1973

Louisiana Canals and Their Influence on Wetland Development.

Donald Wayne Davis
Louisiana State University and Agricultural & Mechanical College

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The Louisiana State University and Agricultural
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Geography

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LOUISIANA CANALS AND THEIR INFLUENCE
ON WETLAND DEVELOPMENT

A Dissertation

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in

The Department of Geography and Anthropology

by

Donald Wayne Davis
B.A., California State University, Hayward, 1967
M.A., Louisiana State University, 1969
May, 1973
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ABSTRACT

Coastal Louisiana, according to recent measurements, has 4,572 miles of canals. This network can be divided into five types: drainage and reclamation, trapping, logging, petroleum and transportation. All of these were constructed in response to a particular economic interest and provided access to the resources in the marsh-swamp complex. These channels, consequently, would not be a landscape feature had it not been for the wetland resources.

Historic maps indicate marsh and swamp drainage ditches were excavated as early as 1720. These watercourses helped drain agricultural land and remove swamp cypress. From this beginning, planters have continued to drain and reclaim land to increase their agricultural output. In the early 1900's, marsh-drainage channels were excavated in an attempt to reclaim this land. The projects generally failed, but the canals are still used as local transportation routes.

The trapping ditch, or trainasse, provided coastal dwellers with quick access to their traps and an easy way to move furs and other supplies. The channels are important, because they allow individuals to trap over a large area.
and, since land owners never placed restrictions on the number of "trails" built, trappers had complete freedom to dig as many canals as needed to work their land efficiently. Hence, the most intensive trapping networks develop in muskrat and nutria feeding areas.

In order to remove cypress from the swamp systematically, the lumber industry built navigable connecting canals, toward which "pull-boats" drug timber, leaving visible scars. As the cypress was depleted, this practice was terminated, leaving only the canals as evidence of this economic activity.

Which conclusion of the logging period, the oil industry began to discover petroleum and natural gas along the coast. In their exploration programs, canals were constructed to simplify the problems of drilling, maintenance and logistics. These channels have become an integral part of the landscape and, due to the constant addition of well sites, the system continues to grow. This canal network -- partly by design -- has become the principal transportation system, in every regard, in the state's oil-rich marsh and swamp.
All these watercourses provided transportation links into the alluvial wetlands. Regardless of the original purpose, many canals were used in the movement of freight. Private interests, in some cases, cut channels specifically to serve the transport needs of the coastal communities; on these routes tolls were collected. Community built channels, on the other hand, were free.

Louisiana's coastal area is criss-crossed, ringed, cut and otherwise dominated by a massive grid of man-made canals. Interest, time, technology and population characteristics have changed, but canals endure, many for over 150 years. Their influence continues to have a decisive and cumulative impact on the wetlands environment.
INTRODUCTION

South Louisiana (Figure 1), according to a calculation based on an analysis of topographic sheets at a scale of 1:24,000 and 1:62,500, has an estimated 4,572 miles of canals south of the Gulf Intracoastal Waterway (Barrett, 1970, p. 1). Since Barrett utilized maps which were out-of-date and in addition excluded waterways north of the Intracoastal Waterway, this figure only approximates the magnitude of the canal system in south Louisiana. However, it is useful because it provides some indication of the extent of artificial waterways in "coastal Louisiana." This essay is a survey of Louisiana's canals south of 30° north latitude and coastward of the Prairie Terrace. It includes the Chenier Plain, Deltaic Plain and a portion of the Mississippi Alluvial Valley, an area greater than that examined by Barrett (Figure 2).

Within this zone, canal construction has progressed unchecked in resource development and utilization. Canals, consequently, have become significant landscape features. The objective of this study was to map the distribution and explain the purpose and economic importance of these canals.
Louisiana South of 30° North Latitude
(Base Map after U.S. Army Corps of Engineers, 1966)
30° North Latitude
Corps of Engineers, 1966)
in a cultural-economic context; that is, the relationship between man and the land as expressed in canals excavated for resource exploitation. To understand this association there is a need to comprehend the history of canal development, the economic activity of canal builders and the configuration of the physical landscape. Concomitant with the principal theme, two additional objectives have been realized. Excavation techniques used in canal construction are analyzed according to their influence on canal size; also the importance of the canal as a culture element to isolated settlements is considered wherever appropriate.
In that there has been little scholarly interest in the evaluation of the state's canal system, the available literature is sketchy. Before the discovery of oil in the coastal zone, the individuals responsible for the excavation of the wetland canals did not record their construction activity for its historic importance. To determine the extent of the early canal network maps were used to compile an inventory of the artificial waterways in the study area. Old charts are defective and incomplete, but provide the best available documentation. In that they do not identify the canal's purpose, this information has been obtained through the literature, personal interpretation and field interviews.

It is hoped, through an explanatory-descriptive treatment of the cultural-economic-physical factors related to wetland canals, that an appreciation of the importance of these landscape features in marsh-swamp resource development will be realized.

To understand the geographic growth and development of canals, a classification has been devised according to the nature of resource exploitation. This analytical scheme consists of five canal types: agricultural, transportation, trapping, logging and petroleum. These five categories are
arranged historically and, in general, show the developmental sequence of resource use and suggest the nature of the changes which have occurred in the swamp and marsh environments. In analyzing these historic shifts, the discussion of canals begins in 1720, and continues to the beginning of the petroleum period, about 1930. With the discovery of petroleum and natural gas, the canal system was expanded significantly. To document the petroleum industry's dependence on artificial waterways, six study areas have been selected. These regions are representative of the wetland environments and are used to indicate changing canal patterns and the increase in total canal mileage through time. Due to the complexity of the petroleum industry's canal network, six case studies are presented in order to reveal the extent of this canal type, along with other types that may have been built by different use groups prior to the petroleum period.

Ditches and Canals

In the traditional sense, a ditch is a long narrow excavation dug in the earth for conveying water for drainage or irrigation" (Webster, 1963, p. 661). The earliest available maps indicate drainage channels were the first
artificial waterways utilized in resource exploitation. They were built by the French for land drainage, but were, in fact, multifunctional units, serving as drainage and access channels.

It is true that ditches were important in increasing the state's agricultural output, but they were not limited to the agricultural community. Many were constructed for transportation purposes. For example, coastal dwellers cut small, narrow marsh passageways called "pirogue trails" or trainasse (see Chapter III) to reduce the difficulty of marsh travel. The ditch is more than a channel for drainage or irrigation; it is a significant factor in the marsh dwellers' systematic exploitation of the environment and a prominent element in this process.

Canals, on the other hand, are "artificial waterways used by people as a transportation link between points" (Webster, 1963, p. 324). They are larger than the ditch and serve more people. On the available maps the word, "canal," first appears on Gauld's 1764 and 1778 sheets; by 1817, the Reconnoitring Chart of the South Frontier of the U.S.A. . . shows several waterways that were probably excavated to simplify the movement of goods between the agricultural areas west of Bayou Lafourche and the New
Orleans market (Anon., 1817, map). Recognizing the difficulties in shipping their products to market, planters in the late 1700's and early 1800's, financed several canals. (Darby, 1816, p. 101; Humphreys, 1861, p. 430). Schooners and later freight-carrying steamers sailed these passages to reduce travel time to the Mississippi and New Orleans (Chapman, 1955, p. v; Mims, 1944, p. 24). These were canals in the traditional sense and provided the basis for the state's extensive network of man-made transportation routes.

All navigable man-made channels will be included in this paper if they are "navigable in fact." Under Louisiana law "water bodies are navigable in fact when they are so used or susceptible to such use, or shown to be capable of commercial use" (Memorandum from Arthur Smith). Consequently, if they are used for that purpose, they are legally navigable and susceptible to the law. This is the case with Louisiana's wetland canals. The smallest ditch, although perhaps intended for drainage, if used by commercial interests is a navigable waterway. A channel, therefore, regardless of size, is navigable when used in the shipment of commerce.
Marsh and Swamp Environments

Louisiana's marsh encompasses approximately four million acres with a width of from 15 to 20 miles in the western part of the state increasing to a maximum of approximately 50 miles south of New Orleans (Chabreck, 1970, p. 1). This broad, flat, coastal zone is a result of sediment accumulation associated with the alluvial processes of the Mississippi River. For centuries, Mississippi sediments have fanned out along the coast producing two distinct regions: the Deltaic and Chenier plains.

East of Vermilion Bay, the area is designated the Deltaic Plain and is the site of seven deltaic lobes of the Mississippi. Accumulation of material in this zone has been a direct result of the building processes of a delta system. West of Vermilion Bay, in the area called the Chenier Plain, the developmental process has been different. In this region, silts and clays from the Mississippi are moved westward by longshore currents, resulting in an accumulation of material along the coast which are stabilized by the colonization of salt-tolerant vegetation (Chabreck, 1970, p. 7).
Vegetation and soils, in the two zones, differ due to the varying rates of compaction and subsidence and changes in salinity. The marsh in the Deltaic Plain, unlike the Chenier Plain, is constantly changing, creating an unstable vegetative cover. Much of the vegetative type is called "flotant," which is "either truly floating on water or supported by highly aqueous organic ooze" (Russell, 1942, p. 79). In the Chenier Plain the marsh soil is firm and can easily support a man.

The peat accumulations present no serious problems to canal excavations. Engineering difficulties are at a minimum; ditches and canals can be cut using hand tools or powerful floating dredges.

The swamp is a different environment and, unlike the marsh, there are canal excavation problems. The luxuriant tree growth extends into the marsh along the natural levees of the lowland rivers and bayous. In places it is almost impenetrable. As a result, the growth of trees, shrubs and vines reduces the excavation equipment's efficiency. To provide floating dredges with enough room to dig a canal, explosives or draglines equipped with special buckets are employed to clear the right-of-way. Once a path is cut, a channel can be dug with ease.
The Total Canal System

Louisiana's marsh-swamp complex has experienced a series of changes resulting from man's desire to obtain the resources in these environments. In that the marsh terrain presents no serious problems to canal construction; canals are built at will. Thus, the system is a dynamic part of the landscape.

New canals are continually added, but old ones are rarely filled in. Once a canal is cut, it remains for years. Theoretically, its duration is finite. Some channels, however, have enlarged until they are now bayous. The only indications of human origin are their relationship to the natural waterways and their physical character.

Since the 1930's, or with development of oil and natural gas fields, the system has changed. Before 1930, there were only a few large canals, most were constructed by trappers and loggers and limited to small areas. The demands of the oil industry changed the system, larger channels were required to marsh and swamp well sites. The product of this activity was a labyrinth of oil field waterways.
Canals have been instrumental in developing the resources in the alluvial wetlands, but have also affected drainage patterns, modified flora and fauna through altered salinity regimes and contributed to land loss. As visible landscape components, they are a reminder of man's ability to change unknowingly the natural system, and will remain on the landscape when the resources are no longer used or exploited.
CHAPTER I

LOUISIANA'S DRAINAGE DITCHES: A METHOD OF AGRICULTURAL IMPROVEMENT AND RESOURCE DEVELOPMENT

The alluvial lands of the state are traversed in every direction by a network of bayous and lakes. They have been rescued from the swamp by levees, and rendered cultivable and productive by ditching. The soil is of unsurpassed richness and easy to cultivate. It needs no rest or variation of crops, nor manuring, to render it always productive. It is upon this soil the great agricultural system of Louisiana was developed with such brilliant result, in the profitable cultivation of the great staples, cotton, sugar and rice (Cottman, 1867, p. 22).

In the economic growth of the coastal zone, canals were excavated by the French as early as 1720. In fact, "... the earliest records of ... French settlements in Louisiana ... are in a practical sense of a great land reclamation project" (Harrison and Kollmorgan, 1947, p. 666). Settlers constructed artificial watercourses primarily to drain potential agricultural land. By 1724, one landholder, across from New Orleans, had eight to 10 miles of canals on his plantation (Surrey, 1916, p. 33, 34).
Planters expanded their land by clearing, channelizing and draining the backswamp. They accomplished this by digging a main "outfall" canal -- at least 12-feet-wide and four-feet-deep -- through the plantation. On the 1817 Reconnoitring Chart of the South Frontier of the U.S.A. . . . there are 19 canals along the Mississippi, south of New Orleans. Eleven years later, Delafield delineated 15 new channels and does not show nine of those that appear on the 1817 map. Thirty-seven new additions appear on Hughes 1842 chart, representing a substantial increase over the original 19 (Figure 3).

These outfall canals, as well as those surrounding the levees, furnished good means of transportation by boat, and often the flow of water . . . will be sufficient to keep them scoured out, so that they require little attention. Such transportation routes, connecting as they do, with a series of lakes, bayous and streams, place the various plantations in a comparatively independent attitude, so . . . they are still within easy and convenient reach of good markets (Morehouse, 1911, p. 272).

Plantation owners, between 1700 and the early 1800's built multifunctional channels. Consequently, Bouligny, Fesejno, Garnell, Hubert, Jamanville, Johnson, Laronde, Larusles and Philippon canals, as shown on the 1817 chart, were dual-purpose channels. They were used for travel, but built for drainage. Samuel Lockett reports several of these
Figure 3. The expansion of the canal system along the Mississippi south of New Orleans, 1817 to 1842, Base map after Hughes (1842).
canals were four to five-feet-deep and provided access to New Orleans (1870, p. 46). During periods of high water many plantation channels were ineffective in removing flood waters. To increase their efficiency, drain machines were often used. This equipment straddled the central channel and through a system of moving buckets discharged excess water into the swamp, thus, removing the water and increasing the channels carrying capacity, but preventing it from being used as a transportation route (Interview with Ben Treadaway, December 17, 1971). As drain equipment gained in popularity and steam improved its efficiency, the number of drainage channels increased.

Along the Mississippi, where documentation of plantation channels is quite good — Hughes' and Graham's 1842 maps show 52 canals south of New Orleans. Man-made waterways were also built to drain the valuable soils along Bayou Lafourche, Black, Terrebonne, Vermillion and others. These watercourses were not mapped completely until after the War between the States. Records, therefore, on drainage ditches west of the Mississippi are limited. Natural levees in this region were notable agricultural areas and it can be assumed that drainage channels were constructed. In fact, the 1859 records of the Swamp Land
Commission states that 57 Bayou Teche planters encouraged the state to aid in draining their land (Caldwell, p. 106). Caldwell's report suggests canals were constructed west of Bayou Lafourche. However, no documentation has been found that indicates canal construction prior to Caldwell's report.

Swamp Land Acts Encourages Drainage Improvements

All man-made drainage channels discharged into basins along the coast. Problems occurred when too much water was added to the natural system. This happened in association with land reclamation and the increase in demand for sufficient drainage.

To alleviate the problem, the state through the Swamp Land Act of 1849 and 1850, appropriated money to "expand and improve levees and drains." Under and Act of Congress, approved March 3rd 1849, the state received all swamp and "overflowed lands" which were unfit for cultivation (p. 41). This land was granted to the state in section one of the Act, which stated:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that, to aid the State of Louisiana, in constructing the necessary levees and drains to reclaim the swamps and overflow lands
therein, the whole of the swamps and overflowed land, which may be or found unfit for cultivation, shall be and the same are hereby, granted to the State (p. 41).

By surveying overflowed land "in wet weather or during the time of spring flood" many tracts were listed as "impassible cypress swamp," when they were only flooded upland (Defebaugh, 1907, pp. 374,375). All this land was a potential source of revenue, which according to section two of the Act must be "applied exclusively, as far as necessary, to the construction of the levees and drains. . . ." (p. 41)

From the Swamp Land Act, DeBow's Review reported Louisiana received 10,210,122.58 acres of swamp under the Act of 1849 and 543,399.13 under the Act of 1850 (Anon., 1852, p. 633), which clarified the land to be considered "unfit for cultivation" (p. 141). The state donated "these lands to the local levee boards which sold them at fifty-cents or less an acre" (Defebaugh, 1907, p. 374). Income received was placed in the Swamp Land Fund and invested in improvement and construction of levees and drains.
State-Supported Projects

In South Louisiana, swamp-land money was invested in wetland drainage improvements. In these areas, the natural system often did not provide adequate drainage; excess water, therefore, contributed to flooding. To decrease the hazzard the state supplemented natural drains with several artificial waterways which were, in most cases, at least 30-feet-wide and four-feet-deep. The thought was:

If plantations can be drained by ditches, when they have fall, Parishes having the same facility can be drained by canals. One thing is certain the current through the canals already made is very strong. . . . Let no one then despair of the value of his property. . . . (Williams, 1848, p. 5)

This could be accomplished because:

The market price of the land is twenty-five cents an acre, and they may be made equal to any in the State by the use of modern steam dredging machines for canalling [sic] and leveeing them, and the improve wind mill pumps for draining them, for the breeze is constant near our coast, . . . lasting the greater part of the day, which greatly moderates the heat and tempers the cold (Robertson, 1868, p. 12).

State-funded drainage canals were planned by state engineers, to aid in land reclamation, reduce the effects of floods and assist the drainage of private lands. To accomplish these objectives, canals were often located
away from the areas drained. Their positions increased runoff, decreased flood problems and generally aided drainage. As an added benefit, they were used by flatboats in the shipment of plantation crops to market.

Examples of State-Supported Drainage Programs

Lafourche Valley

In 1853, George W. Morse, State Engineer, reported that:

By an examination in the Land Office, it was ascertained that the total amount of... lands affected by the overflow [sic] of Bayou Lafourche, exceeds eight hundred thousand acres; the greatest portion consists of low prairies or marshes, which must remain nearly valueless until reclaimed by drainage. As near as can be judged, there is of [sic] these swamp lands about fifty thousand acres which would probably be sold under provisions of existing laws, ... if the overflow of the waters of the bayou can be arrested (p. 7).

To reduce flood damage and increase agricultural land, the state, in 1850, contracted A. Alford and Company to build a canal into Lake Boeuf, clean out Bayou Chegby and Bayou Chevreil and cut a canal from Bayou Chevreil to Bayou Verret (Caldwell, 1859, p. 61) (Figure 4). This started a rather comprehensive state-supported drainage plan for the basin. The justification for this work was that:
Figure 4. Principal early canals in the vicinity of Bayou Lafourche, the channels into Bayou Chevreil have been excluded because they no longer appear as canals. Base map after U.S. Army Corps of Engineers (1966).

In many instances the lands of the front proprietors are rendered almost valueless by their want of drainage; the natural vent of the water being obstructed by growing and increasing vegetable deposits in some contiguous marsh, which is inaccessible to the planter, and can only be removed by the aid of machinery ... I will venture the assertion that with the proper machinery and 10 hands, in less than 30 days I could remove the obstructions [into Lake Boeuf] and give vent to the water; not only relieving the planters, but reclaiming a large amount of the adjacent lands (Williams, 1848, p. 45).
Hains' 1864 map indicates the Lake Boeuf channel was completed, providing the necessary drainage to help reduce flooding in the northern part of the Lafourche Basin. The canal connecting Bayous Chevreil and Verret (now no longer visible as a canal) was completed in 1859, furnishing "a direct outlet for all drainage waters from the head of the valley of Lac des Allemands" (Caldwell, 1859, p. 63). Drainage, therefore, between Donaldsonville and Lac des Allemands was improved. These channels are over 100 years old and continue to aid the region they were built to serve.

Five additional drainage projects were included in the 1859 program and subsequently completed. They were:

(1) A canal from the south end of Lake Long to Grand Bayou Bay and continuing to Bayou Jean Lacroix, (now an important transportation route for the oil industry) (Caldwell, 1859, p. 95). (2) A channel between State Cut-Off Canal and Bayou des Amoureux, which was completed by 1892 (a small portion is still visible). (3) A connection between Lake Salvador and Bayou Lafourche. (4) A water-course between Bayous Coquille and Vacherie (this canal is on the 1892 quadrangle and difficult to trace today) (Caldwell, 1859, p. 82). (5) A drainage outlet between Bayou Rigolets and Bayou St. Denis (canal by-passed part of
Little Lake reducing travel by 11 miles; consequently, it became an important transportation route) (Caldwell, 1859, p. 84) (Figure 4).

