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THE COASTAL ZONE: AN OVERVIEW OF ECONOMIC, RECREATIONAL AND DEMOGRAPHIC PATTERNS

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The State Planning Office is pleased to distribute this valuable reference for your information. It is our hope that the information contained herein will answer many of your questions concerning Louisiana's valuable coastal area.

The State Planning Office would appreciate any comments or questions you may have. Thank you.

Sincerely,

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THE COASTAL ZONE: AN OVERVIEW OF ECONOMIC, RECREATIONAL AND DEMOGRAPHIC PATTERNS

COASTAL ZONE
INFORMATION CENTER

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LIST OF FIGURES AND TABLES

Figure		Page
1	Petroleum Production Gulf Coast	10
2	Petroleum Producing Wells, Louisiana	11
3	Oil and Gas Reserves, Louisiana	12
4	Total Wells Drilled, Offshore	13
5	Menhaden Catch, By Years	29
6	Louisiana Shrimp Landings, By Year	31
7	Louisiana Oyster Landings, By Year	34
8	Louisiana Crab Landings, By Year	37
9	Total Wells Drilled, New Orleans Region	49
10	Total Wells Drilled, Central Coastal Region	53
11	Total Wells Drilled	
12	Total Wells Drilled, Lower South Central Coastal Region	57
13	Total Wells Drilled, Western Coastal Region	62
14	Total Wells Drilled, River Parish Region	66

Table		
1	Petroleum & Natural Gas Based Employment	15
2	Rice Acreage, By Year	17
3	Sugarcane Acreage, By Year	19
4	Soybean Acreage, By Year	21
5	Timber Production, By Year	23
6	Cash Value Crops, By Parish	24
7	Louisiana Commercial Landings	26
8	Employment in Seafood Processing Plants	27
9	Menhaden and Other Industrial Fish Processing Plants	28
10	Shrimp Landings, By Year	32
11	Oyster Landings, By Year	35
12	Crab Landings, By Year	38
13	Louisiana Commercial Fur Catch, By Year	40
14	Waterborne Commerce, Selected Ports in Louisiana	42
15	Resource Based Employment, Louisiana	45
16	Resource Based Employment, New Orleans Region	51
17	Resource Based Employment, Central Coastal Region	55
18	Resource Based Employment, Lower South Central Region	59
19	Resource Based Employment, Western Coastal Region	64
20	Resource Based Employment, River Parish Region	68
21	Resource Based Employment, North Lake Maurepas Region	70
22	Population Projections, By Parish	73
23	Land Use in SMSA's	74
24	Land Use in Non SMSA Urban Settlements	85
25	Hunting Expenditures	88
26	User Days, Recreational Activities	89
27	Estimated Recreational Values	90

TABLE OF CONTENTS

1. INTRODUCTION

2. RESOURCE BASED ACTIVITIES IN THE COASTAL ZONE

- Mining
- Agriculture
  - Rice
  - Sugarcane
  - Soybeans
  - Forestry
- Fish
  - Menhaden
  - Shrimp
  - Oysters
  - Crabs
  - Crawfish
- Trapping
- Navigation

3. REGIONAL ECONOMIC RESOURCE USE

- New Orleans
- Central Gulf Coast
- Lower South Central
- Western Coastal
- River Parishes
- North Lake Maurepas

4. POPULATION AND SETTLEMENT PATTERNS

5. RECREATION PATTERNS

INTRODUCTION

This report gives a general perspective on the uses of the physical resources of the coastal zone, both renewable and non-renewable. These uses can be categorized as economic, demographic and recreational. The principal economic resources are petroleum and other minerals, soils and climate that contribute to agriculture, estuarine areas that produce a substantial fish and shellfish population, and waterways that provide both transportation and fresh water.

Recreational use of the area is largely dependent on the fish and wildlife produced in wetland areas. Indirectly, the population is dependent on all of the resources of the area.

The economic uses are the bases for several industries in the area, and although it is not indicated by this study, it is a safe assumption that these industries are the principal basic industries of the area. With very few exceptions, it is easily demonstrated that most manufacturing categories are related to the production of raw materials in the coastal zone. Employment in production of raw materials, related manufacturing and transportation of these goods accounts for over 30 percent of all employment. The final products and services of this employment are such that it is clear that most of this is exported. Petrochemicals, processed fish and processed farm products are all obviously exported from the area, and the act of transporting goods through national and international ports is also obviously an export service. In addition to these basic industries that are dependent upon the physical resources, there are also certain industries that appear

to be basic, but are more dependent upon cultural or other resources. These include tourism and textile manufacturing and are relatively minor in comparison to those industries that are based on physical resources.

The remainder of the area's employment is attributable to wholesale and retail sales, business and personal services, general construction and financial, legal and miscellaneous servies. These are types of employment generally associated with nonbasic activities, i.e., they are consumed by the local populace instead of exported. These nonbasic activities can be proportioned to the basic industries through further analysis. This analysis has not been performed due to time and funding constraints on the program.

The perspective given to resource usage is entirely internal. The utilization of the resources in economic production, especially basic production, is closely tied to several external factors. International prices, national foreign trade policies and production of substitute products all might affect the internal usage of these resources. In assessing the levels at which physical resources are used in an economy, these are important considerations, but this is outside of the scope of this particular study.

The renewable resources may be consumed for alternative uses. For example, prime agricultural land can be converted to urban or industrial land. The impacts of such an alternative use are both negative and positive. That portion of the economy related to agriculture will presumably decline in this situation. The alternative use will almost certainly affect the economy in a positive manner. The net effect may be either positive or negative. Similarly, estuarine areas may be used for purposes other than propogation of fish and shellfish and wildlife

habitat. If the alternative uses interfere with these functions, then there is a negative impact. The alternative use will also presumably have a positive impact, and the net impact on the economy must be judged to the best extent possible for each specific case. The information contained in this report can and should serve as a guide in assessing such impacts.

Nonrenewable resources are subject to declining productivity. In the coastal zone, this applies particularly to the petroleum industry. The identifiable trends towards declining petroleum production in the area will have negative impacts on the economy. In assessing programs relating to other resource usage, the effects of this decline must be given considerable attention. Specific projects that might offset this decline (e.g., Superport) should be given high priority in programs that affect resource usage for the area.

The choice of an internal, resource based framework for analysis was necessitated for several reasons. Policies developed external to Louisiana will not be influenced by decisions made through a coastal zone management program. Consequently, the internal framework is the most suitable. A second factor is that the program is being designed for resource management. The presence of resources is not the sole input into a working economy. State industrial enticement programs, entrepreneurship, educational and vocational levels, and available capital, to name a few, all influence the development of the economy within the area. The

coastal zone management program will not address these considerations and, hence, the framework chosen was resource based. As a potential input into a program that will exercise some control over resources within the coastal zone, this framework provides an appropriate basis for these decisions.

The choice of this framework introduced several problems of analysis. Economic statistics are generally gathered in categories that are not compatible with a resource framework. Employment and income statistics that are disaggregated into standard industrial classifications (SIC) do not adequately describe the resource origins of these activities. For instance, manufacturing can be either food processing or petrochemical processing. Even if the disaggregation is carried to the second or third level, the activities may still not be identifiable by resource origin. For instance, food processing might be related to agriculture or fisheries. Employment statistics were taken from County Business Patterns (1973) and cross referenced with other data, especially the Louisiana Directory of Manufacturers. This resulted in a reasonable establishment of employment per resource category for each area.

Another problem was the unavailability of employment data for certain resource categories. Substantial numbers of agricultural workers are excluded from employment figures published in County Business Patterns. Agricultural workers are also frequently lumped together with fishery workers. This led to the estimation of agricultural employment based on expenditures for farm labor, contract workers and number of farm operators. These were taken from

the 1969 Census of Agriculture. Employment in fisheries was taken from "Fishery Statistics of the United States, 1972" and disaggregated to the parish level on the basis of commercial fishing licenses issued in each parish.

The selection of data from diverse sources created another problem, that of assimilating data gathered in different years. This in itself diminishes the compatibility of the data. This problem was unavoidable, given the situation with respect to the resources.

The recreational analysis is presented in terms of expenditures, rather than user days. Expenditures were chosen instead of the more common user days in order to more clearly indicate the recreational value attached to the physical resources. Only those recreational activities directly dependent on coastal resources were considered.

The inexact nature of the analysis was such that the data gathered has limited usefulness. It is sufficient as a descriptive model of the general economic patterns of the area. However, the problems of data assimilation were such that the model is inadequate for specific impact analysis or projection. Both of these are important aspects of a coastal zone management program and appropriate analysis should be performed for these purposes. Analysis should extend not only to the four main physical resources and their accompanying economic activity, but also to those sectors of the economy that are more dependent on other factors. Specific factors that need to be determined are multiplier effects of raw material production, location patterns of activities induced by raw material

production and the effects of changes in production levels on the total economy.

RESOURCE BASED ACTIVITIES IN THE COASTAL ZONE

Louisiana's coastal zone region is remarkable for the magnitude and variety of its natural resources. The petroleum and natural gas reserves provide a significant share of the nation's energy; the estuarine system produces 28% of the nation's fishery harvest; the soils and climate provide for much of the nation's sugar and rice; and the Mississippi River, among other waterways, serves as a vital commercial artery for much of the interior of the United States. It is not an exaggeration to say that the nation depends upon the Louisiana coastal region for energy, food and transportation.

These resources are also essential to coastal Louisiana's economy. To an unusual extent the region's economy is based directly on its resources. Almost every basic economic activity can be traced to either the petroleum, natural gas and other mineral reserves, the estuarine system, the fertile soils or the navigable waterways. Notable exceptions are tourism and apparel manufacturing. Although their relative importance may vary, each of these resources can be found in every local area within the region.

The primary effect of these resources on the region's economy is through the employment provided by production activities. Of even greater importance, however, are the secondary employment effects created by activities associated with production. Petroleum production induces refining, rig construction, geophysical exploration, laying of pipelines, and other activities; commercial fishing induces boat construction and fish processing; and agriculture induces manufacturing of farm machinery and food processing--all of which contribute substantially to total employment in the coastal region. Additional employment is generated through development of resource related manufacturing for export

purposes. Two prominent examples of this are the export of offshore drilling rigs and the export of sugarcane processing equipment. Together the primary and secondary resource based activities are related to much of the basic employment in the region.

Mining

The most dominant of the area's resources are the minerals. Since the first oil well was drilled near Jennings in 1901, Louisiana's coastal area has developed into a major petroleum and natural gas producer. Other principal minerals include sulfur and salt. Petroleum, natural gas and sulfur are produced both onshore and offshore, with salt being produced from numerous onshore areas. Processing facilities are presently in operation for each of these mineral types.

The process for onshore petroleum and natural gas production is lengthy. Initial activity consists of geophysical surveys to locate geological formations with potential oil and gas reservoirs. Selection of a site necessitates rig construction, road construction, and provisions of various mechanical supplies. Actual drilling is a significant employer and the drilling procedure requires chemical supplies, wireline services, and transportation services. The extraction of petroleum requires further services, and induces construction of pipelines and other transportation means. Outer continental shelf (OCS) production also requires services for catering to personal needs of the employees and transportation of personnel. Altogether the result has been the development of a complex network of petroleum related employment in the coastal area.

The complexities of the economy and lack of statistical data make it difficult to arrive at an exact count of total petroleum production related

employment. However, in the coastal zone there are approximately 34,000 persons directly employed in petroleum extraction and direct services. This includes such categories as drilling, exploration, and services supplied to oil and gas wells. This employment is related to the level of oil and gas production which varies with time.

From the 1930's onward, the onshore production grew at a prolific rate until the 1960's. The production growth then began to grow at a more gradual rate and reached an apparent peak in 1971. As the onshore production peaked, the OCS production continued to increase, but was unable to offset the onshore decline past 1971. This year is apparently the peak year for petroleum and natural gas production in the coastal area (Figure 1). The peak and subsequent decline of petroleum and natural gas activities in Louisiana and the offshore area is indicated by several other parameters. The number of producing wells in Louisiana has declined by nearly 14% since the peak in 1966 (Figure 2). Reserves continued to increase, despite extractions, until the late 1960's as additional producing areas were discovered. Natural gas reserves reached a peak in 1968 and petroleum reserves reached a peak in 1970 (Figure 3); 1973 production was 17% of existing reserves. The general trend towards decreasing activity in production activities will probably continue with a resulting decrease in production related employment.

There are numerous national and international factors that may affect the rate of production. Deregulation of natural gas, import quotas, price increases or development of alternative energy sources could impact the level of petroleum and natural gas activity. Nevertheless, the long-range trend must be toward a lower level of activity.

FIGURE 1

Petroleum Production Gulf Coast (thousand barrels)

