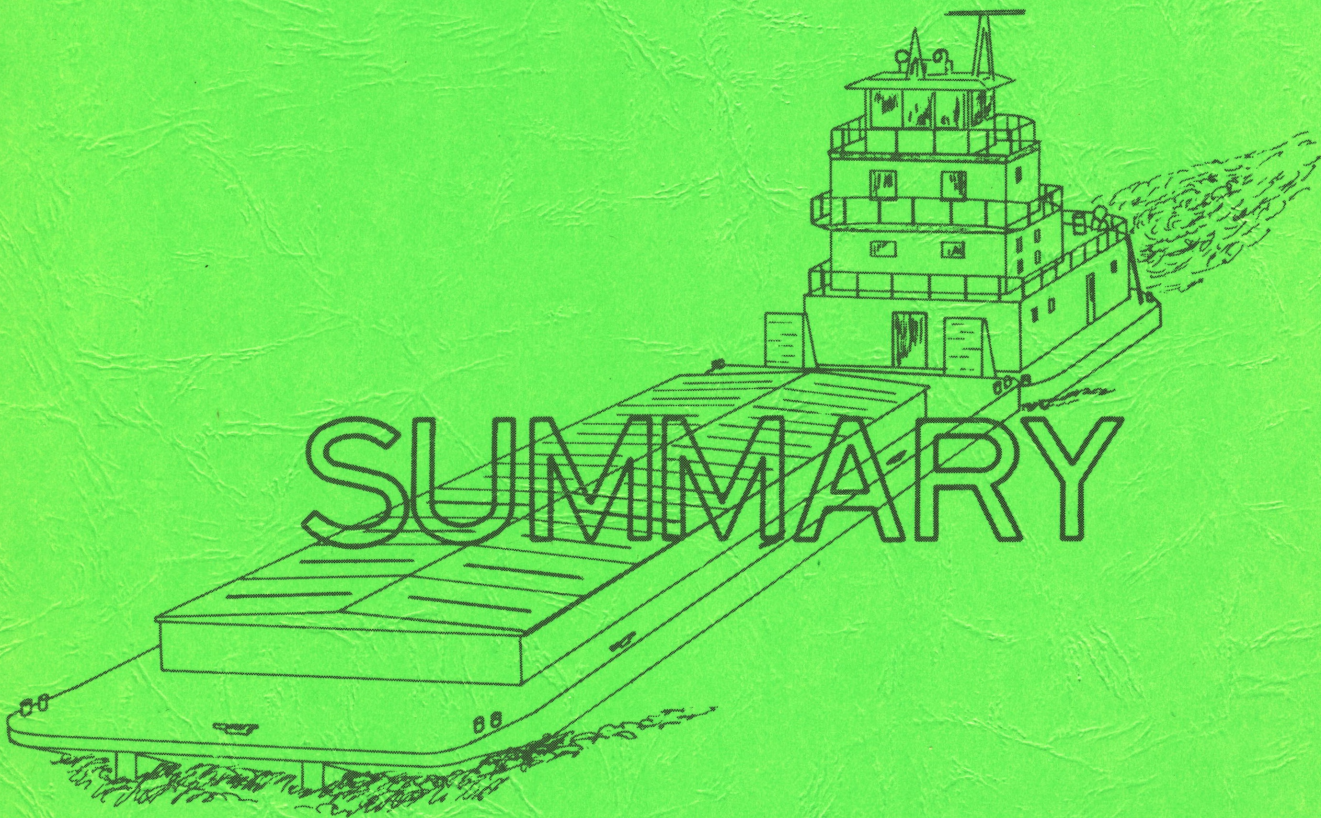


THE GULF INTRACOASTAL WATERWAY IN TEXAS



1980

Prepared By

THE STATE DEPARTMENT
OF
HIGHWAYS AND PUBLIC TRANSPORTATION

**THE GULF INTRACOASTAL WATERWAY
IN TEXAS**

SUMMARY

**PRESENTED IN RESPONSE TO
THE TEXAS COASTAL WATERWAY ACT OF 1975
AND
SUBMITTED TO
THE SIXTY-SEVENTH SESSION
OF THE TEXAS LEGISLATURE**



**PREPARED BY
TRANSPORTATION PLANNING DIVISION
THE STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION
M. G. Goode, ENGINEER-DIRECTOR**

1980



COMMISSION
A. SAM WALDROP, CHAIRMAN
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STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION
AUSTIN, TEXAS 78701

ENGINEER-DIRECTOR
M. G. GOODE

IN REPLY REFER TO
FILE NO.

Governor William P. Clements

Lieutenant Governor William P. Hobby

Members of the Sixty-Seventh Legislature

Prior to 1975, the need existed for a single, local nonfederal sponsor of the Gulf Intracoastal Waterway in Texas. The Texas Coastal Waterway Act of 1975 filled that need by appointing the State Highway and Public Transportation Commission to act as agent for the State of Texas as the non-federal sponsor of the Gulf Intracoastal Waterway in Texas.

The Act also instructed the Commission to evaluate the Gulf Intracoastal Waterway as it relates to Texas, including an assessment of the importance of the Waterway, an identification of principal problems and possible solutions to these problems, an evaluation of the need for significant modifications to the Waterway, and specific recommendations for legislative action, if any.

The evaluation mandated by the Act has been conducted and a report prepared; it represents information based upon available data and reflects the current status of Waterway-related matters as well as the possible future of these matters. It also reiterates the desire of the Commission to foster the growth of shallow-draft navigation in Texas while simultaneously fostering the protection and enhancement of the coastal environment.