All these canals contributed to increased runoff. The waterways through Grand Bayou Bay were particularly significant. It was estimated they would "immediately drain . . . the whole of the upper . . . valley, and . . . reclaim . . ., the extensive bodies of swamp lands now worthless, and benefit the whole of private property mostly adopted for sugar" (Caldwell, 1859, p. 94). This amounted to an estimated 208,514 acres of reclaimed land at a cost of about $2.12/acre (Caldwell, 1859, p. 94). To planters living along the reclaimed area, the channels were significant landscape additions.

West of Bayou Lafourche

West of Bayou Lafourche, drainage surveys were conducted on the "Grand Mauvais" swamp near Franklin, which is bounded by Bayou Teche, Tortue and Vermilion. In July 1859, land owners in St. Mary Parish wrote Lafayette Caldwell, Commissioner for the Second Swamp Land District, explaining: "That the draining of the Grand Mauvais is a work of the greatest importance, and would remove a serious obstacle to
the prosperity of our parish" (p. 97, 98). Demand for reclaimed land continued, with 57 planters encouraging state engineers to "dig a canal from some point near . . . Bayou Teche, in the rear of Franklin, to the bayous in the Sea Marsh." By draining this area "a large tract of swamp and high marsh would be brought into the market and become a source of revenue to the Swamp Land Fund. . . ." (p. 106)

M. J. Thompson, in 1872, reported that the Grand Mauvais canal had been approved, but not completed. Two miles "were constructed by the State in 1860, with a base of twenty-five feet . . ." and "it is proposed to bring the rest of the canal to the same standard . . . ." (p. 13)

This region is now extensively cultivated, so apparently the drainage project was successful. The extent of the reclaimed land is unknown, owing to the absence of accurate historic data.

These are a few of the projects supported by the Swamp Land Fund. The canals were instrumental in land reclamation and significant elements in changing the agricultural geography of the alluvial wetlands. Drainage channels were excavated to improve natural drainage and bring into production potential agricultural land. The material available, on these projects, is inadequate to estimate the
number of drainage-reclamation canals the state was responsible for building. From the data in Caldwell's report and current topographic maps, it is apparent many waterways built between 1858 and 1859 are still landscape features. They were excavated 113 years ago and continue to provide drainage-transportation routes. Their age testifies to the longevity of Louisiana's canals. They were not temporary features, but permanent landscape elements, indicating current wetlands canalization will have a long-term environmental effect. Historic evidence clearly indicates that once a canal is cut it endures.

Land Reclamation

In the decade before the War between the States, private and state-supported flood programs had reached a level of sophistication that "... hope could be held for attempts to reclaim the marshlands" (Harrison and Kollmorgen, 1947, p. 667). Some wealthy planters extended their land holdings into the swamp and marsh. New Orleans expanded "... the area under pump and laid elaborate plans for enlarging the adjoining potential residential areas..." (Harrison and Kollmorgen, 1947, p. 669) In 1843, the Report of the State Engineer, M. G. Penn, reveals that:
By . . . act of the state legislature it is the duty of the State Engineer to report on the most feasible plan for draining the low lands back of the city of New Orleans.

The importance of this cannot be too highly appreciated, when we take into consideration that by effectually draining the low lands that surround the city, not only her highly favored position for commerce will be greatly improved and her limits extended, but that also the prevalence of the Yellow Fever, will, it is confidently anticipated, be driven from our otherwise healthy and beautiful city to accomplish this end, I would respectively recommend the plan pursued by almost every intelligent and prudent planter, . . . (p. 3).

Early maps (Banks and others) show that by 1863 the city was being drained by a well developed network of canals and ditches (Figure 5).

Figure 5. New Orleans canal network, after Banks (1863).
In Orleans Parish, dikes, pumps and canals were constructed as early as 1846, resulting in reclaimed land that was planted in Sea Island cotton (Harrison and Kollmorgan, 1947, p. 669). This type of program was limited to small areas and continued until the War between the States.

After the War

. . . many of the attempts at reclamation were tidelands projects. This proximity to the coast made them very vulnerable to storms. The wave of reclamation which came after 1900 centered farther inland on marshes not quite so vulnerable to Gulf winds and high tides. Many of the techniques developed in the tideland projects were, however, later carried out in the more inland swamp and marshland reclamation which began in Louisiana about 1900 (Harrison and Kollmorgan, 1947, p. 674).

Between 1870 and 1890, interest in land reclamation increased. In 1878, the "State Legislature chartered the Louisiana Land Reclamation Company . . . , which reclaimed 13,000 acres in the coastal area of Terrebonne Parish" (Harrison and Kollmorgan, 1947, p. 671). Land improvement was accomplished through a well organized system of canals and levees. Steam dredges increased the company's efficiency in excavating the required levees and canals. "Later the land was broken by cable plows operated by the engines of . . . steam dredging machines which floated in canals at opposite sides of the fields" (Harrison and Kollmorgan, 1947, p. 671).
Many writers assume South Louisiana reclamation projects began about 1907. Charles W. Okey, stresses this date, stating: "Previous to 1907 there had been no active movement in the drainage of the wet prairie lands of Louisiana" (1918, p. 21). Records show this is incorrect. Marsh reclamation is an old practice, dating back to French colonization. From this beginning, considerable experience has been gained in the proper methods to be employed in land reclamation.

Organized marsh development programs waited until after 1900, when enterprising northern investors purchased large tracts of what was considered "worthless" marsh. They were going to dike, drain and reclaim this land for agriculture and pasture, transforming the coast into a series of polders. The most enthusiastic supporter of the program was Edward Wisner.

Reclamation projects developed after 1900 were, to a large degree, inspired and carried out by Wisner through Louisiana Meadows Company and affiliated organizations. Paying 12-1/2 cents an acre, he held at one time almost 1,500,000 acres of land bordering the coast (Harrison and Kollmorgen, 1947, p. 677). He was so confident of the
feasibility of developing Louisiana's swamp and marsh that he was certain he would succeed, saying:

Judging from the progress that is being made in reclaiming land by the Louisiana Meadows Company and its branch concerns, and with the assistance of others interested in these matters, all present swamp in Louisiana will be drained in a comparatively short time (Harrison and Kollmorgan, 1947, p. 682). This did not happen; of approximately 50 reclamation projects completed, only four major ones are still productive.

Equipment Used in Reclamation Programs

To perform the work required in building drainage canals, two basic types of equipment were used: steam bucket dredges and draglines. Using a bucket dredge, large channels were excavated. Draglines were employed in digging smaller channels, like the laterals often connecting into the main canal. Both tools leave a distinct "continuous embankment of spoil on one or both sides of the excavation" (Gagliano, 1971, p. 4) and were the principal machines used in drainage channel work.

Steam Bucket Dredges

Steam bucket or dipper dredges consist of a bucket attached to a long handle, or boom, mounted to a cabin on a barge-type hull (Simon, 1920, p. 1) (Figure 6). Operating like a dry-land steam shovel, a bucket dredge operator
lowers the bucket into the proposed cut, filling it, booms up and swings to the spoil embankment depositing the material. Continuing the process, the machine advances in the cut, excavating the canal.

To channelize a section of marsh or swamp, floating dredges are required. In areas where there is a great deal of standing timber and sunken logs "a dipper dredge is the best machine for cutting the canals -- at least for taking out the top 4 or 5 feet" (Okey, 1918, p. 44). To cut a channel in this environment it is best to dig the canal in sections, "allowing the banks and the material excavated the first time over to solidify before placing an additional load on them" (Okey, 1918, p. 44).

When the prairie is free from stumps, or where the stumps have been taken out of the way with a dipper dredge, a long-boom, gravity-swing, orange-peel bucket dredge is a very satisfactory means of cutting such canals. This disturbs the material much less than does a dipper dredge, and the canal cut with the orange-peel bucket will be much freer of soft mud than one cut with the dipper dredge. . . (Okey, 1918, p. 44).

Although barge-mounted draglines (Figure 7) and orange-peel buckets (Figure 8) improved dredging efficiency, the bucket dredge was the first type used in coastal canal work. As early as 1835, this equipment was employed in channel excavation and became the workhorse in canal
construction (Rosseau, p. 4). In fact, the state in 1856, had two dredges constructed at a cost of $40,000 each (Hebert, p. 10).

Private contractors, such as J. H. Harvey, often built their dredges at the job site. In 1859, construction of Harvey Cut-Off was delayed because the dredge boat had to dig its way out of the canal where it was assembled (Caldwell, p. 84). Prior to the War between the States, there were a number of steam dredges operating in coastal waters. As people began to increase their agricultural land, new canals were required. This was particularly true in attempts at marsh and swamp reclamation. Since the dipper dredge had been used so successfully in canal work, it was, with a few refinements, the logical choice in reclamation work.

Draglines

Draglines, unlike steam dredges, were employed in digging small ditches. This machine operates by using a bucket to remove material from the channel, which, when full, is raised clear of the water and dumped on either side of the cut (Simon, 1920, p. 1). In that the machine is outfitted with a crawler undercarriage it can move on land. This is one of the benefits in using a dragline,
because when equipped with the correct length of boom and bucket it is a highly efficient excavating machine (Figure 9). Due to its low cost and operating expense, it is an ideal tool for the numerous small drainage channels associated with farming.

Reclamation Techniques

Wetlands reclamation was based on a system of levees, internal drains and pumping plants. Once the area to be reclaimed was defined, a large "dredge-boat canal," at least 25-feet-wide and five-feet-deep, was constructed around the projects perimeter. In building these canals the spoil was used as a protective levee, with a height of five to six feet and a top width up to 12 feet. When the boundary canals and levees were completed, the internal drainage network was constructed (Merry, 1910, p. 13).

A good example of this technique exists at Des Allemands where reservoir canals were cut through the projects interior to insure adequate drainage. Adjoining these reservoir channels were "collecting" ditches of somewhat smaller size -- about four-feet-wide and three-feet-deep -- as opposed to the main canals, which were from 10 to 20-feet-wide and up to eight-feet-deep (Harrison and Kollmorgan, 1947, p. 680) (Figure 10). This system of
Figure 6. Bucket dredge engaged in channel maintenance.

Figure 7. Barge-mounted dragline with a clamshell bucket on the deck.

Figure 8. Extra heavy orange-peel bucket (Simon, p. 8).

Figure 9. Small dragline equipped with a standard dragline bucket.
Figure 10. Reclamation project at Des Allemands. Base map after U.S.G.S. Hahnville Quadrangle (1969).
internal ditches was deep enough for navigation, providing the farmer with a transportation network (Figure 11). Erosion caused by boat traffic and the tendency of mud or silt to accumulate in the canals resulted in maintenance problems. Clearing ditches of soft mud and accumulated vegetation was a costly procedure, requiring large floating dredges or draglines capable of removing the debris.

Figure 11. Farmer using a reclamation canal for transportation purposes. (Thomson, p. 45).
Drainage Projects: Successes and Failures

Avoca Island, Bayou Terre Aux Boeuf, Caernarvon, Clovelly Farms, Delta Farms, Des Allemands, Golden Meadow, Gueydan and Lafitte were a few of the attempts at marsh reclamation. These projects, along with about 40 others (Figure 12) were laid out in similar patterns; the landscape becoming a system of interconnecting channels. The problem was they were constructed in areas where the land was frequently inundated by storm surges, or channel infilling was so great it was too expensive to maintain the canals and levees. As a result, the large, ordered system of polders proved unsuccessful and the projects generally failed. The canals remain as the only evidence of the state's experience in marsh reclamation. The canal system within the reclamation projects at Clovelly Farms, Des Allemands, Gueydan and the Raceland Prairie have been maintained. Through extensive drainage and pumping programs these are the only projects still productive; the only four that succeeded.

Organized drainage plans have also been effective around New Orleans. Through time, drainage canals have become an integral part of the total land utilization
Reclamation
(From Lake Charles Pumping Plant-
1. Lake Charles Pumping Plant-
2. Grand Chenier- Surveys and plans completed for project
3. Gueydan- Partially cultivated
4. Atchafalaya Bay- Surveys and plans completed for project
5. Avoca Island- Partially cultivated
6. Upper Terrebonne- Partially cultivated
7. Raceland- Surveys and plans completed for project
8. Raceland Prairie- Cultivated
9. Raceland Prairie- Construction started
10. Smithport Plantation- Cultivated
11. Lake Fields- Surveys and plans completed for project
12. Raceland Prairie- Surveys and plans completed for project
13. Des Allemands- Surveys and plans completed for project
14. Des Allemands- Partially cultivated
15. New Orleans Neatherlands Co.- Partially cultivated
16. Des Allemands- Surveys and plans completed for project
17. Des Allemands- Partially cultivated

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Reclamation Projects, circa 1917
(From Okey, 1918, p. 3)

18. Gheens- Cultivated
19. Delta Farms- Partially cultivated
20. Clovelly Farms- Construction started
21. Golden Meadow Farms- Cultivated
22. Pontchartrain- Cultivated
23. Pontchartrain- Surveys and plans completed
24. Willwood Plantation- Cultivated
25. Plaquemine-Jefferson- Partially cultivated
26. Lafitte- Partially cultivated
27. Bayou Berot- Construction started
28. Caernarvon- Partially cultivated
29. Caernarvon- Construction started
30. Shell Beach- Construction started
31. Bayou Terre Au Boeuf- Partially cultivated
32. Bayou Terre Au Boeuf- Construction started
33. Venice- Partially cultivated
Gheens - Cultivated
19. Delta Farms - Partially cultivated
20. Clovelly Farms - Construction started
21. Golden Meadow Farms - Construction started
22. Pontchartrain - Cultivated
23. Pontchartrain - Surveys and plans completed for project
24. Willswood Plantation - Cultivated
25. Plaquemine-Jefferson - Partially cultivated
26. Lafitte - Partially cultivated
27. Bayou Perot - Construction started
28. Caernarvon - Partially cultivated
29. Caernarvon - Construction started
30. Shell Beach - Construction started
31. Bayou Terre Au Boeuf - Partially cultivated
32. Bayou Terre Au Boeuf - Construction started
33. Venice - Partially cultivated

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Figure 13. New Orleans East, 1917 and 1967, from Okey, 1918, pp. 27 and 39 and U.S.G.S. Little Woods and Spanish Fort Quadrangles, 1967 and 1965.
pattern within the urban environment. They have been a significant element in contributing to the city's expansion by allowing people to build on reclaimed land (Figure 13).

Other projects failed, but many of their canal networks are now important transportation routes. As a result, they have not filled in, but enlarged, to provide commercial fishermen and sportsmen with marsh-access routes.

These projects represent a desire to increase agricultural land through reclamation. Swamp and marsh bordering natural levees is still being diked, channelized and pumped dry, thereby, bringing marginal land into production and increasing farm and pasture land (Figure 14).

Figure 14. Current rice reclamation project, located on the fringes of the marsh south of Abbeville, indicating the orderly network of canals and levees.
Drainage Canals - A Summary

Beginning with the French, Louisiana's agricultural productivity expanded through marsh and swamp reclamation. In the 1700's, the French and travelers passing through Louisiana remarked on the feasibility of reclaiming land, or expanding agricultural production by increasing the plantation's system of drains. Swamp was cleared, drained and planted. Land owners, by 1850, enthusiastically supported drainage programs.

Agricultural land increased with land reclamation. Today, marginal areas are diked and drained, continuing the process. Land development is occurring along natural levees where the swamp can be cleared. Marsh is reclaimed in the rice areas north of the Chenier Plain; small polders are also drained as pasture in other regions. Large drainage schemes have been abandoned, leaving as evidence of their existence a distinctive canal pattern. A few, such as Clovelly Farms and Des Allemands, remain. The others either failed completely, were partially successful, or are now part of the suburbs of New Orleans.
Canals, such as Ardoyne, Ashland, Brazen, Dredge Boat, Lapeans, Laurel Grove, Minors, Reggio and Wilkinson were excavated as plantation outflow channels. All were additions to the total system and the fact that they remain on the landscape attests to their use. Other plantations constructed canals, which also served as drainage outlets. These channels have endured and with the clearing of new land the system continues to expand.
CHAPTER II

TRANSPORTATION CANALS

Movement of goods by water has long been an integral part of the transportation geography of Louisiana's alluvial wetlands. From the days of the bateau and the pirogue to the steamboat to the present people have depended on the intricate system of connecting rivers, bayous, lakes and deep channels as effective routes for moving their commodities to market. Natural waterways provided the major shipping routes, but to increase the efficiency of this system and reduce travel time, canals were constructed.

Louisiana's coastal drainage is generally oriented in a north-south direction, making east-west movement difficult (Figure 1). To rectify this situation, canals were excavated as connective links between navigable bayous. These additions improved the transportation system and became significant travel routes, resulting in a network of natural and artificial marsh-swamp passages (Figure 15).

Evaluating the expansion of transportation canals was a problem, because all man-made waterways were potential

41
Louisiana's Principal Base Map After U.S. Army Corps of Engineers.

1. Algiers Canal
2. Attakapas Canal
3. Barataria Bay Waterway
4. Caminada Bay Canal*
5. Canal Bellisle*
6. Canal de Gentilly*
7. Canal Running to the Southern Lakes*
8. Charenton Navigation Canal
9. Cut-Off Canal
10. Delcambre Canal
11. Doulluts Canal
12. Franklin Canal
13. Freshwater Bayou Gulf Outlet
14. Grand Bayou Canal
15. Grand Caillou Canal
16. Grays Canal

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Louisiana's Principal Transportation Canals
Base Map After U.S. Army Corps of Engineers (1966)
Transportation Canals
Corps of Engineers (1966)

1. Gulf Intracoastal Waterway (G.I.W.W.)
2. Harvey Canal
3. Houma Navigation Canal
4. Jean Plaisance Canal
5. Lake Borgne Canal
6. Lake Charles Ship Channel
7. Mississippi River Gulf Outlet
8. Old Intracoastal Waterway
9. Ostrica Canal
10. Panama Canal
11. Plaquemine-Morgan City Alternate Route - G.I.W.W.
12. Robinson Canal
13. Saltworks Canal*
14. Terrebonne Canal (Southwest Louisiana Canal)
15. Wax Lake Outlet
16. Wood Yard Canal*

* Approximate Location
Figure 15.
arteries of commerce. Only a few were built exclusively for commercial traffic; most were constructed for other purposes. That is, their primary function was to aid in developing the state's agricultural, mineral, forest and fur resources. They served, secondarily, as transport routes and would not be on the landscape if local resources had not been exploited.

The Evolution of Louisiana's Transportation Canals

Gauld's 1764 and 1778 coastal surveys, along with a 1770 unsigned chart, were the first maps located to name a waterway a "canal." Gauld's maps show two named channels, "Canal Bellisle," located on the Mississippi's east bank north of New Orleans and, on the west bank near the present city of Vacherie, the "Canal running into the Southern Lakes" (Figure 16). These channels provided a route from the Mississippi into Lake Pontchartrain and Lac des Allemands. Also, the 1770 map shows a "Canal de Gentilly" south of New Orleans, connecting the Mississippi's east bank with Bayou Boeuf (Figure 17). These were the first named canals to appear on historic maps. Since they were important enough to be included on these charts, it is possible they were the first coastal transportation canals.
N. M. Surrey reports that on the lower Mississippi the French constructed canals for two reasons: to make a direct route to the Gulf, and to join the Mississippi with the bayous at the rear of settlements. In fact, to reduce travel time the "entrepreneur to public works (entrepreneur des travaux du roi) established a water connection between New Orleans and Barataria Bay" (1916, p. 33).

... This canal, twenty-five feet wide and a little more than three leagues long, was finished in 1739 and by 1741 the colony was deriving considerable
benefit from it through the exploration of lumber over this route. As early as 1723 it was proposed to construct a canal between St. Jean Bay and Lake Pontchartrain. The work was begun in 1728; but it was some years later before there was a direct waterway through canal, lake and stream between the capital and Mobile (Surrey, 1916, p. 34).

From this account, it is apparent the French were building transportation waterways; the three channels shown on the 1758, 1770 and 1778 maps were probably constructed to aid in the movement of their commerce. Surrey documents that a canal was built to connect New Orleans and Barataria Bay. Information, however, is not provided on its location. Historic maps suggest the "Canal running to the Southern Lakes" may be the original French waterway. Until the 1800's, it was the only mapped canal on the Mississippi's west bank providing a link between the River and Lac des Allemands. Using the lakes and bayous connecting into Lac des Allemands, traffic could gain access into Barataria Bay and the Gulf.

