugas morphostratigraphic units of the Rio Grande Valley; with vertebrate faunas of Rancholabrean provincial age. Coeval with a_2, ag_2.

ar_1 — River alluvium-older (early phase); mainly sand and gravel (pbls, cbls), with loamy to clayey interbeds and surficial layers; deposits of ancestral rivers beneath high terraces and relict bolson floors 75 to 200 m above valley floors; with prominent relict and buried soil horizons of carbonate (km) and clay accumulation, as well as nonpedogenic, calcite-cemented sandstones and conglomerates. Up to 50 m. thick. Correlative with younger fluvial facies of Camp Rice, Sierra Ladrones, Garuña, Mimbres, and "upper Gila" formations; with tephra deposits including Lava Creek Bishop, Tsankawi, Cerro Toledo, and Guaje ashes; with vertebrate faunas of Irvingtonian provincial age; coeval with a_1.

aro — River alluvium-older (undivided); sand to loam and clay; fluvial deposits of ancestral Mimbres River in relict bolson-floor position; with prominent relict soil horizons of carbonate (k, km) and clay accumulation. Up to 50 m thick. Undifferentiated equivalent of ar_1 and ar_2. Includes younger alluvial (a) and playa (p) deposits in scattered depressions and linear swales, as well as discontinuous veneers of eolian sediments (e).

aru River alluvium-undivided; undifferentiated equivalent of ary and aro; coeval with au. Up to 50 m thick.

art River alluvium-Pliocene and lower Pleistocene; sandy fluvial deposits like ar; with prominent buried and relict soil horizons of carbonate (Kt, km) and clay accumulation, as well as nonpedogenic, calcite-cemented sandstones and conglomerates. Up to 200 m thick. Correlative with older fluvial facies of Camp Rice, Sierra Ladrones, Gatuña, and "upper Gila" formations; with tephra deposits including the Juckleberry Ridge (Pearlette-B) ash; vertebrate faunas of Blancan and early Irvingtonian(?) provincial age.

Alluvium-Valley Fill

av — Valley fill; sand, gravel, and loam to clay; stream and colluvial deposits in upland-valley and canyon areas. Includes: alluvium of valley floors, commonly loam to clay in upper part and gradational downward and laterally to sand and gravel; intermediate terrace remnants of older stream deposits (commonly gravelly); and gravelly to loamy colluvium on valley sides, which grades to stream deposits. Partly-indurated zones of secondary carbonate occur both as relict soil horizons in terrace and older colluvial deposits, and as nonpedogenic accumulations including spring deposits (tufa and travertine). Up to 35 m thick. Undifferentiated avy and av_2; coeval with a, ca.

avy — Valley fill-younger; loam, clay and sand, grading downward and laterally to gravel and gravelly sand to loam; includes stream alluvium of valley floors, and marginal fan and colluvial deposits on valley sides; secondary-carbonate zones generally absent except for local spring deposits in limestone terranes. Up to 35 m thick; coeval with ay.

av_2 — Valley fill-older (late phase);vloam to sand, grading downward and laterally to gravel and gravelly loam to sand; includes intermediate stream-terrane deposits (generally within 50 m of valley floors), and marginal fan alluvium and colluvium; with relict soil horizons of carbonate (k, km), and clay accumulation; nonpedogenic carbonate zones include local sandstones, conglomerates, and spring deposits in limestone terranes. Up to 35 m thick. Coeval with a_2.

av_1 — Valley fill-older (early phase; loam to sand, grading downward and laterally to gravel and gravelly loam to sand; includes high-level terrace deposits and marginal fan alluvium and colluvium; with prominent relict soil horizons of carbonate (k, km) and clay accumulation; nonpedogenic calcite-cemented sandstones and conglomerates also locally present. Up to 35 m thick. Coeval with a_1.

avo — Valley fill-older (undivided); loam to sand, grading downward and laterally to gravelly alluvium; includes terrace and fan deposits, and colluvium on valley sides. Up to 35 m thick. Undifferentiated av_1 and av_2; coeval with ao.

avu — Valley fill-undivided; sand, gravel, and loam to clay; stream and colluvial deposits in deep valleys and canyons within major upland areas (mountains, plateaus, dissected piedmont terrain). Undifferentiated avy and avo; coeval with au.

ap — Erosion-surface-cover; gravel (pbl to bldr), and gravelly sand to loam; alluvium and some debris-flow deposits forming thin covers on piedmont-erosion surfaces; zones of calcium carbonate accumulation are locally present in buried and relict soil horizons. Up to 10 m thick. Undifferentiated apy and ap_2; coeval with a, f.

apy — Erosion-surface-cover--younger; gravel, and gravelly sand to loam; alluvial and some debris-flow deposits on piedmont-erosion surfaces; zones of soil-carbonate accumulation are weak or absent. UP to 10 m thick. Correlative with Organ and Isaacks Ranch morphostratigraphic units of Jornada del Muerto Basin; coeval with fy, ay.

ap_2 — Erosion-surface-cover--older (late phase); grave, and gravelly sand to loam; alluvial and some debris-flow deposits on piedmont-erosion surfaces; wit relict soil horizons of carbonate (kg) and clay accumulation. Up to 10 m thick. Correlative with Jornada II morphostratigraphic unit of Jornada del Muerto Bolson; coeval with f_2, a_2.

ap_1 — Erosion-surface cover alluvium--older (early phase); gravel, and gravelly sand to loam; alluvial and some debris flow deposits on piedmont-erosion surfaces; with prominent relict soil horizons of carbonate (km) and clay accumulation; nonpedogenic carbonate zones include calcite-cemented conglomerates and sandstones. Up to 10 m thick. Correlative with younger piedmont facies of Camp Rice, Sierra Ladrones, and Mimbres formations; coeval with f_1, a_1.

apo — Erosion-surface-cover alluvium--older (undivided); dominantly coarse-grained alluvium and some debris-flow deposits forming thin covers on piedmont erosion surfaces. Up to 10 m thick. Undifferentiated equivalent of ap_1 and ap_2.

apu — Erosion-surface-cover alluvium--undivided; dominantly coarse-grained alluvium and some debris-flow deposits forming thin covers on piedmont-erosion surfaces (including rock pediments and surfaces cut on older piedmont deposits). Up to 10 m thick. Undifferentiated apy and apo; coeval with au.

