

**STATUS OF THE
CHICOT AQUIFER SYSTEM
IN SOUTHWESTERN LOUISIANA**
WITH EMPHASIS ON THE LAKE PEIGNEUR AREA

prepared by the
U.S. Geological Survey

August 4, 2010



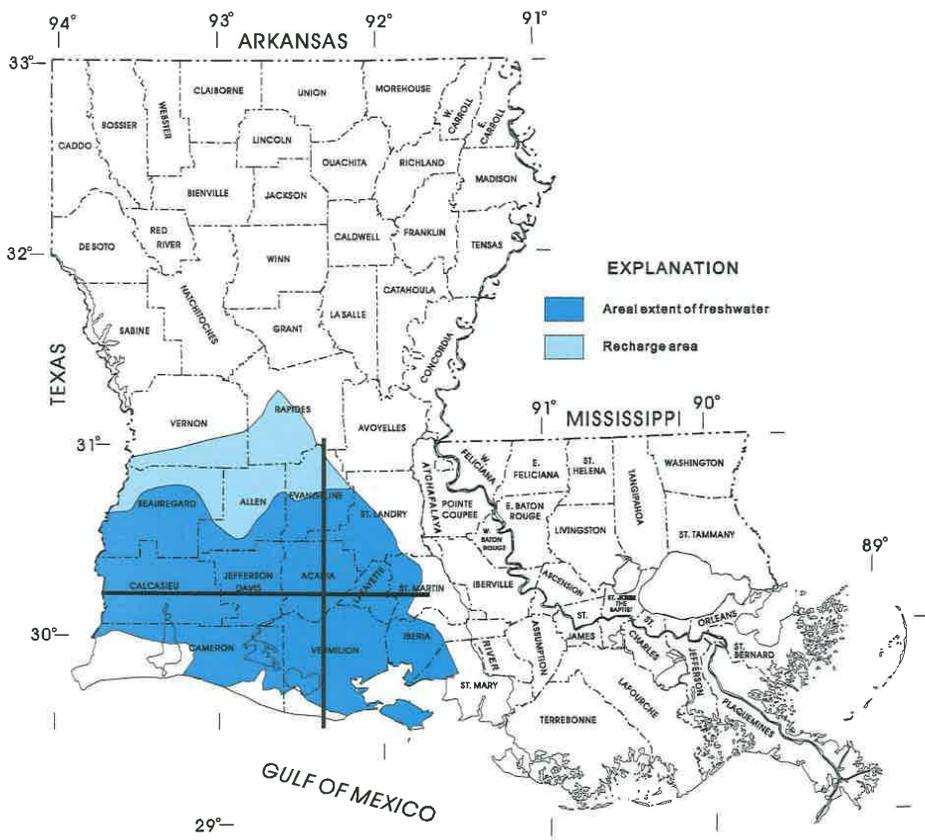
The USGS has not conducted any studies that were specifically designed to assess the affects of groundwater withdrawals at the Jefferson Island Storage Hub (JISH) facility.

The data presented herein are the results of monitoring and investigations that the USGS has conducted in southwestern Louisiana since the early 1900's. Most of the data are the result of cooperative partnerships with the following agencies and organizations:

- Louisiana Department of Transportation and Development
- LSU AgCenter
- Louisiana Rice Research Board
- Calcasieu Parish Police Jury

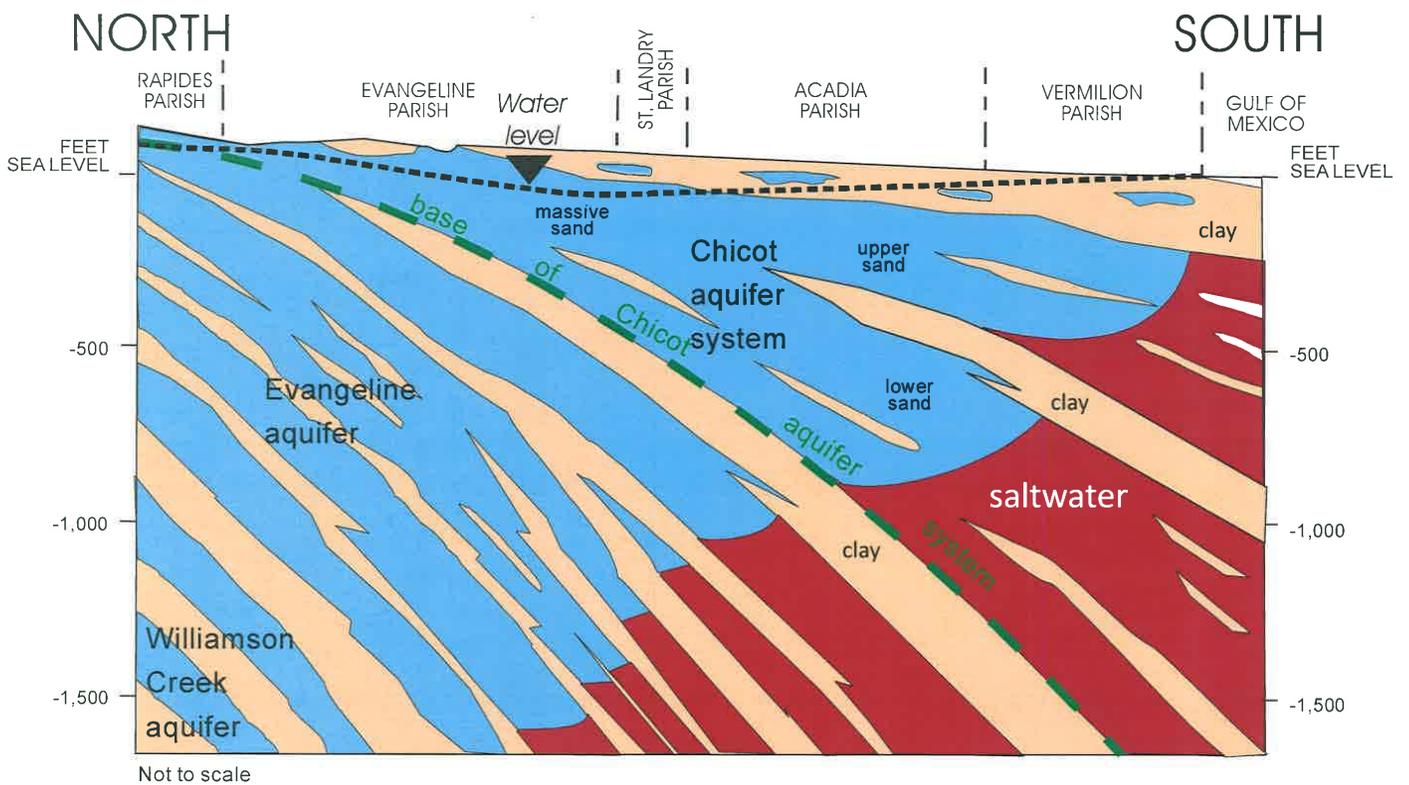


Chicot aquifer system



(modified from Smoot, 1986)

