



**Fluvial-Deltaic and Barrier-Strandplain Settings**  
(wetland classification terminology of coastal geologic environments in *italics*)

**Modern to Holocene**

**Estuarine Environment**

- E1AB—Water; *subtidal, unknown aquatic bed.*
- E1AB3—Water; *subtidal, aquatic bed, rooted vascular.*
- E1AB5—Unknown aquatic bed; *subtidal, unknown submergent, excavated.*
- E1UBL—Water; *subtidal, unconsolidated bottom.*
- E1UBLx—Water; *subtidal, unconsolidated bottom, excavated.*
- E2AB1Ns—Water; *intertidal, aquatic bed, algal, regularly flooded, spoil.*
- E2EM1N—Low marsh; *intertidal, emergent, persistent, regularly flooded.*
- E2EM1Ns—Low marsh; *intertidal, emergent, persistent, regularly flooded, spoil.*
- E2EM1P—High marsh; *intertidal, emergent, persistent, irregularly flooded.*
- E2EM1Ps—High marsh; *intertidal, emergent, persistent, irregularly flooded, spoil.*
- E2RF2M—Reef; *intertidal, mollusk, irregularly exposed.*
- E2USN—Low flat; *intertidal, unconsolidated shore, regularly flooded.*
- E2USNs—Low flat on spoil; *intertidal, unconsolidated shore, regularly flooded, spoil.*
- E2USP—High flat; *intertidal, unconsolidated shore, irregularly flooded.*
- E2USPs—High flat on spoil; *intertidal, unconsolidated shore, irregularly flooded, spoil.*

**Lacustrine Environment**

- L1UBHx—Water; *limnetic, unconsolidated bottom, permanently flooded, excavated.*
- L2AB1hs—Aquatic bed; *littoral, algal, diked/impounded, spoil.*
- L2USKh—Water; *littoral, unconsolidated shore, artificially flooded, diked/impounded.*
- L2USKhs—Water; *littoral, unconsolidated bottom, artificially flooded, diked/impounded, spoil.*

**Marine Environment**

- M1UB—Water; *subtidal, unconsolidated bottom.*
- M2USN—Low shore; *intertidal, unconsolidated shore, regularly flooded.*
- M2USP—High shore; *intertidal, unconsolidated shore, regularly flooded.*

**Palustrine Environment**

- PAB4Fx—Aquatic bed; *floating vascular, semipermanently flooded, excavated.*
  - PAB4Khs—Aquatic bed; *floating vascular, artificially flooded, diked/impounded, spoil.*
  - PEM1A—Marsh; *emergent, persistent, temporarily flooded.*
  - PEM1Ad—Marsh; *emergent, persistent, temporarily flooded, partly drained/ditched.*
  - PEM1Ah—Marsh; *emergent, persistent, temporarily flooded, diked/impounded.*
  - PEM1Ahs—Marsh; *emergent, persistent, temporarily flooded, diked/impounded, spoil.*
  - PEM1Ax—Marsh; *emergent, persistent, temporarily flooded, excavated.*
  - PEM1C—Marsh; *emergent, persistent, seasonally flooded.*
  - PEM1Cd—Marsh; *emergent, persistent, seasonally flooded, partly drained/ditched.*
  - PEM1Ch—Marsh; *emergent, persistent, seasonally flooded, diked/impounded.*
  - PEM1Cx—Marsh; *emergent, persistent, seasonally flooded, excavated.*
  - PEM1F—Marsh; *emergent, persistent, semipermanently flooded.*
  - PEM1Fd—Marsh; *emergent, persistent, semipermanently flooded, drained/ditched.*
  - PEM1Fh—Marsh; *emergent, persistent, semipermanently flooded, diked/impounded.*
  - PEM1Fh—Marsh; *emergent, persistent, semipermanently flooded, diked/impounded, spoil.*
  - PEM1Khs—Marsh; *emergent, persistent, artificially flooded, diked/impounded spoil.*
  - PFO1A—Forested area; *broad-leaved deciduous, temporarily flooded.*
  - PFO1C—Forested area; *broad-leaved deciduous, seasonally flooded.*
  - PSS1A—Scrub-shrub area; *broad-leaved deciduous, temporarily flooded.*
  - PSS1Ah—Scrub-shrub area; *broad-leaved deciduous, temporarily flooded, diked/impounded.*
  - PSS1C—Scrub-shrub area; *broad-leaved deciduous, seasonally flooded.*
  - PUB—Water; *unconsolidated bottom.*
  - PUBFh—Water; *unconsolidated bottom, semipermanently flooded, diked/impounded.*
  - PUBHx—Water; *unconsolidated bottom, permanently flooded, excavated.*
  - PUBKh—Water; *unconsolidated bottom, artificially flooded, diked/impounded.*
  - PUBKhs—Water; *unconsolidated bottom, artificially flooded, diked/impounded spoil.*
  - PUS—Water; *unconsolidated shore.*
  - PUSCx—Flat; *unconsolidated shore, seasonally flooded, excavated.*
- Riverine Environment**
- R1UBV—Water; *tidal, unconsolidated bottom, permanently tidal.*
  - R2UBH—Water; *lower perennial, permanently flooded.*
  - R2UBHx—Water; *lower perennial, permanently flooded, excavated.*
- Uplands Environment**
- U1—Upland area; *fluvial-deltaic system; undivided levee and crevasse splay silt, mud, and sand; local, reworked land undivided.*
  - U2—Upland area; *fluvial-deltaic system; delta-plain mud and sand.*
  - U3—Upland area; *fluvial-deltaic system; fluvial sand and floodbasin mud.*
  - U4—Upland area; *barrier-strandplain system; barrier sand and silt.*
  - U5—Upland area; *barrier-strandplain system; eolian dominated; coppice dunes, foredunes, and blowouts; sand.*
  - Usp—Upland area; *undivided spoil, reworked spoil, made land, and reworked land.*
- Pleistocene**
- Qb1—Beaumont Formation; *delta-front sand and mud.*
  - Qb2—Beaumont Formation; *fluvial and distributary sand, silt, and clay.*