Fan Alluvium

af — Fan alluvium; stream and lesser amounts of debris-flow deposits in piedmont and valley-border areas marginal to mountain fronts, tableland escarpments, and steep valley sides. Partly-indurated zones of calcium carbonate accumulation are locally present as buried and relict soil horizons. Unit designated "afs" where partly impregnated with gypsum. Up to 35 m thick. Undifferentiated afy and af_2; coeval with a.

afy — Fan alluvium--younger; includes fan and coalescent-fan deposits marginal to valley and bolson floors; zones of soil-carbonate accumulation are weak or absent. Up to 25 m thick. Correlative with Fort Selden, Organ and Isaacks Ranch morphostratigraphic units of Rio Grande valleys and adjacent bolsons (late Wisconsin and Holocene); coeval with ay.

af_2 — Fan alluvium--older (late phase); fan and coalescent-fan deposits of valley borders, piedmont slopes, and escarpment footslopes; with buried and relict soil horizons of carbonate (kg) and clay accumulation. Up to 35 m thick. Correlative with mostly interfacial alluvial facies of the Picacho, Tortugas, and Jornada II morphostratigraphic units of the Rio Grande Valley and adjacent bolsons; coeval with a_2.

af_1 — Fan alluvium - older (early phase); fan and coalescent-fan deposits of piedmont slopes; with prominent relict and buried soil horizons of carbonate (kg, m) and clay accumulation; nonpedogenic carbonate zones include calcite-cemented conglomerates and sandstones. UP to 70 m thick. Correlative with younger piedmont facies of Camp Rice, Sierra Ladrones, and Mimbres formation; coeval with a_1.

afo — Fan alluvium--older (undivided); undifferentiated f_1 and f_2. Up to 100 m thick.

afu — Fan alluvium--undivided; undifferentiated afy and afo; alluvial and some debris-flow deposits of footslope areas marginal to mountain fronts, escarpments, and valley sides; coeval with au.

aft — Fan alluvium--middle Pleistocene to Pliocene; partly indurate alluvial and debris flow deposits; with prominent buried and relict soil horizons of carbonate (Kt, km) and clay accumulation; thick, nonpedogenic carbonate zones include calcite-cemented conglomerates and sandstones. Up to 100 m thick. Correlative with piedmont facies of the Camp Rice, Sierra Ladrones, and Mimbres formations; coeval with at.

Bolson Floor Alluvium

ab — Bolson-floor alluvium-undivided; undifferentiated equivalent of aby and ab_2; loam, clay, and sand; with less than 15% pebble gravel, except for pebbly sand zones in basal parts of some units; distributary streamflood and sheetflood deposits associated with active and relict alluvial flats; with buried and relict soil horizons of carbonate (k) and clay accumulation in older units (b_2). Up to 30 m thick. Coeval with a.

abs — Bolson-floor alluvium-saline; loamy, clayey, and sandy deposits similar to "b"; partly impregnated with calcium sulfate or sodium salts. Undifferentiated equivalent of absy and abs_2.

aby, absy — Bolson-floor alluvium--younger; loamy, clayey, and sandy; with less than 15% pebble gravel, except for pebbly sand zones in basal part of some units (by); deposits partly impregnated with calcium sulfate or sodium salts (bsy); distributary streamflood and sheetflood deposits in areas of active alluvial-flat sedimentation; includes playa (p) deposits in scattered depressions and discontinuous eolian (e) veneers. Up to 10 m thick. Transitional with "ay" in Lower Mimbres River basin; coeval with ay.

ab_2, abs_2 — Bolson-floor alluvium--older (late phase); loamy, clayey and sandy; generally less than 15% pebble gravel, with local gravelly sand zones (b_2); deposits partly impregnated with calcium sulfate or sodium salts (bs_2); includes streamflood and sheetflood deposits associated with relict alluvial flats; with buried and relict soil horizons of carbonate (k) and clay accumulation. Up to 15 m thick. Transitional with "aro" in lower Mimbres River basin and correlative with Petts Tank morphostratigraphic unit in Jornada del Muerto Basin; coeval with a_2.

ab_1 — Bolson-floor alluvium--older (early phase); sandy, loamy and clayey; generally less than 15% pebble gravel, with local gravelly sand zones; includes streamflood and sheetflood deposits emplaced prior to entrenchment of Rio Grande and Gila valley systems; with prominent relict and buried soil horizons of carbonate (k, km) and clay accumulation. Up to 35 m thick. Correlative with younger members of "upper Gila", Mimbres, Camp Rice, and Sierra Ladrones formations; coeval with a_1.

abo, abso — Bolson-floor alluvium--older; undifferentiated equivalent of b_1 and b_2. Sandy to clayey; with local pebble gravel zones (abo); deposits partly impregnated with calcium sulfate or sodium salts (abso); with prominent relict and buried soil horizons of carbonate (k, km) and clay accumulation. Up to 50 m thick.