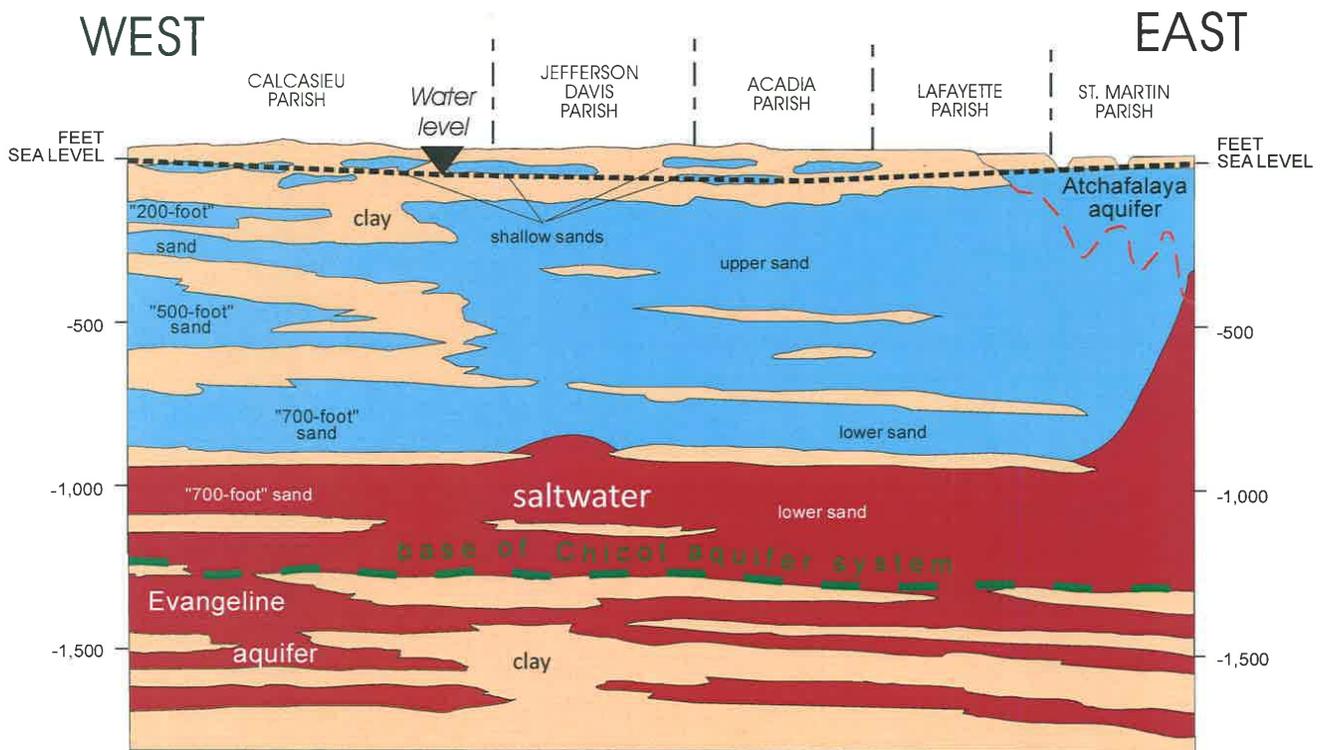




Idealized north-south cross-section of the Chicot aquifer system.

(modified from Nyman, 1984)





Not to scale
Trace of sections shown on figure 1

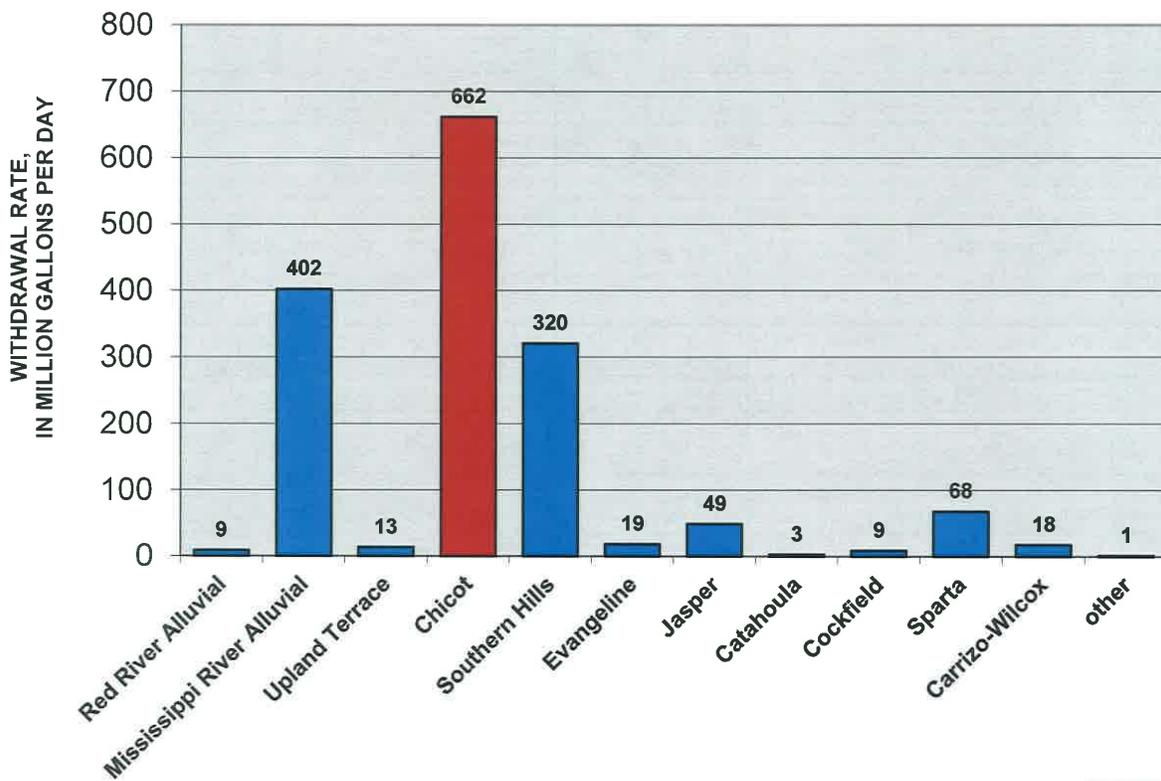


(modified from Nyman, 1984)

PROBLEMS/CONCERNS

- Ground-water withdrawals are lowering water levels in some areas of the Chicot aquifer system.
- In certain areas, these withdrawals are creating conditions favorable for saltwater encroachment.
- Water-level declines and saltwater encroachment have not been problems in the Lake Peigneur area.

