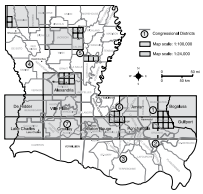

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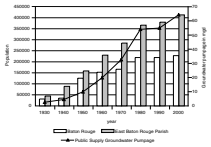

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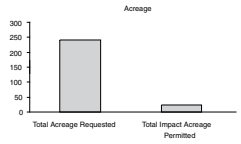


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Louisiana Geological Survey

# NewsInsights

Summer 2006 • Volume 16, Number 1

# Is Oil & Gas Production Contributing to Louisiana's Land Loss Problem?

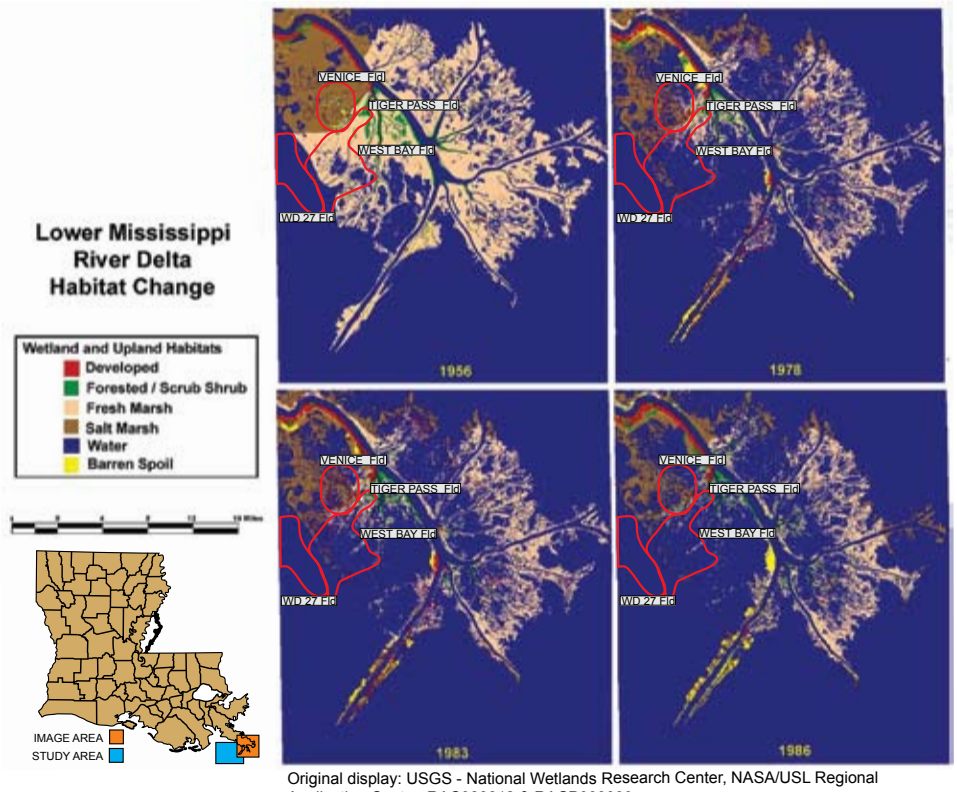
*Byron Miller*

Louisiana's land loss problem has in many ways been a chronic and unyielding problem since the time of the dinosaurs. Louisiana sits on the north rim of the Gulf of Mexico; a huge sedimentary basin which has been filling with sediments since the Jurassic age. Although the net result over this period of time has been positive, resulting in the creation of Louisiana and the Gulf Coast as we now know it, undoubtedly this 200 million year period has seen countless episodes of shoreline advance and retreat, land emergence and subsidence.

Human activities have most likely contributed to Louisiana's land loss problem, however, the degree to which man's activities have impacted the subsidence of coastal wetlands remains a key point of debate. For example, flood control levees are believed to intensify wetland loss by restricting the flow of sediment rich flood waters to sediment starved areas. Oil and gas extraction has also been cited as a possible contributor to land subsidence resulting in coastal land loss.

The LGS investigated the role of oil and gas production and it's relationship to Louisiana's wetland loss problem as part of a project funded by the U.S. Dept. of the Interior Minerals Management Service. Oil and gas production from a number of fields located in Plaquemines Parish and the adjacent federal offshore West Delta area was compared with land subsidence data from previous studies. Areas of Plaquemines Parish have suffered tremendous amounts of land loss in the last 50 years. Figure 1 illustrates the amount of land loss in the Mississippi River Delta portion of Plaquemines Parish from 1956 to 1986 . The West Delta quadrangle in Plaquemines Parish (Figure 2) lost 47,475 acres, or approximately 65% of the existing land area, in the period 1932 to 1983.

The onshore fields studied in Plaquemines Parish (West Delta 27, Venice, West Bay, and Tiger Pass fields) produced over 496 Million Barrels of Oil and 2.1 Trillion Cubic Feet of gas from 1937 to 2005. This amount of oil and gas production, when corrected for reservoir temperature and pressure, equals over 3 cubic feet of fluids removed for every square foot of surface area overlying these fields. This tremendous volume of extracted fluids creates a void in the subsurface that must be replaced by groundwater influx or injected fluids, or it will result in the shrinkage and compaction of the reservoir.




Original display: USGS - National Wetlands Research Center, NASA/USL Regional Application Center, RAC980012 & RACP990039

*Figure 1. Time sequence images of Mississippi Delta showing the magnitude of land loss and changes in habitat. Images have been modified to show outlines of producing fields studied. A color version of figures in this newsletter is available on the LGS website - www.lgs.lsu.edu.*

# The Louisiana Geological Survey

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***LGS Mission Statement***

*The goals of the Geological Survey are to perform geological investigations that benefit the state of Louisiana by:*

*(1) encouraging the economic development of the natural resources of the state (energy, mineral, water, and environmental);*

*(2) providing unbiased geologic information on natural and environmental hazards; and*

*(3) ensuring the effective transfer of geological information.*

The Louisiana Geological Survey was created by Act 131 of the Louisiana Legislature in 1934 to investigate the geology and resources of the State. LGS is presently a research unit affiliated with the Louisiana State University and reports through the Executive Director of the Center for Energy Studies to the Vice Chancellor for Research and Graduate Studies.

Reservoir compaction is the mechanism whereby oil and gas production could lead to subsidence of the land surface. As the reservoir is compacted or squeezed into a smaller volume by the weight of the overlying sediments, the land surface may sink. In this low-lying coastal area of Louisiana, even a small amount of subsidence will result in submergence and loss of the land surface. The potential for land loss resulting from this amount of oil and gas production in this area is substantial.

Figure 3 compares the cumulative oil and gas production from the fields studied with the percent land loss over time in the West Delta, East Delta, and Venice quadrangles. The periods of highest land loss rates correspond to the periods of peak oil and gas production. The cumulative extracted oil and gas volume curve also correlates well with periods of high land loss rates. Although periods of high oil and gas production clearly correlate to periods of high land loss rates, a direct causal relationship cannot be determined. However, this data suggests some contribution to land subsidence is likely from high oil and gas production rates.

Land loss in south Louisiana is a very serious problem. Subsidence and sedimentation in the Gulf of Mexico basin are processes that have been operating for millions of years, and are the processes that created the Louisiana we have today. It is important to understand these processes, and recognize the possible impact of human activities, in order to minimize any adverse affects to Louisiana's fragile wetlands.

