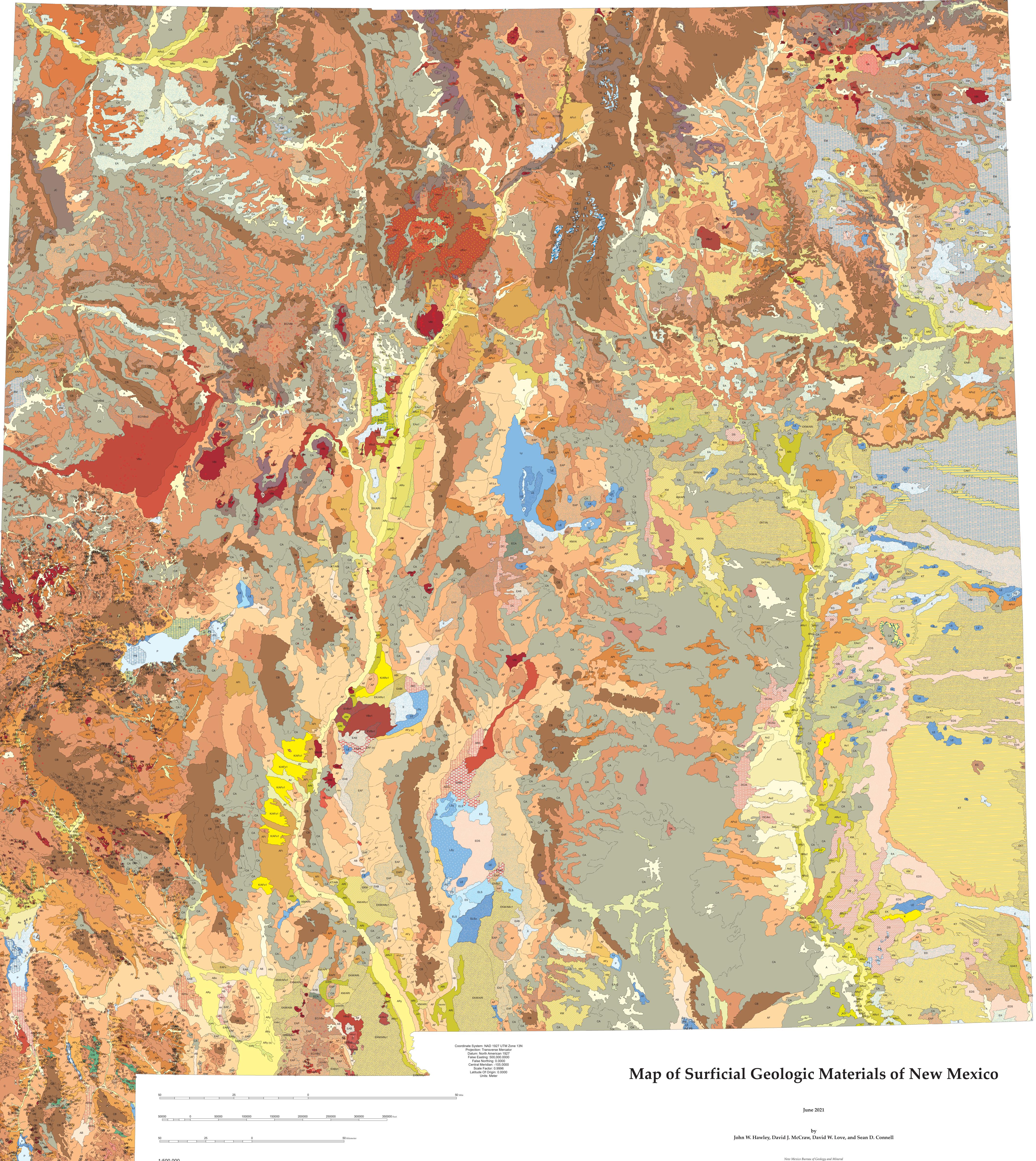
NEW MEXICO BUREAU OF GEOLOGY AND MINERAL RESOURCES A RESEARCH DIVISION OF NEW MEXICO INSTITUTE OF MINING AND TECHNOLOGY



01-00-00-00-heading01—Alluv—Alluvial Deposits (Age unspecified)—Alluvial 01-01-00-00-00—heading02—AlluvUnd—Alluvium undivided (Age unspecified)—Alluvium 01-01-01-00-00 — map unit — A — Alluvium-undivided (Age undifferentiated) — Alluviumundivided. Stream deposits; fine to coarse grained, with local cementation by secondary carbonates, gypsum, or silica ccumulation 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. 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 (A2 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.Remarks: 1. Symbol when used only with lithologic and textural composition modifiers (without age modifier--y, o, u, t, etc.) indicates unit of Late Quaternary age (younger than 200-300 ka.). 2. Special subclasses include: 1) river alluvium

01-01-02-00-00 — map unit — Ay — Alluvium-younger (Holocene / Younger Pleistocene)—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). 01-01-03-00-00 — map unit — Ao — Alluvium-older (undivided) (Older Pleistocene) — Alluvium-older (undivided). Up to 50 m thick.

thin deposits on piedmont and footslope erosion surfaces (AP).

