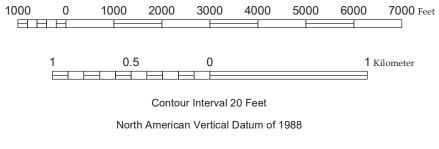


NEW MEXICO BUREAU OF GEOLOGY AND MINERAL RESOURCES A RESEARCH DIVISION OF NEW MEXICO INSTITUTE OF MINING AND

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New Mexico Bureau of Geology and Mineral Resources **Open-File Geologic Map 290** Mapping of this quadrangle was funded by a matching-funds grant from the STATEMAP program of the National Cooperative Geologic Mapping Act (Fund Number: G20AC00250), administered by the U. S. Geological Survey, and by the New Mexico Bureau of Geology and Mineral Resources, (Dr. Nelia W. Dunbar, Director and State Geologist, Dr. J. Michael Timmons, Assoc. Director for Mapping Programs).

Geologic Map of the Selden Canyon 7.5-Minute Quadrangle, Doña Ana County, New Mexico

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Digital layout and cartography by the NMBGMR Map Production Group: Phil L. Miller, Amy L. Dunn, Ann D. Knight and Justine L. Nicolette

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Comments to Map Users

Location is accurate. Sawteeth on upper

_____ 31.08 Map neatline

o o o o Landslide d o o o

A geologic map displays information on the distribution, nature, orientation, and age relationships of rock and deposits and the occurrence of structural features. Geologic and fault contacts are irregular surfaces that form boundaries between different types or ages of units. Data depicted on this geologic quadrangle map may be based on any of the following: reconnaissance field geologic mapping, compilation of published and unpublished work, and photogeologic interpretation. Locations of contacts are not surveyed, but are plotted by interpretation of the position of a given contact onto a topographic base map; therefore, the accuracy of contact locations depends on the scale of mapping and the interpretation of the geologist(s). Any enlargement of this map could cause misunderstanding in the detail of mapping and may result in erroneous interpretations. Site-specific conditions should be verified by detailed surface mapping or subsurface exploration. Topographic and cultural changes may not be shown due to recent development.

Cross sections are constructed based upon the interpretations of the author made from geologic mapping and available geophysical and subsurface (drillhole) data. Cross sections should be used as an aid to understanding the general geologic framework of the map area, and not be the sole source of information for use in locating or designing wells, buildings, roads, or other man-made structures.