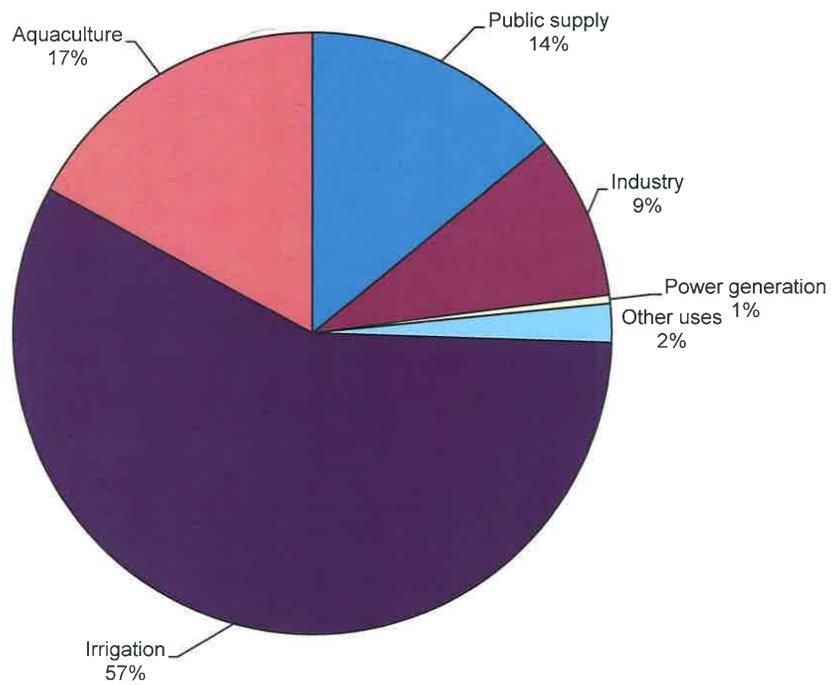
PUMPAGE BY MAJOR AQUIFER OR AQUIFER SYSTEM, 2005



(source: Sargent, 2007)



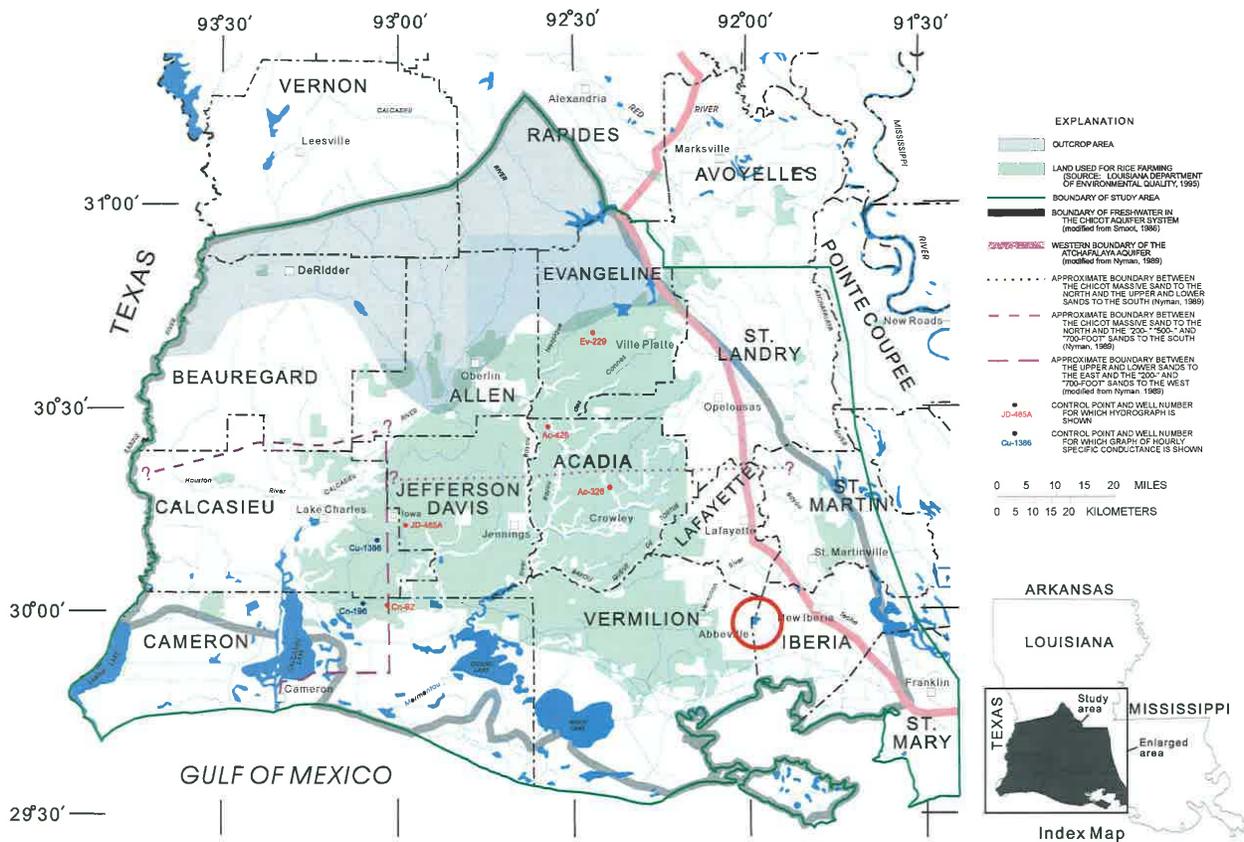
WITHDRAWALS FROM THE CHICOT AQUIFER SYSTEM, 2005 (660 MILLION GALLONS PER DAY)



(source: Sargent, 2007)