**Legend**

- Jetty
- UD—Developed upland area
- Gulf salt dome (approximate boundary)
- Normal fault; U = upthrown side, D = downthrown side
- Approximate fault; question mark where queried. U = upthrown side, D = downthrown side
- Tropical-storm washover channel
- Contact; dashed where approximate
- Railroad
- Road
- x<sup>4</sup> Elevation (ft)

Photography used in study was 0.5-m-pixel, color-infrared digital imagery photographed in 2001, 2008, and 2010. Previous regional maps that cover this area include the 1:125,000-scale *Environmental Geology, Bay City-Freepoint Sheet* (McGowen and others, 1976), the 1:125,000-scale map of *Distribution of Wetlands and Benthic Macroinvertebrates, Bay City-Freepoint Area* (White and others, 1988), and the 1:250,000-scale *Geologic Atlas of Texas Beeville-Bay City Sheet* (Aronow and others, 1975). Fault data from Paine (2010). Modern wetland geologic environments adapted from unpublished BEG data sets by W. A. White in 2002 and T. A. Tremblay in 2008. Terminology related to wetlands classification of geologic environments mapped after Cowardin and others (1979). Shoreline and dune mapping used 2010 photography as a base. Shoreline erosion rates adapted from Paine and others (2011). Digital files of topographic elevation points from Texas Natural Resources Information Services (TNRIS) for U.S. Geologic Survey 7.5-minute topographic quadrangle maps, Matagorda and Matagorda SW. Digital files of roads and railroads were also obtained through TNRIS. Photo preparation was by John T. Ames and David M. Stephens. Editing was by Lana Dieterich.

Edward W. Collins, Project Coordinator  
GIS data set coordinated by Thomas A. Tremblay  
Graphics by John T. Ames

**Selected References**

- Aronow, S., Brown, T. E., Brewton, J. L., Eargle, D. H., and Barnes, V. E., 1975 (revised 1987), *Beeville-Bay City Sheet*. The University of Texas at Austin, Bureau of Economic Geology Geologic Atlas of Texas, scale 1:250,000.
- Cowardin, L. M., Carter, B., Golet, F. C., and LaRoe, E. T., 1979, *Classification of wetlands and deepwater habitats of the United States*. U.S. Department of Interior, Fish and Wildlife Service, 131 p.
- McGowen, J. H., and Brewton, J. L., 1975, *Historical changes and related coastal processes*. Gulf and mainland shorelines, Matagorda Bay area, Texas. The University of Texas at Austin, Bureau of Economic Geology, 1 plate, 16 maps, 72 p.
- McGowen, J. H., Brown, L. F., Jr., Evans, T. J., Fisher, W. L., and Groat, C. G., 1976, *Environmental geologic atlas of the Texas Coastal Zone—Bay City-Freepoint area*. The University of Texas at Austin, Bureau of Economic Geology, scales 1:250,000 and 1:125,000, 98 p.
- Paine, J. G., 2010, *Geophysical imaging of possible faulted strata near Matagorda, Texas*. The University of Texas at Austin, Bureau of Economic Geology, contract report prepared for U.S. Department of Energy under award no. DE-FC02-06ER64298 through Tulane University grant TUL-558-07/08, 4 p.
- Paine, J. G., Mathew, S., and Caudle, T., 2011, *Texas Gulf shoreline change rates through 2007*. The University of Texas at Austin, Bureau of Economic Geology, report prepared under General Land Office contract no. 10-041-000-3737 and National Oceanic and Atmospheric Administration award no. NA06NO54160165, 38 p., 16 maps, 3 apps.
- White, W. A., Calnan, T. R., Morton, R. A., Kimble, R. S., Littleton, T. G., McGowen, J. H., and Nance, H. S., 1988, *Submerged lands of Texas, Bay City-Freepoint area*. sediments, geochemistry, benthic macroinvertebrates, and associated wetlands. The University of Texas at Austin, Bureau of Economic Geology, 130 p., 65 figs., 16 tables, 6 pls., 3 apps.



Well-developed low and high vegetated dunes landward of barrier, sparsely vegetated beach on Matagorda Peninsula.



Beaumont Formation deltaic sand and mud interbeds exposed in an excavation east of Matagorda.



Wetlands (marsh, wind-tidal flats, and open water) along main Matagorda fault, Matagorda Peninsula.