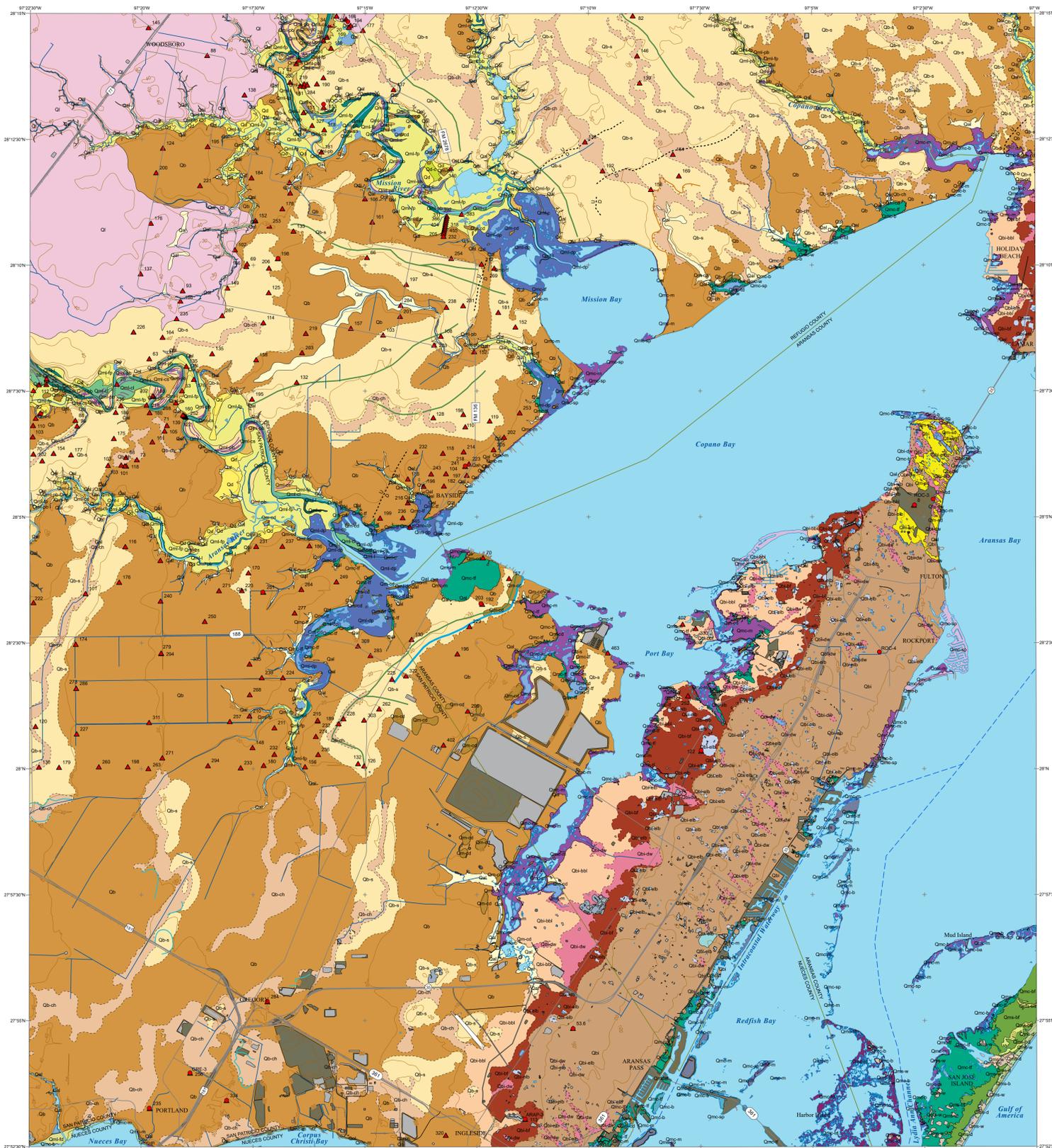


In cooperation with the State of Texas Advanced Resource Recovery (STARR) Program and the U.S. Geological Survey National Cooperative Geologic Mapping Program under STATEMAP award number G24AC00508, 2024.