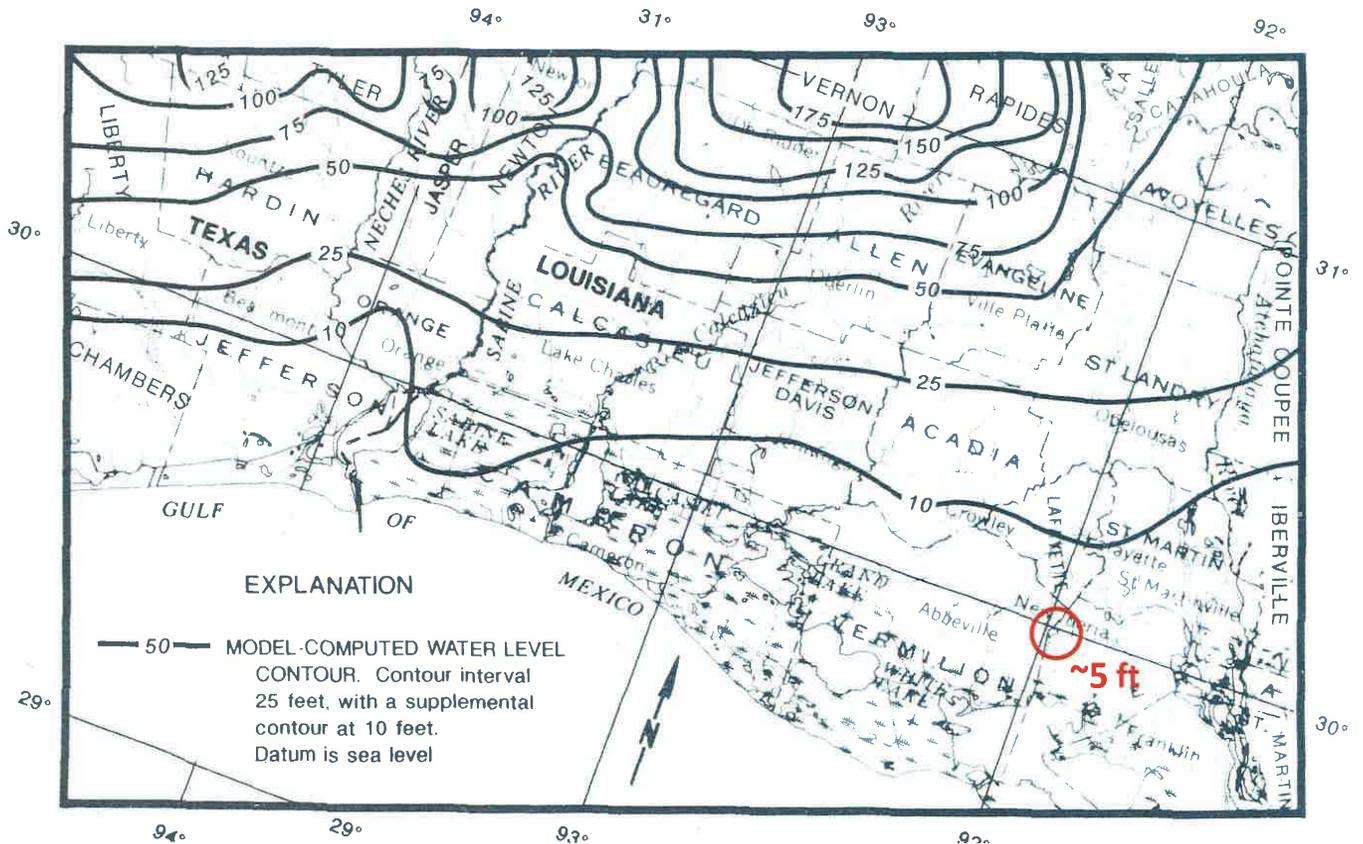
Rebound in Chicot





Freshwater extent of the Chicot aquifer system and land used for rice-farming in southwestern Louisiana.

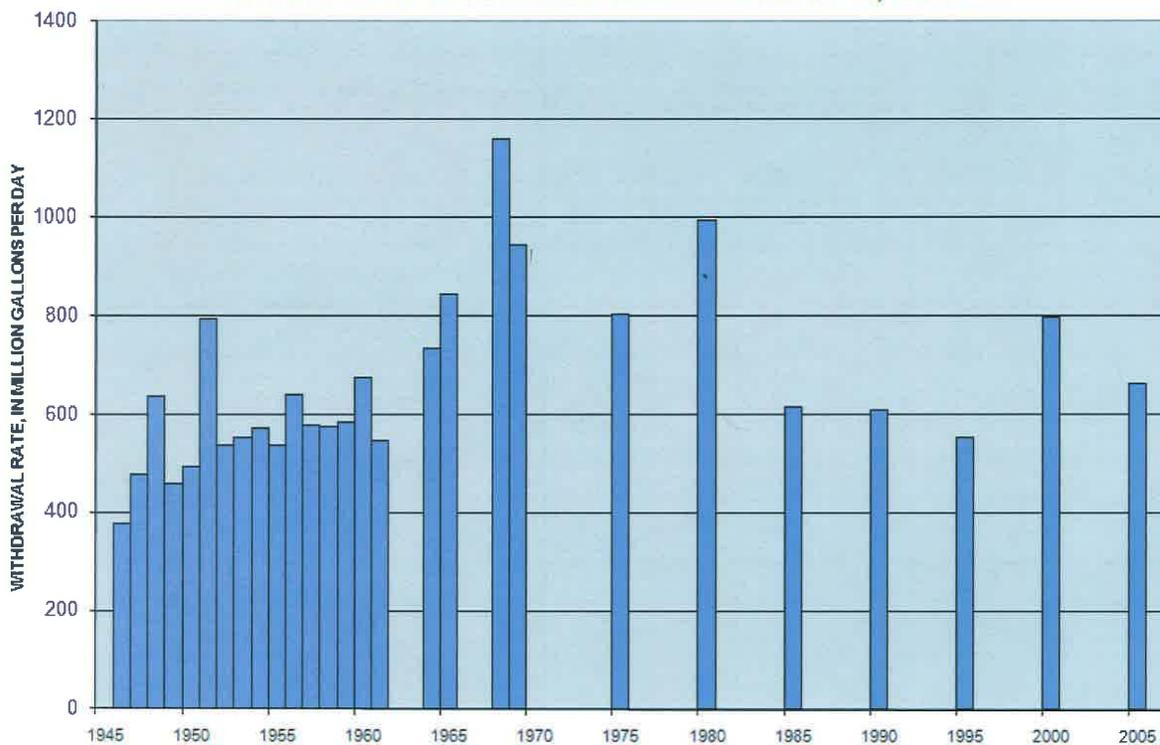




A model-computed potentiometric surface of the Chicot aquifer system indicates that the water level in the Lake Peigneur area was about 5 ft above sea level in 1990 prior to development (source: Nyman and others, 1990).