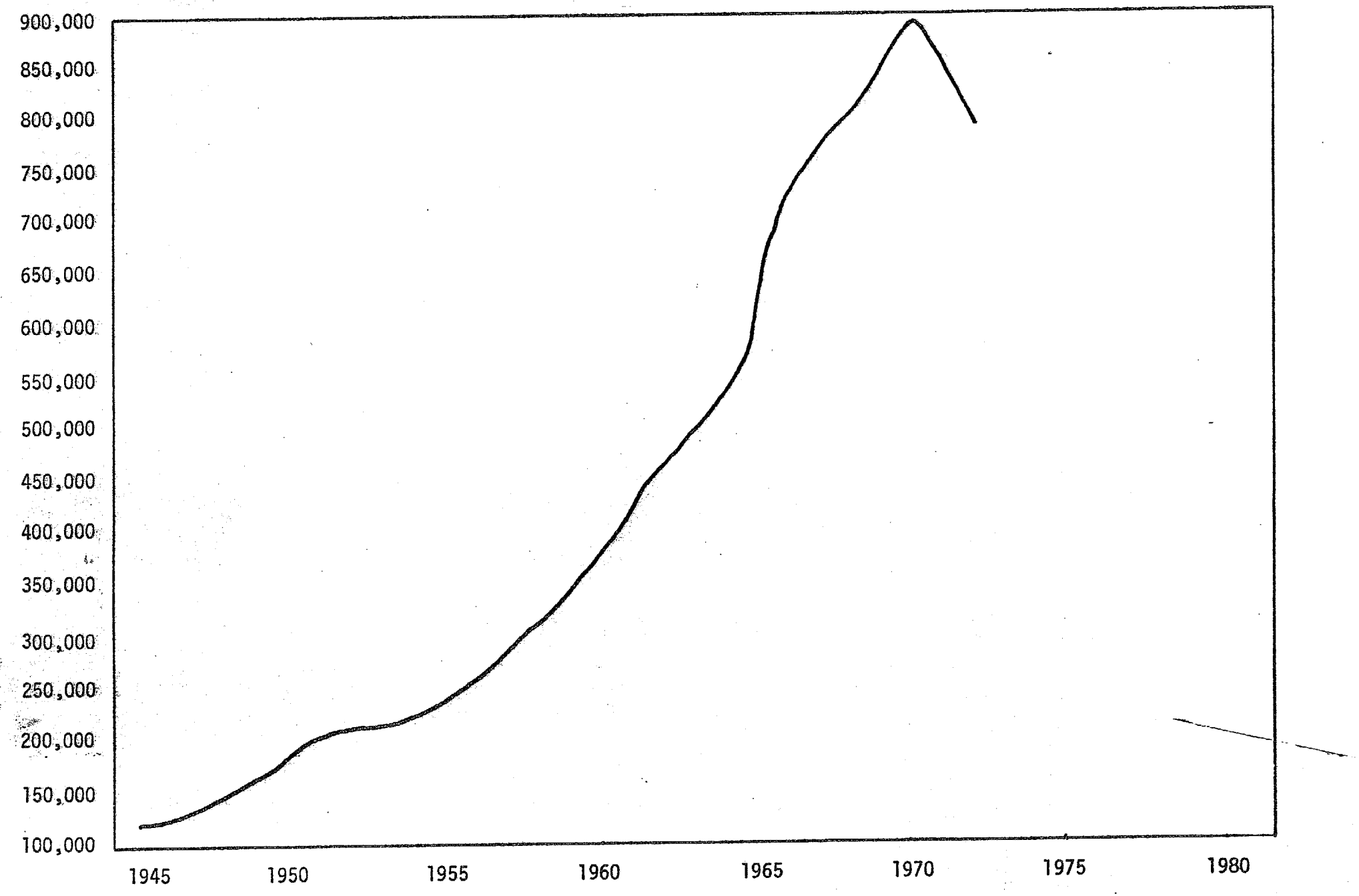


FIGURE 2

Petroleum Producing Wells, Louisiana

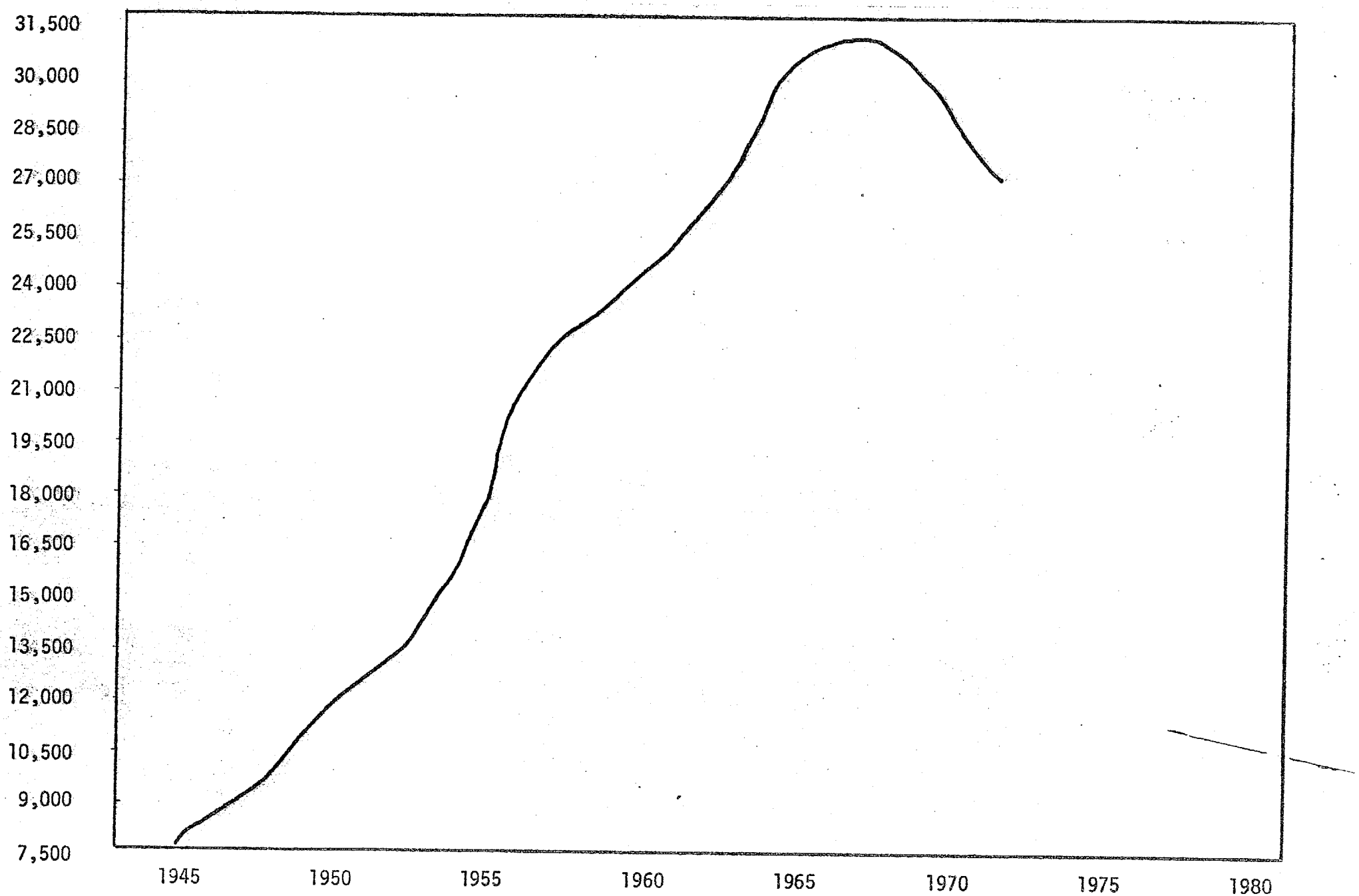


FIGURE 3

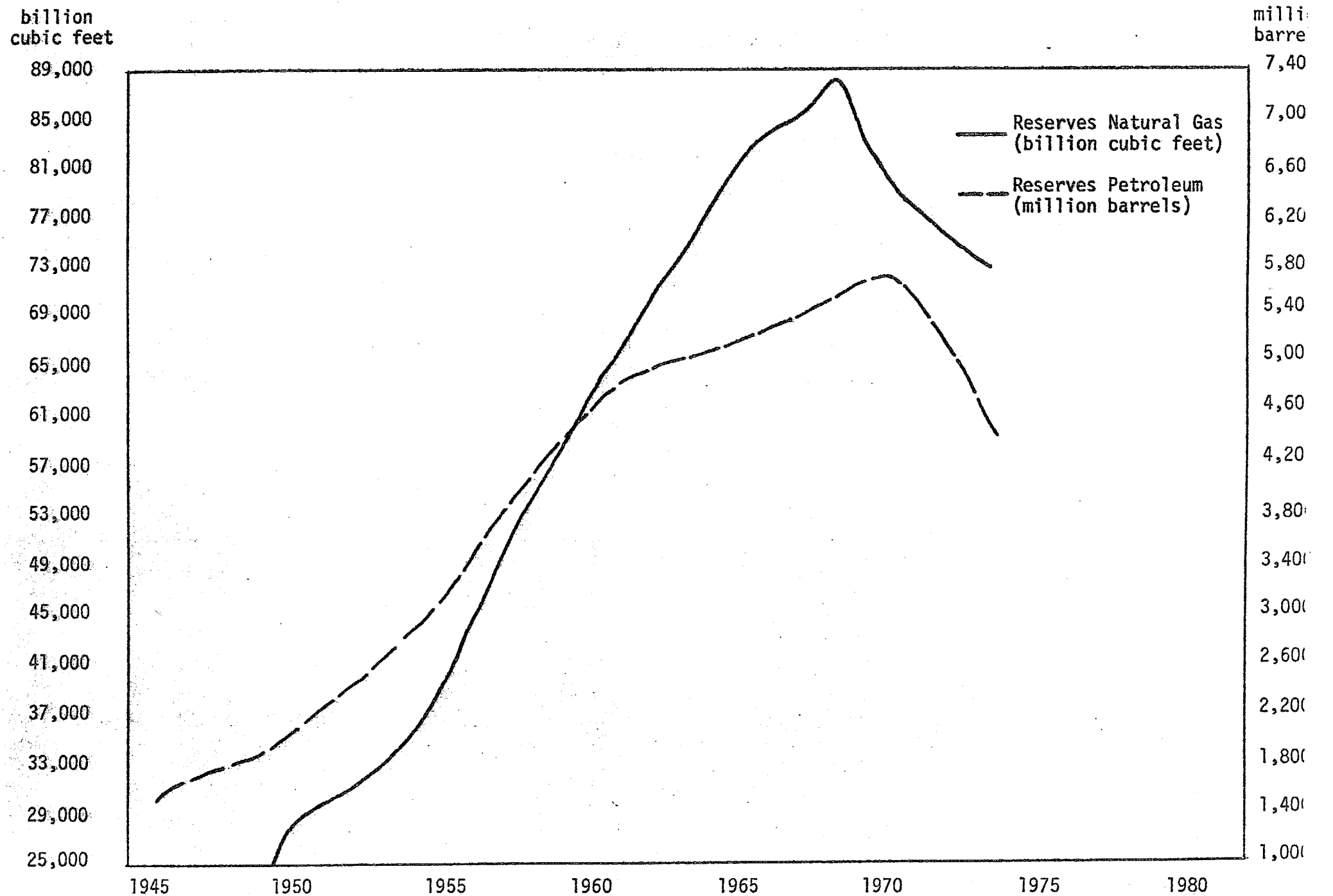
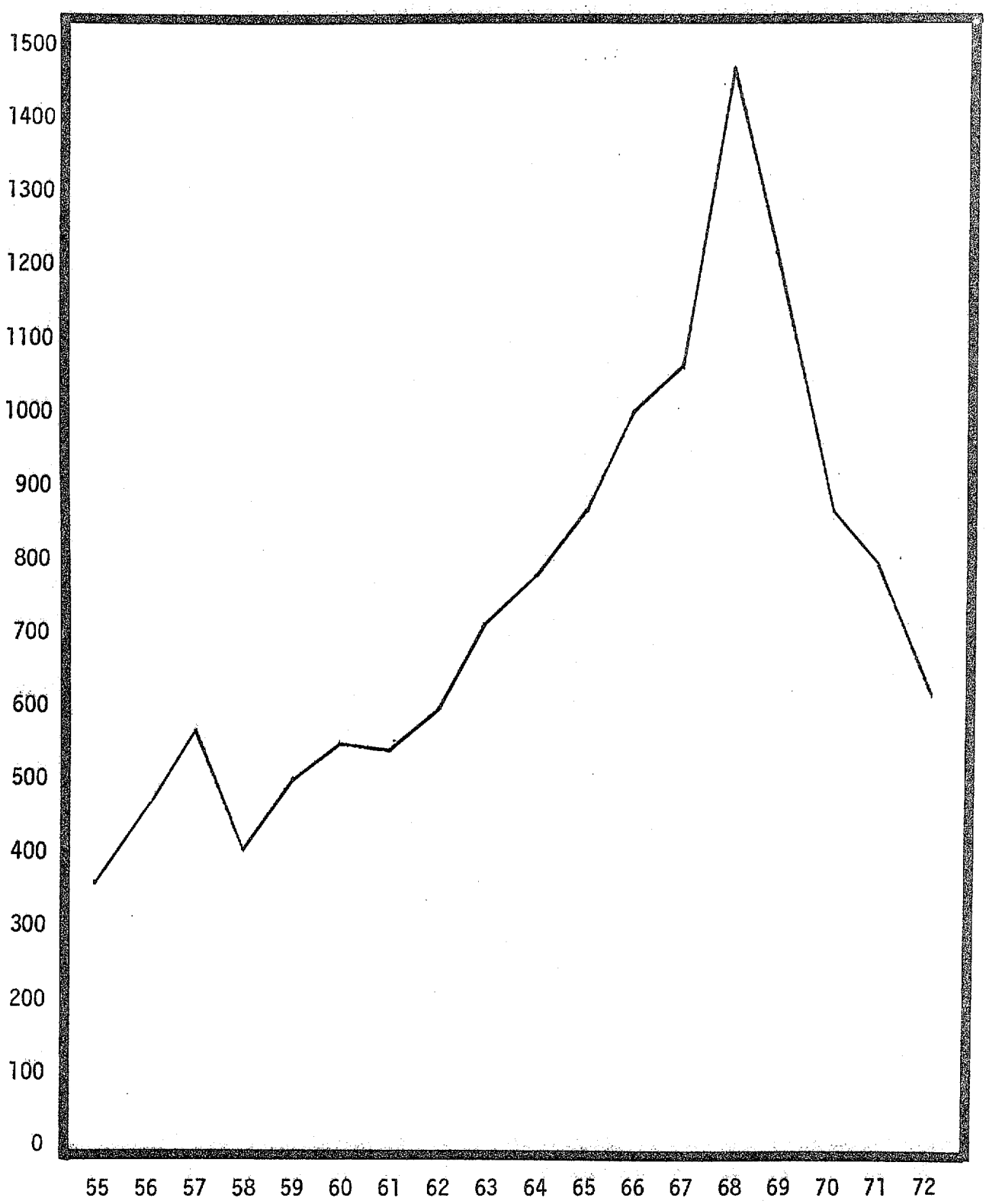

billion cubic feet
milli barre
89,000
85,000
81,000
77,000
73,000
69,000
65,000
61,000
57,000
53,000
49,000
45,000
41,000
37,000
33,000
29,000
25,000
7,40
7,00
6,60
6,20
5,80
5,40
5,00
4,60
4,20
3,80
3,40
3,00
2,60
2,20
1,80
1,40
1,00
1945
1950
1955
1960
1965
1970
1975
1980
Reserves Natural Gas (billion cubic feet)
Reserves Petroleum (million barrels)

FIGURE 4

TOTAL WELLS DRILLED
Offshore



Source: Minerals Yearbook, U.S. Department of Interior.

Petroleum production has also contributed heavily to the location of refineries and petrochemical plants in the coastal area. Location of such plants depends on a multitude of factors, but at least one study (Nebel, 1971) has indicated that low raw material costs in Louisiana have been a principal factor in development of the petrochemical industry in the state. Low resource costs are a function of location near the source. An additional factor may be the presence of large quantities of freshwater and navigable waterways. There are two centers for this development, the Baton Rouge - New Orleans Corridor and the Lake Charles area. Within the last decade over $3 billion has been invested in petrochemical and refinery plants. Employment in petroleum processing and refinery plants stand at approximately 10,000 for the coastal area. Further use of petroleum products in chemical processing adds an additional 18,000 jobs for the area. Over 7,000 jobs are directly generated by manufacture of equipment for petroleum production. Total petroleum and natural gas related employment is in excess of 69,000 in the coastal zone (Table1).

Mining of salt and sulfur are also activities of some significance in the coastal area. There are five locations with operating salt mines and six with operating sulfur mines. Approximately 800 persons are employed in production for both categories. In addition there are also approximately 400 persons employed in processing salt products and 700 persons directly processing sulfur. Sulfur production has declined in recent years, but salt mining appears to be constant. Numerous deposits of salt exist which are available for mining in the future should market conditions be favorable.

Agriculture

Agriculture accounts for a significant portion of the total economic base of the coastal area. Sugarcane and rice are the two major crops, and

Table 1

Petroleum and Natural Gas
Based Employment

	Equipment Manufacture* and Supply	Production	Petroleum and Natural Gas Processing	Petrochemical Manufacturing	Total
Ascension		50		990	1,040
Assumption	1,750	315			2,065
Calcasieu		1,335	3,750	3,427	8,512
Cameron	140	1,599			1,739
Iberia		1,698			1,698
Iberville		262		1,420	1,682
Jefferson		4,259	635		4,894
Jeff Davis		295			295
Lafourche	2,137	1,245			3,382
Livingston					
Orleans		4,521			4,521
Plaquemines	582	3,761	375	250	4,968
St. Bernard		140	550		690
St. Charles		275	963	2,001	3,239
St. James		55	350	1,319	1,724
St. John		37		375	412
St. Martin		890			890
St. Mary	735	2,542	514		3,791
St. Tammany					
Tangipahoa					
Terrebonne	1,886	3,811			5,697
Vermilion		941			941
Acadia		663	144		807
East Baton Rouge	250	400	2,600	8,145	11,395
Lafayette		4,794			4,794
West Baton Rouge					
TOTAL	7,480	33,888	9,881	17,927	69,176

SOURCES: County Business Patterns, 1973, Louisiana Directory of Manufacturers.

*Includes only those readily identifiable from data sources.

they are supplemented by soybeans, vegetables, cattle and dairy farming, as well as other smaller crops; forestry is also practiced within the area. These activities provide employment directly through on-farm jobs, plus the processing and handling of products, and also the supply of materials and services required for farm production. Although farm production is generally increasing throughout the coastal zone, on-farm employment is decreasing in line with a well established national trend. Employment induced through backward and forward-linked activities are not uniformly increasing or decreasing and only examination of particular localities and types of farm production can generate information with respect to this. Estimated on-farm employment including farm proprietors and workers is over 22,000. Based on income statistics, this employment is equivalent to 5,200 full-time jobs. Over 15,500 are employed through food processing and direct services such as pesticide supply and field leveling.

Rice

Rice is a major crop in Louisiana and is produced principally in the coastal area, particularly the southwestern area. Rice consistently ranks as one of the top cash crops in Louisiana, with the unprocessed crop exceeding $250,000,000 value in 1974. As shown in Table 2, in 1974 62% of the state's rice production came from the coastal parishes.

The coastal zone is naturally suited for rice production because of its warm temperature, abundant rainfall, plentiful surface and ground water supply, and soils adapted to rice production. Other advantages include close proximity to port facilities (for exporting); adequate milling and storage capacity (15.5 billion barrels/year milling capacity); thriving agribusiness industry (seed, fertilizer, pesticides, farm equipment); and research and higher education institutions which continually provide trained agriculturists

Table 2

Rice Acreage Planted*

PARISH	1945	1950	1955	1960	1965	1970	1975
Calcasieu	83,925	67,500	65,400	58,000	66,500	76,000	80,000
Cameron	16,974	16,400	13,200	12,300	15,300	16,500	16,800
Iberia	6,004	6,000	6,140	5,380	6,350	6,400	5,600
Jefferson Davis	114,366	98,200	97,000	87,500	99,000	114,000	119,000
St. Martin	6,643	4,100	4,080	3,640	4,330	2,980	5,100
St. Mary	1,520	3,100	3,100	2,630	3,140	3,020	3,750
Vermillion	142,342	114,800	101,500	101,500	116,000	126,000	124,700
Coastal Zone Total	371,774	296,600	293,020	276,040	322,610	382,150	361,390
State Total	700,000	525,000	517,000	464,000	530,000	569,000	584,000
% of State Total Planted in the Coastal Zone	53%	56%	57%	59%	61%	67%	62%

*Source: D. A. E. Research Report No. 436
"Louisiana Crop Statistics by Parish, Through 1970" except for 1975 which came from U.S.D.A. Statistics Report.

and updated production technology.

Altogether there are 15 rice mills and 362 rice dryers located on farms in coastal areas. These mills provide an estimated 1,000 man years of employment annually. Additional employment is also generated through backward-linked services and forward-linked activities, but no suitable estimates can be made of the magnitude of this employment.

Sugarcane

In 1974 sugarcane was the major cash crop in Louisiana and had an unprocessed value of over $500 million. This represents one of the better years for sugarcane growers. Sugarcane is grown in 16 parishes in southern Louisiana and appears to be a farm product that will continue to provide income and employment in Louisiana.

Sugar is processed in raw sugar factories. There are 37 raw sugar factories now operating in Louisiana, as compared to over 50 mills during the 1940's. In addition to the raw sugar factories there are six sugar refineries in the coastal area. Raw sugar factories operate during the harvesting season (October - January) and sugar refineries operate continuously. Estimated seasonal employment in sugarcane milling and processing is 7,300 and 4,700 year round in refining. Equivalent full-time employment is an estimated 6,800.

