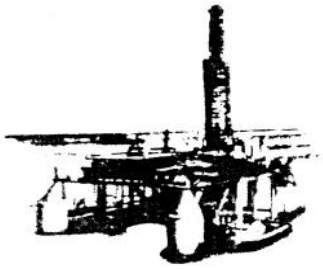
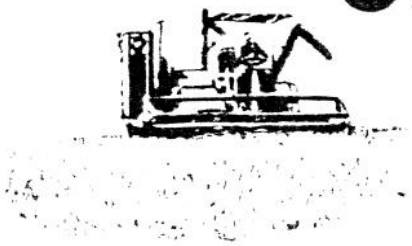
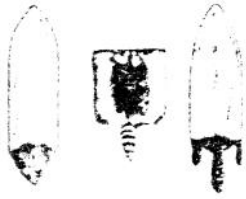


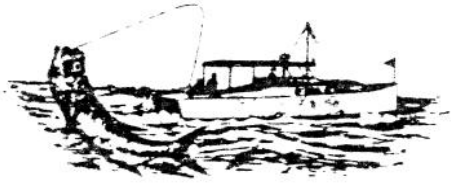
CAMERON PARISH



COASTAL RESOURCE



MANAGEMENT PLAN



POLICE JURY

PARISH OF CAMERON

P. O. BOX 366

CAMERON, LOUISIANA 70631

318/775-5718

January 12, 1983

Phil Pittman
Dept. of Natural Resources
CZM Division
P. O. Box 44396
Baton Rouge, LA 70804

Dear Mr. Pittman:

The Cameron Parish Police Jury met on January 4, 1983 to hear additional comments on the proposed Cameron Parish Coastal Zone Management Program. The only comment came from Mr. Hayes Picou, Parish Secretary, to include an amendment designating the Cameron Parish Police Jury as median for all mitigation policies (see Amendment #2). There being no other comments, the Cameron Parish Police Jury made two (2) separate and distinct resolutions.

Resolution #1: Cameron Parish Police Jury hereby accepts the Coastal Zone Management Plan for Cameron Parish as submitted on January 4, 1983, to be forwarded to CMS.DNR for final approval.

Resolution #2: Cameron Parish Police Jury accepts the two amendments submitted on January 4, 1983, subject to approval by DNR, to be included in the final Cameron Parish CZM document.

I have directed John Cody with IMCAL to send to you the necessary copies of the document, copies of the two (2) amendments, and any other information that you might require prior to final approval from your office.

I would like to take this opportunity to thank you for the tremendous amount of assistance we have received from you over the years in our coastal zone program and also for your help in the Jury being able to accept Cameron Parish's CZM plan.

Should you have any questions, should you need any additional information, or should you have any comments concerning any of the above, please contact the undersigned.

Sincerely yours,

Garner Nunez

Garner Nunez, Treasurer-Adm. Ass't.
CAMERON PARISH POLICE JURY

GN/bc

Enclosures

cc: John Cody

PROCEEDINGS

CAMERON PARISH POLICE JURY

JANUARY 4, 1983

The Cameron Parish Police Jury met in special session on Tuesday, January 4, 1983, at the Police Jury Building in the Village of Cameron, Louisiana at 9:00 o'clock A.M. The following members were present: Mr. W. Ray Conner, Mr. A. Brent Nunez, Mr. Lester J. Richard, Jr., Mr. Ernest Carol Trahan, Mr. Kenneth R. Ducote, absent was Mr. J. B. Blake, Jr.

It was moved by Mr. Ducote, seconded by Mr. Trahan and carried, that the Coastal Zone Management Plan Proposal for Cameron Parish be and the same is hereby adopted and approved as presented.

It was moved by Mr. Ducote, seconded by Mr. Nunez and carried, that the two amendments submitted on January 4, 1983 to the Coastal Zone Management Plan Proposal for Cameron Parish be and the same are hereby accepted subject to approval by the Department of Natural Resources.

There being no further business and upon motion of Mr. Ducote, seconded by Mr. Trahan, the meeting was declared adjourned.

APPROVED:

/s/ Lester J. Richard, Jr.
LESTER J. RICHARD, JR., PRESIDENT
CAMERON PARISH POLICE JURY

ATTEST:

/s/ Hayes P. Picou, Jr.
HAYES P. PICOU, JR., SECRETARY

STATE OF LOUISIANA
PARISH OF CAMERON

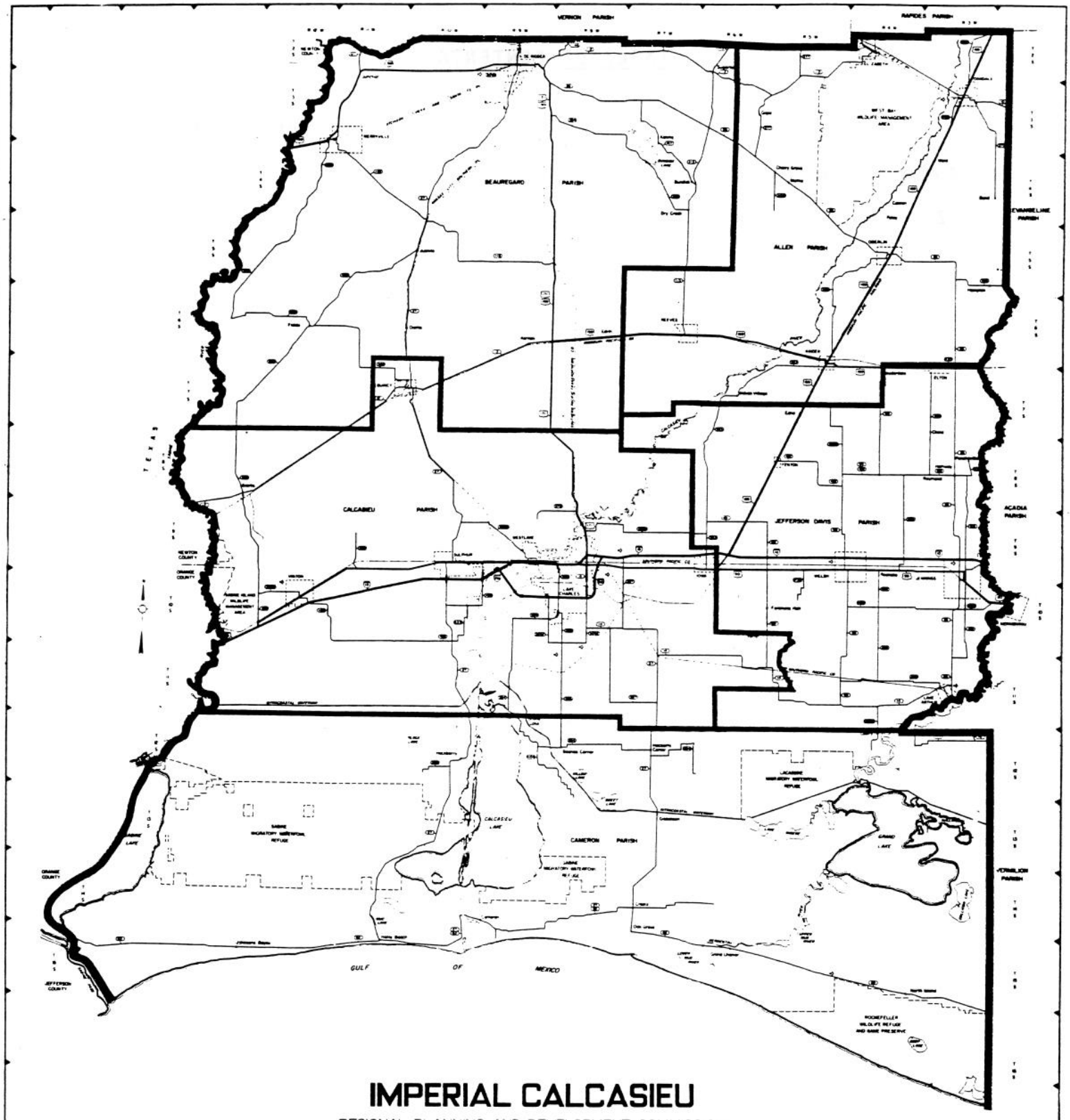
I certify that the above and foregoing is a true and correct copy of the minutes of the special meeting of the said Cameron Parish Police Jury held on the 4th day of January, 1983. Cameron, Louisiana this 27th day of January, 1983.

HAYES P. PICOU, JR., SECRETARY
CAMERON PARISH POLICE JURY

"The preparation of this report was financed in part through a grant from the U.S. Department of Commerce under provisions of the Coastal Zone Management Act of 1972, as amended."

N O T I C E

This document is disseminated under the sponsorship of the Louisiana Department of Natural Resources in the interest of information exchange. The State of Louisiana assumes no liability for its content or the use thereof.



IMPERIAL CALCASIEU

REGIONAL PLANNING AND DEVELOPMENT COMMISSION

COMPREHENSIVE PLANNING ASSISTANCE GRANT NO. CPA-LA-05-48-1075 was prepared under contract for the Louisiana Department of Urban and Community Affairs by the Imperial Calcasieu Regional Planning and Development Commission. The preparation of this map was financially aided through a federal grant from the Department of Housing and Urban Development under the Urban Planning Assistance Program authorized by Section 701 of the Housing Act of 1954, as amended, and through the financial assistance, in part, by the State of Louisiana Department of Urban and Community Affairs and, in part, by Imperial Calcasieu Regional Planning and Development Commission.

SCALE

LEGEND

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AUTHOR'S NOTE

Cameron is the westernmost coastal parish in Louisiana. Although it is unique in many ways, it is similar to other coastal parishes in that it has a sensitive ecological system. The following pages contain a comprehensive approach to effective management of the resources within the coastal zone. This plan is intended as a tool; a guideline for minimizing impact of development and enhancing natural characteristics of the coastal zone. It is hoped that the Cameron Parish Coastal Resource Management Plan provides the mechanisim for preserving the beauty and quality of the environment and quality of life which is Cameron Parish.

Cameron Parish has been involved with Coastal Zone Management for nine years now. It has been a long process with people coming and going on all sides, but I would like to take this opportunity to thank those individuals who played an important role in making this product a reality. First there are two gentlemen who have been involved in the process since its inception, and who have been involved in resource management since long before the Coastal Zone Management Program was established: John Walther (with the U.S. Fish and Wildlife Service) and Francis Ezernack (with the Soil Conservation Service). Their dedication was an inspiration to us all. I would also like to especially thank Paul Coriel, contributing author of this report, who's special insight to the problems of the coastal zone and who's continued support throughout this project made its completion possible.

Author's Note
Continued

Last, but certainly not least, I would like to thank the Cameron Parish Police Jury and Parish Administrator Garner Nunez. Their commitment to this effort was the key element to its fruition.

John D. Cody, Jr.

JOHN D. CODY, JR.
Assistant Director
IMCAL

CAMERON PARISH

CZM ADVISORY COMMITTEE

Mr. Glenn Alexander
P. O. Drawer M
Cameron, LA 70631
775-5714 (o)

Mr. Braxton Blake
P. O. Box 722
Cameron, LA 70631
775-5335 (h)

Mr. Paul Coreil
P. O. Drawer H
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775-5516 (o)

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Creole, LA 70632

Mr. Ray Conner
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762-7740

Mr. Daryl Dupont
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Cameron, LA 70631

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775-5516 (o)

Mr. Robert Mhire
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538-2165

Mr. A. Brent Nunez
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Bell City, LA 70630

Mr. Garner Nunez
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Mr. Lester Richard, Jr.
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Grand Chenier, LA 70643
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Mr. John Walther
MRH Box 107
Hackberry, LA 70645
762-4620

P R E F A C E

The Coastal Resources Program in Cameron Parish has been an ongoing process since 1976. IMCAL has served as consultant in preparing the yearly coastal zone management reports since this date. This, the final year of coastal zone management planning, was a task to take all previous material and check it for consistency with the scope of services and La. R.S. 49:213. In other words, final development of the local program was undertaken so that implementation could begin.

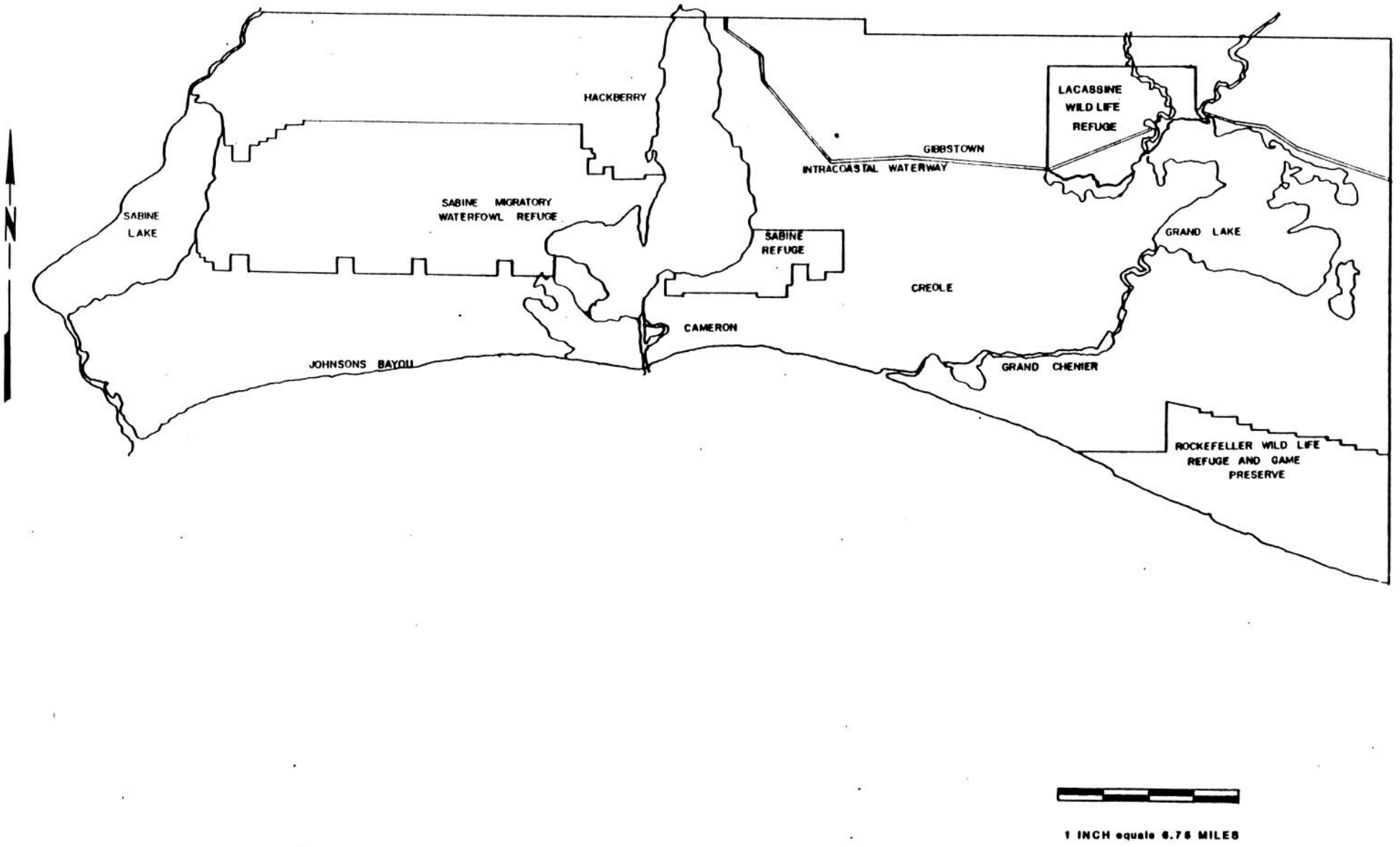
The police jury was extremely helpful this year in completing the local program, making it a priority goal for the parish. They have attended meetings, suggested new members, monitored progress, and offered much assistance.

Basically, the information taken from other reports included the Environmental Profile from the 1978 report, and the Model Ordinance from the 1980 report. Some changes and updates were made to be in compliance with Act 361, but the foundation came from these previous reports.

Contacts with local, state, and federal agencies were made in order to obtain the most recent data. The CAC was constantly consulted to insure input from the local area and professionals who work in Cameron Parish everyday.

It is hoped that this program will succeed in the preservation of the coastal zone for the future economy and enjoyment of the people of Cameron Parish.

FIGURE 1



SOURCE: IMCAL 1984

INTRODUCTION

A HISTORY OF CZM

A vital component to the strength of any nation is its supply of natural resources. They are an important part of its economy, both national and international. America is a nation with some of the greatest natural resources in the world, which helps to support its population, its economy, and its world position. However, many of our resources are non-renewable and those which are renewable need protection so they will continue to furnish needed supplies for the country.

The coastal areas of the United States provide very important resources to the country, and they also provide recreation, employment, and income to the residents of the coastal areas and people all over the country. Thus, the concept of coastal management to protect these renewable resources while enhancing the area was born.

Federal

On the federal level, concern over the environment in coastal areas was translated in legislation as Public Law 92-583, or the Coastal Zone Management Act of 1972. This act found that coastal areas were rich in a variety of natural, commercial, recreational, ecological, industrial, and aesthetic resources of immediate and potential value to the present and future well-being of the nation. Also that competing uses in the coastal zone were causing irretrievable losses to important ecological, cultural, historic, and ecologically sensitive living marine resources. Since present state and local planning land regulating arrangements were inadequate to protect and enhance the coastal zone, the Act declared

that effective management, beneficial use, and protection and development of the coastal zone was of national interest and designated policies to implement these goals. Therefore, the National Oceanographic and Atmospheric Administration (NOAA), under the Department of Commerce, was designated as the federal agency in charge of establishing coastal zone management programs in the coastal states.

State

Louisiana's involvement in the coastal zone management process began in 1975, when the State Planning Office (the state agency in charge of CZM at that time) requested the assistance of the Southwest Federal Regional Council in developing the coastal zone management program. The State Legislature became involved with coastal zone management in Louisiana beginning with Act 705 (Senate Bill 425) to create legislation for the official establishment of a Louisiana Coastal Resources Program. This eventually became Act 361 (Senate Bill 930) of 1978, which was amended in 1979 and 1980. Act 361 is basically a revision of Louisiana Statute 49:213. There is now a coastal zone management program for the state. However, in order to have a complete program for management of the coastal zone, it was necessary for each parish to have a local program so better identification of goals and problems, and subsequently more efficient management of the coastal zone, could be undertaken.

Local

Coastal Zone Management began in Cameron Parish in 1976, when the Imperial Calcasieu Regional Planning and Development Commission

contracted with the State Planning Office and NOAA to undertake a CZM information inventory for the parishes of the coastal zone located in its district. CZM Planning continued as reports for 1977, 1978, 1979, and 1980 were compiled and published as part of a building process for development of the local program. In 1980, the Final Environmental Impact Statement of the Louisiana Coastal Resources Program was published. Subsequently, rules and procedures for the development, approval, modification, and periodic review of local coastal management programs were derived so guidelines for completion of the local programs could take place during 1981.

This year's task has primarily been to compile previous information and complete unfinished elements of the local program for submission of a completed report to the State Department of Natural Resources. Approved local programs will become part of the state local coastal resources program.

COASTAL ENERGY IMPACT PROGRAM (CEIP)

One of the most important resources found in coastal areas is fossil fuels. Oil and gas are abundant in many coastal areas of the United States. Louisiana is among the most energy rich states, being the leading gas producer and the second leading oil producer in the country.

With the realization that current energy resources are running out, and with price hikes on crude oil which we import in large quantities, the increase in oil and gas exploration activities have caused communities to bear the impact of increased industrial and social needs related to the search for more energy. In order to compensate for this burden, the Coastal Energy Impact Program was established under Section 308 of the CZM Act Amendments of 1976. This program allowed 100% funding for unavoidable environmental and recreational losses within the coastal zone and not attributed to an identifiable person or company.[1]

For Cameron Parish this meant that projects to upgrade and construct parish facilities could now be funded. Among the projects which have applied for CEIP funding are:

Water facility for distribution to southeast portion of parish	$1,200,000
Drainage gate replacement, District #5	600,000

[1] Calcasieu Parish 1978 Coastal Zone Management activity, IMCAL.

Park and Boat Launch Facility	$ 200,000	1978*
Addition to Courthouse Annex	250,000	1977
Water Facility for Distribution to Southwest Portion of Parish	3,500,000	1977
Comprehensive Recreation Plan	35,000	1979
South Cameron High School	576,000	1979
Cameron Parish Bookmobile	60,000	1979*
South Cameron Memorial Hospital	676,000	1979*
Water Treatment and Plant Filtering Facilities	325,000	1980*
Mosquito Control Project	255,750	1980
Multi-Purpose Recreational Building	65,000	1980*
Cameron Waterworks District #7	100,000	1980
Sheriff's Office Communication System	56,375	1980*
Cameron Fire Protection District #7	101,915	1981*
Cameron Fire Protection District #2	300,000	1981*
East Fork Road	175,000	1979*

Some of these projects have already been approved, and some are still pending. It is obvious that the program has been extremely helpful in alleviating some of the problems in a parish which has been affected by a lot of energy-related activity. Continued funding is required in order to continue to alleviate the impacts of OCS development.

Multi-Purpose Building Renovation	1983	$ 100,000
Water Facility in Grand Chenier	1977	1,200,000
Sewerage District #1	1977	250,000
Sewerage District #2	1978	1,000,000

*Funded Projects

THE CITIZEN'S ADVISORY COMMITTEE

A coastal zone management plan needs a lot of secondary data for an information base. An environmental profile, population data, and social and economic factors are a necessary component for analysis and decision-making. It is also necessary to have primary data concerning present problems and the attitudes of the people. For this reason, the Citizen's Advisory Committee was established as part of the local program development process. In Cameron Parish, the CAC was perhaps the best information source to the program.

The CAC was a balanced committee which was represented by conservation, governmental, commercial, and land management personnel. Each part of the parish program was discussed and the variety of comments allowed consideration of many points of view. A current list of the CAC members is as follows:

Mr. Francis Ezernack	-	Soil Conservation Service
Mr. John Walther	-	Manager, Sabine Wildlife Refuge
Mr. Braxton Blake	-	Police Juror
Mr. Ray Conner	-	Police Juror
Mr. Kenneth Ducote	-	Police Jury President
Mr. Carol Trahan	-	Police Juror
Mr. Allen Nunez	-	Police Juror
Mr. Garner Nunez	-	Parish Administrator
Mr. Glenn Alexander	-	Police Jury Secretary
Mr. Lester Richard	-	Police Juror
Mr. Paul Coriel	-	LSU Extension Service
Mr. Clifford Myers	-	County Agent
Mrs. Verna Kyle	-	Hackberry Store Owner
Mr. Neil Crain	-	Crain Brothers, Inc.
Mr. Robert Mhire	-	Rockefeller Wildlife Refuge
Mr. Preston Hebert	-	Local Fisherman
Mr. Dickie Dickens	-	Louisiana Menhaden Corp.
Mr. Daryl Dupont	-	Miami Corp.

Former members have included:

Mr. Kenneth Sweeney	-	McNeese State University
Mr. John P. Crain	-	Crain Brothers, Inc.
Mr. Ernest Myers	-	Former Police Juror
Mr. Robert Ortego	-	Parish School Board Supervisor
Dr. George White	-	McNeese State University
Mr. Charles White	-	Louisiana Wildlife and Fisheries
Mr. Frank Adams	-	Lake Charles American Press
Mr. Roland Trosclair	-	Former Police Juror
Mr. Jerry Jones	-	District Attorney

All of these people have been instrumental in the development of the Cameron Parish local coastal resources program. They have donated their time and effort to the preservation and enhancement of the coastal zone. Their help has been an invaluable asset to the identification of problems, concerns of the people, and possible solutions to these situations. It is with appreciation that we recognize these members for their help.

PROBLEMS, GOALS, AND OBJECTIVES

The purpose of the local coastal resources program is to develop a management system to preserve the natural resources and amenities of the coastal zone, while promoting development in those areas which are suited for it. In order to fulfill this purpose, a three-part process is used. First there is an identification of the problems in the parish; second the goals and objectives which the program hopes to achieve must be stated; and finally the means to accomplish these goals must be set forth.

The problems of Cameron Parish are generally the activities which have detrimental effect to the marsh and conflicts which come from industrial and residential impact on the land. The following list describes these problems in more detail:

1) The control and negation of saltwater intrusion into fresh and intermediate marshes.

2) The restoration of polluted waters (Calcasieu River, Calcasieu Lake, Gulf of Mexico) when the pollutants are flowing from out of parish sources or from the sea (oil spills, etc.).

3) Achieving a balance between environmental concerns and economic development.

4) Erosion and subsidence in the wetlands.

5) Changes in ground-water quantity.

6) Dredging of wetlands for purposes such as leveeing property, sinking wells, and pipeline channels without proper mitigation guidelines.

7) Waste disposal in the wetlands (open pits, injection wells, brine dumping) and the monitoring of previous disposal sites.

8) Lack of funds to maintain and improve the environment of the wetlands.

9) Lack of an enforceable permitting ordinance.

10) Effective use of existing fastland areas diminishing the need to reclaim wetlands.

11) Disruption of the natural waterflow throughout the marsh.

12) Lack of mitigation guidelines for uses of local concern.

The goals of the Cameron Coastal Resources Program are stated in the Goals, Objectives, and Policies section of this report. They are designed to alleviate the problems of the parish, to allow for the protection and development of the environmental management units, and to represent a decision-making basis for the activities carried on in the coastal zone. It is hoped they will stop current deterioration of the coastal zone and enhance the economic, recreational, and cultural features of Cameron Parish.

A realistic approach to the designation of goals and objectives is a method to accomplish them. This has resulted in establishment of a coastal management ordinance which is based on the findings of this report and the procedures called for by Act 361. Basically, the ordinance sets up a process for permitting, regulating, and monitoring activities in the coastal zone. Through this means, development in the coastal zone may be planned and directed and activities which are potentially detrimental to the coastal zone may be regulated by requiring mitigation efforts for permit approval. Therefore, a logical method for choosing the most beneficial direction for the future of Cameron Parish and the coastal zone is established and implemented.

THE REPORT

The Cameron Parish Coastal Resources Program for Management of the Coastal Zone is divided into seven chapters: (1) the Introduction, (2) the Environmental Profile, (3) the Social Profile, (4) the Goals, Objectives, and Policies, (5) Resources, (6) the Cameron Parish Program, and (7) the Coastal Management Ordinance. Some of these chapters have subsections which break down the chapters for individualized analysis. One element of the rules and procedures for local program development of Act 361 allows for the designation of special or particular areas which, because of their unique characteristics, need special regulation. Because the CAC felt that no areas had problems critical enough to require special procedures, and the Police Jury felt that any policies more restrictive than those of the general program would constitute unnecessary land use control, no special areas were designated.

Cameron Parish has no barrier islands, cheniers are the only developable land in many parts of the parish, and beaches are abundant along Cameron's coast; thus, no special areas are included in the program. Conversations with the State DNR confirmed this decision and stated that many parishes will not have special areas.

The information necessary to establish a data base for the report and subsequent permitting decisions comes from a variety of sources. Agencies contacted in preparation of this report include the Census Bureau, the Office of State Planning, the State Department of Commerce, the State Department of Revenue, the State Department of Culture, Recreation, and Tourism, LSU Center for Wetland Resources, the U. S. Army Corps of Engineers, the U. S. Geological Survey, the

U. S. Wildlife and Fisheries Commission, the Calcasieu Area Tourism Agency, the State Department of Natural Resources, and many others. Graphical information for mapping and other data comes from the following material located at the IMCAL office:

Map List

1. Negative - West 2/3 (Cameron Parish) - 1" = 3,000' (1957)
2. Economic Development Administration (EDA) Map - mylar color zoned with legend (Cameron Parish) - 1/2" = 1 mile (1976)
3. Economic Development Administration Map - blue line color zoned with legend (Cameron Parish) - 1/2" = 1 mile (no date)
4. Mylar - West 2/3 (Cameron Parish) - 1" = 2 miles (1957)
5. Department of Highways, Traffic and Planning Section (West Section) (Cameron Parish) - 1/2" = 1 mile (no date)
6. Mylar showing township and range - T-12-S, R-10-W (no title block) - no scale (no date)
7. Mylar - Agriculture Map (Cameron Parish) - no scale (1976)
8. Mylar - showing Wildlife Refuge and Reserves (Cameron Parish) - no scale (1977)
9. Mylar - Cameron Parish Study Units - no scale (1981)
10. Department of Highways Traffic and Planning Section (West Section) (Cameron Parish) - 1/2" = 1 mile (1970)
11. Enumeration District Map - Hackberry unincorporated area (Cameron Parish) (3 maps) - 1 & 1/5" = 1,000' (1973)
12. Mylar - Cameron Parish Pipeline Corridor System - no scale (1978)
13. Department of Highways Traffic and Planning Section (East Section) (Cameron Parish) (10 maps) - 1/2" = 1 mile (1979)
14. Department of Highways Traffic and Planning Section (West Section) (Cameron Parish) (3 maps) - 1/2" = 1 mile (1979)
15. Cameron Parish Base Map - mylar - 1/2" = 1 mile (1976)

16. Regional Maps

a. Future Land Use Plan for 1990 (17 maps) - 1" = 4 miles (1975)

b. Existing Land Use Map - 1:1,000,000 (1974)

17. Cameron Parish Aerials (1975)

a. Bayour LaBauve
b. Boudreaux Lake
c. Browns Lake
d. Cameron
e. Catfish Lake
f. Constance Bayour
g. Five Lakes
h. Grand Bayou
i. Grand Chenier
j. Grand Lake East (NW)
k. Grand Lake East (SW)
l. Greens Bayou
m. Hackberry
n. Hog Bayou (NE)
o. Hog Bayou (NW)
p. Holly Beach
q. Johnsons Bayou
r. Lake Misere
s. Latania Lake
t. Peveto Beach
u. Sweetlake

18. Department of Highways Traffic and Planning Maps (1980)

a. Cameron Parish (West Section) - Louisiana Department of Highways, Traffic and Planning Section (2 maps) - 1" = 1 mile

b. Cameron Parish (East Section) - Louisiana Department of Highways, Traffic and Planning Section (2 maps) - 1" = 1 mile

19. Cameron Parish Quad Maps

QUANDRANGLE NAME	INFORMATION DATE
Texas Point (7.5 min. series)	1970
Sabine Pass (7.5 min. series)	1970
Port Arthur South (7.5 min. series)	1974
West of Johnsons Bayou (7.5 min. series)	1974
Creole (7.5 min. series)	1982
Grand Bayou (7.5 min. series)	1982
Sweet Lake (7.5 min. series)	1982
Lake Charles SW (7.5 min. series)	1975
Floating Turf Bayou (7.5 min. series)	1979

QUANDRANGLE NAME	INFORMATION DATE
Hog Bayou (7.5 min. series)	1979
Deep Lake (7.5 min. series)	1979
Rollover Lake (7.5 min. series)	1979
Big Constance Lake (7.5 min. series)	1979
Lake LeBleu (7.5 min. series)	1979
Grand Chenier (7.5 min. series)	1980
Cow Island (7.5 min. series)	1979
Boudreaux Lake (7.5 min. series)	1982
West of Greens Bayou (7.5 min. series)	1974
Greens Bayou (7.5 min. series)	1982
Holly Beach (7.5 min. series)	1982
Peveto Beach (7.5 min. series)	1982
Johnsons Bayou (7.5 min. series)	1982
F-R Ranch (7.5 min. series)	1982
Cameron Farms (7.5 min. series)	1975
Black Lake (7.5 min. series)	1975
Browns Lake (7.5 min. series)	1982
Cameron (7.5 min. series)	1982
Lake Misere (7.5 min. series)	1980
Catfish Lake (7.5 min. series)	1980
Mallard Bay (7.5 min. series)	1979
Latania Lake (7.5 min. series)	1980
Hackberry (7.5 min. series)	1982
Moss Lake (7.5 min. series)	1975
Latanier Bayou (7.5 min. series)	1979
Orange LA-TX (7.5 min. series)	1979
Collicon Lake (7.5 min. series)	1979
Welsh (15 min. series)	1971

20. Aerial Maps (Soil Conservation Service)

    a. 1953 Flight - 4" = 1 mile scale
    b. 1968 Flight - 4" = 1 mile scale
    c. 1978 Flight - 4" = 1 mile scale

21. General Soil Maps (Soil Conservation Service) (1971)

    a. Cameron Parish - 1" = 15 miles

22. Cameron Parish Underwater Obstruction Maps, DNR, 1" = 125,000' (1981)

23. Official Map of the Louisiana Coastal Boundary, DOTD, 1" = 6 status miles (1980)

24. Louisiana Coastal Resources Map (Cameron Parish), Burk and Associates - 1" = 125,000' (1979)

25. Volume III, An Ecological Characterization Study of the Chenier Plain Coastal Ecosystem of Louisiana and Texas

a. Index maps
b. The Pleistocene Erosional Surface
c. Chenier Plain Habitat Group
d. Chenier Plain Wetland Habitats
e. Canal and Point Surface Discharges
f. Special Features

In the following report, information concerning many aspects of Cameron Parish has been compiled. The environmental and social factors which make up the parish are analyzed; the resources and conflicts among multiple resource uses are covered; the goals, objectives, and policies for the preservation and development of the coastal zone have been determined; and regulations for locally permitted activities and subsequent application, review, modification, and enforcement of the permitting process and its explanation have been included.

For the purpose of proper analysis, the above issues have not only been studies from the macro-level (the parish) but from the micro-level (environmental management units) as well. These units or EMU's are smaller, homogeneous areas with natural or locally recognized boundaries and were designed to better identify parish problems and better manage the coastal zone. In Cameron Parish the EMU's are:

1. Black Bayou
2. West Black Lake
3. Sabine Refuge
4. Blue Buck Ridge
5. Johnson's Bayou
6. Cameron Meadows
7. Holly Beach
8. West Cove
9. Hackberry
10. Calcasieu River
11. Sabine Lake
12. Grand Lake Ridge
13. Calcasieu Lake
14. Big Pasture Area
15. Big Burn East
16. Big Burn West
17. Grand Lake
18. Lacassine Refuge
19. Pumpkin Ridge
20. Cameron Creole
21. Grand Chenier
22. Hog Bayou
23. Rockefeller Refuge

The management units are mentioned throughout the report in terms of their characteristics, problems, and goals. They add an important facet to the procedure for managing uses and resources of the coastal zone.

WHY COASTAL ZONE MANAGEMENT?

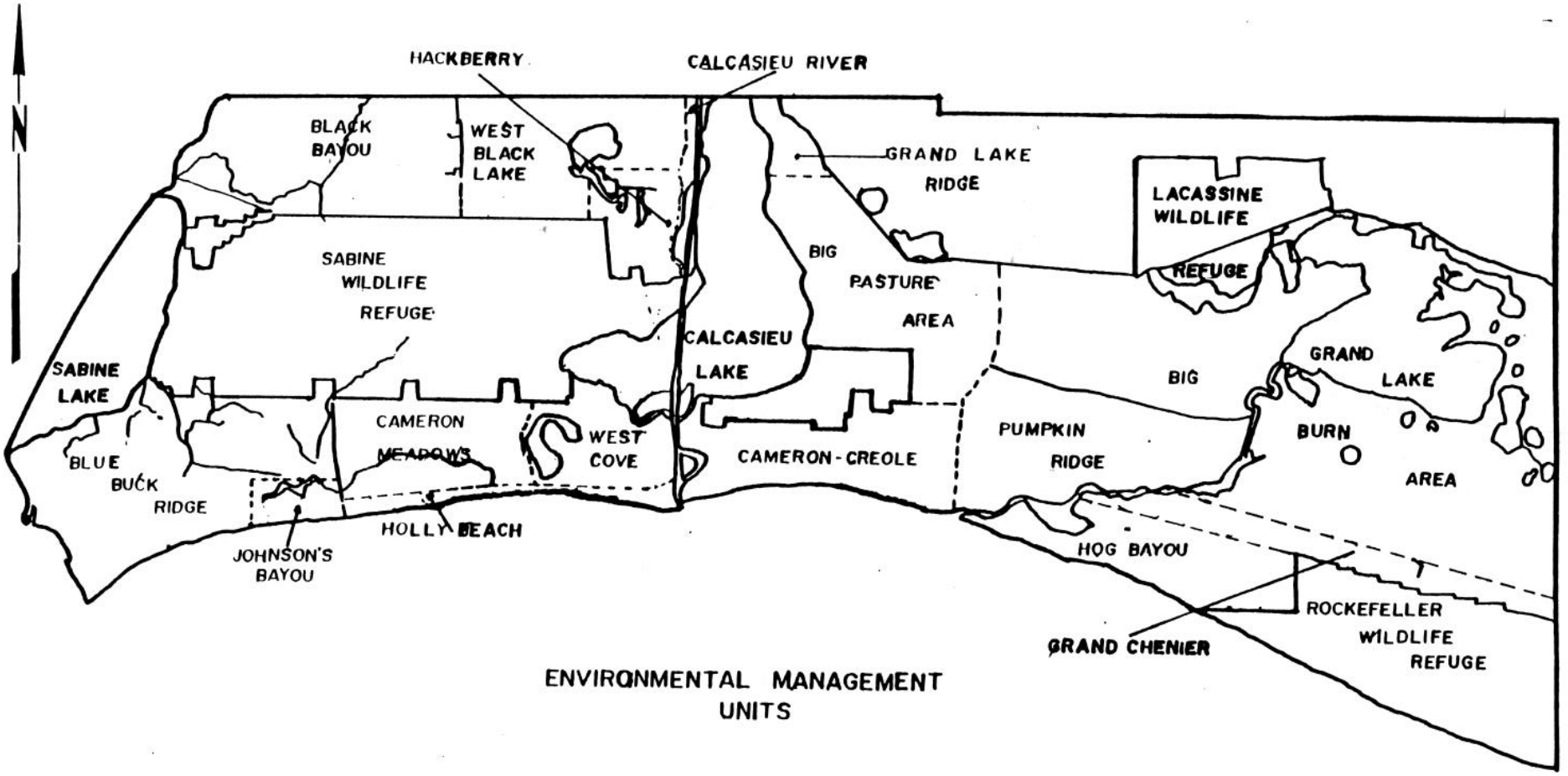
In 1980, Cameron recorded the largest commercial fishery landings in the country for the second straight year.[1] This is testimony to the fact that Louisiana has the richest estuarine habitat in the country. Adverse impacts to these areas caused by industry and other man-made land uses are occurring every day. This may result in irreparable damage to these areas and subsequently a large part of Louisiana's economy and way of life.

It is estimated that some 54 square miles of Louisiana is lost into the sea each year. This figure has been rising steadily and will continue to do so until the harmful effects to the coastal areas are arrested.

Finally, this program is designed to enhance and preserve the coastal zone of Louisiana, not to serve as a land control document or to inhibit growth. However, the very existence of the coastal areas as we know them today are in jeopardy. It is hoped that the Cameron Parish Resources Program can contribute to the preservation of this beautiful and unique area for future generations of Cameron, Louisiana, and the United States.

[1] Fisheries of the United States, U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Current Fishery Statistics No. 8100, April, 1981.

FIGURE 2



ENVIRONMENTAL MANAGEMENT UNITS

SCALE 1" = 6 MILES

SOURCE: IMCAL 1981

ENVIRONMENTAL

CHARACTERISTICS

An important part of any attempt to manage the coastal zone is the detailed breakdown of its physical composition. This not only gives an overall picture of the parish's appearance, but also explores the characteristics of its individual features.

The Environmental Profile section of this report is basically in two parts: first, the physical components, which in conjunction form the nature of the environment; and secondly the land uses which are found in the parish, identifying man's modification of the natural environment. These features are discussed and shown graphically in maps. They provide a picture of what the parish is made of, and how it exists today. They will provide a good data base for decisions in the coastal zone and a good foundation for this report.

GEOLOGICAL FEATURES

Cameron Parish, lying in the southwestern corner of Louisiana, is on the Gulf Coast. Therefore, it is a land of coastal geological features. Marshes cover the vast majority of the area. Louisiana's marshlands represent 67% of Louisiana's coastal area, while Louisiana's swamps represent 15% of Louisiana's coastal area, and Louisiana's dry lands represent 18% of Louisiana's coastal area.

Topography

The northern edge of the marshland in Cameron Parish extends slightly beyond the Intracoastal Waterway. The coastal marshes are bound on three sides by water. In some areas, the lakes, bayous, and canals are so numerous that the marshes appear not as a land mass, but a vast region of unbroken stands covering as much as one square mile.

In most areas, the topography is only slightly above mean Gulf level. Most noticeable are the low natural levee ridges lying along tidal channels and larger streams flowing into or through the marsh. Alteration of the topography has been caused by the construction of artificial levees and spoil deposits.

Coastal Origin

Coastal marshes are a product of the Mississippi River. This region (Cameron) lies on the Chenier Plain and was formed from river sediment swept westward by long-shore currents in the Gulf. Sediment gradually accumulated as mud flats against the shoreline. The mud flats became occupied by salt-tolerant

vegetation, and new marsh was created. Then the Mississippi River changed its course, which resulted in a loss of sedimentary material. With this, the building process ceased, and the marsh was under attack by wave action. Then the shoreline retreated and beach deposits were formed. Later, the river changed its course again, causing another buildup along the shores. This resulted in the marshes advancing seaward, leaving the beaches stranded. These beaches, also called cheniers, have a strategic role in the drainage patterns of the Chenier Plain.

Soils

The coastal marsh soils are classified as peats, mucks, and clays and are basically brown and black in color.[1] The gray color is apparent in the water-logged reduced soil conditions. The depth of the soil is determined by the amount of subsidence and the vegetative history of a particular area. Organic soils are classified on the basis of the stage of decomposition. Peat soil contains plant parts only partially decomposed, and over 50% organic matter. Mucks contain organic material which is finely divided and mostly decomposed with no plant parts identifiable. Its organic content is from 15% to 50%, and soils with less than 15% organic matter are classified as mineral soil.

Geological Formations

The coastal zone is geologically unique not only for the topography of the area, but also for the variety of geological formations.[2] Cameron Parish features include shell deposits, beaches, cheniers, oil and gas fields, and salt domes. Figure 3 shows the locations of these features and their frequency in the parish.

