oastal Zone
Information
Center

COASTAL ZONE
INFORMATION CENTER

SEP 17 1974

THIS PRINTING
COURTESY OF
SENATOR A. R. SCHWARTZ
DISTRICT 17

Texas Coastal Resources Management Program.

TRANSPORTATION IN THE COASTAL ZONE

STAL RESOURCES MANAGEMENT PROGRAM
(REPRINTS)

HE
213
.T3
D69
1970

AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

Senate Concurrent Resolution No. 38, authored by *Senator A. R. Schwartz*, and passed by the 61st Texas Legislature, directed the Interagency Natural Resources Council to undertake a comprehensive study of coastal resources. This was initiated in the Division of Planning Coordination of the Office of the Governor.

Eighteen brief studies constitute part of Phase I, which culminated in 1970.

The 62nd Legislature, further recognizing the need for continuing studies of the coastal zone, passed *Senate Concurrent Resolutions Nos. 8 and 9*, also authored by *Senator Schwartz*, which provided the Coastal Resources Management Program with further direction.

Under the broad guidance of *S.C.R. No. 38* and the specific direction of *S.C.R. No. 8* and *S.C.R. No. 9*, the Interagency Council on Natural Resources and the Environment is continuing with the development of the Coastal Resources Management Program of Texas. Phase II consists of six particular projects which have been defined and are presently underway:

. LEGAL/INSTITUTIONAL - Analyze the existing legal/institutional structure and determine an array of possible institutional arrangements to insure the proper management of Texas' coastal resources.

. BAY AND ESTUARINE MANAGEMENT - Develop a comprehensive set of scientific and technical guidelines for the multipurpose use of estuarine systems.

. WASTE MANAGEMENT - Delineate alternative ways, including costs and side effects, of reducing, eliminating, recycling, treating and disposing of liquid, solid, and gaseous by-products of society.

. ECONOMIC DEVELOPMENT - Identify the most likely growth patterns (location and intensity) in the Coastal Zone and delineate their basic requirements in terms of raw materials, energy, manpower and land.

. TRANSPORTAION - Identify present and future transportation linkages and delineate the key relationships between land use patterns and transportation corridors.

. POWER PLANT SITING - Develop realistic guidelines and identify locational factors for power plants (This effort is applicable to the entire State and not just for the Coastal Zone.).

Doyle, John P.

TRANSPORTATION IN THE COASTAL ZONE

Prepared by

The Texas Transportation Institute

Texas A&M University

John P. Doyle, Project Leader

Jack Keese, Director

HE213.T3D69 1970
#23669945

October 1970

for

COASTAL RESOURCES MANAGEMENT PROGRAM

INTERAGENCY NATURAL RESOURCES COUNCIL

DIVISION OF PLANNING COORDINATION

OFFICE OF THE GOVERNOR

CONTENTS

I. *The Problem*

Figure 1

Figure 2

II. *Major Texas Ports*

Figure 3

III. *Water Transportation*

IV. *Super-Draft Water Ports*

Figure 4

Table A

V. *Port Organization*

VI. *Railroads*

Table B

VII. *Highway Transportation*

VIII. *Air Transportation*

IX. *Pipeline Transportation*

X. *Recreational and Ecological Factors*

XI. *Mass Rapid Transit*

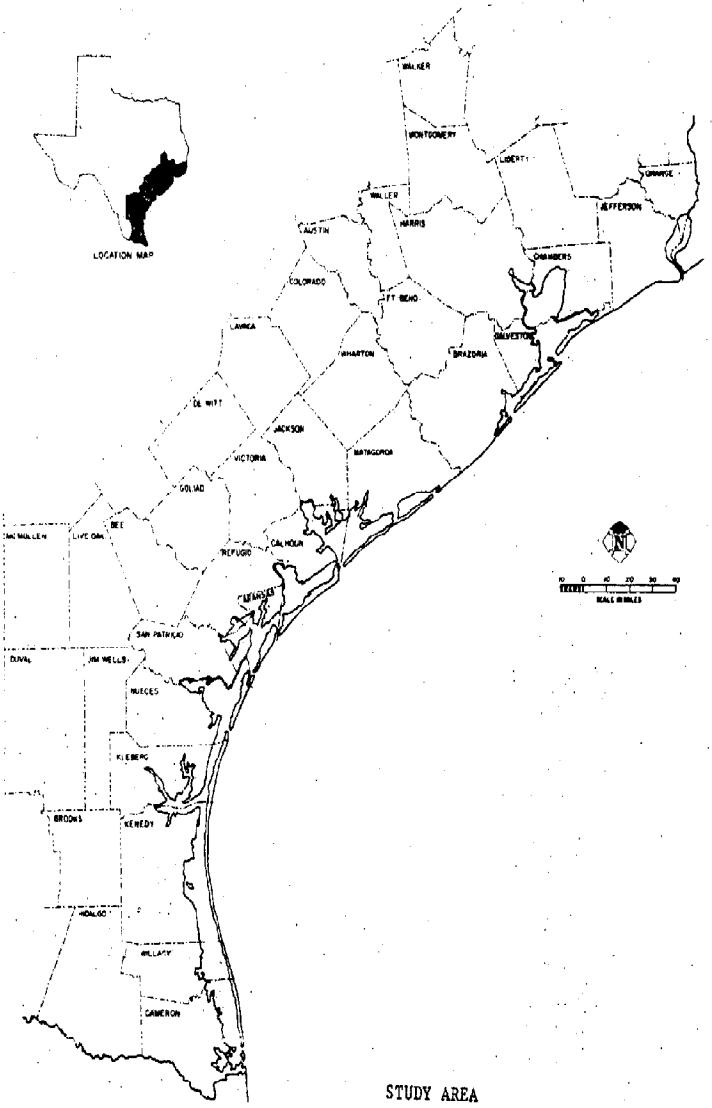
TRANSPORTATION IN THE COASTAL ZONE

I. THE PROBLEM

Texas' Coastal Zone has never been clearly defined. For the purpose of this exercixe it has been agreed that the Zone embraces all State of Texas Planning Regions which contain one or more counties bordering on the Gulf of Mexico; see Figure 1. It extends seaward 10½ miles from the coastline. These regions and their included counties, from south to north, are:

Lower Rio Grande Valley	Cameron Hidalgo	Willacy
Coastal Bend	Kenedy Brooks Kleberg Jim Wells Duval San Patricio	Refugio Bee Live Oak McMullen Nueces
Golden Cresc	Calhoun Goliad Victoria	Jackson Dewitt Lavaca
Gulf Coast	Matagorda Brazoria Wharton Fort Bend Colorado Galveston Harris	Waller Austin Chambers Liberty Montgomery Walker
South East Texas	Jefferson	Orange

It is recognized this delineation of the Coastal Zone is subject to challenge and does not agree exactly with the boundaries established by the Interagency Natural Resources Council in its 1969 Coastal Resources Plan Program Guideline. The total absence of any clearly defined topographical barrier or other distinguishing characteristic, such as marked agricultural, industrial or population changes as one proceeds inland from the Gulf, forces what may seem to be an arbitrary delineation. The area could be expanded or curtailed without greatly affecting the planning which should be done. It is strongly recommended, however, that the *integrity of Texas Planning Regions be maintained wherever practical* in order that this work be in harmony with other planning under the *"Goals for Texas"* program.