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Correlation of Map Units		
Qbf QI Qs Qec Qse Qsp Qt Qva Qpy afe	00-00-00-00-heading02—Quaternary—Quaternary	
	00-01-00-00—heading03—Anthropogenic Units—Anthropogenic Units (Recent)—Anthropogenic Units	
Qvou	00-01-01-00-00—unit—afe—Anthropogenic fill and excavated ground, undifferentiated (Recent)—Aerially extensive land surface areas affected by human construction fill and excavation.	
	00-02-00-00-heading03-Surficial Units-Quaternary (Quaternary)-Surficial Units	
	00-02-01-00-00—unit—Qva—Active Rio Grande alluvium and river channel (Holocene)—Mapped from NAIP 2018 imagery.	
Deposits Hayner	00-02-02-00-00-unit-Qvy-Younger Border-Valley Alluvium (Holocene)-Active arroyo channel, terrace, fan, and pediment deposits graded to within a few meters of the modern Rio Grande floodplain. Mostly unconsolidated, moderate to poorly sorted sand and gravel with a few silt/clay lenses; little to no soil development. As much as 21.3 m thick.	
Ranch Basin Trv c Unconformity on pre_Thrl units	 00-02-03-00-00 - unit - Qvyf - Younger Valley Floor Fluvial facies (Holocene) - River- channel and overbank deposits of the modern Rio Grande and its floodplain. Interbedded sequences of well-sorted and well-rounded gravel, sand, and silt/clay. As much as 21.3 m thick. 00-02-04-00-00 - unit - Qt - Travertine (Holocene) - Mounds of porous, banded 	Г
Unconformity on Tpp in northern West Selden Hills	00-02-05-00-00 - unit - Qt - Haverline (Holocene) - Mountas of porous, banded travertine, as well as travertine-cemented alluvium, that formed along faults bordering the Tonuco uplift. 00-02-05-00-00 - unit - Ql - Playa Deposits (Holocene) - Silt/clay of small playa lakes on the Jornada del Muerto. Characterized by subtle depressions (≤2-3 m) in the topography with abundant vegetation that includes grass, trees, and cactus.	
2	 Topographic depressions surrounding Ql are mostly unconsolidated sandy silt that is subtly finer-grained than nearby Qse deposits. 00-02-06-00-00-unit-Qec-Eolian Coppice Dunes (Holocene)-Areas dominated by 1–1.5 m tall coppice dunes, showing eolian-dominated environment. Dunes cover approximately 50% of surface area and are commonly covered by mesquite bushes. 	
	00-02-07-00-00 – unit – Qs – Eolian Deposits, undifferentiated (Holocene) – Dunes and sand sheets that mantle Camp Rice deposits in approximate central part of map	
Ma- Breccia Breccia	00-02-08-00-00 – unit – Qse – Sheetwash and Eolian Deposits, undivided (Holocene) – Sheet-like sand that overlies Camp Rice deposits on and near the Jornada del Muerto; inferred to have mainly accumulated via sheetwash (or sheet- flooding) and, to a lesser degree, by eolian processes. Dark brown to reddish-orange and red-brown. Some areas consist of minor coppice dunes that are typically ≤0.5 m tall. In the northeast part of the map, some deposits of Qse are elongated ENE subparallel to the prevailing wind direction. Forms a thin (<1 m thick) mantle above Camp Rice deposits.	
Tbt ppi	00-02-09-00-00-unit-Qca-Colluvium (Holocene)-Hillslope gravel, sand, and soil graded to Qvy or Qvo surfaces. 00-02-10-00-00-unit-Qpy-Younger piedmont-slope alluvium	
	 (Holocene) — Alluvial deposits in southeast map area that form subtle fans north of the Jornada fault. 00.02.11.00.00, write Org. Baliana departie contents (caliaba) surface. 	
	00-02-11-00-00−unit−Qsp−Relic pedogenic carbonate (caliche) surface (Holocene)−Mounds of unconsolidated pedogenic carbonate nodules atop the La Mesa surface sands. Nodules are typically pebble to cobble size and angular to subrounded. Mounds sit 0.3–0.6 m higher than surrounding Qse and scattered pedogenic carbonate nodules cover ≥30–50% surface area. In northernmost Qsp polygon in northeast part of map area, the area is characterized by abundant Qsp with intermittent Qse that is not resolvable at scale 1:24,000. Agglomeration of mounds are oriented ENE subparallel to prevailing wind direction and are interpreted to represent a relic geomorphic surface.	
	00-02-12-00-00 – unit – Qbf – Basin-Floor Sediments (Holocene) – Topographically low area that consists of abundant and relatively large Ql (playa lakes) conspicuously oriented subparallel to and on the downthrown side of the Jornada and East Tonuco faults. Consists of unconsolidated sandy silt.	
	00-02-13-00-00 – unit – Qvo – Older Valley-Border Alluvium (Holocene) – Arroyo and fan deposits, and pediment veneers that form a stepped sequence of geomorphic surfaces graded to former levels of the Rio Grande floodplain, the oldest of which is approximately 76 m above the modern Rio Grande. Sand and silt/clay with poorly sorted and poorly rounded gravel; ground-water-cemented conglomerate and conglomeratic sandstone is locally present. Stage II–III pedogenic carbonate is	Γ
	00-02-14-00-00 – unit – Qvof – Older Valley Border Fluvial Facies (Holocene) – River deposits of the Rio Grande that interfinger with or are inset against Qvo or Camp Rice deposits adjacent to the modern Rio Grande floodplain. Highest preserved deposits are generally no higher than a few tens of meters above the modern	
	floodplain. Well-rounded pebbles and cobbles, together with well-sorted sand, comprise most of the unit; stage II–III pedogenic carbonate cements uppermost parts of the deposits. As much as 30 m thick. 00-02-15-00-00—unit—Qvou—Undifferentiated Qvo and Qvof	
	 (Holocene) – Undifferentiated Qvo and Qvof 01-00-00-00-00 – heading02 – Quaternary–Tertiary – Quaternary–Tertiary (Quaternary–Tertiary) – Quaternary–Tertiary 	
	01-01-00-00-heading03-Mineralized Deposits-Mineralized Deposits (Quaternary-Tertiary)-Mineralized Deposits	