The report is hereby submitted to the Sixty-Seventh Legislature in accordance with the Texas Coastal Waterway Act of 1975.

Sincerely yours,

A handwritten signature in black ink that reads "M. G. Goode".

M. G. Goode
Engineer-Director

PREFACE

The Texas coast, one of the state's most productive areas, has come under intense pressures since the turn of the century. The demands for development of natural resources, the changes due to the growth of the coastal population, the development of a vast industrial complex in the area, and the alterations required to provide a marine transportation network to serve the state have all contributed to the pressures on the coastal environment. The early alterations of the coastal environment were often justified in the name of progress with too little concern being given to the effects of the fragile environment. In recent years, increased concern for the future of this coastal environment has caused a new appraisal to be made of the relationship between the coastal economy and the coastal environment.

In partial response to these concerns, the Sixty-Fourth session of the Texas Legislature enacted the Texas Coastal Waterway Act of 1975. This Act states the policy of the State of Texas as being to support marine commerce and the economy of the state by providing for the shallow-draft navigation of the state's coastal waters in an environmentally sound fashion, to prevent waste of both publicly and privately owned natural resources, to prevent and minimize adverse impacts on the environment, and to maintain, preserve and enhance wildlife and fisheries.

To aid in accomplishing this policy, the Act designates the State of Texas as the nonfederal sponsor of the main channel of the Gulf Intracoastal Waterway and names the State Highway and Public Transportation Commission to administer the provisions of the Act. The Commission is further directed to continually evaluate the Waterway as it relates to Texas including an assessment of the importance of the Waterway, the identification of principal problem and possible solutions, the evaluation of the need for significant modifications to the Waterway, and specific recommendations for legislative actions to aid in carrying out this policy of the state.

The 1976 and 1978 reports of the evaluations were submitted to the sixty-fifth and sixty-sixth sessions of the Texas Legislature in January 1977, and January, 1979, respectively. The 1980 report in this series has been presented to the sixty-eighth session of the Texas Legislature. This is a summary of that report.

Copies of the full report are available at cost from the State Department of Highways and Public Transportation, Post Office Box 5051, Austin, Texas 78763. In addition, the required distribution through the Texas Publications Clearinghouse of the State Library system will soon be available.

THE GULF INTRACOASTAL WATERWAY IN TEXAS

INTRODUCTION

The Texas portion of the over 1,100 mile Gulf Intracoastal Waterway (GIWW) extends approximately 426 miles along the entire Texas Gulf coast. As a major segment of the State's transportation system this waterway provides an essential connecting link between the deepwater ports of Texas, the industrial complexes which have developed around them, and the trade markets of the Gulf coast and the midwest.

The Texas coast, composed primarily of an almost continuous series of shallow bays separated from the Gulf of Mexico by low barrier islands and peninsulas, was not naturally suited for modern navigation. As Texas entered the twentieth century, Texans had to dredge deep-draft channels to enable modern cargo ships to provide service to their ports. Likewise the connecting canals and shallow channels of coastal bays that had been constructed in the mid-1800's needed to be replaced by a modern system of shallow-draft waterways to enable the use of commercial barge transportation.

The federal government assumed control of the waterways along the Gulf coast and authorization for the first channel to connect Texas with the Mississippi River was received in 1925. By 1941, this 9 x 100 foot channel extended from the Sabine River to Corpus Christi Bay. The United States Army Corps of Engineers completed the enlargement of the entire GIWW to 12 x 125 foot dimensions and in 1949 extended it south to the Brownsville Ship Channel. This waterway, completed over twenty-five years ago, is virtually the same waterway used today.

COMMERCE ON THE GIWW

Most of the products that utilize the GIWW are the low cost liquid and dry bulk products that use barge transport because it is energy efficient and economical. In 1976, nearly 62 million tons of commodities moved over the GIWW in Texas with a commodity breakdown as follows: petroleum products (34.7%), crude petroleum (22.6%), chemicals (23.3%), non-metallic minerals (7.5%), marine shell (5.0%) and other commodities (6.9%). This showed a slight drop in tonnage as compared to a high of 66 million tons recorded for 1974. Of particular interest is the reduction in movement of crude petroleum and marine shell

along the waterway. The reduced local production of these natural resources has led to the substitution of foreign imports or other domestic materials which often do not move by barge.

These losses are beginning to be offset by any increasing flow of petroleum products that are now moving along the GIWW from the refineries located at the deepwater ports. Over 50% of the Texas products moving out of the State are destined for inland ports along the Mississippi River and its tributaries.

IMPROVEMENT NEEDS OF THE GIWW IN TEXAS

As noted in the introduction the dimensions of the GIWW are 12 by 125 feet. Many of the important markets of other states served by Texas barge traffic can handle tows of 20 to 40 barges, mainly because their channel widths are 200 feet or more. The narrow 125 foot width of the Texas GIWW restricts the number of barges per tow to a small number thereby increasing the costs per ton-mile over areas having more favorable channel dimensions. Larger tow size is additionally restricted because of the sharp curvature on bends of the GIWW. To remain competitive, the Texas GIWW must be improved to allow movement of larger tows of Texas products and raw materials.

HOW MUCH WILL THESE IMPROVEMENTS COST

Because of the high cost of a project of such magnitude, a portion of or conceivably all of which could be a state responsibility, a preliminary cost estimate of major construction items for the Texas portion of the project was included in the 1978 GIWW report. The estimate was based on five assumptions:

- 1) The improved channel will follow the same alignment as the existing channel.
- 2) The excavation quantities would be based on the original natural ground elevations present at the time of the original construction.
- 3) The existing disposal areas possessing perpetual easements will not be disturbed or reduced in area during the improvement project.
- 4) Maintenance dredging quantities are not dependent on channel dimensions.