Canal Bellisle and Gentilly appear only on the 1768 and 1770 surveys, but the canal into Lac des Allemands is noted on all coastal charts up to 1842. Historic records indicate this canal remained open for approximately 120 years. Whether it was the original French route into Barataria Bay, is difficult to say, but its longevity and
location suggest that it was. Hence, it was the first important transportation canal in Louisiana

**Attakapas Canal**

By 1816, two additional transportation canals had been added to the landscape. The Attakapas Canal providing a connective link between Bayou Lafourche and Lake Verret (Figure 18) and Harvey Canal from the Mississippi to Bayou Barataria (Darby, 1816, map). Along with the canal into Lac des Allemands, these two man-made waterways became significant transport routes.

Planters along Bayou Teche, using shallow-draft vessels shipped agricultural commodities through Attakapas Canal into Bayou Lafourche, by-passing the longer more dangerous passage through the Gulf. In 1835, Benjamin Buisson, State Engineer, reported the Attakapas Canal "is a small stream through which a part of the high waters of bayou Lafourche run to lake Verrett [sic] but, by straightening and widening the channel it could be transformed into a major steamboat route" (p. 7). Buisson implies the channel was not a significant route. The project to improve the canal never materialized, because as the number of coastal waterways increased, other routes were used. By 1862, the
Attakapas Canal "had passed into oblivion and only the memories of its appearance lingered [sic]" (Chapman, 1955, p. 95).

Harvey Canal

Harvey Canal was started in 1737 as a five-mile water route from the Mississippi south to Bayou Barataria (Figure 19). "This [canal] was probably an enlargement of a drainage ditch which the records tell us existed as early as 1724, and which have borne considerable small boat traffic" (Dabney, 1941, p. 86). The canal was dug by German immigrants using hand tools and draft animals. In fact, Louisiana's German coast was partially settled by men who received small farms for their work on the channel.

Samuel Lockett's 1870 coastal survey states that between Barataria Bay and New Orleans there is an extensive trade by water through the bayous and [sic] 1853 there were small steamboats and over a hundred lugger boats engaged in trade. . . . The principal of these routes and from which four to six feet can be taken is either Bayou St. Denoris or Grande Bayou from the N.W. corner of the bay to Little Lake, thence by Bayou Perot to Lake Washa and thence by canal entering the Mississippi nearly opposite Carrolton, about ten miles above New Orleans; the whole distance being about sixty-five miles (p. 45).
Figure 18. Attakapas Canal, from Anon. (1817).

Figure 19. Harvey Canal, from Leach and Turtle (1887).

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From this description, it is obvious that prior to the War between the States considerable traffic was using Harvey Canal as a by-pass into the bays and bayous south of New Orleans.

In 1907, the canal was connected by a lock 135-feet-long, 30-feet-wide and seven-feet-deep into the Mississippi (Dabney, 1941, p. 90). Based on tonnage, Harvey Canal and Land Improvement Company collected a toll for use of the locks. Vessels under 50 gross tons paid 30 cents/ton, 50 to 100 gross tons 14 cents/ton and over 100 tons the fee was reduced to 10 cents/ton (Louisiana Board of Commissioners, 1922, p. 13). The Company continued to collect a fee until March 10, 1924, when the Federal government purchased the canal for $500,000. They improved the channel and subsequently included it in the Gulf Intracoastal Waterway (Louisiana Board of Commissioners, 1922, p. 90).

The current lock (Figure 20), dedicated on March 26, 1934, replaced the brick and wood structure and increased the canals dimensions to 425 feet long, 75 feet wide and 12 feet deep (Louisiana Board of Commissioners, 1922, p. 13).

Harvey's Canal is at least 235 years old and its continuous use is an indicator of its importance in freight
movement. Available historic material suggests this is the oldest major artificial waterway in Louisiana. Although the Federal government shifted the locks a few hundred yards in 1935 (Interview with J. Rosco, March 13, 1971), it is essentially the same route built by German immigrants in 1737.

Figure 20. The Harvey Canal gate into the lock between the channel and the Mississippi.

Other Canals

Maps drafted between 1817 and 1842, denote a number of plantation canals bordering the Mississippi south of New Orleans. By 1842 there were at least 52 of these waterways (Figure 3). Only two, however, were apparently built
exclusively for transportation — Barataria and Harvey (also called Destrehan). Others varied in width from six to 12 feet, large enough for a pirogue or flatboat, but not a freight-carrying steamboat. Traffic from Bayou Lafourche sailed through a canal into "Lake Ouatcha" (Lake Salvador), called the "Way from La Fourche to New Orleans" (Figure 21), indicating that by 1817 it was a significant transportation route (Anon., 1817, pap). Later named Harang's Canal, and now a part of the Gulf Intracoastal Waterway, this channel has, for 155 years, provided an east-west link between New Orleans and Bayou Lafourche. Three other Bayou Lafourche-linked canals — Lake La Fourche (Lake Boeuf), Lake Fields and Bayou L'eau Bleue — were possible transportation channels, especially the route into Lake La Fourche (Anon., 1817, map) (Figure 22). By using the canal into Lake La Fourche, boats gained access to Lac des AlleMANDS and the "Canal running to the Southern Lakes" therefore, by-passing the navigational difficulties associated with the Gulf and minimizing those along the Mississippi. Other channels may have been used by local traffic, but they did not connect into a larger system of natural or artificial channels.
Figure 21. The "Way from La Fourche to New Orleans," from Anon. (1817).

Figure 22. Early Bayou Lafourche-linked canals, from Anon. (1817)
Between 1730 and 1820 concerned citizens were building canals between natural waterways to improve east-west trade. After 1820, these first canals were incorporated into a more extensive transportation system.

By 1840, the Lake Field channel became a segment of Barataria Canal, connecting New Orleans and Morgan City; the Lake Salvador channel was apparently not used after completion of Barataria Canal. In 1872, it was again in use, extending from Bayou Lafourche northeast, a distance of six miles to Lake Salvador, eventually becoming a portion of the Gulf Intracoastal Waterway (Forshey and Thompson, 1873, p. 44). These transport routes, after 155 years or more, continue to serve the needs of coastal shipping. The canal between Lac des Allemands and the Mississippi was not used after 1842, but the other two channels remain as significant waterways.

From this first transportation network, and with the introduction of steam dredging equipment, new canals were added. By 1818, someone had cut a canal between Bayou Lafourche and Caminada Bay (Ludlow, 1818, map) (Figure 23). Gadsden (1818) calls this a bayou and Hughes (1842) does not show any channel. If this was a canal, and became a bayou through natural enlargement, it was the first east-west
Figure 23. Caminada Bay Canal, from Ludlow (1818).

Figure 24. First mapped canal west of Bayou Teche, from Ludlow (1818).
connection along the lower Lafourche, predating, by at least 70 years, any other transportation channels in this area. It may also be the first documentation of a canal losing its man-made characteristics to become a bayou.

Bayou Teche Canals

The first canal mapped west of Bayou Teche was a small channel connected to a salt works in the vicinity of Avery Island (Ludlow, 1818, map) (Figure 24). No canals were apparently cut between the Teche and the extensive natural waterways in the Atchafalaya Basin. This is understandable, in that it was not until April, 1825, that the steamboat Louisville successfully navigated the treacherous waters of Bayou Plaquemine below Baton Rouge, sailed through the Atchafalaya Basin and up Bayou Teche to St. Martinville. The trip established a means of low-cost transportation between the trade centers of western Louisiana and the ports along the Mississippi (Attakapas Gazette, April 16, 1825).

Prior to the development of the steamboat, freight was shipped aboard sailboats, flatboats and pirogues. The steamboat changed the method of cargo transport and the traffic patterns used in the origin and destination of coastal trade. It could carry more cargo over routes previously inaccessible. By 1850, Franklin acted as a
distribution center for plantation products along Bayou Teche. "Ships from Boston, New York, Philadelphia, Richmond, Galveston, Jamaica, Bermuda, Vera Cruz, Havana and Matagorda lined her wharves" (DeGrummond, 1949, p. 53).

Along with functioning as a port of entry for ships representing the Atlantic and Gulf markets, "four steam-boats regularly plied the route between New Orleans and the Attakapas area" (DeGrummond, 1949, p. 54). These vessels used a waterway developed in the 1830's -- Barataria Canal.

For 50 years this was the principal watercourse between Bayou Teche and New Orleans.

**Barataria Waterway**

This transportation system, composed of natural and artificial waterways, provided a continuous watercourse from Morgan City to New Orleans. The canal is first shown on Graham and Tanner's 1834 Map of Louisiana as the "Grand Caillou Canal" (Figure 25), later referred to as "Barataria Canal" (Graham, 1838: Hughes, 1842, maps) or "Company of Barataria Canal" (Leach and Turtle, 1887, map). Today it is called "Company Canal," (the section into the Mississippi is referred to as Westwego Canal, now closed) which probably comes from the Barataria and Lafourche Canal Company who were responsible for the channel excavation (Rosseau, 1835, p. 3).
Figure 25. Grand Caillou Canal (Now called Company Canal) connecting the Atchafalaya River with Lake Salvador, providing a continuous watercourse from Morgan City to New Orleans, from Graham and Tanner (1834).

The January 15, 1835, Report of the Board of Public Works of the State of Louisiana states:

The Barataria and Lafourche canal . . . is now open for small craft, from the Mississippi to lake Barataria . . . it appears that the canal is finished to within about seven miles of the bayou Lafourche. One third of the distance will be through timbered land and cypress swamps, the balance of prairie, easily excavated, on the west side of the Lafourche. Four cuts of about three quarters of a mile each will carry the canal through lake Mercier and lake Long to the bayou Terrebonne: the route proposed follows up this bayou eight miles, which will have to be deepened and widened to double its present width the whole distance; thence a
cut of about one mile long will reach the head waters of the bayou Black: by deepening, widening and improving this bayou, a distance of from sixteen to eighteen miles will carry the canal to navigable water leading to Berwick's Bay: the completion of this canal, so as to give an outlet to the settlements on the Terrebonne and Caillou, must add greatly to the convenience and prosperity of the inhabitants of that part of the parish of Terrebonne (Rosseau, pp. 4, 5).

However, between 1835 and 1847, it appears this waterway was being "... permitted to languish" (Williams, 1848, p. 40). The channel was filling with organic deposits. "This would not be the case if the thoroughfare were free for boats, which would so agitate the water as to prevent all vegetative build up" (Williams, 1848, p. 40). To make the channel navigable locks would have to be placed on Bayou Lafourche. This was done in 1852 at the city of Lockport (Morse and Wooldridge, 1853, p. 1).

By 1922, the waterway was owned by R. R. Barrow, who charged vessels under 50 gross tons a fee of 30 cent/ton, 50 to 100 gross tons 14 cents/ton and over 100 tons the toll was reduced to 10 cents/ton, which was the same fee charged on the Harvey locks and maintained the competition between the two canals (Louisiana Board of Commissioners, 1922, p. 12).

With completion of this channel and opening of the route through the Atchafalaya, steamboat-carried freight
increased. Steamer traffic patterns were altered, particularly in the agricultural regions along Bayou Teche and in Terrebonne Parish (Morse, 1954, pp. 31, 32). As a result, water transport reached a peak during the years prior to the War between the States. "Steamers were transporting goods to and from the heart of almost every parish in the state" (Chapman, 1955, p. 4). Planters depended almost entirely on steamer transportation. With the advantage of protected waterways they moved their products to market throughout the year. Cost and risks were reduced and they received from New Orleans or foreign countries, the products "deemed essential to life" (Anon., 1956, p. 200).

In addition to the "Barataria Waterway," there were a number of 12-foot-wide plantation canals into the lakes and bayous west of the Mississippi (Hughes, 1942, map). It can be assumed, therefore, that Fleitas, Gardiers, Johnson, Lesepp, Marigny, Oiprions, Osgood, Packwood, Rappelets, Al Rigeux, Urguhart, Veret, Wilkinson (Figure 3) and many others were built as drainage canals. They were not big enough for the movement of large ships and their cargoes, but could have been used for small boats. Several, such as Wilkinson and Rappelets, are now used by commercial fishermen and sportsmen as access routes into Barataria Bay.
Robinson Canal

Located on Bayou Petit Caillou, approximately 24 miles south of Houma, Robinson Canal, built by 1856, is the oldest documented artificial waterway in this region (Hebert, 1857, p. 17). As a 116 year old canal, it continues to serve the transport needs of fishermen, sportsmen and trappers. Its age is another example of the longevity of the coastal canal network.

Shipping Channels through New Orleans

In New Orleans, two transportation canals linked the city to Lake Pontchartrain -- Carondelet and New Basin. Carondelet dates from 1794 when the Spanish started its construction. By utilizing Bayou St. John, they needed only to excavate a 1.57 mile canal, completed in 1797 (Louisiana Board of Commissioners, 1922, p. 14). Approximately 70-feet-wide and seven-feet-deep, the canal, in 1818, provided the Navy access to a refitting yard built on the channel (Lockett, 1870, p. 10). In 1944, 47 years after completion of the Carondelet channel, New Basin Canal was completed by a private firm at a cost of $1,266,070. It was 6.65 miles long, 60-100 feet wide and nine-feet-deep (Figure 5). As a privately financed project, a tool of 20 cents/ton
was levied on all ships using the waterway. It is estimated that before the state obtained the property, the channel netted in one two-year period $3,894,230.80 (Louisiana Board of Commissioners, 1922, p. 15).

Canal Construction After the War Between the States

Terrebonne Canal

In the late 1800's, many new canals were added to Louisiana's coastal landscape. Leach and Turtle's 1887 Map of the Alluvial Valley of the Mississippi River . . . clearly show the changes in the canal network. One important channel was "Terrebonne Canal," connecting Caminada Bay and Little Lake. This waterway later became the "Southwest Louisiana Canal" (Figure 26), a privately owned toll route. In that the right-of-way crossed Bayou Lafourche, two tolls were charged -- 30 cents/ton on the east channel and 16 cents/ton on the western section (Interview with Abdon Martin, December 29, 1971). With completion of the canal, coastal settlers had an east-west route into Timbalier and Barataria Bays. No longer was it necessary to use Company Canal (Figure 25) or the Gulf to gain access to the coastal bays. For a small fee, Southwest Louisiana Canal was used. For example, in the early 1900's the lock
master often collected a fee from 300 vessels a day
(Interview with Abdon Martin, December 29, 1971). These
were small boats used primarily by fishermen and trappers.
However, other people traveled the route. One family living
on Brush Island often poled their watermelon-laden sailboat
through this channel to the New Orleans market (Interview
with William Boyne, July 29, 1971). For at least 85 years
this has been an important route for small boat traffic
and has eroded through use into a watercourse that is about
200 feet wide.

Grays Canal

Hains' 1864 map of the Mississippi Basin denotes a
small canal-like connection between Bayou Lafourche and
Hackberry Bay. Subsequent maps such as Leach and Turtle
(1887) and the current United States Geologic Survey Quad­
rangle labels the channel -- Grays Canal (Figure 26). The
waterway, according to several people along Bayou Lafourche,
was originally a toll channel serving as a short-cut for
small boat traffic. Probably cut as a trainasse, the canal
through use has enlarged into a major waterway. Although,
it was large enough for oil industry support vessels, the
toll apparently was too great, as Haviland Canal was
constructed to avoid paying the fee (Interview with Felecin Duet, December 10, 1971).

Panama Canal

South of Grays Canal is Panama Canal (Figure 26), which was probably excavated around 1910 as a trainasse into Timbalier Bay. The canal, now a bayou, was originally built as a toll channel. However, fishermen did not want to pay for the privilege of using this route; consequently, the floating barriers placed across the watercourse were either by-passed or dynamited. Even a cement dam constructed by the state was destroyed. As a result, the canal remained open to become an unnamed bayou on the current Leeville Quadrangle (Interview with Lester Plaisance, December 20, 1971).

Jean Plaisance Canal

Another important canal, Jean Plaisance (Figure 26), linked Bayou Lafourche to Catfish Lake. The route, according to many people, was cut by coastal Indians to provide a waterway to Bayou Lafourche from settlements at Faleau, Isle Jean Charles and Point Au Chien. People in these communities used the ditch to bring goods to sell or trade along Bayou Lafourche -- a trip that took three hours (Interview with
Felecin Duet, December 10, 1971). In 1924, Jean Plaisance, widened the channel, so it could be used to move sugarcane from plantations in Terrebonne Parish to refineries on Bayou Lafourche. It also provided an access route for Plaisance's grocery boat, which served the 300 trappers working for him. Later the canal was filled in, but for many years it was the primary route into the marsh west of Bayou Lafourche from Larose south to Leeville. The current Jean Plaisance Canal, was constructed as an access channel to an oil field in Catfish Lake (Figure 62) and is not the original channel (Interview with Lester Plaisance, December 20, 1971).

**Mississippi River Toll Canals**

On the Mississippi, Leach and Turtle (1887) show a small unnamed channel in the vicinity of Ostrica, along with Doulluts Canal at Empire (Figure 27); this waterway became a significant east-west route for oystermen obtaining seed oysters in Quarantine Bay. By providing a connection into the Mississippi, both channels were significant short-cuts. To use these routes a toll based on a ship's length was levied. Data available for 1931 indicate the tolls were:
Figure 26. Grays, Jean Plaisance, Panama and Terrebonne canals, from Leach and Turtle (1887), U.S.G.S. Leeville Quadrangle (1967) and U.S.G.S. Lake Felicity Quadrangle (1964).

Figure 27. Two important Mississippi River toll canals, from U.S.G.S. Empire Quadrangle (1960).
For boats under 30 feet . . . . $3.25 at each lock
For boats even 30 feet . . . . $3.75 at each lock
For boats over 30 feet . . . . $3.75 plus 15¢ for
each additional foot

(McConnell, 1931, p. 227).

In that oyster luggers were the principal vessels using
these canals, an additional fee of one cent/sack was col-
lected. During 1930-31 "two hundred separate oyster boats
passed through these locks, some making as many as fifteen
round trips" (McConnell, 1931, p. 227).

The eastern channel was serving boat traffic as
early as 1887. Due to the absence of early 1900 maps, the
western channel is difficult to document. It was probably
built in the early 1900's when there was a considerable
amount of coastal canal construction. Today, both channels
continue to serve as access routes into the Mississippi and
the oyster beds in Quarantine Bay (Interview with Captain
Hyman Pitre, December 29, 1971).

The First Delta Canals

South of these two waterways Lockett reported in 1870
two canals in the delta of the Mississippi (Figure 28).

There are but few communications between these bays
and the Mississippi River; a boat canal connects Bay
Rondo with Pass a Loutre at the so called Wood Yard
just above the head of the South East Pass. . . .  
[This canal is called by Talcott, 1838, Charley's Canal].

There is another boat canal just below the Saltworks but it is reported as being closed by drift logs. From the Saltworks communication may be had with the bay, by a small canal running in a straight line from the settlements, but it does not extend to the Mississippi, there being one hundred yards left unopened (Lockett, 1870, p. 21).

These are the earliest canals in the delta. By 1900 both were apparently closed. New canals were not built until the discovery of oil. When petroleum was found to exist in this region it became criss-crossed with artificial channels.

The Mississippi by-pass,
Lake Borgne Canal

Another transport route built after the War between the States was Lake Borgne Canal (Figure 29). Authorized in March, 1855 to cross the plantation of Richard A. Stewart, it was not completed until the early 1870's (Anon., 1856, p. 107). Built by the "most powerful dredgeboats and derricks in the Union" (Thompson, 1870, p. 65), this route, along with Carondelet and New Basin canals, provided traffic with a by-pass of the long sinuous course down the Mississippi. The canal was a major waterway until other routes were developed. It was subsequently dammed at the junction with
Figure 28. The first canals in the Mississippi delta, after Talcott (1839) and Lockett (1873).

Figure 29. Lake Borgne Canal, after Leach and Turtle (1887).

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the Mississippi, and today its channel is used as a port for fishing vessels.

As a 7.5 mile long, 85-feet-wide and seven-feet-deep channel, the canal provided vessels with a route into Lake Borgne. It was not a free canal. Non-cargo carrying boats paid 40 cents/ton, based on the hull's outside dimensions. If ships were loaded the toll was based on the cargo. A captain paid 40 cents/1,000 for bricks, $1.00/1,000 for logs, $1.00/1,000 for lumber and 3 cents each for railroad cross-ties (Louisiana Board of Commissioners, 1922, p. 11).