Evelopetion of Man Combols	01-01-01-00-00-unit-TQmn-Fault-bound manganese deposits (Plio-Pleistocene?)-Manganese deposits located in the footwall of the Jornada fault in the southeast portion of the map area east of I-25.	
Explanation of Map Symbols stence are certain. Location is accurate. 05.01.01 Anticline (1st option)—Identity and existence are certain.		
ence are questionable. Location is 05.01.03 Anticline (1st option)—Identity and existence are certain.		
 Location is approximate. Stence are certain. Location is 05.01.07 Anticline (1st option)—Identity and existence are certain. Location is concealed. 	Jornada and East Tonuco radius, Qcp in the hanging wan is notably uncker with	Γ
ence are questionable. Location is 05.03.17 Overturned anticline (1st option)—Identity and existence certain. Location is accurate. Beds on one limb are overturned; are	having a suith Change III IV and a serie is the series of the factors II of the factors in	
overtical, or high-angle; or unknown or slip)—Identity and existence areshow dip direction of limbs.05.05.01 Syncline (1st option)—Identity and existence are certain. is accurate.	Location 01-02-02-00-00 – unit – TQcf – Fluvial Facies of the Camp Rice Formation (Plio–Pleistocene) – Braidplain channel and overbank deposits of the ancestral Rio Grande. Light gray to cream or ochre-colored sand and pebbly sand, sandstone, and	
overtical, or high-angle; or unknown or slip)—Identity and existence are 05.09.23 Monocline, anticlinal bend (1st option)—Identity and exi are certain. Location is concealed. Arrows show direction of dip;	shorter fragments from upstream sources are common. Calcareous concretions are common	
arrow on steeper limb. overtical, or high-angle; or unknown or 31.10 Cross section line and label slip)—Identity and existence are	and a variety of Pleistocene mammal fossils have been recovered from outcrops in the quadrangle. Bedding ranges from channel form and crossbedded to massive, multistory bodies of sand or sandstone. Cementation ranges from modest to friable.	
d existence are certain. Location is	Locally silicified near east boundary fault of Tonuco uplift. Calcareous paleosols are interbedded, especially near the top. Constructional top of the fluvial facies is the La Mesa surface, underlain by stage IV–V caliche; it forms the undissected surface of the	
wen block. d existence are certain. Location is	Jornada del Muerto across the eastern half of the quadrangle. As much as 90 m thick. ction. 01-02-03-00-00 – unit – TQcr – Alluvial flat facies of the Camp Rice Formation (Plio–Pleistocene) – Pale red to light gray siltstone, claystone, and mudstone	
nthrown block. d existence are certain. Location is wn block. 06.01 Horizontal bedding	interbedded with occasional paleosols. Unit is best developed in southern reaches of Selden Canyon, interfingering northward with TQcf. Unit represents distal piedmont-slope, alluvial-flat, and eolian deposition adjacent to floodplains. As much	
06.02 Inclined bedding—Showing strike and dip. 06.04 Overturned bedding—Showing strike and dip.	as 15 m thick. 01-02-04-00-00—unit—TQcc—Conglomerate Facies of the Camp Rice Formation (Plio–Pleistocene)—Unit includes deposits at both the top and base of the Camp Rice	
existence are questionable. Location is rown block	Formation. The basal conglomerate is a thin sheet of well-indurated, ground-water cemented, alluvial-fan and arroyo alluvium containing clasts from both upstream sources and underlying bedrock; 5–15 m thick. The upper conglomerate occurs in	
identity and existence are certain. a downthrown block. identity and existence are certain. identity and existence are certain. approximate strike and dip. 08.01.02 Inclined generic (origin not known or not specified) foliation—Showing strike and dip.	two settings: between San Diego Mountain and the East Tonuco fault, the conglomerate is a thin pediment veneer overlying Precambrian rocks; in contrast, conglomeratic sandstone, mapped as TQcc adjacent to the East Tonuco fault, overlie	
Identity and existence are certain.		
pper (tectonically higher) plate. • 09.017 Inclined slickenline, groove, or striation on fault surface (1) • option)—Showing bearing and plunge.	st 01-03-00-00-heading03—"Early Rift" Basin Deposits (Hayner Ranch and Rincon Valley Formations)—"Early Rift" Basin Deposits (Hayner Ranch and Rincon Valley Formations) (Oligo–Miocene)—"Early Rift" Basin Deposits (Hayner Ranch and Rincon Valley Formations)	
12.05 Fluvial transport direction	01-03-01-00-00—heading04—Rincon Valley Formation—Rincon Valley Formation (Miocene)—Formation includes alluvial-fan and playa deposits that record the culmination of filling of the Hayner Ranch half graben and also document the initiation and filling of the Rincon Valley half graben. The 9.6 Ma Selden Basalt is	
	interbedded near the middle (?) of the formation.	
Middle-Late Miocene Caballo uplift	A Picture Rock Canyon West Tonuco horst East 5000> Hayner Ranch basin 14500	
Pia Hayner	4.000 Hayner Ranch basin Rio Grande floodplain 4.000 Grande floodplain	
Hayner A., Ranch basin	3,000 Thr Thr?	
Hatch Rincon	2,000- De Oe	
Tonuco uplift	1,000- Thri	
West Selden Hills	0 feet Tbb? above mean	
Middle–Late Miocene Sierra de las Uvas uplift	sea level sea level sea level	
	C West	t Se ¹
T P P P P P P P P P P P P P P P P P P P	West	Hills
L a wall	5,000- West Selden Hills fault Gea	₿~
CHVZ Rincon Valley basin	4,000 THE TOP	tr.
	3,000- 0e? This	
Miles Kilometers 0 1 2 3 4 5 10 15	1.000-	55
Figure 1—Map of the quadrangle area and surrounding region showing distribution of the Hayner Ranch and Rincon Valley basins during deposition of the Rincon Valley Formation. Major faults shown and uplifts labeled. CHVZ – Cedar Hills vent zone.	0 feet above	
	mean sea level	