Eolian Deposits

e — Eolian deposits - undivided. Wind-deposited sand, silt and clay, with active and stabilized dune forms and sheet-like morphology; includes quartz to feldspathic-quartz sand, and calcareous silt-clay-fine sand (loamy) aggregates. Zones of pedogenic clay and carbonate accumulation occur locally as buried and relict-surface soil horizons. Generally less that 15 m thick.
Remarks: Larger deposits are in areas downwind of river floodplains, and basin-floor alluvial and lacustrine plains. Symbol used in combination with other categories where eolian deposits form thin veneers on genetic material classes including alluvium, colluvium and lacustrine sediments.

Eolian Deposits; First Order Subclasses

ex — Eolian sand-undivided of quartz of feldspathic quartz composition. Deposits with dune and sheet morphology; of primarily areas of vegetation-stabilized deposits, with localized active dunes. Pale to reddish brown, fine to medium sand; zones of pedogenic clay and carbonate accumulation occur as buried and relict soil horizons. Generally less than 10 m thick.

es — Eolian deposits-gypsiferous. Eolian sand and silt, primarily calcium sulfate; with dune and sheet morphology; with alkali-flat deposits in scattered interdune depressions. Generally less that 15 m thick. Coeval with e.
Remarks: Occurs in complexes with, and downwind of, relict gypsiferous and alkalic lake plains and playas central bolson areas (e.g. Tularosa and Estancia Valleys).

ed — Dune sand of quartz to feldspathic quartz composition. In addition to active parabolic and barchanoid forms, dune complexes include vegetation-stabilized coppice mounds and longitudinal ridges. Up to 10 m thick.
Remarks: Most dune complexes include small interdune flats and sheetlike eolian deposits, lake beds, and basin-floor alluvium. Unit for the most part postdates maximum expansion of Wisconsin pluvial lakes, and includes presently active forms.

eds — Dune sands-gypsiferous. Dune complexes include large areas of active transverse forms (parabolic and barchanoid) with restricted areas of vegetation stabilized coppice mounds and longitudinal ridges. Unit includes alkali-flat deposition scattered interdune depressions. Up to 15 m thick. (See le)
Remarks: Unit for the most part postdates maximum expansion of Wisconsin pluvial lakes, and include presently active forms.

ey — Eolian sand to loam--younger; deposits with active and stabilized dune forms or sheet-like morphology; includes quartz to feldspathic-quartz sand, and calcareous clay-silt-fine sand aggregates. Up to 15 m thick. Undifferentiated dune deposits

(ed and el), and other eolian sediments postdating last major expansion of pluvial lakes.

em — Eolian loamy sand to sandy clay loam--older; deposits with stabilized dune forms or sheet-like morphology; includes quartz to feldspathic-quartz sand and calcareous clay-silt-fine sand aggregates; with prominent buried and relict soil horizons of clay and carbonate accumulation. Generally less than 10 m thick.. Coeval with ao.
Remarks: Bulk of unit deposited in middle to late Pleistocene prior of expansion of Wisconsin pluvial lakes. Unit includes thousands of small (<1 km^2) depressions with thin playa deposits, widely scattered narrow swales with thin alluvial deposits, and local areas of younger eolian cover. Correlative in part with Blackwater Draw Formation.

e- (prefix) — Eolian cover-discontinuous; thin sandy deposits, including vegetation stabilized ridges and coppice dunes over designated substrate (for example, ea_1, ekm). Up to 3 m thick. Primarily equivalent to ey.

Lacustrine Deposits

l — Lacustrine deposits. Sediments deposited in permanent bodies of standing water, including medium- to coarse-grained shore facies, fine- to medium-grained floor facies, and local fine- to coarse-grained deltaic facies.
Remarks: Primarily to deposits of Pleistocene to early Holocene pluvial lakes; includes numerous deposits of playa lakes in small deflation depressions, and associated eolian deposits.

ls — Lacustrine deposits with evaporites. Sediments deposited during desiccation phases of pluvial lakes and after ephemeral flooding of playa areas. Dominant evaporites are sodium and calcium sulfates; zeolites and dolomitic marks are locally present, with high magnesium and calcium clays including sepiolite and montmorillonite.

Line symbol showing approximate upper limit of late Pleistocene expansion in the Basin and Range province. 6225' late Lake Estancia; 6350' Lake Estancia; 7000'+ Lake San Agustin; 3950' Lake Otero; 4200' Lake Animas; 5200' Lake Cloverdale; 4500' Lake Goodsight; and 4695' Lake Trinity.

Lacustrine Deposits - First Order Subclasses

1 — Lacustrine deposit--undivided; light gray and greenish to brownish gray, calcareous clay to sand (or offshore facies), sand and pebble gravel (near shore and shore facies), and clay to loam (playa facies-p); with local fine-grained evaporite phases (ls). Up to 30m thick. Undifferentiated equivalent of ly (lsy) and l_2; coeval with a, ab.

ly
lsy — Lacustrine deposit--younger; light gray and greenish to brownish gray, calcareous clay to sand (bottom facies), sand and pebble gravel (shore facies), and clay to loam with local evaporite phases; includes small playas (p, ps); fine-grained, locally dolomitic deposits, with calcium-sulfate and sodium salts (lsy). Up to 5 m thick. Coeval with ay, aby; in part correlative with Tahoka Formation of Llano Estacado.

l_2 — Lacustrine deposit--older (late phase); greenish to brownish gray, clay to sand with peripheral sand to gravel; with local evaporitic (l_2s), alluvial, and eolian facies. Up to 30 m thick. Correlative with Tahoka and double Lakes Formations of Llano Estacado.

