GROUNDWATER STATUS IN LOUISIANA

prepared by the

U.S. Geological Survey

February 5, 2009

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COOPERATIVE PARTNERSHIPS

- Louisiana Department of Transportation and Development
- Capital Area Ground Water Conservation Commission
- Louisiana Department of Natural Resources
- Sparta Ground Water Conservation Commission
- U.S. Army at Fort Polk

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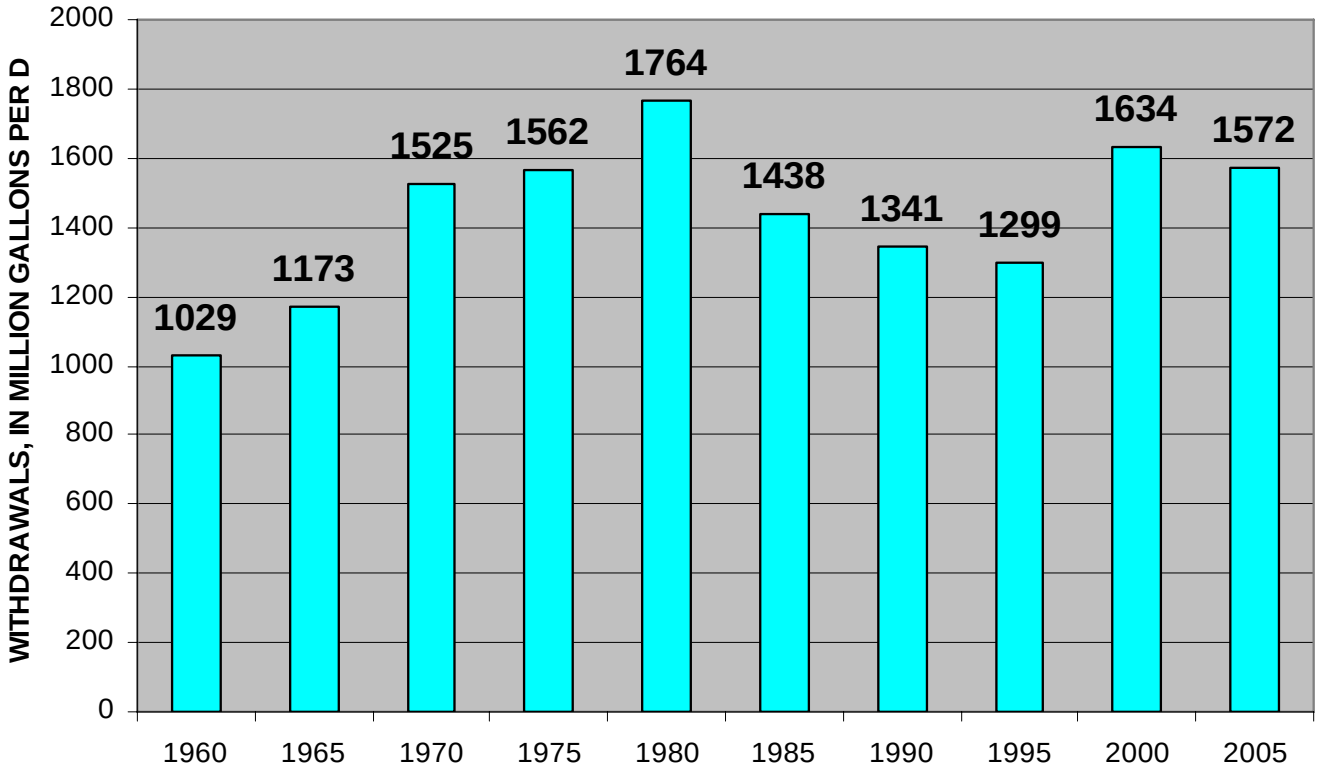
GROUND-WATER WITHDRAWALS IN LOUISIANA, 1960-2005



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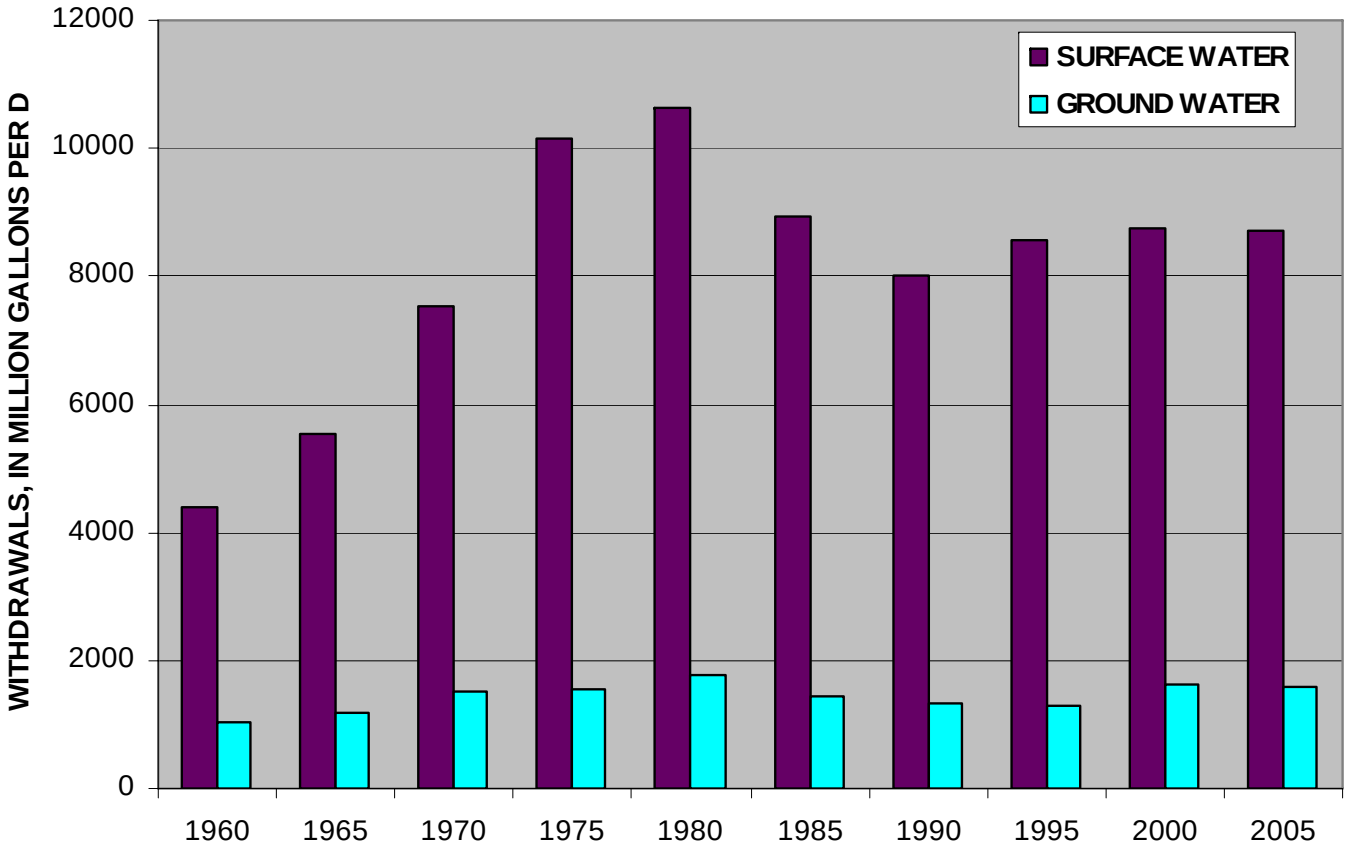
WATER WITHDRAWALS IN LOUISIANA, 1960-2005



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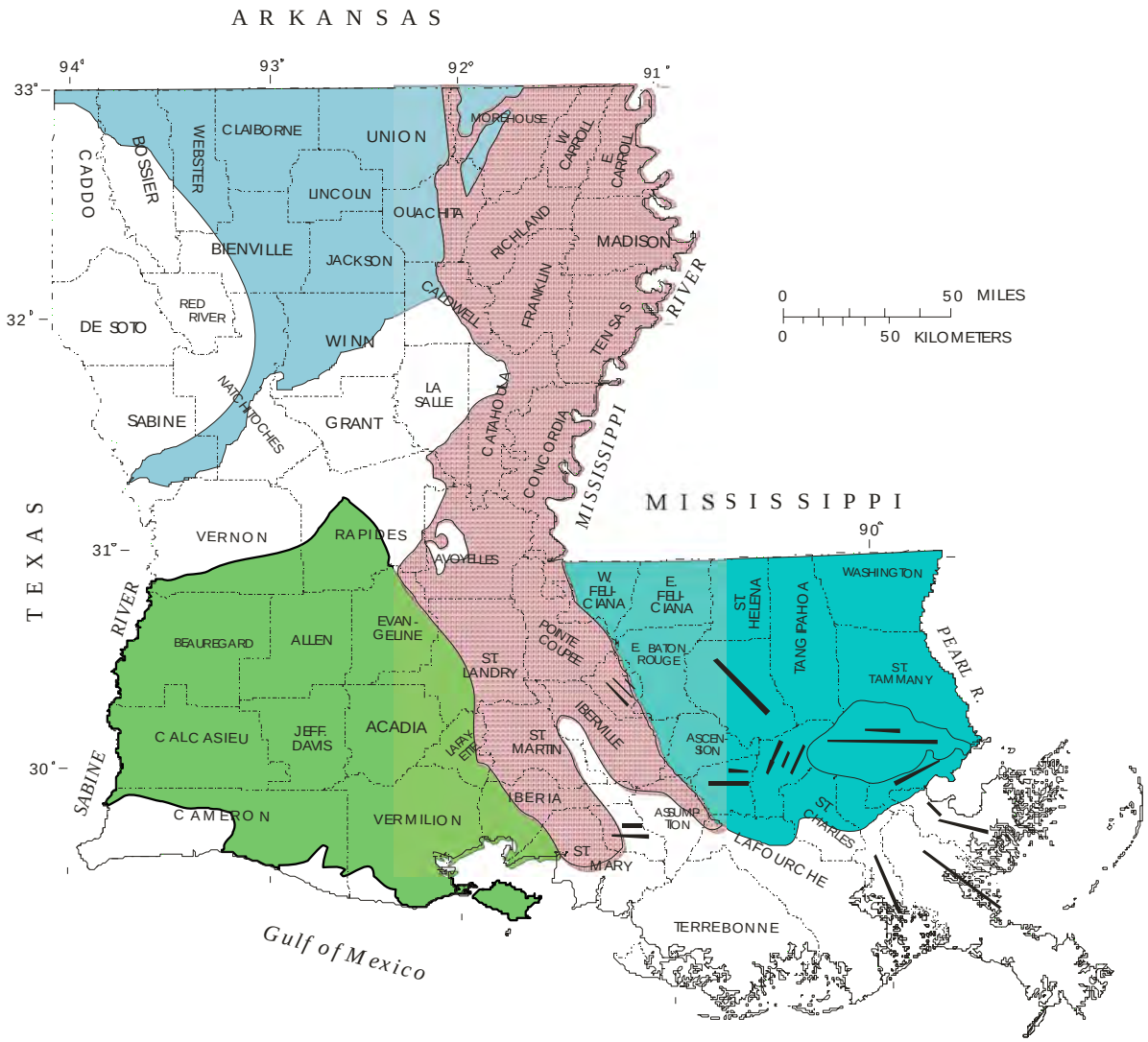
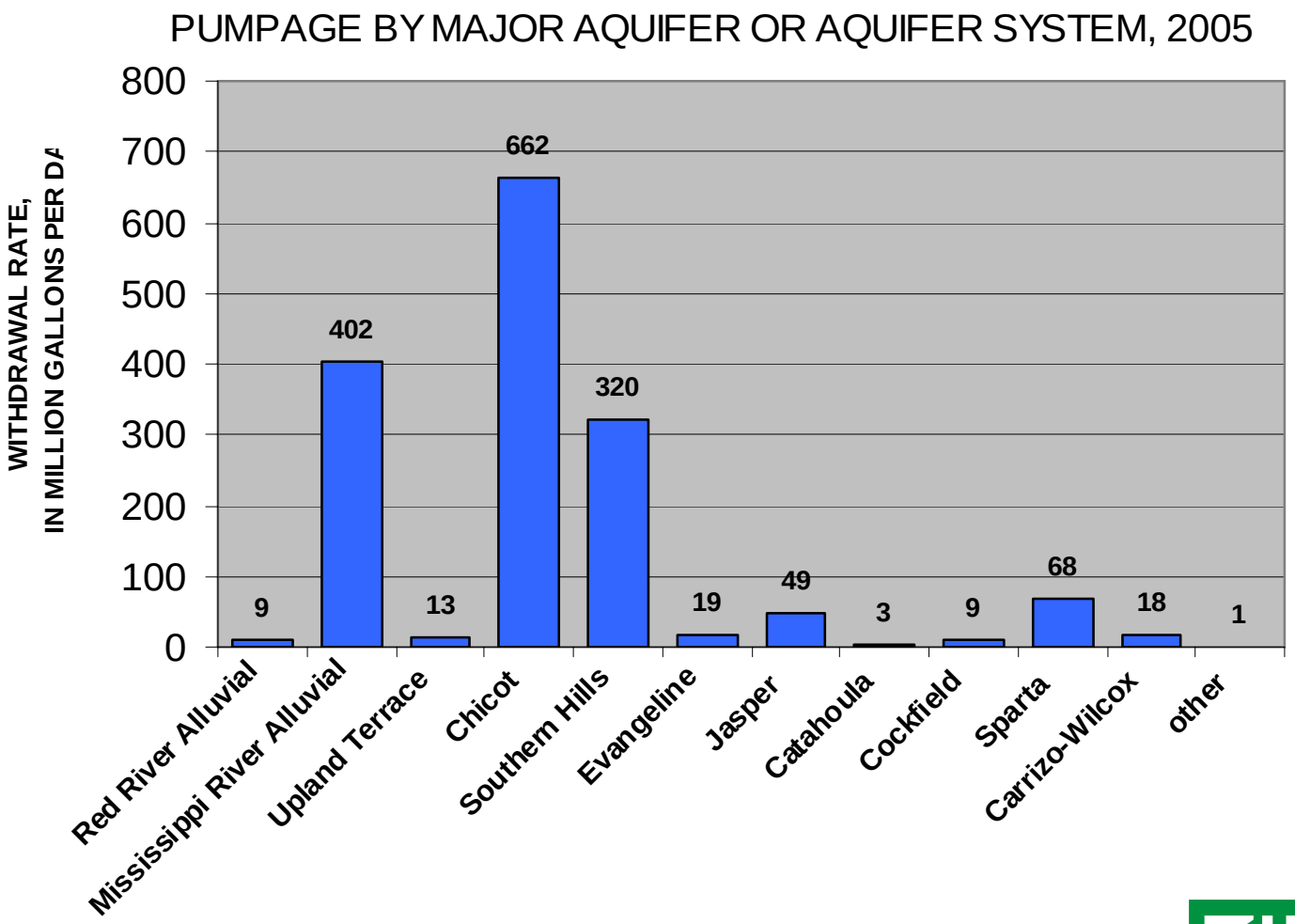


EXPLANATION

SELECTED AQUIFERS AND AQUIFER SYSTEMS:

- SPARTA AQUIFER
- MISSISSIPPI RIVER ALLUVIAL AQUIFER
- CHICOT AQUIFER SYSTEM
- SOUTHERN HILLS AQUIFER SYSTEM



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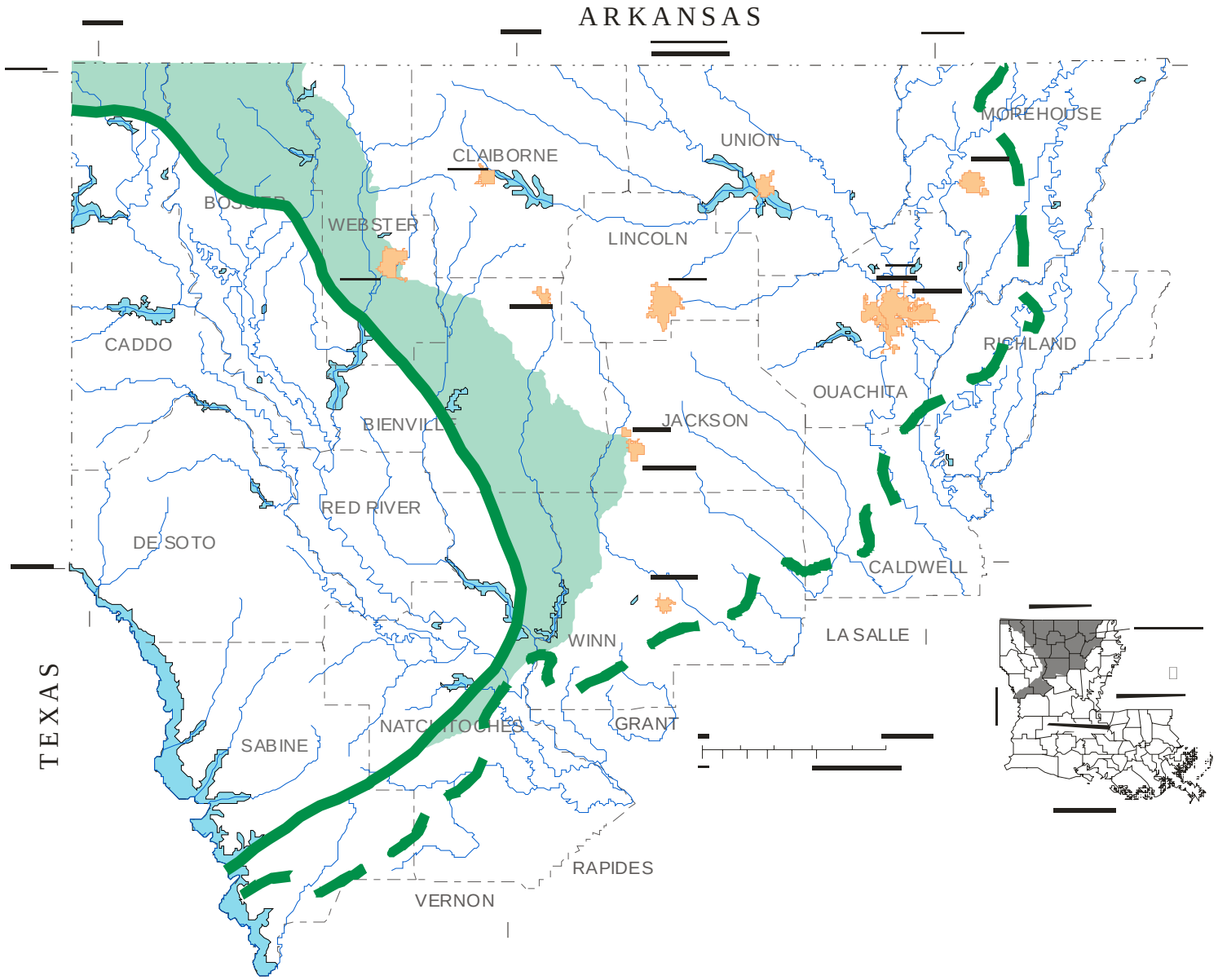
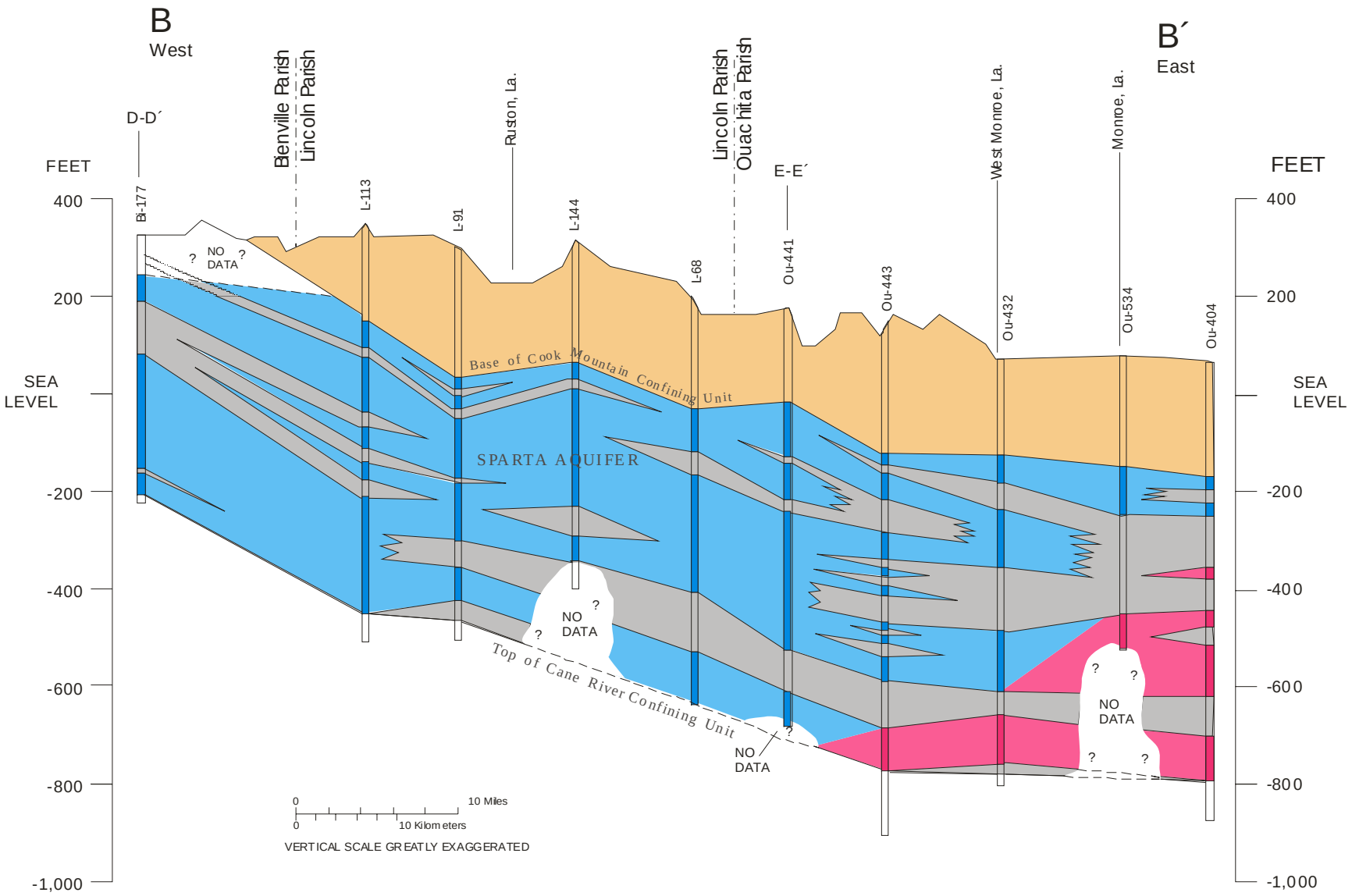
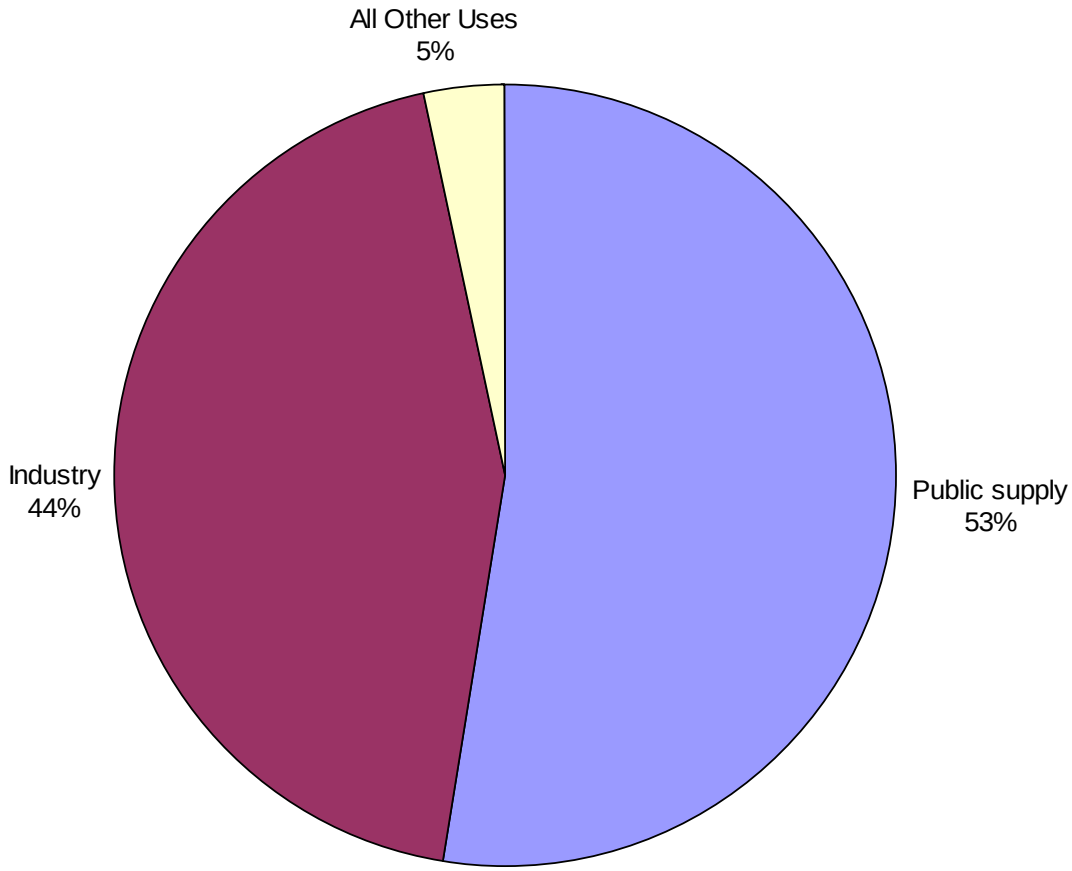
Freshwater extent of the Sparta aquifer in north Louisiana




B
West
B´
East
D-D´
E-E´
Benville Parish
Lincoln Parish
Lincoln Parish
Ouachita Parish
Ruston, La.
West Monroe, La.
Monroe, La.
Bi-177
L-113
L-91
L-144
L-68
Ou-441
Ou-443
Ou-432
Ou-534
Ou-404
FEET
400
200
SEA LEVEL
-200
-400
-600
-800
-1,000
? NO DATA ?
Base of Cook Mountain Confining Unit
SPARTA AQUIFER
? NO DATA ?
Top of Cane River Confining Unit
? NO DATA ?
? NO DATA ?
0
10 Miles
0
10 Kilometers
VERTICAL SCALE GREATLY EXAGGERATED

WITHDRAWALS FROM THE SPARTA AQUIFER IN LOUISIANA, 2005
(68 MILLION GALLONS PER DAY)



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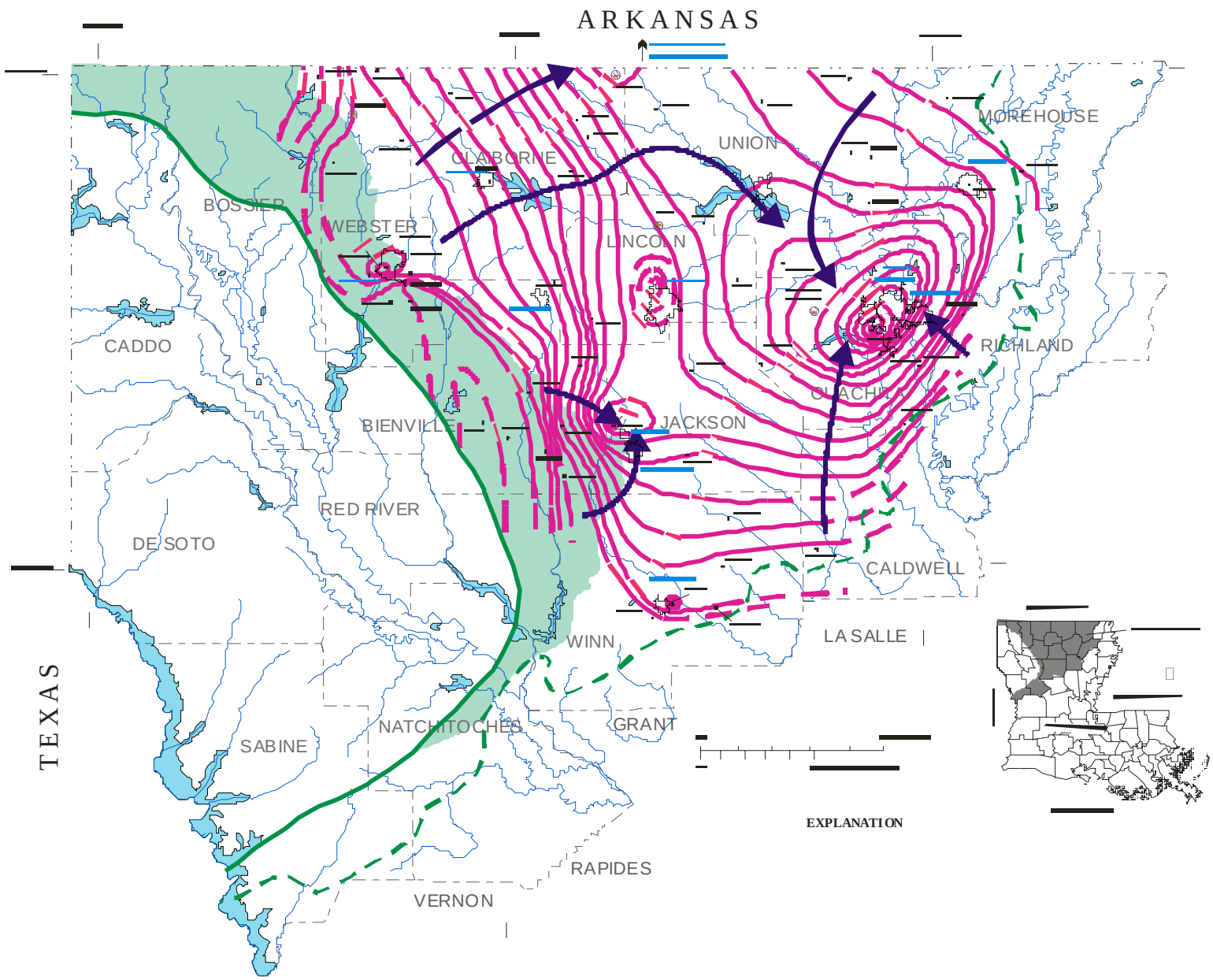
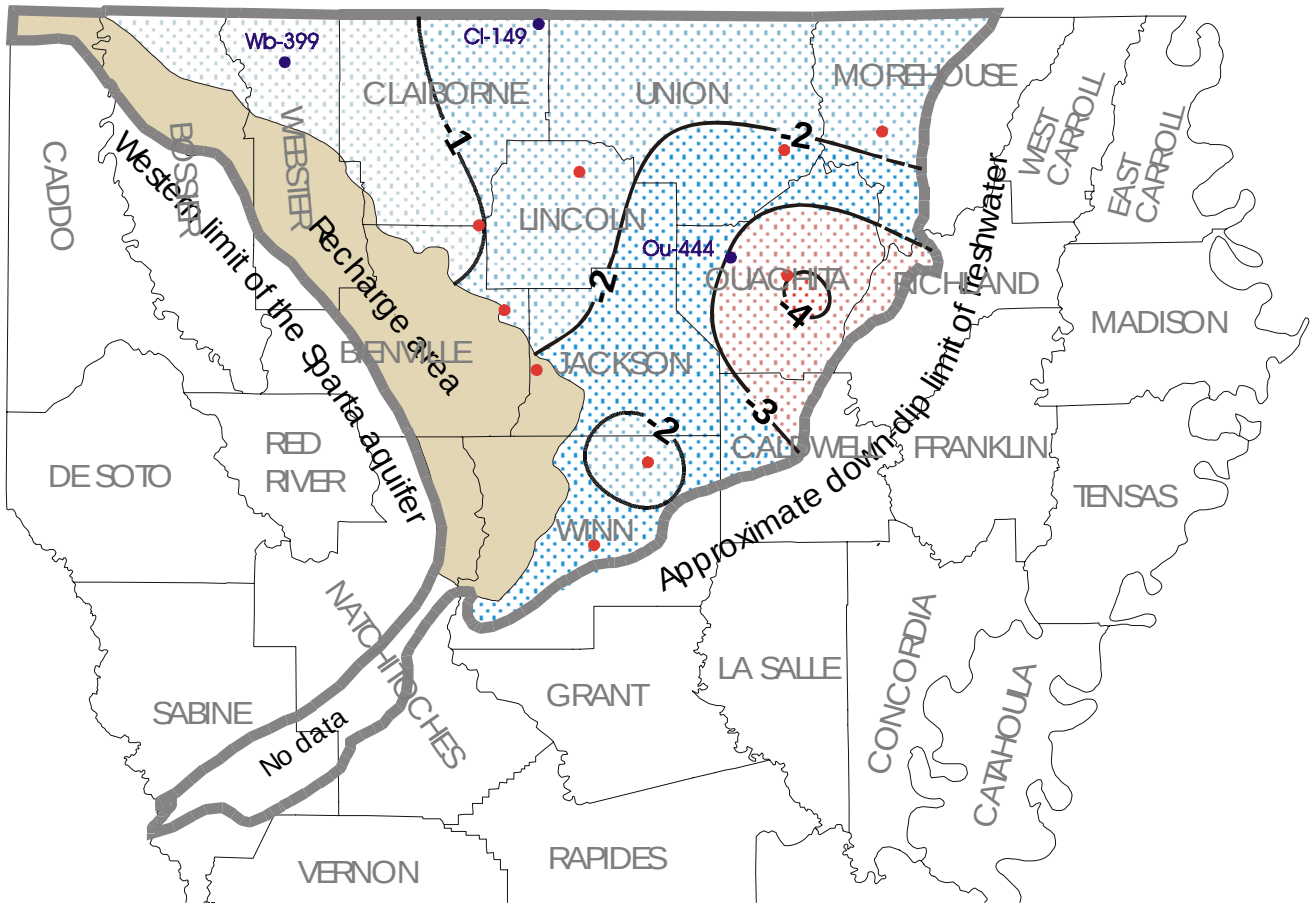
Potentiometric map of the Sparta aquifer in north Louisiana, 1996



Water-level decline in the Sparta aquifer in northern Louisiana during the period 1990 to 2000, based on data from USGS/DOTD water-level networks.