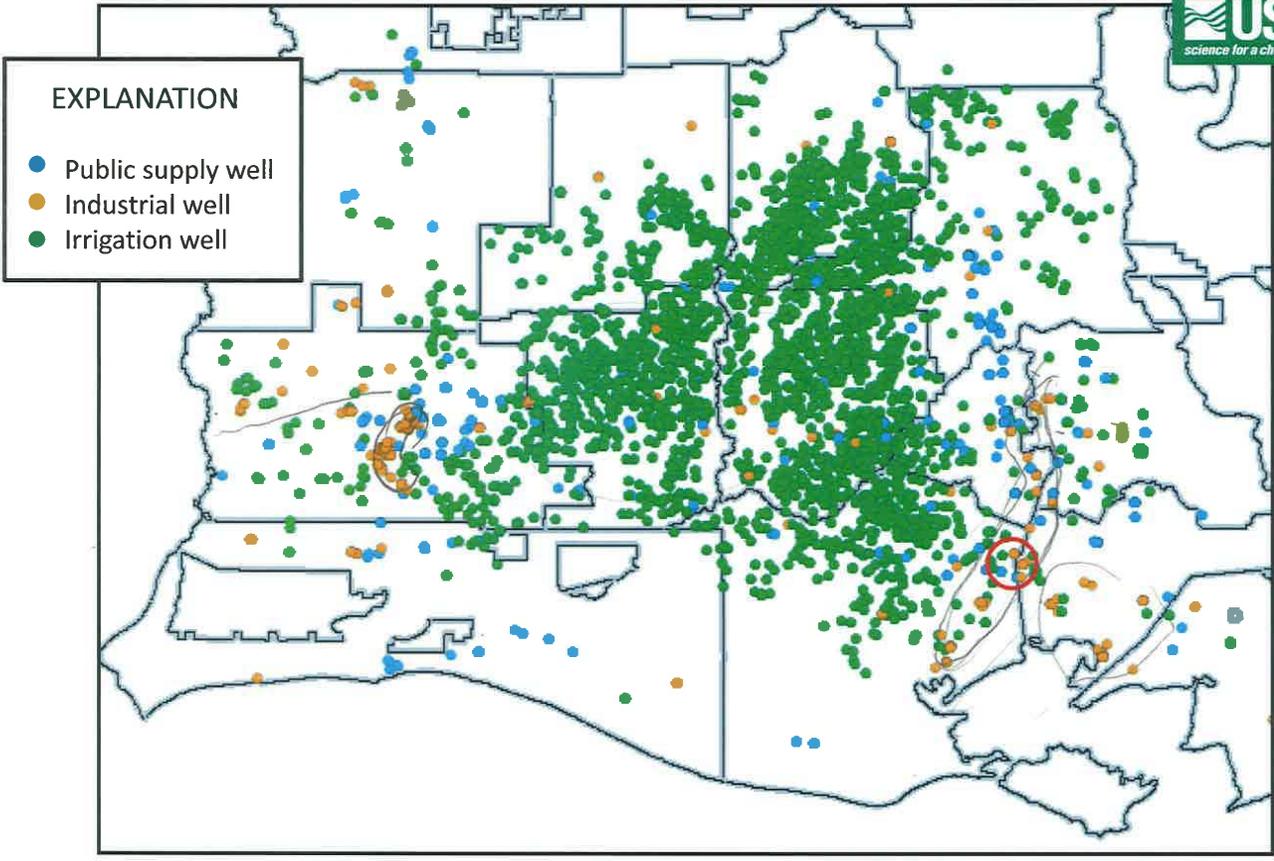


WITHDRAWALS FROM THE CHICOT AQUIFER SYSTEM, 1946-2005

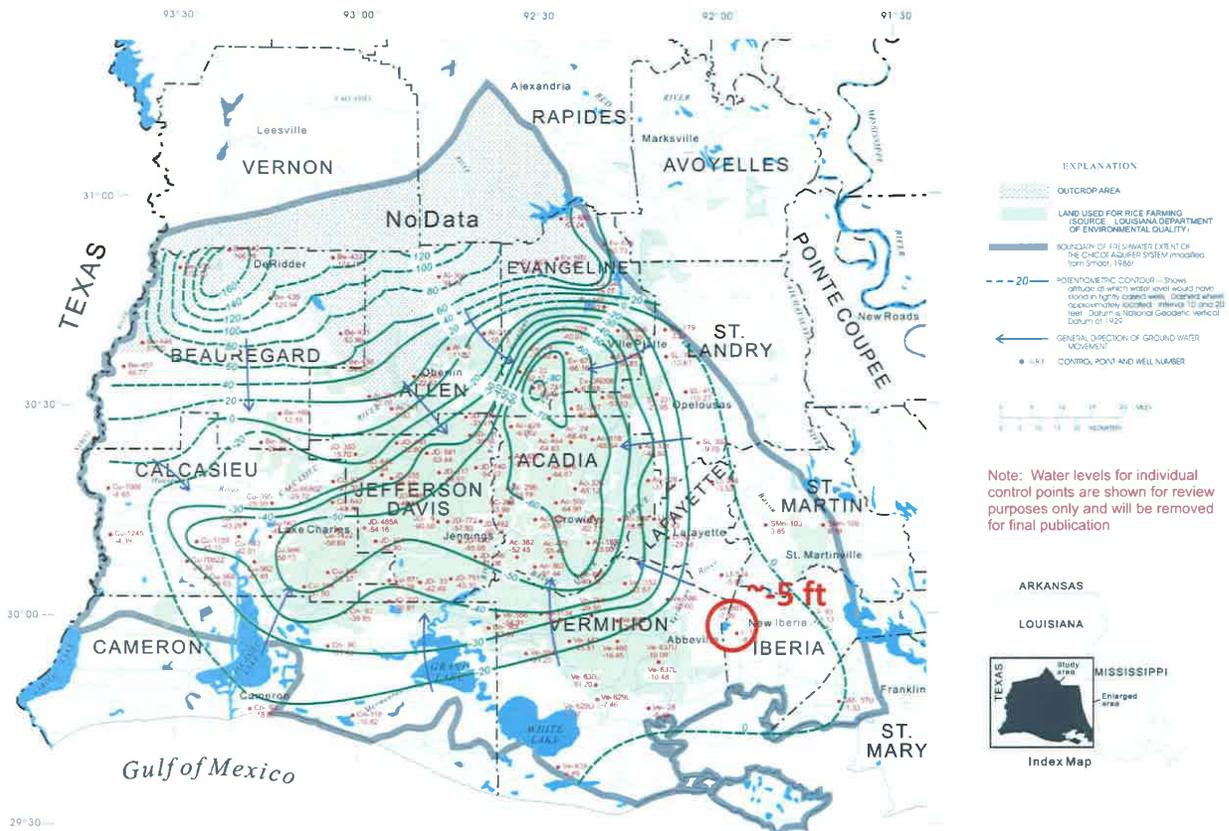


Withdrawals from the Chicot aquifer system peaked in the 1970's. Withdrawals in Iberia, Lafayette, and Vermilion Parishes have followed a similar trend, although withdrawals for public supplies at Lafayette have now exceeded their 1970's levels (source: Nyman and others, 1990; Sargent, 2007).