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U.S. Army Engineer Waterways Experiment Station, 1987, Land Loss and Land Accretion, West Delta, LA 15 Minute Quadrangle: Vicksburg, MS, prepared for U.S. Army Engineer District, New Orleans, LA, scale 1:62500.


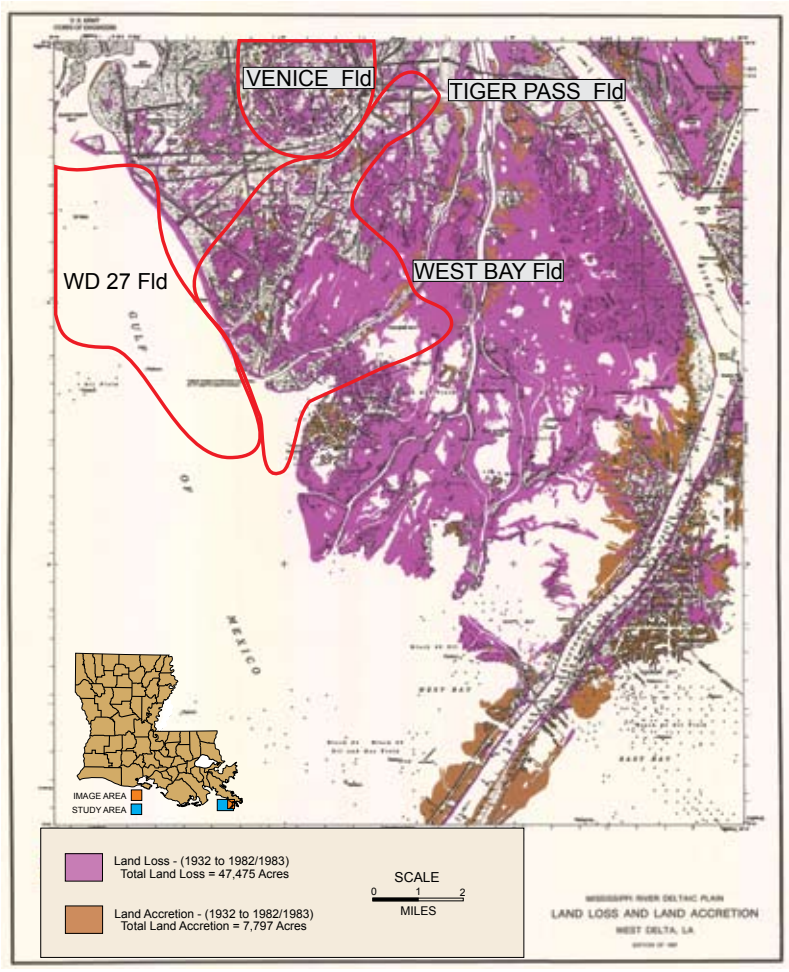


*Figure 2. Land loss in West Delta Quadrangle in the period 1932 to 1982/83.*

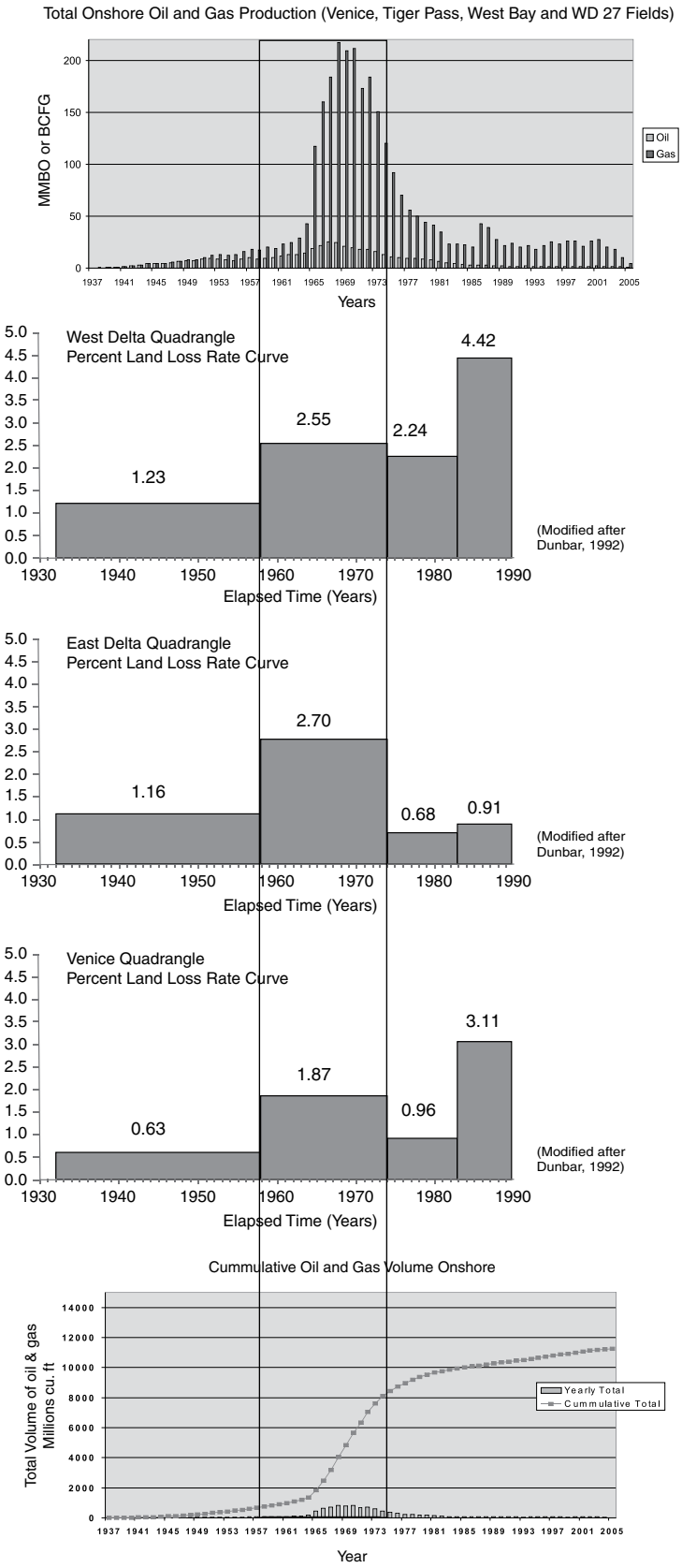


*Figure 3. Comparison of oil and gas production, produced oil and gas volumes, and land loss rates in the West Delta, East Delta, and Venice Quadrangles in the period 1932 to 1982/83.*

## Spring 2006 LGS Field Work for FY 2005 STATEMAP Project

The photo below was taken on May 2, 2006 during field work for the annual geologic mapping project supported by a cooperative agreement with the U.S. Geological Survey. The fiscal-year 2005-06 project is funded under the STATEMAP component of the National Cooperative Geologic Mapping Program. The project includes 1:24,000-scale mapping of two 7.5-minute quadrangles, Blanchard and Mooringsport, in Caddo Parish, northwestern Louisiana. The photo shows examination of an exposure in an abandoned sand pit in the northeastern portion of the Blanchard quadrangle. The pit exposes granuliferous sand and sandy granule conglomerate of the Carrizo Formation (Eocene).