Deep migratory tidal passes are ecologically important as migratory pathways for many estuarine dependent fish and shellfish. Because of tidal scouring and high volumes of water movement, passes are often 50 to 100 feet deep. Three significant ones (in Cameron) in terms of fishery migration and tidal movements are Sabine Pass, Calcasieu Pass, and Mermentau River.

Cheniers are the most distinctive topographic features of the Chenier Plain in Southwest Louisiana.[2] The largest in Cameron are the Blue Buck Ridge, Smith Ridge, Front Ridge, Back Ridge, Hackberry Beach, Oak Grove Ridge, Little Chenier, Pumpkin Ridge, Eugene Island, Grand Chenier Ridge, and Pardue Chenier.[3] They are important as wildlife habitats and storm barriers and in limiting saltwater intrusion into the marshes.

Freshwater impoundments in the marshes are another unique feature of Cameron. Freshwater pools have been created by leveeing off natural marsh in which water levels are manipulated by pumping or control structures. This creates productive waterfowl and fishing areas. There are two major impoundments in Cameron, both of which are used for conservation purposes in the parish. The Sabine Refuge Pool is 34,000 acres of freshwater marsh, used as a wintering and nesting habitat. It is also excellent for freshwater fishing. The Lacassine Refuge Pool covers 16,000 acres that serve as a roosting and feeding area for ducks, geese, and birds. The

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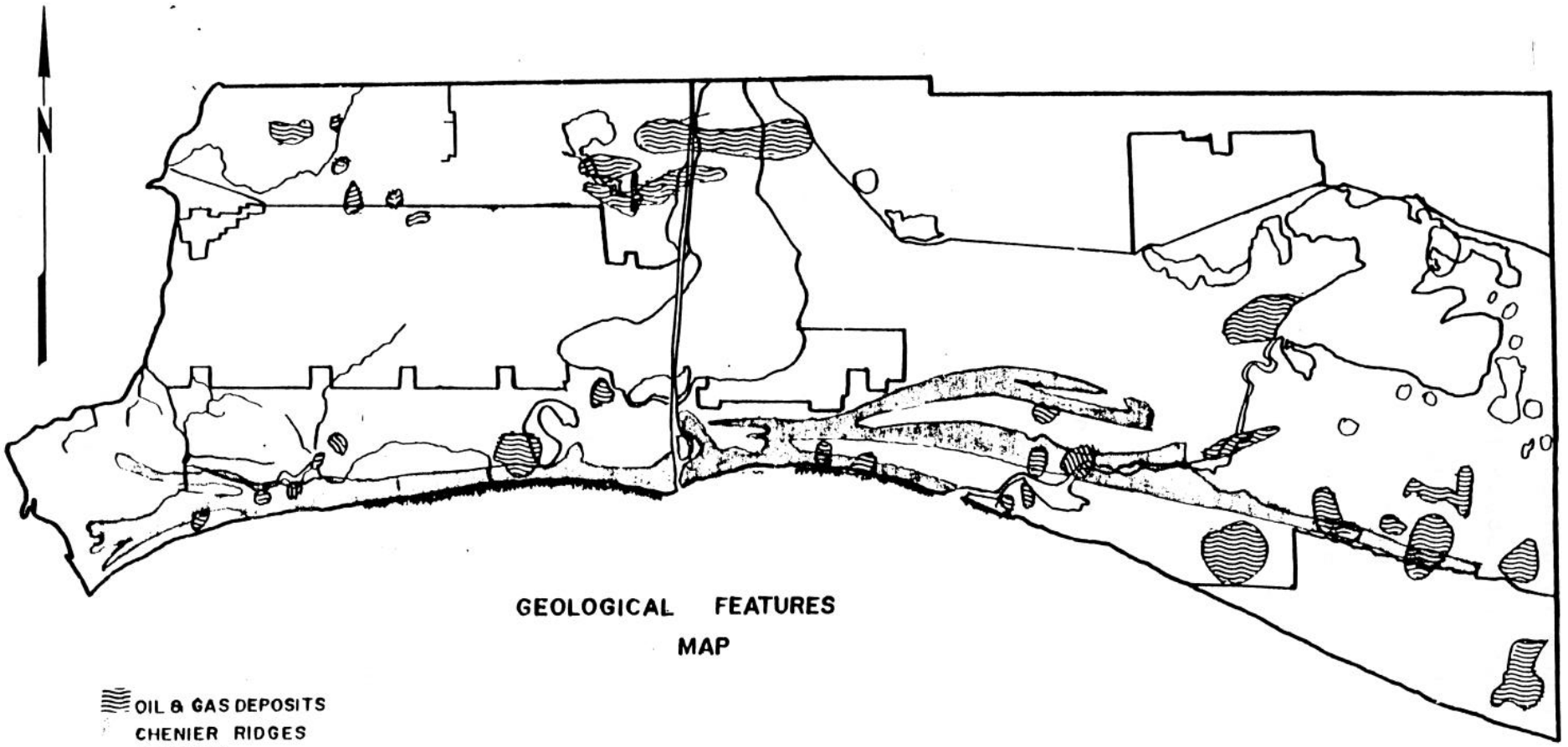
[2]General Soils Map, IMCAL, 1975.

[3]Louisiana Coastal Resources Program, Unique Ecological Features of the Louisiana Coast, Louisiana State Planning Office, Baton Rouge, Louisiana, March, 1977.

FIGURE 3



SOURCE: BURK and ASSOCIATES COASTAL RESOURCES MAP 1975

vegetation common is bulltongue, maidencane, watershield, water lilly, spikerush, and southern bullrush. The pool is also good for large mouth bass fishing.

The geological composition of Cameron Parish is the product of many centuries of built-up sediment deposited by movement of the Mississippi River. Cameron is a fairly typical coastal parish, and its features are an integral part of its characteristic look.

Climate

Climate in Cameron Parish is influenced by the subtropical latitude and its proximity to the Gulf. The marine tropical effect results from the average water temperature of the Gulf (from 64°F in February to 84°F in August). Southerly winds in the summer provide moist, semi-tropical weather and afternoon showers. However, when the westerly or northerly winds interrupt, hotter, dryer weather results. In the winter, the cold continental air and the warmer tropical air alternate, causing drastic variations in the climate.

The mean monthly temperature is the lowest in January and highest in August. The growing season along the coast is the period between the last freeze in the spring, and the first in the fall and averages 317 days.

The Louisiana coast has an abundance of rainfall, the maximum in July and the minimum in October. Hurricanes and tropical storms with strong winds, high tides, and rain occasionally occur between June and November.[4]

[4]Robert H. Chabreck, Vegetation, Water and Soil Characteristics of the Louisiana Coastal Region, Louisiana State University, Baton Rouge, Louisiana, September, 1972, Pages 10-12.

HYDROLOGY

Hydrologic Units

Hydrology deals with the properties, distribution, and circulation of water on the surface of the land, in the soil and underlying rocks, and in the atmosphere. According to Robert H. Chadbreck, Cameron Parish lies in Hydrologic Units VIII and IX. These units provide for a grouping of the areas with a common drainage.

Unit VIII lies in the eastern half of the parish and encompasses the Mermentau Basin which includes the Mermentau River, Grand Lake, White Lake, and the associated marshes.

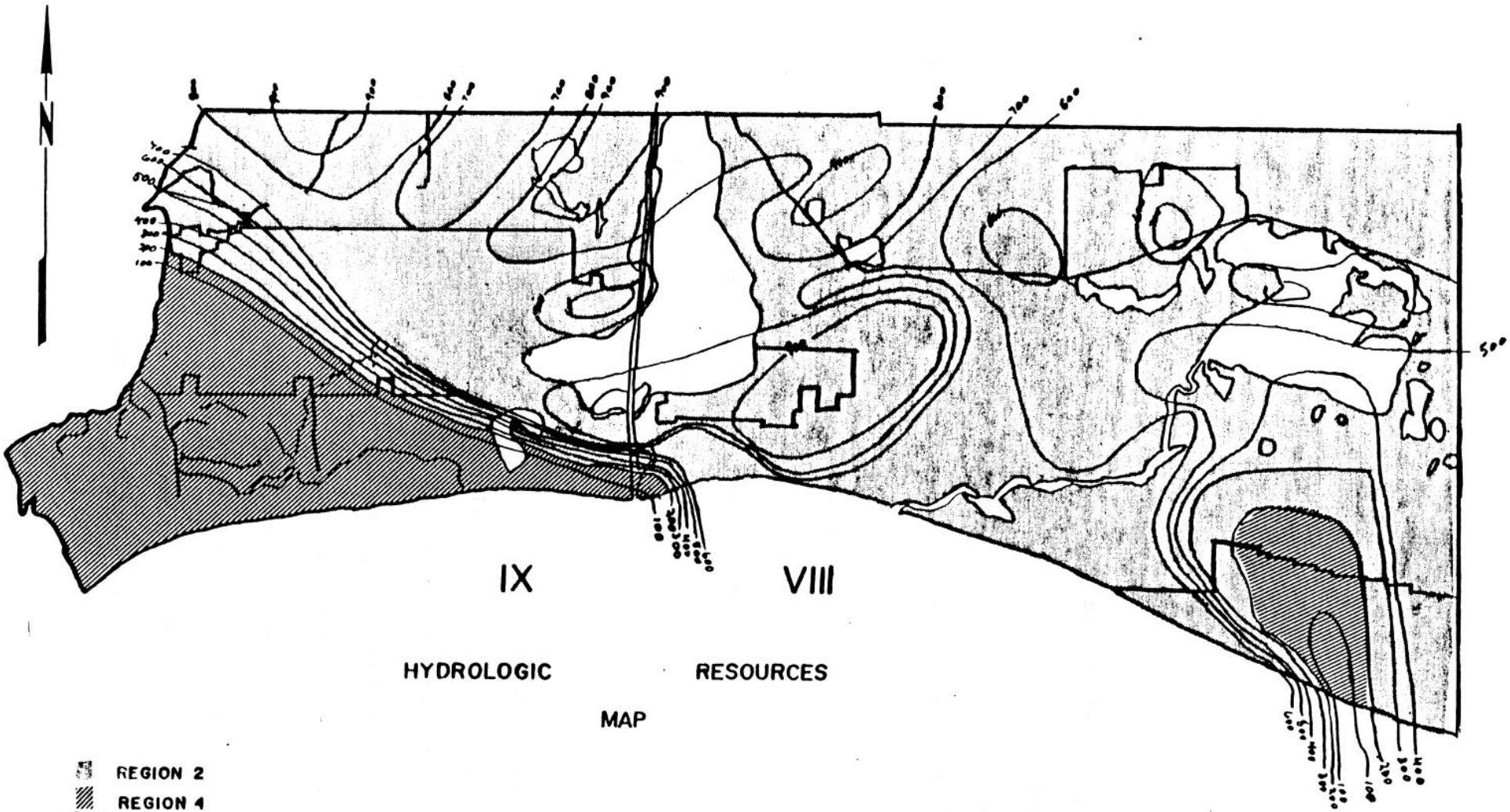
Unit IX lies in the western half of the parish and includes the marshes drained by the Calcasieu and Sabine Rivers. Study units lying within Hydrologic Units IX and VIII are indicated on Table 7. Figure 4 is a map of Cameron Parish showing the hydrologic units.

Hydrologic Resources

Figure 4 shows the different regions of hydrologic resources in Cameron Parish. The regions are distinguished by their differing quantity and quality characteristics. The contour lines indicate the base of fresh ground water deposits.

There are two of the four statewide regions found in Cameron Parish. Region 1 occurs in an area east of Sabine Lake (Texas border) to an area just east of Calcasieu Pass. It also occurs in a smaller area within Rockefeller Refuge in the southeastern portion

FIGURE 4



SOURCE: BURK and ASSOCIATES COASTAL RESOURCES MAP 1978

of the parish. This region has large quantities of groundwater. Wells usually range from 400 - 2,400 feet and yield 1,000 - 3,200 gp. Flowing artesian wells are common in this region.

Region 2 extends over the remainder of Cameron Parish. Wells in the quartermary sand and gravel deposits range in depth from 200 - 700 feet and yield large quantities of water. The pumping rate in this area ranges between 1,000 and 2,000 gpm. Water levels range from 20 to 70 feet below the surface, except in the northern portion of the parish where levels have declined to about 110 feet below the land surface.

Hydrologic Basins

According to the Louisiana Water Quality Management Plan, Cameron Parish is contained within two water basins--the Calcasieu River Basin Plan and the Mermentau-Vermilion-Teche Basin. The Calcasieu River Basin is located in southwestern Louisiana. It is east of the Sabine River, south of the Red River, and west of the Mermentau. Figure indicates the basin location. The river, which drains 3,773 square miles, arises near Slagle, in Vernon Parish, and drains into the Gulf of Mexico at St. John's Pass, in Cameron Parish. The overall length of the mainstem of the river is approximately 160 miles.

The Mermentau-Vermilion-Teche Basin is located in the south-central, southwestern part of the State of Louisiana and comprises an area of approximately 6,730 square miles. The basin is bordered on the north by the Red River and its levees, on the west by the Calcasieu River Basin, and on the east by the West Atchafalaya

River Protection Levee. The southern boundary is the Gulf of Mexico. Figure shows a statewide vicinity map as well as the basin map and the stream segments.

The Calcasieu Basin contains four principal physiographic areas. These are the Benthy Terrace in the upland areas, the Montgomery Terrace in the rolling hill area between the uplands and the prairie, the Prairie Terrace between the rolling hills and coastal marsh area, and the Deltaic Plain in the coastal area.

Land use in the Calcasieu Basin is extremely varied due to the natural resources of the basin. The basin contains one large urban industrial area (Lake Charles, located in Calcasieu Parish). Sulphur and oil deposits, timber and port facilities have encouraged industrialization of the community. The majority of the rest of the area is rural. The following general descriptions of the remaining basin parishes reflect the variability of land use within the Calcasieu Basin.

The southernmost parish in the basin is Cameron Parish, which borders the Gulf of Mexico. Much of the parish is covered with marshland which serves as a wintering ground for migratory birds. Fur trapping is extensive, and the fish and shrimping industry is important. There are also rich farmlands which give big yields of corn, rice, figs, and oranges.

Geologically, the Calcasieu River flows from the upland hills with elevations generally being around 260 feet above mean sea level (a maximum of 400 feet above mean sea level). The river flows through the coastal prairie and coastal marshes, which have an elevation

ranging from 1 - 2 feet above mean sea level. The flood plains are extremely flat with little relief and average 2 - 3 feet above mean sea level. Lakes traversed include Lake Charles, Prien Lake, Moss Lake, and Calcasieu Lake. Dominant features include osbow lakes, natural levees, and the surrounding Pleistocene Uplands.

General soil areas in the Calcasieu River Basin are the Flatwoods, the Coastal Prairies, and the Coastal Marsh soil series groups. The Flatwoods group is a poorly-drained forested soil developed from Pleistocene sediments. Coastal Marsh soils are organic clays and sandy beaches derived from stream sediments and marine deposits. Soil loss and sediment yields associated with various land uses in the basin segments are discussed in later sections of this report.

The Mermentau-Vermilion-Teche Basin is composed of three different and distinctive land forms which are arranged in broad bands from north to south. The northern part of the basin is a flatwoods area which gives way to an undulating landscape extending northward into the drainage basins of the Calcasieu and Red Rivers. To the south of the flatwoods area lies a broad prairie which extends from the Bayou Teche on the east into the Calcasieu Basin to the west. The prairie is characterized by large expanses of flat grassland disected by the numerous tributaries of the basin, and with scattered areas of oak trees and other mixed hardwoods. The prairie, which is extensively cultivated, gives way to a band of marshland which extends from east to west along Louisiana's entire coastline. The marsh is further subdivided into a fresh water marsh which borders the prairie to the north, and a saltwater marsh which forms the coastline adjacent to the Gulf of Mexico and its bays. The flatwoods

and the prairie are generally considered upland areas, while the marshland is considered a coastal area.

Basin Hydrology

A. Calcasieu River

The Calcasieu River varies from a small, fast stream in the headwaters to a broad, sluggish estuary from the latitude of Lake Charles to its entrance to the Gulf of Mexico. Flows in the upper basin may range from a high of 180,000 cfs. in the winter and spring, to zero during the summer and fall. Precipitation is generally greatest during December through April, and usually very sparse during May through October. Average annual rainfall in the basin ranges from 55 inches in the western portion to 61 inches in the eastern portion of the basin. The 50 percent duration flow in the Calcasieu and its major tributaries ranges from 0.35 to 0.73 cfs/mi2 of drainage area.

The Calcasieu River is tidally influenced for the lower 50 miles, from St. John's Pass to the saltwater barrier above the city of Lake Charles. The barrier divides the river into the riverine freshwater portion above and the estuarine, saltwater portion below. By preventing saltwater intrusion, the barrier protects the upper Calcasieu from degradation, and thus preserves the major source of irrigation water for rice production.

The lower portion of the river from the city of Lake Charles to the Gulf is subject to tidal variation. A semidiurnal tide extends 65 miles upstream and has mean tidal ranges of 1.7 feet

at the river mouth and 0.7 feet at Lake Charles. Navigation improvements have modified the Calcasieu from its mouth approximately 52.6 river miles inland.

The Calcasieu Basin is located in a water-rich area of the United States. The area not only receives abundant rainfall, but also has vast sources of untapped groundwater. Aquifers containing fresh groundwater underlie most of the basin except for the coastal area. The aquifers are generally of fairly high quality and yield large volumes of fresh water. The Chicot Aquifer underlies most of the Calcasieu River Basin.

The Calcasieu River Basin is dotted with numerous lakes and reservoirs. Major water bodies within the basin include: Calcasieu Lake, Bundick Lake, Lake Charles, Prien Lake, Moss Lake, Sweet Lake, Black Lake, and Mud Lake.

The Intracoastal Waterway crosses the Calcasieu River just above Calcasieu Lake. In addition to the Intracoastal Waterway, both the Calcasieu River and Houston River are navigable with 71 and 20 miles navigable length, respectively.

B. Mermentau-Vermilion-Teche

1. Surface Water Hydrology

The slope of the land is generally from north to south with the highest elevation being in excess of 300 feet. The three major streams are the Mermentau River, the Vermilion River, and Bayou Teche. Each of these streams flow south toward the Gulf of Mexico. Figure 2-1 shows a map of the different stream segments, each of which has its own distinctive hydrologic characteristics.

Because of its relatively low relief, especially in the prairie and marsh areas, the basin is characterized by annual backwater flooding of agricultural lands, poor drainage, and saltwater intrusion along the Gulf of Mexico. The variations in the monthly rate of precipitation are reflected in corresponding variations in the stream flows of the Mermentau-Vermilion-Teche Basin as indicated by U.S.G.S. flow records. The critical, low stream flows generally occur during warm weather in September and October. The low flow, combined with a tidal influence in the coastal zone and low relief, contributes to a low natural reaeration rate and oxygen depletion.

The Mermentau River is the westernmost of the streams in the basin. It provides drainage for more than half of of the basin area. The Mermentau River is formed by the confluence of Bayou des Cannes, Bayou Nezpique, and Bayou Plaquemine Brule. Other major tributaries to the river are Bayou Queue de Tortue and Bayou Lacassine. The Mermentau River is a vital and valuable water resource for irrigation. To prevent saltwater intrusion, and to aid navigation, the Catfish Point Control Structure was installed below Grand Lake. The Mermentau River empties into the Gulf of Mexico and is subject to tidal action below the Catfish Point Control Structure.

Relief along the Mermentau and its tributaries is low and is a contributing factor to annual backwater flooding of agricultural lands. In addition, the slope of the river and its tributaries is very low and, as a result, flow is sluggish.

The Vermilion River has a well-defined watershed, draining the 652 square mile area lying between the Mermentau watershed on the west and the Bayou Teche ridge on the east. The elevation of the watershed ranges from 1 foot above msl near the mouth, to 15 feet above msl at Abbeville, to 40 feet above msl at Lafayette, to 75 feet above msl at Opelousas.

The Vermilion River can be separated into two distinct sections: Upper Vermilion River and Lower Vermilion River. The Upper Vermilion River, about 12.4 miles long, runs south to the city of Lafayette. It has a broad valley. Its banks are only slightly higher than the adjacent lands, and it receives drainage waters from the adjacent watershed at several points where tributary streams enter the river. The Lower Vermilion River begins at Lafayette and ends at Vermilion Bay. It has high banks and a well defined stream valley. The Intracoastal Canal intersects the Vermilion River just as it flows into Vermilion Bay. Below Abbeville, Louisiana, the Vermilion River is tidal. The mean range of normal tides at the mouth is 10 inches. The maximum variation of water level in the reaches during hurricanes is 8 - 10 feet.

The Vermilion River also functions as a distributary of Bayou Teche. Bayou Fusilier, a small alluvial stream about 6 miles in length, connects the Vermilion River at its head with Bayou Teche at Arnaudville. An average of about 25 percent of the flow of Bayou Teche is normally

diverted through this channel into the Vermilion, although a small earth dam prevents flow at stages below about 10 feet msl. Runoff from heavy local storms in the upper Vermilion watershed occassionally causes a reversal of flow in Bayou Fusilier toward Bayou Teche.

The Ruth Canal is about 4 miles long and connects Bayou Teche with the Vermilion River. It was built by private interests for diverting a portion of the Teche flow to the Vermilion for rice irrigation. Flow is regulated by a reinforced concrete control structure with three manually-operated gates.

Bayou Teche is today a comparatively small stream occupying the highest part of a very large alluvial ridge similar in size to the nearby ridge of the Mississippi River. Elevations on the ridge near the bayou range from 30 feet above sea level at Port Barre, to 20 feet at New Iberia, and 10 feet at Franklin. The ridge slopes gently to the swamps which lie from 1 to 3 miles back on either side where elevations are generally from 5 to 10 feet lower than near the bayou. Since all local drainage is away from the stream, it functions principally as a flume, conveying drainage from Bayou Courtablue to the Vermilion and lower Teche systems.

The drainage from the upper 1,560 square miles, conveyed principally by the Bayous Rapides, Boeuf, and Cocodrie diversion canal on the east and the upper portion of the West Atchafalaya Basin Protection Levee (WABPL) borrow

pit on the east, is intercepted by Bayou Courtableu near the center of the watershed. Under normal conditions, about 20 percent of the flow leaves Bayou Courtablue and enters Bayou Teche at Port Barre, the balance continuing down the WABPL borrow pit to rejoin the Teche at Charenton. There it is diverted to West Cote Blanche Bay through the Charenton Drainage and Navigation Canal.

Drainage is diverted from the watershed at several points when stages are favorable: into Red River at Alexandria through the Rapides floodgates; into the Red River backwater area through the Coulee des Grues floodgate near Marksville; into the Atchafalaya River through the Bordelonville floodgates on Bayou des Glaises; and into the West Atchafalaya Basin Floodway through the Darbonne, Courtableu, and Charenton control structures. The two weirs in the borrow pit immediately below the Courtableu drainage structure serve to divert all flow in the system below a stage of 18.0 feet msl down Bayou Teche.

Principal features of the Teche-Lower Atchafalaya system are the Berwick Locks in the Lower Atchafalaya River; Wax Lake Outlet, which diverts Atchafalaya basin floodwaters across Bayou Teche; the east and west Calument floodgates; the Hanson Canal and lock on the right bank; the Charenton Drainage and Navigation Canal which conveys the WABPL borrow pit flow through and across Bayou Teche, entering the bayou; the Loreauville Canal on the left bank which connects the Teche with the Vermilion River; and Bayou Fusilier on the right bank which also connects the Teche to the Vermilion River.

The U. S. Army Corps of Engineers has begun construction on a flow augmentation project that will supplement the low flows in the Vermilion River and Bayou Teche by pumping water from the Atchafalaya River near Krotz Springs through a series of diversion structures into the Bayou Teche and from there into the Vermilion River by way of the Ruth Canal and Bayou Fusilier. This project was designed both to improve water quality in the Vermilion and Teche during summer low flow conditions and to provide additional water for irrigation of the area's crops. The scheduled completion date for this project is 1981.

2. Ground Water Hydrology

Ground water in the Mermentau-Vermilion-Teche Basin is generally derived in large quantities from strata that is chiefly sand and gravel interbedded with clay. Large groundwater supplies are obtained from alluvial gravels. Aquifers beneath the cheniers and in the shallow Pleistocene Age sediments, and acquifers receiving freshwater recharge tend to have freshwater, while groundwater in the muddy sediments between the cheniers tends to be brackish. Saltwater intrusion into the coastal acquifers can be a problem during excessive pumping and/or high tides.

Hydrologic Stream Segments

A. Calcasieu River Basin

Within the Calcasieu River Basin there are 13 stream segments (see Pages 41-44). The segments consist of hydrologic

units such as a major tributary or a group of tributaries. A map of the entire basin is not available. The 3 segments contained in Cameron Parish are explained below:

0315 - Lower Calcasieu River. This lower mainstem Calcasieu segment includes the tidally influenced portions of river system. Included in the segments are Lake Charles, Prien Lake, Moss Lake, and Lake Calcasieu--all saltwater lakes. Important towns and cities include Lake Charles, Cameron, Westlake, and Hackberry. It receives drainage from Bayou D'Inde (0323), Black Lake Bayou, Contraband Bayou, and Choupique Bayou (0325); as well as the East-West Intracoastal Waterway (0321) and general marsh drainage. The greatest portion of the population of the basin affects this segment.

0321 - East-West Intracoastal Waterway. This narrow segment contains only the direct drainage to the canal west of the Calcasieu.

0325 - Lower Calcasieu River Estuarine Area. This area includes many small tributaries and estuarine lakes such as Choupique Bayou, Black Bayou, Black Lake, Willow Lake, Sweet Lake, Mud Lake, and the towns of Choupique and Holly Beach.

Water Quality Standards for all stream segments are also shown on Table .

B. Mermentau-Vermilion-Teche Basin

The Mermentau-Vermilion-Teche Basin is divided into 17 stream segments (not shown in this study). A description of the 4 segments located within Cameron Parish are given below:

Segment 0507 - This segment extends from Lacassine Bayou to Grand Lake and tributaries including Lake Misere, Bayou Misere, and the Intracoastal Waterway.

The data from the water quality monitoring stations located in this segment shows that the water quality in this segment is good with the possible exception of certain toxicants. Stations on the Intracoastal Waterway

at Lake Misere had high levels of D.O., moderate to low levels of BOD_5 and nutrients, low levels of fecal coliforms and acceptible levels of pH, chlorides and sulfates. The station located on Bayou Lacassine had high D.O. levels with a minimum of 4.0 mg/l recorded. Nutrient levels vary from low to significant, indicating a potential for algal growths. There was only one chloride violation in 1978, and none for pH and sulfates. This segment is designated for the propagation of fish and wildlife. Mercury, dieldrin, and endosulfan had maximum values that exceeded the criteria for aquatic life.

Segment 0509 - This segment includes Grand Lake and White Lake, including Old Intracoastal Waterway between Vermilion Lock and the Mermentau River.

There are 24 water quality monitoring stations in this segment. The D.O. levels throughout the segment were high on the average. Stations on the Intracoastal Waterway and in Grand Lake all had minimum D.O. levels below 1 mg/l, but they all had average D.O. levels above 5 mg/l. The majority of the chloride contraventions occurred in the southeastern portion of the segment. The stations recording the contraventions are located on Schooner Bayou, the eastern edge of White Lake, and bayous connecting to the Gulf. The station at the Catfish Point Control Structure had a mean chloride level of 598 mg/l for the period of 1974 to 1978, a mean value of 220 mg/l for 1978 and 40 percent chloride contraventions in 1978. Sulfate levels follow the same pattern as the chlorides. Violations of the pH standard occur mainly in the eastern end of White Lake and the Intracoastal Waterway. Saltwater intrusion is a specific problem for the basin, and there are significant levels of chlorides and sulfates in this segment.

Segment 0511 - This segment contains the coastal waters south of Highway 82 from Belle Isle Canal to the Mermentau River.

All of the water quality monitoring stations are located in the eastern portion of this segment. The recorded average D.O. levels were high with very few violations. Temperature and pH were at acceptable levels and

there was no coliform data. There are no standards for chlorides, sulfates, and total dissolved solids (TDS) for this segment; however, saltwater intrusion in this segment may cause violations of standards in Segment 0509. The average chloride levels vary from 8550 mg/l near the coast to 853 mg/l on Belle Isle Canal.

Segment 0513 - This segment contains the Mermentau River below Catfish Point Control Structures, including Upper and Lower Mud Lake and all tributaries.

Several stations in this Segment had high D.O. levels. These stations had an average D.O. above 6.0 mg/l and very few violations. The portion of this segment that includes the Mermentau River and Hog Bayou is designated for shellfish propagation. There are no standards for chlorides, sulfates, and TDS for the Mermentau River in this segment. Only the maximum values of mercury and dieldrin exceeded the water quality criteria for acquatic life. The data for this segment indicates generally good water quality.

WATER QUALITY SEGMENTS AND APPLICABLE STANDARDS IN CAMERON PARISH

SEGMENT 030150 - CALCASIEU RIVER

Water Uses:
Primary contact recreation, propagation of fish and wildlife.

Water Quality Criteria:

Bacteria standard	4
Dissolved oxygen (mg/l) not less than	4.0
pH range	6.0 to 8.5
Temperature (^{o}C) not to exceed	35

Standard Violated: dissolved oxygen, oil and grease, toxic chemicals, heavy metals, coliform, taste and odor, temperature, saltwater ammonia nitrogen.

SEGMENT 030170 - BLACK LAKE

Water Uses:
Secondary contact recreation, propagation of fish and wildlife.

Water Quality Criteria:

Bacteria standard	2
Dissolved oxygen (mg/l) not less than	4.0
pH range	6.0 to 8.5
Temperature (^{o}C) not to exceed	35

SEGMENT 100080 - SABINE LAKE

Water Uses:
Primary contact recreation, propagation of fish and wildlife.

Water Quality Criteria:

Bacteria standard	4
Dissolved oxygen (mg/l) not less than	4.0
pH range	6.0 to 8.5

SEGMENT 100081 - SABINE PASS

Water Uses:
Primary contact recreation, propagation of fish and wildlife.

Water Quality Criteria:

Bacteria standard	4
Dissolved oxygen (mg/l) not less than	5.0
pH range	6.5 to 9.0
Temperature (°C) not to exceed	35

SEGMENT 100090 - BLACK BAYOU

Water Uses:
Secondary contact recreation, propagation of fish and wildlife.

Water Quality Criteria:

Bacteria standard	2
Dissolved oxygen (mg/l) not less than	4.0
pH range	6.0 to 8.5

SEGMENT 040060 - MERMENTAU RIVER

Water Uses:
Primary contact recreation, propagation of fish and wildlife.

Water Quality Criteria:

Bacteria standard	1
Chloride (mg/l) not to exceed	90
Dissolved oxygen (mg/l) not less than	5.0
pH range	6.0 to 8.5
Sulphate (mg/l) not to exceed	30
Temperature (°C) not to exceed	32
Total dissolved solids (mg/l) not to exceed	260

SEGMENT 040070 - LACASSINE BAYOU

Water Uses:
Primary contact recreation, propagation of fish and wildlife.

Water Quality Criteria:

Bacteria standard	1
Chloride (mg/l) not to exceed	90

Water Quality Criteria (Continued)

Dissolved oxygen (mg/l) not less than	5.0
pH range	6.0 to 8.5
Sulphate (mg/l) not to exceed	30
Temperature (°C) not to exceed	32
Total dissolved solids (mg/l) not to exceed	360

SEGMENT 040080 - GRAND LAKE - WHITE LAKE

Water Uses:

Primary contact recreation, propagation of fish and wildlife.

Water Quality Criteria:

Bacteria standard	1
Chloride (mg/l) not to exceed	250
Dissolved oxygen (mg/l) not to exceed	5.0
pH range	6.5 to 9.0
Sulphate (mg/l) not to exceed	75
Temperature (°C) not to exceed	32
Total dissolved solids (mg/l) not to exceed	500

SEGMENT 040100 - LITTLE PECAN BAYOU

Water Uses:

Secondary contact recreation, propagation of fish and wildlife.

Water Quality Criteria:

Bacteria standard	2
Dissolved oxygen (mg/l) not less than	4.0
pH range	6.5 to 9.0
Temperature (°C) not to exceed	35

SEGMENT 040110 - HOG BAYOU

Water Uses:

Bacteria standard	4
Chloride (mg/l) not to exceed	250
Dissolved oxygen (mg/l) not less than	5.0
pH range	6.5 to 9.0
Sulphate (mg/l) not to exceed	75
Temperature (°C) not to exceed	32
Total dissolved solids (mg/l) not to exceed	500

SEGMENT 040260 - INTRACOASTAL WATERWAY

Water Uses:
Secondary contact recreation, propagation of fish and wildlife

Water Quality Criteria:

Bacteria standard	2
Chloride (mg/l) not to exceed	250
Dissolved oxygen (mg/l) not less than	5.0
pH range	6.0 to 8.5
Sulphate (mg/l) not to exceed	75
Temperature (°C) not to exceed	32
Total dissolved solids (mg/l) not to exceed	500

SOURCES OF INFORMATION

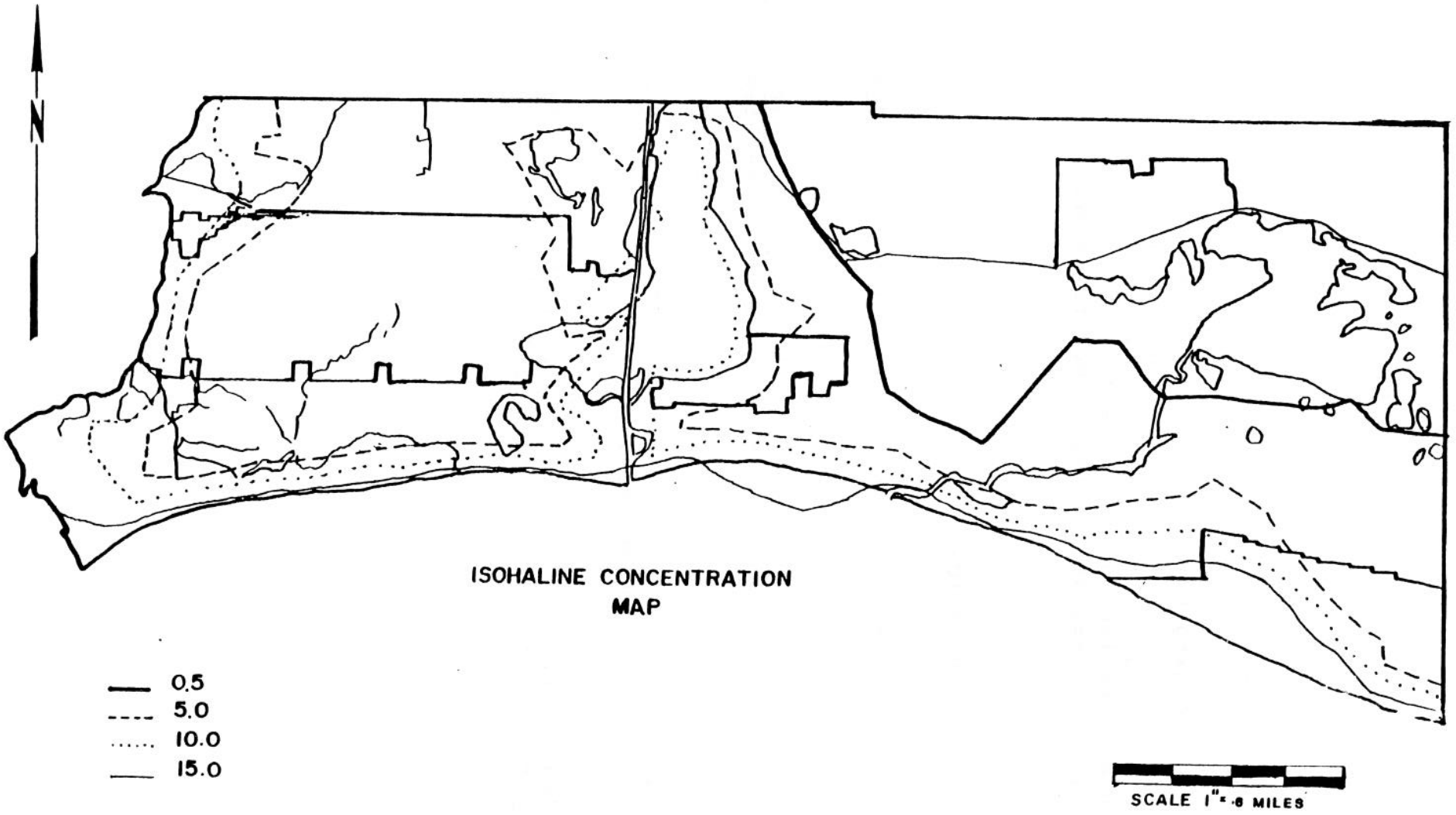
Louisiana Department of Conservation, 1960. Ground Water in Louisiana, Water Resources Bulletin No. 1.

Louisiana Department of Public Works, 1969. Present Municipal Water Use in Louisiana. Comprehensive Water and Related Land Resources Study. Series 1, Volume 1.

Louisiana Stream Control Commission, 1975. Water Quality Criteria and Plan for Implementation.

Louisiana Stream Control Commission, 1975. Water Quality Inventory Report. Section 305(b) PH 92-500. Volume 1.

FIGURE 5



SOURCE: BURK and ASSOCIATES COASTAL RESOURCES MAP 1978

FLOOD-PRONE AREAS

Figure 6 is a map portraying the vast majority of Cameron considered to be flood-prone. Only isolated areas along the northern boundary in the west and east section of Cameron Parish are referred to as non-flood-prone areas.[5]

The zones of the flood hazard area indicate the extent of the "100-year flood" shown in Figure 6. The majority of the 100-year flood hazard occurs along streams and river tributaries, including waterways associated with the Sabine, Calcasieu, and Mermentau River Basins. Cameron Parish provides a unique exception to the 100-year flood boundary.

As a result of the low coastal marshes and past tidal surges, the entire parish lies within the 100-year flood zone. The parish is further divided into three district zones, depending upon the exact water elevations. According to the Louisiana State Planning Office, Cameron Parish is comprised of 1,047,512 acres. Zone A2 covers 28% or 293,303.4 acres; Zone V5 covers 43% or 450,430.1 acres; and Zone V12 covers 29% or 303,778.5 acres in the parish (for definition of zone designations, see following page).

Zone A2 has special flood hazards with base flood elevations. Zone A2's high point of floods occurred 4.5 feet above the mean sea level. Zones V5 and V12 have special flood hazards, with velocity that are inudated by tidal floods.

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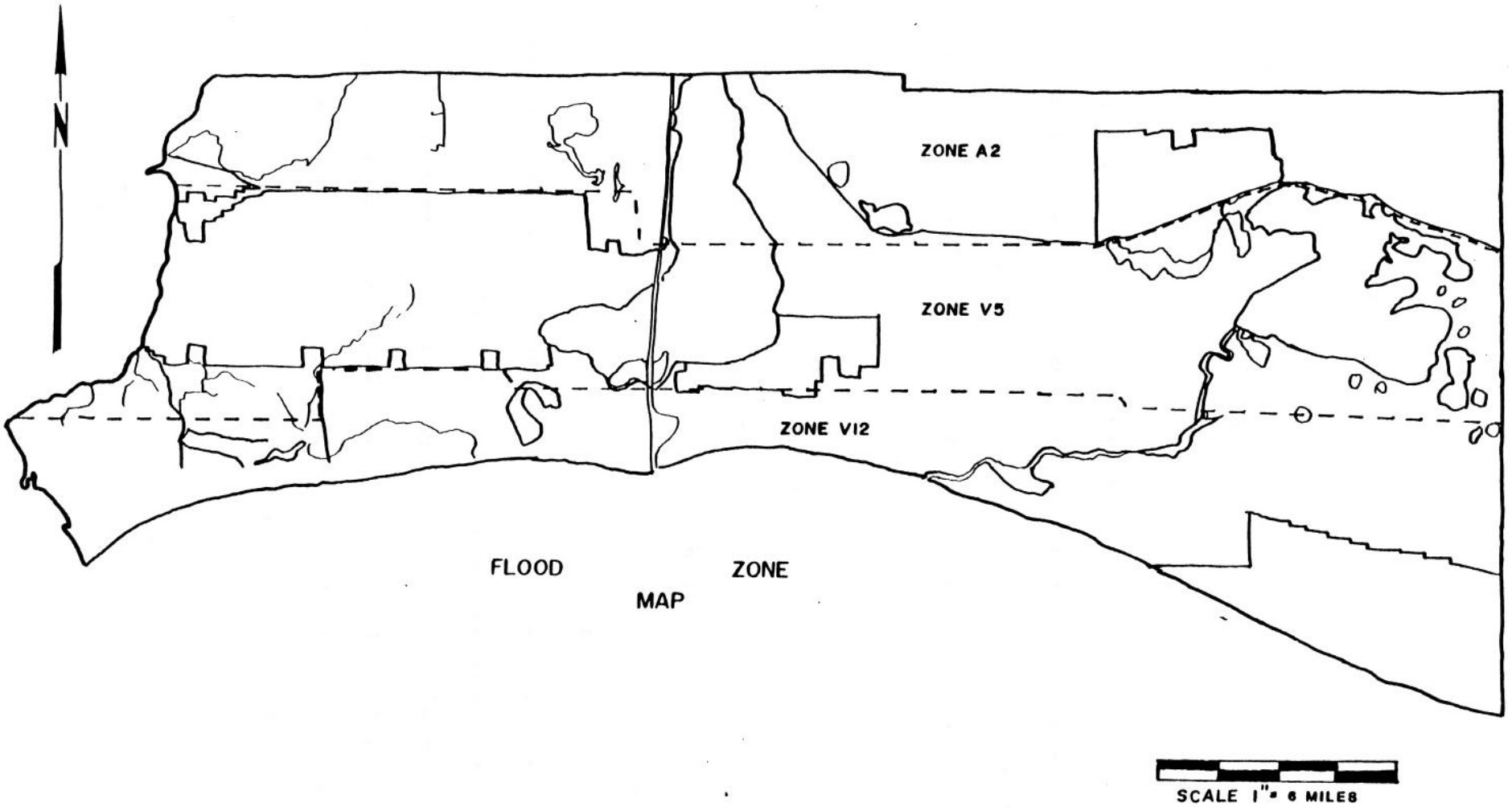
[5]Louisiana Coastal Resources Program, Flood-Prone Areas, Cameron Parish, Louisiana State Planning Office, Baton Rouge, Louisiana, June, 1976.

