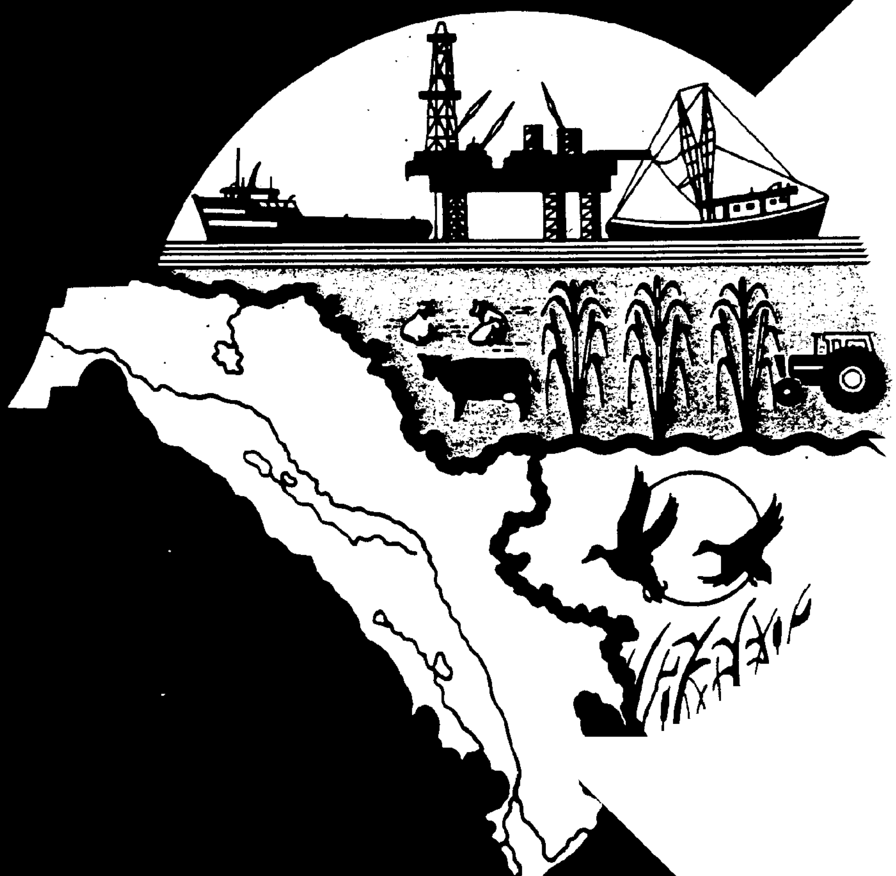
# LAFOURCHE PARISH
# Coastal Zone Management Program





## VOLUME I
## An Overview of Lafourche Parish

LAFOURCHE PARISH

COASTAL ZONE MANAGEMENT PROGRAM

VOLUME I - AN OVERVIEW OF LAFOURCHE PARISH

REPORT OF THE COASTAL ZONE MANAGEMENT ADVISORY COMMITTEE AND LAFOURCHE PARISH PLANNING DEPARTMENT TO THE LAFOURCHE PARISH COUNCIL



PREPARED BY EDWIN J. DURABB, PLANNING DIRECTOR, IN CONJUNCTION WITH THE LAFOURCHE PARISH CZM ADVISORY COMMITTEE



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LAFOURCHE PARISH COASTAL ZONE MANAGEMENT

ADVISORY COMMITTEE MEMBERS

AS OF DECEMBER 20, 1982

Caroll Adams

Gerald Bordelon

Windell Curole

Ted Falgout

Perry Gisclair

Horace Thibodaux

Mark Daire

Vince Guillory

Gerald Louviere

LAFOURCHE PARISH CZM STAFF

CZM Coordinator - Ed Durabb, Planning Director

Typing - Connie Doran, Secretary

Drafting - Sandi Aymond, Student Draftsperson

Printing - Susan Burleigh, Public Services Coordinator

The author also wishes to gratefully acknowledge the logistical and financial support provided to the Coastal Zone Management project by Parish President, Dick Egle', without whose committment the program would not have been possible.

# INTRODUCTION

This report is the culmination of several years of dedicated effort at the state and parish level to develop a workable plan to manage the valuable wetland areas in Lafourche Parish. From the earliest reports outlining the alarming problems in our coastal areas in 1970, to the passage of the Federal Coastal Zone Management Act in 1972, to the numerous efforts at developing a State Coastal Plan to the passage of the Louisiana State and Local Coastal Resources Management Act of 1978 (Act 361), there has been an increasing realization of the critical problems confronting our state and the need to establish a plan to deal with these problems in a coordinated fashion.

Lafourche Parish has participated since 1977 in several management efforts, 1st to provide input into the state program development and, later, to develop a local plan as part of the developing state program. After several efforts, changes in direction, and necessary alterations to management proposals, the state program was established and allowance was made for parish participation in the coastal management process on a voluntary basis. This report is a summary of a proposed local Coastal Zone Management Plan for Lafourche Parish. Considering the fact that the parish is over 84% wetlands and water, and that 4000 acres of wetlands are being lost per year to erosion and saltwater intrusion and that, until recently, the parish had no control of activities occurring in the wetlands, (control rested with Federal agencies, mainly the U.S. Army Corps of Engineers) and considering the renewable resources and mineral production of these areas and the large population residing in the coastal zone, it became imperative that the parish government participate in a program such as CZM and thus reassert control over this area of vital parish interest.

The new parish governmental structure (Council - President system) with its division of responsiblilities and expansion of services made it feasible for perhaps the 1st time for the parish to develop and administer a management plan that best protects parish interests while recognizing the statewide and national importance of our state's productive wetland areas, lands that compose over 40% of the total wetland area of the entire United States!

The program outlined in this report provides the guidance, framework, and specific management techniques for wetlands management in our parish coastal zone. Although tailored to meet the needs of Lafourche Parish, the program fits within the guidelines set for the overall state program. Acceptance of these plans puts Lafourche Parish into a partnership with the State of Louisiana in the management of parish wetland resources. This is a far cry from the exclusive federal control that, up until recently was the only management attempt over an area that is so important to Lafourche Parish.

The Coastal Zone Management report is divided into two volumes:

Volume I - An Overview of Lafourche Parish

- Chapter I - The Environmental Setting
- Chapter II - Demography and Settlement Patterns
- Chapter III - The Economy of the Lafourche Parish Coastal Zone
- Appendix i - Land Cover - Lafourche Parish

Volume II - Coastal Zone Management in Lafourche Parish

- Chapter I - An Overview of the Federal and State CZM Program
- Chapter II - An Overview of the local CZM Program
- Chapter III - Permitting and Permit Monitoring - the CZM Management Tool
- Chapter IV - Environmental Management Units
- Chapter V - The CZM Ordinance
- Appendix i - Information Base for the Local Program
- Appendix ii - Minutes of the CZM Advisory Committee

The Lafourche CZM plan outlined in these two reports, when combined with the information and resources of the state program will, when accepted and implemented, provide the basis for sound local and state management of a vital and endangered parish resource in the best interest of the citizens of Lafourche Parish and the State of Louisiana.

# CHAPTER I

# THE ENVIRONMENTAL SETTING

## GEOLOGY

### Geologic History

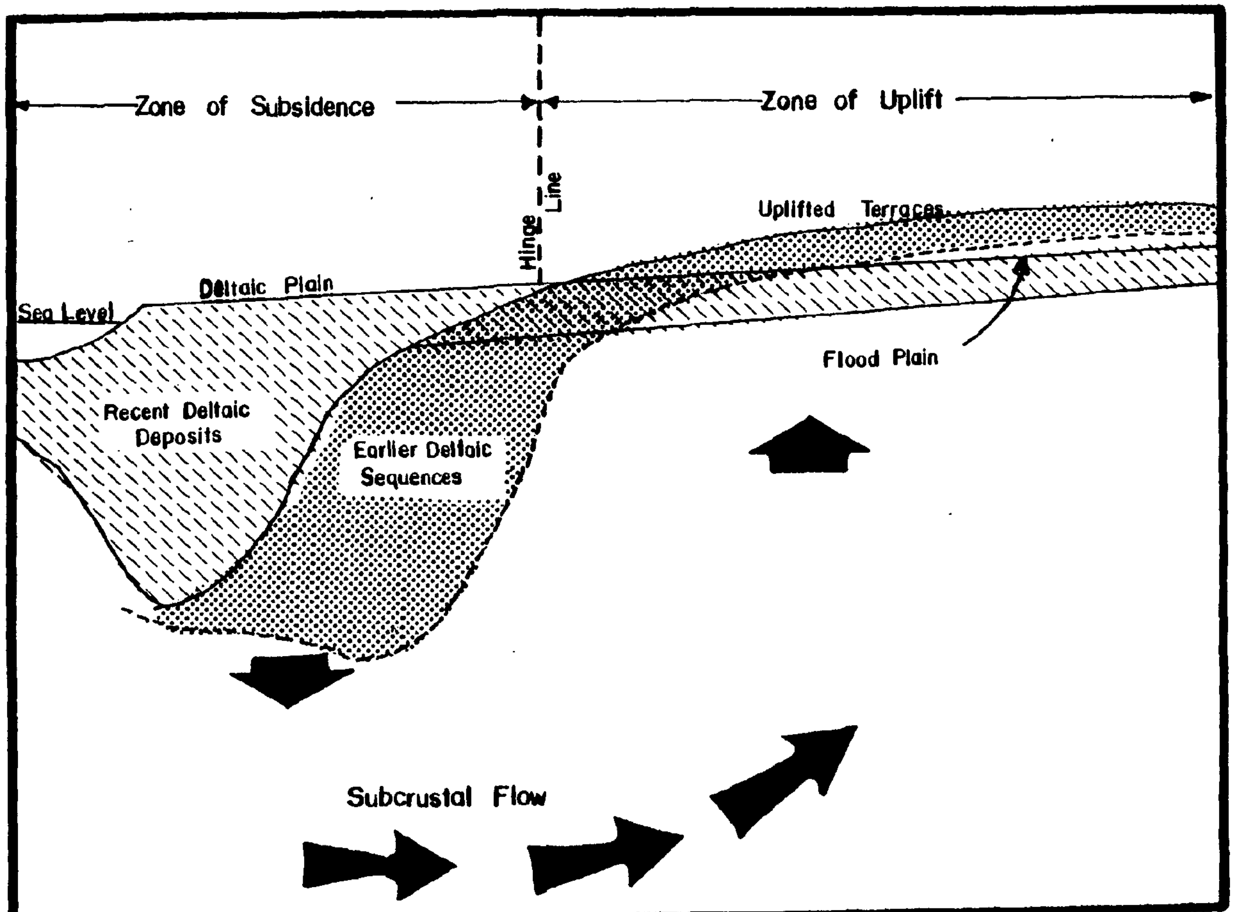
Lafourche Parish lies within a geologic basin which has been collecting sediment since the Mesozoic Period. The depth of this sediment to crustal rock is estimated to be in excess of 60,000 feet. Fluctuations in sea level, over time, have caused these sediments to consist mainly of sand, gravel, clay, shale, and limestone, during their sequential deposition. A layer of salt was deposited during the Jurassic Period. The sinking of the Gulf Coast Geosyncline (a belt shaped basin area that subsides deeply) is a continuous process. The basin has downwarped, partially from the weight of the sediment load it has collected and partially from the compaction of the sediment itself. This process has gone on for over 200,000,000 years. Recently, the downwarping has led to subsidence of surface features and to uplifting of the Pleistocene terraces to the north (Figures 1.1 and 1.2). These features are currently extant today in the Florida Parishes of Louisiana.

### Economic and Structural Geology

Economically, the Gulf Coast geosyncline is very important.

FIGURE 1.1

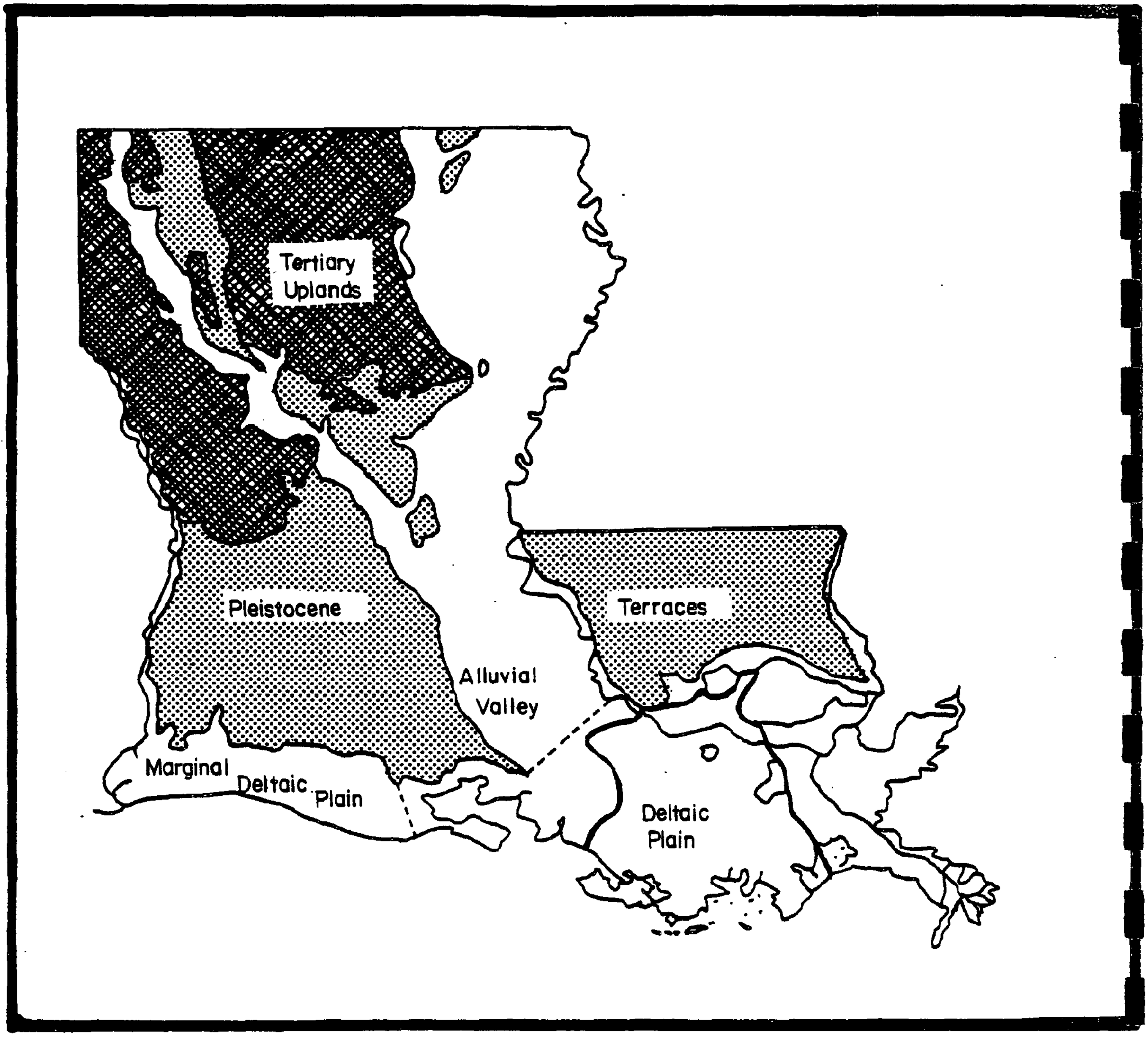
GULF COAST GEOSYNCLINE




SOURCE: MORGAN (1977)

FIGURE 1.2

LOUISIANA PHYSIOGRAPHIC REGIONS




SOURCE: MORGAN (1977)

Deposits of natural gas, oil, sulphur, and salt are numerous. These natural resources have been found in the Miocene Age or younger strata. Lafourche Parish is a very large producer of oil and gas. These deposits, to a large degree, depend upon a phenomenon in the area known as salt domes. Salt domes are intrusions of a Jurassic salt layer which, due to the enormous pressure subjected on the salt by overlying sediments and strata and to its ability to flow to areas of less pressure, are slowly rising toward the surface. This movement toward the surface includes breaking through the overlying strata or deforming it (Figure 1.3).

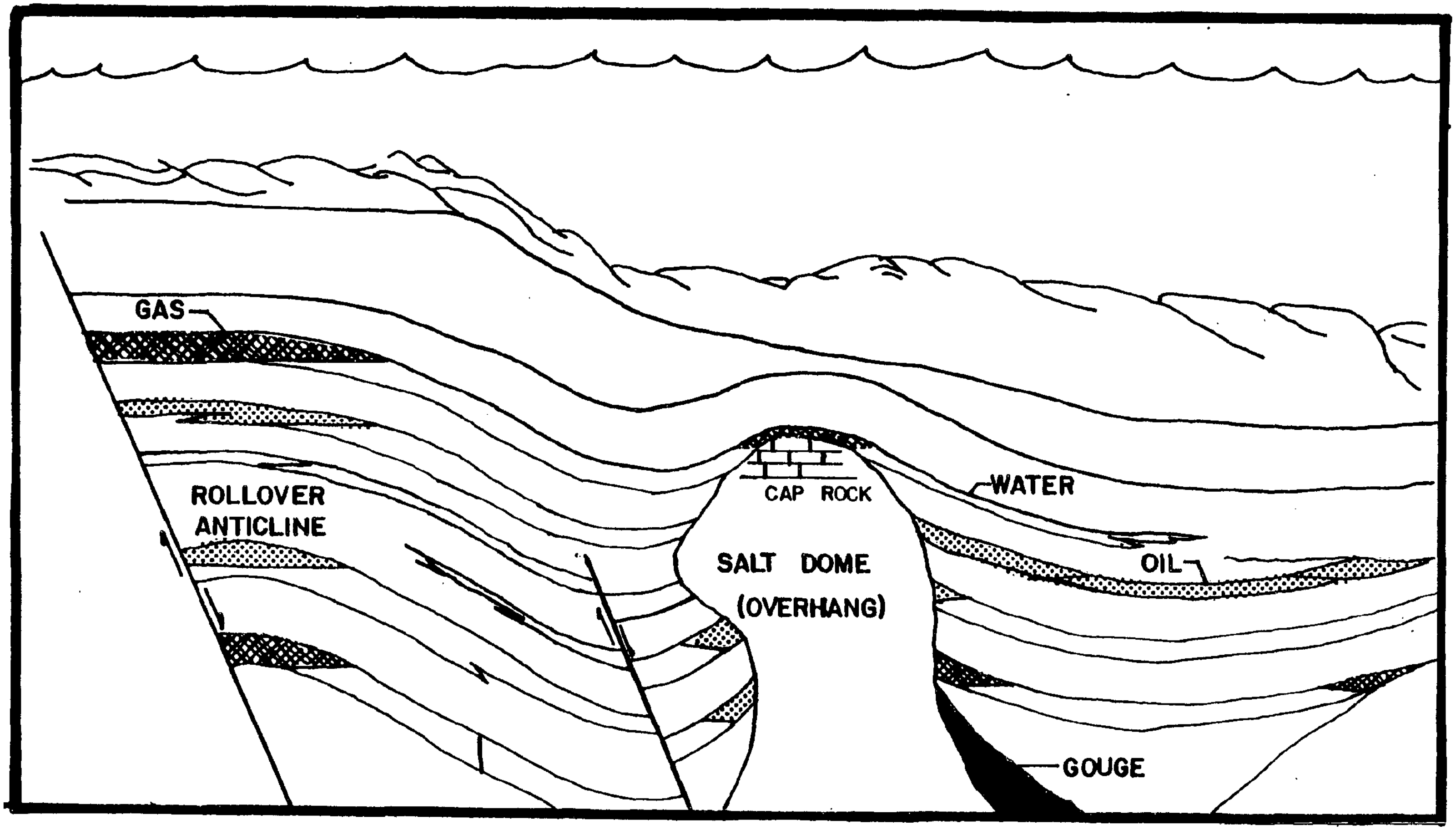
Some of these domes of salt have risen as much as 40,000 feet from their original depth and several even have surface expressions of over 100 feet mean sea level (m.s.l.). No salt domes have reached the surface in Lafourche Parish, however.

Oil and gas deposits are trapped by the piercement of strata by the salt dome. This allows the deposits to pool along the side of the salt. The deformation of the overlying strata also allows for pooling and trapping of oil and gas deposits (Figure 1.4). Some of the largest oil and gas fields have been developed over these domes.

Sulphur, basite, gypsum, calcite, and anhydrite are formed in a portion of the salt dome called the cap rock (Figure 1.4). Anhydrite precipitates out of groundwaters which come into contact with the salt, and the other minerals are formed by alteration of the anhydrite. The salt and sulphur can be mined.