NMBGMR Open-File Geologic Map 290 **Description of Map** Last Modified December 2021 01-07-02-00-00—unit—Tpp—Palm Park Formation (Eocene)—Various shades of 01-03-01-00-01—unit—Trvc—Alluvial-Fan Facies of the Rincon Valley Formation (Miocene)—In Hayner Ranch Basin (Tonuco Uplift area), Trvc is tan or pale brown purple, gray, red, and brown, epiclastic volcanic breccia comprises most of the Palm conglomerate, conglomeratic sandstone, sandstone, and minor interbedded light Park Formation in the Selden Canyon quadrangle. Ranging up to 3 m in length, clasts gray mudstone and sandstone. Outcrops of conglomeratic strata adjacent to the include a wide variety of andesite and latite porphyry, whose phenocrysts of southern flank of the Tonuco uplift contain poorly sorted and rounded pebbles and plagioclase and mafic minerals are commonly altered to clay, epidote, sausserite, and cobbles of Palm Park, Bell Top, and Uvas rock units, as well as Paleozoic and various iron oxides. Both monolithologic and heterolithologic breccia are Cretaceous clasts that were derived from an ancestral Caballo uplift to the north. represented. Clasts are subangular to angular, poorly sorted, and supported by Horizontal stratification, trough crossbedding and channel structures are common in matrix fragments. The tuffaceous matrix consists of crystal fragments, ash, and the clastic strata. The unit is interpreted to be arroyo and sheet-flood alluvium comminuted rock fragments. Individual beds of breccia, as much as 35 m thick, form deposited in mid-fan to distal fan positions in the Hayner Ranch half graben. Trvc is sheets or channels 10s to 100s of meters wide. In the Tonuco uplift breccia beds are conformable with both overlying Trv and underlying Hayner Ranch Formation (Thr) indurated, rather resistant bodies of rock. Elsewhere, tuffaceous matrix components in outcrops adjacent to the Tonuco uplift. Approximately 250 m thick. — In Rincon of the breccia are less cemented, permitting clasts to weather in relief or to accumulate on hillsides as boulder fields. Porphyritic andesite/latite flows that grade Valley Basin (East and West Selden Hills area and south of Rio Grande River), Trvc is tan to pale-brown conglomerate and conglomeratic sandstone interbedded with gray laterally and vertically into breccia beds are exposed on the Tonuco uplift, such to pink mudstone. Clasts are subangular, poorly sorted, and include Palm Park (Tpp) sequences attaining thicknesses of 240 m. Interbedded with the breccia beds and and flow-banded rhyolite (Tbfr) as well as sedimentary and metamorphic rocks lavas are thin, rather minor tuffaceous, laminated to cross-bedded sandstone and derived from the western dip slope of the Doña Ana Mountains. Bedding ranges conglomerate beds, and minor, thin (≤1 m) air-fall ash layers. Sandstone and from parallel to crossbedded; channels are ubiquitous within sandstone and conglomeratic strata are entirely volcaniclastic except for one thin limestone-andesite conglomeratic strata. The unit was deposited by sheet flood and streams/arroyos on conglomerate exposed on the Tonuco uplift. Poorly sorted breccia are interpreted to the distal portions of alluvial fans that drained westward from the Doña Ana be volcanic mudflow (lahar) deposits, some of which apparently accompanied emplacement of andesitic lava flows. Reworking of lahars, locally at least, by sheet Mountains and eastward from the Cedar Hills vent zone and Sierra de las Uvas. It flood or stream runoff resulted in fluvial sand and gravel deposits that overlie or unconformably overlies Uvas Basaltic Andesite in Selden Canyon. East of the West grade laterally into lahars. The Palm Park Formation grades downward into the Lov Selden Hills fault, the formation unconformably overlaps deeply eroded Palm Park and Hayner Ranch strata. At least 150 m thick, top everywhere eroded. Ranch Formation; the top is unconformable beneath tuffs of the Bell Top Formation. Approximately 600 m thick. 