FIGURE 6



SOURCE: BURK and ASSOCIATES COASTAL RESOURCES MAP 1978

EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined
AO	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inudation are shown, but no flood hazard factors are determined
AH	Areas of 100-year shallow flooding where depths are between one (1) and three(3) feet; base flood elevations are shown, but no flood hazard factors are determined
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood (medium shading)
C	Areas of minimal flooding (no shading)
D	Areas of undetermined, but possible, flood hazards
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined

Zone V5's high point of flood occurrance in the last 100 years was 6 feet above mean sea level, and Zone V12's high point of flood occurrance in the last 100 years was 9.5 feet above the mean sea level.[6]

[6]Federal Insurance Administration, FIA Official Flood Hazard Map, Cameron Parish, Department of Housing and Urban Development, September 1, 1970.

TABLE 1

FLOOD ZONES OF STUDY UNITS

Units in Zone A2	Units in Zone V5	Units in Zone V12
Black Bayou	Sabine Refuge*	Blue Buck Ridge*
Sabine Refuge*	Blue Buck Ridge*	Johnson Bayou
West Black Lake	Hackberry*	Cameron Meadows
Calcasieu River	West Cove*	Holly Beach
Hackberry*	Calcasieu Lake*	West Cove*
Calcasieu Lake*	Pumpkin Ridge*	Big Pasture Area
Grand Lake Ridge	Grand Lake	Cameron - Creole
	Big Pasture Area*	Pumpkin Ridge*
	Big Burn Area*	Hog Bayou
		Rockefeller Refuge
		Big Burn Area*

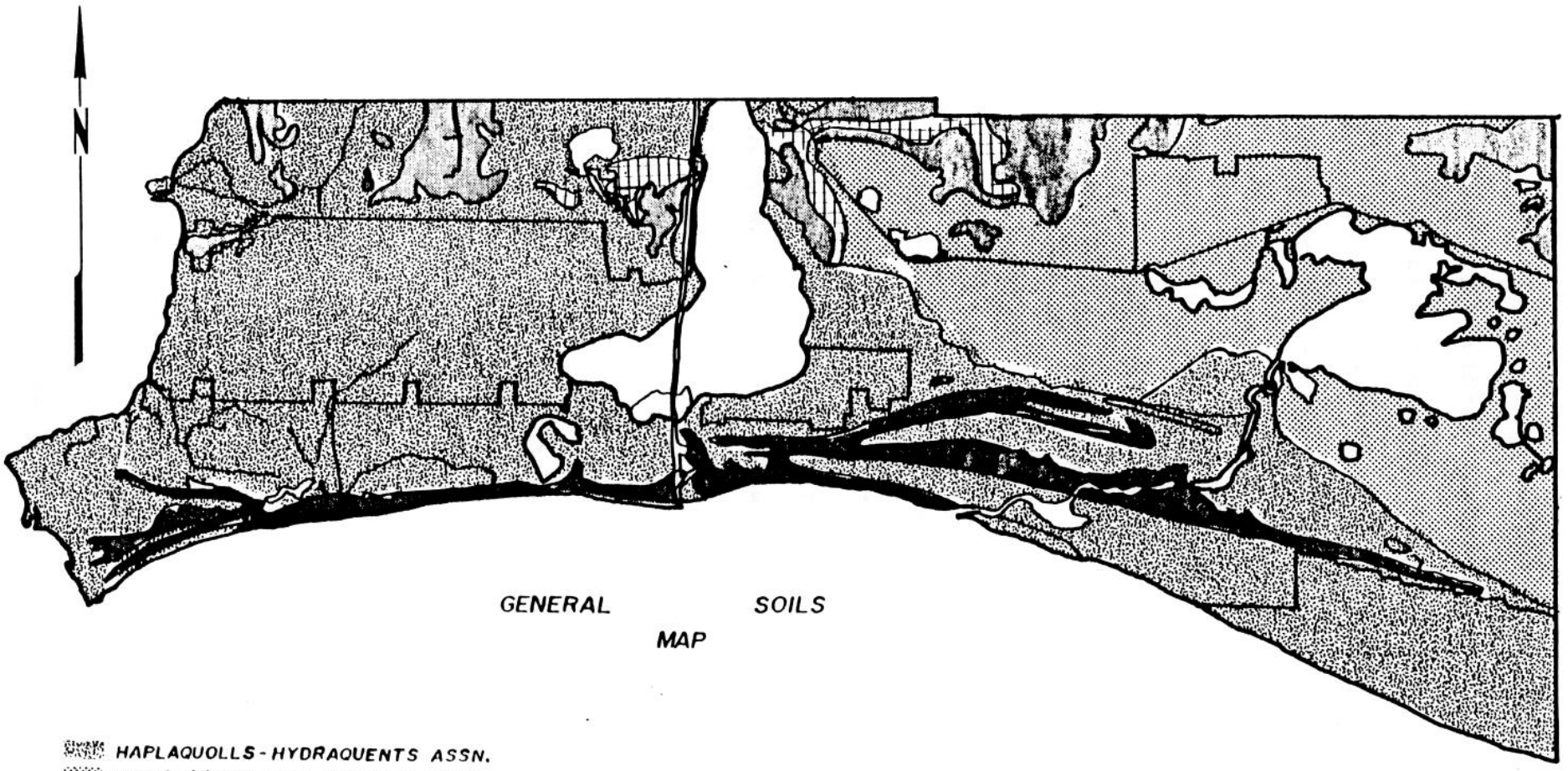
*Study units lying in more than one zone.

SOILS

There are five basic soil associations present in Cameron Parish. The Haplaquolls-Hydraquents Association covers 58% of the total square miles of the parish. It is mostly in southern and western portions of the parish that are at or near sea level. The association is a mineral and organic saltwater marsh land. Cattle ranging and wildlife habitat are the main uses of this land. Fifty percent of the association is composed of Harris soils that are in the higher elevations, and 45% is saltwater marsh at the lowest elevation. The Harris soil has a dark gray clay surface, and the saltwater marsh has a soft organic and mineral mud surface. Both have a gray clay subsoil.

Twenty-two and eight-tenths percent of the total area of Cameron Parish has a Medaprists-Haplaquolls Association. This soil association is found along the Intracoastal Waterway in the eastern part of the parish. The mineral and organic freshwater marsh land is flooded with freshwater in many places. The principal land use of the drained areas is as rice cropland, and of the undrained areas as a wildlife habitat. Seventy-five percent of the Medaprists-Haplaquolls Association is made up of freshwater marsh and peat soils, and 10% is Harris soils (undrained). Another 10% is composed of Harris soil, drained phase. Freshwater marsh has an organic surface; Harris soils (undrained) has a dark gray clay surface; and Harris Soils (drained phase) has a black clay surface. The subsoil is gray clay under all three. The other 5% of the association is Beaumont, Morey, and Mowata soils.

FIGURE 7



SOURCE : IMCAL 1976

The Morey-Beaumont Association of nearly level clayey and silty soils makes up 9.4% of the total square miles in Cameron Parish. These soils are on the prairie in the northern part of the parish, with cropland for rice as the major land use. Seventy percent of the association is composed of morey soils with a dark gray silt loam surface and a gray silty clay loam subsoil. Beaumont soils with a dark gray clay surface and a gray clay subsoil, and the other 15% is Crowley, Mowata, and Harris soils. Six and the nine-tenths percent of the total square miles of the parish is covered by the Udipsamments-Haplaquolls Association with clayey and sandy soils on low narrow ridges. The land use of this area in the southern part of the parish is range, pasture, and homesites. Sixty percent of the association is poorly drained Harris soil, that has a very dark gray surface and a gray sandy or clayey subsoil. Palm Beach soils with dark brown sand surface and a brown sandy subsoil with sea shell fragments, are about 20% of the association. Several other soils compose the remaining 20% of the association.

The association that covers the least amount of square miles is the Crowley-Morey-Mowata, that has nearly level silty soils with clayey and silty subsoils. This soil association is in the northern part of the parish, and cropland with rice as the principal crop is the major land use. Forty-five percent of the association is Crowley soils, with a surface of very dark grayish-brown silt loam, and a subsoil of gray silty clay. The Morey soils, with a very dark silt loam surface and a gray silty clay loam subsoil, composes some 25% of the association. Twenty percent of the association is the Mowata soils, with surface of gray

silt loam and subsoil of gray heavy silty clay loam. The last 10% of the association consists of Beaumont soils.[7] Figure 7 is a map showing the various areas that the five soil associations cover.

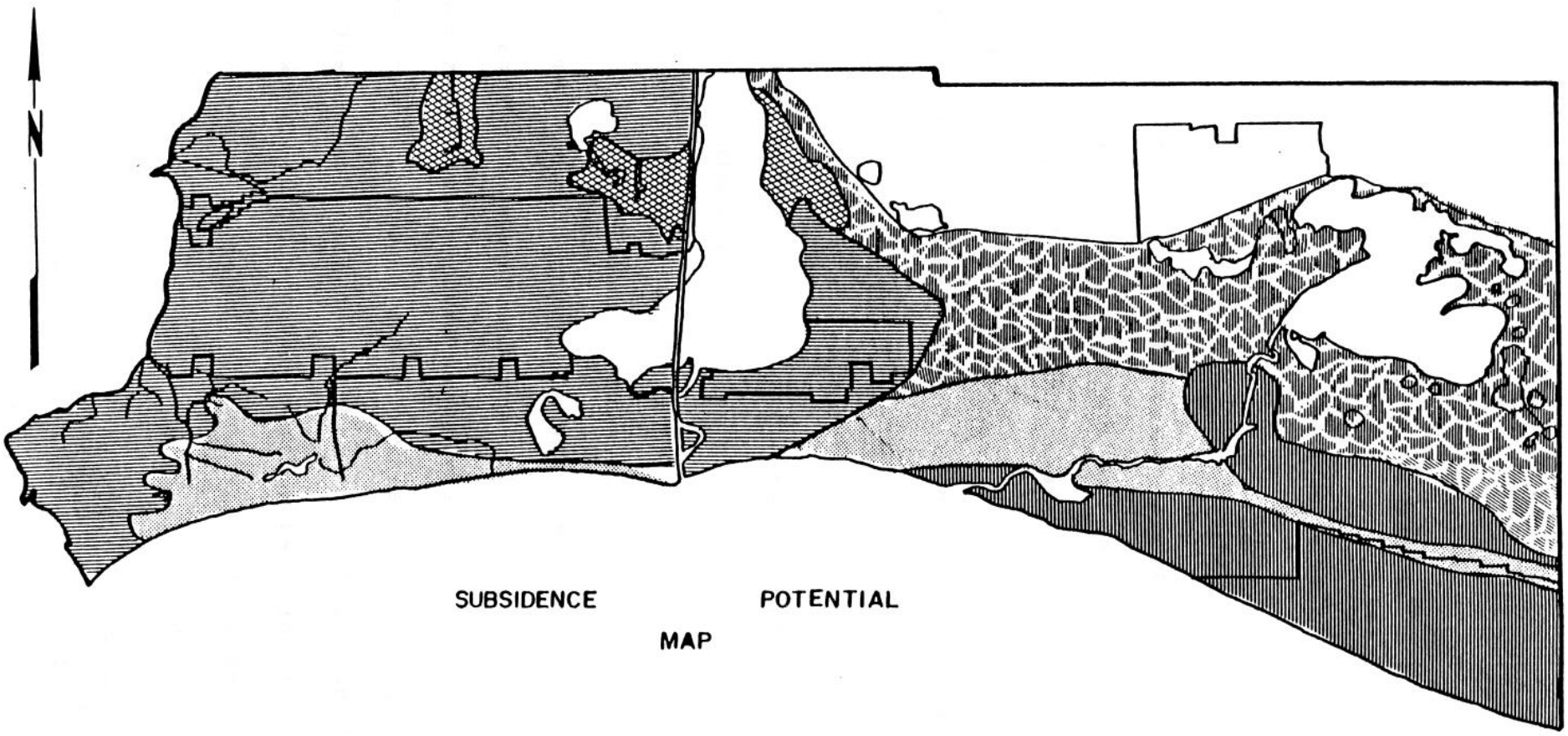
Soil Subsidence

Figure 8 is a map that illustrates the soil subsidence potential in Cameron Parish. An organic or semi-fluid mineral layer soil has a potential surface elevation loss, after it is artificially drained and dried. This is referred to as subsidence potential. Subsidence of soils can be a hindrance on construction of buildings. This can be reduced by maintaining water levels at the surface and by maintaining the water level as high as possible for the land use.

The potentiality of subsidence grows greater as the organic layers thicken. It ranges from zero, on firm mineral soils, to more than 5' on some organic soils. There are 5 classes of subsidence. There are some soils with no subsidence potential. These are mineral soils that contain no organic or semi-fluid mineral layers. Soils with low subsidence potential range from 0" to 3", if drained. These mineral soils have firm subsoils and thin mucky or semi-fluid clayey surface layers. The majority of Cameron Parish has soils with moderate subsidence potential ranging from 3" to 16", if drained. These soils contain thick semi-fluid mineral layers and soils that contain organic layers with a total thickness of less than 16".

[7] Soil Conservation Service, General Soil Map, Cameron Parish, U. S. Department of Agriculture, Alexandria, Louisiana, November, 1971.

FIGURE 8



SOURCE: BURK and ASSOCIATES COASTAL RESOURCES MAP 1978

There is also quite a bit of area in Cameron that has soils with high subsidence potential ranging from 16" to 51", if drained. These soils have organic layers with a thickness ranging from 1" to 51". There are some soils in Cameron Parish with very high subsidence potential. These soils have organic layers greater than 51".[8]

Land Loss Potential

Land loss is caused by a number of factors in Cameron Parish. Among these are erosion, subsidence, saltwater intrusion, and tidal action or eustatic rise in sea level. Erosion is most prevalent in two categories: beach erosion and erosion at natural or man-made waterways. Beach erosion is the result of tidal action and the lack of resedimentation due to the current route of the Mississippi River. Each year, more and more coastal acreage is lost to the Gulf through tropical storms and the natural forces of the Gulf.

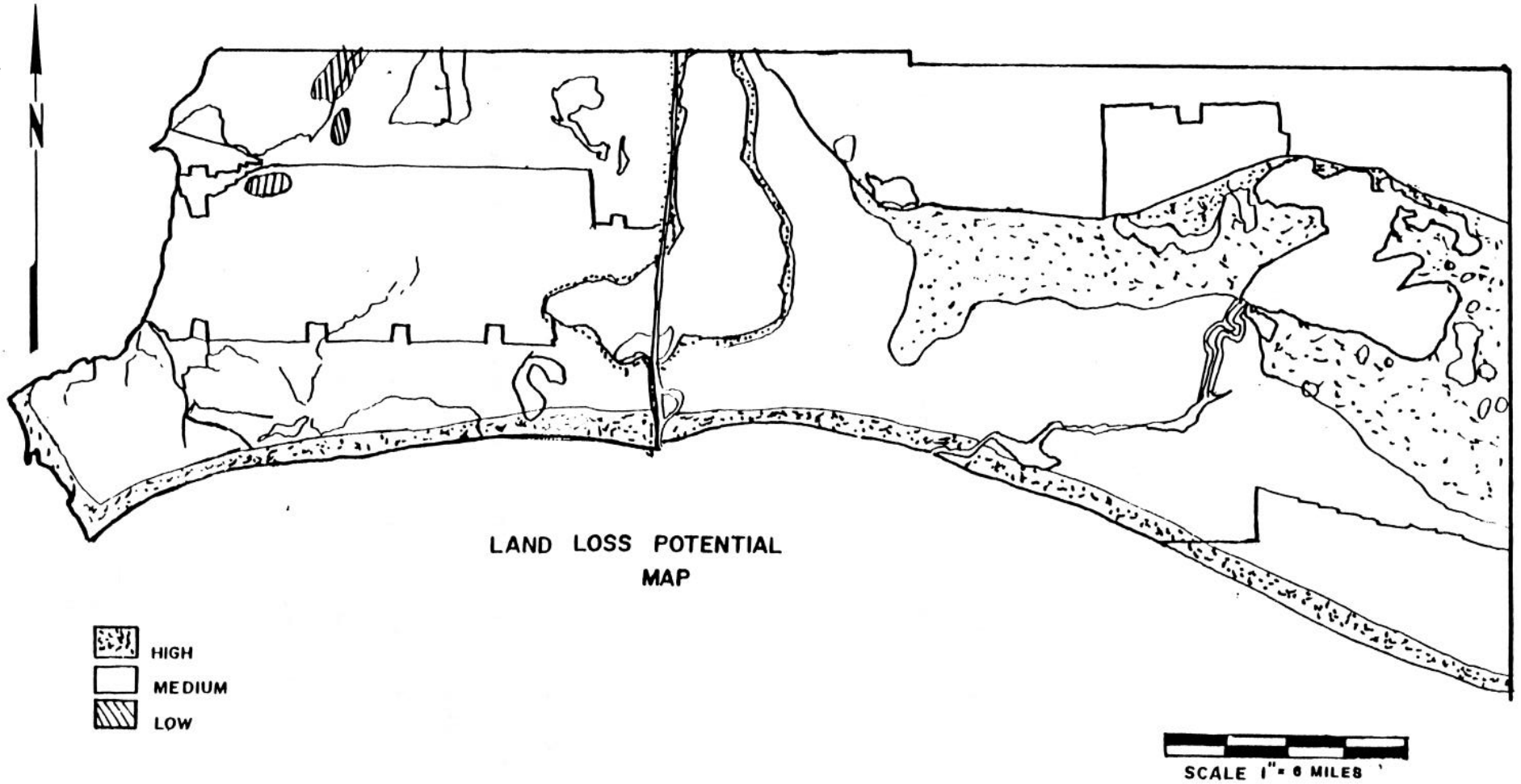
Flooding is a natural but constant event in Cameron Parish, which has such a low terrain. This fact, combined with the level of saltwater intrusion which occurs, increases erosion along rivers, channels, canals, and other bodies.

Subsidence also contributes to the loss of coastal wetlands by subjecting land areas and marsh vegetation to saltwater intrusion and tidal action on inland waterways.

The soils that are moderately susceptible to land loss if disturbed for channel construction are those that contain moderate

[8]Louisiana Coastal Resources Program, Soil Subsidence, Cameron Parish, Louisiana State Planning Office, Baton Rouge, Louisiana, June, 1976.

FIGURE 9



SOURCE: BURK and ASSOCIATES COASTAL RESOURCES MAP 1978

amounts of organic matter, semi-fluid clays, sands, and loamy sands. Some soils are slightly susceptible to land loss if disturbed for channel construction, because of the properties they contain.[9]

[9]Louisiana Coastal Resources Program, Land Loss Potential, Cameron Parish, Louisiana State Planning Office, Baton Rouge, Louisiana, June, 1976.

VEGETATION

The topographical make-up of Cameron Parish is largely responsible for its vegetation. Vegetative types in Cameron Parish are both diverse and numerous. These types include Mixed Upland Pine and Hardwood Forest, Natural Levee Forest, Chenier Oak Forest, Cypress-Tupelo Gum Swamp, and Fresh, Intermediate, Brackish, and Saline Marshes. Each type is discussed below.

The Mixed Upland Pine and Hardwood Forest Association is located in the northern one-third of the parish. The vegetative types indigenous to the association are located on terrace lands about five feet in elevation. Upland vegetation such as pine (*Pinus* sp.) and oak (*Quercus* sp.) is characteristic of this area.

Natural Levee Forest occur on natural levees formed by deltaic sedimentation. These ridges mark active and abandoned river distributaries of various courses of the Mississippi and Atchafalya Rivers. Native woody vegetation of the alluvial ridges is live oak (*Quercus virginiana*) and other bottomland hardwoods. Most of these hardwoods have been cleared and replaced with crop land and urban areas. The remaining bottomland hardwoods are located primarily on the flanks and distal ends of alluvial ridges.

The Chenier Oak Forest Association is located along existing cheniers, salt domes, shell middens, and spoil areas. The cheniers are ancient Gulf beach ridges composed of sand and shell fragements. They lie in linear bands parallel to the Gulf. The

TABLE 2

MARSH TYPES AND TYPICAL VEGETATION FOR EACH

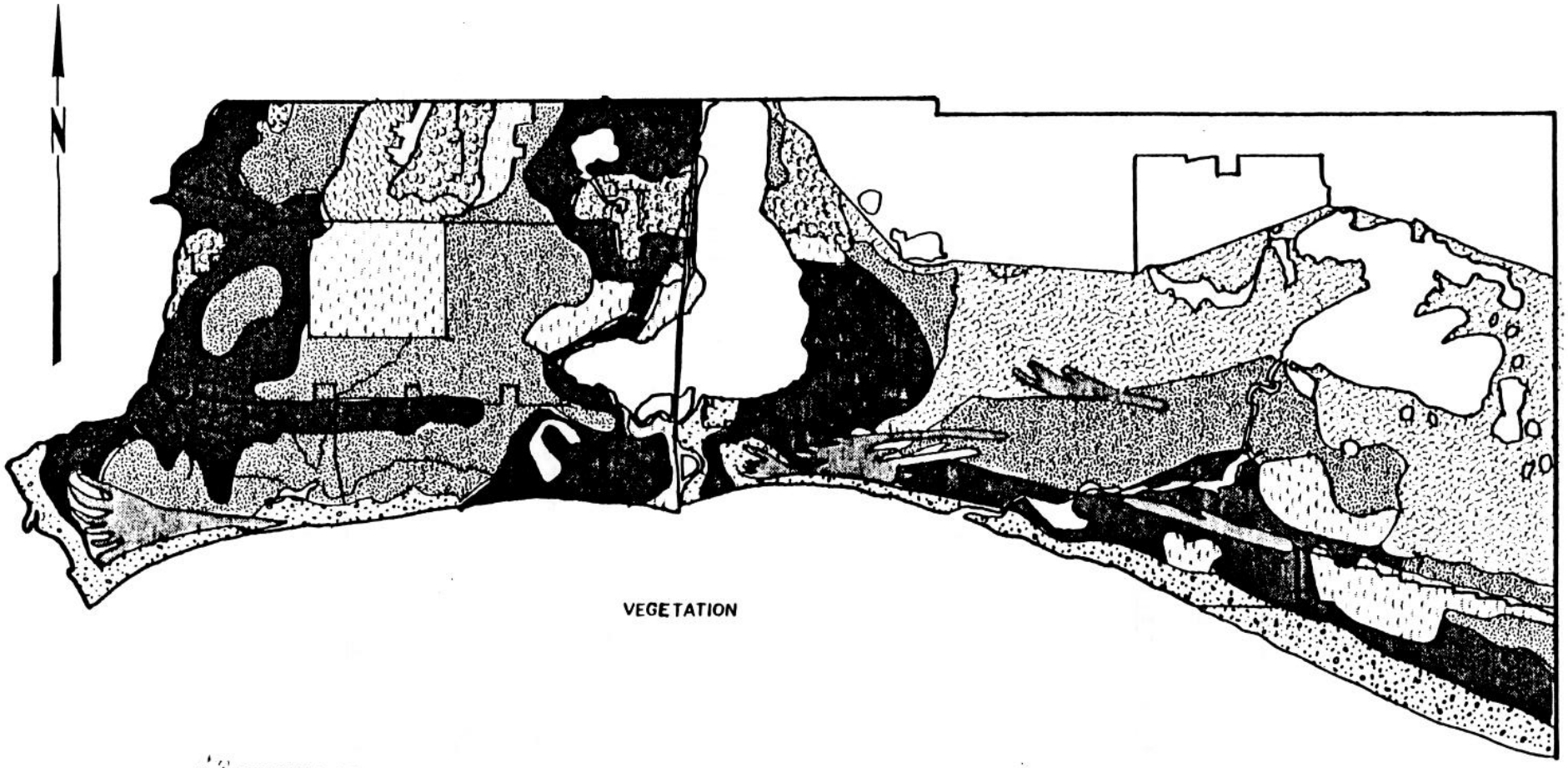
Fresh Marshes - Typical vegetation is maiden cane (Panicum hemitomon), Hydrocotyl sp., water hyacinth (Eichhornia crassipes), pickerelweed (Pontederia cordata), alligatorweed (Alternanthera philoxeroides), and bulltongue (Sagittaria sp.).

Intermediate Marshes - Marshes of low salinity have typical vegetation consisting of wiregrass, deer pea (Vigna repens), bulltongue, wild millet (Echinochloa walteria), bullwhip (Scirpus californicus), and sawgrass (Cladium jamaicense).

Brackish Marshes - Marshes of moderate salinity have typical vegetation consisting of wiregrass (Spartina patens), three-cornered grass (Scirpus olneyi), coco (Scirpus robustus), and widgeongrass (Ruppia maritima).

Saline Marshes - Typical vegetation is oystergrass (Spartina alterniflora), Salicorni sp., black rush (Juncus roemerianus), Batis maritima, black mangrove (Avicennia nitida), and saltgrass (Distichlis spicata).

FIGURE 10



SOURCE: E and CIA COAS RES ES 1978

chenier ridges are dominated by live oak, with other species occurring such as pecan (Carya illinoensis), hackberry (Celtis laevigata), and haws (Crategus sp.). Understory vegetation in this association includes palmetto (Sabal minor), rattlebox (Daubentonia sp.), smartweed (Polygonum hydropiperoides), buttercup (Ranuncubus sp.), and wiregrass (Spartina patens).

Although few forested wetlands (Cypress-Tupelo Gum Association) occur in the parish, there are isolated patches which exist. Bald cypress (Taxodium distichum) and tupelo-gum (Nyssa aquatica) are the predominant overstory vegetation, with black willow (Salix nigra), cottonwood (Populus deltoides), american elm (Ulmus americana), ash (Fraximus sp.), and oak (Quercus sp.) also occurring.

The non-forested wetlands (marsh) of Cameron Parish are dominated by the grass-rush-sedge community. Due to the combined inter action of elevation, water depth, and increasing salinity, the four marsh types exist in arcuate belts proceeding toward the coast. Transitional areas exist due to the gradual blending of marsh vegetation between zones. These four marsh types are given on the following page.

Fresh marshes occur in the northern section of Cameron Parish. These marshes contain little or no measurable saltwater. Typical vegetation found in these marshes are: maidencane (Panicum hemitmon), water hycanith (Eichhornia crassipes), pennywort (Hydrocotyl sp.), pickerelweed (Pontederia cordata), alligatorweed (Alternanthera philoxeroides), cattail (Typha latifolia), and bulltongue (Sagittaria sp.).

Intermediate marshes occur in bands between fresh and brackish marshes. Salt content in these marshes is generally between one to five ppt (parts per thousand). Typical vegetation in these areas consit of wiregrass (Spartina patens), deer pea (Vigna repens), bulltongue, wild millet (Echinochloa walteria), bullwhip (Scirpus californicus), and sawgrass (Cladium jamaicense).

Vegetation of the brackish marshes consist mainly of wiregrass, three-cornered grass (Scirpus olneyi), coco (Scirpus robustus), saltgrass (Distichlis spicata), and black rush (Jancus roemerianus). Brackish marshes have a salinity of one to thirteen ppt and are generally located slightly to the north of saline marshes and along major waterways connected by the Gulf.

Saline marshes are located along the Gulf and many inland lakes. Salinities range between thirteen and thirty ppt. The typical vegetation found in the marshes consist of: oystergrass (Spartina alterniflora), glasswort (Salicornia sp.), black rush, saltgrass, saltwort (Batis maritina), and black mangrove (Avicennia nitidas).

The last vegetative area found in Cameron Parish is modified wetlands. These are areas that have been leveed, ditched, filled, or drained for urbanization, flood protection, navigation, farming, mining, spoil disposal, or waterfowl management purposes. The natural wetland processes no longer occur in this area. There are several degrees of modification. They may be completely drained, partially drained, only slightly modified, or flooded and impounded.

ZOOLOGICAL FEATURES

The parish abounds with a wide variety of fauna. Of particular importance are the millions of migratory waterfowl and numerous furbearing mammals. Also important are the fish, shellfish, and many invertebrates.

There are many mammals in the parish. These include: nutria, muskrats, raccoon, North American mink, Neartic river otter, striped skunk, red fox, gray fox, gray squirrel, fox squirrel, eastern cottontail rabbit, swamp rabbit, whitetailed deer, harvest mouse, marsh rice rat, hispid cotton rat, roof rat, least shrew, evening bat, oppossum, southern flying squirrel, spotted dolphin (protected species), Atlantic bottle-nosed dolphin (protected species), armadillo, and coyote.

Birds also make up an important part of the animals of this area. These include: mottled duck, blue-winged teal, clapper rail, king rail, wood duck, bobwhite, mourning dove, snipe, woodcock, mallard, pintail, green-winged teal, gadwall, fulvous tree duck, canvasback, red-head, greater and lesser scaup snow geese, shoveler, widgeon, egret, cormorant, gull, tern, sandpiper, plover, woodpecker (some on endangered list), bluejay, warbler (some on endangered list), hawk, thrush, owl, vulture, grackle, crow, wren, sparrow, heron, ibis, bittern, vireo, passerine bird, shorebird, falcon, osprey, and kite.[10]

[10] United States Army Corps of Engineers, EIS-Calcasieu River and Pass (Including Saltwater Barrier); Coon Island; Devils Elbow; Calcasieu River Basin, Louisiana: Continued Operations and Maintenance, United States Army Engineer District, New Orleans, Louisiana, October 1976, Pages II-46 - II-58.

Ducks do not blanket the entire coastal area, but tend to concentrate in areas with preferred foods and proper water levels. Fresh and intermediate marshes, one to six inches deep, produce the prime habitat conditions. Wild millet, smart weed, cyperus, three-cornered grass, wild rice, delta duck potato, bulrush, spikerush, pondweeds, and wild celery are found in fresh and low-salinity marshes, and are the perferred waterfowl foods. Saline marshes attract diving ducks such as lesser scaup, redheads, and canvasbacks. Duck populations are greater in southwest Louisiana, and the locations in Cameron attracting peak duck concentrations are: Black Bayou area, Johnson Bayou area, Sabine Refuge, Lacassine Refuge, Grand Chenier to Grand Lake area, and Rockefeller Refuge.

The primary goose concentrations are located on and around Lacassine National Refuge. A resident flock of protected Canada Geese is presently established there. Other concentrations of geese, such as the white-fronted geese, winter in rice fields along the Intracoastal Waterway; and the blue and lesser snow geese reside near Johnson Bayou and Sabine Refuge.

Seabirds (represented by gulls, terns, black skimmers, and willets) and wading birds (illustrated by herons, egrets, ibises, and anhingas) utilize Louisiana Coastal wetlands heavily for nesting.

Also of importance in this parish is a unique bird, the Roseate Spoonbill, found in southwest Louisiana prairie marshes. The bird is pink and white in color, with a spoon-shaped bill and long legs. The only confirmed nesting sites in Louisiana are on Rabbit Island in Calcasieu Lake (where ten breeding pairs were noted in 1975) and Lacassine Refuge. Louisiana colonies are the northernmost for this

species. They do not migrate, but remain in the southwest marshes year round. Although they are classified as uncommon in the Sabine Refuge, on the 1972 Christmas Bird Count, 252 birds are listed.[11]

Reptiles and amphibians are also abundant in the area. These include: American alligator (threatened similarily of appearance-species in this area), diamond back terrapin, snapping and mud turtles, water snake, terrestrial salamander and aquatic salamanders (water dog, western lesser siren, three-toed amphiuma, small-mouthed), Hurter's spade-foot toad, tree frog, peeper, chorus frog, bull frog, green tree frog, leopard frog, pond slider, rattlesnake, cottonmouth, copperhead, western ribbon snake, red-bellied snake, eastern hognose snake, ringnecked snake, brown snake, common garter snake, racer, coachwhip, rough green snake, rat snake, common kingsnake, mild snake, eastern coral snake, and sea turtles (endangered species).

Another animal group in the area is the insect, many of which are aquatic. This group includes the mosquito, dragon fly, damsel fly, grasshopper, bee, wasp, ant, bettle, butterfly, moth, and important aquatic varieties of diptera, collembola, hemiptera, and orthoptera.

Zooplankton is an important food for many aquatic organisms. These include calonoid and cyclopid copepods, of which Acartia tonsa is the most abundant. There are freshwater cladocerans: these are Daphnia, Monia, Diaphanosoma, and Ceridaphnia.

Other animals of importance to the area are the crustaceans, mollusks, and other benthic organisims. These include: blue crab,

[11] Louisiana Coastal Resources Program, Unique Ecological Features of the Louisiana Coast, State Planning Office, Baton Rouge, Louisiana, March, 1977.

brown and white shrimp, sergestid shrimp, mysid, bivalve, polychaete worm, amphipod, xanthid crab, sponge, bryozoans, gastropod mollusk, oyster, mantis shrimp, grass shrimp, squid, seabob, net clinger, fiddler crab, mud crab, hermit crab, marsh periwinkle, olive neresis, ribbed mussel, and the coffee melampus.[12]

In Lower Calcasieu Lake, there are public oyster grounds where the state has planted clutch material (generally clam shells) as a supplement for the production of seed oysters. All oysters produced on these seed grounds are for the use and benefit of the oyster industry and are available to the public.[13]

The fish that are important to the area include: menhaden, croaker, spot, sea trout, drum, flounder, kingfish, catfish, buffalo, bass, freshwater drum, bowfin, carp, garfish, green sunfish, warmouth, bluegull, longear sunfish, redear sunfish, large mouth bass, white and black crappies, sheepshead, spade fish, redfish, and gaftop tail fish.[14]

Primary fish, as well as shellfish, have nursery grounds that are shallow estuarine marshes and adjacent shallow water areas.

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[12] United States Army Corps of Engineers, EIS-Calcasieu River and Pass (Including Saltwater Barrier); Coon Island; Devil's Elbow; Calcasieu River Basin, Louisiana: Continued Operation and Maintenance, U. S. Army Engineer District, New Orleans, La., October, 1976, Pages 11-46 - 11-58.

[13] Louisiana Coastal Resources Program, Unique Ecologocal Features of the Louisiana Coast, State Planning Office, Baton Rouge, La., March, 1977.

[14] United States Army Corps of Engineers, EIS-Calcasieu River and Pass (Including Saltwater Barrier); Coon Island; Devil's Elbow; Calcasieu River Basin, Louisiana: Continued Operation and Maintenance, U. S. Army Engineer District, New Orleans, La., October, 1976, Pages 11-46 - 11-58.

These areas are vital to the juvenile stages of estuarine dependent fish and shellfish. In the southwestern part of the state, the nursery grounds are confined to the narrow land between Chenier au Tigre and Calcasieu Pass, and around Calcasieu and Sabine Lakes.[15]

The predominant wildlife and fisheries located with each study unit are listed on the following table.

[15]Louisiana Coastal Resources Program, Unique Ecological Features of the Louisiana Coast, State Planning Office, Baton Rouge, La., March, 1977.

TABLE 5

PREDOMINANT WILDLIFE WITHIN EACH

STUDY UNIT

Johnson's Bayou	- oppossum, deer, rabbit, raccoon, muskrat, alligator, mourning and white-wing dove, otter, and nutria
Cameron Meadows	- nutria, blue and snow geese, and duck
Blue Buck Ridge	- raccoon, muskrat, otter, nutria, and blue snow geese
Sabine Refuge	- deer, alligator, geese, duck, and red wolf
Black Bayou	- muskrat, nutria, duck, alligator, and geese
West Black Lake	- deer, blue and snow geese, duck, muskrat, and alligator
Calcasieu Lake	- none listed
Hackberry	- none listed
West Cove	- muskrat and nutria
Holly Beach	- rabbit, mourning and white-wing dove, and duck
Cameron - Creole	- deer, rabbit, alligator, geese, and duck
Calcasieu River	- none listed
Grand Lake Ridge	- deer, alligator, geese, and duck
Big Pasture Area	- geese and duck
Pumpkin Ridge	- geese and duck
Hog Bayou	- none listed
Grand Lake	- none listed
Rockefeller Refuge	- deer, rabbit, alligator, nutria, and duck
Big Burn Area	- deer, rabbit, alligator, nutria, geese, and duck

SOURCE: Ted Joanen, Research Leader, Refuge Division, Louisiana Wildlife and Fisheries Commission, December, 1977.

ACREAGE

Cameron Parish covers a total of 1,047,512 square acres, according the the State Planning Office and the U. S. Geological Survey. This represents the largest overall parish in the state (land and water areas) and the third largest in terms of total land area.

Of the 1,047,512 acres in the parish, approximately 500,000 acres (or 41%) of the parish is marshland.[1] Another 354,880 acres (or 29%) is water area (including lakes, rivers, and coastal waters inside the three-mile limit).[2]

Agricultural land accounts for 270,000 acres in the parish, and transportation land use represents 2,300 acres.[3] Other land uses account for an estimated 4,618 (or 3.7%), composed of built-up land in the parish.[4] This leaves approximately 87,000 acres, which are unaccounted for and represents about 7% of the acreage to which no land use is assigned.

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[1] Paul Coriel, LSU Extension Service.

[2] State Planning Bulletin, Spring, 1981, Volumn 9, No. 1.

[3] Cameron Coastal Zone Management Report, 1978.

[4] IMCAL, Future Land Use Plan for 1980.

HISTORICAL AND CULTURAL

As a parish within the coastal zone, Cameron is unique for many reasons. One is the richness of its historical and cultural background. Historically, the parish is filled with relics of ancient civilizations, including 79 known shell middens and 53 probable shell middens. There are also seven prehistoric Indian mounds.

Recently, a 17th Century Spanish galleon filled with various relics was discovered off the coast of Grand Chenier, indicating the importance of the area as a trade route for early American settlers. Tales of pirate treasures buried by John LaFitte are still commonly told by older citizens of Cameron Parish.

Most of the ancestors of the present day residents of Cameron Parish were drawn to this area by the rich fur trapping, cattle grazing, farming, and commercial fishing resources. The oil and gas exploration boom of the 1950's and 1970's also provided the incentive for a tremendous population influx, which is still occurring today.

Today, Cameron Parish is one of the top two cattle producing parishes in Louisiana, and the Port of Cameron has been the number one fishing port in the United States for the past seven years. Cameron Parish has also been among Louisiana's leading oil and gas producing parishes.

The rich fisheries and wildlife resources in Cameron Parish have provided tremendous recreational opportunities for both hunters and fishermen. Waterfoul hunting is excellent throughout the parish, and saltwater fishing for redfish, speckled trout,

and flounder and freshwater fishing for bass, white perch, and bluegill provides excellent recreational opportunities. Where the Calcasieu Ship Channel enters the Gulf of Mexico, a large rock jetty has been constructed that provides tremendous scenic and recreational fishing opportunities for the general public.

Culturally, Cameron Parish is the site of two important annual celebrations. The Louisiana Fur and Wildlife Festival, which is held each year in Cameron on the second weekend in January. During this festival, the parish honors important natural resources that have provided a livelihood to its residents. The Cameron Parish Deep-Sea Fishing Rodeo is held each year on the weekend nearest to the 4th of July. The Fishing Rodeo's headquarters is located at the Grand Chenier State Park and many saltwater anglers from throughout Southwest Louisiana participate.

Figure 11 depicts the important historical and cultural sites within the parish.

Sabine Wildlife Migratory Refuge

The U. S. Fish and Wildlife Service administers the Sabine Wildlife Refuge, which covers almost 143,000 acres.[7] The refuge is located in the southwestern corner of Cameron Parish and has a very flat terrain. There are approximately 34,000 surface acres of water divided into three major impoundments.[8]

The refuge was established in 1937, so that wintering snow geese and ducks, the American alligator, fur animals, the roseate spoonbill, and many others might have food and shelter. The refuge serves as a resting place for migratory waterfowl in both the Mississippi and Central Flyways, but primarily the Mississippi Flyway. Management procedures of Sabine Refuge include marsh burning, grazing, and water level manipulation. Burning and grazing help promote new green growth, and waterfowl plant food production is increased through control of the water level.

These coastal marshes in southwest Louisiana were once famous for their fur production. However, canals dug throughout the area for easier access to the fur-producing areas resulted in a drainage of freshwater and intrusion of saltwater. This caused a drastic reduction in the productivity of marshes. Although the

[7]Louisiana State Parks and Recreational Commission, Outdoor Recreation in Louisiana, 1975-1980, Baton Rouge, La., June, 1974, Pages 3.6 - 9.8.

[8]Gus Stacy, III, Food Habits of Bowfin, (Amia calva), On Lacassine National Wildlife Refuge and Other Locations in Southern Louisiana, Louisiana Wildlife and Fisheries Commission, Baton Rouge, La., 1967.

management is striving to overcome this damage, the marshes may never regain that level of productivity.

Mammals on the refuge that are trapped for their furs are nutria, mink, muskrat, otter, and raccoon. Skunks, armadillos, whitetail deer, red and gray foxes, and numerous small rodents are a few of the mammals common to the refuge. The red wolf is also considered to be a refuge mammal. The alligator can be commonly observed at the refuge.[9]

Sabine Refuge is very important as a habitat for numerous wading birds. Two-hundred and fifty species of birds are listed as being observed by refuge personnel and other ornithologists. There are an additional 28 species listed as very rarely seen on the refuge.[10]

The area is mostly devoid of vegetation, due to a saltwater invasion caused by Hurricane Audrey. Before 1957, the dominant vegetation in this area was sawgrass. Other vegetation is found in the almost 34,000 surface acres of water. Several common emergents in the impoundments are wiregrass, Olney's three-square, alligatorweed, bulltongue, and bullwhip. Common submerged plants are the bladderwort and coontail.

Thirty-one species of fish were found in the impoundments at Sabine Refuge. Some of these were the largemouth black bass,

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[9]Fish and Wildlife Service, Sabine National Wildlife Refuge, U. S. Department of the Interior, 1977.