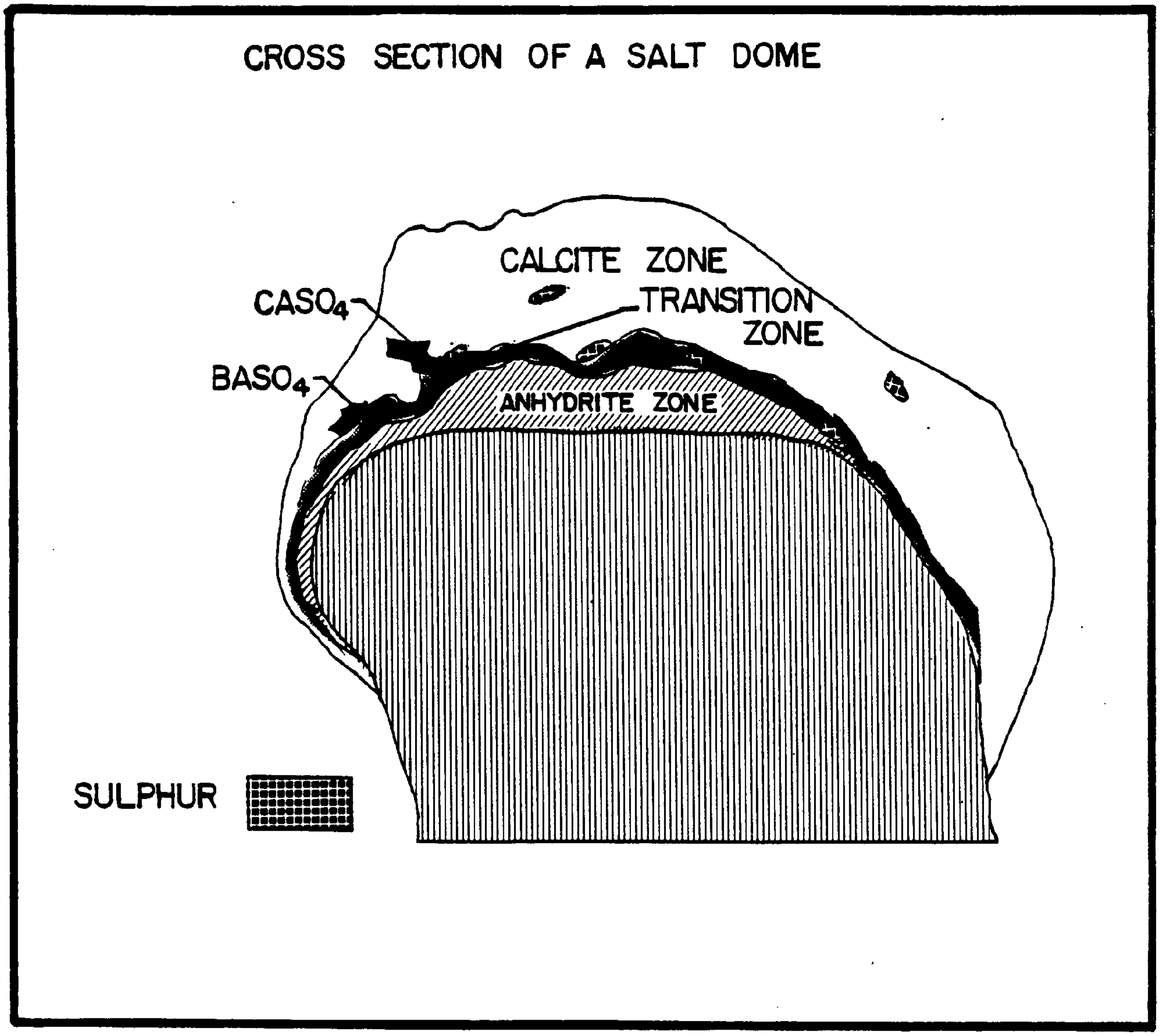
FIGURE 1.3

SALT DOME GEOLOGIC STRUCTURE




SOURCE: TEXACO (1979)

FIGURE 1.4




SOURCE: MORGAN (1977)

Examples of this include Avery Island and Jefferson Island, Louisiana which are currently operating salt mines on salt domes that have pierced the surface.

Oil and gas are also trapped by pinchouts of sand layers and by faults. Faults are a disruption of the strata that change the general alignment of the strata. Salt domes usually have numerous faults above them. Sometimes, however, faults are caused by other means. Lafourche Parish is crossed by a series of fault systems which trend west to east. These faults were brought on by the nature of the deposition of sediment causing weak sections of strata to give way or by salt layers applying pressure from below. Geologists are not certain what the origin of the fault system is. In Lafourche Parish, these faults are buried by newer sediment and thus have no surface expression.

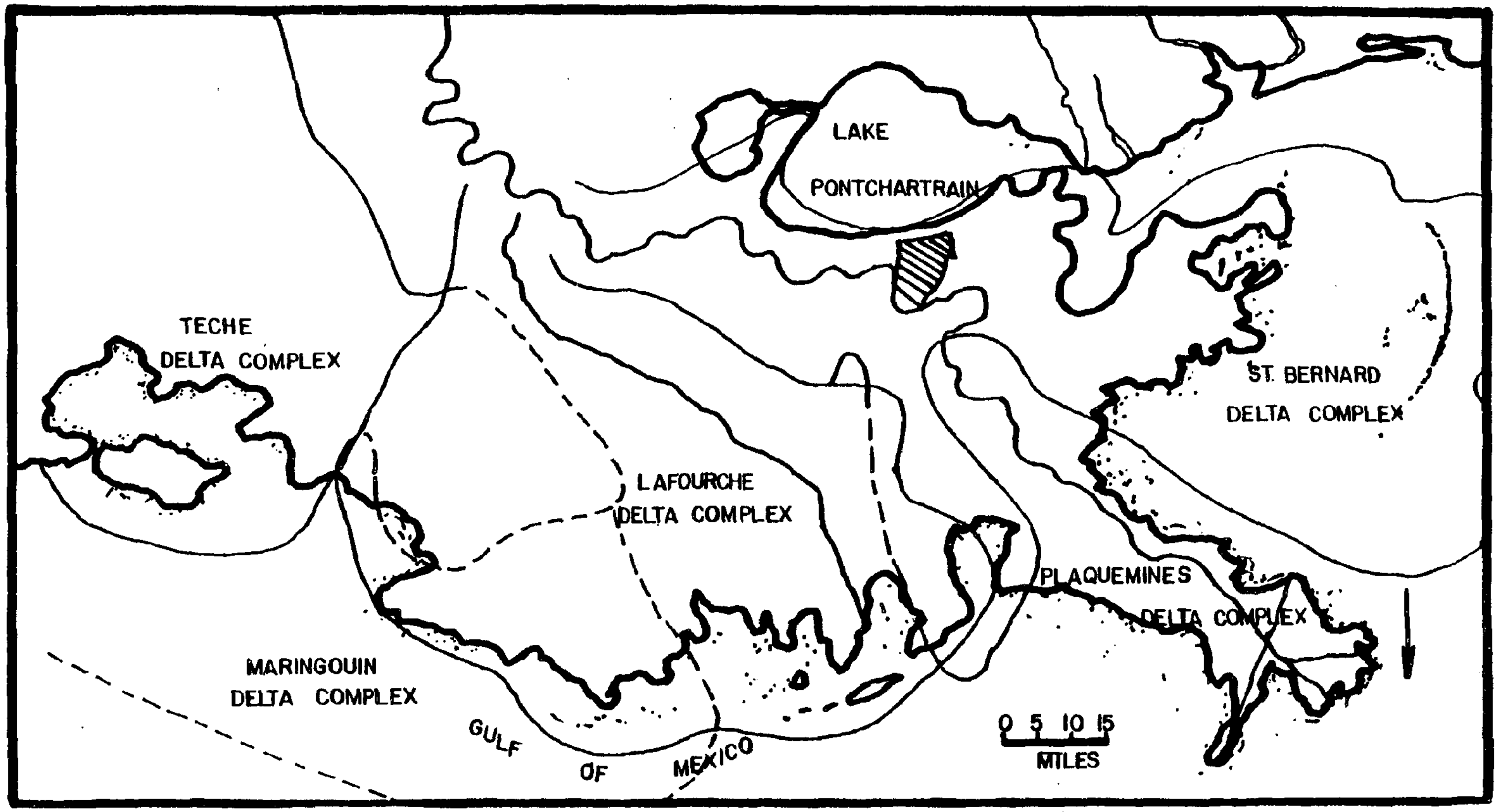
# GEOMORPHOLOGY

## Introduction

The land area of Lafourche Parish sits astride one of the most dynamic geomorphological systems in the United States, the Mississippi River Deltaic Plain. Prior to 6,000 years ago, the land area now exposed in our parish was part of the continental shelf of the Gulf Coast and largely under water. From that point to the present, the Mississippi River distributary system has created several delta lobes extending far into what once was the Gulf of Mexico (Gagliano and Van Beek, 1970). Figure 1.5 illustrates the aerial extent of the main deltas formed by the river as it shifted its course in the coastal waters of Louisiana. As one can easily see, these deltaic land forms extended much further into the Gulf than their current land expressions indicate. Severe erosion has destroyed land areas no longer occupied by the main river channel. The dynamic cycle of delta building and erosion has thus created the unique landscape that has delineated the resource base and settlement patterns existing today in the parish. The following sections explain the alluvial processes that have shaped our landscape and the results of natural interactions on the system.

## FIGURE 1.5

### DELTAS OF THE MISSISSIPPI




SOURCE : GAGLIANO & VAN BEEK (1970)

## Recent Geologic History

The physical expression of the geology of southern Louisiana can be classified into four areas: the Pleistocene terrace, the marginal deltaic plain, the deltaic plain, and the alluvial valley. The parish lies wholly within the deltaic plain.

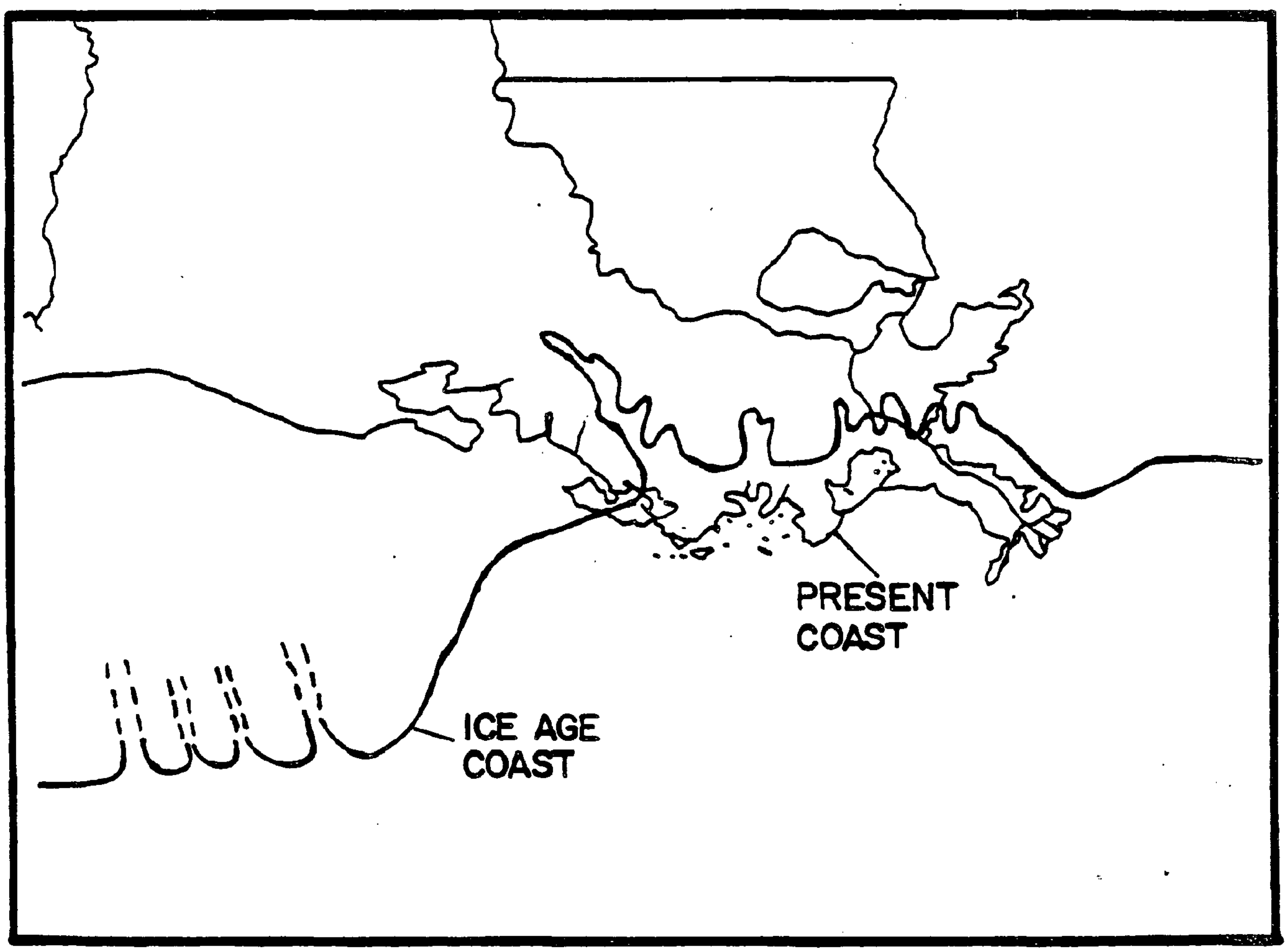
The alluvial valley area consists of sediment (alluvium) deposited within the Mississippi River Valley as it cut through the tertiary uplands and Pleistocene terraces. The deltaic plain was originally under water.

Approximately 18,000 to 20,000 years ago the sea level was lowered about 390 feet below current sea level. This was in response to continental glaciation. The shoreline was relocated close to the outer margin of the continental shelf (Figure 1.6). The Mississippi River cut a trench into the resultant Pleistocene prairie terrace in an effort to adjust to the new sea level. This trench occurred west of the present course of the Mississippi, probably in the western portion of south central Louisiana.

The sea level started to rise about 18,000 years ago. Streams began filling in their valleys in an attempt to adjust to the rising sea level. About 6,000 years ago the rise in the sea level slowed, but continued until it reached its current level. The Pleistocene prairie was inundated and the coastline relocated to what is now far inshore (Figure 1.7). It was at this point that the Mississippi River began to shape the landscape that currently exists in Lafourche Parish.

FIGURE 1.6

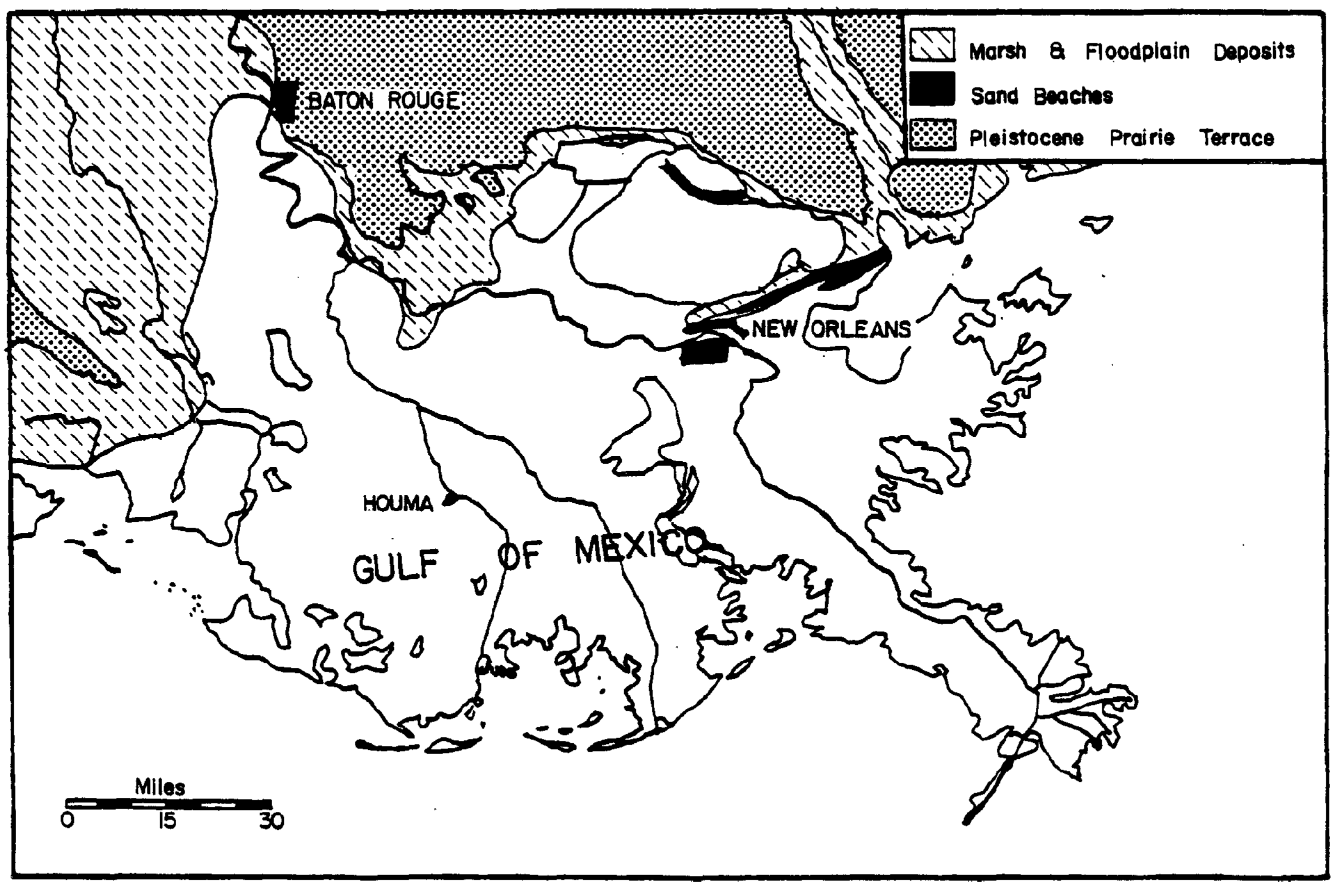
ICE AGE LOUISIANA SHORELINE
GREATEST SEAWARD ADVANCE




SOURCE: MORGAN (1977)

FIGURE 1.7

APPROXIMATE POSITION OF THE SHORELINE DURING MAXIMUM GULF OF MEXICO TRANSGRESSION




SOURCE: MORGAN (1977)

## Recent Alluvial Processes

During the last 6,000 years after sea level adjusted itself to near its present level, the Mississippi River began discharging huge amounts of sediment onto the continental shelf. In the process of deposition, areas that were once sea bottom were elevated above the ocean as deltaic deposits accumulated. The river continually shifted course, always seeking a shorter path to the sea, thus abandoning one delta and creating a new one. During these meanderings over the last 7,500 years, five delta complexes have been created by the river. These are:

| | |
|---|---|
| (1) Maringouin | 7500 - 6200 years ago |
| (2) Teche | 5700 - 3900 years ago |
| (3) St. Bernard | 4700 - 700 years ago |
| (4) Lafourche | 3500 - Present |
| (5) Plaquemines/modern | 1000 - Present |

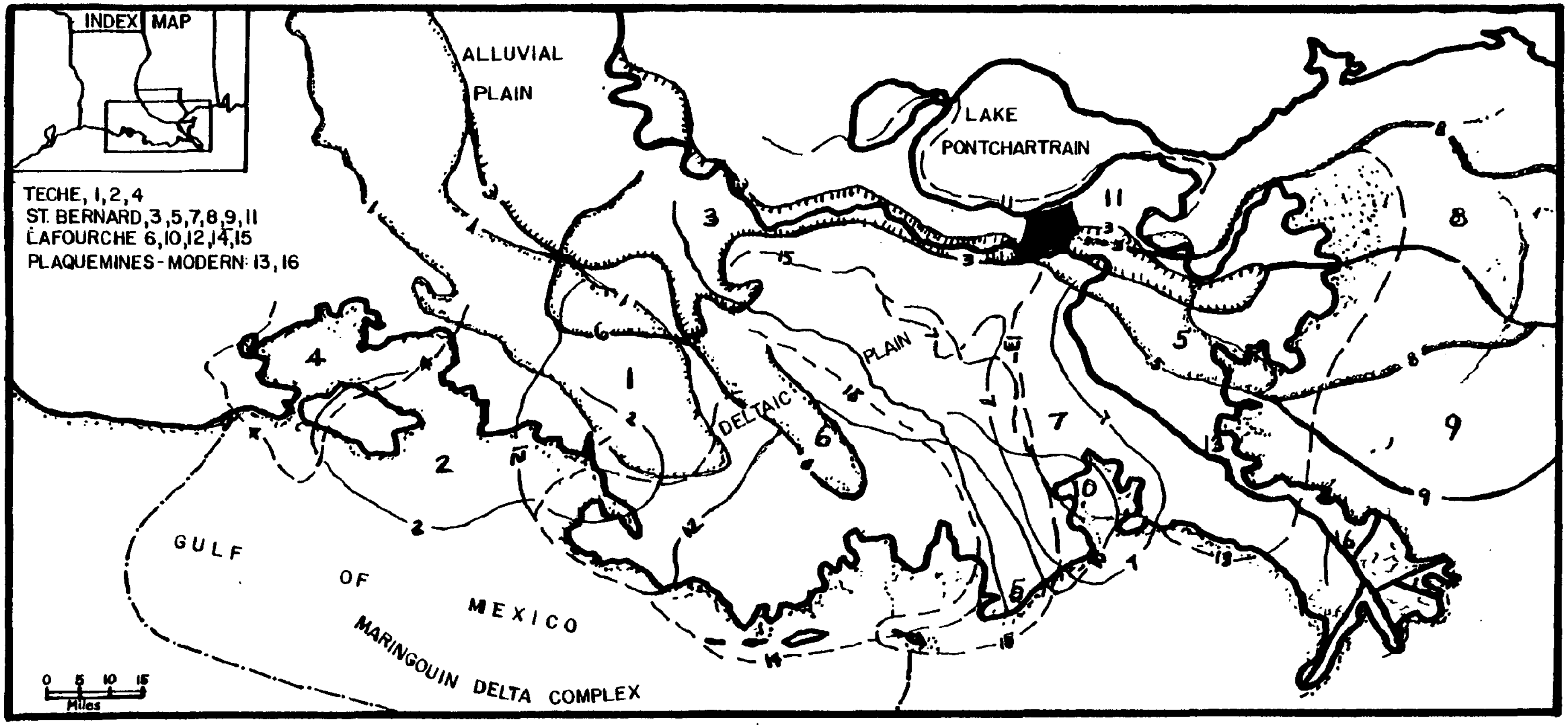
Figure 1.8 illustrates the shifting courses of the Mississippi as it deposited sediment across the continental shelf in Louisiana.

Of the major delta systems only the earliest (Maringouin) has no surface expression. The Deltaic lobe system that has created the land of Lafourche Parish was the Lafourche system. Because these deltas were formed at different times and locations, they are in various stages of development as landforms.