01-03-01-01-00—heading05—Hayner Ranch Basin—Hayner Ranch Basin (Miocene)—Hayner Ranch Basin 01-08-00-00–heading03–Love Ranch Formation–Love Ranch Formation (Paleo–Eocene)–Love Ranch Formation 01-03-01-01-01-unit-Trv-Playa/Alluvial-Flat Facies of the Rincon Valley Formation (Miocene)—Pale red, gypsiferous mudstone, siltstone and shale, 01-08-01-00-00-unit-Tlr-Love Ranch Formation (Paleo-Eocene)-Reddish-brown weathering to barren badlands. The deposits represent the final stages of filling of to gray cobble/boulder conglomerate. Subangular to angular clasts, as much as 1.5 m the Hayner Ranch half graben. Interfingers laterally and downward with alluvial-fan in diameter, include El Paso limestone (Oe), Bliss sandstone (COb), and Precambrian deposits (Trvc). Approximately 160 m thick, top eroded. granite and metamorphic rocks (pC). Poorly stratified beds are between 1–2.5 m thick and overlie El Paso and Bliss formations with angular unconformity, or are 01-03-01-02-00—heading05—Rincon Valley Basin—Rincon Valley Basin nonconformable above Precambrian rocks. Minor beds of reddish-brown arkosic (Miocene)—Rincon Valley Basin siltstone and sandstone are interbedded with the conglomerate, as is a 1.5 m-thick, ostracod-bearing limestone bed. Along the eastern edges of the Tonuco uplift the 01-03-01-02-01–unit–Trvs–Selden Basalt of the Rincon Valley Formation formation is interpreted to be a proximal alluvial-fan deposit that locally may grade Miocene)—Black alkali-olivine basalt. One, locally two, flows are typically auto to talus. Fresh-water cienegas apparently were part of the fan environment. At the brecciated at the base, scoriaceous at the top, and have dense to vesicular interiors. northwest corner of the Tonuco uplift the Love Ranch Formation is represented by Flows are interbedded with Trvc. Each flow is less than 10 m thick. only a few cobbles of granite nonconformably overlying deeply eroded Precambrian granite; apparently these represent a veneer of colluvium or soil only a few meters 01-03-02-00–00–heading04–Hayner Ranch Formation–Hayner Ranch Formation thick. Here the Love Ranch Formation appears to grade abruptly upward into Palm (Oligo–Miocene) – The Hayner Ranch Formation includes both alluvial-fan and Park lahar breccia, but along the eastern flank of the Tonuco uplift, a minor basin-floor sediments that were deposited during the early to middle stages of disconformity may separate the two formations. As much as 50 m thick along the growth of the Hayner Ranch half graben. In the Selden Canyon quadrangle the eastern flank of the Tonuco uplift. formation is exposed in the Tonuco uplift, as well as in the northern West Selden 02-00-00-00-heading02-Paleozoic-Paleozoic 01-03-02-02-00-heading05-Tonuco Uplift-Tonuco Uplift (Oligo-Miocene)-Two informal members are recognized: lower member (Thrl) formerly referred to as 2-00-01-00-00—unit—Pz—Paleozoic rocks, undifferentiated (Paleozoic)—Cross "transitional unit", and upper member (Thr). ctions only. 01-03-02-02-01—unit—Thr—Upper member of the Hayner Ranch Formation 02-00-02-00-00-unit-Pzu-Upper Paleozoic rocks, undifferentiated (Miocene)—Brick-red sandstone, conglomeratic sandstone and conglomerate (Paleozoic) – Abo, Hueco, Pennsylvanian and Lake Valley formations; cross sections interbedded with gray to pale red mudstone; a light gray to pale tan mudstone and conglomeratic sandstone tongue occurs near the middle of the upper half of the member. Poorly sorted, subangular to subrounded conglomerate clasts are entirely 02-00-03-00-00-unit-Pzl-Lower Paleozoic rocks, undifferentiated volcanic rocks, with Palm Park andesite (Tpp), Bell Top ash-flow tuff, and Uvas aleozoic)—Bliss, El Paso, Montoya, Fusselman, and Percha formation. Cross basaltic andesite (Tu) always conspicuous. Horizontal stratification, including sections only. laminae, predominates but trough crossbedding within channels is also common. 02-01-00-00-heading03-Early Permian-Early Permian (Early Permian)-Early Like the upper part of the lower unit, this conspicuously red section of conglomeratic strata is interpreted to have been deposited on mid to distal portions of alluvial fans. Permian Approximately 580 m thick; grades upward into Rincon Valley Formation. 