

CORE DISPLAY: Courtesy of the Bureau of Economic Geology, The University of Texas at Austin

Operator: Mobil

Lease: Lake Creek Unit #48

Formation: Wilcox

Depositional Environment: This formation primarily represents deltaic deposition

Field: Lake Creek Field (discovery well, February of 1941)

Production: Gas

In 1991 the Bureau of Economic Geology (as lead for the Secondary Gas Recovery Project) and Mobil obtained continuous cores from an interval of the Wilcox in the Lake Creek Unit No. 48 well for research purposes.

The map below shows the area of deposition of the Rockdale Delta System, preserved as the Eocene Wilcox Group. The Wilcox is the injection zone for the Salt Water Disposal Well (EVX Midstream near Waelder, TX) we are visiting and the interval of core you have displayed at this stop. The Wilcox deltas in the area of the Salt Water Disposal well and the ASR Project from Gonzales County are called the Guadalupe Deltas in reference to their proximity to the modern Guadalupe River. The Wilcox deltas in the area of the Lake Creek Unit #48 core are called the Brazos Deltas in reference to their proximity to the modern Brazos River. In the small inset map of Texas you can see that deposition of the Wilcox represents a large series of deltas along the coastline of Texas, which was further inland than the current shoreline. [Fisher, W. L., & McGowen, J. H. (1967). Depositional systems in the Wilcox Group of Texas and their relationship to occurrence of oil and gas.]