The deltaic depositional distributary system created

FIGURE 1.8

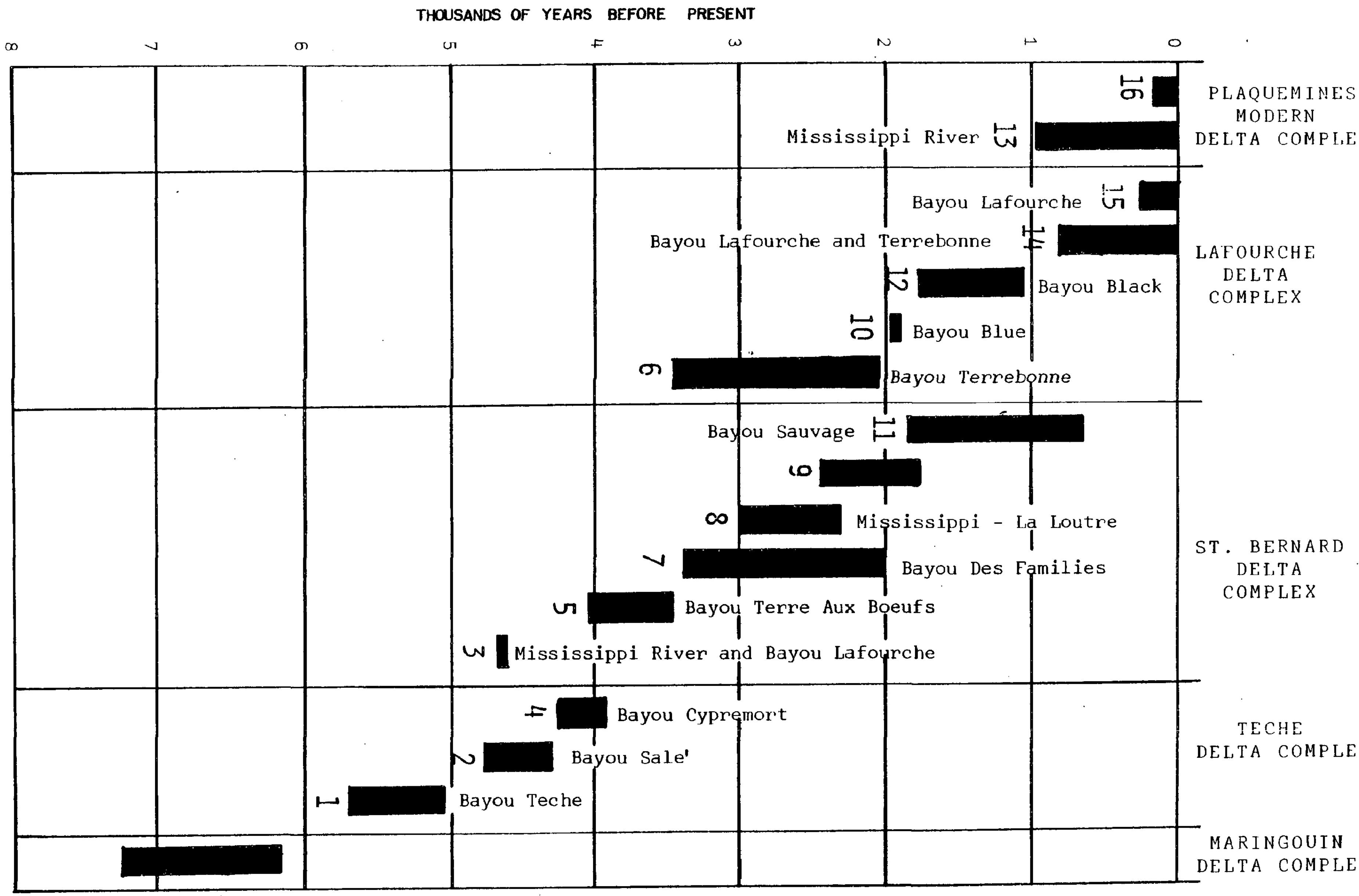
IDENTIFICATION MAP FOR DELTA LOBES OF THE MISSISSIPPI




SOURCE GAGLIANO & VAN BEEK (1970)

# FIGURE 1.8 (cont.)

## TIME SEQUENCE OR MISSISSIPPI DELTA LOBES




SOURCE: GAGLIANO & VAN BEEK (1970)

landform systems in Lafourche Parish. These are:

(1) Natural Levees (Depositional Landform)

(2) Inter-Distributary Basins (Depositional-Subsidence Landform)

(3) Barrier Island/Beach Ridges (Erosional Landform)

The natural levees extant in the parish are those of the Lafourche deltaic lobes. The inter-distributary basins are the Barataria and Terrebonne Basins. The processes leading to the formation of these features are discussed in the following sections.

## Factors Affecting the Current Landscape

There are four main factors affecting the landscape that have interacted to create the current landforms of our region. These are:

(1) Sediment Deposition

(2) Erosion

(3) Subsidence

(4) Man-Made Alterations

### Sediment Deposition

The delta building process created the existing landforms by deposition of sediment first under water, then on the surface on the delta's own sediment base. After the delta floor reached the level of the sea, a system of ridges and basins formed a part of the deltaic plain. The alluvial ridges called "natural levees" were formed when the river flooded during the spring time. Heavy suspended sediment (silt) was dropped as soon as the flow rate of water decreased as a result of overbank flooding. Later, vegetation also helped to hold back sediment. The mature resultant landform consisted of the river flanked by two ridges of silt, gradually sloping away from the channel (reflecting the decreased sediment deposition away from the main distributary). Deposition in the inter-distributary basins consisted mainly of fine clays and thus deposition here proceeded at a slower rate. The historical settlement patterns in Lafourche Parish reflect a linear pattern coinciding with these higher-drier ridges of good alluvial silt deposits.

### Erosion and Subsidence

Two processes that run concurrent with, and continue after delta building in coastal Louisiana, are subsidence and erosion. Erosion of the deltaic deposits come from the sea, mainly during intense storm periods. After deltaic deposition slows or stops in reaction to a shifting river channel, erosion rapidly reclaims much of the area that was once land. As waves, especially during storms, erode the coastline of an abandoned deltaic plain, features known as barrier islands are produced. Barrier Island have been defined as:

> Elongate, thin structures parallel to the shoreline of unconsolidated sediments (usually sand) . . . They are separated from the marshland by estuarines and wetlands . . . and are generally located in areas with low sloping coastal plains and moderate tidal range.
>
> Conservation Foundation (1976), Page 1.

The main factors shaping the barrier islands of Louisiana and other areas of the United States have been described thusly:

> Barrier islands are dominated by energy stresses. Exceptional wave force, wind and tidal energies, and ocean flooding are the predominant factors which shape and regulate the barrier island ecosystem. As a result of these factors, barrier islands are extremely dynamic systems, constantly subject to change. Seasonal and other regular cyclic fluctuations in wave patterns and intensity combine with irregular ocean storms and hurricanes to form and reform island profiles. The beaches and dunes migrate in response to these fluctuations. Storm overwash periodically carries sand onto the island, leaving substantial deposits of new sediments. The result is that morphologically, the islands are in a continual state of influx. While we generally recognize the great impact that hurricanes have on barrier island, I should emphasize that they play an equally important role in shaping the islands.
>
> Conservation Foundation (1976), Page 1.

In Louisiana the barrier island off the coast of Lafourche Parish (East Timbalier) is derived from silt deposits from the current delta of the Mississippi River, as well as erosional reworking of old silt deposits.

The stranded barrier beaches of the parish were developed in a similar manner.

These features serve as unique ecosystems in themselves. They also protect the vulnerable marshlands behind them from rapid erosion. Currently, the barrier island complex is diminishing in size due to lack of sediment replenishment and man-made alterations in the ecosystems.

Natural subsidence originates from two factors: compaction and geologic subsidence.

Structural geologic subsidence has occurred for millions of years. The weight of overlying sediment contributes to this process. Compaction occurs as sediments "settle" or consolidate over time, thus lowering the surface level. The results of these two processes is the eventual destruction of the entire deltaic landform once deprivation has ceased in the area.

Man-Made Alterations

Three man-made alterations to the natural system have served to speed up the destruction of the deltaic land mass that is the south central region. These are:

(1) Levee Building

(2) Reclamation

(3) Channelization of Wetlands

Although the levee ridges are dry areas for most of the year, artificial levees were built to prevent the occurrence of disastrous river flooding that constantly plagued early settlers in the area. These levees also halted deposition of new sediment onto the deltas where they were built, thus preventing further deltaic development.

Reclamation, which has occurred mainly in this century, attempted to expand settlement into the low-lying water covered basins flanking the natural levees. During the natural process of subsidence, peat (partially decomposed organic matter) accumulating on top of old sediments in the basins helped keep pace with subsidence and maintain a surface level near to mean sea level. Once the land was drained and leveed, however, this peat oxidized and decomposed causing the level of the land to drop below sea level. The land must be kept dry by artificial means (pumps). Should the levees break, the area would revert to a shallow water body due to the artificial increase in subsidence brought about by the reclamation process.

Channelization of wetlands in the inter-distributary basins for navigation and mineral exploration has contributed to land loss by several means. Erosion and <u>salinity</u> changes brought about by these straight deep channels have destroyed the vegetation that holds together the peat and clay deposits that make up the basins. Without this protection most of the land succumbs quickly to erosion and is lost (the man-made alterations to the landscape will be discussed further in later chapters.) Total land loss (natural and man induced) is currently estimated at over 40 square miles per year in Louisiana. The Geologic Subsidence Rate is calculated to be approximately one foot per century from natural causes (Gagliano et. al. 1981)

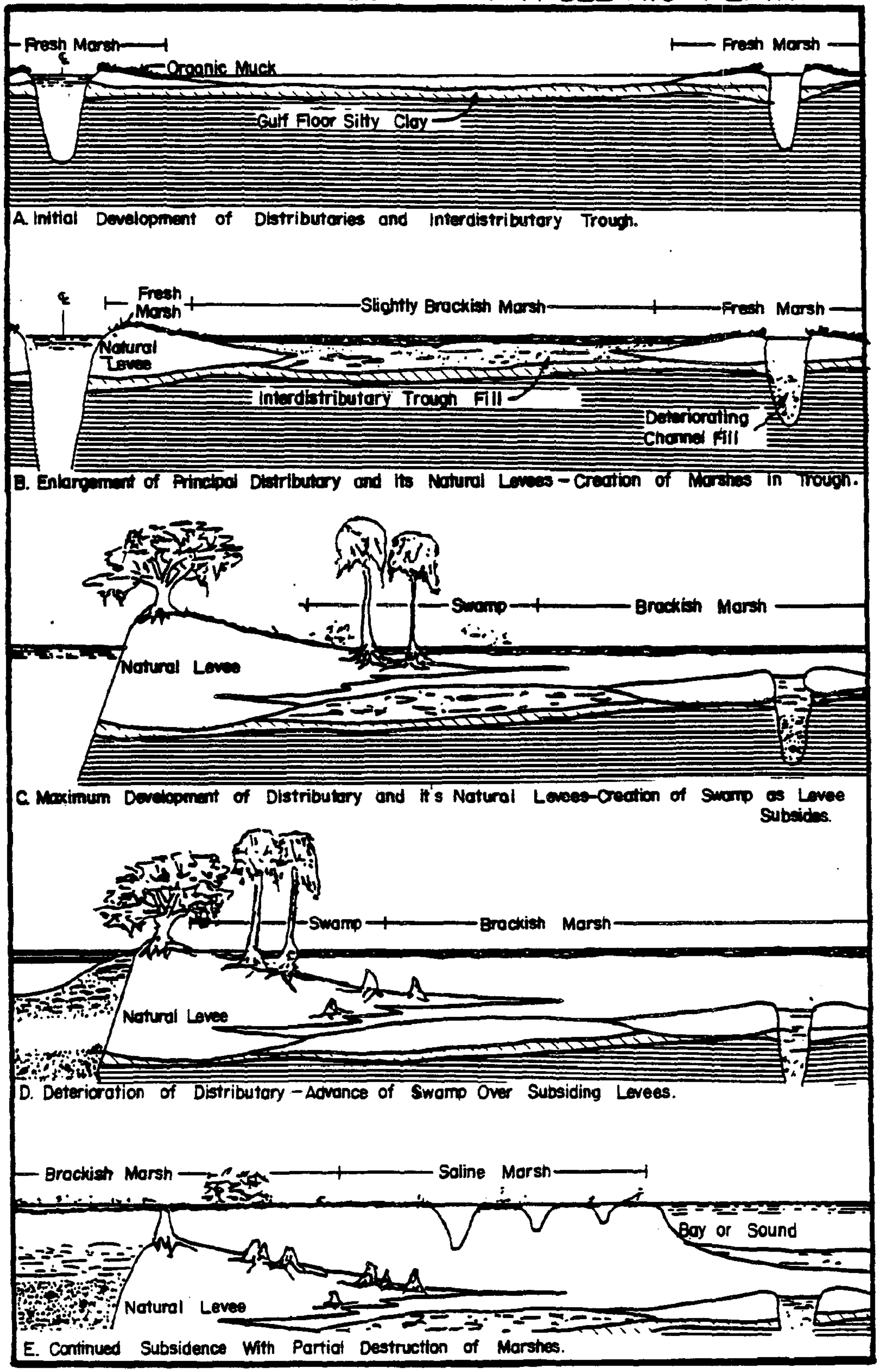
Figure 1.9 is an illustrative example of a natural levee/basin structure of a deltaic lobe moving through the various stages of delta building and decay. The Lafourche delta lobe falls to classes B and C. The upper more extensive ridge/basin structures are still intact while the lower ends of the delta have suffered the ravages of erosion and subsidence. Figure 1.10 illustrates the various landforms extant in south-central Louisiana at present.

## Summary

It is apparent from the previous discussion that the entire region is a young dynamic geomorphological area, the features of

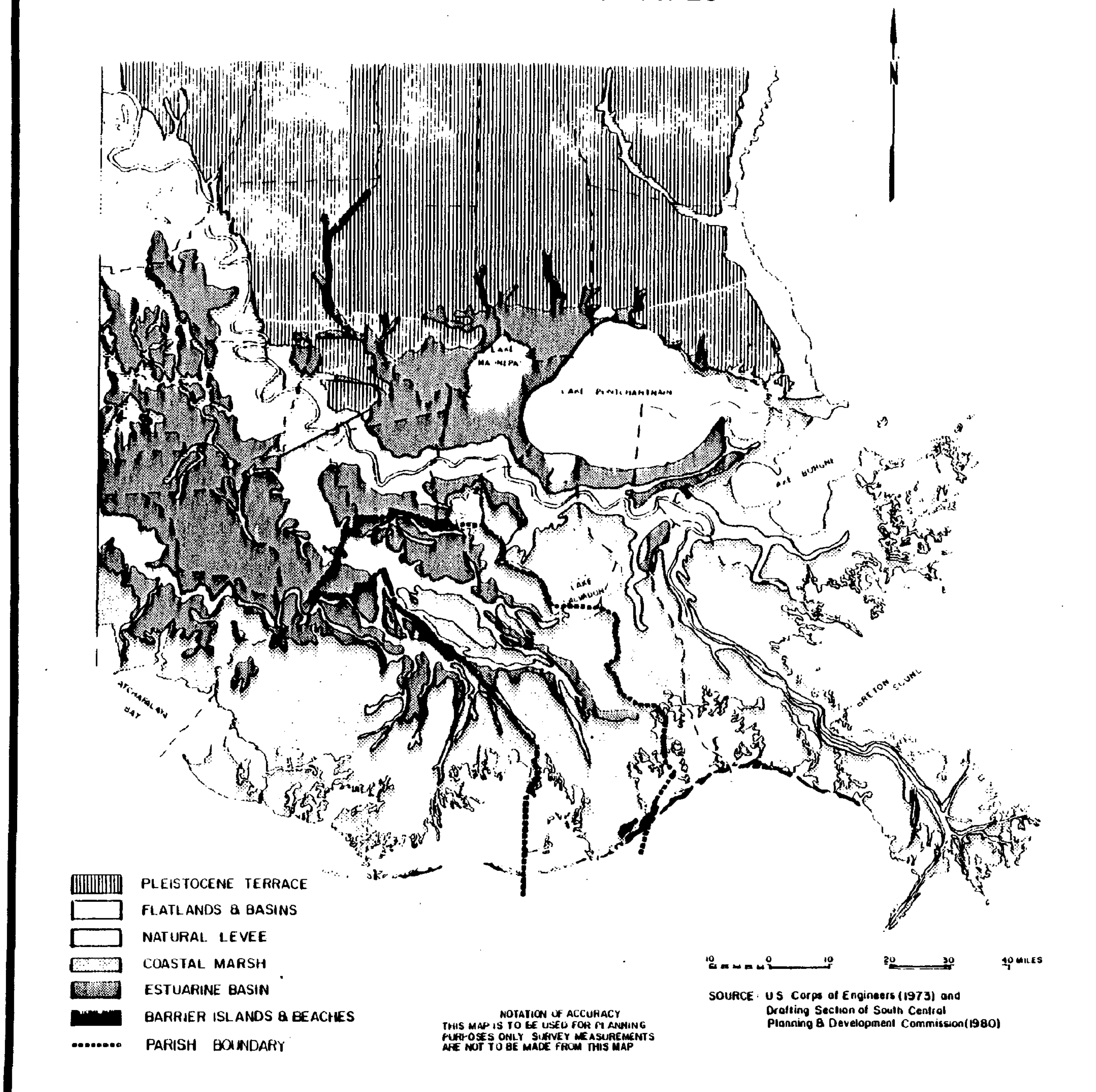
# FIGURE 1.9

LIFE CYCLE CROSS SECTION OF A DELTAIC PLAIN




SOURCE: GAGLIANO & VAN BEEK (1970)

## GEOMORPHOLOGICAL FEATURES



which have shaped the patterns of settlement and the economic activity in the past and in the present.

## SOILS

The soils of Lafourche Parish are those developed as a result of the alluvial processes that created the parish. In the coastal zone of Lafourche, the major alluvial soil types are represented. (See Figure 1.11)

### General Categories

The only truly stable soils are the mineral ones associated with the Bayou Lafourche distributary system. Although elevations are generally below +5 feet m.s.l. in the coastal zone, the mineral base of the soil reduces subsidence and provides a firm base on which to construct homes, businesses, etc. Fortunately, there are several ridges of this alluvium either at the surface or buried slightly beneath it within the area covered by the South Lafourche levee system, the only area suitable for human habitation due to adequate flood protection. These soils are expressed Commerce and Sharkey soil types. The latter soil has limitations due to the shrinking and swelling of the largely clay base of the soil and its poor drainage characteristics. The clay base soils include Sharkey and Barbary Fausse soils. The other soils of the south Lafourche area are mainly saturated marsh soils with variable organic content. These soils are constantly flooded, very unstable, and subject to subsidence if drained. They include Allemands - Kenner - Larose soils, Lafitte Clovelly and Timbalier, Belle Pass soils. A major percentage of the soils underlying the area with the new South Lafourche levee system are reclaimed swamp or marsh soils (See Figure 1.11). Figure 1.12 shows the location and

Figure 1.11

GENERAL SOIL MAP

LAFOURCHE PARISH, LOUISIANA

Soils of the natural levees that are never flooded and occasionally flooded are called:

1. Commerce: Level, somewhat poorly drained soils that are loamy throughout

2. Sharkey: Level, poorly drained soils that have a loamy and clayey surface layer and a clayey subsoil and underlying material

Soils of the swamps and marshes that are ponded and frequently flooded include:

3. Barbary-Fausse: Level, very poorly drained soils that have a mucky and clayey surface layer and a clayey subsoil and underlying material; in swamps

4. Allemands-Kenner-Larose: Level, very poorly drained soils that have a mucky surface layer and a mucky and clayey underlying material; in freshwater marshes.

5. Lafitte-Clovelly: Level, very poorly drained soils that have a mucky surface layer and a mucky and clayey underlying material; in brackish marshes

6. Timbalier-Bellpass: Level, very poorly drained soils that have a mucky surface layer and mucky and clayey underlying material; in saline marshes

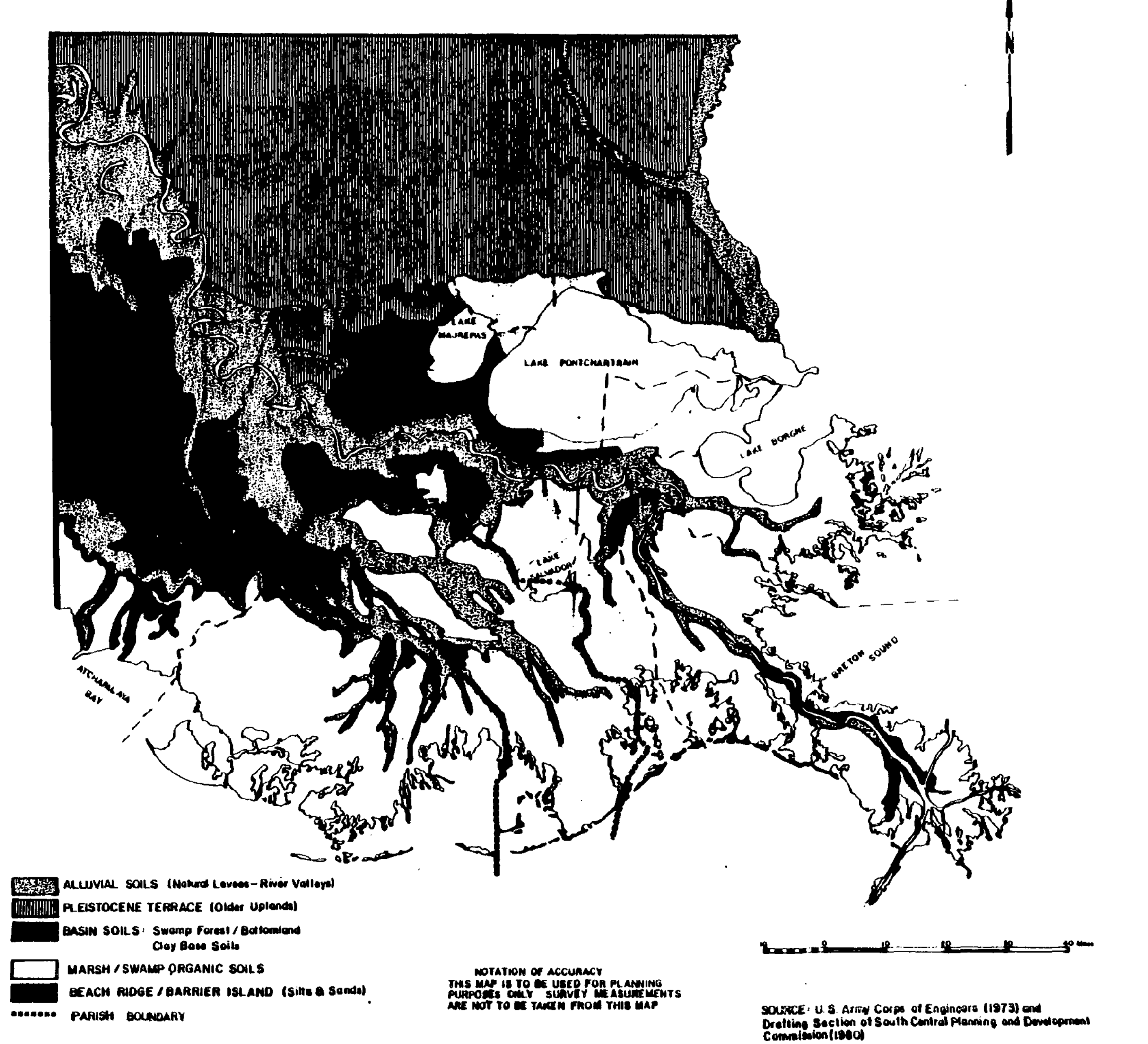
7. Scatlake: Level, very poorly drained soils that have a clayey surface layer and a clayey, loamy, and sandy underlying material; in saline marshes

Soils of former marshes that are drained and protected from flooding include:

8. Rita-Allemands; drained: Level, poorly drained soils that have a mucky surface layer and a mucky loamy, and clayey subsoil and underlying material; in former freshwater marshes

Source: U.S. Soil Conservation Service, 1982

# SOILS OF SOUTH LOUISIANA



general types of soils in south central Louisiana. Drainage of these soils for agricultural, industrial, commercial, and residential purposes has resulted in subsidence of some areas to slightly below sea level. The development of land in south Lafourche has created similar problems to those encountered by New Orleans. In south Lafourche there is a narrow central spine of high land with reclaimed wetland on either side. Thus, drainage water moves in two directions away from the high central land. Forced pumpage must be utilized to keep the area dry since portions of the drainage area are now below sea level, as in the New Orleans area. Although the reclamation of the area is completed and the levee is necessary for the safety of the residents of south Lafourche, there are some negative impacts caused by subsidence. The following is a brief discussion of a major problem in the reclaimed wetlands of the Lafourche Coastal Zone.