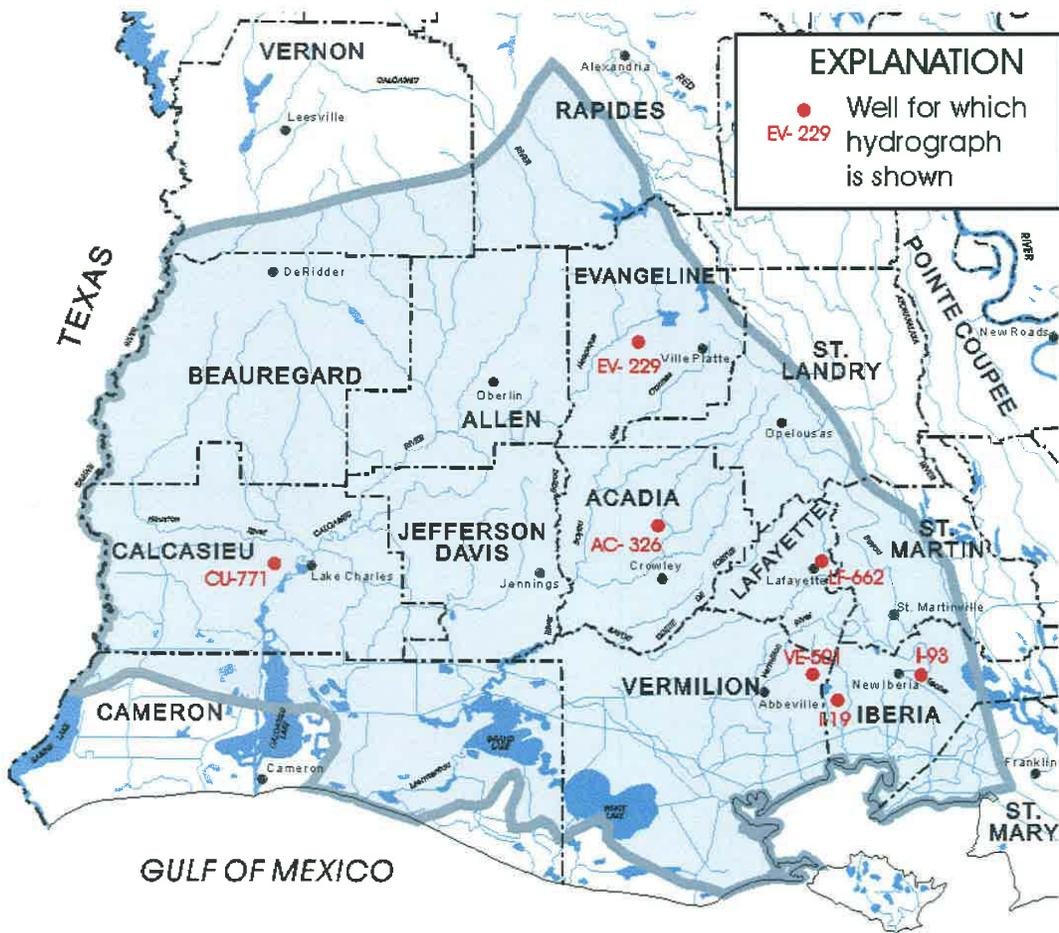


Locations of 3,090 registered currently-active large-capacity (casing size ≥ 10 inches and yield typically 1,500 – 2,500 gpm [2 – 3 MGD]) wells in the Chicot aquifer system in Louisiana (source: LaDNR SONRIS database).



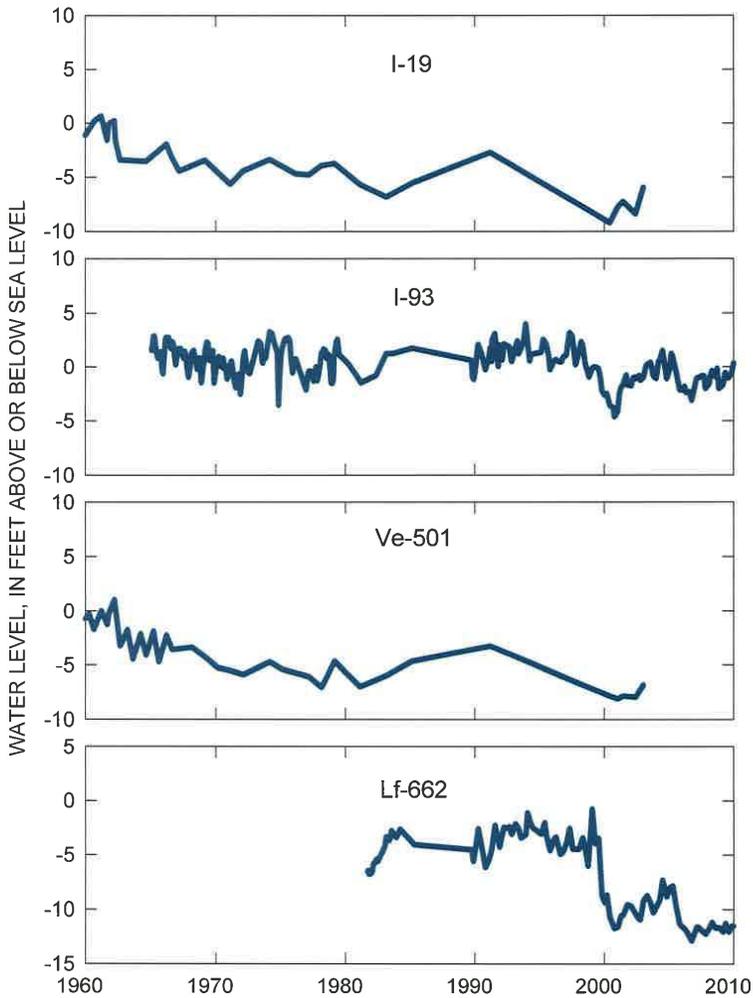
Water levels in the Chicot aquifer system, June 2002. Water levels across much of Acadia, Evangeline, and Jefferson Davis Parishes have declined 75 to 120 ft since 1900. Water levels in the Lake Peigneur area have declined 10 to 15 ft since 1900 (map source: Lovelace and others, 2004).