01-01-03-01-00 — map unit — Ao1 — Alluvium-older (early phase) (Older Pleistocene - Early Phase)—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. 01-01-03-02-00—map unit—Ao2—Alluvium-older (late phase) (Older Pleistocene - Late Phase) — Alluvium-older (late phase); includes stream deposits of intermediate-level valley-

Correlative with Pichacho and Tortugas, and Orchard Park and Blackdom morphostratigraphic units, respectively, of the Rio Grande and Pecos valleys (mainly late 01-01-04-00-00—map unit—At—Alluvial-Pliocene and lower Pleistocene (Early Pleistocene / Pliocene) — 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

01-02-01-00-00 — map unit — AR — River Alluvium (Age undifferentiated) — Fluvial (floodplain and channel) deposits of major perennial streams (Rio Grande, Pecos, San Juan, Animas, Gila, and Canadian). Includes valley-floor and terrace fill deposits (ARo2), and contiguous narrow belts of colluvium and rock outcrop on steep valley-side slopes. River alluvium; mainly sand and pebble gravel, with loamy to clayey surficial layers; discontinuous, partly-indurated horizons of soil-carbonate accumulation and nonpedogenic, calcite-cemented zones within 50 m of valley floors; includes lesser amounts of colluvium and locally derived alluvium. Up to 40 m thick. Undifferentiated equivalent of ARy and ARo2; coeval with A. Remarks: 1. Major components of bedrock and colluvium are noted by secondary symbol combinations. 01-02-02-00-00 — map unit — ARy — River alluvium-younger (Holocene / Younger

distributary channels of lower Mimbres River (with bye inclusions); secondary carbonate zones usually absent. Up to 40 m thick. Coeval with Ay, ABy, ABSy. 01-02-03-00-00 — map unit — ARo — River alluvium-older (undivided) (Older Pleistocene) — River alluvium-older (undivided); sand to loam and clay; fluvial deposits of carbonate (K, KM) and clay accumulation. Up to 50 m thick. Undifferentiated equivalent of ARo1 and ARo2. Includes younger alluvial (A) and playa (P) deposits in scattered depressions and linear swales, as well as discontinuous veneers of eolian sediments (E). 01-02-03-01-00 — map unit — ARo2 — River alluvium-older (late phase) (Older Pleistocene -Late Phase) – River alluvium-older (late phase); mainly sand and gravel (pbls, cbls), with

01-02-03-02-00 — map unit — ARo1 — River alluvium-older (early phase) (Older Pleistocene - 01-07-03-00-00 — map unit — APo — Erosion-surface-cover alluvium-older (undivided) (Older Early Phase)—River alluvium-older (early phase); mainly sand and gravel (pbls, cbls), with

Pleistocene)—Erosion-surface-cover alluvium-older (undivided); dominantly coarseloamy 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;

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.

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(?) 01-03-00-00-00—heading02—Valley-fill—Valley-fill (Age unspecified)—Valley-fill 01-03-01-00-00 — map unit — AV — Valley-fill Alluvium (Age undifferentiated) — Valley-fill

Alluvium. Deposits of sand, gravel, and loam to clay 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. 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. Coeval with A, CA. 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

Pleistocene)—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 01-03-03-00-00 — map unit — AVo — Valley fill-older (undivided) (Older Pleistocene) — 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. Coeval

01-03-02-00-00 — map unit — AVy — Valley fill-younger (Holocene / Younger

01-03-04-00-00 — map unit — AVt — Valley-fill Alluvium (Early Pleistocene / Pliocene) — Valleyfill Alluvium. Deposits of sand, gravel, and loam to clay 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. 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. Coeval with

01-04-01-00-00 — map unit — AB — Bolson-floor alluvium-undivided (Age undifferentiated) - 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. Undifferentiated equivalent of ABY and ABo2; 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. Up to 30 m thick. Coeval with A. 01-04-02-00-00 — map unit — ABy — Bolson-floor alluvium--younger (Holocene / Younger

Pleistocene) — Bolson-floor alluvium--younger; loamy, clayey, and sandy; with less than 15% 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.

01-04-03-00-00 — map unit — ABo — Bolson-floor alluvium--older undivided (Older Pleistocene) — Bolson-floor alluvium--older undivided. 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. 01-04-03-01-00—map unit—ABo1—Bolson-floor alluvium--older (early phase) (Older Pleistocene - Early Phase) — Bolson-floor alluvium--older. 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. Early phase of ABo.

01-05-00-00-heading02—BolsonSal—Bolson Floor (saline) (Age unspecified)—Bolson 01-05-01-00-00—map unit—ABS—Bolson-floor alluvium-saline (Age undifferentiated)—Bolson-floor alluvium-saline; loamy, clayey, and sandy deposits; partly impregnated with calcium sulfate or sodium salts. Undifferentiated equivalent of ABSy and (AR); 2) valley-fill alluvium (AV); 3) bolson-floor alluvium (AB); 4) fan alluvium (AF); and 5) Younger Pleistocene)—Bolson-floor alluvium-saline-younger; loamy, clayey, and sandy; with

01-04-04-00-00 — map unit — ABt — Bolson-floor alluvium (Age undifferentiated) — Bolson-

floor alluvium. Genetically-related overlying t horizons of silicate clay accumulation.