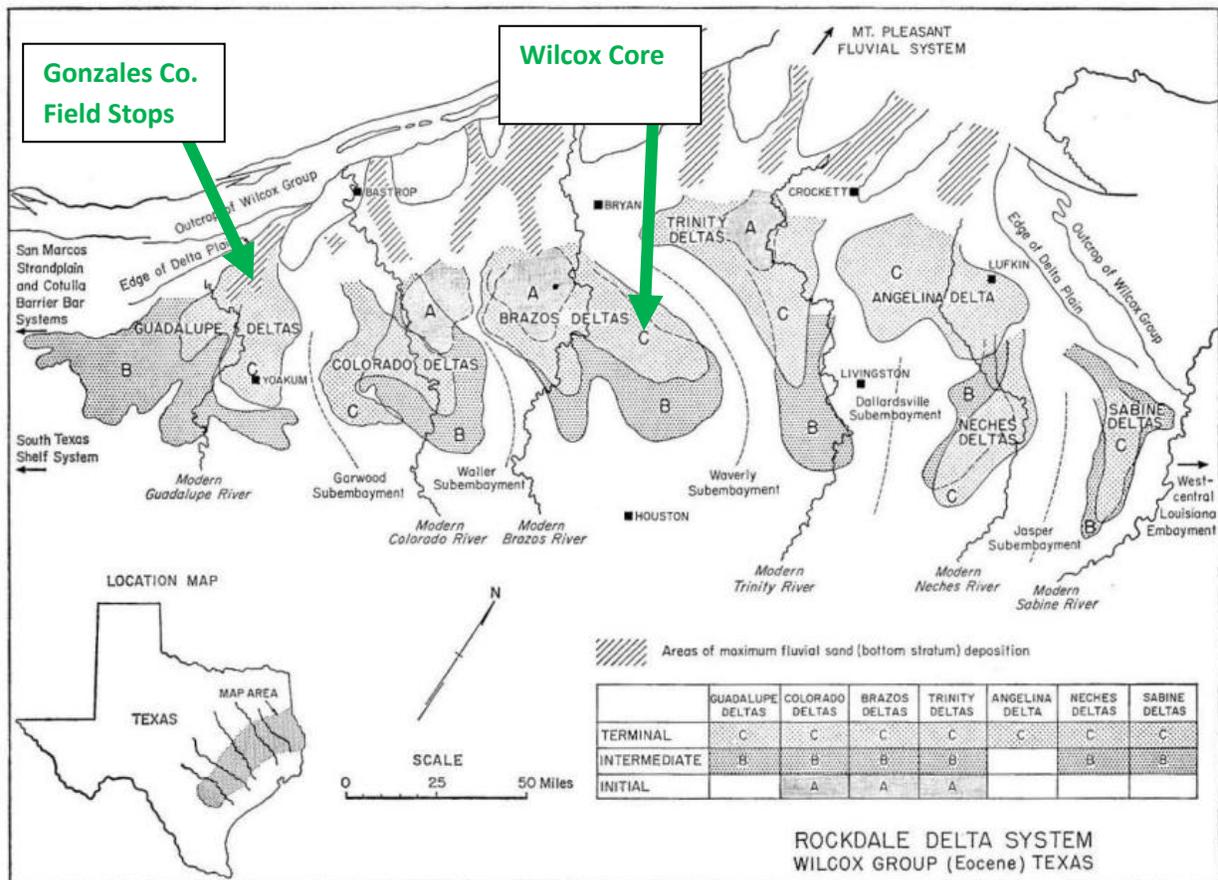