[10]Fish and Wildlife Service, Birds of Sabine National Wildlife Refuge, U. S. Department of the Interior, June, 1977.

bluegill, red-ear sunfish, blue catfish, and carp. Flounder, gar, buffalo, and mullet are also in this area.[11]

Crabbing for blue crabs is a frequent activity on the refuge. Another popular recreation on the refuge is waterfowl hunting. A nature trail that is one-mile long is open to the public year-round, and provides a better insight into the marshes.[12]

Lacassine National Wildlife Refuge

Some 31,000 acres compose the Lacassine National Wildlife Refuge. The refuge is under the federal sponsorship of the U. S. Fish and Wildlife Service.[13] Twenty-two thousand nine hundred ninety one (22,991) acres of land, which was acquired by the Resettlement Administration, were established as the Lacassine Migratory Waterfowl Refuge in 1937. The Six Million Fund, the Resettlement Administration, and the Migratory Bird Fund contributed to further purchases and leases of land. In 1940, the refuge was renamed as the Lacassine National Wildlife Refuge by a Presidential Proclamation.[14]

Lacassine National Wildlife Refuge was established to provide a haven primarily for waterfowl and other migratory birds, but it

[11] Gus Stacy, III, Food Habits of Bowfin (Amia calva) On Lacassine National Wildlife Refuge and Other Locations in Southern Louisiana, Louisiana Wildlife and Fisheries Commission, Baton Rouge, La., 1967.

[12] Fish and Wildlife Service, Birds of Sabine National Wildlife Refuge, United States Department of the Interior, 1977.

[13] Louisiana State Parks and Recreation Commission, Outdoor Recreation in Louisiana, 1975-1980, Baton Rouge, La., June, 1974, Pages 3.6 - 9.8.

[14] United States Department of the Interior, Lacassine Wilderness Proposal, Lacassine National Wildlife Refuge, Atlanta, Georgia, (no date).

also benefits many other wildlife inhabitants. Limited recreational and educational activities that are wildlife-oriented are available at the refuge.[15] A supply of vegetation to attract waterfowl has been achieved by burning, selective spraying, and manipulation of water levels. Lacassine Refuge has the largest concentration of white-fronted geese in the Mississippi Flyway. A nesting colony of cattle egrets in the refuge was the first one found in the United States, outside of Florida. There are 203 species of birds listed as having been sighted on Lacassine Refuge. An additional 26 species are seen very rarely on the refuge. The refuge also supports such wildlife as alligators, armadillos, bobcats, minks, muskrats, rabbits, raccoons, and others.[16]

After the sawgrass die-off in 1957, which resulted from Hurricane Audrey, maidencane and bulltongue became the dominant vegetation on Lacassine Refuge. Water tolerant grasses, sedges, and shrubs are the basic vegetative types on the refuge. The Lacassine Pool, a 16,000 acre impoundment pool formed by levees, has such vegetative types as bulltongue, maidencane, watershield, waterlily, spikerush, and southern bullrush. The pool also supports 28 species of fish. Limited fishing is permitted, and this is the foremost reason people visit the refuge.[17]

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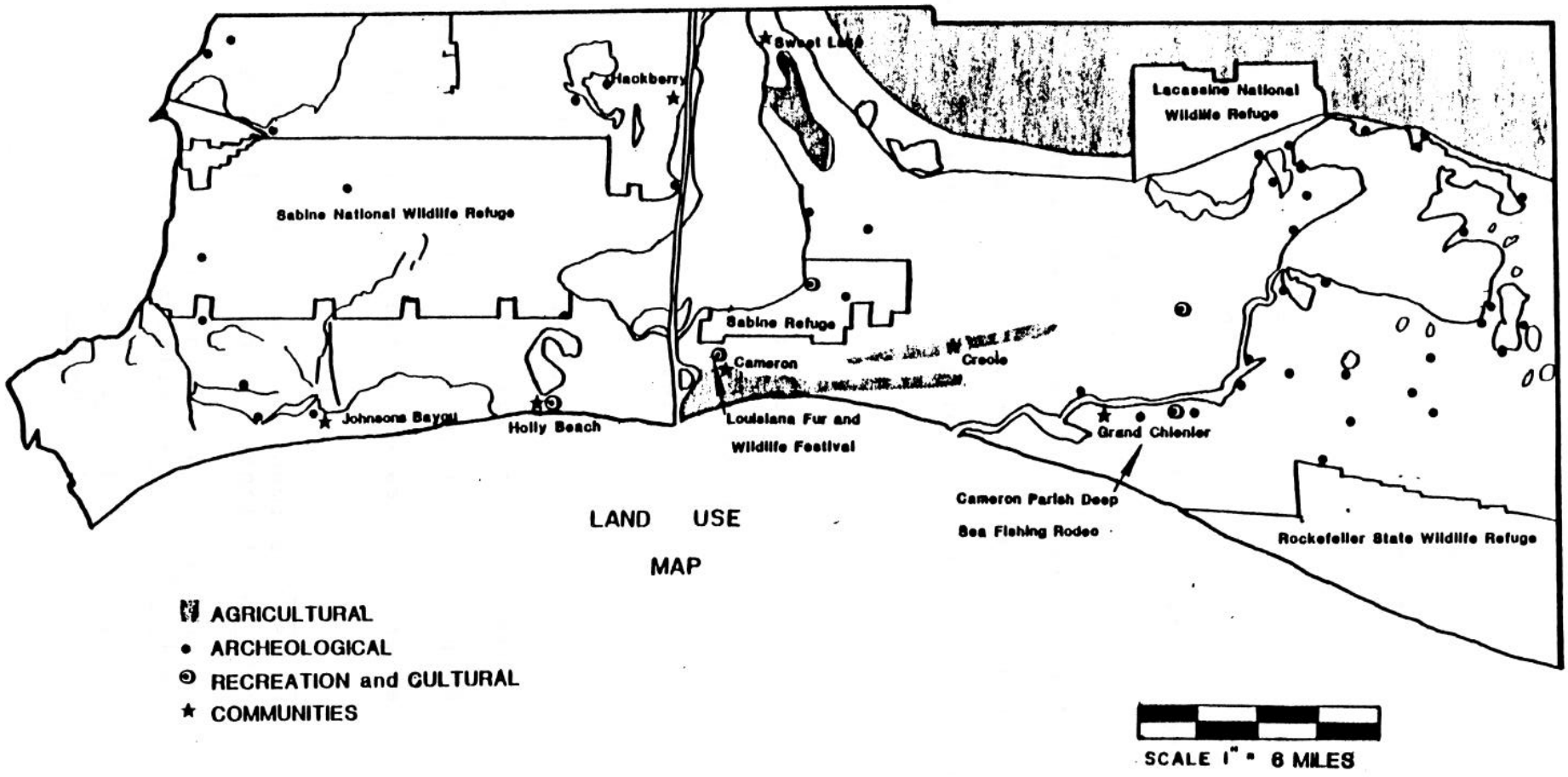
[15] United States Department of the Interior, Lacassine National Wildlife Refuge, Atlanta, Georgia, April, 1976.

[16] United States Department of the Interior, Birds of the Lacassine National Wildlife Refuge, Atlanta, Georgia, December, 1972.

[17] Gus Stacy, III, Food Habits of Bowfin (Amia calva) On Lacassine National Wildlife Refuge and Other Locations in Southwest Louisiana, Louisiana Wildlife and Fisheries Commission, Baton Rouge, La., 1967.

FIGURE II



SOURCE: CAMERON PARISH 1984

The waterfowl, and specifically the wintering geese, are the primary ones which management operations are to benefit. The American alligator is also a beneficiary of some management efforts. These management operations are hindered because the former owners of several tracts of land, totaling a little more than one-half the refuge acres, reserved the mineral rights to the land. The mineral rights of the rest of the land was purchased by the Federal Government. Several gas companies have permits for pipeline right-of-ways.

Lacassine Refuge is almost entirely marshland, which is normally fresh. Brackish tidal waters once intruded into the marsh, but the Mermentau River Basin project corrected that situation. Because of the marsh, most areas in the refuge can only be reached by boat. Visitors can enjoy observing the wildlife and photographing it. Waterfowl hunting is another recreation available on the refuge. The public is welcome to visit the refuge from March 1, until October 15.[18]

Rockefeller Wildlife Refuge

Rockefeller Refuge consists of 84,000 acres of marshlands that provide a wintering home for approximately 600,000 wintering waterfowl.[19] The Louisiana Department of Wildlife and Fisheries exercises management control over the Rockefeller State Wildlife Refuge, which is owned by the state of Louisiana. The public may

[18]United States Department of the Interior, Lacassine National Wildlife Refuge, Atlanta, Georgia, 1976.

[19]Louisiana Wildlife and Fisheries Commission, Wings Over Rockefeller, Baton Rouge, La., 1969, Page 3.

enjoy observing and photographing the wildlife along with recreational fishing.[20]

The Rockefeller Refuge borders the Gulf of Mexico with some 26.5 miles of shoreline and extends northward 6 miles to the Grand Chenier ridge complex. The refuge is mostly marshland with several elevated stranded beach ridges that support tree growth. It is in these wooded areas that migrant land birds find food and shelter.[21]

The land that the refuge covers was originally purchased by E. A. McIlhenny of Avery Island in 1912. Later, he sold the land to Rockefeller Foundation and urged them to turn it over to the state for at least five years. Instead, they gave complete ownership to the state of Louisiana on the stipulation to make it a refuge. Other strict regulations were also made concerning conditions of the donation. If at any time these conditions or regulations are violated, the land will revert to the Rockefeller Foundation. The donation was presented to the state of Louisiana on September 30, 1920.

Because of the unique location of Rockefeller Refuge, it is one of the most important wildlife management areas in the United States. The position of the refuge at the southern-most end of the Mississippi Flyway provides a winter home for waterfowl from northern nesting grounds, and a resting area for many birds in

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[20] Louisiana State Parks and Recreation Commission, Outdoor Recreation in Louisiana, 1975-1980, Baton Rouge, La., June, 1974.

[21] Louisiana Wildlife and Fisheries Commission, Wings Over Rockefeller, Baton Rouge, La., 1969, Page 3.

transit for a winter in Central and South America.[22] Also, in the spring it is a refuge for many birds forced down by unfavorable weather conditions. Fall migration also brings many unusual western species. All in all, 269 species of birds are listed as being sighted at the Rockefeller Wildlife Refuge.

Protection, isolation, and food are provided to a variety of shorebirds, wading birds, and other water-loving species along with the waterfowl who are the principle habitats of the refuge. The nesting population of the refuge includes mottled duck, pied-billed Grebe, black-neck stilt, killdeer, night herons, green herons, and a captive flock of Canada geese.[23]

Rockefeller Refuge also has many year-round residents, such as the nutria, muskrat, raccoon, otter, and alligator. Trapping is strictly controlled in the refuge.

Numerous ponds, potholes, and lakes with many bayous and man-made canals cover a large area of the refuge. There are also flat, treeless areas of the refuge with soils high in organic matter. Tons of waterfowl food plants are produced each year.

Intensive development programs have been conducted by the Louisiana Department of Wildlife and Fisheries with waterfowl management as the primary interest. Among the control structures constructed are the marsh impoundments and weirs, which resulted in a continued production of plant food to attract waterfowl. Since the impoundments were constructed, the bird population has risen

[22]Ted Joanen, Rockefeller Refuge-Haven for Wildlife, Louisiana Wildlife and Fisheries Commission, Baton Rouge, La., 1969.

[23]Louisiana Wildlife and Fisheries Commission, Wings Over Rockefeller, Baton Rouge, La., 1969, Page 3.

from 75,000 to 400,000. Also, 80% of the 400,000 birds use the impoundments. These structures, the headquarter buildings, and the wildlife population suffered greatly from Hurricane "Audrey" in 1957, but have since recovered.

The refuge is well staffed with a refuge supervisor, maintenance crews, and partol agents. Included in the research section are four wildlife biologists and one fisheries biologist. There are constant patrols made to protect the alligator. This refuge is one of the last retreats where large numbers of alligators reside. Patrol efforts are aimed towards the protection of the waterfowl during winter months.

Rockefeller Wildlife Refuge is open to the public for sightseeing and sport fishing from March 1, through September 30. Permits to visit the refuge may be obtained from the Refuge Office at Grand Chenier, although there are no guided tours. There are few roads in the refuge, so most travel must be done by boat. There are captive animals in a display area near the headquarters that are open year-round, and no permits are required.[24]

[24]Ted Joanen, Rockefeller Refuge-Haven for Wildlife, Louisiana Wildlife and Fisheries Commission, Baton Rouge, La., 1969.

OTHER LAND USES

Although Cameron Parish is limited in its amount of developable land, the range of land uses is consistent with that of other southern Louisiana parishes. Agriculture in Cameron Parish consists primarily of cattle and rice farming. Cattle farming takes place on the higher grounds such as the cheniers, while rice farming occurs in lowland areas which can be levied off to allow only freshwater irrigating. Although there are no farmlands of state importance in the coastal zone, agriculture is still an important land use in the parish.

Recreation has always played an important role in Louisiana and in Cameron Parish. This part of the sportsman's paradise offers a wide variety of water-related recreation. Recreational fishing, both inland and deep sea, compares with the best in the country--boating along the bayous, enjoying the ocean at Holly Beach, some of the best waterfowl hunting in the world, national wildlife refuges, and other recreational activities make tourism and recreation an import part of Cameron's economy and land use. Boat launches, parks, public beaches, and the wildlife refuges are areas of recreational land use as denoted on Figure 11.

Urban areas exist only in the small communities located sparsely in Cameron Parish. These communities are Cameron, Hackberry, Grand Chenier, Johnson's Bayou, Holly Beach, and Sweetlake. The largest of these communities is Cameron, with a population of 1,736. The amount of developable land has an influence on the size of the communities and on their potential for growth. Land uses within these

communities include residential, commercial, industrial, as well as transportation and communication. Due to the nature of oil exploration, industrial activity occurs in all parts of Cameron Parish. Overall, however, the development of land is concentrated in these communities.

SOCIO-ECONOMIC

PROFILE

The social, physical, and economic needs of Cameron Parish are somewhat unique to the southern United States, but fairly common to the coastal zone of Louisiana. Because Cameron Parish is largely covered by wetlands and because it is part of the richest estuarine and marine breeding grounds of the country, the composition of the parish and the needs of its inhabitants are in a delicate relationship with their ecosystem. The geological uniqueness of the wetland areas has an effect on all aspects of life in Cameron Parish, even playing an integral role in the culture and customs of its citizens.

The parish's low population density keeps it from suffering the intensity of problems that more urbanized areas experience. However, the predominance of wetlands also distinguishes it from a typical rural area. Parishes within the coastal zone of Louisiana have problems which typical rural and urbanized areas are seldom confronted with, and yet their importance as a limited resource of our country intensifies each problem even more.

Basically, the potential for significant growth in Cameron Parish is limited because the resources required for this growth are limited. Many times the physical needs of the parish become social and economic needs, due to the severity of the problem and its far-reaching effect. In the following section the social, physical, and economic needs of Cameron Parish will be identified and discussed. Much of the discussion will center on the views of the people who live and work in Cameron Parish everyday. It is hoped this information will better identify the needs of the

parish, the importance of its resources, and the necessity of considering these factors as the growth of the coastal zone continues.

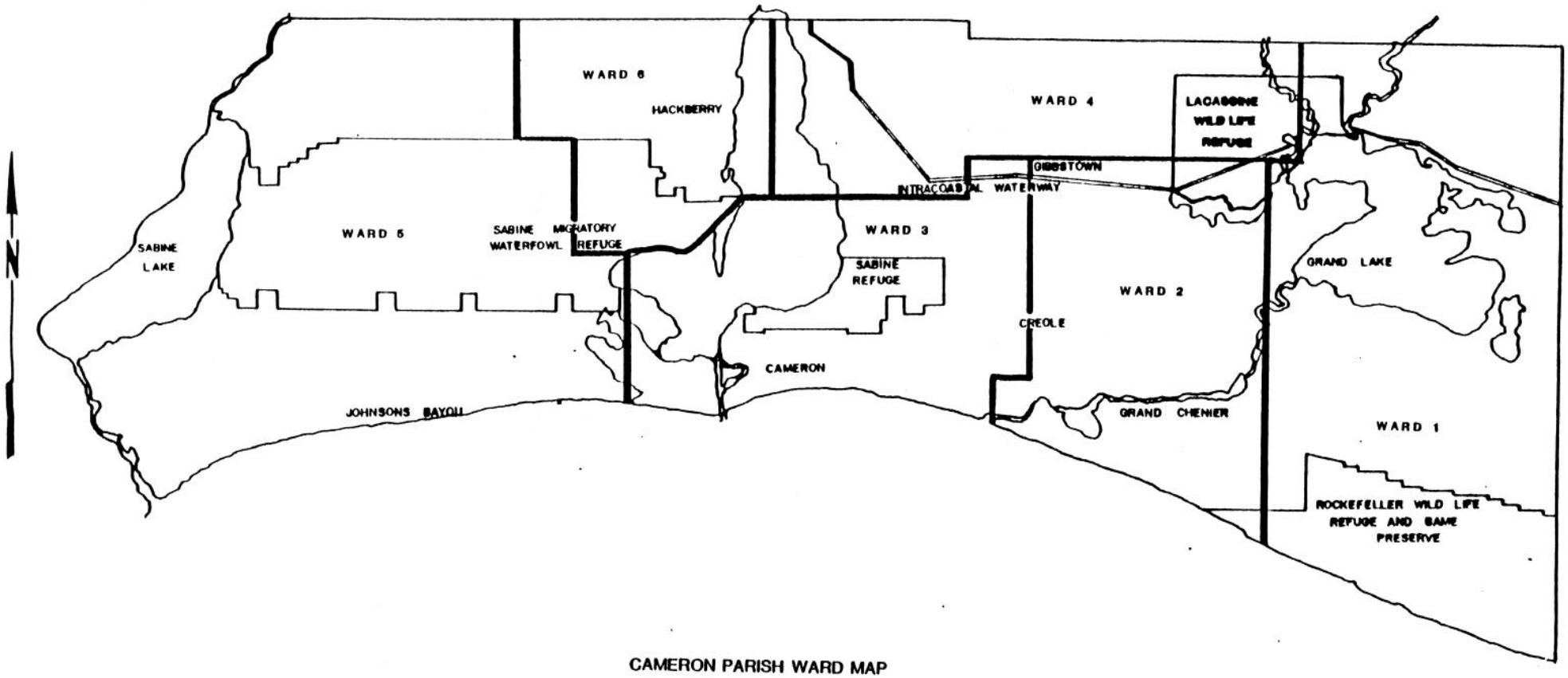
POPULATION

Cameron Parish is the largest parish in the state. It occupies 1,417 square miles of area.[1] It also has the second smallest population in the state with 9,336 inhabitants, or a ratio of 6.5 people per square mile. Over the past 30 years, Cameron Parish has grown by 48%, increasing from 6,244 in 1950 to 9,254 in 1980. A significant factor in the sparce population of the parish is the lack of developable land for transportation, housing, and industry. Since topography and environment play such an important role in the parish population characteristics, a thorough review of population changes over the last few decades and what affects future changes will have on the environment are in order.

Cameron Parish's population has increased 13% between 1970 and 1980. Home units increased 36% (up from 3,303 to 4,479 from 1970 to 1980). This indicates a three-to-one percentage increase in housing units over population in the parish, a rather significant factor considering the lack of developable land. With the importance of oil-related industry in Cameron, and the goal of independence from foreign oil in the United States, it is important that expansion of oil exploration activities be consistent with the local coastal resources program. Even though population and economic expansion are not expected to be of extreme significance in the future, their importance in terms of coastal zone management will be explored in this report.

[1] 1980 Census of Population.

FIGURE 12



CAMERON PARISH WARD MAP

1 INCH equals 0.75 MILES

SOURCE: IMCAL 1984

In order to give a better picture of the population makeup of Cameron Parish, the following section will break the parish down into individual census tracts or wards. The geography, population, and housing changes from 1950 to 1980 will be examined and then reviewed in regard to future growth.

Ward 1 (Cow Island) - Ward 1 occupies the eastern most one-fifth of the parish. Highway 82 (in the southern part) and Highway 717 (in the northwest corner) are the only significant roads in the ward. The only community is Lowry, located in the extreme northeastern part of the ward. There are two significant areas in the ward which require mention: Grand Lake, which is the second largest lake in the parish, and Rockefeller Wildlife Refuge, which is located in the southeastern most part of the ward. These areas are most significant in as much as they restrict all development and, along with the marshes in the area, predetermine the lack of population growth. Between 1950 and 1980, Ward 1 has only experienced 3.5% growth; and from 1970 to 1980, it actually decreased by 7%. Due to these factors, little growth is predicted for Ward 1 in the following years.

Ward 2 (Grand Chenier) - Ward 2 adjoins Ward 1 on the west, Ward 4 (Township 13 south) to the north, Ward 3 to the east (District Line 1B), and the Gulf of Mexico to the south. The extreme northeast corner is occupied in part by Lacassine National Wildlife Refuge.

The upper and lower mud lakes and Lake Misere are found in the ward. The only significant roads in the ward are Highway 82 (which runs parallel to the Gulf in the southern part of the ward) and LA 1143 (which runs to Little Chenier and various other places in the central part of the ward). Highway 27 also exists in the ward just north of Oak Grove for about one-half mile, where it then enters Ward 3. Two communities are found in Ward 3--Oak Grove and Grand Chenier. Oak Grove has perhaps the greatest chance for future population growth in that it is the intersection of the two main thoroughfares in the parish--Highways 27 and 82. Overall, only moderate growth is predicted for the area. Between 1950 and 1980, the ward increased by 348 people, according to Census data (an increase of 38%). In the last decade, Ward 2 experienced 7% growth and future growth trends are expected to follow this general pattern.

Ward 3 (Cameron) - Ward 3 is the most populous in the parish and is likely to remain that way. Cameron is the largest community in the parish. It is the county seat and the center of the seafood industry in the parish. It also contains other industry and is located on the Calcasieu Ship Channel. Ward 3 is located in the south central part of the parish, bounded by Wards 2, 4, 5, and 6 as well as the coast. It also contains the community of Creole and Highways 82 and 27. Ward 3 has experienced a growth of 1,316 people (58%).

since 1950, and has shown a 12% increase over the past decade. As long as the petrochemical and fishing industries continue to grow, so will Cameron and Ward 3.

Ward 4 (Grand Lake) - Ward 4 is located in the top central portion of the parish, bordered at the north by the Calcasieu and Jefferson Davis Parish borders, on the east by Ward 1, to the south by Wards 2 and 3, and to the west by Ward 6--halfway across the northern section of Calcasieu Lake. The southeastern corner of Ward 4 is largely occupied by the Lacassine Wildlife Refuge, and the western most one-eighth of the ward is covered by part of Calcasieu (Big) Lake. Highways 27, 385, 384, and 1144 are located in Ward 4. This is a network primarily found in the western half of the ward. The communities located in the ward are Sweetlake and Grand Lake. The ward has grown from 1,012 to 1,515 in the period from 1950 to 1980 (an increase of 50%), and has increased by 24% during the last decade. Little more than moderate growth is predicted for the area in the future.

Ward 5 (Johnson's Bayou) - Ward 5 covers the western one-fourth of the parish, and is bordered by Ward 6 on the east. A large part of the ward is occupied by Sabine Wildlife Refuge, the largest in the parish. To the north of the Refuge in Ward 5 there is virtually no development at all. To the south of the Refuge is Highway 82, which runs along the coast to the Texas border.

Located along Highway 82 are the communities of Holly Beach and Johnson's Bayou, both seasonal resort areas. There is a considerable amount of industry in the ward, due to the petrochemical company locations and pipelines in the area. Ward 5 is the largest in the parish, but is the next to least populous, even though the beach provides a popular recreation spot. There is little growth predicted for the future. Although the ward has grown by 128%, this has only been a growth of 400 people in real numbers over the last decade. There has only been a 7% increase in the last decade which indicates a considerable slowdown in growth.

Ward 6 (Hackberry) - Ward 6 is located between Wards 3, 4, and 5 above the eastern part of Calcasieu Lake. Almost the entire bottom half of the ward is covered by Sabine Refuge. The western half of Highway 27 is located in the ward, and the majority of the population is located in the town of Hackberry. It contains about 17% of the parish population. Ward 6 grew from 1,208 to 1,608 from 1950 to 1980 (33%), and increased 20% in the last decade. Moderate to heavy growth is predicted for the future in Ward 6.[2]

Population for Cameron Parish in the next two decades is expected to continue its growth, only at a somewhat slower pace.

[2]Information for this section obtained from Statistical Profile of Cameron Parish, Public Affairs Research Council, Baton Rouge; and 1980 Preliminary Census Reports, Bureau of the Census, Department of Commerce.

The projected populations for 1990 and 2000 and their increase from 1980 data are located in Table 6. Important factors in the growth of Cameron Parish in the future will be the increased industrial expansion and the sound use of land for development purposes. These factors, combined with the Cameron Coastal Zone Management Program, will ensure that the growth of Cameron Parish will develop in an orderly, efficient manner.

TABLE 6

POPULATION FIGURES FOR CAMERON PARISH
BY WARD - 1950-1980

	Population For				Percent Increase 1950-1980	Percent Increase 1970-1980
	1950	1960	1970	1980		
Ward 1	514	611	566	532	+3.5	-7
Ward 2	904	879	1,166	1,252	+38	+7
Ward 3	2,276	2,721	3,205	3,592	+58	+12
Ward 4	1,012	1,036	1,218	1,515	+50	+24
Ward 5	330	479	704	755	+128	+7
Ward 6	1,208	1,183	1,335	1,608	+33	+20
TOTAL	6,244	6,909	8,194	9,254		

PROJECTED POPULATION FOR CAMERON PARISH
THROUGH YEAR 2000

	Projected Population[3]				Percent Increase 1980-2000
	1985	1990	1995	2000	
Cameron	9,817	10,059	10,218	10,397	12.3

[3]Louisiana Projections, Division of Economic Research, UNO, Study 21.

Housing

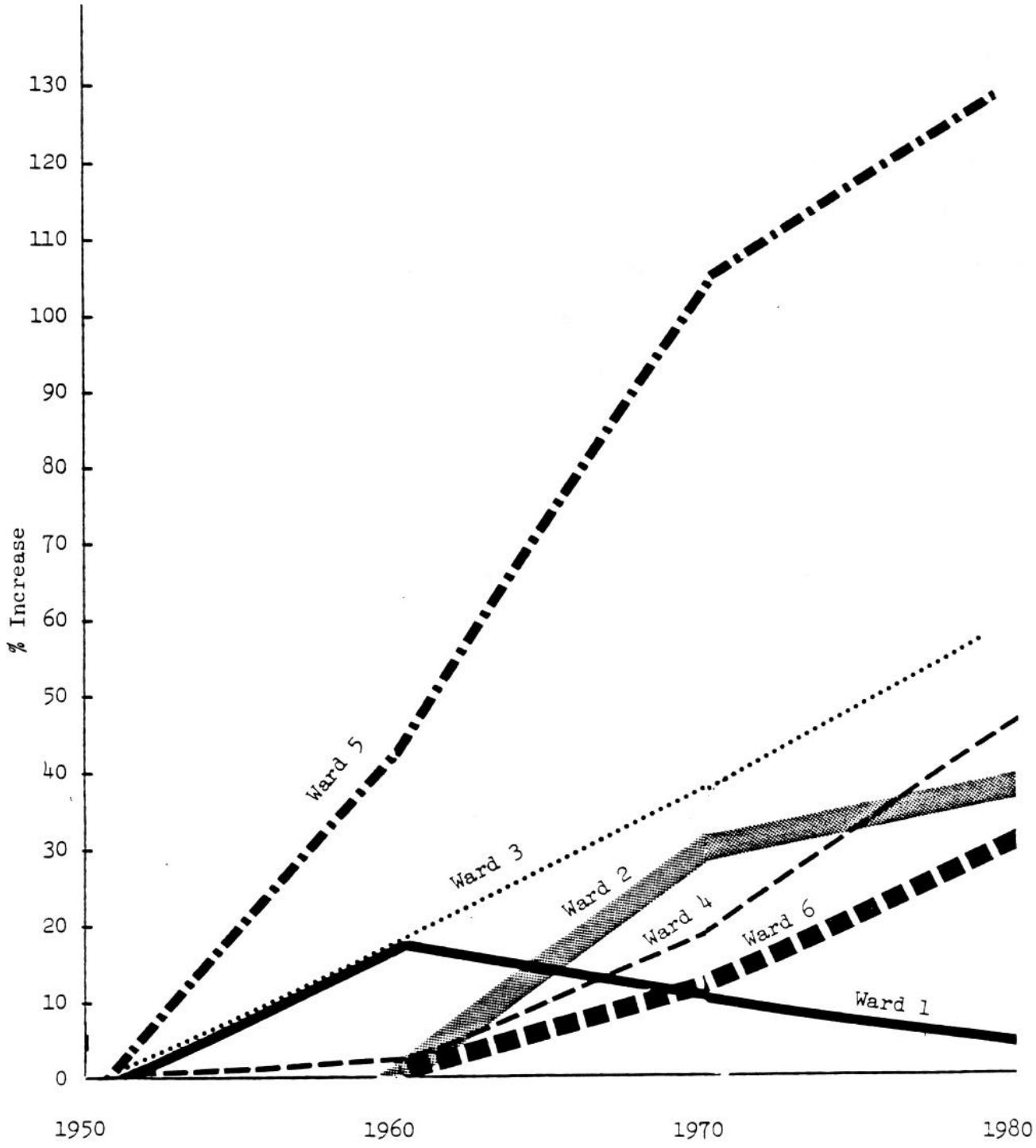
Housing in Cameron Parish as a whole is well below the state average, with 2.06 persons per dwelling unit (9,254 people per 4,479 dwelling units). The state average is 2.72 people per dwelling unit (4,199,542 per 1,546,552). Two wards in the parish stand out in these figures--they are Ward 1 (Cow Island) and Ward 5 (Johnson's Bayou).

Ward 5 contains 88 more dwelling units than it does people, but this is due to the large number of vacation homes located along the beaches. Ward 1 has a ratio of 1.4 persons per dwelling unit, almost one-half of the parish average. This could possibly be attributed to resort homes and unutilized structures in the ward. As long as the population in the parish remains sparce and the petrochemical related mobile work force remains an important requirement of employers, this figure (2.06 persons per household) will probably not change significantly in the future.[4]

[4]State Planning Office, Preliminary Census Reports for Bureau of the Census, Department of Commerce.

POPULATION INCREASE IN CAMERON PARISH

BY WARD (1950-1980)



*Only Positive change is shown on this graph

CORRECTIONS TO THIS DOCUMENT

1. The footnotes on Page 22 should be disregarded.

2. Reference to the figure in the first paragraph on Page 29 should be disregarded.

3. Reference to Figure 2-1 in the last paragraph on Page 32 should be disregarded.

4. The source reference on Page 111 should be Glen Daigre.

5. Footnote 17 on Page 146 refers to the last sentence on that page.

6. Footnotes at the bottom of Page 149 should be 21 and 22.

7. The reference under "Soils" on Page 184 should read Figure 7.

8. The reference at the end of the second paragraph on Page 205 should read "Appendix 3 map C10".

POPULATION INCREASE IN CAMERON PARISH

BY WARD (1950-1980)

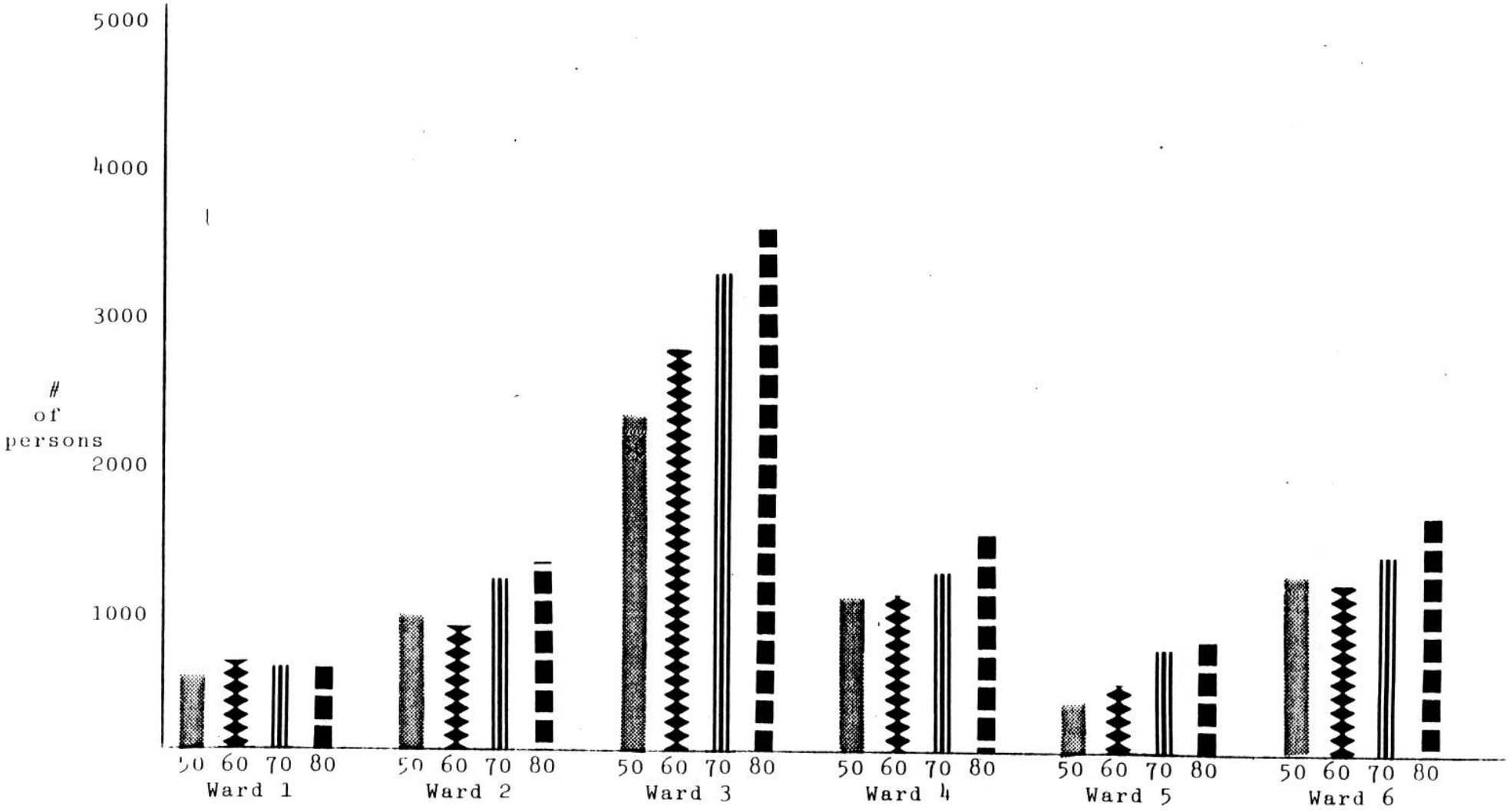


TABLE 7

CAMERON PARISH
POPULATION PER DWELLING UNIT
BY WARD

	Population	Dwelling Unit	Ratio
Ward 1	532	366	1.58
Ward 2	1,252	533	2.34
Ward 3	3,592	1,379	2.60
Ward 4	1,515	680	2.22
Ward 5	755	843	0.89
Ward 6	1,608	708	2.27

PHYSICAL

Physical needs are the basic requirements for existence and growth. The physical needs of Cameron Parish are, therefore, the most imperative. The balance of water to land in the fragile ecosystem of Louisiana's coastal zone is susceptible to many factors, and an effort to identify and describe these factors is the basis for the following section.

According to the Future Land Use Plan of 1990[1], total land use requirements for projected population are 5,211 acres. This represents an increase of 1,301 acres from 1972 figures (33%). The majority of this acreage will be required by strip commercial and industrial use, accounting for 64% of the increase. In addition to developable land, fresh water, adequate drainage, and abatement of pollution are the physical prerequisites for population expansion.

Among the physical needs for economic expansion are: an available supply of developable land (preferably unintensive agricultural); a large supply of water (fresh); sites for dumping industrial waste; protection of wildlife and fisheries (through canal control, estuarine preservation, adequate habitat for fur bearing animals, etc.); and a more efficient highway system.

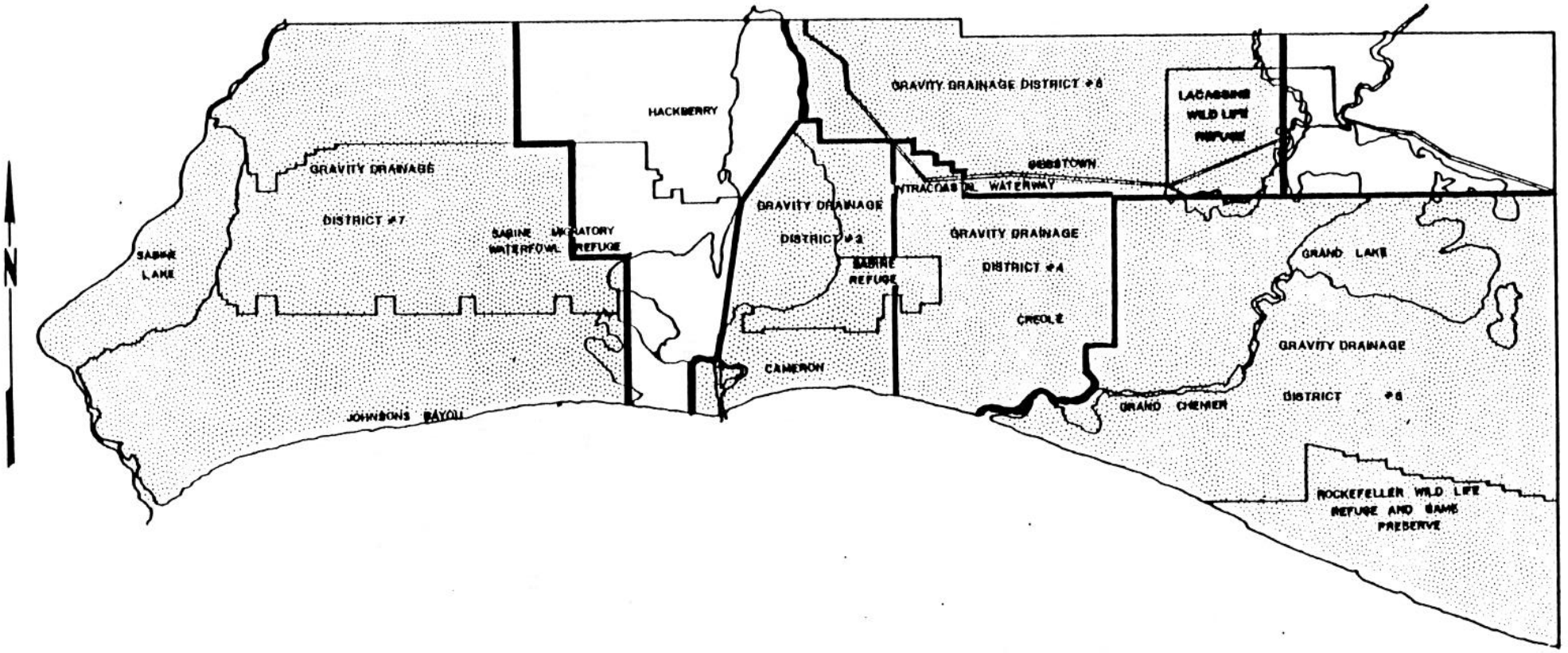
The most serious physical problem in Cameron Parish is drainage. Much of the parish is wetland and marsh area, and it is well below sea level. Therefore, rainfall to any significant extent poses a real drainage problem. The problem is controlled by drainage canals which are under the authority of the Corps of

[1]Future Land Use Plan for 1990, IMCAL.

Engineers. When the flood gates are maintained properly, drainage is controlled. However, the opening and closing of the gates becomes a problem area in itself. The drainage ditches serve as habitat for wildlife (especially fur bearing animals, upon which trappers make their livelihood), and usually have a direct opening into the marsh and estuarine areas of the parish. When the flood and drainage gates are opened, saltwater intrusion occurs. This causes destruction of vegetation and wildlife as well as destroying habitats of these freshwater wildlife. This dead vegetation degenerates into detritus when contributes to the clogging of drainage canals, thereby contributing to the clogging of river mouths. Leaving the drainage gates open for extend periods of time causes the speed of the river to be decreased, also causing silt deposits to form at the mouths of some rivers. The Mermentau has experienced this problem and recently became almost totally blocked by silt deposits at its mouth in Cameron Parish. Another problem with drainage, especially in the central part of the parish, is that private landowners maintain levees for various purposes (range management and waterfowl enhancement) and this inhibits the natural southern flow of water.

There is a policy sometimes used in mitigating marsh impacts in relation to dredging operations which has been met, with some confusion and controversy, in Cameron Parish. Backfilling in canals which have already been cut is looked upon by some members of the CAC as a useless mitigation tool. They feel that once a canal has been cut, it begins to serve a purpose as both wildlife habitat and a recreational fishing area. Now, although this is an opinion of some CAC members, there is at this time no evidence to prove that backfilling

FIGURE 13



CAMERON PARISH GRAVITY DRAINAGE DISTRICTS MAP

1 INCH equals 0.75 MILES

SOURCE: CAMERON PARISH POLICE JURY 1984

actually has a positive impact at this time. This mitigation tool is currently under investigation by LSU. In any case, the CAC recommends that a better attempt at involving the landowners in the decision-making process and educating them as to the range of alternatives is needed. Coordination and cooperation are the keys to successful management.

The Citizen's Advisory Committee also feels that a better line of communication should exist between the federal agencies which have control over the wetlands and the citizens of the parish, who are daily users of the wetlands.

Another problem in Cameron Parish is the supply of freshwater. The problem is not as intense in terms of priority as drainage, but nonetheless real and important. The Chicot Aquifer is the primary source of groundwater in Cameron Parish, and the water table has been dropping steadily in past years. The residential demands are not too exhaustive due to the sparce population of the parish, but industrial use has grown to require thousands of gallons per month of freshwater. Much of this use is for offshore supply boats that obtain water from the town of Cameron. Industrial mud companies previously had their own wells, but they now get their water from Cameron as well. Therefore, perhaps monitoring of industrial water use would make a good policy for the EMU's affected.

