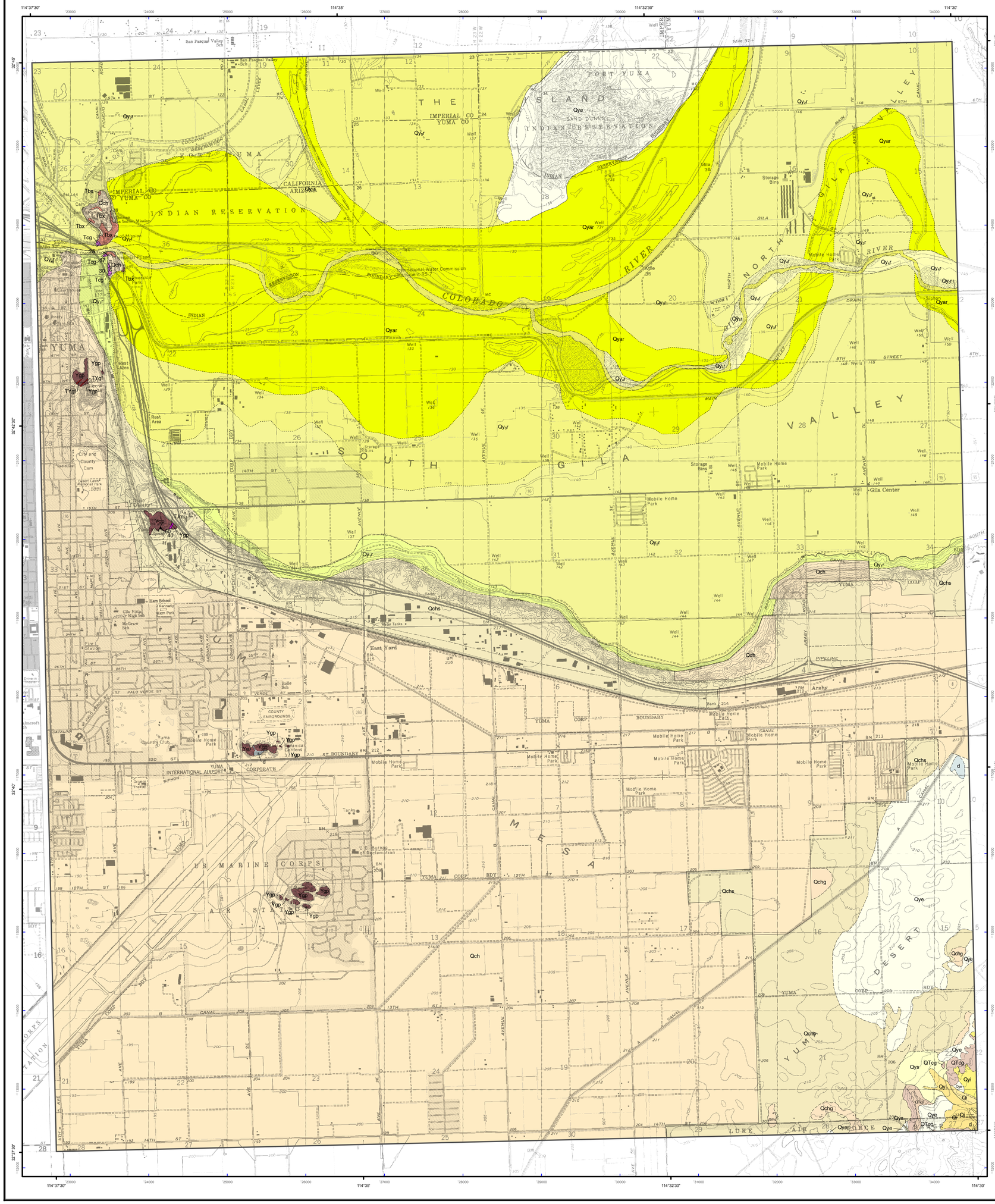

GEOLOGIC MAP OF THE YUMA EAST 7 ½' QUADRANGLE, YUMA COUNTY, ARIZONA

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Arizona Geological Survey Digital Geologic Map 86
(DGM-86), version 1.0

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Geologic map of the Yuma East 7½' Quadrangle,
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Digital Geologic Map DGM-86, scale 1:24,000.