(ABy); deposits partly impregnated with calcium sulfate or sodium salts (ABSy); distributary streamflood and sheetflood deposits in areas of active alluvial-flat sedimentation; includes playa (P) deposits in scattered depressions and iscontinuous eolian (E) veneers. Up to 10 m

Pleistocene)—Lacustrine deposit-younger; light gray and greenish to brownish gray, thick. Transitional with "Ay" in Lower Mimbres River basin; coeval with Ay. 01-05-03-00-00 — map unit — ABSo — Bolson-floor alluvium-saline-older (Older Pleistocene) — Bolson-floor alluvium-saline-older. 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 01-06-00-00-heading02—Fan—Fan (Age

less than ABSy 15% pebble gravel, except for pebbly sand zones in basal part of some units

alluvial facies of the Picacho, Tortugas, and Jornada II morphostratigraphic units of the Rio

piedmont slopes; with prominent relict and buried soil horizons of carbonate (KG, KM) and

01-06-03-02-00 — map unit — AFo1 — Fan alluvium - older (early phase) (Older Pleistocene -

clay accumulation; nonpedogenic carbonate zones include calcite-cemented conglomerates

01-06-04-00-00 — map unit — AFt — Fan alluvium--middle Pleistocene to Pliocene (Early

and debris flow deposits; with prominent buried and relict soil horizons of carbonate (KT,

conglomerates and sandstones. Up to 100 m thick. Correlative with piedmont facies of the

amounts of sheetflood and debris-flow deposits that form relatively thin covers (< 10 m) on

valley basin fill. Zones of calcium carbonate accumulation are locally present in buried and

piedmont and footslope erosion surfaces. Unit includes alluvial veneers on rock pediments,

and valley-flanking and mountainfront erosion surfaces cut on both bedrock and older

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 AFy, Ay.

grained alluvium and some debris-flow deposits forming thin covers on piedmont erosion

sandstones. Up to 10 m thick. Correlative with younger piedmont facies of Camp Rice, Sierra

KM) and clay accumulation; thick, nonpedogenic carbonate zones include calcite- cemented

Camp Rice, Sierra Ladrones, and Mimbres formations; coeval with At.

relict soil horizons. Undifferentiated APy and APo2; coeval with A, AF.

surfaces. Up to 10 m thick. Undifferentiated equivalent of APo1 and APo2.

01-07-00-00-heading02—Piedmont—Piedmont (Age unspecified)—Piedmont

and sandstones. Up to 70 m thick. Correlative with younger piedmont facies of Camp Rice,

Pleistocene/Pliocene) — Fan alluvium--middle Pleistocene to Pliocene; partly indurate alluvial

Early Phase)—Fan alluvium--older (early phase); fan and coalescent-fan deposits of

Grande Valley and adjacent bolsons; coeval with A.

Sierra Ladrones, and Mimbres formation; coeval with A.

01-06-01-00-00 — map unit — AF — Fan alluvium-undivided (Age undifferentiated) — 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

Pleistocene)—Lacustrine deposits and evaporities (younger). Sediments deposited during 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 border and piedmont surfaces (terrace fills, fan alluvium, and erosion-surface veneers); with of low escarpments of structural or erosional origin. Partly-indurated zones of calcium relict soil horizons of carbonate (KG) and clay accumulation; nonpedogenic carbonate zones carbonate accumulation are locally present as buried and relict soil horizons. Up to 35 m include calcite-cemented sandstones, conglomerates, and spring deposits. Up to 40 m thick. thick. Undifferentiated AFy and AFo2; coeval with A. Remarks: 1. Symbol also used in lower-relief terrains to denote fan deposits on constructional toeslopes to valley sides and

01-06-02-00-00 — map unit — AFy — Fan alluvium--younger (Holocene / Younger Rio Grande valleys and adjacent bolsons (late Wisconsin and Holocene); coeval with Ay. 01-06-03-00-00—map unit—AFo—Fan alluvium--older (undivided) (Older Pleistocene)—Fan alluvium--older (undivided); undifferentiated AFo1 and AFo2. Up to 100 m thick. including Huckleberry Ridge (Pearlette-B), and "Blanco" ashes (west Texas); vertebrate 01-06-03-01-00 — map unit — AFo2 — Fan alluvium--older (late phase) (Older Pleistocene - Late Phase)—Fan alluvium--older (late phase); fan and coalescent-fan deposits of valley borders,

O3-03-01-00-00—map unit—AL—Alluvium-Lacustrine deposits-undivided (Age faunas of Blancan and early Irvingtonian(?) provincial ages. 01-02-00-00-00—heading02—River—River (Age carbonate (KG) and clay accumulation. Up to 35 m thick. Correlative with mostly interfacial