There are three major water bodies in Cameron Parish (Calcasieu Lake, Sabine Lake, and Grand Lake), as well as numerous small lakes and rivers. Lake Charles, located north of Cameron in Calcasieu Parish, is a regional center for the surrounding parishes and is home to some 80,000 plus citizens. It is also the location of many

industrial companies which generate large amounts of pollution in the form of industrial waste. Over the course of years, some of this pollution has been dumped into Calcasieu Lake and, to a lesser extent, Grand Lake causing them to become problem areas. Calcasieu Lake is a very shallow lake and even though it is the largest in the parish, it is limited to fishing and boating activities for recreational purposes. Pollution in the local lakes is a situation which needs to be confronted for the safety and recreation of Cameron's citizens. For these reasons, it may be feasible for Cameron and Calcasieu Parishes to get together and discuss these problems through Cameron's efforts at multi-parish coordination.

Erosion and subsidence in the parish are significant problems. It is estimated that some 54 square miles of land is lost to erosion in Louisiana each year. This problem is compounded by saltwater intrusion in Cameron Parish, which kills vegetation and increases land loss through this destruction of ground cover.

The physical needs of Cameron Parish are, for the most part, atypical from the usual physical needs of the communities in Louisiana. Because geological uniqueness and environmental stability play such an important role in Cameron Parish, their sensitivity limits the capacity of the land to meet parish needs. The ability of the environment to support the needs of the people of Cameron Parish in the future will depend on how well its resources are managed now. It is one of the purposes of this report, to see that they are managed properly.

SOCIAL

The social needs of Cameron Parish have been identified in this section as education, health care, police and fire protection, sewage and waste disposal, acreage for future residential development, and planning. The sparce population of the parish has kept most of these needs from becoming severe ; however, they are real and important to the future growth and welfare of Cameron Parish.

EDUCATIONAL NEEDS

The educational needs of Cameron Parish are perhaps the most serious at this point. There are seven schools in Cameron Parish (Cameron Elementary, Grand Chenier Elementary, Grand Lake School, Hackberry School, Johnson Bayou School, South Cameron Elementary School, and South Cameron High School). There is also a vocational-technical school in Creole and McNeese State University (located in Lake Charles), which is 50 miles to the north. The problem lies in the fact that most of the schools were built a number of years ago to facilitate the student population of that time, and now communities such as Cameron, which have almost doubled in student population, are experiencing an overcrowding problem.

Plans have been made for additional space, but as yet there has been a lack of funding for expansion in the high schools. Training for job opportunities (primarily oil field and construction related) would lend practical experience to young people entering the labor force, and is a real need in the parish school system. Education is the key to the future, and the educational needs of Cameron Parish are a social resource which must be given the utmost consideration.

HEALTH CARE

Health care in Cameron Parish is another story. South Cameron Memorial Hospital (a 27-bed hospital located in Creole), and Cameron Medical Center (an out-patient treatment center in Cameron) serve parish health care needs. Ground has recently been broken on a x-ray unit addition to the hospital and in talking with administration officials, the hospital does not usually run to capacity due to many of the residents of Cameron Parish using hospitals in Lake Charles and West Calcasieu Parish.

The parish has had some trouble in getting doctors to the area, but currently has three. Because there is no great population increase anticipated in the next decade, the health care needs of Cameron are not deemed serious at this time.

LAW ENFORCEMENT

Law enforcement in Cameron Parish is basically the Sheriff's Department. The force consists of 20 vehicles and 60 total employees. Its jurisdiction covers the entire parish and is based out of the community of Cameron. Recently, there has been a small sub-station placed in Hackberry. Besides providing law enforcement for the citizens of Cameron Parish, the Sheriff's Department also assists other agencies such as the Coast Guard and Federal drug enforcement officials. Because Cameron Parish is located on the Gulf and has numerous waterways, there are many attempts to smuggle contraband (items uncheckes by Customs) and drugs into the country. The Sheriff's Office cooperates with these officials in every effort to stop these activities.

The need for law enforcement in the parish consist primarily in two areas. First, there is a need for an all terrain, 4-wheel drive vehicle which would make beach patrol possible. During the tourist season, Holly Beach and Hackberry Beach become very active. Patrol of the beaches would not only help prevent vandalism and crime, but would also allow emergency assistance to be provided to otherwise non-accessible areas. The other problem in the parish is animal control. Currently, there is no animal control agency or vehicle to handle livestock and domestic animal problems. The Sheriff's Office acts in these situations, but is limited to its automobiles for transportation. If these two areas could be considered, the law enforcement situation in the parish would be working at a more efficient capacity.

FIRE PROTECTION

Cameron Parish is divided into six fire districts: Hackberry, Johnson's Bayou, Cameron, Creole, Grand Chenier, and Grand Lake. Cameron, Hackberry, and Grand Lake each have two trucks, while each of the others have one. Holly Beach has its own fire truck as well. The departments are strictly volunteer and are basically one-truck operations. The main needs for fire protection in the parish are more hydrants and better technical equipment (such as foam). Even though the fire stations are spread out over large distances in the parish, their resources are deemed adequate for the fire protection of its citizens.

WASTE DISPOSAL

Waste disposal in Cameron is not determined to be a real problem. The one exception to this determination is Hackberry. It has suffered from sewage disposal problems for many years, and no funding for sewage disposal has been available as yet. Solid waste disposal is currently handled by sanitary landfills (eight of them exist in Cameron Parish). However, EPA has set a deadline for use of sanitary landfills in the coastal zone. This deadline is 1985. This may present a problem as there is currently no other method for solid waste disposal in the area. Conversion to incineration has been considered, but would be a costly investment with current levels of funding.

FUTURE LAND USE REQUIREMENTS

From the Future Land Use Plan for 1990, Cameron Parish had 466 acres of residential land use in 1972. From that study, it was determined that an additional 73 acres of land would be necessary to supply increased population needs by 1980. This figure would become 112 additional acres by 1990. Forty percent of this demand is expected to come from the community of Cameron, which is experiencing the most growth. Although developable land is not in abundance in Cameron Parish, building permits are reviewed by the Cameron Parish Police Jury to insure that growth occurs in a reasonable fashion. Wetlands in Cameron Parish are not affected significantly by residential development.

TABLE 8

CAMERON PARISH

EXISTING LAND USE ACREAGE

Category	Acreage*
Residential	2,069
Commercial/Services	386
Industrial	5,523
Transportation-Communication-Utilities	293
Mixed Urban and Built-Up	201
Cropland/Pastureland	139,580
Desiduous Forestland	2,564
Evergreen Forestland	309
Streams and Canals	11,722
Lakes	235,425
Reservoirs	540
Forested Wetlands	1,992
Beaches	644,606
Sandy Areas Other Than Beaches	1,112
Transitional Areas	880
T O T A L	1,047,512

*Base year information taken from 1978 USGS Aerial Land Use Maps.

SOURCE: Glen Daigle, Louisiana State Planning Office, 1983.

TABLE 9

CAMERON PARISH
1990 PROJECTED ADDITIONAL ACREAGE OF URBAN AREAS

Urban and Built-Up Category	North Island	Grand Chenier	Cameron	Grand Lake	Johnson's Bayou	Hackberry	Total
Residential	4.97	18.09	43.43	16.47	11.98	17.06	112
Commercial-Services	.62	2.26	5.43	2.06	1.50	2.13	14
Industrial	14.48	52.65	126.42	47.92	34.88	49.65	326
Transportation-Communication-Utilities	5.46	19.87	47.70	18.08	13.16	18.73	123
Institutional	4.93	17.93	43.04	16.32	11.88	16.70	111
Strip-Clustered	22.56	82.04	197.01	74.66	54.36	77.37	508
Mixed	-0-	-0-	-0-	-0-	-0-	-0-	-0-
Open Space-Recreation	4.75	17.28	41.49	15.73	11.45	16.30	107
Total Projected Urban Acreage	57.77	210.12	504.52	191.24	139.21	198.14	1,301
Total Existing Urban Acreage	50.00	250.84	900.38	347.52	20.00	169.00	1,737.74
Total 1990 Urban Acreage	107.77	460.96	1,404.90	538.76	159.21	367.14	3,038.74
Percent Increase 1970-1990	115.54	83.76	56.03	55.02	696.05	117.24	74.86

SOURCE: Imperial Calcasieu Regional Planning and Development Commission.

GOVERNMENT NEEDS

Another of the social needs for Cameron Parish is expansion for needed government facilities. Document storage is a problem in the courthouse which has housed the parish government since 1937. As the population expands, room for additional government services will also have to expand. Another problem is the parish jail, which is already operating near capacity. Additional space for incarceration is becoming a serious issue, and law enforcement officials are currently seeking funding for this additional space.

None of the social needs of the parish are deemed to have any significant impact on coastal waters. However, it is recommended that large scale developments (such as housing complexes or large municipal construction sites) require a permit if they should occur. Any significant change in waste disposal or sewage treatment plans should also require a permit as a monitor of their impact on the coastal zone.

ECONOMIC

The economic needs of Cameron Parish are in two categories: the physical prerequisites and the employment requirements for future growth. Perhaps the largest physical need is that of developable land which is required in large amounts for industrial purposes. The wetland area of the parish significantly reduces this commodity, thereby inhibiting growth to existing industries and potential developers. Another factor inhibiting growth is the drainage situation in the parish, which affects the vegetation, amount of wetlands, flooding, etc. (as covered in the physical needs section). Therefore, land and drainage are the significant physical problems for the economic sector of the parish.

Water is a physical prerequisite for economic growth which is currently being supplied by the parish, but which has potential to become a real problem in the future. Industrial demand for water is perhaps the greatest in a community, and Cameron Parish is no exception. The problem lies in the limited amount of potable water in the parish. Cameron relies totally on underground water supplies for its needs. The Chicot Aquifer is the only underground freshwater source in the parish and, therefore, when depleted will leave the parish in critical shape. The water table has been dropping significantly in recent years, according to parish sources, and in the future it may become necessary to prohibit industrial consumption in order to maintain supplies for residential use.

Another important physical need for the economy in the coastal zone is an adequate site for the disposal of industrial wastes.

In an area where much of the land is below sea level, disposal of industrial waste is a necessity. The hazardous effects which this waste has on the ecosystem (marshes, estuaries, water supply, and fishing and trapping grounds) has made dumping of hazardous waste (via injection wells and nuclear waste dump sites) a sensitive political issue to the inhabitants of Cameron Parish. An alternative to waste disposal in the parish and in the sea, which also has serious ramifications, must be considered for present and future industrial operations.

Another economic need is the important factor of transportation in Cameron Parish. The primary road which leads in and out of Cameron Parish (north and south) is Highway 27, which runs along both sides of Calcasieu Lake to Lake Charles. Highway 82 runs east and west through the southern part of the parish, from Rockefeller Refuge to Sabine Lake. One of the major problems is the absence of a bridge over the ship channel at the edge of the community of Cameron. Instead, there is a ferry (due to the problem of erecting a bridge of sufficient height within the distance available) which delays travel time, and when out of order, is replaced by a smaller ferry that is unable to accomodate large trucks. Much of the highway on the eastern side of the lake is surrounded by marshland and subsequently accidents can take several minutes to clear up. This causes backups for miles in both directions at times. These factors not only hinder the transport

of goods brought into the parish, but create real problems for large cargos such as oil platform equipment and mobile homes.

The other transportation mode in Cameron is water transport. Because Cameron Parish is located on the Gulf and is also traversed by the Calcasieu Ship Channel and the Intracoastal Waterway, water transport in the parish is not only utilized, but is prevalent throughout the parish. Small canal systems and bayous cover the parish and make virtually every area of the parish accessible by some form of water. Better docking and loading facilities along the major ship channels will be a requisite as growth occurs. Fishing and wildlife has been identified as the most important industry in the parish, due to the large number of people whose living depends on it. The problems surrounding these activities have been covered in previous sections. It is only emphasized here so that every effort should be made to preserve this industry for the future growth of the parish.

Generally, the needs and problems of the economic sector in Cameron Parish are not at the serious stages presently. However, care in identification and modification of resource problems will be necessary to prepare for adequate opportunity of economic growth and alleviation of future problems in Cameron Parish.

Because the resources for economic expansion (developable land, labor supply, utilities, and transportation) are limited, the economy has become industry specific in Cameron Parish. The

infrastructure to the petroleum industry and the seafood industry have become the dominant employment categories in Cameron Parish. As a member of the Imperial Calcasieu Regional Planning and Development District, the parish has had several feasibility studies and development projects performed to boost its economy. Primarily, these projects have been implemented as part of the Overall Economic Development Plan, which is implemented under the Economic Development Administration of the United States. Projects in this area have included: the Cameron Parish Harbor and Terminal Project, the Cameron Parish Solid Waste Management and Sewage Disposal Program, courthouse additions, neighborhood service center, road and highway improvements, drainage improvements, and many others. Economic impact studies of Outer Continental Shelf Oil Exploration, and efforts to reduce unemployment and stimulate the economy are other ways in which the economy is being improved.

Although petroleum and fishing related industries are responsible for a large sector of the employment and economy, other sources are also important. According to the 1970 U. S. Census characteristics, government, services, and miscellaneous accounted for the largest single employment category; while wholesale, retail, and manufacturing were also among the chief employers in the parish. Total employment has increased from 1,936 in 1950 to 4,254 by 1980 in Cameron Parish, while unemployment has fluctuated between 5.0% and 8.2% over the same period (see Table 10). According to a survey mailed out by IMCAL to 12 of the largest employers in the parish; most of those responding had experienced substantial growth over

TABLE 10

CAMERON PARISH

SECTOR ANALYSIS EMPLOYMENT FORECAST
BY MAYOR EMPLOYMENT GROUPS
1975 - 1990

Industry Group	1975	1980	1985	1990
Agriculture, Forestry, and Fisheries	339	436	431	433
Mining	403	500	452	414
Construction	226	296	314	332
Manufacturing	389	578	715	829
Transportation, Communications, and Utilities	325	460	477	492
Wholesale and Retail	439	611	680	747
Finance, Insurance, and Real Estate	96	139	159	181
Government, Services, and Miscellaneous	658	754	1,055	1,180
Other	250	318	313	315
TOTAL	3,125	4,254	4,596	4,923

SOURCE: Imperial Calcasieu Regional Planning and Development Commission.

the last two decades, but did not anticipate the same results in the future (see Appendix).

Among the significant developments which has occurred in Cameron Parish over the past few years has been construction of the Strategic Petroleum Reserve's Brine Line project in West Hackberry. The Department of Energy has decided to use saltdomes on the coast of Louisiana to store oil for National reserves. The process involves disolving the salt with water and then pumping it offshore into the Gulf of Mexico. The project is expected to involve an estimated 320 workers over an 18-month period, and payroll of some $4 million. Recently, McNeese State University in Lake Charles was awarded $3.3 million to monitor the effects of the increased salinity in the Gulf fishing resources. This project will not create jobs for the area and, according to updated EIS reports, will not significantly help the local economy.

Future development in the parish is expected to occur along the ship channel, primarily in Cameron and Hackberry. Spoil from original dredging has now become suitable for development and a demand for sea vessel related services certainly exists. There is also a possibility of commercial development along the intracoastal waterway; however, developable land and supporting infrastructure are not as abundant. Strip commercial development along Highway 82 is expected as the major land development.

An extra 340 acres is projected for 1990 commercial and industrial land use needs. There seems to be adequate land and utilities to accomodate these needs in most areas. This extra

acreage represents an increase of 31% in land requirements from 1972 figures, and 26% of the total land use needs for 1990.

The rate of economic growth, therefore, is not expected to have a significant impact on the coastal zone in the near future. The industrial growth which can be expected will be absorbed by the use of unintensive agricultural land. Growth is a phenomenon which is dependent on the relationship of many factors: physiography, population characteristics, and economic potential. As long as the demands for the restraints of these relationships do not change significantly, the growth in the coastal zone of Cameron will remain orderly, planned, and anticipated. Cameron is a very unique area both physically and culturally, and the growth of the parish (more than in most places) is expected to fall in line with the wishes of its citizens due to this fact.

The economic needs for Cameron Parish have potential for many significant impacts to coastal waters. Because the demand for resources in industry is so large, and because the chemicals used in production are so harsh, an effect on the environment is inevitable. Large construction sites create large amounts of sedimentation which are dumped into local waters. Water requirements for industrial use are tremendous, thereby significantly affecting water tables. Therefore, monitoring and permitting any large industrial facility would be a recommendation of this report.

Another problem is the use of injection wells for industrial waste. This is essentially a process of removing industrial waste by injecting it directly into the ground. This becomes an extremely hazardous process because this chemical waste may enter the water

TABLE 11

CAMERON PARISH

UNEMPLOYMENT FIGURES
(Yearly Averages)
1970 - 1980

1970	-	6.1
1971	-	5.5
1972	-	7.2
1973	-	7.6
1974	-	6.7
1975	-	6.0
1976	-	5.9
1977	-	6.2
1978	-	8.2
1979	-	6.6
1980	-	5.0

table, affects the ecosystem, and has been strenuously opposed by the residents of Cameron Parish. Along the same lines, oil drilling rigs use pits for chemical dumping during their drilling, and failure to neutralize these pits results in detrimental effects to the marsh and estuary areas in the parish. Better follow-up procedures are encouraged to insure that these pits are neutralized after the drilling is finished. Finally, due to the low population of the area and the diminished likelihood for future population expansion, Cameron has been considered as a possible location for nuclear waste dumping. The hazard is obvious not only to the inhabitants of Cameron Parish, but to the people of the United States if leakage should get into the fresh and saltwater estuaries and breeding grounds, whose products are marketed all over America. These are problems which are not at the critical stage now, but are identified as potential problems of importance in the future.

These are the requirements for economic growth which will have significant impact on coastal waters. The degree of their impact will depend on the actual amount of growth that occurs.

RESOURCES

Perhaps the most important task of the Coastal Management Program is the identification of resources which are being utilized within the coastal zone. This task will not only give an idea of the benefit which residents of the coastal zone realize from these resources, but an idea of the adverse impact which occurs from man's utilization as well.

Resources is a very broad term. To be comprehensive concerning the resources of Cameron Parish would be a report in itself. Therefore, for the purposes of this section, resources shall be explored on the basis of their prevalance and importance to the residents of Cameron Parish and the state. Resource users, then, determine the resources which are analyzed because they provide the easiest way to quantify resource in terms of man's benefit. Resource users shall be defined as those groups who:

(1) obtain raw materials (minerals, energy, etc.) from the coastal zone,

(2) harvest renewable resources such as flora or fauna for commercial or recreational pursuits,

(3) require significant land resources for their activities, and

(4) use the resources of the coastal zone for other designated activities (recreation, tourism).

It is important to remember that some resources are utilized for amenities and daily functions, as well as for economic gain.

Resource use conflicts occur in two general ways: Conflicts which arise from the adverse impact of man's activities, and conflicts between the resource users which arise when multiple uses

of the coastal zone compete for its resources. General resource use conflicts caused by man's adverse affect upon the environment have contributed to the loss of nearly 54 square miles of land per year throughout Louisiana. Much of this acreage is productive wetlands. In Cameron Parish, the extent of these problems caused by man's impact include:

1. Increased subsidence
2. Increased flooding
3. Irreversible loss to productive estuarine resources
4. Decreased water quality
5. Erosion
6. Detrimental effects to marsh areas
7. Decreased productivity in renewable resources

Specific conflicts among users of the coastal resources is covered in another subsection of this chapter.

It is the primary purpose of the Cameron Parish Coastal Resources Program to abate these problems and reduce these conflicts so non-renewable resources may be more efficiently managed, and so renewable resources shall be preserved for the future generations of the parish and the state.

RESOURCE USERS

AGRICULTURE

Perhaps the greatest renewable resource in the state is agriculture. It has played a major role in Louisiana's economy for centuries and continues to do so today. The rich delta region provides excellent conditions for crop growing and cattle raising. In total, 36,439,000 acres of land are used for agricultural activities--these are broken down as:

Agriculture	-	8,755,000[1]
Forestry	-	11,146,000
All Other	-	16,538,000

As an industry, agriculture employed 20,750 workers statewide. Agriculture ranks second only to the oil and gas industry in terms of revenue generated in the state. As such, it must be maintained to insure future commodity yields are available to the people of Louisiana.

In the coastal zone, agriculture is not as predominant as in other parts of the state, due to the lack of available land. This is true of Cameron Parish also, but agriculture is still important in the parish. Agricultural acreage (excluding grazing lands) in the parish numbered about 33,900, and the industry employed 225 full-time employees. Commodity yields and acreage can be seen in the following table:

	Acreage	Commodity Yield
Soybeans	16,300	21.5 bushels/acre
Rice	15,750	34.5 cwt./acre
Hay	1,500	60 bales/acre
Corn	350	40 bushels/acre

[1]All figures obtained from Clifford Myers, Cameron County Agent, LSU Cooperative Extension Service, 1981.

In economic value, plant production accounted for $8,660,675, while animal production accounted for $5,526,255 in Cameron Parish. Although energy resources are of major importance today, food will be of major importance one day; and with prime farmland disappearing at a rate of one million acres per year, every effort to preserve the essence of our existence is our obligation to the future.

FISHERIES AND WILDLIFE[2]

A. General Fisheries - 1980

1. Louisiana has 3,378,924 acres of estuarine waters; approximately 44% of the estuarine waters in the U.S. Gulf Coast.

2. Louisiana has 3,900,000 acres of coastal marshes. This is the largest such acreage of any Gulf state and represents approximately 72% of the coastal marshes on the Gulf Coast of the U.S. Cameron Parish holds approximately 500,000 acres (or 12.5%) of the Louisiana marshland.

3. In 1977, Louisiana led all states in volume of total fisheries landings with 1,529.1 million pounds valued at $198.5 million to the fishermen.

4. In 1979-80, Louisiana led all states in fur catch with 2,256,671 pelts taken, valued at almost $16.5 million to the trapper. Over 1.5 million pounds of furbearer carcass meat valued at over $300,000 to the trapper was also taken.

5. It is estimated that estuarine-dependent (marsh or shallow Gulf dependent) species make up 95% of the total commercial catch of the Gulf of Mexico.

6. It is estimated that over 95% of the fur catch and over 75% of the fur value is harvested from the Louisiana coastal marshes.

7. Commercial fishermen statistics[3] for Cameron and Calcasieu Parishes and Louisiana are listed below:

Fishermen Category	Cameron & Calcasieu	Louisiana Total
Commercial Shrimpers	1,664	14,830
Recreational Shrimpers[4]	1,000	10,375
Commercial Oystermen	900	2,125
Commercial Freshwater Finfishermen	450	2,500
Menhaden Seine and Vessel	24	99
Commercial Bait Fishermen	61	1,944
Commercial Crab-trap Fishermen	63	832
Commercial Saltwater Gill Net Fishermen	80	382
Retail Fish and Seafood Dealers	155	2,867

[2]Annual condition paper developed by Paul Coriel, LSU Entension Center in conjunction with the U.S. Marine Fisheries Service.

[3]Louisiana Department of Wildlife and Fisheries, 1978 liscense sales.

[4]Using trawls over 16' long.

8. The 1979-80 Louisiana Department of Wildlife and Fisheries license sales indicate Louisiana has approximately 10,000 commercial fur trappers. The number of license fur trappers in Cameron Parish is estimated at 400 (Source: Per communication, Noel Kinler, Biologist L.D.W.F.).

9. Primary segments of commercial fisheries in Cameron Parish include: shrimp, crabs, oysters, finfish (fresh and saltwater), and menhaden.

10. Primary segments of the commercial fur industry in Cameron Parish include: nutria, muskrat, otter, mink, raccoon, red fox, coyote, and Virginia opossum. The American alligator is also very important with over 5,000 alligators harvested from Cameron Parish in 1980, and with an estimated value of over $500,000 to the trapper.

11. Recreational fisheries are very important in Louisiana and Cameron Parish. In 1977, Americans spent over $15 billion for recreational fishing activities, according to the U. S. Fish and Wildlife Service.

B. Shrimp - 1980

1. The major portion of the Cameron Parish shrimp industry is located in Cameron and Hackberry, Louisiana. The actual number of boats and fishermen residing in these areas is unknown, however, over 1,000 boats utilize these two ports with the majority being in Cameron, Louisiana.

2. The Cameron Port serves a large number of "Big" boats, which fish primarily offshore. These fishermen catch primarily white and brown shrimp, however, seabobs are also important seasonally.

3. The Hackberry Port serves many "Small" boats which fish primarily in the inland waters of Calcasieu Lake. Both white and brown shrimp are very important to the inland fishery.

4. The Cameron Port serves many out-of-state boats from other Gulf Coast states.

5. There are three major processing plants in Cameron and three in Hackberry concerned with buying and marketing fresh shrimp (head-on or headless). One of the shrimp processors in Cameron has also operated a mechanized shrimp canning factory during good market years.

5. Problems with oyster production have been natural in nature in the past few years. The main problem has been much higher salinities over oyster beds due to severe draughts of 1981 and 1982. High salinities increase oyster mortality because the oyster drill, or couch (Thais floridana) thrives in high salinity water and increases predation; and a waterborne parasite oyster fungus organism called Dermocystidium marinum also caused extreme summer mortality of oysters.

6. In 1983 to date, more rain has fallen and problems are not as serious.

7. The potential for good production is present under proper conditions.

8. East Pass and West Pass areas of Calcasieu River (Lower Calcasieu Lake) have suffered due to human waste pollution problems which cause periodic damage of these areas.

E. Crabs - 1980

1. Calcasieu Lake, Sabine Lake, Mud Lake, Grand Lake, and Lower Mud Lake provide valuable commercial and recreational blue crab fisheries in Cameron Parish. The many bayou and river systems are also important to the commercial crab industry in the parish.

2. Cameron Parish had 45 commercially-licensed crab fishermen in 1978.

3. There are four major crab processors in Cameron Parish; one volume buyer of live crabs in Holly Beach, and three volume buyers in Hackberry.

4. In 1978, crab landings in Cameron Parish exceeded 2 million pounds (live weight), valued at almost $.5 million.

5. Crabs are fished with three major gear types in Louisiana:
   a. Traps (pots)
   b. Trawls
   c. Troutlines

6. Crabs are marketed alive, boiled, frozen, shelled, and peeled. Until the recent development of a crab meat peeler, all peeling was done by hand.

F. Fish - 1980

1. Valued commercial fisheries are primarily dependent upon the estuaries, bays, lakes, rivers, and bayous.

6. In 1979, Louisiana led all Gulf states in production with over 60 million pounds of shrimp, valued at over $8 million. The Gulf states produced over half of the total U. S. shrimp landings in 1979 (Source: National Marine Fisheries Services).

7. In 1979, Cameron Parish shrimp landings were approximately 4 million pounds, or 6% of the total Louisiana landings.

C. Menhaden - 1980

1. Menhaden are first in volume among all U. S. fishery landings.

2. Catch varies with environmental conditions, and for the past 10 years, has fluctuated between 1 and 1.5 billion pounds.

3. Cameron Parish has three menhaden or "pogy" plants which process the fish and produce various fish meals and fish oils used in livestock and poultry feeds. Approximately 26 menhaden boats are currently operated by these three processing plants.

4. In 1980, these three plants caught approximately 232,000 tons with a gross value of $28.5 million.

5. The purse seine is the commercial method used to catch menhaden.

D. Oyster - 1980

1. The major portion of the Cameron Parish oyster fishery is located in Hackberry, with most oysters being harvested from reefs within the Calcasieu Lake.

2. Cameron Parish had 273 licensed oyster fishermen in 1978.

3. There are three major processing plants in Cameron Parish concerned with buying and marketing fresh shucked or sacked oysters.

4. All oyster reefs within Calcasieu Lake are closed to dredging, therefore, all harvesting is conducted with hand tongs only.

2. Commercial method of taking fish include:

   a. Gill nets and trammel nets (speckled trout, redfish, drum, garfish, and others)

   b. Hoop nets (catfish, freshwater drum)

   c. Seines (redfish, speckle trout)

   d. Hook and line (red snapper, jew fish, grouper, redfish, garfish)

   e. Slat traps

   f. Trawls

3. Grand Lake produces a small, but productive catfish fishery and Calcasieu Lake produces an extensive saltwater fishery.

4. Cameron Parish species and catch data for 1978 obtained from the National Marine Fisheries Service are as follows:

Species	Pounds	Value (in dollars)
Catfish	4,800	1,714
Garfish	1,500	352
Black Drum	38,900	9,487
Redfish	45,700	22,450
Flounder	32,800	17,857
Croaker	1,400	350
Red Snapper	16,900	16,281
Speckled Trout	191,600	103,718
White Trout	10,900	5,363

Trapping

1. The most important furbearing animal in Cameron Parish is the nutria.

2. The total value of the fur and alligator industry in Cameron Parish was over $2.5 million to the trapper for skins and meat in 1979-80.

3. During Louisiana's 1972 experimental alligator season, 1,337 hides were sold, averaging $55.93 each. The 1973 season saw 2,916 hides sold at $92.02 each. There was no season in 1974, however, the 1975 season produced 4,302 hides worth $251,876 with an average price per hide of $58.55. The 1976 season yielded 4,300 hides worth $118.80 per hide, or $16.50 per foot. The 1977 season produced 5,209 pelts valued at $474,563 ($91.10 per hide), or $12.23 per foot (SOURCE: O'Neal T. and G. Linscome, 1977. The fur animals, the alligator, and the fur industry

in Louisiana, Department of Wildlife and Fisheries Bulletin No. 10). In 1979, the alligator season was open in 12 south Louisiana parishes, with over 16,000 alligators harvested. In Cameron Parish, approximately 5,000 alligators were taken in 1979, valued at over $500,000 to the trappers. In 1980, over 5,000 alligators were taken, valued at $500,000 to the trappers. The average price per foot for both years was about $15.00 or $1.25 per inch.

4. Cameron Parish has four resident fur buyers that mainly function as a link between the fur dealers and trappers.

5. With over 500,000 acres of prime marsh habitat, Cameron Parish furbearer population is responsible for a significant part of the State's harvest.

SOURCE: Situational Report, Paul Coriel, Associate Area Agent (Fisheries and Wildlife), LSU Cooperative Extension Service, 1981.

RECREATION

Recreation is a very important activity in Cameron Parish. Cameron is a sportsman's paradise with recreation of all kinds for residents and visitors alike. There is access to the wilderness of the marsh, the utilization of abundant freshwater lakes and the ocean. Significant recreational opportunities in Cameron Parish include water sports, hunting of all types, and fresh and saltwater fishing. There are three wildlife refuges in the parish which protect and maintain wildlife habitat for preservation and recreational purposes. Activities such as alligator harvesting, bird-watching, and deep sea fishing are common to the parish. Hunting and camping are also very popular.

The popularity of hunting and fishing as a recreational sport is evidenced by the 14,980 fishing licenses and the 4,687 hunting licenses issued during 1980.[5] Not only are they recreational activities, but part of the culture as well. Fish and seafood are an important ingredient in the diet of Cameron residents and recreation is as much a part of life as the work which must be done every day.

The ocean provides a distinctive difference in the recreational resources of the parish. Deep-sea fishing and diving are particular delights along the coast. Cameron beaches (Holly, Rutherford, Hackberry, Peveto, and Ocean View) provide recreation to tourists

[5] Cameron Parish Sheriff's Office.

from all over the state and the south. Holly Beach even accommodates summer homes for the seasonal crowd which frequents the area each year.

These are the main recreational activities, although many others exist in the parish.[6] Because recreational activities encompass large amounts of land in virtually all parts of the parish, and because these activities are so dependent on the natural, undistrubed characteristics of the area, recreation is encroached upon by many other resource users. Recreation is an important part of Cameron Parish and every effort to resolve resource conflicts should be made so future generations may enjoy the amenities of today.

[6]Outdoor Recreation in Louisiana, 1975-1980, State Parks and Recreation Commission, 1974.

TOURISM

Perhaps the greatest resource Louisiana has is its natural beauty. In a state which has such geological diversity, a mild climate, a fascinating history, and a rich cultural background, tourism is one of her largest and most beneficial industries. Tourism is an economically important industry for several reasons: (1) it generates money from outside the local area or state which is turned over several times before it is absorbed completely by the local economy, (2) it creates jobs in the local area and the state, (3) it creates substantial tax revenues, (4) it requires minimum maintenance, (5) it has little detrimental effect on the resources and their environment, and (6) it is the third largest industry in the state in terms of expenditures.

In 1979, tourism generated $2.5 billion in Louisiana. These expenditures created 74,000 jobs statewide, and a payroll of $524,200,000. These expenditures also generated state taxes of $90,316,000[7]. Broken down by category of expenditure, the figures look like this:

Transportation	-	$ 125,000,000
Lodging (hotels, motels, etc.)	-	1,075,000,000
Food (restaurants)	-	675,000,000
Retail Trade and Auto Service	-	275,000,000
Miscellaneous	-	350,000,000
TOTAL for 1979		$2,500,000,000[8]

[7] Vicki Miller, Lake Charles-Calcasieu Parish Convention and Tourism Commission.

[8] Figures are average of information from U. S. Travel Data and the International Association of Convention and Vacation Businesses.

From this information, it is obvious that tourism is an important part of the economy with only mining (principally oil and gas production) and agriculture generating more income.

Tourism is also an important element of the Cameron Parish economy. In 1979, tourism generated $9,576,000 of expenditures for the parish. This created 219 jobs and a payroll of $2,140,000, as well as generating $31,000 of local taxes for Cameron Parish.

Cameron Parish is a rich area for the tourist. Combining the colorful culture of the parish with the unique geography of the coastal zone provides many places for the tourist to explore. Among the attractions of the parish area:

Fishing Rodeo

The Cameron Parish Deep Sea Rodeo at Grand Chenier Park, an ongoing celebration, is held in the closest weekend to July 4. The Fishing Rodeo offers fine saltwater fishing in the Gulf of Mexico which results in catches of tarpon, sail fish, and the many other sought after sport fish. Three days of on-shore activities includes fish fries, shrimp boils, street dances, boat races, baseball games, and prizes for outstanding catches. There is also the Blessing of the Shrimp Fleet, which occurs during the evening of the first day of the fish rodeo. To commemorate such an activity, a priest blesses the shrimp fleet with Holy water and says a prayer for the boats. The boats travel down the Mermentau River and enter the Gulf via the mouth of the Mermentau Jetties.

Fur and Wildlife Festival

The annual Fur and Wildlife Festival generally takes place the second weekend in January. Muskrat and nutria skinning contests,

oyster shucking, retriever dog trails, duck and goose calling, and a parade and beauty contest are among the many activities of the event. Most of the contests are entered by both men and women, boys and girls.

Holly Beach and Rutherford Beach

Holly Beach and Rutherford Beach, located on the Gulf of Mexico, are popular spots for surf fishing, swimming, seining, and shell collecting. The beaches also accommodate their guests with cabins and travel trailer space near the Gulf's waters.

Rockefeller Wildlife Refuge

Rockefeller Wildlife Refuge is located in the southeast portion of Cameron on Highway 82. It was donated to the state of Louisiana by the Rockefeller Foundation in 1921. The 85,000 acre area is now part of a wildlife refuge system operated by the Louisiana Wildlife and Fisheries Commission, and it is open year-round. The Rockefeller Wildlife Refuge is a waterfowl wintering area in the Mississippi Flyway and each year, wintering about one-quarter million ducks and geese. The refuge also has one of the major concentrations of alligators in North America. Sport fishing in fresh and saltwater is allowed on the refuge by permit only.

Sabine and Lacassine National Wildlife Refuges

The Sabine National Wildlife Refuge was established in 1937, and is located in the extreme southwest corner of Louisiana, off Highway 27. Sabine Refuge contains 142,000 acres of fresh and brackish marshes, interspersed with low-prairie ridges. Lacassine National Wildlife Refuge, comprised of 31,765 acres, is located

eleven miles southwest of Lake Arthur, Louisiana. These two federal refuges provide wintering habitat for approximately one-half million ducks and geese annually. The hunting of waterfowl is permitted on these federal refuges at designated times. Fishing is also allowed on these refuges. Common freshwater fish sought by the sport fisherman are black bass, crappie, blue gill, redear sunfish, large war-mouth bass, striped bass, and blue catfish. Saltwater fishing offers mainly redfish, flounder, spotted weakfish, croaker, mullet, ladyfish, striped bass, garfish, buffalo, carp, blue catfish, crappie, and speckled trout. Alligators and many furbearers, such as whitetail deer, nutria, mink, and raccoon, find their home at Sabine National Wildlife Refuge and Lacassine National Refuge.

Fishing

Several charter boats are available in Cameron to the deep-sea fishermen. Deep-sea fishing off Cameron produces tarpon, marlin, cobia, bonita, barracuda, jackfish, grouper, and shark. Good saltwater fishing can be enjoyed from ship channel jetties or along ship channel banks.

Creole Nature Trail

The Creole Nature Trail is a scenic route which runs from Sulphur, Louisiana, in Calcasieu Parish southward on Highway 27 to Lake Charles. The route takes travelers by the Intracoastal Canal, Sabine Wildlife Refuge, the Gulf of Mexico, the ferry crossing the Calcasieu Ship Channel to Cameron, and Rockefeller Refuge. Interesting sights include alligators and other wildlife along roadside

canals, marshland, shrimp boats, and the Gulf. It provides a visual feast for the tourist of southwest Louisiana.

Tourism is a resource user which is necessary to the economy of the parish, has very little bad effect on the area, is potentially an inexhaustible industry, and has very little conflict with other resource users. It is testimony to the fact that the characteristics of the coastal zone and the parish must be preserved for the good of all.

CONSTRUCTION

One of the most important resources in Cameron Parish is developable land. It is a limited resource and, therefore, growth in the parish (residential, commercial, and industrial) is subject to the availability of this resource. Although growth in the parish is slow due to the sparce population, as natural expansion occurs, the resource will become more and more important. In effect, the construction prerequisites are the limiting factor to substantial growth in the parish.

In 1979, average covered employment for contract construction was 144,123, with an annual payroll of $2,217,178,853 for the state. In Cameron Parish, the employment was 542 with an average annual payroll of $16,082.[9] By 1980, employment had dropped to 140,600 for the state, and 200 for the parish[10] (payroll amounts unavailable).

In 1980, a total of 25 building permits were issued in Cameron Parish. As the demand for developable land increases, conflicts with areas in need of preservation and conversion of agricultural land will arise. It is hoped that the most efficient use of land in a multi-use situation will be undertaken to insure maximum benefit to all.

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[9] Employment and Wages, 1979, Louisiana Department of Labor, Office of Management and Finance, Research and Statistics Unit, 1980.

[10] Louisiana Department of Labor, Office of Employment Security, 1981 (Don Wimberly - Labor Market Analyst).

TRANSPORTATION

The transportation network of any area is important to its survival and growth. Transportation in south Louisiana is of particular importance because the wetland and marsh acreage create special problems for highway transportation, and because the abundance of water makes water travel a predominant factor as opposed to an alternative. Louisiana contains approximately 50,000 miles of public roads, 16,379 of which are state maintained.[11] In Cameron Parish, there are 186 miles of state maintained roads. This mileage primarily consists of Highway 27 (which runs north-south along either side of Calcasieu Lake), Highway 82 (which runs east-west along the southern part of the parish), Highway 384 (which runs through the north central section of the parish), and other minor mileage roads (1141, 1143, 383, 14). Water travel is important through the commercial freight shipment through the ship channel and the Intracoastal Waterway, but it is also important to industry (canals for equipment transportation), recreation (hunting and fishing), government operations (Corps of Engineers, U. S. Fish and Wildlife), and commercial operations (trapping). In terms of commercial tonnage passed through Cameron Parish, as tabulated by the Corps of Engineers at Calcasieu locks, there were 7,871 lockages with a total of 46,996,868 tons of cargo.[12]

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[11] Louisiana Department of Transportation and Development.

[12] Lockmaster, Calcasieu Lock System, Corps of Engineers.

Pipelines are also an important part of the transportation network in Cameron Parish. Although accurate figures for pipeline mileage are unavailable for Cameron Parish[13], the network of intrastate, interstate, and production pipelines criscrosses the entire parish transferring energy resources to all parts of the state and nation.

Primary conflict areas include saltwater intrusion and flooding from the major canals, and marsh disruption from the pipelines. Transportation is an important resource user in Cameron, and its coexistance with other resource users at minimum conflicts is a necessity.

[13] Department of Natural Resources, Pipeline Division.

OIL AND GAS INDUSTRIES

Louisiana is the leading producer of natural gas in the United States. It is also the second leading producer of crude oil. At a time when energy production is so crucial to the United States, Louisiana is an invaluable asset to its well-being. In 1980, 2,483,331,761 MCF of natural gas and 170,554,991 barrels of crude oil were produced in Louisiana.[14] A considerable portion of this energy is transported to other parts of the country with greater needs.

In terms of benefit to the state, crude oil and natural gas industries maintained 74,014 employees in 1979, with a payroll of $1,497,834,912.[15] Severance taxes from the oil and gas industries are also a substantial contribution to Louisiana's economy. Over the period from 1960 to 1978, severance taxes accounted for an average of 38.5% of the state's total revenue (equaling $474 million by 1978).[16]

The oil and gas industry is also an important part of Cameron Parish's economy. Cameron ranks sixth in production of both natural gas and crude oil for the state of Louisiana. In 1979, oil and gas production accounted for a large portion of employment at 1,462 jobs (average) and $300 a week payroll (average).

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14 Louisiana Department of Conservation: Production Audit Section.

15 Employment and Wages 1979, Louisiana Department of Labor, Research and Statistics, 1980.

16 State of the State, State Planning Office, 1978.

17 Employment and Wages 1979, Louisiana Department of Labor, Research and Statistics, 1980.

The number of jobs had increased by 1980 to just over 1,500.[18] Most of the industry's operation in Cameron Parish is in the exploration phase. By 1976, there were a total of 64 onshore and 69 offshore fields which had realized production in the Cameron range.[19] Table 12 breaks down the energy production in Cameron Parish for 1980.