STUDY AREA

FIGURE 1

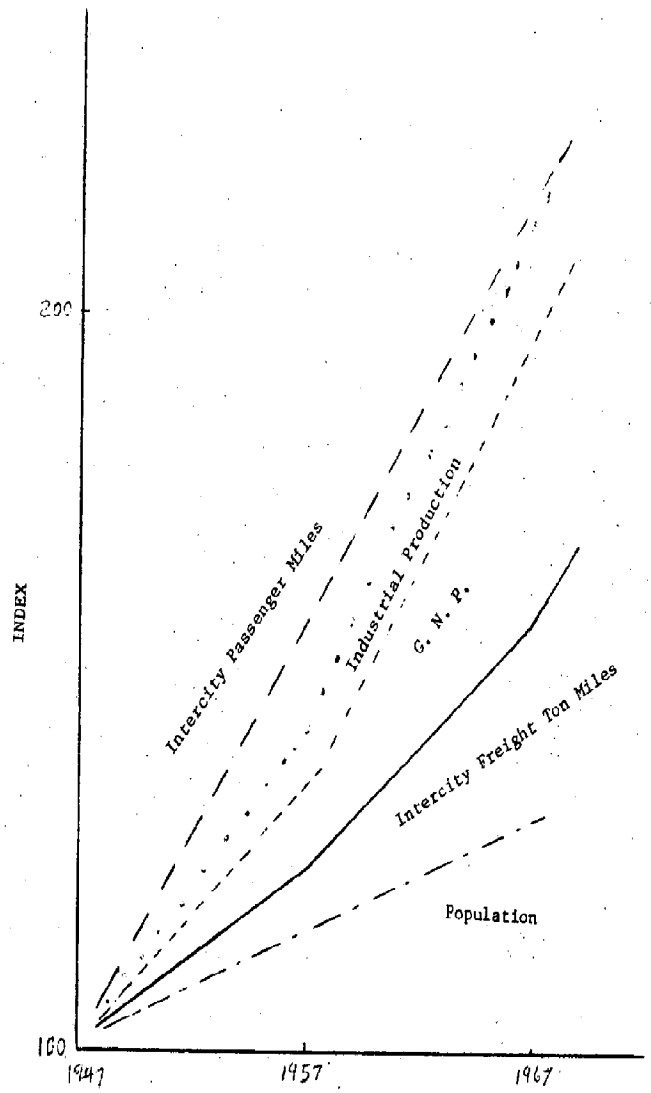
This would require adjustment of the Council guideline. It is also recognized, however, that efficient transportation planning must transcend such regional boundaries since by its very nature it does link-up regions.

The multiplicity of governmental activities within the Coastal Zone as defined above contributes to the difficulty of comprehensive planning for this area and emphasizes the essentiality of strong leadership at State level. In addition to the five planning regions, containing thirty-five counties, there are *twenty-five points at which liquid and dry commodities are interchanged between land and water transportation.* Eleven of these ports handle more than ninety percent of the total tonnage so interchanged and are in competition with each other to varying degrees. This tradition of competition at local level coupled with the heterogeneity of agricultural and industrial activity and of population densities in the Zone will require the utmost effort to develop the spirit of cooperation necessary to maximize the potential of Texas' Gulf Coast.

On the national level transportation demand grows faster than the population (Figure 2). Over a number of years expenditures for transportation in one form or another have accounted for an almost constant twenty percent of our gross national product. A high ratio of transportation expenditures is characteristic of the more highly developed nations. While no breakout of these data has been made for the Coastal Zone, there is no reason to believe the ratio differs significantly th. .in.

Projections made by the Department of Transportation indicate that the United States, in the next ten years, will have to *approximately double its present transportation capacity* if current trends continue. This does not necessarily mean doubling the physical plant, although some expansion will be required. *Better utilization of the transport complex as a whole,* with less avoidable waste of time, space and other resources resulting from better planning can provide much of the needed capacity.

Many phases of transportation have grown without the benefit of system planning. Fortunately, transportation planners have now recognized the need for tying transportation to land use and other developmental planning. This is nowhere as evident as in highway planning by the Texas Highway Department. Efforts of the Highway Department to maintain smooth flows of traffic as the people of Texas became more mobile permitted occurrence of the inevitable transition from rail to highway travel with a minimum of disrupted service. Many miles of railroad have been abandoned as they outlive their usefulness. Traffic generation centers have arisen because of income and employment opportunities, with many of these centers having *explosive rather than gradual* growth characteristics. Naturally, transportation services had to *react* to the growth of these centers *rather than plan* for them. A better understanding of the complexities of transportation by the general public as well as public officials whose actions however remotely affect transportation is essential to the success of future planning.



NATIONAL TRANSPORTATION DEMAND

FIGURE 2

Source: Transportation Institute of America

Transportation differs from all other industries in many ways. Unlike, for example, electrical power or telephone service, part of its product is subject to economic regulation (price, points served, etc.) while being in direct competition with unregulated service in the same area. Some of the operators (rail, pipe line) use private way constructed and maintained at private cost while others use publicly provided way at costs proportional to use (truck, air) and one, inland water, uses tax supported facilities at no cost whatever. Another difference often forgotten is the varying service characteristics of the several carrier modes. To many, transportation of goods is just that whereas, to the user, the difference of time in transit; loss and damage; and other service factors are often more *important than price differentials.*

Despite the personal feelings of railroad presidents, trucking executives and ship operators, *transportation is no end in itself.* While, as we shall see later, it is more than just a service, as such *it exists only to satisfy the needs of its users* - a public utility - along with electric power, telephone communication, and the rest. Unlike other public utilities, most of which are regional and local monopolies, transportation companies engage in fierce competition within modes and between modes for the larger portion of their business. The result is, with some exceptions, a low rate return on investment which translates into extreme difficulty in generating and attracting essential equity capital. This, in turn, impedes expansion and modernization. The sole exception to this generality is pipe line transportation which enjoys a unique position in the transport complex.

Many of the problems of transportation are blamed upon regulation. It has become fashionable to call for "deregulation," to claim that "free competition" is the magic button which would provide all the answers (Others often prefer to think of "re-regulation" as being the solution.). *Nothing could be more fallacious despite our national* dedication to what we choose to call "--free competition."