- 5) The channel side slopes will be the same as those of the original construction.

Based on these assumptions, estimated costs for six channel configurations were determined. The project quantities used for the cost estimates were based on a 50-year life of the project with construction assumed to begin in 1987. The only quantities studied were property, dredging and levee requirements and required open-water disposal.

A summary of project cost estimates is shown in Table 1. Costs were calculated on the basis of 1978 dollars with no provisions added for inflation or rising costs during the entire project life.

TABLE 1
COST SUMMARY FOR CHANNEL IMPROVEMENTS

Channel	Construction	50-Year Maintenance*	Total Project
250' x 12'	\$172,647,000	\$269,686,000	\$442,333,000
250' x 14'	\$247,183,000	\$272,926,000	\$520,109,000
250' x 16'	\$327,025,000	\$275,816,000	\$602,841,000
300' x 12'	\$244,865,000	\$274,338,000	\$519,203,000
300' x 14'	\$333,718,000	\$276,801,000	\$610,519,000
300' x 16'	\$427,923,000	\$276,083,000	\$704,006,000

* Includes estimated federal cost for maintenance dredging during 50-year period of \$235,801,000. This cost may be deducted to determine required initial cost of project.

STATE SPONSORSHIP HITS A SNAG

Of increasing concern to navigation interests and supporters is the changing political climate regarding navigation projects. For the first time in U.S. history, a user tax at the federal level was levied on the inland navigation industry. However of greater concern to the State is a growing urge for the states to share their cost on all new navigation projects.

The formal assumption of full state sponsorship of navigation projects was delayed by some provisions in the Texas Flood Control Act of 1970 (P.L. 91-611), one of which required the local sponsor to sign a contract with the Secretary of Army releasing the Federal Government of responsibilities for any future damages incurred from a navigation project's construction and/or maintenance. This statutory requirement would pledge the credit of the State and would be in violation of the Texas Constitution.

An amendment to P.L. 91-611 was introduced to Congress as an attempt to resolve this conflict. This amendment would make payment of damages contingent on the legislative appropriations process of the State. The desired amendment however, saw no action. Only when such transactions are formally concluded, can official sponsorship of the State be possible.

STUDY-NEED OF RECREATIONAL BOATING IN COASTAL WATERS

Bridge opening records of marine traffic along one 43-mile segment of the GIWW have shown the GIWW to be a multipurpose waterway, providing a means of transportation not only to commercial traffic but also to fishing vessels, work boats, and recreational craft. The records report the recreational traffic to be 19.1% -26.1% of the marine traffic on that 43-mile segment depending on the exact location. Although these records are indicative of a substantial volume of recreational craft for a short section of the GIWW, they do not show the complete traffic picture of the entire Texas GIWW.

So far as can be determined a recreational boat study to determine Texas recreational boating activity had not previously been performed, therefore a complete study of coastal boating was initiated for this report. The objective of the study was to determine the nature, magnitude and extent of recreational boat traffic in all major Texas coastal waters and particularly the GIWW. A portion of this study is presented in this report.

Public recreational activities in Texas have generated expenditures of approximately \$3 billion each year, much of which may be attributed to coastal boating activities. Coastal boating activities can offer an appealing yet reasonably economic attraction to the recreationist. Spokesmen for recreational interests at public hearings for proposed improvements to the GIWW, have indicated that only a survey of the boating public could provide a true representation of this important group's marine needs and desires. As a result, a survey of the actual boating public was conducted for this study to reveal the extent of recreational boating of all types in Texas coastal waters.

Data on the recreational use of the GIWW and adjacent land areas could be an aid in the planning for multiple-use of coastal public lands. Multiple use of dredge-material disposal sites is a strong recommendation of the Dredged Material Research Program of the Corps of Engineers. As the State's sponsorship of the

GIWW develops, Texas may become a major land owner along its coastline. Since the development and maintenance of these properties would be conducted with public funds, it would be mandatory to develop these properties to yield the greatest benefits, both in the interest of navigation as well as recreation.

DESCRIPTION OF SURVEY SAMPLES

There are some 500,000 recreational boats registered in the State of Texas. This study did not attempt to survey all of them because there are too many and in addition, many boat owners seldom, if ever, transport their boat long distances to the coast. This study is concerned only with those who may participate in Texas coastal boating activities and therefore was arbitrarily limited to owners who lived within a 200 mile radius of the coast. Analysis of the 1975 estimated Texas population revealed that 6.8 million people or 55.5% of the State's total population live within that boundary radius. The survey size was further reduced by selecting only 38 of the 99 counties within the 200 mile boundary for a sampling of their coastal and recreational habits. (See Figure 1.) The combined populations of these counties total about 84% of the persons residing within the two hundred mile radius of the coast.

It was assumed that by classifying boats into groups of similar size and type of recreational craft, then their reply to the survey would have the least variance. To additionally reduce the still large remaining number of registered boats (240,400), random samplings of the four boat classifications were selected to obtain a more manageable data base for the study.

The boat classes were as follows:

<u>Boat Type</u>	<u>Boat Size</u>
Powerboats	1' - 20'
Powerboats	21' and over
Sailboats	1' - 20'
Sailboats	21' and over

PRELIMINARY FINDINGS

A complete analysis of all the data acquired by the study questionnaire has not yet been performed, however, the replies to certain key questions have been analyzed and are submitted in this report as preliminary findings.