# Groundwater Use in East Baton Rouge Parish: The Past Fifty Years

*Douglas Carlson*

## Introduction

Groundwater has been an important source of water for East Baton Rouge Parish (EBRP) since before 1900. The first public supply well was completed in the EBRP in 1892 and 22 years later the first wells were completed to meet industry's need for water (Meyer and Turcan, 1955). It has been estimated that in 1900 the pumpage of groundwater was approximately 2 million gallons per day (mgd). The rate of groundwater use increased to approximately 10 mgd in 1920, and 12 mgd in 1936 (Meyer and Turcan, 1955). However, there are few pumpage records prior to 1940 (Meyer and Turcan, 1955).

This groundwater use study examines roughly the past fifty years of production. Groundwater has been the only source of public supplied drinking water since 1960, as determined in a series of studies (Snider and Forbes, 1961; Bieber and Forbes, 1966; Dial, 1970; Cardwell and Walter, 1979; Walter, 1982; Lurry, 1987; Lovelace, 1991; Lovelace and Johnson, 1996; and Sargent, 2002). In addition, over the past forty years the importance of groundwater as a source of EBRP general water needs (for example, drinking, industrial, etc.) has increased (Figure 1). Other categories of groundwater users include power generation, rural domestic, livestock, agriculture, and aquaculture (Sargent, 2002). These users have increased their dependence on groundwater from approximately 65% of all water needs meet by groundwater in 1960 to 1970 to almost 100% for 1990 to 2000. However, the most significant change in water use is industry. In 1960 to 1970 approximately 20% of industrial water needs were met by groundwater (Figure 1). By 1990 to 2000 approximately 75% of industrial water needs were met by groundwater (Figure 1). So as a whole the EBRP changed from a parish, which had most of its water needs met by surface water during 1960 to 1970 to a parish which has over 80% of all water needs met by groundwater from 1990 to 2000 (Figure 1). Ten different sand layers (aquifers) underlying the parish are the source for this groundwater.

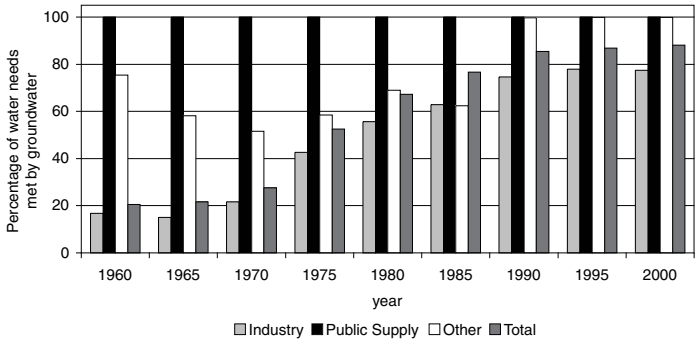


*Figure 1. Percentage of water demand by various categories of water users within East Baton Rouge Parish. Results are derived from category pumping values listed in: Snider and Forbes (1961), Bieber and Forbes (1966), Dial (1970) Cardwell and Walter, (1979), Walter (1982), Lurry (1987), Lovelace (1991), Lovelace and Johnson (1995) and Sargent (2002).*

## Stratigraphy of East Baton Rouge Parish Aquifers

The aquifers that lie under EBRP are Pleistocene to Miocene in age (Lovelace and Lovelace, 1995) and are composed of very fine to coarse sand, and pea size to cobble size gravel (Griffith and Lovelace, 2003). The nomenclature of aquifers by depth (Figure 2) are from type logs, which are located in the industrial corridor of Baton Rouge, north of the downtown area (Meyer and Turcan, 1955). These aquifers in general dip towards the south (Gulf of Mexico) approximately 20 to 80 feet per mile (Smith, 1976, 1979; Whiteman, 1979; Halford and Lovelace, 1994). In general, the dip is greater for the deeper aquifers than the near surface aquifers (Kuniansky et al., 1989; and Halford and Lovelace, 1994). These sand aquifers are significantly displaced by faults, such as the Denham Springs-Scotlandville and Baton Rouge faults (Smith, 1976; McCulloh, 1991). The displacement of sands increases downwards in the section and is generally larger for the Baton Rouge fault than the Denham Springs-Scotlandville fault (Smith, 1976; McCulloh, 1991). They thicken on the downthrown side of each of the faults (Murray, 1961). In EBRP, as well as most of southeastern Louisiana, there are many sand units that have been identified and locally named (Lovelace and Lovelace, 1995) as shown in Figure 2. However, the exact correlation of these sands across southeastern Louisiana is difficult because the units are not traceable for more than a few miles (Fetter, 1980).

| System | Series | Stratigraphic Unit | | Aquifer | Aquifer System |
|---|---|---|---|---|---|
| Quaternary | Pleistocene | | | Chicot Equivalent | Mississippi River Alluvial<br>Shallow sand<br>"400-ft" sand<br>"600-ft" sand |
| Tertiary | Pliocene | Fleming Formation | Blounts Creek Member | Evangeline Equivalent | "800-ft" sand<br>"1000-ft" sand<br>"1200-ft" sand<br>"1500-ft" sand<br>"1700-ft" sand |
| | | | Caster Creek Member | Unnamed confining unit | "2000-ft" sand<br>"2400-ft" sand<br>"2800-ft" sand |
| | Miocene | | Williamson Cr.<br>Dough Hills<br>Carnahan Bayou<br>Members | Jasper Equivalent | |
| | | | Lena Member | Unnamed confining unit | |

*Figure 2. Stratigraphy of East Baton Rouge Parish (modified from Lovelace and Lovelace (1995).*

## How Groundwater is Used

In terms of groundwater consumers the two categories of groundwater users that are important in EBRP are the public supply and industrial users. The other consumer categories including power generation, rural domestic, livestock, agriculture, and aquaculture (Sargent, 2002) are small in comparison and for this study have been lumped together as "other" on Figure 3. However, the "other" category accounts for less than 10% of groundwater used in EBRP for any year.

The trend of use by the two dominant categories of groundwater users is very different. Public supply has increased in its use of groundwater from approximately 15 mgd in 1955 (Kazmann, 1970) to approximately 65 mgd in 2000 (Sargent, 2002). This represents an increase of approximately 330% over the 45 years between 1955 and 2000. By comparison industrial use of groundwater declined from approximately 70 mgd in 1955 (Kazmann, 1970) to 65 mgd in 2000 (Sargent, 2000). These two trends show that industry dominated groundwater use in EBRP till 1980 and public supply and industry were approximately equal in groundwater use from 1985 to 2000, see Figure 3.

Total groundwater used in EBRP by industry between 1960 and 2000 has remained fairly constant. However, groundwater use by different major categories of industries has changed significantly between 1960 and 2000. In general, the chemical industry was the dominant category of industrial groundwater user in EBRP from 1960 to 1980 (Sargent, 2005a, b). In 1985 the chemical industry and paper products industry were approximately equal size consumers of groundwater as shown in Figure 4 (Sargent, 2005b). From 1990 to 2000 the leading industrial category of groundwater user was paper products (Lovelace, 1991; Lovelace and Johnson, 1996; Sargent, 2002). Another significant industrial category in terms of groundwater use is petroleum refining. Refining has never in the past forty years been the leading industrial user of groundwater, but it has remained an important user throughout this time period (Lovelace, 1991; Lovelace and Johnson, 1996; Sargent, 2002, 2005a, b).