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Map Unit Descriptions

Other Deposits

d — **disturbed ground** - Land that has been substantially modified or obscured by human activity. Includes aggregate pits, and airfield runways, but does not include areas disturbed by agricultural activity.

Qye — **Holocene sandy eolian deposits** - Windblown sand and silt deposits in broad valleys and mantling the lower portions of hillslopes in upland areas. Deposits are reworked Colorado River quartz-rich medium to fine sand, and eolian silt. Local topography is undulating, with ubiquitous small-scale coppice dunes and mounds around vegetation. Soil development is minimal.

Piedmont Deposits

Qys — **Small active channels, bars, and low terraces associated with large washes** - Deposits associated with active channels, bars and low terraces along relatively large piedmont washes. Deposits mainly consist of moderately sorted silt, sand, and fine gravel, including some pebbles and cobbles in channels. Channels are typically incised less than 1 m below adjacent terraces. Channel morphologies generally consist of multi-threaded, shallow, low-flow channels with adjacent bars and finer terrace deposits. Terraces commonly have planar to gently undulating surfaces and are covered primarily with fine-grained deposits with minor gravel concentrations. Soil development is minimal.

Qys — **Holocene sandy fluvial deposits** - Quartz-rich medium to fine sand deposits with minor gravel associated with wash systems draining upland areas. Qys deposits are reworked from older Colorado River deposits and are compositionally very similar to them, but generally contain only minor gravel, pebbles and cobbles. Channels are small, discontinuous, and multi-threaded, with low sand bars and small terraces between channels. Soil development is minimal.

Qyi — **Older Holocene to late Pleistocene fluvial(?) deposits** - Sand, silt, and fine gravel deposits with minor eolian overprint. Deposits are mostly reworked older Colorado River sand and gravel, so sand is quartz-rich and medium to fine-grained, and gravel is commonly rounded to well-rounded. Surfaces are relatively planar with small mounds around bushes and burrows. Surfaces typically have lightly varnished pebble lags, although open gravel pavements with more darkly varnished clasts are found in some areas. Qyi surfaces are darker and topographically higher than adjacent Qys surfaces, but lower than adjacent Qye surfaces.

Qi — **Late Pleistocene gravel and sand deposits** - Intermediate age gravel and sand deposits reworked from older Colorado River deposits. Pebbles and cobbles are well-rounded to subangular, mixed lithologies. Medium to fine sand is quartz-rich. Surfaces are typically planar to broadly rounded; surface margins are rounded by local erosion. Surface character varies from weak to moderate gravel pavements with weak to moderate varnish, making these surfaces substantially darker than those on younger and finer deposits.

River Deposits - River deposits of the Colorado and Gila Rivers were mapped using several historical sources including 1926, 1938 and 1979 aerial photographs, a1929 Soil Conservation Survey map, 1919 and 1964 topographic maps, and 1983 and 1993 flood inundation maps from the Bureau of Reclamation. Unit boundaries for Qyar and Qy3r represent the greatest aerial extent of these units through this time period.

Qyrf — **Active river channel deposits** - Deposits associated with the active channels of the Colorado and Gila Rivers. Deposits are inundated most or all of the year, especially on the Colorado River. Where exposed, deposits are dominantly unconsolidated, very poorly sorted sandy to cobbly bars and narrow, low terraces mantled with fine-grained deposits along channel margins. Gravel clasts are typically well-rounded but may be angular to sub-angular, and sand is medium to fine-grained and quartz rich. Qycr deposits are unvegetated to lightly vegetated. Qycr deposits are entrenched from 2-5 meters or more below adjacent low terraces and abandoned historical flood channels. Extent of Qycr deposits varies and shifts with significant flooding.