Areal extent of freshwater in the Sparta aquifer system in Louisiana

—1— Contours indicate approximate water-level declines at monitor wells, in feet per year, for the period 1990-2000. Dashed where indefinite

Control point

Wb-399 Control point and well number for which hydrograph is shown

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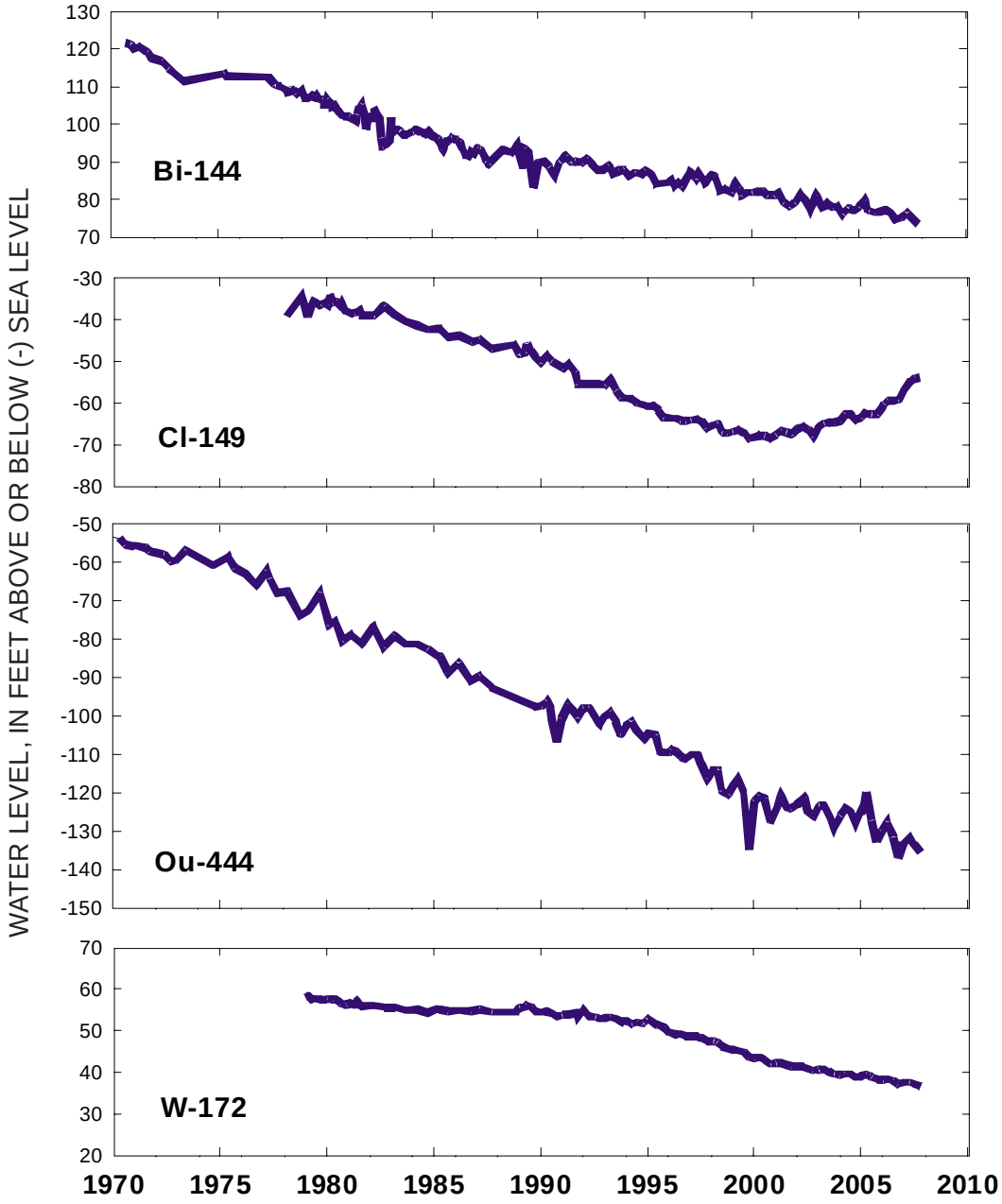
Water levels in the Sparta aquifer, 1970-2007



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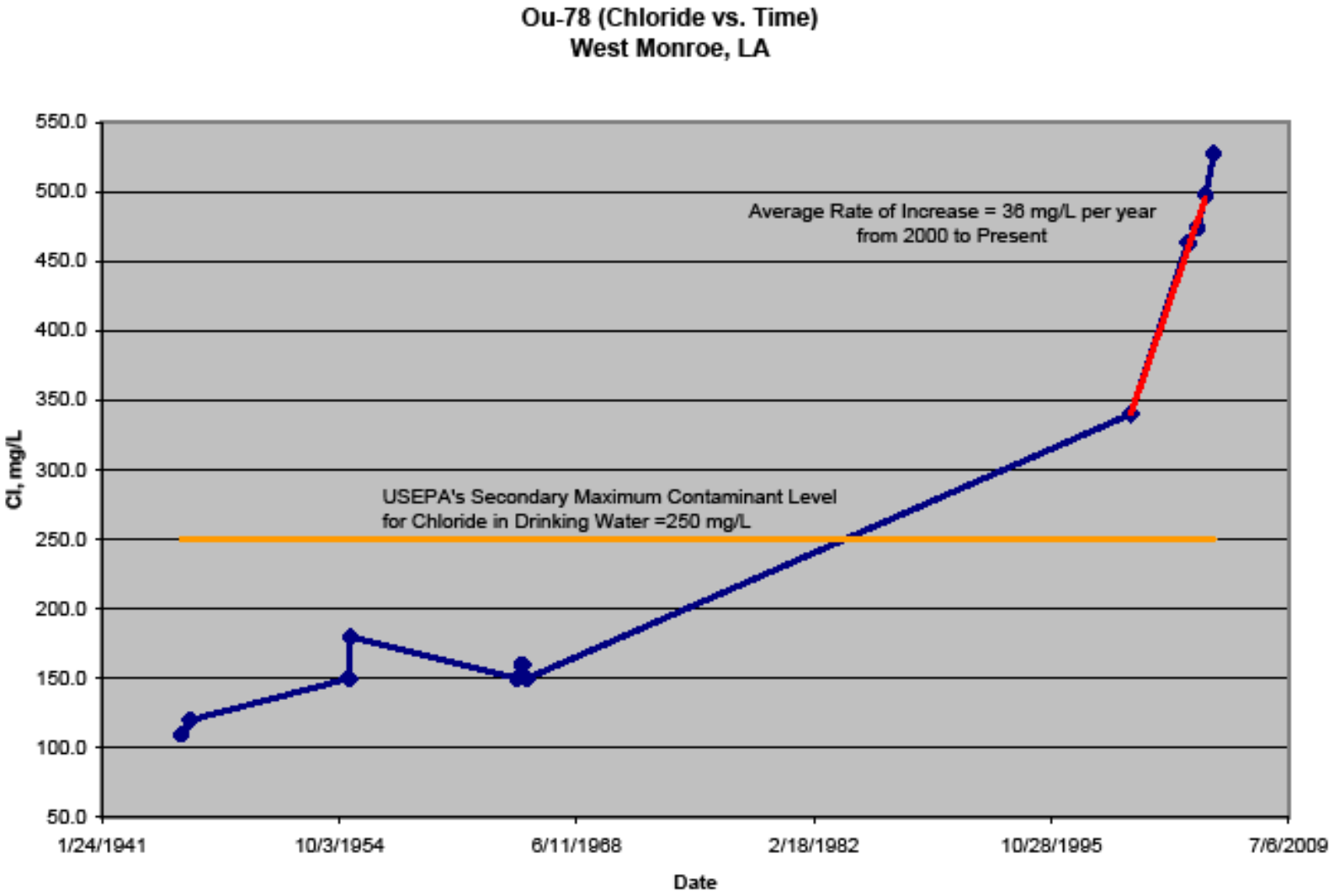
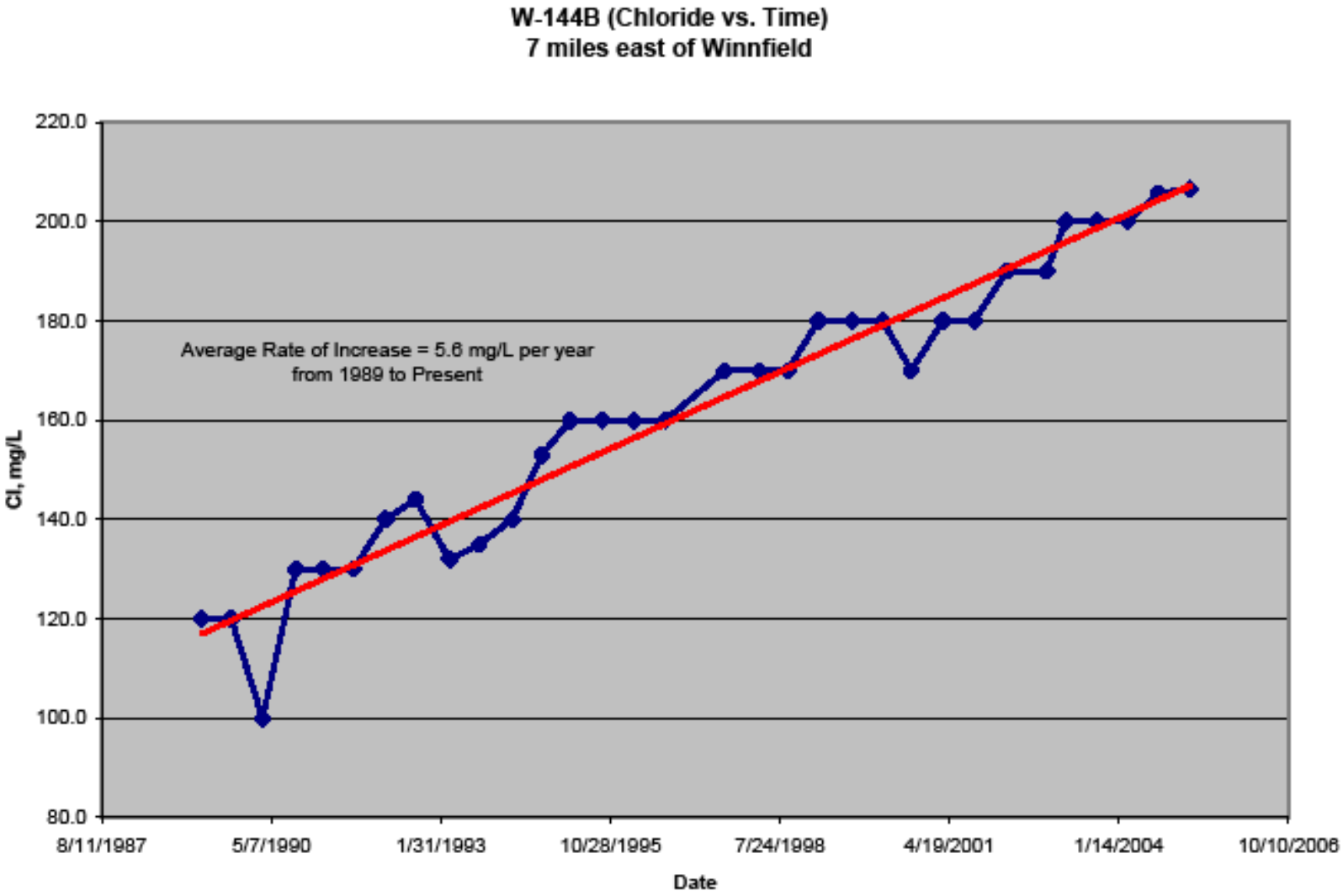
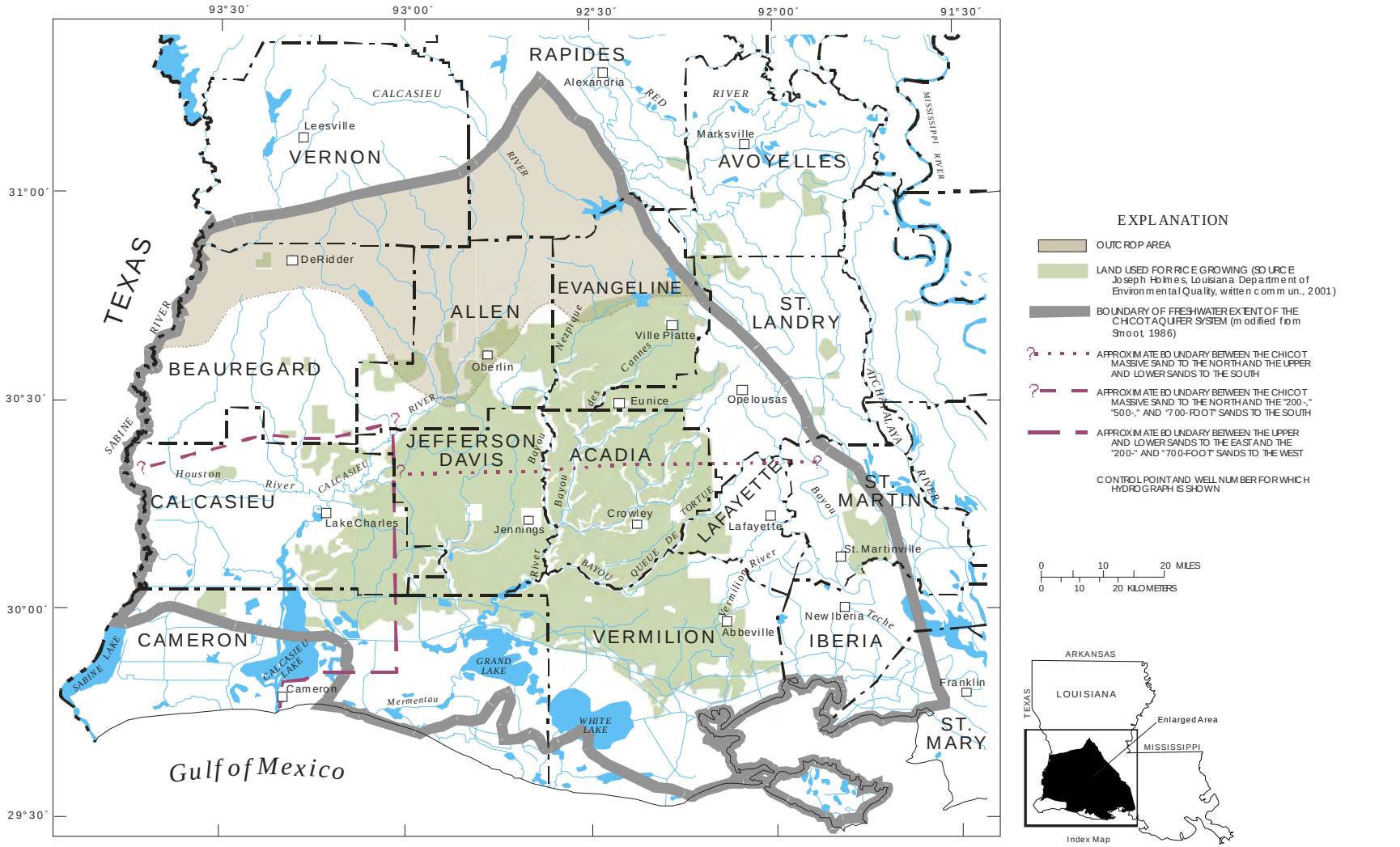

Ou-78 (Chloride vs. Time)
West Monroe, LA
Average Rate of Increase = 36 mg/L per year
from 2000 to Present
USEPA's Secondary Maximum Contaminant Level
for Chloride in Drinking Water =250 mg/L
Cl, mg/L
550.0
500.0
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
1/24/1941
10/3/1954
6/11/1968
2/18/1982
10/28/1995
7/6/2009
Date


W-144B (Chloride vs. Time)
7 miles east of Winnfield
Average Rate of Increase = 5.6 mg/L per year
from 1989 to Present
Cl, mg/L
220.0
200.0
180.0
160.0
140.0
120.0
100.0
80.0
8/11/1987
5/7/1990
1/31/1993
10/28/1995
7/24/1998
4/19/2001
1/14/2004
10/10/2006
Date

Location of the Chicot aquifer system and rice-growing area in southwestern Louisiana