The prospects for expansion of sugarcane within the coastal zone area will depend on a number of factors such as sugar prices, prices obtained from other production enterprises already established in the area, environmental considerations, and international and national marketing factors. It is likely that the most important factor regulating the expansion of the Louisiana cane industry is limited raw milling. Due to the cost in operating

Table 3

Sugarcane Acreage

PARISHES	1950	1955	1960	1965	1970	1975
Ascension	14,434	11,364	11,593	13,966	12,127	15,819
Assumption	30,884	25,686	29,873	32,370	31,833	38,334
Iberia	38,748	33,352	36,968	38,899	35,909	46,006
Iberville	21,239	16,651	17,520	21,914	20,329	25,009
Lafourche	29,246	24,235	26,458	31,567	29,298	29,250
Plaquemines				1,084		
St. Charles	1,531	1,330	1,502	2,814	1,849	1,208
St. James	17,331	14,383	16,994	20,940	19,269	22,956
St. John	15,762	12,560	9,249	9,948	8,301	10,138
St. Martin	17,028	16,728	18,371	18,539	16,956	21,808
St. Mary	35,411	30,054	35,050	38,451	36,373	42,051
Terrebonne	35,612	28,526	35,731	37,920	34,381	37,391
Vermilion	4,502	2,360	2,082	3,136	3,278	3,587
TOTAL	256,152	217,231	241,393	271,549	249,908	293,567
STATE TOTALS	296,581	249,576	281,615	314,241	286,402	331,185
% OF STATE	86%	87%	86%	86%	87%	89%

Source: D.A.E. Research Report No. 436
"Louisiana Crop Statistics by Parish, through 1970" except for 1975 which came from U.S.D.A. Statistics Report.

and constructing factories, the number of mills has been reduced while the milling capacity of remaining mills has increased. The last raw cane mill constructed in the state was the Cajun Sugar Co-op in New Iberia in 1963. At that time the cost for this 5,000-6,000 ton/day mill was approximately $8 million. Present cost (1975) of a comparable mill is estimated to be between $40-$50 million. (Stallings, 1975) Based on the indicated daily grinding capacity of each mill for a 75-day season and assuming a yield of 25 tons/ACU, it would be possible to grow and process approximately 400,000 acres of cane. Using presently established raw sugar mills this compares with 331,000 acres in 1975.

Soybeans

Soybean planting acreage in the study area has increased from an insignificant amount in 1955 to the third-ranking crop in the coastal zone. In 1975 most of this acreage has come at the expense of cotton acreage and pasture grown in rotation with rice. Cash value of the crop in 1974 was $46 million. As can be seen from Table 3, 10% of the acreage grown in the coastal area in 1974 was from three rice-producing parishes--Jeff Davis, Calcasieu and Vermilion. The most expensive equipment used in production of the crop is the same as needed for rice growing. Rotating rice and soybeans reduces the problem of red rice, a weed that cannot be controlled with a herbicide in rice production years, but can in soybean production years. These factors make the two crops highly compatible.

The rising market value of soybeans has increased the number of acres in production in most parishes. Twenty-two parishes reported some soybeans grown in 1970, compared to 13 parishes in 1965. If the world demand for protein continues to increase, which seems likely, soybean planting should remain high and may increase on suitable land. The greatest potential for production increase remains an increasing average yield per acre by using

Table 4

Soybean Acreage*

PARISH	1955	1960	1965	1970	1974
Ascension	100		200	3,900	4,500
Assumption	300	50		3,500	2,500
Calcasieu			6,500	35,000	38,500
Cameron			3,200	10,000	5,500
Iberia	600	750	300	2,500	2,000
Iberville	300	100	50	13,000	11,000
Jeff Davis		130	24,000	83,000	108,000
Lafourche	800			1,900	4,000
Plaquemines				500	500
St. Charles				1,000	400
St. James			200	1,400	3,300
St. John				3,000	3,600
St. Martin		650	150	3,000	7,500
St. Mary	300			5,500	3,000
St. Tammany			250	3,000	800
Tangipahoa				2,500	1,800
Terrebonne				2,500	1,700
Vermilion		90	600	21,000	25,000
TOTAL	2,400	1,770	35,450	196,200	223,600
STATE TOTAL	95,000	216,000	622,000	1,688,000	1,760,000
% of State Total in Wetlands	2.5%	.8%	5.7%	11.6%	12.7%
State Average Yield Per Acre	22.0	24.0	21.5	22.5	25.5

*Source: D.A.E. Research Report No. 436
"Louisiana Crop Statistics, by Parishes, Through 1970" except for 1974 which came from Louisiana Crop and Livestock Reporting Service, U.S.D.A. Statistical Reporting Service.

recommended practices. Only one soybean processing facility presently exists in the area, but more could develop as the crop becomes well established.

Forestry

Forestry is located chiefly in the upland areas of four coastal zone parishes. The value of cut timber in the coastal zone in 1974 was approximately $16 million with 80% of this in the parishes of Calcasieu, Livingston, Tangipahoa and St. Tammany (Table 5). Although these parishes are located partially within the coastal zone, the commercial forests are found mostly in the upland areas north of the coastal zone boundary.

Forestry is not a labor intensive industry and consequently there is limited employment generated directly by commercial operations. However, because of transportation costs, forest products are almost always processed near the forest area. Approximately 3,300 persons are employed indirectly by processing of forestry products in the coastal zone.

The demand for forest products will certainly remain high in Louisiana. Currently, Louisiana is an importer of wood products and it is likely to remain so. The forestry industry in the coastal zone is likely to be limited only by production capability. Based on land currently in forest production, the outlook is for forestry to remain at approximately a level constant with 1974 production.

Other Crops

Other important agricultural crops include various fruits and nuts, cattle and dairy farming, grain crops and vegetable farming. These various crops had a $66,835,000 value during 1974.

Agriculture represents a significant portion of the economic the coastal zone. The two principal crops, rice and sugarcane, are located in specific portions of the coastal area. Many of the other crops are distributed more evenly, and when totaled, they also represent an important

TABLE 5

TIMBER PRODUCTION AND VALUE BY PARISH, 1974

Parish	Saw Timber	Pine Pulpwood	Hardwood Pulpwood	Total Stumpage	Value Delivere To Mill
	Board Feet	Cords	Cords	Dollars	Dollars
ASCENSION	260,246	27	1,969	23,524	76,624
ASSUMPTION	617,835	149	955	25,192	74,292
CALCASIEU	20,079,133	45,662	356	1,828,802	3,488,951
CAMERON	0	0	32	85	789
IBERIA	0	14	9	109	629
IBERVILLE	6,370,847	48	452	226,055	492,910
JEFFERSON	30,191	4	0	1,103	2,404
JEFFERSON DAVIS	4,997,967	11,510	400	434,648	859,298
LAFOURCHE	1,590,640	0	0	56,070	119,950
LIVINGSTON	72,006,246	62,492	33,225	6,392,366	10,889,306
ORLEANS	94,616	34	16	3,584	8,511
PLAQUEMINES	0	5	6	44	280
ST. CHARLES	66,403	0	0	2,287	5,007
ST. JAMES	219,177	217	443	10,195	33,562
ST. JOHN	235,502	0	10	8,328	18,007
ST. MARTIN	3,131,376	77	9	159,028	280,398
ST. MARY	1,505,936	42	18	72,359	131,682
ST. TAMMANY	29,370,459	84,877	3,711	2,614,213	4,457,853
TANGIPAHOA	27,895,312	58,943	13,655	2,504,492	5,192,240
TERREBONNE	2,372,197	49	4	83,925	180,375
VERMILION	0	26	53	298	2,053
COASTAL ZONE TOTAL	170,844,083	264,176	55,323	14,446,707	26,315,121

SOURCE: "Giant Step II Parish Progress Reports," La. Cooperative Extension Service, Cassens and Main, 1974.

Table 6

Cash Value of Crops in the Coastal Zone ($000)

1975

Parish	Sugarcane	Rice	Forage	Forestry	Soybean	Total AG (000)
Ascension	6,324	--	360	60	450	8,041
Assumption	15,504	--	--	74	62	16,151
Calcasieu	--	70,299	--	1,857	5,902	29,308
Cameron	--	5,078	17	--	455	6,410
Iberia	17,204	1,745	594	--	246	21,949
Iberville	10,608	--	265	--	956	13,177
Jefferson	--	--	20	--	--	5,628
Jeff Davis	--	36,960	--	381	13,860	51,250
Lafourche	15,428	--	55	--	6	17,213
Orleans	--	--	--	--	--	441
Plaquemines	--	--	6	--	--	3,430
St. Bernard	--	--	6	--	--	3,920
St. Charles	326	--	12	--	--	1,576
St. James	11,262	--	88	27	260	12,472
St. John	3,392	--	37	--	862	5,744
St. Martin	8,228	1,949	1,572	--	2,620	17,126
St. Mary	17,391	213	12	--	--	17,961
St. Tammany	--	--	168	3,552	245	17,830
Tangipahoa	--	--	28	--	428	5,692
Terrebonne	6,460	--	120	3	132	6,985
Vermilion	2,125	43,990	400	--	6,720	54,545
Livingston	--	--	8	--	--	1,186
TOTAL	118,032	115,345	3,768	5,954	35,548	331,714

Source: Plant Science Report, U.S.D.A.

addition to local economics. Total cash value of crops in 1975 was estimated to be $331,714,000 in the twenty-two coastal parishes (Table 6). Direct employment generated by these crops exceeded 20,000.

Fish

Louisiana's coastal fishery resources are both large and diverse. Commercial landings in 1974 totaled nearly 1.2 billion pounds, with a dock-side value of $86,000,000 (Table 7). Additional processing and handling of the catch brings the total value to an estimated $200,000,000. Recreational fishing is also a significant factor in coastal Louisiana. A recent survey indicated that there are more than 17,000,000 man-days of recreational fishing valued at over $200 million in the state annually.

Employment in commercial fishing was the equivalent of over 12,000 full-time employment during the year, with an additional 5,000 employed in processing of the catch. Altogether there are 58 seafood processing plants in coastal Louisiana (Table 8). In addition to processing of the catch, employment is provided through many services for fish and shellfish, including both ship and boat construction, handling and transportation of the catch, and provision of necessary supplies such as ice and nets.

Menhaden

Amoung the commercial species, menhaden had both the highest dockside value ($40,000,000) and the greatest weight (1,000,000,000 pounds). Menhaden is an industrial fish which is processed to obtain edible oils and meals for animal feed. The catch represents gains of $2,000,000 and 100,000,000 pounds over the previous year. The menhaden harvest has continuously increased in recent years. The increase in menhaden landings has been a result of the increasing value for industrial fish products on the world market. The

Table 7

Louisiana Commercial Landings

	1973		1974	
	Pounds	Dollars	Pounds	Dollars
Fish				
Catfish	6,051,942	1,837,507	5,801,887	1,831,952
Buffalofish	2,289,410	313,015	1,208,595	175,963
Menhaden	894,930,390	37,220,673	1,079,303,670	39,539,154
Red Drum	1,183,785	229,124	1,436,090	296,470
Sea Trout Spotted	3,527,023	774,936	2,124,476	635,364
Unclassified Industrial	239,799	10,530	5,670,330	106,039
Other	5,604,775	641,155	4,265,804	566,513
TOTAL FISH	912,827,124	41,027,432	1,099,810,852	43,151,455
Shellfish				
Crabs	23,199,632	2,912,721	20,704,997	2,828,446
Crawfish	10,384,482	2,057,676	6,784,323	2,203,671
Shrimp	58,653,109	44,512,892	59,558,603	32,145,552
Oysters (meat)	8,953,779	5,545,022	8,983,681	5,670,383
Other Shellfish	116,306	47,080	101,512	35,077
TOTAL SHELLFISH	101,307,308	55,105,391	96,113,116	42,883,129
GRAND TOTAL	1,014,134,432	96,132,823	1,195,923,968	86,034,584

Source: National Marine Fisheries Service

Table 8

Employment in Seafood Processing Plants
in Louisiana, 1972

Parish	Shellfish	Industrial Fish	Other Fish	Total
Cameron	110	185		295
Jefferson	1,650			1,650
Lafourche	180		80	260
Livingston	10			10
Orleans	250			250
Plaquemines		250		250
St. Bernard	175			175
St. Martin	50			50
St. Mary	355	175	15	545
Tangipahoa	185			185
Terrebonne	950	175	20	1,145
Vermilion		75	175	250
TOTAL	3,915	860		5,065

Source: Louisiana Department of Commerce and Industry and U. S. Department of Commerce, "Fishery Statistics."

Table 9

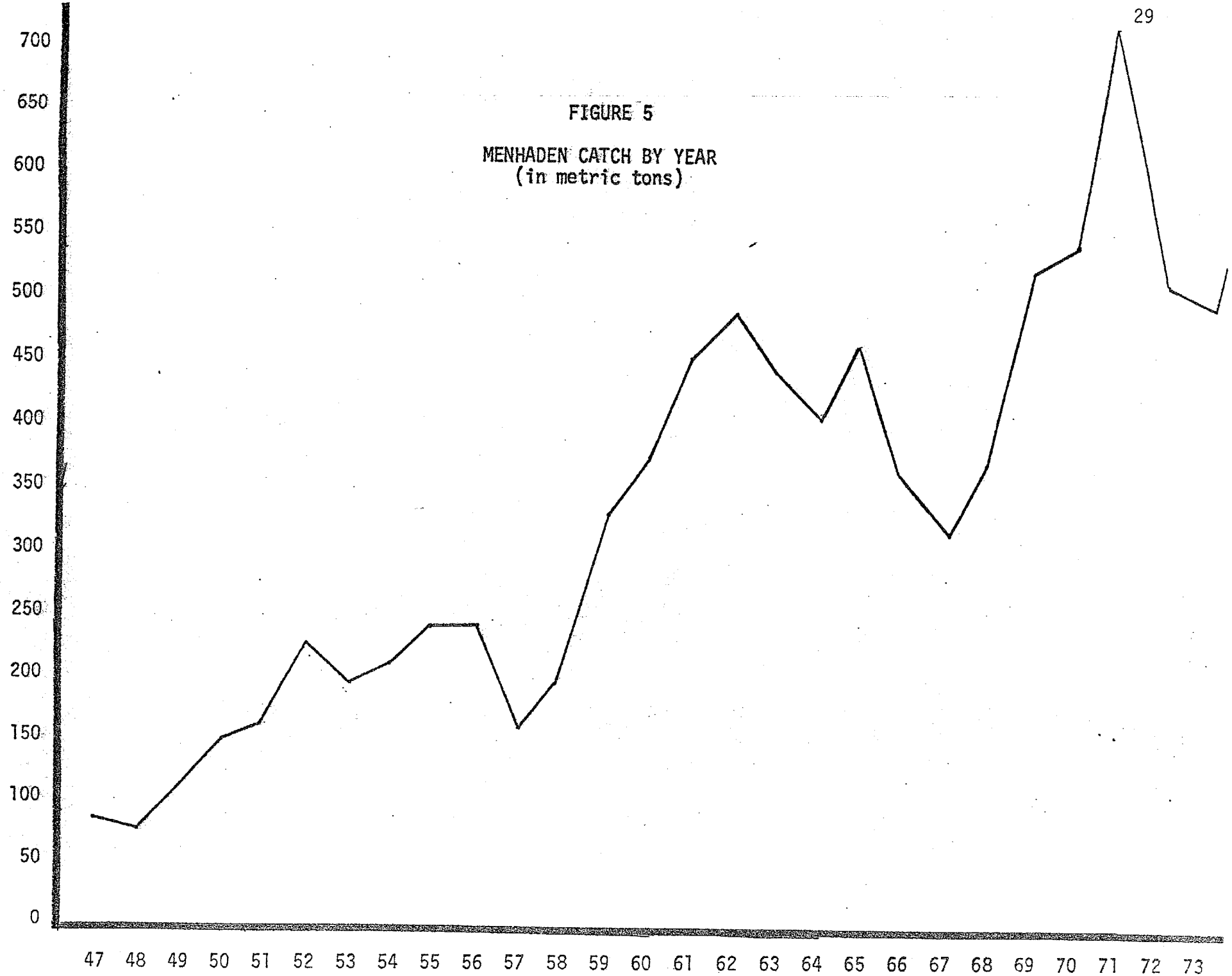
Menhaden and Other Industrial
Fish Processing Plants

Parish	Date of Establishment
St. Mary	1959
Cameron	1946
Cameron	1948
Cameron	1967
Terrebonne	1965
Plaquemines	1950
Plaquemines	1971
Vermilion	1965

Source: Louisiana Department of Commerce and Industry

FIGURE 5

MENHADEN CATCH BY YEAR
(in metric tons)



increased demand for these products has led to the development of a sizeable industry in the coastal area. In 1974 there were 485,000 vessel-ton weeks expended in pursuit of menhaden. The effort has increased over the years and has accounted for the increased catch. The increasing harvest has prompted the construction of numerous processing plants in the past two decades (Table 7). Presently there are eight menhaden processing plants employing a total of approximately 850 persons. Other types of industrial fish account for over $100,000 dockside value and 5,000,000 of Louisiana's catch.