Pleistocene)—River alluvium-younger; mainly sand and pebble gravel with loamy to clayey surficial layers; floodplain and channel deposits of major perennial streams, including

ancestral Mimbres River in relict bolson-floor position; with prominent relict soil horizons of footslopes (Age undifferentiated)—Alluvium on erosion surfaces. Piedmont and escarpment Pleistocene)—Playa deposit with evaporites. Clay or loam deposited in ephemeral lakes footslopes. Stream deposits, gravel (pbl to bldr), and gravelly sand to loam, with lesser discontinuous, loamy surficial layers; fluvial deposits of major perennial streams in terraces within 50 m of valley floors; with relict soil horizons of carbonate clay accumulation; 01-07-02-00-00 — map unit — APy — Erosion-surface-cover--younger (Holocene / Younger nonpedogenic carbonate zones include calcite-cemented sandstones and conglomerates. Up Pleistocene)—Erosion-surface-cover--younger; gravel, and gravelly sand to loam; alluvial

with vertebrate faunas of Irvingtonian provincial age; coeval with Ao1.

01-02-04-00-00 — map unit — ARt — River alluvium-Pliocene and lower Pleistocene (Early leistocene/Pliocene) — River alluvium-Pliocene and lower Pleistocene; sandy fluvial

secondary symbol conginations.

including alluvium, colluvium and lacustrine sediments.

unspecified) — Eolian deposits - gypsiferous Pleistocene) — Eolian loamy sand to sandy clay loam (older). Deposits with stabilized dune 01-04-00-00-00—heading02—Bolson—Bolson Floor (Age unspecified)—Bolson Correlative in part with Blackwater Draw Formation.

Correlation of Map Units

Age
Undifferentiated

AR

AR

AR

AB

AF

AF

AP

Eolian undivided Eolian deposits
| discontinuous - gypsiferous | Dune sand - gypsiferous | Dune sand - gypsiferous | Clay loam, older

Lacustrine & Playa Deposits

Glacial & Periglacial Deposits

Volcanics, Basalts Basaltic Rhyolites Andesites Undivided Tuff Rings

Lacustrine Lacustrine, Alluvial - Lacustrine Playa Playa deposit undivided saline complex complex deposit with evaporites

Alluvium Bolson Bolson undivided River Valley-fill Bolson Floor Fan Piedmont (saline)

02-03-00-00-heading02—Dune—Dune sand (Age unspecified)—Dune 02-03-01-00-00—map unit—ES—Eolian deposits-gypsiferous (Holocene / Younger 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). pebble gravel, except for pebbly sand zones in basal part of some units (ABy); deposits partly 02-04-01-00-00—map unit—ED—Dune sand of quartz to feldspathic quartz composition

lakes, and includes presently active forms.

floor alluvium. Unit for the most part postdates maximum expansion of Wisconsin pluvial

02-05-00-00—heading02—EolLoam—Eolian loamy sand to sandy clay loam, older (Age 06-06-00-00-00—map unit—J—Landslides-undivided (Age undifferentiated)—Landslides-undivided (Age undifferentiated)—Lands unspecified)—Eolian loamy sand to sandy clay loam, older 02-05-01-00-00—map unit—EDS—Dune sands-gypsiferous (Holocene / Younger Pleistocene) — 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. Remarks: 1. Unit for the most part postdates

with Ay, ABy; in part correlative with Tahoka Formation of Llano Estacado.

03-02-01-00-00 — map unit — LS — Lacustrine deposits with evaporites (Age

03-02-00-00-heading02—LacSal—Lacustrine, saline (Age unspecified)—Lacustrine,

undifferentiated)—Lacustrine deposits with evaporites. Sediments deposited during

with high magnesium and calcium clays including sepiolite and montmorillonite.

03-05-00-00-00—heading02—Playa—Playa deposit (Age unspecified)—Playa deposit

04-02-00-00-00 — map unit — DK — Karst-plain deposits (Age undifferentiated) — Karst-plain

wasting. Complex alluvial, colluvial, eolian and lacustrine fills locally as thick as 100 m,

(s), loamy (m), and clayey (c) textures. Includes lesser amounts of non-blocky colluvium and

03-02-02-00-00—map unit—LSy—Lacustrine deposit--younger (Holocene / Younger

desiccation phases of pluvial lakes and after ephemeral flooding of playa areas. Dominant

maximum expansion of Wisconsin pluvial lakes, and include presently active forms. 06-08-00-00-00 — map unit — CJ — Colluvium-landslide complexes of CJ or JC (Age undifferentiated)—Colluvium-landslide complexes. Symbol order denotes relative 02-06-00-00-heading02-E/E+-E/E+unit indicates discontinuous Eolian over substrate abundance. (CJ and JC) unit (Age Undifferentiated)—E/E+unit indicates discontinuous Eolian over substrate unit 03-00-00-00—heading01—LacPlay—Lacustrine and Playa Deposits (Age 07-00-00-00-00—heading01—Calcret—Calcretes (Age unspecified)—Lacustrine and Playa Deposits 07-01-00-00-00 — map unit — K — Calcretes-undivided (Age undifferentiated) — Calcretes-03-01-00-00-00—heading02—LacUnd—Lacustrine undivided (Age unspecified)—Lacustrine undivided. Primarily soil petrocalcic horizons formed in surficial alluvial and eolian deposits 03-01-01-00-00—map unit—L—Lacustrine deposits (Age undifferentiated)—Lacustrine deposits-undivided. Sediments deposited in permanent bodies of standing water, including medium- to coarse-grained shore facies, fine- to medium-grained floor facies, and local fine-