Recreational boating on Texas coastal waters is

found all along the Texas coastline, but is particularly concentrated in the Galveston Bay complex of Galveston Bay, East Galveston and West Galveston Bay. Together these three areas reportedly initiate more than 800,000 boat trips each year. A mapping of the entire Texas Gulf coast reports the figures for other Texas coastal waters (See Figure 2). It was learned from the survey that over 85% of the survey respondents reportedly make more than one trip per year. Almost 4% of the respondents estimated from 50-200 coastal trips per year.

THE IMPORTANCE OF THE GIWW

The GIWW is a vital connecting artery that most of the coastal boating traffic must use to safely navigate from one bay to another or to the Gulf. Because of the protective passage from rougher, open waters or sudden squalls, and the dredged channels of sufficient depth for deeper drafts, the GIWW is important to all sizes of boats.

A total of 1,579,164 trips was determined by this study as the reported annual recreational traffic using this channel. That figure represents over 79% of all reported boat trips on Texas coastal waters each year.

Using the previously noted boat classifications, calculations of the average miles per boat trip on the GIWW for each of four boat classes were finalized as follows:

<u>Boat Class</u>	<u>GIWW Mileage Per Trip</u>
Powerboats 1-20'	20.2 miles
Powerboats 21' and over	49.3 miles
Sailboats 1-20'	15.1 miles
Sailboats 21' and over	46.1 miles

As the recreational activity of Texas coastal areas becomes increasingly evident, the interests of the coastal participants should become more important in the considerations of the State's planning and development of its coastal areas. Continued improvements for the marine safety of recreationalists should remain an important issue. It may be assumed that with the growing volumes of marine traffic that often produce congestion, the potential for accidents increases and therefore merits the attention of the State. Upon complete analysis of the study, it is envisioned that the final report could be of significant value in determining the needs of the boating public and be used as an additional tool in developing coastal waters for recreational uses.