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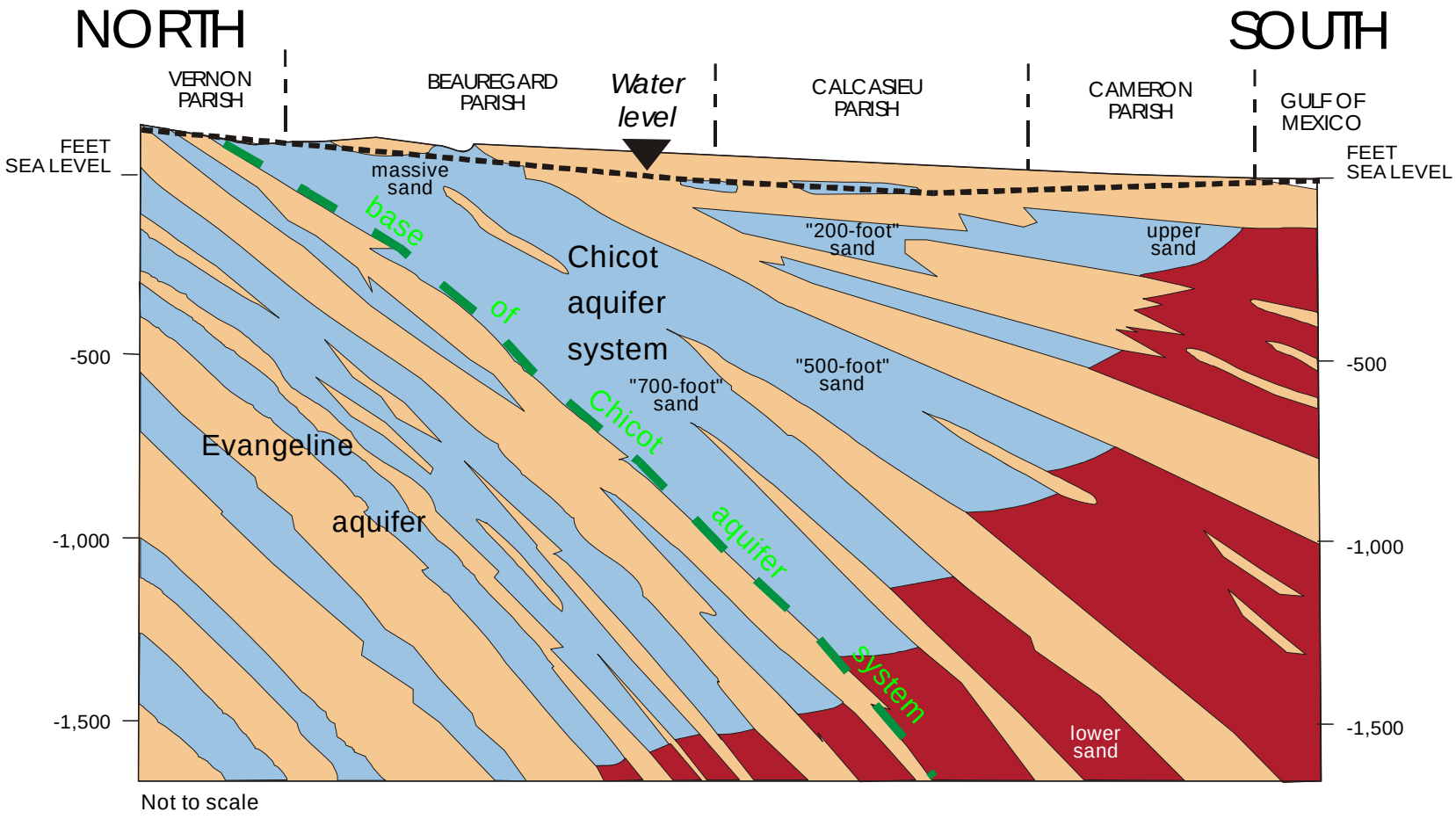
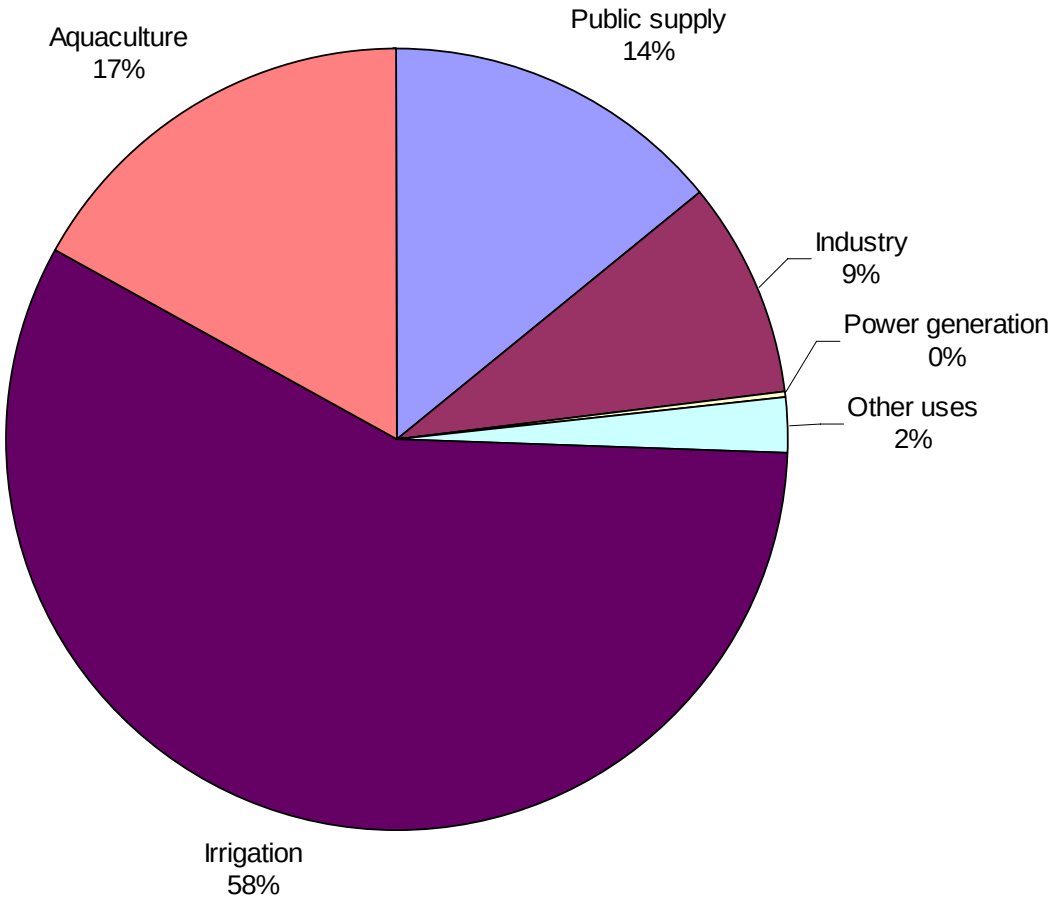

NORTH
SOUTH
VERNON PARISH
BEAUREGARD PARISH
Water level
CALCASIEU PARISH
CAMERON PARISH
GULF OF MEXICO
FEET SEA LEVEL
FEET SEA LEVEL
massive sand
base
of
Chicot
aquifer
system
"200-foot" sand
upper sand
"500-foot" sand
"700-foot" sand
Chicot
aquifer
system
Evangeline
aquifer
lower sand
-500
-1,000
-1,500
-500
-1,000
-1,500
Not to scale

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



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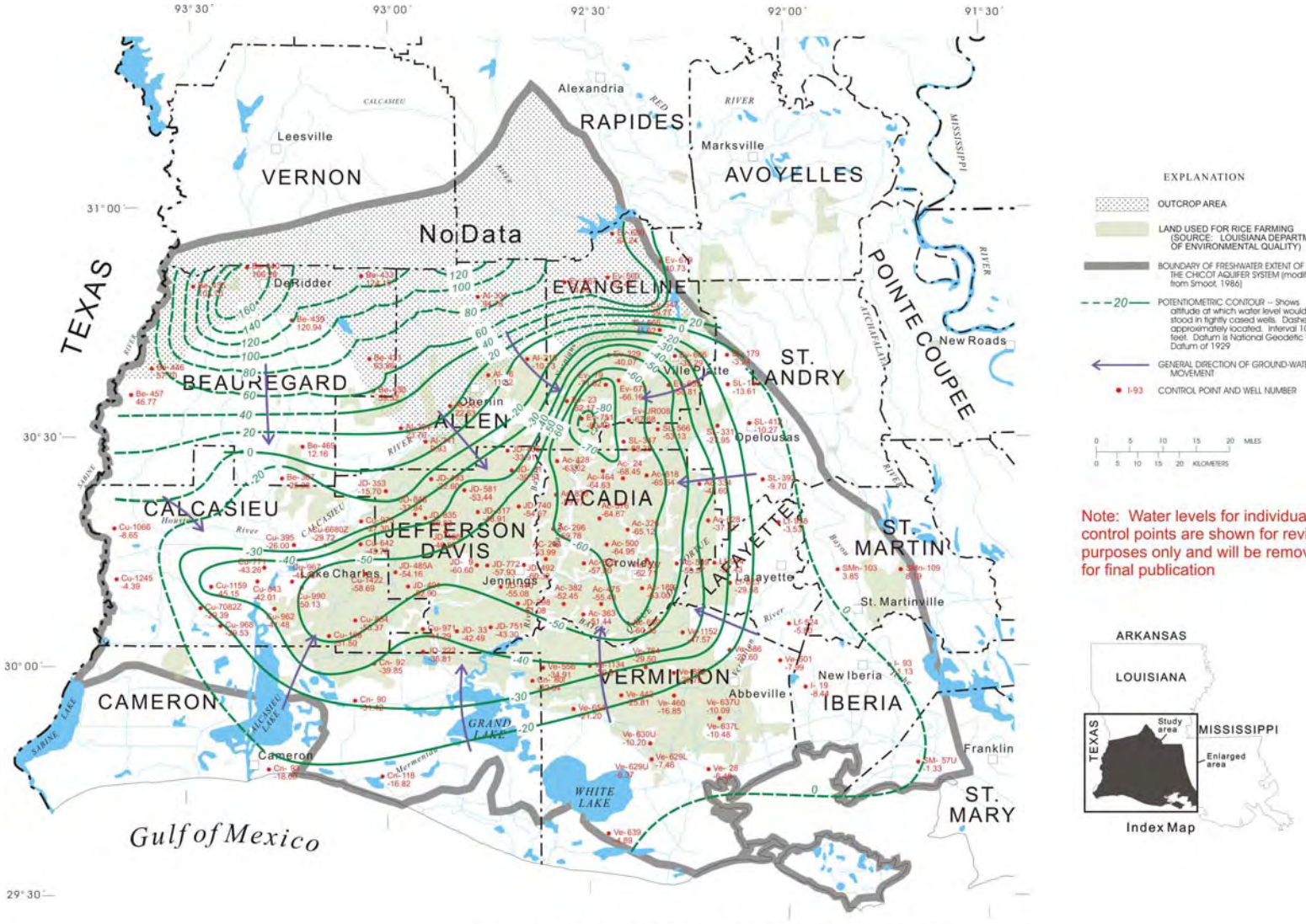

Map credit: Modified from Official Map of Louisiana, Louisiana Department of Transportation and Development, 1986

Figure 5. Potentiometric surface of the massive, upper, and "200-foot" sands of the Chicot aquifer system in southwestern Louisiana, June 2002.

Water levels in the Chicot aquifer system, June 2002.

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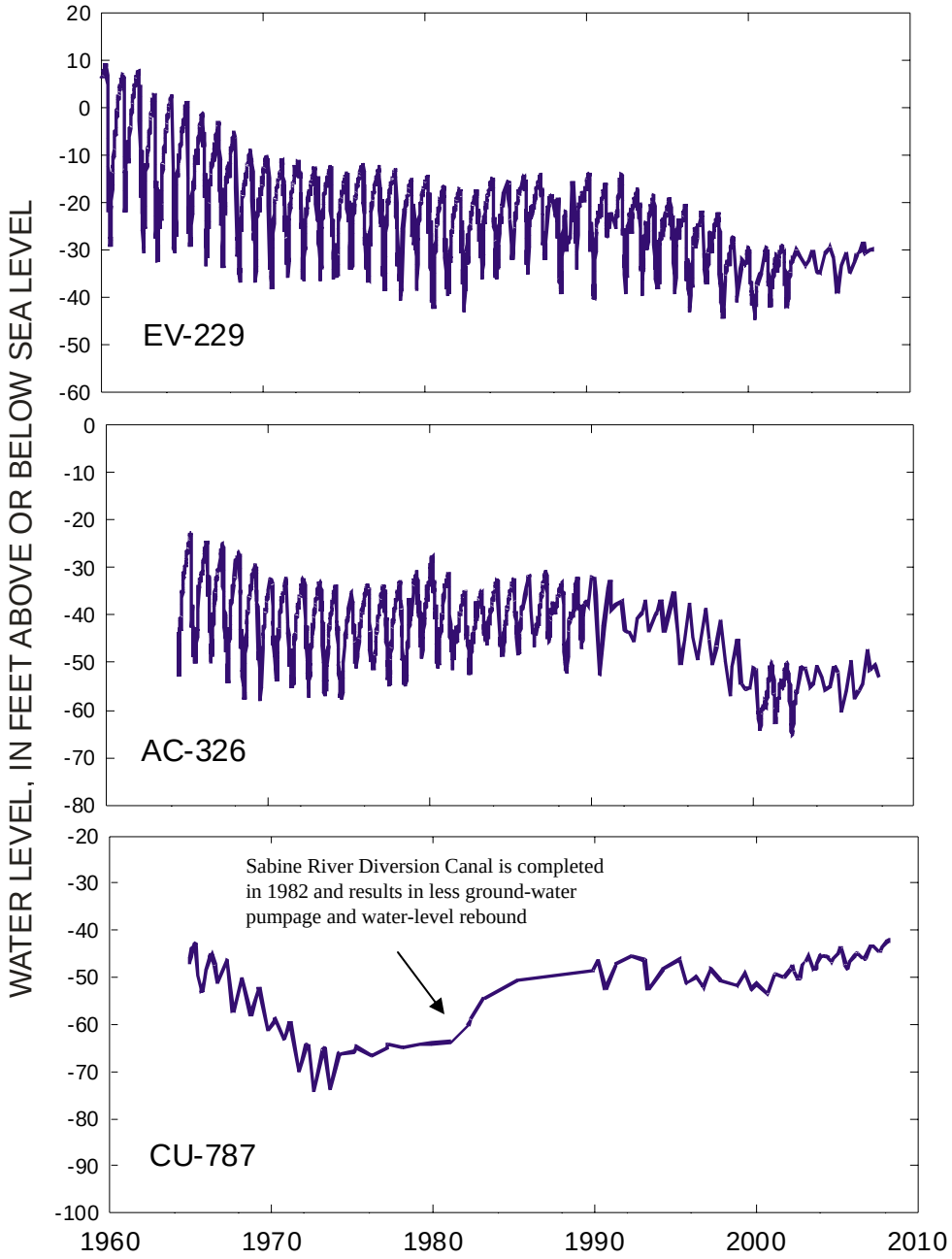

Water levels show long-term declines and seasonal fluctuations at 3 wells screened in the Chicot aquifer system in southwestern Louisiana, 1960-2010.

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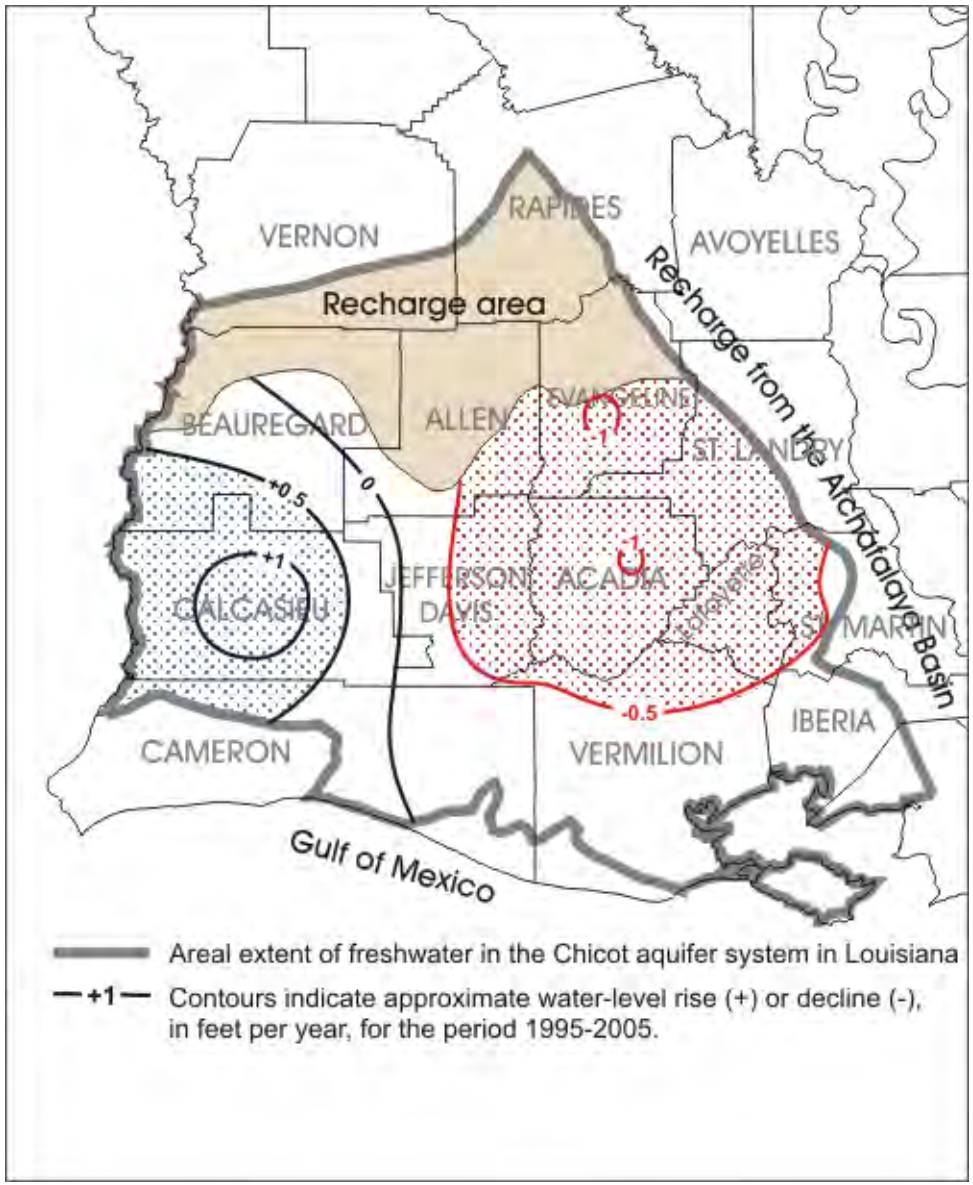
Water-level decline in the Chicot aquifer system during the period 1995 to 2005, based on data from the USGS/DOTD water-level network.