Expansion of the Transportation Canal Network

Between 1887 and 1930 the transportation canal system was expanded. Enterprising businessmen and coastal communities cut artificial waterways to reduce travel time and provide access to important markets. As a result, by 1930, prior to the tremendous surge in canal building associated with the petroleum industry, the coastal landscape was marked by a number of transportation canals. The system was small, but adequate. It was built to serve the peoples needs and provided the necessary connectivity required by these individuals (Appendix 1).
The inventory of transportation canals in the Appendix is a compilation of the waterways excavated between 1887 and 1930 and represents the major additions to the transportation network. They were constructed by several interest groups, but, in all cases, provided significant routes for trappers, fishermen, freight-carrying vessels and access into isolated communities. Although these canals are not over 100 years old, all continue to serve as important transportation arteries. Due to their constant use, many have eroded into large watercourses.

Later Developments

After 1930, oil companies began to use canals in their work, thereby changing the transportation pattern along the coast. These patterns were further altered with the completion of the Gulf Intracoastal Waterway, which, along with the Mississippi, has become the dominant water route in the state. Plaquemine-Morgan City Alternate Route, Lake Charles Deep Water Channel, Houma Navigation Canal, Freshwater Bayou Gulf Outlet and Franklin Canal (Figure 15), provide the state with a good coastal transport system, Louisiana, however, had a tradition of canal building and although the Gulf Intracoastal Waterway was the first
complete man-made waterway across South Louisiana, other channels, that predate it, provided similar connections.

The transportation canal network expanded as the need for shorter routes were required. The system dates back to the early 1700's and new channels were added as they were required -- a process that is continuing. As a result, canals excavated for the movement of freight have played a significant role in developing the state's resources.
CHAPTER III

TRAPPING CANALS: A TRAPPER'S ACCESS TO THE MARSH

Across Louisiana's marsh is a special canal type, called a trainasse and defined as a "trail cut through the marsh grass for the passage of a canoe [pirogue]" (Read, 1931, p. 74). Built by coastal dwellers these ditches provided access into an environment that was considered by many to be worthless. They were small, only about five-feet-wide and from six to 12-inches-deep, just wide and deep enough for a pirogue (which is approximately 16-feet-long, 24 to 28-inches-wide and will float in two to three inches of water). The boat was important, because it was the marsh dweller's principal means of travel (Figure 30).

Ditches were dug in greatest number by people living at such isolated communities as Basa Basa, Bayou Norman, Chenier Au Tigre, Grand Chenier, Hermitage, Manila Village, Mauvais Bois, Pecan Island and others (Figure 31). In marsh settlements, trainasses were dug from a navigable bayou into a lake or pond, where men in the winter would hunt ducks, selling them for 10 to 25 cents a pair on the
Figure 30. Trapping using a push-pole to maneuver his pirogue through a trainasse (courtesy Fred B. Kniffen).

New Orleans market. In the early 1900's duck hunting was more profitable than trapping, because the most valuable fur-bearing animal of the marsh, the muskrat (Figure 32), would bring only five to 10 cents a pelt.

Hunting trails provided a water route into land-locked water bodies and became the marsh dwellers connective link into these areas. Around 1915, the muskrat became a fashionable fur. Pelts increased in value and marsh folks extended their hunting ditches into muskrat's habitat. The marsh dwellers changed their winter activity from hunting to trapping.
Significant Louisiana
(Material compiled from

1. American Bayou
2. Avery Island
3. Basa Basa
4. Bayou Black
5. Bayou Cholus
6. Bayou Gauche
7. Bayou L'Ours
8. Bayou Norman
9. Bayou Point Au Chien
10. Belize
11. Belle Isle
12. Bourg
13. Brush Island
14. Cameron
15. Camp Dewey
16. Carmandelle
17. Chaudiere Casse
18. Chauvin
19. Chenier Au Tigre
20. Chenier Caminada
21. Ch
22. Co
23. Co
24. Cr
25. Cu
26. Cy
27. Du
28. Fa
29. Fr
30. Gh
31. Go
32. Gr
33. He
34. Is
35. Ja
36. Jo
37. Ki
38. La
39. La
40. La

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Significant Louisiana Coastal Settlements, circa 1930
(Material compiled from Documents, Interviews, and Maps)

1. American Bayou
2. Bayou Black
3. Bayou Chalas
4. Bayou Gauche
5. Bayou L'Ours
6. Bayou Norman
7. Bayou Point Au Chien
8. Belle Isle
9. Bourg
10. Brush Island
11. Cameron
12. Dewey Armament
13. Hauvire Casse
14. Havvin
15. Henier Au Tigre
16. Henier Caminada
17. Chenier Perdou
18. Cocodrie
19. Cote Blanche
20. Creole
21. Cut-Off
22. Cypremort Point
23. Dulac
24. Faleau
25. Frenier
26. Gheens
27. Golden Meadow
28. Grand Chenier
29. Hermitage
30. Isle Jean Charles
31. Johnson's Bayou
32. Kings Ridge
33. Lafitte
34. Lake Cataouatche
35. Lake Penschent
36. Last Island
37. Leeville
38. Little Car
39. Little Che
40. Little Fec
41. Little Ten
42. Manila Vil
43. Marmande
44. Mauvais Bc
45. Montegut
46. Mulberry
47. Pecan Isles
48. Plumb Isles
49. Pointe Bai
50. Sheal Beac
51. Stevensville
52. The Temple
53. Weeks Isles

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Settlements, circa 1930
(Interviews, and Maps)
To exploit fur animals it became necessary to dig ditches into areas of high animal production. Many date back to the early 1900's, when men were building **trainasses** to get to their trapping areas. Trapping canals not only provided access, but served as a means of moving muskrat from the field to camp, where they were skinned and dried (Figure 33). During this period a good trapper could catch up to 200 muskrat a day (Interview with Felecin Duet, December 10, 1971). It was necessary, therefore, that he have a natural or man-made channel to his camp.

Figure 32. Louisiana muskrat. (Courtesy Louisiana Department of Commerce and Industry).
Trainasses were essential to trapping; without them it would have been impossible to exploit muskrat. Consequently, all trappers were potential canal builders. Their attitude was that a man should dig his ditches when and where he needed them in order to insure a "good winter" (Figure 34).

Construction Techniques

In building his trainasse a trapper took account of the physical environment. On the Chenier Plain the marsh
was deep and firm. Here a man could work his traps on foot. Extensive networks of ditches did not develop until the muskrat catch began to decline. Then it was necessary to cut many watercourses, so a larger area could be covered and the catch increased. East of the Chenier Plain trappers cut trails in the easy to excavate floating vegetation. Ditches were extended into the best muskrat habitats, increasing production (Interview with Alvin Dyson, October 23, 1971).

**Pirogue Paddles**

Trappers first used a pirogue paddle to cut small marsh waterways. Currents eroded the sides and bottom producing a shallow pirogue channel (Interview with Mr. and Mrs. Mathew Creppel, December 14, 1971).

Erosion of these ditches has resulted in their no longer being referred to as ditches, or trails, but as bayous. For example, 50 years ago Mathew Creppel used a pirogue paddle to cut a 40-inch-wide, 12-inch-deep ditch between two bayous in the vicinity of Bayou St. Denis in Barataria Bay. Today this *trainasse* has eroded into a bayou 200-feet-wide and eight to 10-feet-deep (Interview with Mr. and Mrs. Mathew Creppel, December 14, 1971).
Every trapper had his own ditch to which he had exclusive rights. As a result, there developed in the marsh a large network of trails only deep and wide enough to allow a pirogue to be pulled or poled through (Figure 30). Due to the difficulties involved in locating the man who cut the original ditch, it is almost impossible to document all channels that have enlarged into major waterways.

**Shovels, Rakes and Sweepers**

The most widely used tools in *trainasse* construction were a shovel bent like a hoe (called a crooked shovel) (Figure 35), a rake and a "sweeper," which was a long handled steel bladed knife. With these tools a man cut his trapping ditches to a width and depth large enough that he did not have to rely on the current to erode the channel. These *trainasses* were often dammed, so a trapper could control the water on his land and prevent erosional enlargement of his ditches. A trapper recognized the problems of drainage, salt water intrusion and erosion; consequently, he tried to guard against these forces and their effect on his trapping land (Interview with Mr. and Mrs. Mathew Creppel, December 14, 1971).
Figure 35. A "crooked shovel" is the trapper's principal tool in cutting trainasse.

The crooked shovel was used by all marshland trappers. The greatest number of shovel ditches were built in the Deltaic Plain, where the marsh could not be trapped on foot. It was necessary that a man cut passages into his trapping area (Figure 34).

On the Chenier and Deltaic Plains, the ditch was an important landscape element and the shovel, rake and sweeper provided a man with an inexpensive set of tools to build his trainasse. Two months before trapping season opened a man would prepare his ditches. In some areas ditches were often located every quarter mile to insure adequate coverage; this was certainly not the rule. A
trapper would build only the canals essential to efficiently work his land. The number, therefore, was a function of the productivity of a trapping area and depended on the location and density of muskrat communities. If a man's land was productive he would dig few canals; if the muskrat were scattered it was then necessary to enlarge the canal network.

Increased efficiency in trainasse construction occurred when several trappers worked together. This cooperation allowed a man to finish his ditches before the season opened and guaranteed adequate passageways.

To build a trail, two men would use a sweeper to chop parallel trenches. These cuts were four-feet-apart and the outside boundary of the ditch. They dug a 10-foot section, then placed another trench down the middle to divide it in two. The ditch was then cut into blocks one-foot-long and two-feet-wide, which were pulled out of the channel with a rake or sweeper and made into small levees (Figure 36). Using this method trappers could cut from 3,000 to 5,000 feet a day. However, without help it often took up to three weeks to clear a mile of trainasse (Interview with Lester Plaisance, December 20, 1971).
Cross Cuts - Small enough to be removed with hand tools, usually a rake or hoe.

Center Cut - using sweeper and hoe.

IDEALIZED TRAINASSE - Work done by up to three men using hand tools.

Figure 36.
In good trapping years demand for fur was so high many land owners and fur buyers hired men to work all year cutting trainasses. One year, Pierre Lege of Intracoastal City, worked for $1.25 a day cutting ditches for Peter Dyson. Also, Vermilion Corporation (originally Louisiana and Delaware Fur Company) often contracted to have ditches built on land between Vermilion Bay and Pecan Island. These trainasses were dug by a string of men, each working a section of ditch and cost about 10 to 15 dollars/mile. The channels were small, but effective in the trapper's efforts to catch muskrat, mink, otter, raccoon and nutria (which were introduced into the United States from Argentina in 1937).

Mudboats

Construction of Chenier Plain trainasses increased, when in 1918 Sostane Broussard brought to Pecan Island from Cameron the first mudboat. This vessel was a bateau-like boat, powered by a four cylinder, air-cooled inboard engine and developed enough power to plow a ditch through the marsh (Figure 37). It simply pushed the mud and vegetation out of the way, leaving a navigable push-pole channel. The first use of the boat was to enlarge hand-cut
trails built by the community for Eugene Broussard, Joe Dyson and Ulysses Veazey. The boat was so new, however, and dug a trail so fast, many people were afraid of it. This fear did not last long. They quickly started to build and use mudboats to dig trapping ditches, a practice still followed by many men living in the area, in spite of a cost of about $2,500/boat (Interview with Eugene Broussard, October 12, 1971).
After 1920, most canals west of Vermilion Bay were built with mudboats. The boat could plow up to six miles of ditch a day and became the trapper's principal excavation tool. It runs like a car, in that the engine is not sucking water, as does an outboard and will efficiently cut \textit{trainasse} in one or two inches of water.

Once a trail was cut, a trapper would run his boat through the ditch to stir up the mud; then he relied on the current to carry the material out of the channel. These ditches were built about four-feet-wide and six-inches-deep, but enlarged, through use, into 15-feet-wide and two-feet-deep channels. The ditches constructed in this manner, such as those south of Pecan Island, are still important landscape features (Figure 38).

\textbf{Ditch Diggers}

Mudboats were utilized effectively by trappers west of Vermilion Bay, but were not employed to excavate ditches east of the Bay. Here men used shovels, rakes and sweepers until Wash Rodrigue at Larose, around 1933, invented the "ditch digger." In the Deltaic Plain this new tool effectively cut trails in the floating vegetation and high organic soils (Interview with Linwood Marlborough, July 28, 1971).
This floating vessel, 20-feet-long and five and a half feet wide, is powered by an inboard engine. Its unique characteristic is two bow-mounted 36-inch rotating cutting blades, which are capable of excavating a six-foot-wide, six-inch-deep channel (Figure 39). The blades are designed, like an airplane propeller, so as to cut the vegetation and at the same time pull the boat through the marsh. As long as the machine operates in at least five inches of water, it can cut trainasse; in fact, under these conditions it can dig up to three miles a day. If the marsh is dry, it is difficult for a man to cut 1,200 feet a day. This is faster than using hand tools and certainly easier. When the marsh is dry, ditch digger operators wait until high tide to cut ditches. At low tide channels are recut in order to assure sufficient draft for a pirogue (Interview with Linwood Marlborough, July 28, 1971).

Initial cost of a ditch digger is approximately $3,000. In that all trappers cannot afford this machine, many contracted to have a ditch digger cut their trainasse. Rental varied with the job, but the average seemed to be about $50.00. Use of the mechanical ditch digger represented a considerable savings of time and, in terms of effort, the money was well spent in that the trapper did not have
to spend two months preparing his ditches. The ditch
digger completed the job in a week, or less.

**Marsh Buggies**

The newest excavation equipment used by trappers
is the marsh buggy. Two types were developed -- wheeled
and tracked. The wheeled buggy (Figure 40), perfected by
Andrew Cheramie at Cut Off, was used in the marsh east and
west of Bayou Lafourche (Interview with Elie Cheramie,
December 29, 1971). This buggy, however, was not widely
employed in *trainasse* construction. The track buggy
(Figure 41), developed by John Paul Crain (at Grand Chenier),
was employed in digging trapping ditches in the Chenier
Plain. Two marsh buggies pulling a marsh plow (Figure 42),
of Crain's design, could excavate up to 12 miles of ditch
a day. The completed channel would be six-feet-wide, 18-
inches-deep and cost about $12.00/mile. With this equip-
ment a trapper could have his canals built in a short period
of time, for a fee that, at one time, represented about half
a day's catch (Interview with John Paul Crain, October 20,
1971).

Marsh buggies provided Chenier Plain trappers with
sufficient ditches. When production was good these trails
were localized in muskrat and nutria communities. The area
Figure 39. Ditch digger employed in Deltaic Plain trainasse construction; note the cutting blades and the splatter shield.

Figure 40. Wheeled buggies were used in the marsh around Bayou Lafourche; note the high wheels.
Figure 41. Track buggies equipped with a back hoe.

Figure 42. The marsh plow, designed by John Crain, when pulled by two buggies could excavate up to 12 miles of ditch a day.
has consistently produced large numbers of muskrat and nutria. Additional marsh buggy ditches were welcomed by trappers, because they allowed them more mobility in covering a larger area.

Trapping Areas, Marsh Leases and Their Influence on Canalization

Prior to discovery of oil, Louisiana's marsh was considered by many individuals to be worthless; it provided economic benefits only to people living in coastal settlements. These settlers never considered owning the marsh. It was open country and could be used by anyone.

To bring order, to what could have been a chaotic situation, cane poles were used to stake out a trapping area. Once boundaries were marked, individual plots were respected. Trappers would not trespass; they would use the canals crossing an area, but would not set traps on someone else's land. It was folk law, that a man's trapping ground was to be respected. Territoriality was so strong a man and wife team would mark two sections. Each worked a tract and only trespassed when asked. The marsh, therefore, was divided into individual trapping claims. Many were family controlled, a son often inheriting the right to trap a particular tract (Interview with Mr. and Mrs. Mathew Creppel, December 14, 1971).
In his trapping area a man cut as many canals as needed to efficiently work the tract. To determine the required ditches, a trapper surveyed the land, noting density and location of muskrat communities. With this information, he determined where to cut his trainasse (Figure 43).

**Trapping Land Leases**

After muskrat became a fashionable fur, and pelt prices increased, many people "outside" the marsh started to spend their winters trapping. These individuals often did not respect traditional trapping areas. They trapped all regions, regardless of who claimed the tract and often secured trapping privileges through leasing (Interview with Mr. and Mrs. Mathew Creppel, December 14, 1971).

The lease agreements commercialized the industry. Outsiders went into the marsh and indiscriminately cut trainasses. They cut them into bayous, across ridges and dug large networks to work the land. When trapping was carried on only by marsh dwellers, they protected the area by building small dams on their ditches, only digging enough canals to work the land and never placing a channel across a ridge.
Figure 43.
Large operators, like E. P. Brady, Mahler Fur, Steinberg Fur and Louisiana Fur companies, constructed canals. Voss, Brady and Louisiana Fur canals were cut so fur buyers could move easily across the lease. They provided connective links between the trapper and fur company buyers and are still important parts of the marsh transportation system.

In the swamp, trappers used logging canals (See Chapter IV), such as Bowie, Cotton, Lewis, Providence, St. Louis and Williams. These channels became the trappers link into the swamp. In the marsh, a man could dig his own ditches. In the swamp it was too difficult and he relied on those canals already on the landscape.

Today trappers no longer build as many ditches. Small canals are now cut by duck hunters, who lease much of the marsh. One stipulation often in the lease is that any canal built can be used by a trapper. This is to the trappers advantage, because he no longer pays for the ditch. As a result, when animals are scarce he can cover a larger area. For example, a Vermilion Corporation lease reads in part:

Party of the second part shall have the right to use any canals which are on the property of the company or over which the company has right of way,
only in so far as the use of said canal or canals are necessary in the trapping operation under this contract (Interview with Mark Hebert, October 19, 1971).

Trapping Canals - A Summary

Louisiana's small coastal ditches became significant landscape features when fur prices increased to a profitable level. In 1913, a pelt was worth eight cents, a pair of ducks sold for 25, thus providing the greatest return. Fur prices, however, increased from eight cents in 1914 to 50 cents in 1922, or 625 percent (Chatterton, 1944, p. 194). With this price increase, coastal dwellers changed their winter activity to trapping.

To operate efficiently in the alluvial wetlands, a large number of ditches were constructed, representing the first expansion of the trainasse system. This growth occurred between 1912 and 1920, representing the start of a concentrated effort to cut trails into trapping areas. Consequently, as the number of people trapping increased, the network expanded into its current chaotic pattern.

Today, as in the past, the most productive muskrat and nutria areas are in Cameron, Vermilion and St. Bernard parishes. Along the Chenier Plain, people have trapped since the early 1900's. Even at eight cents a pelt, there
were enough animals that a man could make a good living. Therefore, some of the earliest trainasses were built in this territory. By 1935, land between Vermilion Bay and Pecan Island had been transformed into a labyrinth of criss-crossing trapping trails (Figure 44). Many ditches, constructed in this tract, are now a notable part of the landscape, continuing to serve the peoples transportation needs. It is this constant use that maintains these channels as functioning navigable watercourses.

In the swamp and the Deltaic Plain, the growth pattern has been different. A survey of early coastal maps, compiled from air photos, indicates before 1935 few trainasses were on the Deltaic Plain. People built access routes, but the system was not as intensive as on the Chenier Plain.

In the swamp, trappers worked along logging canals and pull-boat trails (See Chapter IV); they were not canal builders. Lumber companies provided access routes which trappers used, along with bayous, to move through the swamp. The concentration of timber channels made them particularly useful in providing trappers with adequate access.
Figure 44. Pecan Island trapping ditches, circa 1950, from U.S.G.S. Pecan Island Quadrangle (1951).

Chenier Plain

By 1955, numerous small watercourses were constructed in the Chenier Plain (Figure 45). Between Calcasieu and Sabine Lakes Orange-Cameron Land Company, around 1920 invested up to $1,500/mile for canals 18-feet-wide and six-feet-deep. They also spent, in 1927, $1,635 to dynamite pirogue trails to aid in "protecting, patrolling and transporting supplies" (Arthur, 1931, p. 322). The investment represented the company's efforts to establish a muskrat
farm on its 163,000 acres. The region was already one of the state's best trapping tracts, but the company wanted to increase muskrat production. The project failed, primarily because the channels were too large and drained too much of the marsh. As a result, the animals left, and this attempt at marsh management was unsuccessful (Arthur, 1931, p. 322).