(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 nonindurated, massive to nodular horizons of carbonate impregnation. Locally includes to coarse-grained deltaic facies. Light gray and greenish to brownish gray, calcareous clay to minor amounts of carbonate-cemented conglomerate, sandstone, and mudstone with sand (or offshore facies), sand and pebble gravel (near shore and shore facies), and clay to nonpedogenic, secondary carbonate introduced by ground water or deeply percolating loam (playa facies-P); with local fine-grained evaporite phases (LS). Up to 30m thick. vadose water. Remarks: K2m (Bkm) horizons-morphogenetic Stage IV (gravelly and nongravelly) of Gile and others, 1965-1966), and States V and VI of Bachman and Machette Undifferentiated equivalent of Ly (LSy); coeval with A, AB. Remarks: Primarily to deposits (1977). Unit mapped only where it is generally within 1 m of the land surface and is a really of Pleistocene to early Holocene pluvial lakes; includes numerous deposits of playa lakes in small deflation depressions, and associated eolian deposits. extensive (>4 km2). May include genetically-related overlying horizons of clay accumulation (ABt), or thin overlays of eolian and/or alluvial deposits (usually <1 m thick). 03-01-02-00-00 — map unit — Ly — Lacustrine deposit--younger (Holocene / Younger 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

07-02-00-00-00—map unit—KG—Gravelly calcrete (Age undifferentiated)—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/cm3. Lower-weakly indurated, massive horizons grade downward into uncemented gravel or gravelly sand to loam with carbonatecoated clasts. ABBABBARemarks: 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. evaporites are sodium and calcium sulfates; zeolites and dolomitic marks are locally present, 07-03-00-00-00 map unit KM—Calcrete (Age undifferentiated)—Calcrete. Thick soil petrocalcic horizons formed in sandy to loamy alluvial and eolian deposits with <15%

07-06-00-00-map unit—EKT—Eolian veneer on caprock calcrete (Age

andesites; locally extensive flow from a variety of vent types. Middle to late Pleistocene

08-02-03-01-00 — map unit — VBo2 — Basaltic volcanics--older (Older Pleistocene - Late

Phase)—Basaltic volcanics. Primarily alkali olivine basalt and olivine tholeiite, with lesser

of vent types. Middle to late Pleistocene (VBo2), early to middle Pleistocene (VBo1) and

08-02-03-02-00 — map unit — VBo1 — Basaltic volcanics--older (Older Pleistocene - Early

amounts of feldspathoidal basalt and basaltic andesite. Locally extensive flow from a variety

amounts of feldspathoidal basalt and basaltic andesite. Locally extensive flow from a variet

08-02-04-00-00 — map unit — VBt — Basaltic volcanic--Pliocene to early Pleistocene (Early

a variety of vent types. Younger than 5 my, in part correlative with VBo1.

08-03-01-00-00 — map unit — VBS — Tuff rings (basaltic associated with maare) (Age

(basaltic associated with maare).

08-04-00-00-00-heading02-Rhyolites-Rhyolites (Age

08-03-02-00-00 — map unit — VBSo2 — Tuff rings - older (Age unspecified) — Tuff rings - older

08-04-01-00-00 — map unit — VRo2 — Rhyolitic volcanics (Older Pleistocene - Late

08-04-02-00-00 — map unit — VRo1 — Rhyolitic volcanics (Older Pleistocene - Early

08-05-00-00-heading02—Andesites—Andesites (Age

Pleistocene caldera-forming eruptions in the Jemez Mountains. Includes Bandelier Tuff and

Cerro Toledo Rhyolite (VRo1); and intracaldera domes, flows, pyroclastics, sedimentary fill

Pleistocene caldera-forming eruptions in the Jemez Mountains. Includes Bandelier Tuff and

Cerro Toledo Rhyolite (VRo1); and intracaldera domes, flows, pyroclastics, sedimentary fill

Pleistocene emplacement of domes and stratovolcanoes in the Mount Taylor, Raton and Sar

08-05-01-00-00 — map unit — VA — Andesite (Early Pleistocene/Pliocene) — Andesite. Includes

stratovolcanoes and shield volcanoes in the Rio Grande rift, Raton and Mount Taylor areas.

lavas and vent units related to Pliocene and early Pleistocene emplacement of

Pliocene) — Dacitic to rhyolitic volcanoes. Includes lavas and vent units to Pliocene and early

of vent types. Middle to late Pleistocene (VBo2), early to middle Pleistocene (VBo1) and

basalts, with some feldspathoidal basalts and basaltic andesites; locally extensive flows from

