BUREAU OF ECONOMIC GEOLOGY
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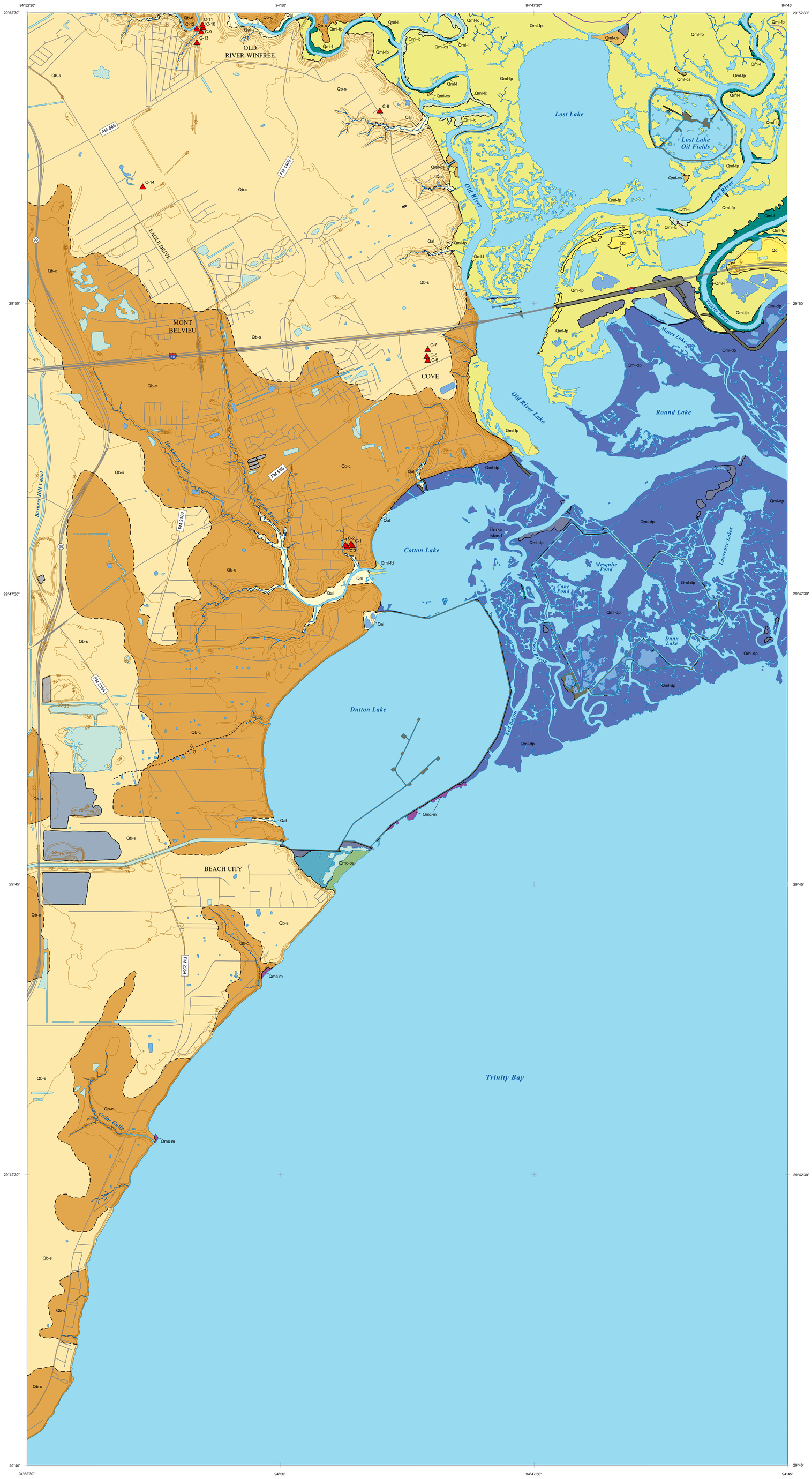
In cooperation with the State of Texas Advanced Resource Recovery (STARR) Program and the U.S. Geological Survey National Cooperative Geologic Mapping Program under STATEMAP award number G24AC00508, 2024.