Stark, Beach, Willow Bayou and North canals are part of the original network of trapping and supply channels. They are a notable aspect on the landscape and remain as evidence of the Orange-Cameron Land Company's efforts to exploit the marsh (Figure 45).
Early surveys east of Lake Calcasieu indicate there were a few marsh channels. Canals shown on these charts are located in the vicinity of the Chenier ridges, in the area west of Pecan Island, along the Gulf Intracoastal Waterway and in a few isolated portions of the marsh (Figure 45).

The network was small because trappers living on the ridges trapped much of the land on foot. They did not need an elaborate network of ditches; they only required a route from their home to their trapping areas. Along Chenier ridges, therefore, north-south trending pirogue trails provided trappers with adequate passages.

At Pecan Island and Grand Chenier, trappers cut access channels to their trapping regions. Several early settlers, like Eugene Broussard, Sostane Broussard, Joe Dyson, Moise Sturlese and Jake Von were responsible for excavating many of the canals along the ridges (Interview with Eugene Broussard, October 12, 1971). These individuals cut trails from their homes into the marsh. Often the entire community would help so that everyone could use the channel. Long Island Ditch on Grand Chenier was built as a cooperative project. One trail, served the community, reducing the time involved in the excavation work and the number of canals required (Interview with Moise Sturlese, October 19, 1971).
Pirogue trails constructed prior to 1935 are still a landscape component. Many have enlarged (Figure 38). Mudboats, ditch diggers, marsh buggies and motor boats have done the work, producing substantial channels. Early maps show 18 ridge canals, but local informants claim others were built. These trails were so small they did not become permanent features.

Between Pecan Island and Vermilion Bay, historic maps document a well developed network of pirogue trails, representing fur dealers' and land owners' efforts to exploit the marsh. In the late 1800's, several of these trails were constructed by residents of Chenier Au Tigre, but the system was small. Freshwater Canal is the only significant channel that remains from the early network and is now part of Freshwater Bayou Gulf Outlet. It was built originally as an important link to the Gulf and served as the sea route to Abbeville (Interviews with Mr. and Mrs. Pierre Lege, October 7th and 8th, 1971).

The number of trapping ditches increased when the marsh was leased to fur companies. Louisiana and Delaware Fur Company, along with Ned McIlhenny, were responsible for this growth. Louisiana Fur began excavating trails in 1910; McIlhenny started around 1912. Their efforts resulted in a
series of multifunctional routes, serving trappers and 
sportsmen (Interview with Nick Schexnayder, October 15, 
1971).

Louisiana Fur's most important trails, Dewitt and 
Louisiana Fur, were built about 1920. They were cut as 
transportation routes for trappers leasing company land. 
Both canals were three to four-feet-wide with a depth of 
18 inches. Today Dewitt is larger, but Louisiana Fur is 
still essentially a pirogue trail. The difference is a 
result of boat traffic using Dewitt and not Louisiana Fur 
(Interview with Mark Hebert, October 19, 1971).

Between 1912 and 1926 Ned McIlhenny had constructed 
Belle Isle, Cut Off, McIlhenny, Sixmile and West Chenier 
Au Tigre canals. These routes traversed some excellent 
three-corner grass marsh and with practically every adult 
male living at Chenier Au Tigre and Pecan Island involved 
in trapping, the channels provided these men with marsh 
access. Additions to the system are a result of trappers 
building canals on their leases (Interview with Ted Bonin, 
October 6, 1971).

The first complete maps of the marsh indicate that 
north of the cheniers there were few trapping channels. 
This is because men worked the area on foot; they did not
rely as much on boats. The two small systems that appear along the Gulf Intracoastal Waterway were built by three hunting clubs -- Coastal, Crowley and Florence.

These groups, along with Ned McIlhenny, were the first in this region to excavate canals for organized recreation. By 1935, they had completed their channels, thus providing trappers living along the marsh margins with a ready-made transportation system. New hunting ditches simply extended the area trappers could work.

Today a large part of the Chenier Plain is leased to hunters, who, like hunting clubs, build small canals to their blinds. Sportsmen are constructing more trails now than trappers did in the past; they have become the Chenier Plain canal builders. The trapper is pleased with the system because it provides him with a larger canal network (Interview with Alvin Dyson, October 25, 1971).

The coastal canal system expanded out of people's desire to exploit marsh products, first, by their efforts to make a little money during the winter and later by fur dealers. Ditches cut for access became the water roads of Chenier Plain. Through use, many became so large that they never filled in.
Deltaic Plain

East of Vermilion Bay, on the Deltaic Plain, trainasse growth has been similar to that on the Chenier Plain. The system evolved through community interest in marsh travel and commercial fur dealers desire to gain lease access. These use groups were responsible for canal expansion and landscape modification (Interview with J. C. Thomas, August 26, 1971).

Since "flotant" (Figure 46) is difficult to traverse on foot, it is essential that people living in this environment create their own waterways. To expedite travel, pirogue trails were originally cut to settlements along the ridges, natural levees, and into muskrat and nutria habitats. Without these passageways it would have been difficult to trap. The trainasse was the difference between success and failure. Recognizing the reality of the situation, marsh dwellers constructed numerous access routes (Interview with Randolph Bazet, July 23, 1971).

Billiot, Falgout, Kings, Marmande, Peoples and St. Jean Charles canals are shovel ditches excavated by individuals living on Kings Ridge, Marmande Ridge, Mauvais Bois and Isle St. Jean Charles (Figure 31). These waterways were passageways to natural levee settlements and became key
Figure 46. Flotant, located in the Deltaic Plain, is made up of decomposing vegetative debris, which makes it a quagmire underfoot.

marsh routes -- a function they still perform (Interview with Marshall Vignes, July 16, 1971). Built between 1890 and 1920, they served the transportation needs of the people using the alluvial wetlands. They were not only significant as traffic corridors, but also as trapping ditches. Men trapped along their banks, but several, such as Marmande, Peoples and St. Jean Charles, were extended beyond the settlements. They served as approaches to the brackish marsh of the muskrat and nutria.

These watercourses are now well-defined landscape features. It should be emphasized that they were not the only
ones constructed. Pirogue trails were also built into trapping leases. In southern Terrebonne Parish, between Four League Bay and Bayou Terrebonne, trapping ditches were concentrated between Plumb Bayou and Bayou Carrion Crow. Another intensive network was in the triangle formed from Lake Penchant. These almost obscure features were, in all cases, engineered to serve as trapping area transportation routes.

Along Bayou Carrion Crow, ditches were cut into several sections paralleling the bayou. One trainasse, less than two miles long, connected into each section and was the only channel excavated. A trapper used the extensive network of natural waterways, rather than building an elaborate system of interconnecting trapping ditches. One channel, was sufficient (Figure 47).

To supervise this area, Louisiana Fur Company built, around 1930, Brady and Voss canals (Interview with Marshall Vignes, July 16, 1971). These were important marsh routes and reduced greatly the travel time between Bayou Carrion Crow and Bayou Penchant. Both channels, along with Crochet Canal, were cut between large bayous. As a result, all have scoured into major waterways. They started as ditches, but are now prominent marsh features.
Figure 47. Carrion Crow Lake ditches are an example of how Deltaic Plain trappers cut only a few channels, extending from a natural water body into their land, from U.S.G.S. Lake DeCade Quadrangle (1956).

Pirogue trails, in the triangle, served the trapping needs of settlements at Marmande Ridge and Mauvais Bois (Figure 48), as well as those individuals who had winter camps in the area. Southeast of Lake DeCade the large network of ditches represents one trapper's efforts to efficiently work his lease (Figure 49). Today this system has increased into one of the best examples of trainasse growth along the coast. The property is trapped along a line of carefully spaced channels. These trails, located
Figure 48. Important canals around Lake DeCade, from U.S.G.S. Lake DeCade Quadrangle (1956).

Figure 49. One of the few examples, on the Deltaic Plain, of a dense network of ditches used to efficiently trap a lease, from U.S.G.S. Lake DeCade Quadrangle (1956).
approximately every quarter section, give adequate lease coverage and have evolved into a landscape criss-crossed, ringed and cut by small trails.

East of Bayou Grand Caillou trapping ditches were not apparently built in large numbers until after 1930. The first important channels were Lapeyrouse, Madison, Rabbit and Sevin. These connected into the lakes and bayous behind the natural levees of Bayou Terrebonne. They were multifunctional channels, used by trappers, fishermen and hunters. Trappers utilized these routes to reduce travel time, but rarely trapped along them (Interview with J. J. Lapeyrouse, July 21, 1971).

Lafourche Parish trainasses often resembled drainage ditches. Men constructed trails from their homes into the marsh. These paths allowed them to use their homes as base camps (Interview with Felecin Duet, December 10, 1971). As the width of Bayou Lafourche's natural levee decreases south of Golden Meadow, winter camps and an increased number of ditches were required, because the home no longer served as a base camp.

The area around Leeville was well trapped and men who worked this marsh built many trails, but through time and repeated use, these channels have enlarged and now are a part
of the natural system. Along Bayou Coche trappers cut several trainasses. Most now appear as unnamed bayous (Interview with Lester Plaisance, December 28, 1971).

New ditches are being added to the Deltaic Plain, but are not being built by trappers. Oil companies and sportsmen are responsible for this expansion. A trapper can no longer afford to cut his own ditches, but relies on someone else to do the work. In fact, there are so many canals across the marsh a trapper can work a lease without any problems -- no new ditches are needed.

Most trails do not appear on early maps. Some channels are at least 100 years old, but were considered a part of the "worthless" marsh. No effort was made to document the canal systems' growth. The absence of reliable data complicates the problem of determining the influence man-made channels had in altering the physical environment.

One area where channel enlargement has occurred is in Barataria Basin. Old settlers recall when large parts of the Basin were trapped using trainasses. Many of these trapping regions are gone, eroded away; the ditches have enlarged into major channels or coalesced to form larger water bodies (Interview with Mr. and Mrs. Mathew Creppel, December 14, 1971).
It would be difficult to speculate on the total number of pirogue trails excavated in this area, in that most are no longer recognizable. At one time the Basin had many small settlements located within it (Figure 31), representing a population of approximately 500. These people depended on the estuary for their livelihood. They trapped, hunted and fished to support themselves. In winter, members of the community trapped their own tracts. Consequently, all trappers were potential canal builders (Interview with Mr. and Mrs. Mathew Creppel, December 14, 1971). Ditches were dug to make it easier to work the marsh and if these people cut their own trails then the number of trainasses would be quite high. Written records show that there were few ditches in this region. Old timers claim that they built many trainasses into, across and around their trapping claims. These trails are now waterways and have become man-made elements on the natural landscape.

In that the marsh terrain presents no serious problems to canal construction the network of trapping ditches has become a dynamic part of the landscape and represents the first large scale network of marsh canals. New channels are added, but old ones are rarely filled in. Once a trainasse is cut, it remains for years, often enlarging into
a bayou. Many channels began as small insignificant pirogue ditches, which allowed the trapper to successfully work in the alluvial wetlands. However, through repeated use, storms and current flow they enlarged so sailboats and an occasional lugger could take advantage of the channel, and have become major landscape features. They are now permanent. The only indications of human origin lie in their straightness and relationship to the natural waterway. The work of the canal builders continues to have a decisive and cumulative impact on the wetlands environment. Some trails are over 100 years old and have become a vital part of the total transportation network; they are a visible segment on the landscape and have affected drainage patterns, influenced salinities and are a reminder of man's abilities to unknowingly change the delicate balance in the natural system.
The sea marsh embraces about one-eighth of the area of the State, forming a broad strip of wet and boggy prairie along the Gulf coast. Though the richest lands in the State, they have been but partially reclaimed. . . . Deep bayous intersect this region in every direction, which, with the lakes and lagoones, into which these bayous expand, supply a good navigation and cheap transportation for the valuable lumber in which the State abounds. These lands can be bought, reclaimed and brought into cultivation, even at the old rates of labor, at $20 per acre (Cottman, 1866, p. 22).

In the early 1700's, Louisiana's lumber trade with France was considerable. Milled timber was in demand and provided an "inducement to French merchants to bring shiploads of European goods to Louisiana" (Surrey, 1916, p. 194). During this period, building material was a good investment; planks purchased at the beginning of the year had often tripled at the end. This kind of return increased the search for marketable cypress, but due to the difficulties of working in the swamp, most timber was purchased from planters who were clearing their land.
To harvest timber, canals were excavated. These channels represented the first attempts to use artificial waterways to exploit the state's forest resources. From this beginning, the canal network, associated with the removal of swamp cypress, was expanded. Plantation owners extended their canals; they dug multifunctional drainage, transportation and timber access routes. Along these passageways, lumber was acquired for building purposes, and, since most large land owners had their own sawmills, planks were cut and shipped to the New Orleans market.

On the 1817 Reconnoitring Chart of the South Frontier of the U.S.A. ..., several planters south of New Orleans had constructed canals into the swamp, Larounds, Larosles, Vilkre, Jamanville, Philippon, Gentilly, Johnson and others were built to serve the plantations drainage and transportation needs. They were also important in gaining access to marketable cypress (Figure 3). These were not, however, commercial logging operations; this occurred after the War between the States.

Large-Scale Logging

Large-scale logging began after the Timber Act of 1876 repealed the Homestead Act of 1866, which stated that swamp land was unfit for cultivation and therefore could not
be claimed (Norgress, 1936, p. i.). With repeal, large swamp tracts were sold for 25 to 50 cents/acre. Recognizing the timber's value, lumber companies purchased a considerable quantity of this land. Brownell and Moore, Louisiana Cypress Lumber Company and Pharr and Williams were three of the first logging firms to obtain cypress land. With mills at Morgan City, Houma and Patterson, these companies cut and processed timber from the surrounding swamp (Norgress, 1936), p. 43) (Figure 50).

Other investors recognized the value of the state's forest resources and began to acquire swamp tracts. By 1890, a considerable quantity of swamp had been sold to lumber companies. Their most important problems were access and timber removal. Methods needed to be developed to successfully operate a swamp logging enterprise. To cope with the problem, canals were dredged (Figure 51) into areas containing large tracts of cypress. These waterways provided the industry with adequate transportation routes and became connective links into the swamp. Today they remain as relic features of the exploitation of Louisiana's cypress.

Canal patterns, names and location indicate the areas of cypress activity. Abandoned logging canals are in most swamps bordering the marsh. In the Atchafalaya Basin, around
Boutte, Franklin, Gibson, Houma, Kraemer and Lake Veret logging canals are still a visible landscape component (Figure 52). These channels were constructed by Brownell and Drew, Cotton, Diebert-Stark and Brown, F. B. Williams, Hanson, Kyle, Louisiana Cypress, Norman-Breux and St. Louis lumber companies (Interview with Louis Peterson, August 28, 1971).

Some of the canals used to harvest cypress were Bowie, Cotton, Cousins, Diebert-Stark, Hanson, Himalaya, Hollywood, Ivanhoe, Louisiana Cypress, Pointe Lavin, St. Louis and others
Figure 52. Louisiana logging canals, circa 1930. Compiled from U.S.G.S. Quadrangles dated between 1930 and 1933. (Appendix 2A). Many were not named, but due to their location and pattern they can be classified as logging channels (Appendix 2B, C). The excavation of canals expanded with the industry and as a result, it is difficult to determine the lumber companies responsible for their construction.
Construction Techniques

Lumber companies could not afford the financial risk involved in cutting timber in anticipation of the June rise. If high water failed to come, logs remained on the ground, inflicting the land owner with a heavy loss (Norgress, 1936, p. 31). New developments were pursued and with introduction of the steam-logging engine and pull-boat (Figure 53) "the cypress manufacturers were independent of rises and unaffected by droughts" (Norgress, 1936, p. 33).

These two inventions were instrumental in increasing cypress output. The pull-boat, developed by William Baptist of New Orleans, would pull into a central canal up to 3,000 feet of logs a day (Norgress, 1936, p. 35). To use the equipment, lumber companies required canals into logging areas. Channels were dredged providing pull-boats with a watercourse from which to work. These waterways were constructed specifically as access routes; they were essential to logging operations and provided the necessary connectivity to successfully harvest cypress. They allowed pull-boats to drag timber from the swamp into the canal. With this arrangement it was imperative that the canal network be continually
expanded. To accomplish this, steam-bucket dredges were used.

Demand for new channels was so great large firms, such as F. B. Williams, Louisiana Cypress and St. Louis, maintained their own dredging equipment. This machinery was in use constantly digging new channels and keeping them navigable. In some cases, the dredge was constructed in the swamp and when timber was removed it was left to rot (Interview with Harry Brazan, July 13, 1971).

Between 1880 and 1930 there was a tremendous amount of dredging activity being done by lumber companies. When they could not use their equipment, or they did not own any, contractors were employed. Huth and Aycock, one of the first wetland dredging firms, excavated most contracted canals between Avery Island and Bayou Lafourche. The company kept a dredge in the Atchafalaya Basin at all times to work for lumber companies. Huth and Aycock dredges built the canals around Grand Lake, along with Hanson, Ivanhoe and the majority of those south and west of Franklin and Patterson. With nine dredges, four draglines and a fleet of barges and towboats the lumber companies were supplied by Huth and Aycock with the required excavation equipment (Interview with Stanley Boudreaux, August 26, 1971).
To work the swamp, channels from 25 to 30-feet-wide and about 10-feet-deep were excavated. Several others were cut at right angles to this canal increasing the areas logged by pull-boats. These laterals were generally about one-half to one mile in length and always slightly curved at the junction with the central channel. This slight curvature was purposely cut so the log rafts could be pulled easily around the corner and is one of the identifying characteristics of logging canals. At approximately 300 foot intervals, wide spots were dredged. These were built to allow pull-boats room to maneuver (Figure 54). The canal pattern, as a result, was a series of generally north-south, east-west connecting channels (Figure 55) with fan-shaped paths radiating out from points along the canals (Figure 56). This distinctive design indicates the areas logged, using canals and pull-boats (Interview with Wilton J. Stevens, August 24, 1971).

Every lumber company did not use this system. May Brothers, for example, developed a ponding technique (Figure 57), where an area approximately one mile by two-miles-long was marked off with a four-foot-high levee. On one side of the pond the company cut their main canal which was eight to ten-feet-wide and about ten-feet-deep (Letter from Jack Eaton, December 3, 1971).
In the pond, cypress were killed by girdling them three to four feet from the ground. Loggers flooded the area, cut the trees and pushed them out of the pond. This method had, however, limited use. Centered primarily in the area around Bayou Boeuf and Belle River in the Atchafalaya Basin, the pond's rectangular shape makes them a distinct landscape feature (Interview with August Landry, July 8, 1971).

Logging Canals - A Summary

From 1880 and until 1930 (Appendix 2A), when the cypress industry began to decline, many swamp canals were constructed.
Figure 55. Atchafalaya Basin logging canals; note the channel curvature into the main canal, from U.S.G.S. Centerville Quadrangle (1959).

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Figure 56. The fan-shaped paths radiating out from the logging channels leave distinct pull-boat scars (U.S. Department of Agriculture).

Figure 57. May Brothers used a ponding technique to harvest cypress from U.S.G.S. Napoleonville Quadrangle (1952).
These channels often paralleled a bayou and became a part of the natural drainage system. Some, in the Atchafalaya Basin, are beginning to fill with sediments, but all remain as evidence of the importance of canals in cutting, removing and transporting timber. As relic man-made waterways they indicate the regions where intensive efforts were made to harvest cypress; they are a culture element which identifies logging areas.

Today these channels no longer serve the needs of the lumber industry. However, many are used by oil companies, sportsmen and trappers. Built by lumber companies, these channels now serve a variety of interests.
Development of South Louisiana's petroleum industry began at Jennings in 1902 (Figure 1). Emphasis in Louisiana, however, was in the north; in fact, for 25 years this region continually produced more petroleum than South Louisiana. The change in emphasis occurred in the late 1930's, when new oil and gas fields were discovered in Louisiana's wetland parishes. Significant additions occurred in 1937 and 1938 when 29 new fields were discovered, nearly doubling the 30 developed between 1902 and 1937 (Table 1). Why the sudden change? Why were oil companies beginning to concentrate their drilling activity in South Louisiana? If oil was known to exist as early as 1902, why did it take 35 years to develop new production areas?