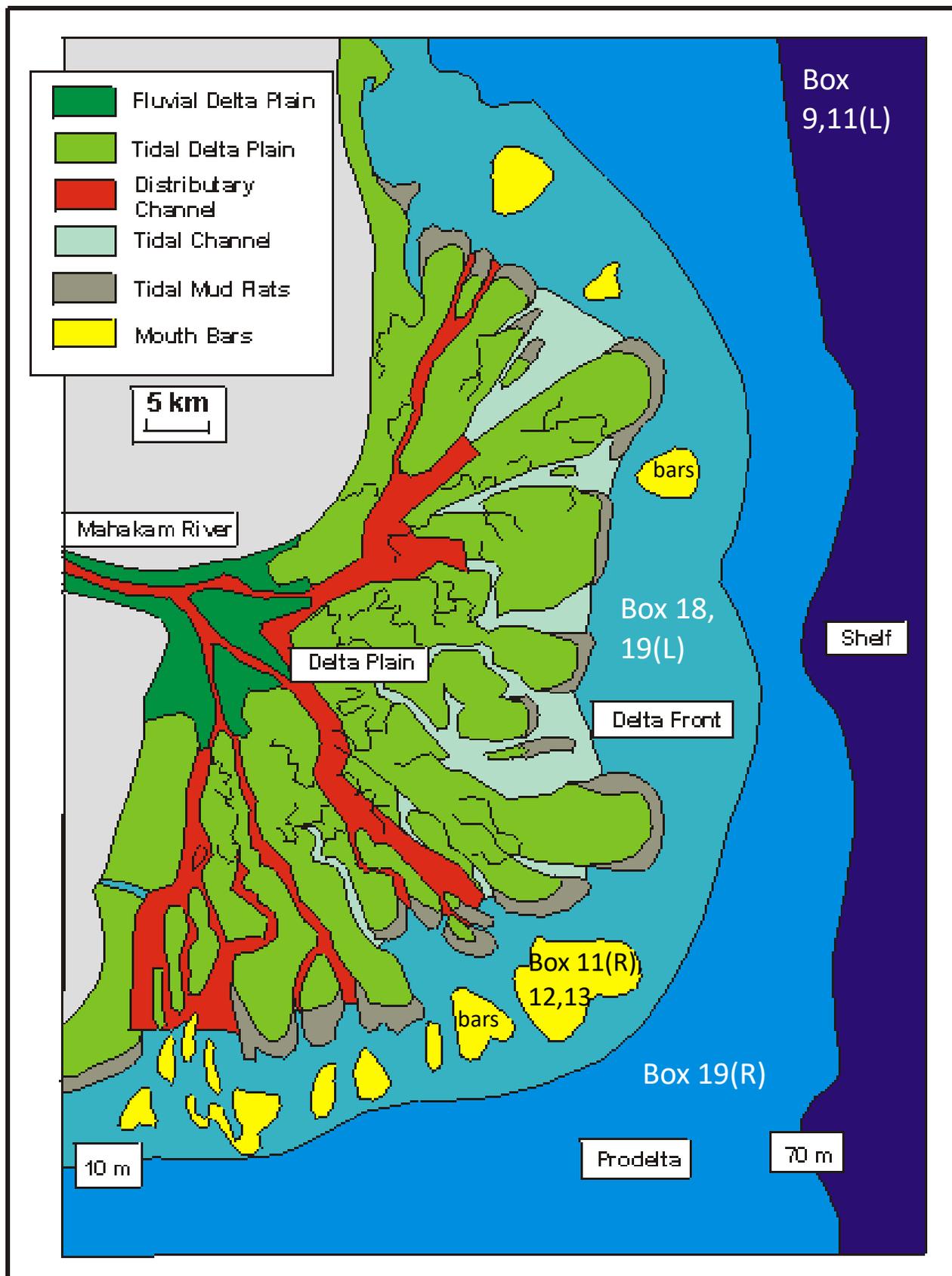