Qyrr — **Recently active flood channel and floodplain deposits** Unit Qy4r is composed of bars and overflow channels of the Gila River that were created or reworked in the 1993 flood. Qy4r is composed of sand, silt and clay, with some gravel bars and no soil development. The surface is hummocky and has channelized flow due to the bars and swales. These surfaces are inundated during moderate flooding. Qy4r is sparsely vegetated with some grasses.

Qyar — **Fine-grained alluvium in abandoned river channels** - Abandoned historical, pre-dam river channels and adjacent floodplains. These areas are currently covered by impenetrable tamarisk growth or agricultural fields. Surface deposits consist of sand, silt and clay, but river gravel deposits likely underlie much of the unit. Qyar could be inundated during large flooding events. Qyar was identified and mapped using historical aerial photos, soil surveys, and topographic maps.

Qyar — **Historical river terrace deposits** - Deposits associated with the historical river floodplain that are up to 3-5m above active river channels and 2-3m above adjacent Qy4r surfaces. Qy3r surfaces are planar and have been almost completely altered by agricultural activity. Sediments composing these deposits are poorly sorted silt, sand, pebbles and cobbles. Pebbles and cobbles are well-rounded to sub-angular. These deposits are prone to flooding during extreme flow events. Qy3r was mapped using historical air photos, soil surveys, and topographic maps.

Qyrf — **Latest Holocene to historical river terrace deposits** - Deposits associated with the late Holocene to historical river floodplain that are up to 6m above active river channels and ~2m above adjacent Qy3r surfaces. Qy2r surfaces are planar and have been almost completely altered by agricultural activity or urban development. Sediments composing these deposits are poorly sorted silt, sand, pebbles and cobbles. Pebbles and cobbles are well-rounded to sub-angular. These deposits are probably not prone to flooding in the modern, post-dam environment.

Qyrr — **Late Holocene river floodplain deposits** - Deposits on the fringe of the Holocene river floodplain that are up to 8m above active river channels and ~2m above adjacent Qy2r surfaces. Qy1r surfaces are planar and slope gently toward the river. These deposits are composed of poorly sorted silt, sand, pebbles and cobbles, some of which is likely eroded from adjacent Qch deposits. Pebbles and cobbles are well-rounded to sub-angular.

Qchs — **Late Pleistocene Chemehuevi Formation, sandy member** - Sand, silt, clay and very minor gravel Colorado River, and locally Gila River, deposits associated with a major late Pleistocene aggradation period. Deposits consist primarily of beds of sand, clay and silt, generally in thin to medium, nearly horizontal beds. OSL dating of similar deposits farther upstream along the Colorado River suggests that they are ~70 ka. Deposits are at least 20m thick, and the base of the unit is rarely exposed. Surface deposits are commonly reworked into small-scale eolian features.

Qchg — **Late Pleistocene Chemehuevi Formation, gravelly member** - Late Pleistocene Colorado River pebble, cobble, sand, silt, and clay deposits. Underlying deposits likely are very similar to Qchs, but these areas are covered with open to tight pebble to fine cobble lag. Surface clasts vary from well-rounded to subangular clasts. In some areas lithologies are very diverse, in other areas gravel is mostly locally derived.

Qch — **Chemehuevi Formation, undivided** - Late Pleistocene Colorado River deposits, undifferentiated. Silt, clay, sand and minor gravel. Surface is modified by agricultural activity or urban development.

QTcg — **Pliocene to Quaternary Colorado River gravel deposits** - Older Colorado River gravel and sand deposits underlying dissected upland areas. Surfaces are partially or completely covered by well-rounded to subangular pebbles and cobbles of diverse lithology. Exposures are limited, but gravel bedding varies from subhorizontal to large-scale crossbedding. Because gravel clasts are difficult to transport by local fluvial processes, gravel likely mantles ridge crests and side slopes as underlying sandier deposits are translocated by erosion.