08-03-00-00-00 - heading 02 - Bas Tuff - Basaltic Tuff Rings (Age unspecified) - Basaltic Tuff

(VBo2), early to middle Pleistocene (VBo1) and undivided (VBo).

granule and pebble gravel; including lesser amounts of gravelly alluvium (15 to 35% >2 mm);

undivided. Large, broken to coherent masses of bedrock units on steep, high-relief slopes

06-07-00-00-map unit—JC—Colluvium-landslide complexes (Age undifferentiated)—Colluvium-landslide complexes. Symbol order denotes relative

colluvium. Only larger areas shown (>2 km wide).

underlain by weak rock types and capped with resistant units. Includes up to 50% blocky

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 desiccation phases of pluvial lakes and after ephemeral flooding of playa areas. Dominant structure and laminar internal fabric; calcrete bulk densities range up to 2.2 g/cm3. Lower evaporites are sodium and calcium sulfates; zeolites and dolomitic marks are locally present, weakly-indurated, massive to nodular, horizons grade downward in to uncemented sand with high magnesium and calcium clays including sepiolite and montmorillonite. Light gray and gravelly sand to loam. Remarks: K2m (Bkm) horizons-Stage IV (nongravelly) of Gile et 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, 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 PS); fine- grained, locally dolomitic deposits, with calcium-sulfate and sodium salts (LSy). Pliocene) surfaces in the Great Plains region. Up to 5 m thick. Coeval with Ay, ABy; in part correlative with Tahoka Formation of Llano 07-04-00-00-00 — map unit — KT — Caprock Calcrete (Miocene to early Pleistocene) — Caprock Pleistocene)—Fan alluvium--younger; includes fan and coalescent-fan deposits marginal to

03-02-03-00-00—map unit—LSo—Lacustrine deposits with evaporites - older (Older Calcrete. Thick soil petrocalcic horizons formed in alluvial and eolian deposits, late Miocene valley and bolson floors; zones of soil-carbonate accumulation are weak or absent. Up to 25 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 m thick. Correlative with Fort Selden, Organ and Isaacks Ranch morphostratigraphic units of 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, 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 with high magnesium and calcium clays including sepiolite and montmorillonite. 2.7 g/cm³. Lower weakly-indurated, massive to nodular horizons grade downward into 03-03-00-00-heading02—AllLuc—Alluvial - lacustrine complex (Age partly-cemented sand to loam with or without interbedded pebble gravel. Remarks: unspecified) — Alluvial - lacustrine complex 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 undifferentiated)—Lacustrine sediments and alluvial stream desposits including medium- to Blanco Fms of the Great Plains province and equivalent units. Unit includes some areas

coarse-grained shore facies, fine- to medium-grained floor facies, and local fine- to coarsewhere calcrete has formed in the veneers of eolian, colluvial and residual material and grained deltaic facies, along with stream deposits fine to coarse grained. comprises crusts and fracture fillings, on and in bedrock units (primarily limestone, 03-04-00-00-heading02—LacEol—Lacustrine - eolian complex (Age sandstone, and basalt). unspecified)—Lacustrine - eolian complex 07-05-00-00-00 — map unit — KTG — Caprock Calcrete (KT) with pebble and cobble gravel 03-04-01-00-00 — map unit — LE — Lacustrine-eolian complex (Age (Age undifferentiated)—Caprock Calcrete (KT) with pebble and cobble gravel within 9 m of undifferentiated) — Lacustrine-eolian complex. Complex of Ly and E.

undifferentiated)—Eolian veneer up to 1-3 m thick on KT; with KT exposed along rims of 03-05-01-00-00—map unit—P—Playa deposit (Holocene / Younger Pleistocene)—Playa escarpments, High Plains depressions and draws with local High Plains depression fills and deposit. Clay to loam of ephemeral lakes in a variety of geomorphic settings, including deposits of bolson floors, solution-subsidence basins, deflation basins, lava field depressions, 07-07-00-00-00—map unit—AKT—Caprock calcrete in shallow draws (Younger structural depressions, and former valleys blocked by subsequent eolian and alluvial Pleistocene)—Caprock calcrete in shallow draws of high plains. deposition or lava flows. Up to 5 meter thick. Remarks: 1. Thousands of playas less than 2 km in width not shown. Also included in "depression fill" units (D). 07-08-00-00-map unit—CAKT—Caprock calcrete in deep draws (Age undifferentiated)—Caprock calcrete in deep draws of High Plains. 03-06-00-00-heading02—PlayaEvap—Playa deposit with evaporites (Age unspecified)—Playa deposit with evaporites 08-00-00-00-heading01-Volc-Volcanics (Age

01-07-01-00-00—map unit—AP—Alluvium on erosion surfaces--piedmont and escarpment 03-06-01-00-00—map unit—PS—Playa deposit with evaporites (Holocene / Younger 08-01-00-00 — heading 02 — VolcUnd — Volcanics, Undivided (Age unspecified) — Volcanics, subject to ground-water discharge or in deflation basins in older saline lake deposits (LSy) or wind reworked evaporites (ES). Dominant salts are calcium and sodium sulfates. Up to 5