Although oil companies were aware that South Louisiana's coastal salt domes were a probable source of petroleum, their exploration and drilling programs were hampered by the logistics and economics involved in working in the marsh and swamp. "Penetration of these barriers was
| Assumption | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 3 | 1 | 1 |
| Cameron    | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 |
| Iberia     | 2 | 1 | 1 | 1 | 2 | 2 | 1 | 3 | 3 | 2 |
| Iberville  | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 1 |
| Jefferson  | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 1 | 1 | 1 |
| Lafourche  | 1 | 1 | 5 | 1 | 1 | 1 | 2 | 2 | 3 | 3 |
| Orleans    | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Plaquemine | 1 | 1 | 3 | 2 | 2 | 2 | 1 | 2 | 3 | 4 |
| St. Bernard| 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 |
| St. Charles| 1 | 1 | 1 | 1 | 1 | 3 | 1 | 2 | 2 | 3 |
| St. James  | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| St. John the Baptist | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| St. Martin | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 2 | 1 | 3 |
| St. Mary   | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 3 | 2 |
| Terrebonne | 2 | 1 | 1 | 3 | 3 | 3 | 3 | 2 | 1 | 2 |
| Vermilion  | 1 | 1 | 2 | 1 | 1 | 5 | 5 | 6 | 9 | 3 |

delayed until the late 1930's when equipment and techniques were developed which enabled [mineral] exploration of the coastal marshes" (Davis, 1969, p. 14).

The problem was not accessibility. Wetland dredging procedures had been perfected in the 1800's. This technology was available and dredges were capable of excavating the required petroleum and natural gas watercourses. Exploration delay was related to the perfection of drilling equipment capable of operating in aquatic environments (Figure 58). New technology had to be developed before drilling could begin.

This occurred in the mid-1930's when "the first submersible drilling barge was built for inland waters" (McGhee and Hoot, 1963, p. 151). With completion of this equipment, it was now possible to expand drilling activity. To drill for petroleum, well sites had to be dredged. It is claimed that in 1938, barge-mounted draglines were employed in digging "the first drilling site ever prepared by floating equipment" (McGhee and Hoot, 1963, p. 151) (Figure 59). This is incorrect.

The oldest petroleum related canal was apparently built in 1926 at Venice. This channel, excavated by Villere and Brest for the Gulf Oil Company (Interview with W. P.
Villere, April 15, 1971), marked the beginning of the oil industries efforts in channelization. Dredging activity occurred prior to 1935 when canals were a part of the Bayou Blue and Bayou Des Clase fields, in the Atchafalaya Basin, and Grande Ecaille field, in the marsh west of Empire (Figure 60).

Successful operation of the submersible drilling barge and excavation of canals with barge mounted draglines, bucket and suction dredges, opened the coastal zone to petroleum development. This equipment was so successful that out of 623 (as of May, 1972) oil and gas fields (tabulated in Table 1), 328 or over 50 percent are actually in the

Figure 58. Collapsed floating drilling platform that can be pulled to a well site.

Figure 59. One of the numerous canals used to gain access to well sites.
swamps and marshes. Their location has made the petroleum industry the greatest wetland canal builder.

The industry constructed a network of petroleum access, pipeline and transportation canals have become a dynamic part of the landscape and, as a result of the constant addition of new channels, the system continues to grow. Thus, Louisiana's coastal plain in dominated by a massive system of man-made canals (Figure 61). The addition of new channels is a continuous process, but no effort is made to fill in the old ones. When a canal is cut, it often becomes
Figure 61. Venice dome and the massive system of man-made canals associated with the oil and gas fields in the area (N.A.S.A. photo).

a permanent feature. In some oil fields, such as Catfish Lake, straight-sided channels have become cusped (Figure 62). Erosion altered the channel characteristics, and like some trainasses these waterways will eventually become bayous. The work, therefore, of the canal builders has had a decisive and cumulative impact on the wetlands environment.

Canalization of natural streams invariable alters their flow regime. In upland areas canals may change runoff characteristics, usually improving drainage. In lowlands they alter both runoff and storage and may also seriously upset natural circulation patterns and water chemistry. In general, although the effects of canals on wetlands environments are more difficult to evaluate, it is likely that they are more pronounced than in upland areas (Gagliano, 1971, p. 1).
One immediate effect is the change in salinity regimes. For example, Lake DeCade (in Terrebonne Parish), prior to the excavation of lake channels, was well stocked with catfish (Interview with Randolph Bazet, July 23, 1971). With construction of Falgout Canal and channelizing of Bayou DeCade the lake's salinity has increased enough so that shrimp now breed there (Interview with Linwood Marlborough, July 22, 1971) (Figure 48). Channels into the lake altered the salinity regime. This is a significant change when one considers the numerous canals built as integral parts of the 328 oil and gas fields along the coast and their possible influence on salinity.
To reduce the environmental impact of canals, dams, weirs and other protective measures are being employed. The marsh is no longer considered worthless, but an important aquatic habitat. It is, therefore, worth protecting. Oil and natural gas continue to produce the greatest revenue from the coastal zone, but these are non-renewable resources. Aquatic life, on the other hand, will continually use the estuarine environment as a breeding area. Consequently, protective measures are being initiated to try to preserve this habitat (Figure 63).

Figure 63. One of the numerous water-control structures now being constructed in the marsh. These weirs are generally being placed on pipeline canals where they cross a bayou.
Development of Petroleum Dredging

Just how important to [the] petroleum [industry] are its dredging operations? Without them, scores of fields along the Gulf Coast would never have been discovered; thousands of miles of trunk and gathering pipelines could never have been laid; great volumes of crude oil could not be moved by barge. In short, without dredges, a large share of the nation's oil and gas would be just where it was 25 years ago -- beyond economic reach.

In spite of its size and importance, the captive dredging industry chews through swamps and marsh with so little fanfare and with so much efficiency many inland drillers, producers and pipeliners are completely unaware of the existence of petroleum industry dredging (McGhee and Hoot, 1963, p. 150).

Large-scale coastal dredging began in the late 1930's. As a result, by 1950, 121 new fields had been developed (Table 1). In 1947, the exploration for petroleum took on a new dimension when Kerr-McGhee Oil Industries drilled the first well classified as "offshore" (Louisiana Department of Conservation, 1948-49, p. 26) (Figure 64). This development meant oil companies must establish large land-based logistic support facilities to supply the offshore activities (Figure 65). Boats would have to be used to move men and equipment and canals needed to be cut.

To perform the work required in canal excavation four basic types of equipment are used: hydraulic or suction
dredges, bucket dredges, spud barges outfitted with portable draglines and marsh buggies equipped with small draglines.

Hydraulic Dredges

Hydraulic dredges were first employed in France in 1867 and became essentially an "American tool," because European construction engineers preferred ladder dredges (Simon, 1920, p. 109). Suction dredges (Figure 66) are efficient because they not only cut into the bottom with large rotating cutterheads (Figure 67), but also deposit the material through pipelines into spoil areas. The dredge size is determined by the pump, which varies from 12 to 48 inches. However, "the twenty-inch dredge is generally conceded the most advantageous for all-around work" (Simon, 1920, p. 60). In 1970, there were 45 suction dredges in Louisiana -- eleven 16 inch and 22 larger than 20 inch (World Directory of Dredging, 1970, pp. 36, 37).

While [this machinery] can be used in all classes of material short of solid rock, it is most efficient in handling homogeneous material that is not excessively hard, such as silt, mud, sand, clay and gravel, ... Mud and fine sand are regarded as the best hydraulic materials. ... (Simon, 1920, pp. 109, 110)

Due to the physical characteristics of Louisiana's marsh this is an extremely efficient excavating tool. Equipped with the proper cutterhead and capable of dredging...
To supply the marsh and offshore oil fields, large land-based logistic facilities have been established, like this one in Houma.

The hydraulic or suction dredge is the most efficient excavation tool used in digging canals.
to a depth of 50 feet, these machines are used in constructing navigable waterways and flood control projects. However, there are problems, such as:

1. stumps, logs and other trash which is hard to pass through centrifugal pumps;

2. pockets of gas entrapped in the material which causes severe cavitation and turbulence in the pumping system;

3. job locations in remote areas are difficult to reach; and

4. extremely stiff clay soils, which are difficult to cut with the dredge cutterhead, are hard to pump due to the weight of the material (Letter from A. W. Henry, May 5, 1971).
The dredge is limited to large jobs and rarely used on small well sites. Along channels excavated with hydraulic dredges, the spoil is typically "deposited in small hillocks or mounds in the vicinity of the tail pipe" and "since the tail pipe is moved only periodically, the embankment formed by this types of spoil is often discontinuous (Gagliano, 1971, p. 4). In that this machinery is rarely used in oil field work the most common type of equipment is the bucket dredge and spud barge.

**Bucket Dredge**

The bucket dredge is the principal piece of equipment employed in cutting oil-well-access canals. These dredges consist of a bucket or clam-shell dredge permanently mounted on a barge-type hull (Figure 68). Position and movement of the dredge is controlled by movable spuds, which can be thrust into the bottom to anchor the barge in position while digging.

Two buckets are used, clam-shell (Figure 69) and orange-peel (Figure 8). "Both have the same principle of operation, but differ in that the clam-shell has two jaws or shells while the orange-peel has three or four" (Simon, 1920, p. 6). Working with a six to ten-cubic yard bucket,
Figure 68. Barge-mounted bucket dredge being moved to a new job site.

Figure 69. Small clamshell bucket, used on bucket type dredges.

the dredge can cut the standard 70-feet-wide, 10-feet-deep, oil-well-access channel without any lateral movement (Simon, 1920, p. 156). The usual practice is that the dredge will be outfitted with 145 feet of boom for an eight-cubic yard bucket and 125 feet for a six. Using a six-yard bucket an operator can excavate, on a good day, 18 to 22,000 cubic-yards. The average is about 15,000, which will increase slightly with an eight-yard bucket (Interview with W. A. Shelton, April 23, 1971).

Problems occur when the dredge is digging clay or sand. Clay is difficult to dig and sand tends to filter through the bucket reducing the equipment's efficiency. However, these are relatively minor problems.
The bucket dredge is the workhorse in channel work (Figure 70); it digs the canal and usually leaves a "continuous embankment of spoil on one or both sides of the excavation" (Gagliano, 1971, p. 4). It is also extensively employed in channel maintenance. Silting and bank collapse are two major contributors to altering the channel's profile and changing depths. Oil companies contract for an eight-foot channel, but will pay for a two-foot "overdepth" to reduce maintenance. When clean-out work is required, costs increase. It is to the oil companies benefit to excavate a larger channel than required, rather than pay rental on a dredge doing channel maintenance. The problem of siltation is difficult to predict. In the Mississippi Delta, for example, one canal may have to be cleaned out twice a year, but due to changes in silting it may not be redredged for two years. In other regions, some canals may not be cleaned for ten years. Consequently, as much as 50 percent of some dredging firms business is involved in channel maintenance.

Bucket dredges do the work in developing marsh and swamp oil and gas fields, but spud barges provide the versatility in clearing swamp locations and laying pipeline. They are used on most small jobs.
Spud Barges

Spud barges are "similar to bucket dredges, but the dragline is not permanently fixed to the barge" (Gagliano, 1971, p. 4) (Figure 71). In that the machine is equipped with a crawler undercarriage it can be moved off the barge to work on shore. This versatility is extremely valuable in excavating a pipeline channel, clearing a swamp location or improving a levee. The dragline is particularly useful because it can handle wet as well as dry excavation successfully (Power Crane and Shovel Association, 1968, p. 19).
Figure 71. Spud barge equipped with a small mobile dragline; the vertical columns are the spuds, which are lowered into the water to stabilize the barge.

Projects involving ditch excavation through swamp or soft terrain are well suited for draglines.

Since the dragline is such a versatile tool it can be equipped with various boom lengths and bucket sizes depending on the output desired and work range needed for spoil placement (Table 2).

This sample of buckets is representative of those used in the coastal zone. In Louisiana's wetlands, the 2-1/2-yard bucket (Figure 72) is about the largest employed in channel work. Draglines, like bucket dredges, place a
### TABLE 2

**COMMON BUCKETS USED ON DRAGLINES**

<table>
<thead>
<tr>
<th>Bucket Size</th>
<th>3/8</th>
<th>1/2</th>
<th>1</th>
<th>1-1/2</th>
<th>2</th>
<th>2-1/2</th>
</tr>
</thead>
<tbody>
<tr>
<td>in cubic yds</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard</td>
<td>25'</td>
<td>30'</td>
<td>40'</td>
<td>45'</td>
<td>50'</td>
<td>60'</td>
</tr>
<tr>
<td>boom length to</td>
<td>35'</td>
<td>40'</td>
<td>55'</td>
<td>60'</td>
<td>90'</td>
<td>100'</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Class of Material</th>
<th>5/0'</th>
<th>5.5'</th>
<th>6'6'</th>
<th>7.4'</th>
<th>8.0'</th>
<th>8.5'</th>
<th>Optimum d. yards/hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light moist clay or loam</td>
<td>70</td>
<td>95</td>
<td>160</td>
<td>220</td>
<td>265</td>
<td>305</td>
<td>110, 120, 130, 140</td>
</tr>
<tr>
<td>Sand or gravel</td>
<td>65</td>
<td>90</td>
<td>155</td>
<td>210</td>
<td>255</td>
<td>295</td>
<td>90, 100, 110, 120</td>
</tr>
<tr>
<td>Good common earth</td>
<td>55</td>
<td>75</td>
<td>135</td>
<td>190</td>
<td>230</td>
<td>265</td>
<td>70, 80, 90, 100</td>
</tr>
<tr>
<td>Clay, hard tough</td>
<td>35</td>
<td>55</td>
<td>110</td>
<td>160</td>
<td>195</td>
<td>230</td>
<td>50, 60, 70, 80</td>
</tr>
<tr>
<td>Clay, wet, sticky</td>
<td>35</td>
<td>30</td>
<td>75</td>
<td>110</td>
<td>145</td>
<td>175</td>
<td>40, 50, 60, 70</td>
</tr>
</tbody>
</table>

d. depth

*Source: Power Crane and Shovel Association, 1966, pp. 11, 12.*
Figure 72. The 2-1/2-yard bucket is about the largest used by draglines.

continuous mound of spoil on either bank immediately adjacent to the canal. These artificial ridges often become colonized with vegetation; thus, the canal pattern is outlined by the flora's accumulation.

**Marsh Buggies**

The fourth type of equipment utilized in channel work is a small dragline mounted on a marsh buggy (Figure 73). Marsh buggies are widely used by oil companies in running seismic profiles, laying pipeline and as the principal vehicle in crossing the marsh. To increase their usefulness Richie Dragline and Quality Boiler equipped their buggies with small draglines.
Figure 73. Marsh buggy draglines are used to excavate small channels, such as those associated with laying pipelines.

This type of machine is used primarily for laying pipeline through marsh areas. It simply cuts a ditch for floating in the pipe, eliminating the necessity for dredging a full-scale canal to accommodate the pipeline-laying barge. While this type of operation produces far less spoil, marsh buggy tracks often cause pronounced changes in the marsh surface, particularly in areas of floating marsh, where the floating vegetation mat may be permanently damaged (Gagliano, 1971, p. 4).

Petroleum Canals - A Summary

The combined work of this construction equipment has produced a spectacular network of artificial waterways (Figure 61). These man-made channels can be divided into three types, those to build well sites, those used for pipeline right-of-way and those used for oil-logistic support.
vessels and the movement of petroleum barges.

Although the standard oil-field canal is contracted to 70-feet-wide and eight-feet-deep, because of the allowance for overdepth and erosion, many channels are 200-feet-wide and 10 to 12-feet-deep (Figure 74), enlargement being attributed to scour and erosion. At the channel terminous is the well site, which is usually 150-feet-wide and up to 350-feet-long with the well placed approximately 50 feet from the back and right bank (Figure 75).

The development of an oil and gas field is a random but cumulative process; that is, the first exploratory well is usually drilled on the basis of some geophysical data. The exploratory well provides additional information, which influences the location of the next well. Each new well drilled adds to the understanding of subsurface structure and stratigraphy and in its turn aids in the selection of new drilling sites. Thus, the full development of an oil and gas field cannot be planned in advance. . . .

The human factor further complicates surface canal configuration. After the geologist has selected the point at which he would like to drill, the land men secure surface rights-of-way and permits for access to the proposed drilling site. The routing of the access canal is dictated largely by property boundaries and locations of navigable waterways, and it generally cuts across natural drainage lines and surface at random angles (Gagliano, 1971, p. 6).

Oil companies, in developing petroleum fields, cut a series of primary channels which serve as principal access routes. From these main channels other canals are added, all
connecting to the main waterway. As a result, the network, filters into these central traffic arteries and allows oil companies easy access to well sites. Although a field may have developed over a period of up to 40 years, all new canals and appendages will interconnect resulting in a web of channels (Figure 61). Through time the system expands with each new well. In that one canal usually represents one well, some oil fields may have 30 miles of canals within a six square mile area. Consequently, land areas are reduced, due to continuous addition of new canals and channel enlargement associated with erosion (Figure 76).
Figure 76. Lafitte oil field indicating the growth pattern in one of the alluvial wetland oil and gas fields, from U.S.G.S. Barataria Quadrangle (1962).

As the canal pattern increases in density, channels begin to coalesce producing small lakes and bays. Unless sediments or fill are added, this land is permanently lost. After the field has been fully developed, the man-made canal system is the dominate element on the landscape. Once mineral resources have been depleted, the canal network remains as evidence of this economic activity. They are artificial landscape features that will endure.
Pipeline Canals

To ship petroleum and natural gas to storage tank complexes or refineries, oil companies rely on barges and pipelines. Although barge transport offers greater flexibility in the ease with which changes can be made in both origin and destination of cargoes, this transport method accounts for only 24 percent of the state's petroleum commerce. Pipelines carry about 75 percent. They are an important part of petroleum companies oil field development programs (Mid-Continent Oil and Gas Association, 1968, p. 1).

In the coastal zone, pipeline placement is accomplished by excavating a canal along the right-of-way. Since these routes are often several miles long and as straight as oil companies can make them, they have become an integral and distinct addition to the landscape (Figure 77).

On state and some privately owned property a system of dams, dikes and weirs (Figure 63) has been employed to reduce the potential environmental damage of pipeline canals. These water-control structures are placed on the channel at every point where it crosses a natural waterway. Pipeline canals, consequently, have numerous barriers across them (Figure 63); these dams are one of the identifying aspects of these channels.
Pipeline canals, which are 50-feet-wide and 10-feet-deep, appear as distinct landscape features and are an important component in the oil industry's efforts to move their products from the field to the refinery.

Oil Field Transport Channels

To develop successfully an oil or gas field petroleum companies need access into the area. When the natural drainage system does not provide a route, a canal is cut. These channels become the principal means of moving men and machinery into the region being developed (Figures 61, 62, and 76). Due to usage, these transport channels often become wider than the well-access canals. The extra width is a result of bank collapse caused by boat traffic along the channel and identifies the principal transportation arteries into the oil and gas fields.
CHAPTER VI

OTHER CANAL-LIKE FEATURES

In addition to the five canal types used to develop wetland resources, are two canal-like excavations that, although resembling artificial waterways, do not serve the traditional functions of canals. In the Chenier Plain dredged material from long, rectangular ponds is used for cattle walkways. Also, within the marsh small ditches were cut to mark property boundaries. Each of these excavations provides a distinct service and is a unique landscape element.

Cattle Walkways

Cattlemen on the Chenier Plain graze their cattle in the marsh. To provide livestock with dry areas, Dr. M. O. Miller of Grand Chenier has built a number of walkways into the marsh. These "cattle trails" are constructed from marsh soil obtained from linear channels at the walkway site. The first walkways were built from spoil removed from an excavation paralleling the length of the project. This method of construction proved to be detrimental to the marsh. To reduce
the possible environmental impact, staggered ditches were built. This new construction technique has created a distinct landscape feature (Interview with Eugene Broussard, October, 12, 1971). On air photos cattleways are bounded on both sides by a series of small ponds strung out in a line. No longer is one long channel necessary.