## Subsidence

Subsidence is a negative land change caused by geological lowering of the surface elevation or other factors. In coastal Louisiana, the primary cause of subsidence is the shrinkage and oxidation of organic materials in soils. The problem is compounded by geological lowering of the surface elevation throughout the coastal areas of the Gulf of Mexico.

The reason for shrinkage of wetland soils is their organic nature. Organic materials in the soil are generally decomposed or partially decomposed plant remains. Soils shrink as the organic matter dries, shrinks and oxidates (disintegrates on exposure to oxygen).

Subsidence of soils takes place in two phases:

(1) Initial Soil Subsidence. This is the result of drainage of the soils and lowering of the water table. Overall, initial subsidence causes a 50% immediate volume reduction in organic wetland soils.

(2) Continued soil subsidence. Continued, gradual decomposition of the organic material. This phase may produce up to 2 inches per year reduction in surface elevation.

It should be noted that farming speeds up the oxidation process by allowing more oxygen into the soil during tilling.

Subsidence in an already developed area may be slowed by adding a layer of good mineral soil, which helps to inhibit oxygen penetration into the organic matter.

## Cost of Subsidence

Four basic areas of concern arise over subsidence in areas that have been reclaimed and developed.

(1) Landscape elements such as drives, walkways, and walks may crack, warp, sink, or suffer structural failure. Plant growth may be inhibited by poor drainage or soil conditions.

(2) Sinking of the ground level and actual cracking of the land surface may result in unsightly gaps around foundation edges, etc.

(3) Building elements such as walls, foundations and roofs may crack or break with the settling, tilting, and uneven stress related to land movement.

(4) Utilities systems providing water, sewerage, electricity, gas, and telephone services may be interrupted by leakage or breakage of service lines.

Homeowners assume all costs for repair or replacement of damaged structures on their property.

Major structural repairs may cost between $1,200 to $6,000 per home.

Yearly maintenance costs may be computed by the number of loads of fill needed to shore up around a house at about $25 per load (in 1976).

A real fear related to subsidence is the breakage of gas lines connecting homes with the main utility line along street right-of-ways. Gas lines that are unsupported sag and crack as surface elevations drop. Leaking gas becomes trapped underneath the house foundation and is highly combustible.

Developers face added costs in wetlands which are passed on to the consumer.

(1) The ground surface, buildings, roads, and utilities must be stabilized.

(2) Buildings and sometimes roads must be elevated on fill.

(3) Excavations for utilities, drainage, and foundations must cope with on-site soil problems.

It is estimated by New Orleans contractors that the cost of developing a subdivision (exclusive of homes) in recently reclaimed wetlands is 50 per cent greater than in natural dry lands.

The average cost of raising a conventional slab house with fill to meet flood insurance elevation standards in reclaimed wetlands was estimated to cost between $400 for a 1 foot rise to $3000 for an 8 foot rise above the base elevation.

Government expenditures for subsidence problems are as follows:

(1) Installation and maintenance of drainage and flood protection facilities comprises a major budget item.

(2) Public facilities such as schools and parks require continual maintenance.

(3) Services such as street repairs and protection from the fire hazards of underground organic soil combustion must be provided.

(4) Property values in neighborhoods must be retained to prevent the creation of tax burdens if serious deterioration is allowed.

These governmental expenditures to remedy subsidence based problems ultimately result in an increased burden on the taxpayers.

## Flooding

Problems in coastal areas due to flooding are listed below in six general categories. Each problem tends to become a government responsibility. Local governments cannot afford all the aid necessary to homeowners and businessmen after floods. Disaster assistance must be sought from the state and federal government. Again, the ultimate burden is on the taxpayer.

(1) Contamination of the water supply by toxic, flammable or bacterial matter creating a community health hazard;

(2) Reverse flow of sewerage effluent into buildings from septic tanks and other sewage disposal systems;

(3) Structural damage by high velocity flood waters and/or water-borne debris;

(4) Danger from inundated electric lines, circuits, equipment and appliances;

(5) Property damage to building contents by flood waters;

(6) Injury to community residents

While no set figure is available, sewerage costs are expected to be twice as much in reclaimed wetlands as in more stable areas. Special techniques are necessary to install both sewer and water lines.

## Conclusion

While there are severe problems associated with the reclamation process, reclamation in the south Lafourche area within the coastal zone is an accomplished feat. There are 27,000 people and millions of dollars of industrial and commercial development to serve the fishing and oil and gas industry. It is necessary, therefore, to do what is necessary in the area of levee building, pump construction for drainage and flood protection in this area of human habitation in the coastal zone. Due to cost prohibitions and environmental restrictions it is unlikely that any major new projects to reclaim wetlands will occur in Lafourche Parish. There is ample land for expansion of population and industry in the area already reclaimed in the forseeable future.

CLIMATE

## Introduction

The climate of Lafourche has been categorized by the Koppen-Geiger system of climatic classification as a "Cfa" type climate, i.e. warm and moist with a warm summer (Muller and Oberlander, 1978). One reason for the moisture and heat that dominates our climate is the Gulf of Mexico. This body of water provides the heat and moisture supply for the entire eastern half of the United States for significant portions of the year. The land area of the parish sits immediately adjacent to this moisture source. Water temperatures in the Gulf, off the Louisiana coast, range from a low of 64$^{O}$F in February to 84$^{O}$F in July (U.S. Department of Commerce, 1979). This accounts for the moderating influence of Gulf air in the winter and hot, humid air in the summer.

Another main factor in our climate is our subtropical latitude. Although the geomorphology and climatic patterns of the United States and Canada allow colder continental air to intrude into the region on occasion, our subtropical latitude moderates the effect of these incursions in the winter. We receive high levels of solar radiation and actually receive more solar radiation than we lose to space for nearly eleven months out of the year. Thus, the main components that shape our climate are latitude and proximity to the Gulf of Mexico. The following is a brief summary description of the parameters that make up the climate of the south central region.

## Temperature

Yearly average temperatures for the region reflect the subtropical latitude of the area (See Figure 1.13). The area is categorized by long, hot summers and short, cool spring, fall and winter periods. Temperatures are uniformly hot with a high humidity in the summers. Highest temperatures generally occur in the inland areas. Spring, fall, and winter generally consist of moderately warm humid periods dominated by tropical Gulf air, broken occasionally by Pacific or Polar continental drier-cooler air masses. The polar air incursions occur most often in the winter and can bring large sudden drops in temperature. In the winter, as in the summer, the coldest local temperatures occur inland and away from wetlands and water bodies. Extreme temperatures for Houma (the closest station for which such records are available) range from 12$^{\circ}$F to 100$^{\circ}$F in August (See Table 1.1). [1]

The growing season in Lafourche Parish is extremely long averaging over three-hundred days in the northern part of the parish and nearly three-hundred sixty five days near the coast.

Occasionally, an early frost or freeze can damage the agricultural interests in the parish since the main crop of sugar cane is a tropical plant susceptible to freeze damage. However, the average number of days when the minimum temperature

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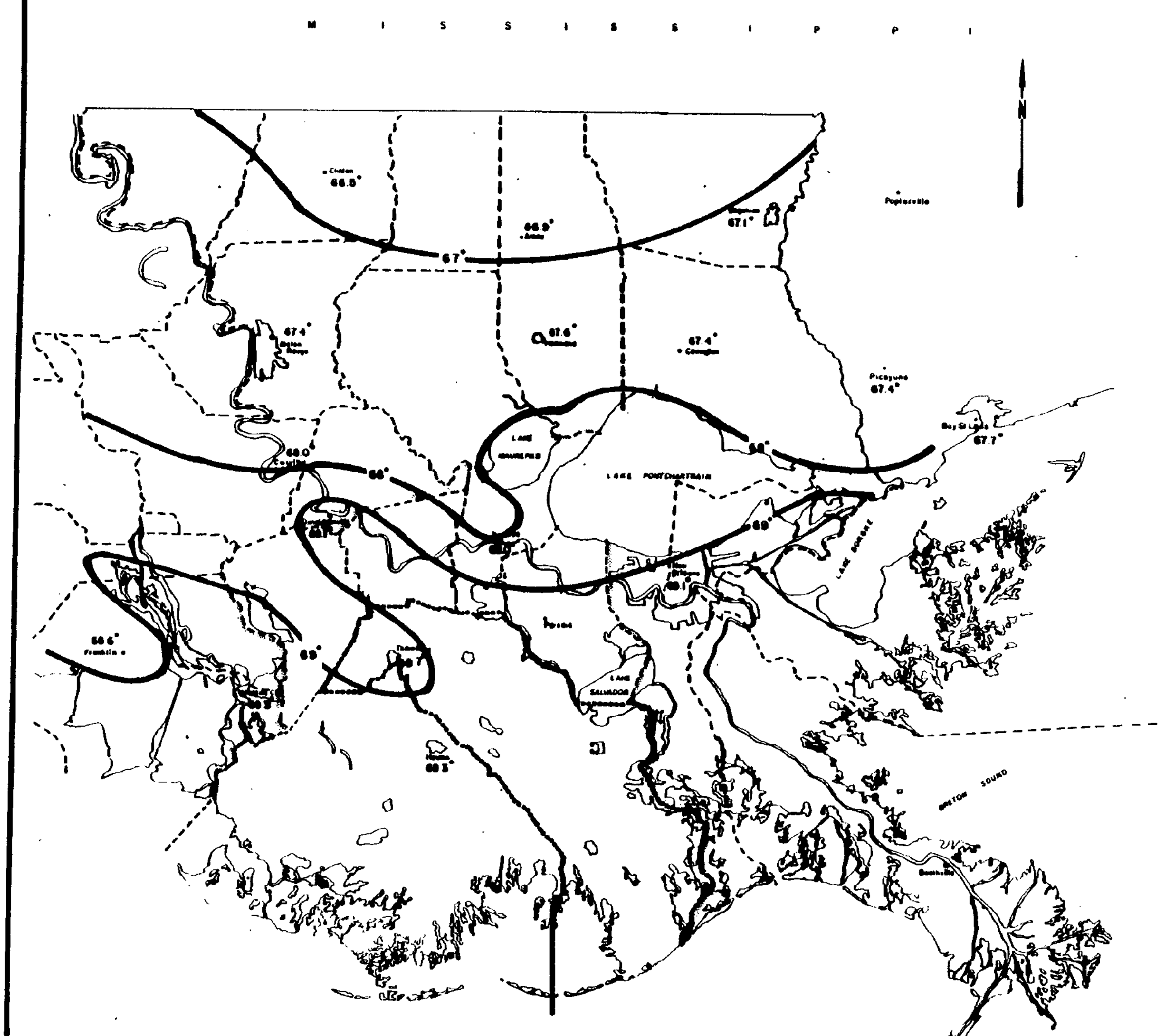
[1] Note that there are no recording weather stations in the parish. Therefore, we have chosen the closest station available outside of the district boundary which is Houma, Louisiana.




AVERAGE YEARLY TEMPERATURE

Scale 1 500,000

SOURCE: Map compiled by author from various sources provided by the U.S. Department of Commerce National Oceanic & Atmospheric Administration statistical summaries. SCPBDC Drafting Department

NOTE: This map is meant for illustration planning purposes only.

TABLE [illegible]

HOUMA

1951 – 1973

Elevation 15 feet

LAT 29° 35' N
LONG 90° 44' W

| | TEMPERATURE (°F) | | | | | | | | | PRECIPITATION TOTALS (Inches) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Means | | | Extremes | | | | | | Mean | Greatest Monthly | Year | Snow, Sleet | | |
| Month | Max. | Min. | Monthly | Record High | Year | Day | Record Low | Year | Day | | | | Mean | Max. Monthly | Year |
| Jan. | 65.0 | 44.5 | 54.8 | 83 | 1952 | 2nd | 12 | 1962 | 11th | 4.58 | 12.36 | 1966 | .0 | .0 | |
| Feb. | 67.3 | 46.3 | 56.8 | 85 | 1957 | 4th | 13 | 1951 | 3rd | 4.86 | 10.28 | 1966 | .1 | 2.5 | 1958 |
| March | 72.7 | 52.0 | 62.4 | 88 | 1965 | 25th | 28+ | 1968 | 1st | 4.13 | 9.50 | 1973 | .0 | .0 | |
| April | 79.8 | 59.6 | 69.7 | 90+ | 1965 | 13th | 34 | 1971 | 8th | 4.37 | 14.06 | 1973 | .0 | .0 | |
| May | 85.3 | 65.1 | 75.3 | 96 | 1953 | 28th | 44 | 1952 | 12th | 4.78 | 15.44 | 1959 | .0 | .0 | |
| June | 90.1 | 70.3 | 80.2 | 99 | 1954 | 30th | 55 | 1966 | 2nd | 6.45 | 14.08 | 1963 | .0 | .0 | |
| July | 90.9 | 72.5 | 81.7 | 99 | 1960 | 22nd | 59 | 1967 | 16th | 8.09 | 18.85 | 1954 | .0 | .0 | |
| Aug. | 90.7 | 72.2 | 81.5 | 100 | 1951 | 15th | 60 | 1967 | 12th | 6.51 | 10.55 | 1960 | .0 | .0 | |
| Sept. | 87.7 | 69.2 | 78.5 | 98 | 1964 | 1st | 44 | 1967 | 30th | 8.05 | 19.41 | 1973 | .0 | .0 | |
| Oct. | 81.5 | 58.6 | 70.0 | 94 | 1962 | 9th | 31 | 1952 | 30th | 3.10 | 11.60 | 1959 | .0 | .0 | |
| Nov. | 72.8 | 50.5 | 61.7 | 87+ | 1956 | 2nd | 25 | 1951 | 18th | 3.20 | 13.26 | 1963 | .0 | .0 | |
| Dec. | 67.5 | 46.2 | 56.9 | 84+ | 1956 | 7th | 15 | 1962 | 13th | 5.17 | 11.56 | 1967 | .0 | .0 | |
| YEAR | 79.3 | 58.9 | 69.1 | 100 | Aug. 1951 | 12th | 12 | Jan. 1962 | 11th | 63.59 | 19.41 | Sept. 1973 | .1 | .0 | |

+ Also on earlier dates

SOURCE: U.S. Department of Commerce, 1975.

Houma Supplemental Data

Mean Number of days Maximum 90° and above: 83 days
Mean Number of days Minimum 32 and below: 15 day
Greatest Daily Precipitation: 11.35" - May 31, 1959

drops below 32$^{\circ}$F is fifteen at Houma and thirteen at New Orleans. Rarely do temperatures drop below 20$^{\circ}$F anywhere in the parish.

There are two main factors that periodically effect the local climate picture. These are:

(1) Proximity to the Gulf of Mexico

(2) Proximity to wetland areas and inland waters

Proximity to the Gulf of Mexico

Proximity to the Gulf of Mexico accounts for a significant increase in yearly temperature. More importantly, the impact of occasional surges of cold polar continental air is moderated by both wetlands and the Gulf itself, thus altering temperatures. Water stores large quantities of heat and releases it slowly over time. This accounts for the fact that water takes longer to warm up and cool down in relation to the land surface. This fact causes a reduction in the temperature range over water and the adjacent land masses. This is reflected in the fact that black mangrove, a tropical type plant intolerant to freezes or even frost, is found immediately along the coast. Although there are no reporting weather stations on the coast in our parish, the existence of black mangrove suggests a more moderate climate than in the interior where temperatures occasionally drop below 32$^{\circ}$F in the winter.

Proximity to Wetland Areas and Inland Waters

Temperature differences between water and land account for the sea and land breezes that moderate temperatures along the coast. Louisiana, with its vast inland marshes, swamps, bays, and lakes allows this moderating effect of water to extend far inland. Sea and land breezes can occur along lakes, for example, Lake Pontchartrain in the north of the region, and the water moderates temperatures wherever it is located. Since over 80% of the parish has water cover for most of the year, the influence in climate is significant (South Central Planning and Development Commission: 1976:1).

## Precipitation

Precipitation in the parish is heavy throughout the year. There are, however, two wet periods and one drier season. The two wet seasons occur in July - August, and December, respectively.

The drier period extends from late September to mid - November (U.S. Department of Commerce, 1979). Rainfall in the summer is usually associated with tropical air mass afternoon convection thunderstorms. Precipitation is heavy but of short duration. Rainfall in the winter is usually associated with cold frontal passages and, occasionally, low pressure areas in the Gulf of Mexico. This rainfall is moderate and more widespread in nature. Sometimes heavy rains are associated with tropical waves or storms in the late summer and fall.

From 1954 - 1976, nine tropical storms or hurricanes passed through or near enough to the parish to affect local precipitation (U. S. Department of the Interior, 1977).

Snow and sleet are extremely rare inland and almost nonexistent along the coast. For example, measureable snow has occurred only once in Houma during the period of 1951 - 1973.

Figure 1.14 illustrates that maximum yearly precipitation occurs somewhat inland from the coast line. This is probably due to the warming effect of the land as moist ocean air passes over it. The large expanse of coastal marsh make the transition from a water to land base extremely slow.

Relative humidity, the component of the local climate that makes our weather most uncomfortable, is high throughout the year. Table 1.2 illustrates the yearly means of Relative Humidity for New Orleans. The driest and wettest monthly averages are also included.

## Winds

Prevailing winds generally blow from a southerly direction for about half the year. In the late fall, winter and early spring, intrusions of continental air into the region cause the resulting direction to shift primarily to a northeast or northerly component.

Winds are generally light in the summer with maximum speeds associated with the brief localized down drafts of afternoon thunderstorms, Winds can occasionally be much stronger in the late summer and fall due to tropical storms or hurricane activity. For example, along the coast at Grand Isle, estimated peak winds during Hurricane Betsy exceeded 120 mph. This extreme wind is rare and always localized to coastal regions. In the winter, strong southerly winds or northerly winds associated with low pressure systems and high pressure centers flow for brief periods.

FIGURE 1.14

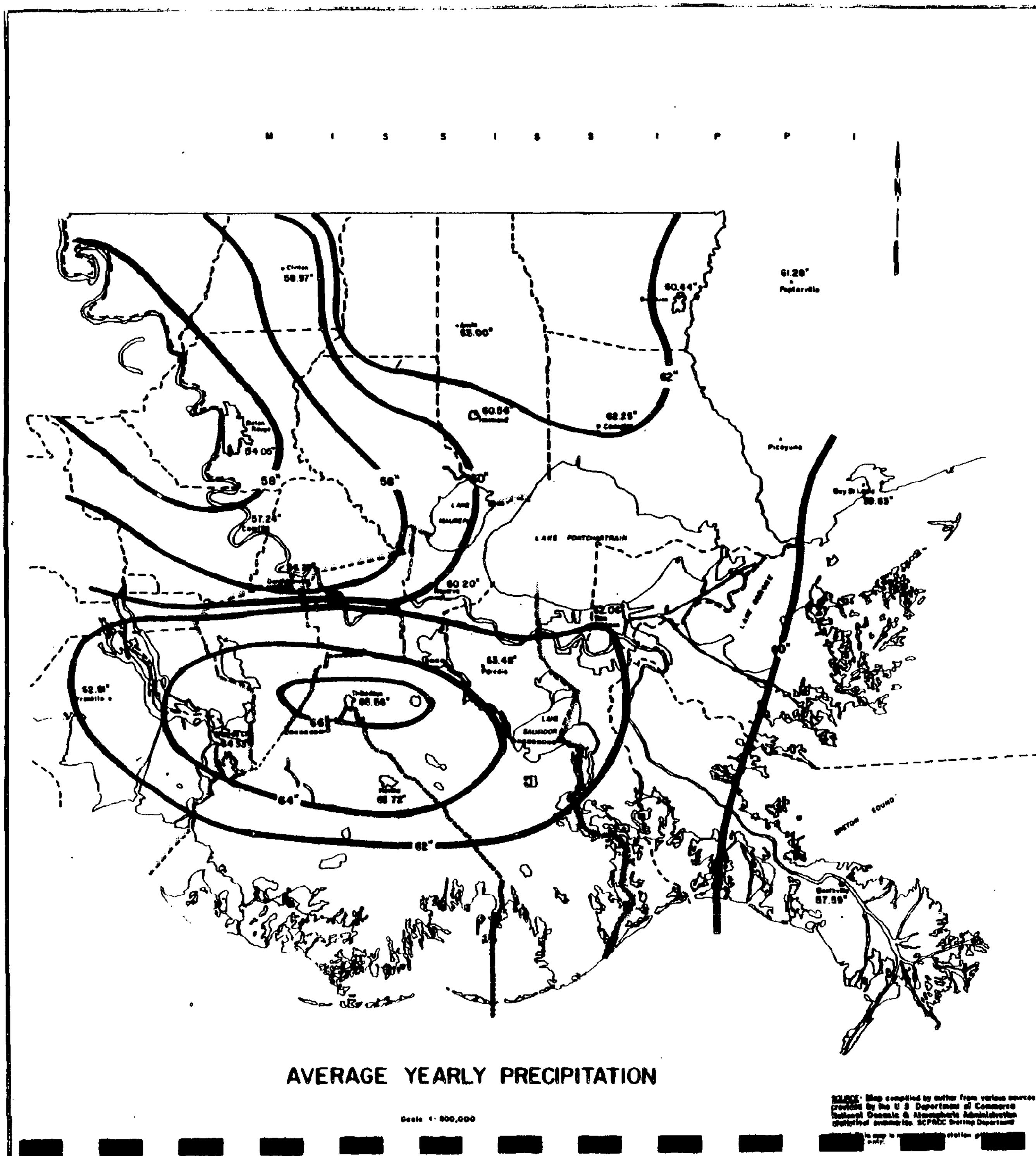

M I S S I S S I P P I
N
LAKE PONTCHARTRAIN
BRETON SOUND
AVERAGE YEARLY PRECIPITATION

TABLE 1.2

AVERAGE RELATIVE HUMIDITY

NEW ORLEANS, LOUISIANA

| | Midnight | 6:00 a.m. | Noon | 6:00 p.m. |
|---|---|---|---|---|
| (Dry) March | 83% | 85% | 61% | 65% |
| (Dry) November | 84% | 86% | 60% | 74% |
| (Wet) July | 89% | 91% | 66% | 73% |
| YEARLY AVERAGE | 85% | 88% | 63% | 71% |

Source: U.S. Department of Commerce, 1979.