Rightly or wrongly, our infant nation adopted as national policy the concept that a small business is as entitled to freedom from discriminatory treatment by suppliers of goods and services as his larger competitors. Price discrimination by suppliers of transportation was the target of early regulation. Control of *maximum transportation prices* (rates and fares) resulted. It is important that this was no action of a paternalistic central government but *originated by popular demand at the State level* and in the presence of cut-throat competition between carriers. The Federal Government entered the scene only when it became apparent that fragmented economic regulation by individual states was ineffective and destructive of the best interests of our budding nation as a whole. *We invented regulation by commission as an alternative to nationalization of transportation (the railroads), then common in most other nations.* As newer modes came into general use the rail regulatory pattern was extended to them without adequate analytical thought (Hindsight).

Later on, at a time when our railroads were suffering a wave of bankruptcies and when nationalization was again being advocated, we found ourselves about to lose private enterprise rail transport on which the national economy then depended, and to a large degree, still does. We found it necessary to exercise some degree of control over the prevailing intense competition. Control of entry and *minimum rates* (price) resulted. These provisions also were carried over into regulation of other modes when, beginning in 1935, they were partially regulated.

It must be concluded that, in 1970, generalized advocacy of "deregulation" is arrant nonsense. We may change the form of economic regulation. We might even transfer the job from the regulatory agencies to some more politically responsive body, such as the Department of Justice or the Department of Transportation, *though doing so would create a whole new set of troubles.* However, until public service replaces private profit as personal and corporate motivation and the biblical Golden Rule generally prevails, we will continue to have transportation regulation in some form, by some agency of government, at both State and Federal levels. *The real task is to stop fighting windmills, study the fundamentals, decide what we want and why, then make it work.* Decision making is not the proper function of planners or analysts, who can and should, however, provide the decision makers with the factors essential to an informed decision.

II. MAJOR TEXAS PORTS

One of the major factors accounting for the dynamic growth of the Gulf Coast area in Texas has been the development of deep water ports. Of the 25 points shipping and receiving dry and liquid commodities along the Texas Coast, 11 ports annually handle more than 90 percent of the total tonnage shipped. Figure 3 gives the name of the 11 major ports in the Texas Coastal Zone and indicates the approximate relative size and location of each port.

These 11 Texas ports accounted for over *168 million short tons* of cargo shipped during 1967. With over 58.3 million tons, Houston led all other Texas ports in volume for this time period. Beaumont, Corpus Christi and Port Arthur ranked 2nd, 3rd and 4th after Houston with 31.0 million tons, 23.4 million tons and 23.1 million tons, respectively. Figure 4 shows the types of cargoes handled by the major ports in Texas during 1967.

Table A shows the general characteristics of the 11 major ports on the Texas Gulf Coast for 1967, including domestic and foreign shipments, channel depths, accommodations and other facilities available to shippers. Consistent with the total volume handled, the Port of Houston leads in all categories relating to domestic and foreign shipments.