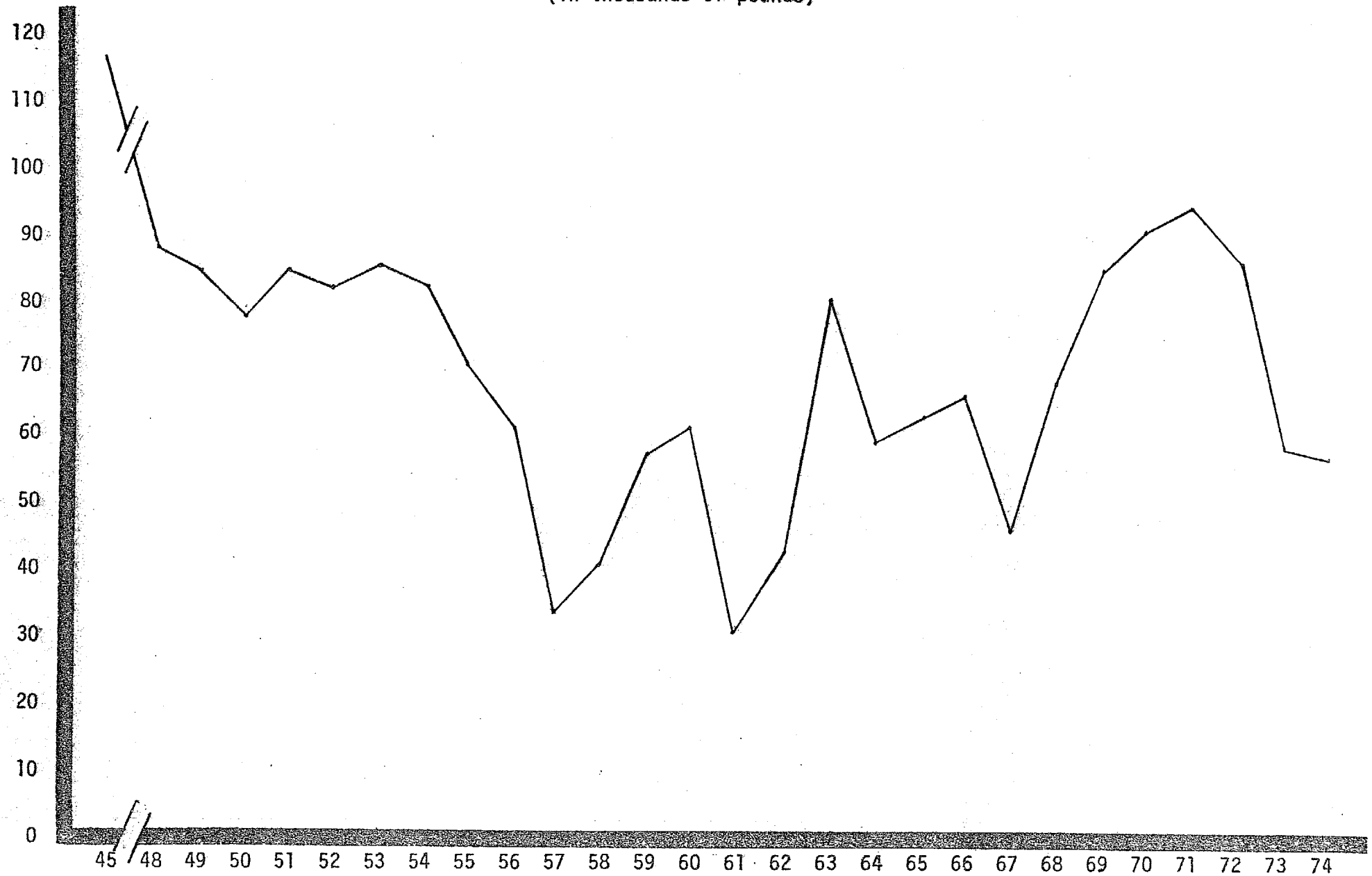
Shrimp

Shrimp had the second highest dockside value among the state's commercial landings, over $32,000,000 from 60,000,000 pounds. This dockside value is a 25% decline from the previous year, although the amount of shrimp remained constant. This decline reflects the highly erratic market conditions that plague gulf coast shrimpers. Unstable market conditions for shrimpers have driven marginal shrimpers out of business. Over 9,000 persons engaged in shrimping in coastal Louisiana in 1972. Processing of shrimp products is a large source of employment in the coastal area. Over 3,200 persons are employed in 33 plants.

The shrimp harvest has fluctuated considerably but with no apparent decline in recent years. The landings in 1970 and 1971 were the largest in the last 25 years and are exceeded only by the 1939 and 1945 totals (Table 10). Factors influencing the large fluctuations in landings include both environmental and market conditions. The difficulties of controlling these factors indicate that the shrimp industry will continue to suffer from large scale price and supply fluctuations. Nevertheless, even in the worst of years, the industry will remain an important factor in coastal Louisiana.

FIGURE 6

LOUISIANA SHRIMP LANDINGS BY YEAR
(in thousands of pounds)



Source: U.S. Fishery Statistics, National Marine Fisheries Service

Table 10

Shrimp Landings by Year

Year	000 Pounds
1936	53,430
1937	68,781
1938	81,379
1939	100,612
1940	98,986
1945	116,904
1948	88,249
1949	85,707
1950	77,835
1951	85,718
1952	83,104
1953	86,941
1954	83,608
1955	71,994
1956	60,792
1957	34,103
1958	41,008
1959	57,353
1960	61,758
1961	31,027
1962	43,585
1963	80,809
1964	59,382
1965	62,593
1966	67,476
1967	47,499
1968	68,968
1969	84,588
1970	92,484
1971	94,281
1972	86,435
1973	59,558
1974	58,653

Source: U. S. Fishery Statistics, National Marine Fishery Service.

Oysters

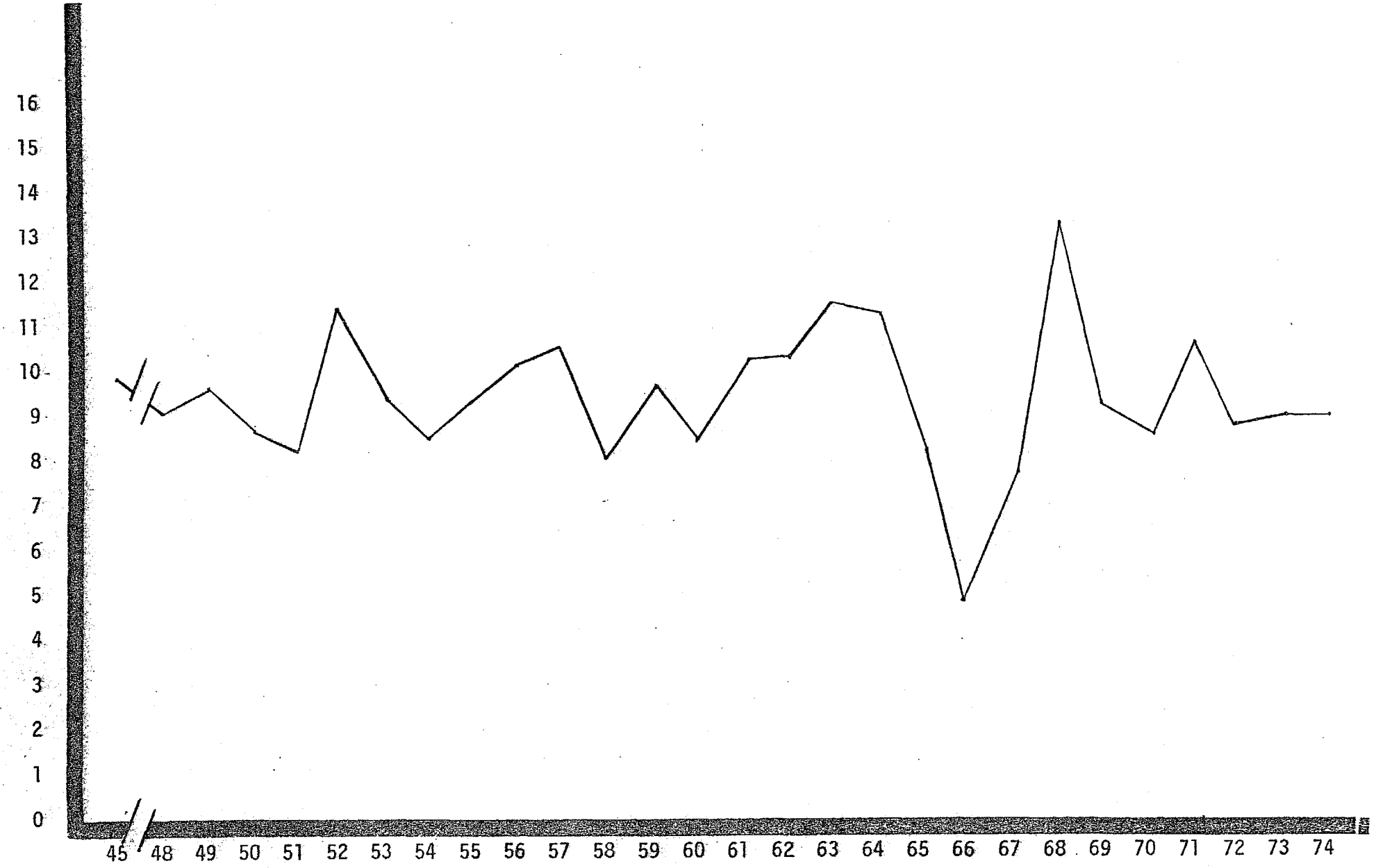
The oyster industry contributes significant employment and income to the coastal area. Over 1,100 fishermen are directly employed in oyster harvesting and in 1974 the landed value was $6.35 million. There are over 14 processing plants for oyster products that employ additional personnel. The oyster harvest has remained relatively constant over recent decades (Table 11), although the acreage used for production has increased from 19,767 in 1945, to 161,162 acres in 1973. This indicates a decline in oyster production from approximately 500 to 50 pounds per acre and is primarily the result of (1) change from intensive to extensive cultivation; (2) saltwater intrusion which brings predators, particularly the oyster drill; and (3) increasing urbanization with increased sewage and wastes. Because of this last factor, 41,710 acres, or 26% of water bottoms for oyster production, have been closed to harvesting for relatively brief periods. Saltwater intrusion, which has moved northward across Barataria Bay by approximately four miles since 1937, has resulted in a loss of over 17,000 acres of potential oyster producing waterbottoms (Louisiana Advisory Commission, 1973: 122-125, 142).

The five primary oyster producing parishes in Louisiana are Plaquemines, St. Bernard, Terrebonne, Jefferson, and Lafourche. The combined oyster acreage in these parishes is 580,107 acres or more than 99% of Louisiana's total oyster acreage. In the several years prior to 1973, these five parishes produced a combined average of 270,000 barrels or 3,923,100 pounds of oyster meat per year (Pollard, 1973).

Plaquemines Parish and St. Bernard Parish are undoubtedly the most important oyster producing parishes since their combined acreage of oyster

FIGURE 7

LOUISIANA OYSTER LANDINGS BY YEAR
(in thousands of pounds)



Source: U.S. Fishery Statistics, National Marine Fisheries Service

Table 11

Oyster Landings by Year

Year	000 Pounds
1936	5,743
1937	8,048
1938	10,222
1939	13,586
1949	12,412
1945	9,884
1948	9,016
1949	9,688
1950	8,716
1951	8,164
1952	11,402
1953	9,435
1954	8,361
1955	9,396
1956	10,056
1957	10,490
1958	8,265
1959	9,667
1960	8,311
1961	10,139
1962	10,160
1963	11,563
1964	11,401
1965	8,343
1966	4,800
1967	7,700
1968	13,100
1969	9,200
1970	8,600
1971	10,500
1972	8,800
1973	9,000
1974	9,000

Source: U. S. Fishing Statistics, National Marine Fisheries Service.

bottoms account for 90% of the total in the coastal zone. The oyster bottoms in these two parishes are indirectly responsible for the success of the entire Louisiana oyster industry, for their acreage includes more than 450,000 acres of seed grounds, which are being nurtured for future seeding purposes. Over the last twenty years, steadily increasing saltwater intrusion has reduced the effectiveness of these seed grounds by some 60-65%. Periods of drought, industrial development with its accompanying canalization and dredging, and the implementation of the Mississippi River-Gulf Outlet Channel are the acknowledged causes for this intrusion.

The fluctuations of the oyster landings over several decades are given in Table 11. It is interesting to note that the catch for 1912 (12,419,000) pounds) has been exceeded only twice.

Crabs

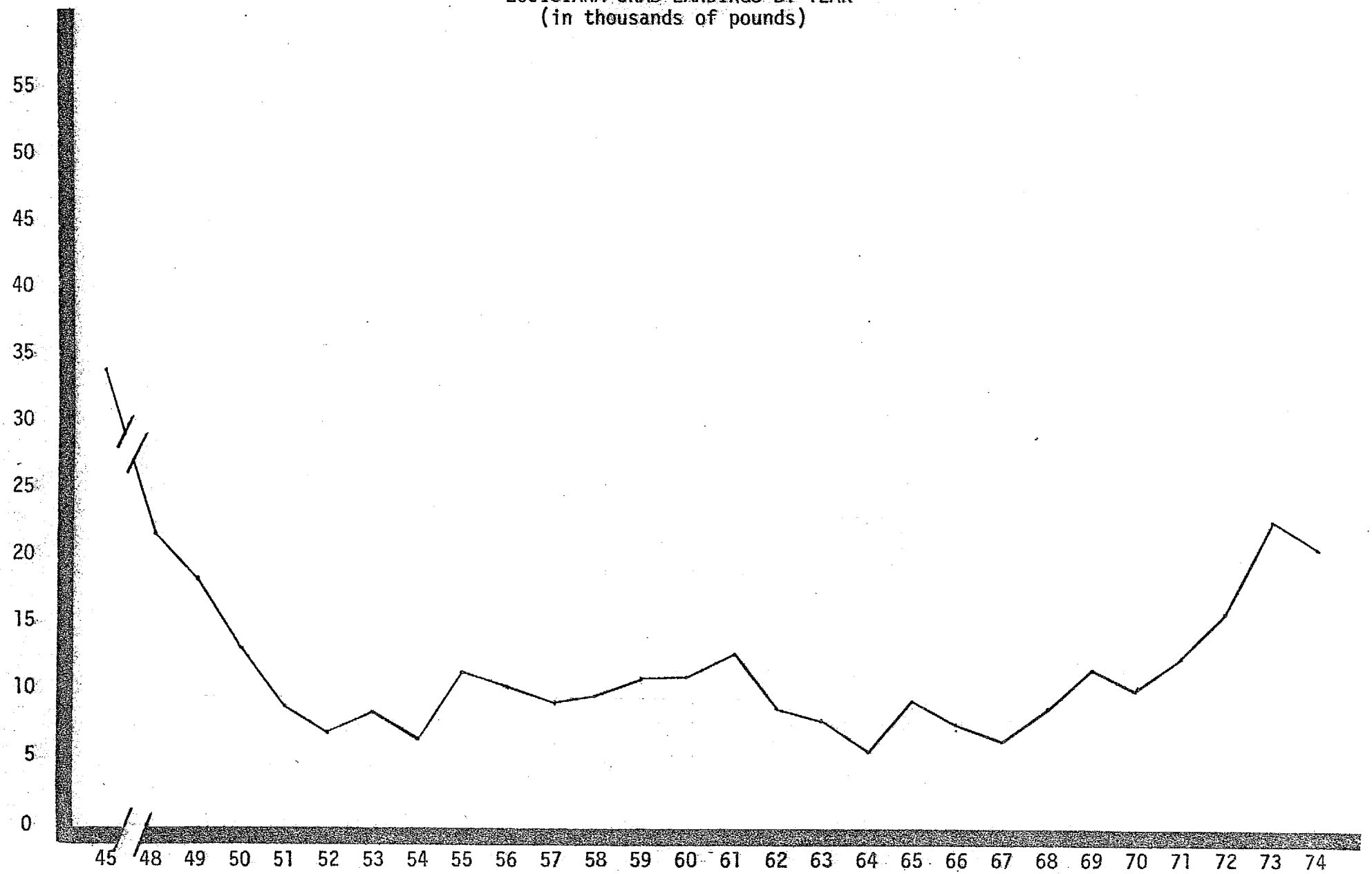
The crabbing industry has increased noticeably in recent years after having had relatively low landings for many years (Table 12). The landed totals for each of the years from 1972 to 1974 exceed those for any year after 1950. Landed weight in 1974 was 20.7 million pounds, valued at $2.7 million. Approximately 850 fishermen are involved in commercial crabbing. Additional employment is provided through seven processing plants. The bulk of commercial crabbing is located in the eastern and central coastal area.

Crawfish

Another significant commercial shellfish in the area is the crawfish. Landed totals for 1974 were over 7.1 million pounds, valued at $2.3 million. In addition to crawfish harvested from natural water areas, there is cultivation of crawfish in ponds. Crawfish pond acreage is conspicuously concentrated in the Bayou Teche and Bayou Lafourche areas. Approximately 35,000 acres of ponds are devoted to this enterprise. Over 1,000 fishermen harvest crawfish for commercial purposes and additional employment is added through

FIGURE 8

LOUISIANA CRAB LANDINGS BY YEAR
(in thousands of pounds)



Source: U.S. Fishery Statistics, National Marine Fisheries Service

Table 12

Crab Landings by Year

Year	000 Pounds
1936	12,941
1937	15,046
1938	10,781
1939	11,443
1940	14,314
1945	33,650
1948	22,018
1949	18,329
1950	13,470
1951	9,060
1952	7,782
1953	8,619
1954	7,540
1955	11,392
1956	10,002
1957	9,110
1958	9,913
1959	10,175
1960	10,564
1961	12,530
1962	9,867
1963	8,311
1964	5,892
1965	9,488
1966	8,114
1967	7,705
1968	9,835
1969	11,799
1970	10,344
1971	12,213
1972	15,185
1973	23,199
1974	20,704

processing and services. The principal area for the crawfish industry is the Atchafalaya drainage area.

Trapping

The abundant fur bearing animals found in the wetlands also provide a livelihood for numerous trappers. During the period from 1972 to 1975 income from trapping averaged over $10,000,000 annuall. This represents the efforts over 7,500 trappers. This number of trappers does not represent full-time employment, but rather part-time employment. Based on the income received and assuming an average level of gross income per trapper of $10,000 annually (income=earnings+expenses), then employment from trapping can be estimated at approximately 1,000 man-years in the coastal zone.

Fur trapping has been marked by good and bad years. The trend has generally been upward, particularly during the last five years (Table 13). Trappers's income has increased due to the recent high prices. In the 1974-1975 season the average price per pelt (for all fur-bearing animals) was $8.33, compared to $4.32 paid during the 1969-1970 season. Trapping will continue as a source of income, even with reduced catches, provided that prices continue at the recent levels.