## Groundwater Consumption by Public Suppliers

In general, groundwater production by public suppliers has generally increased faster than population in EBRP for the past seventy years, Figure 6 (Lovelace, 1991; Anonymous, 2002; Sargent, 2002; USGS, 2006). The population of Baton Rouge increased from 30,729 in 1930 to 227,818 in 2000, a 640% increase. Population of EBRP increased from in 44,513 in 1930 to 412,852 in 2000, a 830 % increase (Anonymous, 2002). Public supply water production has increased from 2.4 mgd in 1930 to 64 mgd in 2000, an approximately 2570% increase (Snider and Forbes, 1961; Dial, 1970; Walter, 1989; Lovelace, 1991, Sargent, 2002; USGS, 2006) (Figure 5).

## Public Supply Demand by Source Aquifers

In terms of groundwater pumpage from shallow sands and intermediate depth sands the trends of use are different. For the shallow 400-foot and 600-foot sand there has been a general decline in use between 1953 and 1990. After 1990 the trend has been to increase use of these two shallow sands, see Figure 6 (Kazmann, 1970; Capitol Area Ground Water Conservation District (CAGWCD), 2005; USGS, 2006). For the intermediate depth sands there has been a general increase in usage. For the 1200-foot sand there was a rapid increase in demand between 1953 and 1962, followed by a slow decrease in demand between 1962 and 1992, (Figure 6). After 1992 there has been another rapid increase in groundwater demand for the 1200-foot sand from approximately 12 mgd to 18 mgd (Kazmann, 1970; CAGWCD, 2005; USGS, 2006). Pumpage in the 1500-foot sand has slowly

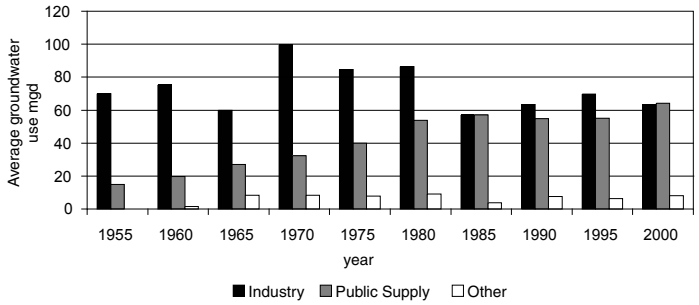


*Figure 3. The average daily pumping rate for various categories of water users in East Baton Rouge Parish (Snider and Forbes, 1961; Bieber and Forbes, 1966; Dial, 1970; Kazmann, 1970; Cardwell and Walter, 1979; Walter, 1982; Lurry, 1987; Lovelace, 1991; Lovelace and Johnson, 1995; Sargent, 2002)*

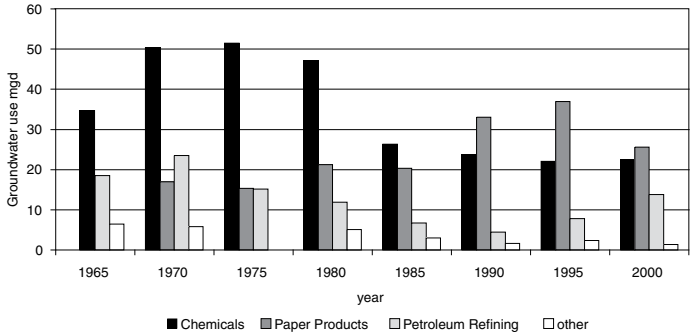


*Figure 4. The average daily pumping rate for various categories of industrial water users in East Baton Rouge Parish Parish (Lovelace, 1991; Lovelace and Johnson, 1995; Sargent, 2002, 200 5a, b).*

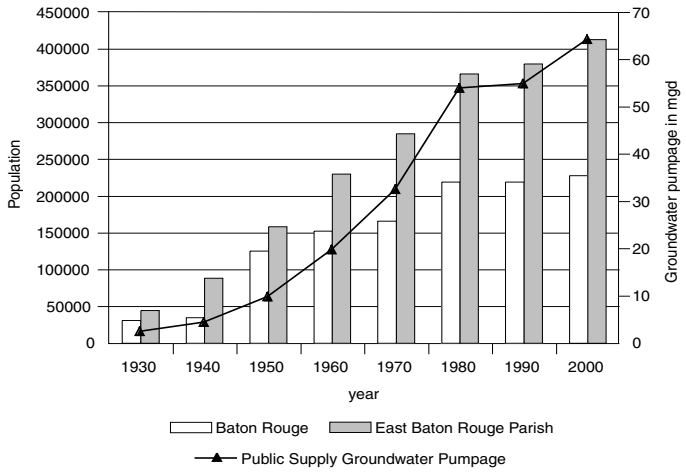


*Figure 5. Public supply of groundwater production, and population of Baton Rouge and EBRP between 1930 and 2000 (Snider and Forbes, 1961; Dial, 1970; Walter, 1982; Lovelace, 1991; Anonymous, 2002; Sargent, 2002; USGS, 2006).*

increased between 1953 and 1990, and has remained fairly constant after 1990 (Kazmann, 1970; CAGWCD, 2005; USGS, 2006).

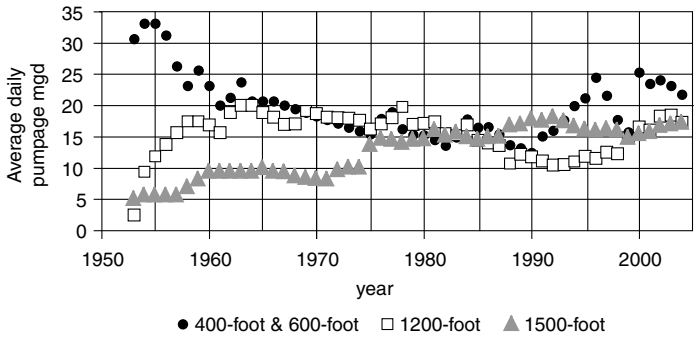


*Figure 6. Daily supply of groundwater that is drawn from three Pleistocene-Pliocene aquifers within East Baton Rouge Parish (Kazmann, 1970; CAGWCD 2005). Between 1967 to 1974 groundwater supply is approximated from station production results that includes multiple sand units blended into a single station production value for Pliocene aquifers (USGS, 2006). For the Pleistocene aquifer a linear interpolation between 1967 and 1974 was used as an estimated pumpage in this aquifer.*

All of the deep sand aquifers experience a major increase in pumpage between 1953 and 2004 (Figure 7). However, the trends vary between sands. For the 2400-foot sand there has been a slow steady increase in pumpage from approximately 10 mgd in 1955 to approximately 20 mgd in 1995 to 2004, as shown in Figure 7 (Kazmann, 1970; CAGWCD, 2005; USGS, 2006). The 2800-foot sand has experienced a rapid increase in pumpage from approximately 1 mgd in 1953 to approximately 30 mgd in 1980. After 1980 the demand for groundwater from the 2800-foot sand (Figure 7) has remained fairly constant with some yearly variations (Kazmann, 1970; CAGWCD, 2005; USGS, 2006). The 2000-foot sand experienced a similar pattern of demand as the 2800-foot sand. There is a rapid increase in demand from approximately 15 mgd in 1953 to approximately 45 mgd in 1975. After 1975 there is a general decrease in demand with some scatter (Kazmann, 1970; CAGWCD, 2005; USGS, 2006).