GEOLOGIC MAP OF THE COVE AND UMBRELLA POINT QUADRANGLES
TEXAS GULF COAST
OPEN-FILE MAP NO. 297
2025



SCALE 1:24,000

0 1 2 MILES

0 1 2 KILOMETERS

UNIVERSAL TRANSVERSE MERCATOR PROJECTION, ZONE 15N NAD83

N
0.90°GN
1.45°MN
True North
Magnetic North

Approximate 2025 Magnetic North (MN) declination

GEOLOGIC MAP OF THE COVE AND UMBRELLA POINT QUADRANGLES TEXAS GULF COAST

Tiffany L. Caudle and Jeffrey G. Paine

2025

Explanation

HOLOCENE
Matagorda Formation

Lavaca Member (Fluvial and Deltaic Deposits)

Qml-l–Levee. Unconsolidated sand and mud in low, narrow areas subparallel and adjacent to active and abandoned stream channels.

Qml-cs–Crevasse splay. Unconsolidated sand and mud deposited in fans adjacent to stream channels and levees.

Qml-lc–Levee and crevasse splay, undifferentiated. Unconsolidated sand and mud deposited in levee and crevasse-splay setting.

Qml-fd–Fan or fan delta. Unconsolidated sand and mud in small, lobate deltas deposited by streams flowing into bays and lakes and onto low-relief surfaces. Coastal prairie, woodland, and brackish- to fresh-water marsh vegetation.

Qml-fp–Flood plain. Unconsolidated mud and sand deposited on a low-relief valley floor during floods. Includes some minor levees, crevasse splays, and active and abandoned stream channels. Coastal prairie or wetland vegetation.

Qml-dp–Delta plain. Unconsolidated mud and sand deposited in bay-margin delta. Includes some minor fluvial levees, crevasse splays, tidal-channel levees, and active and abandoned stream and tidal channels. Brackish- or fresh-water marsh vegetation.

Carancahua Member (Bay- and Estuarine-margin Deposits)

Qmc-bm–Marsh. Unconsolidated mud and sand deposited in low-relief areas adjacent to bay shoreline. Common tidal channels. Salt- or brackish-water marsh vegetation.

Qmc-ba–Beach or berm, abandoned. Unconsolidated sand, shell, and mud deposited in an abandoned low berm along former bay shorelines from wave action. Commonly vegetated.

HOLOCENE TO PLEISTOCENE

Qal–Alluvium, undifferentiated. Unconsolidated sand, silt, and clay deposited in a variety of environments along streams and drainages. May include Holocene deposits.

Qd–Deweyville Formation, fluvial terrace, undifferentiated. Unconsolidated sand, silt, clay, and less gravel deposited in alluvial channel, levee, point-bar, and flood-plain settings at elevations above the modern flood plain and below the Beaumont Formation depositional surface.

PLEISTOCENE
Beaumont Formation

Qb-c–Beaumont Formation, clayey facies. Semiconsolidated clay, silt, sand, and minor gravel deposited in fluvial-deltaic, interdistributary, distributary, bay and estuarine settings. Includes flood-plain and delta-plain deposits and minor channel, levee, and crevasse-splay deposits.

Qb-s–Beaumont Formation, sandy facies. Semiconsolidated sandy mud, silt, and some fine sand deposited in fluvial- and distributary-channel setting.

Map Symbols (lines, symbols, and patterns)

- Contact (distinct)
- Contact (gradational)
- Fault (inferred) — U / D
- Elevation (ft); contour interval 5 ft
- Water; bay, large lake, or large stream connected to bay
- SPW; selected ponded water
- DCP; dredged canal, ditch, or pond
- Pit; excavation or area enclosed by levees. May contain standing water
- Stream (active or intermittent), drainage ditch, canal, or tidal channel
- Meander scar
- Road
- FDEM measurement site
- Fill; land artificially elevated by fill material
- DMDA; dredged material disposal area
- DMR; dredged material, reworked
- Sand pit; Excavation area for sand or clay. May contain standing water in ponds.

Acknowledgments

Photography used in the study included (1) 0.6-m pixel, natural color, National Agriculture Imagery Program (NAIP) digital imagery, photographed in 2024; (2) 0.6-m resolution, natural color, NAIP digital imagery photographed in 2022; (3) 1:24,000-scale Tobin aerial photographic mosaics of the Cove quadrangle and Umbrella Point quadrangle flown in August 1956; and (4) 1:24,000-scale Tobin aerial photographic mosaics of the Cove quadrangle and Umbrella Point quadrangle flown in April 1930. NAIP imagery was obtained from the Texas Geographic Information Office (TxGIO), Photography was supplemented by 1-m cell size digital elevation models (DEMs) constructed from data acquired during airborne lidar surveys flown by Sanborn Mapping Company in 2017 and by Fugro USA Land, Inc., in 2018. The lidar datasets were compiled for the Texas Geographic Information Office (TxGIO) Texas Strategic Mapping (StratMap) program. Soil data from U.S. Department of Agriculture Soil Survey program, wetland data from the National Wetlands Inventory distributed by the U.S. Fish & Wildlife Service, and State of Texas well reports downloaded from the Texas Water Development Board's (TWDB) Groundwater Database were used to assist in feature interpretation.