Wind velocities are generally higher in the winter. At New Orleans[2], average wind speed ranges from 6.1 mph in August to 10.3 mph in March. The average being 8.4 mph (U.S. Department of Commerce, 1979).

## Air Quality

Due to the recently developed heavy industries associated with the petro-chemical industry north of Lafourche Parish along the river, and in response to the Clean Air Act, Louisiana has established an air quality monitoring and control program. Table 1.3 lists the air quality monitoring stations near Lafourche Parish. Table 1.4 lists the air quality standards currently being used in Louisiana to monitor pollutants.

For the most part, air quality is good in Lafourche Parish; however, as the petro-chemical industry continues to expand along the Mississippi River, increased levels of pollutants are to be expected, especially on days with inversions and light northerly winds.

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[2] New Orleans was the closest available station with wind data. There are no stations within Lafourche Parish that keep this type of record.

TABLE 1.3

AIR QUALITY MONITORING SITES

| CITY | SITE NAME | ADDRESS | PARISH |
|---|---|---|---|
| Carville | USPHA Hospital | Highway 75 | Iberville |
| Donaldsonville | Riverdate Subdivision | Highway 18 | Ascension |
| Garyville | Mobile Trailer Lot | Azaleas, Apricot St. | St. John |
| Geismar | Wintz Mart Market | Highway 75 | Ascension |
| Harvey | West Jefferson P.H.U. | 1901 8th Street | Jefferson |
| Metairie | Borden Company | 1751 Airline Hwy. | Jefferson |
| Metairie | East Jefferson P.H.U. | 111 N. Causeway Blvd. | Jefferson |

Source: Louisiana Air Control Commission, 1978: p. 3, 4.

TABLE 1.3 (cont).

MONITORING PARAMETERS

| | Continuous | | Non-Continuous | | |
|---|---|---|---|---|---|
| | $O_3$ | $SO_2$ | TSP | $SO_2$ | $NO_2$ |
| Carville | X | | X | X | X |
| Garyville | X | | X | X | X |
| Geismar | | | X | X | X |
| Harvey | | | X | X | X |
| Metairie | | | | | |
| Donaldsonville | | | | | |

$O_3$ = Ozone

$SO_2$ = Sulphur Dioxide

$NO_2$ = Nitrogen Dioxide

TSP = Total Suspended Particulates

Source: Louisiana Air Control Commission, 1978: p. 3, 4.

TABLE 1.4

AMBIENT AIR QUALITY STANDARDS

(Non-continuous Data)

| Parameter | | Maximum 24 hour average | Annual Geometric Mean | Annual Arithmetic Mean | Conversion Factors ($25^{o}C$, 760 mm Hg) |
|---|---|---|---|---|---|
| Total Suspended Particulate | Prim. | 260 $ug/m^3$ | 75 $ug/m^3$ | | |
| | Sec. | 150 $ug/m^3$ | 60 $ug/m^3$ | | |
| Sulphur Dioxide | Prim. | 365 $ug/m^3$ 0.14 ppm | | 80 $ug/m^3$ (0.03 ppm) | ppm x 2620 = $ug/m^3$ |
| | Sec. | 260 $ug/m^3$ 0.10 ppm | | 60 $ug/m^3$ (0.02 ppm) | |
| Nitrogen Dioxide | Prim. | | | 100 $ug/m^3$ (0.05 ppm) | ppm x 1880 = $ug/m^3$ |
| | Sec. | | | 100 $ug/m^3$ (0.05 ppm) | |
| Soiling Index | Prim. | 1.50 COH/1000 linear ft. | 0.60 COH/1000 linear ft. | 0.75 COH/1000 linear ft. | |
| | Sec. | | | | |

Source: Louisiana Air Control Commission (1978), page 32.

## THE WETLANDS ECOSYSTEM

### Introduction

Lafourche Parish sits astride one of the most dynamic and productive ecosystems in the world. In its entirety, coastal Louisiana contains about ten and one-half million acres of land: one and one-half million acres are dry land, and eight and one-half million are coastal wetlands. These eight and one-half million acres represent roughly 25% of the entire wetlands average in the United States (Louisiana State Planning Office, 1977). South central Louisiana contains nearly 31% (or three and one-half million acres) of the state total wetland area (Louisiana State Planning Office, 1975). Lafourche Parish contains over 973,000 acres of wetland or water, over 80% of the total.

The geology, climate, geomorphology, vegetation, water, drainage, and soils of Lafourche Parish are elements that enable the estuarine ecosystems of wetlands to function as a productive system to man and nature. The following is a discussion of the workings of this system and its value to man and to nature.

### Ecosystem Components

The wetlands estuarine ecosystems of coastal Louisiana are excellent examples of a productive, circular biologic system. The primary elements in this system are:

| | |
|---|---|
| (1) Sediment | (4) Water |
| (2) Wetlands | (5) Living Organisms |
| (3) Detritus | (6) Other Properties of Ecosystem |

Each of these elements operate singly and in concert with the others to produce the massive biologic productivity of the coastal areas of our state. The following is a discussion of each element of this system.

## Sediment

Sediment performs several functions in the wetlands ecosystem:

(1) Provides the base material upon which the ecosystem exists

(2) Shapes the surrounding landforms to delineate the estuarine basins

(3) Provide nutrients necessary for plant growth

Before the advent of man, yearly overflow of the Mississippi River on its deltaic plain provided the sediment load responsible for deltaic plain progradation. Deposition within estuarine basins was limited to fine clays, heavier silty materials being deposited on the "natural levees". Since the advent of man and artificial flood control structures almost all sediment deposits have ceased within south central Louisiana.

## Wetlands

The wetlands areas, consisting of swamp forest, fresh, brackish, and saline marsh, provide the floral vegetation component of the ecosystem. This vegetation provides habitat and food for primary consumers and provides "detritus" to the estuarine system.

Detritus

"Detritus" or partially decomposed organic matter can be compared to the fuel that powers the living estuarine ecosystems in each basin. This material, derived from plants and animal waste, forms the food source for the organisms that make up the base of the wetlands food chain.

Water

Water is the integrating factor in the estuarine ecosystem of south central Louisiana. Water performs the following functions:

(1) Transports sediment from the river into wetlands areas, providing nutrients to the basin

(2) Transports detritus throughout the system, providing the basic food source for the food chain base

(3) Determines the vegetation type, at any point, in the basin by its depth and salinity

(4) Provides the living environment, directly or indirectly, for all of the creatures of the ecosystem

(5) Provides the means of travel for the interaction of the living creatures of the system

Living Organisms

These are the creatures that use the natural resources of the system in their life cycles and generate the plethora of life both qualitatively and quantitatively, that exists in the ecosystems.

Other Properties of Estuaries

Table 1.5 lists other properties of estuaries that interact to form the ecosystems extant in south central Louisiana.

TABLE 1.5

Physical Properties Governing

Productivity of Estuarine Systems

1. Confinement
   a. provides shelter that protects estuary from wave action
   b. allows plants to root
   c. permits retention of suspended life and nutrients

2. Depth
   a. allows light to penetrate to plants on the bottom
   b. fosters growth of marsh plants and tideflat biota
   c. discourages oceanic predators which avoid shallow water

3. Salinity
   a. freshwater flow may create a distinct surface layer over saltier, heavier bottom layer, indicating beneficial stratified flow
   b. fresh water dillution deters oceanic predators and encourages estuarine flows

4. Circulation
   a. sets up beneficial system of transport for suspended life when stratified, such that the bottom layer flows in and the surface layer flows out
   b. enhances flushing
   c. retains organisms in favorable habitats through behavioral adaptions

5. Tide Driving Force
   a. transports nutrients and suspended life
   b. dilutes and flushes wastes
   c. acts as an important regulator of feeding, breeding, etc.

6. Nutrient Storage
   a. trapping mechanisms store nutrients within the estuary
   b. marsh and grass beds store nutrients for slow release as detritus
   c. richness induces high accumulation of available nutrients in animal tissue

---

Source: Clark, 1974: 2.

These elements involve water, landforms, vegetation, and detritus. These driving forces keep the system operating at a peak level of productivity.

## A View of the Ecosystem of the Estuarine Basin

In this section we will travel down the estuarine system from the upper portion of the basin to the sea to provide the reader with an insight into the complex system at work in the wetlands areas that comprise the coastal areas. This section draws heavily from the work of Clark (1974), Mumphrey et al (1975), Day et al (1973), and Bahr and Hebrard (1976) for information on the ecosystem function. Let us begin our journey.

### Upper Basin

Freshwater enters the system through river overflow and rainfall. This water is fresh and laden with sediment and nutrients as it flows off of the natural levee into the swamp forest. Trees living here use sunlight and these nutrients to grow. The organic matter shed into the shallow water is used by the organisms there, as well as reused by the aquatic and terrestrial plants growing in the area. Three primary organisms operate here and throughout the rest of the system to form the base of the food chain. Although the location within the estuary will determine the species of animals present, their function in the system is the same (Day et al, 1973, and Mumphrey et al, 1975) have determined their function thusly:

> Packagers organize organic material into forms available for convenient transfer to higher tropic levels (life requiring higher forms of nutrition).
>
> These packagers may be autotrophs (they make their own food) or heterotrophs (they consume primary plant matter). Cord grass (Spartina)

and phytoplankton are examples of the former; snails and zooplankton are examples of the latter.

Regulators are organisms with generalized feeding habits. They regulate populations by feeding on the most abundant food sources. Regulators have longer life spans and larger individual sizes than packagers. They are also highly mobile. Regulators are subdivided into two classes: subsystem regulators and whole system regulators. Subsystem regulators feed on specific organisms, thus controlling specific populations. Catfish, blue crabs, shore birds, drum, croaker, etc. are considered subsystem regulators. This level (subsystem regulators) is analogous to mid-level carnivores. Whole system regulators feed on system regulators, as well as what the subsystem regulators feed on. Thus, they regulate the other regulators. This group includes animals such as trout, coons, most birds, and man. There is little predation on these organisms (also called top carnivores), except by man who, of course, has assumed the role of regulator of the entire system.

The Regenerators take waste from all sources and regenerate these wastes into nutrients to start the whole cycle over again. Bacteria, yeast, etc., are examples of this type of organism.

Table 1.6 illustrates some examples of each type of organism. It is by no means implied that these categories of life are rigid. There are organisms that function in more than one capacity. What these categories attempt to do, is point out the organism's primary function in the estuary. This enables the larger scheme of life to be assembled more simply to give the reader a more general, but fairly accurate view of the circle of life.

Source: Mumphrey et al (1975), pages 45, 47.

TABLE 1.6

Ecological Roles of Some Estuarine Species

| Packagers | Regulators | Regenerators |
| --- | --- | --- |
| Spartina | Mature Fish | Bacteria |
| Benthic Algae | Porpoises | Yeasts |
| Periphyton | Pelicans | Molds |
| Phytoplankton | Herons | Meiofouna |
| Killifish | Egrets | Protozoa |
| Shrimp | Gulls | |
| Fiddler Crabs | Comb-jellies | |
| Juvenile Fish | Raccoon | |
| Marsh Snails | Man | |
| Modiolus | | |
| Oysters | | |

Source: Day *et al*, 1973.

The Swamp Forest provides habitat for birds, fish, reptiles, insects, etc. Water flowing by means of pressure and a very slight downhill grade moves detritus and organisms out of the swamp forest into the fresh marsh.

Fresh Marsh

Fresh water continues its flow to the sea through the fresh marsh zone. Two kinds of flow occur throughout the ecosystem sheetflow and channel flow. Sheetflow is the general movement of surface water through the wetlands towards the Gulf. This is important because this slow flow allows nutrient exchange between the marsh and water. Detritus is used and new detritus is produced and moved downstream. Channel flow is also slow, but here the water is slightly deeper and moves a bit faster. Adequate nutrient exchange occurs here also.

The only effect the Gulf of Mexico has on freshwater areas is a very slight tidal influence. Habitat is diverse here. A few more species of marine fish have been sighted near the lower end of the freshwater area, but, for the most part, this zone is noted for the detritus and fresh water it supplies to the lower part of the basin, as well as for habitat.

Brackish Marsh

This zone may be the most important part of the estuary system. It is here that inland fresh water and fresh water species meet marine waters and their associated organisms.

In this zone, tidal influence is more pronounced and the water tends toward increasing salinity. Many species of sea animals use this zone for nursery areas. Among them are menhaden, shrimp, crabs, and others. Perret (1971) has estimated that the estuary is relied on directly, (nursery and habitat) in indirectly (food sources), by seventy-five percent of all fish and ninety percent of the eight most abundant fish and invertebrates that inhabit Louisiana's coastal waters. It is in the brackish water zone that juvenile sea creatures feed and are protected, until they can fend for themselves in open water.

The prime reason for this brackish water zone is the shallow sinuous channel flow to and from the Gulf, as well as sheetflow. In these shallow, slow moving systems, water tends to mix rather than maintain its saline or fresh integrity, thus modifying extremes to a great extent (Clark, 1974). This single fact has enabled this zone to serve as the nursery area of the estuarine system. It is also here that man-made influences have upset the balance of the ecosystem the most.

## Salt Marsh

This zone is highly marine in character. Detritus and fresher waters intrude occasionally, but saltwater is the norm for this area. Although not as productive as the brackish zone, this area serves similar function. Daily tidal flushing is high here, and this area is subject to rapid erosion during storm periods.

As this area erodes, each zone is pushed further inland. This is a natural process that eventually results in the sea reclaiming the entire deltaic plain. Here, as elsewhere, man-made influences have altered the ecosystem significantly and increased the rate of erosion.

## Resultant Estuarine Productivity

The result of this estuarine interaction within the coastal basins that cover in or near Lafourche Parish i.e. Terrebonne and Barataria Basins, is tremendous productivity. It is no accident that the state with the most wetland area also leads the nation in fisheries production. (See Chapter 3 for statistics on commercial fish catch in Louisiana). These figures do not include the sport fishing catch in Louisiana waters. The millions of birds, especially ducks that frequent the marsh and the fur bearing creatures that are harvested yearly, also enhance the value of this ecosystem to man. Table 1.7 lists some of the benefits that the coastal wetlands provide to man and to nature. Later in this report, we will investigate what man has done to this ecosystem and the effects of these activities on the evolution of the wetlands.

TABLE 1.7

Benefits of the Estuarine Ecosystem

A. Benefits to the Natural System

1. Habitat for birds, fish, mammals, reptiles and the varied flora of the region.

2. Nursery area for birds, fish, mammals, and reptiles.

3. Food Source for the creatures of the open Gulf of Mexico.

4. Nutrient source for luxurious plant growth of the basins.

B. Benefits to Man

1. High assimilative capacity to absorb pollutants.

2. High yield of birds, fish, mammals, reptiles to both commercial and sport interests.

3. Buffer zone against tropical storms.

4. Recreation area for coastal residents.

Source: Author.

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# CHAPTER II

## DEMOGRAPHY AND SETTLEMENT PATTERNS

### GENERAL HISTORY

Prior to the settlement of the area which is now Lafourche Parish, the area was inhabited by Indians, primarily the Chitmacha and the Washa/Chawasha tribes (upper and middle Lafourche Parish respectively). These peoples belonged to the eastern maise culture group, hunters, and fishermen who depended significantly on agriculture for their continuing source of food. The primary technique of farming was the slash and burn method. As fields lost their productivity, they were abandoned and left fallow to return to forest as new land was cleared. The various tribes lived mainly on the alluvial ridges that formed the Bayou Lafourche distributary systems.

The French were the first Europeans to make successful colonization efforts in Louisiana when they established New Orleans in 1718. The city struggled well into the 1770's and did not experience rapid growth till Spanish domination in the latter part of the 18th century.

For the most part, the French settlers stayed near New Orleans; John Law in the 1720's led the first move to colonize the area outside of the city. Several groups came to the new world to find a new life, especially Germans who settled along the Mississippi alluvial ridge near what is now Hahnville in St. Charles Parish. A few Germans did hunt and fish and established what is now Des Allemands in the swamp in western St. Charles Parish. The French were never very successful in colonizing New Orleans or the surrounding areas until the early 1760's when the Louisiana colony, which was at that time under Spanish control, allowed Acadian settlers driven out of Nova Scotia during King George's War to settle near St. Martinville. These settlers numbered upwards of 10,000 persons.

From St. Martinville, these settlers moved up the Mississippi and down Bayou Lafourche to establish the Acadian coasts. Although culturally similar to the other French settlers, they tended to isolate themselves from the rest of the colony. The people were very successful farmers and multiplied so fast that in 1772, Spain created the ecclesiastical parish of Ascension. In 1778, the District of Valenzuela was established in what is now Assumption Parish.

The Acadians along Bayou Lafourche generally were not large landowners. They grew corn, rice, cotton, and okra. There were some cattle and other domestic animals mainly for family use. Cypress and spanish moss were also utilized for subsistence, as well as commercial purposes. Some Acadians moved out into the swamps and marshes to utilize the hunting and fishing resources, but most remained small farmers.

After initial Acadian settlement, Anglo-Americans came by land and sea to take advantage of free land offered by Spain, to encourage settlement of Louisiana. Bayou Lafourche especially felt the effects of this American colonization after the discovery of crystallization of sugar by Etienne de Bore in 1774. Cotton planters and small farmers from the lower south flooded to south Louisiana hoping to establish themselves. The unstable cotton market and the crystallization of sugar led many newcomers to turn to sugar as a cash crop. The land and climate along Bayou Lafourche were conducive to the development of sugar as a dominant crop.

In the early 19th centry, many wealthy planters from the Natchez area and elsewhere purchased property and settled along Bayou Lafourche so that the area once densely settled by white French farmers was transformed into plantations occupied by a few rich Americans with many black slaves. Blacks were introduced to Bayou Lafourche as slaves to work the large fields of the planters. Just before the Civil War, blacks in the agricultural areas constituted over 50% of the total population.

After the Civil War, many factors contributed to a decline in the black population in the agricultural areas along the bayou.

## SETTLEMENT PATTERNS

In coastal Louisiana, settlement patterns were historically dictated by waterways, the primary transportation arteries of the area until quite recently. The French government even used waterways as a convenient reference by developing land. They utilized the arpent (192 foot squares) as their measuring unit. This unit allowed maximum utilization of high land along the crests of the natural levee of Bayou Lafourche.

The arpent system and the use of the waterway as a transportation artery combined with vast areas of hostile wetlands between natural levee ridges surrounding the waterways led to a largely linear settlement pattern. Bayou Lafourche illustrates this settlement pattern better than anywhere else in Louisiana.

Within this linear pattern, confluence of waterways, waterway crossings, or locations of churches became the magnets that encouraged the development of urban centers.

Cities like Napoleonville (Assumption Parish), Thibodaux (Lafourche Parish), and Houma (Terrebonne Parish) owe their initial settlement to these factors. In the lower portions of Lafourche Parish, where the natural levee was narrow and in the swamps and marshes, the populations were small, widely dispersed and isolated, the environment shaping their existence. (Portions of this section excerpted from Land Use Report, Phase I by Durabb et al (1980).

## DEMOGRAPHY

It is in the context of the history of settlement, the character of long alluvial ridges surrounded by wetlands, the French system of land division and the agriculture and fisheries resources of the area that have shaped the population that exists today in Lafourche Parish. Settlement is still linear along an increasingly narrow natural levee ridge that bisects the parish from its northern boundary to just south of Golden Meadow. Modern drainage and reclamation efforts have expanded this strip of development, especially in the coastal zone of Lafourche Parish south of the Intracoastal Waterway. (See Table 2.1)

Table 2.1 lists the population of Lafourche Parish for the years of 1960, 1970, 1980. It is important to point out that although the parish is quite large (2,169 square miles) over 80% is wetlands or water (Louisiana State Planning Office, 1975). Almost all of the population lives on less than 20% of this land area. There are only three incorporated municipalities in Lafourche Parish. These municipalities include Thibodaux with a 1980 population of 15,810; Lockport with a 1980 population of 2,424; and Golden Meadow with a population of 2,282. Table 2.2 lists births and deaths for the period of 1960 - 1980.

The southern third of Lafourche Parish (below what is now the Intracoastal Waterway) had a history of hunting and fishing

Table 2.1

LAFOURCHE PARISH POPULATION

BY WARDS

| | Ward 1 | Ward 2 | Ward 3 | Ward 4 [1] | Ward 5 | Ward 6 |
|---|---|---|---|---|---|---|
| 1960 | 1,982 | 14,008 | 5,752 | 5,530 | 2,101 | 3,267 |
| 1970 | 4,104 | 16,055 | 7,561 | 7,112 | 1,762 | 4,323 |
| 1980 | 7,754 | 16,174 | 10,414 | 8,238 | 2,262 | 5,323 |
| Population Change 1960 - 1970 | + 2,122 | + 2,047 | + 1,809 | + 1,582 | - 339 | + 1,056 |
| Population Change 1970 - 1980 | + 3,650 | + 119 | + 2,853 | + 1,126 | + 480 | + 1,000 |
| Total Change 1960 - 1980 | + 5,772 | + 2,166 | + 4,662 | + 2,708 | + 161 | + 2,056 |
| Percentage Change 1960- 1980 | + 391% | + 15% | + 81% | + 49% | + 8% | + 63% |

Source: U.S. Department of Commerce (1960, 1970, 1980)

1. Partially in Coastal Zone
2. In Coastal Zone

Table 2.1 (cont.)