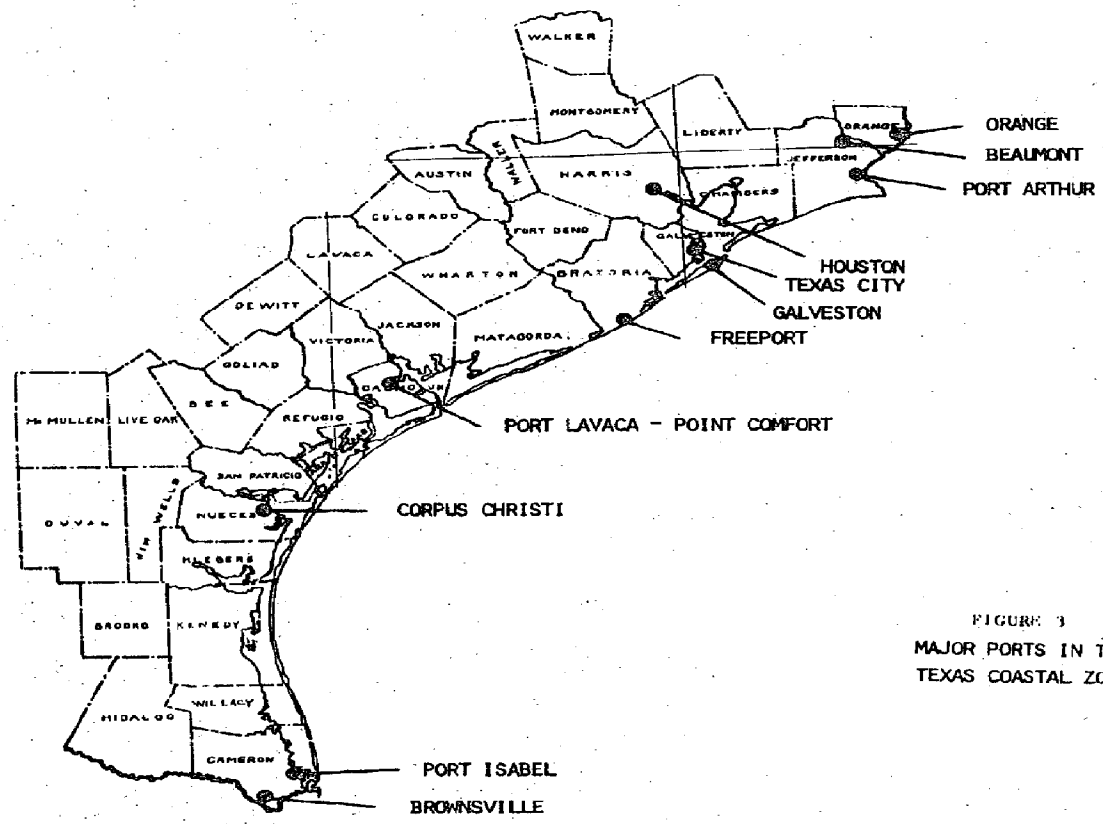


FIGURE 3
MAJOR PORTS IN THE
TEXAS COASTAL ZONE

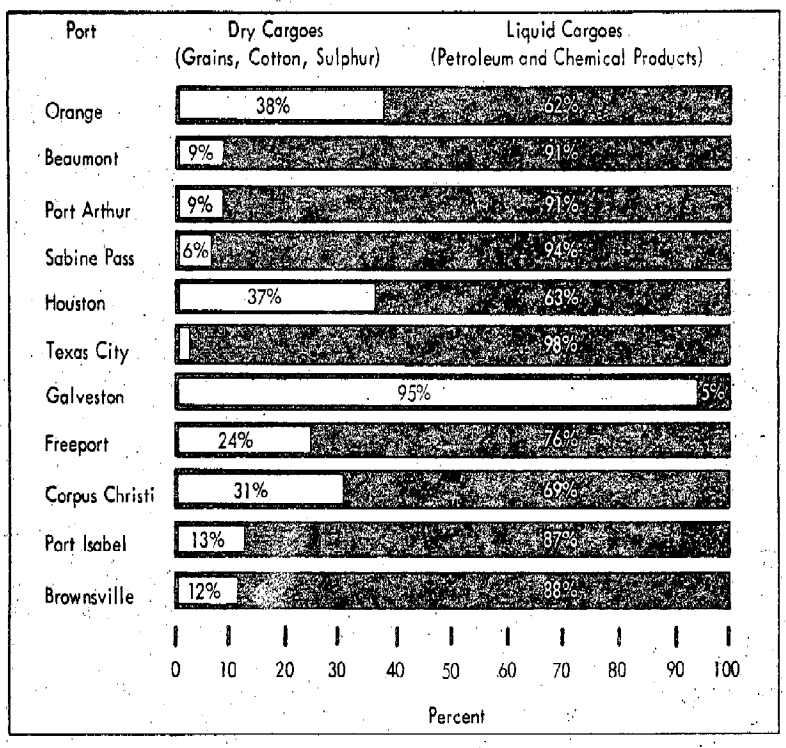
With the rapid development of superships and supertankers, those Texas ports unable to accommodate super draft vessels due to channel limitations now fear *they face an immense and crucial challenge to their economic future.* Partial solutions to these gigantic ships are available through containerization and Lighter-Aboard Ship (LASH) concepts. Full resolution of the supership problem to allow major Texas ports to maintain orderly growth patterns may only occur through the establishment of offshore terminals in deeper waters to accommodate such superships, or alternative arrangements. Specific problems of such facilities are addressed in Section IV, "Super Draft Water Ports."

III. WATER TRANSPORTATION

The comparatively recent advent of so-called superships has served to focus attention on these craft and their port facility requirements almost to the exclusion of older, more conventional shipping. *There can be no question that planning of needed facilities is a matter of extreme urgency if Texas is to retain her place in water transportation.* It must be remembered, however, that to date these ships are planned for specific commodities over specific trade routes. It must also not be forgotten that Texas' water borne traffic is presently carried in shallow draft vessels and conventional ocean shipping. In 1968, barge traffic operating on the Gulf Intracoastal Waterway handled 63.3 million short tons of freight. This is practically all domestic freight moving directly to/from origin/consignee facilities and as such it *does not* go thru port authority or private terminal facilities. Thus, most of it would never be candidate traffic for superships. Planning for water transportation in the Coastal Zone must, of necessity, start with *analysis in depth* of existing traffic flow patterns by commodity, origin, destination and volume and the application thereto of projections of change resulting not only from technological development but from such factors as user preference and identifiable changes in the commodity mix, its origins and destinations. Up until now, we've relied almost entirely upon inputs from the modes themselves, with limited guidance from organizations such as the Federal Maritime Administration, and now the time may have arrived that we should broaden and include other related considerations. A number of these factors depend on other than transportation inputs.

IV. SUPER-DRAFT WATER PORTS

As used in this section, super-draft should be understood to mean channel, docking and loading facilities capable of accommodating superships as these may develop. At present *drafts of 40-80 feet* are being considered.



TYPES OF CARGOES HANDLED BY THE
MAJOR TEXAS PORTS IN 1967

FIGURE 4

Source: Industrial Economics Research Division
Texas A&M

TABLE A

GENERAL CHARACTERISTICS OF MAJOR PORTS
ON THE TEXAS GULF COAST

	SHIPMENTS*					CHANNEL DEPTH (FEET)	ACCOMMODATIONS	
	DOMESTIC		FOREIGN				TRANSIT SHEDS (SQUARE FEET)	OPEN DOCKS (SQUARE FEET)
	RECEIPTS	SHIPMENTS	IMPORT	EXPORT	TOTAL			
Houston	9,432	35,092	3,632	10,149	58,305	40	3,532,625**	N.A.
Beaumont	8,963	18,733	48	3,257	31,001	34	349,000	235,000
Corpus Christi	3,004	14,815	3,021	2,634	23,474	40	508,000	N.A.
Port Arthur	7,971	12,729	114	2,291	23,105	36	108,000	360,000
Texas City	8,547	7,245	54	276	16,122	40	N.A.	40,000
Brownsville	313	1,989	1,900	857	5,059	38	100,000	N.A.
Port Lavaca - Point Comfort	590	934	3,090	101	4,735	36	N.A.	15,000
Freeport	1,566	1,542	91	993	4,192	36	156,720	N.A.
Galveston	316	86	200	2,064	2,666	36	4,484,952	929,100
Orange	833	576	2	143	1,554	30	285,350	41,400
Port Isabel	42	307	2	3	354	38	52,000	50,000

* In thousands of short tons - 1967
** Includes 1,616,004 square feet enclosed and 1,916,621 square feet open area
N.A. Not Available
Note: Houston has recently announced plans for major port construction in the Barbour's Cut area.
SOURCE: Respective Port Authorities directly from IERD report.

The eleven major water ports of Texas are understood to be exploring the advantages of off-shore terminals for the accommodation of superships. *While each of these ports naturally seeks to attract the supership traffic, there seems to be no present evidence that the volume will justify expenditure of public funds to provide more than one or, at most, two facilities of this nature on the Texas Gulf Coast.* On the upper Texas coast, a casual inspection of greater water depths seems to indicate that the Port of Freeport is nearest to 60-foot and greater depth in the Gulf of Mexico (approximately 6.5 miles as compared to 23 miles off Galveston and 38 miles off Sabine Pass). See Figure 5. However, distance from shore to deep water *is by no means the only sufficient* criteria to locate such facilities. In fact, in the final analysis, it may be *relatively unimportant*. Considerable additional research would seem to be in order to determine priorities, cost factors and economies of scale for the location and construction of an offshore terminal. *It would seem that our competition in this area should be with Louisiana and Alabama rather than between Texas port cities.* It has been suggested that only strong *State leadership* can avoid wasteful expenditures by premature construction not justified by predictable demand. Others believe the converse: namely that the *local entities* through the effects of their competition will provide sufficient leadership and arrive at an "optimal" solution. All possible alternatives should be thoroughly explored. It could be that comprehensive planning might indicate construction of a new port or development of a smaller existing facility favorably located in relation to the ten - fifteen fathom depth contours *vis-a-vis* more costly construction and maintenance at an existing port having wider reaches of shallow water. The solution here has not, at this time, been determined; in fact, the various groups studying the many trade-offs involved in this complex problem are still identifying parameters and relevant factors.