Figure 5. Distribution of principal deltas, Rockdale Delta System, Wilcox Group, Texas; lobal outline drawn at distal margin of delta front facies (For well control, see Fig. 1)

What are the features of a typical modern delta that serve as an analogy for the Eocene Wilcox deltas?

[Image: <http://fosi.iagi.or.id/mahakam/mah-facies.gif> (accessed: 3/22/2015)]



- **Shelf or Bay**
(seaward of or adjacent to the delta where facies are not much influenced by the delta, mixture of sand and mud, burrowing / bioturbation common, macrofossils such as mollusks may be present)
 - **Boxes 9 and 11 (left side)** are good examples.

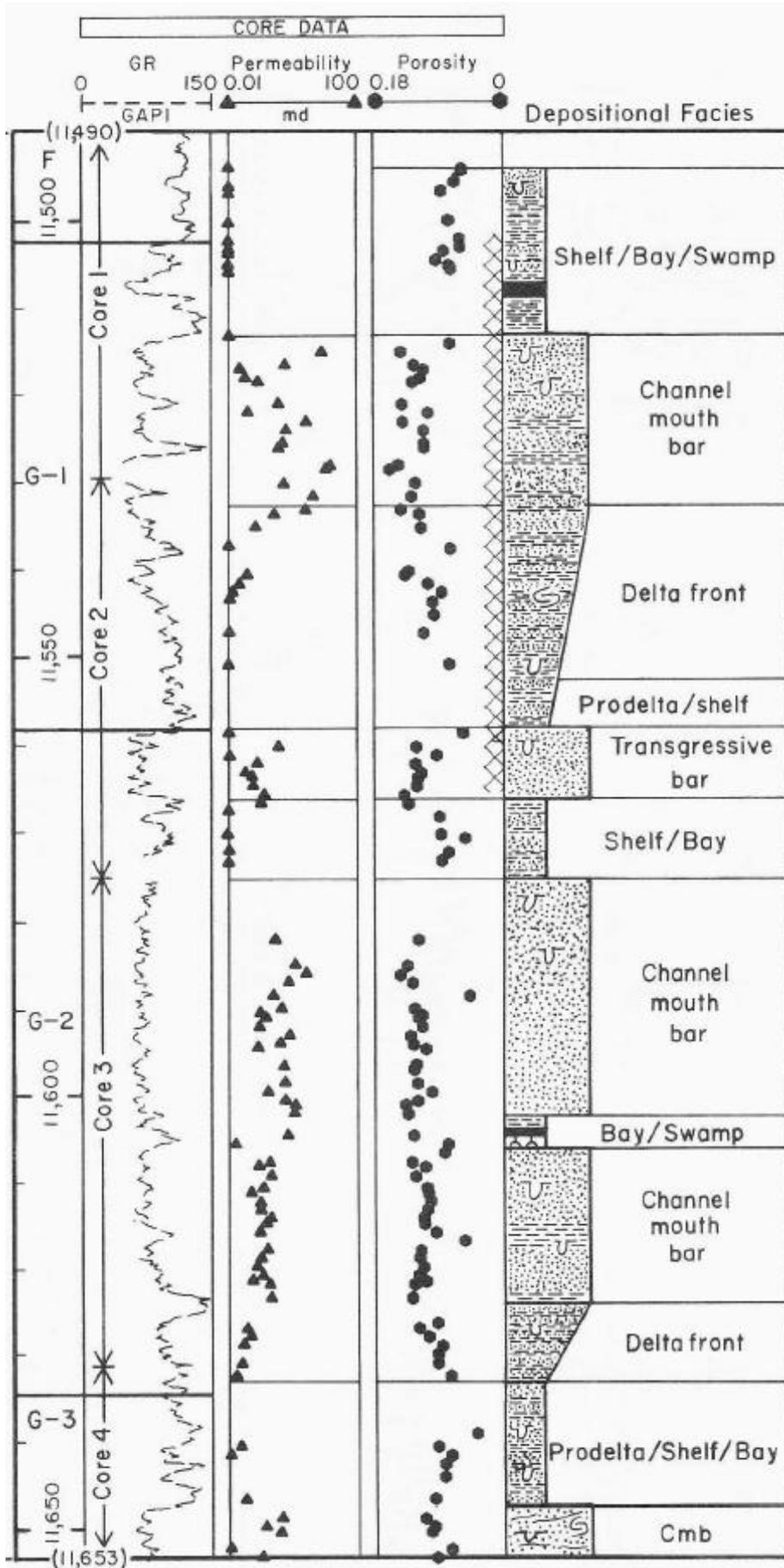
- **Prodelta**
(furthest regions influenced by the delta, where clays (terrigenous) are carried furthest out on the shelf and settle to the seafloor, forming mud deposits, burrowing / bioturbation may be present)
 - **Box 19 (right side)** is a good example.