l_1 Lacustrine deposit--older (early phase); light gray to brownish gray, clay to sand, and some dolomitic marl; with relict soil horizons of carbonate accumulation. Up to 30 m thick. Correlative in part with Tule Formation of Llano Estacado; with tephra deposits including Lava Creek, Bishop and Tsankawi ashes.

lo Lacustrine deposit--older (undivided); undifferentiated equivalent of l_1 and l_2.

le Complex of ly and el.
ls_2

PLAYA DEPOSITS

p — Playa deposit. Clay to loam of ephemeral lakes in a variety of geomorphic setting, including deposits of bolson floors, solution-subsidence basins, deflation basins, lava field depressions, structural depressions, and former valleys blocked by subsequent eolian and alluvial deposition or lava flows. Up to 5 meter thick. Remarks: Thousands of playas less than 2 km in width not shown. Also included in "depression fill" units (d).

ps — Playa deposit with evaporites. Clay or loam deposited in ephemeral lakes subject to ground-water discharge or in deflation basins in older saline lake deposits (ls) or wind reworked evaporites (es). Dominant salts are calcium and sodium sulfates. Up to 5 meters thick.

GLACIAL DEPOSITS

t Glacial till, and associated ice contact stratified drift in alpine valley areas of southern Rocky Mountains and on Sierra Blanca (Roswell Sheet). Glacial outwash mapped with av and ar units.
Remarks: Only larger areas shown. Line and spot symbols used for areas less than 2 km wide.

COLLUVIUM

c	Colluvium-undivided. Deposits on mountain and hill slopes emplaced by mass-wasting processes, including creep, small landslides, debris flows, rock falls and slides, and unconcentrated slopewash; with wide range of textures and composition. Area of bedrock outcrop generally less than 25%. Includes thin residuum, and narrow belts to thin sheets of alluvium deposited by low order streams (up to 25% a and av equivalents). Surface and buried horizons of pedogenic-clay and/or carbonate accumulation are commonly present in older subunits.
ca	Colluvium in combination with valley-fill alluvium. In many areas, larger colluvium-alluvium complexes shown by "ca" "cra", "cwa" and "cba" symbols. In combination with small landslides in areas of high local relief with steep slopes underlain by weak bedrock types capped by resistant units. Larger colluvium-landslide complexes shown by "cj" symbol.
cr	Colluvium with large areas of bedrock outcrop (usually >50%); used in combination with Second-order symbols denoting bedrock terranes Remarks: Used primarily in arid parts of the state: includes extensive mudstone-siltstone-shale badlands; and very high relief terrains with erosion-resistant rocks.
cw	Colluvium with large areas of weakly-consolidated sedimentary-rock outcrops (w).
cb	Block-rubble Colluvium. Mantle of angular to subangular very-coarse rock fragments, or steep slopes capped by resistant bedrock types. Clasts primarily of boulder size, but including blocks. Fabric ranges from clast supported to matrix supported with matrix including sandy (s), loamy (m), and clayey (c) textures. Includes lesser amounts of non-blocky colluvium and small landslides.
cf	Colluvium-high altitude. Includes c and cb in alpine or subalpine areas of northern and central NM (elevations >3900 m).
j	Landslides-undivided. Large, broken to coherent masses of bedrock units on steep, high-relief slopes underlain by weak rock types and capped with resistant units. Includes up to 50% blocky colluvium. Only larger areas shown (>2 km wide).
jc, cj	Colluvium-landslide complexes. Colluvium.

CALCRETES

k — Calcretes-undivided. Primarily soil petrocalcic horizons (K2m, Ccam) formed in surficial alluvial and eolian deposits (upper 2-4 m), with local occurrences on bedrock surfaces and in rock fractures. Sediments and fracture fillings are impregnated with alluvial calcium carbonate and lesser amounts of alluvial clay. Upper indurated laminar to platy horizons usually grade downward to non-indurated, massive to nodular horizons of carbonate impregnation. Locally includes minor amounts of carbonate-cemented conglomerate, sandstone, and mudstone with nonpedogenic, secondary carbonate introduced by ground water or deeply percolating vadose water.
Remarks: K2m (Bkm) horizons-morphogenetic Stage IV (gravelly and non-gravelly) of Gile and others, 1965-1966), and States V and VI of Bachman and Machette (1977).

Unit mapped only where it is generally within 1 m of the land surface and is a really extensive (>4 km^2).

May include genetically-related overlying horizons of clay accumulation (Bt), or thin overlays of eolian and/or alluvial deposits (usually <1 m thick).

ki — Incipient calcrete - plugged, weakly indurated stage III-IV.

kg — Gravelly calcrete. Primarily soil petrocalcic horizons formed in very gravelly alluvium (>35% granule to cobble size). Sediments are impregnated with alluvial calcium carbonate and many clasts are supported by a carbonate-cemented sand to loam matrix. Upper, moderately-well-indurated horizons 0.3 to 2 m thick, form thin caprock units with platy structure and laminar internal fabric; calcrete bulk densities range up to 2.2 g/cm^3. Lower-weakly indurated, massive horizons grade downward into uncemented gravel or gravelly sand to loam with carbonate-coated clasts.
Remarks: K2m (Bkm) horizons-State IV (gravelly) of gile et al. (1965-1966) to Stage V of Bachman and Machette (1977). Primarily associated with relict constructional geomorphic surface of Pleistocene age.

km — Calcrete. Thick soil petrocalcic horizons formed in sandy to loamy alluvial and eolian deposits with <15% granule and pebble gravel; including lesser amounts of gravelly alluvium (15 to 35% >2 mm); most primary grains are dispersed in a matrix of alluvial calcium carbonate. Upper moderately-well-indurated horizons, 0.3 to 2 m thick, form thin caprock units with platy structure and laminar internal fabric; calcrete bulk densities range up to 2.2 g/cm^3. Lower weakly-indurated, massive to nodular, horizons grade downward in to uncemented sand and gravelly sand to loam.