Present channel depths of major Texas ports reveal 40-foot channel depths available at the ports of Houston, Corpus Christi and Texas City. The ports of Galveston and Corpus Christi are in the process of developing 45-foot channels for deeper-draft ships. Noteworthy is the new proposed Barbours Cut port facility for the Houston area which is to be operating by 1972. With a channel depth of 40-feet, the Houston port authorities apparently feel such a channel depth will be sufficient to accomodate most general cargo carriers for the near future.

The concept of developing a super-draft port in a less developed region *has many interesting aspects*. For example, it could result in *population dispersion* or decentralization - an occurrence which many sociologists believe desirable; but conversely, if such an action caused *adverse economic effects* of the older areas this would be most undesirable. And, certainly not least, many *conservationists* would be upset at the idea of industrial development moving into a new area. The total benefit/cost analysis must, of course, include the costs of interfacing with land, barge and, possibly, air transport. The effect

of port location on super-ship turn-around time will be of vital importance in attracting this traffic. Because of the present inter-port competition, such rational evaluation will almost certainly have to come from some other source than the existing local port authorities, unless of course, their existing attitudes change as they realize that the Texas Gulf Coast is engaged with *all the rest of the nation in a fierce struggle* for much of the developmental enterprises which will follow the super-draft facilities. In order to successfully pluck this "national plum" an *unprecedented* amount of inter-port cooperation may be necessary; however, there is *no reason to believe* that the existing organizations will fail to meet the challenge.

V. PORT ORGANIZATION

There seems to be *little uniformity throughout America* among the organizations formed to promote and/or operate ports. They all, however, seem to have *one thing in common*--to do everything possible to increase the tonnage handled by the individual port as a means of promoting growth of the port city. Some have taxing authority without direct accountability to the electorate upon whom the tax burden falls. Some, such as the Port of New York Authority, operate or otherwise control transportation facilities not directly related to any water port function. So far as is known, none of them is charged with overall responsibility for land use compatibility with any set of comprehensive regional objectives. None is charged with relating growth ambitions to other social or economic goals. Until recently this single-minded devotion to bigness was considered acceptable or even desirable. *Today, there is considerable doubt that sheer growth is, in all cases, the proper target.* There is a rising certainty that the actions of any sizeable community cannot fail to impact other communities, some of which may, by older standards, seem quite distant from the action, under a separate local political jurisdiction, and with no readily available means of effective protest.

Embarking upon a program of Coastal Zone development, Texas may well profit in the long run by clearly defining the desired relationship of the Zone to the rest of the State and the creation of governmental machinery by which compatible development may be fostered and, if need be, insured while maintaining a *reasonable balance between individual rights and the public interest.* For example, some industries such as mining or oil and sulphur extraction must exist where nature has placed the resources. Salt water fisheries, as well as recreation, depend upon natural factors, as does agricultural production which must be suited to the soil and climate available. On the other hand, a number of activities unrelated to the Gulf have located in the coastal counties and there may be some doubt that these, in the long run, will contribute to the overall desirability of Texas as a place to work and live. To the extent such activities are

unnecessarily exposed to wind and water damage they may prove an economic liability to the State and the Nation. Note the combined implication of the attached clippings. The Chief of the National Hurricane Center told President Nixon's Disaster Preparedness Conference, "I am enormously concerned with development of high density populations right at the shore lines." (Figure 5)

Guidance of Coastal Zone development will be, in any event, *a long, slow process, depending essentially upon public acceptance and clear delineation of regional objectives.* It will not be accomplished by uncoordinated efforts of private enterprise nor by competitive strife between the cities and counties of the Zone. Meaningful State leadership is definitely needed to show the way, to encourage cooperative effort and to insure compatibility with the overall Goals for Texas. Several courses of action appear to be possible, though each most certainly will have its merits/liabilities, and thus attract a strong crowd of either followers or opponents. They include the following "possible" candidates:

One action might be for the Legislature to create a *Texas Port Commission* empowered to approve or reject all private and public port construction and modification; to act for the State in relation to Federal port and water transport programs; and further, charged with developing port objectives in relation to Coastal Zone and Texas objectives and insuring compatibility of port projects therewith. Such a Commission would provide full time specialized attention to Texas' important port activity as a valuable adjunct to and in no conflict with the overall function of the Interagency Natural Resources Council (of which it would be a member). Texas ports, collectively, would gain a voice in government which they do not now possess.

The existing port organizations might join together in some type of *organization stronger than their existing TPA.* Such a federation would have the "final say" about the expansion or modification of their own facilities when it came to major matters in which the whole region was competing with another major section of the United States. Yet on minor things, inter-port competition would still exist.

A strong *Inter-Agency Transportation Council* might be developed. Here the port organizations would join with other transportation-related groups in developing a State/regional approach. Under the influence of the unbiased non-port members, possibly a good, workable plan could be developed.

Yet another possibility - though most feel it is both infeasible and impractical - would be a *State Department of Transportation.* However, such a monster would almost certainly create more problems than it would solve.

As stated under Water Transportation, it is *important that concentration on deep water Coastal Zone ports not obscure the present and potential value of inland water ports and shallow-draft water transport.* Development of the LASH (lighter-aboard-ship) and off-shore terminal concepts will enhance the already high value of these facilities. Inland ports should be within the scope of the responsibility of whatever organization(s) that evolve.

VI. RAILROADS

It is a rather common fallacy to believe all the railroads of America are dead or dying because of the publicity attending rail passenger discontinuances and the financial troubles of some railroads. While it is true that, except for the war years, the railroad *share of intercity freight* - the bread and butter - has declined steadily from 62.3% in 1939 to 41.0% in 1969, this is only part of the story. Such *relative* decline was to have been expected as alternative transportation developed. Once this share was close to 100%. The other side of the coin is that, in *absolute ton-miles carried, the railroads have, in thirty years, gone from 339 billion ton-miles in 1939 to an all time record high of 780 billion in 1969.* It can confidently be expected that railroads will continue to play a vital role in the industrial future of the Coastal Zone although their role in *passenger transportation is most doubtful.*

The Coastal Zone is served by a comprehensive rail network (see map). The eleven major ports, accounting for the lion's share of ocean tonnage, benefit from competitive rail service as follows: (also, see Table B)

Port City	Number of Railroads (1)
Beaumont	4
Brownsville	2 (4)
Corpus Christi	3
Freeport	1
Galveston	6
Houston	6
Orange	2 (2)
Port Arthur	2

Port City	Number of Railroads (1)
Port Lavaca-Point Comfort	1
Port Isabel	1
Texas City	6 (3)

(1) Not including local belt or terminal companies.
(2) By connection with port owned railroad.
(3) By connection with terminal railroad.
(4) Plus Mexican National RR.

All of these railroads connect with the interior directly or by interchange. The most direct coastwise rail transport from Brownsville to Beaumont and intermediate points is over the trackage of two parallel railroads, Southern Pacific and Missouri Pacific.