02-01-01-00-00—unit—Pa—Abo Formation (Permian)—Interbedded red to tan 01-03-02-02–02–unit–Thrl–Lower member of the Hayner Ranch Formation sandstone, shale, and siltstone; green to gray, to purplish-gray shale; fossilferous (Oligo-Miocene) – Bright-red siltstone, mudstone, shale, and sandstone grading gray, orange-gray, olive gray limestone; and tan to yellow-gray dolomicrite. upward into pale purplish-brown to grayish-red conglomeratic sandstone and Sandstone and siltstone beds as much as 12 m thick are channel shaped and exhibit ripple cross lamination, trough crossbedding, desiccation cracks, and plant remains conglomerate. Siltstone and shale units are micaceous. Conglomerate clasts are locally. Limestone beds are generally less than 3 m thick, micritic, and contain entirely poorly sorted, sub angular to subrounded cobbles and pebbles, largely derived from the Palm Park and Bell Top formations. Thin (1 m) algal limestone beds gastropods, echinoids, bryozoans, brachiopods, and pelecypods; mud filled burrows are locally present. Horizontal bedding, trough crossbedding, and channels are are common in some beds. Sandstone and siltstone beds are fluvial to fluvialcommon within conglomeratic beds. This part of the section is interpreted to estuarine in origin whereas fossiliferous limestones represent normal to somewhat represent alluvial-flat deposits at the base, changing abruptly upward into mid-fan to restricted marine environments. Some shale beds containing siltstone with distal-fan facies. Approximately 500 m thick, base not exposed due to faulting; hummocky stratification are probably storm deposited sediment. Dolomicrites were deposited in lagoonal, intertidal, and supratidal environments. As much as 81 m grades upward into the upper member. thick, top not exposed. 01-03-02-03-00-heading05-West Selden Hills-West Selden Hills 02-01-02-00-00-unit-Ph-Hueco Formation (Permian)-Limestone, dolomite, and (Oligo–Miocene) – Reddish-gray boulder conglomerate; crudely bedded. Clasts are angular to subangular flow-banded rhyolite and Uvas Basaltic Andesite (Tu). Unconformably overlies Palm Park Formation (Tpp). Unit is interpreted to be 02-02-00-00-heading03-Pennsylvanian-Pennsylvanian proximal fan deposits that onlapped the hanging wall dip slope of the Hayner Ranch (Pennsylvanian) – Pennsylvanian basin, and may be correlative with middle strata of the upper member of the Hayner Ranch Formation exposed in the Tonuco uplift. Unconformably (?) overlapped by 02-02-01-00-00—unit—IP—Pennsylvanian rocks, undifferentiated Rincon Valley Formation (Trvc). Zero to 70 m thick, top eroded. (Pennsylvanian)—Interbedded thin limestone, sandy limestone, dolomite, and black shale; cross sections only. 01-04-00-00–heading03–Uvas Basaltic Andesite–Uvas Basaltic Andesite (Oligocene)—Uvas Basaltic Andesite 02-03-00-00-heading03-Early to Middle Mississippian-Early to Middle Mississippian (Early to Middle Mississippian)-Early to Middle Mississippian 1-04-01-00-00–unit–Tu–Uvas Basaltic Andesite (Oligocene)–Medium to dark ray basaltic andesite flows and associated pyroclastic rocks, mostly red cinder beds. 02-03-01-00-00-unit-M-Mississippian rocks, undifferentiated Fextures range from vesicular and amygdaloidal to closely spaced, platy fracturing fississippian) – Cross sections only. subparallel to flow tops; base of flows are commonly autobrecciated. The formation is only present west of the West Selden Hills fault where the Rincon Valley Formation 02-04-00-00-heading03-Middle to Late Devonian-Middle to Late Devonian (Trvc) is either inset against or locally fills deep paleocanyons cut into upper parts of (Middle to Late Devonian)—Middle to Late Devonian the formation. Small dikes in the Tonuco uplift may be Uvas Basaltic Andesite. At 2-04-01-00-00—unit—Dp—Percha Shale (Devonian)—Dark gray, fissile shale with least 75 m thick in the Selden Canyon quadrangle, base not exposed. minor interbeds of yellow to light gray siltstone and nodular, brachiopod-bearing 01-05-00-00-heading03-Rhyolite Breccia-Rhyolite Breccia limestone characteristic of the Onate Formation (Middle Devonian) of the San (Eo–Oligocene?) – Rhyolite Breccia Andres Mountains. At least 20 m thick, top not exposed. 01-05-01-00-00-unit-Tbb-Rhyolite breccia (Eo-Oligocene?)-Present only in fault-02-05-00-00–heading03–Middle Silurian–Middle Silurian (Middle bounded outcrops on the Tonuco uplift. Pale red to pale purple or pale brown beds Silurian)—Middle Silurian of rhyolite breccia grading upward into pale red mudstone; generally channel form 2-05-01-00-00—unit—Sf—Fusselman Dolomite (Silurian)—Massive, brown to light in shape, each graded bed is 5-10m thick. Clasts are angular flow-banded rhyolite gray, somewhat cherty dolomite. Sucrosic texture in places. Unit crops out in East with minor Uvas Basaltic Andesite (?), mostly pebble to cobble size. Unit is Selden Hills where it is surrounded (onlapped ?) by Palm Park Formation (Tpp). interpreted to be a succession of mudflow deposits, apparently derived from erosion Fractured, faulted, and altered over much of the