BOUNDARIES OF GEOGRAPHIC STRATUM FOR BOAT SURVEY

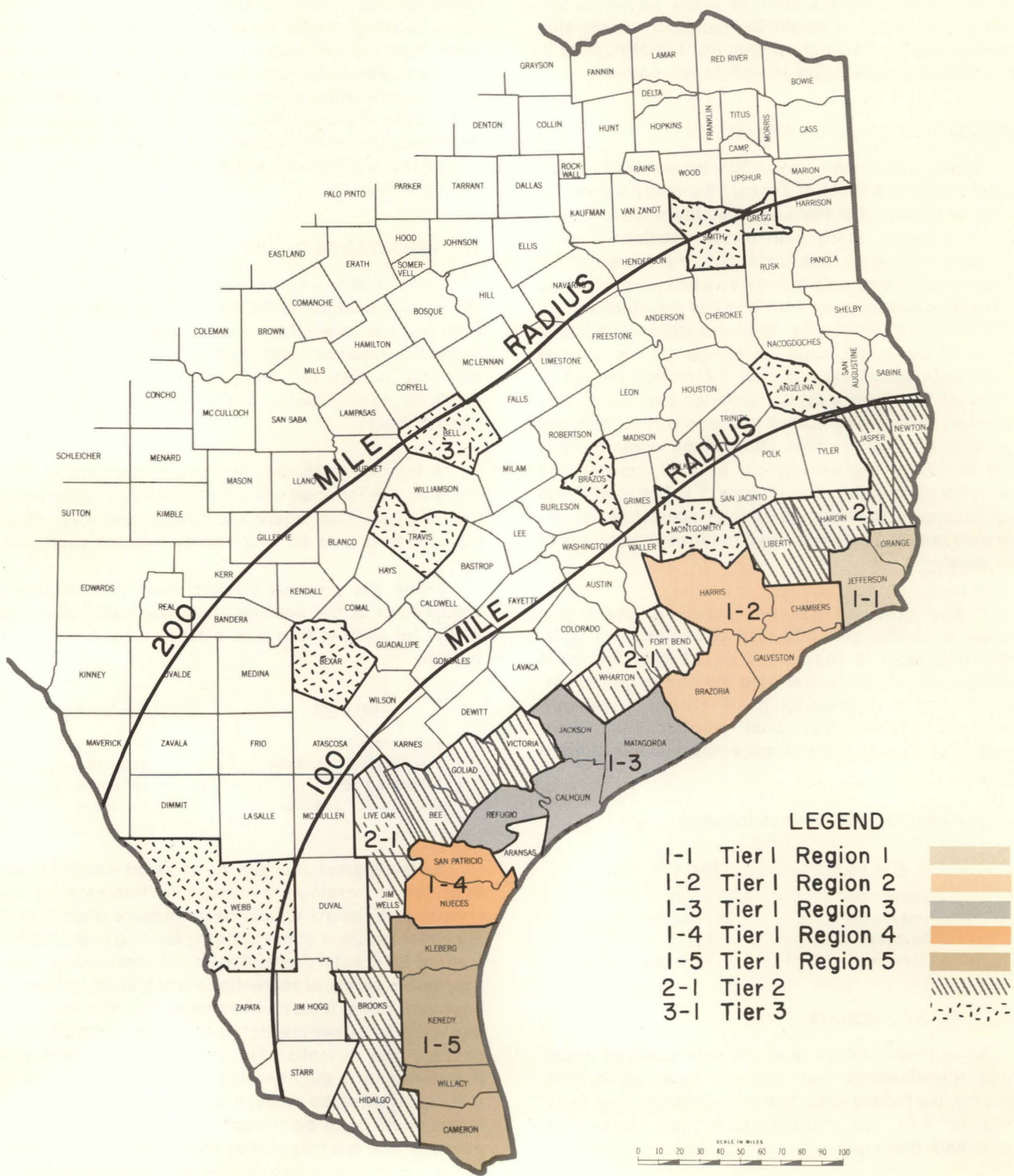
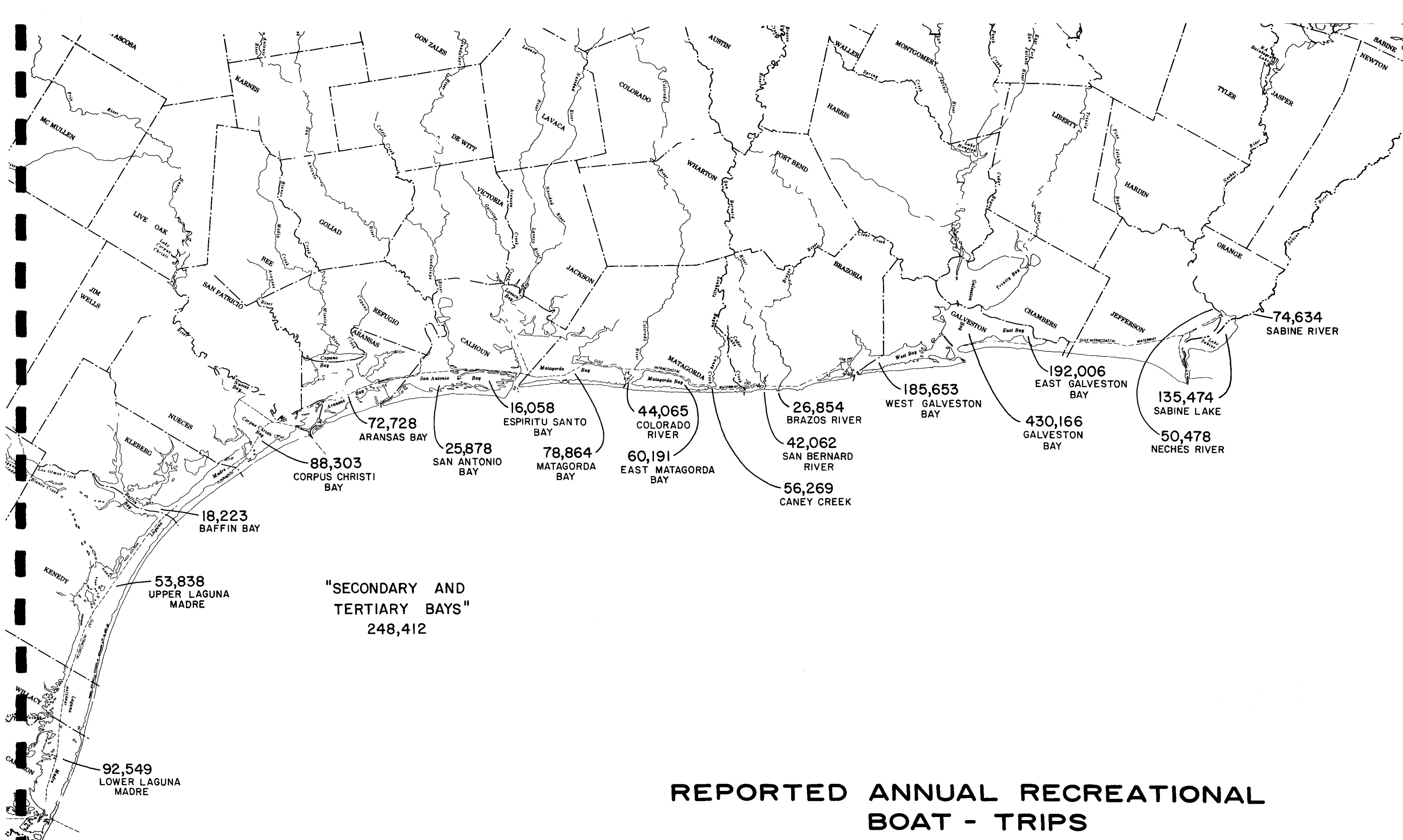


Figure 1



REPORTED ANNUAL RECREATIONAL BOAT - TRIPS

A NEW LOOK AT TEXAS' MARINE COMMERCE

Marine movement of commodity goods on the GIWW in Texas fell 10 million tons from 1972 to 1975. Those volume totals have since risen to a high of 69 million tons of goods in 1977 which was the latest year that statistics from the Waterborne Commerce of the United States were available. A new method of tabulating these tonnages is now being employed, and it is believed to more accurately reflect the flow of commodities within the waterway system. As a result trade flow patterns are more defined than before and changes in these patterns are easier to detect. The growth of these trade movement totals is an affirmation that the GIWW in Texas remains a major artery in the transportation of commodity goods.

In the 1978 report, trade movement tonnages were determined for individual segments of the waterway. In contrast, the 1980 report compares the movement of tonnages through Texas' deepwater ports and notes the fluctuation of their totals for the years 1970 and 1977. Figure 3 is a comparison of tonnage totals for shipments and receipts using Texas deepwater ports for those years. For most of the deepwater ports tonnage receipts increased proportionately much greater than the tonnage shipments.