08-01-01-00-00 — map unit — V — Volcanic Rocks-undivided (Age undifferentiated) — Volcanic Rocks-undivided. Includes flows and vent units of Pliocene age. 04-00-00-00-heading01—DepFill—Depression Fills (Age unspecified)—Depression 08-02-00-00-00—heading02—Basalts—Basalts (Age

> 04-01-00-00-00 — map unit — D — Depression Fill-undivided (Age 08-02-01-00-00 — map unit — VB — Basalt flows (Age undifferentiated) — Basalt flows. undifferentiated)—Depression Fill-undivided. Complexes of alluvial, colluvial lacustrine,
>
> Primarily alkali olivine basalt and olivine tholeiite, with lesser amounts of feldspathoidal and eolian deposits of large closed depressions or interconnected systems of depressions that basalt and basaltic andesite. Holocene to Pliocene. range in area from about 10 to as much as 200 km2 and closure relief ranging from several 08-02-02-00-00 — map unit — VBy — Basalt Flows (Holocene / Younger Pleistocene) — Basalt meters to 50 m. Major mechanisms of depression formation, (usually operating in flows. Primarily alkali olivine basalt and olivine tholeiite, with lesser amounts of combination) include: solution-subsidence in carbonate and evaporite tenures; deflation; feldspathoidal basalt and basaltic andesite. Late Wisconsin-Holocene. large-scale piping; basalt extrusions; local structural subsidence; and blocking of former valleys by alluvial or eolian processes, mass wasting or lava flows. Remarks: 1. Tens of 08-02-03-00-00 — map unit — VBo — Basaltic volcanics--older (Older Pleistocene) — Basaltic thousands of small depressions and associated fill complexes not shown due to map scale volcanics--older; primarily alkalic basalts, with some feldspathoidal basalts and basaltic

deposits. Pitted upland plains on carbonate rocks. Pleistocene - Late Phase) — Erosion-surface-cover--older (late phase); gravel, and gravelly sand to loam; alluvial and some debris-flow deposits on piedmont-erosion surfaces; with 04-03-00-00-map unit—DD—Fills of deflational depressions (Age relict soil horizons of carbonate (KG) and clay accumulation. Up to 10 m thick. Correlative undifferentiated)—Fills of deflational depressions in eolian sheet and dune deposits, and in with Jornada II morphostratigraphic unit of Jornada del Muerto Bolson; coeval with AFo2, 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 undivided (VBo). 01-07-03-02-00 — map unit — APo1 — Erosion-surface cover alluvium--older (early phase) Older Pleistocene - Early Phase) — Erosion-surface cover alluvium--older (early phase); 04-04-00-00-map unit—DS—Filled Solution-subsidence Depressions in salme-gypsum Phase)—Basaltic volcanics. Primarily alkali olivine basalt and olivine tholeiite, with lesser gravel, and gravelly sand to loam; alluvial and some debris flow deposits on piedmontevaporite terrane (Age undifferentiated) — Filled Solution-subsidence Depressions in salmeerosion surfaces; with prominent relict soil horizons of carbonate (KM) and clay gypsum evaporite terrane. Depressions significantly modified by stream erosion and accumulation; nonpedogenic carbonate zones include calcite-cemented conglomerates and deposition, deflation and eolian deposition, pluvial-lake and playa deposition, and mass

south-trending structural subsidence.

generally less than 30 m thick. Remarks: 1. Active formation and filling of depressions since

Pleistocene/Pliocene)—Basaltic volcanics. Pliocene to early Pleistocene; primarily alkalic Ladrones, and Mimbres formations; coeval with AFo and Ao. late-middle Pleistocene time (past 300-500 ka). Includes extensive modern subsidence at San 01-07-04-00-00 — map unit — APt — Alluvium on erosion surfaces (Age undifferentiated)—Alluvium on erosion surfaces. Piedmont and escarpment footslopes 04-05-00-00-map unit—DC—Fills of Solution-subsidence Depressions in gypsiferous Stream deposits, gravel (pbl to bldr), and gravelly sand to loam, with lesser amounts of sheetflood and debris-flow deposits that form relatively thin covers (< 10 m) on piedmont carbonate terrane (Age undifferentiated)—Fills of Solution-subsidence Depressions in and footslope erosion surfaces. Unit includes alluvial veneers on rock pediments, and valleygypsiferous carbonate terrane. Depressions significantly modified by stream erosion and flanking and mountainfront erosion surfaces cut on both bedrock and older valley basin fill. deposition, and mass wasting and are aligned along zones of faulting and structural Zones of calcium carbonate accumulation are locally present in buried and relict soil warping. Alluvial and colluvial fills with minor playa and eolian deposits usually less than undifferentiated)—Tuff rings (basaltic associated with maare). 10 m thick. Remarks: Includes depressions near Vaughn (Ft. Sumner sheet) along north-