outcrop, the formation probably is of flow-banded rhyolite dome/flow complexes in the Cedar Hills vent zone or Dona autochthonous, but a slide-block origin is possible. At least 40 m thick, base not Ana Mountains. As much as 210 m thick, top and bottom not exposed. exposed 01-06-00-00-heading03-Bell Top Formation-Bell Top Formation (Eocene)-The 02-06-00-00-heading03-Late Ordovician-Late Ordovician (Late Bell Top Formation is thickest and best exposed west of Selden Canyon where it Ordovician)—Late Ordovician consist of ash-flow tuffs (2–7), as well as a series of flow-banded rhyolite dome/flow complexes, pumice cones and diatremes (Cedar Hills Vent Zone), and various 02-06-01-00-00-unit-Om-Montoya Formation (Ordovician)-Dolomite, cherty reworked air-fall tuffs. In the Selden canyon quadrangle, only small and isolated dolomite; cross sections only. outcrops of the formation are present west of the West Selden Hills fault: flowbanded rhyolite (Tbfr), ash-flow tuff 3 (Tbt3), and air-fall tuff (Tbt). Outcrops of 02-07-00-00—heading03—Early Ordovician—Early Ordovician (Early rhyolite porphyry (Tbrp) that occur east of the West Selden hills fault are included Ordovician) – Early Ordovician here with the Bell Top Formation because of similarities in age and lithology with 02-07-01-00-00-unit-Oe-El Paso Formation (Ordovician)-Gray, thin to medium-Bell Top units. bedded, slabby limestone, correlated with the Sierrite Limestone of the Caballo 01-06-01-00-00—unit—Tbrp—Rhyolite porphyry of the Bell Top Formation Mountains (Kelley and Silver, 1952). Comminuted fossil debris is present in some (Eocene) – Cream to pale tan or pale pink rhyolite porphyry sills, dikes, and small beds but the limestone is notably fine-grained, dense, and silicified over wide areas. plugs exposed in the East Selden Hills and Radium Springs area. Sanidine Branching burrows are pervasive, giving the limestone a mottled appearance. Filled phenocrysts are small (2–3 mm) and generally altered to clay. Tbrp rocks in the with siliceous material, burrows weather to irregular tubes, flakes, and quadrangle are lithologically identical to thick rhyolite porphyry sills of the Robledo discontinuous streaks that stand in relief. The formation conformably overlies the Mountains. Sills and dikes are generally less than 15 m thick. Bliss Formation (COb) and is unconformably overlain by Love Ranch Formation (Tlr). Only the lower 100 m of the formation remains after Laramide (Late 01-06-02-00-00—unit—Tbfr—Flow-banded rhyolite of the Bell Top Formation Cretaceous(?) to Early Eocene) erosion. ocene) – Pink to gray rhyolite, weakly porphyritic locally, with generally steeply dipping foliation (flow banding). Interpreted to be the eroded "roots" of rhyolite 02-08-00-00-heading03-Late Cambrian to Early Ordovician-Late Cambrian to dome/flow groups, which comprise most of the Cedar Hills vent zone. Largely Early Ordovician (Late Cambrian to Early Ordovician)—Late Cambrian to Early buried in the Selden Canyon quadrangle by Uvas Basaltic Andesite (Tu) and Rincon Ordovician Valley Formation (Trvc). Small plugs and dikes occur in the West Selden Hills. 02-08-01-00-00-unit-COb-Bliss Formation (Cambro-Ordovician)-Dark brown to 01-06-03-00-00—unit—Tbt3—Ash-flow tuff 3 of the Bell Top Formation black quartz sandstone interbedded with gray quartzite and light-brown shale and Eocene)—Pink to pale reddish-orange pumiceous ash-flow tuff. Moderately welded siltstone. Sandstones are medium to coarse grained, arkosic, in the lower part, and to nearly unwelded; pumice fragments generally <3 cm long. Except as small slivers, hematitic; glauconite is conspicuous in some beds. Trilobite and Linguloid the tuff is not present east of the West Selden Hills fault. Mostly buried by Rincon brachiopods have been recovered from the formation, but fossils are notably sparse, Valley alluvial fan conglomerate (Trvc) and Uvas Basaltic Andesite (Tu); as much as except for vertical burrows which are conspicuous in several beds.. The Bliss 10 m thick in scattered, small outcrops. Formation is conformably overlain by the El Paso Formation (Oe), or unconformably, by the Love Ranch Formation (Tlr). Approximately 38 m thick. 01-06-04-00-00-unit-Tbt- (Eocene)-Light gray to white fine-grained, tuffaceous epiclastic rocks and thin beds of air-fall tuff, generally associated with Tbt3. Less 03-00-00-00-heading02-Precambrian-Precambrian (Precambrian) – Precambrian