Development of the Coastal Zone as an interface between inland points and ocean transportation will continue to depend to a large degree on the efficiency of rail transportation. *A key factor in this efficiency are the railroad yards, modernization of which require substantial capital expenditures.* Traditionally, these improvements and choice of location have been left to the private initiative of the railroads which has resulted in total overcapacity at some locations, undercapacity at others, and general failure to achieve the full potential of interchange, with minimum delay and cost incident thereto.

Any sound developmental plan for the Coastal Zone should require *treatment of the rail network as a whole*--designed to best satisfy the total zone rail transport requirements in the most efficient manner. Strategic location of modern yards, operated as joint undertakings by the using railroads and with appropriate governmental financial assistance could possibly advance the regional economy. Incident to this concept, obsolete rail terminal facilities in localities unsuited to present and projected metropolitan needs should be encouraged to relocate.

As ship capacity grows and as port facilities are developed, consideration should be given by port planners to provision of *facilities to handle unit-train movements as the land-water interface.* The economics inherent in this comparatively recent development in rail transportation of such commodities as grain should not be overlooked.

Because of anti-trust and economic considerations, strong leadership on the part of the State or other overall regional governmental authority will be required. Should Coastal Zone development entail construction of port facilities at a new location or material augmentation at old locations such leadership will be indispensable to insure coordination with land use planning.

TABLE B

RAILROADS SERVING MAJOR TEXAS PORTS

PORT	
Beaumont	Kansas City Southern; Atcheson, Topeka and Santa Fe; Missouri Pacific; and Southern Pacific.
Brownsville	Missouri Pacific; Southern Pacific; and National Railways of Mexico.
Corpus Christi	Missouri Pacific; Southern Pacific; and Texas Mexican Railway.
Freeport	Missouri Pacific.
Galveston	Atcheson, Topeka and Santa Fe; Chicago, Rock Island, and Pacific; Fort Worth and Denver; M-K-T; Missouri Pacific; and Southern Pacific.
Houston	M-K-T; Missouri Pacific; Atcheson, Topeka and Santa Fe; Southern Pacific; Fort Worth-Denver; and Rock Island Lines.
Orange	The port owns 1.6 miles of trackage to provide rail transportation to the Missouri Pacific and the Southern Pacific.
Port Arthur	Kansas City Southern and Southern Pacific.
Port Lavaca-Point Comfort	Point Comfort and Northern Railroad.
Port Isabel	No railroads serve the port at the present time.
Texas City	Texas City Terminal Railway Company has daily connections to the Atcheson, Topeka and Santa Fe; Missouri Pacific; M-K-T; Southern Pacific; Rock Island; and Fort Worth and Denver Railroads.

VII. HIGHWAY TRANSPORTATION

Highway transportation is, of course, the most visible form of transport to everyone. Because of the personal relationship between people, automobiles and highway traffic it is the first transportation mode in the minds of nearly all. Nevertheless, highway transport is but one part of what should be a balanced system designed to best satisfy the needs of all users--both as to service characteristics and as to cost.

As is true with most parts of Texas, the Coastal Zone is served by *a network of excellent highways*. With the exception of the Beaumont-Houston-Galveston triangle, however, little of this network is now constructed to Interstate standards. If development of the Coastal Zone *is* to be a matter of priority, *efforts to expedite construction of an "Interstate quality" highway from Brownsville to Houston are indicated* despite the fact that existing traffic volumes may not seem to justify the expenditures at this time. The developmental effect of better transportation is of major interest to this area.

In addition to local drayage and other unregulated motor transport the eleven major port cities are served by regulated intrastate and interstate motor common carriers as follows:

Port City	Number of Carriers
Beaumont	13
Brownsville	N.A.
Corpus Christi	7
Freeport	4
Galveston	10
Houston	34
Orange	9
Port Arthur	7
Port Lavaca - Point Comfort	3
Port Isabel	2
Texas City	2

Incident to planning for highway development, the space requirements and location of highway terminal facilities, and truck-rail, truck-water and truck-air interchange facilities for both unitized and non-unitized cargo should be provided for. The important aspect of the transportation interface should no longer be left to chance or the uncoordinated actions of individual interests.

VIII. AIR TRANSPORTATION

Interstate common carrier air transportation of both passengers and cargo originating or terminating in the Coastal Zone presently requires routing through Houston Intercontinental Airport and, usually, interchange at that point. This condition will prevail for an indefinite period. Some exploration of an air cargo center primarily oriented toward transporation of perishables, generally South and East of San Antonio, has been initiated but, to date, no proposals have been formulated.

The Texas Aeronautics Commission is engaged in long range planning for intrastate air transportation and facilities. This planning process could be a model for Coastal Zone transportation planning which, in any case, must be closely coordinated therewith. This would seem to be a factor favoring establishment of a *Texas Interagency Transportation Council* to assist the Governor in performing his statutory responsibilities for overall planning in Texas.

At some future date, coincident with material expansion of the all-cargo air carrier fleet (possibly 1980) *an air cargo center on the Houston-Galveston axis will probably be required to relieve air space congestion at Houston Intercontinental.* It is not too soon to set aside land required for such a facility. *The location should be carefully coordinated with the main routes of surface transport.*

The Texas Air Transportation Plan, now in early developmental stage, should be carefully reviewed in connection with Coastal Zone planning.

IX. PIPE LINE TRANSPORTATION

The unique operating and ownership characteristics of pipe line transportation set this mode apart from all other forms of transport, although in the movement of some commodities pipe lines are highly competitive with other forms of surface transport.

Portions of the Coastal Zone are a maze of interstate, intrastate, gathering and inter-plant pipe lines carrying petroleum products, natural gas and chemicals. *It has been said with apparent justification that there is no single public or private agency having readily available*

full knowledge of the location and activities of all Texas pipe lines. If true, this is a situation which should be speedily corrected at State level for reasons of safety as well as economics.

In addition to transportation of liquids and gasses by pipe line, other commodities are now being moved in this manner. As technology permits and demand justifies, there is every reason to expect this form of transportation to increase. Coastal Zone, and all other regional planning in Texas, should keep abreast of these changes and integrate them into the planning process.

It is a foregone conclusion that new port development and augmentation of existing facilities, on-shore or off-shore, will require adjustment of the pipe line complex which, as stated elsewhere in this commentary, must depend on comprehensive, in-depth commodity flow analysis. Once again, *uncoordinated actions by individual interests, public or private, can be expected to maximize cost and impede the attainment of overall Texas objectives.*

X. RECREATIONAL AND ECOLOGICAL FACTORS

In addition to being an important factor in Texas' economic development, the Gulf Coast is, perhaps, the major playground for all Texans and a valuable attraction for out-of-state visitors. The amount of coastal space available for this purpose and for preservation of wildlife is *steadily shrinking.* A Texas Interagency Transportation Council, such as the one mentioned under AIR TRANSPORTATION, *could be most valuable here.* It could, through proper coordination with the already existing Natural Resources Council, allow for the *compatible, complimentary development* of transportation systems and natural resources.