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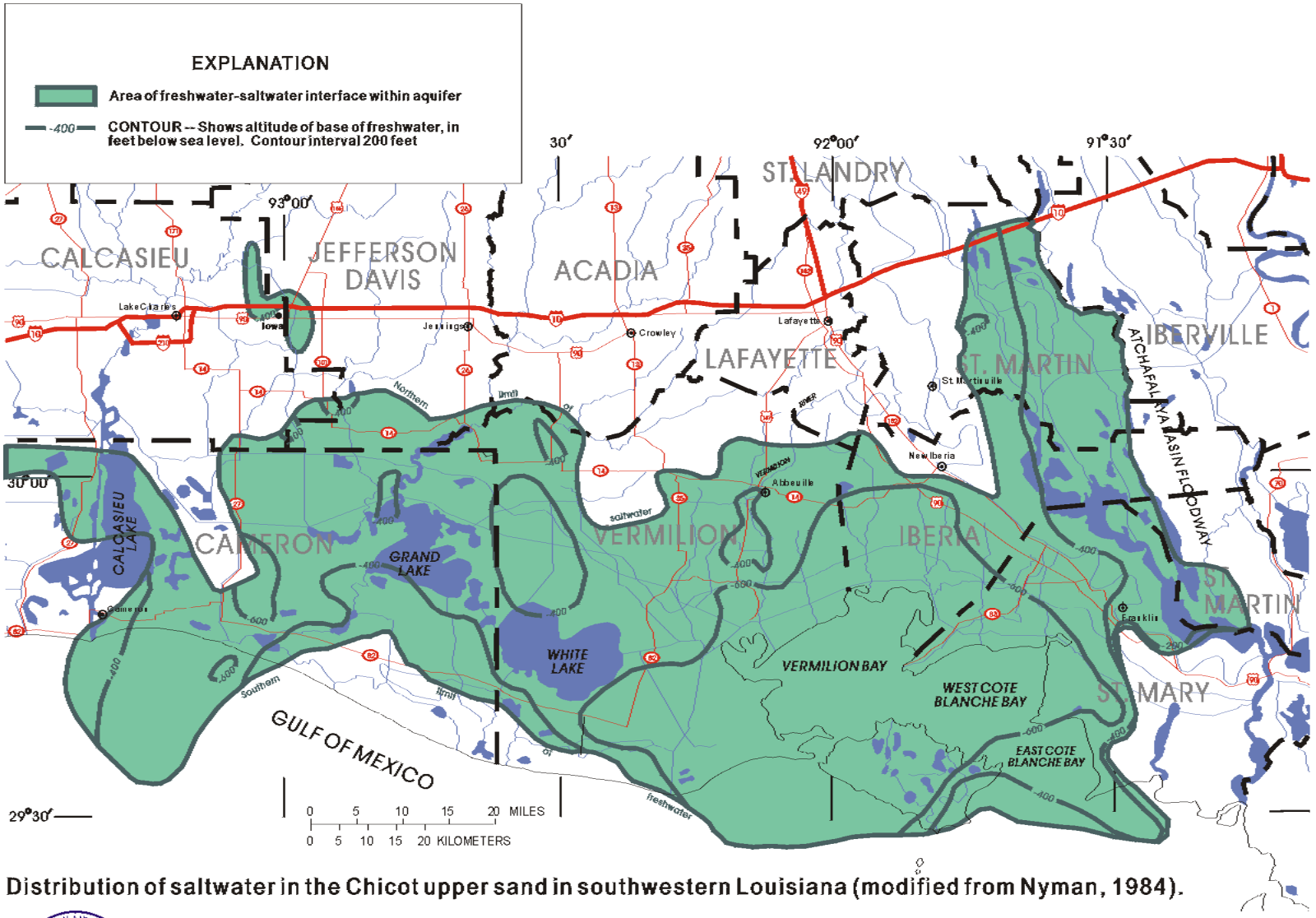
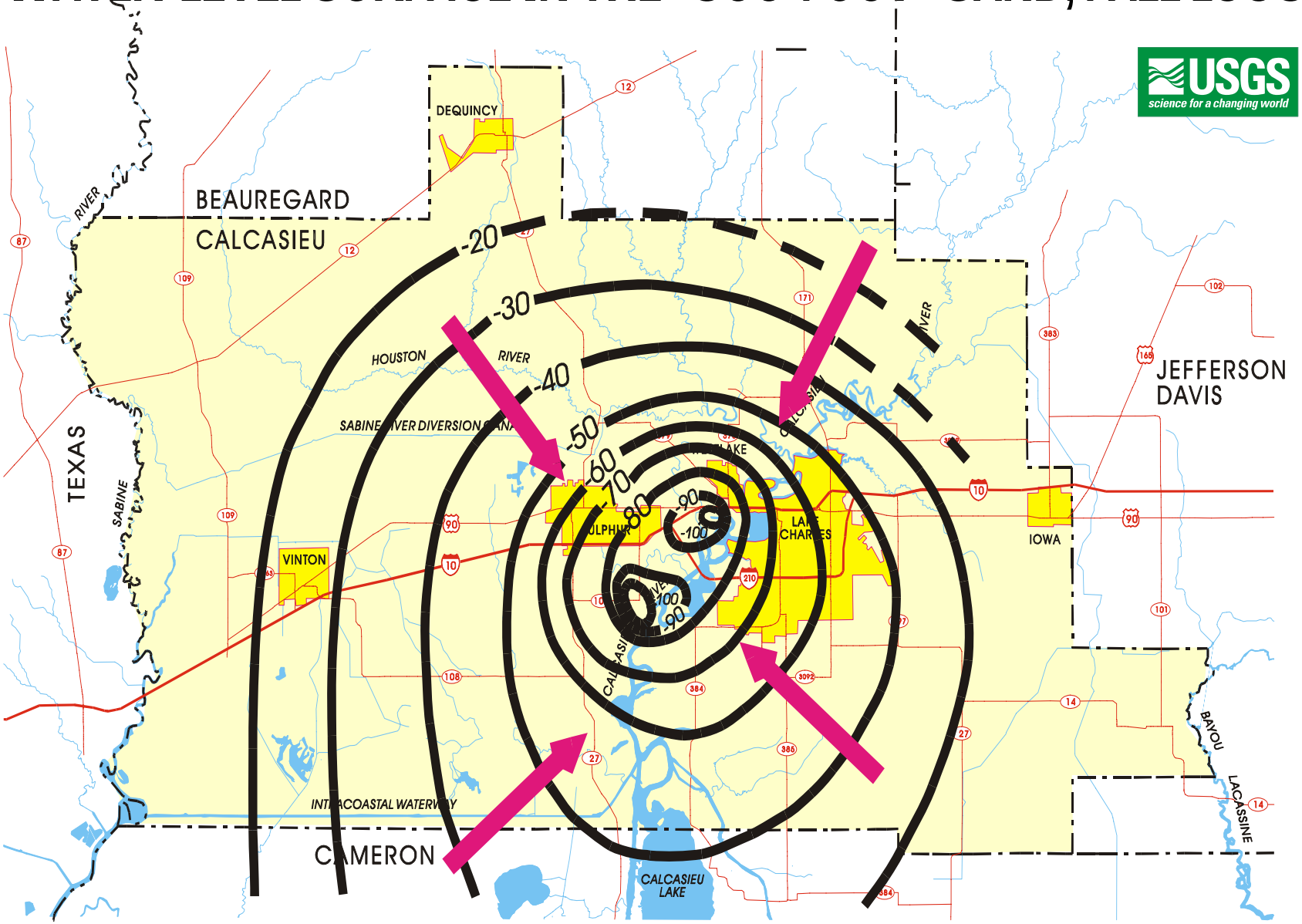
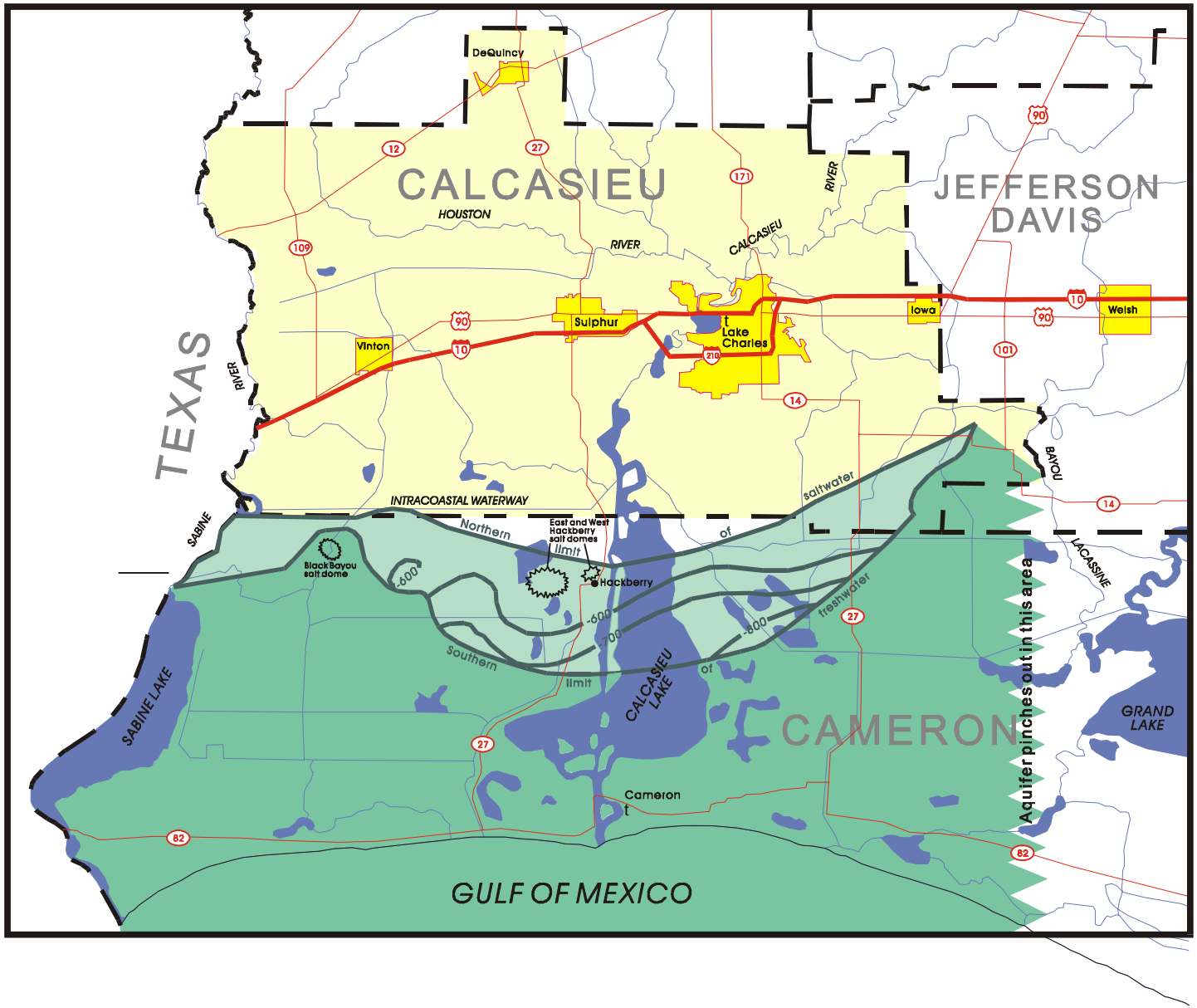


Distribution of saltwater in the Chicot upper sand in southwestern Louisiana (modified from Nyman, 1984).

WATER-LEVEL SURFACE IN THE "500-FOOT" SAND, FALL 1995



Areas of saltwater in the “500-foot” sand, 1996



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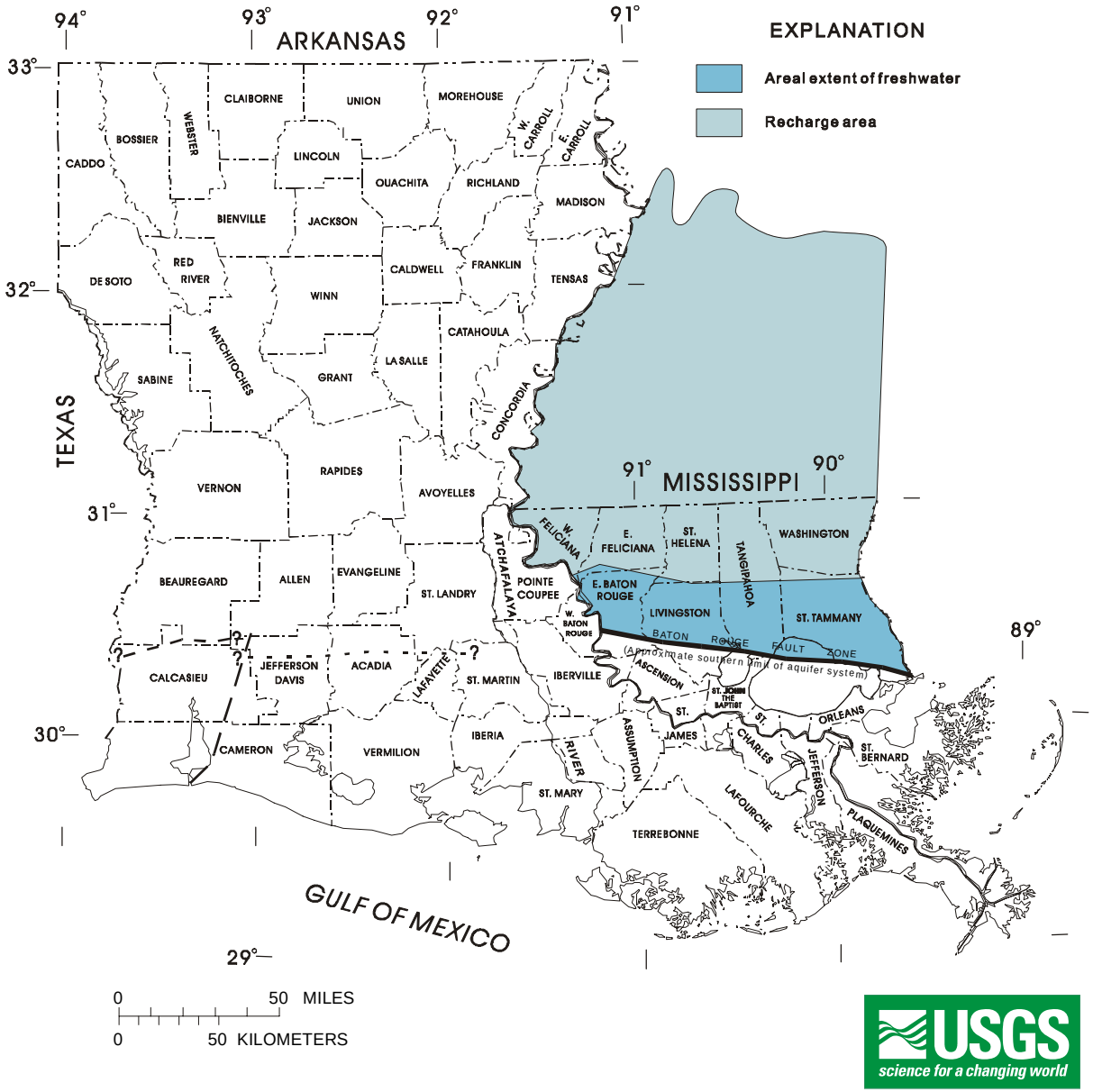
Southern Hills aquifer system



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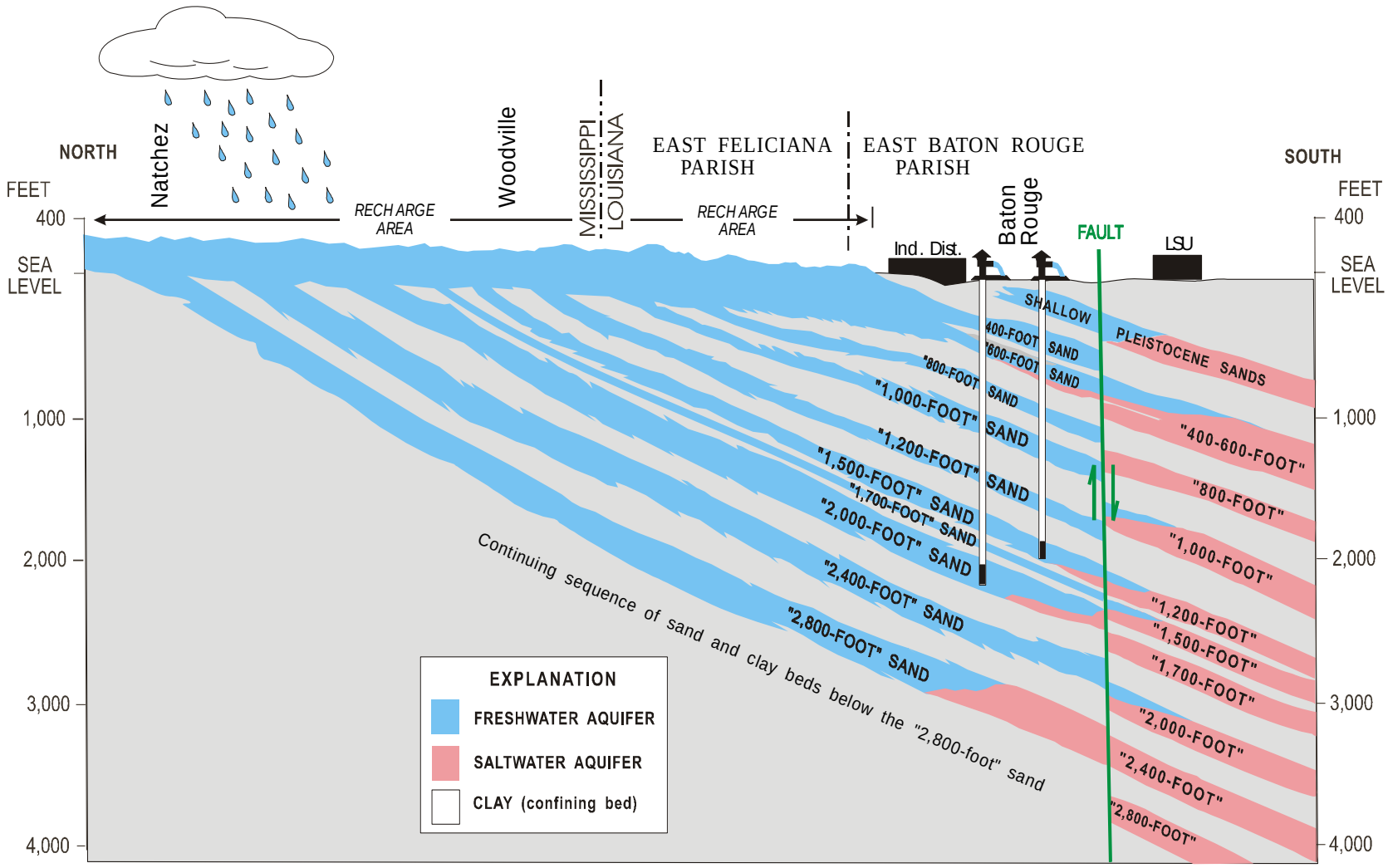

Idealized cross-section showing aquifers in the Baton Rouge area.