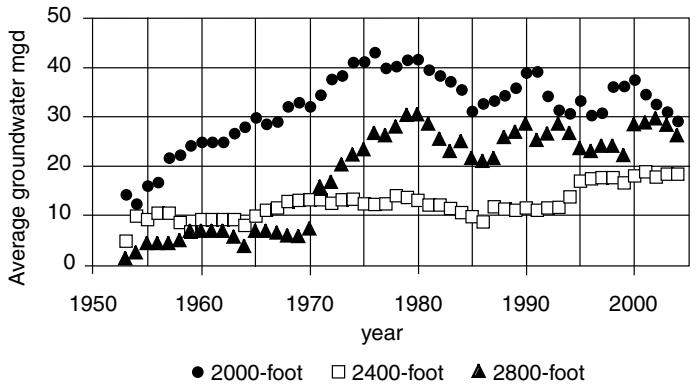


*Figure 7. Daily supply of groundwater drawn from three Miocene aquifers within East Baton Rouge Parish (Kazmann, 1970; Dial 2005). Pumpage value between 1967 to 1974 are approximated from station production results that includes multiple sand units blended into a single station production value (USGS, 2006).*

In general, the demand for groundwater in EBRP has been met progressively by deeper aquifers over shallower aquifers. Until 1959 the 400-foot and 600-foot sand aquifer was the leading source of groundwater in EBRP. However, in 1960 the 2000-foot aquifer replaced the 400-foot and 600-foot aquifer as the leading source of water. By 1972 the 400-foot and 600-foot sand aquifer was replaced as EBRP's secondary source of groundwater by the 2800-foot aquifer, which had previously remained as a secondary source. By 1973 the 400-foot and 600-foot aquifer was replaced as EBRP's third source of groundwater by the 1200-foot aquifer until 1983. However, the position of the third ranking source of groundwater has been traded off between 1200-foot and 400-foot & 600-foot aquifers throughout most of the next twenty years.

EBRP has become increasingly dependent on sands belonging to the deepest of the three general aquifer systems. As can been seen in Figure 8 the Chicot Equivalent Aquifer (shallowest system) supplies a decreasing share of EBRP's groundwater needs and the Jasper Equivalent Aquifer (deepest system) supplied an increasing share of EBRP's groundwater needs between 1953 and 1978. After 1978 the reverse was the case but not nearly as large a change in the share of groundwater supplied by the two aquifer systems. However, in 2004 the Jasper Equivalent still supplied over half of the groundwater used in EBRP as has been the case since 1967 (Figure 8). The Chicot Equivalent supplied the least amount of water in 2004 as it has been since 1958. By comparison the share of groundwater supplied by the Evangeline Equivalent Aquifer has remained fairly constant since 1958 at approximately 30%.

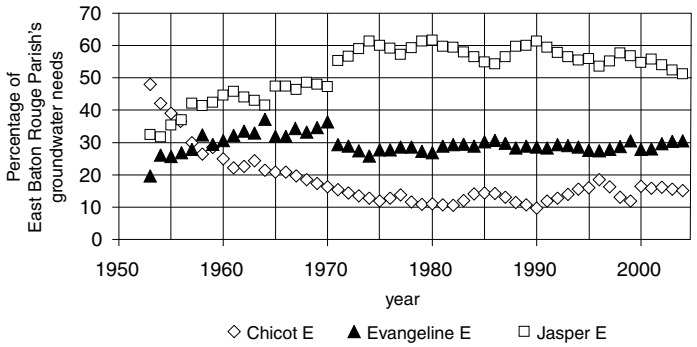


*Figure 8. The distribution of groundwater supplied by aquifer sands within East Baton Rouge Parish. Between 1967 to 1974 the production is approximated by a linear interpolation between 1966 and 1975 production values.*

## Summary

There are numerous observations that can be made about groundwater use in East Baton Rouge Parish over the past fifty years.

1. Public supply has been solely met by groundwater from ten major sand aquifers since 1960.
2. There has been a growing share of water needs being met by groundwater for industrial water needs over the past forty years from under 20% in 1960 to over 70% in 2000.
3. An increasing share of water needs for other more minor categories of water use such as agriculture, rural domestic, power generation, livestock, and aquaculture has been met by groundwater from about 75% in 1960 to about 100% in 1990 to 2000.
4. Groundwater needs of East Baton Rouge Parish have been met by unconsolidated sands from Pleistocene to Miocene age.
5. The leading use of groundwater over the past forty years is for industry with public supply having the secondary demand. Other categories of use comprise a relatively minor share of groundwater demand within East Baton Rouge Parish, usually less than 20%.
6. The three categories of industries that have dominated industrial groundwater use in East Baton Rouge Parish over the past forty years are Chemicals, Paper Products and Petroleum Refining.
7. The share of groundwater supplied by Chicot Equivalent shallow aquifers such as 400-foot and 600-foot sand has decreased since the early 1950s, from approximately 50% in 1952 to approximately 15% in 2004.
8. The share of groundwater supplied by the intermediate depth Evangeline Equivalent aquifers (800-foot, 1,000-foot, 1,200-foot, 1,500-foot, and 1,700-foot sands) has remained fairly constant at approximately 30% from 1960 to 2004 after a brief increase in the 1950s from approximately 20%.
9. The share of groundwater supplied by the deep Jasper-Equivalent aquifers (2,000-foot, 2,400-foot, and 2,800-foot sands) has increased since the early 1950s, from approximately 30% in 1952 to approximately 50% in 2004. However, the share of groundwater from these three aquifers has remained fairly constant over the past thirty years from 50% to 60%.

**Acknowledgments**

I would like to thank Pierre Sargent for providing spreadsheets that note groundwater use by industry type and by public supplier for 1980 and 1985 and for access to a collection of written records of industrial and public supply water use for 1960, 1965, 1970 and 1975. In addition thanks to Charlie Demas and Wendy Lovelace among others at the Baton Rouge office of the U.S. Geological Survey for their gracious help and access to their vast set of records. Thanks also to Don Dial of the Capital Area Ground Water Conservation Commission for supplying a spreadsheet file that includes record of pumping values from 1975 to 2004 of all major water users in East Baton Rouge Parish.