Cameron's connection to the ocean via the Calcasieu Ship Channel and the Intracoastal Waterway and the location of support industries such as Cameron Offshore Services and Industrial Marine Services will insure the maintenance and growth of this industry as long as the resources hold out. It is important to note, however, that even though the energy production industry is important to the parish economy, exploration operations take their toll on the land. Marsh areas are disrupted, canals are cut, board roads are constructed, chemical pits are left unneutralized, and many times wetlands are left unrestored. Every attempt must be made to reduce and eliminate conflicts with this industry and other resource users, as well as the ecological balance of marsh areas.

[18] Louisiana Department of Labor, Office of Employment Security, 1981 (Don Wimberly, Labor Market Analyst).

[19] Urban Observatory Study, Impact of OCS Development on the Parishes of Cameron, Calcasieu, and Jefferson Davis, 1978.

TABLE 12

CRUDE, CONDENSATE, CALCULATED THEORETICAL CONDENSATE, CASINGHEAD GAS, AND NATURAL GAS PRODUCTION FOR CAMERON PARISH[20]

Production in Barrels			Production in	MCF
Crude Oil	Condensate	CTC	Casinghead Gas	Natural Gas
6,917,815	2,821,131	77,507	4,549,941	189,912,355

[20] Louisiana Department of Conservation: Production Audit Section, 1980.

NON-FUEL MINERALS

The non-fuel mineral industry has been an important part of the resource extraction sector of the economy. In 1978, non-fuel mineral production netted over $150 billion statewide.[21] The average covered employment in 1979 for this category was 3,530, with an annual payroll of $61,360.[22]

In Cameron Parish, salt is the primary non-fuel mineral with salt domes located in various parts of the parish. Although salt is no longer mined commercially from salt domes, their significance in recent years has been tied to their acquisition as storage facilities. The Strategic Petroleum Reserve Division of the Department of Energy has acquired the salt domes west of Hackberry for use as natural fuel storage facilities. The resulting transfer of salt deposits and its impacts are covered in other sections of the report.

[20] State of the State Report, State Planning Office, 1978.

[21] Employment and Wages 1979, Louisiana Department of Labor, Office of Management and Finance, Research and Statistics Unit, 1980.

RESOURCE USE

CONFLICTS

In any area where multiple land uses coexist and resources are utilized by several different groups, conflicts arise. The activities of some resource users necessitate a conflict or infringement on other resources users. Given this reality, it is the goal of this section to identify the resource use conflicts which exist in the parish and any possible solutions to them. The conflicts have been mapped to the extent possible, and they are reviewed in the following pages according to discussions by the Citizen's Advisory Council concerning their existance and resolution. It is hoped that identification of these conflicts and their possible solutions will influence decisions concerning management of coastal zones for the good of all resource users.

A good place to begin this section is in the consideration that these conflicts involve public and private interests. Some of the conflicts arise from state and federal legislation and are, therefore, outside of parish influence. Some of the possible solutions deal with regulation of private land or public investment. It is important to keep in mind, however, that these are suggestions which can possibly solve problems which these resource conflicts create.

The importance of the coastal zone depends upon its resources and the jobs, enjoyment, and way of life which they create. Therefore, protection and effective management of these resources for the future is the main purpose of the coastal resources program. Reduction of the conflicts between the multiple users of the resources will aid in the overall management of this unique area known as the coastal zone.

Wetland Designation and Potential Farmland

The designation of wetlands in the state is an important issue for Louisiana. With the loss of prime farmland each year and the demand for more and more product yields, farmers have turned to the reclaimation of wetlands for agricultural uses. This has created a conflict between factions which want to preserve these areas and the farmers.

Recently, a court case in Alexandria involved the definition of wetlands due to certain vegetation types. Farmers fear that this designation will cause non-wetlands, which contain these vegetation types, to be restricted from clearance and cultivation. Limiting the amount of potential farmland when so much of existing farmland is being lost to construction of homes and businesses is, in effect, limiting the potential for increased commodity production.

Availability of good farmland and protection of valuable wetlands are both important issues. It is hoped that perhaps a more reliable criteria for designating wetlands can be derived and both uses can be properly addressed.

Cattle Grazing in Marshlands

The abundance of marshland in the parish almost necessitates the use of it for cattle grazing purposes. The rich vegetation of the marshes make it even more attractive for grazing. It is also necessary for some minor alterations to be made to the marsh to accommodate cattle mobility. Although these minor changes have little detrimental effect, sometimes more intensive alterations occur which significantly affect marsh characteristics.

Conflict has arisen from attitudes by agencies controlling activity in the marsh. Apparently some agencies feel that any cattle grazing is detrimental to the marsh. Contrastingly, many farmers feel that too much government control is exercised on private land. Perhaps a more detailed discussion of how cattle grazing and related activities affect the marsh should be brought out. This information would better justify the guidelines which are currently adhered to and provide for less conflict between the interested parties.

National Marine Fisheries Service and Marsh Policy

The marsh is a uniquely balanced ecosystem where each characteristic is dependent on the other. However, because of its vastness in the coastal zone, it is frequently disturbed for transportation, oil exploration, drainage, and irrigation. The National Marine Fisheries Service has come up with a plan to restore marshes which must be disturbed by canal cuts. It is a policy by which any party who cuts a canal must backfill another previously cut canal somewhere in the parish. This policy is felt to be unfounded by many land management personnel in the parish for two reasons.

First, it is believed that once damage is done to the marsh areas it can never be completely restored. Secondly, once the canal is cut it then becomes a beneficial part of the system, serving as habitat for furbearing animals and alligators, and as recreation for fishermen. It is felt by some members of the CAC that this arbitrary backfilling is an exercise in futility. Perhaps a better educational-promotional program to explain the policy is necessary.

Perhaps an alternative policy which is biologically acceptable and has better results would be in order. To any extent, marsh policy which must be adhered to should consider all aspects of the area and people this policy affects.

Private Landowners, Taxpayers, and Recreational Fishermen

There has been some conflict recently on the rights of recreational fishermen to fish canals on private property. There have been problems concerning litter, shooting of furbearing animals, and the slaughter of alligators. Subsequently, there have been complaints by trappers concerning low yields during trapping season. The primary controversy, however, comes in the restriction of recreational fishing in canals which lie on private property. The dredging of canals on land which is privately owned in effect gives the landowner the authority to allow or restrict any activity in the canal, because he owns the bottom of the canal as well as the land on both sides. The fishermen feel that any canal which is navigable is not private, according to a Corps of Engineers regulation. However, these regulations are for Corps permitted activities and do not include recreational fishing.

The controversy is a complicated one: large landowners are troubled with constant patrolling of canal areas and litter cleanup, trappers are faced with a threat to their livelihood, and some fishermen give the rest a bad name by not adhering to the rules. Some of these canals have been fished by several generations of the same families for decades. This situation has been the subject of past and present litigation in state and national courts. Its ruling will determine the resulting laws.

Marsh Disruption From Energy Exploration

In order to reach some of the remote locations which are necessary for oil exploration activities, many times artificial passages through the marsh are necessary for transportation purposes. The problem arises because transportation into the marsh (via canal cuts or board roads) has detrimental and sometimes irreversible effects to the marsh.

When an area is as energy rich as Cameron, exploration for oil is a common occurrence. The resulting numerous cuts and board roads can have a serious effect on a large area of marsh by affecting water flow, drainage, etc. An effort to restrict transportation to existing canals and roads would be a possible solution, and one this program would encourage, especially in some areas.

The primary concern of the Cameron Parish Coastal Resources Program is the balance of uses within the coastal zone. Conservation and development are both concerns which must be considered. Due to the frequency of drilling sites in Cameron Parish and the large amount of wetland acreage, many areas of the parish will require special mitigation policies for certain activities in order to restore the marsh to its original character. Although oil exploration is an important part of Cameron Parish's industrial and economic structure, every attempt must be made to conserve the wetlands of the parish and the state through mitigation and regulation.

Mitigation necessary for coastal use permits of local concern will include projects proposed and selected by the Cameron Parish Police Jury. The Cameron Parish Police Jury may recommend projects for mitigation measures for coastal use permits of state concern.

These mitigation measures for uses of state concern must be closely coordinated between DNR/CMS, the Cameron Parish Police Jury, and the local landowners. Recommendations by the Cameron Parish Police Jury should be considered to the maximum extend practicable. Final authority, however, is vested in DNR. The parish will be informed in writing of decisions regarding mitigation and the reason for choosing the selected project.

Injection Wells and Hazardous Waste

The sparce population of Cameron Parish and the limited amount of developable land has made it a favorable possibility as a dumping site for industrial and hazardous waste. The people of Cameron, however, who must live in the parish, drink its water, and eat its food do not feel that their health is any less important than other parts of the country. But more than this, chemical and nuclear waste can have irreversible effects on one of the richest and most sensitive estuarine areas in the world.

The seafood, which is harvested from this area, is marketed across the country--therefore having far-reaching effects. The residents of Cameron Parish are opposed to the dumping of any out-side waste. In this conflict between industry and residents, it is believed that compromise must be made for the health and safety of people first.

Dumping Waste in Non-Approved Sites

Although all oil-related activities are permitted by DNR for the coastal zone, there have been occurrences of chemical and solid waste dumps in non-approved dump sites. This conflict is merely a

non-adherence to the law, and is not common; however, it is mentioned because waste disposal sites are already out of compliance with EPA standards and available sites are limited.

The possible solution would be the promotion of using only approved sites and possible monitoring of industrial waste disposal.

Docking Facilities for Fishermen

With the growth of the oil exploration support industries in the Cameron area, more and more commercial fishing dock area has given way to industrial acquisition. Fishermen cannot afford to financially compete with these industries for valuable docking space. Also, they cannot afford to make improvements to land which may be required in lease contracts, and which industry has the financial ability to do. As more dock space is converted, remaining dock space becomes crowded. When the suitable dock space becomes entirely utilized by industry, commercial fishing will be at a critical stage.

A compromise before this situation occurs must be considered. Some suggestions include the formation of a fishermen's coalition, which could perhaps raise money to acquire land for docking facilities, or efforts by the parish government to obtain or reserve land on currently unutilized property such as Monkey Island. Commercial fishing is an important aspect of the parish economy and provides jobs for many of its residents. It is hoped some solution may be found before the docks disappear in Cameron and the fishing industry moves on.

Residential Construction and Chenier Vegetation

There has been concern recently that an increase in the amount of housing in Johnson's Bayou is causing most of the trees along the chenier ridges to be cleared. These trees serve as valuable resting areas for birds flying north off the Gulf of Mexico. Chenier trees are wildlife uses which do not exist at nearby locations and which cannot be restored once they have been cut down. It is apparent that land suitable for development is limited in the parish, as well as Johnson's Bayou, and that these ridges make excellent home sites. They are located on high land, they have beautiful landscapes, and they are the most logical places for residential expansion. However, preservation of our natural resources must come first.

A suggestion for the preservation of these chenier ridge trees is the establishment of a park. This would also provide recreation and increase amenities to currently existing homes. This would not be an effort to dictate land control as much as a way to benefit all parties in the future.

Litter in the Parish

The most beautiful of areas can be spoiled by unsightly litter. Along the roadsides and beaches of Cameron Parish there is an abundance of litter. This has become an eyesore and a real problem in the parish. Efforts have been made to help alleviate the problem through a recently enstated prisoner work program to clean up parish litter.

Other suggestions, as mentioned earlier, include increased fines or stiffer enforcement, litter detail as punishment for litter violations, roadside trash cans (especially near canal bridges), and more beach litter disposal areas. The natural beauty of Cameron Parish is too valuable to be spoiled by careless people and unconcerned citizens.

Water Level From the Catfish Locks

Catfish locks are an Army Corps of Engineers-operated lock system at the southwest corner of Grand Lake. It regulates the flow of traffic to and from the Mermentau River, to the south. The locks are also regulated to maintain a specific water level in Grand Lake. That water level is currently 2.0, as mandated by the Corps of Engineers in response to a report bearing this suggestion. The conflict arises when a drought situation occurs in southwest Louisiana, such as this spring (1981). The marsh areas to the south become dried out, saltwater intrusion flows right up to the lock gates, and rice farmers have difficulty obtaining enough water.

Since the primary function of the locks is to regulate water traffic, some of these other problems are at times overlooked. A possible solution would be the re-evaluation of the 2.0 level at which the lake is maintained, so all those affected can have input into the water level decision. Another suggestion is the allowance for deviance from this level in serious situations. This would allow logical judgement based on current conditions. Water is a critical factor in Cameron Parish, and its regulation must consider all aspects of its use.

Recreation Versus Industry at Canal Bridges

Along the major roads in Cameron Parish (Highways 27 and 82) there are canals to allow drainage in the low-lying areas. These canals provide good recreational fishing with good access. The problem is that this fishing goes on at bridges which were built to allow industrial vehicles to enter the marsh. Also, there is no place for these people to park, so they use the shoulder of the highway which is very narrow. This poses a dual threat to traffic safety--commercial vehicles trying to enter the marsh are held up by citizens fishing from the bridge, and the citizens are in danger of getting accidently hurt. Because the highway shoulder is narrow, many times part of the vehicle protrudes out onto the highway, thus causing a highway hazard. Whole families will fish along these roadside canals and there exists a threat to young children who might venture onto the highway.

A possible solution to this problem is the establishment of roadside parking lots across the bridges on the other side of the canal. This would eliminate roadside hazards. Along with parking spaces, there could also be a fine established and enforced for people fishing from bridges. Perhaps if the state supports the CEIP program, some of its funds could be used for this purpose.

Sewage Treatment in Hackberry

As mentioned in the social section of this report, Hackberry has the only real sewage problem in the parish. Percolation of the soil is poor and the ground is level, so sewage disposal has been a real problem in Hackberry for quite some time.

There have been attempts to get funds for sewage treatment plants in the past, but trouble in securing the local match has created a holdup. It is hoped that the strain of additional land use requiring sewage treatment will not create a health problem in Hackberry, and that funding will soon be found to alleviate this problem.

Transportation and Saltwater Intrusion

The Calcasieu Ship Channel accommodates most of the sea cargo for southwest Louisiana. Between the Ship Channel and the Intracoastal Waterway, a large amount of commercial tonnage passes through the Calcasieu locks. However, this traffic has brought more and more saltwater intrusion up the channel into Calcasieu Lake and even as far north as Lake Charles. This problem has contributed to erosion, siltation of canals and rivers, loss of recreational use, and a loss of freshwater sources. Although it is realized how important transportation is in Cameron Parish, it is also important to consider the damage it is causing.

A possible solution would be a lock system at the mouth of the channel. This would, of course, be a costly solution and is not very likely. Obviously, there are some uses which are normally considered as resource use conflicts (industrial discharge, large subdivisions, other activities which have affects on coastal waters) that have not been mentioned in this section. This is because they do not exist in specific cases in Cameron. Considerations for these uses, should they occur, are given in the next section.

The Louisiana Coastal Resources Program is unique among the Gulf states with approved coastal zone management programs. This difference is the establishment of individual coastal management programs within each coastal parish. Cameron Parish feels that the intent of this legislation is clear--that local governments who are the most familiar with their environmental condition should be directly involved in the decision-making process for those uses which impact their areas.

The following pages contain guidelines for uses of both local and state concern, and although Cameron Parish recognizes the state's right to reserve final decisions for uses of state concern to itself, these recommendations are meant to be considered to the maximum extent practicable in all cases.

GOALS, OBJECTIVES, AND POLICIES

FOR

CAMERON PARISH

The preceding chapters of this report have drawn an overall sketch of Cameron Parish. Its environmental characteristics, its social and economic situation, the users of its valuable resources, and the conflicts which arise among these multiple users have been explored. All of these issues help to create the setting which is Cameron Parish.

Now the direction for the future development of Cameron Parish can be prescribed, both in terms of resources to be preserved and areas suited for growth. The mechanism for achievement of this task is the establishment of an effective management system. For the Cameron Parish Coastal Resources Program, this mechanism is the establishment of goals, objectives, and policies for the parish as a whole and for smaller, homogeneous environmental management units. The parish goals, objectives, and policies are general in nature and designed to set a framework of coastal zone management for the entire parish. EMU goals, objectives, and policies are more specific and deal with problems and desired trends for particular areas of the parish.

Goals are the ideal situations which the parish or management aspires to reach. Objectives are the <u>what</u> (the more specific items which must be achieved to reach the goals). Policies are the <u>how</u> (they set forth guidelines or techniques through which the policies can be achieved).

The end result to this management system will be the reduction of problems which plague the valuable resources of the parish, a direction for future growth and the restoration of a way of life which citizens of Cameron Parish have enjoyed for centuries.

GOALS, OBJECTIVES, AND POLICIES

FOR

CAMERON PARISH

GOALS:

To establish a coastal resources program for Cameron Parish which will protect the sensitive marsh and estuarine areas, upgrade the recreational amenities of the parish, promote development within the defined and well planned sectors, and provide for the beneficial coexistance of its people, its businesses, and its industry for the good of the parish, the state, and the nation.

OBJECTIVES:

1) Decrease detrimental effects to marsh areas and loss of productive wetlands.

2) Prevention of saltwater intrusion into fresh and intermediate marsh areas, resulting in death of native vegetation, erosion, and siltation.

3) Maintenance of natural water flow where possible.

4) Educate the public of the intrinsic value of the wetlands and to the importance of its maintenance for future generations.

5) Prevent subsidence and erosion within the coastal zone.

6) Minimize effects of pipelines in marsh areas.

7) Maintain the quality of water in the parish while increasing the amount available.

8) Reduce the likelihood of flooding in the parish.

9) Reduce saltwater intrusion into coastal lakes and rivers, undertake replanting of native grasses, and stabilize shorelines where possible.

10) Adherence to refuge management guidelines for activities occurring on refuge lands.

11) The arrest of shoreline erosion and the restoration of beaches by the establishment of jetties, breakwaters, etc.

12) Promotion, where possible, of parish recreation sources (i.e. through Act 455) and use of CEIP funds for recreational amenities where needed.

13) Enhancement of the parish through the planned development of its growth.

14) Require industry which has adverse impact to coastal wetlands and waters to adhere to mitigation guidelines.

15) Adoption of the Cameron Parish Coastal Resources Ordinance as Cameron Parish law to allow permitting uses of local concern.

POLICIES:

1) Monitor and influence all development in the coastal zone.

2) Proper operation of canal and lock systems regarding saltwater intrusion, to plug all unnecessary canals leading into open water bodies which decrease water velocity, and to balance activities calling for freshwater reservoirs.

3) A strict control system pertaining to channelization which requires a coasal permit and requires users of the channel to restore the canal consistent with goals of the parish coastal resources program.

4) Provide brochures and workshops which point out the value and beauty of the parish's recreational areas by involving them in the permit hearing process.

5) Inhibit saltwater intrusion, undertake replanting of native grasses, and stabilize shorelines where possible.

6) Cooperation between the parish and the refuges concerning adherence to refuge management guidelines and projects.

7) Parish resources directed towards agricultural needs and priority given to residential land use.

8) Promotion, where possible, of parish recreation sources (i.e. through Act 455) for use of CEIP funds for recreational amenities, where needed.

9) Inclusion of a permitting process as part of the parish coastal resources program, which will be incorporated into the parish ordinances.

10) Because of strong objection by the citizens of Cameron Parish and members of the Citizens Advisory Committee, and because we feel that the risk to an environmentally sensitive area is so significant, the Citizens Advisory Committee and the Cameron Parish Police Jury strongly recommends that chemical and hazardous injection wells be prohibited from Cameron Parish, if at all possible.

11) To protect and conserve historial archaeological resources in the parish.

12) Parish guidelines for uses of local concern and recommendations, which the parish requests the state to consider for uses of state concern, are included below:

A. Discourage backfill and previously cut canals which have become wildlife habitat.

B. Encourage board roads or use of existing canals as opposed to new canal cuts in marsh areas.

C. Provision of drag line or plow trails around all canals where feasible.

Explanation: Many times, canal cuts destroy trapping trails. This requirement will insure habitat access to trappers.

D. Staggering of bar pits which should be no more than 400' in length.

Explanation: To insure proper drainage and sheet flow.

E. Minimum culvert diameter of 24".

Explanation: To insure proper drainage capacity.

F. Stop canal cuts at least 75' from another waterway.

Explanation: To insure erosion doesn't cause a continuous waterway.

G. Access site during high tide.

Explanation: Drilling barges normally required 8' of water draft. Many areas require either sweeping out of proposed barge route or floating barge in during high tide.

H. Use turbidity screens during dredging.

Explanation: This is to reduce the damage to shellfish and other organisms caused by sediment deposition from dredging.

I. Revegetate distributed spoil areas with appropriate native materials.

Explanation: Revegetating areas distributed by dredging helps to prevent the future erosion of the distributed area, which often occurs before natural revegetation can occur.

J. Spoil banks shall be graded to avoid potholes or other fisures which would create mosquito breeding habitat.

Explanation: Self-explanatory.

K. Dredged material should be deposited in open water areas adjacent to marsh in non-navigation areas at elevations conducive to the creation of new marsh.

Explanation: Self-explanatory.

L. Restrictions on the width of altered areas of marsh or swamp adjacent to pipelines.

Explanation: Restrictions are placed to maintain natural drainage and nutrient exchange.

M. Upon abandonment, canals should be plugged using earthen plug and rip-rap or other stabilizing material.

Explanation: To avoid saltwater intrusion into freshwater areas.

N. Mitigation may be stipulated to improve one area of marsh or swamp for destroying another.

Explanation: Self-explanatory.

O. Stabilization material should be used on areas of severe erosion along canal length.

Explanation: To prevent erosion.

P. Use directional drilling, where necessary, to avoid severe damage to marsh habitat, wildlife, or archaeological features.

Explanation: Self-explanatory.

Q. Placement of clam shells to provide new oyster habitat.

Explanation: Self-explanatory.

R. All logs and stumps unearthed during dredging should be buried beneath the bottom of the waterway or removed to a disposal site on land.

Explanation: To avoid underwater obstructions.

S. Spoil should be spread so as not to decrease the water depth by more than 0.5'.

Explanation: This condition applies to open water areas to avoid decreasing navigable water depth.

T. Spoil should be deposited leaving a minimum of 50' gaps every 500'. Also, no spoil will be placed in marsh ponds or tidal streams.

Explanation: This condition is used in areas when saltwater intrusion is not a problem in order to maintain sheet flow and water circulation patterns.

U. Shorelines should be stabilized by methods other than bulkheading (i.e. rip-rap, matting material, or natural vegetation).

Explanation: Bulkheading can cause further bank erosion in areas which are not predominantly bulkheaded by increasing wavewash. Other methods of shoreline erosion in many situations may be more effective.

V. Board road conditions:

(1) Culverts should be placed where streams and sloughs are crossed by the roadway embankment and at other locations to promote or maintain sheet flows. The maximum spacing between culverts shall be 500'. The openings of the culverts must be maintained so as to allow for free flow of water.

(2) Contents of mud pits and other drilling residues should be removed from the site and disposed of in a lawful manner when drilling operations have been completed.

(3) Ring levees should be degraded by restoring the material with which they were built into the areas from which it was removed, and the area leveled to as near pre-project conditions as practicable after mud pits have been cleaned.

(4) Broken boards and other extraneous construction materials should be removed from the site when the road is abandoned by the permittee. All plastic sheeting should be removed from areas of the roadway from which the boards are removed.

(5) No hydrocarbons, substances containing hydrocarbons, drilling mud, drilling cuttings, and toxic substances should be allowed to enter adjacent waterways and wetlands.

(6) The road fill placed in wetlands should be degraded when the location is abandoned. The material should be deposited into the bar areas or ditches, and the area restored to as near pre-project conditions as practical using the material available in the road fill.

(7) That should changes in the location or the section of the existing waterways, or in the generally prevailing conditions in the vicinity be required in the future, in the public interest, the applicant should make such changes in the project concerned or in the arrangement thereof as may be necessary to satisfactorily meet the situation and shall bear the cost thereof.

Explanation: These board road conditions ensure that sheet flow and water circulation

are maintained, and that toxic substances or pollutants are not allowed to enter into wetland habitats.

(14) Local expertise will be utilized in regulating uses of local concern and commenting on uses of state concern.

ENVIRONMENTAL MANAGEMENT

UNITS

Once the problems of the parish have been identified and the general goals for the parish have been established, it is necessary for the means of accomplishment to be determined. The Louisiana Coastal Resources Program has been designed to incorporate management units at the local level. Management units are specific areas in the parish which have their own unique characteristics and problems. Therefore, they also have their own specific goals, objectives, and policies for management of activities within their boundaries.

Since the inception of the Coastal Zone Management program in 1976, management units have decreased from 32, as designated in 1978, to 23 this year. The environmental management units, or EMU's were streamlined to better fit the homogenous areas of the parish. These management units are also grouped because EMU's with like characteristics will have similar goals and management guidelines. However, they remain individual so particular activities may be regulated with regard to the specific environment of each unit.

The following section is devoted to the goals, objectives, and policies of the EMU's of Cameron Parish. Each group of EMU's is in two parts: A general description of each unit (including the particular problems which bear identification), and the goals, objectives, and policies for each group. In some areas policies will serve as mitigation guidelines for certain activities.

This type of management process will not only allow local programs to assess and regulate activities of local concern, but will allow the state to determine guidelines for activities of state concern which occur in the parish.

Because certain EMU's have very similar characteristics either from a congruent geographical and geological perspective (such as Blue Buck Ridge and Cameron Meadows) or because, regardless of geographical location, they share similar problems and goals (such as the lakes and communities), they have been grouped accordingly.

On the first two groups, the identified characteristics do not necessarily apply because their properties are outside of the scope which these particular characteristics encompass (such as the properties of the major lakes which are grouped) or because their characteristics are too varied to include in one group (such as the various communities which are grouped because of common goals).

Therefore, the EMU's and their groups have been matched to best identify the regional and specific problems of the Cameron Parish coastal zone.

At this point, it is necessary to clarify the relationship of Cameron Parish and the state concerning the permitting of uses within the coastal zone. The parish is responsible for regulating uses of local concern by Act 361, and the state is responsible for regulating uses of state concern by the same legislation. However, the whole purpose of including the parishes in the coastal resources program is to derive their input and to adhere, wherever possible, to their recommendations and suggestions. The citizens who live in the local parishes have to live with the decisions which are made. Therefore, although final authority concerning uses of state concern lies with the state, it is the entire thrust of this program to insure that the parish is included in the decision-making process, and that their recommendations and concerns are given maximum weight.

GOALS, OBJECTIVES, AND POLICIES
FOR CAMERON PARISH
ENVIRONMENTAL MANAGEMENT UNITS

Group I

- Sabine Lake
- Calcasieu Lake
- Grand Lake

Group II

- Cameron-Creole
- Hackberry
- Grand Chenier
- Johnson's Bayou
- Grand Lake Ridge

Group III

- Sabine Refuge
- Lacassine Refuge
- Rockefeller Refuge

Group IV

- Cameron Meadows
- Blue Buck Ridge

Group V

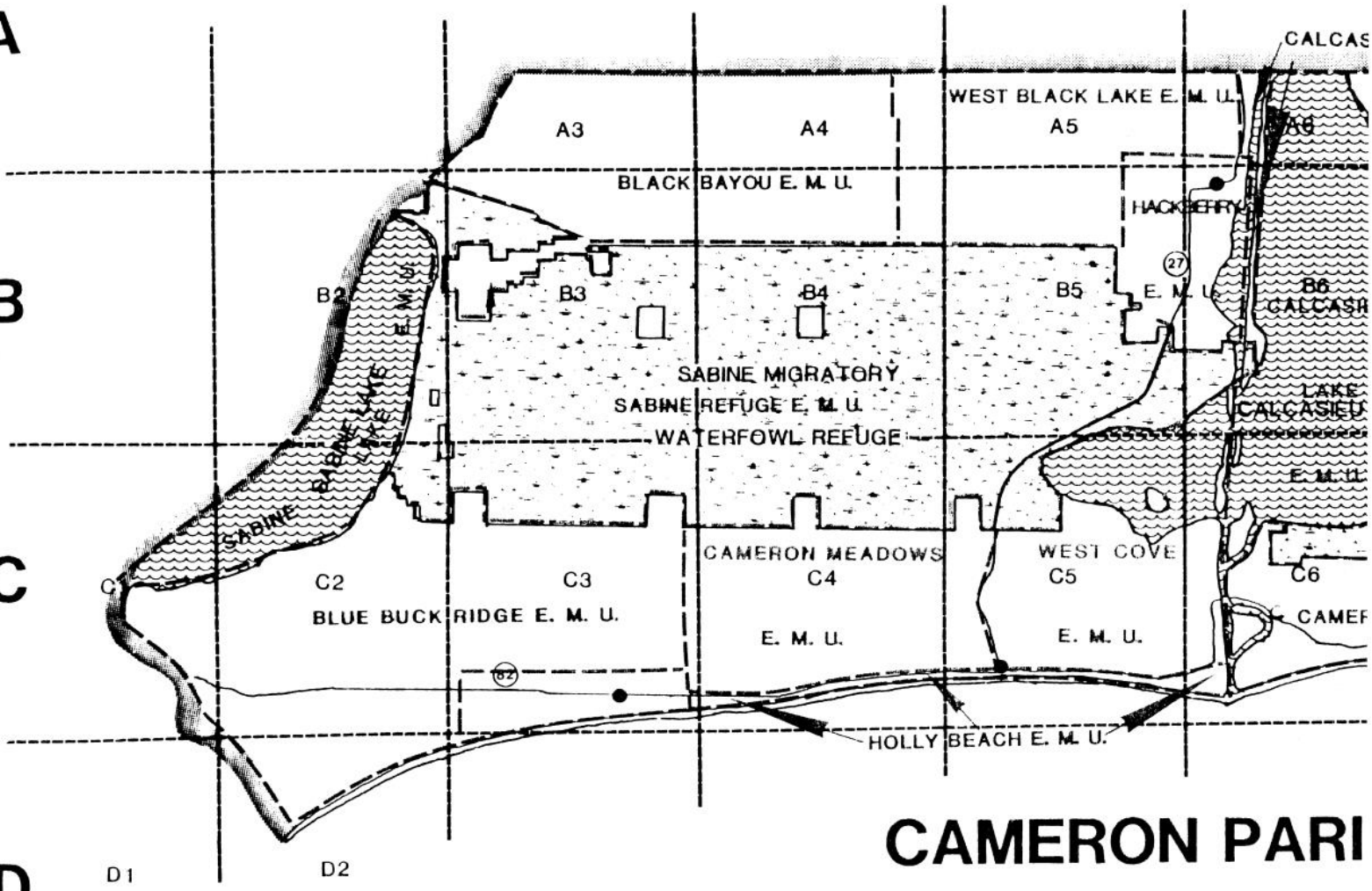
- Big Pasture Area
- Big Burn East
- Big Burn West
- Pumpkin Ridge

Group VI

- West Black Lake
- Black Bayou

Non-Grouped Management Units

- West Cove
- Holly Beach
- Calcasieu River
- Hog Bayou



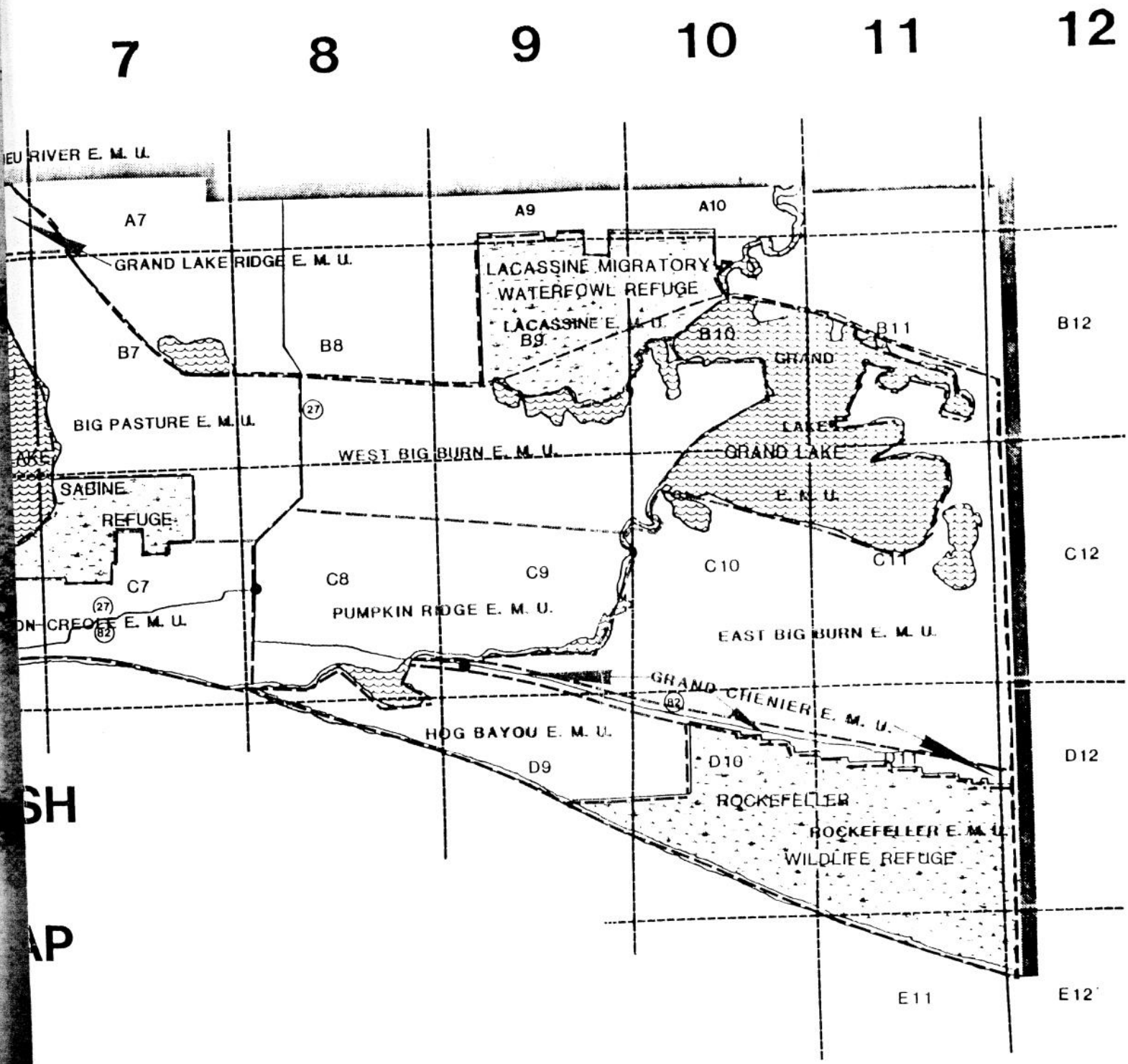
CAMERON PARI

E. M. U.

REFERENCE M

* THIS MAP CORRESPONDS TO THE USGS QUADRANGLE MAPS WHICH AC

E. M. U. REFERENCE MAP NOT SC



OMPANY THIS REPORT IN APPENDIX 3

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FIGURE 14

177 –

GROUP I*

Calcasieu Lake | Grand Lake | Sabine Lake

This group encompasses the three major lakes in Cameron Parish which have all been designated as Environmental Management Units because they have unique problems and properties. Each are used for both commercial fishing and commercial transport activities, and each have recreational values, however a further description is needed to give a general idea of their current conditions.

Calcasieu Lake is the largest of the three lakes and is located in the center of the parish. Its primary problems are saltwater intrusion (which is amplified by the constant traffic in the Calcasieu Ship Channel, which is an outlet to the Gulf of Mexico), turbidity levels caused from frequent underwater constructions for pipelines and lakebottom disturbance from energy exploration which brings heavy metal deposits up from the bottom and disperses them in the shallow water areas like West Cove. Since this is one of the main fishing and oyster-gathering areas in the parish, these activities can be detrimental to marine life.

Sabine Lake is only partially located in Cameron Parish and in Louisiana, as Cameron Parish borders the state line with Texas. However, the Louisiana side of the lake suffers primarily from saltwater intrusion through the Sabine Pass which opens into the Gulf of Mexico, shoreline erosion on the lakebank, and pollution from industries on the Texas side of the lake (Port Arthur).

Grand Lake is located on the eastern side of the parish near the Vermilion Parish line. Its primary problems include saltwater intrusion from the Intracoastal Waterway and shoreline erosion.

The following pages are a breakdown of the lakes' properties and a guide for restoration of their water quality.

*For topographical information, see map reference on Figure 14.

LOCATION: Check Figure 1 for the location of each of these lakes.

TOPOGRAPHY: Water bodies.

UNIQUE ECOLOGICAL FEATURES: Oyster reefs.

RECREATION: Fishing, boating, as well as fishing in the lakes.

PROBLEMS:

1) Significant erosion on the banks of all lakes.

2) Saltwater intrusion from the Calcasieu Ship Channel in Calcasieu Lake, from the Sabine Pass in Sabine Lake, and from the Intracoastal Waterway and from the Mermentau River in Grand Lake. All of these lakes have access to the Gulf in some form, thus causing the high levels of saltwater intrusion.

3) Materials left in the lakes from construction activities, such as pipelines, which act as obstructions to fishing activities.

4) Pollution from sewage and storm drain discharges and industry discharges into the tributaries which flow into Calcasieu Lake and Sabine Lake.

5) Constant dredging activities which bring heavy metal deposits from the bottom and disperse them into the water, especially in shallow waters.

GOALS:

To insure good water quality levels to enhance recreational and commercial fishing activities in the major lakes.

OBJECTIVES:

1) Reduce shoreline erosion.

2) Reduce saltwater intrusion.

3) Maximize commercial fishing conditions.

4) Monitor and reduce point discharge pollutions.

5) Reduce lakebottom disruption where needed.

POLICIES:

1) To plug all new canals opening into the lakes with spoil material or rip-rap at least 75 feet from lake banks.

2) Continued monitoring of SPR brine line and encouragement of a lock system for barge traffic entering the major lakes.

3) Require all subsurface materials associated with construction activities to be removed upon completion of activities (platform bases, concrete pilings, discarded pipeline materials, etc.).

4) Discourage dredging activities through oyster reefs.

5) Monitor heavy metal and effluent levels in the lakes at places nearest point source discharges.

6) Monitor turbidity levels of dredging activities.

7) Recommend central drilling locations for multiple wells in shallow areas of major lakes, such as West Cove in Calcasieu Lake, to reduce dispersion of heavy metals which have settled to the bottom in these areas.

GROUP II*

Cameron	Creole	Hackberry
Grand Lake Ridge	Grand Chenier	Johnson's Bayou

This group encompasses the communities which are spread throughout Cameron Parish, as can be seen in Figure 1 of this report. These communities have been grouped because they are the only real areas of population growth in the parish. Their problems range from lack of good ground water in Johnson's Bayou to lack a of an adequate sewer system in Hackberry, to a lack of enough jail space in Cameron (the county seat).

The goals of these communities collectively are not much different than any community and, therefore, their specifics and the implementation policies for their goals are included in the following pages.

*For topographical information, see map reference on Figure 14.

LOCATION: Due to the lack of developable land in Cameron Parish, the communities of Cameron Parish have been earmarked as the growth areas of the parish. Because of this designation, the communities of the parish are grouped into a single category. Even though they are scattered throughout the parish, they have the same problems and goals and, therefore, represent a cohesive group. Their various locations may be found in Figure 1.

TOPOGRAPHIC: Primarily raised land with various forms of vegetation.

UNIQUE ECOLOGICAL FEATURES: None.

SOILS: Various (see Figure 10).

SUBSIDENCE: Hackberry, Grand Lake - very low; Johnson's Bayou, Holly Beach - low; Cameron - medium; Grand Chenier - high; Creole - very high.

LAND LOSS POTENTIAL: Medium in all communities except Holly Beach where it is high.

HYDROLOGICAL: Primarily potable water in all areas except Johnson's Bayou.

FLOODING POTENTIAL: High in all areas. Holly Beach, Johnson's Bayou, Cameron, and Grand Chenier are in a V-12 Zone; Creole is in a V-5 Zone; and Hackberry and Grand Lake are in an A-2 Zone.

VEGETATION: Various forms of marsh and dry land vegetation.

LAND USE: Residential, commercial, industrial, agricultural, public, and utility.

IMPORTANT FARMLANDS: Hackberry and Grand Lake have some prime farmland areas.

RECREATION: Fishing, hunting, trapping, and water sports.

HISTORICAL, ARCHAEOLGICAL, AND CULTURAL: The Cameron Lighthouse has recently been restored and would be considered a historical site. Cameron is the site of the Louisiana Fur and Wildlife Festival which is held in January of each year, and Grand Chenier is the site of the Cameron Parish Deep Sea Rodeo held each 4th of July.

PROBLEMS:

1) Limited developable land.

2) Flood hazards.

3) Sewage problem in Hackberry, parishwide sanitary landfill problems.

4) Water quality problems in Johnson's Bayou area.

5) Organization of land use patterns.

GOALS:

To enhance development opportunities in communities and to plan for growth while reducing harmful effects which urban land uses have on the environment.

OBJECTIVES:

1) Encourage development in areas which are best suited for growth.

2) Limit flood hazard potential as much as possible.

3) Limit harmful effects of community waste while insuring efficient treatment of this waste.

4) Restrict the use of having detrimental effects to water resources in sensitive areas.

5) Plan for orderly growth in those communities which have resources to accommodate it.

POLICIES:

1) Use of planning tools to allow for most efficient use of land.

2) Encourage industrial growth along ship channels where spoil from ship channel dredging has turned into developable land.

3) Restriction of uses which significantly alter the flow of water.

4) Discourage water control structures such as levees in critical water flow areas.

5) To develop a solid waste disposal program for parishwide waste disposal.

6) To encourage installation of a community-wide sewage facility in Hackberry, while monitoring percability of soils in the new subdivisions and point sources of industrial waste.

7) Because the freshwater base in the Johnson's Bayou area is so easily penetrated by saltwater, the CAC strongly urges disposal of saltwater by means other than injection wells in this area.

8) Monitor depths of water levels in the Chicot Aquifer, the primary source of freshwater in the area.

GROUP III*

(Sabine, Lacassine, and Rockefeller Refuges)[1]

The state and federal wildlife refuges are outside of the jurisdiction of this report. Therefore, only a brief description of their characteristics shall be covered in as much as they control the uses which occur on their respective boundaries.