Remarks: K2m (Bkm) horizons-Stage IV (nongravelly) of Gile et al. (1965, 1966) to Stage V of Machette (1985).
Primarily associated with relict constructional geomorphic surfaces of early to middle Pleistocene age, with older (early Pleistocene to Pliocene) surfaces in the Great Plains region.

kt — Caprock Calcrete. Thick soil petrocalcic horizons formed in alluvial and eolian deposits, late Miocene to early Pleistocene age, generally with <15% granule and pebble gravel; most primary grains are dispersed in a matrix of alluvial calcium carbonate; with very thin zones of silica cementation. Upper, well-indurated horizons 2 to 4 m thick, form caprock units with tabular structure, and laminar and pisolitic internal fabric; calcrete bulk densities range from 2.4 to 2.7 g/cm^3. Lower weakly-indurated, massive to nodular horizons grade downward into partly-cemented sand to loam with or without interbedded pebble gravel.
Remarks: Morphogenetic Stages V and VI of Machette (1985).

Primarily formed in loamy to gravelly deposits associated with relict construction and erosional geomorphic surfaces of Pliocene and late Miocene age. Major parent sediments are the upper Miocene Ogallala and Pliocene Blanco Fms of the Great Plains province and equivalent units. Unit includes some areas where calcrete has formed in the veneers of eolian, colluvial and residual material and comprises crusts and fracture fillings, on and in bedrock units (primarily limestone (k·c), sandstone (k·s), and basalt (k·b).

ktg — As above with pebble and cobble gravel within 9 m of surface.

ekt — Eolian veneer up to 1-3 m thick on kt; wtkt exposed along rims of escarpments, HP depressions and draws with local HP depression fills and alluvial channels.

akt — Shallow draws of high plains.

cakt — Deep draws of high plains.

VOLCANICS

v — Volcanic Rocks-undivided. Includes flows and vent units of Pliocene age.

vb — Basalt flows. Primarily alkali olivine basalt and olivine tholeiite, with lesser amounts of feldspathoidal basalt and basaltic andesite. Holocene to Pliocene.

vby — Late Wisconsin--Holocene.

vb_2, vb_1, $vb_ø$ — Basaltic volcanics--older; primarily alkalic basalts, with some feldspathoidal basalts and basaltic andesites; locally extensive flow from a variety of vent types. Middle to late Pleistocene (vb_2), early to middle Pleistocene (vb_1) and undivided ($vb_ø$).

vbt — Basaltic volcanic--Pliocene to early Pleistocene; primarily alkalic basalts, with some feldspathoidal basalts and basaltic andesites; locally extensive flows from a variety of vent types. Younger than 5 my, in part correlative with vb_1.

vbs — Tuff rings (basaltic associated w/maare).

vr_2 — Rhyolitic volcanics. Ash-flow tuffs, mostly welded, lava, and tephra from Pleistocene caldera-forming eruptions in the Jemez Mountains. Includes Bandelier Tuff and Cerro Toledo Rhyolite (vr_1); and intracaldera domes, flows, pyroclastics, sedimentary fill (vr_2).

vrt — Dacitic to rhyolitic volcanoes. Includes lavas and vent units to Pliocene and early Pleistocene emplacement of domes and stratovolcanoes in the Mount Taylor, Raton and San Luis Valley areas.

va — Andesite. Includes lavas and vent units related to Pliocene and early Pleistocene emplacement of stratovolcanoes and shield volcanoes in the Rio Grande rift, Raton and Mount Taylor areas.

Symbols.

Volcanic Vents Shown by Spot Symbols

- cinder and lava cones or cone clusters - basalt and basaltic andesite
- × necks and plugs - basalt and basaltic andesite
- OR/S maare and tuff rings, with local basaltic flows
- ■ shield volcanoes - basalt and andesite
- OR/C stratovolcanoes - rhyolite, dacite and andesite
- ⮝ domes, dome clusters, plug domes - rhyolite and dacite
- ○ caldera margin

Rhyolitic tephra deposits occurring as lenses in sedimentary sequences shown by spot symbols

- Yellowstone-derived tephra (Pearlette)
  - Lava Creek
  - Huckleberry Ridge (west Texas and Arizona)
- Long Valley-derived tephra (Bishop)
- Jemez-derived tephra
  - Tsankawi (Bandelier)
  - Cerro Toledo
  - Guaje (Bandelier)

DEPRESSION FILLS

d — Depression Fill-undivided. Complexes of alluvial, colluvial lacustrine, and eolian deposits of large closed depressions or interconnected systems of depressions that range in area from about 10 to as much as 200 km^2 and closure relief ranging from several meters to 50 m. Major mechanisms of depression formation, (usually operating in combination) include: solution-subsidence in carbonate and evaporite tenures; deflation; large-scale piping; basalt extrusions; local structural subsidence; and blocking of former valleys by alluvial or eolian processes, mass wasting or lava flows.
Remarks: Tens of thousands of small depressions and associated fill complexes not shown due to map scale limitations. These are included in categories ar, ab, e, ex, em, vb, km, kt, and in ea, ec, and ek complexes.

ds — Filled Solution-subsidence Depressions in salme-gypsum evaporite terrane. Depressions significantly modified by stream erosion and deposition, deflation and eolian deposition, pluvial-lake and playa deposition, and mass wasting. Complex alluvial, colluvial, eolian and lacustrine fills locally as thick as 100 m, generally less than 30 m thick.
Remarks: Active formation and filling of depressions since late-middle Pleistocene time (past 300-500 ka). Includes extensive modern subsidence at San Simon Sink (Hobbs sheet).