**Boundary Ditches**

Small ditches are often used to delimit property boundaries; they serve as the fences of the marsh. These boundary markers are especially important today because of the coastal oil activity. It is essential that a land owner knows the limits of his property, so he can claim any royalties, due him from petroleum discovered on his land. Small ditches, often patrolled by boat or airboat, are used as boundaries.

These channels often follow the line established by the township and range system of land division. Therefore, their angularity is in direct contrast in surface form with other canals, particularly the sinuosity of the trainasse. Boundary channels are easily identified by their sharp right angles and straightness, thereby producing a distinct landscape pattern. This is not the pattern created by
trappers, who build numerous interconnecting ditches, but by land owners seeking accurate land division.
CHAPTER VII

CANAL DEVELOPMENT

To illustrate the uncontrolled growth of canal patterns through time, six quadrangles -- Barataria, Bayou Du Large, Centerville, Lake Felicity, Pecan Island and West Delta -- were selected for detailed analysis (Figure 77A). An effort was made to select areas that contained the most representative examples of the canal patterns occurring in coastal Louisiana. These patterns, as shown on the idealized representation of the various canal networks (Figure 77B), can be readily identified on the land. Each type has certain characteristics which distinguishes it from the others.

Patterns

**Drainage Ditches**

Drainage ditches (Figure 77B-1) are small narrow features, crossing natural levees and usually connecting into a backswamp canal which parallels the natural levees. They have been constructed in such large numbers that they not only provide the farmer with adequate drainage, but due to their density and location, can be easily identified as drainage.
Figure 77A. Case study quadrangles location.

Figure 77B. Idealized canal network patterns.
channels. On the other hand, special drainage systems, such as those resulting from reclamation projects, have a distinct canal grid. This orderly grid confined within a levee network outlining the property, is the principal element in recognizing this type of drainage pattern.

Problems are encountered in identifying old drainage channels, in that many have become transportation canals and no longer have the size characteristics of a drainage ditch. Due to their location it is difficult to determine their original function. There are no identifying characteristics and a documents search is required to discover the original purpose. On the other hand, new ditches and reclamation patterns can be easily identified.

**Transportation Canals**

Transportation channels (Figure 77B-2) are wide, straight, distinct features which provide open-ended links between points. As potential routes of commerce, they are excavated in regions which will improve commodity movements. Often extending for miles in a general east-west direction, the transportation canal is a dominate landscape element. The smaller transportation channels are not as easily recognized as such, but an analysis of their location aids
in identifying their function. When a canal connects bayous, lakes, or settlements, it was probably excavated for transportation purposes. These channels, may be confused with pipeline canals, which are also wide and straight, but the absence of numerous water-control structures along the transportation canal routes separates them from pipeline right-of-way.

**Trainasse**

The trainasse (Figure 77B-3), like the drainage ditch, is a small narrow feature, which often meanders across the marsh. It is found in trapping and hunting areas or as connections into settlements. Junctions are rarely at right angles and the trainasse builder makes maximum use of the natural system. The trainasse, therefore, connects into existing waterways. Its sinuosity and size are its principal distinguishing qualities.

**Logging Canals**

Logging canals (Figure 77B-4) usually have fan-shaped pull-boat trails radiating out into the swamp from points along the canals. An exception to this general pattern results when ponds were made in the areas logged by May Brothers Lumber Company. When this logging method was
employed the canal pattern was rectangular. In the regions of the greatest logging activity the pattern is well developed and consists of a central channel with several laterals leading into the swamp. These canals are identified by a small curve connecting into the main canal. The pull-boat trail, pattern and swamp location are all additional identifying properties of logging canals.

**Petroleum Canals**

Petroleum canals (Figure 77B-5) can be distinguished from other types because of the dense grid which results from numerous interconnecting channels. Appendages join this net to the central canals.

**Case Studies**

The following case studies show the expansion and enlargement of the various canal networks during the past 30 years, as well as, the changes that have occurred in the types of canals excavated. The maps (Figures 78-83) prepared from the six quadrangles (see page 157) are a compilation of all canals shown on the available historic maps, except that since 1968 only petroleum-related canals are used. This qualification was made because of the complex nature of the numerous small drainage, logging and trapping channels as
they appear on a 1968 air-photo mosaic, which was the source of the 1968 data. To provide the sequential evidence of canal growth and expansion within each area, maps representative of at least three time periods (except on the Centerville quadrangle, where only two maps were used) between 1930 and 1968 were utilized.

Despite the fact that the maps used were selected because they had a prevalence of particular patterns, they nonetheless still show how the petroleum industry, in a relatively short period, has become the primary force behind the expansion of canal networks across the coastal zone. In each time period, the case studies illustrate man's ability to reshape the landscape in order to obtain resources. Currently, the petroleum industry dominates; but prior to its canal building activities, canals, somewhat smaller in scope, were used to exploit other products.

These case studies further reveal the shifts in resource exploitation and show how Louisiana's alluvial wetlands have become dominated by artificial waterways. Each study considers only one section within the plain, but all reveal the significance of canals as landscape elements.
Barataria

The first topographic maps of this region, those of 1939, show that the landscape was dominated by canals associated with drainage, logging, reclamation and trapping. These activities accounted for the 54 miles of man-made channels (Figure 78) that appear on these early maps. During the next nine years, no new canals were added to these systems. However, 46 miles of petroleum-related canals had been excavated, representing the first appearance of this canal type and the beginning of petroleum exploration activity. By 1962, 14 years later, an additional 156 miles of well-access channels had been constructed, an increase of over 300 percent, or an average of 11 miles of canals/year. In addition, there were 15 miles of drainage channels added to the network that appears on the 1939 maps.

Six years later, dredging of petroleum-related channels had been reduced to approximately five miles/year. Between 1962 and 1968 only 32 miles of canals had been added to the oil fields shown on the Barataria quadrangle, possibly indicating that the 234 miles of canals are enough to accommodate the oil industries continuing exploration program in that area.
Figure 78. Canal growth and expansion in the Barataria region between 1939 and 1968. Compiled from U.S.G.S. Quadrangles (1939 to 1962) and a 1968 U.S. Army Corps of Engineers air-photo mosaic.
Along with these channels, there are 69 miles of smaller canals, which represents only 23 percent of the channels in this region. It is apparent that the oil industry, in the last 20 years, has been responsible for the expansion of the canal system, accounting for 77 percent of the man-made waterways appearing on the 1968 map.

Bayou Du Large

In this portion of the Deltaic Plain the 1944 quadrangle shows there were 29 miles of transportation channels, 20 miles of trainasses and four miles of petroleum canals. Between 1944 and 1964 construction of transportation channels declined and the trainasse became the principal canal type. In 20 years the system of trapping ditches increased at the rate of nine miles/year. Consequently, by 1964 there were 197 miles (Figure 79) of trainasses in this region. This canal type, therefore, dominates the landscape and has continued to represent the largest number of miles of channels excavated.

During the same period, the petroleum industry constructed 65 miles of well-access channels, or about three and one-half miles/year. By 1968, they had built a total of 94 miles of channels, representing about 29 percent of the
Figure 79. Canal growth and expansion in the Bayou Du Large region between 1944 and 1968. Compiled from U.S. G.S. Quadrangles (1944 to 1964) and a 1968 U.S. Army Corps of Engineers air-photo mosaic.
canals constructed. The system of petroleum-related channels has been expanded through the addition of small appendages to the existing canal network. This procedure has expanded the oil fields, but reduced the number of miles of channels in the region. However, within the petroleum fields the small channels have coalesced into a network of connecting waterways contributing to land loss.

**Centerville**

In this region the logging industry, prior to 1930, was actively cutting cypress. To remove the swamp timber approximately 40 miles of canals were excavated. After 1930, no new channels were cut, indicating that this resource activity had been terminated. This canal type represents about 18 percent of the area's channels (Figure 80).

The agricultural land along Bayou Teche was drained, in 1930, by 60 miles of ditches. The system doubled by 1959, expanding at the rate of about two miles/year. The 29 year record shows that drainage channels were the principal canal type excavated in this area. This system was expanded as new land was brought into production.

Along with drainage and logging canals the 1959 record reveals that about 90 miles of petroleum-related
Figure 80, Canal growth and expansion in the Centerville region between 1930 and 1959. Compiled from U.S.G.S. Quadrangles (1940 to 1959).
channels had been excavated. Primarily built in the Atchafalaya Basin, these channels provided the petroleum industry with adequate well-access. This area does not appear on the 1968 air-photo mosaic; consequently, the most recent petroleum activity is not shown.

Lake Felicity

In the area shown on the Lake Felicity Quadrangle, trappers had cut 39 miles of trainasses by 1939. These "pirogue trails," along with 14 miles of transportation canals and 23 miles of drainage ditches (which may have also served as marsh-access routes), were the principal waterways in this region. In 1939 there were 79 miles of man-made waterways on the landscape. Twenty-five years later, 359 miles of new canals had been excavated, representing an increase of about 460 percent.

One-hundred and sixty-eight miles of these new channels were associated with the petroleum industry's exploration program. This was the greatest increase in any one canal type. Since 1964, an average of about 10 miles/year has been added, thereby, expanding the density of petroleum waterways. Consequently, by 1968, 211 miles of petroleum-related canals had been dredged, or 44 percent of the channels indicated on the 1939 to 1968 quadrangles and
Within this area petroleum waterways dominate the landscape. However, along with these channels, the 1964 quadrangle shows that 119 miles of drainage ditches had been constructed. These canals, like those on the Centerville map, were built to expand the amount of cultivatable land bordering the bayous. The ditches are also an important landscape component, representing 29 percent of the channels shown on Figure 81. In addition to these canal types, trappers between 1939 and 1964 added 64 miles of trainasses, accounting for 22 percent of the 478 miles of artificial watercourses on this quadrangle. During the same period, 13 miles of boundary ditches were cut.

**Pecan Island**

By 1951 the trainasse, which had a total length of 310 miles, was the principal type of canal in this portion of the Chenier Plain (Figure 82). This was a substantial increase over the two miles of trapping trails shown on the 1932 quadrangle. Local informants claim that there were more than two miles of trapping ditches in the marsh surrounding Pecan Island, but these trainasses do not appear on the 1932 map. The length of ditches shown on this quadrangle...
Figure 81. Canal growth and expansion in the Lake Felicity region between 1939 and 1968. Compiled from U.S. G.S. Quadrangles (1939 to 1964) and a 1968 U.S. Army Corps of Engineers air-photo mosaic.
Figure 82. Canal growth and expansion in the Pecan Island region between 1932 and 1968. Compiled from U.S. G.S. Quadrangles (1932 to 1951) and a 1968 U.S. Army Corps of Engineers air-photo mosaic.
is, therefore, misleading. During the next 19 years approximately 310 miles of trainasses were constructed, primarily by hunter's building routes into their leases and not trappers trying to efficiently utilize the marsh.

Oil field channels first appear on the 1952 map, when the area was traversed by 31 miles of petroleum waterways. Seventeen years later the oil industry had added another 52 miles to give a cumulative total, in 1968, of 84 miles of well-access canals. Due to the nature of the marsh in the Chenier Plain, many oil wells are now drilled from board roads extending to the well-site. This practice is reducing the number of petroleum-related canals in the area.

**West Delta**

In this section of the Mississippi Delta petroleum canals dominate the landscape. In 1935, only three miles of petroleum waterways were mapped. By 1953, the oil industry had added 32 miles of channels, or about two miles/year. Between 1953 and 1968 the industry excavated an additional 101 miles of new canals, or an increase of about 300 percent (Figure 83).
Figure 83. Canal growth and expansion in the West Delta region between 1935 and 1968. Compiled from U.S. G.S. Quadrangles (1932 to 1953) and a 1968 U.S. Army Corps of Engineers air-photo mosaic.
The Future

In the process of canal construction in the swamp and marsh, canal builders have modified drainage patterns, altered flora and fauna, changed salinity regimes and contributed to land loss. There is not enough quantitative material available to estimate the total effect canals have had on the environment. Field investigations show, and nearly all informants note, that changes are occurring. Water areas that were fresh are now brackish, which has often resulted in a change in the vegetative communities; trainasses have enlarged into bayous, contributing to land loss.

Canals have had an environmental impact and based on the present-day trend of canal development, it appears the canals of the future will continue to further modify the coastal zone. Petroleum companies will expand their canal systems by adding new channels to their existing oil fields and as new fields are developed they will dredge canals within these areas. This will be the most continuous source of new canals. In conjunction with canal construction dams, dikes and weirs will be required to protect the marsh habitat.
Oil companies are likely to remain the major producer of canals for sometime. However, industries and private citizens will continue to be involved in canal construction, for a variety of purposes.

Past history indicates clearly the oil industry's zealous activity in canal building; the landscape shows how the total system has modified local habitats. People raised in the marsh have witnessed the environmental transitions which have accompanied canal construction. Although it is difficult to assess the total change, some of which may have been detrimental, canal construction appears to be an essential variable in environmental modifications. The marsh has changed; and the people who knew what it was like 70 years ago are generally not optimistic about its future.
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SELECTED BIBLIOGRAPHY


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APPENDICES
APPENDIX I

INVENTORY OF TRANSPORTATION CANALS
1887 TO 1930
AS SHOWN ON FIGURE 83

<table>
<thead>
<tr>
<th>Canal</th>
<th>Approx. Date</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amoureux</td>
<td>1930</td>
<td>This trainasse was cut by trappers as a by-pass into Lake Salvador from</td>
</tr>
<tr>
<td></td>
<td></td>
<td>the Gulf Intracoastal Waterway. Current maps show that the canal has</td>
</tr>
<tr>
<td></td>
<td></td>
<td>been filled in.</td>
</tr>
<tr>
<td>Avery</td>
<td>1850</td>
<td>As one of the oldest privately built canals along the coast, this channel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>continues to transport salt from Avery Island, its original function.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Canal included in this section for convenience).</td>
</tr>
<tr>
<td>Bayou LaCache</td>
<td>1900</td>
<td>Bush and McGinnis, owners of the Lower Terrebonne Refinery at Montegut,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>had this bayou channelized to aid in the movement of sugarcane to their</td>
</tr>
<tr>
<td></td>
<td></td>
<td>mill.</td>
</tr>
<tr>
<td>Belle Isle</td>
<td>1912</td>
<td>This channel was dredged for Ned McIlhenny as an access route into Belle</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Isle and Chenier Au Tigre. When Chenier Au Tigre was opened to the public</td>
</tr>
<tr>
<td></td>
<td></td>
<td>in 1915, Belle Isle Canal was used to gain access to the island. To try</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and reduce boat traffic, a toll of from $10 to $35 was charged. Now this</td>
</tr>
<tr>
<td></td>
<td></td>
<td>canal is a part of Freshwater Bayou Gulf Outlet.</td>
</tr>
<tr>
<td>Canal</td>
<td>Approx. Date</td>
<td>Purpose</td>
</tr>
<tr>
<td>-----------</td>
<td>--------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Billiot</td>
<td>1900</td>
<td>Cut by settlers living on Mauvais Bois, this channel was used as a connection from the ridge to Lake DeCade. It may have been built before 1900, but was so small it did not appear on early maps. It was essentially a pirogue trail.</td>
</tr>
<tr>
<td>Boudreaux</td>
<td>1910</td>
<td>This channel, often called St. Martin Canal, was apparently built by the St. Martin family as an access route into Lake Boudreaux from Bayou Petit Caillou. It was an important route for shrimpers working in the lakes and bays west of Bayou Petit Caillou, a function it continues to perform.</td>
</tr>
<tr>
<td>Breton</td>
<td>1910</td>
<td>Originally a trainasse, this canal provided an access route into the fishing, hunting and trapping regions around Little Lake. It was later enlarged by oil companies to provide a route into the Clovelly Oil and Gas Field.</td>
</tr>
<tr>
<td>Bush</td>
<td>1905</td>
<td>This route, between Bayou Petit Caillou and Bayou Terrebonne, was dredged by Bush and McGinnis so the plantations west of Bayou Terrebonne could use their Montegut refinery. Originally a 40-foot-wide channel, it is now 200-feet-wide and used primarily by fishermen and oil support vessels.</td>
</tr>
<tr>
<td>Canal</td>
<td>Approx. Date</td>
<td>Purpose</td>
</tr>
<tr>
<td>--------------------</td>
<td>--------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Caernarvon</td>
<td>1912</td>
<td>This canal was originally a small drainage ditch on the Caernarvon plantation. However, in an attempt at marsh reclamation, the Phillip's Land Company enlarged it into a canal. The project failed, but the channel became an important transport route for fishermen.</td>
</tr>
<tr>
<td>Canal Blue</td>
<td>1900</td>
<td>Often called Drexlers Canal, this waterway was an important watercourse for the fishermen and trappers living north of Belle Amie, on Bayou Lafourche. It was the only major canal into the marsh north of Jean Plaisance and was used by a tremendous number of people. Today it is dammed, but in the early 1900's it was the principal route into the navigable waterways west of Bayou Lafourche. From this canal trappers would often push their pirogues to Four League Bay.</td>
</tr>
<tr>
<td>Canal St. Jean Charles</td>
<td>1900</td>
<td>Originally built as a trainasse, this channel provided the people living on Isle St. Jean Charles with a route to Point Au Chien and Bayou Terrebonne. The waterway probably dates back to the 1800's, but due to its size, it was not included on historic maps. Until 1965, when the island was connected to Point Au Chien by road, this canal provided the people of Isle St. Jean Charles with a means of moving to and from the island.</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Canal</th>
<th>Approx.</th>
<th>Date</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancienne</td>
<td></td>
<td>1905</td>
<td>As an important connection between Lake Verret and Bayou Lafourche, this channel provided fishermen and settlers with a route through the swamp. In fact, people living at Stevensville and American Bayou used this canal to go to Napoleonville to purchase supplies and sell moss. The channel has been re-dredged and today pleasure boats and oil barges use it as far as the bridge on Louisiana highway 400.</td>
</tr>
<tr>
<td>Caezu</td>
<td></td>
<td>1925</td>
<td>To provide easy access for fishermen using the Caezu cannary, this canal was cut from Buras to Bay Pomme D'Or.</td>
</tr>
<tr>
<td>Delcambre</td>
<td></td>
<td>1880</td>
<td>This canal was originally built by continuously running cattle along the route between Delcambre and Bayou Carlin and allowing the current to scour the channel. As a result, the canal was used by schooners in the shipment of cattle. Today, there are seven shrimp processing plants along the channel regularly servicing 125 shrimp boats. During a hurricane, up to 300 vessels will seek refuge in the canal.</td>
</tr>
<tr>
<td>Dupre</td>
<td></td>
<td>1921</td>
<td>As a state funded project this canal reduced the navigational problems from Bayou Barataria to Bayou Cutler, providing boat traffic with a shorter route to New Orleans. Today the channel is the principal waterway into Barataria Bay; consequently, the canal's width has increased due to the constant movement of boats along the watercourse.</td>
</tr>
<tr>
<td>Canal</td>
<td>Date</td>
<td>Purpose</td>
<td></td>
</tr>
<tr>
<td>------------</td>
<td>------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Falgout</td>
<td>1905</td>
<td>Falgout Canal was built as a 10-foot-wide channel by the settlers on Bayou Du Large and was used as an access route into Lake DeCade. Through continuous use, first by people living on Mauvais Bois Ridge, Marmande Ridge and Bayou Du Large, and later by other, the channel has enlarged into a 200-foot-wide canal. As an access route into trapping areas west of Lake DeCade, it became the regions most important canal.</td>
<td></td>
</tr>
<tr>
<td>Fasterling</td>
<td>1925</td>
<td>This canal was cut from Buras to Bay Pomme D'Or, and like Cazezu, provided fishermen with an access route to the Fasterling family cannery.</td>
<td></td>
</tr>
<tr>
<td>Franklin</td>
<td>1800</td>
<td>This canal was enlarged by the Corps of Engineers as part of the Gulf Intracoastal Waterway system into West Cote Blanche Bay. However, prior to that time, it served as a logging transport channel for the people and logging firms around Franklin.</td>
<td></td>
</tr>
<tr>
<td>Freshwater</td>
<td>1900</td>
<td>In 1967, the Corps of Engineers completed the 11-foot-deep, 125-foot-wide Freshwater Bayou Gulf Outlet between the Gulf of Mexico and the Gulf Intracoastal Waterway. Using Belle Isle, Freshwater and Sixmile canals, the Engineers provided ships with a protected waterway, by-passing the dangerous water of Vermilion Bay. Although today the canal is used by large vessels, it was originally built to provide people on the coastal ridges with a route to the Gulf. When Belle Isle and Sixmile</td>
<td></td>
</tr>
<tr>
<td>Canal</td>
<td>Approx. Date</td>
<td>Purpose</td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>--------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Golden Star</td>
<td>1918</td>
<td>The canal was constructed to provide a protected waterway to Abbeville, their main source of supplies. To aid in the movement of sugarcane, Golden Star plantation built a canal into Lac des Allemands. Syrup, sugar, crude oil for the mill and molasses were shipped along this route. Although the canal was primarily built to serve the plantation, it was also a favorite stop for the entertainment steamboats Mayflower and Magnolia and provided people at Kraemer with a route to Vacherie to obtain supplies. Now called Vacherie Canal, it continues to serve a large number of people.</td>
<td></td>
</tr>
<tr>
<td>Grand Pass</td>
<td>1890</td>
<td>Originally a pirogue trail, this channel has eroded into a 13-foot-deep connection between Caillou Lake and Lake Méchant. Used primarily by oyster luggers as a short-cut between the two lakes, the Pass now is traveled by shrimpers.</td>
<td></td>
</tr>
<tr>
<td>Gravolet</td>
<td>1923</td>
<td>Gravolet Canal, along with several others, such as Belair, Fairview and Jim Williams, provided fishermen living along the Mississippi with an access route into coastal fishing regions. It was also apparently used a great deal by smugglers during prohibition. In fact, most of Louisiana's canals were used in the illegal importation of alcohol. At Leeville, for example, cases of illegal alcohol were stacked on the wharve during prohibition. This contraband was</td>
<td></td>
</tr>
<tr>
<td>Canal</td>
<td>Date</td>
<td>Purpose</td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>------</td>
<td>-------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Gueydan</td>
<td>1900</td>
<td>This channel was originally constructed as a drainage canal; however, the waterways proximity to Lake Arthur provided the people on Pecan Island with an access route to this service center. Cotton raised on the island was shipped via the canal to be sold at Jennings or Gueydan. Later, they traded at Abbeville and Gueydan. Canal was no longer used by Pecan Island residents.</td>
<td></td>
</tr>
<tr>
<td>Hayes</td>
<td>1925</td>
<td>Like Cazezu and Fasterling, this canal was built to provide fishermen with an access route to a packing plant, without going into the Mississippi River.</td>
<td></td>
</tr>
<tr>
<td>Jimmie</td>
<td>1900</td>
<td>This canal connects Lakes Five and Laurier and was primarily used by fishermen. The most important canal in this region, however, was Wilkinson Canal.</td>
<td></td>
</tr>
<tr>
<td>Kings</td>
<td>1925</td>
<td>To aid farmers raising oranges and sugarcane on Kings Ridge, the canal was cut as a transportation link from the ridge to Little Lake. It provided a route to the New Orleans market.</td>
<td></td>
</tr>
<tr>
<td>Canal</td>
<td>Date</td>
<td>Approx.</td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td>------</td>
<td>------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Lapeyrouse</td>
<td>1910</td>
<td>This hand-dug channel, for a 25-cent toll provided fishermen with a short-cut from Bayou Terrebonne to Madison Bay. People living on Isle St. Jean Charles also used it to trade at Lapeyrouse store.</td>
<td></td>
</tr>
<tr>
<td>Last Point</td>
<td>1921</td>
<td>Like McIlhenny and West Chenier Au Tigre canals, this waterway provided the McIlhenny family with an access route to their camp on Chenier Au Tigre.</td>
<td></td>
</tr>
<tr>
<td>Little Chenier</td>
<td>1929</td>
<td>In the early 1900's there were 30 to 40 families living on Little Chenier Ridge. This canal provided a route to the communities along Front and Oak Ridges.</td>
<td></td>
</tr>
<tr>
<td>Madison</td>
<td>1890</td>
<td>Built by Madison Belanger as a pirogue trail, this channel subsequently eroded into a significant canal, providing fishermen with a cut-off into Madison Bay. Due to the accessibility of shrimping areas, Chinese fishermen established drying platforms along the waterway.</td>
<td></td>
</tr>
<tr>
<td>Marmande</td>
<td>1910</td>
<td>Marmande Canal, originally a trainasse, was dredged to gain access to shell on the ridge. Its secondary purpose was to aid in the movement of sugarcane from the ridge to Theriot. It may have also been used by marsh hunters and trappers working between Bayou Du Large and Lake Theriot.</td>
<td></td>
</tr>
</tbody>
</table>