Locations of wells for which hydrographs are shown to depict water-level changes from 1960 to 2010 in the upper and 200-ft sands of the Chicot aquifer system.





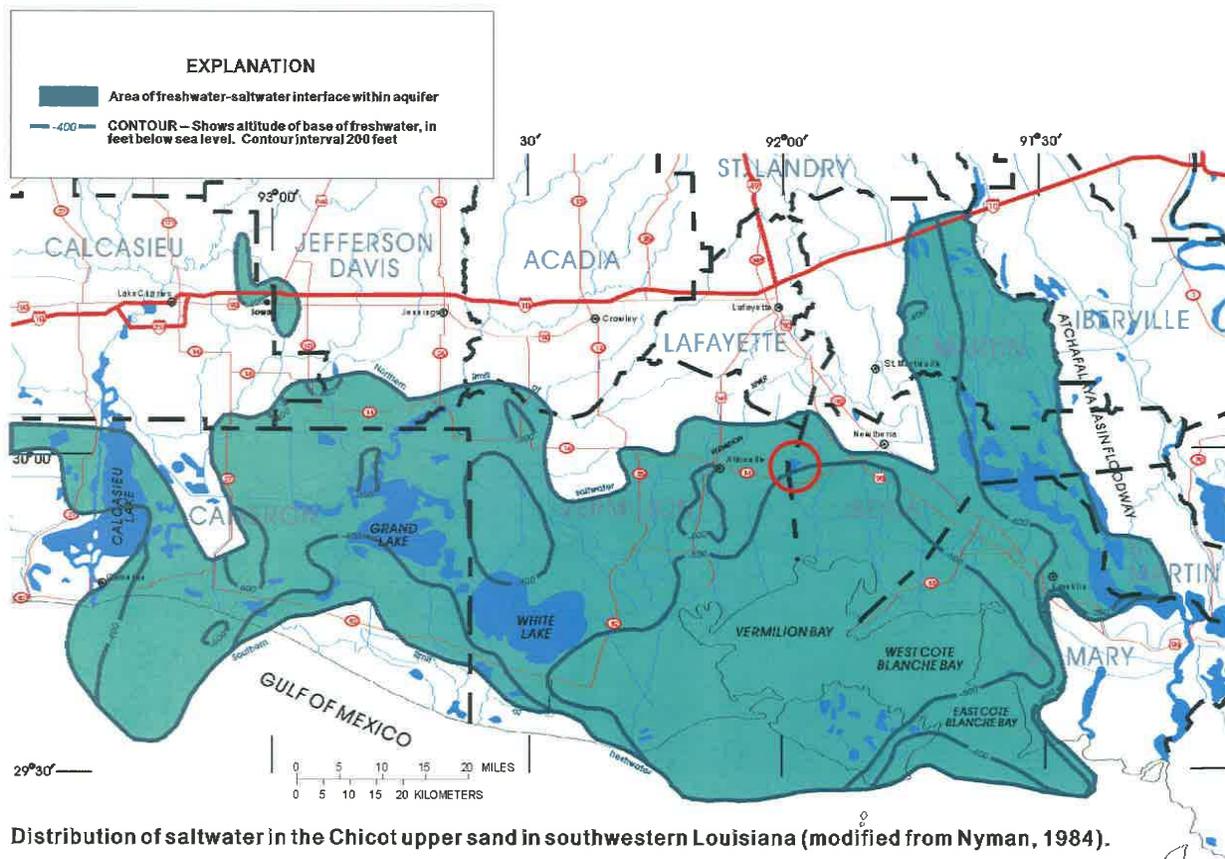
In 2005, withdrawals from the Chicot aquifer were 2.1 Mgal/d at Abbeville, 6.5 Mgal/d at New Iberia, and 21 Mgal/d at Lafayette. The long-term, sustained pumping at these cities has had not resulted in large cones of depression in the aquifer in these areas.

Water levels at wells Lf-662 and I-93 near pumping centers in Lafayette and New Iberia and at wells I-19 and Ve-501 near Lake Peigneur declined less than 10 ft from 1960-2010 (source: <http://waterdata.usgs.gov/la/nwis/gw/>).