LAFOURCHE PARISH POPULATION

BY WARDS

| | Ward 7 | Ward 8 | Ward 9 | Ward 10 [2] | Ward 11 [1] | Parish Total |
|---|---|---|---|---|---|---|
| 1960 | 3,327 | 534 | 1,596 | 15,596 | 1,688 | 55,381 |
| 1970 | 3,603 | 849 | 1,708 | 18,831 | 3,033 | 68,941 |
| 1980 | 3,576 | 795 | 2,175 | 21,328 | 4,444 | 82,483 |
| Population Change 1960 - 1970 | + 276 | + 315 | + 112 | + 3,235 | + 1,345 | + 13,560 |
| Population Change 1970 - 1980 | - 27 | - 54 | + 467 | + 2,497 | + 1,411 | + 13,542 |
| Total Change 1960 - 1980 | + 249 | + 261 | + 579 | + 5,732 | + 2,756 | + 27,102 |
| Percentage Change 1960 - 1980 | + 7% | + 49% | + 36% | + 37% | + 363% | + 49% |

Source: U.S. Department of Commerce (1960, 1970, 1980)

1. Partially in Coastal Zone
2. In Coastal Zone

Table 2.2

POPULATION, BIRTHS, AND DEATHS BY RACE AND BY BIRTH AND DEATH RATES

1960 TO DATE

| | | LIVE BIRTHS | | |
|---|---|---|---|---|
| | REVISED POPULATION | TOTAL | WHITE | NON-WHITE |
| LAFOURCHE | | | | |
| 1960 | 55381 | 1743 | 1448 | 295 |
| 1961 | 56086 | 1775 | 1481 | 294 |
| 1962 | 56749 | 1803 | 1504 | 299 |
| 1963 | 58079 | 1749 | 1431 | 318 |
| 1964 | 60127 | 1829 | 1530 | 299 |
| 1965 | 61475 | 1777 | 1476 | 301 |
| 1966 | 62410 | 1768 | 1494 | 274 |
| 1967 | 62842 | 1701 | 1403 | 298 |
| 1968 | 63826 | 1529 | 1245 | 284 |
| 1969 | 65627 | 1557 | 1312 | 245 |
| 1970 | 68941 | 1362 | 1140 | 222 |

Source: Louisiana State Planning Office (1981).

(cont.)

Table 2.2

POPULATION, BIRTHS, AND DEATHS BY RACE AND BY BIRTH AND DEATH RATES

1960 TO DATE

| | | LIVE BIRTHS | | |
|---|---|---|---|---|
| | REVISED POULATION | TOTAL | WHITE | NON-WHITE |
| LAFOURCHE | | | | |
| 1971 | 70400 | 1460 | 1203 | 257 |
| 1972 | 71958 | 1264 | 1037 | 227 |
| 1973 | 71479 | 1260 | 1025 | 235 |
| 1974 | 71893 | 1217 | 1008 | 209 |
| 1975 | 72999 | 1232 | 981 | 251 |
| 1976 | 74783 | 1320 | 1099 | 221 |
| 1977 | 76208 | 1434 | 1155 | 279 |
| 1978 | 77331 | 1464 | 1219 | 245 |
| 1979 | 79084 | 1517 | 1237 | 280 |
| 1980 | 82483 | -- | -- | - |

Source: Louisiana State Planning Office (1981).

with mainly sparse settlement. Although there was some sugar cane agriculture in the more northerly areas and even some citrus plantations near Leeville, the predominant occupations were trapping and fishing. Coastal erosion and subsidence as well as blockage of Bayou Lafourche in the early 20th century helped to eliminate agriculture south of Golden Meadow. Hurricanes wiped out settlements at the coast and later at Leeville concentrating people along the alluvial ridge from Golden Meadow north. It was not until the advent of the oil and gas development that there was a significant growth in population in this area.

The Coastal Zone population of Lafourche Parish encompasses all of Ward 10 and a small portion of Ward 4 (Table 2.1). However, almost all of the population in the coastal zone of Lafourche Parish resides in Ward 10. Table 2.3 lists the population of Ward 10 from 1960 - 1980.

The population in Ward 10 has remained about one-fourth of the parish total for the last twenty years. Small fluctuations due to the variable property of the oil and gas industry have largely accounted for seasonal population change.

With the Coastal Zone of Lafourche so dependent on the unstable oil and gas industry and their utilization of a non-renewable resource (See Chapter 3), the growth or decline of the population there is largely tied to the fate of the energy industry. Any population projections, therefore, have limited validity if they assume normal historical in and out migrations as well as births and deaths. With this fact in mind only one method of projection was used to forecast possible trends in

TABLE 2.3

WARD 10 POPULATION

| YEAR | POPULATION | INCREASE | % OF PARISH TOTAL |
|---|---|---|---|
| 1960 | 15,596 | -- | 28% |
| 1970 | 18,831 | 3,235 | 27% |
| 1980 | 21,328 | 2,497 | 26% |

Source: U.S. Department of Commerce (1960, 1970, 1980) the coastal zone - the Cohort Survival Method. Table 2.4 lists projected populations for Lafourche Parish to the year 2000. Table 2.5 lists the projection for Ward 10 assuming a constant percentage of the parish total.

Table 2.4

POPULATION PROJECTIONS

LAFOURCHE PARISH *

| | Population | % Change |
|---|---|---|
| 1980 - current | 82,483 | ---- |
| 1985 - projected | 90,531 | +10% |
| 1990 - projected | 98,925 | +09% |
| 1995 - projected | 105,972 | +07% |
| 2000 - projected | 112,350 | +06% |

Source: Maruggi et al (1982)

* Middle Migration Assumptions, Segal Projections.

Table 2.5

WARD 10

POPULATION PROJECTIONS *

| | Population |
|---|---|
| 1980 - Current | 21,328 |
| 1985 - projected | 23,538 |
| 1990 - projected | 25,721 |
| 1995 - projected | 27,553 |
| 2000 - projected | 29,211 |

* Assumes constant 26% of total parish population based on 1980 parish populations and parish population projections in Table 2.4

Source: Maruggi et al (1982)

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# CHAPTER III

# THE ECONOMY OF THE LAFOURCHE PARISH COASTAL ZONE [1]

## EMPLOYMENT AND WAGES

The employment base in Lafourche Parish has traditionally been divided into three areas: agriculture, fishing, and resource extraction. South of the Intracoastal Waterway in the Lafourche Coastal Zone, agriculture plays a minor role. The primary employers are the fishing and resource extraction sectors of the parish economy.

Table 3.1 lists employment in Lafourche Parish by major industrial sectors from 1958 - 1981. There are no statistical break-outs for the coastal zone of Lafourche Parish but other figures indicate a prepondence of employment in the oil and gas mining, service, and the allied construction industry in south Lafourche.

Table 3.1 also shows average weekly wages for Lafourche Parish in comparison to the state average for the years of 1958 - 1981. Although, Lafourche Parish wages are slightly

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[1] This section attempts a discussion of the economy of the area designated as the Coastal Zone Management area of Lafourche Parish. Because the CZM boundary is artificial in that it cuts across a rural area, and because there is little in the way of data generated <u>specifically</u> for the land area under this program, parish-wide statistics are utilized to describe conditions extant there. Where possible, the data has been pared down to approximate the CZM area of the parish.

TABLE 3.1

AVERAGE EMPLOYMENT BY INDUSTRY IN LAFOURCHE PARISH

COVERED BY THE LOUISIANA EMPLOYMENT SECURITY LAW

| YEAR | TOTAL | MANUFACTURING | MINING | CONSTRUCTION | TRANSPORTATION | TRADE |
|---|---|---|---|---|---|---|
| 1958 | 7,524 | ------- | --- | ------ | ---------- | --- |
| 1959 | 7,787 | 1,884 | --- | ------ | ---------- | --- |
| 1960 | 7,662 | 1,721 | --- | ------ | ---------- | --- |
| 1961 | 7,504 | 1,797 | --- | ------ | ---------- | --- |
| 1962 | 7,626 | 1,790 | --- | ------ | ---------- | --- |
| 1963 | 7,912 | 1,843 | --- | ------ | ---------- | --- |
| 1964 | 8,528 | 1,985 | --- | ------ | ---------- | --- |
| 1965 | 8,881 | 1,957 | 1,509 | 424 | 1,948 | 2,197 |
| 1966 | 9,615 | 2,012 | 1,602 | 610 | 2,081 | 2,396 |
| 1967 | 9,695 | 2,077 | 1,503 | 613 | 2,076 | 2,482 |
| 1968 | 9,938 | 2,059 | 1,670 | 536 | 2,186 | 2,497 |
| 1969 | 9,839 | 2,056 | 1,554 | 479 | 2,210 | 2,513 |
| 1970 | 9,609 | 1,977 | 1,468 | 447 | 2,234 | 2,460 |

Source: Louisiana Department of Labor. (1958-1981)

(cont.)

TABLE 3.1

AVERAGE EMPLOYMENT BY INDUSTRY IN LAFOURCHE PARISH

COVERED BY THE LOUISIANA EMPLOYMENT SECURITY LAW

| YEAR | TOTAL | MANUFACTURING | MINING | CONSTRUCTION | TRANSPORTATION | TRADE |
|---|---|---|---|---|---|---|
| 1971 | 9,844 | 1,980 | 1,518 | 401 | 2,224 | 2,634 |
| 1972 | 12,307 | 2,092 | 1,582 | 572 | 2,494 | 3,014 |
| 1973 | 13,082 | 2,077 | 1,491 | 717 | 2,684 | 3,123 |
| 1974 | 14,600 | 2,671 | 1,716 | 793 | 2,783 | 3,228 |
| 1975 | 15,104 | 3,084 | 1,590 | 932 | 2,877 | 3,352 |
| 1976 | 15,969 | 3,183 | 1,496 | 967 | 3,228 | 3,786 |
| 1977 | 16,998 | 3,466 | 1,383 | 969 | 3,583 | 4,018 |
| 1978 | 22,244 | 3,873 | 1,351 | 1,172 | 4,138 | 4,077 |
| 1979 | 23,214 | 3,576 | 1,420 | 1,352 | 4,449 | 4,196 |
| 1980 | 23,843 | 3,560 | 1,579 | 1,583 | 4,838 | 4,417 |
| 1981 | 24,716 | 3,687 | 1,778 | 1,433 | 5,182 | 4,650 |

Source: Louisiana Department of Labor, (1958 - 1981)

(cont.)

TABLE 3.1

AVERAGE WAGE BY INDUSTRY IN LAFOURCHE PARISH

COVERED BY THE LOUISIANA EMPLOYMENT SECURITY LAW

| YEAR | FINANCE | SERVICES | GOVERNMENT *PUBLIC ADMINISTRATION | AVERAGE WEEKLY WAGES | LA. AVERAGE WEEKLY WAGE |
|---|---|---|---|---|---|
| 1958 | --- | --- | ---------- | $ 77.19 | $ 78.14 |
| 1959 | --- | --- | ---------- | 79.38 | 81.05 |
| 1960 | --- | --- | ---------- | 80.26 | 82.76 |
| 1961 | --- | --- | ---------- | 84.48 | 85.60 |
| 1962 | --- | --- | ---------- | 85.77 | 88.75 |
| 1963 | --- | --- | ---------- | 87.58 | 92.51 |
| 1964 | --- | --- | ---------- | 91.90 | 96.61 |
| 1965 | 215 | 632 | ---------- | 94.77 | 100.58 |
| 1966 | 256 | 656 | ---------- | 102.85 | 106.30 |
| 1967 | 253 | 689 | ---------- | 109.03 | 112.32 |
| 1968 | 273 | 717 | ---------- | 117.17 | 119.69 |
| 1969 | 302 | 725 | ---------- | 119.93 | 126.34 |
| 1970 | 324 | 698 | ---------- | 128.77 | 133.14 |

Source: Louisiana Department of Labor (1958 - 1981)

(cont.)

TABLE 3.1

AVERAGE WAGE BY INDUSTRY IN LAFOURCHE PARISH

COVERED BY THE LOUISIANA EMPLOYMENT SECURITY LAW

| YEAR | FINANCE | SERVICES | GOVERNMENT *PUBLIC ADMINISTRATION | AVERAGE WEEKLY WAGES | LA. AVERAGE WEEKLY WAGE |
|---|---|---|---|---|---|
| 1971 | 338 | 748 | --------- | $131.63 | $140.24 |
| 1972 | 417 | 1,443 | 694 | 137.97 | 144.23 |
| 1973 | 488 | 1,679 | 819 | 145.93 | 150.46 |
| 1974 | 539 | 1,978 | 892 | 159.55 | 164.78 |
| 1975 | 614 | 2,470 | 184* | 180.44 | 181.32 |
| 1976 | 607 | 2,558 | 145* | 195.14 | 196.88 |
| 1977 | 683 | 2,749 | 147* | 204.60 | 213.06 |
| 1978 | 792 | 6,171 | 671* | 212.30 | 224.25 |
| 1979 | 748 | 6,140 | 686* | 234.07 | 246.93 |
| 1980 | 809 | 6,320 | 737 | 264.48 | 276.43 |
| 1981 | 835 | 6,418 | 733 | 295.51 | 308.07 |

Source: Louisiana Department of Labor (1958 - 1981).

below the state averages, the Lafourche Parish figures indicate the lower scale agricultural and service jobs in the northern and central portion of the parish. Wages in the oil and gas industry have been traditionally higher than the average for the State of Louisiana.

Table 3.2 lists per-capita personal income for the parish in comparison to the surrounding parishes in southeast Louisiana.

The oil and gas industry has, until recently, suffered little in the way of recessionary cutbacks. Typically, there has always been a shortage of workers in south Lafourche to meet the demands for construction, service, and mining of the vast oil and gas reserves onshore and offshore. However, the latest national recession has affected all sectors of the economy and the economy has cooled down even in the oil industry. Table 3.3 illustrates a consistently lower unemployment rate for Lafourche Parish for the last seven years even though recent rates reflect the national recession and higher unemployment.

TABLE 3.2

PER CAPITA PERSONAL INCOME, BY PARISH

LOUISIANA, 1973 - 1978

| | PER CAPITA PERSONAL INCOME (DOLLARS) | | | | | |
|---|---|---|---|---|---|---|
| | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 |
| Assumption | 3,095 | 3,960 | 4,169 | 4,637 | 5,068 | 5,819 |
| Lafourche | 3,488 | 4,148 | 4,670 | 5,217 | 5,789 | 6,680 |
| St. Charles | 3,549 | 4,077 | 4,714 | 5,419 | 6,199 | 7,167 |
| Terrebonne | 3,847 | 4,382 | 4,943 | 5,707 | 6,412 | 7,504 |

Source: University of New Orleans, Division of Business and Economic Research and Louisiana State Planning Office (1981) p. 160.

TABLE 3.3

UNEMPLOYMENT RATES

LAFOURCHE PARISH - LOUISIANA

| | | Louisiana State Average | Lafourche Parish |
|---|---|---|---|
| Annual Average | 1976 | 6.8 | 4.2 |
| | 1977 | 7.0 | 4.4 |
| | 1978 | 7.0 | 5.8 |
| | 1979 | 6.7 | 5.6 |
| | 1980 | 6.7 | 3.5 |
| | 1981 | 8.4 | 6.2 |
| Monthly Average 1982 | Jan. | 10.2 | 6.9 |
| | Feb. | 9.8 | 7.6 |
| | Mar. | 10.1 | 7.1 |
| | Apr. | 10.2 | 7.7 |
| | May | 10.5 | 8.8 |
| | June | 11.8 | 10.6 |
| | July | 11.4 | 9.7 |
| | Aug. | 10.9 | 9.4 |

Source: Louisiana Department of Labor, 1976 - 1982.

## ECONOMIC SECTORS

### Manufacturing

Table 3.4 is an incomplete but representative of the manufacturing establishments in Lafourche Parish contained in the 1981 yearbook of the Louisiana Department of Commerce. Note that the types of industry reported for the Lafourche Coastal Zone (Larose, Cut Off, Galliano, Golden Meadow) are mainly associated with fishing and oil and gas production or service.

### The Oil and Gas Industry

The lifeblood of the economy of south Lafourche is the oil and gas industry. This industry has also played a major role in the environment of the wetlands surrounding the leveed south Lafourche cities. Table 3.5 lists the major onshore and offshore oil and gas fields in the Lafourche Coastal Zone. Many of these fields date back to the initial exploratory attempts at offshore drilling and exploration. This area pioneered most of the technology used today in the offshore oil drilling industry.

Louisiana has been a major energy producer for decades. The oil and gas production from onshore and offshore areas of the coast has steadily declined since the peak year of 1970. Tables 3.6 and 3.7 compare production of oil and gas in 1974 and 1980 in south east Louisiana. A drastic decline in production is evident over this 6 year period. Lafourche Parish

TABLE 3.4

MANUFACTURERS IN LAFOURCHE PARISH IN 1981

| SIC CODE | LOCATION | PRODUCT | NUMBER OF EMPLOYEES | NAME OF FIRM | MARKET AREA |
|---|---|---|---|---|---|
| 2026, 2022 2033 | Thibodaux | Fluid milk, cheese, vegetables, preserves, jams and jellies | 50 - 99 | Acadia Dairy | Regional |
| 3732, 3731 | Larose | Offshore and inland boats, barge repair | 50 - 99 | Allied Shipyard | Regional |
| 3731, 3599 | Lockport | Boats for oil and fishing industry, hydraulic steering systems, marine propeller repair, machine shop | 250 - 499 | Bollinger Shipyard | International Trade-Export Only |
| 2061 | Thibodaux | Raw sugar, blackstrip molasses | 50 - 99 | Caldwell Sugars Co-op | Local |
| 3523 | Thibodaux | Tractors, loaders, harvesters, cane tables | 100 - 249 | Cameco Industries Grand Moulins de Parish Parent Co. - France | International Trade Export Only |
| 3711 | Cut Off | Marsh Buggies | 20 - 49 | Andrew A. Cheramie Marsh Buggies, Inc. | Local |
| 3731 | Larose | Offshore and inshore vessels, custom made shrimp boats | 10 - 19 | Collins Seafood, Inc. | Local |
| 2711 | Thibodaux | Newspaper publishing and printing - Monday - Friday | 20 - 49 | The Daily Comet | Local |
| 3599, 3533 | Raceland | Job shop, oil field equipment repair, fishing (wireline tools) | 1 - 4 | Danco Machine Shop, Inc. | Local |
| 2051 | Golden Meadow | Bread, pastries | 10 - 19 | Paul Dufrene Bakery | Regional |

Source: Louisiana Department of Commerce (1982)

(cont.)

| SIC CODE | LOCATION | PRODUCT | NUMBER OF EMPLOYEES | NAME OF FIRM | MARKET AREA |
|---|---|---|---|---|---|
| 3823 | Thibodaux | Electrical Testing Equipment for the Oil Industry | 5 - 9 | Electrocraft Corporation | Regional |
| 2399 | Galliano | Trawl Nets, butterfly nets | 1 - 4 | Alvin Griffin Net Shop, Inc. | Regional |
| 2092 | Golden Meadow | Shrimp Processing | 10 - 19 | Gulf Shrimp Processors, Inc. | Regional |
| 2013 | Thibodaux | Smoked, fresh and seasoned pork sausage, pork chops, hamburger patties, pickled salt pork, hog head cheese, boudin | 1 - 4 | Hebert's Processing Plant | Local |
| 2091 | Bayou Blue | Dried shrimp, carded | 1 - 4 | Park Avenue Dried Shrimp | Regional |
| 2092 | Golden Meadow | Frozen headless shrimp | 50 - 99 | Hubert Lafont Shrimp Co. Inc. | National |
| 3731 | Bourg | Barge and tugboat construction and repair | 100 - 249 | Acadian Shipyard, Inc. | National |
| 3732, 3731 | Bourg | Marine construction and repair of offshore boats and inland vessels, barge fabrication and repair | 100 - 249 | Bourg Drydock and Service Co. | National |
| 2092 | Des Allemands | Frozen and fresh catfish, shrimp, crab, seafood | 10 - 19 | Sampey Seafood, Inc. | International Trade Export Only |
| 2077 | Golden Meadow | Fish Protein | 20 - 49 | Louisiana Marine Protein Inc. | International Trade Export Only |
| 2097 | Golden Meadow | Ice | 5 - 9 | Martin Ice Co, Inc. | Local |
| 3443, 3471 | Golden Meadow | Fabrication Shop, sandblasting of metal parts | 50 - 99 | TBW Offshore Welders | Regional |
| 2399 | Golden Meadow | Shrimp Nets | 5 - 9 | Terrebonne and Perez Net Shop and Hardware | Local |

Source: Louisiana Department of Commerce (1982)

(cont..)

TABLE 3.4

MANUFACTURERS IN LAFOURCHE PARISH IN 1981

| SIC CODE | LOCATION | PRODUCT | NUMBER OF EMPLOYEES | NAME OF FIRM | MARKET AREA |
|---|---|---|---|---|---|
| 2711 | Larose | Newspaper publishing | 5 - 9 | The Lafourche Gazette Inc. | Local |
| 3731, 3732 | Larose | Barges, offshore and inland boats | 250 - 499 | Theriot-Modec Enterprises (Mitsui Oceanic Development Corporation Products) Parent Co. | National |
| 2621 | Lockport | Writing and printing paper offset paper, return post cards, tablets | 100 - 249 | Valentine Pulp and Paper Co. (Litton Industries-Parent Co.) | International Trade Export Only |
| 2821 | Lockport | Phenolic granular resin molding compounds | 50 - 99 | Valentine Sugar Valite Division | National |
| 3499, 3321 | Lockport | Steel marine closures, watertight doors, hatches; double steel doors, portlights, manhole covers | 1 - 4 | Weldbilt Marine Products | International Trade Export Only |
| 2911 | Lockport | Reduced crude and residual for refinery feedstock | 5 - 9 | W. J. Oil Co., Inc. (office Houston, TX) | Regional |
| 3446, 3442 | Raceland | Ornamental iron posts, window bars, fencing, steel doors | 1 - 4 | Breaux's Ornamental Iron Works, Inc. | Local |
| 3079 | Raceland | Polystyrene pipeline flotation buoys, polystyrene surveying marker buoys | 10 - 19 | Pipeline Products and Services Inc. | National |
| 2061 | Thibodaux | Raw sugar, blackstrip molasses, bagass | 50 - 99 | Lafourche Sugars Corp. | Local |
| 2086 | Thibodaux | Coca cola, tab, fanta orange, sprite, Mr. Pibb, Rondo, rex, Welch's grape | 100 - 249 | The Louisiana Coca-Cola Bottling Co., Ltd. | Local |

Source: Louisiana Department of Commerce (1982)

(cont.)

