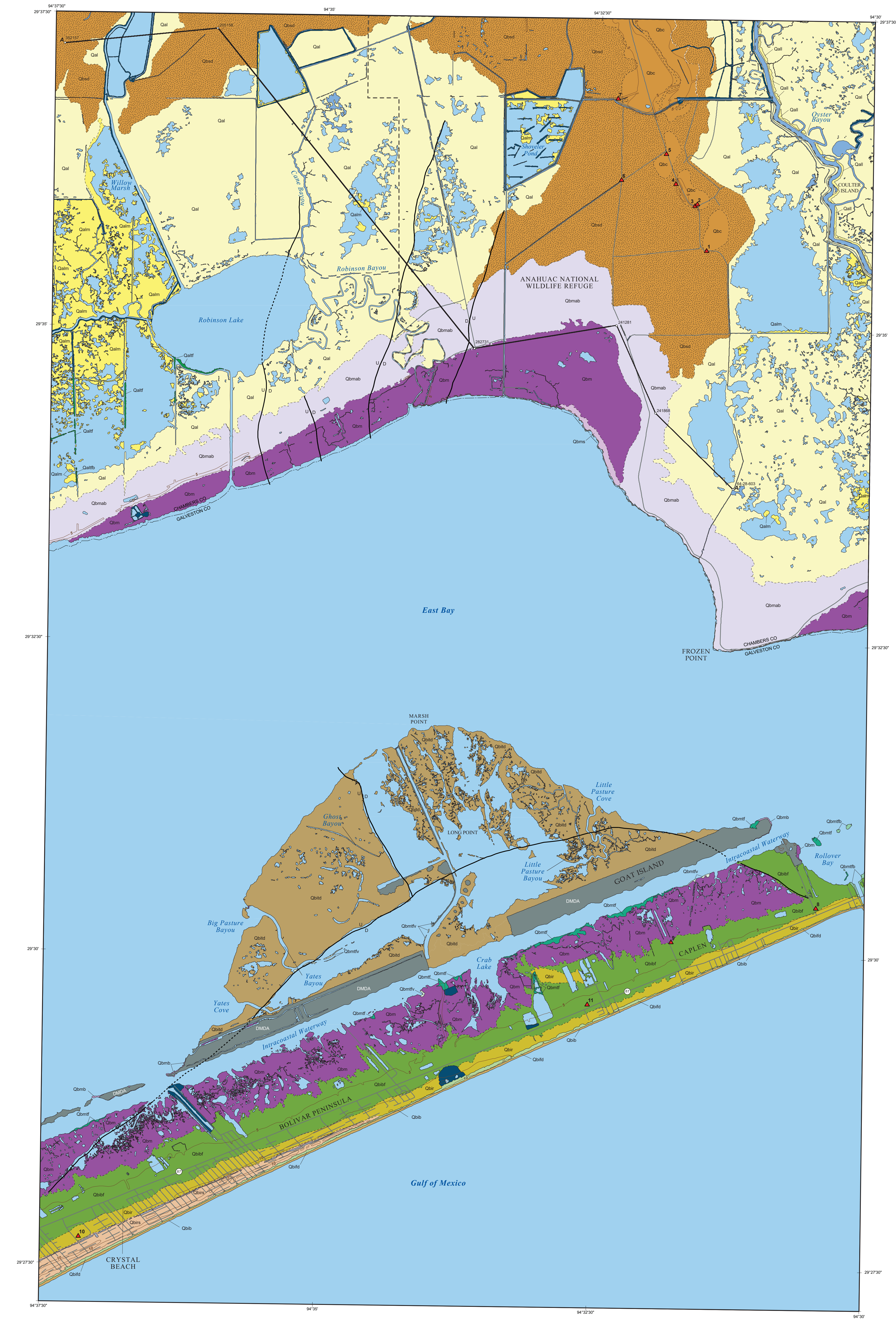




GEOLOGIC UNITS

HOLOCENE

- Qal**—Alluvium. Clay, silt, and sand. Includes point bar, floodplain, stream channel, backswamp, coastal marsh, and mudflat deposits.
- Qalt**—Alluvium levee. Silt and sand. Natural levee deposits along active stream channel.
- Qalm**—Marsh deposits in emergent areas. Sand and mud. Vegetated, low lying areas.
- Qaltf**—Tidal flat deposits in emergent areas. Sand and mud. Vegetated and barren undivided.
- Qaltfb**—Barren tidal flat deposits in emergent areas. Sand and mud.
- Qbmab**—Abandoned bay margin berm. Sand, silt, and clay. Beach and storm deposits in a low berm parallel to the bay shoreline.
- Qbms**—Bay margin spit. Sand, silt, and clay. Beach and storm deposits in a low berm adjacent to the bay shoreline.
- Qbm**—Bay margin deposits. Mud and sand. Vegetated low-relief deposits adjacent to the bay shoreline.
- Qbmb**—Bay margin beach deposits. Sand, mud, and shell.
- Qbmtf**—Bay margin tidal flat deposits. Sand and mud. Vegetated and barren undivided.
- Qbmtfb**—Bay margin barren tidal flat deposits. Sand and mud.
- Qbmtfv**—Bay margin vegetated tidal flat deposits. Sand and mud.
- Qblbf**—Barrier island or peninsula barrier flat deposits. Sand.
- Qblb**—Barrier island or peninsula ridge deposits. Sand.
- Qblms**—Barrier island or peninsula ridge-and-swale complex. Sand and mud.
- Qblf**—Barrier island or peninsula foredune deposits. Sand.
- Qblb**—Barrier island or peninsula beach deposits. Sand.
- Qblf**—Barrier island or peninsula tidal delta. Mud and sand.