CHANGES IN TRADE MOVEMENT PATTERNS

As reflected in Figure 3, a change in the pattern of trade movements through deep water ports had begun. In order to more easily understand the significance of these changes to the GIWW system it is necessary to plot the changes along the three recognized paths of GIWW waterway traffic: inland waterways, coastal waterways and the movements of foreign trade. Incoming tonnages are those tons of goods whose origin of shipment are out of state, whereas outgoing tonnages have origin of shipment within the state boundaries.

Inland marine movements (Figure 4) reflected a higher percentage of in-coming goods until 1973, when this pattern reversed and out-going tonnages became more dominant. As the coastal and foreign goods movements are presented it will be noted that their outgoing shipment patterns are opposite to the changes that have occurred within the inland marine movements.

Although the total volumes of coastal marine movements have fluctuated for many years, there has been a steady overall decline of total tonnages within the last fifteen years. Figure 5 shows that out-going tonnages have declined significantly enough to cause

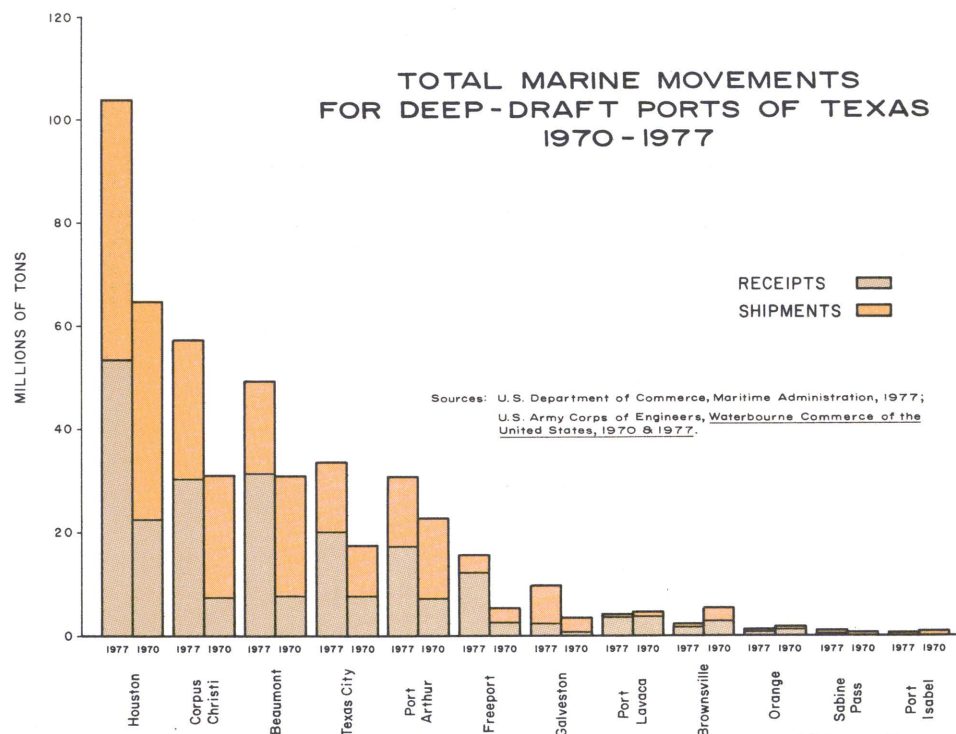
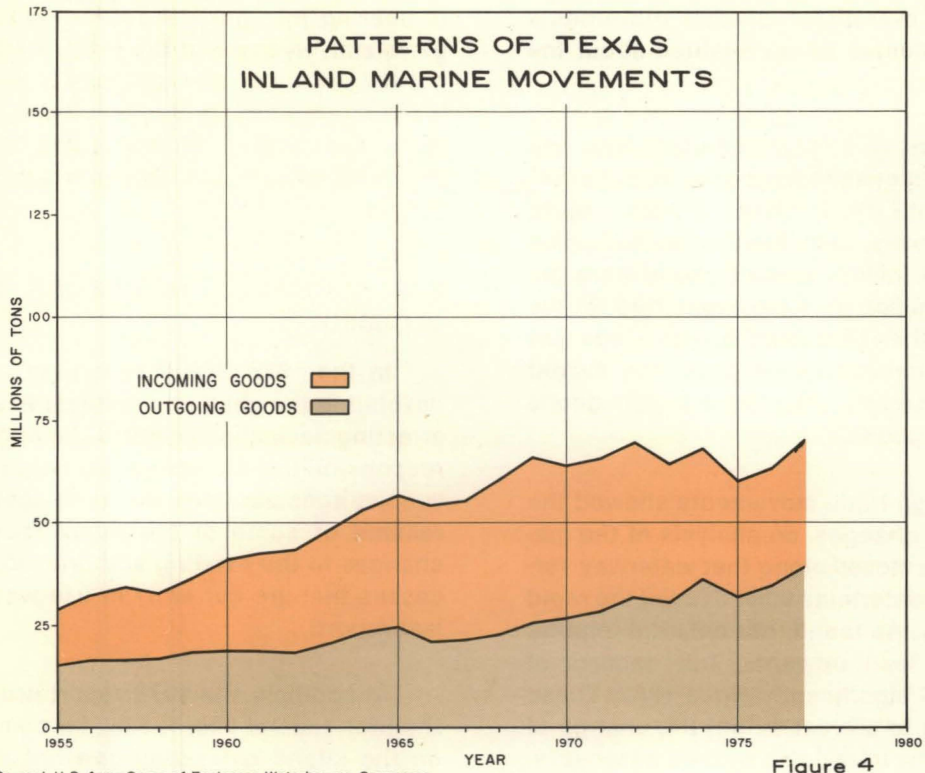
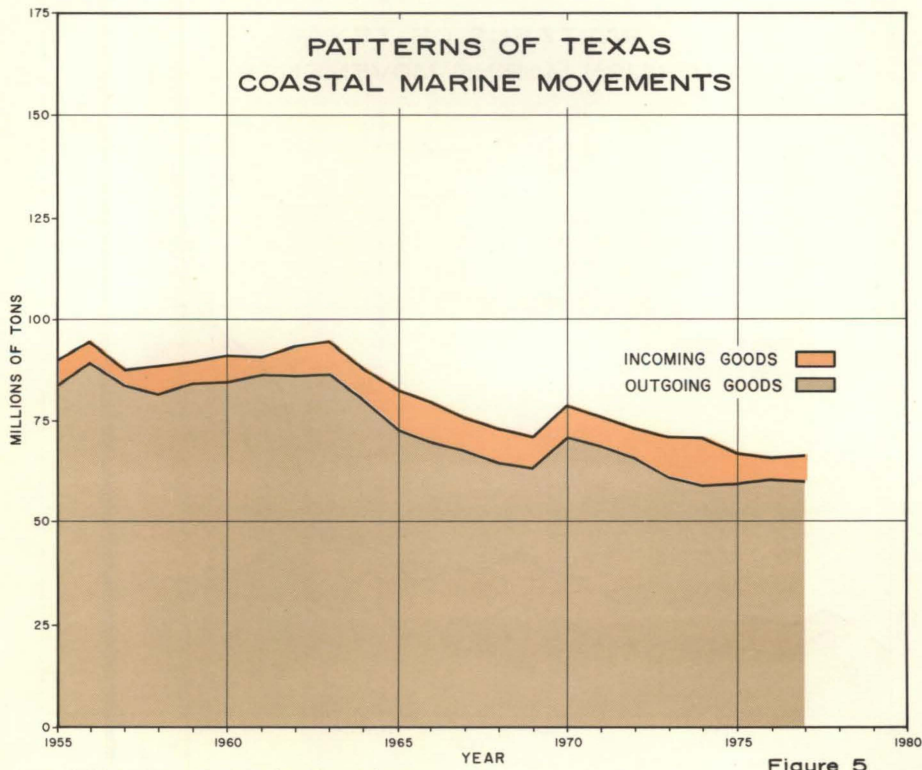