- **Delta Front**
(area marking where the high energy river/channel systems meet the lower energy marine environment; receives the majority of coarse sediment as it settles where the energy of the two systems transition; high rates of sedimentation result in loading and deposition of underconsolidated sediments followed by sediment failure, such as slumping, folding, faulting; seaward inclined beds not uncommon)
 - **Boxes 18 and 19 (left side)** are good examples.

- **Mouth Bars or Channel Mouth Bars**
(coarse load of the river dropped in the Delta Front region immediately in front of the main channel or distributary channel; channel mouth bars are features within the delta front environment; may contain specific ichthnofacies related to sandy environments, such as *Ophiomorpha nodosa*, the trace of a burrowing shrimp)
 - **Boxes 11 (right side), 12 and 13** are good examples.

- **Delta Plain**
(region encompassing the main distributary channels branching out from the main river channel to form the upper part of the delta; regions between channels may contain mud flats, swamps, marshes – depending upon the specific deltaic setting)
 - **No examples shown**

- **Distributary Channel**
(one of many channels branching out from the main river channel to carry sediment (the bedload of the river) into the marine environment)
 - **No examples shown**



Box 9,

11(L)

Box 11(R),

12,

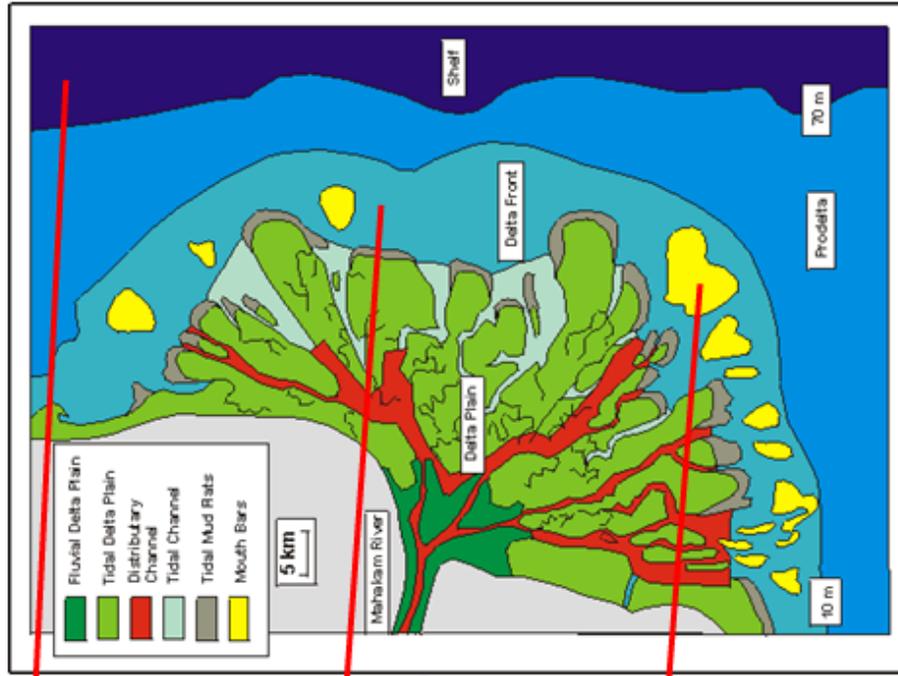
13

Box 18,

19(L)

Box 19(R)

Core measurements courtesy of
Dr. Hugh Daigle, UT Austin



11,503.6'

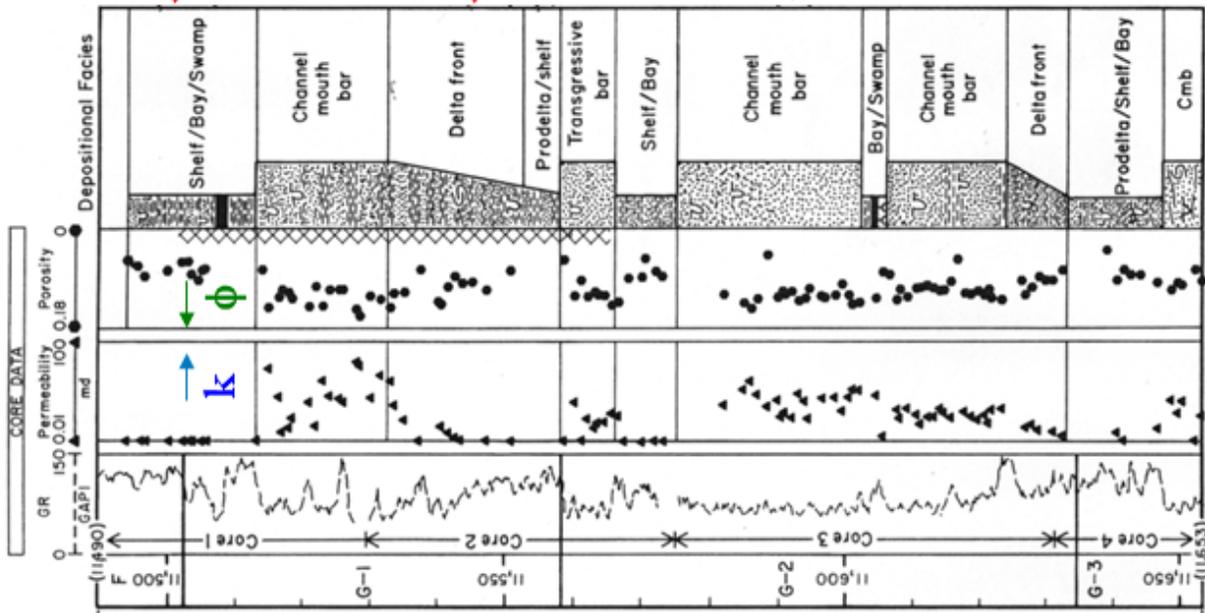
$\phi_T = 8.4\%$ $\phi_e = 5.6\%$
 $T_{2LM} = 8.5$ ms $k = 0.014$ mD

11,545.85'

$\phi_T = 11.1\%$ $\phi_e = 8.5\%$
 $T_{2LM} = 12.4$ ms $k = 0.093$ mD

11,591.4'

$\phi_T = 15.8\%$ $\phi_e = 15.0\%$
 $T_{2LM} = 63.5$ ms $k = 10.1$ mD



Which element of the delta has the best porosity?
Which element of the delta has the best permeability?

ϕ_e = porosity (effective) = storage of fluids as a % of the rock
 k = permeability = ease of flow in Darcies or milliDarcies (mD)