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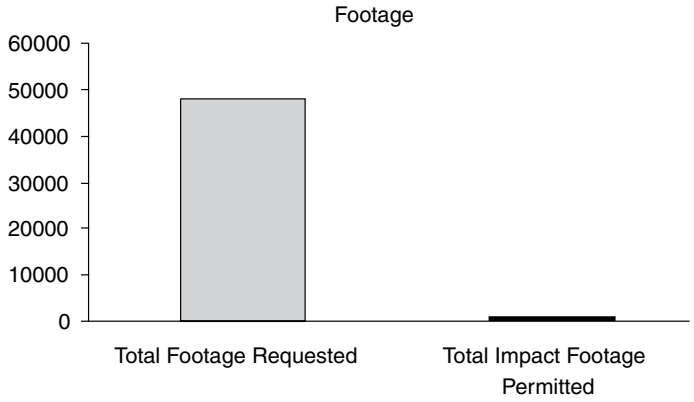
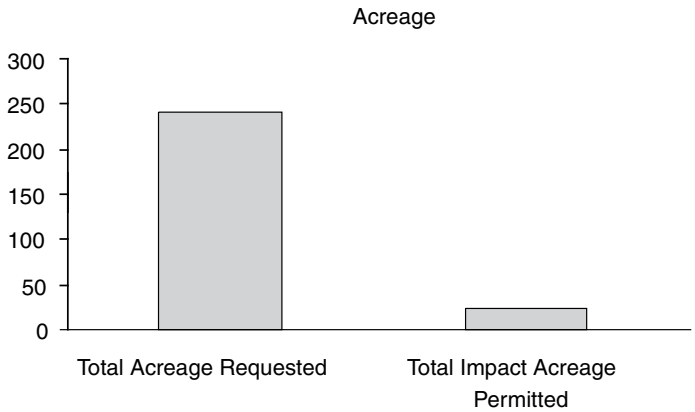
## Geologic Review

Geologic Review (GR), a program created by the Louisiana Geological Survey in 1982 to provide regulatory technical assistance to the Coastal Management Division (CMD) of the Louisiana Department of Natural Resources and to three districts of the U.S. Army Corps of Engineers (USACE), continued its successful protection of the environment during 2004-2005. Oil and gas permit applications made to these two agencies which involved environmental impact to wetlands or other environmentally sensitive areas had their geology, engineering, lease, and site-specific data – and sometimes their economic data – reviewed and evaluated by LGS assistant director John E. Johnston III and the other agencies mentioned earlier, in order to determine if there was a less-damaging feasible alternative available. These alternatives involved such concepts as reducing the size of ring levees and slips, reducing the length of board roads and canals, the use of directional drilling, and the use of alternate and less-damaging access routes which still allowed the well to be drilled while avoiding or minimizing any environmental damage involved. During 2004-2005, based on data submitted by CMD and USCAE from issued permits, Geologic Review's search for less-damaging alternatives had the very successful effects illustrated on the charts below on the length of canals and board roads requested and the overall acreage of projects requested.



PTTC
TECHNOLOGY CONNECTIONS
Central Gulf Region

## New Products from the Center for Energy Studies

### Report on Wellbore Completion Schematics, Formation Tops Available

Donald A. Goddard, PTTC coordinator and CES associate professor, recently completed a report titled ***Louisiana Wellbore Completion Schematics and Formation Tops***, which provides typical wellbore completion designs used in drilling and completing wells in onshore oil and gas producing parishes of North and South Louisiana. The report features examples of typical AFE drilling costs for several drilling depths, as well as selected wellbore schematics for most of the producing intervals, including lithologies and formation tops that are penetrated.

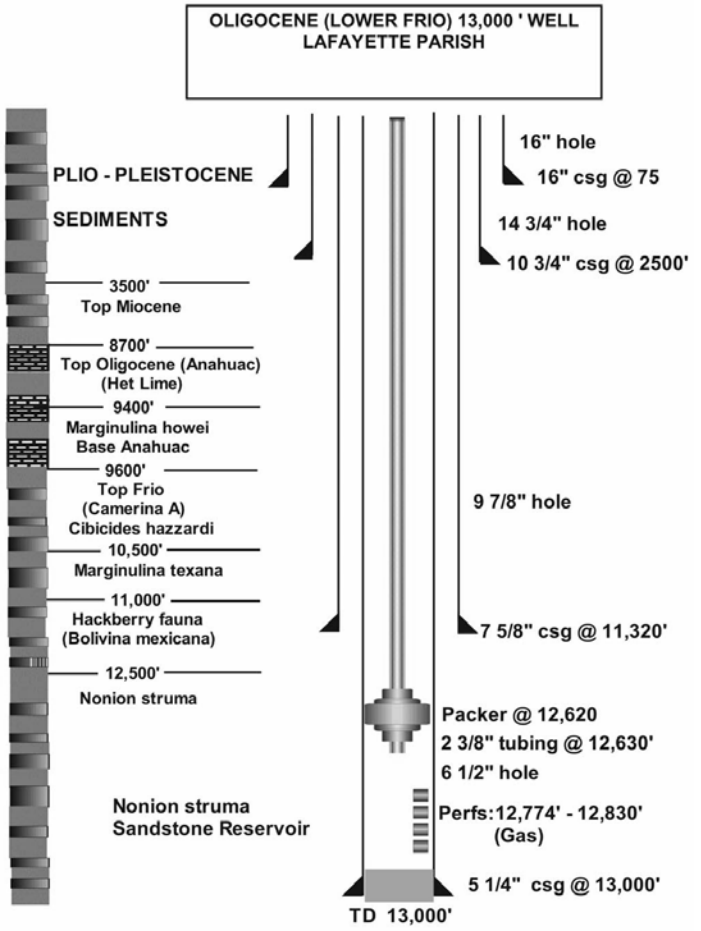
Visit **www.cgrpttc.lsu.edu** to order a copy of the report. The cost is $35 for a black and white hard copy or the color CD version.

### Rapides, Vernon Desktop Reference

The new ***Rapides and Vernon Parish Desktop Well Reference*** CD is available. Part of the Louisiana Parish Well Reference (LPWR) series, the reference is modeled after the Louisiana Desktop Well Reference, which is a Geographic Information System (GIS) for the Louisiana oil and gas industry emphasizing the historical field and lease unit well (LUW) production at the parish level. The CD was developed by Brian Harder, Louisiana Geological Survey Research Associate, and Mike Surman, CES Computer Manager.

The historical production data in the parish CDs, including that prior to 1977, was compiled from two sources from the Louisiana Department of Natural Resources Office of Conservation. Monthly LUW production was taken from the Production Audit Cards, and annual field production was taken from the Annual Oil and Gas Reports.

Contact Mike Surman at msurman@lsu.edu or 225-578-4553, or visit **www.cgrttc.lsu.edu/lpwr** to order a copy.



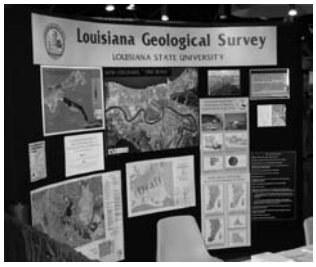

*An example of one of the 50 schematics included in "Louisiana Wellbore Completion Schematics and Formation Tops."*

## The Louisiana Geological Survey Assists in Evaluation of the Redden-Brown Home Site in East Feliciana Parish, Louisiana

The Redden-Brown site is a privately owned property located in East Feliciana Parish, Louisiana (sec 45 T2S R3E), located on Bluff Road (Hwy. 63) southeast of Clinton, LA. Sid Gray (Historic Building Consultant) invited a multi-disciplined group of specialists for consultation about archaeology, geomorphology, and the historical use among other aspects of the study site. Riley Milner with the Louisiana Geological Survey was asked to join the group for his knowledge and understanding of geomorphology and landforms of the area. Others included Rob Mann, Louisiana Division of Archaeology-Regional Archaeology Program; Ward Reilly, specialist on Louisiana History and exploring historic sites; Kathy Mathewson, specialist of the Anglo-American culture; and Ian Lindsey, an expert in exploring natural environments. Riley Milner and Ian Lindsey worked together to identify what areas on the site are natural settings or have been disturbed by activities of the home site.