- Explanation**
- HOLOCENE**
Matagorda Formation
- Eolian Deposits**
- Qm-sd** – Sand dune. Unconsolidated sand deposited by wind, including blowout dunes. May be active or stabilized by vegetation. May include Pleistocene deposits.
 - Qm-cd** – Clay dune. Semiconsolidated silt, clay, and sand deposited by wind adjacent to active and abandoned tidal flats. May include storm deposits. Common coastal prairie vegetation.
- Lavaca Member (Fluvial and Deltaic Deposits)**
- Qml-c** – Channel and channel fill. Unconsolidated mud and sand filling abandoned fluvial channels.
 - Qml-l** – Levee. Unconsolidated sand and mud deposited in low, narrow areas subparallel and adjacent to active and abandoned stream channels.
 - Qml-d** – Channel and levee, undifferentiated. Unconsolidated sand and mud deposited in stream or river channel or levee setting.
 - Qml-pb** – Point bar. Unconsolidated sand, silt, and clay deposited at the inside bank of sinuous, laterally migrating channels.
 - Qml-cs** – Crevasse splay. Unconsolidated sand and mud deposited in fans adjacent to stream channels and levees.
 - Qml-fp** – Floodplain. 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-fd** – Fan or fan delta. Unconsolidated sand and mud in small, lobate-alluvial fans or 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-dp** – Delta plain. Unconsolidated mud and sand deposited in a bay-margin delta. Includes some undifferentiated minor fluvial levees, crevasse splays, tidal-channel levees, and active and abandoned stream and tidal channels. Brackish- or fresh-water marsh vegetation.
- Caranchua Member (Bay- and Estuarine-margin Deposits)**
- Qmc-m** – Marsh. Unconsolidated mud and sand deposited in low-relief areas adjacent to bay shoreline. Common tidal channels. Saltwater or brackish-water marsh vegetation.
 - Qmc-b** – Beach or berm. Unconsolidated sand, shell, and mud deposited along bay shoreline from wave action. Beach is unvegetated; berm may be sparsely vegetated.
 - 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.
 - Qmc-w** – Washover. Unconsolidated sand and shell deposited adjacent to bay shoreline by high water level and wave activity during tropical cyclone passage. Commonly unvegetated.
 - Qmc-sp** – Spit. Unconsolidated sand, shell, and mud deposited across bay and valley mouths from erosion of adjacent shoreline and lateral sediment migration. May include beach, berm, and washover deposits.
 - Qmc-f** – Tidal flat. Unconsolidated sand and mud deposited in a tidal flat that is periodically inundated by astronomical tides or wind-driven water at the margins of bays or tributary valleys. May include barren or vegetated areas and algal mats.
 - Qmc-td** – Tidal delta. Unconsolidated sand and mud deposited at tidal inlet. May include storm washover deposits. Common saltwater or brackish-water marsh vegetation and tidal flats.
- Salaria Member (Gulf-margin Deposits)**
- Qms-b** – Beach. Unconsolidated sand deposited in forebeach or backbeach environment. Forebeach is unvegetated. Backbeach may have sparse vegetation.
 - Qms-d** – Dune. Unconsolidated sand deposited by wind adjacent to the beach. Includes foredunes and former foredunes. May be active or stabilized by vegetation.
 - Qms-bd** – Blowout dune. Unconsolidated sand deposited by wind. Includes back-island or elongate dunes extending across the barrier flat. May be active or stabilized by vegetation.
 - Qms-bf** – Barrier flat. Unconsolidated sand deposited in low-relief barrier-island environment landward of the beach and dune system. May include washover and eolian deposits.
 - Qms-w** – Washover. Unconsolidated sand and shell deposited in sheets, fans, or bars landward of the beach by high water level and wave activity during tropical cyclone passage. May be barren or vegetated.
 - Qms-wc** – Washover channel. Unconsolidated sand, shell, and mud deposited in washover channels active during high water level associated with tropical cyclone passage. May be barren or vegetated.
- HOLOCENE TO PLEISTOCENE**
- Deweyville Formation**
- Qd** – Deweyville Formation, undifferentiated. Fluvial terrace deposits within incised valleys. Unconsolidated sand, silt, clay, and less gravel deposited in alluvial channel, levee, point-bar, and floodplain settings at elevations above the modern floodplain and below the Beaumont Formation depositional surface.
 - Qd-c** – Channel fill. Unconsolidated mud and sand deposited in abandoned channels on fluvial terrace at elevations above the modern flood plain and lower than the Beaumont Formation depositional surface.
- PLEISTOCENE**
Beaumont Formation
- Qb** – Beaumont Formation, undifferentiated. Semiconsolidated clay, silt, sand, and minor gravel deposited in fluvial-deltaic, interdistributary, distributary, and bay and estuarine settings. Includes floodplain and delta-plain deposits and channel, levee, and crevasse-splay deposits.
 - Qb-s** – Sandy facies. Semiconsolidated sandy mud, silt, and some fine sand deposited in fluvial- and distributary-channel setting.
 - Qb-ch** – Channel facies. Semiconsolidated sandy clay to clayey sand deposited in abandoned stream or distributary channels.
- Ingleside Unit (Gulf-margin Deposits)**
- Qbi** – Barrier island, barrier peninsula, and strandplain, undifferentiated. Semiconsolidated sand, silt, and lesser clay deposited in barrier island, barrier peninsula, or strandplain setting. Common pimple mounds, closed basins, and ridge-and-swale topography.
 - Qbi-bf** – Barrier flat. Semiconsolidated sand and mud deposited in barrier-flat environment.
 - Qbi-bbl** – Back barrier and lagoon. Semiconsolidated sand and mud deposited in back barrier or lagoon environment.
 - Qbi-dw** – Barrier drainageway. Semiconsolidated sand, silt, and lesser clay deposited in former larger swales, tidal channels, and washover channels. Generally low elevation with few pimple mounds. Commonly flooded by storm-elevated tides.
 - Qbi-elb** – Ephemeral lake basin. Semiconsolidated sand and mud deposited in closed or connected topographic basins in a barrier-island or strandplain environment. May include younger lacustrine deposits.
- Liesie Formation**
- Ql** – Liesie Formation, undifferentiated. Semiconsolidated sand, silt, clay, and minor gravel deposited in fluvial-deltaic setting. Includes meanderbelt, levee, crevasse-splay, and distributary sands, and floodplain and interdistributary mud.