GOALS:

To preserve the refuges as habitat for a wide variety of wildlife species, and to offer wildlife-oriented recreation to refuge visitors.

OBJECTIVES:

1) To provide wintering habitat for migratory waterfowl, consistant with objectives of the Mississippi Flyway Council.

2) To provide optimum habitat and protection for endangered and threatened species, including the Red Wolf, Perequine Falcon, and American Alligator.

3) To provide optimum habitat for wildlife-oriented recreation, interpretation and environmental education for over 100,000 visitors annually.

[1]The above noted refuges are state and federal entities and are outside outside the jurisdiction of DNR. Therefore, these are merely suggestions.

4) To provide optimum habitat for a wide diversity of game and non-game birds, mammals, reptiles, and amphibians.

POLICIES:

1) Implementation of wildlife management practices, including controlled burning, water level manipulation, and cattle grazing.

2) Constant observation and monitoring of endangered species and their habitats.

3) Public fishing and waterfowl hunting, nature trail and observation tower, boat access rollers and launching ramps, and portable restrooms as part of the public use program.

4) Use of freshwater impoundments and barge canal systems as part of the existing management facilities; piers, levees, lakeshore stabilization patrol substations, and water control structures as part of the proposed management facility expansions.

*For topographical information, see map reference on Figure 14.

GROUP IV*

Cameron Meadows

Blue Buck Ridge

These two units are located in the Southwest section of the parish, west of Highway 27 and south of the Sabine National Wildlife Refuge. The Cameron Meadows unit is plagued with excessive canal cuts as well as saltwater intrusion and flooding. Mitigation activities to alleviate these problems have been suggested in the goals and objectives of this EMU.

Blue Buck Ridge suffers from a poor ground water quality supply and shoreline erosion along the Sabine Lake. These problems have also been addressed in the goals and objectives.

*For topographical information, see map reference on Figure 14.

CAMERON MEADOWS

LOCATION: Cameron Meadows EMU runs from the Magnolia Vacuum Canal on the west of Highway 27 on the east. It lies between the southern boundary of Sabine National Wildlife Refuge on Highway 82.

TOPOGRAPHIC: Primarily intermediate and organic salt marshes with an alluvial chenier ridge along its southern border.

UNIQUE ECOLOGICAL FEATURES: None.

SOILS: Primarily the Haplaquolls-Hydraquents Association (also known as the Harris Saltwater Marsh Association).

SUBSIDENCE: Ranges between medium in most of the unit to low in the southwest corner of the unit.

LAND LOSS POTENTIAL: Medium throughout the unit.

HYDROLOGICAL RESOURCES: Most of the unit lies in Region 4 of the water quality standard, meaning it has limited potable water sources.

FLOODING POTENTIAL: The unit lies in Zone V-12, which means it has serious flooding potential.

VEGETATION: Intermediate and brackish marshes and some saltwater marsh in the extreme southern portion of the EMU.

LAND USE: Recreational, oil and gas exploration, and commercial hunting and trapping.

IMPORTANT FARMLANDS: None.

HISTORICAL, ARCHAEOLOGICAL AND CULTURAL: None.

PROBLEMS:

1) Saltwater intrusion.

2) Excessive flooding.

3) Water flow problems due to excessive canal cutting.

GOALS:

To prevent further unnecessary disruption of the marsh and restore marsh characteristics to the maximum extent possible.

OBJECTIVES:

1) Reduce saltwater intrusion.
2) Reduce water flow and flooding problems.
3) Discourage further disruption of the marsh.
4) Maintain environmental quality of the marsh.
5) Protect freshwater sources.

POLICIES:

1) Recommend the plugging of all canals traversing both saltwater and freshwater marsh areas.

2) Restrict, to the maximum extent practicable, the connection of drainage ditches in the construction of roads; thereby inhibiting continuous channels for saltwater intrusion, especially around the board roads of First and Second Bayou in the northwest corner of the Cameron Meadows unit.

3) Stabilization of the Sabine Lake shoreline on the extreme northwest corner of the Blue Buck Ridge unit with both shell and rip-rap.

4) Recommend that any new exploration activities use existing canal cuts or slip off of them. The excessive canal cuts are particularly acute around the Old East Bayou area.

5) Recommend the plugging of all canal cuts in both EMU's leading off significantly large existing canals or other bodies of water with a 75' plug.

6) Encourage culvert drainage as opposed to entire canal backfill.

7) Any canals leading off of Hamilton Lake should be immediately plugged.

BLUE BUCK RIDGE

LOCATION: Located in the southwest corner of the parish, this EMU runs from the Sabine Pass on the west to the Magnolia Vacuum Canal, and lies between the Gulf and Sabine National Wildlife Refuge.

TOPOGRAPHIC: Mineral and organic salt and brackish marshes, chenier plain ridges, and intermediate marsh areas.

UNIQUE ECOLOGICAL FEATURES: None.

SOILS: Haplaquolls-Hydraquents and Haplaquolls-Udipsaments Associations.

SUBSIDENCE: Low and medium subsidence in the EMU. Low subsidence in the eastern portion, and medium in the western portion.

LAND LOSS POTENTIAL: High along the coastline and the Sabine Pass area, and medium in the rest of the unit.

HYDROLOGICAL: The entire unit lies within Region 4 of the water quality standard and, therefore, has limited potable water supplies. Hamilton Lake near Johnson's Bayou is the only lake in the area.

FLOODING POTENTIAL: This entire area is located in flood zone V-12, and is susceptible to extreme flooding.

VEGETATION: Intermediate, brackish, saline marshes, and alluvial chenier ridges.

LAND USES: Recreational, oil and gas exploration, and commercial hunting and trapping.

IMPORTANT FARMLANDS: None.

RECREATION: Fishing, hunting, and trapping.

HISTORICAL, ARCHAEOLOGICAL AND CULTURAL: Five known shell middens (check Figure 11 for locations).

PROBLEMS:

1) Shoreline erosion.

2) Saltwater intrusion.

3) High salinity groundwater base.

4) Open canal cuts on Hamilton Lake.

GOALS:

To preserve the environmental characteristics of the marsh, to the extent possible, while insuring compatible development.

OBJECTIVES:

1) To stabilize shoreline erosion.

2) To reduce saltwater intrusion.

3) To reduce contamination of groundwater base.

4) To reduce salinity and chemical leakage in the Hamilton Lake.

POLICIES:

1) Use of shell and rip-rap along Hamilton Lake.

2) Install sediment catching fingers along the lake bank.

3) Recommend the plugging of all canal cuts to within 75' of existing water bodies.

4) Recommend the use of board roads wherever possible.

5) Restrict, to the maximum extent practicable, canals leading off of Hamilton and Sabine Lakes.

6) Recommend all chemical puts to be neutralized upon abandonment.

GROUP V*

Big Pasture Area

Pumpkin Ridge

Big Burn East

Big Burn West

These EMU's are located east of Calcasieu Lake and lie south of the Intracoastal Waterway and north of Highway 82. The major problems in these areas are excessive flooding from floods and runoff, saltwater intrusion, street water flow interruption, marsh disruption, adverse activities associated with oil and gas exploration, and water flow from Grand Lake through the Catfish Locks operated by the Corps of Engineers.

Each of their characteristics, problems and recommendations for solutions is covered in the following pages.

*For topographical information, see map reference on Figure 14.

BIG PASTURE

LOCATION: Runs from Calcasieu Lake on the west to Highway 27 on the eastern border and lies between the Grand Lake Ridge boundary on the north side to Sabine Wildlife Refuge annex and the Cameron-Creole EMU border to the south.

TOPOGRAPHIC: This is an area of mineral and organic fresh to brackish marsh that occurs near sea level. The area is flooded most of the time by fresh water on the northeast side of the unit. The west side is flooded by saltwater except where protected by dikes or levees and pumped off or controlled by flood gates. Much of the area is affected by tidal action and occasional tropical storms.

UNIQUE ECOLOGICAL FEATURES: None.

SOILS: Primarily Haplaquolls-Hydraquents Association, but there are also soils of the Medisaprists-Haplaquolls, Morey-Beaumont, and Mowata-Morey-Crowley Associations (see Figure 7).

SUBSIDENCE: Very low in the northwestern part of the unit, very high in the northeastern part of the unit, and medium in the southern part of the unit.

LAND LOSS POTENTIAL: High along the shoreline of Calcasieu Lake, its western boundary. Medium in the rest of the unit.

HYDROLOGICAL: Located in Region 2 of the water quality standard guide, potable freshwater sources, no lakes or rivers in the unit.

FLOOD POTENTIAL: High. Unit split by Zone V-5 and Zone A-2.

VEGETATION: Primarily brackish marsh with some modified wetlands and coastal plains to the northwest, and brackish and fresh marsh to the northeast (see Figure 10).

LAND USE: Wildlife habitat, cattle grazing, some energy exploration, fur trapping, and hunting.

IMPORTANT FARMLANDS: North central section used for rice production and cattle raising.

RECREATION: Fishing and hunting.

HISTORICAL, ARCHAEOLOGICAL AND CULTURAL: Two shell middens (see Figure 11).

PROBLEMS:

1) Saltwater intrusion from Calcasieu Lake and Intracoastal Waterway.
2) Shoreline erosion.
3) Sheet water marsh flow inhibited by freshwater levees.
4) Flooding.
5) Chemical pits left unneutralized.

GOALS:

To reduce marsh disruption and to see that proper mitigation is undertaken to restore those marsh areas which are adversely affected by certain coastal uses.

OBJECTIVES:

1) To reduce saltwater intrusion into freshwater marsh areas.

2) To stabilize shoreline erosion on Calcasieu Lake and the Intracoastal Waterway.

3) To provide adequate tools necessary for restoration of sheetwater flow in marsh areas.

4) To reduce flooding where possible.

5) To insure continuous ring levees and neutralization of chemical pits in the Big Pasture area.

POLICIES:

1) Recommend the plugging of all new levees leading into the marsh on the west side of the Calcasieu Lake between the Sabine Wildlife Refuge annex and the Intracoastal Waterway, and leading in south from the Intracoastal Waterway between Sweetlake Canal and Highway 27. Also, plug canals which come south off of Sweetlake Canal.

2) Recommend the use of rip-rap and shell to stabilize shoreline erosion along the west side of Calcasieu Lake,

which is subject to tidal action and large amounts of saltwater intrusion.

Use above materials to also stabilize the Intracoastal Canal, which is subject to saltwater intrusion and continuous barge traffic.

3) Recommend the installation of culverts and other necessary devices to insure proper drainage and sheetflow, especially in the area between Bayou Bois Connine and the north prong of Grand Bayou.

4) Recommend that all chemical pits be neutralized upon completion of the activity creating them.

WATERSHED WORK PLAN

CAMERON-CREOLE WATERSHED

Cameron Parish, Louisiana

January 1967, 1971, & 1982

SUMMARY PLAN

This work plan is for watershed protection, flood prevention, and agricultural water management in the Cameron-Creole Watershed. It was prepared by the Gravity Drainage District No. 3 and Gravity Drainage District No. 4 of Cameron Parish, the Cameron Parish Police Jury, and the Gulf Coast Soil and Water Conservation District as the sponsoring local organizations. Technical assistance was provided by the Department of Public Works of the State of Louisiana, the Bureau of Sport Fisheries and Wildlife of the U. S. Department of Interior, and the Soil Conservation Service of the U. S. Department of Agriculture.

The watershed contains about 113,000 acres, or 177 square miles, in Cameron Parish. Approximately 1 percent of the area is in cropland, 8 percent is in pastureland, 68 percent is in rangeland, and 23 percent is in miscellaneous uses which include the National Wildlife Refuge, villages, farmsteads, roads, etc. The Bureau of Sport Fisheries and Wildlife administers 14,926 acres, and the Cameron Parish School Board administers about 1,280 acres. The remainder of the area is privately owned.

All of the watershed land is level to nearly level. The elevations range from sea level to 8 feet above sea level. All land below the approximate elevation of 2 feet above sea level is considered marsh and approximately 82 percent of the watershed is in this category. Land that is above this elevation consists of several ridges, locally referred to as "cheniers", and practically all the watershed residents have their homes on these cheniers.

Cameron (population about 3,000) and Creole (population about 500) are the only villages in the watershed.

There are both saltwater marshes and freshwater marshes within the watershed, and both are highly productive range sites for grazing cattle and for wildlife habitat. The natural vegetation that is desirable as forage plants for cattle produces from 2,000 pounds of air-dry herbage per acre up to 10,000 pounds. This marsh area is centered in one of the major duck and geese wintering areas of the United States.

This area has deteriorated as a wetland marsh since the mid-1940's. due to increasing soil and water salinities, undesirable fluctuation of low water levels, and extremely high floodwater inudation.

These conditions alternately occur. Flooding of the marsh occurs from storm runoff in the Calcasieu River watershed, from abnormally high tide events, and from high direct precipitation.

The primary objectives of the project are watershed protection, flood prevention, and water management for range. The proposed plan will meet these objectives by installing, in a 5-year period, a project for the protection and development of the watershed. The total estimated installation cost is $3½ million for the levee and approximately $3¼ million for the structure. Public Law 566 will bear about 75-80 percent of this cost. Other interests will bear the entire cost of operation and maintenance.

Structural Measures

Structural measures planned consist of about 19 miles of single-purpose levee for flood prevention, 35 miles of multiple-purpose channel improvement for flood prevention and agricultural water management, multiple-purpose water control structures for flood prevention and agricultural water management.

Benefits

Approximately 3,600 persons live within the watershed and will receive benefits from the installation of the project. Benefits will result directly to about 98,074 acres involving about 295 landowners and operators and to 14,926 acres of the Sabine National Wildlife Refuge administered by the Bureau of Sport Fisheries and Wildlife.

An estuarine study is presently being carried out by Louisiana Cooperative Fishery Research Personnel from LSU to determine the number and kind of structures to be placed in the openings going into Calcasieu Lake.

THE BIG BURN MANAGEMENT AREA[1]

Location

The Big Burn Management Unit is located in the western portion of the Mermentau drainage system and is situated approximately 15 miles south-southeast of of Lake Charles, Louisiana, and 8 miles north of Grand Chenier, Louisiana, in Cameron Parish. It is bordered to the west by Louisiana Highway 27, and to the east by Grand Lake. The north is bounded by the Gulf Intracoastal Waterway (GIWW) and Lacassine National Wildlife Refuge; the southern boundary is adjacent to and north of Little Chenier Ridge and the Mermentau River.

Size and Location

Large ponds, bayous, and canals make up approximately 7% of the 59,301-acre management unit (U. S. Fish and Wildlife Service, 1982). The major pond area is located directly in the center and the southeast corner of the management unit (Figure 4).

The western side of the area is interspersed with small ponds and broken marsh. The extreme western edge of the area, totaling several hundred acres, is open water. This phenomenon was caused by saltwater intrusion. The northeast section of the management unit is a closed stand wiregrass marsh interspersed with location canals.

[1]Big Burn Management Plan, Miami Corporation, 1984.

History

The Big Burn marsh received its name following the 1924-25 drought. During the drought, extensive peat burns scoured the marsh 1.5 to 1.8 meters to the clay subsoil (Lynch, 1941; O'Neil, 1949). Since the 1924-25 burn, many of the ponds created by the peat burn have reverted to climax vegetation.

Although this area was historically an estuarine nursery ground, it no longer functions in this capacity as far as fisheries are concerned (Gunter & Shell, 1958; Morton, 1973). Since the installation of a number of water control structures in 1950, (at Catfish Point, Schooner Bayou, Superior Canal, Vermilion River, Calcasieu River, and Freshwater Bayou) the Mermentau Basin has essentially become one large freshwater impoundment (Gosselink et al, 1979).

Ecological Stage

The major portion of the management unit is included in the fresh marsh area of the Vegetative Type Map of Louisiana Coastal Marshes (Chabreck and Linscombe, 1978). A narrow strip of marsh running along the east side of Louisiana Highway 27 from the Gibbstown Bridge to Little Chenier Road is classified as intermediate marsh. The portion of the management unit designated as fresh marsh is in a climax vegetational state, while the narrow band of marsh running along the east side of Louisiana Highway 27 is in a sub-climax state.

In 1978, saltwater intruded into the west side of the Big Burn Management Unit, causing the destruction of several hundred

acres of fresh and intermediate marsh plants (U. S. Fish and Wildlife Service, 1979). When environmental factors have stabilized, this area should revert to a climax vegetational situation.

BIG BURN WEST

LOCATION: Runs from Highway 27 to Grand Lake and the Mermentau River, and lies between the Intracoastal Waterway and Little Chenier Ridge.

TOPOGRAPHIC: This is an area of mineral and organic fresh to brackish marsh that occurs near sea level occurring at or near sea level. The area is flooded most of the time by water, except for the west side of the unit which is flooded by saltwater much of the time and is slowly becoming a brackish marsh. Peat soils make up about 60% of the area with organic surfaces from 18-40 inches thick over a grey clay subsoil.

UNIQUE ECOLOGICAL FEATURES: None.

SOILS: Primarily Medisaprists-Haplaquolls Association with Haplaquolls-Hydraquents Association in the southeast corner.

SUBSIDENCE: Very high throughout the unit.

LAND USE POTENTIAL: High throughout most of the unit.

HYDROLOGICAL: Located in Region 2, no major water bodies in unit.

FLOODING POTENTIAL: Very high, located in Zone V-5.

VEGETATION: Fresh and brackish marsh.

LAND USE: Recreation, oil and gas exploration, and commercial hunting and trapping.

IMPORTANT FARMLANDS: None.

RECREATION: Hunting and fishing.

PROBLEMS:

1) Excess flooding from rain and runoff from surrounding areas.

2) Water control structures need to be operated according to weather conditions.

3) Saltwater encroachment on the freshwater marsh areas.

4) Lake bank erosion on Grand Lake.

GOALS:

To maintain characteristics of fresh- and saltwater marshes, to control flooding and its harmful effects, and to inhibit saltwater intrusion.

OBJECTIVES:

1) To reduce chance of flooding.

2) To suggest maintaining the Calcasieu locks according to weather conditions, as well as other criteria.

3) To reduce saltwater encroachment.

4) To reduce erosion on lake banks.

POLICIES:

1) Recommend the installation of culverts and other water-flow structures.

2) Monitoring of the Cameron-Creole Watershed Project.

3) Suggest that the Corps of Engineers consider weather conditions (such as drought or flooding) as well as water level on Grand Lake for opening and closing the Catfish Locks on Grand Lake.

4) Consider the building of levees between the fresh- and saltwater or brackish marshes near the Little Pecan Lake area.

5) Recommend the plugging of all canals leading off Grand Lake not used for commercial transportation.

6) Recommend the use of rip-rap, shell, and sediment catching fingers to reduce erosion on Grand Lake.

BIG BURN EAST

LOCATION: West of the Mermentau River and Grand Lake, north of the Grand Chenier Management Unit to the Intracoastal Waterway.

TOPOGRAPHY: Mineral and organic freshwater marsh occurring at or near sea level. The area is flooded most of the time by fresh water although the extreme southern portion of the unit is brackish marsh. Peat soils make up about 75% of the area and have an organic surface of 18-50 inches over a grey clay subsoil.

UNIQUE ECOLOGICAL FEATURES: Large organic peat marsh.

SOILS: Medisaprists-Haplaquolls and Haplaquolls-Hydraquents Associations.

SUBSIDENCE: Very high through most of the unit, and high in the rest of the unit.

LAND LOSS POTENTIAL: High throughout most of the unit.

HYDROLOGICAL: No lakes, numerous small lakes, constant flooding, potable groundwater base.

FLOODING POTENTIAL: High, Zone V-5.

VEGETATION: Primarily freshwater marsh with some intermediate marsh and some modified wetlands in the southern part of the unit.

LAND USE: Agriculture, oil and gas exploration, water storage, wildlife habitat, and commercial hunting and trapping.

IMPORTANT FARMLANDS: None.

RECREATION: Hunting and fishing.

HISTORICAL, ARCHAEOLOGICAL AND CULTURAL: Twenty-one shell midden sites throughout the unit.

PROBLEMS:

1) Excess flooding from rain and runoff in the area.

2) Lack of seasonal adjustments from the Catfish locks on Grand Lake.

3) Recommend that mitigative measures for marsh restoration include educating the landowner as to possible alternatives, and include him in the decision-making process.

4) Severe land loss and subsidence potential create conditions which are non-conducive to board roads for oil and gas exploration activities, therefore canal cuts have become numerous in some areas.

GOALS:

To control excessive flooding in the unit, and to direct coastal uses in the unit in a way as to reduce marsh disruption.

OBJECTIVES:

1) Insure that runoff and rainwater have proper drainage to prevent excessive flooding.

2) Alleviate detrimental effects from coastal uses.

POLICIES:

1) Monitor the efficiency of the Cameron-Creole Watershed project, which is designed to alleviate this excess flooding.

2) Recommend that transport activities associated with energy exploration be limited to existing canals, since board roads are not feasible (due to soil conditions) and since numerous canal cuts already exist.

3) Request that the Corps of Engineers at the Catfish Locks on Grand Lake consider weather conditions, as well as water level, on Grand Lake.

4) Based on the experience of Rockefeller Refuge personnel, the CAC recommends that any state or federal agencies demonstrate evidence to the landowner that backfilling is the best mitigative measure for that particular area, and that alternative proposals be discussed.

PUMPKIN RIDGE

LOCATION: This EMU runs from Highway 27 to the Mermentau River and lies between Little Chenier Ridge and the Mermentau River and Lower Mud Lake.

TOPOGRAPHIC: Primarily intermediate and fresh marsh with organic peat soils, flooded most of the time from the Mermentau River to the west and Big Burn West to the north with freshwater.

UNIQUE GEOLOGICAL FEATURES: Alluvial chenier ridges.

SOILS: Haplaquolls-Hydraquents Association interspersed with Haplaquolls-Udipsaments Association.

SUBSIDENCE: Low subsidence potential throughout the EMU.

LAND LOSS POTENTIAL: Medium land loss potential.

HYDROLOGICAL: Region 2 of water quality standards, no major rivers or lakes in the unit.

FLOODING POTENTIAL: High throughout the unit, which is located entirely in Zone V-5.

VEGETATION: Primarily intermediate marsh with some chenier ridge areas and fresh marsh to the north, and brackish marsh to the south.

LAND USE: Recreation, oil and gas exploration, and commercial hunting and trapping.

IMPORTANT FARMLANDS: None.

RECREATION: Hunting and fishing.

HISTORICAL, ARCHAEOLOGICAL AND CULTURAL: One shell midden along the Mermentau River.

PROBLEMS:

1) Saltwater intrusion from the south.

2) Occasional flooding from the north.

3) Siltation along the banks of the Mermentau.

GOALS:

To maintain good marsh habitat and preserve individual marsh characteristics.

OBJECTIVES:

1) Reduce flooding potential.
2) Reduce saltwater intrusion.
3) Reduce detrimental affects to the Mermentau River.

POLICIES:

1) To insure proper water flow from the Little Chenier areas to the north.

2) Recommend that all canals opening into the Pumpkin Ridge from the Hog Bayou EMU to the south and from the Mermentau River to the east be plugged.

3) Plug canals along the Mermentau River to help eliminate siltation from the Pumpkin Ridge EMU, and reduce the potential to decrease river velocity.

GROUP VI*

West Black Lake

Black Bayou

These EMU's are located in the northwest corner of Cameron Parish above the Sabine Wildlife Refuge. The West Black Lake Management Unit is perhaps the worst unit in the parish. It suffers from extreme subsidence caused primarily by depletion of underground oil and gas resources, which were taken out in the 1930's and 1940's and for which no replacement substance such as water was added. This problem is especially acute in the east side of the unit, which is constantly flooded and therefore has little vegetation left. The outline to remedy some of these problems and to prevent further damage to this unit is outlined in the goals and objectives section.

The Black Bayou area is in fairly good shape; however, it suffers from numerous canal cuts along the Black Bayou itself as well as saltwater intrusion and shoreline erosion. The goals and objectives section of this unit follows.

*For topographical information, see map reference on Figure 14.

WEST BLACK LAKE

LOCATION: Located between the Calcasieu-Cameron Parish line to the north and the Sabine National Wildlife Refuge and the Hackberry EMU to the south. It runs from the Cameron Farms road to the Calcasieu River.

TOPOGRAPHIC: This is perhaps the worst EMU in the coastal zone of Cameron Parish. The west side of this unit is poorly drained, subject to constant tidal action and flooding, has highly organic poorly drained, dark colored soils which are subject to subsidence. In the earlier days of drilling, oil taken out of the ground caused large amounts of subsidence and caused much of the area to sink below sea level. Several saltwater ponds and open water areas occur in the unit.

UNIQUE ECOLOGICAL FEATURES: None.

SOILS: Haplaquolls-Hydraquents Association and Mowata-Morey-Crowley Association.

SUBSIDENCE: Medium to high.

LAND LOSS POTENTIAL: High along the banks of the Calcasieu Ship Channel, medium in the rest of the unit.

HYDROLOGICAL: Region 2, Black Lake located in the unit.

FLOODING POTENTIAL: Zone A-2, extremely high in east side of the unit.

VEGETATION: Primarily brackish marsh with some intermediate marsh and some modified wetlands in the west section of the unit.

LAND USE: Oil and gas exploration, and commercial fishing.

IMPORTANT FARMLANDS: Near Cameron Farms on the west side of the parish.

RECREATION: Hunting, fishing.

HISTORICAL, ARCHAEOLOGICAL AND CULTURAL: Three shell midden sites around Black Lake.

PROBLEMS:

1) Severe subsidence problems.
2) Continuous flooding.
3) Excessive saltwater intrusion.
4) Sheet erosion due to lack of marsh vegetation.
5) Lake bank erosion.

GOALS:

To restrict further deterioration to the marsh, and to restore to the extent possible the environmental characteristics of the original marsh.

OBJECTIVES:

1) Reduce the subsidence potential from non-environmental sources.

2) Reduce water level in the EMU and reduce chance of future flooding.

3) Inhibit saltwater intrusion.

4) Restore vegetation and remove EMU from tidal action.

5) Restore lake bank to inhibit shoreline erosion.

POLICIES:

1) Strongly recommend that any oil company doing exploration in the unit to refill the area where oil or gas is extracted with freshwater, to reduce the chance of soil subsidence.

2) Suggest draining the east side of the unit and levee the north side of the unit near Kelsoe Bayou.

3) Recommend plugging any and all canals leading into the Calcasieu Lake, Black Lake, or Calcasieu Ship Channel.

4) Recommend the installation of culverts and other water-flow devices, to recreate the natural sheet flow of the unit.

5) Recommend replanting native vegetation in the drained areas which will not currently support vegetation.

6) Recommend the use of rip-rap and shell to stabilize shoreline erosion on the north bank of Black Lake and the west bank of the Calcasieu Lake.

BLACK BAYOU

LOCATION: From Cameron Farms to the Sabine River/Texas border lying between the Cameron-Calcasieu Parish border and the Sabine National Wildlife Refuge.

TOPOGRAPHIC: The eastern part of the unit is poorly drained, dark colored soils on the prairie. The west part of the EMU is mineral and organic brackish marsh.

UNIQUE ECOLOGICAL FEATURES: None.

SOILS: Haplaquolls-Hydraquents and Morey-Beaumont Associations.

SUBSIDENCE: Medium to very low.

LAND LOSS POTENTIAL: Medium to low.

HYDROLOGICAL: Black Bayou is located in the unit, potable groundwater base.

FLOODING POTENTIAL: From low in some areas to high in others (near Sabine Lake), Zone A-Z.

VEGETATION: Fresh, intermediate and brackish with some coastal plain around the Cameron Farms area.

LAND USE: Agricultural, recreational, oil and gas exploration, and commercial hunting and fishing.

HISTORICAL, ARCHAEOLOGICAL AND CULTURAL: Three shell midden sites.

PROBLEMS:

1) Saltwater intrusion.

2) Extensive canal cuts.

3) Stream bank erosion along Black Bayou.

GOALS:

To protect the marshlands of the Black Bayou EMU from deterioration and excessive adverse coastal uses.

OBJECTIVES:

1) Limit saltwater intrusion.

2) Limit canal cuts.

3) Inhibit further shoreline erosion along Black Bayou.

POLICIES:

1) Canal cuts leading into major waterways which are not used for navigation should be plugged.

2) Recommend the use of board roads for transportation into the marsh, where feabible.

3) Rip-rap and shell should be used to stabilize banks of the major water body in Black Bayou.

NON-GROUPED EMU'S*

These EMU's are addressed separately, due to special characteristics or their inability to be associated with other groups.

*For topographical information, see map reference on Figure 14.

WEST COVE

The West Cove area covers the west cove of Calcasieu Lake, which is located west of the Ship Channel and that area of land west of the lake and east of Highway 27. The problems of this unit include the stirring of heavy metals from the bottom in the shallow areas of the cove caused by multiple drilling sites, high turbidity levels and oyster reef destruction from underwater construction activities and saltwater intrusion, flooding, erosion on the land or marsh area of this unit.

Several ideas to reduce these problems are given in the policy section of this unit.

WEST COVE

LOCATION: Located west of the Calcasieu Ship Channel to Highway 27, and lying between the Sabine National Wildlife Refuge and the Gulf of Mexico.

TOPOGRAPHIC: An area of mineral and organic salt and brackish marsh subject to tidal action and frequent flooding.

UNIQUE ECOLOGICAL FEATURES: None.

SOILS: Haplaquolls-Hydraquents and Haplaquolls-Udipsaments Associations.

SUBSIDENCE: Primarily medium and some low near the coast (along the chenier ridge).

LAND LOSS POTENTIAL: High along the cost and along the banks of the West Cove of the Calcasieu River.

HYDROLOGICAL: Contains the West Cove of Calcasieu River and has primarily a potable water base.

FLOODING POTENTIAL: Very high, Zone V-12.

VEGETATION: Primarily brackish marsh, some salt and intermediate as well.

LAND USE: Industrial development along west bank of ship channel, oil and gas exploration, and commercial fishing.

IMPORTANT FARMLANDS: None.

RECREATION: Boating, fishing, and hunting.

HISTORICAL, ARCHEOLOGICAL AND CULTURAL: None.

PROBLEMS:

1) Dredging activities in the shallow waters of West Cove cause the resuspension of heavy metals, which have settled on the bottom into the water.

2) Oyster reefs must be protected from disrupting activities such as pipeline construction.

3) High turbidity levels.

4) Saltwater intrusion.

5) Shoreline erosion.

GOALS:

To reduce detrimental effects to marine life in Calcasieu Lake, and to reduce marsh disruption in the West Cove EMU.

OBJECTIVES:

1) Reduce frequent drilling activities in different sites in the West Cove of Calcasieu Lake.

2) Protect oyster reefs from disruption.

3) Reduce turbidity levels in Calcasieu Lake.

4) Inhibit saltwater intrusion.

5) Prevent further shoreline erosion.

POLICIES:

1) Recommend that multiple well drilling in the shallow areas of West Cove be carried on from a central point, to reduce redispersement of heavy metals and to reduce turbidity.

2) Recommend underwater construction activities, such as pipelines through state-designated oyster reefs, be restricted to the maximum extent practicable.

3) Provide jetties on either side of the open areas of the Calcasieu Ship Channel, to reduce turbidity.

4) All but main transportation canals leading into land areas from the West Cove of Calcasieu Lake should be

plugged, to reduce saltwater intrusion.

5) Rip-rap and shell should be used to prevent further erosion along the banks of the Calcasieu Lake.

HOLLY BEACH

Holly Beach is the primary recreational beach in Cameron Parish. It is located south of Highway 27, a few miles west of the Calcasieu Ship Channel ferry. Its foremost problems are erosion, which has been significantly reducing the beach area for years, littering, and lack of beach maintenance and emergency vehicles.

This beach is used by visitors from all over Louisiana and surrounding states and is an important part of Cameron Parish's tourism business.

HOLLY BEACH

LOCATION: South of Highway 82 between the West Cove and Johnson's Bayou environmental management units.

TOPOGRAPHIC: Chenier ridge sandy soils with poorly drained clayey soils between cheniers. Primarily beach area adjacent to the Gulf of Mexico.

SOILS: Haplaquolls-Udipsaments Association.

SUBSIDENCE: Low.

LAND LOSS POTENTIAL: Very high.

HYDROLOGICAL: Saltwater ground base due to proximity to Gulf of Mexico.

FLOODING POTENTIAL: High, Zone V-12.

VEGETATION: Saline marsh and saltwater beach vegetation.

LAND USE: Recreational, and commercial hunting and fishing.

IMPORTANT FARMLANDS: None.

HISTORICAL, ARCHAEOLOGICAL AND CULTURAL: None.

PROBLEMS:

1) Shoreline erosion.

2) Littering.

3) Lack of adequate beach maintenance and law enforcement.

GOALS:

To restore the recreational quality of Holly Beach, and to reverse shoreline erosion along its Gulf of Mexico banks.

OBJECTIVES:

1) Stabilize shoreline erosion.

2) Upgrade policing activities.

3) Insure adequate beach maintenance.

POLICIES:

1) Recommend the use of jetties, breakwaters, and other sediment-catching devises to reduce harmful erosion effects of tidal action, and to restore some of the beach area.

2) Increase policing of Holly Beach and give tickets for littering of the beach.

3) Recommend the purchase of equipment to maintain the beach and for emergency purposes.

CALCASIEU RIVER

Saltwater intrusion reaches from Calcasieu Lake to north of Lake Charles on the Calcasieu River. This translates into almost 40 miles of saltwater intrusion into southwest Louisiana, due in part to barge traffic through the Calcasieu Ship Channel and the Intracoastal Waterway. There is also a large petrochemical industry base set up along the Calcasieu River in Lake Charles which releases pollution into the water. Therefore, the Calcasieu River unit is a special unit which has been set up to monitor saltwater and pollution levels in Calcasieu Lake.

The goals for its operation are found on the following pages.

CALCASIEU RIVER

LOCATION: A narrow strip following either side of the Calcasieu Ship Channel between the Calcasieu Parish line and the Hackberry EMU.

TOPOGRAPHIC: An area of organic and mineral brackish marsh through which the Calcasieu Ship Channel passes.

UNIQUE ECOLOGICAL FEATURES: None.

SOILS: Hapaquolls-Hydraquents Association.

SUBSIDENCE: Medium.

LAND LOSS POTENTIAL: High.

HYDROLOGICAL: Potable groundwater base, ship channel, flooded marsh areas.

FLOODING POTENTIAL: High.

VEGETATION: Brackish marsh.

LAND USE: Oil and gas exploration, commercial barge traffic, and commercial hunting and fishing.

IMPORTANT FARMLANDS: None.

RECREATION: Fishing and hunting.

HISTORICAL, ARCHAEOLOGICAL AND CULTURAL: None.

PROBLEMS:

1) Pollution.
2) Saltwater intrusion.
3) Flooding.

GOALS:

To provide better water quality for recreational purposes in Calcasieu Lake and Cameron Parish.

OBJECTIVES:

To monitor pollution levels and saltwater intrusion levels in Calcasieu Lake.

POLICIES:

1) A water quality station should be set up at this EMU to determine the effect of pollution from the north of Calcasieu Parish and from the traffic in the Calcasieu Ship Channel.

2) Monitor the extent of saltwater intrusion in north Calcasieu Lake and the effect which the ship channel and the Intracoastal Waterway have on this saltwater level.

HOG BAYOU

Hog Bayou is the primary saltwater marsh area along the Gulf of Mexico in Cameron Parish, as such it is the foremost estaurine breeding ground for saltwater marine life. Because of its sensitivity to many coastal uses and the importance of its role in the seafood industry, certain guidelines to preserve its character must be set forth. They are listed in the goals, objectives, and policies sections for this EMU in the following pages.

HOG BAYOU

LOCATION: West of the Mermentau River to Rockefeller Wildlife Refuge and south of Highway 82.

TOPOGRAPHIC: This is an area of organic saltwater marsh that occurs at or many times below sea level in the southern part of the parish. The area is flooded by saltwater except where protected by dikes and drained by pumps or where it is controlled by flood-gates. Much of the area is affected by tidal action and occasional tropical storms. Many saltwater ponds and tidal channels are present.

UNIQUE ECOLOGICAL FEATURES: Large saltwater estuarine area.

SOILS: Haplaquolls-Hydraquents Association.

SUBSIDENCE: High throughout the unit.

LAND LOSS POTENTIAL: High along the coastal area, medium in the northern part of the unit.

HYDROLOGICAL: Saltwater surface ponds, potable water underground source.

FLOODING POTENTIAL: High, Zone V-12.

VEGETATION: Saline and brackish marsh.

LAND USE: Oil and gas exploration, marine estaurine area, recreation, and commercial hunting and trapping.

IMPORTANT FARMLANDS: None.

RECREATION: Fishing and hunting.

HISTORICAL, ARCHAEOLOGICAL AND CULTURAL: Shell midden sites along the Mermentau River.

PROBLEMS:

1) Extremely sensitive estuarine areas.
2) No flooding protection along Bayou Labauve.
3) Chemical pits unneutralized at drilling sites.
4) Shoreline erosion.

GOALS:

To protect one of the major saltwater nursery areas in the parish, and to protect the natural marsh characteristics of the Hog Bayou EMU.

OBJECTIVES:

1) Reduce potential for detrimental effects on sensitive estuarine areas.

2) Reduce flood hazards from freshwater areas.

3) Reduce hazard of unneutralized chemical pits seeping out into marshland.

4) Reduce potential for shoreline erosion.

POLICIES:

1) To limit the amount of detrimental activity in the estuarine areas of Hog Bayou by recommending use of board roads and directional drilling (where feasible) for well sites, and for pipelines to go around estaurine areas (where feasible).

2) Recommend the neutralization of chemical pits at drill sites.

3) Recommend restricting increased salinity levels in estuarine areas which could damage the habitat.

4) Provision of a levee along Bayou LeBlank to inhibit freshwater flooding from the north.

5) Use of jetties and breakwaters, as well as sediment-catching "groins", are recommended to reduce further shoreline erosion on the banks of the Hog Bayou EMU which borders the Gulf of Mexico.

THE CAMERON PARISH

COASTAL RESOURCES PROGRAM

ADMINISTRATIVE CONSIDERATIONS

The final step in the implementation process of the coastal zone is the ordinance which converts the program into parish law. The ordinance, spelling out the various aspects and requirements of the program, is found in the following section; however, certain parts of the ordinance, which have been included for total compliance with La. R.S. 49:213, must be further explained. The purpose of this section is to accomplish the above task and to elaborate on other administrative sections related to the local program.

Staff Requirements

In order for the local coastal resources program to be administered in Cameron Parish, a permitting agent's office will be established to review, issue, and monitor permits for uses of local concern in the coastal zone.

The responsibilities of this office will be to (1) accept applications for coastal use permits, (2) determine if these are of local, state, or federal concern, (3) monitor the permitted uses for compliance with permit specifications, (4) review any plans whether regional, state, or federal which include Cameron Parish and any other duties which are consistent with permitting in the coastal zone, and (5) comment on all permit guidelines as set forth by DNR for uses of state concern within the 25-day deadline. Staff requirements will basically include the permitting agent (to determine the kinds of uses and to monitor activities), and an administrative assistant who will handle office tasks (typing, filing, etc.) and accept permit applications in the absence of the permit agent.

Activities Which Have Effects Beyond Their Own Management Units

Even though Cameron is a sparcely populated parish with a large area, there are still some activities which occur within the coastal zone which have effects beyond their particular management unit. Most significant among these is the SPR brine line which has its base operations in Hackberry, and which pumps brine into the Gulf of Mexico. Other activities which have far-reaching effects include dredging and canal cuts which affect the flow of water in marsh areas, lack of sewage treatment in areas such as Hackberry which runs into coastal waters, artificial levees and other water barriers, pollution which comes from Lake Charles through the Calcasieu River management unit, and the ship channel which increases saltwater intrusion in lakes and rivers. These are the main activities which have affects beyond their management units, although some others may exist.

Consideration of Greater Than Local Benefit

Part of the administrative process in permitting the various uses in Cameron Parish is the determination of local, regional, state, and federal interest in a particular activity. There are basically two categories of permits: uses of local concern and uses of state concern. Regional and federal interests are included as uses of state concern and require state permits. Uses of federal interest are found on pages 117-132, while uses of regional benefit are found on pages 143-146 of the Louisiana Coastal Resources Final Environmental Impact Statement. Uses of state and local concern are found in subsection 213.5 of Act 361 and in Section 2.5 of the Cameron Parish Coastal Management Ordinance. No aspect

of the local program shall be so restrictive so as to exclude uses of greater than local benefit and, therefore, each permit application shall be reviewed to identify these interests in compliance with Act 361.

Administrative Coordination

Cameron is a rather unique parish in the fact that its only governmental body is the police jury. There are no incorporated towns or other political entities. There are, however, advisory committees such as the drainage board and the planning commission, but no written memoranda of understanding exists between them. Only a verbal agreement concerning areas of concern is in effect.

There are no current multi-parish agreements concerning plans affecting Cameron Parish. In the event that some activity or plan concerning environmental considerations in Cameron and another parish or parishes should arise, there is a provision that the police jury will seek to coordinate meetings with the involved parishes or state and federal agencies. In order to insure that these multi-parish environmental considerations will be undertaken if needed, all plans and activities involving Cameron and other parishes shall be reviewed by the permitting agent's office.

Ordinances

In order to create a smooth transition into the existing legal framework of Cameron Parish, its ordinances have been reviewed for consistency with the proposed coastal management ordinance. Although there are several sections of the ordinance which are related to coastal management, only two have guidelines which

fall within the concerns of the proposed coastal management ordinance. These are Section 7: Flood Hazard and Control, and Article II of Section 19: Roads and Drainage. Both of these sections are in compliance with the objectives of the coastal resources program. Article II of Section 19 requires a parish permit for any oil exploration activities. Although the parish permits oil exploration under its own ordinance, under the coastal resources program, oil exploration is a use of state concern and, therefore, Cameron's ordinance will not be included as part of the local program.