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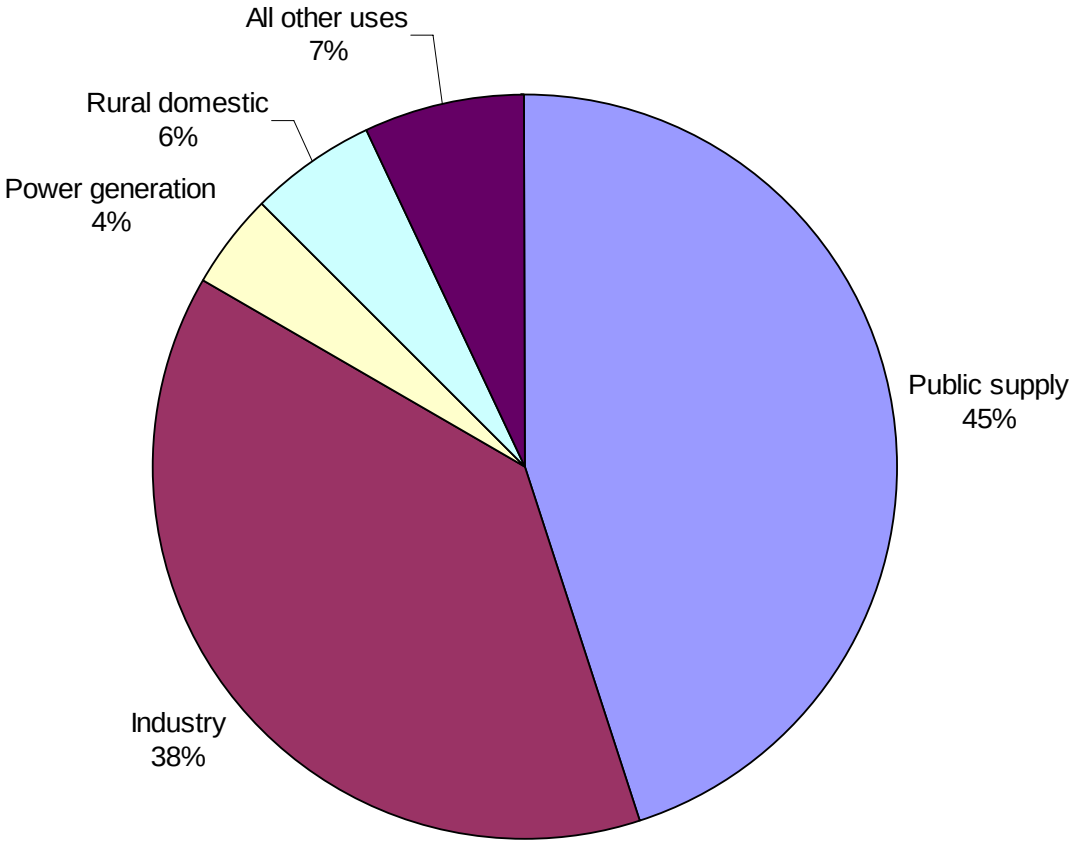
WITHDRAWALS FROM THE SOUTHERN HILLS AQUIFER SYSTEM, 2005
(320 MILLION GALLONS PER DAY)



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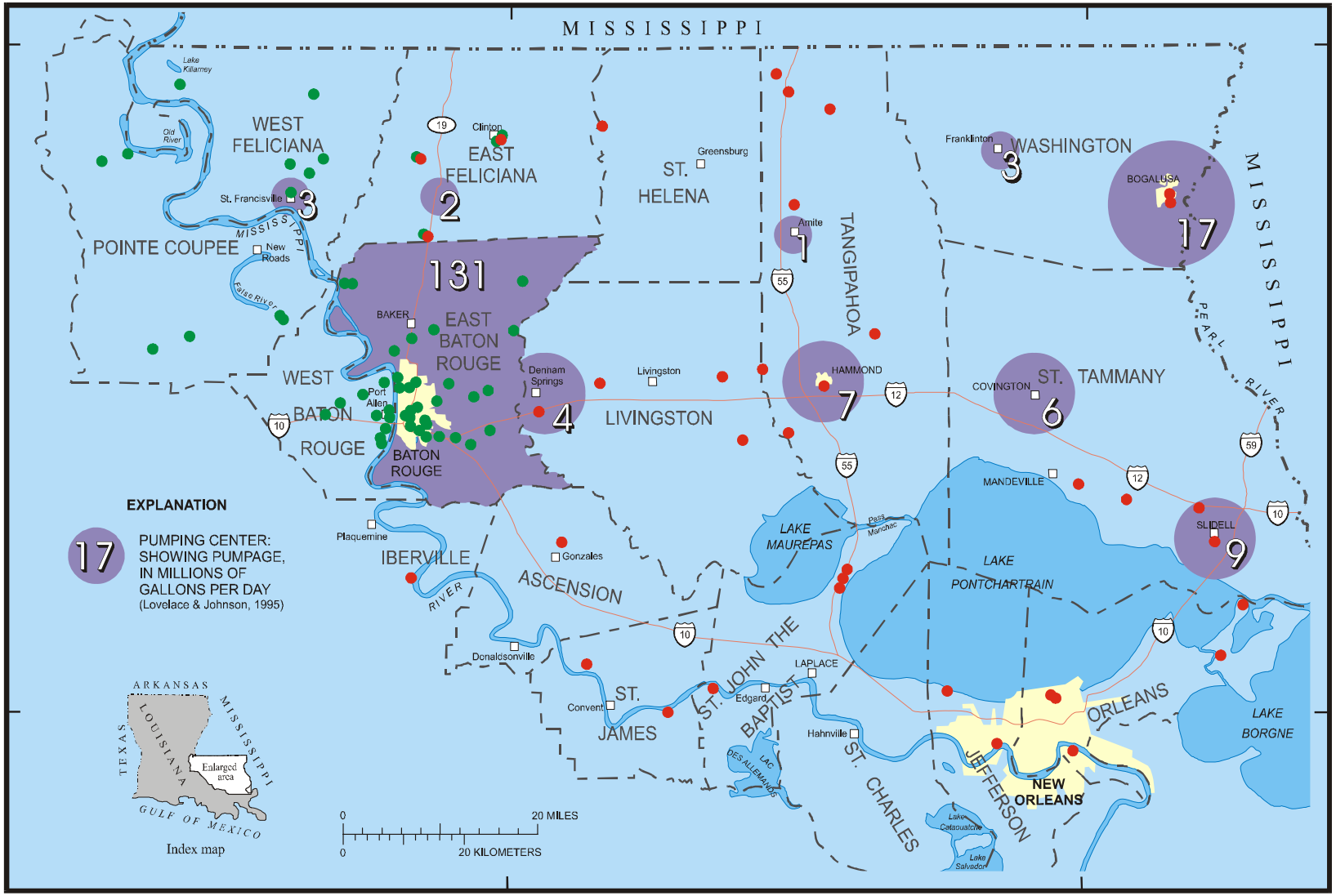
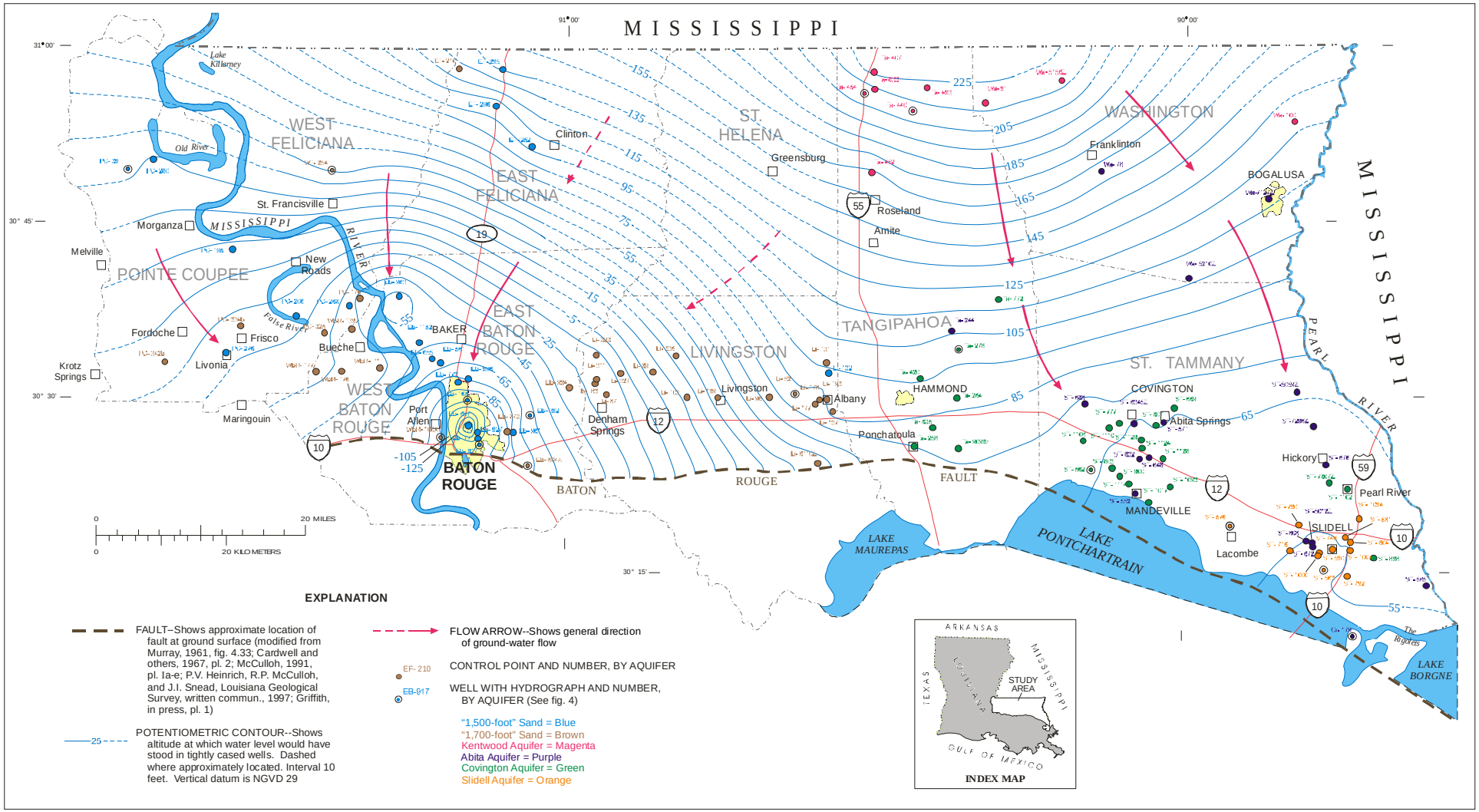
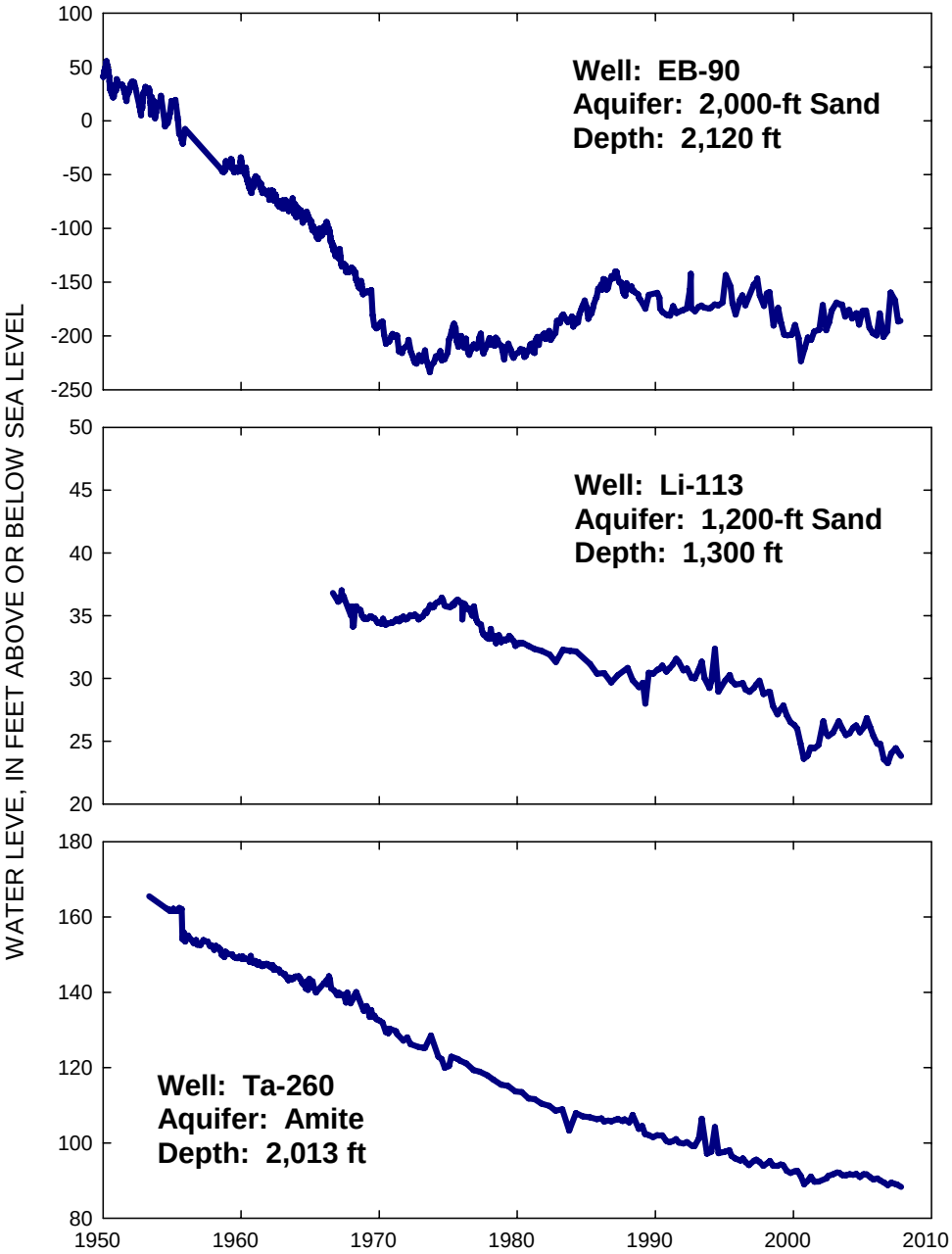
PUMPAGE CENTERS IN THE SOUTHERN HILLS AQUIFER SYSTEM, 1995





Base map modified from Louisiana Oil Spill Coordinator, Office of the Governor, Louisiana GIS CD: A digital Map of the State, Version 2.0

Figure 1. Potentiometric surface of the Kentwood aquifer system and the "1,500-foot" and "1,700-foot" sands of the Baton Rouge area, southeastern Louisiana, March-April, 2003.