Of particular interest to trappers has been the recent reintroduction of alligator trapping in the coastal areas. In the 1972-1973 season, alligator hunting was permitted in Cameron and Vermilion Parishes, with 59 people obtaining a license. From this short season the state recorded a catch of 2,423 hides. The following season 112 individuals paid $2,800 to hunt alligators. The alligator take was 1,085 below the previous season figure. Alligator catches from both seasons were considerably below the 29,912 alligators killed during the 1949-1950 season.

Table 13

FUR CATCH AND PRICES, 1965 - 1975

Season	Number of Pelts[a]	Average price per pelt[b]	Prices[c]
1965-1966	1,699,330	2.72	$4,614,371.10
1966-1967	1,993,873	1.83	3,648,011.70
1967-1968	2,130,473	1.34	2,858,324.40
1968-1969	3,469,040	1.75	6,063,514.40
1969-1970	3,002,043	1.99	5,965,700.25
1970-1971	2,090,761	2.15	4,512,968.50
1971-1972	1,732,682	3.24	5,691,398.50
1972-1973	2,180,332	4.42	9,628,831.00
1973-1974	2,304,916	5.18	11,932,453.25
1974-1975	2,038,379	4.74	9,655,195.00

[a]Louisiana Wildlife and Fisheries Commission, Biennial Reports.

[b]Prices as calculated from total catch and price data.

[c]Reflects price received by the trapper based on 11 types of fur-bearing animals.

Navigation

Navigable waterways are also a major resource for the coastal area. Unlike the other resources, no tangible product is created, but rather it is the source of an immense service industry. Although there are 29,000 directly employed in navigation-related jobs, the full impact of the waterways can not be truly measured by this figure. Numerous products, including those produced from petroleum, agriculture and fishing resources, are directly benefited by the transportation afforded by navigable waterways. In simple terms, the provision of inexpensive transportation for these goods reduces their ultimate cost to consumers. Without this transportation, another more expensive form would be required and the good produced in the coastal zone would be more expensive to the ultimate consumer. The result would be that substitutes for these products, possibly from outside of Louisiana, would reduce the actual goods produced and sold from the coastal area. Estimation of the importance of the navigable waterways in relation to the production of these goods is impossible, due to the multitude of factors involved. However, investigation of the waterway commerce proves that these goods are heavily dependent upon this form of transportation (Table 14).

In addition to the immediate service provided to the local economy, the Mississippi River provides an outlet for the products of 22 states, including most of the Midwest and some Southern states. The Port of New Orleans had the second largest tonnage in the country (third largest in the world), and Baton Rouge ranked as the seventh largest in 1974. Other major waterways in coastal Louisiana include the Atchafalaya River, Calcasieu River, Gulf Intracoastal Waterway, Mississippi River Gulf Outlet, Mermentau

Table 14

WATERBORNE COMMERCE THROUGH SELECTED PORTS AND WATERWAYS

Port	Tonnage
New Orleans	192,456,246
Baton Rouge	59,126,282
Lake Charles (Calcasieu River)	16,564,654
Lake Charles (Deepwater Channel)	34,712,249
Gulf Intracoastal Waterway (Morgan City-Port Allen)	15,895,856
Morgan City (Atchafalaya River)	3,694,205

Source: Waterborne Commerce of the United States (1974), U. S. Army Corps of Engineers

River, Vermilion River, Bayou Lafourche, Bayou Teche, Bayou Terrebonne, Bayou Little Caillou, Houma Navigation Canal, and Petit Anse, Tigre and Carlin Bayous. The sheer number of navigable waterways indicates the importance to coastal Louisiana of this form of transportation.

Non-Resource Based Industries

In addition to the employment found in the industries related to physical resources, there are two othe. industries that deserve to be classified, at least partially, as basic industries: tourism and apparel manufacturing. The impact of tourism is centered mainly in the New Orleans region. Total direct employment generated by tourists is difficult to estimate. Some services provided to tourists are normally provided to the general populace. However, if one bases the division between locally induced activities and tourist inspired activities on comparable non-tourist areas, then there appears to be in excess of 8,000 persons directly employed by this industry.

Textiles and apparel manufacturing have historically been basic activities. Within the coastal area there are approximately 6,500 persons employed in these activities, with the majority of this located in the New Orleans region. Another source of basic employment is found in certain miscellaneous manufacturing. Examination of manufacturing facilities in the coastal zone shows that the majority of such manufacturing is located along the Baton Rouge-New Orleans corridor, which would indicate that the particular requirements of those types of facilities include large quantities of fresh water for processing and/or marine transportation. Prominent examples of this type of manufacturing are the aluminum processing facilities found between New Orleans and Baton Rouge. There are an estimated 5,000 persons employed in this type of manufacturing in the coastal zone.

The utilization of natural resources accounts for the employment of an estimated 148,400 persons in the coastal zone. Although this is not entirely basic employment, it is a safe assumption that the majority of these products are for export purposes. Of this total, 70,900 is related to nonrenewable resources. These nonrenewable resources, petroleum and natural gas, have passed their peak activities, and are presently being depleted at a level that will have impacts in the near future. Employment related to production of petroleum and natural gas can be expected to decrease accordingly. Related employment, in either backward or forward linked activities, may or may not have a similar decline. Petroleum processing and petrochemical manufacturing may continue at their present level or even expand depending on the impacts from Superport.

Renewable resources account for direct employment of 77,500 persons. Agriculture, using land and water, accounts for 20,000; fisheries and trapping, using estuarine areas and water resources, account for 18,000; marine transportation using the waterways and land fronting on the waterways, accounts for 29,000; and, boat and ship construction, also using waterways and land, accounts for 10,500. The continuance of these industries depends on a variety of factors. International and national marketing conditions, location economics and environmental conditions will have effects on agriculture, navigation and fishery production. Government decisions concerning coastal zone areas will also effect the deployment of these resources for alternative uses and the consequent employment from resource utilization. Maximization of renewable resources related employment should be a consideration in any government program.

TABLE 15
RESOURCE RELATED AND OTHER EMPLOYMENT *

	Coastal Zone Area		
Petroleum Production	34,000		
Petroleum Related Employment	35,000		
Subtotal		69,000	
Other Mineral Production	800		
Other Mineral Related Employment	1,100		
Subtotal		1,900	
Non Renewable Resource Related Subtotal			70,900
Agricultural Production	5,000		
Agricultural Related	15,000		
Subtotal		20,000	
Fisheries	12,000		
Fishery Related	5,000		
Subtotal		17,000	
Navigation	29,000	29,000	
Trapping	1,000	1,000	
Boat & Ship Construction	10,500	10,500	
Renewable Resource Related Subtotal			77,500
Tourism	8,000		8,000
Textiles	6,500		6,500
Miscellaneous Raw Material Mfg.	5,000		5,000
Total Resource Related			167,900
Other			333,400
Total Employment			501,300

*These figures represent estimates based on statistics from various sources which were gathered in different years. They should be interpreted as indicators of trends in economic use of resources, not as precise statements of the economy.

Sources: County Business Patterns, 1973; Louisiana Directory of Manufacturers, 1975; Census of Agriculture, 1969; U. S. Fishery Statistics, 1973.

Basic related employment that is not directly dependent on the natural resources amounts to 20,000 persons. The expansion in non-resource related jobs should be a matter of some concern in view of the projected decreases in nonrenewable resource production.

REGIONAL ECONOMIC RESOURCE USE

New Orleans Region

The New Orleans metropolitan area serves as a commercial and service center for most of the coastal zone, as well as for other parts of the state and nearby regions. Estimated resource related and other employment in the area is given in Table 16. Navigation and mining predominate, together accounting for over 53 percent of the resource based employment. The ratio of resource related employment to total employment is unusually low for this area, but this is due to the noninclusion of the commercial and service employment in the former category.

One problem frequently mentioned in the New Orleans economy is the number of low paying industries. Tourism, a significant percentage of the total, is noted for this, as is apparel manufacturing, which employs over 5,000 in the area. Another problem that may be tentatively identified for the future is the declining mining base in the area. Offsetting this, employment in navigation will probably increase due to extensive development plans and national trends. The seafood industry will change in relation to national and international marketing conditions and environmental conditions. The same is true for agriculture. The development of additional manufacturing jobs, both resource related and nonresource related, may be a key to the future of the area's economy. Some such development is likely to take place along the Mississippi River and other navigable waterways in the area. Consideration of land, water and other requirements for such development should be a prime consideration in any program designed for this area.

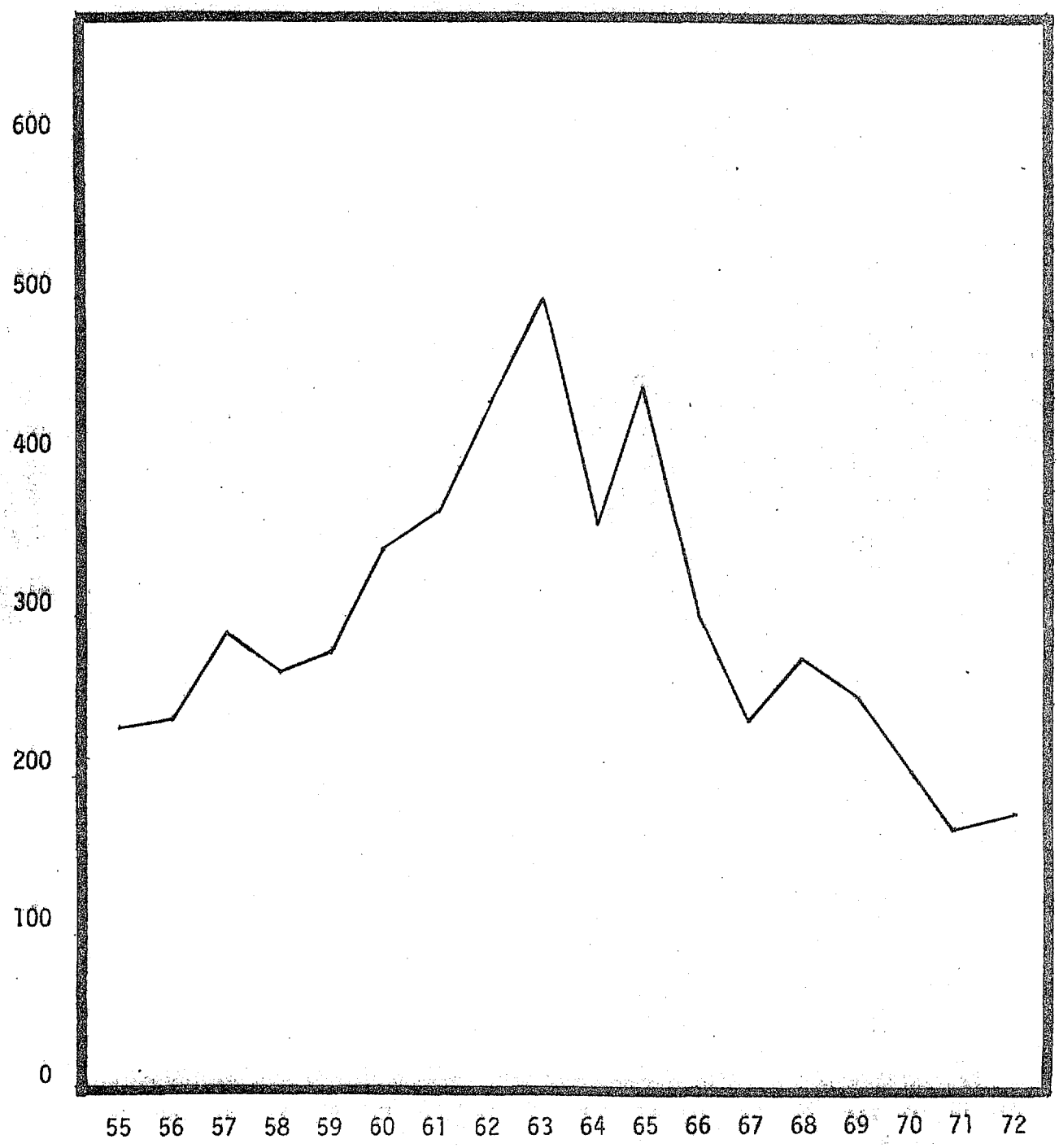
Petroleum and natural gas production employs 12,700 in the area. A considerable portion of this is through the offshore production. Several areas serve as supply centers for the offshore developments, including Venice in Plaquemine and Grand Isle in Jefferson. Substantial employment is also generated by onshore production, particularly in the southern portion of Jefferson and Plaquemine parish. Onshore drilling has declined considerably in recent years. In the peak year, 1973, there were 491 wells drilled. Figures for 1971 and 1972 were 160 and 171, respectively. It is felt by many that this decline will continue. Processing and manufacturing employment directly related to petroleum and natural gas production is 2,300. This is located mostly along waterways in the southern portion of the region.

Navigation and marine transportation employs 21,000 in this region. As the nation's second largest port, New Orleans' economic activities are greatly influenced by marine developments. Several waterways are responsible for the magnitude of the cargo handled. Most important of these is the Mississippi River, with the Intracoastal Canal, the Industrial Canal, the Mississippi River-Gulf Outlet and the Harvey Canal also contributing to the total. Plans for expansion of port facilities are being developed and the likelihood is that the employment and income generated by marine transportation will increase in the future.

Seafood and associated processing employs 5,800 in the area. Although seafood is available in all parts of the region, the southern portion is the principal area for landings. Empire, in Plaquemine Parish, landed 243,786,000 pounds of seafood valued at $12,485,000 in 1974. There are 16 fish processing plants in the area.

FIGURE 9

TOTAL WELLS DRILLED
New Orleans Region



Source: Minerals Yearbook, U.S. Department of Interior.

Agriculture is of relatively minor importance in the area. Most agriculture is located in St. Tammany Parish. Equivalent full-time employment is estimated at 300 for the area. There are also numerous processing facilities employing a total of 3,900. Sugarcane processing accounts for 900 of this, dairy processing for over 800 and meat packing for 800. The remainder is in miscellaneous vegetable and fruit packing. Some forestry and timber processing is found in St. Tammany Parish.

Several industries have located in the area that do not process local resources. Ship manufacturing is one of these with 8,000 persons employed. The establishment of this industry and the obvious advantage of the Mississippi River will probably enable this industry to maintain itself or even experience growth in the future. Apparel and textile manufacturing has also located in the area and employs 6,000. This, too, can be expected to maintain itself over future years.

Tourism is also a significant industry for the area, particularly for the city of New Orleans. Based on estimates made by comparing ratios of selected employment categories in other cities with New Orleans, there are at least 6,000 persons directly employed by the tourist industry. This figure does not include all hotel, motel and other tourist facility employment, and it does not include all of the employment generated in retail, wholesale and other sectors of the economy. The figures are estimates of number of employed in tourist facilities directly due to tourist requirements and demands.

The total employment generated by the above categories is 66,000. Other employment in the New Orleans area is 287,000 and total employment is 353,000. As the state's largest urban center, the area has developed

Table 16

RESOURCE BASED EMPLOYMENT
NEW ORLEANS REGION

Navigation	21,000
Petroleum	12,700
Petroleum Manufacturing	2,300
Boat & Ship Construction	8,000
Apparel and Textile Manufacturing	6,000
Seafood	3,100
Seafood Manufacturing	2,700
Agriculture	300
Agriculture Manufacturing	3,900
	66,000
Other Employment	287,000
Total Employment	353,000

Source: County Business Patterns, 1973; Louisiana Directory of Manufacturers; Census of Agriculture, 1969, U. S. Fishery Statistics, 1973.

the highest income level within the state. Personal income is in excess of five million dollars, and per capita income of $4,600 is 16 percent above the state's per capita income. The position of the area as an urban and economic center for the state should continue into the foreseeable future.