Permitting by the Department of Natural Resources

Cameron Parish is a very active area for the oil and gas industry. The large areas of unpopulated wetlands make drilling locations much easier to access for land rigs. There is also a large number of offshore rigs in the Cameron Parish area, and growth in the oil exploration support industry is occurring in Cameron. Under Act 361, all oil and gas related activities must be permitted by the State DNR. During 1981, Cameron Parish has ranked third in the state for DNR permits with 190 by the middle of August. The coordination between DNR and the parish is a very real need for efficient management of the coastal zone in Cameron Parish.

The following section is from the LCRP Federal Environmental Impact Statement, which outlines the state's role in coastal use permitting and the actual permitting process:

The State's Role:

1. Coastal use permit applications shall be submitted to the administrator, except that applications for uses in areas subject to an approved local program may instead be submitted to the local government. Local governments with an approved program to whom applications are submitted shall make the initial determination, subject to review by the administrator with a right of appeal to the commission, as to whether the proposed use is of state concern or local concern. In the event of an appeal to the commission, the burden of proof shall be on the administrator. Copies of all applications submitted to local governments, and the local government's use-type determination, shall be transmitted to the administrator within two days of receipt.

2. Within ten days of receipt of a coastal use permit application by the administrator, copies of the application shall be distributed to the local government or governments in whose parish the use is to occur and all appropriate state and local agencies and public notice shall be given. A public hearing on an application may be held.

3. The decision to approve, approve with modifications, or otherwise condition approval, or deny the coastal use permit shall be made within thirty days after public notice or within fifteen days after a public hearing, whichever is later. The coastal use permit decision must be consistent with the state program and approved local programs for affected parishes and must represent an appropriate balancing of social, environmental and economic factors. In all instances local government comments shall be given substantial consideration.

4. The decision to approve, approve with modifications, or otherwise condition approval, or deny the application for a coastal use permit shall be in writing and copies of the decisions shall be sent to all parties.

5. Public notice of coastal use prmit decisions shall be given.

6. The secretary may adopt rules providing for alternate procedures for the filing of applications, distribution of copies, giving of notices, and public hearings in order to implement the coordinated coastal permitting process established pursuant to Section 213.14.

7. The applicant, the secretary, and affected local government or affected federal, state, or local agency, any aggrieved person, or any other person adversely affected by

a coastal use permit decision may appeal the coastal use permit decision to the commission. An appeal must be filed in writing within thirty days following public notice of the final decision and shall be in accordance with procedures adopted by the commission.

8. The secretary is authorized to adopt rules and procedures for the issuance of general coastal use permits and for the issuance of variances from the normal coastal use permitting requirements. For the purposes of this Part, a general coastal use permit is an authorization to prospective users to perform specific uses within prescribed areas of the coastal zone without the necessity for a complete, independent review of each proposed use and allows the shortest time period of review possible. The rules and procedures which may be adopted pursuant to this Section shall provide for expeditious processing of applications for general coastal use permits and may authorize variances from the normal coastal use permit application and review procedures. General coastal use permits and variances from the normal coastal use permitting requirements may not be issued except when the issuance of such general coastal use permits or variances does not impair the fulfillment of the objectives and policies of the Part.

9. The secretary shall adopt rules whereby specified types of activities may be carried out under prescribed emergency conditions without the necessity of obtaining a coastal use permit in advance.

10. The secretary is authorized to establish a reasonable schedule for fees to be charged to the applicant for the processing and evaluation of coastal uses permit applications.

The State's Permitting Process:

1. When an apparently complete application for a permit is received, the permitting body shall immediately assign it a number for identification, acknowledge receipt thereof, and advise the applicant of the number assigned to it.

2. Application processing will begin when an application that is apparently complete is accepted by the permitting body.

3. Within two working days of receipt of an apparently complete application by a local government with an approved program, a copy of the application and all attachments and the local government's decision as to whether the use is one of state or local concern shall be sent to the Administrator.

4. Public notice will be issued within ten days of receipt of an apparently complete application by the Administrator.

5. The permitting body shall evaluate the proposed application, to determine the need for a public hearing.

6. The permitting body shall either send a draft permit to the applicant for acceptance and signature, or send notice of denial to the applicant within thirty days of the giving of public notice or within fifteen days after the closing of the record of a public hearing (if held), whichever is later.

7. The applicant, the secretary, any affected local government or affected federal, state, or local agency, any aggrieved person, or any other person adversely affected by a coastal use permit decision may appeal the coastal permit decision to the commission. An appeal must be filed in writing within thirty days following public notice of the final decision and shall be in accordance with procedures adopted by the commission.

Areas and Uses Normally Requiring Permits

The area normally requiring permitting in the coastal zone could be those areas below the five-foot msl line, which might be subject to uses of local concern. In Cameron Parish, this is the entire coastal zone because it is predominantly wetlands and primarily below the five-foot contour line. The coastal zone boundary is illustrated in Figure 1 of the report.

Although there are no areas, except the cheniers which lie above the five-foot contour in the coastal zone, some of the area north of the Intracoastal Waterway is above the five-foot contour in Cameron Parish. Activities which might have an affect upon coastal waters in this area include discharge of industrial or public waste, discharge of other pollutants into coastal waters, large subdivisions or other development which may contribute to runoff and high turbidity levels, oil spills in industrial canals which open into coastal waters, injection wells, large amounts of chemical additives used for agriculture, municipal dumps located near coastal waters, and any other uses which would affect the environment so as to have significant impact on coastal waters.

Uses of the coastal zone subject to the coastal use permitting program shall be of two types:

1. Uses of State Concern - Those uses which directly and significantly affect coastal waters and which are in need of coastal management and which have impacts of greater than local significance or which significantly affect interests of regional, state, or national concern. Uses of state concern shall include, but not be limited to:

   (a) any dredge or fill activity which intersects with more than one water body;

   (b) projects involving use of state-owned lands or water bottoms;

(c) state publicly-funded projects;

(d) national interest projects;

(e) projects occurring in more than one parish;

(f) all mineral activities, including exploration for, and production of, oil, gas, and other minerals, all dredge and fill uses associated therewith, and all other associated uses;

(g) all pipelines for the gathering, transportation, or transmission of oil, gas, and other minerals;

(h) energy facility siting and development; and

(i) uses of local concern which may significantly affect interests of regional, state, or national concern.

2. Uses of Local Concern - Those uses which directly and significantly affect coastal waters and are in need of coastal management, but are not uses of state concern, and which should be regulated by the Cameron Parish Police Jury. Uses of local concern shall include, but not be limited to:

(a) privately-funded projects which are not uses of state concern;

(b) publicly-funded projects which are not uses of state concern;

(c) maintenance of uses of local concern;

(d) jetties or breakwaters;

(e) dredge or fill projects not intersecting more than one water body;

(f) bulkheads;

(g) piers;

(h) camps and cattlewalks;

(i) maintenance dredging;

(j) private water control structures of less than $15,000 in cost; and

(k) uses on cheniers, salt domes, or similar land forms.

THE COASTAL USE PERMITTING PROCESS IN CAMERON PARISH

The permitting process in Cameron Parish is a twofold process: first, it is a process to permit uses of local concern for the parish; and second, it is a checking process for uses of state concern. This second process is an attempt to include local programs, with knowledge of their own problems, in the permitting decisions at the state level. This allows better cooperation and more accurate requirements between the state and local levels.

All applications for permitted activities in the coastal zone must be reviewed by the local permitting office in Cameron Parish. The chart on the following page describes the local permitting procedure. Its general outline is as follows:

1) The state will notify the parish of any preapplication hearing, for which they have 24-hour's prior notice.

2) All applications are submitted to the local permit agent or the state administrator.

3) For permits submitted at the local level, the agent will make an initial decision (within two days) as to whether the activity in question is of local or state concern, and he will then forward a copy of the permit application and his decision to the administrator of the Coastal Management section of the Department of Natural Resources.

4) The administrator concurs or reverses this decision and notifies the parish.

5) For permits submitted at the state level, the secretary will make his determination of local or state concern, and then forward this along with a copy of the application within two working days.

6) Public notice of the permit application is published, including where to address comments.

7) A comment and review period of twenty-five (25) days follows publication of a public notice.

8) For uses of local concern, the Cameron Parish permit agent shall review the permit application and make a recommendation to the police jury during the twenty-five (25) day review period.

9) At the conclusion of the review period, the police jury shall make the decision to approve or deny the permit, or to hold a public hearing.

10) If a decision is made to hold a public hearing, the Cameron Parish Police Jury shall conduct a hearing at least thirty (30) days after the notification of the hearing.

11) Upon the completion of a public hearing, the Cameron Parish Police Jury shall make a decision either to issue or deny the permit.

12) All appeals of the Cameron Parish Police Jury concerning coastal permit decisions must be made within thirty (30)

days to the judiciary system.

This is a brief description of the local permit process. Exact details of the process are found in the ordinance. Requirements for public notices and public hearings are consistent with the Louisiana Coastal Resources Program.

PERMITTING DECISION

The permit agent will be responsible for the determination of local or state concern for each project or activity. The site review for each activity will then reveal the required mitigation for uses of local concern or the basis for comment on a use of state concern.

The final recommendation for either use will follow a three-stage process: (1) permitting agent's recommendation; (2) comments from other parish agencies such as the drainage board, mosquito control, etc.; and (3) police jury recommendations. Unfavorable comments from the other agencies in the parish will require a meeting with the permitting agent, the police jury, and the agency or agencies involved.

The final recommendation will then be translated into requirements for uses of local concern or submitted as a comment on a use of state concern. The initial and final recommendations will be made based on the local and state guidelines, taking into account the particular situation in which the activity occurs and the best interests of the parish, its citizens, and the state.

Cameron Parish will submit an annual report on the activities of their approved local program. This annual report will include:

1) The number, type, and characteristics of applications for coastal use and other permits.
2) The number, type, and characteristics of coastal use and other permits granted, conditioned, denied, and withdrawn.
3) The number, type, and characteristics of permits appealed to the courts.

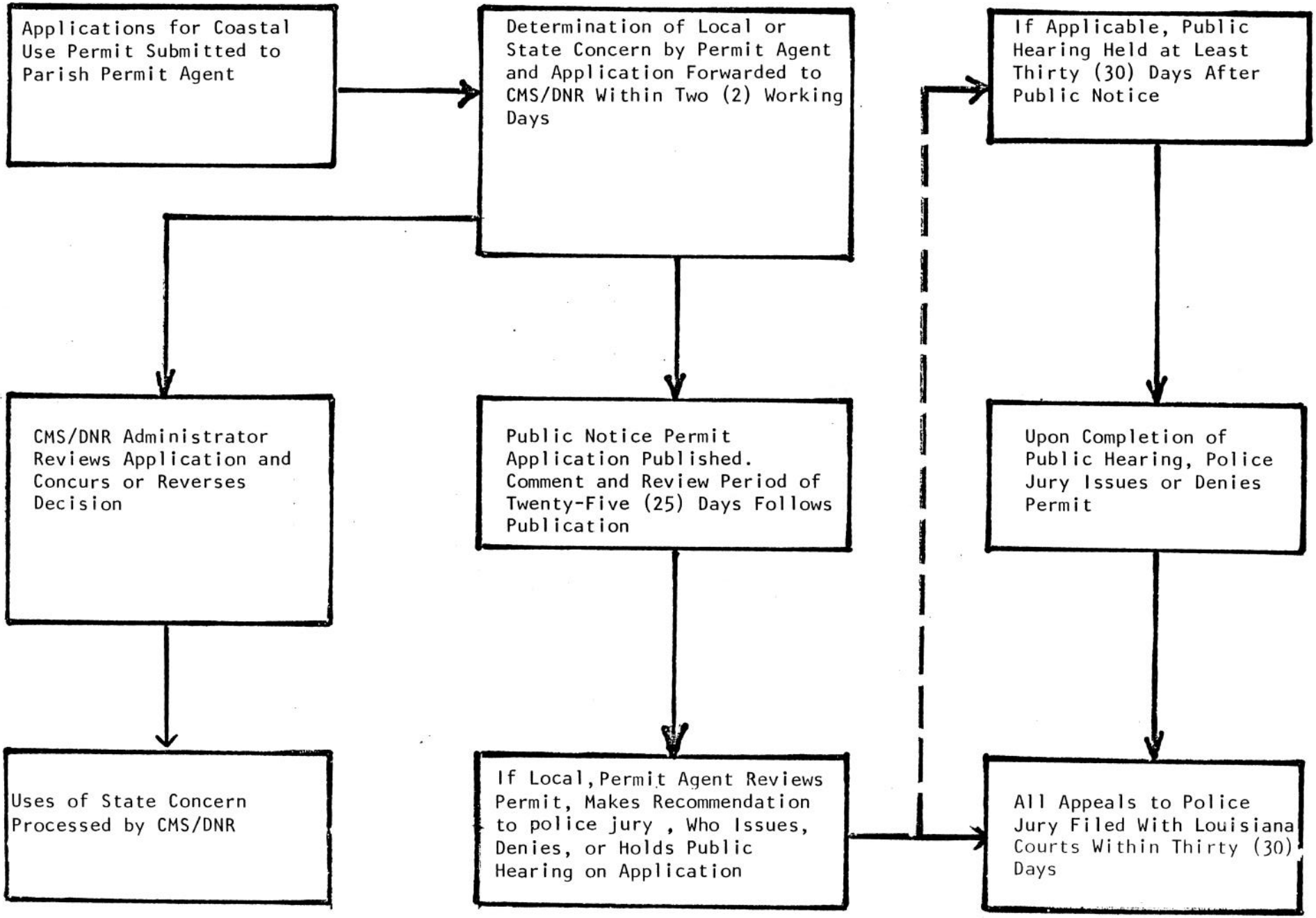
4) Results of any appeals.

5) A record of all variances granted.

6) A record of any enforcement actions taken.

7) A description of any problem areas within the state or local program, and proposed solutions to any such problems.

8) Proposed changes in the state or local program.


Applications for Coastal Use Permit Submitted to Parish Permit Agent
Determination of Local or State Concern by Permit Agent and Application Forwarded to CMS/DNR Within Two (2) Working Days
If Applicable, Public Hearing Held at Least Thirty (30) Days After Public Notice
CMS/DNR Administrator Reviews Application and Concurs or Reverses Decision
Public Notice Permit Application Published. Comment and Review Period of Twenty-Five (25) Days Follows Publication
Upon Completion of Public Hearing, Police Jury Issues or Denies Permit
Uses of State Concern Processed by CMS/DNR
If Local, Permit Agent Reviews Permit, Makes Recommendation to police jury , Who Issues, Denies, or Holds Public Hearing on Application
All Appeals to Police Jury Filed With Louisiana Courts Within Thirty (30) Days

THE CAMERON PARISH

COASTAL MANAGEMENT

ORDINANCE

Ordinance No. _____

COASTAL ZONE MANAGEMENT REGULATIONS

CAMERON PARISH, LOUISIANA

SECTION 1: GENERAL PROVISIONS

1.1 Title - This ordinance shall hereafter be known, referred to, and cited as "The Coastal Zone Management Regulations of Cameron Parish", (hereinafter referred to as "Parish").

1.2 Purposes - The Cameron Parish Coastal Zone Management Oridnance is hereby enacted for the purposes of:

1. Ensuring ecologically sound development in order to:

   (a) preserve and enhance the resources of the coastal zone for the enjoyment of present and future generations;

   (b) promote public safety, health, and welfare;

   (c) protect wildlife, fisheries, aquatic life, estuarine, and other water resources;

   (d) preserve and protect the remaining scenic and historic resources of the coastal zone;

   (e) to enhance opportunities for the use and enjoyment of the recreational values of the coastal zone; and

   (f) to develop and implement a coastal resources management program which is based on consideration of our resources, the environment, the needs of the people of the State, the Nation, and of state and local government.

2. Promoting a balanced approach to development and conservation within the fragile ecosystem of the coastal zone, and support and encourage multiple use of coastal resources consistent with the maintenance and enhancement of renewable resource management.

3. To employ procedures and practices that resolve conflicts among competing uses within the coastal zone in accordance with Act 361, and to simplify administrative procedures.

4. To express certain regulatory and non-regulatory policies for the Coastal Zone Management program.

Regulatory policies are to form a basis for administrative decisions to approve or disapprove activities only to the extent that such policies are contained in the statutes of this State or regulations duly adopted and promulgated by the Cameron Parish Police Jury. Other policies are non-regulatory. They are included in the Coastal Zone Management Plan to help set out priorities in administrative decisions and to inform the public and decision makers of a coherent state framework, but such policies are not binding on private parties.

SECTION 2: DEFINITIONS

2.1 Usage

1. For the purposes of this ordinance, certain words, terms, numbers, and abbreviations used herein shall be used, interpreted and defined, as set forth in this section.

2. Unless specifically defined in this section, words or phrases used in this ordinance shall be interpreted to give them the meaning they have in common usage and to give this ordinance its most reasonable application.

3. Words used in the present tense include the future tense; words used in the singular number include the plural, and the plural number includes the singular; the word "shall" is always mandatory; and the word "herein" means "in this ordinance".

2.2 Words and Terms Defined

1. "Administrator" shall mean the administrator of the Coastal Management Section with the Louisiana Department of Natural Resources.

2. "Coastal waters" shall mean bays, lakes, inlets, estuaries, rivers, bayous, and other bodies of water within the boundaries of the coastal zone which have measurable seawater content (under normal weather conditions over a period of years).

3. "Coastal Zone" shall mean the coastal waters and adjacent shorelands within the boundaries of the coastal zone established in Section 213.4, of Act 361, which are strongly influenced by each other, and in proximity of the shorelines and uses of which have a direct and significant impact on coastal waters.

4. "Local government" shall mean the governmental body having general jurisdiction and operations at the parish level.

5. "Person" shall mean any individual, partnership, association, trust, corporation, public agency or authority, or state or local government body.

6. "Secretary" shall mean the Secretary of the Department of Natural Resources.

7. "Use" shall mean any use or activity within the coastal zone which has a direct and significant impact on coastal waters.

8. "Fastlands" are lands surrounded by publicly-owned, maintained, or otherwise valid existing levees, or natural formations, as of the effective date of Act 361 or as may be lawfully constructed in the future; which levees or natural formations would normally prevent activities, not to include the pumping of water for drainage purposes, within the surrounding area from having direct and significant impacts on coastal waters.

9. "Guidelines" means those rules and regulations adopted pursuant to Section 213.8 of Act 361, known as Rules and Procudues for the Development, Approval, Modification, and Periodic Review of Local Coastal Management Programs.

10. "Public hearing", wherever required in this Part, shall be a hearing announced to the public at least 30 days in advance, and at which all interested persons shall be afforded a reasonable opportunity to submit data, views, or arguments orally or in writing. At the time of the announcement of the public hearing all materials pertinent to the hearing, including documents, studies, and other data in the possession of the party calling the hearing, must be made available to the public for review and study. As similar materials are subsequently developed, they shall be made available to the public as they become available to the party which conducted the hearing.

11. "Coastal use permit" shall mean the permits required by Section 213.11 of Act 361 and shall not mean or refer to, and shall be in addition to, any other permit or approval required or established pursuant to any other constitutional provision or statue.

12. "Exempted use" shall mean any use specifically listed in this Ordinance as a use not requiring a coastal use permit.

13. "Existing" as applied to any use, structure, or development includes the words "existing on the effective date of this Ordinance".

2.3 The Coastal Zone - The Cameron Parish coastal zone boundary begins at the Louisiana-Texas border following the Calcasieu-Cameron parish line eastward to the Intracoastal Waterway, which is followed eastwardly to the Vermilion Parish line (Figure 1).

2.4 Area Normally Subject to Permitting - In Cameron Parish, the entire coastal zone will be subject to coastal use permitting.

2.5 Types of Uses - Uses of the coastal zone subject to the coastal use permitting program shall be of two types:

1. Uses of state concern - Those uses which directly and significantly affect coastal waters and which are in need of coastal management and which have impacts of greater than local significance or which significantly affect interests of regional, state, or national concern. Uses of state concern shall include, but not be limited to:

   (a) any dredge or fill activity which intersects with more than one water body;

   (b) projects involving use of state-owned lands or water bottoms;

   (c) state publicly-funded projects;

   (d) national interest projects;

   (e) projects occurring in more than one parish;

   (f) all mineral activities, including exploration for, and production of, oil, gas, and other minerals, all dredge and fill uses associated therewith, and all other associated uses;

   (g) all pipelines for the gathering, transportation, or transmission of oil, gas, and other minerals;

   (h) energy facility siting and development; and

   (i) uses of local concern which may significantly affect interests of regional, state, or national concern.

2. Uses of local concern - Those uses which directly and significantly affect coastal waters and are in need

of coastal management, but are not uses of state concern, and which should be regulated by the Cameron Parish Police Jury. Uses of local concern shall include, but not be limited to:

(a) privately-funded projects which are not uses of state concern;

(b) publicly-funded projects which are not uses of state concern;

(c) maintenance of uses of local concern;

(d) jetties or breakwaters;

(e) dredge or fill projects not intersecting more than one water body;

(f) bulkheads;

(g) piers;

(h) camps and cattlewalks;

(i) maintenance dredging;

(j) private water control structures of less than $15,000 in cost; and

(k) uses on cheniers, salt domes, or similar land forms.

2.6 Uses at Greater Than Local Benefit

1. No management policy of the Cameron Parish Coastal Resources program shall be so restrictive as to exclude uses of greater than local benefit.

2. Uses of state interest are found in Section 2.5.

3. Uses of regional benefit include:

(a) interstate natural gas transmission pipelines;

(b) major state or federal transportation facilities such as highways and expressways;

(c) major state or federal transportation facilities such as deep-water ports and navigation projects;

(d) public wildlife and fisheries management projects;

(e) public utility or cooperative energy generating plants; and

(f) state parks and beaches and other state-owned recreational facilities.

Each permit application will be reviewed to determine whether it is of local, regional, state or federal interest.

2.7 Exempted Uses

1. The following activities normally do not have direct and significant impacts on coastal waters; hence, a coastal use permit is not required, execpt as set forth in the following section:

   (a) agricultural, forestry, and agriculture activities on lands consistently used in the past for such activities;

   (b) hunting, fishing, trapping, and the preservation of scenic, historic, and scientific areas and wildlife preserves;

   (c) normal maintenance or repair of existing structures including emergency repairs of damage caused by accident, by fire, or the elements;

   (d) construction of "single family" residences or camps used for non-commercial, non-profit purposes;

   (e) construction and modification of navigational aids such as channel markers and anchor buoys; and

   (f) activities which do not have a direct and significant impact on coastal waters.

2. Activities occurring wholly on lands five feet or more above sea level or within fastlands do not normally have a direct and significant impact on coastal waters. Consequently, a coastal use permit for such uses generally need not be applied for.

3. However, if a proposed activity exempted from permitting in the Subsection above (2.7, 2) will result in discharges into coastal waters, or significantly change existing water flow into coastal waters, then the person proposing the activity shall notify the Secretary and provide such information regarding the proposed activity as may be required by the Secretary in deciding whether the activity is a use subject to a coastal permit.

4. The execption described in Section 2.7(2) shall not refer to activities occurring on cheniers, salt domes, barrier islands, beaches, and similar isolated, raised land

forms in the coastal zone. It does refer to natural ridges and levees.

5. The construction of a residence or camp shall not require a coastal use permit provided that:

   (a) the terms shall refer solely to structures used for non-commercial and non-profit purposes, and which are commonly referred to as "single family" and not multiple family dwellings; and

   (b) the terms shall refer solely to the construction of one such structure by or for the owner of the land for the owner's use and not to practices involving the building of more than one such structure as in subdividing, tracting development, speculative building, or recreational community development.

6. The exemption shall apply only to the construction of the structure and appurtenances such as septic fields, out buildings, walkways, gazebos, small wharves, landings, boathouses, private driveways, and similar works; but not to any bulkheading or any dredging or filling activity except for small amounts of fill necessary for the structure itself, and for the installation and maintenance of septic or sewerage facilities.

7. The construction and modification of navigational aids shall not require a coastal use permit.

8. The term shall include channel markers, buoys, marker piles, dolphins, piling, pile cluster, etc.; provided that the exemption does not apply to associated dredge or fill uses or the construction of mooring structures, advertising signs, platforms, or similar structures associated with such facilities. All navigational aids constructed pursuant to this section shall conform to United States Coast Guard standards and requirements.

9. Agricultural, forestry, and aquacultural activities on lands consistently used in the past for such activities shall not require a coastal use permit provided that:

   (a) the activity is located on lands or in waters which have been used on an ongoing basis for such purposes, consistent with normal practices, prior to the effective date of the Act;

   (b) the activity is consistent with good management practices for the particular agricultural, forestry, or aquacultural use to which the land has been put;

(c) the activity is conducted or carried out in such a manner as to minimize adverse impacts on the coastal water environment; and

(d) the activity is not intended to, or will it result in, changing the type of agricultural, forestry, or aquacultural use to which the land has been consistently used for in the past.

10. Included in the exception are normal agricultural, forestry, and aquacultural activities such as plowing; seeding; grazing; cultivating; insect control; fence building and repair; thinning; harvesting for the production of food, fiber, and forest products; maintenance and drainage of existing farm, stock, or fish ponds; digging of small drainage ditches; or maintenance of existing drainage ditches and farm or forest roads carried out in accordance with good management practices.

11. No use or activity shall require a coastal use permit if:

(a) the use or activity was lawfully commenced or established prior to the implementation of the coastal use permit process; or

(b) the Administrator determines that it does not have a direct or significant impact.

SECTION 3: ADMINISTRATION AND ENFORCEMENT

3.1 Designation and Powers of the Cameron Parish Police Jury - The Cameron Parish Police Jury, in conjunction with the Office of the Parish Administrator (Permit Agent) shall exercise jurisdiction within the coastal zone consistently with the Ordinance. The powers and responsibilities of the Police Jury shall include, but not be limited to, the following:

1. Maintain and hold open for public inspection all records pertaining to the provisions of this Ordinance.

2. To issue, deny, or modify permits.

3. To adopt any rules and regulations which are consistent with the general law and which it finds reasonable and necessary to carry out the purposes of this Ordinance.

4. To conduct any investigation it deems necessary to comply with the purposes of this Ordinance.

3.2 Intergovernmental Agreements - The Police Jury is the only governmental body in Cameron Parish. Therefore, no intergovernmental agreements exist, except oral understandings between the Police Jury and its advisory boards such as the Planning Commission, Drainage Board, etc.

3.3 Multi-Parish Considerations

1. All plans concerning Cameron Parish, whether regional, state, or federal, shall be reviewed by the permitting agent's office.

2. Should it become necessary, the permitting agent and the Cameron Parish Police Jury shall coordinate meetings with other parish or parishes which are involved in multi-parish plans along with Cameron. The parish will also coordinate meetings with appropriate state and federal agencies as needed.

3.4 Coastal Use Permit Requirements - Any person seeking to commence any use not specifically exempted by Section 2, 2.7 of this Ordinance, within the Cameron Parish Coastal Zone must first obtain a Coastal Use Permit from the Cameron Parish Police Jury.

3.5 Permit Procedure - Formal Requirements

1. All applications shall be made on the form(s) prescribed by the Secretary.

2. All applications shall be submitted to the permit agent in the appropriate department of the Office of the Cameron Parish Police Jury.

3. All applications of local concern shall be accompanied by:

(a) the application fee, which will be based upon the estimated cost of the proposed use in the relevant amount as set forth below:

ESTIMATED COST	PERMIT FEE
$0 - $5,000	$5.00
Over $5,000	1% of estimated cost not to exceed $100.00

(b) all information currently required by the Coastal Management Section of the Department of Natural Resources, including:

(1) Maps showing the actual location, size, and dimensions of the real property to be used;

(2) plans showing the exact location, size, and height of the buildings or structures to be developed;

(3) a list of all applications, approvals, and/or denials already made concerning the development to/by federal, state, or local agencies; and

(4) if the development involves dredging, a description of:

...the type, composition, and quantity of material to be dredged;
...the method of dredging; and
...the site of the plans for the disposal of the dredged material.

4. The parish shall submit to the administrator and make available to the public an annual report within 30 days of the close of the calendar year. This report shall contain a list of the number, type (local or state concern), habitat (marsh type, etc.), frequency (number of applications per month), and the decision on all permit applications.

3.6 Permit Procedure - Administrative Action

1. When an application for a permit is received, the permit agent shall immediately assign it a number for identification, acknowledge receipt thereof, and advise the applicant of the number assigned to it.

2. Application processing will begin when an application that is apparently complete is accepted by the agent.

3. Within two working days of receipt of a complete application, a copy of the application and all attachments and the decision as to whether the use is one of state or local concern shall be sent to the administrator or the permit agent, depending upon the location of submittal.

4. If the proposed activity is determined by the administrator to be of local concern, the permit agent shall present the coastal use permit application to the Cameron Parish Police Jury for approval or denial.

5. Public notice of all applications for coastal use permits shall be given by:

(a) mailing a brief description of the application, along with a statement indicating where a copy of the application may be inspected, so any person who has filed a request to be notified of such permit applications and to all affected governmental bodies.

(b) by posting or causing to be posted a copy of the application at the location of the proposed site;

(c) by sending notice of the application to the media in Cameron Parish; and

(d) by causing the publication of notice of the application in the official journal of the parish.

6. Public notice of all applications for coastal use permits of local concern will be issued within ten (10) days of filing of application.

7. The notice shall set forth that any comments on the application shall be submitted to the permitting body within twenty-five (25) days from the date of official journal publication of the notice.

8. A copy of the application will be sent to any person requesting it upon payment of a reasonable fee to cover costs of copying, handling, and mailing, except that information of a confidential or proprietary nature shall be withheld.

9. The Cameron Parish Police Jury shall consider comments received in response to the public notice in its subsequent actions on the permit application. Comments received will be made a part of the official file on the application. If comments received relate to matters within the special expertise of another governmental body, the permitting body may seek advice of that agency. If necessary, the applicant will be given the opportunity to furnish his proposed resolution or rebuttal to all objections from government agencies and other substantive adverse comments before a final decision is made on the application.

10. The Cameron Parish Police Jury shall send notice of approval or denial of permit within thirty (30) days of the giving of public notice, or within fifteen (15) days after the closing of the record of a public hearing, if held, whichever is later.

11. If the final decision is to issue a permit, the parish permit agent shall forward two copies of the draft permit to the applicant for his signature, accepting the conditions of the permit, along with the finding on the application. The applicant will return both signed copies to the parish permit agent for signature and dating by the Cameron Parish Police Jury.

12. If the final decision is to deny said permit, the permit agent shall send the applicant a statement setting forth the reason(s) for denial.

13. The Cameron Parish Permit Agent will issue a monthly list of permits issued or denied during the previous month. This list will be distributed to all persons who received the public notices.

3.7 Public Hearings on Permit Applications

1. A public hearing may be held in connection with the consideration of an application for a new permit and when it is proposed that an existing permit be modified or revoked.

2. Any person may request in writing within the comment period specified in the public notice that a public hearing be held to consider material matters at issue in a permit application. Upon receipt of any such request, the Cameron Parish Police Jury shall determine whether the issues raised are substantial and there is a valid public interest to be served by holding a public hearing.

3. Public hearing(s) may be appropriate when there is significant public opposition to a proposed use, legislative requests, requests from local governments or other local authorities, or controversial cases involving significant economic, social, or environmental issues. The Cameron Parish Police Jury has the discretion to require hearings in any particular case. Failure to hold a hearing on an application may not be appealed.

4. If the determination is made to hold a public hearing by the Cameron Parish Police Jury, the permit agent shall promptly notify the applicant, set a time and place for the hearing, and give public notice.

5. Public notice shall be given at least thirty (30) days in advance of any public hearing except that in cases of public necessity a shorter time may be allowed.

6. Notice shall be sent to all persons regarding notices of public hearings and published in the official journal of the parish.

7. The Cameron Parish Police Jury will make a decision to grant, deny, or grant with modifications within fifteen (15) days of the public hearing.

8. Notification of the decision to grant, deny, or grant with modification shall conform to Section 3, 3.4 of this Ordinance.

3.8 Criteria for Coastal Use Permit Approval

1. Coastal use permits of local concern will be approved by the Cameron Parish Police Jury only after:

   (a) it is determined that the probable impact of any phase of the project will not be detrimental to the coastal zone and people of the parish;

(b) the permit's use conforms to the state guidelines and regulations, pursuant to the Final Environmental Impact Statement compiled by the Louisiana Coastal Resources Programs and Act 361; and

(c) after a full and fair consideration of all information.

3.9 Term of Permit

1. Permits issued under this section shall remain in effect for a period of a year from the date of issuance.

2. A coastal use permit may be renewed if the Cameron Parish Police Jury is satisfied that substantial progress has been made on said project or that the permittee has been precluded from acting by non self-induced litigation, material shortages, labor problems, or other events beyond the permittee's control.

3.10 Conditions of Permit

1. By accepting the permit, the applicant agrees to:

(a) carry out or perform the use in accordance with the plans and specifications approved by the Cameron Parish Police Jury;

(b) comply with any permit conditions imposed by the Cameron Parish Police Jury;

(c) adjust, alter, or remove any structure or other physical evidence of the permitted use if, in the opinion of the Cameron Parish Police Jury, it proves to be beyond the scope of the use as approved or is abandoned;

(d) provide, if required by the Cameron Parish Police Jury, an acceptable surety bond in an appropriate amount to ensure adjustment, alteration, or removal should the permitting body determine it necessary;

(e) hold and save the state of Louisiana, the local government, the Department, and their officers and employees harmless from any damage to persons or property which might result from the work, activity, or structure permitted; and

(f) certify that any permitted construction has been completed in an acceptable and satisfactory manner and in accordance with the plans and specifications approved by the permitting body. The Cameron Parish Police Jury may, when appropriate,

require such certification be given by a registered professional engineer.

2. The Cameron Parish Police Jury shall place such other conditions on the permit as are appropriate to ensure compliance with the Coastal Management Program.

3.11 Appeals - Any interested person may appeal the decision of the Cameron Parish Police Jury to issue a permit or not to issue a permit to the Louisiana Coastal Commission. Said appeal must be filed in writing within thirty (30) days of public notice of the Police Jury's final decision.

3.12 Modifications

1. The terms and conditions of a permit may be modified to allow changes in the permitted use, in the plans and specifications for that use, in the methods by which the use is being implemented, or to assure that the permitted use will be in conformity with the Coastal Management Program. Changes which would significantly increase the scope of a permitted activity shall be processed as new applications for permits, not as modifications.

2. A permit may be modified upon request of the permittee:

   (a) if mutual agreement between the permittee and the Cameron Parish Police Jury can be reached on a modification; or

   (b) if mutual agreement between the permittee and the Cameron Parish Police Jury cannot be reached, a permittee's request for a modification shall be considered denied.

3.13 Monitoring - The permit agent's office will be responsible for monitoring progress of all permitted uses and compliance with regulations accompanying permit approval. This will include on-site inspections to verify compliance, and follow-up reports for each permitted project.

3.14 Emergency Permits - The Cameron Parish Police Jury may allow emergency permits to be granted where the public safety is endangered or in situations requiring immediate action to protect the general welfare of Cameron's citizens. This action shall include consultation with the Louisiana Department of Natural Resources and will be adhered to only in those cases which can not be remedied by normal permit process.

3.15 Suspensions

1. The Cameron Parish Police Jury may suspend a permit upon finding that:

   (a) the permittee has failed or refuses to comply with the terms and conditions of the permit or any modifications thereof;

(b) the permittee has submitted false or incomplete information in his application or otherwise; or

(c) the permittee has failed or refused to comply with any lawful order or request of the Cameorn Parish Police Jury or the permit agent.

2. The Cameron Parish Police Jury shall notify the permittee in writing that the permit has been suspended and the reasons therefore, and order the permittee to cease immediately all previously authorized activities. The notice shall also advise the permittee that he will be given, upon request made within ten (10) days of receipt of the notice, an opportunity to respond to the reasons given for the suspension.

3. After consideration of the permittee's response, or if none within a 30-day period after issuance of notice, the Cameron Parish Police Jury shall take action to reinstate, modify, or revoke the permit and shall notify the permittee of the action taken.

3.16 Revocation - If, after compliance with the suspension procedures in Subsection 3.15 above, the Cameron Parish Police Jury determines that revocation or modification of the permit is warranted, written notice of the revocation or modification shall be given to the permittee.

3.17 Enforcement - If the permittee fails to comply with a cease and desist order or the suspension or revocation of a permit, the Cameron Parish Police Jury shall seek appropriate civil and criminal relief as provided by 213.17 of the Act.

3.18 Penalty - Violation or failure to comply with the provisions of this Ordinance or the terms or conditions of any coastal use permit shall be punishable by a fine of not less than one hundred dollars ($100.00) nor more than five hundred dollars ($500.00), or ninety (90) days imprisonment, or both. Each day for which the violation continues shall constitute a separate penalty.

SECTION 4: NON-CONFORMING USE AND MAINTENANCE

4.1 Definition and Classification

1. Individual specific uses legally commenced or established prior to the effective date of the coastal use permit program shall not require a coastal use permit.

2. Normal repairs and the rehabilitation, replacement, or maintenance of existing structures shall not require a coastal use permit, provided that:

(a) the structure or work was lawfully in existence, currently servicable, and in active use during the year preceding the repair, replacement, or maintenance;

(b) the repair or maintenance does not result in an encroachment into a wetland area greater than that of the previous structure or work;

(c) the repair or maintenance does not involve dredge or fill activities; and

(d) the repair or maintenance does not result in a structure of facility that is significantly different in magnitude or function from the original.

3. This exemption shall not apply to the repair or maintenence of any structure or facility built or maintained in violation of the coastal management program.

4. Coastal use permits will normally authorize periodic maintenance, including maintenance dredging. All maintenance activities authorized by coastal use permits shall be conducted pursuant to the conditions established for that permit. Where maintenance is performed which is not described in an applicable coastal permit, it shall conform to this section.

4.2 General Coastal Use Permits - General Coastal Use Permits may be issued by the Cameron Parish Police Jury, subject to approval by the Secretary. Such a permit is an authorization to prospective users to perform specific uses within a prescribed area without the necessity for a complete independent review of each proposed use. The condition for allowing a general permit shall be a situation in which any user of the coastal zone submits an application to the permit agent to carry out uses of local concern, which are allowed in the coastal zone. Therefore, a public hearing will not be necessary and the procedure will involve submission of an application for a general permit constituting several proposed uses of local concern within a specific area which are individually allowed by permit. The permitting agent then reviews the permit, makes recommendation to the Cameron Parish Police Jury and the Coastal Management section of the Louisiana Department of Natural Resources. Upon approval by the Secretary, the Cameron Parish Police Jury shall make a determination on the general permit. The proposed actions shall be monitored monthly to insure compliance with the local ordinance.

4.3 Ordinance Adoption - The Cameron Parish Police Jury has two general types of ordinances: (1) proclaimation or resolution type ordinances; and (2) rules and procedures type ordinances

which require a public hearing prior to adoption. The Cameron Parish Coastal Resources Program will be submitted to the Police Jury prior to the public hearing. They will review the plan, take comments at the public hearing (according to Section 3.7 of this ordinance), and adopt the program after all comments have been received and final determinations are made.

SECTION 5: SCOPE OF COVERAGE

All provisions of this Ordinance apply only to uses of local concern as prescribed by Act 361 of the Louisiana State Legislature, 1978, "State and Local Coastal Resources Management Act:. All issues of state concern as prescribed by said Act will be directed to the appropriate state agency by the Cameron Parish Police Jury for permit approval.

SECTION 6: VARIANCE

When the Permit Agent finds that hardships may result from the strict compliance of these regulations, he/she may recommend to the Police Jury the variance of the regulations so that substantial justice may be done and the public interest secured, provided, however, that such variation will not have the affect of nullifying the intent and purpose of these regulations. The permitting agent shall promptly notify the Cameron Parish Police Jury for approval whenever any application is made for a variance from the strict compliance of these regulations. A public notice shall be published at least 10 days before the date of the hearing in the parish journal. This variance procedure shall only exist for coastal uses of local concern over which the Cameron Parish Police Jury has jurisdiction.

SECTION 7: SEPARABILITY CLAUSE

If any section, subsection, paragraph, sentence, or phrase of this Ordinance shall, for any reason, be held to be unconstitutional by any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions of this Ordinance, which shall continue in full force and effect.

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appendix 1

economic survey sample

ECONOMIC EXPANSION SURVEY
IMCAL

1. *Name of Company* Chevron U.S.A. Inc.

2. *Number of years of operation in Cameron Parish* 20

3. *Have you experienced substantial growth in size of plant and/or number of employees since beginning operations in Cameron?* Yes.

4. *Do you anticipate this kind of growth in the near future?* Anticipate growth, but not at the same rate.

5. *Do you think there will be significant industry expansion in Cameron Parish in the near future? If yes, in what area?* ---

APPENDIX 2

Comments And Responses To The Public Hearing
On The Final Draft
Of The Cameron Parish Coastal Resources Program
Held On December 7, 1982
At The Cameron Parish Police Jury Building

The only comments made were from Mr. Dean H. Roome, who directed his comments to saltwater intrusion in two areas:

COMMENT: Mr. Roome indicated that the lack of a water control structure on the west side of Bayou Labouve, where it intersects the abandoned canal which runs from Oak Grove to the Gulf of Mexico (this intersection lies just south of LA Highway 82 at Oak Grove), was causing high levels of saltwater intrusion and flooding due to the tidal action. Mr. Roome therefore suggested that a water control structure or some other form of mitigation be made to correct this problem.

RESPONSE: Therefore, the following policy shall be added to the Cameron/Creole Management Unit:

9. Mitigation measures shall be taken where feasible to inhibit saltwater intrusion and flooding to those lands west of the Bayou Labouve intersec tion with the canal leading to the Gulf; south of Highway 82 at Oak Grove.

COMMENT: Mr. Roome also indicated that the canal leading south from lower Mud Lake, which is used for navigation, has been steadily increasing in width over the past several years. This widening of the channel which runs directly from the Gulf to lower Mud Lake is causing increased saltwater intrusion and flooding to the Hog Bayou Management Unit.

RESPONSE: Therefore, the following policy shall be added to the Hog Bayou Management Unit:

6. Efforts will be made, where feasible, to prevent any further erosion and to make any necessary restoration to canals leading from the Gulf of Mexico and opening into lower Mud Lake or other large water body.