the Edwards aquifer and the cavernous HSU of the upper zone of the Trinity aquifer.

## Scientific Investigations Map 3366 Pamphlet accompanies map

Yellow clay, blue clay

large Exogyra ponderosa

with calcite-filled veins,

Black dendrites, iron

Bioturbated iron-stained

massive limestone beds;

Wispy iron-oxide stains,

grainstone

Massive, nodular and

and springs, ferns

stairstep topography

Weathers to an orangish

boxwork porosity, Corbula sp., spring and

Orbitolina texana (Roemer, 1852),

Macraster sp., Nerinia sp.,

pecten, gastropods,

Thick argillaceous beds, thin shale beds, *Orbitolina texana* (Roemer, 1852), contains ponds and

seeps, often little vegetation, steeper slopes often with "badlands" type

weathering, thinner in areas of patch reefs in the

underlying Doeppenschmidt HSU

Orbitolina texana (Roemer, 1852),

and more resistive than overlying and underlying patch reefs formed on rudist, reefal

topography with soils, Orbitolina texana (Roemer, 1852)

wackestone, packstone,

grainstone; corals,
Caprina sp., Trigonia sp.,
cliff forming; outcrop
often contains large
limestone float with large

channel and moldic porosity, caves and springs

Quartz geodes, large oyster shells, reddish sandy soil with thick grass growth, red sandstone

base

crossbedding near top, patch reefs composed of corals and rudist,

talus slopes

Holds surface water,

springs at contact with Cow Creek

limestone beds thicker

MO, BU, erosion than overlying and

BP, FR underlying units, *Orbitolina*texana (Roemer, 1852),
patch reefs

BU, BR growth and thicker grasses,

BP, CV

beds separated by

Confining, locally IP, MO, White, chalky limestone; water bearing in FR, BP, Gryphaea aucella,

study area, in feet)

VII 90–120

evaporite (C) 0-10

(typically 30)

(typically 30)

(typically 40)

45-60

(typically 55)

Marl, calcareous clay, blue in the

Massive, chalky, locally marly, mudstone,

nodular wackestone, mudstone, nodular bioturbated wackestone; *Gryphaea aucella*, Inoceramus sp.; volcanic and terrigenous clastics, calcite

Brown, flaggy, sandy shale and argillaceous limestone; iron nodules; Inoceramus sp., shark teeth, fossil fragments; petroliferous

Buff to light gray, dense nodular mudstone and wackestone, calcite-filled veins, bluish

dendrites, iron nodules, iron staining; shell

ssiliferous blue-green to yellow-brown clay, packstone, iron nodules; Ilymatogyra arietina

Reddish-brown, gray to light tan shaley iron nodules, iron staining; Plesioturrilites

brazoensis, Waconella wacoensis

large nodules); caprinids, crossbedded

Recrystallized limestone, mudstone,

wackestone, packstone, grainstone; chert

(bedded and large nodules); iron stained, stromatolitic, Toucasia sp., Montastrea roemeriana, oysters

Dense, shaly, mudstone, wackestone, oyster-shell mudstone and wackestone, iron staining, chert

mudstone, wackestone; chert (beds and nodules); crossbedded and ripple marked

Highly altered crystalline limestone chalky mudstone, occasional grainstone

associated with tidal channels; chert breccia, travertine

Chert (absent in lower 20 ft), dolomitic

mudstone, wackestone, packstone,

Shaly, nodular, burrowed mudstone wackestone, packstone, miliolid grainstone, dolomite, contains dark

spherical textural features locally known as BRBs; Ceratostreon texana

Caprina sp., miliolids, and gastropods

Evaporites, wackestone, packstone, miliolid grainstone, argillaceous limestone, heavily bioturbated; occasional dinosaur tracks

packstone, miliolid grainstone, argillaceous

Dissolved evaporites, highly altered

crystalline limestone and chalky mudstone,

breccia, boxwork voids

Caprinid biostrome near top (locally),

miliolid grainstone, argillaceous limestone,

mudstone, silty mudstone at base;

Orbitolina minuta (Douglas, 1960),

Tapes decepta, Hemiaster sp., Neithea sp.,

and *Turritella* sp., gastropods

Dissolved evaporites, highly altered

crystalline limestone and chalky mudstone,

breccia, boxwork voids; Corbula beds

Wackestone, packstone, grainstone,

argillaceous wackestone, shales,

evaporites; this section contains occasional fossils of *Orbitolina texana* (Roemer, 1852), Porocystis golobularis,

Toucasia sp., Macraster sp., Nerinea sp.,

gastropods, pectens, and pelecypods

Monopleura sp., and Toucasia sp., gastropods, pectens, and pelecypods

Argillaceous wackestone, shale; *Orbitolina texana* (Roemer, 1852),

gastropods, pelecypods

grainstone, boundstone, argillaceous wackestone and packstone, *Orbitolina* texana (Roemer, 1852), *Caprina* sp., *Toucasia* sp., *Monopleura* sp., *Nerinea* sp., *Tylostoma* 

sp., oysters, pectens, pelecypods

Alternating beds of argillaceous wackestone, packstone; mudstone, wackestone, packstone, grainstone, miliolid

grainstone; Orbitolina texana (Roemer, 1852), Monopleura sp., Nerinea sp., Tylostoma sp.,

Wackestone, packstone, grainstone,

boundstone, burrows, Orbitolina texana (Roemer, 1852), *Caprina* sp., *Toucasia* sp., *Trigonia* sp., *Turritella* sp., miliolids,

pectens, various corals, shell fragments

base of unit; oysters, quartz geodes; grades into the lower member of the Glen Rose Limestone to the south becoming dolomitic