- Map Symbols (lines, symbols, and patterns)**
- Contact (distinct)
 - Contact (gradational)
 - Normal fault - approximately located; Growth fault with surface topographic expression, but fault is not visible
 - Waterline
 - Stream (active or intermittent), drainage ditch, canal, or tidal channel
 - Meander scar; Archaic ridge and swale pattern left by a meandering stream
 - Axis of Ob channel complex; Approximate ground-surface location of the axis of relatively sandy Beaumont Formation fluvial and deltaic channel complex strata
 - Ob paleochannel; Sinuous topographic low within a Beaumont Formation channel complex left by abandoned channel
 - Paleoshoreline; Former shoreline position
 - Topographic scarp; Distinct and abrupt elevation change across the ground surface
 - Elevation (ft); contour interval 10 ft
 - Road
 - Railroad
 - Ship channel
 - Coastal structure - Jetty, pier, groin, or breakwater
 - County line
 - Apparent electrical conductivity (in millisiemens per meter, or mS/m) of the ground measured using a Geonics EM31 ground-conductivity meter in the vertical dipole coil orientation. Value shows is bulk conductivity from the surface to depths of 10 to 20 ft (McNeill, 1989a, 1990a).
 - Time-domain EM sounding for subsurface lithostratigraphic interpretation.
 - Water; Bay, large lake, or large stream connected to bay
 - SPW; Selected ponded water
 - Fill; Land artificially elevated by fill material
 - DMDA; Dredged material disposal area
 - DMR; Dredged material, reworked. Unconsolidated sand and mud.
 - DCP; Dredged or excavated canal, ditch, or pond. May contain water.
 - PI; Excavated area. May contain water.
 - Sand pit; Excavation for sand or gravel
 - IA; Highly developed industrial area with significant land disturbance and areal extent
 - Br; Breakwater. Protective rock structure.
 - Airfield; Airfield runway, taxiway, and fill

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GEOLOGIC MAP OF THE COPANO BAY AREA, TEXAS GULF OF AMERICA COAST

Jeffrey G. Paine, Edward W. Collins, Lucie Costard, Benjamin A. Grunau, Jennifer N. Morris, and Tiffany L. Caudle
2025

Acknowledgments

Photography used in the study included (1) 0.6-m to 1.0-m pixel, natural color, National Agriculture Imagery Program (NAIP) digital imagery, photographed between 2012 and 2024 and (2) 1:24,000-scale Tobin aerial photographic mosaics flown in the 1930s and 1950s. 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 the Bureau of Economic Geology in 2014 and the U.S. Geological Survey (USGS) in 2018. Previous regional maps that cover this area include the 1:250,000-scale Geologic Atlas of Texas, Beeville-Bay City Sheet (Brown and others, 1975; revised 1987) and Corpus Christi Sheet (Brown and others, 1975); the 1:125,000-scale Environmental Geologic Atlas of Texas, Port Lavaca area (McGowen and others, 1976) and Corpus Christi area (Brown and others, 1976); and the 1:125,000-scale map of Distribution of Wetlands and Benthic Macroinvertebrates from the Submerged Lands of Texas, Corpus Christi area (White and others, 1983) and Port Lavaca area (White and others, 1989). This map compiles and updates current and recent STATEMAP- and STARR-supported geologic mapping (Paine and Collins, 2014a, b; Paine, Collins, and Costard, 2015a, b; Paine, Grunau, and Morris, 2024; and Paine, Morris, and Grunau, 2023, 2024a, b). 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 collection and interpretation of surface and subsurface electrical conductivities measured using Geonics EM31 and EM38 ground-based electromagnetic induction conductivity meters (McNeill, 1989a, 1990a) and Adem WskTEM and TEMCompany sTEM time-domain electromagnetic induction instruments. Elevation contours were modified from the USGS. Roads and railroads were obtained from the Texas Department of Transportation. Streams, drainage ditches, and canals were obtained from the TXGIO (2025).

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System	Series	Time (ka)	Map Units																	
		0	Eolian		Laocostine		Fluvial and Deltaic			Bay and Estuarine		Gulf Margin								
Holocene	Matagorda	0	Qm-sd	Qm-cd	Qml-c	Qml-l	Qml-d	Qml-pb	Qml-cs	Qml-fp	Qml-fd	Qml-dp	Qmc-m	Qmc-b	Qmc-ba	Qmc-w	Qmc-sp	Qmc-f	Qmc-td	
			Qd	Qd-c	Qb	Qb-s	Qb-ch	Qbi	Qbi-bf	Qbi-bbl	Qbi-dw	Qbi-elb	Ql							
Pleistocene	Beaumont	~2,600																		