than 10 m thick within the quadrangle. 01-07-00-00–heading03–Palm Park Formation–Palm Park Formation (Eocene)—Palm Park Formation

West Selden

01-07-01-00-00-unit-Tppi-Andesite flows within the Palm Park Formation ocene)—Pale gray to pale purplish-gray porphyritic andesite flows. Phenocrysts of plagioclase and hornblende as much as 4mm in length are altered to sausserite,

chlorite, and iron oxides. Generally, flows are massive, thick bedded, but locally exhibit flow banding formed by aligned phenocrysts. Individual flows may be as much as 200m thick.



quartz.

03-00-01-00-00—unit—pC—Precambrian (Precambrian)—Brown to pale reddish

prown granite enclosing many discontinuous bodies of gneiss and biotite schist.

Granite grades locally into small pegmatite bodies and contains pods and veins of

Hayner Hayner Ranch Ranch/Jornada East basin basin West Tonuc 4.000 TQcf & Late Pliocene basin fill Structure of thrus fault footwall is speculative 0 meters below mear below mea sea level sea level

Jornada basin

Qcf & Late

Pliocene

Trvc

__?____?___

basin fill

Geologic Cross Section C-C Rancl

Hanging wall dip

- slope of Hayner -

Ranch basin

basir

Iornada fau