Figure 3



Source: U.S. Army Corps of Engineers, *Waterborne Commerce of the United States, 1955-1977*.

Figure 4



Source: U.S. Army Corps of Engineers, *Waterborne Commerce of the United States, 1955-1977*.

Figure 5

a diminishing effect overall for coastal movements while the incoming volumes have remained about the same.

It is the movement of foreign imports along the GIWW that is most responsible for changes in Texas' marine commerce. Until 1973, Texas exported more goods to foreign markets than were imported. (See Figure 6.) By 1974, 56 million tons of goods were imported while only 34 million tons were exported via the waterway. In 1977, for the 162 million tons of goods that were designated as foreign goods and that moved through the Texas waterway, 79% were import goods and 21% were export goods.

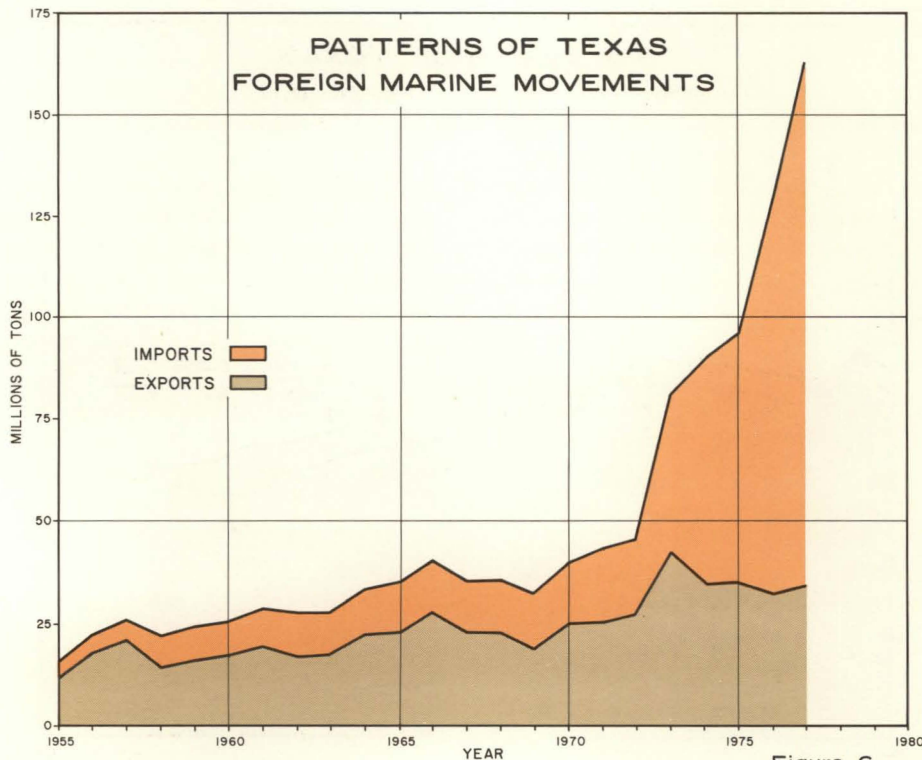
Because the foreign trade movements showed the greatest trade pattern changes, an analysis of the major commodities which moved along that waterway service was conducted to determine what caused the rapid rise of foreign imports. As found, not only did imports of foreign crude oil leap upwards, but exports of domestic crude oil fell significantly since 1966. These facts will then explain to a great extent the change of trade movements over the inland and coastal waterways. The increase in inland exports is due to the additional petroleum products of the foreign crude petroleum that

is pouring into our deepwater ports. Domestic crude petroleum was one of the major items shipped via the coastal waterway and that now is almost non-existent. It will be interesting to follow these ever changing patterns of waterway commerce and to note what effects the rising total of foreign imports has on our waterway system.