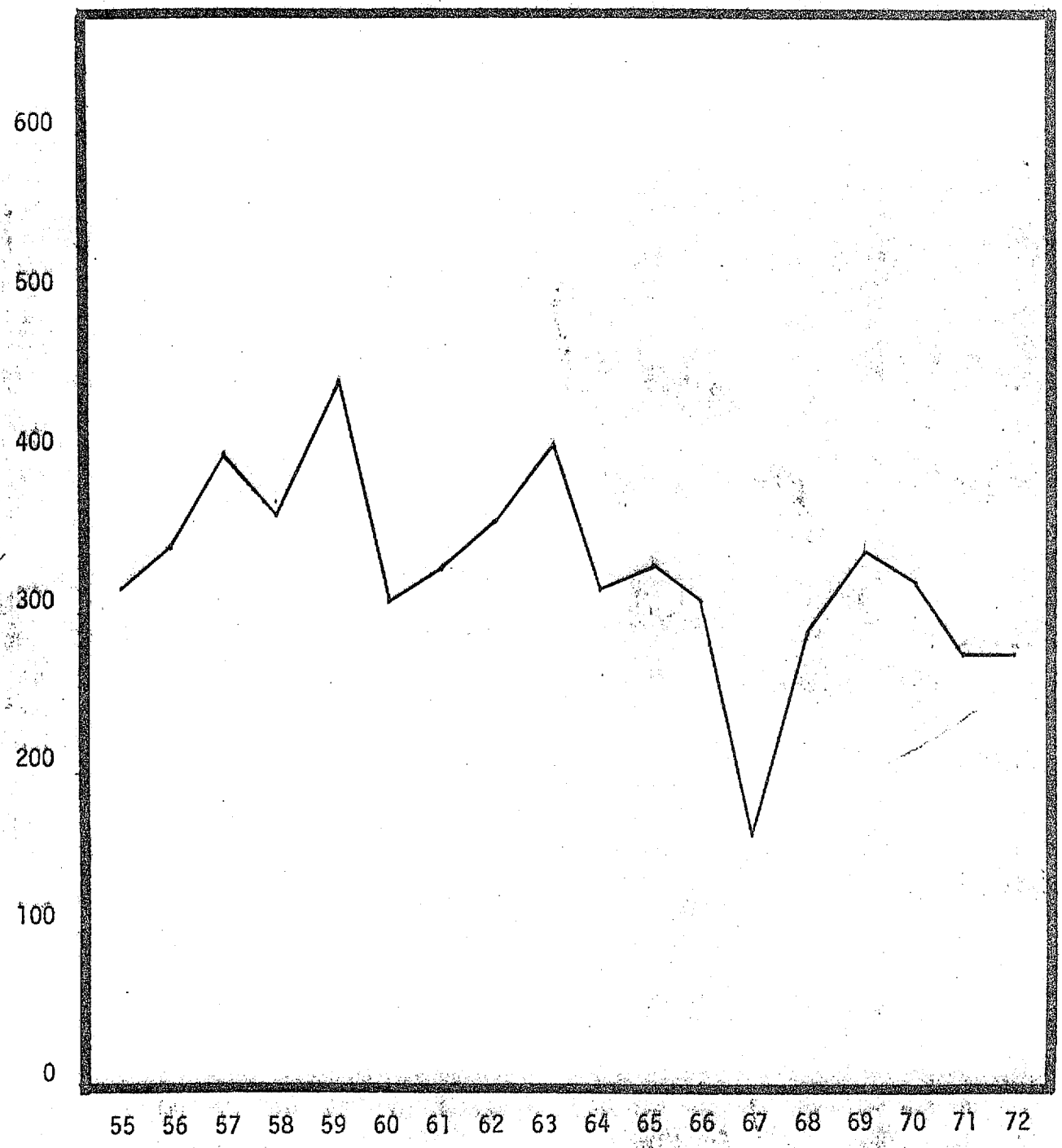
Central Gulf Coast Region

This region includes St. Mary, Iberia, St. Martin and Vermilion Parishes. Major urban areas include Morgan City, Franklin, New Iberia, Abbeville and St. Martinville. Lafayette, although not within the coastal zone, serves as a commercial and service center to this region. Petroleum and natural gas production, seafood, and agriculture are the principal economic activities of the region. The dominant agricultural crops are sugarcane and rice, with rice being located chiefly in Vermilion.

Petroleum and natural gas production is found both onshore and offshore. Employment in production activities is 6,100. Closely related employment in manufacturing totals an estimated 1,300 mostly in the construction of oil drilling rigs. Employment in production is approximately level with that of 1967. This is probably due to offshore production, as the number of onshore wells drilled in the region has declined by 40% since the peak year of 1959. Supplies purchased in the area during 1972 for production acquirements were $527 million and capital expenditures were $111 million. Construction of offshore drilling rigs in Morgan City has become a significant employer in the area. The rigs are used locally and also exported to other offshore producing areas throughout the world. Declines in offshore employment production in the region could be offset, or at least mitigated by this manufacturing base. Another location

FIGURE 10

TOTAL WELLS DRILLED
Central Gulf Coast Region



Source: Minerals Yearbook, U.S. Department of Interior.

where drilling rig production is a source of employment is New Iberia, where manufacturing development in this category has increased in recent years.

Seafood products are landed chiefly at two ports, Morgan City and Intracoastal City. Morgan City ranked sixth nationally in landed weight with 141,541,000 pounds and seventeenth nationally in landed value. Landings in Intracoastal City are roughly in the same range, cut data is not available on the exact totals. Employment in fisheries totals 1,300 man-years and approximately 750 in processing. Processing facilities are located in St. Mary, Vermilion and St. Martin. St. Martin Parish does not directly touch the Gulf of Mexico, and its seafood industry is dependent on the Atchafalaya Basin. The principal catch for St. Martin is crawfish.

In agriculture the parishes of St. Mary, St. Martin and Iberia are mainly sugarcane producers. Rice is the chief crop in Vermilion. In 1975, the estimated crop value for the region was $112,000,000. Sugarcane, despite a very poor year for prices, accounted for $45,000,000 or 40% of the total. Rice accounted for $48,000,000 or 43% of the total. There were 5,600 persons employed in agriculture during 1973. Most of this is seasonal and estimates of equivalent full-time employment, based on income, is 1,300. There are twelve sugarcane mills and refineries in the area; and one mill, which is in Lafayette Parish, is less than a mile from St. Martin Parish. Most of the sugarcane farmland and the processing facilities are located along the banks of Bayou Teche. Employment in these mills is estimated at 1,400. Manufacture of sugar-cane harvesting and processing is found at seven locations in the region and employs 400 persons. Processing of fruits and vegetables employ 1,100. Dairy processing employs 200.

Table 17

RESOURCE BASED EMPLOYMENT
CENTRAL COASTAL REGION

Agriculture	1,300
Agriculture Manufacturing	3,900
Petroleum	6,100
Petroleum Manufacturing	1,300
Seafood	1,300
Seafood Manufacturing	700
Apparel Manufacturing	1,000
Boat and Ship Construction	900
Navigation	500
	17,000
Other Employment	25,400
TOTAL EMPLOYMENT	42,400

Source: County Business Patterns, 1973; Louisiana Directory of Manufacturers; Census of Agriculture, 1969; U. S. Fishery Statistics, 1973.

An apparel manufacturing plant located in St. Martin Parish in 1971. Approximate employment in the plant is 1,000. Other major employment in the region is found in boat and ship construction, and in navigation. Boat and ship construction employs 900 and is related to the offshore petroleum industry, employs 500. In recent years, New Iberia has expanded its employment in boat and ship construction, but data on number employed is not available for the recent expansions.

Total employment in resource related activities is 17,000. From examination of the available data, this would seem to include most of the direct basic employment of the region. Other employment was 25,400, and total employment was 42,400. Total income for the area was 685,720,000, and per capita income was 3,464. This is 88% of the state's per capita income.

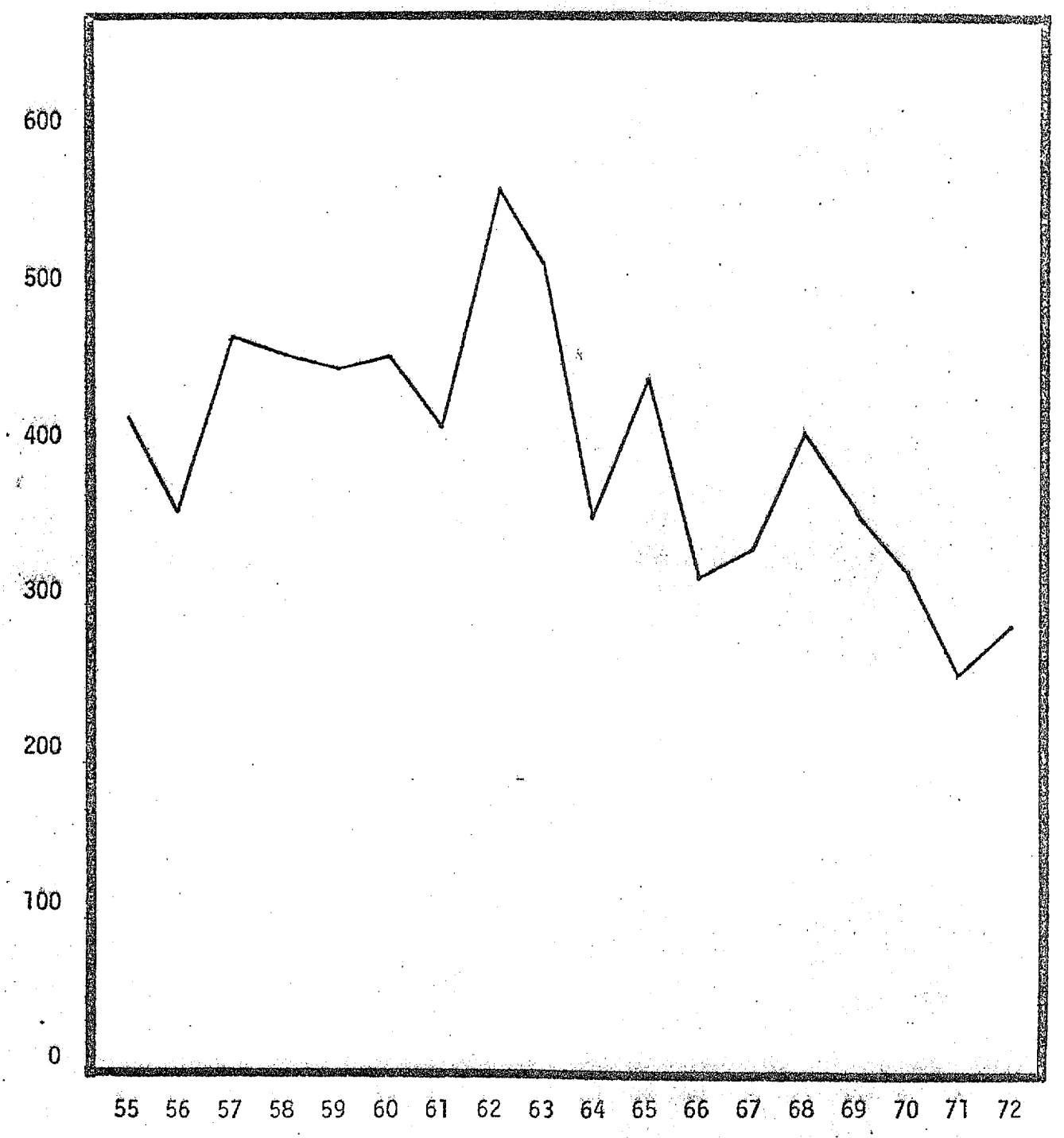
Lower South Central Region

This region, composed of Assumption, Terrebonne, and Lafourche parishes, has two urban settlement patterns. Houma is a central city providing services for several settlement strips extending in numerous directions. The Lafourche strip extends along Bayou Lafourche almost continuously for a distance of 60 miles. The three principal sources of economic activity are petroleum and natural gas production and associated activities, fish and shellfish, and sugarcane production.

Petroleum and natural gas production is located both throughout the onshore area and off the coast of this region. Employment in production is 5,600 and there are an estimated 3,800 jobs in closely related activities. Over 2,000 of these jobs are in manufacture of drilling rigs. Another indicator of the importance of this industry in the area is that there were

FIGURE 12

TOTAL WELLS DRILLED
LOWER SOUTH CENTRAL COASTAL REGION



Source: Minerals Yearbook, U.S. Department of Interior.

more than $360 million of purchases by this industry for supplies and machinery, and over $325 million in capital expenditures in 1972. The trend in employment has generally been upward. Production employment increased by 300 from 1967 to 1973. This employment increase is undoubtedly due to offshore production, as onshore wells drilled in the area have declined from a high of 553 in 1962 to 279 in 1972. Production in onshore drilling is expected to gradually decline, and offshore drilling may also decline. The construction of offshore drilling rigs has become an export industry, with rigs being sent to various overseas locations. The maintenance and even expansion of this associated industry may be crucial to the economic health of the area as production declines.

The region produces a substantial portion of the nation's fish and shellfish landings. In 1974 Dulac-Chauvin, in Terrebonne Parish, had over 206,000,000 pounds of land fish valued at nearly $17,000,000. This made Dulac-Chauvin the fifth ranked fish landing port by weight in the nation and eighth ranked by landed value. Golden Meadow, with 27,000,000 pounds and $8,000,000 ranked nineteenth and sixteenth, respectively. There are an estimated 3,000 man-years of employment by fishermen. In addition, there are 2,000 jobs in processing of the catch. The processing is located along Bayou Lafourche and near Dulac. Most of the fishery effort and processing is shellfish, with shrimp predominating over crabs and oysters.

Agriculture, mostly sugarcane, is also a significant factor in the area's economy. Cash value of the total crop exceeded $40,000,000 in 1975. This is an extremely poor year due to low prices paid for raw sugar. There were 3,200 persons employed by agriculture during 1973, but

Table 18

RESOURCE BASED EMPLOYMENT
LOWER SOUTH CENTRAL REGION

Petroleum	5,600
Petroleum Manufacturing	3,800
Agriculture	900
Agriculture Manufacturing	2,200
Seafood	3,000
Seafood Manufacturing	2,000
Navigation	3,500
Boat and Ship Contruction	1,100
	22,100
Other Employment	19,100
TOTAL EMPLOYMENT	41,200

Source: County Business Patterns, 1973 and Louisiana Directory of Manufacturers, Census of Agriculture, 1969, U. S. Fishery Statistics, 1973.

this does not represent man-years of employment, as much of this is not year round work. Based on income and wages received, the man-years of employment can be estimated at approximately 900. There are eleven sugar cane mills and refineries located in the area. These are located mostly in Assumption Parish and the northern section of Lafourche. There are also two sugarcane machinery manufacturers in the Thibodaux area, both of which export the equipment internationally. Total employment in agricultural related processing and manufacturing is 2,200. In addition to sugar cane, there is some forestry, cattle, soybeans and vegetable farming in the area.

There are approximately 3,500 persons employed by water transportation in the area. Although there is no data available to verify it, transportation of supplies and personnel to offshore oil rigs almost certainly accounts for a majority of this. Several locations, including Dulac and Leeville, are centers for transportation to the offshore areas. An additional activity that contributes to the area is boat and ship construction. This is also related to offshore drilling and fishery industry, but no data is available to relate it specifically.

Total employment in these resource related activities is 22,100. It appears to include all of the basic activities of the region. Other employment was 19,100 in 1973. Total employment was an estimated 41,800 and total income was $608,000,000 for the year. Per capita income for the area was $3,533, 10% below the state average of $3,950.

Western Coastal

This region is centered around Lake Charles and Calcasieu Parish and includes Cameron and Jefferson Davis Parishes. Other than Lake

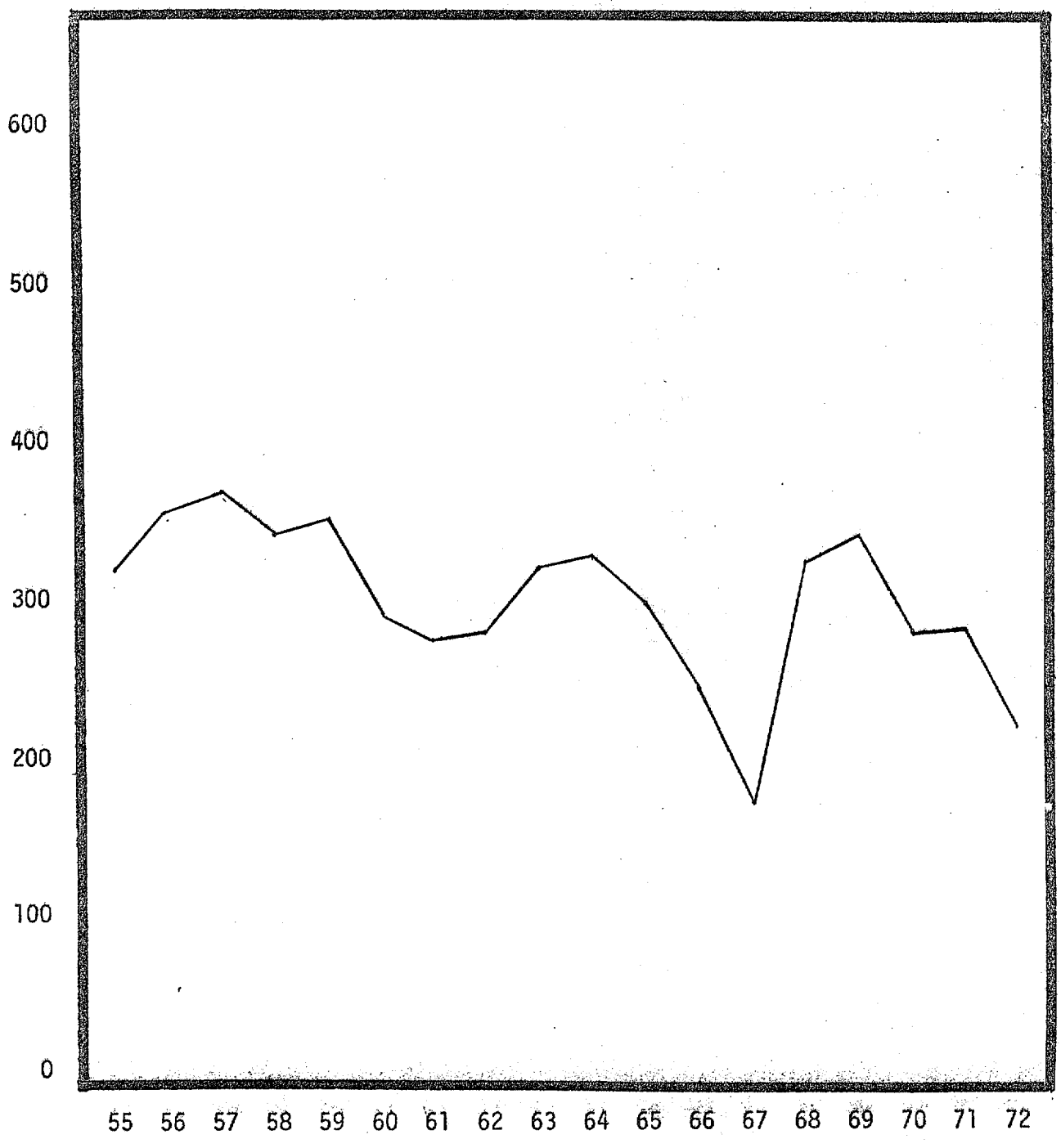
Charles, there are no large cities in the region. Jennings in Jefferson Davis and Sulphur in Calcasieu are moderate size towns. Other communities include Lake Arthur, Cameron and Grand Chenier. The principal activities of the region are based on petroleum and natural gas, agriculture and fishery resources.