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Canal | Approx. Date | Purpose
--- | --- | ---
McIlhenny | 1912 | Now as one of the most important transportation routes into the Audubon Wildlife Refuge McIlhenny Canal provides a north-south passage across the sanctuary. The original purpose of this dredged channel, however, was to provide the McIlhenny family with a convenient water route to Belle Isle.
Meyers | 1930 | For oyster luggers going to Empire, Meyers Canal was a principal part of their route. Providing a link between Barataria and Adams Bay, the channel saved fishermen a considerable amount of sailing time.
Oaks | 1880 | This canal, like Delcambre, was built by putting cattle in pens and allowing them to churn up the turf. By extending the "cattle trail" into Vermilion Bay cattlemen south of Erath had a means of moving cattle into the marsh.
Peoples | 1895 | Often called Liners Canal, this hand-dug watercourse first appears on Hardee's 1895 map and was probably built to serve the transport needs of people living on Mauvais Bois. Connecting Lake Decade and Panchant, the canal, through time, has been used by trappers, hunters, fishermen, the oil industry and weekend sportsmen.
Pecan Island | 1905 | As a community built project, this channel was originally eight-foot-wide and three-foot-deep. However, in that it was the only waterway off the island, it was redredged in 1910 to a depth of eight feet and a width of 35 feet. Therefore,
<table>
<thead>
<tr>
<th>Canal</th>
<th>Date</th>
<th>Approx.</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rabbit</td>
<td>1920</td>
<td></td>
<td>Constructed by several fishermen, this one-quarter mile channel provided a significant short-cut into fishing, hunting and trapping areas west of Bayou Petit Caillou.</td>
</tr>
<tr>
<td>Sea Breeze</td>
<td>1920</td>
<td></td>
<td>Sea Breeze Pass was excavated by Yancey Sanders to aid in the shipment of sugarcane to New Orleans.</td>
</tr>
<tr>
<td>Sevin</td>
<td>1920</td>
<td></td>
<td>This one-half mile channel provided the fishermen who built it with a significant short-cut into Lake Barre east of Bayou Petit Caillou.</td>
</tr>
<tr>
<td>Schooner Bayou</td>
<td>1908</td>
<td></td>
<td>When the canal was completed, people on Pecan Island began to trade at Abbeville, rather than Gueydan and Lake Arthur. It became a significant transportation route for traffic moving between White Lake and Schooner Bayou.</td>
</tr>
<tr>
<td>Canal</td>
<td>Date</td>
<td>Approx.</td>
<td></td>
</tr>
<tr>
<td>--------------------------</td>
<td>------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Sixmile</td>
<td>1918</td>
<td>Now part of Freshwater Bayou Gulf Outlet, this channel provides shrimpers with an alternate route to the Gulf. It was originally constructed by Ned McIlhenny as an access route into their property on Belle Isle and Chenier Au Tigre.</td>
<td></td>
</tr>
<tr>
<td>Socolo</td>
<td>1925</td>
<td>Apparently built by fishing interests, this channel provided a route to processing plants, without going into the Mississippi.</td>
<td></td>
</tr>
<tr>
<td>Verdunville</td>
<td>1915</td>
<td>With completion of this canal, loggers and fishermen had a convenient waterway into the Atchafalaya Basin. Built by Captain Huth for the Kyle, Jeanerette, F. B. Williams and Hanson lumber companies, it provided these firms with a shortcut to their mills.</td>
<td></td>
</tr>
<tr>
<td>Weeks</td>
<td>1900</td>
<td>Probably built to provide people living on Weeks Island with a route to and from the island.</td>
<td></td>
</tr>
<tr>
<td>West Chenier Au Tigre</td>
<td>1926</td>
<td>Like McIlhenny Canal, this channel provides an important transport route into the Audubon Wildlife Refuge. It was originally constructed by Ned McIlhenny, as a convenient route into Chenier Au Tigre.</td>
<td></td>
</tr>
<tr>
<td>White Lake System</td>
<td>1895</td>
<td>This series of canals first appears on Hardee's survey of Louisiana; it provided a significant link between Grand and White Lakes. Prior to completion of the Gulf Intracoastal Waterway,</td>
<td></td>
</tr>
<tr>
<td>Canal</td>
<td>Date</td>
<td>Purpose</td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Wilkinson</td>
<td>1900</td>
<td>Apparently this canal was built as a result of the efforts of the New Orleans-Fort Jackson-Grand Isle Railroad's attempt to extend their system to Grand Isle. They failed, but the canal provided the people living on Barataria Bay with a route to Myrtle Grove, where they could take the train to New Orleans.</td>
<td></td>
</tr>
<tr>
<td>Williams</td>
<td>1920</td>
<td>Williams (along with Grays, Panama and Southwest Louisiana) was excavated to avoid sailing into the Gulf to get into Barataria Bay. However, it was originally a pirogue trail that subsequently enlarged into a major waterway. No toll was charged to use this channel.</td>
<td></td>
</tr>
</tbody>
</table>
Inventory of Trans (Material compiled from):

1. Amoureux
2. Avery
3. Bayou LaCache
4. Belle Isle
5. Billiot
6. Boudreaux
7. Breton
8. Bush
9. Caernarvon
10. Canal Blue
11. Canal St. Jean Charles
12. Caniennne
13. Cazeuz
14. Delcambre
15. Dupre
16. Falgout
Inventory of Transportation Canals, 1887 to 1930
(Material compiled from Documents, Interviews, and Maps)

| 1. Amoureaux | 17. Fasterling |
| 2. Avery | 18. Franklin |
| 7. Breton | 23. Gueydan |
| 8. Bush | 24. Hayes |
| 11. Canal St. Jean Charles | 27. Lapeyrouse |
| 12. Cazeneuve | 28. Last Point |
| 13. Cezceau | 29. Little Chenier |
| 15. Dupre | 31. Marmande |
| 16. Falgout | 32. McIlhenny |

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### Principal Lumbering Canals Built Between 1880 and 1930

<table>
<thead>
<tr>
<th>Canal</th>
<th>Company</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ashland</td>
<td>St. Louis Cypress Lumber Company</td>
<td>West of Ashland on Bayou Grand Caillou</td>
</tr>
<tr>
<td>Bayou Prevost</td>
<td>St. Louis Cypress Lumber Company</td>
<td>Between Bayou Du Large and Grand Caillou</td>
</tr>
<tr>
<td>Bowie</td>
<td>Bowie Lumber Company</td>
<td>North of Lake Boeuf</td>
</tr>
<tr>
<td>Cooke</td>
<td>St. Louis Cypress Lumber Company</td>
<td>From Bayou Black to Bull Run</td>
</tr>
<tr>
<td>Cotton</td>
<td>Cotton Brothers Lumber Company</td>
<td>South of Lake Fausse Pointe.</td>
</tr>
<tr>
<td>Cousins</td>
<td>Louisiana Cypress Lumber Company</td>
<td>West of Lake Cataouatche</td>
</tr>
<tr>
<td>Donner</td>
<td>Diebert-Stark &amp; Brown</td>
<td>From Bayou Black to Tigre Bayou.</td>
</tr>
<tr>
<td>Dry Cypress</td>
<td>Louisiana Cypress Lumber Company</td>
<td>Between Lake Salvador and Bayou Perot</td>
</tr>
<tr>
<td>F.B. Williams</td>
<td>F.B. Williams Lumber Company</td>
<td>South of Franklin</td>
</tr>
<tr>
<td>Hanson</td>
<td>Hanson Lumber Company</td>
<td>Between Big and Little Bayou Black</td>
</tr>
<tr>
<td>Hanson</td>
<td>Hanson Lumber Company</td>
<td>Parallel to Bayou Black</td>
</tr>
<tr>
<td>Canal</td>
<td>Company</td>
<td>Location</td>
</tr>
<tr>
<td>-----------------</td>
<td>--------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>Himalaya</td>
<td>Cotton Brothers Lumber Company</td>
<td>East side of Lake Verret</td>
</tr>
<tr>
<td>Hollywood</td>
<td>St. Louis Cypress Lumber Company</td>
<td>Southeast of Houma</td>
</tr>
<tr>
<td>Ivahoe</td>
<td>Hanson Lumber Company</td>
<td>South of Ivahoe on Bayou Cypremort</td>
</tr>
<tr>
<td>Lewis</td>
<td>May Brothers Lumber Company</td>
<td>South of Lac des Allemands</td>
</tr>
<tr>
<td>Louisiana Cyprus</td>
<td>Louisiana Cypress Lumber Company</td>
<td>West of Lake Cata-</td>
</tr>
<tr>
<td>New Canal</td>
<td>St. Bernard Lumber Company</td>
<td>South of Lake Borgne</td>
</tr>
<tr>
<td>Pitre Lening</td>
<td>Louisiana Cypress Lumber Company</td>
<td>East of Lake Boeuf</td>
</tr>
<tr>
<td>St. Louis</td>
<td>St. Louis Cypress Lumber Company</td>
<td>South of Ashland on</td>
</tr>
<tr>
<td>St. Louis</td>
<td>St. Louis Cypress Lumber Company</td>
<td>South of Bayou Blue</td>
</tr>
<tr>
<td>William</td>
<td>F.B. Williams Lumber Company</td>
<td>East of Grassy Lake in the Atchafalaya Basin</td>
</tr>
</tbody>
</table>
## APPENDIX II - B

### REGIONS WITH UNNAMED LOGGING CANALS

<table>
<thead>
<tr>
<th>Region</th>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avery Island</td>
<td>(?)</td>
</tr>
<tr>
<td>Bayou Boeuf Swamp</td>
<td>Bowie Lumber Company</td>
</tr>
<tr>
<td>Bayou Boeuf Swamp</td>
<td>Louisiana Cypress Lumber Company</td>
</tr>
<tr>
<td>Bayou Boeuf Swamp</td>
<td>May Brothers Lumber Company</td>
</tr>
<tr>
<td>Bayou Sorrel and Bayou Gunnie</td>
<td>May Brothers Lumber Company</td>
</tr>
<tr>
<td>Chacahoula Swamp</td>
<td>Brownell &amp; Drew</td>
</tr>
<tr>
<td>Chacahoula Swamp</td>
<td>Diebert-Stark &amp; Brown</td>
</tr>
<tr>
<td>East of Franklin Canal</td>
<td>F.B. Williams Lumber Company</td>
</tr>
<tr>
<td>East of Franklin Canal</td>
<td>Hanson Lumber Company</td>
</tr>
<tr>
<td>East of Grand Lake</td>
<td>F.B. Williams Lumber Company</td>
</tr>
<tr>
<td>East of Grand River</td>
<td>F.B. Williams Lumber Company</td>
</tr>
<tr>
<td>East of Atchafalaya</td>
<td>(?)</td>
</tr>
<tr>
<td>Eastshore Lake Verret</td>
<td>Kyle Lumber Company</td>
</tr>
</tbody>
</table>

In the Atchafalaya along the area east of Little Lake Long

In the Atchafalaya along the area in the vicinity of Lake Fausse Pointe

196
<table>
<thead>
<tr>
<th>Region</th>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the Atchafalaya along</td>
<td></td>
</tr>
<tr>
<td>the West Arm of Grand Lake</td>
<td>(?</td>
</tr>
<tr>
<td>Lake</td>
<td></td>
</tr>
<tr>
<td>Lake Bridge West</td>
<td>Brownell &amp; Drew</td>
</tr>
<tr>
<td>Lake Bridge West</td>
<td>Brownell &amp; Drew</td>
</tr>
<tr>
<td>North of Bayou Cocodrie</td>
<td>(?</td>
</tr>
<tr>
<td>North of Bayou Sorrel</td>
<td>Jeanerette Lumber Company</td>
</tr>
<tr>
<td>North of Ivanhoe</td>
<td>Hanson Lumber Company</td>
</tr>
<tr>
<td>North of Lake Natchez</td>
<td>(?</td>
</tr>
<tr>
<td>North of Little Bayou Pigeon</td>
<td>F.B. Williams Lumber Company</td>
</tr>
<tr>
<td>South of Bayou Chevreuil</td>
<td>George Cousins</td>
</tr>
<tr>
<td>South of Big Bayou Pigeon</td>
<td>F.B. Williams Lumber Company</td>
</tr>
<tr>
<td>South of Six Mile Lake</td>
<td>Norman-Breaux Lumber Company</td>
</tr>
<tr>
<td>Vicinity of Bayou Long</td>
<td>F.B. Williams Lumber Company</td>
</tr>
<tr>
<td>Vicinity of Bayou L'Ors</td>
<td>Brownell &amp; Drew</td>
</tr>
<tr>
<td>Vicinity of Fork Bayou</td>
<td>William Carpentier</td>
</tr>
<tr>
<td>Vicinity of Lake Verret</td>
<td>F.B. Williams Lumber Company</td>
</tr>
<tr>
<td>Vicinity of Lake Verret</td>
<td>Kyle Lumber Company</td>
</tr>
<tr>
<td>West of Bayou Sale</td>
<td>Hanson Lumber Company</td>
</tr>
<tr>
<td>West of Franklin</td>
<td>Baldwin Lumber Company</td>
</tr>
</tbody>
</table>
APPENDIX II - C

LOGGING CANALS OF UNKNOWN BUILDERS

<table>
<thead>
<tr>
<th>Canal</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bonvillain</td>
<td>Near Crozier on Bayou Du Large</td>
</tr>
<tr>
<td>Delery</td>
<td>Near Lafitte</td>
</tr>
<tr>
<td>Halpin</td>
<td>West of Lake Boeuf</td>
</tr>
<tr>
<td>Johnson</td>
<td>North of Des Allemands</td>
</tr>
<tr>
<td>Kenta</td>
<td>Bayou Barataria to Bayou Des Familles</td>
</tr>
<tr>
<td>Pointe Lavin</td>
<td>Northeast of Lac des Allemands near Des Allemands</td>
</tr>
<tr>
<td>Providence</td>
<td>Northeast of Lac des Allemands</td>
</tr>
<tr>
<td>Ross</td>
<td>West of Bayou des Familles</td>
</tr>
<tr>
<td>Thorgeson</td>
<td>Gulf Intracoastal Waterway, east of Bayou Sale</td>
</tr>
<tr>
<td>Victor</td>
<td>North of Des Allemands</td>
</tr>
</tbody>
</table>
VITA

Donald Wayne Davis was born on July 25, 1943, in Oakland, California. In 1961, he was graduated from Richmond Union High School in Richmond, California. He subsequently entered Contra Costa College and in June, 1964, received the degree of Associate of Arts. In September, 1964, he entered California State University, Hayward, California and in June, 1967, received the degree of Bachelor of Arts in geography. In September, 1967, he entered Louisiana State University and received a Masters of Arts in geography in August, 1969. In June, 1968, he married Karen Sue Williams.

He was admitted to Louisiana State University to study marine geography and is a candidate for the degree of Doctor of Philosophy in geography and anthropology in the May Commencement of 1973. He is currently employed as an Assistant Professor in the Earth Science Department, Francis T. Nicholls State University, Thibodaux, Louisiana.
EXAMINATION AND THESIS REPORT

Candidate: Donald Wayne Davis
Major Field: Geography
Title of Thesis: LOUISIANA CANALS AND THEIR INFLUENCE ON WETLAND DEVELOPMENT

Approved:

Major Professor and Chairman

Dean of the Graduate School

EXAMINING COMMITTEE:

Date of Examination:
April 9, 1973