THE FUTURE OF NAVIGATION PROJECTS STILL CLOUDED

In the 1978 GIWW report, an entire chapter was devoted to the changing political environment that was affecting navigation projects. An explanation of federal responsibilities for navigation projects, and a listing of various agencies involved in navigation were given. A resume of some of the many recommendations for changes to the existing authorization and funding processes that are currently in use was also given in the last report.

In addition, the 1978 report presented a review of the first, federal user-fee tax for commercial navigation on the inland navigation network. The initial state of this tax, a four-cent tax on fuel used for commercial navigation went into effect October 1, 1980. Although



Source: U.S. Army Corps of Engineers, Waterborne Commerce of the United States, 1955-1977.

Figure 6

not considered a cost recovery measure, all revenues from the tax are required to be deposited in an open-ended navigation trust fund which shall be available for inland waterway projects.

SPONSORSHIP RESPONSIBILITIES CHALLENGED

Section 221(b) of the Flood Control Act of 1970, (Public Law 91-611) allowed that the Federal Government would not be held accountable for damages incurred from maintenance or improvements to waterways, but rather, the non-federal sponsor would be the responsible party. In addition, the U.S. Corps of Engineers issued a ruling in March, 1979, that all non-federal sponsors would henceforth be required to pay for all levees, weirs and drainage ditches required for the containment of dredged material from navigation projects.

Among the many navigation projects affected by these policies was the maintenance dredging required on the GIWW. The majority of the waterway in Texas has no sponsor other than the county which provided the original right-of-way and/or the disposal area for the original construction of the waterway. None of the local government bodies were prepared nor inclined to provide the funds or services required.

To further complicate matters, the Texas Coastal Waterway Act of 1975 declared the State of Texas to be the non-federal sponsor for the main channel of the GIWW in Texas. Because of the Corps' decision to hold the Federal Government free from damages, a direct conflict with the Texas State Constitution occurred. The credit of the State can not be pledged with regards to future damages incurred, thus no contracts can be signed thereby jeopardizing the required maintenance dredging on the waterway.

While the GIWW in Texas remained in jeopardy, other channels in Texas were also affected. As many projects were postponed due to the rising costs to the sponsor, efforts had begun to pass legislation that would force at least a three-year moratorium on enforcement of the Texas Coastal Waterway Act, 1975. Finally, the Corps of Engineers rescinded the ruling until the U.S. Congress had a chance to address the problem.

FEDERAL FUNDING JEOPARDIZED

A shortfall of funding, available to the Corps of Engineers for fiscal year 1980, occurred because of rising costs of construction and maintenance. In addition,

there appeared to be reductions forthcoming (\$100 - \$165 million) in the appropriations anticipated for the fiscal year 1981 budget of \$414 million. As a consequence, the Corps of Engineers ordered a temporary suspension of advertising of contracts, bid openings and contract awards. However, the Corps had scheduled a record-setting \$37 million for maintenance dredging and structural repairs to navigation channels in Texas. How much of this needed work would have to be postponed due to the funding shortfall is uncertain.

FEDERAL STUDIES COULD LEAD TO CHANGES

Two very important studies in regard to the future of navigation projects are currently underway. The first is a federal study of inland waterway user fees. While this study is still in progress and no preliminary results have been announced, there have been stern warnings that this study is oriented strictly from the national viewpoint, and could produce recommendations that would adversely affect local or regional transportation facilities.

The Maritime Administration has called on all states affected by inland navigation to conduct studies of the impact of navigation user-fees at their own local level so their own interests may be protected. In recognition of this calling, the State Department of Highways and Public Transportation, in cooperation with the Texas Transport Institute, on September 1, 1980, began a study of the impact of navigation user-fees upon the economy of Texas.

The second study that could have strong impact on navigation in Texas is the National Waterway Study. Directed by the Corps of Engineers, the study intends to identify and analyze alternative strategies for providing a navigation system to serve the nation's current and projected transportation needs.

This study (baseline year 1977, with a twenty-five year projection to the year 2003) has forecast an increase in demand for domestic marine shipments of 48% due to increased movements of coal, farm products and metallic ores. Most of these commodities projected for marine movement will not in fact move through domestic waterways of Texas due to geographic location of the products but rather will move by other modes of transportation. Subsequently the projected decreases in 44% of petroleum products and 13% in crude petroleum will further dim the future of Texas' domestic marine transportation.

Another blow that could be dealt to the Texas

economy as a result of this study is the waterway classification system developed in this study, using the projected operation and maintenance cost (O & M) divided by the projected ton-miles of use for the year 2003. As a result of Texas' waterway classifications, the Texas GIWW could be relegated to receiving

minimum funds for operations and maintenance, or could even be de-authorized as federal projects. It appears that the trend to neglect or downgrade navigation projects will continue in the future at the federal level, unless State and regional interests become more active and alert to protect their local interests.