The original home (~1820) burned and in 1855 the home was replaced at a different location. Part of the activities was to find the original home site, and an access road shown on old topographic maps. Neither were located. This gathering of experts provides an excellent opportunity to explore some basic questions about land settlement in the late 18th and 19th century and add to the overall understanding of the history of Louisiana.

Conferences



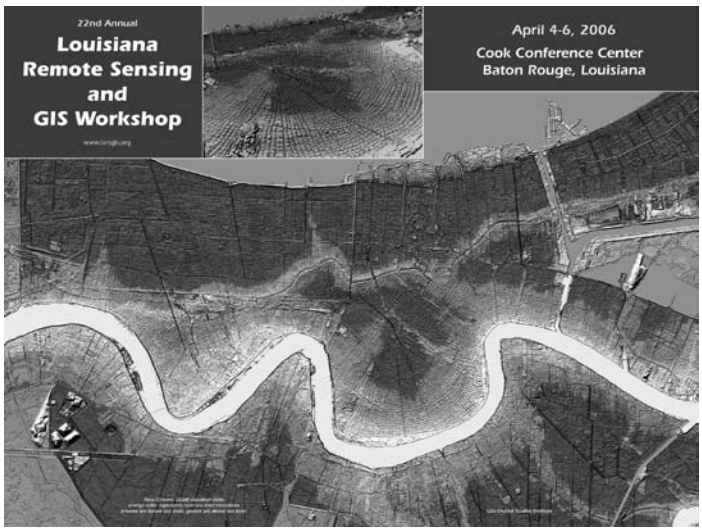

## American Association of Petroleum Geologists (AAPG)

The AAPG annual convention was held in Houston, Texas from April 9-12, 2006. LGS had an exhibit booth at this convention where LGS publications and posters were displayed which provided information on past and ongoing LGS projects. The booth also featured a display of a 3D image of the New Orleans area titled **"The Bowl"** which proved to be a popular attraction for the attendees. LGS personnel who attended the meeting and assisted Riley Milner at the booth were Chacko John, Roger Barnaby, and Douglas Carlson.

## 22nd Annual Louisiana Remote Sensing and GIS Workshop

The 22nd Annual Louisiana Remote Sensing and Geographic Information System workshop (RSGIS) was held in Baton Rouge at the Lod Cook Conference Center at LSU on April 4-6, 2006. This annual conference of Louisiana mapping science professionals featured the theme of *" Hurricanes Katrina & Rita Response and Recovery"*. John Snead, Hampton Peele, and Robert Paulsell attended from LGS.

- Hampton Peele, Ahmet Binselam, John Snead, Lisa Pond, and Robert Paulsell exhibited a poster and map display entitled *"The Impact of Hurricane Katrina"*.
- Hampton Peele presented a paper entitled *"The New Orleans HEF Database in Hurricane Katrina Response"* with co-authors Ahmet Binselam and Kate Streva of the LSU Center for the Study of Health Impacts of Hurricanes.
- John Snead, with DeWitt Braud of the LSU Coastal Studies Institute, developed and designed the RSGIS 2006 promotional poster.




## American Institute of Hydrogeology (AIH)

The AIH 25th Anniversary meeting and International Conference on "Challenges in Coalbed Hydrogeology and Water Quality" was held from May 21-24, 2006 in Baton Rouge, La. In addition to having an exhibit booth displaying LGS publications and ongoing projects of the Water and Environmental Section of LGS, Douglas Carlson, Thomas Van Biersel and Riley Milner presented papers which are listed under "Papers Published" in this newsletter. Attendees showed keen interest in the LGS exhibit booth display and questions on the ongoing projects etc. were answered by Riley Milner who manned the booth, assisted by Douglas Carlson and Thomas Van Biersel.

## Digital Mapping Techniques 2006 (DMT '06)

The tenth annual DMT workshop was held in Columbus Ohio from June 11-14. Research Associate Hampton Peele was the LGS representative at this conference and exhibited a poster and map display entitled *"The Impact of Hurricane Katrina"*. This conference was designed to share information and knowledge concerning GIS applications and digital mapping techniques to state and federal geologic survey personnel and others working in these fields. The proceedings volume and summaries of past workshops are available on the USGS website: http://ngmdb.usgs.gov/info/dmt. The DMT is organized by the USGS Association of American State Geologists (AASG) and USGS.

## OSRADP May Symposium 2006

The Louisiana Oil Spill Research and Development Program (OSRADP) May Symposium 2006 was held on May 9, 2006 at the new Galvez Conference Center in the state government complex in downtown Baton Rouge. This annual symposium showcases the results of OSRADP research projects to professionals in the oil spill research, planning, and response communities. John Snead, Lisa Pond, and Robert Paulsell of LGS attended.

- John Snead presented a report on his project titled *" Field Investigation and Digital Mapping of Pipeline Crossings of the Coastal Zone Navigation Channels in Louisiana"*.
- Robert Paulsell presented a report on his project titled *"Research and Development of a GIS for Oil, Gas, and Petrochemical Transmission Pipelines between Baton Rouge and New Orleans, Louisiana"*

## Environmental Workshop for the Oil and Gas Professional

This technology workshop, held in Jackson, Mississippi, was attended by Thomas Van Biersel and Douglas Carlson of the Louisiana Geological Survey (LGS). The LGS's geoscientists also met with members of the Mississippi Dept. of Environmental Quality Office of Geology and Office of Land and Water Resources, and the U.S. Geological Survey Water Resource Division Jackson Mississippi Office to discuss data sharing and ongoing projects by the four agencies.

## Geological Society of America Southeastern Section

The GSA Southeastern Section conference was held in Knoxville, Tennessee from March 23-24. Douglas Carlson attended this meeting and presented a poster paper titled *"Sand Distribution of the Chicot Aquifer in Southwestern, Louisiana"*.

## LGS Advisory Board Meeting

The LGS Advisory Board Meeting was held on February 10, 2006. LGS researchers made short presentations of their projects after a review of all LGS activities for the year by LGS Director Chacko John. The Board meets once annually.

### New Publications

***White Lake 30 X 60 Minute Geologic Quadrangle Map*** (2006). Scale 1:100,000. Geology by Paul Heinrich, GIS compilation by R. Hampton Peele, Jomish George, Arvind Parthasarathy and Arti Singh and Cartography by John Snead. Multicolored, sheet size 20" X 46" with descriptions of map units.

***Geology and Hurricane-Protection Strategies in the Greater New Orleans Area***, Public Information Series No. 11, (2006), by Richard P. McCulloh, Paul Heinrich, and Bill Good. This publication reviews and examines the geological contexts of subsidence affecting the New Orleans area, and the issues of chosen flood- and hurricane-protection strategies in the area and their consequences for subsidence effects at the surface. Available free of charge.