Previous regional maps that depict this area include the 1:250,000-scale Geologic Atlas of Texas, Houston Sheet (Aronow and others, 1968; revised 1982), the 1:125,000-scale Environmental Geologic Atlas, Galveston-Houston Sheet (Fisher and others, 1972), and the 1:125,000-scale Distribution of Wetlands and Benthic Macroinvertebrates map (White and others, 1985). The rationale for the mapping approach to Holocene fluvial, deltaic, bay, and estuarine deposits is described in Paine and others (in press).

The study included field observations of surficial deposits and contacts and interpretation of surface and subsurface electrical conductivities measured using a ground-based electromagnetic induction conductivity meter (Geonics EM38, McNeill, 1980a, 1980b). The Cove quadrangle elevation contours were obtained in GIS format from the U.S. Geological Survey. Umbrella Point elevation contours were created by contouring the DEMs. Roads were obtained in GIS format from the Texas Department of Transportation. Streams and drainage ditches were mapped from aerial imagery and the lidar-derived DEM.

Geologic mapping and map production were supported partly by the U.S. Geological Survey National Cooperative Geologic Mapping Program through STATEMAP award G24AC00508, 2024 (Jeffrey G. Paine, Principal Investigator), and partly by Bureau of Economic Geology STARR funds for geologic mapping and geologic hazards. Graphics were by Theodore Hennessy. Views and conclusions contained in this map should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government. The authors disclaim any responsibility or liability for interpretations from this map or digital data or decisions based thereon.

References

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White, W. A., Calnan, T. R., Morton, R. A., Kimble, R. S., Littleton, T. G., McGowen, J. H., Nance, H. S., and Schmedes, K. E., 1985, Distribution of wetlands and benthic macroinvertebrates, *in* Submerged lands of Texas, Galveston-Houston area: sediments, geochemistry, benthic macroinvertebrates, and associated wetlands: The University of Texas at Austin, Bureau of Economic Geology Submerged Lands of Texas, SL0005, plate V.

Frequency-Domain Electromagnetic Induction Measurement

Frequency-domain electromagnetic (FDEM) induction measurements of apparent conductivity were measured using Geonics EM38 ground-conductivity meter in the horizontal dipole (HD) and vertical dipole (VD) coil orientations on November 4 and 5, 2025. Measurements are in millisiemens per meter, or mS/m. Approximate exploration depth ranges are 0 to 0.75 m (EM38 HD) and 0 to 1.5 m (EM38 VD). Measurement locations are shown on the map by FDEM site number.

FDEM site	Latitude	Longitude	Easting	Northing	EM38 HD mS/m	EM38 VD mS/m
C-1	29.79870	-94.82155	323947.11	3297871.07	60	95
C-2	29.79895	-94.82177	323926.61	3297899.11	63	102
C-3	29.79855	-94.82243	323861.46	3297855.79	90	129
C-4	29.79877	-94.82272	323834.45	3297880.24	113	182
C-5	29.82585	-94.80932	325176.92	3300861.56	69	80
C-6	29.82530	-94.80915	325192.07	3300800.35	70	77
C-7	29.82685	-94.80915	325194.77	3300972.14	136	154
C-8	29.86107	-94.81703	324492.80	3304776.50	49	75
C-9	29.87240	-94.84643	321672.73	3306077.85	68	85
C-10	29.87300	-94.84617	321699.55	3306143.94	54	91
C-11	29.87338	-94.84625	321692.19	3306186.56	43	65
C-12	29.87283	-94.84718	321601.05	3306127.04	64	73
C-13	29.87085	-94.84717	321599.13	3305907.20	49	63
C-14	29.85018	-94.85607	320702.44	3303629.89	39	51

System	Series	Time (ka)	Map Units	
			Fluvial and Deltaic	Bay and Estuarine
Quaternary	Holocene	0 – ~12	Qal, Qd, Qml-cs, Qml-dp, Qml-fd, Qml-fp, Qml-l, Qml-lc	Qmc-ba, Qmc-m
	Pleistocene	~12 – ~2,600	Qal, Qb-c, Qb-s, Qd