There are comparatively minor industrial traffic demands generated by this use. Of greatest importance, major industrial transportation centers are, to a large degree, incompatible with recreation and the preservation of natural attractions. The close relationship between ease of transportation and recreational development is too well known to require detailed comment.

Land use planning should carefully weigh the impacts of industrial development upon other objectives for this area in order to avoid costly mistakes so often committed in the past. In this case, *land-use planning and the resulting decisions should precede transportation planning.* Consideration should be given Statewide as well as local impacts, since conflicts of interest are most likely to occur in this area.

Texas Growth Patterns Told

Dr. R.L. Skrabanek, head of the new Department of Sociology and Anthropology at Texas A&M, told Extension workers Tuesday the population of Texas is increasing faster than the United States or world population.

Dr. Skrabanek spoke at the State Extension Conference being held on campus this week. He spoke as a member of a panel which tried to help the county agents better analyze their county's census data.

"The United States is growing at a more rapid rate than the world in general and Texas is increasing at an even more rapid rate," he said.

Skrabanek admitted he was one of the many who anticipated higher census counts, but said that as the results have come in, he feels the census bureau did a very good job.

He attributed the over estimates to anticipated population growth that didn't occur. "We didn't grow as much between 1960 and 1970 as we did between 1955 and 1960," he said.

"We have simply had a further decline in the birth rate," Skrabanek explained. "I don't want to overplay the word 'slowdown' because we are still growing at a very rapid rate," he added.

Skrabanek pointed out to the group of county agents that the population of Texas is very unevenly distributed. "Two out of every three counties lost population during 1960-70," he said.

"Those one third of the counties that are increasing really had to pack the people in because they make up for the other 2-3 of the counties plus they added a half million new people."

Skrabanek illustrated density by contrasting Dallas County which has 1,500 people per square mile to Loving County which has one person per four square miles.

"As a general rule, the smaller the town the more likely it is to be losing in population and the bigger the town the more likely it is to be growing," Skrabanek said.

He said that three out of four Texans live in the 23 Standard Metropolitan Statistical Areas of Texas. "Five of these areas hold over one half of the state's people," he said, "and Dallas and Houston alone hold one third of the people."

Skrabanek said he saw no increases in rural population but felt it would remain about the same. "We now have 66 counties in Texas which have more deaths than births annually," he added. He felt that this meant that the older people are being left behind when others migrate to the city.

Dr. W. Kennedy Upham of the Sociology and Anthropology department told the agents how to interpret mortality rates, fertility rates, etc. And R. L. Copeland, of the same department, explained ethnic group trends.

The convention will continue through Friday with speaches and workshops for the Extension agents.

Hurricane Danger

Chief Calls For Evacuation Route

MIAMI (AP) — Expanding populations along the warm weather coasts of the Atlantic and Gulf states could become "sitting ducks for disaster" unless escape routes are provided from tropical storms, says the chief of the National Hurricane Center.

"A hurricane in the near future could kill 20,000 or 30,000, even 50,000 people unless we have sound planning," Dr. Robert H. Simpson told President Nixon's fourth regional Disaster Preparedness Conference Tuesday.

"I am enormously concerned with development of high density populations right at the shore lines," Simpson said. "If we stack in people by hundreds of thousands and fail to provide escape routes, we will be sitting ducks for disaster one of these days."

Simpson said Dade County—Miami—is a prime example of mushrooming population and poor planning.

If a major hurricane struck south of Miami, he said, 250,000 people jammed between U.S. 1 and Biscayne Bay would have only the one highway on which to travel to shelter.

"A very high percentage of these people would be drowned or killed by flying debris," he said.

Simpson told disaster officials from 12 Southern and Southwestern states that Hurricane Celia, which ravaged Corpus Christi, Tex., Aug. 3, was "a meteorological enigma which will give forecasters and building engineers something to think about for years."

The highest gust registered by the Weather Bureau hit 161 miles per hour, Simpson said. "But who can say how high they actually were? They might have been 40 per cent higher."

Simpson said it was the first time on record that the major damage from a hurricane was done by gusts rather than sustained winds.

"Building engineers have told us through the years that they design for sustained winds and do not bother about gust loads," Simpson said.

"We can measure these sustained winds but there is no known means of predicting gust speeds. This calls for new thinking in meteorology and ... designing of our building structures," he said.

CALL
CLASSIFIED
822-2707

COUNTRY KITCHEN
Closed for Vacation
WILL RE-OPEN
TUESDAY AUG. 25th

*XI. MASS RAPID TRANSIT**

The mechanics of moving a large number of people speedily and in relative comfort presents a major problem in and around any major urban area. Conflicts arise from the unbalanced distribution of demand over time, arising from the AM and PM "rush" hours. This creates many problems including delays, frustrations, accidents, and injuries, and provides headaches for both the urban trip-maker and the urban transportation administrator. There appears to be four alternative ways to alleviate the problem:

Rescheduling of some trip-makers

Rerouting of some trip-makers

Increasing the size (capacity) of the facilities

Increasing the movement capability by providing for larger passenger loads per vehicle

Each of these has its pros and cons. Unfortunately, polarization has developed between proponents of the two major alternate means: "rail transit" vs "highway transit." Each, of course, has both its merits and its limitations. However, while rail transit has its place in certain highly congested areas with population densities *in excess of 20,000 persons per square mile*, it most certainly is NOT the answer to all - or even most - of our present problems.

"Rubber-tired" or highway-based mass transit systems present a different picture, for a variety of reasons.

> The maximum population density in Texas is 3,528 persons per square mile and this occurs *only* in one very small area. For the major Texas cities, this maximum density is on the order of less than 2,800 persons per square mile. Also, *national trends even in the urban areas indicate a strong move toward dispersion rather than concentration.* (While the final result remains to be seen, there is considerable speculation that San Francisco's BART will not be able to support itself by bringing commuters from the relatively settled suburban communities.)
>
> The highway-oriented system can respond to *rapid relocations of demand generation/attraction centers.* In

---

**Taken in part from* *A System to Facilitate Bus Rapid Transit on Urban Freeways* *by Texas Transportation Institute, 1968.*

our rapidly changing country this should be a paramount consideration. (New York City provides an excellent example how shift in demand causes the abandonment of rail systems. At one time rails connected Harlem with the textile/garment district; then as that industry moved south, the area needed stevedores which came from a different section of the city. These rail-oriented facilities have since been abandoned and removed since they could not respond to changes.)