Water levels in deep aquifers of the Southern Hills aquifer system in southeastern Louisiana, 1950-2010

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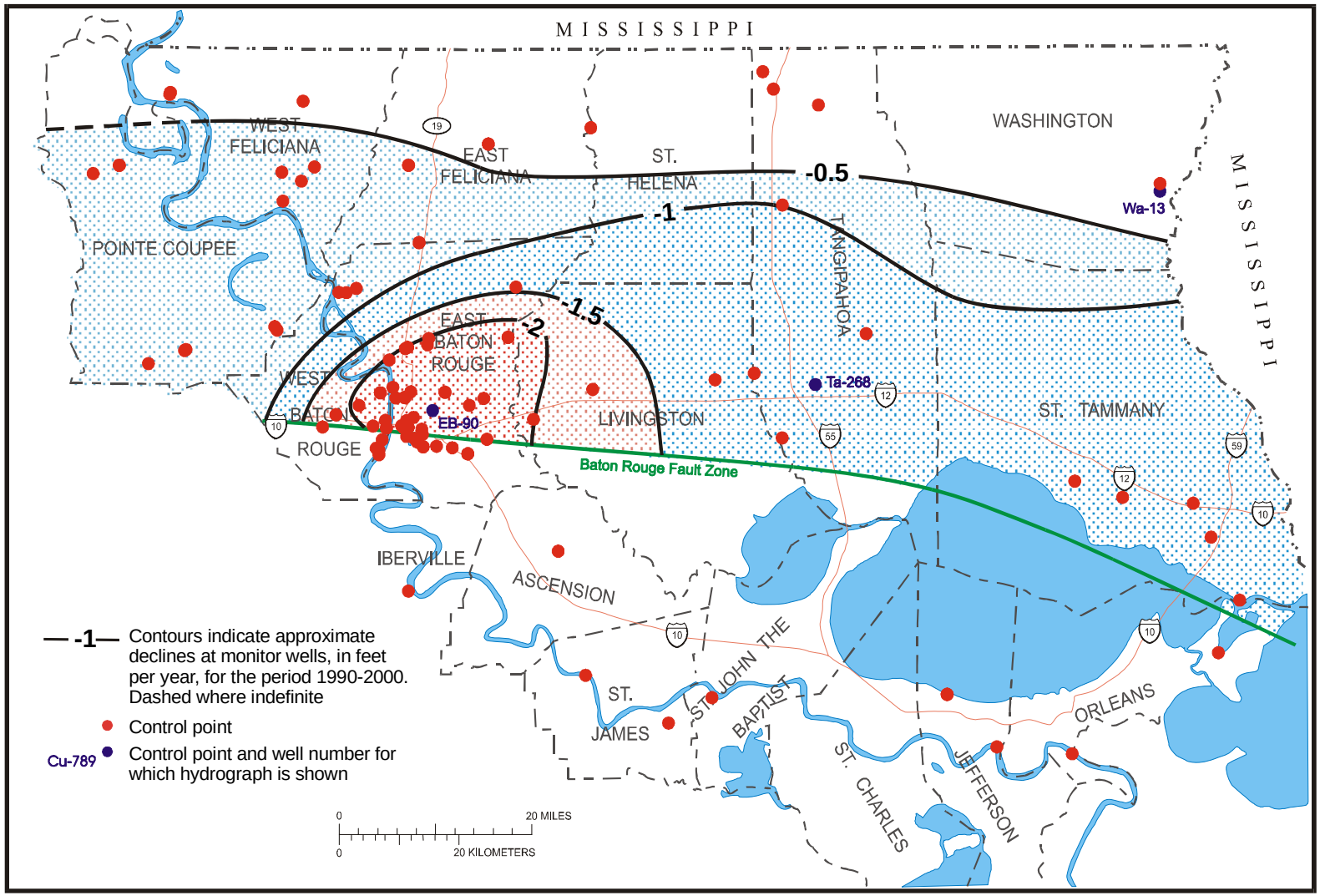

Water-level decline in the Southern Hills aquifer system in southeastern Louisiana during the period 1990 to 2000, based on data from USGS/DOTD/CAGWCC water-level networks.

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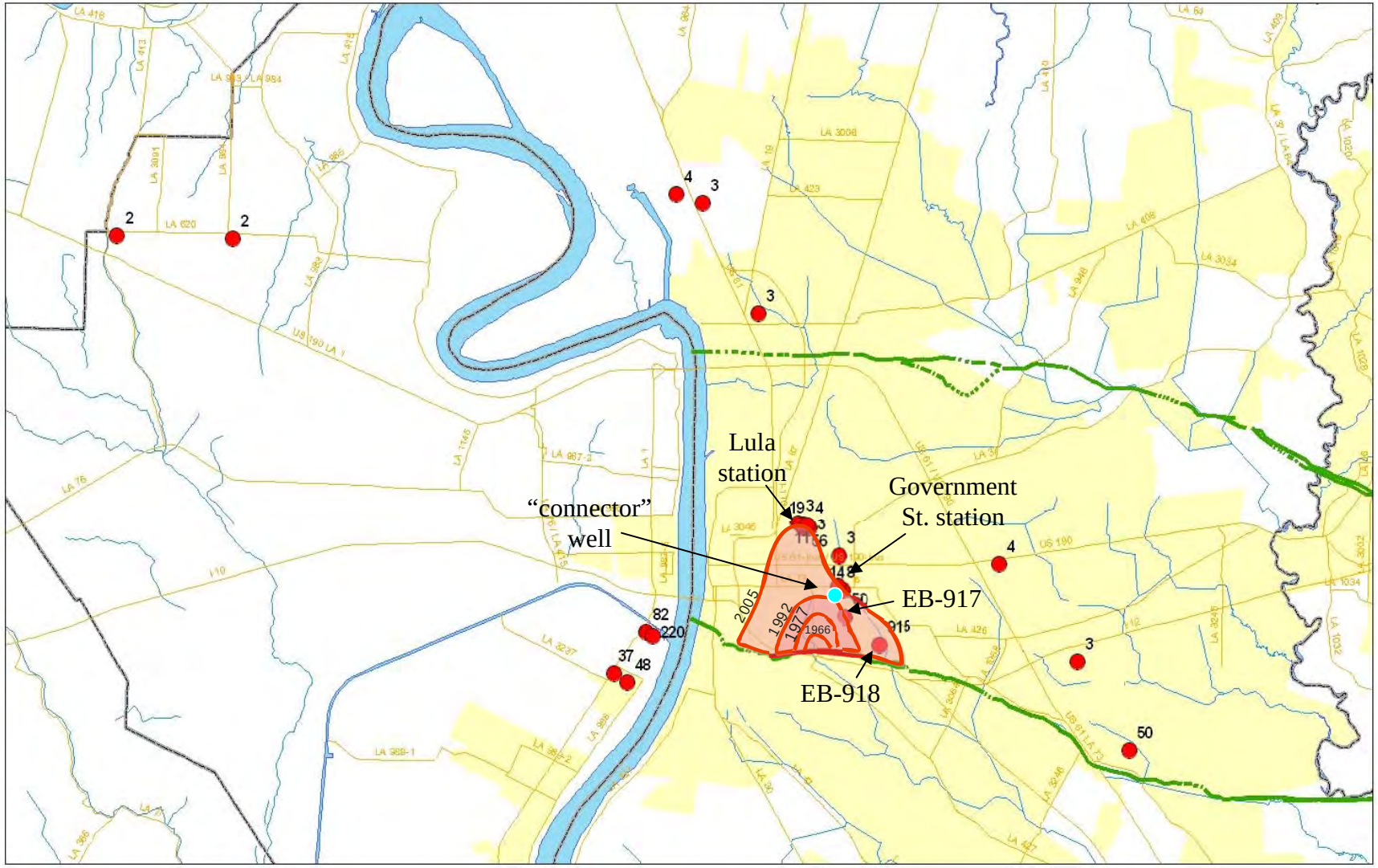

Location of saltwater and chloride concentrations at sampled wells and in the "1,500-foot" sand.

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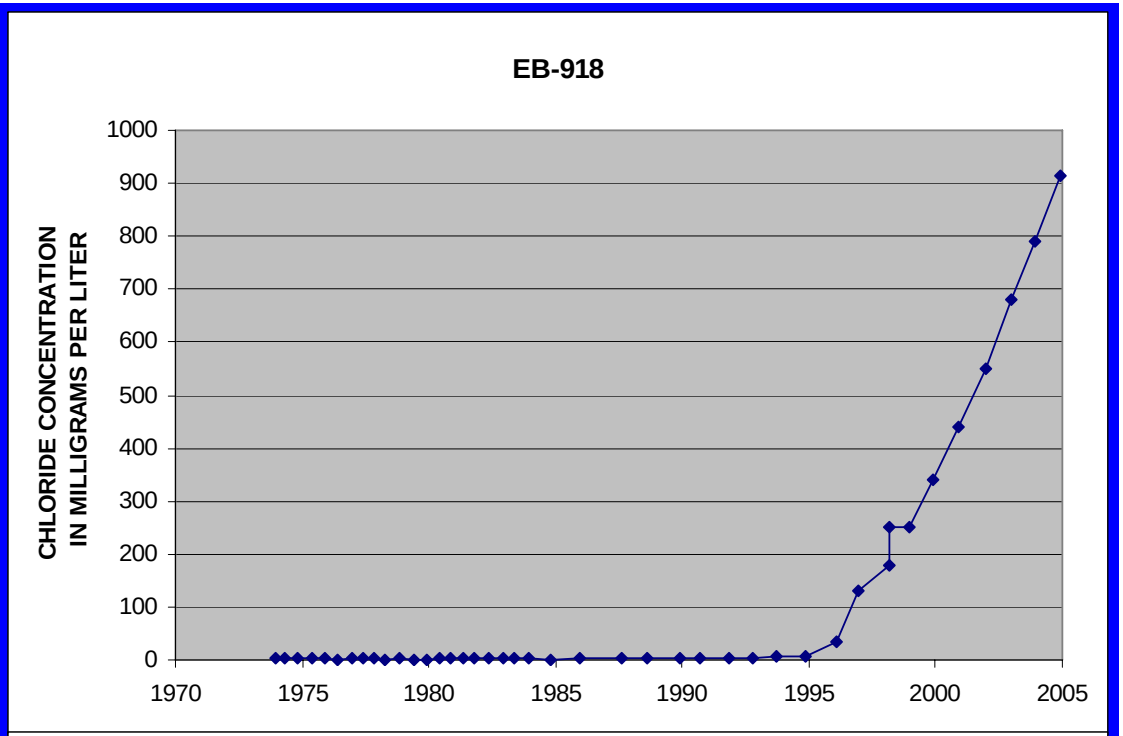
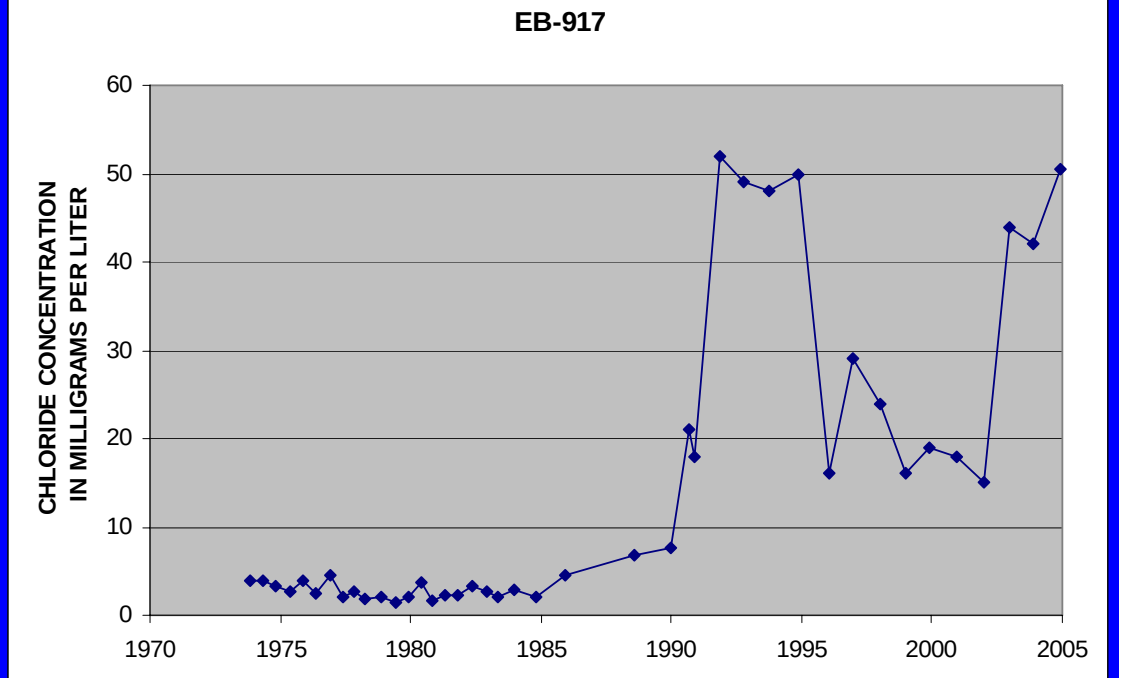
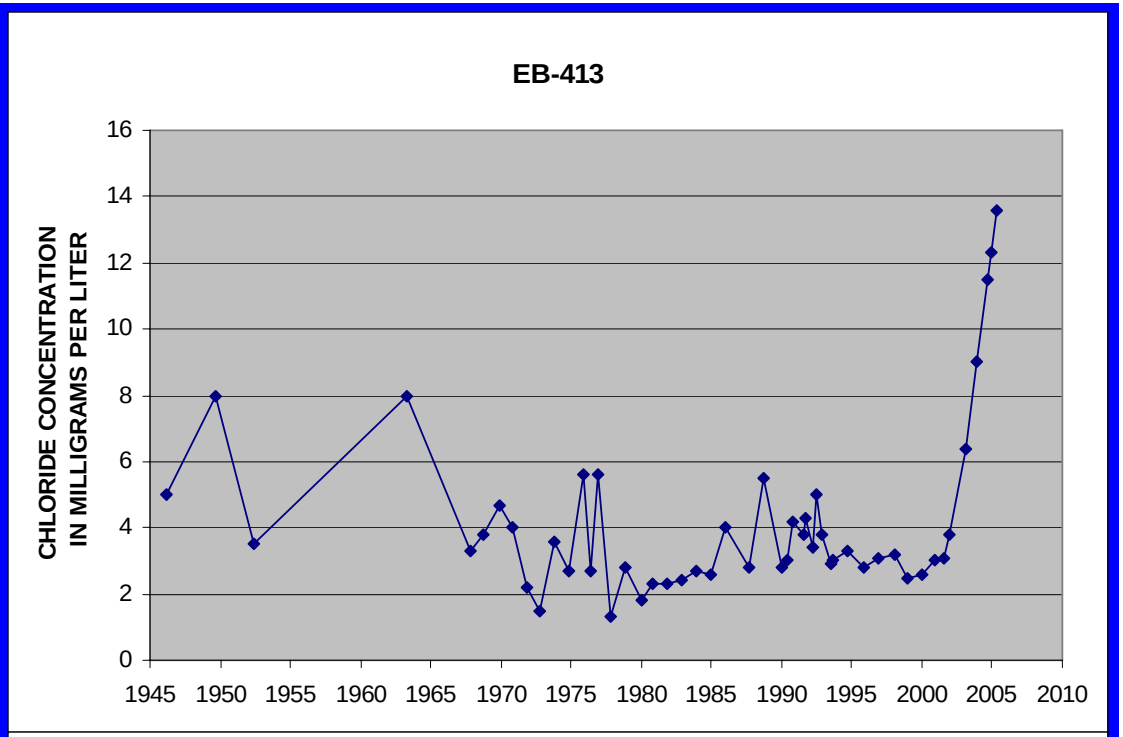
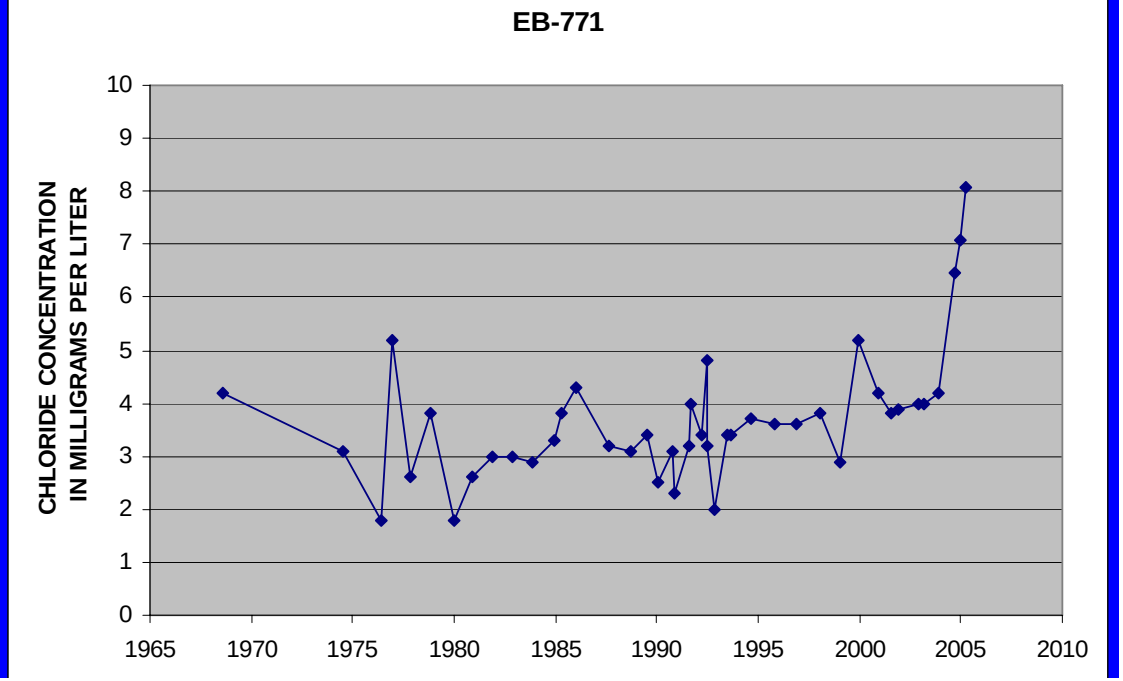
Graphs of chloride concentrations in USGS observation wells screened in the “1,500-foot” sand and located between the Baton Rouge fault and the “connector” well