TABLE 3.4

MANUFACTURERS IN LAFOURCHE PARISH IN 1981

| SIC CODE | LOCATION | PRODUCT | NUMBER OF EMPLOYEES | NAME OF COMPANY | MARKET AREA |
|---|---|---|---|---|---|
| 2065 | Thibodaux | Candy | 20 - 49 | Howard Stark Company Inc. | International Trade Export Only |
| 3523, 3551 | Thibodaux | Sugar cane harvesters, loaders, cultivators, and wagons, yard equipment for sugar cane mills | 50 - 99 | Thompson International Co. (Seilon Inc.-Toledo, Ohio) Parent Company | International Trade Export Only |
| 3731 | Lockport | Tugs, push boats, barges, off-shore support vessels, marine repair | 200 - 499 | Halter Marine | National |

SOURCE: Louisiana Department of Commerce (1982)

TABLE 3.5

OIL AND GAS FIELDS IN THE

LAFOURCHE PARISH COASTAL ZONE

| | |
|---|---|
| Lake Long | Lake Enfermer |
| Larose | Coffee Bay |
| South Larose | South Little Lake |
| Kings Ridge | Plum Point |
| Bayou Raphael | Clovelly |
| Golden Meadow | Cut Off |
| Bayou Ferblanc | Montegut |
| East Golden Meadow | North Montegut |
| Timbalier Bay | Poignard Bayou |
| Bully Camp | Delta Farms |
| Courant Bay | Little Temple |
| Lake Raccourci | Bay De Chene |
| Leeville | Caillou Island |
| Lizette Bay | Lake Barre |
| Fishermans Bay | Point Chicot |
| Jaque Bay | West Delta Farms |
| Raccoon Lake | Little Lake |
| Bay Marchand | |

Source: Louisiana Geological Survey, July 1981.

TABLE 3.6

OIL PRODUCTION

| Parish | 1974<br>Crude Oil (Barrels) | 1980<br>Crude Oil (Barrels) |
|---|---|---|
| Assumption | 806,464 | 257,774 |
| Lafourche | 46,087,249 | 16,493,007 |
| St. Charles | 9,714,933 | 317,852 |
| Terrebonne | 34,739,965 | 13,869,393 |
| Lafourche % Decrease in Production | ----- | -64%<br>1974-1980 |

Source: Office of Conservation, Department of Natural Resources (1982).

TABLE 3.7

GAS PRODUCTION

| Parish | 1974 Natural Gas (MCF) | 1980 Natural Gas (MCF) |
| --- | --- | --- |
| Assumption | 98,375,285 | 48,042,415 |
| Lafourche | 239,913,664 | 130,176,412 |
| St. Charles | 68,070,870 | 29,442,782 |
| Terrebonne | 723,812,065 | 357,642,069 |
| Lafourche % of Decrease in Production | ------- | -46% 1974-1980 |

Source: Office of Conservation, Department of Natural Resurces (1982).

has not yet felt the full effect of this declining production due to the drastic increases in prices for oil and the recent attempts to deregulate natural gas. This price increase has until recently created a windfall for the State of Louisiana. Continued production declines, however, will more than affect any price increases. It is anticipated that revenues from the severance taxes will continue to drop at the state and parish level.

Table 3.8 lists the number of oil and gas wells in Lafourche Parish 1976 - 1981. The total assessed value has actually dropped from 1979 - 1981.

Figure 3.1 illustrates that most of the revenues for Lafourche Parish are derived from state money, mainly severance taxes on oil and gas production within the parish, making the parish highly susceptible to declining severance tax revenues.

Table 3.9 and 3.10 list the total assessed valuation and taxes on that valuation in Lafourche Parish for the last two years. Since the parish receives no sales tax money on its own, this table represents almost all of the taxes levied by the parish and/or districts within it. Property taxes additionally have the rider of the Louisiana homestead exemption. Therefore, most local tax money is derived mainly from assessments on businesses. Since a large percentage of the businesses in Lafourche Parish are oil and gas related, any drop in exploration and/or production decreases jobs and tax revenues

TABLE 3.8

OIL AND GAS WELLS

LAFOURCHE PARISH

| | Number | Average Value | Total Assessed Value |
|---|---|---|---|
| 1976 | 2,633 | $7,068.32 | $18,610,880 |
| 1977 | 2,557 | 7,120.50 | 18,207,120 |
| 1978 | 2,764 | 8,081.36 | 22,336,890 |
| 1979 | 2,801 | 8,078.45 | 22,627,730 |
| 1980 | 2,822 | 7,800.71 | 22,013,600 |
| 1981 | 2,809 | 7,702.93 | 21,637,540 |

Source: Louisiana Tax Commission, Eighteenth Biennial Report (1978)

Louisiana Tax Commission, Nineteenth Biennial Report (1980)

Louisiana Tax Commission, Twentieth Biennial Report (1982)

# PARISH REVENUES

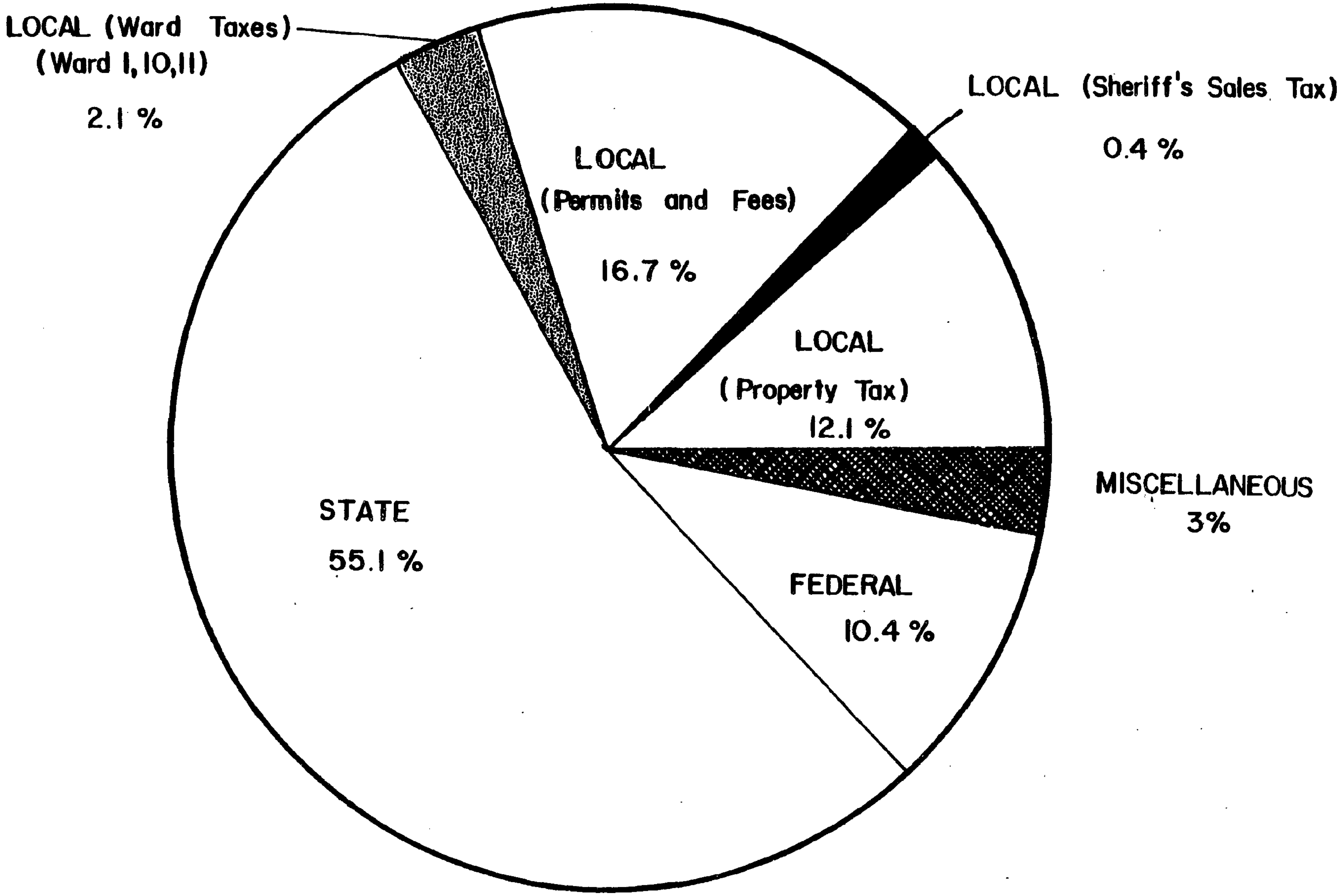


Figure 3.1

TOTAL BUDGET: 9,295,549.00 = 100%

TABLE 3.9

PROPERTY ASSESSMENTS

1978 - 1979

PARISH OF LAFOURCHE

| | | Dollar Amount |
|---|---|---|
| Total Assessed Value | | $146,510,800.00 |
| **Local Taxes** | | |
| Parish Tax | @ 3.08 mills | 395,245.92 |
| School Taxes: | | |
| Constitutional School - Maintenance | @ 3.92 mills | 574,322.32 |
| Parishwide School - Maintenance | @ 5.49 mills | 804,344.28 |
| Parishwide Consolidated School - Bonds | @ 7.00 mills | 1,025,575.60 |
| Special Education District #1 - Maintenance and Bonds | @ 8.60 mills | 526,506.62 |
| Levee Taxes: | | |
| Atchafalaya Basin Levee District | @ 3.65 mills | 312,388.10 |
| South Louisiana Tidal Water Control Levee District | @ 4.31 mills | 271,961,60 |
| Drainage Taxes: | | |
| Drainage and Improvements - Bonds | @ 1.35 mills | 197,789.58 |
| Drainage - Maintenance | @ 3.61 mills | 528,903.97 |
| Drainage District #1 - Maintenance | @ .89 mills | 37,961.35 |
| 5th Ward Drainage - Maintenance | @ 5.00 mills | 28,440.40 |
| Drainage District #1 of 12 | @ $2.50 an acre | 2,006.49 |
| Drainage District #2 of 12 | @ $2.50 an acre | 2,471.48 |
| Drainage District #3 of 12 | @ $2.50 an acre | 5,265.63 |
| Miscellaneous Taxes: | | |
| Public Buildings - Maintenance and Operation | @ 2.71 mills | 397,044.26 |
| Public Health Unit - Maintenance and Operation | @ .90 mills | 131,859.72 |
| Library Tax - Maintenance | @ 1.80 mills | 263,719.44 |
| Recreation Tax - Maintenance | @ 1.80 mills | 263,719.44 |
| Recreation District #1 - Maintenance | @ 2.81 mills | 40,406.85 |
| Fire Protection District #1 - Maintenance and Bonds | @ 4.80 mills | 100,595.23 |
| Fire Protection District #2 - Maintenance and Bonds | @ 1.97 mills | 33,796.09 |
| Fire Protection District #3 - Maintenance and Bonds | @ 3.83 mills | 234,479.11 |
| Water District #1 - Maintenance and Bonds | @ 5.36 mills | 675,757.60 |

TABLE 3.9

1978 - 1979

PARISH OF LAFOURCHE

| | | | Dollar Amoun |
|---|---|---|---|
| Bayou Lafourche Fresh Water District. . | @ | 1.58 mills . . . . | 230,801.27 |
| Hospital Service District #1 - Maintenance and Bonds . . . . . . . . . | @ | 12.35 mills . . . . | 756,088.00 |
| Hospital Service District #2 - Maintenance and Bonds . . . . . . . . . | @ | 7.01 mills . . . . | 267,170.17 |
| Hospital Service District #3 - Maintenance and Bonds . . . . . . . . . | @ | 10.36 mills . . . . | 422,339.69 |
| Road Lighting District #1 - Maintenance | @ | 1.75 mills . . . . | 213,164.56 |
| Greater Lafourche Port Commission Maintenance and Bonds . . . . . . . . . | @ | 6.39 mills . . . . | 391,206.67 |
| Garbage District #1 - Maintenance . . . | @ | 3.71 mills . . . . | 214,768.19 |
| Garbage District #3 - Maintenance . . . | @ | 3.78 mills . . . . | 33,413.54 |
| Law Enforcement District #1 . . . . . . | @ | 9.53 mills . . . | 1,396,247.91 |
| Parish Criminal Expense . . . . . . . . | @ | 90 mills . . . | 16,365.78 |
| Total Parish and Local Taxes . . . . . . . . . . . . . . . | | | $10,796,126.86 |

Source: Louisiana Tax Commission, (1980).

TABLE 3.10

PROPERTY ASSESSMENTS

1980 - 1981

PARISH OF LAFOURCHE

| | | Dollar Amount |
|---|---|---|
| Total Assessed Value | | $166,562,630.00 |
| **Local Taxes** | | |
| Parish Tax | @ 3.08 mills | 452,380.65 |
| School Taxes: | | |
| Constitutional School Tax Maintenance | @ 3.92 mills | 652,925.51 |
| Parishwide School - Maintenance | @ 14.00 mills | 2,331,876.82 |
| Parishwide Consolidated School - Bonds | @ 16.00 mills | 2,665,002.08 |
| Levee Taxes: | | |
| Atchafalaya Basin Levee District | @ 3.00 mills | 286,841.55 |
| South Louisiana Tidal Levee District | @ 4.31 mills | 314,085.61 |
| Drainage Taxes: | | |
| Drainage & Improvement-Bonds | @ 1.35 mills | 224,859.55 |
| Drainage - Maintenance | @ 3.61 mills | 601,291.09 |
| Drainage District #1 | @ 5.00 mills | 242,396.15 |
| 5th Ward Drainage District #1 - Maintenance | @ 5.00 mills | 34,940.35 |
| Drainage District #1 of 12 | @ $2.50 per acre | 2,006.48 |
| Drainage District #2 of 12 | @ $2.50 per acre | 2,471.47 |
| Drainage District #3 of 12 | @ $2.50 per acre | 5,265.93 |
| Drainage District #1 of 12 | @ 20.00 mills | 7,258.60 |
| Drainage District #2 of 12 | @ 20.00 mills | 3,433.40 |
| Drainage District #3 of 12 | @ 20.00 mills | 8,149.80 |
| Miscellaneous Taxes: | | |
| Parish Criminal Expense | @ .90 mills | 17,717.23 |
| Public Buildings - Maintenance | @ 2.71 mills | 451,384.73 |
| Public Health Unit - Maintenance & Operation | @ .90 mills | 149,906.37 |

1980 - 1981

PARISH OF LAFOURCHE

| | | | Dollar Amount |
|---|---|---|---|
| Library Tax - Maintenance | @ 1.80 mills | . . . . . | 299,812.73 |
| Recreation Tax - Maintenance . . . . . . . . . | @ 1.80 mills | . . . . . . . | 299,812.73 |
| Recreation District #1 - Maintenance . . . . . | @ 2.81 mills | . . . . . . . | 46,328.85 |
| Fire Protection District #1 - Maintenance . . . | @ 4.80 mills | . . . . . . . | 111,064.32 |
| Fire Protection District #2 . . . . . . . . . . | @ 1.97 mills | . . . . . . . | 39,303.96 |
| Fire Protection District #3 . . . . . . . . . . | @ 3.40 mills | . . . . . . . | 240,919.95 |
| Fire Protection District #5 . . . . . . . . . . | @ 6.00 mills | . . . . . . . | 31,033.44 |
| Water District #1 - Maintenance . . . . . | @ 5.86 mills | . . . . . . . | 847,190.76 |
| Bayou Lafourche Fresh Water District . . . . | @ 1.57 mills | . . . . . . . | 261,251.58 |
| Hospital Service District #1 - Maintenance | @ 17.24 mills | . . . . . . | 1,221,605.88 |
| Hospital Service District #2 - Maintenance | @ 7.00 mills | . . . . . | 301,627.62 |
| Hospital Service District #3 - Maintenance | @ 12.00 mills | . . . . . | 553,104.60 |
| Road Lighting District #1 - Maintenance . . . | @ 1.75 mills | . . . . . | 244,978.24 |
| Greater Lafourche Port Commission . . . . . . | @ 6.39 mills | . . . . . | 452,787.79 |
| Garbage District #1 - Maintenance . . . . . | @ 3.71 mills | . . . . . . . | 248,557.20 |
| Garbage District #2 - Maintenance . . . . . | @ 11.00 mills | . . . . . . . | 70,120.60 |
| Garbage District #3 - Maintenance . . . . . | @ 3.78 mills | . . . . . . . | 39,367.31 |
| Law Enforcement District #1 . . . . . . . | @ 9.53 mills | . . . . | 1, 587,341.86 |
| Special Education District #1 - Maintenance | @ 8.60 mills | . . . . | 609,385.77 |

Total Parish and Local Taxes . . . . . . . . . . . . . $15,959,788.56

Source: Louisiana Tax Commission, (1982) for the parish in addition to severance tax lines. This fact will pose some hard questions to parish officials for the future of the economy in south Lafourche and the tax base of the parish as a whole in the next few years if current trends continue.

### Fishing - The Renewable Resource

For many years the coastal zone of Louisiana has yielded vast renewable resources, especially commercial fisheries. Louisiana produces approximately 25% of the nation's fishery resources. Lafourche Parish sits astride the most productive of Louisiana's onshore and nearshore fishing industry, the Barataria Basin.

Table 3.11 illustrates the extent of the Louisiana fishing both on poundage and dollar value. Tables 3.12 and 3.13 offer a breakdown by species of the finfish and shellfish that make up the commercial catch. By far, the largest contribution to the catch is menhaden, with over one billion pounds caught. The most valuable harvest, however, is shrimp, bringing in over 131 million dollars in 1981.

Table 3.14 lists the leased water bottom acreage for oysters in coastal Louisiana and Lafourche Parish. Table 3.15 is a list of wholesale and retail seafood outlets in the coastal zone in 1979, illustrating the value of the fishing industry to the local economy other than to the fisherman themselves.

TABLE 3.11

LOUISIANA LANDINGS

1981

0 - 200 Miles Offshore

All Fish

| | Pounds | Dollars |
|---|---|---|
| Finfish | 1,168,597,000 | $ 84,735,000 |
| Shellfish | 132,425,000 | 149,583,000 |
| Total | 1,168,597,000 | $234,318,000 |

Source: National Marine Fisheries Service (1982)

TABLE 3.12

LOUISIANA LANDINGS

1981

0 - 200 Miles Offshore

Finfish

| Fish | Pounds | Dollars | Price/Pound |
|---|---|---|---|
| Croaker | 149,000 | $ 41,000 | $ .275 |
| Atlantic Flounder | 104,000 | 69,000 | .663 |
| Groupers | 5,000 | 5,000 | 1.00 |
| Menhaden | 1,024,611,000 | 39,203,000 | .038 |
| Mullet | 1,799,000 | 273,000 | .151 |
| Sea Trout, Spot | 523,000 | 518,000 | .990 |
| Sea Trout, White | 83,000 | 26,000 | .313 |
| Sharks | 2,000 | 1,000 | .500 |
| Red Snapper | 410,000 | 628,000 | 1.531 |
| Spanish Mackeral | 18,000 | 5,000 | .277 |
| Other Fish | 8,468,000 | 3,197,000 | -- |
| Total | 1,036,172,000 | $43,966,000 | |

Source: National Marine Fisheries Service (1982)

TABLE 3.13

LOUISIANA LANDINGS

1981

0 - 200 Miles Offshore

Shellfish

| Shellfish | Pounds | Dollars | Price/Pound |
|---|---|---|---|
| Blue Crab | 13,026,000 | $ 3,609,000 | $ .277 |
| Shrimp | 110,211,000 | 131,466,000 | 1.192 |
| Oyster Near | 7,298,000 | 13,050,000 | 1.788 |
| Squid | 1,000 | ------ | .000 |
| Other Shellfish | 1,889,000 | 1,458,000 | .771 |
| Total | 132,425,000 | $149,583,000 | |

Source: National Marine Fisheries Service (1982)

TABLE 3.14

LOUISIANA DEPARTMENT OF WILDLIFE AND FISHERIES

SEAFOOD DIVISION - SURVEY SECTION

LEASED WATER BOTTOM ACREAGE

| PARISH | 1976-76 | 1976-77 | 1977-78 | 1978-79 | 1979-80 | 1980-81 |
|---|---|---|---|---|---|---|
| St. Bernard | 71,750 | 74,343 | 72,377 | 72,083 | 69,838 | 69,011 |
| Plaquemines | 56,346 | 65,375 | 74,450 | 80,674 | 79,438 | 81,632 |
| Terrebonne | 33,012 | 38,781 | 44,762 | 43,284 | 41,265 | 42,595 |
| Jefferson | 16,147 | 16,572 | 19,826 | 20,295 | 19,608 | 19,775 |
| Lafourche | 12,951 | 15,157 | 17,340 | 18,456 | 15,689 | 15,657 |
| St. Tammany | 940 | 940 | 925 | 925 | 940 | 940 |
| Vermillion | 720 | 720 | 720 | 720 | 720 | 720 |
| St. Mary | 643 | 643 | 643 | 620 | 573 | 543 |
| Iberia | 716 | 880 | 866 | 889 | 889 | 889 |
| Grand Total | 193,225 | 213,411 | 231,909 | 237,946 | 228,960 | 231,762 |
| Lease Holders | | | | | | 1,424 |

Source: Louisiana Wildlife and Fisheries (1982).

TABLE 3.15

WHOLESALE AND RETAIL FISH AND SEAFOOD OUTLETS

LAFOURCHE PARISH

WHOLESALE

Bob's Seafood - Galliano

Dos Gris Seafood - Leeville

Guidry's Seafood Company - Cut Off

Gulf Shrimp Processors - Golden Meadow

Hubert Lafont Shrimp Company - Golden Meadow

Louisiana Sea Products - Golden Meadow

Andrew Martin Seafood - Leeville

New Orleans Shrimp Company, Inc. - Leeville

Quality Seafood Company, Inc. - Leeville

RETAIL

Bayou Lafourche Fish Co., Inc. - Leeville

Dennis Collins - Golden Meadow

Dos Gris Seafood - Leeville

Golden Meadow Oyster House, Inc. - Golden Meadow

J & L Seafood - Leeville

Eldon Lee Seafood - Leeville

Leeville Seafood and Oil Station - Leeville

Andrew Martin Seafood - Leeville

Eddie Martin Seafood - Golden Meadow

Quality Seafood Company, Inc. - Leeville

M & M Fish Company - Leeville

Source: Fingerman and Durabb (1979)

With the declining oil and gas production anticipated in future years, the fishing industry should remain a strong viable industry in an area that will lose some of its viability as an oil and gas production, service, and construction area. There is some concern that the deteriorating condition of parish wetlands could adversely affect what should be a continuing resource for the residents of the Lafourche Coastal Zone.