02-00-00-00 — heading 01 — Eolian — Eolian Deposits (Age unspecified) — Eolian 04-06-00-00-00 map unit – DB – Fill of depressions on and adjacent to basalt flows (Age 02-01-00-00-heading02—EolUnd—Eolian undivided / discontinuous (Age undifferentiated)—Fill of depressions on and adjacent to basalt flows. Genetically related to unspecified) — Eolian undivided / discontinuous flow emplacement, including intraflow collapse basins and extraflow valley blockage depressions. Eolian, playa, and colluvial deposits form the major fill components, usually

Phase)—Rhyolitic volcanics. Ash-flow tuffs, mostly welded, lava, and tephra from 02-01-01-00-00—map unit—E—Eolian deposits - undivided (Holocene / Younger Pleistocene) — Eolian deposits - undivided. Wind-deposited sand, silt and clay, with active 05-00-00-00-heading01—GlacDep—Glacial and Periglacial Deposits (Age 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 unspecified)—Glacial and Periglacial Deposits carbonate accumulation occur locally as buried and relict- surface soil horizons. Generally 05-01-00-00-00 — map unit — GF — Colluvium-high altitude and glacial fill (Age

EKM). Up to 3 m thick. Remarks: 1. Larger deposits are in areas downwind of river floodplains, and basin- floor alluvial and lacustrine plains. Symbol used in combination with 05-02-00-000—map unit—GT—Glacial till (Age undifferentiated)—Glacial till, and other categories where eolian deposits form thin veneers on genetic material classes 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: 08-04-03-00-00 — map unit — VRt — Dacitic to rhyolitic volcanoes (Early Pleistocene / 1. Only larger areas shown. Line and spot symbols used for areas less than 2 km wide. 02-01-02-00-00 — map unit — Eo — Eolian deposits - older (Age unspecified) — Eolian deposits -06-00-00-00-heading01—Colluv—Colluvial Deposits (Age unspecified)—Colluvial 02-02-00-00-00-heading02-EolDepGyp-Eolian deposits - gypsiferous (Age 06-01-00-00 — map unit — C — Colluvium-undivided (Age undifferentiated) — Colluviumundivided. Deposits on mountain and hill slopes emplaced by mass- wasting processes, 02-02-04-00-00 -- map unit -- EM -- Eolian loamy sand to sandy clay loam--older (Older 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 forms or sheet-like morphology; includes quartz to feldspathic-quartz sand and calcareous less than 25%. Includes thin residuum, and narrow belts to thin sheets of alluvium deposited clay-silt-fine sand aggregates; with prominent buried and relict soil horizons of clay and by low order streams (up to 25% A and AV equivalents). Surface and buried horizons of carbonate accumulation. Generally less than 10 m thick. Coeval with Ao. Remarks: 1. Bulk of pedogenic-clay and/or carbonate accumulation are commonly present in older subunits. unit deposited in middle to late Pleistocene prior of expansion of Wisconsin pluvial lakes. Unit includes thousands of small (<1 km2) depressions with thin playa deposits, widely scattered narrow swales with thin alluvial deposits, and local areas of younger eolian cover. 06-02-00-00-map unit—CA—Colluvium in combination with valley-fill alluvium (Age undifferentiated) - Colluvium in combination with valley-fill alluvium. Complex of C, CR, CW, or CB with A, AV, or AP. Sometimes 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 depicted as CJ. Pleistocene)—Eolian deposits-gypsiferous. Eolian sand and silt, primarily calcium sulfate; 06-03-00-00-map unit—CR—Colluvium with large areas of bedrock outcrop (usually

>50%) (Age undifferentiated)—Colluvium with large areas of bedrock outcrop (usually >50%). Used in combination with Second-order symbols denoting bedrock terranes. Remarks: 1.Used primarily in arid parts of the state: includes extensive mudstone-siltstoneshale badlands; and very high relief terrains with erosion-resistant rocks. 02-04-00-00—heading02—DuneGyp—Dune sand - gypsiferous (Age unspecified)—Dune 06-04-00-00—map unit—CW—Colluvium with large areas of weakly-consolidated sedimentary-rock outcrops (w) (Age undifferentiated)—Colluvium with large areas of impregnated with calcium sulfate or sodium salts (ABSy); distributary streamflood and (Holocene / Younger Pleistocene) — Dune sand of quartz to feldspathic quartz composition. In addition to active parabolic and barchanoid forms, dune complexes include vegetationstabilized coppice mounds and longitudinal ridges. Up to 10 m thick. Remarks: 1. Most dune slopes capped by resistant bedrock types. Clasts primarily of boulder size, but including complexes include small interdune flats and sheetlike eolian deposits, lake beds, and basinblocks. Fabric ranges from clast supported to matrix supported with matrix including sandy

Explanation of Map Symbols ——— 01.01.01 Contact—Identity and existence are certain. Location is accurate.

———— 01.01.09 Internal contact—Identity and existence are certain. Location is accurate.

* 18.55 Small cone, vent, cinder cone, or spatter cone * 18.56 Large cone, vent, cinder cone, or spatter cone

18.68 Cinder cone on small-scale maps

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