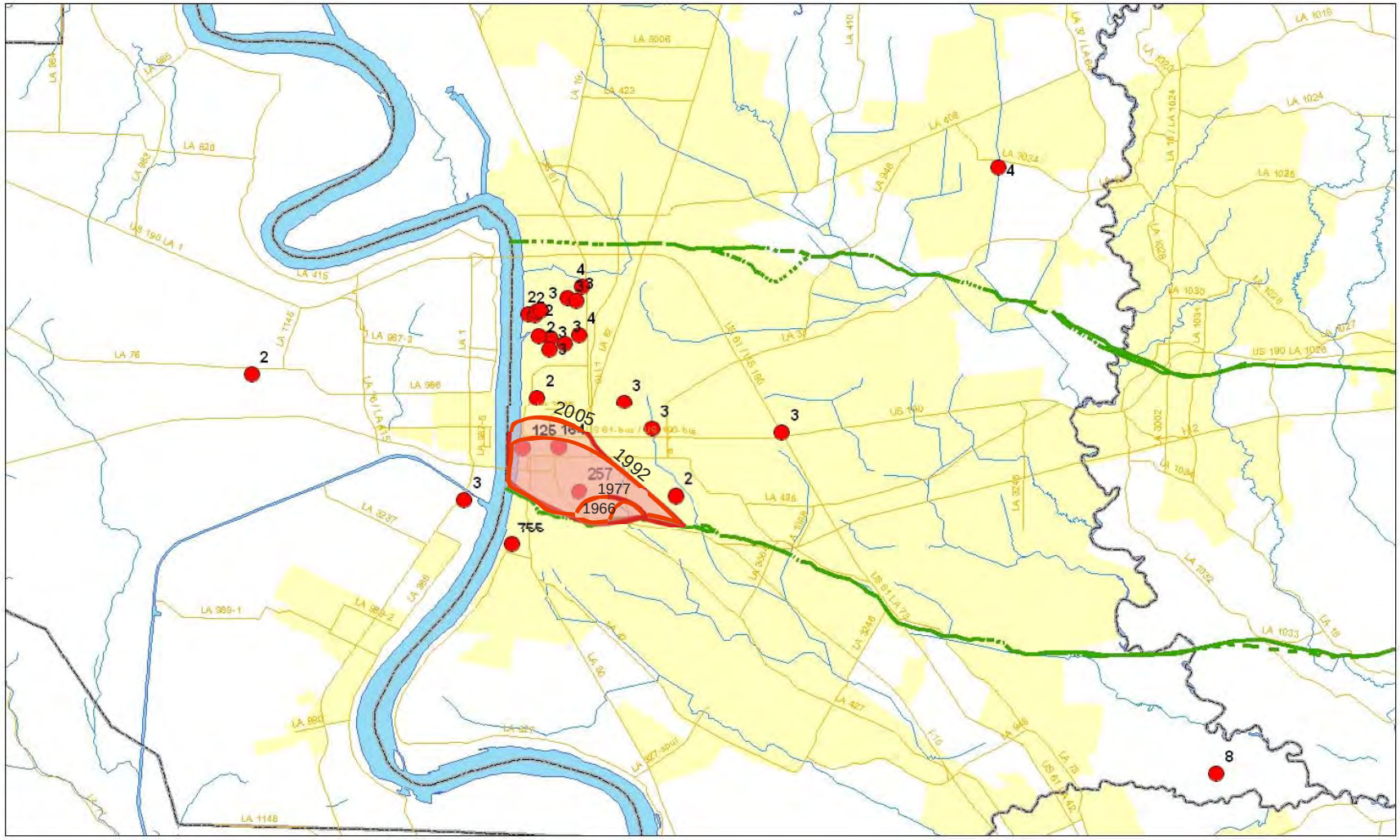




Graphs of chloride concentrations in public supply wells screened in the “1,500-foot” sand at the Government St. station







Location of saltwater and chloride concentrations at sampled wells and in the “2,000-foot” sand.

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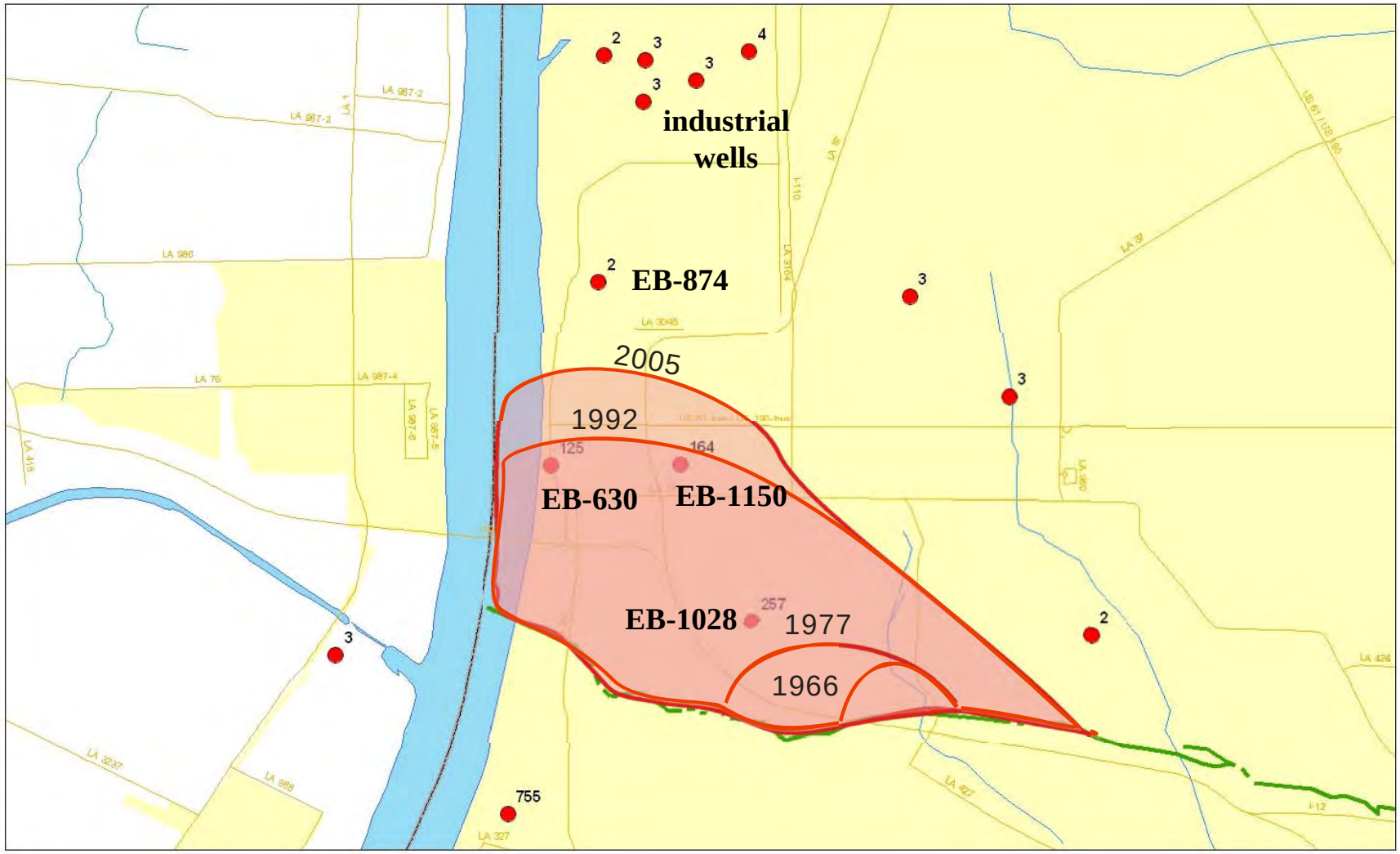

Location of saltwater and chloride concentrations at sampled wells and in the “2,000-foot” sand.

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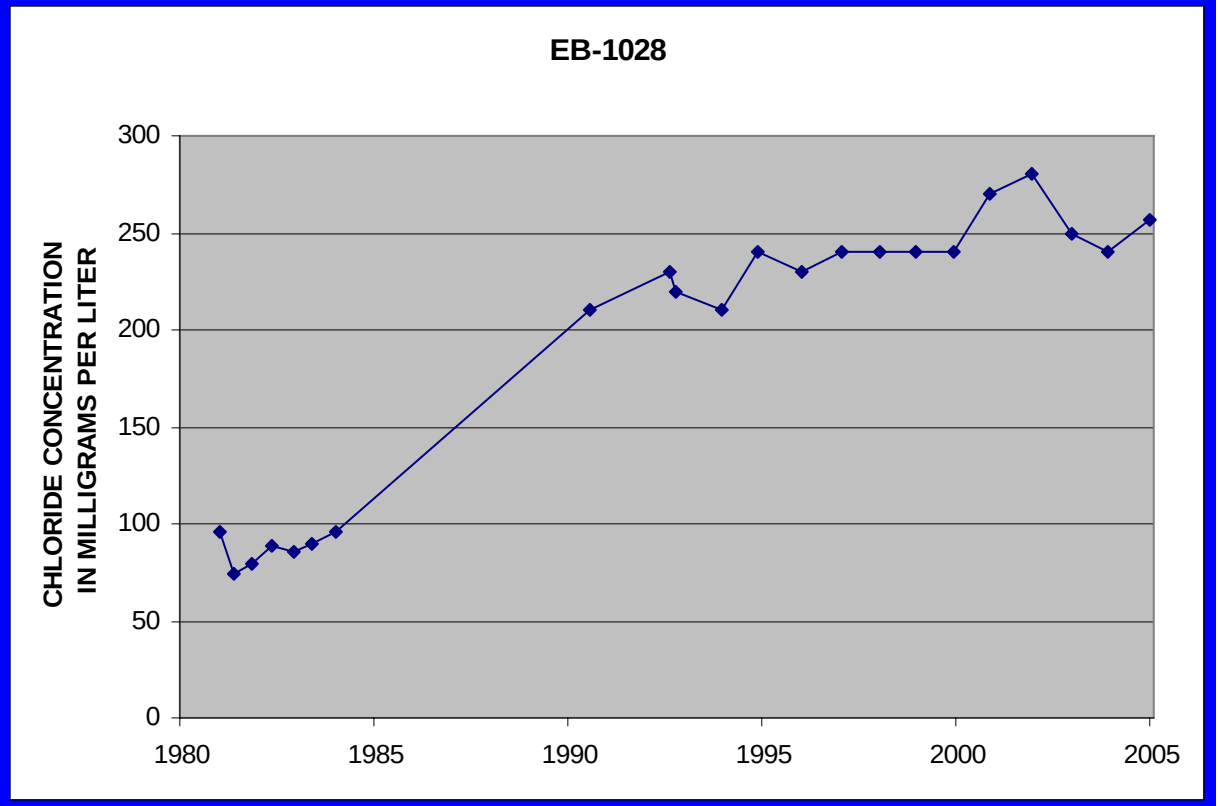
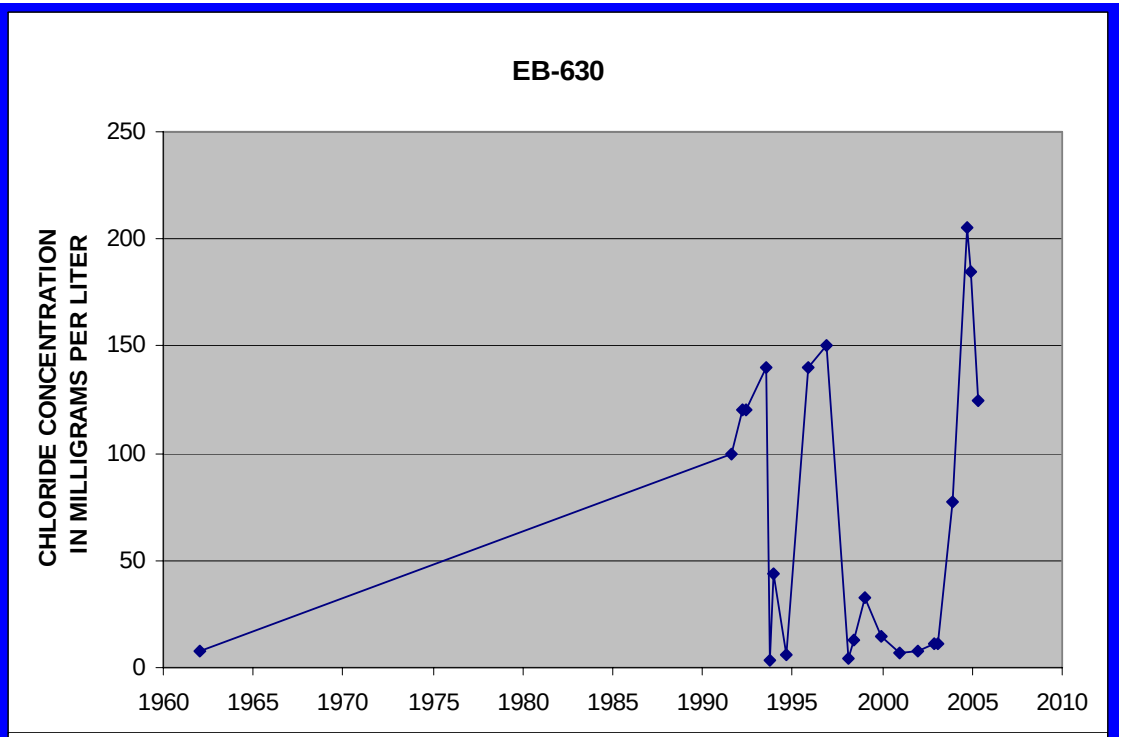
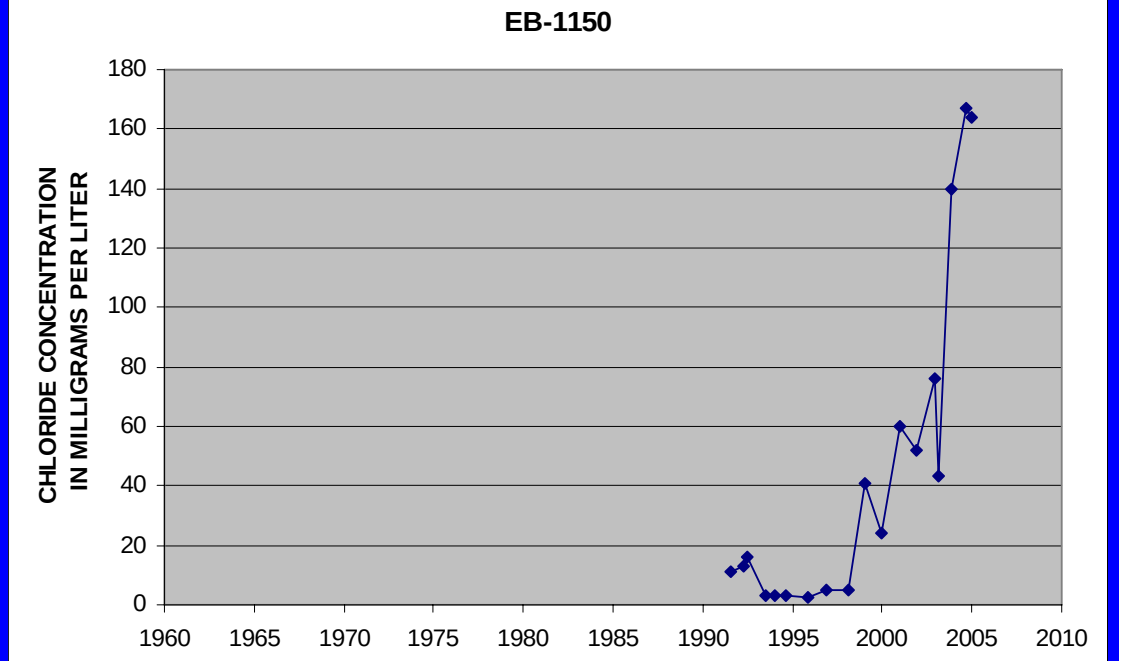
Graph of chloride concentrations at well EB-1028 screened in the “2,000-foot” sand and located between the Baton Rouge fault and downtown pumping stations



Graphs of chloride concentrations in downtown Baton Rouge public supply wells screened in the “2,000-foot” sand





SUMMARY

- Water level declines and saltwater encroachment are serious concerns in the Sparta aquifer in the Monroe area
- Water level declines and saltwater encroachment are potential future concerns in the Chicot aquifer, especially in the Lake Charles area
- Saltwater encroachment is a serious concern in the Southern Hills aquifer system in the Baton Rouge 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 jlovelac@usgs.gov

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