Petroleum and natural gas are extracted in considerable quantities from the area. Onshore production has declined only slightly in recent years. Offshore production in this area is not as intense as in other areas of Louisiana, but appears to offer the most likely area for expansion in the future. Employment in production is 3,800. Petroleum related manufacturing, mostly refining and petrochemical processing, accounts for employment of 7,400. The refining has located along the Calcasieu River in Lake Charles and West Lake, in order to take advantage of a plentiful supply of freshwater and navigation facilities. This combination of resources will probably continue to contribute to the manufacturing base of the area. The anticipated future expansion of offshore production in this area should have significant employment effects. In addition to direct production employment, there will be associated manufacturing and services related employment. Cameron is presently an area for such employment and is the area in which expansion would most likely locate. In addition to petroleum and natural gas, there is mining of sulphur, stone and lime in the area. Employment from these minerals is about 200.

Rice and soybeans are the two main agricultural crops. Forestry and cattle are also of some significance in the area. Cash value of the rice crop in 1975 was $62,200,000. This is more than 50 percent of

FIGURE 13

TOTAL WELLS DRILLED
WESTERN COASTAL REGION



Source: Minerals Yearbook, U.S. Department of Interior.

the coastal zone total. Total value of crops in the area was $87,000,000. There were 3,500 persons employed by agriculture in 1973. Estimated equivalent full-time employment, based on income totals, is 1,300 man-years. There is some processing of agricultural products, although this is not as large as in other areas. Manufacturing directly related to local agriculture employs approximately 600. One reason for the relatively low amount of associated manufacturing employment is that rice is frequently not processed in the locale in which it is grown. This is in marked contrast to sugarcane, forest products and cattle, which are found in other parts of the coastal zone. The processing plants in this region are mostly found in Calcasieu Parish. Beef and poultry processing, and dairy processing account for 500 of the total. Not included in the agricultural processing totals are 800 jobs in lumber and wood products. This employment is related to timber production in the northern, upland sections of Calcasieu where coastal zone influences are minimal.

Employment in fishing and seafood production is located principally in Cameron Parish. There are an estimated 500 fishermen in the area and an additional 300 are employed in processing. Menhaden and shellfish account for most of this. Cameron with landed totals of 405,233 pounds and $18,724,000 ranked second and seventh in national totals, respectively. Fish landings are also important to several other communities in the area.

Other resource related employment in the region includes navigation and boat and ship construction. Navigation employs 700 and ship construction employs 500. In addition to being dependent on the navigable waterways, the navigation employment is directly dependent on the mining, agricultural and fishery products, as is evidenced from an examination

Table 19

RESOURCE BASED EMPLOYMENT
WESTERN COASTAL REGION

Petroleum	3,800
Petroleum Manufacturing	7,400
Agriculture	1,300
Agriculture Manufacturing	600
Seafood	500
Seafood Manufacturing	300
Navigation	700
Boat and Ship Construction	500
	15,100
Other Employment	28,700
TOTAL EMPLOYMENT	43,800

Source: County Business Patterns, 1973; Louisiana Directory of Manufacturers; Cencus of Agriculture, 1969; U. S. Fishery Statistics, 1973.

of cargo data. Boat and ship construction is also directly dependent on the offshore petroleum and natural gas, and fishery industries.

Total resource related employment in the region is 15,100. There is apparently very little basic economic activity in the region that is not related to this resource base. Other employment in the region is 28,700 for a total of 43,800 in the region. Most of this is located in the one large city, Lake Charles, although the resources are distributed throughout the nation. Total income for the area in 1973 was $770,000,000. Per capita income was 4,100, which is 3.8 percent above the state's per capita income.

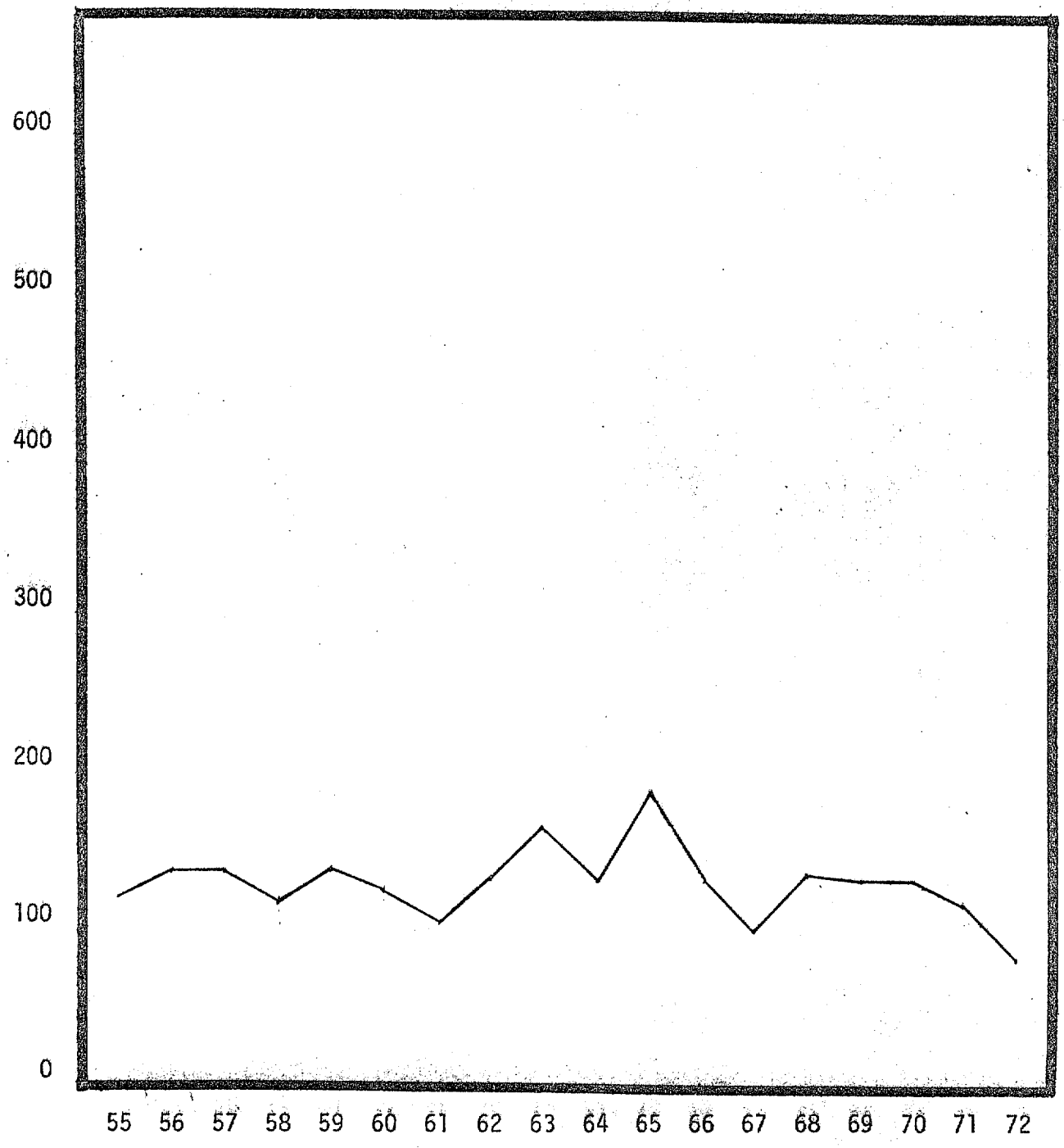
River Parish Region

This region is located between New Orleans and Baton Rouge and includes the parishes of Ascension, Iberville, St. James, St. John and St. Charles. The area is noted for its industrial development along the Mississippi River and the productivity of its agricultural lands, also along the banks of the river. Most of the industrial activity found along the river is processing of petroleum and agricultural products. Some manufacturing and processing has located in this area that does not utilize local resources directly, particularly metal and chemical processing. However, it is obvious that this choice of location for these activities is due to the abundant freshwater and navigational access provided by the river.

Petroleum and natural gas production is found throughout the area. In comparison to other coastal regions, this is a relatively minor source of employment, with only 600 jobs in production. Processing of petroleum products, however, accounts for employment of 8,000. This

FIGURE 14

TOTAL WELLS DRILLED
RIVER PARISH REGION



Source: Minerals Yearbook, U.S. Department of Interior.

processing is done at 39 different plants, with most of the employment attributable to less than 10 of these. Most of this industrial development has taken place in the last two decades (Table 1). This employment will remain an important source of economic activity for the area. One area of concern is the declining production of petroleum in Louisiana. Depletion of resources used in these plants could have negative effects on employment levels. However, the development of Superport should offset declining state resources as a source of raw materials. Additionally, the freshwater and navigational access provided by the Mississippi are likely to continue to induce industry into the area.

Sugarcane is easily the dominant crop in the region. Over 2,900 persons were employed in agriculture in 1973, including full and part time. Based on income data for these employees, the employment was the equivalent of 800 full-time jobs. In addition to the production employment, there are 2,500 employed in processing and related manufacturing. Sugarcane processing accounts for 2,000, or 80 percent of this total. Beef cattle processing accounts for 200, tobacco processing accounts for 100, and the remainder is in several categories of general agriculture.

The seafood industry in this region is less important than in other regions of the coastal zone. Nevertheless, there are an estimated 800 persons employed in the industry, either as fishermen or processors and wholesalers. The main source of these landings are crawfish taken from the Atchafalaya Basin and the wetlands areas to the south of Lake Maurepas and Lake Pontchartrain. Other species of fish are also taken from these areas, including some crabs in Lake Pontchartrain.

Table 20

RESOURCE BASED EMPLOYMENT
RIVER PARISH REGION

Petroleum	600
Petroleum Manufacturing	8,000
Agriculture	800
Agriculture Manufacturing	2,500
Seafood	800
Navigation	700
Metal & nonpetroleum chemical manufacturing	1,200
	14,600
Other Employment	14,200
Total Employment	28,800

Source: County Business Patterns, 1973; Louisiana Directory of Manufacturers; Census of Agriculture, 1969, U. S. Fishery Statistics, 1973.

Processing of metals and nonpetroleum chemicals along the river employs 1,200 persons. This employment is independent of mineral or agricultural resources locally and can be expected to remain constant or increase in the future. Navigation employs 700 persons. This is related to the petroleum, agriculture and other products processed in the area.

Total resource related and basic manufacturing employment for the area is 14,600. Other employment is 14,200, with total employment at 28,800. Personal income in 1973 was $409,000,000. Per capita income was $3,502, 11 percent below the state's per capita income of $3,950.

North Lake Maurepas Region

Tangipahoa and Livingston parishes are in this region. Both have considerable areas of wetlands along the northern shores of Lake Maurepas and Lake Pontchartrain. However, neither parish has a major portion of its economic base or population in the wetlands area. Major communities in these parishes include Denham Springs in Livingston, and Hammond, Amite and Independence in Tangipahoa. None of these is impacted significantly by wetlands. These parishes are sparsely settled and their economic base differs significantly from other coastal parishes. Agriculture and forestry account for over 80 percent of resource related employment.

Forestry and agriculture are concentrated in the northern sections of Tangipahoa. Employment in forestry and miscellaneous agriculture is 4,000 in the area. Equivalent full-time employment based on income data is the equivalent of 600. Within the area of these are ten saw mills and five other lumber processing plants. Over 1,200 persons are employed in these plants. Other agricultural processing employment is through

Table 21

RESOURCE BASED EMPLOYMENT
NORTH LAKE MAUREPAS REGION

Agriculture and Forestry	600
Agriculture Manufacturing	1,700
Seafood	200
Seafood Manufacturing	200
Mining	100
Mining Manufacturing	--
	2,800
Other Employment	10,800
Total Employment	13,600

Source: County Business Patterns, 1973; Louisiana Directory of Manufacturers; Census of Agriculture, 1969; U. S. Fishery Statistics, 1973.

meat packing, grain milling and vegetable processing plants. These account for an additional 500 jobs in the area.

Seafood production in the area is principally from Lake Pontchartrain. There are an estimated 200 persons employed by this means. There are three oyster packing plants in Tangipahoa employing approximately 200 persons.

Mining in the area is mostly sand and gravel. Employment in mining is about 100. No mineral processing is done in the area.

Resource related employment in the area is 2,800. Other employment occurs in a wide range of miscellaneous categories and amount to 10,800. Total employment for the area is 13,600. The lack of manufacturing and diversity in economic activity accounts for the relatively low per capita income, 3,200. This is 19 percent lower than the state's per capita income.

POPULATION AND SETTLEMENT PATTERNS

The heavy concentration of resources in the coastal zone is matched by the population concentration. The coastal area with a population of almost 2,000,000 has a population density of 100 per square mile. These figures compare with 1,774,000 and 72 per square mile for non-coastal Louisiana. Population densities for Louisiana as a whole and the United States are 84 and 56 per square mile, respectively. Clearly, the coastal area has a relatively high population concentration.

On the basis of previous population trends, the population of the coastal zone is projected to increase by 5% for the five year period ending in 1980, and 13% for the period ending in 1985. These increases are significantly in excess of projections for non-coastal Louisiana and the United States. These projections confirm the readily observable growth occurring in the various settlement areas of the coastal zone. Projected increases of population are particularly significant in St. Tammany, St. Bernard and Jefferson parishes with percentage increases of over 35% in a ten year period. The summary of estimated and projected populations for the coastal area is given in Table 22.

The population of the area is heavily concentrated in several urban areas. Of the seven Standard Metropolitan Statistical Areas (SMSA's) in Louisiana, two, New Orleans and Lake Charles, are entirely within coastal zone parishes. Another, Baton Rouge, is partially within the coastal zone and a fourth, Lafayette, is adjacent to the coastal zone. The populations of these latter two are largely dependent upon coastal related activities for their economic base. Houma also shows some indications of developing into a dominant centralized city for surrounding areas. Population and land use data for these centralized urban areas is given in Table 23.

Table 22

PROJECTED POPULATION IN COASTAL ZONE

	1970	1975	1980	1985	1990	1995	2000
Ascension	37,086	41,106	45,985	51,445	58,277	63,700	69,887
Assumption	19,654	20,230	20,823	21,402	22,205	22,466	22,917
Calcasieu	145,415	149,103	153,121	156,478	159,824	161,385	163,940
Cameron	8,194	8,482	8,956	9,111	9,400	9,431	9,633
Iberia	57,397	60,323	63,813	66,316	69,115	69,395	69,738
Iberville	30,746	30,293	29,710	29,022	28,460	27,366	26,399
Jefferson	337,568	402,652	493,427	568,634	663,497	722,795	798,594
Jeff Davis	29,554	28,424	27,290	26,015	25,079	23,492	22,224
Lafourche	68,941	73,026	77,994	82,496	87,870	90,184	92,871
Livingston	36,511	41,572	47,961	53,117	59,788	65,830	73,375
Orleans	593,471	568,863	550,844	539,981	531,028	523,053	517,911
Plaquemines	25,225	26,376	27,677	29,165	32,285	31,388	32,438
St. Bernard	51,185	59,362	71,084	80,340	92,045	99,471	109,412
St. Charles	29,550	32,633	36,729	40,690	45,506	49,569	54,022
St. James	19,733	20,005	20,198	20,836	21,477	22,137	22,680
St. John	23,813	25,867	28,262	31,370	35,310	38,244	41,325
St. Martin	32,453	33,584	34,691	35,718	36,936	37,461	38,013
St. Mary	60,752	65,428	70,831	59,200	58,335	56,467	54,779
St. Tammany	63,585	73,398	86,356	98,264	114,653	129,341	148,676
Tangipahoa	65,875	69,071	72,218	75,417	78,722	81,043	83,876
Terrebonne	76,049	81,509	88,032	94,896	102,953	106,857	111,380
Vermilion	43,071	43,755	44,977	44,997	46,104	44,328	44,032
TOTAL	1,855,868	1,950,074	2,090,257	2,214,910	2,536,343	2,637,525	2,715,744

Source: University of New Orleans, Business and Economic Research

Table 23

CENTRAL CITIES POPULATION AND LAND USE

	Projected Population for Central Urban Areas				Land Area Industrial/ Urban	Total Land Area
	1975	1980	1985	1990	Square Miles	
New Orleans	1,131,000	1,231,000	1,317,000	1,432,000	129	2,355
Baton Rouge	309,000	337,000	363,000	389,000	49	290
Lafayette	121,000	135,000	146,000	157,000	18	163
Lake Charles	149,000	153,000	156,000	160,000	42	686

The population of the coastal zone has historically located on the natural levees and ridges formed by various geologic processes. The settlements east of Vermilion Bay are found on natural levees along waterways and those to the west are found on ridges.

The settlements in eastern sections are going to continue to locate along the waterways, until there will be essentially one continuous linear development. As the land bordering the principal highways becomes completely settled, expansion will proceed into the agricultural land. This type of residential subdividing is already occurring in Thibodaux, Houma and in the communities bordering Bayou Lafourche and the Mississippi River in Plaquemines. As a result, residential and industrial pressure is being placed on the agricultural land bordering the strips.

The four settlement strips in the western section of the coastal zone will experience no immediate large scale residential pressure. The communities will expand, however, along the highways connecting the cheniers. Individuals responsible for this growth will more than likely not be permanent residents. If the present trend continues, this growth will come from sportsmen who will look for land on which to build camps. As part of the North American Flyway, the region provides hunters with considerable opportunity.