The costs of such systems are much less, since in most cases *existing freeways would form the backbone of such rubber-tired transit systems.* Also, they provide valuable transportation linkages in non-peaking hours - and who wants to wait two hours for a train at 1:30 A. M.!

Our existing and proposed network of excellent highways, freeways, and other roadways, is capable of handling our present and projected surface passenger loads. On the other hand, anyone who commutes daily through the freeway rush-hour can't help but wonder that if, for the particular problem of going to work, *a better mousetrap is possible.* Also, he may be inclined to ponder the massive amount of natural resources being expended by all the 5-passenger automobiles - each with one occupant - that sit motionless on the 4-lane concrete path below him; he may even begin to think about the cost of his 2nd or 3rd car.

If any type of mass rapid transit system is to succeed, it must attract and capture this individual. For it to do so, it must *equal or excel* the automobile in the following ways:

Convenience,

Comfort,

Cost,

Speed, and

Security.

Only if a system meets these criteria will it gain public acceptance. (The present shuttle-bus system at the University of Texas at Austin campus is a perfect example of a mass system *providing an alternative more palatable than driving* in a very specific situation.) At present, and well into the future, the only possible solution, if we are to consider the mass transit alternative, appears to be the rubber-tired, highway-oriented version. Such a system, utilizine existing structures and maintaining a maximum degree of flexibility, might relieve the congestion in the most urbanized areas. These routes must exist for the movement of goods and services *even if there was no passenger demand.* In speaking of mass transit systems, people often forget that the streets and roads must exist for the local movement of non-human

cargo anyway. However, for the present, the automobile is far and away the best solution to existing problems. Before any rash decisions are made, much more consideration of the alternatives will be needed. This is only one part of the total transportation system for the Gulf Coast and it should be considered in any planning efforts.

STUDIES COMPLETED BY THE COASTAL RESOURCES MANAGEMENT PROGRAM INCLUDE:

Marine Affairs in Texas: A Higher Education Report

Agriculture in the Coastal Zone

Notes on the Texas Gulf Coast as a Tourism-Recreation Region

Minerals and Mining

Interagency Relations Affecting the Coastal Zone

Historical and Cultural Features

The Climate and Physiography of the Texas Coastal Zone

Financial Institutions in the Coastal Zone

The Status of Public Health in the Texas Coastal Zone

Inventory of Waste Sources in the Coastal Zone

Land-Use Patterns in the Texas Coastal Zone

Electric Power in the Coastal Zone

Land Ownership Patterns

Oceanographic Report for Coastal Zone Study

The Wildlife Resources of Coastal Texas

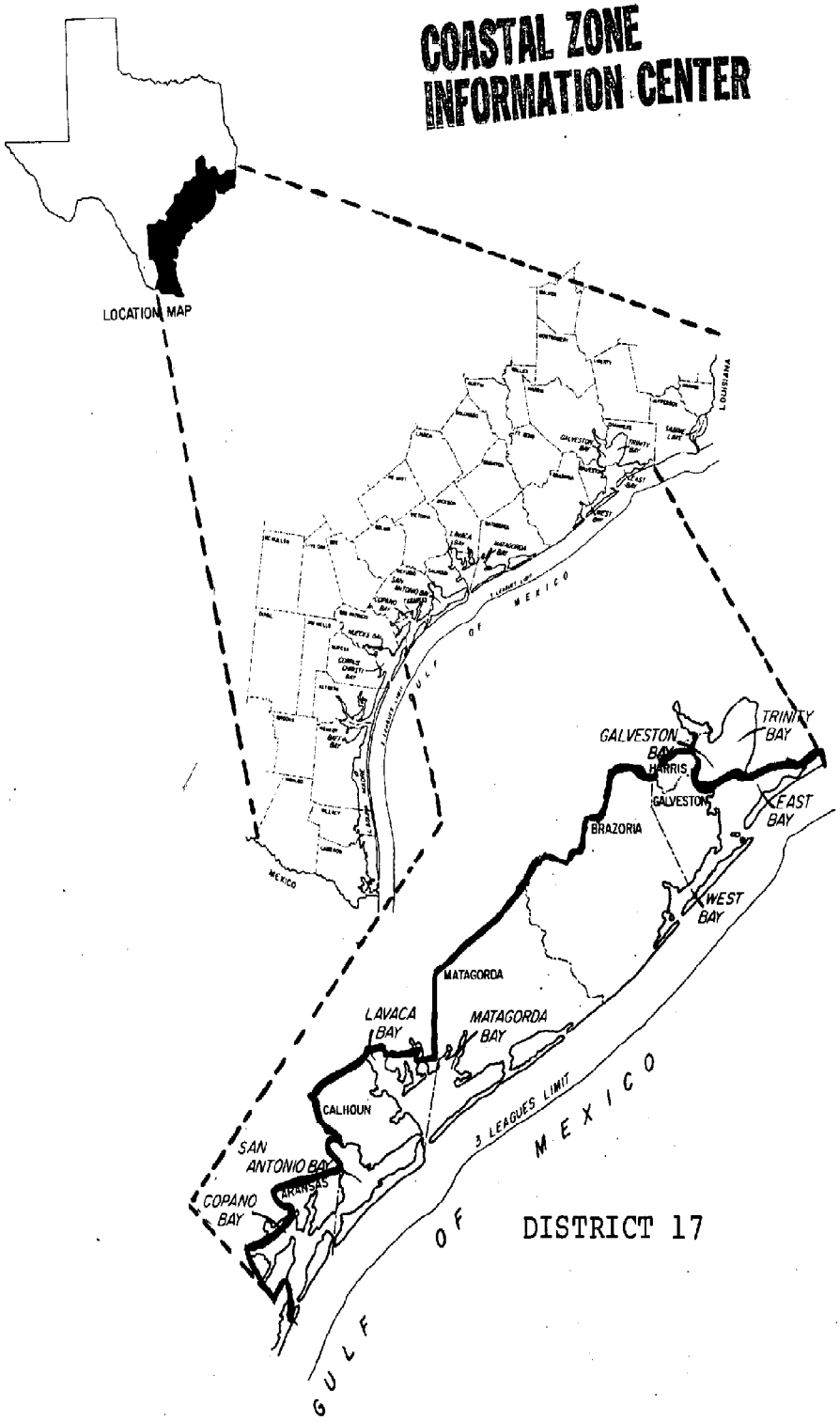
Transportation in the Coastal Zone

A Water Inventory of the Texas Coastal Zone

Special Reports

ABOVE STUDIES ARE AVAILABLE THROUGH: Coastal Resources Management Program
Division of Planning Coordination
Office of the Governor
Austin, Texas 78711

COASTAL ZONE
INFORMATION CENTER



DISTRICT 17

NOAA COASTAL SERVICES CENTER LIBRARY
3 6668 14109 8089