dc — Fills of Solution-subsidence Depressions in gypsiferous carbonate terrane. Depressions significantly modified by stream erosion and deposition, and mass wasting and are aligned along zones of faulting and structural warping. Alluvial and colluvial fills with minor playa and eolian deposits usually less than 10 m thick.
Remarks: Includes depressions near Vaughn (Ft. Sumner sheet) along north-south-trending structural subsidence.

dk — Karst-plain deposits - pitted upland plains on carbonate rocks.

dd — Fills of deflational depressions in eolian sheet and dune deposits, and in sandstone and calcrete caprock terranes; modification by carbonate and sulfate dissolution and stream erosion is of secondary importance. Eolian and playa deposits form the major fill components; usually <10 m thick.

genetically related to flow emplacement, including intraflow collapse basins and extraflow valley blockage depressions. Eolian, playa, and colluvial deposits form the major fill components, usually <10 m thick.

db — Fill of depressions on and adjacent to basalt flows;

QUATMAP2.EXP

SECOND-ORDER SYMBOLS - LITHOLOGIC CHARACTER OF CLASTS AND BEDROCK TERRANES

CLASS	DESCRIPTION	BED ROCK TERRANE AND REPRESENTATIVE TIME AND ROCK UNITS
p	Plutonic and Associated Crystalline Rocks. Mostly silicic and intermediate types including: granite, monozonite, syenite, diorite granodiorite, pegmatites, dacite to andesite porphyries, gneiss, and schist.	Precambrian igneous and metamorphic terranes, Late Cretaceous and Tertiary plutons in southern Rocky Mountain, Basin and Range, and Colorado Plateau provinces.
n	Metamorphic Rocks-undivided; include minor areas of small plutons.	Precambrian igneous and metamorphic terranes in southern Rocky Mountains, with limited areas in Basin and Range, and Colorado Plateau provinces.
q	Quartzite; with lesser amounts of silicic metasediments and metavolcanics.	
f	Foliated Metamorphic Rocks; mostly metasediments, including phyllite, schist and slate; iwth lesser amounts of quartzite, gneiss, and greenstone.	
qf	Mixed assemblage of quartzite and foliated metamorphics.	
u	Metavolcanics and associated metasediments; including metarhyolite, amphibolite, schist, plyllite, greenstone, quartzinte and metaconglomerate.	

pn complexes	Examples of mixed assemblages of plutonic and metamorphic rocks.	Precambrian plutonic-metamorphic terrane; or Precambrian metamorphic terrane with Teritary plutons.
pu	Plutonic and metavolanic rocks; with lesser amounts of metasediments; plutonic rocks >50% of unit.	
np	Metamorphic-plutonic complex including metavolcanics, foliated metasediments and quartz, with lesser amount of graphitic rocks (<50%).	

v	Volcanic rocks; all Quaternary and some Pliocene units excluded. Undivided assemblages of mafic, silicic, and intermediate composition.	Volcano-tectonic terranes of southern Colorado Plateau and Basin and Range provinces; Great Plains-Raton section; Southern Rocky Mtns. Middle and upper Tertiary; local Cretaceous and early Tertiary volcanic centers.
b	Mafic volcanics; Mainly basalt and basaltic andesite flow units; with limtied areas of vent units (cinders, scoria, tuff).	Extensional tectonic terranes with fissure, shield and cone eruptive centers. Uvas Basaltic andesite.
r	Silicic volcanics; including rhyolite, dacite, quartz latite; mostly welded tuff, with lesser amounts of poortly welded tuff, lava, and pumice.	Cauldron complexes of Datil-Mogollon and Mexican Highland sections; Southern Rocky Mtns.. Bell Top Formation, Kneeling Nun Rhyolite, Hells Mesa Tuff-Oligocene.
i	Intermediate volcanics and volcaniclastic rocks, mostly laharic breccias and tuffs, with lesser amounts of andesitic lava; mudsonte, sandstone, and conglomerate.	Andesitic stratovolcanoes and surrounding areas oflava nd volcaniclastic deposition. Datil-Mogollon and Mexican Highland sectoins, Southern Rocky Mtns.. Palm Park, Rubio Peak, Spears, Conejos, Espinaso Fms-Oligocene.
		Examples of mixed volcanic terranes:
br		Basaltic andesite and rhyolite tuffs; andesite flows dominant.
ri		Rhyolite ash-flow tuff, lava plug domes, and pumicite that partly mantle and locally intrude an earlier andesitic laharic breccia and sandstone unit.
bi		Intermediate volanic terrane as described above

rp pi		Examples of mixed of volcanic and plutonic terranes. Granitic rocks (monzonite) forming central pluton cauldron complex including rhyolite domes and welded tuffs. Large granodiorite or syenite pluton intruding andesitic laharic breccia
z	Mixed Igneous and Metamorphic rocks-undivided mixed assemblages of plutonic, metamorphic and volcanic clasts, resistant types including quartzite, rhyolite, basalt, granite and gneiss.	