## Agriculture

Compared with the oil and gas and fishing industry and support facilities, agriculture plays a minor role in the coastal zone of Lafourche Parish. The main uses for agricultural land are sugar cane and pasture. Almost all of the sugar cane is located north of Galliano, Louisiana. Clovelly Farms is a large reclaimed area on the east side of Bayou Lafourche that is the largest sugar cane growing area south of the Intracoastal Waterway. It is anticipated that sugar cane acreage will continue to decrease as more pressure develops for more intensive uses of the limited land area available within the south Lafourche levee system. Due to the high cost of reclamation and environmental restrictions on such activity, it is unlikely that any additional lands will be reclaimed for agriculture or anything else in the forseeable future.

Table 3.16 lists the number of farms in Lafourche Parish as well as projections to 1990. Table 3.17 lists the crops,

TABLE 3.16

CHANGES IN NUMBER

OF FARMS

Lafourche Parish

| | # of Farms |
|---|---|
| 1969 | 519 |
| 1974 | 356 |
| 1978 | 399 |
| Percentage change 1969 - 1978 | -23.1% |
| Projected 1990 | 361 |

Source: Lonnie L. Fielder, Jr. (1981)

TABLE 3.17

LAFOURCHE PARISH

FARM STATISTICS - CROPS

1980 - 81

| | CROP | ACREAGE | YIELD/ACRE | PRODUCTION |
|---|---|---|---|---|
| 1980 | Corn | 150 | 40.0 bushels | 6,000 bushels |
| 1981 | Corn | 100 | 60.0 bushels | 6,000 bushels |
| 1980 | Soybeans | 3700 | 25.9 bushels | 96,000 bushels |
| 1981 | Soybeans | 4100 | 27.1 bushels | 111,000 bushels |
| 1980 | Wheat | 150 | 16.0 bushels | 2,400 bushels |
| 1981 | Wheat | 400 | 35.0 bushels | 14,000 bushels |
| 1980 | Sugarcane | 26,200 | 23.0 tons | 618,000 tons |
| 1981 | Sugarcane | 38,700 | 28.9 tons | 830,000 tons |

Source: Fielder, Lonnie L. and Berger Nelson (1982) acreages, yields, and total products for all the major crops in the parish in 1980 and 1981. Table 3.18 lists numbers of beef and milk cattle in the parish 1979 - 1982. Table 3.19 lists changes in sugar cane and total cropland in Lafourche Parish from 1969 - 1978.

TABLE 3.18

CATTLE AND CALVES ON FARMS

1979 - 82

Lafourche Parish

| | |
|---|---|
| 1979 | 24,800 |
| 1980 | 22,300 |
| 1981 | 20,900 |
| 1982 | 25,400 |

MILK COWS ON FARMS

1979 - 82

| | |
|---|---|
| 1979 | 100 |
| 1980 | 50 |
| 1981 | 1 |
| 1982 | 0 |

Source: Fielder, Lonnie L. and Berger Nelson (1982)

TABLE 3.19

CHANGE IN TOTAL CROPLAND

Lafourche Parish

1969 - 78 With Projections

| | Acres of Cropland |
|---|---|
| 1969 | 81,409 |
| 1974 | 74,139 |
| 1978 | 80,777 |
| Percentage Change 1969 - 78 | -0.8% |
| Projected 1990 | 77,510 |

CHANGE IN SUGAR CANE

ACRES HARVESTED

| | |
|---|---|
| 1969 | 24,385 |
| 1974 | 27,365 |
| 1978 | 32,000 |
| Percentage Change 1969 - 78 | 11.9% |
| Projected 1990 | 32,201 |

Source: Lonnie L. Fielder (1981)

## FEDERAL, STATE, AND LOCAL PROJECTS

## IN THE COASTAL ZONE

These are the three projects of note in the Lafourche Coastal Zone. They are as follows:

(1) The Louisiana Offshore Oil Port - An offshore loading terminal pipeline, storage facility, and distribution system financed for a consortium of oil camps. This is the only offshore loading port in the entire U.S.

(2) Port Fourchon Multi-Port - A local oil and gas and fishing support facility near the mouth of Bayou Lafourche.

(3) The South Lafourche Levee System - A major ring levee, flood gate, and pumping station that completely encloses the inhabited area of the coastal zone from Larose to south of Golden Meadow. This levee is the main line flood protection for the entire area and is a federal project with local and state matching funds.

Each of these three major facilities has a significant effect on the economy and the ecology of Lafourche Parish. The facilities are described here and their impact on Coastal Zone Management is assessed in the chapter dealing with Environmental Management Units.

Table 3.20 lists information about Port Fourchon. Table 3.21 describes the Louisiana Offshore Oil Port. Table 3.22 describes the South Lafourche Levee System.

## TABLE 3.20

## PORT FOURCHON MULTI-PORT

LOCATION: Highway 3090 near the coast of Lafourche Parish

AUTHORITY: Governed by the Greater Lafourche Port Commission

AREA COVERED: 3,600 acres

FACILITIES: Jetties at Belle Passe
Belle Passe deepened to 20 feet, widened to 300 feet
Commercial marina with capacity of 68 large shrimp boats completed
A warehouse and docking facility completed
Bridge constructed and Highway 3090 improved to Port Fourchon site

CURRENT ECONOMIC ACTIVITY:

TOTAL LEASES: 7

Martin Fuel Distributors - crane service, fuel, sub-tenants
Deepwater Port Services - provide LOOP supertankers with supplies
N/L Baroid, Inc. - drilling supplies
Dowell, Inc. - drilling supplies
J.O.B. Labor Contractors, Inc. - roustabouts, divers, etc.
J & L Seafood, Inc. - seafood
Cajun Trucking Co. - Radcliff materials
L.O.O.P. Inc.

SUB-LESSEES OR TENANTS OF LESSEES:

Shell Oil Company
Tenneco Oil Company
OBI Hughes, Inc. - drilling fluids
Sea Con, Inc. - offshore construction
JFD, Inc. - production company
Exxon
Conoco
Pipeline, Inc. - pipeline laying
Cockrell Oil Corporation
Haliburton

OTHER FACILITIES: Fourchon Docks, Inc.
Charlie Hardison Charter Boat Fishing

AVAILABLE LAND: 75 acres for lease
300 acres under development

Source: Ted Falgout, Port Commission Director, 1982.

TABLE 3.21

LOUISIANA OFFSHORE OIL PORT FACTS

TOTAL CAPACITY: 1.4 million barrels of throughput per day (42 gallons to a barrel)

PORT FACILITY: Located in 115 feet of water in Grand Isle, Block 59 in the Gulf of Mexico - 19 miles offshore

TRANSPORT: 56" subterranean pipeline from port to pumping platform complex

48" pipeline continuing from pumping platform to storage facility at the Clovelly Salt Dome

CLOVELLY SALT DOME: 8 cavities of storage capable of holding 32 million barrels of crude oil. Pipeline cavities are of the brine displacement type.

CONNECTING CARRIERS: 5 distributing pipelines tied to L.O.O.P. Clovelly Dome Storage Areas:

| | | |
|---|---|---|
| 1) LOCAP, Inc. | - | 55,000 barrels/hour |
| 2) Shell Pipeline | - | 12,300 barrels/hour |
| 3) Exxon Pipeline | - | 7,500 barrels/hour |
| 4) Texaco Cities Service Pipeline | - | 15,200 barrels/hour |
| 5) CAM Pipeline | - | 12,600 barrels/hour |

OWNERS:
1) Ashland Oil Co.
2) Marathon Pipeline Co.
3) Murphy Oil Corp.
4) Shell Oil Co.
5) Texaco, Inc.

TOTAL COST OF LOOP PIPELINE: $700,000,000

SOURCE: Terry D. Trovato, Press Release, L.O.O.P., Inc., 1981

TABLE 3.22

SOUTH LAFOURCHE LEVEE DISTRICT

HURRICANE PROTECTION PROJECT

Length: 43 Miles

Construction: Earthen Levees
Concrete Walls
8 Pumping Stations
2 Flood Gates (Located on Bayou Lafourche) at Larose and Golden Meadow

Height: +13 feet M.S.L. at the southern portion
+ 8½ feet M.S.L. at the northern portion near Larose

Area Protected: 32,400 acres including the communities of Larose, Cut Off, Galliano, and Golden Meadow

Population: Approximately 26,000

Funding: 70% Federal, 30% Local Interest

Time Period: Construction Began in 1975
Estimated Completion date in 1988

Source: Windell Curole, Director, South Lafourche Levee District (1982)

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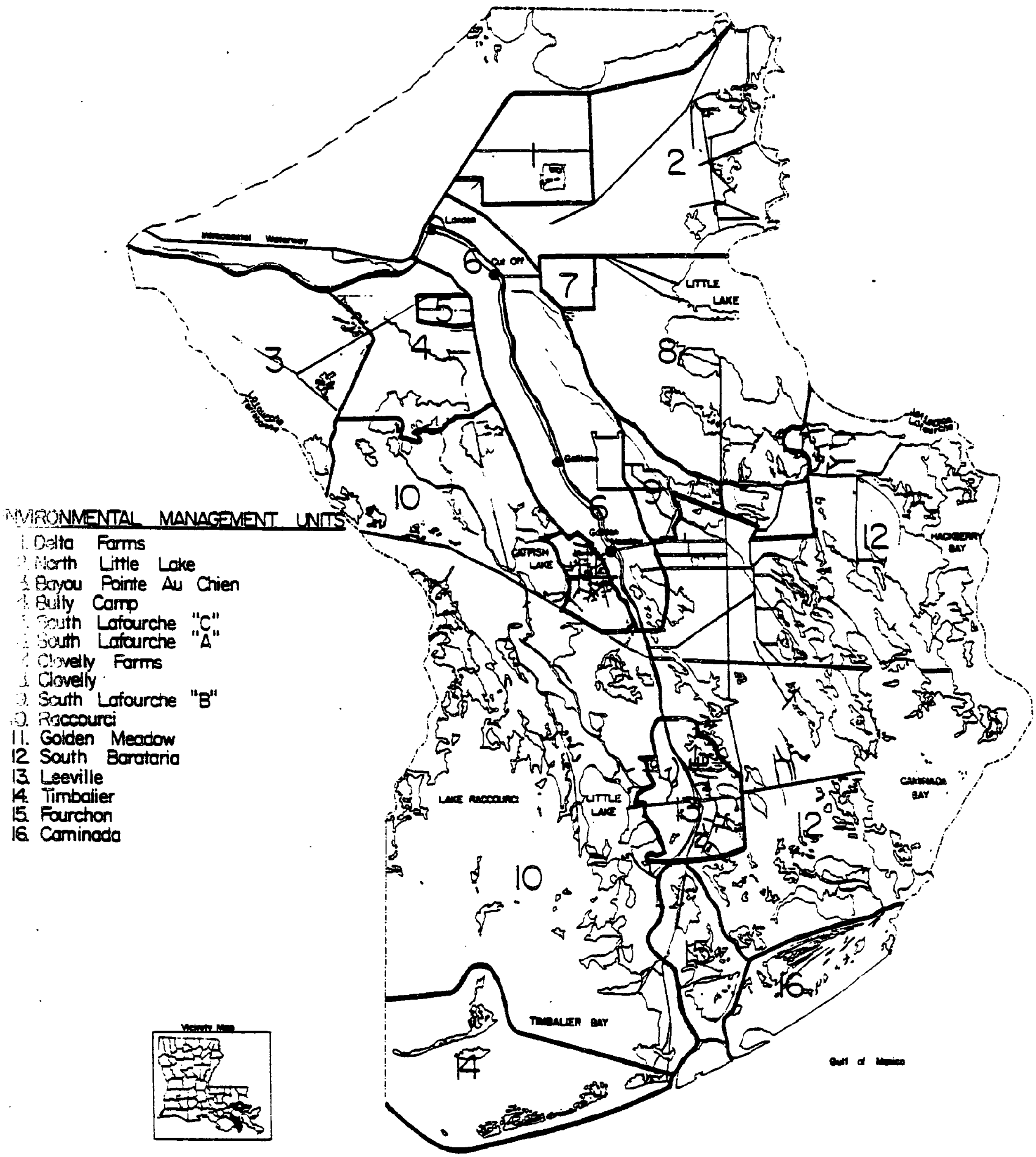
Appendix i

# LAFOURCHE PARISH COASTAL ZONE



Appendix i

LAND COVER: LAFOURCHE PARISH

1980

The following is a series of tables illustrating Land Cover for the Lafourche Parish Coastal Zone in 1980. This information was derived from an experimental, joint effort of Lafourche Parish, Louisiana State University, and the National Aeronautics and Space Administration designed to assess land loss in the parish using Landsat satellite remotely sensed information and a computerized data base. The information used to develop a land cover analysis was extracted from a satellite frame in September 1980 and, therefore, provides an up to date land cover for the parish and for each of the sixteen Environmental Management Units in the CZM Program. Budgetary limitations prevented this analysis from covering the entire coastal zone, nevertheless valuable information was obtained that will benefit the CZM Program.

An explanation, description, and analysis results of the Landsat Demonstration Project is available in a separate publication.

TABLE 1

LAND COVER 1980

LAFOURCHE PARISH COASTAL ZONE *

| Class | Acres | Square Miles |
|---|---|---|
| Water | 235,667.30 | 368.23 |
| Agriculture/ Bare Ground | 25,217.79 | 39.40 |
| Urban Built Up/ Bare Ground | 9,486.17 | 14.82 |
| Marsh | 152,536.10 | 238.34 |
| Forest | 15,114.49 | 23.62 |
| Beach/Bare Ground | 881.53 | 1.38 |
| Unclassified | 335.44 | 0.52 |
| Total: | 439,238.82 | 686.31 |

* NOTE: Classification using September, 1980, Landsat frame statistics of North Little Lake and Delta Farm areas and portions of Clovelly Farms, Bayou Pointe-au-Chien and Bully Camp are unavailable due to frame cut off point.

TABLES 2, 3

LAND COVER 1980

SOUTH LAFOURCHE "C"

| Class | Acres | Square Miles |
|---|---|---|
| Water | 0 | 0 |
| Agriculture/ Bare Ground | 1231.18 | 1.92 |
| Urban Built Up/ Bare Ground | 11.12 | 0.02 |
| Marsh | 38.30 | 0.06 |
| Forest | 124.17 | 0.19 |
| Beach/Bare Ground | 0 | 0 |
| Unclassified | 0 | 0 |
| Total: | 1404.77 | 2.19 |

LAND COVER 1980

RACCOURCI

| Class | Acres | Square Miles |
|---|---|---|
| Water | 84,269.13 | 131.67 |
| Agriculture/ Bare Ground | 386.71 | 0.60 |
| Urban Built Up/ Bare Ground | 544.86 | 0.85 |
| Marsh | 45,583.15 | 71.22 |
| Forest | 316.91 | 0.50 |
| Beach/Bare Ground | 3.09 | 0.01 |
| Unclassified | 54.98 | 0.09 |
| Total: | 131,158.83 | 204.94 |

TABLES 4, 5

LAND COVER 1980

SOUTH BARATARIA

| Class | Acres | Square Miles |
|---|---|---|
| Water | 78,852.06 | 123.21 |
| Agriculture/ Bare Ground | 852.49 | 1.33 |
| Urban Built Up/ Bare Ground | 2,656.32 | 4.15 |
| Marsh | 45,271.80 | 70.74 |
| Forest | 115.52 | 0.18 |
| Beach/Bare Ground | 3.71 | 0.01 |
| Unclassified | 43.86 | 0.07 |
| Total: | 127,795.76 | 199.69 |

LAND COVER 1980

TIMBALIER

| Class | Acres | Square Miles |
|---|---|---|
| Water | 27,065.48 | 42.29 |
| Agriculture/ Bare Ground | 37.07 | 0.06 |
| Urban Built Up/ Bare Ground | 24.71 | 0.04 |
| Marsh | 1,179.28 | 1.84 |
| Forest | 239.07 | 0.37 |
| Beach/Bare Ground | 133.43 | 0.21 |
| Unclassified | --- | --- |
| Total: | 28,679.04 | 44.81 |

TABLES 6, 7

LAND COVER 1980

CAMINADA

| Class | Acres | Square Miles |
|---|---|---|
| Water | 5,827.85 | 9.11 |
| Agriculture/ Bare Ground | 72.28 | 0.11 |
| Urban Built Up/ Bare Ground | 160.61 | 0.25 |
| Marsh | 4,769.03 | 7.45 |
| Forest | 38.30 | 0.06 |
| Beach/Bare Ground | 296.52 | 0.46 |
| Unclassified | 14.83 | 0.02 |
| Total: | 11,179.42 | 17.46 |

LAND COVER 1980

SOUTH LAFOURCHE "B"

| Class | Acres | Square Miles |
|---|---|---|
| Water | 1,228.70 | 1.92 |
| Agriculture/ Bare Ground | 1,937.26 | 3.03 |
| Urban Built Up/ Bare Ground | 297.76 | 0.47 |
| Marsh | 955.04 | 1.49 |
| Forest | 1,376.35 | 2.15 |
| Beach/Bare Ground | 46.95 | 0.07 |
| Unclassified | 6.80 | 0.01 |
| Total: | 5,848.86 | 9.14 |

TABLES 8, 9

LAND COVER 1980

GOLDEN MEADOW

| Class | Acres | Square Miles |
|---|---|---|
| Water | 1,827.30 | 2.86 |
| Agriculture/ Bare Ground | 48.80 | 0.08 |
| Urban Built Up/ Bare Ground | 35.83 | 0.06 |
| Marsh | 2,416.02 | 3.78 |
| Forest | 29.65 | 0.05 |
| Beach/Bare Ground | 7.41 | 0.01 |
| Unclassified | 12.97 | 0.02 |
| Total: | 4,377.98 | 6.86 |

LAND COVER 1980

FOURCHON

| Class | Acres | Square Miles |
|---|---|---|
| Water | 7,065.21 | 11.04 |
| Agriculture/ Bare Ground | 252.04 | 0.39 |
| Urban Built Up/ Bare Ground | 389.18 | 0.61 |
| Marsh | 2,862.65 | 4.47 |
| Forest | 15.44 | 0.02 |
| Beach/Bare Ground | 172.35 | 0.27 |
| Unclassified | 18.53 | 0.03 |
| Total: | 10,775.40 | 16.83 |

TABLE 10

LAND COVER 1980

CLOVELLY *

| Class | Acres | Square Miles |
|---|---|---|
| Water | 16,782.41 | 26.22 |
| Agriculture/ Bare Ground | 737.59 | 1.15 |
| Urban Built Up/ Bare Ground | 488.02 | 0.76 |
| Marsh | 19,556.73 | 30.56 |
| Forest | 470.73 | 0.74 |
| Beach/Bare Ground | 6.80 | 0.01 |
| Unclassified | 12.97 | 0.02 |
| Total: | 38,055.25 | 59.46 |

* NOTE: Coverage on Landsat frame used in this analysis did not cover northern 10% of this E.M.U. Therefore, statistics shown only reflect the lower 90% of this unit.

TABLE 11

LAND COVER 1980

BULLY CAMP *

| Class | Acres | Square Miles |
|---|---|---|
| Water | 3,486.58 | 5.45 |
| Agriculture/ Bare Ground | 2,066.37 | 3.23 |
| Urban Built Up/ Bare Ground | 138.38 | 0.22 |
| Marsh | 9,006.79 | 14.07 |
| Forest | 1,650.63 | 2.58 |
| Beach/Bare Ground | 0 | 0 |
| Unclassified | 0 | 0 |
| Total: | 16,348.75 | 25.55 |

* NOTE: Coverage on Landsat frame used in this analysis did not cover northern 10% of this unit. Therefore, statistics shown cover only 90% of this unit.

TABLE 12

LAND COVER 1980

SOUTH LAFOURCHE "A" *

| Class | Acres | Square Miles |
|---|---|---|
| Water | 1,178.05 | 1.84 |
| Agriculture/ Bare Ground | 15,208.39 | 23.76 |
| Urban Built Up/ Bare Ground | 3,602.10 | 5.63 |
| Marsh | 2,765.67 | 4.32 |
| Forest | 4,799.30 | 7.50 |
| Beach/Bare Ground | 139.61 | 0.22 |
| Unclassified | 103.78 | 0.16 |
| Total: | 27,796.90 | 43.43 |

* NOTE: Coverage on Landsat frame used in this analysis did not cover the northern 15% of this E.M.U. Therefore, statistics shown cover only 85% of this unit.

TABLE 13

LAND COVER 1980

CLOVELLY FARMS *

| Class | Acres | Square Miles |
|---|---|---|
| Water | 8.07 | 0.01 |
| Agriculture/ Bare Ground | 895.74 | 1.40 |
| Urban Built Up/ Bare Ground | 147.64 | 0.23 |
| Marsh | 25.95 | 0.04 |
| Forest | 1.85 | 0.01 |
| Beach/Bare Ground | 0 | 0 |
| Unclassified | 0 | 0 |
| Total: | 1,079.25 | 1.69 |

* NOTE: Coverage on Landsat frame used in this analysis did not register the northern 2/3 of this E.M.U. Therefore, statistics shown only reflect about 1/3 of the area of this unit.

TABLE 14

LAND COVER 1980

BAYOU POINTE-AU-CHIEN *

| Class | Acres | Square Miles |
|---|---|---|
| Water | 1,288.01 | 2.01 |
| Agriculture/ Bare Ground | 1,386.23 | 2.17 |
| Urban Built Up/ Bare Ground | 808.02 | 1.26 |
| Marsh | 13,352.05 | 20.86 |
| Forest | 5,932.25 | 9.27 |
| Beach/Bare Ground | 35.83 | 0.06 |
| Unclassified | 37.07 | 0.06 |
| Total: | 22,839.46 | 35.69 |

* NOTE: Coverage on Landsat frame used in this analysis did not cover northern 25% of this E.M.U. Therefore, statistics shown only reflect the lower 75% of the unit.

Source: Braud, Durabb, Howard, Whitehurst (1982).