***Research Related to Two Common Restoration Project Types in Coastal Louisiana: Marsh Terracing and Hydrogeologic Restoration,*** Report of Investigations No. 06-01 (A & B), (2006). A) Aerial Growth of the Sabine Marsh Terracing Project over a Ten-Year Period by Bill Good, Hampton Peele and Reed Bourgeois. B) Development of a Conceptual Model for Two Hydrogeologic Restoration Projects in the Barataria Basin of Coastal Louisiana by Bill Good.

Contact Patrick O'Neill to order LGS publications at 225/578-8590 or email at poneil2@lsu.edu.

### Papers Published


Barnaby, Roger, 2006, Outcrop analog for mixed siliciclastic-carbonate ramp reservoirs-stratigraphic hierarchy, facies architecture, and geologic heterogeneity: Grayburg Formation, Permean Basin, U.S.A.; Journal of Sedimentary Research, (In Press).

Breland, F. Clayton Jr. and P.D. Warwick, 2005, Wilcox Group coalbed methane in north central Louisiana: Gulf Coast Association of Geological Societies Transactions, v. 55, p. 39-46.

Carlson, Douglas and R.P. McCulloh, 2005, A preliminary examination of geothermal gradient throughout Louisiana's 64 parishes: Gulf Coast Association of Geological Societies Transactions, v. 55, p. 57-70.

Carlson, D.A., 2006 How falling groundwater levels influence the water budget of Lake Pontchartrain watershed: Transactions of the AIH 25th Anniversary Conference, Baton Rouge, (In press).

John, Chacko J., B.L. Jones, B.J. Harder, and R.J. Bourgeois, 2005, Exploratory progress towards proving the billion barrel potential of the Tuscaloosa Marine Shale: Gulf Coast Association of Geological Societies Transactions, v. 55, p. 367-372.

Van Biersel, T.P. and L. Riley Milner, 2006, Saltwater encroachment in regional drainage basins of southern Louisiana: an update: Transactions of the AIH 25th Anniversary Conference, Baton Rouge, (In press).

Milner, L. Riley and T.P. Van Biersel, 2006, Updated geology and saltwater intrusion for the Chicot aquifer of southwestern Louisiana: Transactions of the AIH 25th Anniversary Conference, Baton Rouge, (In press).


## New Contracts

***"Development of a Traveling Oil Spill Exhibit"***, from the Louisiana Oil Spill Research & Development Program, a two-year HDTV kiosk project for $94,970. John Snead, Principal Investigator.

***"Research and Development of a GIS for the Oil, Gas, & Petrochemical Transmission Pipelines between Baton Rouge and New Orleans"***, from the Louisiana Oil Spill Research & Development Program, second-year funding of $51,780 for a three-year project. Robert Paulsell, Principal Investigator.

***"Design and Preparation of North Louisiana Birding Trail Maps"***, from Fermata Corp. for $5,065, to develop guidebook maps for the Louisiana Office of Tourism. Lisa Pond, Principal Investigator.

## Personnel News

Jeanne Johnson, Accountant Technician, completed 15 years of service with LSU in March and was presented with an LSU Service Award by LGS Director Chacko J. John.

F. Clayton Breland, Jr., Assistant Professor-Research gave a presentation to the Shreveport Geological Society at their March meeting titled ***"An Introduction to Coalbed Methane in Louisiana".***

M. Byron Miller, Research Associate, and F. Clayton Breland, Jr., Assistant Professor-Research, attended the PTTC and DOE Sponsored CO2 Enhanced Oil Recovery (EOR) pre-proposal meeting held in March at Houston to get proposal details for potential LGS involvement in a research proposal.

Richard P. McCulloh, Research Associate, was asked to serve on the Advisory Board of the Boone Pickens School of Geology at Oklahoma State University, and attended its initial organizational meeting in Stillwater, OK, on April 22nd.

Chacko J. John, LGS Director & State Geologist, attended the annual meeting of the Association of American State Geologists (AASG) held in Santa Fe, New Mexico from June 4-7. He was elected as President-elect of AASG for the upcoming year and will be responsible for arranging the biannual AASG liaison meetings with Federal agencies and other related geological institutions in Washington DC. AASG is a national organization and primary membership consists of the state geologists of the 50 states and Puerto Rico.

Riley Milner made a presentation on Louisiana Geology to the Fourth grade classes at Westminster Elementary School in East Baton Rouge Parish. All of the children and the teachers were very interested in the hands on part with the rock and mineral specimens. They especially liked the "floating rock", a piece of volcanic pumice.

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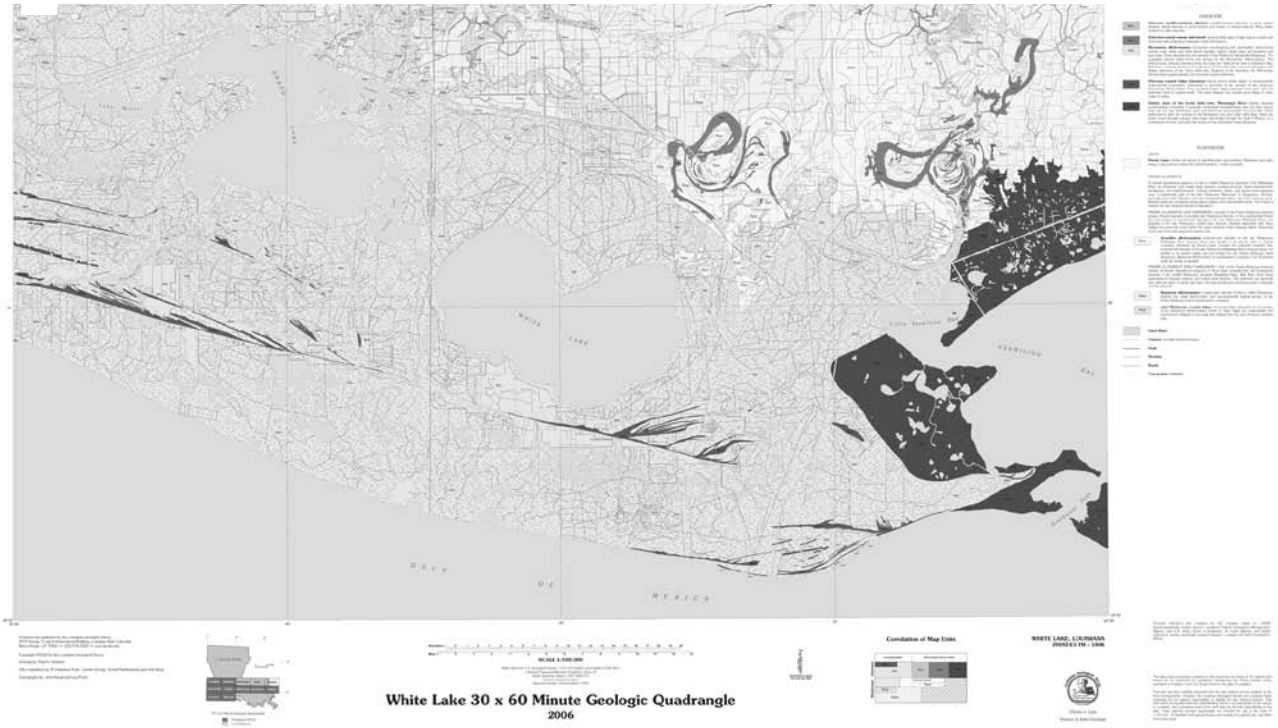


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