The cheniers' rural settlement pattern has been firmly established. The farming tradition will continue with very little change in land use patterns. Recreational opportunities, such as the development of Holly Beach and the possible creation of a park and resort at Chenier au Tigre, will attract tourists.

Industrial expansion will probably be limited to Cameron, but with only

148 businesses, employing 1,988 people, changes will probably be minimal. For example, the addition of 500 jobs would represent an increase of 25% to the Cameron strip. This could be changed by significant Outer Continental Shelf development in the western gulf.

The narrowness of these natural levees and ridges and their high productivity as agricultural land are a source of a significant problem for the expanding population of the coastal area.

If the expansion occurs in the adjacent wetlands areas, the effect is likely to be a reduction in estuarine productivity. This, in turn, will have an impact on that portion of the local economy related to commercial fisheries and recreation. If, on the other hand, the expansion occurs along the natural levees, as it has in the past, the highly productive agricultural lands will be converted to other uses. This will also reduce the economic base and recreational potential of the area. A third possibility is one of population growth limitation. Although it has been attempted in a few areas of the country, this alternative has detrimental effects on the economic base and is also likely to result in an age distribution of the population that is abnormally skewed towards the elderly.

NEW ORLEANS

The New Orleans SMSA is comprised of Orleans, Jefferson, St. Bernard and St. Tammany Parishes. Wetlands are located near Lake Pontchartrain in Orleans, St. Tammany, and St. Charles Parishes, Lake Borne in Orleans and St. Bernard Parishes, Lake Salvador and Lake Little in Jefferson Parish and along the Bogue Chitto and Pearl Rivers in St. Tammany Parish. Even though St. Charles Parish is not formally a part of the SMSA, it is mentioned here because it may soon be a part and because the expansion of the New Orleans area is already exerting developmental pressures on it. It is obvious from the maps that the population center of New Orleans (Orleans and Jefferson Parishes) is surrounded by either water or wetland. Any expansion of New Orleans without further impact on the wetland areas would have to take place in St. Tammany Parish.

In 1974, New Orleans had almost 1.1 million people. This should increase to about 1.2 million in 1980 and 1.4 million in 1990.

LAKE CHARLES

Calcasieu Parish comprises the Lake Charles SMSA. The wetland areas which are rather distant from the City of Lake Charles are those that are near the Sabine River, and near the boundary of Calcasieu Parish with Cameron Parish. The wetlands near the city of Lake Charles are generally to the north and along the Calcasieu River. Expansion of Lake Charles to the south and east would not impact directly on the wetlands.

LAFAYETTE

Although Lafayette is not within the coastal zone, it is dependent on the coastal zone for its economic life. In 1975, Lafayette had approximately 121,000 people. By 1980 the population of Lafayette is projected to reach 135,000 and by 1990, 157,000.

BATON ROUGE

The Baton Rouge Standard Metropolitan Statistical Area (SMSA) includes the parishes of Ascension, East Baton Rouge, Livingston, and West Baton Rouge. Livingston and Ascension are within the coastal zone and major wetlands areas are found in these parishes near Lake Maurepas. The major population parish of the SMSA, East Baton Rouge, is not within the coastal zone. There is much room for the expansion of Baton Rouge into areas that are not presently wetlands or within the coastal zone. In 1974 there were 309,000 people in East Baton Rouge; by 1980, there will be about 337,000 persons; and population by 1990 will be about 389,000. In the SMSA, population estimates for 1974, 1980, and 1990 are approximately 410,000, 460,000, and 565,000, respectively.

HOUMA

Houma is not presently classified as an SMSA. However, judging from ratios of wholesale sales and service employment to total employment, it appears that Houma has begun to assume some of the characteristics of central cities. Development is proceeding in several strip settlements adjacent to Houma at a rapid pace and if Houma were to be designated an SMSA, then these settlement strips would be considered a part of the SMSA. Consequently, data will be presented for Terrebonne Parish which constitutes the area described.

The Terrebonne urban area has an existing population of over 80,000. Growth is projected to occur at a rapid rate, reaching 95,000 by 1985; and exceeding 100,000 by 1990. Land used for urban settlement is 13,783 acres in Houma, plus an additional 9,050 in the various strip

settlement areas. Expansion of this area will necessarily be in either prime agricultural land or in wetlands.

In addition to the centralized cities there are numerous other urbanized areas within the coastal zone. The most common form of the urban settlement is a strip development along natural levees and ridges found in wetlands areas. Altogether, there are 10 such areas throughout the coastal zone. Population and land use data for these urban settlement areas is given in Table 24.

MORGAN CITY

This area consists of development that extends from Patterson to Amelia. Morgan City with a population of 16,500 in 4,667 households, is the center for urban services of this area. To the west of Morgan City are the communities of Patterson, Bayou Vista and Berwick. These communities lie in a nearby continuous strip up to the banks of the Atchafalaya River. Total population of this western segment of strip is 13,700 in 3,600 households. To the east of Morgan City is a largely industrial strip area. The only town of significance in this area is Amelia, with population of 2,300 and 609 households. Total land area consumed by this development is 11,271 acres of which nearly 2,800 is for industrial purposes. This area has increased markedly in population and industrial development in the last 10 years and will probably continue to do so in the near future. Limiting factors for future development is available land, particularly in the Morgan City area. In the western segment of this strip land is more available, but is also highly productive agricultural land.

FRANKLIN

The Franklin settlement strip consists of development along Highway 90 and Bayou Teche from Baldwin to Centerville. The city of Franklin is a center for this development. Population of Franklin is approximately 9,300 in nearly 2,600 households. Baldwin has a population of 2,100 with 523 households. The remainder of the population is found in strip development. Total urban and commercial land use in the area is 8,766 acres. Projected increases in population for the area are moderate. However, any expansion will probably take place in highly productive agricultural land.

PLAQUEMINE PARISH

Settlement in Plaquemine Parish is along the high natural levees of the Mississippi River. Population is slightly in excess of 25,000 and is projected to increase 27,000 by 1980. This does not represent a significant increase. Land use consumed for settlement purposes is almost 26,000 acres. A large portion of this is for industrial sites along the Mississippi River. Expansion of industrial sites is likely to continue and can be expected to consume large amounts of productive agricultural land.

BAYOU LAFOURCHE

The Bayou Lafourche strip settlement is the largest of this type in Louisiana. Extending from the eastern section of Assumption Parish to Leeville in Lafourche Parish, the area has a population of nearly 70,000. Large communities within the area include Thibodaux, with a population of approximately 15,000; Raceland, 4,800; Larose, 4,000; and Golden Meadow, Lockport and Galliano. This area has experienced population increases and is projected to increase by more than 10% in the decade

from 1975 to 1985. There are presently 18,000 households in the area.

The natural levee on which the development is located becomes progressively more narrow as it extends southward. Thus, Thibodaux in the northern section has expanded outward from the banks of Bayou Lafourche, but the southern communities, such as Golden Meadow and Galliano, have had difficulties with land availability. Land consumed by urban and commercial development in this strip is over 17,000 acres. Land along this strip is noted for its high agricultural potential, while wetland away from the levee are noted for its high productivity for wildlife and marine nutrients.

BAYOU PETIT CAILLOU

This settlement is located on the natural levees adjacent to Bayou Petit Caillou and Bayou Terrebonne. The proximity of these two geologic features is such that the land use patterns indistinguishable. Population of this area is approximately 9,700 in 2,407 households. This area has had population gains related to expansion of adjacent Houma and can expect additional expansion in the future. The area along Bayou Petit Caillou had a population increase of over 22% in the 1960-1970 decade. The larger communities of this area include Cocodrie, Chauvin and Bourg. Nearly 4,900 acres are used for urban and commercial purposes in this area.

BAYOU GRAND CAILLOU

This settlement strip is located along a natural high levee. Population in this strip is approximately 4,500, with no communities over 1,000. There are 1,041 households in this area with an unusually high 4.5 persons per household. Land in this settlement by urban and commercial uses is 1,795 acres. Expansion in the area could be influenced

by population pressures from Houma. Within this area is the port of Dulac, which serves both fishery and petroleum interests.

BAYOU DULARGE

The Bayou DuLarge settlement is another sparsely settled area. The settlement is a strip development along Highway 57. There are no communities with any population data in this area. Land consumed by this settlement area is 381 acres. Expansion is not considered likely in the near future, although there may be some residential developments related to population increases in Houma.

BAYOU BLACK

The strip settlement along Bayou Black is very sparsely settled. Small residential and commercial clusters are found on both sides of the bayou from Gibson to Houma. The settlement is so small that population statistics are not available for any community in this area. Land consumed by these communities is 1,977 acres. The land is on the high natural levees along Bayou Black and is also highly productive for agricultural purposes. No significant expansion of the population is anticipated. The economic base is almost exclusively agriculture.

CAMERON

Cameron is the parish seat of Cameron Parish and is located at the mouth of the Calcasieu river. Over 3,200 persons reside in the area in 903 households. Residential settlement accounts for 994 acres. As a port with proximity to areas of anticipated Outer Continental Shelf development, there will probably be pressures for development in the area. Available dry land in the immediate area is extremely limited. This is likely to effect future expansion of this settlement area.

HOLLY BEACH

Holly Beach is west of Cameron Parish. This is a very lightly settled area with only 700 permanent residents in 201 households; there are numerous recreational camps in the area. There are 169 acres in the area devoted to settlement uses. Large scale expansion is not anticipated due to inadequate economic base.

GRAND CHENIER

The Grand Chenier settlement area is on a chenier ridge to the east of Cameron. Nearly 1,200 persons live in this area in 323 households. Land use by settlement is 542 acres. Large scale expansion is unlikely due to inadequate economic base.

PECAN ISLAND

This settlement is situated on a chenier ridge in Vermilion Parish, and has an approximate population of 1,500. Land used for settlement purposes is 224 acres. Expansion of the area is unlikely due to inadequate economic base.

NORTH LAKE SHORE

This development along the northern shore of Lake Pontchartrain is officially a part of the New Orleans Metropolitan Area. However, the area is only beginning to urbanize on a large scale. The development is largely based on residential commuters to the central city and extends from the Causeway at Mandeville to the I-10 bridge at Slidell. Total population of the area is over 30,000, with enormous growth likely to occur in the near future. Slidell, on the eastern section is the largest community with nearly 16,000 persons and it can be expected to increase.

This development area is mostly located on the upland areas just to the north of the lake. However, there are several areas of wetlands in the area that are under development. The high amenity value of living on the lake front will induce more development of the wetlands areas. Existing urban and commercial land uses in the area totals approximately 8,000 acres. The projected population increases will also increase land used for these purposes.

Table 24

LAND USE AND POPULATION DATA, URBAN SETTLEMENTS

	Urban Land Use[1] (acres)	Population[2]
Cameron Parish	1976	8,194
Cameron	994	
Grand Chenier	542	
Holly Beach	169	
Vermilion Parish	6,916	43,071
Pecan Island	224	
St. Mary Parish	19,020	60,752
Franklin	8,766	
Morgan City	11,271	
Terrebonne Parish	17,537	76,049
Bayou DuLarge	1,977	
Bayou Black	381	
Bayou Grand Caillou	11,795	
Bayou Petit Caillou	4,899	
Houma	13,783	
Lafourche Parish	14,820	68,941
Lafourche	17,909	
Plaquemine Parish	25,950	25,255
Plaquemine	25,950	

1. Source: Land Use Maps; State Planning Office.

2. Source: University of New Orleans, Business & Economic Research Service.

RECREATION PATTERNS

Recreation is a major activity associated with the coastal area. Most of this takes place in wetlands, although a significant portion occurs in dry land, forests, agricultural areas, and open water. Many of the recreational activities take place in more than one environment, thus making it difficult to estimate the recreational potential for specific environments. Hunting and fishing, the two major activities, are exercised in multiple environmental types.

In terms of total recreational value, fishing appears to be the major activity in the coastal area. A survey conducted by the U. S. Bureau of Sports Fishing and Wildlife in 1970, determined that fresh water fishermen spend an average of $6.30 per trip, and saltwater fishermen spend an average of $10.77 per trip. Assuming that these expenditures increased at the same level as other recreational expenditures in the United States, then these figures would be $7.83 and $13.39, respectively in 1975. Estimates from other Louisiana Wildlife and Fisheries Commission (Murray, unpublished data) indicate that there were 7,164,533 saltwater fishing trips and 19,493,693 fresh water trips in Louisiana during 1970. It is a safe assumption that all the saltwater trips were in the coastal zone and the number of fresh water trips in the coastal zone can be estimated from other data. The coastal zone parishes accounted for 64.6% of all fishing licenses sold in the state and, if one assumes that the fishing trips (salt and fresh water) were in equal proportion, then there would be 17,200,567 trips in the coastal parishes. Of these trips, 17,164,533 are saltwater, and then 10,056,034 must be fresh water trips. At the rates of $95,933,096 and $78,738,746, respectively for a total of $174,671,842

for recreational fishing expenditures attributable to coastal zone resources in 1975. This assumes that the level of fishing activity was the same in 1975 as in 1970. More than likely, the level of activity has increased since recreational activity has generally increased during these years, and there has been a 5.5% population increase in the coastal area. Thus, these figures are conservative.

Hunting also is a major use of the wetlands. A survey by the Louisiana Wildlife and Fisheries Commission in 1973 determined the number of game animals hunted throughout the state. Using an earlier survey to determine the relative proportions of game animals killed in the coastal zone and an estimate of the number killed per hunting efforts, it is possible to estimate the number of hunting type for each type of game. From this the expenditures per game type can be calculated by using the Bureau of Sports Fishing and Wildlife estimates of expenditures per hunting trip. Similar calculations are performed for waterfowl and deer (Table 25).

The calculations show that there were $27,423,721 expenditures for hunting in the coastal zone. Not all of this is attributable to the wetlands, as considerable hunting activity takes place in dryland forest and agricultural areas. The assumption for these calculations are the same as for fishing, with the game kill data being gathered in 1972-1974. Thus, the hunting expenditure estimates are also somewhat conservative.

Table 25

Hunting Expenditures in the Coastal Zone

Species	(1) # Killed	(2) Kills/effort	(3) Efforts	(4) $/Effort	(5) Expenditures
Rabbits		1.9	598,190	9.54	5,706,729
Squirrel		2.1	440,395	9.54	4,201,366
Quail		2.5	98,288	9.54	937,668
Dove	109,412	5.7	312,471	9.54	2,980,973
Gallinule, Rail, Swipe and Woodcock	91,958	3.0	262,073	9.54	1,997,000
Ducks	2,017,231	2.8	616,732	11.94	7,363,780
Geese	158,952	1.7	93,266	11.94	1,113,596
Deer	12,990	.045	285,780	21.72	6,207,141
TOTAL					30,508,253

Sources: 1) Wildlife and Fisheries Commission--1972-1973
Small Game Kill Survey and 1973-1974
Waterfowl Kill Survey and 1973-1974
Deer Kill Survey
2) Op. cit.
3) (1) ÷ (2)
4) National Survey of Fishing and Hunting; Bureau of Sports Fisheries and Wildlife, 1970.
5) (3) x (4)

In addition to fishing and hunting, there are numerous other recreational activities dependent on the natural resources of the area (Table 26). These include crabbing, motorboating, crawfishing, waterskiing and bird watching. Altogether these activities account for an estimated 11,954,160 user days of activity. Using a conservative figure of $10 expenditures per day, this would represent an annual expenditure of $119,541,600 in the coastal zone.

Table 26

User Days for Various Recreational Activities
Louisiana Coastal Parishes, 1970-1980

Activity	1970	1975	1980	1985
Motorboating	4,135,456	4,781,665	5,301,392	5,727,459
Crabbing	1,971,255	2,279,631	2,684,685	3,147,275
Waterskiing	1,442,601	1,668,022	1,964,404	2,346,787
Crawfishing	1,178,123	1,362,217	1,604,262	1,925,543
Birdwatching	1,610,904	1,862,625	2,193,584	2,620,579
TOTAL	10,338,339	11,954,160	13,748,327	15,767,643

Source: Louisiana State Parks and Recreation Commission, Annual Report, 1971.

Fishing, hunting and the other activities are dependent on the environmental resources of the coastal zone. It is difficult to estimate the impact of these activities on the economy of the coastal area. There does not exist sufficient data to determine employment generated, nor is it possible to provide a reasonable estimate of the proportion of these expenditures on services and goods produced in either the coastal zone or Louisiana. However, the value of this recreation can be calculated as it applies to social well being. It is obviously an economic good which is greatly desired by the citizenery. The annual expenditures on these renewable resources can be considered as expenditures that may be extended indefinitely and consequently may be considered on a present value basis. Using the discount rate of 6 1/8% established by the federal government, the annual expenditures of over $287 million may be converted to a present value of $4,693,556,815 (Table 27). This represents an approximation of the existing value of environmentally based recreation in the coastal area.

Table 27

Estimated Recreational Value of Coastal Zone in 1975

	Estimated Expenditures	Present Value
Hunting	$30,508,253	$498,093,926
Fishing	174,671,842	2,807,785,175
Other	119,541,600	1,951,699,591
TOTAL	$324,721,695	$5,301,578,692

Discount rate of 6 1/8% is taken from rate established by federal government for water resource projects.

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ABSTRACT

The natural resources of the coastal zone are used for economic, demographic and recreational purposes.

The economic uses are described by employment data and the trends in the use of the resources is given. The four principal resources are petroleum and natural gas, soils and water for agriculture, the estuarine based fisheries and the navigable waterways. To a limited extent, the economic uses of these resources is disaggregated to a regional level.

The demographic patterns are described. Population data and trends are given. Data for land use by population settlement is also given.

The recreational uses of the resources is mostly through hunting and fishing. Expenditures and other data are provided.