y	Sedimentary Rocks-undivided; primarily s/m, w/c	
c	Carbonate rocks; limestone and dolomite, in part cherty; may include minor amounts of sandstone, shale and mudstone; locally with minor gypsite.	Sacramento and Mexican Highland sections - Basin and Range Province. Paleozoic, Cretaceous
s	Sandstone; may include minor amounts of conglomerate, mudstone, siltstone, shale, and carbonate rocks.	Colorado Plateau; Great Plains province-Raton and Pecos Valley sections. Mesozoic, Lower Tertiary
g	Conglomerate, with lesser amounts of conglomeratic sandstone and mudstone; gravel-size clasts usually made up from 35 to 65% of rock.	Not extensive bedrock unit in New Mexico. Lower Tertiary and Cretaceous, with some upper Tertiary.
m	Mudstone, shale and siltstone; may have minor amounts of sandstone and carbonate rocks.	
cy, sy, my, gy	Mixed Sedimentary Units; dominant unit listed first is estimated to make up at least 50% of sequence.	Usually in interbedded sequences

cs	Carbonate rocks and sandstone; with lesser amounts of mudstone and siltstone; and minor gypsite.	Basin and Range Province and Southern Rocky Mountains. Paleozoic, and Lower Cretaceous
cm	Carbonate rocks, siltstone, shale and mudstone; with minor amounts of sandstone. Gypsite present in Carlsbad area*.	Great Plains-Raton section, and Basin and Range province. *Southern Sacramento section. Cretaceous, Pennsylvanian Permian
sg	Sandstone, conglomeratic sandstone and conglomerate.	Colorado Plateau, southern Rocky Mountains, Basin and Range. Cretaceous and Lower Tertiary, some Upper Tertiary
sc	Sandstone and carbonate rocks with, lesser amounts of mudstone, siltstone and shale.	Southern Rocky Mountains, Basin and Range. Pennsylvanian-Permian , Sandia Fm, Madera Gp, Sangre de Cristo Fm in part
sm	Sandstone with mudstone, siltstone and shale; with minor amounts of carbonate rocks and gypsite in a few areas.	Great Plains-Pecos Valley and Raton sections; small areas in Basin and Range. Permian, Triassic, Jurassic, Upper Cretaceous and Lower Tertiary.
ms	Mudstone and shale, with interbedded sandstone and siltstone; with minor amounts of carbonate rocks and gypsite in a few areas.	Colorado Plateau, Gret Plains-Pecos Valley and Raton sections; small areas in Basin and Range. Triassic, Upper Cretaceous and Lower Tertiary.
mc	Mudstone, siltstone and shale with lesser amounts of limestone and marl.	Great Plains-Raton section, Colorado Plateau. Upper Cretaceous, Greenhorn and Niobrara Ls, and Granerous, Carlisle, Smokey Hill shales and marls

ye	Mixed Sedimentary units with evaporites	
ec	Evaporitic Sedimentary rocks; mainly gypsite and dolomite with lesser amounts of sandstone and mudstones. Deeply underlain by anhydrite and sodium-potasium chloride salt sequences that have been subject to partial dissolution in late Tertiary and Quaternary time. Associated with "ds" map unit (1st order).	Great Plains-Pecos Valley section. Upper Permian Castile, Salado Rustler Fms, and Artesia Group
ce	Carbonate rocks, with gypsite, mudstone, siltstone and sandstone transitional with "se". Adjacent and underlying carbonate and gypsite sectoins have been subject to partial dissolution in late Tertiary and Pleistocene time. Associated with "dc" map unit.	Basin and Range-Sacramento section (Permian), and eastern Colorado Plateau (Jurassic). Permian-San Andres and Yeso Fms; with very small areas of Jurassic-Todilto Fm
se	Sandstone, with mudstone, siltstone and gypsum, lesser amounts of limestone-transitional with "ce".	Basin and Range-Sacramento section with samll areas in B&R-Mexican Highland section, and eastern Colorado Plateau (Jurassic). Permian-Yeso Fm, Jrassic-Morrison Fm/Todilto/la Entrada ss sequence
me	Mudstone, with siltstone and gypsum, and minor amounts of limestone and sandstone.	Great Plains-Pecos Valley section. Upper Permian-Artesia Gp

w	Sedimentary rocks, weakly consolidated. Including sandstone, mudstone and conglomeratic sandstone to mudstone with mixed clast lithologies.	Great Plains-High Plains and Raton sections; Basin and Range-Mexican Highland and Sacramento sectoins, Datil-Mogollon section, southern Colorado Plateau. Upper Tertiary--incl: Ogallala Fm, Gila Gp, Santa Fe Gp, Bidahochi Fm
wg	Weakly-consolidated conglomerates and conglomeratic sandstone sto mudstones; gravel-size clasts usually make up from 35 to 35% of unit; partly cemented with carbonates, silica, zeolites and sulfates.	Some weakly consolidated conglomerates are included in unit "g".
ws	Weakly-consolidated sandstone with lesser amounts of mudstone and conglomeratic sandstone; mixed mineralogy: partly cemented with carbonates, silica, zeolites, and sulfates.	Southern Llano Estacado. Ogallala south of Portales Valley.
wm	Weakly-consolidated mudstone-commonly an ancient bolson-floor facies, including playa deposits with minor gypsum.	Southern Rio Grande rift. Rincon Valley and Popotosa Fm playa facies.
	Examples special classes of weakly consolidated sedimentary rocks	
wk wgk	ws and ws with calcrete (kg, km, kt) zones.	
wc wgc	Weakly consolidated sandstone and mudstone with carbonate rocks the doinant clast type in conglomeratic facies.	
wv	Weakly consolidated sandstone and mudstone, with	

x	Mixed clast assemblages. Designates units with subrounded to well-rounded gravel of mixed composition usually resistant types including quartzite, quartz, chert, petrified wood, rhyolite, basalt, granite, gneiss, and metavolcanics; with minor amounts of snadstone, limestone, and mudstone. Symbol without modifier designates units with significant component of rounded siliceous clasts (e.g. quartzite, quattz, chert, feldspar), usually reworked from older conglomeratic rocks of Precambrian to early Cenozoic age.	
xp	Mixed clast assemblage with major component of plutonic rocks.	
xv	Mixed clast assemblage with major component of volcanics.	
xc	Mixed clast assemblage with major component of carbonate rocks.	
xy	Mixed clast assemblage with major component of sandstone, limestone and mudstone.	
xz	Mixed clast assemblage with major component of igneous rocks and metamorphic rocks.	