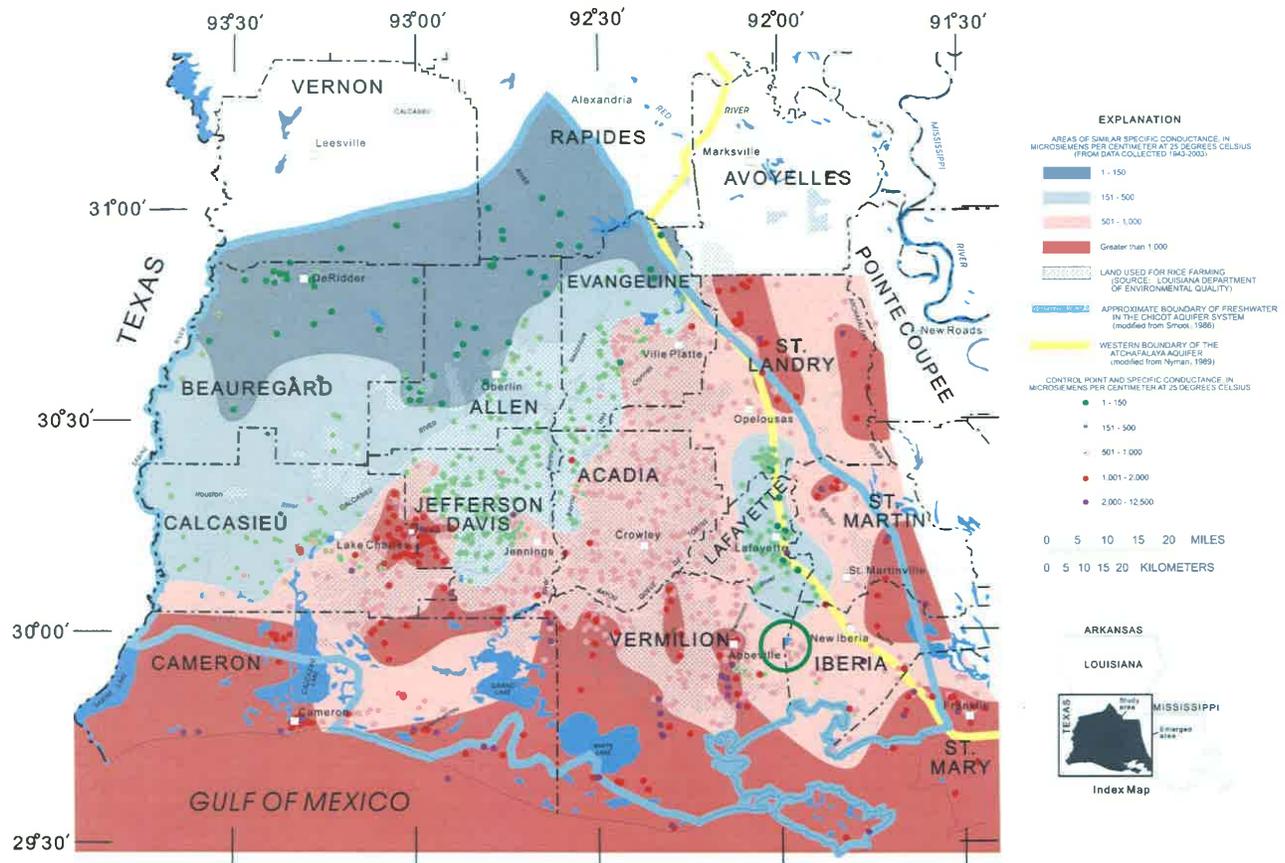
SALTWATER IN THE CHICOT AQUIFER SYSTEM

- Saltwater extends inland from coastal areas as a thinning wedge along the base of the Chicot aquifer system. Heavy pumping could induce movement of saltwater laterally northward or upward from deeper sands (upconing) in some areas.
- Saltwater encroachment is most notable along the Cameron and Calcasieu Parish border where heavy pumping in the Lake Charles area has caused northward encroachment of saltwater.
- Saltwater upconing from deeper sands also has occurred at wells in the Lake Charles area.
- There is little evidence that wide-spread encroachment or upconing is occurring in other areas of the Chicot aquifer system.
- Saltwater also is present in the shallow and upper sands in an irregular area along the Vermilion River south of Abbeville, but there is no evidence that the saltwater is moving.



The base of freshwater is about 600 ft below sea level in the Lake Peigneur area and upward movement or “upconing” of saltwater is unlikely to occur.

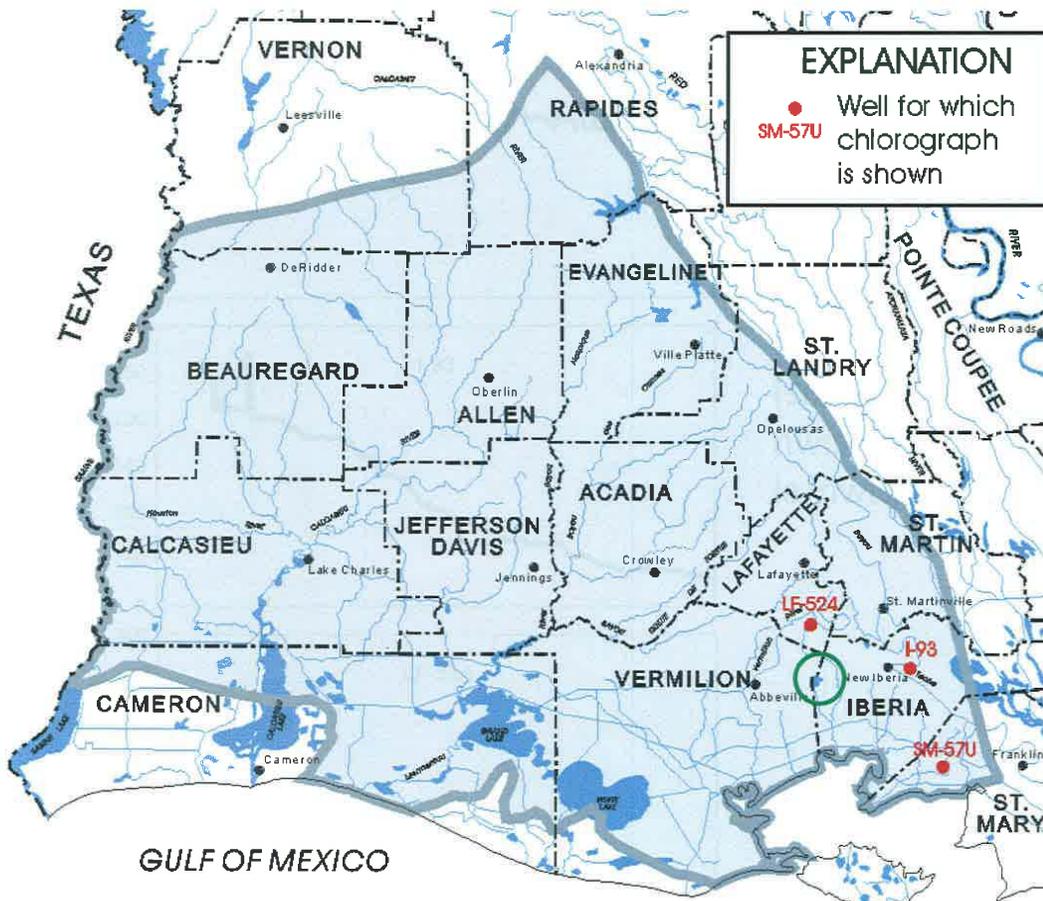




Map credit: Modified from Official Map of Louisiana, Louisiana Department of Transportation and Development, 1986

Specific conductance, an indicator of saltwater, generally ranges from 500 to 1,000 uS/cm (~ 25-60 mg/L chloride) in the upper sand of the Chicot aquifer in and around the Lake Peigneur area (source: Lovelace and others, 2004).





Locations of wells for which chlorographs are shown to depict saltwater movement (or the lack thereof) in the upper sand of the Chicot aquifer system in the Lake Peigneur area.

SUMMARY

- Large amounts of fresh groundwater are available from the Chicot aquifer system in the Lake Peigneur area.
- Since 1900, water-levels have declined more than 100 ft in some areas, but only 10 to 15 feet in the Lake Peigneur area.
- Saltwater encroachment has not been an issue in the Lake Peigneur area.

For more information on ground-water
conditions in Louisiana, visit the USGS
Louisiana District web site at:

la.water.usgs.gov

or contact John Lovelace by phone at (225)
389-0281 ext. 3210 or by email to
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