PLEISTOCENE

- Qbc**—Beaumont Formation. Clay, silt, and minor sand. Deposited in fluvial-deltaic, interdistributary, and distributary setting. Contacts with Beaumont Formation sandy facies. Qbcd are gradational.
- Qbd**—Beaumont Formation sandy facies. Sandy mud, silt, and minor sand. Deposited in fluvial-deltaic and distributary channel setting. Contacts with Beaumont Formation, Qb, are gradational.

Map Symbols

- Contact (distinct)
- Contact (gradational)
- Road
- Elevation (ft); contour interval = 5 ft
- Fault—showing sense of motion
U = upthrown block; D = downthrown block
- County Boundary
- Wildlife Refuge
- Cross-section line
- Well locations (label is well report number)
- Apparent electrical conductivity. Measurement locations are shown on map by FDEM site number.
- Gulf, bay, and selected ponded water
- Selected channel
- Fill (land artificially elevated by fill material)
- DMDA—Dredged-material disposal area

Frequency-Domain Electromagnetic Induction Measurements

Frequency-domain electromagnetic (FDEM) induction measurements of apparent conductivity measured using Geonics EM38 and Geonics EM31 ground-conductivity meters in the horizontal dipole (HD) and vertical dipole (VD) coil orientations on May 19, 2021. Measurements are in millisiemens per meter, or mS/m. Approximate exploration depth ranges are 0 to 0.75 m (EM38 HD), 0 to 1.5 (EM38 VD), 0 to 3 m (EM31 HD), and 0 to 6 m (EM31 VD). Measurement locations are shown on map by FDEM site number.

FDEM Site	Latitude (°N, WGS84)	Longitude (°W, WGS84)	App. cond. EM38 HD (mS/m)	App. cond. EM38 VD (mS/m)	App. cond. EM31 HD (mS/m)	App. cond. EM31 VD (mS/m)
1	29° 35.658	94° 31.517	135	156	239	212
2	29° 36.029	94° 31.610	126	187	231	268
3	29° 36.022	94° 31.629	49	77	119	161
4	29° 36.190	94° 31.807	237	268	287	225
5	29° 36.430	94° 31.898	132	155	171	182
6	29° 36.517	94° 32.307	443	414	408	269
7	29° 36.866	94° 32.346	72	85	115	126
8	29° 30.412	94° 30.444	17	37	65	98
9	29° 30.128	94° 31.761	1062	699	831	329
10	29° 27.715	94° 37.147	19	36	59	86
11	29° 29.618	94° 32.518	21	41	60	84

Acknowledgments

Photography used in the study was 1-m resolution, natural color, National Agricultural Inventory Program digital imagery photographed in 2016 and 60-cm resolution, natural color, National Agricultural Inventory Program digital imagery photographed in 2018 and 2020. Photography was obtained from Texas Natural Resources Information System (TNRIS). Photography was supplemented by a 50-cm cell size digital elevation model (DEM) constructed from topographic data acquired during an airborne lidar survey flown by Fugro USA Land, Inc. in 2018 for the Texas Natural Resources Information System (TNRIS), Texas Water Development Board (TWDB), and Houston-Galveston Area Council (H-GAC) as part of the Texas Strategic Mapping (StratMap) program and 1-m-cell-size DEMs constructed from topographic data acquired during lidar surveys flown by the Bureau of Economic Geology in 2012 and 2019. Previous regional maps that cover 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 study included field observations of surficial deposits and contacts and interpretation of surface and subsurface electrical conductivities measured using ground-based electromagnetic induction conductivity meters (Geonics EM31 and EM38, McNeil, 1980a,b). Digital elevation contour files for generalized topography were adapted from USGS topographic data obtained from TNRIS. Digital files of Texas Department of Transportation roads were also obtained through TNRIS. Water bodies were adapted from aerial photographs and the lidar-derived DEM. Geologic cross-section constructed from State of Texas well reports downloaded from the Texas Water Development Board's (TWDB) Groundwater Database (<https://www.twdb.texas.gov/groundwater/databases/ghdb.asp>). Well locations are labeled with the well report number.

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System	Series	Time Ma	Map and Cross Section Units
Quaternary	Holocene	0.012	<div>Barrier/Bay-Estuarine and Fluvial Systems</div> <div>Qbmab Qbms Qbm Qbmb Qbmtf Qbmtfb Qbmtfv Qblbf Qblb Qblms Qblf Qblb Qblf</div>
	Pleistocene	2.6	<div>Qbc Qbd</div>

GEOLOGIC MAP OF THE FROZEN POINT AND CAPLEN QUADRANGLES TEXAS GULF OF MEXICO COAST

Tiffany L. Caudle and Jeffrey G. Paine
2021