	Examples of source terranes for mixed assmeblages of sedimentary and volcanic rocks	
bm	Basalt capping interbedded mudstone and sandstone sequence.	Mount Taylor area of Colorado Plateau (Acoma-Zunia section). Pliocene Basalt Flows and mafic dikes and plugs (B); Upper Cretaceous, Mancos Shale and Mesaverde Group (ms and sm).
sb	Sandstone, interbedded with mudstone (sm) intruded by mafic volcanic plugs and dikes.	
cv	Carbonate rocks and mixed rhyolitic to basaltic volcanics in complexly faulted mountain blocks.	Basin and Range-Mexican Highland. Middle Tertiary volcanic and lower Paleozoic carbonates.
	Examples of mixed assemblages of sedimentary and plutonic rocks	
cp	Carbonate rocks, with thin interbedded sandstone and shale capping granitic pluton.	Basin and Range-Rio Grande rift. Upper Paleozoic sedimentary sequence/Precambrian granite.
pm	Andesite porphyry to monzoite or syenite intrusive complex in mudstone or shale with lesser amount of interbedded sandstone and siltstone.	Basin and Range- Sacramento section (Sierra Blanca-Capitan Mtns). Middle Tertiary plutons, Upper Cretaceous-lower Tertiary mudstone/sandstone sequence.
	Examples of source terrances for mixed assemblages of sedimentary and metamorphic rocks	
cn	Caronate rocks, with thin interbedded mudstone and sandstone, capping a complex metamorphic terrane.	Basin and Range-Rio Grande rift. Upper Paleozoic sedimentary sequence/Precambrian

ns	Complex metamorphic terrane, discontinuously capped with sandstone and lesser amounts of interbedded mudstone.	Basin and Range-northern Sacramento section. Permian sandstone to mudstone over Precambrian metamorphics.

THIRD-ORDER SYMBOLS FOR PARTICLE SIZE AND DOMINANT TEXTURAL CLASSES*

CLASS	DESCRIPTION	REMARKS
s	Sand. A particle-size term designating 0.06 (0.05) to 2 mm clasts.	can include up to 15% pebble gravel clasts.
i	Silt. A particle-size term designating 0.004 (0.002) to 0.06 (0.05) mm clasts.	
c	Clay. A particle-size term designating <0.00 (0.002) mm clasts.	Silicate clay minerals noted in unit description may be coarser than clay size.
m	Loam. A term denoting sand-silt-clay mixtures with <35% clay, <50% silt, and varying amounts of sand.	
s	Textural-class-unit modifier used to designate sand and sand-silt-clay mixture with <30% silt and <15% clay.	Approximately equivalent to sand and loamy sand (pedologic) soil-textural classes, and to the sandy soil-family particle-size grouping.
i	Silty. Textural-class-unit modifier used to designate silt, and sit-clay-sand mixtures	Approximately equivalent to silt, silt-loam and silty-clay-loam soil-textural classes, and to the (fine and coarse) silty soil-family particle-size groupings.
c	Clayey. Textural-class-unit modifier used to designate clay, and clay-sand-silt mixtures with >35 to 40% clay.	Appriximately equivalent to clay, silty clay, and sand clay soil-textural classes, and to (fine to very fine) clayey soil-family particle-size groupings.
m	Loamy. Textural-class-unit modifier used to designate sand-silt-clay mixtures with <35-40% clay, <50% silt, and 20 to 85% sand.	Approximately equvalent to loam, sandy loam, clay loam and sandy-clay-loam soil-textural classes, and to loamy soil-family particle-size groupings.

g	Gravel. A particle-size term designateing >2mm clasts comprising: granules (2-4mm), pebbles (4-64mm), cobbles (64-256mm) and boulders (>256mm). Also a material class for unconsolidated sedimentary deposits with more than 50-65% >2mm clasts.	Lithologic character of clasts noted by second order symbols and in map unit narrative description. Material class coincides with gravelly, cobbly, and stony soil (pedologic) textural classes of rock fragments.
	Gravelly. Textural-class unit modifiers for unconsolidated sedimentary deposits with 15 to 50 to 65% 2-mm clasts.	
g	Gravelly - as used in narrative descriptions designates units with more than 15% and generally less than 35% >2-mm clasts.	* Colluvial deposits for themost part have more than 15% >2-mm clasts; and "g" used only for very gravelly units (more than 35% >2-mm).
	Very Gravelly - as used in narrative descriptions designates units with more than 35% and less than 50 to 65% >2-mm clasts.	

*NOTE: Third-order symbols indicate domniant textures and major genetic material classes (first order or primary symbols) which have been further subdivided on the basis of lithologic character of clasts and associated source-bedrock terranes (second order symbols). Numeric subscripts (0, 1, 2, 3) are used to denote presence (or absence) of pebble-, cobble, and boulder-size clasts in (generally well-graded) gravelly alluvial, colluvial and lacustrine deposits: 1) gravel of dominantly pebbel and granule size, 2) gravel includes cobbles, 3) gravel includes boulders and cobbles. Subscript "0" used for deposits of colluvium that are essentially gravel free. Examples: $c.b.m_2$ = colluvium-gravelly loam with basalt clasts in pebble- to cobble-size range. $af.cp.gm_3$ = fan alluvium-loamy gravel with limestone and granitic clasts in granule to boulder-size range.

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