Very fine to fine-grained carbonate sand

areas of patch reefs with talus slopes, corals

and rudists

Dolomitic mudstone, wackestone,

packstone; oysters

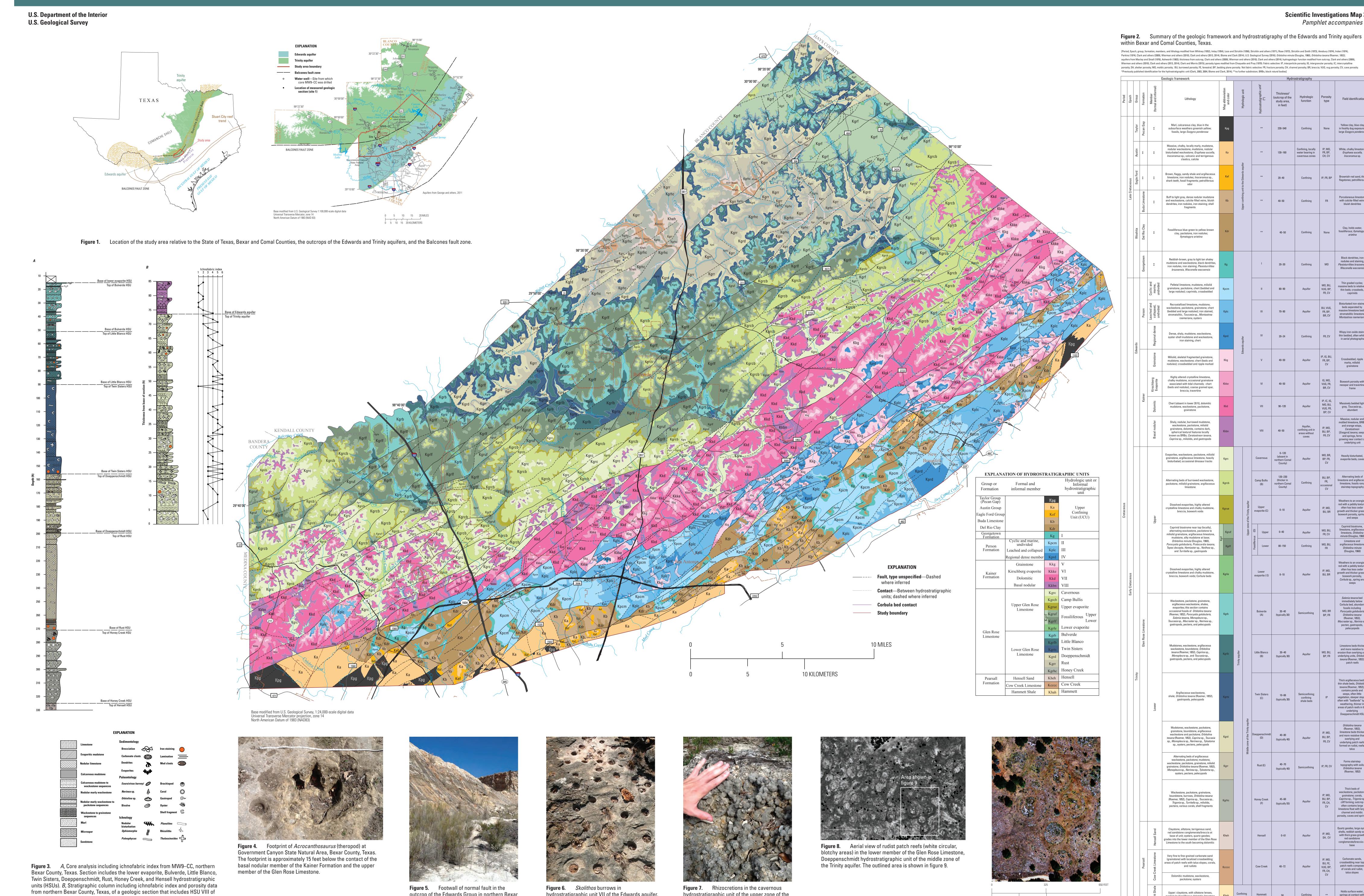
Upper: claystone, with siltstone lenses,

Lower: siltstone and dolomite

overlain by fossiliferous dolomitic limestone

pamphlet, https://doi.org/10.3133/sim3366.

subsurface weathers greenish yellov fossils, large *Exogyra ponderosa* 



**Figure 9.** Very high-resolution aerial view of the outlined area shown in figure 8, rudist patch reefs (circular areas) in the lower member of the Glen Rose Limestone, Doeppenschmidt hydrostratigraphic unit of the middle zone of the Trinity aquifer.

<sup>2</sup>Thickness ranged based on field mapping. Any use of trade, product, or firm names in this publication is for descriptive purposes only and does not imply endorsement by the U.S. Government For sale by U.S. Geological Survey, Information Services, Box 25286, Federal Center, Denver, CO 80225, 1-888-ASK-USGS Digital files available at https://doi.org/10.3133/sim3366 Suggested citation: Clark, A.K., Golab, J.A., and Morris, R.R., 2016, Geologic framework and hydrostratigraphy of the Edwards and Trinity aquifers within northern Bexar and Comal Counties, Texas: U.S. Geological Survey Scientific Investigations Map 3366, 1 sheet, scale 1:24,000,

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hydrostratigraphic unit VII of the Edwards aquifer,

dolomitic member of the Kainer Formation (Kkd).

outcrop of the Edwards Group in northern Bexar

County, Texas.

Geologic Framework and Hydrostratigraphy of the Edwards and Trinity Aquifers Within Northern Bexar and Comal Counties, Texas

hydrostratigraphic unit of the upper zone of the

Trinity aquifer, upper member of the Glen Rose