QTcs — **Pliocene to Quaternary sand deposits** - Older Colorado River medium to fine-grained sand deposits with minor gravel. Sand is quartz-rich and mature. Gravel consists of rounded to well-rounded pebbles of diverse lithology. Surface sand deposits have been reworked by eolian activity to varying degrees, and locally QTcs deposits are mantled by small-scale dunes and mounds.

Bedrock Map Units

Tcg — **Conglomerate of Yuma Prison** - Poorly sorted and crudely bedded conglomerate with subangular to subrounded, 2-20 cm clasts, locally to 1 m. Clasts consist of porphyritic biotite granite like that of bedrock hills to south, plus other granitoids and gneiss. Unit includes very sparse thin beds of sandstone. This unit and underlying breccia are tilted 30-40 degrees to the southwest. This conglomerate hosts the prison cells at the Yuma Territorial Prison.

Tbx — **Rock-avalanche breccia** - Massive breccia with clasts generally 1-100 cm in an unsorted matrix. Some clasts are larger (up to 5 m), and consist of porphyritic biotite granite as is exposed in hills to the south, with about 1-2% of clasts consisting of very fine grain biotite granitoid. This deposit is inferred to represent a large rock avalanch breccia, as are common in the Laguna Hills to the northeast.

TJm — **Fine-grain mafic dike** - Fine grain, medium to dark gray mafic dike at hill at16th street and I-8. Mafic content is highly variable (15-70%). Rock is holocrystalline but all phenocrysts are <0.2 mm.

TYgi — **Fine-grained biotite granitoid** - ~1-10 m thick dikes intruding Proterozoic granite (map unit Ygp) at Sierra Prieta hill. Dikes consist of 6-10%, <1mm mafic minerals, and fine gray quartz and pale gray to whitish gray feldspar.

Ygp — **Porphyritic biotite granite** - Coarse-grained granite with pale gray K-feldspar phenocrysts up to 5 cm across. Mafic content is ~15 to 20%. Mafic minerals consist of felted, very fine aggregates of biotite, magnetite(?), and hornblende(?). In some samples, recrystallization has affected all minerals, which have been transformed to very fine aggregates of grains (as with the mafic minerals). Pegmatites are rare to sparse.

SCALE 1:24 000

1 — 0.5 — 0 — 1 MILE

1000 — 0 — 1000 — 2000 — 3000 — 4000 — 5000 — 6000 — 7000 FEET

1 — 0.5 — 0 — 1 KILOMETER

CONTOUR INTERVAL 40 FEET

MN

11½°

2010 MAGNETIC NORTH DECLINATION

Topographic base from USGS 1:24,000 Quadrangle Series.
Seamless basemap generated using iGage All Topo Pro software.

Projection Information:
North American Datum of 1983.
1000-meter Universal Transverse Mercator grid tics, zone 11, shown in blue.

Map Symbol Descriptions

25 — **Contact, accurate - showing dip**

Contact, approximate

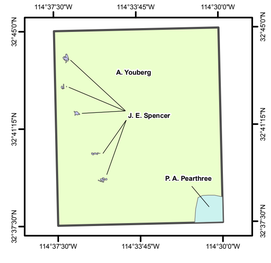
Contact, concealed

14 — **Bedding**

23 — **Generic foliation**

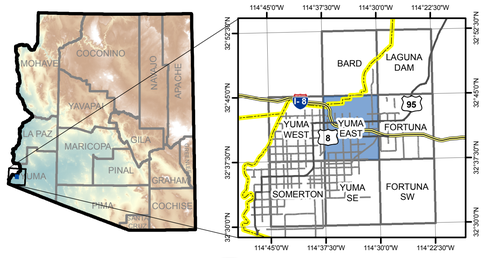
Generic lineation

Mapping Responsibility



Location Map

Mapped Area Shown in Blue



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